NSAI Agrément

IRISH AGRÉMENT BOARD
CERTIFICATE NO. 03/0196

Kingspan Insulation, Castleblayney,
Co. Monaghan, Ireland.
Tel: +353 (0)42 9795000 Fax: +353 (0)42 9754299
Email: info@insulation.kingspan.com
Website: www.kingspaninsulation.ie

Kingspan TP10, TW50, TW55, TW52, TW56 & TF70 Zero ODP Insulation Products

Isolation de murs
Wärmedämmung

NSAI Agrément (Irish Agrément Board) is designated by Government to issue European Technical Approvals.

NSAI Agrément Certificates establish proof that the certified products are **'proper materials'** suitable for their intended use under Irish site conditions, and in accordance with the **Building Regulations 1997 to 2017**.

PRODUCT DESCRIPTION:
This Certificate relates to the following products:

- TP10 – Pitched Roof Insulation (Detail Sheet 1)
- TW50 – Cavity Wall Insulation (Detail Sheet 2)
- TW55 – Cavity Wall Insulation (Details Sheet 3)
- TW52 – Plasterboard Laminated (Detail Sheet 4)
- TW56 – Plasterboard Laminate (Detail Sheet 5)
- TF70 – Underfloor Insulation (Detail Sheet 6)

MANUFACTURE AND MARKETING:
These products are manufactured and marketed by:
Kingspan Insulation,
Castleblayney,
County Monaghan,
Ireland.

1.1 ASSESSMENT

In the opinion of NSAI Agrément, the Kingspan Insulation products described in this general Certificate when used in conjunction with the relevant Detail Sheet, and if used in accordance with this Certificate, meet the requirements of the Building Regulations 1997 - 2017 as indicated in Section 1.2 of this Certificate.

1.2 BUILDING REGULATIONS 1997 to 2017

REQUIREMENT:

Part D – Materials and Workmanship

D3 – The Kingspan Insulation products as certified in this Certificate comprise proper materials fit for their intended use (See Part 4 of this Certificate).

D1 – The Kingspan Insulation products, as certified in this Certificate, meet the requirements of the building regulations for workmanship.

Part B – Fire Safety

Part B Vol 2 – Fire Safety

B2 & B7 – Internal Fire Spread (Linings)

The Kingspan Insulation products faced with plasterboard are considered to be Class 0. They may therefore be used on the internal surfaces of buildings of every purpose group.

B3 & B8 – Internal Fire Spread (Structure)

The reaction to fire classifications for the Kingspan Insulation products are listed in their Detail Sheets.

Part C – Site Preparation and Resistance to Moisture

C4 – Resistance to Weather and Ground Moisture

The Kingspan Insulation products referred to in this Certificate when installed in compliance with the conditions indicated in Part 3 of the relevant Detail Sheet will not promote the passage of moisture and will minimise the risk of surface of interstitial condensation.

Part J – Heat Producing Appliances

J3 – Protection of Building

The Kingspan Insulation products referred to in this Certificate, if used in accordance with this Certificate, meet the requirements of the Building Regulations 1997 to 2017.

Part L – Conservation of Fuel and Energy

L1 - Conservation of fuel and energy

Based on the measured thermal conductivity of the Kingspan Insulation products referred to in this certificate and detailed in the relevant Detail Sheet meet current 'U-value' requirements (see Section 4.4 of this Certificate).

Part Two / Technical Specification and Control Data 2

2.1 PRODUCT DESCRIPTION

Each of the insulation products is given a detailed description in the relevant Detail Sheet.

2.2 DELIVERY, STORAGE AND MARKING

Kingspan Insulation products are supplied palletised in labelled packs and shrink wrapped in polyethylene. Each pack carries a label bearing the CE Marking together with the product description, product characteristics (λ and R values), manufacturer's name and NSAI Agrément Certificate number for the system.

The product packaging must not be considered adequate for outside protection. Ideally, boards should be stored inside the building. If stored outside, the products should be stacked flat on a level base raised off the ground on skids and should be covered with a polythene sheet or protected with weatherproof tarpaulins. The boards must not be exposed to a naked flame or other ignition sources.

The boards must not be exposed to a naked flame or other ignition sources.

On-site trimming of boards where necessary to maintain continuity of insulation around doors, windows or other openings is easily executed using a fine tooth saw or by cutting through the insulation, and paper backing of any plasterboard layer, then snapping the board face down over a straight edge and cutting the paper facing of the plasterboard on the other side.

Tapered edged boards are jointed and finished in accordance with standard dry lining procedure offering a surface suitable for paper hanging and paint finishes.

Good workmanship and appropriate site procedures are necessary to achieve expected thermal and air tightness performance. Ensure accurate trimming to achieve close butting joints and continuity of insulation.

Adequate protection and safety precautions should be taken.

Part Three / Design Data 3

3.1 GENERAL

This matter is dealt with for each product in their Detail Sheet.

4.1 BEHAVIOUR IN FIRE
Each Detail Sheet contains the relevant information.

4.2 WATER PENETRATION
The Kingspan Insulation products referred to in this Certificate are of a closed cell structure, which does not allow water uptake by capillary action. When used in accordance with this Certificate, the products present no significant risk of water penetration.

4.3 THERMAL INSULATION
The aged/design thermal conductivity 'λ' value' of Kingspan Thermapitch TP10 zero ODP, Thermawall TW50 zero ODP, Thermawall TW55 zero ODP, Thermawall TW56 zero ODP and Thermafloor TF70 zero ODP is 0.022W/mK when measured in accordance with I.S. EN 12667 :2001 '*Thermal performance of building materials and products – Determination of thermal resistance by means of guarded hot plate and heat flow meters method – Products of high and medium thermal resistance*'.

Lintel jamb and cill designs similar to those shown in Diagram 3 of the TGD to Part L of the Building Regulations 1997 to 2017 will be satisfactory to limit thermal bridging.

Uncontrolled leakage of air through the fabric of a building and/or cracks in and around door and window frames, sills, jambs etc. can occur due to wind pressure or air movement due to thermal effects. Details of how to avoid the infiltration of cold air are given in TGD to Part L of the Building Regulations 1997 to 2017, Section 1.6 Page 14.

The required maximum U-values for external walls and roofs can be obtained from the relevant Detail Sheet.

4.4 LIMITING THERMAL BRIDGING
The linear thermal transmittance 'ψ' (Psi) describes the heat loss associated with junctions and around openings. Junction design used with the Kingspan Insulation products have been assessed and when detailed in accordance with this Certificate can meet the requirements of Table D2 of TGD to Part L of the Building Regulations 1997 to 2017.

When **all** bridged junctions within a building comply with the requirements of Table D2 of TGD to Part L, the improved 'y' factor of 0.08 can be entered into the DEAP building energy rating (BER) calculation. If **all** junctions can be shown to be equivalent or better than Acceptable Construction Details published by the DECLG, then the values published in Table D2 apply.

Where either of the above options are shown to be valid, or when the required values cannot be achieved, all relevant details should be recorded on the 'Certificate of Compliance' for that project for use in future BER calculations.

'ψ' values for other junctions outside the scope of this Certificate should be assessed in accordance with BRE IP1/06 *Assessing the effects of thermal bridging at junctions and around openings* and BRE BR 497 *Conventions for calculating linear thermal transmittance and temperature factors* in accordance with Appendix D of TGD to Part L of the Building Regulations 1997 to 2017.

As per Acceptable Construction Details, a minimum thermal resistance of 0.6m^{2}K/W should be provided at window reveals, heads and sills.

4.5 MATERIALS IN CONTACT WITH ELECTRICAL WIRING
Electrical installations should be in accordance with the ETCI publication ET 207 *Guide to the National Rules for Electrical Installations as Applicable to Domestic Installations.* It is recommended that cables should not be buried in the insulation and carried in a conduit. In relation to recessed spotlights and other luminaries, ET 207 requires they be not less than the minimum distances from combustible materials as specified in clause 559.3.2 of the TCI National rules of the Electro Technical Council of Ireland (ET 101). For extra low voltage (ELV) it is recommended that only surface mounted ELV lighting be permitted in conjunction with TW 56 insulated plasterboard.

4.6 CONDENSATION RISK
The Kingspan Insulation products referred to in this Certificate have a high vapour resistance and are therefore unlikely to be affected by surface or interstitial condensation, provided all joints between boards are filled and taped in accordance with standard dry lining practice. Interstitial condensation analysis for average winter environmental conditions for cavity wall constructions indicate no condensation risk. When insulating buildings the recommendations of BS 5250: 2011+A1:2016 '*Code of Practice for control of condensation in buildings*' should be followed to minimise the risk of condensation within the building elements and structures.

4.7 RESISTANCE TO SOLVENTS, FUNGI AND RODENTS
The Kingspan Insulation products referred to in this Certificate do not promote infestation, as there is no food value in the materials used. They also resist attack by mould and microbial growth. The insulation core is resistant to dilute acids, alkalis, mineral oil and petrol. It is not resistant to some solvent-based adhesive systems, particularly those containing methyl ethyl keytone. Adhesives containing such solvents should not be used in association with the boards. Boards which have been in contact with harsh solvents, petrol, mineral oil or acids or boards that have been damaged in any other way should not be used.

4.8 WALL MOUNTED FITTINGS
This matter is dealt with in the Detail Sheets.

4.9 MAINTENANCE
This matter is dealt with in the Detail Sheets.

4.10 DURABILITY
The Kingspan Insulation products referred to in this Certificate are rot-proof and durable. As cavity wall insulation, such products are judged to be stable and will remain effective as an insulation system for the life of the building, so long as it is installed in accordance with this certificate.

4.11 CE MARKING
The manufacturer has taken responsibility of CE marking the Kingspan Koolterm in accordance with harmonised European Standard IS EN 13165:2012+A2:2016 *Thermal insulation products for buildings – Factory made rigid polyurethane foam (PU) products - Specification*. An asterisk (*) appearing in this Certificate indicates that data shown is an essential characteristic of the product and declared in the manufacturers Declaration of Performance (DoP).

Reference should be made to the latest version of the manufacturer's DoP for current information on any essential characteristics declared by the manufacturer.

Part Five / Conditions of Certification 5

5.1 National Standards Authority of Ireland ("NSAI") following consultation with NSAI Agrément has assessed the performance and method of installation of the product/process and the quality of the materials used in its manufacture and certifies the product/process to be fit for the use for which it is certified provided that it is manufactured, installed, used and maintained in accordance with the descriptions and specifications set out in this Certificate and in accordance with the manufacturer's instructions and usual trade practice. This Certificate shall remain valid for five years from date of issue so long as:

(a) the specification of the product is unchanged.

(b) the Building Regulations 1997 to 2017 and any other regulation or standard applicable to the product/process, its use or installation remains unchanged.

(c) the product continues to be assessed for the quality of its manufacture and marking by NSAI.

(d) no new information becomes available which in the opinion of the NSAI, would preclude the granting of the Certificate.

(e) the product or process continues to be manufactured, installed, used and maintained in accordance with the description, specifications and safety recommendations set out in this certificate.

(f) the registration and/or surveillance fees due to NSAI Agrément are paid.

5.2 The NSAI Agrément mark and certification number may only be used on or in relation to product/processes in respect of which a valid Certificate exists. If the Certificate becomes invalid the Certificate holder must not use the NSAI Agrément mark and certification number and must remove them from the products already marked.

5.3 In granting Certification, the NSAI makes no representation as to;

(a) the absence or presence of patent rights subsisting in the product/process; or

(b) the legal right of the Certificate holder to market, install or maintain the product/process; or

(c) whether individual products have been manufactured or installed by the Certificate holder in accordance with the descriptions and specifications set out in this Certificate.

5.4 This Certificate does not comprise installation instructions and does not replace the manufacturer's directions or any professional or trade advice relating to use and installation which may be appropriate.

5.5 Any recommendations contained in this Certificate relating to the safe use of the certified product/process are preconditions to the validity of the Certificate. However the NSAI does not certify that the manufacture

or installation of the certified product or process in accordance with the descriptions and specifications set out in this Certificate will satisfy the requirements of the Safety, Health and Welfare at Work Act 2005, or of any other current or future common law duty of care owed by the manufacturer or by the Certificate holder.

5.6 The NSAI is not responsible to any person or body for loss or damage including personal injury arising as a direct or indirect result of the use of this product or process.

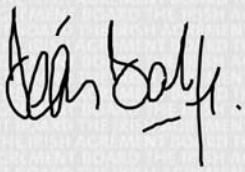
5.7 Where reference is made in this Certificate to any Act of the Oireachtas, Regulation made thereunder, Statutory Instrument, Code of Practice, National Standards, manufacturer's instructions, or similar publication, it shall be construed as reference to such publication in the form in which it is in force at the date of this Certification.

NSAI Agrément

This Certificate No. **03/0196** is accordingly granted by the NSAI to **Kingspan Insulation Ltd.** on behalf of NSAI Agrément.

Date of Issue: **June 2005**

Signed



Seán Balfe
Director of NSAI Agrément

Readers may check that the status of this Certificate has not changed by contacting NSAI Agrément , NSAI, 1 Swift Square, Northwood, Santry, Dublin 9, Ireland. Telephone: (01) 807 3800. Fax: (01) 807 3842. www.nsai.ie

Revisions:
July 2014: Update for latest Building Regulations.
March 2019: References to Building Regulations and standards updated, product specifications updated to reflect manufacturer's DoP.
14th January 2021: General revision.

Detail Sheet 1: Kingspan Thermapitch TP10 zero ODP

PRODUCT DESCRIPTION:
This Detail Sheet relates to Kingspan Thermapitch TP10 zero ODP, as defined in IAB Certificate 03/0196.

USE:
The product is used for the thermal insulation of pitched and tiled roofs constructed in accordance with SR 82:2017 *Slating and tiling – Code of Practice*. It can be used between, between and under, over or between and over rafters. It also facilitates the control of surface and interstitial condensation in roofs.

Part One / Technical Specification and Control Data 1

1.1 PRODUCT DESCRIPTION

This Detail Sheet relates to the Kingspan Thermapitch TP10 zero ODP using Polyisocyanurate (PIR), closed cell rigid foam insulation manufactured in accordance with I.S. EN 13165:2012+A2:2016. During the manufacturing process, liquid raw materials expanded by blowing agents are applied between low emissivity composite foil facings. This Detail Sheet certifies compliance with the requirements of the Building Regulations 1997 to 2017.

Kingspan Thermapitch TP10 zero ODP boards are CFC and HCFC free and therefore have zero ozone depletion potential (zero ODP).

Table 1 shows the Kingspan Thermapitch TP10 zero ODP product range.

The boards are available in the following grades and sizes:	
Length*	2400mm
Width*	1200mm
Thickness*	20 – 140mm^{+}
Core density	32kg/m^3
$^{+}$ *Other thicknesses are available subject to quantity required*	

Table 1: Product Range

1.2 MANUFACTURE

Kingspan Thermapitch TP10 zero ODP is manufactured from a formulation of chemicals, which is distributed onto low emmissivity composite foil facers subsequently autohesively bonded to the insulation core during manufacture.

1.3 INSTALLATION

1.3.1 General

Installation must be in accordance with the relevant clauses of SR 82:2017 and the manufacturers instructions and can be carried out in all conditions normal for roof construction.

The Kingspan Thermapitch TP10 zero ODP is light to handle and can be easily cut or shaped. The boards will not support the weight of operatives and care must be taken during tiling as indicated in the Company's Safety Notes.

Where the board is installed in Traditional and Timber Frame Construction cavity barriers at the junction of the external wall and roof space should be provided in accordance with the requirements of Part B of the Building Regulations 1997 to 2017.

1.3.2 Procedure – Over Rafter Layer of Insulation

Ensure that the Kingspan wall insulation has been continued to roof height to engage with the roof insulation. The insulation must be continuous to provide a complete envelope to reduce the risk of thermal bridging and condensation risk.

The Kingspan Thermapitch TP10 zero ODP is laid over the rafters and under the treated softwood counter-battens. The boards should be tightly butted and positioned in a break bond pattern with all the joints running from eaves to ridge occurring over the rafters. It is preferable to use crawling boards as the insulation will not support operatives and continue until the entire area from the eaves to ridge has been covered. Any gaps in the insulation must be sealed with flexible sealant or expanding foam. Use large headed clout nails to hold boards temporarily in place until the counter-battens secure them. Secure the counter-battens to the rafters by fixing through the counter-battens, the sarking board and the Kingspan Thermapitch TP10 zero ODP. A treated timber stop rail, the same thickness as the Kingspan Thermapitch TP10 zero ODP, is fixed to the

rafters close to the eaves to provide a firm fixing point for the counter battens.

Treated counterbattens are fixed through the insulation into the rafter with approved proprietary fixings at the appropriate centres, taking account of the specific roof design e.g. pitch, weight of slates/tiles and location of the building.
A vapour permeable roof tile underlay should be installed (fully supported or over the counterbattens) depending on the type and in accordance with the certification. However, using the underlay over the counterbattens ensures a marginally better thermal performance from the Kingspan Thermapitch TP10 zero ODP insulation.

1.3.3 Procedure – Between Rafter Layer of Insulation
Kingspan Thermapitch TP10 zero ODP may be used in pitched roof constructions where the insulation follows the slope of the roof. Battens fixed to the rafters may be used as a retaining stop. The required thickness of Kingspan Thermapitch TP10 zero ODP is fixed between the rafters to achieve the relevant 'U value'. However, where the requirement is for very low 'U values' or to reduce the effects of thermal bridging, a second layer fixed to the underside of the rafters under the first layer may be appropriate. When using multiple layers of Kingspan Thermapitch TP10 zero ODP, ensure that the thinnest layer is placed on the warmside. As in the solution for the Warm Roof when the relevant space is to be used as a living area, Kingspan Thermapitch TP10 zero ODP should be covered with 12.5mm plasterboard or use Kingspan TW 56 zero ODP thermal Liner board, which eliminates the cold bridge effect of the rafters.

1.3.4 Procedure – Between and Over Rafter Layer of Insulation
In cases where the insulation between rafters is to be flush with the top of the rafters but does not fill the full rafter depth, the insulation can be installed by the use of nailable sarking clips. These clips are driven into the upper surface of each of rafter at one-metre intervals up the roof slope. The nailable sarking clips then support lengths of Kingspan Thermapitch TP10 zero ODP suitably trimmed to size and placed between the rafters.

In cases where the Kingspan Thermapitch TP10 zero ODP between the rafters is to be flush with the bottom of the rafters but does not fill the full rafter depth, install the insulation with the aid of battens nailed to the side of the rafters. The battens should be in the appropriate position to ensure the insulation flush with the bottom of the rafters.

In cases where the Kingspan Thermapitch TP10 zero ODP between rafters fully fills the rafter depth, simply install the correct thickness of insulation in such manner that it is flush with the bottom of the rafters.

In accordance with building regulations, a 50 mm ventilation space should be maintained between the sarking board and the insulation in "Cold Roof" construction, unless a vapour permeable membrane is used allowing for a reduction in the recommended airspace (refer to manufacturers instruction and conditions of the Certificate).

1.3.5 Cutting
On-site trimming of boards where necessary to maintain continuity of insulation around doors, windows or other openings is easily executed using a fine tooth saw or by cutting through the insulation, then snapping the board face down over a straight edge.

Good workmanship and appropriate site procedures are necessary to achieve expected thermal and air tightness performance. Ensure accurate trimming to achieve close butting joints and continuity of insulation.

1.3.6 Finishing
Details of the finishing to the under rafter insulation layer can be found in the Detail Sheet for Kingspan Thermawall TW52 zero ODP and Kingspan Thermawall TW56 zero ODP.

1.3.7 Vapour Permeable Membranes
Vapour permeable membrane for the purposes of this Certificate should be approved for use with the system by Kingspan or may be any other breather membrane which has an Irish Agrément Certificate.

1.3.8 Slating and Tiling
Slating and tiling is installed in accordance with SR 82:2017. When the relevant space is to be used as a living area, Kingspan Thermapitch TP10 zero ODP should be covered with 12.5 mm plasterboard.

Part Two / Design Data 2

2. GENERAL

Kingspan Thermapitch TP10 zero ODP when installed in accordance with this Detail Sheet is effective in reducing the 'U' value (thermal transmittance) of new and existing pitched roof constructions. It is essential that such roofs are designed and constructed to prevent moisture penetration having regard to the Driving Rain Index.

Roofs subject to the relevant requirements of the Building Regulations 1997 to 2017 should be constructed in accordance with SR 82:2017.

When installed in accordance with this Certificate, Kingspan Thermapitch TP10 zero ODP will contribute to the buckling and racking strength of the roof as described in SR 82:2017. However, it is not recommended that they be considered as an alternative to cross bracing.

During installation, boards must not be walked on except over supporting timbers. The boards have insufficient nail holding ability to be considered as an alternative to timber sarking.

Roof tile underlays must be approved by the manufacturer or be the subject of a current Irish Agrément Certificate for such use. Underlays should be installed in accordance with, and within the limits of that Certificate.

Moisture entering the roof must be minimised using a minimum of 500 gauge polyethylene with sealed gaps, placed under the inclined ceiling. Gaps in the ceiling should be minimised and service openings should be sealed.

Part Three / Technical Investigations 3

3.1 BEHAVIOUR IN FIRE

Combustibility - Kingspan Thermapitch TP10 zero ODP is classified as NPD to EN 13501-1. The boards are combustible and must be protected from naked flames and other ignition sources during and after installation.

Toxicity - Negligible when used in protected roof situation.

As Kingspan Thermapitch TP10 zero ODP is manufactured without the use of CFC's or HCFC's, there is no release of such gas on burning.

3.2 STRENGTH

Kingspan Thermapitch TP10 zero ODP when installed in accordance with the manufacturer's instructions, and this certificate, will resist the loads likely to be met during installation and in service.

3.3 RESISTANCE TO WIND LOAD

The resistance to wind uplift depends on many factors peculiar to each project. The effect of wind loading should be calculated in accordance with IS EN 1991-1-4:2005+A1:2010 *Eurocode 1: Actions on structures: General actions: Wind actions,* using the appropriate basic wind speed shown on the map in Diagram 15 of TDG to Part A of the Building Regulations 1997 to 2017.

Kingspan Thermapitch TP10 zero ODP, when installed in accordance with section 1.3 of this Detail Sheet, will have sufficient resistance to wind uplift.

3.4 RESISTANCE TO MOISTURE

Kingspan Thermapitch TP10 zero ODP will not be adversely affected by rain during installation for a limited time scale or by wind driven snow or rain penetrating the tiling in service.

3.5 CONDENSATION RISK

Kingspan Thermapitch TP10 zero ODP has a vapour resistivity exceeding 250 MNs/gm. The Certificate holder should be contracted for the purpose of calculating a project specific condensation risk analysis. The risk of condensation on the underside of the sarking will be minimal under normal conditions of use.

3.6 MAINTENANCE AND REPAIR

Damaged boards can be easily replaced prior to the installation of counter battens.

3.7 TESTS AND ASSESSMENTS WERE CARRIED OUT TO DETERMINE THE FOLLOWING:

- Density
- Water vapour transmission
- Long term water absorption
- Dimensional accuracy
- Compressive strength
- Dimensional stability
- Thermal conductivity
- Efficiency of the construction process

3.8 OTHER INVESTIGATIONS

(i) Existing data on product properties in relation to fire, toxicity, environmental impact and the effect on mechanical strength/stability and durability were assessed. Kingspan Thermapitch TP10 zero ODP does not contain CFC or HCFC gas.

(ii) The manufacturing process was examined including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

(iii) Site visits were conducted to assess the practicability of installation and the history of performance in use of the product.

(iv) A condensation risk analysis was performed.

Property	Declared Value
Reaction to fire*	NPD
Thermal conductivity*	0.022 W/mK
Thermal resistance*	
25 mm	1.10 m^2K/W
30 mm	1.35 m^2K/W
35 mm	1.55 m^2K/W
40 mm	1.80 m^2K/W
50 mm	2.25 m^2K/W
60 mm	2.70 m^2K/W
70 mm	3.15 m^2K/W
80 mm	3.60 m^2K/W
90 mm	4.05 m^2K/W
100 mm	4.50 m^2K/W
110 mm	5.00 m^2K/W
120 mm	5.45 m^2K/W
125 mm	5.65 m^2K/W
130 mm	5.90 m^2K/W
140 mm	6.35 m^2K/W
150 mm	6.80 m^2K/W
Compressive strength*	CS(10\Y)140

Table 2: Physical Properties of Kingspan TP10

NSAI Agrément

Detail Sheet 2: Kingspan Thermawall TW50 zero ODP

PRODUCT DESCRIPTION:
This Detail Sheet relates to Kingspan Thermawall TW50 zero ODP, as defined in IAB Certificate 03/0196.

USE:
The product is used for the thermal insulation of new cavity masonry walls of dwellings or buildings of similar occupancy type and conditions. It also facilitates the control of surface condensation in walls.

Part One / Technical Specification and Control Data 1

1.1 PRODUCT DESCRIPTION

This Detail Sheet relates to Kingspan Thermawall TW50 zero ODP, a partial fill cavity wall board with an option of square edge or jointed system, using Polyisocyanurate (PIR) closed cell rigid insulation manufactured in accordance with IS EN 13165: 2012+A2:2016 *Thermal insulation products for buildings – Factory made products of polyurethane foam (PUR) specification.* During the manufacturing process, liquid raw materials expanded by blowing agents are applied between low emissivity composite foil facings. This Detail Sheet certifies compliance with the requirements of the Building Regulations 1997 to 2017.

Kingspan Thermawall TW50 zero ODP board is CFC and HCFC free.

Table 1 shows the Kingspan Thermawall TW50 zero ODP product range.

The boards are available in the following grades and sizes:	
Length	1200mm
Width	450mm
Thickness	60, 80, 100 and 150mm*
Grade	PIR
** Other thicknesses are available subject to quantity required*	

Table 1: Product Range

1.2 MANUFACTURE

Kingspan Thermawall TW50 zero ODP is manufactured from a formulation of chemicals, which is distributed onto low emissivity composite foil facers subsequently autohesively bonded to the insulation core during manufacture. The reflective, low emissivity surface increases the thermal resistance of the residual cavity airspace in which the board is placed.

1.3 INSTALLATION

Walls are constructed in the conventional manner with the first row of ties one course below damp-proof course level at not greater than 600 mm horizontal centres. It is recommended that the wall ties are not placed directly on the damp-proof course. The first row of insulation boards should be supported by the ties providing edge insulation for the floor, as required by TGD to Part L of the Building Regulations 1997 to 2017. The mortar fill below DPC level must be considered and it is also necessary to ensure that any installed Radon Barrier is not damaged. The walls are constructed by raising each section of the inner or outer leaf up to the level of the next run of wall ties, which are situated at a spacing of 450 mm vertically, and 900 mm horizontally. The Kingspan Thermawall TW50 zero ODP boards are then placed in position behind the retaining clips on the wall ties tight against the cavity face of the inner leaf. It is critical that butt joints should be as neat as possible, assisted by the jointed edge option. This ensures maximum thermal performance. It is recommended that drainage holes be provided in the perpendicular block joints below DPC level at approximately 1 m centres.

Each board should be secured by a minimum of 3 retaining clips. Additional wall ties at unbonded openings, junctions and cut ends should be located at a maximum 225 mm vertical centres and within 150 mm of any opening. All wall ties should be installed correctly, clear of all mortar and sloped downwards towards the outer leaf and conform to structural design requirements. In severe exposure zones Kingspan Thermawall TW50 zero ODP should be installed in walls whilst maintaining a residual 40 mm cavity width. Only certified wall ties should be used in conjunction with this system.

Table 2 shows typical wall tie spacing.

Cavity Width	Horizontal Spacing mm	Vertical Spacing mm	No. of Wall Ties per m^2
76 – 110	750	450	3.0
111 - 150	450	450	4.9

Table 2: Maximum Spacing of Wall Ties

Successive sections of wall fixed by certified stainless steel wall ties are constructed and Kingspan Thermawall TW50 zero ODP boards are installed as work proceeds up to the required height. Excess mortar should be removed and mortar droppings cleaned from the exposed edges of the installed boards. Use of cavity battens or cavity boards or similar means is recommended to protect installed boards and keep the cavity mortar free. Penetration of damp across the cavity will be prevented with good practice.

Proprietary reveal closers may be used to close cavities at openings. Where the use of wall ties is inappropriate e.g. under window cills, proprietary clips may be used to hold the cavity boards tightly in place. Jamb details must incorporate a vertical DPC, positioned between the Kingspan Thermawall TW50 zero ODP board and the external leaf, returning a minimum of 150 mm.

On-site trimming of boards where necessary to maintain continuity of insulation around doors, windows or other openings is easily executed using a fine tooth saw or by scoring with a sharp knife and cutting snapping the board face down over a straight edge and cutting the foil facing on the other side

To prevent damp penetrating across the cavity it is important to ensure the following:

- Mortar filling of cavity wall base is not too high.
- Keep wall ties clean ‘free’ from mortar droppings. This is achieved with the use of cavity board and daily cleaning of wall ties.
- The d.p.c. should not project into cavity at ground floor level as it can lead to catching mortar droppings, resulting in bridging the cavity.
- Avoid the build up of mortar on trays/lintels.
- Ensure the correct fitting of ties. Avoid sloping wall ties, which could be caused by the difference in level between the outer and inner leaf of the cavity wall.
- Kingspan Thermawall TW50 zero ODP board is placed against the inner leaf properly; i.e. as specified in this Agrément Detail Sheet and the manufacturer’s instructions. This is critical in order to minimise the potential for Thermal Looping.
- Once the Kingspan Thermawall TW50 zero ODP board is installed in the cavity wall ensure that there are no gaps in the insulation, as this will reduce the risk of cold bridging.

Good workmanship and appropriate site procedures are vital to achieve expected thermal and air tightness performance. Ensure accurate trimming to achieve close butting joints and continuity of insulation.

2. GENERAL

Kingspan Thermawall TW50 zero ODP board when installed in accordance with this Detail Sheet, is effective in reducing the 'U' value (thermal transmittance) of new external masonry cavity walls, using clay or calcium silicate bricks, concrete blocks, or natural and reconstituted stone blocks. It is essential that such walls are designed and constructed to prevent moisture penetration having regard to the Driving Rain Index.

Buildings subject to the relevant requirements of the Building Regulations 1997 to 2017 should be constructed in accordance with IS EN 1996-1-1:2005+A1:2012, IS EN 1996-1-2:2005 COR:2010 *Eurocode 6 – Design of masonry structures – Part 1-2: General rules – Structural fire design (including Irish National Annex)*, IS EN 1996-2:2006 COR:2009 *Eurocode 6 – Design of masonry structures – Part 2: Design considerations, selection of materials and execution of masonry (including Irish National Annex)* and IS EN 1996-3:2006 COR:2009 *Eurocode 6 – Design of masonry structures – Part 3: Simplified calculation methods for unreinforced masonry structures (including Irish National Annex)*. The relevant recommendations these standards should be followed where the wall incorporates stone or cast stone.

The use of a cavity board or cavity batten during construction is recommended to prevent accumulation of mortar droppings on the top edge of the Kingspan Thermawall TW50 zero ODP board and to prevent bridging of cavity by mortar droppings.

As with all cavity wall insulation, the construction detailing should comply with good practice.

It is recommended that installation be carried out to the highest level on each wall. Where appropriate the top edge of the insulation should be protected by a cavity tray. On site trimming of boards may be necessary to achieve this.

Where a nominal residual cavity width of 40 mm is maintained, Kingspan Thermawall TW50 zero ODP board is suitable for use in any exposure conditions, in buildings up to 12 meters in height. For buildings over 12 meters and up to 25 meters in height the exposure factor must not exceed 120, calculated in accordance with IS EN 1996-3:2006 (with masonry or concrete inner and outer leaves) and using the Irish Map of Driving Rain Index.

It is important to ensure during installation that:

a) Wall ties and fixings are installed correctly and are thoroughly clean.
b) Excess mortar is cleaned from the inside face of the leading leaf and any debris is removed from the cavity.
c) Mortar droppings are cleaned from the exposed edges of installed slabs.

Data obtained by NSAI Agrément confirms that a masonry wall incorporating the Kingspan Thermawall TW50 zero ODP board and built to the requirements of IS EN 1996-1-1:2005+A1:2012 will not transmit water to the inner leaf.

Data obtained by NSAI Agrément also demonstrates that Kingspan Thermawall TW50 zero ODP boards do not absorb water by capillary action. When the product is used in situations where it bridges the dpc in walls, dampness from the ground will not pass through, provided the cavity is taken down to at least 150 mm below the level of the lowest dpc.

A minimum residual cavity width of 40 mm should be maintained where possible. Where, for structural reasons, the cavity width is reduced by the intrusion of ring beams or other structural elements, the manufacturer’s advice on fixing and weather-proofing should be sought. Raked or recessed mortar joints are not suitable in high exposure areas and must be avoided.

3.1 BEHAVIOUR IN FIRE

Kingspan Thermawall TW50 zero ODP board may be used in buildings of any purpose group in a wall in which the cavity intercommunicates with another such cavity, and may be unlimited in extent in respect of the provision of barriers provided the walls comply with Part B3, Diagram 17 (Cavity walls excluded from provisions for cavity barriers) of the TGD to Part B of the Building Regulations 1997 to 2017, as follows:

a) The wall consists of two leaves, each being not less than 75mm thick and constructed of non-combustible materials;
b) The cavity is closed by a cavity barrier at the top of the wall and at the top of any opening through any leaf of the wall; and
c) There is no combustible material exposed or situated within the cavity other than:
   - timber lintels, window or door frames or the end faces of joists
   - pipes, ducts or cables
   - closers, flashings, damp proof courses or wall ties
   - thermal insulating material
   - metre boxes which require an opening in the outer leaf of not greater than 800mm x 500mm and do not penetrate the inner leaf except through a sleeve of not more than 80mm by 80mm which is fire stopped where it passes through the inner leaf.

Combustibility - Kingspan Thermawall TW50 has a reaction to fire classification of NPD to IS EN 13501-1. The boards are combustible and must be protected from naked flames and other ignition sources during and after installation.

Toxicity - Negligible when used in a cavity wall situation.

Kingspan Thermawall TW50 zero ODP board is manufactured without the use of CFC's or HCFC's, there is no release of such gas on burning.

3.1.1 J3 – Protection of Building

Combustible wall insulation material shall generally be separated by solid non combustible material not less than 200mm thick, from any heating appliance or from any flue pipe or opening to a heating appliance. Particular details are given in Section 2, and in Diagrams 2 - 8 of the TGD Part J Building Regulations 1997 to 2017. It should also be separated by 40mm from the external surface of a masonry chimney. For chimneys covered by IS EN 1859:2009+A1:2013 *Chimneys: Metal chimneys: Test methods* separation between this product and the external surface of the chimney shall be determined in accordance with clause 2.17, Part J Building Regulations 1997 to 2017.

3.2 WATER PENETRATION

Capillary Action – The closed cell structure does not allow water uptake by capillary action.

Kingspan Thermawall TW50 zero ODP board, when used in accordance with this Detail Sheet, presents no significant risk of water penetration.

3.3 WATER VAPOUR PENETRATION AND CONDENSATION RISK

Kingspan Thermawall TW50 zero ODP board has a vapour resistivity exceeding 250 MNs/gm. It has a significant resistance to the passage of water vapour, when used in conventional masonry cavity wall construction. This obviates the risk of surface condensation and presents no significant risk of damage from interstitial condensation. Correct use of the heating and ventilation system is important. When insulating buildings the recommendations of BS 5250:2011+A1:2016 *Code of practice for control of condensation in buildings*, should be followed to minimise the risk of condensation within the building elements and structures.

3.4 THERMAL INSULATION

The aged/design thermal conductivity 'λ' value' of Kingspan Thermawall TW50 zero ODP boards when measured in accordance with IS EN 12667:2001 *Thermal performance of building materials and products – Determination of thermal resistance by means of guarded hot plate and heat flow meters method – Products of high and medium thermal resistance*, is 0.022 to 0.023 W/mK. The high thermal resistance of Kingspan Thermawall TW50 zero ODP board ensures that cold bridging and extra heat loss around the edges of openings can be avoided. A minimum thickness of 22 mm of Kingspan Thermawall TW50 zero ODP board will be suitable.

The DoEHLG publication *Limiting Thermal Bridging & Air Infiltration – Acceptable Construction Details* should also be referred to.

The foil facing on Kingspan Thermawall TW50 zero ODP board is a low emissivity aluminium foil which has been tested by the National Physics Laboratory to achieve an aged aggregate emissivity value (including printing) of 0.06. This value can then be used in the calculation in Appendix B2 of IS EN ISO 6946:2007 *Building components and building elements – Thermal resistance and thermal transmittance – Calculation method* to derive an increased thermal resistance of 0.644W/mK for the residual airspace immediately adjacent to the foil facing.

Uncontrolled leakage of air through the fabric of a building and/or cracks in and around door and window frames, sills, jambs etc. can occur due to wind pressure or air movement due to thermal effects. Details of how to avoid the infiltration of cold air are given in TGD to Part L of the Building Regulations 1997 to 2017

Lintel jamb and cill designs similar to those shown in Diagram 3 of the TGD to Part L, Building Regulations 1997 to 2017 will be satisfactory to limit thermal bridging.

3.5 TESTS AND ASSESSMENTS WERE CARRIED OUT TO DETERMINE THE FOLLOWING:

- Density
- Water vapour resistance
- Water uptake
- Dimensional accuracy
- Compressive and cross breaking strength
- Dimensional stability
- Thermal conductivity
- Efficiency of the construction process

3.6 MATERIALS IN CONTACT WITH ELECTRICAL WIRING

Electrical installations should be in accordance with the ETCI publication ET 207 *Guide to the National Rules for Electrical Installations as Applicable to Domestic Installations.* It is recommended that cables should not be buried in the insulation and carried in a conduit. In relation to recessed spotlights and other luminaries, ET 207 requires they be not less than the minimum distances from combustible materials as specified in clause 559.3.2 of the TCI National rules of the Electro Technical Council of Ireland (ET 101).

3.7 OTHER INVESTIGATIONS

(i) Existing data on product properties in relation to fire, toxicity, environmental impact and the effect on mechanical strength/stability and durability were assessed. Kingspan Thermawall TW50 zero ODP board does not contain CFC or HCFC gas.

(ii) The manufacturing process was examined including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

(iii) Site visits were conducted to assess the practicability of installation and the history of performance in use of the product.

(iv) A condensation risk analysis was performed.

Property	Declared Value
Reaction to fire*	NPD
Thermal conductivity*	0.022 W/mK
Thermal resistance*	
60 mm	2.70 m^2K/W
80 mm	3.60 m^2K/W
100 mm	4.50 m^2K/W
110 mm	5.00 m^2K/W
120 mm	5.45 m^2K/W
125 mm	5.65 m^2K/W
130 mm	5.90 m^2K/W
140 mm	6.35 m^2K/W
Compressive strength*	CS(10\Y)140

Table 3: Physical Properties of Kingspan TW50

NSAI Agrément

Detail Sheet 3: Kingspan Thermawall TW55 zero ODP

PRODUCT DESCRIPTION:
This Detail Sheet relates to Kingspan Thermawall TW55 zero ODP, a high performance rigid urethane insulation.

USE:
The product is used for the thermal insulation of timber framed or steel framed walls by inserting between the studs, or it may be used as an insulation sheathing. It also facilitates the control of surface and interstitial condensation in walls.

Part One / Technical Specification and Control Data 1

1.1 PRODUCT DESCRIPTION

This Detail Sheet relates to the Kingspan Thermawall TW55 zero ODP using Polyisocyanurate (PIR), closed cell rigid foam insulation manufactured in accordance with IS EN 13165: 2012+A2:2016 *Thermal insulation products for buildings – Factory made products of polyurethane foam (PUR) specification.* During the manufacturing process, liquid raw materials expanded by blowing agents are applied between low emissivity composite foil facings. This Detail Sheet certifies compliance with the requirements of the Building Regulations 1997 to 2017.

Kingspan Thermawall TW55 zero ODP boards are CFC and HCFC free and therefore have zero ozone depletion potential (Zero ODP).

Table 1 shows the Kingspan Thermawall TW55 zero ODP product range.

The boards are available in the following grades and sizes:	
Length	2400mm
Width	1200mm
Thickness	20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95 and 100mm*
Grade	PIR

** Other thicknesses are available subject to quantity required. Boards can be pre-cut to suit standard timber stud dimensions.*

Table 1: Product Range

1.2 MANUFACTURE

Kingspan Thermawall TW55 zero ODP is manufactured from a formulation of chemicals, which are distributed onto low emissivity composite foil facers subsequently autohesively bonded to the insulation core during manufacture.

1.3 INSTALLATION

1.3.1 Between Timber Studs/Dwarf Walls

Kingspan Thermawall TW55 zero ODP boards should be cut to fit tightly between the timber studding and restrained in position by timber battens or by nails so that the Kingspan Thermawall TW55 zero ODP boards are allowed to finish flush with the outside surface of the stud wall.

Insulation boards that have been individually cut to fit the stud spacing may be temporarily held to the battens with large headed clout nails. When using Kingspan Thermawall TW55 zero ODP boards between studwork, the plasterboard lining should be of the vapour check type or a separate polythene vapour control layer used.

It is important to ensure a tight fit between Kingspan Thermawall TW55 zero ODP boards and the adjoining structure to obtain the benefit of the high thermal performance. Gaps should be filled with expanding urethane sealant.

1.3.2 As Insulating Sheathing on Timber Frame Wall

Kingspan Thermawall TW55 zero ODP boards are fixed to the external surface of the timber frame structure (outside of any OSB or plywood sheathing) and restrained using temporary fixing in the form of large headed galvanised clout nails prior to being tied into the brickwork/blockwork with an appropriate timber frame wall tie. Ensure that Kingspan Thermawall TW55 zero ODP boards are tightly butted and that any requirements of the timber frame manufacturer are met. Contact Kingspan Technical Services Department for further information if required.

The use of self adhesive foil tape is NOT recommended for this application. No separate vapour control layer is required when adopting Kingspan Thermawall TW55 zero ODP boards sheathing. The insulation boards themselves will act as an efficient vapour check.

1.3.3 As Insulating Sheathing on Steel Frame Wall

Similarly fix as for timber frame. Kingspan Thermawall TW55 zero ODP board should be restrained to the outside of the steel frame construction ensuring vertical board joints coincide with a vertical member. Fixings should be in accordance with the steel frame manufacturers recommendations. Contact Kingspan Technical Services Department for further information.

1.3.4 Use of Wall Ties (Timber Frame Wall)

The outer leaf of brickwork/blockwork may be constructed in the conventional manner using appropriate wall ties to restrain the two wall skins together. The ties should be inserted whist constructing the outer leaf ensuring a slight offset is achieved, sloping the tie downwards towards the outer leaf.

1.3.5 Use of Wall Ties (Steel Frame Wall)

Advice should be sought from the appropriate steel frame manufacturer for recommendations of a suitable wall tie specification.

1.3.6 Cutting

On-site trimming of Kingspan Thermawall TW55 zero ODP board where necessary to maintain continuity of insulation or to fit around openings is easily executed using a fine tooth saw or by scoring with a sharp knife and snapping the board face down over a straight edge and cutting the foil facing on the other side. Accurate trimming will ensure close butting joints and continuity of insulation.

Part Two / Design Data 2

2. GENERAL

Kingspan Thermawall TW55 zero ODP when installed in accordance with this Detail Sheet, is effective in reducing the 'U' value (thermal transmittance) of new or existing walls and ceilings.

Timber frame buildings subject to the relevant requirements of the Building Regulations 1997 to 2017 should be constructed in accordance with IS EN 1995-1-1:2004+A2:2014 *Eurocode 5: Design of timber structures: General: Common rules for buildings,* and IS EN 1995-1-2:2005 *Eurocode 5: Design of timber structures: General: Structural fire design* as appropriate.

For steel frame buildings, the frame should be in accordance with IS EN 1993-1-3:2006 *Eurocode 3: Design of steel structures: General rules: Supplementary rules for cold-formed members and sheeting* and other relevant codes as appropriate.

As with all types of wall insulation, the construction detailing should comply with good practice.

3.1 BEHAVIOUR IN FIRE

3.1.1 General

Kingspan Thermawall TW55 zero ODP board of itself has a Class 1 Surface Spread of Flame rating in accordance with BS 476: Part 7:1997. The plasterboard used to cover the Kingspan Thermawall TW55 zero ODP board is deemed to be Class '0' in accordance with the Building Regulations 1997 to 2017 and so the insulated board qualifies as the highest product performance classification as defined in Technical Guidance Document B - Fire Safety (paragraph A10 of Annex A). The insulation component of the board should be isolated from possible sources of combustion.

The Kingspan Thermawall TW55 zero ODP board should be separated by a minimum distance of 150 mm from an oil, solid fuel or gas heating appliance as indicated in Diagram 8 of Technical Guidance Document J - Heat Producing Appliances, of Building Regulations 1997 to 2017.

Kingspan Thermawall TW55 zero ODP when installed with a residual cavity between the board and the wall, will require the provision of cavity barriers and may be used in buildings of any purpose group provided:

a) cavity barriers in walls are provided at maximum distances apart of 10m unless a Class 1 material is exposed to the cavity when a spacing of 20m may be adopted;
b) every such cavity shall be closed by a cavity barrier around the whole perimeter of the wall or ceiling element and around the perimeter of any opening through such elements;
c) cavity barriers in spaces between a floor and ceiling are provided at maximum distances of 20m for any class of surface exposed to the cavity;
d) where any wall or ceiling containing a cavity meets another such element, the cavities shall be closed so that they do not communicate with one another;
e) direction on the provision and spacing of cavity barriers is given in Tables 3.2 and 3.3 of Technical Guidance Document B – Fire Safety to the Building Regulations 1997 to 2017.

3.1.2 J3 – Protection of Building

Combustible wall insulation material shall generally be separated by solid non-combustible material not less than 200 mm thick, from any heating appliance or from any flue pipe or opening to a heating appliance. Particular details are given in Section 2, and in Diagrams 2 - 8 of the TGD Part J Building Regulations 1997 to 2018. It should also be separated by 40 mm from the external surface of a masonry chimney. For chimneys covered by IS EN 1859:2009+A1:2013 *Chimneys: Metal chimneys: Test methods*, separation between this product and the external surface of the chimney shall be determined in accordance with clause 2.17, Part J Building Regulations 1997 to 2017.

3.2 WATER PENETRATION

Kingspan Thermawall TW55 zero ODP incorporates a closed cell structure that does not allow water uptake by capillary action.

Kingspan Thermawall TW55 zero ODP when used in accordance with this Detail Sheet presents no significant risk of water penetration.

3.3 WATER VAPOUR PENETATION AND CONDENSATION RISK

Kingspan Thermawall TW55 zero ODP board has a vapour resistivity exceeding 250 MNs/gm. It has a significant resistance to the passage of water vapour. This obviates the risk of surface condensation and presents no significant risk of damage from interstitial condensation. However, as in normal practice the insulation should not be regarded as a vapour barrier and a full vapour barrier and vapour permeable membranes are required.

3.4 THERMAL INSULATION

The aged/design thermal conductivity 'λ' value' of Kingspan Thermawall TW55 zero ODP board when measured in accordance with I.S. EN 12667: 2001 *Thermal performance of building materials and products – Determination of thermal resistance by means of guarded hot plate and heat flow meters method – Products of high and medium thermal resistance* is 0.022 – 0.023 W/mK.

The foil facing on Kingspan Thermawall TW55 zero ODP boards is a low emissivity aluminium foil which has been tested by the National Physics Laboratory to achieve an aged aggregate emissivity value (including printing) of 0.06. This value can then be used in the calculation in Appendix B2 or B3 as appropriate of IS EN ISO 6946:2007 *Building components and building elements – Thermal resistance and thermal transmittance – Calculation method* to derive an increased thermal resistance of 0.644W/mK for the residual airspace immediately adjacent to the foil facing.

The DoEHLG publication *Limiting Thermal Bridging & Air Infiltration – Acceptable Construction Details* should also be referred to.

Lintel jamb and cill designs similar to those shown in Diagram 3 of the TGD to Part L, Building Regulations 1997 to 2017, and considering the details 'Limiting thermal bridging and air leakage: Robust construction details for dwellings and similar buildings,' DEFRA and DTLR, The Stationery Office, London.

The required maximum U-values for external walls can be obtained with Kingspan Thermawall TW55 zero ODP board constructions as indicated in Table 2.

U-Value W/m²K	Timber Frame Wall Block Render (external)	Timber Frame Wall Brick (external)
0.27*	80 mm	80 mm
** Assumes 140mm stud size.*		

Table 2: Wall Constructions – Typical U Values

3.5 TESTS AND ASSESSMENTS WERE CARRIED OUT TO DETERMINE THE FOLLOWING:

- Density
- Water vapour transmission
- Long term water absorption
- Dimensional accuracy
- Compressive and cross-breaking strength
- Dimensional stability
- Thermal conductivity
- Efficiency of the construction process

Property	Declared Value
Reaction to fire*	NPD
Thermal conductivity*	0.022 W/mK
Thermal resistance*	
25 mm	1.10 m^2K/W
30 mm	1.35 m^2K/W
35 mm	1.55 m^2K/W
40 mm	1.80 m^2K/W
50 mm	2.25 m^2K/W
60 mm	2.70 m^2K/W
70 mm	3.15 m^2K/W
80 mm	3.60 m^2K/W
90 mm	4.05 m^2K/W
100 mm	4.50 m^2K/W
110 mm	5.00 m^2K/W
120 mm	5.45 m^2K/W
125 mm	5.65 m^2K/W
130 mm	5.90 m^2K/W
140 mm	6.35 m^2K/W
150 mm	6.80 m^2K/W
Compressive strength*	CS(10\Y)140

Table 3: Physical Properties of Kingspan TW55

3.6 OTHER INVESTIGATIONS

(i) Existing data on product properties in relation to fire, toxicity, environmental impact and the effect on mechanical strength/stability and durability were assessed. Kingspan Thermawall TW55 zero ODP board does not contain CFC or HCFC gas.

(ii) The manufacturing process was examined including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

(iii) Site visits were conducted to assess the practicability of installation and the history of performance in use of the product.

(iv) A condensation risk analysis was performed.

Detail Sheet 4: Kingspan Thermawall TW52 zero ODP

PRODUCT DESCRIPTION:
This Detail Sheet relates to Kingspan Thermawall TW52 zero ODP, as defined in IAB Certificate 03/0196.

USE:
The product is used for the thermal insulation of existing or new, solid or cavity masonry walls of dwellings or buildings of similar occupancy type and conditions. It may also be used to line ceilings. It also facilitates the control of surface and interstitial condensation in walls and ceilings.

Part One / Technical Specification and Control Data 1

1.1 PRODUCT DESCRIPTION

Kingspan Thermawall TW52 zero ODP is a composite insulation board consisting of a rigid Polyisocyanurate (PIR) foam core bonded to tapered edge plasterboard for internal applications. The plasterboard is 12.5 mm thick manufactured to IS EN 520:2004+A1:2009 *Gypsum plasterboards: Definitions, requirements and test methods,* and accepts dry-jointing materials, plaster skim or direct decoration. Polyisocyanurate (PIR) foam core is a thermoset closed cell rigid foam insulation manufactured in accordance with I.S. EN 13165: 2012 *Thermal insulation products for buildings – Factory made products of polyurethane foam (PUR) specification*.

Kingspan Thermawall TW52 zero ODP board does not contain either CFC or HCFC gases and has zero Ozone Depletion Potential (ODP).

Table 1 shows the Kingspan Thermawall TW52 zero ODP product range.

The boards are available in the following grades and sizes:	
Length	2436 and 2740mm
Width	1196mm
Thickness	25, 38, 50, 60, 70 and 80mm*
Grade	PIR
** Other thicknesses are available subject to quantity required. Thickness refers to insulation only and does not include 12.5mm gypsum plasterboard.*	

Table 1: Product Range

1.2 MANUFACTURE

Kingspan Thermawall TW52 zero ODP is manufactured from a formulation of chemicals, which is distributed onto the kraft paper facer subsequently autohesively bonded to the insulation core during manufacture. The plasterboard is secondary bonded and provides a durable surface to accept traditional finishing techniques.

1.3 INSTALLATION

1.3.1 General

Kingspan Thermawall TW52 zero ODP is for installation on the internal surface of walls and ceilings of new or existing buildings. The fixing method depends on the substrate. The ceiling lining should be in position before wall lining commences.

Installation should be in accordance with good drylining practice and the manufacturers instructions. All installations require careful planning and setting out.

Before fixing the product, sufficient time must be allowed to disperse the solvents contained in wood preservatives and damp proofing treatments where applied. Ensure continuity of insulation between first floor joists on all external walls.

1.3.2 Thermal Bridging

Walls should be insulated to full height and returned at door/window reveals to prevent cold bridging. The margins of window and door reveals should be sufficient to accommodate the thickness of Kingspan Thermawall TW52 zero ODP being employed. The possibility of a cold bridge occurring via the window boards should also be considered and provision made to insulate this area. Services should be fixed in place before drylining commences. The void between the wall and the Thermal Liner can accommodate certain services however the rigid Polyisocyanurate PIR insulation should not be chased. The area around any services that penetrate the Thermal Liner must be sealed to prevent air leakage and thermal looping.

1.3.3 Thermal Looping/Fire Stops

Fire stops must be provided using proprietary methods or by applying a continuous 50 mm ribbon of dry wall adhesive to the top and bottom edge of each sheet. A treated timber batten will also suffice.

1.3.4 Plaster Dab Bonding

This method is for application to brick, hollow block or concrete masonry cavity walls and usually involves setting out a continuous ribbon around perimeter wall and ceiling junctions, and around any openings in order to provide a seal. Vertical dabs of the gypsum adhesive are progressively applied to the background together with a continuous fillet at skirting and ceiling level. The number, size and layout of the dabs will depend on the chosen gypsum adhesive manufacturer's recommendations. Boards are then located against the adhesive dabs and tapped back to align with the predetermined guidelines on the floor and ceiling allowing a 20 mm expansion joint at the top and bottom of the panel. Apply adhesive dabs to the wall ensuring a continuous 50 mm ribbon. Dabs should be applied in accordance with BS 8212:1995 and BS 8000-8:1994. Lift the Kingspan Thermawall TW52 zero ODP into position using wedges on the floor to position the boards. Apply pressure to the board to level and embed the adhesive. Building regulations may require the provision of vertical cavity barriers in long runs of lining. Such barriers can be formed using a continuous vertical line running down the centre of the board. Nailable plugs are recommended to complement the plaster dabs bond, these are normally applied at a rate of 3 no. per board, after the plaster dabs have set. Two fixings positioned at the top of each board and one at the board centre.

1.3.5 Adhesive Bonding

This method is for application to sound, plane concrete or plastered wall surfaces on cavity walls. Bostik 1440 adhesive is applied to the wall surface in strips to a pre-determined pattern that coincides with the edges of the board; a further strip is applied horizontally at the mid point of the board. Strips of Bostik 1440 pads are then applied to the wet adhesive, which is allowed to become tacky which takes about half an hour. The protective paper is then removed from the foam strips, and a coating of adhesive is applied to the corresponding position on the Kingspan Thermawall TW52 zero ODP. After a suitable delay to allow the adhesive to become tacky the board should be accurately offered up to the wall and pressed firmly back into the pads. Nailable plugs are recommended to complement the plaster dabs, these are normally applied at a rate of 3 no. per board, after the adhesive has set. Two fixings positioned at the top of each board and one at the board centre. Allow for expansion at the top and bottom of the panel.

1.3.6 Metal Frame System

Kingspan Thermawall TW52 zero ODP can be fixed by the use of metal framing systems to brick, block or concrete walls. The metal frame should be fixed to the masonry or concrete wall in accordance with the manufacturers instruction to provide a true and level base for the board. The frame should be set vertically at a maximum of 600mm centres to coincide with the board joints and mid point of the board. Short lengths of metal framing should be fixed horizontally between the vertical pieces at skirting level, at the midpoint of the board and just below the ceiling or soffit level. Provision for horizontal services behind the board can be made by the use of two pieces of metal framing set no more than 300mm apart. Kingspan Thermawall TW52 zero ODP should be screw fixed to each metal framing section with self drilling and tapping, countersunk, surface coated (to avoid corrosion), screws placed at 150mm centres. Screws should not be sited less than 10mm from the edges of the board. The screws should be driven straight until the heads are slightly below the paper surface of the plasterboard facing taking care not to overdrive the screws.

1.3.7 Fixing to Timber Frame/Battens

This method may be used for timber frame constructions or on any dry masonry walls that will support and retain the battens and associated fixings. Kingspan Thermawall TW52 zero ODP should be fixed to timber framing/battens set at a maximum of 600mm centres and positioned horizontally at floor and ceiling level. The timbers should run vertically and be wide enough to offer a minimum 20mm support to all four edges of the board. Galvanised clout nails, long enough to allow a minimum 25mm penetration of timber, should be placed at 150mm centres and not less than 10mm from the edges of the board. They should be driven straight with the heads embedded just below the surface of the board. Care should be taken not to overdrive nails. Timbers should be treated where appropriate.

1.3.8 Mechanical Fixing

This method is for application to fair finished brick, block and concrete cavity walls where Kingspan Thermawall TW52 zero ODP is to be finished with gypsum plaster. The wall should be sound, dry and level (surface irregularities may impede the fixing of the board). The board should be fully restrained using mechanical fixings. The number and type of such fixings should be in accordance with the fixing suppliers recommendations, and should be evenly distributed over the whole area of the board, fixings should not overlap boards edges.

1.3.9 Ceiling Linings (Horizontal and Sloping)

Kingspan Thermawall TW52 zero ODP may be used to line ceilings. Installation is similar to standard plasterboard. Boards must always be placed with the long edge running across the joists, rafters or battens and all edges must be supported. Timbers must offer a minimum 20mm support to all four edges of the board. This will necessitate the use of noggins placed between the joists to coincide with the long edges of the board. Large headed galvanised clout or sheradised nails should be used to fix the board. These must be long enough to allow a minimum 25mm penetration of the supporting timber, and be placed not less than 10mm from the edges of the board and be spaced at 150mm intervals along all supporting timbers.

1.3.10 Cutting

On-site trimming of boards where necessary to maintain continuity of insulation around doors, windows or other openings is easily executed using a fine tooth saw or by cutting through the insulation, and paper backing of the plasterboard, then snapping the board face down over a straight edge and cutting the paper facing of the plasterboard on the other side.

Good workmanship and appropriate site procedures are necessary to achieve expected thermal and air tightness performance. Ensure accurate trimming to achieve close butting joints and continuity of insulation.

1.3.11 Finishing

Tapered edged boards are jointed and finished in accordance with standard dry lining procedure offering a surface suitable for paper hanging and paint finishes. A plaster skim finish can also be applied to the boards. The finishing should be carried out in accordance with the specified manufacturer's instructions, particularly in relation to the need to allow thorough drying of the plaster prior to decoration.

Part Two / Design Data 2

2. GENERAL

Kingspan Thermawall TW52 zero ODP when installed in accordance with this Detail Sheet, is effective in reducing the 'U' value (thermal transmittance) of new or existing walls and ceilings.

Kingspan Thermawall TW52 zero ODP may be used to insulate clay or calcium silicate bricks, concrete blocks, or natural and reconstituted stone blocks. It is essential that such walls are designed and constructed to prevent moisture penetration having regard to the Driving Rain Index.

Buildings subject to the relevant requirements of the Building Regulations 1997 to 2017 should be constructed in accordance with IS EN 1996-1-1:2005+A1:2012, IS EN 1996-1-2:2005 COR:2010 *Eurocode 6 – Design of masonry structures – Part 1-2: General rules – Structural fire design (including Irish National Annex)*, IS EN 1996-2:2006 COR:2009 *Eurocode 6 – Design of masonry structures – Part 2: Design considerations, selection of materials and execution of masonry (including Irish National Annex)* and IS EN 1996-3:2006 COR:2009 *Eurocode 6 – Design of masonry structures – Part 3: Simplified calculation methods for unreinforced masonry structures (including Irish National Annex)*. The relevant recommendations these standards should be followed where the wall incorporates stone or cast stone.

With dry lining installations forming a void of 20mm or more, services can be incorporated behind the dry lining, making the chasing of the wall unnecessary. When using adhesive systems, or where the services have a greater depth than the void, the wall should be chased rather than the insulation.

All mould or fungal growth should be treated prior to the application of the product.

When bonding is by adhesives, it is essential that a satisfactory bond is achieved between the walling material and the adhesives. Backgrounds of high suction will behave differently to those of low suction. The Certificate holder's advice should be sought in case of difficulty.

3.1 BEHAVIOUR IN FIRE

The plasterboard used in the Kingspan Thermawall TW52 zero ODP is deemed to be Class '0' in accordance with the Building Regulations 1997 to 2017 and so the insulated board qualifies as the highest product performance classification as defined in Technical Guidance Document B - Fire Safety (paragraph A10 of Annex A). The insulation component of the board should be isolated from possible sources of combustion.

Combustible material shall be separated by solid non-combustible material not less than 200 mm thick from a flue pipe to an oil, solid fuel or gas heating appliance as indicated in Section 2 of Technical Guidance Document J – Heat Producing Appliances.

The Kingspan Thermawall TW52 zero ODP should be separated by a minimum distance of 150 mm from an oil, solid fuel or gas heating appliance as indicated in Diagram 8 of Technical Guidance Document J - Heat Producing Appliances, of Building Regulations 1997 to 2017.

Kingspan Thermawall TW52 zero ODP when installed with a residual cavity between the board and the wall, will require the provision of cavity barriers and may be used in buildings of any purpose group provided:

a) cavity barriers in walls are provided at maximum distances apart of 10m unless a Class 1 material is exposed to the cavity when a spacing of 20m may be adopted;
b) every such cavity shall be closed by a cavity barrier around the whole perimeter of the wall or ceiling element and around the perimeter of any opening through such elements;
c) cavity barriers in spaces between a floor and ceiling are provided at maximum distances of 20m for any class of surface exposed to the cavity;
d) where any wall or ceiling containing a cavity meets another such element, the cavities shall be closed so that they do not communicate with one another;
e) direction on the provision and spacing of cavity barriers is given in Tables 3.2 and 3.3 of Technical Guidance Document B – Fire Safety to the Building Regulations 1997 to 2017.

3.2 WATER PENETRATION

Kingspan Thermawall TW52 zero ODP incorporates a closed cell structure that does not allow water uptake by capillary action.

Kingspan Thermawall TW52 zero ODP when used in accordance with this Detail Sheet presents no significant risk of water penetration.

3.3 THERMAL INSULATION

The aged/design thermal conductivity 'λ' value' of Kingspan Thermawall TW52 zero ODP when measured in accordance with I.S. EN 12667: 2001 *Thermal performance of building materials and products – Determination of thermal resistance by means of guarded hot plate and heat flow meters method – Products of high and medium thermal resistance*, is 0.027 W/mK (insulation only – does not include gypsum plasterboard). The high thermal resistance of Kingspan Thermawall TW52 zero ODP ensures that cold bridging and extra heat loss around the edges of openings can be avoided. A minimum thickness of 27 mm of Kingspan Thermawall TW52 zero ODP will be suitable.

Lintel jamb and cill designs similar to those shown in Diagram 3 of the TGD to Part L of the Building Regulations 1997 to 2017, and will be satisfactory to limit thermal bridging.

Uncontrolled leakage of air through the fabric of a building and/or cracks in and around door and window frames, sills, jambs etc. can occur due to wind pressure or air movement due to thermal effects. Details of how to avoid the infiltration of cold air are given in TGD – L (DWELLINGS), Section 1.6 page 14.

The required maximum U-values for external walls can be obtained with Kingspan Thermawall TW52 zero ODP constructions as indicated in Table 2.

3.4 MATERIALS IN CONTACT WITH ELECTRICAL WIRING

Electrical installations should be in accordance with the ETCI publication ET 207 *Guide to the National Rules for Electrical Installations as Applicable to Domestic Installations.* It is recommended that cables should not be buried in the insulation and carried in a conduit. In relation to recessed spotlights and other luminaries, ET 207 requires they be not less than the minimum distances from combustible materials as specified in clause 559.3.2 of the TCI National rules of the Electro Technical Council of Ireland (ET 101).

3.5 CONDENSATION RISK

Kingspan Thermawall TW52 zero ODP has a high vapour resistance and is therefore unlikely to be affected by surface or interstitial condensation, provided the correct thickness of Kingspan Thermawall TW52 zero ODP is chosen and all joints between boards are filled and taped in accordance with Standard Dry Lining practice. Correct use of the heating and ventilation system is important. Interstitial condensation analysis for average winter environmental conditions for cavity wall constructions indicate no condensation risk. When insulating buildings the recommendations of BS 5250:2011 *Code of practice for control of condensation in buildings*, should be followed to minimise the risk of condensation within the building elements and structures. No separate vapour control layer is required, however areas of high moisture content (wet rooms) should have moisture resistant plasterboard in accordance with the Building Regulations 1997 to 2017.

Adhesive System[1]		
	Thickness of Insulation[2] (mm)	
U-value (W/m²K)	215mm brickwork λ=0.77W/mK	200mm dense blockwork λ= 1.75W/mK
0.18	110[3]	110[3]
0.19	105[3]	105[3]
0.25	75	80
0.26	75	75

[1] Wall construction inclusive of 12.5mm plasterboard and 15mm cavity (20% dabs)
[2] Based upon incremental insulation thickness of 5mm
[3] Non-standard thickness (special order)

Fixing System[1][2]		
	Thickness of Insulation[3] (mm)	
U-value (W/m²K)	215mm brickwork λ=0.77W/mK	200mm dense blockwork λ= 1.75W/mK
0.18	145[4]	150[4]
0.19	135[4]	140[4]
0.25	100[4]	105[4]
0.26	95[4]	100[4]

[1] Wall construction inclusive of 12.5mm plasterboard and 15mm cavity (10% timber or 0.5% steel)
[2] Fixings – 18.2mm² area with λ=50W/mK and 10 per m²
[3] Based upon incremental insulation thickness of 5mm
[4] Non-standard thickness (special order)

Table 2: Wall Constructions – Typical U Values

3.6 WALL MOUNTED FITTINGS

The recommendations of the manufacturer should be followed. Any object fixed to the wall, other than lightweight items, e.g. framed pictures, should be fixed through the lining board into the wall behind, using proprietary fixings.

3.7 LIMITATIONS

Kingspan Thermawall TW52 zero ODP has a gypsum plasterboard face, and should therefore not be used to isolate dampness nor be used in continuously damp or humid conditions.

3.8 TESTS AND ASSESSMENTS WERE CARRIED OUT TO DETERMINE THE FOLLOWING:

- Density
- Water vapour transmission
- Long term water absorption
- Dimensional accuracy
- Compressive and cross-breaking strength
- Dimensional stability
- Thermal conductivity
- Efficiency of the construction process

3.9 OTHER INVESTIGATIONS

(i) Existing data on product properties in relation to fire, toxicity, environmental impact and the effect on mechanical strength/stability and durability were assessed. Kingspan Thermawall TW52 zero ODP board does not contain CFC or HCFC gas.

(ii) The manufacturing process was examined including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

(iii) Site visits were conducted to assess the practicability of installation and the history of performance in use of the product.

(iv) A condensation risk analysis was performed.

Property	Declared Value
Reaction to Fire*	NPD
Thermal Conductivity*	20-79mm: 0.026W/mK 80-119mm: 0.025 W/mK Plasterboard: 0.19 W/mK
Thermal Resistance*	
25 mm	0.95 m²K/W
30 mm	1.15 m²K/W
40 mm	1.55 m²K/W
50 mm	1.90 m²K/W
60 mm	2.30 m²K/W
70 mm	2.70 m²K/W
80 mm	3.20 m²K/W
Adhesion/Cohesion*	≥0.017MPa
Flatness*	≤5.0mm
Flexural Strength*	Transverse: ≥160N Longitudinal: ≥400N

Table 3: Physical Properties of Kingspan TW52

Detail Sheet 5: Kingspan Thermawall TW56 zero ODP

PRODUCT DESCRIPTION:
This Detail Sheet relates to Kingspan Thermawall TW56 zero ODP, as defined in IAB Certificate 03/0196.

USE:
The product is used for the thermal insulation of existing or new, solid or cavity masonry walls of dwellings or buildings of similar occupancy type and conditions. It may also be used to line ceilings. It also facilitates the control of surface and interstitial condensation in walls and ceilings.

Part One / Technical Specification and Control Data 1

1.1 PRODUCT DESCRIPTION

Kingspan Thermawall TW56 zero ODP is a composite insulation board consisting of a rigid Polyisocyanurate (PIR) foam core bonded to tapered edge plasterboard for internal applications. The plasterboard is 12.5 mm thick manufactured to IS EN 520:2004+A1:2009 *Gypsum plasterboards: Definitions, requirements and test methods*, and accepts dry-jointing materials, plaster skim or direct decoration. Polyisocyanurate (PIR) foam core is a thermoset closed cell rigid foam insulation manufactured in accordance with IS EN 13165:2012+A2:2016 *Thermal insulation products for buildings – Factory made products of polyurethane foam (PUR) specification*.

Kingspan Thermawall TW56 zero ODP board does not contain either CFC or HCFC gases and has zero Ozone Depletion Potential (ODP).

Table 1 shows the Kingspan Thermawall TW56 zero ODP product range.

The boards are available in the following grades and sizes:	
Length	2436 and 2740mm
Width	1196mm
Thickness	25, 40, 50, 60, 65 and 80mm*
Grade	PIR
** Other thicknesses are available subject to quantity required. Thickness refers to insulation only and does not include 12.5mm gypsum plasterboard.*	

Table 1: Product Range

1.2 MANUFACTURE

Kingspan Thermawall TW56 zero ODP is manufactured from a formulation of chemicals, which are distributed onto low emissivity composite foil facers subsequently autohesively bonded to the insulation core during manufacture. The plasterboard is secondary bonded and provides a durable surface to accept traditional finishing techniques.

1.3 INSTALLATION

1.3.1 General

Kingspan Thermawall TW56 zero ODP is for installation on the internal surface of walls and ceilings of new or existing buildings. The board is intended to be mechanically fixed to the substrate. The ceiling lining should be in position before wall lining commences.

Installation should be in accordance with good drylining practice and the manufacturer's instructions. All installations require careful planning and setting out.

Before fixing the product, sufficient time must be allowed to disperse the solvents contained in wood preservatives and damp proofing treatments where applied.

1.3.2 Thermal Bridging

Walls should be insulated to full height and returned at door/window reveals to prevent cold bridging. The margins of window and door reveals should be sufficient to accommodate the thickness of Kingspan Thermawall TW56 zero ODP being employed. The possibility of a cold bridge occurring via the window boards should also be considered and provision made to insulate this area. Services should be fixed in place before drylining commences. The void between the wall and the Thermal Liner can accommodate certain services however the PIR insulation should not be chased. The area around any services that penetrate the Thermal Liner must be sealed to prevent air leakage and thermal looping.

1.3.3 Thermal Looping/Fire Stops

Fire stops must be provided using proprietary methods horizontally at floor and ceiling level.

1.3.4 Metal Frame System

Kingspan Thermawall TW56 zero ODP can be fixed by the use of proprietary metal framing systems to brick, block or concrete walls. The metal frame should be fixed to the masonry or concrete wall in accordance with the manufacturer's instruction to provide a true and level base for the board. The frame should be set vertically at a maximum of 600 mm centres to coincide with the

board joints and mid point of the board. Short lengths of metal framing should be fixed horizontally between the vertical pieces at skirting level, at the midpoint of the board and just below the ceiling or soffit level. Provision for horizontal services behind the board can be made by the use of two pieces of metal framing set no more than 300 mm apart. Kingspan Thermawall TW56 zero ODP should be screw fixed to each metal framing section with self drilling and tapping, countersunk, surface coated (to avoid corrosion), screws placed at 150 mm centres. Screws should not be sited less than 10 mm from the edges of the board. The screws should be driven straight until the heads are slightly below the paper surface of the plasterboard facing taking care not to overdrive the screws.

1.3.5 Fixing to Timber Frame/Battens

This method may be used on timber frame constructions or on any dry masonry walls that will support and retain the battens and associated fixings. Kingspan Thermawall TW56 zero ODP should be fixed to timber framing/battens set at a maximum of 600 mm centres and positioned horizontally at floor and ceiling level. The timbers should run vertically and be wide enough to offer a minimum 20 mm support to all four edges of the board. Galvanised clout nails, long enough to allow a minimum 25 mm penetration of timber, should be placed at 150 mm centres and not less than 10 mm from the edges of the board. They should be driven straight with the heads embedded just below the surface of the board. Care should be taken not to overdrive nails. Timbers should be treated where appropriate.

1.3.6 Mechanical Fixing

This method is for application to fair finished brick, block and concrete cavity walls where Kingspan Thermawall TW56 zero ODP is to be finished with gypsum plaster. The wall should be sound, dry and level (surface irregularities may impede the fixing of the board). The board should be fully restrained using mechanical fixings. The number and type of such fixings should be in accordance with the fixing suppliers recommendations, and should be evenly distributed over the whole area of the board, fixings should not overlap boards edges.

1.3.7 Ceiling Linings (Horizontal and Sloping)

Kingspan Thermawall TW56 zero ODP may be used to line ceilings. Insulation is similar to standard plasterboard. Boards must always be placed with the long edge running across the joists, rafters or battens and all edges must be supported. Timbers must offer a minimum 20 mm support to all four edges of the board. This will necessitate the use of noggins placed between the joists to coincide with the long edges of the board. Large headed galvanised clout or sheradised nails should be used to fix the board. These must be long enough to allow a minimum 25 mm penetration of the supporting timber, and be placed not less than 10 mm from the edges of the board and be spaced at 150 mm intervals along all supporting timbers.

1.3.8 Cutting

On-site trimming of boards where necessary to maintain continuity of insulation around doors, windows or other openings is easily executed using a fine tooth saw or by cutting through the insulation, and paper backing of the plasterboard, then snapping the board face down over a straight edge and cutting the paper facing of the plasterboard on the other side.

Good workmanship and appropriate site procedures are necessary to achieve expected thermal and air tightness performance. Ensure accurate trimming to achieve close butting joints and continuity of insulation.

1.3.9 Finishing

Tapered edged boards are jointed and finished in accordance with standard dry lining procedure offering a surface suitable for paper hanging and paint finishes. A plaster skim finish can also be applied to the boards. The finishing should be carried out in accordance with the specified manufacturer's instructions, particularly in relation to the need to allow thorough drying of the plaster prior to decoration.

Part Two / Design Data 2

2. GENERAL

Kingspan Thermawall TW56 zero ODP when installed in accordance with this Detail Sheet, is effective in reducing the 'U' value (thermal transmittance) of new or existing walls and ceilings.

Kingspan Thermawall TW56 zero ODP may be used to insulate clay or calcium silicate bricks, concrete blocks, or natural and reconstituted stone blocks. It is essential that such walls are designed and constructed to prevent moisture penetration having regard to the Driving Rain index.

Buildings subject to the relevant requirements of the Building Regulations 1997 to 2017 should be constructed in accordance with IS EN 1996-1-1:2005+A1:2012 *Eurocode 6: Design of masonry structures: Part 1-1: General rules for reinforced and unreinforced masonry structures*,. Where reinforced masonry is involved, the design should be in accordance with IS EN 1996-3:2006 *Eurocode 6: Design of masonry structures: Simplified calculation methods for unreinforced masonry structures*.

Particular attention should be paid to the exclusion of moisture in that the designer should select a construction appropriate to the local wind driven rain index, paying due regard to the design detailing, workmanship and materials to be used.

The relevant recommendations of Section 3 of IS EN 1996-3:2006 should be followed where the wall incorporates stone or cast stone.

With dry lining installations forming a void of 20mm or more, services can be incorporated behind the dry lining, making the chasing of the wall unnecessary. Where the services have a greater depth than the void, the wall should be chased rather than the insulation.

All mould or fungal growth should be treated prior to the application of the product.

Part Three / Technical Investigations 3

3.1 BEHAVIOUR IN FIRE

The plasterboard used in the Kingspan Thermawall TW56 zero ODP is deemed to be Class '0' in accordance with the Building Regulations 1997 to 2013 and so the insulated board qualifies as the highest product performance classification as defined in Technical Guidance Document B - Fire Safety (paragraph A10 of Annex A). The insulation component of the board should be isolated from possible sources of combustion.

Combustible material shall be separated by solid non-combustible material not less than 200 mm thick from a flue pipe to an oil, solid fuel or gas heating appliance as indicated in Section 2 of TGD J.

The Kingspan Thermawall TW56 zero ODP should be separated by a minimum distance of 150 mm from an oil, solid fuel or gas heating appliance as indicated in Diagram 8 of TGD J.

Kingspan Thermawall TW56 zero ODP when installed with a residual cavity between the board and the wall, will require the provision of cavity barriers and may be used in buildings of any purpose group provided:

a) cavity barriers in walls are provided at maximum distances apart of 10m unless a Class 1 material is exposed to the cavity when a spacing of 20m may be adopted;
b) every such cavity shall be closed by a cavity barrier around the whole perimeter of the wall or ceiling element and around the perimeter of any opening through such elements;
c) cavity barriers in spaces between a floor and ceiling are provided at maximum distances of 20m for any class of surface exposed to the cavity;
d) where any wall or ceiling containing a cavity meets another such element, the cavities shall be closed so that they do not communicate with one another;
e) direction on the provision and spacing of cavity barriers is given in Tables 3.2 and 3.3 of TGD to Part B of the Building Regulations 1997 to 2017.

3.2 WATER PENETRATION

Kingspan Thermawall TW56 zero ODP incorporates a closed cell structure that does not allow water uptake by capillary action.

Kingspan Thermawall TW56 Zero ODP when used in accordance with this Detail Sheet presents no significant risk of water penetration.

3.3 THERMAL INSULATION

The aged/design thermal conductivity 'λ' value' of Kingspan Thermawall TW56 zero ODP when measured in accordance with IS EN 12667: 2001 *Thermal performance of building materials and products – Determination of thermal resistance by means of guarded hot plate and heat flow meters method – Products of high and medium thermal resistance*, is 0.022 – 0.023 W/mK (insulation only). The high thermal resistance of Kingspan Thermawall TW56 Zero ODP ensures that cold bridging and extra heat loss around the edges of openings can be avoided. A minimum thickness of 22 mm of Kingspan Thermawall TW56 zero ODP will be suitable.

The foil facing on Kingspan Thermawall TW56 zero ODP boards is a low emissivity aluminium foil which has been tested by the National Physics Laboratory to achieve an aged aggregate emissivity value (including printing) of 0.06. This value can then be used in the calculation in Appendix B2 or B3 as appropriate of IS EN ISO 6946:2007 *Building components and building elements – Thermal resistance and thermal transmittance – Calculation method* to derive an increased thermal resistance of 0.644W/mK for the residual airspace immediately adjacent to the foil facing.

Lintel jamb and cill designs similar to those shown in Diagram 3 of the TGD to Part of the Building Regulations 1997 to 2013, and will be satisfactory to limit thermal bridging. The DoEHLG publication *Limiting Thermal Bridging & Air Infiltration – Acceptable Construction Details* should also be referred to.

Uncontrolled leakage of air through the fabric of a building and/or cracks in and around door and window frames, sills, jambs etc. can occur due to wind pressure or air movement due to thermal effects. Details of how to avoid the infiltration of cold air are given in TGD – L (DWELLINGS), Section 1.6 page 14.

The required maximum U-values for external walls can be obtained with Kingspan Thermawall TW56 zero ODP constructions as indicated in Table 2 below.

3.4 MATERIALS IN CONTACT WITH ELECTRICAL WIRING

Electrical installations should be in accordance with the ETCI publication ET 207 *Guide to the National Rules for Electrical Installations as Applicable to Domestic Installations.* It is recommended that cables should not be buried in the insulation and carried in a conduit. In relation to recessed spotlights and other luminaries, ET 207 requires they be not less than the minimum distances from combustible materials as specified in clause 559.3.2 of the TCI National rules of the Electro Technical Council of Ireland (ET 101).

3.5 CONDENSATION RISK

Kingspan Thermawall TW56 zero ODP has a high vapour resistance and is therefore unlikely to be affected by surface or interstitial condensation, provided the correct thickness of Kingspan Thermawall TW56 zero ODP is chosen and all joints between boards are filled and taped in accordance with Standards Dry Lining practice. Correct use of the heating and ventilation system is important. Interstitial condensation analysis for average winter environmental conditions for cavity wall constructions indicate no condensation risk. When insulating buildings the recommendations of BS 5250:2011+A1:2016 *Code of practice for control of condensation in buildings*, should be followed to minimise the risk of condensation within the building elements and structures. No separate vapour control layer is required, however areas of high moisture content (wet rooms) should have moisture resistant plasterboard in accordance with the Building Regulations 1997 to 2017.

3.6 WALL MOUNTED FITTINGS

The recommendations of the manufacturer should be followed. Any object fixed to the wall, other than lightweight items such as framed pictures, should be fixed through the lining board into the wall behind using proprietary fixings.

3.7 LIMITATIONS

Kingspan Thermawall TW56 zero ODP has a gypsum plasterboard face, and should therefore not be used to isolate dampness nor be used in continuously damp or humid conditions.

3.8 TESTS AND ASSESSMENTS WERE CARRIED OUT TO DETERMINE THE FOLLOWING:

- Density
- Water vapour transmission
- Long term water absorption
- Dimensional accuracy
- Compressive and cross-breaking strength
- Dimensional stability
- Thermal conductivity
- Efficiency of the construction process

3.9 OTHER INVESTIGATIONS

(i) Existing data on product properties in relation to fire, toxicity, environmental impact and the effect on mechanical strength/stability and durability were assessed. Kingspan Thermawall TW56 zero ODP board does not contain CFC or HCFC gas.

(ii) The manufacturing process was examined including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

(iii) Site visits were conducted to assess the practicability of installation and the history of performance in use of the product.

(iv) A condensation risk analysis was performed.

Inner Leaf	Block	Block	Block	Block	Hollow Block
Outer Leaf	Block	Block	Brick	Brick	
Timber Batten	Yes	No	Yes	No	Yes
U = 0.27 W/m^{2}K	72.5*	82.5*	72.5*	82.5*	72.5*
U = 0.45 W/m^{2}K	37.5*	52.5*	37.5*	52.5*	37.5*

Note*: Includes 12.5mm plasterboard

Table 2: Wall Construction Typical U Values (Dry Lining) – Compliance with Building Regulations

Property	Declared Value
Reaction to Fire*	NPD
Thermal Conductivity*	20-79mm: 0.023W/mK 80-119mm: 0.022 W/mK Plasterboard: 0.19 W/mK
Thermal Resistance*	
25 mm	1.15 m^{2}K/W
30 mm	1.35 m^{2}K/W
40 mm	1.80 m^{2}K/W
50 mm	2.25 m^{2}K/W
60 mm	2.70 m^{2}K/W
70 mm	3.15 m^{2}K/W
80 mm	3.60 m^{2}K/W

Table 3: Physical Properties of Kingspan TW56

NSAI Agrément

Detail Sheet 6: Kingspan Thermafloor TF70 zero ODP

PRODUCT DESCRIPTION:
This Detail Sheet relates to Kingspan Thermafloor TF70 zero ODP, as defined in IAB Certificate 03/0196.

USE:
Kingspan Thermafloor TF70 zero ODP is used for the thermal insulation in ground supported and suspended floors and may be installed:

- Below a concrete floor slab;
- Below a cement based floor screed on a concrete slab with a hardcore base;
- Above a suspended concrete floor (e.g. block and beam) with a cement based screed;
- Between the joists of a suspended timber floor.

Part One / Technical Specification and Control Data 1

1.1 PRODUCT DESCRIPTION

This Certificate relates to the Kingspan Thermafloor TF70 zero ODP using Polyisocyanurate (PIR), closed cell rigid foam insulation manufactured in accordance with I.S. EN 13165: 2012+A2:2016 *Thermal insulation products for buildings – Factory made products of polyurethane foam (PUR) specification.* During the manufacturing process, liquid raw materials expanded by blowing agents are applied between low emissivity composite foil facings. This Detail Sheet certifies compliance with the requirements of the Building Regulations 1997 to 2017.

Kingspan Thermafloor TF70 zero ODP boards are CFC and HCFC free and therefore have zero ozone depletion potential (zero ODP).

Table 1 shows the Kingspan Thermafloor TF70 zero ODP product range.

The boards are available in the following grades and sizes:	
Length	2400mm
Width	1200mm
Thickness	25, 30, 40, 50 and 60mm*
Grade	PIR
** Other thicknesses are available subject to quantity required*	

Table 1: Product Range

1.2 MANUFACTURE

Kingspan Thermafloor TF70 zero ODP is manufactured from a formulation of chemicals, which are distributed onto low emissivity composite foil facers subsequently autohesively bonded to the insulation core during manufacture.

1.3 INSTALLATION

1.3.1 General

Kingspan Thermafloor TF70 zero ODP boards are placed below the slab or between the slab and the screed. Boards can also be used to provide insulation to suspended timber floors. Vertical upstands of insulation (perimeter insulation strips) should be used to separate the screed/slab from the wall to reduce thermal bridging at the wall/floor junction.

1.3.2 Laying Below the Floor Screed

Where Kingspan Thermafloor TF70 zero ODP board is used below the floor screed, it is simply laid loose over the concrete floor slab with the necessary water and vapour protection for the slab. Board joints should be lightly butted, staggered and laid to break-bonded pattern. The floor slab should be uniformly flat without steps or gaps to provide continuous bearing support to the Kingspan Thermafloor TF70 zero ODP board. A strip of board 25 mm thick should be used around the perimeter of the floor area being insulated. This should be placed vertically against the abutting wall so that it connects with the insulation laid over the slab and protects the edge of the screed, so preventing cold bridging of the floor screed. Boards are overlaid with a separating layer of building paper to BS 1521:1994 *Specification for waterproof building papers*, Grade B1F or polythene sheet (not less than 125 micron/500 gauge). The minimum thickness of sand and cement screed is 65 mm for domestic construction and 75 mm for most other buildings.

The concrete floor over which the insulation is to be laid should be left as long as possible to maximise drying out in accordance with the relevant recommendations of BS 8203:2001+A1:2009, *Code of practice for the installation of resilient floor coverings*.

1.3.3 Laying Below the Floor Slab

Where Kingspan Thermafloor TF70 zero ODP board is used below the floor slab, lay the hardcore in layers; min 150 – 225 mm; each layer should be well compacted, with the surfaced blinded with quarry dust or sand to provide a suitable surface for laying a damp proof membrane (dpm).

A damp proof membrane e.g. 1200 gauge polythene or a Radon Barrier, subject to site conditions, should be laid over the well compacted hardcore and blinding with joints taped and folded to prevent the passage of ground moisture. The dpm should be carried up the surrounding foundation walls until it meets and seals with the damp proof course.

Kingspan Thermafloor TF70 zero ODP board should be laid staggered to break-bonded pattern with closely butted joints, fitted tightly at the edges and around any service penetrations. A strip of board 25 mm thick should be used around the perimeter of the floor slab in order to prevent cold bridging of the slab. Boards are overlaid with a separating layer of building paper to BS 1521:1994 *Specification for waterproof building papers*, Grade B1F or polythene sheet (not less than 125 micron/500 gauge).

Care should be taken to avoid damage to the insulation or damp proof membranes and radon barriers as the slab is being poured and operatives should make use of barrow runs and walkways whilst installation progresses.

1.3.4 Laying on Precast Block and Beam Floor

All surfaces should be level to accept the Kingspan Thermafloor TF70 zero ODP board. The floor surface should be smooth, uneven surfaces should be levelled prior to laying of the floor and flat irregularities should be removed by a levelling screed. Lay a Damp Proof Membrane, ensure that it is correctly positioned and turned up to meet the seal with the dpc.

Kingspan Thermafloor TF70 zero ODP board should be laid with joints tightly butted. During construction the boards must be protected from damage by moisture sources, water spillage, plaster droppings etc. Use scaffold boards to prevent wheelbarrow and other traffic damage to the boards. Kingspan Thermafloor TF70 zero ODP board should be over laid with 500 gauge polythene sheet to prevent the wet screed from penetrating the joints between the insulation boards.

As in the case with solid ground floors, attention should be given to detailing to avoid thermal bridging.

1.3.5 Laying in Suspended Timber Floors

The application of Kingspan Thermafloor TF70 zero ODP board in suspended floor constructions should be carried out before commencement of floor boarding. Kingspan Thermafloor TF70 zero ODP board should be cut to fit snugly between the timber joists. It should be supported on softwood timber battens, proprietary galvanised steel saddle clips or galvanised nails partly driven into the side of the joists. Battens/nails should be placed at an appropriate height to suit the thickness of board being employed and nails should remain 40 mm proud of the joist. The board should then be laid between the joists so that they are supported by the battens/nails. Any narrow gaps between the joist and perimeter walls should be insulated by specially cut pieces of board. They should be supported on blocks nailed to the underside of the joists. Kingspan Thermafloor TF70 zero ODP board is not suitable for laying over timber joists.

Where services need to be accommodated below the floor, Kingspan Thermafloor TF70 zero ODP board can be lowered to provide an insulated duct.

Install flooring grade chipboard, ply or softwood timber flooring directly onto the joists fixing in the normal manner.

Ensure that the void below the insulated suspended floor is well ventilated and that the airflow is not restricted by sleeper walls.

1.3.6 Cutting

On-site trimming of Kingspan Thermafloor TF70 zero ODP boards where necessary to maintain continuity of insulation or to fit around openings is easily executed using a fine tooth saw or by scoring with a sharp knife and cutting snapping the board face down over a straight edge and cutting the foil facing on the other side.

Part Two / Design Data 2

2.1 GENERAL

Kingspan Thermafloor TF70 zero ODP board when installed in accordance with this Detail Sheet, is effective in reducing the 'U' value (thermal transmittance) of new and existing floor constructions.

Ground supported floors incorporating Kingspan Thermafloor TF70 zero ODP board must include a suitable damp proof membrane laid in accordance with BS CP 102: 1973 *Code of Practice for the protection of buildings against water from the ground* (as read with AMD 1511, AMD 2196, and AMD 2470).

Suspended concrete ground floors incorporating Kingspan Thermafloor TF70 zero ODP board must include suitable ventilation.

The overlay to Kingspan Thermafloor TF70 zero ODP board should be:

a) A cement based floor; or
b) A concrete slab.

2.2 FLOOR LOADING

The design loadings for self contained single family dwelling units as defined in IS EN 1991-1-1:2002+NA:2013 *Eurocode 1: Actions on structures – Part 1-1: General actions – Densities, self-weight, imposed loads for buildings (including Irish National Annex 2013).*

Kingspan Thermafloor TF70 zero ODP board covered with chipboard or OSB (laid over joists) or a screed can support these design loadings without undue deflection.

Where Kingspan Thermafloor TF70 zero ODP board is used under a concrete slab, resistance to concentrated and distributed loads is a function of the slab specification.

2.3 UNDERFLOOR SERVICES

The maximum continuous working temperature of PIR is 100°C. Where underfloor heating systems are to be used, installers should ensure that this temperature is not exceeded.

2.4 WATERPROOFING

If an overlay of chipboard, OSB or similar material is to be used in bathrooms or kitchens, a continuous waterproof finish (e.g. vinyl) must be provided to protect it. Please note that OSB or similar material must be laid over joists and not directly overlaid onto the insulation.

Part Three / Technical Investigations 3

3.1 BEHAVIOUR IN FIRE

Combustibility - Kingspan Thermafloor TF70 is classified as NPD to IS EN 13501-1. The boards when in proximity to a constructional hearth must be protected by 250mm of solid concrete or as detailed in Diagram 4 of TGD J: Heat Producing Appliances. The boards are combustible and must be protected from naked flames and other ignition sources during and after installation.

Toxicity – Negligible when used in a ground floor construction.

Kingspan Thermafloor TF70 zero ODP board is manufactured without the use of CFC's and HCFC's, there is no release of such gas on burning.

3.2 STRENGTH

Kingspan Thermafloor TF70 zero ODP board exceeds 140 kPa at 10% yield and when installed in accordance with the manufacturer's instructions, and this certificate, will resist the loads likely to be met in service.

3.3 RESISTANCE TO MOISTURE

Kingspan Thermafloor TF70 zero ODP board will not allow moisture to cross the floor construction provided it is installed in accordance with this Detail Sheet.

3.4 CONDENSATION RISK

Kingspan Thermafloor TF70 zero ODP board has a vapour resistivity exceeding 250 MNs/gm. It has significant resistance to the passage of water vapour when used in ground floor construction using a suitable damp proof membrane.

Capillary Action – The closed cell structure does not allow water uptake by capillary action.

3.5 THERMAL INSULATION

The aged thermal conductivity 'λ' value of Kingspan Thermafloor TF 70 zero ODP board, when measured in accordance with IS EN 12667:2001 *Thermal performance of building materials and products – Determination of thermal resistance by means of guarded hot plate and heat flow meters method – Products of high and medium thermal resistance*, is 0.022 – 0.023 W/mK. The required maximum U-values

for ground floors can be obtained with Kingspan Thermafloor TF70 zero ODP board constructions as indicated in Table 2.

3.6 TESTS AND ASSESSMENTS WERE CARRIED OUT TO DETERMINE THE FOLLOWING:

- Density
- Water vapour transmission
- Long term water absorption
- Dimensional accuracy
- Compressive and cross-breaking strength
- Dimensional stability
- Thermal conductivity
- Efficiency of the construction process

3.7 OTHER INVESTIGATIONS

(i) Existing data on product properties in relation to fire, toxicity, environmental impact and the effect on mechanical strength/stability and durability were assessed. Kingspan Thermafloor TF70 zero ODP board does not contain CFC or HCFC gas.

(ii) The manufacturing process was examined including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

(iii) Site visits were conducted to assess the practicability of installation and the history of performance in use of the product.

(iv) A condensation risk analysis was performed.

Property	Declared Value
Reaction to Fire*	NPD
Thermal Conductivity*	0.022W/mK
Thermal Resistance*	
30 mm	1.35 m^2K/W
40 mm	1.80 m^2K/W
50 mm	2.25 m^2K/W
60 mm	2.70 m^2K/W
70 mm	3.15 m^2K/W
80 mm	3.60 m^2K/W
90 mm	4.05 m^2K/W
100 mm	4.50 m^2K/W
120 mm	5.45 m^2K/W
130 mm	5.90 m^2K/W
140 mm	6.35 m^2K/W
150 mm	6.80 m^2K/W
160 mm	7.25 m^2K/W

Table 3: Physical Properties of Kingspan TF70

Typical thicknesses to achieve 0.25 W/m^2K									
P/A	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
	40	50	60	65	65	70	70	75	75

Perimeter/Area
Above values are based on assuming a thermal conductivity value of 2.0 for earth.

Table 2: Ground Floor Construction Typical U Values