

**FLEXIBLE PVC-P
WATERPROOFING
MEMBRANES**
RENOLIT Belgium
NV

Product family

RENOLIT ALKORPLAN A,
RENOLIT ALKORPLAN L,
RENOLIT ALKORPLAN F

Thermoplastic PVC-P membrane

WATERPROOFING MEMBRANES

RENOLIT Belgium NV



FLEXIBLE PVC-P WATERPROOFING MEMBRANES

Product family

RENOLIT ALKORPLAN

Description

RENOLIT ALKORPLAN is a thermoplastic flexible membrane made of a PVC-P monomer base. RENOLIT ALKORPLAN membranes are primarily intended for flat roofs, but they are also used for vaulted or sloped roofs due to their aesthetic qualities. They can be installed on all types of accepted constructions for new build or refurbishment.

Contact information

Representative in Spain:
RENOLIT IBERICA S.A. www.renolit.com
 Carretera del Montnegre, s/n, 08470 Sant Celoni,
 Tel: +34 93/848 40 00
 Juan Carlos Giralt – juan-carlos.giralt@renolit.com

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Summary table: Environmental parameters in which the material has a specific contribution. Detailed in the respective credit membranes of the environmental certifications VERDE, LEED and BREEAM.

Supporting documents ■ **Certifications:** EPD, CSR, REACH ■ **Self-declarations** ■ **Potential**

Category	Supporting documents	Certifications	Self-declarations	Potential
Plot Mobility 	Solar reflectance index SRI	Rainwater management	External lighting control	...
Energy Atmosphere 	Embodied energy	Greenhouse gases	Energy demand reduction	Equipment efficiency, Other polluting gases, Renewable energy, Energy management, ...
Materials 	Accredited location	Pre-consumer recycling	Post-consumer recycling	Reuse potential, Certified wood, Construction waste, Chemical composition, ...
Water 	Consumption < reference	Water management	...	
Indoor comfort 	Low VOC emission	Low formaldehyde emission	Comfort control	Visual comfort, Acoustic comfort, Air quality, ...
Innovation 	Innovative design	...		

NOTES:

- The information contained in this document, in accordance with the respective credits of the selected environmental certification system (VERDE, LEED or BREEAM), is based on information provided by the company. To ensure the possibility of compliance with said credits, it is required during any of the accreditation processes to verify the validity of the information provided.
- This document does not constitute a product certification, nor is it a guarantee of compliance with current local regulations.
- The conclusions of this analysis apply only to the products mentioned in this report and are subject to the invariability of the technical conditions of the product.
- The validity of this document is subject to the expiration of supporting documentation or to changes made to the regulations and/or versions of each environmental certification seal.
- This document provides information about the potential contribution of the studied products to obtain VERDE, LEED or BREEAM certifications. However, the final decision on whether a product meets the requirements for LEED certification is exclusive to the GBCI (Green Business Certification Inc.)

Table of contents

CREDIT SUMMARY	5
VERDE	5
PLOT AND SITE	6
• P&S 08, Heat island effect	6
NATURAL RESOURCES	7
• NR05, Use of recycled materials	7
NATURAL RESOURCES	8
• NR06, Use of materials obtained from sustainable resources	8
NATURAL RESOURCES	9
• NR07, Use of local materials	9
NATURAL RESOURCES	10
• NR08, Selective demolition strategy planning	10
NATURAL RESOURCES	11
• NR09, Construction waste management	11
NATURAL RESOURCES	12
• NR10, Impact of construction materials	12
NATURAL RESOURCES	13
• NR11, Product eco-labeling	13
CREDIT SUMMARY	14
LEED v4	14
SUSTAINABLE SITES (SS)	15
• SSc2, Site Development – Protect or Restore Habitat	15
SUSTAINABLE SITES (SS)	16
• SSc3, Open Space	16
SUSTAINABLE SITES (SS)	17
• SSc4, Rainwater Management	17
SUSTAINABLE SITES (SS)	18
• SSc5, Heat Island Reduction	18
MATERIALS & RESOURCES (MR)	20
• MRp2 and MRc5, Construction and Demolition Waste Management Planning	20
MATERIALS & RESOURCES (MR)	21
• MRc1, Building Life-Cycle Impact Reduction	21
MATERIALS & RESOURCES (MR)	23
• MRc2, Building Product Disclosure and Optimization – Environmental Product Declarations (EPD)	23
MATERIALS & RESOURCES (MR)	24

- SSc3, Building Product Disclosure and Optimization – Sourcing of Raw Materials .. 24
- CREDIT SUMMARY 26**
- BREEAM 26**
- MANAGEMENT 27
 - Man 03 Construction site impacts 27
- MANAGEMENT 29
 - Man 05 Life cycle cost and service life planning 29
- MATERIALS..... 30
 - Mat 01 – Life cycle impacts..... 30
 - Mat 08 – Materials of low environmental impact 30
- MATERIALS..... 32
 - Mat 03 – Responsible sourcing of materials..... 32
 - Mat 09 – Responsible sourcing of materials – key building elements..... 32
- WASTE 34
 - Wst 01 – Construction waste management..... 34
- INNOVATION..... 36
 - INNOVATION 36



CREDIT SUMMARY

VERDE



PLOT AND SITE (P&S)

- ◆ PS 08, Heat island effect



NATURAL RESOURCES (NR)

- ◆ NR 05, Use of recycled materials
- ◆ NR 06, Use of materials obtained from sustainable resources
- ◆ NR 07, Use of local materials
- ◆ NR 08, Selective demolition strategy planning
- ◆ NR 09, Construction waste management
- ◆ NR 10, Impact of construction materials
- ◆ NR 11, Product eco-labeling

Environmental categories VERDE



Plot and site



Energy and atmosphere



Natural resources



Indoor space quality



Quality of service



Social and economic aspects



Innovation

VERDE certification standards

Ω Residential
Ω Equipment

Omega Residential
Omega Equipment

DU P

Polygonal urban development

CREDIT SHEET

VERDE



CATEGORY

PLOT AND SITE

P&S 08, Heat island effect

(Ω Equipment - Ω Res Can contribute up to 1.63% of the total score in Ω Residential and up to 1.65% in Ω Equipment)

Aim Reduce the heat island effect in urban areas through the use of wooded green spaces and the installation of shading elements and solar protection on accumulative surfaces.

Compliance information In the event that the waterproofing membranes are the outermost layer of the roof, this material can be considered for this credit by means of its Solar Reflection Index (SRI).

To qualify for the credit, the SRI must be greater than 50% in roofs with a slope greater than 15%, and greater than 70% in roofs with a slope of less than 15%.

RENOLIT has provided the SRI testing results of the following products according to the color of their finish.

PRODUCT	SRI
RENOLIT ALKORBRIGHT	110%
RENOLIT ALKORSMART Cool Grey	62.8%
RENOLIT ALKORSMART Cool Ivory	82.5%

Testing process In this case, it can be seen that if the roof slope of the building in question is less than 15%, this credit can be met if covered by either the **RENOLIT ALKORBRIGHT** or **RENOLIT ALKORSMART Cool Ivory** membranes; and if the slope is greater than 15%, the credit would also be met if covered by either the **RENOLIT ALKORBRIGHT**, **RENOLIT ALKORSMART Cool Ivory**, or **RENOLIT ALKORSMART Cool Grey** membranes.

The testing process of the building by means of this credit is established by calculating the surface area of the plot, roof and E-S-W facades that have the following characteristics:

- Landscaped surfaces with a topsoil thickness of at least 20cm.
- Surfaces with permeable paving. In the case of open grid permeable paving, at least 50% of its surface must be permeable.
- Surfaces shaded by highly reflective coating elements.
- Surfaces with a highly reflective coating.

The percentage of these surfaces with respect to the total surface area of roofing and E-S-W facades should be between 40% and 70%.

Analysis example NA

Supporting documentation *Test ASTM E1980-11*

Baseline NA



CATEGORY NATURAL RESOURCES

◆ NR05, Use of recycled materials

(Ω Equipment - Ω Res, Can contribute up to 1.57% of the total score in Ω Equipment and up to 2.48% in Ω Residential)

Aim Encourage the choice of producers with high levels of pre-consumer and post-consumer recycling in their products in order to reduce the depletion of raw materials and the environmental impact associated with their extraction.

Compliance information **RENOLIT** ALKORPLAN membranes contain recycled material, always of pre-consumer origin and in variable percentages according to the characteristics of each individual product. **RENOLIT** provides self-declarations regarding the recycled content.

PRODUCT	% POST-CONSUMER RECYCLED MATERIAL	% PRE-CONSUMER RECYCLED MATERIAL
RENOLIT ALKORPLAN A *	0 %	13.9 – 44.7 %*
RENOLIT ALKORPLAN L	0%	12.7 – 14.5 %
RENOLIT ALKORPLAN F	0%	9.5 – 46.8 %

* PVC-P accounts for approximately 85% of the **RENOLIT** ALKORPLAN A material and it is the only component containing recycled materials. The above values have already been calculated considering the total.

Testing process The testing process of the building by means of this credit is established by calculating the total percentage of post-consumer recycled material plus 50% of the pre-consumer recycled material with respect to the total material used in the building project or renovation process. This percentage should be between 10% and 30%.

Ω Residential calculation is established by taking, on the one hand, dry and stone materials (which should make up between 40% and 100%), and on the other hand, all remaining materials (a percentage that should vary between 10% and 30%).

Analysis example NA

Supporting documentation *Self-declaration of recycled material content*

Baseline NA



CATEGORY NATURAL RESOURCES

◆ **NR06, Use of materials obtained from sustainable resources**
(Ω Equipment - Ω Res, Can contribute up to 1.26% of the total score in Ω Equipment and up to 1.24% in Ω Residential)

Aim Encourage the use of materials sourced from and extracted according to recognized social and environmental standards. The objective is to protect forests, prevent child exploitation and maintain environmentally respectful standards in the extraction of natural stone.

Compliance information **RENOLIT** membranes are delivered on wooden pallets and packaging from Embalajes del Vallés S.L. which hold ISO 9001:2015 certification specifying the provision of a control system for the chain of custody of forest products. In addition, **RENOLIT** requires that all its raw material distributors comply with basic workers rights, including child labor and environmental respect for protected areas of high ecological value.

Testing process The testing process of the building by means of this credit is established by calculating the total percentage of wood and materials containing wood used in the project that possess chain of custody certification. All wood to be used during construction must be considered, even if not permanently installed in the building, such as concrete formwork and pallets. This percentage should be between 5% and 50%.

Analysis example NA

Supporting documentation *ISO9001 – PEFC – Embalajes del Vallés Company policy*

Baseline NA



CATEGORY NATURAL RESOURCES

◆ NR07, Use of local materials

(Ω Equipment and Ω Res, Can contribute up to 2.51% of the total score in Ω Equipment and up to 2.48% in Ω Residential)

Aim Encourage the use of local materials, thus promoting the local economy and reducing impact caused by transport.

Compliance information The production center of all **RENOLIT** ALKORPLAN products is located at Carretera de Montnegre, s/n – 08470 Sant Celoni - Spain

Testing process The testing process of the building by means of this credit is established by calculating the total percentage of locally produced materials in relation to the total materials used in the project. Local materials are considered to be those whose production plant is located within a radius of between 200 and 400km from the site in question.

All materials must be considered, including mechanical, electrical or plumbing components; as well as special elements such as elevators or other equipment.

Materials produced within a radius of between 0 and 200km from the center of the plot compute 100%.

Materials produced within a radius of between 200 and 400km from the center of the plot are calculated based on a linear scale in which materials produced at a distance of 200km are calculated at 100% and those produced at a distance of 400km are calculated at 0%.

Materials produced at a distance of more than 400km from the center of the plot are not scored.

Analysis example NA

Supporting documentation *Environmental Product Declaration (EPD)*
Declaration of location

Baseline NA



CATEGORY NATURAL RESOURCES

◆ NR08, Selective demolition strategy planning

(Ω Equipment - Ω Res, Can contribute up to 1.57% of the total score in Ω Equipment and up to 1.55% in Ω Residential)

Aim Encourage designs that include and anticipate a selective demolition plan at the end of the building life cycle that allows the reuse of the maximum amount of materials and recycling of the rest.

Compliance information **RENOLIT ALKORPLAN L** and **RENOLIT ALKORPLAN F** membranes are easily removed, and are therefore relatively straightforward to recycle during the waste treatment stage (100% recyclable). It is, however, assumed that 10% of the membrane is lost during the removal process. This 10% loss is transported to a landfill.

On the other hand, **RENOLIT ALKORPLAN A** membranes, due to their adhesion system, are not easily removed, and are therefore more difficult to recycle during the waste treatment stage. For these membranes, a typical scenario (as indicated by the Technical Committee CEN/TC 254 on flexible membranes for waterproofing) was considered, resulting in 10% of the material able to be recycled, 45% destined for incineration and 45% for landfill.

PRODUCT	% REUSABLE MATERIAL	% RECYCLABLE MATERIAL
RENOLIT ALKORPLAN A	0 %	10%
RENOLIT ALKORPLAN L	0%	90%
RENOLIT ALKORPLAN F	0%	90%

Testing process The testing process of the building by means of this credit is established by the existence of a selective demolition plan in compliance with certain requirements that ensures the reuse of materials and facilitates recycling of the remainder.

To comply with the objectives of this credit, the Selective Demolition Plan must meet the following requirements:

- Ensure the reuse of at least 10% of the total materials.
- Ensure the revaluation of the remaining materials, guaranteeing that at least 80% will be recycled in such a manner that they reenter the production chain of materials or other products.
-

Analysis example NA

Supporting documentation *Environmental Product Declaration (EPD)*
Selective Demolition Plan

Baseline NA



CATEGORY NATURAL RESOURCES

NR09, Construction waste management
(Ω Equipment - Ω Res, Can contribute up to 1.26% of the total score in Ω Equipment and up to 1.24% in Ω Residential)

Aim Reduce construction waste by using prefabricated and industrial materials and by using controlled work processes that minimize waste production. Only waste produced during the construction or renovation phase is considered. The percentage of revalued waste should be between 50% and 75% of the total construction waste.

Compliance information 100% of both material waste generated during its installation, as well as packaging materials, can be collected for recycling. The waste generated (in kg/m²) by each product is outlined in the table below.

PRODUCT	WASTE GENERATED
RENOLIT ALKORPLAN A	0.26 kg/m ² (1.2mm thickness)
RENOLIT ALKORPLAN L	0.30 kg/m ² (1.5mm thickness)
RENOLIT ALKORPLAN F	0.18-0.22 kg/m ² (1.2mm thickness)

Testing process The testing process of the building by means of this credit is determined by the existence, in the planning phase, of a Construction Waste Management Survey that complies with current regulations. Before beginning the intervention phase, a Construction Waste Management Plan, in accordance with the above-mentioned Survey, must be devised. In the case of a renovation intervention, all waste production that is required for the renovation will be considered, including possible demolitions.

Analysis example NA

Supporting documentation *Environmental Product Declaration (EPD) of each product (3.2.2 A5)*

Baseline NA



CATEGORY NATURAL RESOURCES

NR10, Impact of construction materials

(Ω Equipment - Ω Res, Can contribute up to 6.92% of the total score in Ω Equipment and up to 6.83% in Ω Residential)

Aim Reduce the impacts associated with the production of construction materials by choosing materials with a low impact throughout their extraction and transformation processes, as well as by using reused and/or recycled materials.

Compliance information **RENOLIT** provides EPDs for all **RENOLIT** ALKORPLAN products. The table below shows the impacts reflected in the EPDs of each product. These results can be used to calculate the LCA of the building.

CRADLE TO GATE IMPACT	Climate change	Ozone depletion	Acidification	Eutrophication	Tropospheric ozone formation	Use of non-renewable primary energy resources
Indicator	Kg CO ₂ -Eq/fu	Kg CFC11-Eq/fu	KgSO ₂ -Eq/fu	Kg (PO ₄) ₃ -Eq/fu	KGEthe n-Eq/fu	MJ/fu
RENOLIT ALKORPLAN A	11.7	1.96E-06	3.51E-02	6.55E-03	4.08E-03	267
RENOLIT ALKORPLAN L	12.5	2.18E-06	3.75E-02	3.93E-03	5.08E-03	281
RENOLIT ALKORPLAN F (1.2mm 2.10m)	8.1	1.51E-06	2.46E-02	5.52E-03	2.53E-03	176
RENOLIT ALKORPLAN F (1.2mm 1.05m)	8.08	1.51E-06	2.45E-02	5.51E-03	2.53E-03	176
RENOLIT ALKORPLAN F (1.2mm 1.60m)	8.43	1.59E-06	2.55E-02	5.61E-03	2.60E-03	182
RENOLIT ALKORPLAN F (1.5mm 1.60m)	1.03E+01	1.97E-06	3.09E-02	6.42E-03	3.13E-03	222

Testing process The testing process of the building by means of this credit is established by the comparison of impacts attributed to the construction materials in relation to an established baseline. The scope of study of this credit is limited to materials used for the surroundings and interior partitions, including the following construction elements: roofing, facade, horizontal and vertical interior partitions, slabs in contact with the ground and basement walls. It has been decided not to include the structure in the calculation of this credit. However, it could be included if the definition of a baseline structure for a particular case is justified.

Analysis example NA

Supporting documentation *Environmental Product Declaration (EPD)*

Baseline NA



CATEGORY NATURAL RESOURCES

➤ NR11, Product eco-labeling

(Ω Equipment and Ω Res, Can contribute up to 2.51% of the total score in Ω Equipment and up to 2.48% in Ω Residential)

Aim	Encourage the use of products with Type I or Type III ecolabels.
Compliance information	RENOLIT ALKORPLAN A , RENOLIT ALKORPLAN L and RENOLIT ALKORPLAN F have their own EPD. As a result, these products contribute to meeting this credit.
Testing process	<p>The testing process of the building by means of this credit is established by a list of materials that have a Type I or Type III ecolabel (EPD). To obtain the maximum score:</p> <ul style="list-style-type: none"> • The total percentage of materials with a Type I ecolabel must be between 10% and 20%. • The total percentage of materials with an EPD must be between 10% and 20%, and must include at least the following groups: structural elements, insulation and coverings.
Analysis example	NA
Supporting documentation	<i>Environmental Product Declaration (EPD)</i>
Baseline	NA

CREDIT SUMMARY

LEED v4



SUSTAINABLE SITES (SS)

- SSc2, Site Development – Protect or Restore Habitat
- SSc3, Open Space
- SSc4, Rainwater Management
- SSc5, Heat Island Reduction



MATERIALS AND RESOURCES (MR)

- MRp2 and MRc5, Construction and Demolition Waste Management Planning
- MRc1, Building Life-Cycle Impact Reduction
- MRc2, Building Product Disclosure and Optimization – Environmental Product Declarations (EPD)
- MRc3, Building Product Disclosure and Optimization – Sourcing of Raw Materials

LEED environmental categories



(LT)
Location & Transportation



(SS)
Sustainable Sites



(WE)
Water Efficiency



(EA)
Energy and atmosphere



(MR)
Materials & Resources



(IEQ)
Indoor Environmental Quality



(ID)
Innovation



(RP)
Regional Priority

LEED certification standards (v4)

EB Existing Building	RNC Retail New Construction	DCNC Data Center NC
NC New Construction	REB Retail Existing Building	DCEB Data Center EB
CI Commercial Interiors	RCI Retail Commercial Interiors	WNC Warehouse NC
CS Core & Shell	HC Healthcare	WEB Warehouse EB
SNC School New Construction	HNC Hospitality-New Constr.	NDP Neighborhood Devel. Plan
SEB School Existing Building	HEB Hospitality-Existing Building	ND Neighborhood Develop.
MRB Mid Rise Buildings	HCI Hospitality-Commercial Int.	HO Homes

CREDIT SHEET

LEED v4



CATEGORY

SUSTAINABLE SITES (SS)

SSc2, Site Development – Protect or Restore Habitat (LEED BDC: NC, CS, SNC, RNC, HC, HNC, DCNC, WNC)

Aim	To conserve existing natural areas and restore damaged areas to provide habitat and promote biodiversity, keeping 40% of the site unaffected.
Compliance information	The waterproofing membrane, if part of a green (more common?) roof system, can contribute to the natural restoration of the site. In any case, it would only be considered a partial contribution. The RENOLIT ALKORGREEN system includes a large number of the components needed to implement a vegetated roof system.
Testing process	1. Restore 30% of the altered site with native or adapted plants. Justify the soil composition: -Soils (imported or in situ) must be reused for functions comparable to their original function. -Restored soils must meet soil criteria in terms of: 1. Organic content, 2. Compaction, and 3. Infiltration rate. They must also comply with one of the following two categories: 4. Biological function of the soil and 5. Chemical characteristics of the soil.
Analysis example	NA
Supporting documentation	FT RENOLIT ALKORGREEN
Baseline	<ul style="list-style-type: none"> • U.S. EPA ecoregions: epa.gov • Land Trust Alliance accreditation: landtrustalliance.org • Natural Resources Conservation Service, web soil survey: websoilsurvey.nrcs.usda.gov • Sustainable Sites Initiative (SITES™): sustainablesites.org



CATEGORY SUSTAINABLE SITES (SS)

SSc3, Open Space (LEED BDC: NC, CS, SNC, RNC, HC, HNC, DCNC, WNC)

Aim	To promote biodiversity via a high proportion of open spaces.
Compliance information	<p>The waterproofing membrane, if part of a vegetated roof system, can contribute to the natural restoration of the site. In any case, it would only be considered a partial contribution.</p> <p>The RENOLIT ALKORGREEN system includes a large number of the components needed to implement a vegetated roof system.</p>
Testing process	<p>Outdoor space must make up at least 30% of the total site area (discounting energy production installations and systems).</p> <p>A minimum of 25% of the open space must be planted (ground or roof) or have an overhead vegetated canopy.</p> <p>The outdoor space must be physically accessible and enter into 1 or more of the following categories:</p> <ul style="list-style-type: none"> – a pedestrian-oriented area containing elements that accommodate outdoor social activities – a recreation-oriented area that encourages physical activity – a garden area with a diversity of vegetation types and species, dedicated to the community – and/or food production <p>For projects with a density greater than 1.5 (FAR - floor area ratio), vegetated roof surfaces can make up a maximum of 25% of the total outdoor space.</p>
Analysis example	NA
Supporting documentation	FT RENOLIT ALKORGREEN
Baseline	NA



CATEGORY SUSTAINABLE SITES (SS)



SSc4, Rainwater Management (LEED BDC: NC, CS, SNC, RNC, HC, HNC, DCNC, WNC)

Objective	To reduce water runoff by avoiding impervious surfaces, increasing the infiltration of rainwater and controlling its pollution.
Aim	<p>The waterproofing membrane, if part of a vegetated roof system, can contribute to rainwater management through two complementary strategies:</p> <ul style="list-style-type: none"> a) Rainwater collection by rainwater tank on roof or annex b) As part of the nature restoration system of the roof <p>In any case, it would only be considered a partial contribution. The RENOLIT ALKORGREEN system includes a large number of the components needed to implement a vegetated roof system.</p>
Testing process	<p>Implement a rainwater control system that prevents sudden runoff, including by use of a rainwater tank if necessary.</p> <p>Option 1. Percentage of precipitation events. Path 3. "Zero lot line" projects (with an occupation of the site above > 90%) Discharge following development must not exceed 85% of the site's usual discharge.</p>
Analysis example	NA
Supporting documentation	<i>FT RENOLIT ALKORGREEN</i>
Baseline	<i>U.S. EPA Technical Guidance on Implementing the Rainwater Runoff Requirements.</i>



CATEGORY SUSTAINABLE SITES (SS)

SSc5, Heat Island Reduction (LEED BDC: NC, CS, SNC, RNC, HC, HNC, DCNC, WNC)

Aim To minimize effects on microclimates and human and wildlife habitats by reducing heat islands.

Compliance information In the event that the waterproofing membranes are the outermost layer of the roof, this material can be considered for this credit by means of its Solar Reflection Index (SRI).
RENOLIT has provided the SRI testing results of its products according to the ASTM E1980-11.

PRODUCT	SRI
RENOLIT ALKORBRIGHT	110%
RENOLIT ALKORSMART Cool Grey	62.8%
RENOLIT ALKORSMART Cool Ivory	82.5%

* The LEED guide proposes ASTM E903 E892 as a reference. The manufacturer provides values according to ASTM E1980-11. According to the accredited laboratories (CRRC Label and EELab) the difference does not exceed 1.5% in any case. The most restrictive value is used.

Testing process

Option 1. Nonroof and roof

1. Nonroof (BDC, CI)
(Option 3, Existing Buildings):

- Use materials with a solar reflectance index (SRI) of at least 28 (for 3-year-old materials), or an initial SRI of 33 (for new materials).
- Provide shade with vegetated structures or energy generation systems.
- Provide shade or paving with vegetated structures.
- Use an open-grid pavement system (at least 50% unbound).

$$\frac{\text{Area of Nonroof Measures}}{0.5} + \frac{\text{Area of High-Reflectance Roof}}{0.75} + \frac{\text{Area of Vegetated Roof}}{0.75} \geq \frac{\text{Total Site Paving Area}}{\text{Total Roof Area}}$$

2. Roof: (BDC, CI)
(Option 2. Roof Existing Buildings)

- Use of roofing materials that have an SRI equal to or greater than 39 (initial) and 32 (after three years) for a steep-sloped roof; and 82 (initial) and 64 (after three years) for a low-sloped roof for 75% of the roof -
- Vegetated Roof
- Or a combination of both:

$$\frac{\text{Area of High-Reflectance Roof}}{0.75} + \frac{\text{Area of Vegetated Roof}}{0.5} \geq \text{Total Roof Area}$$

> Roof installations and skylights are excluded from the calculation.

Option 2. Covered parking

Place a minimum of 75% of parking spaces under cover. Any roof used to shade or cover parking must (1) have a three-year aged SRI of at least 32 (if three-year aged value information is not available, use materials with an initial SRI of at least 39 at installation), (2) be a vegetated roof, or (3) be covered by energy generation systems, such as solar thermal collectors, photovoltaics, and wind turbines.

Analysis example

NA

Supporting documentation

Test ASTM E1980-11
LEED SRI validation

Baseline

ASTM Standards E903 and E892: astm.org
Cool Roof Rating Council Standard (CRRC-1): coolroofs.org





CATEGORY MATERIALS & RESOURCES (MR)

MRp2 and MRc5, Construction and Demolition Waste Management Planning (LEED BDC: NC, CS, SNC, RNC, HC, HNC, DCNC, WNC)

Aim To reduce construction and demolition waste disposed of in landfills and incineration facilities by recovering, reusing, and recycling materials.

Compliance information 100% of both material waste generated during its installation, as well as packaging materials, can be collected for recycling. The waste generated (in kg/m²) by each product is outlined in the table below.

PRODUCT	WASTE GENERATED
RENOLIT ALKORPLAN A	0.26 kg/m ² (1.2mm thickness)
RENOLIT ALKORPLAN L	0.30 kg/m ² (1.5mm thickness)
RENOLIT ALKORPLAN F	0.18-0.22 kg/m ² (1.2mm thickness)

RENOLIT ALKORPLAN L and RENOLIT ALKORPLAN F products are 100% recyclable. It is, however, assumed that 10% is lost during the removal process. This 10% is transported to a landfill.

On the other hand, RENOLIT ALKORPLAN A, due to its adhesion system, is not easy to remove, making its recycling process more complicated.

It is considered that 10% of this material content will be recycled, 45% incinerated and 45% transported to a landfill.

PRODUCT	% REUSABLE MATERIAL	% RECYCLABLE MATERIAL
RENOLIT ALKORPLAN A	0 %	10%
RENOLIT ALKORPLAN L	0%	90%
RENOLIT ALKORPLAN F	0%	90%

Testing process Develop, implement and monitor a Construction and Demolition Waste Management Plan that incorporates the percentages of recovered and/or recycled material.

Describe where the material will be taken and how the recycling facility will process the material including expected diversion rates for each material stream.

Option 1. (BDC, CI)

Prevent 50% or 75% of the total construction and demolition waste from ending up in landfill or the incinerator (at least 3 and 4 material streams), being repurposed instead.

Option 1. (EB)

Prevent 70% of the total construction and demolition waste from ending up in the landfill or incinerator, being repurposed instead.

Option 2.

Reduce the total amount of construction waste generated to below 12.2 kg/m².

Analysis example NA

Baseline *Environmental Product Declaration (EPD) of each product (3.2.2 A5)*



CATEGORY MATERIALS & RESOURCES (MR)

MRc1, Building Life-Cycle Impact Reduction (LEED BDC: NC, CS, SNC, RNC, HC, HNC, DCNC, WNC)

Aim To encourage adaptive reuse and optimize the environmental performance of products and materials.
Extend the lifespan of the building, preserve resources and cultural heritage.
Reduce waste and environmental impact caused by the new construction.

Compliance information **RENOLIT** provides EPDs for all **RENOLIT** ALKORPLAN products. The table below shows the impacts reflected in the EPDs of each product. These results can be used to calculate the LCA of the building

CRADLE TO GATE IMPACT	Climate change	Ozone depletion	Acidification	Eutrophication	Tropospheric ozone formation	Use of non-renewable primary energy resources
Indicator	Kg CO2-Eq/fu	Kg CFC11-Eq/fu	KgSO2-Eq/fu	Kg (PO4)3-Eq/fu	KGThe n-Eq/fu	MJ/fu
RENOLIT ALKORPLAN A	11.7	1.96E-06	3.51E-02	6.55E-03	4.08E-03	267
RENOLIT ALKORPLAN L	12.5	2.18E-06	3.75E-02	3.93E-03	5.08E-03	281
RENOLIT ALKORPLAN F (1.2mm 2.10m)	8.1	1.51E-06	2.46E-02	5.52E-03	2.53E-03	176
RENOLIT ALKORPLAN F (1.2mm 1.05m)	8.08	1.51E-06	2.45E-02	5.51E-03	2.53E-03	176
RENOLIT ALKORPLAN F (1.2mm 1.60m)	8.43	1.59E-06	2.55E-02	5.61E-03	2.60E-03	182
RENOLIT ALKORPLAN F (1.5mm 1.60m)	1.03E+01	1.97E-06	3.09E-02	6.42E-03	3.13E-03	222

Testing process For new construction, only the following two options are applicable:

Option 3. Material reuse

Permanent elements are included in the calculation scope: structure, enclosure, interior distribution, etc. (25-50-75% of the material with respect to the total surface area of the materials)

Option 4. Whole-Building Life-Cycle Assessment

Carry out an assessment of the life cycle of the building (structure and enclosure) that demonstrates a minimum 10% reduction in the impact of the life cycle with respect to the project construction. No single category can have an impact of more than 5% of the baseline.

The baseline and the project must consider a life cycle of 60 years and equivalent use.

Select at least three of the following impact categories for reduction:

- global warming potential (greenhouse gases), in kg CO₂e
- depletion of the stratospheric ozone layer, in kg CFC-11
- acidification of land and water sources, in moles H⁺ or kg SO₂
- eutrophication, in kg nitrogen or kg phosphate
- formation of tropospheric ozone, in kg NO_x, kg O₃ eq, or kg ethene
- depletion of nonrenewable energy resources, in MJ using CML

Analysis example NA

Supporting documentation *Environmental Product Declaration (EPD)*

Baseline NA



CATEGORY MATERIALS & RESOURCES (MR)

MRc2, Building Product Disclosure and Optimization – Environmental Product Declarations (EPD) (LEED BDC: NC, CS, SNC, RNC, HC, HNC, DCNC, WNC)

Aim	To encourage the use of products and materials for which life-cycle information is available and that have environmentally, economically, and socially preferable life-cycle impacts.
Compliance information	RENOLIT ALKORPLAN A, RENOLIT ALKORPLAN L and RENOLIT ALKORPLAN F each have their respective EPDs. Consequently, this range of products contributes to qualifying for option 1 of this credit.
Testing process	Option 1: Use at least 20 different permanently installed products sourced from at least five different manufacturers that meet one of the disclosure criteria below: <ul style="list-style-type: none"> – Products with a publicly available, critically reviewed life-cycle assessment conforming to ISO 14044 that have at least a cradle to gate scope (valued ¼) – Environmental Product Declarations (EPDs) which conform to ISO 14025, 14040, 14044 and EN 15804 or ISO 21930, and that have at least a cradle to gate scope. <ul style="list-style-type: none"> – Industry-wide EPD (generic) (valued ½) – Product-specific Type III EPD (valued 1)
Analysis example	NA
Supporting documentation	Environmental Product Declaration (EPD)
Baseline	<ul style="list-style-type: none"> – <i>International Standard ISO 14021–1999, Environmental labels and declarations—Self Declared Claims (Type II Environmental Labeling): iso.org</i> – <i>International Standard ISO 14025–2006, Environmental labels and declarations (Type III Environmental Declarations—Principles and Procedures): iso.org</i> – <i>International Standard ISO 14040–2006, Environmental management, Life cycle assessment principles, and frameworks: iso.org</i> – <i>International Standard ISO 14044–2006, Environmental management, Life cycle assessment requirements, and guidelines: iso.org</i> – <i>CEN Comité Européen de Normalisation (European Committee for Standardization) EN 15804–2012 Sustainability of construction works, Environmental product declarations, Core rules for the product category of construction products: cen.eu</i> – <i>International Standard ISO 21930–2007 Sustainability in building construction—Environmental declaration of building products: iso.org</i> – <i>Federal Trade Commission, Guides for the Use of Environmental Marketing Claims, 16 CFR 260.7 (e): ftc.gov/bcp/grnrule/guides980427.htm</i>



CATEGORY MATERIALS & RESOURCES (MR)

SSc3, Building Product Disclosure and Optimization – Sourcing of Raw Materials (LEED BDC: NC, CS, SNC, RNC, HC, HNC, DCNC, WNC)

Aim To encourage the use of products and materials for which life cycle information is available and that have environmentally, economically, and socially preferable life cycle impacts.
To reward project teams for selecting products verified to have been extracted or sourced in a responsible manner.

Compliance information The production plant for all **RENOLIT** ALKORPLAN products is located at Carretera de Montnegre, s/n - 08470 Sant Celoni - Spain.
However, the source of the raw material is located at a distance of more than 160 km.

The **RENOLIT** ALKORPLAN membranes contain recycled material, always of pre-consumption origin, and in a variable percentage according to the characteristics of the product.

RENOLIT provides self-declarations regarding the recycled content.

PRODUCT	% POST-CONSUMER RECYCLED MATERIAL	% PRE-CONSUMER RECYCLED MATERIAL
RENOLIT ALKORPLAN A *	0 %	13.9 – 43.0 %
RENOLIT ALKORPLAN L	0%	12.7 – 14.5 %
RENOLIT ALKORPLAN F	0%	9.5 – 46.8 %

** PVC makes up approximately 85% of **RENOLIT** ALKORPLAN A material and is the only component that incorporates recycled content. The above values have been calculated based on the total material*

Testing process **Option 1. Raw material source and extraction reporting**
Use a minimum of 20 materials (from 5 different suppliers), which have verifiable information on their extraction process and commitment to the preservation of the environment.
They must comply with at least one of the following programs and requirements:

- Third-party verified Corporate Sustainability Reports (CSR)
- GRI Sustainability report, OECD guidelines for Multinational Enterprises, UN Global Compact, ISO 26000...
- Manufacturers with self-declared reports (valued ½)

Option 2. Leadership extraction practices
Use products that meet at least one of the responsible extraction criteria below for at least 25%, by cost, of the total value of permanently installed building products in the project.

Bio-based materials, FSC and CoC certified wood, reused materials, recycled content.

Materials extracted and produced at a distance of less than 160 km from the construction site will be valued at 200%.

Analysis example	NA
Reference standard	<i>Self-declaration of recycled material content</i>
Baseline	<i>International Standards ISO 14021–1999, Environmental Labels and Declarations—Self Declared Environmental Claims (Type II Environmental Labeling): iso.org/iso/catalogue_detail.htm?csnumber=23146)</i>



CREDIT SUMMARY

BREEAM



MANAGEMENT

- Man 03 Construction Site impacts. Credits 6, 7 and 8 (BREEAM ES New Construction 2015). Credit 4 and item b (BREEAM ES Home 2011)
- Man 05 Life cycle cost and service life planning (BREEAM ES New Construction 2015)



MATERIALS











- Mat 01 Life cycle impacts (BREEAM ES New Construction 2015)
- Mat 08 Materials of low environmental impact (BREEAM ES Home 2011)
- Mat 03 Responsible sourcing of materials (BREEAM ES New Construction 2015)
- Mat 09 Responsible sourcing of materials – key building elements (BREEAM ES Home 2011)



WASTE

- Wst 01, Construction waste management (BREEAM ES New Construction 2015 and BREEAM ES Home 2011)

BREEAM environmental categories

									
Management	Health and Wellbeing	Energy	Transport	Water	Materials	Waste	Land Use and Ecology	Pollution	Innovation

BREEAM Certification Standards

UR	BREEAM ES Urban Planning	VIV	BREEAM ES Home	USO	BREEAM In-Use
NC	BREEAM ES New Construction				

CREDIT SHEET

BREAM ES



CATEGORY MANAGEMENT

Man 03 Construction site impacts (BREEAM ES NEW CONSTRUCTION 2015 and BREEAM ES HOMES 2011)

Aim	To recognize and encourage construction sites managed in an environmentally sound manner in terms of resource use, energy consumption and pollution. Relevant criteria: - Transport of construction materials and waste - Timber procurement
Compliance information	In relation to transportation, the production center for all RENOLIT ALKORPLAN products is located at Carretera de Montnegre, s/n – 08470 Sant Celoni - Spain In relation to the supply of RENOLIT ALKORPLAN products, the company RENOLIT uses wood material supplied by Embalajes del Vallés S.L. which uses a forestry product chain-of-custody control system N°: PEFC / 14-35-00391. Certificate valid until May 4th, 2022.
Testing process	<u>Transport of construction materials and waste (one point)</u> The testing process of the building by means of this criteria is established by indicating, in a separate report, the total fuel consumption (liters), the total carbon dioxide emissions (kgCO ₂ eq) as a result of transport and the total distance traveled (km) to reach the building. <u>Timber procurement (one point)</u> The testing process of the building by means of this criteria is established by confirming that all the wood used for palletizing the product is "legally reused and sold wood" or has a recognized certification system (FSC, PEFC) or its approved schemes (SFI , etc.). If they do not possess the certification system seal, the supplier must provide written confirmation that the wood used has been legally obtained and sold.
Analysis example	The calculation of the transport credit should be carried out in each case according to the location of the building, interim storage and its distribution.
Supporting documentation	<i>Location declaration provided by the manufacturer</i> <i>Certificate ISO9001 - PEFC - Embalajes del Vallés</i>

Baseline

- National Atmospheric Emissions Inventory (Netcen, 2005) based on DTI data combined with TRL factors as functions of the average speed of the vehicles, derived from data from tests carried out in real test cycles.
- UK Energy Statistics Summary DTI 2004 and carbon factors for UKPIA fuels (2004).
- Guidelines for Corporate Information on Emissions of Greenhouse Gases, DEFRA, Continuous Survey of Transportation of Goods by Road 2001.





CATEGORY MANAGEMENT

Man 05 Life cycle cost and service life planning (BREEAM ES NEW CONSTRUCTION 2015)

Aim	To recognize and encourage life cycle costing and service life planning in order to improve design, specification and through-life maintenance and operation.
Compliance information	Check with RENOLIT to consult the price of the product (Juan Carlos Giralt – juan-carlos.giralt@renolit.com). In relation to maintenance, no specific action will be necessary during the use of the building that involves the maintenance of these materials, except for those indicated for the roofs of the buildings in accordance with the current standard.
Testing process	Carry out a Life Cycle Cost (LCC) analysis based on the proposals developed during RIBA Work Stages C/D (concept design/design development) in accordance with the standard UNE-EN 15643-4: 2012, using a study period of at least 40 years and, ideally, 60 years. The results must be shown in real and discounted cash flow terms with the following phases and uses: <ul style="list-style-type: none"> i. Construction: includes investment costs. ii. Operation: includes, as a minimum, installation, cleaning and management costs. iii. Maintenance: includes, as a minimum, planned maintenance, replacement and repair costs.
Analysis example	NA
Supporting documentation	<i>Selective Demolition Plan provided by the manufacturer</i>
Baseline	<ul style="list-style-type: none"> • UNE-EN 15643-4:2012 Sustainability of construction works. Sustainability assessment of buildings. Part 4: Framework for the assessment of economic performance. • UNE-EN 15978:2012 Sustainability of construction works. Assessment of environmental performance of buildings. Calculation method



CATEGORY MATERIALS

- ◆ **Mat 01 – Life cycle impacts (BREEAM ES NEW CONSTRUCTION 2015)**
- ◆ **Mat 08 – Materials of low environmental impact (BREEAM ES HOME 2011)**

Aim To recognize and encourage the use of construction materials with a low environmental impact (including embodied carbon) over the full life cycle of the building.

Compliance information **Type I, II and III environmental labels:** RENOLIT provides Environmental Product Declarations (EPD) for all RENOLIT ALKORPLAN products (Label Type III), valid until December 21st, 2022. The data contained in the EPDs complies with UNE EN ISO 14025 and has been verified according to UNE EN 15804 standard.

Life Cycle Analysis: Impacts shown in the EPDs can be used for the LCA, contributing to compliance with option 2. The impacts reflected in the EPDs of each product that can be used to calculate the LCA of the building are shown below.

CRADLE TO GATE IMPACT	Climate change	Ozone depletion	Acidification	Eutrophication	Tropospheric ozone formation	Use of non-renewable primary energy resources
Indicator	Kg CO2-Eq/uf	Kg CFC11-Eq/uf	KgSO2-Eq/uf	Kg (PO4)3-Eq/uf	KGThe n-Eq/uf	MJ/uf
RENOLIT ALKORPLAN A	11.7	1.96E-06	3.51E-02	6.55E-03	4.08E-03	267
RENOLIT ALKORPLAN L	12.5	2.18E-06	3.75E-02	3.93E-03	5.08E-03	281
RENOLIT ALKORPLAN F (1.2mm 2.10m)	8.1	1.51E-06	2.46E-02	5.52E-03	2.53E-03	176
RENOLIT ALKORPLAN F (1.2mm 1.05m)	8.08	1.51E-06	2.45E-02	5.51E-03	2.53E-03	176
RENOLIT ALKORPLAN F (1.2mm 1.60m)	8.43	1.59E-06	2.55E-02	5.61E-03	2.60E-03	182
RENOLIT ALKORPLAN F (1.5mm 1.60m)	1.03E+01	1.97E-06	3.09E-02	6.42E-03	3.13E-03	222

Testing process **Type I, II and III environmental labels:**

- BREEAM ES Home: specify products with ecolabels Type I, II or III.
- BREEAM ES New Construction: specify products with Environmental Product Declarations (EPD) (Type III Label).

Life Cycle Analysis (LCA):

The project uses a life cycle analysis (LCA) tool that complies with BREEAM specifications to measure the environmental impact of the life cycle of the building elements.

Exemplary level criteria (1 extra point):

- BREEAM ES Home: as a result of the LCA, materials with low environmental impacts have been chosen in at least 6 elements of the building.
- BREEAM ES New Construction: rigorous LCAs have been carried out in which the majority of the building's elements are included.

Analysis example

NA

Supporting documentation*Environmental Product Declaration (EPD)***Baseline**

- *UNE-EN ISO 14025:2010. Environmental labels and declarations. Environmental declarations type III. Principles and procedures. (ISO 14025: 2006)*
- *UNE-EN 15804:2012. Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products.*
- *UNE-EN 15978:2012. Sustainability of construction works. Assessment of environmental performance of buildings. Calculation methods*



CATEGORY MATERIALS

- ◆ **Mat 03 – Responsible sourcing of materials (BREEAM ES NEW CONSTRUCTION 2015)**
- ◆ **Mat 09 – Responsible sourcing of materials – key building elements (BREEAM ES HOME 2011)**

Aim To recognize and encourage the specification of responsibly sourced materials for key building elements.

Compliance information The production site for all **RENOLIT** ALKORPLAN products is located at Carretera de Montnegre, s/n - 08470 Sant Celoni - Spain and has an environmental management system (EMS), certified by a third party, for product manufacturing (Environmental Management System certified for the key process phase).

RENOLIT ALKORPLAN membranes contain recycled material, always from pre-consumer origin, and in a variable percentage according to the characteristics of each product. **RENOLIT** provides self-declarations regarding the recycled content.

PRODUCT	% RECYCLED CONTENT POST-CONSUMER	% RECYCLED CONTENT PRE-CONSUMER
RENOLIT ALKORPLAN A *	0 %	13.9 – 43.0 %
RENOLIT ALKORPLAN L	0%	12.7 – 14.5 %
RENOLIT ALKORPLAN F	0%	9.5 – 46.8 %

* PVC-P accounts for approximately 85% of the **RENOLIT** ALKORPLAN A material and it is the only component containing recycled materials. The above values have already been calculated considering the total.

For **BREEAM ES New Construction 2015** the Environmental Management System certificate (EMS) for the key process phase corresponds to level 3 of the responsible sourcing certification and, as material containing recycled content, it corresponds to level 2.

For **BREEAM ES Home 2011** the Environmental Management System certificate (EMS) for the key process phase corresponds to level 4 of the responsible sourcing certification and, as material containing recycled content, it corresponds to level 3.

Testing process **Prerequisite only in BREEAM ES New Construction:** Confirmation that all timber used in the project has been "legally harvested and sold".

Requirement: The number of BREEAM points assigned is determined by compliance with responsible sourcing requirements of the key construction elements. To justify compliance, each product must be certified in accordance with any of the

responsible sourcing systems approved by BREEAM.

Each of the applicable materials will be assigned a responsible sourcing certification level, along with a corresponding score. The certification level is determined based on the rigor of responsible sourcing shown by the suppliers/producers for each material/element (via the responsible sourcing certification schemes). The responsible sourcing certification schemes are listed below:

- BRE Global, BES6001 Product certification (or equivalent)
- Canadian Standards Association's (CSA) Chain of Custody Scheme (CoC) (endorsed by the PEFC) for chain of custody (CoC) certification
- Environmental Management System (EMS) (certified) for the key process and supply chain extraction process
- Environmental Management System (EMS) (certified) for the key process
- FLEGT-licensed timber
- Forest Stewardship Council (FSC)
- Recycled materials with Certified EMS for key process.
- Reused materials
- Malaysian Timber Certification Council (MTCC) with chain of custody certification (CoC)
- Programme for the Endorsement of Forest Certification (PEFC) with chain of custody certification (CoC)
- Sustainable Forest Initiative (SFI) (endorsed by the PEFC) with chain of custody certification (CoC) with a declaration of 70% certified material.

Exemplary level criteria only for BREEAM ES New Construction:

Where 70% of the available responsible sourcing points have been achieved.

Analysis example

NA

Supporting documentation

ISO Certification 14001 (2017-2020)
Self-declaration of recycled material content
Location declaration provided by the manufacturer

Baseline

- To consult a list of products approved under the BES6001 standard, as well as for additional information, visit: www.greenbooklive.com/
- Document to determine the validity of the FSC and PEFC certifications. <http://www.pefc.org/index.php/certification-services/find-certified>
- Databases to search holders of certifications obtained in accordance with individual certification systems: <http://info.fsc.org/> <http://www.pefc.es>
- UNE-EN ISO 14006: 2011. Environmental management systems. Guidelines for the incorporation of ecodesign.
- ISO 14001 standard



CATEGORY WASTE

Wst 01 – Construction waste management (BREEAM ES NEW CONSTRUCTION 2015 and BREEAM ES HOME 2011)

Aim To promote resource efficiency via the effective management and reduction of construction waste.

Compliance information 100% of both material waste generated during its installation, as well as packaging materials, can be collected for recycling.
Waste generated in kg/m² by each product is specified in the following table

PRODUCT	WASTE GENERATED
RENOLIT ALKORPLAN A	0.26 kg/m ² (1.2mm thickness)
RENOLIT ALKORPLAN L	0.30 kg/m ² (1.5mm thickness)
RENOLIT ALKORPLAN F	0.18-0.22kg/m ² (1.2mm thickness)

Testing process **BREEAM ES New Construction 2015** requirements for construction resource efficiency and the diversion of resources from landfill are as follows:

One point: Compliance with credits 1-6 is justified by means of a Site Waste Management Plan (SWMP) that meets certain requirements that ensure the minimization of hazardous and non-hazardous waste produced.

One point: Compliance with credits 7-8 is justified through the implementation of procedures for classification, reuse and recycling of construction waste of at least the proportions of waste identified in the current legislation, on- or off-site, through an authorized external waste manager. Each type of waste must be specified by its code and associated with a waste manager with accredited capacity for waste management and recovery.

One point: Compliance with credits 9-11 is justified by reports/controls that confirm the total waste produced and it must be demonstrated that a significant amount of demolition waste (if relevant) and non-hazardous construction waste generated in the project have been diverted from landfill by at least 80%.

The **BREEAM ES Home 2011** requirements are:

First point: The fulfillment of credits 1-3 is justified by the completion of the Site Waste Management Survey (SWMS) with the minimum content established in the applicable legislation and its transfer to the Site Waste Management Plan (SWMP) that meets certain requirements that ensure the minimization of hazardous and non-hazardous waste produced.

Second point: Compliance with credits 4-6 is justified by reports / controls that confirm the total waste produced and it must be demonstrated that a significant amount of demolition waste (if relevant) and non-hazardous construction generated in the project have been diverted from landfill by at least 70%.

Third point: Compliance with credits 7-9 confirms that the amount of

demolition (if relevant) and non-hazardous construction waste generated in the project has been diverted from landfill by at least 80%.

Exemplary level: When a minimum of 95% of non-hazardous construction and demolition waste (if relevant) generated in the project has been diverted from landfill.

Analysis example NA

Supporting documentation *Environmental Product Declaration (EPD) of each product (3.2.2 A5)*

Baseline NA





CATEGORY INNOVATION

INNOVATION (BREEAM ES NEW CONSTRUCTION 2015, BREEAM ES HOME 2011)

Aim	To support innovation within the construction industry through the recognition of sustainability related benefits which are not rewarded by standard BREEAM issues.
Compliance information	<p>RENOLIT ALKORPLAN products can contribute to achieving exemplary level credits in the following requirements:</p> <ul style="list-style-type: none"> • Mat 01, Life cycle impacts • Mat 03, Responsible sourcing of materials • Wst 01, Construction waste management <p>NOTE: See the exemplary level criteria for the corresponding requirement.</p>
Testing process	<p>Up to 10 innovation points can be obtained by a combination of the following options:</p> <p>Exemplary level in existing requirements Some BREEAM credits give the option to obtain an additional score for demonstrating exemplary efficiency by meeting defined exemplary level performance criteria in the corresponding credits.</p> <p>Approved innovations One innovation credit can be awarded for each innovation application approved by BRE Global, where the building complies with the criteria defined in an Approved Innovation application form.</p>
Analysis example	NA
Supporting documentation	<i>See corresponding requirements</i>
Baseline	<i>See corresponding requirements</i>