# BREEAM-NL 2010

## LABEL FOR SUSTAINABLE REAL ESTATE

Assessor manual new buildings

Version 1.11, March 2010

Dutch Green Building Council

breeam nl

A member of the BREEAM family of codes for sustainable buildings

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**Version 1.11, March 2010**

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**Changes**
All changes of all the versions will be published on www.breeam.nl.

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## The Dutch Green Building Council

The Dutch Green Building Council (DGBC) is an independent organization that has developed a sustainability label for new Dutch buildings. For areas and buildings are used for the labels still in development. DGBC is a foundation that certificates issued to clients that the degree of sustainability of their building or area have them assessed according to predetermined criteria. More information about the Dutch Green Building Council itself can also be found on the website www.dgbc.nl

This manual contains all information about the Dutch version of BREEAM for new building, called BREEAM-NL. You can specify any additions and suggestions on the talk pages on Wikipedia DGBC (http://www.wiki.dgbc.nl, second-placed dialogue ('overleg') tab).

The DGBC is supported by a large number of organizations who all have ambition and the sustainability objectives of the DGBC subscribe. These are active participants in the development and continuous improvement involved. On www.dgbc.nl more information about the participant shelf.

## BREEAM

BREEAM is an instrument for assessing the sustainability of buildings. BREEAM was developed by the Center for Sustainable Construction, BRE part of the British. BREEAM stands for Building Research Establishment Environmental Assessment Method. BREEAM-NL is developed and managed by DGBC licensed by BRE Global Ltd (UK), where the use and development direction will be overseen by an independent board and a Central Advisory Group (similar to the Dutch National Board of Experts), where a broad cross-section of stakeholders from the construction industry are represented.

## Imprint

A large number of people were involved in translating BREEAM to the Dutch situation. First there is the Advisory Group. They give advice to the Board DGBC when it comes to substantive decisions. This is similar to a National Board of Experts. All credits and parts of the label by the Advisory Group reviewed and approved by the board.

There are several consultants who were content to have supported the translation and the development of version 1.0. By the letter of credit acts of version 1.0, the following persons involved:

| | |
|---|---|
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| Glaudemans, Ing. L. G. | Search B.V. |
| Kooken, J.E. | Search B.V. |
| Anink, Ir. D.A.F. | W/E Adviseurs |

In addition, many thanks to BRE Global who have made the adaptation of BREEAM possible and of course all the persons and participants by means of the focus groups, pilots and otherwise feedback and recommendations provided in this version of the credit texts processed.
Also you can input (continue to) work through www.wiki.dgbc.nl because this manual is largely created through an open source approach, using knowledge and expertise from the market.

## General information

There are increasly higher demands for sustainability of buildings. In the Netherlands, requirements for sustainable buildings were not harmonized until recently. By implementing the BREEAM-system is a good assessment framework available. BREEAM-NL is based on the BREEAM-International system.

The following exemption has been made towards BREEAM International:
1. International BREEAM assessors only knows where in the Netherlands distinguishes between experts and assessors.

- The expert is a qualified process manager and content expert regarding BREEAM-NL and has therefore trained. The expert supports the developer / client during the design and construction process with regard to the requirements of the BREEAM-NL certificate. Also, the expert in this way to work for the assessor in building a dossier of evidence. Based on this case is an independent assessor final BREEAM-NL assessment.
  The expert must work with the developer / client or hired as an external expert.
- The assessor is an independent, qualified and DGBC registered assessor regarding BREEAM-NL, working for a licensee Organization ( "Licensed Organization"). The Assessor may be supported by an expert in gathering evidence, but shall at all times responsible for the assessment on which DGBC determines whether a certificate can be granted.

BREEAM-NL version 1.0 is in consultation with interested groups established in September 2009, submitted to the Advisory Group of the Dutch Green Building Council (DGBC) and adopted by the Board of the Dutch Green Building Council (DGBC).

Users of this manual are expected to be aware of the contents of the **BREEAM-NL Operations Manual**, in which details are given of the methods, responsibilities and powers, method of submission of assessment reports, version numbering, registration, etc. In the case of discrepancies in procedures the Operations Manual overrules this technical manual. The Operations Manual available to view and download on the DGBC site.

**Intellectual Property**
This manual, the Operations Manual and relating material on the DGBC websites are published and made available for download, may freely be used but is intellectual property of BRE Global. This material may not be used in a misleading context or for commercial purposes. If the material is made available to others, then the source is required.

## Table of contents

# 1. Introduction

## 1.1. What is BREEAM?

BREEAM (Building Research Establishment's Environmental Assessment Method) is the world's leading and most widely used environmental assessment method for buildings, with over 115,000 buildings certified and nearly 700,000 registered. It sets the standard for best practice in sustainable design and has become the de facto measure used to describe a building's environmental performance. Credits are awarded in ten categories according to performance. These credits are then added together to produce a single overall score on a scale of Pass, Good, Very Good, Excellent and Outstanding. The operation of BREEAM is overseen by an independent Sustainability Board, representing a wide cross-section of construction industry stakeholders.

**Aims of BREEAM:**

- To mitigate the impacts of buildings on the environment
- To enable buildings to be recognised according to their environmental benefits
- To provide a credible, environmental label for buildings
- To stimulate demand for sustainable buildings

**Objectives of BREEAM:**

- To provide market recognition to low environmental impact buildings
- To ensure best environmental practice is incorporated in buildings
- To set criteria and standards surpassing those required by regulations and challenge the market to provide innovative solutions that minimise the environmental impact of buildings
- To raise the awareness of owners, occupants, designers and operators of the benefits of buildings with a reduced impact on the environment
- To allow organisations to demonstrate progress towards corporate environmental objectives

## 1.2. BREEAM Credibility

**Technical Credibility**

BREEAM is tried and tested, both in terms of its robust technical standards and its commercial delivery, and expert advice (based on scientific evidence) continues to inform almost every issue in BREEAM. In the UK there are over 115,000 buildings certified and over 700,000 homes and buildings currently registered for assessment. BREEAM can be used to assess any building type anywhere in the world.

**Robust Technical Standards**

BREEAM has always used objective criteria to recognise good environmental performance:

- Issues for assessment are agreed to be significant, and offer worthwhile reductions in environmental impact
- Issues must be assessable at the relevant stage in the building's life
- Performance levels are based on scientific evidence wherever possible
- Performance levels must exceed demands of law and regulations and encourage innovation
- Improvements encouraged by BREEAM are achievable and cost effective

Where specific targets cannot be set using hard science or research, sensible practical measures are recommended to minimise environmental impact or enhance the environment of the building and its users.

**Commercial Credibility**
Assessments are undertaken by organisations and individuals trained by DGBC under license of BRE Global. This ensures:
• Competition in the market for assessment services
• Engagement with the whole of the industry
• Assessors work to the same quality standards (monitored by DGBC)
• Certification is carried out by DGBC under license of BRE Global

BRE Global has gained UKAS (United Kingdom Accreditation Service) accreditation for all its BREEAM schemes. This means that the management of BREEAM is monitored and overseen by UKAS.

## *1.3. Summary of topics in the BREEAM-NL manual*

The assessment of a building (plus plot) is based on a so-called credit list. DGBC made a translation based on the BREEAM Europe 2008 Credit list. The Dutch Credit List focuses on Dutch legislation, practice guidelines and building practice.

The points to be allocated may vary by type of building (retail, school, office). The applicant must indicate in his registration for each part of the building which building type is applicable.

Version 1.0 and subsequent major changes in the credit list are approved by the Advisory Group of DGBC and BRE Global and is available on www.breeam.nl.

A BREEAM standard covers issues in categories of sustainability as follows:
• Management
• Health & Well Being
• Energy
• Transportation
• Water
• Materials
• Waste
• Land Use and Ecology
• Pollution

Each category is detailed in this technical manual and consists of a number of issues (summarized below). Each issue seeks to Mitigating the impact of a new or refurbished building on the environment by defining a target performance and assessment criteria that must be met to confirm the target has been achieved. Where a performance target has been achieved the number of available BREEAM credits can be awarded.

The sustainability objectives rise above the statutory minimum as laid down in the Building Decree or other laws and regulations. BREEAM-NL certification therefore goes beyond legal requirements and is a voluntary choice of the building owner / client. The objectives are based on current practice guidelines (best practices).

Most credits have a certain freedom of choice, which means that development and construction teams can choose themselves which credits they wish to obtain points and thus build up a total score. For a number of items a minimum standard is applicable, that must be achieved in order to obtain a total score. These are mandatory credits, see § 3.3.

If all subjects within a category are assessed, then a score category can be determined, to which an environmental weighting is applied (see below).
The weighted category scores are totaled and lead to an overall score, which may have additional scores if innovation credits have been awarded. This total score eventually leads to a BREEAM-NL rating.

The assessments of buildings result in a final report and a BREEAM-NL certificate, in which the environmental performance of the building are listed against the issues from the standards framework.

# 2. Scope

This chapter looks at the scope, the scope of the Technical Manual, and the building typologies.

## *2.1. Subject of assessment*

This Technical Manual (BRL) was designed to assess properties under BREEAM-NL. After positive results from the assessment, a BREEAM-NL certificate is issued showing the appropriate ratings of the project. Upon registering the project to be assessed it is determined against which version the object is to be assessed. The version against which the assessment has been made will be shown on the BREEAM-NL certificate. BREEAM-NL issued certificates for completed assessments are a snapshot and have in principle an unlimited validity. This does not apply to temporary certificates for the BREEAM-NL Design Phase upon completion of the actual building.

All BREEAM assessments in the Netherlands should be conducted against the BREEAM-NL Technical Manual; not with e.g. BREEAM International or BREEAM Europe. This agreement was made between DGBC and BRE Gobal.
If a building does not fall under the scope of this Technical Manual, then a custom process may be started, known as 'BREEAM bespoke'. DGBC must be contacted for this, and DGBC will consult with BRE Global.

## *2.2. Building Definition*

The building is integrally assessed on the following elements:

1. Architectural elements (between floors, walls, roof, windows, supporting structure);
2. Installations (lighting, heating, cooling, ventilation);
3. Finish (inside walls, floor finishes, etc.);
4. The plot of which the building forms a part.

## *2.3. Project stages - Design & Post-construction stage*

For the following stages in the development and construction process of buildings, a BREEAM-NL assessment of building (plus plot) can be made:

- Design stage: leads to a preliminary BREEAM-NL certificate
- Post-construction stage: leads to a final BREEAM-NL certificate

**Design stage: Interim Certificate**
The requirements in the design stage represent the sustainability performance of the building before starting work on the site. The assessment at this stage does therefore not represent the final BREEAM-NL assessment of the building once completed or in operation.

In order to do a formal BREEAM-NL assessment in the design phase, the design must have been advanced such that sufficient evidence is present for a proper assessment. The design assessment should therefore be executed in the final design stage and could thus possibly be registered simultaneously with applying for the building permit. But DGBC does emphasize that BREEAM-NL should be considered in the earliest possible stages to maximise the benefit.

The temporary certificate expires as soon as the actual building has been assessed and has received final certification. The temporary certificate could be used by the owner / developer for communications to investors, tenants, license – issuers, end-users and financial institutions. There is validity to the temporary certificate, however the certificate can not be used to assume final performance in the post construction stage. However, the design / construction team should aware that requirements over time will be stricter and that as more time evolves between design and delivery fase, it will be less certain that the same score will be achieved after completion.

**Post construction stage: final certificate**

The final assessment relates to the sustainability performance of the building after completion as it will be used, so after the construction work has essentially been completed. An assessment of issues that can only be assessed during construction, must be documented by the expert after which a final inspection will be performed by the assessor. This concerns mainly credits under the "Management" category. The assessment of the remaining credits will be executed after completion of construction and before commissioning of the building. The assessor can check these credits on site during the construction phase.

The assessment in the delivery phase can be performed in 2 ways:

1. An assessment based on completion of a design phase assessment
2. An full assessment of the delivery phase

Ad. 1. In a delivery phase assessment of a building, for which in the design phase a temporary BREEAM-NL certificate was issued, it will be confirmed whether the building has actually been realized according to the design. Any deviations need to be evidenced. The final assessment is -logically- for the completed building.
Ad.2. If no design phase assessment has been undertaken, a full delivery-phase assessment needs to be carried out. In both cases, both the evidence necessary for a design assessment and a delivery assessment needs to be verified.

A post construction stage assessment takes place based on the BREEAM-NL credit list current at the time of project registration. The post constrauction stage assessment provides the final BREEAM-NL certificate, through which the developer / owner has the full right to use the BREEAM-NL logo and brand name for the corresponding object. Where in the case of a design stage certificate it aways has to be clarified that it is only a *design stage* certificate.

## *2.4. Project types that can be assessed using BREEAM-NL*

Building assessments with BREEAM NL can only be executed for the following types of building projects:

- New build
- Large-scale renovation of existing buildings
- New extensions to an existing building

Thus existing buildings do not fall under this scheme. There is a separate method (BREEAM Existing Building) being developed.

**Large-scale renovation of existing buildings**
Large-scale renovation including change to the building envelope (walls, floor, roof, windows, doors) and the installations (lighting, heating, cooling, ventilation) with the aim of building life extension.

**Small-scale renovation**
BREEAM-NL is not designed for small-scale renovations of existing buildings to be assessed, i.e. renovations that do not lead to a change in the thermal shell and installations or use of the function of the building.

**New build extension to an existing building**
Assessment of a new extension to an existing building, possibly in combination with renovation of the existing building. If the new extension is being assessed separately, in cases where the new extension uses installations or facilities in the existing building, it is necessary to include these in the assessment. In the additional information on the credit criteria guidelines are given.

## *2.5. Awarding a score for Shell only*

A special situation will arise in practice, whereby developers / builders build Shell buildings whereby future tenants / users apply the finish / fit-out. The developer / builder can therefore not influence the fit-out. A BREEAM-NL assessment however includes both the shell and the fit-out. In the final assessment of a building therefore fit-out elements can not be omitted. It is possible to have the scores for both shell and fit-out separately shown on the certificate. The score for the fit-out is called the PFFO-score, which stands for Potentially Fully Fitted Out.

In shell buildings it is not possible in the design phase to assess the finishing elements for which choices will have to be made by future tenants / users, who at the time of the assessment are not yet known. For the assessment of Shell buildings the following methods therefore apply:

**Maximum potential fully fitted out score (PFFO) of shell only buildings in a design phase assessment**
If a BREEAM-NL item can not be assessed because of the nature of the Shell building, for this item the maximum potential fit-out score can be applied. The temporary certificate for the design phase then gives the "maximum potential" BREEAM-NL score. This maximum potential score includes the score of the actual shell design plus the maximum possible score for the finishing elements that can not yet be assessed. The final score for these elements can only be definitively established upon commissioning. The aim of this approach is to allow the developer / builder to communicate to interested parties (tenants, investors, governments) the maximum achievable BREEAM-NL score after finishing the shell. The maximum possible score does not guarantee that this score will actually be realized. If the assessor for the specific building finds the awarding of a fit-out credit after completion unrealistic then the related credit can not be included in the maximum potential fit-out score.

Upon registration the assessor should indicate that the maximum possible fit-out score should be included on the temporary BREEAM-NL certificate.

**Possible Potentially Fully Fitted Out credits:**

These are the credits in case of a Shell delivery no points are awarded, but which in a note on the certificate can be mentioned. The possible fit-out credits are the following:

| Potentially Possible Fully Fitted Out credits | |
|---|---|
| Man 1 – Commissioning | Tra 8 - Supplies and maneuvering |
| Man 4 - User Manual | |
| | Wat 1 - Water useage |
| Hea 1 - Daylight | Wat 2 - Water Meter |
| Hea 2 – View-out | Wat 4 - Self-closing water supply |
| Hea 3 - Inhibiting light pollution | Wat 5 - Water Recycling |
| Hea 4 - High-frequency lighting | |
| Hea 5 - Internal and external lighting levels | Pol 1 GWP of refrigerants for air conditioning |
| Hea 6 - Light control | Pol 2 Prevention of leakage of refrigerants |
| Hea 9 - Volatile organic compounds | Pol 3 GWP of refrigerants for food cooling |
| Hea 10 - Thermal Comfort | Pol 4 Space related NOx emissions |
| Hea 11 - Temperature | Pol 7 Minimize light pollution |
| Hea 13 - acoustics | Pol 8 Noise |
| | |
| Ene 1 - Energy Efficiency | |
| Ene 2 - Sub-metering energy consumption | |
| Ene 4 - Energy saving outdoor lights | |

**For example:**

Your final score is GOOD. This final score will be shown on the certificate. To this will be added the note that *if* the prospective tenant (s) meet the requirements for PFFO credits, the maximum possible final score is e.g. VERY GOOD.

The assessor should check whether the PFFO credits where justified by establishing e.g. that it has indeed not been possible to adhere to the criteria at Shell delivery, because the tenant was not yet known.

**Shell score in design phase**

It is also possible to assess the Shell buildings in the design phase without including the fit-out elements. The provisional certificate for the design phase will then only list the score for the Shell elements. The final delivery assessment will be conducted after the fit-out elements were included by the tenant / user.

**Future tenant known in design phase**

Where the future tenant is known at the design stage of assessment it is permissible to carry out a collaborative assessment. The performance of the building is assessed using the developer's design and

procurement evidence and the future tenant's fit-out specification. The final assessment and certification can then be carried out post fit-out.

**Final assessment of buildings after fit-out**

The final assessment of Shell and fit-out is carried out as the finishing elements were applied by the tenant. Only then can the fit-out elements that were not known in the design phase be assessed. The assessment then does not take place upon completion of the Shell / core but prior to commissioning of the building.

Under development is the possibility to have the second page of the certificate state the scores for credits that apply specifically to construction, Shell / core and fit-out. The certificate however is always applicable to the total score for shell / core and fit-out. If for the temporary BREEAM-NL certificate for the design phase the maximum PFFO score is included, this will be noted on the certificate.

## *2.6. Building Types that can be assessed with BREEAM-NL*

**Building Types**

This Technical Manual can currently be used to assess the following building types:

1. Offices
2. Retail / retail premises
3. Schools
4. Industrial Buildings, where the assessment relates to the building-related environmental performance (not on the industrial processes taking place)

Within the various topics in BREEAM NL function-specific requirements are made in relation to the building type. According to the Building Decree the building function is the function that was linked to the building or space.

**Other buildings**

Based on the current version no other building types can be assessed. In the future it is possible to submit an application for other types of building. Houses and residential buildings will have priority.

**Mixed-use**

Buildings which combine several of these functions, may also be assessed. In the assessment tool one can specify how many m2 of each building type is used. For specific credits different requirements are then set or additional information is requested. The weighting of scores for different building functions will then be assessed in proportion to the usable area of each type. The following sections deal with mixed use per function type.

**Bespoke BREEAM**

If a project does not fall under the BREEAM-NL scheme, it can still be assessed with a customized approach. Customized approaches are called "BREEAM bespoke '. DGBC is to be contacted for this. Bespoke assessments come with additional costs and also require some startup time.

**Ad. 1 Offices**

BREEAM-NL / Offices can be used to assess one of the following types of offices or a combination thereof:

- Offices, open or closed
- Meeting rooms
- Training & presentation rooms

And other related functions / areas:

- Reception and waiting rooms
- Restaurant and / or kitchen facilities for its staff
- Toilets and clothes rooms
- Storage and waste areas
- IT / server rooms
- Sports rooms and crèches for their own staff
- Other areas such as exercise areas

A project can be qualified as main function office if there are more primary office spaces (offices, conference rooms, training rooms and presentation) than "other related functions / areas.

The above list is not exhaustive, but serves to indicate the type of areas covered by the scope of this BREEAM-NL scheme. Where a proposed building contains a small additional function/area that is not listed above, the building can still be assessed using this scheme. If the assessor has reason to believe that this scheme is not appropriate given the small additional function/area type, DGBC should be contacted for advice.

**Mixed use - office**

Office space within a mixed use development/building can be assessed using BREEAM-NL, provided the office space is separable from the other mixed use elements of the building. When in doubt, DGBC is to be contacted.

**Floors within a larger office development**

Single or multiple floors of office space 'sandwiched' between other floors that do not form a part of the assessment can be assessed using this scheme. An example of this situation may be in the case of a tenanted building where part of the building is undergoing refurbishment or a re-fit and the remaining parts are not undergoing such change, or they are undergoing refurbishment/fit out but do not require a BREEAM-NL assessment

**Data Centres**

BREEAM-NL can not be used to assess data centres. A BREEAM Bespoke would be required.

**Ad 2. Retail**

BREEAM-NL can be used to assess one or a combination of the following types of retail building:

1. **General display and sale of goods**: covers general shops and retail units selling non-food goods
2. **Food retail**: covers supermarkets/superstores and other convenience stores i.e. building types

which display food or food and non-food goods
3. **Food preparation and serv**ice: covers restaurants, cafes, public houses, bakeries, takeaways i.e. building types where food is prepared on site and served for consumption either on or off site
4. **Service provider**: covers banks, post office, bookmakers, dry cleaners, travel agencies.

The Retail scheme can assess the above types of retail where they combine to form part of a larger retail development e.g. shopping centre/district, department store or retail park.

The building functions/areas listed below are covered by the scope of BREEAM-NL Retail where they form a part of one of the above retail building types:

**Retail areas**
· Retail sales and display areas
· Counter and customer service areas
· Customer dining and seating areas
· Petrol station & vehicle wash

**Operational support areas**
· Goods storage/warehousing
· Workshops
· Cold storage
· Commercial kitchen/food preparation and servery
· Commercial laundry/dry cleaner
· Delivery yard
· Waste management areas

The above list is not exhaustive, but serves to indicate the type of spaces covered by the scope of this BREEAM-NL scheme. Where a proposed building contains a small additional function/area that is not listed above, the building can still be assessed using this scheme. If the assessor has reason to believe that this scheme is not appropriate given the small additional function/area type, DGBC should be contacted for advice.

Unless otherwise stated this Scheme cannot be used to assess any of the above functions/spaces as standalone developments, i.e. the Retail scheme cannot be used to assess and certify an office or gym that does not form a part of one of the above retail building types. Such buildings can be assessed using a Bespoke scheme.

**Trade Warehouse**
A building used for trade only with a counter and customer service area can be assessed using the applicable credits from the BREEAM-NL scheme / industrial. A building with goods display areas must be assessed using the BREEAM-NL Retail credits.

**Automotive servicing and repair workshops**
Buildings with a vehicle workshop service and repair area, counter and customer waiting area and staff office/room should be assessed using the BREEAM-NL Industrial credits.

**Automotive showrooms**
Automotive showrooms that meet the following must be assessed using the BREEAM-NL Retail credits:
a) More than 50% of the gross internal floor area (excluding 'office areas' and 'other associated function areas') consists of vehicle sales and display areas.
b) The remaining gross internal floor area consists of vehicle workshops and offices areas.

Where the vehicle sales and display area is less than 50% of the gross internal floor area, DGBC should be contacted for advice on which BREEAM-NL scheme to use.

**Mixed use developments**
Retail space within a mixed use development/building can be assessed using BREEAM-NL Retail credits, provided the retail space is separable from the other mixed use elements of the building. If in doubt, contact DGBC.

**Floors within a larger retail development**
Single or multiple floors or units of retail space 'sandwiched' between other floors that do not form a part of the assessment, can be assessed using this scheme. An example of this situation may be in the case of a tenanted building where part of the building is under-going refurbishment or a re-fit and the remaining parts are not undergoing such change, or they are undergoing refurbishment/fit out but do not require a BREEAM-NL assessment.

**Ad 3. Schools**
BREEAM-NL / school credits can be used to assess one of the following types of schools or a combination thereof:

- School for all types of education (primary, secondary, colleges, universities, special)
- Classroom and classrooms, lecture rooms
- Sports rooms and gyms for pupils / students
- Library / study room

And other related functions / areas:

- Meeting rooms
- Training & presentation rooms
- Reception and waiting rooms
- Restaurant and / or kitchen facilities for its staff and pupils / students
- Toilets and clothes rooms
- Storage and waste areas
- IT / server rooms
- Other areas such as exercise areas

If the building contains special functions (e.g. laboratories, workshops, etc) this needs to be assessed with BREEAM Bespoke, please contact DGBC to verify the scheme selection.

A project can be considered having the main function "school" if there are more prime school spaces than 'other related functions / areas'.

The above list is not exhaustive but is intended as indicative of the scope. Even if a building contains a small space that is not listed, then the building can still be assessed by BREEAM-NL / Schools. When in doubt, DGBC is to be contacted.

**Mixed use - Schools**

Schools within a mixed use building (a building with multiple user functions) can be assessed with this Technical Manual provided that the school spaces are clearly separated from the other features of the building. When in doubt, DGBC is to be contacted.

**Ad 4. Industrial**

BREEAM-NL Industrial credits can be used to assess one of the following types of Industrial building or a combination:

1. **Storage and distribution warehouses**: (including cold food storage)
2. **Light industrial/factory units** e.g. manufacturing, assembly, packaging etc. and small 'starter' units.
3. **Workshops**: e.g. manual workshops and vehicle workshops.

The building functions/areas listed below are covered by the scope of BREEAM-NL Industrial where they form a part of one of the above industrial building types:

**Operational areas**

· Storage/warehousing
· Light industrial/factory uses
· Workshops and cold storage
· Delivery yard
· Waste management areas

**Office areas**

· Cellular or open plan offices
· Meeting rooms
· Training/presentation rooms

The above list is not exhaustive, but serves to indicate the type of areas covered by the scope of this BREEAM-NL scheme. Where a proposed building contains a small additional function/area that is not listed above, the building can still be assessed using this scheme. If the assessor has reason to believe that this scheme is not appropriate given the small additional function/area type, DGBC should be contacted for advice.

Unless otherwise stated, BREEAM-NL Industrial credits cannot be used to assess any of the above functions/spaces as standalone developments, i.e. the Industrial scheme cannot be used to assess and certify an office or gym that does not form a part of one of the above industrial building types. Such buildings can be assessed using one of the other standard BREEAM-NL schemes or, where appropriate, the BREEAM Bespoke scheme.

**Trade Warehouse**
A building used for trade only with a counter and customer service area can be assessed using the BREEAM-NL Industrial scheme. A building with goods display areas must be assessed using the BREEAM-NL
Retail scheme.
**Automotive servicing and repair workshops**
Buildings with a vehicle workshop service and repair area, counter and customer waiting area and staff office/room should be assessed using the BREEAM-NL Industrial scheme.

**Car showrooms**
Car showrooms which have the following characteristics have to be assessed with BREEAM-NL / retail scheme:

- More than 50% of the GFA (not "offices" and "other related functions / areas") consists of car showroom and sales
- The remaining GFA consists of workshop and office.

If less than 50% of the total GFA is car showroom then DGBC needs to be contacted.

# 3. Score and rating

This section of the BREEAM-NL manual explains how an assessed building's certified BREEAM-NL rating is calculated.

There are a number of elements that determine the BREEAM-NL rating; these are as follows:

- BREEAM-NL rating benchmarks
- BREEAM-NL environmental weightings
- Minimum BREEAM-NL standards
- BREEAM-NL credits for Innovation

## *3.1. Thresholds for qualifying*

The final rating is obtained by conversing the score in the following table into a BREEAM-NL rating:

| BREEAM-NL Rating | Score |
|---|---|
| PASS | ≥ 30% |
| GOOD | ≥ 45% |
| VERY GOOD | ≥ 55% |
| EXCELLENT | ≥ 70% |
| OUTSTANDING * | ≥ 85% |

** For the rating Outstanding additional mandatory requirements exist, which are explained below.*

The final score obtained is listed on the certificate.

## *3.2. Weighting*

The final total score is determined by adding the scores for each category. These scores are multiplied by a weighting percentage that applies to each category.

The weights follow from research-based consensus among different groups including government, suppliers, manufacturers and research institutions. This research was conducted by BRE to determine the relative importance (weight) of each category. The Netherlands has not yet performed own research / stakeholder analysis and that is why the same weighting as BREEAM International is currently maintained. So these are consensus rather than scientific weightings. The weighting percentages may change over time given societal developments.

| BREEAM-NL Category | Weighting |
|---|---|
| Management | 12% |

| | |
|---|---|
| Health and Comfort | 15% |
| Energy | 19% |
| Transport | 8% |
| Water | 6% |
| Materials | 12.5% |
| Waste | 7.5% |
| Land Use and Ecology | 10% |
| Pollution | 10% |

## *3.3. Mandatory credits*

To achieve a BREEAM-NL rating, the minimum percentage score must be achieved (as outlined in table 2 above) and the minimum standards (i.e. number of credits achieved) applicable to that rating level (below) complied with.

In the BREEAM-NL 2010 version 1.11, the mandatory credits are the same as the mandatory credits in the UK BREEAM-2008 scheme. The feasibility of these credits will be carefully monitored in the project database and will serve as a basis for recommendations for future versions.

| BREEAM credit-NL | PASS | GOOD | VERY GOOD | EXCELLENT | OUTSTANDING |
|---|---|---|---|---|---|
| Man 1 – Commissioning | 1 | 1 | 1 | 1 | 2 |
| Man 2 - Site and surroundings | | | | 1 | 2 |
| Man 4 - User Manual | | | | 1 | 1 |
| Man 9 - Publishing of Building Information (Only required for schools) | | | | | 1 |
| Man 10 – Project as a means of education (schools only) | | | | | 1 |
| Hea 4 - High-frequency lighting | 1 | 1 | 1 | 1 | 1 |
| Ene 1 - CO2 emission reduction | | | | 6 | 10 |
| Ene 2 - Submetering energy consumption | | | 1 | 1 | 1 |
| Ene 5 - Application renewable energy | | | | 1 | 1 |
| Wat 1 - Water | | 1 | 1 | 1 | 2 |
| Wat 2 - Water Meter | | 1 | 1 | 1 | 1 |
| Wst 3 - Storage for recyclable waste | | | | 1 | 1 |
| Le 4 - Plants and animals co-user of the planning area | | | 1 | 1 | 1 |
| Case study material | | | | | √ |

## 3.4. BREEAM-NL Innovation credits

Innovation credits provide additional recognition for a building that innovates in the field of sustainable performance, above and beyond the level that is currently recognised and rewarded within standard BREEAM-NL issues. Innovation credits therefore enable clients and design teams to boost their building's BREEAM-NL performance and in addition, help support the market for new innovative technologies and practices.

An additional 1% score can be added to a building's final BREEAM-NL score for each Innovation credit achieved. The maximum number of Innovation credits that can be awarded for any one building assessed is 10; therefore the maximum available score achieved for 'innovation' is 10%. Innovation credits can be awarded regardless of the final BREEAM-NL rating i.e. they are awardable at any BREEAM-NL rating level.

A building can achieve an Innovation credit by meeting exemplary performance criteria for an existing BREEAM-NL issue (the following table outlines the BREEAM-NL issues with exemplary performance criteria).

**Table BREEAM-NL issues with exemplary level criteria.**

**Man 3** – Construction Site Impacts
**Man 13** – Combined credit
**Hea 1** – Daylighting
**Ene 1** - Energy Efficiency
**Ene 5** - Zero Carbon Technologies
**Tra 3** – Alternative modes of transport
**Wat 2** - Water Meter
**Mat 1** - Materials Specification
**Mat 5** - Responsible Sourcing of Materials
**Wst 1** - Construction Site Waste Management
**Pol 4** – NOx emissions of heating source

The criteria for exemplary performance are mentioned in the specific credit texts.

*In the future also new credits can awarded as innovation credit. At this moment new credits can be submitted but can not be awarded, it does not add to the final score. If unsure about innovation credits always contact the DGBC.*

## 3.5. How does a BREEAM-NL rating achieved

The final BREEAM-NL rating (from Pass to Outstanding) is calculated by the DGBC assessment tool based on the by the assessor entered and verified data. However this does not mean that the assessor can't calculate the rating by hand. To achieve the rating proceed as follows (see table below):

1. Determine the number of points scored per category

2. Determine the percentage per category on the basis of the maximum number of points to be obtained in each category
3. Multiply the percentages with the category weightings; this provides the category score
4. Add the category scores, including the innovation credits if applicable, this provides a preliminary total score
5. Check whether the mandatory credits for the preliminary rating have been achieved. If so, then the preliminary rating equal final rating.
6. An additional 1% can be added to the final BREEAM-NL score for each Innovation credit achieved (up to a maximum of 10%).

Example of calculation of the BREEAM-NL-rating

| BREEAM-NL Category | Achieved | Available * | % Achieved | Weighting | Category score |
|---|---|---|---|---|---|
| Management | 7 | 10 | 70% | 12% | 8,40% |
| Health and wellbeing | 11 | 14 | 79% | 15% | 11,79% |
| Energy | 10 | 21 | 48% | 19% | 9,05% |
| Transport | 5 | 10 | 50% | 8% | 4,00% |
| Water | 4 | 6 | 67% | 6% | 4,00% |
| Materials | 6 | 12 | 50% | 12,5% | 6,25% |
| Waste | 3 | 7 | 43% | 7,5% | 3,21% |
| Landuse and ecology | 4 | 10 | 40% | 10% | 4,00% |
| Pollution | 5 | 12 | 42% | 10% | 4,17% |
| Innovation | 1 | 10 | 10% | 10% | 1,00% |
| **Total BREEAM-NL score** | | | | | **55,87%** |
| **BREEAM-NL Rating** | | | | | **Very Good** |
| ** NOTE: the number of points available varies based on the building type; the numbers here are just an example* | | | | | |

| Mandatory credits for BREEAM-NL rating Very Good | Achieved |
|---|---|
| Man 1 – Commissioning | √ |
| Hea 4 – High frequency lighting | √ |
| Ene 2 – Sub-metering of Substantial Energy Uses | √ |
| Wat 1 – Water use | √ |
| Wat 2 – Water meter | √ |
| Le 4 - Impact on site ecology | √ |

## 3.6. Credit filtering

The list of credits that a building is assessed against depends on the type of building and the application of certain building components such as elevators, escalators or a cooling site. When entering the building information in the Assessment Tool, the required credit list is automatically generated.

The following credits are **not** included in the calculation:

Ene 6 Minimizing air infiltration loading and unloading platform; if no loading / losplatform
Ene 7 Energy efficient refrigeration and freezer storage, if no cold storage
Ene 8 Energy-efficient elevators, if no lifts
Ene 9 Energy-efficient escalators / moving walkways, escalators, if any / moving walkways
Wat 6 Irrigation Systems, if no green area
Wat 7 Vehicles Laundry service, if no vehicles washing service

## 3.7. Default credits

If one or more of the following credits specified are not applicable, then the points related to those credits may be awarded default.

| Default credits | |
|---|---|
| Tra 4 Pedestrian and cycle safety; | In the case of no external area |
| Le 1 Re use of land; | In the case of refurbishment |
| Pol 1 Refrigerant GWP - Building Services; | In the case of no refrigerants(but incl. GTO) |
| Pol 2 Preventing refrigerant leaks; | In the case of no refrigerants |
| Ene 4 External lighting; | In the case of no external lighting |
| Pol 7 Reduction of night time light pollution; | In the case of no external lighting |
| Pol 8 Noise attenuation; | In the case there are no buildings in a radius of 800 meters |

The assessor can approve these credits through a proper justification that the credit is not applicable.

## 3.8. BREEAM-NL Outstanding rating

In order for a building (+ plot) to obtain a BREEAM-NL Outstanding rating the following requirements need to be met:

1. the BREEAM-NL score must be ≥ 85%
2. The mandatory credits must have been achieved

3. A case study must be completed according to the following guidelines

**Case study**

One of the most important aspects of a BREEAM-NL Outstanding rating will the example of these projects for the rest of the industry. It is therefore important that design teams within the wider industry can refer to a good quality case study.

The design / the principal of the building that achieved the BREEAM-NL Outstanding rating will be asked by DGBC to either deliver a completed case study, or otherwise so much material that DGBC can make the case study by itself. This information will be requested together with the final report of the assessor for the Delivery Phase.

After approval of the design / the client DGBC will use the case study for various publications.

If no case study or insufficient material is delivered, then the building will receive a maximum rating of BREEAM-NL Excellent.

## *3.9. Glossary*

**DGBC** – Dutch Green Building Council

**Advisory Group** – DGBC body forming a broad representation of the construction / building industry; advises the Board of DGBC

**Assessor** – Qualified person in relation to BREEAM-NL, working for a Licensed Organisation

**Expert** – Qualified process manager and content expert in relation to BREEAM-NL

**Applicant** - The person seeking BREEAM-NL assessment of a project

**Shell only** – Shell / core building where no or limited building installations and / or other finishes are applied.

**Fit-out** - by developer / client, but possibly also by renter / user to make provision for facilities such as heating, cooling and ventilation, lighting (indoor and outdoor lighting), building control, sanitation, partitions, floor finishes, blinds, soundproof facilities, OV travel information services, field irrigation systems and rainwater reuse systems

**Large-scale renovation** - renovation with change of building envelope (walls, floor, roof, windows, doors) and equipment (lighting, heating, cooling, ventilation) with the aim of building life extension

**Small-scale renovation** - Renovations that do not lead to a change in the thermal shell and a change of equipment or use the function of the building.

**Floor area** - Where BREEAM-NL mentions floor area it is based on the definitions according NEN2580

**Assessmenttool** Online software tool in which buildings can be registered for assessing and where the overall assessment report is compiled. Only registered projects and received reports trough the assessmenttool are taken into consideration by the DGBC.

# 1. Management

# MAN 1 Commissioning

## Credit aim

To encourage an appropriate manner of building services commissioning, thus ensuring optimum performance under occupancy conditions.

## Credit criteria

Up to 2 points can be awarded as follows:

| Points | |
|---|---|
| 1 | Where the supplied schedule of evidence shows that sufficient time, manpower and resources were made available in the construction planning for the pre-handover commissioning, thereby ensuring efficient operation of all building services. |
| 1 | Where the supplied schedule of evidence shows that, in addition to the above, the commissioning is carried out in accordance with best practice principles and that seasonal commissioning is carried out in the first year of occupancy after handover. |

## Compliance requirements

Compliance is demonstrated as follows:

### First point

1. A commissioning plan that demonstrates that sufficient time, money and manpower was devoted to the commissioning of the building services.
2. An appropriate member of the design tem has been appointed to supervise, in the principal's name, the commissioning and where necessary recommissioning of the building services.
3. In the case of complex services, the principal has appointed a commissioning manager for elements such as:
    - air conditioning;
    - mechanical ventilation, displacement ventilation and complex passive ventilation;
    - building management systems;
    - renewable energy sources;
    - fume cupboards and microbiological safety cabinets;
    - cold storage enclosures and refrigeration plant associated with buildings.

The commissioning manager must have been appointed in the design stage; his responsibilities must include:

- Input concerning the aim, scope and content of the commissioning plan;
- Input regarding commissioning during the design process;
- Giving a judgement on whether the building services design will meet the functional requirements as laid down in, for example, a schedule of requirements;
- Input regarding the commissioning of the installations during the implementation stage;
- The same during the post-construction and maintenance stages.

**Second point**

1. The first point must have been gained.
2. At a minimum, the commissioning must relate to the following building services:
    - Heating systems;
    - Water distribution systems;
    - Lighting systems;
    - Ventilation systems;
    - Refrigeration systems;
    - Automatic controls.
3. The commissioning must be carried out in accordance with best practice principles (as shown in the references).
4. If a building management system (BMS) is specified, the following commissioning procedure must be implemented:
    - Commissioning of air and water systems is carried out when all control devices are installed, wired and functional.
    - In addition to air and water flow results, commissioning results include physical measurements of room temperatures and other parameters as appropriate.
    - The BMS/controls installation should be running in auto with satisfactory internal conditions prior to handover.
    - All BMS schematics and graphics (if BMS is present) must be fully installed with a functional user interface before handover.
    - The occupier must be fully trained in the operation of the system.
5. The above stipulation(s) also include the following seasonal commissioning responsibilities over a minimum 12-month period once the building becomes occupied:

**Complex Systems – Commissioning Manager**

- Testing of all building services under full load conditions, e.g. heating equipment in mid-winter, cooling/ventilation equipment in mid-summer, and under part load conditions in spring and autumn.
- Where applicable, testing should be carried out during periods of extreme (high or low) occupancy.
- Interviews with building occupants (insofar as they are affected by the complex systems).
- Recommissioning of systems (following any work needed to serve revised loads) and incorporating any revisions in operating procedures into the O&M manuals.

Where specialist building services systems such as fume cupboards, microbiological safety cabinets and cold storage enclosures are present then the assessor must ensure that commissioning of these systems is included in the specialist commissioning manager's responsibilities.

**Simple systems (naturally ventilated) – External consultant/Facilities Manager**
Review thermal comfort, ventilation, and lighting, at three, six and nine month intervals after initial occupation, either by measurement or occupant feedback.

## Compliance notes

**New build**
There are no additional or different requirements to those outlined above specific to new build projects.

**Refurbishment**
There are no additional or different requirements to those outlined above specific to refurbishment projects.

**Extensions to existing buildings**
There are no additional or different requirements to those outlined above specific to the extension of existing projects.
If the facilities are located in the existing building, these facilities must be evaluated in the light of the aforementioned requirements.

**Shell only**
An assumption has to be made that the building will contain HVAC, DHWS or Lighting and therefore both credits must be assessed. If the end user is unknown the seasonal commissioning requirement must be assessed on a commitment by the developer/client to carry out seasonal commissioning on behalf of the end user. The credit cannot be awarded where the developer/client is unable to make this commitment. If the end user is known and they do not want the developer to carry out seasonal commissioning, then the end user would need to commit to carrying out seasonal commissioning for the credit to be awarded.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additions for the application of this credit to offices.

**Retail**
There are no additions for the application of this credit to retail premises.

**Industrial buildings**
There are no additions for the application of this credit to industrial buildings.

**Schools**
There are no additions for the application of this credit to schools.

## Schedule of evidence required

**Design stage**

First point:

1.: A copy of the contractual clause or a copy of the commissioning schedule, confirming:

- That sufficient time will be allocated for the entire commissioning process (commissioning, testing and handover);
- The scope of the commissioning (which systems are included and which are expressly not included).

2. & 3.: A copy of a letter or commissioning responsibilities schedule confirming the appointment of (or commitment to appoint):

- The design team members involved in commissioning and their individual responsibilities.

Second point

1.: Evidence confirming compliance with the first credit point.

2. & 3.: A copy of the schedule of requirements or a signed declaration from the design team, containing an overview of the standards and guidelines applicable to commissioning.

4.: A copy of the schedule of requirements or the commissioning schedule, defining the phases of the procedure for commissioning the BMS.

5.: The evidence relating to testing requirements 2 & 3 for the first credit point must confirm the scope, tasks and responsibilities for the seasonal commissioning.

**Post-construction stage**

First point

1.: A copy of the implementation schedule containing the time schedule for commissioning (commissioning, testing and handover).

2. & 3.: Reports confirming which commissioning activities have been carried out by (members of) the design team.

Second point

1.: Evidence confirming compliance with the first credit point.

2. & 3.: As-built specifications confirming that no changes have occurred since design stage assessment.

Where changes have occurred since the design stage assessment, a signed declaration from the design team, providing an overview of the standards and guidelines applicable to commissioning.
In both cases: evidence confirming that commissioning has been carried out to the applicable standards.

4.: Reports confirming that the BMS/control instruments have been commissioned in line with the prevailing standards.

5.: A copy of the time schedule for the seasonal commissioning.

*OR*

- A copy of the commissioning manager's letter of appointment, supplemented by the scope of his responsibilities.

## Definitions

**Commissioning**
The inspection, testing and adjustment for optimum performance, under operating conditions, of complex heating, refrigeration and ventilation systems with the aim of ensuring appropriate commissioning and optimum operation of building services.

**Commissioning manager**
A specialist qualified to inspect, test and adjust complex heating, refrigeration and ventilation systems under operating conditions.

## Additional information

None.

## References

Heating systems:

- ISSO Publication 31: Meetpoints en meetmethoden voor klimaatinstallaties (Measurement points and measurement methods for climate control systems)
- ISSO Publication 68: Energetisch optimale stook- en koellijnen voor klimaatinstallaties in kantoorgebouwen (Optimum energy regulation (heating & cooling) for climate systems in office buildings)
- ISSO Publicatie 71: Selectie van energetisch optimale warmteopwekkingsinstallaties voor kantoorgebouwen.
- ISSO Publicatie 80: Handboek integraal ontwerpen van collectieve installaties met warmtepompen in de woningbouw.
- ISSO Publicatie 81: Handboek integraal ontwerpen van warmtepompinstallaties voor de utiliteitsbouw.
- CEN-EN 14336:2004: Heating systems in buildings. Installation and commissioning of water based heating systems

Water distribution systems:

- ISSO Publication 31: Meetpoints en meetmethoden voor klimaatinstallaties (Measurement points and measurement methods for climate control systems)
- ISSO Publication 65: Adjustment of design volume flows in water heating systems
- ISSO Publication: Kleintje inregelen (adjustment pocket book)

Lighting systems:

- NEN 12464-1: Licht en verlichting - Werkplekverlichting - Deel 1: Werkplekken binnen (Light and lighting – Workplace lighting – Part 1: Indoor workplaces)

Ventilation systems:

- ISSO Publication 31: Meetpoints en meetmethoden voor klimaatinstallaties (Measurement points and measurement methods for climate control systems)

- CEN-EN 12599: Ventilation for buildings. Test procedures and measuring methods for handing over installed ventilation and air conditioning systems.

Refrigeration systems and building-related cold storage enclosures:

- ISSO Publication 31: Meetpoints en meetmethoden voor klimaatinstallaties (Measurement points and measurement methods for climate control systems)
- "Model Building Specification for Design, Installation, and Commissioning of Insulated Envelopes and Insulated Floors for Temperature .Controlled and Ambient Environments", International Association for Cold Storage construction (June 2003)

Automatic controls:

- ISSO Publication 31: Meetpoints en meetmethoden voor klimaatinstallaties (Measurement points and measurement methods for climate control systems)
- ISSO Publication 68: Energetisch optimale stook- en koellijnen voor klimaatinstallaties in kantoorgebouwen (Optimum energy regulation (heating & cooling) for climate systems in office buildings)
- CEN-EN 50491: General requirements for Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS)

Fume cupboards and microbiological safety cabinets:

- CEN EN 14175-2:2003 "Fume cupboards - Part 2: Safety and performance requirements"
- CEN EN 12469 – "Biotechnology – Performance criteria for microbiological safety cabinets"

In the Netherlands, the system for quality control is specified in ISSO/SBR-publication 347, "Model kwaliteitsbeheersing klimaatinstallaties (MKK)" (Model quality control for climate systems).

Awaiting publication:

- ISSO publication series "Duurzaam Beheer" (Sustainable Management) (to appear towards the end of 2009)
- ISSO Publication 52, "Luchtzijdig inregelen van klimaatinstallaties" (Adjustment of air aspects of climate systems) (scheduled to appear in August 2009)

Relevant websites:

- http://www.isso.nl
- http://www.tvvl.nl

*Note: The course "Commissioning Duurzame Energie Installaties" (Commissioning of Renewable Energy Systems) can be followed with TVVL from 2010.*

# MAN 2 Construction Site and Surroundings

## Credit aim

To encourage responsible management of the construction site and its influence on the surrounding area.

## Credit criteria

2 points can be awarded as follows:

| Points | |
|---|---|
| 1 | Where evidence provided demonstrates that there is a commitment to comply with best practice site management principles. |
| 1 | Where evidence provided demonstrates that there is a commitment to go beyond with best practice site management principles. |

## Compliance requirements

Compliance is demonstrated as follows:

1. The main contractor has complied with the requirements in Checklist A2, which is used to independently assess and monitor construction site impacts, with credit points awarded as follows:

   1 point:

   - If the construction site has been tested in an independent way according Checklist A2 AND which met 6 items from all four categories of the Checklist A2;

   2 points:

   - If the construction site has been tested in an independent way according Checklist A2 AND which met all items from all four categories of the Checklist A2;

## Compliance notes

**New build**
There are no additional or different requirements to those outlined above specific to new build projects.

**Refurbishment**
There are no additional or different requirements to those outlined above specific to refurbishment projects.

**Extensions to existing buildings**
There are no additional or different requirements to those outlined above specific to the extension of existing projects.
If the facilities are located in the existing building, these facilities must be evaluated in the light of the aforementioned requirements.

**Shell only**
There are no additional or different requirements to those outlined above specific to shell-only projects.

**Site clearance**
The scope of this credit applies to the main contractor and their scope of works. If the scope of the main contractor's works includes demolition and site clearance then this stage of work falls within the scope of the credit requirements.

**Contractor not yet appointed**
At the interim design stage of assessment, where the contractor is not yet appointed, the client must either include within the specification, or commit to including, a requirement for the appointed contractor to comply with specific criteria of Checklist A2. A general commitment to satisfy Checklist A2 will not be acceptable. The assessor must then use this information to complete Checklist A2.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additions for the application of this credit to offices.

**Retail**
There are no additions for the application of this credit to retail premises.

**Industrial buildings**
There are no additions for the application of this credit to industrial buildings.

**Schools**
There are no additions for the application of this credit to schools.

## Schedule of evidence required

### Design stage

1.: To be submitted:

- A copy of Checklist A2;
- A formal letter from the principal/project developer, confirming that:

- The main contract will include a clause requiring compliance with the requirements of Checklist A2;
- The individual/organisation responsible for third party assessment on the construction site;
- The scope of the work to which the main contract applies.

### Post-construction stage

1.: A copy of the report demonstrating that the contractor has complied with Checklist A2.

### Definitions

None.

### Additional information

None.

### References

None.

### Checklist A2

http://www.dgbc.nl/images/uploads/Technical_checklist_A2_def.pdf

# MAN 3 Construction site impacts

## Credit aim

To recognise and encourage construction sites managed in an environmentally sound manner in terms of resource use, energy consumption and pollution.

## Credit criteria

Four credits available as follows:

| Points | |
|---|---|
| 1 | Where evidence provided demonstrates that at least 80% of site timber is responsibly sourced and 100% is legally sourced. |
| 1 | Where evidence provided demonstrates that 2 or more of items a-g (listed below) are achieved. *OR* |
| 2 | Where evidence provided demonstrates that 4 or more of items a-g (listed below) are achieved. *OR* |
| 3 | Where evidence provided demonstrates that 6 or more of items a-g are achieved. |

a. Monitor, report and set targets for CO2 or energy arising from site activities
b. Monitor, report and set targets for CO2 or energy arising from transport to and from site
c. Monitor, report and set targets for water consumption arising from site activities
d. Implement best practice policies in respect of air (dust) pollution arising from the site
e. Implement best practice policies in respect of water (ground and surface) pollution occurring on the site
f. Main contractor has an environmental materials policy, used for sourcing of construction materials to be utilised on site
g. Main contractor operates an Environmental Management System.

**Exemplary level criteria – new build and refurbishment projects only**

The following outlines the exemplary level criteria to achieve an *innovation credit* for this BREEAM-NL issue:

1. Evidence provided demonstrates that all of the items a-g listed previously are achieved and at least 80% of site timber is responsibly sourced and 100% is legally sourced.

## Compliance requirements

The following demonstrates compliance:

1. The requirements in the relevant sections of Checklist A3 have been met.

## Compliance notes

### New Build

There are no additional or different requirements to those outlined above specific to new-build projects.

### Renovation

There are no additional or different requirements to those outlined above specific to refurbishment projects.

**Extensions to existing buildings**
There are no additional or different requirements to those outlined above specific to the assessment of extensions to existing buildings.

**Shell only**
There are no additional or different requirements to those outlined above specific to shell only assessments.

**Site clearance**
The scope of this credit applies to the main contractor and their scope of works. If the scope of the main contractor's works includes demolition and site clearance then this stage of work falls within the scope of the credit requirements.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additions for the application of this credit to offices.

**Retail**
There are no additions for the application of this credit to retail premises.

**Industrial buildings**
There are no additions for the application of this credit to industrial buildings.

**Schools**
There are no additions for the application of this credit to schools.

## Schedule of evidence required

**Design stage**

1. A copy of the relevant section from the main contract specification confirming:

- Contractor's obligations with respect to each item in Checklist A3
- Site timber will be sourced from suppliers capable of providing certification to the level required for the particular tier claimed (see table 1 of BREEAM-NL credit MAT 5)
- All timber will come from a 'legal source' and is not on the CITES list

*OR*

Where the main contract specification is not yet available, a formal letter from the client/developer including:

- Completed Checklist A3 identifying which items will form part of the main contractor's obligations.

- The policy for sourcing site timber for the project.
- Confirmation that the above will be implemented in compliance with BREEAM-NL's requirements.

**Post construction stage**

1. To be handed over:

- Site records demonstrating monitoring and recording of the following (where relevant):
  - Site energy/CO2 consumption
  - Site deliveries
  - Site water consumption

- Project targets set for water and energy consumption.
- Copies of the documented procedures used on site for working to best practice pollution management guidelines.
- A letter from the main contractor confirming:
  - Procedures for pollution management and mitigation were implemented
  - Name/job title of individual responsible for monitoring and managing construction site impacts throughout the project.
- A copy of the certification document or Chain of Custody (CoC) certificate(s) for the site timber.
- Where any non-certified timber is used, written confirmation from the supplier(s) confirming that:
  - All timber comes from a legal source.
  - All timber species and sources used in the development are not listed on any of the CITES appendices for endangered or threatened species (Appendix I, II, or III).

## Definitions

**Construction site**
The area of construction and other land used.

**Construction area**
The ground on which the building will be developed.

**Chain of Custody**
This is a process used to maintain and document the chronological history of the evidence/path for products from forests to consumers. Wood must be tracked from the certified forest to the finished product. All the steps, from transporting wood from the forest to a sawmill, until it reaches the customer, must maintain adequate inventory control systems that allow for separation and identification of the certified product. Chain-of-custody certification ensures that a facility has procedures in place to track wood from certified forests and avoid confusing it with non certified wood. Chain-of-custody is established and audited according to relevant forest certification systems rules.

**CITES**
(Convention on International Trade in Endangered Species) Appendices I and II of the CITES list illustrate species of timber that are protected outright. Appendix III of the CITES list illustrates species that are

protected in at least one country. If a timber species used in the development is on Appendix III it can be included as part of the assessment as long as the timber is not obtained from the country(s) seeking to protect this species (see additional information for further details).

**Targets**
Targets are requested in the BREEAM-NL credit to promote the process of setting, monitoring and achieving targets. BREEAM-NL does not set targets, as these are very project specific.

**Energy**
Monitoring and reporting at site level are the key factors in raising awareness of the impacts of energy consumption. Whilst total energy is frequently monitored, this information is predominantly used to feedback into the tendering process and is seldom used to seek improvements on the site in question.

**FSC**
Forest Stewardship Council is a non-profit organization established to promote sustainable use of forests. The medicine used is leaving the FSC label, assigned to timber and timber products. A timber company or another company that wants to be FSC-certified and use the logo must cooperate in an audit by certification bodies. They are working with a chain of custody where the wood cap (in the certified forest) to be followed to final product.

**Wood used on site**
The first point (responsibly produced wood for the site) is independent of the remaining three credits.
In order to award this credit, wood is considered as the site for wood used to build easier. Including formwork, site fencing, scaffolding boards and other on site uses temporary timber. Construction Wood and wood used for finishings is not evaluated here (this is included in Mat 5).

**Work area**
The temporary area required for the construction of the project possible, and that no part of the building site.

## Additional information
None.

## References
- http://www.fscnl.org (website of the Forest Stewardship Council)
- http://www.inkoopduurzaamhout.nl/documenten.html

## Checklist A3
http://www.dgbc.nl/images/uploads/Technical_checklist_A3_def.pdf

# MAN 4 User guide

## Credit aim

To recognise and encourage the provision of guidance for the non technical building user to enable them to understand and operate the building efficiently.

## Credit criteria

A maximum of one point can be awarded as follows:

| Credits | |
|---|---|
| 1 | Where evidence provided demonstrates the provision of a simple guide that covers information relevant to the tenant/occupants and non-technical building manager on the operation and environmental performance of the building. |

## Compliance requirements

The following demonstrates compliance:

1. A Building User Guide that contains the information described under the 'User Guide Contents' heading (see additional guidance) has been developed.

2. The guide is relevant to the non-technical building user and appropriate to the stakeholder(s) that will occupy the building.

## Compliance notes

### New Build

There are no additional or different requirements to those outlined above specific to new-build projects.

### Renovation

There are no additional or different requirements to those outlined above specific to refurbishment projects.

### Extensions to existing buildings

There are no additional or different requirements to those outlined above specific to the assessment of extensions to existing buildings.

### Shell only

For speculative developments it may not be possible to include all information outlined below. The Building User Guide must be developed, including all relevant sections and completed as far as is possible given the services and fabric installed, so that it can be handed over to the fit-out team who will then be able to complete the relevant sections based on the fit-out strategy before handing over to the tenant/building owner.

### O&M manual

The presence of a building O&M manual does not meet this requirement. The latter provides the detailed specialist information required by technical Facilities Managers (FMs) and maintenance staff/contractors. The guide can be contained in the Operation & Maintenance (O&M) manual, but must be an extractable or 'stand alone' section.

**Multiple tenanted buildings**
Where the building will be divided in to multiple tenancies, one central building user guide should be provided covering the scope of landlord controlled areas/responsibilities. A separate subsidiary guide should be provided for each tenant's space, appropriate to the status/responsibility of the tenant(s) and their building/unit.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additions for the application of this credit to offices.

**Retail**
There are no additions for the application of this credit to retail premises.

**Industrial buildings**
There are no additions for the application of this credit to industrial buildings.

**Schools**
There are no additions for the application of this credit to schools.

## Schedule of evidence

**Design stage**

1. & 2.: A copy of the specification clause confirming:

- Requirement to develop a Building User Guide
- Scope of the Guide's contents.

*OR*

- A formal letter from the client/developer confirming:
- That the design team will be required to develop a Building User Guide.
- The contents of the Guide will be developed in compliance with the BREEAM-NL requirements.

**Post construction stage**
1. & 2.: To be handed over:

- A copy of the Building User Guide.
- Written confirmation from the design team that the guide has been distributed to the building's owner, tenant(s)
- or fit out contractor (for completion), as appropriate.

## Definitions

None.

## Schedule of evidence required

### User guide contents

The list below indicates the type of information that should be included to meet the needs of the Facilities Management (FM) Team/Building Manager and the general users (staff):

• For users: where are the facilities available, how does the operation of the facilities and who should be contacted if there are faults or complaints? (described from the user)

• For the building manager: additional information on operating equipment and facilities (described from the building manager).

1. Building services information

For Information:

• Users: general information about the heating, ventilation, cooling, lighting:

o Which plants are present in the building, how the operation works and where are the buttons found (for users)?

o Tips on not covering radiators, use blinds, etc., with underlying 'strategies' on draft, Temperature (LT in the case of heating, cooling by opening windows, etc.).

o Report draft / broken doors, etc., dealing with lighting, cooling, heating.

• Building Manager: as above, plus a non-technical summary of the management and maintenance of building facilities, including the building management (if any) and a summary of the operating instruments.

2. Emergency management

For Information:

• User: a evacuation plan, possibly as part of a BHV-plan, containing information about the location of emergency exits, assembly areas, and fire alarm systems.

• Building Manager: as above, plus detailed information about the nature and location of emergency and fire fighting facilities, the nearest emergency exits and the location of first aid equipment.

3. Energy & Environmental Strategy

This should give owners and occupiers information on energy-efficient features and strategies relating to the building, and also provide an overview of the reasons for their use, e.g. economic and environmental savings. Information could include:

o General User – Information on the operation of innovative features such as automatic blinds, lighting systems etc., and guidance on the impacts of strategies covering window opening and the use of blinds, lighting and heating controls

- FM - As above, plus information on airtightness and solar gain (e.g. the impact of leaving windows/doors open in an air conditioned office, or use of blinds in winter with respect to solar gain); energy targets and benchmarks for the building type, information on monitoring such as the metering and sub-metering strategy, and how to read, record and present meter readings.

4. Water use
For information:

- General User – details of water saving features and their use and benefits, e.g. aerating taps, low flush toilets, leak detection, metering etc.
- FM – As above, plus details of main components (including controls) and operation. Recommendations for system maintenance and its importance, e.g. risk of legionella.

5. Transport Facilities
For information:

- General User – details of car-parking and cycling provision; local public transport information, maps and timetables; information on alternative methods of transport to the workplace, e.g. car sharing schemes; local 'green' transport facilities.
- FM - As above, plus information on conditions of access, maintenance and appropriate use of car parking and cycling facilities, e.g. number of spaces provided.

6. Materials & Waste Policy
For information:

- General User – Information on the location of recyclable materials storage areas and how to use them appropriately.
- FM – As above, plus information on recycling, including recyclable building/office/fit out components, waste storage and disposal requirements; examples of Waste Management Strategies and any cleaning/maintenance requirements for particular materials and finishes.

7. Re-fit/Re-arrangement Considerations
For information:

- General User – an explanation of the impact of re-positioning of furniture, i.e. may cover grilles/outlets, implications of layout change, e.g. installation of screens, higher density occupation etc.
- FM - As above, plus environmental recommendations for consideration in any refit. Relevant issues covered in BREEAM-NL should be highlighted, e.g. the use of natural ventilation, use of Green Guide 'A' rated materials, reuse of other materials etc., the potential impact of increasing occupancy and any provision made in the original design to accommodate future changes.

8. Reporting Provision
For informatie:

- General User – Contact details of FM/manager, maintenance team, and/or help desk facility; and details of any building user group if relevant.
- FM – As above, plus contact details of suppliers/installers of equipment and services and their areas of responsibility for reporting any subsequent problems.

9. Training
Details of the proposed content and suggested suppliers of any training and/or demonstrations in the use of the building's services, features and facilities that will be needed. This could include:

- General User - Training in the use of any innovative/energy saving features.
- FM – As above, plus training in emergency procedures and setting up, adjusting, and fine tuning, the systems in the building.

10. Links & references
This should include links to other information including websites, publications and organisations..

11. General

Where further technical detail may be required by the FM Team or manager there should be references to the appropriate sections in the Operation and Maintenance Manual.

BREEAM-NL requires a 'Building User Guide' that contains the necessary details about the everyday operation of the development in a form that is easy for the intended users to understand.

Without the provision of adequate information and guidance it is likely that the building will be used inappropriately leading to the dissatisfaction of occupants and wasted resources. For example: Some ventilation and/or lighting systems can be impaired by inappropriate positioning of partitions, office furniture etc. so causing inefficiencies, a lack of comfort and poor performance.

The aim of the credit is to ensure that design features are used efficiently and that changes to office space are managed in the most appropriate manner. For example, the design team of a speculative, open plan office, are likely to have considered the need for meeting or cellular space, and may have provided additional riser or duct space to assist future use. The design of the building may require additional or expanded systems to be installed if occupant levels rise above those designed for. This information should be passed on to the personnel making management decisions, so that they are aware of the implications of such decisions on the management of the building.

## References

- NEN 5509, 1998 (Gebruikershandleidingen - Inhoud, structuur, formulering en presentatie)
- Nationaal pakket Duurzaam Bouwen, U443/S433 Gezond beheren van gebouwen - SBR
- CIBSE Building log book toolkit ( http://www.cibse.org/index.cfm?go=publications.view&item=227 )
- Woningbouw: Gebruikershandleidingen duurzame woningen (SEV) 'Bewonershandleiding, documentatie installaties, aparte oplevering en instructie installaties'

# MAN 12 Life cycle costing

## Credit aim

To recognise and encourage the development of a Life Cycle Cost (LCC) analysis model for the project to improve design, specification and through-life maintenance and operation.

## Credit criteria

Two credits available as follows:

| Credits | |
|---|---|
| 1 | Where evidence provided demonstrates that a Life Cycle Cost (LCC) analysis based on the feasibility study proposals has been undertaken on the building design at a strategic and system level. |
| 1 | Where evidence provided demonstrates that the results of the feasibility study and consideration of LCC have been implemented. |

## Compliance requirements

The following demonstrates compliance:

**First point:**

1. A life cycle cost analysis is performed based on feasibility study of the feasibility phase of the preliminary design phase of the project (ISSO/SBR 347, MKK model: brief and designstage).
2. The Life Cycle Costs analysis based on the feasibility study proposals covers the following stages:
    - Construction
    - Operation - includes, as a minimum, utilities
    - Maintenance - includes, as a minimum, planned maintenance, replacements and repairs, cleaning, management costs
    - End of life.
3. The LCC analysis uses a study period of 25 or 30 (as applicable) AND 60 years, shown in real, discounted and non-discounted cash flow terms.
4. The life cycle cost analysis shows that at the strategic level (ISSO / SBR 347, MKK model program phase) and at the system level (ISSO / SBR 347, MKK model - design) at least two of the following topics are examined: main structure;
    a. Structure
    b. Envelope
    c. Service
    d. Finishes
5. The option(s) with the lowest discounted LCC over the period is preferred, assuming that their selection results in at least one of the following:

a. The lowest building energy consumption over the operational life span of the building (compared to other options/alternatives analysed)
b. A reduction in maintenance requirement/frequency
c. Prolonged replacement intervals of services infrastructure/systems or building fabric
d. Dismantling and recycling or reuse of building components

6. The life cycle cost analysis is adjusted in the final design and specification phase (ISSO/SBR 347, MMK model: design and development phase).

**Second point:**
1. The first point is achieved.
2. The results of the feasibility study have been implemented in the specification, design and final construction of the assessed building.

## Compliance notes

**New Build**
There are no additional or different requirements to those outlined above specific to new-build projects.

**Renovation**
There are no additional or different requirements to those outlined above specific to refurbishment projects.

**Extensions to existing buildings**
There are no additional or different requirements to those outlined above specific to the assessment of extensions to existing buildings.

**Shell only**
There are no additional or different requirements to those outlined above specific to shell only assessments.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additions for the application of this credit to offices.

**Retail**
There are no additions for the application of this credit to retail premises.

**Industrial buildings**
There are no additions for the application of this credit to industrial buildings.

**Schools**
There are no additions for the application of this credit to schools.

## Schedule of ef evidence required

### Design Stage

First credit:
1. t/m 4. To produce:
- A copy of the feasibility stage LCC analysis.
- The details of the cost consultant who has completed the analysis.

5. A formal letter from the design team or cost consultant confirming:
The preferred option.
6. To produce:
- An updated copy of the LCC analysis for the detailed and final design.

*OR*

A formal letter from the design team confirming::
- The LCC analysis will be updated to reflect the detailed and final design proposals
- Any proposed change(s) made to the specification will be on the basis that they will minimise life cycle costs and impacts.

Second credit:
1. No additional evidence required.

2. A formal letter from the design team confirming: The option(s) with the lowest discounted life cycle costs have been, or will be, implemented in the design and specification.

**Post construction stage**
First point:
1. to 4. No additional evidence required to that outlined for the design stage of assessment.
5. No additional evidence required to that outlined for the design stage of assessment.
6. An updated copy of the LCC analysis for the final design.

Second point:
1. No additional evidence required..

2. Assessor's building/site inspection confirming: The completed building reflects the preferred option identified in the LCC analysis.

## Definitions

### Strategic level analysis

The strategic level analysis (looking at issues such as location and external environment, maintainability and internal environment, etc.) and system level analysis (looking at issues such as foundations, solid or framed wall and floors, types of energy, ventilation, water capacity, communications etc.) should be carried out early in the design process to influence the fundamental decisions taken regarding the building without having an adverse affect on either cost or design programme. It is however important that this is revisited as the design develops to ensure that an optimal solution is retained throughout the procurement process.

**Life cycle cost analysis**
A procurement evaluation technique which determines the total cost of acquisition, operation, maintenance and disposal of the building.

## Additional Information

A life cycle cost analysis is not the same as a LCA analysis with the aim of determining the environmental impact of a building. A life cycle cost analysis aims in an early stage to optimize the design so that the full costs throughout the life cycle (including energy and maintenance costs) are minimized. Analysis of the environmental impact of a building with LCA-based tools is assessed in the material credit Mat1.

## References

- ISSO/SBR-publicatie 347 Model kwaliteitsbeheersing klimaatinstallaties (MKK).
- ISO 15685-1 Gebouwen en Geconstrueerde waarde. Planning van de levensduur

# MAN 13 Combined Credits (Man 6 - Man 11)

## Credit aim

To encourage take-up of the various management credits. The aforementioned credits have been newly introduced to BREEAM International. This optional credit can be used to assess, after one year, which of these management credits are definitely to be included in the full list.

## Credit criteria

**Up to 3 points** can be gained if **at least 2** of the 6 optional credits are complied with:

| Points | Credits |
|---|---|
| 1 or 2 | Man 6 Consultation |
| 1 or 2 | Man 7 Shared facilities |
| 1 | Man 8 Security |
| 1 | Man 9 Publication of building-related information (mandatory for schools if achieving an outstanding rating) |
| 1 | Man 10 The building and its grounds as an educational resource (mandatory for schools if achieving an outstanding rating) |
| 1 | Man 11 Ease of maintenance |

### Exemplary level criteria

The following outlines the exemplary level criteria to achieve an *innovation credit* for this BREEAM-NL issue:

1. If it can be demonstrated that 5 out of 8 points have been achieved for this combined credit Man13.

## Compliance notes

### New build

There are no additional or different requirements to those outlined above specific to new build projects.

### Refurbishment

There are no additional or different requirements to those outlined above specific to refurbishment projects.

### Extensions to existing buildings

There are no additional or different requirements to those outlined above specific to the extension of existing projects.
If the facilities are located in the existing building, these facilities must be evaluated in the light of the aforementioned requirements.

### Shell only

There are no additional or different requirements to those outlined above specific to shell-only projects.

### The credit is applicable to the following building types:

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additions for the application of this credit to offices.

**Retail**
There are no additions for the application of this credit to retail premises.
Industrial buildings
There are no additions for the application of this credit to industrial buildings:

**Schools**
There are no additions for the application of this credit to schools:

## Schedule of evidence required

**Design stage**
For each point that must be gained in this credit, please refer to the various credit criteria and the associated evidence as specified in the various optional credits.

**Post-construction stage**
For each point that must be gained in this credit, please refer to the various credit criteria and the associated evidence as specified in the various optional credits.

## Definitions
See the definitions in the separate optional credits.

## Additional information
None

## References
None

# MAN 6 Consultation (combined credit)

Combined-credit, add awarded points to Man 13.

## Aim of the credit

To involve the relevant stakeholders (including building users, business, residents and local government) in the design process in order to provide buildings fit for purpose and to increase local “ownership”.

## Creditcriteria

Two credits available as follows:

| Points | |
|---|---|
| 1 | Where evidence provided demonstrates that consultation has been, or is being, undertaken and feedback given to the local community and building users. |
| 1 | Where, in addition to the above, evidence provided demonstrates that the consultation process is being, or has been, undertaken using an independent method facilitated by a third party. |

## Compliance requirements

The following demonstrates compliance:

First point:

1. During the preparation of the brief the following was undertaken::
    - A consultation plan was prepared and included a timescale and methods of consultation, clearly identifying at which points consultees can usefully contribute and how they will be kept informed about progress on the project.Members of the local community and appropriate stakeholders identified with whom the design team consulted.
    - Knowledge and experience collated from the existing buildings of the same type (if relevant) to identify existing partnerships and networks. If the building is a new development in an existing community or for a community still under construction, a representative consultation group should be identified from similar buildings of the same type in the same authority/area
    - an inventory of the needs of future users and residents on green / environmental planning and use of outer space.
    - members of the local community is invited to share their knowledge about the presence of (populations) plant and animal species.
2. The consultation included at least the following issues:
    - Functionality, building quality and local impact (including aesthetics)
    - Building user satisfaction/productivity
    - Management and operational implications
    - Maintenance resources/burdens
    - Good and bad examples of buildings of the same type.
    - Local traffic/transport impact.
    - Opportunities for shared use of facilities and infrastructure with the community

- Consultation on the opportunities available to design the building so it can be used as a learning resource to demonstrate environmental awareness to pupils/students
- Feedback has been given to the consultation group regarding suggestions made, and this feedback covered:
  a. What was proposed during the consultation exercise
  b. How each of these proposals were considered
  c. The outcome, e.g. implementation of suggestions or description of why options have not been deemed feasible.

Second point:

1. The first point is achieved.
2. The consultation process used an independent method carried out by a third party.

**Compliance notes**

**New Build**
There are no additional or different requirements to those outlined above specific to new-build projects.

**Renovation**
There are no additional or different requirements to those outlined above specific to refurbishment projects.

**Extensions to existing buildings**
There are no additional or different requirements to those outlined above specific to the assessment of extensions to existing buildings.

**Shell only**
There are no additional or different requirements to those outlined above specific to shell only assessments.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additions for the application of this credit to offices.

**Retail**
There are no additions for the application of this credit to retail premises.

**Industrial buildings**
There are no additions for the application of this credit to industrial buildings.

**Schools**
There are no additions for the application of this credit to schools.

**Relevant stakeholders**
Includes the following (as appropriate):

· Local residents and volunteer group(s)
· Ex pupils/students group(s)
· Teachers/lecturers (representative groups)
· Local businesses

· Design team members and main contractor
· Community groups (for example based on religion, leisure or culture)
· Local Authority and/or local education service providers.

## Schedule of evidence required

**Design stage**
First point:
1.& 2.

- Evidence to handed over:
  - A list of the stakeholders consulted.
  - A consultation plan setting out the process and the scope of the consultation.
- Copies of agendas and minutes of meetings with the stakeholders demonstrating:
  - The consultation plan in action;
  - The stage in plan of works that consultation occurred.
- Copies of documentation demonstrating consultation feedback, including (where relevant):
  - Newsletters, posters, circulars etc.;
  - Agenda and minutes from meetings.

Second point:
1. Evidence (as outlined above) confirming compliance with the first credit.
2. The name of the officer / organization who carried out the consultation as an independent third party.

**Post construction stage:**
First point:

1.& 2. Evidence as outlined at the design stage of assessment

Second point:
1. The evidence for this phase is the same as for the design.
2. Copies of the results of the consultation (s) by independent third.

## Definitions

**Functionality**
The way in which the building is designed to be useful and is split into use, access and space

**Build quality:**
The engineering and construction performance of a building.

**Impact**
The building's ability to create a sense of place, and have a positive effect on the local community and environment. This includes character and innovation, form and materials,
internal environment and urban and social integration.

### Additional information

In LE 8 (Local wildlife partnerships) a reference is made to this credit. LE 8 is only applicable to schools. If the project being assessed is a school, it might be interesting to go for Man 6 as well as LE 8.

### Referenties

Geen.

# MAN 7 Shared facilities (combined credit)

Combined-credit, add awarded points to Man 13.

## Credit aim
To recognise and encourage flexible buildings designed to cater for shared use with the local community.

## Credit criteria
Two credits available as follows:

| Points | |
|---|---|
| 1 | Where evidence provided demonstrates that shared facilities have been provided as a consequence of consultation feedback. |
| 1 | Where evidence provided demonstrates that these facilities can be accessed without compromising the safety and security of the building and its occupants. |

## Compliance requirements
The following demonstrates compliance:

First point:

1. The design team confirms that:
    - Potential users of the shared facilities (such as operators of clubs and community groups) have been consulted and their requirements have informed the brief.
    - They met formally to consider feedback according to the consultation plan
    - A document was produced describing the facilities to be shared and how access to them will be arranged
    - This document has been communicated to all consultees.

Second point:

1. The first credit is achieved.
2. Shared facilities are provided in a separate and secured zone that can be accessed by members of the public/community without gaining uncontrolled access to other parts of the building.
3. Instructions and guidance on access and use of shared facilities has been developed and handed over to the building occupants (this can be included in the building user guide where such a guide is provided).

## Compiance notes

### New Build
There are no additional or different requirements to those outlined above specific to new-build projects.

### Renovation
There are no additional or different requirements to those outlined above specific to refurbishment projects.

**Extensions to existing buildings**
There are no additional or different requirements to those outlined above specific to the assessment of extensions to existing buildings.

**Shell only**
There are no additional or different requirements to those outlined above specific to shell only assessments.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additions for the application of this credit to offices.

**Retail**
There are no additions for the application of this credit to retail premises.

**Industrial buildings**
There are no additions for the application of this credit to industrial buildings.

**Schools**
There are no additions for the application of this credit to schools.

## Schedule of evidence required

**Design stage**
First point:

1. To be deliverd:
    - Agenda & minutes from design team meeting.;
    - A copy of the document, and its distribution list, outlining the strategy for shared facilities.

Second point:

1. The required evidence is the same as the evidence of the first point.
2. A marked-up design plan highlighting:
    - The facilities that will be shared;
    - Access and security zones for and around the shared facilities.

3. A copy of the document containing the instructions and guidance on access and use of shared facilities.

OR
A formal letter from the design team confirming that such a document will be written and handed over to the building occupants.

**Post construction stage**

First point:

1. There is no additional evidence required at the post construction stage of assessment.

Second point:

1. The required evidence is the same as the evidence of the design stage.

2. Assessor's building/site inspection and photographic evidence confirming: Existence of shared facilities. Access and security arrangements for the facilities

3. A copy of the document containing the instructions and guidance on access and use of shared facilities.

## Definitions

None.

## Additional information

None.

## Referenties

None.

# MAN 8 Security (combined credit)

Combined-credit, add awarded points to Man 13.

## Credit aim

To identify and encourage effective design measures that improve security in the project.

## Credit criteria

1 point can be awarded as follows:

| Points | |
|---|---|
| 1 | If the evidence provided shows that a licensed and recognised security consultant has been consulted during the design stage and that the recommendations have been incorporated in the design of the building and (if applicable) the parking facilities associated with the building. |

## Compliance requirements

Compliance is demonstrated as follows:

1. The design team has consulted the security consultant and the recommendations have been incorporated in the design.
2. The aforementioned consultation took place prior to or during the creation of the design as it currently stands.
3. The recommendations have been incorporated in the final design and in the completed building.

## Compliance notes

**New build**
There are no additional or different requirements to those outlined above specific to new build projects.

**Refurbishment**
There are no additional or different requirements to those outlined above specific to refurbishment projects.

**Extensions to existing buildings**
There are no additional or different requirements to those outlined above specific to the extension of existing projects.
If the facilities are located in the existing building, these facilities must be evaluated in the light of the aforementioned requirements.

## Schedule of evidence required
**Design stage**

1. & 2.: Copies of correspondence with one or more security consultants, or a copy of the advisory report, showing:

- The scope of the consultants' work and their involvement;

- The design stage(s) in which they were asked for advice;
- A summary of their recommendations.

3.: A design drawing showing examples of:

- How the recommendations of the security consultant(s) have been incorporated.

*OR*
If the recommendations have not yet been incorporated in the design at the time of assessment:

- A copy of the stipulations in the work specification, confirming that the design will comply with the recommendations of the security consultant(s).

OR

If all recommendations are already incorporated in the design, or there are no recommendations:

- a report the security consultant that confirmed this.

**Post-construction stage**

1. & 2.: No further information needs be added to the requirements of the design stage.

3.: To be submitted:

- The inspection report from the assessor of the building/construction site, with accompanying photographic evidence that the building complies with the recommendations of the security consultant(s).

*OR*

- Correspondence from the security consultant(s), confirming that the building complies with the recommendations.

## Definitions

**Politiekeurmerk Veilig Wonen (PKVW)**
This is a police seal of approval for dwellings that have an adequate standard of security. Dwellings with the seal of approval incorporate sufficient anti-burglary features and have no weak points that allow a burglar easy access to the dwelling. (The concept originates in the UK, where it is known as *Secured by Design*.)

**Security consultant**
A security consultant from an accredited PKVW company certified by the Centrum voor Criminaliteitspreventie en Veiligheid (Centre for Security and Crime Prevention, CCV).

## Additional information

The PKVW only applies to dwellings. Currently there is no similar label for non-residential buildings available. In the case of a non-residential buildings the credit therefore focuses only on burglary resistance (until an alternative is available).

### The Buildings Decree

The Buildings Decree sets the following requirements for dwellings:

*Article 2.214, section 1:* A projected building must be burglary-resistant.

*Article 2.215:* Doors, windows, frames and comparable structural elements in an external partitioning structure of a non-communal space, which (under the terms of NEN 5087) are accessible to burglars, must be burglar-resistant in conformity with class 2 of standard NEN 5096. The same applies to an internal partition between a non-communal space and an adjacent function or an adjacent communal space.

### References

- http://www.politiekeurmerk.nl (website of Politiekeurmerk Veilig Wonen.)

# MAN 9 Publication of building information (combined credit)

Combined-credit, add awarded points to Man 13.

## Credit aim

To recognise and encourage the publication of information related to the aspects of the designand procurement process' which reduce the overall environmental impact of the building.

## Credit criteria

A maximum of 1 point can be awarded:

| Points | |
|---|---|
| 1 | Where evidence provided demonstrates that the design team are committed to publicising information about the environmental performance of the new development via the internet, newsletters, site visits, presentations etc. |

## Compliance requirements

The following demonstrates compliance:

1. The information listed below is publicised as a case study through one of the following means:
    - Developer's own website, publicly available literature or press release
    - Industry/sector or Government/Local Authority sponsored website or information portals.
    - A website or information portal of a school or college website or literature.
2. The following project related information is publicised in the case study:
    - A basic description of the project and building
    - BREEAM-NL Rating and score
    - The key innovative and low-impact design features of the building
    - Basic Building Cost - £/m2
    - Services Costs - £/m2
    - ExternalWorks - £/m2
    - Gross floor area - m2
    - Total area of site – hectares
    - Function areas and their size (m2)
    - Area of circulation (m2)
    - Area of storage (m2)
    - % area of grounds to be used by community (where relevant)
    - % area of buildings to be used by community (where relevant)
    - Predicted electricity consumption - kWh/m2
    - Predicted fossil fuel consumption - kWh/m2
    - Predicted renewable energy generation - kWh/m2
    - Predicted water use - m3/person/year
    - % predicted water use to be provided by rainwater or greywater
    - The steps taken during the construction process to reduce environmental impacts,

i.e. innovative construction management techniques
- A list of any social or economically sustainable measures achieved/piloted.

3. At least two of the following must be met::
   - Site visits have been arranged for future building users
   - Building users and/or other stakeholders have been given the opportunity to attend design team meetings
   - Building users and/or other stakeholders are given regular presentations on progress of design/construction
   - Online and updated information on the progress of the design and construction of the project.

## Compiance notes

**New Build**
There are no additional or different requirements to those outlined above specific to new-build projects.

**Renovation**
There are no additional or different requirements to those outlined above specific to refurbishment projects.

**Extensions to existing buildings**
There are no additional or different requirements to those outlined above specific to the assessment of extensions to existing buildings.

**Shell only**
There are no additional or different requirements to those outlined above specific to shell only assessments.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additions for the application of this credit to offices.

**Retail**
There are no additions for the application of this credit to retail premises.

**Industrial buildings**
There are no additions for the application of this credit to industrial buildings.

**Schools**
There are no additions for the application of this credit to schools.

## Compliance notes

**Design stage**
1. & 2. A formal letter from the developer or design team confirming:

- A case study for the development will be prepared.
- The information to be included in the case study.
- The medium for case study publication.

3. As appropriate:

- A marked-up programme showing dates of site visits.
- A marked-up programme showing dates of design team meetings attended by building users/stakeholders.
- The programme for presentations that have been or will be given.
- A brief description of the subject of each presentation or copy of the presentation.
- The web address for publicly accessing information on the design and construction process.

**Post-construction stage**

1. & 2. A copy of the published case study.

3. As appropriate:

- A formal letter from the design team or main contractor confirming date(s) of site visits and design team meetings attended by building users/stakeholders.
- A copy of the presentation.
- Assessor check of website to ensure project information is valid and up to.

## Definition

None.

## Additional information

None.

## References

Reference only as an example, there aren´t any BREEAM-NL-equivalents yet:

- http://www.constructingexcellence.org.uk
- http://www.wellbuilt.org.uk/lascn/login.jsp

# *MAN 10 The development as a learning resource*

Combined-credit, add awarded points to Man 13.

## Credit aim

To recognise and encourage the use of the building and site as a learning resource for demonstrating environmental awareness.

## Credit criteria

A maximum of 1 point can be awarded:

| Points | |
|---|---|
| 1 | Where evidence provided demonstrates that the proposed building AND landscape design provides a learning resource that can be used to facilitate development of environmental issues for building users and visitors. |

## Compliance requirements

The following demonstrates compliance:

1. Based on the consultation process, the building and/or landscape (as appropriate to building type) is designed, or includes features or installations that demonstrate to future building users a local and/or global environmental impact of building development or operation, and how the building and/or landscape mitigates such impacts.
2. Due to the subjective nature of the issue and circumstances of the individual project strict compliance requirements have not been set. The items outlined below are suggestions that can be used to determine whether the building and/or landscape meet the credit requirements.
3. If the building is non-eductional (e.g. no school or university) extra effort has to be made to show it's educational purposes, this can be achieved by creating a website or publications or other forms of public exposure.

**Gebouw**

1. Use of demonstration projects such as:
    - A working renewable energy source such as PV's or wind turbines with a description of the technology and live data on energy generated and subsequent CO2 emissions prevented.
    - Alternative heating sources such as wood fuel, solar thermal, geothermal with a description of the technology, live data on energy generated and subsequent CO2 emissions prevented.
    - Rainwater collection systems with live readings, a basic description of how the technology works and its environmental benefit.
2. Utilisation of the building fabric or structure:; for example a cutaway wall section that shows building insulation use within the fabric, with internal and external temperature readings to demonstrate its function. Alternatively, innovative use of a low-impact building material(s) or technology, such as building products made from recycled materials, e.g. roof tiles made from recycled tyres.
3. A permanent display section with:

- Information on the building's design, construction and strategies to reduce its environmental impact
- General information on the environmental impact of the building as whole
- Low-impact building solutions and materials that can be specified in modern design and construction to mitigate such impacts.

4. Where energy or water meters with a pulsed output have been provided, the data can be displayed with a description of the system being monitored.
5. The demonstration/information for the building is presented in a part of the building that has regular user access: for example assembly halls, group or resource spaces.

**Landscaping**

6. The landscaping/site demonstrates either of the following:
   - Space within or adjacent to the site boundary or in the local area/region has been set aside, to allow creation and management of a natural habitat or wetland
     **OR**
   - Space within or adjacent to the site boundary or in the local area/region has been set aside to allow creation and management of an area for organic planting and/or animal husbandry.

The landscaping/site space(s) are clearly marked and designated on a site plan and provide an adequately sized area for achievement of the aim.

## Compiance notes

**New Build**

There are no additional or different requirements to those outlined above specific to new-build projects.

**Renovation**

There are no additional or different requirements to those outlined above specific to refurbishment projects.

**Extensions to existing buildings**

There are no additional or different requirements to those outlined above specific to the assessment of extensions to existing buildings.

**Shell only**

There are no additional or different requirements to those outlined above specific to shell only assessments.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**

There are no additions for the application of this credit to offices.

**Retail**

There are no additions for the application of this credit to retail premises.

**Industrial buildings**
There are no additions for the application of this credit to industrial buildings.

**Schools**
There are no additions for the application of this credit to schools.

## Schedule of evidence

**Design stage**
1.: Marked-up design plan demonstrating:
- The proposed/specified demonstration feature/installation.

3.: A letter from the owner indicating the chosen media for showing the building to the public.

Other requirements: No additional evidence required.

**Post-construction stage**
1.: Assessor's building/site inspection and photographic evidence confirming:
- · Installation and existence of the demonstration feature

3.: A copy of the chosen media for showing the building to the public. This can for example be a screenshot or link to the website or a copy of the publication.

Other requirements: No additional evidence required.

## Definitions
None.

## Additional information
None.

## References
None.

# MAN 11 Ease of maintenance (combined credit)

Combined-credit, add awarded points to Man 13.

## Credit aim

To recognise and encourage the specification of a building and building services that can be easily maintained during their lifecycle.

## Credit criteria

A maximum of 1 point can be awarded:

| Points | |
|---|---|
| 1 | Where evidence provided demonstrates that specifications for the building and the building services/systems and landscaping have considered ease and efficiency of maintenance in line with best practice. |

## Compliance requirements

The following demonstrates compliance:

1. The items identified for each of the key procurement stages in the checklist '*design guide to maintainable buildings*', outlined in Appendix 2 A1 of CIBSE *guide to ownership, operation and maintenance of building services,* have been addressed.
2. A critical appraisal has been completed at the feasibility stage of building procurement, covering the maintenance implications for different design options. This appraisal must comply with the following:
   a. Service life planning in accordance with ISO 15686 *Buildings and constructed assets* - Service life planning Part 1
3. A maintenance strategy has been developed from the critical appraisal and formulated at the design stage. The maintenance strategy must cover the extent to which maintenance can be designed out and how support systems can be built into the specification to facilitate efficient and cost-effective operation and maintenance.
   The strategy must include an indication on how all major plant and equipment is to be removed and replaced within the design life of the building, including the access openings, lifting arrangement and route to and from the plant room at a delivery point.
4. Where there is a management plan for the landscaping (for example, as defined in credit LUE 6 Long term impact on biodiversity), this has been included in the maintenance strategy.
5. Storage space has been provided for cleaning and general maintenance equipment in line with Building Bulletin 98/99 as appropriate. This must be evenly distributed throughout the site/building and as a minimum, storage space is provided on each floor of the building.

## Compiance notes

### New Build

There are no additional or different requirements to those outlined above specific to new-build projects.

### Renovation

There are no additional or different requirements to those outlined above specific to refurbishment projects.

**Extensions to existing buildings**
There are no additional or different requirements to those outlined above specific to the assessment of extensions to existing buildings.

**Shell only**
There are no additional or different requirements to those outlined above specific to shell only assessments.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additions for the application of this credit to offices.

**Retail**
There are no additions for the application of this credit to retail premises.

**Industrial buildings**
There are no additions for the application of this credit to industrial buildings.

**Schools**
There are no additions for the application of this credit to schools.

## Schedule of evidence required

**Design stage**
1. A formal letter from the design team with:
- Confirmation of use and compliance with the CIBSE checklist at the feasibility, outline proposal, prelimary design and final design stages
- A signed, dated and completed copy of the checklist for the relevant stages.
- Indicative examples of how items on the checklist were addressed at each stage of design for the building

2. A copy of the feasibility stage appraisal for the design options.
A formal letter from the design team confirming:
  - o Compliance of the appraisal with the relevant standard(s).

3. & 4. A copy of the maintenance strategy (including the landscaping plan if appropriate).
OR
A formal letter from the design team confirming that:

- A compliant maintenance strategy will be developed.
- This will include the landscape maintenance plan, if relevant.

5. The following is required :
   - Marked-up drawings showing locations and sizes of the storage space.

**Post construction stage**

1. A formal letter from the design team or main contractor with:
   - Confirmation of use and compliance with the CIBSE checklist at the Production information, tender, preconstruction, construction and commissioning stages.
   - A signed, dated and completed copy of the checklist for the relevant stages.
   - Indicative examples of how items on the checklist were addressed at each stage for the building.
2. No additional evidence required to that outlined for the design stage of assessment.

3. & 4. A copy of the maintenance strategy (including the landscaping plan if appropriate).

5. Assessor's building/site inspection and photographic evidence confirming:
   - The location and sizes of the cleaners' storage space.

## Definition

None.

## Additional information

None.

## Referenties

- Guide to ownership, operation and maintenance of building services. CIBSE 2000 http://www.dgbc.nl/images/uploads/CIBSE_Guide_M_Appendix_pag25-26.pdf
- ISO 15686 Gebouwen en geconstrueerde waarde. Planning van de levensduur.
- Part 1 - General Principles 2000
- Part 2 - Service Life Prediction Procedures, 2002
- Part 3 - Performance audits and reviews, 2002
- Part 6 - Procedures for considering environmental impacts, 2004

# 2. Health & Wellbeing

# HEA 1 Daylighting

## Credit aim

To ensure adequate daylighting within occupied areas and rooms to avoid eye strain and promote wellbeing.

## Credit criteria

1 point can be awarded as follows:

| Points | |
|---|---|
| 1 | Where the evidence provided shows that the amount of daylight entering occupied rooms and/or occupied areas complies with the stipulated standards of visual comfort. |

## Compliance requirements

Compliance is demonstrated as follows:

1. Per individual building function, the amount of daylight entering each occupied space complies with the following requirements:

a) An average daylight factor higher than the minimum values in Table 1.

PLUS (b) OR (c AND d)

b) A uniformity ratio of at least 0.4 or a minimum point daylight factor of at least 0.8% (spaces with glazed roofs, such as atria, must achieve a uniformity ratio of at least 0.7 or a minimum point daylight factor of at least 1.4%).

OR

c) A view of sky from desk height (0.7 m) is achieved.

AND

d) The room depth criterion $d/w+d/Hw < 2/(1-Ra)$ is satisfied.

Where:
d = room depth
w = room width
Hw = window head height from floor level
Ra = average reflectance of surfaces in the rear half of the room.
Table 2 (see additional information) gives maximum room depths in metres for different room widths and window head heights of side-lit rooms.

2. The average daylight factor can be calculated using the BRE formula (see additional information).

If one chooses to calculate uniformity ratios and (point) daylight factors, a validated daylight calculation program must be used.

Table 1: Minimum values for average daylight factor per separate building function

| *Building function* | *Minimum average daylight factor (%) per occupied space* | *Minimum percentage of the total floor area to be assessed* |
|---|---|---|
| Office | 2,0% | 80% |
| Education | 2,0% | 80% |
| Retail | 2,0% | 35% |
| Meetings | 2,0% | 35% |

## Exemplary level criteria

The following outlines the exemplary level criteria to achieve an *innovation credit* for this BREEAM-NL issue.

1. At least 80% of the floor area (for the building spaces/room identified above in the standard criteria) has an average daylight factor of 3,0% or above.

2. A uniformity ratio of at least 0.4 or a minimum point daylight factor of at least 1.2% (spaces with glazed roofs, such as atria, must achieve a uniformity ratio of at least 0.7 or a minimum point daylight factor of at least 2.0%).

3. For retail developments, at least 50% by floor area of the common spaces and 35% by floor area of the sales spaces have point daylight factors in accordance with the abovementioned criteria.

## Compliance notes

### New build

Other than the above requirements, there are no additional or deviating requirements for new build projects.

### Refurbishment

Other than the above requirements, there are no additional or deviating requirements for refurbishment projects.

### Extensions to existing buildings

Only the actual extension counts for the purpose of assessing this credit in extensions to existing buildings.

### Shell only

This credit can only be applied to shell-only construction if all the required information on the daylight apertures (including LTA) and on the wall/floor finish (reflectivity factors) is known.

### Percentage of the assessable area

Minimum part of the total assessable floor area of all occupied spaces that meets the requirement for the average daylight factor. If 6 spaces in all, each of 150 m2 (900 m2 in total) are to be assessed, then 720 m2 must satisfy the daylight factor requirement. This is equal to 4.8 spaces. The number of spaces should always be rounded up, which means in this case that 5 spaces must satisfy the requirement

### Equivalence of occupied areas

A minimum proportion of the total assessment of the total floor area must meet the requirements. If certain

areas are equivalent in terms of daylight (such as size, shape, window area, tranmsmissiefactor, sky view angle, reflectance, etc.), only one daylight calculation has to be made for the equivalent areas. The copies of the design drawings, and the list of all occupied areas, must clearly indicate the daylight calculations of the occupied areas which are equivalent.

**Point daylight factors**
Computer simulations with a validated daylight calculation program are essential when calculating point daylight factors.

**Occupied spaces where daylight enters via other occupied spaces**
Occupied spaces that only receive daylight from another occupied space (e.g. which are adjacent to a light well or atrium) and which are separated from this other space by an interior wall consisting for at least 50% of clear glass or some other transparent material are regarded as a single occupied space for the purposes of this credit.

**Different window types or other forms of daylighting**
Different window types or other forms of daylighting (e.g. roof lights, fanlights, matt glass, domed roof lights, solar tubes, sun pipes and similar) are included in the calculation of the daylight factor and the uniformity ratio, providing the contribution to daylighting is calculated in an integrated way using a validated daylight calculation program.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additional or different requirements to those outlined above specific to office buildings.

**Retail**
There are no additional or different requirements to those outlined above specific to the retail spaces within retail buildings.

**Schools**
There are no additional or different requirements to those outlined above specific to the occupied spaces with an educational function within school buildings.

**Industry**
At present, this credit is only applicable to the office and meeting room functions in industrial buildings.

## Schedule of evidence required

### Design stage

1. & 2.: Copies of design drawings showing all occupied spaces, with the function of each occupied space, for every floor of the building.

AND

Daylight calculations confirming:

- That the daylighting of all relevant occupied spaces has been assessed;
- That the necessary daylight parameters have been studied;
- The average daylight factor for each relevant occupied space;
- That the requirements regarding the room depth criterion, the uniformity ratio and view of sky (if applicable) have been satisfied;
- The percentage of the total assessed floor area that satisfies the average daylight factor requirements in Table 1.

**Post-construction stage**

1. to 4:

- An inspection report from the assessor, confirming that window sizes and the layout of the occupied spaces comply with the specifications from the design stage, and a letter from the design team declaring that the building at the time of handover has not been changed in relation to the original design.
- If the building, on handover, has been altered in relation to the original design, the evidence required for the design stage must be submitted again.

## Definitions

**Building function**
The functional use of spaces in a building in accordance with the definitions of the Buildings Decree.

**Average daylight factor**
Ratio of the average illuminance (of daylight) on a work surface in the enclosure to the simultaneous unobstructed outdoor illuminance on a horizontal surface, assuming an overcast sky (Commission Internationale de l'Eclairage).

**Point daylight factor**
The point daylight factor is the ratio of the illuminance (of daylight) at a specific point on the work surface in an enclosure to the simultaneous unobstructed outdoor illuminance on a horizontal surface, assuming an overcast sky (Commission Internationale de l'Eclairage).

**Uniformity ratio**
The ratio between the minimum illuminance (of daylight) on the work surface in an occupied space (or minimum daylight factor) and the average illuminance (of daylight on the same work surface (or average daylight factor).

**Occupied space**
Space intended for human occupation for at least 30 minutes on average per day or in which activities consistent with the relevant functional use take place. An occupied space complies with the minimum criteria of the Buildings Decree with regard to floor area and height.

**Illuminance**
The amount of light, measured in Lux, falling on a surface unit.

**Working plane**
The horizontal, vertical or sloping surface on which the visual tasks are performed. Working planes are normally assumed to be horizontal, 0.7 m above the floor surface in offices and 0.85 m above the floor surface in industry.

**View of sky**

There is a view of the sky from the working plane if direct light is received from the sky, or the sky is visible from the working plane.

## Additional information

Table 2: Shows the maximum depth (in metres) of the space, for various widths and window heights (height of window top from the floor), for a side-lit space.

| Reflectie (Re) | 0,4 | | 0,5 | | 0,6 | |
|---|---|---|---|---|---|---|
| Breedte (m) | 3.0 | 10,0 | 3,0 | 10,0 | 3,0 | 10,0 |
| Raamhoogte (m) | | | | | | |
| 2,5 | 4,5 | 6,7 | 5,4 | 8,0 | 6,8 | 10,0 |
| 3,0 | 5,0 | 7,7 | 6,0 | 9,2 | 7,5 | 11,5 |
| 3,5 | 5,4 | 8,6 | 6,5 | 10,4 | 8,1 | 13,0 |

**BRE formula for simplified calculation of the average daylight factor**
The assessor evaluates the requirement using the BRE formula for calculating the average daylight factor or by means of an average daylight factor calculation (to be submitted by the certificate applicant) from a specially designed and validated computer program.
BRE formula for simplified calculation of the average daylight factor:

$$DF_{AV} = \frac{A_{raam} \cdot T_{raam} \cdot \gamma}{A_{schil} \cdot \left(1 - R_{AV}{}^{2}\right)}$$

Where:
$DF_{AV}$ average daylight factor
$A_{raam}$ window area of the enclosure in $m^2$
$A_{schil}$ shell area of the enclosure (floor, ceiling, walls including windows) in $m^2$
$T_{raam}$ transmission factor of window (LTA) in %
$\gamma$ view-of-sky angle (taking into account overhangs and obstacles) in degrees (°)
$R_{AV}$ average reflectivity factor of the shell (excluding the windows)

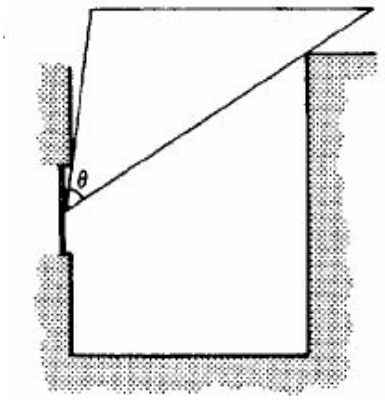
**Window area ($A_{raam}$)**
The window area is the net daylight aperture and therefore excludes the area of the frame.

**Transmission factor of window ($T_{raam}$)**
The total transmission factor (LTA) is the product of the transmission factors of all glazed surfaces between the relevant enclosure and the outside. For interior enclosures that receive light via another enclosure, the depth of the other enclose must be taken into account as an overhang in the calculation.

**Average reflectivity factor ($R_{AV}$ )**
The reflectivity factor is determined by the colour and texture of the material. For floors, (light) walls and (light) ceilings in new buildings, respective default reflectivity factors of 0.3, 0.7 and 0.8 may be applied. The average reflectivity factor is weighted according to the associated shell area.

**View-of-sky angle**

The view-of-sky angle ($\gamma$) depends on the overhangs (alpha) and the obstacles (beta) as taken into account in the Energy Performance Norm (EPN). The view-of-sky angle is the unhindered view (of the sky) from a window, minus the limitation imposed on this by overhangs and obstacles. Overhangs are associated with the building. Obstacles are determined by the surrounding area.




## The Buildings Decree

The Buildings Decree sets the following requirements for dwellings, offices and schools:

*Article 3.134, section 1:* An occupied area has an equivalent daylight area in m², calculated in conformity with NEN 2057, of which the numeric value is not less than the numeric value of the part of the floor area in m² of the occupied area, as shown in Table 3.133.

*Article 3.134, section 2:* An occupied space has an equivalent daylight area in m², calculated in conformity with NEN 2057, that is not less than the area given in Table 3.133.

*Article 3.134, section 3:* An equivalent daylight area, as referred to in the first and second sections, is not realised by means of a light aperture in an internal partition that separates it from an adjacent occupied area, toilet area, bathroom or technical space.

*Article 3.134, section 4:* In the calculation of an equivalent daylight area, as referred to in the first and second sections:

• built structures and equivalent obstacles located on another plot of land are not taken into account,

• daylight apertures in an external separating structure that are less than 2 m distant from the plot boundary (measured in a straight line from the projecting surface of these apertures) are not taken into consideration; if the plot on which the function is located borders a public highway, public water feature or public green space, the distance is measured to the centre of the highway, public green space or public water feature, and

• the relevant angle of impedance ‘alpha’, as referred to in NEN 2057, is not less than 25 degrees for each distinct segment.

*Article 3.134, section 7:* The second section does not apply to an occupied space with a floor area of more than 150 m². In calculating the equivalent daylighting of the occupied area in which the occupied space lies, the floor area of that space is not (as an exception to the first section) taken into consideration.

## References

Average daylight factor: a simple basis for daylight design, Information Paper 15/88, Building Research Establishment, Watford, UK.

# HEA 2 View Out

## Credit aim

To encourage adequate provision of an external view in all relevant workplaces. This is in order to prevent eye strain and break the monotony of the indoor environment.

## Credit criteria

1 point can be awarded as follows:

| Points | |
|---|---|
| 1 | Where the evidence provided demonstrates that all relevant workplaces have an adequate 'unimpeded external view'. |

## Compliance requirements

Compliance is demonstrated as follows:

1. All workplaces are within 7 metres of a wall with windows or permanent openings, whereby the bottom of the window or opening is no more than 0.9 metres from the floor and provides an 'unimpeded external view' (see the definitions section for explanation of the term 'unimpeded external view'.
2. If the window or opening looks out on an atrium, inner courtyard, enclosed garden, enclosed plaza or other buildings, the distance in a straight line from the window or opening to the rear wall of the atrium, inner courtyard, enclosed garden or enclosed plaza, or the facing wall of the other building, must be at least 10 metres. If the view out looks onto an atrium, inner courtyard, enclosed garden or enclosed plaza, this should be furnished with decoration of some description such as greenery, plant containers, artwork etc.

## Compliance notes

**New build**
There are no additional or different requirements to those outlined above specific to new build projects.

**Refurbishment**
There are no additional or different requirements to those outlined above specific to refurbishment projects.

**Extensions to existing buildings**
There are no additional or different requirements to those outlined above specific to the extension of existing projects.

**Shell only**
If it is not possible to demonstrate which occupied spaces contain workplaces, all occupied area in the building must comply with the above requirements.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|

| | | | |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additional or different requirements to those outlined above specific to new office projects.

**Retail**
This credit is only applicable to relevant occupied spaces in retail projects.

**Industrial buildings**
This credit is only applicable to relevant occupied spaces in industrial projects.

**Schools**
There are no additional or different requirements to those outlined above specific to schools.

## Schedule of evidence required

### Design stage

1. & 2.:

- A copy of the design or specification drawings, showing the location of the openings and information about measurements/distances to the workplaces, including any structural obstacles such as raised floors, pillars or interior walls. If no final layout drawing is present, a drawing showing the possible layout of workplaces will suffice.
- Situation drawings showing the building's surroundings and the distance to adjacent buildings, including designations or descriptions of any obstacles.

### Post-construction stage

1. & 2.:

- A report on a site inspection by the assessor and photographic evidence that the requirements are fulfilled. As regards the photographic evidence, a representative sample of all the workplaces in the building will suffice.

*OR*

- A written declaration from the design team that the building, on handover, does not deviate from the design or specification drawings. If changes have been made in the meantime, the design team must show this clearly by means of additional drawings and specifications; the assessor will then judge the extent to which the requirements are still fulfilled.

## Definitions

**Relevant occupied areas**
All occupied areas with workspace or a desk for building users.

**Unimpeded external view**
This is an unhindered view directly to the outside, with a view of:

- landscape (not only the sky), *OR*

- objects, including buildings, near and far.

### Additional information

None.

### References

None.

# HEA 3 Glare Control

## Credit aim

To counter the nuisance in occupied spaces from reflection or dazzle by incoming light through the use of shading systems.

## Credit criteria

1 point can be awarded as follows:

| Points | |
|---|---|
| 1 | Where evidence provided demonstrates that an occupant-controlled shading system that adequately controls glare is fitted all occupied spaces. |

## Compliance requirements

Compliance is demonstrated as follows:

1. An occupant-controlled shading system is applied to all glazed elements, in all occupied spaces, that directly face the outside or separate the space from another space into which direct sunlight can fall, where people can experience glare from incoming sunlight due to the geographical orientation of the building.
2. The shading systems used allow for smoothly variable regulation by individual occupants (partial to complete covering of the surface illuminated by outside light).
3. The shading systems used are compliant in terms of glare control with class 3 or 4 of EN 14501:2005 (whereby the transmission measurement complies with EN 14500:2008).

## Compliance notes

### New build

There are no additional or different requirements to those outlined above specific to new build projects.

### Refurbishment

There are no additional or different requirements to those outlined above specific to refurbishment projects.

### Extensions to existing buildings

There are no additional or different requirements to those outlined above specific to the extension of existing projects.
If the facilities are located in the existing building, these facilities must be evaluated in the light of the aforementioned requirements.

### Shell only

If it can be demonstrated that a shading system in conformity with the above requirements is used, the credit can be awarded. If the use of a shading system is not (yet) specified, the credit cannot be awarded.

### The credit is applicable to the following building types

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|

| | | | |
|---|---|---|---|
| √ | √ | √ | √ |

**Offices**
There are no additional or different requirements to those outlined above specific to new office projects.

**Retail**
This credit is only applicable to office spaces in retail projects. This credit does not need to be assessed for the other building functions.

**Industrial buildings**
This credit is only applicable to office spaces in industrial projects. This credit does not need to be assessed for the other building functions.

**Schools**
In the case of classrooms, the requirement for operation by individual occupants only applies to the teachers in these rooms. The provisions do not apply to sports halls.

## Schedule of evidence required

**Design stage**
1 to 3.

- A copy of the design or specification drawings in which the various building functions are indicated and their need for glare control.
- A copy of the schedule of requirements of specification, describing the shading system, its operation and the locations where it is used.

**Post-construction stage**
1 to 3.

- A report on a site inspection by the assessor and photographic evidence confirming that the prescribed shading systems have been fitted. As regards the photographic evidence, a representative sample will suffice.

## Definitions

**Geographical orientation**
For the purpose of this credit, geographical orientation can be defined as the building's facing in relation to the rising and setting of the sun. In general, the east and west sides of the building will be respectively more brightly illuminated by the sun in the morning and late afternoon/early evening. One should also take account of the sun's elevation (lower in winter, higher in summer).

**Luminance**
The luminance is a measure of the luminous intensity of a light source or a lit surface observed by the eye. Unit: Candela per square metre (cd/m²). This measure expresses that light entering with a given intensity in lumens will be reflected with much less intensity in dark rooms than in light-coloured rooms.

**Luminance of shading system**

Measure of the extent to which a shading system reduces the luminance of the incoming light. The luminance relates to the measured brightness of a light source, surface or object. After all, light of a given intensity in lumens will produce a much lower impression of brightness in a dark room than in a room painted in light colours.

**Occupied space**
Space intended for human occupation for at least 30 minutes on average per day or in which activities consistent with the relevant functional use take place. An occupied space complies with the minimum criteria of the Buildings Decree with regard to floor area and height for the occupation by people during it's use.

## Additional information

- This credit is about glare control. Sun screening can also be used for energy-saving purposes (reduction of the need for artificial cooling). However, this is already dealt with in ENE 1.
- Glare can also be caused by reflected artificial light, particularly from computer screens. However, this aspect is dealt with in credit Hea 5, 'Internal and External Lighting Levels'.

## References

- NEN-EN 14500:2008: Sun shades and shutters – Thermal and visual comfort – Methods of testing and calculation
- NEN-EN 14501:2005: Sun shades and shutters – Thermal and visual comfort – Performance characteristics and classification
- CIE 117 Discomfort glare in interior lighting
- SBR Publication: Healthy Buildings Practical Manual, Section2: Interior environment performance requirements for office buildings

# HEA 4 High frequency lighting

## Credit aim
To increase visual comfort by the use of high-frequency fluorescent lighting in a building's occupied spaces.

## Credit criteria
1 point can be awarded as follows:

| Points | |
|---|---|
| 1 | Where evidence provided demonstrates that high frequency ballasts are installed in all fluorescent lighting in the building's occupied spaces. |

## Compliance requirements
1. All fluorescent and compact fluorescent lamps in the occupied spaces of a building are fitted with high frequency ballasts.

## Compliance notes

### New build
There are no additional or different requirements to those outlined above specific to new build projects.

### Refurbishment
There are no additional or different requirements to those outlined above specific to refurbishment projects.

### Extensions to existing buildings
When the existing building is also the subject of the assessment, the lighting in those parts of the building must also be included when assessing this credit. If the assessment only relates to the extension to the building, the assessment of the credit can be restricted to this building section.

### Shell only
If, in a shell-only development, the tenants are responsible for selecting the lighting in the tenanted spaces, the requirements for these spaces can be met if:
1. The use of high frequency ballasts in fluorescent lighting for at least 50% of the tenanted floor area is assured by the inclusion of clauses in signed rental contracts, making the use of such high frequency ballasts compulsory; OR the compulsory use of such high frequency ballasts is included in the standard tenancy conditions applicable to all spaces that are let.
2. With regard to the remaining area to be let, use of such high frequency ballasts is encouraged by its inclusion in information material AND/OR the user manual that is presented to the tenant on handover.
3. Occupied spaces that are not to be let must comply with the standard HEA4 requirements.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| √ | √ | √ | √ |

**Offices**
There are no additional or different requirements to those outlined above specific to office buildings.

**Retail**
There are no additional or different requirements to those outlined above specific to retail buildings.

**Industrial buildings**
There are no additional or different requirements to those outlined above specific to industrial buildings.

**Schools**
There are no additional or different requirements to those outlined above specific to school buildings.

## Schedule of evidence required

**Design stage**
1. To be submitted:
- A copy of the schedule of requirements, the specification or the drawings of the electrical systems, including a list of light fittings or a technical specification of the lighting plan, clearly showing that high frequency ballasts are used in the fluorescent lighting of every occupied space.

**Post-construction stage**
1. To be submitted:
- A report on a site inspection by the assessor and photographic evidence confirming that high frequency lighting in conformity with requirements has been installed in the occupied spaces. A representative sample of the fitted lighting will suffice.

*OR*
- A declaration from the design team that the building, on handover, does not differ from the original design in respect of the applied lighting techniques or, if anything has been changed in this respect, a copy of the changed lighting plan, changed specification (drawings) or technical specifications of all light fittings, demonstrating compliance with the credit requirements.

## Definitions

**High frequency lighting**
'High frequency lighting' refers to lighting using fluorescent lamps fitted with electronic ballasts that raise the current frequency from the electricity network (50 Hz) to 30 kHz. The advantage of this type of lighting, compared to conventional ballasts, is that it eliminates the stroboscopic effect (flickering) produced at 50 Hz frequency. Furthermore, a frequency of 30 kHz is not audible to the human ear, which also eliminates the familiar buzzing that one gets with older ballasts. Finally, a high frequency lamp also produces much more light.

**Occupied space**
Space intended for human occupation for at least 30 minutes on average per day or in which activities consistent with the relevant functional use take place. An occupied space complies with the minimum criteria of the Buildings Decree with regard to floor area and height.

**Additional information**
No additional information.

**References**
- NEN-EN 12464 Light and lighting – Workplace lighting – Part 1: Interior workplaces

NEN-EN 12665 Light and lighting – Basic terms and criteria for determining lighting requirements

# HEA 5 Internal and External Lighting Levels

## Credit aim

To ensure that there are adequate levels of lighting both inside the building and in its grounds, and that the lighting is also of sufficient quality in other respects to maintain a high degree of visual comfort and performance.

## Credit criteria

1 point can be awarded as follows:

| Points | |
|---|---|
| 1 | Where the evidence provided shows that the implemented lighting levels, reduction of dazzle, colour values and luminance ratios, both inside the building and (insofar as relevant) in its own grounds, meet the minimum requirements for visual comfort and performance. |

## Compliance requirements

Compliance is demonstrated as follows:

1. The values for the 'best practice illuminance' (Em in lux), the 'colour rendering index' (Ra) of the interior lighting and the value for the limitation of 'glare' (UGRL - Unified Glare Rating) from the building's interior light fittings comply – for each distinct function of the building and its spaces – with the minimum requirements shown in Table 1 and are defined in conformity with NEN-EN 12464 Light and lighting – Workplace lighting – Part 1: Interior workplaces, or NEN 3087 Ergonomics – Visual ergonomics in relation to lighting – Principles and applications.
2. The 'maximum luminance ratios' of the 'working planes' in relation to the immediate surroundings or the periphery, in all office spaces and for all functions shown in Table 1, should amount to no more than 10:3:1 and should be defined in conformity with NEN 3087 Ergonomics – Visual ergonomics in relation to lighting – Principles and applications.
3. In order to promote a uniform distribution of light, an automatic, daylight-dependent light arrangement is used.
4. The values for the 'average illuminance' (Em in lux), the 'uniformity of illuminance' (Uo), the 'glare reduction' (GRL) and the 'colour rendering index' (Ra) of the lighting used in the 'grounds of the building' are defined on the basis of, or comply with, the relevant minimum requirements in NEN-EN 12464 Light and lighting – Workplace lighting – Part 2: External workplaces.

Table 1: Requirements for minimum practical illuminance, reduction of glare and colour rendering index.

| *Building function* | *Minimum requirements for practical lighting level, reduction of glare and colour rendering index* |
|---|---|
| Office buildings | NEN-EN 12464 Light and lighting – Workplace lighting – Part 1: Interior workplaces |
| Retail | NEN-EN 12464 Light and lighting – Workplace lighting – Part 1: Interior workplaces |
| Industry | NEN-EN 12464 Light and lighting – Workplace lighting – Part 1: Interior workplaces |
| School buildings | Class A in the SenterNovem publication 'Guidance document for |

| | |
|---|---|
| | new, fresh schools', 2008. |

## Compliance notes

**New build**
There are no additional or different requirements to those outlined above specific to new build projects.

**Refurbishment**
There are no additional or different requirements to those outlined above specific to refurbishment projects.

**Extensions to existing buildings**
If the existing building comes within the scope of the assessment, it should be included in the assessment of the credit. If the assessment only relates to the extension itself, only the new structural element need be included in the assessment of the credit.

**Shell only**
If the internal lighting has not yet been specified due to the speculative nature of the building (and hence the lighting levels to be used are unknown), the credit cannot be allocated.

**No outside grounds present with lighting**
If the building does not have any outside grounds for which lighting is necessary, the compliance requirements with regard to exterior lighting do not need to be taken into consideration and the credit can be allocated in full if the compliance requirements with regard to interior lighting are met.

**The credit is applicable to the following building types**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additional or different requirements to those outlined above specific to office buildings.

**Retail**
There are no additional or different requirements to those outlined above specific to retail buildings.

**Industrial buildings**
There are no additional or different requirements to those outlined above specific to industrial buildings.

**Schools**
There are no additional or different requirements to those outlined above specific to school buildings.

## Schedule of evidence required
**Design stage**

1. to 4:

- The drawings for the lighting systems, including technical specification of the lighting used in each occupied space/area, or a technically specified lighting plan that clearly shows what lighting is used in which places (specified by building/spatial function) and from which one

can conclude whether the requirements with regard to both interior and exterior lighting are complied with.

**Post-construction stage**

1. to 4:

- A written declaration from the design team that the building, on handover, does not differ from the original design in respect of the applied lighting techniques or the lighting plan.

*OR*

- If anything has been changed in this respect: a copy of the changed lighting plan or changed specification, the changed specification drawings or technical specifications of all light fittings, showing that the requirements are met.

## Definitions

**Grounds of the building**
These include features such as car parks, access roads, walkways, storage bays for outside equipment, bike sheds etc. However, the compliance requirements only relate to lighting of the building's grounds insofar as installed by private initiative. Municipal street lighting therefore falls outside the scope of this credit.

**Uniformity of illuminance**
This is a figure of up to 1, calculated by dividing the average illuminance (or luminance) by the minimum illuminance (or luminance).

**Average illuminance**
The illuminance is the amount of light (the luminous flux in lumens) falling on an object per unit of surface area ($m^2$). The illuminance is expressed in lux (lx).

**Colour rendering index**
The ability of a light source to reproduce the colours of objects faithfully in comparison with a natural light source. The colour rendering is expressed as an index, a figure from 1 to 100, where 1 represents the worst colour rendering and 100 represents perfect colour rendering. It therefore shows, as a percentage, how well (or uniformly) the assessed light source displays the colours of objects.

**Luminance**
The luminance is a measure of the luminous intensity of a light source or a lit surface observed by the eye. Unit: Candela per square metre ($cd/m^2$). This measure expresses that light entering with a given intensity in lumens will be reflected with much less intensity in dark rooms than in light-coloured rooms.

**Maximum luminance ratios**
This measure characterises the relationship between the brightness (brightness contrasts) of the various zones in the space that fall within the field of view. A space that has excessively monotone lighting (and in which various planes are of more or less equal brightness) will be experienced by the people who work there as dull and monotonous. In museums, for example, uniform luminance ratios are created precisely in order to draw attention to the displayed objects. On the other hand, if the contrasts in brightness are too great, the eye must constantly adapt to the big differences. This leads very quickly to fatigue, and in a work environment will surely result in loss of production. The luminance ratios are the contrasts in brightness (see above) between the working planes (see below), their immediate surroundings and the periphery of the lit space, and are expressed in figures, for example 50:3:1.

**Best practice illuminance (Em)**
The lowest permissible value of the average illuminance on the specified plane at the time when the bulb or tube should normally be replaced. It is therefore the average minimum light flux per m² on the working area after depreciation (loss of light output from the bulb or tube due to normal wear). If it is known in which part of the space the visual task will be performed, the task area is assumed to be the part of the space where it could be performed. This frequently encompasses the entire space, with a 50-centimetre peripheral zone all round.

**Working planes**
The working plane or working area is the plane, measured in height from the floor, on which typical visual tasks for a given space in a building are performed. If it is known in which part of the space the visual task will be performed, the task area is assumed to be the part of the space where it could be performed. This frequently encompasses the entire space, with a 50-centimetre peripheral zone all round.

**Reduction of glare**
A measure of the reduction of glare from the light radiating from a light fitting.

**Glare**
Hindrance caused by the light from light fittings reflecting on the working plane, particularly computer screens. The measure of glare is the 'Unified Glare Rating' (UGRL), which indicates the degree to which light fittings and their operation cause glare at the user's eye level and direction of view, based on a regular pattern, in length and breadth, of light fittings. The manufacturer of the light fittings must supply a table per fitting from which the UGRL can be read.

## Additional information

Adequate lighting of the grounds also increases social safety. Adequate interior lighting also increases safety at work (reduces danger of tripping and allows risky tasks to be carried out safely).

## References


- NEN-EN 12464 "Light and lighting – Workplace lighting – Part 1: Interior workplaces";
- NEN-EN 12464 "Light and lighting – Workplace lighting – Part 2: External workplaces.";
- NEN-EN 12665 "Light and lighting – Basic terms and criteria for determining lighting requirements";
- NEN 3087 Ergonomics – "Visual ergonomics in relation to lighting – Principles and applications";

- SBR "Healthy Buildings Practical Manual", Section A2 "Healthy Lighting" and Section R2 "Performance Requirements for the Interior Environment of Offices";
- SenterNovem "Guidance Document for New, Fresh Schools", 2008.

# HEA 6 Lighting zones & controls

## Credit aims
To ensure occupants have easy and accessible control over lighting within each relevant building area.

## Credit criteria
A maximum of 1 point can be awarded.

| Points | |
|---|---|
| 1 | Where evidence provided demonstrates that, in all relevant building areas, lighting is appropriately zoned and occupant controllable. |

## Compliance requirements

The following demonstrates compliance:

1. Lighting is zoned to allow separate user-control of the following areas (where applicable):
   - Office and circulation spaces in open plan offices
   - In office areas, zones of no more than four workplaces
   - Circulation spaces (horizontal and vertical transport)
   - Workstations adjacent to windows/atria and other building areas separately zoned and controlled.
   - In the library book theses spaces, reading corners and the bar separately zoned
   - Seminar and lecture rooms: zoned for presentation and audience areas
   - Library spaces: separate zoning of stacks, reading and counter areas.

2. The circulation spaces (horizontal and vertical transport) is separately zoned areas but not necessarily user-accessible and easy to operate.

## Compliance notes

### New build
There are no additional or different requirements to those outlined above specific to new build projects.

### Refurbishment
There are no additional or different requirements to those outlined above specific to refurbishment projects.

### Extensions to existing buildings
There are no additional or different requirements to those outlined above specific to the extension of existing projects.

### Shell only
In the case of speculative buildings, the control system must have the capacity to be zoned, as required, once the final tenant is known and occupancy patterns/layout are agreed.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additional or different requirements to those outlined above specific to new office projects.

**Retail**
This credit is only applicable to office spaces in retail projects.

**Industrial buildings**
This credit is only applicable to office spaces in industrial projects.

**Schools**
There are no additional or different requirements to those outlined above specific to schools.

**Occupancy/workstation layout unknown**
Where occupancy/workstation layout is not known, lighting control can be zoned on the basis of 40m$^2$ grids i.e. an assumption of 1 person/workspace per 10m$^2$.

**Small spaces**
Where the building consists entirely of small rooms/spaces (less than 40m$^2$) which do not require any subdivision of lighting zones/control or meet the requirements by default, then this credit may be awarded.

## Schedule of evidence required

**Design stage**
1. & 2. To be handed over:

- A copy of the brief, final draft (DO), specifications or drawings of the electrical equipment which clearly indicate that adequate opportunities are provided so that switching lights in various rooms of the building can be operated individually.

**Post construction stage**
1. & 2. To be handed over:

- A report of an inspection on site by the assessor showing that the requirements are met, which may be sufficient to an inspection where a representative sample of all building areas are checked.

*OR*

- A written statement that the design of the lighting system at completion of the structure is unchanged from the draft or a technical specification of any interim changes that have occurred. The assessor assesses whether these changes meet the requirements.

## Definitions
None.

**Additional information**
None.

**References**
- ISSO/SBR Publicatie 807 Daglichtsystemen en visueel comfort, 2000
- Daglicht in het ontwerp van utiliteitsgebouwen, kennis- en informatiebron voor de architect, 2003
- SBR Publicatie Gezonde verlichting in gebouwen

# HEA 7 Natural Ventilation

## Credit aim

An addition possibility for the occupants to get (temporary) ventilation directly from outside, to supplement the basic ventilation in the building.

## Credit criteria

1 point can be awarded as follows:

| Points | |
|---|---|
| 1 | Where it can be demonstrated that occupied spaces can enjoy sufficient natural ventilation from outside because the occupants can open windows. |

## Compliance requirements

The compliance requirements are fulfilled if the occupied areas can be ventilated by means of peak load ventilation.

1. Each occupied space contains at least one openable window and/or one openable window for every 3.6 metres in the length of the outer wall.
2. The openable windows provide a minimum peak load ventilation capacity, determined in accordance with NEN 1087, for an occupied area and for an occupied space, as shown in Table 1.
3. In occupied spaces where there are workplaces more than 7 metres from the nearest ventilation facility, there must also be openable windows in the facing wall or equivalent means of peak load ventilation, in such a way that the distribution in both walls gives an adequate flow of air.
4. The occupants must be able to operate the window opening mechanism with ease. This mechanism allows either for smoothly variable adjustment or at least three settings, one of which is a slit setting.

Table 1: Minimum capacity for peak load ventilation of occupied spaces and occupied areas, per function

| Function | Minimum capacity per occupied area ($dm^3/s$ per $m^2$ of floor area in occupied area) | Minimum capacity per occupied space ($dm^3/s$ per $m^2$ of floor area in occupied space) |
|---|---|---|
| Office | 6 $dm^3/s$ per $m^2$ | 3 $dm^3/s$ per $m^2$ |
| Education | 9 $dm^3/s$ per $m^2$ | 6 $dm^3/s$ per $m^2$ |

## Compliance notes

**New build**
There are no additional or different requirements to those outlined above specific to new build projects.

**Refurbishment**
There are no additional or different requirements to those outlined above specific to refurbishment projects.

**Extensions to existing buildings**
If the existing part is also the subject of the assessment, the requirements also apply to this part. If this is not the case, the requirements only apply to the extension.

**Shell only**
There are no additional or different requirements to those outlined above specific to the assessment of shell-only projects.

**Atrium or second skin facades**
Openable windows that open onto atriums or second skin facades also suffice, for the purposes of this credit, as adequate provision for peak load ventilation, providing the temperature in the adjoining space (the atrium or the double skin) does not exceed the outside temperature + 3℃ when the outside temperature is more than 20℃, and providing they meet the compliance r equirements in other respects.

**Mechanically ventilated/cooled buildings**
A credit can be allocated to these buildings if it can be demonstrated that the building has the facilities to fulfil the aforesaid requirements. This is with an eye to (possible) future use (design flexibility).

**High buildings**
High buildings (with an occupied area or occupied spaces at a height of more than 12 metres) must be constructed with hybrid ventilation, i.e. a combination of natural and mechanical ventilation, in which the natural component fulfils the compliance requirements and the mechanical component incorporates automated capacity controls based on automatic detection when the $CO_2$ level of the interior air becomes excessive. The latter is to ensure that the mechanical ventilation will automatically provide adequate ventilation if the occupants completely close the provisions for natural ventilation because the wind is too strong or the outside air is polluted. See also the notes under ‘Further Information’.

**Buildings in a noisy environment or an environment with a raised level of air pollution**
Buildings in a noisy environment or an environment with a raised level of air pollution (e.g. buildings in a town centre or close to busy highways) must be constructed with hybrid ventilation, i.e. a combination of natural and mechanical ventilation, in which the natural component fulfils the compliance requirements and the mechanical component incorporates automated capacity controls based on automatic detection when the $CO_2$ level of the interior air becomes excessive. The latter is to ensure that the mechanical ventilation will automatically provide adequate ventilation if the occupants completely close the provisions for natural ventilation because the wind is too strong or the outside air is polluted. See also the notes under ‘Further Information’.

**The credit is applicable to the following building types**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additional or different requirements to those outlined above specific to office buildings.

**Retail**
For retail buildings, the requirements apply only to occupied areas with an office function in the building.

**Industrial buildings**
For industrial buildings, the requirements apply only to occupied areas with an office function in the building.

**Schools**
There are no additional or different requirements to those outlined above specific to school buildings.

## Schedule of evidence required

### Design stage

1. to 4:

- Plans and elevations indicating:
  - Dimensions of occupied areas and occupied spaces.
  - Location of the openable windows.
  - Capacity of the openable windows.
- A calculation of the peak load ventilation capacity through NEN 1087 standards.
- If necessary, a written explanation incorporation technical arguments from the building designer, showing why natural ventilation cannot be used due to considerations of structural technology and/or physics.

### Post-construction stage

1. to 4:

- A written statement by the design team that at completion of the building the provisions for natural ventilation have not changed in comparisson to the design. If changes have occurred the technical specifications of these amendments and the 'as built' calculation of the ventilation capacity of the peak load natural ventilation capacity through NEN 1087 standards. The assessor assesses whether these changes meet the requirements.
- A report on a site inspection by the assessor and photographic evidence, confirming that provisions for natural ventilation have been installed in all occupied spaces. As regards the photographic evidence, a representative sample of the occupied spaces in the building will suffice.

## Definitions

**Occupied area**
The part of a building with at least one occupied space, consisting of one or more adjoining spaces on the same floor that has a function other than a toilet, bathroom, technical space or circulation space.

**Occupied space**
Space intended for human occupation for at least 30 minutes on average per day or in which activities consistent with the relevant functional use take place. An occupied space complies with the minimum criteria of the Buildings Decree with regard to floor area and height.

## Additional information

**Importance of natural ventilation**
In buildings that have only mechanical air conditioning, the occupants prove to be almost twice as sensitive to temperature changes as in naturally ventilated buildings, and (natural) temperature changes will lead much faster to a feeling of discomfort.

**High buildings**
High buildings can be furnished with possibilities for natural ventilation, even on the higher storeys, as long as the windows are installed with a rotating configuration. This does not apply if there are weighty objections because of considerations structural physics and/or technology. After all, it is also listed as an additional compliance requirement that the occupants can regulate the availability and the level of natural ventilation. If

there is excessive disturbance from the wind, occupants can and will suspend the supply of natural ventilation. In that case, it is essential that the mechanical ventilation system automatically takes care of the ventilation.

**Buildings in areas that are noisy or have a high level of air pollution**
Buildings in areas that are noisy or have a high level of air pollution can also be provided with facilities for natural ventilation. Arguments against natural ventilation in such situations are that this would diminish the interior air quality (intake of contaminated air) or cause too much noise hindrance. With regard to the interior air quality, it must be said that most mechanical ventilation systems do not incorporate any filters that filter out the most important sources of exterior air pollution, NOx, $SO_2$ en $CO_2$. Extensive research shows that the interior air quality of buildings is therefore often worse than the outside air.
After all, it is furthermore listed as an additional compliance requirement that the occupants can regulate the availability and the level of natural ventilation. If the air is polluted or there is excessive noise, occupants can and will suspend the supply of natural ventilation. In that case, it is essential that the mechanical ventilation system automatically takes care of the ventilation.

## The Buildings Decree

The Buildings Decree sets the following requirements for childcare in housing and meeting factions:

*Article 3.61, section 1:* The external dividing structure has movable parts for the rapid removal of polluted interior air.

*Article 3.61, section 2:* The first section does not apply if the provision for ventilation referred to in Article 3.47 has a capacity, determined in conformity with NEN 1087, of 6 dm³/s per m² of floor area in the occupied area and 3 dm³/s per m² of floor area in the occupied space.

*Article 3.62, section 1:* Movable parts as referred to in Article 3.61 give a peak load ventilation capacity for an occupied area, determined in conformity with NEN 1087, of at least 6 dm³/s per m² of floor area in that area. For an occupied space, the capacity is at least 3 dm³/s per m² of floor area in that space.

*Article 3.61, section 2:* The first section does not apply to a communal occupied area or a communal occupied space.

*Article 3.63:* A movable component, as referred to in Article 3.61, is located at a distance of at least 2 m from the plot boundary, measured in a straight line from the exterior dividing structure of the building. If the plot where the building is located lies adjacent to a public highway, public water feature or public green space, the distance to the relevant highway, feature or space is used.

## References

- Buildings Decree, current version, Article 3.62
- NEN 1087 Ventilation of buildings – Calculation methods for new building
- NEN 8087 Ventilation of buildings – Calculation methods for existing buildings.

- NEN-EN 15242 Ventilation of buildings – Calculation methods for air volume flow and infiltration in buildings
- REHVA Guidebook 10 Computational fluid dynamics in ventilation design

# HEA 8 Internal Air Quality

## Credit aim

To promote a healthy living and accommodation climate, ensuring that there is adequate ventilation through introducing clean air from outside and extracting depleted internal air, and ensuring that the internal air in the building is free from pollution by sources inside and outside the building. An adequate supply of fresh air (when the building is occupied) guarantees that the $CO_2$ concentration remains below 800 ppm (given a standard occupation ratio and a concentration of 350 ppm in the outside air).

## Credit criteria

2 points can be awarded as follows:

| Points | |
|---|---|
| 1 | Where the supplied schedule of evidence shows that the quantity of fresh air introduced is sufficient to guarantee a healthy indoor climate. |
| 2 | Where the supplied schedule of evidence shows that the introduced outside air is not polluted by external or internal contamination sources and where the building's indoor air is protected against internal sources of air contamination. |

## Compliance requirements

**First point:** With regard to an adequate level of ventilation:

1. All occupied spaces must have a ventilation facility, consisting of a component for the introduction of fresh air and a component for the extraction of internal air. The (exhausted) internal air in all occupied spaces (depending on the functional use, the floor area, the maximum number of persons present and the occupation ratio) is at least refreshed at a rate as indicated in Table 1. The capacity of the ventilation facilities, as mentioned in Table 1, is to be calculated in conformity with standard NEN 1087 'Ventilation of buildings – Calculation methods for new build' or standard NEN 8078 'Ventilation of buildings – Calculation methods for existing buildings', whichever is applicable.
2. Occupied spaces with a highly changeable level of occupation (meeting functions, sports function and retail functions) are to incorporate an automatic monitoring system that measures the $CO_2$ content in the internal air and (in the case of mechanical ventilation) automatically controls the ventilation flow rate in such a way that the $CO_2$ content in the internal air does not exceed 0.08 vol % (800 ppm). If the building is naturally ventilated, an alarm signal should be transmitted to the responsible (technical) building management to enable adequate measures to be taken with regard to ventilation of the building.

Explanatory note on point 2: In practice, occupation of the aforementioned occupied spaces is highly variable, which means there are many periods in which limited ventilation is sufficient. Examples of such spaces are meeting halls, auditoriums, lecture theatres, waiting rooms, restaurants, canteens, fitness centres and gymnasiums.

Table 1 Threshold values for ventilation capacity

| Functional use | Threshold value for ventilation in occupied space | |
|---|---|---|
| | [$m^3$/h pp] | [$m^3$/h per $m^2$] |
| Meetings<br><br>- occupation ratio > 0.5 persons per $m^2$<br>- occupation ratio between 0.125 and 0.5 persons per $m^2$<br>- occupation ratio ≤ 0,125 persons per $m^2$ | -<br><br>50<br>interpolate<br>35 | |
| Industry | 45 | |
| Office<br>- occupation ratio > 0.5 persons per $m^2$<br>- occupation ratio between 0.125 and 0.5 persons per $m^2$<br>- occupation ratio ≤ 0,125 persons per $m^2$ | -<br>50<br>interpolate<br>35 | |
| Education | | 22,5 |

**Second point:** With regard to prevention of the circulation of polluted or exhausted air:

1. All air intakes of the building's mechanical ventilation system must be at least 10 metres distant from air exhausts of any other mechanical ventilation system of the building to prevent recirculation of exhausted air.
2. All air intakes of the building's mechanical ventilation system must be at least 20 metres distant from 'external sources of air pollution'.
3. All ventilation grills for peak load ventilation and all openable windows in the building must be at least 20 metres distant from 'external sources of air pollution'.
4. The building's mechanical ventilation system is not to incorporate the use of any recirculation system, internal isolation of air channels or air humidification, unless only a steam humidification system is used (so that it meets the hygiene and cleanliness standards from REHVA Guidebook 8 'Cleanliness of ventilation systems' or REHVA Guidebook 9 'Hygiene requirement for ventilation and air-conditioning' or VDI 6022 'Hygienische Anforderungen an RaumluftTechnical Anlagen und Geräte', whichever may be applicable).
5. Filters of a minimum quality and class are to be used in mechanical ventilation systems in order to conform with NEN-EN 13779 'Ventilation for utility buildings – Performance requirements for ventilation and air-conditioning systems'.
6. In spaces containing an internal source of air pollution (such as specially designated smoking areas and spaces intended for printers and/or copying machines), the air is to be extracted separately to prevent exhaust air from these spaces mixing with air that is used for ventilation elsewhere in the building.

## Compliance notes

### New build

There are no additional or different requirements to those outlined above specific to new build projects, except that NEN 1087 is applicable.

### Refurbishment

There are no additional or different requirements to those outlined above specific to refurbishment projects, except that NEN 8087 is applicable.

### Extensions to existing buildings

For extensions to existing buildings, only the section that is being extended counts and there are additional or different requirements to those outlined above.

**Shell only**
There are no additional or different requirements to those outlined above specific to shell-only projects. If, on being taken into use, the building function has changed in comparison with the original shell design (e.g. a couple of shops added to what was originally designed as an office building), one must check whether the requirements for ventilation and air quality are still achieved for the new (mixed) function(s).

**Air filters**
The use of air filters is not deemed to provide adequate protection against internal or external sources of air pollution. This means that, for the purposes of this credit, they cannot be considered as an alternative to the terms of compliance requirement 6 for the second credit point.

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additional or different requirements to those outlined above specific to office buildings.

**Retail**
There are no additional or different requirements to those outlined above specific to retail buildings.

**Industrial buildings**
There are no additional or different requirements to those outlined above specific to industrial buildings.

**Schools**
There are no additional or different requirements to those outlined above specific to school buildings.

## Schedule of evidence required

### Design stage

To satisfy the requirements for the first point:

1:

- A copy of the schedule of requirements or specification, containing the requirements per occupied space with regard to the ventilation capacity of the facilities incorporated in the building in conformity with NEN 1078 or NEN 8087, differentiated according to the functional uses specified in the compliance requirements.

2:

- A copy of the schedule of requirements or a specification, showing that an automatic system to monitor the CO2 content of the internal air is being installed in the building and that this can automatically regulate the flow rate of the mechanical ventilation (if present) or – if the building is naturally ventilated – is linked to an alarm system for the building manager.

To satisfy the requirements for the second point:

1 to 3:

- Construction drawings of the building or a site plan, showing the ventilation intakes and outlets, the location of openable windows and/or other provisions for natural ventilation. It should also show any present sources of air pollution on the site in question and its immediate vicinity (to a distance of 30 metres), together with calculated distances between these 'sources of air pollution' and the ventilation intakes and provisions for natural ventilation.

4:

- A copy of the schedule of evidence, design or specification, showing that no recirculation system, internal isolation of air channels or air humidification is used, unless only a steam humidification system is used.

5:

- A copy of the schedule of requirements, specification or an official product specification from the manufacturer, showing that the filters in the mechanical ventilation system comply with standards NEN-EN 13779.

6:

- Design drawings showing that the air from spaces with an internal source of air pollution is extracted separately and cannot mix with fresh air elsewhere in the building.

**Post-construction stage**

To satisfy the requirements for the first point:

1 & 2:

- A written declaration from the design team that the specifications of the ventilation systems, as required for this credit, have not changed at the time of handover from those in the design phase. If interim changes have been made, the schedule of evidence specified in the design phase must be suitably amended for the changed elements and submitted anew for evaluation.

To satisfy the requirements for the second point:

1 to 4 inclusive and 6.

- An inspection report from the assessor, confirming:
- The correct location of the intake and exhaust apertures and openable windows for ventilation, plus the presence of external sources of pollution.
- That the system complies with the stipulated hygiene and cleanliness standards.
- That air is extracted separately from spaces containing an internal air pollution source.

## Definitions

**External sources of air pollution**
This relates to:

- Flue gas exhaust points.
- Exhaust air outlets.
- Nearby highways.
- Adjacent parking lots.
- Loading and unloading bays.
- Nearby exits from industrial of agricultural businesses and similar.

**Occupied space**
Space intended for human occupation for at least 30 minutes on average per day or in which activities consistent with the relevant functional use take place. An occupied space complies with the minimum criteria of the Buildings Decree with regard to floor area and height.

**Spaces with an unpredictable or highly variable pattern of occupation**
This relates to spaces such as:

- Auditoriums.
- Gymnasiums
- Retail areas.
- Meeting rooms and lecture theatres.
- Waiting rooms.
- Restaurants/canteens.

## Additional information

None.

## The Buildings Decree

Section 3.10 ‘Ventilation of an occupied area, occupied space, toilet and bathroom’.

## References

- NEN-EN 13779 ‘Ventilation for utility buildings – Performance requirements for ventilation and air-conditioning systems’
- Working conditions policy rules: Policy rule 6.2 Ventilation
- Working Conditions Information Sheet 24 Interior Environment
- Buildings Decree, current version
- GWI/ISSO Design and assembly recommendations. New-build family dwellings and apartment buildings, 2008
- NEN-EN 15243 Ventilation of buildings
- NEN-EN 15251 Interior environment-related input parameters for design and evaluation of energy performance of buildings for internal air quality, thermal comfort, lighting and acoustics.
- NEN-EN 1886 Ventilation of buildings – Air-conditioning units
- NEN 1087 Ventilation of buildings – Calculation methods for new building
- NEN 1089 Ventilation of school buildings - Requirements
- NEN 8087 Ventilation of buildings – Calculation methods for existing buildings.

- NEN-EN 13779 'Ventilation for utility buildings – Performance requirements for ventilation and air-conditioning systems'
- NPR-CR 1752 Ventilation of buildings – Design criteria for the internal conditions
- REHVA Guidebook 8 Cleanliness of ventilation systems, Federation of European Heating and Air-conditioning Associations

- REHVA Guidebook 9 Hygiene requirement for ventilation and air-conditioning, Federation of European Heating and Air-conditioning Associations
- VDI 6022 Hygienische Anforderungen an RaumluftTechnical Anlagen und Geräte, Verein Deutscher Ingenieure

# HEA 9 Volatile Organic Compounds

## Credit aim

To promote a good, healthy interior air quality by specifying that the construction and finishing materials that are used have low emissions of volatile organic compounds and other harmful substances.

## Credit criteria

1 point can be awarded as follows:

| Points | |
|---|---|
| 1 | Where the evidence provided shows that a good and healthy interior air quality is achieved by the use of construction and finishing materials that have low emissions of harmful volatile organic compounds. |

## Compliance requirements

Compliance is demonstrated as follows:

1. The emissions of volatile organic compounds from the construction and finishing materials used inside the building comply with the following requirements:
    - Chipboard, MDF, fibreboard, woodwool panels, three-ply, multi-ply, hardboard, solid wooden panels and acoustically insulating board comply with the emission standards of category E1 in EN 13986, whereby the emission concentration has been determined in conformity with EN 717-1 or, alternatively, a generally recognised health label can be provided.
    - Glued wooden elements and wood laminates comply with the emission standards of category E1 in EN 14080, whereby the emission concentration has been determined in conformity with EN 717-1 or, alternatively, a generally recognised health label can be provided.
    - Glued wooden elements and wood laminates comply with the emission standards of category E1 in EN 14342, whereby the emission concentration has been determined in conformity with EN 717-1 or, alternatively, a generally recognised health label can be provided.
    - Resilient textile or laminated floor coverings, such as vinyl, linoleum, cork, rubber, carpets and floor laminates, comply with the emission standards of category E1 in EN 14041, whereby the emission concentration has been determined in conformity with EN 717-1 or, alternatively, a generally recognised health label can be provided.
    - Ceiling tiles comply with the emission standards of category E1 in EN 13964, whereby the emission concentration has been determined in conformity with EN 717-1 or, alternatively, a generally recognised health label can be provided.
    - Floor adhesives and mastics comply with the emission standards in EN 13999, whereby the emission concentration is determined in conformity with EN 13999-2/4.
    - Paints, varnishes and lacquers comply with the emission standards for organic solvents in EN 13300, whereby the emission concentration is determined in accordance with EN-ISO 11890-2.

## Compliance notes

**New build**

There are no additional or different requirements to those outlined above specific to new build projects.

**Refurbishment**
There are no additional or different requirements to those outlined above specific to refurbishment projects.

**Extensions to existing buildings**
There are no additional or different requirements to those outlined above specific to the extension of existing projects.

**Shell only**
For shell-only projects, the above requirements only apply to the stated construction and finishing materials, insofar as these are already used.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additional or different requirements for the application of this credit to office buildings.

**Retail**
There are no additional or different requirements for the application of this credit to retail buildings.

**Industrial buildings**
There are no additional or different requirements for the application of this credit to industrial buildings.

**Schools**
There are no additional or different requirements for the application of this credit to school buildings.

## Schedule of evidence required

**Design stage**

1. to 3:

- A copy of the schedule of requirements or a specification, in which it is specified that the construction and finishing materials used must comply with the relevant requirements concerning emissions of volatile organic compounds, specified per relevant material.

**Post-construction stage**

1. to 3:

- A copy of the manufacturer's or supplier's specification for each construction or finishing material that is used, showing the standard by which the emissions of volatile organic compounds have been determined, the emission concentrations of volatile organic compounds thus determined, and the specifications that they comply with the stated standards. Alternatively, an internationally recognised health label from the manufacturer for each construction or finishing material may be supplied.

## Definitions

**Construction and finishing materials**
For the purposes of assessing this credit, construction and finishing materials are defined as all (primary) building materials (concrete, wood, mastics, resins, plaster, building boards etc.) and materials used in the finishing of the building (wallpaper, floor coverings, paints etc.)

**Volatile organic substances (VOS)**
'Volatile organic substances' (VOS) is a term that covers numerous substances encountered in buildings and originating from the employed building materials, including finishing materials such as soft furnishings, wall and floor coverings, adhesives, mastics, paints and lacquers. It has been demonstrated that these substances, in certain concentrations, can cause irritation when inhaled and can even cause health problems (such as 'sick building syndrome') when they exceed certain concentrations. For the assessment of this credit, VOS are defined as the substances mentioned in the EU 1999/13/CE Solvents Directive. For this purpose, VOS also includes SVOC or semi-volatile organic compounds.

## Additional information

**Internationally recognised health label**
An internationally recognised label still has to comply to EN regulations or set higher standards, this has to be demonstrated.

## References

- EN 717-1 Wood-based board materials – Determination of formaldehyde emission by the chamber method
- EN 13986 Wood-based panels for use in construction – Characteristics, evaluation of conformity and marking
- EN 14080 Timber structures, glued laminated timber - Requirements
- EN 14342 Wood flooring - Characteristics, evaluation of conformity and marking
- EN 14041 Resilient textile and laminate floor coverings - Essential characteristics
- EN 13964 Suspended ceilings – Essential characteristics
- EN 13999-1/4 Adhesives – Short term method for measuring the emission properties of low-solvent or solvent-free adhesives after application
- EN 13300 Paints and varnishes. Water-borne coating materials and coating systems for interior walls and ceilings - Classification
- EU Hazardous Substance Directive 2004/42/CE on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain paints and varnishes and vehicle refinishing products
- European Union Substances Directive 2004/67/CE concerning the classification of chemical substances and preparations

- European Union Solvents Directive 1999/13/CE concerning the restricted use of organic solvents

# HEA 10 Thermal Comfort

## Credit aim

To ensure an appropriate level of thermal comfort through the use of a dynamic thermal building simulation in the design phase.

## Credit criteria

Up to 2 points can be awarded as follows:

| Points | |
|---|---|
| 2 | If it is demonstrated that thermal comfort levels in occupied spaces of the building are assessed at the design stage using a dynamic thermal simulation, ensuring that appropriate thermal comfort levels are achieved. |

## Compliance requirements

Compliance is demonstrated as follows:

**For 1 credit point:**

1. Calculations have been made using a validated dynamic building simulation tool, with the aim of optimizing thermal comfort in occupied spaces. The following factors are taken into account in this thermal simulation with the aid of the relevant model:
    - The basic building form and geographical orientation.
    - The layout of the building.
    - The effect of shade from trees and surrounding buildings on solar heat gain and the effect on transmission losses.
    - Balancing the maximisation of daylight (for reduced lighting energy use) against increased cooling loads and thermal comfort levels.
    - The risk of overheating (in the summer).
    - The risk of cold downdraught (in the winter).
    - In the calculation of the 'weighted temperature exceedances' (WTE), assumptions are made with regard to clothing resistance (Clo) and metabolism (Met) for the tasks and activities that are representative for the relevant building function.
2. The simulation model used must be a full dynamic thermal temperature simulation. Furthermore, it must at least comply with the relevant requirements in NEN-EN-ISO 13792 (Thermal properties of buildings – Calculation of the interior temperature of a space in summer conditions, without mechanical cooling – Simple methods) and *either* the requirements in ISSO publication 32 (Basic principles of temperature simulation calculations) *or* ISSO publication 74 (Thermal comfort – requirements for the internal temperature of buildings). The design team must demonstrate that the employed simulation model complies with, or is suitable for simulations in accordance with, these directives.
3. The simulation calculations are in accordance with ISO 5060:2008 Hygrothermal properties of building - Reference Climate data carried by the base RA2008T1.
4. The thermal comfort level in the occupied spaces, in summer and in winter, per distinct functional use, complies with the requirements in conformity with the temperature exceedance method of NEN7730/ISSO32, or with the requirements in conformity with the adaptive temperature method of ISSO74/NEN-EN 15251, as shown in the table below.

| Function | Minimum requirement with respect to thermal comfort level |
|---|---|
| Offices | Class B climate in conformity with NEN 7730 with a maximum of 150 exceedance hours (WTE < 150) or:<br><br>Adaptive Class B climate in conformity with ISSO 74* - ATG method (category II requirement Annex A2 NEN-EN 15251) |
| Education | Class B ('good') for thermal comfort in conformity with SenterNovem "Guidance Document for New, Fresh Schools" or:<br><br>Adaptive Class B climate in conformity with ISSO 74* - ATG method (category II requirement Annex A2 NEN-EN 15251). |
| Retail | Class B climate in conformity with NEN 7730 with a maximum of 300 exceedance hours (WTE < 300) or:<br><br>Adaptive Class C climate in conformity with ISSO 74* - ATG method (category III requirement Annex A2 NEN-EN 15251) |
| Industry | Class B climate in conformity with NEN 7730 with a maximum of 300 exceedance hours (WTE < 300) or:<br><br>Adaptive Class C climate in conformity with ISSO 74* - ATG method (category III Annex A2 NEN-EN 15251) |

(*) Only permitted if the relevant occupied spaces are fitted with freely openable windows and there is no strict dress code (e.g. one is allowed to remove one's jacket in the summer).

**For 2 credit points:**

1. There is compliance with the methodology requirements under points 1 to 3 above.
2. The thermal comfort level in the occupied spaces, in summer and in winter, per distinct functional use, complies with the requirements in conformity with the temperature exceedance method of NEN7730/ISSO32, or with the requirements in conformity with the adaptive temperature method of ISSO74/NEN-EN 15251, as shown in the table below:::{| border="1"

| Function | Minimum requirement with respect to thermal comfort level |
|---|---|
| Offices | Class A climate in conformity with NEN 7730 with a maximum of 125 exceedance hours (WTE < 125) or:<br><br>Adaptive Class A climate in conformity with ISSO 74* - ATG method (category I requirement Annex A2 NEN-EN 15251). |
| Schools | Class A ('very good') for thermal comfort in conformity with SenterNovem "Guidance Document for New, Fresh Schools" or:<br><br>Adaptive Class A climate in conformity with ISSO 74* - ATG method (category I requirement Annex A2 NEN-EN 15251). |
| Retail | Class A climate in conformity with NEN 7730 with a maximum of 250 exceedance hours (WTE < 250) or:<br><br>Adaptive Class B climate in conformity with ISSO 74* - ATG method (category II requirement Annex A2 NEN-EN 15251). |

| | |
|---|---|
| Industry | Class A climate in conformity with NEN 7730 with a maximum of 250 exceedance hours (WTE < 250) or:<br><br>Adaptive Class B climate in conformity with ISSO 74* - ATG method (category II requirement Annex A2 NEN-EN 15251). |

(*) Only permitted if the relevant occupied spaces are fitted with freely openable windows and there is no strict dress code (e.g. one is allowed to remove one's jacket in the summer).

See the Definitions section for an explanation of 'PMV' and 'WTE'.

## Compliance notes

### New build

There are no additional or different requirements to those outlined above specific to new build projects.

### Refurbishment

Optimization of geographical orientation is not possible; insofar as possible, optimization has been sought in the existing situation.

### Extensions to existing buildings

Only the newly extension is assessed if the other spaces are left intact. If the existing building is altered, this should also be included.

### Shell only

For the allocation of this credit, it is acceptable to work from a projected standard layout that is as realistic as possible in the simulation calculations. If the simulation calculations could not be fully carried out (or not at all), due to the speculative character of the building, the credit is not allocated.

### The credit is applicable to the following building types:

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

### Offices

There are no additional or different requirements to those outlined above specific to office buildings.

### Retail

Additions for the application of this credit to retail premises: Further to the above general requirements, there is the additional requirement in shops and retail buildings that split unit air conditioning must be installed at each till to increase the thermal comfort of the till assistants as they work.

### Industrial buildings

There are no additional or different requirements to those outlined above specific to industrial buildings.

### Schools

There are no additional or different requirements to those outlined above specific to school buildings.

## Schedule of evidence required

### Design stage

A copy of the building physics report, containing at a minimum:

- Confirmation that the temperature simulation study has taken place in conformity with the compliance requirements;
- Confirmation that this included examination and calculation of the alternatives;
- A description of the type of software used, including the input mode employed.

**Post-construction stage**

Confirmation that, at the time of handover, no changes have been made in relation to the design stage; if changes have been made to the original design, a renewed simulation calculation must be provided, showing that the compliance requirements are still met.

## Definitions

**Appropriate levels of thermal comfort**
'Appropriate' means that thermal comfort must comply with the generally accepted requirements (e.g. as stated in NEN 7730) and also the specific requirements set by the building's occupier (the ambition of the principal/owner in the case of a projected building).

**Dynamic thermal simulation**
A computational model that dynamically simulates the thermal management of a building in relation to the future heat requirement, based on the entered parameters relating to heat generation, the building shell, the employed climate systems and other relevant data. Examples of dynamic simulation models are TRNSYS, IDA-ICE (Indoor Climate and Energy), TASE, Energy+ WEI-model (ECN) and DYWAG (DYnamisch WArmtegebruik in Gebouwen).

**WTE**
WTE is the abbreviation for Weighted Temperature Exceedance hours. This measurement represents the weighted number of hours per year when the limits of comfort are exceeded. This can happen in extreme weather conditions or due to malfunctions in building services. The WTE, as a measurement of the quality of the thermal interior climate within a building, must remain below a certain maximum value. A figure of 150 is usually deemed acceptable for offices, and 300 for homes. Unweighted temperature exceedance hours (TE) are calculated in homes rather than weighted temperature exceedance hours (WTE).

**PMV**
PMV is the abbreviation for 'Predicted Mean Vote'. This is the average perception of the interior climate, predicted using a temperature simulation model, of a large group of people. In this sense, it is a forecast of how they will perceive the thermal qualities of their (building) environment. The PMV should stay within a certain range, usually -0.5 < PMV < +0.5 for non-residential buildings and < +0.5 for buildings. In addition, there is the proportion of people who are expected to feel uncomfortable in that climate if the building stays within these PMV limits. This is expresses in the form of the PPD.

**PPD**
PPD is the abbreviation for 'Predicted Percentage Dissatisfied'. This is the percentage of people, predicted by means of a temperature simulation model, who will experience the simulated interior climate conditions as uncomfortable.

**Asymmetric radiation temperature**
Difference between the cooling of two different sides of the body (the side turned towards a heat source as opposed to an opposite source of cooling).

**Thermal comfort**

The state in which a person is satisfied with his thermal environment, has no need of a warmer or cooler environment and is therefore hindered as little as possible, if at all, in his normal activities (domestic, work, relaxation, sleep etc.). Human thermoregulation plays a central part in this. This thermoregulation is influenced both by individual factors (activity, clothing, basic physical metabolism) and by environmental factors (air temperature, radiated temperature, wind speed, humidity etc.). Various adaptation mechanisms also play a role in this. The most important is the expectation that one has of a building's climate, based on the prevailing exterior temperature and the temperature over the previous days.

**Occupied area**
A space that is used for an average of 30 minutes or longer per day by the occupants under normal circumstances and which is fitted out for the activities typical of the building's function.

## Additional information

None.

## References


- NEN 5060 Hygrothermal properties of buildings – Reference climate data
- NEN 7726 Ergonomics of the thermal environment – Instruments for measuring physical quantities
- NEN-EN-ISO 7730 Moderated thermal interior conditions Calculations of the PMV and PPD and specifications of the conditions for thermal comfort
- NEN-EN-ISO 13792 Thermal properties of buildings – Calculation of the interior temperature of a space in summer conditions, without mechanical cooling – Simple methods
- NEN-EN 15251 Interior environment-related input parameters for design and evaluation of energy performance of buildings for internal air quality, thermal comfort, lighting and acoustics.
- NPR-CR 1752 Ventilation of buildings – Design criteria for the internal conditions
- GIW/ISSO Publication: System requirements for new build family homes and apartments
- ISSO Publication 32: Basic principles of temperature simulation calculations
- ISSO Publication 74: Thermal comfort – requirements for the internal temperature of buildings
- ISSO Guideline: Interior Climate Pocket Book
- SBR Publication: Healthy Buildings Practical Manual, Section2: Interior environment performance requirements for office buildings
- SenterNovem "Guidance Document for New, Fresh Schools", 2008.

# HEA 11 Thermal zoning

## Credit aim

The provision of adequate opportunity for temperature regulation (heating and cooling) within occupied spaces by the individual occupants.

## Credit criteria

1 point can be awarded as follows:

| Points | |
|---|---|
| 1 | Where evidence provided demonstrates that there are facilities in every occupied space with which the occupant can adjust the ambient temperature to individual needs and comfort requirements. |

## Compliance requirements

Compliance is demonstrated as follows:

1. The heating and cooling systems are designed in such a way that individual occupants can adjust the ambient temperature, in the warm seasons (cooling) as well as in the cold seasons (heating), within zones (as defined below) for all occupied spaces with a temperature variation of at least -2℃ to +2℃. The following definitions apply to the separa te zones per function of use:
   - Offices: each segment of an occupied space, measuring 3.6 metres across the width of the outer wall and 7.2 metres deep, counts as a zone.
   - Schools: every area in which lessons are given and every office space count as zones.
2. The temperature regulation controls must be simple and understandable for the average user.

## Compliance notes

### New build

There are no additional or different requirements to those outlined above specific to new build projects.

### Refurbishment

There are no additional or different requirements to those outlined above specific to refurbishment projects.

### Extensions to existing buildings

If the existing building is to be considered in the assessment, then the entire building must comply with the required specifications. If only the new extension is to be considered, only that section has to comply with the required specifications.

### Shell only

In the case of shell-only projects, the credit can only be awarded if the heating and cooling systems are included in the building specifications or building design and comply with the requirements stated under ‘Credit criteria’. If, due to the speculative nature of the building, the regulation method for the cooling and heating systems is not yet known, the credit cannot be awarded.

**LTH systems**

With low-temperature heating (LTH) systems, heat is given off via the building's structural components. An example of this is floor heating, whereby the floor is used to distribute the heat evenly. In this situation, the heat output is delayed. One consequence of this is that such a system does not respond immediately to individual temperature regulation by occupants within the zones of occupied spaces.
In such situations, this credit can only be awarded if the LTH system provides the basic heating requirement and secondary heating elements which can be controlled separately (in accordance with the criteria for this credit) are installed in each space.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| √ | - | - | √ |

**Offices**

There are no additional or different requirements to those outlined above.

**Schools**

There are no additional or different requirements to those outlined above.

## Schedule of evidence required

**Design stage**

1. & 2.

- A copy of the schedule of requirements or specification, showing that the heating and cooling systems are fitted with temperature controls per separate zone defined by function. Individual occupants must be able to operate these controls in conformity with the 'Compliance requirements' stated above.
- A specification from the supplier (or included in the general specification) of the type of temperature control that is used.
- In shell-only projects, where the installation of a heating system is not usually included (this being left to the future occupant), a written declaration from the future occupant that the required specifications will be met on completion of the building.

**Post-construction stage**

1. & 2.

- An inspection report from the building's assessor, containing photographic material that clearly shows compliance with the 'Compliance requirements' stated above. Where a large building is involved, photos do not have to be made of every space; a representative sample will suffice.

## Definitions

**Temperature regulation**

For the purposes of this credit, temperature control systems are defined as:

- Thermostat valves on radiators and convectors.
- Control buttons on electric boilers and heating appliances.
- Control buttons on air conditioning units and other cooling appliances.

- Slide controls or adjustable airflow interrupters on heating or cooling appliances or ventilation systems.

**Occupied space**
Space intended for human occupation for at least 30 minutes on average per day or in which activities consistent with the relevant functional use take place. An occupied space complies with the minimum criteria of the Buildings Decree with regard to floor area and height.

## Additional information
None.

## References
SBR/ISSO Publication 354 Interior environment factors for offices

# HEA 13 Acoustic Performance

## Credit aim

To ensure, through the use of appropriate acoustic insulation and soundproofing, that noise nuisance is prevented insofar as possible and that excessive noise in a building is reduced to an acceptable level, thereby ensuring a high level of acoustic comfort within the building.

## Credit criteria

1 point can be awarded as follows:

| Points | |
|---|---|
| 1 | Where the evidence provided demonstrates that appropriate acoustic insulation and soundproofing is installed in the building, thereby ensuring acceptable levels of airborne and structure-borne noise in all occupied spaces of the building. Adequate soundproofing is installed between acoustically sensitive occupied spaces and other occupied spaces, thereby ensuring adequate privacy. |

## Compliance requirements

Compliance is demonstrated as follows:

1. An acoustic calculation has been made in the building's design stage in conformity with NEN-EN 12354 and NEN5077, parts 1-4 and 6, in which the following aspects are calculated:
    - The characteristic soundproofing of the façade ($G_{a,k}$) against outside noise in relation to all occupied areas in the building; this should be based on NEN 5077. The exposure to separate external sources of noise nuisance, as defined in the Noise Abatement Act, must be calculated in conformity with the "Regulations for the calculation and measurement of noise nuisance, 2006".
    - The characteristic difference in airborne sound level ($D_{nT,Ak}$) between all the building's occupied spaces.
    - The characteristic difference in structure-borne sound level ($L_{nT,A}$) between all the building's occupied spaces.
    - The characteristic system noise level ($L_{AI}$) from the building service systems installed inside and outside the building.
2. The level of the characteristic soundproofing ($G_{a,k}$) against noise from outside the building, the characteristic difference in airborne sound level ($D_{nT,Ak}$) between occupied spaces, the weighted structure-borne sound level ($L_{nT,A}$) between occupied spaces, and the characteristic system sound level ($L_{AI}$) from the building service systems installed inside and outside the building comply with the standard values as shown in Table 1.
3. An acoustic survey is carried out in the building's post construction stage in conformity with NEN-EN 140 OR in conformity with NEN 5077, demonstrating that the standard values referred to under point 2 are actually achieved.
4. The calculations and measurements are performed by a trained and qualified acoustic consultant.
5. All areas used for teaching, training and educational purposes (such as classrooms, seminar rooms and lecture theatres) achieve reverberation times of the average frequencies compliant with Senternovem publication 'Handreiking nieuwe frisse scholen' 2008:
    - Comfort class B: college rooms designed for speech.
    - Basic package: reverberation times in large area's (e.g. playroom, large rooms) is 0,8 s.

Table 1: Limiting values for characteristic soundproofing, characteristic airborne sound insulation, structure-borne sound insulation value, and acoustic exposure level to systems, per separate building and/or space function.

| Function | Characteristic soundproofing ($G_{a,k}$) | Characteristic difference in airborne sound level ($D_{nT,Ak}$) | Weighted structure-borne sound level ($L_{nT,A}$) | Characteristic system sound level ($L_{AI}$) |
|---|---|---|---|---|
| Office | 5 dB better than standards in Art. 3.2 and 3.3 of the Buildings Decree | > 38 dB between all occupied spaces inside the building | < 59 dB between all occupied spaces inside the building | < 35 dB(A) |
| Education | 5 dB better than required standards in Art. 3.2 and 3.3 of the Buildings Decree | > 38 dB between all occupied spaces inside the building | < 59 dB between all occupied spaces inside the building | < 35 dB(A) |

## Compliance notes

**New build**
There are no additional or different requirements to those outlined above specific to new build projects.

**Refurbishment**
There are no additional or different requirements to those outlined above specific to refurbishment projects.

**Extensions to existing buildings**
There are no additional or different requirements to those outlined above specific to the extension of existing projects.
If the facilities are located in the existing building, this must be evaluated in the light of the aforementioned requirements.

**Shell only**
If the future occupancy of the building has not yet been determined, an open occupied space with an occupancy rate of 1 person per 10 $m^2$ is assumed in the case of office buildings.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
For office buildings where there are no additional or different requirements to those outlined above.

**Retail**
For retail buildings, only office spaces are taken into account in the assessment of this credit.

**Industry**
For industrial buildings, only office spaces are taken into account in the assessment of this credit.

**Schools**
There are no additional or different requirements to those outlined above specific to school buildings.

## Schedule of evidence required

### Design stage

1., 2. & 4.:

- A copy of the schedule of requirements or the specification incorporating the requirements with regard to the acoustic exposures or insulation indices in conformity with NEN-EN 12354 or NEN 5077, and explicitly showing that the requirements under points 1 and 2 of the 'compliance requirements' are met, and from which it can be seen that the calculations are performed by a trained and qualified acoustic consultant in conformity with compliance requirement 4.

### Post-construction stage

3. & 4.:

- A copy of an acoustic survey in conformity with NEN-EN 140 or in conformity with NEN 5077 (incl. NPR 5092 and NPR 5097), explicitly showing that there is compliance with the requirements under point 3 of the 'compliance requirements' and that the measurements have been carried out by a trained and qualified acoustic consultant in conformity with compliance requirement 4.

## Definitions

**Service systems**
'Service systems' refers to the following noise-producing systems in buildings: building systems for heating, hot water preparation, cooling, mechanical ventilation, sanitary facilities like toilets and taps, drainage, plant to increase water pressure, lifts.

**Weighted structure-borne sound level ($L_{nT,A}$)**
A variable reflecting the sound level, standardised for the reference reverberation time and the relevant spectrum, as a single figure.

**Characteristic system sound level ($L_{AI}$)**
A variable that shows the sound level, in the receiving space, caused by a system in operation and based on normative measurements of the receiving space, as a single figure.

**Characteristic difference in airborne sound level ($D_{nT,Ak}$)**
A variable that shows the difference between two sound levels, standardised for the reference reverberation time and the relevant spectrum and based on normative measurements of the receiving space, as a single figure.

**Characteristic soundproofing in an external dividing structure ($G_{A,k}$)**
A variable that shows the difference between the level of the incoming sound on the outside of an external dividing structure and sound level in a space behind this dividing structure, based on normative dimensions of the receiving space, as a single figure.

**Occupied area**
The part of a building with at least one occupied space, consisting of one or more adjoining spaces on the same floor that has a function other than a toilet, bathroom, technical space or circulation space.

**Occupied space**
Space intended for human occupation for at least 30 minutes on average per day or in which activities consistent with the relevant functional use take place. An occupied space complies with the minimum criteria of the Buildings Decree with regard to floor area and height. For the rest, the relevant definition in section 3.1 of the Buildings Decree should be adhered to.

**Average frequencies**
The average reverberation times over the octaaf bandwith of the middle frequencies of 125 till 2000Hz must comply to the values of the matrix. De discrepancy of the reverberation times of the octaaf bandwith from 125 till 2000 may have respectively be +20% and -20% to the 500Hz octaaf.

## Additional information

None.

## The Buildings Decree

Five different sections are relevant to this credit:

• Section 3.1 ‘Protection against noise from outside, new build’

• Section 3.2 ‘Protection against noise from systems, new build’

• Section 3.3 ‘Soundproofing between occupied spaces that have the same functional use, new build’

• Section 3.5 ‘Soundproofing between occupied spaces that have different functional uses, new build’

## References

- Buildings Decree, current version
- NEN-ISO 140-2 Acoustics – The measurement of acoustic insulation in buildings and structural elements - Part 2: Specification of measurement accuracy requirements
- NEN-EN-ISO 140-4 Acoustics – The measurement of acoustic insulation in buildings and structural elements - Part 4: Practical measurement of the airborne sound insulation between spaces
- NEN-EN-ISO 140-5 Acoustics – The measurement of acoustic insulation in buildings and structural elements - Part 5: Practical measurement of the airborne sound insulation of façade elements and facades
- NEN-EN-ISO 140-7 Acoustics – The measurement of acoustic insulation in buildings and structural elements - Part 7: Practical measurement of the structure-borne sound insulation of floors
- ISO/TR 140-13 Acoustics – The measurement of acoustic insulation in buildings and structural elements - Part 13: Guidelines
- NEN-EN-ISO 140-14 Acoustics – The measurement of acoustic insulation in buildings and structural elements - Part 14: Guidelines for special situations in practice
- NEN-EN-ISO 717 Acoustics – Single-figure designation for the acoustic insulation in buildings and structural elements
- NEN 1070 Soundproofing in buildings; Specification and assessment of quality

- NEN-EN-ISO 3382 Acoustics – Measurement of the spatial acoustic parameters – Part 2: Reverberation time in ordinary spaces
- NEN 5077 Soundproofing in buildings – Calculation methods for the variables for soundproofing of external dividing structures, airborne sound insulation, structure-borne sound insulation, sound levels caused by systems, and reverberation time
- NEN 5078 Soundproofing in buildings; Computational method for determining sound absorption in space, and supplement A1
- NEN-EN 12354-1 Soundproofing in buildings – Calculation of the acoustic properties of buildings with the properties of the structural elements – Part 1: Airborne sound insulation between spaces
- NEN-EN 12354-2 Soundproofing in buildings – Calculation of the acoustic properties of buildings with the properties of the structural elements – Part 2: Structure-borne sound insulation between spaces
- NEN-EN 12354-3 Soundproofing in buildings – Calculation of the acoustic properties of buildings with the properties of the structural elements – Part 3: Airborne sound insulation against noises from outside
- NEN-EN 12354-4 Soundproofing in buildings – Calculation of the acoustic properties of buildings with the properties of the structural elements – Part 4: Acoustic transmission from the inside to the outside
- NEN-EN 12354-5 Soundproofing in buildings – Calculation of the acoustic properties of buildings with the properties of the structural elements – Part 5: Sound level caused by service equipment
- NEN-EN 12354-5 Soundproofing in buildings – Calculation of the acoustic properties of buildings with the properties of the structural elements – Part 5: Sound level caused by service equipment
- NEN-EN 12354-6 Soundproofing in buildings – Calculation of the acoustic properties of buildings with the properties of the structural elements – Part 6: Sound absorption in enclosed spaces
- NEN-EN 12758 Glass for buildings – Glazing and airborne sound insulation – Product descriptions and determination of properties
- NEN-ISO 15186-2 Acoustics – The measurement of acoustic insulation in buildings and structural elements with the use of acoustic intensities
- NEN-EN-ISO 15712 Soundproofing in buildings – Calculation of the acoustic properties of buildings with the properties of the structural elements
- NEN-EN-ISO 16032 Acoustics – Measurement of the sound pressure level from systems in buildings – Practical method
- NEN-EN-ISO 18233 Acoustics – Use of new measurement methods in building and space acoustics
- ISO 6242-3 Building construction – Expression of users' requirements – Part 3: Acoustical requirements
- NPR 5092 Soundproofing in buildings – Assessment of the results of acoustic measurements in conformity with NEN 5077
- NEN 5097 Soundproofing in buildings – Notes on the calculation methods for the variables for soundproofing of external dividing structures, airborne sound insulation, structure-borne sound insulation, sound levels caused by systems, and reverberation time
- NPR 5272 Soundproofing in buildings – Instructions for using the prescribed computation for the soundproofing of facades, based on NEN-EN 12354-3
- UIT 38 – Buildings Decree Guide (Sound), 2004
- GIW/ISSO Publication 24 Sound from systems
- GIW/ISSO Publication 30 Piped water systems in homes
- GIW/ISSO Publication 55 Tap water systems in residential and utility buildings

- Ministry of Housing, Spatial Planning and the Environment: Calculation and measurement regulations for noise nuisance 2006
- SenterNovem “Guidance Document for New, Fresh Schools”, 2008.

# 3. Energy

# ENE 1 Reduction of CO2 Emissions

## Credit aim

To encourage the design and construction of buildings with minimum $CO_2$ emissions from building-related primary energy consumption in the occupancy stage.

## Credit criteria

When establishing the energy performance requirement of a functional use in the building, the reduction in $CO_2$ emissions is determined by means of a calculation in accordance with the energy performance standard indicated in the Buildings Decree.

For each functional use, there is a stated energy performance requirement in the Buildings Decree. In the case of buildings with multiple functional uses for which a requirement applies to the EPC, the Buildings Decree also sets a requirement regarding the relationship between the characteristic energy use (Qpres;tot) and the permissible characteristic energy performance (Qpres;toel). Within the framework of BREEAM-NL, we designate the variable for this 'EPimprovement'.

This 'Epimprovement' ratio is representative over the entire building for the relationship between the calculated primary energy use and the permissible primary energy use, based on the energy performance requirements prevailing at the time. In BREEAM-NL, the allocation of the credits is based on the aforementioned EPimprovement ratio.

**Utility buildings**
For utility buildings, this coefficient for the entire building with all its functional uses is computed directly into the ratio Qpres;tot / Qpres;toel using an energy performance computation in conformity with NEN 2916.
EPimprovement = {1 - (Qpres;tot / Qpres;toel)} * 100 [%]

Where:
Epimprovement = improvement in energy performance in relationship to statutory requirement [%]
Qpres;tot = total primary energy use [MJ]
Qpres;toel = total permissible primary energy use [MJ]

The percentage improvement in energy performance (EPimprovement) is directly related to the number of allocated credits in BREEAM-NL in accordance with the table below.

Up to 15 points can be awarded as follows:

## Compliance requirements

A maximum of 15 points can be awarded as follows:

| | |
|---|---|
| Points | Where a EPC-calculation for the building has been done, which shows an EP-improvement of more |

| | then .. % | |
|---|---|---|
| | New Build | Renovation |
| 1 | 1% | -50% |
| 2 | 3% | -32% |
| 3 | 5% | -20% |
| 4 | 7% | -9% |
| 5 | 11% | 0% |
| 6 | 15% | 8% |
| 7 | 19% | 15% |
| 8 | 25% | 21% |
| 9 | 31% | 28% |
| 10 | 37% | 36% |
| 11 | 45% | 45% |
| 12 | 55% | 55% |
| 13 | 70% | 70% |
| 14 | 85% | 85% |
| 15 | 100% | 100% |

Guide to the table:
• 12 points can be achieved if an EPC calculation for the construction project is done in which resulted in an EPimprovement of more than 55% but less than or equal to 70%.
• An EPimprovement of -50% can be read as a building with an energy efficiency of 50% below the legal requirement (eg an EPC of 1.5 instead of 1.0).

**Compliance is demonstrated as follows:**

1. An EPC calculation has been carried out in conformity with NEN 5128 for homes or NEN 2916 for utility buildings, showing that the compliance criteria are met with regard to the improvement in the building's energy performance, expressed as a percentage, in relation to the current EPC requirements of the Buildings Decree as applicable to the building permit.

2. Computer tools, automated versions of the aforementioned NEN 5128 and NEN 2916, are available on the market. The software employed must be attested as in conformity with BRL9501.

## Exemplary level criteria

The following outlines the exemplary level criteria to achieve an *innovation credit* for this BREEAM-NL issue:

1. Fifteen credits have been achieved.

2. One additional innovation credit can be awarded where evidence provided demonstrates the building is designed to be a *carbon neutral* building (i.e. in terms of building services energy demand).

3. Two additional innovation credits can be awarded where evidence provided demonstrates the building is designed to be a *True zero carbon building* (in terms of building services and operational energy demand).
4. The building has been modelled using a DSM software.

## Compliance notes

**New build**
There are no additional or different requirements to those outlined above specific to new build projects.

**Refurbishment**

In this context, refurbishment is a radical refurbishment as referred to in the European EPBD directive (used area in excess of 1000 m² or a refurbishment sum exceeding 25% of the building's value (including land value). It refers to large scale alteration of the building and its services to achieve a radical improvement in the associated energy use. For radical interventions of this kind, application for a building permit is mandatory, including an associated EPC calculation. For the sake of uniformity of the BREEAM-NL method, uniformity with BREEAM Europe and the obligation to perform an EPC calculation, the assessment of the refurbishment will also be carried out on the basis of the EPC calculation for the building. This EPC calculation is also an equivalent solution, valid for 10 years, for the building's energy performance certificate.

For the purposes of BREEAM-NL the EPimprovement indicator is also used for refurbishment. See the 'New Build' section for the calculation of Epimprovement. The EPC calculation requirements that are applicable in new build projects cannot be imposed for existing buildings that are to be refurbished. As an exception to the compliance criteria for the first 13 credit points, there is therefore a modified allocation for refurbishment projects: The first four points are allocated in order to bring the existing building to the level of the EPC requirements for new build. The points that follow are used to bring the EPC below the statutory EPC.

**Extensions to existing buildings**
There are no additional or different requirements to those outlined above specific to the extension of existing projects. However, when the existing building is also the subject of the assessment, the energy management of that part must be included in the allocation of this credit and the new and existing parts of the building must be assessed together as new build; otherwise the assessment of the new part of the building will suffice. If the new and old parts of the building are connected to the same services, the new and existing parts of the building are assessed together as new build. In that case, the existing parts of the building must be included in the assessment for this credit, even if these parts do not themselves form part of the total assessment.

**Shell only**
In shell-only projects, where the installation of heating and climate systems is left to the future owner/occupier, the EPC or dynamic simulation calculations must be performed. In these, a standard pattern of fitting out and occupancy, compliant with the existing building standards, should be assumed.

**Part refurbishment and part new build**
In projects involving a combination of refurbishment and new build, the final score is calculated with the aid of the BREEAM-EU E1 calculator, utilising the respective areas in m2 of both structural elements.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additions for the application of this credit to office buildings.

**Retail**
There are no additions for the application of this credit to retail buildings.

**Industrial buildings**
As yet, there is no method for calculating the EPC for industrial buildings. The norm sheet NEN 2916 does not provide any possibility for calculating the EPC of industrial buildings. Industrial buildings can be allocated up to 10 credit points through assessment on the basis of checklist A7 (see Additional Information).

**Schools**
There are no additions for the application of this credit to school buildings.

## Schedule of evidence required

### Design stage

1. & 2.:

- A print-out of the EPC calculation for the building's energy performance, as approved by the municipality as part of the building permit application. The calculation must be performed using a computational model based on norm sheet NEN 5128 or NEN 2916. The name of the software that is used must appear on the calculation print-out. If it cannot be demonstrated that the calculation has been approved by the municipality as part of the building permit application, an additional written declaration must be submitted. This declaration must include confirmation of the expertise and experience of the person who has performed the EPC calculation(s) in conformity with the prevailing NEN standards.

### Post-construction stage

1. & 2.:

- It is sufficient to provide the schedule of evidence from the design phase together with a written declaration from the construction team that no interim changes have been made to the building design at the time of handover. If any changes have been made, a revised EPC calculation must be submitted with calculations reflecting the energy management of the new building design.

## Definitions

**Energy Performance Coefficient (EPC)**
A measure of the energy-related properties of a building or part of a building, including the building services, given a certain pattern of behaviour by the occupants.

**Improvement in energy performance (Epimprovement)**
A measure of the relative difference between the energy performance coefficient (EPC) of the building and the prevailing EPC requirement as included in the Buildings Decree.

**Carbon neutral building**
Where net carbon dioxide emissions resulting from energy consumed in the operation of the space heating/cooling, hot-water systems, ventilation and internal lighting is zero or better.

**True zero carbon building**

Where net carbon dioxide emissions resulting from energy consumed in the operation of the space heating/cooling, hot-water systems, ventilation, internal lighting AND process related energy consumption is zero or better.
The calculation of CO2 emissions can take account of contributions from *on-site*, *near-site* and *accredited external* renewable/low carbon installations. Off-site renewables that are not accredited cannot be used to meet this definition.

**Recognised energy Dynamic Simulation Modelling (DSM) software**
Where the design team wishes to use a modelling software package for the purposes of assessing this BREEAM-NL issue, please determine whether the modelling software package meets the minimum requirements in terms of:

- Minimum capabilities
- Design features
- Testing

Please contact DGBC for final approval before the package can be used for the purposes of demonstrating compliance with Ene1.

Recognised energy DSM software packages include ASHRAE Energy Standard 90.1-2007, TAS or IES.

## Additional information

The BREEAM-NL model places value on buildings with a low EPC. The methods that are used for this (NEN 2916 en NEN 5128) also have validity for low EPCs. A possible problem is that the numerical values shown in the norm sheet do not yet have sufficient scope (e.g. for the airtightness of the building shell) or that technologies required to achieve low EPCs are not yet incorporated in the norm sheet.

In this respect, the Buildings Decree itself offers a solution. One can then fall back on the equivalence principle in the Buildings Decree. This principle gives the possibility (under certain conditions) to change other formulas or numerical values of technologies. The basic principle here is that deviation is only permitted if it can be demonstrated that the relevant matters do not fall within the scope of the norm sheet. When incorporating an alternative calculation/deduction of numerical values, the same assumptions should be taken into account as those used in the formulation of the numerical values and formulas in the norm sheet. Concrete examples of these assumptions are outdoor climate and occupants' behaviour. In addition, the technology must comply with the principles of 'verifiability' and 'feasibility' in the building regulations.

## The Buildings Decree

*Article 5.12, section 1:* A building has an energy performance coefficient not exceeding the limiting value stated in table 5.11.

*Article 5.12, section 2:* If a building or part of a building accommodates only functions of the same kind, which make use of a communal circulation space that does not serve any other functions, that building or part of a building has an energy performance coefficient not exceeding the limiting vale stated in table 5.11.

*Article 5.12, section 3:* If a building or part of a building accommodates several functions or parts to which an energy performance coefficient is applicable in accordance with the first or second section, and this building or part of a building does not occupy more than one plot, then, as an exception to the first and second sections, the total characteristic energy use calculated in conformity with NEN 2916 does not exceed the total permissible energy use calculated in conformity with NEN 2916. In calculating the total permissible energy use, the limiting values for the energy performance coefficient are maintained in accordance with the first and second sections.

*Article 5.13, section 1:* An energy performance coefficient, as referred to in Article 5.12, is calculated in accordance with NEN 5128.

*Article 5.13, section 2:* An energy performance coefficient, as referred to in Article 5.12, is calculated in accordance with NEN 2916. In calculating the energy performance coefficient of the building, a value of 4 is maintained for the coefficient for cooling and a value of 135 is maintained for the factor by which compensation for permissible energy use for ventilation is arrived at. In calculating the energy performance coefficient, one may leave out of consideration a toilet space, a bathroom, a meter space, accommodation for a hot water apparatus and accommodation for a boiler.

### References

- NEN 2916 Energy performance in utility buildings – Calculation method
- NPR 2917 Computational program for energy performance in utility buildings

As from 2011, NEN 2916 and NEN 5128 will be replaced by NEN 7120 Energy performance of buildings – Calculation method. In this future norm sheet, NEN 2916 and NEN 5128 will be combined and harmonised with European regulations on energy performance.

### Checklist A7

http://www.dgbc.nl/images/uploads/Technical_checklist_A7_def.pdf

# ENE 2 Sub-metering of Energy Uses

## Credit aim

The use of sub-metering for zones within the building and for substantial consumption groups, and the introduction of a monitoring system with which the metered energy uses can be tracked and adjusted if necessary.

## Credit criteria

2 points can be awarded as follows:

| Points | |
|---|---|
| 1 | Where it can be demonstrated that the substantial groups in the total energy consumption of the building are metered separately. |
| 1 | Where it can be demonstrated that the energy consumption of relevant zones or functional parts within the building is metered separately. |

## Compliance requirements

The following demonstrates compliance with the credit criteria:

**First point:**

The first point can be allocated if:

1. Submeters are used to record the energy use of the substantial consumption groups within the total building-related energy use, i.e.
    - space heating: always sub-metering;
    - hot domestic water if the total system has an installed capacity of more than 50 kW and/or if the central boiler has an installed capacity of more than 10 kW in the case of a modular system;
    - humidification if there is an installed capacity of more than 10 kW;
    - refrigeration if there is an installed capacity of more than 20 kW;
    - ventilators (of the main system) if there is an installed capacity of more than 10 kW;
    - lighting, incl. operating equipment, if a terminal distribution box distributes a capacity of more than 50 kW;
    - lifts, automatic doors, turnstiles, escalators and travelators: always sub-metering;
    - other substantial energy users, if applicable to the specific building function, where it is expected on the basis of the EPC calculation that the energy use of the relevant consumption group will amount to over 5% of the total building-related energy use.
2. The energy sub-meters are fitted with pulse transmitters that can be connected to a building management system, and each meter is labelled according to its specific consumption group.

**Second point:**

The second point can be allocated if:

1. Submeters are used to record energy use (gas, heat/cold, electricity) per zone, i.e. each floor or specific functional part of the building.
2. The energy sub-meters are fitted with pulse transmitters that can be connected to a building management system, and each meter is labelled according to its zone or part of the building.

## Compliance notes

**New build**
There are no additional or different requirements to those outlined above specific to new build projects.

**Refurbishment**
There are no additional or different requirements to those outlined above specific to refurbishment projects.

**Extensions to existing buildings**
If a building is extended and the building services come to form part of the communal services of the building, the requirements for energy submeters apply to the whole building.

**Shell only**
If it is shown during the building's development that the new owner/tenant will be responsible for installing specific building services, this credit must be worked out on the basis of an assumed 'fit-out' specification. It can be assumed (unless proven in another manner) that the building will at least use heating, hot domestic water, lighting and operating equipment/small devices. If the building is not specifically designed for natural ventilation it can be assumed that there is mechanical ventilation, with or without cooling. If it is not yet possible to install submeters, this credit must be withheld until Schedule of evidence required is supplied on the basis of additional information.

**Catering**
If the building includes catering facilities, one submeter is to be used for the entire catering section (central kitchen, dishwashing kitchen, cold storage, all kitchen equipment, restaurant).

**Central facilities**
Central lighting and small devices/equipment in zones where the energy use cannot reasonably be assigned to a tenant or occupant, and which are usually managed by the building owner or manager in normal situations, are to be furnished with their own submeter. Examples of these are: the central building entrance and reception, an atrium, outside lighting, parking garages and stairwells.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additions for the application of this credit to office buildings.

**Retail**
Submeters are to be installed per letting unit in the retail building and also per substantial consumption group.
Industrial buildings
There are no additions for the application of this credit to industrial buildings.

**Schools**
There are no additions for the application of this credit to school buildings.

## Schedule of evidence required

### Design stage

A copy of the schedule of requirements, a specification and technical drawings clearly showing:

First and second points:

1. & 2.:

- All floors with their respective spatial distribution of zones and/or parts.
- The locations of the building services.
- An indication on the drawing, showing where submeters have been installed per zone, floor or building service, showing which zone, floor or building service is served by each meter.
- Type indication of the used submeters with pulse transmitter incl. technical specifications.

### Post-construction stage

An assessor's inspection report and photographic evidence for the credit points below, confirming that the aforementioned requirements are met.

First and second points:

1. & 2.:

- The locations of the submeters with pulse transmitters; it is sufficient to provide a representative sample of selected locations in the building as long as the submeters per consumption function (building service) are all included.

## Definitions

Building management system
Functional building section: a section of the building that is specifically designed to accommodate a specific and distinct function of the building. Examples of these are: catering, laboratories, swimming baths, auditoria of substantial size etc.
A building management system (central computer) regulates, records, monitors and controls various systems and installations in the building, such as air conditioning, heating, cooling, lighting and security.

## Additional information

None.

## The Buildings Decree

### Non-residential buildings

*Article 4.66, section 1:* A building with a provision for electricity, gas, drinking water or heating, that has a possibility for connection to the relevant public network has a meter space, which may or may not be communal.

*Article 4.67, section 3:* A meter space, as referred to in Article 4.66, first section, has a layout and dimensions appropriate to the equipment to be placed inside it.

*Article 4.69:* The external dividing structure of a meter space, as referred to in Article 4.66 is rainproof in compliance with NEN 2778.

*Article 2,185, section 3:* The walking distance between a meter space, as referred to in Article 4.66, and the entrance to a residence is no more than 3 m if the distance covered passes through a non-residential space.

## References

- ISSO Publication Sustainable Management, part 4: The need for monitoring
- ISSO Publication 31 Measurement points and measurement methods

# ENE 4 Energy-efficient external lighting

## Credit aim
To promote energy conservation and CO2 reduction through the use of energy-efficient exterior lighting.

## Credit criteria
1 point can be awarded as follows:

| Points | |
|---|---|
| 1 | Where the evidence provided shows that energy-efficient exterior lighting is used and that this lighting is not left on unnecessarily, all without detriment to social safety. |

## Compliance requirements
Compliance is demonstrated as follows:

1. The exterior lighting is made energy-efficient through the use of certain lighting technology, whereby the 'specific luminous flux' must not be less than 65 lumen/Watt and the 'specific, installed light capacity' is no more than:
    - 5 Watt/m² for parking areas, the access roads to these and other paths and lanes in the grounds;
    - 10 Watt/m² for the access points and payment points of parking areas;
    - 2 Watt/m² for bicycle sheds.
2. Where atmospheric lighting is not used for (pedestrian) paths or on borders, OR where atmospheric lighting takes the form of lamps that charge up automatically by day from solar energy and require no power from the electricity network.
3. Where all lighting in the grounds is switched on and off automatically, being activated by low ambient light at dusk (and hence automatically geared to the length of the days) and deactivated by means of a time switch. 'Deactivation' also includes the lowering of the lighting level to the minimum standard required for safety around the building. The use of a manual override to force the lighting to turn on or off (e.g. in emergencies) is permitted and will not lead to the credit being withheld. This also applies to presence sensors for anti-intruder security and social safety, providing these are restricted to the lighting points in the immediate vicinity of the building and/or locations that are prescribed or desirable for the purpose of anti-intruder security and social safety.

## Compliance notes

### New build
There are no additional or different requirements to those outlined above specific to new build projects.

### Refurbishment
There are no additional or different requirements to those outlined above specific to refurbishment projects.
Extensions to existing buildings

There are no additional or different requirements to those outlined above specific to the extension of existing projects.
If the facilities are located in the existing building, these facilities must be evaluated in the light of the aforementioned requirements.

**Shell only**
There are no additional or different requirements to those outlined above specific to shell-only projects.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| √ | √ | √ | √ |

**Offices**
There are no additions for the application of this credit to office buildings.

**Retail**
For retail buildings there is an additional requirement that awning illumination (if used) must not exceed the maximum specific lighting capacity of 7 Watt/m².

**Industrial buildings**
For industrial buildings there are no additional or different requirements to those outlined above, other than the application of 1.0 Watt/m² as the norm for specific lighting capacity on industrial and business estates.

**Schools**
There are no additions for the application of this credit to school buildings.

**Social safety**
The lighting must not result in a light level that is detrimental to the social safety of the grounds around the building, as defined in the Buildings Decree and the 'Politiekeurmerk Veilig Wonen' (Police 'Safe Habitation' seal of approval).

**No exterior lighting**
When it can be demonstrated that the building is designed to function without any exterior lighting whatsoever (including without illumination of the façade, entrance or advertising), the credit can be awarded automatically.

## Schedule of evidence required

**Design stage**
A copy of the schedule of requirements, specification or specification drawings and/or additional specifications from the manufacturer or installation company, indicating:

1. The type of lighting technology used per function of use (parking area, entrance to parking area, access roads, paths, garaging/storage facilities, façade lighting) with indication of the specific luminous flux in lumen/Watt, as shown by the manufacturer's specifications and/or measurements and calculations performed to determine the applied specific luminous flux and specific illumination capacities, in conformity with NEN 1891 'Methods of measuring luminance and illuminance';

2. Specification of the atmospheric lighting (if used), its type and electric power source;
3. Specification of the light fittings used per type of lighting;
4. What type of automatic switching is used on all the exterior lighting.

**Post-construction stage**

A copy of the schedule of requirements, specification or specification drawings and/or additional specifications from the manufacturer or installation company, indicating:

1. The type of lighting technology used per function of use (parking area, entrance to parking area, access roads, paths, garaging/storage facilities, façade lighting) with indication of the specific luminous flux in lumen/Watt, as shown by the manufacturer's specifications and/or measurements and calculations performed to determine the applied specific luminous flux and specific illumination capacities, in conformity with NEN 1891 'Methods of measuring luminance and illuminance';
2. Specification of the atmospheric lighting (if used), its type and electric power source;
3. Specification of the light fittings used per type of lighting;
4. What type of automatic switching is used on all the exterior lighting;
5. A declaration from the assessor that the exterior lighting (if present) has been checked for conformity with the compliance requirements.

## Definitions

**Exterior lighting**

Lighting of paths, roads, parking areas, garaging/storage facilities and other outdoor areas belonging to the building plot, including the exterior lighting of the inner courtyards and back paths of dwellings.

**Specific luminous flux (efficiency)**

Measurement of the energy-efficiency of lighting, being the light output in lumen per Watt of energy consumed.

**Specific lighting capacity**

Measurement of the capacity required for illumination, per m2 of illuminated floor area, expressed in Watt/m2 of useful floor area.

### Additional information

In the dark, the sensitivity of the human eye shifts towards the blue shades in the spectrum. Lamps that mainly emit, or include, light in the yellow and red bands deliver a low light output in such circumstances. On the one hand, this consumes energy unnecessarily and on the other hand it produces the tendency to fit lamps with a higher wattage to achieve the desired light output. Such lamps are also less efficient at fulfilling the functional requirement that objects should be distinct and clearly visible. This requirement is especially important with regard to safety.

For that reason, for the purposes of this credit no specific requirements are set for the type of lighting to be used (sodium lamps, fluorescent tubes, metal-halogenide lamps, induction lamps etc.) and the requirements are limited to the combination of the maximum specific lighting capacity (expressed in Watt/m2) and the specific luminous flux (in lumen/Watt).

The requirements with regard to the specific luminous flux ensure that energy-efficient lamps are used, while the requirements with regard to the specific lighting capacity make it possible to vary the number of illumination points (on a parking area, for example) in relation to the height of masts in order to achieve the desired (normative) lighting level.

Studies have shown that the combination of light-sensitive switching (activation of exterior lighting when daylight falls below a certain level) and timed switching (deactivation when the building is deserted and the exterior lighting is no longer required) is the best way to limit the number of hours that lights are switched on.

**References**

- NEN 1981 Methods of measuring luminance and illuminance
- NEN-EN 12464 - Part 2 Light and lighting – Exterior lighting
- National Package for Sustainable Building, S048/U048/B048.
- SenterNovem Publication “Dat licht zó!!!” Part 4: Energy-efficient lighting around buildings (1998)
- ECN Publication ECN-C-04-017 Lighting energy in Amsterdam.. Shining the light on energy savings” (2004)
- Politiekeurmerk VeiligWonen (Police ‘Safe Habitation’ seal of approval)

# ENE 5 Use of Renewable Energy

## Credit aim

To encourage the use of renewable energy systems.

## Credit criteria

Up to 3 points can be awarded as follows:

| Points | |
|---|---|
| 1 | Where the evidence provided demonstrates that a feasibility study has been performed with regard to renewable energy generation for the building (whereby the system is installed on the building itself or in the immediate surroundings) and that the results of the study have also been implemented. |
| 2 | Where the evidence provided shows that the first credit point has been gained and that at a reduction of at least 10% in the building's CO2 emissions has been achieved by implementation of the renewable energy techniques advised in the feasibility report (in relation to the reference situation without renewable energy generation). |
| 3 | Where the evidence provided shows that the first credit point has been gained and that at a reduction of at least 20% in the building's CO2 emissions has been achieved by implementation of the renewable energy techniques advised in the feasibility report (in relation to the reference situation without renewable energy generation). |

## Compliance requirements

Compliance is demonstrated as follows:

**First point:**

1. A study has been carried out to examine the feasibility of using local renewable energy sources to supply the building's requirements. The local, renewable energy sources are ones that are already in or close to the building's own grounds and to which the building can be connected, or systems for renewable energy generation that can be realised within the building itself. The feasibility study must comply with the relevant requirements in 'Compliance notes' AND a researched renewable energy technology must be included in the design.
2. The feasibility study is carried out at an early stage in the building's design so that any available and feasible technologies for renewable energy generation can be brought into the further development of the building. If the feasibility study, as referred to here, is carried out too late, with the result that certain technologies for renewable energy generation cannot be applied, this credit will not be allocated.
3. If the feasibility study has been performed on time, but indicates that there is no feasible technology for renewable energy generation for the building and that there is no present or achievable source of renewable energy in the building's proximity (or that the building cannot be connected to any), this credit can be allocated but the second and third credit points lapse, leaving only one point to be allocated.

**Second point:**

1. The first credit point has been gained and one or more renewable energy sources, as recommended in the feasibility study, are actually in use, thereby achieving a reduction (totalled for all renewable sources) of at least 10% in the building's total CO2 emissions in comparison with the base situation.

**Third point:**

1. The first credit point has been gained and one or more renewable energy sources, as recommended in the feasibility study, are actually in use, thereby achieving a reduction (totalled for all renewable sources) of at least 20% in the building's total CO2 emissions in comparison with the base situation.

**Exemplary level criteria**
The following outlines the exemplary level criteria to achieve one innovation credit for this BREEAM-NL issue:

1. The first credit for a feasibility study must be achieved.

2. A local zero carbon technology has been installed in line with the recommendations of the above feasibility study and this method of supply results in a 25% reduction in the building's CO2 emissions.

3. Figures used for calculations of the percentage carbon production provided by zero carbon technology are based on the output from a recognised energy modelling software.

## Compliance notes

**New build**
There are no additional or different requirements to those outlined above specific to new build projects.

**Refurbishment**
There are no additional or different requirements to those outlined above specific to refurbishment projects.

**Extensions to existing buildings**
There are no additional or different requirements to those outlined above specific to the extension of existing buildings.
If the existing (part of the) building already incorporates systems for generating renewable energy, these must be assessed in terms of the above requirements. The requirement for a feasibility study remains undiminished however, and the emphasis will lie on the feasibility of other renewable energy sources than those used in the existing system(s).

**Shell only**
There are no additional or different requirements to those outlined above specific to shell-only projects.

**Feasibility study**
The feasibility study must meet the following requirements:

- The study examines the feasibility of using renewable energy sources as specified under 'Definitions', including the possibilities for supplying renewable energy to the public network;
- The study includes an analysis of the 'Life Cycle Costs' and 'Life Cycle Impact' of the renewable energy system in terms of CO2 emissions;
- The return on investment (ROI), pay-off times or other normal economic indices are calculated, taking into account the possibility of getting subsidies;

- The study takes environmental and spatial effects into account in the total assessment and cost calculation, in terms of land use, noise nuisance and compatibility with the current local plan;
- The study explains why available technologies for renewable energy generation have been rejected;
- The corresponding results of the calculations for Ene 1 can be used in calculating the building's baseline CO2 emissions.

When undertaking a feasibility study at a later stage than outline proposals, an additional element will need to be included in the report to highlight the local zero carbon energy sources which have been discounted due to the constraints placed on the project by the late consideration, and the reason for their omission with the same arguments taken in consideration (LCC, ROI, environmental/spatial effects, etc).

If the feasibility study discounts all local zero carbon energy sources as unfeasible due to the late stage in the project that the study was commissioned, then the credit for the feasibility study must be withheld.

If the feasibility was commissioned at the outline proposals stage or earlier and in the unlikely event the study concludes that the specification of any local zero carbon energy technology is unfeasible, the first credit can still be awarded. Subsequent credits for installing zero carbon energy technology that meets a percentage of building energy demand will not be achievable.

**The building forms part of a larger area development**
If the building forms part of a larger area development incorporating new or existing systems for renewable energy generation to serve the total development, then only the renewable energy actually produced for the building with count in calculating the reduction in its CO2 emissions in comparison to the baseline situation without renewable energy generation.

**Immediate surroundings**
The system that generates renewable energy for the building does not have to be on the building itself, but can also be realised at the same location. Renewable energy generation at a location different to that of the building is not valid for the purposes of this credit.

**Supply to the public network**
All the generated renewable energy that the feasibility study shows to be surplus to the building's own energy requirements and can therefore be supplied to the public energy network can be included in the calculation of the total proportion of renewable energy generation within/of the building itself.

**Energy use of the generating system itself**
The energy that the generating system uses itself cannot be included in calculating the proportion of renewable energy generation within/of the building.

**The building owner or manager does not carry out energy procurement**
If energy procurement for the building in the occupancy stage is not done by the owner or on the owner's behalf by the building manager, but is left to the (future) occupant (tenant, or building occupant if the building is sold after construction), the credit cannot be allocated because there is insufficient certainty that the electricity for the building will definitely come from renewable sources during the first three years of occupancy.

**Building-related $CO_2$ emissions**
The total building-related CO2 emissions in connection with heating, cooling, hot water production and lighting, in conformity with the energy performance methodology (NEN2916 and NEN5128).

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additional or different requirements to those outlined above specific to office buildings.

**Retail**
There are no additional or different requirements to those outlined above specific to retail buildings.

**Industrial buildings**
Additions for the application of this credit to industrial buildings: the residual heat from the industrial processes that (will) take place in the building counts as a source of renewable energy.

**Schools**
There are no additional or different requirements to those outlined above specific to school buildings.

## Schedule of evidence required
**Design stage**

First point:

1. to 3:

- A copy of the feasibility study showing in which phase of the building design schedule the study was performed and the competency of the energy consultant to perform the feasibility study.

Second and third points:

- A copy of the specification showing that the feasible and profitable techniques of renewable energy generation, as recommended in the feasibility study, are actually used within or in the proximity of the building.
- A copy of the print-out from the computer program used to calculate the building's CO2 reduction; this must show which computer program was used, the competency of the person who performed the calculations and the building's total quantity of CO2, both in the baseline situation and when the examined sources of renewable energy generation are used.
- The manufacturer's technical information on the selected and applied systems for renewable energy generation, demonstrating the CO2 reduction calculated in the feasibility study on the basis of the installed technology.

**Post-construction stage**

**Second and third points:**

- A report on a site inspection by the assessor and photographic evidence, confirming that the renewable energy generation systems are actually present in the building.

## Definitions
**Electricity generated from renewable sources**

In the context of this credit, electricity generated from renewable sources covers all procured electricity generated for 100% from renewable sources. This condition is met is the electricity is derived from:

- wind power;
- energy from the tides or waves of the sea;
- heat conversion due to the temperature difference between the cold deep-sea layers and the surface water of oceans;
- the potential difference between saltwater and fresh water;
- water power (energy generation from height differences in a water course);
- solar energy from the use of solar panels, solar collectors or turbines driven by the collection and concentration of solar heat;
- geothermal energy;
- biomass power stations.

**Renewable energy sources**
Renewable energy sources relate to one of the following methods of energy generation:

- solar collector for heating spaces and/or producing hot water;
- photovoltaic solar cells for generating electricity;
- biomass boilers/heating systems;
- total energy systems based on biomass or biogas;
- water power;
- geothermal energy;
- a wind turbine;
- a water pump system (using ambient heat as a source: earth, water, air);
- a system with cold storage;
- thermal storage in combination with a heat pump;
- hydrogen-based fuel cells (in which the hydrogen must be sustainably produced using one of the above technologies).

**Life Cycle Costs**
Total costs of the system over its entire life cycle, including design, procurement by tender, use, maintenance and disposal, minus the residual value.

**Life Cycle Impacts**
The CO2 balance over the entire life cycle.

## Additional information

Only (local) techniques for renewable energy generation are to be included in this credit, and not energy efficiency techniques. Energy efficiency techniques are already assessed in credit Ene 1. These also include some techniques for renewable energy generation in buildings that have an energy-saving effect (thereby reducing CO2 emissions) within the building, such as the use of solar cells and total energy systems based on biomass, biogas and such like. The underlying concept in this Credit Ene 5 is to separately assess techniques for renewable energy generation within the building or in its proximity for the building's benefit. This is because relatively little use is made of renewable energy techniques in the Netherlands. The credit is therefore intended to positively recognise the fact that the building contributes to the use of renewable energy within the built environment as such.

## References

- SenterNovem Protocol: Monitoring Renewable Energy; method for calculating and recording the contribution from renewable energy sources (most recent update)

# ENE 6 Building fabric performance & avoidance of air infiltration

## Aim of the credit
Promoting energy saving and CO2 reduction through the implementation and design of loading / unloading platforms and / or exhibition areas with a minimum loss of heat or cold.

## Credit criteria
A maximum of 1 point can be awarded:

| Points | |
|---|---|
| 1 | Where evidence provided demonstrates that loading / unloading platforms and / or exhibition areas are designed and constructed to minimize of building heat or cold loss during use. |

## Compliance requirements
The following demonstrates compliance:

### Design measures
1. Installation of personnel door(s) between internal and external areas within proximity of any adjacent openings for goods delivery access; **AND** a draught lobby between office areas (where present) and the external building access.
2. Delivery loading/unloading areas and operational and/or storage areas are partitioned.
3. Where present all goods/personnel access, vents in the roof and backdraught dampers on extract fans are draught sealed.
4. Loading/unloading bay doors insulated to 0.6 W/m2K.
5. Plastic strip curtains are specified between internal delivery areas and other internal warehouse storage or operational areas (where there is no other draught sealing or doors). The strip curtains should have a partial overlap.
6. Either of the following are specified on the external goods doors/vehicle delivery bays:
    - Plastic strip curtains (with a partial overlap), air curtains.
    - Dock seals mounted on all vehicle delivery bays.
7. Rapid rise loading/unloading bay doors with at least 1.0 m/sec closing speed or less than 5 secs closing time between fully opened and fully closed are specified/installed.

### As built performance measures

1. In the post construction phase, the effectiveness of these facilities and measures tested by means of a thermographic study of heat or cold any leaks in the construction of the loading / unloading platforms and / or forwarding all relevant areas and boundaries between areas with air conditioning and without air conditioning zones following on the loading / unloading platforms and / or exhibition areas, which satisfies the following:

- Thermographic examination complies with the requirements of EN 13187 Thermal performance of buildings, Qualitative detection of thermal irregularities in building envelope - Infrared Method;
- Thermographic study shows that compliance with the insulation requirements as set out in the building specifications;

- Thermographic study shows that no significant heat leaks are present;
- Thermographic study shows avoidance of excessive thermal bridging
- Thermographic study shows that no significant air infiltration takes place except where it is deliberately designed and installed (eg vents).
- Any defects identified via the inspection are rectified and the building re-inspected to confirm it complies with the requirements of point 1.
- Plus, where integral cold storage facilities are present, these have been tested and commissioned in accordance with the cold storage requirements of BREEAM-NL credit Man 1 (this does not necessarily require BREEAM-NL credit Man 1 to have been awarded).

## Compliance notes

**New build**
There are no additional or different requirements to those outlined above specific to new build projects.

**Refurbishment**
There are no additional or different requirements to those outlined above specific to refurbishment projects.

**Extensions to existing buildings**
There are no additional or different requirements to those outlined above specific to the extension of existing projects.
If the facilities are located in the existing building, this must be evaluated in the light of the aforementioned requirements.

**Shell only**
There are no additional or different requirements to those outlined above specific to shell-only projects.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | - |

**Offices**
For office buildings, this credit is filtered if the building has no loading / unloading platforms.

**Retail**
For retail buildings, only office spaces are taken into account in the assessment of this credit.

**Industry**
For industrial buildings, only office spaces are taken into account in the assessment of this credit.

**Different specifications in the building design**
If some of the design measures are not relevant, e.g. partitioning between delivery and storage areas of smaller buildings/units may not be practical; the assessor may omit them from the assessment. In such instances the design team must provide the assessor with an adequate statement of justification as to why

this is the case. The assessor must use their discretion in determining the validity of the case and reference any justification and design team statement in the formal BREEAM-NL report.

### No heated or air conditioned areas

Where the scope of the building specification covers fitted-out elements and the building is designed to be untreated then the requirement to comply with the 'as built' performance measures can be omitted. The design measures are still applicable for future-proofing i.e. in the event that the building at some point has heating and/or air conditioning plant installed.

## Schedule of evidence required

**Design stage**

1. to 6. A copy of the brief, documents or drawings, specifications and additional specifications of the manufacturer or the installation company, which indicates:

- where loading / unloading platforms and / or exhibition areas are located, while the cargo doors are used, the insulation and that these doors have locking mechanism is applied; evidence that strip curtains, flap doors, air curtains and / or pneumatic door locks are applied
- to the "Criteria requirements' prescribed places;
- specifications of the method of sealing the trip to "Criteria requirements' prescribed places;
- the separation of loading / unloading platforms and / or exhibition areas compared to other operational areas.

**Post construction stage**

1. to 6. An inspection of the assessor and photographic evidence that demonstrates that the requirements are met.

7. A copy of the thermographic examination held.

## Definitions

**Dockseals**

Also referred to as inflatable shelters, are structures that surround the top and sides of a vehicle loading dock forming a seal between the building and delivery vehicle and therefore minimising the loss of heated or cooled air from the building.

**Air curtain**

A fan heater that directs a curtain of warm air downwards over an opening which prevents the transfer of heat through the opening. Air curtains help to manage and minimise heat loss from the building when it is necessary to open external doors or access a cold storage enclosure.

## Additional information

The requirements of this credit be awarded in the EPC calculation in credit ENE1 "CO2 emissions" is standard for building types such as offices, schools, etc. The present credit ENE6 aspect is to "energy-efficient loading and unloading platforms" to be included for building types where no standard exists for calculating EPC or performed, or if the air infiltration of loading and unloading platforms not included in such calculations. This is particularly the case in retail and industrial buildings (warehouses, etc.).

A thermographic survey is also included as proof in the post contruction stage in credit ENE10. It is therefore economically logical to where thermographic survey is performed, to take in account the air infiltration and thermal properties of the loading and unloading platforms. In this case, be aware of the quality statements on the part of the manufacturer as valid evidence.

## Building decree

**Artikel 5.9, lid 1:** De volgens NEN 2686 bepaalde luchtvolumestroom van het totaal aan verblijfsgebieden, toiletruimten en badruimten van een gebruiksfunctie is niet groter dan 0,2 m³/s.
**Artikel 5.9, lid 3:** Het eerste lid geldt niet, indien de industriefunctie uitsluitend wordt verwarmd voor een ander doel dan het verblijven van mensen of niet wordt verwarmd.
**Artikel 5.9, lid 4:** Indien in een gebouw of een gedeelte van een gebouw meer dan een gebruiksfunctie ligt en dit gebouw of gedeelte van een gebouw op niet meer dan een perceel ligt, is, in afwijking van het eerste lid, de volgens NEN 2686 bepaalde luchtvolumestroom van het totaal aan verblijfsgebieden, toiletruimten en badruimten van de gebruiksfuncties waarvoor het eerste lid geldt, niet groter dan 0,2 m³/s.

## References

- EN 13187 Thermische eigenschappen van gebouwen: Kwalitatieve detectie van thermische onregelmatigheden in de gebouwschil – Infraroodmethode

# ENE 7 Energy-efficient refrigerated and frozen storage

## Credit aim

To promote energy conservation and CO2 reduction through the use of energy-efficient storage facilities in which product are held in refrigerated and frozen states.

## Credit criteria

For retail, up to 3 points can be awarded as follows:

| Points | |
|---|---|
| 1 | Where the evidence provided demonstrates that refrigerator and freezer units bear energy label 'A'. |
| 1 | Where evidence provided demonstrates that the cold food storage plant is designed to minimise energy consumption in operation. |
| 1 | Where the evidence provided demonstrates that heat recovery and cold buffering is used in the system for refrigerated and frozen storage. |

Up to 3 points can be awarded for retail buildings, one point for each of the compliance requirements 1 to 3. The points can be awarded independently of each other.

For building categories other than retail, 1 point can be awarded as follows:

| Points | |
|---|---|
| 1 | Where the evidence provided demonstrates that energy-efficient refrigerator and freezer units and an energy-efficient system for refrigerated and frozen storage are used. |

Up to 1 point can be awarded for building categories other than retail if compliance requirements 1 *and* 2 are met.

## Compliance requirements

Compliance is demonstrated as follows:

1. The refrigerator and freezer units bear energy label 'A'.
2. The following minimum facilities are installed:
    - The refrigerated or frozen storage takes the form of a direct expansion (DX direct) system using refrigerant R407C or a direct pump system using refrigerant R507;
    - The doors are self-closing through the use of induction loops, presence sensors or activated automatic door closers, or are fitted with strip curtains or draught doors that keep the outside warmth out as much as possible on opening, or (in the case of refrigerator units) there is a self-closing door or a covering for when the refrigerator or freezer unit is not in use (e.g. at night);
    - The compressor is water-cooled with a cooling tower, or an evaporator/condenser and/or high-yield compressor is used (with a yield > 60%);
    - The refrigerated or frozen storage facility is fitted with an electronic expansion valve instead of a thermostat-operated one;
    - Compressors, fans and pumps have variable revolution control;

- The refrigerated or frozen storage facility has a computerized monitoring system that automatically or by means of programming adjusts the compressor operation, the fan revolutions and the cooling capacity to the outside temperature and/or the quantity of stored goods, and also provides for automatic defrosting;
- The plant has been commissioned in compliance with the requirements for cold food storage commissioning outlined in BREEAM-NL credit Man 1 Commissioning (this does not necessarily require BREEAM-NL credit M1 to have been awarded).

At least 3 of the following facilities have also been installed:

- If multiple refrigerator and freezer compartments are arranged next to each other, these are grouped by temperature;
- The refrigerated or frozen storage facility is situated in an unheated or naturally cool location;
- The size of the door openings is minimized in relation to their functionality (e.g. whether they need to be accessible or not to forklift trucks);
- Smaller, built-in access doors for personnel and/or the use of roller conveyors with airlocks for the passage of goods if the refrigerated or frozen storage facility has a large main door;
- Use of air curtains or airlocks where possible and useful;
- Freezer compartments are furnished with a refrigerated anteroom;
- The refrigerated or frozen storage facility is equipped with automatic defrosting;
- The refrigerated or frozen storage facility has compressed gas defrosting system rather than an electric one;
- The refrigerated or frozen storage facility has energy-efficient illumination that radiates little or no heat, or (where possible) no artificial lighting is fitted;
- The evaporator is not fitted directly above the access door.

3. Use of thermal storage and heat recovery:
   - The refrigerated or frozen storage system has a cold/heat recovery system (e.g. for floor heating and/or air heating);
   - The refrigerated or frozen storage system has a system for storing cold (cold buffering) in periods when demand for freezing/refrigeration is low so that it can be used in periods when demand is high.
   - If a study by the design team can demonstrate that the use of cold/heat recovery or cold buffering is not viable (e.g. due to lack of demand for residual heat or absence of peak periods of cooling or freezing), this requirement can still be fulfilled.

## Compliance notes

### New build

There are no additional or different requirements to those outlined above specific to new build projects.

### Refurbishment

If the assessment comprises of a part new build-extension and part refurbishment and there is existing cold storage plant in the existing building that also serves the new extension, then the compliance note above for refurbishment applies.

### Extensions to existing buildings

There are no additional or different requirements to those outlined above specific to the extension of existing projects.
If the facilities are located in the existing building, these facilities must be evaluated in the light of the aforementioned requirements.

**Shell only**
If the future occupancy of the building has not yet been determined, the credit can be awarded if the intended occupant supplies a written declaration of his intention to comply with the requirements.

**Heat recovery or thermal storage unfeasible**
Where the specification of thermal storage or heat recovery is unfeasible because there will be no low load periods and/or there is no demand for recovered heat, then the third credit can be awarded provided all the requirements of the second credit are met. The design team must justify why there are no feasible opportunities for heat recovery, free cooling or thermal storage.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| √ | √ | √ | √ |

**Offices**
There are no additional or different requirements to those outlined above specific to office buildings.
Refrigerated or frozen storage will seldom be used in office environments, and then only if there is on-site catering.

**Retail**
There are no additions for the application of this credit to retail premises.

**Industrial buildings**
There are no additional or different requirements to those outlined above specific to industrial buildings.

## Schedule of evidence required

**Design stage**
1 to 3.

- A copy of the schedule of requirements or the technical specifications of the refrigerator or freezer units and the refrigerated or frozen storage system, from which it can be inferred whether and to what extent the compliance requirements are met. If the technical specification does not provide sufficient clarity in this respect, a further specification or declaration should be requested from the manufacturer, installer or supplier of the refrigerator and freezer units and the refrigerated of frozen storage system.
- If it has not proved feasible to exploit residual heat or a cold buffering system, a copy of the study in which the design team demonstrates this.

**Post-construction stage**

1 to 3. The evidence required for this phase is the same as that for the design phase, supplemented by a site inspection report from the assessor and photographic evidence demonstrating that the refrigerator and freezer units and the refrigerated and frozen storage system are installed in compliance with the specifications given during the design phase, and that the facilities called for in the compliance requirements are present.

## Definitions

**Global warming potential (GWP)**
The GWP is a measure of the effect that a refrigerant has on augmenting the greenhouse effect, expressed in kg of CO2 equivalent as emitted over a 100-year period. As a standard for measurement, 1 kg $CO_2$ has a GWP of 1.0. The 100-year period is applicable because the CO2 cycle in the atmosphere takes about 105 years.

**Refrigerated and frozen storage**
Building-related refrigerated and frozen storage, such as refrigerator and freezer compartments and units that are integrated into the building and connected to a central refrigeration/freezer system. Not stand-alone refrigerators or freezers (cabinets).

## Additional information

**Energy label for refrigerator and freezer units**
At present there is no obligatory energy labelling system for refrigerator and freezer units that form part of a central cooling system. However, TNO-MEP has developed a methodology in an international context for the voluntary labelling of refrigerator and freezer units; this is based on the European Eurovent measurement standard. See references [1-5]

## References


- [1] SenterNovem Publication – The choice of refrigeration or freezer systems in supermarkets, 2006
- [2] Finding the Energy Label for your refrigerated display cabinet, Saint Trofee 2008. http://www.dgbc.nl/images/uploads/Find_your_energy_label.pdf
- [3] Refrigerated_Display_Cabinet_Classification, Saint Trofee 2008. http://www.dgbc.nl/images/uploads/Refrigerated_Display_Cabinet_Classification.pdf
- [4] Refrigerated Display Cabinets, the meaning of TEC and TDA, Saint Trofee 2008. http://www.dgbc.nl/images/uploads/TEC_and_TDA.pdf
- [5] TDA, Total Display Area calculation. http://www.dgbc.nl/images/uploads/TDA_calculation.pdf
- [6] Regulation (EC) No. 842/2006 of the European Parliament and Council, 17 May 2006, on certain fluorinated greenhouse gases.

[7] TNO Publication Supplement to Building Guide: Refrigeration and freezer sheds, 2004.

# ENE 8 Energy-efficient lifts

## Credit aim

To promote energy conservation and CO2 reduction through the use of purpose-designed, energy-efficient lifts.

## Credit criteria

2 points can be awarded as follows:

| Points | |
|---|---|
| 2 | Up to 2 points can be awarded where the evidence provided demonstrates that energy-efficient goods and passenger lifts are used. |

## Compliance requirements

Compliance is demonstrated as follows:

**First point:**

Process requirements:

1. An analysis of transport demand and patterns for the building has been carried out by the design team to determine the optimum number and size of lifts and counterbalancing ratio on the basis of anticipated passenger demand.
2. The energy consumption for at least two types of lift or lift strategy ‘fit for purpose’ has been estimated and the system with the lowest energy consumption specified.

Lift requirements:

3. The lifts are fitted with energy-efficient power units. A power unit is considered energy-efficient if the specific energy consumption while the lift is in motion, as calculated in accordance with VDI4707-1, is less than 1.26 mWh/(kg*m).
4. The manufacturer declares that the decline in yield during the power unit’s expected service life is not more than 5%.
5. The lift is fitted with a non-hydraulic drive system (hydraulic drive systems are less energy-efficient than lifts with traction drives, permanent magnet motors or other drive systems).
6. The lift is fitted with a control system with which the power supplied by the motor is automatically made dependent on the load to be lifted (the number of people or quantity of transported goods at a given moment), through (for example) the elimination of peak loads by the use of frequency regulation on the power unit.
7. The lift has a low-energy, stand-by mode and also variable speed that are automatically matched to the load in the car to avoid excessive energy consumption with unfavourable car loading.
8. The lift has a system to recover the released energy and return it to the electricity network or usefully recycle it in some other way. Where energy recovery already forms an integral part of the lift technology, the lift automatically fulfils this requirement. This also applies if the recovery of braking energy is not viable because the building has few floors. However, the other compliance requirements must be fulfilled in this case.

9. The lift is fitted with LED lighting, presence sensors for the lighting or automatic activation/deactivation of the lighting.

**Second point:**

1. The first point must have been gained.
2. When there are multiple lifts in one group, these are automatically coordinated in such a way that the nearest lift responds to a call (so that several lifts do not needlessly respond to the same call), or there is some other optimization system that matches the number of lift movements to the current requirement and aims for an optimum car load ratio.
3. Access to the stairs is clearly indicated next to the lifts.
4. Configuration variants are assessed by means of lift simulations. The concept that is most fit for purpose is selected.

## Compliance notes

**New build**
There are no additional or different requirements to those outlined above specific to new build projects.

**Refurbishment**
There are no additional or different requirements to those outlined above specific to refurbishment projects.

**Extensions to existing buildings**
There are no additional or different requirements to those outlined above specific to the extension of existing projects.
If the facilities are located in the existing building, these facilities must be evaluated in the light of the aforementioned requirements.

**Shell only**
There are no additional or different requirements to those outlined above specific to shell-only projects.

**No energy recovery possible due to building dimensions**
If energy recovery cannot be usefully applied because the building is not high enough, the credit can still be awarded if the other requirements are fulfilled.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| √ | √ | √ | √ |

**Offices**
There are no additions for the application of this credit to office buildings.

**Retail**
There are no additions for the application of this credit to retail premises.

**Industrial buildings**
There are no additions for the application of this credit to industrial buildings.

**Schools**
There are no additions for the application of this credit to school buildings.

## Schedule of evidence required

**Design stage**
First point:

1 & 2.

- A copy of the relevant report or documentation detailing the analysis undertaken and findings/recommendations.
- A copy of the lift specification.

3 to 9. A copy of the schedule of requirements, specification or specification drawings and/or written declarations from the manufacturer or installation company, indicating:

- The exact locations of the lifts in the building;
- What type of lift and power unit have been used;
- The specific energy consumption when the lift is in motion in accordance with VDI4707-1;
- A manufacturer's declaration concerning reduction in yield during the expected service life of the power unit;
- Which control system automatically matches the supplied power of the lift to the current load to be lifted;
- What power-saving stand-by modes are used, and what speed control in response to the loading of the car;
- What system for the recovery of braking energy is used. If the building designer is of the opinion that the recovery of braking energy is not viable, this must be demonstrated with a further specification from the lift manufacturer supplemented by calculations of further evidence from the building designer. If the recovery of braking energy already forms an integral feature of the lift technology that is used, this must be demonstrated on the basis of more detailed specification from the lift manufacturer.
- Type and regulation of the lift lighting.

Second point:
1 to 4. A copy of the schedule of requirements, building drawings and/or written declarations from the manufacturer or installation company, indicating:

- Whether a sign pointing to the stairs has been placed next to every lift on every floor;
- What type of control system has been used for responding to calls, and how coordination between lifts is achieved in this regard;
- A copy of the lift simulation calculations showing that the concept that is most fit for purpose has been selected.

**Post-construction stage**

The evidence required for this phase is the same as that for the design phase, supplemented by a declaration from the assessor that the lifts in the building were checked for fulfilment of the compliance requirements during the site inspection; this must be supplemented by photographic evidence.

## Definitions

The term 'lift' refers to: a machine that serves certain stages in a building using a car that moves along fixed guide rails inclined at more than 15 degrees from the horizontal, and which is intended for the transport of

- passengers,
- passengers and goods,
- only goods if the car can be entered without difficult by a person and is equipped with controls situated in the car or within reach of a person inside the car.

Lifts that follow a completely fixed trajectory in space, even if they do not move along fixed guide rails, are covered by this directive (e.g. scissor lifts).

This credit is not applicable to:

- Cable systems, including cable railways, for the public or private transport of passengers,
- Lifts specially designed and built for military or peacekeeping purposes,
- mine lifts,
- stage lifting machinery,
- lifts built into vehicles,
- lifts associated with a piece of machinery and intended exclusively to facilitate access to the workplace,
- rack railways,
- construction lifts.

## Additional information

None.

## References

- SBR National Package for Sustainable Building ('Dubocatalogus'), measure U484;
- VDI 4707, "Lifts - Energy efficiency" (German norm, original title: "Aufzüge - Energieeffizienz");

(still under development) prEN-ISO 257451-1&2 "Method for measuring energy-efficiency in lifts".

# ENE 9 Energy-efficient escalators and travelators

## Credit aim

To promote energy conservation and CO2 reduction through the use of energy-efficient escalators and travelators.

## Credit criteria

1 point can be awarded as follows:

| Points | |
|---|---|
| 1 | Where the evidence provided demonstrates that energy-efficient escalators and travelators are used. |

**Where the term 'travelator' is used for the purposes of this credit, it should be taken to include sloping thoroughfares.*

## Compliance requirements

Compliance is demonstrated as follows:

1. The escalators and travelators are fitted with an energy-efficient power unit. A power unit is considered energy-efficient if the rotary current consumed by the escalator or travelator does not exceed 15mA per kg of load to be carried at a speed of 0.5 metres per second, or a consumption that increases proportionately at higher speeds (see also 'Additional information').
2. The escalators or travelators are fitted with a motor with a yield (electrical and mechanical) of over 90%.
3. The escalators or travelators are fitted with a control system with which the power supplied by the motor is automatically made dependent on the load to be carried (the number of people at a given moment), through (for example) the elimination of peak loads by the use of frequency regulation on the power unit.
4. The escalators or travelators are equipped with a stand-by system so that the escalator or travelator automatically switches off and halts when not used for a protracted period. Please note that in some cases it is more energy escalator efficient to leave travelator running at low speed, see compliance requirements.
5. A sign indicating the location of the stairs is placed next to every ascending or descending escalator or travelator.

## Compliance notes

### New build

There are no additional or different requirements to those outlined above specific to new build projects.

### Refurbishment

There are no additional or different requirements to those outlined above specific to refurbishment projects.

### Extensions to existing buildings

There are no additional or different requirements to those outlined above specific to the extension of existing projects.

If the facilities are located in the existing building, these facilities must be evaluated in the light of the aforementioned requirements.

**Shell only**
There are no additional or different requirements to those outlined above specific to shell-only projects.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| √ | √ | - | - |

**Office**
There are no additions for the application of this credit to offices.

**Retail**
There are no additions for the application of this credit to retail premises.

**Automatic deactivation**
Automatic deactivation depends greatly on the usage situation and is only fruitful if the escalator is not used for a protracted period. For escalators in frequent use, stopping them can have a detrimental effect on energy consumption and it is better to keep them moving at a low speed when not in use. In this case this strategy has be justified a report from the consultant or supplier.

## Schedule of evidence required

**Design stage**
1 to 5. A copy of the schedule of requirements, specification or specification drawings and/or a declaration from the manufacturer or installation company, indicating:

- The exact locations of escalators and/or travelators in the building;
- What type of escalator/travelator and power unit have been used;
- The presence of a stand-by system;
- What kind of control system automatically matches the power supplied to the escalator/travelator to the current load; whether a sign has been placed next to every escalator/travelator to indicate the location of the stairs.

**Post-construction stage**
1. to 5: The evidence required for this phase is the same as that for the design phase, supplemented by a declaration from the assessor that the escalators and travelators in the building were checked for fulfilment of the compliance requirements during the site inspection; this must be supplemented by photographic evidence.

## Definitions
None.

## Additional information

The following table can be used when establishing how much current is used by the lift motor at various moving speeds:

| Lift speed | Maximum rotary current per kg load |
|---|---|
| ≤ 0.50 metres per second | 15 mA |
| > 0.50 metres per second | 25 mA |

## References

None.

# ENE 26 Assurance of thermal quality of building shell

## Credit aim

To encourage that buildings are designed and constructed in such a way as to achieve the minimum CO2 emissions possible.

## Credit criteria

2 points can be awarded as follows:

| Points | |
|---|---|
| 1 | One point for when heat loss measurements, performed in the form of a thermographic survey in the post-construction stage, show that the building meets the design specifications with regard to thermal insulation, on the basis of which the building's energy performance is calculated and established. |
| 1 | One point for when heat loss measurements, performed in the form of an air permeability test in the post-construction stage, show that the building meets the design specifications with regard to thermal insulation and airtightness, on the basis of which the building's energy performance is calculated and established. |

## Compliance requirements

Compliance is demonstrated as follows:

**First credit:**

A thermographic survey is to be performed on the building in the post-construction stage. This survey must comply with the requirements stipulated in NEN-EN 13187 'Thermal characteristics of buildings – Qualitative detection of thermal irregularities in the building shell – Infra-red method.

This point is only awarded if the contractor has been notified in advance that the relevant surveys are taking place, because only then can the desired improvement in building quality be realised.

**Second credit:**

An air permeability test is to be performed on the building in the post-construction stage. This test must comply with the relevant requirements in NEN-EN NEN 2686 'Air permeability of buildings – Measurement method'.

This point is only awarded if the contractor has been notified in advance that the relevant surveys are taking place, because only then can the desired improvement in building quality be realised.

## Compliance notes

**New build**
There are no additional or different requirements to those outlined above specific to new build projects.

**Refurbishment**
There are no additional or different requirements to those outlined above specific to refurbishment projects.

**Extensions to existing buildings**
There are no additional or different requirements to those outlined above specific to the extension of existing projects.

**Shell only**
There are no additional or different requirements to those outlined above specific to shell-only projects.

**The credit is applicable to the following building types**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additions for the application of this credit to offices:

**Retail**
Additions for the application of this credit to retail premises:

**Industrial buildings**
There are no additions for the application of this credit to industrial buildings:

**Schools**
There are no additions for the application of this credit to schools:

## Schedule of evidence required

## Design stage

1. & 2.:

- If the design team wishes to obtain the points for the thermographic survey and the air permeability test, this should be demonstrated using relevant passages from the schedule of evidence, with instructions to the external parties performing these surveys or using a written declaration from the developer/principal to the effect that these surveys are going to be carried out.

## Post-construction stage

1.:

- If the construction team wishes to gain a point with a thermographic survey, it must produce a copy of the report on the thermographic survey results, showing that the building shell has the standard of insulation that was required in the design. The team must also produce evidence that the measurement model and the employed measurement and survey methods meet the compliance requirements and have been carried out by people with the relevant training and qualifications.

2.:

- If the construction team wishes to gain a point with an air permeability test, it must produce a copy of the report on the air permeability test results, showing that the building shell has the standard of airtightness that was required in the design. The team must also produce evidence that the measurement model and the employed measurement and survey methods meet the compliance requirements and have been carried out by people with the relevant training and qualifications.

### Definitions
None.

### Additional information
None.

### References

- NEN-EN 2686 Air permeability of buildings – Measurement method
- NEN-EN 13187 'Thermal characteristics of buildings – Qualitative detection of thermal irregularities in the building shell – Infra-red method'

# 4. Transport

# TRA 1 Provision of public transport

## Credit aim

To acknowledge and encourage developments in close proximity to good public transport networks, thereby reducing travel-related emissions and traffic queues.

## Credit criteria

### Offices, schools and industrial buildings:

| Points | |
|---|---|
| 2 | Up to 2 credit points are available where good access to public transport is assured, depending on the type, frequency and proximity of the public transport. |

### Retail:

| Points | |
|---|---|
| 4 | Up to 4 credit points are available where good access to public transport is assured, depending on the type, frequency and proximity of the public transport. |

## Compliance requirements

Compliance is demonstrated as follows:

### Offices, schools and industrial buildings:

1. One or two credit points can be allocated as follows:

| Points | |
|---|---|
| 1 | The distance from the building entrance to the public transport node (i.e. bus stop, station etc.) is less than 500m; the node has a service frequency of at least once every 15 minutes at peak times (i.e. 7.30 am-9.30 am and 5.00 pm to 7.00 pm) to a local urban centre or major public transport node, and a journey time of no more than 15 minutes.<br><br>*OR*<br><br>The distance from the building to a major public transport node is less than 1000 m. |
| 2 | If there is compliance with the first point and at least 2 of the following 3 requirements:<br><br>a) The distance from the building to the public transport node is less than 250 m;<br><br>b) Public transport with a service frequency of at least every 10 minutes;<br><br>c) The entire day during office hours / opening hours to an urban centre or major public transport node, with a frequency of every 15 minutes. |

**Retail:**

1. The table below illustrates the frequency (during opening hours) and proximity of public transport to and from the retail building, and the appropriate number of points to be allocated.

| Frequency/ Proximity | < 10 min | < 15 min | < 20 min |
|---|---|---|---|
| 100 m | 4 | 3 | 2 |
| 300 m | 3 | 2 | 1 |
| 500 m | 2 | 1 | 0 |

## Compliance notes

**New build**
There are no additional or different requirements to those outlined above specific to new build projects.

**Refurbishment**
There are no additional or different requirements to those outlined above specific to refurbishment projects.

**Extensions to existing buildings**
There are no additional or different requirements to those outlined above specific to the extension of existing projects.
If the facilities are located in the existing building, these facilities must be evaluated in the light of the aforementioned requirements.

**Shell only**
There are no additional or different requirements to those outlined above specific to shell-only projects.

**Large phased developments**
In the case of large, phased developments that provide for new public transport facilities, only those facilities can be take into account during assessment where:

- A commitment to provide the relevant transport facilities has been accepted in the contract documents/specifications, and the shortest of the periods mentioned below;
- The transport facilities will be available for use as soon as 25% of all phases have been completed and are ready for occupation;

*OR*

- The transport facilities will be available for use within 25% of the total build time for the phase in which the assessed building forms a part, measured from the completion date of that phase.

The most appropriate time criterion for the development in question must be used, ensuring that the time building users have to wait before having use of the public transport facilities is as short as possible. Where the transport facilities will not be available for use within a period of five years from occupation of the building, they cannot be considered for determining compliance with the BREEAM-NL requirements.

**Dedicated transport services**

Where a dedicated company bus service is provided for staff during, or before or after, the building's hours of occupation, the building entrance can be substituted for the drop-off/pick-up destination point of this service and therefore public transport accessibility measured from that point.

**Multiple nodes in proximity**

Public transport services that go from multiple nodes in the building's proximity, e.g. two separate nodes that are called at by one service, must only be taken into consideration once. Different public transport services from one or more nodes in the proximity of the building should be individually included.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additions for the application of this credit to offices.

**Retail**
There are no additions for the application of this credit to retail premises.

**Industrial buildings**
There are no additions for the application of this credit to industrial buildings.

**Schools**
There are no additions for the application of this credit to schools.

## Schedule of evidence required

**Design stage**

1. To be submitted:

- Distances to a railway station, public transport node and/or major public transport node on a scale map, indicating:

- Location of the building and entrance.
- Location and type of facilities.
- Route and distance to the facility.

- Timetable for (express) buses, trams, metro system and/or trains.

**Post-construction stage**

1. Checking of distances to public transport as in the design stage. Where changes have been made since the design stage, full details of the changes are required, demonstrating that there is still compliance.

## Definitions

**Public Transport**

Public transport is passenger transport that is accessible to the public, i.e. anyone who wishes to make use of the transport service can do so.

**Opening hours**
The times when a (public) building is open.

**Major transport node**
This is a meeting point of one or more modalities ((express) bus, tram, metro, train) that connects with the local and regional public transport network.

## Additional information

The aforesaid distances are applicable to the available safe, pedestrian routes between the main entrance and point of departure/arrival and a public transport node. The distance is measured along the shortest walkable distance via safe pedestrian routes.

## References

- ASVV (2004) Recommendations for travel facilities within the urban area. CROW, Ede

# TRA 2 Proximity to amenities

## Credit aim

To acknowledge and encourage developments in close proximity amenities, thereby reducing travel-related emissions and traffic queues.

## Credit criteria

1 point can be awarded as follows:

| Points | |
|---|---|
| 1 | Where a number of local facilities, such as a supermarket, are present within walking distance of 500 metres. |

## Compliance requirements

1. A minimum of three of the following facilities must be present within a walking distance of 500 metres from the main entrance to the building:
    - Canteen or tearoom;
    - Supermarket with fresh produce department;
    - Cash dispenser (chip-and-pin);
    - Sports facilities;
    - Nursery or crèche;
    - Other facilities, including at least one of the following: book shop, kiosk, pharmacy, chemist, hairdresser, cycle repairer, dry cleaner, weekly market, flower shop.

## Compliance notes

**New build**
There are no additional or different requirements to those outlined above specific to new build projects.

**Refurbishment**
There are no additional or different requirements to those outlined above specific to refurbishment projects.

**Extensions to existing buildings**
There are no additional or different requirements to those outlined above specific to the extension of existing projects.
If the facilities are located in the existing building, these facilities must be evaluated in the light of the aforementioned requirements.

**Shell only**
There are no additional or different requirements to those outlined above specific to shell-only projects.

**Large phased developments**
Phased developments are subject to the same requirements as those outlined in Tra 1.

**Combined facilities**
The facilities may also be combined within a single shop, such as a supermarket in a petrol station or a cash dispenser in a supermarket, in order to achieve the point.

**Facilities inside the building**
Facilities present inside the building or its grounds also meet the requirement for receiving a credit.

**Other facilities**
Should more than one of the aforementioned facilities be present, they will only count as 1 other facility.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additions for the application of this credit to offices.

**Retail**
There are no additions for the application of this credit to retail premises.

**Industrial buildings**
There are no additions for the application of this credit to industrial buildings.

**Schools**
There are no additions for the application of this credit to schools.

## Schedule of evidence required

### Design stage

1.: A scale map of the area around the building that indicates:

- Location of the building and entrance;
- Location and types of facilities;
- Pedestrian and cycle routes and distance to the facilities.

If the facilities are not yet active, but still being developed, a letter from the developer must be submitted which confirms the following:

- Location and types of facilities being developed;
- A planning schedule specifying when the facilities will be realised.

### Post-construction stage

1.: A report on a building inspection by the assessor with evidence and/or photos of the facilities.

If the facilities are not yet active, but still being developed:

- See the design stage.

## Definitions

### Walking distance

The distance measured (not in a straight line) via safe pedestrian routes/pavements and safe pedestrian crossings.

### Additional information

None.

### References

None.

# TRA 3 Cyclist facilities

## Credit aim
To encourage users of the building to use bicycles by providing adequate bicycle storage facilities.

## Credit criteria
Up to two credits available as follows, subject to building function type and availability of bicycle storage facilities:

### Offices and industrial buildings
Two credits available as follows:

| Credits | |
|---|---|
| 1 | If a covered or lockable bicycle storage facility is available to personnel. |
| 2 | If, in addition to the above, a shower, changing room and lockers are also available. |

### Retail
Two credits available as follows:

| Credits | |
|---|---|
| 1 | If adequate bicycle storage facilities are available to visitors and a covered or lockable bicycle storage facility is available to personnel. |
| 2 | If, in addition to the above, a shower, changing room and lockers are also available to personnel. |

### Schools
Two credits available as follows:

| Credits | |
|---|---|
| 1 | If adequate covered or lockable bicycle storage facilities are available to pupils and personnel. |
| 2 | If, in addition to the above, a shower, changing room and lockers are also available to personnel. |

## Exemplary level criteria
The following outlines the exemplary level criteria to achieve an *innovation credit* for this BREEAM-NL issue.

1. Both credits have been achieved.

   AND (one of the three options: 2,3,4):

2. During the preparation of the brief the design team has consulted with the local authority on the state of the local cycling network and how the development could contribute to improving it. And one proposition has been chosen in agreement with the local authority and implemented. This proposition must be additional to what would have been done by the local authority without the support from the project and must have a significant impact on the local cycling network.

   OR

3. Negotiations with local bus companies have resulted in an increase of the local service provision in the development's local area.

   OR

4. For office and industrial developments, electric recharging stations have been provided for at least 3% of the total carparking capacity for the building. All electricity must be provided from a 100% renewable energy source as per BREEAM-NL issue Ene5 criteria.

## Compliance requirements

A bicycle storage facility should at least make it possible for both the wheel and frame of the bicycle to be secured with a lock (e.g.: a paving stone with a slot for the bicycle wheel does not comply with requirements) and must have sufficient lighting and is clearly visible from the building.

The following demonstrates compliance:

**Offices and industrial buildings**

First credit

1. The bicycle storage facility must be covered and lockable.
2. A total of 20% over and above the minimum requirements of the Buildings Decree must be met in order to provide adequate capacity.

**Buildings Decree Section 4.11:**

Functional use includes a bicycle storage room either as an additional function or as an outdoor space, whether or not it is a communal facility. The total floor area should be no less than the percentage of total usable floor area stated below in the table for functional uses designated to that storage room, with a minimum floor area of 2 $m^2$. The floor area should have a minimum width of 0.8 m and, if covered, the height above the floor should be at least 2.1 metres.

The percentages below include the additional 20%:

| Occupation ratio | B1 | B2 | B3 | B4 | B5 |
|---|---|---|---|---|---|
| % | 15.0 | 6.0 | 2.4 | 1.0 | n/a |

For further details please refer to Section 4.11 of the Buildings Decree.

Second credit:

1. The first credit must have been achieved.
2. In addition, the following facilities should be available to personnel:
   - showers;

- changing room and lockers for clothing;
- whereby at least a men's and ladies' shower and changing room is provided.

**Retail**

First credit:

1. Covered and lockable bicycle storage facilities for a minimum of 20% of the total number of personnel (FTE).
2. See the table below for the minimum number of bicycle storage facilities that must be available to customers by shopping centre type.

| Type of shopping centre | Number of bicycle storage spaces |
|---|---|
| Main shopping centre | Minimum of 4 per 100 $m^2$ of GFA |
| Large shopping centre | Minimum of 5 per 100 $m^2$ of GFA |
| Neighbourhood shopping centre | Minimum of 6 per 100 $m^2$ of GFA |

Second credit:

1. The first credit must have been achieved.
2. In addition, the following facilities should be available to personnel:
   - showers;
   - changing room and lockers for clothing;
   - whereby at least a men's and ladies' shower and changing room is provided.

**Schools**

First credit:

1. Covered and lockable bicycle storage facilities for a minimum of 20% of the total number of personnel (FTE).
2. For the school type, see the table below for the minimum number of bicycle storage facilities that must be available to pupils.

| Type of school | Number of bicycle storage spaces |
|---|---|
| Nursery | Minimum of 10 per 100 pupils |
| Primary school | Minimum of 40 per 100 pupils |
| Secondary education | Minimum of 70 per 100 pupils |
| Higher education | Minimum of 60 per 100 students |

Second credit:

1. The first credit must have been achieved.
2. In addition, the following facilities should be available to personnel:
   - showers;
   - changing room and lockers for clothing;
   - whereby at least a men's and ladies' shower and changing room is provided.

## Compliance notes

**New Build**
There are no additional or different requirements to those outlined above specific to new build projects.

**Refurbishment**
There are no additional or different requirements to those outlined above specific to refurbishment projects.

**Extensions to Existing Buildings**
There are no additional or different requirements to those outlined above specific to the extension of existing projects.

**Shell Only**
There are no additional or different requirements to those outlined above specific to shell-only projects.

**Town or City Centre**
If a building located within a town or city centre meets both credits awarded in TRA 1, the criteria for the first credit may be halved.

**Communal Bicycle Storage Facility**
If one or more communal bicycle storage facilities are available or due to be constructed for multiple buildings within a 100-metre radius, consideration should be given to the occupation ratios of all the related buildings.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial Buildings | Schools |
|---|---|---|---|
| √ | √ | √ | √ |

**Offices**
There are additional or different requirements to those outlined above specific to offices.

**Retail**
There are no additional or different requirements to those outlined above specific to retail premises.

**Schools**
There are additional or different requirements to those outlined above specific to schools.

## Schedule of evidence required

**Design stage**
First credit:
1&2 Site plans, design drawings and/or a copy of the specification clause confirming:

- Location of the bicycle storage facility;
- Number of storage spaces;
- Type, dimensions and layout of the bicycle racks;
- Materials and constructions of the facility;
- Facility lighting complies with the applicable regulations in force;
- Detailed figures of building users and/or usable floor area.

Second credit:
1. Evidence, as above, to demonstrate compliance with the first credit.
2. Site plans, design drawings and/or a copy of the specifications to show the:
   - Number of showers;
   - Number of changing rooms;
   - Lockers, location, dimensions and numbers.

**Post-construction stage**
First credit:
1&2 A random assessor's inspection report, including photographic evidence of the facilities present.

Second credit:
1. Evidence as above to confirm compliance with the first credit.
2. A random assessor's inspection report, including photographic evidence of the facilities present.

## Relevant definitions

**Gross floor area (GFA)**
The floor area of the space or multiple spaces in a real estate object, measured (in accordance with NEN 2580) at floor level along the perimeter of the outermost vertical partition enclosing the relevant space or spaces.

**Neighbourhood shopping centre**
A neighbourhood or local shopping centre with a local catchment area.

**Usable floor area**
The usable floor area as described in NEN 2580.

**Large shopping centre**
A large shopping centre, usually located outside the town or city centre, which supplies the surrounding areas and neighbourhoods with daily and non-daily goods.

**Main shopping centre**
A main shopping centre supplies non-daily goods, includes the entire town or city in its catchment area, and is often located in a town or city centre.

## Additional information
None.

## Buildings Decree

**Industrial function, office function, education function, retail function:**
Article 4.62, section 1: A building yet to be built that includes a bicycle storage room.
Article 4.63: Functional use includes a bicycle storage room as an additional function or as an outdoor space, whether communal or not. The total floor area should be no less than the percentage of total usable floor area given in the table below for the functional uses designated to that storage room, with a minimum of 2 m2. The floor area should have a minimum width of 0.8 m and, if covered, the height above the floor should be at least 2.1 m².
Section 4.64: A bicycle storage room as referred to in Section 4.63, is directly accessible from the public highway via the adjacent site.

## References
- Bouwbesluite Afd. 4.11 Stallingsruimte voor fietsen, nieuwbouw Bicycle storage room, new housing)
- Nationaal Pakket Duurzaam Bouwen (National Package for Sustainable Urban Building) B450/U450
- Keurmerk Fietsparkeur (FietsParKeur Quality Mark)
- CROW Publicatie 158 Leidraad fietsparkeren (National Information and Technology Centre for Transport and Infrastructure (CROW) Publication 158: Guidelines for Bicycle Parking)
- CROW Publicatie 683 Fietsparkeerwijzer (National Information and Technology Centre for Transport and Infrastructure (CROW) Publication 683: Bicycle Parking Guide)
- SBR – Bouwstenen – Gids bij het maken van een programme van eisen (SBR – Bricks – Guide to Drawing Up a Schedule of Requirements)

# TRA 4 Pedestrian and cyclist safety

## Credit aim
To encourage safe pedestrian and cyclist access routes to the site.

## Credit criteria
Up to 2 credits can be awarded as follows:

| Credits | |
|---|---|
| 1 | Where cyclists have good and safe access to the site. |
| 1 | Where pedestrians have good and safe access to the site. |

## Compliance requirements
Where there are safe cycle paths and footpaths to local basic facilities, and the site has been laid out to minimize the risks for pedestrians and cyclists.

First credit:

1. Cycle paths from the site entrance to the bicycle storage facility.
2. Cycle paths should be directly connected to a clearly signposted bicycle storage facility from the public highway. Cycle paths must also be lit, link up with public cycle paths, and preferrably not cross public highways.

*AND/OR*

Second credit:

1. Footpaths from the site entrance to the main entrance of the building.
2. Footpaths should be directly connected to the main entrance of the building from the public highway. A footpath must be lit and separate from motorized traffic and cycle traffic.

If the bicycle storage facilities directly connect to the public highway (with no cycle path on the site), the first credit can be awarded by default. The locations of the bicycle storage facilities and the public highway should be indicated.

## Compliance notes

### National Norms and Criteria
The criteria requires that footpaths and cycle paths are laid in accordance with the Recommendations for Traffic Provisions in Built-up Areas (ASVV) 2004 Guidelines. Dutch Practice Guideline NPR 13201-1 Public Lighting - Section 1: Quality Criteria applies to lighting. Pages 1150 to 1155 of the ASVV 2004 Guidelines can also be consulted under the subject of lighting.

### New Build
There are no additional or different requirements to those outlined above specific to new build projects.

**Refurbishment**
There are no additional or different requirements to those outlined above specific to refurbishment projects.

**Extensions to Existing Buildings**
There are no additional or different requirements to those outlined above specific to the extension of existing projects.

**Shell Only**
There are no additional or different requirements to those outlined above specific to shell-only projects.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| √ | √ | √ | √ |

**Offices**
There are no additional criteria for applying this credit to offices.

**Retail**
There are no additional criteria for applying this credit to retail premises.

**Industrial Buildings**
There are no additional criteria for applying this credit to industrial buildings.

**Schools**
Schools are subject an additional criterion which requires that cycle path and footpath connections must be safe. This is achieved by taking measures to slow down motorized traffic, such as speed ramps, zebra crossings, traffic lights, at separate cycle paths, footpaths and crossing places.

## Schedule of evidence required

**Design stage**
1&2

- A site plan drawn to scale, specifications and/or design details that show all the necessary amenities and measurements.
- The cycle paths and footpaths should be well lit in accordance with NPR 13201-1 Public Lighting – Section 1: Quality Criteria. It is not necessary to introduce additional lighting if sufficient light is provided by street lighting, greenhouses, well-lit car parks or an airport. Evidence of compliance with the NPR should be available, however.

**Post-construction stage**
1&2

- A structural report and/or assessor's location inspection, including photographic evidence and/or 'as built' site plans and design specifications.

## Relevant definitions

None.

### Additional information
None.

### The Buildings Decree
Industrial function, office function, education function, retail function:
*Article 4.64: A bicycle storage room as described in Article 4.64 is directly accessible from the public highway via the adjacent site.*

### References
- ASVV 2004
- NPR 13201-1 Openbare Verlichting – Deel 1: Kwaliteitscriteria (NPR 13201-1 Public Lighting - Section 1: Quality Criteria).
- Nationaal Pakket Duurzaam Bouwen (National Package for Sustainable Urban Building) U436
- Bouwbesluit Afd. 4.11(Buildings Decree Article 4.11 Bicycle storage room, new build)
- Nationaal Pakket Duurzaam Bouwen (National Package for Sustainable Urban Building) B450/U450
- Keurmerk Fietsparkeur (FietsParKeur Quality Mark)
- CROW Publicatie 158 Leidraad fietsparkeren (CROW Publication 158: Bicycle Parking Guidelines
- CROW Publicatie 683 Fietsparkeerwijzer (CROW Publication 683: Bicycle Parking Guide)
- SBR – Bouwstenen – Gids bij het maken van een programma van eisen (SBR – Bricks – Guide to Drawing Up a Schedule of Requirements)

# TRA 5 Travel Plan and Parking Policy

## Credit aim

To promote, based on business operations and cooperation with local government, the minimisation of travel with a high environmental impact, thereby reducing travel-related emissions and traffic queues and limiting the nuisance factor for the surrounding area.

## Credit criteria

Up to 3 points can be awarded as follows:

| Points | |
|---|---|
| 2 | If a travel plan is in place (ready for use) or operational. |
| 1 | If it can be demonstrated that the parking policy at the relevant location is designed to reduce car use and/or parking fees have been introduced. |

## Compliance requirements

Compliance is demonstrated as follows:

**First 2 points:**

1. In the design stage a transport plan for the location was developed that includes all forms of transport that are relevant to the building type and users / visitors.
2. The transportation plan includes an analysis of the specific location which in any case include:
    - Analysis of current patterns of transport (for renovation) and future users
    - Analysis of existing public transport facilities
    - Analysis of infrastructure and facilities for pedestrians and cyclists in the area
3. The transportation plan includes a package of measures aimed at managing and controlling the commuting and business traffic to and from the location with the aim of reducing car kilometres and the accessibility of the area to maintain or improve. The measures focus on the following aspects:
    - Prevention of transport (eg use of flex points in the design for remote workers)
    - Prevention of car use (eg by appropriate facilities for cyclists and pedestrians, negotiate improved supply of PT, delivery services, PT or carpool information services in public spaces)
    - Improve the transport (eg loading points for elektriche cars, alternative fuel service station)
    - Improve the use of vehicles (eg preferential parking for car-poolers)
4. The transportation plan includes a plan of action containing:
    - Breakdown by mode of transport measures and alternatives.
    - Implementation plan (in phases) and a plan of action.
    - Costs and benefits.
    - Preconditions and agreements.

**Third point:**

1. The number of parking spaces on the site is no more than 20% higher than the municipal parking ratio for the site OR
   paid parking is introduced on the site OR
   the municipal parking policy at the location or it's direct surroundings is aimed at reducing car use (e.g. by introducing paid parking and parking permits).

## Compliance notes

**New build**
There are no additional or different requirements to those outlined above specific to new build projects.

**Refurbishment**
There are no additional or different requirements to those outlined above specific to refurbishment projects.

**Extensions to existing buildings**
There are no additional or different requirements to those outlined above specific to the extension of existing projects.
If the facilities are located in the existing building, this must be evaluated in the light of the aforementioned requirements.

**Shell only**
There are no additional or different requirements to those outlined above specific to shell-only projects.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additions for the application of this credit to offices.

**Retail**
There are no additions for the application of this credit to retail premises.

**Industrial buildings**
There are no additions for the application of this credit to industrial buildings.

**Schools**
There are no additions for the application of this credit to schools.

## Schedule of evidence required

**Design stage**

First two points:

1.: A copy of a travel plan (and a copy of the specific travel survey, if applicable).

2.: A memo showing that the management has approved the implementation of the travel plan.

Third point:

3.: Official documents showing that the current municipal parking policy aims to reduce car use and/or that parking fees have been introduced at the location.

**After being taken into use**

First two points:

1. & 2.: It must be demonstrated that the user has implemented the plan..

Third point:

3.: The same requirements as in the design phase.

## Definitions

**Travel plan**
The management and control of commuter and business traffic in order to maintain or improve the accessibility of an area (promotion of selective car use).
The travel plan must be designed to achieve the following:

- Prevent travel (stimulate teleworking).
- Prevent car use (encourage use of bicycles, public transport (see Tra 7) and other alternatives).
- Improve the mode of travel (e.g. fuel-efficient cars, cruise control).
- Improve the use of the mode of travel (e.g. by driving style training, car pooling and improved occupation ratio).

## Additional information

The Environmental Management Act includes a passage specifying that establishments must restrict, insofar as possible, emissions arising from travel to and from the establishment. This is an important argument for the use of mobility management and clean vehicles. Associated with the Environmental Management Act is a General Administrative Measure containing a proposal for a ministerial ruling for mobility management. This incorporates a points system that obliges companies with over 50 employees to take measures to comply with environmental standards. This relates to measures such as teleworking, public transport and clean vehicles. In practice, 'tempting' employees to make alternative mobility choices has been found insufficient on its own to change their behaviour. The emphasis is on the implementation of measures and not, as used to be the case, on making travel plans.

See also Tra 7.

## References

- Ministry of Housing, Spatial Planning and the Environment (2006), "Werkboek Preventie bij Bedrijven" (Manual of Prevention in Businesses)

- CROW (2007), "Wat kun je met parkeercijfers en parkeernormen?" (What can you do with parking statistics and standards?)

# TRA 7 Travel information point

## Credit aim
To ensure the building has the capacity to provide users with up-to-date information on local public transport routes and timetables.

## Credit criteria
A maximum 1 point can be awarded:

| Points | |
|---|---|
| 1 | Where a dynamic transport information system (DRIS) is present that provides updated travel information. |

## Compliance requirements

The following demonstrates compliance:

1. Check if up to date information is present. Usually a part of the transport plan, see Tra 5. Information Point (near main entrance / reception), the actual departure of nearest transport stop contain and / or current departure from nearest train station.

## Compliance notes

**New build**
There are no additional or different requirements to those outlined above specific to new build projects.

**Refurbishment**
There are no additional or different requirements to those outlined above specific to refurbishment projects.

**Extensions to existing buildings**
There are no additional or different requirements to those outlined above specific to the extension of existing projects.
If the facilities are located in the existing building, this must be evaluated in the light of the aforementioned requirements.

**Shell only**
There are no additional or different requirements to those outlined above specific to shell-only projects.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additions for the application of this credit to offices.

**Retail**
There are no additions for the application of this credit to retail premises.

**Industrial buildings**
There are no additions for the application of this credit to industrial buildings.

**Schools**
There are no additions for the application of this credit to schools.

## Schedule of evidence required

**Design stage**

1. Relevant documentation or correspondence of the design team or the client / developer confirming that the transport information is included in the plan.

**Post-construction stage**

1. Report of a building inspection by the assessor and photographic material which proves that the transport information point meets the requirements.

## Definitions

**DRIS**
Dynamic Information System for travelers.

## Additional information
see Tra 5.

## References
None.

# TRA 8 Deliveries and manoeuvring

## Credit aim

To ensure that safety is maintained and disruption due to delivery vehicles minimised through well-planned layout and access to the site.

## Credit criteria

A maximum of 1 point can be awarded:

| Points | |
|---|---|
| 1 | Where evidence provided demonstrates that vehicle access areas have been designed to ensure adequate space for manoeuvring delivery vehicles and provide space away from manoeuvring area for storage of supplies. |

## Compliance requirements

The following demonstrates compliance:

1. Parking and turning areas are designed for simple manoeuvring according to the type of delivery vehicle likely to access the site, thus avoiding the need for repeated shunting.
2. There is a separate parking area for waiting goods vehicles, away from the manoeuvring area and staff/visitor car parking.
3. Delivery areas are not accessed through parking areas and do not cross or share pedestrian and cyclist routes and other outside amenity areas accessible to building users and general public.
4. There is a dedicated space for the storage of refuse skips and pallets away from the delivery vehicle manoeuvring area and staff/visitor car parking.

## Compliance notes

### New build

There are no additional or different requirements to those outlined above specific to new build projects.

### Refurbishment

There are no additional or different requirements to those outlined above specific to refurbishment projects.

### Extensions to existing buildings

There are no additional or different requirements to those outlined above specific to the extension of existing projects.
If the facilities are located in the existing building, this must be evaluated in the light of the aforementioned requirements.

### Shell only

Where the building occupier is known then the design team must be able to demonstrate that the layout of the manoeuvring area is suitable for the specified types and number of delivery vehicles typically used by the occupier. For speculative developments it must be demonstrated that the manoeuvring area can accommodate a range of goods vehicle types.

### The credit is applicable to the following building types:

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | - |

**Offices**
There are no additions for the application of this credit to offices.

**Retail**
There are no additions for the application of this credit to retail premises.

**Industrial buildings**
There are no additions for the application of this credit to industrial buildings.

## Schedule of evidence

### Design stage

1. t/m 4.
   - Location, design drawings and / or a copy of the specification.

### Post-construction stage

1. t/m 4.
   - Reporting of a building and / or site inspection by the assessor with photographic evidence of the facilities.

## Definition

None.

## Additional Information

None.

## References

Ernst & Peter Neufert, Architects data, Blackwell Publishing, juli 2002.

# 5. Water

# WAT 1 Water consumption

## Credit aim

To minimise the consumption of potable water in sanitary applications by encouraging the use of low water use fittings or waterless fittings.

## Credit criteria

3 credits can be awarded as follows:

| Credits | |
|---|---|
| 3 | Where evidence provided demonstrates that the specification includes taps, urinals, WCs and showers that consume less potable water in use than standard specifications for the same type of fittings.. |

## Compliance requirements

The following demonstrates compliance:

First credit

1. All WCs have a dual flush or flush control buttons and the maximum flush volume is 6 liter. If toilets are present without dual flush buttons or flush control buttons, the maximum flush volume is 4 litres.

Where dual flush toilets are specified they have guidance or symbols instructing the user on the appropriate operation of the flushing device. This can be provided on the flush control buttons, cistern, or nearby for a group of cisterns.

Second credit

1. All WCs have a dual flush or flush control buttons and the maximum flush volume is 4 liter.
2. Where dual flush toilets are specified they have guidance or symbols instructing the user on the appropriate operation of the flushing device. This can be provided on the flush control buttons, cistern, or nearby for a group of cisterns.

Third credit

Of the following, the two that offer the greatest possible reduction in annual water consumption have been specified:

All taps except kitchen taps, cleaners' sinks and external taps have a maximum flow rate less than 6 litres/min for a water pressure of 0.3Mpa (= 3 bar) and are one of, or a combination of, the following types:

- Timed automatic shut-off taps e.g. push taps
- Electronic sensor taps
- Low flow screw-down/lever taps
- Spray taps

All showers, where specified, have a measured flow rate that does not exceed 9 litres per minute for a water pressure of 0.3Mpa (3 bar), assuming a delivered water temperature of 37ºC.

All urinals are either:

- Fitted with individual presence detectors that operate the flushing control after each use or.
- Ultra low flush or waterless urinals.

d. At least 50% of all gentlemantoilets is an urinal, which is specified according the requirements of c.

## Compliance notes

**New build**
There are no additional or different requirements to those outlined above specific to new build projects.

**Refurbishment**
There are no additional or different requirements to those outlined above specific to refurbishment projects.

**Extensions to existing buildings**
Where a project under assessment consists solely of an extension, and no new sanitary facilities are to be provided, facilities provided in the existing building should be assessed (this refers to the nearest accessible facilities for each gender/function, where appropriate, i.e. those likely to be used by the occupants and visitors in the extension building).

**Shell only**
If sanitary fittings are not specified at the design stage of assessment, the assessor must assume that only industry-standard fittings will be installed.

When these are not known, the following default values must be used:
- Regular taps for wash hand basins (12 litres/minute)
- High flow shower (14 litres/minute)
- WC (6 litre cistern)
- Cistern serving single urinal = 10 litres per use (flush).
- Cistern serving two or more urinals = 7.5 litres per use (flush).
- Urinals with manual flush on each stall or automatic pressure flushing valves = 1.5 litres per use.

For such instances therefore, none of the credits will be achievable at this stage of assessment.

**No Fittings specified**
Where no sanitary fittings are to be installed in the building being assessed then the credit must be assessed on the basis of the nearest accessible facilities likely to be used by the occupants of the assessed building.

**Third point**
Awarding the third credit is not dependent on the first or second credits having been achieved.

**Other water-saving features**
If the development is using alternative or innovative water-saving features other than those listed in the requirements, and the client wishes to consider this as one of the two fittings with the greatest water saving potential, then the assessor must contact DGBC for approval prior to awarding a credit.

**Showers with a range of flow rates**
Where a shower head delivers a range of flow rates, the average or typical flow rate should be used.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additions for the application of this credit to offices.

**Retail**
There are no additions for the application of this credit to retail premises.

**Industrial buildings**
There are no additions for the application of this credit to industrial buildings.

**Schools**
There are no additions for the application of this credit to schools.

## Schedule of evidence required

**Designstage**
First point:
1 A copy of the relevant section of the M&E specification and/or manufacturer's details confirming:
- Technical specification for sanitary fittings (flow rate) and controls to be installed.

2 Design plan showing the location within the building of the sanitary facilities.

Second point:
1 A copy of the relevant section of the M&E specification and/or manufacturer's details confirming:
- Technical specification for sanitary fittings (flow rate) and controls to be installed.

2 Design plan showing the location within the building of the sanitary facilities.

Third point:
1 A copy of the relevant section of the M&E specification and/or manufacturer's details confirming:
- Technical specification for sanitary fittings (flow rate) and controls to be installed.

2 Design plan showing the location within the building of the sanitary facilities.
3 Technical specifications of the to be installed sanitary facilities.

**Post construction stage**
Assessor's building/site inspection report and photographs confirming:
- The type and amount of fittings and controls installed.
- Manufacturer's details for installed fittings/controls confirming the technical specification.

## Additional information

**Delayed action inlet valve**
Devices that prevent water entering the WC cistern until it has completely emptied, enabling a precise volume of water to be discharged independent of water pressure.
**Dual Flush Cisterns**:
Devices that have the facility to provide lower flush volume for liquids and higher flush volume for solids and paper.

**References**
None.

# WAT 2 Watermeter

## Credit aim

To ensure water consumption can be monitored and managed and therefore encourage reductions in water consumption.

## Credit criteria

A maximum of 1 point can be awarded:

| Credit | |
|---|---|
| 1 | Where evidence provided demonstrates that a water meter with a pulsed output will be installed on the mains supply to each building/unit. |

## Compliance requirements

The following demonstrates compliance:

1. specification of a water meter on the mains water supply to each building; this includes instances where water is supplied via a borehole or other private source.

2. The water meter has a pulsed output to enable connection to a Building Management System (BMS) for the monitoring of water consumption.

## Exemplary level criteria

The following outlines the exemplary level criteria to achieve an *innovation credit* for this BREEAM-NL issue:

1. Where sub meters are fitted to allow the metering of individual water-consuming plant or building areas, where demand in such areas will be equal to or greater than of 10% of the total water demand of the building (see also compliance note).
2. Each sub meter has a pulsed output to enable connection to a Building Management System (BMS) for the monitoring of water consumption.

## Compliance notes

### New build

There are no additional or different requirements to those outlined above specific to new build projects.

### Refurbishment

There are no additional or different requirements to those outlined above specific to refurbishment projects.

### Extensions to existing buildings

If no new water supply is being installed because occupants of the extended building will use the facilities in, and therefore water supply to the existing building, then the credit should be assessed on the basis of whether a compliant water meter is installed on the existing supply.

### Shell only

There are no additional or different requirements to those outlined above specific to assessments of shell-only buildings

**No water supply to the building/unit**

If there is no water supply to the building during operation because there will be no installed water-consuming fittings in the building, then the credit must be assessed on the basis of the water supply to the nearest accessible building with such facilities, likely to be used by the future occupants of the assessed building.

**Exemplary performance criteria**

It is widely accepted that water usage can be decreased by how water is consumed by building users. If there are only small water consuming units used within the building such as singular toilets, small kitchen etc. It is unlikely there will be an opportunity to reduce water consumption by increased water management. And therefore there will be no benefit to installing a sub-meter; in such instances the exemplary credit is not available. Compliance with the criteria can also be demonstrated where the water metering/monitoring equipment is integral to the water consuming plant, as opposed to a sub meter on the water supply to the plant.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**

There are no additions for the application of this credit to offices.

**Retail**

To apply this credit for retail the following requirement count:

1. Ancillary buildings who are separated from the mainbuilding, for example gasstations near supermarkets, need to be metered seperately with a pulsed water meter.
2. For building with several units, for example shoppingcentres, seperate pulsed meters are required for the following area's:
    - Rented units: the watersupply to each unit;
    - Common areas: watersupply to the toiletfacility;
    - Service area: watersupply to area's for storage
3. For shoppingcentres of large shopping developments with multiple retailunites, separate pulsed meter are required for each retailunit.

**Industrial buildings**

There are no additions for the application of this credit to industrial buildings.

**Schools**

There are no additions for the application of this credit to schools.

## Schedule of evidence required

**Design stage**

1. & 2.

A copy of the specification clause confirming:

1. The specification and type of water meter(s).
2. Specification of the watersystems

Design plan(s) showing:

- Location of the water meter(s) in each assessed building/unit.

**Post construction stage**

1. & 2.:

Assessor's building/site inspection report and photographs confirming:

- The location of the water meter(s).

Manufacturer's details confirming:

- The specification of a pulsed output on the installed meter(s).

## Definitions

None.

## Additional information

The requirement for a pulsed output has been included to encourage the use of meters capable of transmitting (by wire or wirelessly) a continuous or pulsed signal with water management information such as total water consumed or flow rate to a Building Management System. This allows demand patterns on water systems to be monitored and evaluated over time. A significant increase in demand may indicate the presence of a leak or inappropriate or unexpected water consumption.

## References

## Building decree

Functions:

**Artikel 4.66, lid 1:** Een gebruiksfunctie met een voorziening voor elektriciteit, gas, drinkwater of verwarming, die een aansluitmogelijkheid heeft op het desbetreffende openbare net, heeft een al dan niet gemeenschappelijke meterruimte.

**Artikel 4.67, lid 3:** Een meterruimte als bedoeld in artikel 4.66, eerste lid, heeft afmeting, en een indeling, die zijn afgestemd op de in de meterruimte te plaatsen apparatuur.

**Artikel 4.69:** De uitwendige scheidingsconstructie van een meterruimte als bedoeld in artikel 4.66, is, bepaald volgens NEN 2778, regenwerend.

**Artikel 2.185, lid 3:** De loopafstand tussen een meterruimte als bedoeld in artikel 4.66 en de toegang van een woonfunctie is ten hoogste 3 m, indien die afstand wordt afgelegd door een niet-gemeenschappelijke ruimte.

# WAT 3 Major leak detection

## Credit aim
To reduce the impact of major water leaks that may otherwise go undetected.

## Credit criteria
A maximum of 1 point can be awarded:

| Credits | |
|---|---|
| 1 | Where evidence provided demonstrates that a leak detection system is specified or installed on the buildings water supply. |

## Compliance requirements
The following demonstrates compliance:

1. A leak detection system capable of detecting major leaks on the water supply has been installed. The system is fitted on the main water supply, directly after the main water meter of the building.

The leak detection system is:

a. Audible when activated
b. Activated when the flow of water passes through the water meter/data logger at a flow rate above a pre-set minimum for a pre-set period of time
c. Able to identify different flow and therefore leakage rates, e.g. continuous, high and/or low level, over set time periods
d. Programmable to suit the owner/occupiers' water consumption requirements
e. Where applicable, designed to avoid false alarms caused by normal operation of large water-consuming plant such as chillers.

## Compliance notes

### New build
There are no additional or different requirements to those outlined above specific to new build projects.

### Refurbishment
There are no additional or different requirements to those outlined above specific to refurbishment projects.

### Extensions to existing buildings
If the water supply to the new extension is via the existing building then the water supply to the existing building must be assessed against the requirements of this credit.

### Shell Only
There are no additional or different requirements to those outlined above specific to assessments of shell-only buildings.

**Ancillary or multiple buildings**
The requirements apply to the water supply to all buildings falling within the scope of the assessment.

**Mains supply shut-off**
It is not a requirement of this credit that the leak detection system shut off the water supply when the alarm is triggered.

**No water supply to the building/unit**
If there is no water supply to the building because there will be no installed water-consuming fittings in the building, then the credit must be assessed on the basis of the water supply to the nearest accessible building with such facilities, likely to be used by the future occupants of the assessed building.

**Leakage Rates**
This credit does not specify what the high and low level leakage rates should be; however, the equipment installed must have the flexibility to distinguish between different flow rates to enable it to be programmed to suit the owner/occupier's usage patterns.

**Pre-set flow rates**
Pre-set flow rates and time periods will vary depending on the building type and usage.

**System requirements**
It is anticipated that this credit will usually be achieved by installing a system which detects higher than normal flow rates at meters and/or sub-meters. It does not require a system that would directly detect water leakage along part or the whole length of the water supply system.

**Water authority meters**
Where there is a water authority meter at the site/building boundary, it may be necessary to install a separate flow meter to detect leaks; however, if the water authority agrees to some form of leak detection being installed on their meter, this would also be acceptable.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additions for the application of this credit to offices.

**Retail**
If retail units in shopping centrese have their own water supply of the water autority, the credit is applicable to each of these water supplies.

**Industrial buildings**
There are no additions for the application of this credit to industrial buildings.

**Schools**
There are no additional or different requirements to those outlined above specific to school buildings.

## Required evidence

### Design stage

1. & 2.

A copy of the specification clause confirming:
3. Scope and performance requirements of leak detection system.

**AND/OR**

Manufacturer's details confirming:
The technical specification the specified systems.

### Post contrstuction stage

1. & 2.

Assessor's building/site inspection and photographic evidence confirming:

- The installation and operation of the leak detection system.
- The pre-set variables of the system for triggering the alarm and the flexibility of the building occupier to vary these*.

* This can be confirmed in a letter from the contractor/installer to the assessor.

## Definitions

### Major leaks

These are leaks with free flow of water (more than drops or moisture). The specific flow volume must be specified in the leak detectionsystem.

## Additional information

None.

## References

None.

# WAT 4 Sanitary supply shut off

## Credit aim
To reduce the risk of minor leaks in toilet facilities.

## Credit criteria
A maximum of 1 point can be awarded:

| Points | |
|---|---|
| 1 | Where evidence provided demonstrates that proximity detection shut-off is provided to the water supply to all toilet areas. |

## Compliance requirements
The following demonstrates compliance:

Solenoid valves are installed on the water supply to each toilet area in the building and the flow of water through that supply is controlled by motion detectors in the toilet facility.

## Compliance notes

### New build
There are no additional or different requirements to those outlined above specific to new build projects.

### Refurbishment
There are no additional or different requirements to those outlined above specific to refurbishment projects.

### Extensions to existing buildings
If the facilities are within the existing building then it is those existing facilities that must be assessed against the requirements of this credit.

### Shell only
If toilet facilities are not being fitted out as part of the scope of works for the initial build, then an assumption must be made at this stage that no supply shut-off system will be installed and the credit therefore withheld.

### No toilet facilities in the assessed building
If no toilet areas exist in the building then the credit must be assessed on the basis of the nearest accessible building with such facilities likely to be used by the occupants of the assessed building.

### Shut-off systems
Shut-off systems may control combined toilet areas, such as male and female toilets within a core.

### Proximity detection requirements
Proximity detection shut-off is not required for each individual sanitary appliance to achieve the credit. The requirement is for the water supply to be isolated for each toilet block on a floor when not being used by the occupants.

**Single WCs**
The requirements of this credit apply to facilities with a single WC (potentially within smaller or low occupancy buildings). In these instances shut-off can be provided via the same switch that controls the lighting (whether proximity detection or a manual switch).

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additions for the application of this credit to offices.

**Retail**
There are no additions for the application of this credit to retail premises.

**Industrial buildings**
There are no additions for the application of this credit to industrial buildings.

**Schools**
There are no additional or different requirements to those outlined above specific to school buildings.

## Schedule of evidence required

**Design stage**
A copy of the specification clause confirming:
4. The specification of shut-off valves
5. The controls for the shut-off valves.

A design plan showing:
The location of the toilet facilities.

**Post construction stage**
Assessor's building/site inspection and photographic evidence confirming:
- The location and installation of proximity detection controls.

**AND**

'As built' drawings showing:
- The specification of shut-off valves

## Additional information

## Definitions

**Solenoid valve**: An electrically operated shut-off device that controls the flow of water in pipes.

**Volume controller**: An automatic control device to turn off the water supply once a maximum preset volume is reached.

**Programmed time controller**: An automatic time switch device to switch the water supply on and/or off at predetermined times.

Light fittings in toilets are often controlled by proximity detection, IR movement detectors or sensors placed at entry doors (the latter can be less accurate as more than one person can enter or depart in the opening of one door). The sensors used to control the lighting can also be linked to a solenoid valve in the cold water supply. This will then act as a proximity detection system.

Small water leaks can result in significant losses over time, increasing costs as well as causing damage. There is a significant risk of leaks going undetected, particularly as toilet accommodation is often unoccupied for long periods. A proximity detection shut-off system prevents waste water from minor leaks by shutting off the water supply when toilet accommodation is not occupied.

Valves in cisterns supplying urinals and WCs are especially prone to failure, leading to wastage of water via the overflow. Whilst leakage from any valve is variable, a typical value for a leaking valve toilet might be 4 litres/day.

**Legionella**

Shut-off system can cause a risk of legionella. By interrupting the flow is a possible increased risk of legionella. Try to avoid prolonged standing water. Please therefore take in account a good waterflow in the design stage.

## References

None.

# WAT 5 Water recycling

## Credit aim

To encourage the collection and re-use of waste water or rainwater to meet toilet flushing needs and reduce the demand for potable fresh water.

## Credit criteria

Two credits available as follows:

| Points | |
|---|---|
| 2 | Where evidence provided demonstrates the specification of systems that collect, store and, where necessary treat, rainwater or greywater for WC and urinal flushing purposes. |

## Compliance requirements

The following demonstrates compliance:

Where **one** of the following water recycling strategies has been implemented:

1. Where a rainwater collection tank has been installed and the tank is sized to collect at least 50% of **EITHER:**
    a. The total predicted rainwater run-off from the roof catchment area for the *defined period of collection*. **OR**
    b. The rainwater run-off required to meet the total predicted flushing demand for the *defined period of collection*.

2. Waste water from wash hand basins and showers is collected from ≥80% of fittings and recycled to meet part (minimum of 10%) or the total of WC/urinal flushing demand within the building(s).

3. A combination of waste water and rainwater collection that meets at least 50% of **EITHER:**
    a. The total predicted toilet and urinal flushing demand for the *defined period of collection* **OR**
    b. The total predicted toilet and urinal flushing demand for the *defined period of collection* and (where specified) irrigation of planting and landscaping.

## Compliance notes

### New build

There are no additional or different requirements to those outlined above specific to new build projects.

### Refurbishment

There are no additional or different requirements to those outlined above specific to refurbishment projects.

### Extensions to existing buildings

If the assessment is of the new extension only, then the roof catchment area can be taken as the roof area of the extended building. If feasible however, the total roof area of the new extension and existing building can be used. If the assessment is of the new build extension and existing building i.e. whole building, then the roof catchment area is taken as the whole roof area of the building.

### Shell only

If sanitary fittings are not specified within the scope of works i.e. they are a fit out item; then for the purpose of the assessment of this credit, industry-standard fittings should be assumed (see additional guidance)

**Rainwater collection tank size**
Of the two options available for demonstrating compliance, it is the option with the lesser of the two figures (litres) that should be specified and therefore used to demonstrate compliance. For example it would not be expected to size a system that collected significantly more rainwater over the defined period than was required to meet flushing demand in the building over the same period, unless the collection system is being used to meet landscape irrigation demand or forms part of a storm water management strategy.

**Greywater system**
No BREEAM-NL requirements have been set in terms of the period of collection that the tank should be sized to meet. Where a greywater collection system is specified, the size of the tank should be appropriate to the building occupancy and frequency of the facilities usage, bearing in mind that greywater tanks have a typical maximum retention period of 24 hours.

**Calculation requirements**
See definitions for an example of calculating compliance with the requirements of this credit.

**Run-off from paved areas**
Run-off from paved areas can also be collected and included in the calculation. Where the run-off is collected from part roof, part paved areas, the total catchment area must be at least equivalent to the plan area of the roof.

**Using rainwater to meet irrigation and other process demands**
Using rainwater collection for WC/urinal flushing is the first priority. Where this demand is met, additional rainwater resources can be used to meet water demand for irrigation or building/operational processes.

**Horticultural building types**
Where there is a constant demand for potable water for horticultural-related processes for the operational life of the building, the credit can be assessed on the basis of using rainwater to meet this demand, provided it offsets the equivalent demand for WC/urinal flushing. Examples where this rule applies includes garden centres, botanical gardens and golf courses. This rule does not include irrigation for general landscaping and ornamental planting for such building types.

**Calculating total predicted flushing demand**
Total predicted flushing demand can be estimated by the design team on the basis of the following variables:

- Number of building users (staff and visitors)
- Effective flush volume of WCs/urinals
    - Estimated number* of WC/urinal uses per person per day (multiplied by the defined period of collection)

For staff use, unless other data is available, assume 1.3 WC uses per person per day and 2 urinal uses per person per day (assume that only 50% of the building occupants will use urinals).

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|

| | | | |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additions for the application of this credit to offices.

**Retail**
There are no additions for the application of this credit to retail premises.

**Industrial buildings**
There are no additions for the application of this credit to industrial buildings.

**Schools**
There are no additions for the application of this credit to schools.

## Schedule for evidence required

**Design stage**
1. t/m 3.

A copy of the specification clause confirming:
6. Type of collection system specified.
7. WC, urinal, taps and shower specification (where appropriate).
8. Design team calculations for the *defined period of collection* demonstrating (where appropriate):
9. Rainwater yield for the catchment area (mm)
10. Predicted WC/urinal flushing demand
11. Estimated potential for waste water collection from taps/showers.
12. Size (litres) of the rainwater/greywater collection tank specified.

**Post construction stage**
1. t/m 3.

Assessor's building/site inspection and photographic evidence confirming:
- The installation of the collection system.

Where changes have occurred since design stage assessment, a revised copy of the technical specification and sizing calculations for the installed system.

## Definitions

**Greywater**: Waste water from taps, showers and laundries.

**Considerations in design**
The use of greywater within a building can cause health problems if the system is properly designed, installed and maintained. Clear information design, maintenance procedures and an understanding of these issues in the user can eliminate these concerns and these systems can be used without any significant opposition to health and safety. When available, local guidelines for the design and maintenance of rainwater and greywater recycling systems are followed.

**Run-off co-efficient**
A coefficient is used to adjust the tank size calculation to allow for the fact that not every drop of rain that falls within the catchment area will be collected by the tank. Drainage co-efficient is dependent on the type of roof specified for the building, flat roofs having a lower co-efficient. Below are some typical co-efficient factors:

| Roof type | Run-off co-efficient |
|---|---|
| Pitched roof tiles | 0.75 - 0.9 |
| Flat roof smooth tiles | 0.5 |
| Flat roof with gravel layer | 0.4 – 0.5 |

**Filter co-efficient**
Not all the water that drains from the roof down the gutters will reach the holding tank; the filter co-efficient accounts for this. Most manufacturers/installers of systems will recommend a filter co-efficient of 90% i.e. 0.9.

Drainage and filter co-efficiencies can be found in CIRIA guidance [2], though these should be in the design team's sizing calculations.

Example calculation:

| | |
|---|---|
| Average annual rainfall for the site location (mm) | 757mm |
| Roof catchment area ($m^2$) | 3,500$m^2$ |
| Drainage co-efficient (tiled pitched roof) | 0.8 |
| Filter co-efficient. | 0.9 |
| Defined period of collection | 0.05 |
| Volume of rainwater for the defined period of collection | 95,382 Litres |

An installed rainwater collection tank with a capacity of 50,000 litres would therefore collect 52.4% of the total predicted rainwater run-off from the roof catchment area for the defined period of collection.

**Calculating compliance**
The following formula can be used to calculate the volume of collectable rainwater for the assessed building's catchment area for the defined period of collection:

$\sum (A_{RF} \times C \times R_{co\text{-}ef} \times F_{co\text{-}ef} \times D_{col})$

Where:

$A_{RF}$ = Annual rainfall for the site location (mm)
C = Rainwater catchment area ($m^2$)
$R_{co\text{-}ef}$ = Run-off co-efficient
$F_{co\text{-}ef}$ = Filter co-efficient.
$D_{col}$ = Defined period of collection: 18 days/365 days = 0.05

**Annual rainfall**
Data for the annual rainfall at any place in Europe are available through the World Meteorological Office http://www.worldweather.org

**Defined period of collection**
For the purpose of assessing this credit the defined period of collection is 18 days. This is equivalent to approximately 5% of annual rainfall yield.

**Potable water**
Defined as drinkable and/or mains supplied water. This definition includes water obtained by borehole abstraction and water sourced from rivers, mountain streams, lakes etc.

## Industry-standard fittings

Where a type of appliance or fitting is not specified, assume the following building regulations (Water Supply (Water Fittings) Regulations 1999) or default fittings:

- Regular taps for wash hand basins (12 litres/minute)
- High flow shower (14 litres/minute)
- WC (6 litre cistern)
- Cistern serving single urinal = 10 litres per use (flush).
- Cistern serving two or more urinals = 7.5 litres per use (flush).
- Urinals with manual flush on each stall or automatic pressure flushing valves = 1.5 litres per use.

## Additional information

None.

## References

- Gegevens voor de jaarlijkse regenval op elke plaats in Europa zijn beschikbaar via het World Meteorological Office http://www.worldweather.org
- EN 12056-3:2000: Gravity drainage systems inside buildings. Roof drainage, layout and calculation, 2000
- Zie de landspecifieke referenties voor meer informatie.

**Country-specific information for The Netherlands**

- NEN-EN 1717 Bescherming tegen verontreiniging van drinkwater in waterinstallaties en algemene eisen voor inrichtingen ter voorkoming van verontreiniging door terugstroming
- NEN 1006 Algemene voorschriften voor leidingwaterinstallaties (AVWI-2002)
- SBR Infoblad 88 Grijswater inzetten voor toiletten
- SBR Catalogus Duurzaam bouwen
- SBR Hemelwater binnen de perceelgrens
- SBR Ontwerp en uitvoering van voorzieningen ten behoeve van opvang, gebruik en infiltratie van hemelwater binnen de perceelgrens

# WAT 6 Irrigation systems

## Credit aim
To reduce the consumption of potable water for ornamental planting and landscape irrigation.

## Credit criteria
A maximum of 1 point can be awarded:

| Points | |
|---|---|
| 1 | Where evidence provided demonstrates that a low-water irrigation strategy/system has been installed, or where planting and landscaping is irrigated via rainwater or reclaimed water. |

## Compliance requirements
1. Where the irrigation method specified for internal or external planting and/or landscaping complies with **ANY ONE** of the following:
   a. Drip feed subsurface irrigation that incorporates soil moisture sensors. The irrigation control should be zoned to permit variable irrigation to different planting assemblages.
   b. Reclaimed water from a rainwater or greywater system.
   c. External landscaping and planting that relies solely on precipitation, during all seasons of the year.
   d. The only planting specified is restricted to species that thrive in hot and dry conditions.
   e. Where no dedicated, mains-supplied irrigation systems (including pop-up sprinklers and hoses) are specified, and planting will rely solely on manual watering by building occupier or landlord.
2. Where a sub surface drip feed irrigation system is installed for external areas, a rainstat must also be installed to prevent automatic irrigation of the planting and the landscape during periods of rainfall.

## Compliance notes

### New Build
There are no additional or different requirements to those outlined above specific to new build projects.

### Refurbishment
There are no additional or different requirements to those outlined above specific to refurbishment projects..

### Extensions to existing buildings
There are no additional or different requirements to those outlined above specific to the assessment of extensions to existing buildings.

### Shell Only
There are no additional or different requirements to those outlined above specific to shell-only projects.

### No landscaped areas
This credit does not apply where there are no landscaped areas within the construction zone of the assessed building.

### The credit is applicable to the following building types:

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additions for the application of this credit to offices.

**Retail**
There are no additions for the application of this credit to retail premises.

**Industrial buildings**
There are no additions for the application of this credit to industrial buildings.

**Schools**
There are no additional or different requirements to those outlined above specific to school buildings.

## Schedule of evidence required

**Design stage**
1. & 2..
Design team confirmation via assessment meeting minutes, letter or email confirming the irrigation strategy for the site

Proposed site plan, marked up to illustrate the scope of the irrigation specified **AND**

One of the following:

A copy of the specification clause confirming type of irrigation system and controls.

**OR**

Manufacturer's information detailing the technical details of the specified system.

**Post construction stage**
1. & 2.
Assessor's building/site inspection and photographic evidence confirming:
- The implementation of the proposed strategy.
- If relevant, the installation of the specified system.

## Definitions

**Construction zone**: For the purpose of this credit the construction zone is defined as the site which is being developed for the BREEAM-NL-assessed building and its external site areas i.e. the scope of the new works.

**external planting and/or landscaping**
Green space outside the building with a minimum continuous area of 20m2. Examples of green landscaping include: plants, gardens and parks.

**internal planting and/or landscaping**
Green space within the building with a minimum continuous area of 10m2. Examples of green landscaping include: planting and gardens.

## Additional information
None.

## References
None.

# WAT 7 Vehicle wash

## Credit aim
To minimise the volume of potable water used by vehicle washing facilities.

## Credit criteria
A maximum of 2 points can be awarded as follows:

| Points | |
|---|---|
| 2 | Where evidence provided demonstrates that vehicle washing facilities include a water reclaim system. |

## Compliance requirements

The following demonstrates compliance:
Two points:

4. The vehicle washing system reclaims and recycles water that falls on, and drains off from, the vehicle pad. The reclaim system must be fully automatic.

## Compliance notes

### New build
There are no additional or different requirements to those outlined above specific to new build projects.

### Refurbishment
There are no additional or different requirements to those outlined above specific to refurbishment projects.

### Extensions to existing buildings
If the existing part is also the subject of the assessment, the requirements also apply to this part. If this is not the case, the requirements only apply to the extension.

### Shell only
There are no additional or different requirements to those outlined above specific to the assessment of shell-only projects.

### The credit is applicable to the following building types

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| - | X | X | - |

### Retail
There are no additional or different requirements to those outlined above specific to retail buildings.

### Industrial buildings
There are no additional or different requirements to those outlined above specific to industrial buildings.

## Schedule of evidence required

### Design stage

1. A copy of the specification clause confirming:
- Type of vehicle wash system.

### OR

Manufacturer's information confirming:
- The technical details of the specified system.

### Post construction stage

1. Assessor's building/site inspection and photographic evidence confirming:
- The installation of the specified system.

## Definitions

### Vehicle wash

A commercial automatic, semi-automatic or manual system for washing vehicles. This includes wheel and chassis wash, fixed gantry and screen wash systems using brushes, spray bars or handheld jet hoses.

## Additional information

None.

## References

None.

# 6. Materials

# MAT 1 Materials specification

## Credit aim

To recognise and encourage the use of construction materials with a low environmental impact over the full life cycle of the building.

## Credit criteria

6 points can be awarded as follows:

| Points | |
|---|---|
| 6 | Where the supplied schedule of evidence shows that the environmental impact of the materials used is at least 60% less than the shadow price of 0.8 euro/$m^2$ GFA |
| 5 | Where the supplied schedule of evidence shows that the environmental impact of the materials used is at least 50% less than the shadow price of 0.8 euro/$m^2$ GFA |
| 4 | Where the supplied schedule of evidence shows that the environmental impact of the materials used is at least 40% less than the shadow price of 0.8 euro/$m^2$ GFA |
| 3 | Where the supplied schedule of evidence shows that the environmental impact of the materials used is at least 30% less than the shadow price of 0.8 euro/$m^2$ GFA |
| 2 | Where the supplied schedule of evidence shows that the environmental impact of the materials used is at least 20% less than the shadow price of 0.8 euro/$m^2$ GFA |
| 1 | Where the supplied schedule of evidence shows that the environmental impact of the materials used is at least 10% less than the shadow price of 0.8 euro/$m^2$ GFA |

**Exemplary level criteria**
The following outlines the exemplary level criteria to achieve an innovation credit for this BREEAM-NL issue.

One exemplary BREEAM-NL credit can be awarded as follows:
1. The use of a nationally recognised LCA tool with minimum adequate features to evaluate a range of material options for the building AND the design team can demonstrate that the outcome has influenced design choices for all of the building elements.

## Compliance requirements

In order to evaluate the environmental impact of the materials used, reference is made to the most recent version of the Handleiding Milieuprestatie Gebouwen (*Guide to the Environmental Performance of Buildings*) (currently version 1.1 [1]). The evaluation makes use of the most recent version of the harmonised materials database, with environmental data for each item of building material. (A harmonised product database will also be available in the future).

Working through the calculation method results in an environmental profile comprising the following 9 effects:

(1) Depletion of resources

(2) Greenhouse effect

(3) Ozone layer depletion

(4) Smog

(5) Human toxicity

(6) Ecotoxicity, water

(7) Ecotoxicity, water

(8) Acidification

(9) Over-fertilization

To make the results comparable, the environmental effect scores are divided by the gross floor area (GFA) of the building. The effects are then aggregated to a single indicator by means of a weighted addition. The weighting factors and weighting method (shadow prices) are laid down in the “Handleiding Milieuprestatie Gebouwen”.

Compliance is demonstrated as follows:

1. A calculation of the total shadow price per $m^2$ GFA of the building. (based on the above mentioned environmental effects, calculated in accordance with the “Handleiding Milieuprestaties Gebouwen”.

The number of points attainable depends on the amount by which the shadow price per $m^2$ GFA is reduced in relation to the reference shadow price of 0.8 euro/$m^2$ GFA.

## Compliance notes

**New build**
There are no additional or different requirements to those outlined above specific to new build projects.

**Refurbishment**
For renovation projects, the new materials as well as the existing materials must be taken into consideration. The existing materials must be entered into the LCA calculation as if they were new materials.

**Extensions to existing buildings**
For extensions to existing projects, all the materials that are required for the extension must be taken into consideration. The gross floor area of the extension must be used in the calculation of the shadow price.

**Shell only**
There are no additional or different requirements to those outlined above specific to shell-only projects.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additions for the application of this credit to offices.

**Retail**
There are no additions for the application of this credit to retail premises.

**Industrial buildings**
There are no additions for the application of this credit to industrial buildings.

**Schools**
There are no additions for the application of this credit to schools.

**Recycling of materials**
When materials are recycled, they must be entered into the LCA calculation as if they were new materials. Extra points for the recycling of materials are awarded via credit Mat 3 and Mat 4.

**Mixed use developments**
If, with regard to a building with mixed use developments, an evaluation for only one functional use is made, the materials of the relevant part of the building must be included in full. For example: if the roof that serves one functional use is also the floor that serves another functional use, the floor or the roof must be fully included (in both evaluations). The underlying idea is that the floor or the roof would still have been necessary without the combination of functional uses.

**Life cycle**
The following standard life cycles are adhered to for the various building types:

- utility: 50 years (including schools, shops, sports halls etc.)

In mixed structures (e.g. dwellings above shops), a standard life cycle of 75 years will be assumed for the structure, and otherwise as indicated above. If the actual life cycle is demonstrably different, the actual life cycle can be used in the calculation.
Shadow price per environmental effect

Afbeelding:Schaduwprijzen.jpg

**Tools**

- Together with market participants, DGBC is currently developing a tool for calculating the shadow price; this will be made available to assessors. DGBC expects to have the tool available by October 2009. Until the DGBC tool becomes available, the shadow price can be calculated using the commercial tools available in the Netherlands. The DGBC tool will be accompanied by its own user manual.
- The tools used need to meet the following requirements:

  Environmental quide and the merging of databases [4] :

  - i. ISO 14040 2006 Environmental Management -LCA- Principles & Framework
  - ii. ISO 14044 2006 Environmental Management - LCA Requirements and guidelines

  - iii. ISO 14025: 2006 Environmental labels and declarations — Type III environmental declarations — Principles and procedures
  - iv. ISO 21930 2006 Building construction - Sustainability in building construction – Environmental declaration of building products
- A number of commercial tools, such as GPR Gebouw, GreenCalc+ and EcoQuantum, are available in the Netherlands for simple calculation of a LCA for Mat 1. The 9 environmental effects and/or the indicator score can be adopted directly from the instruments. With GPR Gebouw version 4.0, the shadow price is calculated in the instrument. For other instruments, the shadow price can be calculated on the basis of the 9 environmental effects.
- In GreenCalc+ version 2.2, the environmental effects are not yet calculated on the basis of the harmonised materials database. However, the method that is used conforms to the "Handleiding Milieuprestaties Gebouwen". An update of the environmental database contained in the instrument is currently being worked on. Until the update is completed, the current instrument can be used. One must, however, take account of a deviating life cycle of 50 years for utility buildings.
- The method for calculating the shadow price using GPR Gebouw and Greencalc+ is described under Additional Information.

**Check by the assessor**

- The Assessor sample checks whether the input parameters of the applied environmental effects / shadowprice calculation match the building design.

## Schedule of evidence required

**Design stage**

1. & 2.:

- Documentation on the basis of which the total GFA of the building can be established.
- A concept calculation showing what the shadow price per $m^2$ GFA is. (Based on the 9 environmental effects, calculated in accordance with the "Handleiding Milieuprestaties Gebouwen").

**Post-construction stage**

1. & 2.:

- Documentation on the basis of which the total GFA of the building can be established.
- The relevant parts of the technical specifications and building services including any amendments on which the shadow price calculation can be checked.
- A final calculation showing what the shadow price per m2 GFA is. (Based on the 9 environmental effects, calculated in accordance with the "Handleiding Milieuprestaties Gebouwen").

## Definitions

**GFA**

Gross Floor Area (GFA)
This relates to the floor area of the space or of multiple spaces in a real estate object, measured (in line with NEN 2580) at floor level along the perimeter of the (outermost) vertical partition enclosing the relevant space(s).

**Materials**

The relates to all materials for the building, for the systems in the building and for the site layout around the building up to the boundaries of the areas involved in the development of the building. Consideration of the building takes into account the foundations, underground parking, the outer walls, the roof, the floors and the interior walls, including the finishing elements of the aforementioned structural components. Materials for the furnishing of the building fall outside the scope of the assessment.

## Additional information

**LCA assessment of buildings in the Netherlands**
In the Netherlands, there is a broad consensus regarding the use of the LCA (life cycle assessment) approach for determining the materials-related environmental impact of buildings. A harmonisation project was recently completed. In the project, the instrument owners, the national government, the building materials industry and others worked together on a uniform calculation method and materials database. The method has been defined in the "Handleiding Milieuprestatie Gebouwen" [2], version 1.1 and may possibly be converted into a NTA or NPR.

**Calculation of the shadow price with GPR Gebouw**

- The shadow price should be calculated using the instrument GPR Gebouw 4.0.
- Enter the building by entering the specification of the building's measurements under INVOER and the selected materials under MILIEU, section 2.3, 'Materiaal'.
- For the usable floor area, enter the Gross Floor Area (GFA) rather than the UFA.
- Adjust the standard building life cycle to 50 years for non-residential buildings and 75 years for residential buildings. (INVOER), unless this is demonstrably different.
- Then, as the result, copy the value on the right of the 'Milieubelasting alle bouwdelen' line under 2.3 'Materiaal'.
- Divide this environmental score for materials by 1,000 and you have the shadow price for materials in €/$m^2$ GFA.

**Calculation of the shadow price with Greencalc+**

- Use Greencalc+ version 2.2.
- For the calculation, use a life cycle of 50 years for utility buildings. The building's life cycle can be changed on the 'ontwerp' tab in the first window.
- In the program, take the results from the fourth column (of the 'milieueffecten' tab under 'resultaat materiaal van het ontwerp' (NB this relates only to the materials of the (designed) building and the environmental effects (milieueffecten) under 'emissies' (emissions) and 'uitputting' (depletion of resources); make sure you do not take the data in euro or the data from the reference).
- **OR** take the results from a print-out of the standard Greencalc report from the "Millieu-effecten materiaal [Gebouw] (MIG)" table from the fourth column (Milieueffecten – Ontw.) Make sure you do not take the data in euro or the data of the environmental effects (milieueffecten) of the reference (Milieueffecten - Ref.).
- Multiply the environmental effects with the shadow costs and divide by the GFA.
- Excel tool for calculation of shadow price from Greencalc:

Calculation of shadow costs from GreenCalc[3]

## References

Handleiding Milieuprestaties Gebouwen (*Guide to the Environmental Performance of Buildings*)

- Calculation method for determining the environmental performance of buildings over their entire life cycle, based on the life cycle analysis method (LCA-CML2). Final version 1.1, dated 7.11.2007 [4]

# MAT 3 Reuse of building façade

## Credit aim
To recognise and encourage the in-situ reuse of existing building façades.

## Credit criteria
A maximum of 1 point can be awarded:

| Points | |
|---|---|
| 1 | Where evidence provided demonstrates that at least 50% of the total final façade (by area) is reused in situ and at least 80% of the reused façade (by mass) comprises in-situ reused material. |

## Compliance requirements
The following demonstrates compliance:

1. At least 50% of the total final building façade (by area) is reused.
2. At least 80% of the reused façade (by mass) comprises in-situ reused material.

## Compliance notes

### New build
There are no additional or different requirements to those outlined above specific to new build projects.

### Refurbishment
Refurbishment projects are likely to achieve this credit without difficulty.

### Extensions to existing buildings
There are no additional or different requirements to those outlined above specific to the extension of existing projects.

### Shell only
There are no additional or different requirements to those outlined above specific to shell-only projects.

### Curtain walling & windows
Where existing windows are being replaced they may be excluded from the calculation of façade area; however, curtain walling counts as façade.

### The credit is applicable to the following building types:

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

### Offices
There are no additions for the application of this credit to offices.

**Retail**
There are no additions for the application of this credit to retail premises.

**Industrial buildings**
There are no additions for the application of this credit to industrial buildings.

**Schools**
There are no additions for the application of this credit to schools.

## Schedule of evidence required

**Design stage**
1. & 2.

- Drawings detailing the elevation of the existing and the new-build façades.
- Calculations demonstrating the % of façade comprising in situ material.
- These calculations should be simply based on the volume of each material and its density, with totals compared for the new and retained parts of the structure.

**Post construction stage**
1. & 2.

- Assessor's building/site inspection and photographic evidence confirming: The existence of the reused façade.
- Final calculations which demonstrate the percentage of façade comprising in situ material.
- As built drawings/calculations.
  *OR*
- Written confirmation from the design team or contractor of any changes to the specification for the façade.

## Definities

**Façade**
Any exposed building face, not just the front elevation. The definition excludes party walls.

In practice, reusing façades will often require extensive renovation and/or reinforcement, hence the BREEAM-NL requirement for at least 80% by mass of the reused façade to be in situ reused material. Façades with new external cladding or internal lining therefore can gain this credit provided that this criterion is met.

## Additional information
None.

## References
None.

# MAT 4 Reuse of building structure

## Credit aim
To recognise and encourage the reuse of existing structures that previously occupied the site.

## Credit criteria
A maximum of 1 point can be awarded:

| Points | |
|---|---|
| 1 | Where evidence provided demonstrates that a design reuses at least 80% of an existing primary structure and, for part refurbishment and part new build, the volume of the reused structure comprises at least 50% of the final structure's volume. |

## Compliance requirements
The following demonstrates compliance:

1. Where at least 80% by volume of an existing primary structure is reused without significant strengthening or alteration works.
2. Where a project is part refurbishment and part new build, the reused structure comprises at least 50% by volume of the final building, i.e. any new-build extension to a building being refurbished should not be larger than the original building to qualify for this credit

## Compliance notes

### New build
There are no additional or different requirements to those outlined above specific to new build projects.

### Refurbishment
Refurbishment projects are likely to be the only buildings to achieve this credit.

### Extensions to existing buildings
There are no additional or different requirements to those outlined above specific to the extension of existing projects.

### Shell only
There are no additional or different requirements to those outlined above specific to shell-only projects.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

### Offices
There are no additions for the application of this credit to offices.

### Retail
There are no additions for the application of this credit to retail premises.

**Industrial buildings**
There are no additions for the application of this credit to industrial buildings.

**Schools**
There are no additions for the application of this credit to schools.

## Schedule of evidence required

**Design stage**

1. & 2. Drawings or design team calculations detailing:

- The sections of the existing structure to be reused.
- Any parts of the structure to be demolished and the total new structure.
- Where appropriate, calculations confirming any strengthening/alteration are not deemed 'significant' in terms of the credit requirements for the mass of materials used.

**Post construction stage**

1. & 2.

- As built drawings/calculations.
- Written confirmation from the design team or contractor of any changes to the structural specification.

## Definition

**Significant strengthening or alteration**
Defined as where the mass of new material is equal to or greater than 50% of the total mass of the reused structure.

**Primary structure**
Defined as structural floors, columns, beams, load bearing walls and foundations i.e. where required for structural use by the new building. So for example insulation is excluded.

## Additional information

None.

## References

None.

# MAT 5 Responsible sourcing of materials

## Credit aim
To recognise and encourage the specification of responsibly sourced materials for key building elements.

## Credit criteria
A maximum of 4 points can be awarded:

| Points | |
|---|---|
| 4 | Where evidence provided demonstrates that 80% of the assessed materials of the main building elements are responsibly sourced. |
| Additionally 100% of any timber must be legally sourced. | |

## Compliance requirements
The following demonstrates compliance:

1. A minimum of 80% of the assessed materials (below the list of materials to be assessed) of the main building elements are responsibly sourced.
    a. Structural Frame
    b. Ground floor
    c. Upper floors (including separating floors)
    d. Roof
    e. External walls
    f. Internal walls
    g. Foundation/substructure
    h. Staircase

**The list of materials to be assessed**

a. Brick (including clay tiles and other ceramics)
b. Resin-based composites and materials, including GRP and polymeric render
c. Concrete (including in-situ and pre-cast concrete, blocks, tiles, mortars, cementious renders etc.)
d. Glass
e. Plastics and rubbers (including EPDM, TPO, PVC and VET roofing membranes including polymeric renders)
f. Metals (steel, aluminium etc.)
g. Dressed or building stone including slate
h. Timber, timber composite and wood panels (including glulam, plywood, OSB, MDF, chipboard and cement bonded particleboard)
i. Plasterboard and plaster
j. Bituminous materials, such as roofing membranes and asphalt
k. Other mineral-based materials, including fibre cement and calcium silicate
l. Products with recycled content
m. Insulation materials.

2. Each applicable material is assigned to a responsible sourcing tier level based on the level and scope of certification achieved by the material supplier(s)/manufacturer(s). See Tabel 1: Tier levels and compliance, Tabel 2: EMS Requirements, Tabel 3: EMS criteria for insulation products). For insulation materials in m) is tier level 4 insufficient.

3. Use the calculator '2008_Mat_5_calculator_rev02_NL.xls' to determine the number of credits to be awarded:
   - For a) to l): follow the calculation procedure outlined in the additional guidance section, and use the *Responsible Sourcing Calculator* 'Mat 5 Responsible Sourcing'
   - For m): follow the calculation procedure outlined in the sheet 'Mat5 Insulation'.

4. Any non-certified timber used in the development comes from a legal source and is not included on the CITES list (see definition for legally sourced timber).

**Exemplary level criteria**
The following outlines the exemplary level criteria to achieve an *innovation credit* for this BREEAM-NL issue:

1. Where, in addition to the above criteria, 95% of the applicable materials, comprised within the applicable building elements, have been responsibly sourced.

## Compliance notes

**New build**
There are no additional or different requirements to those outlined above specific to new build projects.

**Refurbishment**
In the case of a refurbishment assess the newly specified applicable and reused materials (reused as defined below).

**Extensions to existing buildings**
There are no additional or different requirements to those outlined above specific to the extension of existing projects.

**Shell only**
There are no additional or different requirements to those outlined above specific to shell-only projects.

**Building element not present**
Where an element is not present in a project (e.g. an assessment of a ground floor of a building only and therefore no roof in the scope of the assessment), the points for this/these element(s) will be redistributed by the calculator to reward only the elements being assessed.

**Reused in-situ materials**
Materials reused in-situ can be excluded from the assessment. The aim of the credit is to focus on the responsible sourcing of new specified materials.

**Specified reused materials**

Reused materials specified for the development e.g. recycled aggregates are considered equivalent to materials covered by certification schemes that fall within tier 1 of table 1.

**Temporary timber**
Timber that is temporarely used on the construction site is within the scope of this credit. This in the scope of Man 3. Only materials that remain on site are within the scope.

**CITES-list**
CITES (Convention on International Trade in Endangered Species) Appendices I and II of the CITES list illustrate species of timber that are protected outright. Appendix III of the CITES list illustrates species that are protected in at least one country. If a timber species used in the development is on Appendix III it can be included as part of the assessment as long as the timber is not obtained from the country(ies) seeking to protect this species (see additional information for further details).

**A Government license**
A Government felling licence certificate, does not comply as a third party timber certification scheme for this credit, but can be used as evidence of legally sourced timber.

**Pre- or post-consumer waste**
Where materials being assessed (including timber) are part of a pre- or post-consumer waste stream, the EMS sections of the credit can be applied for; however, using an EMS scheme (ISO, EMAS etc.) for new timber does not demonstrate timber certification and therefore does not qualify for any of these BREEAM-NL credits.

**Checklist A5**
Checklist A5 is contains information for the BREEAM-NL assessor, including an explanation of what is required for each of the responsible sourcing tiers.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additions for the application of this credit to offices.

**Retail**
There are no additions for the application of this credit to retail premises.

**Industrial buildings**
There are no additions for the application of this credit to industrial buildings.

**Schools**
There are no additions for the application of this credit to schools.

## Schedule of evidence required

### Design stage

1. Design plan and/or specification confirming:
    13. the location of elements and materials specified
    14. details of the materials specified.

2. & 3. A copy of the output from the Responsible Sourcing of Materials Calculator Tool.

For materials certified through the EMS route, a letter of intent from the design team confirming:

- The relevant materials shall be sourced from suppliers who can provide an EMS certificate (or equivalent) for the process and/or extraction stages of their product.

Certified timber requires a letter of intent from the design team confirming:

- The timber shall be sourced from suppliers capable of providing certification to the level required for the particular tier claimed.

4. Written confirmation from the developer confirming that:

- All timber will come from a 'legal source' and one not on the CITES list. Or in the case of Appendix III of the CITES list, it has not been sourced from the country seeking to protect this species as listed in Appendix III.

### Post construction stage

1.

- As built drawings or as built specifications confirming that the building has been constructed in accordance with the design stage drawings/specifications.
- Copies of purchase orders or receipts or certificate/letter of conformity for all applicable materials, including those recycled or reused

2. & 3. A copy of the results from the calculation tool Mat 5 and Mat 6 (if there are any differences with the materials used in the design stage)
Voor materialen die gecertificeerd zijn via een milieumanagementsysteem (EMS), moet 1 van de volgende documenten aangeleverd worden:

- Copy of the ISO 14001-certificate.
- Copy of the EMS certificate.
- Copy of the certification document or the Chain of Custody-certificate.

4. Where any non-certified timber is used, written confirmation from the supplier(s) confirming that:

- All timber comes from a legal source.
- All timber species and sources used in the development are not listed on any of the CITES appendices for endangered or threatened species (Appendix I, II, or III). Or in the case of Appendix III of the CITES list, it has not been sourced from the country seeking to protect this species as listed in Appendix III.

## Definitions

### Reused materials

Materials that can be extracted from the waste stream and used again without further processing, or with only minor processing, that does not alter the nature of the material (e.g. cleaning, cutting, fixing to other materials).

**Tier levels**

A graded scale to reflect the rigour of the certification scheme used to demonstrate responsible sourcing, forming the basis for awarding points (all as detailed in Table 1).

**Legally sourced timber**

Legal timber and wood derived products are those which originate from a forest where the following requirements are met:

1. The forest owner/manager holds legal use rights to the forest.
2. There is compliance by both the forest management organisation and any contractors with local and national legal requirements including those relevant to:
    a. Forest management
    b. Environment
    c. Labour and welfare
    d. Health & safety
    e. Other parties' tenure and use rights
3. All relevant royalties and taxes are paid.
4. There is compliance with the requirements of CITES.

Relevant documentation demonstrating the above must be provided or made available on request subject to the availability of such materials in the country concerned. Certification from any of the timber certification schemes identified in tiers 1, 2 and 4 for this credit demonstrate legally sourced timber.

**Supply chain EMS**

Covers all of the major aspects of processing and extraction involved in the supply chain for the end product. Note that recycled materials are not required to demonstrate a Supply Chain EMS. If EMS certification is provided for the Key Processes for recycled materials, this is assumed by default.

**Small company**

A company is defined as 'small' if it satisfies at least two of the following criteria:

a. A turnover of not more than £5.6 million;
b. 50 employees or fewer.

This is based on the definition stated in the European Guideline 2003/361/CE.

**Pre-consumer waste stream:**

Waste material generated during manufacturing processes. Excluded is reutilisation of materials such as rework, regrind or scrap generated in a process and capable of being reclaimed within the same process that generated it.

**Post-consumer waste stream:**

Waste material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product, which can no longer be used for its intended purpose. This includes returns of material from the distribution chain.

**Recycled materials**
Materials diverted from the pre-consumer and/or post-consumer waste streams that require significant processing before they can be used again.

**Responsible sourcing**
Demonstrated through auditable third party certification schemes.

## Additional information

**Calculation procedure**
The Mat5 credit points can be calculated using the English language Excel calculator Mat 5 "2008_Mat_5_calculator_rev02_NL.xls" (see Rekentools). The calculator has an English explanation listed. The direct link to the calculator:
http://www.dgbc.nl/images/uploads/2008_Mat_5_calculator_rev02_NL.xls.

The score for the materials A to I is calculated by the spreadsheet Mat 5 Responsible Sourcing "is up 4 credit points:

a. ≥ 20 points 4 credit points
b. ≥ 15 points 3 credit points
c. ≥ 2 points 10 credit points
d. ≥ 5 points 1 credit point

The score for the materials m) insulation is given by the spreadsheet 'Mat5 Insulation " and is up 1 credit point.

If not all main building components are applicable for assessing the points, the calculator will adapt to the number of main building elements present.

**Note: The total score for Mat5 is the sum of credit points on both parts though) and m) together. The total score is maximized at 4 credit points, more points are not awarded kunnnen!**
**Table 1: Tier levels and compliance)**
Table 1 in BREEAM Europe: Commercial 2009, Mat 5.

| Tier level | Issue assessed | Points available per element | Evidence / measure assessed | Examples of compliant schemes |
|---|---|---|---|---|
| 1 | Legality & responsible sourcing | 3 | Certification scheme | FSC, CSA, SFI with CoC, PEFC, Reused Materials, Schemes compliant with BES6001:2008[i] (or similar) Excellent* and Very Good* Performance Ratings (Note; the EMS required to achieve these ratings must be independently certified) |
| 2 | Legality & responsible | 2 | Certification scheme | Schemes compliant with BES6001:2008 (or similar) |

| | | | | |
|---|---|---|---|---|
| | sourcing | | | Good* and Pass* Performance Ratings (Note; the EMS required to achieve these ratings must be independently certified) |
| 3 | Legality & responsible sourcing | 1.5 | Certification scheme/ EMS | Timber: MTCC, Verified**, SGS, TFT |
| | | | | Other materials: Certified EMS for the Key Process and *Supply Chain*. |
| | | | | Recycled Materials with certified EMS for the *Key Process* |
| 4 | Legality & responsible sourcing | 1 | Certification scheme/EMS | Certified EMS for key process stage. |

Note:
Where any timber is used, it must be legally sourced. Where evidence cannot be provided to demonstrate legal sourcing for any element, no points can be awarded for the Responsible Sourcing Issue.

Where new in situ concrete (not existing concrete) is used, certification of the manufacture of the cement as the primary process, extraction of the aggregate and limestone used to make the cement as well as supply chain processes to be provided.

* Performance ratings for schemes compliant with BES6001:2008 (or similar) can only be used to demonstrate compliance with the assessment criteria for this issue where certification covers the key process and supply chain processes for the material being assessed.

**** "Verified" is the name of a scheme produced by SmartWood.

**Table 2: EMS requirements**

Table 2 in BREEAM Europe: Offices 2008, Mat 5, pag. 20-22

**Table 2: EMS Requirements**

| Material | Key Process | Supply chain processes |
|---|---|---|
| Brick (including clay tiles and other ceramics) | Product Manufacture | Clay Extraction |
| Resin-based composites and materials (including GRP and polymeric render) | Composite product manufacture | Glass fibre production<br>Polymer production |
| In situ Concrete (including ready mix and cemetitious mortars and renders) | Ready mixed concrete plant | Cement production<br>Aggregate extraction and production |
| Precast concrete and other concrete products (including blocks, cladding, precast flooring, concrete or cementitious roof tiles) | Concrete product manufacture | Cement production<br>Aggregate extraction and production |
| Glass | Glass production | Sand extraction<br>Soda Ash production or extraction |
| Plastics and rubbers (including polymeric renders, EPDM, TPO, PVC and VET roofing membranes) | Plastic/rubber product manufacture | Main polymer production |
| Metals (steel, aluminium etc) | Metal Product manufacture - e.g. cladding production, steel section production | Metal production:<br>Steel: Electric arc furnace or Basic oxygen furnace process.<br>Aluminium, ingot production.<br>Copper: ingot or cathode production. |
| Dressed or building stone (including slate) | Stone product manufacture | Stone extraction |
| Plasterboard and plaster | Plasterboard or plaster manufacture | Gypsum extraction<br>Synthetic gypsum (from flue gas desulphurisation) by default (recycled content) |
| Virgin timber | Timber from certified sources | Timber from certified sources |
| Cement Bonded Particle Board | Due to the significant cement content, in addition to requiring timber certification, the key supply chain process must also be considered to obtain the relevant tier for timber certification. Production of Cement Bonded Particleboard | Cement production<br>Timber from certified sources |
| Wood panel products such as Oriented Strand Board, plywood, chipboard/particle board, etc.) | Wood panel products, including those with recycled content, can only use the Timber Certification route | |

| | | |
|---|---|---|
| Bituminous materials, such as roofing membranes and asphalt | Product manufacture | Bitumen production<br>Aggregate extraction and production |
| Other mineral-based materials, including fibre cement and calcium silicate | Product manufacture | Cement production<br>lime production<br>other mineral extraction and production |
| Products with 100% recycled content | Product manufacture | Recycled input by default |
| Products with lower % of recycled content | Product manufacture | Supply chain process/processes for any virgin material in the relevant product type above.<br>Recycled input by default |
| Any other product | Key processes is likely to be product manufacture | 1 or 2 main inputs with significant production or extraction impacts should be identified |
| Excluded products: insulation materials, fixings, adhesives, additives | N/A | N/A |

**Table 3 - EMS requirements for insulation products**
Table 3 in BREEAM Europe: Offices 2008, Mat 6, pag. 29

**Table 3: EMS requirements for insulation products**

| Material | Key Process | Supply chain processes |
|---|---|---|
| Foam Insulation | Insulation manufacture | Principal Polymer production, e.g. Polystyrene, MDI , Phenolic resin or equivalent |
| Stone wool, glass & cellular glass made using < 50% recycled input | Product manufacture | Any quarried or mined mineral over 20% of input |
| Wool | Product manufacture | Wool Scouring |
| Products using > 50% recycled content except those using timber | Product manufacture | Recycled content by default |
| Timber-based insulation materials including those using recycled timber | Product manufacture | Recycled timber by default, all other timber from one of the recognised timber certification schemes in Table 1. |
| Other renewable-based insulation materials using agricultural by-products (e.g. straw) | Product manufacture | By-product manufacture by default |

**Timber and Environmental Management Schemes (EMS)**

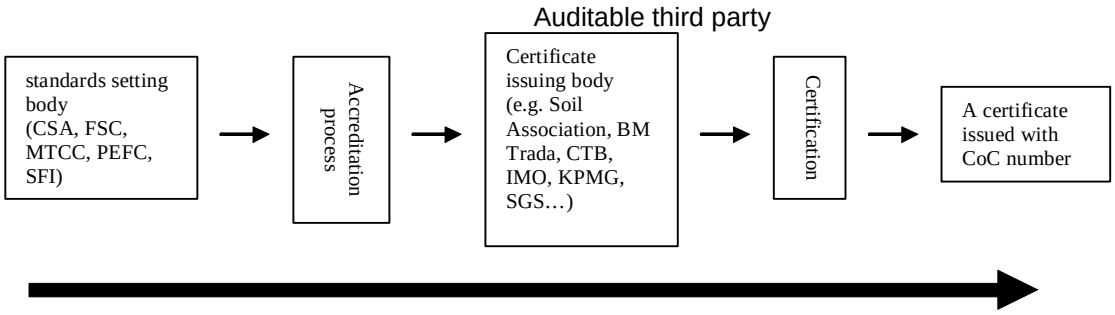
Where an Environmental management scheme is used to assess products made from recycled timber, 100% of the timber content must be recycled or sourced from one of the recognised timber certification schemes in Table 1. A timber product with 50% recycled timber and 50% legally sourced timber will not comply with the criteria and will not be awarded any points.

Using an EMS for new timber does not demonstrate timber certification and therefore does not qualify for points.

**Chain of custody**

This is a process used to maintain and document the chronological history of the evidence/path for products from forests to consumers. Wood must be tracked from the certified forest to the finished product. All the steps, from transporting wood from the forest to a sawmill, until it reaches the customer, must maintain adequate inventory control systems that allow for separation and identification of the certified product. Chain-of-custody certification ensures that a facility has procedures in place to track wood from certified forests and avoid confusing it with non-certified wood. Chain-of-custody is established and audited according to relevant forest certification systems rules.

Third party certification process




**Timber certification process**

CITES - Convention on International Trade in Endangered Species of wild fauna and flora (extract taken from the CITES website)

''CITES works by subjecting international trade in specimens of selected species to certain controls. All import, export, re-export and introduction from the sea of species covered by the Convention has to be authorized through a licensing system. Each Party to the Convention must designate one or more Management Authorities in charge of administering that licensing system and one or more Scientific Authorities to advise them on the effects of trade on the status of the species.

The species covered by CITES are listed in three Appendices, according to the degree of protection they need.

1. Appendix I includes species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances.
2. Appendix II includes species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival.
3. Appendix III contains species that are protected in at least one country, which has asked other CITES Parties for assistance in controlling the trade.''

Calculation of Timber Volumes

a. Most of the information on areas, lengths and volumes of timber will be available from the component manufacturers or estimator, who should provide a detailed breakdown of quantities of materials.

b. In order to calculate the volume of wood in timber frame windows, the total length of frame must be obtained. This can then be converted to a volume by multiplying the length of frame on fixed windows by 0.00653 and the length of frame on opening windows by 0.01089.

c. In order to calculate the volume of timber in composite timber doors such as a flush door, calculate the total area of all doors summed over the whole building and multiply this by 0.02187 (this factor gives the total volume of timber in the doors and frames).

## References


- EU Eco-Management and Audit Scheme (EMAS)(http://www.emas.org.uk/aboutemas/mainframe.htm) (http://europa.eu.int/comm/environment/emas/index_en.htm)
- International Standards for Organisation (ISO) http://www.iso.org/iso/en/ISOOnline.frontpage
- Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) (http://www.cites.org/)
- EU Forest Law Enforcement, Governance and Trade (FLEGT) Action Plan (http://europa.eu.int/)
- SGS timber tracking programme (http://www.sgs.com/forest_services_?serviceId=8535&lobId=5548)
- TFT – Tropical Forest Trust (http://www.tropicalforesttrust.com/)
- FERN – European NGO campaigning for forests (http://www.fern.org)
- ProForest (http://www.ProForest.net)
- WWF (http://www.panda.org)
- Greenpeace Ancient Forest Campaign (http://www.greenpeace.org)
- Forests Forever Campaign (http://www.forestsforever.org)
- TFT – Tropical Forest Trust publication Good Wood, Good Business – (http://www.tropicalforesttrust.com)
- Good Wood Guide, Friends of the Earth/ Flora and Fauna International, 2002 (http://www.goodwoodguide.com)
- http://www.fsc.nl of http://www.fsc.org
- http://www.pefc.nl

# MAT 7 Designing for robustness

## Credit aim

To recognise and encourage adequate protection of exposed parts of the building and landscape, therefore minimising the frequency of use of replacement materials.

## Credit criteria

A maximum of 1 point can be awarded:

| Points | |
|---|---|
| 1 | Where protection is given to vulnerable parts of the building such as areas exposed to high pedestrian traffic, vehicular and trolley movements. |

## Compliance requirements

The following demonstrates compliance:

1. Internal and external areas of the building where vehicular, trolley and pedestrian movement occur have been identified.

2. Suitable durability and protection measures or design features have been specified to prevent damage to the vulnerable parts of these building areas from such traffic. This must include, but not be limited to:
   - Protection from the effects of high pedestrian traffic in main entrances, public areas and thoroughfares (corridors, lifts, stairs, doors etc).
   - Protection against any internal vehicular/trolley movement within 1m of the internal building fabric in storage, delivery, corridor and kitchen areas.
   - Protection against, or prevention from, any potential vehicular collision where vehicular parking and manoeuvring occurs within 1m of the external building façade for all car parking areas and within 2m for all delivery areas.

## Compliance notes

### New Build

There are no additional or different requirements to those outlined above specific to new-build projects.

### Renovation

There are no additional or different requirements to those outlined above specific to refurbishment projects.

### Extensions to existing buildings

Where the assessment is of a refurbished building on an existing site then the requirements apply to the areas that form a part of the works or hard landscape for that building.

### Shell only

There are no additional or different requirements to those outlined above specific to shell only assessments.

**Suitable durability measures**

Suitable durability and protection measures to vulnerable parts of the building can include:

- Bollards/barriers/raised kerbs to delivery and vehicle drop-off areas
- Robust external wall construction, up to 2m high
- Protection rails to walls of corridors
- Kick plates/impact protection (from trolleys etc) on doors
- Hard-wearing and easily washable floor finishes in heavily used circulation areas (i.e. main entrance, corridors, public areas etc)

**Sales areas**

In any sales areas, where customer goods trolleys will be used, protection must be provided to vulnerable parts of the building (such as glass curtain walling etc.) within 1m of trolley movement.

**Vehicle impact protection**

Any vehicle impact protection measures specified must be positioned at an adequate distance from the building to protect the fabric from impact from any vehicle with a measurable overhang of the body from the wheel track, in particular for any goods delivery areas.

In vehicle movement areas only; where the specification of external robust wall construction is specified to comply with the credit, additional protection must be provided to ensure against potential damage to the robust façade from vehicle movement, i.e. specifying bollards or protection rails.

**Public / common areas**

Consideration should be given to materials specification in public/common areas (especially public waiting areas and toilet areas) to provide protection against potential malicious or physical abuse in as far as it is possible.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**

There are no additions for the application of this credit to offices.

**Retail**

There are no additions for the application of this credit to retail premises.

**Industrial buildings**

There are no additions for the application of this credit to industrial buildings.

**Schools**

There are no additions for the application of this credit to schools.

## Schedule of evidence required

### Design stage

1. Design drawings marked up to illustrate:
    - Vulnerable areas/parts of the building.
2. Design drawings and/or specification confirming:
    - The durability measures specified.

### Post construction stage

1. & 2. Assessor's building/site inspection and photographic evidence confirming:
    - Vulnerable areas of the building
    - The durability measures in-situ.

## Definitions

None.

## Additional information

None.

## References

None.

# 7. Waste

# WST 1 Waste management on the construction site

## Credit aim

To promote resource efficiency via the effective and appropriate management of construction site waste.

## Credit criteria

3 points can be awarded as follows:

| Points | |
|---|---|
| 1 | Where evidence provided demonstrates that there is a commitment by the contractor or a commitment by the client to require the contractor to minimise waste arising from construction. |
| 2 | Where, in addition to the above, evidence provided demonstrates that construction waste materials will be sorted into separate key waste groups. |
| 3 | Where, in addition to the above, evidence provided demonstrates that 80% of non-hazardous construction waste will be will be reused or recycled. |

## Compliance requirements

Compliance is demonstrated as follows:

First point:

1. Appropriate targets have been set for the amount of non-hazardous and hazardous waste produced on site and are indicated in tonnes.
2. Procedures are in place to minimise non-hazardous and hazardous site construction waste in line with the targets.
3. The amount of site construction waste arising is monitored and targets are reviewed at least once a fortnight.
4. The design/site management team has designated an individual responsible for implementing the above.
5. The contractor is VCA certified.
    - In addition, construction projects with existing buildings that will be refurbished or demolished:
6. In the case of demolition, an audit has been carried out to determine whether refurbishment is feasible.
7. In the case of demolition and refurbishment, an audit has been carried out to identify the potential recovery of material for high-grade applications. The audit must cover the following elements:
    - Identification of the key refurbishment/demolition materials and quantities arising;
    - Potential for reuse or recycling of the key refurbishment and demolition materials

Second point:

1. Point 1 has been achieved.

2. Procedures are in place for sorting construction waste materials into key waste groups either on site or offsite through a licensed waste collector or processor. At least 4 of the following groups have been defined:
    - Wood waste;
    - Stony materials;
    - Metal;
    - Plastics;
    - Glass (in the case of demolition);
    - Pruning waste (in the case of demolition or site preparations);
    - Gypsum;
    - Insulation (by type).
3. The waste collector or processor is VCA certified.

Third point:

1. Point 2 has been achieved.
2. A significant quantity of recyclable construction waste has been diverted from landfill as follows: A minimum of 80% of the recyclable construction waste must either be:
    - Reused in the construction project; *OR*
    - Reused in another construction project; *OR*
    - Reused in another manner via responsible recovery and recycled by the supplier or by a licensed external contractor.
3. The contractor and the waste collector or processor must have ISO 9001 and ISO 14001 certification.

**Exemplary level criteria**
The following outlines the exemplary level criteria to achieve an innovation credit for this BREEAM-NL issue.

1. All three credits have been achieved.

2. At least six key waste groups are identified for diversion from landfill at pre-construction stage.

3. At least six key waste groups have waste reduction potential at Design stage. These should be reviewed throughout the construction

Buildings complying with the exemplary level criteria would therefore achieve four credits in total.

## Compliance notes

**New build**
There are no additional or different requirements to those outlined above specific to new build projects.

**Refurbishment**
There are no additional or different requirements to those outlined above specific to refurbishment projects. For demolition, use can be made of the SEV Guidelines for sustainable demolition and/or the demolition tool (see 'Additional information').

**Extensions to existing buildings**
If the building is part refurbishment part new-build extension, then the whole building must be assessed to determine compliance with the credit. For assessments of extensions to existing buildings, where only the extension is being assessed, it is the extension only that must comply with the requirements.

**Shell only**

There are no additional or different requirements to those outlined above specific to shell-only projects.

**Demolition**
For demolition, use can be made of the SEV Guidelines for sustainable demolition and/or the demolition tool (see 'Additional information').

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additions for the application of this credit to offices.

**Retail**
There are no additions for the application of this credit to retail premises.

**Industrial buildings**
There are no additions for the application of this credit to industrial buildings.

**Schools**
There are no additions for the application of this credit to schools.

## Schedule of evidence required

### Design stage

First point:

1. to 7:

- A copy of the schedule of requirements or procedure which confirms the following:

- Procedures are in place to minimise construction waste;
- Targets are set and reviewed at least once a fortnight;
- The name and job title of the designated individual responsible for implementation;
- A copy of the contractor's VCA certificate;
- Where relevant, the principal contractor is to carry out a pre-demolition/pre-refurbishment audit for the potential refurbishment and reuse of materials.

*OR*

- A letter from the developer or his representative containing:

- Confirmation that the specification will contain a clause on minimising construction waste;

- A detailed description of the requirements that will be included in that specification clause.

Second point:

1.: Evidence (as outlined above) confirming compliance with the first credit.

2. & 3.:

- A copy of the specification or procedure which confirms the following:

- Procedures are in place to sort construction waste;
- Details of the key waste groups.

- A copy of the waste collector or processor's VCA certificate.
- Where relevant, a letter from the licensed external contractor confirming that segregation of materials is carried out in compliance with legislation and regulations in the Netherlands and that materials are reused/recycled as appropriate.

*OR*

- A letter from the developer or his representative containing:

- Confirmation that the specification will contain a clause on sorting construction waste;
- A detailed description of the requirements that will be included in that specification clause.

Third point:

1.: Evidence (as outlined above) confirming compliance with the second credit.

2.: A copy of the specification or procedure which confirms the following:

- Percentage of non-hazardous construction waste to be reused or recycled;
- Procedures in place for reuse and recycling.
- A copy of the contractor's and waste collector or processor's ISO 9001 and ISO 14001 certificates.

**Post-construction stage**

First point:

1. to 7:

- A copy of the contract confirming the procedures for minimising construction waste.
- A copy of the contractor's VCA certificate.
- A monitoring record or report which confirms the following:

- Monitoring actions carried out by the designated responsible individual;
- The total amount of waste arising for the construction project;
- A comparison of the total amount of construction waste arising against the targets set.

Second point:

1.: Evidence (as outlined above) confirming compliance with the first point.

2.: A monitoring record or report confirming the amount and proportion of waste by key waste group.

3.: A copy of the waste collector or processor's VCA certificate.

Third point:

1.: Evidence (as outlined above) confirming compliance with the second point.

2.: To be submitted:

- A monitoring record or report confirming the amount and proportion of waste that was used, recycled and landfilled by key waste group.
- Disposal and landfill receipts from the waste collector or processor to substantiate the aforementioned amounts and proportions.
- A copy of the contractor's and waste collector or processor's ISO 9001 and ISO 14001 certificates.

## Definitions

None.

## Additional information

Sustainable demolition guide

- Sustainable Demolition Guide, SEV Realisatie, Rotterdam, April 2005, ISBN 9085771005. Download (Dutch version only) via http://www.sev-realisatie.nl/.

### Demolition tool

- Environmental effects and tender instrument Sustainable Demolition Rotterdam, De Haas & Partners commissioned by the Province of Zuid-Holland. Published by IVAM, http://www.ivam.uva.nl

## References

None.

# WST 2 Recycled aggregates

## Credit aim

To recognise and encourage the use of recycled and secondary aggregates in construction, thereby reducing the demand for virgin material.

## Credit criteria

A minimum of 1 point can be awarded:

| Points | |
|---|---|
| 1 | Where evidence provided demonstrates the significant use of recycled or secondary aggregates in 'high-grade' building aggregate uses. |

## Compliance requirements

The following demonstrates compliance:

1. Where the amount of recycled and secondary aggregate specified is over 25% (by weight or volume) of the total *high-grade* aggregate uses for the building. Such aggregates can be **EITHER**:
   a. Obtained on site **OR**
   b. Obtained from waste processing site(s) within a 30km radius of the site; the source will be principally from construction, demolition and excavation waste (CD&E) – this includes road planings **OR**
   c. Secondary aggregates obtained from a non-construction post-consumer or post-industrial by-product source (see compliance notes).

## Compliance notes

### New build

There are no additional or different requirements to those outlined above specific to new build projects.

### Refurbishment

This credit can be automatically granted if no new aggregate is used. That may be the case with most renovation projects.

### Extensions to existing buildings

There are no additional or different requirements to those outlined above specific to extensions to existing buildings.

### Shell only

There are no additional or different requirements to those outlined above specific to shell-only projects.

### Secondary aggregates

Recognised non-construction post-consumer or post-industrial by-products include:

- China clay waste

- Slate overburden
- Pulverised Fuel Ash (PFA)
- Ground Granulated Blast Furnace Slag (GGBFS)
- Air-cooled blast furnace slag
- Steel slag
- Furnace bottom ash (FBA)
- Incinerator bottom ash
- Foundry sands
- Recycled glass
- Recycled plastic
- Tyres
- Spent oil shale
- Colliery spoil
- Municipal Solid Waste Treatment Residues

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additions for the application of this credit to offices.

**Retail**
There are no additions for the application of this credit to retail premises.

**Industrial buildings**
There are no additions for the application of this credit to industrial buildings.

**Schools**
There are no additions for the application of this credit to schools.

## Schedule of evidence required

**Design stage**

A copy of the relevant specification or contract clause confirming:
- Recycled and secondary aggregate use requirements for the project.
- A letter from the design team or main contractor confirming:
- The source of recycled/secondary aggregates
- The amount and quality required can be obtained from this source.

**Post construction stage**

Structural engineers calculations demonstrating the weight/volume of:
- Total high grade aggregate used.
- Total recycled and secondary aggregates used.

Third party documentation as follows:

Delivery notes for all recycled and secondary aggregates confirming:
- Source of recycled/secondary aggregate.

**AND/OR**

A letter or email from the aggregate/ concrete supplier confirming that:
- The aggregate supplied and used was from a recycled/secondary source
- Source of recycled/secondary aggregate.

## Definitions

**High Grade aggregate**
uses are considered to be:

**Bound**
Structural frame;
- Floor slabs including ground floor slabs;
- Bitumen or hydraulically bound base, binder, and surface courses for paved areas and roads.

**Unbound**
- Asphalt-based or similar road surfaces
- Granular fill and capping
- Pipe bedding
- Sub bases/building foundations
- Gravel landscaping.

Crushed masonry used as fill material for general landscaping is not considered to be high grade. This practice is now common place on construction sites due to landfill costs.

**Pre-consumer waste stream**
Waste material generated during manufacturing processes.
Excluded is reutilisation of materials such as rework, regrind or scrap generated in a process and capable of being reclaimed within the same process that generated it.

**Post-consumer waste stream**
Waste material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product, which can no longer be used for its intended purpose. This includes returns of material from the distribution chain.

**Recycled aggregates**
are those derived from reprocessing materials previously used in construction, e.g. crushed concrete or masonry from construction and demolition waste material.

**Secondary aggregates**
By-products of industrial processes that can be processed to produce secondary aggregates. Secondary Aggregates are sub-divided into manufactured and natural, depending on their source.

## Additional information

• BRL 2506 Recycling Aggregates for use in concrete, road construction, land and construction work. An overview of BRL-2506 certified suppliers can be found at: http://www.bouwkwaliteit.nl/nieuwe_database/brl_nummer/output_brl.php?brlno=2506
• In 2506 BRL his requirements with which a company must meet to be allowed to perform the following: ® KOMO-attest-with-product certificate, KOMO ® product certificate, NL BSB ® Certificate.

**References**
None.

# WST 3 Recyclable waste storage

## Credit aim
To recognise the provision of dedicated storage facilities for a building's operational-related recyclable waste streams, so that such waste is diverted from landfill or incineration.

## Credit criteria
Er kan 1 punt als volgt toegekend worden:

| Points | |
|---|---|
| 1 | Where a central, dedicated space is provided for the storage of the building's recyclable waste streams. |

## Compliance requirements
The following demonstrates compliance:

1. A dedicated storage space to cater for recyclable materials generated by the building during occupation, compliant with the following:
    - Clearly labelled for recycling
    - Placed within accessible reach of the building
    - Water supply available for cleaning
    - In a location with good vehicular access to facilitate collections.

2. The size of the space allocated must be adequate to store the likely volume of recyclable materials generated by the building's occupants/operation. Whilst a fixed area cannot always be given, the following must be complied with as a minimum:
    - At least $2m^2$ per $1000m^2$ of net floor area for buildings $<5000m^2$
    - A minimum of $10m^2$ for buildings $\geq 5000\ m^2$
    - An additional $2m^2$ per $1000m^2$ of net floor area where catering is provided OR
    - up to an additional minimum of $10m^2$ $\geq 5000m^2$.

## Compliance notes

### New build
There are no additional or different requirements to those outlined above specific to new build projects.

### Refurbishment
There are no additional or different requirements to those outlined above specific to refurbishment projects.

### Extensions to existing buildings
If the building is part refurbishment part new-build extension, then the whole building must be assessed to determine compliance with the credit.

### Shell only
There are no additional or different requirements to those outlined above specific to shell-only projects.

### The credit is applicable to the following building types:

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additions for the application of this credit to offices.

**Retail**
There are no additions for the application of this credit to retail premises.

**Industrial buildings**
There are no additions for the application of this credit to industrial buildings.

**Schools**
There are no additions for the application of this credit to schools.

## Schedule of evidence

### Design stage

1. Marked-up building/site plan and/or copy of the specification confirming:
   - Description of the labelling.
   - The location of the dedicated recyclable storage area
   - Water supply

2. Marked-up building/site plan and/or copy of the specification confirming:
   - Storage area for general waste
   - The area ($m^2$) of the storage space(s)

### Post construction stage

1. Assessor's building/site inspection and photographic evidence confirming:
   - Labelling of the dedicated facilities.

2. Assessor's building/site inspection and photographic evidence confirming:
   - The location, size and capacity of the storage provision

## Definitions

**NVO**
Nettovloeroppervlak als bedoeld in NEN 2580.

## Additional information
Geen.

## Building decree

Article 4.60, paragraph 2: The walking distance between an entry of a warehouse under Article 4.59, and an access of the residential function should not preclude an effective use of the containers placed in storage.
Article 4.60, paragraph 3: The altitude of more than 0.02 m between the floor of a warehouse as referred to in Article 4.59, and the connecting area is covered by a ramp.
Article 4.61: A shared storage as provided in Article 4.59, is lockable and a door of that room from the outside only with a key to open.

**References**
None.

# WST 5 Compost

## Credit aim

To guarantee the realisation of organic waste composting facilities that either reduce the volume of waste to be transported, or encourage and make it suitable for use on site.

## Credit criteria

1 point can be awarded as follows:

| Points | |
|---|---|
| 1 | Where evidence provided demonstrates there is a vessel on site for composting food waste, and adequate storage for such waste generated by the building's users and operation.<br>OR<br>Where space or access is limited, there is a dedicated space for compostable food waste to be stored prior to removal and composting at an alternative site. |

## Compliance requirements

The following demonstrates compliance:

1. A vessel is installed on site for composting suitable food waste resulting from the building's daily operation and use.

2. There is adequate space for storing segregated food waste and composted organic material.
3. At least one water outlet is provided for cleaning in and around the facility.
   OR
4. Where there are space or access limitations on site, the following demonstrates compliance:
   a. There is a dedicated segregated space for storing compostable food waste prior to collection and delivery to an alternative composting facility.
   b. At least one water outlet is provided for cleaning in and around the facility.

## Additions to the compliance requirements

**New build**
There are no additional or different requirements to those outlined above specific to new build projects.

**Refurbishment**
There are no additional or different requirements to those outlined above specific to refurbishment projects.

**Extensions to existing buildings**
There are no additional or different requirements to those outlined above specific to the extension of existing projects.
If the facilities are located in the existing building, these facilities must be evaluated in the light of the aforementioned requirements.

**Shell only**
There are no additional or different requirements to those outlined above specific to shell-only projects.

**Storage Capacity**
No requirements are set on the type of vessel or storage capacity required as this will be determined by the end user and predicted volumes of organic compostable waste. The assessor should be satisfied that, within reason, the installation is adequate for the size of development, bearing in mind the likely quantity of organic waste that will be produced by the development.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| - | X | - | - |

## Schedule of evidence required

### Design stage

Marked-up design plan and/or a copy of the specification confirming (as appropriate):
- Specification of composting vessel
- Location and size of space for vessel and storage of waste/compost
- Water outlet.

### Post-construction stage

Assessor's building/site inspection and photographic evidence confirming:
- The installation of the vessel
- The provision of adequate storage space/facilities
- Installation of a water outlet

If appropriate, a letter from the occupier or service provider confirming:
- Location of the off-site facility where compostable material will be delivered.
- The procedure and frequency for collecting the compostable material.

## Definitions

None.

## Additional information

None.

## References
None.

# WST 6 Finishing elements

## Credit aim

To encourage the specification of finishing elements selected by the future building occupant and thereby avoid unnecessary waste of materials.

## Credit criteria

1 point can be awarded as follows:

| Points | |
|---|---|
| 1 | If the finishing elements of the building are specified by the future occupant, or – in tenanted areas of speculative buildings – where the finish and/or layout of the building are installed in a limited show area. |

## Compliance requirements

The following demonstrates compliance with the credit criteria:

1. For tenanted areas where the future occupant is not known, the finishing elements such as carpeting, wall finishes and kitchenettes have been installed in a show area only.
2. In a building developed for a specific occupant, that occupant has selected or agreed to the specified finishing elements.

## Compliance notes

**New build**
There are no additional or different requirements to those outlined above specific to new build projects.

**Refurbishment**
There are no additional or different requirements to those outlined above specific to refurbishment projects.

**Extensions to existing buildings**
There are no additional or different requirements to those outlined above specific to the extension of existing projects.

**Shell only**
There are no additional or different requirements to those outlined above specific to shell-only projects.

**Show area**
The show area could be either a floor plate or an individual office. However, to award this credit it must be less than 25% of the net lettable floor area.

**Handover without finishing elements**
If it can be demonstrated that the building is handed over without finishing elements the credit can be automatically allocated.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | - |

**Offices**
There are no additions for the application of this credit to offices.

**Retail**
There are no additions for the application of this credit to retail premises.

**Industrial buildings**
There are no additions for the application of this credit to industrial buildings.

## Schedule of evidence required

**Design stage**

1. & 2.: Specified design drawings and a copy of the specification which confirms the following:

- The materials used and total number or surfaces of the finishing elements.

If the future occupant is known, a letter is required from the client or the design team confirming:

- That the materials used and total number or surfaces of the finishing elements have either been given or approved by the future occupant.

**Post-construction stage**

1. & 2.: A report on a site inspection by the assessor and photographic evidence confirming that:

- The finishing elements are compliant with the given specifications or with the future occupant's wishes.

## Definitions

**Finish and layout**
Finish and layout are understood to mean:

- Carpeting or floor finishes;
- Kitchenettes, including worktops and kitchen cupboards;
- Reception desks;
- Wall finishes;
- Partitioning walls.

## Additional information

None.

**References**
None.

# 8. Landuse and Ecology

# LE 1 Re use of land

## Credit aim

To encourage project developers, municipalities, housing corporations and other constructing parties to realise building projects at locations with a low ecological and landscape value, and to encourage the reuse of previously developed land in order to prevent the unregulated proliferation of buildings in rural areas.

## Credit criteria

Up to five points can be earned because the choice of building location is a very important factor. Space is a scarce resource in the Netherlands and it is important to prevent what little space we have being completely built up. In principle, this credit encourages the development on reused land, or where this is not possible, on land that has low ecological or landscape value. If the project is developed on land of higher value then extra effort must made to ensure the minimal negative ecological impact by the development, see link with LE 3, LE 4 and LE 6.

Points can only be gained if the construction project falls outside the boundaries of the EHS (Main Ecological Structure) and/or a Natura 2000 zone and/or a national park.

For the purpose of points allocation, the category from the table below that is (most) applicable to the construction project is to be used.

| Category | | Point(s) |
|---|---|---|
| A | Inside the national landscape, land of low ecological value, on reused land and all points have been achieved for LE 3, LE 4 and LE 6. | 1 |
| B | Outside the national landscape, on reused land and all points have been achieved for LE 3, LE 4 and LE 6. | 1 |
| C | Inside the national landscape, within an urban area and all points have been achieved for LE 4. | 2 |
| D | Outside the national landscape, land of low ecological value and all points have been achieved for LE 4 and LE 6. | 2 |
| E | Inside the national landscape, withinan urban area, on reused land and all points have been achieved for LE 4. | 3 |
| F | Outside the national landscape, land of low ecological value, reused land and all points have been achieved for LE 4 and LE 6. | 3 |
| G | Outside the national landscape, within an urban area. | 4 |
| H | Outside the national landscape, within an urban area and on reused land | 5 |

## Compliance requirements

1. The design team must make a justified argument for which category the building site falls under. This can be done by means of a report on the natural value of the proposed building site. Inclusion of the following elements is mandatory:

- A map showing the area of the planned construction project, with all temporary buildings.
- A map indicating the protected natural areas (if any) in and around the plan area. For this purpose one can utilize Alterra's mapping engine showing protected natural areas. This can be found on the website of the Netherlands Ministry of Agriculture, Nature and Food Quality: http://www.synbiosys.alterra.nl/natura2000/googlemapszoek.aspx. The map must be composed in such a way that all areas of natural importance within a radius of at least 1 kilometre of the plan area are visible.
- A description of the current building and/or current function on the site, plus an explanation of what is to become of this building or function in consequence of the planned construction project.
- Photographs of the construction site.

The following elements are to be included if relevant:

- A municipal area development plan (available from the relevant municipality) showing that the building is within the urban area; recent amendments to the area development plan for the benefit of the construction project are not valid for the schedule of evidence to BREEAM-NL.
- A provincial plan (available from the relevant provincial administration), showing the status of the building location.

NB: The report on natural value is produced for LE 1, LE 3, LE 4 and LE 6.

## Compliance notes

**New build**
There are no additional conditions applicable to new build projects.

**Refurbishment**
The points can be allocated without further ado if the refurbishment does not involve the construction of any new buildings or infrastructure.

**Extensions to existing buildings**
For extensions to existing buildings, the percentages for gaining points are applicable to the planned new extension. The existing building cannot be included in the calculation of the area.

**Shell only**
There are no additional conditions applicable to shell-only projects.

**Indirect negative influence**
If an existing building or function is relocated outside the urban area in connection with the construction project. For example, a new building is planned on the site that is currently occupied by a garage. In order to make room for the new building, the garage is relocated to another site outside the present urban area. This is undesirable and has, in net terms, the same result as if the planned building had been built outside the urban area in the first place. If this is the case, the project needs to be classified as the building or land use that has to be relocated.

**Re used land**
At least 75% of the proposed development's footprint is on an area of land which has previously been *developed (*hard landscaping*)* for use by industrial, commercial or domestic purposes in the last 50 years.
The definition excludes:

a. Land that is or has been occupied by agricultural or forestry buildings.
b. Land that has been developed for minerals extraction or waste disposal by landfill purposes

where provision for restoration has been made through development control procedures.
c. Land in built-up areas such as parks, recreation grounds and allotments which, although may feature paths, pavilions and other buildings, have not been previously developed.
d. Land that was previously developed but where the remains of the permanent structure or fixed surface structure have blended into the landscape in the process of time (to the extent that it can reasonably be considered as part of the natural surroundings).

**Temporary buildings**
Buildings temporarily (during the construction period) located on or near the location count in the calculation of the construction project's footprint.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additions for the application of this credit to offices.

**Retail**
There are no additions for the application of this credit to retail premises.

**Industrial buildings**
There are no additions for the application of this credit to industrial buildings.

**Schools**
There are no additions for the application of this credit to schools.

## Schedule of evidence required
**Design stage**

1. A report with a description of the building location, justifying and proving the assignment to a specific category. The justification must satisfy the terms of the compliance requirements. The schedule of evidence must consist of information that is available to the public. No requirements are set with regard to the person drawing the report.

**Post-construction stage**

1. The assessor is to check whether the building has been constructed within the area specified during the design phase.

## Definitions

**Urban area**
Space that is designated as a built area in the old municipal area development plan (so before the start of the project). If an amendment to the area development plan is implemented for the benefit of the construction project, the old area development plan is consulted.

**Construction project**

See ‘Compliance notes’ and ‘Applicability to building types’ for the types of project and building function that are referred to under a building project,

**EHS**
The main ecological structure (Dutch: ‘ecologische hoofdstructuur’), a spatial network for the purpose of conserving and developing areas of natural importance. The Dutch national government has indicated where this network is to be realised and the provincial governments have the task of defining and implementing it.

**Client**
The initiator of the construction project and the person or organisation that wishes to be eligible for BREEAM-NL certification.

**National landscape**
These are areas with a unique combination of cultural, historical and natural elements that characterise the Dutch landscape.

**Land of low ecological value**
Not the hard landscaping as defined in reuse land, but including market gardening, commercial greenhouses, bulb growing, arable farming, livestock farming, low-growth orchards or land that has been developed for minerals extraction or waste disposal by landfill purposes where provision for restoration has been made through development control procedures.

**National park**
Areas (frequently within the EHS) that are regarded as the most valuable natural areas of the Netherlands.

**Natura 2000**
A European network of natural areas in which there is the space for the conservation of plant and animal species in Europe.

**Nature report**
A report, drawn up by an ecologist, in which all the relevant ecological information relating to a construction project is recorded (see Appendix 1 for an example of the content of such a nature report). This document is drawn up by a recognised ecologist and updated during the entire construction process, from the site selection to the management of green space. Appendix 1 shows what information should be included in such a nature report.

**Plan area**
The area in which the construction project is to be realised. Temporary buildings and zones that are temporarily used are included in the definition of the plan area.

## Additional information

New construction projects are very frequently realised in open, undeveloped landscapes because this cheaper and easier that redeveloping previously developed parcels of land. This works to the detriment of the green, open space, which is scarce in the Netherlands.

**Overview of criteria**

| category | points | outside national landscape | inside national landscape | within urban area | land of low value (mono-culture) | Land reused | require extra effort LE3 | require extra effort LE4 | require extra effort LE6 |
|---|---|---|---|---|---|---|---|---|---|

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| A | 1 | | v | | v | v | v | v | v |
| B | 1 | v | | | | v | v | v | v |
| C | 2 | | v | v | | | | v | |
| D | 2 | v | | | v | | | v | v |
| E | 3 | | v | v | | v | | v | |
| F | 3 | v | | | v | v | | v | v |
| G | 4 | v | | v | | | | | |
| H | 5 | v | | v | | v | | | |

## References

- Boundaries and descriptions of natural areas: http://www.minlnv.nl
- Spatial Planning Act – Area Development Plan
- National Package for Sustainable Urban Building (NPDS)
- Reference Framework for Sustainable Urban Development: http://www.npds.nl/stedenbouw/dsog/
- Local Noise and Environmental Quality (LOGO) area characterisation – http://www.logo-dcmr.nl/
- Habiforum – Knowledge Network for Sustainable Use of Space – http://www.habiforum.nl/

# LE 2 Contaminated land

## Credit aim

To encourage project developers, local authorities, housing associations and similar organizations to build on contaminated as opposed to uncontaminated land.

## Credit criteria

Two credits available as follows:

| Credits | |
|---|---|
| 1 | When the construction project is built at a site with seriously contaminated soil. |
| 2 | When the construction project is built at a site with seriously contaminated soil that also requires urgent remedial action. |

## Compliance requirements

**First credit:**

1. Soil inspection identifies the presence of serious contamination at the site to be developed (in accordance with Article 29 of the Dutch Soil Protection Act). The client/developer should provide an official decision as evidence of serious pollution on the site.
2. The client/developer is required to draw up a remediation plan or an action plan in order to build on the site. This action plan must be approved by the competent authorities, usually the county council.
3. The client/developer has the action plan carried out and is thereby legally authorized to develop the site.

**Second credit:**

1. In addition to the above three criteria the official decision should indicate that the contamination is not only serious, but also requires urgent remedial action (in accordance with Article 37 of the Dutch Soil Protection Act).

## Compliance notes

### New Build

There are no additional or different requirements to those outlined above specific to new build projects.

### Refurbishment

There are no additional or different requirements to those outlined above specific to refurbishment projects.

### Extensions to Existing Buildings

There are no additional or different requirements to those outlined above specific to the extension of existing projects.

### Shell Only

There are no additional or different requirements to those outlined above specific to shell-only projects.

**Health and Safety**
Contaminated soil that has undergone remediation with a view to health and safety rather than for the purpose of facilitating a construction project is not eligible for the LE 2 credit.

**Asbestos**
The removal of asbestos from existing buildings does not count as remediation for the LE 2 credit. Should asbestos be present in soil, the associated remediation is eligible for the LE 2 credit.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial Buildings | Schools |
|---|---|---|---|
| √ | √ | √ | √ |

*The designated function of a zone determines the norms for contaminated ground. A zone that is designated as residential must comply with more stringent legal norms than an industrial zone. This is incorporated in the inspection conducted by the competent authority.*

**Offices**
There are no additional or different requirements to those outlined above specific to offices.

**Retail**
There are no additional or different requirements to those outlined above specific to retail premises.

**Industrial Buildings**
There are additional or different requirements to those outlined above specific to industrial buildings.

**Schools**
There are no additional or different requirements to those outlined above specific to schools.

## Schedule of evidence required

**Design stage**
First credit:
1. - 3. The client/developer should provide reports or documents that include the following information:
- An official decision by a competent authority which demonstrates that the contamination may be described as ‘serious’.
- An action plan approved by the competent authority.

Second credit:
1. The client/developer should provide reports or documents that include the following information:
- An official decision by a competent authority which demonstrates that the contamination may be described as ‘urgent’.

**Post-construction stage**

**First credit:**

2. & 3. To be submitted:

- An evaluation report that demonstrates that the action plan has been carried out in line with the agreement.

## Relevant definitions

**Competent authority**

The institute that is authorized to make official decisions within the scope of contaminated soil and decontamination plans. The competent authority checks remediation plans and/or action plans relating to the treatment of contaminated soil. A plan may not be executed without the approval of the competent authority, and a construction project cannot be continued. In the case of serious contamination, the competent authority is usually the county council. In certain cases this authority is delegated, such as in the Rijnmond region, where the DCMR Environmental Protection Agency is the competent authority.

**Soil Inspection**

Soil inspection is often conducted in various stages, ranging from risk-oriented inspection to further and more specific inspection. For the demonstration of proof required by BREEAM-NL, a further inspection is relevant, in which the seriousness, urgency and location of the contamination are given.

**Serious contamination**

Contamination is serious if the volume ($m^3$) and concentration of the contamination prove to be above an established legal value or norm. The norm is established on the basis of the function of a site. The norms are higher for an industrial zone than for a school playground.

**Action plan**

A plan of execution to facilitate the development of contaminated land. Contamination may be removed or isolated.

**Urgency**

Contamination is urgent if it has a short-term negative impact on (1) ecology, (2) human health and/or (3) there is a risk of spreading.

## Additional information

None.

## References

- Besluit Bodemkwaliteit (Soil Quality Decree), 2008
- Richtlijn Bodemkwaliteitskaarten (Guidelines: Soil Quality Maps), 2008
- Convenant Bodemsanering Bdrijfsterreinen, (Environmental Agreement for the Decontamination of Industrial Sites), 2001

**Relevant legislation and regulations**

- Wet Bodembescherming (Dutch Soil Protection Act) http://wetten.overheid.nl/BWBR0003994/geldigheidsdatum_22-07-2009
- http://www.milieuennatuurcompendium.nl/indicatoren/nl0257-Bodemkwaliteit-en-bodemverontreiniging%3A-beleid.html?i=3-13
- http://www.vrom.nl/pagina.html?id=9735&term=bodem
- NEN 5740 Bodem – Onderzoeksstrategie bij verkennend onderzoek (Soil – Exploratory Survey Inspection Strategy)
- NEN 5707 Bodem – Inspectie, monsterneming en analyse van asbest in bodem (Soil – Inspection, Samplying and Analysis of Asbestos in Soil)
- NEN 5725 Bodem – Leidraad voor het uitvoeren van vooronderzoek bij verkennend, oriënterend en nader onderzoek (Soil – Guidelines for Conducting a Preliminary Survey During an Exploratory, Initial and Further Survey)
- BRL SIKB Beoordelingsrichtlijnen voor de kwaliteit van bodembeheer (Assessment Guidelines for Soil Quality Management)
- BRL SIKB 5000 Advisering bodemonderzoek (Soil Survey Advisory Report)
- BRL SIKB 6000 Milieukundige begeleiding van (water-)bodemsaneringen en nazorg (Environmental Guidance for Soil and Water Remediation and Aftercare)
- BRL SIKB 7000 Uitvoering van (water-)bodemsaneringen (Conducting Soil and Water Remediation)
- BRL 9335 Grond en stoffenpakket (Soil and Substance Package)

**Relevant links**

- Insight into measures for identifying soil quality (soil survey) or cleaning up soil (soil remediation): http://www.bodemloket.nl/

Map of soil contamination sites: http://www.milieuennatuurcompendium.nl/indicatoren/nl0258-Inventarisatie-van-aantal-locaties-met-bodemverontreiniging.html

# LE 3 Existing Wildlife at the Construction Site

## Credit aim

To encourage the taking of measures during construction for the protection and conservation of wildlife existing at the construction site.

## Credit criteria

1 point can be awarded as follows:

| Points | |
|---|---|
| 1 | When a recognised ecologist has drawn up a nature report before the start of the construction activities. In addition, a recognised ecologist is to oversee (specific) construction activities to ensure that existing flora and fauna are taken into account during construction. |

## Compliance requirements

One point can be gained if all the following requirements are met:

1. Before the start of the construction activities/site preparations, a recognised ecologist draws up a nature report describing the construction location on the basis of desk research and field research, including, if necessary, the formation of an inventory on site. This means that:
    - The plant and animal species present are listed.
    - The location's potential for plant and animal species is assessed, relating this potential to the surroundings (regional position) of the construction site. In concrete terms, this means for example that a construction site close to dunes can potentially be of value to the flora and fauna of dune systems.
    - Forming part of the nature report is an ecological work protocol, indicating how the contractor can realise the project with little or no damage to the flora and fauna. NOTE: The objective here is to realise the construction project, but with minimal disruption of the flora and fauna.
    - The contractor needs inform and train the construction workforce in how to implement the ecological work protocol.
    - The legal obligations of the Flora and Fauna Act, the Nature Conservancy Act, the Forestry Act and the Provincial Compensation Principle must be complied with. This is to be confirmed by the recognised ecologist.
    - All EU regulations relating to the protection and improvement of ecology must be complied with and continue to be complied with during the design and construction process.
2. A recognised ecologist has established during the construction process that work is carried out in accordance with the work protocol and (the specific conditions of) any exemption that has been issued, and makes a declaration to this effect on completion of the work.

NB: The nature report is produced for LE 1, LE 3, LE 4 and LE 6.

## Compliance notes

**New build**
There are no additional or different requirements to those outlined above specific to new build projects.

**Refurbishment**
There are no additional or different requirements to those outlined above specific to refurbishment projects.

**Extensions to existing buildings**
There are no additional or different requirements to those outlined above specific to the extension of existing projects.

**Shell only**
There are no additional or different requirements to those outlined above specific to shell-only projects.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additions for the application of this credit to offices.

**Retail**
No additions for the application of this credit to retail premises.

**Industrial buildings**
No additions for the application of this credit to industrial buildings.

**Schools**
No additions for the application of this credit to schools.

## Schedule of evidence required

### Design stage

1.: A copy of a completed report (nature report) containing:

- A description of the site's ecology and ecological potential.
- An overview of the possible effects of the construction work on the local ecology.
- A work protocol containing instructions for the contractor to mitigate/avoid possible negative effects.

### Post-construction stage

2.: A report from a recognised ecologist showing that:

- The work has been carried out in line with the work protocol (this may form a section of the aforementioned nature report);
- The relevant Dutch legislation relating to nature and ecology has been complied with;

## Definitions

### Ecological work protocol

A document that provides instructions to the contractor to protect flora and fauna during the implementation of the construction project and to properly perform any measures for the benefit of ecology (see LE 4). An ecological work protocol offers very concrete measures for this purpose. If available, an ecological work protocol is based on a 'code of conduct' recognised by the Ministry of Agriculture, Nature and Food Quality. The aim of an ecological work protocol is to fulfil the duty of care and obligations arising from the Nature Conservancy Act and to protect more strictly protected species (Article 2 of the Flora and Fauna Act and 'red list' species) and other rare species.

**Recognised ecologist**
BREEAM-NL bases its definition of a recognised ecologist on that used by the Regulations Department (the department of the Ministry of Agriculture, Nature and Food Quality that issues licences and exemptions relating to the Flora and Fauna Act). A recognised ecologist is a person who:

1. is educated to higher vocational or university level with an emphasis on (Dutch) ecology *AND/OR*
2. is employed as an ecologist by an ecological consultancy affiliated to the Groene Bureaus (Green Consultancies) network *AND/OR*
3. is demonstrably active in the field of species protection and is affiliated to the relevant Dutch organisations (such as Das en Boom, VZZ, RAVON, Vogelbescherming Nederland, Vlinderstichting, Natuurhistorisch genootschap, KNNV, NJN, IVN, EIS Nederland, FLORON, VOFF, SOVON etc.).

**Code of Conduct**
A document in which a contractor commits itself to fulfil, in the performance of certain activities, the duty of care and the duty to protect the more strictly protected species mentioned in the Flora and Fauna Act. This code of conduct must be approved by the Ministry of Agriculture, Nature and Food Quality. A code of conduct may be drawn up jointly by parties that perform the same types of activities. The organisation 'Bouwend Nederland' is drawing up a code of conduct of this type at the time of writing this document.

**Nature report**
A report, drawn up by an ecologist, in which all the relevant ecological information relating to the construction project is recorded (see Appendix 1 for an example of the content of such a nature report). This document is drawn up by a recognised ecologist and updated during the entire construction process, from the site selection to the management of green space. Appendix 1 shows what information should be included in such a nature report.

## Additional information

### Relevant legislation and regulations

- Flora and Fauna Act (protection of native plant and animal species).
- Nature Conservancy Act (protection of area with special value for the wildlife of the Netherlands); see http://www.minlnv.nl)
- The Spatial Planning Act obliges municipalities to draw up an area development plan. The boundaries of natural areas are also defined in the area development plan. Within the framework of the principle of care, there is a duty to investigate, when deciding on an (amendment to an) area development plan, whether there is no other legislation that conflicts with this decision. This means that a study of flora and fauna will have to be carried out in order to check that no articles of the nature protection legislation are breached.

## References

- Ministry of Agriculture, Nature and Food Quality for information on Dutch legislation relating to nature. http://www.minlnv.nl
- The Flora and Fauna Act (2002): protection and conservation of native plant and animal species.
- The Nature Conservancy Act (1998, in force from 2005) with the aim of protecting and conserving natural areas.

*Relevant links:*

- On the website http://www.natuurloket.nl/ you can get an insight into the distribution of protected species and information on the legal stipulations relating to these animals and plants.

- Netwerk Groene Bureaus: to find a recognised ecologist. http://www.netwerkgroenebureaus.nl/

# LE 4 Plants and Animals as Co-users of the Plan Area

## Credit aim

To encourage the taking of measures to ensure the sustainable co-use of the planned building and the open space by native plant and animal species.

## Credit criteria

2 points can be awarded as follows:

| Points | |
|---|---|
| 1 | If measures are implemented to ensure that species mentioned in Table 1, 2 and/or 3 (of the Administrative Order) of the Flora and Fauna Act and/or the Red List can sustainably make use of the building or the open space around the building. |
| 1 | If, in addition to the above measures, further measures are taken that can be significant for rare or unusual wildlife (values) at regional level. For example, the creation of an ecological connection zone or contributing to the objectives for neighbouring Natura 2000 or EHS areas. |

## Compliance requirements

**First point:**

1. The nature report should also include a paragraph containing recommendations for the encouragement of sustainable co-use by plant and animal species. This is accomplished by creating the suitable conditions or a suitable habitat for plant and animal species.
2. A recognised ecologist is to confirm (in the nature report), on completion of the construction project, that measures have been implemented to ensure that species mentioned in Table 1, 2 and/or 3 (of the Administrative Order) of the Flora and Fauna Act and/or the Red List can sustainably make use of the building or the open space around the building. Because this involves a prediction of future sustainable use, arguments should be presented to say why the measures are expected to meet with success. On the basis of his expert judgement, the ecologist will assess whether enough has been done and relate this to the ecological potential of the location. NOTE: This means that the ecologist in question will have to estimate whether a point has been earned, based on the efforts made by the principal/developer. These efforts should be viewed in relation to, among other things, the site's ecological potential (as given in the nature report for LE 3). This option is selected because it is difficult to set hard, quantitative requirements in ecological matters.

**Second point:**

1. The first point for LE 4 has been earned.
2. If measures are taken that can be significant for rare or unusual wildlife (values) at regional level. For example, the creation of an ecological connection zone or contributing to the objectives for neighbouring Natura 2000 or EHS areas. Specially tailored efforts at local level are required to gain this credit and the estimate must be made by an independent, recognised ecologist.
3. On completion of the construction project, the recognised ecologist will use his expert judgement to assess whether sufficient measures have been taken, relating these to the site's ecological potential, and make a declaration to this effect (in the nature report).

NB: The report on natural value is produced for LE 1, LE 3, LE 4 and LE 6.

## Compliance notes

**New build**
There are no additional or different requirements to those outlined above specific to new build projects.

**Refurbishment**
There are no additional or different requirements to those outlined above specific to refurbishment projects.

**Extensions to existing buildings**
There are no additional or different requirements to those outlined above specific to the extension of existing projects.

**Shell only**
There are no additional or different requirements to those outlined above specific to shell-only projects.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additions for the application of this credit to offices.

**Retail**
There are no additions for the application of this credit to retail premises.

**Industrial buildings**
There are no additions for the application of this credit to industrial buildings.

**Schools**
There are no additions for the application of this credit to schools.

## Schedule of evidence required

**Design stage**

First and second points:

1. & 2.: A copy of the completed nature report, containing:

- A description of the site's ecology and ecological potential.
- Recommendations for the creation of added ecological value.

- A letter from the project developer indicating which of the ecologist's recommendations have been adopted and implemented.

**Post-construction stage**

First and second points:

3.: A declaration in which:

- a recognised ecologist estimates, on completion of the construction project, the degree to which plant and animal species can make sustainable use of the location. On the basis of this, a decision is made as to how many points can be awarded for LE 4. This estimate is viewed in relation to the location's ecological potential.

## Definitions

**Recognised ecologist**
BREEAM-NL bases its definition of a recognised ecologist on that used by the Regulations Department (the department of the Ministry of Agriculture, Nature and Food Quality that issues licences and exemptions relating to the Flora and Fauna Act). A recognised ecologist is a person who:

1. is educated to higher vocational or university level with an emphasis on (Dutch) ecology *AND/OR*
2. is employed as an ecologist by an ecological consultancy affiliated to the Groene Bureaus (Green Consultancies) network AND/OR
3. is demonstrably active in the field of species protection and is affiliated to the relevant Dutch organisations (such as Das en Boom, VZZ, RAVON, Vogelbescherming Nederland, Vlinderstichting, Natuurhistorisch genootschap, KNNV, NJN, IVN, EIS Nederland, FLORON, VOFF, SOVON etc.).

**Habitat**
The biotic and abiotic requirements that an organism has with respect to an environment.

**Nature report**
A report, drawn up by an ecologist, in which all the relevant ecological information relating to a construction project is recorded (see Appendix 1 for an example of the content of such a nature report). This document is drawn up by a recognised ecologist and updated during the entire construction process, from the site selection to the management of green space. Appendix 1 shows what information should be included in such a nature report.

## Additional information

The suggested methodology for the awarding or withholding of points is not watertight because the estimation of an individual (which may be subjective) is a decisive factor. Nevertheless, there are reasons for awarding the points in this way:

- One relies on the professional and independent judgement of a professional. This is also done when ecological arguments are made in legal issues.
- The alternative, whereby the absolute measurability of an ecological value is assumed, is neither desirable nor realistic.
- There is room for creativity and reasoned argument
- It is assumed that the principal/developer adopts a positive approach.
- The required effort is measurable (in the form of a nature report) and is in itself highly valuable.

## References

- Red Lists (Flora and Fauna) Decree, 5 November 2004, http://www.minlnv.nl/cdlpub/servlet/CDLServlet?p_file_id=16165
- Red Lists, Environment and Nature Compendium, http://www.milieuennatuurcompendium.nl/indicatoren/nl1333-Rode-lijsten.html?i=2-8

- Netwerk Groene Bureaus (NGB), http://www.natuurnet.nl/ngb/
- Nederlands-Vlaamse Vereniging voor Ecologie (*Dutch-Flemish Ecology Association*), http://www.necov.org/
- Nationaal Pakket Duurzaam Bouwen *(National Package for Sustainable Urban Building)* B392/S392/U392

**Relevant legislation and regulations:**
Directive 97/11/EC, Directive 2001/42/EC, the Environmental Management Act and the Directive on Strategic Environmental Assessment. The Birds Directive and the Habitats Directive, issued by the European Union, indicate which species and habitats must be protected by the member states. In the Netherlands, the Birds Directive and the Habitats Directive are embodied in the Nature Conservancy Act and the Flora and Fauna Act. The Nature Conservancy Act aims at habitat protection, while the Flora and Fauna Act relates to aspects of protecting wildlife species in the Netherlands.

# LE 6 Long-term Sustainable Co-use by Plants and Animals

## Credit aim

To encourage the management, maintenance and monitoring of the building and the surrounding space in a manner sympathetic to wildlife, in order to guarantee sustainable co-use by the plants and animals referred to in LE 3 and LE 4.

## Credit criteria

1 point can be awarded as follows:

| Points | |
|---|---|
| 1 | If the principal/developer further encourages co-use by the plants and animals referred to in LE 3 and LE 4 by implementing sound long term management. |

## Compliance requirements

One point can be gained if the following requirements are met:

1. The principal/developer must present the future user(s) of the building with a 6-year plan, written (or approved) by a recognised ecologist, for the management of the building and the surrounding space. This management plan must:
    - be realistic and feasible
    - be created in a pre-construction stage and cover construction and operational activities.
    - make it clear who is responsible for which management aspects (lessee, user, buyer, third party) and Ecology Champion has to be appointed.
    - incorporate a monitoring and evaluation plan so that the effectiveness of the management plan and the physical infrastructure can be evaluated.

If the ecological management is carried out by a third party, this must be approved by a recognised ecologist.
NB: the management plan can form a section of the nature report; see also LE 1, LE 3 and LE 4.

## Compliance notes

**New build**
There are no additional or different requirements to those outlined above specific to new build projects.

**Refurbishment**
There are no additional or different requirements to those outlined above specific to refurbishment projects.

**Extensions to existing buildings**
There are no additional or different requirements to those outlined above specific to the extension of existing projects.

**Shell only**
There are no additional or different requirements to those outlined above specific to shell-only projects.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additions for the application of this credit to offices.

**Retail**
There are no additions for the application of this credit to retail premises.

**Industrial buildings**
There are no additions for the application of this credit to industrial buildings.

**Schools**
There are no additions for the application of this credit to schools.

## Schedule of evidence required

### Design stage

1. & 2.: An outline draft management plan corresponding to the measures implemented in order to gain points in LE 4 (can form a section of the nature report).

### Post-construction stage

1. & 2.: The principal/developer is to supply a copy of the management plan that fulfils the compliance requirements.

## Definitions

**Recognised ecologist**
BREEAM-NL bases its definition of a recognised ecologist on that used by the Regulations Department (the department of the Ministry of Agriculture, Nature and Food Quality that issues licences and exemptions relating to the Flora and Fauna Act). A recognised ecologist is a person who:

1. is educated to higher vocational or university level with an emphasis on (Dutch) ecology *AND/OR*
2. is employed as an ecologist by an ecological consultancy affiliated to the Groene Bureaus (Green Consultancies) network *AND/OR*
3. is demonstrably active in the field of species protection and is affiliated to the relevant Dutch organisations (such as Das en Boom, VZZ, RAVON, Vogelbescherming Nederland, Vlinderstichting, Natuurhistorisch genootschap, KNNV, NJN, IVN, EIS Nederland, FLORON, VOFF, SOVON etc.).

**Nature report**
A report, drawn up by an ecologist, in which all the relevant ecological information relating to the construction project is recorded (see Appendix 1 for an example of the content of such a nature report). This document is drawn up by a recognised ecologist and updated during the entire construction process, from the site

selection to the management of green space. Appendix 1 shows what information should be included in such a nature report.

**Additional information**

Because the certificate is supplied on handover, it is impossible to check whether the management will actually be carried out. The points are therefore awarded if the principal/developer hands over a sound management plan to the users of the building. This means that the management must be taken into consideration even in the design stage.

**References**

- Area-oriented Biodiversity Action Plans (BAP)
- http://www.vrom.nl/pagina.html?id=21109

# LE 8 Local wildlife partnerships

## Credit aim

To encourage the client/developer to form a partnership with a local organization or person with knowledge of the local ecosystem and local plants and wildlife. The purpose is to benefit from this local knowledge and long-term support. Ideally, the individual should be a certified ecologist (not compulsory) who can contribute to the site ecology report and in doing so support the ecological buildng process from design to completion.

## Credit criteria

One credit available as follows:

| Points | |
|---|---|
| 1 | Where evidence is supplied that the design team has established a long-term partnership with a local organization or person with knowledge of nature and wildlife for the purpose of drawing on knowledge of the local ecosystem to manage the building and surrounding site. This partnership should be established before the design has been finalized and the partner should confirm the partnership. |

## Compliance requirements

The following demonstrates compliance:

**First credit:**

1. A minimum of 1 credit must have been achieved for MAN 6 in order to be eligible for this credit.
2. In addition, the client/developer should demonstrate that a partnership has been formed with a local organization with knowledge of ecology and nature. The partnership is of long-term nature during the management stage, but should have been established before the design is finalized so that local knowledge can still be used to optimize the design where possible.

## Compliance notes

### New Build

There are no additional or different requirements to those outlined above specific to new build projects.

### Refurbishment

There are no additional or different requirements to those outlined above specific to refurbishment projects.

### Extensions to existing buildings

There are no additional or different requirements to those outlined above specific to the extension of existing projects.

### Shell Only

There are no additional or different requirements to those outlined above specific to shell-only projects.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|

**Schools**
There are no additional or different requirements to those outlined above specific to schools.

## Schedule of evidence required

**Design stage**
1. No additional evidence is required other than that provided for MAN6.
2.A copy of a contract of agreement in which:
- the partnership is made official and the qualifications of the partner are stated.

**Post-construction stage**
1. No additional evidence is required other than that provided for MAN6.
2. A formal letter from the partner confirming:
- That the partner has been involved in the development of the construction project.

## Relevant definitions
None.

## Additional information
In this credit it is important that clear agreements are made in the contract and that expectations are voiced. The partnership serves as an aid to achieving support, facilitating control and monitoring, and contributing ideas to the environmentally friendly design of the building and its surroundings. When seeking out a suitable partner the councils involved should first be approached. Some councils employ a local government ecologist with extensive local knowledge and a relevant network.

## References
Netwerk Groene Bureaus (Green Agency Network): to find a certified ecologist.
http://www.netwerkgroenebureaus.nl/

# 9. Pollution

# POL 1 Refrigerant GWP - Building services

## Credit aim
To reduce the contribution to climate change from refrigerants with a high global warming potential.

## Credit criteria
1 Credit can be awarded according to:

| Credits | |
|---|---|
| 1 | Where evidence provided demonstrates the use of refrigerants with a global warming potential (GWP) of less than 5 or where there are no refrigerants specified for use in building services. AND the thermal comfort has been considered in the design |

## Compliance requirements
The following demonstrates compliance:

1. The building has no refrigerants and thermal comfort has been considered in the design. The exact requirements of HEA10 do not have to been met **OR**

2. The refrigerants used within the building services have a GWP less than 5.

## Compliance notes

### New Build
There are no additional or different requirements to those outlined above specific to new build projects.

### Refurbishment
There are no additional or different requirements to those outlined above specific to refurbishment projects.

### Extensions to existing buildings
If the extended and existing building share the same building services, then these services must be assessed against the requirements regardless of whether the existing building forms a part of the assessment or not. If the extension is served by independent services, only these need be assessed against the compliance requirements.

### Shell Only
If the building is designed to be fully naturally ventilated, and therefore no refrigerant using building services will be specified for the fit out, then this credit can be awarded. If the building is not designed to be naturally ventilated and the refrigerant type cannot be confirmed by the design team, this credit must be withheld.

### Solid refrigerant
The credit can be awarded by default where a solid refrigerant is used.

### Refrigerant charge less than 3kg
The credit can be awarded where the total refrigerant charge used in the building services is less than 3kg.

**Multiple split units**
In the case of multiple split units, through-the-wall or other packaged units, the credit can be awarded where the **total** collective refrigerant charge is less than 3kg. If the **total** collective refrigerant charge in such systems is greater than 3kg, then the refrigerant(s) must comply with the BREEAM-NL requirements.

**Heat pump systems**
This credit is also applicable to heat pump systems.

**Office server and comms rooms**
Refrigerants used in services for typical office server and comms rooms cannot be excluded from the assessment.

Where air conditioning equipment is provided, the equipment may not be able to achieve this credit as smaller systems often require refrigerants with a GWP > 5. In this instance the credit cannot be awarded by default as there are alternatives for designers to consider. These alternatives include revisiting the design and the room conditions specification to see if the cooling equipment is necessary. In addition, whilst a manufacturer or supplier may specify a narrow temperature band for server equipment, acceptable limits may allow a greater temperature range without adverse effect and thus the cooling equipment may not be necessary.

**GWP data not available**
Where GWP data for the specified refrigerant is not available, the credit cannot be awarded on a default basis.

**This credit is applicable to the following building types:**

| Offices | Retail | Industrial | Education |
|---|---|---|---|
| √ | √ | √ | √ |

**Offices**
There are no additional or different requirements to those outlined above specific to office projects.
**Retail**
There are no additional or different requirements to those outlined above specific to retail projects.
**Industrial**
There are no additional or different requirements to those outlined above specific to industrial projects.
**Education**
There are no additional or different requirements to those outlined above specific to education projects.

## Schedule of evidence required

**Design Stage**
A copy of the specification clause confirming either:
- Absence of refrigerant in the development.
- A letter from the architect or consultant that thermal comfort has been considered in the design OR the requirements for HEA10 have been met.

OR

A copy of the specification clause confirming either:
- Type(s) of refrigerant to be used.
- The total amount of refrigerants used.
- Manufacturer's information confirming the GWP of each refrigerant.

**Post Construction Stage**

Assessor's building/site inspection and as built drawings confirming:
1. Presence or absence of any refrigeration plant.

- A letter from the architect or consultant that thermal comfort has been considered in the design OR the requirements for HEA10 have been met.

OR
- A letter from the design team/developer confirming that the refrigerant type(s) specified remained unchanged.

OR
Where a change has occurred, written confirmation from the design team confirming:
- A written confirmation of the design team with the used type(s) of refrigerant
- A written statement by the installer which shows the type of refrigerant used and and what quantities are applied.
- Manufacturer's information confirming the GWP of each refrigerant used.

## Definitions

**GWP-100**
GWP (Global Warming Potential) is defined as the potential for global warming that a chemical has relative to 1 unit of carbon dioxide, the primary greenhouse gas. In determining the GWP of the blowing agent, the Intergovernmental Panel on Climate Change (IPCC) methodology using a 100-year Integrated Time Horizon (or ITH) should be applied. The addition -100 is the viewing period (the contribution of the refrigerant over 100 years).

**ODP**
ODP (Ozone Depleting Potential) is the ratio of the relative amount of degradation to the ozone layer caused by a particular substance relative to the calculated depletion for the reference gas CFC 11 (ODP = 1.0). The ODP of the refrigerants is not assessed under this credit and there is no link between GWP and ODP.

## Additional information
**Table of refrigerants and their Global Warming Potentials**
The table below is copied from BREEAM Europe: Offices 2008

| Koudemiddel | GWP | Koudemiddel | GWP |
|---|---|---|---|
| R11 (CFC-11) * | 4000 | R32 (HCFC-32) * | 580 |
| R12 (CFC-12) * | 8500 | R407C (HFC-407) | 1600 |
| R113 (CFC-113) * | 5000 | R152a (HFC-152a) | 140 |

| | | | |
|---|---|---|---|
| R114 (CFC-114) * | 9300 | R404A (HFC blend) | 3800 |
| R115 (CFC-115)* | 9300 | R410A (HFC blend) | 1900 |
| R125 (HFC-125) | 3200 | R413A (HFC blend) | 1770 |
| Halon-1211 | N/A | R417A (HFC blend) | 1950 |
| Halon-1301 | 5600 | R500 (CFC/HFC) * | 6300 |
| Halon-2402 | N/A | R502 (HCFC/CFC) * | 5600 |
| Ammonia | 0 | R507 (HFC azeotrope) | 3800 |
| R22 (HCFC-22) * | 1700 | R290 (HC290 propane) | 3 |
| R123 (HCFC-123) * | 93 | R600 (HC600 butane) | 3 |
| R134a(HFC-134a) | 1300 | R600a (HC600a isobutane) | 3 |
| R124 (HCFC-124) * | 480 | R290/R170(HC290/HC170) | 3 |
| R141b (HCFC-141b) * | 630 | R1270 (HC1270 propene) | 3 |
| R142b (HCFC-142b) * | 2000 | R143a (HFC-143a) | 4400 |

N/A Indicates that there is insufficient data available to give a GWP value.

Global warming potential (GWP) values are based on best available data at the time of writing and are based on a 100-year time horizon. Other published data may be based on different time horizons.

**References**
None.

# POL 2 Preventing refrigerant leaks

## Credit aim
To reduce the emissions of refrigerants to the atmosphere arising from leakages in cooling plant.

## Credit criteria
2 Credits can be awarded according to:

| Credits | |
|---|---|
| 1 | Where evidence provided demonstrates that refrigerant leaks can be detected<br>OR<br>Where there are no refrigerants specified for the development. |
| 1 | Where evidence provided demonstrates that the provision of automatic refrigerant pump down is made to a heat exchanger (or dedicated storage tanks) with isolation valves.<br>OR<br>Where there are no refrigerants specified for the development. |

## Compliance requirements
The following demonstrates compliance:

First credit:

1. The building has no refrigerants.

**OR**

2. Systems using refrigerants are contained in a moderately air tight enclosure (or a mechanically ventilated plant room), and a refrigerant leak detection system is installed covering high-risk parts of the plant.

***OR***

3. An automatic permanent refrigerant leak detection system is specified, which is NOT based on the principle of detecting or measuring the concentration of refrigerant in air.

Second credit:

4. The first credit must be achieved in order to award the second credit.
5. The automatic shutdown and pump down of refrigerant occurs on the detection of high concentrations of refrigerant in the plant room/enclosure. For the majority of cases only systems in mechanically ventilated/moderately air tight plant rooms (or enclosures) comply.
6. Automatic pump-down to either a separate storage tank or into the heat exchanger is acceptable but only where automatic isolation valves are fitted to contain the refrigerant once fully pumped down.
7. The alarm threshold that triggers automatic pump down is set to a maximum of 2000ppm (0.2%), but lower levels can be set. The credit cannot be awarded for manual systems.

## Compliance notes

**New Build**
There are no additional or different requirements to those outlined above specific to new build projects.

**Refurbishment**
There are no additional or different requirements to those outlined above specific to refurbishment projects.

**Extensions to existing buildings**
Where an existing building is being extended and it has existing building services plant and systems that will be common to both the new extension and existing building, the existing plant must be assessed against the requirements of this credit. If the extension is served by independent services, only these need be assessed against the compliance requirements.

**Shell Only**
There are no additional or different requirements to those outlined above specific to shell only projects.

**Solid refrigerant**
The credit can be awarded by default where a solid refrigerant is used.

**$CO_2$ as a refrigerant** When $CO_2$ is used as a refrigerant, the refrigerant recovery system credit can be awarded by default.

**$H_2O$ as a refrigerant**
When $H_2O$ is used as a refrigerant, the refrigerant recovery system credit can be awarded by default.

**The total amount of refrigerant is less than 3 kg.**
The credit can be awarded by default if the total amount of refrigerant is less than 3 kg.

**Multiple split systems**
For installations of small multiple hermetic systems only, where the refrigerant charge in each unit is less than 5kg but the total refrigerant charge in the building is greater than 3 kg, the credit can be awarded by default. This is on the basis that the risk of a large refrigerant leak is minimised and individual leaks from each system will be small (< 3 kg).

**Heat pump systems**
This credit is also applicable to heat pump systems.

**High-risk parts**
High-risk parts of refrigeration plant typically include the pipe work and compressor. Evaporator or condenser coils can be omitted from the coverage of the system.

**Manual refrigerant recovery system**
The provision of any manual system, including manual storage cylinders on site, does not comply with the requirements of this credit.

**This credit is applicable to the following building types:**

| Offices | Retail | Industrial | Education |
|---|---|---|---|
| √ | √ | √ | √ |

**Offices**
There are no additional or different requirements to those outlined above specific to office projects.

**Retail**
There are no additional or different requirements to those outlined above specific to retail projects.

**Industrial**
There are no additional or different requirements to those outlined above specific to industrial projects.

**Education**
There are no additional or different requirements to those outlined above specific to education projects.

## Schedule of evidence required

**Design Stage**

First credit:
*1.*A copy of the specification clause or design plan confirming:

2. Absence of refrigerants in the development.

*OR*

2. & 3. A copy of the specification clause or letter from the M&E engineer confirming:

3. Type of leak detection system(s).
4. Scope of the system(s)
5. Where relevant, containment strategy for such equipment.

Second credit:

5. t/m 7. A copy of the specification clause or letter from the M&E engineer confirming:

6. Type, scope and operation of automatic refrigerant recovery equipment
7. Details of the plant room enclosure where the refrigeration plant is installed

Alarm threshold for triggering automatic pump down.

**Post Construction Stage**
First credit:

*1.* Assessor's building/site inspection and photographic evidence confirming:

- Absence of refrigeration plant.

*2. & 3.* Assessor's building/site inspection and photographic evidence confirming:

- Presence of refrigeration plant.

Second credit:

*1. t/m 4.* Assessor's building/site inspection and photographic evidence confirming:

- Installation of automatic refrigerant recovery equipment
- Pre-set threshold level for automatic pump down.

## Additional information

**Moderately airtight enclosure:**
this can be defined as an enclosure that does not produce a draught or significant fresh air ingress that would dilute any leaked refrigerant gas (dilution may prevent detection).

## Additional information

None.

## References:

None.

# POL 3 Refrigerant GWP - Cold storage

## Credit aim
To reduce the contribution to climate change from refrigerants with a high global warming potential.

## Credit criteria
1 Credit can be awarded as follows:

| Credit | |
|---|---|
| 1 | Where evidence provided demonstrates the use of refrigerants within cold storage systems with a global warming potential (GWP) of less than 5. |

## Compliance requirements
The following demonstrates compliance:

1. All refrigerant types used in cold storage systems have a global warming potential (GWP) of less than 5.

2. The requirement applies to refrigerants used in systems integral to the building, including where specified:
    - Cold storage enclosures.
    - Cold store services including: Chilled water pipework, refrigerant pipework and ductwork etc
    - Fixed cold or chilled storage cabinets
    - Fixed cold drink coolers and candy machines.

## Compliance notes

### New Build
There are no additional or different requirements to those outlined above specific to new build projects.

### Refurbishment
There are no additional or different requirements to those outlined above specific to refurbishment projects.
.

### Extensions to existing buildings
For expansion of existing projects, no additional or different requirements are needed in relation to the above mentioned requirements.
If the facilities are located in the building, they must be assessed based on the above mentioned requirements.

### Shell Only
It is assumed that systems of the building, be installed as part of the (Shell Only) building. If this is not the case, the credit cannot be granted if the GWP of the refrigerants can not be demonstrated.

### Household refrigerators and small plug-in coolers
The use of household refrigerators and small plug-in coolers can be ignored.

**This credit is applicable to the following building types:**

| Offices | Retail | Industrial | Education |
|---|---|---|---|
| √ | √ | √ | √ |

**Offices**
There are no additional or different requirements to those outlined above specific to office projects.

**Retail**
There are no additional or different requirements to those outlined above specific to retail projects.

**Industrial**
There are no additional or different requirements to those outlined above specific to industrial projects.

**Education**
There are no additional or different requirements to those outlined above specific to education projects.

## Schedule of evidence required

**Design Stage**
1. & 2.

- A marked-up design plan highlighting the cold food storage areas/plant in the building.
- A copy of the specification clause confirming the type(s) of refrigerant to be used.
- Manufacturer's information confirming the GWP of each refrigerant

**Post Construction Stage**
1. & 2.

- A letter from the design team/developer confirming that the refrigerant type specified remained unchanged.

**OR**

- When a change occurred:
  - A written confirmation from the design team confirming the type of refrigerant(s) used.
  - A letter from the installer which shows what refrigerants are used.
  - Manufacturer's information confirming the GWP of each refrigerant.

## Definitions

**GWP-100**
GWP (Global Warming Potential) is defined as the potential for global warming that a chemical has relative to 1 unit of carbon dioxide, the primary greenhouse gas. In determining the GWP of the blowing agent, the Intergovernmental Panel on Climate Change (IPCC) methodology using a 100-year Integrated Time Horizon (or ITH) should be applied. The addition -100 is the viewing period (the contribution of the refrigerant over 100 years).

## Additional Information

**Table of refrigerants and their Global Warming Potentials**
The table below is copied from BREEAM Europe: Offices 2008

| Koudemiddel | GWP | Koudemiddel | GWP |
|---|---|---|---|
| R11 (CFC-11) * | 4000 | R32 (HCFC-32) * | 580 |
| R12 (CFC-12) * | 8500 | R407C (HFC-407) | 1600 |
| R113 (CFC-113) * | 5000 | R152a (HFC-152a) | 140 |
| R114 (CFC-114) * | 9300 | R404A (HFC blend) | 3800 |
| R115 (CFC-115)* | 9300 | R410A (HFC blend) | 1900 |
| R125 (HFC-125) | 3200 | R413A (HFC blend) | 1770 |
| Halon-1211 | N/A | R417A (HFC blend) | 1950 |
| Halon-1301 | 5600 | R500 (CFC/HFC) * | 6300 |
| Halon-2402 | N/A | R502 (HCFC/CFC) * | 5600 |
| Ammonia | 0 | R507 (HFC azeotrope) | 3800 |
| R22 (HCFC-22) * | 1700 | R290 (HC290 propane) | 3 |
| R123 (HCFC-123) * | 93 | R600 (HC600 butane) | 3 |
| R134a(HFC-134a) | 1300 | R600a (HC600a isobutane) | 3 |
| R124 (HCFC-124) * | 480 | R290/R170(HC290/HC170) | 3 |
| R141b (HCFC-141b) * | 630 | R1270 (HC1270 propene) | 3 |
| R142b (HCFC-142b) * | 2000 | R143a (HFC-143a) | 4400 |

N/A Indicates that there is insufficient data available to give a GWP value.

Global warming potential (GWP) values are based on best available data at the time of writing and are based on a 100-year time horizon. Other published data may be based on different time horizons.

**References**
None.

# POL 4 NOx Emissions from Heating Sources

## Credit aim

To encourage the use of heating systems that minimise NOx emissions, and therefore reduce local air pollution.

## Credit criteria

Up to 3 points can be awarded as follows:

| Points | |
|---|---|
| 1 | The maximum dry NOx emission from delivered space heating energy is ≤ 70 mg/kWh. |
| 2 | The maximum dry NOx emission from delivered space heating energy is ≤ 50 mg/kWh. |
| 3 | The maximum dry NOx emission from delivered space heating energy is ≤ 35 mg/kWh. |

## Compliance requirements

Compliance is demonstrated as follows:

**First point:**

- Where evidence provided demonstrates that the maximum dry NOx emission from delivered space heating energy is ≤ 70% mg/kWh (at 3% excess $O_2$).

**Second point:**

- Where evidence provided demonstrates that the maximum dry NOx emission from delivered space heating energy is ≤ 50% mg/kWh (at 3% excess O2).

**Third point:**

- Where evidence provided demonstrates that the maximum dry NOx emission from delivered space heating energy is ≤ 35% mg/kWh (at 3% excess O2).

**Exemplary level criteria**
The following outlines the exemplary level criteria to achieve an innovation credit for this BREEAM-NL issue.

1. An exemplary credit can be awarded where manufacturer's details demonstrate that the plant installed to meet the building's space heating demand has zero dry NOx emission levels at 3% excess O2.

## Compliance notes

**New build**
There are no additional or different requirements to those outlined above specific to new build projects.

**Refurbishment**
If the (already existing) facilities for space heating are located in the existing building, these facilities must be evaluated in the light of the aforementioned requirements.

**Extensions to existing buildings**
The abovementioned supplement for refurbishment projects also applies to extensions to existing buildings.

**Shell only**
Where the final decision concerning the specification of the heating system will be made by the buyer/occupant, this credit must be assessed on the basis of an assumed worst-case fit-out specification. The credits may only be allocated if the level of NOx emissions can be determined.

**Gaskeur Clean Combustion (SV) label**
Gas-fired heating appliances with the Gaskeur Clean Combustion (SV) label automatically comply with the first credit criterion. This only applies to propane and butane-fuelled appliances with fully premixed burners. The Gaskeur Clean Combustion (SV) label applies to appliances with nominal heat inputs of up to 900 kW.

**Grid electricity**
Where some of the building is heated with electricity from the national grid, the average NOx emission must be determined on the basis of 0.15 gram NOx/kWh electricity (source: Cijfers en Tabellen 2007).

**Electricity from a renewable source**
Where electricity used by the heating system is sourced from a zero-emission renewable source such as PVs, wind etc, there are no resulting emissions. This source of heating can therefore be counted as having zero NOx emissions.

**Green Tariff**
As insufficient controls exist to establish how low NOx emissions are for green electricity, this credit does not recognise the purchase of green electricity for heating buildings.

**District heating**
District heating systems that incinerate waste usually have NOx emission rates higher than the levels set to achieve any BREEAM-NL credits.

**Heat recovery and industrial heat**
Heat supplied by a heat recovery system and industrial waste heat to be produced locally if the project parcel and used for space heating, attributes no NOx emissions.

**Combined Heat & Power**
Refer to the section with additional information on calculating NOx emission levels for the use of CHP.

**More than one heating system**
Where heat is provided by more than one heating system a weighted average NOx emission rate must be calculated based on the ratio of power outputs from each source to the total heating requirement of the building.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additions for the application of this credit to offices.

**Retail**
There are no additions for the application of this credit to retail premises.

**Industrial buildings**
There are no additions for the application of this credit to industrial buildings.

**Schools**
There are no additions for the application of this credit to schools.

## Schedule of evidence required

**Design stage**

- A copy of the schedule of requirements or the specification containing the type of heating system to be installed.
- For each system specified, a written declaration from the manufacturers or product specifications confirming the NOx emission in conformity with type approval.
- If more than one system is providing heat, design-team calculations are required confirming the average NOx emission rate (see Compliance notes).

**Post-construction stage**

- A site inspection report from the assessor and photographic evidence confirming that the heating systems submitted during the design stage are installed.

*OR*

- A written declaration from the design team or main contractor confirming that there are no changes to the specification submitted during the design stage.

## Definitions

**Dry NOx levels**
The NOx emission (mg/kWh) resulting from the combustion of a fuel at 0% excess oxygen levels.

**NOx emissions**
Pollutant gases produced by the combustion of fossil fuels. NOx reacts with heat and sunlight to produce ozone that can cause serious respiratory problems. It also reacts with water to produce acid rain, which has a detrimental effect on ecosystems.

## Additional information

**Calculating NOx emission levels from Combined Heat & Power (CHP) systems**

Where CHP systems are present or specified, only the heat-related emissions are considered for this credit. The NOx emissions are allocated to heat and electricity in line with the respective power outputs. This is done using a NOx emission rate for the electrical output equivalent to the current rate for grid electricity, and allocated the remaining NOx to the heat output. Only the heat-related component is related to this credit. The following formula is used to determine this:
X = (A - B) / C
Where:

- X = NOx emissions per unit of heat supplied (mg/kWh heat)
- A = NOx emissions per unit of electricity (mg/kWh electricity) i.e. the NOx emitted by the CHP system per unit of electricity generated. This figure should be obtained from the installer/supplier of the system.
- B = NOx emissions per unit of electricity supplied from the grid (mg/kWh electricity). This is assumed to be 0.15 grams NOx per kWh electricity (source: Cijfers en Tabellen 2007).
- C = Heat to Electricity Ratio of the CHP system.

The above methodology determines the net NOx emissions from CHP-generated electricity compared with centrally generated electricity and allocates this amount to the heat production. Where X is calculated to be negative, it should be assumed to be zero.

### References

- CV-SV:2001 – Gaskeur Criteria for the Gaskeur Central Heating Label for Gas-fired Central Heating Appliances with a Nominal Load of up to 900 kW
- Type Approval for Heating Appliances, Air Pollution and Nitrogen Dioxides Decree, 11 July 1995
- ( Emission Requirements for Combustion Plants (Environmental Management B) Decree

- ECN-C--05-015 NOx emissions from minor sources; update of the emissions in 2000 and 2010. February 2005. Including appendices and annexes to option document 2010/20, 13 March 2006
- Cijfers en Tabellen (Figures and Tables) 2007, SenterNovem

# POL 5 Protecting Buildings from Floods

## Credit aim

To encourage the development of buildings in areas with a low risk of flooding or to take measures to reduce potential flooding in buildings in areas with an average or high risk of flooding.

## Credit criteria

Up to 3 points can be awarded as follows:

| Points | |
|---|---|
| 1 | Where the evidence provided demonstrates that the assessed development is located in an area with an average or high annual risk of flooding.<br>***AND***<br>The ground floor, car park and entrance to a building are located above the design high water elevation for the location.<br>***OR*** |
| 2 | Where the evidence provided demonstrates that the assessed development is located in an area with a low annual risk of flooding. |

Further 1 point can be awarded as follows:

| | |
|---|---|
| 1 | Where the evidence provided demonstrates that sustainable water storage and infiltration measures have been specified. These measure eliminate the risk of increased flooding, which can arise due to a decline in water storage capacity on the site as a result of development. |

## Compliance requirements

The following demonstrates compliance:

### One point

1. A site-specific flood risk assessment has been conducted by a qualified consultant.
2. The flood risk assessment confirms the following:
   - The assessed development is located in a flood area defined as susceptible to an average or high annual risk of flooding.
   - The development is adequately flood resistant according to the local authority and legally recognized agency.
   - The ground floor of the building and the entrance to the building and site are designed (or zoned) so that they are a minimum of 600 mm above the design-high water level in the area in which the assessed development is located.

### Two points

1. A site-specific flood risk assessment has been conducted by a qualified consultant.
2. The flood risk assessment confirms that the assessed development is located in a flood area defined as susceptible to a low annual risk of flooding from any source.

### Additional credit

1. Where sustainable water storage and infiltration measures have been specified. These measures guarantee that the peak runoff speed to natural or local council watercourses on the site is no greater than it was before the site was developed. These measures must comply with national practice guidelines.
2. The capacity of the flood damage reduction measures must incorporate climate change.

## Compliance notes

**New Build**
There are no additional or different requirements to those outlined above specific to new build projects.

**Refurbishment**
Refurbishment projects that exclude the development of new buildings or paved surfaces will in all likelihood be awarded the credit for reducing surface runoff. In these cases a water risk assessment must be carried out and all opportunities identified for reducing surface runoff caused by refurbishment must be implemented.

**Extensions to existing buildings**
There are no additional or different requirements to those outlined above specific to the extension of existing projects.

**Shell Only**
There are no additional or different requirements to those outlined above specific to shell-only projects.

**Definition of risk of flooding**

- Low annual risk of flooding: less than 1 in a 1000 risk of flooding from rivers and sea ((< 0,1%).
- Average annual risk of flooding: 1 in 100 and 1 in 1000 interim risk of flooding from rivers (1% - 0,1%) and 1 in 200 and 1 in 1000 interim risk of flooding from sea (0.5 – 0.1%).
- High annual risk of flooding: greater than 1 in 100 risk of flooding from rivers (> 1%) and a 1 in 200 chance or greater of flooding from sea (> 0,5%) or land where water needs to flow or collects during floods.
- The flood risk should be determined on the basis of historical as well as geographical records (such as height) and should include all potential sources of flooding.

**Sources of flooding**
If the development is in a low-risk area the flood risk assessment must demonstrate that there is a low risk of flooding from one or a combination of the following sources:

1. Rivers
2. Tide
3. Surface water: surface runoff from adjoining land (urban or rural)
4. Groundwater: more common in low-lying areas located on permeable soil layers (aquifers)
5. Drains: combined, waste or surface water drainage

**Existing dikes**
An area protected by existing dikes (designed to withstand a certain degree of flooding) can be awarded the correct number of credits if the water barriers limit the risk to low or average *AND* meet the following criteria:

1. The development is not located in an area where new dikes are required or have already been built to limit the risk of flooding in the location and immediate surroundings for the sole purpose of development and/or the wider master plan.
2. The development is located on a previously developed site (as defined by the criteria in BREEAM-NL credit LE 1 Reuse of Land) and the correct legally recognized agency certifies that, as a result of existing dikes, the risk of flooding is reduced to low or average (as appropriate to BREEAM-NL credit levels). If convincing evidence is not supplied the credit cannot be awarded.
3. The relevant agency certifies that, as a result of storm surge barriers such as these, the risk of flooding has been reduced to low or average.

The local or regional office of a recognized agency is able to provide more information on existing storm surge barriers in the area in which the assessed development is located.

**Threshold of 600 mm**

It is accepted that buildings in an area with a high risk of flooding may experience flooding in parts of the car park and access to the location, which are under the 600 mm threshold. In cases such as these, the credit may still be awarded if the access to the site and the ground floor of the building are safe (i.e. if they are 600 mm above the design-high water level) to ensure that the building or developed site does not become an island during flooding.

If development is permitted and the ground floor of the area or infrastructure directly adjoining the site is under the 600 mm threshold, the credit can still be awarded if there are no other practical solutions for access to the site above this level and the assessed building and access meet the compliance requirements. As much of the area as possible (or as much as is required by a recognized agency) must be designed at or above the threshold value.

**Third party storm surge barriers**

Many storm surge barriers owned by third parties serve as dikes by definition due to their location, for example motorways, railway embankments, dams and so forth. Railway embankments can be assumed to remain in place during the lifespan of the development, unless the assessor or the design team have reason to assess otherwise. For a dam, confirmation must be obtained that it is reasonable that the dam remains for the lifecycle of the building.

National best practice guidelines for designing sustainable waste water systems.
For country specific references, please refer to the country relevant appendix sheet.

**Effectiveness of water storage measures**

In order to guarantee the effectiveness of water storage measures the installations must be able to discharge half their volume within 24-48 hours after a storm (unless otherwise advised by a recognized agency) in order to ensure readiness for another storm.

**Calculation of peak discharge speed**

References [2] and [3] contain guidelines for calculating the peak discharge speed and determining the design flood frequency. To achieve this credit the design team must demonstrate that the calculation takes into consideration the scope of the flood damage reduction measures needed to store the relevant amount of water.

**Precipitation**

Official precipitation records from the nearest meteorological station should be used for the risk assessment.

**Discharge to the sea or estuaries**
If rainwater runoff is discharged directly from the site to the sea, beach, estuaries with a shoreline management plan or designated nature conservation areas (as part of habitat management), the credit will be awarded without the need for specifying additional flood damage reduction measures.

**Stricter requirements**
If the local government authority (or other recognized agency) requires more stringent limitations than the above mentioned percentages and/or a more stringent flood risk design than required by EN 752:2008, the highest requirement must be complied with to achieve the credit.

**Advice from a recognized government agency**
None of the credits are available if the assessed development has conducted legal proceedings against the advice of a recognized government agency because the consequences of flooding are too great.

**The credit is applicable to the following building types:**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| √ | √ | √ | √ |

**Offices**
There are no additional or different requirements to those outlined above specific to offices.

**Retail**
There are no additional or different requirements to those outlined above specific to retail premises.

**Industrial buildings**
There are no additional or different requirements to those outlined above specific to industrial buildings.

**Schools**
There are additional or different requirements to those outlined above specific to schools.

## Schedule of evidence required

**Design stage**
First and second credit:
1&2

- A copy of the flood risk assessment confirming:
- The qualifications of the appropriate qualified consultant.
- Flood area or the annual risk of flooding in the location.
- If pertinent, the correspondence between the relevant government agency confirming:
- The reduced annual risk of flooding as a result of dikes.
- Site drawings that confirm:
- The design-high water level for the location.
- The ground floor design elevation for all developed parts of the site.

- Safe access and escape routes.

Additional credit:

1&2 Site drawings and a copy of the advisory report confirming: «

- The type and storage volume (in litres) of the reduction measures for surface runoff.
- Total paved surface area (in $m^2$).
- Peak runoff speed (in litres per second) for the design flow.
- Additional room is included for a climate change system.

**Post-construction stage**
First and second credit:
1&2 Formal written correspondence from the design team which confirms:

- The flood risk assessment is unchanged and that no amendments were required during the interim period.
- Site drawings that match the building.

Additional credit:
1&2

- A site inspection report from the assessor and photographic evidence confirming:
- Installation of reduction measures for surface runoff.
- No changes to the evidence provided since the design stage assessment.
- Written confirmation from the design team or the contractor confirming:
- That the specifications are unchanged.
- That if changes have occured, copies of the built design and the calculations must be provided.

## Relevant definitions

**Surface runoff**
The overland flow of excess water to a drainage system. This occurs when soil is saturated or impervious, or when precipitation is intense.

**Water runoff**
This usually refers to rainwater, but may also include ground water, a drain overflow and other sources.

**Runoff speed**
The speed at which water runs off a surface.

**Catchment area**
The area that draws surface runoff from precipitation into a watercourse or drainage system. A catchment area can be subdivided into catchment zones.

**Sustainable urban water storage and infiltration systems**

A series of management methods and control systems developed to discharge surface water in a more sustainable manner than some conventional techniques.
This includes:

- Storage ponds
- Water delivery for irrigation (WaDI)
- Reedland
- Permeable paving: in areas where local geological and hydrological conditions make this possible, such as building paved surfaces on a permeable foundation on a ballast bed in order to store water and ensure soil penetration. The ballast layer may be deeper for less permeable soils and it may transport the water to an infiltration facility, although this may not be possible in some areas.
- Roof runoff rainwater collected as part of a rainwater harvesting system.
- Roof runoff rainwater is diverted to an infiltration facility or other storage facility, such as a tank, pond or WaDI.
- Green roofs.

**Qualified consultant**
A consultant with qualifications and relevant experience in calculating surface runoff and designing sustainable urban drainage systems and flood damage reduction measures. If complex flood calculations and reduction measures are required, these should be made by an engineer specializing in hydrology.

**High water level**
The maximum estimated water level during the design storm. The high water level of a location can be determined either by known historical records or by model predictions for the specific location.

**Infiltration**
The penetration of water through a permeable surface, such as soil, permeable paving, infiltration facilities and the like.

**Shoreline management plan**
A shoreline management plan is a largescale assessment of the risks arising from coastal processes and provides a policy framework for sustainably reducing the risks to individuals and the developed, historical and natural environments.

**Measures to reduce water runoff**
This describes all possible structures and installations that can be deployed to reduce the impact of water runoff on hard surfaces and roofs. Measures include: underground storage, extra-large pipes, storage ponds, WaDIs, reedlands, permeable paving, green roofs and local or centralized infiltration facilities.

**Natural watercourses**
Any natural watercourse that conveys surface water.

**Undeveloped land**
A site that has either never been built on or has remained undisturbed over the last 5 years.

**Runoff speed on undeveloped land**

The runoff speed that would occur if the site is in an undeveloped and undisturbed condition.

**Design storm**
Historical or notable weather conditions that have a certain annual chance of occurring, against which the suitability of a proposed development is assessed and for which reduction measures, if relevant, are designed.

**Design flood**
Historical or notable flood that has a certain annual chance of occurring, against which the suitability of a proposed development is assessed and for which reduction measures, if relevant, are designed.

**Peak runoff speed (litres/second)**
This is the highest runoff speed of a defined catchment area and based on the assumption that rainfall is uniformly spread over the catchment area, whereby the entire catchment area is considered as a whole and an estimate is made of the flow speed at the most downstream point.

**Peak flow speed**
The peak speed that water runs off hard surfaces.. To calculate peak flow volumes the design storm should be used for a period of one hour, unless the relevant government agency requires otherwise.

**Relevant government agency**
Refers to the agency responsible for determining flood risks, such as the water board.

**Starting situation**
The condition of the assessed site immediately prior to the purchase of the site by the client/developer or the current condition, if the client has already owned or used the land for a number of years.

**Paved surfaces**
Includes roofs, car parks, access roads, surfacing, delivery and maintenance depots and paved gardens. Footpaths that are less than 1.5 metres wide and drain freely onto unsurfaced green areas can be excluded.

**Water storage**
The temporary storage of excess water runoff or river water in ponds, basins, reservoirs or emergency overflow areas during flooding.

**Dikes**
Dikes do not eliminate the risk of flooding completely, but they do reduce it. Building in areas where dikes are present (and the correct design for withstanding a certain degree of flooding) is therefore preferrable above building in average and high risk areas without storm surge barriers. However, for the purpose of this publication preference is given to building in low risk areas rather than developing new dikes in higher risk areas in favour of new development.

**Flooding**
Flooding is characterised by a peak runoff level or runoff hydrograph level

**Flood chance**

The estimated risk that a flood of a certain size will occur or be exceeded during a specified period. For example, a 100-year flood has a 1% chace of occuring in any year.

**Flood risk**
The chance of flood combined with the extent of the potential consequences of flooding.

**Flood risk assessment**
A study to assess the risk of flooding in a certain location, as well as the consequences that any site changes or development will have on the flood risk for that site and elsewhere.

## Additional information
None.

## References
- EU Floods Directive 2007/60/EC on the Assessment and Management of Flood Risks, http://ec.europa.eu/environment/water/flood_risk/key_docs.htm
- EN 12056-3, Gravity drainage systems inside buildings — Part 3: Roof Drainage, Layout and Calculation.
- EN 752: 2008, Drain and Sewer Systems Outside Buildings
- http://ec.europa.eu/environment/water/index_en.htm
- http://www.floodsite.net
- http://www.worldweather.org

For country specific references, please refer to the country relevant appendix sheet.

**Country specific references for the Netherlands**
- Rainfall records are available from the KNMI Operational Data Centre (KODAC) http://www.knmi.nl/kodac NEN-EN (http://www.nen.nl)
- NEN 6702 Technical grondslagen voor bouwconstructies (Technical Principles for Structures) - TGB 1990 - Belastingen en vervormingen (Loads and Deformations)
- NPR 6703 Wateraccumulatie - Aanvullende rekenregels en vereenvoudigingen voor het belastingsgeval regenwater in NEN 6702 (Ponding on Flat Roofs Caused by Rainwater – Supplementary to NEN 6702 with Simplified Rules)
- **NVA** Nederlandse Vereniging voor Waterbeheer (Netherlands Water Management Association) http://www.nva.net
- **UvW**, Unie van Waterschappen (Union of Waterboards) http://www.uvw.nl
- **VNG**, Vereniging van Nederlandse Gemeenten (Association of Dutch Municipalities) http://www.vng.nl

# POL 6 Minimising watercourse pollution

## Credit aim

To reduce the potential for silt, heavy metals, chemicals or oil pollution to natural watercourses from surface water run-off from buildings and hard surfaces.

## Credit criteria

1 Credit can be awarded according to:

| Credit | |
|---|---|
| 1 | Where evidence provided demonstrates that effective on site treatment such as Sustainable Drainage Systems (SUDs) or oil separators have been specified in areas that are or could be a source of watercourse pollution. |

## Compliance requirements

The following demonstrates compliance:

1. Specification of Sustainable Drainage Systems (SUDs) or source control systems such as permeable surfaces or infiltration trenches where run-off drains are in areas with a relatively low risk source of watercourse pollution.
2. Specification of oil/petrol separators (or equivalent system) in surface water drainage systems, where there is a high risk of contamination or spillage of substances such as petrol and oil (see compliance notes for a list of areas).
3. Confirmation that the " Appropriate statutory body " agrees with the proposal.
4. A comprehensive and up-to-date drainage plan of the site will be made available for the building/site occupiers.

## Compliance notes

### New Build

There are no additional or different requirements to those outlined above specific to new build projects.

### Refurbishment

There are no additional or different requirements to those outlined above specific to refurbishment projects.

### Extensions to existing buildings

Please refer to the compliance note below regarding '*infill building on an existing site'*.

### Shell Only

There are no additional or different requirements to those outlined above specific to shell only assessments.

### Areas that are a source of pollution

For the purpose of this credit an area that presents a risk of watercourse pollution includes vehicle manoeuvring areas, car parks, waste disposal facilities, delivery and storage facilities or plant areas.

### Areas where oil separators are required

The following site areas (where present) require oil separators in surface water drainage systems:

- Car parks larger than 800m$^2$ or with 50 or more parking spaces
- Smaller car parks discharging to a sensitive environment
- Areas where goods vehicles are parked or manoeuvred
- Vehicle maintenance areas
- Roads
- Industrial sites where oil is stored or used
- Refuelling facilities.

**SUDS and oil interception**
In some instances, where the risk of contamination is infrequent and potential spills will be small, oil interceptors may not be required if appropriately designed Sustainable Urban Drainage systems are specified.

**Infill building on existing site**
Where the assessment is of an individual building on an existing site, i.e. infill development, the requirements apply to areas within the construction zone that present a risk of pollution, as well as any areas external to the construction zone that are affected by the new works i.e. drainage onto or from the proposed development.

**Suitable level of treatment**
In all cases the assessor should determine the operational use of the site in order to determine if the proposed surface water run-off strategy is suitable.

**Rainwater run-off**
This credit is not intended to cover the treatment of rainwater run-off except where there is a risk of significant pollution arising.

**Underground/ covered areas**
Where it can be demonstrated that there will be no drainage or wash down facilities that may lead water from inside the underground or covered area to natural watercourses, then such areas comply with the requirements by default.

**Roof plant**
Roof top plant space must be considered where there is a risk from substances such as petrol or oil. Refrigerants are not assessed under this credit, as the only risk of pollution is to air and not the watercourse.

**No areas at risk from pollution**
Where it can be demonstrated that there are no external areas that present a pollution risk, e.g. parking, delivery, manoeuvring or servicing facilities (including individual parking spaces), external waste storage space or other hard standing areas AND there is no plant supported on the roof, then this credit can be awarded by default.

**Permeable paving system**
Where it can be demonstrated that a permeable paving system designed to retain silts and degrade oils has been used, then this will meet the requirements of this credit for car parks and access roads.

**Drainage plan**

A comprehensive and up-to-date drainage plan of the site, which accurately identifies all drains, must be produced and handed over to the new occupier. If there is no in-house expertise to do this, a reputable drainage company should be used.

**Workshop areas**
Where workshop areas are specified, they should be assessed against the above criteria. This is due to circumstances where there may be some form of vehicle servicing as part of a car showroom or other type of retail space.

**This credit is applicable to the following building types:**

| Offices | Retail | Industrial | Education |
|---|---|---|---|
| √ | √ | √ | √ |

**Offices**
There are no additional or different requirements to those outlined above specific to office projects.

**Retail**
There are no additional or different requirements to those outlined above specific to retail projects.

**Industrial**
There are no additional or different requirements to those outlined above specific to industrial projects.

**Education**
There are no additional or different requirements to those outlined above specific to education projects.

## Schedule of evidence required

**Design Stage**
1. & 2.
Marked-up proposed site plan highlighting with low and high risk areas of the site.
A copy of the specification or design plan confirming the type of pollution control systems specified.

3. Confirmation that the " Appropriate statutory body " agrees with the proposal.
4. A letter from the design team which confirmed that a copy of the drainage plan will be made and be presented to the user of the building.

**Post Construction Stage**
1. & 2. Assessor's building/site inspection and photographic evidence confirming the installation of pollution control system(s).
4. Assessor's building/site inspection and photographic evidence confirming the existence of the drainage plan in the building's O&M manual/file.

## Definitions

**Appropriate statutory body**

This refers to the authority responsible for licensing and setting the conditions for the removal of roof and surface water into waterways.

**Low risk areas**
Low risk areas can be defined as areas where the risk of contamination or spillage of substances such as petrol and oil is reduced. For the purpose of this credit, roofs and small car parks may be considered as low risk areas.

**Soakaways**
A sub-surface structure designed to promote the infiltration of surface water in to the ground. As a general point, soakaways may be shallow and broad – as in a blanket under permeable paving, or deeper structures. Deeper, point source soakaways should be avoided for road and car-park drainage, but shallow structures providing infiltration in an extensive way (infiltration trenches and permeable paving) do not need oil separators. See reference[4] for further guidance.

## Types of Oil Separator

- **Class 1 Separators:** These are designed to achieve a concentration of less than 5mg/l oil under standard test conditions. They should be used when the separator is required to remove very small oil droplets, such as those arising from car park run-off.

- **Class 2 Separators:** These are designed to achieve a concentration of less than 100mg/l oil under standard test conditions. They are suitable for dealing with discharges where a lower quality requirement applies and/or for trapping large spillages.

  Both classes can be produced as 'full retention' or 'by pass' separators:

- **Full retention separators** treat the flow that can be delivered by the drainage system, which is normally equivalent to the flow generated by a rainfall intensity of 50mm/hr.

- **Bypass separators** fully treat all flows generated by rainfall rates of up to 5mm/hr. Flows above this rate are allowed to bypass the separator. These separators are used when it is an acceptable risk not to provide full treatment for high flows.

**The references** contain more detailed guidance on the selection and sizing of an appropriate type of separator.

## Additional Information
None.

## References
- EN 858-2:2003 Separator systems for light liquids (e.g. oil and petrol)
- EN 1825-2:2002 Grease separators
- EN 1253-5:2003 Gullies for buildings. Gullies with light liquids closure
- prEN 12056-3 Gravity drainage systems inside buildings — Part 3: Roof drainage, layout and calculation
- EN 752-4: 1997 Drain and sewer systems outside buildings — Part 4: Hydraulic design and environmental considerations
- http://www.worldweather.org

See country-specific references for more information

country-specific references for The Netherlands

- NEN-EN (http://www.nen.nl):
- NEN-EN 858-1 en -2 Afscheiders en slibvangputten voor lichte vloeistoffen (bv. olie en benzine)
- NEN 7089 Olie-afscheiders en slibvangputten – Type-indeling, eisen en beproevingsmethoden
- NEN 7067 Kolken – Definities, nominale afmetingen en functionele eisen
- NEN-EN 1253 delen 1-5 Afvoerputten en -goten voor gebouwen
- NEN-EN 14654 Aanpak en controle reiniging van de buitenriolering
- NEN-EN 1433 Afwateringsgoten voor verkeersgebieden

# POL 7 Reduction of night time light pollution

## Credit aim

To ensure that external lighting is concentrated in the appropriate areas and that upward lighting is minimised, reducing unnecessary light pollution, energy consumption and nuisance to neighbouring properties.

## Credit criteria

1 Credit can be awarded according to:

| Credits | |
|---|---|
| 1 | Where evidence provided demonstrates that the external lighting design is in compliance with the guidance of the commissie Lichthinder of the Dutch Foundation for Illumination. |

## Compliance requirements

The following demonstrates compliance:

1. The external lighting strategy has been designed in compliance with the guidance of the commissie Lichthinder of the Dutch Foundation for Illumination of the NSVV, (Nederlandse Stichting voor Verlichtingskunde) and CIE 126-1997 (Guidelines for minimizing sky glow). In stead of the guidelines of the NSVV the CIE 150-2003 can be followed.
2. All external lighting (except for safety and security lighting) can be automatically switched off between 2300hrs and 0700hrs. This can be achieved by providing a timer for all external lighting set to the appropriate hours.
3. If safety or security lighting is provided and will be used between 2300hrs and 0700hrs, this part of the lighting system complies with the guidance of the commissie Lichthinder of the Dutch Foundation for Illumination of the NSVV, (Nederlandse Stichting voor Verlichtingskunde) and EN 12464-2:2007, for example by using an automatic switch to reduce the lighting levels at 2300 or earlier.

## Compliance notes

### New Build

There are no additional or different requirements to those outlined above specific to new build projects.

### Refurbishment

For refurbishment projects, in addition to any new external lighting specified, any existing lighting that will remain post development must be assessed against the requirements of this credit.

### Extensions to existing buildings

If the scope of the assessment covers the new extension only, then it is only new lighting specified as part of that extended works that must be assessed against the requirements of this credit. If the new and existing building is being assessed as one, then the rule for refurbishments (above) applies to the existing building.

### Shell Only

There are no additional or different requirements to those outlined above specific to shell-only assessments.

**No external lighting**
If there is no external lighting on or around the assessed development the credit can be awarded by default.

**Safety lights**
Flush stud lights used for safety purposes in vehicle manoeuvring areas may be excluded from the assessment.

**Floodlighting, signage lighting**
The guidance notes recommend the setting of a curfew, during which all non-essential external lighting is switched off. This will normally include floodlighting, signage and all lighting that is not required for safety or security.

**Essential lighting between 2300 and 0700**
Where essential lighting is provided between 2300 and 0700, i.e. for 24-hour operating buildings, the system is able to automatically switch to the lower levels of lighting conform the guidance of the committee Lichthinder of the Dutch Foundation for Illumination of the NSVV, (Nederlandse Stichting voor Verlichtingskunde) and EN 12464-2:2007. It is also possible to apply this lighting level by default.

**Specific security requirements**
Any light fittings in the areas outlined above that are specified to comply with specific security requirements/standards, and where those requirements and the BREEAM-NL requirements are not complementary, can be excluded from the assessment of this credit. In these circumstances the assessor must obtain evidence confirming that such requirements are applicable to the assessed development.

**This credit is applicable to the following building types:**

| Offices | Retail | Industrial | Education |
|---|---|---|---|
| √ | √ | √ | √ |

**Offices**
There are no additional or different requirements to those outlined above specific to office projects.

**Retail**
There are no additional or different requirements to those outlined above specific to retail projects.

**Industrial**
There are no additional or different requirements to those outlined above specific to industrial projects.

**Education**
There are no additional or different requirements to those outlined above specific to education projects.

## Schedule of evidence required

**Design Stage**
1. t/m 3.

A marked-up copy of the site plan showing:

- 
- Areas of the building and site that will be externally lit
- Any nearby properties.

A copy of the specification clause requiring, or external lighting design confirming:

- The external lighting design in compliance with the NSVV or CIE regulations.
- Controls for all external lighting.
- In the case of a lighting design the lighting designer should, with indicative examples, substantiate where and how to meet the requirements.

**Post Construction Stage**

1. t/m 3.

Een rapport van een inspectie op locatie door de assessor en fotografisch bewijsmateriaal dat bevestigt dat:

- Cut-off luminaires, if provided, have been angled to limit spill light to potentially obtrusive directions.
- The external lighting is switchable.

A letter from the design team or main contractor confirming:

- Installation of systems in accordance with compliant design.
- No changes to the evidence provided at the interim ‘design’ stage assessment.

## Definitions

None.

## Additional Information

None.

## References

- Algemene richtlijn betreffende lichthinder, deel 1: Algemeen en grenswaarden voor sportverlichting (HI-101), NSVV commissie lichthinder 2003, ISBN 90-76549-01-X. Hierbij is alleen het deel: ‘Algemeen’ van toepassing
- Algemene richtlijn betreffende lichthinder, deel 2: Terreinverlichting (HI-102), NSVV commissie Lichthinder 2003
- Algemene richtlijn betreffende lichthinder, deel 3: Aanstraling van gebouwen en objecten (HI-104), NSVV commissie Lichthinder 2004
- Algemene richtlijn betreffende lichthinder, deel 4: Reclameverlichting (HI-105), NSVV commissie Lichthinder 2004
- Guide on the Limitation of the effects of obtrusive light from outdoor lighting installation, Commission Internationale D’éclairage (CIE), Publication 150, 2003
- Guidelines for minimising sky glow, Commission Internationale D’éclairage (CIE), Publication 126, 1997
- EN 12464-2:2007 – Light and lighting – Lighting of work places – part 2: Outdoor work places

# POL 8 Noise Attenuation

## Credit aim

To diminish the possibility that noise from the building's systems causes a nuisance in the in-use stage for neighbouring, noise-sensitive buildings.

## Credit criteria

1 point can be awarded as follows:

| Points | |
|---|---|
| 1 | Where the supplied schedule of evidence shows that new sources of noise from the project development will not give rise, in the in-use stage, to complaints of noise nuisance from existing noise-sensitive buildings or natural habitats located in the neighbourhood of the project development. |

## Compliance requirements

Compliance is demonstrated as follows:

1. *Noise-sensitive areas or buildings* already exist or are scheduled within a radius of 800 metres from the evaluated project. If no *noise-sensitive areas or buildings* exist or are scheduled in the neighbourhood of the evaluated project, the credit can be awarded by default.
2. A noise survey has been carried out in accordance with the "Handleiding meten en rekenen industrielawaai" (Manual for the measurement and calculation of industrial noise, HMRI) to establish the anticipated long-term average assessment level (LAr, LT) and the maximum noise level (LAmax) resulting from the noise source at the normative noise-sensitive locations. The noise level on the outside (at the facade) and on the inside must be determined. The noise survey must be carried out by a suitable, qualified acoustic consultant from a qualified consultancy.
3. If the noise level emanating from the grounds or the building is less than or equal to the values in Table 1, the point can be awarded.
4. If the noise level emanating from the grounds or the building is higher than the values in Table 1, measures must be taken at the source.

Table 1

| | 07.00-19.00 hours | 19.00-23.00 hours | 23.00-07.00 hours |
|---|---|---|---|
| LAr,LT at the facade of the sensitive buildings | 45 dB(A) | 40 dB(A) | 35 dB(A) |
| LAr,LT internal and adjoining sensitive buildings | 30 dB(A) | 25 dB(A) | 20 dB(A) |
| Lamax at the facade of the sensitive buildings | 65 dB(A) | 60 dB(A) | 55 dB(A) |
| LAmax internal and adjoining sensitive buildings | 50 dB(A) | 45 dB(A) | 40 dB(A) |

## Compliance notes

**New build**
There are no additional or different requirements to those outlined above specific to new build projects.

**Refurbishment**
There are no additional or different requirements to those outlined above specific to refurbishment projects.

**Extensions to existing buildings**
There are no additional or different requirements to those outlined above specific to the extension of existing projects.

**Shell only**
If the building's use and fitout is not yet known, the (design stage) credit can not be assessed. This credit is considered a 'potentially fully fitted out' credit.

**Part of a bigger project**
If the building is part of a bigger project in which noise-sensitive locations exist or are being developed, an acoustic survey is essential to assess whether the building in question will cause any problem in the future.

**The assessed building is itself a noise-sensitive location**
If the building itself is a noise-sensitive location, an acoustic survey must be carried out regardless of the distance from other noise-sensitive locations.

**Guideline not applicable**
If a qualified acoustic consultancy finds that the HMRI is not applicable, an evaluation of the probability of noise-related complaints can be used in order to assess this credit.
Scope of the acoustic survey

The acoustic survey must take account of all noise sources in and around the building. The exceptions included in Section 2.8 of the Activities Decree are applicable.

**Construction noise and noise nuisance during building**
Noise nuisance during construction is not covered by this credit (see also the foregoing under 'scope of the acoustic survey'); it is assessed in Management 2.

**The credit is applicable to the following building types**

| Offices | Retail | Industrial buildings | Schools |
|---|---|---|---|
| X | X | X | X |

**Offices**
There are no additions for the application of this credit to offices.

**Retail**
There are no additions for the application of this credit to retail premises.

**Industrial buildings**
There are no additions for the application of this credit to industrial buildings.

**Schools**
There are no additions for the application of this credit to schools.

## Schedule of evidence required
**Design stage**

1.: A situation drawing that indicates:

- All existing and planned noise-sensitive buildings in the neighbourhood of the development location.
- The planned noise sources of the building under evaluation.
- The distance from these buildings to the building under evaluation.

2. & 3.:

- A copy of the acoustic survey, carried out in accordance with the HMRI, with the demonstrated qualifications of the acoustic consultant.

*OR*

- A copy of the schedule of requirements or the specification, in which the requirement is shown that an acoustic survey must be carried out in accordance with the HMRI by a qualified acoustic consultant.

*OR*

- A formal letter from the design team that it is appointing an acoustic consultant to carry out an acoustic survey in accordance with the HMRI.

4.:

- The acoustic survey with recommendations for noise reducing measures.
- One of the following pieces of evidence:
  - A signed design containing a specification of noise reducing measures OR
  - A formal letter from the principal or the design team, stating that the noise reducing measures prescribed (if applicable) by the qualified acoustic consultant will be put in place.

**Post-construction stage**

1.: A site inspection report from the assessor and photographic evidence, defining:

- All existing and planned noise-sensitive buildings in the neighbourhood of the development location.
- The planned noise sources of the building under evaluation.
- The distance from these buildings to the building under evaluation.

2. & 3.:

- A copy of the acoustic report with measurements based on the system in operation.

4.:

- A site inspection by the assessor and photographic evidence confirming that the noise reducing measures have actually (and correctly) been put in place.
- A formal letter from the acoustic consultant, stating that all the noise reducing measures have actually been correctly put in place.

## Definitions

**Noise-sensitive**
Noise-sensitive buildings and open spaces are defined in the Noise Abatement Act and the Noise Abatement Decree.

**HMRI**
Handleiding Meten en Rekenen Industrielawaai (Manual for the Measurement and Calculation of Industrial Noise).

## Additional information
None.

## References

- Handleiding Meten en Rekenen Industrielawaai (Manual for the Measurement and Calculation of Industrial Noise). Ministry of Housing, Spatial Planning and the Environment, 1999
- ISO 1996-1:2003 Acoustics — Description, measurement and assessment of environmental noise — Part 1: Basic quantities and assessment procedures
- ISO 1996-2 Acoustics — Description, measurement and assessment of environmental noise — Part 2: Determination of environmental noise levels
- ISO 1996-3:1987 Acoustics — Description and measurement of environmental noise — Part 3: Application to noise limits
- Noise Abatement Act: this incorporates EC directive 2002/49/EC on evaluating and dealing with noise nuisances.
- EC directive 2000/14/EC on noise nuisance from equipment for outside use

Decree of 19 October 2007, no. 07.001133, containing general rules for institutions (Environmental management institutions (general rules) decree)

# Appendices

## Nature report

It is a good idea to draw up a document containing all the evidence and background information used to gain points in the Land Use and Ecology section. The following gives suggestions as to which elements such a report should justifiably include. It also indicates to which credit the element applies. The information that is to be included in the section for purposes of evidence is described in more detail in the relevant section. This appendix shows the connection between the various topics and sections.

| Section Contents | Applies to |
|---|---|
| Description of the construction site before work begins. | LE1, LE2, LE3, LE4 and LE6 |
| The effects of the construction work (temporary effects) *and* the presence and use of the new building (permanent effects) on the ecological values (protected species and general habitat values). | LE3 |
| Suggestions from the ecologist on how to prevent and/or mitigate the negative effects in the design stage (physical infrastructure measures), the realisation stage and/or the management stage. | LE3, LE4, LE6 |
| Suggestions as to how to create added ecological value (protected and general, during design stage (physical infrastructure measures), realisation stage and management stage). | LE3, LE4, LE6 |
| An ecological work protocol with (1) instructions to the contractor for the minimisation of harmful effects on flora and fauna during implementation, and (2) instructions on how the suggestions from 3 and 4 can be effectively implemented. | LE3, LE4 |
| A report on a visit to the construction site in order to check whether work is being carried out in accordance with the ecologist's recommendations. | LE3, LE4 |
| A management plan with instructions for management, monitoring, evaluation and course adjustments. | LE6 |
| A contract with a local partner. | LE8 |

# Technical checklist A2

## 1 Safe and adequate access

This section is intended to demonstrate that the constructor operates the site in a manner that guarantees a safe and appropriate access to, around and on the site. The following items demonstrate compliance with this section:

| REF | Criteria | √ | Evidence/reference required | Validation/Justification |
|---|---|---|---|---|
| a | Appropriate and safe access to the site is provided. This must include as a minimum:<br>• Provision of parking on or near site OR a public transport node with an average frequency under 30minutes within 500m OR a dedicated transport service to a major public transport node provided by the contractor.<br>• Good lighting AND Adequate barriers AND uniform surfaces ie no trip hazards outside the site boundary<br>• All accesses to be clean and mud free<br>• Hoarding or scaffolding to be well lit at night AND scaffold netting is in place and well maintained | | See copy of parking plan & check transport / dedicated service timetables.<br>View on site.<br>View on site.<br>View on site. | |
| b | Appropriate and safe access on site is provided. This must include as a minimum:<br>• Footpaths marked with ramps and signs<br>• Pathways wide enough for wheelchairs<br>• Accessibility of all areas by visually or hearing impaired visitors<br>• All site hazards advertised at the site entrance | | View on site and check that list of hazards is complete | |
| c | Site entrances and exits are clearly marked for visitors and delivery drivers to see. | | View on site | |
| d | Site reception is clearly signposted OR all visitors are escorted to the reception | | Check on arrival for the signs OR see a copy of the | |

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| | | | induction procedure. | |
| e | The post box has been placed on the pavement to avoid the postman from entering the site. | | View on site | |
| f | Where there are minority communities speaking a different language in the area or working onsite, notices are printed in the common local language | | Check the area and the staffs register for a minority culture community. Where this is present on- or off-site, check for signs in the communities language. | |
| g | All road signs / names can be seen OR when a road sign / name is obstructed a replacement has been erected | | View on site | |
| h | Where a site with severe congestion has a delivery point remote from a site, deliveries can then be made in smaller vehicles at times to cause the least inconvenience. | | View procedures on site. | |

## 2 Good Neighbour

This section is intended to demonstrate that the constructor operates the site in a manner that is considerate to the surrounding neighbours. The following items demonstrate compliance with this section:

| REF | Criteria | √ | Evidence/reference required | Validation/Justification |
|---|---|---|---|---|
| a | Introductory letters have been / will be sent to all neighbours AND there is a commitment to write and thank neighbours at the end of the contract for their forbearance AND provide feedback form | | See copies of letters with list of addresses. A copy of this commitment should be provided or a copy of a standard letter that is always sent at the end of a project. A copy of the feedback form must be provided along a procedure to monitor the results and implement changes for future work. | |

| | | | | |
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| b | Site hours and noisy work restrictions are appropriate to the area, in particular when the site is located near:<br>• Houses<br>• Schools<br>• Hospitals<br>• Industrial Units<br>• Major public Transport Nodes<br>• City centres<br>• Shopping facilities | | Copy of statement of intent, policy, agreement etc to be provided | |
| c | The site boundary is clearly and safely marked and appropriate to the environment:<br>• The colour of the hoarding has been considered in terms of the surrounding environment.<br>• Pedestrians have a suitable, safe and protected passage around the site boundary<br>• There are well lit warning signs for the benefit of the pedestrian and road user<br>• The site's surroundings are seen by the public as tidy and clean | | Ask site manager if any thought was given to the hoarding and the location of the site.<br>Is the hoarding clearly /safely marked, clean, neat and well maintained?<br>Ensure that there are no complaints about the site being untidy or that if there were this was quickly rectified and not repeated. | |
| d | There is a complaints book available AND evidence that complaints are being dealt with immediately | | Inspect the complaints book and check responses for timeliness | |
| e | Local people are appropriately informed by the use of a notice board:<br>• Of the site progress<br>• Of the company contact details (telephone number / web site / email address) | | View on site | |
| f | Light is shielded from the neighbours | | Copy of the temporary works indicating light shielding or the site manager must demonstrate how the light shielding works or is not applicable. | |
| g | Site personnel are discouraged from using local facilities in their site clothes. Examples of how this might be achieved include :<br>• A canteen<br>• Staggered breaks for different gangs.<br>• Provision of showers / wash rooms.<br>• Provision of lockers. | | View on site.<br>Check procedures with the Site Manager. | |

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| | • A request to leave PPE on site. | | | |
| h | There is a volume restriction on radio use or there is a radio ban | | Check if restriction / ban is in place and how this is enforced | |

## 3 Environmentally Aware

This section is intended to demonstrate that the constructor has considered the impact of the site on the environment and has implemented measures to mitigate this impact. The following items demonstrate compliance with this section:

| REF | Criteria | √ | Evidence/reference | Validation/Justification |
|---|---|---|---|---|
| a | There are restrictions on the effects of light pollution and all lights are directional and non-polluting. If there is a site specific environmental policy which sets restrictions on lighting, this point can be awarded. | | View on site. | |
| b | Energy saving measures are implemented on site. Examples of this include:<br>• Low energy lighting<br>• Switching off equipment when not in use<br>• Installing thermostats<br>• Installing timers<br>• Choosing energy efficient equipment<br>If there is a site specific environmental policy which defines energy saving measures, this point can be awarded. | | View on site. | |
| c | An impact minimisation strategy review is in place for the site. The review should consider the impact of the site in environmental terms and how any adverse effects are being minimised. | | View impact minimisation strategy. | |
| d | Water saving measures are implemented on site and monitored. If there is a site specific environmental policy which indicates how water saving measures are managed and monitored on site, this point can be | | View procedures on site. | |

| | | | | |
|---|---|---|---|---|
| | awarded. | | | |
| e | Alternative energy sources have been considered. | | View on site. | |
| f | Fuel oil spillage equipment is available. | | View on site. Ensure the spillage equipment is located where spillages may occur to ensure a rapid response time. | |
| g | Sumps are provided in cases of heavy water run off. If there is a site specific environmental policy which indicates how heavy water run off will be minimised and dealt with on site, this point can be awarded. | | View on site. | |
| h | Materials and equipment are tidily stacked and protected / covered where necessary AND there is adequate space for new materials to be stored in secured covered areas to avoid damage, theft and to protect from weather. | | View on site. Ensure that where the space has been provided, it is being used correctly | |

## 4 Safe and considerate working environment

This section is intended to demonstrate that the constructor is operating the site in a clean and safe manner in order to ensure the wellbeing of its workers and to minimise the risk to their health and safety. The following items demonstrate compliance with this section:

| REF | Criteria | √ | Evidence/reference | Validation/Justification |
|---|---|---|---|---|
| a | Adequate facilities are provided on-site for workers and visitors. These must include as a minimum:<br>• Separate male, female and disabled toilets<br>• Working usable showers AND suitable changing areas e<br>• Lockers in the drying room<br>• Dedicated smoking area | | View on site | |
| b | Site facilities are well maintained and clean. This must cover as a minimum:<br>• Areas around the canteen, offices and skips<br>• Site welfare facilities<br>• Dedicated smoking area | | View on site. | |

| | | | | |
|---|---|---|---|---|
| c | Private or visually-impacting areas are screened. These must include as a minimum:<br>• Areas around the canteen, offices and skips where necessary.<br>• Toilets<br>• Dedicated smoking area | | View on site. | |
| d | Clean PPE is available for use by visitors | | Check company policy and procedure and if it is being implemented on site | |
| e | Health and Safety procedures are in place for the following issues:<br>• Appropriate training of all staff including non native operatives to understand H&S best practices and information displayed on site<br>• Operatives' exposure to the sun<br>• Operatives' identification; all operatives to be provided with a photo ID clip card<br>• Reporting of all incidents (minor and serious) and near misses<br>• Ensuring that an appropriate number of first aiders and first aid equipment are available for the site. | | Check company policy and procedures and how these are enforced Check first aid book in particular for minor accidents. Check the first aiders list and their qualifications (must be less than 3 years old). Check that each first aiders have a box with basic equipment and that they have access to more equipment if necessary and that they know where to find it. | |
| f | There is posted material indicating nearest police Station and Hospital (with Accident & Emergency facilities) in the following areas as a minimum:<br>• Site reception<br>• Site canteen<br>• Main site office | | Spot check managers, operatives, reception staff to check they know this information or at least where they would find it. Check induction talk. | |
| g | An inspection has been carried out by a Health and Safety inspector or equivalent. | | View on site. | |
| h | Emergency escape routes well identified and clear emergency evacuation procedure AND drills carried out. | | View on site. Written proof of fire drill procedure. | |

**Signed by:**

**BREEAM Assessor _____**

**Site representative _____**

# Technical checklist A3

| a. Monitor, report and set targets for $CO_2$ production of energy use arising from site activities | | |
|---|---|---|
| **Compliance requirement** | **Tick** | **Evidence/Reference** |
| Monthly measurements of energy use will be/has been recorded and displayed on site. | | |
| Appropriate target levels* of energy consumption will be/were set and displayed (targets could be annual, monthly, or project targets). | | |
| As a minimum, monitoring will/did include checking the meters and displaying some form of graphical analysis in the site office to show consumption over the project duration and how actual consumption compares to the targets set. | | |
| The design/site management team will/did nominate an individual who will be responsible for the monitoring and collection of data. | | |
| Notes:<br>• BREEAM-NL does not require targets to be met but is encouraging the process of setting, monitoring and reporting against targets. | | |

| b. Monitor and report $CO_2$ or energy arising from commercial transport to and from the site | | |
|---|---|---|
| **Compliance requirement** | **Tick** | **Evidence/Reference** |
| A site monitoring system will be/was in place to monitor and record deliveries*. This system will/did record:<br>• The number of deliveries<br>• The mode of transport<br>• The km/miles travelled for all deliveries | | |
| The design/site management team will/did nominate an individual responsible for the monitoring and collection of data. | | |

Notes:

- Where the delivery is specifically for the site, a figure of total distance travelled should be used, i.e. a round trip (from the point of origin, to the site and back to the point of origin).
- Where the delivery to the site is part of a multiple delivery route, the recorded figure for distance travelled should be the distance travelled to the site (from the previous delivery), plus the distance to the next delivery or return.
- This information can then be used to estimate a total figure for kg of $CO_2$ for the project. BREEAM-NL does not require this information to be converted to $CO_2$ but the information must be made available to the senior project and site management staff/suppliers to establish benchmarks and aid future decision-making towards improving site and transport efficiency. If the project team wishes to convert this information into $CO_2$ emissions there are tables provided at the end of this checklist which can be used to do this.

**c. Monitor, report and set targets for water consumption arising from site activities**

| Compliance requirement | Tick | Evidence/Reference |
|---|---|---|
| Monthly measurements of water consumption will be/were recorded and displayed on site. | | |
| Appropriate target* levels of water consumption will be/were set and displayed (targets could be annual, monthly or project targets). | | |
| As a minimum, monitoring will/did include checking the meters and displaying some form of graphical analysis in the site office to show consumption over the project duration and how actual consumption compares to targets set. | | |
| The design/site management team will/did nominate an individual responsible for the monitoring and collection of data. | | |

Notes:

- BREEAM-NL does not require targets to be met but is encouraging the process of setting, monitoring and reporting targets.

| d. Adopt best practice policies in respect of air (dust) pollution arising from site activities | | |
|---|---|---|
| **Compliance requirement** | **Tick** | **Evidence/Reference** |
| The site will/did adopt best practice procedures in relation to minimising air/dust pollution. This should include:<br>• 'dust sheets'<br>• regular proposals to damp down the site in dry weather<br>• covers to skips etc. | | |
| This information will be/was disseminated to site operatives. | | |
| Notes:<br>• Further information can be obtained from DTI/BRE publications 'Control of Dust from Construction and Demolition Activities' and Pollution Control Guide Parts 1-5 provide good practice guidelines on construction related pollution (see References and Further Information for details). | | |
| **e. Adopt best practice policies in respect of water (ground and surface) pollution occurring on the site** | | |
| **Compliance requirement** | **Tick** | **Evidence/Reference** |
| The site will/did adopt best practice procedures in relation to minimising water pollution. | | |
| This information will be/was disseminated to site operatives. | | |

| f. A main contractor with an environmental materials policy | | |
|---|---|---|
| **Compliance requirement** | **Tick** | **Evidence/Reference** |
| The main contractor operates an environmental materials policy, used for sourcing of construction materials to be utilised on site. The policy should cover/promote the following:<br>• Use of local materials (where possible)<br>• Use of responsibly sourced materials<br>• Re use of materials<br>• Use of materials with a high recycled content<br>• Waste minimisation and recycling<br>• Use of non-toxic materials & refrigerants with a high global warming potential<br>• Use of materials with a low embodied impact<br>• Use of durable materials | | |
| Post construction: indicative examples have been provided to demonstrate the policy in action. | | |

| g. A main contractor that operates an Environmental Management System* | | |
|---|---|---|
| **Compliance requirement** | **Tick** | **Evidence/Reference** |
| The main contractor operates an Environmental Management System covering their main operations. The EMS must be third party certified, to ISO14001/EMAS or equivalent standard. | | |

| h. 80% of site timber is reclaimed, re-used or responsibly sourced | | |
|---|---|---|
| **Compliance requirement** | **Tick** | **Evidence/Reference** |
| 80% of timber used during construction, including formwork, site hoardings and other temporary site timber used for the purpose of facilitating construction, will be/was procured from sustainably managed sources, independently certified by one of the top two levels as set out in the Responsible Sourcing of Materials Issues (BREEAM-NL credit Mat 5) in the Materials section of this document. | | |
| Additionally 100% of all site timber will be/was legally sourced. | | |
| Notes:<br>• Re-used timber from off site can be counted as equivalent but re-usable formwork only complies if it meets the above criteria.<br>• This credit can be awarded where all the timber used is reclaimed timber. | | |

**Fit Out assessment only items** (Offices/Retail/Industrial/Bespoke versions)

| **Adopt best practice policies in respect of air (dust) pollution arising from site activities** | | |
|---|---|---|
| **Compliance requirement** | **Tick** | **Evidence/Reference** |
| The site will/did adopt best practice procedures in relation to minimising air/dust pollution. This should include:<br>• 'dust sheets'<br>• regular proposals to damp down the site in dry weather<br>• covers to skips etc. | | |
| This information will be/was disseminated to site operatives. | | |
| | | |

| **Appointment of a fit out contractor who has an environmental materials policy** | | |
|---|---|---|
| **Compliance requirement** | **Tick** | **Evidence/Reference** |
| The fit out contractor operates an environmental materials policy, used for sourcing of construction materials to be utilised on site. The policy should cover/promote the following:<br>• Use of local materials (where possible)<br>• Use of responsibly sourced materials<br>• Re use of materials<br>• Use of materials with a high recycled content<br>• Waste minimisation and recycling<br>• Use of non-toxic materials & refrigerants with a high global warming potential<br>• Use of materials with a low embodied impact<br>• Use of durable materials | | |
| Post construction: indicative examples have been provided to demonstrate the policy in action. | | |

| Appointment of a fit contractor who operates an Environmental Management System | | |
|---|---|---|
| **Compliance requirement** | **Tick** | **Evidence/Reference** |
| • The fit out contractor operates an Environmental Management System covering their main operations. The EMS must be third party certified, to ISO14001/EMAS or equivalent standard. | | |

## Assessor Information

### Monitoring Site Transport $CO_2$

The following tables are taken from the DEFRA 'Guidelines for Company Reporting on Greenhouse Gas Emissions' and COPERT II emission factors, and can be used to convert the information gathered from monitoring deliveries into total kg $CO_2$.

**Table 1 : Standard road transport fuel conversion factors**

| Fuel used | Total units used | Units | x | kg $CO_2$ per unit | Total kg $CO_2$ |
|---|---|---|---|---|---|
| Petrol | | litres | x | 2.30 | |
| Diesel (inc. Low Sulphur) | | litres | x | 2.63 | |
| Compressed Natural Gas | | kg | x | 2.65 | |
| Liquid Petroleum Gas | | litres | x | 1.49 | |

*Source: National Atmospheric Emissions Inventory for 2003 developed by Netcen (2005). UK Greenhouse Gas Inventory for 2003 developed by Netcen (2005), Digest of UK Energy Statistics DTI 2004 and carbon factors for fuels from UKPIA (2004)*

**Table 2 : Standard road transport fuel conversion factors**

| Size of car and distance units | Total units travelled | Units | x | kg $CO_2$ per unit | Total kg $CO_2$ |
|---|---|---|---|---|---|
| Small petrol car max. 1.4 litre engine | | miles | x | 0.26 | |
| | | km | x | 0.16 | |
| Medium petrol car max. 1.4-2.1 litre engine | | miles | x | 0.30 | |
| | | km | x | 0.19 | |
| Large petrol car above 2.1 litres | | miles | x | 0.35 | |
| | | km | x | 0.22 | |
| Average petrol car | | miles | x | 0.29 | |
| | | km | x | 0.18 | |

*Source: NAEI (Netcen, 2005) based on data from DfT combined with factors from TRL as functions of average speed of vehicle derived from test data under real world testing cycles*

| Table 3 : Standard Road Transport Fuel Conversion Factors | | | | | |
|---|---|---|---|---|---|
| **Size of car and distance units** | **Total units travelled** | **Units** | **x** | **kg $CO_2$ per unit** | **Total kg $CO_2$** |
| Small Diesel car 2.0 litres engine and under | | miles | x | 0.26 | |
| | | km | x | 0.16 | |
| Large Diesel car over 2.0 litres - 2.1 litre engine | | miles | x | 0.31 | |
| | | km | x | 0.19 | |
| Average Diesel car | | miles | x | 0.27 | |
| | | km | x | 0.17 | |

*Source: NAEI (Netcen, 2005) based on data from DfT combined with factors from TRL as functions of average speed of vehicle derived from test data under real world testing cycles.*

| Table 4: Freight road mileage conversion factors | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Type of lorry** | **Total km travelled** | **x** | **Litre Fuel per km** | **x** | **Fuel Type** | **Fuel Conversion Factor** | **Total kg $CO_2$** |
| Articulated | | x | 0.35 | x | Petrol | 2.30 | |
| | | | | | Diesel | 2.63 | |
| | | | | | LPG | 1.49 | |
| Rigid | | x | 0.40 | x | Petrol | 2.30 | |
| | | | | | Diesel | 2.63 | |
| | | | | | LPG | 1.49 | |

*Source: Guidelines for Company Reporting on Greenhouse Gas Emissions, DEFRA. Continuing Survey of Road Goods Transport 2001.*

## Section 1: Ecological features of the site

**Instruction:** criteria 1.1-1.5 can be used to determine the presence of existing ecological features across the total site. However, if YES is recorded against **any** question in Section 1 for the *construction zone,* then it cannot be defined as *land of low ecological value* and the credit cannot be awarded. If the *construction zone* records a NO against **all** the questions in Section 1 then proceed to Section 2.

| | | | |
|---|---|---|---|
| 1.1 | Does the site contain any trees or hedges above 1m high or with a trunk diameter greater than 100mm? | YES ☐ | NO ☐ |
| 1.2 | Are there any ponds, streams or rivers on, or running through the site? | YES ☐ | NO ☐ |
| 1.3 | Is there any marsh or other wetland present on the site? | YES ☐ | NO ☐ |
| 1.4 | Are there any meadows or species-rich grassland present on the site? | YES ☐ | NO ☐ |
| 1.5 | Is there any heath land such as heather present on site? | YES ☐ | NO ☐ |

## Section 2: Type of land to be used for the new building

**Instruction:** in addition to answering NO to all the questions in Section 1, if YES is recorded against one or more of the questions in Section 2 then the *construction zone* can be defined as *land of low ecological value*. This credit can then be awarded, as long as all features of ecological value (as defined in Section 1) in the surrounding site and boundary area are adequately protected from damage.

| | | | |
|---|---|---|---|
| 2.1 | Does the *construction zone* consist of land which is entirely within the footprint of existing building(s) or building(s) demolished within the past 2 years? | YES ☐ | NO ☐ |
| 2.2 | Does the *construction zone* consist of land which is entirely covered by other construction such as hard surfaces, car parking or such constructions which have been demolished within the past two years? | YES ☐ | NO ☐ |
| 2.3 | Does the *construction zone* consist of land which is contaminated by industrial or other waste to the extent that it would need decontamination to facilitate development? | YES ☐ | NO ☐ |
| 2.4 | Does the *construction zone* consist of land which is a mixture of either existing building(s), hard surfaces and/or contaminated land? | YES ☐ | NO ☐ |
| 2.5 | Does 80% of the land within the *construction zone* comply with statements 2.1, 2.2 or 2.3 and the remaining 20% of the footprint of the *construction zone* extend into land which has been either:<br>a. Used for single-crop arable farming for at least 5 years, OR<br>b. Consists of regularly cut lawns and sports fields | YES ☐ | NO ☐ |

# Technical checklist A5

breeam:international

| BREEAM Europe 2008 |
|---|
| Materials |
| Checklist A5 – Responsible Sourcing |

Table 1 - Checklist of requirements for Tiers 1-4

| Tier | Requirements | Examples of compliant schemes | Checklist of documentation required |
|---|---|---|---|
| 1 | Third party certification scheme with CoC and rigorous stakeholder consultation (at both standard setting and during implementation)<br><br>Scheme must have developed standards which meet the requirements outlined in Table 3 below. | FSC<br>CSA<br>SFI with CoC<br>PEFC<br>Reused materials | **Design**<br><br>One of the following indicating that the material will comply with the relevant certification scheme.<br>• Letter of intent from supplier<br>OR<br>• Purchase order from the supplier including CoC number (if the material has been ordered)<br>OR<br>• Chain of Custody (CoC) certificate (if timber has already been supplied)<br><br>**Post Construction**<br>• CoC certificate for all appropriate elements<br>AND<br>• Delivery notes for all appropriate elements |
| 2 | Third party certification scheme with CoC and stakeholder consultation.<br><br>Scheme must have developed standards which meet the requirements outlined in Table 3 below. | Currently no schemes in this tier | As above. |

| Tier | Requirements | Examples of compliant schemes | Checklist of documentation required |
|---|---|---|---|
| 3 | Certification Scheme for timber<br><br>Environmental Management System at **extraction & process stages** - see Table 2 below for description of stages. | ISO 14001<br>EMAS<br>MTCC<br>Verified*<br>SGS<br>TFT | **Design**<br><br>Timber<br><br>One of the following indicating that the material will comply with the relevant certification scheme.<br>• Letter of intent from supplier<br>OR<br>• Purchase order from the supplier including CoC number (if the material has been ordered)<br>OR<br>• Chain of Custody (CoC) certificate (if timber has already been supplied)<br><br>Non timber materials<br><br>One of the following indicating that the material will comply with the relevant EMS standards (see credit for further information).<br><br>• EMS (or equivalent) certificate from the manufacturers at the process and extraction stages<br>OR<br>• Signed letter from the manufacturers at the process and extraction stages confirming EMS (or equivalent) certification details<br>OR<br>• Letter of intent from the developer to use a manufacturer at the process and extraction stages, who has an EMS (or equivalent), if supplier is not yet appointed. |

| Tier | Requirements | Examples of compliant schemes | Checklist of documentation required |
|---|---|---|---|
| 3 | | | Post Construction<br>• Delivery notes for all appropriate elements<br><br>Timber<br>• CoC certificate for all appropriate elements<br><br>Non timber materials<br><br>One of the following indicating that the material will comply with the relevant EMS standards (see credit for further information).<br>• EMS certificate (or equivalent) from the manufacturers at the process and extraction stages<br>OR<br>• Signed letter from the manufacturers at the process and extraction stages confirming EMS (or equivalent) certification details<br><br>In addition:<br>• Delivery notes for all appropriate elements |

| Tier | Requirements | Examples of compliant schemes | Checklist of documentation required |
|---|---|---|---|
| 4 | Environmental Management System at process stages for other materials - see Table 2 below for description of stages. | EMAS<br>ISO 14001 | Design<br><br>One of the following indicating that the material will comply with the relevant EMS standards (see credit for further information).<br>• EMS (or equivalent) certificate from the manufacturers at the process stage<br>OR<br>• Signed letter from the manufacturers at the process stage confirming EMS (or equivalent) certification details<br>OR<br>• Letter of intent from the developer to use a manufacturer at the process stage, who has an EMS (or equivalent), if supplier is not yet appointed.<br><br>Post Construction<br><br>One of the following indicating that the material will comply with the relevant EMS standards (see credit for further information).<br>• EMS certificate (or equivalent) from the manufacturers at the process stage<br>OR<br>• Signed letter from the manufacturers at the process stage confirming EMS (or equivalent) certification details. |

* 'Verified' is the name of a scheme

**Where ANY non certified timber is used (even if only a small quantity) the following must also be provided in ALL cases:**

- Written confirmation from the timber supplier(s) (or at the design stage of assessment, the developer where a supplier is not yet appointed) confirming that all timber species and sources used in the development are not listed on any of the CITES appendices for endangered and threatened species (see credit for further information).
- Written confirmation from the timber supplier(s) (or at the design stage of assessment the developer where a supplier is not yet appointed) confirming that all timber is to be legally sourced (see credit for further information).

Table 2 - Diagrammatic explanation of how the required EMS relates to the process and extraction phases

| Stage of production process | Extraction | Process | Manufacture |
|---|---|---|---|
| Materials | Stone<br>Aggregate (sand, limestone etc.)<br>Hematite<br>Bauxite<br>Clay<br>Raw materials - other | Bricks<br>Cement or alternative<br><br>Glass<br>Metals<br>Other materials (plastic etc)<br>Pre-cast concrete | Concrete / blocks<br><br><br><br>Composites |
| Points available | 1.5 points | 1 point | |

Note: As this credit is looking at responsible sourcing, currently the manufacture stage is not considered.

NOTE TO ASSESSORS

This list is included for information, you are not expected to evaluate whether a scheme complies with this criteria. All new schemes claiming to meet the criteria listed below will be evaluated by BRE, and will be included in the list of compliant schemes where appropriate.

Table 3 - Features of a top tier (1) comparable certification scheme

| Standard setting |
| --- |
| When setting standards for a materials certification scheme the following should be addressed in order to be considered comparable to Tier 1/2 of this credit.<br>• The scheme must include a third party chain of custody certification scheme covering all stages of the product throughout the supply chain<br>• The scheme must verify that all local and national legislative requirements are met.<br>• The process for policy and standards development is transparent, clear and accessible.<br>• The scheme is independent and standards are developed in a way which balances the interests of all stakeholders. This should be done through a rigorous consultation process which makes best use of the stakeholder knowledge, methodically and comprehensively considering all feedback and after such consideration, aims to implement all feasible stakeholder suggestions<br>• The scheme is inclusive, striving to involve all interested people and groups in the development of the scheme's policies and standards.<br>• Monitoring and assessment must be integral to the scheme and conducted appropriate to the scale and intensity of the industry/ materials assessed by the scheme. This requirement is likely to be fulfilled by the incorporation of an EMS such as ISO14001.<br>• The scheme should contain principles by which the scheme should be governed. These should be specific to industry/materials but should also be composed of the fundamental issues related to the environment. These issues should focus on specific practices associated with sourcing virgin and other materials.<br>• The scheme should assess that initiatives are in place to ensure continuous performance and environmental improvement.<br>• The scheme should provide for small to medium sized business as well as larger businesses. SME's grouping together to achieve group certification should be an |

option. This could, for example, take place on a regional or other relevant basis.

- The scheme should include a mechanism to revise the standard within a defined, suitable time frame to ensure that the current knowledge or upcoming robust scientific or other professional evidence can be incorporated (in good time) into the standard as an update. It should ensure that all updates are well adapted to the local/regional and/or global conditions.

- The scheme should also aim to consider social and economic aspects widening the scope to sustainability under the umbrella of a Corporate Social Responsibility (CSR). This is in line with the future aims of BREEAM and could be assessed within the credit in the future.

NOTE: The scheme may be generic for the materials industries or specific for individual materials sectors.

**Differences between Tier 1&2**

Tiers 1 and 2 follow the standard setting process outline above, however there are differences in the rigour of the two schemes which is why they fall into two different categories. These are outlined below:

1. The top tier category schemes comprehensively address a consultation process with local community. This is done at source via a management company, as the focus is on sustainable project management at source.

2. The top tier category must have no reservations/uncertainty/pending charge or indictment identified by any professional bodies in the relevant materials sectors.

# Technical checklist A7

**Average NOx emission for grid electricity in the Netherlands is 357.22 mg/kWh**

| Feature | Additional Requirements / Guidance | Credits available | Credits achieved |
|---|---|---|---|
| **Cooling System** | | | |
| **Applicable to all climatic zones**<br>Where the building incorporates a free cooling strategy that completely displaces the need for conventional mechanical cooling systems and that thermal comfort has been considered. | Where the building has **ANY** of the following free cooling strategies:<br>1. Night-time cooling (requires fabric to have a high thermal mass);<br>2. Ground coupled air cooling;<br>3. Displacement ventilation;<br>4. Ground water cooling;<br>5. Surface water cooling;<br>6. Evaporative cooling, direct or indirect;<br>7. Desiccant dehumidification and evaporative cooling, using waste heat;<br>8. Absorption cooling, using waste heat;<br>9. The building does not require any form of cooling (i.e. naturally ventilated). | 1 | |
| **Applicable to 'Southern and Mediterranean' climatic zone only**<br>Where there is mechanical cooling, at least 80% of cooling demand is served by systems using a refrigerant to distribute cooling to each zone and seasonal mixed mode controls adopted<br>**OR**<br>No mechanical cooling (apart from where required as part of building regulations) | That is, cooling distribution is not by air or water based systems.<br>Mechanical cooling is only operated when otherwise overheating would occur.<br>For buildings above 10MW of cooling load, water systems are allowed if Seasonal Energy Efficiency Ratio (SEER) is above 3.3. | 1 | |
| **Heating System** | | | |
| **Applicable to all climatic zones except 'Southern and Mediterranean'**<br>Construction of walls, floors, roof, windows, doors etc:<br>Average U-value [$W/m^2K$] is 20% better than current national regulations (based on values from confirmed construction specifications (see U-Values in Europe[4])<br>If national regulations do not exist then the reference values to take are: Walls = 0.35 $W/m^2K$, Floors = 0.25 $W/m^2K$, Roofs = 0.25 $W/m^2K$ | Glazing shading and thermal mass are not considered directly for credits as their carbon impact needs to be calculated for each project - there may be an advantage or disadvantage depending on other circumstances.<br><br>This credit assumes that the heating advantage is dominant and that cooling and daylighting are not compromised by multi-layer glazing. The exclusion of other coatings is because they often compromise daylight availability. | 1 | |

| | | | |
|---|---|---|---|
| **AND**<br>Glazing - If 95 % of windows are double or triple glazed with low emissivity (but no other) coating and the area of glazing is ≤ 50% of all external wall areas. | | | |
| **Ventilation** | | | |
| All ductwork and Air Handling Units (AHUs) if used are certificated to meet the best leakage standards<br><br>**OR**<br><br>No mechanical ventilation (apart from where required as part of building regulations) | For example ductwork meets EN13779[5] class B, AHUs meet EN1886[6] class L1. | 1 | |
| **Fan Power** | | | |
| Specific fan power <1W/l/s for all ducted air handling systems<br><br>**OR**<br><br>No mechanical ventilation (apart from where required as part of building regulations) | | 1 | |
| **Lighting** | | | |
| Energy efficient light source | At least 90% of light fittings are ≤ 3.3w/m$^2$/100lux (equivalent to T5 (16 mm diameter) triphosphor coated fluorescent tube with high frequency ballast, or better) | 1 | |
| Lighting controls | Either daylight sensing<br><br>**OR**<br><br>Occupancy sensing, covering at least 90% of building floor area. | 1 | |
| **Low-Carbon and Renewable Energy Technologies** | | | |
| At least 5% of total electricity demand is generated on site from Low Carbon or Renewable Energy Sources | Where the building has **ANY** of the following Low-Carbon / Renewable Energy technologies:<br>• Stand alone and roof mounted wind turbines;<br>• Solar domestic hot water;<br>• Photovoltaic panels;<br>• Ground/water source heat/coolth pumps;<br>• Geothermal energy;<br>• Biomass, biogas;<br>• Fuel cells (based on hydrogen generated from using renewable energy technologies)<br>• Heat from technological processes that | 1 | |
| At least 5% of total space and water heating demand is generated on site from Low Carbon or Renewable Energy Sources | | 1 | |

| | | | |
|---|---|---|---|
| | would otherwise be wasted, delivered via district heating network (but not heat generated for the purpose of feeding into a district heating network).<br><br>*For ground/water source heat/coolth pumps the seasonal system Coefficient Of Performance (CoP) has to be at least 2.5.* | | |
| **Heat and/or Cooling Generator Efficiency** | | | |
| At least 90% of the space heating and hot water energy is provided from a source (excluding electric resistance heating) with seasonal efficiency at least 90% or measured full load efficiency at least 95%<br>**OR**<br>At least 70% of space heating and hot water energy is provided from high efficiency cogeneration or trigeneration. | The implication is that oil and coal will not get credits here as they cannot achieve these efficiencies.<br>For heat pump or biofuel heating see low carbon credits above.<br><br>High efficiency cogeneration should meet minimum standards defined in EU CHP directive or according to national standards implementing this directive. | 1 | |
| **Others** | | | |
| Pressure test shows air permeability ≤ 50% of current national standards.<br>If national standards are not available, $5m^3/h/m^2$ @ 50Pa should be taken as the default value. | | 1 | |
| **Total (max)** | | **10** | |

[i] BES6001:2008 Issue 1 *Framework Standard for the Responsible Sourcing of Construction Products*, BRE Global, 2008.