



Polyurethane products & technology





PartnerPlast

PartnerPlast is a leading specialist in plastic materials, rotational moulding and design. We manufacture a wide range of products within our product segments: Seismic, Offshore & Subsea, Electronics and Industry.

The history of PartnerPlast stretches all the way back to 1946. The first buoyancy products were supplied to the offshore industry in 1979. The development of subsea products started in the late 1990's. These products were first marketed through our subsidiary Marine Subsea Group. But as of 2009 the company and its products were integrated into PartnerPlast as an independent product segment called Offshore & Subsea. In 2014 PartnerPlast acquired Exploration Support Services Inc. in Houston and subsequently changed the company name to PartnerPlast Inc. PartnerPlast Inc. which primarily offers operational support services, but also our full range of Seismic and Offshore & Subsea products. During 2014 Powex AS also became a fully integrated part of PartnerPlast. In 2015, the company Molstad Modell & Form AS was acquired, and hence providing PartnerPlast AS with in-house manufacturing of a Polyurethane products as well as the capability of mould manufacturing. This signifies our continuous effort to provide an extended and broad product range, where our design and standards will meet even the toughest demands.

Since the beginning our experience and know-how has given our customers the needed assurance.

Our capabilities within design and manufacturing of polyurethane technology is and can be utilised within a wide range of markets and products. This includes but are not limited to solutions for:

- Energy
- Subsea
- Offshore
- Offshore Wind
- Industrial
- Fisheries
- Seismic

If our standard products do not match your demands, we are more than happy to design and manufacture products that will fit your unique needs and requirements. We have our own in-house engineering department. The town of Åndalsnes is a center for the plastic industry in Norway and the key suppliers are located at our doorstep. This unique situation has enabled PartnerPlast to have an exceptional track record of supplying every project on time, and we will do everything to keep it that way!

Molstad Modell & Form

Molstad Modell & Form is a company in the PartnerPlast Group, focusing on production of moulds for rotational moulding and thermosetting plastics, and making of moulds and patterns for metal casting. We are also a dedicated producer of high performance polyurethane elastomer parts.

We are a modern casting tool- and pattern maker with long traditions. We combine good craftsmanship with the very best of the new technology available within 3D-modeling programs and NC-milling machines. We are a centre of competence within the fields of Reverse Engineering, 3D-modeling, moulding and machining services focusing on moulds, patterns and prototypes.

We also handle Additive manufacturing and PU casting.

Together with our partners, we can deliver castings, machined and surface-treated parts in plastic, aluminium, nickel aluminium bronze, iron and steel. We provide turn-key solutions fulfilling your requirements.



The PartnerPlast Polyurethane material and technology

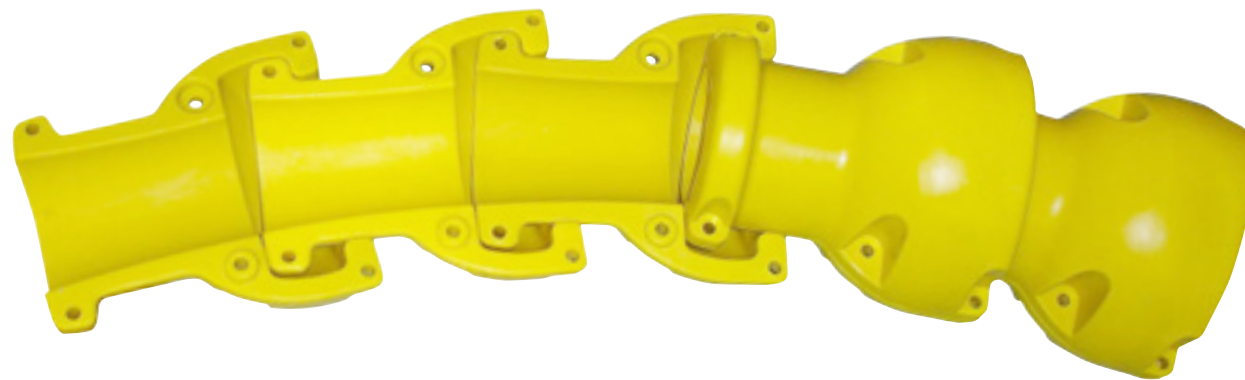
PartnerPlast utilizes one of the best and most versatile polyurethane materials available in the world today. Our Polyurethane is a semicomponent unfoamed, soft to tough elastic PU elastomer with outstanding mechanical and dynamic properties. Due to the Polyether polyol formula, the product is highly resistant to abrasion and hydrolysis. The material is compliant with the RoHS directive. The cured material contains no hazardous substances, and will not have any negative effect on the environment.

Possible applications are Abrasive protection, Boat fenders, Shock- and vibration dampers, Clamps, Cable Protection, Bending strain relief, Bending restrictors, Protection covers, VIV stakes etc. Product range from small parts weighing

a few grams to large products weighing several hundred kilos. The material is highly suitable for offshore and subsea applications.

Our system allows adjusting the hardnesses between 60 Shore A and 75 Shore D. It is also an option to mix several hardness in one product, e.g. to combine high strength with good impact protection properties. It is possible to mold in different type of reinforcement (Metals, fibers, wood etc) and threaded inserts.

We can manufacture and deliver in variety of many different standard colours, such as yellow, red, orange, black and blue. Other colours on request.



Bend Restrictor

PartnerPlast manufactures polyurethane Bend Restrictors in different hardnesses, to fit any gun cable, flexible flowline, umbilical, or other cables. Our Bend Restrictors provide excellent protection against damage due to overbending. They will also provide good protection against abrasion and impact. The Bend Restrictors are designed and manufactured according to customer specifications, based on outer diameter of the product they are encompassing, the minimum allowed bend radius and the static and dynamic loads.

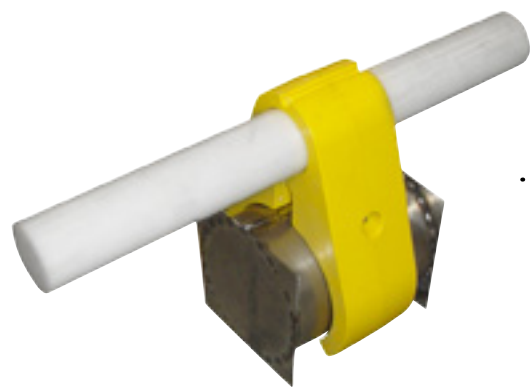
Bend Restrictors consist of a number of interlocking half elements, bolted together with Stainless steel bolts. It is also possible to add mold-in steel reinforcement in the elements to increase strength further. Using a reinforced PartnerPlast Bend Restrictor can often provide a substitute for the use of steel bend restrictors. The Bend Restrictors will have a free movement until it reaches the minimum allowed bending radius. It will then prevent further bending of the cable and thereby protecting it from potential damage.



Cable Protection

PartnerPlast manufactures Cable Protection from a marine grade polyurethane system with high abrasion resistance properties and excellent impact protection. The PartnerPlast Cable Protection design is flexible and can be fitted to cable dimensions from 10 mm and up to 400 mm, including bundles of several cables and umbilicals.

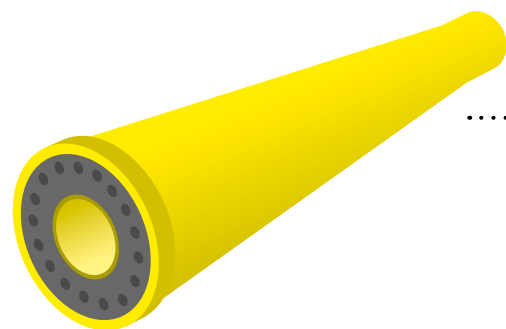
Our Cable Protection consists of tubular interlocking half shells and comes in lengths of 0,6 meter, 1,2 meter and 2,4 meter adjusted to standard cargo carriers. For assembly on board the cable-laying vessel we supply different kind of banding, e.g. Inconell, aramid or fibre reinforced plastic bands.



Piggy Back Clamps, Guides & Saddles and Spacers

PartnerPlast has the capability to design and manufacture a wide variety of clamps, saddles, spacers. The design can be project specific made, or utilising existing concepts. Our products are designed for rapid installation, and clamping force can be achieved by straps – Kevlar or steel, or bolting, depending on customer requirements.

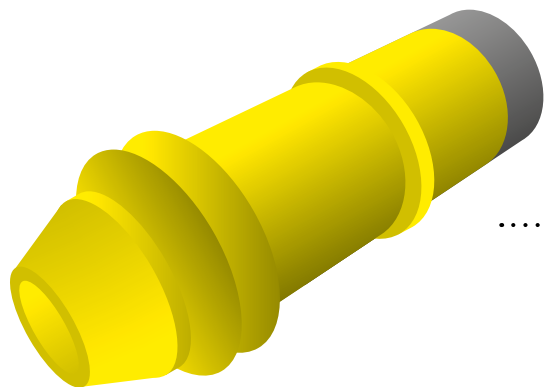
The products are mainly used within the oil, gas and energy sector in order to piggy-back or separate two pipelines or cable/umbilical to a pipeline.



Bend Stiffener

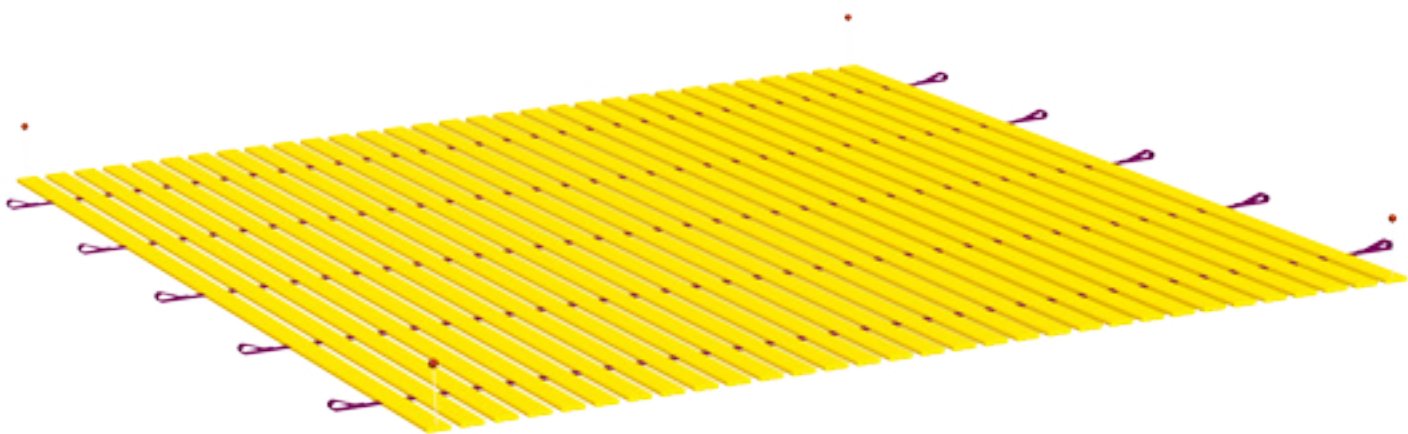
PartnerPlast produces dynamic Bend Stiffeners from a flexible and tear resistant marine grade polyurethane material. Our Bend Stiffeners are designed and manufactured according to customer specifications, based on outer diameter of the cable or umbilical they are encompassing and desirable bend stiffening. The Bend Stiffeners will provide excellent protection against fatigue at the cable or umbilical termination.

Bend Stiffeners can be made as a single piece, with a mold-in steel bracket that will fit to the termination head. It can also be delivered as a split design, or as interlocking half shells for retrofitting on existing cables.



J-tube Seals and Centralizers

PartnerPlast J-tube Seals and Centralizers are produced according to customer specifications and will provide excellent sealing solutions and centralizing properties. J-tube Seals and Centralizers can be made to fit our other protection systems, such as Bend Restrictors or Bend Stiffeners.



MudMat® in cooperation with Installit

MudMat® is a heavy-duty polyurethane (PU) mat developed for use offshore or onshore. The mat can be used as subsea support, landing /positioning device or seabed /pipeline /cable protection. The design is based on offshore experience and the need for a flexible mat for several purposes. MudMat® can also be produced with reinforcement and/or weights if requested.

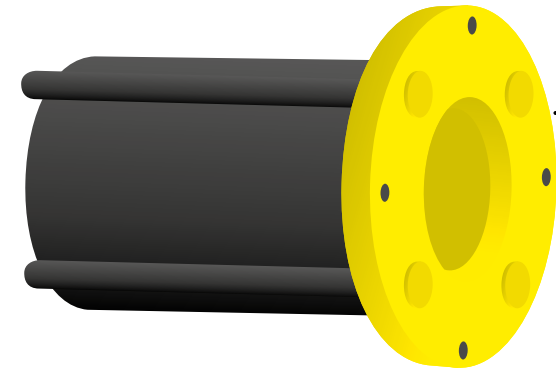
The MudMat® is produced in PU (Polyurethane). The hardness of the PU can be decided by the customer. Default is 60 Shore D. Certified lifting slings are integrated into the planks during fabrication, building a mat that is robust for easy handling. Extra weight can be added to increase the weight in water for subsea operations. Color and size can be decided by the customer.

A heavy-duty mat is developed for special purposes. This mat has reinforcement and extra weights moulded into the mat to increase stiffness, weight and robustness.

The MudMat® has on a typical seabed with low temperature and reduced UV light, an expected life cycle of minimum 20 years.

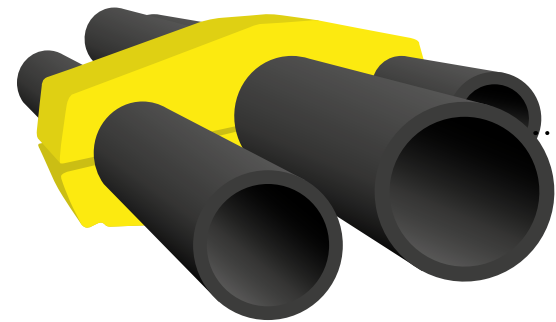
Dimensions and characteristics for MudMat®

Type	Dimension [mm]	Weight in air/seawater [kg]	
		Standard	Reinforced
MudMat® 30	6000 x 5000 x 30	682 / 47	768 / 132
MudMat® 18	3600 x 5000 x 30	409 / 28	461 / 80
MudMat® 9	3600 x 2500 x 30	211 / 15	238 / 41
MudMat® 4	2400 x 1600 x 30	132 / 9	149 / 26



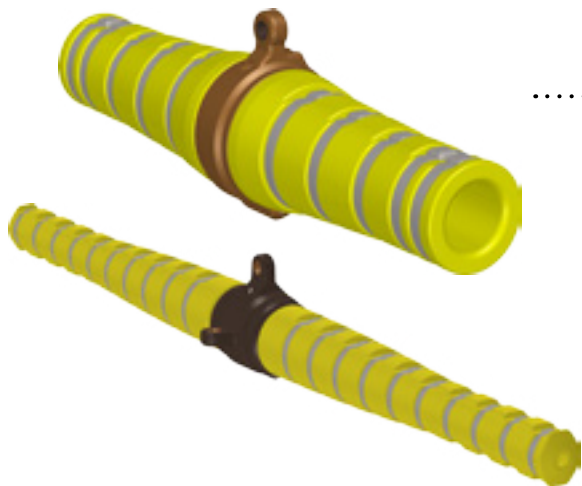
Riser End Cover

PartnerPlast Riser End Covers will protect your risers from damage during transport and handling. They are manufactured according to customer specifications, and are made in a versatile marine grade polyurethane material with very good abrasion- and impact resistance. The covers are long-lasting and can be reused many times.



Riser Clamps and Protectors

PartnerPlast Riser Clamps will create a strong and easy fix for attaching different kinds of tubing to a riser. The Riser Clamps are manufactured according to customers specifications and are produced in a marine grade polyurethane material combined with strap-ping in Inconell, stainless steel or Aramid. To protect the clamp from damage during installations, Riser Clamp protectors can be supplied.



Slider and Grip

The Slider is designed to slide down a lead-in for attachment to flexi float system, lead-in flotation or other temporarily installed equipment while protecting the lead-in from over-bending.

The Grip is equipped with hinges for easy and fast instalment and removal, while giving the cable the best protection against over-bending. Typical use as attachment points for flotation, inner lead-in spreader ropes, gun umbilical's as attachment to diverters or lead-ins.

To achieve good friction and compression over the cable, steel bands are used.



Custom products and solutions

To build a successful product or solution PartnerPlast knows the tough demands in the industry. An important niche is the customized product range, and this is perhaps also the most challenging. PartnerPlast engineers will work closely with your engineers in order to capture the best solution. Only through teamwork and collaboration can the necessary skills can be brought together.

The goal is not only to make a successful project, but to lay the foundation for future projects for us and for our customers. PartnerPlast has manufactured licensed products for serial production and unique new designs.

Custom products can either be one-off tailor-made devices for a specific and dedicated need, or a custom design adapted to the customer's requirement, produced in larger series. For the latter, the customer's logo can be included in the shell, either as a permanent emboss or a mould on graphic.

Engineering

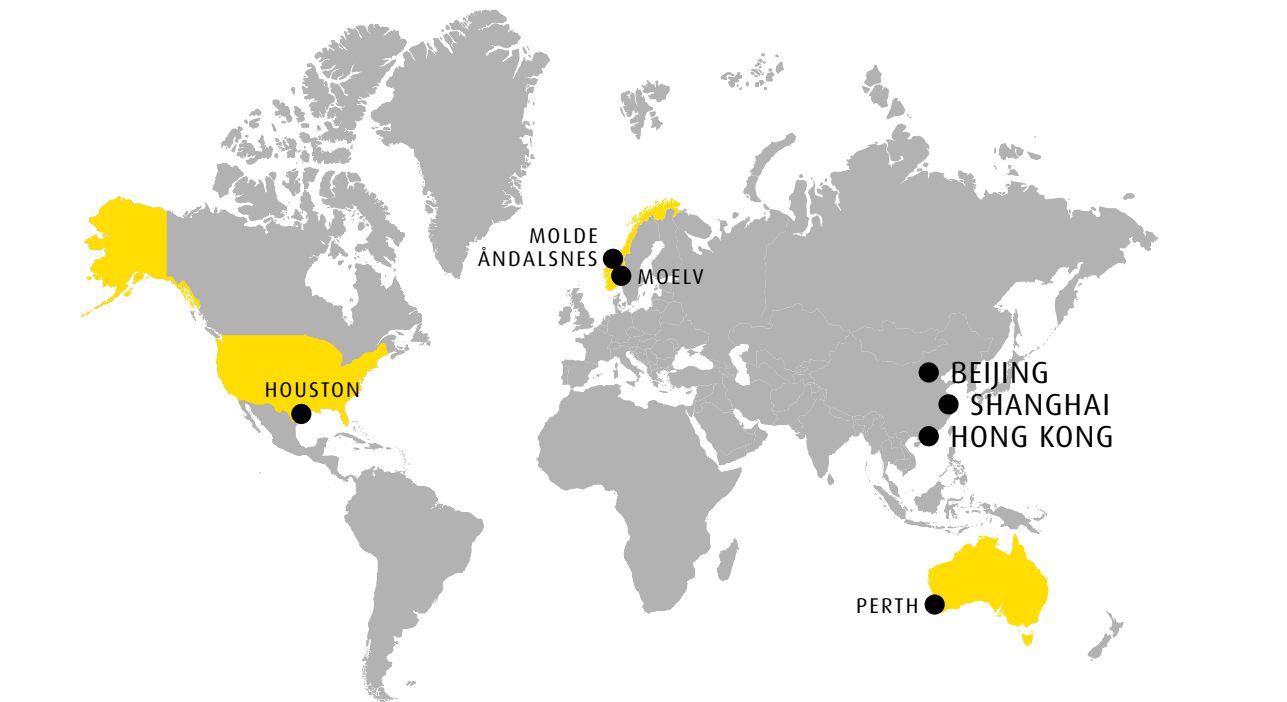
PartnerPlast has a professional skilled team with the capacity to develop and design new products. The product development process is covered through these steps:

- Concept design
- Tool fabrication
- Production and testing of prototype
- Final design ready for production

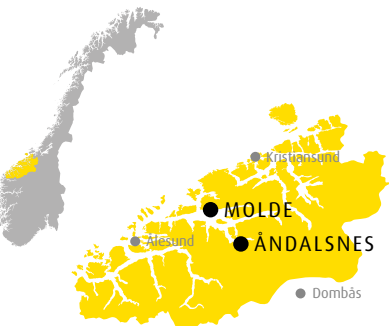
Our technical capacity covers more than the shaping of products. PartnerPlast has a long history in successful and innovative development of complete product combinations. Our plastic components are used in combination with steel and aluminium structures, and can be equipped with electronic accesories such as GPS tracking devices, sensors etc.



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