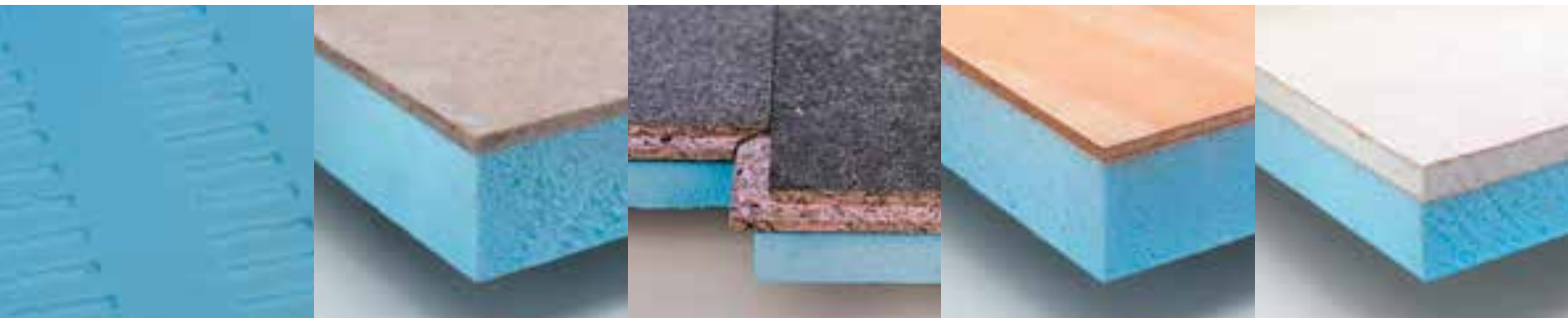


THE KNOWLEDGE TO PRODUCE SOLUTIONS



THERMAL LAMINATES

for roofs, walls, floors and soffits



THERMAL INSULATION
CONDENSATION CONTROL
GROUND GAS PROTECTION
ACOUSTIC FLOOR SOLUTIONS
TIMBER CLADDING

THE KNOWLEDGE TO PRODUCE SOLUTIONS



The Haugh, Blairgowrie

The Problem

Over the last few decades energy efficiency and heat loss has become an important criteria in the designing of buildings. This has increased demand for laminates used in roofs, floors and walls

Insulating external walls on the inside-closer to the heat source than exterior or cavity insulation-means fast reflection of heat into the room, which is especially important in our unpredictable climate and where intermittent heating systems are in use.

The Solution

The A.Proctor Group has acquired Plusboard Insulation Ltd which was established in 1976 in order to develop products which exploited superior thermal and structural characteristics of extruded polystyrene, particularly in laminated insulation products.

The advantages of extruded foam were obvious and Plusboard Styrofoam/plasterboard laminate was an instant success and eventually became the industry standard.

This success resulted in the expansion and development of:

- Plusboard (for walls)
- Plusfloor (for flooring)
- Plusdeck (for roofing)
- Plusclad (for external soffit insulation)

The Knowledge

The A. Proctor Group has for over 40 years been serving the construction industry with an extensive portfolio of technically advanced Thermal, Acoustic and Membrane products.

The commitment to develop a soundly engineered Thermal Laminate System has resulted in a unique partnership with the U.K.'s largest manufacturer of Extruded Polystyrene, Dow Construction Products.

Dow Construction Products** manufacture the STYROFOAM* range of blue extruded polystyrene to a carefully determined specification, in Kings Lynn, Norfolk.

ISO 9001 quality procedures and ensure product reliability and performance.

A nationwide technical specification team, together with Tecline Advice Centre, ensure professional response to the industry's requirements.

A national network of distribution outlets ensure prompt and effective service.

We are still the only independent Scottish manufacturer of laminated thermal insulation products for the construction industry. With thirty years experience, we still lead the field in the follow-through service we provide, beginning with seminars and technical assistance to specifiers, through tailor-made products, to installation advice.

* STYROFOAM is a trademark of The Dow Chemical Company.

** Dow Construction Products is a division of The Dow Chemical Company Ltd.

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Objective of Technical Guide

This Technical Guide offers good advice on the specification of thermal laminate systems. By adopting the practical measures given in this Technical Guide, the design and build team can reduce the risks of cold bridging in both traditional and timber frame buildings.



THE IMPORTANCE OF THERMAL INSULATION

The Problem

When designing any building whether domestic or commercial, the designer must take into consideration the thermal performance of the building and any associated risks of condensation. These two areas are very important to ensure the client's comfort in the future. The location of the insulation whether external, cavity (new build) or internal is part of this process.

External insulation gives the property good thermal mass however has slow response, cavity insulation can be easier to install during construction, and internal insulation can provide a quick response to heating.

The position of the insulation will be dependent on whether the building is existing or a new build. It should also take into account the use of the building and the type of heating system.

The Solution

The use of laminates in construction has long been established and their benefits well recognised. An internal laminate such as laminated plasterboard or laminated floorboard gives a quick response time to heating designs and is particularly suitable to dry, warm air systems, especially if the building is to be intermittently heated.

The A. Proctor Group, with its history of successful technical solutions recognise these factors and has developed the Thermal Laminate Range.

Each system is a simple, effective solution to heat loss through floors, roofs and walls. By utilising a closed cell, extruded polystyrene (XPS), Styrofoam, bonded to plasterboard or chipboard, the XPS with its high vapour resistance ensures any condensation risk is taken out with the building fabric.

The board's closed cell structure ensures permanently low thermal conductivity without the risk of moisture pick up, ease of handling and ease of installation. Risks of cold bridging are reduced in both traditional and timber frame building thus providing continuous insulation at marginally extra costs.

These systems can be applied using normal plasterboard fixing techniques to walls i.e. mechanical fixings or plaster dabs; and also nails or screws to floors.

This internal laminated insulation provides ease of construction with user-friendly materials that are quick to install and not dependent on weather conditions. They also provide a finish to the inside of the building, increasing the thermal insulation at the same time. Laminates can avoid using difficult or sometimes complicated insulation systems. Continuity of insulation limits the possibility of surface condensation.

The Benefits

The following benefits are true of all of the thermal laminates supplied by The A. Proctor Group.



High Compressive Strength - the high compressive strength of the extruded polystyrene results in a product which is less likely to deform under high loads.



Good Bonding Properties - the flatness of the material with its keyed surface provides an optimum base for lamination.



Low Water Absorption - the Styrofoam's closed cell structure prevents the ingress of water.



Excellent Thermal Performance - Styrofoam is a highly efficient insulator with a very low 'k' factor.



Lightweight and Strong - High strength to weight ratio is an advantage in longer spans.



Strong rigid continuous insulation prevent cold bridging.



User Friendly.



Will last the lifetime of the floor, wall or ceiling.



Access for trades to ceilings, floors and walls immediately after installation (no drying out period).



Good working environment - Styrofoam presents no health hazard and generates very little dust during sawing or drilling.



Close tolerance.

THE IMPORTANCE OF THERMAL INSULATION

Why Styrofoam?

Styrofoam, the extruded polystyrene foam material developed by DOW is much more than a remarkably effective thermal insulant. It has a unique combination of physical and chemical characteristics that make it a key component within a wide variety of today's high performance composite structures.

Styrofoam is lightweight yet exceptionally strong, safe in use, stable in sustained hostile environments and capable of being precision engineered. It contributes rigidity, durability, manageability, high strength-to-weight ratios and thermal performance.

Thermal Efficiency

No other insulating material combines the thermal efficiency of styrofoam with its versatility. It is rigid, stable, can be cut to any size, is not friable and requires no additional vapour control layer in most cases.

- Low thermal conductivity: 0.033 W/mK at 10⁰c

Stability

Styrofoam is cured for 90 days before thermal testing—three times longer than most other foams.

The 90-day cure means that there will be no further movement of the foam, ensuring that it will retain its final structural-and thermal values indefinitely.

- Tolerance: +/- 0.5mm

Moisture resistance

Moist insulant is inefficient insulant, and air is moist. Unlike other foam insulants, Styrofoam is extruded, producing a structured, closed-cell foam, with negligible moisture absorption.

Its all-round impermeability means it requires no additional vapour check facing in most cases, and ensures its thermal resistance is unaffected by the moisture content of the air:

- Low moisture pick-up: maximum 0.5% vol
- High vapour resistance: μ value 100

Compressive Strength

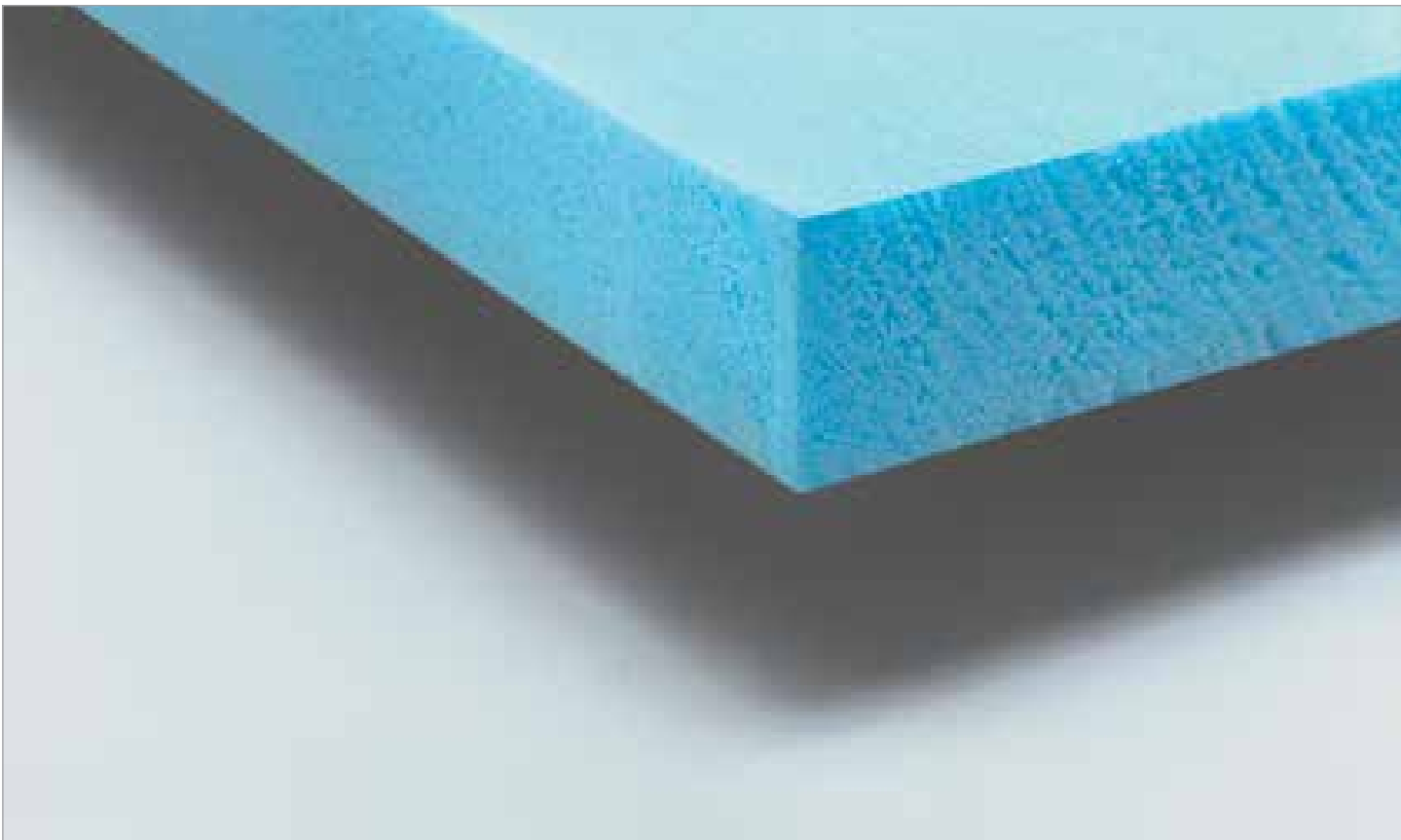
Styrofoam's density and coherent internal structure enable it to withstand compression in excess of normal domestic usage.

- High compressive strength: minimum 300kN/m²

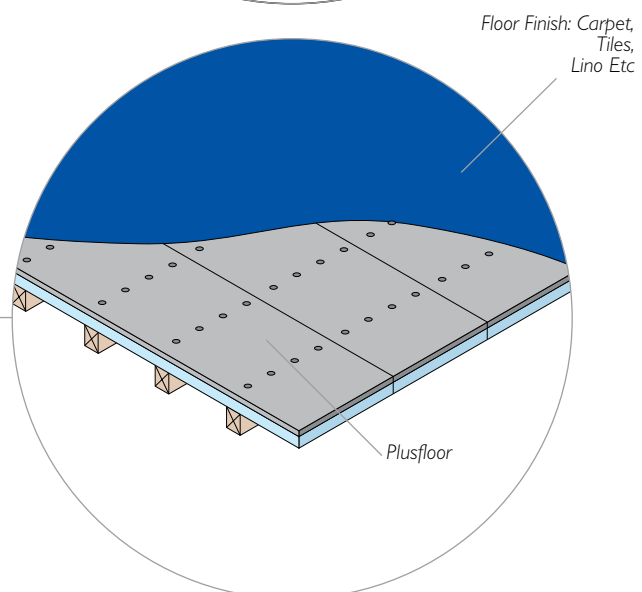
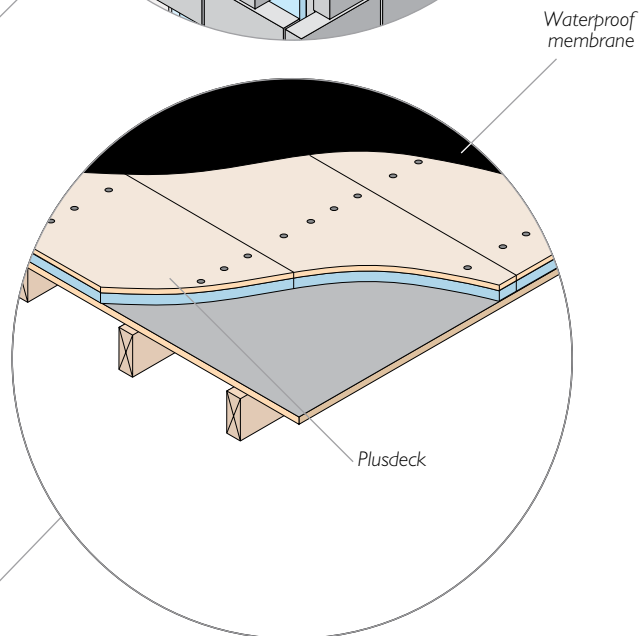
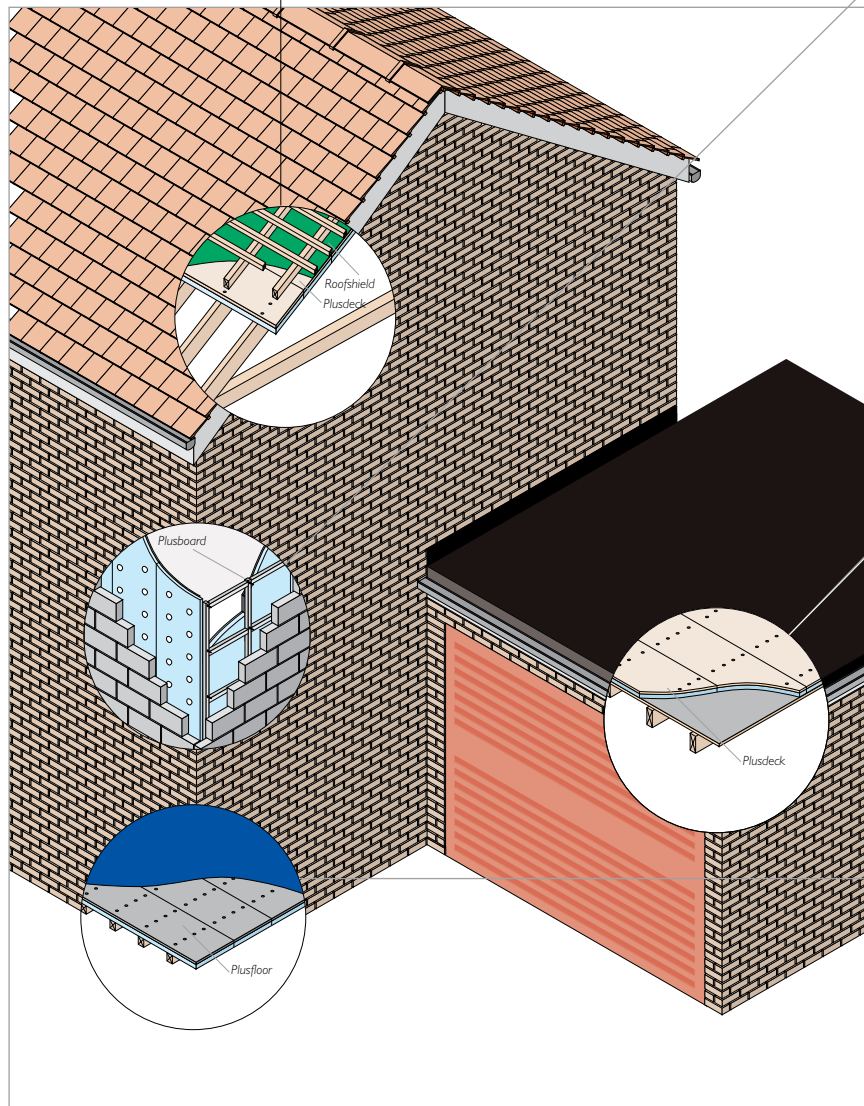
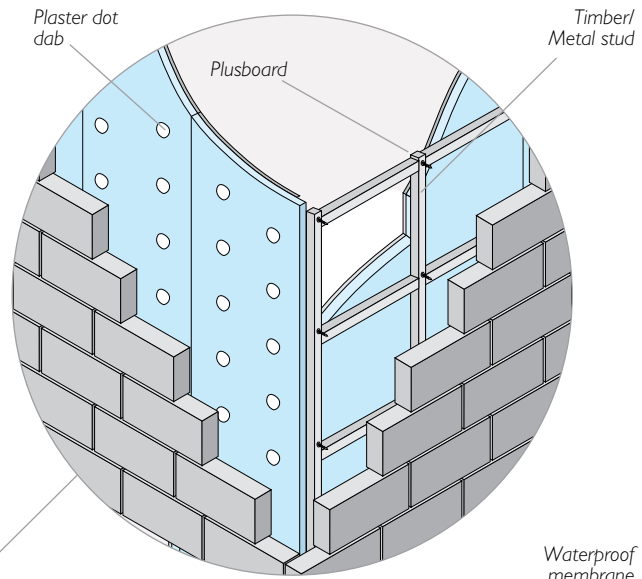
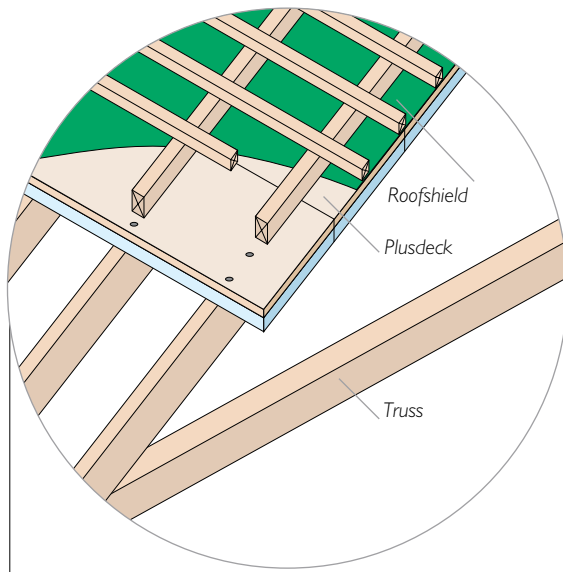
Flammability

Styrofoam contains a fire retardant additive which inhibits accidental ignition from a small fire.

Styrofoam



AN INTRODUCTION TO THERMAL LAMINATES



Diag. TLI

Important: For manufacturer's recommended installation and technical requirements please contact the A. Proctor Group Technical Dept at 01250 872261

AN INTRODUCTION TO THERMAL LAMINATES

Walls

Plusboard

Styrofoam/plasterboard laminate, Plusboard, was developed as the answer to the need for high-quality internal wall insulation. It is applied to the inner wall of traditional or timber frame buildings using conventional techniques. The thickness of insulant required can be varied to meet the U-value required with different construction materials.

We also manufacture using polyurethane foam (PUR), polyisocyanurate (PIR), and expanded polystyrene (EPS). Although no other foam has the rigidity, moisture resistance and easy-handling of Styrofoam, each has qualities which may influence the choice of one insulant over another.

Floors

Plusfloor

Styrofoam's exceptional compressive strength and moisture resistance led to the development of Plusfloor - Styrofoam bonded to V313 moisture resistant tongue and groove chipboard flooring, which can be laid directly on both concrete and timber joisted floors in the same way as plain chipboard.

Plusfloor eliminates the need for underfloor insulation and overcomes the problem of cold-bridging at joists.

Soffit/cladding

Plusclad

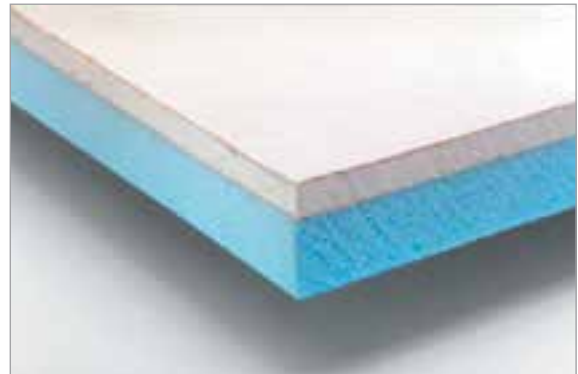
Plusclad is a high strength laminate of cement fibre board bonded to Styrofoam extruded polystyrene insulation. This combines the non-combustibility, fire resistance, wear and impact resistance of the cement fibre board with the high insulation value, moisture resistance and rigidity of Styrofoam. Ideal for use in car parks, balconies and soffits. Smooth surface finish allows direct painting.

Roofs

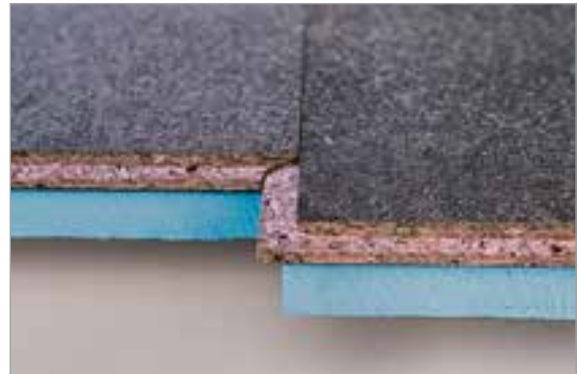
Plusdeck

Styrofoam's integrity, structural strength, moisture-resistance and thermal efficiency make it an ideal roofing material. Laminated to ply or other sarking board, it is suitable for both flat or pitched 'warm' or 'room in the roof' designs.

Plusdeck is intended primarily as an inexpensive, strong, insulated deck which can be speedily erected to provide sufficient insulation to meet building requirements in one operation.



For a comparison of technical qualities please contact the technical office (Tecline).

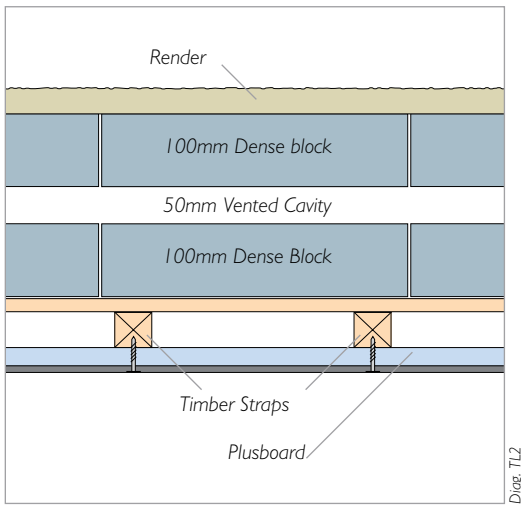


*Ancillary items: Plusfloor adhesive
Plusfloor edging strip*

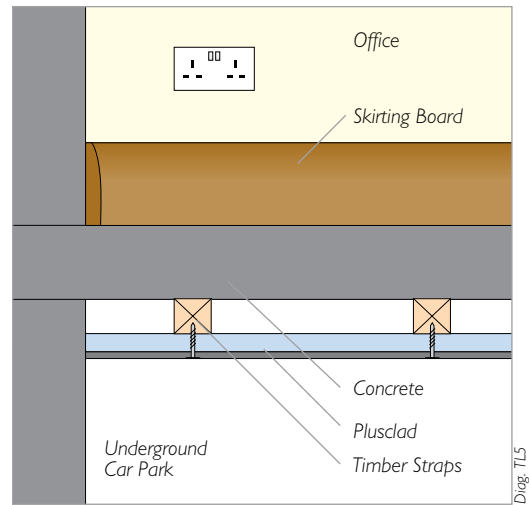


Indented surface provides increased adhesion to the plaster dab.

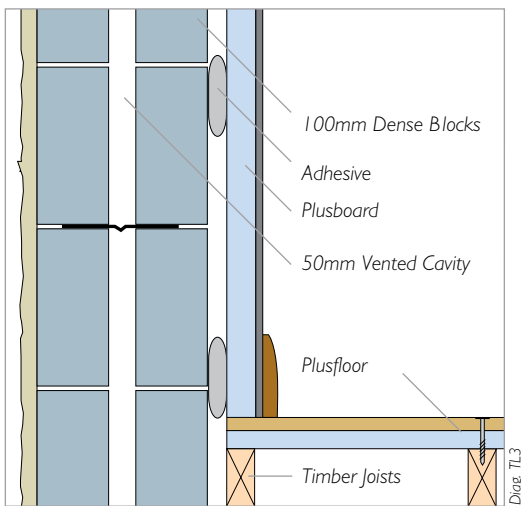
PREFERRED DETAILS



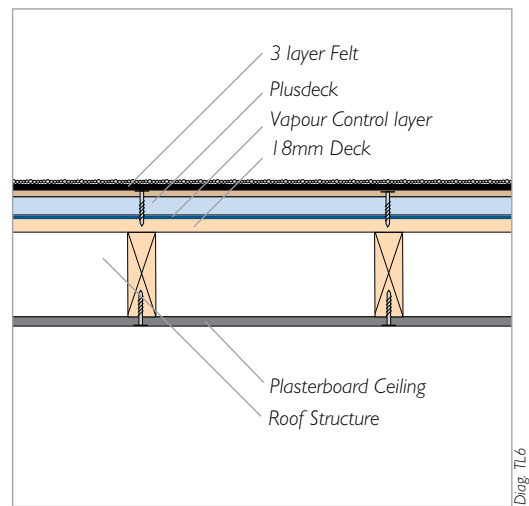
Plusboard in traditional build (plan)



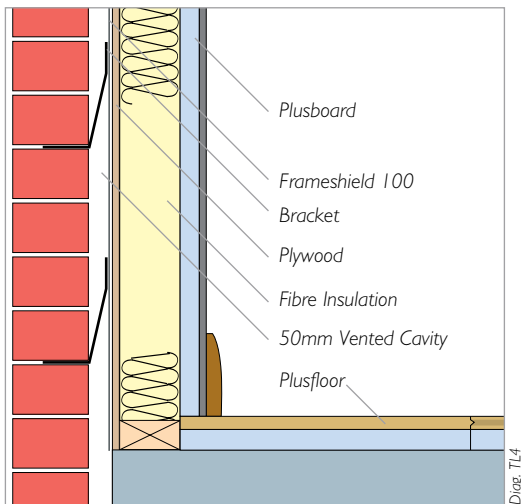
Plusclad in a soffit e.g car park



Plusboard / Plusfloor in traditional build



Plusdeck in a Flat roof



Plusboard / Plusfloor in A timber frame



TECHNICAL DETAILS

Styrofoam

STYROFOAM*, the extruded polystyrene foam material developed by DOW Construction Products** is much more than a remarkably effective thermal insulant. It has a unique combination of physical and chemical characteristics that make it a key component within a wide variety of today's high performance composite structures.

Styrofoam is lightweight yet exceptionally strong, safe in use, stable in sustained hostile environments and capable of being precision engineered. It contributes rigidity, durability, manageability, high strength-to-weight ratios and thermal performance.

Plusboard

Any specified thickness of STYROFOAM bonded to gypsum plasterboard (eg. British Gypsum, Lafarge, Knauf) 9,5 or 12,5mm thickness
 Sizes: 1200 x 2400, other sizes available on request
 Thermal Conductivity (gypsum): 0.16 W/mK

Plusfloor

Any specified thickness of STYROFOAM bonded to 18mm P5 moisture resistant chipboard
 Sizes: 600 x 2400mm
 Thermal Conductivity (chipboard): 0.14 W/mK
 Ancillary Items - Plusfloor edging strip, 75mm Ringshank Nails, 75mm Screws (supplied by others)

Plusclad

Any specified thickness of STYROFOAM bonded to 4, 6 or 12mm of cement fibre board
 Sizes: 1200 x 2400mm
 Thermal Conductivity (cement fibre board): 0.30 W/mK

Plusdeck

Any specified thickness of STYROFOAM bonded to 6mm of exterior plywood (other thickness available).
 Sizes: 1200 x 2400mm
 Thermal Conductivity (plywood): 0.14 W/mK
 Ancillary Items - Proctor PR Nails

Properties (units)	Styrofoam LB
Min Density (kg/m ³)	30
Thermal conductivity (W/mK) (90 days at 10°C)	0.033
Compressive Strength (kN/m ²)†	300
Maximum continuous operating temp (°C)	75
Water Absorption (Vol %)	0.5
Dimension - Thickness (mm)	10-100
Tolerance (mm)	+/- 0.5

* STYROFOAM is a trademark of the Dow Chemical Company.

** Dow Construction Products is a division of the Dow Chemical Company.

† At yield or 10% deflection (whichever comes first) minimum value.



WINTER CONDENSATION RISK ANALYSIS

Tecline

The A. Proctor Group has a dedicated Technical Department which can deal with installation details, view drawings for approval and give specialist advice on the correct use of the A. Proctor Group products. The service also includes U-Value calculations and Condensation Risk Analysis'.

This computer analysis allows the specifier or contractor to view where, if any, condensation risks would be and whether this will cause potential problems in a given roof construction on any particular project.



Determining the U-value

Construction Type (Typical Example)

Element:	Wall, Brick and block cavity wall, clear cavity
Exposure:	Normal
Internal surface emissivity:	High
External surface emissivity:	High
Building use:	BS5250 dry/moist occupancy

		Thickness (mm)	Thermal Conductivity (W/mk)	Thermal Resistance (m ² K/W)
1.	Outside surface resistance	-	R-Value	0.040
2.	Render (cement, sand)	19.00	1.00	0.019
3.	Concrete Block (dense) exposed	100.00	1.21	0.083
4.	50mm Cavity	50.00	R-Value	0.180
5.	Concrete Block (dense) protected	100.00	1.13	0.088
6.	10mm Timber Strapping Cavity	10.00	R-Value	0.18
7.	Styrofoam LBH	90	0.033	2.727
8.	Plasterboard	9.50	0.21	0.045
	Inside surface resistance	-	-	0.130

* Bridged with timber at 11.8%

U-value

U-value: 0.30 W/m²k

WINTER CONDENSATION RISK ANALYSIS

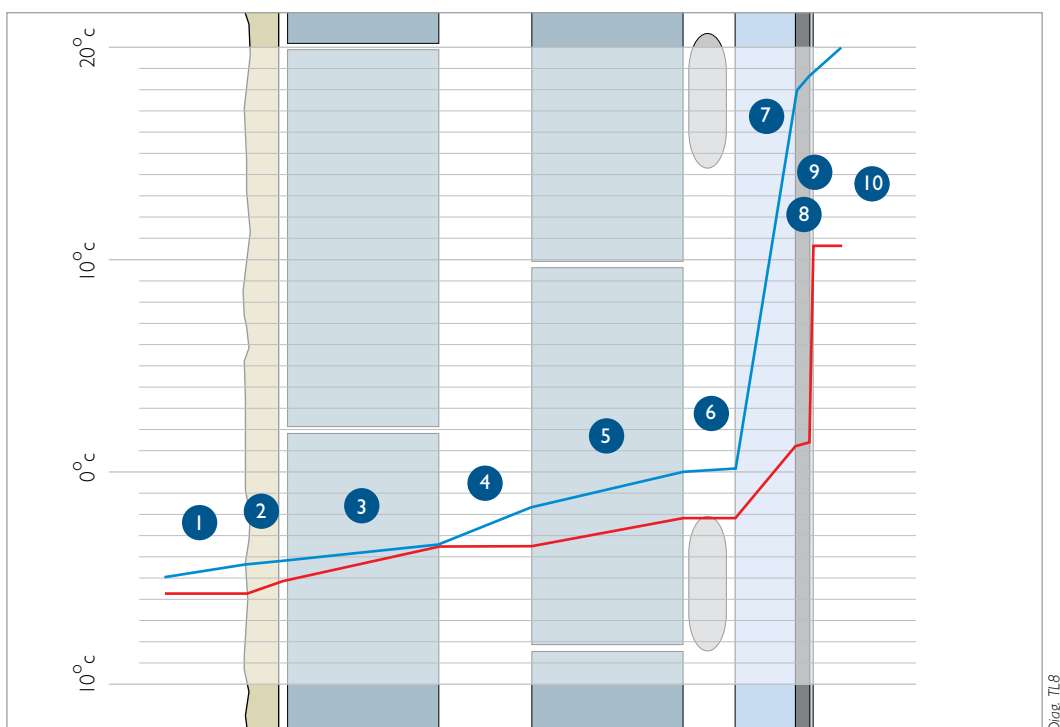
Determining the Dew point

Internal RH	65%
External RH	95%

Left: Typical Profile Graph available from the A. Proctor - Technical Department

		Interface Temp (C)	Dewpoint Temp (C)	Vapour Pressure (KPa)	Saturated V _p (KPa)	Winter Buildup (m ² K/W)	Annual Buildup (m ² K/W)	Condensation
1.	Outside surface resistance	-	-	-	-	-	-	-
2.	Cement Render	-4.8	-5.5	0.38	0.41	0	0	No
3.	Concrete Block	-4.6	-5.4	0.39	0.42	0	0	No
4.	50mm Cavity	-3.0	-4.1	0.43	0.43	0	0	No
5.	Blockwork Dense	-4.1	-4.1	0.43	0.48	0	0	No
6.	10mm Timber Strapping Cavity	-3.0	-3.0	0.47	0.50	0	0	No
7.	Styrofoam LB	-2.5	-3.0	0.47	0.53	0	0	No
8.	Plasterboard (standard wall board)	-1.6	-1.7	0.53	1.59	0	0	No
9.	Drywall Sealer	14.2	-1.7	0.53	1.62	0	0	No
10.	Inside surface resistance	14.2	8.5	1.11	1.62	-	-	-

How the profile graph works



THE KNOWLEDGE TO PRODUCE SOLUTIONS



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