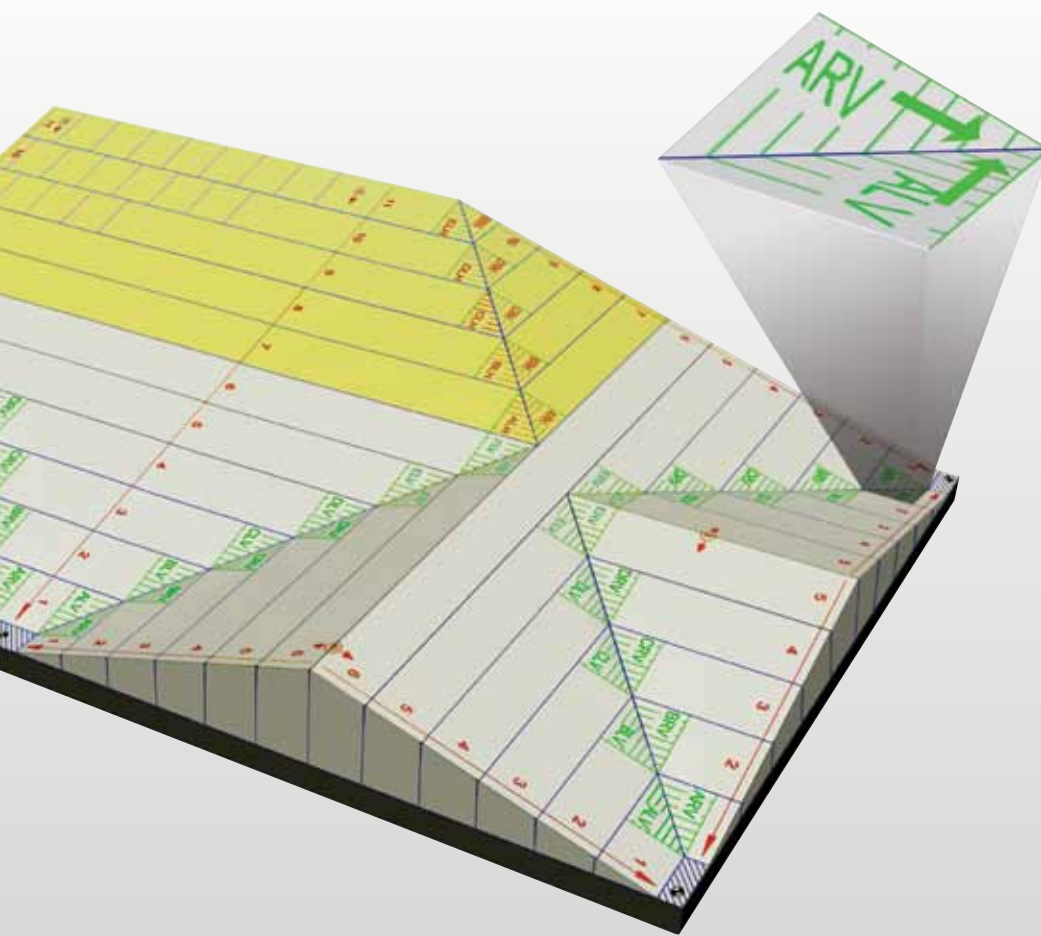




Therma™ Tapered Roofing Systems

TAPERED INSULATION TO ENHANCE WATER DRAINAGE FROM FLAT ROOFS



- Super high performance rigid thermoset insulation
- LPCB approved to LPS 1181: Part 1
- FM approved for Class 1 steel deck roof assemblies
- Insulation and drainage in one
- Compatible with most waterproofing and green roof systems
- Provides a practical alternative to screeding, structural falls or firings
- Load bearing implications for an existing structure can be minimal
- Resistant to the passage of water vapour
- Easy to handle and install
- Ideal for new build and refurbishment
- CFC/HCFC-free with zero Ozone Depletion Potential (ODP)
- NCC BCA and AS/NZS 4859.1 compliant



*Low Energy –
Low Carbon Buildings*

Introduction to **Therma™** Tapered Roofing Systems

The Problem

There are many critical factors which must be taken into consideration when designing a flat roof construction. Two of these factors, insulation and rainwater run-off, can be addressed with one product range: **Therma™ Tapered Roofing Systems** from Kingspan Insulation Limited.

Many flat roof failures can be traced to the inability of the roof to shed rainwater from its surface, leading to the formation of water ponds. Ponding of rainwater can decrease the design life of a roof by subjecting its waterproofing membrane to attack from thermal stress and growth of plants, moss and algae.

Excessive ponding can also increase roof loading, causing further deflection of the deck, which may add to the problem of drainage. The most effective solution is to eliminate ponding by designing an adequate fall into the roof.

The Solution

Kingspan Therma™ Tapered Roofing Systems have been developed to help solve these problems. **Kingspan Therma™ Tapered Roofing Systems** comprise tapered insulation boards, flat packer boards, pre-mitred hip and valley boards and the market's leading tapered roofing design service. **Kingspan Therma™ Tapered Roofing Systems** products are designed: for use under most waterproofing membranes; to provide required roof falls; and to provide insulation to meet the requirements of Building Regulations / Standards.

The Benefits

Simpler

On new roofs, the use of a **Kingspan Therma™ Tapered Roofing Systems** eliminates the need to incorporate a fall into the design of the roof deck. On existing roofs, a **Kingspan Therma™ Tapered Roofing Systems** and a new waterproofing membrane can be laid on top of the original waterproofing. This eliminates the need for stripping down the roof to deck level, and the provision of a vapour control layer may not be required.

NB The existing insulation / substrate and waterproofing must be sound, in order to provide a satisfactory surface for the **Kingspan Therma™ Tapered Roofing Systems**, and the risk of interstitial condensation must be fully assessed.

Quicker

Kingspan Therma™ Tapered Roofing Systems avoid a wet trade and do not need time to dry out, saving time in the scheduling of a construction project.

Lighter

Kingspan Therma™ Tapered Roofing Systems are also a lighter weight alternative to screeding and they do not present the risk of an overloaded structure due to excessive screed depths. **Kingspan Therma™ Tapered Roofing Systems** can be as little as 1.5%, or less, of the weight of a solution using screed to falls with a flat insulation board.

Less Waste

Pre-mitred boards reduce waste from the installation process. Insulation boards are cut in half by Kingspan Insulation in its factory to make mitred hip and valley boards. These are single picked to match the tapered system design so as to reduce waste from cutting hips and valleys on site. Both (hip and valley) halves of the cut board are used and the only waste is the dust generated by sawing. Whereas, when boards are cut on site, up to 50% of the cut boards could be wasted, depending on the particulars of the specific board layout and falls design.

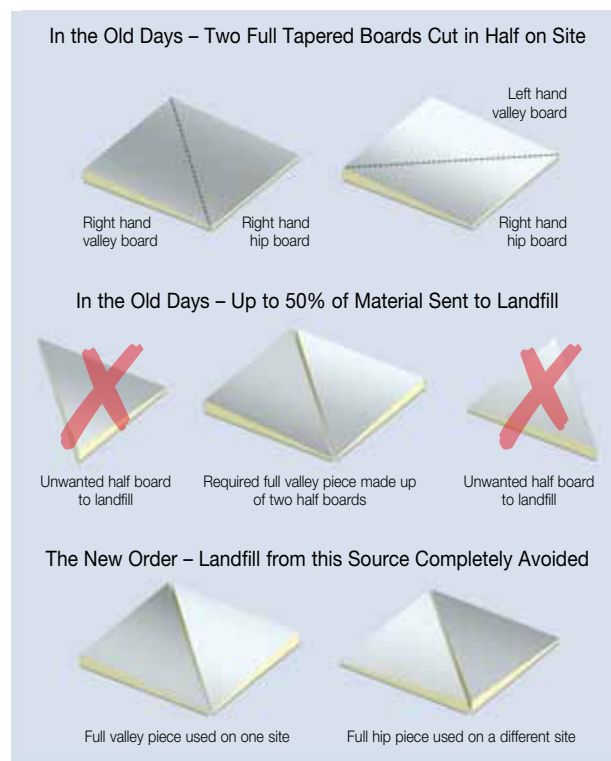


Figure 1 How Kingspan Pre-Mitred Tapered Flat Roof Insulation Boards Save Waste from Going to Landfill

Typical Tapered Roofing Design for *Kingspan Therma*™ TT47 LPC/FM

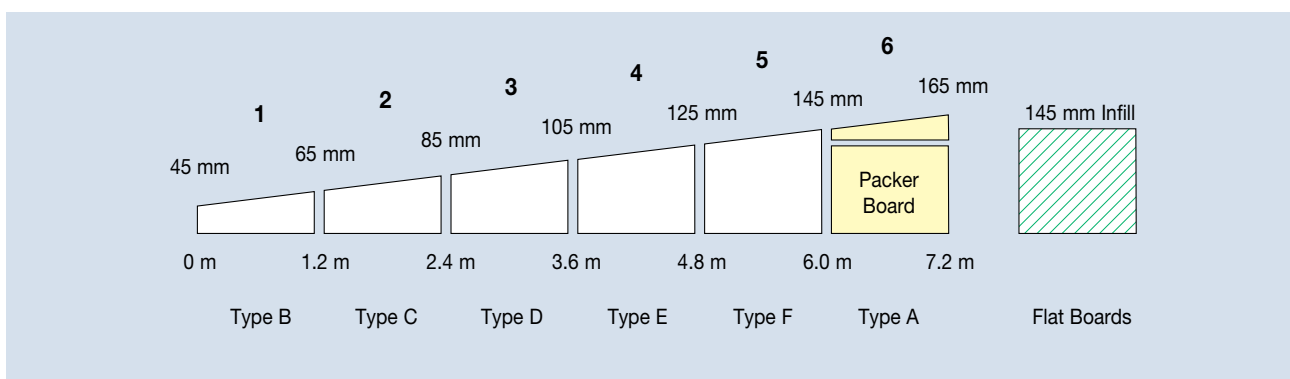
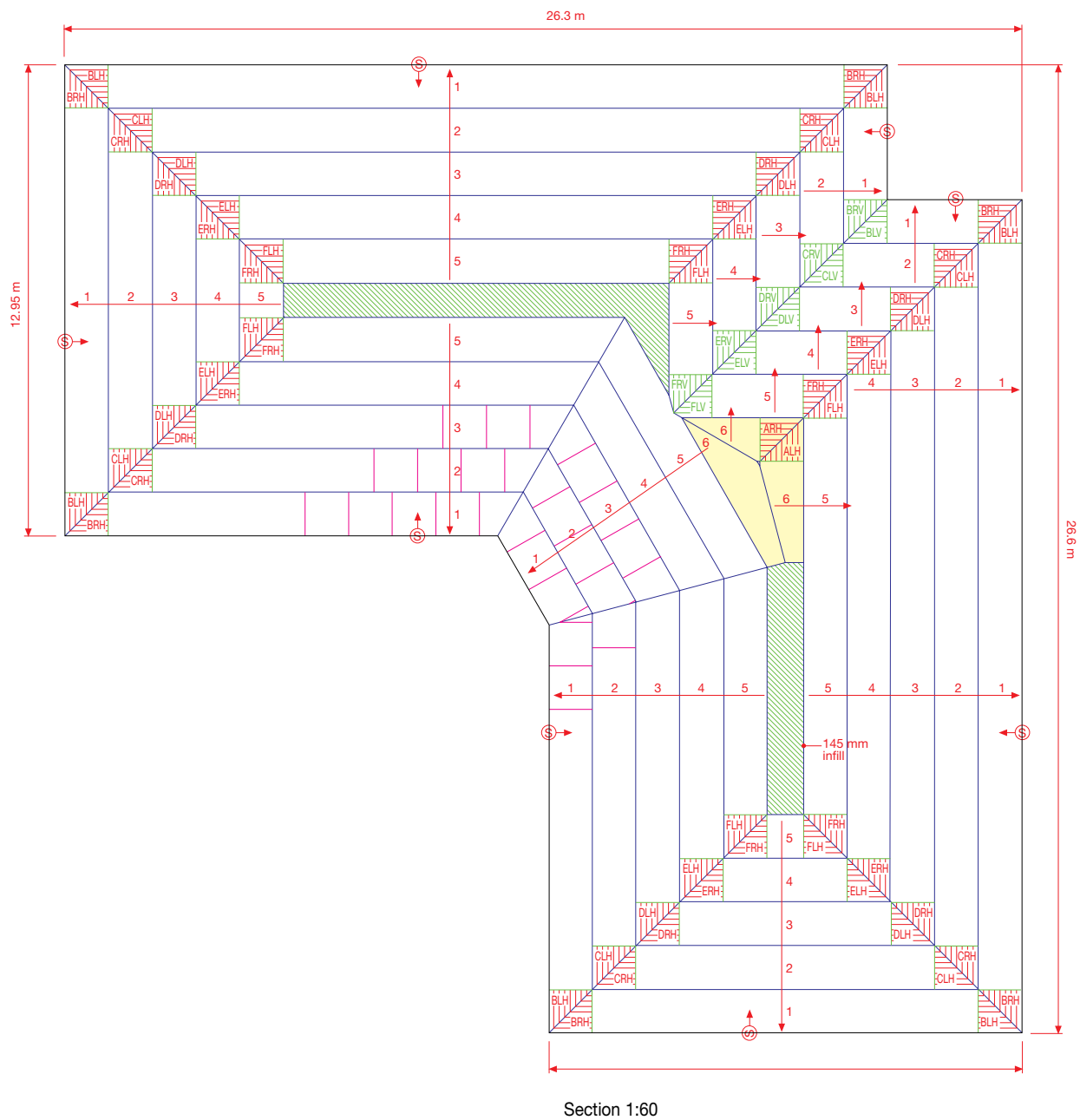


Figure 2

Typical Constructions

Concrete Deck

Kingspan **Therma**™ TT46 LPC/FM in a Dense Concrete Deck with Suspended Ceiling

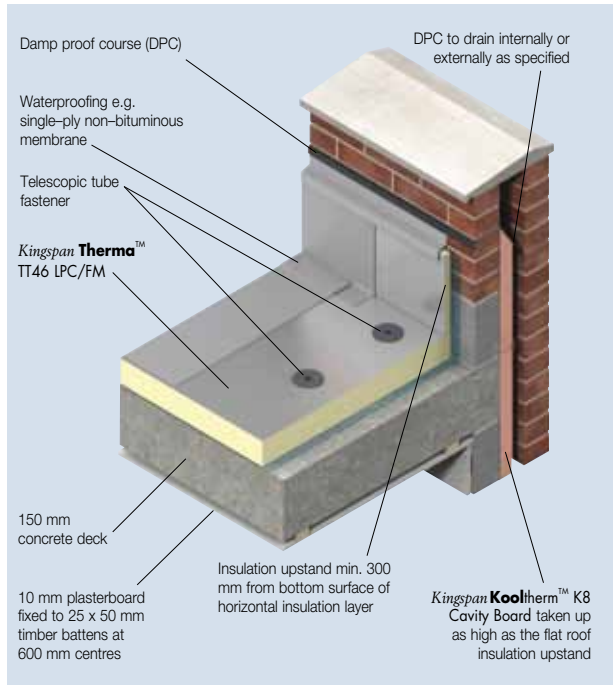


Figure 3

Kingspan **Therma**™ TT47 LPC/FM in a Dense Concrete Deck with Suspended Ceiling

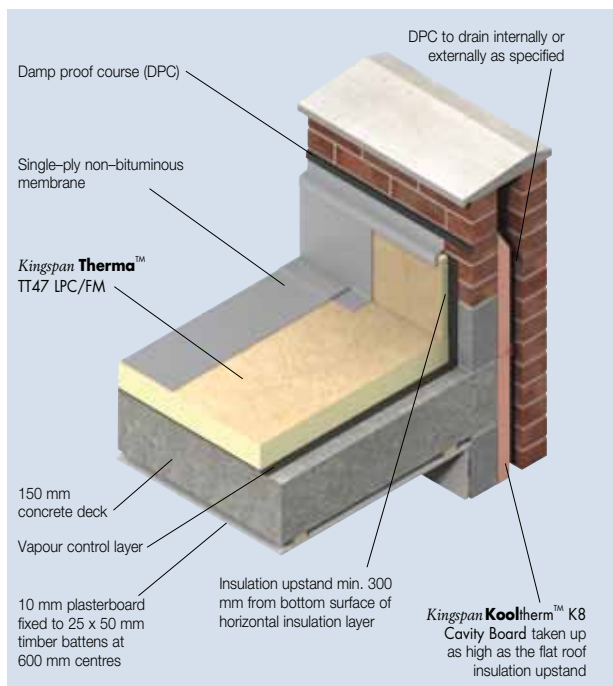


Figure 4

Metal Deck

Kingspan **Therma**™ TT46 LPC/FM in a Metal Deck with No Ceiling

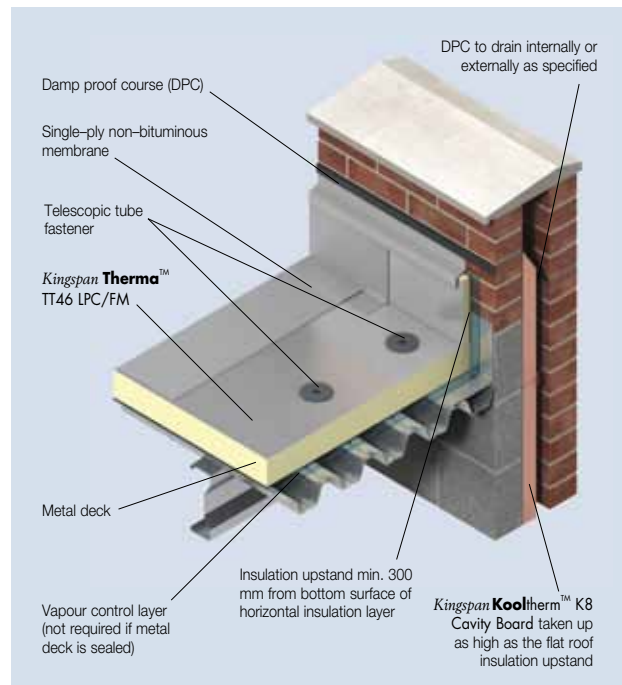


Figure 5

Kingspan **Therma**™ TT47 LPC/FM in a Metal Deck with No Ceiling

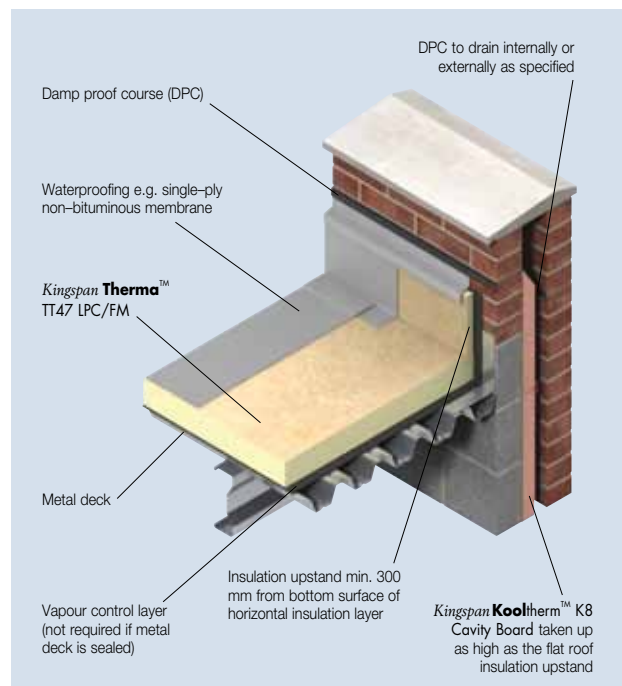


Figure 6

Product Details

Product Description

Kingspan Therma™ TT46 LPC/FM

Kingspan Therma™ TT46 LPC/FM is a tapered super high performance, fibre-free rigid thermoset insulation, faced on both sides with a low emissivity composite foil autohesively bonded to the insulation core during manufacture.

Kingspan Therma™ TT47 LPC/FM

Kingspan Therma™ TT47 LPC/FM is a tapered super high performance, fibre-free rigid thermoset insulation, faced on both sides with a coated glass tissue autohesively bonded to the insulation core during manufacture.

Kingspan Therma™ products are manufactured without the use of CFCs/HCFCs and have zero Ozone Depletion Potential (ODP).



Product Data

Product Dimensions 1200 mm x 1200 mm (1.44 m²)

Product Thickness
Systems with a 1:30 & 1:40 fall: 50 mm minimum
Systems with a 1:60 & 1:80 fall: 25 mm minimum
Systems with a 1:120 fall: 30 mm minimum*
All systems: Unlimited maximum*

Taper Gradients Falls of 1:30, 1:40, 1:60 and 1:80**

*Packer boards will be required above a specific thickness.

**For information regarding tapered roof designs incorporating *Kingspan Therma™* TT46 LPC/FM or *Kingspan Therma™* TT47 LPC/FM in a wider range of falls please contact the Kingspan Insulation Technical Service (see rear cover).

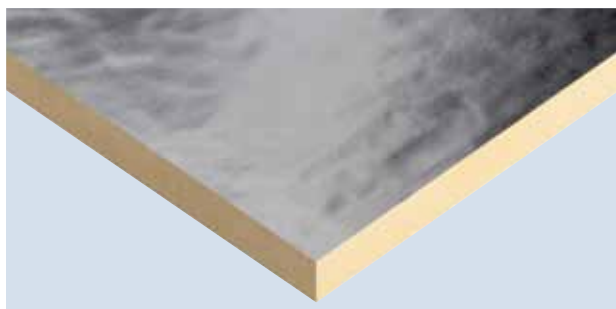


Figure 7 Tapered super high performance foil faced *Kingspan Therma™* TT46 LPC/FM



Figure 8 Tapered super high performance glass tissue faced *Kingspan Therma™* TT47 LPC/FM

Installation should be in accordance with AS 3999:2015, Section 4 - Safety Requirements for Insulation Installation.

For further details please contact Kingspan Insulation Technical Service (see back cover for contact details).

Thermal Properties

The effective thermal conductivity and thermal resistance of the insulation in a tapered roofing system is specific to the individual roof design. The Kingspan Insulation Tapered Roofing Department (see rear cover for details) performs calculations to determine these values in accordance with Annex C of BS EN ISO 6946: 2007 (Building components and Building elements – Thermal resistance and thermal transmittance – Calculation method) as part of the scheme design process.

Specification Guide

Kingspan Therma™ TT46 LPC/FM

The roof insulation shall be *Kingspan Therma™* TT46 LPC/FM ____ mm thick, comprising a CFC/HCFC-free and zero Ozone Depletion Potential (ODP) rigid thermoset insulation core with composite foil facings on both sides, manufactured under a management system certified to BS / I.S. EN ISO 9001:2008, BS / I.S. EN ISO 14001:2004 and BS / I.S. OHSAS 18001:2007 by Kingspan Insulation Limited and shall be installed in accordance with the instructions issued by them.

A Project Specific Warranty provided by Kingspan Insulation must be submitted.

Kingspan Therma™ TT47 LPC/FM

The roof insulation shall be *Kingspan Therma™* TT47 LPC/FM ____ mm thick, comprising a CFC/HCFC-free and zero Ozone Depletion Potential (ODP) rigid thermoset insulation core with coated glass tissue facings on both sides, manufactured under a management system certified to BS / I.S. EN ISO 9001:2008, BS / I.S. EN ISO 14001:2004 and BS / I.S. OHSAS 18001:2007 by Kingspan Insulation Limited and shall be installed in accordance with the instructions issued by them.

A Project Specific Warranty provided by Kingspan Insulation must be submitted.

Roof Loading/Traffic

Kingspan Therma™ TT47 LPC/FM is suitable for use on access decks subject to limited foot traffic.

Where frequent foot traffic is liable to occur, it is recommended that the roof surface is protected by specially designed walkways, or a trafficable material.

Spanning on Metal Decks

The designer's attention is drawn to the requirement that insulation boards are of the minimum thicknesses shown in the table below, when used over metal decks with trough openings as shown.

Trough Opening (mm)	Minimum Insulant Thickness (mm)
≤75	25
76 – 100	30
101 – 125	35
126 – 150	40
151 – 175	45
176 – 200	50
201 – 225	55
226 – 250	60

Standards and Approvals

Kingspan Therma™ TT46 LPC/FM and *Kingspan Therma™ TT47 LPC/FM* are compliant with AS/NZS 4859.1 as required by the NCC BCA.

Kingspan Therma™ TT46 LPC/FM and *Kingspan Therma™ TT47 LPC/FM* are manufactured to the highest standards and certified under the following management systems:

Standard	Management System
BS / I.S. EN ISO 9001:2008	Quality Management
BS / I.S. EN ISO 14001:2004	Environmental Management
BS / I.S. OHSAS 18001:2007	Health and Safety Management

Kingspan Therma™ TT46 LPC/FM and *Kingspan Therma™ TT47 LPC/FM* are also manufactured to the highest standards in accordance with the requirements of:

Requirement	Rigid polyisocyanurate (PIR) and polyurethane (PUR) products for building end-use applications
BS 4841-3*	Specification for laminated boards (roofboards) with auto-adhesively or separately bonded facings for use as roof board thermal insulation under built-up bituminous roofing membranes
BS 4841-4	Specification for laminated boards (roofboards) with auto-adhesively or separately bonded facings for use as roofboard thermal insulation under single-ply roofing membranes

*Applies to *Kingspan Therma™ TT47 LPC/FM* only

Product Testing

Characteristic	Standard	Result
Compressive Strength	AS 2498.3	Typically exceeds 150 kPa at 10% compression
Water Vapour Resistance	AS 2498.5	> 100 MN·s/g (<i>Kingspan Therma™ TT46 LPC/FM</i>) > 7 MN·s/g (<i>Kingspan Therma™ TT47 LPC/FM</i>)

Fire Performance

Kingspan Therma™ TT46 LPC/FM and *Kingspan Therma™ TT47 LPC/FM*, when subjected to the British Standard fire test specified in the table below, will achieve the result shown, when waterproofed with a single-ply waterproofing membrane.

Test	Result
BS 476-3: 2004 (External fire exposure roof test)	Dependent on single-ply membrane adopted
AS 1530.3 (Ignitability, Flame Spread, Heat Release, Smoke Release)	Spread of Flame Index: 0 Smoke Development Index: 1 (TR26 LPC/FM); 5 (TR27 LPC/FM)
AS 2122.1 (Flame Propagation AS 1366)	Complies

Kingspan Therma™ TT47 LPC/FM, when subjected to the British Standard fire test, specified in the table below, will achieve the result shown when waterproofed with 3 layer built-up felt and a loading coat of 10 mm chippings. For specifications without the chippings please consult the manufacturer of the mineral surfaced cap sheet for their fire classification details.

Test	Result
BS 476-3: 2004 (External fire exposure roof test)	FAA Rating

Further details on the fire performance of Kingspan Insulation products may be obtained from the Kingspan Insulation Technical Service (see back cover).

LPCB & FM Certification

FM Certification

Kingspan Therma™ TT46 LPC/FM and *Kingspan Therma™* TT47 LPC/FM are certified as achieving Class 1 Insulated Steel Deck Pass to Factory Mutual Research Standards 4450 (Approval Standard for Class 1 Insulated Steel Deck Pass) and 4470 (Approval Standard for Single-Ply, Polymer-Modified Bitumen Sheet, Built-Up Roof (BUR) and Liquid Applied Roof Assemblies for use in Class 1 Non-combustible Roof Deck Construction), subject to the conditions of approval as a roof insulation product for use in Class 1 roof constructions as described in the current edition of the Factory Mutual Research Approval Guide.

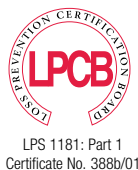


LPCB Certification

Metal deck roofing constructions incorporating *Kingspan Therma™* TT46 LPC/FM and *Kingspan Therma™* TT47 LPC/FM, produced at Kingspan Insulation's Pembridge and Castleblayney manufacturing facilities, have been successfully tested to LPS 1181: Part 1 (Requirements and Tests for Built-up Cladding and Sandwich Panel Systems for use as the External Envelope of Buildings). The table below indicates the LPCB listed approvals for *Kingspan Therma™* TT46 LPC/FM and *Kingspan Therma™* TT47 LPC/FM.

For further details please contact the Kingspan Insulation Technical Service (see back cover for contact details) or alternatively search for approval reference numbers 388b/01 and 388b/02 on www.redbooklive.com.

Product	Thickness (mm)	Vapour Control	Grade	LPCB Ref No.
<i>Kingspan Therma™</i> TT46 LPC/FM	30 – 120 in a single layer	Sealed metal deck or separate vapour control layer	EXT – B	388b/01
<i>Kingspan Therma™</i> TT47 LPC/FM	30 – 120 in a single layer	Sealed metal deck or separate vapour control layer	EXT – B	388b/02



Durability

If correctly applied, *Kingspan Therma™* products can be expected to have a long life of service.

Their durability depends on the supporting structure and the conditions of its use.

Kingspan Therma™ products are warranted for a period of 10 years for both residential and commercial installations.*

* Subject to the terms of the complete *Kingspan Therma™* warranty document which is available upon request or downloadable from our website (see back cover).

Environmental Data

Aspect	Characteristic
Recyclability	Non-contaminated insulation site waste is recyclable, but there are currently no facilities in Australia to process returned material
Re-usability	Re-usable if removed with care (long term of service expected)
Water Use	No water used in Kingspan Insulation's manufacturing process
Blowing Agent Global Warming Potential (GWP)	Manufactured with a blowing agent that has low GWP
Blowing Agent Ozone Depletion Potential (ODP)	Manufactured with a CFC/HCFC-free blowing agent that has zero ODP
Packaging	Contains 0% recycled product Polythene wrap and EPS skids 100% recyclable

Contact Details

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Kingspan Insulation Pty. Ltd. reserves the right to amend product specifications without prior notice. The information, technical details and fixing instructions etc. included in this literature are given in good faith and apply to uses described. Recommendations for use should be verified as to the suitability and compliance with actual requirements, specifications and any applicable laws and regulations. For other applications or conditions of use, Kingspan Insulation offers a Technical Advisory Service the advice of which should be sought for uses of Kingspan Insulation products that are not specifically described herein. Please check that your copy of the literature is current by contacting us or visiting our website.



Kingspan Insulation Pty Ltd