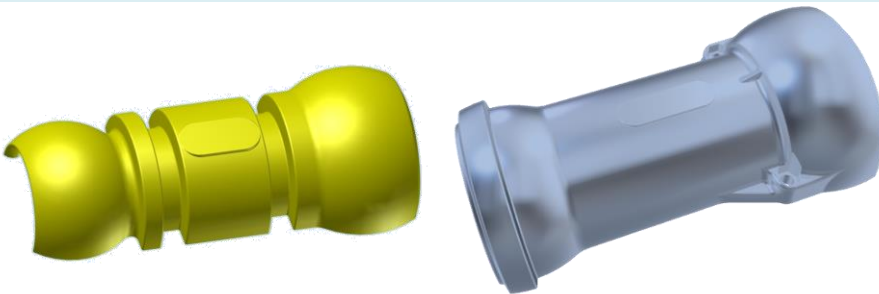




Success Through Technical Excellence

The Blue Ocean Protector range is designed to provide mechanical protection for subsea cables or pipes. Applications include shallow water, offshore renewable energy foundations, landfalls, river crossings, through boulder fields and rocky seabed. Consisting of a series of interlocking half shell modules to form a vertebrae bend restrictor around the line, the Blue Ocean Protectors are manufactured in ductile iron to provide:

- Bend Restriction to ensure that product minimum bend radius is respected within the bending moment capacity of the protectors,
- Protection to the cable from impact and abrasion,
- Increased on-bottom stability through added weight,
- Ease of installation and cost-effective protection,
- Greater articulation angle achieved at each joint than conventional 'split pipe', facilitating use over deck sheaves, chutes and quadrants,
- Smooth bore to facilitate longitudinal cable movement where required, for instance for cable pull-in or cable tension relief,
- No sharp edges,
- All bolted assembly with identical top and bottom castings and use of large fasteners with built in nut recesses for simplicity, speed and reliability of assembly,
- Smooth outer profile for ease of pulling through apertures and structures,
- Range of accessories available, including male/male adaptors with or without cable clamps, female/female adaptors, end pieces, pulling heads, and flange connections.



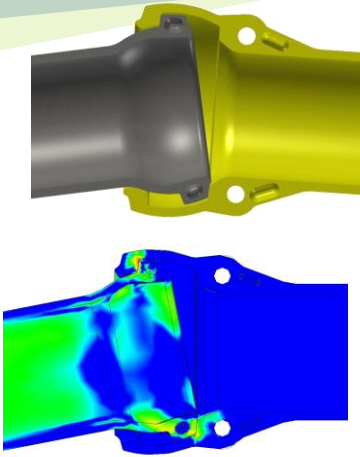
Castings are manufactured in a high capacity, highly mechanised, 'automotive grade' UK foundry (with full ISO9001 quality and ISO14001 environmental certification) for quality, consistency of fitting, material traceability and dependable lead times. Tooling is manufactured directly from 3D CAD software models for quality and precision.



CABLE PROTECTORS

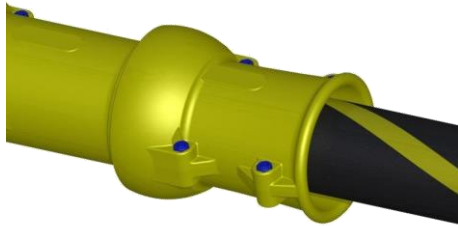
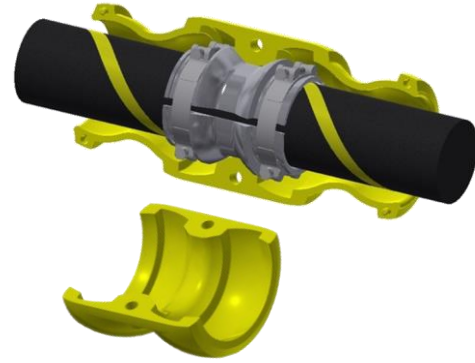
The Blue Ocean Protectors have a ball and socket (shoulder) joint between each interlocking module, allowing movement in any plane down to the lock out (minimum) bend radius. Supplied in EN-GJS-400-15 or EN-GJS-400-18-LT ductile iron depending on environment and strength requirements, with socket head cap screws and nuts as fasteners between each pair. The existing product range includes:

Internal Diameter	Pitch (Effective Length)	Lock-out Radius	Casting Wall Thickness	Weight in Air per Casting	Weight in Air per m
89mm	305mm	1.5m	12.7mm	11.0kg	72kg/m
120mm	400mm	2.0m	8.5mm	8.2kg	41kg/m
150mm	400mm	2.5m	8.5mm	10.7kg	54kg/m
180mm	400mm	2.5m	8.5mm	12.7kg	64kg/m
330mm	333.5mm	8.0m	10.0mm	23.0kg	138kg/m



MALE/MALE & FEMALE/FEMALE ADAPTOR AND CABLE CLAMP

The male/male adaptor ('Dogbone') is a casting designed such that it can incorporate a cable clamp, or alternatively can be cut down to create a female/female adaptor. The standard cable clamp is designed as a three-part clamp which provides greater tolerance of variations in cable or pipe diameter or ('out of roundness') than a conventional two-part clamp. It also provides greater tension holding capability for a given clamping pressure.



END PIECE

The end piece casting has a flared internal bore to provide a mini bellmouth surface for the cable and provides a smooth transition to unprotected/buried cable at the end of the run of cable protectors.

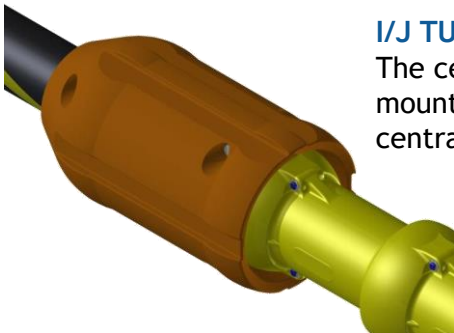
FLANGE CONNECTOR

Normally machined from carbon steel, the flange connector provides a starting point for connection to a structure. It may be supplied either as a single piece or split in half to enable retrofitting over the cable or pipe.



I/J TUBE CENTRALISER

The centraliser is made from a polymer (e.g. HDPE) and is normally mounted onto a male/male cable clamp, to provide a robust centraliser for I-tube or J-tube installations.



PULLING HEAD

The pulling head castings incorporate a length of chain which enables a string of cable protectors to be pulled into position. The inside end of the chain can be linked to the cable or pipe inside the protectors by a suitable stocking, for subsequent pull through.



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