SINTEF

SINTEF Certification

No. 20401

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Technical Approval

SINTEF Building and Infrastructure confirms that

Gerard Diamant and Gerard Heritage

has been found to be fit for use in Norway and to meet the provisions regarding product documentation given in the regulation relating to the marketing of products for construction works (DOK) and regulations on technical requirements for building works (TEK), with the properties, fields of application and conditions for use as stated in this document

1. Holder of the approval

AHI Roofing Kft
Fehérvári út 28/14
8100 Várpalota
Hungary
http://www.gerardroofs.eu/

2. Manufacturer

AHI Roofing Kft, Várpalota, Hungary

3. Product description

Gerard Diamant and Gerard Heritage are steel tile sheets manufactured from respectively 0.4 mm and 0.43 mm sheet of S280GD steel. The steel is coated with Aluminium–Zinc, and acrylic resin on both sides. The weather side is coated with a basecoat of colored natural stonechips and a clear acrylic overglaze. Each sheet is interlocking. Gerard Diamant covers 0.50m^2 while Gerard Heritage covers 0.46 m^2.

Gerard Diamant and Gerard Heritage are available in several colors. The chip used to coat the roofing sheets is crushed natural rock and there may be slight colour variations between different batches of chip.

The weight is 6.2 kg/m^2 for Gerard Diamant and 6.5 kg/m^2 for Gerard Heritage. Dimensions and shape of the sheets are shown in figure 1 and 2.

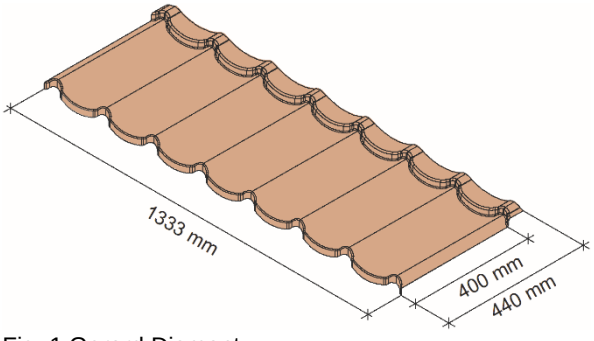

Fig. 1 Gerard Diamant

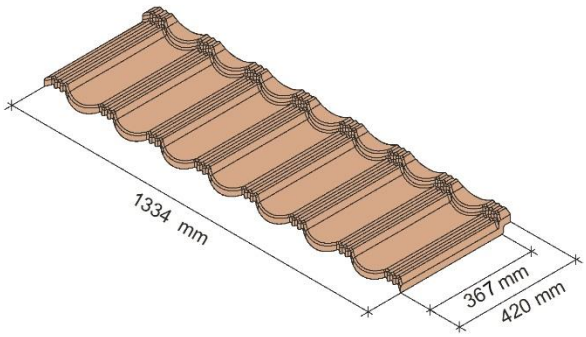

Fig. 2 Gerard Heritage

4. Fields of application

Gerard Diamant and Gerard Heritage can be used as roofing on ventilated pitched roofs where the sheets are laid on battens of wood.

5. Properties

Load-carrying capacity

Gerard Diamant and Gerard Heritage have been tested with an evenly distributed load up to 21 kN/m^2 without any breakage. The roofing sheets can be regarded as having satisfactory strength at all relevant snow loads experienced in Norway. However, the stiffness of the steel sheets is limited. This means that visible deflections may occour at snow loads over 10 kN/m^2.

Tests with static concentrated loads on the roofing sheets show that permanent deformation occures at loads in exess of 1 kN when load is not placed in the valley of the undulation directly above a roofing batten.

Head Office:
SINTEF Building and Infrastructure
P.O.Box 124 Blindern – NO 0314 Oslo
Tel. + 47 22 96 55 55 – Fax + 47 22 69 94 38

e-mail: byggforsk@sintef.no
www.sintef.no/byggforsk

Trondheim:
SINTEF Building and Infrastructure
P.O. Box 4760 Sluppen - 7465 Trondheim
Tel. +47 73 59 30 00 – Fax +47 73 59 33 50

Properties related to fire

Gerard Diamant and Gerard Heritage is classified $B_{ROOF(t2)}$ according to EN 13501-5, based on EN 14782.

Durability

Gerard Diamant and Gerard Heritage have documented sufficient corrosion protection. The cut edges are coated with acrylic coating at the factory. However, in general roofing based on steel sheeting may be subject to corrosion damage over time in locations with particularly corrosive atmospheres.

6. Environmental aspects

Substances hazardous to health and environment

The product contains no hazardous substances with priority in quantities that pose any increased risk for human health and environment. Chemicals with priority include CMR, PBT or vPvB substances.

Effect on soil, surface water and ground water

The leaching properties of the product are evaluated to have no negative effects on soil, ground water.

Waste treatment/recycling

Gerard Diamant and Gerard Heritage shall be sorted as iron and other metals on the building/demolition site. The product shall be delivered to an authorized waste treatment plant where it can be material-recovered after the coating has been removed.

Environmental declaration

No environmental declaration (EPD) has been worked out for the product.

7. Special conditions for use and installation

Design considerations

Gerard Diamant can be used over a roofing underlay on roofs with a slope down to 14° and Gerard Heritage can be used in the same way on roofs with a slope down to 12° provided that the roofing underlay has satisfactory documentation for use at such roof slopes.

Installation

Gerard Diamant and Gerard Heritage must always be fitted on top of a roofing underlay or sub-roof and installed by working progressively from the top of the roof to the bottom. The completed sections must not be loaded more than necessary until the installation is completed.

The sheets shall be fastened with 50 mm hot galvanized ring shank nails with a diameter of 2.8 mm. The sheets must be placed on battens which are positioned at a distance of c/c 400 mm for Gerard Diamant and c/c 367 mm for Gerard Heritage as shown in figure 3a and 3b. The sheets shall be fastened at the front edge with 50 mm hot galvanized ring shank nails with a diameter of 2.8 mm. Four nails shall be used in each steel tile as shown in figure 4. The nails should be placed 60 – 65 mm to the side of the centre of the pan for Gerard Diamant and 60 mm to the side of the centre of the pan for Gerard Heritage.

The fastening method requires the battens to be positioned at precise intervals. Battens of at least 30 x 48 mm are recommended.

Care must be taken both when walking on the roofing and when fastening the sheets with nails to ensure that the tiles are not damaged during installation. The manufacturers' installation guide has to be followed.

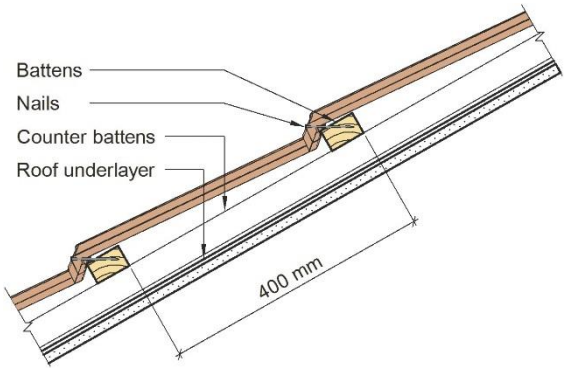

Fig. 3a

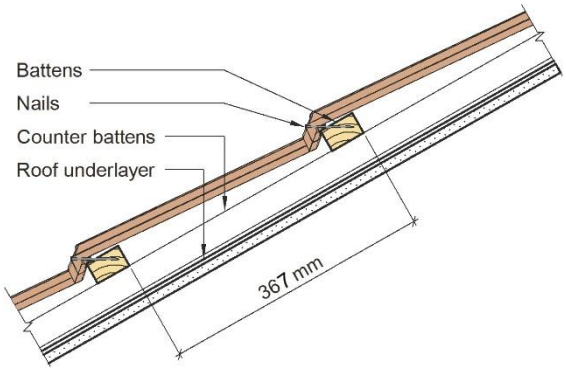

Fig 3b
The roofing sheets are placed/mounted on battens and counter battens. Gerard Diamant (3a) and Gerard Heritage (3b)

The roof surface must have sufficient ventilation. Particular care must be taken to assure air supply below the tiles at the eaves, cf. the manufacturers' installation guideline.

Cutting of the roofing sheets must be carried out using a guillotine, sheet metal shears, or a special saw with hardened metal blade. Grinders or high speed saws that generate high temperatures in the cut edges should be avoided. Cut edges should be coated with corrosion protective paint.

In general, the roofing steel sheets should be installed in accordance with the principles given in the Building Research Design Sheets 544.101 and 544.103, including connections to other parts of the building structure.

The need for a snow-guard may be assumed to be the same as for roofing made of bituminous roofing membrane or shingles, and coarse concrete tiles. See Building Research Design Sheet 525.931 for details. Where snow guards are required, these must be specially designed for the profiling of Gerard Diamant and Gerard Heritage.

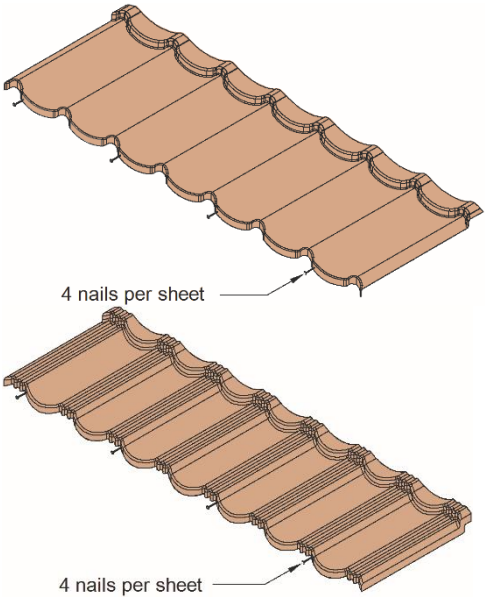

Fig. 4 Nailing of the sheets

Traffic on the roof

Deformation of sheets due to overloading may cause damages to the corrosion protection. Roofing with Gerard Diamant and Gerard Heritage should therefore be supplemented with specially designed roof ladder or roof bridge where access to the roof is required for maintenance purposes.

Walking on the sheets must only be done with caution. Soft-soled shoes must be worn and the weight placed on the balls of the feet when walking on the roof. The foot should be positioned in the valley of the undulation directly above the roofing batten.

Transport and storage

If stored outside, a waterproof cover must be placed over the sheets to keep them dry and prevent damage to the substrate.

8. Factory production control

Gerard Diamant and Gerard Heritage are subjected to supervisory factory production and product control according to contract between SINTEF Building and Infrastructure and AHI Roofing Kft concerning Technical Approval.

AHI Roofing Kft. is subject to supervisory production control carried out by British Board of Agreement, United Kingdom. The manufacturer has a certified quality system certified by SGS with ISO 9001:2008, certificate No HU09/4557; ISO 14001:2004, certificate No HU12/6657 and OHSAS 18001:2007, certificate No HU12/6658.

9. Basis for the approval

The approval is based on type testing, other property testings from SINTEF Building and Infrastructure in following reports:

- SINTEF report 102005068-3/1, dated 2014-10-13, Snow load and pedestrian traffic/concentrated load
- SINTEF report 102005068-3/2, dated 2014-11-04. Type testing
- SP report 5P02536, dated 2015-04-21, Fire exposure
- SP report 5P02536-1, dated 2015-04-07, Fire exposure

10. Marking

Gerard Diamant and Gerard Heritage are marked on the reverse side of each roofing sheet with the production number, production place and date of manufacture. The approval mark for SINTEF Technical Approval No. 20401 may also be used.

Approval mark

11. Liability

The holder/manufacturer has sole product responsibility according to existing law. Claims resulting from the use of the product cannot be brought against SINTEF beyond the provisions of Norwegian Standard NS 8402.

12. Technical management

Project manager for this approval is Daniel Hallingbye, SINTEF Building and Infrastructure, dep. Architecture, Building materials and Construction, Trondheim.

for SINTEF Building and Infrastructure

Hans Boye Skogstad

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Approval Manager