

Fiber in Metal Tube | Optical and sensing link

General Datasheet

 Distributed Temperature Sensing

 Distributed Acoustic Sensing

 FBG based point sensing

Description

Fiber in Metal Tubes (FIMT) manufactured by NBG are designed in a loose tube construction to protect the integrated optical fibers against mechanical stress, hydrogen and other environmental influence in order to provide maximum optical lifetime and highest sensing accuracy for their application. Produced in Austria and by the highest quality standards, NBGs Fiber in Metal Tubes meet and exceed the industrial requirements. A high degree of design flexibility allows a best fit approach, ensuring enhanced efficiency in the application.

Typical Applications

- Optical link for Umbilical, HV/MV/LV cables
- Subsea telecommunication cables
- Part of OPGW / OPPC cables
- Sensing element for bigger cable assemblies
- Downhole cables for Oil & Gas market
- Optical core element for all kind of harsh environment applications

General Characteristics

Outer diameter, mm (inch)	1.10 - 7.00 (0.043 - 0.276)
Wall thickness, mm (inch)	0.125 - 0.300 (.0049 - .012)
Max. cont. length, km (kft)	up to 50 (164)
Min. bending radius	20x OD
max. fiber count	up to 192 in a single tube
Fiber type	Single Mode, Multi Mode and combinations

Typical Tube Sizes

Diameter available in steps of 0.05/0.10mm. Please reach to out to NBG if you need a specific outer diameter.

OD FIMT mm inch	max. amount of fiber	
	250µm OD	200µm OD
1.10 (0.043)	2	2
1.25 (0.049)	4	4
1.70 (0.067)	6	8
1.80 (0.071)	8	12
2.20 (0.087)	16	24
2.40 (0.094)	24	36
2.75 (0.108)	30	42
2.85 (0.112)	30	48
2.90 (0.114)	36	48
3.30 (0.130)	48	64
3.60 (0.142)	56	72
4.00 (0.157)	64	80
4.50 (0.177)	80	96
5.30 (0.209)	144	192

Filling Compound

Thixotropic gels can be used to lock the fiber in place, ensuring stable excess fiber length and blocks water ingress. Market leading performance for filling degree of gel ensures full compliance with EN60694-1-22 method E5. Hydrogen absorbing additives can be used to ensure no hydrogen infused darkening, ensuring long term reliability. Options for selection the suitable gel include the amount of hydrogen scavenging and maximum temperature in application with up to 300°C.

Available Steel Material

Starting with standard stainless steel materials such as 304 for common applications with limited corrosive environment, various stainless steel materials can be chosen by the customer to fit the applicational requirements. Higher grade materials such as 316L are common in subsea applications while nickel alloys such as 625 and 825 are standard in O&G upstream.

Available steel material

Common Stainless Steel		Nickel Alloys	
304	1.4301	Alloy 625	2.4856
304L	1.4306	Alloy 825	2.4858
316L	1.4404	Invar 36	1.3912
316Ti	1.4571		

Mechanical Characteristics

FIMT are the most common construction whenever harsh environment conditions and small form factors comes into play. Mechanical tests such as bending, repeated bending, kink, twist, crush, impact and hydrostatic pressure are defined within standard EN60694 and can be requested.

Coloring and Bundling Options

Fiber coloring done based on EIA/TIA-598-C, DIN VDE V 0888, DIN IEC 60304 or on customer request. Bundling with colored yarns, ring marking on fiber and outer tube marking (meter marking, ring code) can be chosen for identification.

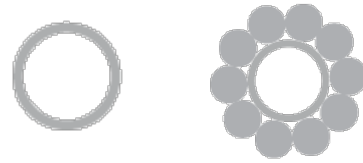
Additional Metallic Layers

Up to 5 additional metallic layers can be chosen for better tensile strength, stiffness, crush and impact resistance. Thin or thick wall aluminum layers add cross conductor resistance, hydrogen barrier and prevention of galvanic corrosion.



Stranding Layers

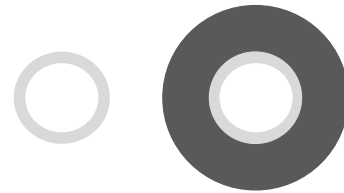
Improving tensile strength while maintaining flexibility, stranding layers can be selected in different material grades such as galvanized steel wires, stainless steel wires and nickel alloy wires with different wire sizes.



Additional Polymer Layer

Applying polymer layers in combination with metal tube or stranding layers to protect the inner elements of the construction and make the assembly into bigger cable designs easier. A polymer layer is also used as low cost buffer material for subsea cables.

Different materials such as PA, HDPE, PVC, TPE, FRNC, high performance fluoropolymers and properties such as LSZH and flame retardant can be fulfilled.



Triple Stranding Tube Construction

High temperature and long vertical distances need special designs to overcome the issue of strain on the fiber. NBGs unique triple stranded tube design with or without an outer tube protection and optionally additional stranding layers allow for deployment in the harshest environments.

