

**CABLE GLANDS & ACCESSORIES**  
for **GLOBAL HAZARDOUS**  
**APPLICATION**



**bimed**  
Trademark for Innovation & Quality

Bimed begun in 1978 as a manufacturer of medical and mechanical components. Today Bimed is a family owned organization with more than 300 people and a 20.000 square meter facility. The Istanbul, Turkey-based company has offices in North America, Germany and Egypt. In many other countries Bimed is represented through local distribution partners.

Our product range consists of the following groups:

- Cable glands and conduit fittings
- Pressure balance elements
- Connectors for the appliance and automotive industries
- Gas springs for the automotive and furniture industries
- Disposable medical products

Cable glands and conduit fittings are designed for applications in a wide range of industries. Pressure balance elements improve quality and reliability of our customers' products. Connectors for appliances and for the automotive industry are used all over the world. Custom designed gas springs reduce total cost of ownership of our customers. Medical products are manufactured in a clean room environment and are sold as OEM products globally. All our products conform to the relevant national and international standards and our activities are based on EN ISO 9001:2008 standard.

As a result, Bimed gained an international reputation for high quality production. Due to our state-of-the-art certified laboratory and our 30 years of experience in the cable gland and electrical industry we also received ATEX 100 and IEC Ex factory approval.

Bimed is constantly working to achieve customer satisfaction, by meeting requested requirements with its standard and customized products. Most often, our research and development department produces completely new items in accordance with client demands. These activities help us gain the praise and high appreciation of our customers.

Because of High standards need for Hazardus Area Bimed start to invest for own Laboratory which has been certified by IMQ according to EN60079-0/2009.

With a worldwide market base, the Bimed distribution network has been established to ensure that the needs of this global market are well understood and fully satisfied. Our products have been expanded to and distributed in more than 30 countries. Bimed has a merit-based leadership in the cable gland and connector sector established on its reputation for quality and innovation. This philosophy has been instrumental in the development of a product line that is constantly growing to reflect the changing industry needs and advancements in technology.

With the above resume about Bimed we intend to emphasize the Bimed production philosophy and let it serve as certification for the large product line manufactured by all our divisions.





Certificate and Group

Name	Code	Type	Page
<b>Mining - Group I</b>			
<i>Ex I M2</i>			
<i>Ex d I Mb</i>			
<i>Ex e I Mb</i>			
<b>Dorado</b>	M-BA	4 Function Glands	<b>05-06</b>
<b>Orion</b>	M-KBA	4 Function Glands	<b>07-08</b>
<b>Gas &amp; Dust - Group II-III</b>			
<i>Ex II GD</i>			
<i>Ex d IIC Gb</i>			
<i>Ex e IIC Gb</i>			
<i>Ex tb III Db</i>			
<b>Dorado</b>	BA	4 Function Glands	<b>11-12</b>
<b>L-Dorado</b>	BA-L	4 Function Glands	<b>13-14</b>
<b>Orion</b>	KBA	4 Function Glands	<b>15-16</b>
<b>Octans</b>	BU	1 Function Glands	<b>17-18</b>
<b>Gas &amp; Dust - Group II-III</b>			
<i>Ex II GD</i>			
<i>Ex d IIC Gb</i>			
<i>Ex e IIC Gb</i>			
<i>Ex tb III Db</i>			
<b>Orion</b>	KBA	4 Function Glands	<b>21-22</b>
<b>Orion Universal</b>	KBAU	4 Function Glands	<b>23-24</b>
<b>Orion Offshore</b>	KBAO	4 Function Glands	<b>25-26</b>
<b>Crater</b>	KBU	1 Function Glands	<b>29-30</b>
<b>E-Octans</b>	EBU	1 Function Glands	<b>31-32</b>
<b>E-Vela</b>	EBS	1 Function Glands	<b>33-34</b>
<b>Norma</b>	NBU	1 Function Glands	<b>35-36</b>
<b>E-Carina</b>	EBM	Rigid Conduit Fittings	<b>39-40</b>
<b>E-Cygnus</b>	EBMC	Rigid Conduit Fittings	<b>41-42</b>
<b>Phoenix</b>	SV	Swivel Rigid Conduit Fittings	<b>43-44</b>
<b>E-Hydrus</b>	EBLS	Liquidtight Conduit Fittings	<b>47-48</b>
<b>E-Scorpius</b>	EBLQ	45° Liquidtight Conduit Fittings	<b>49-50</b>
<b>E-Lupus</b>	EBLN	90° Liquidtight Conduit Fittings	<b>51-52</b>
<b>E-Corvus</b>	EBMC	Swivel Liquidtight Conduit Fittings	<b>53-54</b>
<b>Lyra</b>	BM-X	Polyamide Glands	<b>57-58</b>
<b>Hi-Lyra</b>	HBM-X	High Impact Polyamide Glands	<b>59-60</b>
<b>Hi-Lyra B</b>	MHBM-X	High Impact Polyamide Glands	<b>61-62</b>
<b>Lyra DS</b>	BM-X	Polyamide Double Seal Glands	<b>63-64</b>
<b>Hi-Lyra DS</b>	HBM-X	High Impact Polyamide Glands	<b>65-66</b>
<b>Hi-Lyra DSB</b>	MHBM-X	High Impact Polyamide Glands	<b>67-68</b>
<b>Gemini</b>	BM-X	Polyamide Glands	<b>69-70</b>
<b>Draco</b>	TP-X	Polyamide Plugs	<b>71-72</b>
<b>Cetus</b>	BPM-X/BPT-X	Polyamide Dome Plugs	<b>73-74</b>
<b>Apus</b>	B-RB	Enlargers	<b>77-80</b>
<b>Grus</b>	B-RA	Reducers	<b>81-84</b>
<b>Aries</b>	B-RM	Couplings	<b>85-86</b>
<b>Pavo</b>	B-RN	Nipples	<b>87-88</b>
<b>Aquila</b>	B-TS	Plugs	<b>89-90</b>
<b>Hydra</b>	BBVP	Ventilation Plugs	<b>93-94</b>
<b>Virgo</b>	BDRV	Drain Valve	<b>95-96</b>
<b>Earthtag</b>	BMET	Metal Earth Tags	<b>99</b>
<b>Shroud</b>	BMSH	Pvc Shrouds	<b>100</b>
<b>Lock Nut</b>	BML/BMBL	Polyamide and Metal Lock Nuts	<b>101</b>
<b>Gasket</b>	BMSW	Gaskets	<b>102</b>
<b>Washer</b>	BMSW	Polyamide and Fibre Washers	<b>103</b>
<b>Washer</b>	BMTW	Serrated Washers	<b>104</b>
<b>Flat Seal</b>	FXA	Flat Seals for BU and BM	<b>105</b>



# Cable Glands for MINING applications



The first hazardous area was discovered in the early coal mines. This area held a double hazard: methane gas (firedamp) and coal dust. Methane gas is absorbed in the pores of coal. When the coal is mined the methane is evolved, a process that takes a relatively short time. To be completely free of methane, coal has to be stored for a period of up to 1000 hours.

When miners worked an 8-hour shift pattern, the mined coal would be left in the shaft until the next day, during which time the methane would start to be evolved into the air in the shaft. The methane would collect in pockets at the roof of the mine and form an explosive layer. The miners returning for the next shift would carry with them the means of igniting the gas, hot mounted candles, and hand carried oil lanterns. The resulting ignition of the methane would in itself not necessarily be fatal for the miners. It was the secondary ignition of coal dust, thrown up into a cloud by the methane explosion, that resulted in a more violent and deadly detonation.

The first method used to remove the methane hazard was to have a person crawl along the mine floor holding a lighted torch in their outstretched hand. This procedure would 'safely' ignite the methane layer and burn it off before the miners started work. The person performing this task was known as the 'fireman' and it was soon found that there were very few volunteers for this hazardous job. This resulted in prisoners being offered short jail terms if they would volunteer for the position.

With the advent of forced ventilation in the mines, the hazards were reduced by the dilution of the methane with fresh air so that it was below its explosive limit. When electrical equipment was first introduced into the mines, there were some explosions due to electrical sparking. However, it was discovered that totally enclosed motors were able to contain explosions without transmitting it to the surrounding external atmosphere. This concept was transferred to the design of other electrical equipment; fitting it inside substantial cast iron enclosures with tight fitting joints.

Later, low voltage signaling bells were introduced into the mines. It was believed that, since these bells operated on a very low voltage (12V or less), they would be safe. However, in the years 1912 and 1913, there were two disastrous mine explosions in England, which were traced to the signaling bells. Research showed that these low voltage circuits were capable of igniting mine gases, it also led to new circuit designs in which the stored energy was reduced to a non ignition capable level. This technique was labeled 'intrinsic safety' and it was the beginning of a new era in safety methods for explosive hazardous areas.



variable-frequency on motors  
Lighting Fixtures  
Motor Starters  
Enclosures for control units and junction boxes (Power & Lighting)  
Lighting

manual call points  
doorholder magnets  
Electrical, digital compact volume flow controller  
Electric linear valve actuators  
Modulating electric

digital sensors for temperature, humidity, pressure and differential pressure  
Modulating transducer  
Binary switching module

Cranes  
Motors  
Heaters  
Thermostat  
Heat detectors  
Flame detectors

Smoke detectors  
Alarm Indicators  
motor starters  
loudspeakers  
alarm bell  
sounders / horns

control and distribution units, panels and boards  
beacons / strobes  
status lamps  
control stations  
junction and terminal boxes

 **GROUP I**



**DORADO  
M-BA**  
4 Function  
Ex d/e Gland  
for SWA & AWA  
cable



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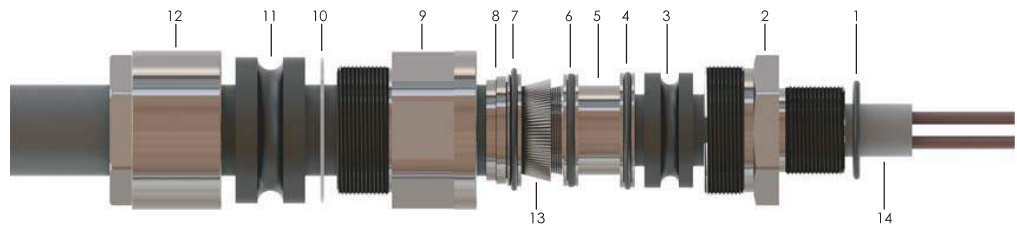
**ORION  
M-KBA**  
4 Function  
Ex d/e Gland  
for SWA & AWA  
cable



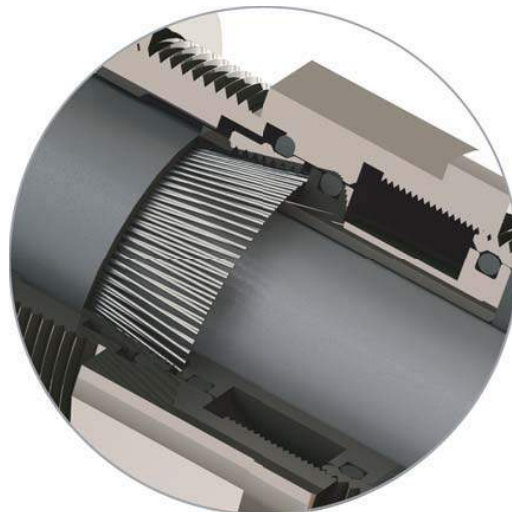
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Approved by	IMQ	
Examination Certificate Number	IMQ 11 ATEX 036	
Date of Issue	14.05.2012	
Test Report Number	43AL00050	
Safety Requirements	EN 60079-0:2009 EN 60079-1:2007 EN 60079-7:2007 EN 60079-31:2009	
Equipment Marking	Ex I M2	Ex-d I Mb Ex-e I Mb
Approved	GOST'R	
Equipment	Mining Group ZONE1/ZONE2	

Items	Item Description
1	O-ring
2	Lower body
3	Lower seal
4	O-ring
5	Grounding cone
6	O-ring
7	O-ring
8	Swivel retainer
9	Upper body
10	Washer
11	Upper seal
12	Pressure Cap
13	Armored wire
14	Armored Cable



A	No need to change, to remove or to adjust any internal components as long as the diameter of the used cable is within the declared clamping range.
B	The swiveling "shielding cone" (5) for clamping armor is secured to the "upper body" (9) and "lower body" (2) by o-rings which prevent the shielding cone from being lost when cable glands are disassembled for cable installation.
C	For the periodic inspection purpose the internal parts can be removed with a simple "pulling" movement, because they are fixed only with the o-rings. In result the glands are inspectable without any need to damage the cable or any part.
D	High strain relief, IP rating and explosion proof protection is obtained through the special shape of lower (3) and upper (11) seal.
E	Because of the design of seals (3) and (11) these cable glands can be used for a wider spectrum of cable diameters/clamping ranges.
F	Hexagon nuts for most cable gland sizes are of the same size (SW). Fewer wrench sizes are required.
G	Cable glands are deluge proof because of two o-rings (6) and (7) on the grounding cone (5). Water intrusion will be trapped between the o-rings and won't get in contact with armor.

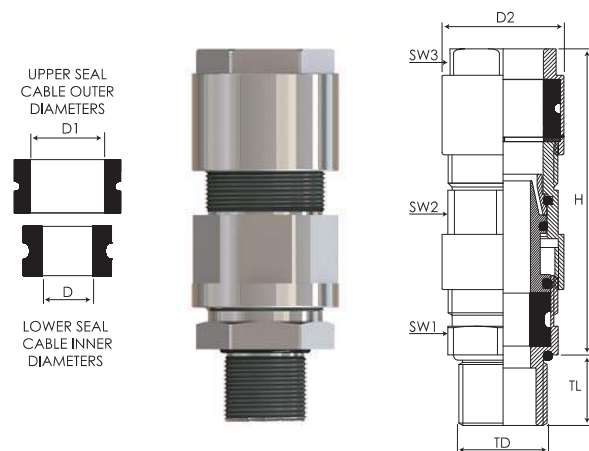


# Dorado 4 Function Ex d/e Gland

Suitable for use in	Group I Mining IM2	
For	Mining potentially explosive atmospheres	
Degree of Protection	IP66 – IP68 (EN 60529)	
Marking	BMD M-BA.. Ex CE 0722 I M2 Ex-d I Mb / Ex-e I Mb Ta-30°C +120°C IP66/68 IMQ 10 ATEX 036	
Deluge Proof Option	Standard	
Cable Type	Steel wire armor	
Seal Operating Temperature	Nbr	-30°C / +120°C
	Chloroprene	-40°C / +100°C
	Silicone	-60°C / +180°C
	Items 1-3-4-6-7-11	
Material	Brass	Items 2-5-8-9-12
	Stainless Steel	
Thread Type	Metric (M) ISO Pitch 1.5 Npt (N) ANSI ASME B1.20.1 Other thread types also available upon request.	

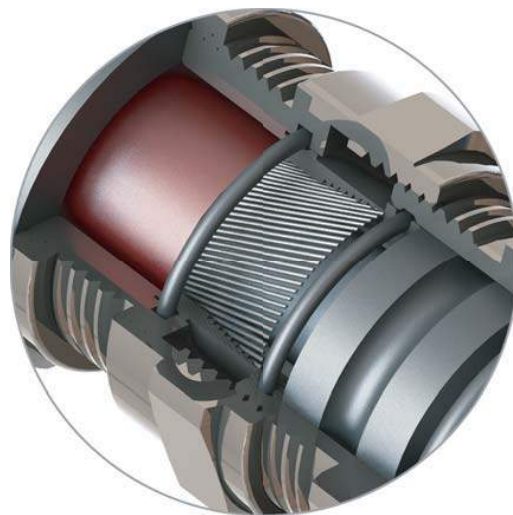
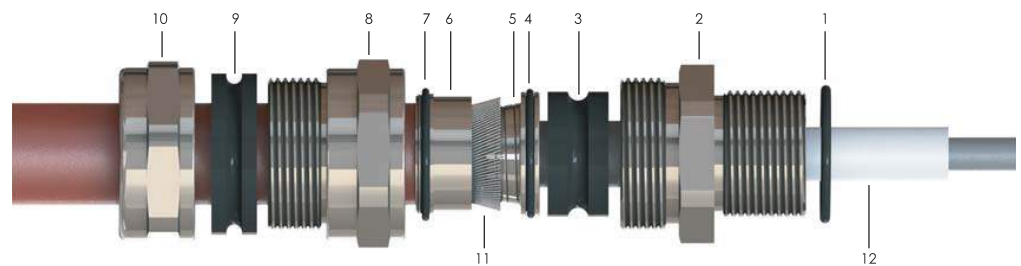
Order Encoding					
Type	Thread	Material	Plated	Sealing	Code Examples
M-BA01	M (Metric) N (Npt)	B (Brass) X (Stainless Steel)	N (Nickel Only for Brass)	N (NBR) C (Chloroprene) S (Silicone)	M-BA01MBNS

Thread Type (TD)	Product Code	Clamping Range Ø min-max mm		Cable Gland Dimensions						Armor Wire Ø (mm)
		D mm	D1 mm	H min (mm)	TL min (mm)	SW1 (mm)	SW2 (mm)	SW3 (mm)	D2 Min (mm)	
M16x1.5	M-BA01SM	3,0-8,5	6,0-12,0	59,0	16,0	22	22	22	25,0	0,7-1,5
M16x1.5	M-BA01M	4,0-12,0	9,0-18,0	70,5	16,0	25	25	24	27,6	0,7-1,2
M20x1.5	M-BA1M	4,0-12,0	9,0-18,0	69,0	16,0	25	25	24	27,6	0,7-1,5
M25x1.5	M-BA2M	9,0-20,0	14,0-26,0	82,5	18,0	36	40	36	43,5	1,2-2,1
M32x1.5	M-BA3M	15,0-26,0	20,0-33,0	109,5	18,0	48	48	48	54,5	1,0-2,1
M40x1.5	M-BA4M	20,0-32,0	29,0-41,0	116,0	18,0	55	60	55	63,0	1,2-2,6
M50x1.5	M-BA5M	22,0-35,0	36,0-52,0	123,5	18,0	60	65	60	69,6	1,8-3,2
M63x1.5	M-BA6M	35,0-45,0	42,0-62,0	153,0	20,0	75	75	75	84,5	2,7-4,2
M75x1.5	M-BA7M	45,0-60,0	54,0-78,0	173,0	20,0	90	95	90	104,5	2,4-4,5
M90x1.5	M-BA8M	60,0-72,0	63,0-88,0	197,5	20,0	110	115	110	124,2	2,3-4,1
M110x1.5	M-BA10M	75,0-85,0	88,0-105,0	227,0	20,0	135	135	130	143,0	2,4-4,2
NPT 3/8"	M-BA01SN	3,0-8,5	6,0-12,0	59,0	16,0	22	22	22	25,0	0,7-1,5
NPT 3/8"	M-BA01N	4,0-12,0	9,0-18,0	70,5	16,0	25	25	24	27,6	0,7-1,2
NPT 1/2"	M-BA1N	4,0-12,0	9,0-18,0	69,0	16,0	25	25	24	27,6	0,7-1,5
NPT 3/4"	M-BA2N	9,0-20,0	14,0-26,0	82,5	16,0	36	40	36	43,5	1,2-2,1
NPT 1"	M-BA3N	15,0-26,0	20,0-33,0	109,5	21,0	48	48	48	54,5	1,0-2,1
NPT 1 1/4"	M-BA4N	20,0-32,0	29,0-41,0	116,0	18,0	55	60	55	63,0	1,2-2,6
NPT 1 1/2"	M-BA5N	22,0-35,0	36,0-52,0	123,5	21,0	60	65	60	69,6	1,8-3,2
NPT 2"	M-BA6N	35,0-45,0	42,0-62,0	153,0	20,0	75	75	75	84,5	2,7-4,2
NPT 2 1/2"	M-BA7N	45,0-60,0	54,0-78,0	173,0	20,0	90	95	90	104,5	2,4-4,5
NPT 3"	M-BA8N	60,0-72,0	63,0-88,0	197,5	20,0	110	115	110	124,2	2,3-4,1
NPT 4"	M-BA10N	75,0-85,0	88,0-105,0	227,0	20,0	135	135	130	143,0	2,4-4,2



Approved by	IMQ	
Examination Certificate Number	IMQ 11 ATEX 037	
Date of Issue	16.01.2012	
Test Report Number	43AL00047	
Safety Requirements	EN 60079-0:2009 EN 60079-1:2007 EN 60079-7:2007 EN 60079-11:2010 EN 60079-31:2009	
Equipment Marking	Ex I M2	Ex-d I Mb Ex-e I Mb
Approved	GOST'R" - INMETRO	

Items	Item Description
1	O-ring
2	Lower body
3	Lower seal
4	O-ring
5	Grounding cone
6	Swivel retainer
7	O-ring
8	Upper body
9	Upper seal
10	Pressure Cap
11	Armored wire
12	Armored cable



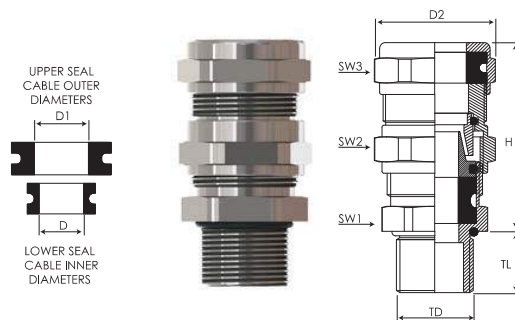


# Orion 4 Function Ex d/e Gland

Equipment	Mining Group ZONE1/ZONE2	
Suitable for use in	Group I Mining IM2	
For	Mining potentially explosive atmospheres	
Degree of Protection	IP66 – IP68 (EN 60529)	
Marking	BMD M-KBA.. Ex CE 0722 I M2 Ex-d I Mb / Ex-e I Mb Ta-40°C +100°C IP66/68 IMQ 11 ATEX 037	
Cable Type	Steel wire armor	
Seal	Chloroprene	-40°C / +100°C
	Silicone	-60°C / +180°C
	Nbr	-30°C / +120°C
Operating Temperature	Items 1-3-4-7-9	
Material	Brass	Items 2-5-6-8-10
	Stainless Steel	
Thread Type	Metric (M) ISO Pitch 1.5	
	Npt (N) ANSI ASME B1.20.1	
	Other thread types also available upon request.	

Order Encoding					
Type	Thread	Material	Plated	Sealing	Code Examples
M-KBA01	M (Metric) N (Npt)	B (Brass) X (Stainless Steel)	N (Nickel Only for Brass)	C (Chloroprene) S (Silicone) N(Nbr)	M-KBA01MBNS

Thread Type (TD)	Code	Clamping Range Ø min-max		Cable Gland Dimensions						Armor Wire Ø (mm)
		D mm	D1 mm	H min (mm)	TL min (mm)	SW1 (mm)	SW2 (mm)	SW3 (mm)	D2 Min (mm)	
M12x1.5	M-KBA0SM	3,0-4,0	3,0-5,5	55,0	15,0	17,0	17,0	17,0	18,9	0,1-0,7
M16x1.5	M-KBA01SM	3,0-8,5	6,0-12,0	47,5	16,0	22,0	26,0	26,0	29,0	0,7-1,2
M16x1.5	M-KBA01M	6,0-12,0	8,5-16,0	50,0	16,0	25,0	29,0	29,0	31,5	0,7-1,2
M20x1.5	M-KBA1SM	3,0-8,5	6,0-12,0	47,5	16,0	24,0	26,0	26,0	29,0	0,7-1,2
M20x1.5	M-KBA1M	6,0-12,0	8,5-16,0	49,0	16,0	25,0	29,0	29,0	31,5	0,7-1,2
M20x1.5	M-KBA1LM	8,5-14,5	12,0-20,0	50,0	16,0	28,0	30,0	30,0	35,0	0,8-1,3
M25x1.5	M-KBA2SM	6,0-12,0	8,5-16,0	50,5	18,0	29,0	29,0	29,0	31,5	0,7-1,2
M25x1.5	M-KBA2M	8,5-16,0	12,0-21,0	53,0	18,0	32,0	34,0	32,0	37,0	0,8-1,3
M25x1.5	M-KBA2LM	12,0-20,0	16,0-26,0	60,5	18,0	36,0	40,0	40,0	44,0	1,0-1,6
M32x1.5	M-KBA3SM	12,0-20,0	16,0-26,0	62,0	18,0	40,0	40,0	40,0	44,0	1,0-1,6
M32x1.5	M-KBA3M	15,0-26,0	20,0-33,0	78,5	18,0	48,0	52,0	52,0	57,0	1,0-1,8
M40x1.5	M-KBA4SM	15,0-26,0	20,0-33,0	78,5	18,0	48,0	52,0	52,0	57,0	1,0-1,8
M40x1.5	M-KBA4M	20,0-32,0	29,0-41,0	89,5	18,0	55,0	60,0	60,0	66,0	1,5-2,2
M50x1.5	M-KBA5SM	22,0-35,0	33,0-48,0	96,5	18,0	60,0	70,0	75,0	82,0	2,0-2,7
M50x1.5	M-KBA5M	27,0-41,0	36,0-52,0	100,0	18,0	70,0	70,0	74,0	83,0	2,0-2,7
M63x1.5	M-KBA6SM	35,0-45,0	43,0-57,0	106,0	20,0	75,0	80,0	80,0	89,5	2,5-3,5
M63x1.5	M-KBA6M	40,0-52,0	47,0-60,0	108,0	20,0	85,0	85,0	85,0	94,0	2,0-3,0
M75x1.5	M-KBA7SM	40,0-52,0	47,0-60,0	108,0	20,0	85,0	85,0	85,0	94,0	2,0-3,0
M75x1.5	M-KBA7M	45,0-60,0	54,0-70,0	125,0	20,0	90,0	95,0	100,0	110,5	1,8-3,0
M90x1.5	M-KBA8SM	45,0-60,0	54,0-70,0	124,0	20,0	95,0	95,0	100,0	110,5	1,8-3,0
M90x1.5	M-KBA8M	60,0-72,0	63,0-80,0	154,0	20,0	110,0	115,0	115,0	127,0	1,8-3,5
NPT1/4"	M-KBA0SN	3,0-4,0	3,0-5,5	55,0	15,0	17,0	17,0	17,0	18,9	0,1-0,7
NPT3/8"	M-KBA01SN	3,0-8,5	6,0-12,0	47,5	16,0	22,0	26,0	26,0	29,0	0,7-1,2
NPT3/8"	M-KBA01N	6,0-12,0	8,5-16,0	50,0	16,0	25,0	29,0	29,0	31,5	0,7-1,2
NPT1/2"	M-KBA1SN	3,0-8,5	6,0-12,0	47,5	16,0	24,0	26,0	26,0	29,0	0,7-1,2
NPT1/2"	M-KBA1N	6,0-12,0	8,5-16,0	49,0	16,0	25,0	29,0	29,0	31,5	0,7-1,2
NPT1/2"	M-KBA1LN	8,5-14,5	12,0-20,0	50,0	16,0	28,0	30,0	30,0	35,0	0,8-1,3
NPT3/4"	M-KBA2SN	6,0-12,0	8,5-16,0	50,5	18,0	29,0	29,0	29,0	31,5	0,7-1,2
NPT3/4"	M-KBA2N	8,5-16,0	12,0-21,0	53,0	18,0	32,0	34,0	32,0	37,0	0,8-1,3
NPT3/4"	M-KBA2LN	12,0-20,0	16,0-26,0	60,5	18,0	36,0	40,0	40,0	44,0	1,0-1,6
NPT1"	M-KBA3SN	12,0-20,0	16,0-26,0	62,0	21,0	40,0	40,0	40,0	44,0	1,0-1,6
NPT1"	M-KBA3N	15,0-26,0	20,0-33,0	78,5	21,0	48,0	52,0	52,0	57,0	1,0-1,8
NPT1 1/4"	M-KBA4SN	15,0-26,0	20,0-33,0	78,5	21,0	48,0	52,0	52,0	57,0	1,0-1,8
NPT1 1/4"	M-KBA4N	20,0-32,0	29,0-41,0	89,5	21,0	55,0	60,0	60,0	66,0	1,5-2,2
NPT1 1/2"	M-KBA5SN	22,0-35,0	33,0-48,0	96,5	21,0	60,0	70,0	75,0	82,0	2,0-2,7
NPT1 1/2"	M-KBA5N	27,0-41,0	36,0-52,0	100,0	21,0	70,0	70,0	74,0	83,0	2,0-2,7
NPT2"	M-KBA6SN	35,0-45,0	43,0-57,0	106,0	21,0	75,0	80,0	80,0	89,5	2,5-3,5
NPT2"	M-KBA6N	40,0-52,0	47,0-60,0	108,0	21,0	85,0	85,0	85,0	94,0	2,0-3,0
NPT2 1/2"	M-KBA7SN	40,0-52,0	47,0-60,0	108,0	21,0	85,0	85,0	85,0	94,0	2,0-3,0
NPT2 1/2"	M-KBA7N	45,0-60,0	54,0-70,0	125,0	21,0	90,0	95,0	100,0	110,5	1,8-3,0
NPT3"	M-KBA8SN	45,0-60,0	54,0-70,0	124,0	21,0	95,0	95,0	100,0	110,5	1,8-3,0
NPT3"	M-KBA8N	60,0-72,0	63,0-80,0	154,0	21,0	110,0	115,0	115,0	127,0	1,8-3,5



# Cable Glands for **GAS & DUST** applications



**Groups II & III** are further sub-divided depending upon the hazard. Group II gases are grouped together based upon the amount of energy required to ignite the most explosive mixture of the gas with air. Group III dusts are subdivided according to the nature of the explosive atmosphere for which it is intended.

**Ex d Flameproof**

The equipment that may cause an explosion is contained within an enclosure which can withstand the force of an explosion and prevent transmission to the outside hazardous atmosphere. This method of protection also prevents the hazardous atmosphere from entering the enclosure and coming into contact with equipment.

**Ex e Increased Safety**

Precautions are applied to the installation to ensure increased security against the possibility of excessive temperatures and sparks from electrical equipment. Equipment that normally causes sparks is excluded from use within this method of protection.



Cranes  
Motors  
Heaters  
Thermostat  
Heat detectors  
Flame detectors

Smoke detectors  
Alarm indicators  
motor starters  
loudspeakers  
alarm bell  
sounders / horns

control and distribution units,  
panels and boards  
beacons / strobes  
status lamps  
control stations  
junction and terminal boxes

variable-frequency on motors  
Lighting Fixtures  
Motor Starters  
Enclosures for control units and  
junction boxes (Power & Lighting)  
Lighting

manual call points  
doorholder magnets  
Electrical, digital compact volume  
flow controller  
Electric linear valve actuators  
Modulating electric

digital sensors for temperature,  
humidity, pressure and differential  
pressure  
Modulating transducer  
Binary switching module

 **ATEX GROUP II-III**



**DORADO  
BA**  
**4** Function  
Ex d/e Gland  
for SWA & AWA  
cable



Page  
**11-12**

**L-DORADO  
BA..L**  
**4** Function  
Ex d/e Gland  
for Leadsheathed  
and SWA cable



Page  
**13-14**

**ORION  
KBA**  
**4** Function  
Ex d/e Gland  
for SWA & AWA  
cable



Page  
**15-16**

**OCTANS  
BU**  
**1** Function  
Ex d/e Gland  
for non armor  
cable

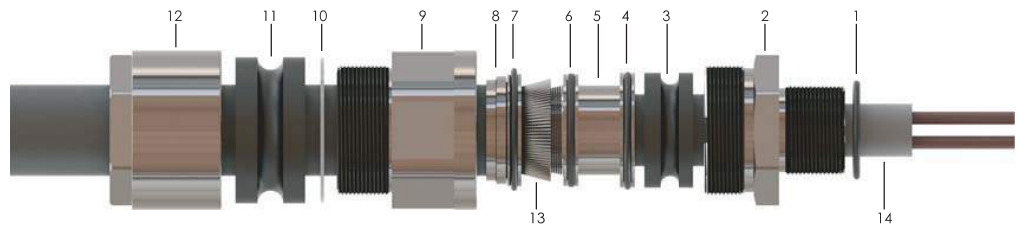


Page  
**17-18**

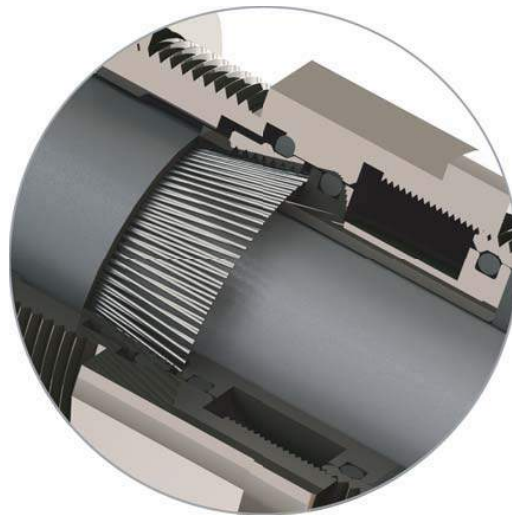
Ex II 2 GD / Ex d IIC Gb - Ex e IIC Gb - Ex tb III Db

Approved by	IMQ	
Examination Certificate Number	IMQ 11 ATEX 036	
Date of Issue	14.05.2012	
Test Report Number	43AL00050	
Safety Requirements	EN 60079-0:2009 EN 60079-1:2007 EN 60079-7:2007 EN 60079-31:2009	
Equipment Marking	Ex II 2 GD	Ex d IIC Gb Ex e IIC Gb Ex tb IIIC Db
Approved	GOST"R"	

Items	Item Description
1	O-ring
2	Lower body
3	Lower seal
4	O-ring
5	Grounding cone
6	O-ring
7	O-ring
8	Swivel retainer
9	Upper body
10	Washer
11	Upper seal
12	Pressure Cap
13	Armored wire
14	Armored Cable



A	No need to change, to remove or to adjust any internal components as long as the diameter of the used cable is within the declared clamping range.
B	The swiveling "shielding cone" (5) for clamping armor is secured to the "upper body" (9) and "lower body" (2) by o-rings which prevent the shielding cone from being lost when cable glands are disassembled for cable installation.
C	For the periodic inspection purpose the internal parts can be removed with a simple "pulling" movement, because they are fixed only with the o-rings. In result the glands are inspectable without any need to damage the cable or any part.
D	High strain relief, IP rating and explosion proof protection is obtained through the special shape of lower (3) and upper (11) seal.
E	Because of the design of seals (3) and (11) these cable glands can be used for a wider spectrum of cable diameters/clamping ranges.
F	Hexagon nuts for most cable gland sizes are of the same size (SW). Fewer wrench sizes are required.
G	Cable glands are deluge proof because of two o-rings (6) and (7) on the grounding cone (5). Water intrusion will be trapped between the o-rings and won't get in contact with armor.

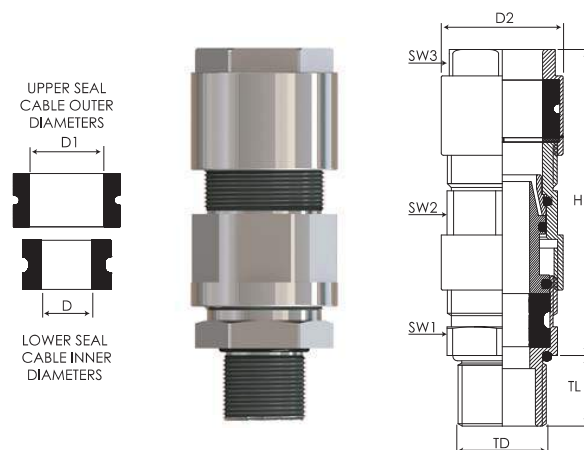


# Dorado 4 Function Ex d/e Gland

Equipment	Gas Group	Dust Group
Suitable for use in	ZONE1/ZONE2	ZONE21/ZONE 22
For	Group II	Group III
	Gas Group IIC	Dust Group IIIC
Degree of Protection	Gas & Dust potentially explosive atmospheres	
Marking	IP66 – IP68 (EN 60529)	
Deluge Proof Option	Standard	
Cable Type	Steel wire armor	
Seal	Nbr	-30°C / +120°C
	Operating Temperature	-40°C / +100°C
Material	Chloroprene	Items 1-3-4-6-7-11
	Silicone	-60°C / +180°C
Thread Type	Brass	Items 2-5-8-9-12
	Stainless Steel	
Metric (M) ISO Pitch 1,5 Npt (N) ANSI ASME B1.20.1 Other thread types also available upon request.		

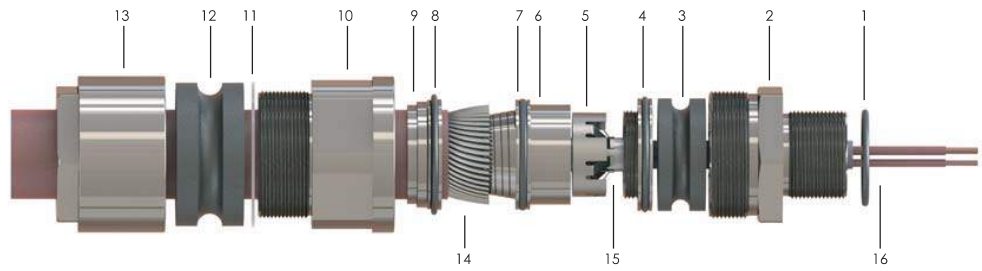
Order Encoding					
Type	Thread	Material	Plated	Sealing	Code Examples
BA01	M (Metric) N (Npt)	B (Brass) X (Stainless Steel)	N (Nickel Only for Brass)	N (NBR) C (Chloroprene) S (Silicone)	BA01MBNS

Thread Type (TD)	Code	Clamping Range Ø min-max		Cable Gland Dimensions						Armor Wire Ø (mm)
		D mm	D1 mm	H min (mm)	TL min (mm)	SW1 (mm)	SW2 (mm)	SW3 (mm)	D2 Min (mm)	
M16x1.5	BA01SM	3,0-8,5	6,0-12,0	59,0	16,0	22	22	22	25,0	0,7-1,5
M16x1.5	BA01M	4,0-12,0	9,0-18,0	70,5	16,0	25	25	24	27,6	0,7-1,2
M20x1.5	BA1M	4,0-12,0	9,0-18,0	69,0	16,0	25	25	24	27,6	0,7-1,5
M25x1.5	BA2M	9,0-20,0	14,0-26,0	82,5	18,0	36	40	36	43,5	1,2-2,1
M32x1.5	BA3M	15,0-26,0	20,0-33,0	109,5	18,0	48	48	48	54,5	1,0-2,1
M40x1.5	BA4M	20,0-32,0	29,0-41,0	116,0	18,0	55	60	55	63,0	1,2-2,6
M50x1.5	BA5M	22,0-35,0	36,0-52,0	123,5	18,0	60	65	60	69,6	1,8-3,2
M63x1.5	BA6M	35,0-45,0	42,0-62,0	153,0	20,0	75	75	75	84,5	2,7-4,2
M75x1.5	BA7M	45,0-60,0	54,0-78,0	173,0	20,0	90	95	90	105,5	2,4-4,5
M90x1.5	BA8M	60,0-72,0	63,0-88,0	197,5	20,0	110	115	110	124,2	2,3-4,1
M110x1.5	BA10M	75,0-85,0	88,0-105,0	227,0	20,0	135	135	130	143,0	2,4-4,2
NPT 3/8"	BA01SN	3,0-8,5	6,0-12,0	59,0	16,0	22	22	22	25,0	0,7-1,5
NPT 3/8"	BA01N	4,0-12,0	9,0-18,0	70,5	16,0	25	25	24	27,6	0,7-1,2
NPT 1/2"	BA1N	4,0-12,0	9,0-18,0	69,0	16,0	25	25	24	27,6	0,7-1,5
NPT 3/4"	BA2N	9,0-20,0	14,0-26,0	82,5	16,0	36	40	36	43,5	1,2-2,1
NPT 1"	BA3N	15,0-26,0	20,0-33,0	109,5	21,0	48	48	48	54,5	1,0-2,1
NPT 1 1/4"	BA4N	20,0-32,0	29,0-41,0	116,0	18,0	55	60	55	63,0	1,2-2,6
NPT 1 1/2"	BA5N	22,0-35,0	36,0-52,0	123,5	21,0	60	65	60	69,6	1,8-3,2
NPT 2"	BA6N	35,0-45,0	42,0-62,0	153,0	20,0	75	75	75	84,5	2,7-4,2
NPT 2 1/2"	BA7N	45,0-60,0	54,0-78,0	173,0	20,0	90	95	90	105,5	2,4-4,5
NPT 3"	BA8N	60,0-72,0	63,0-88,0	197,5	20,0	110	115	110	124,2	2,3-4,1
NPT 4"	BA10N	75,0-85,0	88,0-105,0	227,0	20,0	135	135	130	143,0	2,4-4,2



Approved by	IMQ	
Examination Certificate Number	IMQ 11 ATEX 036	
Date of Issue	14.05.2012	
Test Report Number	43AL00050	
Safety Requirements	EN 60079-0:2009 EN 60079-1:2007 EN 60079-7:2007 EN 60079-31:2009	
Equipment Marking	Ex II 2 GD	Ex d IIC Gb Ex e IIC Gb Ex tb III Db
Approved	GOST'R'	

Items	Item Description
1	O-ring
2	Lower body
3	Lower seal
4	O-ring
5	Lead Emc spring
6	Grounding cone
7	O-ring
8	O-ring
9	Swivel retainer
10	Upper body
11	Washer
12	Upper seal
13	Pressure Cap
14	Armored wire
15	Lead sheath
16	Armored cable

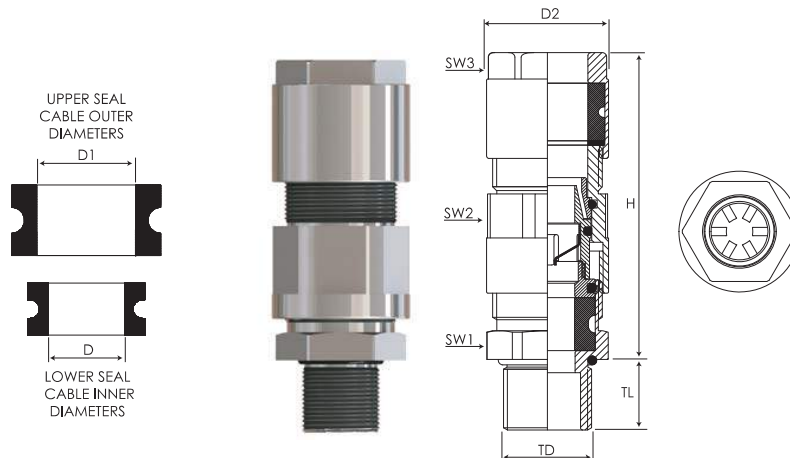


# L-Dorado 4 Function Ex d/e Gland

Equipment	Gas Group ZONE1/ZONE2	Dust Group ZONE21/ZONE 22
Suitable for use in	Group II Gas Group IIC	Group III Dust Group IIIC
For	Gas & Dust potentially explosive atmospheres	
Degree of Protection	IP66 – IP68 (EN 60529)	
Marking	BMD BA, Ex CE 0722 II 2GD Exd IIC GB / Exe IIC Gb Ex tb IIIC Db Ta-30°C +120°C IP66/68 IMQ 10 ATEX 036	
Deluge Proof Option	Standard	
Cable Type	Lead shielded-Steel wire armor	
Seal	Nbr	Items 1-3-4-7-8-12
	Operating Temperature	
	Chloroprene	
Material	Silicone	Items 2-6-9-10-13
	Brass	
Spring Material	Stainless Steel	Item 5
Thread Type	Special Copper Alloy	Item 5
	Metric (M) ISO Pitch 1.5	
	Npt (N) ANSI ASME B1.20.1	
Other thread types also available upon request.		

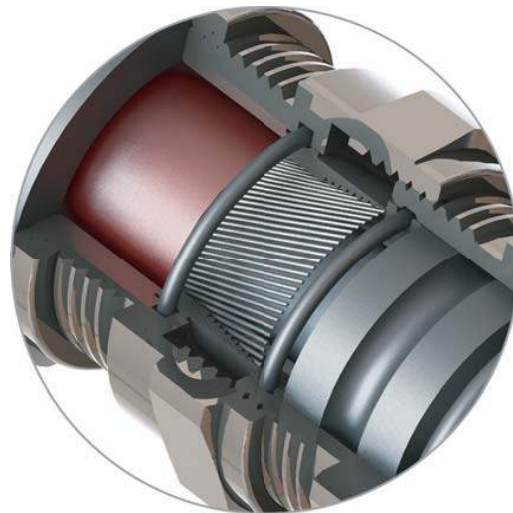
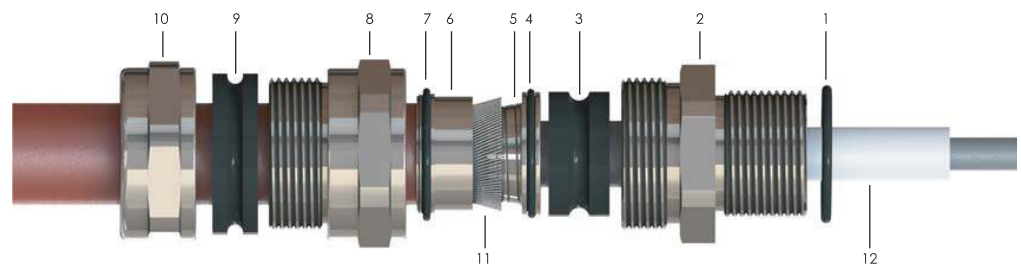
Order Encoding					
Type	Thread	Material	Plated	Sealing	Code Examples
BA...L	M (Metric) N (Npt)	B (Brass) X (Stainless Steel)	N (Nickel Only for Brass)	N (NBR) C (Chloroprene) S (Silicone)	BA01MLBNS

Thread Type (TD)	Code	Clamping Range Ø min-max		Cable Gland Dimensions						Armor Wire Ø (mm)
		D mm	D1 mm	H min (mm)	TL min (mm)	SW1 (mm)	SW2 (mm)	SW3 (mm)	D2 Min (mm)	
M16x1.5	BA01SML	3,0-8,5	6,0-12,0	59,0	16,0	22	22	22	25,0	0,7-1,5
M16x1.5	BA01ML	4,0-12,0	9,0-18,0	70,5	16,0	25	25	24	27,6	0,7-1,2
M20x1.5	BA1ML	4,0-12,0	9,0-18,0	69,0	16,0	25	25	24	27,6	0,7-1,5
M25x1.5	BA2ML	9,0-20,0	14,0-26,0	82,5	18,0	36	40	36	43,5	1,2-2,1
M32x1.5	BA3ML	15,0-26,0	20,0-33,0	109,5	18,0	48	48	48	54,5	1,0-2,1
M40x1.5	BA4ML	20,0-32,0	29,0-41,0	116,0	18,0	55	60	55	63,0	1,2-2,6
M50x1.5	BA5ML	22,0-35,0	36,0-52,0	123,0	18,0	60	65	60	69,6	1,8-3,2
M63x1.5	BA6ML	35,0-45,0	42,0-62,0	153,0	20,0	75	75	75	84,5	2,7-4,2
M75x1.5	BA7ML	45,0-60,0	54,0-78,0	173,0	20,0	90	95	90	104,5	2,4-4,5
M90x1.5	BA8ML	60,0-72,0	63,0-88,0	197,5	20,0	110	115	110	124,2	2,3-4,1
M110x1.5	BA10ML	75,0-85,0	88,0-105,0	227,0	20,0	135	135	130	143,0	2,4-4,2
NPT 3/8"	BA01SNL	3,0-8,5	6,0-12,0	59,0	16,0	22	22	22	25,0	0,7-1,5
NPT 3/8"	BA01NL	4,0-12,0	9,0-18,0	70,5	16,0	25	25	24	27,6	0,7-1,2
NPT 1/2"	BA1NL	4,0-12,0	9,0-18,0	69,0	16,0	25	25	24	27,6	0,7-1,5
NPT 3/4"	BA2NL	9,0-20,0	14,0-26,0	82,5	16,0	36	40	36	43,5	1,2-2,1
NPT 1"	BA3NL	15,0-26,0	20,0-33,0	109,5	21,0	48	48	48	54,5	1,0-2,1
NPT 1 1/4"	BA4NL	20,0-32,0	29,0-41,0	116,0	18,0	55	60	55	63,0	1,2-2,6
NPT 1 1/2"	BA5NL	22,0-35,0	36,0-52,0	123,5	21,0	60	65	60	69,6	1,8-3,2
NPT 2"	BA6NL	35,0-45,0	42,0-62,0	153,0	20,0	75	75	75	84,5	2,7-4,2
NPT 2 1/2"	BA7NL	45,0-60,0	54,0-78,0	173,0	20,0	90	95	90	104,5	2,4-4,5
NPT 3"	BA8NL	60,0-72,0	63,0-88,0	197,5	20,0	110	115	110	124,2	2,3-4,1
NPT 4"	BA10NL	75,0-85,0	88,0-105,0	227,0	20,0	135	135	130	143,0	2,4-4,2



Approved by	IMQ	
Examination Certificate Number	IMQ 11 ATEX 037	
Date of Issue	16.01.2012	
Test Report Number	43AL00047	
Safety Requirements	EN 60079-0:2009 EN 60079-1:2007 EN 60079-7:2007 EN 60079-11:2010 EN 60079-31:2009	
Equipment Marking	Ex II 2 GD	Ex d IIC Gb Ex e IIC Gb Ex tb III Db
Approved	GOST'R® - INMETRO	

Items	Item Description
1	O-ring
2	Lower body
3	Lower seal
4	O-ring
5	Grounding cone
6	Swivel retainer
7	O-ring
8	Upper body
9	Upper seal
10	Pressure Cap
11	Armored wire
12	Armored cable



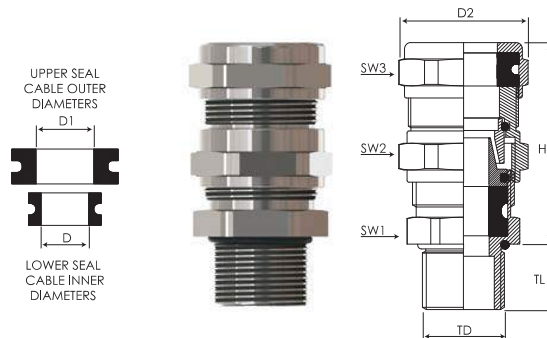


# Orion 4 Function Ex d/e Gland

Equipment	Gas Group ZONE1/ZONE2	Dust Group ZONE21/ZONE 22
Suitable for use in	Group II Gas Group IIC	Group III Dust Group III C
For	Gas & Dust potentially explosive atmospheres	
Degree of Protection	IP66 – IP68 (EN 60529)	
Marking	BMD KBA.. Ex CE 0722 II 2GD Exd IIC Gb / Exe IIC Gb / Ex tb IIC Db Ta-40°C +100°C IP66/68 IMQ 11 ATEX 037	
Cable Type	SWA-AWA	
Seal Operating Temperature	Chloroprene	Items 1-3-4-7-9
	Silicone	
	Nbr	
Material	Brass Stainless Steel	Items 2-5-6-8-10
Thread Type	Metric (M) ISO Pitch 1.5 Npt (N) ANSI ASME B1.20.1 Other thread types also available upon request.	

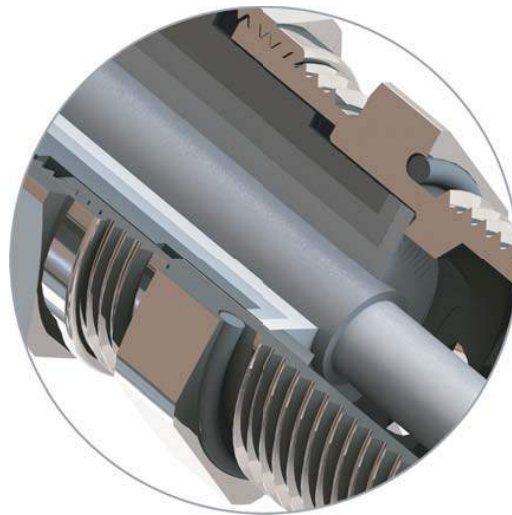
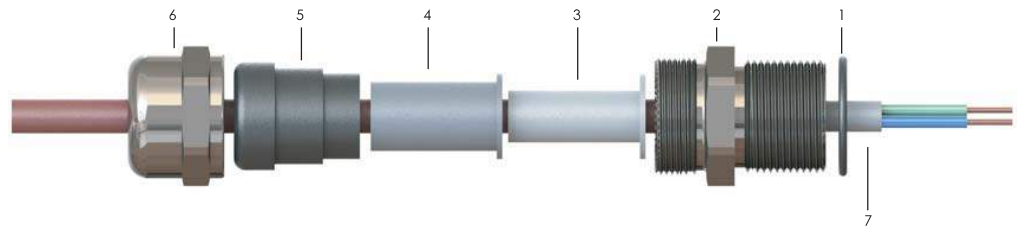
Order Encoding					
Type	Thread	Material	Plated	Sealing	Code Examples
KBA01	M (Metric) N (Npt)	B (Brass) X (Stainless Steel)	N (Nickel Only for Brass)	C (Chloroprene) S (Silicone) N (Nbr)	KBA01MBNS

Thread Type (TD)	Code	Clamping Range Ø min-max		Cable Gland Dimensions							Armor Wire Ø (mm)
		D mm	D1 mm	H min (mm)	TL min (mm)	SW1 (mm)	SW2 (mm)	SW3 (mm)	D2 Min (mm)		
M12x1.5	KBA0SM	3,0-4,0	3,0-5,5	55,0	15,0	17,0	17,0	17,0	18,9	0,1-0,7	
M16x1.5	KBA01SM	3,0-8,5	6,0-12,0	47,5	16,0	22,0	26,0	26,0	29,0	0,7-1,2	
M16x1.5	KBA01M	6,0-12,0	8,5-16,0	50,0	16,0	25,0	29,0	29,0	31,5	0,7-1,2	
M20x1.5	KBA1SM	3,0-8,5	6,0-12,0	47,5	16,0	24,0	26,0	26,0	29,0	0,7-1,2	
M20x1.5	KBA1M	6,0-12,0	8,5-16,0	49,0	16,0	25,0	29,0	29,0	31,5	0,7-1,2	
M20x1.5	KBA1LM	8,5-14,5	12,0-20,0	50,0	16,0	28,0	30,0	30,0	35,0	0,8-1,3	
M25x1.5	KBA2SM	6,0-12,0	8,5-16,0	50,5	18,0	29,0	29,0	29,0	31,5	0,7-1,2	
M25x1.5	KBA2M	8,5-16,0	12,0-21,0	53,0	18,0	32,0	34,0	32,0	37,0	0,8-1,3	
M25x1.5	KBA2LM	12,0-20,0	16,0-26,0	60,5	18,0	36,0	40,0	40,0	44,0	1,0-1,6	
M32x1.5	KBA3SM	12,0-20,0	16,0-26,0	62,0	18,0	40,0	40,0	40,0	44,0	1,0-1,6	
M32x1.5	KBA3M	15,0-26,0	20,0-33,0	78,5	18,0	48,0	52,0	52,0	57,0	1,0-1,8	
M40x1.5	KBA4SM	15,0-26,0	20,0-33,0	78,5	18,0	48,0	52,0	52,0	57,0	1,0-1,8	
M40x1.5	KBA4M	20,0-32,0	29,0-41,0	89,5	18,0	55,0	60,0	60,0	66,0	1,5-2,2	
M50x1.5	KBA5SM	22,0-35,0	33,0-48,0	96,5	18,0	60,0	70,0	75,0	82,0	2,0-2,7	
M50x1.5	KBA5M	27,0-41,0	36,0-52,0	100,0	18,0	70,0	70,0	74,0	83,0	2,0-2,7	
M63x1.5	KBA6SM	35,0-45,0	43,0-57,0	106,0	20,0	75,0	80,0	80,0	89,5	2,5-3,5	
M63x1.5	KBA6M	40,0-52,0	47,0-60,0	108,0	20,0	85,0	85,0	85,0	94,0	2,0-3,0	
M75x1.5	KBA7SM	40,0-52,0	47,0-60,0	108,0	20,0	85,0	85,0	85,0	94,0	2,0-3,0	
M75x1.5	KBA7M	45,0-60,0	54,0-70,0	125,0	20,0	90,0	95,0	100,0	110,5	1,8-3,0	
M90x1.5	KBA8SM	45,0-60,0	54,0-70,0	124,0	20,0	95,0	95,0	100,0	110,5	1,8-3,0	
M90x1.5	KBA8M	60,0-72,0	63,0-80,0	154,0	20,0	110,0	115,0	115,0	127,0	1,8-3,5	
NPT1/4"	KBA0SN	3,0-4,0	3,0-5,5	55,0	15,0	17,0	17,0	17,0	18,9	0,1-0,7	
NPT3/8"	KBA01SN	3,0-8,5	6,0-12,0	47,5	16,0	22,0	26,0	26,0	29,0	0,7-1,2	
NPT3/8"	KBA01N	6,0-12,0	8,5-16,0	50,0	16,0	25,0	29,0	29,0	31,5	0,7-1,2	
NPT1/2"	KBA1SN	3,0-8,5	6,0-12,0	47,5	16,0	24,0	26,0	26,0	29,0	0,7-1,2	
NPT1/2"	KBA1N	6,0-12,0	8,5-16,0	49,0	16,0	25,0	29,0	29,0	31,5	0,7-1,2	
NPT1/2"	KBA1LN	8,5-14,5	12,0-20,0	50,0	16,0	28,0	30,0	30,0	35,0	0,8-1,3	
NPT3/4"	KBA2SN	6,0-12,0	8,5-16,0	50,5	18,0	29,0	29,0	29,0	31,5	0,7-1,2	
NPT3/4"	KBA2N	8,5-16,0	12,0-21,0	53,0	18,0	32,0	34,0	32,0	37,0	0,8-1,3	
NPT3/4"	KBA2LN	12,0-20,0	16,0-26,0	60,5	16,0	36,0	40,0	40,0	44,0	1,0-1,6	
NPT1"	KBA3SN	12,0-20,0	16,0-26,0	62,0	21,0	40,0	40,0	40,0	44,0	1,0-1,6	
NPT1"	KBA3N	15,0-26,0	20,0-33,0	78,5	21,0	48,0	52,0	52,0	57,0	1,0-1,8	
NPT1 1/4"	KBA4SN	15,0-26,0	20,0-33,0	78,5	21,0	48,0	52,0	52,0	57,0	1,0-1,8	
NPT1 1/4"	KBA4N	20,0-32,0	29,0-41,0	89,5	18,0	55,0	60,0	60,0	66,0	1,5-2,2	
NPT1 1/2"	KBA5SN	22,0-35,0	33,0-48,0	96,5	21,0	60,0	70,0	75,0	82,0	2,0-2,7	
NPT1 1/2"	KBA5N	27,0-41,0	36,0-52,0	100,0	21,0	70,0	70,0	74,0	83,0	2,0-2,7	
NPT2"	KBA6SN	35,0-45,0	43,0-57,0	106,0	20,0	75,0	80,0	80,0	89,5	2,5-3,5	
NPT2"	KBA6N	40,0-52,0	47,0-60,0	108,0	21,0	85,0	85,0	85,0	94,0	2,0-3,0	
NPT2 1/2"	KBA7SN	40,0-52,0	47,0-60,0	108,0	21,0	85,0	85,0	85,0	94,0	2,0-3,0	
NPT2 1/2"	KBA7N	45,0-60,0	54,0-70,0	125,0	20,0	90,0	95,0	100,0	110,5	1,8-3,0	
NPT3"	KBA8SN	45,0-60,0	54,0-70,0	124,0	21,0	95,0	95,0	100,0	110,5	1,8-3,0	
NPT3"	KBA8N	60,0-72,0	63,0-80,0	154,0	21,0	110,0	115,0	115,0	127,0	1,8-3,5	



Approved by	IMQ	
Examination Certificate Number	IMQ 11 ATEX 038 X	
Date of Issue	16.01.2012	
Test Report Number	43L00002	
Safety Requirements	EN 60079-0:2009 EN 60079-1:2007 EN 60079-7:2007 EN 60079-11:2010 EN 60079-31:2009	
Equipment Marking	Ex II 2 GD	Ex d IIC Gb Ex e IIC Gb Ex tb III Db
Approved	GOST'R' - INMETRO	

Item	Item Description
1	O-ring
2	Lower body
3	Seal S3
4	Seal S2
5	Seal S1
6	Cap
7	Cable

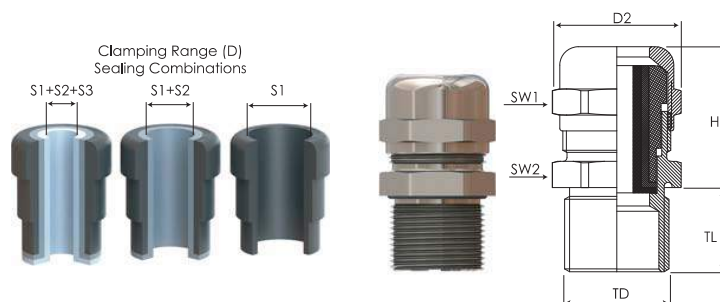


# Octans 1Function Ex d/e Gland

Equipment	Gas Group	Dust Group
Suitable for use in	ZONE1/ZONE2	ZONE21/ZONE 22
	Group II	Group III
	Gas Group IIC	Dust Group IIIC
For	Gas & Dust potentially explosive atmospheres	
Degree of Protection	IP66 – IP68 (EN 60529)	
Marking	BMD BU... Ex CE 0722 II 2GD Ex d IIC Gb / Ex e IIC Gb / Ex tb III C Db Ta-30°C +120°C IP66/68 MQ11 ATEX 038X	
Cable Type	Non-armor	
Seal Operating Temperature	Chloroprene	Items 1-3-4-5
	Silicone	
Material	Brass	Items 2-6
	Stainless Steel	
Thread Type	Metric (M) ISO Pitch 1,5 Npt (N) ANSI ASME B1.20.1 Other thread types also available upon request.	

Order Encoding						
Type	Thread	Material		Plated	Sealing	Code Examples
BU01	M (Metric) N (Npt)	B (Brass) X (Stainless Steel)		N (Nickel Only for Brass)	C (Chloroprene) S (Silicone)	BU01MBNS

Thread Type (TD)	Code	Clamping Range Ø min-max				Cable Gland Dimensions				
		D mm	S1+S2+S3 mm	S1+S2 mm	S1 mm	H min (mm)	TL (mm)	SW1 (mm)	SW2 (mm)	D2 (mm)
M16x1.5	BU01M	3,0-12,0	3,0-6,0	6,0-9,0	9,0-12,0	31,0	16	22	22	24,5
M20x1.5	BU1M	3,0-12,0	3,0-6,0	6,0-9,0	9,0-12,0	27,0	16	22	22	24,5
M20x1.5	BU12M	10,0-16,0	10,0-12,0	12,0-14,5	14,5-16,0	30,0	16	28	28	31,0
M25x1.5	BU2M	10,0-18,0	10,0-12,0	12,0-14,5	14,5-18,0	30,5	16	28	28	31,0
M25x1.5	BU23M	14,0-20,0	14,0-17,0	17,0-20,0	-	34,0	16	35	35	39,0
M32x1.5	BU3M	14,0-24,0	14,0-17,0	17,0-20,0	20,0-24,0	33,0	16	35	35	39,0
M32x1.5	BU34M	22,0-28,0	22,0-24,0	24,0-27,0	27,0-28,0	40,5	16	45	45	49,5
M40x1.5	BU4M	22,0-32,0	22,0-24,0	24,0-27,0	27,0-32,0	40,5	18	45	45	49,5
M40x1.5	BU45M	26,0-34,0	26,0-28,0	28,0-31,0	31,0-34,0	43,5	18	50	50	56,0
M50x1.5	BU5M	26,0-35,0	26,0-28,0	28,0-31,0	31,0-35,0	43,5	18	50	55	56,0
M50x1.5	BU56M	35,0-42,0	35,0-38,0	38,0-41,0	41,0-44,0	43,0	18	64	64	70,0
M63x1.5	BU6M	35,0-45,0	35,0-38,0	38,0-41,0	41,0-45,0	43,0	18	64	68	70,0
M63x1.5	BU67M	46,0-56,0	46,0-48,0	48,0-52,0	52,0-56,0	52,5	20	80	75	89,0
M75x1.5	BU7M	46,0-62,0	46,0-51,0	51,0-56,0	56,0-62,0	52,0	20	80	80	89,0
M75x1.5	BU78M	60,0-69,0	60,0-65,0	65,0-69,0	-	55,0	20	95	95	105,0
M90x1.5	BU8M	60,0-75,0	60,0-65,0	65,0-70,0	70,0-75,0	55,0	20	95	95	105,0
M90x1.5	BU810M	75,0-82,0	75,0-78,0	78,0-81,0	81,0-82,0	54,5	20	105	105	117,0
M100x1.5	BU10M	75,0-85,0	75,0-78,0	78,0-81,0	81,0-85,0	54,5	20	105	105	117,0
M110x1.5	BU11M	85,0-95,0	85,0-88,0	88,0-91,0	91,0-95,0	56,5	20	115	115	129,0
NPT3/8"	BU01N	3,0-12,0	3,0-6,0	6,0-9,0	9,0-12,0	30,0	16	22	22	24,5
NPT1/2"	BU1N	3,0-12,0	3,0-6,0	6,0-9,0	9,0-12,0	26,0	16	22	22	24,5
NPT1/2"	BU12N	10,0-16,0	10,0-12,0	12,0-14,5	14,0-16,0	30,0	16	28	28	31,0
NPT3/4"	BU2N	10,0-18,0	10,0-12,0	12,0-14,5	14,0-18,0	30,0	16	28	28	31,0
NPT3/4"	BU23N	14,0-20,0	14,0-17,0	17,0-20,0	-	33,0	16	35	35	39,0
NPT1"	BU3N	14,0-24,0	14,0-17,0	17,0-20,0	20,0-24,0	33,0	20	35	35	39,0
NPT1"	BU34N	22,0-26,0	22,0-24,0	24,0-26,0	-	40,0	20	45	45	49,5
NPT1 1/4"	BU4N	22,0-32,0	22,0-24,0	24,0-27,0	27,0-32,0	40,5	20	45	45	49,5
NPT1 1/4"	BU45N	26,0-34,0	26,0-28,0	28,0-31,0	31,0-34,0	43,0	20	50	50	56,0
NPT1 1/2"	BU5N	26,0-35,0	26,0-28,0	28,0-31,0	31,0-35,0	43,0	20	50	55	56,0
NPT1 1/2"	BU56N	35,0-41,0	35,0-38,0	38,0-41,0	-	41,5	20	64	64	70,0
NPT2"	BU6N	35,0-45,0	35,0-38,0	38,0-41,0	41,0-45,0	43,0	20	64	68	70,0
NPT2"	BU67N	46,0-52,0	46,0-48,0	48,0-52,0	-	52,0	20	80	75	89,0
NPT2 1/2"	BU7N	46,0-62,0	46,0-51,0	51,0-56,0	56,0-62,0	52,0	21	80	80	89,0
NPT2 1/2"	BU78N	60,0-64,0	60,0-64,0	-	-	55,0	21	95	95	105,0
NPT3"	BU8N	60,0-75,0	60,0-65,0	65,0-70,0	70,0-75,0	55,0	21	95	95	105,0
NPT3"	BU810N	75,0-79,5	75,0-78,0	78,0-79,5	-	54,5	21	105	105	117,0
NPT4"	BU10N	75,0-85,0	75,0-78,0	78,0-81,0	81,0-85,0	54,5	21	105	105	117,0
NPT4"	BU11N	85,0-95,0	85,0-88,0	88,0-91,0	91,0-95,0	56,0	21	115	115	129,0



# Cable Glands for **GAS & DUST** applications



Explosive gases, vapors and dusts have different chemical properties that affect the likelihood and severity of an explosion. Such properties include flame temperature, minimum ignition energy, upper and lower explosive limits, and molecular weight. Empirical testing is done to determine parameters such as the maximum experimental safe gap, minimum ignition current, explosion pressure and time to peak pressure, spontaneous ignition temperature, and maximum rate of pressure rise. Every substance has a differing combination of properties but it is found that they can be ranked into similar ranges, simplifying the selection of equipment for hazardous areas.

Flammability of combustible liquids are defined by their flash-point. The flash-point is the temperature at which the material will generate sufficient quantity of vapor to form an ignitable mixture. The flash point determines if an area needs to be classified. A material may have a relatively low autoignition temperature yet if its flash-point is above the ambient temperature, then the area may not need to be classified. Conversely if the same material is heated and handled above its flash-point, the area must be classified.

Each chemical gas or vapour used in industry is classified into a gas group.

Flammable dusts when suspended in air can explode. An old system of area classification to a British standard used a system of letters to designate the zones. This has been replaced by a European numerical system, as set out in directive 1999/92/EU implemented in the UK as the Dangerous Substances and Explosives Atmospheres Regulations 2002

The boundaries and extent of these three dimensional zones should be decided by a competent person. There must be a site plan drawn up of the factory with the zones marked on.



Cranes  
Motors  
Heaters  
Thermostat  
Heat dedectors  
Flame dedectors

Smoke dedectors  
Alarm Indicators  
motor starters  
loudspeakers  
alarm bell  
sounders / horns

control and distribution units,  
panels and boards  
beacons / strobes  
status lamps  
control stations  
junction and terminal boxes

variable-frequency on motors  
Lighting Fixtures  
Motor Starters  
Enclosures for control units and  
junction boxes (Power & Lighting)  
Lighting

manual call points  
doorholder magnets  
Electrical, digital compact volume  
flow controller  
Electric linear valve actuators  
Modulating electric

digital sensors for temperature,  
humidity, pressure and differential  
pressure  
Modulating transducer  
Binary switching module

**IEC** **IECEX** **Ex** **ATEX** **GROUP II-III**



**ORION  
KBA**

**4** Function  
Ex d/e Gland  
for SWA & AWA  
cable



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**21-22**

**ORION UNIVERSAL  
KBAU**

**4** Function  
Ex d/e Gland  
for SWA - SWB  
STA - Shielded  
PWA - AWA  
cable



Page  
**23-24**

**ORION OFFSHORE  
KBAO**

**4** Function  
Ex d/e Gland  
for SWB - STA  
& Shielded  
cable

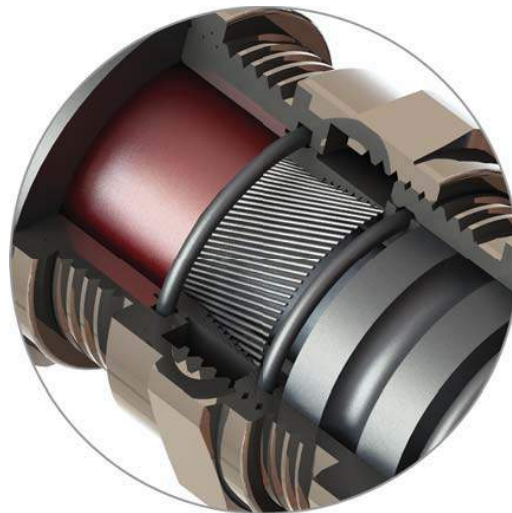
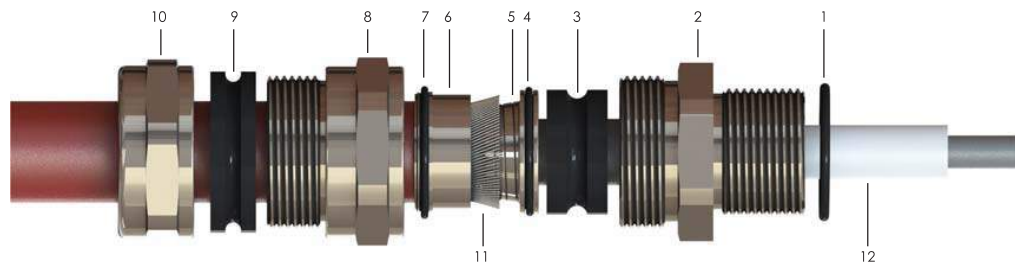


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**25-26**

Ex II 2 GD / Ex d IIC Gb - Ex e IIC Gb - Ex tb III Db

Approved by	CESI	CESI
Examination Certificate Number	CESI 13 ATEX 033X	IECEx CES 13.0013X
Date of Issue	15.07.2013	15.07.2013
Test Report Number	EX-B3019128	IT/CES/ExTR13.0007/00
Safety Requirements	EN 60079-0:2012 EN 60079-1:2007 EN 60079-7:2007 EN 60079-31:2009	IEC 60079-0:2011 Edition:6.0 IEC 60079-1:2007-04 Edition:6.0 IEC 60079-31:2008 Edition:1 IEC 60079-7:2006-07 Edition:4
Equipment Marking	Ex II 2 GD Ex d IIC Gb Ex e IIC Gb Ex tb IIIC Db	Ex II 2 GD Ex d IIC Gb Ex e IIC Gb Ex tb IIIC Db
Approved	GOST'R' - INMETRO	

Items	Item Description
1	O-ring or Washer
2	Lower body
3	Lower seal
4	O-ring
5	Grounding cone
6	Swivel retainer
7	O-ring
8	Upper body
9	Upper seal
10	Pressure Cap
11	Armored wire
12	Armored cable

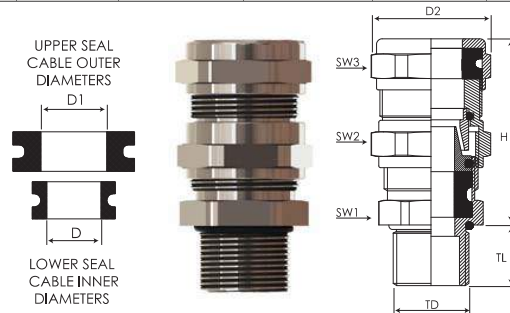


# Orion 4 Function Ex d/e Gland

Equipment	Gas Group	Dust Group
Suitable for use in	ZONE1/ZONE2	ZONE21/ZONE 22
For	Group II	Group III
Degree of Protection	Gas Group IIC	Dust Group IIIC
Marking	Gas & Dust potentially explosive atmospheres	
Cable Type	IP66 - IP68 (EN 60529)	
Seal Operating Temperature	Chloroprene (C)	-40°C / +100°C
	Silicone (S)	-60°C / +130°C
* (LT) Seal Operating Low Temperature	Chloroprene (C)	-40°C / +80°C
	Silicone (S)	-60°C / +80°C
Material	Brass	Items 1-3-4-7-9
	Stainless Steel	Items 2-5-6-8-10
Thread Type	Metric (M) ISO Pitch 1.5 Npt (N) ANSI ASME B1.20.1 Other thread types also available upon request.	

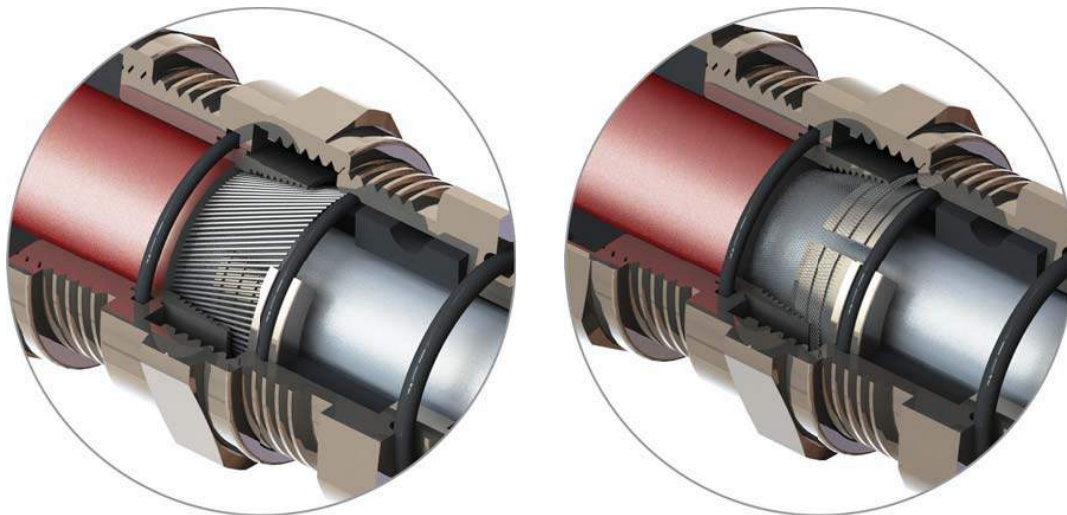
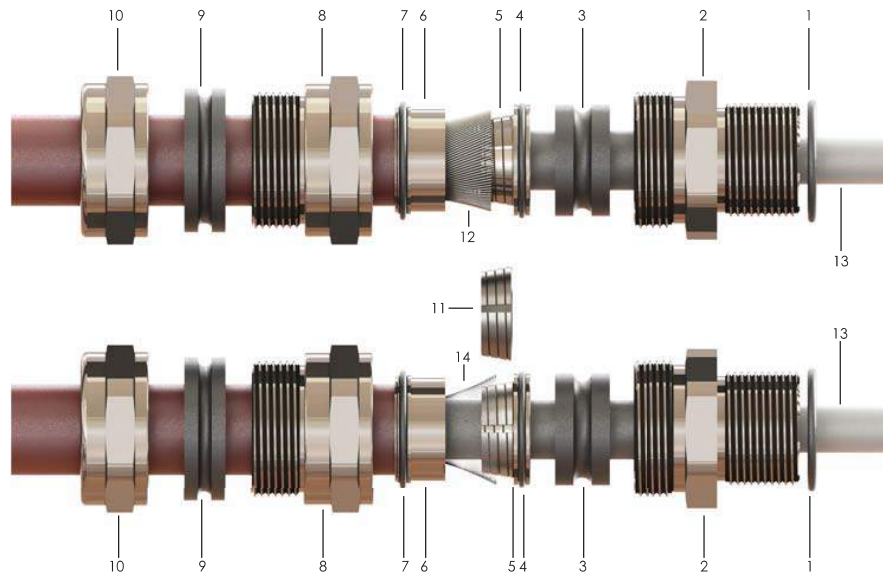
Order Encoding		Material	Plated	Sealing	Washer	Code Examples
Type	Thread	B (Brass) X (Stainless Steel)	N (Nickel Only for Brass)	C (Chloroprene) S (Silicone)	WC (Chloroprene) WS (Silicone) WF (Green Fibre)	KBA01MBNS KBA1MLTBNWS
KBA01	M (Metric)					
KBA1MLT	N (Npt)					

Thread Type (ID)	Code	Clamping Range Ø min-max		Cable Gland Dimensions						Armor Wire Ø (mm)
		D mm	D1 mm	H min (mm)	TL min (mm)	SW1 (mm)	SW2 (mm)	SW3 (mm)	D2 Min (mm)	
M16x1.5	KBA01SM	3,0-8,5	6,0-12,0	47,5	16,0	22,0	26,0	26,0	29,0	0,7-1,2
M16x1.5	KBA01M	6,0-12,0	8,5-16,0	50,0	16,0	25,0	29,0	29,0	31,5	0,7-1,2
M20x1.5	KBA1SM	3,0-8,5	6,0-12,0	47,5	16,0	24,0	26,0	26,0	29,0	0,7-1,2
M20x1.5	KBA1M	6,0-12,0	8,5-16,0	49,0	16,0	25,0	29,0	29,0	31,5	0,7-1,2
M20x1.5	KBA1LM	8,5-14,5	12,0-20,0	50,0	16,0	28,0	30,0	30,0	35,0	0,8-1,3
*M20x1.5	KBA1MLT	8,5-14,5	12,0-20,0	56,4	16,0	28,0	30,0	32,0	35,0	0,7-1,2
M25x1.5	KBA2SM	6,0-12,0	8,5-16,0	50,5	18,0	29,0	29,0	29,0	31,5	0,7-1,2
M25x1.5	KBA2M	8,5-16,0	12,0-21,0	53,0	18,0	32,0	34,0	32,0	37,0	0,8-1,3
*M25x1.5	KBA2MLT	8,5-16,0	12,0-21,0	59,5	18,0	32,0	34,0	34,0	37,0	1,0-1,6
M25x1.5	KBA2LM	12,0-20,0	16,0-26,0	60,5	18,0	36,0	40,0	40,0	44,0	1,0-1,6
*M25x1.5	KBA2XMMLT	8,5-14,5	12,0-16,0	56,4	16,0	29,0	30,0	32,0	35,0	1,0-1,6
M32x1.5	KBA3SM	12,0-20,0	16,0-26,0	62,0	18,0	40,0	40,0	40,0	44,0	1,0-1,6
*M32x1.5	KBA3XMMLT	8,5-16,0	12,0-21,0	59,5	18,0	36,0	34,0	34,0	37,0	1,0-1,6
M32x1.5	KBA3M	15,0-26,0	20,0-33,0	78,5	18,0	48,0	52,0	52,0	57,0	1,0-1,8
M40x1.5	KBA4SM	15,0-26,0	20,0-33,0	78,5	18,0	48,0	52,0	52,0	57,0	1,0-1,8
M40x1.5	KBA4M	20,0-32,0	29,0-41,0	89,5	18,0	55,0	60,0	60,0	66,0	1,5-2,2
M50x1.5	KBA5SM	22,0-35,0	33,0-48,0	96,5	18,0	60,0	70,0	75,0	82,0	2,0-2,7
M50x1.5	KBA5M	27,0-41,0	36,0-52,0	100,0	18,0	70,0	70,0	74,0	83,0	2,0-2,7
M63x1.5	KBA6SM	35,0-45,0	43,0-57,0	106,0	20,0	75,0	80,0	80,0	89,5	2,5-3,5
M63x1.5	KBA6M	40,0-52,0	47,0-60,0	108,0	20,0	85,0	85,0	85,0	94,0	2,0-3,0
M75x1.5	KBA7SM	40,0-52,0	47,0-60,0	108,0	20,0	85,0	85,0	85,0	94,0	2,0-3,0
M75x1.5	KBA7M	45,0-60,0	54,0-70,0	125,0	20,0	90,0	95,0	100,0	110,5	1,8-3,0
M90x1.5	KBA8SM	45,0-60,0	54,0-70,0	124,0	20,0	95,0	95,0	100,0	110,5	1,8-3,0
M90x1.5	KBA8M	60,0-72,0	63,0-80,0	154,0	20,0	110,0	115,0	115,0	127,0	1,8-3,5
NPT3/8"	KBA01SN	3,0-8,5	6,0-12,0	47,5	16,0	22,0	26,0	26,0	29,0	0,7-1,2
NPT3/8"	KBA01N	6,0-12,0	8,5-16,0	50,0	16,0	25,0	29,0	29,0	31,5	0,7-1,2
NPT1/2"	KBA1SN	3,0-8,5	6,0-12,0	47,5	16,0	24,0	26,0	26,0	29,0	0,7-1,2
NPT1/2"	KBA1N	6,0-12,0	8,5-16,0	49,0	16,0	25,0	29,0	29,0	31,5	0,7-1,2
*NPT1/2"	KBA1NLT	8,5-14,5	12,0-20,0	56,4	16,0	28,0	30,0	32,0	35,0	0,7-1,2
NPT1/2"	KBA1LN	8,5-14,5	12,0-20,0	50,0	18,0	28,0	30,0	32,0	35,0	0,8-1,3
NPT3/4"	KBA2SN	6,0-12,0	8,5-16,0	50,5	18,0	29,0	29,0	29,0	31,5	0,7-1,2
NPT3/4"	KBA2N	8,5-16,0	12,0-21,0	53,0	18,0	32,0	34,0	34,0	37,0	0,8-1,3
*NPT3/4"	KBA2NLT	8,5-16,0	12,0-21,0	59,5	18,0	32,0	34,0	34,0	37,0	0,7-1,2
NPT3/4"	KBA2LN	12,0-20,0	16,0-26,0	60,5	21,0	36,0	40,0	40,0	44,0	1,0-1,6
*NPT3/4"	KBA2XMNLT	8,5-14,5	12,0-20,0	56,4	21,0	29,0	30,0	32,0	35,0	1,0-1,6
NPT1"	KBA3SN	12,0-20,0	16,0-26,0	62,0	21,0	40,0	40,0	40,0	44,0	1,0-1,6
NPT1"	KBA3N	15,0-26,0	20,0-33,0	78,5	21,0	48,0	52,0	52,0	57,0	1,0-1,8
*NPT1"	KBA3XMNLT	8,5-16,0	12,0-21,0	59,5	21,0	36,0	34,0	34,0	37,0	1,0-1,8
NPT1 1/4"	KBA4SN	15,0-26,0	20,0-33,0	78,5	21,0	48,0	52,0	52,0	57,0	1,0-1,8
NPT1 1/4"	KBA4N	20,0-32,0	29,0-41,0	89,5	18,0	55,0	60,0	60,0	66,0	1,5-2,2
NPT1 1/2"	KBA5SN	22,0-35,0	33,0-48,0	96,5	21,0	60,0	70,0	75,0	82,0	2,0-2,7
NPT1 1/2"	KBA5N	27,0-41,0	36,0-52,0	100,0	21,0	70,0	70,0	74,0	83,0	2,0-2,7
NPT2"	KBA6SN	35,0-45,0	43,0-57,0	106,0	20,0	75,0	80,0	80,0	89,5	2,5-3,5
NPT2"	KBA6N	40,0-52,0	47,0-60,0	108,0	21,0	85,0	85,0	85,0	94,0	2,0-3,0
NPT2 1/2"	KBA7SN	40,0-52,0	47,0-60,0	108,0	21,0	85,0	85,0	85,0	94,0	2,0-3,0
NPT2 1/2"	KBA7N	45,0-60,0	54,0-70,0	125,0	20,0	90,0	95,0	100,0	110,5	1,8-3,0
NPT3"	KBA8SN	45,0-60,0	54,0-70,0	124,0	21,0	95,0	95,0	100,0	110,5	1,8-3,0
NPT3"	KBA8N	60,0-72,0	63,0-80,0	154,0	21,0	110,0	115,0	115,0	127,0	1,8-3,5



Approved by	CESI	CESI
Examination Certificate Number	CESI 13 ATEX 033X	IECEx CES 13.0013X
Date of Issue	15.07.2013	15.07.2013
Test Report Number	EX-B3019128	IT/CES/ExTR13.0007/00
Safety Requirements	EN 60079-0:2012 EN 60079-1:2007 EN 60079-7:2007 EN 60079-31:2009	IEC 60079-0:2011 Edition:6.0 IEC 60079-1:2007-04 Edition:6.0 IEC 60079-31:2008 Edition:1 IEC 60079-7:2006-07 Edition:4
Equipment Marking	Ex II 2 GD Ex d IIC Gb Ex e IIC Gb Ex tb IIIC Db	Ex II 2 GD Ex d IIC Gb Ex e IIC Gb Ex tb IIIC Db
Approved	GOST'R' - INMETRO	

Items	Item Description
1	O-ring or Washer
2	Lower body
3	Lower seal
4	O-ring
5	Grounding cone
6	Swivel retainer
7	O-ring
8	Upper body
9	Upper seal
10	Pressure Cap
11	Armor reduction
12	Armored wire
13	Armored cable
14	Shielded wire



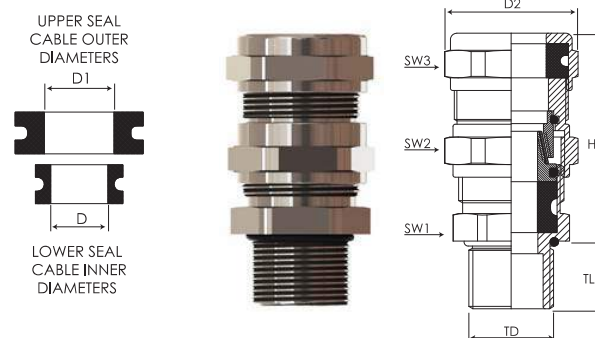


# Orion Universal 4 Function Ex d/e Gland

Equipment	Gas Group	Dust Group
Suitable for use in	ZONE1/ZONE2	ZONE21/ZONE 22
For	Group II	Group III
Degree of Protection	Gas Group IIC	Dust Group III C
Marking	Gas & Dust potentially explosive atmospheres	
Cable Type	IP66 - IP68 (EN 60529)	
Seal Operating Temperature	Chloroprene (C)	-40°C / +100°C
	Silicone (S)	-60°C / +130°C
	Items 1-3-4-7-9	
*(LT) Seal Operating Low temperature	Chloroprene (C)	-40°C / +80°C
	Silicone (S)	-60°C / +80°C
	Items 1-3-4-7-9	
Material	Brass	Items 2-5-6-8-10-11
	Stainless Steel	
Thread Type	Metric (M) ISO Pitch 1.5 Npt (N) ANSI ASME B1.20.1 Other thread types also available upon request.	

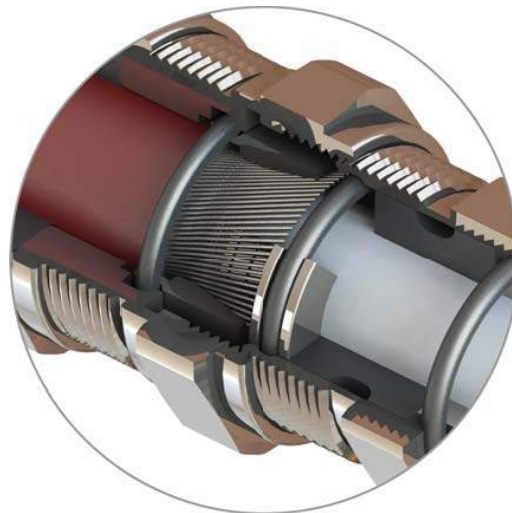
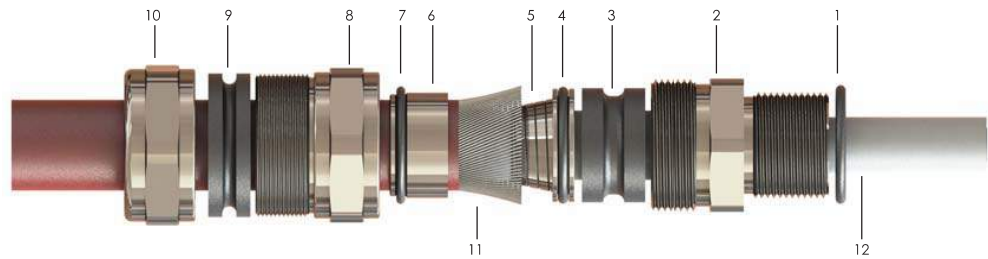
Order Encoding						
Type	Thread	Material	Plated	Sealing	Washer	Code Examples
KBAU01	M (Metric)	B (Brass)	N (Nickel Only for Brass)	C (Chloroprene)	WC (Chloroprene)	KBAU01MBNS
KBAU1MLT	N (Npt)	X (Stainless Steel)		S (Silicone)	WS (Silicone) WF (Green Fibre)	KBAU1MLTBNSWS

Thread Type (TD)	Code	Clamping Range Ø min-max		Cable Gland Dimensions						Armor Wire Ø min-max (mm)
		D mm	D1 mm	H min (mm)	TL min (mm)	SW1 (mm)	SW2 (mm)	SW3 (mm)	D2 Min (mm)	
M16x1.5	KBAU01SM	3.0-8.5	6.0-12.0	47.5	16.0	22.0	26.0	26.0	29.0	0.2-0.5
M16x1.5	KBAU01M	6.0-12.0	8.5-16.0	50.0	16.0	25.0	29.0	29.0	31.5	0.2-0.5
M20x1.5	KBAU1SM	3.0-8.5	6.0-12.0	47.5	16.0	24.0	26.0	26.0	29.0	0.2-0.5
M20x1.5	KBAU1M	6.0-12.0	8.5-16.0	49.0	16.0	25.0	29.0	29.0	31.5	0.2-0.5
M20x1.5	KBAU1LM	8.5-14.5	12.0-20.0	50.0	16.0	28.0	30.0	30.0	35.0	0.2-0.7
*M20x1.5	KBAU1MLT	8.5-14.5	12.0-20.0	56.4	16.0	28.0	30.0	32.0	35.0	0.2-0.5
M25x1.5	KBAU2SM	6.0-12.0	8.5-16.0	50.5	18.0	29.0	29.0	29.0	31.5	0.2-0.5
M25x1.5	KBAU2M	8.5-16.0	12.0-21.0	53.0	18.0	32.0	34.0	32.0	37.0	0.2-0.7
*M25x1.5	KBAU2MLT	8.5-16.0	12.0-21.0	59.5	18.0	32.0	34.0	34.0	37.0	0.2-0.7
M25x1.5	KBAU2LM	12.0-20.0	16.0-26.0	60.5	18.0	36.0	40.0	40.0	44.0	0.2-0.7
*M25x1.5	KBAU2XMMLT	8.5-14.5	12.0-16.0	56.4	16.0	29.0	30.0	32.0	35.0	0.2-0.7
M32x1.5	KBAU3SM	12.0-20.0	16.0-26.0	62.0	18.0	40.0	40.0	40.0	44.0	0.2-0.7
*M32x1.5	KBAU3XMMLT	8.5-16.0	12.0-21.0	59.5	18.0	36.0	34.0	34.0	37.0	0.2-0.7
M32x1.5	KBAU3M	15.0-26.0	20.0-33.0	78.5	18.0	48.0	52.0	52.0	57.0	0.2-0.7
M40x1.5	KBAU4SM	15.0-26.0	20.0-33.0	78.5	18.0	48.0	52.0	52.0	57.0	0.2-0.7
M40x1.5	KBAU4M	20.0-32.0	29.0-41.0	89.5	18.0	55.0	60.0	60.0	66.0	0.2-0.7
M50x1.5	KBAU5SM	22.0-35.0	33.0-48.0	96.5	18.0	60.0	70.0	75.0	82.0	0.2-0.9
M50x1.5	KBAU5M	27.0-41.0	36.0-52.0	100.0	18.0	70.0	70.0	74.0	83.0	0.2-0.9
M63x1.5	KBAU6SM	35.0-45.0	43.0-57.0	106.0	20.0	75.0	80.0	80.0	89.5	0.2-0.9
M63x1.5	KBAU6M	40.0-52.0	47.0-60.0	108.0	20.0	85.0	85.0	85.0	94.0	0.2-1.0
M75x1.5	KBAU7SM	40.0-52.0	47.0-60.0	108.0	20.0	85.0	85.0	85.0	94.0	0.2-1.0
M75x1.5	KBAU7M	45.0-60.0	54.0-70.0	125.0	20.0	90.0	95.0	100.0	110.5	0.2-1.0
M90x1.5	KBAU8SM	45.0-60.0	54.0-70.0	124.0	20.0	95.0	95.0	100.0	110.5	0.2-1.0
M90x1.5	KBAU8M	60.0-72.0	63.0-80.0	154.0	20.0	110.0	115.0	115.0	127.0	0.2-1.5
NPT3/8"	KBAU01SN	3.0-8.5	6.0-12.0	47.5	16.0	22.0	26.0	26.0	29.0	0.2-0.5
NPT3/8"	KBAU01N	6.0-12.0	8.5-16.0	50.0	16.0	25.0	29.0	29.0	31.5	0.2-0.5
NPT1/2"	KBAU1SN	3.0-8.5	6.0-12.0	47.5	16.0	24.0	26.0	26.0	29.0	0.2-0.5
NPT1/2"	KBAU1N	6.0-12.0	8.5-16.0	49.0	16.0	25.0	29.0	29.0	31.5	0.2-0.5
*NPT1/2"	KBAU1NLT	8.5-14.5	12.0-20.0	56.4	16.0	28.0	30.0	32.0	35.0	0.2-0.5
NPT1/2"	KBAU1LN	8.5-14.5	12.0-20.0	50.0	16.0	28.0	30.0	32.0	35.0	0.2-0.7
NPT3/4"	KBAU2SN	6.0-12.0	8.5-16.0	50.5	18.0	29.0	29.0	29.0	31.5	0.2-0.5
NPT3/4"	KBAU2N	8.5-16.0	12.0-21.0	53.0	18.0	32.0	34.0	32.0	37.0	0.2-0.7
*NPT3/4"	KBAU2NLT	8.5-14.5	12.0-20.0	59.5	18.0	32.0	34.0	34.0	37.0	0.2-0.7
NPT3/4"	KBAU2LN	12.0-20.0	16.0-26.0	60.5	18.0	36.0	40.0	40.0	44.0	0.2-0.7
NPT3/4"	KBAU2XMMLT	8.5-14.5	12.0-20.0	56.4	21.0	29.0	30.0	32.0	35.0	0.2-0.7
NPT1"	KBAU3SN	12.0-20.0	16.0-26.0	62.0	21.0	40.0	40.0	40.0	44.0	0.2-0.7
NPT1"	KBAU3N	15.0-26.0	20.0-33.0	78.5	21.0	48.0	52.0	52.0	57.0	0.2-0.7
*NPT1"	KBAU3XMMLT	8.5-16.0	12.0-21.0	59.5	21.0	36.0	34.0	34.0	37.0	0.2-0.7
NPT1 1/4"	KBAU4SN	15.0-26.0	20.0-33.0	78.5	21.0	48.0	52.0	52.0	57.0	0.2-0.7
NPT1 1/4"	KBAU4N	20.0-32.0	29.0-41.0	89.5	21.0	55.0	60.0	60.0	66.0	0.2-0.7
NPT1 1/2"	KBAU5SN	22.0-35.0	33.0-48.0	96.5	21.0	60.0	70.0	75.0	82.0	0.2-0.9
NPT1 1/2"	KBAU5N	27.0-41.0	36.0-52.0	100.0	21.0	70.0	70.0	74.0	83.0	0.2-0.9
NPT2"	KBAU6SN	35.0-45.0	43.0-57.0	106.0	21.0	75.0	80.0	80.0	89.5	0.2-0.9
NPT2"	KBAU6N	40.0-52.0	47.0-60.0	108.0	21.0	85.0	85.0	85.0	94.0	0.2-1.0
NPT2 1/2"	KBAU7SN	40.0-52.0	47.0-60.0	108.0	21.0	85.0	85.0	85.0	94.0	0.2-1.0
NPT2 1/2"	KBAU7N	45.0-60.0	54.0-70.0	125.0	21.0	90.0	95.0	100.0	110.5	0.2-1.0
NPT3"	KBAU8SN	45.0-60.0	54.0-70.0	124.0	21.0	95.0	95.0	100.0	110.5	0.2-1.0
NPT3"	KBAU8N	60.0-72.0	63.0-80.0	154.0	21.0	110.0	115.0	115.0	127.0	0.2-1.5



Approved by	CESI		CESI	
Examination Certificate Number	CESI 13 ATEX 033X		IECEX CES 13.0013X	
Date of Issue	15.07.2013		15.07.2013	
Test Report Number	EX-B3019128		IT/CES/ExTR13.0007/00	
Safety Requirements	EN 60079-0:2012 EN 60079-1:2007 EN 60079-7:2007 EN 60079-31:2009		IEC 60079-0:2011 Edition:6.0 IEC 60079-1:2007-04 Edition:6.0 IEC 60079-31:2008 Edition:1 IEC 60079-7:2006-07 Edition:4	
Equipment Marking	Ex II 2 GD	Ex d IIC Gb Ex e IIC Gb Ex tb IIIC Db	Ex II 2 GD	Ex d IIC Gb Ex e IIC Gb Ex tb IIIC Db
Approved	GOST'R' - INMETRO			

Items	Item Description
1	O-ring or Washer
2	Lower body
3	Lower seal
4	O-ring
5	Grounding cone
6	Swivel retainer
7	O-ring
8	Upper body
9	Upper seal
10	Pressure Cap
11	Shielded wire
12	Shielded cable

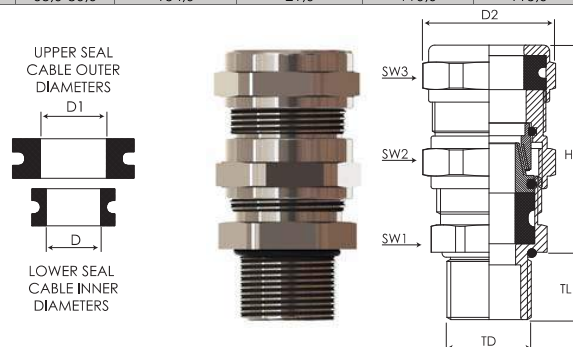


# Orion Offshore 4 Function Ex d/e Gland

Equipment	Gas Group ZONE1/ZONE2		Dust Group ZONE21/ZONE 22
Suitable for use in	Group II Gas Group IIC		Group III Dust Group IIIC
For	Gas & Dust potentially explosive atmospheres		
Degree of Protection	IP66 - IP68 (EN 60529)		
Marking	BMD KBAO.. Ex CE 0722 II 2GD Exd IIC Gb / Exe IIC Gb / Ex tb IIIC Db Ta -40°C +100°C IP66/68 IECEx CES 13.0013X / CESI 13 ATEX 033X		
Cable Type	SWB - STA - Shielded		
Seal Operating Temperature	Chloroprene (C) Silicone (S)	-40°C / +100°C -60°C / +130°C	Items 1-3-4-7-9
*(LT) Seal Operating Low temperature	Chloroprene (C) Silicone (S)	-40°C / +80°C -60°C / +80°C	Items 1-3-4-7-9
Material	Brass Stainless Steel		Items 2-5-6-8-10
Thread Type	Metric (M) ISO Pitch 1.5 Npt (N) ANSI ASME B1.20.1 Other thread types also available upon request.		

Order Encoding						
Type	Thread	Material	Plated	Sealing	Washer	Code Examples
KBAO01	M (Metric)	B (Brass)	N (Nickel Only for Brass)	C (Chloroprene)	WC (Chloroprene)	KBAO01MBNS
KBAO1MLT	N (Npt)	X (Stainless Steel)		S (Silicone)	WS (Silicone) WF (Green Fibre)	KBAO1MLTBSWS

Thread Type (TD)	Code	Clamping Range Ø min-max		Cable Gland Dimensions							Shielded Wire Ø (mm)
		D mm	D1 mm	H min (mm)	TL min (mm)	SW1 (mm)	SW2 (mm)	SW3 (mm)	D2 Min (mm)		
M16x1.5	KBAO01SM	3.0-8.5	6.0-12.0	47.5	16.0	22.0	26.0	26.0	29.0	31.5	0.2-0.5
M16x1.5	KBAO01M	6.0-12.0	8.5-16.0	50.0	16.0	25.0	29.0	29.0	31.5	0.2-0.5	
M20x1.5	KBAO1SM	3.0-8.5	6.0-12.0	47.5	16.0	24.0	26.0	26.0	29.0	31.5	0.2-0.5
M20x1.5	KBAO1M	6.0-12.0	8.5-16.0	49.0	16.0	25.0	29.0	29.0	31.5	0.2-0.5	
M20x1.5	KBAO1LM	8.5-14.5	12.0-20.0	50.0	16.0	28.0	30.0	30.0	35.0	0.2-0.7	
*M20x1.5	KBAO1MLT	8.5-14.5	12.0-20.0	56.4	16.0	28.0	30.0	32.0	35.0	0.2-0.5	
M25x1.5	KBAO2SM	6.0-12.0	8.5-16.0	50.5	18.0	29.0	29.0	29.0	31.5	0.2-0.5	
M25x1.5	KBAO2M	8.5-16.0	12.0-21.0	53.0	18.0	32.0	34.0	32.0	37.0	0.2-0.7	
*M25x1.5	KBAO2MLT	8.5-16.0	12.0-21.0	59.5	18.0	32.0	34.0	34.0	37.0	0.2-0.7	
M25x1.5	KBAO2LM	12.0-20.0	16.0-26.0	60.5	18.0	36.0	40.0	40.0	44.0	0.2-0.7	
*M25x1.5	KBAO2XMMLT	8.5-14.5	12.0-16.0	56.4	16.0	29.0	30.0	32.0	35.0	0.2-0.7	
M32x1.5	KBAO3SM	12.0-20.0	16.0-26.0	62.0	18.0	40.0	40.0	40.0	44.0	0.2-0.7	
*M32x1.5	KBAO3XMMLT	8.5-16.0	12.0-21.0	59.5	18.0	36.0	34.0	34.0	37.0	0.2-0.7	
M32x1.5	KBAO3M	15.0-26.0	20.0-33.0	78.5	18.0	48.0	52.0	52.0	57.0	0.2-0.7	
M40x1.5	KBAO4SM	15.0-26.0	20.0-33.0	78.5	18.0	48.0	52.0	52.0	57.0	0.2-0.7	
M40x1.5	KBAO4M	20.0-32.0	29.0-41.0	89.5	18.0	55.0	60.0	60.0	66.0	0.2-0.7	
M50x1.5	KBAO5SM	22.0-35.0	33.0-48.0	96.5	18.0	60.0	70.0	75.0	82.0	0.2-0.9	
M50x1.5	KBAO5M	27.0-41.0	36.0-52.0	100.0	18.0	70.0	70.0	74.0	83.0	0.2-0.9	
M63x1.5	KBAO6SM	35.0-45.0	43.0-57.0	106.0	20.0	75.0	80.0	80.0	89.5	0.2-0.9	
M63x1.5	KBAO6M	40.0-52.0	47.0-60.0	108.0	20.0	85.0	85.0	85.0	94.0	0.2-1.0	
M75x1.5	KBAO7SM	40.0-52.0	47.0-60.0	108.0	20.0	85.0	85.0	85.0	94.0	0.2-1.0	
M75x1.5	KBAO7M	45.0-60.0	54.0-70.0	125.0	20.0	90.0	95.0	100.0	110.5	0.2-1.0	
M90x1.5	KBAO8SM	45.0-60.0	54.0-70.0	124.0	20.0	95.0	95.0	100.0	110.5	0.2-1.0	
M90x1.5	KBAO8M	60.0-72.0	63.0-80.0	154.0	20.0	110.0	115.0	115.0	127.0	0.2-2.5	
NPT3/8"	KBAO01SN	3.0-8.5	6.0-12.0	47.5	16.0	22.0	26.0	26.0	29.0	31.5	0.2-0.5
NPT3/8"	KBAO01N	6.0-12.0	8.5-16.0	50.0	16.0	25.0	29.0	29.0	31.5	0.2-0.5	
NPT1/2"	KBAO1SN	3.0-8.5	6.0-12.0	47.5	16.0	24.0	26.0	26.0	29.0	31.5	0.2-0.5
NPT1/2"	KBAO1N	6.0-12.0	8.5-16.0	49.0	16.0	25.0	29.0	29.0	31.5	0.2-0.5	
*NPT1/2"	KBAO1NLT	8.5-14.5	12.0-20.0	56.4	16.0	28.0	30.0	32.0	35.0	0.2-0.5	
NPT1/2"	KBAO1LN	8.5-14.5	12.0-20.0	50.0	16.0	28.0	30.0	32.0	35.0	0.2-0.7	
NPT3/4"	KBAO2SN	6.0-12.0	8.5-16.0	50.5	18.0	29.0	29.0	29.0	31.5	0.2-0.5	
NPT3/4"	KBAO2N	8.5-16.0	12.0-21.0	53.0	18.0	32.0	34.0	32.0	37.0	0.2-0.7	
*NPT3/4"	KBAO2NLT	8.5-16.0	12.0-21.0	59.5	18.0	32.0	34.0	34.0	37.0	0.2-0.7	
NPT3/4"	KBAO2LN	12.0-20.0	16.0-26.0	60.5	16.0	36.0	40.0	40.0	44.0	0.2-0.7	
*NPT3/4"	KBAO2XMMLT	8.5-14.5	12.0-20.0	56.4	21.0	29.0	30.0	32.0	35.0	0.2-0.7	
NPT1"	KBAO3SN	12.0-20.0	16.0-26.0	62.0	21.0	40.0	40.0	40.0	44.0	0.2-0.7	
NPT1"	KBAO3N	15.0-26.0	20.0-33.0	78.5	21.0	48.0	52.0	52.0	57.0	0.2-0.7	
*NPT1"	KBAO3XMMLT	8.5-16.0	12.0-21.0	59.5	21.0	36.0	34.0	34.0	37.0	0.2-0.7	
NPT1 1/4"	KBAO4SN	15.0-26.0	20.0-33.0	78.5	21.0	48.0	52.0	52.0	57.0	0.2-0.7	
NPT1 1/4"	KBAO4N	20.0-32.0	29.0-41.0	89.5	18.0	55.0	60.0	60.0	66.0	0.2-0.7	
NPT1 1/2"	KBAO5SN	22.0-35.0	33.0-48.0	96.5	21.0	60.0	70.0	75.0	82.0	0.2-0.9	
NPT1 1/2"	KBAO5N	27.0-41.0	36.0-52.0	100.0	20.0	70.0	70.0	74.0	83.0	0.2-0.9	
NPT2"	KBAO6SN	35.0-45.0	43.0-57.0	106.0	20.0	75.0	80.0	80.0	89.5	0.2-0.9	
NPT2"	KBAO6N	40.0-52.0	47.0-60.0	108.0	21.0	85.0	85.0	85.0	94.0	0.2-1.0	
NPT2 1/2"	KBAO7SN	40.0-52.0	47.0-60.0	108.0	21.0	85.0	85.0	85.0	94.0	0.2-1.0	
NPT2 1/2"	KBAO7N	45.0-60.0	54.0-70.0	125.0	20.0	90.0	95.0	100.0	110.5	0.2-1.0	
NPT3"	KBAO8SN	45.0-60.0	54.0-70.0	124.0	21.0	95.0	95.0	100.0	110.5	0.2-1.0	
NPT3"	KBAO8N	60.0-72.0	63.0-80.0	154.0	21.0	110.0	115.0	115.0	127.0	0.2-2.5	



# Cable Glands for **GAS & DUST** applications



**Auto ignition temperatures**

The auto ignition temperature of a liquid, gas or vapor is the temperature at which the substance will ignite without any external heat source. The exact temperature value determined depends on the laboratory test conditions and apparatus. Such temperatures for common substances are:

The surface of a high pressure steam pipe may be above the autoignition temperature of some fuel/air mixtures.

**Auto ignition temperatures (dust)**

The auto ignition temperature of a dust is usually higher than that of vapours & gases. Examples for common materials are:

Gas	Temperature
Methane	580 °C
Hydrogen	560 °C
Propane	493 °C
Ethylene	425 °C
Acetylene	305 °C
Naphtha	290 °C
Carbon disulfide	102 °C

Substance	Temperature
Sugar	460 °C
Wood	340 °C
Flour	340 °C
Grain dust	300 °C
Tea	300 °C



Cranes  
Motors  
Heaters  
Thermostat  
Heat dedectors  
Flame dedectors



Smoke dedectors  
Alarm indicators  
motor starters  
loudspeakers  
alarm bell  
sounders / horns



control and distribution units,  
panels and boards  
beacons / strobes  
status lamps  
control stations  
junction and terminal boxes



variable-frequency on motors  
Lighting Fixtures  
Motor Starters  
Enclosures for control units and  
junction boxes (Power & Lighting)  
Lighting



manual call points  
doorholder magnets  
Electrical, digital compact volume  
flow controller  
Electric linear valve actuators  
Modulating electric



digital sensors for temperature,  
humidity, pressure and differential  
pressure  
Modulating transducer  
Binary switching module

**IEC** **IECEX** **Ex** **ATEX** **GROUP II-III**



**CRATER**  
**KBU**

**1** Function  
Ex d/e Gland  
for non armor  
cable



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**29-30**

**E-OCTANS**  
**EBU**

**1** Function  
Ex d/e Gland  
for non armor  
cable



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**31-32**

**E-VELA**  
**EBS**

**1** Function  
Ex d/e Emc Gland  
for non armor  
shielded cable



Page  
**33-34**

**NORMA**  
**NBU**

**1** Function  
Ex e Gland  
for non armor  
cable

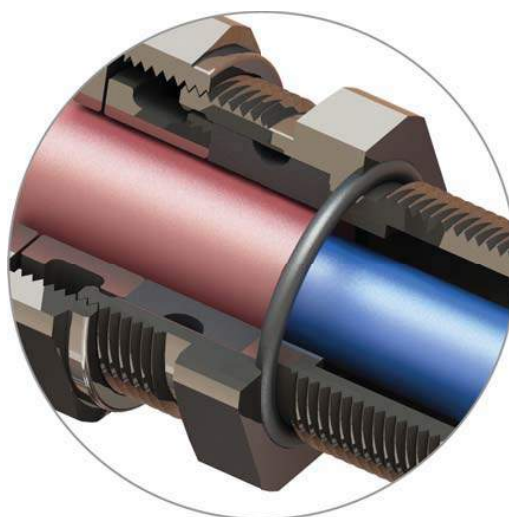
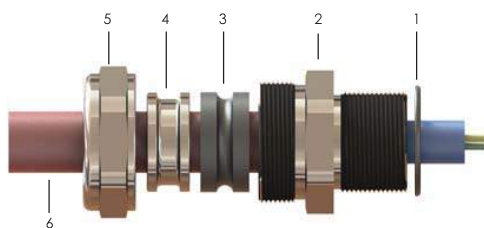


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**35-36**

Ex II 2 GD / Ex d IIC Gb - Ex e IIC Gb - Ex tb III Db

Approved by	CESI		CESI	
Examination Certificate Number	CESI 13 ATEX 033X		IECEX CES 13.0013X	
Date of Issue	15.07.2013		15.07.2013	
Test Report Number	EX-B3019128		IT/CES/ExTR13.0007/00	
Safety Requirements	EN 60079-0:2012 EN 60079-1:2007 EN 60079-7:2007 EN 60079-31:2009		IEC 60079-0:2011 Edition:6.0 IEC 60079-1:2007-04 Edition:6.0 IEC 60079-31:2008 Edition:1 IEC 60079-7:2006-07 Edition:4	
Equipment Marking	Ex II 2 GD	Ex d IIC Gb Ex e IIC Gb Ex tb IIIC Db	Ex II 2 GD	Ex d IIC Gb Ex e IIC Gb Ex tb IIIC Db

Items	Item Description
1	O-ring
2	Lower body
3	Lower seal
4	Pressure ring
5	Pressure cap
6	Cable

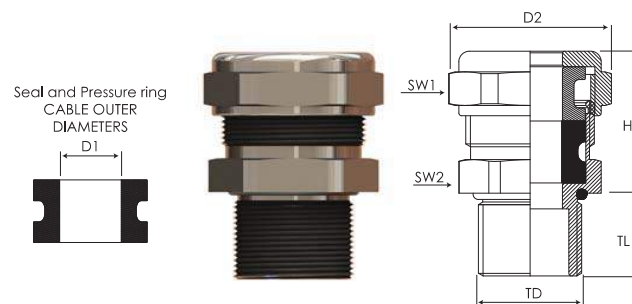


# Crater 1Function Ex d/e Gland

Equipment	Gas Group ZONE1/ZONE2	Dust Group ZONE21/ZONE 22
Suitable for use in	Group II Gas Group IIC	Group III Dust Group IIIC
For	Gas & Dust potentially explosive atmospheres	
Degree of Protection	IP66 – IP68 (EN 60529)	
Marking	BMD KBU., Ex CE 0722 II 2GD Exd IIC Gb / Exe IIC Gb / Ex tb IIIC Db Tc-40°C +100°C IP66/68 IECEx CES 13.001.3X / CESI 13 ATEX 033X	
Cable Type	Non-armor	
Seal Operating Temperature	Chloroprene Silicone	-40°C / +100°C -60°C / +130°C
Material	Brass Stainless Steel Galvanized Steel	Items 1-3 Items 2-4-5
Thread Type	Metric (M) ISO Pitch 1,5 Npt (N) ANSI ASME B1.20.1 Other thread types also available upon request.	

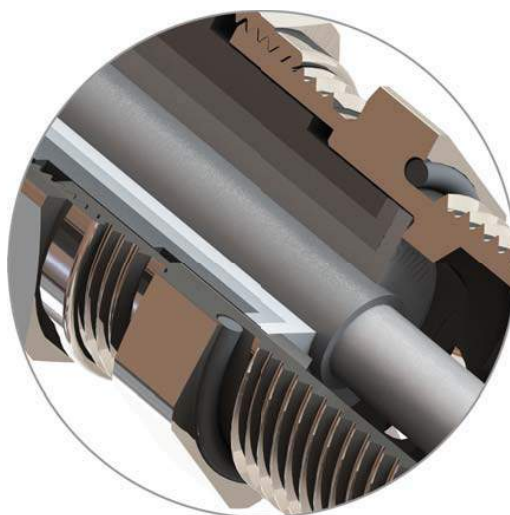
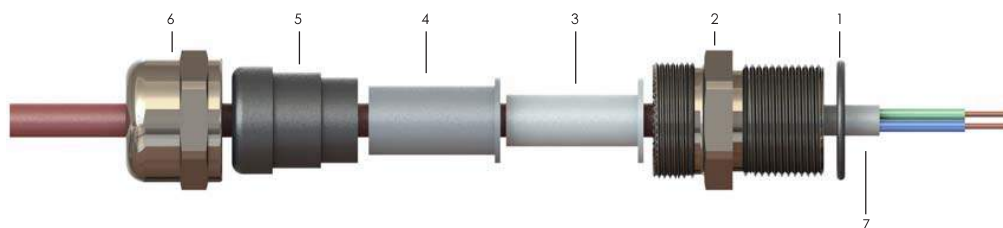
Order Encoding					
Type	Thread	Material	Plated	Sealing	Code Examples
KBU01	M (Metric) N (Npt)	B (Brass) X (Stainless Steel) G (Galvanized S.)	N (Nickel Only for Brass)	C (Chloroprene) S (Silicone)	KBU01MBNS

Thread Type (TD)	Code	Clamping Range Ø min-max D1 mm	Cable Gland Dimensions				
			H min (mm)	TL min (mm)	SW1 (mm)	SW2 (mm)	D2 min (mm)
M16x1.5	KBU01M	3,0-8,5	25,0	16	22	26	29,0
M16x1.5	KBU01LM	6,0-12,0	28,0	16	25	29	31,5
M20x1.5	KBU1M	6,0-12,0	27,5	16	25	29	31,5
M20x1.5	KBU1LM	8,5-14,5	29,0	16	28	30	33,5
M25x1.5	KBU2SM	6,0-12,0	28,5	18	29	29	31,5
M25x1.5	KBU2M	8,5-16,0	28,5	18	32	35	37,0
M25x1.5	KBU2LM	12,0-20,0	32,5	18	36	40	44,5
M32x1.5	KBU3SM	12,0-20,0	33,5	18	40	40	44,5
M32x1.5	KBU3M	15,0-26,0	41,0	18	48	52	57,0
M40x1.5	KBU4SM	15,0-26,0	40,5	18	48	52	57,0
M40x1.5	KBU4M	20,0-32,0	50,0	18	55	60	66,0
M50x1.5	KBU5SM	22,0-35,0	50,5	18	60	70	77,0
M50x1.5	KBU5M	27,0-41,0	54,0	18	70	70	77,0
M63x1.5	KBU6SM	35,0-45,0	61,5	20	75	80	89,5
M63x1.5	KBU6M	40,0-52,0	61,5	20	85	85	94,0
M75x1.5	KBU7SM	40,0-52,0	61,5	20	85	85	94,0
M75x1.5	KBU7M	45,0-60,0	72,0	20	90	95	105,0
M90x1.5	KBU8SM	45,0-60,0	72,0	20	95	95	105,0
M90x1.5	KBU8M	60,0-72,0	84,0	20	110	115	127,0
NPT3/8"	KBU01N	3,0-8,5	25,0	16	22	26	29,0
NPT3/8"	KBU01LN	6,0-12,0	28,0	16	25	29	31,5
NPT1/2"	KBU1N	6,0-12,0	27,5	16	25	29	31,5
NPT1/2"	KBU1LN	8,5-14,5	29,0	16	28	30	33,5
NPT3/4"	KBU2SN	6,0-12,0	28,5	18	29	29	31,5
NPT3/4"	KBU2N	8,5-16,0	28,5	18	32	35	37,0
NPT3/4"	KBU2LN	12,0-20,0	32,5	16	36	40	44,5
NPT1"	KBU3SN	12,0-20,0	33,5	21	40	40	44,5
NPT1"	KBU3N	15,0-26,0	41,0	21	48	52	57,0
NPT1 1/4"	KBU4SN	15,0-26,0	40,5	21	48	52	57,0
NPT1 1/4"	KBU4N	20,0-32,0	50,0	18	55	60	66,0
NPT1 1/2"	KBU5SN	22,0-35,0	50,5	21	60	70	77,0
NPT1 1/2"	KBU5N	27,0-41,0	54,0	21	70	70	77,0
NPT2"	KBU6SN	35,0-45,0	61,5	20	75	80	89,5
NPT2"	KBU6N	40,0-52,0	61,5	21	85	85	94,0
NPT2 1/2"	KBU7SN	40,0-52,0	61,5	21	85	85	94,0
NPT2 1/2"	KBU7N	45,0-60,0	72,0	20	90	95	105,0
NPT3"	KBU8SN	45,0-60,0	72,0	21	95	95	105,0
NPT3"	KBU8N	60,0-72,0	84,0	21	110	115	127,0



Approved by	IMQ	IMQ
Examination Certificate Number	IMQ 13 ATEX 018X	IECEx IMQ 13.0006X
Date of Issue	29.07.2013	31.10.2013
Test Report Number	43AN00024	54AN00009
Safety Requirements	EN 60079-0:2009 EN 60079-7:2007 EN 60079-31:2009	IEC 60079-0:2007 Edition:5 IEC 60079-7:2006 Edition:4 IEC 60079-31:2008 Edition:1
Equipment Marking	Ex II 2 GD	Ex II 2 GD
	Ex d IIC Gb Ex e IIC Gb Ex tb IIIC Db	Exd IIC Gb Ex e IIC Gb Ex tb IIIC Db

Item	Item Description
1	O-ring
2	Lower body
3	Seal S3
4	Seal S2
5	Seal S1
6	Cap
7	Cable





# E-Octans 1Function Ex d/e Gland

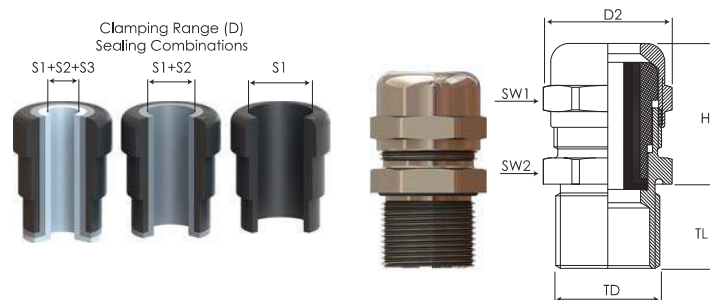
Equipment	Gas Group ZONE1/ZONE2	Dust Group ZONE21/ZONE 22
Suitable for use in	Group II Gas Group IIC	Group III Dust Group IIIC
For	Gas & Dust potentially explosive atmospheres	
Degree of Protection	IP66 – IP68 (EN 60529)	
Marking	BMD EBU., Ex CE 0722 II 2GD Ex d IIC Gb / Ex e IIC Gb / Ex tb IIIC Db Tc=40°C +80°C IP66/68 IECEX IMQ 13.0006X / IMQ 13 ATEX 018X	
Cable Type	Non-armor	
Seal Operating Temperature	Seal Chloroprene Silicone	Temperatures* -40°C / +80°C -60°C / +80°C
Material	Brass Stainless Steel Aluminium	Items 1-3-4-5 Items 2-6
Thread Type	Metric (M) ISO Pitch 1.5 Npt (N) ANSI ASME B1.20.1 Other thread types also available upon request.	

\*customised high temperature (+100°C) Ex-e application is also available.

Order Encoding		Material	Plated	Sealing	Code Examples
Type	Thread	B (Brass) X (Stainless Steel) A (Aluminium)	N (Nickel Only for Brass)	C (Chloroprene) S (Silicone)	EBU01MBNS
EBU01	M (Metric) N (Npt)				

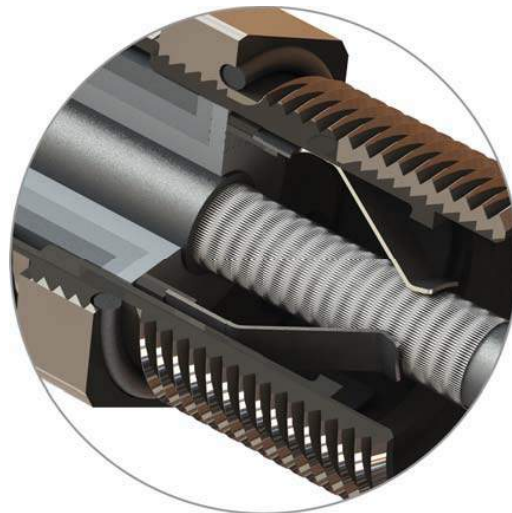
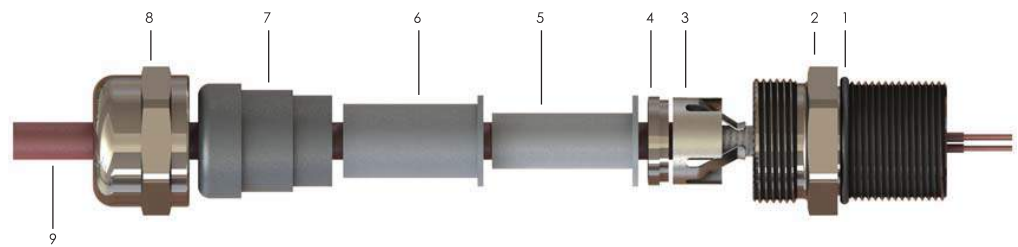
Thread Type (TD)	Code	Clamping Range Ø min-max				Cable Gland Dimensions				
		D mm	S1+S2+S3 mm	S1+S2 mm	S1 mm	H min (mm)	TL (mm)	SW1 (mm)	SW2 (mm)	D2 (mm)
*M8x1.25	EBU0XS	2,0-4,0	-	-	2,0-4,0	15,5	5	11	11	12,0
*M12x1.5	EBU0SM	4,0-8,0	4,0-6,0	6,0-8,0	-	14,5	16	22	22	24,5
M16x1.5	EBU01SM	3,0-9,0	-	3,0-6,0	6,0-9,0	11,0	16	20	20	24,5
M16x1.5	EBU01M	4,0-12,0	4,0-6,0	6,0-9,0	9,0-12,0	24,0	16	22	22	24,5
M20x1.5	EBU1M	4,0-12,0	4,0-6,0	6,0-9,0	9,0-12,0	24,0	16	22	22	24,5
M20x1.5	EBU12M	10,0-16,0	10,0-12,0	12,0-14,5	14,5-16,0	29,0	16	28	28	31,0
M25x1.5	EBU2M	10,0-18,0	10,0-12,0	12,0-14,5	14,5-18,0	24,0	16	28	28	31,0
M25x1.5	EBU23M	14,0-20,0	14,0-17,0	17,0-20,0	-	34,0	16	35	35	39,0
M32x1.5	EBU3M	14,0-24,0	14,0-17,0	17,0-20,0	20,0-24,0	27,0	16	35	35	39,0
M32x1.5	EBU34M	22,0-28,0	22,0-24,0	24,0-27,0	27,0-28,0	37,0	16	45	45	49,5
M40x1.5	EBU4M	22,0-32,0	22,0-24,0	24,0-27,0	27,0-32,0	27,0	18	45	45	49,5
M40x1.5	EBU45M	26,0-34,0	26,0-28,0	28,0-31,0	31,0-34,0	37,0	18	50	50	56,0
M50x1.5	EBU5M	26,0-35,0	26,0-28,0	28,0-31,0	31,0-35,0	28,0	18	50	55	56,0
M50x1.5	EBU56M	35,0-44,0	35,0-38,0	38,0-41,0	41,0-44,0	45,0	18	64	64	70,0
M63x1.5	EBU6M	35,0-45,0	35,0-38,0	38,0-41,0	41,0-45,0	35,0	18	64	68	70,0
M63x1.5	EBU67M	46,0-56,0	46,0-48,0	48,0-52,0	52,0-56,0	44,0	18	80	75	89,0
M75x1.5	EBU7M	46,0-62,0	46,0-51,0	51,0-57,0	57,0-62,0	44,0	20	80	80	89,0
M75x1.5	EBU78M	60,0-70,0	60,0-63,0	63,0-69,0	69,0-70,0	55,0	20	95	95	105,0
M90x1.5	EBU8M	60,0-70,0	60,0-63,0	63,0-69,0	69,0-70,0	55,0	20	95	95	105,0
M90x1.5	EBU810M	75,0-85,0	75,0-79,0	79,0-82,0	82,0-85,0	57,0	20	105	105	117,0
M100x1.5	EBU10M	75,0-85,0	75,0-79,0	79,0-82,0	82,0-85,0	57,0	20	105	105	117,0
M110x1.5	EBU11M	85,0-95,0	85,0-89,0	89,0-92,0	92,0-95,0	57,0	20	115	115	129,0
*NPT1/4"	EBU0XS	4,0-8,0	4,0-6,0	6,0-8,0	-	14,5	16	22	22	24,5
NPT3/8"	EBU01SN	3,0-9,0	-	3,0-6,0	6,0-9,0	11,0	16	20	20	24,5
NPT3/8"	EBU01N	4,0-12,0	4,0-6,0	6,0-9,0	9,0-12,0	14,5	16	22	22	24,5
NPT1/2"	EBU1N	4,0-12,0	4,0-6,0	6,0-9,0	9,0-12,0	26,5	16	22	22	24,5
NPT1/2"	EBU12N	10,0-16,0	10,0-12,0	12,0-14,5	14,5-16,0	30,0	16	28	28	31,0
NPT3/4"	EBU2N	10,0-18,0	10,0-12,0	12,0-14,5	14,5-18,0	30,0	16	28	28	31,0
NPT3/4"	EBU23N	14,0-20,0	14,0-17,0	17,0-20,0	-	33,0	16	35	35	39,0
NPT1"	EBU3N	14,0-24,0	14,0-17,0	17,0-20,0	20,0-24,0	33,5	16	35	35	39,0
NPT1"	EBU34N	22,0-26,0	22,0-24,0	24,0-26,0	-	40,0	16	45	45	49,5
NPT1 1/4"	EBU4N	22,0-32,0	22,0-24,0	24,0-27,0	27,0-32,0	40,5	18	45	45	49,5
NPT1 1/4"	EBU45N	26,0-34,0	26,0-28,0	28,0-31,0	31,0-34,0	43,5	18	50	50	56,0
NPT1 1/2"	EBU5N	26,0-35,0	26,0-28,0	28,0-31,0	31,0-35,0	42,5	18	50	55	56,0
NPT1 1/2"	EBU56N	35,0-41,0	35,0-38,0	38,0-41,0	-	42,5	18	64	64	70,0
NPT2"	EBU6N	35,0-45,0	35,0-38,0	38,0-41,0	41,0-45,0	43,5	18	64	68	70,0
NPT2"	EBU67N	46,0-56,0	46,0-48,0	48,0-52,0	52,0-56,0	52,5	18	80	75	89,0
NPT2 1/2"	EBU7N	46,0-62,0	46,0-51,0	51,0-57,0	57,0-62,0	52,0	20	80	80	89,0
NPT2 1/2"	EBU78N	60,0-70,0	60,0-63,0	63,0-69,0	69,0-70,0	55,0	20	95	95	105,0
NPT3"	EBU8N	60,0-70,0	60,0-63,0	63,0-69,0	69,0-70,0	55,0	20	95	95	105,0
NPT3"	EBU810N	75,0-85,0	75,0-79,0	79,0-82,0	82,0-85,0	54,5	20	105	105	117,0
NPT4"	EBU10N	75,0-85,0	75,0-79,0	79,0-82,0	82,0-85,0	54,5	20	105	115	117,0
NPT4"	EBU11N	85,0-95,0	85,0-89,0	89,0-92,0	92,0-95,0	56,0	20	115	115	129,0

\* Only Ex e IIC Gb / Ex tb IIIC Db



Approved by	IMQ	IMQ
Examination Certificate Number	IMQ 13 ATEX 018X	IECEX IMQ 13.0006X
Date of Issue	29.07.2013	31.10.2013
Test Report Number	43AN00024	54AN00009
Safety Requirements	EN 60079-0:2009 EN 60079-7:2007 EN 60079-31:2009	IEC 60079-0:2007 Edition:5 IEC 60079-7:2006 Edition:4 IEC 60079-31:2008 Edition:1
Equipment Marking	Ex II 2 GD Ex e IIC Gb Ex tb III C Db	Ex II 2 GD Ex d IIC Gb Ex e IIC Gb Ex tb III C Db

Item	Item Description
1	O-ring
2	Lower Body
3	Tapered Spring
4	Spring Ring
5	Seal S3
6	Seal S2
7	Seal S1
8	Cap
9	Cable



# E-Vela 1 Function Ex d/e Gland

Equipment	Gas Group ZONE1/ZONE2	Dust Group ZONE21/ZONE 22
Suitable for use in	Group II Gas Group IIC	Group III Dust Group IIIC
For	Gas & Dust potentially explosive atmospheres	
Degree of Protection	IP66 – IP68 (EN 60529)	
Marking	BMD EBS, Ex CE 0722 II 2GD Ex d IIC Gb / Ex e IIC Gb / Ex tb III C Db Tc-40°C +80°C IP66/68 IECEx IMQ 13.0006X / IMQ 13 ATEX 018X	
Cable Type	Non-armor, Shielded	
Seal Operating Temperature	Seal	Temperatures* -40°C / +80°C -60°C / +80°C
	Chloroprene	
	Silicone	Items 1-5-6-7
Material	Brass Stainless Steel Aluminium	Items 2-4-8
Spring Material	Special Copper Alloy	Item 3
Thread Type	Metric (M) ISO Pitch 1,5 Npt (N) ANSI ASME B1.20.1 Other thread types also available upon request.	

\*customised high temperature (+100°C) Ex-e application is also available.

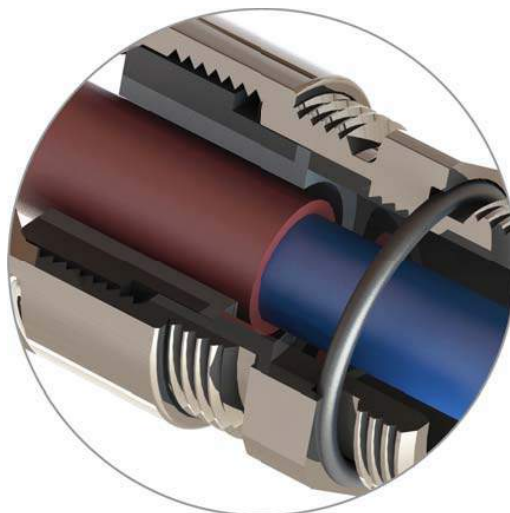
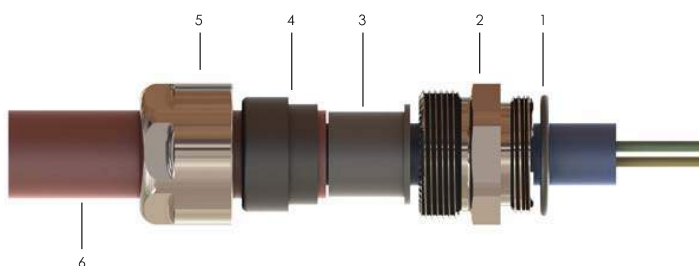
Order Encoding					
Type	Thread	Material	Plated	Sealing	Code Examples
EBS01	M (Metric) N (Npt)	B (Brass) X (Stainless Steel) A (Aluminium)	N (Nickel Only for Brass)	C (Chloroprene) S (Silicone)	EBS01MBNS

Thread Type (TD)	Code	Clamping Range Ø min-max				Cable Gland Dimensions				
		D mm	S1+S2+S3 mm	S1+S2 mm	S1 mm	H min (mm)	TL (mm)	SW1 (mm)	SW2 (mm)	D2 (mm)
M16x1.5	EBS01MS	4.0-8.0	-	4.0-6.0	6.0-8.0	28.5	16	20	20	22.0
M16x1.5	EBS01M	4.0-8.0	-	4.0-6.0	6.0-8.0	28.5	16	22	22	24.5
M20x1.5	EBS1M	4.0-12.0	4.0-6.0	6.0-9.0	9.0-12.0	26.5	18	22	22	24.5
M25x1.5	EBS2M	10.0-18.0	10.0-12.0	12-14.5	14.5-18.0	30.0	16	28	28	31.0
M32x1.5	EBS3M	14.0-24.0	14.0-17.0	17.0-20.0	20.0-24.0	33.0	19	39	35	39.0
M40x1.5	EBS4M	22.0-32.0	22.0-24.0	24.0-27.0	27.0-32.0	41.0	20	45	45	49.5
M50x1.5	EBS5M	26.0-35.0	26.0-28.0	28.0-31.0	31.0-35.0	43.5	20	50	55	56.0
NPT3/8"	EBS01NS	4.0-8.0	-	4.0-6.0	6.0-8.0	28.5	16	20	20	22.0
NPT3/8"	EBS01N	4.0-8.0	-	4.0-6.0	6.0-8.0	28.5	16	22	22	24.5
NPT1/2"	EBS1N	4.0-12.0	4.0-6.0	6.0-9.0	9.0-12.0	26.5	16	22	22	24.5
NPT3/4"	EBS2N	10.0-18.0	10.0-12.0	12.0-14.5	14.5-18.0	30.0	16	28	28	31.0
NPT1"	EBS3N	14.0-24.0	14.0-17.0	17.0-20.0	20.0-24.0	33.0	20	35	35	39.0
NPT1 1/4"	EBS4N	22.0-32.0	22.0-24.0	24.0-27.0	27.0-32.0	41.0	20	45	45	49.5
NPT1 1/2"	EBS5N	26.0-35.0	26.0-28.0	28.0-31.0	31.0-35.0	43.5	20	50	55	56.0



Approved by	IMQ		IMQ	
Examination Certificate Number	IMQ 13 ATEX 018X		IECEX IMQ 13.0006X	
Date of Issue	29.07.2013		31.10.2013	
Test Report Number	43AN00024		54AN00009	
Safety Requirements	EN 60079-0:2009 EN 60079-7:2007 EN 60079-31:2009		IEC 60079-0:2007 Edition:5 IEC 60079-7:2004 Edition:4 IEC 60079-31:2008 Edition:1	
Equipment Marking	Ex II 2 GD	Ex e IIC Gb Ex tb III C Db	Ex II 2 GD	Ex e IIC Gb Ex tb III C Db

Item	Item Description
1	O-ring
2	Lower Body
3	Seal S2
4	Seal S1
5	Cap
6	Cable

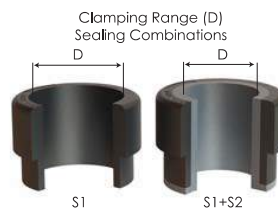


# Norma 1 Function Ex e Gland

Equipment	Gas Group	Dust Group
Suitable for use in	ZONE1/ZONE2	ZONE21/ZONE 22
For	Group II	Group III
	Gas Group IIC	Dust Group IIIC
Degree of Protection	Gas & Dust potentially explosive atmospheres	
Marking	IP66 – IP68 (EN 60529)	
Cable Type	Non-armor, Shielded	
Seal Operating Temperature	Seal	Temperatures
	Epdm	-40°C / +80°C
Material	Silicone	-60°C / +80°C
	Brass	Items 1-5-6-7
Thread Type	Stainless Steel	Items 2-4-8
	Metric (M) ISO Pitch 1.5 Npt (N) ANSI ASME B1.20.1 Other thread types also available upon request.	

Order Encoding					
Type	Thread	Material	Plated	Sealing	Code Examples
NBU01	M (Metric)	B (Brass) X (Stainless Steel)	N (Nickel Only for Brass)	E (Epdm) S (Silicone)	NBU01MBNS

Thread Type (TD)	Code	Clamping Range Ø min-max			Cable Gland Dimensions				
		D mm	S1 mm	S1+S2 mm	H min (mm)	TL (mm)	SW1 (mm)	SW2 (mm)	D2 (mm)
M12x1,5	NBU0XSM	4,0-7,0	4,0-7,0	-	23,6	9	14	14	15,5
M16x1,5	NBU01SM	5,0-8,0	5,0-8,0	-	28,2	9	18	18	20,0
M20x1,5	NBU1M	8,0-14,0	11,0-14,0	8,0-11,0	27,4	9	22	22	24,0
M25x1,5	NBU2M	10,0-16,0	13,0-16,0	10,0-13,0	27,9	9	27	27	30,0
M32x1,5	NBU3M	16,0-21,0	18,0-21,0	16,0-18,0	31,9	9	34	34	37,5
M40x1,5	NBU4M	18,0-27,0	22,0-27,0	18,0-22,0	38,4	9	42	42	46,5
M50x1,5	NBU5M	26,0-35,0	30,0-35,0	26,0-30,0	38,3	9	52	52	59,0
M63x1,5	NBU6M	32,0-49,0	40,0-49,0	32,0-40,0	57,3	12	65	65	72,0
NPT 1/4"	NBU0XSN	4,0-7,0	4,0-7,0	-	39,6	16	14	14	15,5
NPT 3/8"	NBU01SN	5,0-8,0	5,0-8,0	-	44,2	16	18	18	20,0
NPT 1/2"	NBU1N	8,0-14,0	11,0-14,0	8,0-11,0	43,4	16	22	22	24,0
NPT 3/4"	NBU2N	10,0-16,0	13,0-16,0	10,0-13,0	43,9	16	27	27	30,0
NPT 1"	NBU3N	16,0-21,0	18,0-21,0	16,0-18,0	51,9	20	34	34	37,5
NPT 1 1/4"	NBU4N	18,0-27,0	22,0-27,0	18,0-22,0	58,4	20	42	42	46,5
NPT 1 1/2"	NBU5N	26,0-35,0	30,0-35,0	26,0-30,0	58,3	20	52	52	59,0
NPT 2"	NBU6N	32,0-49,0	40,0-49,0	32,0-40,0	77,3	20	65	65	72,0





## Rigid Conduit Fittings for **GAS & DUST** applications



Despite the similarity to pipes used in plumbing, purpose-designed electrical fittings are used to connect conduit.

Box connectors join conduit to a junction box or other electrical box. A typical box connector is inserted into a knockout in a junction box, with the threaded end then being secured with a ring (called a lock nut) from within the box, as a bolt would be secured by a nut. The other end of the fitting usually has a screw or compression ring which is tightened down onto the inserted conduit.

Fittings for non-threaded conduits are either secured with set screws or with a compression nut that encircles the conduit. Fittings for general purpose use with metal conduits may be made of die-cast zinc, but where stronger fittings are needed, they are made of copper-free aluminum or cast iron.

Sometimes the fittings are considered sufficiently conductive to bond (electrically unite) the metal conduit to a metal junction box (thus sharing the box's ground connection); other times, grounding bushings are used which have bonding jumpers from the bushing to a grounding screw on the box. Unlike water piping, if it the conduit is to be watertight, the idea is to keep water out, not in. In this case, gaskets are used with special fittings, such as the weatherhead leading from the overhead electrical mains to the electric meter.



Cranes  
Motors  
Heaters  
Thermostat  
Heat detectors  
Flame detectors



Smoke detectors  
Alarm indicators  
motor starters  
loudspeakers  
alarm bell  
sounders / horns



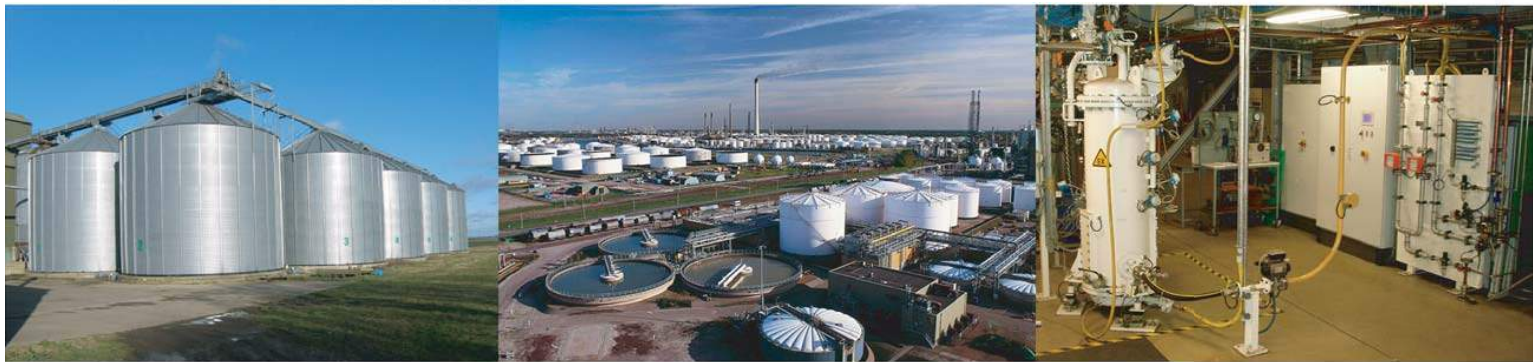
control and distribution units,  
panels and boards  
beacons / strobes  
status lamps  
control stations  
junction and terminal boxes



variable-frequency on motors  
Lighting Fixtures  
Motor Starters  
Enclosures for control units and  
junction boxes (Power & Lighting)  
Lighting

manual call points  
doorholder magnets  
Electrical, digital compact volume  
flow controller  
Electric linear valve actuators  
Modulating electric

digital sensors for temperature,  
humidity, pressure and differential  
pressure  
Modulating transducer  
Binary switching module



**E-CARINA  
EBM**

**1** Function Ex d/e  
Rigid Conduit  
Fitting  
for non armor  
cable



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**E-CYGNUS  
EBMC**

**1** Function Ex d/e  
Rigid Conduit  
Swivel Fitting  
for non armor  
cable



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**41-42**

**PHOENIX  
SV**

Ex e Rigid  
Conduit  
Swivel Fittings  
with Multihole  
Seal

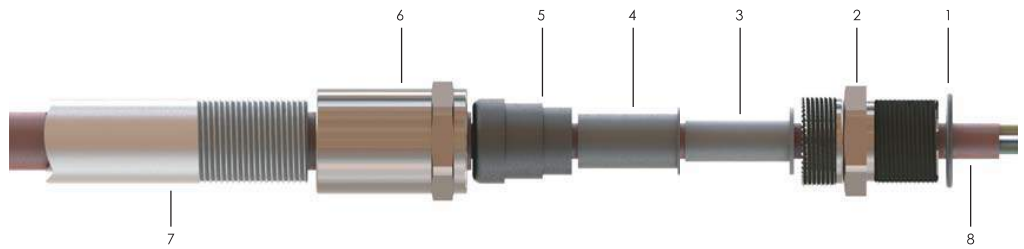


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**43-44**

Ex II 2 GD / Ex d IIC Gb - Ex e IIC Gb - Ex tb III Db

Approved by	IMQ	
Examination Certificate Number	IMQ 13 ATEX 018X	IECEX IMQ 13.0006X
Date of Issue	29.07.2013	31.10.2013
Test Report Number	43AN00024	54AN00009
Safety Requirements	EN 60079-0:2009 EN 60079-7:2007 EN 60079-31:2009	IEC 60079-0:2007 Edition:5 IEC 60079-7:2006 Edition:4 IEC 60079-31:2008 Edition:1
Equipment Marking	Ex II 2 GD Ex d IIC Gb Ex e IIC Gb Ex tb III C Db	Ex II 2 GD Ex d IIC Gb Ex e IIC Gb Ex tb III C Db

Item	Item Description
1	O-ring
2	Lower Body
3	Seal S3
4	Seal S2
5	Seal S1
6	Female Body
7	Pipe
8	Cable





# E-Carina 1 Function Ex d/e Rigid Conduit Fitting

Equipment	Gas Group ZONE1/ZONE2	Dust Group ZONE21/ZONE 22
Suitable for use in	Group II Gas Group IIC	Group III Dust Group IIIC
For	Gas & Dust potentially explosive atmospheres	
Degree of Protection	IP66 – IP68 [EN 60529]	
Marking	BMD EBM., Ex CE 0722 II 2GD Ex d IIC Gb / Ex e IIC Gb / Ex tb IIIC Db Tc-40°C +80°C IP66/68 IECEx IMQ 13.0006X / IMQ 13 ATEX 018X	
Cable Type	Non-armor	
Seal Operating Temperature	Seal Chloroprene Silicone	Temperature* -40°C / +80°C -60°C / +80°C
Material	Brass Stainless Steel Aluminium	Items 1-3-4-5 Items 2-6
Thread Type	Metric (M) ISO Pitch 1.5 Npt (N) ANSI ASME B1.20.1 Other thread types also available upon request. Other combinations: Metric-Metric/Npt-Npt/Npt-Metric *customised high temperature (+100°C) Ex-e application is also available.	

Order Encoding						
Type	Thread	Pipe Thread	Material	Plated	Sealing	Code Examples
EBM	M (Metric) N (Npt)	M (Metric) N (Npt)	B (Brass) X (Stainless Steel) A (Aluminium)	N (Nickel Only for Brass)	C (Chloroprene) S (Silicone)	EBM01M01NBNS

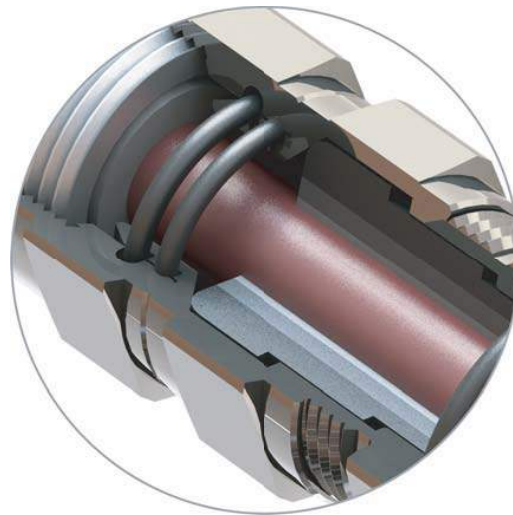
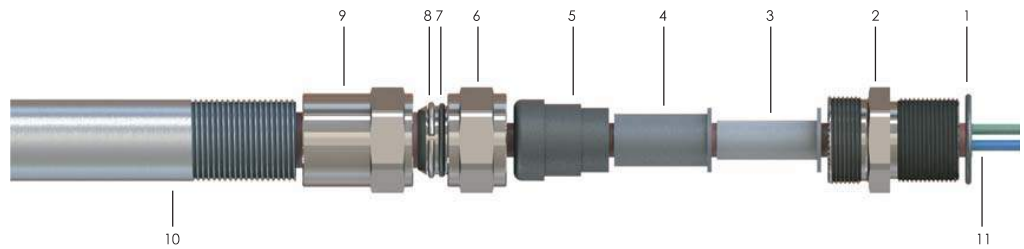
Thread Type (M)	Pipe Thread Type (F)	Code	Clamping Range Ø min-max				Fitting Dimensions					
			D mm	S1+S2+S3 mm	S1+S2 mm	S1 Mm	H (mm)	TL1 (mm)	TL2 (mm)	SW1 (mm)	SW2 (mm)	D2 (mm)
*M12	1/4"	EBM0SM0SN	4.0-8.0	4.0-6.0	6.0-8.0	-	60.0	16	16	22	24	26.5
*M12	3/8"	EBM0SM01N	4.0-8.0	4.0-6.0	6.0-8.0	-	60.0	16	16	22	24	26.5
M16	3/8"	EBM01M01N	4.0-12.0	4.0-6.0	6.0-9.0	10.0-12.0	60.0	16	16	22	24	26.5
M16	1/2"	EBM01M12N	4.0-12.0	4.0-6.0	6.0-9.0	10.0-12.0	60.0	16	16	22	24	26.5
M20	3/8"	EBM12M01N	4.0-12.0	4.0-6.0	6.0-9.0	10.0-12.0	60.0	16	16	28	30	33.0
M20	1/2"	EBM1M1N	4.0-12.0	4.0-6.0	6.0-9.0	10.0-12.0	58.0	16	16	22	24	26.5
M20	1/2"	EBM12M12N	10.0-16.0	10.0-12.0	12.0-14.5	14.5-16.0	60.0	16	16	28	30	33.0
M20	3/4"	EBM12M23N	10.0-16.0	10.0-12.0	12.0-14.5	14.5-16.0	62.0	16	16	28	30	33.0
M25	1/2"	EBM23M12N	10.0-16.0	10.0-12.0	12.0-14.5	14.5-16.0	60.0	16	16	35	35	39.0
M25	3/4"	EBM2M2N	10.0-18.0	10.0-12.0	12.0-14.5	14.5-18.0	58.0	16	16	28	30	33.0
M25	3/4"	EBM23M23N	14.0-20.0	14.0-17.0	17.0-20.0	-	62.0	16	16	35	35	39.0
M25	1"	EBM23M34N	14.0-20.0	14.0-17.0	17.0-20.0	-	77.0	16	20	35	35	39.0
M32	3/4"	EBM34M23N	14.0-20.0	14.0-17.0	17.0-20.0	-	62.0	20	16	45	45	49.5
M32	1"	EBM3M3N	14.0-24.0	14.0-17.0	17.0-20.0	20.0-24.0	68.0	20	20	35	35	39.0
M32	1"	EBM34M34N	22.0-28.0	22.0-24.0	24.0-27.0	27.0-28.0	77.0	20	20	45	45	49.5
M32	1 1/4"	EBM34M45N	22.0-28.0	22.0-24.0	24.0-27.0	27.0-28.0	77.0	20	20	45	45	49.5
M40	1"	EBM4M34N	22.0-28.0	22.0-24.0	24.0-27.0	27.0-28.0	77.0	20	20	50	50	56.0
M40	1 1/4"	EBM4M4N	22.0-32.0	22.0-24.0	24.0-27.0	28.0-32.0	67.0	20	20	45	45	49.5
M40	1 1/4"	EBM45M45N	26.0-34.0	26.0-28.0	28.0-31.0	31.0-34.0	77.0	20	20	50	50	56.0
M40	1 1/2"	EBM45M56N	26.0-34.0	26.0-28.0	28.0-31.0	31.0-34.0	85.0	20	20	50	50	56.0
M50	1 1/4"	EBM5M45N	26.0-34.0	26.0-28.0	28.0-31.0	31.0-34.0	77.0	20	20	55	50	61.0
M50	1 1/2"	EBM5M5N	26.0-35.0	26.0-28.0	28.0-31.0	31.0-35.0	68.0	20	20	55	50	61.0
M50	1 1/2"	EBM56M56N	35.0-44.0	35.0-38.0	38.0-41.0	41.0-44.0	85.0	20	20	64	64	70.0
M50	2"	EBM56M67N	35.0-44.0	35.0-38.0	38.0-41.0	41.0-44.0	84.0	20	20	64	64	70.0
M63	1 1/2"	EBM67M56N	35.0-44.0	35.0-38.0	38.0-41.0	41.0-44.0	85.0	20	20	75	80	89.0
M63	2"	EBM6M6N	35.0-45.0	35.0-38.0	38.0-41.0	41.0-45.0	75.0	20	20	68	68	75.0
M63	2"	EBM67M67N	46.0-56.0	46.0-48.0	48.0-52.0	52.0-56.0	84.0	20	20	75	80	89.0
M63	2 1/2"	EBM67M78N	46.0-56.0	46.0-48.0	48.0-52.0	52.0-56.0	108.0	20	20	75	80	89.0
M75	2 1/2"	EBM7M7N	46.0-62.0	46.0-51.0	51.0-56.0	56.0-62.0	96.0	20	20	80	80	89.0
M75	2 1/2"	EBM78M78N	60.0-69.0	60.0-65.0	65.0-69.0	-	108.0	20	20	95	95	105.0
M75	3"	EBM78M10N	60.0-69.0	60.0-65.0	65.0-69.0	-	110.0	20	20	95	95	105.0
M90	2 1/2"	EBM810M78N	60.0-69.0	60.0-65.0	65.0-69.0	-	108.0	20	20	105	105	117.0
M90	3"	EBM8M8N	60.0-75.0	60.0-65.0	65.0-70.0	70.0-75.0	108.0	20	20	95	95	105.0
M90	3"	EBM810M810N	75.0-82.0	75.0-78.0	78.0-81.0	81.0-82.0	110.0	20	20	105	105	117.0
M90	4"	EBM810M10N	75.0-82.0	75.0-78.0	78.0-81.0	81.0-82.0	110.0	20	20	105	105	117.0
M100	3"	EBM10M810N	75.0-82.0	75.0-78.0	78.0-81.0	81.0-82.0	110.0	20	20	105	105	117.0
M100	4"	EBM10M10N	75.0-85.0	75.0-78.0	78.0-81.0	81.0-85.0	110.0	20	20	105	105	117.0
M110	4"	EBM11M11N	85.0-95.0	85.0-88.0	88.0-91.0	91.0-95.0	110.0	20	20	115	115	128.0

\*Only Ex e IIC Gb / Ex tb IIIC Db



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Equipment Marking	Ex II 2 GD Ex d IIC Gb Ex e IIC Gb Ex tb IIIC Db	Ex II 2 GD Ex d IIC Gb Ex e IIC Gb Ex tb IIIC Db

Item	Item Description
1	O-ring
2	Lower Body
3	Seal S3
4	Seal S2
5	Seal S1
6	Swivel Cap
7	O-ring
8	Wire ring
9	Female Body
10	Pipe
11	Cable



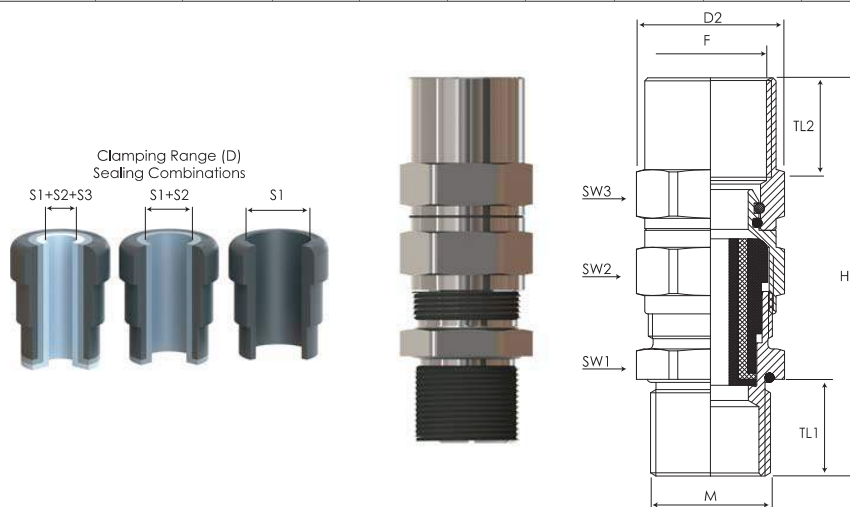
# E-Cygnus 1 Function Ex d/e Rigid Conduit Swivel Fitting

Equipment	Gas Group ZONE1/ZONE2	Dust Group ZONE21/ZONE 22
Suitable for use in	Group II Gas Group IIC	Group III Dust Group IIIC
For	Gas & Dust potentially explosive atmospheres	
Degree of Protection	IP66 – IP68 (EN 60529)	
Marking	BMD EBMS.. Ex CE 0722 II 2GD Ex d IIC Gb Ex e IIC Gb / Ex tb IIC Db Ta-40°C +80°C IP66/68 IECEX IMQ 13.0006X / IMQ 13 ATEX 018X	
Cable Type	Non-armor	
Seal Operating Temperature	Seal	Temperatures*
	Chloroprene	-40°C / +80°C
	Silicone	-60°C / +80°C
Material	Brass	Items 2-6-9
	Stainless Steel	
	Aluminium	Item 8
Thread Type	Metric (M) ISO Pitch 1.5 Npt (N) ANSI ASME B1.20.1 Other thread types also available upon request. Other combinations: Metric-Metric/Npt-Npt/Npt-Metric	

\*customised high temperature (+100°C) Ex-e application is also available.

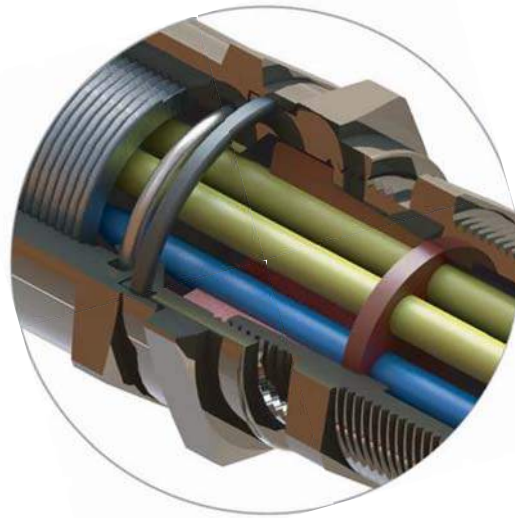
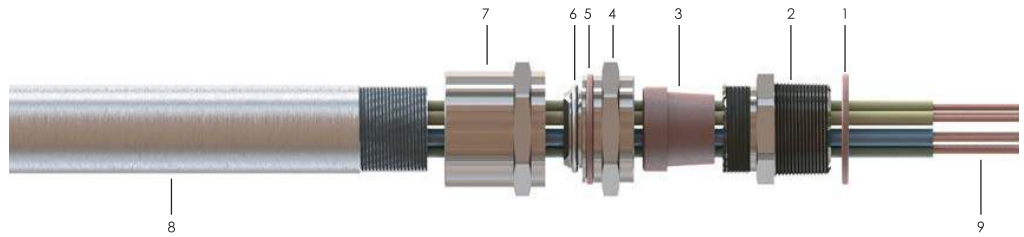
Order Encoding						
Type	Thread	Pipe Thread	Material	Plated	Sealing	Code Examples
EBMS	M (Metric) N (Npt)	M (Metric) N (Npt)	B (Brass) X (Stainless Steel) A (Aluminium)	N (Nickel Only for Brass)	C (Chloroprene) S (Silicone)	EBM01M01NBNS

Thread Type (M)	Pipe Thread Type (F)	Code	Clamping Range Ø min-max				Fitting Dimensions						
			D mm	S1+S2+S3 mm	S1+S2 mm	S1 mm	H (mm)	TL1 (mm)	TL2 (mm)	SW1 (mm)	SW2 (mm)	SW3 (mm)	D2 (mm)
M16	3/8"	EBMS01M01N	4,0-12,0	4,0-6,0	6,0-9,0	10,0-12,0	67,0	16	16	22	24	24	26,5
M16	1/2"	EBMS01M12N	4,0-12,0	4,0-6,0	6,0-9,0	10,0-12,0	67,0	16	16	22	24	24	26,5
M20	3/8"	EBMS12M01N	4,0-12,0	4,0-6,0	6,0-9,0	10,0-12,0	67,0	16	16	28	30	30	33,0
M20K	1/2"K	EBMS1M11N	4,0-12,0	4,0-6,0	6,0-9,0	10,0-12,0	66,0	16	16	22	24	24	26,5
M20	1/2"	EBMS2M12N	10,0-16,0	10,0-12,0	12,0-14,5	14,5-16,0	67,0	16	16	28	30	30	33,0
M20	3/4"	EBMS12M23N	10,0-16,0	10,0-12,0	12,0-14,5	14,5-16,0	69,0	16	16	28	30	30	33,0
M25	1/2"	EBMS23M12N	10,0-16,0	10,0-12,0	12,0-14,5	14,5-16,0	67,0	16	16	35	35	35	39,0
M25K	3/4"K	EBMS2M2N	10,0-18,0	10,0-12,0	12,0-14,5	14,5-18,0	66,0	16	16	28	30	30	33,0
M25	3/4"	EBMS23M23N	14,0-20,0	14,0-17,0	17,0-20,0	-	69,0	16	16	35	35	35	39,0
M25	1"	EBMS23M34N	14,0-20,0	14,0-17,0	17,0-20,0	-	85,0	16	20	35	35	35	39,0
M32	3/4"	EBMS24M23N	14,0-20,0	14,0-17,0	17,0-20,0	-	69,0	20	16	45	45	45	49,5
M32K	1"K	EBMS3M3N	14,0-24,0	14,0-17,0	17,0-20,0	20,0-24,0	76,0	20	20	35	35	35	39,0
M32	1"	EBMS34M34N	22,0-28,0	22,0-24,0	24,0-27,0	27,0-28,0	85,0	20	20	45	45	45	49,5
M32	1 1/4"	EBMS34M45N	22,0-28,0	22,0-24,0	24,0-27,0	27,0-28,0	85,0	20	20	45	45	45	49,5
M40	1"	EBMS45M34N	22,0-28,0	22,0-24,0	24,0-27,0	27,0-28,0	85,0	20	20	50	50	50	56,0
M40K	1 1/4"K	EBMS4M4N	22,0-32,0	22,0-24,0	24,0-27,0	28,0-32,0	75,0	20	20	45	45	45	49,5
M40	1 1/4"	EBMS45M45N	26,0-34,0	26,0-28,0	28,0-31,0	31,0-34,0	85,0	20	20	50	50	50	56,0
M40	1 1/2"	EBMS45M56N	26,0-34,0	26,0-28,0	28,0-31,0	31,0-34,0	94,0	20	20	50	50	50	56,0
M50	1 1/4"	EBMS56M45N	26,0-34,0	26,0-28,0	28,0-31,0	31,0-34,0	85,0	20	20	55	60	60	66,5
M50K	1 1/2"K	EBMS5M5N	26,0-35,0	26,0-28,0	28,0-31,0	31,0-35,0	76,0	20	20	55	50	50	56,0
M50	1 1/2"	EBMS56M56N	35,0-44,0	35,0-38,0	38,0-41,0	41,0-44,0	94,0	20	20	55	60	60	66,5
M50	2"	EBMS56M67N	35,0-44,0	35,0-38,0	38,0-41,0	41,0-44,0	92,0	20	20	55	60	60	66,5
M63	1 1/2"	EBMS67M56N	35,0-44,0	35,0-38,0	38,0-41,0	41,0-44,0	94,0	20	20	75	80	80	89,0
M63K	2"K	EBMS6M6N	35,0-45,0	35,0-38,0	38,0-41,0	41,0-45,0	84,0	20	20	68	65	65	71,0
M63	2"	EBMS67M67N	46,0-56,0	46,0-48,0	48,0-52,0	52,0-56,0	92,0	20	20	75	80	80	89,0
M63	2 1/2"	EBMS67M78N	46,0-56,0	46,0-48,0	48,0-52,0	52,0-56,0	116,0	20	20	75	80	80	89,0
M75	2"	EBMS78M67N	46,0-56,0	46,0-48,0	48,0-52,0	52,0-56,0	92,0	20	20	95	95	95	105,0
M75K	2 1/2"K	EBMS7M7N	46,0-62,0	46,0-51,0	51,0-56,0	56,0-62,0	105,0	20	20	80	80	80	89,0
M75	2 1/2"	EBMS78M78N	60,0-70,0	60,0-65,0	65,0-70,0	-	116,0	20	20	95	95	95	105,0
M75	3"	EBMS78M810N	60,0-70,0	60,0-65,0	65,0-70,0	-	120,0	20	20	95	95	95	105,0
M90	2 1/2"	EBMS810M78N	60,0-70,0	60,0-65,0	65,0-70,0	-	116,0	20	20	105	105	105	117,0
M90K	3"K	EBMS8M8N	60,0-75,0	60,0-65,0	65,0-70,0	70,0-75,0	116,0	20	20	95	95	95	105,0
M90	3"	EBMS810M810N	75,0-85,0	75,0-78,0	78,0-81,0	81,0-85,0	120,0	20	20	105	105	105	117,0
M90	4"K	EBMS810M10N	75,0-85,0	75,0-78,0	78,0-81,0	81,0-85,0	120,0	20	20	105	105	105	117,0
M100	3"	EBMS10M810N	75,0-85,0	75,0-78,0	78,0-81,0	81,0-85,0	120,0	20	20	115	115	115	128,0
M100	4"K	EBMS10M10N	75,0-85,0	75,0-78,0	78,0-81,0	81,0-85,0	120,0	20	20	115	115	115	128,0
M110	4"	EBMS11M11N	85,0-95,0	85,0-88,0	88,0-91,0	91,0-95,0	120,0	20	20	115	115	115	128,0



Approved by	IMQ		IMQ	
Examination Certificate Number	IMQ 13 ATEX 029X		IECEX IMQ 14.0002X	
Date of Issue	29.07.2013		31.10.2013	
Test Report Number	43AN00024		54AN00009	
Safety Requirements	EN 60079-0:2009 EN 60079-7:2007 EN 60079-31:2009		IEC 60079-0:2007 Edition:5 IEC 60079-7:2004 Edition:4 IEC 60079-31:2008 Edition:1	
Equipment Marking	Ex II 2 GD	Ex e IIC Gb Ex tb IIIC Db	Ex II 2 GD	Ex e IIC Gb Ex tb IIIC Db

Item	Item Description
1	O-ring
2	Lower Body
3	Seal
4	Swivel Cap
5	O-ring
6	Wire ring
7	Female Body
8	Pipe
9	Cable

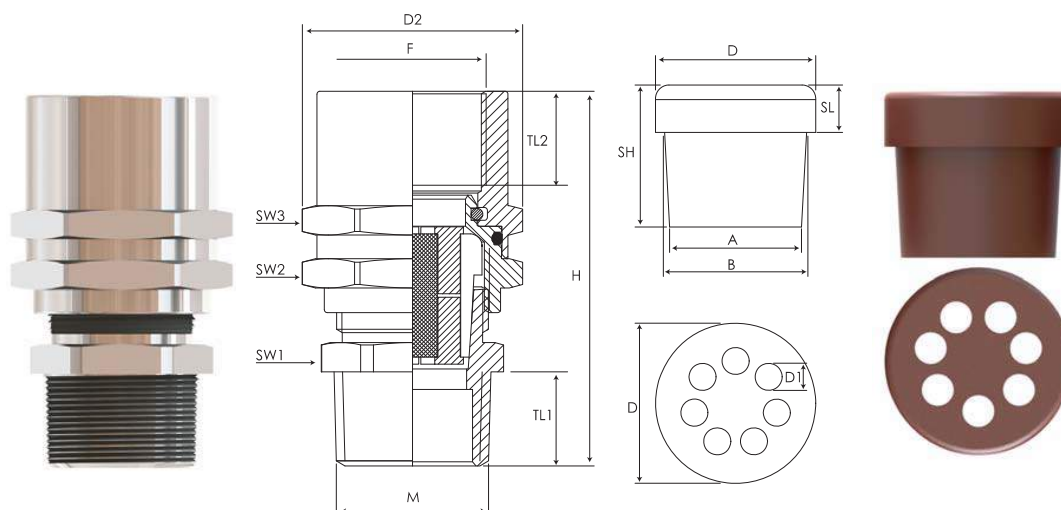


# Phoenix Ex e Rigid Conduit Swivel Fittings with Multihole Seal

Equipment	Gas Group	Dust Group
Suitable for use in	ZONE1/ZONE2	ZONE21/ZONE 22
For	Group II	Group III
	Gas Group IIC	Dust Group IIIC
Degree of Protection	Gas & Dust potentially explosive atmospheres	
Marking	IP66 – IP68 [EN 60529]	
Cable Type	Non-armor	
Seal Operating Temperature	Chloroprene Silicone	-40°C / +80°C -60°C / +80°C
Material	Brass	Items 1-3-4-5-7
	Stainless Steel	Items 2-6-9
	Steel	Item 8
Thread Type	Metric (M) ISO Pitch 1.5 Npt (N) ANSI ASME B1.20.1 Other thread types also available upon request. Other combinations: Metric-Metric/Npt-Npt/Npt-Metric	

Order Encoding									
Type	NH	D	Fitting Type	Fitting Thread	Material	Plated	Sealing	Code Examples	
SV	1-2-3-4-5-6-7H	4	2 (M25) 2 (Npt 3/4)	M (Metric) N (Npt)	B (Brass) X (Stainless Steel)	N (Nickel Only for Brass)	S (Silicone) C (Chloroprene)	SV2H42MBNS	

Thread Type (M)	Pipe Type (F)	Code	Fitting Dimensions							Seal Dimensions							
			H (mm)	TL1 (mm)	TL2 (mm)	SW1 (mm)	SW2 (mm)	SW3 (mm)	D2 (mm)	Clamping Range Ø min-max (mm)	Nr.of Hole (NH)	SH (mm)	SL (mm)	D Ø (mm)	D1 Ø (mm)	A Ø (mm)	B Ø (mm)
M25	M25	SV1H42M	55.0	11.0	16.0	29	33	33	37.5	4.0	1	21.0	7.0	23.7	4.0	19.5	21.0
M25	M25	SV2H42M	55.0	11.0	16.0	29	33	33	37.5	4.0	2	21.0	7.0	23.7	4.0	19.5	21.0
M25	M25	SV3H42M	55.0	11.0	16.0	29	33	33	37.5	4.0	3	21.0	7.0	23.7	4.0	19.5	21.0
M25	M25	SV4H42M	55.0	11.0	16.0	29	33	33	37.5	4.0	4	21.0	7.0	23.7	4.0	19.5	21.0
M25	M25	SV5H42M	55.0	11.0	16.0	29	33	33	37.5	4.0	5	21.0	7.0	23.7	4.0	19.5	21.0
M25	M25	SV6H42M	55.0	11.0	16.0	29	33	33	37.5	4.0	6	21.0	7.0	23.7	4.0	19.5	21.0
M25	M25	SV7H42M	55.0	11.0	16.0	29	33	33	37.5	4.0	7	21.0	7.0	23.7	4.0	19.5	21.0
Npt 3/4"	M25	SV1H42N	48.0	16.0	16.0	28	33	33	37.5	4.0	1	21.0	7.0	23.7	4.0	19.5	21.0
Npt 3/4"	M25	SV2H42N	48.0	16.0	16.0	28	33	33	37.5	4.0	2	21.0	7.0	23.7	4.0	19.5	21.0
Npt 3/4"	M25	SV3H42N	48.0	16.0	16.0	28	33	33	37.5	4.0	3	21.0	7.0	23.7	4.0	19.5	21.0
Npt 3/4"	M25	SV4H42N	48.0	16.0	16.0	28	33	33	37.5	4.0	4	21.0	7.0	23.7	4.0	19.5	21.0
Npt 3/4"	M25	SV5H42N	48.0	16.0	16.0	28	33	33	37.5	4.0	5	21.0	7.0	23.7	4.0	19.5	21.0
Npt 3/4"	M25	SV6H42N	48.0	16.0	16.0	28	33	33	37.5	4.0	6	21.0	7.0	23.7	4.0	19.5	21.0
Npt 3/4"	M25	SV7H42N	48.0	16.0	16.0	28	33	33	37.5	4.0	7	21.0	7.0	23.7	4.0	19.5	21.0





# Liquidtight Conduit Fittings for **GAS & DUST** applications



Typical applications for liquidtight conduit and liquidtight fittings include the wiring of machine tools, motors, transformers, food processing equipment, robotics, air conditioning units, illuminated store front signs and billboards, etc. The flexible metallic conduit and fittings protect conductors from mechanical damage due to vibration and movement, and seal out cutting oils, coolants, water, dust, etc. Applications such as these can be found in, but are not limited to, industries such as:

- Machine tool manufacturers
- Electric power generating plants
- Waste treatment facilities
- Paint manufacturing facilities
- Automobile manufacturing facilities
- Aerospace industries
- Breweries
- Food processing plants
- Dairies
- Pulp and paper mills
- Petroleum refineries
- Chemical and petrochemical plants



Cranes  
Motors  
Heaters  
Thermostat  
Heat detectors  
Flame detectors



Smoke detectors  
Alarm indicators  
motor starters  
loudspeakers  
alarm bell  
sounders / horns



control and distribution units,  
panels and boards  
beacons / strobes  
status lamps  
control stations  
junction and terminal boxes



variable-frequency on motors  
Lighting Fixtures  
Motor Starters  
Enclosures for control units and  
junction boxes (Power & Lighting)  
Lighting



manual call points  
doorholder magnets  
Electrical, digital compact volume  
flow controller  
Electric linear valve actuators  
Modulating electric

digital sensors for temperature,  
humidity, pressure and differential  
pressure  
Modulating transducer  
Binary switching module

**IEC** **IECEX** **Ex** ATEX **GROUP II-III**



**E-HYDRUS  
EBLS**

**1** Function  
Ex d/e Fitting  
for non armor  
cable



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**47-48**

**E-SCORPIUS  
EBLQ**

**1** Function  
Ex d/e 45 Fitting  
for non armor  
cable



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**49-50**

**E-LUPUS  
EBLN**

**1** Function  
Ex d/e 90 Fitting  
for non armor  
cable



Page  
**51-52**

**E-CORVUS  
EBMC**

**1** Function  
Ex d/e Link Gland  
for non armor  
cable

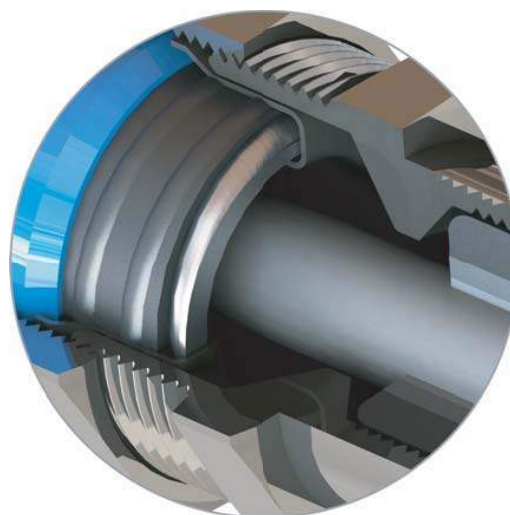
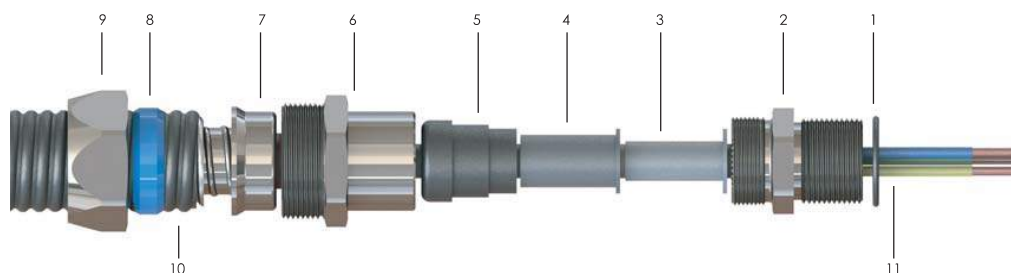


Page  
**53-54**

Ex II 2 GD / Ex d IIC Gb - Ex e IIC Gb - Ex tb III Db

Approved by	IMQ	IMQ
Examination Certificate Number	IMQ 13 ATEX 018X	IECEX IMQ 13.0006X
Date of Issue	29.07.2013	31.10.2013
Test Report Number	43AN00024	54AN00009
Safety Requirements	EN 60079-0:2009 EN 60079-7:2007 EN 60079-31:2009	IEC 60079-0:2007 Edition:5 IEC 60079-7:2004 Edition:4 IEC 60079-31:2008 Edition:1
Equipment Marking	Ex II 2 GD Ex e IIC Gb Ex tb IIIC Db	Ex II 2 GD Ex d IIC Gb Ex e IIC Gb Ex tb IIIC Db

Item	Item Description
1	O-ring
2	Lower Body
3	Seal S1
4	Seal S2
5	Seal S3
6	Middle body
7	Ferrule
8	Plastic ring
9	Cap
10	Liquidtight Conduit
11	Cable





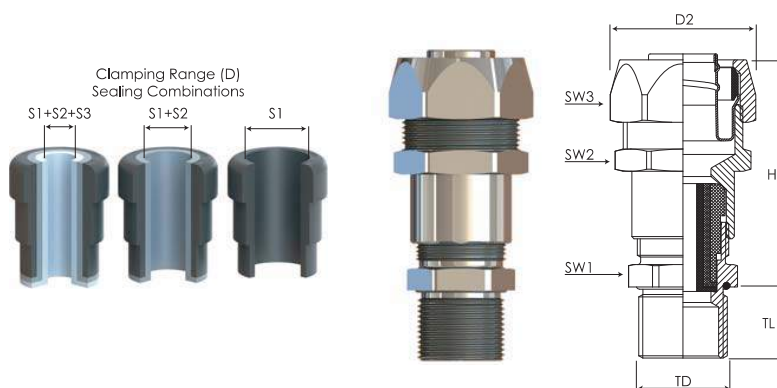
# E-Hydrus 1 Function Ex d/e Liquidtight conduit Fittings

Equipment	Gas Group	Dust Group	
Suitable for use in	ZONE1/ZONE2	ZONE21/ZONE 22	
	Group II	Group III	
	Gas Group IIC	Dust Group IIIC	
For	Gas & Dust potentially explosive atmospheres		
Degree of Protection	IP66 – IP68 (EN 60529)		
Marking	BMD EBLs... Ex CE 0722 II 2GD Ex d IIC / Gb Ex e IIC Gb / Ex tb IIIC Db Ta-40°C +80°C IP66/68 IECEx IMQ 13.0006X / IMQ 13 ATEX 018X		
Cable Type	Non-armor		
Seal Operating Temperature	Temperature*	Items 1-3-4-5	
	Chloroprene		-40°C / +80°C
	Silicone		-60°C / +80°C
Material	Brass Stainless Steel	Items 2-6-9	
Ferrule Material	Steel Zinc Plated Brass Nickel Plated	Item 7	
Plastic Ring	Nylon 6	Item 8	
Thread Type	Metric (M) ISO Pitch 1.5 Npt (N) ANSI ASME B1.20.1 Other thread types also available upon request.		

\*customised high temperature (+100°C) Ex-e application is also available.

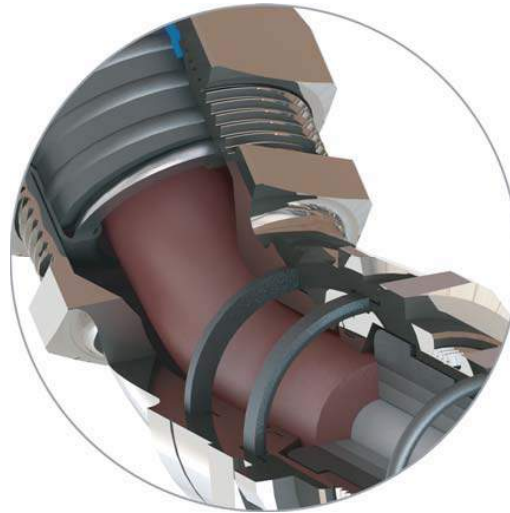
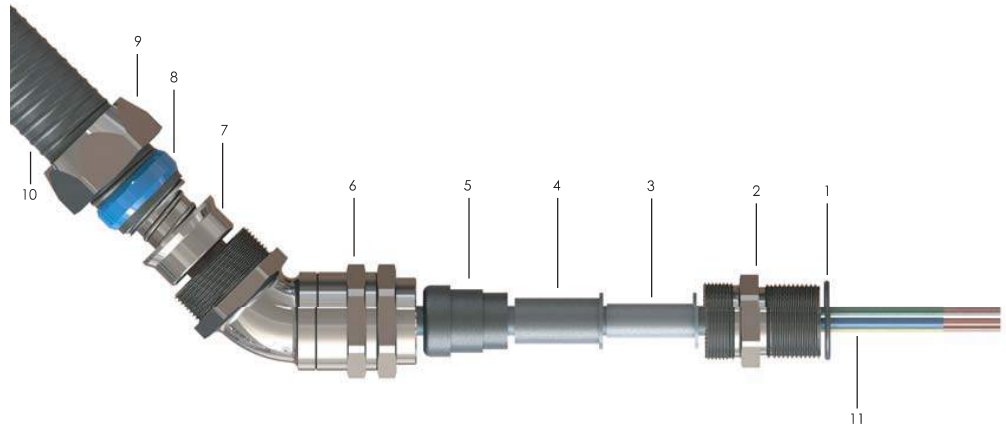
Order Encoding		Material	Plated	Sealing	Code Examples
Type	Thread				
EBLS01	M (Metric)	B (Brass) X (Stainless Steel)	N (Nickel Only for Brass)	C (Chloroprene) S (Silicone)	EBLS01MBNS

Thread Type (TD)	Conduit Ø mm	Code	Clamping Range Ø min-max				Conduit Fitting Dimensions					
			D (mm)	S1+S2+S3 (mm)	S1+S2 (mm)	S1 (mm)	H Min. (mm)	TL Min. (mm)	SW1 (mm)	SW2 (mm)	SW3 (mm)	D2 (mm)
M12x1.5	1/2"	EBLS02M	4,0-8,0	4,0-6,0	6-8	-	55,0	16	22	27	29	32,7
M16x1.5	1/2"	EBLS01M	4,0-12,0	4,0-6,0	6-9	9,0-12,0	54,5	16	22	27	29	32,7
M20x1.5	1/2"	EBLS1M	4,0-12,0	4,0-6,0	6-9	9,0-12,0	51,0	16	22	27	29	32,7
M25x1.5	3/4"	EBLS2M	10,0-18,0	10,0-12,0	12-14,5	14,5-18,0	54,0	16	28	33	35	38,7
M32x1.5	1"	EBLS3M	14,0-24,0	14,0-17,0	17-20	20,0-24,0	62,0	16	35	43	45	50,0
M40x1.5	1 1/4"	EBLS4M	22,0-32,0	22,0-24,0	24-27	27,0-32,0	73,5	18	45	52	54	60,0
M50x1.5	1 1/2"	EBLS5M	26,0-35,0	26,0-28,0	28-31	31,0-35,0	79,0	18	55	60	63	69,3
NPT1/4"	1/2"	EBLS02N	4,0-8,0	4,0-6,0	6,0-8,0	-	54,5	16	22	27	29	32,7
NPT3/8"	1/2"	EBLS01N	4,0-12,0	4,0-6,0	6,0-9,0	9,0-12,0	54,5	16	22	27	29	32,7
NPT1/2"	1/2"	EBLS1N	4,0-12,0	4,0-6,0	6,0-9,0	9,0-12,0	50,5	16	22	27	29	32,7
NPT3/4"	3/4"	EBLS2N	10,0-18,0	10,0-12,0	12,0-14,5	14,5-18,0	53,5	16	28	33	35	38,7
NPT1"	1"	EBLS3N	14,0-24,0	14,0-17,0	17,0-20,0	20,0-24,0	62,0	20	35	43	45	50,0
NPT1 1/4"	1 1/4"	EBLS4N	22,0-32,0	22,0-24,0	24,0-27,0	27,0-32,0	73,5	20	45	52	54	60,0
NPT1 1/2"	1 1/2"	EBLS5N	26,0-35,0	26,0-28,0	28,0-31,0	31,0-35,0	79,5	20	55	60	63	69,3



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Examination Certificate Number	IMQ 13 ATEX 018X	IECEX IMQ 13.0006X
Date of Issue	29.07.2013	31.10.2013
Test Report Number	43AN00024	54AN00009
Safety Requirements	EN 60079-0:2009 EN 60079-7:2007 EN 60079-31:2009	IEC 60079-0:2007 Edition:5 IEC 60079-7:2004 Edition:4 IEC 60079-31:2008 Edition:1
Equipment Marking	Ex II 2 GD Ex d IIC Gb Ex e IIC Gb Ex tb IIIC Db	Ex II 2 GD Ex d IIC Gb Ex e IIC Gb Ex tb IIIC Db

Item	Item Description
1	O-ring
2	Lower Body
3	Seal S1
4	Seal S2
5	Seal S3
6	Middle body
7	Ferrule
8	Plastic ring
9	Cap
10	Liquidtight Conduit
11	Cable



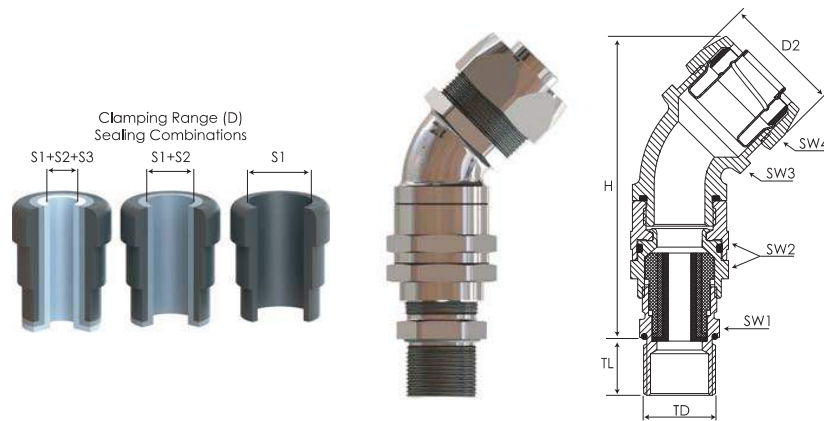
# E-Scorpius 1 Function Ex d/e 45° Liquidtight conduit Fittings

Equipment	Gas Group	Dust Group
Suitable for use in	ZONE1/ZONE2	ZONE21/ZONE 22
	Group II	Group III
	Gas Group IIC	Dust Group IIIC
For	Gas & Dust potentially explosive atmospheres	
Degree of Protection	IP66 – IP68 (EN 60529)	
Marking	BMD EBLQ.. Ex CE 0722 II 2GD Ex d IIC Gb / Ex e IIC Gb / Ex tb IIIC Db Ta-40°C +80°C IP66/68 IECEx IMQ 13.0006X / IMQ 13 ATEX 018X	
Cable Type	Non-armor	
Seal Operating Temperature	Temperature*	
	Chloroprene	-40°C / +80°C
	Silicone	-60°C / +80°C
Material	Brass	Items 1-3-4-5
	Stainless Steel	Items 2-6-9
Ferrule Material	Steel Zinc Plated	Item 7
	Brass Nickel Plated	
Plastic Ring	Nylon 6	Item 8
Thread Type	Metric (M) ISO Pitch 1.5 Npt (N) ANSI ASME B 1.20.1 Other thread types also available upon request.	

\*customised high temperature (+100°C) Ex-e application is also available.

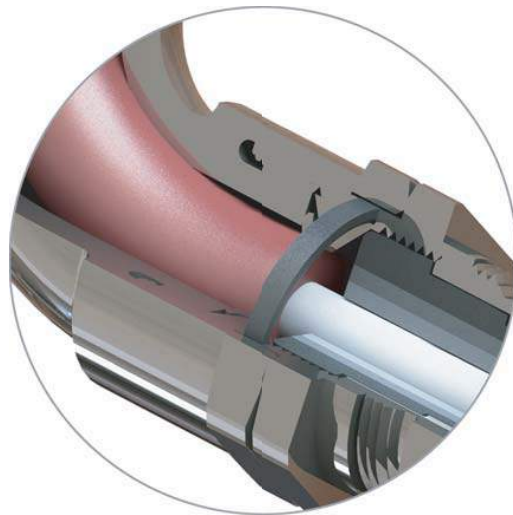
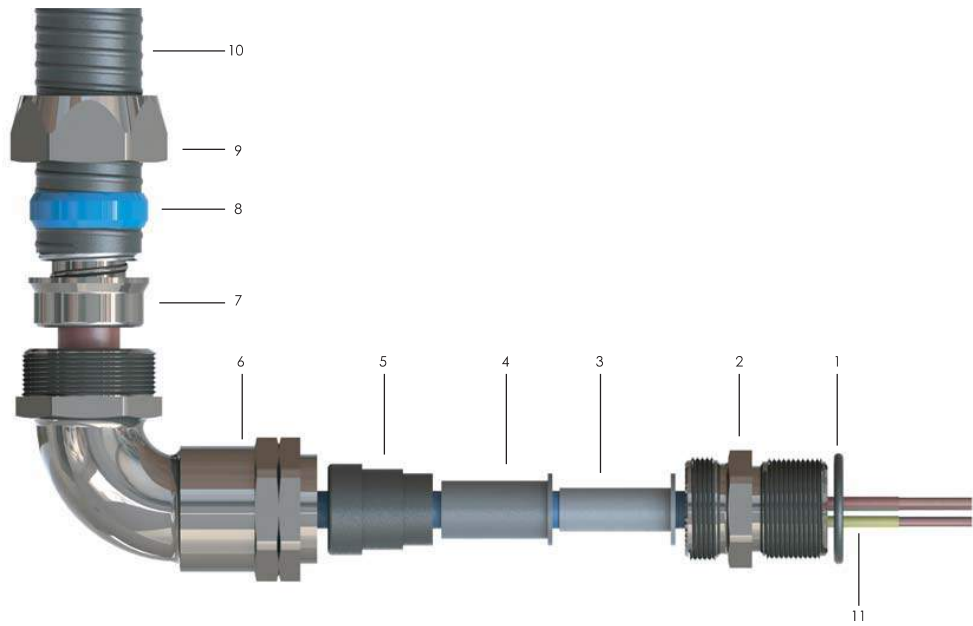
Order Encoding		Material	Plated	Sealing	Code Examples
Type	Thread	B (Brass) X (Stainless Steel)	N (Nickel Only for Brass)	C (Chloroprene) S (Silicone)	EBLQ01MBNS

Thread Type (TD)	Conduit Ø mm	Code	Clamping Range Ø min-max				Conduit Fitting Dimensions						
			D (mm)	S1+S2+S3 (mm)	S1+S2 (mm)	S1 (mm)	H Min. (mm)	TL Min. (mm)	SW1 (mm)	SW2 (mm)	SW3 (mm)	SW4 (mm)	D2 (mm)
M12x1.5	1/2"	EBLQ02M	4,0-8,0	4,0-6,0	6,0-8,9	-	86,5	16	22	27	27	29	32,7
M16x1.5	1/2"	EBLQ01M	4,0-12,0	4,0-6,0	6,0-9,9	9,0-12,0	87,5	16	22	27	27	29	32,7
M20x1.5	1/2"	EBLQ1M	4,0-12,0	4,0-6,0	6,0-9,9	9,0-12,0	83	16	22	27	27	29	32,7
M25x1.5	3/4"	EBLQ2M	10,0-18,0	10,0-12,0	12,0-14,5	14,5-18,0	94	16	28	33	38	35	38,7
M32x1.5	1"	EBLQ3M	14,0-24,0	14,0-17,0	17,0-20,9	20,0-24,0	111	16	35	42	42	45	50,0
M40x1.5	1 1/4"	EBLQ4M	22,0-32,0	22,0-24,0	24,0-27,9	27,0-32,0	131,5	18	45	51	51	54	60,0
M50x1.5	1 1/2"	EBLQ5M	26,0-35,0	26,0-28,0	28,0-31,9	31,0-35,0	143,5	18	55	60	60	63	69,3
1/4"	1/2"	EBLQ02N	4,0-8,0	4,0-6,0	6,0-8,0	-	86,5	16	22	27	27	29	32,7
3/8"	1/2"	EBLQ01N	4,0-12,0	4,0-6,0	6,0-9,0	9,0-12,0	86,5	16	22	27	27	29	32,7
1/2"	1/2"	EBLQ1N	4,0-12,0	4,0-6,0	6,0-9,0	9,0-12,0	82,5	16	22	27	27	29	32,7
3/4"	3/4"	EBLQ2N	10,0-18,0	10,0-12,0	12,0-14,5	14,5-18,0	94	16	28	33	38	35	38,7
1"	1"	EBLQ3N	14,0-24,0	14,0-17,0	17,0-20,0	20,0-24,0	111	20	35	42	42	45	50,0
1 1/4"	1 1/4"	EBLQ4N	22,0-32,0	22,0-24,0	24,0-27,0	27,0-32,0	133	20	45	51	51	54	60,0
1 1/2"	1 1/2"	EBLQ5N	26,0-35,0	26,0-28,0	28,0-31,0	31,0-35,0	143	20	55	60	60	63	69,3



Approved by	IMQ	
Examination Certificate Number	IMQ 13 ATEX 018X	IECEX IMQ 13.0006X
Date of Issue	29.07.2013	31.10.2013
Test Report Number	43AN00024	54AN00009
Safety Requirements	EN 60079-0:2009 EN 60079-7:2007 EN 60079-31:2009	IEC 60079-0:2007 Edition:5 IEC 60079-7:2006 Edition:4 IEC 60079-31:2008 Edition:1
Equipment Marking	Ex II 2 GD Ex d IIC Gb Ex e IIC Gb Ex tb IIIC Db	Ex II 2 GD Ex d IIC Gb Ex e IIC Gb Ex tb IIIC Db

Item	Item Description
1	O-ring
2	Lower Body
3	Seal S1
4	Seal S2
5	Seal S3
6	Middle body
7	Ferrule
8	Plastic ring
9	Cap
10	Liquidtight Conduit
11	Cable



# E-LUPUS 1 Function Ex d/e 45° Liquidtight conduit Fittings

Equipment	Gas Group ZONE1/ZONE2	Dust Group ZONE21/ZONE 22
Suitable for use in	Group II Gas Group IIC	Group III Dust Group IIIC
For	Gas & Dust potentially explosive atmospheres	
Degree of Protection	IP66 – IP68 (EN 60529)	
Marking	BMD EBLN.. Ex CE 0722 II 2GD Ex d IIC Gb / Ex e IIC Gb / Ex tb IIIC Db Ta-40°C +80°C IP66/68 IECEx IMQ 13.0006X / IMQ 13 ATEX 018X	
Cable Type	Non-armor	
Seal Operating Temperature	Temperature*	
	Chloroprene	-40°C / +80°C
	Silicone	-60°C / +80°C
Material	Brass Stainless Steel	Items 1-3-4-5
Ferrule Material	Steel Zinc Plated Brass Nickel Plated	Items 2-6-9
Plastic Ring	Nylon 6	Item 7
Thread Type	Metric (M) ISO Pitch 1.5 Npt (N) ANSI ASME B1.20.1 Other thread types also available upon request.	Item 8

\*customised high temperature (+100°C) Ex-e application is also available.

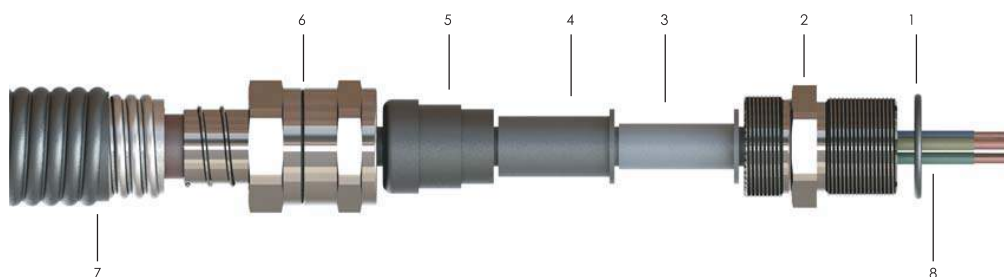
Order Encoding		Material	Plated	Sealing	Code Examples
Type	Thread	B (Brass) X (Stainless Steel)	N (Nickel Only for Brass)	C (Chloroprene) S (Silicone)	EBLN01MBNS

Thread Type (TD)	Conduit Ø mm	Code	Clamping Range Ø Min-Max				Conduit Fitting Dimensions						
			D (mm)	S1+S2+S3 (mm)	S1+S2 (mm)	S1 (mm)	H Min. (mm)	TL Min. (mm)	SW1 (mm)	SW2 (mm)	SW3 (mm)	SW4 (mm)	D2 (mm)
M12x1.5	1/2"	EBLN02M	4,0-8,0	4,0-6,0	6,0-8,0	-	97,0	16	22	27	27	29	32,7
M16x1.5	1/2"	EBLN01M	4,0-12,0	4,0-6,0	6,0-9,0	9,0-12,0	97,0	16	22	27	27	29	32,7
M20x1.5	1/2"	EBLN1M	4,0-12,0	4,0-6,0	6,0-9,0	9,0-12,0	94,0	16	22	27	27	29	32,8
M25x1.5	3/4"	EBLN2M	10,0-18,0	10,0-12,0	12,0-14,5	14,5-18,0	104,0	16	28	33	38	35	38,7
M32x1.5	1"	EBLN3M	14,0-24,0	14,0-17,0	17,0-20,0	20,0-24,0	118,0	16	35	42	42	45	50,0
M40x1.5	1 1/4"	EBLN4M	22,0-32,0	22,0-24,0	24,0-27,0	27,0-32,0	138,0	18	45	51	51	54	60,0
M50x1.5	1 1/2"	EBLN5M	26,0-35,0	26,0-28,0	28,0-31,0	31,0-35,0	153,5	18	55	60	60	63	69,3
NPT1/4"	1/2"	EBLN02N	4,0-8,0	4,0-6,0	6,0-8,0	-	97,0	16	22	27	27	29	32,7
NPT3/8"	1/2"	EBLN01N	4,0-12,0	4,0-6,0	6,0-9,0	9,0-12,0	97,0	16	22	27	27	29	32,7
NPT1/2"	1/2"	EBLN1N	4,0-12,0	4,0-6,0	6,0-9,0	9,0-12,0	93,0	16	22	27	27	29	32,8
NPT3/4"	3/4"	EBLN2N	10,0-18,0	10,0-12,0	12,0-14,5	14,5-18,0	103,5	16	28	33	38	35	38,7
NPT1"	1"	EBLN3N	14,0-24,0	14,0-17,0	17,0-20,0	20,0-24,0	122,0	20	35	42	42	45	50,0
NPT1 1/4"	1 1/4"	EBLN4N	22,0-32,0	22,0-24,0	24,0-27,0	27,0-32,0	140,0	20	45	51	51	54	60,0
NPT1 1/2"	1 1/2"	EBLN5N	26,0-35,0	26,0-28,0	28,0-31,0	31,0-35,0	155,0	20	55	60	60	63	69,3



Approved by	IMQ	
Examination Certificate Number	IMQ 13 ATEX 018X	IECEX IMQ 13.0006X
Date of Issue	29.07.2013	31.10.2013
Test Report Number	43AN00024	54AN00009
Safety Requirements	EN 60079-0:2009 EN 60079-7:2007 EN 60079-31:2009	IEC 60079-0:2007 Edition:5 IEC 60079-7:2006 Edition:4 IEC 60079-31:2008 Edition:1
Equipment Marking	Ex II 2 GD Ex d IIC Gb Ex e IIC Gb Ex tb IIIC Db	Ex II 2 GD Ex d IIC Gb Ex e IIC Gb Ex tb IIIC Db

Item	Item Description
1	O-ring
2	Lower Body
3	Seal S3
4	Seal S2
5	Seal S1
6	Cap in ferrule
7	Conduit
8	Cable



# E-CORVUS<sup>1</sup> Function Ex d/e Liquidtight conduit Fittings

Equipment	Gas Group ZONE1/ZONE2	Dust Group ZONE21/ZONE 22
Suitable for use in	Group II	Group III
	Gas Group IIC	Dust Group IIIC
For	Gas & Dust potentially explosive atmospheres	
Degree of Protection	IP66 – IP68 (EN 60529)	
Marking	BMD EBMC... Ex CE 0722 II 2GD Ex d IIC Gb / Ex e IIC Gb / Ex tb III C Db Tc-40°C +80°C IP66/68 IECEx CES 13.0013X / IMQ 13 ATEX 018X	
Cable Type	Non-armor	
Seal Operating Temperature	Seal	Temperature*
	Chloroprene	-40°C / +80°C
	Silicone	-60°C / +100°C
Material	Brass Stainless Steel Aluminium	Items 1-3-4-5
Thread Type	Metric (M) ISO Pitch 1.5 Npt (N) ANSI ASME B1.20.1 Other thread types also available upon request.	

\*customised high temperature (+100°C) Ex-e application is also available.

Order Encoding		Material	Plated	Sealing	Code Examples
Type	Thread				
EBMC01	M (Metric)	B (Brass) X (Stainless Steel) A (Aluminium)	N (Nickel Only for Brass)	C (Chloroprene) S (Silicone)	EBMC01MBNS

Thread Type (TD)	Conduit Ø mm	Code	Clamping Range Ø Min-Max				Conduit Fitting Dimensions					
			D (mm)	S1+S2+S3 (mm)	S1+S2 (mm)	S1 (mm)	H min (mm)	TL (mm)	SW1 (mm)	SW2 (mm)	SW3 (mm)	D2 (mm)
M12x1.5	1/2"	EBMC0SM	4,0-8,0	4,0-6,0	6,0-8,0	-	40,0	16	22	24	24	26,5
M16x1.5	1/2"	EBMC01M	4,0-12,0	4,0-6,0	6,0-9,0	9,0-12,0	40,0	16	22	24	24	26,5
M20x1.5	1/2"	EBMC1M	4,0-12,0	4,0-6,0	6,0-9,0	9,0-12,0	36,5	16	22	24	24	26,5
M20x1.5	3/4"	EBMC12M	10,0-16,0	10,0-12,0	12,0-14,5	14,5-16,0	39,5	16	28	29	29	31,5
M25x1.5	3/4"	EBMC2M	10,0-18,0	10,0-12,0	12,0-14,5	14,5-18,0	40,0	16	28	29	29	31,5
M25x1.5	1"	EBMC23M	14,0-20,0	14,0-17,0	17,0-20,0	-	45,0	16	35	36	36	39,8
M32x1.5	1"	EBMC3M	14,0-24,0	14,0-17,0	17,0-20,0	20,0-24,0	44,0	16	35	36	36	39,8
M32x1.5	1 1/4"	EBMC34M	22,0-28,0	22,0-24,0	24,0-27,0	27,0-28,0	52,0	16	45	45	45	50,0
M40x1.5	1 1/4"	EBMC4M	22,0-32,0	22,0-24,0	24,0-27,0	27,0-32,0	52,0	18	45	45	45	50,0
M40x1.5	1 1/2"	EBMC45M	26,0-34,0	26,0-28,0	28,0-31,0	31,0-34,0	57,5	18	50	52	52	59,0
M50x1.5	1 1/2"	EBMC5M	26,0-35,0	26,0-28,0	28,0-31,0	31,0-35,0	58,0	18	55	52	52	59,0
M50x1.5	2"	EBMC56M	35,0-44,0	35,0-38,0	38,0-41,0	41,0-44,0	56,0	18	64	65	65	72,0
M63x1.5	2"	EBMC6M	35,0-45,0	35,0-38,0	38,0-41,0	41,0-45,0	56,5	18	68	65	65	72,0
M75x1.5	2 1/2"	EBMC7M	46,0-59,0	46,0-51,0	51,0-57,0	57,0-59,0	65,5	20	80	80	80	89,0
NPT 1/4"	1/2"	EBMC0SN	4,0-8,0	4,0-6,0	6,0-8,0	-	40,0	16	22	24	24	26,5
NPT 3/8"	1/2"	EBMC01N	4,0-12,0	4,0-6,0	6,0-9,0	9,0-12,0	40,0	16	22	24	24	26,5
NPT 1/2"	1/2"	EBMC1N	4,0-12,0	4,0-6,0	6,0-9,0	9,0-12,0	36,5	16	22	24	24	26,5
NPT 1/2"	3/4"	EBMC12N	10,0-16,0	10,0-12,0	12,0-14,5	14,5-16,0	39,5	16	28	29	29	31,5
NPT 3/4"	3/4"	EBMC2N	10,0-18,0	10,0-12,0	12,0-14,5	14,5-18,0	40,0	16	28	29	29	31,5
NPT 3/4"	1"	EBMC23N	14,0-20,0	14,0-17,0	17,0-20,0	-	45,0	16	35	36	36	39,8
NPT 1"	1"	EBMC3N	14,0-24,0	14,0-17,0	17,0-20,0	20,0-24,0	44,0	20	35	36	36	39,8
NPT 1"	1 1/4"	EBMC34N	22,0-28,0	22,0-24,0	24,0-27,0	27,0-28,0	52,0	20	45	45	45	50,0
NPT 1 1/4"	1 1/4"	EBMC4N	22,0-32,0	22,0-24,0	24,0-27,0	27,0-32,0	52,0	20	45	45	45	50,0
NPT 1 1/4"	1 1/2"	EBMC45N	26,0-34,0	26,0-28,0	28,0-31,0	31,0-34,0	57,5	20	50	52	52	59,0
NPT 1 1/2"	1 1/2"	EBMC5N	26,0-35,0	26,0-28,0	28,0-31,0	31,0-35,0	58,0	20	55	52	52	59,0
NPT 1 1/2"	2"	EBMC56N	35,0-44,0	35,0-38,0	38,0-41,0	41,0-44,0	56,0	20	64	65	65	72,0
NPT 2"	2"	EBMC6N	35,0-45,0	35,0-38,0	38,0-41,0	41,0-45,0	56,5	20	68	65	65	72,0
NPT 2 1/2"	2 1/2"	EBMC7N	46,0-59,0	46,0-51,0	51,0-57,0	57,0-59,0	65,5	21	80	80	80	89,0



# Polyamide Glands & Plugs for **GAS & DUST** applications



A cable gland is a fitting that connects a cable to an electrical source, and also is able to secure the cable so it will not escape. Cable gland units are placed into different categories, depending on whether the gland is used for general industrial work or needs hazard protection against high temperatures or explosions. The cables that fit into the glands are either armored or unarmored and a different type of gland will be required for each variety. The gland itself can be made of metals, such as brass or aluminum, or plastic; each material is useful in a different environment.

There are two major categories for cable glands: industrial and hazardous. An industrial cable gland is a general-use gland that meets general hazard requirements, so it is useful in environments without high temperatures or the risk of explosions. If the environment is hazardous, a hazardous gland is used, because these glands meet the necessary extra requirements. They are extra fortified, so they are resistant to temperatures and outside forces that general glands cannot withstand.



Cranes  
Motors  
Heaters  
Thermostat  
Heat detectors  
Flame detectors



Smoke detectors  
Alarm Indicators  
motor starters  
loudspeakers  
alarm bell  
sounders / horns



control and distribution units.  
panels and boards  
beacons / strobes  
status lamps  
control stations  
junction and terminal boxes



variable-frequency on motors  
Lighting Fixtures  
Motor Starters  
Enclosures for control units and  
junction boxes (Power & Lighting)  
Lighting



manual call points  
doorholder magnets  
Electrical, digital compact volume  
flow controller  
Electric linear valve actuators  
Modulating electric



digital sensors for temperature,  
humidity, pressure and differential  
pressure  
Modulating transducer  
Binary switching module



**IEC** **IECEX** **Ex**  
ATEX **GROUP II-III**



**LYRA**  
**BM-X/BP-X/BN-X**

Ex e Polyamide  
Glands  
for non armor  
cable



Page  
**57-58**

**HI-LYRA**  
**HIBM-X/HIBP-X/HIBN-X**

Ex e High Impact  
Polyamide  
Glands  
for non armor  
cable



Page  
**59-60**

**HI-LYRA B**  
**MHIBM-X/MHIBP-X/MHIBN-X**

Ex e High Impact  
Polyamide  
Glands with  
Bushing  
for non armor  
cable



Page  
**61-62**

**LYRA DS**  
**BM-X/BP-X/BN-X**

Ex e Double Seal  
Polyamide  
Glands  
for non armor  
cable



Page  
**63-64**

**HI-LYRA DS**  
**HIBM-X/HIBP-X/HIBN-X**

Ex e High Impact  
Polyamide  
Glands  
for non armor  
cable



Page  
**65-66**

**HI-LYRA DSB**  
**MHIBM-X/MHIBP-X/MHIBN-X**

Ex e High Impact  
Polyamide  
Glands with  
Bushing  
for non armor  
cable



Page  
**67-68**

**Ex II 2 GD / Ex e IIC Gb - Ex tb III Db**

**GEMINI**  
**BM-X/BP-X/BN-X**

Ex e Polyamide  
Glands  
for non circular/  
Heat trace cable



Page  
**69-70**

**DRACO**  
**TP-X**

Ex e Polyamide  
Plugs



Page  
**71-72**

**CETUS**  
**BPM/BPT**

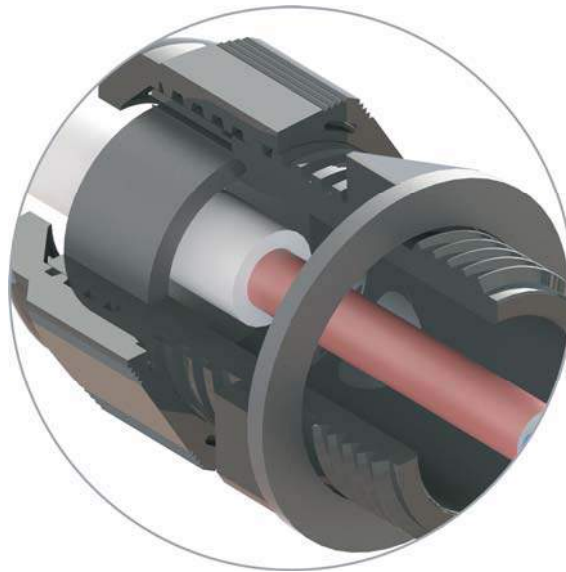
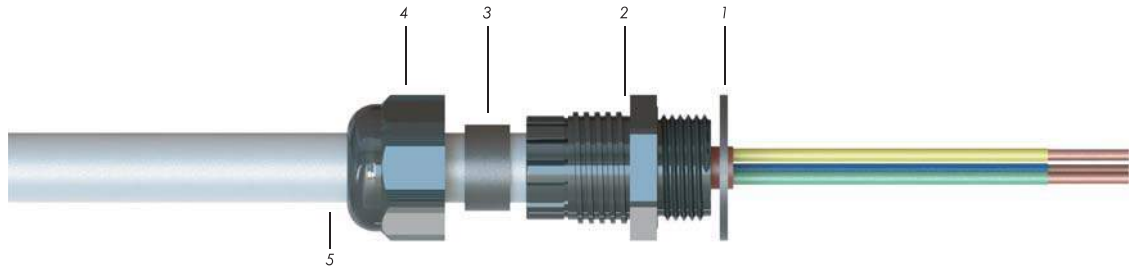
Ex e Polyamide  
Dome Plugs



Page  
**73-74**

Approved by	IMQ	IMQ
Examination Certificate Number	IMQ 13 ATEX 010X	IECEX IMQ 13.0003X
Date of Issue	19.06.2013	29.05.2013
Test Report Number	43AN00017	IT/IMQ/ExTR13.0003/00
Safety Requirements	EN 60079-0:2009 EN 60079-7:2007 EN 60079-31:2009	IEC 60079-0:2007-10 (Edition: 5) IEC 60079-31:2008 (Edition: 1) IEC 60079-7:2006-07 (Edition: 4)
Equipment Marking	Ex II 2 GD    Ex e IIC Gb Ex tb IIIC Db	Ex II 2 GD    Ex e IIC Gb Ex tb IIIC Db
Approved	GOST'R' - INMETRO	
UV resistance according to standard	ISO 4892-2	

Item	Item Description
1	Gasket
2	Body
3	Seal
4	Cap
5	Cable

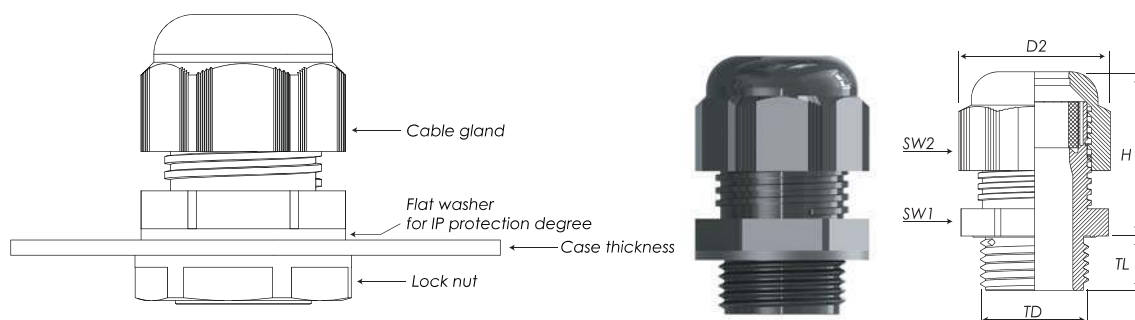


Equipment	Gas Group	Dust Group
Suitable for use in	ZONE1/ZONE2	ZONE21/ZONE 22
	Group II	Group III
	Gas Group IIC	Dust Group IIIC
Type of Protection	Gas & Dust potentially explosive atmospheres. Cable glands should be also used for intrinsically safe circuits Ex-i. These cable glands shall have a light blue colored cap. The symbol "I" will be added beside of the "BM" for order processing.	
For	Ex e ; Ex tb ; Ex i	
Degree of Protection	Gas & Dust potentially explosive atmospheres IP66 – IP68 (EN 60529)	
Marking	BMD BM-X.. Ex CE 0722 II 2GD Ex e IIC Gb Ex tb IIIC Db Ta -40°C +80°C IP66/68 IECEx IMQ 13.0003X / IMQ 13 ATEX 010X	
Seal Operating Temperature	Chloroprene C Silicone S Nbr N	-40°C / +80°C -60°C / +80°C -30°C / +80°C
Material	Polyamide 6	Items 1-3
Impact test result	4J	Items 2-4
Thread Type	Metric (M) ISO Pitch 1,5 Pg (P) DIN 40430 Npt (N) ANSI ASME B1.20.1 Other thread types also available upon request.	

\*You may order the gland with dome plug by simply adding (P) to the end of Bimed code. (BM-X2(P))

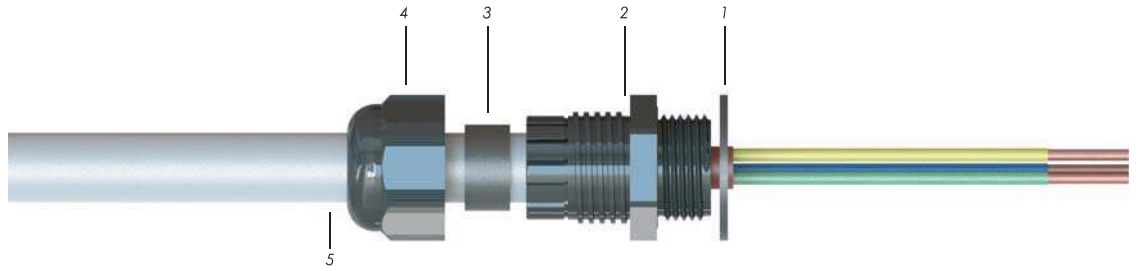
Order Encoding				
Thread Type	Type	Code Examples	Seal Combination	For Ex-i, application code will be
M (Metric)	BM-X	BM-X3	BM-X3C	BMI-X3C
P (Pg)	BP-X	BP-X3	BP-X3C	BPI-X3C
N (Npt)	BN-X	BN-X3	BN-X3C	BNI-X3C

Thread Type (TD)	Code*	Clamping Range		Cable Gland Dimensions				
		Ø Min-Max	H min (mm)	TL (mm)	SW (mm)	SW1 (mm)	D2 (mm)	
M20x1,5	BM-SX2	5,0-10,0	29,5	10	24	22	25,0	
M20x1,5	BM-X2	6,0-12,0	30,0	10	24	24	27,5	
M20x1,5	BM-X2L	6,0-12,0	30,0	15	24	24	27,5	
M20x1,5	BM-X3	10,0-14,0	33,0	10	27	27	31,0	
M20x1,5	BM-X4	10,0-14,0	33,0	15	27	27	31,0	
M25x1,5	BM-SX5	10,0-14,0	33,0	10	27	27	31,0	
M25x1,5	BM-SX6	10,0-14,0	33,0	15	27	27	31,0	
M25x1,5	BM-XEU25	11,0-17,0	34,0	10	29	29	32,5	
M25x1,5	BM-X5	13,0-18,0	35,0	10	33	33	37,0	
M25x1,5	BM-X6	13,0-18,0	35,0	15	33	33	37,0	
M32x1,5	BM-SX7	13,0-18,0	36,0	10	36	33	37,0	
M32x1,5	BM-EU32	15,0-21,0	42,0	10	36	36	41,0	
M32x1,5	BM-X7	18,0-25,0	40,5	15	42	42	47,5	
M40x1,5	BM-XEU40	19,0-28,0	46,0	10	46	46	52,0	
M40x1,5	BM-XEU40L	19,0-28,0	46,0	15	46	46	52,0	
M40x1,5	BM-X8	22,0-32,0	50,0	18	53	53	60,0	
M50x1,5	BM-X9	30,0-38,0	54,0	18	60	60	67,5	
M63x1,5	BM-X10	34,0-44,0	54,0	18	65	65	72,0	
Pg 13,5	BP-X4	6,0-12,0	42,0	10	24	24	27,5	
Pg 16	BP-X5	10,0-14,0	46,5	10	27	27	31,0	
Pg 21	BP-X6	13,0-18,0	47,0	11	33	33	37,0	
Pg 29	BP-X7	18,0-25,0	52,0	11	42	42	47,5	
Pg 36	BP-X8	22,0-32,0	58,5	13	53	53	60,0	
Pg 42	BP-X9	30,0-38,0	68,0	13	60	60	67,5	
Pg 48	BP-X10	34,0-44,0	69,0	14	65	65	72,0	
NPT1/2"	BN-SX2	5,0-10,0	45,0	15	24	22	25,0	
NPT1/2"	BN-X2	6,0-12,0	45,0	15	24	24	27,5	
NPT1/2"	BN-LX2	10,0-14,0	47,0	15	27	27	31,0	
NPT3/4"	BN-X3	13,0-18,0	50,0	15	33	33	37,0	
NPT1"	BN-X4	18,0-25,0	58,0	18	42	42	47,5	



Approved by	IMQ		IMQ	
Examination Certificate Number	IMQ 13 ATEX 010X		IECEx IMQ 13.0003X	
Date of Issue	19.06.2013		29.05.2013	
Test Report Number	43AN00017		IT/IMQ/ExTR13.0003/00	
Safety Requirements	EN 60079-0:2009 EN 60079-7:2007 EN 60079-31:2009		IEC 60079-0:2007-10 (Edition: 5) IEC 60079-31:2008 (Edition: 1) IEC 60079-7:2006-07 (Edition: 4)	
Equipment Marking	Ex II 2 GD	Ex e IIC Gb Ex tb III C Db	Ex II 2 GD	Ex e IIC Gb Ex tb III C Db
Approved	GOST'R' - INMETRO			
UV resistance according to standard	ISO 4892-2			

Item	Item Description
1	Gasket
2	Body
3	Seal
4	Cap
5	Cable



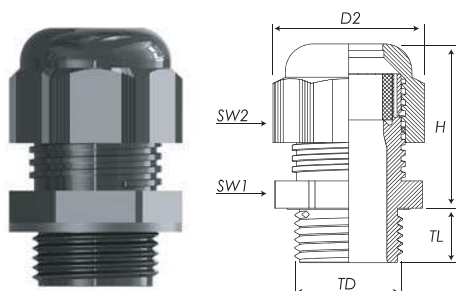
Equipment	Gas Group	Dust Group
Suitable for use in	ZONE1/ZONE2	ZONE21/ZONE 22
	Group II	Group III
	Gas Group IIC	Dust Group IIIC
	Gas & Dust potentially explosive atmospheres. Cable glands should be also used for intrinsically safe circuits Ex-i. These cable glands shall have a light blue colored cap. The symbol "I" will be added beside of the "HIBM" for order processing.	
Type of Protection	Ex e ; Ex tb ; Ex i	
For	Gas & Dust potentially explosive atmospheres	
Degree of Protection	IP66 – IP68 (EN 60529)	
Marking	BMD HIBM-X.. Ex CE 0722 II 2GD Ex e IIC Gb Ex tb IIIC Db Ta -40°C +80°C IP66/68 IECEx IMQ 13.0003X / IMQ 13 ATEX 010X	
Seal Operating Temperature	Chloroprene C	-40°C / +80°C
	Silicone S	-60°C / +80°C
	Nbr N	-30°C / +80°C
Material	Polyamide 6	Items 2-4
Impact test result	7J	
Thread Type	Metric (M) ISO Pitch 1.5 Pg (P) DIN 40430 Npt (N) ANSI ASME B1.20.1 Other thread types also available upon request.	

\*You may order the gland with dome plug by simply adding (P) to the end of Bimed code. (HIBM-X2(P))

### Order Encoding

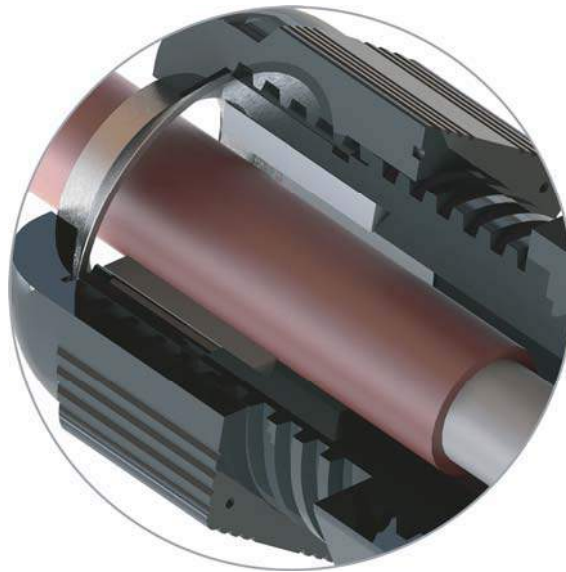
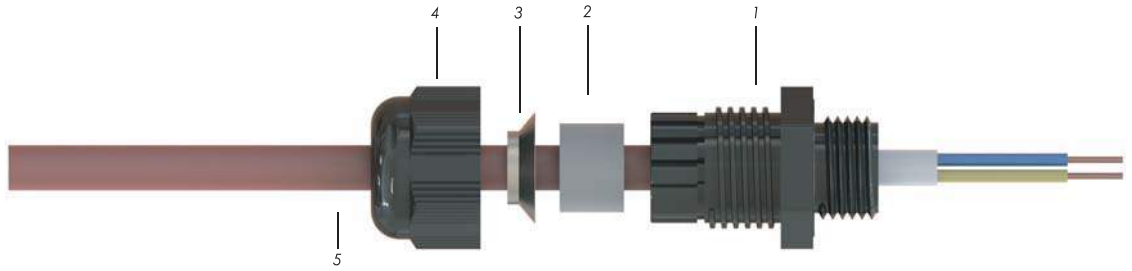
Thread Type	Type	Code Examples	Seal Combination	For Ex-i, application code will be
M (Metric)	HIBM-X	HIBM-X3	HIBM-X3C	HIBMI-X3C
P (Pg)	HIBP-X	HIBP-X3	HIBP-X3C	HIBPI-X3C
N (Npt)	HIBN-X	HIBN-X3	HIBN-X3C	HIBNI-X3C

Thread Type (TD)	Code	Clamping Range	Cable Gland Dimensions				
		Ø Min-Max	H min (mm)	TL (mm)	SW (mm)	SW1 (mm)	D2 (mm)
M12x1.5	HIBM-0XS	4.0-6.5	22.0	10.0	15.0	15.0	17.0
M12x1.5	HIBM-XS	4.0-6.5	22.0	15.0	15.0	15.0	17.0
M16x1.5	HIBM-SX1	5.0-8.0	26.0	10.0	19.0	19.0	21.3
M16x1.5	HIBM-X1	6.0-10.0	29.5	10.0	22.0	22.0	25.0
M16x1.5	HIBM-X1L	6.0-10.0	29.5	15.0	22.0	22.0	25.0
M20x1.5	HIBM-SX2	6.0-10.0	29.5	10.0	24.0	22.0	25.0
M20x1.5	HIBM-X2	7.0-12.0	30.0	10.0	24.0	24.0	27.5
M20x1.5	HIBM-X2L	7.0-12.0	30.0	15.0	24.0	24.0	27.5
M20x1.5	HIBM-MX2	7.0-13.0	30.0	10.0	25.0	25.0	27.5
M20x1.5	HIBM-X3	11.0-14.0	33.0	10.0	27.0	27.0	31.0
M20x1.5	HIBM-X4	11.0-14.0	33.0	15.0	27.0	27.0	31.0
M25x1.5	HIBM-SX5	11.0-14.0	33.0	10.0	27.0	27.0	31.0
M25x1.5	HIBM-SX6	11.0-14.0	33.0	15.0	27.0	27.0	31.0
M25x1.5	HIBM-XEU25	12.0-17.0	34.0	10.0	29.0	29.0	32.5
M25x1.5	HIBM-XEU25L	12.0-17.0	34.0	15.0	29.0	29.0	32.5
M25x1.5	HIBM-X5	14.0-18.0	35.0	10.0	33.0	33.0	37.0
M25x1.5	HIBM-X6	14.0-18.0	35.0	15.0	33.0	33.0	37.0
M32x1.5	HIBM-SX7	14.0-18.0	36.0	10.0	36.0	33.0	37.0
M32x1.5	HIBM-XEU32	16.0-21.0	42.0	10.0	36.0	36.0	41.0
M32x1.5	HIBM-X7	19.0-25.0	40.5	15.0	42.0	42.0	47.5
M40x1.5	HIBM-XEU40	20.0-28.0	46.0	10.0	46.0	46.0	52.0
M40x1.5	HIBM-XEU40L	20.0-28.0	46.0	15.0	46.0	46.0	52.0
M40x1.5	HIBM-X8	23.0-32.0	50.0	18.0	53.0	53.0	60.0
M50x1.5	HIBM-X9	31.0-38.0	54.0	18.0	60.0	60.0	67.5
M63x1.5	HIBM-X10	35.0-44.0	54.0	18.0	65.0	65.0	72.0
Pg 7	HIBP-X1	4.0-6.5	22.0	15.0	15.0	15.0	17.0
Pg 9	HIBP-X2	5.0-8.0	26.0	10.0	19.0	19.0	21.3
Pg 11	HIBP-X3	6.0-10.0	29.5	10.0	22.0	22.0	25.0
Pg 13.5	HIBP-X4	7.0-12.0	30.0	10.0	24.0	24.0	27.5
Pg 16	HIBP-X5	11.0-14.0	33.0	10.0	27.0	27.0	31.0
Pg 21	HIBP-X6	14.0-18.0	35.0	10.0	33.0	33.0	37.0
Pg 29	HIBP-X7	19.0-25.0	40.5	15.0	42.0	42.0	47.5
Pg 36	HIBP-X8	23.0-32.0	50.0	18.0	53.0	53.0	60.0
Pg 42	HIBP-X9	31.0-38.0	54.0	18.0	60.0	60.0	67.5
Pg 48	HIBP-X10	35.0-44.0	54.0	18.0	65.0	65.0	72.0
NPT 3/8"	HIBN-X1	6.0-10.0	29.5	10.0	22.0	22.0	25.0
NPT 1/2"	HIBN-SX2	6.0-10.0	29.5	10.0	24.0	22.0	25.0
NPT 1/2"	HIBN-X2	7.0-12.0	30.0	10.0	24.0	24.0	27.5
NPT 1/2"	HIBN-LX2	11.0-14.0	33.0	10.0	27.0	27.0	31.0
NPT 3/4"	HIBN-X3	14.0-18.0	35.0	10.0	33.0	33.0	37.0
NPT 1"	HIBN-X4	19.0-25.0	40.5	15.0	42.0	42.0	47.5



Approved by	IMQ	IMQ
Examination Certificate Number	IMQ 13 ATEX 010X	IECEX IMQ 13.0003X
Date of Issue	19.06.2013	29.05.2013
Test Report Number	43AN00017	IT/IMQ/ExTR13.0003/00
Safety Requirements	EN 60079-0:2009 EN 60079-7:2007 EN 60079-31:2009	IEC 60079-0:2007-10 (Edition: 5) IEC 60079-31:2008 (Edition: 1) IEC 60079-7:2006-07 (Edition: 4)
Equipment Marking	Ex II 2 GD Ex e IIC Gb Ex tb IIIC Db	Ex II 2 GD Ex e IIC Gb Ex tb IIIC Db
Approved	GOST'R' - INMETRO	
UV resistance according to standard	ISO 4892-2	

Item	Item Description
1	Body
2	Seal
3	Bushing
4	Cap
5	Cable

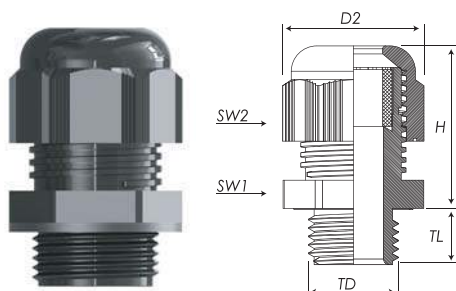


Equipment	Gas Group ZONE1/ZONE2	Dust Group ZONE21/ZONE 22
Suitable for use in	Group II	Group III
	Gas Group IIC	Dust Group IIIC
	Gas & Dust potentially explosive atmospheres. Cable glands should be also used for intrinsically safe circuits Ex-i. These cable glands shall have a light blue colored cap. The symbol "I" will be added beside of the "MHIBM" for order processing.	
Type of Protection	Ex e ; Ex tb ; Ex I	
For	Gas & Dust potentially explosive atmospheres	
Degree of Protection	IP66 – IP68 (EN 60529)	
Marking	BMD MHIBM-X... Ex CE 0722 II 2GD Ex e IIC Gb Ex tb IIIC Db Ta -40°C +80°C IP66/68 IECEx IMQ 13.0003X / IMQ 13 ATEX 010X	
Seal Operating Temperature	Chloroprene C	Items 2
	Silicone S	
	Nbr N	
Gland Material	Polyamide 6	Items 1-4
Bushing Material	Inox	Item 3
Impact test result	7J	
Thread Type	Metric (M) ISO Pitch 1,5 Pg (P) DIN 40430 Npt (N) ANSI ASME B1.20.1 Other thread types also available upon request.	

\*You may order the gland with dome plug by simply adding (P) to the end of Bimed code. (MHIBM-X2P)

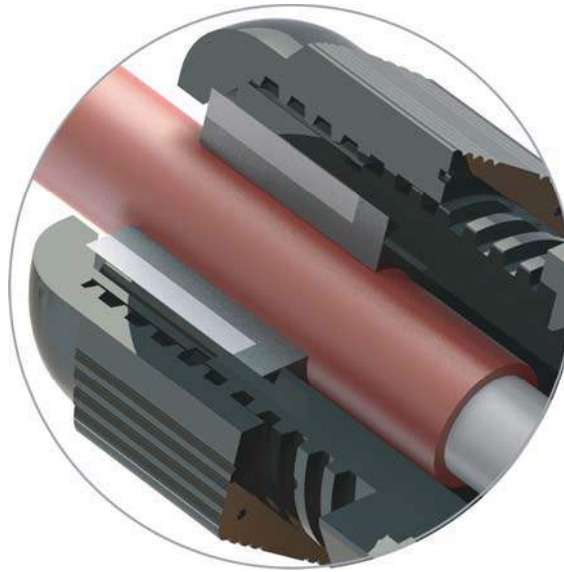
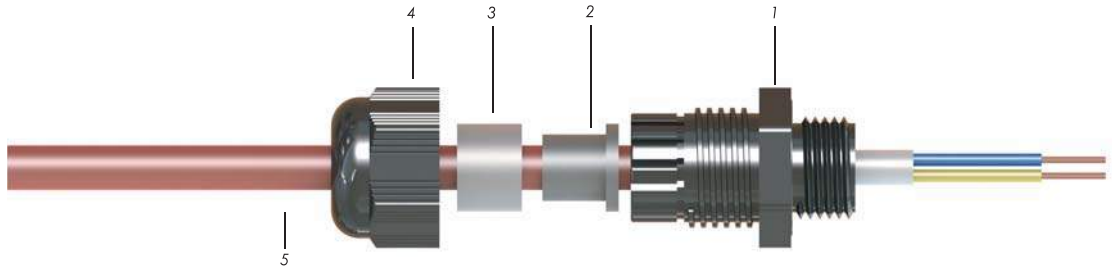
Order Encoding				
Thread Type	Type	Code Examples	Seal Combination	For Ex-i. application code will be
M (Metric)	MHIBM-X	MHIBM-X3	MHIBM-X3C	MHIBM-X3C
P (Pg)	MHIBP-X	MHIBP-X3	MHIBP-X3C	MHIBP-X3C
N (Npt)	MHIBN-X	MHIBN-X3	MHIBN-X3C	MHIBN-X3C

Thread Type (TD)	Code	Clamping Range Ø Min-Max	Cable Gland Dimensions				
			H min (mm)	TL (mm)	SW (mm)	SW1 (mm)	D2 (mm)
M12x1.5	MHIBM-0XS	4.0-6.5	22.0	10.0	15.0	15.0	17.0
M12x1.5	MHIBM-XS	4.0-6.5	22.0	15.0	15.0	15.0	17.0
M16x1.5	MHIBM-SX1	5.0-8.0	26.0	10.0	19.0	19.0	21.3
M16x1.5	MHIBM-X1	6.0-10.0	29.5	10.0	22.0	22.0	25.0
M16x1.5	MHIBM-X1L	6.0-10.0	29.5	15.0	22.0	22.0	25.0
M20x1.5	MHIBM-SX2	6.0-10.0	29.5	10.0	24.0	22.0	25.0
M20x1.5	MHIBM-X2	7.0-12.0	30.0	10.0	24.0	24.0	27.5
M20x1.5	MHIBM-X2L	7.0-12.0	30.0	15.0	24.0	24.0	27.5
M20x1.5	MHIBM-MX2	7.0-13.0	30.0	10.0	25.0	25.0	27.5
M20x1.5	MHIBM-X3	11.0-14.0	33.0	10.0	27.0	27.0	31.0
M20x1.5	MHIBM-X4	11.0-14.0	33.0	15.0	27.0	27.0	31.0
M25x1.5	MHIBM-SX5	11.0-14.0	33.0	10.0	27.0	27.0	31.0
M25x1.5	MHIBM-SX6	11.0-14.0	33.0	15.0	27.0	27.0	31.0
M25x1.5	MHIBM-XEU25	12.0-17.0	34.0	10.0	29.0	29.0	32.5
Ø25x1.5	MHIBM-XEU25L	12.0-17.0	34.0	15.0	29.0	29.0	32.5
M25x1.5	MHIBM-X5	14.0-18.0	35.0	10.0	33.0	33.0	37.0
M25x1.5	MHIBM-X6	14.0-18.0	35.0	15.0	33.0	33.0	37.0
M32x1.5	MHIBM-SX7	14.0-18.0	36.0	10.0	36.0	33.0	37.0
M32x1.5	MHIBM-XEU32	16.0-21.0	42.0	10.0	36.0	36.0	41.0
M32x1.5	MHIBM-X7	19.0-25.0	40.5	15.0	42.0	42.0	47.5
M40x1.5	MHIBM-XEU40	20.0-28.0	46.0	10.0	46.0	46.0	52.0
M40x1.5	MHIBM-XEU40L	20.0-28.0	46.0	15.0	46.0	46.0	52.0
M40x1.5	MHIBM-X8	23.0-32.0	50.0	18.0	53.0	53.0	60.0
M50x1.5	MHIBM-X9	31.0-38.0	54.0	18.0	60.0	60.0	67.5
M63x1.5	MHIBM-X10	35.0-44.0	54.0	18.0	65.0	65.0	72.0
Pg 7	MHIBP-X1	4.0-6.5	22.0	15.0	15.0	15.0	17.0
Pg 9	MHIBP-X2	5.0-8.0	26.0	10.0	19.0	19.0	21.3
Pg 11	MHIBP-X3	6.0-10.0	29.5	10.0	22.0	22.0	25.0
Pg 13.5	MHIBP-X4	7.0-12.0	30.0	10.0	24.0	24.0	27.5
Pg 16	MHIBP-X5	11.0-14.0	33.0	10.0	27.0	27.0	31.0
Pg 21	MHIBP-X6	14.0-18.0	35.0	10.0	33.0	33.0	37.0
Pg 29	MHIBP-X7	19.0-25.0	40.5	15.0	42.0	42.0	47.5
Pg 36	MHIBP-X8	23.0-32.0	50.0	18.0	53.0	53.0	60.0
Pg 42	MHIBP-X9	31.0-38.0	54.0	18.0	60.0	60.0	67.5
Pg 48	MHIBP-X10	35.0-44.0	54.0	18.0	65.0	65.0	72.0
NPT 3/8"	MHIBN-X1	6.0-10.0	29.5	10.0	22.0	22.0	25.0
NPT 1/2"	MHIBN-SX2	6.0-10.0	29.5	10.0	24.0	22.0	25.0
NPT 1/2"	MHIBN-X2	7.0-12.0	30.0	10.0	24.0	24.0	27.5
NPT 1/2"	MHIBN-LX2	11.0-14.0	33.0	10.0	27.0	27.0	31.0
NPT 3/4"	MHIBN-X3	14.0-18.0	35.0	10.0	33.0	33.0	37.0
NPT 1"	MHIBN-X4	19.0-25.0	40.5	15.0	42.0	42.0	47.5



Approved by	IMQ	
Examination Certificate Number	IMQ 13 ATEX 010X	IECEX IMQ 13.0003X
Date of Issue	19.06.2013	29.05.2013
Test Report Number	43AN00017	IT/IMQ/ExTR13.0003/00
Safety Requirements	EN 60079-0:2009 EN 60079-7:2007 EN 60079-31:2009	IEC 60079-0:2007-10 (Edition: 5) IEC 60079-31:2008 (Edition: 1) IEC 60079-7:2006-07 (Edition: 4)
Equipment Marking	Ex II 2 GD    Ex e IIC Gb Ex tb IIIC Db	Ex II 2 GD    Ex e IIC Gb Ex tb IIIC Db
Approved	GOST'R' - INMETRO	
UV resistance according to standard	ISO 4892-2	

Item	Item Description
1	Body
2	Reducing seal
3	Standard seal
4	Cap
5	Cable





Equipment	Gas Group	Dust Group
Suitable for use in	ZONE1/ZONE2	ZONE21/ZONE 22
	Group II	Group III
	Gas Group IIC	Dust Group IIIC
Gas & Dust potentially explosive atmospheres. Cable glands should be also used for intrinsically safe circuits Ex-i. These cable glands shall have a light blue colored cap. The symbol "I" will be added beside of the "BM" for order processing.		
Type of Protection	Ex e ; Ex tb ; Ex i	
For	Gas & Dust potentially explosive atmospheres	
Degree of Protection	IP66 – IP68 (EN 60529)	
Marking	BMD BM-X.. Ex CE 0722 II 2GD Ex e IIC Gb Ex tb IIIC Db Ta-40°C +80°C IP66/68 IECEx IMQ 13.0003X / IMQ 13 ATEX 010X	
Seal Operating Temperature	Chloroprene C	Items 2-3
	Silicone S	
	Nbr N	
Material	Polyamide 6	Items 1-4
Impact test result	4J	
Thread Type	Metric (M) ISO Pitch 1,5 Pg (P) DIN 40430 Npt (N) ANSI ASME B1.20.1 Other thread types also available upon request.	

\*You may order the gland with dome plug by simply adding (P) to the end of Bimed code. (BM-X2DS(P))

#### Order Encoding

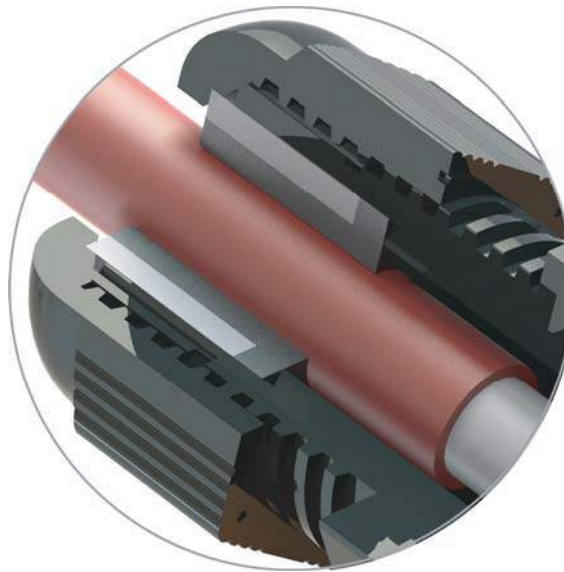
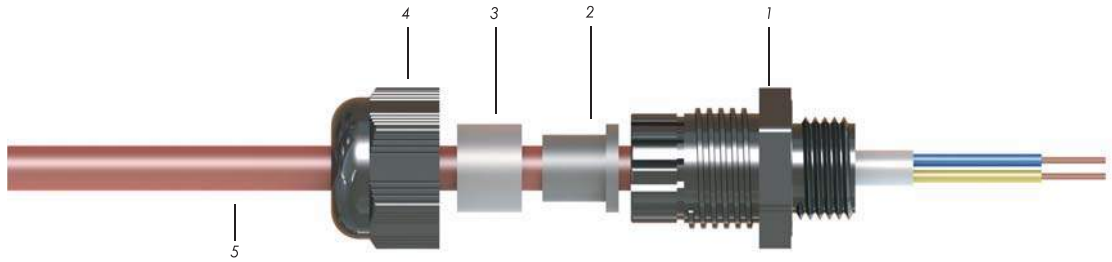
Thread Type	Type	Code Examples	Seal Combination	For Ex-i, application code will be
M (Metric)	BM-X	BM-X3	BM-X3DSC	BMI-X3DSC
P (Pg)	BP-X	BP-X3	BP-X3DSC	BPI-X3DSC
N (Npt)	BN-X	BN-X3	BN-X3DSC	BNI-X3DSC

Thread Type (TD)	Code	Clamping Range		Cable Gland Dimensions				
		Ø Min-Max S (mm)	Ø Min-Max R (mm)	H min (mm)	TL (mm)	SW (mm)	SW1 (mm)	D2 (mm)
M20x1.5	BM-X2DS	6,0-10,0	4,0-7,0	27,5	10	24	24	27,5
M20x1.5	BM-X2LDS	6,0-10,0	4,0-7,0	27,5	15	24	24	27,5
M20x1.5	BM-X3DS	11,0-14,0	8,0-12,0	31,0	10	27	27	31,0
M20x1.5	BM-X4DS	11,0-14,0	8,0-12,0	31,0	15	27	27	31,0
M25x1.5	BM-XEU25DS	12,0-17,0	9,0-13,0	32,5	10	29	29	32,5
M25x1.5	BM-X5DS	14,0-18,0	10,0-14,0	37,0	10	33	33	37,0
M25x1.5	BM-X6DS	14,0-18,0	10,0-14,0	37,0	15	33	33	37,0
M32x1.5	BM-X7DS	19,0-25,0	14,0-20,0	47,5	15	42	42	47,5
M40x1.5	BM-X8DS	23,0-32,0	21,0-26,0	60,0	18	53	53	60,0
M50x1.5	BM-X9DS	31,0-38,0	22,0-31,0	67,5	18	60	60	67,5
M63x1.5	BM-X10DS	35,0-44,0	2,0-35,0	72,0	18	65	65	72,0
Pg 13,5	BP-X4DS	6,0-10,0	4,0-7,0	27,5	10	24	24	27,5
Pg 16	BP-X5DS	11,0-14,0	8,0-12,0	31,0	10	27	27	31,0
Pg 21	BP-X6DS	14,0-18,0	10,0-14,0	37,0	10	33	33	37,0
Pg 29	BP-X7DS	19,0-25,0	14,0-20,0	47,5	15	42	42	47,5
Pg 36	BP-X8DS	23,0-32,0	21,0-26,0	60,0	18	53	53	60,0
Pg 42	BP-X9DS	31,0-38,0	22,0-31,0	67,5	18	60	60	67,5
Pg 48	BP-X10DS	35,0-44,0	2,0-35,0	72,0	18	65	65	72,0
NPT 1/2"	BN-SX2DS	6,0-10,0	4,0-7,0	27,5	10	24	24	27,5
NPT 1/2"	BN-X2DS	11,0-14,0	8,0-12,0	31,0	10	27	27	31,0
NPT 3/4"	BN-X3DS	14,0-18,0	10,0-14,0	37,0	10	33	33	37,0
NPT 1"	BN-X4	19,0-25,0	14,0-20,0	47,5	15	42	42	47,5



Approved by	IMQ	IMQ
Examination Certificate Number	IMQ 13 ATEX 010X	IECEX IMQ 13.0003X
Date of Issue	19.06.2013	29.05.2013
Test Report Number	43AN00017	IT/IMQ/ExTR13.0003/00
Safety Requirements	EN 60079-0:2009 EN 60079-7:2007 EN 60079-31:2009	IEC 60079-0:2007-10 (Edition: 5) IEC 60079-31:2008 (Edition: 1) IEC 60079-7:2006-07 (Edition: 4)
Equipment Marking	Ex II 2 GD Ex e IIC Gb Ex tb IIIC Db	Ex II 2 GD Ex e IIC Gb Ex tb IIIC Db
Approved	GOST <sup>®</sup> - INMETRO	
UV resistance according to standard	ISO 4892-2	

Item	Item Description
1	Body
2	Reducing seal
3	Standard seal
4	Cap
5	Cable



Equipment	Gas Group	Dust Group
Suitable for use in	ZONE1/ZONE2	ZONE21/ZONE 22
	Group II	Group III
	Gas Group IIC	Dust Group IIIC
Type of Protection	Gas & Dust potentially explosive atmospheres. Cable glands should be also used for intrinsically safe circuits Ex-i. These cable glands shall have a light blue colored cap. The symbol "I" will be added beside of the "HIBM" for order processing.	
For	Ex e ; Ex tb ; Ex i	
Degree of Protection	Gas & Dust potentially explosive atmospheres IP66 – IP68 (EN 60529)	
Marking	BMD HIBM-X.. Ex CE 0722 II 2GD Ex e IIC Gb Ex tb IIIC Db Ta -40°C +80°C IP66/68 IECEx IMQ 13.0003X / IMQ 13 ATEX 010X	
Seal Operating Temperature	Chloroprene C Silicone S Nbr N	-40°C / +80°C -60°C / +80°C -30°C / +80°C
Material	Polyamide 6	Items 2-3
Impact test result	7J	Items 1-4
Thread Type	Metric (M) ISO Pitch 1,5 Pg (P) DIN 40430 Npt (N) ANSI ASME B1.20.1 Other thread types also available upon request.	

\*You may order the gland with dome plug by simply adding (P) to the end of Bimed code. (HIBM-X2DS(P))

### Order Encoding

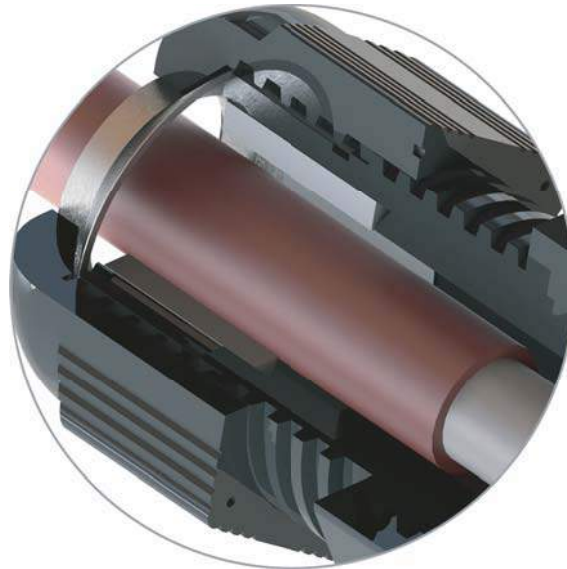
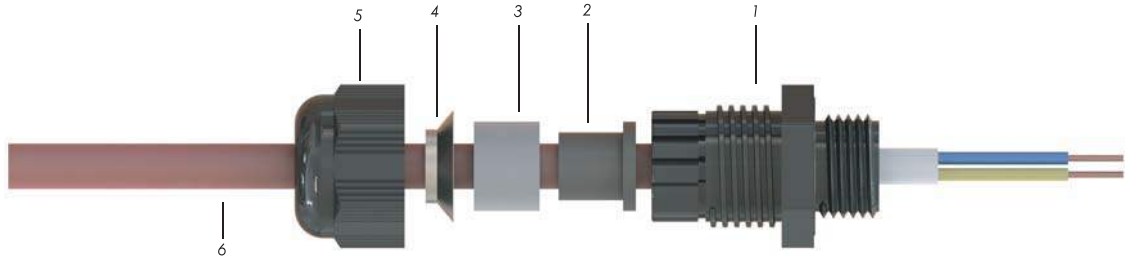
Thread Type	Type	Code Examples	Seal Combination	For Ex-i. application code will be
M (Metric)	HIBM-X	HIBM-X3DS	HIBM-X3DSC	HIBMI-X3DSC
P (Pg)	HIBP-X	HIBP-X3DS	HIBP-X3DSC	HIBPI-X3DSC
N (Npt)	HIBN-X	HIBN-X3DS	HIBN-X3DSC	HIBNI-X3DSC

Thread Type (TD)	Code	Clamping Range		Cable Gland Dimensions				
		Ø Min-Max S (mm)	Ø Min-Max R (mm)	H min (mm)	TL (mm)	SW (mm)	SW1 (mm)	D2 (mm)
M12x1.5	HIBM-0XS(DS)	4.0-6.5	3.0-4.0	22.0	10.0	15.0	15.0	17.0
M12x1.5	HIBM-XS(DS)	4.0-6.5	3.0-4.0	22.0	15.0	15.0	15.0	17.0
M16x1.5	HIBM-SX1(DS)	5.0-8.0	4.0-5.0	26.0	10.0	19.0	19.0	21.3
M16x1.5	HIBM-X1(DS)	6.0-10.0	4.0-7.0	29.5	10.0	22.0	22.0	25.0
M16x1.5	HIBM-X1L(DS)	6.0-10.0	4.0-7.0	29.5	15.0	22.0	22.0	25.0
M20x1.5	HIBM-SX2(DS)	6.0-10.0	4.0-7.0	29.5	10.0	24.0	22.0	25.0
M20x1.5	HIBM-X2(DS)	7.0-12.0	6.0-8.5	30.0	10.0	24.0	24.0	27.5
M20x1.5	HIBM-X2L(DS)	7.0-12.0	6.0-8.5	30.0	15.0	24.0	24.0	27.5
M20x1.5	HIBM-MX2(DS)	7.0-13.0	4.0-7.0	30.0	10.0	25.0	25.0	27.5
M20x1.5	HIBM-X3(DS)	11.0-14.0	8.0-12.0	33.0	10.0	27.0	27.0	31.0
M20x1.5	HIBM-X4(DS)	11.0-14.0	8.0-12.0	33.0	15.0	27.0	27.0	31.0
M25x1.5	HIBM-SX5(DS)	11.0-14.0	8.0-12.0	33.0	10.0	27.0	27.0	31.0
M25x1.5	HIBM-SX6(DS)	11.0-14.0	8.0-12.0	33.0	15.0	27.0	27.0	31.0
M25x1.5	HIBM-XEU2S(DS)	12.0-17.0	9.0-13.0	34.0	10.0	29.0	29.0	32.5
M25x1.5	HIBM-XEU2SL(DS)	12.0-17.0	9.0-13.0	34.0	15.0	29.0	29.0	32.5
M25x1.5	HIBM-X5(DS)	14.0-18.0	10.0-14.0	35.0	10.0	33.0	33.0	37.0
M25x1.5	HIBM-X6(DS)	14.0-18.0	10.0-14.0	35.0	15.0	33.0	33.0	37.0
M32x1.5	HIBM-SX7(DS)	14.0-18.0	10.0-14.0	36.0	10.0	36.0	33.0	37.0
M32x1.5	HIBM-XEU32(DS)	16.0-21.0	12.0-16.0	42.0	10.0	36.0	36.0	41.0
M32x1.5	HIBM-X7(DS)	19.0-25.0	14.0-20.0	40.5	15.0	42.0	42.0	47.5
M40x1.5	HIBM-XEU40(DS)	20.0-28.0	17.0-21.0	46.0	10.0	46.0	46.0	52.0
M40x1.5	HIBM-XEU40L(DS)	20.0-28.0	17.0-21.0	46.0	15.0	46.0	46.0	52.0
M40x1.5	HIBM-X8(DS)	23.0-32.0	21.0-26.0	50.0	18.0	53.0	53.0	60.0
M50x1.5	HIBM-X9(DS)	31.0-38.0	22.0-31.0	54.0	18.0	60.0	60.0	67.5
M63x1.5	HIBM-X10(DS)	35.0-44.0	28.0-35.0	54.0	18.0	65.0	65.0	72.0
Pg 7	HIBP-X1DS	4.0-6.5	3.0-4.0	22.0	15.0	15.0	15.0	17.0
Pg 9	HIBP-X2DS	5.0-8.0	4.0-5.0	26.0	10.0	19.0	19.0	21.3
Pg 11	HIBP-X3DS	6.0-10.0	4.0-7.0	29.5	10.0	22.0	22.0	25.0
Pg 13.5	HIBP-X4DS	7.0-12.0	6.0-8.5	30.0	10.0	24.0	24.0	27.5
Pg 16	HIBP-X5DS	11.0-14.0	8.0-12.0	33.0	10.0	27.0	27.0	31.0
Pg 21	HIBP-X6DS	14.0-18.0	10.0-14.0	35.0	10.0	33.0	33.0	37.0
Pg 29	HIBP-X7DS	19.0-25.0	14.0-20.0	40.5	15.0	42.0	42.0	47.5
Pg 36	HIBP-X8DS	23.0-32.0	21.0-26.0	50.0	18.0	53.0	53.0	60.0
Pg 42	HIBP-X9DS	31.0-38.0	22.0-31.0	54.0	18.0	60.0	60.0	67.5
Pg 48	HIBP-X10DS	35.0-44.0	28.0-35.0	54.0	18.0	65.0	65.0	72.0
NPT 3/8"	HIBN-X1DS	6.0-10.0	4.0-7.0	29.5	10.0	22.0	22.0	25.0
NPT 1/2"	HIBN-SX2DS	6.0-10.0	4.0-7.0	29.5	10.0	24.0	22.0	25.0
NPT 1/2"	HIBN-X2DS	7.0-12.0	6.0-8.5	30.0	10.0	24.0	24.0	27.5
NPT 1/2"	HIBN-LX2DS	11.0-14.0	8.0-12.0	33.0	10.0	27.0	27.0	31.0
NPT 3/4"	HIBN-X3DS	14.0-18.0	10.0-14.0	35.0	10.0	33.0	33.0	37.0
NPT 1"	HIBN-X4DS	19.0-25.0	14.0-20.0	40.5	15.0	42.0	42.0	47.5



Approved by	IMQ	
Examination Certificate Number	IMQ 13 ATEX 010X	IECEX IMQ 13.0003X
Date of Issue	19.06.2013	29.05.2013
Test Report Number	43AN00017	IT/IMQ/ExTR13.0003/00
Safety Requirements	EN 60079-0:2009 EN 60079-7:2007 EN 60079-31:2009	IEC 60079-0:2007-10 (Edition: 5) IEC 60079-31:2008 (Edition: 1) IEC 60079-7:2006-07 (Edition: 4)
Equipment Marking	Ex II 2 GD Ex e IIC Gb Ex tb IIIC Db	Ex II 2 GD Ex e IIC Gb Ex tb IIIC Db
Approved	GOST <sup>®</sup> - INMETRO	
UV resistance according to standard	ISO 4892-2	

Item	Item Description
1	Body
2	Reducing seal
3	Standard seal
4	Bushing
5	Cap
6	Cable



Equipment	Gas Group ZONE1 / ZONE2	Dust Group ZONE21 / ZONE 22
Suitable for use in	Group II	Group III
	Gas Group IIC	Dust Group IIIC
	Gas & Dust potentially explosive atmospheres. Cable glands should be also used for intrinsically safe circuits Ex-i. These cable glands shall have a light blue colored cap. The symbol "I" will be added beside of the "HIBM" for order processing.	
Type of Protection	Ex e ; Ex tb ; Ex I	
For	Gas & Dust potentially explosive atmospheres	
Degree of Protection	IP66 – IP68 (EN 60529)	
Marking	BMD MHIBM-X.. Ex CE 0722 II 2GD Ex e IIC Gb Ex tb IIIC Db Ta -40°C +80°C IP66/68 IECEx IMQ 13.0003X / IMQ 13 ATEX 010X	
Seal Operating Temperature	Chloroprene C	Items 2-3
	Silicone S	
	Nbr N	
Material	Polyamide 6	
Bushing material	Inox	
Impact test result	7J	
Thread Type	Metric (M) ISO Pitch 1,5 Pg (P) DIN 40430 Npt (N) ANSI ASME B1.20.1 Other thread types also available upon request.	

\*You may order the gland with dome plug by simply adding (P) to the end of Bimed code. (MHIBM-X2DS(P))

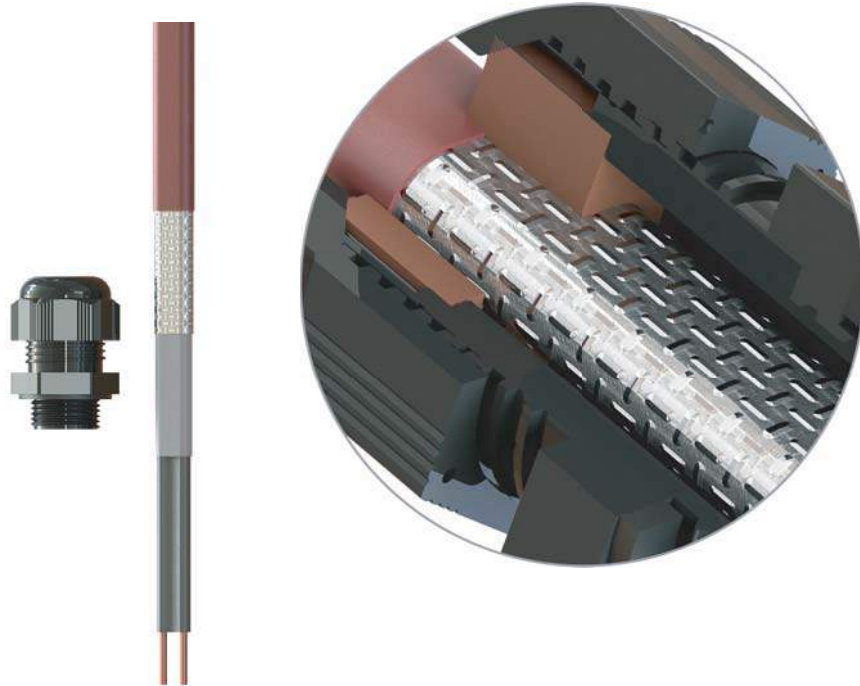
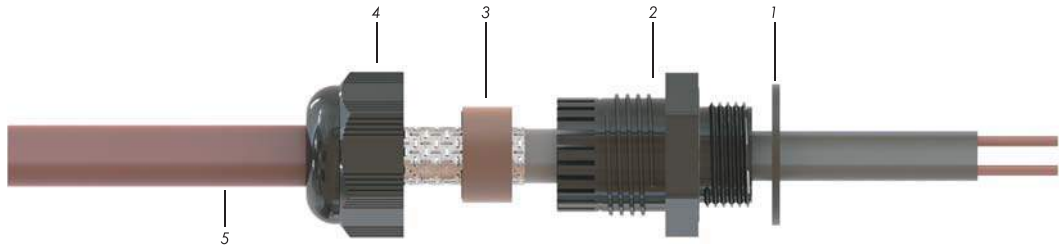
Order Encoding				
Thread Type	Type	Code Examples	Seal Combination	For Ex-i. application code will be
M (Metric)	MHIBM-X	MHIBM-X3DS	MHIBM-X3DSC	MHIBM-X3DSC
P (Pg)	MHIBP-X	MHIBP-X3DS	MHIBP-X3DSC	MHIBP-X3DSC
N (Npt)	MHIBN-X	MHIBN-X3DS	MHIBN-X3DSC	MHIBN-X3DSC

Thread Type (TD)	Code	Clamping Range		Cable Gland Dimensions				
		Ø Min-Max S (mm)	Ø Min-Max R (mm)	H min (mm)	TL (mm)	SW (mm)	SW1 (mm)	D2 (mm)
M12x1.5	MHIBM-0XS(DS)	4.0-6.5	3.0-4.0	22.0	10.0	15.0	15.0	17.0
M12x1.5	MHIBM-XS(DS)	4.0-6.5	3.0-4.0	22.0	15.0	15.0	15.0	17.0
M16x1.5	MHIBM-SX1(DS)	5.0-8.0	4.0-5.0	26.0	10.0	19.0	19.0	21.3
M16x1.5	MHIBM-X1(DS)	6.0-10.0	4.0-7.0	29.5	10.0	22.0	22.0	25.0
M16x1.5	MHIBM-X1L(DS)	6.0-10.0	4.0-7.0	29.5	15.0	22.0	22.0	25.0
M20x1.5	MHIBM-SX2(DS)	6.0-10.0	4.0-7.0	29.5	10.0	24.0	22.0	25.0
M20x1.5	MHIBM-X2(DS)	7.0-12.0	6.0-8.5	30.0	10.0	24.0	24.0	27.5
M20x1.5	MHIBM-X2L(DS)	7.0-12.0	6.0-8.5	30.0	15.0	24.0	24.0	27.5
M20x1.5	MHIBM-MX2(DS)	7.0-13.0	4.0-7.0	30.0	10.0	25.0	25.0	27.5
M20x1.5	MHIBM-X3(DS)	11.0-14.0	8.0-12.0	33.0	10.0	27.0	27.0	31.0
M20x1.5	MHIBM-X4(DS)	11.0-14.0	8.0-12.0	33.0	15.0	27.0	27.0	31.0
M25x1.5	MHIBM-SX5(DS)	11.0-14.0	8.0-12.0	33.0	10.0	27.0	27.0	31.0
M25x1.5	MHIBM-SX6(DS)	11.0-14.0	8.0-12.0	33.0	15.0	27.0	27.0	31.0
M25x1.5	MHIBM-XEU25(DS)	12.0-17.0	9.0-13.0	34.0	10.0	29.0	29.0	32.5
M25x1.5	MHIBM-XEU25L(DS)	12.0-17.0	9.0-13.0	34.0	15.0	29.0	29.0	32.5
M25x1.5	MHIBM-X5(DS)	14.0-18.0	10.0-14.0	35.0	10.0	33.0	33.0	37.0
M25x1.5	MHIBM-X6(DS)	14.0-18.0	10.0-14.0	35.0	15.0	33.0	33.0	37.0
M32x1.5	MHIBM-SX7(DS)	14.0-18.0	10.0-14.0	36.0	10.0	36.0	33.0	37.0
M32x1.5	MHIBM-XEU32(DS)	16.0-21.0	12.0-16.0	42.0	10.0	36.0	36.0	41.0
M32x1.5	MHIBM-X7(DS)	19.0-25.0	14.0-20.0	40.5	15.0	42.0	42.0	47.5
M40x1.5	MHIBM-XEU40(DS)	20.0-28.0	17.0-21.0	46.0	10.0	46.0	46.0	52.0
M40x1.5	MHIBM-XEU40L(DS)	20.0-28.0	17.0-21.0	46.0	15.0	46.0	46.0	52.0
M40x1.5	MHIBM-X8(DS)	23.0-32.0	21.0-26.0	50.0	18.0	53.0	53.0	60.0
M50x1.5	MHIBM-X9(DS)	31.0-38.0	22.0-31.0	54.0	18.0	60.0	60.0	67.5
M63x1.5	MHIBM-X10(DS)	35.0-44.0	28.0-35.0	54.0	18.0	65.0	65.0	72.0
Pg 7	MHIBP-X1DS	4.0-6.5	3.0-4.0	22.0	15.0	15.0	15.0	17.0
Pg 9	MHIBP-X2DS	5.0-8.0	4.0-5.0	26.0	10.0	19.0	19.0	21.3
Pg 11	MHIBP-X3DS	6.0-10.0	4.0-7.0	29.5	10.0	22.0	22.0	25.0
Pg 13.5	MHIBP-X4DS	7.0-12.0	6.0-8.5	30.0	10.0	24.0	24.0	27.5
Pg 16	MHIBP-X5DS	11.0-14.0	8.0-12.0	33.0	10.0	27.0	27.0	31.0
Pg 21	MHIBP-X6DS	14.0-18.0	10.0-14.0	35.0	10.0	33.0	33.0	37.0
Pg 29	MHIBP-X7DS	19.0-25.0	14.0-20.0	40.5	15.0	42.0	42.0	47.5
Pg 36	MHIBP-X8DS	23.0-32.0	21.0-26.0	50.0	18.0	53.0	53.0	60.0
Pg 42	MHIBP-X9DS	31.0-38.0	22.0-31.0	54.0	18.0	60.0	60.0	67.5
Pg 48	MHIBP-X10DS	35.0-44.0	28.0-35.0	54.0	18.0	65.0	65.0	72.0
NPT 3/8"	MHIBN-X1DS	6.0-10.0	4.0-7.0	29.5	10.0	22.0	22.0	25.0
NPT 1/2"	MHIBN-SX2DS	6.0-10.0	4.0-7.0	29.5	10.0	24.0	22.0	25.0
NPT 1/2"	MHIBN-X2DS	7.0-12.0	6.0-8.5	30.0	10.0	24.0	24.0	27.5
NPT 1/2"	MHIBN-LX2DS	11.0-14.0	8.0-12.0	33.0	10.0	27.0	27.0	31.0
NPT 3/4"	MHIBN-X3DS	14.0-18.0	10.0-14.0	35.0	10.0	33.0	33.0	37.0
NPT 1"	MHIBN-X4DS	19.0-25.0	14.0-20.0	40.5	15.0	42.0	42.0	47.5



Approved by	IMQ		IMQ	
Examination Certificate Number	IMQ 13 ATEX 011X		IECEx IMQ 13.0004X	
Date of Issue	21.06.2013		30.05.2013	
Test Report Number	43AN00018		IT/IMQ/ExTR13.0004/00	
Safety Requirements	EN 60079-0:2009 EN 60079-7:2007 EN 60079-31:2009		IEC 60079-0:2007-10 (Edition: 5) IEC 60079-31:2008 (Edition: 1) IEC 60079-7:2006-07 (Edition: 4)	
Equipment Marking	Ex II 2 GD	Ex e IIC Gb Ex tb IIIC Db	Ex II 2 GD	Ex e IIC Gb Ex tb IIIC Db
UV resistance according to standard	ISO 4892-2			

Item	Item Description
1	Gasket
2	Body
3	Flat seal
4	Cap
5	Cable



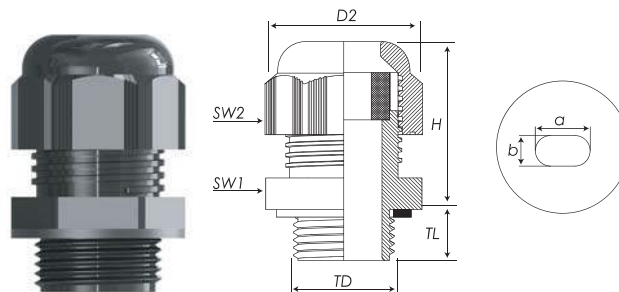
Equipment	Gas Group	Dust Group
Suitable for use in	ZONE1/ZONE2	ZONE21/ZONE 22
	Group II	Group III
	Gas Group IIC	Dust Group IIC
	Gas & Dust potentially explosive atmospheres. Cable glands should be also used for intrinsically safe circuits Ex-i. These cable glands shall have a light blue colored cap. The symbol "I" will be added beside of the "BM" for order processing.	
Type of Protection	Ex e ; Ex tb ; Ex i	
For	Gas & Dust potentially explosive atmospheres	
Degree of Protection	IP66 – IP68 [EN 60529]	
Marking	BMD BM-X.. Ex CE 0722 II 2GD Ex e IIC Gb Ex tb IIC Db Ta-40°C +80°C IP66/68 IECEx IMQ 13.0004X / IMQ 13 ATEX 011X -40°C / +80°C Only for M20-M32	
Seal Operating Temperature	Chloroprene C	Items 2-4
	Silicone S	
Material	Polyamide 6	Items 1-3
Impact test result	4J	
Thread Type	Metric (M) ISO Pitch 1,5 Other thread types also available upon request	

\*You may order the gland with dome plug by simply adding (P) to the end of Bimed code. (BM-X2(P))

#### Order Encoding

Type	Code Examples	Seal Combination	Sealing Hole	For Ex-i, application code will be
BM-X	BM-X3(axb)	BM-X3C(axb)	BM-X3(axb)	BMI-X3(axb)

Thread Type (TD)	Code	Sealing Hole Dimension (±0,24)	Cable Range		Cable Gland Dimensions				
		axb (mm)	axb (mm) Min.	axb (mm) Max.	H min (mm)	TL (mm)	SW (mm)	SW1 (mm)	D2 (mm)
M20x1.5	BM-X2	10,0x4,0	10,0x3,3	10,4x4,0	40	10	24	24	27,5
		10,8x6,0	9,3x5,8	10,8x6,0					
		11,0x6,5	9,0x6,0	11,3x8,0					
M20x1.5	BM-X2L	10,0x4,0	10,0x3,3	10,4x4,0	45	15	24	24	27,5
		10,8x6,0	9,3x5,8	10,8x6,0					
		11,0x6,5	9,0x6,0	11,3x8,0					
M20x1.5	BM-X3	10,8x6,0	10,1x5,3	11,9x7,2	42	10	27	27	31,0
		12,8x5,0	12,1x4,3	12,8x5,3					
		12,4x6,5	11,9x5,8	13,4x8,9					
M20x1.5	BM-X4	10,8x6,0	10,1x5,3	11,9x7,2	47	15	27	27	31,0
		12,8x5,0	12,1x4,3	12,8x5,3					
		12,4x6,5	11,9x5,8	13,4x8,9					
M25x1.5	BM-XSX5	10,0x4,0	10,0x3,3	10,4x4,0	40	10	29	24	27,5
		10,8x6,0	9,3x5,8	10,8x6,0					
		11,0x6,5	9,0x6,0	11,3x8,0					
M25x1.5	BM-SX5	10,8x6,0	10,1x5,3	11,9x7,2	42	10	29	27	31,0
		12,8x5,0	12,1x4,3	12,8x5,3					
		12,4x6,5	11,9x5,8	13,4x8,9					
M25x1.5	BM-X5	12,0x6,0	12,9x5,6	13,8x6,0	45	10	33	33	37,0
		15,0x5,0	14,6x6,2	15,0x5,0					
		10,0x4,0	10,0x3,3	10,4x4,0					
M25x1.5	BM-XSX6	10,8x6,0	9,3x5,8	10,8x6,0	45	15	29	24	27,5
		11,0x6,5	9,0x6,0	11,3x8,0					
		10,8x6	10,1x5,3	11,9x7,2					
M25x1.5	BM-SX6	12,8x5,0	12,1x4,3	12,8x5,3	47	15	29	27	31,0
		12,4x6,5	11,9x5,8	13,4x8,9					
		12,0x6,0	12,9x5,6	13,8x6,0					
M25x1.5	BM-X6	15,0x5,0	14,6x6,2	15,0x6,2	50	15	33	33	37,0
		12,0x6,0	12,9x5,6	13,8x6,0					
M32x1.5	BM-SX7	12,0x6,0	12,9x5,6	13,8x6,0	45	10	36	33	37,0
		15,0x5,0	14,6x6,2	15,0x6,2					

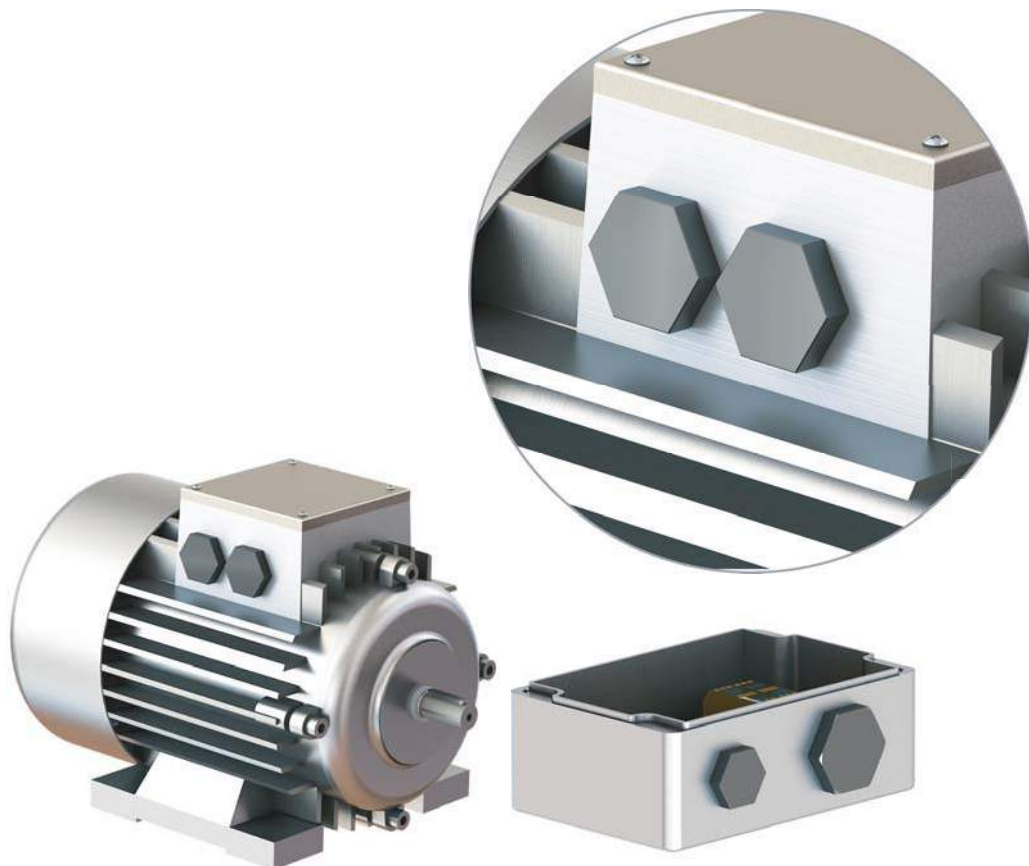


Approved by	IMQ	
Examination Certificate Number	IMQ 13 ATEX 010X	IECEx IMQ 13.0003X
Date of Issue	19.06.2013	29.05.2013
Test Report Number	43AN00017	
Safety Requirements	EN 60079-0:2009 EN 60079-7:2007 EN 60079-31:2009	IEC 60079-0:2007-10 (Edition: 5) IEC 60079-31:2008 (Edition: 1) IEC 60079-7:2006-07 (Edition: 4)
Equipment Marking	Ex II 2 GD Ex e IIC Gb Ex tb III C Db	Ex II 2 GD Ex e IIC Gb Ex tb III C Db
Approved	GOST'R" - INMETRO	
UV resistance according to standard	ISO 4892-2	

Equipment	Gas Group	Dust Group
Suitable for use in	ZONE1 / ZONE2	ZONE21 / ZONE 22
	Group II	Group III
	Gas Group IIC	Dust Group IIC
Gas & Dust potentially explosive atmospheres. Cable glands should be also used for intrinsically safe circuits Ex-i. These cable glands shall have a light blue colored nut. The symbol "I" will be added beside of the "TP" for order processing.		
Type of Protection For	Ex e ; Ex tb ; Ex i	
Degree of Protection	IP66 – IP68 (EN 60529)	
Marking	BMD TP-X.. Ex CE 0722 II 2GD Ex e IIC Gb Ex tb III C Db Ta-40°C +80°C IP66/68 IECEx IMQ 13.0003X / IMQ 13 ATEX 010X	
Seal Operating Temperature	Chloroprene C	-40°C / +80°C
Material	Polyamide 6	
Impact test result	4J Chloroprene C	
Thread Type	Metric (M) ISO Pitch 1,5 - Pg (P) DIN 40430 Other thread types also available upon request	

Order Encoding				
Type	Code Examples	Seal Combination	For Ex-i, application code will be	
TP-X	TP-X3	TP-X3C	TP-X3S	TP-X3C

Thread Type (TD)	Code	Dimensions					
		H min (mm)	TL min (mm)	S min (mm)	SW (mm)	D min (mm)	D2 (mm)
<b>Polyamide Plugs (Metric)</b>							
M12x1,5	TP-X02	7,0	8,0	3,0	15,0	6,0	17,0
M16x1,5	TP-X01	5,0	10,0	3,0	19,0	10,0	22,0
M20x1,5	TP-X1	5,0	10,0	3,0	23,0	12,0	26,0
M25x1,5	TP-X2	5,0	10,0	3,0	28,0	18,0	32,0
M32x1,5	TP-X3	5,0	15,0	3,0	36,0	25,0	41,5
M40x1,5	TP-X4	9,0	18,0	5,0	46,0	32,0	53,0
M50x1,5	TP-X5	9,0	18,0	5,0	55,0	38,0	63,5
M63x1,5	TP-X6	9,0	18,0	5,0	69,0	44,0	80,0
<b>Polyamide Plugs (Pg)</b>							
Pg 7	TB-X02	7,0	8,0	3,0	15,0	6,0	17,0
Pg 11	TB-X01	5,0	10,0	3,0	19,0	10,0	22,0
Pg 13,5	TB-X1	5,0	10,0	3,0	23,0	12,0	26,0
Pg 16	TB-X2	5,0	10,0	3,0	23,0	12,0	26,0
Pg 21	TB-X3	5,0	10,0	3,0	28,0	18,0	32,0
Pg 29	TB-X4	5,0	15,0	3,0	36,0	25,0	41,5
Pg 36	TB-X5	9,0	18,0	5,0	46,0	32,0	53,0
Pg 42	TB-X6	9,0	18,0	5,0	55,0	38,0	63,5
Pg 48	TB-X7	9,0	18,0	5,0	69,0	44,0	80,0





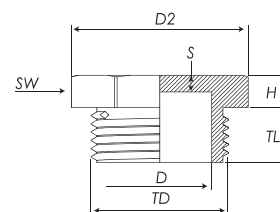
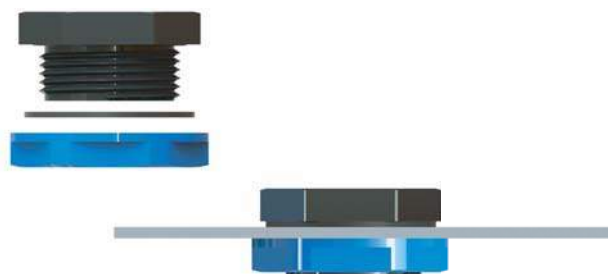
Approved by	IMQ	IMQ	Equipment	Gas Group	Dust Group
Examination Certificate Number	IMQ 13 ATEX 010X	IECEx IMQ 13.0003X	Suitable for use in	ZONE1 / ZONE2	ZONE21 / ZONE 22
Date of Issue	19.06.2013	29.05.2013	Gas Group IIC	Group II	Group III
Test Report Number	43AN00017	IT/IMQ/EXTR13.0003/00		Gas Group IIC	Dust Group IIC
Safety Requirements	EN 60079-0:2009 EN 60079-7:2007 EN 60079-31:2009	IEC 60079-0:2007-10 (Edition: 5) IEC 60079-31:2008 (Edition: 1) IEC 60079-7:2006-07 (Edition: 4)	Gas & Dust potentially explosive atmospheres. Cable glands should be also used for intrinsically safe circuits Ex-i. These cable glands shall have a light blue colored nut. The symbol "I" will be added beside of the "HITP" for order processing.		
Equipment Marking	Ex II 2 GD	Ex e IIC Gb Ex tb IIIC Db	Type of Protection	Ex e ; Ex Ib ; Ex i	
Approved	GOST'R" - INMETRO		For	Gas & Dust potentially explosive atmospheres	
UV resistance according to standard	ISO 4892-2		Degree of Protection	IP66 - IP68 (EN 60529)	
			Marking	BMD HITP-X.. Ex CE 0722 II 2GD Ex e IIC Gb Ex tb IIIC Db Ta-40°C +80°C IP66/68 IECEx IMQ 13.0003X / IMQ 13 ATEX 010X	
			Seal Operating Temperature	Nitrile N Chloroprene C Silicone S	-30°C / +80°C -40°C / +80°C -60°C / +80°C
			Material	Polyamide 6	
			High Impact test result	7J Chloroprene C - Silicone S - Nitrile N	
			Thread Type	Metric (M) ISO Pitch 1,5 - Pg (P) DIN 40430 Other thread types also available upon request	

Order Encoding			
Type	Code Examples	Seal Combination	For Ex-i, application code will be
HITP-X	HITP-X3	HITP-X3C HITP-X3S HITP-X3N	HITP-I-X3C

Thread Type (TD)	Code	Dimensions					
		H min (mm)	TL min (mm)	S min (mm)	SW (mm)	D min (mm)	D2 (mm)
<b>High Impact Polyamide Plugs (Metric)</b>							
M12x1.5	HITP-X02	5,0	10,0	3,0	15,0	7,0	17,0
M16x1.5	HITP-X01	4,3	11,0	4,3	19,0	11,0	22,0
M16x1.5	HITP-X01L	4,3	12,0	4,3	19,0	11,0	22,0
M16x1.5	HITP-X01HL	4,3	15,0	4,3	19,0	11,0	22,0
M20x1.5	HITP-X1	6,0	11,0	3,3	23,0	13,5	26,0
M20x1.5	HITP-X1L	6,0	12,0	3,3	23,0	13,5	26,0
M20x1.5	HITP-X1HL	6,0	15,0	3,3	23,0	13,5	26,0
M25x1.5	HITP-X2	5,8	10,0	3,0	28,0	18,8	32,0
M25x1.5	HITP-X2HL	5,8	15,0	3,0	28,0	18,8	32,0
M32x1.5	HITP-X3	7,8	15,0	3,0	36,0	25,0	41,5
M40x1.5	HITP-X4	8,5	18,0	5,0	46,0	32,0	53,0
M50x1.5	HITP-X5	9,5	18,0	5,5	55,0	40,0	63,5
M63x1.5	HITP-X6	9,5	18,0	5,0	69,0	52,0	80,0
<b>High Impact Polyamide Plugs (Pg)</b>							
Pg 7	HITB-X1	5,00	10,0	3,0	15,0	7,0	17,0
Pg 9	HITB-X2	4,30	11,0	4,3	19,0	11,0	22,0
Pg 9	HITB-X2L	4,30	12,0	4,3	19,0	11,0	22,0
Pg 9	HITB-X2HL	4,30	15,0	4,3	19,0	11,0	22,0
Pg 11	HITB-X3	5,00	11,0	4,3	21,0	13,1	23,0
Pg 13,5	HITB-X4	5,00	11,0	2,3	24,0	15,2	26,5
Pg 13,5	HITB-X4L	5,00	12,0	2,3	24,0	15,2	26,5
Pg 13,5	HITB-X4HL	5,00	15,0	2,3	24,0	15,2	26,5
Pg 16	HITB-X5	6,00	11,0	2,0	28,0	17,0	32,0
Pg 21	HITB-X6	5,80	10,0	3,0	31,0	22,6	34,0
Pg 21	HITB-X6HL	5,80	15,0	3,0	31,0	22,6	34,0
Pg 29	HITB-X7	7,80	15,0	3,0	41,0	31,3	45,5
Pg 36	HITB-X8	8,50	18,0	5,0	50,0	40,3	55,5
Pg 42	HITB-X9	9,50	18,0	5,5	58,0	47,3	64,0
Pg 48	HITB-X10	9,50	18,0	5,0	69,0	52,0	80,0

**See Example "A" for IP protection degree and clamping note:**

The plugs Ex e II, can be used with circuits Ex i. These cable glands should have a nut painted light blue. The plugs must be supplied with the flat washer for IP protection degree

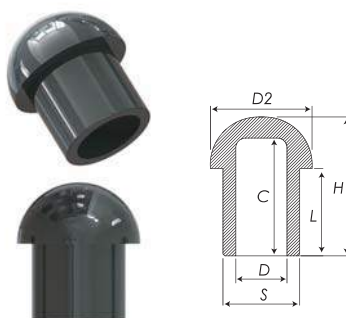


Approved by	IMQ		IMQ	
Examination Certificate Number	IMQ 13 ATEX 010X		IECEX IMQ 13.0003X	
Date of Issue	19.06.2013		29.05.2013	
Test Report Number	43AN00017		IT/IMQ/ExTR13.0003/00	
Safety Requirements	EN 60079-0:2009 EN 60079-7:2007 EN 60079-31:2009		IEC 60079-0:2007-10 (Edition: 5) IEC 60079-31:2008 (Edition: 1) IEC 60079-7:2006-07 (Edition: 4)	
Equipment Marking	Ex II 2 GD	Ex e IIC Gb Ex tb IIIC Db	Ex II 2 GD	Ex e IIC Gb Ex tb IIIC Db
Approved	GOST'R' - INMETRO			
UV resistance according to standard	ISO 4892-2			



Equipment	Gas Group ZONE1 /ZONE2	Dust Group ZONE21 /ZONE 22
Suitable for use in	Group II Gas Group IIC	Group III Dust Group IIIC
Type of Protection	Ex e ; Ex tb	
For	Gas & Dust potentially explosive atmospheres	
Degree of Protection	IP66 – IP68 (EN 60529)	
Marking	BMD BPT-X., Ex CE 0722 II 2GD Ex e IIC Gb Ex tb IIIC Db Ta-40°C +80°C IP66/68 IECEx IMQ 13.0003X / IMQ 13 ATEX 010X	
Seal Operating Temperature	-40°C / +80°C	
Material	Polyamide 6	
Thread Type	Metric (M) ISO Pitch 1,5 Pg (P) DIN 40430 Other thread types also available upon request	

Code	Plug for Plastic glands			DIMENSIONS PLUG					
	Pg	Metric	Metric Euro	L (mm)	H (mm)	C (mm)	D2 (mm)	D (mm)	S (mm)
BPT-X1/BPM-XS	Pg 7 (3-6)	M 12 (3-6)	-	7,0	11,0	8,5	9,2	4,4	6,4
BPT-X2/BPM-EX1	Pg 9 (4-8)	-	M 16 (4-8)	11,0	16,0	13,0	10,5	5,5	8,0
BPT-X3/BPM-X1	Pg 11 (5-10)	M 16 (5-10)	-	15,0	20,7	18,4	13,3	6,9	9,7
BPT-X4/BPM-X2	Pg 13.5 (6-12)	M 20 (6-12)	-	10,0	18,0	16,0	15,8	9,0	12,0
BPT-X5/BPM-X2L	Pg 16 (10-14)	M 20 (10-14)	-	10,0	18,7	16,9	18,0	10,8	13,6
BPM-EX3	-	-	M 25 (11-17)	11,0	18,3	16,5	19,9	13,6	16,4
BPT-X6/BPM-X3	Pg 21 (13-18)	M 25 (13-18)	-	11,3	21,0	19,0	22,2	14,5	17,8
BPM-EX4	-	-	M 32 (15-21)	12,0	21,2	19,4	24,1	16,6	20,4
BPT-X7/BPM-X4	Pg 29 (18-25)	M 32 (18-25)	-	15,0	24,9	22,7	28,8	21,5	25,0
BPM-EX5	-	-	M 40 (19-28)	16,0	25,2	22,0	32,0	23,6	27,5
BPT-X8/BPM-X5	Pg 36 (22-32)	M 40 (22-32)	-	17,0	27,7	25,7	37,3	28,4	31,8
BPT-X9/BPM-X6	Pg 42 (30-38)	M 50 (30-38)	-	20,2	33,3	30,2	44,5	34,0	38,0
BPT-X0/BPM-X7	Pg 48 (34-44)	M 63 (34-44)	-	23,0	39,2	36,0	51,7	39,6	44,2
For Double Seal									
BPTD-X1/BPMD-XS	Pg 7 (3-4)	M 12 (3-4)	-	7,0	11,0	8,5	9,2	1,8	4,0
BPTD-X2/BPMD-EX1	Pg 9	-	M 16	11,0	16,0	13,0	10,5	3,0	5,0
BPTD-X3/BPMD-X1	Pg 11 (4-7)	M 16 (4-7)	-	15,0	20,7	18,4	13,3	4,0	7,0
BPTD-X4/BPMD-X2	Pg 13.5 (6-8,5)	M 20 (6-8,5)	-	10,0	18,0	16,0	15,8	5,3	8,5
BPTD-X5/BPMD-X2L	Pg 16 (8-12)	M 20 (8-12)	-	10,0	18,7	16,9	18,0	9,0	12,1
BPMD-EX3	-	-	M 25 (9-13)	11,0	18,3	16,5	19,9	9,8	13,0
BPTD-X6/BPMD-X3	Pg 21 (10-14)	M 25 (10-14)	-	11,3	21,0	19,0	22,2	10,4	14,0
BPMD-EX4	-	-	M 32 (12-16)	12,0	21,2	19,4	24,1	11,7	16,1
BPTD-X7/BPMD-X4	Pg 29 (14-20)	M 32 (14-20)	-	15,0	24,9	22,7	28,8	16,1	20,3
BPMD-EX5	-	-	M 40 (17-21)	16,0	25,2	22,0	32,0	16,8	21,1
BPTD-X8/BPMD-X5	Pg 36 (21-26)	M 40 (21-26)	-	17,0	27,7	25,7	37,3	22,3	26,3
BPTD-X9/BPMD-X6	Pg 42 (22-31)	M 50 (22-31)	-	20,2	33,3	30,2	44,5	26,6	31,2
BPTD-X0/BPMD-X7	Pg 48 (28-35)	M 63 (28-35)	-	23,0	39,2	36,0	51,7	30,2	35,2



# Adaptors for **GAS & DUST** applications



Adaptors are used where the thread size of the cable gland or connection device is larger than, or of an equivalent size, to the entry thread of the enclosure. Reducers are used where the thread size of the cable gland or entry device is smaller than the entry thread of the enclosure. A coupling is a very short length of pipe or tube, with a socket at one or both ends that allows two pipes or tubes to be joined. Alternatively it is a short length of pipe with two female National pipe threads (NPT) (in North American terms, a coupler is a double female while a nipple is double male) or two male or female British standard pipe threads. When the two ends use the same connection method but are of a different size, the terms reducing coupling or reducer are used.



Cranes  
Motors  
Heaters  
Thermostat  
Heat dedectors  
Flame dedectors

Smoke dedectors  
Alarm Indicators  
motor starters  
loudspeakers  
alarm bell  
sounders / horns

control and distribution units,  
panels and boards  
beacons / strobes  
status lamps  
control stations  
junction and terminal boxes

variable-frequency on motors  
Lighting Fixtures  
Motor Starters  
Enclosures for control units and  
junction boxes (Power & Lighting)  
Lighting

manual call points  
doorholder magnets  
Electrical, digital compact volume  
flow controller  
Electric linear valve actuators  
Modulating electric

digital sensors for temperature,  
humidity, pressure and differential  
pressure  
Modulating transducer  
Binary switching module

**IEC** **IECEX** **Ex** **ATEX** **GROUP II-III**



**APUS**  
**B-RB**

Ex e/d Metal  
Enlargers



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**GRUS**  
**B-RA**

Ex e/d Metal  
Reducers



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**ARIES**  
**B-RM**

Ex e/d Metal  
Couplings



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**PAVO**  
**B-RN**

Ex e/d Metal  
Nipples



Page  
**87-88**

**AQUILA**  
**B-TS**

Ex e/d Metal  
Plugs

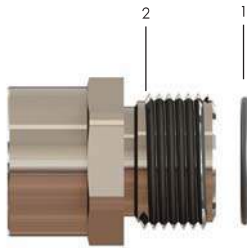


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**89-90**

Ex II 2 GD / Ex d IIC Gb - Ex e IIC Gb - Ex tb III Db

Approved by	CESI		CESI	
Examination Certificate Number	CESI 13 ATEX 066X		IECEx CES 13.0022X	
Date of Issue	22.11.2013		26.11.2013	
Test Report Number	EX-B3030994		IT/CES/ExTR13.0023/00	
Safety Requirements	EN 60079-0:2012 EN 60079-1:2007 EN 60079-7:2007 EN 60079-31:2009		IEC 60079-0:2011 Edition:6 IEC 60079-1:2007-04 Edition:6 IEC 60079-31:2008 Edition:1 IEC 60079-7:2006-07 Edition:4	
Equipment Marking	Ex II 2 GD	Ex d IIC Gb Ex e IIC Gb Ex tb IIIC Db	Ex II 2 GD	Ex d IIC Gb Ex e IIC Gb Ex tb IIIC Db
Approved	GOST"R" - INMETRO			

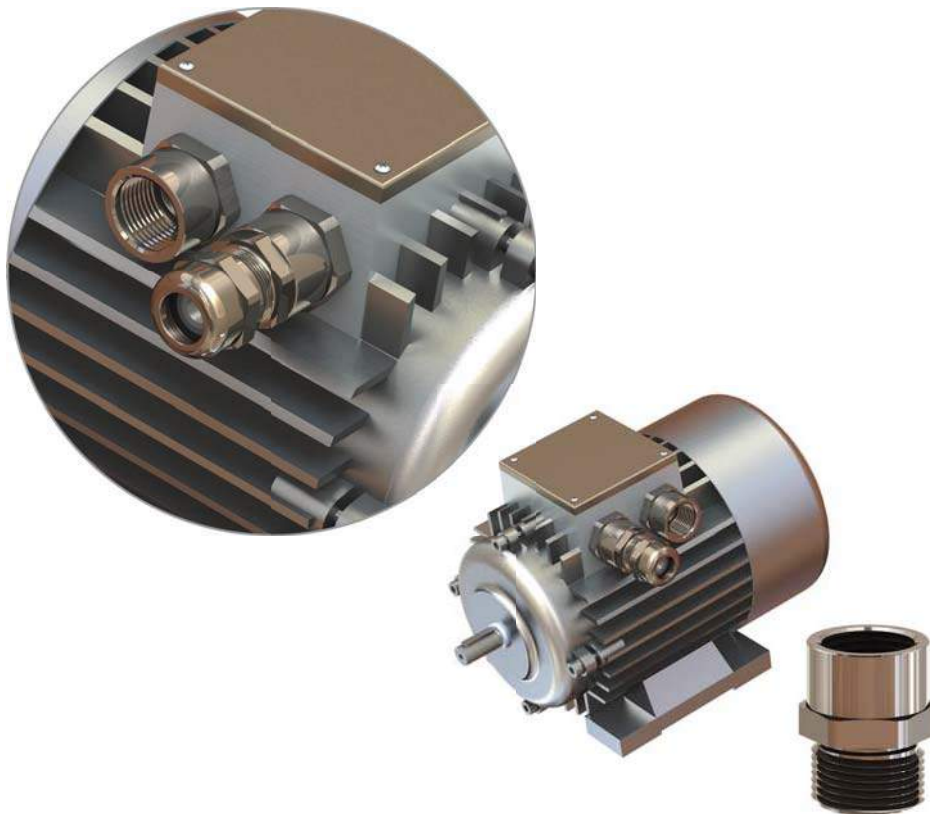
Item	Item Description
1	O-ring
2	Body



Thread Type	Size Selection Table										
	Sizes & Code Nr.										
METRIC EN 60423 (M)	12	16	20	25	32	40	50	63	75	90	110
NPT ANSI B1.20.1 (N)	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
PG DIN 40430 (P)	7	9	11	13,5	16	21	29	36	42	48	
PF JIS B0202 (C)	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4

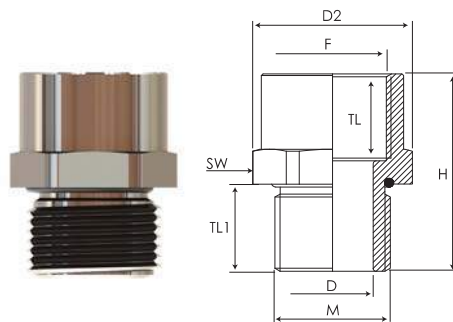
Order Encoding					
Type	Thread	Material	Plated	Sealing	Code Examples
B-RB	M (Metric) P (Pg) N (Npt) C (Gas)	B - Brass X - Stainless Steel Z - Galvanized steel	N (Nickel Only for Brass)	C (Chloroprene)	B-RB01M02MBN

Code Generation Table					
Type	Male Thread Size		Female Thread Size		Material
B-RB	3/8	Npt	16	Metric	Brass-Nickel Plated
Generated Code					
B-RB	01	N	01	M	BN



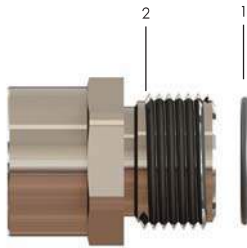
Equipment	Gas Group ZONE1/ZONE2	Dust Group ZONE21/ZONE 22
Suitable for use in	Group II	Group III
	Gas Group IIC	Dust Group IIIC
Type of Protection	Ex d ; Ex e ; Ex tb	
For	Gas & Dust potentially explosive atmospheres	
Degree of Protection	IP66 – IP68 [EN 60529]	
Marking	BMD B-RB.. Ex CE 0722 II 2GD Ex e IIC Gb Ex tb IIIC Db T <sub>a</sub> -40°C +100°C IP66/68 CESI 13 ATEX 066X / IECEx CES 13.0022X	
Seal Operating Temperature	Chloroprene C -40°C / +100°C	Item 1
Material	Brass Stainless Steel Galvanised Steel	Item 2
Thread Type	EN 60423 (Metric)/DIN 40430 (Pg) ANSI ASME B1.20.1 (Npt)/GAS UNI ISO 228/1 (Pf)	

Thread Type		Code	Dimensions mm					
MØ	FØ		DØ (mm)	H (mm)	TL (mm)	TL1 (mm)	SW (mm)	D2 (mm)
M12x1.5	M12x1.5	B-RB02M02M	7,0	33,5	15,0	15,0	18,0	20,0
M12x1.5	M16x1.5	B-RB01M02M	7,0	34,0	15,0	15,0	22,0	24,0
M12x1.5	M20x1.5	B-RB1M02M	7,0	34,0	15,0	15,0	25,0	27,5
M16x1.5	M16x1.5	B-RB01M01M	10,0	34,0	15,0	15,0	22,0	24,0
M16x1.5	M20x1.5	B-RB1M01M	10,0	34,0	15,0	15,0	25,0	27,5
M16x1.5	M25x1.5	B-RB2M01M	10,0	34,0	15,0	15,0	30,0	33,0
M20x1.5	M20x1.5	B-RB1M1M	14,0	34,0	15,0	15,0	25,0	27,5
M20x1.5	M25x1.5	B-RB2M1M	14,0	34,0	15,0	15,0	30,0	33,0
M20x1.5	M32x1.5	B-RB3MM	14,0	34,0	15,0	15,0	36,0	39,8
M25x1.5	M25x1.5	B-RB2M2M	19,0	34,0	15,0	15,0	30,0	33,0
M25x1.5	M32x1.5	B-RB3M2M	19,0	34,0	15,0	15,0	36,0	39,8
M25x1.5	M40x1.5	B-RB4M2M	19,0	37,0	18,0	15,0	45,0	50,0
M32x1.5	M12x1.5	B-RB02M3M	26,0	34,0	15,0	15,0	36,0	39,8
M32x1.5	M32x1.5	B-RB3M3M	26,0	34,0	15,0	15,0	36,0	39,8
M32x1.5	M40x1.5	B-RB4M3M	26,0	37,0	18,0	15,0	45,0	50,0
M32x1.5	M50x1.5	B-RB5M3M	26,0	40,0	18,0	15,0	55,0	61,0
M40x1.5	M40x1.5	B-RB4M4M	34,0	40,0	18,0	18,0	45,0	50,0
M40x1.5	M50x1.5	B-RB5M4M	34,0	40,0	18,0	18,0	55,0	61,0
M50x1.5	M50x1.5	B-RB5M5M	44,0	40,0	18,0	18,0	55,0	61,0
M50x1.5	M63x1.5	B-RB6M5M	44,0	40,5	18,0	18,0	68,0	75,0
M63x1.5	M63x1.5	B-RB6M6M	57,0	40,5	18,0	18,0	70,0	78,0
M63x1.5	M75x1.5	B-RB7M6M	57,0	40,5	18,0	18,0	80,0	89,0
M75x1.5	M75x1.5	B-RB7M7M	69,0	40,5	18,0	18,0	85,0	94,0
M75x1.5	M90x1.5	B-RB8M7M	69,0	43,5	21,0	18,0	95,0	105,0
M90x1.5	M90x1.5	B-RB8M8M	84,0	47,0	21,0	21,0	100,0	111,0
M90x1.5	M110x1.5	B-RB10M8M	84,0	47,0	21,0	21,0	115,0	128,0
M110x1.5	M110x1.5	B-RB10M10M	104,0	47,0	21,0	21,0	120,0	134,0
NPT 1/4"	M12x1.5	B-RB02M02N	8,0	34,0	16,0	15,0	18,0	20,0
NPT 1/4"	M16x1.5	B-RB01M02N	8,0	34,5	16,0	15,0	22,0	24,0
NPT 3/8"	M16x1.5	B-RB01M01N	12,0	34,5	16,0	15,0	22,0	24,0
NPT 3/8"	M20x1.5	B-RB1M01N	12,0	35,0	16,0	15,0	25,0	27,5
NPT 1/2"	M20x1.5	B-RB1M1N	14,5	40,0	21,0	15,0	25,0	27,5
NPT 1/2"	M25x1.5	B-RB2M1N	14,5	40,0	21,0	15,0	30,0	33,0
NPT 3/4"	M25x1.5	B-RB2M2N	19,0	40,0	21,0	15,0	30,0	33,0
NPT 3/4"	M32x1.5	B-RB3M2N	19,0	40,0	21,0	15,0	36,0	39,8
NPT 1"	M32x1.5	B-RB3M3N	26,0	45,0	26,0	15,0	36,0	39,8
NPT 1"	M40x1.5	B-RB4M3N	26,0	45,0	26,0	15,0	45,0	50,0
NPT 1 1/4"	M40x1.5	B-RB4M4N	35,0	50,0	28,0	18,0	45,0	50,0
NPT 1 1/4"	M50x1.5	B-RB5M4N	35,0	50,0	28,0	18,0	55,0	61,0
NPT 1 1/2"	M50x1.5	B-RB5M5N	40,0	50,0	28,0	18,0	55,0	61,0
NPT 1 1/2"	M63x1.5	B-RB6M5N	40,0	50,5	28,0	18,0	68,0	75,0
NPT 2"	M63x1.5	B-RB6M6N	51,0	50,5	28,0	18,0	68,0	75,0
NPT 2"	M75x1.5	B-RB7M6N	51,0	50,5	28,0	18,0	80,0	89,0
NPT 2 1/2"	M75x1.5	B-RB7M7N	62,0	73,5	41,0	28,0	80,0	89,0
NPT 2 1/2"	M90x1.5	B-RB8M7N	62,0	74,0	41,0	28,0	95,0	105,0
NPT 3"	M90x1.5	B-RB8M8N	75,0	76,0	43,0	28,0	95,0	105,0
NPT 3"	M110x1.5	B-RB10M8N	75,0	76,0	43,0	28,0	115,0	128,0
NPT 4"	M110x1.5	B-RB10M10N	100,0	78,0	45,0	28,0	120,0	134,0



Approved by	CESI	
Examination Certificate Number	CESI 13 ATEX 066X	IECEX CES 13.0022X
Date of Issue	22.11.2013	
Test Report Number	EX-B3030994	IT/CES/ExTR13.0023/00
Safety Requirements	EN 60079-0:2012 EN 60079-1:2007 EN 60079-7:2007 EN 60079-31:2009	IEC 60079-0:2011 Edition:6 IEC 60079-1:2007-04 Edition:6 IEC 60079-31:2008 Edition:1 IEC 60079-7:2006-07 Edition:4
Equipment Marking	Ex II 2 GD Ex d IIC Gb Ex e IIC Gb Ex tb IIIC Db	Ex II 2 GD Ex d IIC Gb Ex e IIC Gb Ex tb IIIC Db
Approved	GOST'R' - INMETRO	

Item	Item Description
1	O-ring
2	Body



Size Selection Table

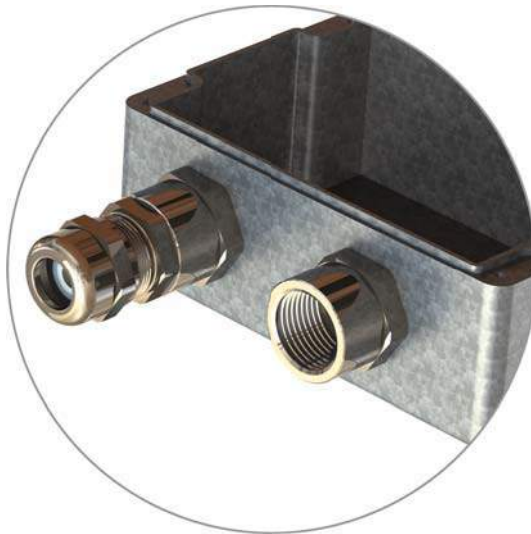
Thread Type	Sizes & Code Nr.										
	12	16	20	25	32	40	50	63	75	90	110
METRIC EN 60423 (M)	02	01	1	2	3	4	5	6	7	8	10
NPT ANSI B1.20.1 (N)	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
PG DIN 40430 (P)	02	01	1	2	3	4	5	6	7	8	10
PF JIS B0202 (C)	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
	02	01	1	2	3	4	5	6	7	8	10

Order Encoding

Type	Thread	Material	Plated	Sealing	Code Examples
B-RB	M (Metric) P (Pg) N (Npt) C (Gas)	B - Brass X - Stainless Steel Z - Galvanized steel	N (Nickel Only for Brass)	C (Chloroprene)	B-RB01M02MBN

Code Generation Table

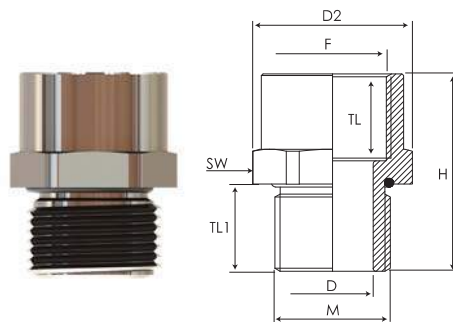
Type	Male Thread Size	Female Thread Size	Material
B-RB	16 Metric	3/8 Npt	Brass-Nickel Plated
Generated Code			
B-RB	01 M	01 N	BN





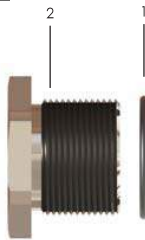
Equipment	Gas Group ZONE1/ZONE2	Dust Group ZONE21/ZONE 22
Suitable for use in	Group II	Group III
	Gas Group IIC	Dust Group IIIC
Type of Protection	Ex d ; Ex e ; Ex tb	
For	Gas & Dust potentially explosive atmospheres	
Degree of Protection	IP66 – IP68 [EN 60529]	
Marking	BMD B-RB.. Ex CE 0722 II 2GD Ex e IIC Gb Ex tb IIIC Db T <sub>a</sub> -40°C +100°C IP66/68 CESI 13 ATEX 066X / IECEx CES 13.0022X	
Seal Operating Temperature	Chloroprene C -40°C / +100°C	Item 1
Material	Brass Stainless Steel Galvanised Steel	Item 2
Thread Type	EN 60423 (Metric)/DIN 40430 (Pg) ANSI ASME B1.20.1 (Npt)/GAS UNI ISO 228/1 (Pf)	

Thread Type		Code	Dimensions mm					
MØ	FØ		DØ (mm)	H (mm)	TL (mm)	TL1 (mm)	SW (mm)	D2 (mm)
M12x1.5	NPT 1/4"	B-RB02N02M	7.0	33.5	15.0	15.0	18.0	20.0
M12x1.5	NPT 3/8"	B-RB01N02M	7.0	33.5	15.0	15.0	20.0	22.0
M16x1.5	NPT 3/8"	B-RB01N01M	10.0	33.5	15.0	15.0	20.0	22.0
M16x1.5	NPT 1/2"	B-RB1N01M	10.0	34.0	15.0	15.0	25.0	27.5
M20x1.5	NPT 1/2"	B-RB1N1M	14.0	34.0	15.0	15.0	25.0	27.5
M20x1.5	NPT 3/4"	B-RB2N1M	14.0	34.0	15.0	15.0	30.0	33.0
M25x1.5	NPT 3/4"	B-RB2N2M	19.0	34.0	15.0	15.0	30.0	33.0
M25x1.5	NPT 1"	B-RB3N2M	19.0	34.0	15.0	15.0	36.0	39.8
M32x1.5	NPT 1"	B-RB3N3M	26.0	34.0	15.0	15.0	36.0	39.8
M32x1.5	NPT 1 1/4"	B-RB4N3M	26.0	37.0	18.0	15.0	45.0	50.0
M40x1.5	NPT 1 1/4"	B-RB4N4M	34.0	40.0	18.0	18.0	45.0	50.0
M40x1.5	NPT 1 1/2"	B-RB5N4M	34.0	40.0	18.0	18.0	55.0	61.0
M50x1.5	NPT 1 1/2"	B-RB5N5M	40.0	40.0	18.0	18.0	55.0	61.0
M50x1.6	NPT 2"	B-RB6N5M	44.0	40.5	18.0	18.0	65.0	72.0
M63x1.5	NPT 2"	B-RB6N6M	51.0	40.5	18.0	18.0	68.0	75.0
M63x1.6	NPT 2 1/2"	B-RB7N6M	57.0	50.5	28.0	18.0	80.0	89.0
M75x1.5	NPT 2 1/2"	B-RB7N7M	62.0	50.5	28.0	18.0	80.0	89.0
M75x1.5	NPT 3"	B-RB8N7M	69.0	50.5	28.0	18.0	95.0	105.0
M90x1.5	NPT 3"	B-RB8N8M	78.0	54.0	28.0	21.0	95.0	105.0
M90x1.5	NPT 4"	B-RB10N8M	84.0	54.0	28.0	21.0	120.0	134.0
M110x1.5	NPT 4"	B-RB10N10M	103.0	54.0	28.0	21.0	120.0	134.0
NPT 1/4"	NPT 1/4"	B-RB02N02N	8.0	33.0	15.0	15.0	18.0	20.0
NPT 1/4"	NPT 3/8"	B-RB01N02N	8.0	33.5	15.0	15.0	20.0	22.0
NPT 3/8"	NPT 3/8"	B-RB01N01N	12.0	33.5	15.0	15.0	20.0	22.0
NPT 3/8"	NPT 1/2"	B-RB1N01N	13.0	34.0	15.0	15.0	25.0	27.5
NPT 1/2"	NPT 1/2"	B-RB1N1N	14.5	34.0	15.0	15.0	25.0	27.5
NPT 1/2"	NPT 3/4"	B-RB2N1N	14.5	34.0	15.0	15.0	30.0	33.0
NPT 1/2"	NPT 1"	B-RB3N1N	14.5	34.0	15.0	15.0	36.0	39.8
NPT 3/4"	NPT 3/4"	B-RB2N2N	19.0	34.0	15.0	15.0	32.0	35.5
NPT 3/4"	NPT 1"	B-RB3N2N	20.0	34.0	15.0	15.0	36.0	39.8
NPT 1"	NPT 1"	B-RB3N3N	25.0	34.0	15.0	15.0	36.0	39.8
NPT 1"	NPT 1 1/4"	B-RB4N3N	27.0	37.0	18.0	15.0	45.0	50.0
NPT 1"	NPT 1 1/2"	B-RB5N3N	25.0	37.5	18.0	15.0	55.0	61.0
NPT 1 1/4"	NPT 1 1/4"	B-RB4N4N	33.0	40.5	18.0	18.0	45.0	50.0
NPT 1 1/4"	NPT 1 1/2"	B-RB5N4N	35.0	40.5	18.0	18.0	55.0	61.0
NPT 1 1/4"	NPT 2"	B-RB6N4N	35.0	40.5	18.0	18.0	65.0	72.0
NPT 1 1/2"	NPT 1 1/2"	B-RB5N5N	40.0	40.5	18.0	18.0	55.0	61.0
NPT 1 1/2"	NPT 2"	B-RB6N5N	41.0	40.5	18.0	18.0	65.0	72.0
NPT 2"	NPT 2"	B-RB6N6N	52.0	40.5	18.0	18.0	65.0	72.0
NPT 2"	NPT 2 1/2"	B-RB7N6N	53.0	50.5	28.0	18.0	80.0	89.0
NPT 2 1/2"	NPT 2 1/2"	B-RB7N7N	62.0	60.5	28.0	28.0	80.0	89.0
NPT 2 1/2"	NPT 3"	B-RB8N7N	62.0	60.5	28.0	28.0	95.0	105.0
NPT 3"	NPT 3"	B-RB8N8N	75.0	61.0	28.0	28.0	95.0	105.0
NPT 3"	NPT 4"	B-RB10N8N	75.0	61.0	28.0	28.0	120.0	134.0
NPT 4"	NPT 4"	B-RB10N10N	100.0	61.0	28.0	28.0	120.0	134.0



Approved by	CESI		CESI	
Examination Certificate Number	CESI 13 ATEX 066X		IECEx CES 13.0022X	
Date of Issue	22.11.2013		26.11.2013	
Test Report Number	EX-B3030994		IT/CES/ExTR13.0023/00	
Safety Requirements	EN 60079-0:2012 EN 60079-1:2007 EN 60079-7:2007 EN 60079-31:2009		IEC 60079-0:2011 Edition:6 IEC 60079-1:2007-04 Edition:6 IEC 60079-31:2008 Edition:1 IEC 60079-7:2006-07 Edition:4	
Equipment Marking	Ex II 2 GD	Ex d IIC Gb Ex e IIC Gb Ex tb IIIC Db	Ex II 2 GD	Ex d IIC Gb Ex e IIC Gb Ex tb IIIC Db

Item	Item Description
1	O-ring
2	Body



Size Selection Table

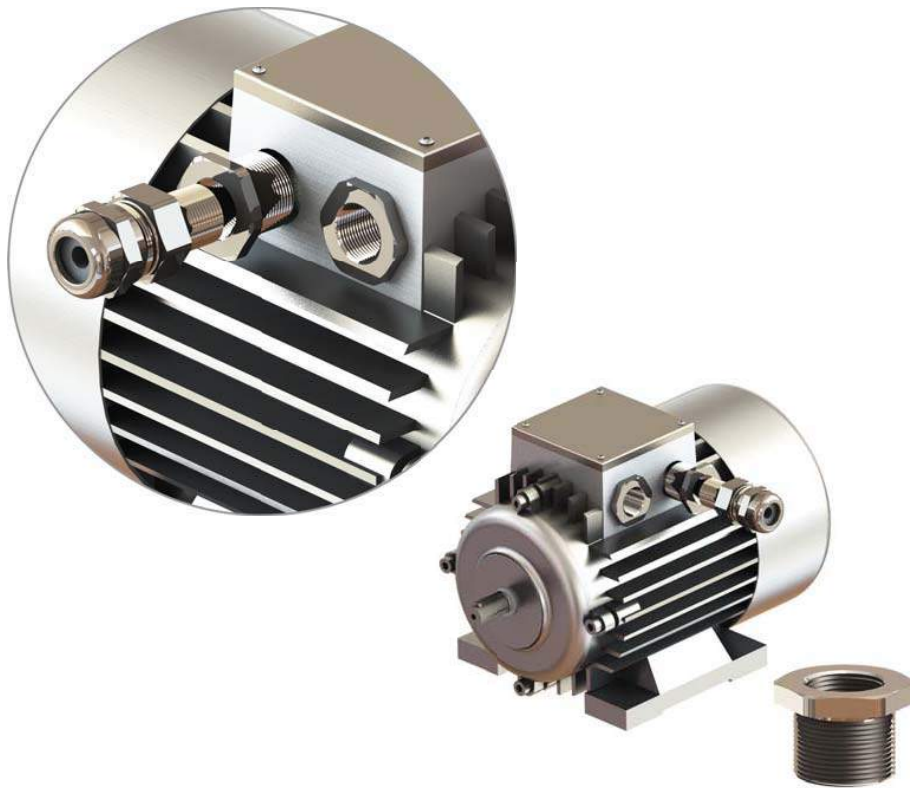
Thread Type	Sizes & Code Nr.										
	12	16	20	25	32	40	50	63	75	90	110
METRIC EN 60423 (M)	02	01	1	2	3	4	5	6	7	8	10
	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
NPT ANSI B1.20.1 (N)	02	01	1	2	3	4	5	6	7	8	10
	7	9	11	13.5	16	21	29	36	42	48	
PG DIN 40430 (P)	1	2	3	4	5	6	7	8	9	10	
	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
PF JIS B0202 (C)	02	01	1	2	3	4	5	6	7	8	10

Order Encoding

Type	Thread	Material	Plated	Sealing	Code Examples
B-RB	M (Metric) P (Pg) N (Npt) C (Gas)	B - Brass X - Stainless Steel Z - Galvanized steel	N (Nickel Only for Brass)	C (Chloroprene)	B-RA01M01MBN

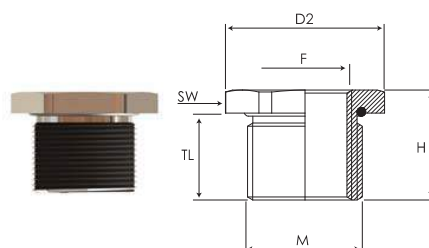
Code Generation Table

Type	Male Thread Size	Female Thread Size	Material
B-RA	16 Metric	16 Metric	Brass-Nickel Plated
Generated Code			
B-RA	01	M	01 M BN



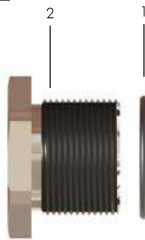
Approved	GOST"R" - INMETRO	
Equipment	Gas Group	Dust Group
	ZONE1/ZONE2	ZONE21/ZONE 22
Suitable for use in	Group II	Group III
	Gas Group IIC	Dust Group IIIC
Type of Protection	Ex d ; Ex e ; Ex tb	
For	Gas & Dust potentially explosive atmospheres	
Degree of Protection	IP66 - IP68 (EN 60529)	
Marking	BMD B-RA.. Ex CE 0722 II 2GD Ex e IIC Gb Ex tb IIIC Db Ta-40°C +100°C IP66/68 CESI 13 ATEX 066X / IECEx CES 13.0022X	
Seal Operating Temperature	Chloroprene C -40°C / +100°C	Item 1
Material	Brass Stainless Steel Galvanised Steel	Item 2
Thread Type	EN 60423 (Metric)/DIN 40430 (Pg) ANSI ASME B1.20.1 (Npt)/GAS UNI ISO 228/1 (Pf)	

Thread Type		Code	Dimensions mm			
MØ	FØ		H (mm)	TL (mm)	SW (mm)	D2 (mm)
M16x1.5	M12x1.5	B-RA01M02M	19,0	15,0	22,0	24,0
M20x1.5	M12x1.5	B-RA1M02M	19,0	15,0	25,0	27,5
M20x1.5	M16x1.5	B-RA1M01M	19,0	15,0	25,0	27,5
M25x1.5	M16x1.5	B-RA2M01M	19,0	15,0	30,0	33,0
M25x1.5	M20x1.5	B-RA2M1M	19,0	15,0	30,0	33,0
M32x1.5	M12x1.5	B-RA3M02M	19,0	15,0	36,0	39,8
M32x1.5	M20x1.5	B-RA3M1M	19,0	15,0	36,0	39,8
M32x1.5	M25x1.5	B-RA3M2M	19,0	15,0	36,0	39,8
M40x1.5	M20x1.5	B-RA4M1M	22,0	18,0	45,0	50,0
M40x1.5	M25x1.5	B-RA4M2M	22,0	18,0	45,0	50,0
M40x1.5	M32x1.5	B-RA4M3M	22,0	18,0	45,0	50,0
M50x1.5	M32x1.5	B-RA5M3M	23,0	18,0	55,0	61,0
M50x1.6	M40x1.5	B-RA5M4M	23,0	18,0	55,0	61,0
M63x1.5	M40x1.5	B-RA6M4M	23,0	18,0	70,0	78,0
M63x1.6	M50x1.5	B-RA6M5M	23,0	18,0	70,0	78,0
M75x1.5	M50x1.5	B-RA7M5M	24,0	18,0	85,0	94,0
M75x1.5	M63x1.5	B-RA7M6M	24,0	18,0	85,0	94,0
M90x1.5	M63x1.5	B-RA8M6M	29,0	21,0	100,0	111,0
M90x1.5	M75x1.5	B-RA8M7M	29,0	21,0	100,0	111,0
M110x1.5	M75x1.5	B-RA10M7M	31,0	21,0	120,0	134,0
M110x1.5	M90x1.5	B-RA10M8M	31,0	21,0	120,0	134,0
M16x1.5	Npt 1/4"	B-RA01M02N	21,0	15,0	22,0	24,0
M20x1.5	Npt 1/4"	B-RA1M02N	21,0	15,0	25,0	27,5
M25x1.5	Npt 1/2"	B-RA2M1N	21,0	15,0	30,0	33,0
M32x1.5	Npt 1/2"	B-RA3M1N	21,0	18,0	36,0	39,8
M32x1.5	Npt 3/4"	B-RA3M2N	26,0	18,0	36,0	39,8
M40x1.5	Npt 3/4"	B-RA4M2N	26,0	18,0	45,0	50,0
M40x1.5	Npt 1"	B-RA4M3N	28,0	18,0	45,0	50,0
M50x1.5	Npt 1"	B-RA5M3N	28,0	18,0	55,0	61,0
M50x1.6	Npt 1 1/4"	B-RA5M4N	28,0	18,0	55,0	61,0
M63x1.5	Npt 1 1/4"	B-RA6M4N	28,0	18,0	70,0	78,0
M63x1.6	Npt 1 1/2"	B-RA6M5N	28,0	18,0	70,0	78,0
M75x1.5	Npt 1 1/2"	B-RA7M5N	28,0	18,0	85,0	94,0
M75x1.5	Npt 2"	B-RA7M6N	28,0	18,0	85,0	94,0
M90x1.5	Npt 2"	B-RA8M6N	28,0	21,0	100,0	111,0
M90x1.5	Npt 2 1/2"	B-RA8M7N	41,0	31,0	100,0	111,0
M110x1.5	Npt 2 1/2"	B-RA10M7N	41,0	31,0	120,0	134,0
M110x1.5	Npt 3"	B-RA10M8N	43,0	33,0	120,0	134,0



Approved by	CESI		CESI	
Examination Certificate Number	CESI 13 ATEX 066X		IECEx CES 13.0022X	
Date of Issue	22.11.2013		26.11.2013	
Test Report Number	EX-B3030994		IT/CES/ExTR13.0023/00	
Safety Requirements	EN 60079-0:2012 EN 60079-1:2007 EN 60079-7:2007 EN 60079-31:2009		IEC 60079-0:2011 Edition:6 IEC 60079-1:2007-04 Edition:6 IEC 60079-31:2008 Edition:1 IEC 60079-7:2006-07 Edition:4	
Equipment Marking	Ex II 2 GD	Ex d IIC Gb Ex e IIC Gb Ex tb IIIC Db	Ex II 2 GD	Ex d IIC Gb Ex e IIC Gb Ex tb IIIC Db

Item	Item Description
1	O-ring
2	Body



Size Selection Table

Thread Type	Sizes & Code Nr.										
	12	16	20	25	32	40	50	63	75	90	110
METRIC EN 60423 (M)	02	01	1	2	3	4	5	6	7	8	10
	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
NPT ANSI B1.20.1 (N)	02	01	1	2	3	4	5	6	7	8	10
	7	9	11	13,5	16	21	29	36	42	48	
PG DIN 40430 (P)	1	2	3	4	5	6	7	8	9	10	
	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
PF JIS B0202 (C)	02	01	1	2	3	4	5	6	7	8	10

Order Encoding

Type	Thread	Material	Plated	Sealing	Code Examples
B-RB	M (Metric) P (Pg) N (Npt) C (Gas)	B - Brass X - Stainless Steel Z - Galvanized steel	N (Nickel Only for Brass)	C (Chloroprene)	B-RA01M01MBN

Code Generation Table

Type	Male Thread Size	Female Thread Size	Material
B-RA	3/8 Npt	1/2 Metric	Brass-Nickel Plated
Generated Code			
B-RA	01	N	01 M BN

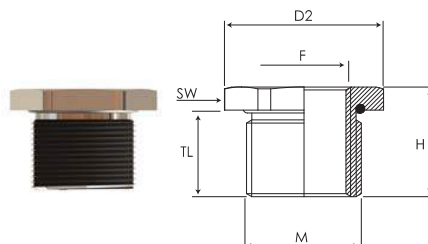


Approved	GOST'R' - INMETRO	
Equipment	Gas Group	Dust Group
	ZONE1/ZONE2	ZONE21/ZONE 22
Suitable for use in	Group II	Group III
	Gas Group IIC	Dust Group IIIC
Type of Protection	Ex d ; Ex e ; Ex tb	
For	Gas & Dust potentially explosive atmospheres	
Degree of Protection	IP66 - IP68 (EN 60529)	
Marking	BMD B-RA.. Ex CE 0722 II 2GD Ex e IIC Gb Ex tb IIIC Db Ta-40°C +100°C IP66/68 CESI 13 ATEX 066X / IECEx CES 13.0022X	
Seal Operating Temperature	Chloroprene C -40°C / +100°C	Item 1
Material	Brass Stainless Steel Galvanised Steel	Item 2
Thread Type	EN 60423 (Metric)/DIN 40430 (Pg) ANSI ASME B1.20.1 (Npt)/GAS UNI ISO 228/1 (Pf)	

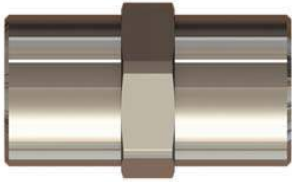
Thread Type		Code	Dimensions mm			
MØ	FØ		H (mm)	TL (mm)	SW (mm)	D2 (mm)
NPT 3/8"	NPT 1/4"	B-RA01N02N	19,0	15,0	22,0	24,0
NPT 1/2"	NPT 1/4"	B-RA1N02N	19,0	15,0	25,0	27,5
NPT 1/2"	NPT 3/8"	B-RA1N01N	19,0	15,0	25,0	27,5
NPT 3/4"	NPT 3/8"	B-RA2N01N	19,0	15,0	30,0	33,0
NPT 3/4"	NPT 1/2"	B-RA2N1N	19,0	15,0	30,0	33,0
NPT 1"	NPT 1/2"	B-RA3N1N	19,0	15,0	36,0	39,8
NPT 1"	NPT 3/4"	B-RA3N2N	19,0	15,0	36,0	39,5
NPT 1 1/4"	NPT 1/2"	B-RA4N1N	22,0	18,0	45,0	50,0
NPT 1 1/4"	NPT 3/4"	B-RA4N2N	22,0	18,0	45,0	50,0
NPT 1 1/4"	NPT 1"	B-RA4N3N	22,0	18,0	45,0	50,0
NPT 1 1/2"	NPT 1/2"	B-RA5N1N	23,0	18,0	55,0	61,0
NPT 1 1/2"	NPT 3/4"	B-RA5N2N	23,0	18,0	55,0	61,0
NPT 1 1/2"	NPT 1"	B-RA5N3N	23,0	18,0	55,0	61,0
NPT 1 1/2"	NPT 1 1/4"	B-RA5N4N	23,0	18,0	55,0	61,0
NPT 2"	NPT 3/4"	B-RA6N2N	23,0	18,0	65,0	72,0
NPT 2"	NPT 1 1/4"	B-RA6N4N	23,0	18,0	65,0	72,0
NPT 2"	NPT 1 1/2"	B-RA6N5N	23,0	18,0	65,0	72,0
NPT 2 1/2"	NPT 1 1/2"	B-RA7N5N	34,0	28,0	75,0	83,0
NPT 2 1/2"	NPT 2"	B-RA7N6N	34,0	28,0	75,0	83,0
NPT 3"	NPT 1 1/2"	B-RA8N5N	36,0	28,0	95,0	105,0
NPT 3"	NPT 2"	B-RA8N6N	36,0	28,0	95,0	105,0
NPT 3"	NPT 2 1/2"	B-RA8N7N	36,0	28,0	95,0	105,0
NPT 4"	NPT 2 1/2"	B-RA10N7N	38,0	28,0	120,0	134,0
NPT 4"	NPT 3"	B-RA10N8N	38,0	28,0	120,0	134,0

NPT 3/8"	M12x1.5	B-RA01N02M	19,0	15,0	22,0	24,0
NPT 1/2"	M12x1.5	B-RA1N02M	19,0	15,0	25,0	27,5
NPT 1/2"	M16x1.5	B-RA1N01M	19,0	15,0	25,0	27,5
NPT 3/4"	M16x1.5	B-RA2N01M	19,0	15,0	30,0	33,0
NPT 3/4"	M20x1.5	B-RA2N1M	19,0	15,0	30,0	33,0
NPT 1"	M20x1.5	B-RA3N1M	19,0	15,0	36,0	39,8
NPT 1"	M25x1.5	B-RA3N2M	19,0	15,0	36,0	39,8
NPT 1 1/4"	M25x1.5	B-RA4N2M	22,0	18,0	45,0	50,0
NPT 1 1/4"	M32x1.5	B-RA4N3M	22,0	18,0	45,0	50,0
NPT 1 1/2"	M32x1.5	B-RA5N3M	23,0	18,0	55,0	61,0
NPT 1 1/2"	M40x1.5	B-RA5N4M	23,0	18,0	55,0	61,0
NPT 2"	M40x1.5	B-RA6N4M	23,0	18,0	65,0	72,0
NPT 2"	M50x1.5	B-RA6N5M	23,0	18,0	65,0	72,0
NPT 2 1/2"	M50x1.5	B-RA7N5M	34,0	28,0	75,0	83,0
NPT 2 1/2"	M63x1.5	B-RA7N6M	34,0	28,0	75,0	83,0
NPT 3"	M63x1.5	B-RA8N6M	36,0	28,0	95,0	105,0
NPT 3"	M75x1.5	B-RA8N7M	36,0	28,0	95,0	105,0
NPT 4"	M75x1.5	B-RA10N7M	38,0	28,0	120,0	134,0
NPT 4"	M90x1.5	B-RA10N8M	38,0	28,0	120,0	134,0



Approved by	CESI		CESI	
Examination Certificate Number	CESI 13 ATEX 066X		IECEx CES 13.0022X	
Date of Issue	22.11.2013		26.11.2013	
Test Report Number	EX-B3030994		IT/CES/ExTR13.0023/00	
Safety Requirements	EN 60079-0:2012 EN 60079-1:2007 EN 60079-7:2007 EN 60079-31:2009		IEC 60079-0:2011 Edition:6 IEC 60079-1:2007-04 Edition:6 IEC 60079-31:2008 Edition:1 IEC 60079-7:2006-07 Edition:4	
Equipment Marking	Ex II 2 GD	Ex d IIC Gb Ex e IIC Gb Ex tb IIIC Db	Ex II 2 GD	Ex d IIC Gb Ex e IIC Gb Ex tb IIIC Db

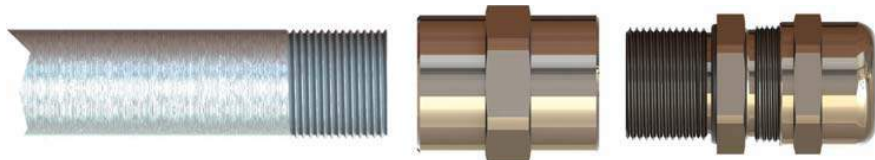
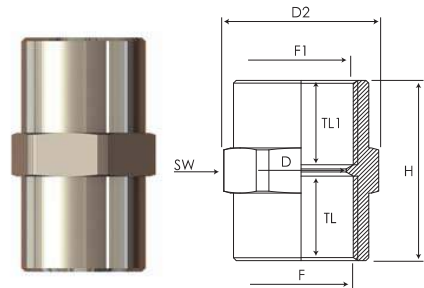


Size Selection Table		Sizes & Code Nr.										
Thread Type		12	16	20	25	32	40	50	63	75	90	110
METRIC EN 60423 (M)	02	01	1	2	3	4	5	6	7	8	10	
	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	
NPT ANSI B1.20.1 (N)	02	01	1	2	3	4	5	6	7	8	10	
	7	9	11	13.5	16	21	29	36	42	48		
PG DIN 40430 (P)	1	2	3	4	5	6	7	8	9	10		
	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	
PF JIS B0202 (C)	02	01	1	2	3	4	5	6	7	8	10	

Order Encoding		Material	Plated	Sealing	Code Examples
Type	Thread	B - Brass X - Stainless Steel Z - Galvanized steel	N (Nickel Only for Brass)	C (Chloroprene)	B-RM01M01MBN
B-RM	M (Metric) P (Pg) N (Npt) C (Gas)				

Code Generation Table					
Type	Female Thread Size	Female Thread Size	Material		
B-RM	16	Metric	16	Metric	Brass-Nickel Plated
Generated Code					
B-RM	01	M	01	M	BN

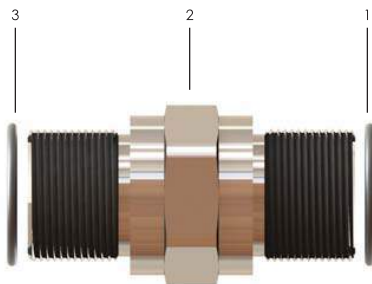


Approved	GOST"R" - INMETRO	
Equipment	Gas Group	Dust Group
	ZONE1/ZONE2	ZONE21/ZONE 22
Suitable for use in	Group II	Group III
	Gas Group IIC	Dust Group III C
Type of Protection	Ex d ; Ex e ; Ex tb	
For	Gas & Dust potentially explosive atmospheres	
Degree of Protection	IP66 - IP68 (EN 60529)	
Marking	BMD B-RM., Ex CE 0722 II 2GD Ex d IIC Gb Ex e IIC Gb Ex tb III C Db Ta-40°C +100°C IP66/68 CESI 13 ATEX 066X / IECEx CES 13.0022X	
Material	Brass Stainless Steel Galvanised Steel	
Thread Type	EN 60423 (Metric)/DIN 40430 (Pg) ANSI ASME B1.20.1 (Npt)/GAS UNI ISO 228/1 (Pf)	

Thread Type		Code	Dimensions (mm)					
FØ	F1Ø		D (mm)	H (mm)	TL (mm)	TL1 (mm)	SW (mm)	D2 (mm)
M12x1.5	M12x1.5	B-RM02M02M	9,5	32,0	15,0	15,0	18,0	20,0
M16x1.5	M12x1.5	B-RM01M02M	9,5	33,0	15,0	15,0	20,0	22,0
M16x1.5	M16x1.5	B-RM01M01M	13,0	33,0	15,0	15,0	20,0	22,0
M20x1.5	M16x1.5	B-RM1M01M	13,5	33,0	15,0	15,0	25,0	27,5
M20x1.5	M20x1.5	B-RM1M1M	16,0	33,0	15,0	15,0	25,0	27,5
M25x1.5	M20x1.5	B-RM2M1M	17,0	33,0	15,0	15,0	32,0	35,5
M25x1.5	M25x1.5	B-RM2M2M	22,0	33,0	15,0	15,0	32,0	35,5
M32x1.5	M25x1.5	B-RM3M2M	22,0	34,0	15,0	15,0	36,0	39,8
M32x1.5	M32x1.5	B-RM3M3M	29,0	34,0	15,0	15,0	36,0	39,8
M40x1.5	M32x1.5	B-RM4M3M	29,0	37,0	18,0	15,0	45,0	50,0
M40x1.5	M40x1.5	B-RM4M4M	37,0	38,0	18,0	18,0	45,0	50,0
M50x1.5	M40x1.5	B-RM5M4M	37,5	40,0	18,0	18,0	55,0	61,0
M50x1.5	M50x1.5	B-RM5M5M	47,0	40,0	18,0	18,0	55,0	61,0
M63x1.5	M50x1.5	B-RM6M5M	47,0	41,0	18,0	18,0	68,0	75,0
M63x1.5	M63x1.5	B-RM6M6M	60,0	41,0	18,0	18,0	68,0	75,0
M75x1.5	M63x1.5	B-RM7M6M	60,0	41,0	18,0	18,0	80,0	89,0
M75x1.5	M75x1.5	B-RM7M7M	72,0	41,0	18,0	18,0	80,0	89,0
M90x1.5	M75x1.5	B-RM8M7M	72,0	45,0	21,0	18,0	95,0	105,0
M90x1.5	M90x1.5	B-RM8M8M	87,0	45,0	21,0	21,0	95,0	105,0
M110x1.5	M110x1.5	B-RM10M10M	107,0	45,0	21,0	21,0	120,0	134,0
NPT 1/4"	M12x1.5	B-RM02N02M	9,5	32,0	15,0	15,0	18,0	20,0
NPT 3/8"	M12x1.5	B-RM01N02M	9,5	33,0	15,0	15,0	20,0	22,0
NPT 3/8"	M16x1.5	B-RM01N01M	12,5	32,0	15,0	15,0	20,0	22,0
NPT 1/2"	M16x1.5	B-RM1N01M	14,0	32,0	15,0	15,0	25,0	27,5
NPT 1/2"	M20x1.5	B-RM1N1M	16,0	32,0	15,0	15,0	25,0	27,5
NPT 3/4"	M20x1.5	B-RM2N1M	17,0	33,0	15,0	15,0	32,0	35,5
NPT 3/4"	M25x1.5	B-RM2N2M	22,0	32,0	15,0	15,0	32,0	35,5
NPT 1"	M25x1.5	B-RM3N2M	22,5	33,0	15,0	15,0	36,0	39,8
NPT 1"	M32x1.5	B-RM3N3M	28,0	32,0	15,0	15,0	36,0	39,8
NPT 1 1/4"	M32x1.5	B-RM4N3M	29,0	37,0	18,0	15,0	45,0	50,0
NPT 1 1/4"	M40x1.5	B-RM4N4M	35,5	38,0	18,0	18,0	45,0	50,0
NPT 1 1/2"	M40x1.5	B-RM5N4M	38,0	39,0	18,0	18,0	55,0	61,0
NPT 1 1/2"	M50x1.5	B-RM5N5M	42,0	39,0	18,0	18,0	55,0	61,0
NPT 2"	M50x1.5	B-RM6N5M	48,0	39,0	18,0	18,0	65,0	72,0
NPT 2"	M63x1.5	B-RM6N6M	54,0	39,0	18,0	18,0	68,0	75,0
NPT 2 1/2"	M63x1.5	B-RM7N6M	60,0	50,0	28,0	18,0	80,0	89,0
NPT 2 1/2"	M75x1.5	B-RM7N7M	64,0	50,0	28,0	18,0	80,0	89,0
NPT 3"	M75x1.5	B-RM8N7M	72,0	51,0	28,0	18,0	95,0	105,0
NPT 3"	M90x1.5	B-RM8N8M	79,5	53,0	28,0	21,0	95,0	105,0
NPT 4"	M90x1.5	B-RM10N8M	87,0	56,0	28,0	21,0	120,0	134,0
NPT 4"	M110x1.5	B-RM10N10M	105,0	52,0	28,0	21,0	120,0	134,0
NPT 1/4"	NPT 1/4"	B-RM01N01	9,5	32,0	15,0	15,0	18,0	20,0
NPT 3/8"	NPT 1/4"	B-RM02N02	9,5	33,0	15,0	15,0	20,0	22,0
NPT 3/8"	NPT 3/8"	B-RM02N02	12,5	32,0	15,0	15,0	20,0	22,0
NPT 1/2"	NPT 3/8"	B-RM1N02	13,0	33,0	15,0	15,0	25,0	27,5
NPT 1/2"	NPT 1/2"	B-RM1N1	16,0	32,0	15,0	15,0	25,0	27,5
NPT 3/4"	NPT 1/2"	B-RM2N1	16,0	33,0	15,0	15,0	32,0	35,5
NPT 3/4"	NPT 3/4"	B-RM2N2	21,0	32,0	15,0	15,0	32,0	35,5
NPT 1"	NPT 3/4"	B-RM3N2	21,0	33,0	15,0	15,0	36,0	39,8
NPT 1"	NPT 1"	B-RM3N3	27,0	32,0	15,0	15,0	36,0	39,8
NPT 1 1/4"	NPT 1"	B-RM4N3	35,5	37,0	18,0	15,0	45,0	50,0
NPT 1 1/4"	NPT 1 1/4"	B-RM4N4	36,0	38,0	18,0	18,0	45,0	50,0
NPT 1 1/2"	NPT 1 1/4"	B-RM5N4	41,5	39,0	18,0	18,0	55,0	61,0
NPT 1 1/2"	NPT 1 1/2"	B-RM5N5	41,5	38,0	18,0	18,0	55,0	61,0
NPT 2"	NPT 1 1/2"	B-RM6N5	41,5	42,0	18,0	18,0	65,0	72,0
NPT 2"	NPT 2"	B-RM6N6	53,5	38,0	18,0	18,0	65,0	72,0
NPT 2 1/2"	NPT 2"	B-RM7N6	53,5	51,0	28,0	18,0	80,0	89,0
NPT 2 1/2"	NPT 2 1/2"	B-RM7N7	64,0	60,0	28,0	28,0	80,0	89,0
NPT 3"	NPT 2 1/2"	B-RM8N7	64,0	53,0	28,0	28,0	95,0	105,0
NPT 3"	NPT 3"	B-RM8N8	80,0	58,0	28,0	28,0	95,0	105,0
NPT 4"	NPT 3"	B-RM10N8	81,0	59,0	28,0	28,0	120,0	134,0
NPT 4"	NPT 4"	B-RM10N10	105,0	59,0	28,0	28,0	120,0	134,0

Approved by	CESI		CESI	
Examination Certificate Number	CESI 13 ATEX 066X		IECEx CES 13.0022X	
Date of Issue	22.11.2013		26.11.2013	
Test Report Number	EX-B3030994		IT/CES/ExTR13.0023/00	
Safety Requirements	EN 60079-0:2012 EN 60079-1:2007 EN 60079-7:2007 EN 60079-31:2009		IEC 60079-0:2011 Edition:6 IEC 60079-1:2007-04 Edition:6 IEC 60079-31:2008 Edition:1 IEC 60079-7:2006-07 Edition:4	
Equipment Marking	Ex II 2 GD	Ex d IIC Gb Ex e IIC Gb Ex tb IIIC Db	Ex II 2 GD	Ex d IIC Gb Ex e IIC Gb Ex tb IIIC Db

Item	Item Description
1	O-ring
2	Body
3	O-ring



Size Selection Table

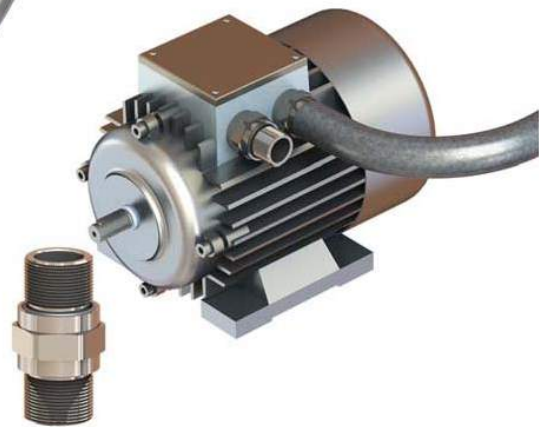
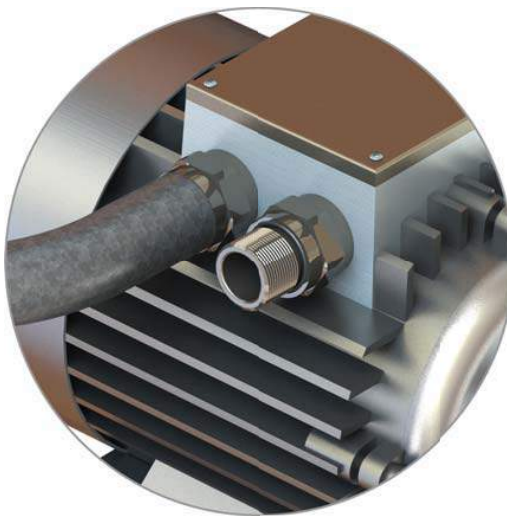
Thread Type	Sizes & Code Nr.										
	12	16	20	25	32	40	50	63	75	90	110
METRIC EN 60423 (M)	02	01	1	2	3	4	5	6	7	8	10
	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
NPT ANSI B1.20.1 (N)	02	01	1	2	3	4	5	6	7	8	10
	7	9	11	13.5	16	21	29	36	42	48	
PG DIN 40430 (P)	1	2	3	4	5	6	7	8	9	10	
	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
PF JIS B0202 (C)	02	01	1	2	3	4	5	6	7	8	10

Order Encoding

Type	Thread	Material	Plated	Sealing	Code Examples
B-RN	M (Metric) P (Pg) N (Npt) C (Gas)	B - Brass X - Stainless Steel Z - Galvanized steel	N (Nickel Only for Brass)	C (Chloroprene)	B-RN01M01MBN

Code Generation Table

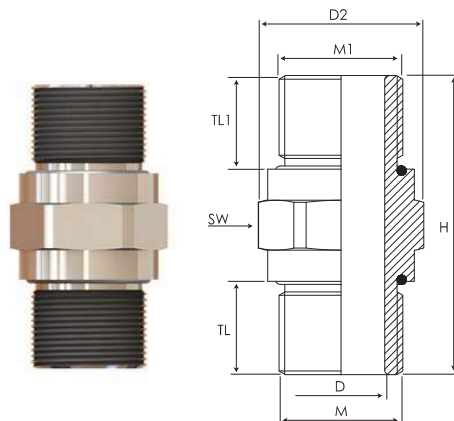
Type	Male Thread Size	Male Thread Size	Material		
B-RN	16	Metric	16	Metric	Brass-Nickel Plated
Generated Code					
B-RN	01	M	01	M	BN





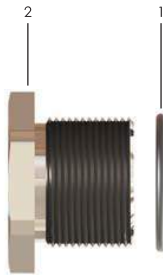
Approved	GOST'R" - INMETRO	
Equipment	Gas Group	Dust Group
	ZONE1 / ZONE2	ZONE21 / ZONE 22
Suitable for use in	Group II	Group III
	Gas Group IIC	Dust Group IIIC
Type of Protection	Ex d ; Ex e ; Ex tb	
For	Gas & Dust potentially explosive atmospheres	
Degree of Protection	IP66 - IP68 (EN 60529)	
Marking	BMD B-RN.. Ex CE 0722 II 2GD Ex d IIC Gb Ex e IIC Gb Ex tb IIIC Db Ta-40°C +100°C IP66/68 CESI 13 ATEX 066X / IECEx CES 13.0022X	
Seal Operating Temperature	Chloroprene C	-40°C / +100°C
		Item 1-3
Material	Brass	Item 2
	Stainless Steel	
	Galvanised Steel	
Thread Type	EN 60423 (Metric)/DIN 40430 (Pg) ANSI ASME B1.20.1 (Npt)/GAS UNI ISO 228/1 (Pf)	

Thread Type		Code	Dimensions (mm)					
MØ	M1Ø		D (mm)	H (mm)	TL (mm)	TL1 (mm)	SW (mm)	D2 (mm)
M16x1.5	M16x1.5	B-RN01M01M	10,0	48,0	15,0	15,0	20,0	22,0
M20x1.5	M20x1.5	B-RN1M1M	14,0	48,0	15,0	15,0	24,0	26,5
M25x1.5	M25x1.5	B-RN2M2M	19,0	50,0	15,0	15,0	32,0	35,5
M32x1.5	M32x1.5	B-RN3M3M	26,0	50,0	15,0	15,0	36,0	39,8
M40x1.5	M40x1.5	B-RN4M4M	34,0	56,0	18,0	18,0	45,0	50,0
M50x1.5	M50x1.5	B-RN5M5M	44,0	58,0	18,0	18,0	55,0	61,0
M63x1.5	M63x1.5	B-RN6M6M	57,0	58,0	18,0	18,0	70,0	78,0
M75x1.5	M75x1.5	B-RN7M7M	69,0	62,0	18,0	18,0	85,0	94,0
M90x1.5	M90x1.5	B-RN8M8M	84,0	68,0	21,0	21,0	100,0	111,0
M110x1.5	M110x1.5	B-RN10M10M	100,0	69,0	21,0	21,0	120,0	134,0
NPT 3/8"	NPT 3/8"	B-RN01N01N	12,0	50,0	16,0	16,0	20,0	22,0
NPT 3/8"	NPT 1/2"	B-RN01N1N	12,0	55,0	16,0	21,0	24,0	26,5
NPT 1/2"	NPT 1/2"	B-RN1N1N	15,5	60,0	21,0	21,0	24,0	26,5
NPT 1/2"	NPT 3/4"	B-RN1N2N	15,5	62,0	21,0	21,0	32,0	35,5
NPT 3/4"	NPT 3/4"	B-RN2N2N	19,0	62,0	21,0	21,0	32,0	35,5
NPT 3/4"	NPT 1"	B-RN2N3N	19,0	67,0	21,0	26,0	36,0	39,8
NPT 1"	NPT 1"	B-RN3N3N	25,0	72,0	26,0	26,0	36,0	39,8
NPT 1"	NPT 1 1/4"	B-RN3N4N	25,0	74,0	26,0	28,0	45,0	50,0
NPT 1 1/4"	NPT 1 1/4"	B-RN4N4N	33,0	76,0	28,0	28,0	45,0	50,0
NPT 1 1/2"	NPT 1 1/2"	B-RN5N5N	40,0	78,0	28,0	28,0	55,0	61,0
NPT 2"	NPT 2"	B-RN6N6N	52,0	78,0	28,0	28,0	65,0	72,0
NPT 2 1/2"	NPT 2 1/2"	B-RN7N7N	62,0	108,0	41,0	41,0	80,0	89,0
NPT 3/8"	M16x1.5	B-RN01N01M	10,0	49,0	15,0	16,0	20,0	22,0
NPT 1/2"	M20x1.5	B-RN1N1M	14,0	54,0	15,0	21,0	24,0	26,5
NPT 3/4"	M25x1.5	B-RN2N2M	19,0	55,0	15,0	21,0	32,0	35,5
NPT 1"	M32x1.5	B-RN3N3M	26,0	61,0	15,0	26,0	36,0	39,8
NPT 1 1/4"	M40x1.5	B-RN4N4M	33,0	66,0	18,0	28,0	45,0	50,0
NPT 1 1/2"	M50x1.5	B-RN5N5M	40,0	68,0	18,0	28,0	55,0	61,0
NPT 2"	M63x1.5	B-RN6N6M	52,0	68,0	18,0	28,0	70,0	78,0
NPT 2 1/2"	M75x1.5	B-RN7N7M	62,0	85,0	18,0	41,0	85,0	94,0
NPT 3"	M90x1.5	B-RN8N8M	75,0	90,0	21,0	43,0	100,0	111,0
NPT 4"	M110x1.5	B-RN10N10M	100,0	93,0	21,0	45,0	120,0	134,0



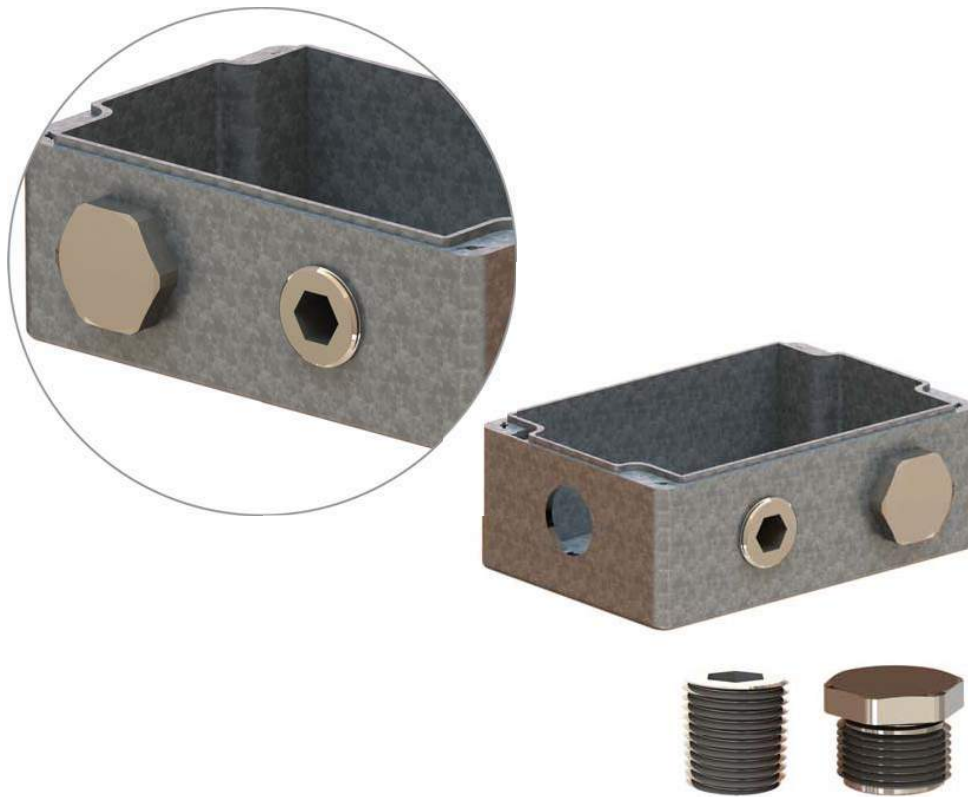
Approved by	CESI		CESI	
Examination Certificate Number	CESI 13 ATEX 066X		IECEx CES 13.0022X	
Date of Issue	22.11.2013		26.11.2013	
Test Report Number	EX-B3030994		IT/CES/ExTR13.0023/00	
Safety Requirements	EN 60079-0:2012 EN 60079-1:2007 EN 60079-7:2007 EN 60079-31:2009		IEC 60079-0:2011 Edition:6 IEC 60079-1:2007-04 Edition:6 IEC 60079-31:2008 Edition:1 IEC 60079-7:2006-07 Edition:4	
Equipment Marking	Ex II 2 GD	Ex d IIC Gb Ex e IIC Gb Ex tb IIIC Db	Ex II 2 GD	Ex d IIC Gb Ex e IIC Gb Ex tb IIIC Db

Item	Item Description
1	O-ring
2	Body



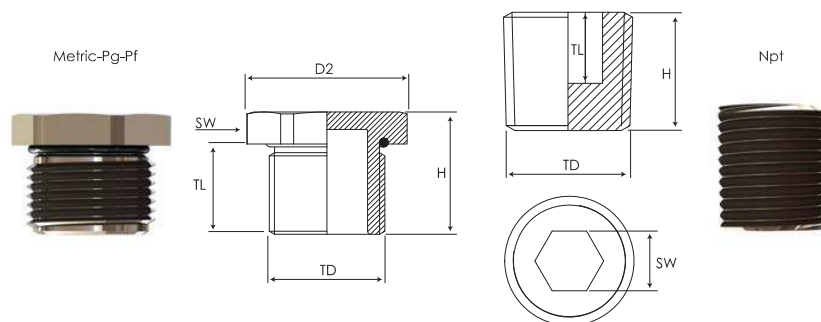
Order Encoding				
Type	Thread	Material	Plated	Code Examples
B-TS	M (Metric) P (Pg) C (Gas) N (Npt)	B - Brass X - Stainless Steel Z - Galvanized steel	N (Nickel Only for Brass)	B-TS01MBN B-TS01PBN B-TS01CBN B-TS01NBN

The male plugs can be used with circuits Ex i. These male plugs should have a part painted light blue. The male can be also GAS UNI ISO 7/1 and GK GAS UNI 6125. For chosen male plugs see example B. Minimum thread length :TL must be min. 5 threads engaged for cylindrical threads and min. 5 construction threads for tapered threads. Thread tolerance in according ISO 9651 - 965III for dimensions ISO pitch 1,5 - GAS UNI ISO 228/1 - PG DIN 40430 - NPT ANSI ASME B1.20.1 M = male thread hub. The threads can be also intermediate for ISO pitch 1,5 (Example M33; M42; M14 and other). The male plugs can have also the sunk key.



Approved	GOST'R" - INMETRO	
Equipment	Gas Group	Dust Group
	ZONE1 / ZONE2	ZONE21 / ZONE 22
Suitable for use in	Group II	Group III
	Gas Group IIC	Dust Group IIIC
Type of Protection	Ex d; Ex e; Ex tb	
For	Gas & Dust potentially explosive atmospheres	
Degree of Protection	IP66 - IP68 (EN 60529)	
Marking	BMD B-TS., Ex CE 0722 II 2GD Ex d IIC Gb Ex e IIC Gb Ex tb IIIC Db Ta-40°C +100°C IP66/68 CESI 13 ATEX 066X / IECEx CES 13.0022X	
Oring Operating Temperature	Chloroprene	-40°C / +100°C
		Item 1
Material	Brass	Item 2
	Stainless Steel	
	Galvanized steel	
Thread Type	EN 60423 (Metric)/ DIN 40430 (Pg) GAS UNI ISO 228/1 (Pf) / ANSI ASME B1.20.1 (Npt)	

Thread Type (TD)	Code	Dimensions			
		H (mm)	TL (mm)	SW (mm)	D2 (mm)
M12x1.5	B-TS02M	21	15.5	17	18.8
M16x1.5	B-TS01M	21	15.5	22	24.0
M20x1.5	B-TS1M	21	15.5	25	27.5
M25x1.5	B-TS2M	21	15.5	30	33.0
M32x1.5	B-TS3M	21	15.5	37	41.0
M40x1.5	B-TS4M	23	17.5	45	50.0
M50x1.5	B-TS5M	23	17.5	55	61.0
M63x1.5	B-TS6M	23	17.5	70	78.0
M75x1.5	B-TS7M	25	20.0	85	89.0
M90x1.5	B-TS8M	25	20.0	100	111.0
M110x1.5	B-TS10M	25	20.0	120	134.0
Pg 7	B-TS1P	22	16.5	17	18.8
Pg 9	B-TS2P	22	16.5	20	22.0
Pg 11	B-TS3P	22	16.5	25	27.5
Pg 13.5	B-TS4P	22	16.5	25	27.5
Pg 16	B-TS5P	22	16.5	27	30.0
Pg 21	B-TS6P	22	17.0	35	39.0
Pg 29	B-TS7P	22	17.0	42	47.0
Pg 36	B-TS8P	22	17.0	55	61.0
Pg 42	B-TS9P	22	17.0	60	66.5
Pg 48	B-TS10P	22	17.0	65	72.0
Pf 1/4"	B-TS02C	23	17.5	18	20.0
Pf 3/8"	B-TS01C	23	17.5	22	24.0
Pf 1/2"	B-TS1C	23	18.0	25	27.5
Pf 3/4"	B-TS2C	23	18.0	32	35.5
Pf 1"	B-TS3C	27	22.0	37	41.0
Pf 1 1/4"	B-TS4C	27	22.0	45	50.0
Pf 1 1/2"	B-TS5C	27	22.0	55	61.0
Pf 2"	B-TS6C	27	22.0	65	72.0
Pf 2 1/2"	B-TS7C	30	22.0	85	94.0
Pf 3"	B-TS8C	30	22.0	95	105.0
Pf 4"	B-TS10C	30	22.0	120	134.0
NPT1/4"	B-TS02N	15.0	10.0	6.1	
NPT3/8"	B-TS01N	15.0	10.0	6.1	
NPT1/2"	B-TS1N	20.0	12.0	10.1	
NPT3/4"	B-TS2N	20.0	12.0	10.1	
NPT1"	B-TS3N	25.0	14.0	14.1	
NPT1 1/4"	B-TS4N	25.0	16.0	20.1	
NPT1 1/2"	B-TS5N	25.0	16.0	25.1	
NPT2"	B-TS6N	25.0	16.0	30.1	
NPT2 1/2"	B-TS7N	32.0	20.0	45.1	
NPT3"	B-TS8N	32.0	20.0	55.1	
NPT4"	B-TS10	32.0	20.0	65.0	



# Pressure Balance Elements for **GAS & DUST** applications



In order to choose the right ventilation plug unit (pressure balance elements) for a specific application, the working principles of the unit must be known first. Ventilation plugs are permeable to "gases and vapours, e.g. air" but impermeable to "liquids and dust, e.g. water". The permeability resistance to liquids depends on the pore size and structure of the membrane inside these devices.

If the working conditions of water (the most common liquid) are studied, it is possible to say that the water intrusion pressure goes down as air permeability increases. The relevant specifications are collected in tabulated data.

Of the relevant parameters, the "Pressure Balance" function depends on the differential pressure between the inner and the outer environments of the enclosure. As a reference pressure, 70 mBar (70mBar = 1 Psi) value is chosen to present data. Under normal conditions, air circulation exists for all differential pressure levels. But the volume flow rate is very low for smaller values and obviously increases with increasing pressure values. Of course the air flow rate also depends on the properties of the membrane (classified as standard, medium, high and ultra high permeability types).

If there is no water pressure danger (if the device is not immersed in the water), it is always better to choose highly permeable elements for good circulation even for low differential pressure levels.

In essence, there is air circulation in the enclosure from the inside to the outside when the device is heating up due to its operation. Similarly, a circulation in reverse direction occurs during the cooling period. It should also be noted that there is always a level of humidity in air, hence some water in the form of vapour is also circulated with air. However condensed water is blocked by the water repellent membrane unless the differential pressure exceeds the intrusion pressure threshold.



Cranes  
Motors  
Heaters  
Thermostat  
Heat detectors  
Flame detectors

Smoke detectors  
Alarm indicators  
motor starters  
loudspeakers  
alarm bell  
sounders / horns

control and distribution units,  
panels and boards  
beacons / strobes  
status lamps  
control stations  
junction and terminal boxes

variable-frequency on motors  
Lighting Fixtures  
Motor Starters  
Enclosures for control units and  
junction boxes (Power & Lighting)  
Lighting

manual call points  
doorholder magnets  
Electrical, digital compact volume  
flow controller  
Electric linear valve actuators  
Modulating electric

digital sensors for temperature,  
humidity, pressure and differential  
pressure  
Modulating transducer  
Binary switching module



**HYDRA  
BBVP**  
Ex e Ventilation  
Plugs



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**VIRGO  
BDRV**  
Ex e Drain  
Valve



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## Ex II 2 GD / Ex e IIC Gb - Ex tb IIIC Db

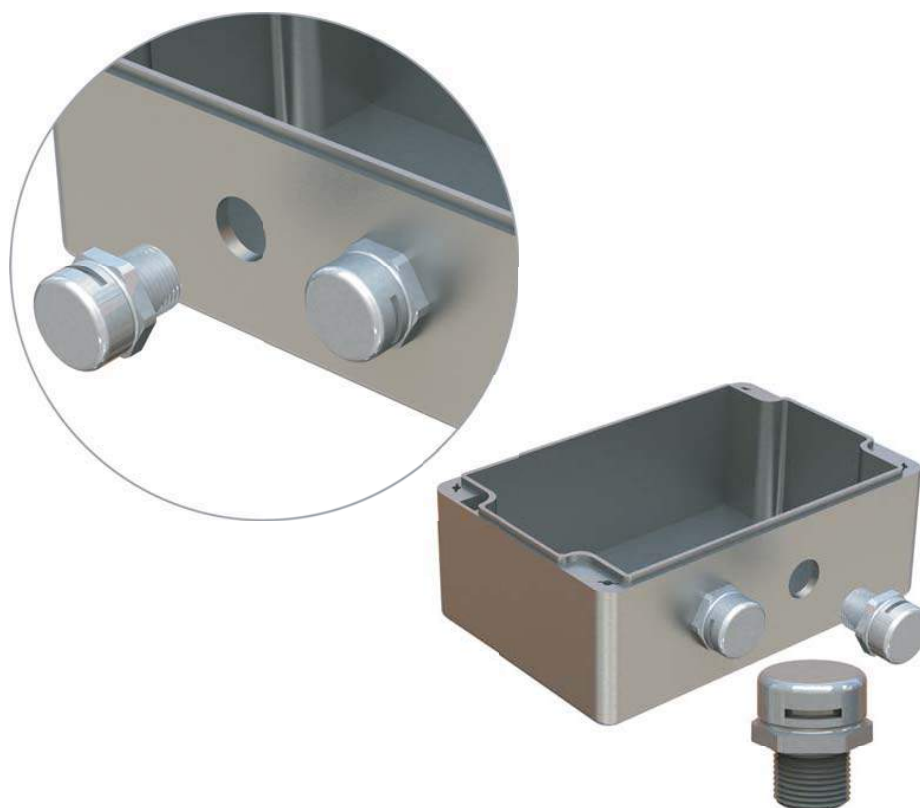
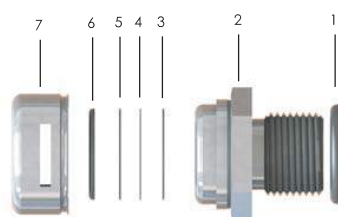
After this technical overview, the utility of the "Ventilation Plugs" can be listed as follows:

- Prevention of pressure increase inside the enclosure. The pressure sensitive elements are not threatened.
- Limiting of temperature increase by the air circulation. The temperature sensitive elements are not threatened.
- Added flexibility for maintenance. In traditional units, when the enclosures are heated, generally the dilated air goes out from the seats but can not return back when the device is colder. Because of the vacuum formed inside the enclosure, the gaskets are exposed to large pressure levels. In result, it is very difficult to open the covers for maintenance. Especially in "luminaires" it is obligatory to change the bulbs when the device is cold. The ventilation plugs in our system prevent these kind of limitations.
- Prevention of accidental water suction into the system. During the cooling period, we know that there is air circulation from the outside to the inside. Hence, if the enclosure is wet from rain or due to other reasons, some water may be sucked inside the enclosure if there is no ventilation plug.
- Prevention of exposure to hot, humid, compressed gases. There is always a level of humidity in the enclosure due to atmospheric conditions. Hence when the device is hot, all the components will be exposed to a hot, humid and compressed environment without the ventilation plug.

To conclude, the ventilation plug can reduce and even fully eliminate the adverse effects of humidity in the environment. Water drops on the bottom of the enclosure are normal, but the inherent damage becomes insignificant due to the existence of a ventilation plug.

Approved by	IBExU	
Examination Certificate Number	IBExU 10 ATEX 1169 U	
Date of Issue	12.11.2010	
Test Report Number	94/9/EG	
Safety Requirements	EN 60079-0:2009 EN 60079-7:2007 EN 60079-31:2009	
Equipment Marking	Ex II 2 GD Ex IID	Ex e IIC Gb Ex tb IIIC Db

Item	Item Description
1	O-ring
2	Body
3	Sealing washer
4	Membran
5	Sealing washer
6	Pressure washer
7	Cap

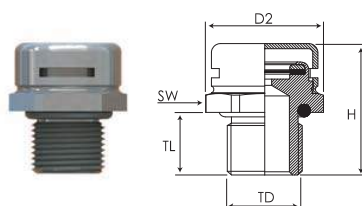


# Hydra Ex e Ventilation Plugs

Equipment	Gas Group	Dust Group
Suitable for use in	ZONE1/ZONE2	ZONE21/ZONE 22
	Group II	Group III
	Gas Group IIC	Dust Group IIIC
Type of Protection	Ex e ; Ex Ib	
For	Gas & Dust potentially explosive atmospheres	
Degree of Protection	IP66	
Marking	RST DAE... IBEU 10 ATEX 1169 U Ex II2D	
Seal	Chloroprene C	
Operating Temperature	-40°C / +100°C	Items 1-6
Material	Stainless Steel	Items 2-7
	Teflon Seal	Item 3-5
	Membran	Item 4
Thread Type	EN 60423 (Metric)	

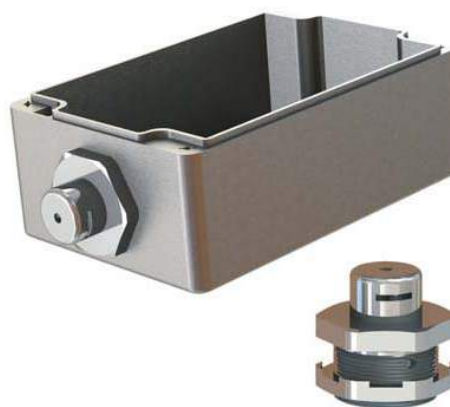
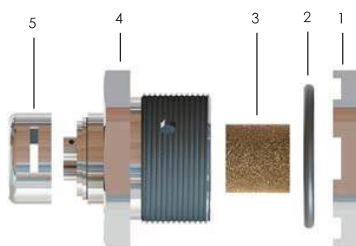
Order Encoding			
Type	Thread	Air Permeability	Code Examples
BBVP	M (Metric)	S-M-H-UH	MBBVP-01 SBBVP-01L HBBVP-01 UHBBVP-01L

Thread Type (TD)	Code	Dimensions (mm)				$\Delta P=1 \text{ Psi}=70 \text{ mBar}$ Average Air Permeability in l/hour				Water Intrusion pressure in Bar				Recomm. Hole Diam. (mm)
		TL	H	SW	D2	S	M	H	UH	S	M	H	UH	
M12x1.5	BBVP-01	6,0	15,2	17,0	18,8	16,0	25,0	120,0	300,0	0,9	0,5	0,2	0,1	12,5
M12x1.5	BBVP-01L	10,0	11,0	17,0	18,8	16,0	25,0	120,0	300,0	0,9	0,5	0,2	0,1	12,5



Approved by	IMQ	
Examination Certificate Number	IMQ 13 ATEX 030U	IECEX IMQ 14.0003U
Date of Issue	19.12.2013	06.05.2014
Test Report Number	43AN00019	
Safety Requirements	EN 60079-0:2012	IEC 60079-0:2011 Edition:6.0
	EN 60079-7:2007	IEC 60079-31:2008 Edition:1
	EN 60079-31:2009	IEC 60079-7:2006-07 Edition:4
Equipment Marking	Ex II 2 GD	Ex e IIC Gb
		Ex tb IIIC Db
		Ex e II C Gb
		Ex tb IIIC Db

Item	Item Description
1	Lock Nut
2	O-ring
3	Bronze bushing
4	Body
5	Cap



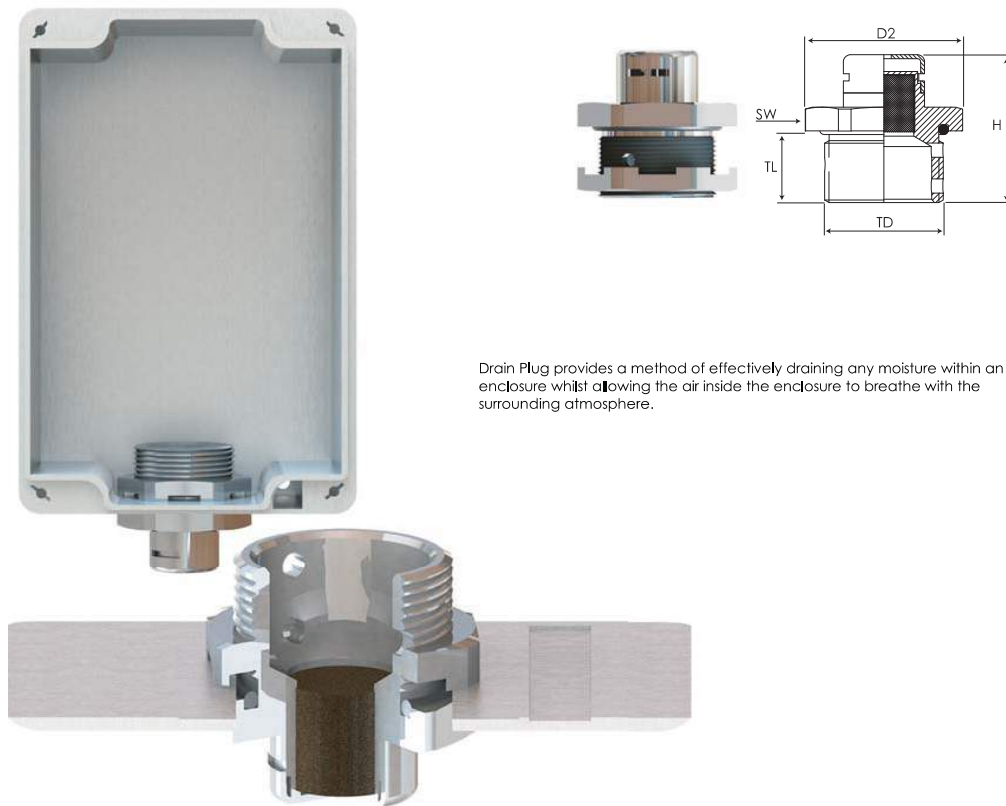


# Virgo Ex e Drain Plug

Equipment	Gas Group	Dust Group
Suitable for use in	ZONE1/ZONE2	ZONE21/ZONE 22
	Group II	Group III
	Gas Group IIC	Dust Group IIC
Type of Protection	Ex e ; Ex tb	
For	Gas & Dust potentially explosive atmospheres	
Degree of Protection	IP66 (EN 60529)	
Marking	BMD BDRV.. Ex CE 0722 II 2GD Ex e IIC Gb Ex tb IIIC Db Ta-40°C +100°C IP66/68 IMQ 13 ATEX 030/IECEx IMQ 14.0003U	
Seal Operating Temperature	Chloroprene C	-60°C / +85°C
Material	Bronze bushing	Item 2
	Brass/Brass Nickel Plated	Item 3
	Stainless Steel	Items 1-4-5
Thread Type	EN 60423 (Metric) ANSI ASME B1.20.1 (Npt)	

Order Encoding			
Type	Thread	Material	Code Examples
BDRV	M (Metric) N (Npt)	B (Brass) BN (Brass Nickel Plated) X (Stainless Steel)	BDRV-1MBN BDRV-2NX

Thread Type (TD)	Code	Dimensions			
		H min (mm)	TL min (mm)	SW (mm)	D2 (mm)
M20x1.5	BDRV-1M	16.0	15.0	25	27.5
M25x1.5	BDRV-2M	16.0	15.0	30	33.0
NPT 1/2"	BDRV-1N	16.0	15.0	25	27.5
NPT 3/4"	BDRV-2N	16.0	15.0	30	33.0



Drain Plug provides a method of effectively draining any moisture within an enclosure whilst allowing the air inside the enclosure to breathe with the surrounding atmosphere.

# Accessories for Mining, Gas & Dust applications



A locknut, also known as a lock nut, locking nut, prevailing torque nut, is a nut that resists loosening under vibrations and torque. Elastic stop nuts and prevailing torque nuts are of the particular type where some portion of the nut deforms elastically to provide a locking action.

Cable Gland seals perform two functions: Prevents the products of an explosion reaching the outside atmosphere if an explosion occurs inside the enclosure. Stops water and dust ingress into the equipment and Cable Gland.

Shrouds are commonly specified and used on glands outdoors as an aid to weather proofing. However, they may in fact have the opposite effect, by acting as moisture or water traps.

Earth Tags are used between Cable gland entry and equipment to provide earth bound connection. Earth Tag produces earth bound connection for electricity continuation.



Cranes  
Motors  
Heaters  
Thermostat  
Heat dedectors  
Flame dedectors

Smoke dedectors  
Alarm Indicators  
motor starters  
loudspeakers  
alarm bell  
sounders / horns

control and distribution units,  
panels and boards  
beacons / strobes  
status lamps  
control stations  
junction and terminal boxes

variable-frequency on motors  
Lighting Fixtures  
Motor Starters  
Enclosures for control units and  
junction boxes (Power & Lighting)  
Lighting

manual call points  
doorholder magnets  
Electrical, digital compact volume  
flow controller  
Electric linear valve actuators  
Modulating electric

digital sensors for temperature,  
humidity, pressure and differential  
pressure  
Modulating transducer  
Binary switching module



**EARTH TAGS  
BMET-BNET**

Brass and  
Nickel Plated



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**SHROUDS  
BMSH**

Pvc



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**LOCK NUTS  
BML-BMBL**

Polyamide  
Brass and  
Nickel Plated



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**GASKETS  
BMSW**

Nbr  
Chloroprene  
Silicone



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**WASHERS  
BMSW**

Polyamide 6  
Red Fibre



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**WASHERS  
BMTW**

Stainless Steel  
Brass Nickel  
Plated



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**FLAT SEALS  
FxA...**

Nbr  
Chloroprene  
Silicone



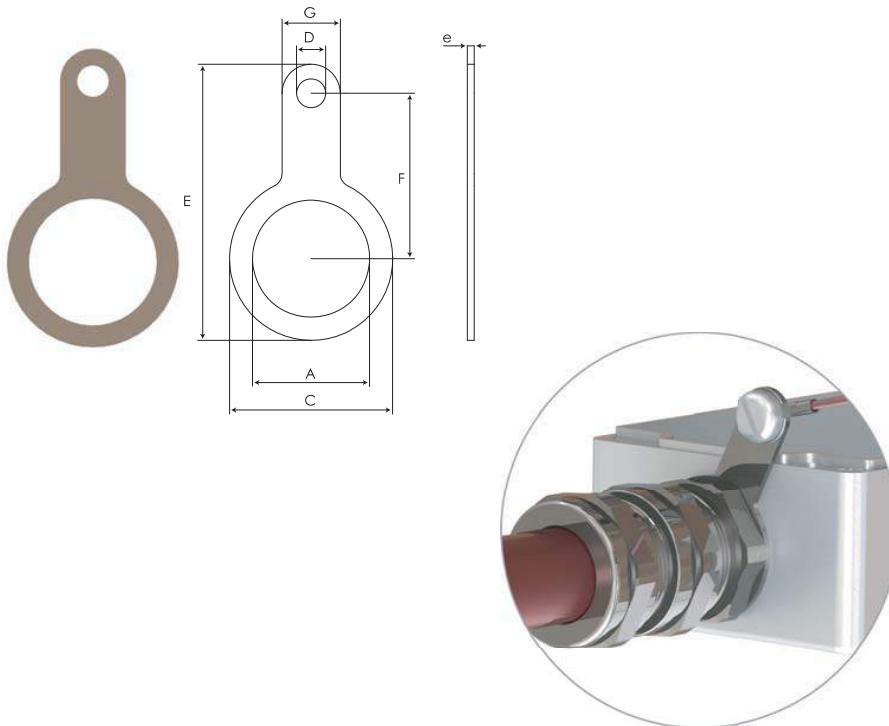
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Material	Brass or Nickel plated
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Size Selection Table												
Thread Type	Sizes & Code Nr.											
METRIC EN 60423 (M)	12	16	20	25	32	40	50	63	75	80	90	110
	02	01	1	2	3	4	5	6	7	8	9	10
NPT ANSI B1.20.1 (N)	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2				
	02	01	1	2	3	4	5	6				

Order Encoding			
Type	Material	Gland Type	Code Examples
BMET	B (Brass)	BA (Dorado)	BMET01BA
BNET	BN (Brass Nickel Plated)	KBA (Orion)	BNET1KBA
		BU (Octans)	BMET2BU

Type	Code	Dimensions						
	Un plated	AØ (mm)	e (mm)	CØ (mm)	DØ (mm)	E (mm)	F (mm)	G (mm)
M12	BMET02	12,20	1,5	22,0	6,2	46,00	30,0	12,0
M16	BMET01	16,20	1,5	25,0	6,2	48,75	30,0	12,5
M20	BMET1	20,20	1,5	28,6	6,2	53,55	33,0	12,5
M25	BMET2	25,20	1,5	34,0	6,2	59,50	36,0	13,0
M32	BMET3	32,20	1,5	42,0	12,2	73,00	41,0	22,0
M40	BMET4	40,20	1,5	54,0	14,2	86,50	46,5	26,0
M50	BMET5	50,20	1,5	67,0	14,2	111,50	63,5	29,0
M63	BMET6	63,20	1,5	77,0	14,2	125,50	72,5	29,0
M75	BMET7	75,20	1,5	89,0	14,2	137,50	77,0	32,0
M80	BMET8	80,20	1,5	100,0	14,2	158,0	91,5	32,0
M90	BMET9	90,20	1,5	109,5	14,2	167,00	94,5	35,5
M110	BMET10	110,20	1,5	138,0	14,2	214,00	125,0	40,0
NPT 1/4"	BNET02	13,50	1,5	22,0	6,2	46,00	30,0	12,0
NPT 3/8"	BNET01	17,35	1,5	25,0	6,2	48,75	30,0	12,5
NPT 1/2"	BNET1	21,70	1,5	28,6	6,2	53,55	33,0	12,5
NPT 3/4"	BNET2	26,90	1,5	34,0	6,2	59,50	36,0	13,0
NPT 1"	BNET3	33,60	1,5	42,0	12,2	73,00	41,0	22,0
NPT 1 1/4"	BNET 4	42,35	1,5	54,0	14,2	86,50	46,5	26,0
NPT 1 1/2"	BNET5	48,50	1,5	67,0	14,2	111,50	63,5	29,0
NPT 2"	BNET6	60,50	1,5	77,0	14,2	125,50	72,5	29,0

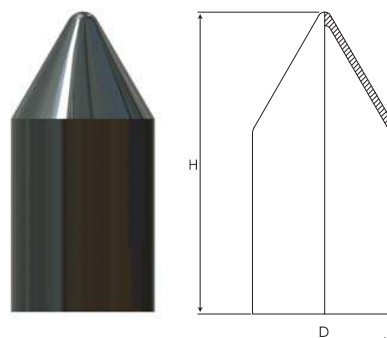


Material	Pvc
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Size Selection Table										
Thread Type	Sizes & Code Nr.									
METRIC	16	20	25	32	40	50	63	75	90	110
EN 60423 (M)	01	1	2	3	4	5	6	7	8	10

Order Encoding			
Type	Size	Gland Type	Code Examples
BMSH	M16	BA (Dorado) KBA (Orion) BU (Octans)	
BMSH	01	BA	BMSH01BA

BA (Dorado)			KBA (Orion)			BU (Octans)		
Code	Dimensions		Code	Dimensions		Code	Dimensions	
	Ø D mm	H mm		Ø D mm	H mm		Ø D mm	H mm
BMSH01BA	25,0	87,4	BMSH01KBA (3,0-8,5)	29,1	67,0	BMSH01BU (3,0-12,0)	24,5	56,1
BMSH1BA	27,5	99,7	BMSH01KBA (6,0-12,0)	31,7	68,0	BMSH1BU (3,0-12,0)	24,5	56,1
BMSH2BA	43,5	115,6	BMSH1KBA (3,0-8,5)	29,1	67,0	BMSH1BU (10,0-18,0)	31,0	67,5
BMSH3BA	54,5	146,0	BMSH1KBA (6,0-12,0)	31,7	68,0	BMSH2BU (10,0-18,0)	31,0	67,5
BMSH4BA	64,5	161,0	BMSH1KBA (8,5-14,5)	35,2	76,6	BMSH2BU (14,0-24,0)	39,0	72,6
BMSH5BA	69,6	160,9	BMSH2KBA (6,0-12,0)	31,7	68,0	BMSH3BU (14,0-24,0)	39,0	72,6
BMSH6BA	84,5	195,7	BMSH2KBA (8,5-16,0)	37,2	78,6	BMSH3BU (22,0-32,0)	49,5	91,7
BMSH7BA	105,2	220,5	BMSH2KBA (12,0-20,0)	44,2	81,6	BMSH4BU (22,0-32,0)	49,5	91,7
			BMSH3KBA (12,0-20,0)	44,2	81,6	BMSH4BU (26,0-34,0)	56,1	88,0
			BMSH3KBA (15,0-26,0)	57,2	112,0	BMSH5BU (26,0-35,0)	61,0	88,0
			BMSH4KBA (15,0-26,0)	57,2	112,0	BMSH5BU (35,0-44,0)	70,1	93,9
			BMSH4KBA (20,0-32,0)	66,2	117,1	BMSH6BU (35,0-45,0)	74,9	95,5
			BMSH5KBA (22,0-35,0)	82,2	132,6	BMSH6BU (46,0-56,0)	89,0	100,8
			BMSH5KBA (27,0-41,0)	83,2	132,6	BMSH7BU (46,0-62,0)	89,0	100,8
			BMSH6KBA (35,0-45,0)	89,7	148,0			
			BMSH6KBA (40,0-52,0)	94,2	143,8			
			BMSH7KBA (40,0-52,0)	94,2	143,8			
			BMSH8KBA (45,0-60,0)	110,6	182,7			



Material	Polyamide 6 Brass or Nickel plated Stainless Steel
Operating Temperature	-20 °C up to +100 °C

Size Selection Table										
Thread Type	Sizes & Code Nr.									
METRIC	16	20	25	32	40	50	63	75	90	110
EN 60423 (M)	01	1	2	3	4	5	6	7	8	10

Metal Nuts Order Encoding			
Type	Size	Material	Code Examples
BMBL	M16	(B) Brass (BN) Brass Nickel Plated (S) Stainless Steel	
BMBL-X	01	B BN S	

Thread Type	Polyamide				Metal			
	Code	H (mm)	Dimensions		Code	H (mm)	Dimensions	
			SW (mm)	D (mm)			SW (mm)	D (mm)
M12x1,5	BML-X02	5	18	19,5	BMBL-X02	2,8	15	16,6
M16x1,5	BML-X01	5	22	24,2	BMBL-X01	3,0	19	21,0
M20x1,5	BML-X1	6	26	28,6	BMBL-X1	3,5	24	26,5
M25x1,5	BML-X2	6	32	35,0	BMBL-X2	4,0	30	33,0
M32x1,5	BML-X3	7	41	46,1	BMBL-X3	5,0	36	39,5
M40x1,5	BML-X4	7	50	55,3	BMBL-X4	5,0	46	51,0
M50x1,5	BML-X5	8	60	66,1	BMBL-X5	5,0	60	66,0
M63x1,5	BML-X6	8	75	82,5	BMBL-X6	6,0	70	77,0
M75x1,5					BMBL-X7	7,0	80	89,0
M90x1,5					BMBL-X8	8,0	100	112,0
M110x1,5					BMBL-X10	10,0	120	135,0

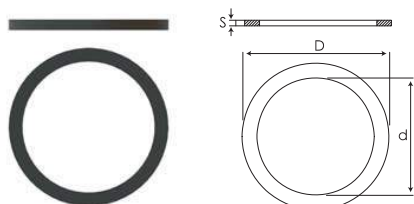


Material	Nbr -30°C / +120°C Chloroprene -40°C / +100°C Silicone -60°C / +180°C
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Size Selection Table											
Thread Type	Sizes & Code Nr.										
METRIC	12	16	20	25	32	40	50	63	75	90	110
EN 60423 (M)	21	22	23	24	25	26	27	28	29	30	31

Order Encoding			
Type	Size	Material	Code Examples
BMSW	M12	(N) Nbr (C) Chloroprene (S) Silicone	
BMSW	21	N C S	

Size	Code	Dimensions		
		S (mm)	D (mm)	d (mm)
M12	BMSW-21	1,5	15,5	10,3
M16	BMSW-22	1,5	21,5	15,5
M20	BMSW-23	1,5	26,0	18,5
M25	BMSW-24	1,5	31,5	23,3
M32	BMSW-25	1,5	38,5	30,5
M40	BMSW-26	1,5	48,5	38,5
M50	BMSW-27	1,5	58,0	48,0
M63	BMSW-28	1,5	70,0	61,2
M75	BMSW-29	1,5	86,0	74,5
M90	BMSW-30	1,5	102,0	89,5
M110	BMSW-31	1,5	123,0	109,5

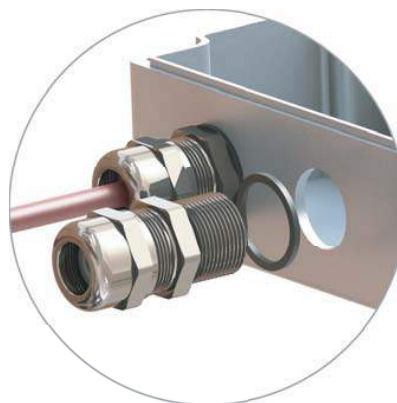


**Nitrile rubber (NBR)**, also called nitrile-butadiene rubber, an oil-resistant synthetic rubber produced from a copolymer of acrylonitrile and butadiene. Its main applications are in fuel hoses, gaskets, rollers, and other products in which oil resistance is required.

In the production of NBR, acrylonitrile ( $\text{CH}_2=\text{CHCN}$ ) and butadiene ( $\text{CH}_2=\text{CH}-\text{CH}=\text{CH}_2$ ) are emulsified in water and then polymerized (their single-unit molecules linked into large, multiple-unit molecules) through the action of free-radical initiators. The amount of acrylonitrile present in the final copolymer varies from 15 to 50 percent. With increasing acrylonitrile content the rubber shows higher strength, greater resistance to swelling by hydrocarbon oils, and lower permeability to gases. At the same time, however, the rubber becomes less flexible at lower temperatures, owing to the higher glass transition temperature of polyacrylonitrile (i.e., the temperature below which the molecules are locked into a rigid, glassy state).

**Chloroprene** is the common name for the organic compound 2-chlorobut-1,3-diene, which has the formula  $\text{CH}_2=\text{CCl}-\text{CH}=\text{CH}_2$ . This colorless liquid is the monomer for the production of the polymer polychloroprene, a type of synthetic rubber.

**Silicone rubber** is an elastomer (rubber-like material) composed of silicone— itself a polymer—containing silicon together with carbon, hydrogen, and oxygen. Silicone rubbers are widely used in industry, and there are multiple formulations. Silicone rubbers are often one- or two-part polymers, and may contain fillers to improve properties or reduce cost. Silicone rubber is generally non-reactive, stable, and resistant to extreme environments and temperatures from  $-55^\circ\text{C}$  to  $+300^\circ\text{C}$  while still maintaining its useful properties. Due to these properties and its ease of manufacturing and shaping, silicone rubber can be found in a wide variety of products, including: automotive applications; cooking, baking, and food storage products; apparel such as undergarments, sportswear, and footwear; electronics; medical devices and implants; and in home repair and hardware with products such as silicone sealants.

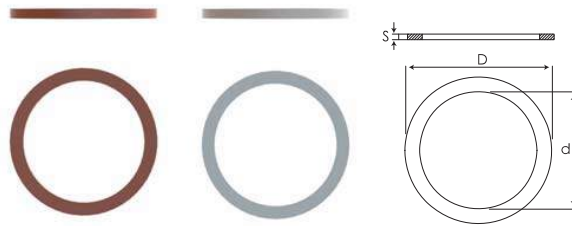


Material	(PA) Polyamide 6 (FB) Fibre
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Size Selection Table									
Thread Type	Sizes & Code Nr.								
METRIC	20	25	32	40	50	63	75	90	110
EN 60423 (M)	03	04	05	06	07	08	09	10	11

Order Encoding			
Type	Size	Material	Code Examples
BMSW	M20	(PA) Polyamide (FB) Fibre	
BMSW	03	PA FB	BMSW-03PA BMSW-03FB

Size	Code	Dimensions		
		S (mm)	D (mm)	d (mm)
M20	BMSW-03	1,5	23,8	19,7
M25	BMSW-04	1,5	32,2	24,7
M32	BMSW-05	1,5	39,6	31,7
M40	BMSW-06	1,5	49,6	39,7
M50	BMSW-07	1,5	62,0	49,7
M63	BMSW-08	1,5	78,4	62,7
M75	BMSW-09	1,5	93,4	74,7
M90	BMSW-10	1,5	112,0	89,7
M110	BMSW-11	1,5	124,6	99,7



Nylon 6 fibres are tough, possessing high tensile strength, as well as elasticity and lustre. They are wrinkle-proof and highly resistant to abrasion and chemicals such as acids and alkalis. The fibres can absorb up to 2.4% of water, although this lowers tensile strength.

Fibre is a laminated plastic composed of only cellulose. The material is a tough, resilient, hornlike material that is lighter than aluminium, tougher than leather, and stiffer than most thermoplastics.

Fibre is a homogeneous nearly 100% cellulose mass free from any artificial glues, resins, or binders. The finished vulcanized fibre has useful mechanical and electrical properties. It offers high tear and tensile strength, while in the thinner thicknesses allowing flexibility to conform to curves and bends. In thicker thicknesses, it can be moulded to shape with steam and pressure. One application for vulcanized fibre that attests to its physical strength is that it is the preferred material for heavy sanding discs. The electrical properties exhibited by vulcanized fibre are high insulating value, and arc and track resistance with service temperature of up to 110°C to 120°C. Vulcanized fibre shows high resistance to penetration by most organic solvents, oils, and petroleum derivatives.





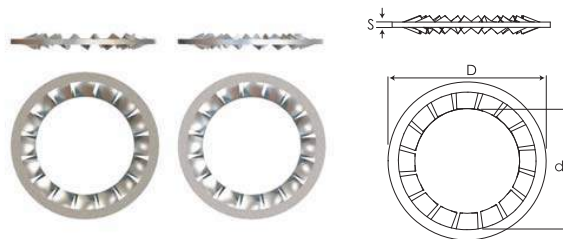
# Washer Serrated

Material	Stainless Steel Brass Nickel Plated
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Size Selection Table											
Thread Type	Sizes & Code Nr.										
METRIC	12	16	20	25	32	40	50	63	75	90	110
EN 60423 (M)	01	02	03	04	05	06	07	08	09	10	11
NPT	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
ANSI B1.20.1 (N)	01	02	03	04	05	06	07	08	09	10	11

Order Encoding			
Type	Size	Material	Code Examples
BMTW	M20	(X) Stainless Steel (BN) Brass Nickel Plated	
BNTW	03	X BN	

Size	Code	Dimensions			
		S (mm)	D (mm)	d (mm)	
M12	NPT 1/4"	BMTW-01	1,5	18,0	12,2
M16	NPT 3/8"	BMTW-02	1,5	24,0	16,2
M20	NPT 1/2"	BMTW-03	1,5	30,0	20,2
M25	NPT 3/4"	BMTW-04	1,5	38,0	25,3
M32	NPT 1"	BMTW-05	1,5	48,0	32,3
M40	NPT 1 1/4"	BMTW-06	1,5	60,0	40,3
M50	NPT 1 1/2"	BMTW-07	1,5	75,0	50,3
M63	NPT 2"	BMTW-08	1,5	95,0	63,4
M75	NPT 2 1/2"	BMTW-09	2,0	112,0	75,4
M90	NPT 3"	BMTW-10	2,0	135,0	90,4
M110	NPT 4"	BMTW-11	2,5	154,0	110,4

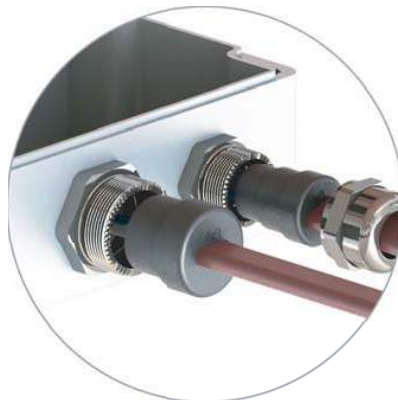
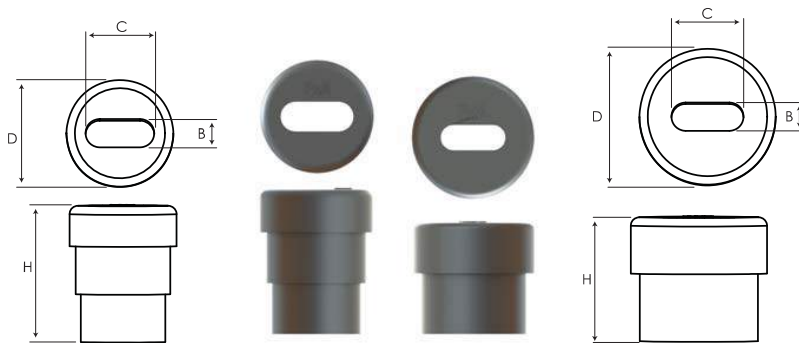


Type Sealing Bushing	BU - BM
Material & Operating Temperature	Nbr -30°C / +120°C Chloroprene -40°C / +100°C Silicone -60°C / +180°C

Thread Type	Sizes & Code Nr.	
METRIC	20	25
	01	02
NPT	1/2	3/4
ANSI B1.20.1 (N)	01	02

Type	Cable Size (BxC)	Gland Type	Material	Code Examples
BMFx	A	01 (M 20)	N (Nbr)	BMFx-A01N
BMFx	B	01 (NPT 1/2")	C (Chloroprene)	BMFx-B01C
BMFx	C	02 (M 25)	S (Silicone)	BMFx-C02S
BMFx	D	02 (NPT 3/4")		BMFx-D02N

Type	Code	Cable Dimensions A		Seal Dimensions	
		B (mm)	C (mm)	D mm	H mm
M 20	NPT 1/2"	5,0	12,2	19,0	24,2
M 20	NPT 1/2"	6,0	8,5	19,0	24,2
M 20	NPT 1/2"	5,5	11,7	19,0	24,2
M 20	NPT 1/2"	6,0	12,2	19,0	24,2
M 25	NPT 3/4"	5,0	12,8	24,2	22,0
M 25	NPT 3/4"	6,0	8,5	24,2	22,0
M 25	NPT 3/4"	5,5	11,7	24,2	22,0
M 25	NPT 3/4"	6,0	14,0	24,2	22,0





## Electrical equipment in hazardous areas

In electrical engineering, a hazardous location is defined as a place where concentrations of flammable gases, vapors, or dusts occur. Electrical equipment that must be installed in such locations is especially designed and tested to ensure it does not initiate an explosion, due to arcing contacts or high surface temperature of equipment.

For example a household light switch may emit a small, harmless visible spark when switching; in an ordinary atmosphere this arc is of no concern, but if a flammable vapor is present, the arc might start an explosion. Electrical equipment intended for use in a chemical factory or refinery is designed either to contain any explosion within the device, or is designed not to produce sparks with sufficient energy to trigger an explosion.

Many strategies exist for safety in electrical installations. The simplest strategy is to minimize the amount of electrical equipment installed in a hazardous area, either by keeping the equipment out of the area altogether or by making the area less hazardous by process improvements or ventilation with clean air. Intrinsic safety, or non-incendive equipment and wiring methods, is a set of practices for apparatus designed with low power levels and low stored energy. Insufficient energy is available to produce an arc that can ignite the surrounding explosive mixture. Equipment enclosures can be pressurized with clean air or inert gas and designed with various controls to remove power or provide notification in case of supply or pressure loss of such gases. Arc-producing elements of the equipment can also be isolated from the surrounding atmosphere by encapsulation, immersion in oil, sand, etc. Heat producing elements such as motor winding, electrical heaters, including heat tracing and lighting fixtures are often designed to limit their maximum temperature below the autoignition temperature of the material involved. Both external and internal temperatures are taken into consideration.

As in most fields of electrical installation, different countries have approached the standardization and testing of equipment for hazardous areas in different ways. As world trade becomes more important in distribution of electrical products, international standards are slowly converging so that a wider range of acceptable techniques can be approved by national regulatory agencies.

Area classification is required by governmental bodies, for example by the U.S. Occupational Safety and Health Administration and compliance is enforced.

Documentation requirements are varied. Often an area classification plan-view is provided to identify equipment ratings and installation techniques to be used for each classified plant area. The plan may contain the list of chemicals with their group and temperature rating, and elevation details shaded to indicate Class, Division (Zone) and group combination. The area classification process would require the participation of operations, maintenance, safety, electrical and instrumentation professionals, the use of process diagrams and material flows, material safety data sheet and any pertinent documents, information and knowledge to determine the hazards and their extent and the countermeasures to be employed. Area classification documentations are reviewed and updated to reflect process changes.

### History

Soon after the introduction of electric power into coal mines, it was discovered that lethal explosions could be initiated by electrical equipment such as lighting, signals, or motors. The hazard of fire damp or methane accumulation in mines was well known by the time electricity was introduced, along with the danger of suspended coal dust. At least two British mine explosions were attributed to an electric bell signal system. In this system, two bare wires were run along the length of a drift, and any miner desiring to signal the surface would momentarily touch the wires to each other or bridge the wires with a metal tool. The inductance of the signal bell coils, combined with breaking of contacts by exposed metal surfaces, resulted in sparks which could ignite methane, causing an explosion.

ABBREVIATIONS	
OFF-SHORE	Marine application Harsh Environment
SWA	Steel wire armored
AWA	Aluminium wire armored
SWB	Steel wire braid
PWA	Pliable wire armored
STA	Steel tape armored

	FUNCTION DESCRIPTION			
	Sealing of the cable	Screen-Armor of the cable	Traction Relief	Double Sealing cable and jacket
1 Function	X			
2 Function	X	X		
3 Function	X	X	X	
4 Function	X	X	X	X

### Gas divisions or zones

In an industrial plant such as a refinery or chemical process plant, handling of large quantities of flammable liquids and gases creates a risk of leaks. In some cases the gas, ignitable vapor or dust is present all the time or for long periods. Other areas would have a dangerous concentration of flammable substances only during process upsets, equipment deterioration between maintenance periods, or during an incident. Refineries and chemical plants are then divided into areas of risk of release of gas, vapor or dust known as divisions or zones. The process of determining the type and size of these hazardous areas is called area classification. Guidance on assessing the extent of the hazard is given in the NFPA 497 Standard, or API 500 and according to their adaptation by other areas gas zones is given in the current edition of IEC 60079-10. For hazardous dusts, the guiding standard is IEC 61421-10.

Typical gas hazards are from hydrocarbon compounds, but hydrogen and ammonia are common industrial gases that are flammable.

### Non-Hazardous Area

An area such as a residence or office would be classed as Non Hazardous (safe area), where the only risk of a release of explosive or flammable gas would be such things as the propellant in an aerosol spray. The only explosive or flammable liquid would be paint and brush cleaner. These are classed as very low risk of causing an explosion and are more of a fire risk (although gas explosions in residential buildings do occur). Non hazardous areas on chemical and other plant are present where the hazardous gas is diluted to a concentration below 25% of its lower flammability limit (or lower explosive limit (LEL)).

### Division 2 or Zone 2 area

This is a step up from the safe area. In this zone the gas, vapor or mist would only be present under abnormal conditions (most often leaks under abnormal conditions). As a general guide for Zone 2, unwanted substances should only be present under 10 hours/year or 0-0.1% of the time.

### Division 1 or Zone 1 area

Gas, vapor or mist will be present or expected to be present for long periods of time under normal operating conditions. As a guide for Zone 1, this can be defined as 10-1000 hours/year or 0.1-10% of the time.

### Zone 0 area

Gas or vapor is present all of the time. An example of this would be the vapor space above the liquid in the top of a tank or drum. The ANSI/NEC classification method consider this environment a Division 1 area. As a guide for Zone 0, this can be defined as over 1000 hours/year or >10% of the time.

### Dust zones

Flammable dusts when suspended in air can explode. An old system of area classification to a British standard used a system of letters to designate the zones. This has been replaced by a European numerical system, as set out in directive 1999/92/EU implemented in the UK as the Dangerous Substances and Explosives Atmospheres Regulations 2002.

The boundaries and extent of these three dimensional zones should be decided by a competent person. There must be a site plan drawn up of the factory with the zones marked on.

The zone definitions are:

#### Zone 20

A place in which an explosive atmosphere in the form of a cloud of combustible dust in air is present continuously, or for long periods or frequently.

#### Zone 21

A place in which an explosive atmosphere in the form of a cloud of combustible dust in air is likely to occur, occasionally, in normal operation.

#### Zone 22

A place in which an explosive atmosphere in the form of a cloud of combustible dust in air is not likely to occur in normal operation but, if it does occur, will persist for a short period only.

### Gas groups

Explosive gases, vapors and dusts have different chemical properties that affect the likelihood and severity of an explosion. Such properties include flame temperature, minimum ignition energy, upper and lower explosive limits, and molecular weight. Empirical testing is done to determine parameters such as the maximum experimental safe gap, minimum ignition current, explosion pressure and time to peak pressure, spontaneous ignition temperature, and maximum rate of pressure rise. Every substance has a differing combination of properties but it is found that they can be ranked into similar ranges, simplifying the selection of equipment for hazardous areas.

Flammability of combustible liquids are defined by their flash-point. The flash-point is the temperature at which the material will generate sufficient quantity of vapor to form an ignitable mixture. The flash point determines if an area needs to be classified. A material may have a relatively low autoignition temperature yet if its flash-point is above the ambient temperature, then the area may not need to be classified. Conversely if the same material is heated and handled above its flash-point, the area must be classified.

Each chemical gas or vapour used in industry is classified into a gas group.

Group	Representative Gases
I	All Underground Coal Mining, Firedamp (methane)
IIA	Industrial methane, propane, petrol and the majority of industrial
IIB	Ethylene, coke oven gas and other industrial gases
IIC	Hydrogen, acetylene, carbon disulphide

Apparatus marked IIB can also be used for IIA gases, IIC marked equipment can be used for both IIA and IIB. If a piece of equipment has just II and no A, B, or C after then it is suitable for any gas group.

A list must be drawn up of every chemical gas or vapor that is on the refinery/chemical complex and included in the site plan of the classified areas. The above groups are formed in order of how volatile the gas or vapor would be if it was ignited, IIC being the most volatile and IIA being the least. The groups also indicate how much energy is required to ignite the gas by spark ignition, Group IIA requiring the most energy and IIC the least.

### Equipment protection level

In recent years also the Equipment Protection Level (EPL) is specified for several kinds of protection. The required Protection level is linked to the intended use in the zones described below:

Group	Ex risk	Zone	EPL	Minimum type of protection
I (mines)	energized		Ma	
I (mines)	de-energized in presence of Ex atmosphere		Mb	
II (gas)	explosive atmosphere > 1000 hrs/yr	0	Ga	ia, ma
II (gas)	explosive atmosphere between 10 and 1000 hrs/yr	1	Gb	ib, mb, px, py, e, o, q, s
II (gas)	explosive atmosphere between 1 and 10 hrs/yr	2	Gc	n, ic, pz
III (dust)	explosive surface > 1000 hrs/yr	20	Da	
III (dust)	explosive surface between 10 and 1000 hrs/yr	21	Db	
III (dust)	explosive surface between 1 and 10 hrs/yr	22	Dc	

### Temperature classification

Another important consideration is the temperature classification of the electrical equipment. The surface temperature or any parts of the electrical equipment that may be exposed to the hazardous atmosphere should be tested that it does not exceed 80% of the auto-ignition temperature of the specific gas or vapor in the area where the equipment is intended to be used.

The temperature classification on the electrical equipment label will be one of the following (in degree Celsius):

USA °C		UK °C	Germany °C
			Continuous - Short Time
T1 - 450	T3A - 180	T1 - 450	G1: 360 - 400
T2 - 300	T3B - 165	T2 - 300	G2: 240 - 270
T2A - 280	T3C - 160	T3 - 200	G3: 160 - 180
T2B - 260	T4 - 135	T4 - 135	G4: 110 - 125
T2C - 230	T4A - 120	T5 - 100	G5: 80 - 90
T2D - 215	T5 - 100	T6 - 85	
T3 - 200	T6 - 85		

The above table tells us that the surface temperature of a piece of electrical equipment with a temperature classification of T3 will not rise above 200 °C.

### Auto-ignition temperatures

The auto-ignition temperature of a liquid, gas or vapor is the temperature at which the substance will ignite without any external heat source. The exact temperature value determined depends on the laboratory test conditions and apparatus. Such temperatures for common substances are:

Gas	Temperature
Methane	580 °C
Hydrogen	560 °C
Propane	493 °C
Ethylene	425 °C
Acetylene	305 °C
Naphtha	290 °C
Carbon disulfide	102 °C

The surface of a high pressure steam pipe may be above the autoignition temperature of some fuel/air mixtures.

### Auto-ignition temperatures (dust)

The auto-ignition temperature of a dust is usually higher than that of vapours & gases. Examples for common materials are:

Substance	Temperature
Sugar	460 °C
Wood	340 °C
Flour	340 °C
Grain dust	300 °C
Tea	300 °C

### Type of protection

To ensure safety in a given situation, equipment is placed into protection level categories according to manufacture method and suitability for different situations. Category 1 is the highest safety level and Category 3 the lowest. Although there are many types of protection, a few are detailed.

	Ex Code	Description	Standard	Location	Use
Flameproof	d	Equipment construction is such that it can withstand an internal explosion and provide relief of the external pressure via flamegap(s) such as the labyrinth created by threaded fittings or machined flanges. The escaping (hot) gases must sufficiently cool down along the escape path that by the time they reach the outside of the enclosure not to be a source of ignition of the outside, potentially ignitable surroundings. Equipment has flameproof gaps (max 0.006" propane/ethylene, 0.004" acetylene/hydrogen)	IEC/EN 60079-1	Zone 1 if gas group & temp. class correct	Motors, lighting, junction boxes, electronics, compressor and pumps
Increased Safety	e	Equipment is very robust and components are made to a high quality	IEC/EN 60079-7	Zone 2 or Zone 1	Motors, lighting, junction boxes
Oil Filled	o	Equipment components are completely submerged in oil	IEC/EN 60079-6	Zone 2 or Zone 1	Heavy current equipment
Sand/Powder/Quartz Filled	q	Equipment components are completely covered with a layer of Sand, powder or quartz	IEC/EN 60079-5	Zone 2 or Zone 1	Electronics, telephones, chokes
Encapsulated	m	Equipment components of the equipment are usually encased in a resin type material	IEC/EN 60079-18	Zone 1 (Ex mb) or Zone 0 (Ex ma)	Electronics (no heat)
Pressurised/purged	p	Equipment is pressurised to a positive pressure relative to the surrounding atmosphere with air or an inert gas, thus the surrounding ignitable atmosphere can not come in contact with energized parts of the apparatus. The overpressure is monitored, maintained and controlled.	IEC/EN 60079-2	Zone 1 (px or py), or zone 2 (pz)	Analysers, motors, control boxes, computers
Intrinsically safe	i	Any arcs or sparks in this equipment has insufficient energy (heat) to ignite a vapour. Equipment can be installed in ANY housing provided to IP54. A 'Zener Barrier' or 'opto iso' or 'galvanic' unit may be used to assist with certification. A special standard for instrumentation is IEC/EN 60079-27, describing requirements for Fieldbus Intrinsically Safe Concept (FISCO) (zone 0, 1 or 2)	IEC/EN 60079-25 IEC/EN 60079-11 IEC/EN60079-27	'ia': Zone 0 & 'ib': Zone 1 'ic': zone 2	Instrumentation, measurement, control
Non Incendive	n	Equipment is non-incendive or non-sparking. A special standard for instrumentation is IEC/EN 60079-27, describing requirements for Fieldbus Non-Incendive Concept (FNICO) (zone 2)	IEC/EN 60079-15 IEC/EN 60079-27	Zone 2	Motors, lighting, junction boxes, electronic equipment
Special Protection	s	This method, being by definition special, has no specific rules. In effect it is any method which can be shown to have the required degree of safety in use. Much early equipment having Ex s protection was designed with encapsulation and this has now been incorporated into IEC 60079-18 [Ex m]. Ex s is a coding referenced in IEC 60079-0. The use of EPL and ATEX Category directly is an alternative for "s" marking. The IEC standard EN 60079-33 is made public and is expected to become effective soon, so that the normal Ex certification will also be possible for Ex-s	IEC/EN 60079-33	Zone depending upon Manufacturers Certification.	As its certification states

The types of protection are subdivided into several sub classes, linked to EPL: ma and mb, px, py and pz, ia, ib and ic. The a subdivisions have the most stringent safety requirements, taking into account more the one independent component faults simultaneously.

**Multiple protection**

Many items of EEx rated equipment will employ more than one method of protection in different components of the apparatus. These would be then labeled with each of the individual methods. For example a socket outlet labeled EEx'de' might have a case made to EEx'e' and switches that are made to EEx'd'.

**ANSI/NFPA areas description**

Class I, Div. 1 - Where ignitable concentrations of flammable gases, vapors or liquids are present continuously or frequently within the atmosphere under normal operation conditions.  
 Class I, Div. 2 - Where ignitable concentrations of flammable gases, vapors, or liquids are present within the atmosphere under abnormal operating conditions.  
 Class II, Div. 1 - Where ignitable concentrations of combustible dusts are present within the atmosphere under normal operation conditions.  
 Class II, Div. 2 - Where ignitable concentrations of combustible dust are present within the atmosphere under abnormal operating conditions.  
 Class III, Div. 1 - Where easily ignitable fibers or materials producing combustible flyings are present within the atmosphere under normal operation conditions.  
 Class III, Div. 2 - Where easily ignitable fibers or materials producing combustible flyings are present within the atmosphere under abnormal operating conditions.  
 Common Materials within Associated Class & Group Ratings, such as "Class I, Division 1, Group A":  
 Class I Areas: Group A: Acetylene / Group B: Hydrogen / Group C: Propane and Ethylene / Group D: Benzene, Butane, Methane & Propane  
 Class II Areas: Group E: Metal Dust / Group F: Carbon & Charcoal / Group G: Flour, Starch, Wood & Plastic  
 Class III Areas: NO GROUP: Cotton & Sawdust  
 For more information see Article 500 of NFPA 70 - The National Electric Code, as published by the National Fire Protection Association.

**Equipment category**

The equipment category indicates the level of protection offered by the equipment. Category 1 equipment may be used in zone 0, zone 1 or zone 2 areas. Category 2 equipment may be used in zone 1 or zone 2 areas. Category 3 equipment may only be used in zone 2 areas.

**Labeling**

All equipment certified for use in hazardous areas must be labelled to show the type and level of protection applied.

**Europe**

In Europe the label must show the CE mark and the code number of the certifying body. The CE marking is complemented with the Ex mark, followed by the indication of the Group, Category and, if group II equipment, the indication relating to gases (G) or dust (D). For example: Ex II 1 G (Explosion protected, Group 2, Category 1, Gas) Specific type or types of protection being used will be marked.

EEx ia IIC T4. (Type ia, Group 2C gases, Temperature category 4).

EEx nA II T3 X (Type n, non-sparking, Group 2 gases, Temperature category 3, special conditions apply).

In the United Kingdom, industrial electrical equipment for hazardous area has to conform to appropriate parts of standard BS EN 60079 and in some cases, certified as meeting that standard. Independent test houses (known as Notified Bodies) are established in most European countries, and a certificate from any of these will be accepted across the EU. The DTI appoint and maintain a list of Notified Bodies within the UK, of which Sira and Baseefa are the most well known.

**North America**

In North America the suitability of equipment for the specific hazardous area must be tested by a Nationally Recognized Testing Laboratory. Such institutes are UL, MET, FM, CSA or Intertek (ETL), for example.

The label will always list the Class(es), Division(s) and may list the Group(s) and temperature Code. Directly adjacent on the label one will find the mark of the listing agency.

Some manufacturers claim "suitability" or "built-to" hazardous areas in their technical literature, but in effect lack the testing agency's certification and thus unacceptable for the AHJ (Authority Having Jurisdiction) to permit operation of the electrical installation/system.

All equipment in Division 1 areas must have an approval label, but certain materials, such as rigid metallic conduit, does not have a specific label indicating the Cl./Div.1 suitability and their listing as approved method of installation in the NEC serves as the permission. Some equipment in Division 2 areas do not require a specific label, such as standard 3 phase induction motors that do not contain normally arcing components.

Also included in the marking are the manufacturers name or trademark and address, the apparatus type, name and serial number, year of manufacture and any special conditions of use. The NEMA enclosure rating or IP code may also be indicated, but it is usually independent of the Classified Area suitability.

**IP Classification Codes**

**Basis of IP Rating System**

International Standard IEC 60529 outlines an international classification system that describes the sealing characteristics of electrical equipment. The classification system defines the level of protection provided by enclosures to prevent the ingress of foreign objects and moisture into the electrical equipment. The classification system uses the "IP" code, or "Ingress Protection" code, to define the level of seal. The IP code uses a system of two numerical digits to define the level of both foreign object and moisture protection. Although the IP classification is primarily used for establishing the level of seal in electrical equipment, it is adapted herein for determining the level of seal in passive electrical components.

**Degrees of Protection (Foreign Bodies) - 1st Digit**

The first digit of the IP code indicates the degree of protection against solid foreign objects from entering the electrical device. The table below outlines the level of protection against foreign objects for each level.

**Degrees of Protection (Moisture) - 2nd Digit**

The second digit of the IP code indicates the degree of protection against the ingress of various forms of moisture (e.g. drip, spray, submersion, etc.) into the component. Tests to determine the level of protection are carried out with fresh water and do not take into account the use of solvents.

IP Level 1st Digit	Foreign Bodies		Moisture	
	IP Level 2nd Digit	Description of Protection Level	IP Level 2nd Digit	Description of Protection Level
0	0	Not protected	0	Not protected
1	1	Protected against solid foreign objects of 50 mm diameter and greater - back of hand	1	Protected against vertically falling water drops
2	2	Protected against solid foreign objects of 12.5 mm diameter and greater / finger	2	Protected against vertically falling water drops when enclosure is tilted up to 15°
3	3	Protected against solid foreign objects of 2.5 mm diameter and greater / tool	3	Protected against water sprayed at an angle up to 60° on either side of the vertical
4	4	Protected against solid foreign objects of 1.0 mm diameter and greater / wire	4	Protected against water splashed against the component from any direction
5	5	Protected from the amount of dust that would interfere with normal operation / wire	5	Protected against water projected in jets from any direction
6	6	Dust tight / wire	6	Protected against water projected in powerful jets from any direction
	7		7	Protected against temporary immersion in water
	8		8	Protected against continuous immersion in water, or as specified by the user

The intent of this section of the catalogue is to identify important features that may be useful in the selection and installation of explosion protected electrical equipment.

There are numerous different regulations, codes, guidelines and standards for the design, installation and maintenance of electrical and non-electrical systems for use in potentially explosive atmospheres. The type of operational facility, geographic location, operator practice, local and national legislation, authority having jurisdiction, will determine many of the design and installation rules permitted. A fixed or floating petroleum facility located offshore for example would not be designed or classified in the same manner as an onshore petrochemical facility.

## 1. What is an explosion?

According to DIN EN 1127-1:1997, an explosion is an oxidation or decay reaction generating an increase in temperature or pressure or both simultaneously.



**EXPLOSION TRIANGLE**

So that an explosion can occur, three conditions must be fulfilled; see the explosion triangle diagram.

Fuel - Oxygen - Source of ignition

If one removes one of these three conditions, an explosion cannot occur.

**Potentially explosive atmosphere:** A potentially explosive atmosphere is understood to be a mixture of a combustible material and oxygen. Oxygen is generally present as a component of air. Combustible materials can be gases, fluids, vapors, mist or dusts.

The terms "potentially explosive atmosphere" and "flammable mixture" are frequently used as synonyms. This mixture or atmosphere can be caused to explode by a source of ignition. The capacity to explode depends on the material used, its flammability and the mixture with air or oxygen. If the mixture is the result of mixing with oxygen from the air which has a different composition from that normally found in the environment, then the proportion of oxygen must be examined closely. If the proportion of oxygen falls below a certain value dependent on the material, known as the oxygen limit concentration, then this mixture cannot be ignited.

This effect is exploited in what is known as initiation in which oxygen is replaced by an inert gas, one which is not suited to oxidation. All the same, the concentration of the flammable material in the air mixture must lie between the lower and upper explosion limit.

Potentially explosive atmospheres can arise intentionally or unintentionally. The former are often present in production processes. In these cases the potentially explosive atmosphere is present where the appropriate materials are used in the presence of ambient air. These may be areas where glues or paints are drying or being applied, in the vicinity of fermentation tanks in alcohol production, in areas where materials are being ground down such as in corn mills and numerous other places. Unintentional potentially explosive atmospheres are created when a fault occurs. This might be for example when a gas pipeline bursts, when an outlet valve is unintentionally opened, or leaks from boilers due to lack of servicing occur.

## 2. Explosion Prevention

Preventing potentially explosive atmospheres (primary explosion prevention) By primary explosion prevention are understood all the measures which prevent a potentially explosive atmosphere from occurring. Here for example it is possible to replace a potentially explosive material by another with no danger of explosion, (e.g.: replace paints containing solvents by water-based paints). Furthermore, the materials can be isolated, i.e.: to prevent the admission of air and thus of oxygen. If it is not possible to prevent a potentially explosive atmosphere, then measures must be taken which prevent ignition of the potentially explosive atmosphere. Avoiding sources of ignition (secondary explosion prevention) By avoiding sources of ignition, once again one of the conditions of the explosion triangle is removed. Thus an explosion cannot occur. In the Workplace Directive 99/92/EC, or alternatively in IEC Standard 60079-10, all potentially explosive areas are to be divided into zones by the plant operator. The higher and longer the probability of the occurrence of a dangerous, potentially explosive atmosphere is, the more demanding the requirements on the devices in use are. In the zones, the probable effectiveness of sources of ignition must be prevented. The following examples could be considered possible sources of ignition: Cf: DIN EN 1127-1, draft April 2009

- hot surfaces
- flames and hot gases
- mechanically generated sparks
- electrical systems
- electric equalizing currents /cathodic corrosion protection
- static electricity
- lightning strike
- electromagnetic waves / high frequency
- ionizing radiation
- ultrasound
- adiabatic compression and shock waves
- exothermic reactions

## 2.1. Tertiary explosion prevention

If it is not possible to ensure that the occurrence of a potentially explosive atmosphere is prevented, and if it is not possible to exclude its ignition, then additional explosion prevention measures must be applied. The objective is to control or limit the effects of an explosion.

Tertiary explosion prevention is thus applied when the measures of primary and secondary explosion prevention are not sufficient.

This can be carried out for example by means of the following measures:

- constructive explosion prevention, i.e.: explosion proof construction which can withstand the explosion blast
- flashback arresters
- automatic foam extinguishing systems
- pressure release and pressure equalization systems.

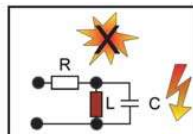
## 3. Explosion Protection Type

In Explosion Protection, what is meant by "type of explosion protection" are the special measures which are applied to electrical operating facilities to prevent the ignition of a surrounding potentially explosive atmosphere.

The construction guidelines and conditions for electrical devices are laid down in IEC Standard 60079-ff. Besides the type of explosion protection for electrical devices, there are other types of explosion protection for non-electrical devices. These types of explosion protection are laid down in DIN EN 13463-ff. From here on, only the types of explosion protection which apply to electrical devices will be considered.

### Intrinsically safe "i"

Type of explosion protection



For the use of these devices in a potentially explosive area, only intrinsically safe circuits are used. Current and voltage are limited so that the minimum ignition energy and the ignition temperature of an explosive mixture cannot be reached.

Norm:

EN 60079-11 - IEC 60079-11

### Increased safety "e"

Type of explosion protection



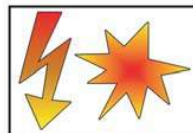
The production of sparks, arcs or excessive temperatures which might act as a source of ignition are prevented by additional measures and an increased degree of safety.

Norm:

EN 60079-7 / IEC 60079-7

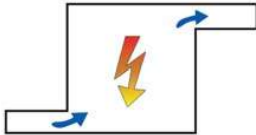
### Flameproof enclosures "d"

Type of explosion protection



The components which could cause the ignition of a potentially explosive mixture are built into an enclosure which is capable of withstanding the pressure of an explosion. Furthermore, it is ensured that the explosion inside the enclosure cannot be transmitted beyond the enclosure and ignite the external potentially explosive atmosphere.

Norm:  
EN 60079-1 / IEC 60079-1  
**Pressurized enclosure "p"**  
Type of explosion protection



The enclosure of a possible source of ignition is filled with a protective gas. Due to the overpressure created in the interior of the enclosure, a potentially explosive atmosphere cannot penetrate into the interior of the enclosure. If necessary, the gas is kept permanently flowing through the enclosure.

Norm:  
EN 60079-2 / IEC 60079-2  
**Oil immersion "o"**  
Type of explosion protection



The components which could ignite a potentially explosive atmosphere are built into an enclosure, which is filled with a protective fluid, e.g.: oil. Thus the source of ignition and the potentially explosive atmosphere are kept apart.

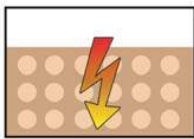
Norm:  
EN 60079-6  
IEC 60079-6

**Encapsulation "m"**  
Type of explosion protection



The components which could ignite a potentially explosive atmosphere are encapsulated in a casting compound. Thus once again the source of ignition and the potentially explosive atmosphere are kept separated.

Norm:  
EN 60079-18 / IEC 60079-18  
**Sand filling "q"**  
Type of explosion protection



The components of an operating facility which might be a source of ignition are surrounded by an enclosure which is filled with quartz sand. When used correctly, the potentially explosive atmosphere cannot be ignited.

Norm:  
EN 60079-5  
IEC 60079-5  
**Protection with "ID" enclosure**  
Type of explosion protection:



This type of explosion protection only applies to "Dust" areas, i.e.: Zones 20, 21 or 22. In this case it is ensured that none or only a limited amount of dust can penetrate the enclosure which surrounds the source of ignition.

Here a distinction must be made Dust-tight IP 6X Dust-protected IP 5X  
Norm:  
IEC 60079-0 / IEC 61241-1

## 4. Potentially Explosive Atmospheres

An explosive atmosphere is defined as: Flammable substances in the form of gases, vapours, mists, dusts or fibres mixed with air, and/or Under atmospheric conditions, which after ignition has occurred, combustion spreads to the entire unburned mixture.

## 5. Area Classification (Classification of Locations)

The purpose of area classification is to provide a basis for the correct selection, installation and location of electrical and non-electrical equipment in those areas. Areas must be classified depending on the properties of the flammable vapours, liquids, gases, mists, combustible dusts or fibres that may be present and the likelihood that a flammable or combustible concentration or quantity is present.

The aim of area classification is to avoid ignition of flammable releases that may occur in the operation of facilities. The intent is to reduce to an acceptable minimum level the probability of a flammable atmosphere and an ignition source occurring at the same time.

## 6. IEC

### 6.1. Area Classification (Zones)

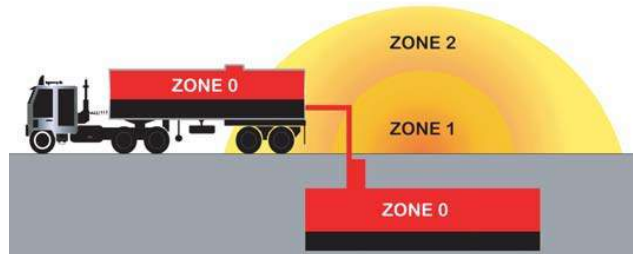
Area classification is the division of a facility into three dimensional hazardous areas and non-hazardous areas and the sub-division of the hazardous area into Zones.

Hazardous areas may be sub-divided into three Zones, as shown below:

Gas	
FLAMMABLE GASES AND VAPOURS	
Zone 0	An area in which an explosive atmosphere is constantly present, or present for long periods.
Zone 1	An area in which an explosive atmosphere is likely to occur in normal operation. (Rough Guide: 10 hours or more per year but less than 1,000 hours per year)
Zone 2	An area in which an explosive atmosphere is not likely to occur in normal operation and if it occurs it will exist only for a short time. (Rough Guide: Less than 10 hours per year)

## Dust

COMBUSTIBLE DUSTS	
Zone 20	An area in which combustible dust, as a cloud, is present continuously or frequently during normal operation in sufficient quantity to be capable of producing an explosive concentration of combustible dust in a mixture with air.
Zone 21	An area in which combustible dust, as a cloud, is occasionally present during normal operation in a sufficient quantity to be capable of producing an explosive concentration of combustible dust in a mixture with air.
Zone 22	An area in which combustible dust, as a cloud, may occur infrequently and persist for only a short period, or in which accumulations of layers of combustible dust may give rise to an explosive concentration of combustible dust in a mixture with air.



## 6.2. Classification Society

A Classification Society may also enforce requirements for the design of installations of facilities. These requirements, which are in addition to statutory requirements, may influence the design and installation of the electrical systems. Classification Societies include ABS, DNV and Lloyd's Register.

## 6.3. Design and Installation of Electrical Systems for

### Hazardous (Classified) Areas

There are numerous regulation codes, guidelines and standards for the design, selection and installation of electrical equipment in potentially explosive atmospheres. These requirements are in addition to the requirements for installations in non-hazardous areas.

There are several types of protection, i.e. construction techniques, available for electrical apparatus in hazardous areas. The type of protection permitted will depend upon the applicable installation codes and rules to be adopted.

The selection of electrical apparatus should be in accordance with the following:

- Classification of the hazardous area.
- Temperature class or ignition temperature of the gas, liquid, vapours, mist, dust or fibre.
- Where applicable, the gas, vapour or dust classification in relation to the group or sub-group of the electrical apparatus.
- External influences and ambient temperature.



## 6.4. Apparatus Selection According to Zones

### 6.4.1. Apparatus for use in Zone 0

Intrinsic safety "ia"

### 6.4.2. Apparatus for use in Zone 1

Electrical apparatus permitted for use in Zone 0, or  
 Flameproof enclosure "d"  
 Pressurized apparatus "p"  
 Powder filling "q"  
 Oil immersion "o"  
 Increased safety "e"  
 Intrinsic safety "ib"  
 Encapsulation "m"

### 6.4.3. Apparatus for use in Zone 2

Electrical apparatus permitted for use in Zone 0 and Zone 1, or  
 Electrical apparatus designed specifically for Zone 2 (e.g. type of protection 'n') or  
 Electrical apparatus complying with the requirements of a recognised standard for  
 industrial electrical apparatus, which does not, in normal operation, have ignition-capable  
 hot surface and does not in normal operation produce arcs or sparks. This equipment  
 must be in an enclosure with a degree of protection and mechanical strength suitable for  
 the environment and be assessed by a person who is familiar with the requirements  
 of any relevant standards and codes of practice.

### 6.4.4. Apparatus for use in Zones 20, 21 and 22

IEC/EN 61241-0- Electrical apparatus for use in the presence of combustible dust.  
 General requirements, and

IEC/EN 61241-1 - Electrical apparatus for use in the presence of combustible dust.  
 Protection by enclosures "iD".

## 6.5. Apparatus selection according to the ignition temperature of the gas or vapour

The equipment must be selected so that its maximum surface temperature will not reach the  
 ignition of any gas or vapour that may be present.

TEMPERATURE CLASS OF ELECTRICAL APPARATUS	MAXIMUM SURFACE TEMPERATURE OF ELECTRICAL APPARATUS	IGNITION TEMPERATURE OF GAS OR VAPOUR
T1	450°C	>450°C
T2	300°C	>300°C<450°C
T3	200°C	>200°C<300°C
T4	135°C	>135°C<200°C
T5	100°C	>100°C<200°C
T6	85°C	>85°C<100°C

If the marking of the electrical apparatus does not include an ambient temperature range, the  
 apparatus is only for use within an ambient temperature range from -20°C to +40°C.

## 6.6. Apparatus selection according to apparatus grouping

The grouping of gases and vapours are classified into Group I and Group II categories. Group I is  
 relevant to atmospheres containing firedamp (a mixture of gases, composed mostly of methane,

Group II is intended for use in all other places with potentially explosive atmospheres. Group II  
 electrical apparatus with types of protection 'd' and 'i' are further sub-divided into apparatus  
 group IIA, IIB or IIC. Electrical apparatus with type of protection 'n' may also be sub-divided if it  
 contains certain devices or components.

GAS / VAPOUR SUB-DIVISION	APPARATUS SUB-GROUP PERMITTED
IIA (typical gas propane)	IIA, IIB or IIC
IIB (typical gas ethylene)	IIB or IIC
IIC (typical gases acetylene and hydrogen)	IIC

### More Information Regarding Of Apparatus Groups:

Devices which are intended for use in potentially explosive atmospheres are divided into two  
 groups. Cf: IEC Standard 60079-0:20

**Group I:** Electrical operating facilities for mine workings susceptible to firedamp

**Group II:** Electrical operating facilities for use in all other potentially explosive areas with the  
 exception of mine workings susceptible to firedamp.

Group II is divided into sub-groups IIA, IIB and IIC. The letter indicates the maximum experimental  
 safe gap (maximum width of the gap on a flashback arrester through which ignition cannot be  
 transmitted). This depends on the explosive material. The degree of danger increases from A to  
 C.

IIA	IIB	IIC
sub-group IIA for example covers diesel, petrol, ethane, methane and carbon monoxide.	town gas, hydrogen sulphide and ethylene for example belong in sub-group IIB.	sub-group IIC includes hydrogen, acetylene and carbon disulphide.

**Group III** stands for electrical operating facilities for potentially explosive dust atmospheres.

IIIA	IIIB	IIC
combustible suspended particles	non-conductive dust	conductive dust

## 7. Device Category

The Device Category is determined depending on the corresponding potentially explosive Zone  
 in which a device is to be used.

### Categories in Group I:

M1: high degree of safety, safe even if two independent faults occur

M2: high degree of safety

### Categories in Group II:

1 : very high degree of safety

2: high degree of safety

3 : normal degree of safety

Device Category	Avoidance of effective sources of ignition	Degree of safety	Approved for Zone	Presence of potentially explosive atmosphere
3	In normal use	Normal	2 22	Seldom or for short periods
2	Including in the event of normal faults	High	1, 2 21, 22	Occasionally
1	Including in the event of infrequent faults	Very high	0, 1, 2 20, 21, 22	For long periods, constantly or frequently

As an example: For use in Zone 1 of Group II, a device must be used which belongs to at least to  
 Category 2, or preferably Cat.1.

## 8. Equipment Protection Level (EPL)

In accordance with IEC Standard 60079-0 (2007), devices for potentially explosive areas are  
 divided into three protection levels (for devices in mine workings susceptible to firedamp, two  
 protection levels are laid down):

**EPL Ga or Da:** device with "very high" protection level for use in potentially explosive areas, in the  
 normal operation of which, foreseeable or infrequent faults/malfunctions represent no danger of  
 ignition.

**EPL Gb or Db:** device with "high" protection level for use in potentially explosive areas, in the  
 normal operation of which, foreseeable or infrequent faults/malfunctions represent no danger of  
 ignition.

**EPL Gc or Dc:** device with "increased" protection level for use in potentially explosive areas, in the  
 normal operation of which, no danger of ignition exists and which is equipped with various  
 additional protective measures which guarantee, in the event of commonly foreseeable faults in  
 the device, that no danger of ignition exists.

The letters "G" and "D" determine whether the device is suitable for potentially explosive areas  
 due to gas (G) or for areas with combustible dust (D).

### Devices for mine workings susceptible to firedamp:

**EPL Ma:** device with "very high" protection level for installation in mine workings susceptible to  
 firedamp which guarantees the necessary degree of safety, with which in normal operation,  
 foreseeable or infrequent faults/malfunctions represent no danger of ignition, even if the device  
 is still in operation when the gas escape occurs.

**EPL Mb:** device with "high" protection level for installation in mine workings susceptible to  
 firedamp which guarantees the necessary degree of safety, with which in normal operation,  
 foreseeable or infrequent faults/malfunctions represent no danger of ignition in the time between  
 when the gas escape occurs and the device is switched off.

The areas of application of operating facilities of a given category, or alternatively of a given EPL  
 in the corresponding potentially explosive area, is shown in the table.

Category	EPL	Zone
Gas		
1G	Ga	0,1,2
2G	Gb	1,2
3G	Gc	2
Dust		
1D	Da	20,21,22
2D	Db	21,22
3D	Dc	22
mine workings susceptible to firedamp		
M1	Ma	permanent using
M2	Mb	stopping in ex atmosphere

