Physikalisch-Technische Bundesanstalt PTB
Braunschweig und Berlin

(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 97 ATEX 1047 U

(4) Component: Line bushing types 07-91**-****/****

(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 confidential report No. Ex 97-17067.

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

DIN EN 50 014: 1994-03 **DIN EN 50 018: 1995-03**

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

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

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

I M 2 EEx d I
II 2 G EEx d II

Zertifizierungsstelle Explosionsschutz Braunschweig, July 4, 1997
By order:

Dr.-Ing. U. Klausmeyer
Oberregierungsrat

(13) # S C H E D U L E

(14) **EC-TYPE-EXAMINATION CERTIFICATE PTB 97 ATEX 1047 U**

(15) Description of component

Line bushing type 07-91**-****/**** are used for the electrical connection of equipment in explosion-proofed enclosures. This applies to a connection between flameproof enclosures or flameproof enclosures and enclosures conforming with other protection types recognized by EN 50 014 section 2.2.
Line bushings without leads may be used as seal plugs.

Technical data

Max. rated voltage *)	up to	250 V	690 V	1000 V	
Rated conductor cross section:		0.35 mm² ...70 mm²			
Number of conductors:		0 ...47			
Type and size of thread:		M10 x 1 ...M42 x 1.5 Thread types and sizes not conforming to ISO standards are marked.			
Diameter of sleeve:		10 ...40 mm	$^{-30}_{-100}$		
Gap length of sleeve:		≥ 12,5 mm	≥ 25 mm	≥ 40 mm	

Rated current for:	0,35 mm²	5.5 A	6 mm²	36 A
(for multi-core versions, ambient	0,5 mm²	7.5 A	10 mm²	50 A
temperature 40°C and permitted	0,75 mm²	10 A	16 mm²	67 A
temperature at cable 80°C for T6)	1,0 mm²	12 A	25 mm²	90 A
	1,5 mm²	15 A	35 mm²	110 A
	2,5 mm²	21 A	50 mm²	140 A
	4,0 mm²	28 A	70 mm²	170 A

Suitable for Temperature class:		T6	T5	T4
Ambient temperature:	-50°C ...	40°C	55°C	70°C

*) Depending on leads used.

SCHEDULE TO EC-TYPE-EXAMINATION CERTIFICATE PTB 97 ATEX 1047 U

(15) Description of component

Max. temperature at line bushing during normal operation of the electrical equipment:

Resin potted	110°C
H05 V-K, H07 V-K	70°C
H05V2-K, H07V2-K	90°C
NSGAF ÖU	90°C
H05G-K, H07G-K	110°C
RADOX 125	120°C
RADOX 155	120°C
RADOX UL/CSA	120°C

Ascertainment of maximum permissible load on the conductors is to be based on self-heating and heating of the electrical equipment at maximum permissible ambient temperature, taking into account the recommended temperatures for use of the resin encapsulation and the quality of the cables.

(16) Test report No. Ex 97-17067 consisting of a description (8 pages), 4 drawings, 1 table and a parts list (2 pages).
This EC-type-examination certificate and future supplements thereto are considered to be supplements to partial conformity certificate PTB No. Ex-87.B.1086 U.

(17) Special conditions

Line bushings screwed in threaded holes must meet the minimum requirements of EN 50 018 section 5.3 (Table 3). These line bushings are suitable for installation in electrical equipment of protection type flameproof enclosures "d" groups I, IIA, IIB or IIC.

Cylindrical holes for line bushings with cylindrical joint must meet the minimum requirements of EN 50 018, Table I or 2 (cylindrical joint). The mean roughness of the joint must not exceed R_a 6.3 μm.
Line bushings with cylindrical joint must be included in type testing to EN 50 018 section 15 in accordance with the group subdivision of the electrical equipment concerned (I, IIA, IIB or IIC).
The line bushings must be fixed to the electrical equipment in such a way that they are secured against rotation and self-loosening.
The conductors of the line bushing must be connected in enclosures meeting a type of protection to EN 50 014 section 2.2.
The classification of the temperatures to the temperature class of line bushing must be stipulated in the type test of the electrical equipment concerned.

SCHEDULE TO EC-TYPE-EXAMINATION CERTIFICATE PTB 97 ATEX 1047 U

Routine tests

The line bushing is an indivisible piece of equipment and the conditions applicable to its installation are documented. In accordance with EN 50 018 section 16.2 (13.4.4) no routine testing in combination with the flameproof enclosures as per section 16.1 is required.
The "Special conditions" and notes on "Routine tests" are to be appended to the line bushings in suitable form.

(18) Basic health and safety requirements

Not applicable.

Zertifizierungsstelle Explosionsschutz
By order:

Braunschweig, 04 July 1997

Dr.-Ing. U. Klausmeyer
Oberregierungsrat

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

1st SUPPLEMENT

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

to EC-type-examination Certificate PTB 97 ATEX 1047 U

(Translation)

Component: Conductor bushing type 07-91..-..../....

Marking: Ⓔx **II 2 G EEx d II** and Ⓔx **I M2 EEx d I**

Manufacturer: BARTEC Componenten und Systeme GmbH

Address: Max-Eyth-Straße 16
D-97980 Bad Mergentheim

Description of supplements and modifications

The type 07-91..-.../... conductor bushing has been supplemented by further cable types and rated cross sections, and the service temperature has been extended to -55 °C.

It is also permitted to use a 2 to 20-core flexible ribbon cable of type FBL-X.

It is also permitted to use a metal-encased coaxial cable.

Rated current at	0,08 mm²	1 A
(ambient temperatures of 40 °C	0,2 mm²	3 A
and permissible temperature	0,3 mm²	4,5 A
on the cable of 80 °C for T6)	95 mm²	205 A

usable for temperature class		T6	T5	T4
Ambient temperature	-55 °C	40 °C	55 °C	70 °C

Max. service temperature at the place of installation of the conductor bushing at normal operation of the electrical apparatus	cast resin	110 °C
	FLB-X	105 °C
	coaxial cable	110 °C

For the determination of the maximum permissible current loading of the cores, self-heating and heating of the electrical apparatus at the place of installation at the maximum permissible ambient temperature are to be taken as a basis, and the service temperatures of the cast resin **and** of the cable qualities must be taken into account. If assigments other than those specified in this type-examination certificate are used for the temperatures, the operating conditions of the conductor bushing must be fixed in the type test of the respective electrical apparatus.

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

1st SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB PTB 97 ATEX 1047 U

Test report: PTB Ex 98-18164

Special conditions

The cables of the conductor bushing must be connected in enclosures which comply with a standardized type of protection according to EN 50 014, section 1.2.

The cores must be suitably connected in accordance with their rated cross sections and the type of protection selected.

The coaxial cable must be properly insulated and laid in accordance with its pattern.

Zertifizierungsstelle Explosionsschutz
By order:

Dr.-Ing. U. Klausmeyer
Oberregierungsrat

Braunschweig, November 30, 1998

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

2nd 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 97 ATEX 1047 U

(Translation)

Component: Conductor bushing, type 07-91..-..../.....

Marking: Ⓔx **II 2 G EEx d II or I M 2 EEx d I**

Manufacturer: BARTEC GmbH former BARTEC Componenten und Systeme GmbH

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

Description of supplements and modifications

The conductor bushing of type 07-91..-..../..... may also come as a "pressure-tight" version with modified internal design.

For the characteristics of this version, reference is made to the manufacturer's specifications provided with the operating instructions.

The type code is extended to:

07-91..-..../. _..

U = "pressure tight"
D = "pressure tight" with additional sealing

Test report: PTB Ex 03-13353

Zertifizierungsstelle Explosionsschutz
By order:

Braunschweig, November 14, 2003

Dr.-Ing. U. Klausmeyer
Regierungsdirektor

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

3rd SUPPLEMENT

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

to EC-TYPE-EXAMINATION CERTIFICATE PTB 97 ATEX 1047 U

(Translation)

Equipment: Conductor bushing, type 07-91..-..../.....

Marking: Ⓔx **II 2 G EEx d II I M 2 EEx d I**

Manufacturer: BARTEC GmbH

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

Description of supplements and modifications

The conductor bushing of type 07-91..-..../..... may also be manufactured on the basis of the following modifications:

- The sleeve of the conductor bushing may be made from additional plastically deformable or castable alloys. It will be surface finished as required.

- The sleeve sizes are extended

Type and size of thread	> M 42 x 1.5 ... M 72 x 1.5 thread types and sizes that are not in conformity with ISO Standards are marked
Diameter of sleeve	$> 40 \ldots 70\ \text{mm}\ ^{-30}_{-100}$
Length of flameproof sleeve joint	≥ 12.5 mm ≥ 25 mm ≥ 40 mm

- Additional insulated conductors are used

Model NSGAFÖU

Nominal voltage ..... up to	3000 V 6000 V
Ambient temperature range	- 40 °C ... 40 °C

Model (N)HXSGAFHXÖ

Nominal voltage ..... up to	6.000 V
Ambient temperature range	- 40 °C ... 70 °C

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

3rd SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 97 ATEX 1047 U

Model 4GAF

Nominal voltage U_0/U ..... up to		450/750 V
Conductor cross section		0.75 mm² ... 1.0 mm²
Ambient temperature range		- 40 °C ... 70 °C

Max. operating temperatures at the location of the cable entry for normal operation of the electrical apparatus

NSGAFÖU	90 °C
(N)HXSGAFHXÖ	120 °C
4GAF	110 °C

Rated current for (multi-core designs, ambient temperature 40 °C and admissible temperature at the cable of 80 °C for T6)

120 mm²	240 A
150 mm²	270 A
185 mm²	310 A

Test report: PTB Ex 04-14211

Zertifizierungsstelle Explosionsschutz
By order:

Dr.-Ing. U. Klausmeyer
Regierungsdirektor

Braunschweig, 20. September 2004

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

4th SUPPLEMENT

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

to EC-TYPE-EXAMINATION CERTIFICATE PTB 97 ATEX 1047 U

(Translation)

Component: Cable bushing, type 07-91..-..../....

Marking: Ⓔx **II 2 G EEx d II I M 2 EEx d I**

Manufacturer: BARTEC GmbH

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

Description of supplements and modifications

The cable bushing, type 07-91..-..../.... , is manufactured with the following modifications:

- The cable bushing with push-fit sleeve may also be equipped with a mounting flange.
- The cable bushing may also be designed as a – bolted and/or push-fit – double sleeve.

The cable bushing, type 07-91..-..../.... , is formally adjusted to standards EN 60079-0 and EN 60079-1 and is marked accordingly.

Ⓔx **II 2 G Ex d II I M 2 Ex d I**

Applied standards

EN 60079-0:2004 EN 60079-1:2004

Test report: PTB Ex 07-16329

Notes for manufacturing and operation

The special conditions continue to apply.

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

4th SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 97 ATEX 1047 U

If the gap dimensions remain below the values specified in EN 60079-1, tables 1 and 2, when assembling the push-fit cable bushing with the complete unit, an "X" mark must be provided on the complete unit as required in section 5.2.2.

Zertifizierungsstelle Explosionsschutz

Braunschweig, September 10, 2007

By order:

Dr.-Ing. U. Klausmeyer
Direktor und Professor

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

5. 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 97 ATEX 1047 U

(Translation)

Equipment: Cable bushing, type 07-91..-..../....

Marking: Ⓔx **II 2 G Ex d II** **I M 2 Ex d I**

Manufacturer: BARTEC GmbH

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

Description of supplements and modifications

The cable bushing, type 07-91..-..../.... serves in the changed design as a connection between a flameproof enclosure and intrinsically safe circuits in mechanically unprotected areas. The manufacturing takes place with a fastening flange and some kind of connection e.g. plug socket with coaxial cable (version A) or without fastening flange with directly lead through coaxial cable (version B). The maximum lever length of a connecting fixture is 100 mm.

Bushing dimensions: M10x1 – M42x1.5
Bushing diameters: Ø10 mm – Ø40 mm
Rated voltage: ≤ AC 50 V, ≤ DC 75 V
Rated current: 1 A
Max. number of conductors: 6

Ambient temperature range:

Coaxial cable with shell made of electron-netted polyolefin polymer compounds	-40 °C ... +105 °C
RG 58 C/U	-30 °C ... +80 °C

Applied standards

EN 60079-0:2006 **EN 60079-1:2007**

Assessment and test report: PTB Ex 09-19153

ZSEx10101e.dot

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

5. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 97 ATEX 1047 U

Notes for manufacture and operation

The notes for manufacture and operation from the EC type examination certificate and the preceding supplements continue to be valid.

Zertifizierungssektor Explosionsschutz
By order:

Braunschweig, September 17, 2009

Dr.-Ing. M. Thedens
Oberregierungsrat