

SINTEF Building and Infrastructure 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 fibre 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  $250 \text{ kg/m}^3$ , corresponding to a sheet weight of approximately  $9 \text{ kg/m}^2$ .

Hunton Silencio Thermo is the same product as Hunton Silencio 36, but is supplied with slotted grooves for pipes combined with heat distribution plates 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 NS-EN 324-1:

Thickness:	$\pm 0.5 \text{ mm}$
Length/width:	$\pm 2 \text{ mm} / \pm 1 \text{ mm}$
Perpendicular alignment:	$\leq \pm 1.5 \text{ mm}$ per board width

Hunton Silencio Thermo is supplied as standard elements, bend elements and distribution elements, with grooves for pipes with 17/16 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 fig 1 and 2.

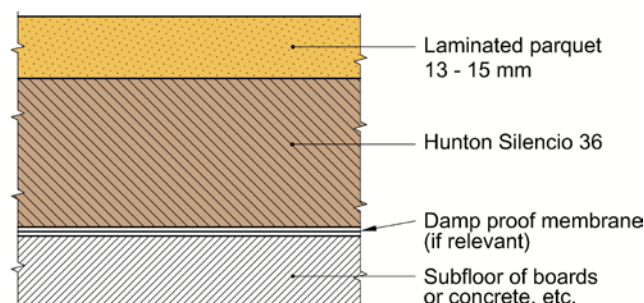


Fig. 1  
Use of Hunton Silencio 36 under parquet flooring

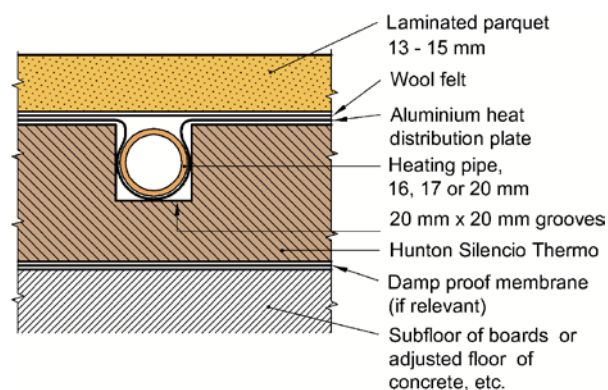
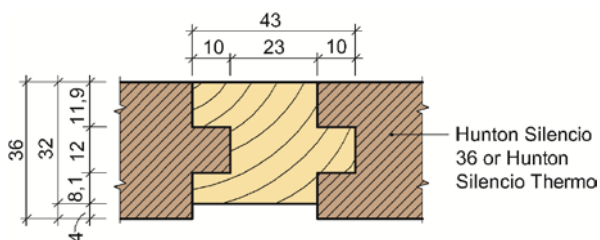


Fig.2.  
Use of Hunton Silencio Thermo with pipes for waterborne heating under parquet flooring

The use is restricted to floors with design loads in category A and B in compliance with NS-EN 1991-1-1:2002 + NA:2008 with definition of user category A-D and associated payload. Category A has evenly vertical distributed load until  $2 \text{ kN/m}^2$  and vertical concentrated load until 2 kN. Category B has evenly distributed load until  $3 \text{ kN/m}^2$  and concentrated load until 2 kN.

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 fig. 3.



**Fig. 3**  
Use of wooden lath in the joints of Hunton Silencio. Floor boards 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.

**4. Properties**

*Load-carrying capacity*

The boards are sufficiently strong and rigid for the intended use as specified in clause 4.

*Properties related to fire*

The boards are classified as E og E<sub>n</sub> in compliance with NS-EN 13986 and NS-EN 13501-1. The boards are classified as combustibile in compliance with NS 3919.

*Sound insulation, dynamic stiffness*

The dynamic stiffness for Hunton Silencio 36 is 8 MN/m<sup>3</sup> measured according to NS-ISO 9052-1 (EN 29052-1).

*Sound insulation, heavy-weight floor decks*

Table 1 states the expected weighted reduction of impact sound pressure level (weighted improvement of impact sound insulation), ΔL<sub>n,w</sub> og expected weighted improvement of the airborne sound insulation, ΔR<sub>w</sub> by use of 13-15 mm laminated parquet on 36 mm Hunton Silencio on heavy floor decks .

**Table 1**

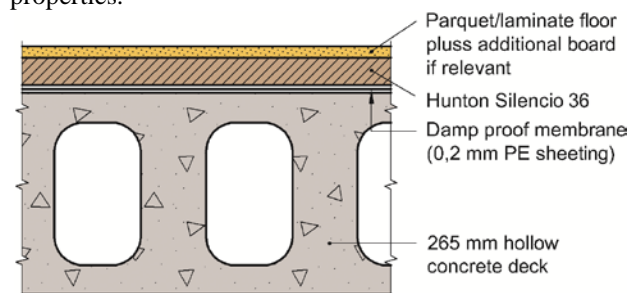
Expected range of variation of impact sound pressure level improvement and airborne sound insulation improvement for various types of flooring on Hunton Silencio on heavy floor decks.

Top floor construction over floor deck	Impact sound pressure level improvement ΔL <sub>n,w</sub> , dB	Improvement of airborne sound insulation ΔR <sub>w</sub> , dB
13-15 mm laminated parquet on Hunton Silencio 36 - Massive concrete floors - Concrete hollow core decks	22-24 26-30	3-5
13-15 mm laminated parquet, on Hunton Silencio - Massive concrete floors - Concrete hollow core decks	23-25 24-32	3-5

The weighted reduction of impact sound pressure level are in compliance with NS-EN ISO 10140-3 (laboratory

measurements) or NS-EN ISO 16283-2 (field measurements) including evaluation according to NS-EN ISO 717-2. The expected, weighted improvement of the airborne sound insulation are in compliance with NS-EN ISO 10140-2 (laboratory measurements) or NS-EN ISO 16283-1 (field measurements) including evaluation according to NS-EN ISO 717-1.

Table 2 states the expected, weighted, apparent sound reduction index, R'<sub>w</sub> and the expected, weighted, normalized impact sound pressure level, L'<sub>n,w</sub> for complete floor constructions in finished buildings with Hunton Silencio 36 or Hunton Silencio Thermo (example in fig. 4). The values are valid for heavyweight floor constructions with normally good flanking transmission properties.



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

**Table 2**

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

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

<sup>1)</sup> From experience the impact sound properties are 1 - 2 dB better with Hunton Silencio Thermo

The weighted, apparent sound reduction index, R'<sub>w</sub> are in compliance with NS-EN ISO 16283-1 including evaluation according to NS-EN ISO 717-1. The weighted, normalized impact sound pressure level, L'<sub>n,w</sub> are in compliance with NS-EN ISO 16283-2 including evaluation according to NS-EN ISO 717-2.

*Sound insulation, light-weight floors*

Table 3 states the expected, weighted, apparent sound reduction index, R'<sub>w</sub> 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 fig. 5 -7). 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.

Table 3

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

Floor construction <sup>1)</sup>	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	$\geq 57$	$\leq 51$
On supporting walls of timber construction with two layers of 13 mm plasterboard or similar on each side.	$\geq 56$	$\leq 53$

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

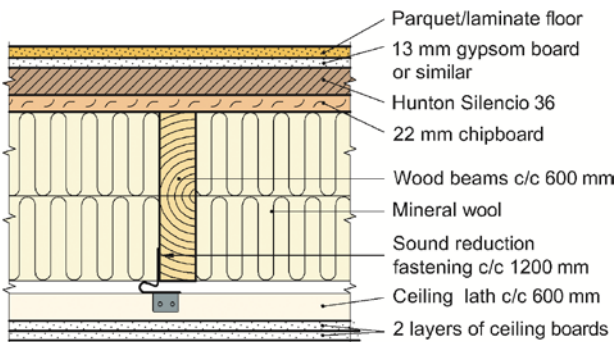


Fig. 5  
Example of timber floor construction with Hunton Silencio.

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

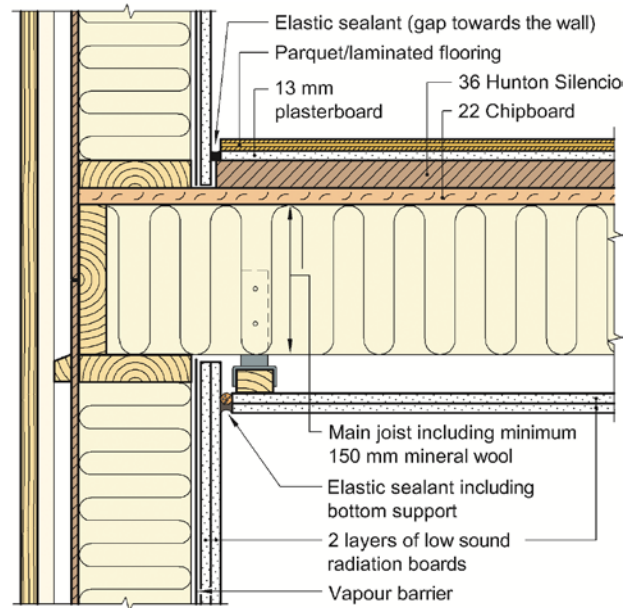


Fig. 6  
Connection detail between external timber wall and timber floor construction. The top floor layers have a gap towards the wall. The gap may be filled with an elastic sealant.

At 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 fig. 7. Use of exposed girder can not be used between different dwellings if the sound insulation requirements shall be fulfilled.

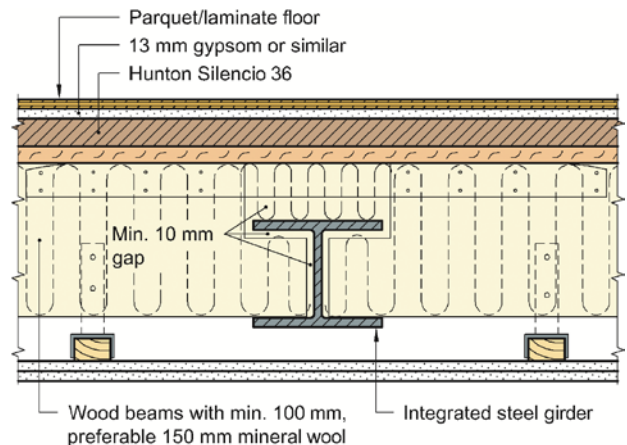


Fig. 7  
Support on hidden steel girder

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 plaster board lining or similar on each side, see fig. 8.

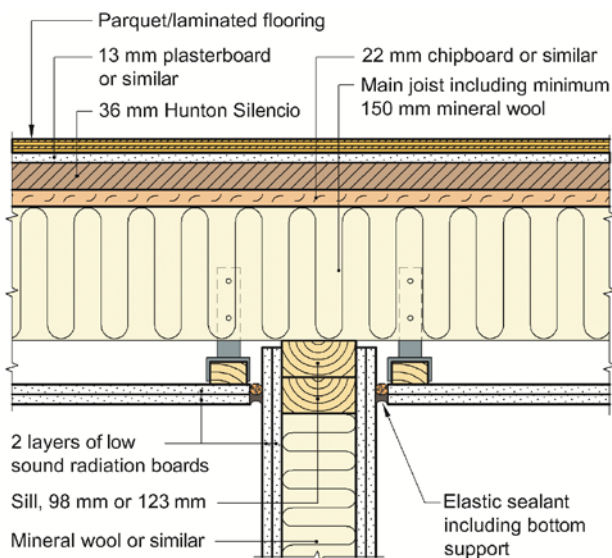


Fig. 8  
Alternative support on insulated, load bearing internal wall with two layers of low sound radiation 13 mm standard plaster board lining or similar on each side.

#### Thermal insulation

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

## 5. 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 indoor environment

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.

### Waste treatment/recycling

The product 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.

### Environmental declaration

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

## 6. Special conditions for use and installation

### Design considerations

The substrate should have evenness according to tolerance class PA as specified in Building Research Design Sheet No. 520.008 when using a floating parquet floor. This

corresponds to a maximum surface deviation of  $\pm 2 \text{ mm}$  over a measurement length of 2 m for decks and subfloors. The requirement is stricter than the recommended normal class in NS 3420-L and NS 3420-Q.

### Flooring material

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 plasterboard can be used under thin laminate flooring, which is particularly relevant in combination with Silencio Thermo and floor heating systems.

### Supporting conditions for the floor construction

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 fig. 6 and 7. If the load bearing beam is replaced by an internal load bearing wall the wall dimension, insulation and number for boards be in accordance with the principle given in fig. 8.

### 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 damp 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 plates and the top floor.

### Transport and storage

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

## 7. Factory production control

The product is produced by Hunton Fiber AS, N- 2810 Gjøvik, Norway.

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

Hunton Silencio is subject to supervisory factory production and product control according to contract between SINTEF Building and Infrastructure and Hunton

Fiber AS concerning 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 approval is primarily based on verification of characteristics documented in the following reports:

- Norwegian Building Research Institute, report O 3952-46 dated 15.03.99. Measurement of thermal conductivity on wood fibre boards
- Norwegian Building Research Institute, report O 7978 dated 16.04.97. Measurement of dynamic stiffness
- Norwegian Building Research Institute, report N 7866 dated 17.09.99 and provisional report 08.02.01 on strength and stiffness of parquet and laminated floors on elastic foundation.
- SP Technical Research Institute of Sweden. Emission measurement Hunton Silencio 36. Report 3F 00 2441 av 05.03.2013.
- SINTEF Building and Infrastructure. Strength and stiffness of floors supported on 36 mm Hunton Silencio, version 2. Base for assessment of increased load class. Test report SBF 20160055. 09.02.2016

In addition, the approval is based upon several assignment reports from the Norwegian Building Research Institute for Hunton Fiber AS et. al. concerning sound insulation

measurements of floors with Hunton Silencio 36 and Hunton Silencio Thermo.

### 9. Marking

All boards shall be labelled with the manufacturer's product designation and date of production. The approval mark for SINTEF Technical Approval No. 2330 may also be used.



Approval mark

### 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 Building and Infrastructure

Marius Kvalvik  
Approval Manager