

ContraFlame® MS400 Underdeck and Bulkhead

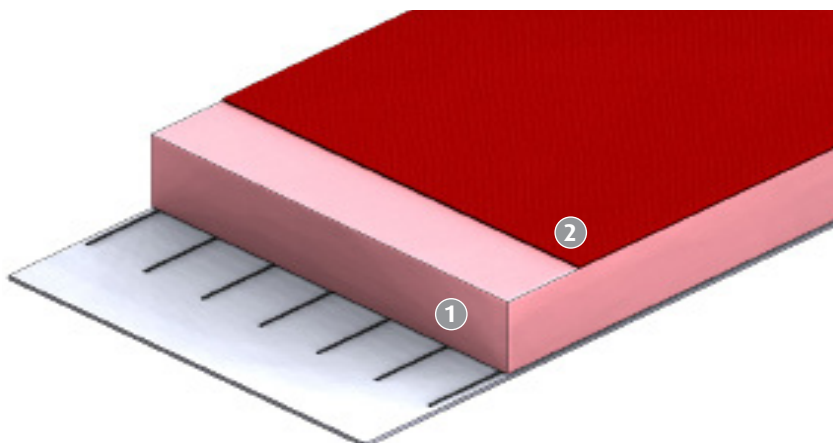
Lightweight, integrated thermal insulation, passive fire protection (PFP) unique phenolic foam, GRP system

General description

ContraFlame® MS400 is a lightweight multifunctional composite system designed to protect topside facilities and platforms underdeck by providing a lightweight, integrated thermal insulation, passive fire protection (PFP) tested and DNV certified to H60, H120. Additional testing including jet fire (HHF), blast overpressure and acoustic (-50dB) . Advanced Insulation provide a single point responsibility on the supply and site installations including offshore hock-up. Weight reduction, system robustness and unparalleled design life led to multiple MS400 installation scope covers areas ranging from 5,000m²-10,000m² with weight reduction of 80-120 tonnes vs traditional systems.

Product construction

ContraFlame® MS400 system is based on unique syntactic phenolic foam and phenolic glass reinforced laminate. Pre-formed MS400 panels (1m x 1m) at a range of thickness 70-107mm are bonded to the underdeck and followed by the application of GRP laminate (3mm). The complete installation is jointless.



1) MS400 Core	Nominal density: 80kg/m ³ Thickness: 70mm to 107mm Thermal conductivity: 0.032 W/m ² K Specific heat: 151 KJ/m ³ K @ 60°C
2) D2004 GRP Laminate	Nominal density: 1300 Kg/m ³ Nominal thickness: 2mm - 3 layer GRP laminate

System properties

Parameter	System Value	Description
Panel nominal dimensions	1000mm x 1000mm	Preformed panels
Panel nominal thickness	70mm to 107mm	Preformed panels
Hydrocarbon fire rating	Up to H120	DNV type approval certification
Large scale jet fire	Up to JF60	High heat flux 356 kW/m ²
Acoustic reduction	-50dB	ISO 10140, 8mm steel plate

Typical applications

- Offshore lightweight, thermal insulation and passive fire protection:
 - H120 Hydrocarbon protection underdeck: 107mm panel – DNV type approved
 - H60 Hydrocarbon protection bulkhead: 70mm panel – DNV type approved
- Underdeck acoustic insulation
- Bulkhead Jet fire/ pool fire barrier and thermal insulation
- Free standing/ supported fire and blast wall

Performance and properties

MS400 has been tested to the following fire scenarios:

Location	Certification	Testing standard
Underdeck	H120 DNV type approval certificate F-20594 (MS400 thickness 107mm) H120 test report 13-J-674	In accordance with IMO 2010 FTP Code Part 3 with the furnace temperature following the hydrocarbon curve specified in EN 1363-2:1999 .
Bulkhead	H60 DNV type approval certificate TAF000003R (MS400 thickness 70mm) H60 Test Report 14-J-002305	In accordance with IMO 2010 FTP Code Part 3 with the furnace temperature following the hydrocarbon curve specified in EN 1363-2:1999 .

Thermal properties

MS400 can be manufactured in varying thicknesses based on the required U-Value:

Panel nominal thickness (mm)	U value (W/m ² K)	Weight (Kg/m ²)
70	0.45	5.6
80	0.39	6.4
90	0.35	7.2
100	0.31	8.0
107	0.30	8.6

Hydrocarbon fire testing (H rating)

Duration (minutes)	H60 bulkhead 73mm (average temp rise °C)	H120 underdeck 110mm (average temp rise °C)
15	0	1
30	1	-
60	31	36
123	-	91

Large scale jet fire (HHF) test performance (heat flux at 356 kW/m²)

Duration (minutes)	(max temp rise °C)	(average temp rise °C)
15	0.9	0.4
30	1.9	1.0
45	4.8	2.1
60	39.3	8.4
65.25 (test stop)	97.8	16.2

Materials have been tested for combustibility, flammability and toxicity:

Combustibility	Standard
MS400 Determination of burning behaviour by oxygen index	In accordance with the procedure specified in BS ISO 4589-2:1999 . The material shows an oxygen index of 29.5%
D2004 Determination of burning behaviour by oxygen index	In accordance with the procedure specified in BS ISO 4589-2:1999 . The material shows an oxygen index of 72%
D2004 Laminate system	BS 6853:1989 Annex D.8.4 (smoke density) – Relates to toxic fumes release for use on passenger carrying trains. Smoke density measurements of Ao(on) average= 0.338 and Ao(off) average= 0.389

Performance and properties

MS400 has been tested to the following fire scenarios:

Flammability	Standard
MS400 Heat release, ignitability, mass loss and visible smoke release	ISO 5660-1:1993 Reaction to fire Part 1 & ASTM E1354-92 : Standard test for heat and visible smoke release. After each case sustained ignition did not occur at an irradiance level of 50KW/m²
MS400 Classification of the surface spread of flame	Surface spread of flame BS 476 Part 7, 1997 . Test result indicated class 1
Toxicity	Standard
D2004 Laminate system	BS6853:1999 Annex B – Relates to toxic fumes release for use on passenger carrying trains. Weighted summation index, R value (toxic fumes) , was determined to be 0.45

Additional resources

Resource	Documents
Component Technical Data Sheets	ContraFlame MS400: Phenolic syntactic foam ContraFlame D2004/3: laminate Resin AMCat3 Catalyst: laminate catalyst

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Contact information

For further details about Advanced Insulation systems and services, please contact your nearest project management office:

Advanced Insulation Limited
Quedgeley West Business Park, Bristol Road, Gloucester, GL2 4PA, United Kingdom

+44 (0)1452 880880
info@advancedinsulation.com
www.advancedinsulation.com

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