

FLEXIBLE BITUMEN SHEETS

DANOSA

Product Family

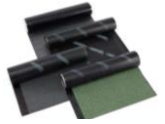
GLASDAN® - ESTERDAN® -
POLYDAN® - SELFDAN®

DANOSA
Flexible Bitumen Sheets for Roof
Waterproofing

ELEMENTS: ROOF. WATERPROOFING.

WATERPROOFING SHEETS

DANOSA



Flexible Bitumen Sheets

Product family representative
GLASDAN® - ESTERDAN® -
POLYDAN® - SELFDAN®

Description

Flexible Bitumen Sheets for roof waterproofing.

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Summary table: Environmental parameters, in which products have a specific contribution.
Contribution detailed in LEED credit information.

| | Support Documentation | Certificated: EPD, CSR, REACH | Self-declared | Potential |
|------------------|-----------------------------|-------------------------------|--------------------------------|-----------------------|
| Site. Mobility | Solar Reflectance Index SRI | Rainwater Management | Exterior lighting | ... |
| Energy Atmosph. | Embodied Energy | Greenhouse gases | Energy Demand Reduction | Equipments Efficiency |
| Materials | Accredited location | Pre-consumer recycled content | Post-consumer recycled content | Potential reuse |
| Water | Consumption < reference | Water management | ... | Certified wood |
| Indoor Environm. | Low emitting VOC's | Low emitting formaldehyde | Thermal comfort. Control | Construction waste |
| Innovation | Innovation | ... | Lighting comfort | Renewable energy |
| | | | Acoustic comfort | Energy management |
| | | | Air quality | Chemical composition |
| | | | ... | ... |

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.
- 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 and BREEAM ES for BREEAM certification.

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CREDIT SUMMARY

LEED v4



SUSTAINABLE SITES (SS)

- ◆ SS Heat Island Reduction



MATERIAL & RESOURCES (MR)

- ◆ MR Building life-cycle impact reduction
- ◆ MR Building product disclosure and optimization - Environmental Product Declarations
- ◆ MR Building product disclosure and optimization - sourcing of raw materials
- ◆ MR Construction and demolition waste management



INNOVATION (ID)

- ◆ ID Innovation. Exemplary Performance

LEED Categories



(LT)
Location & Transportation



(SS)
Sustainable Sites



(WE)
Water Efficiency



(EA)
Energy & Atmosphere



(MR)
Material & 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
 MMR Multifamily Mid Rise

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.
 HM Homes

CREDIT DOCUMENT LEED v4



CATEGORY SUSTAINABLE SITES (SS)

SS Heat Island Reduction (HCNC, NC, CS, SNC, RNC, HNC, DCNC, WNC)

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

Compliance information Below are shown DANOSA products that contribute to credit compliance:

| High-Reflective PRODUCTS | Initial SRI value | Standard Calculation Compliance | Weighted Calculation Compliance ** |
|--|---|---------------------------------|------------------------------------|
| GLASDAN 40/GP ERF ELAST BLANCO | 35 | no | YES (Steep-sloped roof) |
| ESTERDAN PLUS 40/GP ELAST BLANCO | 35 | no | YES (Steep-sloped roof) |
| ESTERDAN PLUS 50/GP ELAST BLANCO | 35 | no | YES (Steep-sloped roof) |
| POLYDAN 180-50/GP ELAST BLANCO | 35 | no | YES (Steep-sloped roof) |
| VEGETATED ROOF | Type | | |
| GLASDAN 30 P ELAST | Extensive and Intensive vegetated roofs | | |
| ESTERDAN PLUS 50/GP ELAST VERDE JARDÍN | | | |

NOTES:

- The final result depends on the area weighted calculation, including all measures employed to reduce heat island effect.
- Products included above, are flexible bitumen sheets with superficial mineral self-protection with white slate granules.
- Products shown above, meet LEED requirements for steep-sloped roofs, according to the weighted calculation, providing the product is installed on 100% of the roof area**.
- Analyzed products do not meet LEED high reflectance requirements for low-sloped roofs, but could contribute to credit compliance, in combination with other solutions with a higher SRI.

Comentado [MO1]: Esto lo quiero verificar

LEED Requirements

Option 1. Roofs:

Use High-Reflective roofing materials according to LEED requirements.
Other heat island effect measures:

- Use open-grid pavement systems or paving materials with a high solar reflectance (SR)
- Provide shade with vegetated structures, high-reflective architectural

devices, or structures covered by energy generation systems

NOTE: The weighted calculation includes all roof and exterior pavements. Therefore, it is not necessary that 100% of the products comply with the requirements. Their compliance will be calculated using an area weighted average.

Option 2: Parking under cover.

EP*: Achieve both Options 1 and 2. Locate 100% of parking under cover.

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

Example N/A

Support Documentation

- **SRI declaration**
- **Vegetated roof data sheets:** www.danosa.com

Reference Standards

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





CATEGORY
MATERIAL & RESOURCES (MR)

MR Building life-cycle impact reduction

(NC, SNC, RNC, HC, HNC, DCNC, WNC, CS)

Intent To encourage adaptive reuse and optimize the environmental performance of products and materials.

Compliance information DANOSA participates, as a member of the EWA (European Waterproofing Association), in the *Flexible Bitumen Sheets For Roof Waterproofing -sector EPD*.

Below is shown environmental performance calculated in the EPD. The data can be used for project LCA calculations.
The data depend on fixing system and number of bitumen sheets:

| PRODUCT STAGE DATA | GLOBAL WARMING POTENTIAL | OZONE DEPLETION POTENTIAL | ACIDIFICATION | EUTROPHICATION | PHOTOCHEMICAL OZONE FORMATION | NON-RENEWABLE PRIMARY ENERGY |
|---|---------------------------|---------------------------|------------------------------|---------------------------|--|------------------------------|
| INDICATOR | Kg CO ₂ eq/ftu | KG DE CFC11 eq/ftu | Kg de SO ₂ eq/ftu | Kg PO ₄ eq/ftu | KG DE C ₂ H ₄ eq/ftu | MJ/ftu |
| Single layer - Fully torched system | 3,39E-02 | 1,47E-08 | 1,34E-04 | 2,09E-05 | 3,73E-05 | 6,14E-01 |
| Single layer – Mechanically fastened system | 3,42E-02 | 1,53E-08 | 1,37E-04 | 2,24E-05 | 3,63E-05 | 6,19E-01 |
| Single layer – Loose laid with ballast system | 3,11E-02 | 1,44E-08 | 1,13E-04 | 1,92E-05 | 3,28E-05 | 5,19E-01 |
| Multi layer - Fully torched system | 4,99E-02 | 1,79E-08 | 1,92E-04 | 2,84E-05 | 5,15E-05 | 8,54E-01 |
| Multi layer – Mechanically fastened system | 5,34E-02 | 2,14E-08 | 1,97E-04 | 2,92E-05 | 5,56E-05 | 9,06E-01 |
| Multi layer – Loose laid with ballast system | 4,85E-02 | 1,97E-08 | 1,76E-04 | 2,57E-05 | 4,92E-05 | 7,99E-01 |

NOTES:
The final result depends on the calculations including all envelope and structure materials.
Functional unit: 1sqm.

LEED Requirements

Option 4: whole-building life-cycle assessment (structure and enclosure)

Conduct a life-cycle assessment of the project’s structure and enclosure that demonstrates a minimum of 10% reduction, compared with a baseline building, in at least three of the six impact categories listed below, one of which must be global warming potential:

- 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; and
- Depletion of nonrenewable energy resources, in MJ.

No impact category assessed as part of the life-cycle assessment may increase by more than 5% compared with the baseline building.

EP* Option 4: Achieve any improvement over the required credit thresholds in all six impact measures.

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

Example N/A

Support Documentation *Flexible Bitumen Sheets For Roof Waterproofing -sector EPD.*

Reference Standards

- ASHRAE 90.1 - 2010 (baseline)
- ISO 14044





CATEGORY MATERIAL & RESOURCES (MR)

MR Building product disclosure and optimization - Environmental Product Declarations

(NC, CS, SNC, RNC, HCNC, HNC, DCNC y WNC)

Intent 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 from manufacturers who have verified improved environmental life-cycle impacts.

Compliance information DANOSA participates, as a member of the EWA (European Waterproofing Association), in the *Flexible Bitumen Sheets For Roof Waterproofing -sector EPD*. It is an industry-wide (generic) EPD, therefore products are valued as one half of a product for purposes of credit achievement calculation (option 1).

LEED Requirements **Option 1. Environmental Product Declarations (EPD) (1 point)**

Use at least 20 different permanently installed products sourced from at least five different manufacturers that meet one of the disclosure criteria below.

- Products with a publicly available, critically reviewed product-specific life-cycle assessment conforming to ISO 14044 that have at least a cradle to gate scope are valued as one quarter (1/4) of a product for the purposes of credit achievement calculation.
- Environmental product declarations which conform to ISO 14025 and EN 15804 or ISO 21930 and have at least a cradle to gate scope.
 - Industry-wide (generic) EPDs are valued as one half (1/2) of a product for purposes of credit achievement calculation.
 - Product-specific Type III EPD are valued as one whole product for purposes of credit achievement calculation.

EP* Option1: Source at least 40 qualifying products from five manufacturers.

Option 2. Multi-attribute optimization (1 point)

Use third party certified products for 50%, by cost, of the total value of permanently installed products in the project that demonstrate impact reduction below industry average in at least three of the following categories.

- global warming potential (greenhouse gases), in 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; and
- depletion of nonrenewable energy resources, in MJ.

For credit achievement calculation, products sourced (extracted, manufactured, purchased) within 100 miles (160 km) of the project site are valued at 200% of their base contributing cost.

EP* Option2: Purchase 75%, by cost, of permanently installed building products that meet the required attributes.

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

Example N/A

**Support
Documentation**

Flexible Bitumen Sheets For Roof Waterproofing -sector EPD.

**Reference
Standards**

ISO 14021–1999/ ISO 14025–2006/ ISO 14040–2006/ ISO 14044–2006 / EN 15804.





CATEGORY
MATERIAL & RESOURCES (MR)

MR Building product disclosure and optimization - sourcing of raw materials

(NC, CS, SNC, RNC, HCNC, HNC, DCNC y WNC)

Intent 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 DANOSA Flexible Bitumen Sheets analyzed in this document have a 35% post-consumer recycled content. Therefore, they can contribute to credit compliance (option 2).

LEED Requirements **Option 1. Raw material source and extraction reporting**
Use at least 20 different permanently installed products from at least five different manufacturers that have publicly released a report from their raw material suppliers which include raw material supplier extraction locations, a commitment to long-term ecologically responsible land use, a commitment to reducing environmental harms from extraction and/or manufacturing processes, and a commitment to meeting applicable standards or programs voluntarily that address responsible sourcing criteria.

- Products sourced from manufacturers with self-declared reports are valued as one half (1/2) of a product for credit achievement.
- Third-party verified corporate sustainability reports (CSR) which include environmental impacts of extraction operations and activities associated with the manufacturer's product and the product's supply chain, are valued as one whole product for credit achievement calculation. Acceptable CSR frameworks include GRI, OECD Guidelines for Multinational Enterprises, U.N. Global Compact- Communication of Progress and ISO 26000: 2010 Guidance on Social Responsibility

EP* Option 1. Source at least 40 products from five manufacturers.

Opción 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.

- Extended producer responsibility.
- Bio-based materials
- FSC certified wood products.
- Materials reuse.
- Recycled content.

For credit achievement calculation, products sourced (extracted, manufactured, and purchased) within 100 miles (160 km) of the project site are valued at 200% of their base contributing cost.

EP* Option 2. Purchase 50%, by cost, of the total value of permanently installed building products that meet the responsible extraction criteria.

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

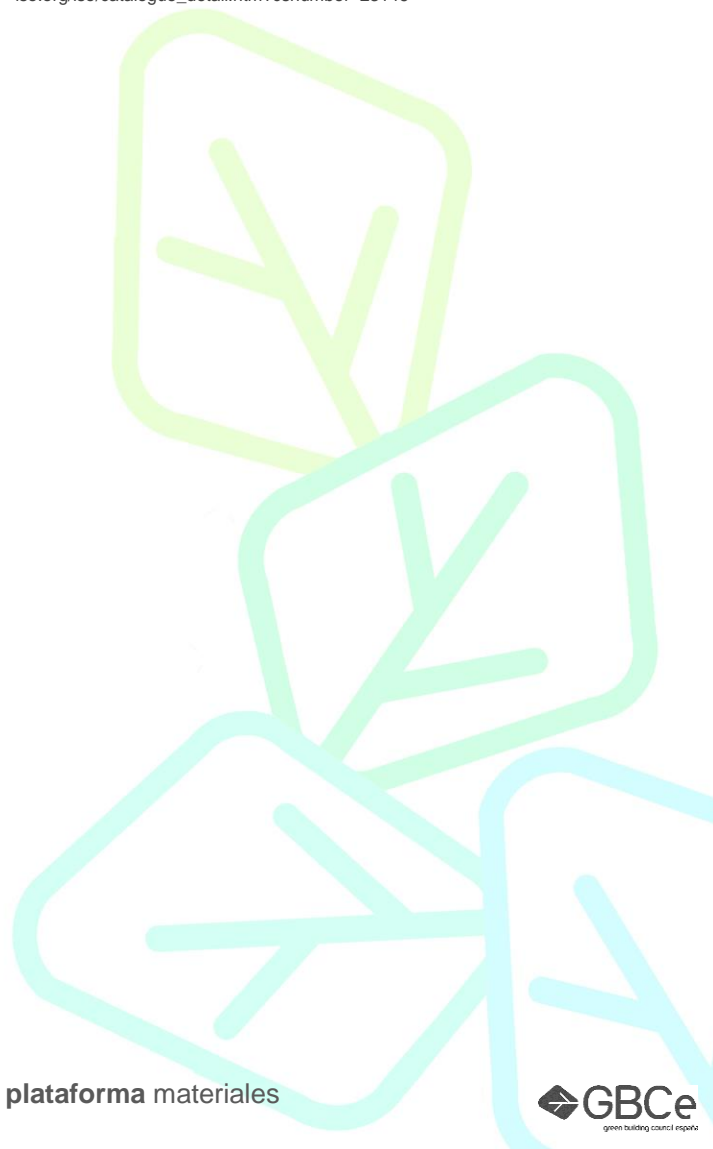
Example N/A

**Support
Documentation**

Recycled content declaration

**Reference
Standards**

- Global Reporting Initiative (GRI) Sustainability Report: globalreporting.org/
- Organisation for Economic Co-operation and Development (OECD) Guidelines for Multinational Enterprises: oecd.org/daf/internationalinvestment/guidelinesformultinationalenterprises/
- U.N. Global Compact, Communication of Progress: unglobalcompact.org/cop/
- ISO 26000—2010 Guidance on Social Responsibility: iso.org/iso/home/standards/iso26000.htm
- Sustainable Agriculture Network: sanstandards.org
- ASTM Test Method D6866: astm.org/Standards/D6866.htm
- 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





CATEGORY
MATERIAL & RESOURCES (MR)

MR Construction and demolition waste management

(NC, CS, SNC, RNC, HCNC, HNC, DCNC y WNC)

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

Compliance information DANOSA contributes to waste reduction on construction site, through its packaging reduction strategies.

Flexible Bitumen Sheets For Roof Waterproofing -sector EPD has developed an estimate of how many kg of non-hazardous waste is generated on site per product sqm (functional unit).

| PRODUCT | Non Hazardous waste disposal (A5) kg/fu |
|---|--|
| Single layer - Fully torched system | 1,62E-03 |
| Single layer – Mechanically fastened system | 1,96E-03 |
| Single layer – Loose laid with ballast system | 1,42E-03 |
| Multi layer - Fully torched system | 2,19E-03 |
| Multi layer – Mechanically fastened system | 2,34E-03 |
| Multi layer – Loose laid with ballast system | 2,85E-03 |

Functional unit: 1sqm

LEED Requirements **Opción 2. reduction of total waste material (2 points)**

Do not generate more than 12.2 kilograms of waste per square meter of the building's floor area.

EP*: Achieve both Option 1 (either Path 1 or Path 2) and Option 2.

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

Example N/A

Support Documentation *Flexible Bitumen Sheets For Roof Waterproofing -sector EPD.*

- 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 INNOVATION (ID)

ID Innovation (NC, CS, SNC, RNC, HC, HNC, DCNC, WNC)

| | |
|-------------------------------|--|
| Intent | To encourage projects to achieve exceptional or innovative performance. |
| Compliance information | <p>DANOSA can contribute to meet the requirements of exemplary performance in the following credits:</p> <ul style="list-style-type: none"> • SS - Heat Island Reduction • MR Building life-cycle impact reduction • MR Building product disclosure and optimization - Environmental Product Declarations • MR Building product disclosure and optimization - sourcing of raw materials • MR Construction and demolition waste management |
| LEED Requirements | <p>Option 3: Exemplary Performance – EP 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> |
| Example | N/A |
| Support Documentation | See requirements defined as “EP”, in each specific credit. |
| Reference Standards | See specifics credits. |