THERMOMUR®

ICF Building System

Thermomur - ICF from the BEWI Group

Training Manual v.2 Jul-24

BEWI

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THERMOMUR®

Insulated Raft Foundation System from the **BEWI** Group Construction Training Manual

This Training manual is aimed at contractors with little or no experience in ICF construction as well as at ICF contractors that are using Thermomur for the first time.

It contains guidance and recommendations as to how to build standard structures based on experience. While the manual does not cover the whole range of structures and designs present in today's construction landscape, it covers the basics of building with Thermomur. This is a generic method statement and specific details for each individual project are subject to the designers, third party product manufacturer and/or local building authorities' approval. Our technical team is always available to discuss details not covered in this manual.

The performance of the Thermomur ICF system has been assessed by the BBA on Agrément Certificate 20/5808. Refer to the latest version of this document.

All drawings (JK & JK-A), sketches, pictures, etc…included in this manual are for guidance only and design and on-site stages specific assessments depending on the design of the structure must be done by the installer and designers. Support is provided from **BEWI** to aid the process if required.

Construction Training Programme

No previous ICF experience:

- Formal Thermomur Training
- Concrete Pour Supervision

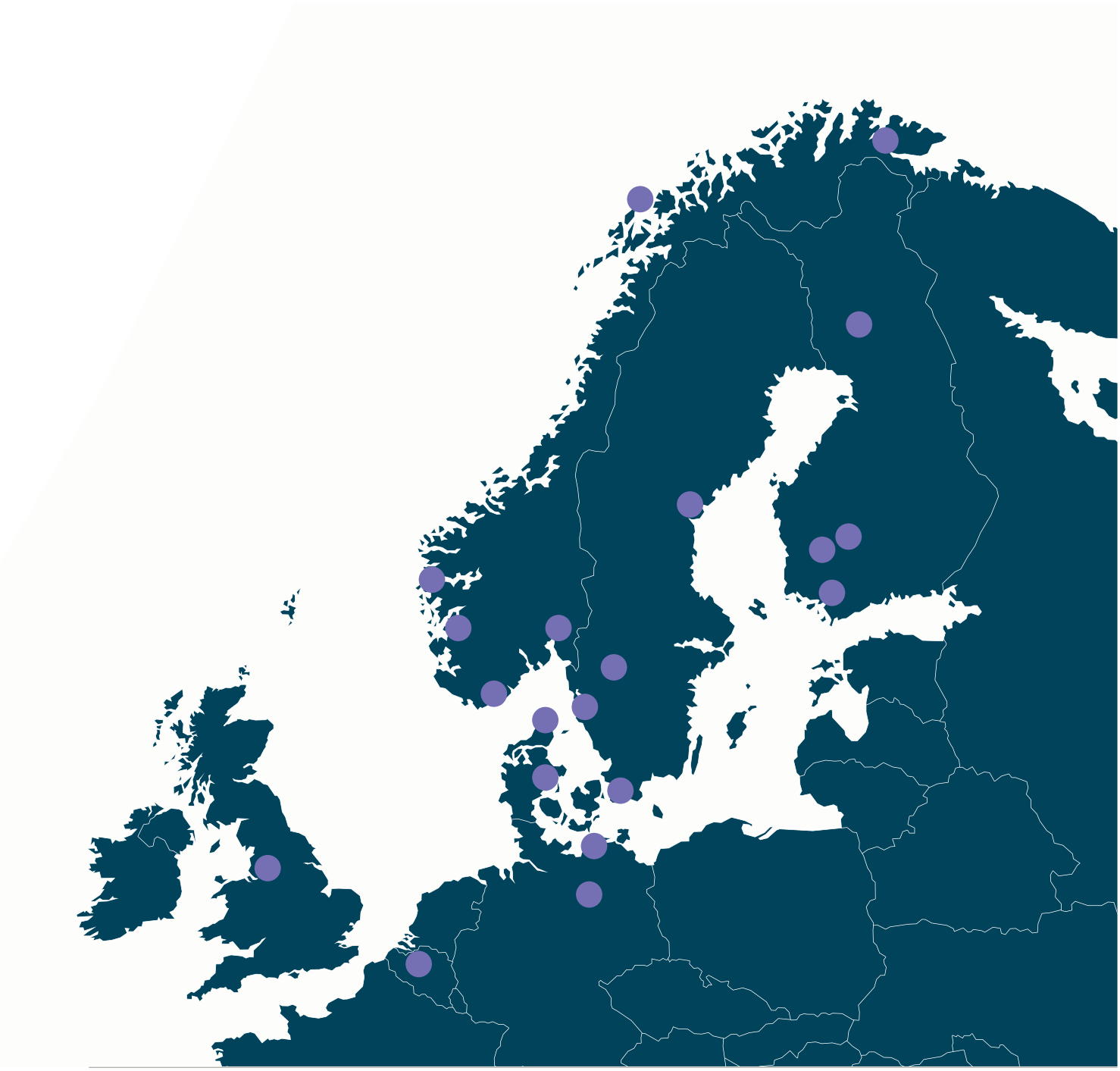
Previous ICF experience:

- Thermomur ICF components training

Successful completion of the above to BEWI's satisfaction leads to Approved Installer status.

The **BEWI** Group - Introduction

- **BEWI** is a leading European provider of packaging, components,and insulation solutions.
- Annual EPS production capacity - 280 kt
- EPS collection capacity - 35 kt
- Employees- 3400
- Facilities - 80



The benefits of ICF

Integrated insulation and formwork

- The insulation acts as the formwork to a robust concrete structure
- No waste materials or time required to remove the formwork
- Rapid construction time

High levels of insulation and reduced thermal bridges

- Excellent u-values
- Systems shown to reduce annual energy costs by 70%
- Elimination of thermal bridges designed into the system

Significant sound elimination

- Continuous concrete core eliminates noise transmission

Air tightness built in

- Continuous concrete core seals the structure, no requirement for tapes and membranes
- Air tightness readings as low as 0.03m^3/m^2/hr have been recorded

Long life cycle

- An insulated concrete structure built to last
- No timber elements that can be affected by moisture or rot

The benefits of THERMOMUR ICF

- Over 30 years of continuous development and experience
- The leading brand in the demanding Scandinavian environment
- High density EPS manufactured in our premises with BEWI's own PS bead
- A robust preformed block requiring no on-site assembly or adjustment with a patented interlocking blocks.
- No internal metal components, eliminating risk of corrosion and increasing speed of build.
- Continuous internal and external insulation layers to eliminate thermal bridging and excellent Ψ values
- A metric system with fixing webs at 150 mm intervals, Curved internal corners reduce the pressure during pour and improve concrete distribution.
- Various block dimensions to meet different u-value requirements without the need for additional insulation.
- Complete European technical and environmental approvals

The Thermomur Range

	Length	Height	Width	Insulation Thickness	Core Thickness	u Value
250X	1200	300	250	2 x 50	150	0.31
350	1200	300	350	2 x 100	150	0.17
350HD	1200	300	350	2 x 75	200	0.22
350 Super	1200	300	350	2 x 100	150	0.15
450	1200	300	450	100 + 200	150	0.11

BEWI THERMOMUR®
250x

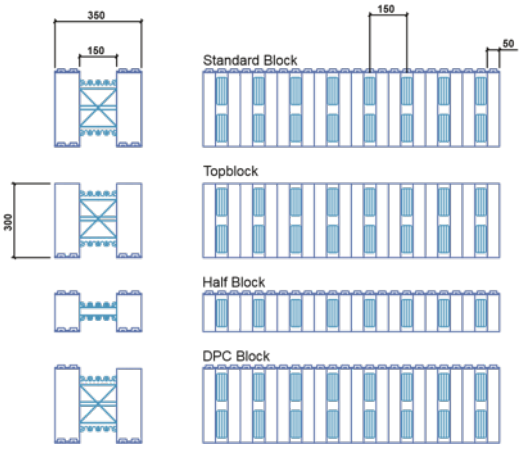
BEWI THERMOMUR®
350

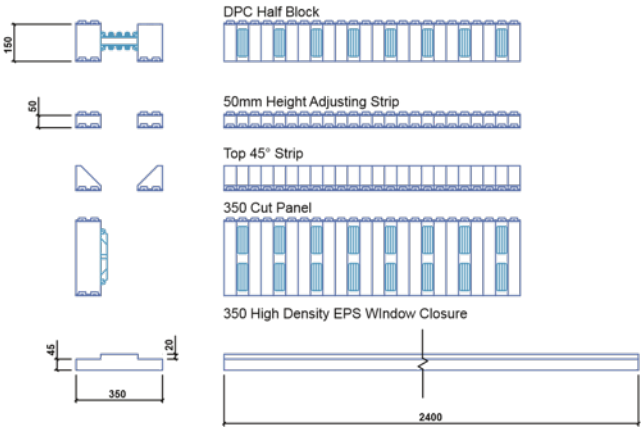
BEWI THERMOMUR®
350 HD

BEWI THERMOMUR®
350 SUPER

BEWI THERMOMUR®
450

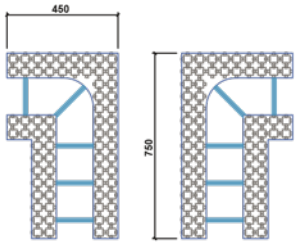
The Thermomur Components





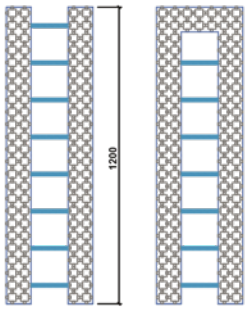
STANDARD

90º Left Hand Corner 90º Right Hand Corner



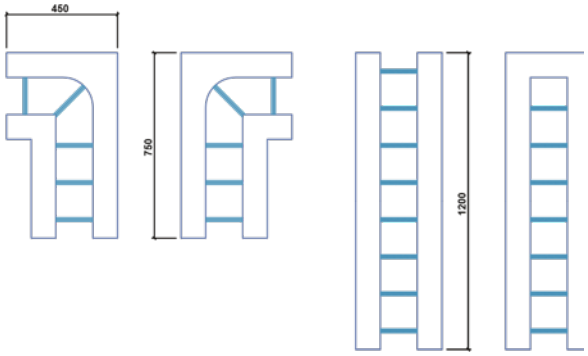
STANDARD AND HALF BLOCK

Open Closed

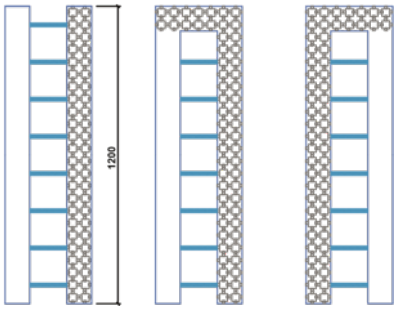


TOP BLOCK

90º Left Hand Corner 90º Right Hand Corner Open Closed

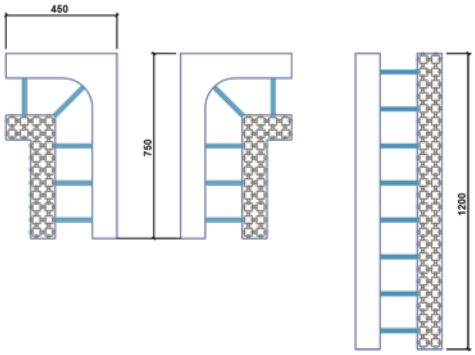


DPC BLOCK



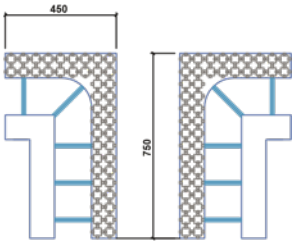
INTERNAL 90º CORNER DPC BLOCK

90º Left Hand Corner 90º Right Hand Corner Open



EXTERNAL 90º CORNER DPC BLOCK

90º Left Hand Corner 90º Right Hand Corner



Module 1: Preparation

The project so far:

- Purchase of the site
- Design and planning
- Site ground investigation
- Find a Structural Engineer
- Building Control and Structural Warranties
- The construction teams

Establishing the site:

- Site strip and level
- Datum point and peg
- Building area
- Storage area
- Welfare
- Waste control
- Security
- Safety

Tools Required

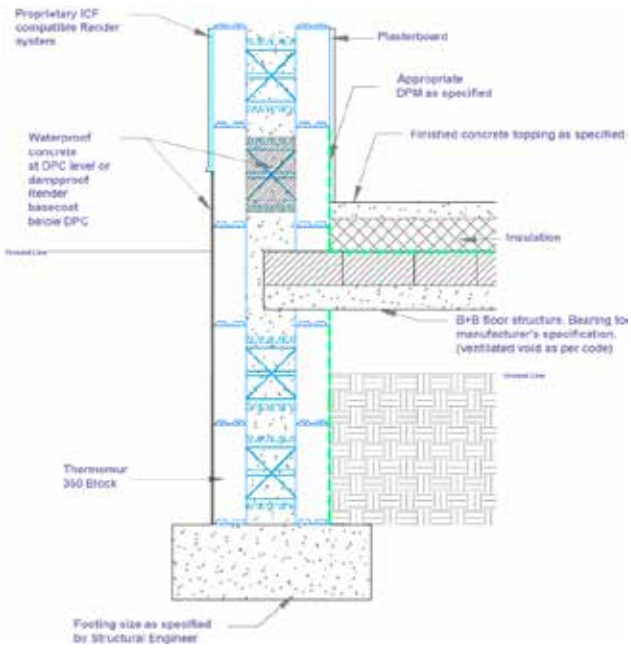
- **PPE for all and Welfare Facilities**
  - Hard hats, boots, wet weather gear, hi viz, gloves, eye protection
- **Specialist items**
  - Bracing System
  - Slump Tester
  - Long tailed 25 mm concrete vibrators, 2 units required
  - Large and small format hot wire cutters
  - Hose pipe connection for equipment cleaning
- **General Builders tools**
  - Laser level
  - Pruning saw and cross cut saw
  - Rubber mallet
  - Retractable knife
  - Foam gun
  - 5 m and 25 m tape, string lines, marker pens, laser level
  - Wheel barrows, shovels and brushes
  - Timber bracing and plywood sheets
  - Battery powered screwdriver, 50 mm mid length screws

Preparation - Foundations

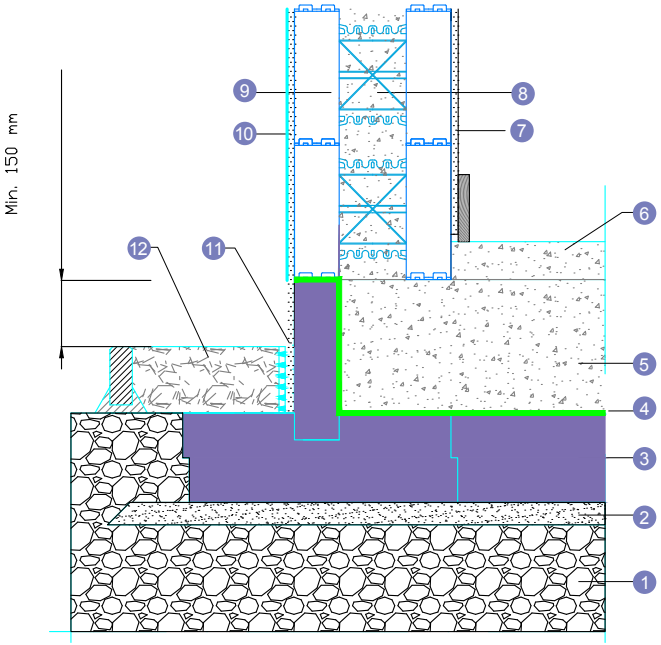
- Target level +/- 5 mm
- Rebar Starter Bars if specified by Engineer
- Foundations determined by Engineer
- Foundations should be set in conjunction with site 'Datum Point'.
- Ideally steps in footings to be at 150 mm or 300 mm to coincide with half/full blocks

Practical: Laser Level operation, 3:4:5 setting out

Foundations Details - Examples



JK-04d GF B+B DPC Render Detail



JK-A-03 Atlas-Thermomur 350

Module 2: Starting the Build

- Set up 'datum point' at ground floor finish height
- Set up string lines for perimeter of building
  - Square corners
  - Parallel sides
  - Check diagonals
  - Check wall lengths

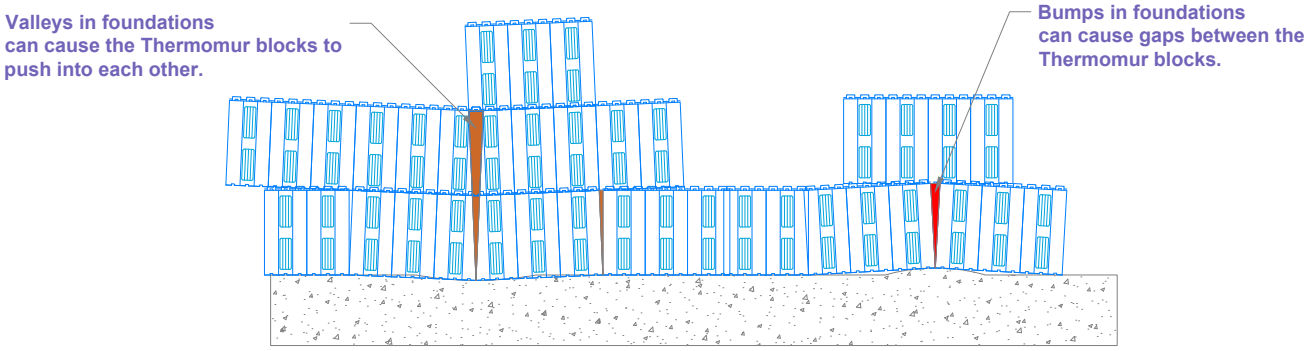
- Only after final check load the site with ICF and tools. Check materials for quantities and damages before starting the build.
- Start at a corner (alternating Thermomur Left/Right Hand Corner on each course to avoid Stack Joints while building) and work towards middle; avoid cutting a corner block
- Cut formwork at 50 mm cut lines; avoid cutting a web.
- Preferred overlap of the blocks is 300 mm minimum (2 plastic bridges) particularly on the lower courses. Smaller overlaps can be used at higher courses if required, or depending on the system used
- If necessary due to dimension constrains or product tolerances, not enabling the Thermomur grid to be maintained a cut off the 50 mm grid might be unavoidable. This is referred to as a 'stack cut'. This will cause the lose of the interlocking between the courses and will simply need additional timber bracing internally and externally to avoid the formwork running offline once the concrete is placed.

Starting the Build

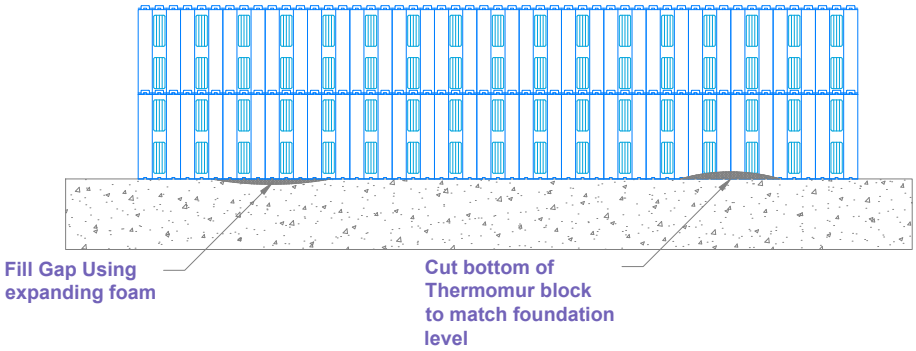
Example of Stack joint. Cured wall

Starting the Build

- If a stack cut is performed choose a door/window jamb if possible to minimise the extra bracing required.
- Fit horizontal rebar on top of first course, leave gaps in rebar for openings
- Build two full courses do not remove any 'openings'
- With two courses complete check the walls for line, squareness then level. See illustration below:



- Both situations will become more apparent and troublesome as the Thermomur courses are built higher.
- It is important to check levels on the first 2 courses
- If tolerances are not acceptable proceed to level theThermomur bottom course as indicated below



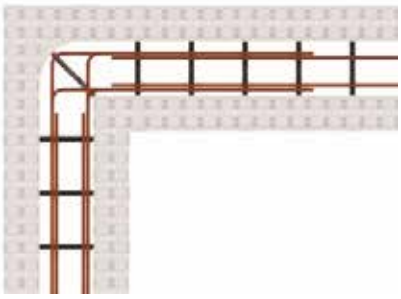
- Mark the position of any openings on the formwork
- Add a second layer of rebar if required and be prepared to add any vertical rebar
- Consider the addition of a DPC
- When building off a strip footing, now is the time to fill the formwork up to DPC level.

Important: Protection of the top inter-locking lugs, DPC placement, wall alignment, starter bars.

Discuss: Waste management, loading the site, DPC Options (WP additive, paint-on, etc…)

- Place all building lines in-situ in a tight orderly manner. Then check the lines on the square, and parallel. Only if all is well, move on to the next stage.

Module 3: Rebar



- Building Control will require calculations from a Structural Engineer
- The quantity, specification and location is determined by the Structural Engineer. Their specification must be adhered to.
- Lintels will also be defined by the Engineer

Rebar is added to give the concrete additional tensile strength. It stops shrinkage cracking, improves load performance and minimises deflections.

The quantity, specification and location of rebar will be defined by the Structural Engineer. Their specification must be adhered to in order to satisfy Building Control. The Structural Engineer will also design the rebar required to construct lintels within the concrete structure. See our "Thermomur Buildability Best Practice" document for guidance on rebar placement.

Discuss: Precut option vs Cut/Bend onsite option

Module 4: Continuing the Build

- Fit the second layer of rebar if required, allow for any openings
- Consider the position of the DPC layer using the DPC Blocks as necessary.
- Mark all openings on the top of the second course.
- Add the third and fourth courses of formwork but leave out any formwork to form openings
- As far as practicable make sure binders line up vertically. 150 mm grid is optimal for this.
- Continue building up to the 4th course then brace, continue building up to lintel level. Then remove the openings from the first two courses as required.
- Assemble rebar reinforcement and links as defined by the structural engineer.
- Check the height of any window sills and mark the position of any windows on the fourth course
- Now is time to start vertically supporting the walls. This can be done by fixing 2x4 timbers (or larger) or a proprietary ICF Bracing System. The recommended centres for the vertical supports are between 1.20 m and 1.80 m and no further than 300 mm from the opening jambs. If using a proprietary system, follow manufacturer's instructions. On site specific assessment depending on the design of the structure must be done by the installer. Support is provided from BEWI to aid the installers if required.
- Fix the chosen vertical support and bracing to the wall and the ground and set the wall plumb.
  Fixing Guidance:
  - Thermomur ICF wall : Standard wood screws onto the plastic ties. 1 per block minimum.
  - Ground: This varies depending on the type of base.
    - Ground: steel or wooden stakes ,
    - Concrete: proprietary concrete fixings
    - Timber: wood screws.
    - If using proprietary ICF system 2 per frame minimum, one the base of the vertical support and one to the base of the bracing leg.

Continuing the Build - Openings

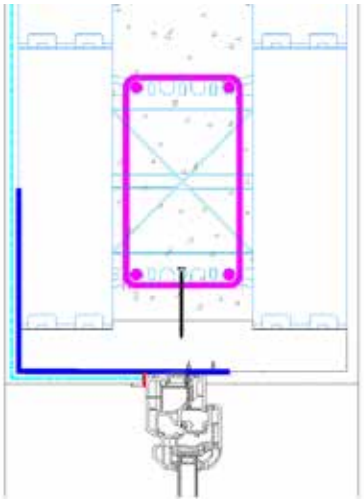
- If the bracing system used does not reach the top block, connect these blocks to the lower course using timber/metal strapping to prevent lifting during concreting.
- If the Thermomur build is to be continued after this pour, ensure that the top castellations of the Thermomur block are protected (tape, plastic channel, height adjusters…) or ensure that the spilled concrete is cleaned when still wet to ensure that the next course of blocks fit. Dried concrete onto EPS is surprisingly hard to remove.
- Create sleeved service penetrations, e.g. foul water, services, air exchange pipes. Consult engineer if any reinforcement is required

Discuss: Off slab cutting, service penetrations

Practical: Brace assembly, window bucks and stack joint support and 'T' joints, vertical and horizontal support within openings

Continuing the Build - Openings

- Determine opening sizes when using the Thermomur cavity closure
- Build up walls to lintel level
- Consider any additional insulation and/or screed on the slab when setting lintel heights
- Fit the head closure first then both vertical closures to support the head closure
- Cut but do not fit the sill closure. This will not be fitted until the void beneath the sill has been filled.
- Fix stainless steel screws at approx. 300 mm cc to the inside of the closure to aid bonding with the concrete core once the pour.



Continuing the Build - Openings

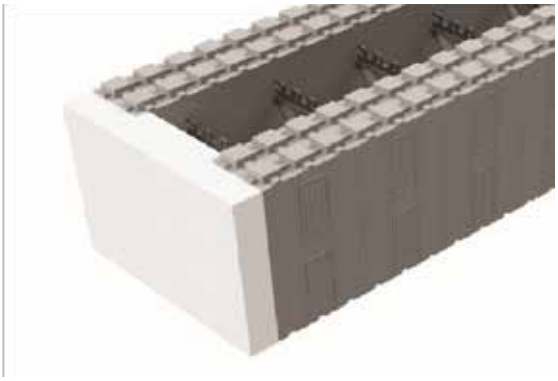
- Window and doors closures must be supported vertically and horizontally. On site specific assessment depending on the design of the structure must be done by the installer. Support is provided by BEWI to aid the installers if required.

- General guidance: 2x4 timbers and/or plywood bucks and/or metal strapping around all opening sides. Brace vertically and horizontally at circa. 600 mm centres, 300 mm if using only metal strapping on door jambs (always use timber minimum for lintel support) If using metal strapping this must be fixed to the plastic bridges in the blocks, fix to at least 2 bridges either side. Lower courses usually require more care while bracing as the pressure of the concrete is higher.

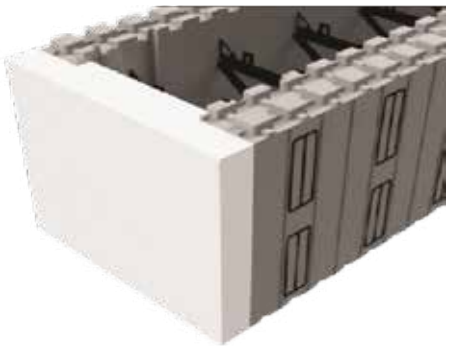
Thermomur 'Cavity Closure'

- Window/Door Frames can be fixed mechanically directly into the High-Density EPS closure at the desired position. Consult window supplier.

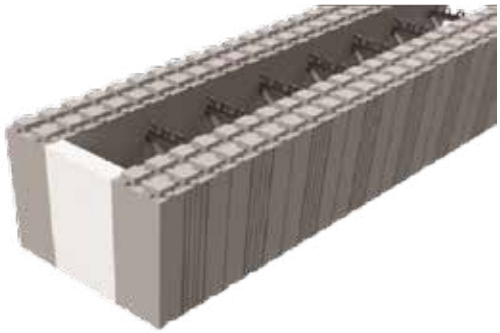
BEWI THERMOMUR®
350/150 core



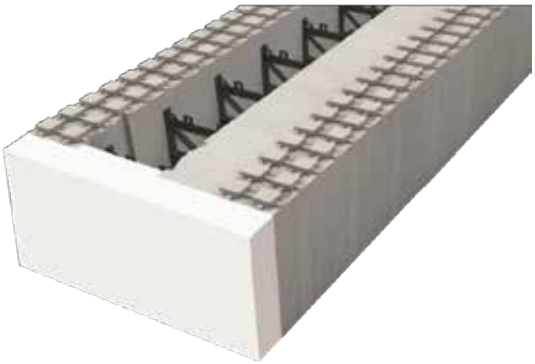
BEWI THERMOMUR®
350/200 core



BEWI THERMOMUR®
150 core

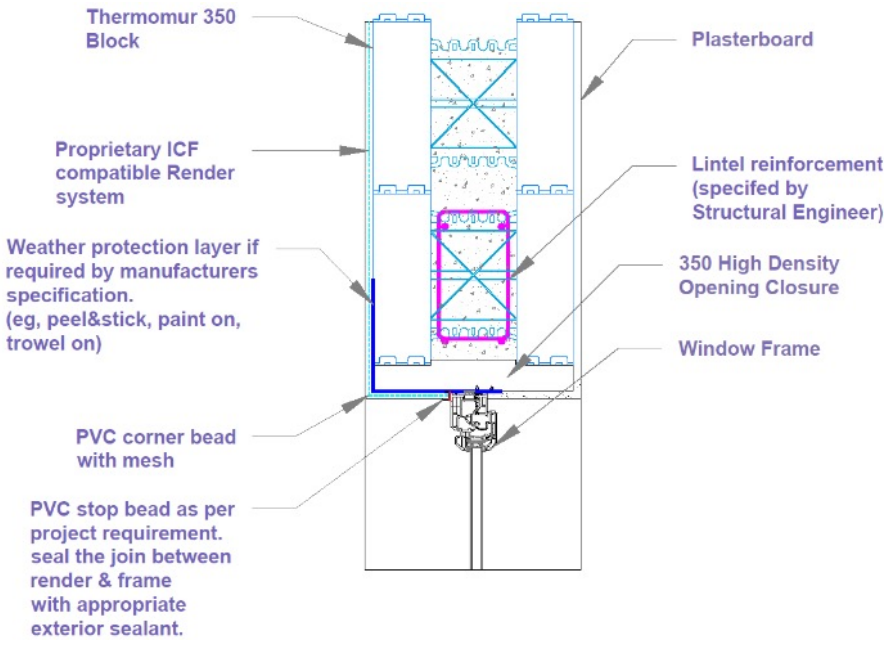


BEWI THERMOMUR®
450/150 core

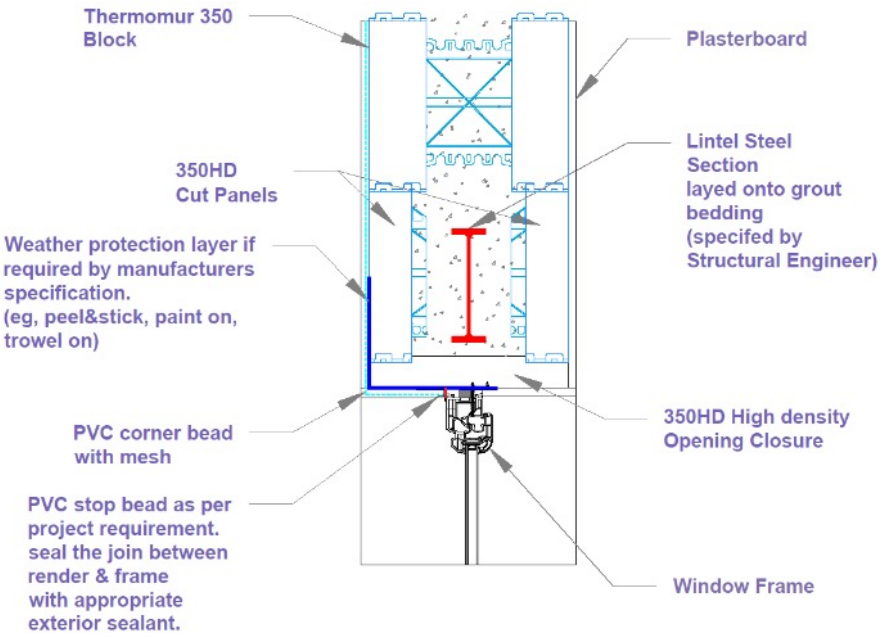


Continuing the Build - Lintel Design

- Always consult a Structural Engineer. See our "Thermomur Buildability Best Practice" document for guidance on rebar placement.
- All openings must be fully supported with timber struts and wedges both vertically and horizontally. See Module 4 - Openings for guidance.



JK-11 Lintel & Jamb-350 Opening Closure

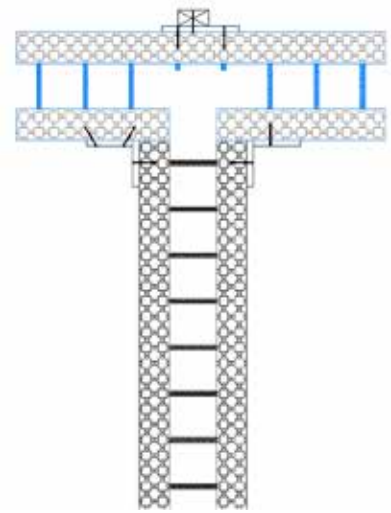


JK-11s Lintel & Jamb-350HD Opening Closure- Steel Section

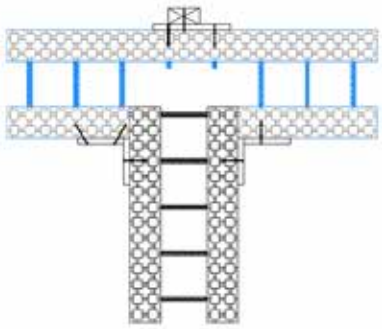
Continuing the Build - T Junctions

- Additional timber reinforcement will be required prior to pour at T-junctions.
- To maintain the continuity of the concrete core and connection of the formwork the blocks are cut and fitted as below:

Courses 1/3/5...



Courses 2/4/6...

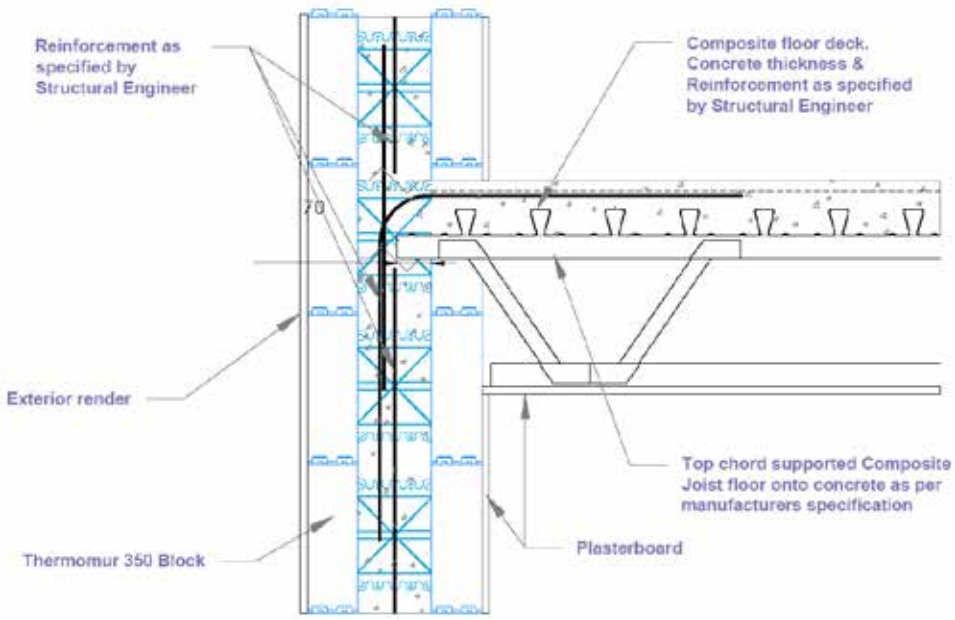


Additional timber support will be required prior to pour at T-Junction where the plastic ties have been cut.

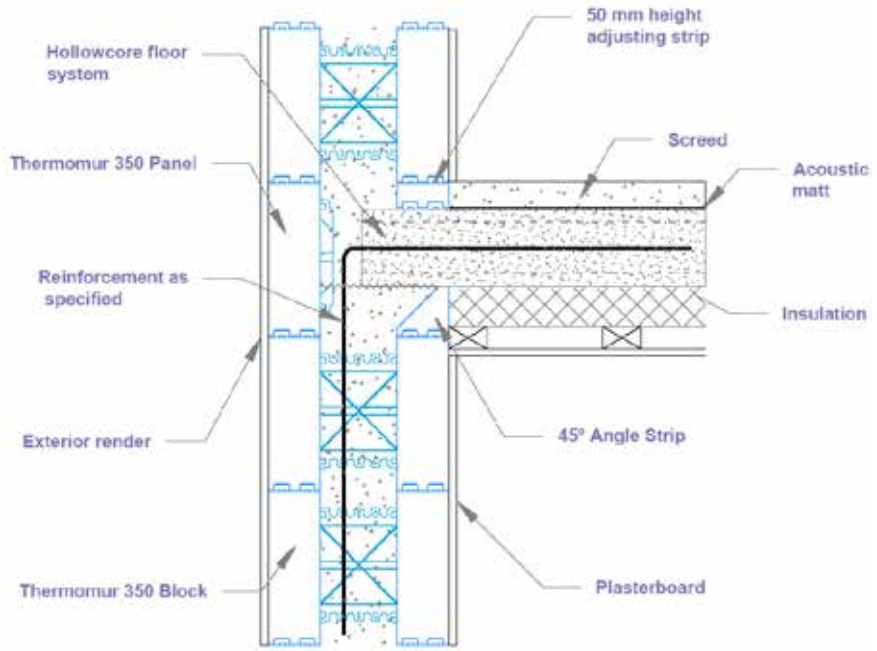
Module 5: Floor and roof connections

Depending on the floor system used the method of connection will vary. The concrete core of the Thermomur ICF system is the structural support for all methods. Consult floor manufacturer and Structural engineer.

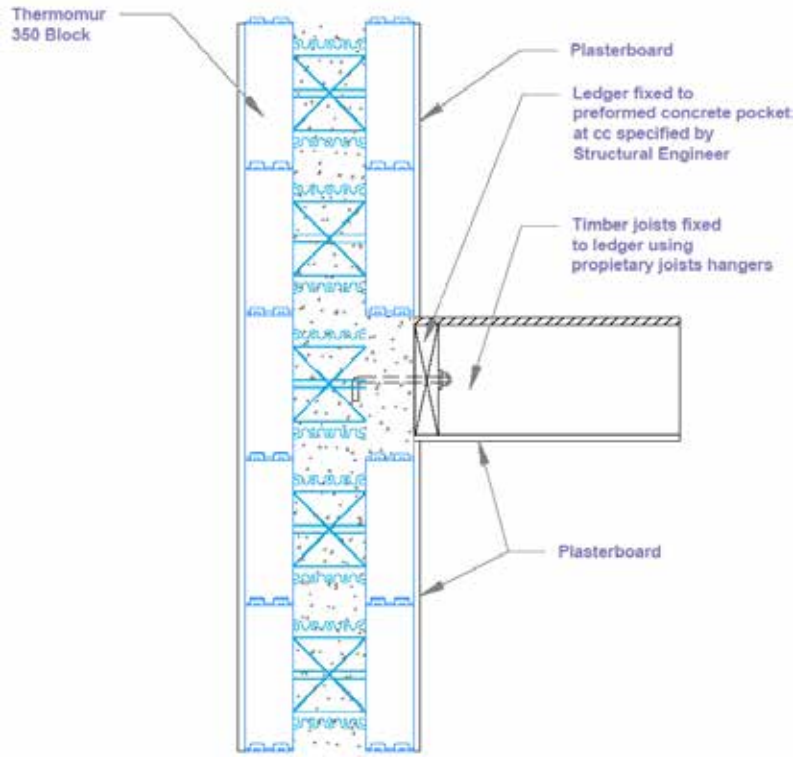
The intermediate floors are a natural break between concrete pours heights in the walls, and therefore connections and structural detail should be programmed and planned in accordingly.



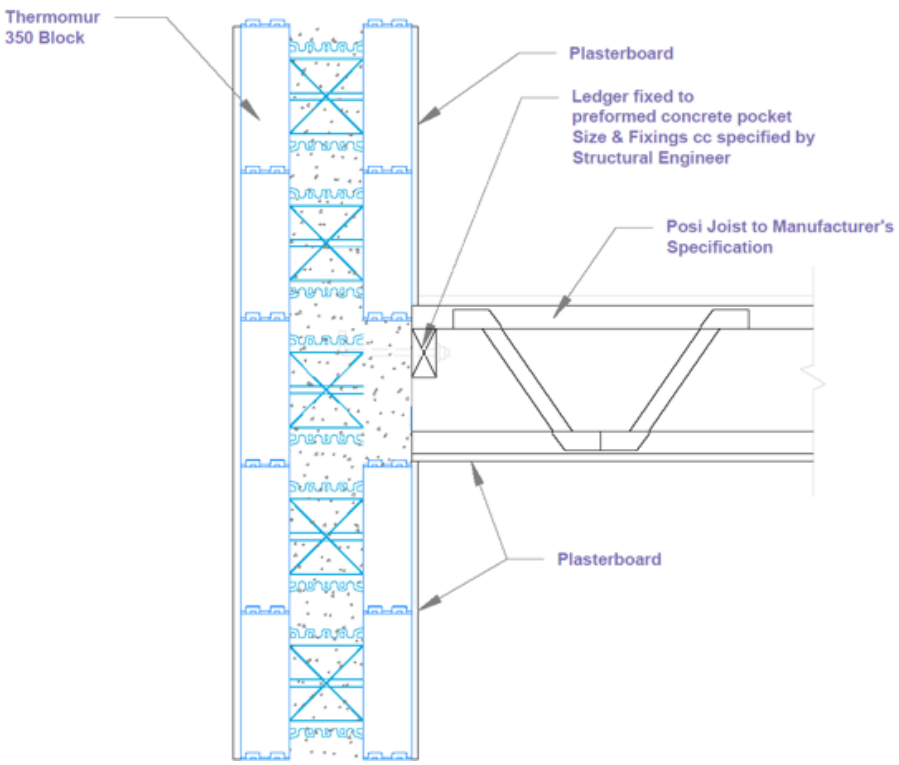
JK-5c Composite Deck



JK-05h Intermediate Hollowcore Floor



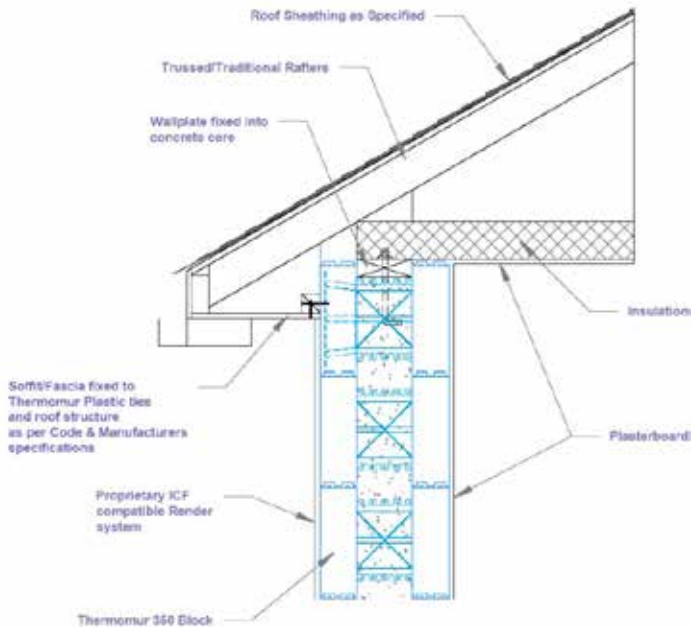
JK-06lc Intermediate Timber Floor-Ledger to Concrete Pocket



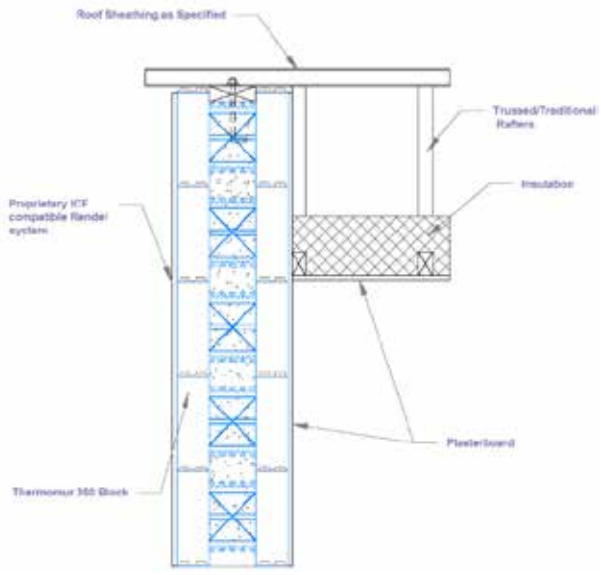
JK-06plb Posi Joist-Load Bearing Wall

Roof Connection

- Pre-cut the timber wall plate ready for the final concrete layer.
- Drill along the length of the wall plate, staggered format. Remember to place fixings at centres that avoid the 150 mm plastic bridges.
- Once the concrete has been levelled bed the wall plate onto the wet concrete
- Embed fixings through the wall plate into the wet concrete and level.
- Alternatively embed fixings into the wet concrete and use to fix the wall plate once the concrete has set
- If either opportunity is missed drill and epoxy fixings into place once the concrete has set, at least 7 days later
- The process is the same regardless of the roof structure; trussed, SIPS, steel or cut.



JK-08 Eaves



JK-09 Gable at Ceiling Level

Module 6: Concrete

A successful concrete pour is key to the ICF Building process. If the instructions concerning Thermomur ICF assembly and bracing and on the previous modules have been followed we are halfway there to a satisfactory pour. However, a few more boxes must be checked in order to ensure this:

Concrete Specification

- Concrete design provided by the structural engineer should always take precedence over the following guidance.
- Strength: Minimum C25 – C30 or as specified by the structural engineer.
- Aggregates: A pump grade mix regardless of whether a pump is used or not to ensure the flow within the Thermomur core. 10mm coarse aggregates is preferred. If 10 mm is not available 20 mm can be used for 150mm with minimal rebar and 200 mm core walls. This will have an effect on speed of delivery and cleanliness implications so care must be taken if using 20 mm.
- Slump test each load: 150 mm-200 mm (Wet S3 or Dry S4)

- Discuss rejection of load if too high!
- For warranty purposes the supplier must hold supplier holds QSRMC, BSI Kitemark Scheme or equivalent

Quantities

- Recheck the quantity required
- Frequency of trucks. Allow minimum 45 m/1h between loads

Placement

- Pumps are the ideal method of placement. Other methods can be used but they might affect speed of build.
- Ensure the pump supplier is aware of any site constrains and the building characteristics. Reach, shape, size, etc.
- Standard 150 mm diameter hose must be reduced to 100 mm to aid control of the concrete flow and placement. This will not be possible if using 20 mm aggregate which will have an effect on speed of placement and cleanliness implications so care must be taken if using 20 mm.

Concrete

Placement *(Continued)*

- A Thin wall flexible hose gives better control.
- Concrete placement should start from corners or window cills continue all the way around in layers to a maximum height of 3 m in a day
- While Thermomur allows the concreting procedure to carry on through inclement weather (freezing conditions, rain, heat) precautions must be taken to minimise the effect of these conditions such as:
    - Covering of the top of the walls if inclement weather is expected both during building and concreting and to avoid debris from entering the cavity (i.e. Autumn tree leaves)

      If water or debris enters the cavity prior to concreting, a whole must be drilled/cut to let the water out and debris to be removed; and made good and sealed prior to the pour.

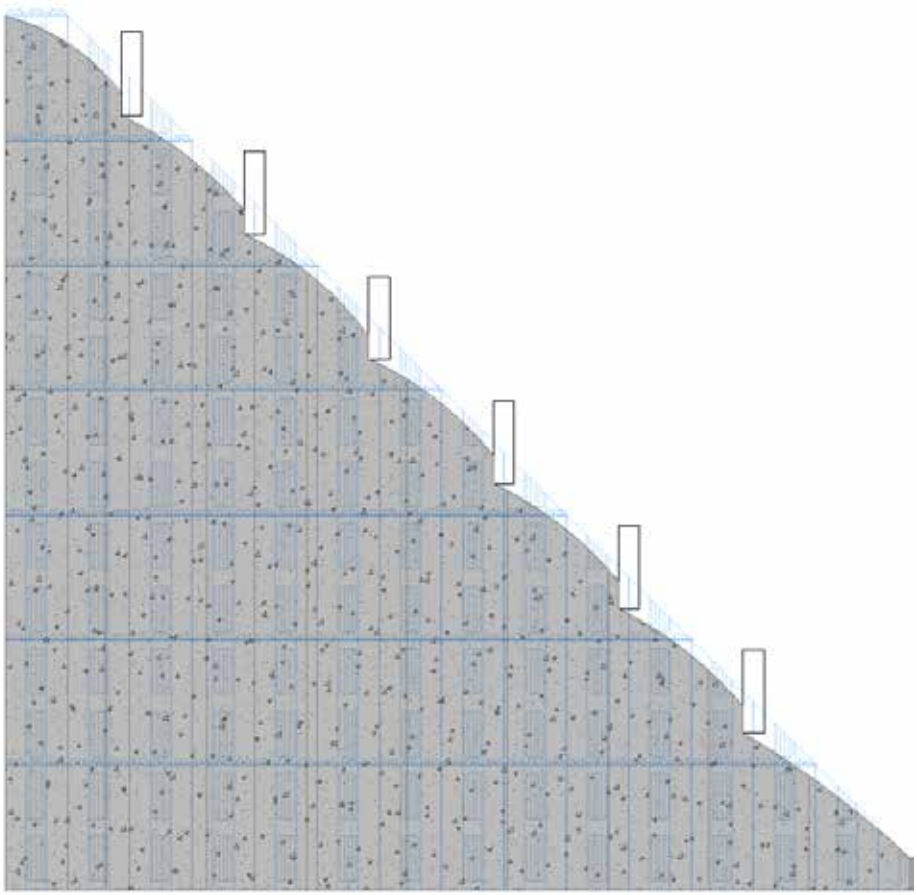
      Correct propping and support to prevent the empty walls from being moved by winds.

Consolidation

- While the specification of the concrete aids its flow in order to prevent voids and honeycombing the concrete needs to be vibrated.
- Use a maximum diameter poker of 30 mm with a long tail
- Electric operated pokers are preferred as they have enough power to consolidate the concrete and are easier to move around the site.
- Work the poker directly behind the pump nozzle
- Quick in – slow out. Too much vibration is also detrimental as it segregates the aggregates and liquids and might cause excessive pressure at the bottom courses.
- Consider protection of the top course if inclement weather is expected (rain, frost, high temperatures…)
- Use the Pre & Post Pour Checklists

Concrete Gable Ends

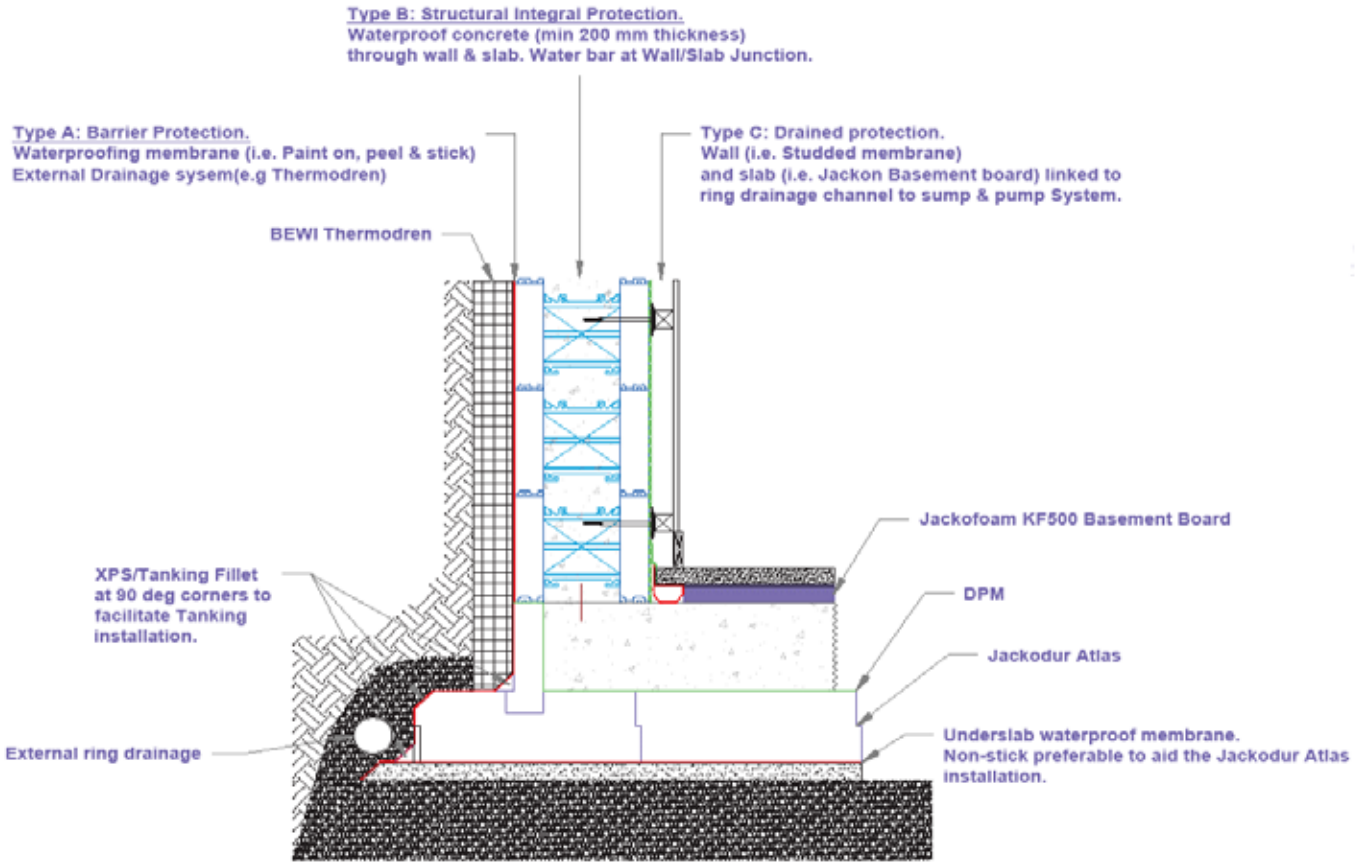
- Cut the forms to the designated angle or wait until the roof structure has been fitted so that the gables can be built to the roof line quickly, easily and accurately.
- Placing the concrete requires a reduced slump. Use the poker with caution.
- If required insert timbers into the core to create a stepped concrete slope.



- Trowel the top concrete flat to the line of the roof and Consider protection of the top course if inclement weather is expected (rain, frost, high temperatures…).
- Check the walls are plumb, adjust if necessary.

Module 7: Waterproofing and External Finishes

- Tanking is a specialist job and must be done by Approved Installers in order to receive the required warranties.
- The waterproofing specialist/manufacturer specifying the systems should be engaged before the RIBA Technical Design stage as per BS8102:2022



BW-TH-Atlas Guidance Sketches-Waterproofing

Module 8: External Finishes

The ultimate weather proofing of the structure is provided by the external finish chosen. BEWI offers guidance and support in conjunction with the supplier of the cladding to ensure that the systems , detailing and compatibility of the chosen cladding is suitable with Thermomur.

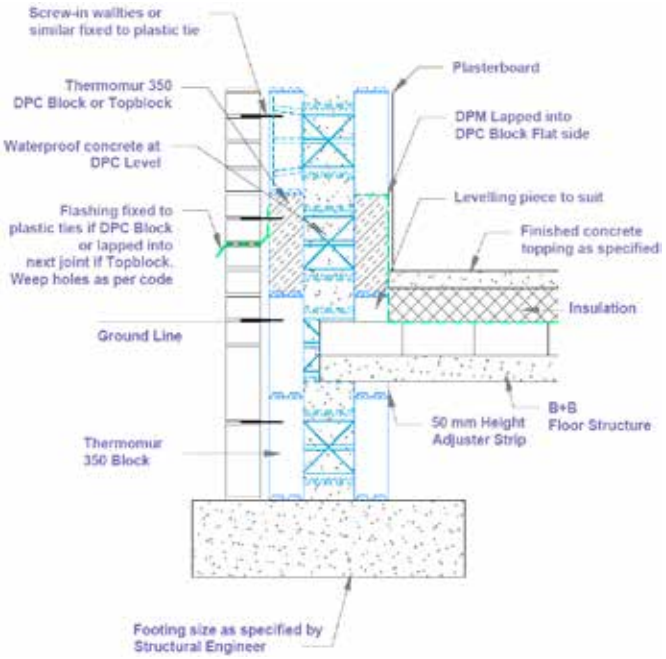
Thermomur can be clad to achieve virtually any look required by the designer, client or planning body. Options of cladding include:

Polymer modified render (EWI)

Timber/metal cladding

Brick, stone slips or panels

Masonry outer skin



Module 9: Internal Services, fixings & finishes

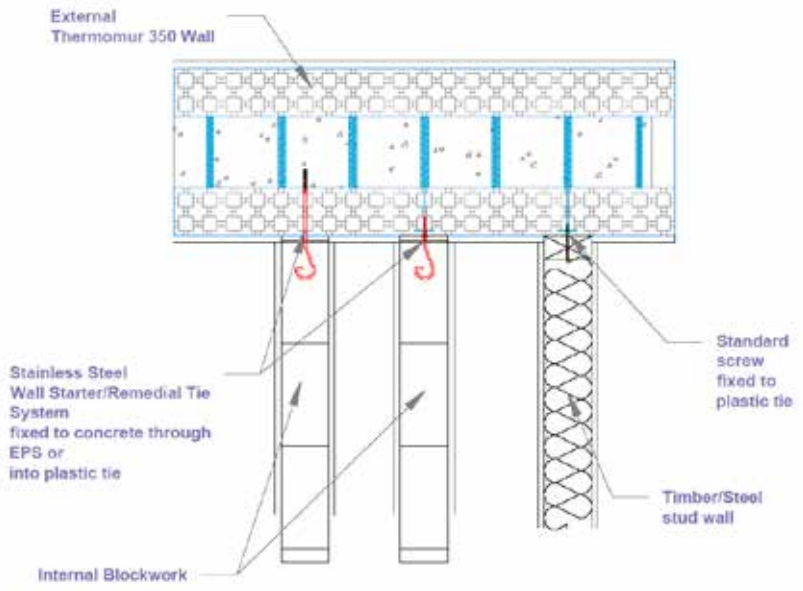
- **Electrical and Plumbing Installation.**
  - Avoid horizontal and vertical service runs within the concrete core. If necessary, these shall be taken into account when designing the wall.
  - Must always be done by a qualified electrician.
  - Service pipes & cables can be placed within the inner insulation panel hidden behind the internal finish, once the concrete has set.
  - Either always use conduit, or non-migratory TPS cable. (Thermo Plastic Sheathing)
  - Use a hot wire cutter to put chases in the wall quickly, cleanly, and very professionally.
  - Insert any ducts through the walls prior to concreting.

- **Interior Fixings.**
  - For heavy or high load items embed a sheet of ply into the wall.
  - Plasterboards: fix mechanically onto the Thermomur plastic binders with 45mm drywall screws following or dot & dab adhesive depending on the site conditions and following third party manufacturer's instructions.
  - Skirting boards: Mark the floor before skimming the walls so all web positions are known

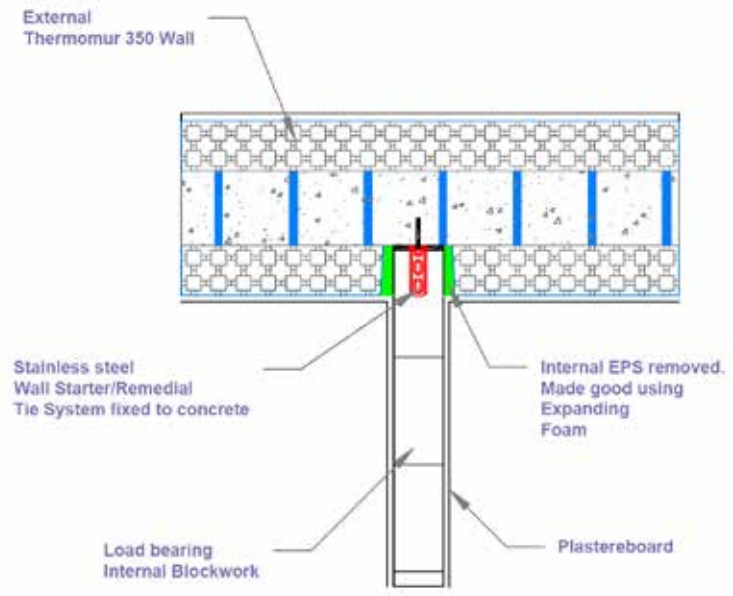
Module 10: Internal Walls. Connections

Thermomur can be used for internal wall construction although due to its thickness and strength, it will have an effect on the floor area of the property, and it flexibility when it comes to future re arrangement hence the internal walls built with Thermomur tend to be either party walls or load bearing walls, which are unlikely to be changed.

Internal walls can be built using any lightweight materials or systems and it connection to Thermomur will largely depend on whether these are load or non load bearing, as well as if these require any fire or sound resistance performance.



JK-03i Internal Partition Junction



JK-03is Internal Partition Structural Junction

Summary

- Fast construction process when good building practices are followed
- Support during predesign, design and construction process
- In-Built Air Tightness, fire safety, noise reduction and U-Values during construction process without after fixings.
- Thermomur allows you to build net zero homes, quickly and accurately. With a robust concrete core, inherent fire safety. These structures will last for hundreds of years.
- With over 30 years' experience THERMOMUR is the leading ICF system in Scandinavia.
- We are in total control of our manufacturing, from the manufacture of the polystyrene bead through to the delivery on site.
- Our range can achieve market leading u values and Ψ values without the need for additional insulation.
- Even from Norway we can deliver at competitive pricing with lead-times of less than two weeks.

Appendix A - BEWI THERMOMUR - Installer's Pre-Pour Checklist

1	Is it built to plan?	
2	Has the bracing been fitted correctly?	
3	Is there adequate/safe access to the top of the wall?	
4	Has the rebar been installed as per instructions, with top protection?	
5	Are all openings the right size and in the right position, and fully braced?	
6	Do all the "Stack Joints" have additional support?	
7	Are "T" sections connected properly inside, and supported externally?	
8	Are there any beam pockets required, if so, are they in the correct position?	
9	Have the walls been plumbed for the pour, with all string lines fitted? Use a 1.8m level, to avoid bulges and hollows.	
10	Are there two long tailed concrete vibrators on site? (A spare for breakdowns)	
11	Have the intermediate floor connections been considered or fitted?	
12	In case of blowouts, is there the necessary kit on site to deal with that scenario? E.g. plywood, saws, screws, screwdrivers, shovels, wheelbarrows, buckets.	
13	Have all the formwork tops been protected with 4" tape?	
14	Has the concrete been ordered to the correct specification?	
15	Is there a bag of OPC to prime the pump on site?	
16	Has the pump operator been on site checking access/overhead cables etc?	
17	Is road access OK for large vehicles, e.g. low bridges, weight restrictions etc?	
18	Does the pump carry the right kit eg. reducers, thin wall pipe?	
19	Is there a good water supply and washing out area for the pump and mixers?	
20	Does the washing out area allow catchment and usage for the waste concrete?	
21	Has there been dialogue between site and the batching plant re: the slump/mix?	
22	Is there a slump tester on site, with an operative that knows how to use it?	
23	Is the correct PPE on site? E.g. Hard hats, safety boots, gloves, glasses etc.	
24	Is there a First Aid Box on site filled with plasters, bandages, eye wash?	
25	Is the access equipment safe, no trap ends, loose ladders, loose cables or other potential trips, basically is the site tidy and ready?	
26	Do all the operatives on site know their job? Are there enough operatives on site? Is there a designated one contact operative to communicate with the pump driver? More than one can cause confusion. Discuss communication signals beforehand.	
27	Safety toolbox talk prior to the concrete pump arriving: Theme of the talk to be "What to do if there is a serious blockage in the pump during the filling operation". The answer must be to clear all operatives a safe distance from the pump whilst the operator clears the blockage by increasing the line pressure. The nozzle must be away from the wall during this operation, preferably over the pump cleaning/washing out area.	
28	Has the empty formwork been cleaned? If not use a blower/ hoover.	

Appendix B - BEWI THERMOMUR - Installer's During & Post-Pour Checklist

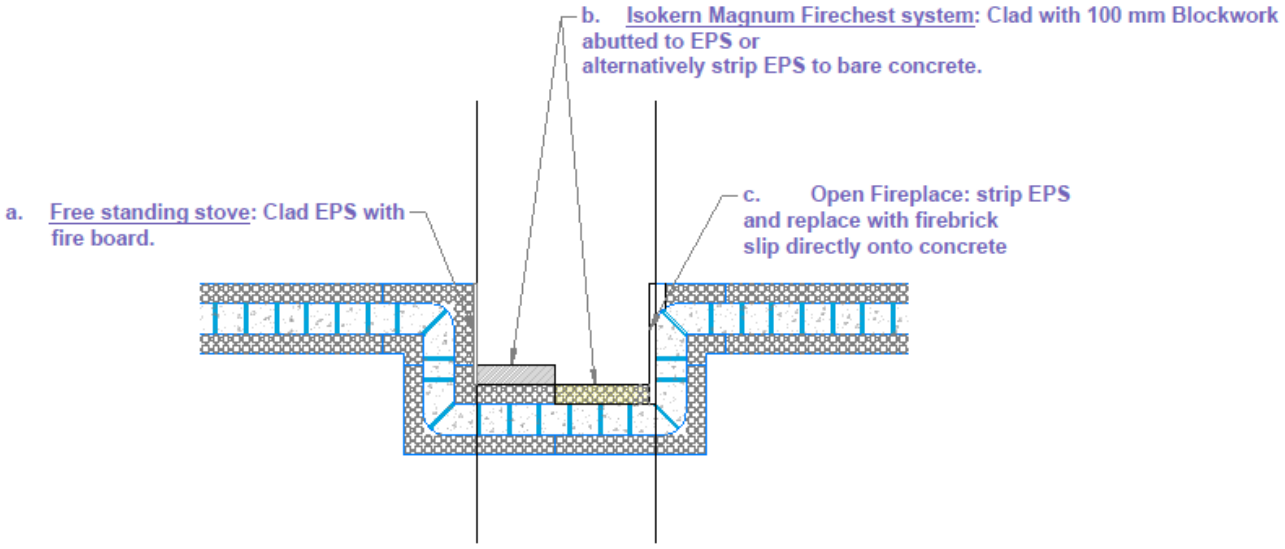
1	Are the walls straight and true?	
2	Are all the openings plumb, have they been checked?	
3	Is the consolidation complete?	
4	Has the top been levelled?	
5	Have all the anchors, wall plates, Joist hangers etc, been fitted?	
6	If the wall is to be continued, are the rebar laps protruding to the right length?	
7	Has all the kit been thoroughly cleaned including the bracing?	
8	Have the walls been cleaned, is the bracing clean?	
9	In cold weather, has the top of the wall been protected from frost penetration?	
10	Remove the protective tape from the top of the formwork.	
11	Have all the concrete spills, inside and out been cleaned up?	

Appendix C - BEWI THERMOMUR - Third Party Hold Point Checklist

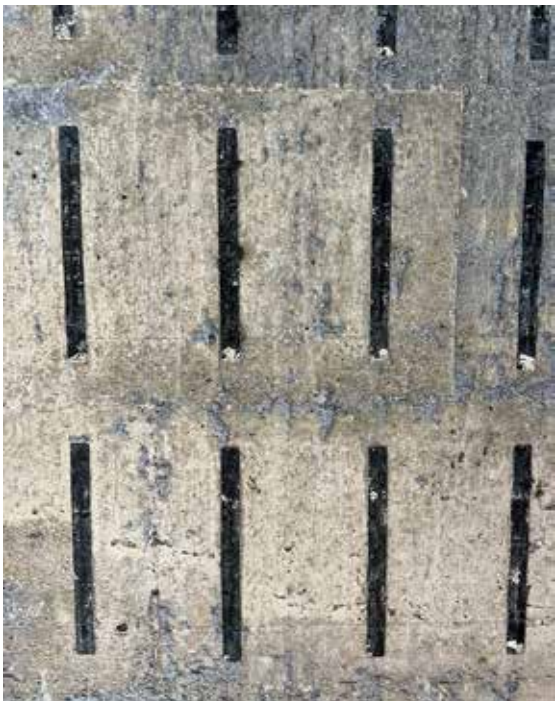
1	Wall/foundations structural connection is built to Structural engineer's specification	
2	DPC detail has been implemented as per design	
3	Thermomur blocks have been fitted following the manual's guidelines regarding: • Block overlap • Stack joints (if present) • T-Junction	
4	Openings have been built using Thermomur Window closures (If applicable)	
5	Reinforcement is present and to the Structural engineer's design	
6	Provisions have been made for any structural elements connections: • Steel Beams • Intermediate floors • Roof	
7	Waterproofing detail has been implemented as per design	

Appendix D - BEWI THERMOMUR - After works/Alterations

After works to the ICF might be required for different reasons: Connecting internal walls, creating unplanned openings, creating fireplace enclosures or simply removing the EPS for aesthetic, inspection or remedial works reasons.



This can be carried out by cutting the area of EPS required and removing it by using the correct tools such crowbar to remove the EPS and multi-tool to cut the plastic ties neatly.



If any remedial work is required this must be assessed by a competent surveyor and carried out by a concrete repair specialist.

It is possible to carry out alterations to an ICF structure. As the walls are the main structural element and the concrete will have to be cut/ drilled through it will be a labour and time intensive exercise and hence pre construction planning is the best way forward.

As a future proofing exercise, it is an option to run a full perimeter layer of reinforcement at lintel height. This will allow the creation of openings in future without having to create a new load bearing lintel in some cases. Any alterations affecting the concrete core must be overseen by a structural engineer.

NOTES

NOTES

Solutions for construction.
Simple but **effective**.

BEWI

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