DNV·GL

Certificate No:
TAF00000G7

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Jet Fire Protection

with type designation(s)
Pyroclad X1 - Jet fire

Issued to
Carboline Company
St. Louis MO, United States

is found to comply with
DNV GL offshore standards

Application :

Approved for use as a jet fire protection of structural I and hollow sections and H-class divisions.

Product approved by this certificate is accepted for installation on all vessels classed by DNV GL.

This Certificate is valid until **2021-12-02**.

Issued at **Høvik** on **2016-12-03**

for **DNV GL**

DNV GL local station: **Houston**

Approval Engineer: **Tomasz Werchowicz**

Petter Langnes
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

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Job Id:
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Product description

"Pyroclad X1– Jet fire"
The system is composed by a primer covered by a 2 part epoxy mastic fire barrier (Pyroclad X1). The intumescent coating is reinforced at approx. 2/3 of desired thickness with high temperature fabric (HTF) with overlap or steel wire mesh (GHC) fixed with pins.

Wet density of Pyroclad X1 is 1035-1110 kg/m^3.

The materials are manufactured at the premises of Carboline Company, 95 Airpark Vista Blvd. Dayton, NV 89403, USA.

Application/Limitation

Any project specific design solutions arrived at on basis of this certificate are to be further validated by project specific approvals carried out by the appointed verifying authority for each project in each case at the detail engineering stage.

Minimum fabric overlap shall be not less than 150 mm.

Thickness of "Pyroclad X1" for jet fire exposure may be determined by adding a "Jet fire erosion factor" as shown in Table 1-3 to the thickness required for hydrocarbon pool fire as given in the DNV Type approval certificates for H-class divisions (DNVGL TAC TAF00000G2 and TAF00000G3 as relevant), structural I-sections (DNVGL TAC TAF00000G5) or structural hollow-sections (DNVGL TAC TAF00000G4).

Table 1: Additional thickness of "Pyroclad X1" system to be applied to account for jet fire erosion for "H-class" division:

H-class	Jet fire erosion factor [mm] *)				
	0-30 minutes	31-60 minutes	61-90 minutes	91-120 minutes	121-150 minutes
pDeck					
Bulkhead					

*) Total minimum thickness shall not be less than 6,5 mm.

Table 2: Additional thickness of "Pyroclad X1" system to be applied to account for jet fire erosion for "I" sections:

Core temp. [°C]	Jet fire erosion factor [mm] *)				
	0-30 minutes	31-60 minutes	61-90 minutes	91-120 minutes	121-150 minutes
200					
250					
300					
350					
400					

*) Total minimum thickness shall not be less than 3,0 mm

Table 3: Additional thickness of "Pyroclad X1" system to be applied to account for jet fire erosion for "hollow" sections:

Core temp. [°C]	Jet fire erosion factor [mm] *)				
	0-30 minutes	31-60 minutes	61-90 minutes	91-120 minutes	121-150 minutes
200					
250					
300					
350					
400					

*) Total minimum thickness shall not be less than 3,0 mm

The protective coating is not defined as non-combustible, and should not be used in accommodation or in enclosed areas.

The approval refers only to the fire resistance properties of the system.

The application of the protective coating is to be performed in accordance with the manufacturer's application manual. Alternative primers and topcoats may be used provided they have been tested and approved by the manufacture.

Each product is to be supplied with its manual for application and maintenance.

Type Approval documentation
Certification in accordance with Class Programme DNVGL-CP-0338, October 2015.

Pyroclad X1 Fire Barrier System Application Manual, Rev.0, dated February 2013 from Carboline Co., St. Louis, US.

Test Report No. 100463890SAT-016 dated 16th June 2012 from Intertek Evaluation Center, Texas, US

Test Reports for divisions:
- No. 100515557SAT-001, Rev.1 dated 15th June 2012,
- No. 100561155SAT-001, Rev.1 dated 15th June 2012,
- No. 100641829SAT-001B, Rev.1 dated 15th June 2012,

all from Intertek Evaluation Center, Texas, US.

Test Reports for I-sections:
- No. 100515557SAT-001, Rev.1 dated 15th June 2012,
- No. 100561155SAT-001, Rev.1 dated 15th June 2012,
- No. 100888737SAT-011B, dated 29th November 2012,
- No. 100888737SAT-001A, dated 29th November 2012,
- No. 101464945SAT-009B, dated 30th May 2014,

all from Intertek Evaluation Center, Texas, US.

Test Reports for hollow sections:
- No. 101073513SAT-002B, dated 30th March 2013,
- No. 100924826SAT-002B, dated 27th December 2012,
- No. 100924826SAT-002A, dated 27th December 2012,

all from Intertek Evaluation Center, Texas, US.

Technical Notes:
- 011313a dated 3rd January 2013, (for hollow sections)
- 060214 dated 2nd June 2014, (for I-sections)
- 120312 dated 3rd December 2012, (for I-sections)
- 071812 dated 18th July 2012, (for divisions)

all from Carboline Co., St. Louis, US.

Tests carried out
Tested according to ISO 22899-1: 2007.

Marking of product
The product or packing is to be marked with name of manufacturer, type designation and fire technical rating.

Periodical assessment

DNV GL's surveyor is to be given permission to perform Periodical Assessments at any time during the validity of this certificate and at least every second year. The arrangement is to be in accordance with procedure described in Class Programme DNVGL-CP-0338, Section 4.