SINTEF

SINTEF Certification

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Page: 1 of 10

Technical Approval

SINTEF Building and Infrastructure confirms that

Thermomur

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

Jackon AS
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1602 Fredrikstad
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2. Manufacturer

Thermomur 250,
Jackon AS avd. Kristiansand, 4640 Søgne

Thermomur 200, 250X, 350, 350 Super og 450,
Jackon AS avd. Fredrikstad, 1621 Gressvik

3. Product description

Thermomur is a formwork and insulation system based on blocks of expanded polystyrene (EPS). Thermomur is found in the following variants:

- Thermomur 200
- Thermomur 250
- Thermomur 250X
- Thermomur 350
- Thermomur 350 Super
- Thermomur 450

Thermomur 200, 250, 250 X, 350 and 450 are comprised of EPS with a compressive stress level class CS(10)150 and a density of approximately 23 kg/m^3. The blocks have a light grey colour. Thermomur 350 Super is comprised of EPS with a compressive stress level class CS(10)150 and a density of approximately 23 kg/m^3. The blocks have a dark grey colour.

The blocks are joined together and reinforced both horizontally and vertically before they are filled with concrete. The blocks have an embossed system with knots at the top and bottom for locking. On the outside of outer walls the blocks to be finished with a layer of mortar above ground level and on the inside with sheet cladding as stated in section 7.

Thermomur 250 standard blocks are shown in figure 1. The side walls are held together with ribs of EPS.

Thermomur 350 and 350 Super standard blocks are shown in figure 2. The side walls for these elements are held together with plastic braces (PE for straight elements and PP for corner elements). Thermomur 250X and 450 look similar, but have a different thickness of the EPS walls. Thermomur 250X, as shown in figure 5, has EPS walls with thickness of 50 mm. Thermomur 450, as shown in figure 6, has EPS walls with thickness of 100 mm (inner wall) and 200 mm (outer wall).

Thermomur Topblock is designed for use as a top element in outer walls, and is supplied in the same variants as Thermomur 350. Thermomur Topblock has cut-outs for a aluminium brackets, called IsoCon, which form a support for the part of the sill that does not rest on concrete, see figure 3. The IsoCon brackets are specially adapted to outer walls with Iso3 sills and studs, see SINTEF Technical Approval no. 2610.

Thermomur 200 standard blocks are shown in figure 4. The side walls are held together by plastic braces (PE).

The largest dimensional tolerances for the blocks are ± 5 mm for width and height, ± 10 mm for length, ± 2 mm for flatness and ± 5 mm for squareness.

As a supplement to the wall system, the following are supplied:

- Jackon Fiberpuss for rendering of polystyrene surfaces
- Alkali-resistant reinforcement fibreglass network for rendering
- Fittings for assembly of supports before casting of walls

Thermomur blocks are also supplied with a closed end for use at corners and similar, half height blocks, top blocks and foundation blocks with the width of 540 mm.

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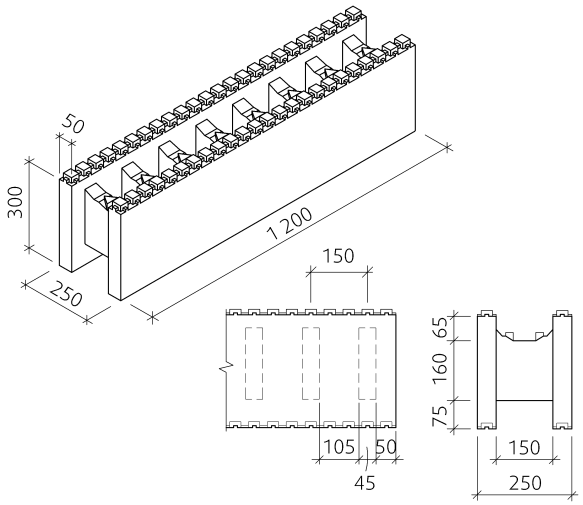

Fig. 1
Thermomur 250 standard block (dimensions in mm)

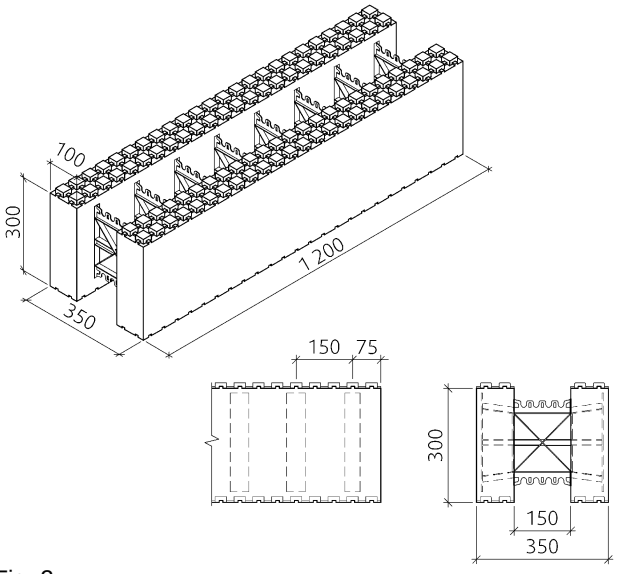

Fig. 2
Thermomur 350 and 350 Super standard blocks (dimensions in mm)

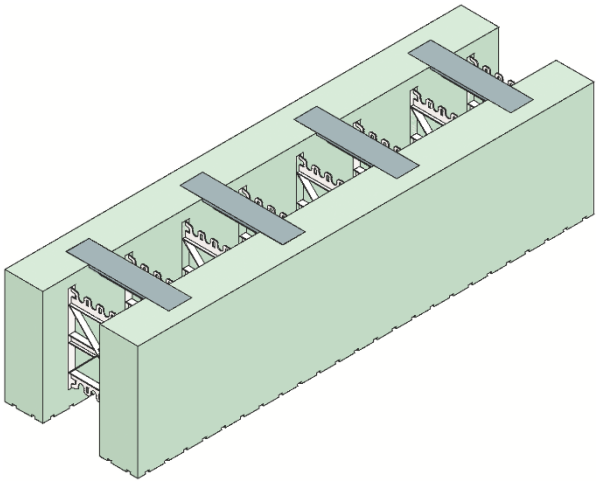

Fig. 3
Thermomur Topblock with IsoCon aluminium brackets

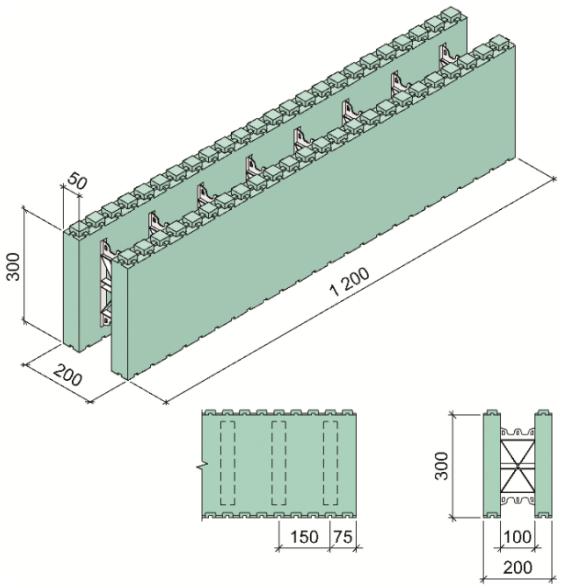

Fig. 4
Thermomur 200 standard block (dimensions in mm)

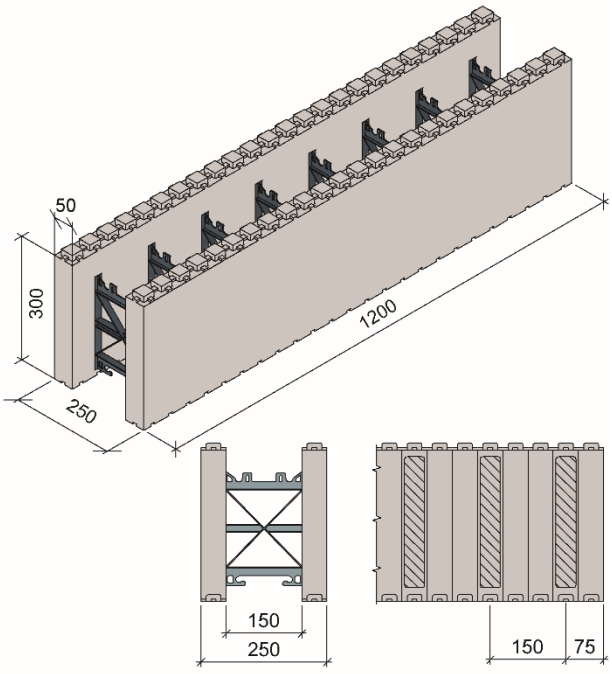

Fig. 5
Thermomur 250X standard block (dimensions in mm)

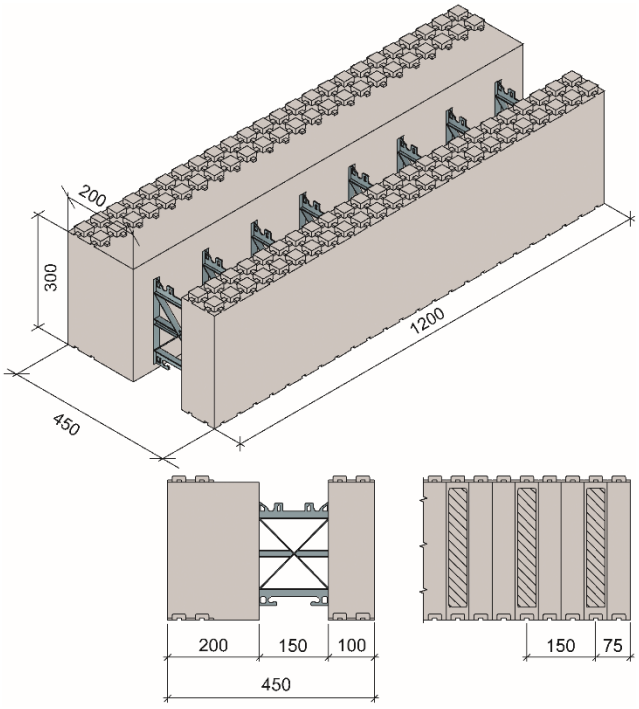

Fig. 6
Thermomur 450 standard blocks (dimensions in mm)

4. Fields of application

Thermomur 250, 250X, 350, 350 Super and 450 can be used for load-bearing walls above and below ground in dwellings with up to two ful storeys above ground. The wall system can also be used in other buildings, provided that specific project planning for documentation of characteristics is carried out.

Thermomur 200 can be used for interior walls in dwellings or other walls with vertical loads only.

Thermomur is restricted to use in buildings in risk class 1, 2 and 4 in fire class 1 with up to 2 storeys.

5. Properties

Strength and rigidity

Thermomur 250, 250X, 350, 350 Super and 450 with a wall height of up to 2.7 m have sufficient load capacity as outer walls on ground, subject to usage as stated in section 4 and construction as stated in section 7.

Thermomur 200 used as an inner wall with a wall height of up to 2.5 m has a vertical design load capacity for the ultimate limit state of 100 kN/m, provided there is no side load, usage area as stated in section 4 and construction as stated in section 7.

The concrete core in Thermomur 250, 250X, 350, 350 Super and 450 can be considered as a solid concrete wall with the same strength as walls with the same concrete cross-section designed in accordance with the design rules for concrete constructions.

Thermomur Topblock with IsoCon aluminium brackets

When IsoCon is cast with a centre distance greater than 300 mm, floor beams must be placed directly over the IsoCon brackets (in the wall's longitudinal direction). If sills are joined, special precautions must be taken in regard to placement of floor beams.

It is important that the execution in casting of concrete walls is carried out precisely, so that depressions and bulges are avoided. The top of the crown of the concrete wall with IsoCon brackets is constructed to comply with tolerance class PA in accordance with NS 3420-1.

For larger local loads, e.g. at the side of window openings, several IsoCon brackets may be used. If necessary, Iso3 sills and studs can be strengthened by creating a cut-out in the form section, i.e. replacing the form section of the sill and stud with timber. In such case, load-bearing calculations must be carried out for each individual case.

Alternative placement of Iso3 sills with joist on Thermomur Topblock with IsoCon brackets are shown in figure 7.

The load capacity based on testing for construction solutions shown in figure 7, given as vertical load from each beam, is stated in Tables 1 and 2 below. The load capacities are on the premise of that the centre distance between the beams is at least equal to the centre distance between the IsoCon brackets.

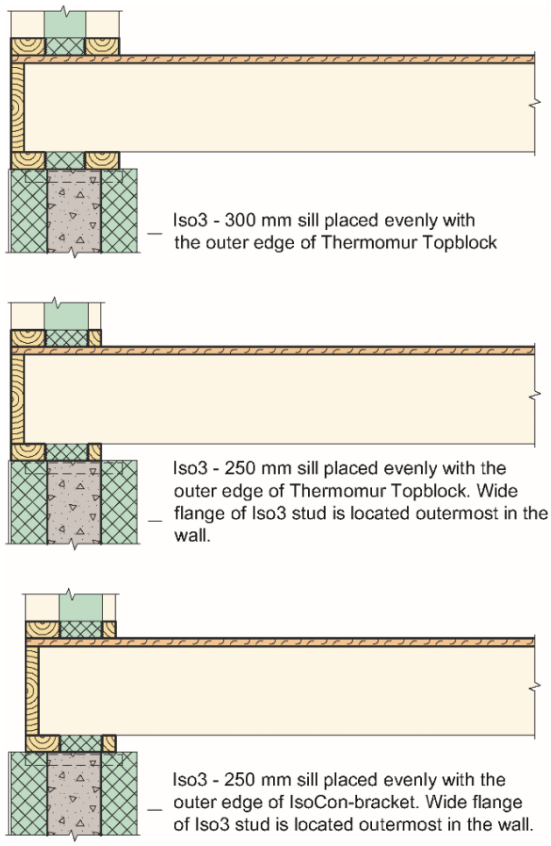

Fig. 7
Alternative placement of timber construction using Iso3 studs

Table 1
The load capacity, indicated as a vertical load from each beam, when the IsoCon brackets are cast with a centre distance of 300 mm or less. The beams can be located independent of the IsoCon brackets' placement in the wall's longitudinal direction.

Sill	Limit state	Design load capacity from each beam (kN)
Iso3 - 250 mm or Iso3 – 300 mm	Ultimate limit	30 kN
	Serviceability limit	15 kN

Table 2
The load capacity, indicated as a vertical load from each beam, when the IsoCon brackets are cast with a centre distance greater than 300 mm. The beams must be placed directly over the IsoCon brackets (in the wall's longitudinal direction).

Sill	Limit state	Design load capacity from each beam (kN)
Iso3 - 250 mm or Iso3 – 300 mm	Ultimate limit	37 kN
	Serviceability limit	15 kN

Themal insulation

The EPS material in Thermomur 200, 250, 250X, 350 and 450 has a declared thermal conductivity, λ_D = 0,035 W/mK in accordance with EN 13163. The EPS material in Thermomur 350 Super has a declared thermal conductivity, λ_D = 0,031 W/mK in accordance with EN 13163.

The thermal transmittance coefficient (U-value) for outer walls with and without supplementary insulation are shown in Table 3 for Thermomur 250, 350 and 450 and in Table 4 for Thermomur 350 Super.

The U-value for outer walls with supplementary insulation and filling of draining mass is shown in Table 5 for Thermomur 250 and 350, in Table 6 for Thermomur 350 Super and in Table 7 for Thermomur 450. This is presumed the use of external supplementary insulation of type Jackopor 80, or corresponding, with a declared thermal conductivity λ_D = 0,038 W/mK.

Table 3
U-value for Thermomur 250 and 350, with 13 mm gypsum board internally and 8 mm render externally, with and without supplementary external insulation, calculated in accordance with EN ISO 6946

Supplementary insulation Jackopor 80	U-value (W/m^{2}K)		
	Thermomur 250	Thermomur 350	Thermomur 450
None	0.31	0.17	0,11
50 mm	0.22	0.14	0,10

Table 4
U-value for Thermomur 350 Super with 13 mm gypsum board internally and 8 mm render externally, with and without supplementary external insulation, calculated in accordance with EN ISO 6946

Supplementary insulation Jackopor 80	U-value (W/m^{2}K)
	Thermomur 350 Super
None	0.15
50 mm	0.13
80 mm	0.12
100 mm	0.11

Table 5
U-value for Thermomur with external supplementary insulation (to ground level) and backfilling of draining mass comprised of sand and gravel[1)]

Supplementary insulation Jackopor 80	Backfilling height (m)	U-value (W/m^{2}K)	
		Thermomur 250	Thermomur 350
None	2.0	0.24	0.14
50 mm	2.0	0.20	0.12
80 mm	1.5	0.23	0.13
100mm	1.0	0.25	0.15

1) Applies to walls with standard blocks and supplementary insulation on the outside of Thermomur up to the top of filling. Calculated in accordance with EN ISO 13370.

Table 6
U-value for Thermomur 350 Super, with external supplementary insulation (to the full height of the wall and filling of draining the mass comprise of sand and gravel[1)]

Supplementary insulation Jackopor 80	Backfilling height (m)	U-value (W/m^{2}K)
		Thermomur 350 Super
None	1.0 1.5 2.0 Equal to the height of the wall	0.15 0.14 0.14 0.13
50 mm	1.0 1.5 2.0 Equal to the height of the wall	0.12 0.12 0.12 0.11
80 mm	1.0 1.5 2.0 Equal to the height of the wall	0.11 0.11 0.11 0.10
100 mm	1.0 1.5 2.0 Equal to the height of the wall	0.11 0.10 0.10 0.10

1) Applies to walls with standard blocks and supplementary insulation on the outside of the Thermomur to the full height of the wall. Calculated in accordance with EN ISO 13370.

Tabell 7
U-verdi for Thermomur 450, med oppfylling av drenerende masser av sand og grus.[1)]

Supplementary insulation Jackopor 80	Backfilling height (m)	U-value (W/m^2K)
		Thermomur 450
Ingen	1,0	0,11
	1,5	0,11
	2,0	0,10
	Lik veggens høyde	0,10

1) Applies to walls with standard blocks. Calculated in accordance with EN ISO 13370.

Fire resistance

Walls with Thermomur 250, internal cladding with 13 mm gypsum board and a layer of fibreglass-reinforced render above ground level have a fire resistance corresponding to REI 30, with one-sided exposure to fire from the interior side. The stated fire resistance applies to vertical line loads up to 35 kN/m.

Walls with Thermomur 350 or 450, internal cladding with 13 mm Gyproc standard gypsum board (type A in accordance with EN 520), and one layer of 8 mm Jackon Fiberpuss externally above ground level, is classified as REI 60 in accordance with EN 13501-2, with exposure to fire from the interior side. The stated fire resistance applies to vertical line loads up to 151 kN/m, and with horizontal reinforcement of 2 pcs ϕ10 mm cc 600 mm.

Walls with Thermomur 250X, cladding with 13 mm gypsum board on both sides, have a fire resistance corresponding to REI 60, with one-sided exposure to fire. The stated fire resistance applies to vertical line loads up to 151 kN/m, and with horizontal reinforcement of 2 pcs ϕ10 mm cc 600 mm.

For Thermomur 450, 350, 250X and 200 for hidden electrical systems, an Elko recessed box with SINTEF Certificate 050-0204 can be used, attached to the plastic braces in the Thermomur element.

Between the cut-outs in the plasterboard and the recess box, sealing must be done with heat expanding sealing Firesafe EX. See figure 8.

The EPS material must always be protected against fire internally and externally with cladding as stated in section 7.

Safety in case of fire

The reaction to fire class for the EPS product according to EN 13501-1 is not determined.

Impact resistance

Thermomur with 8 mm Jackon Fiberpuss complies with the requirements for resistance against hard impact in the usage category I in accordance with "Guideline for European Technical Approval No. 004" for wall systems with render on exterior heat insulation.

The rendering system complies with SINTEF Byggforsk recommendations for use on façades close to levels accessible to the public.

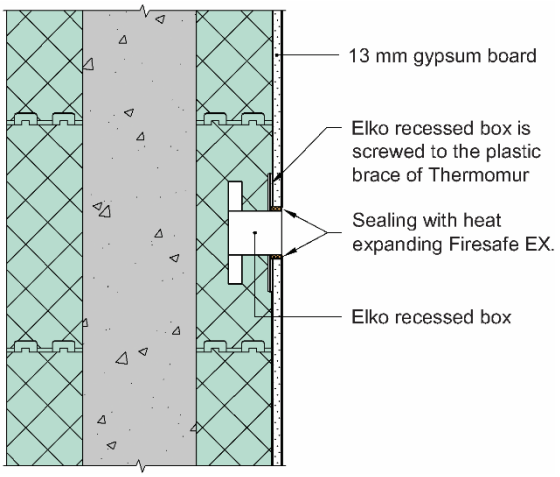

Fig. 8
Construction using ELKO recessed box with SINTEF Certificate 050-0204.

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 and vPvB substances.

Effect on indoor environment

The product is not regarded as emitting any particles, gases or radiation that has a negative influence on the internal climate, or that has health-related significance.

Waste treatment/recycling

Thermomur must be sorted as plastic or residual waste at the building/demolition site. The product must be delivered to an authorized waste treatment plant for material and energy recovery.

Environmental declaration

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

7. Special conditions for use and installation

Foundations and support

Walls with Thermomur must normally stand upon (be cast together with) a reinforced concrete foundation. Walls towards ground must have a horizontal support against adjacent walls, against floors above basements, or both, also against a concrete floor at the bottom.

For backfilling heights above 1 m, the concrete floor must be cast in contact with the wall's concrete core, or as contact points with a width of 100 mm and a height equal to the floor thickness, with maximum 1 m interrelated spacing.

Backfilling

On the outside of exterior walls towards ground there must be a pressure-relieving and draining layer of fine crushed stone, gravel or sand to prevent water pressure building up against the wall, that leads the water unhindered into the drainage pipe

For detailed solutions, reference is given to SINTEF Building Research Design Guide 514.221 523.111 and 521.011.

Construction

An example of execution of wall construction on ground is shown in figure 9. The blocks must be assembled staggered.

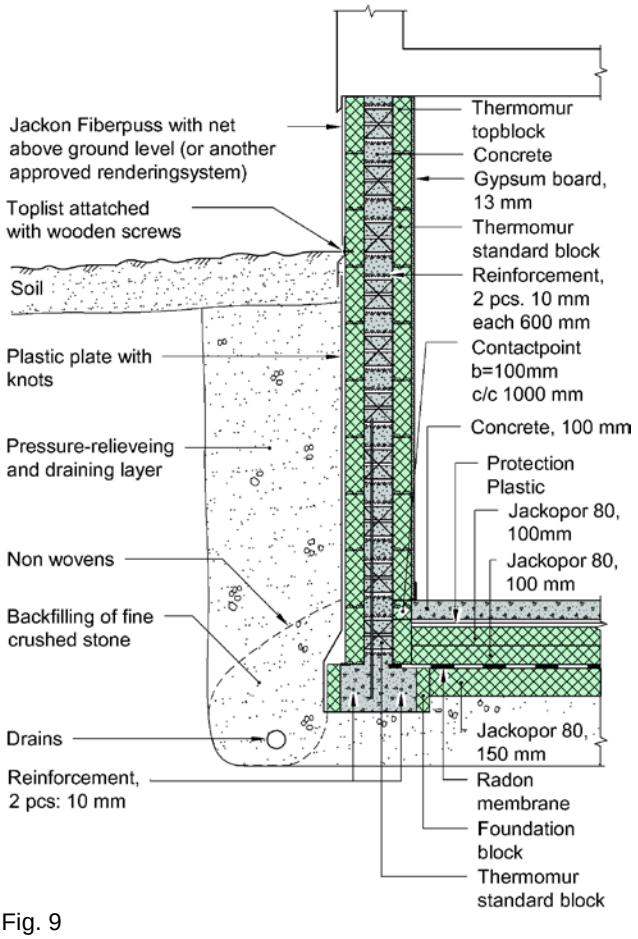

Fig. 9
Example of execution of basement wall of Thermomur 350 or Thermomur 350 Super on ground

Casting of concrete

Thermomur must be cast with concrete with the yield strength of B20 or higher.

In general the maximum particle size of the aggregate must not exceed 16 mm. Jackon recommends that slump should be 18 - 20 cm. For Thermomur 200 the concrete must have particularly good casting qualities.

Reinforcement of exterior walls

In the specification for reinforcement of outer walls and ground below, it is considered that the foundations run a minimum of 500 mm below the centre of the concrete floor, backfilling height ≤ 2 m and a terrain fall ratio of 1:50, minimum of 3 m out from the wall. For backfilling heights greater than 2.0 m, special calculations must be carried out of the construction's strength and stability. I is also considered a maximum distance of 6 m between supporting walls, if the wall is not supported and attached to a floor of concrete above and attached to the foundation at the base.

For uses areas as stated in section 4, walls of Thermomur are reinforced with horizontal reinforcement of 2 pcs ϕ10 mm reinforcement bar in courses no. 1, 3, 5, 7 and 9 (topmost course). Reinforcement bars type B500C according to NS 3576 and EN 10025 must be used. The reinforcement must have a minimum of 500 mm lap length at joints, also in corners. For internal corners, horizontal reinforcement is done as shown in figure 10 below.

In walls subject to soil pressure, extra reinforcement is to be added with reinforcement 90° bends (750 mm x 750 mm) in addition to regular horizontal reinforcement, in external corners and at supporting walls as shown in figures 11 and 12 below. In external corners, reinforcement 90° bends must be used in courses 2, 4, 6 and 8 such that the total extent of reinforcement on the outer edge is ϕ10 mm c/c 300 mm. For supporting walls, reinforcement is via two 90° bends of ϕ10 mm in courses 2, 4, 6 and 8 as shown in figure 12.

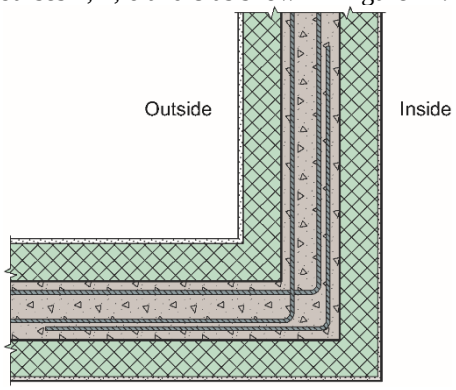

Fig. 10
Principle for reinforcement of internal corners

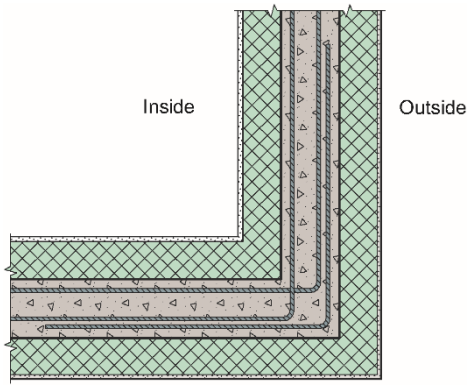

Fig. 11
Reinforcement in external corners for outer walls towards ground

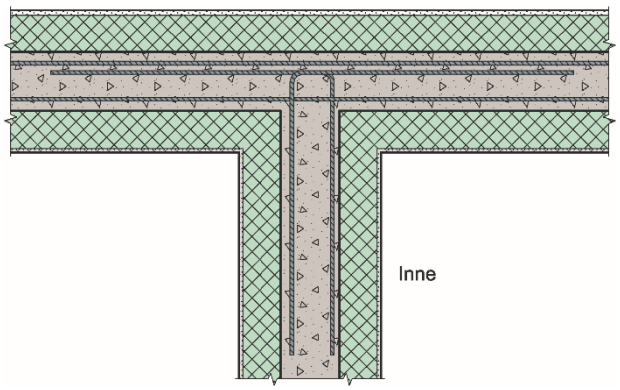

Fig. 12
Reinforcement in supporting walls for outer walls towards ground

The wall system is anchored to the foundation with vertical reinforcement ϕ10 mm c/c 300 mm. This reinforcement must be on the outer side of the wall, be anchored 500 mm in the foundation (bent if required) and protrude 1000 mm over the top edge of the floor.

Above and below doors and smaller window openings and other cut-outs, 2 pcs of ϕ10 mm reinforcement bar must be laid, a minimum of 500 mm length to each side. For cut-outs larger than 1.2 m or for concentrated downward loads, the necessary quantity of reinforcement must be specially calculated and designed.

For other usage areas, the load-bearing characteristics of the walls must be calculated and dimensioned for each individual case.

Supplementary reinforcement for outer walls supported at the top and base

Outer walls towards ground can be constructed such that they are supported and fixed to floor of concrete at the top edge and attached to the foundation at the base, without the need for side support walls. The walls are reinforced vertically with ϕ10 mm reinforcement bar c/c 300 mm on the inside of the wall, in addition to the general reinforcement as referred to above. The wall must also be anchored with a reinforcement 90° bends (ϕ10 mm reinforcement bar c/c 300 mm) to the above floor, such that attachment to the floor is as shown in figure 13.

In this solution, horizontal forces from soil pressure towards the wall must be included in the total evaluation of the building's stability.

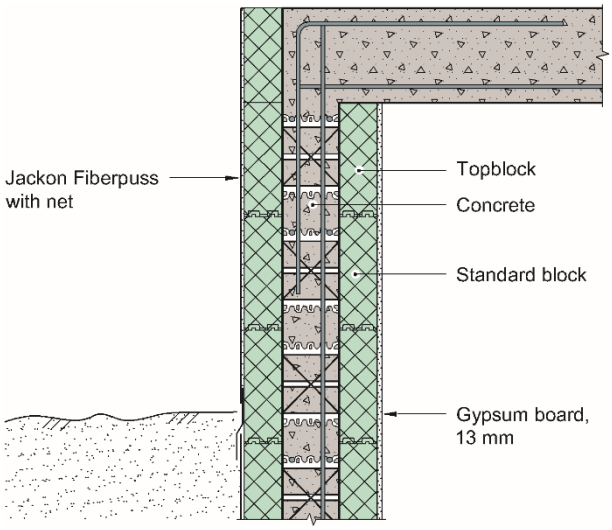

Fig. 13
Installation of reinforcement at connection to floor for walls supported and fixed at top and base

Reinforcement of walls with Thermomur 200

For uses areas as stated in section 4, the inner wall of Thermomur 200 must be reinforced horizontally and vertically with 1 pcs ϕ10 mm c/c 600 mm. Reinforcement bars type B500NC according to NS 3576-3 and EN 10080 must be used. Reinforcement must be centrally placed and have a minimum of 500 mm lap length at joints, also in corners.

Window and door cut-outs

Cut-outs for windows, doors and other openings in Thermomur are to be shuttered using boards equal in width to the thickness of the concrete.

For Thermomur 350 and 350 Super, beams are to be reinforced above opening using lengths and stirrup reinforcement as shown in figure 14 with capacity as stated in Table 8. Longitudinal reinforcement is to be used comprised of 4 bars ϕ10 mm (one bar in each corner) and if required stirrup reinforcement ϕ8 mm reinforcement bar c/c 150 mm. Reinforcement bars type B500NC according to NS 3576-3 and EN 10080 must be used. Longitudinal reinforcement must continue 500 mm beyond each side of the opening. Stirrups are to be installed only over the opening.

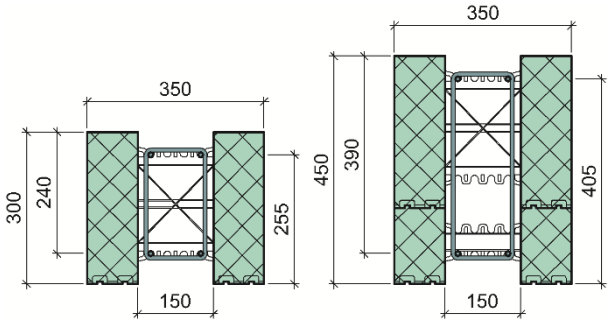

Fig. 14
Reinforcement of beams above openings

Table 8
Capacity for reinforced beams above openings

Beam height (mm)	Opening width (m)	Mix. Design load (kN/m)	
		With stirrup reinforcement	Without stirrup reinforcement
300	1.2	78	37
	2.0	28	20
	2.5	18	16
450	1.2	130	57
	2.0	47	29
	2.5	30	22

Temporary bracing and pouring

Temporary bracing of the walls during pouring must be done according to the manufacturers assembly instructions. Vertical pouring speed must be limited to 1 meter per hour.

Exterior rendering/cladding

Externally above ground level, all EPS material must be covered with 8 mm Jackon Fiberpuss, reinforced with alkali-resistant fibreglass reinforcement net, or other reinforced rendering system with qualities documented via SINTEF Technical Approval or equivalent. The EPS surface must be cleaned of dirt etc. and the surface must be roughened before rendering is applied.

Alternatively, external EPS material above ground level can be covered by a minimum of 9 mm gypsum board type GU, where the board joints are covered with battens or similar. For Thermomur 250, the gypsum board sheets must be attached to the construction's load-bearing system with metal fittings. For Thermomur 200, 350 and 350 Super boards or external cladding can be attached directly to the block plastic braces with metal screws. It is recommended that screws without boring tips are used. For the use of exterior cladding, refer to SINTEF Building Research Design Guide 542.101 and 542.102.

If no special calculations are carried out, attachment of battens for external cladding can be carried out according to table 9 for Thermomur 350 and 350 Super. The table shows the maximum wind load (outward load/vacuum, caused by wind) depending on batten and screw spacing.

Table 9
Maximum design wind load in ultimate limit state for attachment of battens with screws[1)]

Batten spacing in mm	Wind load in kN/m^2	
	Screw spacing in mm	
	150	300
300	3.0	1.5
600	1.5	0.74

1) Screws without boring tips and with the following dimensions: stem diameter 3.2 mm, the diameter 4.5 mm, core diameter 2.7 mm, thread spacing 2.0 mm. It is recommended that countersunk screws with a milled edge are used.

Internal cladding

All EPS material, including window surrounds and similar must be covered by a minimum of one layer 13 mm gypsum board, fire technical class $K_2$10 A2-s1,d0, attached with metal screws to plastic braces in the blocks or to a nailing strip that is attached with metal screws to the plastic braces or with metal attachments affixed to the concrete core. The plasterboard joints must be sealed with joint tape laid in plaster spackle in accordance with SINTEF Building Research Design Guide 543.204.

If the walls have internal linings of timber with a minimum of 50 mm mineral wool insulation, they may (with the exception of emergency exits) as an alternative to gypsum board, use cladding in class $K_2$10 D-s2,d0 in accordance with EN 13501-1 and -2. The mineral wool must be installed with good pressure against stanchions or be attached in the event of fire, in another suitable manner.

In emergency exits, the cladding on battens must be a minimum of $K_2$10 B-s1,d0 in accordance with EN 13501-1 and -2.

For alternative cladding, reference is given to SINTEF Building Research Design Guide 520.339.

Cladding of construction sheets or wooden panels must be attached as stipulated in SINTEF Building Research Design Guide 543.101 and 543.204.

For installation of electrical equipment, the instructions in section 5 must be followed. In all other respects, the cladding must not be pierced in such a way that the EPS material is exposed.

Internal moisture barrier

In order to achieve good protection against moisture, it is recommended that walls are constructed with a minimum of half of the wall's thermal resistance (insulation) on the external side of the concrete core. This applies to walls both above and below ground. Assumed a usage area and execution as stated in section 4 and 7, and that the wall is sufficiently airtight, it is then not necessary to have a moisture barrier for external walls of Thermomur.

For Thermomur 450, 350, 250 and 250X internal lining with timber with 50 mm mineral wool can be used. In such case the moisture barrier must be placed between the inner EPS-wall and the internal lining. The moisture barrier must be attached with airtight joints and interfaces with adjacent construction components.

For wet rooms, reference is made to SINTEF Building Research Design Guide 543.506.

Protection against radon

Measures to prevent increased concentration of radon in indoor air must be taken in accordance with SINTEF Building Research Design Guide 520.706.

Transport and storage

Thermomur is delivered on a pallet and must be transported and stored on a level surface. The blocks should be protected against precipitation and sunlight during storage.

Other conditions

The approval is on the premise that the use of Thermomur is in accordance with recommendations and construction principles stipulated in SINTEF Building Research Design Guide 514.221.

8. Factory production control

Thermomur is subject to supervisory factory production and product control according to contract between SINTEF Building and Infrastructure and Jackon concerning Technical Approval.

9. Basis for the approval

The approval is primarily based on verification of qualities that have been documented in the following reports, and experience in use of the product:

- Norges byggforskningsinstitutt. Rapport nr. KO 40255 U-verdier for Thermomur veggsystem, dated 26.10.1999 (U-verdier for thermomur 250, tilleggsisolering og oppfyllingshøyder)
- Optikon as. Notat dated 07.05.2003 (armering av standardløsning Thermomur)
- SINTEF Bygg og miljøteknikk, Norges branntekniske laboratorium. Prøvningsattest – Test Certificate, 250000.20/ 86.265-1, dated 05.01.1987 (brannteknisk prøving, Thermomur 250)
- Norges byggforskningsinstitutt. Rapport nr. O 9129 dated 25.01.2005 (prøving av støtmotstand)
- Jackon as. ”Thermomur 350 _kapasitet støpetrykk 18042008.pdf”, dated 18.04.2008
- SINTEF NBL as, Prosjektnr. 103011.13. Brannteknisk prøving av bærende vegg i henhold til EN 1365-1:1999, Prøvingsrapport dated 2008-11-21 (brannteknisk prøving, Thermomur 350)
- SINTEF NBL as, Prosjektnr. 103204.11. Brannteknisk vurdering av lav ovnstemperatur i forbindelse med test 103011.13, Vurderingsrapport dated 2008-11-21 (brannteknisk vurdering, Thermomur 350)
- COWI as. ”Thermomur 350”, dated 14.04.2008, (armeringsberegninger)
- SINTEF Byggforsk. Notat ”U-verdi Thermomur”, 30.06.2008
- SINTEF Byggforsk. Oppdragsrapport ”Prøving av motstand mot uttrekk av varmforsinkede skruer innfestet i plastskinner.” dated 07.07.2008
- SINTEF Byggforsk. Oppdragsrapport ”Prøving av plastmateriale i bindere for Thermomur 350.” dated 29.05.2009
- SINTEF Byggforsk. Oppdragsrapport ”Prøving av varmealdring og motstand mot uttrekk av skruer innfestet i plastskinner.” dated 09.12.2008
- SINTEF Byggforsk. ”U-verdi for Thermomur 350 Super kjellervegg – Lambda 31.” Internt notat dated 27.02.2015
- SINTEF Byggforsk. ”U-verdi for Thermomur 450 brukt som kjellervegg 31.” Internt notat dated 31.05.2018
- European Technical Assessment ETA-13/0614 of 2014/04/01. Jackon Thermomur 350 Super
- Norsk Treteknisk Institutt: Rapport nr 310753-3, Iso3 IsoCon, svillebeslag for Jackon Thermomur, svilletrykk, kapasiteter fastsatt ved bruksgrensebetraktninger, dated 14.10.2013 (bæreevne stender/svill)
- SINTEF Byggforsk: Prosjekt 102000707. Rapport nr 102000707-2, Thermomur med IsoCon beslag, dated 15.10.2013 (bæreevne med IsoCon-beslag)
- SINTEF Byggforsk: Prosjekt 102000708. Prøverapport Thermomur med PPsteg – typeprøving, dated 28.06.2013. (styrke utstøping, typeprøving PP-steg)
- SINTEF Byggforsk: Prosjekt 102000870-2. Prosjektnotat Thermomur 200, Prøving støpetrykk, dated 23.04.2013. (styrke utstøping Thermomur 200)
- COWI as. ”Thermomur 200 vegg. Bærekapasitet”, dated 20.03.2013, (bæreevne, armering)
- SINTEF Byggforsk: Prosjekt B0395201-150. Oppdragsrapport, Måling av varmemotstand og varmekonduktivitet på Thermomur 350, nytt råstoff, dated 17.04.2012. (varmekonduktivitet Thermomur 350 Super)
- SINTEF Byggforsk: Prosjekt 102000870-2. Rapport nr 102000870-2-03, Thermomur 350 Super – Prøving trykkfasthet og bøyefasthet, dated 26.02.2015 (bøyefasthet, trykkfasthet av EPS for Thermomur 350 Super)
- SP Fire Research AS: Brannteknisk prøvning av vegg med innfelte elbokser, Jackon AS, SPFR-rapport F15 150000-03:01, dated 01.12.2015 (el-boks i vegg av Thermomur 350/200)
- SINTEF Byggforsk: Prosjekt 102000870-4. Notat, Bruk av dampsperre for Thermomur med innvendig utforing, dated 26.02.2016 (dampsperre)

10. Marking

Thermomur 350 Supere is CE marked in accordance with ETA-13/0614. Thermomur is labelled with the manufacturer, product name, production date or production code and declared thermal conductivity.

The approval mark for SINTEF Technical Approval No. 2156 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 Svein Terje Kolstad, SINTEF Building and Infrastructure, Trondheim

for SINTEF Byggforsk

Hans Boye Skogstad
Approval Manager