



# FIRE-RETARDANT MORTAR MINERAL FIBER SOLUTIONS

Product Family

PERLIWOOL, PERLIWOOL TERMIC

Dry-base spray-on mortars  
MINERAL FIBER SOLUTIONS

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## Spray-on Mortars MINERAL FIBER SOLUTIONS

### Product family representative

PERLIWOOL and PERLIWOOL TERMIC

### Description

Dry-base spray-on rock wool-based mortars. PERLIWOOL TERMIC is used primarily for THERMAL INSULATION in construction systems, having outstanding acoustic properties, and for controlling surface water condensation, with an A1 reaction to fire rating. PERLIWOOL, besides achieving PERLIWOOL TERMIC properties, has been tested to ascertain its fire resistance in a large quantity of complete construction solutions. This mortar is mainly used for PASIVE FIRE PROTECTION.

### Contact information

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**Summary table: Environmental parameters in which products have a specific contribution.**  
 Detailed the environmental certification information sheet

**Support Documentation** ■ **Certificated :** EPD, CSR, REACH ■ **Self-declared** ■ **Potential**

Category	Icon	Parameter 1	Parameter 2	Parameter 3	Parameter 4	Parameter 5	Parameter 6	Parameter 7	Parameter 8
Site. Mobility		Solar Reflectance Index SRI	Rainwater management	Exterior lighting	...				
Energy Atmosph.		Embodied energy	Greenhouse gases	Energy demand reduction	Equipment's efficiency	Other polluting gases	Renewable energy	Energy management	...
Materials		Accredited location	Pre-consumer recycled content	Post-consumer recycled content	Potential reuse	Certified wood	Construction waste	Chemical composition	...
Water		Consumption < reference	Water management	...					
Indoor Environm.		Low emitting VOC's	Low emitting formaldehyde	Thermal comfort control	Lighting comfort	Acoustic comfort	Air quality	...	
Innovation		Innovation	...						

**NOTES:**

- The information included in this document shows product compliance with environmental certification (VERDE, LEED or BREEAM) criteria. The analysis is performed based on the information provided by manufacturer. To ensure the compliance with the credit, it will be needed to verify the validity of the provided information by the manufacturer.
- This document does not constitute a product certification, nor does it guarantee compliance with local regulations.
- The conclusions of this study applies only to products included in this report, and are subject to the invariability of product technical conditions.
- The validity of this document is subject to supporting documents expiration date, regulations variation, and environmental certification systems updates.
- This document informs about products possible contribution to VERDE, LEED or BREEAM certifications. However, the final decision on whether or not a product meets certification requirements is exclusive to certification bodies: GBCI (Green Business Certification Inc.) for LEED certification.

# CREDIT SUMMARY

## LEED v4



### ENERGY & ATMOSPHERE (EA)

- ◆ EA Minimum energy performance (prerequisite)
- ◆ EA Optimize energy performance (credit)



### MATERIAL & RESOURCES (MR)

- ◆ MR Construction and demolition waste management



### INDOOR ENVIRONMENTAL QUALITY (IEQ)

- ◆ IEQ Minimum acoustic performance (Schools prerequisite)
- ◆ IEQ Acoustic performance (credit)
- ◆ IEQ Low-emitting materials
- ◆ IEQ Indoor air quality assessment
- ◆ IEQ Thermal comfort



### INNOVATION (ID)

- ◆ ID Innovation. Exemplary Performance

### LEED Categories



(LT)  
Location & Transportation



(SS)  
Sustainable Sites



(WE)  
Water Efficiency



(EA)  
Energy & Atmosphere



(MR)  
Materials & Resources



(IEQ) Indoor Environmental Quality



(ID)  
Innovation



(RP)  
Regional Priority

### LEED (v4) Rating Systems

**EB** Existing Building  
**NC** New Construction  
**CI** Commercial Interiors  
**CS** Core & Shell  
**SNC** School New Construction  
**SEB** School Existing Building  
**MRB** Mid Rise Buildings

**RNC** Retail New Construction  
**REB** Retail Existing Building  
**RCI** Retail Commercial Interiors  
**HC** Healthcare  
**HNC** Hospitality-New Constr.  
**HEB** Hospitality-Existing Building  
**HCI** Hospitality-Commercial Int.

**DCNC** Data Center NC  
**DCEB** Data Center EB  
**WNC** Warehouse NC  
**WEB** Warehouse EB  
**NDP** Neighborhood Devel. Plan  
**ND** Neighborhood Develop.

# CREDIT DOCUMENT

## LEED v4



### CATEGORY

## ENERGY & ATMOSPHERE (EA)

- EA Minimum energy performance (prerequisite)
- EA Optimize energy performance (credit)  
(Up to 16 points in **SNC**, 18 in **NC**, **CS**, **RNC**, **HNC**, **DCNC**, **WNC** and 20 in **HCNC**. EP\* can contribute with one additional point)

**Intent** To reduce the environmental and economic harms of excessive energy use by achieving a minimum level of energy efficiency for the building and its systems. To achieve increasing levels of energy performance beyond the prerequisite standard to reduce environmental and economic harms associated with excessive energy use.

**Compliance information** MINERAL FIBER SOLUTIONS products have a low thermal conductivity, contributing to efficiency and energy savings. Material thicknesses vary depending on the required thermal transmittance and fire protection. The minimum recommended thickness is 1cm and the maximum 6cm, depending on the sprayed surface. From 6cm, the use of mesh is recommended to ensure product adhesion. Thermal conductivity and thickness data can be used to develop the project building energy simulation, as required by LEED.

PRODUCT	THERMAL CONDUCTIVITY $\lambda$ (W/mK)
PERLIWOOL	0,07
PERLIWOOL TERMIC	0,05

*NOTE: Simulation result depends on the building design, its location, orientation, materials, envelope definition and systems.*

### LEED Requirements

#### Option 1: Energy Simulation.

Demonstrate an improvement in the proposed building performance rating compared with the baseline building performance rating. Calculate the baseline building performance according to ANSI/ASHRAE/IESNA Standard 90.1–2010, Appendix G, with errata.

Demonstrate an improvement of 2-5% (depending on the rating system) for prerequisite, and an improvement of 3-50% for credit achievement. These savings can score between 1 and 20 points.

**EP\* Option 1:** Demonstrate an improvement of 54% in the proposed building performance rating compared with the baseline building performance rating.

*\*EP- Exemplary performance: Requirements for Exemplary Performance (see Innovation LEED category)*

**Example** N/A

**Support Documentation** *Technical data sheets and information: [mineralsol@mineralsol.com](mailto:mineralsol@mineralsol.com)*

**Reference Standards** ASHRAE 90.1-2010





## CATEGORY MATERIAL & RESOURCES (MR)

**MR Construction and demolition waste management**  
(NC, CS, SNC, RNC, HC, HNC, DCNC, WNC: 1-2 points. Option 2: up to 2 points.  
EP\* can contribute with one additional point)

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

**Compliance information** MINERAL FIBER SOLUTIONS contributes to waste reduction on construction site through its packaging reduction strategies: mortar is distributed in kraft paper bags (25 Kg PERLIWOOL and 20 Kg PERLIWOOL TERMIC), onto 600kg pallets.  
Bags can be recycled and pallets are managed by manufacturers or dealers.  
On site generated waste has been calculated:

PRODUCT	Kg of waste disposal per product sqm (Kg/m <sup>2</sup> )
PERLIWOOL	0,16Kg/m <sup>2</sup>
PERLIWOOL TERMIC	0,078Kg/m <sup>2</sup>

**LEED Requirements** **Option 2. reduction of total waste material**  
Do not generate more than 12.2 kilograms of waste per square meter of the building's floor area.

**EP\* Achieve both Option 1** (Divert 50%-70% of waste material, 2-4 material streams) **and Option 2.**

*\*EP- Exemplary performance: Requirements for Exemplary Performance (see Innovation LEED category)*

**Example** N/A

**Support Documentation** **Self-declared wastes**

- Reference Standards**
- European Commission Waste Framework Directive 2008/98/EC
  - European Commission Waste Incineration Directive 2000/76/EC
  - EN 303-1—1999/A1—2003
  - EN 303-3—1998/AC—2006
  - EN 303-4—1999
  - EN 303-5—2012
  - EN 303-6—2000
  - EN 303-7—2006



## CATEGORY INDOOR ENVIRONMENTAL QUALITY (IEQ)

- ◆ **IEQ Minimum acoustic performance (Schools Prerequisite)**
- ◆ **IEQ Acoustic performance (Credit)**  
(Up to 1 point in **NC, SNC, HNC, DCNC y WNC** and 1-2 points in **HCNC**)

<b>Intent</b>	To provide workspaces and classrooms that promote occupants' well-being, productivity, and communications through effective acoustic design.
<b>Compliance information</b>	PERLIWOOL and PERLIWOOL TERMIC products contribute to this credit due to their outstanding thermal and sound insulation properties. However, credit and prerequisite compliance depends on a correct design of spaces and coatings, construction solutions, in addition to external conditions.
<b>LEED Requirements</b>	<p><b>Prerequisite (Schools) – Requirements:</b></p> <p><b>Exterior noise:</b> For high-noise sites, implement acoustic treatment to minimize noise intrusion from exterior sources and control sound transmission between classrooms and other core learning spaces.</p> <p><b>Reverberation time:</b> Meet LEED reverberation time requirements according to classrooms sizes.</p> <p><b>Credit Requirements:</b></p> <p><b>Sound isolation:</b></p> <ul style="list-style-type: none"> <li>• Interior partitions must meet the composite sound transmission class (STCC) ratings.</li> <li>• Schools: Meet STC requirements listed on <i>ANSI S12.60–2010</i> Parte 1.</li> <li>• Healthcare: Acoustic design that meet LEED requirements extracted from <i>2010 FGI Guidelines for Design and Construction of Health Care Facilities y Sound and Vibration Design Guidelines for Health Care Facilities</i>.</li> </ul> <p><b>Reverberation time:</b> Meet LEED reverberation time requirements (table 2).</p>
<b>Example</b>	N/A
<b>Support Documentation</b>	<b>Technical data sheets and information:</b> <a href="mailto:mineralsol@mineralsol.com">mineralsol@mineralsol.com</a>

**Reference Standards**

- AHRI Standard 885–2008, Procedure for Estimating Occupied Space Sound Levels in the Application of Air Terminals and Air Outlets: [ahrinet.org](http://ahrinet.org)
- American National Standards Institute (ANSI)/ASHRAE Standard S12.60–2010, Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools: [asastore.aip.org](http://asastore.aip.org)
- 2011 HVAC Applications, ASHRAE Handbook, Chapter 48, Noise and Vibration Control: [ashrae.org](http://ashrae.org)
- NRC-CNRC Construction Technology Update No.51, Acoustic Design of Rooms for Speech, 2002
- ANSI S1.4, Performance Measurement Protocols for Commercial Buildings: [ashrae.org](http://ashrae.org)
- 2010 Noise and Vibration Guidelines for Health Care Facilities
- FGI Guidelines for Design and Construction of Health Care Facilities, 2010 edition: [www.fgiguidelines.org](http://www.fgiguidelines.org)
- ANSI T1.523–2001, Telecom Glossary 2007: [ansi.org](http://ansi.org)
- E966, Standard Guide for Field Measurements of Airborne Sound Insulation of Building Facades and Façade Elements: [astm.org](http://astm.org)
- ANSI/ASA S12.60–2010 American National Standard Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools, Part 1, Permanent Schools: [asastore.aip.org](http://asastore.aip.org)





## CATEGORY INDOOR ENVIRONMENTAL QUALITY (IEQ)

**IEQ Low-emitting materials**  
(NC, CS, SNC, RNC, HC, HNC, DCNC, WNC: 1-3 points. EP\* can contribute with 1 additional point)

**Intent** To reduce concentrations of chemical contaminants that can damage air quality, human health, productivity, and the environment

**Compliance information** PERLIWOOL and PERLIWOOL TERMIC products are composed of inorganic materials. They are not VOC's emitting materials nor do they have organic-based coatings, adhesives or sealants, so they can contribute to the fulfillment of the credit.

**LEED Requirements** **Option 1. Product Category Calculations:** Achieve the threshold level of compliance with emissions and content standards for the next product categories:

- Interior paints and coatings applied on site.
- Interior adhesives and sealants applied on site (including flooring adhesive).
- Flooring.
- Composite wood.
- Ceilings, walls, thermal and acoustic insulation.
- Furniture.
- Exterior applied products (Healthcare and Schools Projects only): adhesives, sealants, coatings, roofs and on-site applied WP membranes.

Final scoring will depend on the number of product categories that meet the requirements.

**EP\* Option 1:** Achieving the maximum score and compliance of 100% of the products.

*\*EP- Exemplary performance: Requirements for Exemplary Performance (see Innovation LEED category)*

**Example** N/A

**Support Documentation** **Declared VOCs**

**Reference Standards**

- CDPHStandardMethodv1.1–2010:cal-iaq.org
- ISO 17025, ISO Guide 65 e ISO 16000 partes 3, 6, 7, 11: iso.org
- AgBB-2010:umweltbundesamt.de/produkte-e/bauprodukte/agbb.htm
- South Coast Air Quality Management District (SCAQMD) Rule 1168 y Rule 1113: aqmd.gov
- European Decopaint Directive: ec.europa.eu/environment/air/pollutants/stationary/paints/paints\_legis.htm
- Canadian VOC Concentration Limits for Architectural Coatings: ec.gc.ca/lcpe-cepa/eng/regulations/detailReg.cfm?intReg=117
- HongKongAirPollutionControlRegulation: epd.gov.hk/epd/english/environmentinhk/air/air\_maincontent.html
- CARB 93120 ATCM: arb.ca.gov/toxics/compwood/compwood.htm

- ANSI/BIFMA M7.1 Standard Test Method for Determining VOC Emissions from Office Furniture Systems, Components and Seating y ANSI/BIFMA e3-2011 Furniture Sustainability Standard: bifma.org



## CATEGORY INDOOR ENVIRONMENTAL QUALITY (IEQ)

### ◆ IEQ Indoor air quality assessment (NC, CS, SNC, RNC, HC, HNC, DCNC, WNC:1-2 points)

<b>Intent</b>	To establish better quality indoor air in the building after construction and during occupancy.
<b>Compliance information</b>	PERLIWOOL and PERLIWOOL TERMIC products do not contain, or emit, during the whole material life cycle: 4-PCH, formaldehyde, ozone, carbon monoxide or VOCs, according to ISO 16000-6, ISO 16000-3 and table 4.1. of "CDPH Standard Method v1.1.-2010, Allowable Concentrations". Due to their low emissions of toxic products, they can contribute to the fulfillment of this credit.
<b>LEED Requirements</b>	<b>Option 2: Air testing</b> Indoor air quality IAQ testing after construction, using ASTM standard methods, EPA compendium methods or ISO methods for each pollutant type. Following pollutants must be analyzed for every regularly occupied space: Formaldehyde, PM10 and PM 2.5 particulates, ozone, VOCs and carbon monoxide. Demonstrate that contaminants do not exceed the LEED required concentration levels. Laboratories that conduct the tests for chemical analysis must be accredited under ISO/IEC 17025.
<b>Example</b>	N/A
<b>Support Documentation</b>	<i>Air quality Declaration</i>

**Reference Standards**

- ASTM D5197–09e1 Standard Test Method for Determination of Formaldehyde and Other Carbonyl Compounds in Air (Active Sampler Methodology): [astm.org/Standards/D5197.htm](http://astm.org/Standards/D5197.htm)
- ASTM D5149–02(2008) Standard Test Method for Ozone in the Atmosphere: Continuous Measurement by Ethylene Chemiluminescence: [astm.org/Standards/D5149](http://astm.org/Standards/D5149)
- ISO 16000-3, Indoor air–Part 3: Determination of formaldehyde and other carbonyl compounds in indoor air and test chamber air—Active sampling method: [iso.org/iso/home/store/catalogue\\_tc/catalogue\\_detail.htm?csnumber=51812](http://iso.org/iso/home/store/catalogue_tc/catalogue_detail.htm?csnumber=51812)
- ISO 16000-6, Indoor air–Part 6: Determination of volatile organic compounds in indoor and test chamber air by active sampling on Tenax TA sorbent, thermal desorption and gas chromatography using MS or MS- FID: [iso.org/iso/home/store/catalogue\\_tc/catalogue\\_detail.htm?csnumber=52213](http://iso.org/iso/home/store/catalogue_tc/catalogue_detail.htm?csnumber=52213)
- ISO 4224 Ambient air—Determination of carbon monoxide—Nondispersive infrared spectrometric method: [iso.org/iso/home/store/catalogue\\_tc/catalogue\\_detail.htm?csnumber=32229](http://iso.org/iso/home/store/catalogue_tc/catalogue_detail.htm?csnumber=32229)
- ISO 7708 Air quality—Particle size fraction definitions for health-related sampling: [iso.org/iso/home/store/catalogue\\_tc/catalogue\\_detail.htm?csnumber=14534](http://iso.org/iso/home/store/catalogue_tc/catalogue_detail.htm?csnumber=14534)
- ISO 13964 Air quality—Determination of ozone in ambient air—Ultraviolet photometric method: [iso.org/iso/home/store/catalogue\\_tc/catalogue\\_detail.htm?csnumber=23528](http://iso.org/iso/home/store/catalogue_tc/catalogue_detail.htm?csnumber=23528)
- U.S. EPA Compendium of Methods for the Determination of Air Pollutants in Indoor Air, IP-1: Volatile Organic Compounds, IP-3: Carbon Monoxide and Carbon Dioxide, IP-6: Formaldehyde and other aldehydes/ketones, IP-10 Volatile Organic Compounds: [nepis.epa.gov](http://nepis.epa.gov)
- U.S. EPA Compendium of Methods for the Determination of Inorganic Compounds in Ambient Air, TO-1: Volatile Organic Compounds, TO-11: Formaldehyde, TO-15: Volatile Organic Compounds, TO-17: Volatile Organic Compounds: [epa.gov/ttnamti1/airtox.html](http://epa.gov/ttnamti1/airtox.html)
- California Department of Public Health, Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources using Environmental Chambers, v1.1–2010: [cal-iaq.org/separator/voc/standard-method](http://cal-iaq.org/separator/voc/standard-method)



## CATEGORY INDOOR ENVIRONMENTAL QUALITY (IEQ)

### ◆ IEQ Thermal comfort (NC, CS, SNC, RNC, HNC, DCNC, WNC: up to 1 point; HCNC: 1-2 points)

**Intent** To promote occupants' productivity, comfort, and well-being by providing quality thermal comfort.

**Compliance information** MINERAL FIBER SOLUTIONS products have high thermal insulation properties, contributing to credit achievement. The credit intent requires the design of the thermal envelope together with the building systems, so as to maintain the required thermal comfort conditions. Thermal insulation helps to avoid thermal asymmetries, temperature variation, temperature differences in the vertical, etc.

**LEED Requirements** Design heating, ventilating, and air-conditioning (HVAC) systems and the building envelope to meet the requirements of:

- Option 1: ASHRAE Standard 55-2010.
- Option 2:
  - ISO 7730:2005
  - CEN Standard EN 15251:2007, Section A2.

*NOTE: There are also thermal control requirements for credit compliance, which do not apply to analyzed products.*

**Example** N/A

**Support Documentation** *Technical data sheets and information:* [mineralsol@mineralsol.com](mailto:mineralsol@mineralsol.com)

**Reference Standards**

- ASHRAE Standard 55–2010, Thermal Environmental Conditions for Human Occupancy: [ashrae.org](http://ashrae.org)
- ASHRAE HVAC Applications Handbook, 2011 edition, Chapter 5, Places of Assembly, Typical Natatorium Design Conditions: [ashrae.org](http://ashrae.org)
- ISO 7730–2005 Ergonomics of the thermal environment, Analytical determination and interpretation of thermal comfort using calculation of the PMV and PPD indices and local thermal comfort criteria: [iso.org](http://iso.org)
- European Standard EN 15251: 2007, Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting and acoustics: [cen.eu](http://cen.eu)



## CATEGORY INNOVATION (ID)



### ID Innovation

(NC, CS, SNC, RNC, HC, HNC, DCNC, WNC: Up to 2 points, from 2 different credits)

<b>Intent</b>	To encourage projects to achieve exceptional or innovative performance.
<b>Compliance information</b>	<p>MINERAL FIBER SOLUTIONS products can contribute to meet the requirements of exemplary performance in the following credits:</p> <ul style="list-style-type: none"> <li>• EA - Optimize Energy Performance.</li> <li>• MR - Construction and demolition waste management</li> <li>• EQ – Low-emitting materials</li> </ul>
<b>LEED Requirements</b>	<p><b>Option 3: Exemplary Performance – EP</b> Achieve exemplary performance in an existing LEED v4 prerequisite or credit that allows exemplary performance, as specified in the LEED Reference Guide, v4 edition.</p> <p>Exemplary Performance thresholds have been defined in this document as EP, in each specific credit.</p>
<b>Example</b>	N/A
<b>Support Documentation</b>	<i>See requirements defined as “EP”, in each specific credit.</i>
<b>Reference Standards</b>	<i>See specific credits.</i>