

# Product recommendations for shipbuilding applications

PMA conduits, braids, fittings and accessories in shipbuilding and marine applications



PMA offers a very broad range of cable protection products:

- Special products for shipbuilding and marine applications
- Enormous space and weight saving yet extremely robust
- Proven performance many years service in demanding applications
- Numerous worldwide approvals
- Ingress Protection according to IEC 60529 IP66/IP68/IP69
- Extensive range of accessories

## Open deck, cargo compartment + engine room (outdoor and indoor application)

- **XSOL:** PA12/PA6 – Medium-duty 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, green inner layer
  - Wear indicator
  - UL Recognised
- **PIS/PIH:** PA12 – Heavy-duty monolayer conduit for dynamic, external applications
  - Excellent UV resistance, weathering and ageing characteristics (Black colour)
  - Excellent flexibility and resistance to fatigue
  - Good compression and impact strengths under all climatic conditions
  - UL94 V0 flammability rating
  - UL Recognised
  - Lloyd's Register, Bureau Veritas, DNV-GL type approvals
- **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

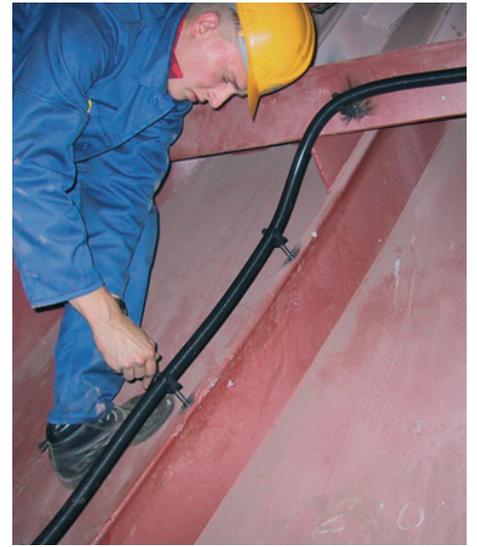
- Lloyd's Register, Bureau Veritas, DNV-GL type approvals

- **VOH:** PA6 – Very heavy duty conduit for static applications

- Excellent compression strength
- Excellent UV resistance and weathering characteristics (Black colour)
- Extremely high system pull-out strength
- Lloyd's Register, Bureau Veritas, DNV-GL type approvals

## Superstructure, crew and passenger compartments (indoor applications)

- **LLPA:** PA6 – Medium-duty monolayer conduit for largely static applications with occasional bending
  - Very good flexibility and resistance to fatigue
  - UL94 V2 flammability rating
  - UL Recognised (UR)
  - Lloyd's Register, Bureau Veritas, DNV-GL type approvals
- **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
  - Lloyd's Register, Bureau Veritas, DNV-GL type approvals



### On masts and booms / movable systems (outdoor applications)

- **PIS/PIH:** PA12 – Heavy-duty monolayer conduit for dynamic, external applications
  - Excellent UV resistance, weathering and ageing characteristics (Black colour) Excellent flexibility and resistance to fatigue
  - Good compression and impact strengths under all climatic conditions
  - UL94 V0 flammability rating
  - UL Recognised
  - Lloyd's Register, Bureau Veritas, DNV-GL type approvals
- **XSOL:** PA12/PA6 – Medium-duty 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, green inner layer
  - Wear indicator
  - UL Recognised

### Power engines

- **LLPA:** PA6 – Medium-duty monolayer conduit for largely static applications with occasional bending
  - Very good flexibility and resistance to fatigue
  - UL94 V2 flammability rating
  - UL Recognised (UR)
  - Lloyd's Register, Bureau Veritas, DNV-GL type approvals
- **VOH:** PA6 – Very heavy duty conduit for static applications
  - Excellent compression strength
  - Excellent UV resistance and weathering characteristics (Black colour)
  - Extremely high system pull-out strength
  - Lloyd's Register, Bureau Veritas, DNV-GL type approvals

### 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
  - UL94 V0 flammability rating
  - Ingress protection to IP40
  - Compatible with PMA divisible fittings (BLNO), locknuts (BLN) but also with standard PMA Fittings allowing repairs using existing fittings
- **PCOF:** PP – Medium-duty conduit preferably for static applications
  - Can be opened and closed along their length at any time
  - Ingress protection to IP40
  - UL94 V2 flammability rating
  - Good chemical resistance characteristics
  - Compatible with PMA divisible fittings (BLNO), locknuts (BLN) but also with standard PMA Fittings allowing repairs using existing fittings

### Fittings

All PMA termination elements are EN45545-2 HL3 and NFPA 130 certified. The PMAFIX product line has a type approval according to Lloyds, DNV-GL and Bureau Veritas.

### External Applications with high sealing requirements

For example for safety related installations such as lighting, winches/hoists, radar etc.

- **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

For example in passenger areas, personnel, machine, working areas, kitchens and general internal 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 & BGPMR:** 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 and 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
  - UL94: V2
- **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:

Either your local PMA representative

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