



Bilfinger Industrier Norge AS

LAMBDA F BOX EPOXY

EPOXY BASED INTUMESCENT
FIREPROOFING TECHNOLOGY

Key Product Benefits

- Extreme performance
 - Low Jet Fire and Hydro-Carbon Pool Fire Thickness Requirements
 - Low installed weight
 - High compressive strength
 - High Impact resistance
 - High Shore D hardness
 - Low Water absorption (0.2%)
- Maintenance free – stainless steel surface
- Easy to install, remove, inspect, and re-install
- Pre-fabricated solution → low installation cost
- Low Life Cycle Cost
- Slim building – typically less than 15mm
- Tested and Certified according to
 - IMO 2010 FTP Code Part 3
 - ISO 22899-Part 1
 - OTI 95634

Passive Fire Protection – Bilfinger Lambda Products

- Lambda is the brand name used on all insulation products marketed by Bilfinger Oil & Gas. All products are designed and documented to be used in high risk environments within the oil & gas industry, nuclear power plants and process industry. The products have been developed and tested as a consequence of the rigorous requirements oil & gas industry, meeting Norsok and ISO standards.
- All Lambda products are highly recognized among professional engineers as "state of the art" insulation systems. Each product is tailor made and pre-fabricated to fit the exact valve, flange or equipment to be protected. In addition to exceeding functional requirements, all products are designed for quick and easy removal and re-installation with a minimum use of personnel and tooling. Bilfinger Lambda is continuously and proactively recognizing customer demands and developing solutions to meet these requirements

Lambda F Box Epoxy

Lambda F Box Epoxy is an insulation system that provides fire protection for valves, flanges, actuators and other equipment.

The Lambda Fire Box is fully tested to meet the strictest on- and offshore specifications for oil and gas installations. This system is built up by insulation material and enclosed by stainless steel (AISI 316). The pieces are fastened with toggle clips in the same material and locked with security pins. The Lambda F Box Epoxy can be equipped with a drain plug as required for top side installations per Norsok standard and inspection hatch for easy access to the protected object.

The system has been tested successfully for blast overpressure at 900 millibar and jet fire with a heat load up to 250kW/m².

Epoxy Based Jetfire Protection

Pyroclad X1 is the latest breakthrough in epoxy based intumescent fireproofing technology. Pyroclad X1 is designed to provide both jet fire and hydrocarbon pool fire protection for oil and gas installations. This innovative new epoxy intumescent system withstands the harsh environmental conditions of coastal and offshore environments and successfully passed the Norsok M-501 environmental test program without a topcoat. Its unsurpassed weathering characteristics ensure long performance and integrity of the system throughout the life span of the coating. The Bilfinger Lambda F Box epoxy with Pyroclad X1 has an exterior sheet metal cladding, further enhancing the longevity of the product, and makes it maintenance free.

The Bilfinger Lambda F Box Epoxy with Pyroclad X1 has been extensively tested and certified in jet- and hydrocarbon fire to IMO 2010 FTP Code Part 3, ISO 22899-Part 1 as well as explosion tests

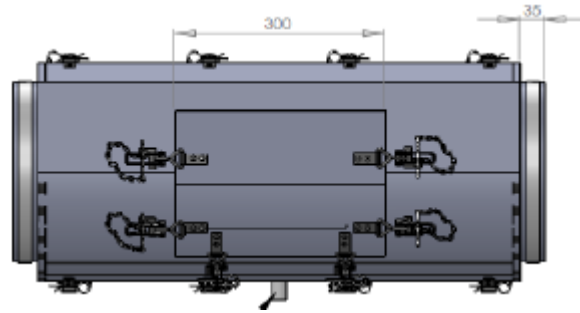




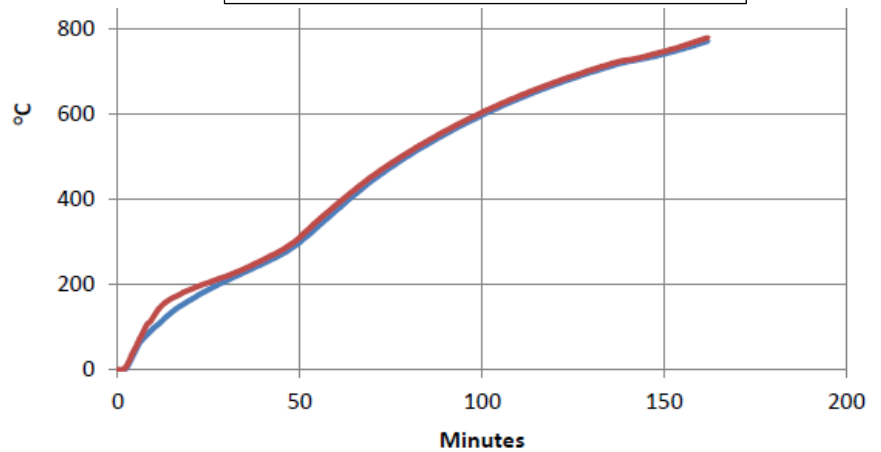
Design and Test results

Lambda F Box Epoxy with Pyroclad X1 are easily installed and are removable to allow for inspection and maintenance. The toggle clips allow for quick and easy installation without the use of tools. The stainless steel surface is maintenance free, and the inside is lined with Pyroclad X1. In case of a fire, Pyroclad X1 material reacts to protect the object. The Pyroclad X1 material is moisture resistant, with an absorption rate of 0.2%.

Lambda F Box Epoxy with Pyroclad X1 is tested with drain plug and inspection hatch meeting industry best practice design.



SP Fire Research – Test Results – 9mm



Completed Tests	Results	Test standard	Test Institue	Certification
Hydrocarbon fire - ability to withstand constant 1200°C	Over 60 minutes	IMO 2010 FTP Code Part 3	SP Fire Research AS (Sintef)	DNV GL
Jetfire - 250kW/m2 - equivalent to 0.3kg Propane / second	Over 75 minutes	ISO 22899-Part 1	SP Fire Research AS (Sintef)	DNV GL
Explosion Tests	Up to 0.9 bar	Explosion Tests	Gexcon	DNV GL
MS Test - test resistance to mechanical stress	Passed	Internal	Internal	N/A
Life Cycle Tests	Passed	Norsok M-501 System 5A Rev. 6		DNV GL

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