

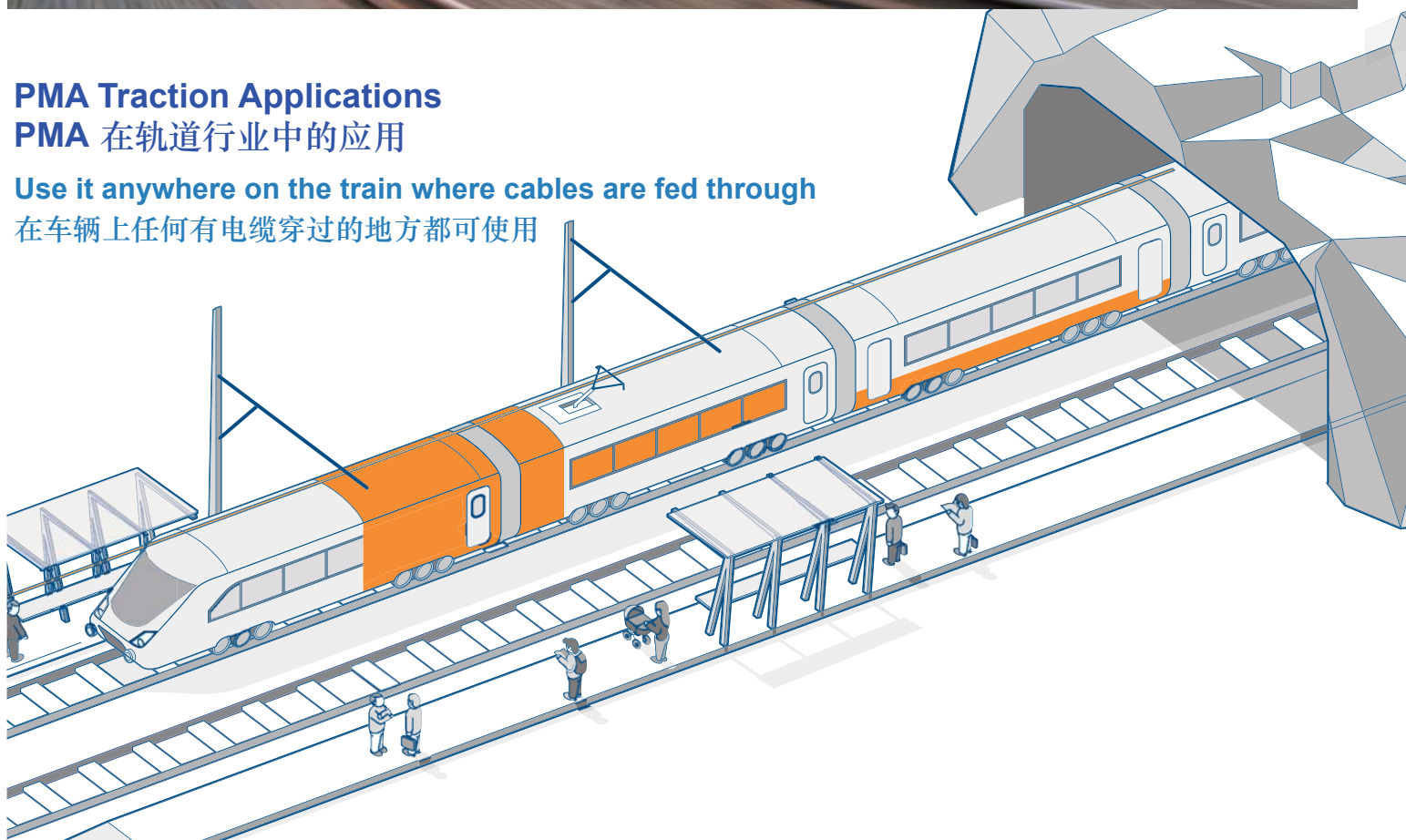


PMA Traction Applications

PMA 在轨道行业中的应用

Use it anywhere on the train where cables are fed through

在车辆上任何有电缆穿过的地方都可使用



PMA products have proven their dependability in railway construction projects around the world. This is the reason why large corporations including CRRC, Siemens, Alstom, Bombardier, Deutsche Bahn, and SNCF have chosen us as supplier over a period of many years. Our special railway engineering product line provides protection and safety on signalling systems, coupling, trucks, and gangways, as well as roof, and underfloor equipment. The range of applications is very extensive. **PMA** products contribute to the safe operation of trams, and even roller coasters.

PMA 产品在全球铁路建设项目上已经证明了它的可靠性。因此 **PMA** 在相当长一段时间里一直作为中车集团、西门子、阿尔斯通、庞巴迪等许多大型跨国集团公司和德国铁路局、法国国营铁路公司稳定的供应商。专业铁路工程产品系列可以为信号系统、车厢连接、载重车、座间通道、以及车顶和车底设备提供安全保护。**PMA** 产品应用非常广泛，有助于轻轨、机车、货车、高速列车、甚至滚厢货车的安全操作。



Standard EN45545

EN45545 标准

To ensure the safety of people and equipment in railway applications

确保铁路应用中的人员及设备的安全

With the introduction and ratification of EN45545 a unification of fire safety standards is taking place in Europe.
随着 EN 45545 的引进和认可，欧洲正在实行统一防火安全标准。

EN 45545-1 contains basic definitions as well as general rules on how to classify rail vehicles.

Train operating and train design categories are defined in order to assess fire risk. Hazard levels are defined based upon these classifications.

EN 45545-1, 不但包含基本的概述，而且还包括划分轨道车辆类别的常规规则。评估火灾风险是根据轨道车辆的运营和设计类别，并且相关的危险等级是根据此等类别进行定义的。

EN 45545-2 describes the material requirements for the different hazard levels (HL1, HL2 and HL3). Table R22 sets the flammability, smoke emission and toxicity requirements for internal applications.
Table R23 does the same for external applications.

EN 45545-2 描述了对于材料的不同危险等级（HL1，HL2和HL3）要求。表 R22 设定车内应用对于易燃性，烟密度和毒性的要求。表 R23 设定外部应用的相同要求。

EN 45545-3 describes the fire resistance requirements for fire barriers.

Unless designed with care, locations where cables within cable protection conduits are fed through fire barriers could represent potential weak points through which fire, heat or gas could penetrate.

EN 45545-3 sets E, I and W requirements for 10 different fire protection installation situations in acc. with the operating categories defined in EN 45545-1:

EN45545-3 描述了防火屏障的耐火要求。穿过防火屏障的电缆保护软管内的电缆如果没有精心设计，那么火、热或气体就可能突破这个潜在的薄弱点。

根据 EN 45545-1 运营类别中定义的 10 种不同的防火屏障安装情况，EN 45545-3 设置 E、I 和 W 的要求：

- E (integrity), with a performance rating of E15, E30 (in minutes)
E (完整性)，含等级评定 E15, E30 (分钟)
- I (heat insulation)
I (热绝缘)
- W (radiation)
W (辐射)

E15 is sufficient for several of the 10 installation situations and operating categories.
对于 10 种安装情况中的许多情况和运营类别，E15 是足够的。

E30, the highest requirement is specified for fire barriers between luggage compartments and passenger areas or the driver's cab for train operating categories 3 and 4. In such situations the fire must be prevented from breaking through for at least 30 minutes.
耐火完整性要求最高的 E30 评级的防火屏障，是安装在行李舱和乘客区或运营类别 3 和 4 的驾驶舱。若发生火灾情况，必须保证至少 30 分钟内防止火灾爆发。

EN 45545-1 General section

EN 45545-1 标准：总论

Railway vehicles are assessed for their fire safety risk according to:
铁路车辆评估的防火安全风险，根据如下因素：

Design Category (Automatic , Double-decker, Sleeping cars, Standard vehicles).
设计类别（自动驾驶、双层、卧铺和标准的车辆）。

Operating Category (Ranging from above ground operation with good evacuation possibilities through to underground or elevated section operation with poor evacuation possibilities).
运营类别（从地面良好的疏散可能性到地下或高架较低的疏散可能性）。

Hazard Level can be derived from the following matrix taking into consideration both the Design Category and the Operation Category.
危险程度考虑到设计类别和运营类别，以下面的矩阵列出。

			Design Categories 设计类别			
			N	A	D	S
			Standard vehicles 标准车辆	Automatic vehicles without trained staff 自动控制车辆（没有受过培训的员工当值）	Double decked vehicles 双层列车	Sleeping cars and couchette 卧铺车
Operating Categories 运营类别	1	Overground trains - No tunnels / elevated sections - Side evacuation possible 车辆不是运行在隧道或高架路上，而是在地面上，方便从侧面撤离	HL1	HL1	HL1	HL2
	2	Trains used in tunnels / on elevated sections - Side evacuation possible - Ultimate place of safety reachable in short running time 车辆运行在隧道或高架路上，可从侧面撤离，并在较短运行时间到达安全区域	HL2	HL2	HL2	HL2
	3	Trains used in tunnels / on elevated sections - Side evacuation possible - Ultimate place of safety reachable in long running time 车辆运行在隧道或高架路上，可从侧面撤离，但在较长运行时间到达安全区域	HL2	HL2	HL2	HL3
	4	Trains used in tunnels / on elevated sections - No side evacuation possible - Ultimate place of safety reachable in short running time 车辆运行在隧道或高架路上，不可从侧面撤离，但能够在较短运行时间到达安全区域	HL3	HL3	HL3	HL3

EN 45545-2 Fire behaviour requirements – materials

EN 45545-2 标准：防火性能的要求 – 材料

Fire safety performance levels for component materials are set for each of the Hazard Levels for internal and external use for the following parameters - Flammability LOI, Smoke emission and Toxicity.

组件材料的防火性能等级设置为每个危害程度内外部使用的参数,易燃物的LOI、排放烟雾和毒性。

Requirements are fixed by Conduit Circumference and Application Area

根据软管的周长和应用领域定义

$P < 0.2m$

R 22 (Internal use 内部使用)

R 23 (External use 外部使用)

(P circumference 周长 = $\pi \times d$ 圆周率 $\times$ 直径)

(d 直径 = 200mm / π)

(d 直径 < 63.66mm)

NW48 OD = 54.5mm

标称内径 NW48 的软管外径 = 54.5mm

Table 8 - Circular conduit

表8 - 圆形软管

Perimeter 周长	Requirement Interior 内部要求	Requirement Exterior 外部要求
0.0 < P ≤ 0.2	R22	R23
0.2 ≤ P	R6	R9

				HL1	HL 2	HL 3
车内 R22 (IN16; EL2; EL6A; EL7A; M2)	T01 EN ISO 4589-2: OI 氧指数	Oxygen Content % 含氧量	Minimum 最小	28	28	32
	T10.03 EN ISO 5659-2: 25 kWm ⁻² 烟密度	D _s max. dimensionless 最大无因次	Maximum 最大	600	300	150
	T12 NF X70-100-1 and -2, 600° C 毒性	CIT _{NLP} dimensionless 无因次	Maximum 最大	1.2	0.9	0.75
车外 R23 (EX12; EL2; EL5 EL6B; EL7B; M3)	T01 EN ISO 4589-2: OI 氧指数	Oxygen Content % 含氧量	Minimum 最小	28	28	32
	T10.03 EN ISO 5659-2: 25 kWm ⁻² 烟密度	D _s max. dimensionless 最大无因次	Maximum 最大	–	600	300
	T12 NF X70-100-1 and -2, 600° C 毒性	CIT _{NLP} dimensionless 无因次	Maximum 最大	–	1.8	1.5

EN45545-2:2013 R22 / R23 Testing Requirements: EN45545-2:2013 R22 / R23 测试要求:

1. R22 材料:

车内用软管 Hoses-Interior

2. R23 Materials 材料:

车外用软管 Hoses-exterior

3. EN ISO 4589-2 Ambient temperature test 室温氧指数测试:

EN ISO 4589-2:2006 Plastics-Determination of burning behaviour by oxygen index-Part 2:

Ambient-temperature test (ISO 4589-2:1996+Amd.1:2005)(includes Amendment A1:2006)

塑料-用氧指数法测定燃烧行为-第 2 部分:室温试验.

EN ISO 4589-2 oxygen index definition 氧指数定义:

When the oxygen and nitrogen mixture of $23^{\circ}\text{C}\pm 2^{\circ}\text{C}$ degree C is entered, the minimum oxygen concentration of the material is maintained, which is expressed in volume fraction.

The oxygen index testing principle vertically fixed an upward flow of oxygen in a sample of size: $(80-150) \times (10\pm 0.5) \times (4\pm 0.25)\text{mm}$.

in a transparent combustion cylinder of a nitrogen mixture, the top of the sample is ignited and the combustion characteristics of the sample are observed and the sample is continuously burned. The interval or combustion length is compared with the given data, and the minimum oxygen concentration is estimated by a series of experiments at different oxygen concentrations.

通入 $23^{\circ}\text{C}\pm 2^{\circ}\text{C}$ 的氧、氮混合气体时, 刚好维持材料燃烧的最小氧浓度, 以体积分数表示。

氧指数测试原理将一个试样; 尺寸大小: $(80-150) \times (10\pm 0.5) \times (4\pm 0.25)\text{mm}$ 垂直固定在向上流动的氧、氮混合气体的透明燃烧筒里, 点燃试样顶端, 并观察试样的燃烧特性, 把样品连续燃烧时间或燃烧长度与给定的数据相比较, 通过在不同氧浓度下的一系列试验, 估算氧浓度的最小值。

4. EN ISO 5659-2 Smoke density test 烟密度测试:

Sample pretreatment 样品预处理:

Samples of size in square $75\pm 1\text{mm}$ and thickness of $1\pm 0.1\text{mm}$ or as far as possible, the material should be tested in the end-use thickness. Before testing, the samples were placed at $23^{\circ}\text{C}\pm 2^{\circ}\text{C}$, and humidity at $(50\pm 10)\%$ for at least 24 hours before reaching the test requirements.

样品尺寸为 $75\pm 1\text{mm}$ 方形, 厚度为 $1\pm 0.1\text{mm}$ 或尽最大可能, 材料应为最终产品的厚度下进行测试。进行测试前, 预先将样品放置在温度 $23^{\circ}\text{C}\pm 2^{\circ}\text{C}$, 湿度在 $(50\pm 10)\%$ 至少24小时, 以达测试要求。

Test method 测试方法:

The test method of smoke density (Ds) was carried out according to the standard of EN ISO 5659-2. The samples were tested in a sealed furnace, and the samples were tested under the $2.50\text{W}/\text{cm}^2$ condition. 1.5 minutes, fourth minutes of smoke density data and the maximum smoke density data within the whole test time were recorded. The whole test time was 20 minutes.

烟密度 (Ds) 测试方法按照 EN ISO 5659-2 标准进行。样品在一个密封的炉内进行测试, 样品分别在 $2.50\text{W}/\text{cm}^2$ 条件下进行烟密度测试。记录第 1.5 分钟, 第 4 分钟烟密度数据及整个测试时间内最大烟密度数据, 整个测试时间为 20 分钟。

5. NFX70-100-1/-2 Toxicity test 毒性测试

The CIT value of the toxicity index is calculated.

In gas (CO^2 、 CO 、 HF 、 HCl 、 HCN 、 NO^2 、 SO^2 、 HBr), the content "ti" is expressed in milligrams per gram of material gas. From the "ti" value and the corresponding dangerous concentration value "Cci", the commonly known toxicity index "C.I.T" can be determined.

毒性指数CIT值计算:

在气体中 (CO^2 、 CO 、 HF 、 HCl 、 HCN 、 NO^2 、 SO^2 、 HBr) , 含量 "ti" 用每克材料气体的毫克表示, 从 "ti" 这些数值及相应的危险浓度值 "Cci" 中, 通常被称为的毒性指数 "C.I.T" 便可确定。

JXPCSF highly flexible, heavy-duty

For dynamic or static external applications in railway vehicles.
On the roof, between carriages and on bogies.

JXPCSF 非常柔软, 厚壁

适用于铁路车辆外部的动态或静态安装。
在车顶上, 车厢和转向架之间。

Order No.	Profile	Conduit size		Inside diameter	Outside diameter	stat.** / dyn.** radius	PU meter	MOQ (M)
订货号	波纹	软管规格		内径	外径	静态 / 动态 最小弯曲半径	包装单位	最小起订量
		标称内径	公制				米	
# JXPCSFT-12B0	T	12	16	11.8	16.0	70 / 100	50	2000
# JXPCSFG-17B0	G	17	20	15.2	21.6	85 / 125	50	1400
# JXPCSFG-23B0	G	23	25	21.5	28.8	110 / 160	50	1500
# JXPCSFG-29B0	G	29	32	27.7	34.8	140 / 200	50	1200
# JXPCSFG-36B0	G	36	40	35.8	42.8	200 / 260	30	1080
# JXPCSFG-48B0	G	48	50	46.8	54.8	230 / 300	30	960

Profiles-fine (T) ; Profiles-coarse (G) / 细波纹 (T) ; 粗波纹 (G)

For technical specification in details, please ask for "Technical Data Sheet" DB-Nr.16322

要了解详细技术规格, 请索取 "技术数据表" DB-Nr.16322

标记为 # 的产品有最小起订量 (MOQ)

unit = mm
单位 = mm



JXPCSF-Index

min.	max.
ductility	柔软性
fatigue / reversed bending	抗弯型
pressure resistance	抗压型
cold temperature performance	抗冻型
weather resistance	耐候型

- Multilayer conduit: specially formulated polyamide 12
- Overextrusion: specially formulated polyamide 12
- Excellent flexibility
- Smooth outer layer prevents accumulation of ice
- Easy cleaning
- High resistance to chemicals and cleaning agents
- Excellent UV resistance and weathering characteristics
- Self-extinguishing
- Temperature range: -50°C to +95°C; Short-term: +150°C
- Classification: HL3 to R23 (Exterior), EN45545-2:2013

- 多层软管: 特别配方聚酰胺12
- 外覆盖: 特别配方聚酰胺12
- 优异的柔韧性
- 外层光滑可防止积冰
- 易清洁
- 高耐化学品和清洗剂
- 优异的抗紫外线和耐候性
- 自熄灭性好
- 温度范围: -50°C 至 +95°C; 短期温度 +150°C
- HL3, 根据EN45545-2:2013车外软管R23标准

XPCSF very flexible, heavy-duty

External, dynamic applications in railway vehicles
on the roof, between carriages and on bogies.

XPCSF 非常柔软, 厚壁

适用于在铁路车辆行业外部的动态安装。
如: 车顶和轨道车辆之间的车厢连接。



Order No. black / orange	Profile	Conduit size NW	Conduit size metric	Inside diameter	Outside diameter	stat.** / dyn.** radius	PU meter	MOQ (M)
订货号 黑色 / 橙色	波纹	软管规格 标称内径	软管规格 公制	内径	外径	静态 / 动态 最小弯曲半径	包装单位 米	最小起订量
XPCSFT-07B0	T	07	10	6.5	10.0	15 / 40	100	—
XPCSFT-10B0	T	10	12	9.6	12.8	20 / 50	50	—
XPCSFT-12B0	T	12	16	11.8	15.6	25 / 65	50	—
XPCSFG-17B0	G	17	20	15.5	21.1	35 / 85	50	—
XPCSFG-23B0	G	23	25	21.5	28.4	45 / 110	50	—
XPCSFG-29B0	G	29	32	27.4	34.5	55 / 135	50	—
XPCSFG-36B0	G	36	40	36.0	42.4	65 / 170	30	—
XPCSFG-48B0	G	48	50	47.1	54.5	85 / 220	30	—
# XPCSFG-56B0	G	56	68	56.7	67.5	110 / 270	30	630
# XPCSFG-70B0	G	70	80	67.1	79.0	130 / 320	10	待定
# XPCSFG-95B0	G	95	106	90.9	106.0	170 / 430	10	待定
# XPCSFG-125B0	G	125	146	125.0	144.5	230 / 580	6	待定

Profiles-fine (T) ; Profiles-coarse (G) / 细波纹 (T) ; 粗波纹 (G)

For technical specification in details, please ask for "Technical Data Sheet" DB-Nr.16161

要了解详细技术规格, 请索取 "技术数据表" DB-Nr.16161

标记为 # 的产品有最小起订量 (MOQ), 待定 = MOQ需与工厂确认

unit = mm
单位 = mm



XPCSF-Index

min.	max.
ductility	柔软性
fatigue / reversed bending	抗弯型
pressure resistance	抗压型
cold temperature performance	抗冻型
weather resistance	耐候型

- Outer layer: black; high-grade, specially formulated polyamide 12
- Intermediate layer: spec. bonding compound
- Inner layer: orange; high-grade, specially formulated polyamide 12
- Excellent UV resistance and weathering characteristics
- Very good flexibility
- Good mechanical strength, also at dry conditions
- Self-extinguishing
- Free from halogens and cadmium
- Temperature range: -50°C to +95°C; Short-term: +150°C
- Classification: HL3 to R23 (Exterior), EN45545-2:2013

- 外层: 黑色; 高级, 特殊配方聚酰胺12
- 中间夹层: 特别接合化合物
- 内层: 橙色; 特殊配方聚酰胺12
- 优异的抗紫外线和耐候性
- 非常好的柔软性
- 在干燥的条件下, 有良好的机械强度
- 自熄灭性好
- 不含卤素和镉
- 温度范围: -50°C 至 +95°C; 短期温度 +150°C
- HL3, 根据EN45545-2:2013车外软管R23标准



XPCS-Index	
min.	max.
ductility	柔软性
fatigue / reversed bending	抗弯型
pressure resistance	抗压型
cold temperature performance	抗冻型
weather resistance	耐候型

- Outer layer: black; high-grade, specially formulated polyamide 12
- Intermediate layer: spec. bonding compound
- Inner layer: green; high-grade, specially formulated polyamide 6
- Excellent resistance to UV rays and atmospheric corrosion
- Very good flexibility
- Good mechanical strength, also at dry conditions
- Self-extinguishing
- Free from halogens and cadmium
- Temperature range: -50°C to +95°C; Short-term: +150°C
- Classification: HL2 to R22 (Interior) / R23 (Exterior), EN45545-2:2013 NFPA 130 (ASTM E162 - ASTM E 662 - ASTM E 1354), BSS 7239 / SMP 800-C
- 外层: 黑色; 高级, 特殊配方聚酰胺12
- 中间层: 特别接合化合物
- 内层: 绿色; 高级, 特殊配方聚酰胺6
- 抗紫外性及大气腐蚀性极好
- 非常好的柔软性
- 在干燥的条件下, 有良好的机械强度
- 自熄灭性好
- 不含卤素和镉
- 温度范围: -50°C 至 +95°C; 短期温度 +150°C
- 等级: HL2, 根据EN45545-2:2013 车内软管R22/ 车外软管R23 标准 NFPA 130 (ASTM E162 - ASTM E 662 - ASTM E 1354), BSS 7239 / SMP 800-C



PCSL-Index	
min.	max.
ductility	柔软性
fatigue / reversed bending	抗弯性
pressure resistance	抗压性
cold temperature performance	抗冻性
weather resistance	耐候性

- High-grade, specially formulated polyamide 12
- Excellent resistance to ultra violet rays and atmospheric corrosion
- Excellent flexibility
- Good mechanical strength at low temperatures and dry conditions
- Self-extinguishing
- Free from halogens and cadmium
- Temperature range: -50°C to +95°C; Shot-term: +150°C;
- Chemical resistance: to fuels, mineral oils, fats, alkalies, weak acids etc.
- Classification: HL2 to R23 (Exterior), EN45545-2:2013
- 高级, 特殊配方聚酰胺12制成
- 优异的耐候性和抗紫外线能力
- 优异的柔软性
- 在低温、干燥的环境下, 有很好的抗冲击强度
- 自熄灭性好
- 不含卤素和镉
- 温度范围: -50°C 至 +95°C; 短期温度: +150°C;
- 耐化学性: 防燃油, 矿物油, 脂肪, 碱, 弱酸等
- 等级: HL2, 根据EN45545-2:2013车外软管R23标准

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适用于在铁路车辆行业外部的动态安装。如: 车顶和轨道车辆之间的车厢连接。



Order No. black / green 订货号 黑色 / 绿色	Profile 波纹	Conduit size NW 软管规格 标称内径	Conduit size metric 软管规格 公制	Inside diameter 内径	Outside diameter 外径	stat.** / dyn.*** radius 静态 / 动态 最小弯曲半径	PU meter 包装单位 米
XPCST-10BG	T	10	12	9.80	12.8	20 / 50	50
XPCST-12BG	T	12	16	12.1	15.6	25 / 65	50
XPCST-17BG	T	17	20	16.5	21.1	35 / 85	50
XPCSG-17BG	G	17	20	15.8	21.1	35 / 85	50
XPCSG-23BG	G	23	25	21.9	28.4	45 / 110	50
XPCSG-29BG	G	29	32	27.7	34.5	55 / 135	50
XPCSG-36BG	G	36	40	36.6	42.4	65 / 170	30
XPCSG-48BG	G	48	50	47.5	54.5	85 / 220	30
XPCSG-56BG	G	56	68	56.7	67.5	110 / 270	30
XPCSG-70BG	G	70	80	67.5	79.0	130 / 320	10
XPCSG-95BG	G	95	106	91.6	106.0	170 / 430	10
XPCSG-125BG	G	125	146	125.5	144.5	230 / 580	6

Profiles-fine (T) ; Profiles-coarse (G) / 细波纹 (T) ; 粗波纹 (G)

For technical specification in details, please ask for "Technical Data Sheet" DB-Nr.16160

要了解详细技术规格, 请索取 "技术数据表" DB-Nr.16160

unit = mm
单位 = mm

PCSL very flexible, medium-duty

Dynamic installations in railway vehicles.

External applications, e.g. solar systems, signalling, CCTV.

PCSL 非常柔软, 中壁

在铁路车辆行业的动态安装

外部应用, 例如: 太阳能系统, 信号, 视频监控等。



Order No. 订货号	Profile 波纹	Conduit size NW 软管规格 标称内径	Conduit size metric 软管规格 公制	Inside diameter 内径	Outside diameter 外径	stat.** / dyn.*** radius 静态 / 动态 最小弯曲半径	PU meter 包装单位 米	MOQ (M) 最小起订量 黑色B/灰色S
# PCSLT-07 *	T	07	10	6.20	10.0	15 / 40	50	1300 / 1300
# PCSLT-10 *	T	10	12	9.60	13.0	20 / 50	50	- / 2000
# PCSLT-12 *	T	12	16	11.9	15.8	25 / 65	50	- / 2000
# PCSLT-17 *	T	17	20	16.4	21.1	30 / 65	50	- / 1400
# PCSLG-17 *	G	17	20	15.2	21.1	30 / 80	50	- / 2100
# PCSLG-23 *	G	23	25	21.7	28.4	40 / 100	50	- / 1500
# PCSLG-29 *	G	29	32	27.4	34.3	50 / 120	50	- / 1200
# PCSLG-36 *	G	36	40	35.8	42.3	60 / 180	30	- / 1080
# PCSLG-48 *	G	48	50	46.7	54.2	70 / 200	30	- / 960

* = Replace with "B" to order black or "S" to order grey / * = "B" 订黑色或 "S" 订灰色

Profiles-fine (T) ; Profiles-coarse (G) / 细波纹 (T) ; 粗波纹 (G)

For technical specification in details, please ask for "Technical Data Sheet" DB-Nr.11010

要了解详细技术规格, 请索取 "技术数据表" DB-Nr.11010

标记为 # 的产品有最小起订量 (MOQ)

unit = mm
单位 = mm



PCS *very flexible, heavy-duty*

Dynamic external installations in railway vehicles.
External applications, e.g. solar systems, signalling, CCTV.

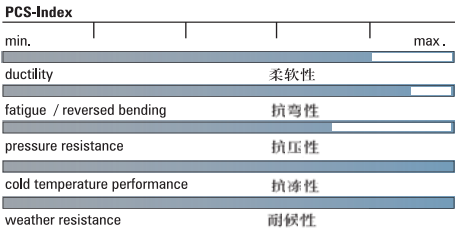
PCS 非常柔软，厚壁

在铁路车辆行业的动态安装
外部应用，例如：太阳能系统，信号，视讯监控系统。

Order No.	Profile	Conduit size NW	Conduit size metric	Inside diameter	Outside diameter	stat.** / dyn.** radius	PU meter	MOQ (M)
订货号	波纹	软管规格 标称内径	软管规格 公制	内径	外径	静态 / 动态 最小弯曲半径	包装单位 米	最小起订量 灰色S
PCST-07 *	T	07	10	6.00	10.0	15 / 40	100	—
# PCST-10 *	T	10	12	9.20	12.7	20 / 50	50	2000
PCST-12 *	T	12	16	11.8	15.8	25 / 70	50	—
# PCST-17 *	T	17	20	16.0	21.2	35 / 80	50	1400
PCSG-17 *	G	17	20	15.2	21.2	35 / 85	50	—
PCSG-23 *	G	23	25	21.5	28.5	40 / 110	50	—
PCSG-29 *	G	29	32	27.7	34.4	50 / 130	50	—
PCSG-36 *	G	36	40	35.8	42.4	60 / 180	30	—
PCSG-48 *	G	48	50	46.8	54.4	70 / 220	30	—
# PCSG-56 *	G	56	68	56.1	67.2	130 / 280	30	630
# PCSG-70 *	G	70	80	66.5	80.0	170 / 360	10	560
# PCSG-95 *	G	95	106	91.0	106.0	250 / 470	10	300

* = Replace with "B" to order black or "S" to order grey / * = "B" 订黑色或 "S" 订灰色
Profiles-fine (T) ; Profiles-coarse (G) / 细波纹 (T) ; 粗波纹 (G)
For technical specification in details, please ask for "Technical Data Sheet" DB-Nr.11020
要了解详细技术规格，请索取“技术数据表” DB-Nr.11020
标记为 # 的产品有最小起订量 (MOQ)

unit = mm
单位 = mm



- High-grade, specially formulated polyamide 12
- Excellent resistance to ultra violet rays and weathering
- Excellent flexibility and self-extinguishing
- Good mechanical strength at low temperatures and dry conditions
- Free from halogens and cadmium
- Temperature range: -50°C to +95°C; Shot-term: +150°C;
- Chemical resistance: to fuels, mineral oils, fats, alkalies, weak acids etc.
- Classification: HL2 to R23 (Exterior), EN45545-2:2013
- 高级，特殊配方聚酰胺12制成
- 优异的耐候性和抗紫外线能力
- 优异的柔软性和自熄灭性
- 在低温、干燥的环境下，有很好的抗冲击强度
- 不含卤素和镉
- 温度范围：-50°C 至 +95°C; 短期温度：+150°C;
- 耐化学性：防燃油，矿物油，脂肪，碱，弱酸等
- 等级：HL2，根据EN45545-2:2013车外软管R23的标准



VAM-Index

min.		max.
ductility	柔软性	
fatigue / reversed bending	折弯性	
pressure resistance	耐压性	
cold temperature performance	耐冻性	
weather resistance	耐候性	

- High-grade, specially formulated polyamide 6
- Good resistance to ultra violet rays and weathering
- High impact and compression strength
- High stiffness
- Free from halogens and cadmium
- Outstanding self-extinguishing characteristics
- Minimal development of smoke and gases
- **Temperature range:** -40°C to +105°C; **Short-term:** +160°C
- **Chemical resistance:** to fuels, mineral oils, fats, alkalies, weak acids etc.
- **Classification:** HL3 to R22 (Interior) / R23 (Exterior), EN45545-2:2013
NFPA 130 (ASTM E162 - ASTM E 662 - ASTM E 1354),
BSS 7239 / SMP 800-C

- 高级，特殊配方聚酰胺6制成
- 良好的抗紫外线和耐候性
- 良好的抗冲击强度
- 高硬度
- 不含卤素和镉
- 杰出的自熄灭性能
- 燃烧时，最小烟雾和气体产生
- 温度范围：-40°C 至 +105°C; 短期温度 +160°C
- 耐化学性：防燃油，矿物油，脂肪，碱，弱酸等
- 等级：HL3, 根据EN45545-2:2013车内软管R22 / 车外软管R23标准
NFPA 130 (ASTM E162 - ASTM E 662 - ASTM E 1354),
BSS 7239 / SMP 800-C



VAM flexible, heavy-duty

Static installation in passenger areas of railway vehicles.
Excellent fire safety characteristics allow application in
public buildings like hospitals, hotels, airports, train and
subway stations, shopping centers etc.

VAM 柔软，厚壁

用于铁路机车的旅客区域。静态安装。
优异的防火性能，用在医院，酒店，机场，火车和地铁
站，购物中心等公共场所。

Order No.	Profile	Conduit size NW	Conduit size metric	Inside diameter	Outside diameter	stat.** radius	PU meter	MOQ (M)
订货号	波纹	软管规格 标称内径	软管规格 公制	内径	外径	静态最小 弯曲半径	包装单位 米	最小起订量 黑色B / 灰色S
# VAMT-07 *	T	07	10	6.70	10.0	20	50	1300
# VAMT-10 *	T	10	12	9.20	13.0	25	50	- / 2000
# VAMT-12 *	T	12	16	11.8	15.8	30	50	- / 2000
# VAMT-17 *	T	17	20	16.0	21.2	40	50	1400
# VAMT-23 *	T	23	25	22.4	28.5	50	50	1500
# VAMT-29 *	T	29	32	28.8	34.5	60	50	1200
# VAMG-17 *	G	17	20	15.2	21.2	40	50	- / 1400
# VAMG-23 *	G	23	25	22.0	28.5	50	50	- / 1500
# VAMG-29 *	G	29	32	27.7	34.4	60	50	- / 1200
# VAMG-36 *	G	36	40	35.8	42.4	70	30	- / 1080
# VAMG-48 *	G	48	50	46.8	54.4	80	30	960 / 960

* = Replace with "B" to order black or "S" to order grey / * = "B" 订黑色或 "S" 订灰色
Profiles-fine (T) ; Profiles-coarse (G) / 细波纹 (T) ; 粗波纹 (G)

For technical specification in details, please ask for "Technical Data Sheet" DB-Nr.10070
要了解详细技术规格，请索取“技术数据表”DB-Nr.10070

标记为 # 的产品有最小起订量 (MOQ)

unit = mm
单位 = mm



VAML flexible, medium-duty

Static installation in passenger areas of railway vehicles.
Excellent fire safety characteristics allow application in public buildings like hospitals, hotels, airports, train and subway stations, shopping centers etc.

VAML 柔软，中壁

用于铁路机车的旅客区域，静态安装。
优异的防火性能，用在医院，酒店，机场，火车和地铁站，购物中心等公共场所。

Order No.	Profile	Conduit size NW	Conduit size metric	Inside Diameter	Outside Diameter	stat.** Radius	PU meter	MOQ (M)
订货号	波纹	软管规格 标称内径	软管规格 公制	内径	外径	静态最小 弯曲半径	包装单位 米	最小起订量 黑色B / 灰色S
# VAMLT-07	* T	07	10	6.80	10.0	15	50	- / 1300
VAMLT-10	* T	10	12	9.60	13.0	20	50	-
VAMLT-12	* T	12	16	12.0	15.8	30	50	-
VAMLG-17	* G	17	20	15.3	21.2	40	50	-
VAMLG-23	* G	23	25	21.6	28.5	45	50	-
VAMLG-29	* G	29	32	27.6	34.5	55	50	-
VAMLG-36	* G	36	40	36.0	42.5	65	30	-
VAMLG-48	* G	48	50	47.0	54.5	75	30	-
# VAMLG-56	* G	56	68	56.3	67.2	140	30	630 / 630
VAMLG-70	* G	70	80	67.5	80.0	160	10	560 / 560
# VAMLG-95	* G	95	106	91.5	106.0	210	10	300 / 300
# VAMLG-125	* G	125	146	126.5	146.5	450	6	612 / 612

* = Replace with "B" to order black or "S" to order grey / * = "B" 订黑色或 "S" 订灰色
Profiles-fine (T) ; Profiles-coarse (G) / 细波纹 (T) ; 粗波纹 (G)
For technical specification in details, please ask for "Technical Data Sheet" DB-Nr.10071
要了解详细技术规格，请索取“技术数据表” DB-Nr.10071
标记为 # 的产品有最小起订量 (MOQ)

unit = mm
单位 = mm



VAML-Index

min.	max.
ductility	柔软性
fatigue / reversed bending	抗弯性
pressure resistance	抗压性
cold temperature performance	抗冻性
weather resistance	耐候性

- High-grade, specially formulated polyamide 6
- Good impact strenght
- Good resistance to ultra violet rays and weathering
- Outstanding self-extinguishing characteristics
- Minimal development of smoke and gases
- Free from halogens and cadmium
- Temperature range: -40°C to +105°C; Short-term: +160°C
- Chemical resistance: to fuels, mineral oils, fats, alkalies, weak acids etc.
- Classification: HL3 to R22 (Interior) / R23 (Exterior), EN45545-2:2013 NFPA 130 (ASTM E162 - ASTM E 662 - ASTM E 1354), BSS 7239 / SMP 800-C
- 高级，特殊配方聚酰胺6制成
- 良好的抗冲击强度
- 良好的抗紫外线和耐候性
- 杰出的自熄灭性能
- 燃烧时，最小烟雾和气体产生
- 不含卤素和镉
- 温度范围：-40°C 至 +105°C; 短期温度 +160°C
- 耐化学性：防燃油，矿物油，脂肪，碱，弱酸等
- 等级：HL3，根据EN45545-2:2013车内软管R22 / 车外软管R23标准 NFPA 130 (ASTM E162 - ASTM E 662 - ASTM E 1354), BSS 7239 / SMP 800-C

PLR flexible, medium-wall

Static installation in light rail rolling stock applications.
e.g. Tram, Metro, Monorail.

PLR 柔软，中壁

在轻轨车辆的静态安装应用。
例如：电车，地铁，单轨。



Order No.	Profile	Conduit size NW	Conduit size metric	Inside diameter	Outside diameter	stat.** radius	PU meter
订货号	波纹	软管规格 标称内径	软管规格 公制	内径	外径	静态最小 弯曲半径	包装单位 米
PLRT-07	* T	07	10	6.20	10.0	15	50
PLRT-10	* T	10	12	9.60	13.0	20	50
PLRT-12	* T	12	16	12.0	15.8	30	50
PLRG-17	* G	17	20	15.8	21.2	40	50
PLRG-23	* G	23	25	21.9	28.5	45	50
PLRG-29	* G	29	32	27.6	34.5	55	50
PLRG-36	* G	36	40	36.0	42.5	60	30
PLRG-48	* G	48	50	47.0	54.5	70	30

* = Replace with "B" to order black or "S" to order grey / * = "B" 订黑色或 "S" 订灰色
Profiles-fine (T) ; Profiles-coarse (G) / 细波纹 (T) ; 粗波纹 (G)
For technical specification in details, please ask for "Technical Data Sheet" DB-Nr.12936
要了解详细技术规格，请索取“技术数据表” DB-Nr.12936

unit = mm
单位 = mm



PLR-Index

min.	max.
ductility	柔软性
fatigue / reversed bending	抗弯性
pressure resistance	抗压性
cold temperature performance	抗冻性
weather resistance	耐候性

- High-grade, specially formulated polyamide 6
- Very good flammability characteristics
- Self-extinguishing
- Free from halogens and cadmium
- Good flexibility, Good pressure resistance
- Good impact resistance, Good weather resistance
- Temperature range: -40°C to +105°C; Short-term to +160°C
- Chemical resistance: to fuels, mineral oils, fats, alkalies, acids etc.
- Classification: HL2 to R22 (Interior) / R23 (Exterior), EN45545-2:2013
- 高级，特殊配方聚酰胺6制成
- 非常好的阻燃性能
- 自熄灭性好
- 不含卤素和镉
- 良好的柔韧性，良好的耐压能力
- 良好的抗冲击能力，良好的耐候性
- 温度范围：-40°C 至 +105°C; 短期温度 +160°C
- 耐化学性：防燃油，矿物油，脂肪，碱，酸等
- 等级：HL2，根据EN45545-2:2013车内软管R22 / 车外软管R23标准



XVCSF-Index

min.	max.
ductility	柔软性
fatigue / reversed bending	抗弯型
pressure resistance	抗压型
cold temperature performance	抗冻型
weather resistance	耐候型

- Outer layer: specially formulated polyamide 6
- Inner layer: specially modified polyamide 6
- Good flexibility
- High compression and impact strengths at low temperature and low humidity
- Very good UV resistance and weathering characteristics
- Self-extinguishing
- Free from halogens and cadmium
- Temperature range: -50°C to +105°C; Short-term: +160°C
- Classification: HL2 to R22 (Interior) / R23 (Exterior), EN45545-2:2013

- 外层：特殊配方聚酰胺6
- 内层：特殊改良聚酰胺6
- 良好的柔韧性
- 在低温和干燥的环境下，有良好的抗压和抗冲击强度
- 非常好的抗紫外线和耐候性
- 自熄灭性好
- 不含卤素和镉
- 温度范围：-50°C 至 +105°C; 短期温度 +160°C
- 等级：HL2，根据EN45545-2:2013车内软管R22 / 车外软管R23标准



PACOF-Index

min.	max.
ductility	柔软性
fatigue / reversed bending	抗弯性
pressure resistance	抗压性
cold temperature performance	抗冻性
weather resistance	耐候性

- Specially modified polyamide 6
- Can be opened and closed again in longitudinal direction any time
- PMA standard nominal widths can be used in combination with all PMA fittings
- Easy installation; Trouble-free retrofitting
- Applicable also for repairs; Self-extinguishing
- Free from halogens and cadmium
- Temperature range: -40°C to +105°C; Short-term: +160°C
- Chemical resistance: To fuels, mineral oils, fats, alkalies, weak acids etc.
- Classification: HL3 to R22 (Interior) / R23 (Exterior), EN45545-2:2013 NFPA 130 (ASTM E162 - ASTM E 662 - ASTM E 1354), BSS 7239 / SMP 800-C

- 特殊改良聚酰胺6
- 软管纵向可多次打开和闭合
- 符合PMA标称内径，可适配所有PMA标准管接头
- 安装方便：无忧再改装
- 可应用于维修：自熄灭性
- 不含卤素和镉
- 温度范围：-40°C 至 +105°C; 短期温度：+160°C;
- 耐化学性：防燃油，矿物油，脂肪，碱，强酸等
- 等级：HL3，根据EN45545-2:2013车内软管R22 / 车外软管R23标准 NFPA 130 (ASTM E162 - ASTM E 662 - ASTM E 1354), BSS 7239 / SMP 800-C

XVCSF flexible, heavy-duty

Rail static external applications such as under carriage, bogie, etc.

XVCSF 柔软，厚壁

适用于轨道外部静态安装，如托架，转向架等。



Order No. black / blue	Profile	Conduit size NW	Conduit size metric	Inside diameter	Outside diameter	stat.** radius	PU meter
订货号 黑色 / 蓝色	波纹	软管规格 标称内径	软管规格 公制	内径	外径	静态最小 弯曲半径	包装单位 米
XVCSFT-10BB	T	10	12	9.60	12.8	20	50
XVCSFT-12BB	T	12	16	11.9	15.6	25	50
XVCSFG-17BB	G	17	20	15.6	21.0	35	50
XVCSFG-23BB	G	23	25	21.6	28.4	45	50
XVCSFG-29BB	G	29	32	27.5	34.5	55	50
XVCSFG-36BB	G	36	40	35.7	42.4	65	30
XVCSFG-48BB	G	48	50	46.8	54.2	85	30

Profiles-fine (T) ; Profiles-coarse (G) / 细波纹 (T) ; 粗波纹 (G)

For technical specification in details, please ask for "Technical Data Sheet" DB-Nr.10063

要了解详细技术规格，请索取“技术数据表”DB-Nr.10063

unit = mm
单位 = mm

PACOF flexible, divisible

In machine building and plant construction.
Static installation in rolling stock applications.

PACOF 柔软，可分型

应用于机械制造和厂房建设。
在轨道车辆的静态安装应用。



Order No. black	Conduit size NW metric		Fits to thread metric	Inside diameter	Outside diameter	Stat.** radius	PU meter
订货号 黑色	软管尺寸 NW	公制	适配螺纹 公制	内径	外径	静态弯曲 半径	包装单位 米
PACOF-07B	07	10	M12 x 1.5	5.6	10.0	30	50
PACOF-10B	10	12	M12 x 1.5	8.5	12.8	33	50
PACOF-12B	12	16	M16 x 1.5	11.0	15.6	35	50
PACOF-17B	17	20	M20 x 1.5	15.5	21.1	45	50
PACOF-23B	23	25	M25 x 1.5	22.1	28.4	70	50
PACOF-29B	29	32	M32 x 1.5	27.2	34.5	120	50
PACOF-36B	36	40	M40 x 1.5	32.0	42.4	145	30
PACOF-48B	48	50	M50 x 1.5	43.9	54.5	150	30
PACOF-70B	70	80	—	62.0	79.0	190	10

For technical specification in details, please ask for "Technical Data Sheet" DB-Nr.10920

要了解详细技术规格，请索取“技术数据表”DB-Nr.10920

unit = mm
单位 = mm

F.66 braided hose

In the industry, aviation, construction of vehicles and trains.

F.66 编织网管

运用于工业, 航空, 汽车制造和铁路等行业。



Order No.	NW	Construction number x Ø mm	Fits to termination	Operative Range min. Ø	Operative Range max. Ø	MOQ (M)
订货号	标称内径	结构根数 x 直径	适配末端配件	工作范围最小	工作范围最大	最小起订量 黑色 / 灰色
F.66.04 *	04	48 x 0.28	-	3.0	7.0	-
F.66.06 *	06	72 x 0.28	SRER-06	5.0	8.0	-
F.66.08 *	08	96 x 0.28	SRER-06	7.0	10.0	-
F.66.10 *	10	120 x 0.28	SRER-06	9.0	13.0	-
F.66.12 *	12	160 x 0.28	SRER-06	11.0	16.0	-
F.66.16 *	16	192 x 0.28	SRER-16	15.0	21.0	-
F.66.20 *	20	240 x 0.28	SRER-16	20.0	26.0	-
F.66.25 *	25	280 x 0.28	SRER-21	24.0	31.0	-
F.66.30 *	30	384 x 0.28	SRER-21 / SRER-29	28.0	38.0	-
F.66.40 *	40	480 x 0.28	SRER-29	38.0	49.0	-
F.66.50 *	50	600 x 0.28	SREV-40 / SRER-50	48.0	65.0	- / 1200
F.66.70 *	70	600 x 0.28	SREV-40 / SRER-50	48.0	85.0	600 / -

* = Replace with "SW" to order black or "GR" to order grey / * = "SW" 订黑色或 "GR" 订灰色

For technical specification in details, please ask for "Technical Data Sheet" DB-Nr.55000

要了解详细技术规格, 请索取 "技术数据表" DB-Nr.55000

标记为 # 的产品有最小起订量 (MOQ)

unit = mm

单位 = mm



- Polyamide PA 6.6
- High temperature stability
- For bundling and protection of electrical wires or cables
- Self-extinguishing UL 94 V2
- Free from halogens construction
- According to DIN 65164 (part 1 and 2) strand 0,28 mm
- Coverage: >90%
- Temperature range: -55°C to +135°C (UL +125°C); Short-term: +160°C
- Classification: HL3 to R22 (Interior) / R23 (Exterior), EN45545-2:2013

- 聚酰胺6.6制成
- 高温稳定性
- 应用于捆绑和保护电线或电缆
- 自熄灭性 UL 94 V2
- 无卤素
- 单股为0.28mm, 结构根据DIN 65 164 (part 1+2)标准
- 覆盖率: >90%
- 温度范围: -55°C 至 +135°C (UL +125°C); 短期温度: +160°C
- 等级: HL3, 根据EN45545-2:2013车内软管R22 / 车外软管R23标准

C.66 braided hose

Industrial and transport sectors.

C.66 编织网管

运用于工业, 交通运输等行业。

Order No.	NW	Construction number x Ø mm	Fits to termination	Operative Range min. Ø	Operative Range max. Ø	MOQ (M)
订货号	标称内径	结构根数 x 直径	适配末端配件	工作范围最小	工作范围最大	最小起订量 黑色
C.66.10 *	10	80 x 0.28	SRER-06	8.0	14.0	-
C.66.12 *	12	120 x 0.28	SRER-06	9.0	18.0	-
C.66.16 *	16	144 x 0.28	SRER-06 / SRER-16	11.0	22.0	-
C.66.20 *	20	192 x 0.28	SRER-16 / SRER-21	14.0	26.0	-
& C.66.25 *	25	168 x 0.28	SRER-16 / SRER-21	18.0	26.0	-
C.66.30 *	30	288 x 0.28	SRER-21 / SRER-29	25.0	43.0	-
C.66.40 *	40	288 x 0.28	SRER-29	30.0	52.0	-
# C.66.45SW	45	480 x 0.28	SREV-40 / SRER-50	40.0	73.0	待定

* = Replace with "SW" to order black or "GR" to order grey / * = "SW" 订黑色或 "GR" 订灰色

& = special size / & = 特别尺寸

For technical specification in details, please ask for "Technical Data Sheet" DB-Nr.55030

要了解详细技术规格, 请索取 "技术数据表" DB-Nr.55030

标记为 # 的产品有最小起订量 (MOQ), 待定 = MOQ需与工厂确认

unit = mm

单位 = mm



- Polyamide PA 6.6
- Economical
- For bundling and protection of electrical wires
- Self-extinguishing UL 94 V2
- Free from halogens
- According to DIN 65164 (part 1 and 2) strand 0,28 mm
- Coverage: >75%
- Temperature range: -55°C to +135°C; Short-term: +160°C
- Classification: HL3 to R22 (Interior) / R23 (Exterior), EN45545-2:2013

- 聚酰胺6.6制成
- 经济型
- 应用于捆绑和保护电线
- 自熄灭性 UL 94 V2
- 无卤素
- 单股为0.28mm, 结构根据DIN 65 164 (part 1+2)标准
- 覆盖率: >75%
- 温度范围: -55°C 至 +135°C; 短期温度: +160°C
- 等级: HL3, 根据EN45545-2:2013车内软管R22 / 车外软管R23标准



- Polyamide PA 6.6
- Economical
- For bundling and protection of electrical wires
- Self-extinguishing UL 94 V2
- Free from halogens
- According to DIN 65164 (part 1 and 2) strand 0,25 mm
- Coverage: >65%
- Temperature range: -55°C to +135°C; Short-term: +160°C
- Classification: HL3 to R22 (Interior) / R23 (Exterior), EN45545-2:2013
- 聚酰胺6.6制成
- 经济型
- 应用于捆绑和保护电线
- 自熄灭性 UL 94 V2
- 无卤素
- 单股为0.25mm, 结构根据DIN 65 164 (part 1+2)标准
- 覆盖率: >65%
- 温度范围: -55°C 至 +135°C ; 短期温度: +160°C
- 等级: HL3, 根据EN45545-2:2013车内软管R22/车外软管R23标准

L.66 braided hose

Industrial and transport sectors.

L.66 编织网管

运用于工业, 交通运输等行业。

Order No.	NW	Construction number x Ø mm	Fits to termination	Operative Range min. Ø	Operative Range max. Ø	MOQ (M)
订货号	标称内径	结构根数 x 直径	适配末端配件	工作范围最小	工作范围最大	最小起订量黑色 / 灰色
# L.66.04 *	04	64 x 0.25	-	4.0	7.0	2000 / 待定
# L.66.08 *	08	64 x 0.25	SRER-06	5.0	10.0	- / 2000
# L.66.10 *	10	120 x 0.25	SRER-06	7.0	13.0	1000 / 2000
# L.66.16 *	16	144 x 0.25	SRER-16	11.0	20.0	1500 / 1800
# L.66.20 *	20	216 x 0.25	SRER-16	17.0	33.0	- / 1600
# L.66.25 *	25	240 x 0.25	SRER-21 / SRER-29	21.0	34.0	- / 1600
# L.66.30 *	30	288 x 0.25	SRER-21 / SRER-29	25.0	45.0	1300 / 1350
# L.66.40 *	40	288 x 0.25	SRER-29	31.0	55.0	1000 / 1000
# L.66.50 *	50	480 x 0.25	SREV-40 / SRER-50	58.0	70.0	- / 1000

* = Replace with "SW" to order black or "GR" to order grey / * = "SW" 订黑色或 "GR" 订灰色

For technical specification in details, please ask for "Technical Data Sheet" DB-Nr.55040

要了解详细技术规格, 请索取 "技术数据表" DB-Nr.55040

标记为 # 的产品有最小起订量 (MOQ), 待定 = MOQ需与工厂确认

unit = mm
单位 = mm



- Polyester
- For bundling and protection of electrical wires
- Self-extinguishing UL 94 V0
- Free from halogens
- According to DIN 65164 (part 1 and 2) strand 0,28 mm
- Coverage: >90%
- Temperature range: -50°C to +120°C; Short-term: +150°C
- Classification: HL3 to R22 (Interior) / R23 (Exterior), EN45545-2:2013
- 聚酯纤维
- 应用于捆绑和保护电线
- 自熄灭性 UL 94 V0
- 无卤素
- 单股为0.28mm, 结构根据DIN 65 164 (part 1+2)标准
- 覆盖率: >90%
- 温度范围: -50°C 至 +120°C ; 短期温度: +150°C
- 等级: HL3, 根据EN45545-2:2013车内软管R22 / 车外软管R23标准

F.PX braided hose

In the industry: aviation, construction of vehicles and trains.

To be phased out on 1st Jan 2021.

F.PX 编织网管

运用于工业, 航空, 汽车制造和铁路等行业。

将逐步淘汰, 截止于: 2021年1月1日

Order No. grey	NW	Fits to termination	Construction number x Ø mm	Operative Range min. Ø	Operative Range max. Ø
订货号 灰色	标称内径	适配末端配件	结构根数 x 直径	工作范围最小	工作范围最大
F.PX.04GR	04	-	48 x 0.28	3.0	7.0
F.PX.06GR	06	SRER-06	72 x 0.28	5.0	8.0
F.PX.08GR	08	SRER-06	96 x 0.28	7.0	10.0
F.PX.10GR	10	SRER-06	120 x 0.28	9.0	13.0
F.PX.12GR	12	SRER-06	160 x 0.28	11.0	16.0
F.PX.16GR	16	SRER-16	192 x 0.28	15.0	21.0
F.PX.20GR	20	SRER-16 / SRER-21	240 x 0.28	20.0	26.0
F.PX.25GR	25	SRER-16 / SRER-21	280 x 0.28	24.0	31.0
F.PX.30GR	30	SRER-21 / SRER-29	384 x 0.28	28.0	38.0
F.PX.40GR	40	SREV-40	480 x 0.28	38.0	49.0

For technical specification in details, please ask for "Technical Data Sheet" DB-Nr.55100

要了解详细技术规格, 请索取 "技术数据表" DB-Nr.55100

unit = mm
单位 = mm

L.PX braided hose

Industrial and transport sectors.
To be phased out on 1st Jan 2021.

L.PX 编织网管

运用于工业，交通运输等行业。
将逐步淘汰，截止于：2021年1月1日



Order No.	NW	Fits to termination	Construction number x Ø mm	Operative Range min. Ø	Operative Range max. Ø	MOQ (M)
订货号	标称内径	适配末端配件	结构根数 x 直径	工作范围最小	工作范围最大	最小起订量黑色 / 灰色
# L.PX.04 *	04	-	64 x 0.22	3.0	8.0	2000/2000
# L.PX.08 *	08	SRER-06	80 x 0.22	5.0	10.0	- / 1500
# L.PX.10 *	10	SRER-06	120 x 0.22	7.0	14.0	-
# L.PX.16 *	16	SRER-16	144 x 0.22	11.0	20.0	-
# L.PX.20 *	20	SRER-16	216 x 0.22	19.0	28.0	-
# L.PX.25 *	25	SRER-21 / SRER-29	240 x 0.22	21.0	34.0	-
# L.PX.30 *	30	SRER-21 / SRER-29	288 x 0.22	25.0	40.0	-
# L.PX.40 *	40	SRER-29	288 x 0.22	31.0	55.0	-
# L.PX.50 *	50	SREV-40 / SRER-50	480 x 0.22	40.0	68.0	- / 1000

* = Replace with "SW" to order black or "GR" to order grey / * = "SW" 订黑色或 "GR" 订灰色
For technical specification in details, please ask for "Technical Data Sheet" DB-Nr.55140
要了解详细技术规格，请索取“技术数据表” DB-Nr.55140

标记为 # 的产品有最小起订量 (MOQ)

unit = mm
单位 = mm



- Polyester
- Economical
- For bundling and protection of electrical wires
- Self-extinguishing UL 94 V0
- Free from halogens
- According to DIN 65164 (part 1 and 2) strand 0.22 mm
- Coverage: >65%
- Temperature range: -50°C to +120°C; Short-term: +150°C
- Classification: HL3 to R22 (Interior) / R23 (Exterior), EN45545-2:2013
- 聚酯纤维
- 经济型
- 应用于捆绑和保护电线
- 自熄灭性 UL 94 V0
- 无卤素
- 单股为0.22mm, 结构根据DIN 65 164 (part 1+2)标准
- 覆盖率: >65%
- 温度范围: -50°C 至 +120°C ; 短期温度: +150°C
- 等级: HL3, 根据EN45545-2:2013车内软管R22 / 车外软管R23标准

G.PX open braided hose self-winding

For mechanical protection in a wide range of applications also for retrofit installation.

G.PX 开合式编织网管，自动关闭

广泛用于机械防护及安装制造。

Order No. black	NW	Operative Range min. Ø	Operative Range max. Ø	Weight nom. per 100 m
订货号 黑色	标称内径	工作范围 最小	工作范围 最大	重量 每100m
G.PX.05SW	05	4.5	5.5	1.6 kg
G.PX.08SW	08	7.0	9.0	2.0 kg
G.PX.10SW	10	9.0	11.0	2.3 kg
G.PX.13SW	13	11.5	13.0	2.5 kg
G.PX.16SW	16	14.5	17.5	3.4 kg
G.PX.19SW	19	17.0	21.0	3.8 kg
G.PX.25SW	25	22.5	27.5	4.8 kg
G.PX.29SW	29	26.0	32.0	5.3 kg
G.PX.32SW	32	29.0	35.0	6.1 kg
G.PX.38SW	38	34.0	42.0	8.3 kg
G.PX.50SW	50	45.0	55.0	8.7 kg

For technical specification in details, please ask for "Technical Data Sheet" DB-Nr.55400
要了解详细技术规格，请索取“技术数据表” DB-Nr.55400

unit = mm
单位 = mm



- Polyester monofil and multifil fibres
- Open, overlapping tube construction
- For bundling and protection of electrical wires or cables
- Self-extinguishing ; Free from halogens
- Abrasion and vibration protection
- Highly flexible
- Very good resistance against chemicals ; UV resistant
- Overlap: 90°
- Temperature range: -55°C to +150°C
- Classification: HL3 to R22 (Interior) / R23 (Exterior), EN45545-2:2013
- 复合聚酯纤维
- 直接打开，采用重叠的设计
- 应用于捆绑和保护电线和电缆
- 自熄灭性；无卤素
- 具有耐磨性和抗震动性
- 非常柔软
- 非常好的抗化学品；抗紫外线
- 重叠：90°
- 温度范围：-55°C 至 +150°C
- 等级：HL3, 根据EN45545-2:2013车内软管R22 / 车外软管R23标准



- Finest tin-plated copper wires mixed with polyester monofilament
- Very high flexibility
- Typical screening values: 45 to 67 dB at 100MHz
- Excellent abrasion and vibration resistance
- Does not fray
- Good fire safety characteristics
- Due to two component structure, mechanical and electrical functions are clearly separated
- Thanks to tube former for small sizes:
 - no fold up of braid
 - easier processing and installation
- Free from halogens
- Coverage: >95%
- Temperature range: -40°C to +150°C
- Classification: HL3 to R22 (Interior) / R23 (Exterior), EN45545-2:2013

- 镀锡铜线和聚酯混合编织
- 非常高的柔软性
- 标准屏蔽值：频率为100MHz时45-67dB
- 优异的耐磨性和抗震动性
- 不磨损
- 良好的防火安全特性
- 基于它由两种材料制成，机械和电气功能很清晰的分开
- 较小尺寸带支撑管：
 - 编织网管不会折叠
 - 便于加工和安装
- 不含卤素和镉
- 覆盖度：>95%
- 温度范围：-40°C 至 +150°C
- 等级：HL3，根据EN45545-2:2013车内软管R22 / 车外软管R23标准

F.HY hybrid screening braid

In ship building, railway construction and machine building.
For dynamic applications.

F.HY 混合编织屏蔽网管

应用于造船业、铁路建设和机械制造。
应用于动态场合。

Order No.	NW	Braid Specification	Tolerance mm	Nominal wall thickness	Operative Range min.Ø	Operative Range max.Ø	PU meter
订货号	标称内径	编织规格	公差	标称壁厚	工作范围最小	工作范围最大	包装单位米
* F.HY.10	10	48 x 8 x 0.1	+/-1.5	0.50	8.0	13.0	50
* F.HY.12	12	56 x 8 x 0.1	+/-2.0	0.50	10.0	15.0	50
F.HY.15	17	68 x 10 x 0.1	+/-3.0	0.50	12.0	18.0	50
F.HY.20	23	72 x 10 x 0.1	+/-4.0	0.50	19.0	27.0	50
F.HY.35	29	120 x 10 x 0.1	+/-4.0	0.50	30.0	40.0	50
F.HY.40	36,48	120 x 16 x 0.1	+/-4.0	0.65	30.0	50.0	50

For technical specification in details, please ask for "Technical Data Sheet" DB-Nr.65040

要了解详细技术规格，请索取“技术数据表”DB-Nr.65040

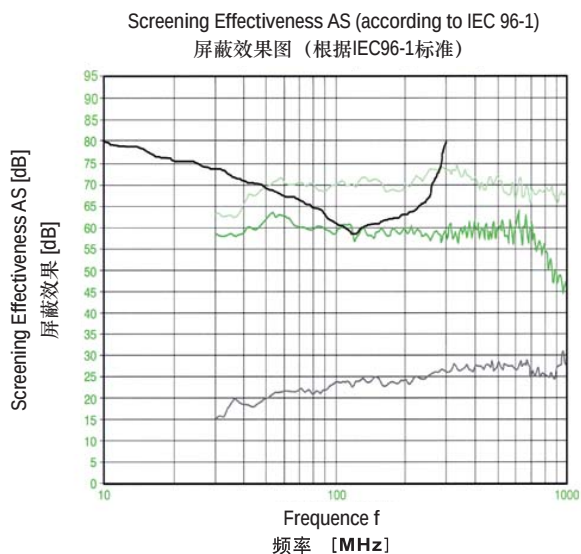
* = With tube former / = 含橡胶支撑管

unit = mm
单位 = mm

Screening Effectiveness 屏蔽效果

Screening Effectiveness of **PMA** Screening Braid (typical values)

PMA 屏蔽编织网管的屏蔽效果图（标准值）



— F.HY	— F.CU
— F.CK	— MEPLA

MEPLA is a standard metal plastic conduit
MEPLA 是一个标准的金属包塑管

EN45545-3 Fire resistance requirements for fire barriers: EN45545-3 标准防火屏障的耐火要求:

Fire barriers can play an important part in fire safety concepts for passenger vehicles, preventing fires from spreading and gases from being transported and providing safe areas for passengers until evacuation can be completed.

防火屏障可以成为发挥客运车辆防火安全理念的一个重要组成部分，防止火势蔓延和气体的渗透以及可以提供乘客完成疏散之前一个安全区域。

EN45545-3 describes the Fire resistance requirements for fire barriers. It is not difficult to envisage that positions where cables are fed through a fire barrier could without careful design be potential weak spots in the barrier where fire, heat or gases could break through.

EN45545-3 标准介绍了防火屏障的耐火要求，不难想象，穿过防火屏障的电缆如果没有精心设计，可能是火、热或气体突破的潜在的薄弱点。

E, I and W requirements are specified for 10 different fire barriers installation situations and according to operating category as defined in EN45545-1.

E, I 和 W 的要求是根据 EN45545-1 标准运营类别中定义的 10 种不同的防火屏障安装情况。

- E (Integrity) with ratings E15, E30 (in minutes)
E (完整性) 带评级 E15, E30 (分钟)
- I (Thermal Insulation)
I (热绝缘)
- W (Radiation)
W (辐射)

The highest requirement E30 for fire integrity is placed upon a fire barrier between a luggage compartment and the passenger zone or driver's cabin for operation category 3 and 4. No break through of fire within 30 minutes.

耐火完整性要求最高的 E30 评级的防火屏障，是放在行李车厢和乘客区或运营类别 3 和 4 的驾驶舱，至少 30 分钟内防止火灾爆发。

For many of the 10 installation situations and operating categories E15 is sufficient.

对于 10 种安装情况中的许多情况和运营类别，E15 评级已经足够的。

Fire resistance requirements for fire barriers:

防火屏障的耐火要求:

Installation Situations – Positions on the Vehicle

安装情况——在车辆的位置

- | | |
|------|---|
| 1-4 | Under floor origin. Barrier protecting passenger or staff/driver area
地板下的隐患。屏障保护乘客或乘务员/驾驶员区域 |
| 5-6 | Passenger area origin. Barrier protecting further passenger or staff/driver area
乘客区的隐患。屏障进一步保护乘客或乘务员/驾驶员区域 |
| 7 | Luggage compartment origin. Barrier to outside of luggage compartment
行李舱的隐患。屏障到行李舱外围 |
| 8 | Luggage compartment origin. Barrier protecting further passenger or staff/driver area
行李舱的隐患。屏障进一步保护乘客或乘务员/驾驶员区域 |
| 9-10 | Technical cabinets origin. Barrier protecting further passenger or staff/driver area
控制柜的隐患。屏障进一步保护乘客或乘务员/驾驶员区域 |

Fire resistance requirements for fire barriers:

防火屏障的耐火要求:

Installation Situations – Positions on the Vehicle – Origin of the fire

安装情况 - 在车辆的位置 - 起火的源头

Origin in an Underfloor area

地板下的源头

Fire resistance requirements for fire barriers:

防火屏障的耐火要求:

Installation Situations – Positions on the Vehicle – Origin of the fire

安装情况 - 在车辆的位置 - 起火的源头

Origin in an Underfloor area

地板下的源头

N°	Fire Origin / 火源	Protected Location 保护的场所	Remarks / 备注	Operation category 运营类别	Requirements / 要求
1	Underfloor technical cabinet containing electrical high power supply or traction circuits other than brake resistors 地板下的控制柜包含大功率电源或制动电阻以外的牵引电路	Passenger and staff area including driver's cab 乘客和工作人员的区域, 包括驾驶室	Tested in accordance with EN1364-2. Requirements are defined from underfloor to the top of the floor covering. 有关要求被定义为地板下到地面复盖物顶部的定义, 根据 EN1364-2 标准测试	1, 2, 4	E15
				3	E15 I15
2	Underfloor traction transformers or reactors filled with insulation fluid 地板下的牵引变压器或注有绝缘液的整流器	Passenger and staff area including driver's cab 乘客和工作人员的区域, 包括驾驶室	Tested in accordance with EN1364-2. Whole cross section and 1m longer than the object in each longitudinal direction. Requirements are defined from underfloor to the top of the floor covering. 整个横截面, 和超过每个轴向物体 1 米以上, 有关要求被定义为地板下到地面复盖物顶部的定义, 根据 EN1364-2 标准测试	1, 2	E15
				3, 4	E15 I15
3	Underfloor combustion engine (including heating equipment, fuel tank and pipework) 地板下内燃机 (含加热设备, 燃油箱和管道)	Passenger and staff area including driver's cab 乘客和工作人员的区域, 包括驾驶室	Tested in accordance with EN1364-2. Whole cross section and 1m longer than the object in each longitudinal direction. Requirements are defined from underfloor to the top of the floor covering. 整个横截面, 和超过每个轴向物体 1 米以上, 有关要求被定义为地板下到地面复盖物顶部的定义, 根据 EN1364-2 标准测试	1, 2	E15
				3, 4	E15 I15
4	Underfloor area not covered by positions 1-3 above 上述 1-3 位置未涵盖地板下的区域	Passenger and staff area including driver's cab 乘客和工作人员的区域, 包括驾驶室	Tested in accordance with EN1364-2. Requirements are defined from underfloor to the top of the floor covering. 有关要求被定义为地板下到地面复盖物顶部的定义, 根据 EN1364-2 标准测试	1, 2, 3, 4	No requirement 没需求

Fire resistance requirements for fire barriers:

防火屏障的耐火要求:

Installation Situations – Positions on the Vehicle – Origin of the fire

安装情况 - 在车辆的位置 - 起火的源头

Origin in the Passenger Area

乘客区的源头

N°	Fire Origin / 火源	Protected Location 保护的场所	Remarks / 备注	Operation category 运营类别	Requirements / 要求
5	Passenger area 乘客区域	Adjacent passenger area 邻近乘客区域	Tested in accordance with EN1364-1(walls). The full cross section shall be tested with all elements positioned as they would be present in an actual railway vehicle. 因为它们应用在铁路车辆上, 整个横截面与所有安装的元件都必须根据 EN1364-1 (墙壁) 标准进行测试	1, 2, 4	No requirements 没需求
				3	E15 for the full cross section, Elements shall be located at a distance not exceeding 30m from another full cross section element E15 适用于整个横截面, 元件与其他的整个横截面元件之间的距离不得超过 30 米
6	Passenger area 乘客区域	Driver's cab 驾驶室	Fire barriers are tested in accordance with EN1364-1 (walls) and Clause 6 of this document. The full cross section shall be tested with all elements positioned as they would be present in an actual railway vehicle. 防火屏障是根据 EN1364-1 (墙壁) 标准和本文档的第 6 节进行测试 因为它们应用在铁路车辆上, 整个横截面与所有安装的元件都必须按标准进行测试	1, 2	No requirements 没需求
				4	E10
				3	E15 I15

Fire resistance requirements for fire barriers:

防火屏障的耐火要求

Installation Situations – Positions on the Vehicle – Origin of the fire

安装情况 - 在车辆的位置 - 起火的源头

Origin in the Luggage Compartment

行李舱的源头

N°	Fire Origin /火源	Protected Location 保护的场所	Remarks /备注	Operation category 运营类别	Requirements / 要求
7	Inside the luggage container 行李舱内部	Outside the luggage container 行李舱外围	Tested in accordance with EN1364-1 (walls) 根据 EN1364-1标准测试 (墙壁)	1, 2, 3, 4	E15
8	Luggage compartments 行李舱	Passenger and staff areas including driver's cab 乘客和工作人员的区域, 包括驾驶室	Tested in accordance with EN1364-1 (walls) 根据 EN1364-1标准测试 (墙壁)	1	No requirements 没需求
				2	E15
				3	E30
		All areas (including exteriors) 所有区域 (包括外围)		4	E30

Fire resistance requirements for fire barriers:

防火屏障的耐火要求

Installation Situations – Positions on the Vehicle – Origin of the fire

安装情况 - 在车辆的位置 - 起火的源头

Origin in the Technical Cabinets

控制柜的源头

N°	Fire Origin /火源	Protected Location 保护的场所	Remarks /备注	Operation category 运营类别	Requirements / 要求
9	Inside a technical cabinet located in the body shell which contains high power electrical equipment. 位于车辆内的控制柜内, 包含 大功率电气设备	passenger and staff areas including driver's cab 乘客和工作人员的区域, 包括驾驶室	Tested in accordance with EN1364-1 (Walls) 根据EN1364-1标准测试 (墙壁)	1, 2, 4	E15
				3	E15 I15
10	Inside a technical cabinet located in the body shell which contains an internal combustion engine including heating equipment with tank and pipe work. 位于车辆内的控制柜内, 内装 有内燃机, 包括带油箱和管道的 加热设备	passenger and staff areas including driver's cab 乘客和工作人员的区域, 包括驾驶室	Tested in accordance with EN1364-1 (Walls). The wall shall end on the roof body structure , if not the ceiling shall be tested in accordance with EN1364-2. 根据 EN1364-1 标准测试 (墙壁) 墙壁应结合车辆顶部主体结构, 否则, 天花板应按照 EN1364-2 进行测试	1, 2	E15
				3, 4	E15 I15

To fit all your requirements

满足您所有需求

Three flexible fire protection solutions, offering total planning and installation flexibility

三种灵活的防火保护解决方案，提供全方面的设计和安装的灵活性

PMA adapter solution

PMA 适配器解决方案



PMA adapter solution fitting provides a secure and effective barrier against fire, smoke and gas for up to 30 minutes.

PMA适配器解决方案提供了一个安全有效的防火、烟雾和气体的屏障，可长达 30 分钟。

PMA Strain relief fitting

PMA 带消除应力解决方案



PMA Strain relief fitting with fire barrier function with clamping elements from Pflitsch provides a secure and effective barrier against fire, smoke and gas for up to 15 minutes.

PMA带消除应力管接头结合了Pflitsch密封插入件，具有防火功能，可以在 15 分钟内提供安全有效的防火、烟雾和气体的屏障。

PMA solution with Roxtec

PMA 和烙克赛克组合的解决方案



PMA solution for use in combination with Roxtec sealing modules.

PMA与烙克赛克密封模块结合使用的解决方案。

As a leading global supplier of cable protection systems for use in rail applications, PMA has developed novel, innovative, EN 45545-3 compliant fire barrier solutions for combination with its proven cable protection systems.

作为全球铁路应用中电缆保护系统的领导者，PMA 根据 EN 45545-3 标准，开发创新并结合其成熟的电缆保护系统提供安全可靠的防火屏障解决方案。

A PMA metal adapter is now available with built in intumescent material which can be used in combination with the standard range of PMA cable protection products approved for use in the rail industry. The adapters allow cables to be ducted through a fire wall without compromising the integrity and function of the fire wall. In the event of a fire the intumescent material swells to up to 40 times its original volume, sealing all cavities around and between the cables, preventing the propagation of fire and transport of smoke and gas along the cable protection system.

用于铁路行业的 PMA 标准电缆保护系统的产品现在可以结合使用内含膨胀材料的 PMA 金属适配器。这个适配器允许电缆穿过防火墙而不损失其完整性的系统。当发生火灾时，膨胀材料由于热而膨胀至它们原体积的 40 倍，这种材料扩张填充适配器内电缆之间的空腔，有效地防止火焰、烟雾和气体沿着电缆保护系统蔓延。

Further solutions offer additional flexibility for other installation situations using elements from two other companies well established in the rail industry, Roxtec and Pflitsch.

利用来自被铁路行业认可的烙克赛克和 Pflitsch 这两家公司的部件，增加其灵活性，以便为其他安装提供解决方案。

PMA fittings using strain relief cable clamping elements from Pflitsch have been available for many years. Special fire resistant Pflitsch clamping elements are now available which when integrated into a PMA fitting provide a secure and effective barrier against fire, smoke and gas for up to 15 minutes.

多年来，PMA 消除应力管接头一直使用 Pflitsch 的密封插入件。当特殊的耐火 Pflitsch 密封插入件结合 PMA 管接头应用时，可以在 15 分钟内提供安全有效的防火、烟雾和气体的屏障。

PMA has also developed an adapter including intumescent material which can be built into a Roxtec sealing system. Roxtec sealing modules are well known and proven in rail and ship building construction for decades.

The specially designed PMA adapter fits perfectly into a Roxtec module providing a sealed system.

PMA 专门设计了内含膨胀材料的适配器，可完美地嵌入至烙克赛克密封系统中的模块，确保密封系统完整性。烙克赛克密封模块在轨道和船舶建造方面已有数十年的历史。

PMA adapter solution PMA 适配器解决方案

How the fire barrier works in a train 防火屏障在车辆上如何工作的

In the event of a fire, the intumescent material ensures that two areas remain separated from each other for at least 30 minutes (E30) in accordance with EN 45545-3. The intumescent material is fixed within the adapter to block the transport of fire, heat and fumes. The material expanding to fill the cavities between the cables within the adapter. Intumescent materials (typically sodium silicate or graphite) swell as a result of heat exposure to many times their original volume. The PMA adapter use this material very effectively to seal cavities preventing heat, fire and gases from passing through.

根据EN 45545-3 标准，当发生火灾时，膨胀材料可确保分隔两个区域至少 30 分钟（E30）。固定在适配器内的膨胀材料阻止火焰、热和烟雾蔓延，这种材料扩张填充适配器内电缆之间所有空腔。膨胀材料（通常为硅酸钠或膨胀石墨）由于热而膨胀至它们原体积的许多倍。PMA 适配器采用这种材料可以非常有效地密封空腔，防止热、火焰、烟雾蔓延。



Without fire barrier: Fire and fumes can spread 若没有防火屏障：火和烟雾会直接蔓延

In case of fire: Without a fire barrier, fire, heat and fumes can immediately spread between the compartments and escalates the situation.

万一发生火灾：若没有防火屏障，火焰、热和烟雾将立即在车厢之间蔓延并逐渐扩散。



With PMA fire barrier: More safety and better prevention 使用PMA防火屏障：更安全，更好的预防

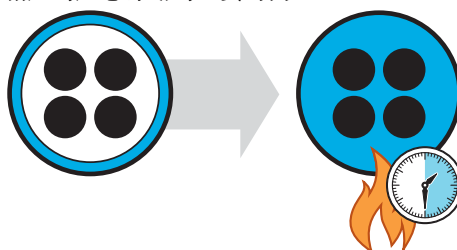
The Intumescent material within the PMA adapter swell in case of fire exposure and blocks transport of fire, heat and fumes between the compartments or cabins up to 30 minutes in accordance to EN45545-3.

根据 EN45545-3 标准，当发生火灾时，PMA 适配器内的膨胀材料由于热而膨胀，从而可以有效阻止车厢或驾驶室之间的火焰、热和烟雾蔓延高达 30 分钟。

In the event of a fire the intumescent material swells to up to 40 times its original volume, sealing all cavities around and between the cables, preventing the propagation of fire and transport of smoke and gas along the cable protection system.

Giving valuable extra time to evacuate passengers and initiate emergency plan.

当发生火灾时，膨胀材料由于热而膨胀至它们原体积的 40 倍，这种材料扩张填充适配器内电缆之间的空腔，有效地防止火焰、烟雾和气体沿着电缆保护系统蔓延。提供了给撤离乘客和启动相应的应急计划的宝贵时间。



30min 30分

PMA adapter solution

PMA 适配器解决方案

Fire safety in trains for up to 30 minutes according to EN45545-3

根据 EN45545-3 标准，在车辆上其防火安全可高达 30 分钟

The unique PMA fire barrier adapters allow termination of a cable protection system to a fire wall. The adapter uses intumescent material to seal all cavities in the event of a fire and can be attached directly to the fire wall. It ensures that cables and wires can be fed through the fire barrier while retaining an E30 rating and above according to EN45545-3. These adapters are available in sizes M16 to M63 and can be adapted to any wall structure to ensure simple and safe assembly.

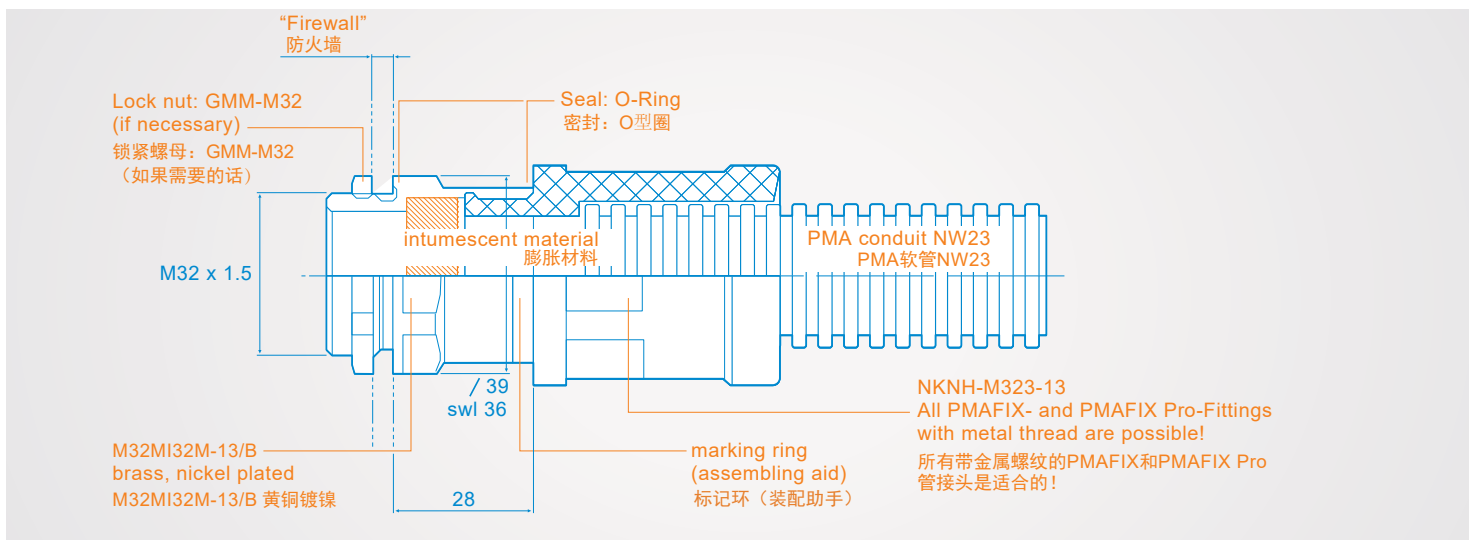
PMA 已经设计了一个允许电缆保护系统连接防火墙的防火屏障适配器。如果发生火灾，这个适配器使用膨胀材料封住所有空腔，它可直接连接到防火墙。根据 EN45545-3 标准，它确保电缆和电线能够通过防火屏障的同时保持 E30 等级及其以上。此适配器含多种规格尺寸从 M16 至 M63，适用于任何墙面结构，易于安装。

In the event of a fire, the intumescent material ensures that two areas remain separated from each other for at least 30 minutes (E30) in accordance with EN 45545-3. The intumescent material is fixed within the adapter to block the transport of fire, heat and fumes. The material expanding to fill the cavities between the cables within the adapter. Intumescent materials (typically sodium silicate or graphite) swell as a result of heat exposure to many times their original volume. The PMA adapter use this material very effectively to seal cavities preventing heat, fire and gases from passing through.

根据 EN 45545-3 标准，当发生火灾时，膨胀材料可确保分隔两个区域至少 30 分钟（E30）。固定在适配器内的膨胀材料阻止火焰、热和烟雾蔓延，这种材料扩张填充适配器内电缆之间所有空腔。膨胀材料（通常为硅酸钠或膨胀石墨）由于热而膨胀至它们原体积的许多倍。PMA 适配器采用这种材料可以非常有效地密封空腔，防止热、火焰、烟雾通过。

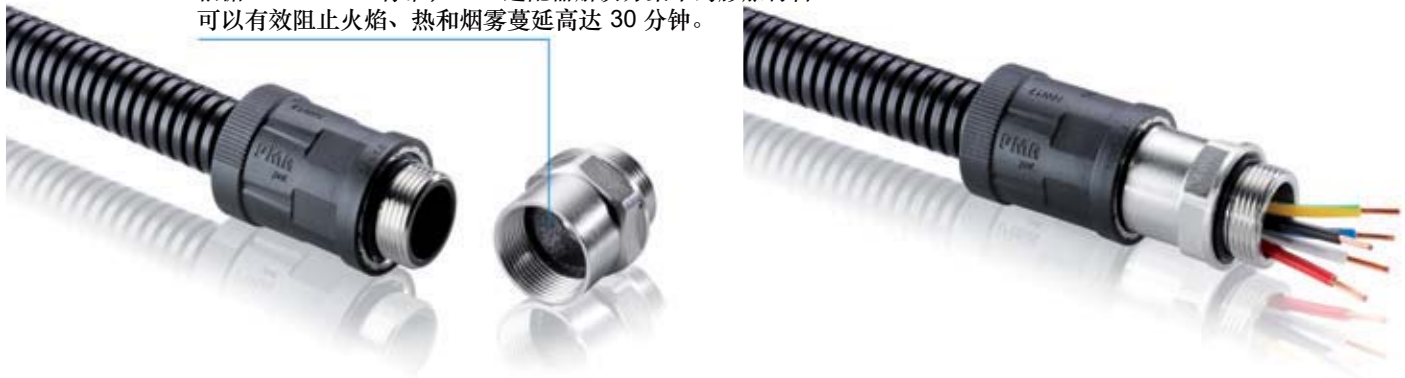
The Intumescent material within the PMA adapter solution blocks transport of fire heat and fumes up to 30 minutes in accordance to EN45545-3.

根据 EN45545-3 标准，PMA 适配器解决方案中的膨胀材料可以有效阻止火焰、热、和烟雾蔓延高达 30 分钟。



The Intumescent material within the PMA adapter solution blocks transport of fire, heat and fumes up to 30 minutes in accordance to EN45545-3.

根据 EN45545-3 标准，PMA适配器解决方案中的膨胀材料可以有效阻止火焰、热和烟雾蔓延高达 30 分钟。



PMA single side solution
PMA 单方面的解决方案
All combinations for fittings and conduits you need
你所需要的管接头和软管组合方案

For use on the carriage roof, couplings, intercar jumper connections and under the vehicle: XPCSF / XPCS / PCS and PCSL Heavy-duty and medium-duty flexible conduits for dynamic outside applications with highest requirements to UV and weathering resistance.
For use inside the carriage passenger zone (Electrical cabinets etc): VAM / VAML and PLR Heavy-duty and medium-duty flexible conduits for high fire and passenger safety requirements in interior applications such as passenger areas.

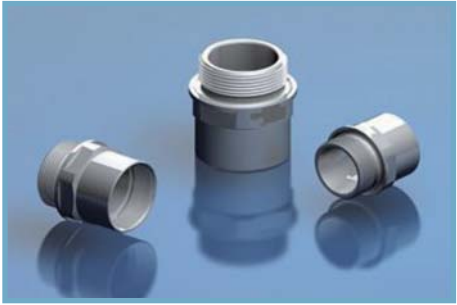
适用于车顶，车钩，车间跳线连接和车辆下方：厚壁 / 中壁，非常柔软的 XPCSF / XPCS / PCS 和 PCSL 软管；适用于在铁路车辆行业外部的动态安装，具有极好的抗紫外线及耐候性能。

适用于车厢乘客区（电气柜等）内使用：厚壁 / 中壁，柔软的 VAM / VAML 和 PLR 软管；适用于铁路机车的旅客区域，具有优异的防火性能。

The matrix below shows the combinations of PMA adapter, fitting and conduit which have been tested to EN45545-3.
以下为 PMA 适配器、管接头和软管的组合指南表，测试符合 EN45545-3 标准。



PMA Adapter PMA 适配器	PMA Conduits PMA 软管		PMA Fittings PMA 管接头					
PMA MA/B Adapter PMA MA/B适配器	Conduit 软管尺寸	Size	VAM & VAML Conduits 软管	PCS & PCSL Conduits 软管	Possible Fitting Geometries 管接头几何结构	PMAFIX Pro	PMAFIX IP68	PMAFIX IP68GT
M16MI16M-10/B	NW10		VAMT-10B or VAMLT-10B	PCST-10B or PCSLT-10B	Straight 直型 90° Curved Elbow 90°曲线弯头 45° Elbow 45°弯头 Pflitsch strain relief Pflitsch 消除应力 Jacob strain relief Jacob 消除应力	NKNH-M160-10 NKBH-M160-10 NKAH-M160-10 NKNZ-M160/Px NKNZ-M160S-10	NVNV-M160-10 NVWV-M160-10 NVNZ-M160S/Px NVNZ-M160S-10	NVNV-M160GT-10 NVWV-M160GT-10 NVNZ-M160GT/Px NVNZ-M160GT-10
M20MI20M-10/B	NW12		VAMT-12B or VAMLT-12B	PCST-12B or PCSLT-12B	Straight 直型 90° Curved Elbow 90°曲线弯头 45° Elbow 45°弯头 Pflitsch strain relief Pflitsch 消除应力 Jacob strain relief Jacob 消除应力	NKNH-M202-10 NKBH-M202-10 NKAH-M202-10 NKNZ-M202/Px NKNZ-M202S-10	NVNV-M202-10 NVWV-M202-10 NVNZ-M202S/Px NVNZ-M202S-10	NVNV-M202GT-10 NVWV-M202GT-10 NVNZ-M202GT/Px NVNZ-M202GT-10
M25MI25M-11/B	NW17		VAMG-17B or VAMLG-17B	PCSG-17B or PCSLG-17B	Straight 直型 90° Curved Elbow 90°曲线弯头 45° Elbow 45°弯头 Pflitsch strain relief Pflitsch 消除应力 Jacob strain relief Jacob 消除应力	NKNH-M257-11 NKBH-M257-11 NKAH-M257-11 NKNZ-M257/Px NKNZ-M257S-11	NVNV-M257-11 NVBV-M257-11 NVAV-M257-11 NVNZ-M257S/Px NVNZ-M257S-11	NVNV-M257GT-11 NVBV-M257GT-11 NVAV-M257GT-11 NVNZ-M257GT/Px NVNZ-M257GT-11
M32MI32M-13/B	NW23		VAMG-23B or VAMLG-23B	PCSG-23B or PCSLG-23B	Straight 直型 90° Curved Elbow 90°曲线弯头 45° Elbow 45°弯头 Pflitsch strain relief Pflitsch 消除应力 Jacob strain relief Jacob 消除应力	NKNH-M323-13 NKBH-M323-13 NKAH-M323-13 NKNZ-M323/Px NKNZ-M323S-13	NVNV-M323-13 NVBV-M323-13 NVAV-M323-13 NVNZ-M323S/Px NVNZ-M323S-13	NVNV-M323GT-13 NVBV-M323GT-13 NVAV-M323GT-13 NVNZ-M323GT/Px NVNZ-M323GT-13
M40MI40M-13/B	NW29		VAMG-29B or VAMLG-29B	PCSG-29B or PCSLG-29B	Straight 直型 90° Curved Elbow 90°曲线弯头 45° Elbow 45°弯头 Pflitsch strain relief Pflitsch 消除应力 Jacob strain relief Jacob 消除应力	NKNH-M409-13 NKBH-M409-13 NKAH-M409-13 NKNZ-M409/Px NKNZ-M409S-13	NVNV-M409-13 NVBV-M409-13 NVAV-M409-13 NVNZ-M409S/Px NVNZ-M409S-13	NVNV-M409GT-13 NVBV-M409GT-13 NVAV-M409GT-13 NVNZ-M409GT/Px NVNZ-M409GT-13
M50MI50M-14/B	NW36		VAMG-36B or VAMLG-36B	PCSG-36B or PCSLG-36B	Straight 直型 90° Curved Elbow 90°曲线弯头 45° Elbow 45°弯头 Pflitsch strain relief Pflitsch 消除应力 Jacob strain relief Jacob 消除应力	NKNH-M506-14 NKBH-M506-14 NKAH-M506-14 NKNZ-M506/Px NKNZ-M506S-14	NVNV-M506-14 NVBV-M506-14 NVAV-M506-14 NVNZ-M506S/Px NVNZ-M506S-14	NVNV-M506GT-14 NVBV-M506GT-14 NVAV-M506GT-14 NVNZ-M506GT/Px NVNZ-M506GT-14
M63MI63M-14/B	NW48		VAMG-48B or VAMLG-48B	PCSG-48B or PCSLG-48B	Straight 直型 90° Curved Elbow 90°曲线弯头 45° Elbow 45°弯头 Pflitsch strain relief Pflitsch 消除应力 Jacob strain relief Jacob 消除应力	NKNH-M638-14 NKBH-M638-14 NKAH-M638-14 NKNZ-M638/Px NKNZ-M638S-14	NVNV-M638-14 NVBV-M638-14 NVAV-M638-14 NVNZ-M638S/Px NVNZ-M638S-14	NVNV-M638GT-14 NVBV-M638GT-14 NVAV-M638GT-14 NVNZ-M638GT/Px NVNZ-M638GT-14



- Nickel-plated brass
- Element including intumescence material
- At the ends one female and one male thread
- Designed to terminate a cable protection system at a fire barrier
- Allowing cables to be fed through the barrier without loss of fire integrity
- Fire Wall Integrity: EN45545-3
 - E30 to E45 Vertical
 - E20 to E30 Horizontal
- 黄铜镀镍制成
- 防火墙单元包括膨胀的材料
- 两端有一公和一母的螺纹
- 设计用于电缆保护系统连接防火屏障的一端
- 允许电缆通过防火屏障而保持耐火完整性
- 防火墙完整性: EN45545-3
 - E30 到 E45 垂直安装
 - E20 到 E30 水平安装

MA/B firewall element
metric, metal thread

MA/B 防火墙单元，公制，金属螺纹

Order No.	Female Thread metric	male, Thread metric	Fits to conduit size NW metric		Thread length	Overall length
订货号	内螺纹 公制	外螺纹 公制	适配软管尺寸 标称内径	公制	螺纹 长度	总 长度
M16MI16M-10/B	M16 x 1.5	M16 x 1.5	10	12	10.0	34.5
M20MI20M-10/B	M20 x 1.5	M20 x 1.5	12	16	10.0	34.5
M25MI25M-11/B	M25 x 1.5	M25 x 1.5	17	20	11.0	37.0
M32MI32M-13/B	M32 x 1.5	M32 x 1.5	23	25	13.0	41.0
M40MI40M-13/B	M40 x 1.5	M40 x 1.5	29	32	13.0	41.5
M50MI50M-14/B	M50 x 1.5	M50 x 1.5	36	40	14.0	43.5
M63MI63M-14/B	M63 x 1.5	M63 x 1.5	48	50	14.0	43.5

For technical specification in details, please ask for "Technical Data Sheet" DB-Nr.60028
要了解详细技术规格，请索取“技术数据表” DB-Nr.60028

unit = mm
单位 = mm

PMA Strain relief fitting
PMA 消除应力管接头
Fire barrier function with clamping elements from Pflitsch
结合 Pflitsch 密封插入件达到防火屏障的功效

Especially for jumper cables used to connect carriages and locomotives in the rail industry, PMA offers a solution with the PMA strain relief fittings NVNZ and NKNZ which include a fire resistant sealing insert from Pflitsch, providing strain relief and prevents fire, heat and fumes from breathing through in event of a fire.

PMA 提供的解决方案，特别适用于铁路行业的机车和车厢之间的跨接应用。一旦发生火灾时，PMA 消除应力管接头 NVNZ 和 NKNZ 中结合 Pflitsch 的耐火密封插入件，可有效阻止火焰、热和烟雾蔓延。

Due to the fact that a screwdriver is required for dismantling, it's impeding unauthorised or accidental opening or dismantling of the fittings.

由于只能用螺丝刀拆卸管接头，有效防止擅自或意外开启或拆卸。

With an easy push-in assembly for maximum installation reliability, the components are easy to install and guarantee up to E15 fire stop rating according to EN45545-3 and offer an excellent conduit pull-out strength.

采用简易的推入式安装方法，可达到最大的安装可靠性；这个组件不仅易于安装，并具有高强度的抗拉能力，同时符合 EN45545-3 标准确保可高达 E15 防火等级。

PMAFIX Pro NKNZ or PMAFIX NVZ fittings can be attached on either side of the adapter allowing connection with the EN45545-2 approved XPCSF, XPCS, PCS, PCSL, VAM, VAML, PLR conduits, to achieve an EN45545-3 E15 rating in combination.

PMAFIX Pro NKNZ 或 PMAFIX NVNZ 系列管接头可以连接到适配器的任意一侧，允许符合 EN45545-2 的 PMA 软管（XPCSF、XPCS、PCS、PCSL、VAM、VAML、PLR）连接。此组合符合 EN45545-3 标准确保可高达 E15 防火等级。



PMAFIX Pro	PMAFIX IP68	NW	Thread size 螺纹规格
NKNZ-M120/B	NVNZ-M120S/B*	10	M12
NKNZ-M160/B	NVNZ-M160S/B*	10	M16
NKNZ-M202/B	NVNZ-M202S/B*	12	M20
NKNZ-M207/B	NVNZ-M207S/B*	17	M20
NKNZ-M257/B	NVNZ-M257S/B*	17	M25
NKNZ-M253/B	NVNZ-M253S/B*	23	M25
NKNZ-M323/B	NVNZ-M323S/B*	23	M32
NKNZ-M329/B	NVNZ-M329S/B*	29	M32
NKNZ-M409/B	NVNZ-M409S/B*	29	M40
NKNZ-M406/B	NVNZ-M406S/B*	36	M40
NKNZ-M506/B	NVNZ-M506S/B*	36	M50
NKNZ-M508/B	NVNZ-M508S/B*	48	M50
NKNZ-M638/B	NVNZ-M638S/B*	48	M63

All sizes available with sealing inserts for various cable sizes
所有管接头均可提供各种电缆尺寸的密封插件



- High-grade, specially formulated polyamide 6, thread made of nickel-plated brass, the sealing insert are made from flame retarded TPE
- Very high impact resistance
- With integrated strain relief and optimal ingress protection at the cable
- Tested according to EN45545-3
- Vibration-proof connection to PMAFLEX conduits
- Polyamide Free from halogens and cadmium
- Fits both conduit profiles-fine (T) and coarse (G)
- Temperature range: -40°C to +105°C; Short-term: +130°C
- Fire barrier classification:
EN 45545-3: E15 Horizontal
E15 Vertical

- 高级，特殊配方聚酰胺6，螺纹部分材质为黄铜镀镍和消除应力部分是由耐火TPE制成
- 极好的抗冲击强度
- 结合消除应力组件，在电缆处提供最适当的防护
- 根据EN45545-3标准测试
- 配合PMAFLEX软管使用具有很好的防震作用
- 不含卤素和镉
- 适用软管类型—细波纹 (T) 和粗波纹 (G)
- 温度范围：-40°C 至 +105°C；短期温度：+130°C
- 防火屏障等级：
EN 45545-3: E15 水平安装
E15 垂直安装

IP66/IP68

VNZ/B

fire barrier function metric
thread straight, with strain
relief and metal thread

Fire barrier function

In railway vehicle and heavy machine construction
For the separation of damp and dry areas.

Furthermore, these connectors can especially be used where
damp and dry areas have to be separated.

VNZ/B

防火屏障功能，公制，
消除应力，金属螺纹

防火屏障功能

应用于铁路机车和重型机械的制造，
也被应用于间隔干湿区域。

此外，这些管接头可被特别用于间隔干湿区域。

CE PFLITSCH

Order No. black, Complete 订货号 黑色，整套	Order No. insert 订货号 插入件	Thread metric 螺纹 公制	Fits to conduit size NW 适配软管尺寸 标称内径	metric 公制	Cable range 电缆 直径范围	Thread length 螺纹 长度	Overall length 总长度	MOQ(pcs) 最小起订量 黑色
# NVNZ-M120S/B1	EK 150b7	M12x1.5	10	12	4.0 - 6.5	5.0	48.5	待定
# NVNZ-M120S/B2	EK 150b8	M12x1.5	10	12	5.0 - 8.0	5.0	48.5	待定
# NVNZ-M120S/B3	EK 150b9	M12x1.5	10	12	6.5 - 9.5	5.0	48.5	待定
# NVNZ-M160S/B1	E 150b7	M16x1.5	10	12	4.0 - 6.5	6.0	49.5	待定
# NVNZ-M160S/B2	E 150b8	M16x1.5	10	12	5.0 - 8.0	6.0	49.5	待定
# NVNZ-M160S/B3	E 150b9	M16x1.5	10	12	6.5 - 9.5	6.0	49.5	待定
# NVNZ-M202S/B1	E 152b7	M20x1.5	12	16	4.0 - 6.5	6.5	54.0	-
# NVNZ-M202S/B3	E 152b9	M20x1.5	12	16	6.5 - 9.5	6.5	54.0	-
# NVNZ-M202S/B4	E 152b11	M20x1.5	12	16	7.0 - 10.5	6.5	54.0	待定
# NVNZ-M207S/B1	E 152b7	M20x1.5	17	20	4.0 - 6.5	6.5	60.0	-
# NVNZ-M207S/B2	E 152b8	M20x1.5	17	20	5.0 - 8.0	6.5	60.0	-
# NVNZ-M207S/B3	E 152b9	M20x1.5	17	20	6.5 - 9.5	6.5	60.0	-
# NVNZ-M207S/B4	E 152b11	M20x1.5	17	20	7.0 - 10.5	6.5	60.0	-
# NVNZ-M207S/B5	E 152b13	M20x1.5	17	20	9.0 - 13.0	6.5	60.0	-
# NVNZ-M253S/B5	EK 154b13	M25x1.5	23	25	9.0 - 13.0	7.5	72.5	待定
# NVNZ-M253S/B6	EK 154b16	M25x1.5	23	25	11.5 - 15.5	7.5	72.5	待定
# NVNZ-M257S/B4	E 153b11	M25x1.5	17	20	7.0 - 10.5	7.5	61.5	待定
# NVNZ-M257S/B5	E 153b13	M25x1.5	17	20	9.0 - 13.0	7.5	61.5	100
# NVNZ-M257S/B6	E 153b16	M25x1.5	17	20	11.5 - 15.5	7.5	61.5	待定
# NVNZ-M323S/B4	E 154b18	M32x1.5	23	25	14.0 - 18.0	8.0	73.0	-
# NVNZ-M323S/B5	E 154b20	M32x1.5	23	25	17.0 - 20.5	8.0	73.0	60
# NVNZ-M329S/B2	EK 155b18	M32x1.5	29	32	14.0 - 18.0	8.0	73.0	待定
# NVNZ-M329S/B3	EK 155b20	M32x1.5	29	32	17.0 - 20.5	8.0	73.0	待定
# NVNZ-M329S/B4	EK 155b25	M32x1.5	29	32	20.0 - 25.0	8.0	73.0	20
# NVNZ-M406S/B1	E 156b25HF	M40x1.5	36	40	20.0 - 25.0	9.0	87.0	待定
# NVNZ-M406S/B2	EK 156b28	M40x1.5	36	40	24.0 - 28.0	9.0	87.0	待定
# NVNZ-M406S/B3	EK 156b32	M40x1.5	36	40	27.0 - 32.0	9.0	87.0	待定
# NVNZ-M409S/B1	E 155b16	M40x1.5	29	32	11.5 - 15.5	8.0	73.0	待定
# NVNZ-M409S/B2	E 155b18	M40x1.5	29	32	14.0 - 18.0	8.0	73.0	待定
# NVNZ-M409S/B3	E 155b20	M40x1.5	29	32	17.0 - 20.5	8.0	73.0	待定
# NVNZ-M409S/B4	E 155b25	M40x1.5	29	32	20.0 - 25.0	8.0	73.0	待定
# NVNZ-M409S/B5	E 155b28	M40x1.5	29	32	24.0 - 28.0	8.0	73.0	待定
# NVNZ-M506S/B1	E 156b32	M50x1.5	36	40	27.0 - 32.0	10.0	89.5	待定
# NVNZ-M506S/B3	E 156b36	M50x1.5	36	40	32.0 - 36.0	10.0	89.5	待定
# NVNZ-M508S/B2	E 157b36HF	M50x1.5	48	50	32.0 - 36.0	10.0	92.0	待定
# NVNZ-M508S/B3	E 157b40HF	M50x1.5	48	50	36.0 - 40.0	10.0	92.0	-
# NVNZ-M638S/B1	E 158bm1x35	M63x1.5	48	50	32.0 - 35.0	10.0	90.5	待定
# NVNZ-M638S/B2	E 158b44	M63x1.5	48	50	39.0 - 44.0	10.0	90.5	待定

For technical specification in details, please ask for "Technical Data Sheet" DB-Nr.35200
要了解详细技术规格，请索取“技术数据表”DB-Nr.35200

标记为 # 的产品有最小起订量 (MOQ)，待定 = MOQ需与工厂确认

unit = mm
单位 = mm

IP66/IP68/IP69

KNZ/B

Fire barrier function, metric thread straight, with strain relief and metal thread

Fire barrier function

In railway vehicle construction for carriage connections and heavy machine construction

For the separation of damp and dry areas.

Furthermore, these connectors can especially be used where damp and dry areas have to be separated.

KNZ/B

防火屏障功能，公制，消除应力，金属螺纹



防火屏障功能

应用于铁路机车建设的车厢连接和重型机械的制造，也被应用于间隔干湿区域。

此外，这些管接头可被特别用于间隔干湿区域。

Order No. black 订货号 黑色	Thread metric 螺纹 公制	Fits to conduit size NW 适配软管尺寸 标称内径 公制	Cable range 电缆 直径范围	Thread length 螺纹 长度	Overall length 总长度	MOQ(pcs) 最小起订量 黑色
# NKNZ-M120/B1	M12x1.5	10 12	4.0 - 6.5	5.0	53.5	待定
# NKNZ-M120/B2	M12x1.5	10 12	5.0 - 8.0	5.0	53.5	待定
# NKNZ-M120/B3	M12x1.5	10 12	6.5 - 9.5	5.0	53.5	待定
# NKNZ-M160/B1	M16x1.5	10 12	4.0 - 6.5	6.0	54.5	待定
# NKNZ-M160/B2	M16x1.5	10 12	5.0 - 8.0	6.0	54.5	待定
# NKNZ-M160/B3	M16x1.5	10 12	6.5 - 9.5	6.0	54.5	待定
# NKNZ-M202/B1	M20x1.5	12 16	4.0 - 6.5	6.5	60.5	待定
# NKNZ-M202/B3	M20x1.5	12 16	6.5 - 9.5	6.5	60.5	待定
# NKNZ-M202/B4	M20x1.5	12 16	7.0 - 10.5	6.5	60.5	待定
# NKNZ-M207/B3	M20x1.5	17 20	6.5 - 9.5	6.5	66.5	待定
# NKNZ-M207/B4	M20x1.5	17 20	7.0 - 10.5	6.5	66.5	待定
# NKNZ-M207/B5	M20x1.5	17 20	9.0 - 13.0	6.5	66.5	待定
# NKNZ-M257/B4	M25x1.5	17 20	7.0 - 10.5	7.5	67.5	待定
# NKNZ-M257/B5	M25x1.5	17 20	9.0 - 13.0	7.5	67.5	待定
# NKNZ-M257/B6	M25x1.5	17 20	11.5 - 15.5	7.5	67.5	待定
# NKNZ-M253/B5	M25x1.5	23 25	9.0 - 13.0	7.5	75.0	待定
# NKNZ-M253/B6	M25x1.5	23 25	11.5 - 15.5	7.5	75.0	待定
# NKNZ-M323/B2	M32x1.5	23 25	9.0 - 13.0	8.0	76.0	待定
# NKNZ-M323/B4	M32x1.5	23 25	14.0 - 18.0	8.0	76.0	待定
# NKNZ-M323/B5	M32x1.5	23 25	17.0 - 20.5	8.0	76.0	待定
# NKNZ-M329/B2	M32x1.5	29 32	14.0 - 18.0	8.0	83.0	-
# NKNZ-M329/B3	M32x1.5	29 32	17.0 - 20.5	8.0	83.0	待定
# NKNZ-M329/B4	M32x1.5	29 32	20.0 - 25.0	8.0	83.0	待定
# NKNZ-M409/B1	M40x1.5	29 32	11.5 - 15.5	8.0	83.0	待定
# NKNZ-M409/B2	M40x1.5	29 32	14.0 - 18.0	8.0	83.0	待定
# NKNZ-M409/B3	M40x1.5	29 32	17.0 - 20.5	8.0	83.0	待定
# NKNZ-M409/B4	M40x1.5	29 32	20.0 - 25.0	8.0	83.0	待定
# NKNZ-M409/B5	M40x1.5	29 32	24.0 - 28.0	8.0	83.0	待定
# NKNZ-M406/B1	M40x1.5	36 40	20.0 - 25.0	9.0	87.5	待定
# NKNZ-M406/B2	M40x1.5	36 40	24.0 - 28.0	9.0	87.5	待定
# NKNZ-M506/B1	M50x1.5	36 40	27.0 - 32.0	10.0	90.0	待定
# NKNZ-M506/B3	M50x1.5	36 40	32.0 - 36.0	10.0	90.0	待定
# NKNZ-M508/B2	M50x1.5	48 50	32.0 - 36.0	10.0	100.0	待定
# NKNZ-M508/B3	M50x1.5	48 50	36.0 - 40.0	10.0	100.0	待定
# NKNZ-M638/B1	M63x1.5	48 50	32.0 - 35.0	10.0	100.0	待定
# NKNZ-M638/B2	M63x1.5	48 50	39.0 - 44.0	10.0	100.0	待定

For technical specification in details, please ask for "Technical Data Sheet" DB-Nr.35400
要了解详细技术规格，请索取“技术数据表”DB-Nr.35400

标记为 # 的产品有最小起订量 (MOQ)，待定 = MOQ需与工厂确认

unit = mm
单位 = mm



- High-grade, specially formulated polyamide 6, thread made of nickel-plated brass, the sealing insert are made from flame retarded TPE
- Very high impact resistance
- With integrated strain relief and optimal ingress protection at the cable
- Tested according to EN45545-3
- Easy push-in assembly for maximum installation reliability
- Screwdriver required for dismantling, impeding unauthorised or accidental opening
- Space-saving dismantling
- Excellent conduit pull-out strength
- Fits both conduit profiles-fine (T) and coarse (G)
- Temperature range: -50°C to +105°C; Short-term: +130°C
- Fire barrier classification:
EN 45545-3: E20 Horizontal
E30 Vertical
- 高级，特殊配方聚酰胺6，螺纹部分材质为黄铜镍和消除应力部分是由耐火TPE制成
- 非常高的耐冲击性
- 结合消除应力组件，在电缆处提供最适当的防护
- 根据EN45545-3标准测试
- 推入式的简易安装，可达到最可靠性安装
- 需螺丝刀拆卸，防止擅自或意外开启
- 采用节省空间及易于拆卸的设计
- 高强度的抗拉能力
- 适用软管类型-细波纹 (T) 和粗波纹 (G)
- 温度范围：-50°C 至 +105°C；短期温度：+130°C
- 防火屏障等级：
EN 45545-3: E20 水平安装
E30 垂直安装

Project relevant certificates

项目相关证书

Bauaufsichtlich anerkannte Prüf-, Überwachungs- und Zertifizierungsstelle
Prüfstelle für Feuerbeständigkeit und -größe
DIN EN ISO/IEC 17025: D-PL-17819-01-00
DIN EN ISO/IEC 17065: D-ZE-17819-01-00
DIN EN ISO/IEC 17020: D-DE-17819-01-00
ZLS-GS-0066
Notified Body no. 0767

MPA Dresden

Test report

No. 20140143/01

1st official copy

Customer: PMA AG
Aathalstrasse 90
CH-8610 Uster

Order content: Performance of a small-scale fire test to verify the fire resistance and the integrity (E) with firing over a period of at least 30 minutes as per the time-temperature curve (TTC) in accordance with DIN EN 1363-1:2012-10 in the vertical installed position

Test principles: DIN EN 1363-1:2012-10
DIN EN 45545-3:2013-08, Section 5.6.3

Test object: PMA fire barrier

Order dated: 2014-04-23

Test date: 2014-05-26

Test result: On the basis of DIN EN 13501-2:2010-02 the integrity (E) of the PMA cable gland fittings installed on the fire-avered side in the test of 2014-05-26 was verified as follows:

Firing Installed position	Duration in minutes	Possible classification
Plate side without cable protection	32	E30
Vertical		

Scope of test report: 5 Pages of text including index of appendices and 7 pages of appendices

The publishing of test reports, even extracts therefrom, and references to tests for the purposes of advertising requires the written consent of MPA Dresden GmbH in each individual case. The individual pages of this test report have been endorsed with the official stamp of the company MPA Dresden GmbH.

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Bauaufsichtlich anerkannte Prüf-, Überwachungs- und Zertifizierungsstelle
Prüfstelle für Feuerbeständigkeit und -größe
DIN EN ISO/IEC 17025: D-PL-17819-01-00
DIN EN ISO/IEC 17065: D-ZE-17819-01-00
DIN EN ISO/IEC 17020: D-DE-17819-01-00
ZLS-GS-0066
Notified Body no. 0767

MPA Dresden

Test report

No. 20140143/02

1st official copy

Customer: PMA AG
Aathalstrasse 90
CH-8610 Uster

Order content: Performance of a small-scale fire test to verify the fire resistance and the integrity (E) with firing over a period of at least 30 minutes as per the time-temperature curve (TTC) in accordance with DIN EN 1363-1:2012-10 in the horizontal installed position

Test principles: DIN EN 1363-1:2012-10
DIN EN 45545-3:2013-08, Section 5.6.3

Test object: PMA fire barrier

Order dated: 2014-04-23

Test date: 2014-05-27

Test result: On the basis of DIN EN 13501-2:2010-02 the integrity (E) of the PMA cable gland fittings installed on the fire-avered side in the test of 2014-05-27 was verified as follows:

Firing Installed position	Duration in minutes	Possible classification
Plate side without cable protection	25	E15 (E20)*
Horizontal		

*not listed in table 7.5.8.4 of DIN EN 13501-2:2010-02

Scope of test report: 5 Pages of text including index of appendices and 7 pages of appendices

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Bauaufsichtlich anerkannte Prüf-, Überwachungs- und Zertifizierungsstelle
Prüfstelle für Feuerbeständigkeit und -größe
DIN EN ISO/IEC 17025: D-PL-17819-01-00
DIN EN ISO/IEC 17065: D-ZE-17819-01-00
DIN EN ISO/IEC 17020: D-DE-17819-01-00
ZLS-GS-0066
Notified Body no. 0767

MPA Dresden

Test report

No. 20140143/01

1st official copy

Customer: PMA AG
Aathalstrasse 90
CH-8610 Uster

Order content: Performance of a small-scale fire test to verify the fire resistance and the integrity (E) with firing over a period of at least 30 minutes as per the time-temperature curve (TTC) in accordance with DIN EN 1363-1:2012-10 in the vertical installed position

Test principles: DIN EN 1363-1:2012-10
DIN EN 45545-3:2013-08, Section 5.6.3

Test object: PMA fire barrier

Order dated: 2014-04-23

Test date: 2014-05-26

Test result: On the basis of DIN EN 13501-2:2010-02 the integrity (E) of the PMA cable gland fittings installed on the fire-avered side in the test of 2014-05-26 was verified as follows:

Firing Installed position	Duration in minutes	Possible classification
Plate side without cable protection	32	E30
Vertical		

Scope of test report: 5 Pages of text including index of appendices and 7 pages of appendices

The publishing of test reports, even extracts therefrom, and references to tests for the purposes of advertising requires the written consent of MPA Dresden GmbH in each individual case. The individual pages of this test report have been endorsed with the official stamp of the company MPA Dresden GmbH.

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IBAN DE88 870520003115024672
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Bauaufsichtlich anerkannte Prüf-, Überwachungs- und Zertifizierungsstelle
Prüfstelle für Feuerbeständigkeit und -größe
DIN EN ISO/IEC 17025: D-PL-17819-01-00
DIN EN ISO/IEC 17065: D-ZE-17819-01-00
DIN EN ISO/IEC 17020: D-DE-17819-01-00
ZLS-GS-0066
Notified Body no. 0767

MPA Dresden

Test report

No. 20140143/02

1st official copy

Customer: PMA AG
Aathalstrasse 90
CH-8610 Uster

Order content: Performance of a small-scale fire test to verify the fire resistance and the integrity (E) with firing over a period of at least 30 minutes as per the time-temperature curve (TTC) in accordance with DIN EN 1363-1:2012-10 in the horizontal installed position

Test principles: DIN EN 1363-1:2012-10
DIN EN 45545-3:2013-08, Section 5.6.3

Test object: PMA fire barrier

Order dated: 2014-04-23

Test date: 2014-05-27

Test result: On the basis of DIN EN 13501-2:2010-02 the integrity (E) of the PMA cable gland fittings installed on the fire-avered side in the test of 2014-05-27 was verified as follows:

Firing Installed position	Duration in minutes	Possible classification
Plate side without cable protection	25	E15 (E20)*
Horizontal		

*not listed in table 7.5.8.4 of DIN EN 13501-2:2010-02

Scope of test report: 5 Pages of text including index of appendices and 7 pages of appendices

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PMA solution with Roxtec

PMA 结合烙克赛克提供的解决方案

A complete wall transit feed through system for cables and wires

电缆和电线的一个完整的穿墙式方案

This solution of PMA fire barrier adapter is designed to be used in combination with Roxtec wall sealing systems.

PMA 防火屏障适配器结合烙克赛克防火墙密封系统提供组合式解决方案。

The combined PMA and Roxtec components provide a complete wall transit feed through system for cables and wires within a cable protection system providing protection against all kinds of mechanical and environmental influences. The components are easy to install and guarantee beyond E30 fire stop rating according to EN45545-3 for wall, roof and floor installations.

结合 PMA 和烙克赛克的技术，为电缆保护系统内的电缆和电线提供一个完整的穿墙式方案，同时避免受到各种机械和环境的影响。这个组合不仅易于安装，而且符合 EN45545-3 标准，从而确保墙壁、车顶和地板安装可超越 E30 防火等级。

The Roxtec RM PPS sealing module is a customized solution produced to order. Combined with a PMA 30mm or 60mm fire barrier adapter it can easily be adapted to seal PMA conduits of various sizes in a wide range of applications achieving an E60 rating according to EN 45545-3. The intumescent material in the PMA fire barrier adapter expands upon exposure to high temperatures sealing wall transits. The solution is easy to install and due to its compact size can reduce the weight of the complete solution.

烙克赛克 RM PPS 密封模块是一种订单式生产的定制化解决方案。结合 PMA 30 毫米或 60 毫米防火屏障适配器，可以适用不同规格尺寸的 PMA 软管，同时符合 EN45545-3 标准，从而确保达到 E60 防火等级。PMA 防火屏障适配器中的膨胀材料由于高温膨胀密封穿墙过道。该方案易于安装，并且由于其紧凑的尺寸，可以减少整套解决方案的重量。

The Roxtec round frame RS PPS/S is a sealing solution which can be used to seal wall penetrations. It is approved for use with PMA conduits in a wide range of structures such as walls and floors, achieving up to E60 rating according to EN 45545-3. In case of fire, it efficiently blocks smoke and flames from passing through the penetration.

烙克赛克圆框 RS PPS/S 是一个可用于密封穿墙的解决方案。它被认可配合 PMA 软管应用在不同的结构，如：墙壁和地板，同时符合 EN45545-3 标准，从而确保达到 E60 防火等级。在发生火灾时，它能有效地防止烟雾和火焰的蔓延。

PMA PMAFIX Pro or PMAFIX fittings can be attached on either side of the adapter allowing connection to PMA conduits. (XPCSF, XPCS, PCS, PCSL, VAM, VAML, PLR). The components are easy to install and guarantee up to E30 fire stop rating according to EN45545-3 for wall, roof and floor installations.

PMA PMAFIX Pro 或 PMAFIX 系列管接头可安装在适配器的任一侧连接 PMA 软管（XPCSF, XPCS, PCS, PCSL, VAM, VAML, PLR）。这个组合不仅易于安装，而且符合 EN45545-3 标准，从而确保墙壁、车顶和地板安装可高达 E30 防火等级。



The Roxtec RM PPS sealing module can easily be adapted to seal PMA conduits of various sizes in a wide range of applications achieving an E60 rating according to EN 45545-3.

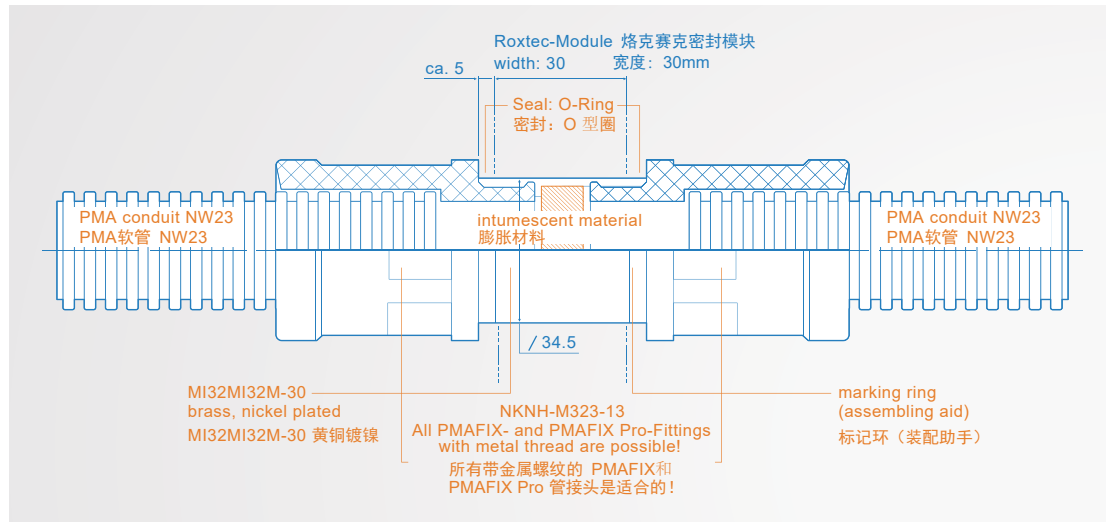
烙克赛克 RM PPS 密封模块可以适用不同规格尺寸的 PMA 软管，同时符合 EN45545-3 标准，从而达到 E60 防火等级。

PMA fire barrier solution with wall transit 穿墙过道的 PMA 防火屏障解决方案

30mm Roxtec compact Modules with PMA combinations PMA 和 30 毫米洛克赛克紧凑型模块的组合式解决方案

The first Fire barrier solution consists of a 30mm PMA fire barrier adapter designed to be used in Roxtec compact modules installed in versions of Roxtec compact frames, achieving an E30 rating according to EN 45545-3.

第一个防火屏障解决方案由一个设计用于安装在洛克赛克紧凑型模块上的 30 毫米 PMA 防火屏障适配器组成，符合 EN45545-3 标准，达到 E30 防火等级。



Roxtec Compact Modules 30mm 洛克赛克紧凑型模块					PMA combinations PMA 组合				
CM 30 (Ø10 - 25mm)	CM 40 (Ø21.5 - 34.5mm)	CM 60 (Ø28 - 54mm)	CM 80 (Ø48 - 71mm)	Conduit sizes 软管尺寸	Fitting and Conduit * 管接头和软管				
					PMAFIX IP68 管接头	PMAFIX IP68GT 管接头	Conduit 软管	PMAFIX Pro 管接头	Conduit 软管
PMA-Adapter / MxxxMxxxM-30 PMA 适配器 / MxxxMxxxM-30	MI20MI20M-30 (Ø 22.5mm)			NW 12	NVNV-M202-10 NVWV-M202-10 NVNZ-M202S/Px NVNZ-M202S-10	NVNV-M202GT-10 NVWV-M202GT-10 NVNZ-M202GT/Px NVNZ-M202GT-10	VAMT-12B VAMLT-12B	NKNH-M202-10 NKBH-M202-10 NKAH-M202-10 NKNZ-M202/Px NKNZ-M202S-10	PCST-12B PCSLT-12B
	MI25MI25M-30 (Ø 27.5mm)			NW 17	NVNV-M257-11 NVBV-M257-11 NVAV-M257-11 NVNZ-M257S/Px NVNZ-M257S-11	NVNV-M257GT-11 NVBV-M257GT-11 NVAV-M257GT-11 NVNZ-M257GT/Px NVNZ-M257GT-11	VAMG-17B VAMLG-17B	NKNH-M257-11 NKBH-M257-11 NKAH-M257-11 NKNZ-M257/Px NKNZ-M257S-11	PCSG-17B PCSLG-17B
	MI32MI32M-30 (Ø 34.5mm)			NW 23	NVNV-M323-13 NVBV-M323-13 NVAV-M323-13 NVNZ-M323S/Px NVNZ-M323S-13	NVNV-M323GT-13 NVBV-M323GT-13 NVAV-M323GT-13 NVNZ-M323GT/Px NVNZ-M323GT-13	VAMG-23B VAMLG-23B	NKNH-M323-13 NKBH-M323-13 NKAH-M323-13 NKNZ-M323/Px NKNZ-M323S-13	PCSG-23B PCSLG-23B
		MI40MI40M-30 (Ø 42.5mm)		NW 29	NVNV-M409-13 NVBV-M409-13 NVAV-M409-13 NVNZ-M409S/Px NVNZ-M409S-13	NVNV-M409GT-13 NVBV-M409GT-13 NVAV-M409GT-13 NVNZ-M409GT/Px NVNZ-M409GT-13	VAMG-29B VAMLG-29B	NKNH-M409-13 NKBH-M409-13 NKAH-M409-13 NKNZ-M409/Px NKNZ-M409S-13	PCSG-29B PCSLG-29B
		MI50MI50M-30 (Ø 53mm)		NW 36	NVNV-M506-14 NVBV-M506-14 NVAV-M506-14 NVNZ-M506S/Px NVNZ-M506S-14	NVNV-M506GT-14 NVBV-M506GT-14 NVAV-M506GT-14 NVNZ-M506GT/Px NVNZ-M506GT-14	VAMG-36B VAMLG-36B	NKNH-M506-14 NKBH-M506-14 NKAH-M506-14 NKNZ-M506/Px NKNZ-M506S-14	PCSG-36B PCSLG-36B
			MI63MI63M-30 (Ø 66mm)	NW 48	NVNV-M638-14 NVBV-M638-14 NVWV-M638-14 NVAV-M638-14 NVNZ-M638S/Px NVNZ-M638S-14	NVNV-M638GT-14 NVBV-M638GT-14 NVWV-M638GT-14 NVAV-M638GT-14 NVNZ-M638GT/Px NVNZ-M638GT-14	VAMG-48B VAMLG-48B	NKNH-M638-14 NKBH-M638-14 NKAH-M638-14 NKNZ-M638/Px NKNZ-M638S-14	PCSG-48B PCSLG-48B

MI-30
firewall adapter, metric,
female metal thread,
30mm long

MI-30
防火墙适配器, 公制,
金属内螺纹, 30mm长

Order No.	Female Thread metric	Fits to conduit size NW metric		Thread length	Overall length	MOQ (pcs)
订货号	内螺纹 公制	适配软管尺寸 标称内径	公制	螺纹 长度	总 长度	最小起订量
# MI20MI20M-30	M20 x 1.5	12	16	10.5	40.0	10
# MI25MI25M-30	M25 x 1.5	17	20	11.5	40.0	10
# MI32MI32M-30	M32 x 1.5	23	25	13.5	40.0	10
# MI40MI40M-30	M40 x 1.5	29	32	13.5	40.0	10
# MI50MI50M-30	M50 x 1.5	36	40	14.5	42.0	10
# MI63MI63M-30	M63 x 1.5	48	50	14.5	42.0	10

For technical specification in details, please ask for “Technical Data Sheet” DB-Nr.60026
要了解详细技术规格，请索取“技术数据表” DB-Nr.60026

标记为 # 的产品有最小起订量（MOQ）

unit = mm
单位 = mm



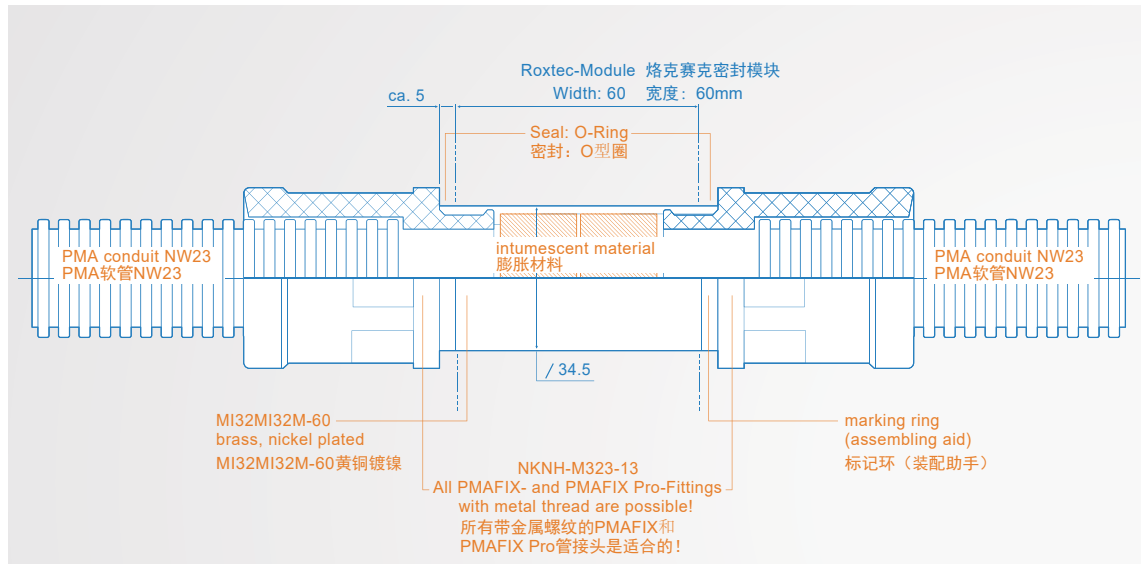
- Nickel-plated brass
- Thread adapter including intumescent material
- Designed for use in combination with Roxtec modules, providing a cable protection system to be fed through a firewall without loss of fire integrity
- Fire Wall Integrity with Roxtec frame (30mm width)
EN45545-3: E30 Vertical / Horizontal
- 黄铜镀镍制成
- 螺纹适配器包括膨胀的材料
- 设计用于与洛克赛克的模块组合并提供一个允许电缆保护系统通过防火墙并确保耐火完整性不损失的解决方案
- 配合洛克赛克30mm宽模块系统的防火墙完整性：
EN45545-3: E30 垂直/水平安装

PMA fire barrier solution with wall transit 穿墙过道的 PMA 防火屏障解决方案

60mm Roxtec compact Modules with PMA combinations PMA 和 60 毫米烙克赛克紧凑型模块的组合式解决方案

The second Fire barrier solution consists of a 60mm PMA fire barrier adapter designed to be used in Roxtec regular modules, installed in Roxtec S-, SF- and G frames or in customized frames, achieving an E60 rating according to EN 45545-3.

第二种防火屏障解决方案由一个设计用于安装在烙克赛克 S-, SF- 和 G 系列框架或定制的烙克赛克标准模块上的 60 毫米 PMA 防火屏障适配器组成。符合 EN45545-3 标准，达到 E60 防火等级。



PMA-Adapter / MixxMixxM-60
PMA 适配器 / MIxxMIxxM-60

Roxtec Regular Modules 60mm 烙克赛克规则模块					Conduit sizes 软管尺寸	PMA combinations PMA 组合				
RM 30 (Ø10 - 25mm)	RM 40 (Ø21.5 - 34.5mm)	RM 60 (Ø28 - 54mm)	RM 80 (Ø48 - 71mm)	RM 90 (Ø48 - 71mm)		Fitting and Conduit * 管接头和软管				
						PMAFIX IP68 管接头	PMAFIX IP68GT 管接头	Conduit 软管	PMAFIX Pro 管接头	Conduit 软管
MI20MI20M-60 (Ø 22.5mm)					NW 12	NVNV-M202-10 NVVV-M202-10 NVNZ-M202S/Px NVNZ-M202S-10	NVNV-M202GT-10 NVVV-M202GT-10 NVNZ-M202GT/Px NVNZ-M202GT-10	VAMT-12B VAMLT-12B	NKNH-M202-10 NKBH-M202-10 NKAH-M202-10 NKNZ-M202/Px NKNZ-M202S-10	PCST-12B PCSLT-12B
	MI25MI25M-60 (Ø 27.5mm)				NW 17	NVNV-M257-11 NVBV-M257-11 NVAV-M257-11 NVNZ-M257S/Px NVNZ-M257S-11	NVNV-M257GT-11 NVBV-M257GT-11 NVAV-M257GT-11 NVNZ-M257GT/Px NVNZ-M257GT-11	VAMG-17B VAMLG-17B	NKNH-M257-11 NKBH-M257-11 NKAH-M257-11 NKNZ-M257/Px NKNZ-M257S-11	PCSG-17B PCSLG-17B
	MI32MI32M-60 (Ø 34.5mm)				NW23	NVNV-M323-13 NVBV-M323-13 NVAV-M323-13 NVNZ-M323S/Px NVNZ-M323S-13	NVNV-M323GT-13 NVBV-M323GT-13 NVAV-M323GT-13 NVNZ-M323GT/Px NVNZ-M323GT-13	VAMG-23B VAMLG-23B	NKNH-M323-13 NKBH-M323-13 NKAH-M323-13 NKNZ-M323/Px NKNZ-M323S-13	PCSG-23B PCSLG-23B
		MI40MI40M-60 (Ø 42.5mm)			NW 29	NVNV-M409-13 NVBV-M409-13 NVAV-M409-13 NVNZ-M409S/Px NVNZ-M409S-13	NVNV-M409GT-13 NVBV-M409GT-13 NVAV-M409GT-13 NVNZ-M409GT/Px NVNZ-M409GT-13	VAMG-29B VAMLG-29B	NKNH-M409-13 NKBH-M409-13 NKAH-M409-13 NKNZ-M409/Px NKNZ-M409S-13	PCSG-29B PCSLG-29B
		MI50MI50M-60 (Ø 53mm)			NW 36	NVNV-M506-14 NVBV-M506-14 NVAV-M506-14 NVNZ-M506S/Px NVNZ-M506S-14	NVNV-M506GT-14 NVBV-M506GT-14 NVAV-M506GT-14 NVNZ-M506GT/Px NVNZ-M506GT-14	VAMG-36B VAMLG-36B	NKNH-M506-14 NKBH-M506-14 NKAH-M506-14 NKNZ-M506/Px NKNZ-M506S-14	PCSG-36B PCSLG-36B
			MI63MI63M-60 (Ø 66mm)		NW 48	NVNV-M638-14 NVBV-M638-14 NVVV-M638-14 NVAV-M638-14 NVNZ-M638S/Px NVNZ-M638S-14	NVNV-M638GT-14 NVBV-M638GT-14 NVVV-M638GT-14 NVAV-M638GT-14 NVNZ-M638GT/Px NVNZ-M638GT-14	VAMG-48B VAMLG-48B	NKNH-M638-14 NKBH-M638-14 NKAH-M638-14 NKNZ-M638/Px NKNZ-M638S-14	PCSG-48B PCSLG-48B

MI-60
firewall adapter, metric,
female metal thread,
60mm long

MI-60
防火墙适配器, 公制,
金属内螺纹, 60mm长

Order No.	Female Thread metric	Fits to conduit size NW metric		Thread length	Overall length	MOQ (pcs)
订货号	内螺纹 公制	适配软管尺寸 标称内径	公制	螺纹 长度	总 长度	最小起订量
# MI20MI20M-60	M20 x 1.5	12	16	10.5	70.0	10
# MI25MI25M-60	M25 x 1.5	17	20	11.5	70.0	10
# MI32MI32M-60	M32 x 1.5	23	25	13.5	70.0	10
# MI40MI40M-60	M40 x 1.5	29	32	13.5	70.0	10
# MI50MI50M-60	M50 x 1.5	36	40	14.5	70.0	10
# MI63MI63M-60	M63 x 1.5	48	50	14.5	70.0	10

For technical specification in details, please ask for "Technical Data Sheet" DB-Nr.60027
要了解详细技术规格, 请索取“技术数据表” DB-Nr.60027
标记为 # 的产品有最小起订量 (MOQ)

unit = mm
单位 = mm



- Nickel-plated brass
- Thread adapter including intumescent material
- Designed for use in combination with Roxtec modules, providing a cable protection system to be fed through a firewall without loss of fire integrity
- Fire Wall Integrity with Roxtec frame (60mm width)
EN45545-3: E30 Horizontal
E60 Vertical
- 黄铜镀镍制成
- 螺纹适配器包括膨胀的材料
- 设计用于与熔克赛克的模块组合并提供一个允许电缆保护系统通过防火墙并确保耐火完整性不损失的解决方案
- 配合熔克赛克60mm宽模块系统的防火墙完整性：
EN45545-3: E30 水平安装
E60 垂直安装