



## 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 Flex BoltCare

Lambda F Flex BoltCare is a flexible jacket designed for fire protection for flanges and bolts where the pipe itself does not require insulation. Lambda BoltCare is tested for jet fire with a heat load of 350 kW/m<sup>2</sup> (OTI 95 634) and extreme weather. This is an advanced and flexible product with regards to inspection & maintenance on flanges.

Lambda BoltCare is fully tested to meet the strictest on- and offshore specifications for oil and gas installations. Our BoltCare system is built up by a core of insulation material and stainless steel foil, enclosed by a specially developed silicone fabric. The pieces are joined with Velcro in the overlap and the system is secured with stainless steel bands, ensuring the integrity of the insulation properties.

The system has been tested successfully for blast overpressure at 1.2 bar and jet fire with a heat load of 350kW/m<sup>2</sup> (1350°C). Fabrics used in all our flexible jacket systems have been tested for weather resistance in cooperation with DNV GL, and can also be equipped with drain plug as required for top side installations per NORSOK standard. All seams are sewn with Kevlar thread and sealed with silicone, with no penetrations to the fabric that can cause water ingress.

In addition to exceeding functional requirements, all Lambda products are designed for quick and easy removal and re-installation with the use of minimum personnel, personal protection equipment and tooling.

Bilfinger Industrier Norge AS

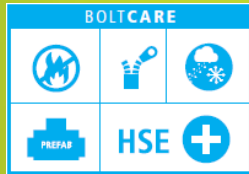
## LAMBDA F FLEX BOLT CARE

FLEXIBLE JACKET BOLT CARE  
FIREPROOFING TECHNOLOGY

### Key Product Benefits

- Extreme performance
  - Slim building
  - Low installed weight
  - High Impact resistance
  - No Water absorption
- HSE: No toxic ingredients, no ceramic fibres
- Maintenance free – tough silicone fabric exterior, stitched with Kevlar thread
- Easy to install, remove, inspect, and re-install
- Pre-fabricated solution → low installation cost.
- Low Life Cycle Cost
- Slim building – from 8mm insulation thickness for fire-rated to 30mm for HD jet-fire rated
- Tested and Certified according to
  - IMO Res. A.754(18)
  - ISO 22899-Part 1
  - Extended OTI 95 634
  - Norsok R-004 and IACS UR S.14.2.3
- Tested for blast overpressure to 1200 millibar (1.2 bar)





## Design and Test results

The Bilfinger Lambda F Flex BoltCare system has been extensively tested and certified by DNV GL. The following test have been carried out:

- Hydrocarbon fire to IMO Res. A.754(18), ISO 834-Part 3 / NS-EN 1363 Part 2
- Jet-fire 250 kW/m<sup>2</sup> to ISO 22899-Part 1
- Jet-fire 350 kW/m<sup>2</sup> to Extended OTI 95 634
- Explosion tests have been conducted by Gexcon, The system has been successfully tested for blast overpressure at 1200 millibar (1.2 bar)
- Weatherproofing test has been completed to 3x10<sup>5</sup> PA, according to Norsok R-004 and IACS UR S.14.2.3.

BoltCare is produced with a layer of silicone fabric, a rustfree foil to protect against jetfire erosion, and an expanding fabric interior.

The Lambda F Flex Boltcare is installed with a Velcro fastening strip, and tightly secured by steel bands. On the HD Boltcare solution the steel bands are fitted through a fabric sleeves to protect the jacket fabric from damage.



Completed Tests	Results	Test standard	Test Institue
Jetfire - 250kW/m <sup>2</sup> - equivalent to 0.3kg Propane / second	Up to 40 minutes	ISO 22899-Part 1	SP Fire Research AS (Sintef)
Jetfire - 350kW/m <sup>2</sup> - ability to withstand 1350°C jetfire	Up to 38 minutes	Extended OTI 95 634	SP Fire Research AS (Sintef)
Explosion Tests	Up to 1.2 bar	Explosion Tests	Gexcon

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