

# Product recommendations for traction vehicle applications

PMA conduits, braids, fittings and accessories for traction vehicle applications



Improved performance and safety for the rail industry with PMA cable protection solutions from ABB.

## Conduits

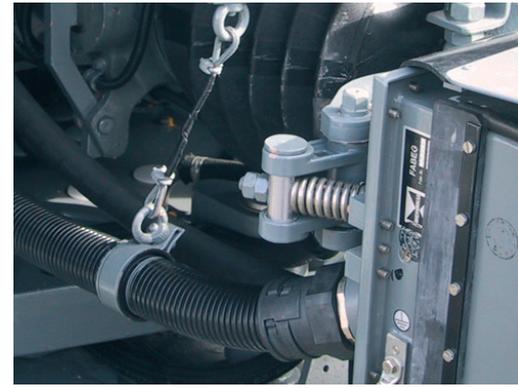
### On the carriage roof, on couplings and for intercar jumper connections

- **XPCSF:** PA12/PA12 - Heavy-duty, multilayer conduit for dynamic and static applications:
  - Excellent compression and impact strengths under all climatic conditions
  - Excellent flexibility and resistance to fatigue
  - Excellent UV resistance, weathering and ageing characteristics
  - Black outer layer, orange inner layer
  - Wear indicator
  - EN45545-2 HL3 according to R22 & R23
- **XPCS:** PA12/PA6 - Heavy-duty, multilayer conduit for dynamic and static applications:
  - Good compression and impact strengths under all climatic conditions
  - Good flexibility and resistance to fatigue
  - Excellent UV resistance, weathering and ageing characteristics
  - Black outer layer, green inner layer
  - Wear indicator
  - EN45545-2 HL2 according to R22 & R23
  - NFPA 130
- **JXPCSF:** PA12/PA12/PA12 - Heavy-duty, over-extruded multilayer conduit suitable for dynamic and static applications:
  - Made from 2 layers of high-grade, specially formulated polyamide 12 with a smooth over-extruded PA12 jacket

- Excellent compression and impact strengths under all climatic conditions
- Excellent flexibility and resistance to fatigue
- Excellent UV resistance, weathering and ageing characteristics
- Reduced accumulation of ice and easy cleaning through smooth outer jacket
- Black outer layers, orange inner
- EN45545-2 HL3 according to R22 & R23

### Under carriages and on bogies

- **XVCSF:** PA6/PA6 - Heavy-duty multilayer conduit for static applications:
  - Outer and Inner layers: specially formulated polyamide 6
  - Excellent compression and impact strengths under all climatic conditions
  - Good flexibility
  - Excellent UV resistance, weathering and ageing characteristics
  - Black outer layer, blue inner layer
  - Wear indicator
  - EN45545-2 HL2 according to R22 & R23
- **XPCSF:** See characteristics above
- **XPCS:** See characteristics above
- **JXPCSF:** See characteristics above
- **PHT:** PA6 Elastomer - Medium-duty conduit for dynamic and static applications:
  - Very good mechanical properties even at very low temperatures down to -50°C



#### Inside carriages and in the passenger zone

- **VAM:** PA6 - Heavy-duty conduit preferably for static applications:
  - Complies with strictest international fire safety regulations regarding smoke and toxicity
  - EN45545-2 HL3 according to R22 & R23
  - NFPA130
- **VAML:** PA6 - Medium-duty conduit preferably for static applications:
  - Complies with strictest international fire safety regulations regarding smoke and toxicity
  - EN45545-2 HL3 according to R22&R23
  - NFPA130

#### Underground railways

- **XPCSF:** See characteristics above
- **VAML:** See characteristics above
- **POH:** Modified polyolefin, medium-duty conduit for static applications:
  - BS6853 category 1a int. & ext.

#### Divisible system conduits for retrofit and repairs

- **PACOF:** PA6 - Medium-duty conduit preferably for static applications:
  - Can be opened and closed along their length at any time
  - Good compression strength
  - Ingress protection to IP40
  - Complies with strictest international fire safety regulations regarding smoke and toxicity
  - EN45545-2 HL3 according to R22&R23
  - NFPA130
  - Compatible with PMA divisible fittings (BLNO), locknuts (BLN) but also with standard PMA Fittings allowing repairs using existing fittings

#### Fittings

All PMA fittings are compliant with EN45545-2 HL3 and NFPA130.

#### Outdoor Applications with high sealing requirements:

e.g. For air conditioning, bogies, couplings, and intercarriage jumper connections:

- **PMAFIX Pro**
  - Fittings with metal thread for attachment of conduits to bulkheads, casings and connectors etc.

- Sealing performance to IP68 and IP69 static and dynamic

- NKNH (Straight), NKAH (45°), NKBH (90°)

- **PMAFIX Pro with cable strain relief element**

- For the relief of stress on cable terminations
- Sealing performance to IP68 and IP69 static and dynamic

- Zone separation for the prevention of condensation, IP68 along the cable

- NKNZ (Straight), NKWZ (90°)

- **PMAFIX Pro female thread**

- Fittings with metal and polyamide thread for the attachment of conduits to round connectors and other male threads

- Sealing performance to IP68 and IP69 static and dynamic

- NKIS (Metal thread), BKIHG (Polyamide thread)

#### Internal applications

e.g. Passenger zone, driver's cabin and other general applications:

- **PMAFIX IP68**

- Design ensures correct installation
- Extremely wide range of fittings
- Straight, 45°, 90° elbows
- Male and female threads
- Nickel plated brass or polyamide thread
- Available with metric, PG, NPT, Gas, UNEF threads
- Strain relief fittings also available
- Available as single piece push-in component (GT)

- **PMAFIX IP66**

- Simple push fit IP66 design
- Extremely wide range of fittings
- Straight, 45°, 90° elbows
- Male and female threads
- Polyamide thread
- Available with metric, PG, NPT, Gas, UNEF threads
- Strain relief fittings also available

### Conduit fixations

- **BGPM & BGPMP** modular multiple conduit and cable clamping system
- Flexible configuration for 1, 2, 3 or 4 conduits or cables of various sizes
- **BGPS** one piece stackable robust conduit clamp
- **BGH, BGL, SGB, SGS** Omega and P single conduit clamps

### Accessories

- **Y & T** junction elements are available to branch conduits in both the PMAFIX IP68 and PMAFIX IP66 series
- **SWA** swivel adapters can be used to relieve conduits from torsion forces in dynamic application
- **SCA** Positioning adapters can be used to adapt conduit exit angle
- **MAVI / MAVIK** with metric thread: IP68 special / positioning elbow adapter made from nickel-plated aluminium for optimal loom configuration especially in moving systems
- **WPS** IP69 water impact protection for IP68 connectors in sizes NW10 to NW48 providing additional protection against high-pressure water jets

### Braids

#### Cable bundling and abrasion protection

Braids for bundling and abrasion protection of cables and wires.

- **F.66:** PA6.6
  - Monofilament Ø 0.28 mm, optical coverage >90 %, highest abrasion resistance
- **C.66:** PA6.6
  - Monofilament Ø 0.28 mm, optical coverage >75 %, high abrasion resistance, flexible
- **L.66:** PA6.6
  - Monofilament Ø 0.25 mm, optical coverage >65 %, good abrasion resistance, highly flexible
- All PA6.6 braids are certified to:
  - EN45545-2 HL3 according to R22 & R23
  - NFPA130
- **B.PX:** Polyester
  - Monofilament Ø 0.20 mm, optical coverage >50 %
  - Light braid with wide expansion range
  - Cables and wires can be fed out sideways
  - EN45545-2 HL3 according to R22 & R23
- **G.PX:** Polyester
  - Mono- and Multifilament
  - Open construction, 90° overlapping, allows fast introduction of cables and wires from the side
  - Individual wires can be fed out from the side if necessary
  - EN45545-2 HL3 according to R22 & R23

All PMA polyamide cable protection products demonstrate excellent resistance to oils, greases and other chemicals as well as the cleaning agents commonly used in the railway industry.

For the PMA conduits, fittings and accessories listed in this document fire safety certificates are available according to various global standards.

These can be supplied upon request:

- EN 45545-2 (Replaces the National standards NF F 16 101/102, DIN5510, BS 6853 etc.)
- NFPA 130 (ASTM E162, ASTM-E662)
- ASTM1354
- BSS 7239
- SMP 800C

All PMA polyamide materials are self-extinguishing, free from halogens and cadmium. PMA RoHS, REACH and Conflict minerals confirmation documents can be supplied on request.

Use of grey products for the passenger zone may help to differentiate from products for outdoor applications where black is recommended.

Multilayer conduits can be identified by their internal colour.

For installations in areas with high levels of vibration, PMA recommends the use of a thread locking and sealing compound to prevent threads becoming loose during operation. Users of PMA products should make their own evaluation to determine the suitability of each product for a specific application.

If PMA products are used in conjunction with cable protection products from other companies all product liability claims will be rejected.

For technical details and specifications please see our technical data sheets at [www.pma.ch](http://www.pma.ch)

Please contact PMA for further application specific technical support:

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