Tenaris understands the complex requirements that the J-Lay method dictates to ensure optimal performance during the pipe laying process. In response to our customers’ request to reduce welding time and overall laying costs, Tenaris developed this innovative solution that can enable you to achieve the same results.

**J-Lay Collar Common Manufacturing Process**

Common manufacturing processes involve creating J-lay collars by forging the steel into the desired shape. Unfortunately, this method has the potential to slow down production and create lower delivery times. Additionally, if the engineering team needs to make adjustments on the dimensions, a new mold will be needed.

Once the J-lay collar has been forged, it generally goes through a manual UT inspection process, which is not as accurate as the automatic UT process that detects all longitudinal and transversal outside diameter (OD) / internal diameter (ID) imperfections.

Furthermore, the manual process cannot perform inspections on the shoulder area, which is the most critical area of the J-lay collar, since it will support the pipe column.

Overall, performing manual UT inspections presents greater risks for human error and does not cover 100% of the body of the J-lay collar.

**The Tenaris Solution**

The Tenaris J-lay collars can be designed to adapt to any customer requirement. For example, a two shoulder design can be used to provide support when the weight of the pipe exceeds the tensioning device capacity or to stop any buckle in the pipe. The J-lay collars are also used to withstand the tensile load of a multi-joint pipe, the misaligned bearing load at the collar, and the pipeline column from the vessel to the seabed.

In order to achieve such reliable use of the J-lay collars, Tenaris designs the mother pipe with a special chemical composition and outstanding mechanical properties. A CNC Lathe machine is used to machine both the OD and the ID, along with the shoulders of the J-lay collar. Most importantly, the mother pipe is machined with a sizable wall thickness (WT) that ensures that the ID of the J-lay collar corresponds with the ID of the flow line, which is key for deep water projects. The mother pipe can also be customized to comply with special requirements such as NACE, heavy WT (i.e. 65 mm and more) and high specified minimum yield strength (SMYS).

To ensure reliability of the J-lay Collar, Tenaris also developed a “state of the art” Non-Destructive Testing (NDT) process with automated UT.

This NDT process covers both the mother pipe and the final product, and involves the following: Full Length Ultrasonics on the Mother Pipe, Blanking and Final Machining, Visual and Dimensional Inspection, Ultrasonics on Machined J-lay collar (Compression Wave over 100% of collar length), Wet Flourescent Magnetic Particle Inspection and Packing and Shipping.
Advantages of the Tenaris Solution

The Tenaris solution considerably reduces welding time due to the special chemical composition and properties of the J-lay collar, which is designed to have a perfect match with the steel of the flowline. It also ensures that there will be an exact match between the J-lay collar ID and the flowline ID.

The automated UT system increases reliability by guaranteeing a 100% inspection frequency on both the mother pipe and the J-lay collar. Due to the automated nature of the system, it avoids the “human error” factor, and also has a data storage capability that enables the future retrieval of inspection data.

Lastly, our solution provides you with the flexibility to make adjustments to the J-lay collar design prior to machining, if necessary. Overall, these advantages enable the J-lay collar to better withstand the tensile load of multi-joint pipes and provide better mechanical properties while improving the laying process.

Full Length Automated Ultrasonic Testing

After the heat treatment, which involves quenching and tempering, the mother pipe is inspected by the ultrasonics to assure the integrity of the material prior to blanking or machining operations.

The mother pipe material for the fabrication of the J-lay collars is subject to 100% volumetric ultrasonic inspection using Shear Wave ultrasonics for Longitudinal and Transverse ID/OD flaw detection, and Compression Wave ultrasonics for the detection of wall variations and Laminar imperfections.

The finished J-lay collars also receive a Compression Wave inspection for Laminar type imperfections over the entire length of the J-lay collar including the body and the shoulders. The artificial reference reflectors shown on the screen shot (next page) demonstrate the sensitivity of the Compression Wave. These reflectors are artificially induced holes used for the calibration of the Automatic Ultrasonic Scanning System. The actual size of the reflectors range from 1mm to 3 mm.
The screen shot shows the C-Scan presentation of the Reference Standard used for the calibration of the Automatic Ultrasonic Scanning System. The artificial reference reflectors range in size from 1mm to 3mm and clearly demonstrate the system sensitivity.
Technical Specifications

**Dimensional Inspection**
Dimensional inspection is performed on both the ID and OD surfaces of the J-lay collar to assure compliance with the applicable J-lay collar design.

**Wet Fluorescent Magnetic Particle Inspection**
The entire surface of each finished J-lay collar is wet magnetic particle examined according to customer specification. The continuous method of examination is used, along with longitudinal and circular magnetization techniques. The ID and OD surfaces are examined and parts are demagnetized before packaging.

**ID Tolerances:** + 0/ -0.1mm
**Design:** According to Customer Specification

**Inspection Frequency**
- Ultrasonic inspection of “Mother Pipe”: 100%
- Dimensional & Visual Inspection of Finished J-Collar: 100%
- Ultrasonic Inspection of Finished J-Collar: 100%
- Wet Fluorescent Magnetic Particle Inspection: 100%

**Full Product Range of Tubular Accessories**
At Tenaris, ensuring that we develop the right product solutions to meet the needs of our valued clients is a permanent objective. We offer a full suite of innovative tubular accessories which include Anode Pads, Bends, Buckle Arrestors and services like Internal and External Coating and Double Jointing. To support our product offering, we provide customers with their own Tenaris Project Manager. This individual serves as the single, proactive communications channel throughout the duration of the project and ensures on-time delivery of the full order.

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