OIL & GAS – PDT – PRYSMIAN DOWNHOLE TECHNOLOGY

Exploration & Production

Control Lines & Flatpacks

Control Line

CONTROL LINE MANUFACTURING

This range includes control lines (hydraulic tubing) designed for use in harsh environments such as those created by chemical injection or well monitoring and other applications where strength, corrosion resistance and reliability are essential. PDT's control lines are manufactured and tested to meet or exceed ASTM requirements. Prysmian Downhole Technology offers four types of control lines. Each manufacturing process has it's own merits based on cost effectiveness vs. technical requirements.

MANUFACTURING METHODS

Outer Tube Materials

A flat strip is formed into a tube through a series of rollers to a round shape and longitudinally welded at size with no additional work.

Welded & Drawn

After welding, the tube is drawn through a reduction die to homogenize the seam weld. The weld seam is reworked externally by the die. By drawing through a die, the tube has an improved sealing surface, and a truly round OD and an improved external surface finish.

Welded & Floated Plug Drawn

After welding, the tube is drawn through a die with a floating plug in the bore to rework the weld seam. The plug is not attached to a rod or mandrel, but "floating" inside the tube surrounded by lubricant. The weld seam is reworked internally and externally by the die. By drawing through a die, the tube has an improved sealing surface, and a truly round OD and a better internal and external surface finish. This tubing is referred to as "smooth" bore.

Seamless

A billet of metal is extruded into a tube and drawn to final size. There is a longitudinal weld with seamless tube although orbital welds are used to manufacture long lengths. The manufacturing process for the seamless tube limits the maximum continuous length, therefore orbital welds are required to join lengths of seamless coil together to achieve lengths that are suitable for well applications.

DESIGN & CONSTRUCTION

Outer Tube Materials

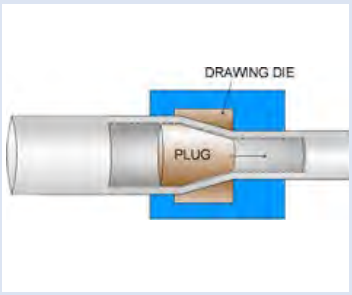
- 316L Stainless Steel
- A825 Alloy
- A825 Alloy Enhanced Properties
- Duplex 2205/2507
- Alloy 625

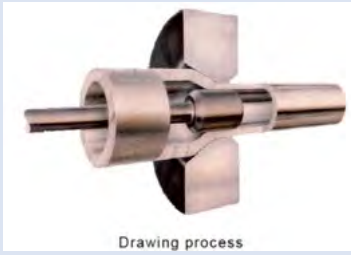
Standard Sizes

- 1/8" x 0.028" & 0.035"
- 1/4" x 0.035", 0.049" & 0.065"
- 3/8" x 0.035", 0.049" & 0.065"
- 1/2" x 0.049", 0.065" & 0.083"
- 5/8" x 0.049", 0.065" & 0.083"

Non Destructive Testing

Eddy current testing (ECT) is performed on the longitudinally seam welded tubing and strip splice welds at intermediate size in the as-heat treated condition. Radiographic testing is performed on all orbital welds and strip splice welds are detected by ECT at intermediate size in the as-heat treated condition. Yield pressure hydro static testing is performed on the cold worked tubing at final size.




Drawing process


Pilgering process

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Flatpacks

ENCAPSULATION & FLATPACKS

Flatpacks are designed to simplify installation and reduce the number of installation spooler units required during well completion. Flatpacks are available in a wide range of configurations with options of single pass encapsulation and dual pass encapsulation for added protection. Individual components and tubes can be color coded and custom printed for immediate identification and if additional crush resistance is needed, bumper bars and /or wire rope can be specified.

APPLICATION

Flatpacks are commonly used when several different lines are terminated at approximately the same depth in the well. Common applications include intelligent well systems, deep-set chemical injection lines with downhole gauge cable and safety valve lines with shallow set chemical injection lines. For some applications bumper bars are also encapsulated into the flatpack to provide additional crush resistance.

STANDARDS & APPROVALS

Control Lines are manufactured according to applicable ASTM standards for each specific material. Tubes can be supplied flushed, filled, and filtered per client requirements and to the appropriate NAS/SAE standards.

QUALITY & TESTING

- Manufactured in accordance with Standard Inspection and Quality Plans

DESIGN & CONSTRUCTION

- Encapsulation for single and multiple lines
- Optional Bumper Bars
- Safety-Strip® Encapsulation (standard)
- Up to 8 lines can be flatpacked
- Encapsulation profiles to suit customer application
- Custom Line Marking
- Full range of application materials
- Optional Flush & Fill

Components (Or Combination)

- TEC
- TEF
- Hybrid
- Control Lines
- Bumper Bars

Encapsulation Materials

- PP (Polypropylene) /TPR (Santoprene) / PA (Nylon) / PVDF / ETFE (Tefzel) / ECTFE (Halar) FEP / PFA / ECA 3000

Bumper Bars

- 5/16" / 7/16" / 1/4" / 3/8/ Galvanized

Pressure Ratings

*Note: Flatpacks will be rated to the line with the lowest pressure rating.

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