

SINTEF Technical Approval

TG 2330

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 Provided listed on
www.sintefcertification.no

SINTEF confirms that

Separating floors with Hunton Silencio® 36 / Hunton Silencio Thermo®

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

Hunton Fiber AS
 P.O. Box 633
 NO-2810 Gjøvik, Norway
www.hunton.no

2. Product description

This approval regards the use of Hunton Silencio® 36 and Hunton Silencio® Thermo as supporting layer and damping material in separating floor constructions.

Hunton Silencio® 36 is Wood Fiber softboards with a thickness of 36 mm, made of three 12 mm sheets glued together with water glass adhesive. The boards have rebated edges or tongue and groove on all four sides. Board density is approximately 250 kg/m³, corresponding to a sheet weight of approximately 9 kg/m².

Hunton Silencio® Thermo is the same product as Hunton Silencio® 36 but is supplied with slotted grooves for pipes combined with heat distribution boards of aluminium for waterborne floor heating.

The standard board format is 600 mm x 1800 mm. The boards have the following tolerances in compliance with EN 324-1:

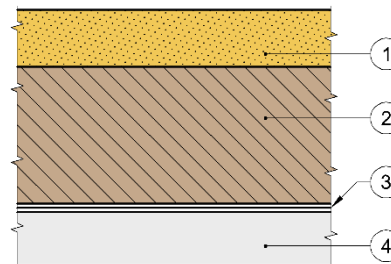
Thickness: ± 0,5 mm
 Length/width: ± 2 mm / ± 1 mm
 Perpendicular alignment: ± 1,5 mm pr. platebredde

Hunton Silencio® Thermo is supplied as standard elements, bend elements and distribution elements, with grooves for pipes with 16 mm or 17 mm diameter spaced c/c 200 mm or 300 mm, and for pipes with 20 mm diameter spaced c/c 300 mm.

3. Fields of application

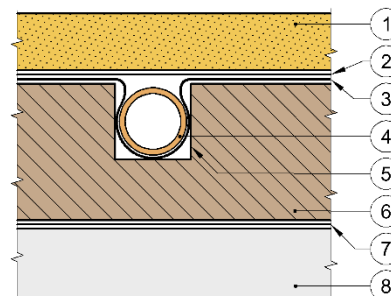
Hunton Silencio® is used as a damping layer under parquet or building board subfloors in floor constructions to reduce the impact sound pressure level, and to increase the airborne sound insulation for rooms below. See figure 1 and 2.

The use is restricted to floors with design loads in category A and B in compliance with EN 1991-1-1 with definition of user category A-D and associated payload.



1	13-15 mm laminated parquet	3	Vapour proof membrane (if relevant)
2	36 mm Hunton Silencio®	4	Subfloor of boards or adjusted floor of concrete etc

Fig. 1
 Use of Hunton Silencio® 36 under parquet flooring



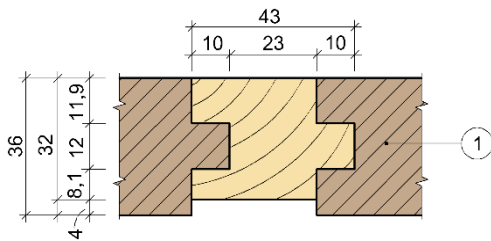
1	13-15 mm laminated parquet	5	20 x 20 mm grooves
2	Wood felt	6	36 mm Hunton Silencio Thermo
3	Aluminium heat distribution board	7	Vapour proof membrane (if relevant)
4	Heating pipe Ø16, Ø17 or Ø20	8	Subfloor of boards or adjusted floor of concrete etc.

Fig. 2
 Use of Hunton Silencio® Thermo with pipes for waterborne heating under parquet flooring.

Category A has distributed load 2 kN/m² and concentrated load 2 kN. Category B has distributed load 3 kN/m² and concentrated load 2 kN.

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Hunton Silencio® may also be used under wooden floors fastened with screws. The boards are then combined with wooden laths in the joints as shown in figure 3.



1	36 mm Hunton Silencio® or Hunton Silencio® Thermo
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Fig. 3
Use of wooden lath in the joints of Hunton Silencio®. Floorboards of solid wood can be attached to the laths with screws. The wooden lath is designed so that attaching the flooring does not impair the sound insulation.

Floor construction with Hunton Nativo Wood Fiber insulation is assessed to satisfy pre-accepted solutions for buildings in fire class 1 with up to 2 floors, and dwellings (risk class 4) with three floors when every dwelling unit has direct exit to the terrain.

Use in buildings in other risk- and fire classes than given here, is not covered by the approval and must be separately documented by a responsible firm in each building project.

Table 1
Material and component specifications for products that are part of floorings with Hunton Silencio to obtain fire resistance as shown in table 2.

Material/component	Specification ¹⁾	TG/PS ²⁾	Fire classification ³⁾	CE marking ⁴⁾
	I-joists			
I-joists	Hunton I-joist	TG 20381	D-s2,d0	ETA-06/0238
Subfloor	22 mm Forestia Flooring Standard	TG 2280	D-s2,d0/ D _{FL} -s1	EN 13986
	Insulation materials			
Thermal insulation	Hunton Nativo® Wood Fiber insulation slabs with density 50 kg/m ³	TG 20440	E	EN 13171
	Hunton Nativo Wood Fiber insulation blown-in with density 23-55 kg/m ³ and minimum thickness 40 mm	PS 3397	E	EN 13171
	Claddings			
Interior cladding	Fermacell Fiber gypsum board 12.5 mm	TG 20122	A2-s1,d0 ⁵⁾	ETA-03/0050
	Gyproc GF 15 mm gypsum board type F	-	A2-s1,d0 ⁵⁾	EN 520
	Gyproc GN 13 mm gypsum board type A	-	A2-s1,d0 ⁵⁾	EN 520
	15 mm Norgips Fire gypsum board type F	TG 20081	A2-s1,d0 ⁵⁾	EN 520
	2.5 mm Norgips Standard gypsum board type A		A2-s1,d0 ⁵⁾	EN 520

¹⁾ Dimensions not specified in the table shall be according to design specifications worked out for each individual delivery or project

²⁾ The component shall be in accordance with the specified SINTEF Technical Approval (TG) or SINTEF Product Certificate (PS)

³⁾ Classification of reaction to fire according to EN 13501-1

⁴⁾ The component shall be CE-marked according to the specified product standard, technical specification or ETA

⁵⁾ Fire classification for the board mounted on Hunton Nativo® Wood FiberInsulation is not documented

4. Properties

4.1 Load-carrying capacity

The boards are sufficiently strong and rigid for the intended use as specified in clause 3.

4.2 Reaction to fire

Reaction to fire classifications according to EN 13501-1 for products included in Hunton Silencio® are given in Table 1. The classification is valid for the way the product is used in this building system.

4.3 Fire resistance.

The fire resistance for the different construction variants is given in Table 2. The fire resistance is determined by large scale fire tests executed at RISE Fire Research AS. Given fire resistance supposes the specified construction given in Table 2 and figure 4, and materials as given in Table 1.

The fire resistance is valid for one-sided fire exposure from below for flooring.

Design load capacity for limit state fire for the given fire resistance time is given in Table 2 as maximum bending moment (kNm) per joist (c/c 600 mm between the joists). See chap. 6 about *Safety in case of fire* regarding special conditions for use and installation.

Table 2
Fire resistance for building components with fire separating and/or loadbearing capacity, with products given in Table 1

Flooring structure	Fire resistance ¹⁾ (Design load capacity at accidental limit state fire kN/m ²) ²⁾
- 2 x 12,5 mm Fermacell Fiber gypsum board - Hunton I-joist SJ45/300", c/c 600 mm - 200 mm Hunton Nativo® Wood FiberInsulation bords or blow-in (Alternatively: glass wool- or stone wool-insulation) - 22 mm Forestia Gulv Standard chipboard	REI 30 2,4 kNm
- 2 x 13 mm Gyproc gypsum board type A - Hunton I-joist SJ45/300", c/c 600 mm - 200 mm Hunton Nativo® Wood Fiber Insulation bords or blow-in (Alternatively: glass wool- or stone wool- insulation) - 22 mm Forestia Gulv Standard chipboard	REI 30 2,4 kNm
- 2 x 13 mm Norgips gypsum board type A - Hunton I-joist SJ45/300", c/c 600 mm - 200 mm Hunton Nativo® Wood Fiber Insulation bords or blow-in (Alternatively: glass wool- or stone wool- insulation) - 22 mm Forestia Gulv Standard chipboard	REI 30 2,4 kNm
- 15,4 mm Gyproc GF 15 gypsum board - 12,5 mm Gyproc GN 13 gypsum board - Hunton I-joist SJ45/300", c/c 600 mm - 200 mm Hunton Nativo® Wood FiberInsulation bords or blow-in (Alternatively: glass wool- or stone wool-insulation) - 22 mm Forestia Gulv Standard chipboard	REI 60 2,4 kNm

¹⁾ Fire resistance is given as equivalent to since it is only performed a fire technical evaluation of the construction and not a classification in accordance with EN 13501-2. The properties separating (EI) and loadbearing ability (R) are given in minutes.

²⁾ Vertical design load capacity at accidental limit state in case of fire.

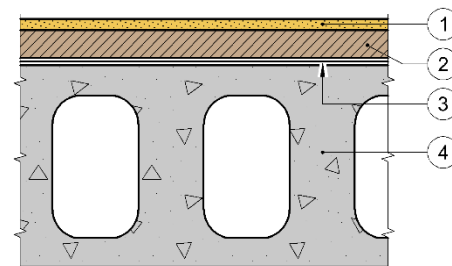
4.4 Sound insulation, heavy-weight floor decks

Table 3 shows the expected weighted reduction of impact sound pressure level $\Delta L_{n,w}$ and expected weighted improvement of the airborne sound insulation, ΔR_w by use of 13-15 mm laminated parquet on 36 mm Hunton Silencio® on heavy floor decks. The weighted reduction of impact sound pressure level is in compliance with EN ISO 10140-3 (laboratory measurements) or EN ISO 16283-2 (field measurements) including evaluation according to EN ISO 717-2 The expected, weighted improvement of the airborne sound insulation are in compliance with EN ISO 10140-2 (laboratory measurements) or EN ISO 16283-1 (field measurements) including evaluation according to EN ISO 717-1.

Table 3
Expected range of variation of impact sound pressure level improvement and airborne sound insulation improvement for various types of flooring on Hunton Silencio® on heavy floor decks.

Construction	Impact sound pressure level improvement $\Delta L_{n,w}$, dB	Improvement of airborne sound insulation ΔR_w , dB
13-15 mm laminated parquet on Hunton Silencio® 36 - Massive concrete floors - Concrete hollow core decks	22-24 26-30	3-5 3-5
13-15 mm laminated parquet, on Hunton Silencio® - Massive concrete floors - Concrete hollow core decks	23-25 24-32	3-5 3-5

Table 4 states the expected, weighted, apparent sound reduction index, R'_w and the expected, weighted, normalized impact sound pressure level, $L'_{n,w}$ for complete floor constructions in finished buildings with Hunton Silencio® 36 or Hunton Silencio® Thermo (example in figure 4).



1	Parquet/laminate floor plus additional board if relevant	3	Vapour proof membrane (0,2 mm PE-sheeting)
2	36 mm Hunton Silencio	4	265 mm hollow concrete slab

Fig. 4
Example of a heavy weight floor construction with Silencio® Hunton.

Sound insulation characteristics applies to heavy weight floors with normally good flanking transmission properties. The weighted, apparent sound reduction index, R'_w is following EN ISO 16283-1 / EN ISO 717-1. The weighted, normalized impact sound pressure level, $L'_{n,w}$ is following EN ISO 16283-2 / EN ISO 717-2.

Table 4
Expected sound insulation characteristics of heavy weight floors with Hunton Silencio® measured in finished buildings.

Construction	Weighted apparent sound reduction index, R'_w , dB	Weighted, normalized impact sound pressure level, $L'_{n,w}$, dB
13-15 mm laminated parquet, Hunton Silencio® 36 ¹⁾ , 10 mm filler levelling, 200 mm concrete hollow core deck	≥ 55	≤ 53
13-15 mm laminated parquet, Hunton Silencio® 36 ¹⁾ , 10 mm filler levelling, 265 mm concrete hollow core deck or 200 mm massive concrete deck	≥ 56	≤ 52

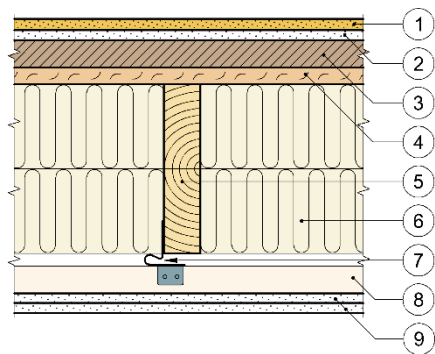
¹⁾ From experience the impact sound properties are 1 - 2 dB better with Hunton Silencio® Thermo

4.5 Sound insulation, light-weight floors

Table 5 states the expected, weighted, apparent sound reduction index, R'_{w} and the expected, weighted, normalized impact sound pressure level, $L'_{n,w}$ for complete floor constructions in finished buildings with Hunton Silencio® 36 or Hunton Silencio® Thermo on timber floor constructions with minimum 223 mm high joists, (see figure 5 - 8).

As the figures show, it is normally necessary to use an additional board under the parquet layer to obtain the impact sound level given in table 3.

The sound insulation values vary with the degree of flanking transmission and are given for floors supported on respectively heavy-weight and light-weight load bearing walls.



1	Parquet/laminate floor	6	Hunton Nativo Wood Fiber insulation (boards or blown in) or mineral wool.
2	13 mm plasterboard or similar	7	Sound reduction fastening c/c 1200 mm
3	36 mm Hunton Silencio	8	Ceiling lath c/c 600 mm
4	22 mm chipboard	9	2 layers of ceiling boards
5	Wooden joists c/c 600 mm		

Fig. 5
Example of timber floor construction with Hunton Silencio®.

Table 5
Expected sound insulation characteristics of timber floor constructions with Hunton Silencio®, measured in finished buildings.

Floor construction ¹⁾	Weighted apparent sound reduction index, R'_{w} , dB	Weighted, normalized impact sound pressure level, $L'_{n,w}$, dB
On supporting walls of masonry or concrete	≥ 57	≤ 51
On supporting walls of timber construction with two layers of 13 mm gypsum board or similar on each side.	≥ 56	≤ 53

¹⁾ Floor construction as shown in figure 5 (13-15 mm laminated parquet, 13 mm gypsum board, Hunton Silencio® 36 / Thermo, 22 mm chipboard, joists with minimum 223 mm height, 150 mm mineral wool, ceiling of 2 x 13 mm gypsum boards suspended in elastic brackets)

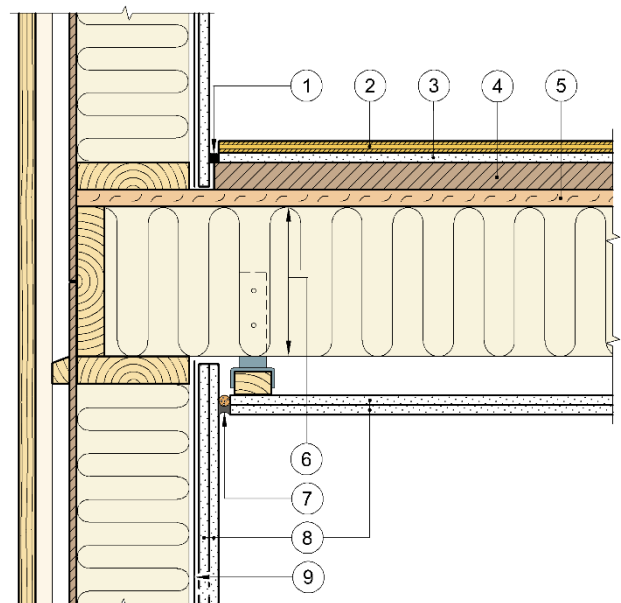
Figure 6 shows construction detail for connection between timber floor construction and external timber wall.

Regarding the need for internal support of the floor joists, we recommend use of hidden steel girder integrated in the floor construction so that the ceiling boards are continuously passing, see figure 7. Use of exposed girder can't be used between different dwellings if the sound insulation requirements shall be fulfilled.

Support on internal load bearing wall may reduce the sound insulation values. If it is to be used, the dimension of the sill and studs must at least be 98 mm. In addition, the cavity must be filled with mineral wool and the wall must have two layers of low sound radiation boards of 13 mm standard gypsum board lining or similar on each side, see figure 8.

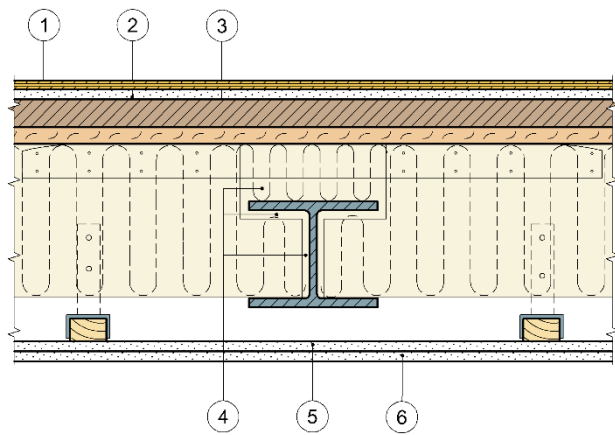
4.6 Thermal insulation

The thermal conductivity for Hunton Silencio® is $\lambda_d = 0,05 \text{ W/(m}\cdot\text{K)}$, and the thermal resistance is $R_d = 0.7 \text{ m}^2\text{K/W}$.



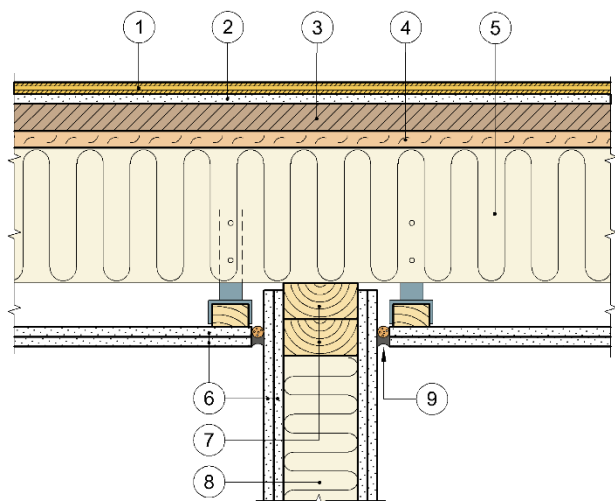
1	Elastic sealing (gap towards the wall)	6	Wooden joists and min. 150 mm Hunton Nativo Wood Fiber insulation (boards or blown in) or mineral wool.
2	Parquet/laminate floor	7	Elastic sealing including bottom support
3	13 mm gypsum-board or similar	8	2 layers of ceiling boards
4	36 mm Hunton Silencio	9	Vapour barrier

Fig. 6
Connection detail between external timber wall and timber floor construction. The top floor layers have a gap towards the wall. The gap may be filled with an elastic sealant.



1	Parquet/laminate floor	4	Min 10 mm gap
2	13 mm plasterboard or similar.	5	Integrated steel girder
3	36 mm Hunton Silencio	6	Wooden joists and min. 150 mm Hunton Nativo Wood Fiber insulation (boards or blown in) or mineral wool.

Fig. 7
Support on hidden steel girder



1	Parquet/laminate floor	6	2 layers of ceiling boards
2	13 mm plaster board or similar	7	98 mm or 123 mm sill
3	36 mm Hunton Silencio	8	Mineralwool
4	22 mm chipboard	9	Elastic sealing including bottom support
5	Wooden joists and min. 150 mm Hunton Nativo Wood Fiber insulation (boards or blown in) or mineralwool.		

Fig. 8
Alternative support on insulated, load bearing internal wall with two layers of low sound radiation 13 mm standard gypsum board lining or similar on each side.

5. Environmental aspects

5.1 Substances hazardous to health and environment

Hunton Silencio® 36 and Hunton Silencio® Thermo 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.

5.2 Effect on indoor environment

Hunton Silencio® 36 and Hunton Silencio® Thermo is evaluated according to SINTEF Technical Approval – Health and Environmental Requirements version 09.05.2022. The product is not regarded as emitting any particles, gases or radiation that have a perceptible impact on the indoor climate, or to have any significant impact on health. The product meets the requirements in BREEAM-NOR v6.0, Emissions from building products according to Hea 02 Indoor air quality.

5.3 Waste treatment/recycling

Hunton Silencio® 36 and Hunton Silencio® Thermo shall be sorted as wood and metal materials on the building/demolition site. The product shall be delivered to an authorized waste treatment plant for energy and material recovery.

5.4 Environmental declaration

An environmental declaration (EPD) has been worked out according to EN 15804 for Hunton Silencio and Hunton Silencio Thermo. For complete documentation see EPD no. NEPD-2792-1490-NO, www.epd-norge.no

6, Special conditions for use and installation

6.1 Design considerations

The substrate should have evenness according to tolerance class PA according to NS 3420-1 when using a floating parquet floor. This corresponds to a maximum surface deviation of ± 2 mm over a measurement length of 2 m for decks and subfloors. The requirement is stricter than the recommended normal class PB as described in NS 3420-1 pt. 4 d2.2.

Laminated parquet laid directly on the boards must have a minimum thickness of 14 mm.

Min. 15 mm boards for load distribution, e.g., chipboard with tongue and groove, shall be placed between Hunton Silencio® and thin floor coverings, carpets and thin laminated flooring. Alternatively, 13 mm floor gypsum board can be used under thin laminate flooring, which is particularly relevant in combination with Silencio® Thermo and floor heating systems.

The characteristic sound insulation values stated in table 3 are valid as long as both external walls and internal load bearing walls have two layers of internal boards, see figure 6 and 7. If the load bearing joist is replaced by a internal load bearing wall the wall dimension, insulation and number for boards be in accordance with the principle given in figure 8.

6.2 Safety in case of fire

For each building project, the required fire resistance according to TEK shall be determined specifically for building parts that shall have loadbearing and/or fire separating capacities.

The required design load capacity at limit state fire must be controlled towards the capacities given in Table 2. Choice of structure is made from the required fire resistance.

The choice of products for internal and external surfaces, behind ventilated claddings, insulation etc. must be based on pre accepted performances in the guideline to TEK.

Board materials for internal lining shall be installed according to the suppliers fitting instructions and the principles in *SINTEF Building Research Guide 543.204 Installation of drywall and fibreboard on walls and ceilings*

Fireproofing of penetrations.

Penetrations through building parts with required fire resistance, and connections to other building parts, must be made in a way which do not reduce the fire resistance performance. See *SINTEF Building Research Guide 520.342 Fireproofing of penetrations*.

On internal surfaces Hunton Nativo® Wood Fiber insulation must be covered with a cladding with reaction to fire at least class K₂10 D-s2,d0. The insulation must also be covered near penetrations, block outs for windows and doors, etc.

The insulation may be laid without covering in cold, unfurnished attic and erected roof. The insulation must not be led past fire rated constructions, if so they must be changed with non-combustible materials. Also see the Norwegian Building Research Institute series: *520.339 Use of combustible insulation in buildings*.

6.3 Installation

The boards must be conditioned at the building site before installation, and the relative humidity of the air must not exceed 60 % during installation.

The boards shall be placed staggered, with at least 200 mm side displacement. Pieces less than 150 mm should be avoided. There should be at least 5 mm clearance to walls, floor openings etc.

A vapour-proof membrane of 0.2 mm polyethylene sheet under the boards shall be used when installation is made on concrete or light weight concrete decks. A wool felt should be placed on Hunton Silencio® Thermo between the heat distribution boards and the top floor.

6.4 Transport and storage

The boards must be protected against precipitation during transport and storage.

7. Factory production control

Hunton Silencio® is produced by Hunton Fiber AS, N- 2810 Gjøvik, Norway.

The holder of the approval is responsible for the factory production control to ensure that Hunton Silencio® is produced in accordance with the preconditions applying to this approval.

The manufacturing of Hunton Silencio® is subject to continuous surveillance of the factory production control in accordance with the contract regarding SINTEF Technical Approval.

The floor construction on site must be controlled in each building project as a part of the ordinary building control.

8. Basis for the approval

The evaluation of *the product* is based on reports owned by the holder of the approval.

The evaluation of design and technical solutions are based on recommendations given in SINTEF Building Research Design Guides.

9. Marking

All boards shall be labelled with the manufacturer's product designation and date of production. The board is CE-marked in accordance with EN 13986. The approval mark for SINTEF Technical Approval TG 2330 may also be used.

10. 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

for SINTEF

Susanne Skjervø
Approval Manager