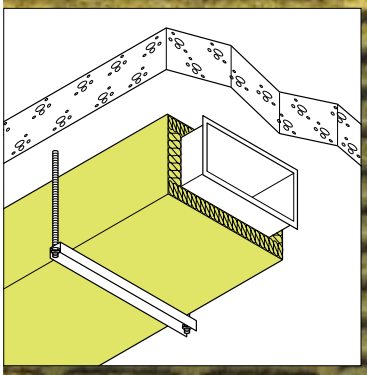
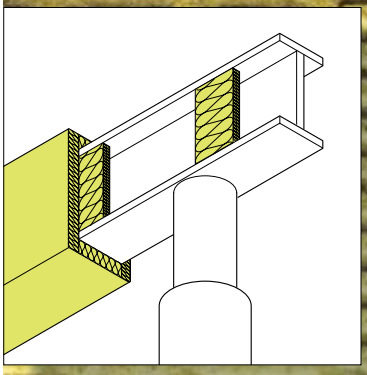
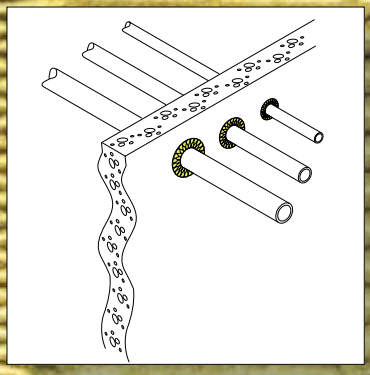
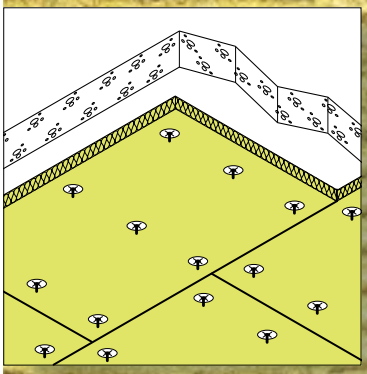
ROXUL®
FIRESAFE INSULATION

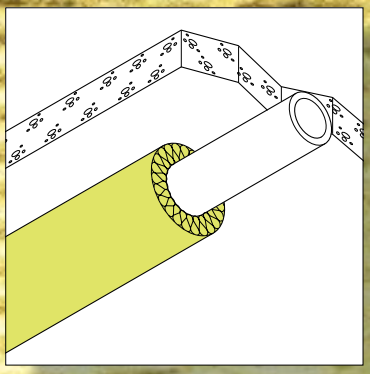
Conlit fire protection











Conlit-P Slab 756
Conlit-150 P Pipe Section

INTRODUCTION

Lapinus Conlit fire protection products are manufactured from mineral wool and are specially engineered to combine maximum fire protection with the least possible weight and thickness. This makes them ideal for those situations where weight reduction is an important factor, for example for ease of handling, in refurbishment and high rise construction work. Both the construction of Conlit systems and their ease of fixing make them highly competitive with other systems of fire protection.

PRODUCT DESCRIPTION
Conlit-P Slab 756 Specially impregnated, self-supporting rigid mineral wool slab.
Conlit-150 P Pipe Section Specially impregnated, pre-formed insulation units.
Conlit Glue Conlit Glue is non-toxic with a pH value of approx. 11. It is provided in 20 kg drums and should always be stirred before use. Use approximately 0.5 kg per m^2 of slab or pipe section.

Application

1. Structural Steel

Lapinus Conlit-P Slab 756 and Conlit-150 P Pipe Sections can be used to provide 1/2, 1, 1 1/2, 2, 3, and 4 hour fire protection to flat and circular loadbearing steel beams and columns, assessed at 550 °C failure criteria.

2. Ducts

Lapinus Conlit-P Slab 756 and Conlit-150 P Pipe Sections can be used to provide 1/2, 1, 1 1/2 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 Part 24, duct 'type B'. The Conlit Ductwork 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 Part 24 requirements, are additionally covered for 1/2 and 1 hour protection periods.

3. Wall - Floor Penetrations of Pipes

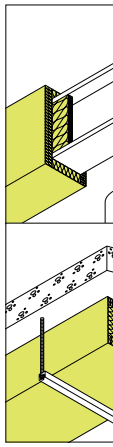
Lapinus Conlit-150 P Pipe Sections can be used to provide up to 90 minutes fire protection to water pipework penetrations in fire resistant wall and floor constructions. The pipes can either be of non combustible steel and copper or of combustible plastic material.

4. Sprinkler pipes

Lapinus Conlit-150 P Pipe Section can be used to provide up to 90 minutes fire protection to fire fighting pipes.

5. Concrete floors

Lapinus Conlit-P Slab 756 can be used to increase the fire resistance of concrete floors. The thickness of a concrete floor, based on a required fire resistance, can be reduced by 25 mm for every 10 mm of Conlit-P Slabs 756 used.

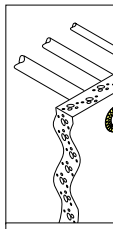


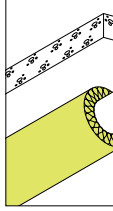
Advantages

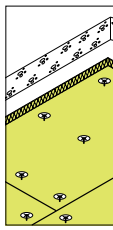
- Single layer, enabling verification of system integrity
- Fast installation time, easy to handle
- Dimensionally stable
- Space efficient, no maintenance, cost effective
- Moisture repellent, CFC and HCFC free

Standards

- The **Conlit Ductwork System** has been tested by the Loss Prevention Council in accordance with BS 476 Part 24. Additional tests have been carried out in accordance with DIN 4102 Part 6.
- The **Conlit Structural Steelwork System** has been tested according to BS 476 Part 8 for the fire protection of load-bearing steel beams and columns, for up to 4 hours protection.
- The **Conlit Sprinkler System** has been assessed by the Technical University Braunschweig in Germany for the fire protection of sprinkler pipes, for 1 1/2 hour fire protection.
- The **Conlit Concrete Floor System** has been tested by the Norwegian Fire Technical Laboratory, SINTEF and has also been assessed by the Technical University Braunschweig in Germany for the fire protection of concrete floor constructions.
- The **Conlit Pipe Penetration System** has been assessed by the Technical University Braunschweig in Germany for the fire protection of wall and floor penetrations, for up to 90 minutes protection.







Conlit-P Slab 756

Dimensions

Length: 1800 mm Width: 1200 mm.

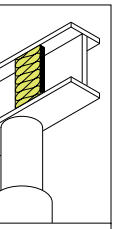
Thicknesses: 15, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100 and 110 mm. Thicknesses below 25 mm are available to special order. Thickness 15 mm only availabe with width 900 mm. Slabs can be supplied with reinforced aluminium foil facing.

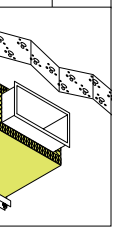
Conlit-150 P Pipe Sections

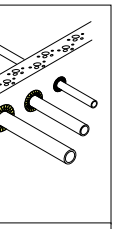
Length: 1000 mm. Nominal pipe O/D: 17 - 610 mm.

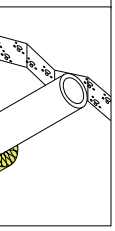
Thickness: 25 up to 120 mm.

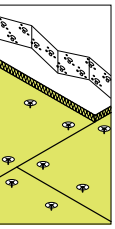
Thickness availability dependent upon Conlit-150 bore.











STRUCTURAL STEEL

Fixing options

Conlit-P Slabs can be fitted to provide boxed or profiled fire protection for 1, 2, 3 or 4 sided exposed steel conditions. Conlit-P Slabs can be fixed using two methods:

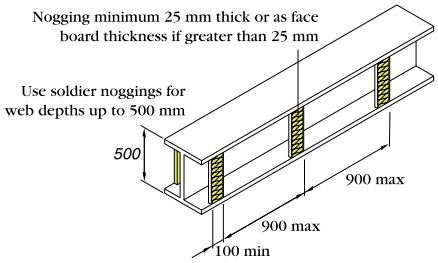
- Noggings, Conlit Glue and nails
- Welded steel pins and glued butt corner joints

FIXING CONLIT-P SLABS TO NOGGINGS

Universal beams and columns

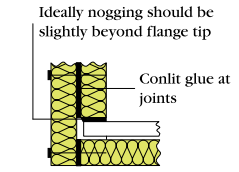
Cut noggings 100 mm wide from waste Conlit-P Slab. Glue noggings to steel flanges with Conlit Glue ensuring the steel surface is free from dust and loose particles.

Noggings should be at least 25 mm thick and never less than the cover slab thickness. For web depths greater than 500 mm, full depth noggings should be used. Fix noggings as indicated below.

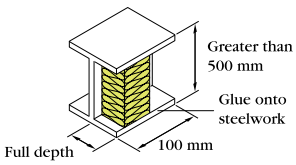


NOGGING FIXING CENTRES

Apply Conlit Glue to face of the noggings, then without delay apply vertical slabs and secure by nails long enough to completely pierce noggings.

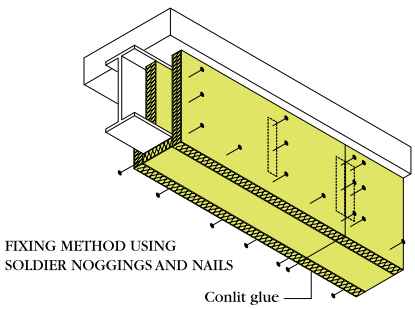


NOGGING DETAIL AT CORNER



FULL DEPTH NOGGINGS FOR LARGER STEEL SECTIONS

Apply bottom flange Conlit-P Slab. Glue at slab joints and nail fix at 450 mm centres. Repeat process with Conlit Glue between adjacent Conlit-P Slab edges.



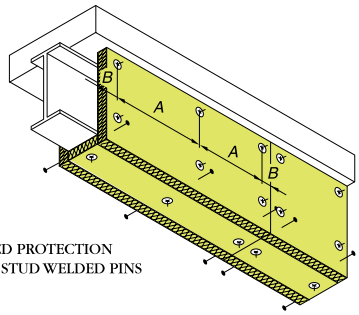
FIXING METHOD USING SOLDIER NOGGINGS AND NAILS

FIXING CONLIT-P SLABS WITH STUD WELDED PINS

Universal beams and columns

Stud welded pins provide the installer with a simple tested alternative to noggings. Minimum 2.5 mm diameter corrosion resistant steel pins are gun welded to the steel structure using capacitor discharge or drawn arc solid state power systems.

Fix stud welded pins as indicated below.



3 SIDED PROTECTION WITH STUD WELDED PINS

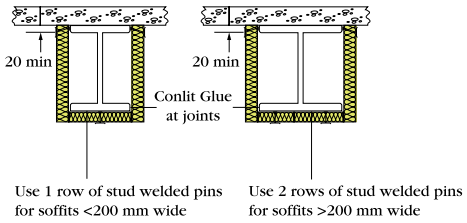
PIN SPACING: A is max 800 mm for 1800 mm boards and max 500 mm for 1200 mm boards
B (stud welded pin to board edge) is max 100 mm, min 20 mm
Edge nails, pins or staples should be at max 450 mm centres

Impale vertical Conlit-P Slabs onto pins, and fit 38 mm diameter spring steel non return washers to secure slabs in situ.

Apply Conlit Glue to all slab-to-slab joints.

Offer up soffit slabs and/or top slabs and nail through glued corner joints at 450 mm maximum centres.

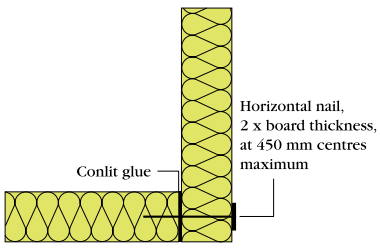
Glue edge joints. Repeat this sequence for the next section of work, first applying glue to all slab-to-slab joints, then crop off excess pin lengths if required.



Use 1 row of stud welded pins for soffits <200 mm wide

Use 2 rows of stud welded pins for soffits >200 mm wide

Apply bottom flange slab. Glue at slab joints and nail fix at 450 mm centres. Repeat process with Conlit Glue between adjacent slab edges.

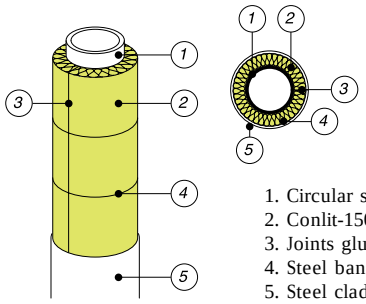


FIXING CONLIT-150 P PIPE SECTIONS

Universal beams and columns

Conlit-150 P Pipe Sections should be wrapped around the circular beam of column. The pipe sections should be temporarily secured with 3 steel binding wires or steel bands at 200 mm centres per pipe section.

All joints should be glued with Conlit Glue, including the internal pipe section joints.



1. Circular structural steel
2. Conlit-150 P Pipe Section
3. Joints glued with Conlit Glue
4. Steel bands at 400 mm centres
5. Steel cladding

The pipe sections may be clad with a steel or aluminium cladding. Cladding should not be fastened directly to the circular section.

DUCTS

FLAT AND CIRCULAR DUCTS Summary of Fire resistance performance			
Fire resistance (hours)	Duct type	Conlit thickness [mm]	Duct joint and hanger options
1/2	Vertical Horizontal Kitchen extract	25 25 40	C C B-C
1	Vertical Horizontal Kitchen extract	30 40 90	C B-C A-B-C
1 1/2	Vertical Horizontal	50 70	B-C A-B-C
2	Vertical Horizontal	70 90	A-B-C A-B-C

Hanger centres: 1500 mm (max.)

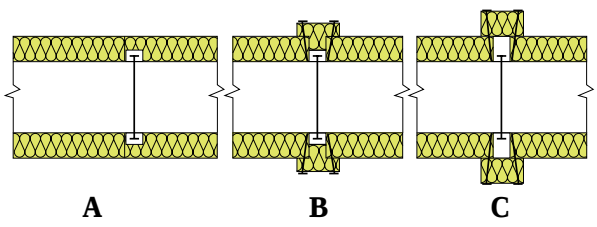
Drop rods: M10 steel (min.)

Tensile stress drop rods: ≤ 6 N/mm²

Bearers: 30 x 30 x 3 mm steel angle (min.)

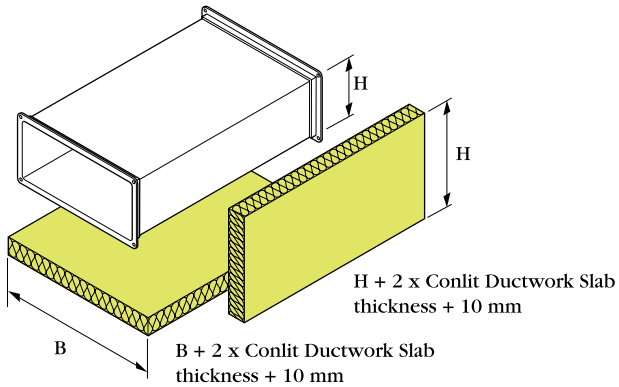
Insulation may be installed either inside or outside the hanger system.

Joint options



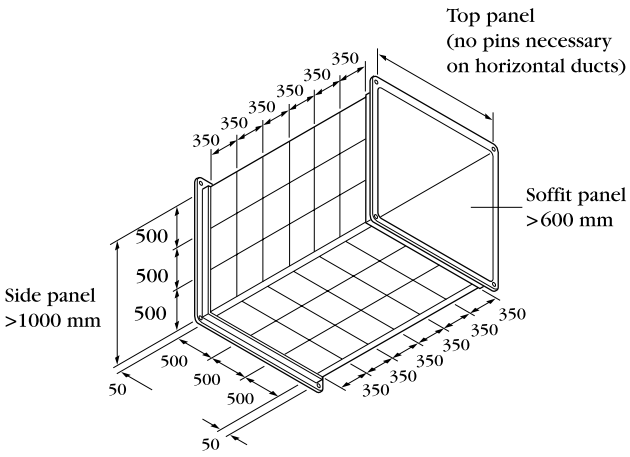
FIXING FLAT DUCTS

Conlit-P Slabs 756 are cut to size using either hand saws or machine tools. A 10 mm tolerance is made for cutting and other tolerances.



Welded steel pins

Conlit-P Slabs 756 are secured to the duct using 2,5 mm dia welded steel pins and 38 mm spring steel washers. Welded pins are generally spaced at 350 mm maximum centres along the length of the duct and at 500 mm maximum centres across the width/height of the duct.

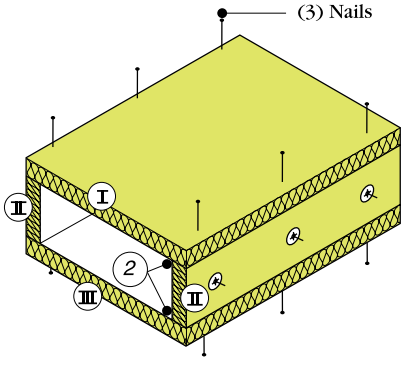


Installation sequence

The installation sequence of the Conlit-P Slabs 756 may vary depending on whether the Conlit-P Slabs 756 are located inside or outside the hanger system.

Insulation outside hanger system I, II, III

Insulation inside hanger system III, II, I

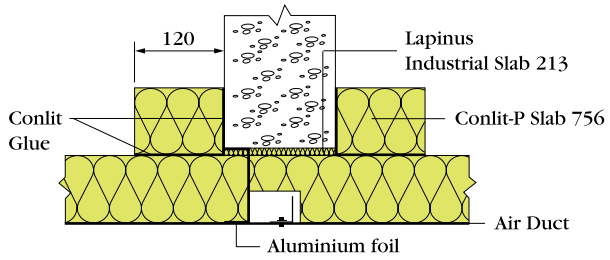


Wall penetrations

Support to the duct sides is required at all penetrations for stability purposes.

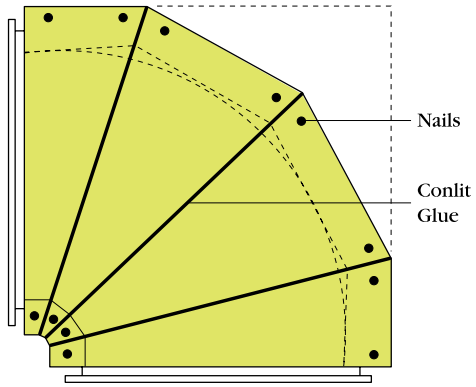
This support can be provided by:

- Locating the duct joint at the penetration mid point.
- Rivetting a 30 x 30 x 2 mm mild steel angle frame to the duct at the penetration mid point. Steel rivets should be used at 300 mm maximum centres.



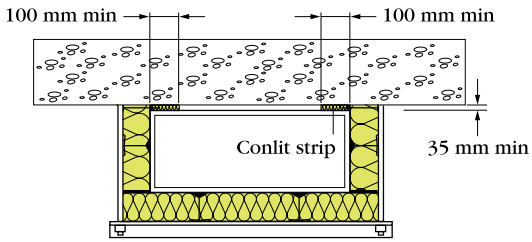
Elbows

Elbows can be protected by cutting fan shapes pieces. All joints are glued.



Three sided application

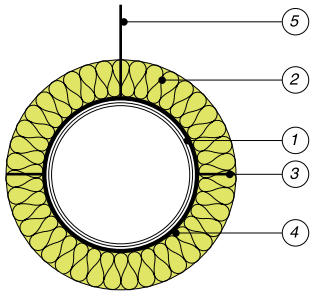
This method for three sided applications, may also be used for two sided applications.



FIXING CIRCULAR DUCTS

Conlit-150 P Pipe Sections should be wrapped around the duct. The pipe sections to be glued with Conlit Glue at joints, hinge and longitudinal split.

Steel bands or wires must be fitted circumferentially to the system at 300 mm nominal centres to hold the joints tightly closed while the glue sets.



1. Duct
2. Conlit-150 P Pipe Section
3. Joints glued with Conlit Glue
4. Steel band 30x3 mm
5. M10 steel drop

PIPE PENETRATIONS

Wall and floor pipe penetrations

Conlit-150 P Pipe Sections can be used to provide up to 90 minutes fire protection to wall and floor penetrations for water pipework.

Non combustible pipes

Wall and floor penetrations of non combustible pipework, except aluminium and fibre cement, can be sealed with Conlit-150 P Pipe Sections.

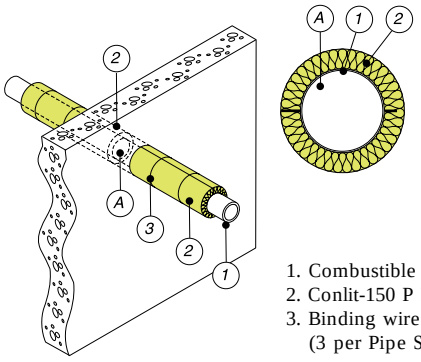
Combustible pipes

The penetration should be insulated the same way as for non combustible pipes.

Additionally wall and floor penetrations with combustible pipes and pipes of aluminium or fibre cement need special requirements.

Wall penetrations

The pipe should be insulated with Conlit-150 P Pipe Section over a distance of 4 m at the penetration, with a minimum of 1 m on one side of the penetration.



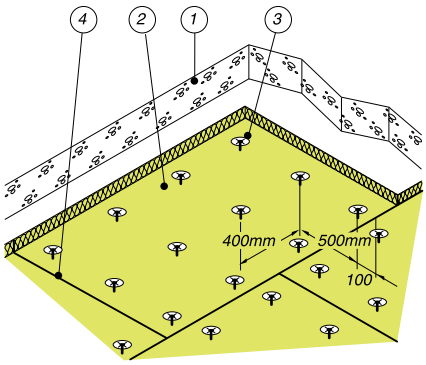
1. Combustible pipe
2. Conlit-150 P Pipe Section (detail A)
3. Binding wire or steel band
   (3 per Pipe Section)

Floor penetrations

The pipes should be insulated over the total length at every floor with Conlit-150 P Pipe Sections.

If aluminium or fibre cement pipes are used, the pipe should only be insulated at every second floor.

Required insulation thickness for wall and floor penetrations: ≥ 30 mm. Conlit-150 P Pipe Sections are generally secured with 3 steel binding wires or steel bands per pipe section.

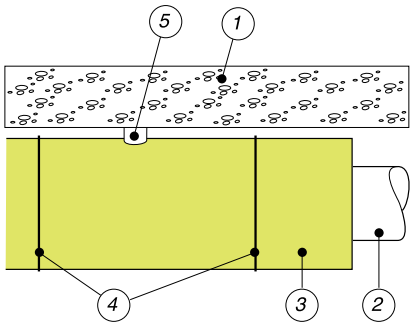


1. Concrete floor
2. Conlit-P Slab 756
3. M6 screw with steel dowel or 6 mm steel fixing with 38 mm diameter non-return washers
4. Conlit Glue to all slab to slab joints

SPRINKLER PIPES

Insulating sprinkler pipes with Conlit-150 P Pipe Sections can provide fire protection up to 1 1/2 hour. The required insulation thickness depends on the thickness of the pipe.

Required Conlit-150 P thickness for 90 minutes fire resistance				
Pipe thickness [mm]				
2.0-2.5	2.5-3.5	3.5-4.5	4.5-5.0	≥5
60 mm	50 mm	40 mm	30 mm	25 mm



1. Concrete floor
2. Sprinkler pipe
3. Conlit-150 P Pipe Section, all joints should be glued with Conlit Glue
4. Steel band or steel wire at 400 mm centres
5. Steel drop rods ≥ M10. Tensile stress ≤ 6 N/mm².

CONCRETE FLOORS

Insulating the soffit of a concrete floor with Conlit-P Slabs 756 can decrease the thickness of a concrete floor, based on a required fire resistance. 25 mm concrete can be replaced by 10 mm Conlit-P Slab. Conlit-P with a thickness of 25 mm can replace 65 mm concrete.

DESIGN PARAMETERS

Protection of structural steelwork

The extent of added protection will depend on the size, mass, degree of exposure and function of the element.

Any element to be protected can be described by a **Section Factor** Hp/A (m^{-1})

This factor is obtained by dividing the perimeter of the element exposed to fire (Hp). in metres, by the cross sectional area of the steel element (A) in square metres. Hp is determined as shown below. A is generally taken from section tables.

TABLE: BOX AND SOLID PROTECTION

STEEL SECTION	BOX and SOLID protection			
Universal beams, universal columns and joists (plain and castellated)	4 sides	3 sides	3 sides	2 sides
	H_p 2B+2D	B+2D	Partially exposed B+2d	B+D
Structural and rolled tees	4 sides	3 sides	3 sides	
	H_p 2B+2D	Flange to soffit B+2D	Toe of web to soffit B+2D	
Angles	4 sides	3 sides	3 sides	
	H_p 2B+2D	Flange to soffit B+2D	Toe of flange to soffit B+2D	
Channels	4 sides	3 sides	3 sides	
	H_p 2B+2D	Web to soffit 2B+D	Flange to soffit B+2D	
Hollow sections, square or rectangular	4 sides	3 sides	Hollow sections, circular	
	H_p 2B+2D	B+2D	H_p πD	πD

H_p determination method for profiled protection available on request

Determining protection thickness

Circular Structural Steel Beams and Colums Thickness [mm]

Conlit-150 P Pipe Sections

SECTION FACTOR H_p/A [m^{-1}]	½	1	1½	2	3	4
260	25	25	50	65		
255	25	25	50	65		
250	25	25	50	65		
245	25	25	50	65		
240	25	25	40	65		
235	25	25	40	65		
230	25	25	40	65		
225	25	25	40	65		
220	25	25	40	65		
215	25	25	40	65		
210	25	25	40	65		
205	25	25	40	65		
200	25	25	40	65		
195	25	25	40	65		
190	25	25	40	65		
185	25	25	40	65		
180	25	25	40	65		
175	25	25	40	50		
170	25	25	40	50		
165	25	25	40	50	80	
160	25	25	40	50	80	
155	25	25	40	50	80	
150	25	25	40	50	75	
145	25	25	40	50	75	
140	25	25	40	50	75	
135	25	25	40	50	75	
130	25	25	40	50	75	
125	25	25	40	50	75	
120	25	25	40	40	65	
115	25	25	40	40	65	
110	25	25	40	40	65	
105	25	25	25	40	65	
100	25	25	25	40	65	80
95	25	25	25	40	65	80
90	25	25	25	40	65	75
85	25	25	25	40	65	75
80	25	25	25	40	50	75
75	25	25	25	40	50	65
70	25	25	25	40	50	65
65	25	25	25	40	50	65
60	25	25	25	25	40	65
55	25	25	25	25	40	65
50	25	25	25	25	40	50
45	25	25	25	25	40	50
40	25	25	25	25	40	40
35	25	25	25	25	40	40
30	25	25	25	25	40	40
25	25	25	25	25	40	40
20	25	25	25	25	40	40
15	25	25	25	25	40	40

FIRE RESISTANCE PERIOD [hours]

Structural Steel Beams Thickness [mm]

Conlit-P Slab 756

SECTION FACTOR H_p/A [m^{-1}]	½	1	1½	2	3	4
260	15	15	25	45	90	
255	15	15	25	45	90	
250	15	15	25	45	90	
245	15	15	25	45	90	
240	15	15	25	45	90	
235	15	15	25	45	90	
230	15	15	25	45	90	
225	15	15	25	45	90	
220	15	15	25	45	90	
215	15	15	25	40	80	
210	15	15	20	40	80	
205	15	15	20	40	80	
200	15	15	20	40	80	
195	15	15	20	40	80	
190	15	15	20	40	80	
185	15	15	20	40	80	110
180	15	15	20	40	80	110
175	15	15	20	40	80	110
170	15	15	20	40	80	110
165	15	15	20	35	70	110
160	15	15	20	35	70	110
155	15	15	20	35	70	100
150	15	15	20	35	70	100
145	15	15	20	35	70	100
140	15	15	20	35	70	100
135	15	15	20	35	70	100
130	15	15	20	35	60	90
125	15	15	15	30	60	90
120	15	15	15	30	60	90
115	15	15	15	30	60	90
110	15	15	15	30	60	90
105	15	15	15	30	60	80
100	15	15	15	30	60	80
95	15	15	15	25	50	80
90	15	15	15	25	50	80
85	15	15	15	25	50	70
80	15	15	15	25	45	70
75	15	15	15	25	45	70
70	15	15	15	20	40	60
65	15	15	15	20	40	60
60	15	15	15	20	35	60
55	15	15	15	20	35	50
50	15	15	15	20	35	50
45	15	15	15	15	30	45
40	15	15	15	15	30	40
35	15	15	15	15	30	35
30	15	15	15	15	30	30
25	15	15	15	15	30	30
20	15	15	15	15	30	30
15	15	15	15	15	30	30

FIRE RESISTANCE PERIOD [hours]

Structural Steel Colums Thickness [mm]

Conlit-P Slab 756

SECTION FACTOR H_p/A [m^{-1}]	½	1	1½	2	3	4
260	15	20	35	60	110	
255	15	20	35	60	110	
250	15	20	35	60	110	
245	15	20	35	60	110	
240	15	20	35	60	110	
235	15	20	35	60	110	
230	15	20	35	60	110	
225	15	20	35	60	110	
220	15	15	35	60	110	
215	15	15	35	60	110	
210	15	15	35	60	100	
205	15	15	30	60	100	
200	15	15	30	60	100	
195	15	15	30	60	100	
190	15	15	30	60	100	
185	15	15	30	50	100	
180	15	15	30	50	100	
175	15	15	30	50	90	
170	15	15	30	50	90	
165	15	15	30	50	90	
160	15	15	30	50	90	
155	15	15	30	50	90	
150	15	15	30	45	90	
145	15	15	25	45	90	
140	15	15	25	45	80	
135	15	15	25	45	80	
130	15	15	25	45	80	
125	15	15	25	40	80	110
120	15	15	25	40	80	100
115	15	15	25	40	70	100
110	15	15	25	40	70	100
105	15	15	25	40	70	100
100	15	15	20	35	70	100
95	15	15	20	35	70	90
90	15	15	20	35	60	90
85	15	15	20	35	60	90
80	15	15	20	30	60	80
75	15	15	20	30	60	80
70	15	15	20	30	50	80
65	15	15	15	30	50	70
60	15	15	15	25	45	70
55	15	15	15	25	45	70
50	15	15	15	25	40	60
45	15	15	15	20	40	60
40	15	15	15	20	35	50
35	15	15	15	20	30	45
30	15	15	15	15	30	40
25	15	15	15	15	30	35
20	15	15	15	15	30	30
15	15	15	15	15	30	30

FIRE RESISTANCE PERIOD [hours]

Determining protection thickness

1. As stated previously, an early decision is required on wether profiled or boxed protection is to be employed.
2. Determine H_p /A factor
   Calculate the perimeter of the element exposed to fire (H_p) in metres.
   Take the cross sectional area of the steel member (A) from section tables in square metres.
3. Establish the period of fire protection required.
4. Use the tables to determine the thickness of appropriate material to be used.

Examples

Universal column
B = 203.9 mm
D = 206.2 mm
A = 66.4 cm^2
Fire protection: 3 hours

Box protection – 4 sided exposure
H_p = 2B + 2D = 2*203.9 + 2*206.2 = 820.2 mm = 0.820 m
H_p /A = 0.82 / 0.00664 = 123.5 m^{-1}
Required insulation thickness: Conlit-P Slab 756: 80 mm

Compatibility

Lapinus mineral wool is compatible with all materials with which it is likely to come into contact in normal building and industrial applications.

Biological

Lapinus Conlit products offer no sustenance to vermin and do not encourage the growth of fungi, moulds or bacteria.

Environment

No CFCs or HCFCs are used in the manufacture of Lapinus materials. Lapinus materials do not contain any asbestos.

Handling and storage

Lapinus Industrial Conlit products are light and easy to cut to any shape with a sharp knife. For long-term protection they should be stored indoors or under a waterproof covering.

Technical services

The Business Centre Industry, staffed by insulation experts, is always ready to give help and advice on fire protection insulation and other situations concerned with the use of Lapinus Conlit products.

ROXUL ASIA SDN BHD IS A SUBSIDIARY OF THE ROCKWOOL INTERNATIONAL GROUP, THE LEADING AND LARGEST MANUFACTURER OF STONE WOOL PRODUCTS IN THE WORLD. PLEASE VISIT THE WEBSITE OF ROCKWOOL INTERNATIONAL A/S – WWW.ROCKWOOL.COM – TO HAVE AN OVERVIEW OF OUR GLOBAL REPRESENTATION, PRODUCTS, AND SERVICES.

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