Promat

Cafco FENDOLITE® MII

Integrated Fire Protective Coating System For Structural Steelwork & Vessels In Oil & Gas Industries

For Promat Asia Pacific Organisation • May 2014

General Description

Cafco FENDOLITE® MII is a spray applied, single package factory controlled premix, based on vermiculite and Portland cement. It may be floated or roller finished.

Cafco FENDOLITE® MII produces a monolithic coating able to withstand thermal shocks experienced typically in a high intensity hydrocarbon fire. Concrete structures in particular, will be protected from explosive spalling when protected using Cafco FENDOLITE® MII.

Although low in density, thus significantly reducing dead load, Cafco FENDOLITE® MII is highly durable and will not crack or spall under mechanical impact.

Cafco FENDOLITE® MII is used for application to construction elements such as concrete or individual steel sections, particularly where off-site application is required. It is suitable for exterior use on structures and vessels in the oil, gas, petrochemical and power industries, and for refurbishment or upgrading of existing tunnel structures.

Fire protection thickness

Fire protection thickness requirements are often specified in the owner operator's engineering codes of practice. Please refer to the tables on pages 5 and 6 on thickness for the fire resistance required. Otherwise please consult Promat to establish the Hp/A ratio for a particular beam or column section and to ascertain the required thickness of Cafco FENDOLITE® MII.

General Technical Properties

Fire resistance		Steel and concrete structures protected with Cafco FENDOLITE® MII have undergone fire resistance tests up to 240 minutes in approved independent laboratories to recognised standards throughout the world, including: ● Australia (AS 1530: Part 4: 2005) ● France, Hydrocarbon Modified Curve ● Germany (DIN 4102: 1977-2009) ● International Standard ISO 834: 2002 ● Italy (UNI 11076) ● Netherlands, RWS (fire test procedures for tunnels GT-98036-1a) ● UK (BS 476: Parts 20 and 21: 1987 Appendix D and Euroclass A1 according to EN 1350-1) ● USA (ASTM E119: 1998, UL 263 and UL 1709 - Design No. XR719) Fire resistance test results relate solely to the constructions tested and test conditions imposed.
Material class (Euroclass A1 according to EN 1350-1)		Non combustible
Smoke generation		Does not contribute to smoke generation
Alkalinity	pH	12.0~12.5
Thermal conductivity at 20°C	W/m°K	0.19
Theoretical coverage at 25mm thickness	m^2/tonne	65
Cure		By hydraulic set
Initial set at 20°C and 50% RH		2~6 hours
Density	kg/m^3	Minimum 775 ± 15% when dry and in place
Sound absorption	NRC	0.35
Corrosion resistance		Does not promote corrosion of steel. Please seek advice of structural engineer concerning long term corrosion protection, particularly when the structure is to be fully exposed to prevailing weather conditions.
Colour and texture condition		Off-white with a monolithic spray texture

Cafco FENDOLITE® MII is manufactured under a quality management system certified in accordance with ISO 9001: 2008. For complete UL listing to application of this product, please visit UL website at http://www.ul.com.

Continued on opposite page

General Technical Properties

Continued from opposite page

Packaging	Storage	Shelf life	Environmental
20kg bags	Kept dry and off the ground until ready for use	Maximum 12 months	• Do not discharge into drains, watercourses or soil. • Not readily biodegradable. • Not expected to bioaccumulate or to be toxic to aquatic life except at high concentrations.

Material Preparation

Typical substrates	Steel and concrete
Substrate preparation	The substrate shall be clean, dry and free from visible moisture (including condensation), concrete laitance, formwork release oils, loose mill scale, loose rust and any other condition preventing good adhesion. Concrete curing agents should not be used.
Mesh reinforcement	Most fire tests conducted have been carried out without mesh reinforcement, to demonstrate the ability of Cafco FENDOLITE® MII to stay in place under the most severe fire conditions. However, for maximum long term in-service durability, the use of lightweight mesh reinforcement is recommended for exterior work and for interior use where vibration or mechanical damage and the possibility of subsequent loss of adhesion exist.

Application Procedures

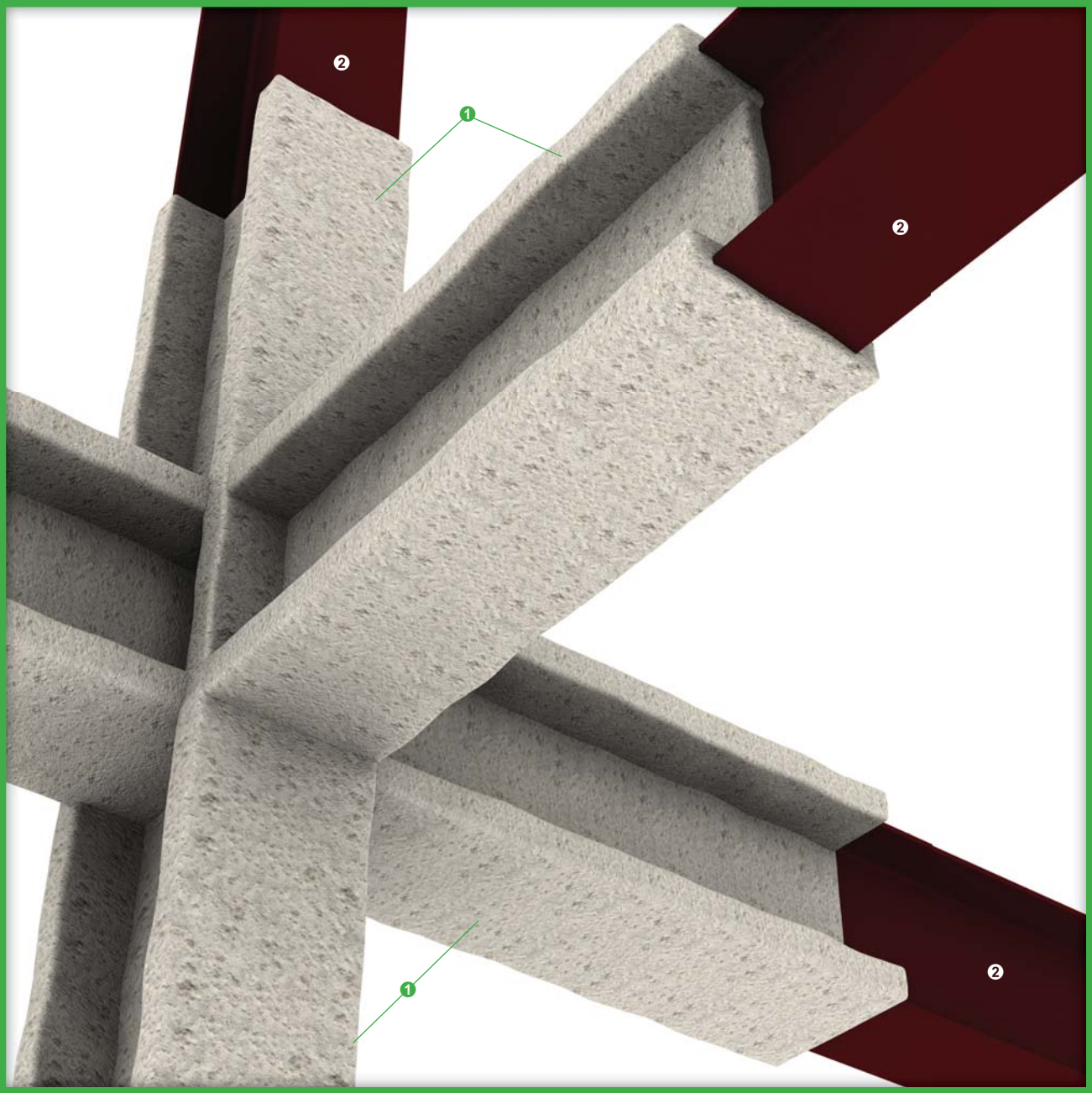
Initial steps	Application of Cafco FENDOLITE® MII must be carried out by an applicator recognised by Promat.
Methods	Mix Cafco FENDOLITE® MII with potable water in a suitable mixer and apply by a spraying machine approved by Promat. Cafco FENDOLITE® MII may also be float or roller finished or left with a spray texture. A hand applied patching mix is available for minor repairs, i.e. Cafco FENDOLITE® TG. Please refer to Promat for a complete application manual.
Limitations	Cafco FENDOLITE® MII may be applied when the substrate and air temperatures are at least 2°C and rising, but should not be applied if the substrate or air temperatures are less than 4°C and falling. Maximum substrate and air temperature is 50°C. Substrate temperature should be at least 2°C above dew point temperature.

Top Coating

Under certain circumstances, CAFCO® TOPCOAT 200 may be used as protection from frequent wash down, long term chemical spills, or for improved resistance to fungal, algae and bacterial growth. Please consult Promat for details.

Health & Safety

Guarantee adequate ventilation during work. Avoid contact with the eyes and skin and avoid inhalation of the dust by wearing appropriate personal protection gear (safety goggles, protective clothing and dust mask). For more information please check the material safety data sheet, available upon request.



Up to 240/-/- fire resistance in accordance with the requirements of BS 476: Part 21: 1987 and/or UL 1709

1. Spray, float or roller applied Cafco FENDOLITE® MII vermiculite and Portland cement based wet mix, thickness in accordance with the Hp/A Ratio tables on pages 5 and 6

   For finishing, trowel applied with Cafco FENDOLITE® TG vermiculite and Portland cement based wet mix

   Where necessary, spray, brush or roller applied CAFCO® TOPCOAT 200 acrylic polymer coating as a top coat sealer for external applications and use in moisture laden conditions or wet areas

2. All structural steel surfaces to receive Cafco FENDOLITE® MII to be primed with compatible primer

   All primed surfaces to be coated with CAFCO® PSK 101 sealer as keycoat prior to the application of Cafco FENDOLITE® MII

Hp/A Ratio Table 1

Up to 240/-/- fire resistance in accordance with the requirements of **BS 476: Part 21: 1987** (report no. SAS F010001) for **Vessels protection tested to Hydrocarbon curve at critical temperature of 427°C**

Hp/A	Cafco FENDOLITE® MII coating thickness when cured (mm)					
	30 minutes	60 minutes	90 minutes	120 minutes	180 minutes	240 minutes
30	14	15	18	22	30	38
40	14	17	21	26	35	44
50	14	18	23	28	38	48
60	14	19	25	30	40	51
70	15	20	26	31	43	54
80	15	21	27	33	44	56
90	16	22	28	34	46	58
100	16	22	28	35	47	59
110	17	23	29	35	48	60
120	17	23	30	36	49	—
130	17	24	30	37	49	—
140	17	24	30	37	50	—
150	18	24	31	37	51	—
160	18	24	31	38	51	—
170	18	25	31	38	52	—
180	18	25	32	39	52	—
190	18	25	32	39	53	—
200	18	25	32	39	53	—
210	18	25	32	39	53	—
220	19	26	33	40	54	—
230	19	26	33	40	54	—
240	19	26	33	40	54	—
250	19	26	33	40	54	—
260	19	26	33	40	55	—
270	19	26	33	41	55	—
280	19	26	33	41	55	—
290	19	26	34	41	55	—
300	19	26	34	41	56	—
310	19	26	34	41	56	—
320	19	27	34	41	56	—
330	19	27	34	41	56	—

Hp/A Ratio Table 2

Up to 240/-/- fire resistance in accordance with the requirements of **UL 1709** (Design No. XR719) for **'I' section of structural steel beam protection tested to Hydrocarbon curve**

Hp/A	Cafco FENDOLITE® MII coating thickness when cured (mm)				
	60 minutes	90 minutes	120 minutes	180 minutes	240 minutes
Profile protection	21	27	34	46	59
Box protection	21	24	24	37	58

NOTE: Figures are accurate at time of publication. Maximum critical temperatures for fully loaded structural steel members are normally accepted at 550ºC for four sided column protection and at 620ºC for three sided beam protection as a support to composite concrete floors.

Hp/A Ratio Table 3

Up to 240/-/- fire resistance in accordance with the requirements of **BS 476: Part 21: 1987** (report no. SAS F010001) for **'I' section of structural steel beam protection tested to Hydrocarbon curve at critical temperature of 550°C**

Hp/A	Cafco FENDOLITE® MII coating thickness when cured (mm)					
	30 minutes	60 minutes	90 minutes	120 minutes	180 minutes	240 minutes
30	14	14	14	17	22	28
40	14	14	16	20	26	33
50	14	15	18	22	29	36
60	14	16	20	24	31	39
70	14	17	21	25	33	42
80	14	17	22	26	35	44
90	14	18	23	27	36	45
100	14	19	23	28	38	47
110	14	19	24	29	39	48
120	15	20	25	30	40	49
130	15	20	25	30	40	50
140	15	20	26	31	41	51
150	15	21	26	31	42	52
160	16	21	26	32	42	53
170	16	21	27	32	43	54
180	16	21	27	32	43	54
190	16	22	27	33	44	55
200	16	22	27	33	44	55
210	17	22	28	33	44	56
220	17	22	28	34	45	56
230	17	22	28	34	45	56
240	17	23	28	34	45	57
250	17	23	28	34	46	57
260	17	23	29	34	46	57
270	17	23	29	35	46	58
280	17	23	29	35	46	58
290	17	23	29	35	47	58
300	17	23	29	35	47	59
310	17	23	29	35	47	59
320	17	23	29	35	47	59
330	18	24	29	35	47	59

NOTE: Figures are accurate at time of publication. Maximum critical temperatures for fully loaded structural steel members are normally accepted at 550ºC for four sided column protection and at 620ºC for three sided beam protection as a support to composite concrete floors.

For thickness calculations on hollow sections, cellular beams, castellated sections, composite floors, upgrading of concrete slabs and more complex structural situations, please consult Promat.

The following is a standard Architectural Specification for structural steel column and beam protection using Cafco FENDOLITE® MII. Please note that Cafco FENDOLITE® MII should be installed by a trained or approved applicator using appropriate and recommended equipment. The end user must determine the suitability of any particular design to meet the performance requirements of any application before undertaking any work. If in doubt, please first obtain advice from Promat.

The installation methods described herein are suitable for steel sections up to 686mm deep and 325mm wide. For larger section, please consult Promat.

Fire Exposure & Area of Application

Exposed faces of steelwork internal to building, for up to 240 minute fire resistance in accordance with the requirements of BS 476: Part 21: 1987 and/or UL 1709.(1)

Location

_____(2)

Type of Construction

_____ minute(3) fire resistance to Cafco FENDOLITE® MII one sided, two sided, three sided or four sided coating of structural steel columns and beams and/or sphere vessels.(1)

Spray Materials

Cafco FENDOLITE® MII in 20kg bags as supplied by licensed manufacturers of Promat International (Asia Pacific) Ltd.

Surface Preparation

The substrate to be coated should be clean, dry and free from dust, or any other condition preventing good adhesion.

Method of Application

Pre mix Cafco FENDOLITE® MII with water in suitable type of mixer and apply onto the surface of substrate by direct spraying. Material-water mixing ratio should be applied strictly in accordance with Promat's recommendations by a trained and approved applicator.

The application of Cafco FENDOLITE® MII is recommended by using a suitable spray head with adequate capacity of air compressor.

Follow-on Trades

Surface of coating materials to be finished off smoothly or with suitable top coat(4) in accordance with manufacturer's recommendations.

NOTE:
- (1), (4) delete as appropriate.
- (2) insert location, e.g. "sphere vessels to structural steel exterior", or provide steelwork drawing reference.
- (3) insert required fire resistance level (not exceeding 240 minutes).

Promat

For latest information of the Promat Asia Pacific organisation, please refer to www.promat-ap.com.

ASIA PACIFIC HEADQUARTERS

Promat International (Asia Pacific) Ltd.
Unit 19-02-01, Level 2 PNB Damansara
No.19 Lorong Dungun, Damansara Heights
50490 Kuala Lumpur
MALAYSIA
Tel: +60 (3) 2095 5111
Fax: +60 (3) 2095 6111
Email: spraysinfo@promat-ap.com

AUSTRALIA

Promat Australia Pty. Ltd.
1 Scotland Road
Mile End South, SA 5031
Tel: 1800 PROMAT (776 628)
Fax: +61 (8) 8352 1014
Email: spraysinfo@promat.com.au

New South Wales Office
Promat Australia Pty. Ltd.
Unit 1, 175 Briens Road
Northmead, NSW 2152
Tel: 1800 PROMAT (776 628)
Fax: +61 (2) 9630 0258
Email: spraysinfo@promat.com.au

Victoria Office
Promat Australia Pty. Ltd.
Suite 205, 198 Harbour Esplanade
Docklands, VIC 3008
Tel: 1800 PROMAT (776 628)
Fax: 1800 334 598
Email: spraysinfo@promat.com.au

Queensland Office
Promat Australia Pty. Ltd.
1/68 Lisgar Street
Virginia, QLD 4014
Tel: 1800 011 376
Fax: 1800 334 598
Email: spraysinfo@promat.com.au

CHINA

Promat China Ltd.
Room 506, Block A, Qi Lin Plaza
13-35 Pan Fu Road
510180 Guangzhou
Tel: +86 (20) 8136 1167
Fax: +86 (20) 8136 1372
Email: spraysinfo@promat-ap.com

Beijing Office
Promat North China
(Division of Promat China Ltd.)
Room 1507 Building 5, SOHO Xiandaicheng
No.88 Jianguo Road, Chaoyang District
100022 Beijing
Tel: +86 (10) 8589 1254
Fax: +86 (10) 8589 2904
Email: spraysinfo@promat-ap.com

For Promat International and its worldwide group, see www.promat-international.com.

HONG KONG

Promat International (Asia Pacific) Ltd.
Room 1010, C.C. Wu Building
302-308 Hennessy Road
Wanchai
Tel: +852 2836 3692
Fax: +852 2834 4313
Email: spraysinfo@promat-ap.com

INDIA

Promat (Malaysia) Sdn. Bhd.
(India Representative Office)
610-611, Ansal Imperial Tower
C-Block, Community Centre
Naraina Vihar, Naraina
New Delhi 110028
Tel: +91 (11) 2577 8413
Fax: +91 (11) 2577 8414
Email: spraysinfo@promat-ap.com

Bangalore Office
Promat (Malaysia) Sdn. Bhd.
(India Representative Office)
Cabin No. BC-10
Oculus Workspaces, No.66/1, 2nd Floor
Coles Road, Frazer Town
Bangalore 560005
Tel: +91 (80) 4031 4151
Fax: +91 (80) 4125 2135
Email: spraysinfo@promat-ap.com

MALAYSIA

Promat (Malaysia) Sdn. Bhd.
Unit 19-02-01, Level 2 PNB Damansara
No.19 Lorong Dungun, Damansara Heights
50490 Kuala Lumpur
Tel: +60 (3) 2095 8555
Fax: +60 (3) 2095 2111
Email: spraysinfo@promat-ap.com

SINGAPORE

Promat Building System Pte. Ltd.
10 Science Park Road, #03-14 The Alpha
Singapore Science Park II
Singapore 117684
Tel: +65 6776 7635
Fax: +65 6776 7624
Email: spraysinfo@promat-ap.com

SOUTH KOREA

Promat International (Asia Pacific) Ltd.
(Korea Branch Office)
Room 406, 811-2
Yeoksam-dong Gangnam-gu
Seoul 135080
Tel: +82 (70) 7794 8216
Email: spraysinfo@promat-ap.com

Your local Promat supplier

- The technical data provided in this publication is based on mean values prevalent at time of publication and is thus subject to fluctuation. It should not be regarded as a guarantee to system performance.
- All data contained herein conforms to and frequently surpasses generally accepted fire protection standards recognised by most professional fire science practitioners and regulatory authorities worldwide. The same general principle is equally applicable to all Promat products and systems. Promat has access to a considerable body of test authentication data and this can be provided on a complimentary basis upon request. It should be noted however that this publication replaces all previous editions in its entirety. Any form of reproduction by any means – manual, electronic, digital or otherwise – is strictly prohibited and subject to prior approval in writing from Promat. All rights related or connected to the Promat logo, Promat registered trademarks, featured illustrations, written information and technical reports in this publication are the sole, exclusive and copyright property of Promat and its legal partner companies.