SINTEF Technical Approval

TG 20360

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Revised: 12.01.2026
Amended:
Valid until 01.02.2031
Provided listed on
www.sintefcertification.no

SINTEF confirms that

Stadus Building System

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

JSC Stadus
Pramonės g. 5
LT-35100 Panevėzys
Lithuania
www.skydmedis.lt

2. Product description

Stadus Building System encompasses composite timber and timber frame construction elements for walls, floors and roofs. The elements are custom made to suit each individual building project.

2.2 Scope

This approval encompasses standard design of the elements, including joints and connection to foundations. Fields of application is described in chapter 3.

The approval covers the production at the factory of the standard construction system with associated materials and components as specified in section 2.4- 2.8. This includes the elements' wall structures, floor dividers and ceilings with associated construction details, as well as details for joining elements.

The approval does not include materials that are supplemented at construction sites, doors or windows. However, windows and doors are normally installed in the factory. The approval neither encompasses roofing, gutters and downpipes, nor supplementary structures such as e.g., stairways and balconies.

Supplementary materials used at construction sites are listed in table 2 with requirements for achieving the performances needed for the elements. Any materials used for assembling must be specified and documented for each project according to “Forskrift om dokumentasjon av byggevarer (DOK)”.

Nor does the approval cover control of installation on the construction site or supplementary building structures in the individual construction project, including technical installations such as ventilation systems, heating systems or electrical installations.

The approval only applies to the elements as a building product as they leave the factory.

2.3 Construction details and general design

Specifications of the individual materials and components are shown in Table 1. The properties of these must be documented from the respective suppliers. Products specified with SINTEF Technical Approval must be used in accordance with what is specified in the separate approval.

The principle design of standard elements is described in chapter 2.4 – 2.8.

Detailed design and construction details for the elements are shown in” Standard *construction details for Stadus Building System pertaining to SINTEF Technical Approval 20360.*” The version filed at SINTEF Community at any one time constitutes a formal part of the approval.

Detailed design of the properties and performance of the structures must be carried out in each individual construction project in accordance with sections 4 and 6.

Tabell 1
Stadus Building System. Material specifications

Material / component	Spesification [1)]	Fire classification 3)	CE-marking 4)
Structural components			
Timber	Strength graded structural timber with class C24 or according to specific structural calculations from AB Holmen or AB Standåsa. Moisture content max. 18 %	D-s2, d0	EN 14081-1
Impr. Timber	Impregnated timber from Hjortkvarn timber AB		
Beams and Joists	Products with SINTEF Technical approval for current application		
Board materials			
Floor sheathing	Products with SINTEF Technical approval for current application		
Roof sheathing	Products with SINTEF Technical approval for current application		
Wind barrier	9.5 mm Saint Gobain GTS 9 gypsum board	A2-s1, d0	EN 520
	9.5 mm Gyproc GTX 9 gypsum board	A2-s1, d0	EN 520
	Products with SINTEF Technical approval for current application		
Claddings and linings			
External cladding	19 mm solid wood cladding grade A in accordance with EN 15146 from AB Holmen or AB Standåsa	D-s2, d0	EN 14915 EN 14519 EN-15146
Internal lining	- 12.5 mm Saint Gobain Rigips gypsum board type A	A2-s1, d0	EN 520
	- 12.5 mm Saint Gobain Rigips Pro Hydro Type H2	A2-s1, d0	EN 520
	- 15 mm Saint Gobain Rigips Pro Fire + Type DF	A2-s1, d0	EN 520
	Products with SINTEF Technical approval for current application		
Thermal insulation			
Mineral wool	Products with SINTEF Technical approval for current application		
	Isover standard 35 glasswool	A1	EN 13162
Membranes and sealings			
Wind barrier, and subroofing roll product	Products with SINTEF Technical approval for current application		
Vapour barrier	Products with SINTEF Technical approval for current application		
Tape	Products with SINTEF Technical approval for current application		
	ISO-BLOCO 600 PUR sealing tape	B1	ETA 07/0072
Fastener products			
Nails / screws	Screws, nails and metal fastenings for external claddings from Essve or Eurotec etc. shall have hot dip zinc coating or equal effective corrosion protection	-	EN 14592
Floor adhesives	Essve Sponplatelim hybrid	-	-
Sealant	Bostik FP403 FIRESEAL HYBRID	B-s1,d0	ETA 20-1119
Miscellaneous			
Windows / doors	Windows and doors are not part of the approval, but products installed in the modules shall satisfy the requirements for thermal insulation and tightness in the technical regulations for construction works (TEK)		

[1)]Unspecified material dimensions must be as specified in the "Standard Construction Details" or as designed specifically for each individual building project
[2)]The product has a SINTEF Environmental Certificate (MS) or SINTEF Product Certificate (PS)
[3)]Fire classification according to EN 13501-1, for use according to "Standard Structural Details"
[4)]The component must be CE marked in accordance with the specified product standard or ETA
[5)]For building parts that must have fire resistance, see chapter 6 Conditions of use

Table 2
Specifications of materials installed on the construction site

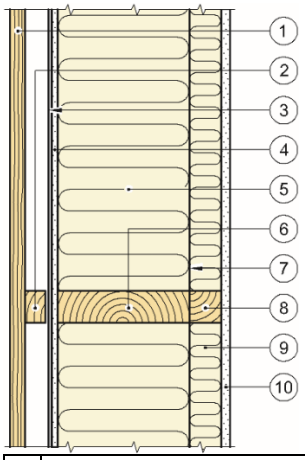
Material	Spesifikasjon [1)]	Fire classi-fication [3)]	CE-marking [4)]
Internal lining	- 12.5 mm gypsum type A	A2-s1,d0	EN 520
	- 15 mm gypsum type DF	A2-s1,d0	EN 520
Insulation	- Glass wool density min. 15 kg/m^3	A1	EN 13162
	- Stone wool density min. 26 kg/m^3	A1	EN 13162
Roofing		B_{ROOF}(t2)	

[1)]Unspecified material dimensions must be as specified in the "Standard Construction Details" or as designed specifically for each individual building project
[2)]The product has a SINTEF Environmental Certificate (MS) or SINTEF Product Certificate (PS)
[3)]Classification of fire exposure properties according to EN 13501-1 when used according to "Standard Structural Details"
[4)]The component must be CE marked in accordance with the specified product standard or ETA

2.4 External walls

Fig. 1 shows the principle design of standard external walls. The elements are storey-high and the length is adjusted to suit the house type and/or to facilitate transport.

External wall elements are normally delivered to the building site with exterior cladding, wind barrier, insulation and water vapour barrier, and with windows and possible doors installed at the factory. The walls are made with a total thermal insulation thickness from 240mm (195+45) to 290mm (245+45) as required. Internal battens, insulation and lining on the inside of the water vapour barrier are normally executed on the building site.

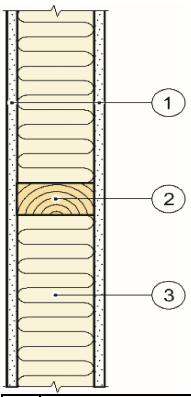


1	External cladding	6	Studs 45 mm x 195/245 mm c/c 600 mm
2	Battens	7	Vapour barrier
3	Wind barrier roll product	8	Battens
4	Wind barrier gypsum board	9	Mineral wool
5	Mineral wool	10	Internal lining

Fig. 1
Principle design of external walls with horizontal cladding.

2.5 Internal walls

Fig. 2 shows the principal design of standard internal walls. The principal design of internal partition walls comprises 45 mm x 95 mm studs of structural timber spaced c/c 600 mm, with a layer of 12.5 mm gypsum board on each side. The elements are storey-high with lengths adjusted to suit to the house type and floor plan. The walls are normally insulated with mineral wool, and stud dimension suited for possible load bearing requirements.

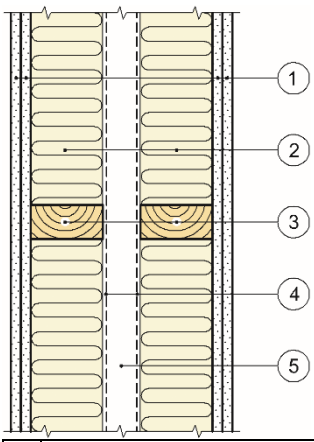


1	Internal lining	3	Mineral wool
2	Studs		

Fig. 2
Principle design of internal load bearing wall.

2.6 Separating walls between apartments.

Fig. 3 shows the principal design of walls between separate apartments, based on storey-high wall elements installed as double walls. The elements are assembled in the factory, apart from the outermost gypsum board layer which is installed on the building site with staggered joints.



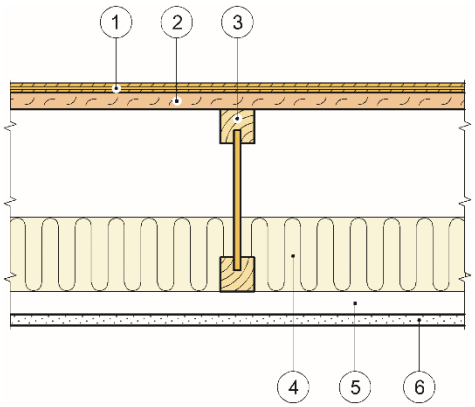
1	Double layer of 12.5 mm gypsum or fibre gypsum boards	4	Steel mesh
2	100 mm mineral wool	5	Minimum 30 mm void
3	45 mm x 95mm studs c/c 600 mm		

Fig. 3
Principle design of separating wall between housing units

2.7 Floor separations

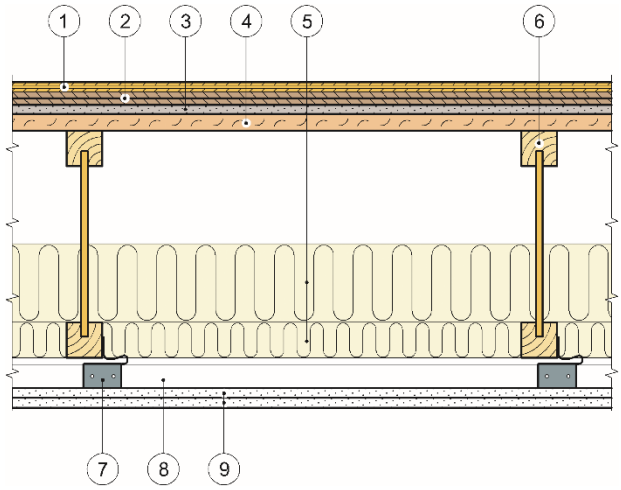
Fig. 4 shows the principle design of floating floor separations inside the same housing unit. Standard element width is 2.4 m. The length is adjusted to suit the house width. The elements are normally delivered on-the building site with joists, floor sheathing (subfloor) and to some extent insulation, while further completion is carried out on the building site. For floor separations between separate apartments, see fig 5, the elements are supplemented with a floating floor on top and a ceiling construction as recommended in SINTEF Building Research Design Guide 522.511 *Lydisolerende etasjeskillere med trebjelkelag i boliger*.

Standard floor separations are designed for stiffness in accordance with SINTEF Building Research Design Guide 522.351 *Trebjelkelag. Dimensjonering og utførelse* unless no other specification is made for each specific building project.



1	Flooring	4	Mineral wool
2	Floor sheathing	5	Battens
3	Joist c/c 600 mm	6	Ceiling lining

Fig. 4 Principle design of floor separations inside a housing unit



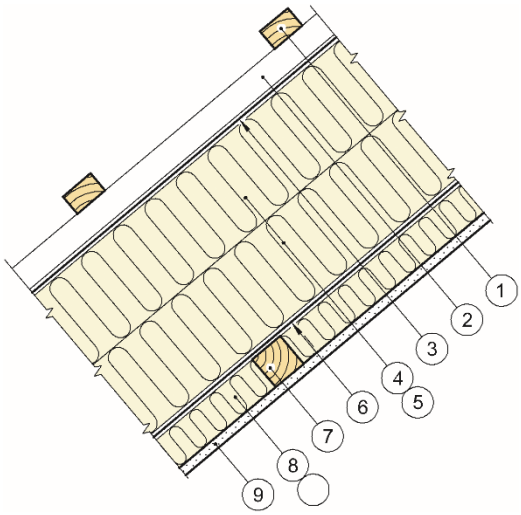
1	Flooring	6	Joist c/c 600 mm
2	Floor sheathing	7	Acoustic profile
3	Mineral wool	8	Battens c/c 600 mm
4	Joist c/c 600 mm	9	Internal lining 2 layers of gypsum boards
5	Mineral wool		

Fig. 5
Principle design of floor separations between housing units

2.8 Roof elements

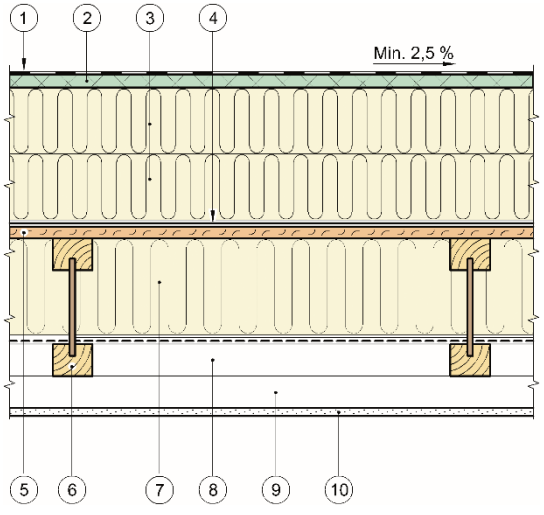
Fig. 6 shows the principle design of roof elements. The load-bearing structure is based on rafters of I-beams or structural timber 300/350 +45 c/c 600 mm, alternatively on rafters made of glue laminated timber as indicated in Table 1.

The roof elements are normally delivered on the building site with battens, counter battens, combined roofing underlay and wind barrier, thermal insulation and water vapour barrier.



1	Battens	6	Vapour barriers
2	Battens	7	Battens
3	Combined roofing underlay and wind barrier	8	Mineral wool
4	Mineral wool	9	Internal lining
5	Rafters		

Fig. 6
Principle design of insulated sloped roof elements



1	Roofing	6	Rafters / joists
2	Pressure-resistant insulation	7	Insulation, max 25 % of total
3	Insulation	8	Steel wires
4	Vapour barrier	9	Battens
5	Underlay	10	Lining

Fig. 7
Principle design of insulated roof elements

2.9 Construction details in general
It is presumed that assembly and construction details for Stadus elements which are not covered by "*Standard construction details for Stadus Building System pertaining to SINTEF Technical Approval TG 20360*" are in accordance with the relevant recommendations in the SINTEF Building Research Design Guides.

3. Fields of application

The building system is primarily for use as housing.

Stadus Building System can be used for buildings in risk class 1-6 in fire class 1, and residential buildings with 3 stories if each residential unit has direct access to the terrain without having to escape via stairs or staircases.

The building system is only evaluated for use in the risk classes and fire class as stated here, other use is not covered by the approval. Use of the product in other buildings with stricter requirements and pre accepted performances than given for houses in TEK 17 with guideline must be considered separately in each case. See chap. 6 regarding special conditions for use and installation.

The use of the Stadus Building System must always be controlled by the responsible company. Stadus Building System are considered to satisfy pre-accepted performance for buildings in risk classes 1-6 in fire class 1 given in the guidelines to TEK 17.

The use of Stadus Building System in fire classes and risk classes other than those specified here has not been assessed by SINTEF and must be documented separately by the responsible company in each individual construction project.

Before Stadus Building System is selected for use in a project, it must also be checked whether the project has requirements for stricter or other services than those pre-accepted.

See sectgion 6 regarding special conditions for use and installation

4. Product performance

4.1 Load-bearing capacity
The load capacity of load-bearing structures is calculated specifically for each individual delivery as stated in section 6.2.

4.2 Characteristics of fire impact
The fire safety class according to EN 13501-1 for products included in Stadus Building System is stated in Table 1.

4.3 Fire resistance
The fire resistance of the building components is given in Table 3. The fire resistance is determined based on calculation methods in accordance with the handbook Brandsäkra Trähus version 3 and EN 1995-1-2:2004. The stated fire resistance assumes the specified structure given in Figure 1 – 7, "*Standard construction details for Stadus Building System belonging to SINTEF Technical Approval No.20360*" and materials as given in Table 1.

For structures not mentioned in Table 3, the fire resistance must be calculated in accordance with the handbook Brandsäkra Trähus version 3 and EN 1995-1-2:2004, or relevant instructions from SINTEF Community.

The fire resistance applies to one-sided fire exposure from the inside for external walls, and from the underside for floor dividers/ceilings. For interior walls, the fire resistance applies to one-sided fire exposure, unless otherwise stated in Table 3.

The design load capacity for walls in the accident limit condition of fire is given as the maximum centric axial load per metre of wall (kN/m with c/c 600 mm between the studs). The design capacity in the event of a fire for floor dividers with single spans and roofs is given as the maximum bending moment (kNm) per beam. Where Full capacity is stated, it means that there will be no charring on the wooden structure during the fire exposure time because the cladding protects the structure. The design for the load-bearing structure determined for the ultimate and serviceability limit states will therefore be decisive.
The mineral wool insulation in the roof/floor separations is assumed to be retained in some cases. See section 6.3 for terms of use.

Table 3
Fire resistance of building components with fire cell limiting and/or load-bearing properties

Structure, in accordance with: "Standard construction details for Stadus Building System belonging to SINTEF Technical Approval nr. 20360"		Fire resist-ance [1]	Design load capacity for limit state fire[2]
External walls, Fig. 1			
Alt. A	- 12.5 mm gypsum plasterboard type A - 195 mm mineral wool insulation	REI 15	Full capacity
Alt. B	- 2 layers 12.5 mm standard gypsum plasterboards type A - 195 mm mineral wool insulation	REI 30	Full capacity
Internal load-bearing walls, Fig. 2			
Alt. A	- 12.5 mm gypsum plasterboard type A - 100-150 mm mineral wool insulation	R 15	Full capacity
Alt. B	- 2 layers 12.5 mm standard gypsum plasterboards type A - 100-150 mm mineral wool insulation	R 30	Full capacity
Separating walls between residential units, Fig. 3			
Alt. A	- 2 layers 12.5 mm standard gypsum plasterboards type A - 100 mm mineral wool insulation	REI 30	Full capacity[3]
Floor above foundation, Fig.4			
Alt. A	- 12.5 mm gypsum plasterboard type A - 200 mm mineral wool insulation	R 15	Full capacity
Floor separation between residential units, Fig.5			
Alt. A	- 2 layers 12.5 mm standard gypsum plasterboards type A - 200 mm mineral wool insulation	REI 30	Full capacity
Roof with rafters, Fig.6			
Alt. A	- 12.5 mm gypsum plasterboard type A - 300 mm mineral wool insulation	REI 15	Full capacity
Alt. B	- 2 layers 12.5 mm standard gypsum plasterboards type A - 300 mm mineral wool insulation	REI 30	Full capacity

[1] Fire resistance equivalent to classification according to EN 13501-2. The fire resistance for separating (EI) and load bearing (R) elements is given in minutes.
[2] Vertical design load capacity at accidental limit state in case of fire. "Full capacity" means no reduction in capacities determined at limit state fire. Wall height maximum 2.4 m.
[3] Design load capacity for each individual wall leaf.

4.4 Sound insulation

With separating wall and floor construction as described in chap. 2, and with construction details for connections as indicated in "*Standard construction details for Staduss Building System belonging to SINTEF Technical Approval TG 20360*", the sound insulation properties in accordance with EN ISO 16283-1 and -2 as well as EN ISO 717-1 and -2, are expected to be as indicated in Table 3 for completed house constructions. This corresponds to sound insulation class C in accordance with NS 8175.

Table 3
Estimated sound insulation performance in completed houses

Structure	Estimated, weighted apparent sound reduction index R'w	Estimated weighted normalised impact sound pressure level L'n,w
Floors between apartments	≥ 55 dB	≤ 53 dB
Separating walls between apartments	≥ 55 dB	≤ 53 dB -

The values satisfy sound insulation class C in NS 8175:2019 and the recommended requirements for sound insulation between house units, including spectrum adaptation term for enlarged frequency range. The sound insulation depends also on the installation of technical service components like pipes, ducts etc., and must be assessed case by case in each building project.

4.5 Thermal insulation

Table 4 shows example of thermal transmittance values, U-values, for a standard element designs described in section 2, calculated according to EN ISO 6946. The values apply to a spacing of c/c 600 mm for studs, joists and rafters.

Table 4
Thermal transmittance values, U-values

Structure, with structural timber spaced c/c 600 mm	Total insulation thickness [1] mm	% wood	U-value W/(m²K)
External wall			
Studs - 45 mm x 195 mm + 45 mm framing	240	15	0.18
- 45 mm x 245 mm + 45mm framing	295		0,15
Roof elements			
Rafters - 45x300 + 45 mm framing	345		0.12
Flat roof			
Rafters	350		0,10

[1] Mineral wool with thermal conductivity λ_D = 0,037 W/mK

The percentage of wood shall be documented for each element and shall include extra beams and joists in connection with windows, doors or other openings. Elements u-value shall be calculated according to EN-IS-6946.

4.6 Durability

Stadus Buliding system design construction satisfies the general requirements recommended by SINTEF with regard to the tightness and durability of the building envelope based on SINTEF Design guides.

5. Environmental conditions

5.1 Chemicals that are hazardous to health and the environment

The products included in elements do not contain any prioritised environmental toxins, or other relevant substances in an amount that is considered hazardous to health and the environment. Priority environmental toxins include CMR, PBT and vPvB substances.

5.2 Indoor climate impact

The elements are deemed not to emit particles, gases or radiation that have a negative impact on the indoor climate, or that have a health impact.

5.3 Impact on soil and water

The leaching from the products included in the elements is deemed not to have a negative impact on soil and groundwater.

5.4 Effects on drinking water

The products in the module/element are judged not to release compounds into drinking water in an amount that is considered to cause a taste, odour, or health hazard.

5.5 Waste management/reuse possibilities

The materials included in the modules/elements must be sorted as waste fractions from as wood, plaster, residual waste and other relevant waste fractions at disposal. The product must be delivered to an approved waste reception centre where it can be recycled, energy recovered or disposed.

5.6 Environmental Product Declaration

No Environmental Product Declaration (EPD) has been prepared for *Stadus Building System*.

6. Special conditions for use and installation

6.1 Products with SINTEF Technical Approval and Product Certificate

Products with SINTEF Technical Approval and Product Certificate included in the modules/elements must be used in accordance with the respective product approvals.

6.2 Structural design

For each delivery a full structural calculation of the necessary load-bearing capacity of the elements shall be worked out and documented according to NS-EN 1995-1-1 with loads according to EN 1991-1. Capacity in the case of fire shall be worked out and documented according to NS-EN 1995-1-5.

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 load-bearing and/or fire separating properties. The required design load capacity at limit state fire must be controlled against the capacities given in Table 2. Choice of construction is made based on the required fire resistance.

Products for internal and external surfaces, behind ventilated claddings, insulation etc. must be chosen based on pre-accepted performances given in the guideline to TEK. The need for special measures to prevent spread of fire on facades must be evaluated for each building project.

Cladding for internal lining shall be installed according to the suppliers fitting instructions and the principles in SINTEF Building Research Guide 543.204.

Penetrations through building parts with fire resistance, and connections between building parts, must not reduce the fire resistance performance of the building parts. See SINTEF Building Research Guide 520.342.

Shafts for technical installations must be designed with fire resistance equivalent to the required fire resistance for the building, or with a fire rated penetration seal in the fire separating building part.

6.3 Insulation
Beyond what is stated in cl. 4.5 the necessary thermal insulation and U-values according to TEK shall be determined and verified for each individual building project.

6.4 Installation
The elements shall be installed as shown in "*Standard construction details for Stadus Building System pertaining to SINTEF Technical Approval TG 20360*."

Anchoring to foundations and connections between the elements shall be carried out according to the structural design for the required wind load resistance in the specific building project. Special attention must be paid to temporary load situations during erection of the building that may lead to reduced load-bearing capacity or other functions.

6.4 Design of sound conditions in multi-dwelling buildings
For use in buildings with several housing units, the elements/modules shall be carried out with floor dividers and supporting outer and inner walls adapted to reduced sound transmission as specified in the " Standard *construction details for Stadus Building System pertaining to SINTEF Technical Approval 20360*".

Against all walls and penetrations, elastic terminations and transitions must be established.

In general, caution should be exercised when laying penetrations for water pipes, ventilation ducts or other installations in soundproofing partitions.

6.5 Design of thermal insulation
For each individual delivery, the necessary energy efficiency in accordance with TEK must be designed for the building project in question. The U-values of the delivery must be calculated for each individual delivery, see section 4.5. Calculation of total heat loss for each individual building is made using a specific calculation program.

6.6 Foundation
The elements must be placed on a foundation that satisfies the manufacturer's requirements for flatness and dimensional tolerances.

Moisture absorption in elements from the building's foundations must be prevented with a capillary breaking layer as a sleeper membrane. It is assumed that floor dividers against the ground are placed over a well-ventilated cavity.

6.7 Assembly
The elements must be assembled in accordance with the design details in the "*Standard Construction Details for* Stadus Building System belonging to SINTEF Technical Approval No. 20360", and specific installation details that have been prepared for each individual construction project.

6.5 Transport and storage
Finished elements must be protected from exposure to precipitation during both transport and storage. The elements must be placed on a surface and supported to avoid deformations.

7. Product and factory production control

Stadus Building System is produsd by JSC Stadus, Pramonės g. 5, LT-35100 Panevėzys, Lithuania.

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

The manufacturing of Stadus Building System is subject to continuous surveillance of the factory production control in accordance with the contract regarding SINTEF Technical Approval. The manufacturer has a quality assurance system that is certified according to EN ISO 9001:2008.

8. Basis for the approval

Stadus Building System constructions, construction details and materials, together with documentation in reports issued by independent bodies, have been used as a basis for SINTEF's assessment of the product.

Stadus Building System has been assessed against the guidelines for SINTEF Technical Approval and SINTEF's recommendations in the Building Research Design Guides.

9. Marking

Each delivery must be accompanied by documents comprising as a minimum the manufacturer's name and address, project identification, time and date of manufacture, assembly instructions, as well as specific construction details and assembly instructions that comply with the "*Standard construction details for Stadus Building System belonging to SINTEF Technical Approval TG 20360*". The approval mark for SINTEF Technical Approval No. 20360 may also be used.

10. Liability

The holder/manufacturer has sole product liability according to **current** law. Claims can only be made against SINTEF under general law or other special grounds.

for SINTEF

Ola Asphaug
Godkjenningsleder