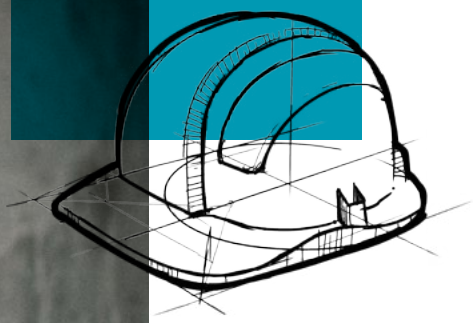
HVAC SPECIFICATION DETAIL GUIDE

A guide to specifying ROCKWOOL insulations for HVAC applications



ROCKWOOL®

1. General

- Insulation materials should have a Euroclass of either A1, A2, or B, should have a FIGRA RCT of less than 1.0, and should **not** have a potential to flashover. The Lambda value of the Insulation must also be quoted, both manufactured and aged value.
- Insulation materials shall have a Global Warming Potential (GWP) **of zero** and an Ozone Depletion Potential (ODP) **of zero**.
- For all mineral wool insulation products, test evidence must be available showing that the fibres from which the products are made are not classified as a possible human carcinogen, as detailed by European Directive 97/69/EC and the Approved Supply List of CHIP98.

2. Specialist thermal insulation sub-contractor

Include for all thermal insulation to be carried out by an approved Specialist Thermal Insulation Contractor selected from the list of preferred Specialist Contractors scheduled elsewhere in this specification. Specialist Thermal Sub-Contractor shall be a member of the :-

Thermal Insulation Contractors Association
TICA House
Allington Way
Yarm Road Business Park
Darlington
Co. Durham
DL1 4QB

Tel: 01325 466704
Fax: 01325 487691

3. Scope

This specification covers the thermal insulation of pipes, ductwork and equipment generally in the temperature range of 0°C to 250°C. The specification is for guidance purposes only and should be read in conjunction with recommendations given in BS 5970 and BS 5422.

The following British Standards are applicable to this thermal insulating specification:

- **BS5422:2009** Method for specifying thermal insulating materials for pipes, tanks, vessels, ductwork and equipment operating within the temperature range -40°C to +700°C.
- **BS 5970:2001** Code of practice for thermal insulation of pipework and equipment (in the temperature range –100°C to +870°C).
- **BS 3533:1981** Glossary of thermal insulation terms.
- **BS EN 14303:2009** Thermal insulation products for building equipment and industrial installations. Factory made mineral wool products (MW).
- **BS 874:1986** Methods for determining thermal insulating properties with definitions of thermal insulating terms.
- **BS 2972:1989** Methods of test for inorganic thermal insulating materials.
- **BS 476 - Part 4:1970** Fire tests on building materials and structures. Non-combustibility test for materials.
- **BS 476 - Part 6:1989** Fire tests on building materials and structures. Method of test for fire propagation of products.
- **BS 476 - Part 4:1970** Fire tests on building materials
- **BS 476 - Part 4:1970** Fire tests on building materials and structures. Method of test to determine the classification of the surface spread of flame of products.
- **BS 1710** 'Specification for identification of pipelines and services'.

4. Internal services - concealed from view (false ceilings/voids/chases)

4.1 Heating/HWS

Pipes to be insulated with ..... *mm thick ROCKWOOL RockLap H&V Pipe Sections, having a nominal density not less than 120 kg/m^3 , with a factory applied facing which is a laminate of close mesh reinforcement between two layers of foil including integral lap for fixing. The whole to comply with BS5422:2009 and BS 5970 water vapour permeance and Building Regulations Class O definition. Fixing to be in accordance with manufacturer's instructions, by peeling protective tape from self-adhesive lap and pressing lap smoothly over joint. Where adjacent Sections abut, approved 75 mm wide aluminium tape to be used to maintain integrity of the vapour barrier.

*insert required thickness

4.2 Chilled Water/CWS

Insulation as 4.1. Attention to be paid to maintaining integrity of the vapour barrier. At termination points, insulation edges to be over-taped and returned to the piping surface. Where the insulation abuts pipe supports, the insulation is to be taped to all supports.

4.3 Ducting Insulation

To be insulated with ROCKWOOL Ductwrap/Ductslab, nominal density 45 kg/m^3, having a factory applied reinforced aluminium foil facing. Joints to be securely taped with 75 mm minimum wide soft aluminium self adhesive tape. The insulation on the underside of the ducting to be additionally secured by suitable insulation hangers @ 300 mm centres.

The whole to be further supported by means of:-

- 19 - 22 swg x 50 mm mesh galvanised wire netting. Where a vapour barrier is required, care to be taken when applying wire mesh support to avoid damaging the aluminium foil.

  or

- Aluminium Bands, circumferential at nominal 300 mm centres. Bands located over the outer surface typically 50 mm from the circumferential joint of the ROCKWOOL Ductwrap and Ductslab. Do not over tighten the aluminium bands, as this will locally reduce the thickness of the insulation and reduce the thermal efficiency. N.B. Additional measures may be necessary to prevent sagging.

  or

- Subject to the client's approval, alternative fixings can be used in place, or alongside the above.

For below ambient operating temperatures a vapour barrier is required, provision should be made, at exposed edges, to carry the aluminium foil to the duct surface.

Where support pins/hangers puncture the foil, they should be sealed using aluminium foil tape to maintain the vapour barrier.

Ductslab of the same density and facing as Ductwrap can be used where aesthetic or mechanical requirements prevail.

For high velocity ductwork, insulation to be ROCKWOOL Lamella Mats.

4.4 Valve and Flange Insulation

All valves and flanges on heating, HWS, CWS and chilled water pipework to be insulated with oversize ROCKWOOL RockLap H & V Pipe Sections. Finish and thickness to be as adjacent pipework services.

5. Internal services – exposed to view

5.1 Heating/HWS

Generally as 4.1. Should the exposed pipework be liable to mechanical damage, i.e. sited at low level, the insulation to be protected with 22 gauge stucco embossed aluminium cladding secured with pop rivets. Aluminium securing bands may be omitted under cladding.

5.2 Chilled Water/CWS

As specification 4.2. Where the insulation is protected with sheeting, care should be taken to ensure that the vapour barrier is not punctured by the rivets. Aluminium banding and seals may be used as an alternative to pop rivets.

5.3 Ducting Insulation

As specification 4.3. Where aluminium cladding is used at low level, wire netting reinforcement to be omitted.

5.4 Valve and Flange Insulation

As specification 4.4. Where insulation is finished with aluminium cladding, valve and flange boxes to be protected with purpose made aluminium covers.

6. Plant rooms/boiler houses/calorifier chambers

6.1 Heating/HWS

To be insulated as specification 4.1, finished and protected with 22 gauge stucco embossed aluminium sheeting, secured by means of pop rivets at 225 mm centres.

6.2 Chilled Water/CWS

To be insulated as specification 4.2, finished and protected with 22 gauge stucco embossed aluminium sheeting secured by means of aluminium banding and seals at 450 mm centres. Alternatively, if pop rivets are used, care should be taken to avoid puncturing the vapour barrier.

6.3 Ducting Insulation

To be insulated with ROCKWOOL semi-rigid slabs, nominal density 45 kg/m^3 , finished and protected with 22 gauge stucco embossed aluminium cladding secured with pop rivets at 225 mm centres. For high velocity and circular ductwork, insulation to be ROCKWOOL Lamella Mats.

6.4 Valve and Flange Insulation

To be insulated with purpose made removable 22 gauge stucco embossed aluminium boxes, lined with ROCKWOOL ProRox WM960.

6.5 Heat Exchangers and HWS Calorifiers

To be insulated with ROCKWOOL Lamella Mat finished and protected with 22 gauge stucco embossed aluminium cladding secured with pop rivets at 225 mm centres. Domed tops of calorifiers to be finished in segments. Manway chests, flanges and covers of heat exchangers to be enclosed in removable stucco embossed aluminium covers lined with ROCKWOOL ProRox WM960.

6.6 Boiler Flues

Boiler flues and chimneys to be insulated as described in BS 5970 with a minimum of 50 mm thick ROCKWOOL ProRox WM960, finished generally as in Specification 6.1.

7. External services

7.1 Heating/HWS

Generally as specification 4.1. Please select the finish from the list of alternatives below.

7.2 Chilled Water/CWS

Generally as specification 4.2. Please select the finish from the list of alternatives below.

7.3 Ducting Insulation

Generally as specification 4.3. Please select the finish from the list of alternatives below.

7.4 Valve and Flange Insulation

Generally as specification 4.4. Please select the finish from the list of alternatives below.

Alternative Finishes

a) Flat Aluminium-Zinc Coated Steel Protection:

Mild steel sheet continuously hot dipped with 185g/m^2 aluminium-zinc coating to BS EN 10326 and BS EN 10327, applied directly to insulating material.

0.4 mm thick flat sheet

Fixed and installed in accordance with BS5790.

b) Ribbed Aluminium-Zinc Coated Steel Protection:

Mild steel sheet continuously hot dipped with 185g/m^2 aluminium-zinc coating to BS EN 10326 and BS EN 10327, applied directly to insulating material.

0.4 mm thick ribbed sheet

Fixed and installed in accordance with BS5790.

c) Aluminium Sheeting Protection:

Apply flat (embossed) or profiled aluminium cladding directly to insulating material.

0.56 mm thick on pipework
0.71 mm thick on ductwork

Fixed and installed in accordance with BS5790.

d) Mild Steel Sheet

Mild steel sheet continuously hot dipped with aluminium-zinc coating to BS EN 10326 and BS EN 10327, applied directly to insulating material.

Fixed and installed in accordance with BS5790.

e) Self Adhesive Weather Resistant Zero Perm Multi-Layer Laminate:

Apply multi-layer laminate directly over ducts and pipework, ensuring 75 mm overlap for a complete vapour barrier.

Fixed and installed in accordance with BS5790.

f) Polyisobutylene:

Polyisobutylene, minimum thickness 0.8 mm.

Fixed and installed in accordance with BS5790.

g) Roofing Felt Protection:

Secure in position with galvanized wire netting, of 1 mm x 25 mm mesh. Finish with two coats of black bituminous paint.

Fixed and installed in accordance with BS5790.

8. Insulation thickness tables

BS5422:2009

Method for specifying thermal insulating materials for pipes, tanks, vessels, ductwork and equipment operating within the temperature range -40°C to +700°C.

BS 5422 is arguably the most important industry-wide standard for determining and specifying the requirements for thermal insulation used on pipe-work and equipment.

Importantly, the appropriate insulation thicknesses taken from BS 5422 and used on pipe-work will be eligible for enhanced capital allowances (ECAs).

In January 2009, BS 5422:2001 was superseded by BS 5422:2009. The new version of this standard is relevant to H&V and process work undertaken on sites across the UK, although additional factors may apply to building works undertaken in accordance with the Building (Scotland) Regulations, which still refer to BS5422:2001 as outlined below.

One of the most significant changes to BS 5422 is that the thicknesses of insulation shown for pipe-work, ducts, plant and equipment are based on 'practical limits' for all applications. For H&V applications, BS 5422 has adopted the thicknesses of insulation published by TIMSA (Thermal Insulation Manufacturers and Suppliers Association) as part of its 'guidance for achieving compliance with Part L of the Building Regulations - Domestic and Non-Domestic Heating, Cooling And Ventilation Guide' (relevant to England, Wales and Northern Ireland).

Scotland

It should be noted that the Scottish Building Standards Authority (SBSA) Editions of the Technical Handbooks (Domestic & Non–Domestic) to the Building Standards (Scotland) Regulations 2013, Sections 6, Energy, still refer directly to BS 5422:2009.

ROCKWOOL stone wool insulation does not thermally age and therefore the thicknesses shown can be relied upon to provide the required insulation performance for the lifetime of the host structure.

BS 5422 is not a prescriptive document and recognises that there are many reasons why the insulation of pipes, tanks, vessels, ductwork and equipment may be required. It is therefore important that specifiers state the criteria or specific clause or reference in this standard in any specification.

Insulation thicknesses are given for a range of thermal conductivities appropriate to the usual materials used for the application; thicknesses for intermediate thermal conductivities and pipe sizes may be deduced by calculation or interpolation.

For guidance in selecting appropriate types of insulation and suitable methods of application, reference should be made to BS 5970.

Table 6 (BS5422:2009)

Minimum insulation thickness for chilled and cold water steel pipes to control condensation on a high emissivity outer surface (0.9) with an ambient temperature of +25°C and a relative humidity of 80%

Outside diameter of steel pipe on which insulation has been based (mm)	Temperature of contents (°C)					
	Thickness of ROCKWOOL RockLap H&V Pipe Section (mm)					
	+10		+5		0	
	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)
17	8	20	11	20	14	20
21	9	20	12	20	15	20
27	9	20	13	20	16	20
33	10	20	13	20	16	20
42	10	20	14	20	17	20
48	10	20	14	20	18	20
60	11	20	15	20	18	20
76	12	25	16	25	20	25
89	12	25	16	25	21	25
102	12	25	17	25	21	25
114	12	25	17	25	22	25
140	13	25	18	25	23	25
169	13	25	18	25	24	25
219	13	25	19	25	24	25
245	14	25	19	25	24	25
273	14	25	19	25	24	25
324	14	25	20	25	25	25
356	14	30	20	30	25	30
406	14	30	20	30	26	30
456	14	40	20	40	26	40
508	15	40	20	40	26	40
558	15	40	21	40	26	40
610	15	40	21	40	27	40

NOTE 1 Thicknesses given are calculated specifically against the criteria noted in the table. These thicknesses may not satisfy other design requirements. In situations where the ambient air temperature is greater than 25°C and/or the relative humidity exceeds 80%, these thicknesses will not be sufficient to control condensation.

NOTE 2 These thicknesses only apply where the vapour barrier has a dark, matt finish.

Table 7 (BS5422:2009)

Minimum insulation thickness for chilled and cold water copper pipes to control condensation on a high emissivity outer surface (0.9) with an ambient temperature of +25°C and a relative humidity of 80%

Outside diameter of copper pipe on which insulation has been based (mm)	Temperature of contents (°C)					
	Thickness of ROCKWOOL RockLap H&V Pipe Section (mm)					
	+10		+5		0	
	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)
10	7	-	10	-	12	-
12	8	-	10	-	13	-
15	8	-	11	-	14	-
22	9	20	12	20	15	20
28	9	20	13	20	16	20
35	10	20	13	20	17	20
42	10	20	14	20	17	20
54	11	20	14	20	18	20
76	12	25	16	25	20	25
108	12	25	17	25	21	25

NOTE 1 Thicknesses given are calculated specifically against the criteria noted in the table. These thicknesses may not satisfy other design requirements. In situations where the ambient air temperature is greater than 25°C and/or the relative humidity exceeds 80%, these thicknesses will not be sufficient to control condensation.

NOTE 2 These thicknesses only apply where the vapour barrier has a dark, matt finish.

Table 8 (BS5422:2009)

Minimum insulation thickness for chilled and cold water steel pipes to control condensation on a low emissivity outer surface (0.05) with an ambient temperature of +25°C and a relative humidity of 80%

Outside diameter of steel pipe on which insulation has been based (mm)	Temperature of contents (°C)					
	Thickness of ROCKWOOL RockLap H&V Pipe Section (mm)					
	+10		+5		0	
	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)
17	16	20	22	25	28	30
21	17	20	24	25	30	30
27	19	20	26	30	32	35
33	20	20	27	30	34	35
42	21	25	29	30	37	40
48	22	25	31	35	39	40
60	24	25	33	35	41	45
76	26	30	36	40	46	50
89	28	30	38	40	48	50
102	29	30	40	40	50	50
114	30	30	41	45	52	60
140	31	35	43	45	55	60
169	33	35	46	50	58	60
219	35	35	49	50	62	70
245	36	40	51	60	64	70
273	37	40	52	60	66	70
324	39	40	55	60	70	70
356	40	40	56	60	71	75
406	41	45	58	60	74	80
456	43	45	60	60	76	80
508	44	45	61	70	78	80
558	45	45	63	70	80	80
610	46	50	64	70	82	90

NOTE 1 Thicknesses given are calculated specifically against the criteria noted in the table. These thicknesses may not satisfy other design requirements. In situations where the ambient air temperature is greater than 25°C and/or the relative humidity exceeds 80%, these thicknesses will not be sufficient to control condensation.

Table 9 (BS5422:2009)

Minimum insulation thickness for chilled and cold water copper pipes to control condensation on a low emissivity outer surface (0.05) with an ambient temperature of +25°C and a relative humidity of 80%

Outside diameter of copper pipe on which insulation has been based (mm)	Temperature of contents (°C)					
	Thickness of ROCKWOOL RockLap H&V Pipe Section (mm)					
	+10		+5		0	
	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)
10	14	N/A	19	N/A	24	N/A
12	15	N/A	20	N/A	25	N/A
15	16	N/A	22	N/A	27	N/A
22	18	20	24	25	30	30
28	19	20	26	30	33	35
35	20	20	28	30	35	35
42	21	25	29	30	37	40
54	23	25	32	35	40	40
76	26	30	36	40	46	50
108	29	30	40	40	51	60

NOTE 1 Thicknesses given are calculated specifically against the criteria noted in the table. These thicknesses may not satisfy other design requirements. In situations where the ambient air temperature is greater than 25°C and/or the relative humidity exceeds 80%, these thicknesses will not be sufficient to control condensation.

Table 10 (BS5422:2009)

Indicative thickness of insulation for cooled and chilled water systems to control heat gain – Low emissivity outer surfaces (ε= 0.05)

Outside diameter of steel pipe on which insulation has been based (mm)	Temperature of contents (°C)								
	Thickness of ROCKWOOL RockLap H&V Pipe Section (mm)								
	+10			+5			0		
	Calculated thickness (mm)	Advised thickness (mm)	Heat gain (W/m)	Calculated thickness (mm)	Advised thickness (mm)	Heat gain (W/m)	Calculated thickness (mm)	Advised thickness (mm)	Heat gain (W/m)
17.2	13	20	2.48	17	20	2.97	21	25	3.47
21.3	14	20	2.72	18	20	3.27	22	25	3.81
26.9	15	20	3.05	20	20	3.58	24	25	4.18
33.7	16	20	3.41	21	25	4.01	25	25	4.60
42.4	17	20	3.86	22	25	4.53	27	30	5.11
48.3	18	20	4.11	23	25	4.82	28	30	5.45
60.3	18	20	4.78	24	25	5.48	29	30	6.17
76.1	20	25	5.51	27	30	6.30	36	40	6.70
88.9	20	25	6.17	28	30	6.90	33	35	7.77
114.3	21	25	7.28	28	30	8.31	34	35	9.15
139.7	21	25	8.52	29	30	9.49	35	35	10.45
168.3	21	25	9.89	29	30	10.97	37	40	11.86
219.1	22	25	12.27	29	30	13.57	37	40	14.61
273.0	22	25	14.74	29	30	16.28	37	40	17.48

NOTE 1 Insulation thicknesses in this table have been calculated according to BS EN ISO 12241:2008 using standardised assumptions: horizontal pipe in still air at 25°C, emissivity of outer surface of insulated system as specified.

NOTE 2 Thicknesses derived solely against the criteria noted in this table may not necessarily satisfy other design requirements such as control of condensation.

NOTE 3 Heat gain relates to the specified thickness and temperature.

Table 11 (BS5422:2009)

Indicative thickness of insulation for cooled and chilled water systems to control heat gain – High emissivity outer surfaces (ε= 0.9)

Outside diameter of steel pipe on which insulation has been based (mm)	Temperature of contents (°C)								
	Thickness of ROCKWOOL RockLap H&V Pipe Section (mm)								
	+10			+5			0		
	Calculated thickness (mm)	Advised thickness (mm)	Heat gain (W/m)	Calculated thickness (mm)	Advised thickness (mm)	Heat gain (W/m)	Calculated thickness (mm)	Advised thickness (mm)	Heat gain (W/m)
17.2	18	20	2.48	23	25	2.97	26	30	3.47
21.3	19	20	2.72	24	25	3.27	27	30	3.81
26.9	20	20	3.05	27	30	3.58	29	30	4.18
33.7	22	25	3.41	27	30	4.01	31	35	4.60
42.4	23	25	3.86	28	30	4.53	33	35	5.11
48.3	24	25	4.11	29	30	4.82	35	35	5.45
60.3	24	25	4.78	31	35	5.48	36	40	6.17
76.1	27	30	5.51	34	35	6.30	43	45	6.70
88.9	27	30	6.17	35	35	6.90	40	40	7.77
114.3	28	30	7.28	35	35	8.31	42	45	9.15
139.7	29	30	8.52	36	40	9.49	43	45	10.45
168.3	29	30	9.89	37	40	10.97	44	45	11.86
219.1	29	30	12.27	37	40	13.57	45	45	14.61
273.0	30	30	14.74	37	40	16.28	45	45	17.48

NOTE 1 Insulation thicknesses in this table have been calculated according to BS EN ISO 12241:2008 using standardised assumptions: horizontal pipe in still air at 25°C, emissivity of outer surface of insulated system as specified.

NOTE 2 Thicknesses derived solely against the criteria noted in this table may not necessarily satisfy other design requirements such as control of condensation.

NOTE 3 Heat gain relates to the specified thickness and temperature.

Table 12 (BS5422:2009)

Minimum insulation thickness for condensation control on ductwork carrying chilled air in ambient conditions: indoor still air temperature +25°C, relative humidity 80%, dewpoint temperature 21.3°C

Table 12 - Ductwrap

Minimum temperature inside duct (OC)	External surface emissivity – Minimum thickness of ROCKWOOL Ductwrap (mm)					
	0.05 (eg bright aluminium foil)		0.44 (eg dusty galvanised steel)		0.90 (eg black paint)	
	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)
15	26	30	13	25	9	25
10	45	50	23	25	15	25
5	64	70	33	40	21	25
0	83	90	42	50	27	30

Table 12 - Ductslab

Minimum temperature inside duct (OC)	External surface emissivity – Minimum thickness of ROCKWOOL Ductslab (mm)					
	0.05 (eg bright aluminium foil)		0.44 (eg dusty galvanised steel)		0.90 (eg black paint)	
	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)
15	26	30	14	25	9	25
10	47	50	24	25	15	25
5	67	70	34	40	22	25
0	86	90	44	50	28	30

NOTE 1 Thicknesses given are calculated in accordance with BS EN ISO 12241:2008 based on 0.6m vertical flat surface of rectangular duct but are also adequate for horizontal surfaces.

NOTE 2 Thicknesses given are calculated specifically against the criteria noted in the table. These thicknesses may not satisfy other design requirements.

NOTE 3 Refer to Annex B, Table B. 1 for surface emissivities of common finishing materials. In situations where the ambient air temperature is greater than 25°C and/or the relative humidity exceeds 80%, these thicknesses will not be sufficient to control condensation.

Table 13 (BS5422:2009)

Indicative thickness of insulation for ductwork carrying warm air to control heat loss.

Table 13 - Ductwrap

Max Heat Loss (W/m^2)	External surface emissivity – Minimum thickness of ROCKWOOL Ductwrap (mm)					
	0.05 (eg bright aluminium foil)		0.44 (eg dusty galvanised steel)		0.90 (eg black paint)	
	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)
16.34	31	40	37	40	39	40

Table 13 - Ductslab

Max Heat Loss (W/m^2)	External surface emissivity – Minimum thickness of ROCKWOOL Ductslab (mm)					
	0.05 (eg bright aluminium foil)		0.44 (eg dusty galvanised steel)		0.90 (eg black paint)	
	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)
16.34	32	40	38	40	41	50

NOTE 1 Heat loss relates to the specified thickness and temperature.

NOTE 2 Insulation thicknesses in this table have been calculated according to BS EN ISO 12241:2008 using standardised assumptions: horizontal duct at 35°C, with 600 mm vertical sidewall in still air at 15°C, emissivity of outer surface of insulated system as specified.

Table 14 (BS5422:2009)

Indicative thickness of insulation for chilled and dual-purpose ducting to control heat transfer

Table 14 - Ductwrap

Max Heat Loss (W/m^2)	External surface emissivity – Minimum thickness of ROCKWOOL Ductwrap (mm)					
	0.05 (eg bright aluminium foil)		0.44 (eg dusty galvanised steel)		0.90 (eg black paint)	
	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)
6.45	50	50	58	60	61	70

Table 14 - Ductslab

Max Heat Loss (W/m^2)	External surface emissivity – Minimum thickness of ROCKWOOL Ductslab (mm)					
	0.05 (eg bright aluminium foil)		0.44 (eg dusty galvanised steel)		0.90 (eg black paint)	
	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)
6.45	52	60	59	60	63	70

NOTE 1 Heat loss relates to the specified thickness and temperature.

NOTE 2 Insulation thicknesses in this table have been calculated according to BS EN ISO 12241:2008 using standardised assumptions: horizontal duct at 13°C, with 600 mm vertical sidewall in still air at 25°C, emissivity of outer surface of insulated system as specified.

Table 15 (BS5422:2009)

Indicative thickness of insulation for non-domestic heating services to control heat loss – low emissivity outer surfaces (ε =0.05)

Outside diameter of steel pipe on which insulation has been based (mm)	Hot face temperature (°C) – Thickness of ROCKWOOL RockLap H&V Pipe Section (mm)								
	75			100			125		
	Calculated thickness (mm)	Advised thickness (mm)	Heat gain (W/m)	Calculated thickness (mm)	Advised thickness (mm)	Heat gain (W/m)	Calculated thickness (mm)	Advised thickness (mm)	Heat gain (W/m)
17.2	24	25	8.90	24	25	13.34	24	25	17.92
21.3	28	30	9.28	30	30	13.56	30	30	18.32
26.9	31	35	10.06	37	40	13.83	37	40	18.70
33.7	33	35	11.07	44	45	14.39	46	50	19.02
42.4	35	35	12.30	48	50	15.66	64	70	19.25
48.3	37	40	12.94	49	50	16.67	67	70	20.17
60.3	39	40	14.45	57	60	18.25	71	80	21.96
76.1	44	45	16.35	60	60	20.42	76	80	24.21
88.9	45	45	17.91	62	70	22.09	79	80	25.99
114.3	47	50	20.77	65	70	25.31	85	90	29.32
139.7	48	50	23.71	68	70	28.23	89	90	32.47
168.3	49	50	26.89	70	70	31.61	92	100	36.04
219.1	50	50	32.54	72	80	37.66	96	100	42.16
273.0	50	50	38.83	74	80	43.72	99	100	48.48

NOTE 1 Insulation thicknesses in this table have been calculated according to BS EN ISO 12241:2008 using standardised assumptions: horizontal pipe in still air at 15°C, emissivity of outer surface of insulated system as specified.

NOTE 2 Heat loss relates to the specified thickness and temperature.

NOTE 3 The thicknesses in this table are applicable to pipes serving commercial solar hot water panels.

Table 16 (BS5422:2009)

Indicative thickness of insulation for non-domestic heating services to controlheat loss – high emissivity outer surfaces (ε= 0.9)

Outside diameter of steel pipe on which insulation has been based (mm)	Hot face temperature (°C) Thickness of ROCKWOOL RockLap H&V Pipe Section (mm)								
	75			100			125		
	Calculated thickness (mm)	Advised thickness (mm)	Heat gain (W/m)	Calculated thickness (mm)	Advised thickness (mm)	Heat gain (W/m)	Calculated thickness (mm)	Advised thickness (mm)	Heat gain (W/m)
17.2	28	30	8.90	28	30	13.34	28	30	17.92
21.3	33	35	9.28	33	35	13.56	33	35	18.32
26.9	36	40	10.06	41	45	13.83	41	45	18.70
33.7	38	40	11.07	49	50	14.39	55	60	19.02
42.4	40	40	12.30	57	60	15.66	69	70	19.25
48.3	42	45	12.94	58	60	16.67	72	80	20.17
60.3	44	45	14.45	62	70	18.25	77	80	21.96
76.1	49	50	16.35	65	70	20.42	82	90	24.21
88.9	50	50	17.91	67	70	22.09	84	90	25.99
114.3	53	60	20.77	71	80	25.31	91	100	29.32
139.7	54	60	23.71	74	80	28.23	95	100	32.47
168.3	55	60	26.89	76	80	31.61	98	100	36.04
219.1	56	60	32.54	79	80	37.66	102	120	42.16
273.0	57	60	38.83	81	90	43.72	106	120	48.48

NOTE 1 Insulation thicknesses in this table have been calculated according to BS EN ISO 12241:2008 using standardised assumptions: horizontal pipe in still air at 15°C, emissivity of outer surface of insulated system as specified.

NOTE 2 Heat loss relates to the specified thickness and temperature.

NOTE 3 The thicknesses in this table are applicable to pipes serving commercial solar hot water panels.

Table 17 (BS5422:2009)

Indicative thickness of insulation for non-domestic hot water service areas to control heat loss – Low emissivity outer surfaces

Outside diameter of steel pipe on which insulation has been based (mm)	Thickness of ROCKWOOL RockLap H&V Pipe Section (mm)		Heat Loss (W/m)
	Calculated thickness (mm)	Advised thickness (mm)	
17.2	23	25	6.60
21.3	25	25	7.13
26.9	27	30	7.83
33.7	29	30	8.62
42.4	30	30	9.72
48.3	32	35	10.21
60.3	33	35	11.57
76.1	35	35	13.09
88.9	35	35	14.58
114.3	38	40	17.20
139.7	39	40	19.65
168.3	40	40	22.31
219.1	40	40	27.52
273.0	41	45	32.40

NOTE 1 Insulation thicknesses in this table have been calculated according to BS EN ISO 12241:2008 using standardised assumptions: horizontal pipe at 60°C in still air at 15°C, emissivity of outer surface of insulated system as specified.

NOTE 2 Heat loss relates to the specified thickness and temperature.

Table 18 (BS5422:2009)

Indicative thickness of insulation for non-domestic hot water service areas to control heat loss – high emissivity outer surfaces

Outside diameter of steel pipe on which insulation has been based (mm)	Thickness of ROCKWOOL RockLap H&V Pipe Section (mm)		Heat Loss (W/m)
	Calculated thickness (mm)	Advised thickness (mm)	
17.2	27	30	6.60
21.3	29	30	7.13
26.9	32	35	7.83
33.7	33	35	8.62
42.4	35	35	9.72
48.3	37	40	10.21
60.3	35	35	11.57
76.1	43	45	13.09
88.9	43	45	14.58
114.3	44	45	17.20
139.7	45	45	19.65
168.3	46	50	22.31
219.1	47	50	27.52
273.0	48	50	32.40

NOTE 1 Insulation thicknesses in this table have been calculated according to BS EN ISO 12241:2008 using standardised assumptions: horizontal pipe at 60°C in still air at 15°C, emissivity of outer surface of insulated system as specified.

NOTE 2 Heat loss relates to the specified thickness and temperature.

Table 19 (BS5422:2009)

Indicative thickness of insulation for domestic heating and hot water systems having low emissivity outer surfaces

Outside diameter of copper pipe on which insulation has been based (mm)	Thickness of ROCKWOOL RockLap H&V Pipe Section (mm)		Heat Loss (W/m)
	Calculated thickness (mm)	Advised thickness (mm)	
8.0	-	-	7.06
10.0	-	-	7.23
12.0	-	-	7.35
15.0	-	-	7.89
22.0	15	20	9.12
28.0	17	20	10.07
35.0	18	20	11.08
42.0	19	20	12.19
54.0	20	20	14.12

NOTE 1 Insulation thicknesses in this table have been calculated according to BS EN ISO 12241:2008 using standardised assumptions: horizontal pipe at 60°C in still air at 15°C, emissivity of outer surface of insulated system as specified.

NOTE 2 Heat loss relates to the specified thickness and temperature.

NOTE 3 This table is applicable to pipes serving solar hot water panels.

Table 20 (BS5422:2009)

Indicative thickness of insulation for domestic heating and hot water systems having high emissivity outer surfaces

Outside diameter of copper pipe on which insulation has been based (mm)	Thickness of ROCKWOOL RockLap H&V Pipe Section (mm)		Heat Loss (W/m)
	Calculated thickness (mm)	Advised thickness (mm)	
8.0	-	-	7.06
10.0	-	-	7.23
12.0	-	-	7.35
15.0	-	-	7.89
22.0	19	20	9.12
28.0	21	25	10.07
35.0	22	25	11.08
42.0	24	25	12.19
54.0	25	25	14.12

NOTE 1 Insulation thicknesses in this table have been calculated according to BS EN ISO 12241:2008 using standardised assumptions: horizontal pipe at 60°C in still air at 15°C, emissivity of outer surface of insulated system as specified.

NOTE 2 Heat loss relates to the specified thickness and temperature.

NOTE 3 This table is applicable to pipes serving solar hot water panels.

Table 22 (BS5422:2009)

Minimum insulation thickness to control the surface temperature of a non-metallic surface with a surface emissivity of 0.90 and design cold face temperature of 59°C

Outside diameter of steel pipe on which insulation has been based (mm)	Hot face temperature (°C) Thickness of ROCKWOOL RockLap H&V Pipe Section (mm)							
	100		150		200		250	
	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)
17	3	20	6	20	10	20	13	20
21	3	20	7	20	10	20	14	20
27	3	20	7	20	11	20	15	20
33	3	20	7	20	11	20	16	20
42	4	20	8	20	12	20	17	20
48	4	20	8	20	12	20	17	20
60	4	20	8	20	13	20	18	20
76	4	25	9	25	14	25	20	25
89	4	25	9	25	15	25	21	25
102	4	25	9	25	15	25	21	25
114	4	25	9	25	15	25	22	25
140	4	25	10	25	16	25	23	25
169	4	25	10	25	16	25	23	25
219	5	25	10	25	17	25	24	25
245	5	25	10	25	17	25	25	25
273	5	25	11	25	17	25	25	25
324	5	25	11	25	18	25	26	25
356	5	30	11	30	18	30	26	30
406	5	30	11	30	18	30	27	30
456	5	40	11	40	19	40	27	40
508	5	40	11	40	19	40	27	40
558	5	40	11	40	19	40	28	40
610	5	40	12	40	19	40	28	40
flat	5	40	12	40	18	40	27	40

NOTE 1 Insulation thicknesses in this table have been calculated according to BS EN ISO 12241:2008 using standardised assumptions: horizontal pipe in still air at 20°C. Surface emissivity corresponding to outer surface specified.

NOTE 2 Maximum heat loss values for intermediate operating temperatures may be deduced by interpolation.

NOTE 3 Heat loss measured in Watts per metre (W/m) relates to the specified thickness and temperature.

NOTE 4 The thermal conductivity of insulation materials increases with mean temperature, and for any given material the use of a different thermal conductivity can be required for each operating temperature.

NOTE 5 These thicknesses may not satisfy other design requirements, in particular those for control of surface temperature (see Table 22, Table 23 and Table 24).

NOTE 6 To simplify the use of this table the values shaded have been adjusted to avoid the specification of apparently anomalous results given by the calculation method in BS EN ISO 12241, due to the transition from turbulent to laminar flow.

Table 23 (BS5422:2009)

Minimum insulation thickness to control the surface temperature of a metallic surface with a surface emissivity of 0.05 and design cold face temperature of 50°C

Outside diameter of steel pipe on which insulation has been based (mm)	Hot face temperature (°C)							
	Thickness of ROCKWOOL RockLap H&V Pipe Section (mm)							
	100		150		200		250	
	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)
17	7	20	14	20	22	25	31	35
21	8	20	15	20	24	25	33	35
27	8	20	17	20	26	30	36	40
33	9	20	18	20	27	30	38	40
42	10	20	19	20	29	30	41	45
48	10	20	20	20	31	35	43	45
60	10	20	21	25	33	35	46	50
76	12	25	24	25	37	40	52	50
89	12	25	25	25	39	40	55	60
102	13	25	26	30	41	45	57	60
114	13	25	27	30	42	45	59	60
140	14	25	28	30	45	45	63	60
169	14	25	30	30	47	50	67	70
219	15	25	32	35	51	60	72	80
245	16	25	33	35	52	60	74	80
273	16	25	34	35	54	60	77	80
324	17	25	35	35	56	60	80	80
356	17	30	36	40	58	60	83	90
406	18	30	37	40	60	60	86	90
456	18	40	39	40	62	70	88	90
508	19	40	40	40	64	70	91	100
558	19	40	41	45	65	70	91	100
610	19	40	41	45	65	70	91	100
flat	19	40	41	50	62	70	82	90

NOTE 1 Insulation thicknesses in this table have been calculated according to BS EN ISO 12241:2008 using standardised assumptions: horizontal pipe in still air at 20°C. Surface emissivity corresponding to outer surface specified.

NOTE 2 Maximum heat loss values for intermediate operating temperatures may be deduced by interpolation.

NOTE 3 Heat loss measured in Watts per metre (W/m) relates to the specified thickness and temperature.

NOTE 4 The thermal conductivity of insulation materials increases with mean temperature, and for any given material the use of a different thermal conductivity can be required for each operating temperature.

NOTE 5 These thicknesses may not satisfy other design requirements, in particular those for control of surface temperature (see Table 22, Table 23 and Table 24).

NOTE 6 To simplify the use of this table the values shaded have been adjusted to avoid the specification of apparently anomalous results given by the calculation method in BS EN ISO 12241, due to the transition from turbulent to laminar flow.

Table 24 (BS5422:2009)

Minimum insulation thickness to control the surface temperature of a non-metallic surface with a surface emissivity of 0.90 and design cold face temperature of 50°C

Outside diameter of steel pipe on which insulation has been based (mm)	Hot face temperature (°C) Thickness of ROCKWOOL RockLap H&V Pipe Section (mm)							
	100		150		200		250	
	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)
17	5	20	9	20	13	20	18	20
21	5	20	9	20	14	20	19	20
27	5	20	10	20	15	20	20	20
33	5	20	10	20	15	20	21	25
42	5	20	11	20	16	20	22	25
48	6	20	11	20	17	20	23	25
60	6	20	11	20	18	20	24	25
76	6	25	13	25	19	25	27	30
89	6	25	13	25	20	25	28	30
102	7	25	13	25	21	25	29	30
114	6	25	13	25	21	25	30	30
140	7	25	13	25	22	25	31	30
169	7	25	14	25	23	25	32	30
219	7	25	15	25	23	25	33	35
245	7	25	15	25	24	25	34	35
273	7	25	15	25	24	25	35	35
324	8	25	16	25	25	25	35	35
356	8	30	16	30	25	30	36	40
406	8	30	16	30	26	30	37	40
456	8	40	16	40	26	40	37	40
508	8	40	16	40	26	40	38	40
558	8	40	17	40	27	40	38	40
610	8	40	17	40	27	40	39	40
flat	8	40	17	40	27	40	39	40

NOTE 1 Insulation thicknesses in this table have been calculated according to BS EN ISO 12241:2008 using standardised assumptions: horizontal pipe in still air at 20°C. Surface emissivity corresponding to outer surface specified.

NOTE 2 Maximum heat loss values for intermediate operating temperatures may be deduced by interpolation.

NOTE 3 Heat loss measured in Watts per metre (W/m) relates to the specified thickness and temperature.

NOTE 4 The thermal conductivity of insulation materials increases with mean temperature, and for any given material the use of a different thermal conductivity can be required for each operating temperature.

NOTE 5 These thicknesses may not satisfy other design requirements, in particular those for control of surface temperature (see Table 22, Table 23 and Table 24).

NOTE 6 To simplify the use of this table the values shaded have been adjusted to avoid the specification of apparently anomalous results given by the calculation method in BS EN ISO 12241, due to the transition from turbulent to laminar flow.

Table 24 (BS5422:2009)

Minimum insulation thickness to control the surface temperature of a metallic surface with a surface emissivity of 0.05 and design cold face temperature of 55°C

Outside diameter of steel pipe on which insulation has been based (mm)	Hot face temperature (°C) Thickness of ROCKWOOL RockLap H&V Pipe Section (mm)							
	100		150		200		250	
	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)
17	6	20	12	20	18	20	26	30
21	6	20	13	20	20	20	27	30
27	7	20	14	20	21	25	30	30
33	7	20	14	20	23	25	32	35
42	7	20	15	20	24	25	34	35
48	8	20	16	20	25	25	35	35
60	8	20	17	20	27	30	38	40
76	9	20	19	25	31	35	43	45
89	9	20	20	25	32	35	46	50
102	10	20	21	25	33	35	48	50
114	10	25	21	25	34	35	49	50
140	10	25	23	25	37	35	52	60
169	11	25	24	25	39	40	55	60
219	12	25	26	30	41	45	59	60
245	12	25	26	30	43	45	61	70
273	12	25	27	30	44	45	63	70
324	13	25	28	30	46	50	66	70
356	13	30	29	30	47	50	68	70
406	13	30	30	30	49	50	71	80
456	14	40	31	40	50	50	73	80
508	14	40	32	40	52	60	75	80
558	14	40	32	40	52	60	75	80
610	15	40	32	40	52	60	75	80
flat	15	40	32	40	52	60	75	80

NOTE 1 Thicknesses given are calculated specifically against the criteria noted in the table, Adopting these thicknesses may not necessarily satisfy other design requirements.

NOTE 2 To simplify the use of this table the values shaded have been adjusted to avoid the specification of apparently anomalous results given by the calculation method in BS EN ISO 12241, due to the transition from turbulent to laminar flow.

Table 24 (BS5422:2009)

Minimum insulation thickness to control the surface temperature of a metallic surface with a surface emissivity of 0.18 and design cold face temperature of 55°C

Outside diameter of steel pipe on which insulation has been based (mm)	Hot face temperature (°C) Thickness of ROCKWOOL RockLap H&V Pipe Section (mm)							
	100		150		200		250	
	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)
17	5	20	11	20	16	20	23	25
21	6	20	11	20	18	20	24	25
27	6	20	12	20	19	20	26	30
33	6	20	13	20	20	20	28	30
42	7	20	14	20	21	25	30	30
48	7	20	14	20	22	25	31	35
60	7	20	15	20	24	25	33	35
76	8	25	16	25	27	30	38	40
89	8	25	18	25	28	30	39	40
102	8	25	18	25	29	30	41	45
114	9	25	19	25	30	30	42	45
140	9	25	20	25	31	35	45	45
169	9	25	20	25	33	35	47	45
219	10	25	22	25	35	35	50	50
245	10	25	22	25	36	40	52	60
273	10	25	23	25	37	40	53	60
324	11	25	24	25	38	40	55	60
356	11	30	24	30	39	40	57	60
406	11	30	25	30	40	40	58	60
456	11	40	25	40	41	45	60	60
508	12	40	26	40	42	45	61	70
558	12	40	26	40	43	45	61	70
610	12	40	26	40	43	45	61	70
flat	12	40	26	40	43	50	61	70

NOTE 1 Thicknesses given are calculated specifically against the criteria noted in the table, Adopting these thicknesses may not necessarily satisfy other design requirements.

NOTE 2 To simplify the use of this table the values shaded have been adjusted to avoid the specification of apparently anomalous results given by the calculation method in BS EN ISO 12241, due to the transition from turbulent to laminar flow.

Table 24 (BS5422:2009)

Minimum insulation thickness to control the surface temperature of a metallic surface with a surface emissivity of 0.26 and design cold face temperature of 55°C

Outside diameter of steel pipe on which insulation has been based (mm)	Hot face temperature (°C) Thickness of ROCKWOOL RockLap H&V Pipe Section (mm)							
	100		150		200		250	
	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)
17	5	20	10	20	16	20	22	25
21	5	20	11	20	17	20	23	25
27	6	20	11	20	18	20	25	25
33	6	20	12	20	19	20	26	30
42	6	20	13	20	20	20	28	30
48	6	20	13	20	21	25	29	30
60	7	20	14	20	22	25	31	35
76	7	25	16	25	25	25	35	35
89	8	25	16	25	26	30	37	40
102	8	25	17	25	27	30	38	40
114	8	25	17	25	28	30	39	40
140	8	25	18	25	29	30	41	45
169	9	25	19	25	30	30	43	45
219	9	25	20	25	32	35	46	50
245	9	25	20	25	33	35	47	50
273	9	25	21	25	34	35	48	50
324	10	25	21	25	35	35	50	50
356	10	30	22	30	36	40	51	60
406	10	30	22	30	37	40	53	60
456	10	40	23	40	37	40	54	60
508	11	40	23	40	38	40	55	60
558	11	40	24	40	39	40	55	60
610	11	40	24	40	39	40	55	60
flat	11	40	24	40	39	40	55	60

NOTE 1 Thicknesses given are calculated specifically against the criteria noted in the table, Adopting these thicknesses may not necessarily satisfy other design requirements.

NOTE 2 To simplify the use of this table the values shaded have been adjusted to avoid the specification of apparently anomalous results given by the calculation method in BS EN ISO 12241, due to the transition from turbulent to laminar flow.

Table 25 (BS5422:2009)

Heat loss from bare surfaces calculated in accordance with BS EN ISO 12241:2008 (black steel pipes)

Outside diameter of steel pipe (mm)	Operating temperature (°C)				
	50	100	150	200	250
	Heat loss (W/m pipes, W/m² flat)				
12.0	17	57	110	176	257
15.0	20	69	133	214	313
17.2	23	78	150	241	353
21.3	27	93	180	290	427
22.0	28	96	186	299	439
26.9	33	114	221	356	525
28.0	35	118	229	369	544
33.7	41	139	269	435	641
42.0	49	168	326	528	781
42.4	50	169	329	532	788
48.3	56	190	369	598	885
54.0	61	209	407	660	979
60.3	68	230	448	728	1081
67.0	74	253	492	800	1188
76.1	83	283	551	896	1333
80.0	87	295	576	938	1395
88.9	95	324	632	1031	1535
101.6	107	365	712	1162	1733
108.0	113	385	752	1228	1832
114.3	119	405	791	1292	1929
139.7	142	484	947	1549	2316
168.3	167	571	1119	1833	2746
219.1	212	722	1419	2330	3498
273.0	258	880	1731	2848	4283
323.9	301	1027	2021	3331	5016

OPERATING CONDITIONS:

Ambient still air: 20°C

Surface emissivity: 0.90

Height of flat surfaces: 0.6m

Surface orientation: horizontal

Table 26 (BS5422:2009)

Heat loss from bare surfaces calculated in accordance with BS EN ISO 12241:2008 (copper pipes – commercial grade, scoured to a shine)

Outside diameter of copper pipe (mm)	Operating temperature (°C)			
	50	100	150	200
	Heat loss (W/m pipes, W/m² flat)			
12.0	11	36	66	100
15.0	12	43	79	119
17.2	14	47	87	132
21.3	16	56	103	156
22.0	17	57	105	160
26.9	19	66	123	186
28.0	20	69	127	192
33.7	23	79	146	222
42.0	27	93	173	263
42.4	28	94	174	265
48.3	31	104	192	292
54.0	33	113	210	319
60.3	36	123	228	347
67.0	39	134	248	377
76.1	43	148	273	416
80.0	45	153	284	432
88.9	49	166	308	469
101.6	54	184	341	520
108.0	57	193	358	545
114.3	59	202	374	570
139.7	69	236	437	666
168.3	80	272	505	770
219.1	98	334	619	946
273.0	116	396	735	1123
323.9	133	452	840	1284
flat	119	647	1244	1938

OPERATING CONDITIONS:

Ambient still air: 20°C

Surface emissivity: 0.07

Height of flat surfaces: 0.6m

Surface orientation: horizontal

Table 27 (BS5422:2009)

Heat loss from bare surfaces calculated in accordance with BS EN ISO 12241:2008 (copper pipes – oxidised)

Outside diameter of copper pipe (mm)	Operating temperature (°C)			
	50	100	150	200
	Heat loss (W/m pipes, W/m² flat)			
12.0	15	52	99	158
15.0	18	63	120	191
17.2	21	70	135	215
21.3	25	84	162	258
22.0	25	87	166	265
26.9	30	103	197	315
28.0	31	106	204	326
33.7	36	124	239	383
42.0	44	150	289	464
42.4	44	151	292	468
48.3	50	169	326	524
54.0	55	186	359	578
60.3	60	205	395	636
67.0	66	224	433	698
76.1	73	250	484	781
80.0	77	261	505	816
88.9	84	286	554	895
101.6	94	321	623	1007
108.0	99	339	657	1063
114.3	104	356	691	1118
139.7	124	424	824	1336
168.3	146	499	971	1577
219.1	184	629	1226	1997
273.0	224	763	1491	2432
323.9	261	888	1737	2837
flat	245	1076	2125	3464

OPERATING CONDITIONS:

Ambient still air: 20°C

Surface emissivity: 0.70

Height of flat surfaces: 0.6m

Surface orientation: horizontal

Table 28 (BS5422:2009)

Minimum insulation thickness to protect steel pipes against freezing under selected industrial process conditions

Outside diameter of pipe (mm)	Inside diameter of pipe (bore) (mm)	Initial temperature: +5°C Minimum ambient air temperature: -10°C Evaluation period: 12 hours Permitted ice formation nil		Initial temperature: +5°C Minimum ambient air temperature: -10°C Evaluation period: 12 hours Permitted ice formation 10%	
		Thickness of ROCKWOOL RockLap H&V Pipe Section (mm)			
		Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)
21.3	16.0	-	-	-	-
26.9	21.6	-	-	-	-
33.7	27.2	-	-	251	-
42.4	35.9	-	-	89	90
48.3	41.8	452	-	59	60
60.3	53.0	173	-	34	35
76.1	68.8	87	90	23	25
88.9	80.8	62	70	19	20
114.3	105.3	40	40	13	25
168.3	158.6	23	25	9	25
219.1	207.9	17	25	6	25

NOTE 1 Thicknesses given are calculated specifically against the criteria noted in the table. These thicknesses may not satisfy other design requirements.

NOTE 2 Some of the insulation thicknesses given are too large to be applied in practice but a selection is included to highlight the difficulty in protecting small diameter pipes against freezing. To provide the appropriate degree of frost protection to certain sizes of pipes, it may be necessary to provide additional heat to the system, for example by circulating the water or heat tracing.

NOTE 3 Assumed densities (ρ) and heat capacities (c_p) are as follows:
— ρ water = 1,000 kg/m³, c_p water = 4,200 J/kg.K;
— ρ steel = 7,840 kg/m³, c_p steel = 455 J/kg.K

Table 29 (BS5422:2009)

Minimum insulation thickness required to give protection against freezing under specified commercial and institutional conditions

Outside diameter of pipe (mm)	Inside diameter of pipe (bore) (mm)	Initial temperature: +2°C Minimum ambient air temperature: -6°C (indoor unheated) Evaluation period: 12 hours Permitted ice formation 50%		Initial temperature: +2°C Minimum ambient air temperature: -10°C (indoor unheated) Evaluation period: 12 hours Permitted ice formation 50%	
		Thickness of ROCKWOOL RockLap H&V Pipe Section (mm)			
COPPER PIPES		Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)
15.0	13.6	66	-	315	-
22.0	20.2	19	20	47	50
28.0	26.2	12	20	24	25
35.0	32.6	9	20	16	20
42.0	39.6	7	20	12	20
54.0	51.6	5	20	8	20
76.1	73.1	4	25	6	25
108.0	105.0	3	25	4	25
STEEL PIPES		Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)
21.3	16.0	40	40	142	-
26.9	21.6	19	20	43	45
33.7	27.2	13	20	25	25
42.4	35.9	8	20	15	20
48.3	41.8	7	20	12	20
60.3	53.0	5	20	9	20
76.1	68.8	4	25	6	25
88.9	80.0	3	25	5	25

NOTE 1 Thicknesses given are calculated specifically against the criteria noted in the table. These thicknesses may not satisfy other design requirements.

NOTE 2 Some of the insulation thicknesses given are too large to be applied in practice but a selection is included to highlight the difficulty in protecting small diameter pipes against freezing. To provide the appropriate degree of frost protection to certain sizes of pipes, it may be necessary to provide additional heat to the system, for example by circulating the water or heat tracing.

NOTE 3 Assumed densities (ρ) and heat capacities (c_p) are as follows:
— ρ water = 1,000 kg/m³, c_p water = 4,200 J/kg.K;
— ρ steel = 7,840 kg/m³, c_p steel = 455 J/kg.K

Table 30 (BS5422:2009)

Minimum insulation thickness to protect against freezing for domestic cold water systems [12 h]

Outside diameter of pipe (mm)	Inside diameter of pipe (bore) (mm)	Normal installation inside the building inside the envelope of the insulation Initial temperature +7°C Minimum ambient air temperature -6°C Evaluation period 12 hours Permitted ice formation 50% Thickness of ROCKWOOL RockLap H&V Pipe Section (mm)		Extreme installation - inside the building but outside the envelope of the insulation Initial temperature +2°C Minimum ambient air temperature -6°C Evaluation period 12 hours Permitted ice formation 50% Thickness of ROCKWOOL RockLap H&V Pipe Section (mm)	
COPPER PIPES		Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)
15.0	13.6	49	-	66	-
22.0	20.2	17	20	19	20
28.0	26.2	11	20	12	25
35.0	32.6	8	20	9	20
42.0	39.6	6	20	7	20
54.0	51.6	5	20	5	20
76.1	73.1	3	25	4	25
108.0	105.0	2	25	3	25
STEEL PIPES		Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)
21.3	16.0	32	40	40	40
26.9	21.6	16	20	19	20
33.7	27.2	11	20	13	20
42.4	35.9	7	20	8	20
48.3	41.8	6	20	7	20
60.3	53.0	5	20	5	20
76.1	68.8	4	25	4	20
88.9	80.0	3	25	3	25

NOTE 1 Thicknesses given are calculated specifically against the criteria noted in the table. These thicknesses may not satisfy other design requirements.

NOTE 2 Some of the insulation thicknesses given are too large to be applied in practice but a selection is included to highlight the difficulty in protecting small diameter pipes against freezing. To provide the appropriate degree of frost protection to certain sizes of pipes, it may be necessary to provide additional heat to the system, for example by circulating the water or heat tracing.

NOTE 3 Assumed densities (ρ) and heat capacities (c_p) are as follows:
— ρ water = 1,000 kg/m³, c_p water = 4,200 J/kg.K;
— ρ steel = 7,840 kg/m³, c_p steel = 455 J/kg.K

Table 31 (BS5422:2009)

Minimum insulation thickness to protect against freezing for domestic cold water systems [8h]

Outside diameter of pipe (mm)	Inside diameter of pipe (bore) (mm)	Normal installation inside the building inside the envelope of the insulation Initial temperature +7°C Minimum ambient air temperature -6°C Evaluation period 8 hours Permitted ice formation 50% Thickness of ROCKWOOL RockLap H&V Pipe Section (mm)		Extreme installation - inside the building but outside the envelope of the insulation Initial temperature +2°C Minimum ambient air temperature -6°C Evaluation period 8 hours Permitted ice formation 50% Thickness of ROCKWOOL RockLap H&V Pipe Section (mm)	
COPPER PIPES		Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)
15.0	13.6	22	-	26	-
22.0	20.2	10	20	11	20
28.0	26.2	7	20	7	20
35.0	32.6	5	20	6	20
42.0	39.6	4	20	4	20
54.0	51.6	3	20	3	20
76.1	73.1	2	25	2	25
108.0	105.0	2	25	2	25
STEEL PIPES		Calculated thickness (mm)	Advised thickness (mm)	Calculated thickness (mm)	Advised thickness (mm)
21.3	16.0	17	20	20	20
26.9	21.6	10	20	11	20
33.7	27.2	7	20	8	20
42.4	35.9	5	20	5	20
48.3	41.8	4	20	5	20
60.3	53.0	3	20	4	20
76.1	68.8	3	25	3	25
88.9	80.0	2	25	2	25

NOTE 1 Thicknesses given are calculated specifically against the criteria noted in the table. These thicknesses may not satisfy other design requirements.

NOTE 2 Some of the insulation thicknesses given are too large to be applied in practice but a selection is included to highlight the difficulty in protecting small diameter pipes against freezing. To provide the appropriate degree of frost protection to certain sizes of pipes, it may be necessary to provide additional heat to the system, for example by circulating the water or heat tracing.

NOTE 3 Assumed densities (ρ) and heat capacities (c_p) are as follows:
— ρ water = 1,000 kg/m³, c_p water = 4,200 J/kg.K;
— ρ steel = 7,840 kg/m³, c_p steel = 455 J/kg.K

Ductwork

9. Braithwaite tank insulation – within buildings

Insulated with an initial layer of 40 mm thick ROCKWOOL HVAC/RWA45 Slabs secured by manufacturer approved adhesive and insulation hangers, followed by a further layer of 40 mm thick ROCKWOOL Ductslab secured to the first layer by adhesive and previously applied insulation hangers. Finish to insulation to be factory applied reinforced aluminium foil, joints in surface covering to be secured with 75 mm wide aluminium foil self adhesive tape, to maintain a vapour barrier. Particular attention to be given to the vapour barrier where the self adhesive insulation hangers protrude through the mineral wool insulation and its factory applied finish (second layer). Further finish should be according to location i.e. external as specification 7.2; plant rooms as specification 6.2.

10. Tank insulation

Cold water tanks, including feed and vent tanks to be insulated with ROCKWOOL Ductslab 50 mm thick. Insulation to be secured by manufacturer approved adhesive and further supported by means of 50 mm, 19-22 swg galvanised wire mesh netting. Care to be taken when applying the wire netting to avoid damage to the foil facing.

11. Fire protection to ductwork

Fire Duct Systems (previously Conlit® Ductwork System) materials can be used to provide ½, 1, 1½ and 2 hour fire protection to rectangular and circular ventilation and smoke extract steel ductwork.

The fire protection provided is in accordance with BS 476 - 24: 1987, duct types A & B. The Fire Duct system protects horizontal and vertical ductwork against both fire 'break out' and fire 'break in'.

Kitchen extract ducts, which are subject to separate BS 476 - 24 requirements, are additionally covered for ½ and 1 hour protection periods.

Full guidance relating to ductwork fire requirements and the Fire Duct System are available from the ROCKWOOL Technical Department. The ROCKWOOL publication 'Fire Duct System' is available on request.

Typical specification

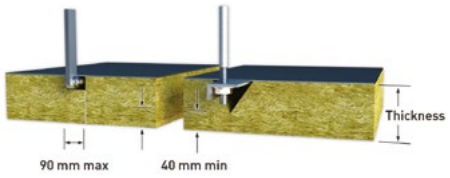
Ductwork shall be in accordance with B&ES Specification DW/144. Ducts to be fire protected with the correct thickness of high density single layer ROCKWOOL fire rated ductwork system. Insulation system shall be independently tested and carry current valid certification to provide fire protection fully in accordance with the requirements of duct 'Type A' and duct 'Type B' of BS476: 24. (The fire resistance of test specimens shall be the duration, in minutes, of heating in accordance with 5.1.1 until failure occurs according to one or more of the performance criteria, i.e. stability, insulation, integrity, or until the test is terminated, whichever is the shortest time). And in accordance with BS9999 (The fire resistance of ductwork, when tested from either side, should be not less than the fire resistance required for the elements of construction in the area through which it passes. The supporting hangers should be capable of supporting the ductwork for not less than the period of fire resistance of the ductwork).

Welded pin fixing method 1

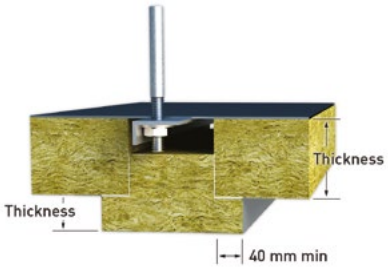
1. All ductwork to be insulated with …..*mm ROCKWOOL Fire Duct slab, having a factory applied reinforced aluminium foil to one face and complying with Building Regulations Class "O" requirements.
2. The Fire Duct Slab to be affixed to the duct using 2.5 mm diameter welded steel pins and 38 mm spring steel washers in accordance with ROCKWOOL manual "Fire Duct System".
3. The foil facing is to be removed from any surface to which Firepro® glue is to be applied.
4. All corner joints are to be fixed with pigtail screws at 250 mm maximum centres. Screw length is to be 2 x slab thickness.
5. All cross joints are to be filled with Firepro® Glue and held tightly closed.
6. For duct sizes up to 1500 x 1500 mm, drop rods and bearers are to be at 1500 mm maximum centres and to be M10 steel rod and 30 x 30 x 3 mm steel angle respectively. Ductwork is to be in accordance with B&ES Specification DW144.
7. Drop rods and exposed bearers are to be insulated with ……mm Fire Duct Slab or Fire Duct Hanger Strip, as appropriate. Rebates or cover pieces are to be used at duct flange and bearer locations according to site conditions and subject to ROCKWOOL approval.
8. Where a vapour barrier is required, all exposed Fire Duct edges and penetrations through the foil should be sealed using soft self-adhesive aluminium foil tape.

Welded pin fixing method 2

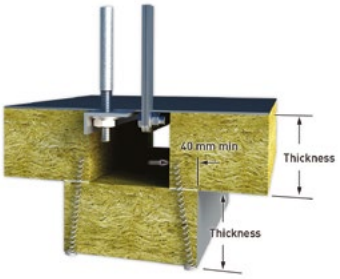
1. All ductwork to be insulated with …..*mm ROCKWOOL Fire Duct slab, having a factory applied reinforced aluminium foil to one face and complying with Building Regulations Class "O" requirements.
2. The Fire Duct Slab to be affixed to the duct using 2.5 mm diameter welded steel pins and 38 mm spring steel washers in accordance with ROCKWOOL manual "Fire Duct System".
3. All corner joints are to be fixed with pigtail screws at 250 mm maximum centres. Screw length is to be 2 x slab thickness.
4. All joints are to be filled with Firepro® Glue and held tightly closed. Nails to be used at corner joints for this purpose.
5. For duct sizes up to 1500 x 1500 mm, drop rods and bearers are to be at 1500 mm maximum centres and to be M10 steel rod and 30 x 30 x 3 mm steel angle respectively. Ductwork is to be in accordance with B&ES Specification DW144.
6. Drop rods and exposed bearers are to be insulated with ……mm Fire Duct Slab or Fire Duct Hanger Strip, as appropriate. Rebates or cover pieces are to be used at duct flange and bearer locations according to site conditions and subject to ROCKWOOL approval.
7. Where a vapour barrier is required, all exposed Fire Duct edges and penetrations through the foil should be sealed using soft self-adhesive aluminium foil tape.



Joint Option A - Rebated protection



Joint Option B - Protection using 'T' section



Joint Option C - Protection using block cover strip

Fire resistance - Performance summary – Fire Duct Slab, Section and PSM

Fire Resistance (hours)	Duct type	Required Fire Duct thickness (mm)	Joint options (see Fig.2 below)	Hanger protection Fire Duct Slab (mm)	Hanger protection Hanger Section (mm)	Max. duct size for mitre-joint, glued system (mm)
½	HVAC & smoke extract	40	BC	40	17 x 30	1500 x 1500
½	Kitchen extract	40	BC	40	17 x 30	1500 x 1500
1	HVAC & smoke extract	40	BC	40	17 x 40	1000 x 1000
1	Kitchen extract	90	ABC	40	17 x 40	1500 x 1500
1½	HVAC & smoke extract	70	ABC	50	17 x 50	1200 x 1200
2	HVAC & smoke extract	90	ABC	60	17 x 70	1000 x 1000

Welded pin fixing method 3

1. All ductwork to be insulated with …..*mm ROCKWOOL Fire Duct slab, having a factory applied reinforced aluminium foil to one face and complying with Building Regulations Class "O" requirements.
2. The Fire Duct Slab to be affixed to the duct using 2.5 mm diameter welded steel pins and 38 mm spring steel washers in accordance with ROCKWOOL manual "Fire Duct System".
3. All corner joints are to be fixed with pigtail screws at 250 mm maximum centres. Screw length is to be 2 x slab thickness.
4. All cross joints are to be covered with centrally positioned 100 mm wide strips of Fire Duct Slab of the same thickness as the insulation. The cover strips are to be fixed along both edges using pigtail screws, as described above.
5. For duct sizes up to 1500 x 1500 mm, drop rods and bearers are to be at 1500 mm maximum centres and to be M10 steel rod and 30 x 30 x 3 mm steel angle respectively. Ductwork is to be in accordance with B&ES Specification DW144.
6. Drop rods and exposed bearers are to be insulated with ……mm Fire Duct Slab or Fire Duct Hanger Strip, as appropriate. Rebates or cover pieces are to be used at duct flange and bearer locations according to site conditions and subject to ROCKWOOL approval.
7. Where a vapour barrier is required, all exposed Fire Duct edges and penetrations through the foil should be sealed using soft self-adhesive aluminium foil tape.

Alternatively the ROCKWOOL Fire Duct system can be fixed using the mitre-joint fixing method-please see ROCKWOOL Fire Duct System brochure for further information.

12. Acoustic treatment of ducts and pipes

Techwrap2

GENERAL - 25 mm ROCKWOOL Techwrap2 to be applied to ducts. The polymeric mass layer should be positioned outermost from the sound source and overlapped at all joints. Techwrap2 should be cut 25 mm oversize and a 25 mm strip of ROCKWOOL stone wool removed to create an overlap. All cutting operations can be completed using a sharp knife. 75 mm wide plain aluminium foil self-adhesive tape should be used to seal the joints.

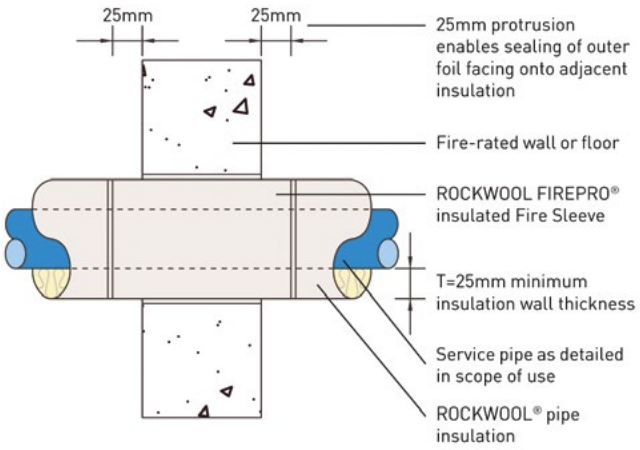
FIXINGS - Welded steel pins should be used to fix Techwrap2 to the duct. However, subject to the manufacturer's approval, adhesive applied insulation hangers may be used in place of welded pins. Particular attention should be paid to support of the Techwrap2 at joint locations and where sagging may occur, eg in 'soffit' areas. The number of pins required will depend upon size and orientation of the duct. However, where pins are employed at Techwrap2 edges, 4 number are recommended at 1000 mm edges and 7 number at 2000 mm edges. Additional 'lines' of pins should be at nominal 300 mm spacings. Where a vapour barrier is required, support pins and hangers, which penetrate the foil, should be sealed using aluminium tape.

For soil-vent and rainwater pipes, ductwork etc. where they pass within a building and a high level of acoustic insulation is required use ROCKWOOL Techtube.

13. Construction type pipework and trunking penetrations - insulated fire sleeves

ROCKWOOL Insulated Fire Sleeves supplied 300 mm long and cut to the desired length. The sleeve must fully cover the part of the pipe that is located within the depth of the compartment wall or floor. The sleeve may be flush fitting or may protrude from the wall/floor by 25mm (typ.) to facilitate sealing of the outer foil facing onto adjacent insulation.

Figure 2



All joints to be taped with self-adhesive foil tape, including the joints where the insulated fire sleeve butts to existing insulation. To maintain the fire rating stated above, the minimum allowable length of sleeve is 50 mm. Insulated Fire Sleeves can accommodate irregularities in the division opening and the pipe O.D.up to 15 mm. Multiple pipe penetrations can be accommodated in conjunction with intumescent
coated batts.

On metal pipes pipe insulation can be used to meet the insulation requirement for fire protection.

Installation to be fully in accordance with manufacturer's instructions.

14. Firestop solution for large voids in walls and floors - ROCKWOOL Ablative Coated Batt

FirePro® Ablative Coated Batts are manufactured by spraying specially produced, high density ROCKWOOL insulation with an additional fire protection ablative coating.

This is a fully automated process to ensure an even coating thickness.

ROCKWOOL Ablative Coated Batts are available in either 50mm or 60mm thicknesses.

Installation

FIREPRO® Ablative Coated Batts are manufactured by spraying specially produced, high density ROCKWOOL insulation with an additional fire protection ablative coating.

This is a fully automated process to ensure an even thickness of coating.

To install, the Batts are simply cut and a bead of Acoustic Intumescent Sealant applied around the external edges.

They are then friction fitted between the services and the wall or floor edges to completely seal the void. Where butt joints are required between cut sections of adjacent batts, Acoustic Intumescent Sealant and/or FIREPRO® Glue is applied to both mating edges in order to form a fire tight bond between individual pieces of insulation. Contact the Technical Solutions team on 01656 862621 for specific details on blank seals and dampers.

All joints, including those around the perimeter of the Batt, are then pointed with FIREPRO® Acoustic Intumescent Sealant to complete the seal.

Plastic pipes (PVC, ABS and HDPE etc) must be sleeved with FIREPRO® Insulated Fire Sleeves at the point at which they pass through the Ablative Coated Batt. Similarly, to achieve fire resistance insulation (I) with metal pipes such as steel or copper, the pipes must be lagged with a 1m length of ROCKWOOL Fire Tube or Pipe Section (minimum 40mm wall thickness) protruding equal distances from both faces of the Ablative Coated Batt. The joint between the Ablative Coated Batt and the pipe insulation must be pointed with the FIREPRO® Sealant. Where the pipe has been thermally lagged with a combustible insulation, this must be cut away and replaced with the ROCKWOOL insulation, as above.

Ensure the integrity of any vapour control layer is re-instated as necessary. The joint between the Batt and Fire Sleeve or Fire Tube must be pointed with the FIREPRO® Sealant.

Load Bearing Seals

FIREPRO® Ablative Coated Batts are not intended for use as load-bearing seals. Where a load-bearing seal is required, ROCKWOOL Firestop Compound should be considered.

Fire performance

ROCKWOOL Ablative Coated Batt has been tested to the dedicated fire resistance standard for penetration seals - prEN 1366-3. The independently prepared assessment, detailing the full scope of fire performance, is available from the ROCKWOOL Technical Solutions Team. Ablative Coated

Batt fire resistance tests were conducted using ROCKWOOL Acoustic Intumescent Sealant Sealant and/or ROCKWOOL FIREPRO® Glue.

Independant tests have proved the capability of a single 50mm Batt to provide up to 2 hours fire resistance integrity, insulation ratings are dependent upon the service penetration. Where 4 hour integrity and insulation are required we recommend the use of our 60mm Coated Batt.

Independent tests have proved the capability of a single 60 mm Batt to provide up to 4 hours fire resistance integrity and up to 2 hours insulation when used with all of the services listed in the Ablative Coated Batt Datasheets and also as a blank seal. Even for extreme requirements, where 4 hours integrity and insulation are required to maintain the performance of a masonry wall, a solution can also be accomplished with a double Batt solution.

Acoustic data

60mm batt:
Tested for head of wall:

Rw = up to 52db (2 x Coated Batts)
Rw = up to 38db (1 x Coated Batts)

The correct use of Coated Batt within concealed cavities and voids will reduce the level of transmitted sound:

Rw = up to 52 db (2 x Coated Batts) – incorporating 48mm O/D PVC /15mm copper pipe penetrations.

Rw = up to 34 db (1x Coated Batts) – incorporating 48mm O/D PVC /15mm copper pipe penetrations.

50mm batt:
Tested for head of wall:

Rw = up to 48db (2 x Coated Batts)
Rw = up to 37db (1 x Coated Batts)

The correct use of Coated Batt within concealed cavities and voids will reduce the level of transmitted sound:

Rw = up to 52 db (2 x Coated Batts) – incorporating 48mm O/D PVC /15mm copper pipe penetrations.

Rw = up to 34 db (1x Coated Batts) – incorporating 48mm O/D PVC /15mm copper pipe penetrations.

Further acoustic test data is available for use in facefix applications. Contact the ROCKWOOL Technical Solutions Team.

Sustainability

As an environmentally conscious company, ROCKWOOL promotes the sustainable production and use of insulation and is committed to a continuous process of environmental improvement.

All ROCKWOOL products provide outstanding thermal protection as well as four added benefits:

- **Fire resistance**
- **Acoustic comfort**
- **Sustainable materials**
- **Durability**

Health & Safety

The safety of ROCKWOOL stone wool is confirmed by current UK and Republic of Ireland health & safety regulations and EU directive 97/69/EC:ROCKWOOL fibres are not classified as a possible human carcinogen.

A Material Safety Data Sheet is available and can be downloaded from www.rockwool.co.uk to assist in the preparation of risk assessments, as required by the Control of Substances Hazardous to Health Regulations (COSHH).

Environment

Made from a renewable and plentiful naturally occuring resource, ROCKWOOL insulation saves fuel costs and energy in use and relies on trapped air for its thermal properties.

ROCKWOOL insulation does not contain (and has never contained) gases that have ozone depletion potential (ODP) or global warming potential (GWP).

ROCKWOOL is approximately 97% recyclable. For waste ROCKWOOL material that may be generated during installation or at end of life, we are happy to discuss the individual requirements of contractors and users considering returning these materials to our factory for recycling.

Interested?

For further information, contact the Technical Solutions Team on 01656 868490 or email technical.solutions@rockwool.co.uk

Visit www.rockwool.co.uk to view our complete range of products and services.

ROCKWOOL Limited

Pencoed
Bridgend
CF35 6NY

Tel: 01656 862 621

info@rockwool.co.uk

rockwool.co.uk