

An Extra Strong, puncture and tear resistant Heat Reflecting Membrane system for lining domestic, commercial and industrial buildings

Long-life Heat Reflecting Membranes (HRM's) made from a various sheet materials were conceived by NASA space scientists to protect orbiting craft from solar radiation. This heat control technology has spawned a variety of terrestrial applications. These include the famous "space" blankets that keep athletes and accident victim's warm, heat-reflecting sheaths for water tanks, air-conditioning ducts, heat-sensitive equipment and even Formula One racing car components



Thermo-Foil ES being installed in a private home prior to fitting plasterboard

Introduction

Thermo-Foil[®]ES is a further development where mass production techniques has provided a cost-effective, two sided HRM for use as a heat reflective lining in domestic and large buildings. This tough product has been specifically engineered to withstand the rigors of site work.

In combination with fibre insulation, Thermo-Foil ES can provide the most cost-efficient insulating method available that meets the requirements of current Building Regulations.

The concept behind Apollo Heat Reflecting Membranes

The primary function of a Heat Reflecting Membrane (HRM) is to block infrared energy radiating across air spaces. Infrared energy (radiation) converts to conducted heat when it strikes a surface such as a wall or roof. The energy transmits through materials, molecule to molecule, until it reaches the next air space where it then radiates from the surface to the next object. The molecules of air touching the solid surface warm, so energy can also leave the surface as rising convective air currents.

Deflects infrared energy and seals in dust

One of the functions of Thermo-Foil ES is to block over 96% (see table below) of infrared energy that would otherwise be absorbed by fibre of foam insulation. The membrane, in conjunction with Apollo tape, can also be used to seal new or existing soft insulation, decreasing dust levels to acceptable safe levels.

Thermo-Foil ES with reflective surface on both sides.

The Thermo-Foil ES system is primarily intended for installation within floors, walls, ceilings and roofs. Its inclusion will reduce the thickness of the soft insulation required, substantially minimising energy needs and improve comfort for occupants. The membrane eliminates excessive heat gain caused by incoming solar radiation yet can keep the room warm during cold weather. No matter the season, room temperatures are far easier to control. For example, solar heat striking a roof will conduct through the tiles and insulation layers crossing any air spaces as unwanted infrared energy, eventually warming the inner skin and over heating the room.

Conversely, useful heat from within the room will conduct through the inner skin, radiate across any air space into the insulation and be lost. In both scenarios the system blocks the radiating heat. Furthermore certified tests show the thickness of soft insulation can be reduced depending on the energy specification and location of the building yet still achieve the U values required by a country's Building Regulations.

Nominal infrared *emissivity value of materials commonly used in the building industry.

i.e. Emission of energy from a surface. 0.05 nominal emissivity value = 95% reflectivity

Material /surface	Nominal emissivity value	Infrared reflectivity %
Asphalt	0.90 to 0.98	10 to 2
Brick	0.93	7
Concrete	0.85 to 0.95	15 to 5
Normal window glass	0.95	5
Low E window glass (Low Emissivity)	0.15	85
Fibreglass / cellulose	0.80 to 0.90	20 to 10
Iron (polished)	0.06	94
Iron (rusty)	0.85	15
Limestone	0.36 to 0.90	64 to 10
Marble	0.93	7
Paint (depending on colour and surface finish)	0.80 to 0.91	20 to 9
White paper	0.92	8
White plaster	0.91	9
Wood	0.90	10
Medium density polyurethane insulation foam	0.85 to 0.90	15 to 10
Heat Reflecting non-tarnish aluminium surface on Apollo Energy Research Thermo-Foil ES	0.046	96.7
If an aluminium surface is tarnished or dull then the emissivity value can be 0.80		
NB: Reflective materials as used by NASA	Emissivity = 0.03 to 0.04	

*Emissivity is the ability of a surface to absorb or emit electromagnetic radiation.

Refer overleaf for Summary of Physical Characteristics



Installing Thermo-Foil ES

An excellent vapour barrier

With a low moisture transmission rate of less than 0.021 g/m² Thermo-Foil ES also act as an excellent vapour/dust barrier. With Thermo-Foil ES installed, dust particles are sealing-in, the insulation kept dry and its performance maintained.

Thermo-Foil adhesive tape

Thermo-Foil high performance acrylic adhesive tape can be used to seal the joints between adjacent sheets, around stud-work, door or window frames. Without using a variety of mastics or other tapes the structure can be effectively sealed preventing air infiltration and ensuring the building meets its mandatory air pressure test. Thermo-Foil adhesive tape has a temperature range of minus 37°C to plus 127°C

Thermo-Foil ES- Summary of Physical Characteristics		
Tear resistant	Tensile MD of 6.620kN/m.	Resists accidental tearing keeping wastage to a minimum.
Puncture resistant	Beach puncture of 40.1 kg-cm	Less patching.
Moisture resistant	Moisture/vapour transmission rate of 0.021 g/m ² .	Seals duct and pipes from outside humidity.
Light and strong	96m x 1.25m = 120m ² roll weighs only 18.0 kg	Clean and easy to handle when installing.
Corrosion resistant	Unique surface coating	Surface keeps bright and clean.
UV resistant,	Testing for the equivalent of 30 years with 100% humidity, and 100% UV	Long life service.
Fire propagation index	Class 0	BS476:Part 6: 1989
Surface flame spread	Class 1	BS476:Part 7: 1997
Temperature resistant	Thermo-Foil ES membrane minus 50°C to plus 127°C	Used with confidence in tropical, temperate, and arctic conditions. Rot and mould-poof.
Cross laminated Valéron® core	Hardly stretches	Maintains surface integrity, simplifies handing during installation
Apollo Adhesive Tape used to seal membrane edges and on to structural elements.		
Nominal roll size	100m x 50mm	36 in box
Reflectivity	95%	To match membrane
Emissivity	0.05	To match membrane
Adhesive thickness	0.0381mm	Waterproof acrylic adhesive – see below
Peel adhesion - PSTC-1	11.4 N/25mm	
Shear adhesion – PSTC-7	Indefinite 15.2 kPa	
Tensile - PSTC-31	99.4 N/25mm	
Elongation	150%	
Max continuous use temp	+127°C	
Min application temp	-37°C	
Release liner	62g	

See the latest issue of *Energy cost the earth* brochure or www.apollo-energy.com for further details

BY INSTALLING AN THERMO-FOIL SYSTEM, ENERGY USAGE FOR HEATING OR COOLING WILL SUBSTANTIALLY REDUCE CARBON EMISSIONS AND YOUR ENERGY BILLS



Thermo-Foil® ES with its Valéron® substrate core is manufactured and distributed worldwide by Apollo Energy Research. Developed in association with Strength Films, a company based in Belgium it's a further advance where mass production techniques have provided a tough product that features a cross-laminated, tear resistant, HDPE substrate that can greatly improve the energy efficiency of buildings. Website: www.valeron.com

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Apollo HPA™ Adhesive Tape



Long-life HEAT REFLECTING tape for the Building Sector

Long-life Heat Reflecting products made from a various sheet materials were conceived by NASA space scientists to protect orbiting craft from solar radiation. This heat control technology has spawned a variety of terrestrial applications. These include the famous "space" blankets that keep athletes and accident victim's warm, heat-reflecting sheaths for water tanks, air-conditioning ducts, heat-sensitive equipment and even high performance racing car components

Introduction

Based on the heat control technology developed at NASA, Apollo Energy Research have developed a high performance, heat reflecting tape for use in the building sector.

The product has been tested to confirm a life-span of at least 20 years.

Apollo HPA™ (High Performance Acrylic) Adhesive Tape has been specifically engineered to withstand the rigors of site work.

Apollo HPA™ Adhesive Tape

Apollo HPA Adhesive Tape is used to seal the joints between adjacent sheets, of Heat Reflecting Membrane, Bubble-Foil and Multi-Foil products. It is also used to seal off these products around stud-work, door or window frames. So without having to using a variety of mastics or other tapes the structure can be effectively sealed preventing air infiltration and ensuring the building meets its mandatory air pressure test.

The aluminium surface of the tape has a special coating that ensures it's UV resistant, bright surface never tarnishes. 100% waterproof and bug proof, this Class 0 fire rated material has a tough high density polyethylene (HDPE) substrate core essential for a long working life and keeping wastage to a minimum during installation.

One side of the sheet is coated with a specially developed waterproof acrylic adhesive with release liner.

Once the tape is in position, the adhesive migrates into other tarnish proof coating used on most heat reflecting foil products, where it sets over a short period of time providing a life-long bond.



Apollo long-life adhesive tape showing release liner



Apollo HPA adhesive tape being used to seal a Heat Reflecting Membrane installed in a private home prior to fitting plasterboard

Apollo HPA Adhesive Tape with release liner

Nominal size of roll and weight	50mm x 100m
Nominal weight per roll	5m ² roll weighs 700g including card core.
Thickness without release liner	45 micron
Reflectivity	96%
Emmissivity	0.05
Peel adhesion – PSTC-1	11.4N/25mm
Shear adhesion – PSTC-7	Indefinite at 15.2 k/Pa
Tensile PSTC-31	99.4N/25mm
Elongation	150%
Maximum continuous use temperature	+127°C
Minimum application temperature	- 37°C
Release liner	75g

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Apollo HPA Adhesive Tape features a tough tear resistant, HDPE substrate.

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