

Steel Tube Umbilicals

Providing hydraulic control and chemical injection lines for demanding applications

A steel tube umbilical contains steel tubes for conveyance of hydraulic control fluids and/or injection chemicals for subsea applications. A steel tube umbilical can also contain electrical and/or fiber optic cables and thermoplastic hoses to support a project's functional needs.

Oceaneering also supplies umbilicals incorporating large bore tubes as central elements in a cabled bundle.

FEATURES

Suitable for ultra deepwater applications

Tubes from 3/8 in to 4 in diameter

Extensive track record



Steel Tube Umbilicals

Oceanengineering umbilical designs incorporating steel tubes as primary conduits may include tubes with diameters ranging from $\frac{3}{8}$ in to 4 in and design working pressures up to 20,000 psi.



Advantages and Characteristics

- » Suitable for ultra deepwater applications and high operating pressures
- » Steel tubes offer inherent tensile strength and load bearing properties
- » Material options offering excellent corrosion resistance and broad compatibility with commonly used service fluids
- » Inclusion of a large bore tube as a central element may eliminate the need for a stand-alone service line
- » High hydrostatic collapse resistance to meet the needs of vent and chemical injection applications
- » Fast hydraulic response due to negligible volumetric expansion
- » Steel tubes withstand high operating temperatures

Parameter	Value
Maximum umbilical diameter	12.6 in / 320 mm (maximum outside diameter to date)
Strength member	Steel tubing acts as strength member. When required, additional strength members in the form of helically wound galvanized steel armor wire may be added to a design.
Manufacturing length limitations	Qualified splicing and joining processes are available. Length limited by umbilical design and installation method.
Maximum allowable installation tension, breaking tension and crush load	Designed to meet requirements
Axial, bending, and torsional stiffness	Optimized during design
Tension/Torsion Factor	Designs are torque balanced.
Design Life	25 years, as standard. Longer design life can be provided
Packing, transportation, load out	Determined by umbilical characteristics and client requirements Reel (typically 9.2 m x 300 tonne), carousel
Installation methods	Umbilicals designed to suit client's installation method
Industry Specification Compliance	ISO 13628-5 / API 17E NORSOK U-001 DNV-OS-F101

Steel Tubes

Vendor supplied steel tubes in seamless or seam welded form are utilized in Oceaneering designs. Material options include:

- » Super Duplex Stainless Steel
- » Lean Duplex Stainless Steel
- » 316L Stainless Steel
- » Coated Carbon Steel

Seamless and seam welded tube products have been thoroughly tested and qualified for use. Oceaneering is able to offer overshooting of steel tubes and qualified welding procedures to meet project needs.

Steel Tube Material Characteristics

Parameter	Super Duplex Stainless Steel	Lean Duplex Stainless Steel	316L Stainless Steel	Coated Carbon Steel
Material Reference	UNS S32750	UNS S32101	UNS S31603	API 5L X52-X80
Pressure Rating (psi)	3,000-20,000	3,000-15,000	3,000-7,500	3,000-10,720
Tube Diameter	$\frac{3}{8}$ in - 4 in	$\frac{3}{8}$ in - 3 in	$\frac{3}{8}$ in - 1 in	1 in - 2 in
External Corrosion Resistance	High resistance	Zinc coating	Limited resistance	Bonded Coating
Pitting Resistance Equivalent (PREN)	> 40	23	23.1 - 28.5	-
Minimum Yield Strength (MPa)	600 - 690	552	170	358 - 551

Integrated Service Umbilicals

Oceaneering's state-of-the-art large bore tube welding and NDE line has increased our ability to provide a broad range of steel tube umbilical solutions designed to meet the demands of our clients including:

- » The need to provide an integrated MEG service or gas lift lines within an umbilical
- » The need to realize reduced installation costs
- » Provision of increased functionality in dynamic and static applications
- » The integration of tubes from 2 in to 4 in, 10 kpsi in umbilical designs
- » Mitigation logistical challenges associated with large bore tubing by utilizing our In-house welding capabilities





oceaneering.com