ALUTHERMO QUATTRO – SUMMARY

1. APPLICATIONS:

- On the roof, from the outside
- On the roof, from the inside
- On the walls as cladding
- On the walls from the inside
- For floors

2. ADVANTAGES:

- Multi-reflective and Multi-layer
- Easy to install as it is thermally-welded across its entire surface
- Durable - as pure aluminium
- Fire protection class Bs1d0 (European Standard)
- Roof membrane, insulation material and vapour barrier - all in one
- No shrinkage and rotproof

3. LAYER DESCRIPTION:

QUATTRO is a semi-rigid complex composed of the following successive layers

- **Layer – 1:** a film of pure aluminium, 30 microns thick, treated against oxidation
- **Layer – 2:** a layer of bubbles of dry air enclosed in self – extinguishing polyethylene
- **Layer – 3:** a film of pure aluminium treated against oxidation
- **Layer – 4:** a foam of fire-retarding and waterproofed polyethylene
- **Layer – 5:** a film of pure aluminium treated against oxidation
- **Layer – 6:** a layer of bubbles of dry air enclosed in self-extinguishing polyethylene
- **Layer – 7:** a film of pure aluminium, 30 microns thick, treated against oxidation

The air trapped in the bubble film and polyethylene foam is dry and stable. Possible condensation is therefore always avoided within the usual range of temperatures for Aluthermo QUATTRO.

4. TECHINCAL CHARACTERISTICS:

• Dimensions of the roll	:	1.2 × 2.5 m or 1.2 × 6.25 m
• Surface area per roll	:	30 m^2 or 7.5 m^2
• Weight	:	± 750 g/m^2
• Thickness	:	± 10 mm
• Operating temperature range	:	-55°C to +80°C
• Fire resistance classification	:	Bs1do (European Standard)
• U-Value	:	1.76 W/m^2K
• R-Value	:	5.70 m^2K/W
• Acoustic attenuation	:	Rw (C;Ct) = 35 (-2;-7) dB
• Impact noise attenuation	:	ΔLw = 22 dB
• Permissible load with 10% deformation	:	543 Kg/m^2
• Permissible load with 20% deformation	:	1232 Kg/m^2
• Bursting resistance	:	2423 Kg/m^2
• Sd value	:	> 6000 m
• Number of layers	:	7

- Number of Aluminium layers : 4
- Thickness of the outer Aluminium film : 30 microns
- Emissivity : < 0.03 (EN 16012)
- Thermal performance : Up to 13% more effective than 200 mm of mineral wool (*) (**)

(*) Performance data only valid for the installation between 2 air gaps without direct contact (see installation instructions of the product)
(**) Thermal performance measured by the Eliosys laboratory, comparing the energy consumption of a structure insulated once with Aluthermo and once with 200 mm of mineral wool (λ=0.040 W/mK).

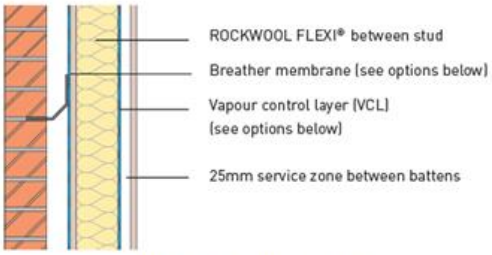
5. COMPARIOSN OF ALUTHERMO QUATTRO (10 mm) VS ROCKWOOL (200 mm):

S.NO	SPECIFICATION	ALUTHERMO QUATTRO	ROCKWOOL
1	Thickness	10 mm	200 mm
2	Weight	750 g/m^2	4.4 Kg/m^2
3	Fire Resistance	Bs1d0	A1
4	Insulation	Thermal & sound	Optional
5	Number of Layers	7	1
6	Number of Aluminium Layers	4	0
7	Acoustic Attenuation	R_w 35 dB	R_w 40 dB
8	R - Value	5.70 m^2K/W	4.54 m^2K/W
9	U - Value	0.176 W/m^2K	0.18 W/m^2K
10	λ-Value (Thermal Conductivity)	0.036 W/mK	0.044 W/mK
11	Humidity	Impermeable	Permeable (Trace)
12	Thermal Radiation	Barrier	Less Barrier

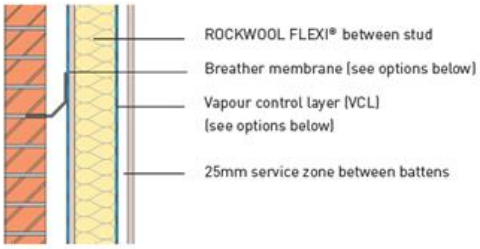
***ALL THE TECHNICAL DETAILS & INSTALLATION FOR COMPARISON OF ROCKWOOL HAS BEEN TAKEN FROM THEIR OWN SITE. INOX ARABIA DOES NOT PERFORM ANY RESEARCH OF THE OTHER COMPANY PRODUCTS.**

6. WALL INSTALLATION OF ROCKWOOL VS ALUTHERMO:

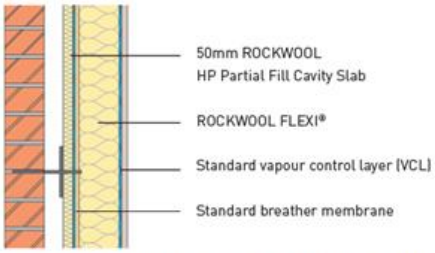
a) INSTALLATION OF ROCKWOOL:



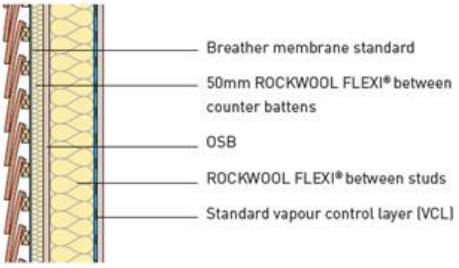
COLD FRAME WITH NO SERVICE VOID



COLD FRAME WITH SERVICE VOID



WARM / HYBRID FRAME (WITH NO SERVICE VOID)

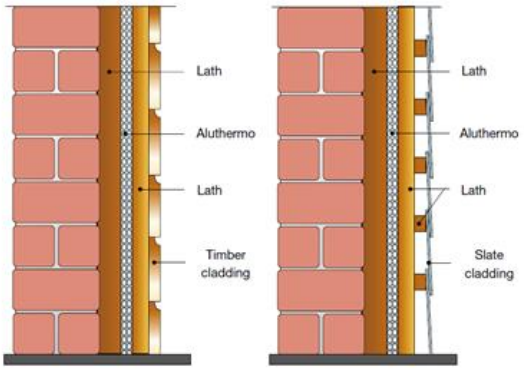


SINGLE TIMBER FRAME WITH CLADDING

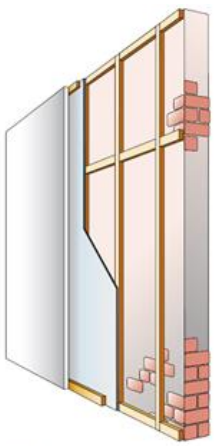
The main disadvantage of Rockwool is:

- **Only external** wall insulation.
- The Air gap (10mm) – Breather Membrane – Rockwool (200mm) – VCL (Vapour Control Layer) / Service Zone Between Battens (25mm): This will add to the **sum of 235mm (Approx.) thickness** for the complete installation i.e., it occupies more space.
- Apart from Rockwool, needs **Polypropylene Netting (AED 1.69/m^2)** & **VCL (AED 5.18/m^2)** for better performance along with installation materials.

b) INSTALLATION OF ALUTHERMO QUATTRO:



INSTALLATION ON EXTERIOR WALL AND CLADDING



INTERIOR WALL INSTALLATION

The advantage of Aluthermo Quattro:

- Can be used for both **Internal & External Insulation**.
- Air gap (20mm) – Aluthermo Quattro (10mm) – Air gap (20mm): the **thickness is 50mm (Approx.)** for the complete installation i.e., it is compact.
- Installation materials & Aluthermo Quattro are the only necessary materials.

7. CEILING INSTALLATION OF ALUTHERMO QUATTRO VS ROCKWOOL:

a) INSTALLATION OF ROCKWOOL:

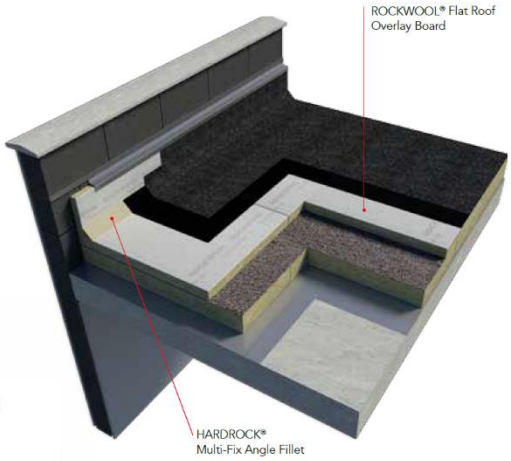


Fig: External insulation Installation of Rockwool

It can be used for both Flat Roof / Triangular Roof made of Concreate / Wood. Required materials for effective installation are **Overlay Board (AED 38.81/m^2 Approx.)** to provide perfect platform for the installation of new waterproof membranes, **Multi-Fix Angle Fillet (AED 7.96/m Approx.)** to provide proper insulation at the edges. And this will result in total thickness of around **250 mm** for Rockwool installation. It adds extra cost & also heavier when compared to Aluthermo Quattro.

b) INSTALLATION OF ALUTHERMO QUATTRO:

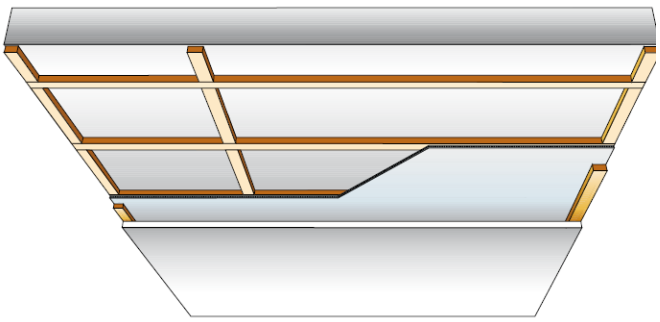


Fig: Aluthermo Quattro Internal Ceiling Insulation

Aluthermo Quattro is very easy to install in any type of ceiling (Flat roof / Triangular roof made of concreate / wood). Required materials for installation will be the Battens and Counter-Battens along with staple / screws as per requirement. The space required for install will be same as the wall insulation **(50 mm)**. It can be installed in either side of the roof. **Effective when compared to Rockwool**.

8. FLOOR INSTALLATION OF ALUTHERMO QUATTRO VS ROCKWOOL:

a) INSTALLATION OF ROCKWOOL:

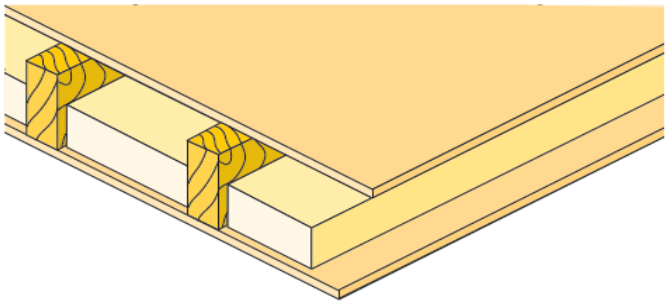


Fig: Internal Floor Insulation

The following are required for installation:

- 18 mm of tongue and groove flooring grade clipboard with a mass per unit area of 12.4 Kg/m^2
- Timber joints at 400 mm centres
- 100 mm of Rockwool Flexi between joints
- A single layer of standard 12.5 mm plasterboard ceiling with a mass per unit area of 8 Kg/m^2

For Acoustic application – the following are required:

- 2 layer of board material of minimum 25 Kg/m^2 (Clipboard + plasterboard plank)
- 25 mm (min) Rockwool Rockfloor resilient layer is laid
- Loose floating layer is installed over Rockfloor
- Existing floor deck on existing timber floor joists
- 100 mm of Rockwool Flexi
- Existing ceiling should be upgraded to 20 Kg/m^2. If existing is Fire Proof B-Grade can be retained.

Rockwool can only be used with wooden decks and Rockwool is not made to be installed with concreate floors.

b) INSTALLATION OF ALUTHERMO QUATTRO:

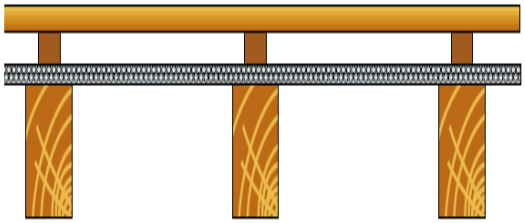


Fig: a) Installation under Floor Boards

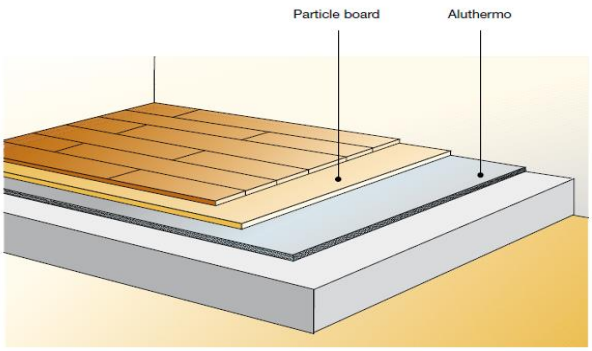
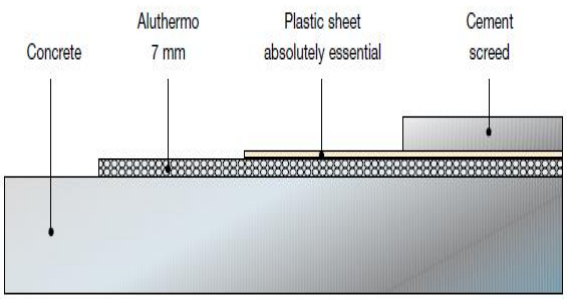


Fig: b) Installation under Floating Floor



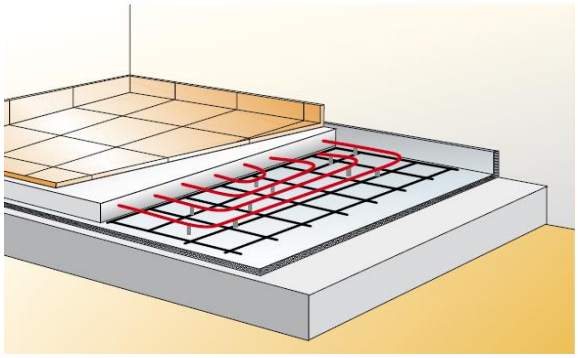


Fig: c) Insulation under Screed

Fig: d) Installation with under floor Heating

The above Figures illustrates that Aluthermo Quattro is capable of any application in the flooring section like Under Floor Boards with air gap (Fig a), Under Floating Boards (Fig b), Under Screeds (Fig c) or even with Under Floor Heating (Fig d).

9. R – VALUE (Ref. Doc 01 & Doc 06)**:**

- Aluthermo Quattro : 5.70 m^2K/W
- Rockwool : 4.54 m^2K/W

At the technical level, **R-value** is a measure of resistance to heat flow through a given thickness of material. In theory, the higher the **R-value**, the greater that resistance**.**

This shows 10 mm thickness Aluthermo Quattro is a better insulator of heat flow when compared to 200mm thickness of Rockwool.

10. U – VALUE (Ref. Doc 01 & Doc 07):

- Aluthermo Quattro : 0.176 W/m^2K
- Rockwool : 0.18 W/m^2K

U-values measure how effective a material is an insulator. **The lower the U-value is, the better the material is as a heat insulator**.

This shows 10mm thickness Aluthermo Quattro is a better insulator when compared to 200mm thickness of Rockwool.

11. λ – VALUE (Ref. Doc 06):

- Aluthermo Quattro : 0.002 W/mK
- Rockwool : 0.044 W/mK

Thermal conductivity is the property of a material to **conduct heat**. Heat transfer occurs at a lower rate across materials of low thermal conductivity than across materials of high thermal conductivity. Thermal conductivity often denoted k, λ, or k.

This shows 10mm thickness Aluthermo Quattro conducts very less amount of heat when compared to 200mm thickness of Rockwool.

12. FIRE RESISTANCE CLASSIFICATION – EUROPEAN STANDARD (Ref. Doc 05 & Doc 08):

- Aluthermo Quattro : Bs1d0 (Hard combustible) – Fire-retardant
- Rockwool : A1 (Non-combustible)

A **fire resistant** material is one that is designed to resist burning and withstand **heat**, however **fire-retardant** materials are designed to burn slowly.

The above standard of testing shows that Rockwool is Non-combustible & Aluthermo Quattro is Combustible but it is hard catching fire. We are doing Research, Developing a better material so as to make Aluthermo Quattro Non-combustible.

13. THERMAL RADIATION (Ref. ELIOSYS LAB Test Report):

- Aluthermo Quattro : Barrier
- Rockwool : Less Barrier

Thermal resistance is a heat property and a measurement of a temperature difference by which an object or material resists a heat flow. Thermal resistance is the reciprocal of thermal conductance.

The Lab Results reveal – Aluthermo Quattro remains stable at all three temperatures (-5°C, 0°C & +5°C). Which clearly states Aluthermo Quattro is a good insulator of both heat & cold. **Also Aluthermo Quattro (10mm) is 13% more efficient than Glasswool (200mm).** This is achieved because of the pure Aluminium layer in Aluthermo Quattro.

14. THICKNESS & WEIGHT (Ref. Doc 06 & Doc 08):

- Aluthermo Quattro : 10 mm & 750 g/m^2
- Rockwool : 200 mm & 4.4 Kg/m^2

In both cases Aluthermo Quattro is much better than Rockwool. These properties shows **Aluthermo is easier for installation and maintenance when compared to Rockwool because of its flexibility and lighter weight**.

15. ACOUSTIC ATTENUATION (Ref. Doc 09 & Doc 10):

- Aluthermo Quattro : R_w 35 dB
- Rockwool : R_w 40 dB

As reference to Document 09 & 10, even though Rockwool is hard and heavier when compared to Aluthermo Quattro, comparing the Acoustic Attenuation: **Rockwool is better than Aluthermo Quattro**. **Rockwool can resist 40 dB of noise but Aluthermo Quattro can resist only upto 35 dB**.

But not all Rockwool are capable of acoustic attenuation.

16. CONCLUSION:

Here from the above study and information it shows **10mm Aluthermo Quattro** is a very good insulator of Temperature when compared to **200mm of Rockwool.** Aluthermo Quattro is having a good result in **Thickness, Weight/m^2, Insulation, R – Value, U – Value, Thermal Conductivity (λ – Value), Humidity** and **Thermal Radiation** when compared to Rockwool. Easy to install, re-used , re-cycled, Durable & eco-friendly.