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NB. This AQP document contains comments and amendment (highlighted in yellow in Bold) which were made during this assessment, carried out on the 28th February 2019, the by Assessor. The document amendments are in need of formal approval and the QP re-signed by the BBA and the client, in preparation for future surveillance assessment.

Assessment of Production

Agreed Quality Plan
for

Kingspan Insulation Ltd

14/5133 (Pembridge, Selby, Basildon)
14/5134 (Pembridge)
14/5134 PS5 & PS7 (Castleblayney)
16/5299 (Pembridge)
16/5332 (Pembridge, Selby, Basildon)
16/5349 (Pembridge, Selby, Basildon)

Building Innovation Ltd

16/5341 (reproduction of 16/5332 PS1)
(Pembridge, Selby, Basildon)

Langley Waterproofing Systems Ltd

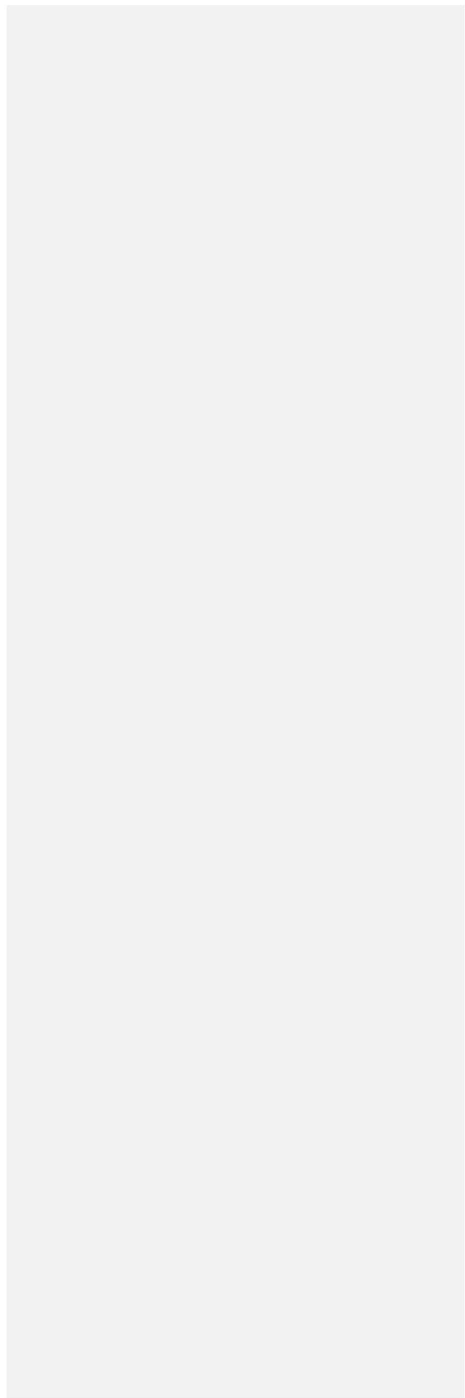
16/5350 (Reproduction of 16/5332 PS1 – TR27/TT47)
(Pembridge, Selby, Basildon)

EcoTherm Ltd

14/5157 (reproduction of 14/5133)
(Pembridge, Selby, Basildon)

Document reference	Kingspan Multi sites AQP 9 th November 2018
Date of issue	9 th November 2018
BBA Section responsible	Construction Products
BBA Project Manager	Martin Oxley

Other products covered by BBA Certificates manufactured on this site:	
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List of BBA Certificates and products:

Kingspan Insulation Ltd products

14/5133 PS 1 - Kingspan Thermafloor TF70 Floorboard
14/5133 PS 2 - Kingspan Thermawall TW50 (Partial Fill Cavity)
14/5133 PS 3 - Kingspan Thermawall TW52 Thermal laminate
14/5133 PS 4 - Kingspan Thermawall TW55 Framing Board
14/5133 PS 5 - Kingspan Thermapitch TP10 Pitched Roof Board

14/5134 PS 1 - Kooltherm K3 Floorboard
14/5134 PS 2 - Kooltherm K7 Pitched Roof Board
14/5134 PS 3 - Kooltherm K6 (Full Fill Cavity Wall Board) – *not visible*
14/5134 PS 4 - Kooltherm K8 (Partial Fill Cavity Wall Board)
14/5134 PS 5 - Kooltherm K10 Soffit Insulation
14/5134 PS 6 - Kooltherm K12 Framing Board
14/5134 PS 7 - Kooltherm K15 Rainscreen Insulation Board
14/5134 PS 8 - Kooltherm K17 and K18 Insulated Dry Lining Systems

16/5299 PS 1 - Kingspan Kooltherm K108 (Partial Fill Cavity Wall Board)
16/5299 PS 2 - Kingspan Kooltherm K106 (Full Fill Cavity Wall Board)
16/5299 PS 3 - Kingspan Kooltherm K107 Pitched Roof Board
16/5299 PS 4 - Kingspan Kooltherm K110 Soffit Insulation
16/5299 PS 5 - Kingspan Kooltherm K112 Framing Board
16/5299 PS 7 - Kingspan Kooltherm K103 Floorboard
16/5299 PS 8 - Kingspan Kooltherm K118 Insulated Dry Lining System

16/5332 PS 1 - Kingspan TherमारooF TR26 / TT46 and TherमारooF TR27 / TT47

16/5349 PS 1 - Kingspan Thermawall TW50 (Full Fill Cavity) – *not visible*

EcoTherm Ltd products

14/5157 PS 1 - EcoTherm Eco-Versal Board for use in Floors (Reproduction of 14/5133 PS 1)
14/5157 PS 2 - EcoTherm Eco-Cavity Partial Fill (Reproduction of 14/5133 PS 2)
14/5157 PS 3 - EcoTherm Eco-Liner (Reproduction of 14/5133 PS 3)
14/5157 PS 4 - EcoTherm Eco-Cavity Full Fill (Reproduction of 16/5349 PS 1)
14/5157 PS 5 - EcoTherm Eco-Versal Board for Pitched Roof Applications (reproduction of 14/5133 PS 5)
14/5157 PS 6 - EcoTherm Eco-Versal Board for Timber Frame Dwellings (reproduction 14/5133 PS 4)

Building Innovation Ltd

16/5341 PS 1 - Building Innovation Inno-Fix and Inno-Bond Roofing Boards (Reproduction of 16/5332 PS 1)

Langley Waterproofing Systems Ltd

16/5350 PS 1 - Langley Parafoam Ultra and Parafoam Ultra Tapered Roofing Boards
(Reproduction of 16/5332 PS 1 - TR27 and TT47 only)

Assessor's Notes:

At the time of assessment there were no changes to the above information, and the products highlighted above were traced through from finished product to raw material P.O. s.

Production location:

Site	Pembridge	Selby	Basildon	Castleblayney
Line(s)	Kooltherm Line (<i>Line 1</i>) PIR Line (<i>Line 2</i>) Bonding Line (<i>Line 3</i>)	PIR Line (<i>Line 5</i>)	PIR Line (<i>Line 10</i>) Bonding Line (<i>Line 11</i>)	Kooltherm Line (<i>Line 7</i>)
Address	Kingspan Insulation Ltd Pembridge Leominster Herefordshire HR6 9LA	Kingspan Insulation Ltd Sherburn Enterprise Park Enterprise Way Sherburn-in-Elmet North Yorkshire LS25 6NA	EcoTherm Insulation (UK) Ltd Harvey Road Burnt Mills Ind. Est. Basildon Essex SS13 1QJ	Kingspan Insulation Ltd Bree Industrial Estate Castleblayney Co. Monaghan Republic of Ireland A75 X966

Specific Site Contacts

Site	Pembridge	Selby	Basildon	Castleblayney
Contact	Samuel Pearce	Steven Buxton	Susan Bigland	Paul McCabe
Title	Quality Engineer	Site Systems Administrator	Quality Engineer	Technical Supervisor
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E-mail:	samuel.pearce@kingspan.com	steven.buxton@kingspan.com	s.bigland@ecotherm.co.uk	paul.mccabe@insulation.kingspan.com

The contacts named above report to:

Mr Christian Elliott – ██████████	christian.elliott@kingspan.com
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(UK & Ireland Quality Manager to be cc'd on all significant written correspondence, e.g. audit reports.)

Is the above production site covered by ISO 9001 : 2015 Registration? **Yes**

If YES, Registration No: **388-1 QMS Pembridge**
388-3 QMS Selby
388-7 QMS Basildon
388-4 QMS Castleblayney

Assessed by (organisation): **The Loss Prevention Certification Board (LPCB) - (All Sites)**

Scope of assessment: **Design and Manufacture of insulation and composite insulation materials for the construction industry.**

Assessor's Notes:

At the time of assessment the above details remained unchanged.

PIR – Lines 2, 5 & 10 – All Sites

Products comprise a pale yellow rigid PIR core of density > 25.0 kg/m³ with plain edges and various facings as detailed in the table below:

Name	Certificate	Application	Facing	Length (mm)	Width (mm)	Thickness (mm)
Thermafloor TF70	14/5133 PS 1	Insulation for floors	Trilaminate foil	2400	1200	20 to 120
Thermawall TW50	14/5133 PS 2	A partial fill cavity wall insulation board	Trilaminate foil	1200	450	25 to 120
	16/5349 PS 1	A full fill cavity wall insulation board (straight edge)	Trilaminate foil	1200	450	45 to 150
Thermawall TW52	14/5133 PS 3	PIR blank for bonding to plasterboard – insulated dry lining	Kraft & foil composite	2400	1200	25 to 80 (insulation)
EcoTherm Eco-Liner	14/5157 PS 3					
Thermawall TW55	14/5133 PS 4	A wall insulation board for use between timber studs or as an insulation sheathing on timber studs	Trilaminate foil	2400	1200	20 to 120
Thermapitch TP10	14/5133 PS 5	A sarking insulation board for pitched roofs	Trilaminate foil	2400	1200	25 to 140
Thermarroof TR26 LPC/FM	16/5332 PS 1	Insulation for flat roofs	Trilaminate foil	2400	1200	25 to 160
Thermataper TT46 LPC/FM				1200		
Thermarroof TR27 LPC/FM		Insulation for flat roofs	Coated glass facing	2400	1200	25 to 160
Thermataper TT47 LPC/FM				600		
Inno-Fix / Tapered	16/5341 PS 1	Insulation for flat roofs	Trilaminate foil	2400	1200	25 to 160
Inno-Bond / Tapered	(repro of 16/5332 PS 1)		Coated glass facing	2400	1200	25 to 160
			600			
EcoTherm Eco-Versal	14/5157 PS 1,5 and 6	Insulation for floors, timber / steel frame walls & pitched roofs	Trilaminate foil	2400	1200	25 to 200
EcoTherm Eco-Cavity	14/5157 PS 2	A partial fill cavity wall insulation board	Trilaminate foil	1200	450	25 to 120

PIR – Lines 2, 5 – Pembridge & Selby

Name	Certificate	Application	Facing	Length (mm)	Width (mm)	Thickness (mm)
Langley Parafoam Ultra	16/5350 PS 1	Insulation for flat roofs	Coated glass facing	600	1200	25 to 160
Langley Parafoam Ultra Tapered				1200		

PIR – Line 5 – Selby Only

Products comprise a pale yellow rigid PIR core of density > 25.0 kg/m³ with T & G profiled edges and trilaminate foil facings as detailed in the table below:

Thermawall TW50	16/5349 PS 1	A full fill cavity wall insulation board (Tongue and groove edge)	Trilaminate foil	1190mm (foil – foil) or 1200mm (Including the Tongue)	450mm (foil – foil) or 460mm (including Tongue)	50 to 150
EcoTherm Eco-Cavity Full Fill	14/5157 PS 4	A full fill cavity wall insulation board (Tongue and groove edge)	Trilaminate foil	1190mm (foil – foil) or 1200mm (Including the Tongue)	450mm (foil – foil) or 460mm (including Tongue)	50 to 150

Pembridge Bonding Line 3

Name	Certificate	Application	Components	Length (mm)	Width (mm)	Thickness (mm)
Thermawall TW52	14/5133 PS 3	An insulating plasterboard laminate	PIR blank	2400	1200	25 to 80
EcoTherm Eco-Liner	14/5157 PS 3		Plasterboard, Type 1			9.5, 12.5
Kooltherm K17	14/5134 PS 8	An exposed glass tissue facer for mechanically fixed plaster board	K17 blank bonded to 12.5mm plasterboard and to glass tissue facing	2400	1200	32.5 to 92.5 overall
Kooltherm K18		An exposed foil facer for mechanically fixed plaster board	K18 blank bonded to 12.5mm plasterboard and to foil facing			
Kooltherm K118	16/5299 PS 8	An exposed foil facer for mechanically fixed plaster board	K118 blank bonded to 12.5mm plasterboard and to foil facing	2400	1200	32.5 to 92.5 overall

Basildon Bonding Line 11

Name	Certificate	Application	Components	Length (mm)	Width (mm)	Thickness (mm)
Thermawall TW52	14/5133 PS 3	An insulating plasterboard laminate	PIR foam blank	2400	1200	25 to 80
EcoTherm Eco-Liner	14/5157 PS 3		Plasterboard, Type 1			9.5, 12.5

Phenolic Pembridge – Line 1

Medium to high density phenolic foam (PF) core faced with tissue or foil

Name	Certificate	Application	Components	Length (mm)	Width (mm)	Thickness (mm)
Kooltherm K3	14/5134 PS 1	Glass-tissue faced floor insulation	OC 170 (Owens Corning) lightweight coated glass fibre facing to both sides	2400	1200	25 to 150
Kooltherm K103	16/5299 PS 7					
Kooltherm K6	14/5134 PS 3	A perforated foil-faced phenolic foam core board for cavity wall insulation	Polypropylene (Silcart) fleece outer facing and a Lamtec composite (perforated) reinforced foil inner facing	1200	450	40, 50, 55, 60, 65, 70, 75, 90, 100, 115
Kooltherm K106	16/5299 PS 2					
Kooltherm K7	14/5134 PS 2	A perforated foil-faced phenolic foam core sarking board	International Converters composite foil facing on both sides	2400	1200	25 to 180
Kooltherm K107	16/5299 PS 3					
Kooltherm K8	14/5134 PS 4	A perforated foil-faced phenolic foam core board for cavity wall insulation	International Converters composite foil facing on both sides – perforated 50 lb	1200	450	25 to 140
Kooltherm K108	16/5299 PS 1					
Kooltherm K10	14/5134 PS 5	Tissue / foil faced soffit insulation	Lamtec reinforced foil facing on one side and glass-tissue to the other	2400	1200	25 to 140
Kooltherm K110	16/5299 PS 4					
Kooltherm K12	14/5134 PS 6	Foil faced timber/steel framing board	International Converters composite foil facing on both sides	2400	1200	20 to 140
Kooltherm K112	16/5299 PS 5					
Kooltherm K15	14/5134 PS 7	Foil faced rain screen cladding insulation	Lamtec reinforced foil facing to both sides.	2400	1200	20 to 140
K17 and K18 Blank	14/5134 PS 8	PF blank for bonding to plasterboard – insulated dry lining	PF core with composite foil & clad tissue facings	2400	1200	20 to 80
K118 Blank	16/5299 PS 8					

Phenolic Castleblayney – Line 7

Medium to high density phenolic foam (PF) core faced with tissue or foil

Name	Certificate	Application	Components	Length (mm)	Width (mm)	Thickness (mm)
Kooltherm K10	14/5134 PS 5	Tissue / foil faced soffit insulation	Lamtec reinforced foil facing on one side and glass-tissue to the other	2400	1200	25 to 150
Kooltherm K15	14/5134 PS 7	Foil faced rain screen cladding insulation	Lamtec reinforced foil facing to both sides	2400	1200	20 to 150

Assessor's Notes:

At the time of assessment there were no changes to the above product details.

Purchasing data & receiving inspection and testing:

All materials are purchased to agreed specifications. For each delivery of bulk chemicals, i.e. Polyol, MDI and blowing agent, a Certificate of Analysis is also provided. Other materials are visually checked and processed in accordance with IMS pb/sb/ba IMP 202 latest version all sites. If a delivery of any material does not appear to meet the specification set out in the Raw Material Database, then a concession is raised and authorised by the Technical Process Manager.

Incoming product, raw materials and Components	Identification (type, class, grade, specification, etc.)	Original supplier	Acceptance limits
Polyol Batch Ref. 7853022-T3006 P.O 45134771 Date – 05/12/18	PS 2412	Stepan	Spec No 256 - 27/09/13
	PS 1812		Spec No 532 - 27/09/13
	PS 3152		Spec No 555 - 27/09/13
	Hoopol F-1497	Synthesia Internacional	Spec No 571 - 21/09/17
MDI Batch Ref. 9020196933283 P.O 45140825 Date- 11/02/19	Desmodur 44V70L	Covestro	Spec No 136 - 27/09/13
	Suprasec 2085	Huntsman	Spec No 109 - 27/09/13
	M70R	BASF	Spec No 175 - 27/09/13
	Wannate PM700	Borsod Chem Zrt	Spec No 661- 02/05/18
Blowing Agents	Cyclo / Iso IP85/15 Pentane	BOC Gases	Spec No 291 - 27/09/13
		Haltermann	Spec No 292 - 27/09/13
	N Pentane	BOC Gases	Spec No 558 - 27/09/13
	Isopropyl-chloride	Ineos Solvents	Spec No 506 - 27/09/13
	Iso Pentane	BOC	Spec No 507 - 27/09/13
	Solstice LBA 1233ZD(E)	Honeywell	Spec No - 578 - 16/09/2014
Surfactant	Tegostab B8871	Evonik	Spec No 458 - 27/09/13

Catalyst	Polycat 5	Evonik	Spec No 108 - 27/09/13	
	Polycat 8	Evonik	Spec No 10 - 27/09/13	
	Kosmos 75	Evonik	EcoTherm Spec B3 - 27/09/2013	
	K-Zero 3000	Momentive / Hexion	Spec No 523 - 27/09/13	
Flame Retardant	Levagard PP (TMCP)	Lanxess	Spec No 277 – 27/09/13	
Facing	Foil faced PIR products	Triply (TF70/TW55/TP10, TW50, Eco-Versal, Eco-Fix, Eco-Cavity)	International Converter	Spec No 246 – 07/10/13
		Triply (TR26 / TT46)		Spec No 255 – 07/10/13
	TR27 / TT47	Coated Glass Facing	Silcart Stoneglass SSP WP FR	Spec No 275 - 31/08/2018
	Laminglass (K6 and K106)	Polypropylene fleece (Laminglass TDS)	Silcart roofing company	Spec No 665/664 – 31/08/2018
Tape used with product - Proctor wraprite – roll size – 50x50, 75, 100, 150, thickness 0.65 mm, weight 280 g/m ² http://www.proctorgroup.com/air-barriers				
Foam blanks ⁽¹⁾	PIR blank for TW52	In-house	As specification	
	PF blanks for K17 & K18			
Plasterboard ⁽¹⁾	9.5mm Square edge	British Gypsum or Knauf	Spec No 601 – British Gypsum ????????	
	9.5mm Tapered edge		Spec No 606 – Knauf ????????	
	12.5mm Square edge			
	12.5mm Tapered edge			
Adhesive (dry lining) Adhesive	A7511	Apollo Chemicals	Spec No 474 27/09/13	
	9677	Sika Melt	Spec No 614 27/09/13	
Hot melt glue	Intact H-509	KMS	Spec No 583 21/03/16	
Phenolic resin ⁽²⁾ Batch Ref. SE9B52135X P.O. 45145857 Date – 21/02/19	R330UF-1	Momentive / Hexion	Spec No 550 – 27/09/13	
Calcium Carbonate	Durcal 130	Omya	Spec No 551 – 27/09/13	
Acid ⁽³⁾	NAXCAT MOD-35	NEASE CORP	Spec No 524 -14/10/13	
Aluminium foil facing ⁽⁵⁾	Lamtec Reinforced Foil Facer	Lamtec	Spec No 466 – 27/09/13	
	ICC Foil / Kraft	International Converters	Spec No 469 – 27/09/13	
Tissue facing ⁽⁵⁾	175lb BF91	Owens Corning	Spec No 465 – 07/10/13	
Self-adhesive tape (K6 and K106)	Wraprite	A Proctor Group Ltd	Customers buy the tape directly from Proctor.	

(1) The raw materials are checked before offloading as per IMS Pb/Sb/Ba IMP 202 all sites.

(2) Phenolic resin is delivered & put into bulk tank. Each batch is accompanied by a Certificate of Analysis.

- (3) Acid is delivered by bulk tanker and transferred into the acid bulk store. Each delivery the C of A is checked for conformance which is retained on file.
- (4) Pentane is delivered in bulk. Deliveries are accompanied by a Certificate of Analysis that are checked for conformance, which is retained on file.
- (5) RM codes for the facing materials are held on file and have the basic information in them about the various materials. The specifications for these and all materials are agreed with the suppliers. This is normally done by Head Office with the agreement of the technical and Plant Manager.

Details of incoming bulk raw materials are recorded on internal document on IMS Pb/Sb/Ba IMF 256 and SAP IMF 257 and SAP at Selby, Basildon and Pembridge.

Details of incoming facings are recorded in SAP.

Assessor's Notes:

At the time of assessment the materials highlighted above were used in the manufacture of the batches of products traced from finished goods all paperwork and records were in place and correct.

Product identification and traceability:

Every order is given a unique SAP Order Number. The Production Programmes for Line 3 - Pembridge bonding line are generated in SAP, then formulated to incorporate all the necessary orders, quoting the respective Order Numbers.

Lines 2, 5 & 10 – all sites. PIR

The Order Number is itself used to identify the boards. The Raw Material Goods Issue Usage Transaction Sheet, SAP Based MIGO Sheet and Works Order Report can be used to identify which consignment of chemicals was used to produce each board.

All blank boards are inkjet printed on one face with the date and time of manufacture. This allows traceability to the production records for that board through the Production Program held in SAP System. Ref. ZWL_PIR for PIR Boards and ZWL_PHL for Phenolic Boards.

Bonding Lines – all sites

All blank boards that are made in-house are inkjet printed on the edge with product type, date and time of manufacture. This allows traceability to the production records for that board.

Line 1 – Pembridge – Phenolic

A run number is issued to cover production. This is a cumulative number issued by the production department. Each pack is also marked with a relevant pallet number which indicates the time or production. A daily production diary also records the products manufactured under that number.

Line 7 – Castleblayney – Phenolic

A run number is issued to cover production. This is a cumulative number issued by the production department. Each pack is also marked with a relevant pallet number which indicates the time or production. A daily production diary also records the products manufactured under that number.

Assessor's Notes:

At the time of assessment the following products were chosen by the assessor from storage, and traced back through manufacturing successfully.

No.	Product	Batch Ref.	Date of Manufacture	Thickness (mm)
1	Kingspan Thermawall TW50 (Partial Fill Cavity)	8100315364	11/02/2019	70
2	Kingspan Thermapitch TP10 Pitched Roof Board	8100314007	28/01/2019	100
3	Kooltherm K15 Rainscreen Insulation Board	8100316758	25/02/2019	25

4	Kingspan Kooltherm K10G (Full Fill Cavity Wall Board)	8100317718	28/02/2019	90
5	Kingspan Thermaroof TT47 (Tapered)	8100309681	03/01/2019	30/45
6	Kingspan Kooltherm K107 Pitched Roof Board	8100313139	19/02/2019	100

Method of production and process control:

PIR – Polyol blend – Lines 2, 5 & 10 – Pembridge, Selby and Basildon

Bulk ingredients (i.e. pure polyols, MDI, pentane, TCPP etc.) are pumped from their respective storage tanks to the day tanks on the Lines 2 & 4. These polyols are then metered to the dynamic mixer.

On line 10 (Basildon) the same chemical are metred directly to the dynamic mixer from their respective storage tanks.

Additives are transferred to designated run tanks (RT) from which the required output is pumped directly into a dynamic mixer where the other additives and blowing agent Pentane and polyols are fed.

The resulting emulsion is fed to the high pressure pumps.

The above operation is computer controlled by the computer software.

The polyol blend is injected under high pressure with MDI at the correct output (defined by the SOP) and ratio in accordance with the line speed to produce the specified product.

Pembridge Bonding Line – Line 3

Plasterboard, chipboard or plywood is lifted with suction pads and placed onto the horizontal conveyor. From the loading station, the board is conveyed into a laydown area where the prescribed amount of single part moisture cured adhesive and hot melt adhesive is applied to the substrate. Insulation panels are manually placed onto the adhesive coated plasterboard/chipboard/plywood. These composite boards pass through a mechanical press, at a defined line speed. The boards then enter the pick and place area where they are automatically placed onto a pallet according to the packing sheet.

Basildon Bonding Line – Line 11

Insulation panels are placed manually on the bonding line, a panel is conveyed into a laydown area where the prescribed amount of single part moisture cured adhesive and/or hot melt adhesive is applied to the insulation panel. Plasterboard is manually placed onto the adhesive coated insulation panel. These boards are then pressed until the adhesive has cured. The boards are then placed onto a pallet according to the packing sheet.

Pembridge – Line 1 – Phenolic

Phenolic resin is taken from the bulk tank and pumped into the resin day tank. The acid, blowing agent and resin are pumped at a pre-set rate to the mixing head. When a stable flow is achieved the machine goes from recirculation to dispense and foam exits the dispensing nozzles onto the base substrate. The top facing of substrate is supplied from a roller at the rear of the lay down. This layer is applied to form the top of the board. The whole of the 'wet end' is controlled by a fully automated computer system.

The board then passes into a fixed gap conveyor contained within an oven between 50°C and 75°C (depending on thickness). The partially cured board then passes through a second oven to complete curing.

After packing/wrapping, the stacked boards are placed in temperature controlled curing chambers and left to condition for a minimum period of 48 hours a representative sample is placed with each produced product.

Castleblayney – Line 7 – Phenolic

Phenolic resin is taken from the bulk tank and pumped into the resin day tank. The acid, blowing agent and resin are pumped at a pre-set rate to the mixing head. When a stable flow is achieved the machine goes from recirculation to dispense and foam exits the dispensing nozzles onto the base substrate. The top facing of substrate is supplied from a roller at the rear of the lay down. This layer is applied to form the top of the board. The whole of the 'wet end' is controlled by a fully automated computer system.

The board then passes into a fixed gap conveyor contained within an oven between 50°C and 75°C (depending on thickness). The partially cured board then passes through a second oven to complete curing.

After packing/wrapping, the stacked boards are placed in temperature controlled curing chambers and left to condition for a minimum period of 48 hours a representative sample is placed with each produced product.

Assessor's Notes:

At the time of assessment no changes were recorded to the above processes.

Process Control:

Lines 2, 5 & 10 – PIR – Pembridge, Selby and Basildon

Lines 2, 5 & 10 laminator is fully computer controlled which governs speed, output and formulation (as laid out in the SOP, Standard Operating Procedure).

The chemicals are laid down using three mixing heads, each having a number of individual streams. The chemicals react and rise, with the top facer being introduced on entrance to the conveyor. It is the height of the gap in the conveyor that determines thickness of the resulting board. The additives can be changed on the run by manual control. The continuous board moves at high speed to the trim saws and then the cross cut saws, the boards are then printed with the ink-jet printer. The boards are then stacked and sent down to the band saw to be cut to the desired length. Each production run has a specific works order number. This number is used on all paperwork for full traceability. The machine operators are given a standard operating procedure to run the machine. The machine operators set the machine conditions and chemical outputs using this information.

A computer record complete with (SAP Based Production Program viewed in QA 33) is given and every 30 minutes checks are carried out to determine dimensions and density. Values are recorded on the computerised record.

The machine software will highlight if in control and a fault will be indicated if >3% from the set point. A computer print-out of polyol blend (material yield) and line conditions can be raised.

- An 'in process control and alarm system' is in place to alarm / trip the machine out on critical running parameters of the machine (e.g. if >3% on flow from set point). This will discontinue the process and therefore eliminate the possibility of running product out of required specified limits.

Respective blend recipe (SAP controlled document) is made available for reference. Prescribed ingredient proportions are controlled by weight and are entered into the line computers by the Laydown Operative.

- Standard Operating Procedures (SOP's) are controlled in SAP ZSOPP – SOP Print/Display. The SOP contains the production details the operators must run too e.g. chemical recipes, machine settings and process parameters. The SOP's are pulled from SAP in line with the work to list for the day generated by planning. This list contains the products required for production and the product batch numbers that is used to obtain the SOP.

Line 1 – Pembridge – Kooltherm

The production line is set-up in accordance to the Line 1 Machine SOP latest issue (SAP controlled SOP) and the relevant Work Instructions. Process data is recorded in SAP and the Line 1 Process Sheet (used as a reference only by production operatives) for each production run.

SOP's (containing the formulation details) are held securely in SAP and any changes required, must go through the Change Management System (CMS) for minor changes.

Line 7 – Castleblayney – Kooltherm

The production line is set-up in accordance to the Line 1 Machine SOP latest issue (SAP controlled SOP) and the relevant Work Instructions. Process data is recorded in SAP and the Line 1 Process Sheet (used as a reference only by production operatives) for each production run. SOP's (containing the formulation details) are held securely in SAP and any changes required, must go through the Change Management System (CMS) for minor changes.

Production Lines controls:

Bonding: Lines 3 – Pembridge & 11 – Basildon

The process is fully described in IMS Pb/Sb/Bs IMP 250 Latest Issue. Pembridge, Selby & Basildon.

Cutting: Line 1 – Pembridge – Kooltherm

Board Cutting: The boards ex cure tunnel are cut to the required dimensions by a two-stage operation:

- (1) Side trimming: by use of a hogging cutter in conjunction with a scoring blade. The unit is adjusted manually to achieve the correct width.
- (2) Cut to length: by use of a traversing cross cut saw which moves in relation to the board. Control of the unit is via a digital meter which the operator sets to the required length.

Cutting: Line 7 – Castleblayney – Kooltherm

Board Cutting: The boards ex cure tunnel are cut to the required dimensions by a two-stage operation:

- (1) Side trimming: by use of a hogging cutter in conjunction with a scoring blade. The unit is adjusted manually to achieve the correct width.
- (2) Cut to length: by use of a traversing cross cut saw which moves in relation to the board. Control of the unit is via a digital meter which the operator sets to the required length.

Cutting: Line 5 – Selby

The process is fully described in IMS Pb/Sb/Ba IMF 253 Selby.

- (1) Side trimming: by use of a hogging cutter in conjunction with a scoring blade. The unit is adjusted manually to achieve the correct width and 'tongue and groove' profile when required.
- (2) Cut to length: by use of a traversing cross cut saw which moves in relation to the board. Control of the unit is via a digital meter which the operator sets to the required length. This would only refer to intermediate length in the 'tongue and groove' case.
- (3) Final length cut 'tongue and groove' profile is achieved by set profiled blades within the final saw booths.

Assessor's Notes:

At the time of assessment there were no changes to the above processes, and the process highlighted above was witnessed and talked through during the visit.

In-process inspection and testing:

As per IMF 253

Results are recorded on form - SAP based PI Sheet viewed through SAP QA33 format.

Property measured	Method used	Frequency	Acceptance limits	Action upon rejection
Density	Line side weigh scale	Every 30 minutes (Line 10 – every 60 minutes)	33-44 kg·m ⁻² (Lines 1&7) 25-33 kg·m ⁻² (Lines 2, 5, 10)	Inform Team Leader
Width	Steel Tape (Class II)		As detailed in relevant SAP based PI Sheet within each Master Recipe / IMS Pb/Sb/Ba IMF 253- pem-23.02.2016.Selby- 01.08.2013 Basildon- 16.06.2016 Need a SAP code master recipe for Castleblayney	
Length				
Squareness				
Thickness	Vernier	Every batch		
Visual Quality	Visual inspection	100% but recorded every 30 minutes. (Lines 10 & 11 – every 60 minutes)		

Machines cut lengths and widths slightly larger than required to allow for shrinkage during curing.

Laminated Board Inspection and Testing online.

All boards are cut by an automatic saw and are simply monitored. The thickness is adjusted by a mixture of the flow rates and the line speed. The rise height is partially limited by the height of the top belt of the line. Checks on the end of the line are instantaneous. The cut boards are measured with a tape measure for length and widths and a Vernier calliper for thickness, and if results are outside of the warning limits, wet end operators are informed immediately.

Bonding Line – Lines 3 – Pembridge & 11 – Basildon

Property measured	Method used	Frequency	Acceptance limits	Action on rejection
Adhesive coating Weight	Line side weigh scale	At start up and hourly	50-60 gsm (nominal for TW52, K17, K18 & K118), Eco-liner 70 to 90 gsm)	Inform Team Leader
Width	Steel tape (Class II)	Every 30 minutes (Line 11 – every 60 minutes)	600 ± 3 mm	
Length			1200 ± 3mm	
Alignment	Visual inspection	Continuous	Visual	
Interlaminar Strength	EN 13950 Section 5.5 – Adhesion / Cohesion	1 per week	≥17 kPa (as per EN 13950)	

Acceptance limits are also specified in IMF 253 and SAP based In Line Inspection & QC Lab based Quality Plans.

Assessor's Notes:

At the time of assessment the following data was recorded for in process inspection –

Property measured	1	2	3	4	5	6

Density	28.593	30.34	41.197	39.979	33.47	36.091
Width	1203	1205	1201	1200	1202	1202
Length	2410	913 (454)	2401	450	1210	2399
Squareness	0	0	0	0	0	0
Thickness	69.681	99.188	24.198	90.823	31.28 & 44.87	99.821
Visual Quality	Pass	Pass	Pass	Pass	Pass	Pass

All results were within acceptance limits of the quality plan.

Final inspection and testing:

Lines 2, 5 & 10 – PIR – Pembridge, Selby and Basildon

The methods of test are described in IMF 253. Test results are entered onto the computer database. Samples from each blend are taken and tested usually off line for the following tests.

Property measured	Method used	Frequency (minimum)	Acceptance limits	Action on rejection
Compressive Strength (@ 10% deformation) Samples 1/ - 143.6, 2/ - 135.6, 5/ 165	EN 826 (Tinius-Olsen / Hounsfield / Zwick compressive machine)	Lines 2 and 5 – one per thickness or once every 2 hours, whichever is sooner. Line 10 as per minimum requirements from EN 13165.	>140kPa (TP10, TW50, TW55, TF70, Eco-Versal, Eco-Cavity Wall Board) >150kPa (all others PIR products)	Either reject or concession
Dimensional Stability (24 hr @ 70°C / 95% RH) Sample 2/ - 0.92	EN 1604 (Humidity chamber) Freezer		< 1.5%	
Direct Thermal Conductivity (W·m ⁻¹ ·K ⁻¹) Sample 2/ - 0.0194	EN 12667 (FOX 300 / FOX 600 / Hesto - Selby site)	(VARIES BY SITE – FOR ADDITIONAL TESTING REFER TO IMS) 253 IMF	Re-calculated $\lambda_D^{(1)}$ Gas tight PIR: All thicknesses = 0.022 Non-Gas tight faced PIR: thickness < 80 mm = 0.026 thickness 80 to 119 mm = 0.025 thickness ≥ 120 mm = 0.024	
Water Submersion test ⁽²⁾⁽³⁾ Samples 1, 2 and 5 all Pass	Water bath	Once per run	No delamination of foil based boards	

Commented [MR1]: Something I noticed during the assessment, are these meant to be min/max limits rather than a static figure?

- (1) λ_D calculations need to be carried out every 3 months.
- Gas tight faced PIR = TF70, TW55, TP10, TW50, TR26, TT46, TW52 Blank, Eco-Versal, Eco-Cavity Wall board, Eco-Liner blank
 - Non-Gas tight faced PIR = TR27, TT47
- (2) All foil faced products.
- (3) Water submersion testing is not carried out on Line 10.

Notes to Inspector:

1. The manufacturer should recalculate the declared thermal conductivity for each product declaration and for each manufacturing line separately at least every three months. Data older than 12 months from the date of calculation should not be included. Please check that this has been done and that they do not conflict with the values given in this Quality Plan.
2. Please submit an electronic copy of the last calculation(s) with the visit report, ensuring that all batch numbers and testing dates are included with the test results.
3. Check and report that each heat flow meter has been checked against a known standard material within the past 12 months, report and obtain a copy of the data and note if these are within the limits set.

A **non-conformance** should be raised for each of the above requirements if evidence cannot be obtained during the audit.

Line 5 – Selby only – PIR. (in addition to the above checks for line 5):

Property measured	Method used	Frequency (minimum)	Acceptance limits	Action on rejection
Tongue and groove profile	Steel Ruler	Every 30 minutes	<2 mm from quoted dimensions As detailed recorded in relevant SAP based PI Sheet within each Master Recipe / IMS Pb/Sb/Ba IMF 253 selby-01.08.2013.	Inform Team Leader

Line 1 – Pembridge – Kooltherm

Property measured	Method used	Frequency (minimum)	Acceptance limits	Action upon rejection
Compressive strength	EN 826	One per production run	K3, K7, K103 ≥ 120 kPa K6, K8, K9, K10, K12, K15, K17, K18 blank, K106, K107, K108, K110, K112 & K118 blank ≥ 100 kPa	Board rejected Compressive Strength Testing carried out on Samples 3/ 154 6/ 132.6 Witnessed batch 810031778; avg. 143 No direct thermal conductivity testing was carried out on the these batches.
Direct Thermal Conductivity (W·m ⁻¹ ·K ⁻¹)	EN 12667 (FOX 314)		Re-calculated λ_0 K3, K6, K7, K8, K10, K12, K15, K17 & K18: thickness < 25 mm = 0.023 thickness 25 to 44 mm = 0.021 thickness ≥45 mm = 0.020 K103, K106, K107, K108, K110, K112, K115 & K118: All thicknesses = 0.018	

Notes to Inspector:

1. The manufacturer should recalculate the declared thermal conductivity for each product declaration and for each manufacturing line separately at least every three months. Data older than 12 months from the date of calculation should not be included. Please check that this has been done and that they do not conflict with the values given in this Quality Plan.
2. Please submit an electronic copy of the last calculation(s) with the visit report, ensuring that all batch numbers and testing dates are included with the test results.
3. Check and report that each heat flow meter has been checked against a known standard material within the past 12 months, report and obtain a copy of the data and note if these are within the limits set.

A **non-conformance** should be raised for each of the above requirements if evidence cannot be obtained during the audit.

Line 7 – Castleblayney – Kooltherm

Property measured	Method used	Frequency (minimum)	Acceptance limits	Action upon rejection
Compressive strength	EN 826	One per production run	K10 & K15 \geq 100 kPa	Board rejected
Direct Thermal Conductivity ($W \cdot m^{-1} \cdot K^{-1}$)	EN 12667 (FOX 314)		Re-calculated $\lambda_D^{(1)}$ K10 & K15 thickness < 25 mm = 0.023 thickness 25 to 44 mm = 0.021 thickness \geq 45 mm = 0.020	

Notes to Inspector:

1. The manufacturer should recalculate the declared thermal conductivity for each product declaration and for each manufacturing line separately at least every three months. Data older than 12 months from the date of calculation should not be included. Please check that this has been done and that they do not conflict with the values given in this Quality Plan.
2. Please submit an electronic copy of the last calculation(s) with the visit report, ensuring that all batch numbers and testing dates are included with the test results.
3. Check and report that each heat flow meter has been checked against a known standard material within the past 12 months, report and obtain a copy of the data and note if these are within the limits set.

A **non-conformance** should be raised for each of the above requirements if evidence cannot be obtained during the audit.

Assessor's Notes: NC. 1

At the time of assessment the frequency of thermal conductivity testing being carried out was not that which was documented within the Quality Plan.

The results highlighted above were recorded, and compressive strength testing for batch ref. 810031778 witnessed during the visit.

Calibration:

Calibration procedures are described in IMS IMP 206 all sites

Assessor's Notes:

At the time of assessment the documented procedure remained unchanged and evidence was witnessed of it still being followed. The items below were traced and certificates ref's recorded.

Item Desc	Ref.	Certificate Ref.	Date
Compressive Strength Tester	3G	F04XMC01 for Tension, F04XMC02 for Compression, Displacement – APVH4P02	24/04/28
0-300mm Vernier	LV04	Q024899	07/03/2018
Desk Top Scales (Adam RS232)	4Z	9190	17/05/2018

Packaging:

Boards are automatically stacked and polythene shrink-wrapped. Each pack bears a label showing relevant information regarding product description and traceability; including works order number and bearing the appropriate BBA identification mark (where applicable). Phenolic boards packed with corner protectors.

Bonding Line: Lines 3 – Pembridge & 11 – Basildon

Number of laminates per stack is in accordance with SAP data material master / warehouse management tab 2 Each palletised stack employs cardboard corner protectors, polythene shrink wrapping and a label which bears manufacturers name, dimensions and date of manufacture.

Assessor's Notes:

At the time of assessment there were no changes to the above method of packaging.

Labelling:

Packs are labelled with a product identification label showing the following information:

- Thickness of product
- Product name
- Board dimensions
- No of boards per pack
- Batch No
- Production date⁽¹⁾

(1) Lamination date where applicable.

Assessor's Notes:

At the time of assessment there were no changes to the above labelling requirements and evidence of it being followed was witnessed.

Use of the BBA symbol:

On marketing literature and labels.

Assessor's Notes:

At the time of assessment there were no changes to the use of the BBA Logo, and usage in line with BBA guidelines was witnessed.

Training:

Training procedures are described in IMS GIMP 003 - Training and Competence.

Assessor's Notes:

At the time of assessment the client's procedure remained unchanged, and training records were witnessed for the following individuals. Their roles within the business relates to manufacture of the products covered within these certs. Steve Mesham – QC Lab Technician, Kevin Duggan – Chemical Off Loader both highly competent in rating for associated tasks.

Complaints:

Complaints procedures are described in IMS Pb IMP 207 all sites.

Assessor's Notes:

At the time of assessment there were no recorded customer complaints for products relating to these certificates. Their documented procedure was still in place and effective.


Quality policy: We undertake to have the product produced and placed on the market as described above. We will advise the BBA of any changes and receive agreement from the BBA before the changes are implemented.

Signed 

Dated 20-11-18

Title QC MANAGER UK AND IRELAND

End of Quality Plan

For BBA internal use only	
BBA Cert(s) on front page.	Approved by:  Date: <u>13/7/17</u>

Appendix – Document Revisions

Revision No	Reason for re-issue	Date
1		
2		
3		
4		