Promat

PROMAPAINT® DC1

Ablative fire resistant coating for steel HVAC ducts

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etex building performance

The relative complexity of any ductwork system passing through different fire compartments and the relevance of the system's function in ambient as well as fire conditions can make the selection of a suitable ductwork system difficult.

Ducts meant for the continuous conveying of air or smoke passing through a fire resistant element punctures the compartmentation function of the element. Fire dampers cannot be employed as the ducts need to function as a unobstructed conveyor of air and smoke during a fire. In such situations, a fire resistance duct is the answer.

Likewise unprotected steel smoke extraction ducts deforms in fire negating its capacity to exhaust smoke. Smoke extractions ducts tested to BS 476:Part 24 must maintain 75% of its cross sectional area in order to fulfil the requirement of a smoke extraction duct.

This document aims to give some guidance on the fire performance requirements of ducts and the protection of ducts using PROMAPAINT® DC1.

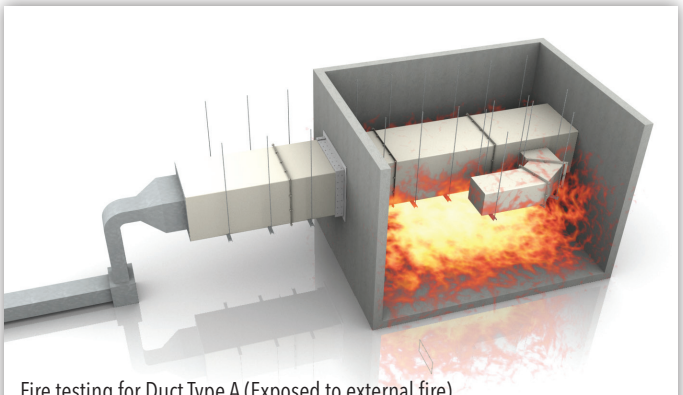
Fire Testing Methods

To determine the fire resistance of ducts passing through or between compartments, the system should normally be tested or assessed in accordance with BS 476: Part 24: 1987 or AS 1530: Part 4: 2005 or BS EN 1366: Parts 1, 8 and 9.

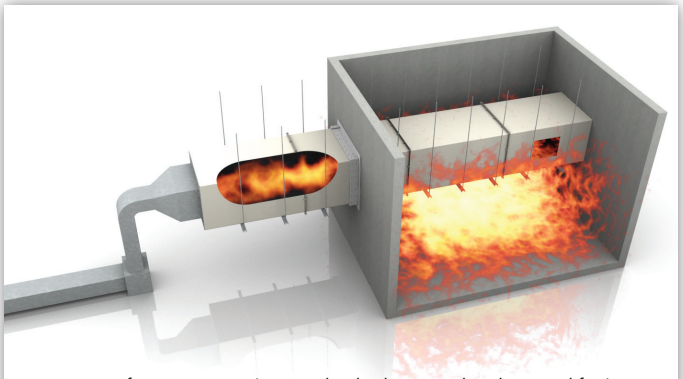
These standards have been written specifically for fire performance testing of ventilation eg. fresh air duct, exhaust air duct and for smoke extraction ducts.

The following information refers to BS 476: Parts 20 and 24. As part of a standard fire test, duct systems are exposed to external fire (also known as Duct Type A) and another duct subject to both external & internal fire (also known as Duct Type B). Fans attached create a standard pressure difference and air flow and the duct s fire performance is assessed in both fan-on and fan-off situations. When testing horizontal ducts, a run of at least 3000mm is located within the test furnace. EN 1366 standards requires a 4000mm length within the furnace and 2500mm outside the furnace on the unexposed face of the specimen.

BS 476: Part 24 expresses the fire resistance of ducts, in terms of stability, integrity and insulation.



Fire testing for Duct Type A (Exposed to external fire)



Fire testing for Duct Type B (Exposed to both external and internal fire)

Stability failure occurs when the suspension or fixing devices can no longer retain a duct in its intended position or when sections of the duct collapse. This requirement does not apply to the length of the duct exposed to internal and external fire (Duct Type B) within the furnace.

It should be noted that if a duct suffers extensive deformation, such that it can no longer fulfil its intended purpose, this would be classed as stability failure. For Duct Type A, loss of pressure within the duct during testing is also construed as stability failure.

Integrity failure occurs when cracks, holes or openings occur in the duct or at any penetrations within walls or floors, through which flames or hot gases can pass. The effects on integrity of the movement and distortion of both restrained and unrestrained ducts are also included in the standard.

Insulation failure occurs when the temperature rise on the outer surface of the duct outside the furnace exceeds 140°C (mean) or 180°C (maximum). Annex A the non-mandatory section of the standard states that ducts lined with combustible materials or coated internally with fats or greases, e.g. kitchen extract, should also have this criterion for the inner surface of the duct within the furnace when the duct is exposed to external fire (Duct Type A).

General Design Considerations

The following points are some of the factors which should be considered when determining the correct specification to ensure a ductwork system will provide the required fire performance.

Required Fire Exposure

Ductwork systems which are located in more than one compartment should always be tested or assessed for their performance when exposed to the heating conditions described within BS 476: Part 20: 1987. Reduced heating curves are generally only acceptable for certain of the systems components, e.g. the fan.

The performance of a ductwork system will vary depending on whether or not a fire could have direct access to inside the duct through an unprotected opening. If in doubt, one should assume direct access, i.e. the prescribed Duct Type B scenario. The construction of PROMAPAINT® DC1 fire resistant ducts detailed in this document fulfil both Duct Type A and B requirements.

Required Fire Performance
To qualify as a fire resistant smoke extraction duct PROMAPAINT® DC1 fire resistant duct has also proven to be capable of maintaining a minimum 75% of its cross section area throughout the duration of the fire exposure. In specific occasions and situation, for example in ventilation-extraction ducts that run within a single compartment where the contact with combustible material and risk to personnel in contact with the duct is assessed as low, the fire authorities may exercise relaxation to waive the insulation criteria.

Supporting Structure
Care should be taken that any structural element from which the duct system is supported, e.g. a beam, floor or wall, must have as a minimum the same fire resistance as the duct system itself and must be able to support the load of the duct under fire conditions.

Hanger Support
The supporting steel hanger rods, channels and fixings should be appropriate for the load of the complete ductwork system including any applied insulation material or other services suspended from it.

Particular attention should be excercised where the hanging length of the hanger is too long where the effect of the thermal expansion may become a concern and where excessive expansion could place undue stress on the duct thus leading to premature failure during a fire incident. As a guide, hanger >2500mm should be given some attention in assessing this risk.

The stress allowance of the steel hanger rods for a 120 minute fire resistant duct should not exceed 10N/mm^2 and the centres of the hanger supports should not exceed 2500mm. These figures are based on research done on the stress and strains of steel members under simulated fire conditions.

The stress reduction ratio factors below are based on BS EN 1993-1-2: 2005. Similar figures can be applied from AS/NZS 4600: 2005/Amendment 1: 2010.

Fire resistance period	Approximate temperature	Maximum permitted stress	Maximum permitted centres
30 minutes	840°C	18N/mm^2	2500mm
60 minutes	950°C	10N/mm^2	2500mm
90 minutes	1000°C	10N/mm^2	2500mm
120 minutes	1050°C	10N/mm^2	2500mm
180 minutes	1110°C	6N/mm^2	2000mm
240 minutes	1150°C	6N/mm^2	1500mm

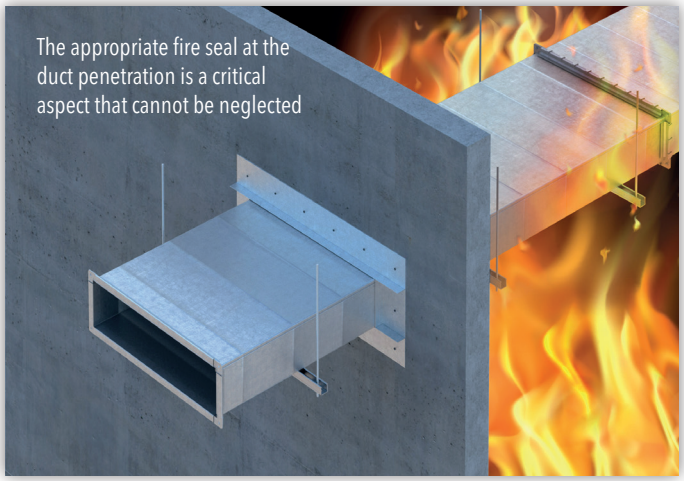
It should be noted that the stress levels referred to above apply to the threaded rod hanger supports themselves. The horizontal members have a differing level of applicable stress. The maximum centres refer to the greatest allowable distance between hanger support systems. However it should be noted that in certain locations, bends for instance, additional supports at lesser centres should be considered.

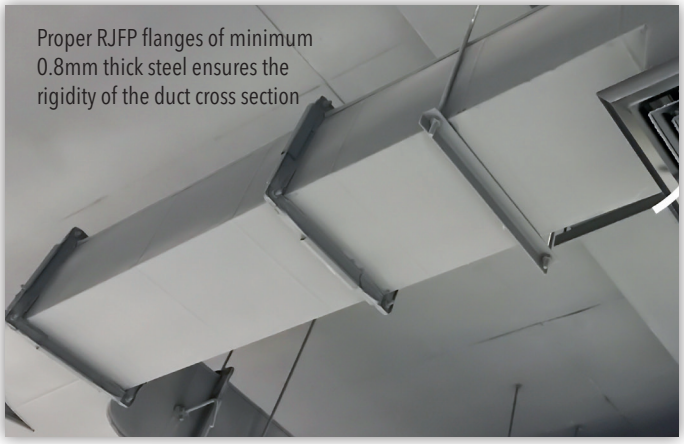
Where the hanger support system may exceed the limits given in the table above, the remedial options are as follows:

1) increase the dimensions of the hanger support system, e.g. rod diameters etc,
2) reduce the centres of the hanger support system, or
3) protect the hanger rods.

Steel Ductwork
The steel duct must be constructed in accordance with the requirements of DW/144, "Specification for sheet metal ductwork: Low, medium and high pressure/velocity air systems (published by the Heating and Ventilating Contractors' Association UK)" or equivalent specification, e.g. SMACNA. The steel ducts must be constructed with rolled steel angle-flanged cross joints. It is recommended that longitudinal seams be formed using the Pittsburgh lock system.

Penetrations Through Walls & Floors
Care should be taken to ensure that movement of the duct in ambient or in fire conditions does not adversely affect the performance of the wall, partition or floor, or any penetration seal. It should be understood that where a duct passes through any compartment wall or floor or other type of separating element, the aperture between the element and the duct must be sealed in accordance with the system approved for use with the specific duct system. In general this requires the use of a penetration seal constructed from materials and in such a manner to match the system used in the duct test programme. Penetrations seals are part of the tested duct system and the use of untested third party products or systems are not permitted.


The appropriate fire seal at the duct penetration is a critical aspect that cannot be neglected


Proper RJFP flanges of minimum 0.8mm thick steel ensures the rigidity of the duct cross section

Promat

PROMAPAINT® DC1
ABLATIVE FIRE RESISTANT COATING FOR STEEL HVAC DUCTS

General description

PROMAPAINT® DC1 is a special acrylic based, single component coating, specially formulated to protect steel ducts up to E 120 minutes.

PROMAPAINT® DC1 forms a flexible layer once dry, it is very suitable for accommodating movement and also resistant to moisture.

PROMAPAINT® DC1 is a lightweight product which is designed to keep its adhesion to the steel surface even in case of stress and deformation due to extreme weather condition and in fire condition.

Steel duct protected with PROMAPAINT® DC1 has been tested according to BS 476 Part 24 for ducts A and B.

Fields of application

Compartmentation is widely used worldwide to limit fire spread throughout the building. Air ducts can be often a critical point, because they connect different compartments and, in case of collapse due to temperature, the sealing of the penetration though wall or ceilings can be compromised.

Fire dampers within ductwork systems are normally used to avoid flame and smoke spread, but in same cases, such as car park extract ducts, smoke extract ducts or pressurisation ducts, the fire dampers cannot be used, therefore a fire resistant duct is necessary. Depending on the building design and local regulations, the ducts can requires insulation and integrity or integrity only.

PROMAPAINT® DC1, applied to a thickness of approximately 0.5mm, improve the fire resistance of the steel ducts up to E 120 minutes, limiting the increase of weight and the external dimensions of the duct.

System advantages / customer benefit

- Up to 60% movement capability
- Excellent adhesion qualities
- Moisture resistant once dry
- Tested for accelerated aging both under Z1 (ETAG 018) and extreme conditions (up to 45°C, 90% humidity)
- Reduction in duct reinforcement
- Limit increase of weight and almost no increase in dimensions
- Easy to apply

Surface Preparation

It is important for long term durability that the galvanised steel ducts must be clean and free from any dust, oil, grease or any other contaminant prior to application of PROMAPAINT® DC1.

The steel duct surface should be cleaned with a solvent degreasing agent to ensure all surfaces are clean.

In case of critical adhesion, an appropriate etching primer (with a DFT of 60-80 microns) can be used within four hours after cleaning/degreasing.

Application of PROMAPAINT® DC1

- Stir PROMAPAINT® DC1 well (we recommend a mechanical mixer);
- PROMAPAINT® DC1 can be diluted (maximum 0.5 litre clean water to each 12kg container);
- PROMAPAINT® DC1 can be applied with a brush, roller or airless device;
- The recommendation of Promat is for the use of airless spray equipment, which will allow fast and simple application of the PROMAPAINT® DC1 in a single pass. The coating should be sprayed to a minimum dry film thickness (DFT) of about 500 to 600 microns.
- Once opened, the contents should be fully used as soon as possible. Reseal containers properly after use;
- Clean tools with water after use;
- 500 microns dry-film thickness is equivalent to 700 microns wet-film thickness (approx. 1.000 g/m^2);
- Top coat or overpainting is possible; adhesion and compatibility must be checked.

Application Conditions

- Minimum +5°C, maximum +40°C for both substrate and ambient temperature;
- Relative humidity of more than 65% will result in extended drying times;
- Substrate must be free of oil, grease and dust;
- Use clean water to dilute PROMAPAINT® DC1 if necessary.

Packaging

- 12 kg plastic bucket
- 33 buckets /pallet
- 396 kg/pallet

Subject to change.

Storage requirements

- Store in cool and dry conditions
- Protect from heat and frost
- Shelf life of original sealed containers at least 12 months
- Once opened, containers should be finished swiftly

Safety instructions

Please refer to the safety data sheet for additional advice

General Technical properties	
Colour	grey
Density	1.35g/cm^3
Viscosity	approx. 60.000mPa.s
Solid Content	approx. 70%
Ash Content	approx. 30%
Shore A	40
Tensile Strength	0.35 MPa
Elongation before failure	approx. 250%
Drying time	approx. 8 hours at 20°C and a relative humidity of 65% for 1mm

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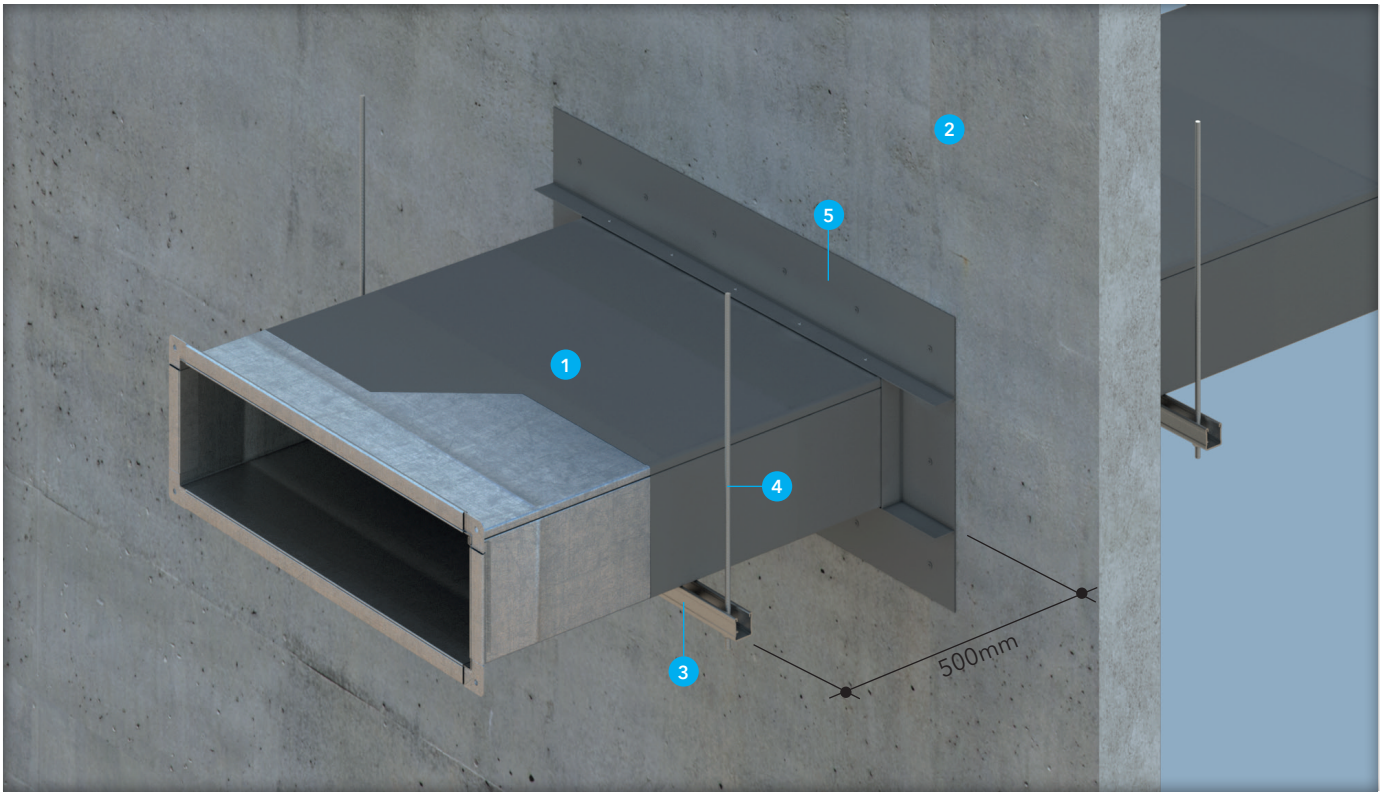
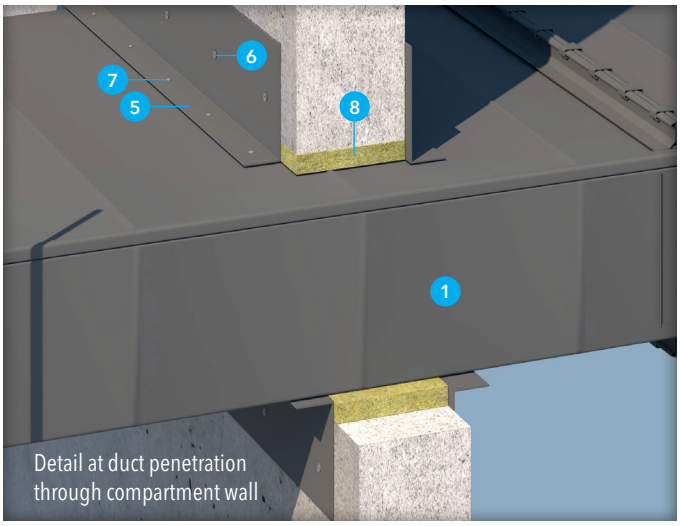
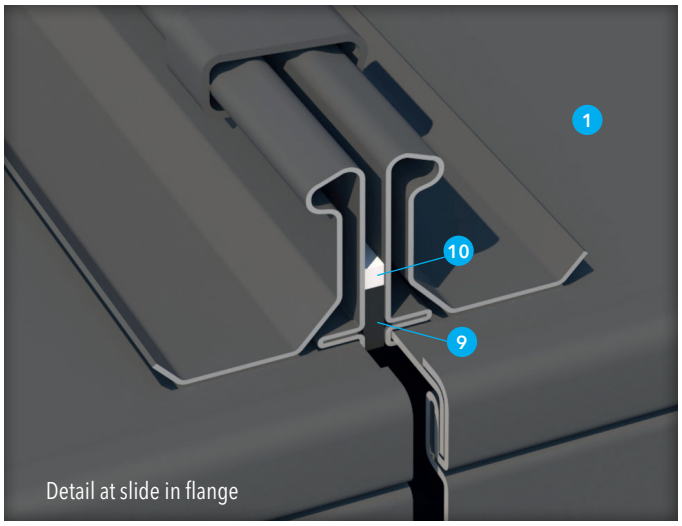
PROMAPAINT® DC1
ABLATIVE FIRE RESISTANT COATING FOR STEEL HVAC DUCTS





Detail at duct penetration through compartment wall



Detail at slide in flange

1. Galvanised steel duct coated with PROMAPAINT® DC1 (566 microns - DFT)
2. Concrete wall
3. Support angle or channel
4. M10 threaded steel rod
5. Steel angle 150 x 50 x 1.5mm thick
6. Universal screw 4 x 70mm length at 200mm on centres
7. Stainless steel rivets with 4.5mm head diameter, 50mm from side and maximum spacing of 120mm on centres
8. Mineral wool insulation 50mm x 100kg/m^3
9. EPDM gasket between flanges 4 x 12mm
10. PROMASEAL®-A between flanges

PROMAPAINT® DC1 fire resistant coating around steel ducts has be thoroughly tested in accordance with the criteria of BS 476: Part 24: 1987, exposed to external and internal fire. It meets the stability & integrity criteria for in excess of 120 minutes. PROMAPAINT® DC1 protected steel duct is also able to maintain 75% of its cross sectional area during the test duration and hence qualify as a fire resistant smoke extraction duct in accordance with BS 476: Part 24: 1987. Consult Promat Technical Department for further information.

Promat

Australia

Promat Australia Pty Ltd

South Australia office

1 Scotland Road
Mile End South, SA 5031
T 1800 PROMAT (776 628)
F +61 (8) 8352 1014

New South Wales office

Unit 1, 175 Briens Road
Northmead, NSW 2152
T 1800 PROMAT (776 628)
F +61 (2) 9630 0258

Victoria office

Suite 205, 198 Harbour Esplanade
Docklands, VIC 3008
T 1800 PROMAT (776 628)
F 1800 334 598

Queensland office

433 Logan Road
Stones Corner, QLD 4120
T 1800 011 376
F 1800 334 598

E mail@promat.com.au

China

Promat Shanghai Ltd

Room 506, Block A, Qi Lin Plaza
13-35 Pan Fu Road
510180 Guangzhou
T +86 (20) 8136 1167
F +86 (20) 8136 1372
E info@promat.com.cn

Etex is a Belgian industrial group that specialises and markets high quality building materials and systems. Founded since 1905 and headquartered in Brussels, Belgium, Etex currently operates in 107 factories and 102 subsidiaries across 42 countries, employs more than 15,000 people and is one of the largest fibre cement producers in the world.

Through its subsidiaries, the group offers an extensive range of products: small and large roofing materials, cladding and building boards, passive fire protection systems and ceramic tiles.

Etex aims to be a professional, solid partner for all kinds of building projects.

Hong Kong

Promat International (Asia Pacific) Ltd

Room 1010, C.C. Wu Building
302-308 Hennessy Road, Wanchai
T +852 2836 3692
F +852 2834 4313
E promat.hk@etexgroup.com

Malaysia

Promat (Malaysia) Sdn Bhd

Unit 19-02-01, Level 2, Wisma Tune
19 Lorong Dungun, Damansara Heights
50490 Kuala Lumpur
T +60 (3) 2095 5111
F +60 (3) 2095 6111
E info@promat.com.my

Singapore

Promat Building System Pte Ltd

10 Science Park Road, #03-14 The Alpha
Singapore Science Park II
Singapore 117684
T +65 6776 7635
F +65 6776 7624
E promat.sg@etexgroup.com

South Korea

Promat International (Asia Pacific) Ltd
(Korea Branch Office)

#1104 Dong-a Building
117 Namdaemun-ro, Jung-gu
Seoul 04522
T +82 (70) 7794 8216
F +82 (2) 779 5566
E info@promat-ap.com

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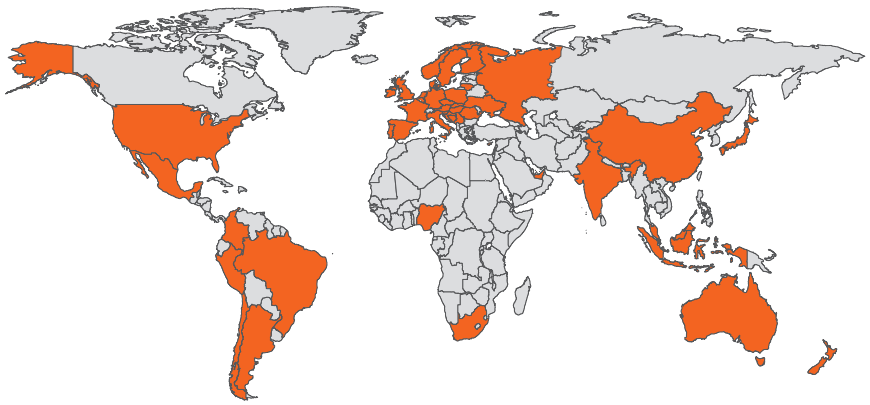

Promat

PROMAPAINT® DC1

Ablative fire-resistant coating for steel HVAC ducts

Product Datasheet

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PROMAPAINT® DC1

Ablative fire-resistant coating for steel HVAC ducts

PROMAPAINT® DC1 is a special acrylic based, single component coating, specially formulated to protect steel ducts up to E120 minutes according to BS 476.

PROMAPAINT® DC1 forms a flexible layer once dry, it is very suitable for accommodating movement and it's also resistant to moisture.

PROMAPAINT® DC1 is a lightweight product which is designed to keep its adhesion to the steel surface even in case of stress and deformation due to extreme weather condition and/or fire exposure.

Steel ducts protected with PROMAPAINT® DC1 have been tested according to BS 476 Part 24 for ducts A and B.

Fields of application

Compartmentation is widely used worldwide to limit fire spread throughout the building. Air ducts can be often a critical point, because they connect different compartments and, in case of collapse due to temperature, the sealing of the penetration though wall or ceilings can be compromised.

Fire dampers within ductwork systems are normally used to avoid flame and smoke spread, but in same cases, such as car cark extract ducts, smoke extract ducts or pressurisation ducts, the fire dampers cannot be used, therefore a fire resistance duct is necessary. Depending on the building design and local regulations, the ducts can requires insulation and integrity or integrity only.

PROMAPAINT® DC1, applied to a thickness of approximately 570 microns for Duct A (outside) and 350 microns for Duct B (inside), improves the fire resistance of the steel ducts of minimum thickness 0.8 mm, up to E120, limiting the increase of weight and the external dimensions of the duct.

System advantages / customer benefit

- Up to 60% movement capability
- Excellent adhesion qualities
- Moisture resistant once dry
- Tested for accelerated aging both under Z1 (ETAG 018) and extreme conditions (up to 45°C, 90% humidity)
- Reduction in duct reinforcement
- Limit increase of weight and almost no increase in dimensions

Test certificate / approval

BS 476 Part 24 for ducts A and B

Surface Preparation

It is important for long term durability that the galvanised steel ducts must be clean and free from any dust, oil, grease or any other contaminant prior to application of PROMAPAINT® DC1.

The steel duct surface should be cleaned with a solvent degreasing agent to ensure all surfaces are clean.

In case of critical adhesion, an appropriate etching primer (with a DFT of 60–80 microns) can be used within four hours after cleaning/degreasing.

Application of PROMASEAL® DC1

- Stir PROMAPAINT® DC1 well (we recommend a mechanical mixer);
- PROMAPAINT® DC1 can be diluted (maximum 0.35 litre clean water to each 12 kg container);
- PROMAPAINT DC1 can be applied with a brush, roller or airless device;
- The recommendation of Promat is for the use of airless spray equipment, which will allow fast and simple application of the PROMAPAINT® DC1 in a single pass. The coating should be sprayed to a minimum dry film thickness (DFT) as reported in the assessments.
- Once opened containers should be fully used as soon as possible. Reseal containers properly after use;
- Clean tools with water after use;
- 570 microns dry film thickness is equivalent to 785 microns wet film thickness (approx 1,140 g/m²). 350 microns dry film thickness is equivalent to 490 microns wet film thickness (approx 700 g/m²).;
- Overpainting is possible; adhesion and compatibility must be checked.

Application Conditions

- Minimum +5 °C, maximum +40 °C for both substrate and ambient temperature;
- Relative humidity of more than 65 % will result in extended drying times;

- → Substrate must be free of oil, grease and dust;
- → Use clean water to dilute PROMAPAINT® DC1 if necessary (max.3%).

Packaging

- → 12 kg plastic bucket
- → 60 buckets /pallet
- → 720 kg/pallet
- → Subject to change.

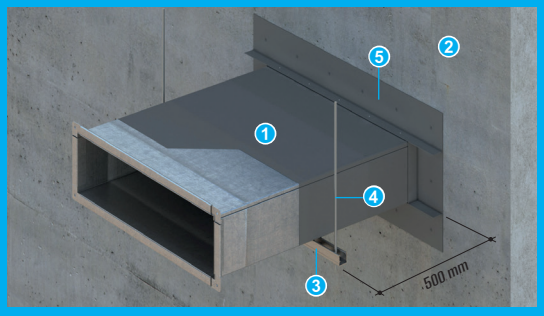
Storage requirements

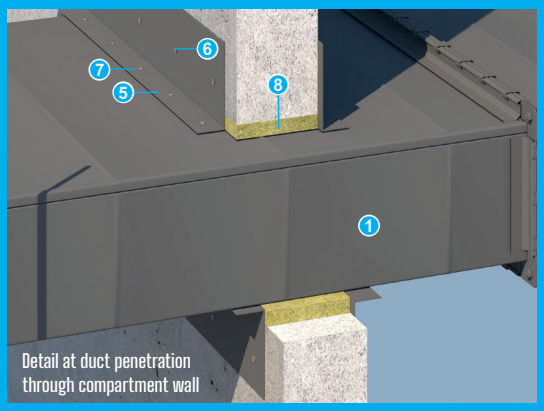
- → Store in cool and dry conditions
- → Protect from heat and frost
- → Shelf life of original sealed containers at least 12 months
- → Once opened, containers should be finished swiftly

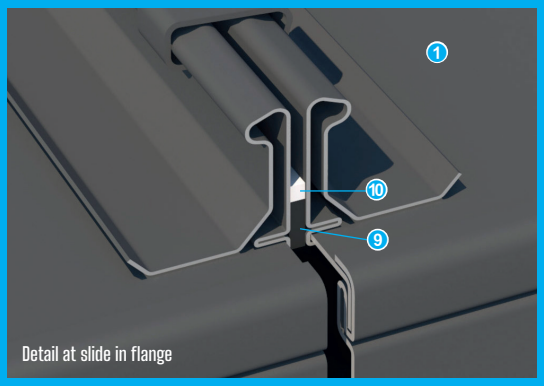
Safety instructions

- → Processing guidelines and information on safety are available with your local Promat / Etex subsidiary or branch office.
- → EUH210 – Safety data sheet available on request.
- → EUH208 – Contains reaction mass of: 5-chloro-2-methyl-2H-isothiazol-3-one and 2-methyl-2H-isothiazol-3-one (3:1) (55965-84-9), 1,2-benzisothiazol-3(2H)-one; 1,2-benzisothiazolin-3-one(2634-33-5). May produce an allergic reaction.

General Technical properties	
Colour	grey
Density	1.35 g/cm³
Viscosity	approx. 60.000 mPa.s
Solid Content	approx. 70%
Ash Content	approx. 30%
Shore A	40
Tensile Strength	0.35 MPa
Elongation before failure	approx 250%
Drying time	approx. 8 hours at 20 °C and a relative humidity of 65 % for 1 mm;







1. Galvanised steel duct coated with PROMAPAINT® DC1
2. Concrete wall
3. Support angle or channel
4. M10 threaded steel rod
5. Steel angle 150 x 50 x 1.5mm thick
6. Universal screw 4 x 70mm length at 200mm on centres
7. Stainless steel rivets with 4.5mm head diameter, 50mm from side and maximum spacing of 120mm on centres
8. Mineral wool insulation 50mm x 100kg/m³
9. EPDM gasket between flanges 4 x 12mm
10. PROMASEAL®-A between flanges

Longer side (mm)	Thickness (mm)	Standard Straight Length (mm)	Hanger Spacing (mm)	Stiffener	Cross Joint	Clamp (mm)	Bearer	Drop Rod (mm)
				Intermediate	Type/Rating			
1000	0.8	1200	1000	-	RSA 25x25x3	200	S-channel 41x41x2.5	8
1250	0.9	1200	1000	-	RSA 30x30x4	200	C-channel 76x38	8
1500	1.0	1200	1000	RSA 30x30x4	RSA 30x30x4	200	C-channel 76x38	10
2500	1.0	1200	1000	RSA 40x40x4	RSA 30x30x4	200	C-channel 102x51	12
3000	1.2	1200	1000	RSA 50x50x5	RSA 30x30x4	200	C-channel 102x51	12

Promat

Headquarters – Belgium
Etex Building Performance NV
Bormstraat 24, 2830 Tisselt
T +32 15 718 100
F +32 15 718 109
E info@promat-international.com
info@promat.be
www.promat-international.com
www.promat.be

Australia
Promat Australia Pty Ltd
1 Scotland Road
SA 5031 Mile End South
T 1800 Promat (776 628)
F +61 8 8352 1014
E mail@promat.com.au
www.promat.com.au

China
Promat Shanghai Ltd
No.2, Tai Hua Street,
Yonghe Economic District,
511356 Guangzhou, Guangdong
T +86 (20) 8136 1167
F +86 (20) 3222 5275
E info@promat.com.cn
www.promat.com.cn

Hong Kong
Promat International (Asia Pacific) Ltd
Room 1010, C.C. Wu Building
302–308 Hennessy Road, Wanchai
T +852 2836 3692
F +852 2834 4313
E apromath@promat.com.hk
www.promat.com.hk

India
Promat Fire & Insulation Pte Ltd
Unit 605, 6th Floor, Tower B
Global Business Park
Mehrauli Gurgaon Road
Sector 26, Gurgaon
122002 Haryana
T +91 12 4434 6865
E info@promat-india.com
www.promat-india.com

Malaysia
Promat (Malaysia) Sdn Bhd
Unit 19–02–01, Level 2, Wisma Tune
19 Lorong Dungun, Damansara Heights
50490 Kuala Lumpur
T +60 3 2095 5111
F +60 3 2095 6111
E info@promat.com.my
www.promat.com.my

Singapore
Promat Building System Pte Ltd
10 Science Park Road, #03–14 The Alpha
Singapore Science Park II
117684 Singapore
T +65 6776 7635
F +65 6776 7624
E info@promat.com.sg
www.promat-ap.com

South Korea
Promat International (Asia Pacific) Ltd
(Korea Branch Office)
#1104 Dong-a Building
117 Namdaemun-ro, Jung-gu
04522 Seoul
T +82 70 7794 8216
F +82 2 779 5566
E info@promat-ap.com
www.promat-ap.com

UAE
Promat Fire Protection LLC
Plot no. 597–921
Dubai Investment Park 2
PO Box 123945, Dubai
T +971 4 885 3070
F +971 4 885 3588
E info@promatfp.ae
www.promatfp.ae

UK
Promat UK Ltd
Gordano House
Marsh Lane, Easton-in-Gordano
BS20 ONE Bristol
T +44 800 373 636
F +44 1275 379 037
E marketinguk@promat.co.uk
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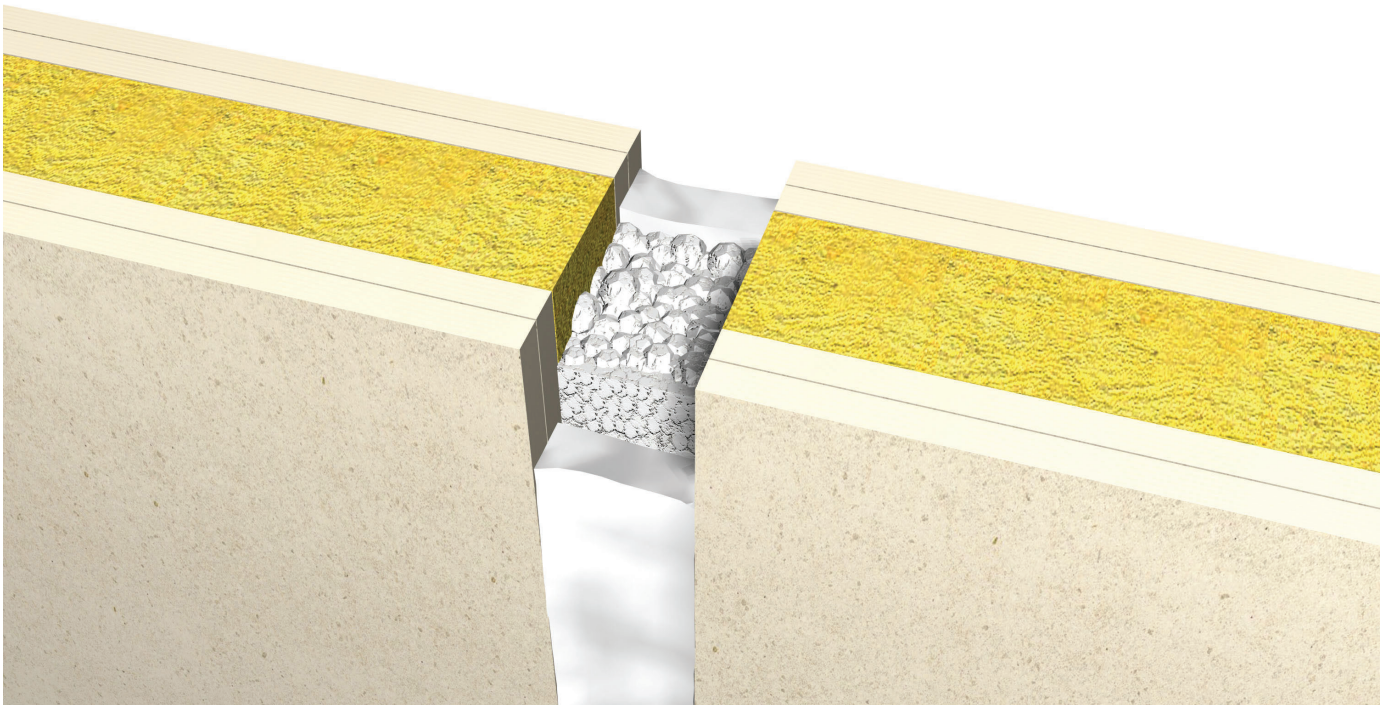
PROMASEAL® Acrylic Sealant Product Data Sheet
Fire stopping acrylic



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PROMASEAL® Acrylic Sealant
Fire stopping acrylic
Product data sheet

Technical data and properties	
Colour	white/grey (others on request)
Consistency	paste
Specific gravity	1.52 -1.62 g.cm^3
Shrinkage	Approx. 12 %
Movement capabilities	Flexible upto 7.5 %
Application temperature	+5 to +40°C
Acoustic isolation (EN 10140)	48 dB
Air permeability (EN 1026)	600 pa- 100pa (0.0/0.0 m^3/h/m^2)

Application instructions
- For good adhesion the surfaces of the building elements shall be free of any dust or grease and may need to be primed. On good clean, virgin concrete & masonry, no priming required.
- Ensure that the aperture and services in question are tested with PROMASEAL® Acrylic Sealant and the site conditions are within the application specification.
- An annular space needs to be present around the service to apply sufficient installation depth.
- All services and apertures need to be clean and clear of all dust and loose particles. The aperture temperature needs to be at +5°C or above at time of installation.
- The PROMASEAL® Acrylic Sealant is either gunned or trowelled into the aperture in or between the separating element/elements to a specific depth utilising various backing materials.
- Upon installation make sure that you install the PROMASEAL® Acrylic Sealant around all services needed.
- Once compacted, smooth off the PROMASEAL® Acrylic Sealant to produce a professional finish

General description
PROMASEAL® Acrylic Sealant is an acrylic based sealant used to reinstate the fire resistance performance wall and floor constructions where they have been provided with apertures for the penetrations of multiple services, also to form linear gap seals where gaps are present within the wall and floor constructions and linear joints where wall and floor constructions abut.

PROMASEAL® Acrylic Sealant has slight intumescent properties that cause it to swell upon heating and can achieve fire rating upto 240 minutes.

Fields of application
Linear joints seals in flexible & rigid walls and floor construction.

Penetration seals around steel /copper pipes, electrical cables, cable trays & ladders.

System advantages / customer benefit
- Paintable
- Adhesions to most substrates
- Backing material can be either Rockwool (80kg/m^3) or PE backing rods
- Halogen free, resist fungi & Vermin
- Tack Free, Water & UV resistant

Approvals
- UL-US & UL-C listed
- UL-EU Approval

Packaging
PROMASEAL® Acrylic Sealant is supplied in liquid form contained within 310ml tubes, other packaging on demand.

Storage requirements
- Store in cool and dry conditions – 3°C to 40°C
- Shelf life for original sealed containers is at least 18 months
- Once opened the container should be used swiftly

Safety instructions
- Please refer to the safety data sheet for additional advice

Promat

Head Office
Promat International N.V.
Bormstraat 24
2830 Tisselt
Belgium
T +32 15 718 100
F +32 15 718 109
E info@promat-international.com
www.promat-international.com
www.promat-tunnel.com
www.promat-marine.com
www.promat-oilandgas.com

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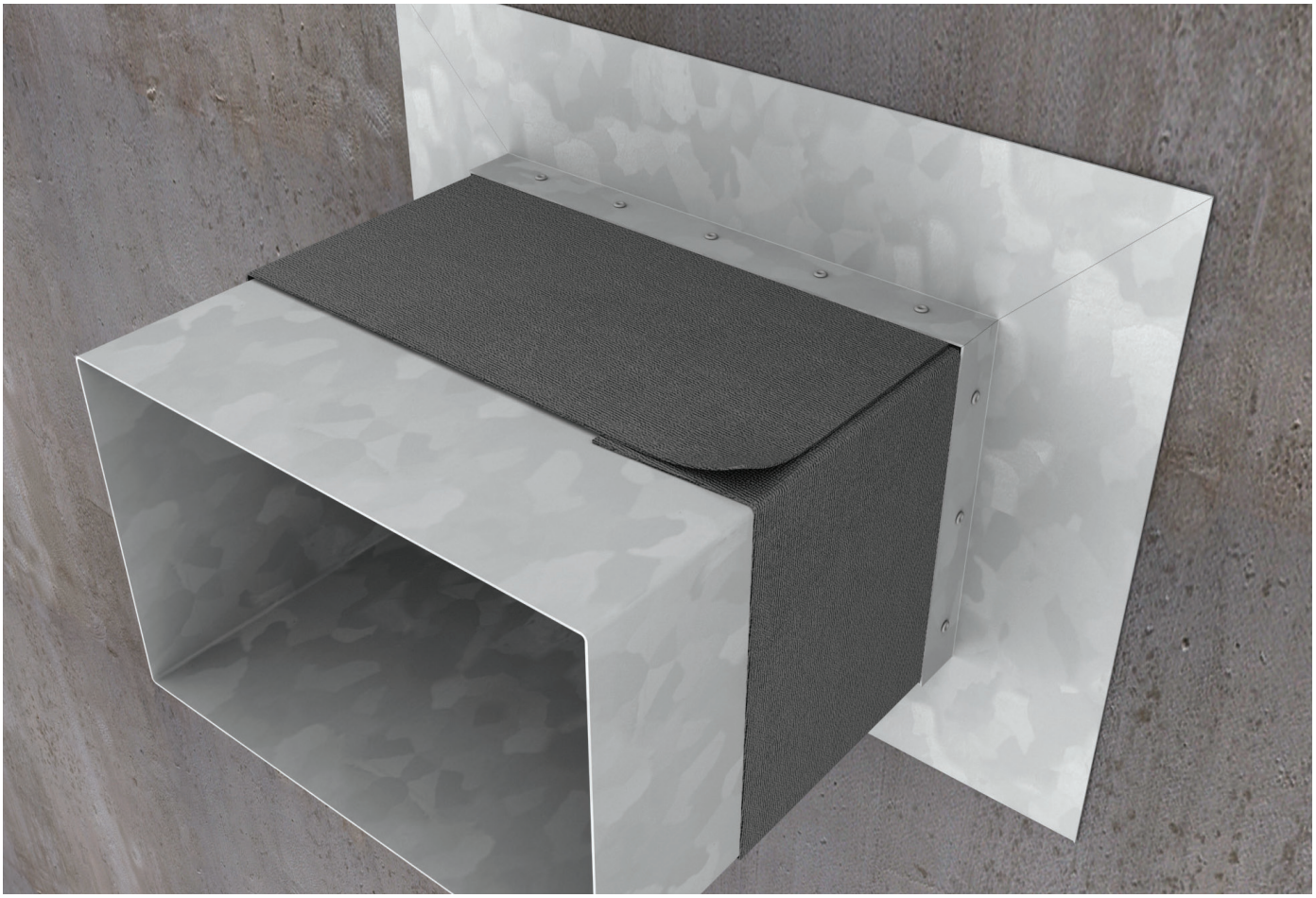
Promat®-BUTYL TAPE Product Data Sheet
Sealing tape for fire resistant ducts



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Promat®-BUTYL TAPE
Sealing tape for fire resistant ducts
Product data sheet

SPECIFICATION

Colours	Grey. Other colours are by request depending on quantity.
Dimensions	15mm x 3mm, in rolls 15m long. Other sizes are available on request, depending on quantity.
Packaging	The tape is sold in boxes of 20 rolls, each 15m long
Shelf Life	24 months in ambient conditions
Life Expectancy	In excess of 25 years
U.V. Resistance	Excellent
Service Temperature Range	-40°C to +90°C
Joint Movement Range	Up to 15%
Compatibility	Very good adhesion to most surfaces and compatible with most commonly used construction materials.
Dynamic tensile tension: **Separation rate 100mm/min @ 20°C**	24N/cm² to standard 180 grit stainless steel
Dynamic shear: **Separation rate 200mm/min @ 20°C**	22N/cm² to standard 180 grit stainless steel
Moisture vapour transmission rate : independently tested to BS 15106-3	0.025g/m²/24hr/mm at 25°C & 75% RH

For further information please contact our technical department.

Description

Promat®-BUTYL TAPE is a preformed, high performance, polyisobutylene (PIB) based sealing tape used to seal flanged joints in fire-resisting Promat®-WRAP Fire Duct systems against air and water ingress. The product is cost effective, non-toxic and requires no tools to apply.

Areas of Use

Sealing flange joints in Promat®-WRAP Fire Duct Systems (e.g. Promat®-WRAP 60, Promat®-WRAP 120, Promat®-WRAP 240).

Advantages

- Approved for use with Promat®-WRAP Fire Ducts
- Self-wound roll presentation
- Solvent-free formulation
- Instant seal
- Direct control over quantity of sealant used in the joint
- Environmentally friendly
- Ease of use
- Good adhesion on both faces to most building materials
- High pumping resistance

Installation

Promat®-BUTYL TAPE should be applied to surfaces at a temperature range of between +4°C and +40°C. For best performance, the surfaces should be clean, dry, and grease free. The product should be unwound and lightly pressed into position leaving the outer release paper in place. On forming the joint, the release paper is removed and the closing surface pushed firmly in place, pressure applied along the length of the joint and mechanically fixed.

When sealing the flanged joints in a four-side rectangular duct one normally uses a continuous length of tape with an overlapped joint located about 50mm from a corner. The tape ends should only overlap about 10mm at the joint.

Further advice is available from Promat Technical Support..

Storage

Promat®-BUTYL TAPE may not be affected by an outdoor environment. However, for long term storage and ease of installation, it is recommended that it should be stored indoors ideally in cool, dry, frost-free conditions above +4°C and below +30°C (best between +5°C and +20°C). Shelf life is 24 months from date of manufacture..

Health & Safety

For health and safety advice refer to the relevant MSDS sheet available from Promat.

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Head Office
Promat International N.V.
Bormstraat 24
2830 Tisselt
Belgium
T +32 15 718 100
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www.promat-international.com
www.promat-tunnel.com
www.promat-marine.com
www.promat-oilandgas.com

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