

WISTHeat is a distributed high temperature sensor based on Fiber Bragg Grating (FBG) technology. The extreme long term stability of less than 1°C per year at 650°C makes it ideal to use in harsh environment industries and processes. By multiplexing several WISTHeat thousands of sensing elements covering small or large areas can be accomplished. Compared to thermocouples WISTHeat provides faster response time, improved accuracy, smaller form factor and insensitivity to EMI.

High Temperature Operation

The long term stability up to 650°C – even for the most advanced FBG arrays – can be guaranteed using a unique grating writing and assembly process. The highest temperature range is available with steel buffer and up to 300°C is available also with polyimide buffer.

High Spatial Resolution

Each sensor handles 1 to 100 FBGs. The number and placement of FBGs along the WISTHeat sensor is fully configurable. Standard configuration is equidistant spacing of 5 mm. Despite the high FBG count and customizable FBG spacing the WISTHeat sensor is produced without any splices between the FBGs.

Rugged

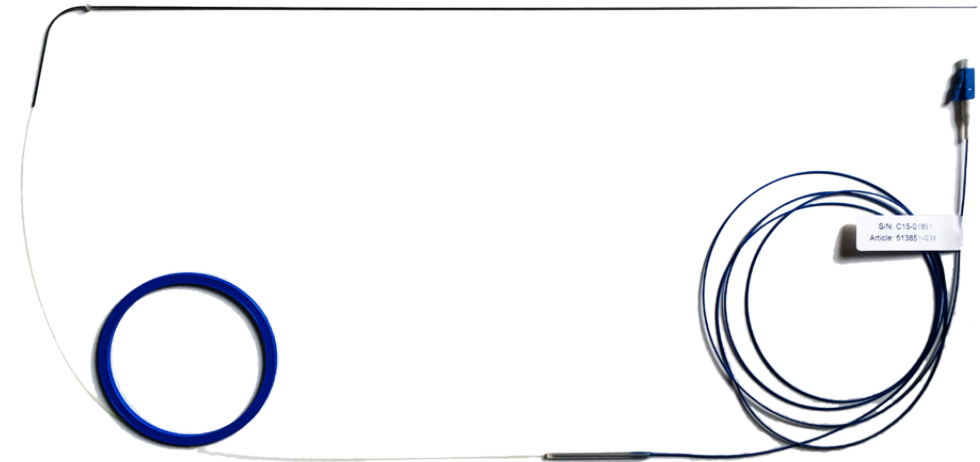
All WISTHeat sensors can be designed for extreme temperature, ionizing radiation, mechanical vibration, dust or EMI. We have experience of suitable fiber coatings, buffer materials, connectors and cabling.

Fast Response Time

Advanced packaging technology allows for a thermal constant of 70 ms for our standard package. The fast response time is also valid for the most advanced configuration with regards to sensor density and temperature operation.

Small Form Factor

WISTHeat sensors can be installed in industries where it previously has not been possible to measure. Outer diameter with steel capillary is standard 1.5 mm and optional down to 250 µm.



Customized WISTHeat with 70 FBGs for a 550 °C industrial process

Key Features

- Customizable sensor number and spacing
- High temperature operation
- Numerous package options to suit your application
- Splice-free array
- Uniquely identifiable sensors

FBG Advantages

- Longevity – resistant to lightning, corrosion, EMI
- Passive – no spark hazard, no power
- Multiplexing – high sensor count, multiple arrays, long range
- Versatility – extremely small, light weight
- Calibration – self calibrating



High Temperature FBG Sensor for Harsh Environments

PROXIMION

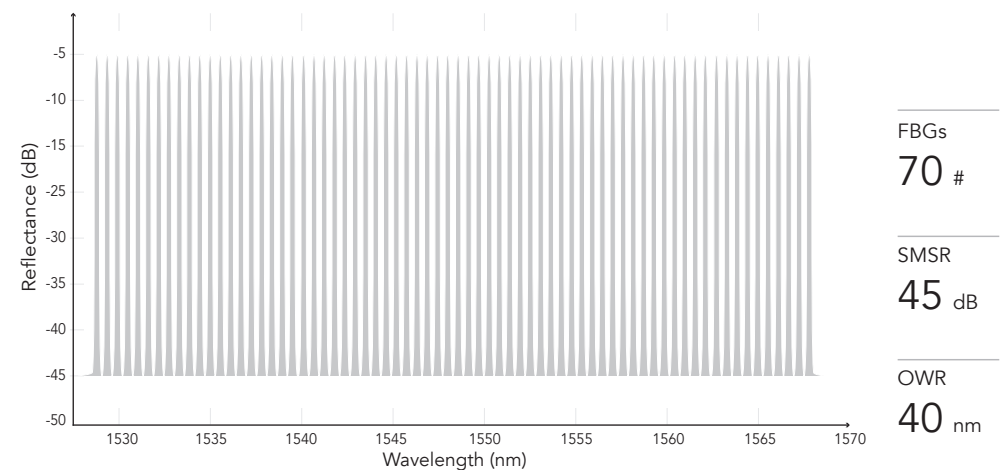
Physical Properties	Typ	Min	Max	Comment
Number of FBGs per fiber	25	1	100	Max value limited by interrogator BW
FBG length	10 mm	1 mm	10000 mm	Continuous FBG can be up to 10 m
Operating Temperature Range		-45 °C	+250 °C	Standard temperatur range
		-45 °C	+450 °C	Extended temperatur range
		-45 °C	+650 °C	High temperature range
Thermal response	7.5 pm/°C			-50-0 °C
	10.0 pm/°C			0-100 °C
	11.8 pm/°C			100-200 °C
	13.3 pm/°C			200-300 °C
	14.4 pm/°C			300-400 °C
	15.1 pm/°C			400-500 °C
	15.5 pm/°C			500-600 °C
Response time	16.0 pm/°C			600-700 °C
	70 ms			Time to reach 63 % from ice to boiling water

Package	Typ	Min	Max	Comment
Material	Stainless steel 304 or 316			Hermetic package
	Silica, Teflon or PEEK			Non-hermetic package
Package diameter	0.8 mm	0.25 mm	2 mm	Hermetic package
	1.5 mm	0.4 mm	6 mm	Non-hermetic package
Fiber pigtail length	1 m	0.1 m	10 m	Connector optional
Fiber pigtail type	SMF28e compatible			
Fiber pigtail coating	Acrylate or polyimide			
Fiber pigtail buffer	900 µm	none	2 mm	Optional with connector
Fiber pigtail bend radius	17 mm	7.5 mm		Optional bend-insensitive fiber
Connector type	SC/FC/LC house, UPC/APC polish			Standard and acrylate coating
	E2000/MU/ST/LSA/ARINC			On request

Optical Properties	Typ	Min	Max	Comment
Peak reflectivity	70 %	0.1 %	99.9999 %	FBG excl. splice and connector
Transmission Attenuation	5 dB	< 0.1 dB	> 60 dB	T > 60 dB estimated from peak width
FWHM (-3dB point)	0.15 nm	0.03 nm		Typical value for R = 70 %.
	(-10dB point)	0.2 nm	0.04 nm	FWHM increase with increasing
	(-20dB point)	0.3 nm	0.05 nm	reflectivity
	(-30dB point)	0.5 nm	0.1 nm	
Isolation/SMSR	45 dB	10 dB	50 dB	Closely spaced FBG-arrays may overlap
Wavelength range	1550 nm	1527 nm	1572 nm	Sensors for WistSenseUltra
		1510 nm	1590 nm	Sensors for WistSenseLight
		1250 nm	1650 nm	Third party Interrogator

Long Term Stability	Typ	Min	Max	Comment
Wavelength drift (Hermetic package only)			0.1 °C/yr	Standard @250 °C
			1.0 °C/yr	Extended @450 °C
			1.0 °C/yr	High @650°C

Custom WISTHeat with 70 FBGs



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