Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

PTB

(1) # EC-TYPE-EXAMINATION CERTIFICATE

(Translation)

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres - **Directive 94/9/EC**

(3) EC-type-examination Certificate Number:

PTB 99 ATEX 1090 U

(4) Component: Optical fibre bushing type 57-91..-..../....

(5) Manufacturer: BARTEC Componenten und Systeme GmbH

(6) Address: D-97980 Bad Mergentheim

(7) This component and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this component has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential report PTB Ex 99-19146.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 50014:1997 **EN 50018:1994**

(10) The sign "U" placed behind the certificate number indicates that this certificate should not be confounded with certificates issued for equipment or protective systems. This Component Certificate only serves as a basis for the issuing of certificates for equipment or protective systems.

(11) This EC-type-examination Certificate relates only to the design and construction of the specified component in accordance with Directive 94/9/EC. Further requirements of this Directive apply to the manufacture and supply of this component.

(12) The marking of the component shall include the following:

Ex II 2 G EEx d II IM 2 EEx d I

Zertifizierungsstelle Explosionsschutz
By order

Dr.-Ing. U. Klausmeyer
Regierungsdirektor

Braunschweig, November 15, 1999

(13) # SCHEDULE

(14) ## EC-TYPE-EXAMINATION CERTIFICATE PTB 99 ATEX 1090 U

(15) Description of component

The optical fibre bushing of type 57-91..-..../.... serves for the optical linking of equipment. Linking may be between a flameproof enclosure and an enclosure or equipment of another recognized type of protection in compliance with EN 50014, section 1.2, or between flameproof enclosures.

Technical data

Number of cores		0...47	
Gewindeart und -größe		M10 x 1...M42 x 1,5 Types and sizes of threads, which are not in conformity with ISO standards have been identified.	
Temperature class		T6	
Ambient temperature		-40 °C	80 °C
Maximum service temperature at the place of installation of the bushing, with the electrical equipment in normal operation	cast resin		-40 °C...110 °C
	PVC, PUR, (FRNC, TEP)*)		-5 °C...80 °C

*) depending on the optical waveguide used

(16) Test report PTB Ex 99-19146, description (7 sheets), drawing (2 sheets), routine test (1 sheet)

(17) Special conditions for safe use

Threaded holes for screwing-in of bushings with internal thread must meet the minimum requirements of EN 50018, section 5.3 (Table 3). These bushings are suitable for installation in electrical equipment of the type of protection flameproof enclosure "d" of group I, IIA, IIB or IIC.

The bushings must be fixed in the electrical equipment so that they are locked against rotation and accidental loosening.

Outside the apparatus the optical waveguide shall lead through the explosion hazardous area without disconnecting point as fixed installation in such a way that it is sufficiently protected against mechanical damage.

If the aperture of the optical waveguide is located inside the explosion hazardous area the irradiance resp. irradiation inside the optical waveguide must not exceed 5 mW/mm^2 or 30 mW total power resp. 0.5 mJ/mm^2 under operating conditions or in case of frequently ocurring failures.

The assignment of the temperatures to the temperature class of the optical waveguide bushing is to be made during the type test of the electrical equipment concerned.

The component is suitable for use in both, group I and group II, as the requirements of the standard are the same in this case.

The bushing is a constructional unit. The reproducible assembly procedure and the mounting conditions have been documented. In compliance with EN 500018, section 16.2 (13.4.4), a routine test according to section 16.1 must, therefore, not be carried out.

(18) Essential health and safety requirements

The tests performed and their positive results show that the optical fibre bushing meets the requirements of Directive 94/9/EC and of the standards listed on the cover sheet.

Zertifizierungsstelle Explosionsschutz
By order:

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1st S U P P L E M E N T

according to Directive 94/9/EC Annex III.6

to EC-TYPE-EXAMINATION CERTIFICATE PTB 99 ATEX 1090 U

(Translation)

Equipment: Fibre optic cable gland, type 57-91**-****/****

Marking:  **II 2G Ex d IIC Gb resp. II 2G Ex db IIC**

 **I M2 Ex d I Mb resp. I M2 Ex db I**

Manufacturer: BARTEC GmbH

Address: Max-Eyth-Straße 16, 97980 Bad Mergentheim, Germany

Description of supplements and modifications

The fibre optic cable gland of the type 57-91**-****/**** may also be manufactured with the following modifications:

The lower range of ambient temperatures has been extended to -55 °C.
(depending on the fibre optic cable used).

The range of thread types and sizes has been extended.

The fibre optic cable gland may also be manufactured as a plug-type version.

- Outside diameter of the plug-type sleeve 10 … 70 mm $^{0}_{-100}$
- Length of flameproof sleeve joint ≥ 12.5 mm ≥ 25 mm ≥ 40 mm
- The surface of the flameproof joint does not exceed a mean roughness of R_a = 6.3 µm

The permissible continuous luminous energy of the radiation sources is limited for:

Ex d II ≤ 35 mW / 5 mW/mm²
Ex d I ≤ 150 mW / 20 mW/mm²

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1st SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 99 ATEX 1090 U

The type code has been extended:

57 -91 * * - * * * * / * * * *

ID number fibre optic cables

ID number for cable gland

ID number for sleeve shape
0 = threaded, metric
1 = threaded, NPT thread
2 = threaded, WWR thread
3 = threaded, special type (metric)
4 = threaded, Pg thread
5 = plug-type, 12.5 mm ≤ joint length L < 25 mm
6 = plug-type, 25 mm ≤ joint length L < 40 mm
7 = plug-type, joint length L ≥ 40 mm
8 = plug-type, special type

ID number for type of fibre optic cable
A = single conductor – glass
K = conductor bundle - glass
C = single conductor – plastics (only for I M2 Ex d I)
Z = different types of fibre optic cables (plastic cores only I M2 Ex d I)

ID number for diameter (approx. values, core/sheath)
A-single cond. -> numbers, K-cond. bundle -> letter, C-single cond., 1mm -> R

1 = 9/125 µm	R = 1 mm	
2 = 50/125 µm	S = 1.5 mm	
3 = 62.5/125 µm	T = 2 mm	
	U = 2.5 mm	
5 = 100/140 µm	V = 3 mm	
6 = 200/230 µm	W = 4 mm	
	Y = 5 mm	
9 = intermediate sizes, conductor	X = intermediate size, bundle	

Z = different fibre diameters

ID number for number of cores
01 = 1 core
02 = 2 cores
...
47 = 47 cores
00 = no cores

ID number for sleeve size

0 = M10x1				Ø 10 mm
1 = M16x1			Pg 7	Ø 15 mm
2 = M24x1.5			Pg 9	Ø 22 mm
3 = M33x1.5			Pg 11	Ø 32 mm
4 = M36x1.5			Pg 13,5	Ø 34 mm
5 = M38x1.5			Pg 16	Ø 36 mm
6 = M42x1.5			Pg 21	Ø 40 mm
7 = M48x1.5	1 1/2" NPT	R 1 1/2"	Pg 29	Ø 46 mm
8 = M56x1.5			Pg 36	Ø 54 mm
9 = special sizes between sizes 0 to 8 or C to S				
C = M12x1.5	1/4 " NPT	R 1/4"		-
D = M16x1.5	3/8" NPT	R 3/8"		Ø 14 mm
E = M20x1.5	1/2" NPT	R 1/2"		Ø 18 mm
F = M25x1.5	3/4" NPT	R 3/4"		-
G = M32x1.5	1" NPT	R 1"		Ø 30 mm
L = M40x1.5	1 1/4" NPT	R 1 1/4"		Ø 38 mm
R = M64x1.5				Ø 62 mm
S = M72x1.5				Ø 70 mm

ID numbers for versions without influence on explosion protection

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1st SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 99 ATEX 1090 U

The fibre optic cable characteristics (type and configuration) have been changed:

BARTEC type	Ø fibre conductor (µm)	Operating temp. (°C)	Sheath material
57-91*A-1***/****	9/125	- 10 ... +75	PVC, PUR,(FRNC, TPE)
57-91*A-2***/****	50/125	- 40 ..+105	PVC, PUR,(FRNC, TPE)
57-91*A-3***/****	62,5/125	- 20 ... +80	PVC, PUR,(FRNC, TPE)
57-91*A-5***/****	100/140	- 10 ... +85	PVC, PUR,(FRNC, TPE)
57-91*A-6***/****	200/230	- 20 ... +70	PVC, PUR,(FRNC, TPE)
57-91*K-R***/****	1	-30 ... +90	PVC, PUR
57-91*K-S***/****	1.5	-30 ... +90	PVC, PUR
57-91*K-T***/****	2	-30 ... +90	PVC, PUR
57-91*K-U***/****	2.5	-30 ... +90	PVC, PUR
57-91*K-V***/****	3	-30 ... +90	PVC, PUR
57-91*K-W***/****	4	-30 ... +90	PVC, PUR
57-91*K-Y***/****	5	-30 ... +90	PVC, PUR
57-91*C-R***/****	1	-55 ... +85	PE

Applied standards

EN 60079-0:2009, EN 60079-1:2007

Test report: PTB Ex 13-12084

Zertifizierungssektor Explosionsschutz
On behalf of PTB:

Braunschweig, 2. September 2013

(*signature*)

Dr.-Ing. U. Klausmeyer
Direktor und Professor

3 pages, correct and complete as regards content.
On behalf of PTB:

Dipl.-Phys. U. Völkel Braunschweig, October 21, 2013