

ContraFlame®

PFP

Is a lightweight multifunctional composite coating system; designed to provide integrated thermal insulation, hydrocarbon pool fire protection up to H240 and jet fire protection up to JF120. In addition, ContraFlame® PFP provides impact and abrasion protection from splash zone to topside.

With over 25 years of upstream offshore and near-shore track record in protecting structural, architectural and processing elements, ContraFlame® PFP; unique syntactic phenolic foam and phenolic glass reinforced laminate is truly passive system. It does not undergo any chemical or physical change during exposure to heat, fire or cryogenic spill and is suited for operation in a wide range of temperatures from -196°C to +185°C.

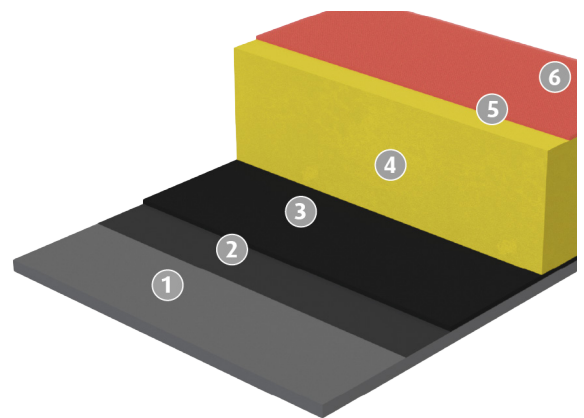
ContraFlame® PFP can be applied as a fully bonded system to protect risers, vessels and steel structures. It can also be pre-formed as enclosures and half shells to protect pipelines, valves and flanges.

Ambient cure coupled with manual application means that ContraFlame® PFP can be applied anywhere in the world, including offshore facilities. ContraFlame® PFP is designed for life of field and requires zero maintenance during operation.

Product construction

The fully bonded system comprises ContraTherm® tiecoat, a single layer of unique ContraFlame® C50x8 phenolic syntactic foam and D2004 phenolic laminate.

1. Blasted steel substrate (e.g. SA 2.5)
2. Approved primer (typically two-pack epoxy)
3. ContraFlame® tiecoat (150 – 300 micron)
4. ContraFlame® C50x8 (min. 10mm – max. 90mm)
5. ContraFlame® D2004 laminate (min. 2.4mm – typically 4 layers)
6. Approved topcoat



Product characteristics

- Designed for an operational life over 25 years
- Operational temperature range (-196°C to +185°C)
- Jet fire JF120 and pool fire H240 rating
- DNV, Lloyds, BV and ABS approved
- 4.2 bar overpressure blast rated
- Closed cell structure
- Robust energy absorbing structure
- Excellent water resistance.

Typical applications

- Production risers, riser clamps, riser jet fire deflectors
- Vessels, saddles
- Separators, hot slug catchers
- Process pipe work
- Underdecks, LNG decks, bulkheads, spill trays.

Performance and properties

Typical general characteristics	Value
Density (cured)	C50x8 – 270–330 kg·m ⁻³ , D2004 – 1,450 kg·m ⁻³
Operating temperature range	–196°C to +185°C
Thermal conductivity @ 25oC	C50x8 – 0.05 W·m ⁻¹ ·K ⁻¹ , D2004 – 0.24 W·m ⁻¹ ·K ⁻¹
Specific heat capacity	1.5 Jg ⁻¹ ·°C ⁻¹
Thermal expansion coefficient	C50x8 – 20.7 x 10 ⁻⁶ , D2004 – 23.96 x 10 ⁻⁶
Young's modulus	C50x8 – 465 MPa, D2004 – 5660 MPa
Tensile strain to failure	C50x8 – 1%, D2004 – 1.65%
Tensile strength	C50x8 – 5.15 MPa, D2004 – 61.6 MPa
Shear strength / modulus	C50x8 – 0.76 MPa / 121 MPa
Compressive strength	5 MPa
Compressive resistance of the system	18.3 MPa
Water absorption	<1% by weight

Burning performance

Smoke, toxicity, combustibility, flame spread, oxygen Index, temperature Index, heat release

Test	Acceptance criteria	D2004	C50
Def stan 02-711 smoke density	Index less than 50	N/A	8.71
Def stan 02-713 toxicity index	Index less than 5	N/A	1.41 – No HF, HCl or HBr was generated during the test
BS 476 Part 7 spread of flame	Class 1	N/A	Class 1
BS ISO 4589-2 oxygen index	Index in excess of 30%	72%	N/A

ContraFlame® PFP planar jet fire rating to ISO 22899-1:2007

Total nominal thickness (mm)	C50x8 thickness (mm)	D2004 (mm)	Temperature rise (°C)			
			J30	J60	J90	J120
14	10	4	297.5	381.2	399.5	N/A
~	30	4	97	256	309	321
90	86	4	8	20	42	118

ContraFlame® PFP tubular jet fire data (Up to 0.5m dia) to ISO 22899-1

Total nominal thickness (mm)	C50x8 thickness (mm)	D2004 (mm)	Temperature rise (°C)			
			J30	J60	J90	J120
34	30	4	56	205	348.5	N/A
48.5*	42.5	6	44	82	N/A	N/A
84	75	9	71	124	181	234

*Half shell system

ContraFlame® PFP hydrocarbon fire rating to UL1709 up to 240 minutes

Critical temperature rise (°C)	Total ContraFlame® system thickness / Fire rating	
	55mm	75mm
140	H60	H60/H120
180	H60	H60/H120
300	H60	H60/H120/H180
350	H60/H120	H60/H120/H180
400	H60/H120	H60/H120/H180
427	H60/H120	H60/H120/H180/H240
450	H60/H120	H60/H120/H180/H240
500	H60/H120	H60/H120/H180/H240
538	H60/H120	H60/H120/H180/H240
550	H60/H120	H60/H120/H180/H240

ContraFlame® hydrocarbon fire resistance performance to UL1709

ContraFlame® system thickness (mm)	C50x8 thickness (mm)	D2004 nominal thickness (mm)	Temperature rise (°C)			
			60 mins	120 mins	180 mins	240 mins
55	50	3-5	72	335	-	-
75	70	3-5	16	82	227	407

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