LABC Registered Details

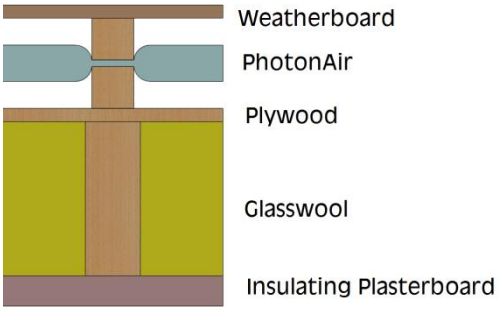
Timber frame wall, U=0.18, 140mm studs @ 600mm centres, PhotonAir across, glasswool between

WTF_600_PA33_CG_0.18

1 Application

Timber frame wall with rainscreen cladding, 140mm studs at 600mm centres fully filled with glasswool; PhotonFoil between external sheathing board and rainscreen cladding:

- Timber frame wall
- U-Value = 0.18
- PhotonAir between external sheathing board and rainscreen cladding
- 140mm stud 600mm spacing
- 140mm Glass λ 0.035 additional insulation between studs
- Plasterboard



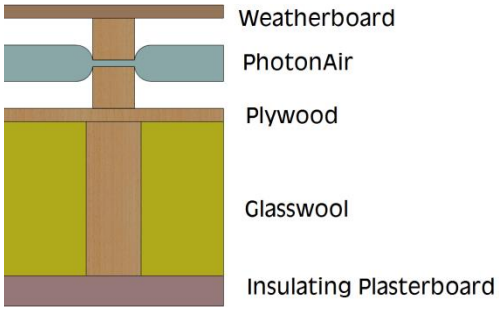
2 Product information

PhotonAir is a breathable lightweight thin flexible reflective insulation that incorporates a breathable underlay. It is constructed with glasswool at its core encapsulated by a perforated reflective lower layer and Klober Permo air roofing underlay upper layer. In accordance with EN16012 PhotonAir is classified as a Type 1 reflective insulation product.

It has been designed for and fully tested in accordance with the EN 16012 standard for reflective insulation products, including the application of 90/90. All testing of the product has been carried out by accredited test houses and Notified Bodies. PhotonAir has been tested to determine the 90/90 fractile and accordingly has a core thermal resistance of 0.97 M^2K/W and an emissivity value of 0.05.

Core conductivity ($\lambda_{90/90}$)	0.034	W/m.K
Emissivity	0.05	
Water vapour resistance	0.34	MN.s/g
Fire performance	Class D	
Product thickness	33	mm
Core R value	0.97	M^2.K/W
Core R value with 1 air space	1.76	M^2.K/W
Airspace thickness	23	mm
Direction of heat flow	Horizontal	
Width	1.2	M
Weight	1.00	Kg/m2
Roll length	10	lm

3 Installation between external sheathing board and rainscreen cladding



Install in line with our general installation instructions:

1. Place 38mm battens, vertically at 600mm centres across the external sheathing board.
2. Staple PhotonAir across the battens, reflective surface facing inwards and secure with 38mm counter battens running along the previously installed 38mm battens.
3. Each layer of PhotonAir must butt-join the previous layer, with the 150mm membrane overlap running onto the lower layer, thus ensuring that any water runs down without penetrating between layers.
4. Ensure that there is a minimum 13mm unventilated air cavity between the reflective surface of the PhotonAir and the external sheathing board.

4 Declared Testing Method

BS EN 16012:2012 states that where a product is already subject to a product specification that describes procedures for the measurement of the aged 90/90 fractile thermal conductivity or thermal resistance of the core insulation material, its guidance should only be used to determine the component of its thermal performance that depends on the emissivity of its external faces; this is the case for PhotonAir:

1. PhotonAir is classified under BS EN 16012:2012 as product type 1 and is manufactured by Thermic Technology Ltd; registered under ISO 9001 for the design and manufacture of thin reflective insulation.
2. PhotonAir is an assembly of three components:
    a. Upper surface: Klober Permo Air breather membrane
    b. Core: 33 mm Superglass λ0.034 glasswool
    c. Lower surface: Perforated reflective layer manufactured specifically for PhotonAir

3. The core of PhotonAir is λ0.034 glasswool manufactured in accordance with BS EN 13162:2012, BS EN 13172:2012 and ISO9001 Quality Management Systems and meets the requirements of Annex ZA of Harmonised European Product standard EN 13162 with its conformity established according to Harmonised European standard EN 13172.

4. PhotonAir upper surface declared performance is according to EN 13859-1:2010 and EN 13859-2:2010.
5. PhotonAir lower surface has been tested by NAMAS accredited laboratories in accordance with BS EN 16012:2012 for emissivity and ISO 12572 for water vapour permeability.
6. PhotonFoil has been fire tested to BS EN 11925-2.
7. PhotonFoil has a core R value of 0.97 M^2.K/W, and an emissivity of 0.05 declared to 90/90.

5 U value calculation and condensation risk

PhotonAir has a defined vapour resistance of 0.34 MN.s/g and when installed above the rafters the risk of condensation calculated in accordance with BS EN ISO 13788 is zero.

The U-Value and condensation risk analysis follow:

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Project Information

Reference PhotonAir
Date October 2014
Client LABC Registered System

Construction Type

Element : Wall - WTF_140_PA33_CG_0.18
Timber framed wall 140mm stud weatherboard
Internal surface emissivity : High External surface emissivity : High

	Thickness (mm)	Thermal Conductivity (W/mK)	Thermal Resistance (m²K/W)	Vapour Resistivity (MNs/gm)	Vapour Resistance (MNs/g)
Outside surface resistance	-	-	0.130	-	-
weatherboarding	-	-	0.000	-	0.00
Unventilated cavity created by 38mm batten	24.0	-	0.000	-	0.00
PhotonAir	33.0	0.034	0.971	-	0.34
Unventilated cavity created by 38mm batten	24.0	-	0.665	-	0.13
(Bridged un-vented cavity - width=562.0mm, hro=5.100, E1=0.900, E2=0.050, horizontal heat flow)					
Plywood	12.0	0.170	0.071	450.00	5.40
Glasswool 0.035	140.0	0.035	4.000	5.00	0.70
Celotex PL4015	24.5	-	0.732	-	150.00
Board joints sealed as VCL + Air Leakage Barrier	-	-	-	-	0.00
Plaster, lightweight skim	3.0	0.220	0.014	30.00	0.09
Inside surface resistance	-	-	0.130	-	-

U-value = 0.18W/m²K

U-value, Combined Method : 0.18W/m²K (upper/lower limit 5.926 / 5.314m²K/W, dUf 0.0000, dUg 0.0000, dUp0.0000, dUr0.0000, dUrc0.0000)

(Correction for mechanical fasteners, Delta Uf = 0.000W/m²K)
(Correction for air gaps, Delta Ug = 0.000W/m²K)

(Based on the combined method for determining U-values of structures containing repeating thermal bridges)

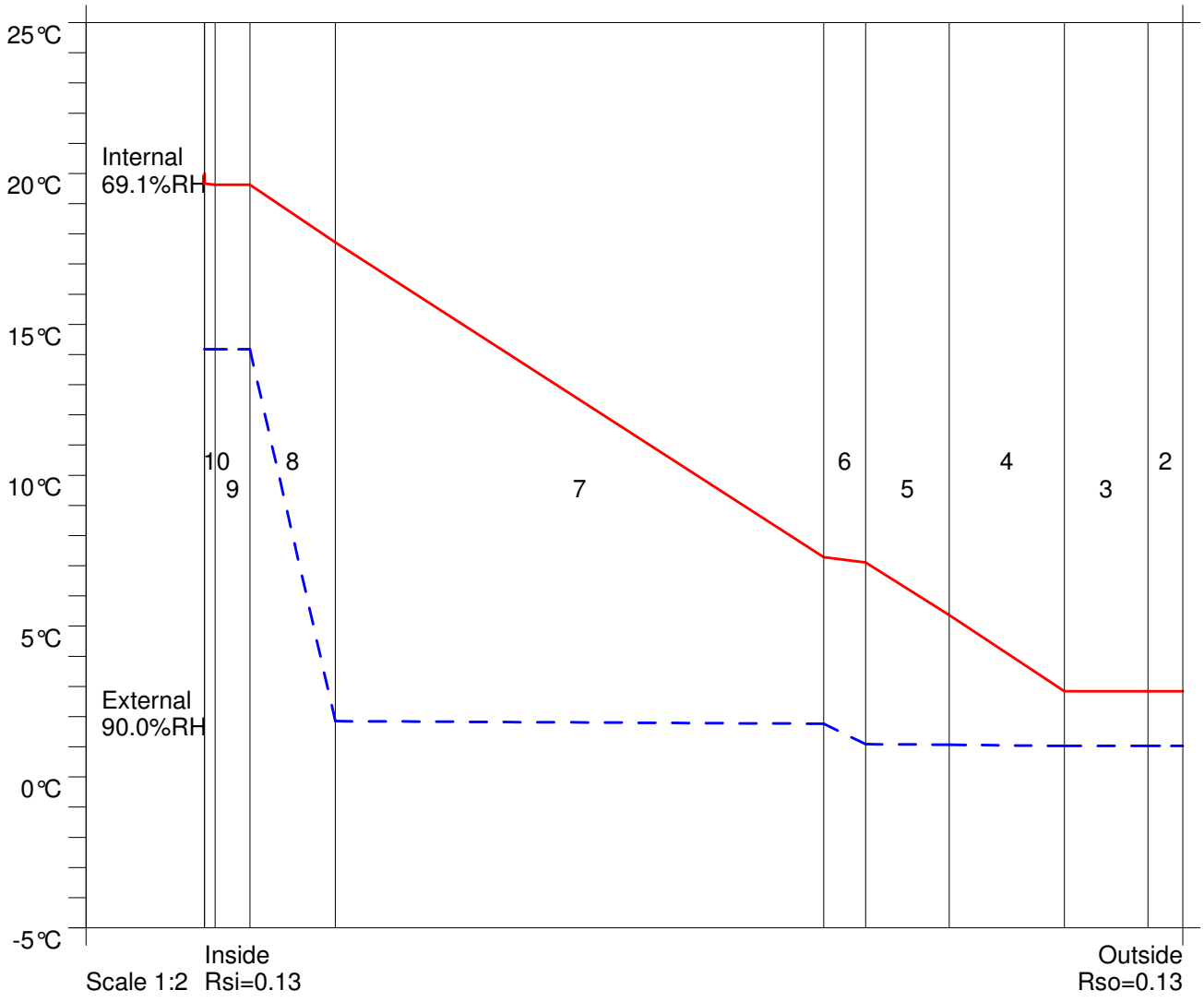
Condensation Risk Analysis (no account taken of thermal bridges)

4 - Dwellings with high occupancy, sport halls, kitchens, canteens; buildings heated with unflued gas heaters

Jan (worst)	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
20.0C 69.1%	20.0C 68.0%	20.0C 67.0%	20.0C 66.2%	20.0C 68.0%	20.0C 70.7%	20.0C 74.3%	20.0C 75.1%	20.0C 73.4%	20.0C 71.2%	20.0C 69.2%	20.0C 69.3%
2.5C 90.0%	2.8C 86.5%	4.7C 84.0%	7.0C 81.0%	10.3C 81.0%	13.4C 80.0%	15.5C 80.5%	15.1C 82.5%	12.8C 85.5%	9.7C 88.0%	5.4C 89.5%	3.5C 90.5%

	Interface Temp. ºC	Dewpoint Temp. ºC	Vapour Pressure (kPa)	Saturated V.P. (kPa)	Worst Cond. (g/m²)	Peak Buildup (g/m²)	Conden-sation
1 Outside surface resistance	2.8	1.0	0.66	0.75			No
2 weatherboarding	2.8	1.0	0.66	0.75			No
3 Unventilated cavity created by 38mm batten	2.8	1.0	0.66	0.75			No
4 PhotonAir	5.4	1.1	0.66	0.89			No
5 Unventilated cavity created by 38mm batten	7.1	1.1	0.66	1.01			No
6 Plywood	7.3	1.8	0.69	1.02			No
7 Glasswool 0.035	17.7	1.8	0.70	2.03			No
8 Celotex PL4015	19.6	14.2	1.61	2.28			No
9 Board joints sealed as VCL + Air Leakage Barrier	19.6	14.2	1.61	2.28			No
10 Plaster, lightweight skim	19.7	14.2	1.61	2.29			No
11 Inside surface resistance							

Worst case internal / external conditions for graph : 20.0℃ @ 69.1%RH / 2.5℃ @ 90.0%RH



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