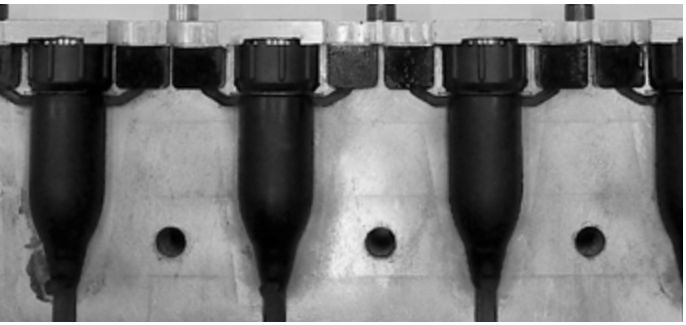
Habia Cable



Underwater pressure resistant

cables and harnesses for outboard use

As one of our business focus markets, Habia Cable is committed to the Naval industry. We are a supplier to most major navies around the world, renowned for our custom design experience and the ability to meet the exact needs of our customers.

The outboard, underwater and pressure resistant applications presents one of the most demanding areas in terms of environmental conditions. This is already a challenge for the cable alone. Together with the issues raised by the cable / connector interface it becomes essential that close working relationships are maintained between cable and connector manufacturers in order to achieve a reliable solution.

With the slow rate of feedback inherent in this application, it is important to rely on proven experience.

With cable manufacture and harness production both in-house, we are able to focus on the key features required in these highly demanding applications.

PHOTO: PETER NILSSON KOCKUMS AB

Key features for outboard cable design

Power / Transmission line

We use highly technical raw materials to guarantee the dielectric strength of the insulation over the conductors.

The best materials for the purpose are fluoropolymers. They combine robustness and exceptional dielectric strength together with a wide operating temperature range, allowing cores to heat with high current capacity. They also offer a long flex-life and excellent resistance to all major fluids encountered in naval operations.

Resistance to pressure

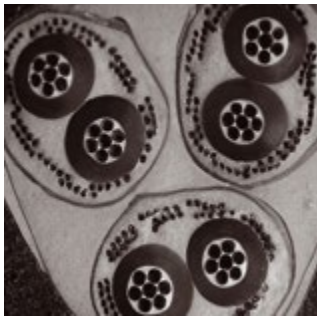
Underwater environments mean hydrostatic pressure. Compression of cables during the increase of hydrostatic pressure can lead to plastic deformation of cables and related issues with regard to the effective water barriers in the harness.

Our designs allow the lowest possible compression of the cables. This means that cables designed for use under higher hydrostatic pressures are completely filled at every production phase in order to avoid compression. In addition, we do our tests for hydrostatic pressure in-house.

Longitudinal Water Blocking

Habia Cable can offer a range of LWB cables, which can significantly reduce the cost of installation by replacing hermetic connectors with simpler penetrators. For example, the ‘Bescond’ penetrators are

100 % Longitudinal Water Blocking



Filling all voids during cable manufacturing

Pressure resistance test equipment

being used on LWB cables by the French Navy on their attack submarines.

Generally, each navy has its own specification for LWB requirements and we have previously supplied various specifications to different navies. Our cable range Seaguard LWB^{VG} is fully qualified to the VG 95218 Teil 29 specifications.

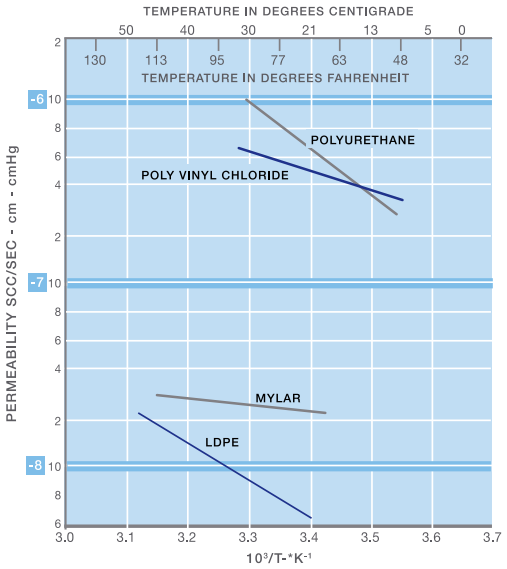
Permeability

Permeability is a critical parameter in extending the lifetime for the underwater harnesses, describing where water will migrate through the jacket barriers and make its way to the connector ends.

Although permeability cannot be avoided, selecting the right jacket formulation can reduce the rate of degradation by anything up to a factor of 1000.

It is also essential that the jacket remains compatible with the connector technology as well as with the processes to assemble the connector.

Water Vapour Permeability of Polyethylene vs other plastics



Seaguard harnesses installed

Connector / Cable integration

There are three main types of barrier technologies interfacing between the connector and the cable. In most cases, at least two types are combined:

- Pressure glands
- Boots
- Mouldings

Pressure glands

With pressure glands, the cold flow properties of the cable itself must be considered as well as washer compression management during the connector fitting.

Boots

Voids between the boot and the cable are filled and glued and/or clamped on the cable jackets. Concerns can be:

- “Bubble management” of the filling compound
- Adhesion strength between the cable jacket and boot
- Cold flow of the cable underneath the clamp
- Corrosion of the clamp itself

Mouldings

During the moulding processes, it is necessary to ensure long-term bonding of the moulded parts as well as having a “bubble” free moulding.

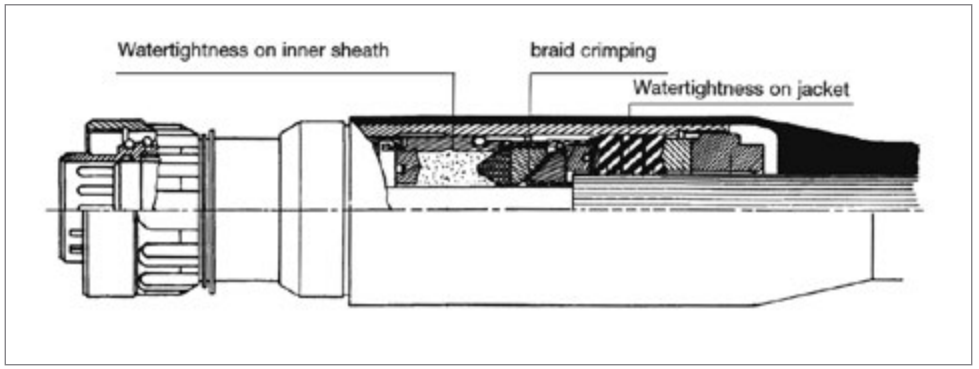
Experience has shown us that moulding on metallic parts in contact with seawater leads to cathodic delamination over time, resulting in water penetration. To avoid this Habia Cable customises connector backshells to ensure protection from potential sources of delamination.

Compatibility between the connector technology and the cable is key to achieving long term reliability of the harnesses.

Pressure glands will require elastomeric cables and the jacket material will need to be compatible with the chemical treatment.

Gisma series 22 boot

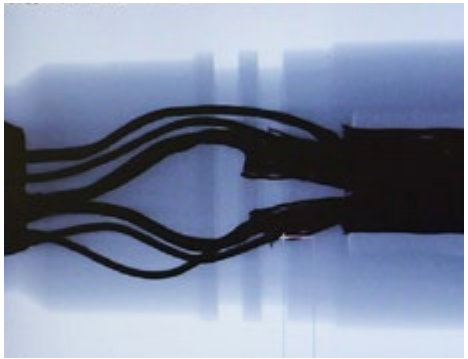
Souriau M-Series Connectors Catalogue



In order to improve our two-component and injection moulding processes, Habia Cable have developed and specialise in various surface treatment techniques (including plasma and chemical treatment) for polyethylene and polyurethane based materials. Developments in the over-moulding methods, in combination with the advanced surface preparation allow us to design reliable water resistant features with complex geometry and functionality.

We also invested in suitable equipment to perform the necessary routine inspections for the manufactured harnesses.These include an X-ray machinery, pressure tanks, a network analyser and automatic electrical test machines.

Combined use of these techniques, equipment, experience based knowledge and polymer expertise allows Habia Cable to recommend optimal combinations of cable material properties and connector water barrier design in order to provide technological feasibility and long term reliable lifetime of the underwater systems.



Habia Cable

Habia Cable is one of Europe's leading wire and cable manufacturers. We develop, manufacture and market custom design cables and harness systems for demanding applications in a number of diverse industries.

The company has a global presence and worldwide sales of custom design and standard products in more than 50 countries.

We aim to provide a high level of customer service and technical competence with competitive lead times and low minimum order quantities.

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