Natural
Building
Technologies

NOTE: DIFFUTHERM & PAVATHERM-PLUS HAVE NOW BEEN REPLACED BY ISOLAIR MULTI

Technical Manual, Steel Frame System

Clad & Render

NBT STEEL EWI

Introduction

Content

No limits to architectual design: NBT PAVACLAD and NBT DIFFUTHERM facades interact together

Description of NBT Steel Frame Systems

The NBT steel frame system is adaptable to all external finishes: NBT PAVACLAD system is an external insulation with cladding and NBT DIFFUTHERM system is an external insulation with render.

Made from over 95 % waste softwood and under 5 % inert water-proofing additives, NBT PAVATEX woodfibre boards (PAVATHERM, DIFFUTHERM, PAVATHERM-PLUS^{+}, ISOLAIR) are a genuinely sustainable non-toxic building material.

To produce NBT PAVATEX boards, waste wood fibres are pulped and mixed with water. The pulp is heated to activate the natural lignin they contain in order to glue the fibres together. The pulp is then pressed into boards, dried, and cut to size.

The advanced manufacturing process uses the inherent properties of wood fibres to produce boards with many excellent technical qualities for thermal and acoustic insulation, thermal storage capacity, vapour permeability and moisture control.

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Performance Guide

A modern wall insulation system must do more than just protect building occupants from cold. It must create a comfortable and healthy environment in all possible combinations of external and internal conditions and control the effects of external heat, cold, noise and internal moisture generation.

NBT PAVACLAD & NBT DIFFUTHERM systems...

Keep the building warm for longer in cold weather:
Low thermal conductivity and high vapour permeability provide high thermal insulation with no risk of interstitial condensation. Vapour barriers are unnecessary. Woodfibre boards reduce the effect of thermal bridging and the interlocking board design easily achieves good windtightness, so increasing thermal performance. Energy use for heating is significantly reduced leading to lower CO2 emissions and running costs.

Keep the building quieter:
The high mass and the fibrous texture of NBT PAVATEX woodfibre boards give excellent acoustic performance to buildings.

Keep the building cooler in hot weather:
The unique combination of high density, high specific heat capacity and low thermal conductivity gives External Wall Insulation (EWI) solutions the effect of thermal mass that would normally be associated with render onto masonry. Compared to conventional EWI material the risk of condensation behind the render during cold nights is minimized as the boards will store the day's heat.

Keep the building dry and breathable:
NBT PAVATEX woodfibre boards are very vapour permeable and hygroscopic. This allows them to disperse accumulating short term moisture and protect vulnerable elements of the building fabric, with no reduction in the performance of the boards themselves. The boards allow moisture from within the structure to pass easily to the outside. This provides a safeguard against high moisture content. This is vital for the long-term health of the building fabric, and is completely overlooked by most conventional insulation systems.

NBT Natural Insulation Products for:

Simple and robust
Improved heat storage for light weight structures
Excellent sound insulation for light weight structures
Highly vapour permeable constructions that do not need membranes to control interstitial condensation
Substantial saving of build cost compared with conventional steel frame construction
Simple robust construction has few skilled operations and is easily adapted for offsite manufacture
Reduced thermal bridging - ideal to achieve CSH Level 3, 4 and beyond

Airtightness

Principle

A building envelope should be airtight when all ventilation openings are closed. The design requirement for air changes has to be provided by opening the windows manually, other controllable ventilation openings or suitable mechanical ventilation systems.

When assessing the air permeability of the building envelope, the following aspects must be considered separately:

- Individual building components must exhibit the necessary airtightness in accordance with building component standards
- The overall air permeability of the building envelope must meet the limiting and target values of building regulations
- Local air permeability (leaks, primarily on the inside) can lead to moisture damage because they allow moist interior air to infiltrate the construction
- Local air permeability and associated draughts can have a detrimental effect on the thermal comfort of the occupants and can also lead to increased energy consumption

Air permeability

The air permeability of the building envelope is specified by the ratio of surface area of the building to the hourly air exchange rate for a 50 Pa pressure difference. In Part L Building Regulations an air permeability of 10.0 $m^3/m^2/h$ is allowed, for EST best practice for CSH level 3 an air permeability of 3.0 $m^3/m^2/h$, for higher CSH levels an air permeability of 1.0 $m^3/m^2/h$ and for PASSIVHAUS an air permeability of 0.6 $m^3/m^2/h$ are accepted as the maximum.

Design and construction

To ensure that the building envelope has the necessary degree of airtightness, an airtightness layer is required over all parts of the construction on the warm side of the thermal insulation. Generally, the vapour control layer and airtight layer functions are combined and provided by one membrane, sheeting or a board type material (OSB, multi-ply board, plywood, gypsum fibreboard, etc.). Such materials require fixings and permanent air tight seals at joints and junctions in the form of adhesive tape, glue, mechanical fasteners etc., or may need to be held in place with battens.

Rock wool and glass-fibre boards, wood fibreboards, wooden panelling, planking, acoustic linings, building papers etc. cannot achieve the degree of airtightness required for modern buildings.

The airtightness layer must be conceived at the design stage as a “seamless” layer over the entire building envelope, planned with its practical installation in mind, and shown as a separate layer on all drawings. Good planning includes corresponding information in the tender documents and detail in the working and fabrication drawings. The materials used to achieve the airtightness must be sealed airtight at junctions with adjoining elements such as windows, doors and foundations. The installation of several layers each of which are only partially airtight will not result in a building with an adequate degree of sealing.

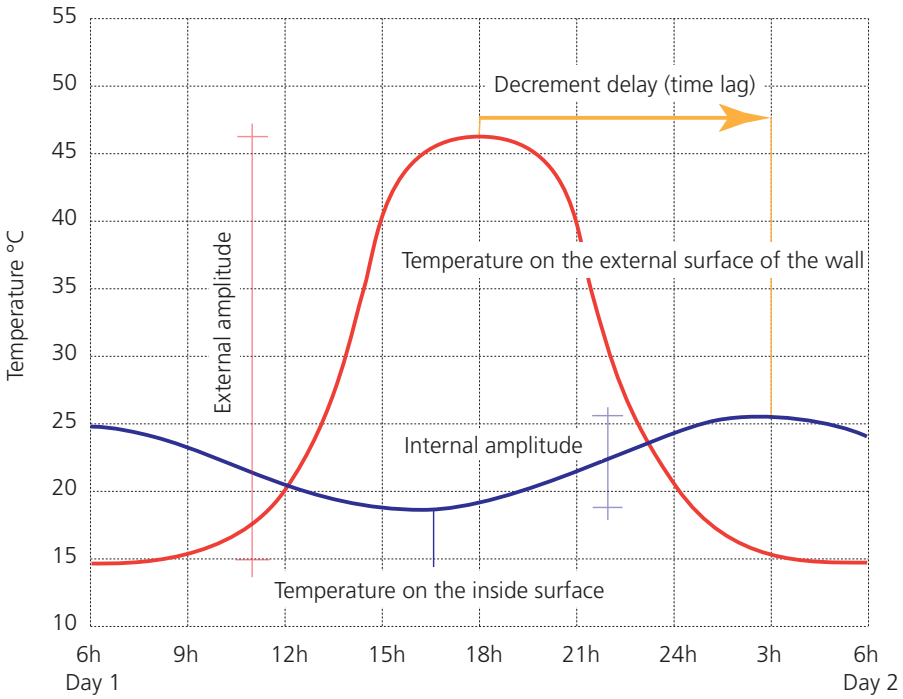
△ Sketch of the principle of an airtightness layer: Build tight, ventilate right.

Testing

In order to achieve an airtight building envelope, measures and checks during construction and after completion of the building are necessary. If the airtightness layer has been properly designed and planned, expensive blower door measurements, leak detection by means of smoke tests or IR thermography, and unnecessary costs of repairs can be saved.

A properly designed and constructed building will fulfil airtightness requirements without the need for further special work. NBT systems provide proper design and site support to ensure that the correct levels of airtightness are achieved.

Summer Overheating



Selecting the right insulation

As part of a building's design it is important to consider the effects of summer overheating control, particularly when there are rooms in roofs or where the construction system is lightweight such as steel or timber frame.

Summer overheating is caused by any or a combination ofthree reasons:

- too great internal gains from appliances, people, machines etc.
- too much sun directly through windows due to poor summer shading
- heat passing directly through the walls

The solution to the fi rst is to reduce the gains or ventilate, the second requires better shading, and the third is solved by reducing peak heat gain to the room by changing the decrement delay and factor.

Decrement delay and factor can be thought of as the amount a peak external surface temperature is smoothed out by the structure, and the time that the peak is delayed before it reaches the inside.

To reduce the solar heat passing through a roof or a wall, a low decrement factor is needed, and more importantly, it should delay the passage of heat by between 6 - 12 hours after the external solar radiation peak – this means that the decrement delay of a wall or roof construction should be between 6 - 12 hours.

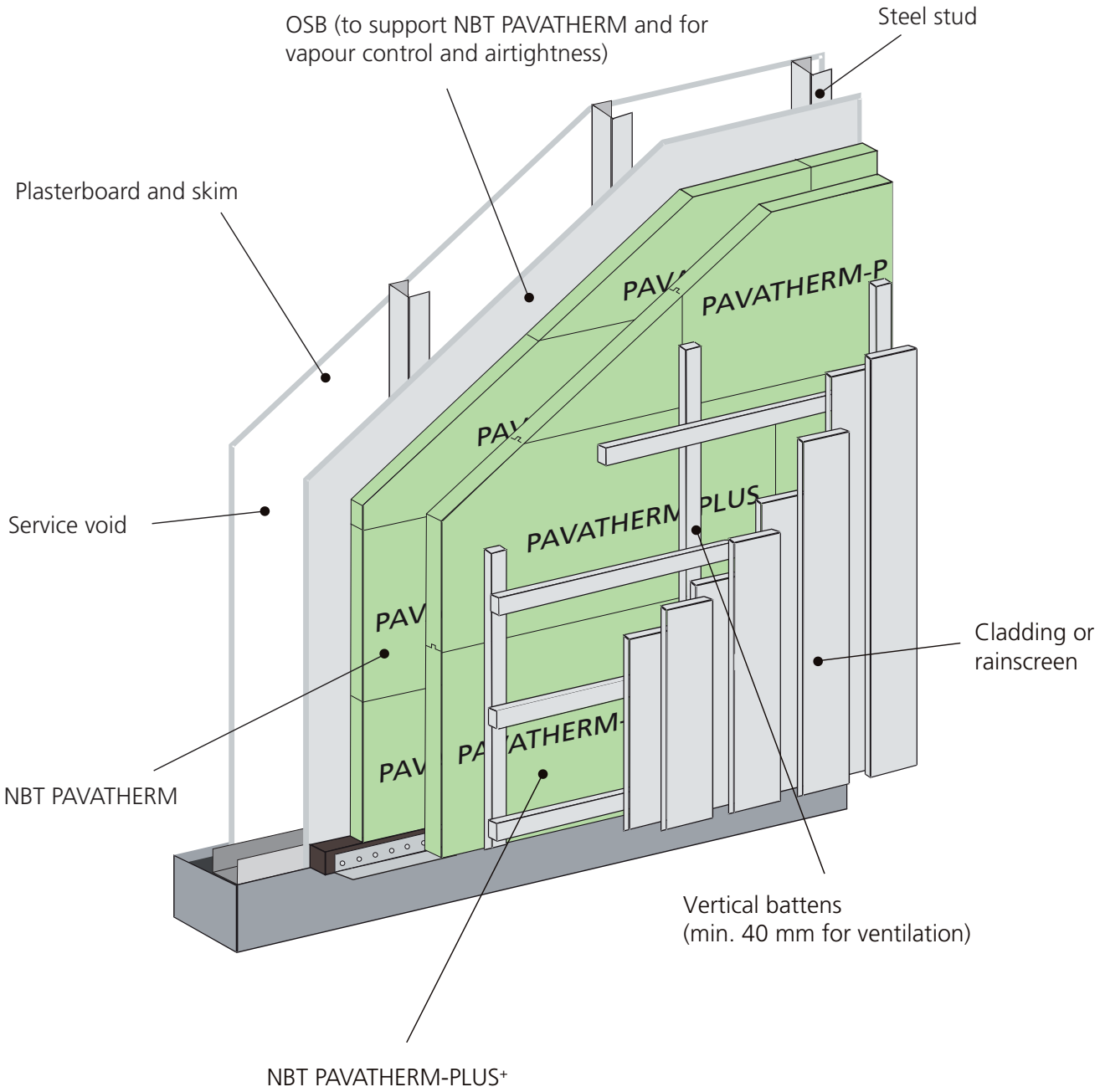
In terms of achieving these satisfactory values, an insulation material that has a high thermal mass is needed to produce better values. A combination of density, thermal conductivity and specific heat capacity is required.

NBT PAVATEX woodfibre boards have an excellent combination of low λD (k-value) (0.038 - 0.047 W/m²K), high specific heat capacity (2100J/kgK) and for insulation boards a high density (140 - 240 kg/m³). These values far exceed any conventional insulation material. This means that with NBT PAVATEX woodfibre insulation a roof or "lightweight" structure such as lightweight frame building can perform as though it was a much more massive structure.

The consequence is the reduction of internal temperatures by 4° C or more in summer compared to a room which may have the same U-value but conventional insulation.

NBT STEEL EWI - Clad

Clad System



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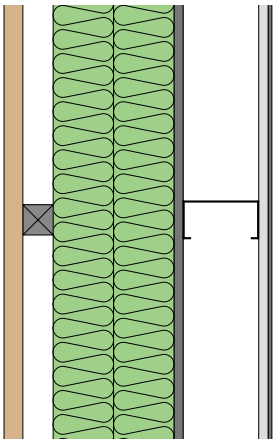
NBT STEEL EWI - Clad

Physical Properties

Physical Properties NBT PAVACLAD



1. 2. 3. 4. 5. 6. 7.8.

1. Cladding system (timber, brick, screen etc.)
2. Vertical battens 40 x 40 mm
3. NBT ISOLAIR 60/80/100/120 mm
4. NBT PAVATHERM 60/80/100/120 mm
5. OSB board (support & airtightness)
6. Steel stud 65 - 250 mm
7. Plasterboard 12.5 mm
8. Plaster, skim and NBT emulsion paint

100 mm stud

Warm frame

Insulation onto stud	NBT PAVATHERM-PLUS^{+}					
	100 mm	**120 mm**	**140 mm**	**160 mm**	**180 mm**	**200 mm**
U-Value [W/m²K]	0.34	0.29	0.24	0.22	0.20	0.18
Admittance [W/m²K]	1.42	1.42	1.42	1.42	1.42	1.42
Sound insulation ca. [dB]	44	45	46	46	47	47
Decrement delay [h]	6.2	7.2	8.6	9.9	11.3	12.6

Note: Calculations are done according to BS EN ISO 6946:1997 and BR 443. 140 mm insulation layer onto studs is made of NBT PAVATHERM-PLUS^{+} 60 mm & NBT PAVATHERM 80 mm; 160 mm insulation layer onto studs is made of NBT PAVATHERM-PLUS^{+} 80 mm & NBT PAVATHERM 80 mm; 180 mm insulation layer onto studs is made of NBT PAVATHERM-PLUS^{+} 80 mm & NBT PAVATHERM 100 mm; 200 mm insulation layer onto studs is made of NBT PAVATHERM-PLUS^{+} 100 mm & NBT PAVATHERM 100 mm.

NBT STEEL EWI - Clad

Designers: Key Considerations

General:
The NBT PAVACLAD System must only be installed by competent contractors. Provide the contractor with full and complete details for all critical areas of the system including those listed below - leave nothing to be agreed "on site".

System Guarantee:
The system is guaranteed only if boards and accessories approved by NBT are used. NBT PAVACLAD system has LANTAC (Local Authority National Type Approval Confederation) approval.

DPC-Level:
Do not use NBT PAVATHERM-PLUS^{+} or NBT PAVATHERM boards below DPC level.

Building Height:
The NBT PAVACLAD System is certified for use in buildings where the height to the top floor is ≤ 18 m. If intended for use in higher buildings, contact NBT for advice.

Non Load Bearing:
The NBT PAVACLAD system must be designed so that no loads from the structure are carried by the boards or cladding system.

Ensure that any cladding system/protection screens are securely fixed back to the frame.

Carefully plan the location of down-pipes, lights, security systems etc. and attach fixing discs screwed directly to the structure where the attachment is more than can be carried directly by the cladding (i.e. cast iron guttering). Contact NBT for further advice on fixings.

Movement Joints:
Movement joints in the substrate must be incorporated into the NBT PAVACLAD system. Consider movement joints for wall elevations ≥ 18 m.

Weather tightness:
For weather tightness seal the boards against the structure at all joints, intersections, openings and penetrations and along all edges using ISO-BLOCO sealing tape.

For water tightness, seal all exposed board edges, openings, corners etc. with NBT PRIMER and NBT PAVATAPE (Installation Procedure NBT PAVACLAD, page 10 - 14).

Rain Penetration:
Design a positive strategy for avoiding rain penetration of the NBT PAVACLAD system. This will include:

- Generous overhangs for roofs, cills and copings (in no case ≤ 30 mm)
- Drip details on all overhangs
- Careful detailing of flashings at critical areas eg. balconies, decks, walkways, parapets, copings, service penetrations, roof abutments, intersecting and adjoining buildings, etc.
- Window and door frames set back from the external face of the wall by at least the thickness of the insulation boards.

Airtightness:
Carefully detail the OSB layer for airtightness at all openings and at internal corners and junctions.

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NBT STEEL EWI - Clad

Installers: Key Considerations

General:

The NBT PAVACLAD System must only be installed by competent contractors.

The details and specifications in this guide and from the designer should be followed as the basis for a successful installation.

The system can be guaranteed only if boards and accessories approved by NBT are used in the specified manner.

Movement joints in the substrate must be incorporated into the NBT PAVACLAD system.

Carefully plan the location of down-pipes, lights, security systems etc. and attach fixing discs screwed directly to the structure or fix battens where the attachment is more than can be carried directly by the cladding (i.e. cast iron guttering). Contact NBT for further advice on fixings.

Boards:

Plan board layout to reduce wastage prior to commencing installation.

Boards must span at least 2 studs. Board edges need not coincide with stud positions, which should be at ≤ 650 mm centres. Minimum bond overlap is 200 mm between courses.

Boards must not be wet or damaged and board edges must be tightly butted together.

Tightly fill all gaps between boards with woodfibre and seal area with NBT PRIMER and NBT PAVATAPE (Installation Procedure NBT PAVACLAD, page 12 - 14).

For weather tightness seal the boards against the structure at all joints, intersections, openings and penetrations and along all edges using ISO-BLOCO sealing tape.

For all exposed board edges, openings, corners etc. use NBT PRIMER and NBT PAVATAPE.

Do not use the NBT PAVACLAD system below DPC level.

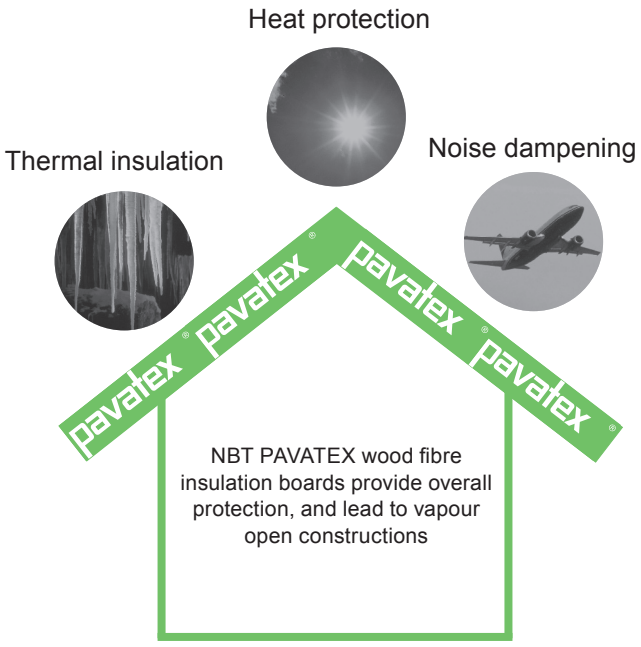
Do not allow the boards to stand exposed to weather for more than 60 days after fixing before applying the cladding system.

Cladding:

Ensure that any cladding system/rain screens are securely fixed back to the frame.

Only use the fixings recommended by NBT.

The cladding system should offer weather protection to the system and it should be detailed so as to allow an unobstructed flow of air ventilation to the void between the cladding and the face of the NBT PAVACLAD system boards.

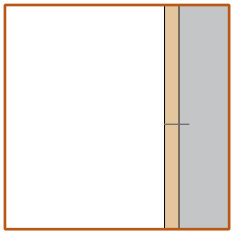


NBT STEEL EWI - Clad
Installation Procedures

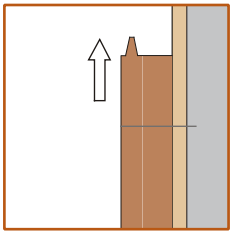
Cutting:
The boards are easily cut with any of the following tools:
- NBT PAVATEX jigsaw blades (bayonet fitting to suit most makes of jigsaw)
- Standard wave edge insulation knife
- Circular saw, hand-held or bench mounted with a fine, cross-cut, tungsten tipped blade

Safety goggles and dust mask must be worn during cutting to protect the user from the small, non hazardous, dust particles.

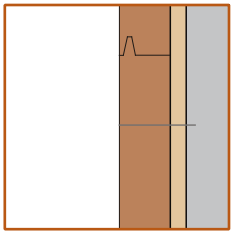
Fixing:



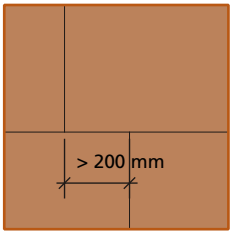
Fix OSB boards using fixings according to the engineers specifications into steel stud. In case more than 100 mm of insulation is used fix NBT PAVATHERM using 2 fixings per board into OSB.



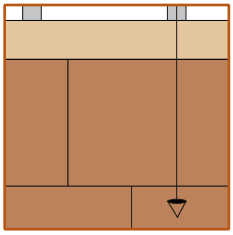
Fix first row of NBT PAVATHERM-PLUS^{+} with tongue uppermost using 1 - 2 fixings per board (through NBT PAVATHERM) into OSB. Final fixing occurs through batten into steel frame except with brick clad facades (see fixings guidelines)



Fix subsequent rows ensuring that the tongue is fully engaged. Fix as first row



Boards must be installed with a minimum 200 mm staggered bond



Boards must span at least 2 studs behind OSB board. Board edges need not coincide with stud positions, which should be at ≤ 650 mm centres. Use a plumb line for marking positioning of fixing of batten to ensure fixing goes into studs behind OSB board.

Damaged boards and butt edged joints:
Any damaged areas and “butt edged” joints in the NBT PAVATHERM-PLUS^{+} layer should be filled tightly with woodfibre offcuts - primed and taped with NBT PAVATAPE to ensure the integrity of the layer and to prevent water ingress (see using NBT PAVATAPE section on page 11).

Openings, corners and penetrations:
All openings, corners and penetrations should be primed and taped with NBT PAVATAPE to ensure the integrity of the layer and to prevent water ingress (see using NBT PAVATAPE section on page 11).

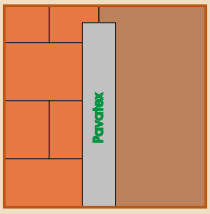
Movement joints:
Movement joints must be provided for wall elevations ≥ 18 m. After the whole wall section has been fitted cut a 5 mm wide groove through the board on the centre line of a stud. Seal over the groove with NBT PAVATAPE to form a sealed air gap.

Using NBT PAVATAPE

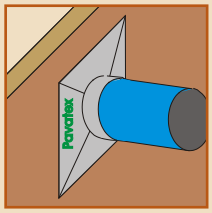
Guidelines for use

- Only use NBT PAVATAPE on dry, clean and dust-free substrates
- Use after fitting boards and always before installing battens
- Two priming solutions are available dependent on weather conditions: For temperatures between 5-10ºC use solvent based NBT PRIMER and use water based NBT PRIMER at temperatures above 10°C
- NBT PAVATAPE should not be applied if the temperature is below 5ºC - Contact NBT
- Apply NBT PRIMER with a brush or roller onto the board and abutments and allow to dry: Water-based NBT PRIMER is temperature sensitive - drying time is between 30 and 60 minutes (at 20ºC ca. 30 min and at 5ºC ca. 60 min). Drying time for solvent based NBT PRIMER is 10 minutes.
- Store NBT PAVATAPE rolls on a fl at surface in a dry dust-free environment.
- Shelf life when stored at around 20ºC is unlimited for NBT PAVATAPE. NBT PRIMER needs to be used within 12 months after manufacture.

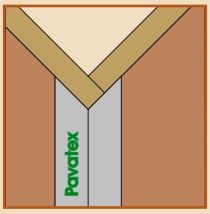
When to use



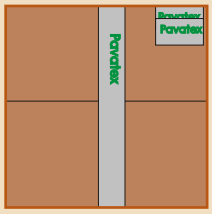
System change



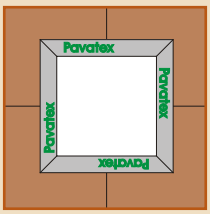
Penetrations



Angles, corners



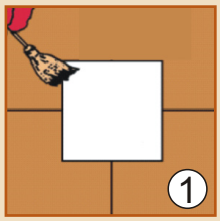
Butt edge joints and damaged board areas. Fill any gaps tightly with wood-fibre off cuts prior to applying NBT PAVATAPE



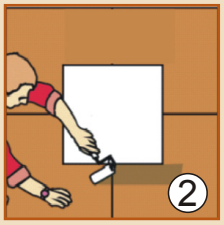
Exposed Openings

How to install

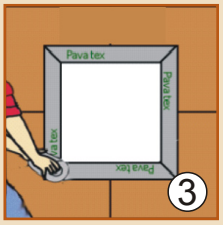
NBT PAVATAPE self adhesive butyl tape 15 m long x 150 mm wide



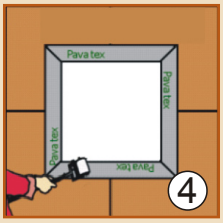
Clean surface with a brush. Surface MUST be dry to ensure good adhesion (use of hot air gun to dry board)



Apply NBT PRIMER with a brush or a roller and allow to dry



Roll out NBT PAVATAPE and press down with other hand. Avoid creases

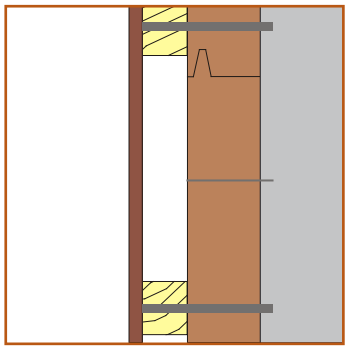


Press NBT PAVATAPE on firmly using a hard faced decora-tors seam roller or similar

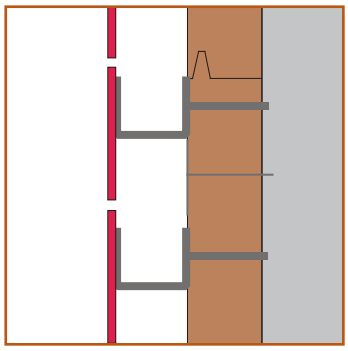
NBT STEEL EWI - Clad
Installation Procedures

Fixing Cladding:
- Only use fixings in accordance with NBT's recommendations or manufacture's instructions
- Batten/rail system should applied AFTER taping/ sealing the board surface
- In general fixings should be at 200 mm centres - for exposed areas/buildings ≥ 18 m high please contact NBT or the fixing manufacturer for advice
- Usa a plumb line for marking positioning of fixing and wall ties to ensure fixing goes into studs

Timber Batten onto Stud:
Initially fix the boards as described on page 10. Final fixing occurs through the battens. For fixing of timber battens over the NBT PAVACLAD system onto studs, NBT recommends the use of:
- EJOT SW8 R (embedment ≥ 20 mm into steel)

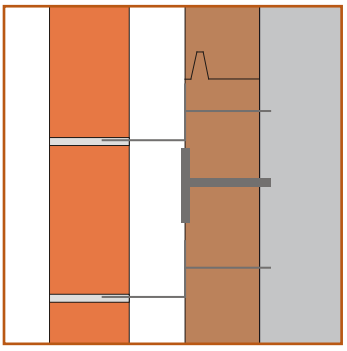


Rain Screen onto Stud:
Initially fix the boards as described. Final fixing of the system occurs on installation of the rail system - fixings as specified by the rain screen supplier.



Brick Facade onto Stud:
For brick façade over the NBT PAVACLAD system NBT recommends the use of 3 no. fixings with washer plate per board/stud; final fixing of the system occurs at this stage:
- EJOT SBH-T & SW8 R (embedment ≥ 20 mm into steel)

Suitable Brick ties, fixed back to the studs, should be installed as the façade is built.



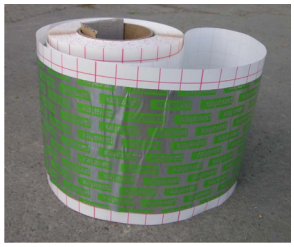
Fixing Partners

EJOT The Quality Connection

EJOT U.K. Limited
Hurricane Close
Sherburn Enterprise Park
Sherburn-in-Elmet
Leeds
LS25 6PB
Tel: 01977 6870740
Fax: 01977 687041
web: www.ejot.co.uk

NBT STEEL EWI - Clad

Components & Accessories



NBT PAVATAPE

Butyl tape with aluminum covering to seal butt edge joints (corners, etc.) and openings through NBT PAVATHERM-PLUS^{+} and NBT ISOLAIR boards. Surface of the board requires priming, length 15 m, width 150 mm.

PAVZT15 PAVATAPE

NBT PRIMER for NBT PAVATAPE (solvent based)

Solvent based NBT PRIMER for better adhesion of NBT PAVATAPE onto woodfibre insulation boards. Used for temperatures above 5ºC. Drying time approx. 10 minutes. Coverage 15 m/l. Comes in 1 litre tin.

PAVZTP1 PAVATEX solvant PRIMER 1 lt

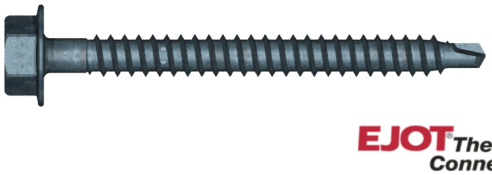
NBT PRIMER for NBT PAVATAPE (water based)

Water based primer for better adhesion of NBT PAVATAPE onto woodfibre insulation boards. Recommended for temperatures above 5ºC. Drying time approx. 30 to 60 minutes. Coverage 20 m/l. Comes in 5 litre tub.

PAVZTP5 PAVATEX waterbased PRIMER 5 lt

NBT STEEL EWI - Clad

Components & Accessories



EJOT SW8 R

Climadur coated carbon steel fixings for fixing battens through insulation and OSB board back into steel studs. Embedment into steel 20 mm.

FXESW8R130	EJOT SW8 R x 130 mm
FXESW8R150	EJOT SW8 R x 150 mm
FXESW8R170	EJOT SW8 R x 170 mm
FXESW8R190	EJOT SW8 R x 190 mm
FXESW8R210	EJOT SW8 R x 210 mm
FXESW8R230	EJOT SW8 R x 230 mm
FXESW8R250	EJOT SW8 R x 250 mm
FXESW8R270	EJOT SW8 R x 270 mm

NBT PAVATEX jigsaw blade

Bayonet fitting jigsaw blade from PAVATEX for cutting woodfibre insulation boards. Length approx. 130 mm.

PAVZK	PAVATEX cutting blades

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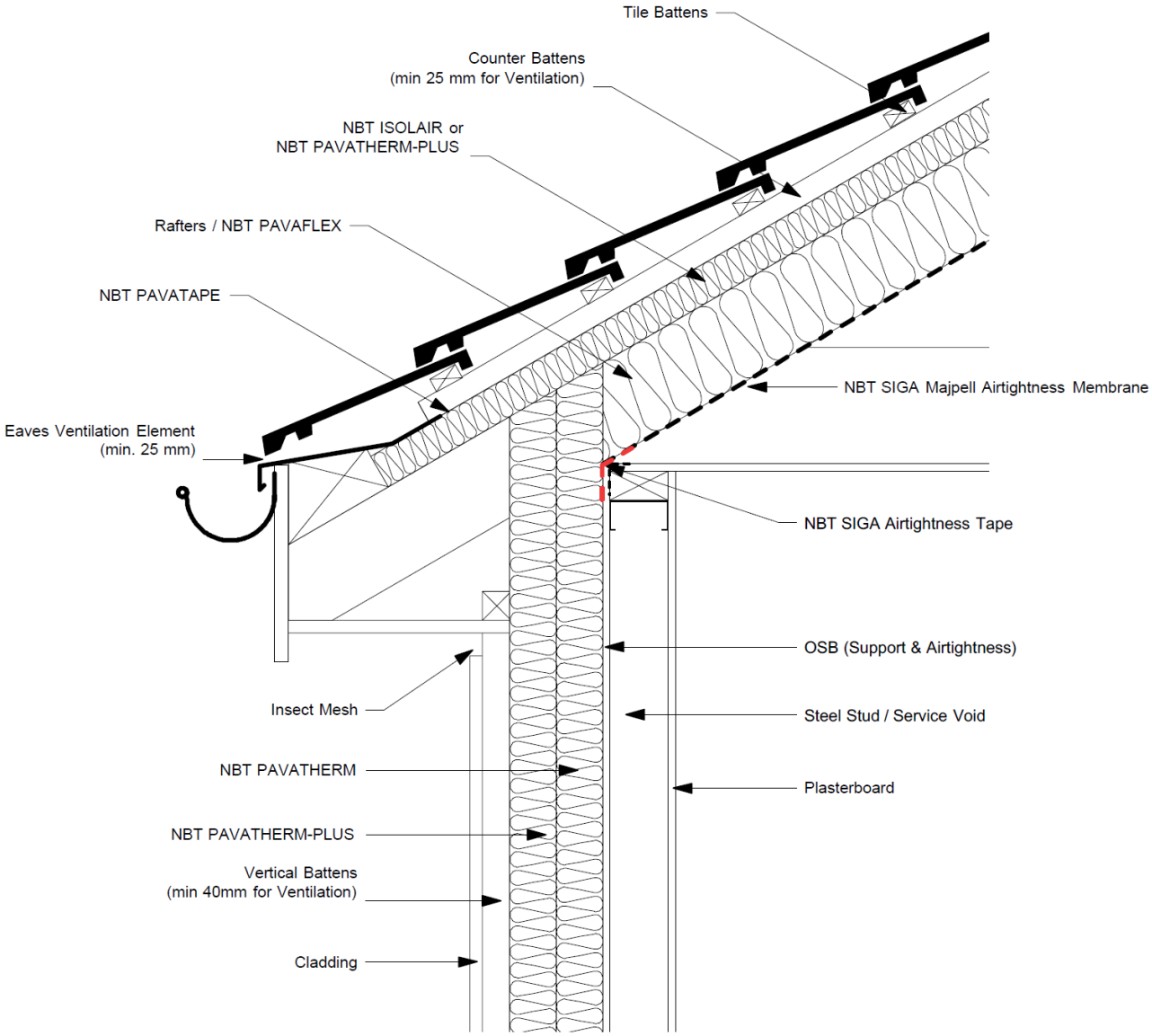
NBT STEEL EWI - Clad

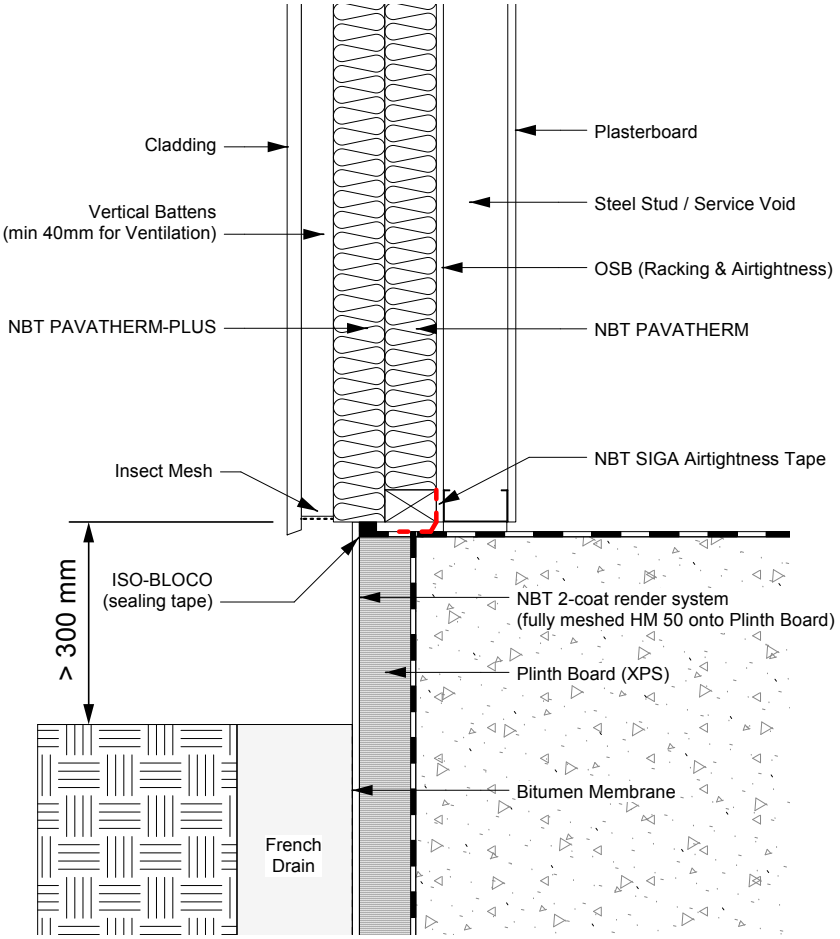
Eaves Detail



Title: Steel Frame NBT PAVACLAD Eaves		
Drawing Number: SFP001	Drawn By: Umendra	Date: 19.02.2011
CAD File Name: SFP001_110219_Eaves		

NBT STEEL EWI - Clad

Plinth Detail



Title: Steel Frame NBT PAVACLAD Plinth		
Drawing Number: SFP002	Drawn By: Umendra	Date: 19.02.2011
CAD File Name: SFP002_110219_Plinth		

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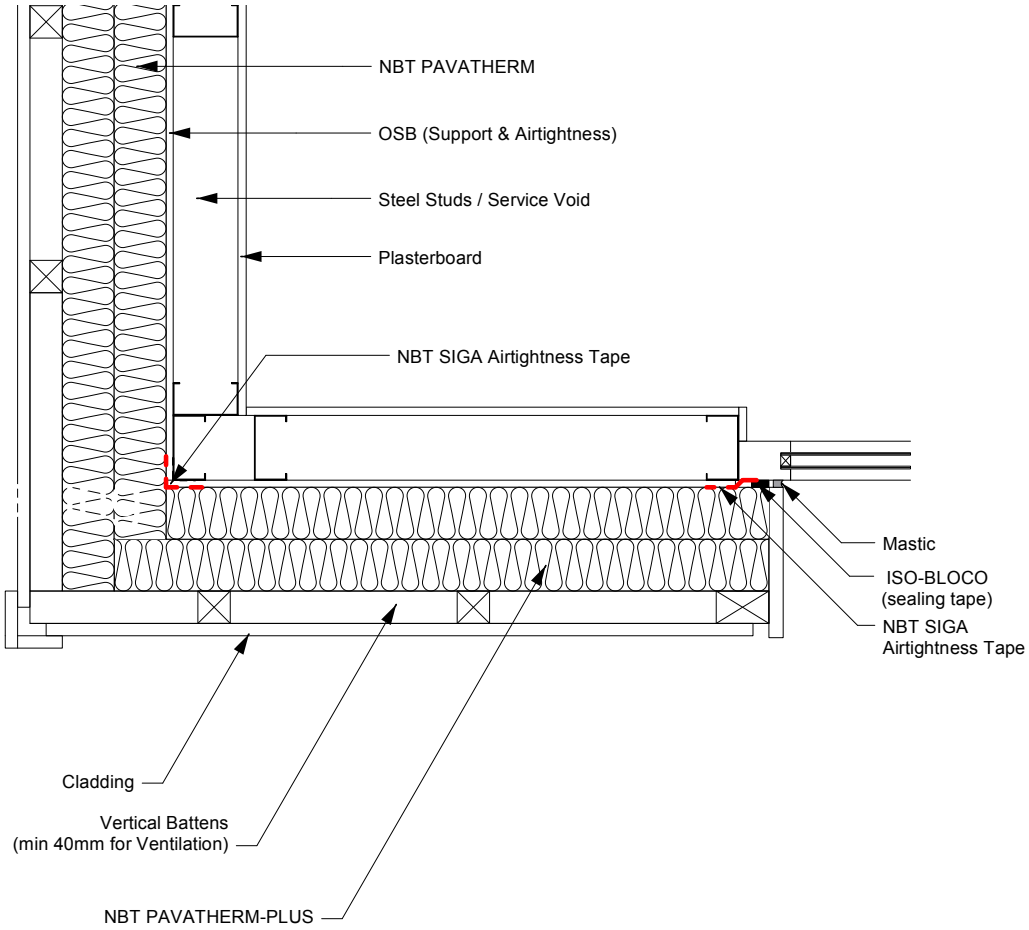
NBT STEEL EWI - Clad

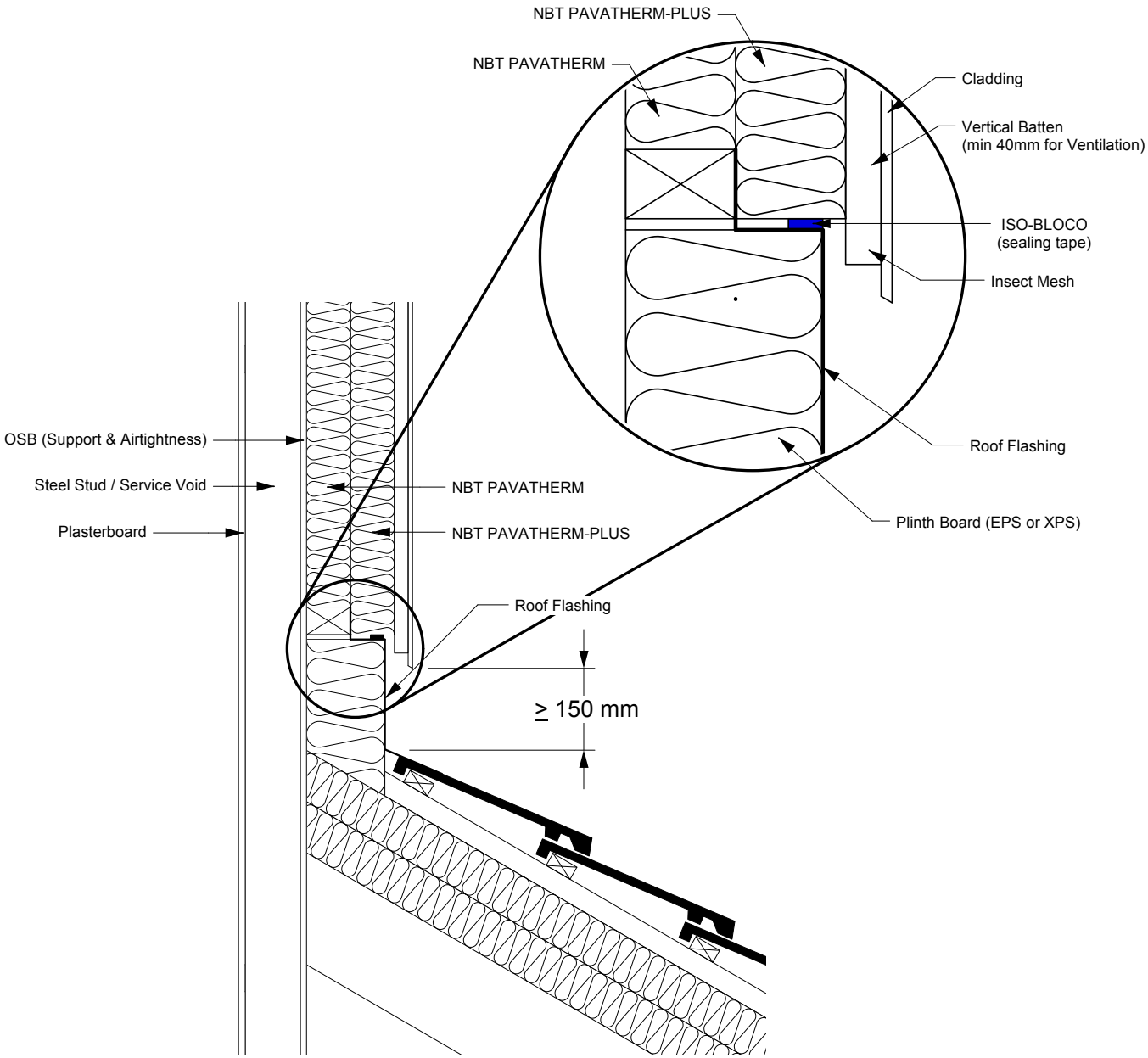
External Corner & Window Detail



Title		
Steel Frame NBT PAVACLAD Corner & Window reveal		
Drawing Number	Drawn By	Date
SFP004	Umendra	19.02.2011
CAD File Name		
SFP004_110219_Corner_&_Window		

NBT STEEL EWI - Clad

Roof Flashing Abutment Detail



Title: Steel Frame NBT PAVATHERM-PLUS Roof Flashing		
Drawing Number: SFP010	Drawn By: Umendra	Date: 19.02.2011
CAD File Name: SFP010_110219_RoofFlashing		

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NBT STEEL EWI - Clad

Specification

General:

The system comprises NBT PAVATHERM-PLUS^{+} boards supplied together with all accessories by NBT.

Access:

Scaffolding and access to the work must be carried out in accordance with current CDM and Health and Safety Regulations.

Adverse Weather/Storage:

Application of the system must only take place in suitable weather conditions in accordance with NBT recommendations, protecting the works if necessary. Boards should be clad within 2 months. Boards should be stored flat and dry. Edges should be protected to prevent damage to tongue & groove.

Board System:

Do not use the NBT PAVACLAD system below DPC. Board edges should be adequately protected at DPC level to prevent water ingress.

Fixing Boards:

Locate the 1st course of boards with grooved side down and edge tongue and groove joints fully engaged. Initially fix through the insulation and OSB boards into the studs using 1 - 2 fixings per stud/board.

Fixing Timber Batten/Cladding:

Final fixing of the system occurs through the batten according to guidance of NBT and the cladding manufacturer (Installation Procedure NBT PAVACLAD, page 12 - 14).

Fixing Brick Facade:

Use 3 No. of fixings per stud as the NBT PAVACLAD system is finally fixed at this stage. Fix the brick facade with suitable brick ties into the timber studs (”Installation Procedure NBT PAVACLAD”, page 12 - 14).

Boards must span at least 2 studs. Board edges need not coincide with stud positions, which should be at ≤ 850 mm centres. The faces of the boards should be flush. Stagger fixings where board edges coincide with a stud position.

Install 2nd course in ½ bond pattern with overlap ≥ 200 mm, over-lapping board ends at vertical corners, ensuring all board joints are fully engaged and tightly joined. Fix to studs as for 1st course. Fill any gaps and areas of damaged boards with loose woodfibres and apply a “patch” of NBT PRIMER and NBT PAVATAPE (Installation Procedure NBT PAVACLAD, page 12 - 14) at least 50 mm larger than the area of damage/repair.

Openings and Abutments:

At all openings, service penetrations and cut/exposed edges, seal the board using NBT PRIMER and NBT PAVATAPE (Installation Procedure, page 11).

Cladding System:

Ensure that any cladding system/protection rain screens are securely fixed back to the frame.

Only use the fixings in accordance with NBT’s recommendations or manufacturer‘s instructions.

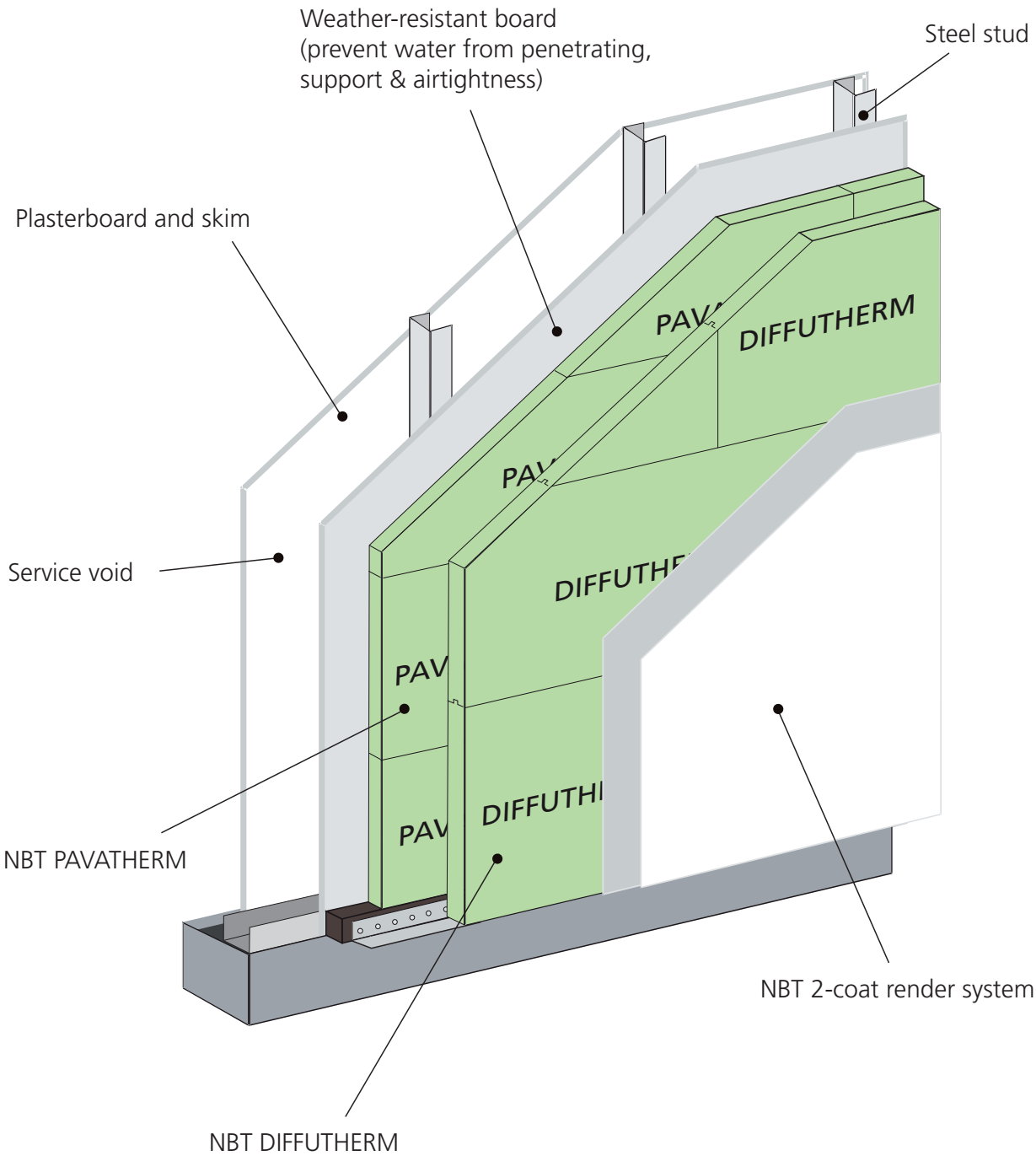
The cladding system should offer weather protection to the NBT PAVACLAD system.

The cladding system should be detailed to offer adequate weather protection to the NBT PAVACLAD system at all openings and abutments.

The cladding system should be detailed so as to allow an unobstructed flow of ventilation to the void behind the cladding and to the face of the NBT PAVACLAD system boards.

NBT STEEL EWI - Render

Rendered System



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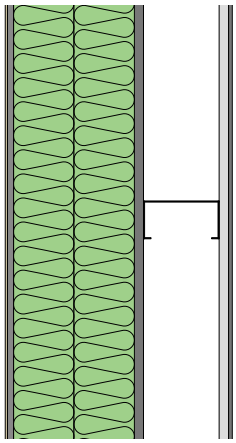
NBT STEEL EWI - Render

Physical Properties

Physical Properties NBT DIFFUTHERM



1. 2. 3. 4. 5. 6.7.

1. NBT 2-coat render system
2. NBT DIFFUTHERM 60/80/100/120 mm
3. NBT PAVATHERM 60/80/100/120 mm
4. Weather-resistant board
   (prevent water from penetrating, support & airtightness)
5. Steel stud 62 - 250 mm
6. Plasterboard 12.5 mm
7. Plaster, skim and NBT emulsion paint

100 mm stud

Warm frame

Insulation onto stud	NBT DIFFUTHERM					
`	100 mm	120 mm	140 mm	160 mm	180 mm	200 mm
U-Value [W/m²K]	0.35	0.30	0.25	0.22	0.20	0.18
Admittance [W/m²K]	1.53	1.53	1.53	1.53	1.53	1.53
Sound insulation ca. [dB]	45	46	47	47	48	48
Decrement delay [h]	6.2	7.2	8.6	9.9	11.3	12.6

Note: Calculations are done according to BS EN ISO 6946:1997 and BR 443. 140 mm insulation layer onto studs is made of NBT DIFFUTHERM 60 mm & NBT PAVATHERM 80 mm; 160 mm insulation layer onto studs is made of NBT DIFFUTHERM 80 mm & NBT PAVATHERM 80 mm; 180 mm insulation layer onto studs is made of NBT DIFFUTHERM 80 mm & NBT PAVATHERM 100 mm; 200 mm insulation layer onto studs is made of NBT DIFFUTHERM 100 mm & NBT PAVATHERM 100 mm.

NBT STEEL EWI - Render

Designers: Key Considerations

General:
Provide the contractor with full and complete details for all critical areas of the system including those listed below. Leave nothing to be agreed "on-site".

System Guarantee:
The NBT DIFFUTHERM system is guaranteed only if boards, mortars, renders and accessories approved by NBT are used. NBT DIFFUTHERM has LANTAC (Local Authority National Type Approval Confederation) approval.

The NBT DIFFUTHERM system is certified for use in rain exposure zones (EZ) 1-3 (described in BS 8104 and the BRE report "Thermal Insulation, avoiding risks"). If intended for use in EZ 4, contact NBT for advice.

DPC-Level:
Do not use NBT DIFFUTHERM or NBT PAVATHERM boards below DPC level. Use boards suitable for wet exposure (e.g. EPS) and a different NBT base coat (HM 50) in the plinth area (within 300 mm of ground level).

Building Height:
The NBT DIFFUTHERM system is for use in buildings where the height to the top floor is ≤ 18 m. If intended for use in higher buildings, contact NBT for advice.

Non Load Bearing:
The NBT DIFFUTHERM system must be designed so that no loads from the structure are carried by the boards or render.
Only lightweight fittings can be attached directly to the NBT DIFFUTHERM boards. Carefully plan the location of down-pipes, lights, security systems etc.

Movement Joints:
Movement joints in the substrate must be incorporated into the NBT DIFFUTHERM system. Consider movement joints for walls ≥ 18 m.

Weather Tightness:
For weather tightness seal the boards against the structure at all joints, intersections, openings and penetrations and along all edges using ISO-BLOCO sealing tape.
For weather tightness, seal the render around all openings using the appropriate APU rail.

Rain Penetration:
Design a positive strategy for avoiding rain penetration of the external wall insulation system. This will include:

- Generous overhangs for roofs, sills and copings (in no case ≤ 30 mm), drip details on all overhangs
- Careful detailing of flashings at critical areas eg. balconies, decks, walkways, parapets, copings, service penetrations, roof abutments, intersecting and adjoining buildings, etc.
- Window and door frames set back from the external face of the wall by at least the thickness of the insulation boards

Airtightness:
Carefully detail the weather-resistant board layer for airtightness at all openings and at internal corners and junctions.

Fire Resistance:
NBT Diffutherm system has been tested by Warrington Fire (report no 154324) and achieves a fire resistance of 60 minutes according to BS EN 1365-1:1999.

Render:
Colours:
Please be aware, when chosing colours for the top coat, that it must be taken into account that the LIGHT-BRIGHT RELATION VALUE is not less than 20.0. This is due to the fact that dark colours can be directly linked to elevated thermal stress, which leads to an increased risk for cracks.
Please check page 29 and 30 of the BAUMIT Product Brochure "Render, Plasters, Mortars" for further information and a wide range of different colours.

Grain size:
Coarse-grained finishes (2-5 mm grain sizes) are preferred for long-term durability and appearance.
Cracking of the render system cannot be completely avoided. Minor cracking is not detrimental to the system and the board will not deteriorate if the cracks are small and repaired quickly.
Apply equalisation paint to the finish render coat to avoid discolouration from uneven drying.

To select paints for applying to the finished surface without significant reduction of the vapour permeability of the DIFFUTHERM system, refer to NBT.

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NBT STEEL EWI - Render

Installers: Key Considerations

General:

The NBT DIFFUTHERM system must only be installed by approved contractors who have been trained by NBT.

The details and specifications in this guide and from the designer should be followed as the basis for a successful installation.

The system is guaranteed if only boards, mortars, renders and accessories approved by NBT are used.

Movement joints in the substrate must be incorporated into the NBT DIFFUTHERM System.

Only lightweight fi ttings can be attached directly to the NBT DIFFUTHERM boards. Carefully plan the location of down-pipes, lights, security systems etc.

Boards:

Plan board layout to reduce wastage prior to commencing installation.

A base rail must be used to start the system.

Minimum bond overlap is 200 mm between courses.

Boards must not be wet or damaged and board edges must be tightly butted together.

Tightly fill all gaps with woodfibre.

For weather tightness seal the boards against the structure at all joints, intersections, openings and penetrations and along all edges using ISO-BLOCO sealing tape.

Do not use the NBT DIFFUTHERM system below DPC level.

Use appropriate boards (EPS) and a different NBT base coat (HM 50) in the plinth area (i.e. within 300 mm above ground level).

Do not allow the boards to stand exposed to weather for more than 60 days after fixing before applying the render system.

Renders:

Do not apply the render system onto rain-soaked boards or when the air temperature is below 5o C and avoid workingin strong, direct sunlight.

The reinforcing mesh should lie in the outer 1/3 of the basecoat layer and sheets should overlap by at least 100mm.

Additional mesh reinforcement is required around all openings, along all corners and edges, across zones where suspended floors intersect walls and where boards are applied over different substrates, along continuous straight board joints and over repaired areas.

Seal the render around all openings using the appropriate APU rail.

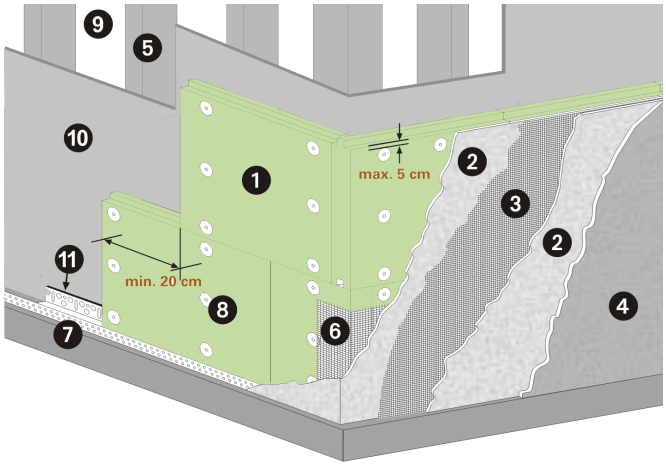
Allow 1 day per 1 mm thickness drying time for the basecoat before applying the topcoat.

Apply equalisation paint to the finish render coat to avoid discolouration from uneven drying. This is not required where the top coat is Silica, Silicon or Nanopor render.

Cracking of the render system cannot be completely avoided. Minor cracking is not detrimental to the system and the board will not deteriorate if the cracks are small and repaired quickly.

NBT STEEL EWI - Render

Installation Procedures



1 NBT DIFFUTHERM insulation board
2 NBT base coat (MC 55 W)
3 NBT reinforcement mesh
4 NBT decorative finish
5 Steel studwork
6 Wemico mesh corner bead
7 Wemico base rail
8 EJOT SBH-T 65/25 washer with EJOT SW8 R fixing
9 Plasterboard
10 Weather-resistant board (prevent water from penetrating, support & airtightness)
11 ISO-BLOCO sealing tape

Cutting:

The boards are easily cut with any of the following tools:

- NBT PAVATEX jigsaw blades (bayonet fitting to suit most makes of jigsaws)
- Standard wave edge insulation knife
- Circular saw, hand-held or bench mounted with a fine, cross-cut, tungsten tipped blade

Safety goggles and dust mask must be worn during cutting to protect the user from the small, non hazardous, dust particles.

Fitting:

Above plinth area: Fix nogging and base rail for insulation layer > 100 mm above DPC to each stud packed to true line and level, using 1 fixing per stud. Fix base rail for insulation layer ≤ 100 mm above DPC to each stud packed to true line and level, using 1 fixing per stud. Rail connector clips may be fitted at all rail joints. Attach clip-on drip profile to complete run of base and corner rail.

For insulation layer ≤ 100 mm locate the 1st course of NBT DIFFUTHERM boards tightly in the base rail channel with grooved side down and edge tongue and groove joints fully engaged. Fix through the insulation and weather-resistant boards into the studs using 3 fixings per stud/board. Use plumb line for marking positioning of fixing to ensure fixing goes into studs behind weather-resistant board. NBT DIFFUTHERM boards must span at least 2 studs.

NBT DIFFUTHERM boards must span at least 2 studs. NBT DIFFUTHERM edges need not coincide with stud positions, which should be at ≤ 600 mm centres. The faces of the boards should be flush. Stagger fixings where board edges coincide with a stud position.

Install 2nd course in ½ bond pattern, over-lapping board ends at vertical corners, ensuring all board joints are fully engaged and tightly packed. Fix to studs as for 1st course.

For insulation layer > 100 mm locate the 1st course of NBT PAVATHERM tighly to nogging. Fix through the insulation into the weather-resistant boards 2 fixings per board. Once NBT PAVATHERM is in place fix NBT DIFFUTHERM boards over NBT PAVATHERM as described above.

Movement Beads:

Where structural movement joints or changes in substrate occur a movement bead should be incorporated into the NBT DIFFUTHERM system to prevent cracking due to differential movement.

ISO-BLOCO sealing tape:

For weather tightness seal the boards against the structure at all joints, intersections, openings and penetrations and along all edges using ISO-BLOCO sealing tape.

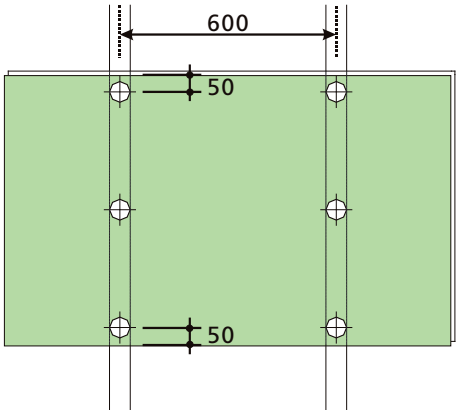
Where boards butt up to other substrates ISO-BLOCO sealing tape should be inserted to allow for differential movement and provide a weather tight seal. Such areas include window and door frames, sills, eaves and soffit boards.

NBT STEEL EWI - Render

Installation Procedures

Fixings:

NBT DIFFUTHERM boards need to be fixed with special thermally-broken fasteners. The washer is flush with the surface of the NBT DIFFUTHERM. Use 3 No. fixings per stud/board as shown (fixings need to go through NBT PAVATHERM and weather-resistant boards into studs):



NBT provides fixings for the NBT DIFFUTHERM system:

Thickness insulation	EJOT screw	EJOT washer
100 mm	SW8-R x 120	SBH-T 65/25
120 mm	SW8-R x 140	SBH-T 65/25
140 mm	SW8-R x 160	SBH-T 65/25
160 mm	SW8-R x 180	SBH-T 65/25
180 mm	SW8-R x 200	SBH-T 65/25
200 mm	SW8-R x 220	SBH-T 65/25

Reveals:

Fully paste the rear side of the reveal boards using NBT base coat and trowel through using a tooth trowel. Apply a ISO-BLOCO sealing tape along the edge of the board and place the board tightly up against the window or door frame.

Render System:

Trowel or machine-apply NBT base coat over the boards and straighten out the render. Use a tooth trowel comb through the render to ensure an overall render depth of 4 - 6 mm.

Place sheets of fibreglass mesh lightly onto the render, with overlaps not less than 100 mm and lightly trowel over. On stiffening apply another coat of NBT base coat 2 - 3 mm thick and smooth out.

On hardening rough up the surface using the edge of a trowel. After six days apply a decorative finish coat.

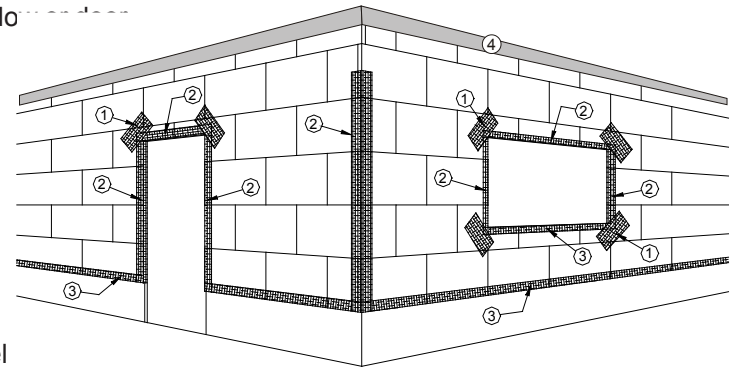
Additional Meshing:

To reduce the risk of cracking, additional mesh reinforcement is required along all exposed board edges and around all openings.

Bed the mesh in NBT base coat mortar and then apply the main meshed render layer, overlapping with the edge strips by at least 100 mm.

In the diagram additional mesh is shown across the corners of window and door openings (1), along all reveals and corners (2), over the starter track and below window sills (3).

An additional band of mesh should be applied across the zone where suspended floor joists bear onto timber frame walls (4).



1 Diagonal strip
2 Mesh corner beads
3 Mesh strips 150 mm wide
4 Mesh strips 500 mm wide at floor level

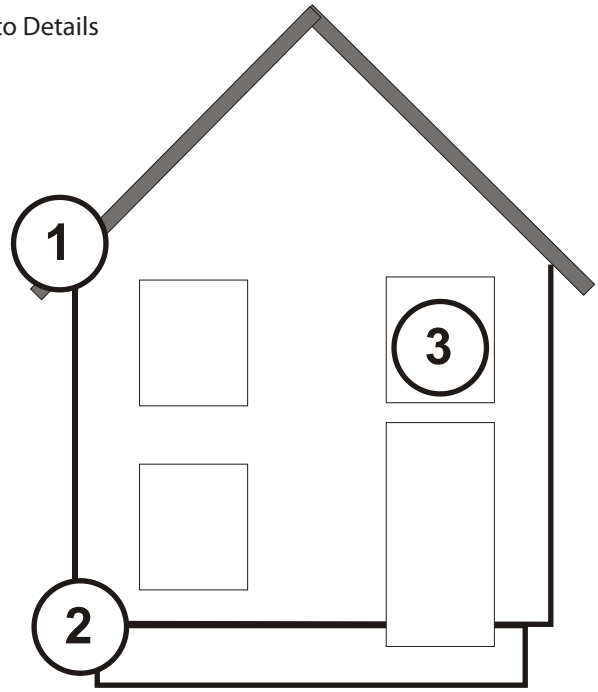
NBT STEEL EWI - Render
Detail Solutions

1 Edges:
- Weather tightness with use of ISO-BLOCO sealing tape

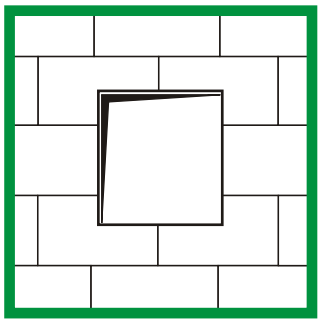
2 Plinth:
- Plinth area 300 mm
- Use plinth & perimeter insulation board (XPS) in plinth area
- Use base rail at bottom of NBT DIFFUTHERM

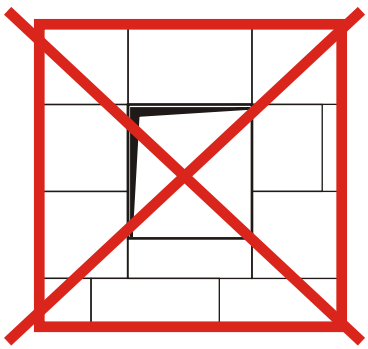
3 Window and door:
- Weather tightness with use of ISO-BLOCO sealing tape and APU-rails
- Use window sills with up stands
- NBT DIFFUTHERM board pattern to window and door opening (see below)

Key to Details



Board Pattern:





NOTE:
PLEASE FIND DETAIL DRAWINGS AT THE END OF THIS MANUAL

Set out NBT DIFFUTHERM boards so that board edges DO NOT coincide with the corners of wall openings.

Always ensure that the vertical joints are staggered by at least 200 mm between courses and that each board is supported on at least two studs.

NBT DIFFUTHERM board joints DO NOT have to terminate on a stud due to the tongue groove board edge.

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NBT STEEL EWI - Render

Components & Accessories

baumit.com

NBT base coat (MC 55 W onto NBT DIFFUTHERM)
Factory prepared white lime-cement dry powder mortar in accordance to BS EN 998-1. Base coat onto NBT DIFFUTHERM. Not recommended for plinth area. Grain size 0 - 1.2 mm, yield 1.0 kg/m² per mm thickness. Comes in 25 kg bag.

BYMC55W	BAUMIT MC 55 W

baumit.com

NBT base coat (HM 50 onto plinth & perimeter board)
Factory prepared lime-cement dry powder mortar in accordance to DIN 18557 and BS EN 998-1. To use in plinth area onto XPS plinth insulation board. Grain size 0 - 1.2 mm, yield 1.2 kg/m² per mm. Comes in 25 kg bag.

BYHM50	BAUMIT HM 50

baumit.com

NBT decorative finish (top coat onto NBT base coat)
Factory prepared white lime-cement dry powder mortar in accordance to BS EN 998-1. Available in 200 colours. Comes in 25 kg bag.

SEP01: Grain size 0 - 1 mm, yield 2.2 kg/m²/2mm
SEP02: Grain size 0 - 2 mm, yield 3.3 kg/m²/2mm
SEP03: Grain size 0 - 3 mm, yield 4.0 kg/m²/3mm

BYSEP01	BAUMIT SEP01
BYSEP02	BAUMIT SEP02
BYSEP03	BAUMIT SEP03

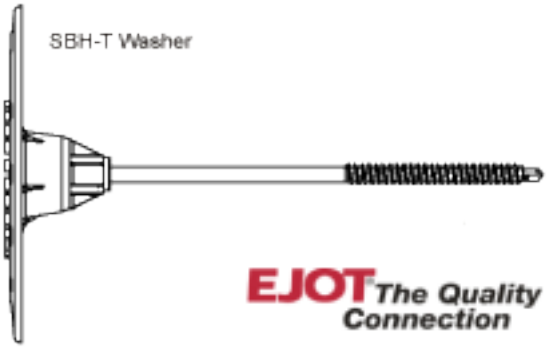
baumit.com

ArtLine Egalisation / BasicEGA (equalization paint)
Silicon-based paint to equalize NBT SEP topcoat. Additional driven rain protection but very vapour open. Yield 0.2 l/m² (only one coat required). Comes in 5 l or 15 l tub.

BYSFCOLO	Colour silicon paint 15 l or 5 l
BYSFWHITE	White silicon paint 15 l or 5 l

NBT STEEL EWI - Render

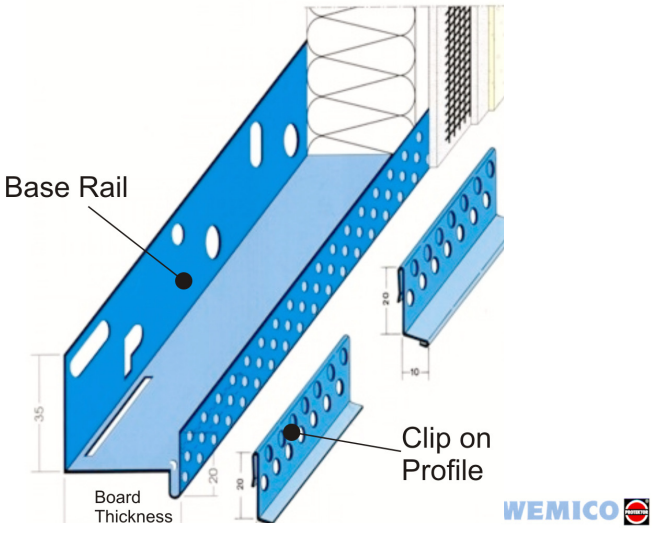
Components & Accessories



EJOT SBH-T and EJOT SW8 RT 4.8

For fixing NBT DIFFUTHERM wood fibre insulation boards through OSB boards onto steel studs. Embedment of 20 mm into steel stud. The air column which is created between countersunk screw and the plug ensures perfect insulation. Heat loss through conduction is therefore substantially reduced. Please find required length of fixings on page 25.

FXESBHT65	EJOT SBH-T washer
FXESW8R120	EJOT SW8 R x 120 mm
FXESW8R140	EJOT SW8 R x 140 mm
FXESW8R160	EJOT SW8 R x 160 mm
FXESW8R180	EJOT SW8 R x 180 mm
FXESW8R200	EJOT SW8 R x 200 mm
FXESW8R220	EJOT SW8 R x 220 mm



Base rail & clip on profile

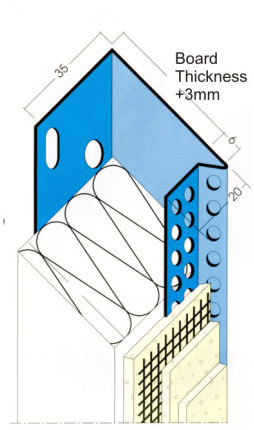
The base rail is generally fixed at DPC level to act as a base for the first layer of NBT DIFFUTHERM. The clip-on profile is then clipped to the front edge of the rail to provide a clean edge for the render to finish to. Length 2500 mm.

BYY9146	Base rail aluminium 60 mm*
BYY9148	Base rail aluminium 80 mm*
BYY9150	Base rail aluminium 100 mm*
BYY9121	Base rail clip aluminium 6 mm*
BYY9124	Base rail clip aluminium 10 mm*

* Stainless steel also available

NBT STEEL EWI - Render

Components & Accessories

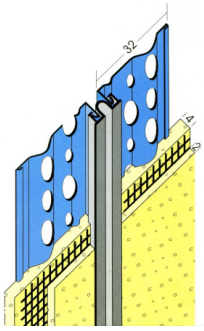


WEMICO

Render stop profile

Similar in appearance to the base rail the stop end profile is used where the NBT DIFFUTHERM system finishes up against another wall of a different type, e.g. against timber or rainscreen cladding or a masonry wall. They are fixed vertically against the other wall with ISO-BLOCO sealing tape between the profile and wall to ensure the joint is sealed against the weather. The lip on the edge of the profile is used to provide a solid edge for the render to finish up to. Length 2500 mm.

BYY9246	Stop profile aluminium 60 mm
BYY9248	Stop profile aluminium 80 mm
BYY9250	Stop profile aluminium 100 mm

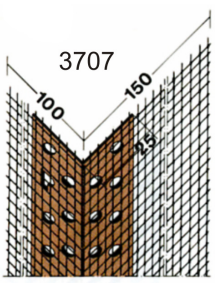


WEMICO

Movement beads

Applied where a movement joint occurs in the structure. The boards must be spaced apart over the joints and the bead set in NBT base coat mortar across the joint. Provides a neat joint to take up movement of the render. Length 3000 mm.

BYYWE79/79	Stainless steel for render 6 mm
BYYWE80/80	Stainless steel for render 10 mm



WEMICO

Corner mesh angle

PVC or stainless steel meshed angles are used on the corners of windows, doors and building corners to provide a straight reinforced edge for the render to finish to. Fixed prior to rendering with NBT base coat to the NBT DIFFUTHERM boards and levelled up. Length 2500 mm.

BYY3707	Corner mesh bead PVC
BYY2031	Corner mesh bead stainless steel

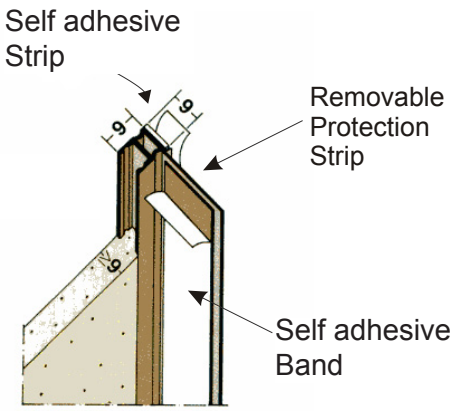
NBT PAVATEX jigsaw blade

Bayonet fitting jigsaw blade from PAVATEX for cutting woodfibre insulation boards. Length approx. 130 mm.

PAVZK	NBT PAVATEX cutting blades

NBT STEEL EWI - Render

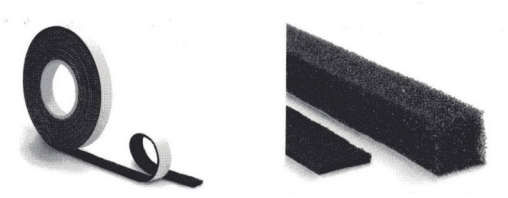
Components & Accessories



APU Rail

Fixed to door or window frames tight against the edge of the NBT DIFFUTHERM. The render is finished flush with the outside of the APU rail and the sacrificial strip removed. Provides a secondary waterproof seal with no additional mastic required. Self-adhesive band can be removed to enable a protective sheet to be applied to cover door and windows - this is then discarded by breaking away the removable protection strip. Length 2600 mm. Packed in bundles of 50.

BYY3726 APU sealing bead PVC



ISO-Bloco sealing tape

An expanding foam sealant applied around the frames of windows and doors, under window sills and soffits. Also around projections through the wall such as pipes or balcony steels. Provides a waterproof seal at these junctions. Length 4300 mm or 12000 mm.

FXISO-600 2-6 ISO-BLOCO sealing tape for joints up to 6mm
FXISO-600 6-15 ISO-BLOCO sealing tape for joints up to 15mm

Reinforcing mesh

Small, 300 mm x 300 mm patches are first applied diagonally to the corners of windows and doors. When the specified render thickness has been applied the reinforcing mesh is applied into the surface of the wet render. The mesh should overlap 100 mm where it meets. Prevents cracking and increases flexibility. Roll: 50 m length, 1 m width

BYYR131 Glassfibre mesh

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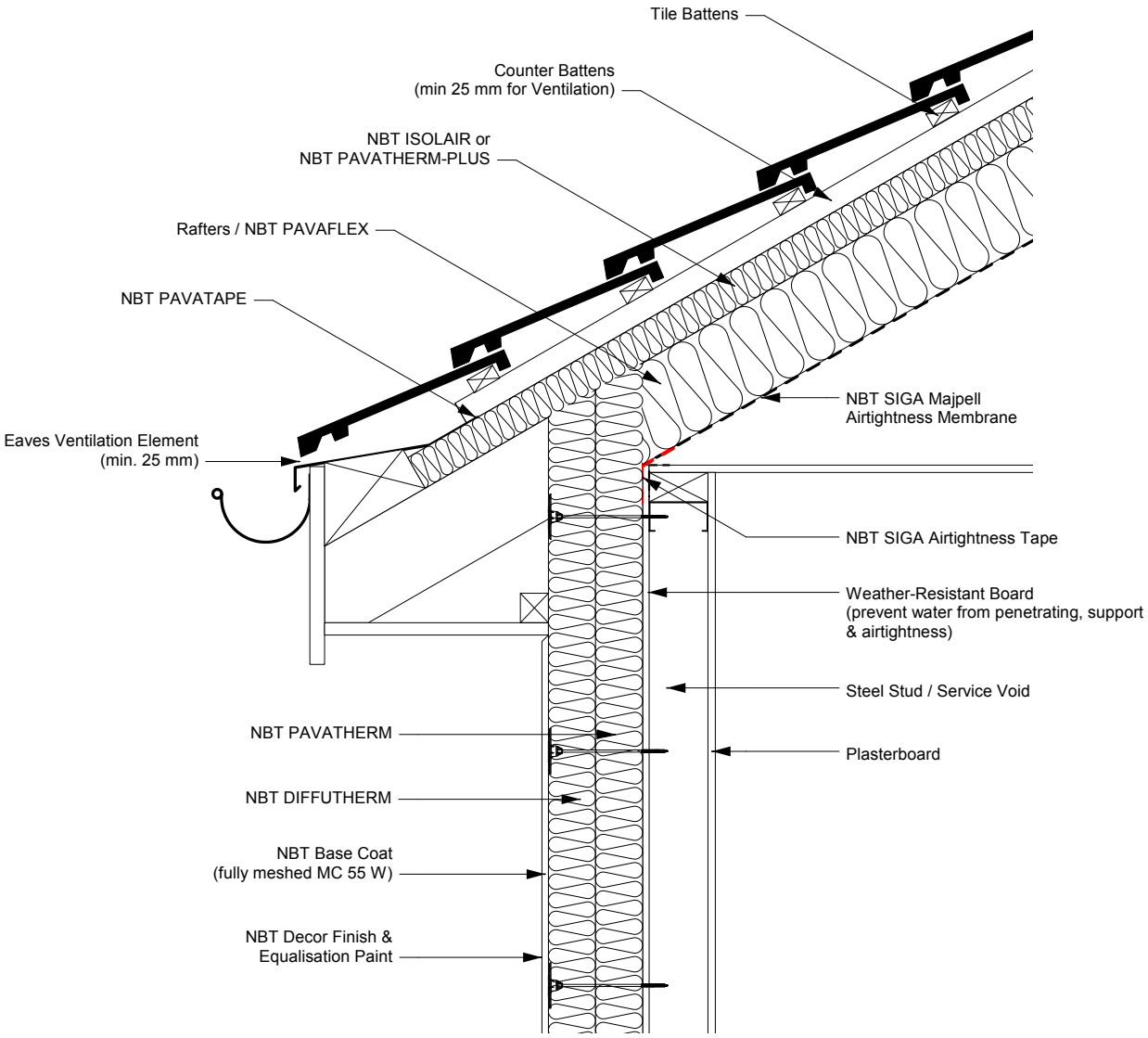
NBT STEEL EWI - Render

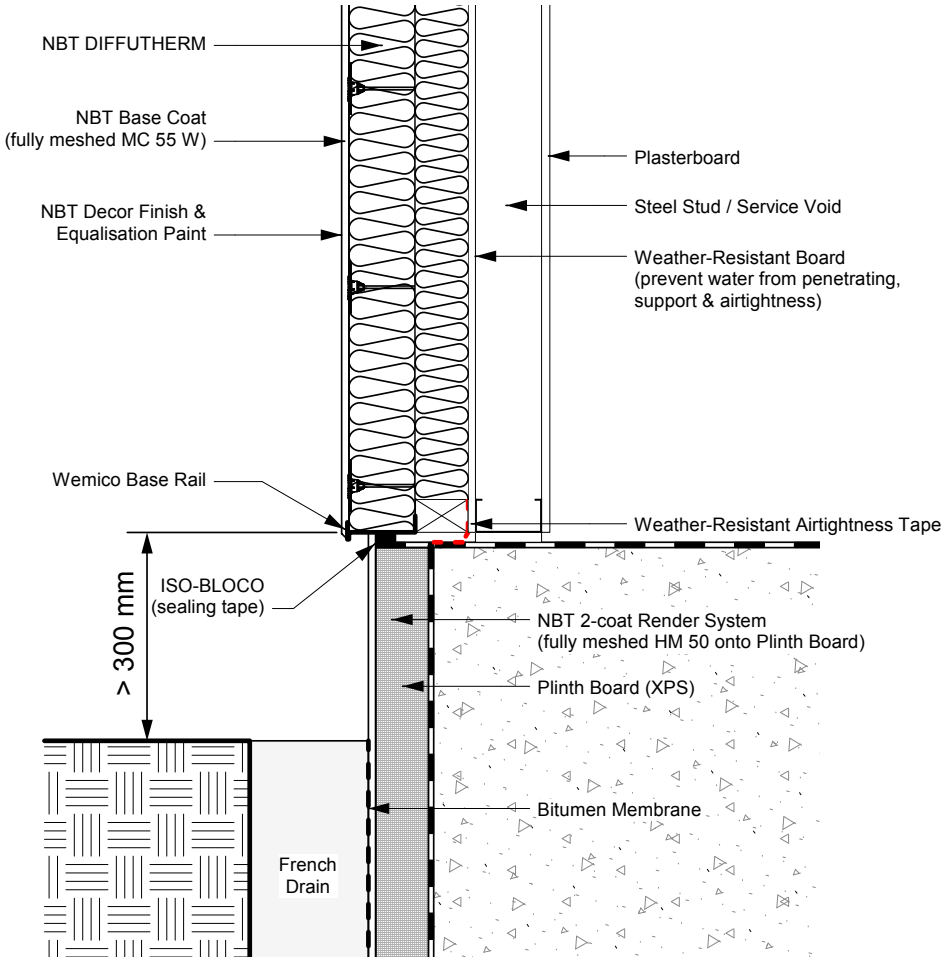
Eaves Detail



Title		
Steel Frame NBT DIFFUTHERM Eaves		
Drawing Number	Drawn By	Date
SFD001	Umendra	19.02.2011
CAD File Name		
SFD001_110219_Eaves		

NBT STEEL EWI - Render

Plinth Detail 1



Title: Steel Frame NBT DIFFUTHERM Plinth1		
Drawing Number: SFD002_1	Drawn By: Umendra	Date: 19.02.2011
CAD File Name: SFD002_110219_Plinth1		

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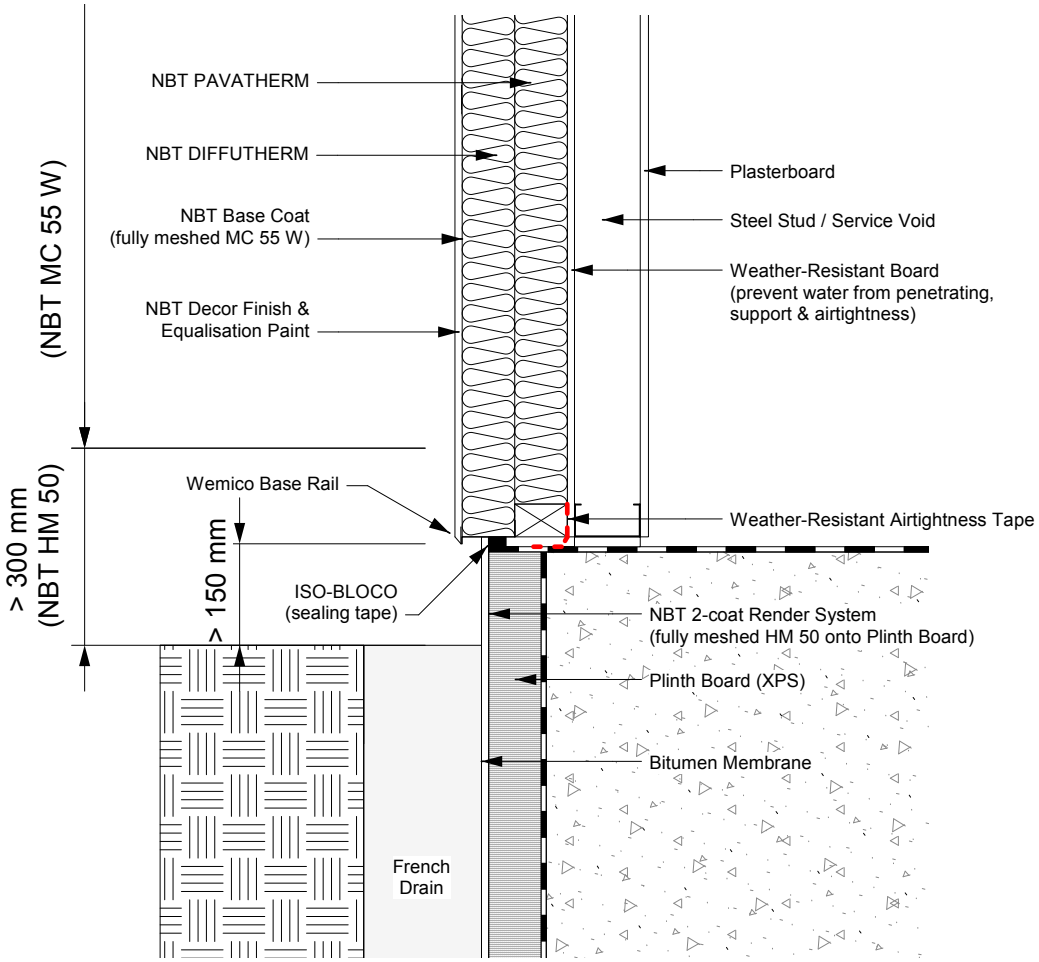
NBT STEEL EWI - Render

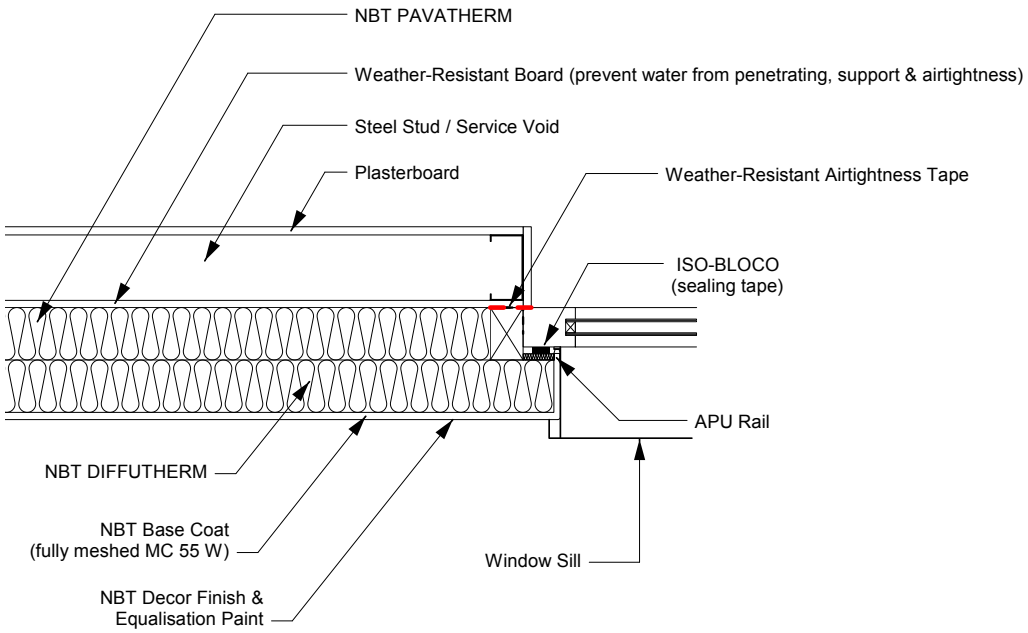
Plinth Detail 2



Title: Steel Frame NBT DIFFUTHERM Plinth2		
Drawing Number: SFD002_2	Drawn By: Umendra	Date: 19.02.2011
CAD File Name: SFD002_110219_Plinth2		

NBT STEEL EWI - Render

Window Reveal Detail



Title		
Steel Frame NBT DIFFUTHERM Window Reveal		
Drawing Number	Drawn By	Date
SFD004-2	Umendra	19.02.2011
CAD File Name		
SFD004-2_110219_Window Reveal		

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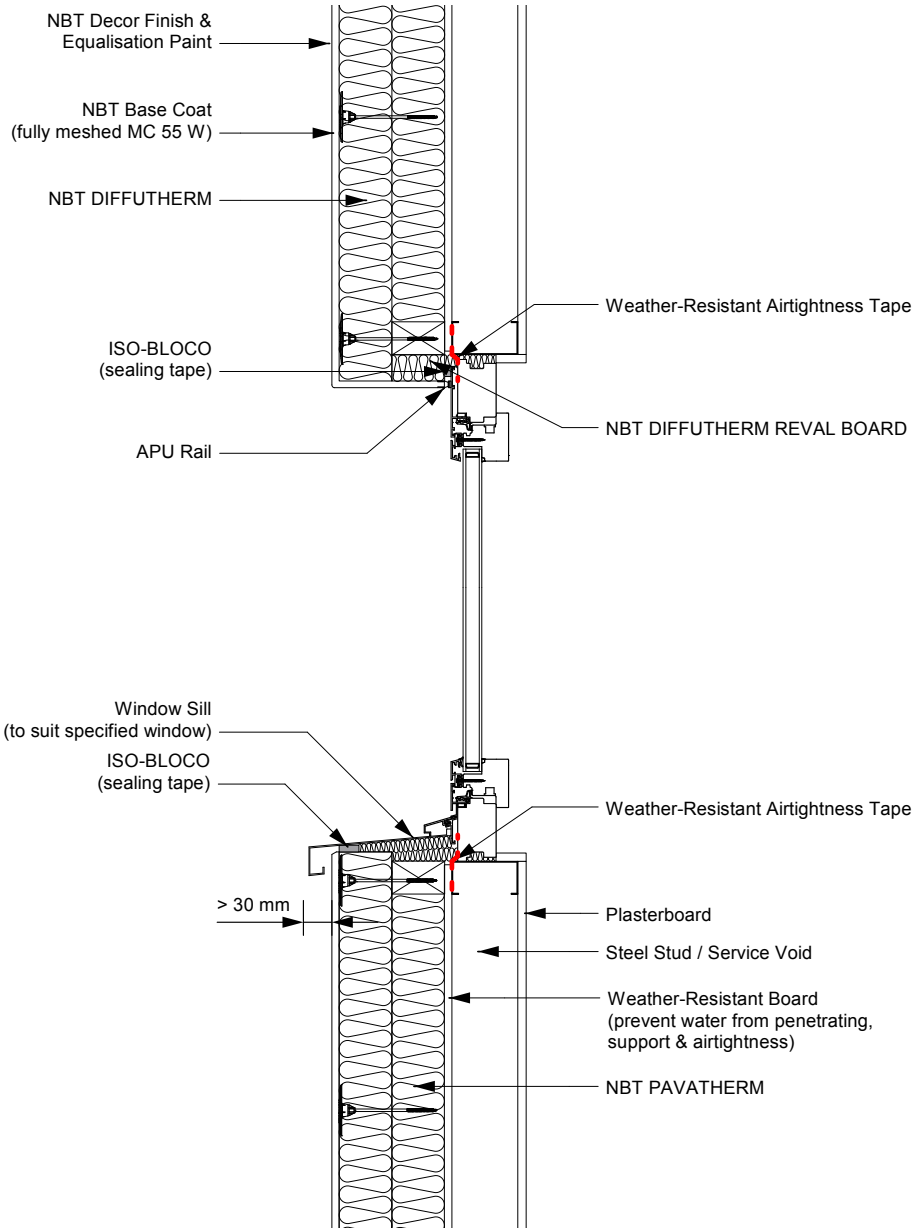
NBT STEEL EWI - Render

Window Sill & Head Detail

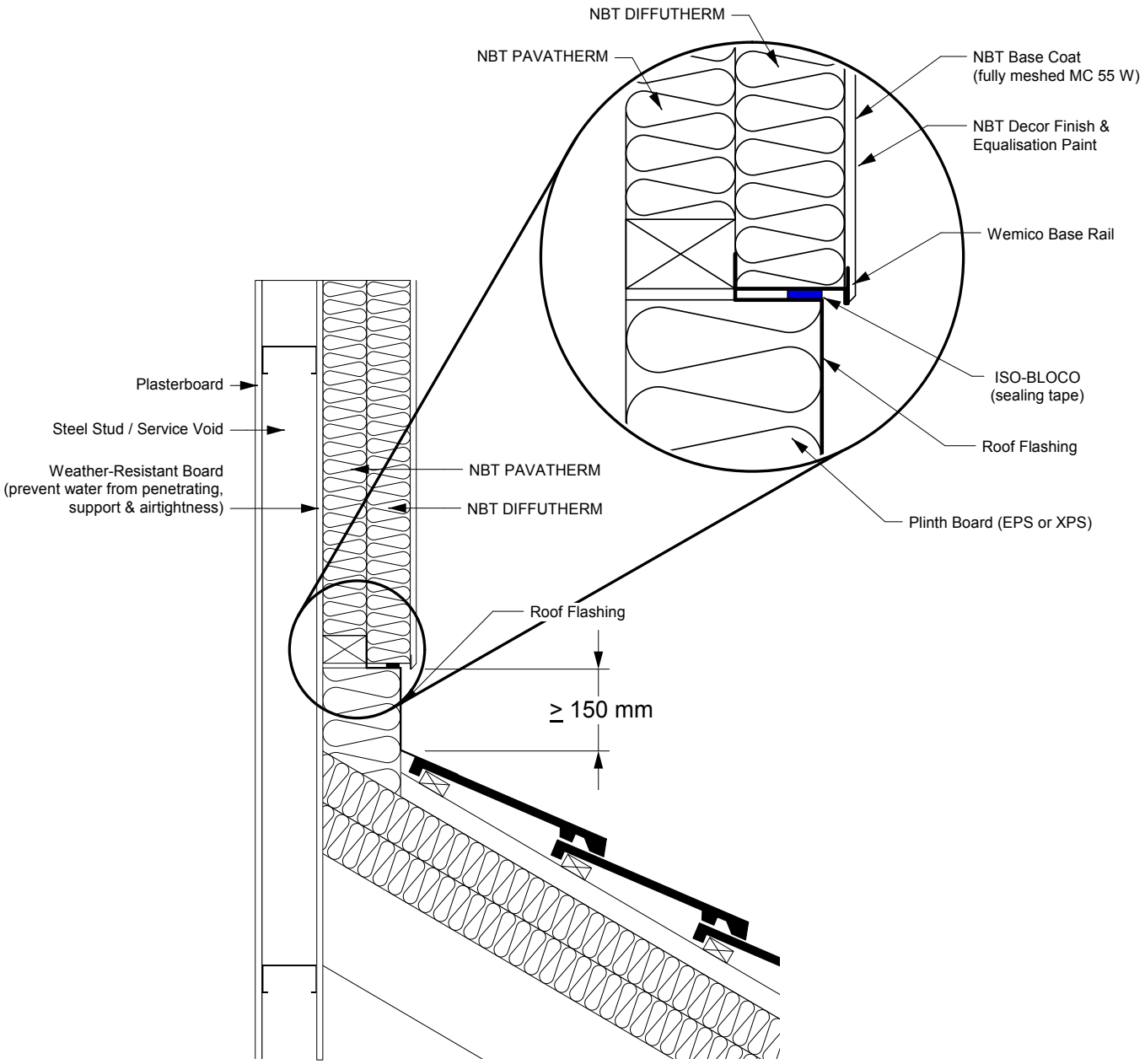


Title		
Steel Frame NBT DIFFUTHERM Window Sill&Head		
Drawing Number	Drawn By	Date
SFD003	Umendra	19.02.2011
CAD File Name		
SFD003_110219_Window Sill & Head		

Note: Window sills that span over the DIFFUTHERM external insulation boards may be optained from WEMICO

NBT STEEL EWI - Render

Roof Flashing Abutment Detail



Title: Steel Frame NBT DIFFUTHERM Roof Flashing		
Drawing Number: SFD010	Drawn By: Umendra	Date: 19.02.2011
CAD File Name: SFD010_110219_RoofFlashing		

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NBT STEEL EWI - Render

Specification

General:

The system comprises NBT DIFFUTHERM boards and NBT thin mesh coat renders supplied together with all accessories by NBT.

Access:

Scaffolding and access to the work must be carried out in accordance with current CDM and Health and Safety Regulations.

Adverse Weather/Storage:

Application of the system must only take place in suitable weather conditions, in accordance with NBT recommendations and good rendering practice. Work may be protected if necessary. Do not apply the NBT DIFFUTHERM system in ambient temperatures below 5º C. Boards should be rendered within 2 months. Boards should be stored flat and dry. Edges should be protected to prevent damage to tongue.

Board System:

Below the DPC and in the plinth area (up to 300 mm above finished ground level) use XPS plinth boards; above the plinth area use NBT DIFFUTHERM boards.

Fixing Boards:

Fix the base rail 300 mm above DPC to each stud packed to true line and level, using one fixing per stud.

Locate the 1st course of NBT DIFFUTHERM boards tightly in the base rail channel with grooved side down and edge tongue and groove joints fully engaged.

Fix through the insulation boards through the weather-resistant boards into the studs using 3 fixings per board/stud. If the building height is ≥ 18 m ask NBT for advice on fixings.

Boards must span at least 2 studs. Board edges need not coincide with stud positions, which should be at ≤ 650 mm centres. The faces of the boards should be flush. Stagger fixings where board edges coincide with a stud position.

Install 2nd course in ½ bond pattern with overlap ≥ 200 mm, over-lapping board ends at vertical corners, ensuring all board joints are fully engaged and tightly joined. Fix to studs as for 1st course. Fill any gaps and areas of damaged boards with loose woodfibres and apply a “patch” of reinforcing mesh at least 200 mm larger than area of damage/repair.

Openings and Abutments:

At all openings, service penetrations and free edges, seal the board to the structure using ISO-BLOCO sealing tape to create a weather tight joint.

Render System:

Apply APU rails to all door and window frames to form a weather tight joint.

Apply diagonal strips of mesh reinforcement across the corners of all openings and continuous strips of mesh reinforcement above the base rail and along all free board edges into 2 mm of NBT base coat mortar.

Apply NBT base coat mortar to all corners and reveals and set fibreglass mesh beads plumbed and aligned to a render depth of 5 - 8 mm.

Hand or machine apply NBT base coat over the board surface and straighten out. Comb with a tooth trowel to an overall depth of 4 - 6 mm then place sheets of fibreglass mesh lightly onto the render (≥ 100 mm overlap).

Apply a further 2 - 3 mm coat of NBT base coat and smooth out. On hardening, scrape back the surface with the edge of a trowel.

Apply 2 - 3 mm decorative finish coat after 6 days. Apply equalizing paint after 6 days.

For your notes & sketches

NBT Product Overview: Insulation

ISOLAIR sarking board

PAVATEX wood fibre board for breathable roof & wall constructions

Size:	770 x 2500 mm
Cover area:	750 x 2480 mm
Thicknesses:	22, 35 & 60 mm
k-value / I_D:	0.047 W/(mK)
Density:	240 kg/m³
Compr. strenght:	180 kPa (at 10 % compression)

PAVATEX DIFFUTHERM external wall insulation

Wood fibre board for rendered external walls

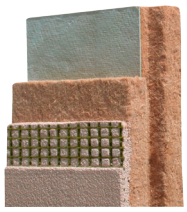
Size:	790 x 1300 mm
Cover:	780 x 1290 mm
Thicknesses:	60, 80 & 100 mm
k-value / I_D:	0.043 W/(mK)
Density:	190 kg/m³
Compr. strenght:	80 kPa (at 10 % compression)

PAVATHERM-PLUS sarking board

Composite wood board for roof & wall insulation

Size:	800 x 1600 mm
Cover area:	780 x 1580 mm
Thicknesses:	60, 80 & 100 mm
k-value / I_D:	0.043 W/(mK)
Density:	180 kg/m³
Compr. strenght:	100 kPa (at 10 % compression)

PAVADENTRO internal wall insulation



Innovative wood fibre insulation board for refurbishment

Size:	600 x 1020 mm
Cover area:	590 x 1010 mm
Thicknesses:	40, 60, 80 & 100 mm
k-value / I_D:	0.043 W/(mK)
Density:	175 kg/m³
Compr. strenght:	70 kPa (at 10 % compression

PAVATHERM general purpose insulation board

Universal wood fibre board for use in external & internal walls, floors & roofs

Sizes/Cover:	600 x 1020 & 1200 x 2050 mm
Thicknesses:	20 -100 mm
k-value / I_D:	0.038 W/(mK)
Density:	140 kg/m³
Compr. strenght:	20 kPa (at 10 % compression)

PAVABOARD load bearing insulation

Wood fibre board for highly insulated floors that have to carry loads

Size/Cover:	600 x 1020 mm
Thicknesses:	40 & 60 mm
k-value / I_D:	0.046 W/(mK)
Density:	220 kg/m³
Compr. strenght:	150 kPa (at 10 % compression)

PAVATHERM-PROFIL wall & floor board

Wood fibre board for insulating floors or internal walls with plaster

Size:	600 x 1020 cm
Cover:	590 x 1010 mm
Thicknesses:	40 & 60 mm
k-value / I_D:	0.043 W/(mK)
Density:	175 kg/m³
Compr. strenght:	70 kPa (at 10 % compression)

NBT PAVATHERM-FORTE

Square edged woodfibre boards for flat roof insulation

Size/Cover:	600 x 1020 mm
Thicknesses:	80, 100, 120, 140 mm
k-value / I_D:	0.043 W/(mK)
Density:	175 kg/m³
Compr. strenght:	70 kPa (at 10 % compression)

NBT Pavaflex

Flexible woodfibre insulation batts for loft, walls, floors & ceilings

Size I:	375 x 1350 mm
Size II:	575 x 1350 mm
Thicknesses:	50, 80, 100 & 140* mm
k-value / I_D:	0.038 W/(mK)
Density:	55 kg/m³
Compr. strenght:	-

NBT Warmcel 100 cellulose fibres

Loose fill derived from waste UK newsprint treated with fire retardant and biocidal additives

Packaging:	Bags of 8 kg (compressed)
Cover area:	e.g. 1 m² at 228 mm
k-value / I_D:	0.035 W/(mK)
Density:	35 kg/m³

ISOLAIR L, all PAVATHERM products, PAVATEX DIFFUTHERM are certified by natureplus. This testifies to excellent natural & ecological compatability.
PAVATEX wood fibre insulation boards are manufactured in Switzerland according to BS EN 13171, have the CE marking and are monitored by 3rd parties.
NBT Warmcel 100 is manufactured in the UK according to prEN 15101 & has the CE marking.
The following applies to all PAVATEX products: Specific heat capacity c = 2100 kJ/(kg•K), Euroclass E (according to BS EN 13501-1), vapour resistivity m = 5 (25 MNs/gm)
The following applies to NBT Warmcell 100: Specific heat capacity c = 1700 kJ/kg•K), Euroclass E (according to BS EN 13501-1), vapour resistivity m = 1.86 (9.3 MNs/gm)

NBT Natural Building Technologies

pavatex

Natural Building Materials and Systems

high performance systems NBT PAVATEX woodfibre systems provide exceptional thermal & acoustic insulation, summer overheating protection and moisture control for the whole building in wall roof and floor

low carbon, renewable products NBT PAVATEX boards are made of waste wood and lock up the equivalent of ca. 11 tonnes of CO_2 per building. Raw material resources are entirely renewable, unlimited and FSC certified

healthy housing NBT PAVATEX insulation boards are certified by natureplus as non-polluting and the NBT systems lead to breathable constructions; NBT PAVATEX insulation is specified exclusively by the Sentinal Haus Institute for healthy housing

tried & tested systems NBT PAVATEX woodfibre insulation are wiedely used across Europe in all climates and conditions; pysical values are 3rd party tested and guarenteed and production is according to BS EN

local service & support Pavatex‘s partner in the UK is Natural Building Technologies (NBT) who are a Technical Sales Company with nationwide coverage based in Oakley, Bucks. NBT lead the UK sustainable materials & systems for high performance building shells

Swiss Made

swiss quality & know-how for the UK produced and developed in Switzerland for more than 70 years by the world‘s most inovative woodfibre insulation manufacturer

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Subject to alteration due to development-Nov. 2013 - US

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