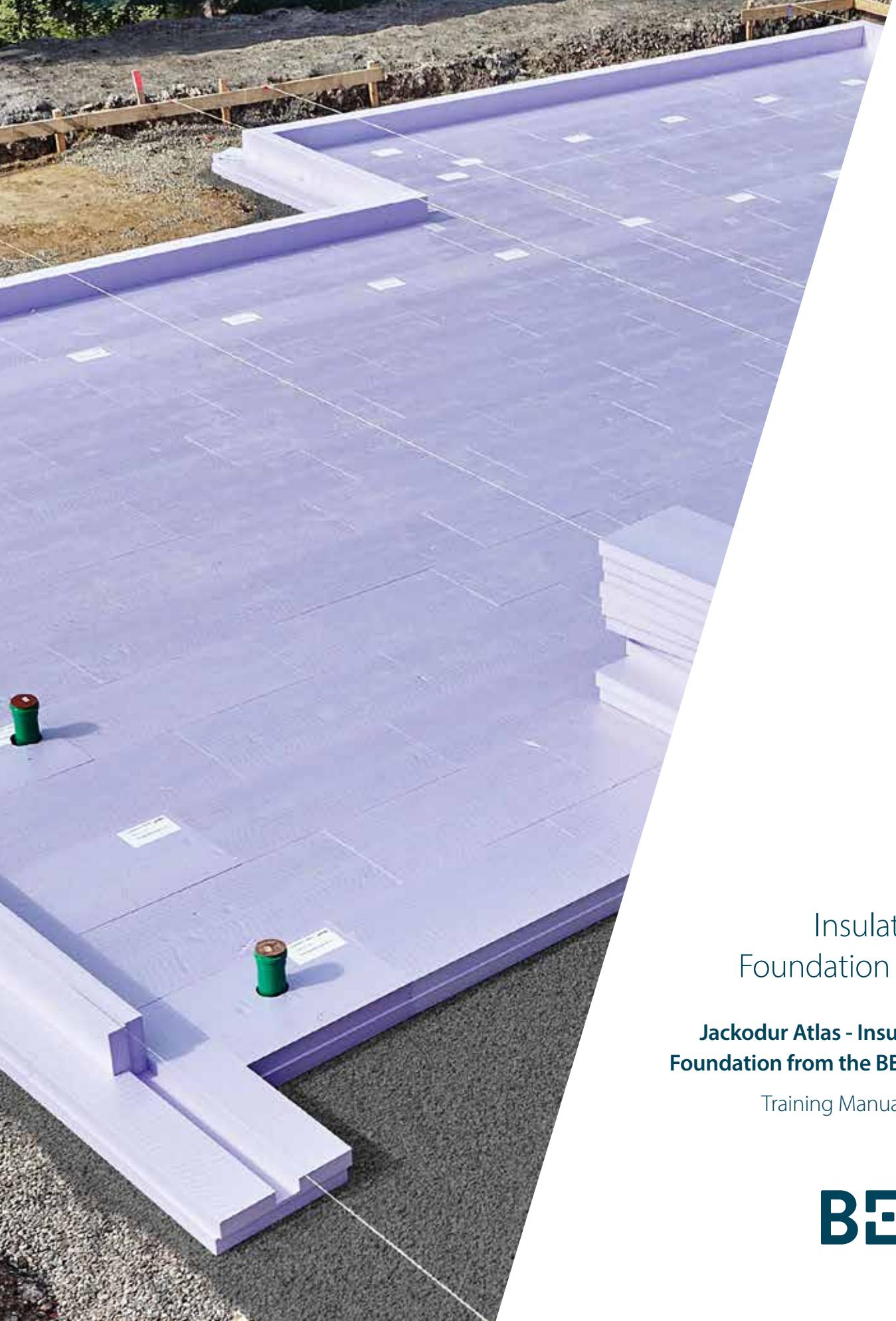


JACKODUR® Atlas



Insulated Raft
Foundation System

**Jackodur Atlas - Insulated Raft
Foundation from the BEWI Group**

Training Manual v.2 Jul-24

BEWI

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JACKODUR® Atlas

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

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

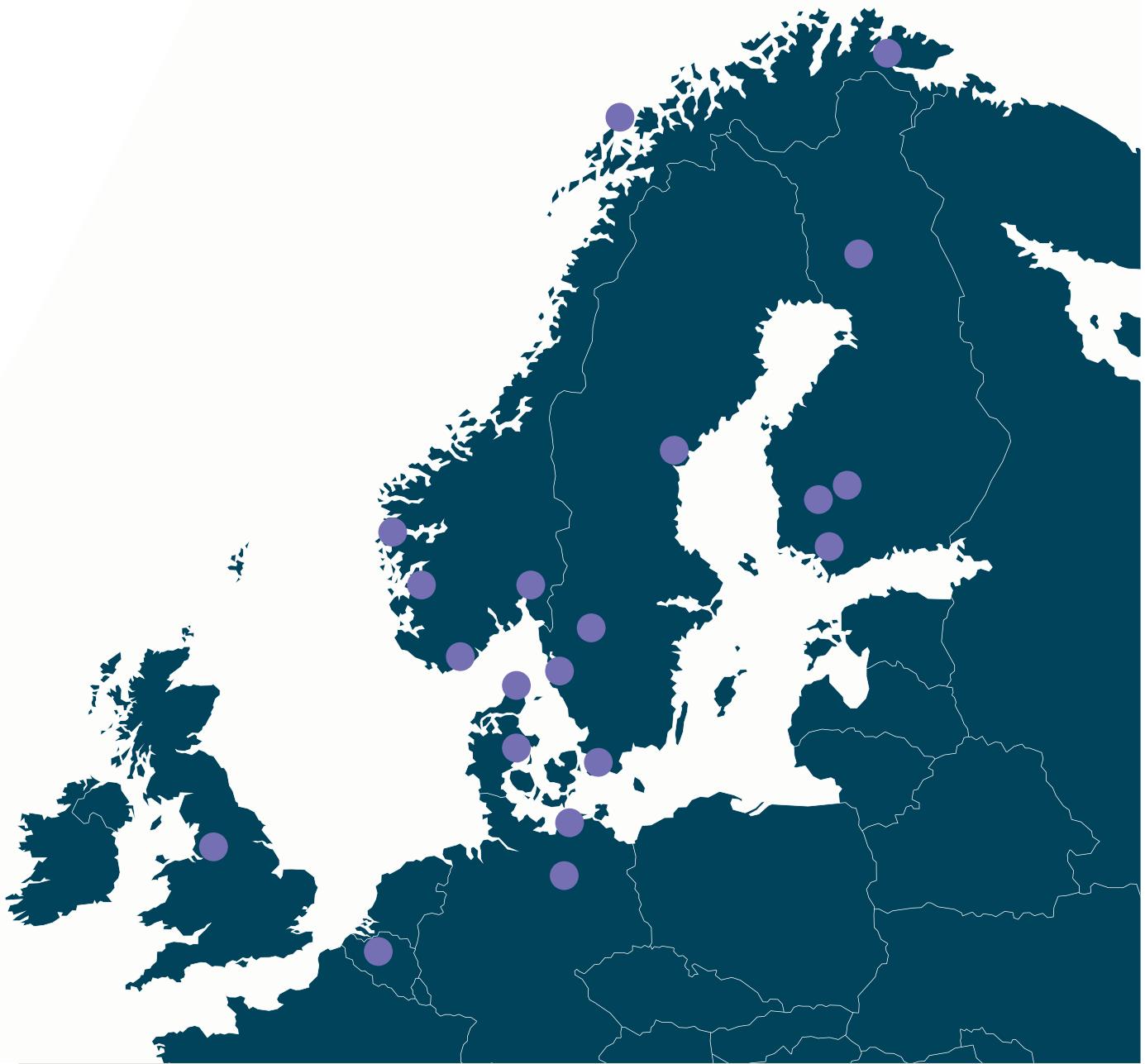
It contains guidance and recommendations as to how to build standard structures based on past experience. While the manual does not cover the whole range of structures and designs present in today's construction landscape, it covers the basics of building with Atlas. This is a generic method statement 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 Jackodur Atlas system has been assessed by the BBA on Agrément Certificate 20/5812. 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.

Introduction - BEWI Group

- 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 Insulated Raft Foundations

Integrated insulation and formwork

- The insulation acts as the formwork to a robust concrete structure
- Low 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

Long life cycle

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

The benefits of Jackodur Atlas Insulated Raft

- XPS components with low water absorption are used below ground meaning U values are consistent and long lasting
- High density XPS to three different Compressive Strengths manufactured in our premises with BEWI's own bead
- Bespoke system with no onsite waste and quick assembly with instruction drawings supplied
- Various XPS thicknesses to meet different u-value requirements without the need for the addition of extra insulation components
- High levels of air tightness and Psi values achieved. Special components available to suit different superstructures.
- Patented production system able to achieve up to 320 mm continuous thickness
- Complete third party technical and environmental approvals
- Certified Passive House

The Jackodur Atlas Range

The Atlas range is comprised by 3 main iterations:

- **Full Bespoke system**
 - Full slab cut bespoke with instructions
 - More suited to intricate footprints
 - Limitations on size due to tolerances (maximum wall length 20 m)
- **Perimeter System**
 - Only the footprint is cut bespoke
 - Internal infill cut onsite
 - More suited to simple footprints
- **JRS System**
 - Standard size elements
 - Suited for Multi unit/repetitive projects
 - Minimum volume orders apply

Full Bespoke & Perimeter Systems - Components

| | DIMS (mm) | Insulation thickness (mm) |
|---|---|---|
|  | Surface Element Covers the majority of the floor area. • Cut bespoke (Full Atlas System) • Cut on site (Atlas Perimeter system) | 1265 x 615 mm, covering area 1250 x 600 on bespoke system (except especially cut elements) 100 to 320 mm |
|  | Side Element Similar thickness to the Surface Elements but are machined with a groove to hold the Formwork Elements secure. | - 100 to 320 mm |
|  | Corner Edge Element Machined to form the corners of the slab. | - 100 to 320 mm |
|  | Formwork Element Can be supplied at a height to suit your floor slab thickness (Standard length cut on site) | Max Height 500 mm 80 to 320 mm |

JRS System - Components

| | DIMS (mm) | Insulation thickness (mm) |
|---|---|---|
|  | Surface Element Covers the majority of the floor area. Cut on site | 1265 x 615 mm, covering area 100 to 320 mm |
|  | Side Element Formworks edge L element glued at the manufacturing plant and cut on site. Standard sizes depending on configuration. | - 100 to 320 mm |
|  | Corner Edge Element External corner formwork glued at the manufacturing plant and cut on site. Standard sizes depending on configuration. | - 100 to 320 mm |
|  | Formwork Element Internal corner formwork glued at the manufacturing plant and cut on site. Standard sizes depending on configuration. | Depending on configuration 80 to 320 mm |

Module 1: Preparation

The project so far:

- Purchase of the site
- Design and planning
- Site ground investigation
- Structural Engineer's design
- 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

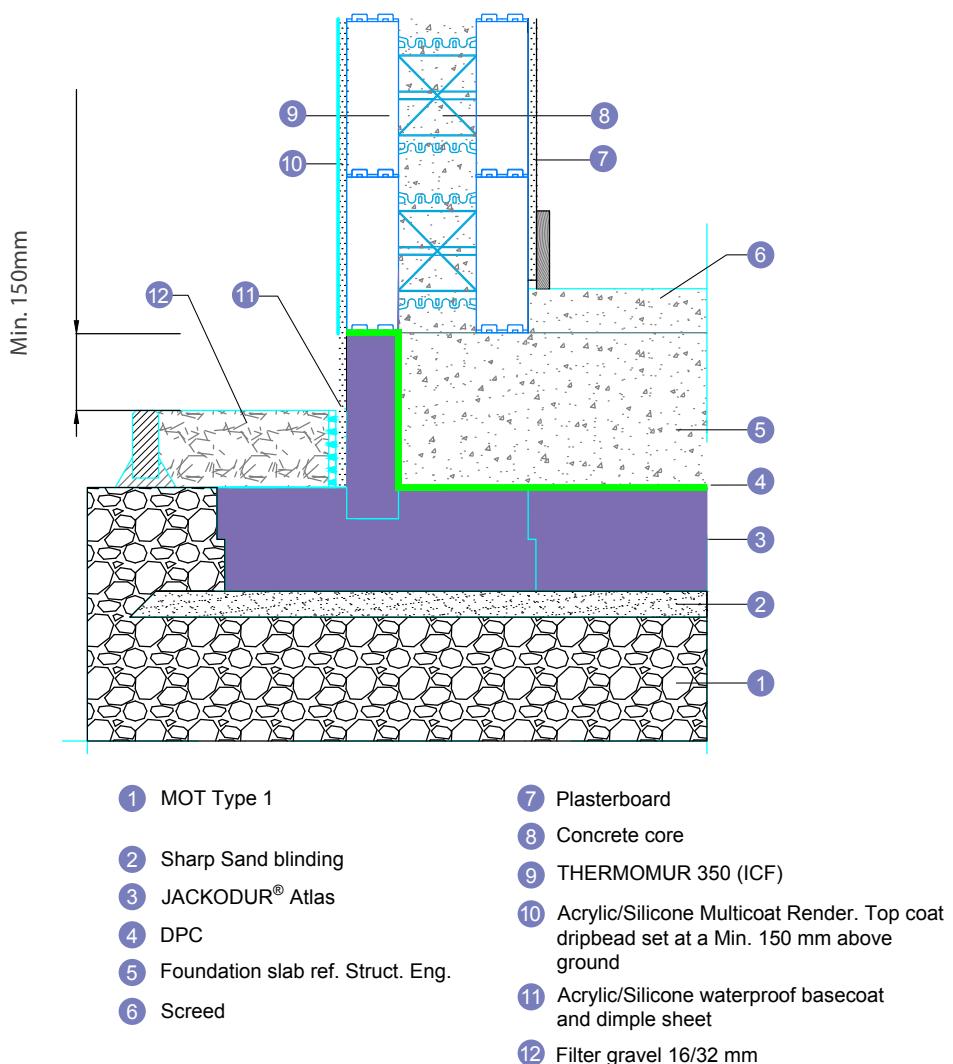
- PPE for all and Welfare Facilities
- Hard hats, boots, wet weather gear, hi viz, gloves, eye protection
- Specialist items
- 2 mm Plastic shims
- Large and small format hot wire cutters
- Rebar bender and cutter
- Hose pipe connection for equipment cleaning
- General Builders tools
- Laser level
- Pruning saw and cross cut saw
- Rubber mallet
- Foam gun
- 5 m and 25 m tape, string lines, marker pens, laser level
- Wheel barrows, shovels and brushes
- Excavator, whacker plate/roller



Discuss: SE input, concrete thickness & rebar design.

Preparation

- The ground below the proposed raft will be excavated according to the reports carried out by the Geotechnical and Structural Engineer to a level that is deemed necessary to the design of the structural base.
- The levels will be brought up with MOT Type 1 graded hard-core, proof rolled, to a level of compaction as per specification set by the Structural Engineers in layers of 150 mm.



JK-A-03 Atlas-Thermomur 350

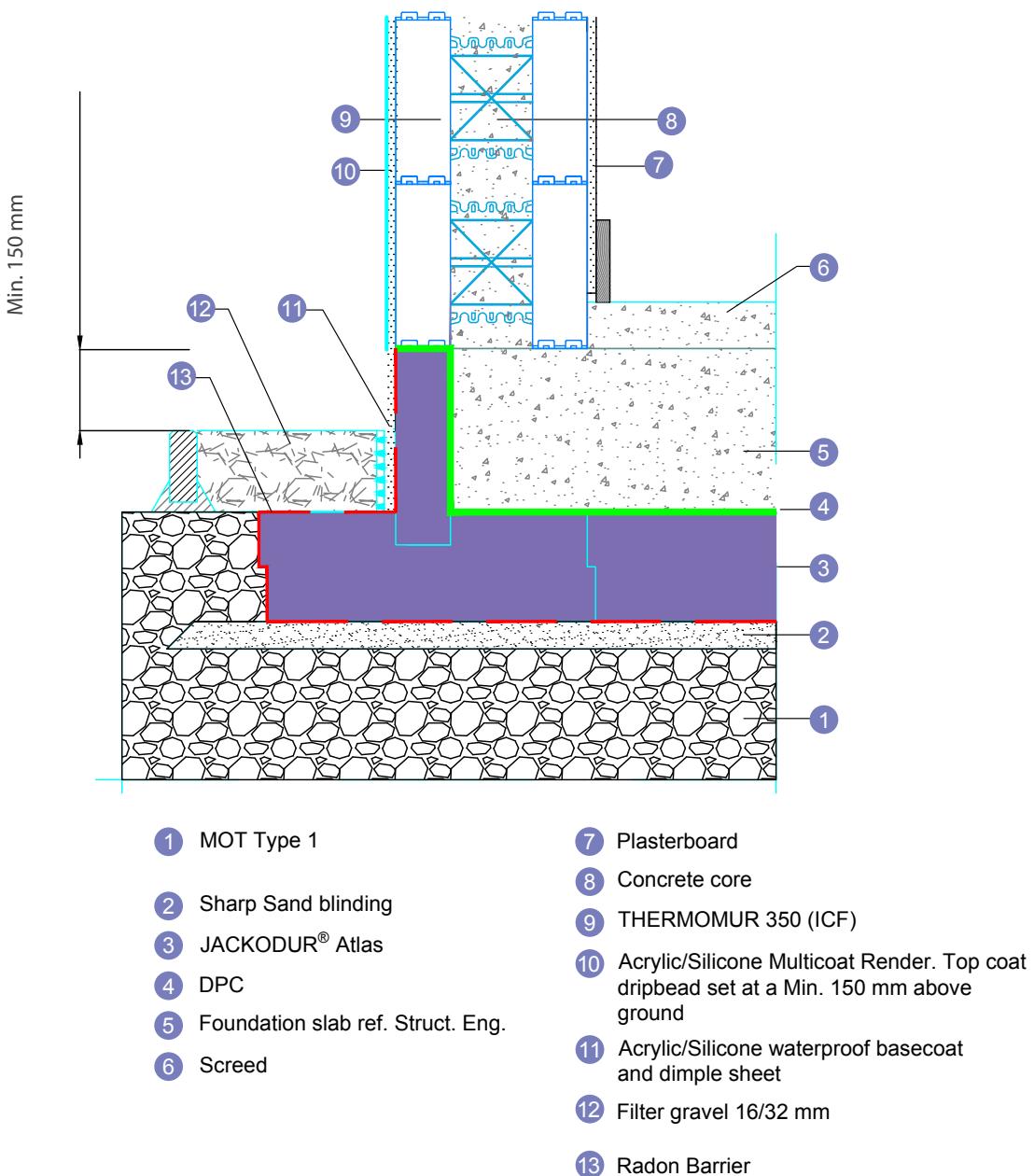
- Before the blinding layer is laid, through slab penetrations should be considered and duly installed.



Practical: Laser Level operation, Setting out pegs & lines, 3:4:5 square check

Preparation - Excavations & Substrate

If required, a Radon Gas membrane can be placed over the blinding, directly under the Atlas and to be turned over the up stand of the Atlas, this will be determined by the designers and will be project specific. It will be trimmed after back-filling and protected during construction, to be lapped with DPC. All penetrations should be fitted with gas proof sleeves. All Radon products should have third party certification. The Atlas product will be laid on this membrane to line and level. If laid onto a Radon membrane, use the BEWI metal wedges to hold the perimeter sections in place.



JK-A-08 Thermomur 350 Radon

Preparation - Excavations & Substrate



- Shallow trenches in the compacted hardcore can be cut to match the positional line and levels for drainage pipes and incoming service ducting as specified. Once laid the pipes and ducts should be covered to the top of the compacted hardcore with a weak mix semi dry concrete. The concrete is to protect the pipes and hold them in a firm position whilst work continues.
- The hard-core is then blinded off with compacted sharp sand or fine grit, which does not promote capillary action. This blinding layer should be no less than 10 mm deep and no more than 50 mm to a tolerance of +/- 5 mm.

Module 2: Starting the Build

- 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.



- If using Full Bespoke or Perimeter system locate the **BEWI** building plan, always attached to the face of 1st pallet to be unloaded from the wagon. As the JRS is comprised of standard sized element no plan is required.
- Read the instructions, get familiarised with the components, and pick the starting corner as shown on the plan and start to assemble the required Atlas sections for the sequence described in the **BEWI** Plan. Take care of differentiating any special parts for the build according to the drawings and packing list provided.

JACKODUR® Atlas

Object: Obj_6675
Order number: A400381432

Packing list:

| | | | |
|-------------------|----|-----|--------------------|
| Pallet 01 (53) | 2 | pcs | Surface element |
| | 3 | pcs | Special part No.4 |
| | 3 | pcs | Special part No.1 |
| | 1 | pc | Special part No.6 |
| | 1 | pc | Special part No.7 |
| | 3 | pcs | Special part No.12 |
| | 1 | pc | Special part No.11 |
| | 21 | pcs | Special part No.10 |
| | 4 | pcs | Special part No.3 |
| | 8 | pcs | Special part No.9 |
| | 1 | pc | Special part No.8 |
| | 1 | pc | Special part No.15 |
| | 1 | pc | Special part No.2 |
| | 1 | pc | Special part No.5 |
| | 1 | pc | Special part No.14 |
| | 1 | pc | Special part No.13 |

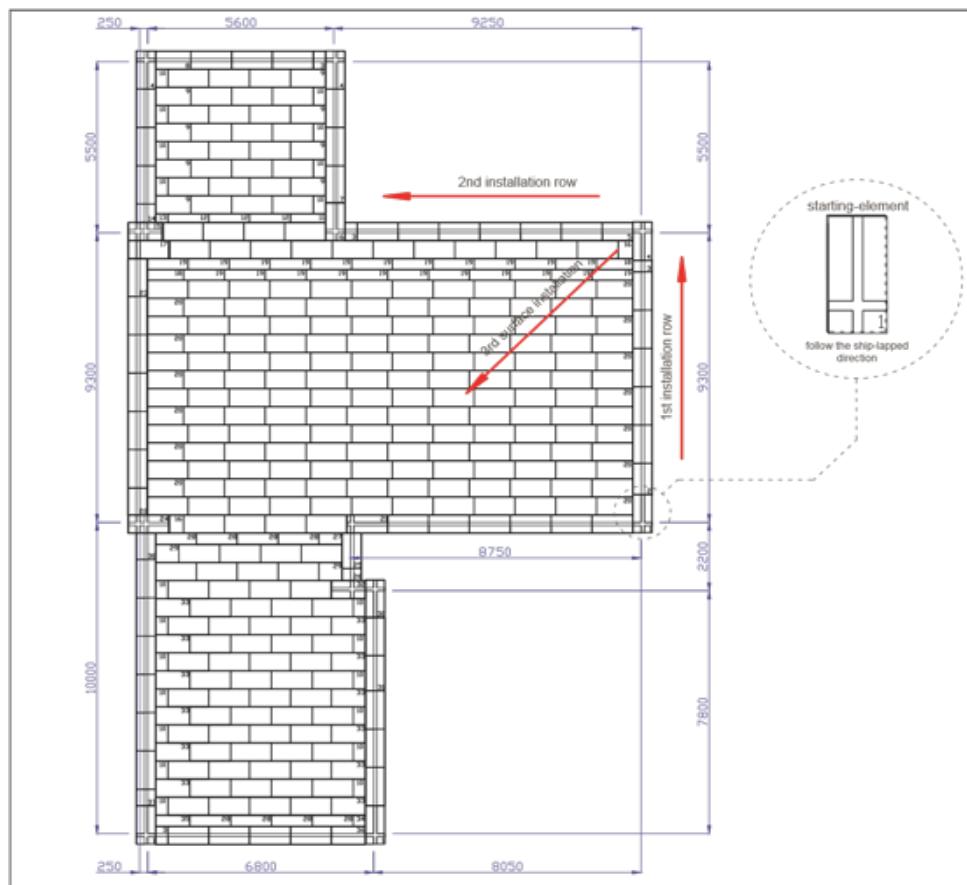
Pallet 02 34 pcs Surface element

Pallet 03 34 pcs Surface element

Pallet 04 34 pcs Surface element

Pallet 05 34 pcs Surface element

Starting the Build



General information

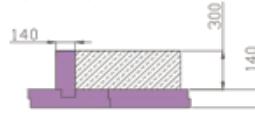
The construction type of substructure and level area should be completed to the specifications calculated in the floor survey/structural stability appraisal and/or to the specifications of the construction manager. The substrate for laying the floor plate must be flat and stable. The JACKODUR Atlas laying plan must be consistent with the design plans for the construction project. The company performing or the manager overseeing the construction is responsible for ensuring that the JACKODUR Atlas system is laid properly.

Installation

Once the start element has been laid, the side elements are laid up to the next angle element (1st row). Further side elements are then laid up to the third angle element (2nd row). The formwork elements are slotted into the grooves provided and the surface elements subsequently laid (3rd surface installation).

Detail

Compressive strength of formwork element: 300 kPa
Compressive strength of insulation beneath the floor plate: 300 kPa
respectively 130 kPa (50 years, deformation < 2%)



Please note: A separating layer (e.g. PE film) must be laid on top of the thermal insulation.

Caption



blue dimensions = outer edge of the concrete

BEWI

JACKODUR Atlas

Thermal insulating and formwork system for floor plates

| | | |
|---------|--------------|-------------|
| Project | Mr. Ken Hall | project no: |
| | | UK_6675 |
| Date | 23-07-20 | Scale |
| | not to scale | Unit mm |

- Lay the first row of perimeter sections to the line. If using JRS start at the corners and fill in with side elements cutting as required.
- Due to production tolerances (+/- 1 mm per m) and site conditions the Bespoke & Perimeter Formwork might require small adjustment during laying to keep to the designed dimensions. To allow for this place 2 mm plastic shims, at each side of the elements to maintain the line position on each joint.



Starting the Build



- Work to the next corner. Check the position of the next section set at 90° to the line. If the position is outside the line remove as many of the 2 mm shims as required and fix the 1st section laid, firmly into place with some extra weight.
- Return to the other end of the line, and gently knock the line of edge pieces into place, closing the 2 mm gaps in this process. By putting the 2 mm shims in place, exact measurements can be achieved.



- With 3no. 90° corners in place, and the three sides locked with the Formwork fitted, the oversite insulation “the Surface Elements” can be placed. Make sure to follow the instructions and to use the correct special parts as described or if using the Perimeter or JRS system, lay the surface elements on a staggered manner and cut to fit accordingly.

Starting the Build

- Now fit the vertical "Formwork Elements" along this line, these will lock the pieces together. If using the JRS system, the formwork elements are already glued together.



- Repeat the above until all the sections have been placed
- Once the Atlas is in place, a grout loss membrane, or DPM must be placed on top of the Atlas Product and lapped up and over the Atlas up-stand, secured during placement of rebar and concrete. To be trimmed after concrete placement has occurred.



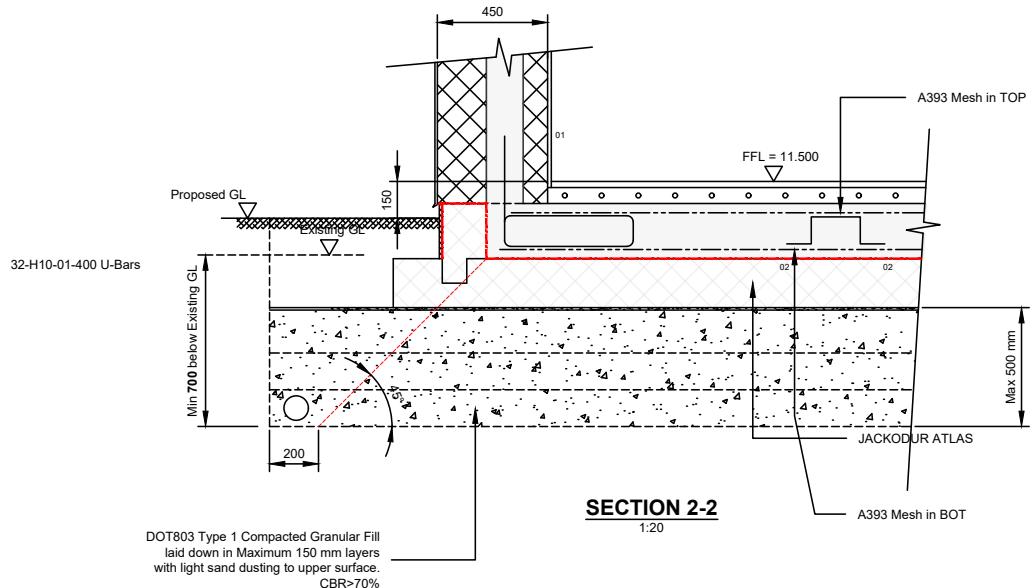
Module 3: Rebar & Concrete

- Mesh/bar reinforcement is then placed on the DPC to details and designs prepared by the Structural Engineer within the Atlas perimeter. All reinforcement to be supported by proprietary plastic spacers, suitable for use on this type of insulation, and by design and specification by the Structural Engineer.



Rebar & Concrete

Structural Detail (Example)



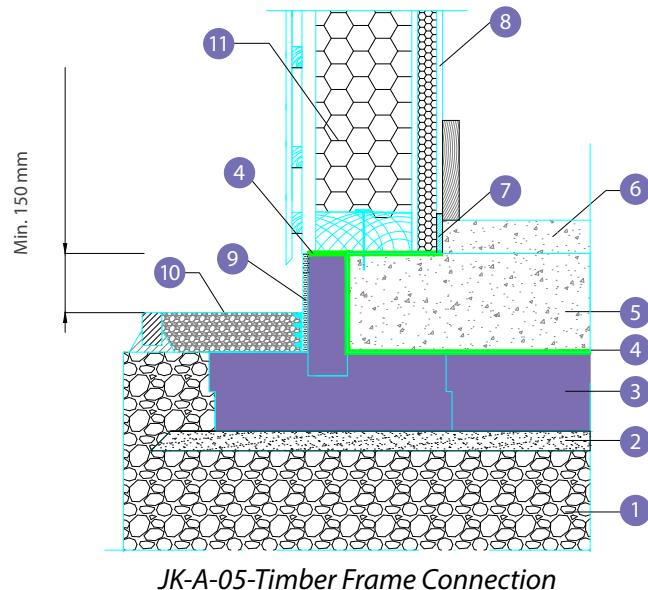
- It is recommended to add some lateral support to the formwork to minimise the waving. If the concrete thickness is higher than 300 mm then vertical bracing every 1.2 mm approx. is required, as well as glueing the formwork to the channel.
- When the reinforcement has been placed and checked, the concrete is then poured to the depth of the Atlas shutter, compacted, and levelled, as detailed by the Structural Engineer.



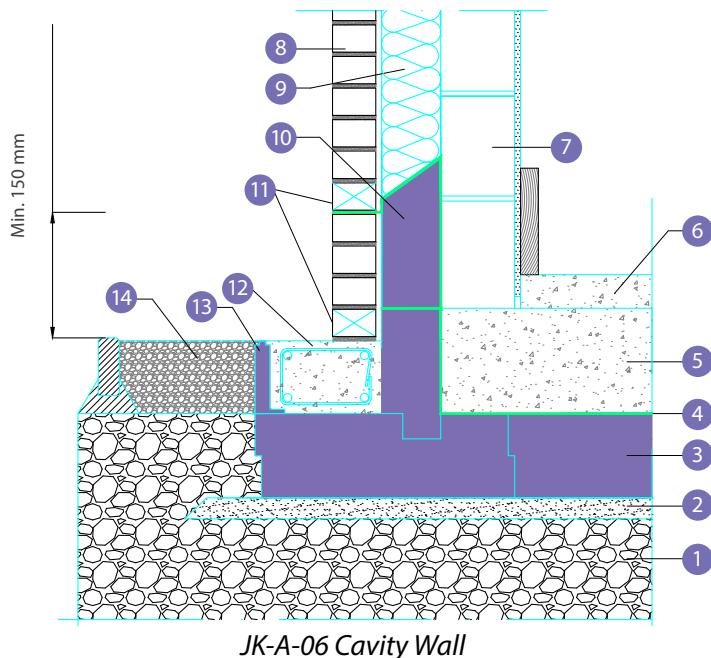
Module 4: Superstructure

- If using Thermomur ICF the building superstructure is placed on top of the concrete so that the outer edge of the concrete in the raft and the outer face of the concrete in the formwork line up and correspond along the full perimeter. X-section details for different building types are available.

Atlas & Timber Frame - Standard Detail



Atlas & Cavity Wall - Standard Detail



Module 4: Superstructure

- If using Thermomur ICF the width of outer face polystyrene of the Thermomur and the width of the up-stand of the Atlas are likely to match, but this is not necessarily required. It will be job specific. Bevel top external edges on the Atlas upstand can be specified to match the width of the structure above.



- The area around the Atlas raft will be back filled and compacted at this stage with either virgin ground or hard-core, depending on the future use of this area.

Summary

- Fast construction process when good building practices are followed
 - Bespoke system to close tolerances (+/-1 mm/m up to 20 m length)
-
- Labelled components with "build by numbers" drawings for fast onsite assembly
 - In-Built Air tightness & low thermal bridging details
 - Full manufacturing control from bead to machining
 - Unique full panel thicknesses can be achieved through patented XPS welding system
 - Market leading U-Values and PSI values without the need of extra insulation



Discuss: Specific details for different superstructures

Appendices

a - Pre Pour Check List

b - Post Pour Check List

JACKODUR ATLAS - Pre-Pour Checklist

| | | |
|----|---|--|
| 1 | Is it built to plan? | |
| 2 | Have all numbered components been fitted correctly? | |
| 3 | Has the DPM been fitted correctly and secured away for safe operations? | |
| 4 | Has the rebar been installed as per instructions? | |
| 5 | Are all service penetrations well secured and foamed in? | |
| 6 | Have the formwork element been checked for line and level with all string lines fitted? | |
| 7 | Has the concrete been ordered to the correct specification? Check SE Instructions. | |
| 8 | Has the pump operator been on site checking access/overhead cables etc? | |
| 9 | Is road access OK for large vehicles, e.g. low bridges, weight restrictions etc? | |
| 10 | Does the pump carry the right kit e.g. Swan necks, reducers, thin wall pipe? | |
| 11 | Is there a good water supply and washing out area for the pump and mixers? | |
| 12 | Does the washing out area allow catchment and usage for the waste concrete? | |
| 13 | Has there been dialogue between site and the batching plant re: specifications, quantities... | |
| 14 | Is the correct PPE on site? E.g. Hard hats, safety boots, gloves, glasses etc. | |
| 15 | Is there a First Aid Box on site filled with plasters, bandages, eye wash? | |
| 16 | Is the access equipment safe, no trap ends, loose ladders, loose cables or other potential trips? | |
| 17 | Basically, is the site tidy and ready? | |
| 18 | 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. | |
| 19 | 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. | |

JACKODUR ATLAS - Post-Pour Checklist

| | | |
|---|--|--|
| 1 | Are the formwork elements straight and true? | |
| 2 | Are all the service pipes still in position? | |
| 3 | Is the consolidation complete? | |
| 4 | Has the top been levelled to the Atlas formwork edge? | |
| 5 | Is the overlapping DPM clean and ready for the superstructure? | |
| 6 | If specified, are all rebar starter bars in position? | |
| 7 | Has all the kit been thoroughly cleaned including the bracing? | |
| 8 | Have all the concrete spills, inside and out been cleaned up? | |

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

BEWI

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