

# BREEAM Consultancy Services

Statement on the sustainability quality of selected products from PCT Performance Chemicals GmbH

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## 1 Task

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ATP sustain GmbH was tasked with producing a statement about the products RETANOL 511, RETANOL EKA / VIWA, RETANOL XTREME, RETANOL XTHINN, PLAFIZ 211/2000, RISOL PLUS and BONDING COURSE ZE from the company “PCT Performance Chemicals GmbH”. The statement addresses the relevance of these products and evaluates them in the context of a BREEAM UK New Construction 2018 certification. The products are relevant for the following BREEAM criteria:

- **MAT01 Environmental impacts from construction products – Building life cycle assessment (LCA)** – Evaluation of the environmental impact and/or resource consumption of a building on the basis of the products used.
- **MAT02 Environmental impacts from construction products – Environmental Product Declarations (EPD)** – Evaluation of the environmental impacts of building products on the basis of Environmental Product Declarations.
- **MAN02 Life cycle cost and service life planning** – Evaluation of the life cycle costs of a building taking into account the costs of construction, repair, maintenance, operation and cleaning.
- **HEA04 Thermal comfort** – Evaluation of the spatial thermal comfort.
- **HEA02 Indoor air quality** – Evaluation of the materials used in the construction of a building and of the contaminants that they contain.
- **HEA05 Acoustic performance** – Evaluation of the sound insulating properties of building elements.
- **WST01 Construction waste management** – Evaluation of resource efficiency in terms of the efficient and correct handling of construction waste.

In investigating each of the individual BREEAM UK New Construction 2018 criteria, special attention is paid to those characteristics of the individual products that could potentially have a neutral, positive or negative impact on a BREEAM UK New Construction 2018 certification. The analysis of each criterion involves descriptions of, firstly, the BREEAM requirements, then the evaluation methods and, finally, the results. These results are briefly described in Chapter 2 below. The detailed investigative methods and evaluations can then be followed from Chapter 3 onwards.

The objective of BREEAM UK New Construction 2018 in addressing certification with EPDs is to increase the accuracy of the life cycle assessment by using product-specific data rather than generic data from a country-specific database. This should also improve the ability of designers to compare individual products. A further objective is to increase demand for EPDs and thus to help them to become more widely accepted and available.

### 1.1 **RETANOL 511<sup>1</sup>**

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RETANOL 511 is suitable for indoor and outdoor screeds, for early floor-covering, fast curing bonded screeds, for screeds on separation or insulation layers and, especially, for heating screeds.

### 1.2 **RETANOL EKA / VIWA<sup>2</sup>**

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RETANOL EKA / VIWA are suitable for indoor and outdoor screeds, for early floorcovering, fast curing bonded screeds, for screeds on separation or insulation layers and, especially, for heating screeds.

### 1.3 **RETANOL XTREME<sup>3</sup>**

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RETANOL XTREME can be used to lay low-shrinkage and low-tension bonded cement screeds as well as screeds on separation or insulation layers and heating screeds. The product offers very good application properties and a high coverage and a guarantee of workability and strength is also available.

### 1.4 **RETANOL XTHINN<sup>4</sup>**

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RETANOL XTHINN is an additive for screeds, which facilitates the laying of thin-layer, low-shrinkage and low-tension cement screeds over type A (A1) underfloor heating.

This potential for reducing the mass or the thickness makes this screed particularly suitable for refurbishment projects with reduced construction

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<sup>1</sup><https://www.pct-chemie.de/fileadmin/editorial-content/download/produkte/informationsblaetter/PCT-Produktbroschuere-511-EKA-VIWA.pdf> - retrieved on 10.11.2020

<sup>3</sup><https://www.pct-chemie.de/fileadmin/editorial-content/download/produkte/informationsblaetter/PCT-Produktbroschuere-Xtreme.pdf> - retrieved on 10.11.2020

<sup>4</sup><https://www.pct-chemie.de/fileadmin/editorial-content/download/produkte/informationsblaetter/PCT-Produktbroschuere-Xthinn.pdf> - retrieved on 10.11.2020

heights coupled with a requirement for a high load-bearing capacity.

### 1.5 **PLAFIZ 211 / 2000<sup>5</sup>**

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PLAFIZ 211 / 2000 is an additive for screeds, which facilitates the laying of light, easy-to-smooth and easy-to-level bonded cement screeds, on separation layers or as floating screeds. The product can also be used in heating screeds or in permanently wet areas. It improves screed homogeneity and surface homogeneity and combines a high plasticising effect with a good water retention capacity while also counteracting adhesive effects.

### 1.6 **RISOL PLUS<sup>6</sup>**

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RISOL PLUS is an additive for screeds which facilitates the laying of light, easy-to-smooth and easy-to-level bonded cement screeds, on separation layers or as floating screeds. The product can also be used in heating screeds or in permanently wet areas. Heating screeds that are created using this product can already be heated five days after being laid. The product also improves screed homogeneity and reduces the number of air voids, shrinkage and cracking.

### 1.7 **BONDING COURSE ZE<sup>7</sup>**

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Bonding Course ZE is a product that can be used to create cement-bound bonding courses of every strength class. The product can be applied to a concrete subgrade or cement screeds. It can also be used as a bonding course on sufficiently sanded and cured reaction resin screeds.

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<sup>5</sup><https://www.pct-chemie.de/fileadmin/editorial-content/download/produkte/informationsblaetter/PCT-Produktbroschuere-Plafiz.pdf> aufgerufen am 10.11.2020

<sup>6</sup><https://www.pct-chemie.de/fileadmin/editorial-content/download/produkte/informationsblaetter/PCT-Produktbroschuere-Risol111.pdf> - aufgerufen am 10.11.2020

<sup>7</sup><https://www.pct-chemie.de/fileadmin/editorial-content/download/produkte/informationsblaetter/PCT-Produktbroschuere-Haftbruecke.pdf> - aufgerufen am 10.11.2020

## 2 Summary of the results

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This section summarises the results of the investigations of the relevant sustainability qualities in accordance with BREEAM UK New Construction 2018. These are then presented in detail from Item 3 onwards.

### 2.1 MAT01 Environmental impacts from construction products – Building life cycle assessment (LCA)

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**Relevance:** not relevant

**Justification:** The products meet the cut-off criterion of BREEAM UK New Construction 2018

### 2.2 MAT02 Environmental impacts from construction products – Environmental Product Declarations (EPD)

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**Relevance:** partly relevant

**Justification:** The product can generate points for this criterion in the category P8-Other Materials, if an EPD is available. However, the desirable interconnections with the life cycle assessment (MAT01) – the optimisation of the level of detail of the results – cannot be achieved by these products due to the fact that they do not have to be taken account of in the life cycle assessment.

### 2.3 MAN02 Life cycle cost and service life planning

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**Relevance:** not relevant

**Justification:** The product does not generate any life cycle costs (and is only relevant for the investment costs).

### 2.4 HEA04 Thermal comfort

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**Relevance:** possibly relevant

**Justification:** Individual products have an impact upon the thermal comfort of indoor spaces. However, this impact can only be determined on a project-by-project basis.

### 2.5 HEA02 Indoor air quality

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**Relevance:** not relevant

**Justification:** The additives for screeds and bonding courses do not feature amongst the groups of building materials that are evaluated as part of the BREEAM UK New Construction 2018 system.

## 2.6 HEA05 Acoustic performance

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**Relevance:** not relevant

**Justification:** The additives for screeds and bonding courses have no influence on the spatial acoustics.

## 2.7 WST01 Construction waste management

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**Relevance:** not relevant

**Justification:** The requirements for the management of building site operations do not generate any requirements for the investigated products.



### 3 **MAT 01 Environmental impacts from construction products – Building life cycle assessment (LCA)<sup>8</sup>**

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The objective of BREEAM is to reduce the emissions-related environmental impact of and the consumption of finite resources by a building across its life cycle. As part of this, the life cycle assessment helps the client and design team to make environmentally-oriented decisions. It is during the early design phases in particular that buildings can be optimised vis-à-vis a range of environmental issues.

Buildings produce emissions and require resources in all phases of their life cycle, from construction (e.g. through the use of building materials and products) via use (e.g. through the operation and maintenance of the building) to the end of their life (e.g. through demolition). These emissions are transferred to the air, water and ground, where they can cause various environmental problems.

#### 3.1 **BREEAM requirements**

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In order to be recognised by BREEAM, the life cycle assessment must be drawn up with the help of recognised software (a list of recognised tools can be found at: <https://www.bregroup.com/impact/impact-compliant-tools/>). The results are then compared with benchmarks from BREEAM UK New Construction 2018 during the conceptual and execution design phases. In addition to this, evaluation points can be obtained during the conceptual and execution design phases if building designs with major conceptual differences are compared with each other.

#### 3.2 **Evaluation**

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In order to evaluate and analyse the relevance of the products from PCT Performance Chemicals GmbH the quantity of the investigated products in the screed is determined. On the basis of this it can be ascertained whether the product meets the cut-off criteria. This approach was applied to the various materials on the basis of the maximum permitted mixing ratio per kg of screed. The calculation is based on 1 kg of screed.

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<sup>8</sup> [BREEAM New Construction 2018 \(UK\) - Mat 01 Environmental impacts from construction products - Building life cycle assessment \(LCA\)](#); retrieved on 09.11.2020

### **3.2.1 RETANOL 511**

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The permitted maximum concentration of the product RETANOL 511 in a screed is 2,500 ml/m<sup>3</sup> screed. This gives a maximum mixing ratio of 1.76 g/kg screed mix.

It follows that the proportion of RETANOL 511 in the screed is below 0.18 %.

### **3.2.2 RETANOL EKA / VIWA**

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The permitted maximum concentration of the product RETANOL EKA / VIWA in a screed is 350 ml/kg screed mix or approx. 0.972 g/kg screed mix.

It follows that the proportion of RETANOL EKA / VIWA in the screed is below 0.10 %.

### **3.2.3 RETANOL XTREME**

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The permitted maximum concentration of the product RETANOL XTREME in a screed is 400 ml/kg screed mix or approx. 1.111 g/kg screed mix.

This enables us to calculate a proportion of RETANOL XTREME in 1 kg screed of below 0.12 %.

### **3.2.4 RETANOL XTHINN**

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This information is valid for the maximum concentration for a mixing ratio for heating screeds with 20 mm coverage of the heating pipes, for bonded screeds above 25 mm or for floating screeds on a separation layer with a thickness exceeding 35 mm: The permitted maximum concentration of the product RETANOL XTHINN in a screed is 400 ml/kg screed mix or approx. 1.111 g/kg screed mix.

This enables us to calculate a proportion of RETANOL XTHINN in 1 kg screed of below 0.12 %.

### **3.2.5 PLAFIZ 211 / 2000**

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The permitted maximum concentration of the product PLAFIZ 211/200 in a screed is 250 ml/m<sup>3</sup> screed mix. This gives us a maximum mixing ratio of 0.288 g/kg screed mix for a bulk density of 1.15 g/cm<sup>3</sup>.

It follows that the proportion of PLAFIZ 211/2000 in the screed is below 0.03 %.

### **3.2.6 RISOL PLUS**

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The permitted maximum concentration of the product Risol Plus in a screed is 150 ml/kg screed mix or approx. 0.416 g/kg screed mix.

This enables us to calculate a proportion of Risol Plus in 1 kg screed of below 0.05 %.

### **3.2.7 BONDING COURSE ZE**

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The permitted maximum amount of the product BONDING COURSE ZE in a mixture of 25 kg cement and 10 litres water is 150 ml.

It follows that the maximum proportion of Bonding Course ZE in the mixture is 1.38 %.

## **3.3 Results**

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If one now considers the screed in isolation, one can conclude for all the products investigated here that the proportion of the products from PCT Performance Chemicals GmbH is below 0.2 % or, in the case of Bonding Course ZE, below 1.38 % and that these products are thus not considered relevant in terms of the life cycle assessment, given that these percentage shares lie below 10 %.

Table 1: Evaluation of the results of the relevance of the life cycle assessment in accordance with the evaluation rules of BREEAM UK New Construction 2018

Product	% share	Relevance	Explanation
<b>RETANOL 511</b>	< 0.18 % *	not relevant	Due to the very low quantity the product meets the cut-off criterion of BREEAM UK New Construction 2018
<b>RETANOL EKA / VIWA</b>	< 0.10 % *	not relevant	Due to the very low quantity the product meets the cut-off criterion of BREEAM UK New Construction 2018
<b>RETANOL XTREME</b>	< 0.12 % *	not relevant	Due to the very low quantity the product meets the cut-off criterion of BREEAM UK New Construction 2018
<b>RETANOL XTHINN</b>	< 0.12 % *	not relevant	Due to the very low quantity the product meets the cut-off criterion of BREEAM UK New Construction 2018
<b>PLAFIZ 211 / 2000</b>	< 0.03 % *	not relevant	Due to the very low quantity the product meets the cut-off criterion of BREEAM UK New Construction 2018
<b>RISOL PLUS</b>	< 0.05 % *	not relevant	Due to the very low quantity the product meets the cut-off criterion of BREEAM UK New Construction 2018
<b>Bonding Course ZE</b>	< 1.38 % **	not relevant	Due to the very low quantity the product meets the cut-off criterion of BREEAM UK New Construction 2018

\* Percentage share of the investigated products in 1 kg screed

\*\* Percentage share of the investigated products in 1 litre bonding course

## 4 MAT 02 Environmental impacts from construction products – Environmental Product Declarations (EPD)

The objective of BREEAM in addressing certification with EPDs is to increase the accuracy of the life cycle assessment by using product-specific data rather than generic data from a country-specific database. This should also improve the ability of designers to compare individual products. A further objective is to increase demand for EPDs and thus to help them to become more widely accepted and available.

### 4.1 BREEAM requirements<sup>9</sup>

According to BREEAM, EPDs can be included in the evaluation. These EPDs are weighted in line with BREEAM evaluation constraints and, from a weighting factor of 20, this leads to one evaluation point.

Table 2: BREEAM EPD weighting

Recognised type of EPD	Validity	EPD weighting
EPD applies to more than one product in the same product category and for more than one manufacturer.	EPD had not yet expired at the point at which the product was used in the project.	0.5
EPD applies to more than one product in the same product category and for a single manufacturer.	The product was installed in the building before the end of the construction phase.  The EPD was issued or registered by an ISO 14025-compliant programme operator.	0.75
EPD applies to a single product* and a single manufacturer (the product can be manufactured in more than one location)  *or variations of an individual product that only differ in terms of colour or pattern.	For products that are subject to the building product regulations the EPD must be drawn up using the product category rules, which are based on either BS EN 15804 or ISO 21930.	1.5

<sup>9</sup>BREEAM New Construction 2018 (UK) - Mat 02 Environmental impacts from construction products – Environmental Product Declarations (EPD) ; retrieved on 09.11.2020

The following material groups are considered in line with the evaluation rules of BREEAM UK New Construction 2018 – with the material categories being differentiated according to the “Uniclass Equivalent code”:

- Timber (P5)
- Cementitious, concrete and mineral-bound materials (P2)\*
- Metal (P4)
- Stone, natural and reconstituted; Minerals, excluding cementitious (P1; P3)\*
- Clay-based materials (P33)
- Gypsum (P232)
- Glass (P314)
- Plastics, rubber, chemicals and synthetics; Bitumen-based materials (P7; P34)
- Animal and vegetable materials, excluding timber (P6)
- Others (P8)

## 4.2 Evaluation

The evaluated products fall into either the material group – Cementitious, concrete and mineral-bound materials (P2) or the material groups Plastics, rubber, chemicals and synthetics; Bitumen-based materials (P7 / P34): In these material groups only the following material groups are collated in detail.

Table 3: Uniclass Equivalent code – Group P2 – Cementitious, concrete and mineral-bound materials <sup>10</sup>

Uniclass Equivalent code	Product group
<b>P21</b>	<b>Cementitious materials, binders</b>
<b>P211</b>	Asbestos cement
<b>P212</b>	Binders
<b>P213</b>	Cement
<b>P214</b>	Fibre cement
<b>P215</b>	Glass reinforced cement
<b>P216</b>	Mineral fibre cement
<b>P217</b>	Mortar
<b>P218</b>	Terrazzo
<b>P219</b>	Wood wool cement
<b>P22</b>	<b>Concrete, general</b>
<b>P221</b>	Concrete, aerated

<sup>10</sup> <https://www.cpic.org.uk/uniclass1/>

<b>P222</b>	Concrete, dense
<b>P223</b>	Concrete, in situ
<b>P224</b>	Concrete, lightweight aggregate
<b>P225</b>	Concrete, precast
<b>P226</b>	Concrete, prestressed
<b>P227</b>	Concrete, reinforced
<b>P23</b>	<b>Other mineral-bound materials</b>
<b>P231</b>	Calcium silicate
<b>P232</b>	Gypsum
<b>P2321</b>	Glass reinforced gypsum
<b>P233</b>	Lime
<b>P234</b>	Plaster
<b>P235</b>	Sandlime

Table 4: Uniclass Equivalent code – Group P7 – Plastics, rubber, chemicals and synthetics<sup>11</sup>

Uniclass Equivalent code	Product groups
<b>P71</b>	<b>Plastics, general</b>
<b>P7101</b>	Acrylonitrile-butadiene-styrene (ABS)
<b>P7102</b>	Acrylic, polymethyl methacrylate
<b>P7103</b>	Epoxy
<b>P7104</b>	Polyamide
<b>P7105</b>	Phenolic
<b>P7106</b>	Polycarbonate
<b>P7107</b>	Polyester
<b>P7108</b>	Polyethylene, polythene
<b>P7109</b>	Polyisocyanurate
<b>P7110</b>	Polypropylene
<b>P7111</b>	Polystyrene
<b>P7112</b>	Polyurethane
<b>P7113</b>	Poly vinyl chloride (PVC), plasticised
<b>P7114</b>	Poly vinyl chloride (PVC-U) unplasticised
<b>P7115</b>	Urea formaldehyde
<b>P7116</b>	Vinyl
<b>P72</b>	<b>Plastics – composite</b>
<b>P721</b>	Glassfibre reinforced plastic (GRP)
<b>P722</b>	Carbon fibre reinforced plastic
<b>P723</b>	Resin bonded paper
<b>P73</b>	<b>Rubber-based materials, natural</b>
<b>P731</b>	Rubber
<b>P74</b>	<b>Rubber-based materials, synthetic</b>
<b>P741</b>	Butyl rubber
<b>P742</b>	Neoprene

<sup>11</sup> <https://www.cpic.org.uk/uniclass1/>

<b>P743</b>	Silicon
<b>P744</b>	Polysulfide
<b>P75</b>	<b>Chemicals, synthetics</b>
<b>P751</b>	Acids
<b>P752</b>	Alkalis
<b>P753</b>	Salts

In addition to this, the overriding objective of this criterion is to improve the accuracy of life cycle assessments. One can conclude from this that only products that are also considered in the life cycle assessment should have an EPD. It follows from Chapter 3 that the investigated products meet the cut off criterion and, hence, that they are not considered relevant.

### 4.3 Results

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From this evaluation we can conclude that the products cannot be assigned to either material group P2, P7 or P34 according to the “Uniclass Equivalent Code”. The products could only be listed in the Category P8 – Other Materials. A further evaluation approach would be to derive the relevance of this criterion from the connection with the criterion MAT01 – Environmental impacts from construction products – Building life cycle assessment (LCA). In the case of this criterion, however, there is no requirement for the investigated products to be included in the calculation. Following this logical line of argument we can conclude that these products also do not have to be verified by an EPD.



## 5 **MAN 02 Life cycle cost and service life planning**

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In the building sector, decisions are principally taken on the basis of the investment costs and of an inadequate understanding of the operational factors that can influence the costs, the performance and the satisfaction. The life cycle cost calculation (Life Cycle Costing, LCC) is established in many sectors as a way of better accounting for operational and maintenance factors within the overall procurement process. These are becoming part of British Government policy for public sector procurement, as emphasised in the strategy document UK Construction 2025(5). This is connected with huge advantages in terms of costs and timetable: The construction industry and British Government are jointly seeking to reduce initial construction costs and life cycle costs by 33 %.

### 5.1 **BREEAM requirements<sup>12</sup>**

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In investigating life cycle costs, BREEAM considers three aspects:

- Life cycle costs at the level of building elements
- The evaluation of alternative building elements at the component level
- Reporting on the investment costs

#### **Life cycle costs at the level of building elements**

The consideration of life cycle costs at the level of the building elements should enable the project team to evaluate the influence of different elements upon the life cycle performance of buildings. In doing so they should be able to evaluate the lifespan and the repair and maintenance costs of building elements with reference to a project-specific observation period (20, 30, 50 or 60 years).

#### **The evaluation of alternative building elements at the component level**

The consideration of life cycle costs at the component level should be aimed at obtaining results in the following areas:

- Building envelope (for example: external wall cladding, windows or roof covering)
- Building operation (for example: heat supply, cold supply and

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<sup>12</sup>[BREEAM New Construction 2018 \(UK\) - Man 02 Life cycle cost and service life planning](#); retrieved on 09.11.2020

- building management)
- The surfaces of building elements (for example: walls, floors or ceilings)
- External areas (for example: alternative design solutions for external hard areas, alternative solutions for boundaries with neighbours)

It is not necessary to address all the examples listed above. Rather, project-specific assumptions should be made that would deliver the most valuable results for the investigated elements of the project. This should ensure that a broad range of options is considered and should help to focus the analysis on those elements where the results of the evaluation have the most significant impact upon the building project.

#### **Reporting on the investment costs**

The aim of reporting on the investment costs is to collect and document cost parameters for BREEAM. These cost parameters should be given in pounds per m<sup>2</sup> GFA in order to enable these parameters to be compared.

## **5.2 Evaluation**

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The life cycle costs are calculated on the basis of the investment costs, the lifespan, the projected repair and maintenance costs, the cleaning costs and the operating costs.

#### **Relevance of the use costs for the investigated products**

In establishing the life cycle costs, BREEAM evaluates the building together with its construction costs and the projected repair, maintenance and operating costs.

The evaluation of the relevance of the individual elements of the life cycle costs for the investigated products

Table 5: Relevance of the elements of the life cycle costs for the product evaluation

<b>Life cycle costs</b>	<b>Relevance</b>
<i>Investment costs</i>	Relevant
<i>Maintenance costs</i>	Not relevant Repair and maintenance costs only apply to fair-faced screed and only the visible surface will be repaired. In this case there will be no renewed application of the investigated products.
<i>Renovation costs</i>	Not relevant There are no renovation costs given that the lifespan is > 50 years
<i>Cleaning costs</i>	Not relevant Cleaning costs only apply to fair-faced screed – and these are to be included as costs anyway given that, in this case, the screed will always be cleaned.

### 5.3 Results

The investigated products have no influence on the life cycle performance of the building given that they only influence the investment costs.

## 6 HEA 04 Thermal comfort

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For BREEAM, the objective of this criterion is to ensure an appropriate level of comfort in both winter and summer. The comfort in a space is measured using the parameters of thermal comfort. Measures within the space that have the greatest possible influence upon the prevailing indoor climate conditions improve the individual well-being of the user. This increases the level of user-satisfaction with the space, which, in turn, improves performance.

### 6.1 BREEAM requirements<sup>13</sup>

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BREEAM evaluates the thermal comfort on the basis of thermal simulations. In order to carry out these simulations, boundary conditions are defined for the calculation process as a means of producing comparable results.

The following calculation results from the simulation flow into the BREEAM evaluation:

- Reduction of extreme indoor temperatures in winter and summer – evaluation of the operational indoor temperature and, where applicable, of the PMV (predicted mean vote) and PPD (predicted percentage of dissatisfied)
- Achievement of a high level of indoor thermal comfort for a projected climate change scenario

The building management was defined on the basis of the results of the thermal simulation – other factors to be considered included: how the individual systems interacted, how thermal comfort can be ensured in different / differently oriented zones and how the user can intervene in the automated system.

The limiting values for the various supply systems of the building are based on the norms:

- CIBE Guide A – Environmental design
- ISO 7730:2005
- CIBSE TM 52 - The limits of thermal comfort: avoiding overheating in European buildings
- CIBSE TM 59 - Design methodology for the assessment of overheating risk in homes

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<sup>13</sup>BREEAM New Construction 2018 (UK) - Hea 04 Thermal comfort; retrieved on 09.11.2020

In addition to this, it is also evaluated as part of this criterion whether the thermal simulation should also calculate a climatic scenario that takes into account climate change and the related temperature and weather changes.

## 6.2 Evaluation

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In order to be able to evaluate the individual indicators it is first necessary to check the relevance of these individual indicators for the investigated products. For this criterion, the following products out of the products being investigated here are relevant:

- RETANOL 511
- RETANOL EKA / VIWA
- RETANOL XTREME
- RETANOL XTHINN
- PLAFIZ 211 / 2000
- RISOL PLUS

Due to a number of factors these products potentially have a positive influence upon the thermal conduction characteristics of the screed and can, hence, have a positive effect on the thermal indoor comfort.

The product "Bonding Course ZE", which is also a subject of this statement, has no influence on the thermal indoor comfort due to the fact that the product merely ensures an optimal connection between two layers.

In addition to this, the relevance of the products in terms of the individual indicators of the criterion must also be checked.

Table 6: Relevance of the investigated products in terms of the indicators of thermal comfort according to BREEAM UK New Construction 2018

<b>Indicators</b>	<b>Relevance</b>
<i>Thermal simulation</i>	Positive effects can arise due to the altered thermal conduction characteristics of the screed
<i>Thermal simulation taking into account the boundary conditions of a climate change scenario</i>	Positive effects can arise due to the altered thermal conduction characteristics of the screed
<i>Management and control of the building</i>	No relevance

The effects of the products on the thermal indoor comfort can only be evaluated on a project-specific basis given that a broad range of parameters have an influence upon the results of the thermal indoor comfort.

### 6.3 Results

In the case of this criterion it is not possible to make an unequivocal statement about the relevance and influence of the parameter. However, the potential positive effects and impact on the space could be evaluated by a detailed investigation of the thermal indoor comfort by means of a thermal simulation and/or a flow simulation for variants of the solution.

## 7 HEA02 Indoor air quality<sup>14</sup>

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The quality of the indoor climate is determined by a complex combination of externally and internally produced contaminants, which can be intensified further by user behaviour.

### 7.1 BREEAM requirements

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The evaluation of the indoor air quality is carried out in four parts:

- **Indoor air quality plan**

The objective of the plan is to reduce the contamination of the indoor air during use. It addresses emissions that are produced during construction (fine particles and emissions) and by existing parts of the building and emissions that are produced during use.

- **Ventilation**

The objective of the ventilation of the building is to reduce the concentration of contaminants in the interior spaces during periods of use

- **Emissions from building products**

The products built into the building should meet low-emission requirements

- **Measurement of the indoor air**

The indoor air quality and the low emission level of the materials built into the building will be verified upon the completion of the building by a measurement of the indoor air.

Only the item 'Emissions from building products' is relevant for the products from PCT Chemie GmbH. All other indicators of indoor air quality are related to management processes, measurements or the technical concept of the building. For this reason, only the requirements for low-emission building products are described in detail below.

The low-emission level of the building products is evaluated in the following categories:

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<sup>14</sup>[BREEAM New Construction 2018 \(UK\) - Hea 02 Indoor air quality](#); retrieved on 09.11.2020

Table 7: BREEAM requirements for low-emission levels in building products in terms of product categories

Product type / Product category	Emissions limit for formaldehyde	TVOC
Interior paints and finishes	$\leq 0.06 \text{ mg/m}^3$	$\leq 1.0 \text{ mg/m}^3$
Wood / Wood materials (including wood flooring)	$\leq 0.06 \text{ mg/m}^3$ (not MDF) $\leq 0.08 \text{ mg/m}^3$ (MDF)	$\leq 1.0 \text{ mg/m}^3$
Floor coverings (including floor levelling compounds and resin flooring)	$\leq 0.06 \text{ mg/m}^3$	$\leq 1.0 \text{ mg/m}^3$
Ceiling, wall, sound and thermal insulation materials	$\leq 0.06 \text{ mg/m}^3$	$\leq 1.0 \text{ mg/m}^3$
Adhesive and sealing materials for interior use (including flooring adhesives)	$\leq 0.06 \text{ mg/m}^3$	$\leq 1.0 \text{ mg/m}^3$

## 7.2 Evaluation

In order to evaluate the investigated products it is necessary to establish whether they belong to the categories that are to be investigated according to BREEAM.



Table 8: Relevance of the product categories that are to be investigated in line with BREEAM New Construction UK 2018 for the investigated products of PCT Chemie

Products of PCT Chemie GmbH	Product type / Product category	Relevance
RETANOL 511	Additive for screeds	Does not belong to any of the categories identified as relevant by BREEAM!
RETANOL EKA / VIWA	Additive for screeds	Does not belong to any of the categories identified as relevant by BREEAM!
RETANOL XTREME	Additive for screeds	Does not belong to any of the categories identified as relevant by BREEAM!
RETANOL XTHINN	Additive for screeds	Does not belong to any of the categories identified as relevant by BREEAM!
PLAFIZ 211 / 2000	Additive for screeds	Does not belong to any of the categories identified as relevant by BREEAM!
RISOL PLUS	Additive for screeds	Does not belong to any of the categories identified as relevant by BREEAM!
BONDING COURSE ZE	Bonding course between concrete and screed	Does not belong to any of the categories identified as relevant by BREEAM!

### 7.3 Results

The investigated products have no direct influence on the evaluation of the indoor air quality in line with BREEAM and are thus not relevant for the evaluation of this criterion. They cannot be assigned to any of the product categories that require verification.

## 8 HEA05 Acoustic performance<sup>15</sup>

A low level of acoustic comfort can bring a series of disadvantages for the building user. Amongst other things this can lead to a reduced ability to concentrate, discomfort and lower productivity levels.

For this reason, it is important that noise within a building is addressed in such a way that the comfort and performance levels of users are maximised and their privacy is protected. As a result of this, building acoustics is an important aspect of the design, operation and construction of buildings.

### 8.1 BREEAM requirements

BREEAM evaluates spatial acoustics on the basis of the sound insulation, the indoor ambient noise level and the spatial acoustics. These criteria are differently evaluated depending upon the building category. The evaluation is carried out on the basis of the requirements set out in BB93.

### 8.2 Evaluation

The requirements of BREEAM UK New Construction 2018 are requirements for the spatial acoustics. The investigated products have no influence on the spatial acoustic characteristics of a building.

### 8.3 Results

The products of PCT Chemie GmbH have no influence on the spatial acoustic characteristics. For this reason the investigated products are not relevant for the evaluation in line with BREEAM UK New Construction 2018.

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<sup>15</sup> [BREEAM New Construction 2018 \(UK\) - Hea 05 Acoustic performance](#); retrieved on 09.11.2020

## 9 WST01 Construction waste management<sup>16</sup>

A third of all waste in Great Britain, e.g. 120 million tonnes of waste per year, is generated by the building and demolition sector, which is responsible for the largest share of the total national volume of waste. The reduction of waste simultaneously reduces the environmental impact and the costs of the construction process. The true costs of waste include the costs of the product or material that is wasted, the costs of treating the waste and the costs of waste management.

### 9.1 BREEAM requirements

Under this criterion, BREEAM evaluates the approach to construction waste. In doing so it evaluates the following indicators:

- Checking / auditing the built substance – Assessment / optimisation of the recyclability/reusability
- Resource efficiency in building – Drawing up of a Resource Management Plan
- Avoidance of depositing of raw materials / site waste on landfill sites, etc. – Reduction of the volume of waste on building sites and sorting of waste into material groups in line with the European Waste Catalogue.

### 9.2 Evaluation

The requirements of BREEAM UK New Construction 2018 are requirements for the management of building sites. None of these requirements for site management result in requirements for the composition of products or the elimination of certain product groups.

### 9.3 Results

The requirements of BREEAM UK New Construction 2018 do not result in any restrictions upon the use of the investigated materials from PCT Chemie GmbH.

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<sup>16</sup> [BREEAM New Construction 2018 \(UK\) - Wst 01 Construction waste management](#); retrieved on 09.11.2020

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## Sources

<i>Name</i>	<i>Source</i>
<i>PCT Products</i>	<a href="https://www.pct-chemie.de/downloads/">https://www.pct-chemie.de/downloads/</a>
<i>WST 01</i>	<a href="#"><u>BREEAM New Construction 2018 (UK) - Wst 01 Construction waste management</u></a>
<i>HEA 05</i>	<a href="#"><u>BREEAM New Construction 2018 (UK) - Hea 05 Acoustic performance</u></a>
<i>HEA 02</i>	<a href="#"><u>BREEAM New Construction 2018 (UK) - Hea 02 Indoor air quality</u></a>
<i>HEA 04</i>	<a href="#"><u>BREEAM New Construction 2018 (UK) - Hea 04 Thermal comfort</u></a>
<i>MAN 02</i>	<a href="#"><u>BREEAM New Construction 2018 (UK) - Man 02 Life cycle cost and service life planning</u></a>
<i>MAT 02</i>	<a href="#"><u>BREEAM New Construction 2018 (UK) - Mat 02 Environmental impacts from construction products – Environmental Product Declarations (EPD)</u></a>
<i>MAT 01</i>	<a href="#"><u>BREEAM New Construction 2018 (UK) - Mat 01 Environmental impacts from construction products - Building life cycle assessment (LCA)</u></a>
<i>Uniclass</i>	<a href="https://www.cpic.org.uk/uniclass1/">https://www.cpic.org.uk/uniclass1/</a>