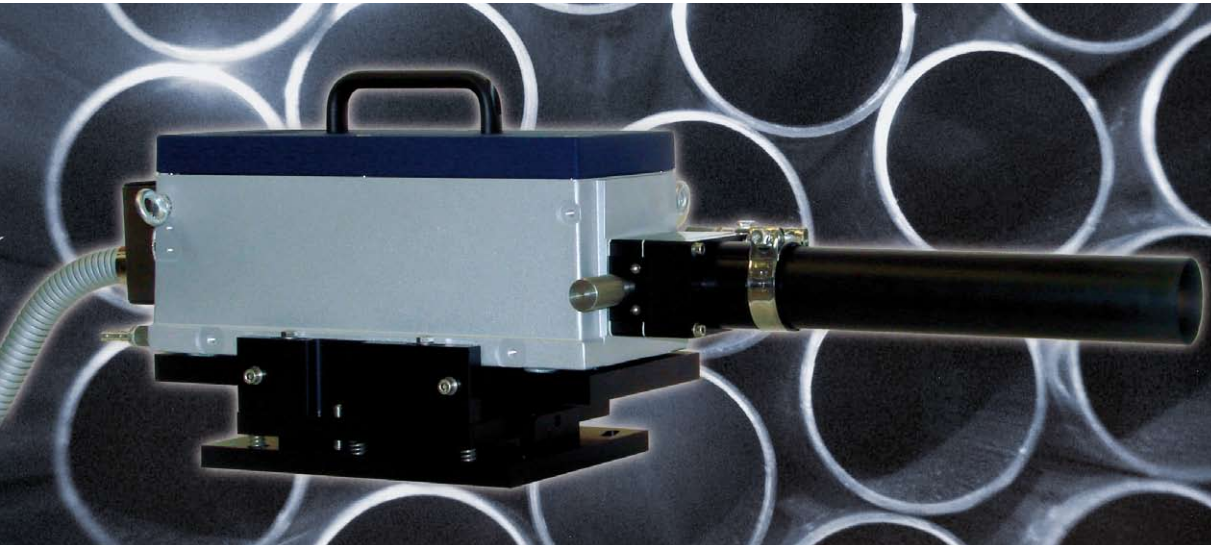


Length and Speed Testing of Steel Tubes



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Optical Measurement Technique for Non-destructive Testing of Steel Tubes

For more than 60 years, the Institut Dr. Foerster has provided a comprehensive selection of quality products for non-destructive testing, metal detection and magnetic field characterization. At the head office in Reutlingen, solutions for automatic non-destructive testing of semi-finished products (wire, bar and tube profiles) for the metal-producing and metalworking industry are developed and manufactured. To provide a turnkey solution, so called Multi Test Blocks are combined to form an individual system solution consisting of Foerster testing systems and measurement equipment from other manufacturers.



Fig. 1: An example of a Foerster testing line.

In the following article, we describe the integration of Polytec's LSV-1000-30 Velocimeter into a testing system for seamless steel tubes (Fig. 2).

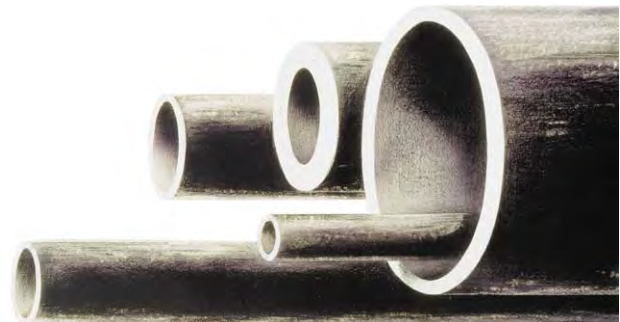


Fig. 2: Seamless steel tubes.

For a current project for a South American customer, the seamless steel tubes must be tested according to the API 5CT and API 5L standards. The tubes can be described by

- outside diameters ranging from 167 mm to 408 mm
- wall thicknesses ranging from 6 mm to 35 mm
- lengths ranging from 7.5 m to 30 m

The assembly of the testing line in Reutlingen is currently under way with final production certification at the customer premises in March 2010.

This Multi Test Block consists of four drivers that center the test piece and achieve appropriate guiding. At the input to the test center there is a mechanical entry protection to prevent bent tubes from damaging or even destroying the precision test heads. At the output there is a easy-to-maintain 8-channel color marking device. Detected flaws are marked on the test piece with different colors not only indicating the position of



Fig. 4: The first Velocimeter is located behind the entry protection.

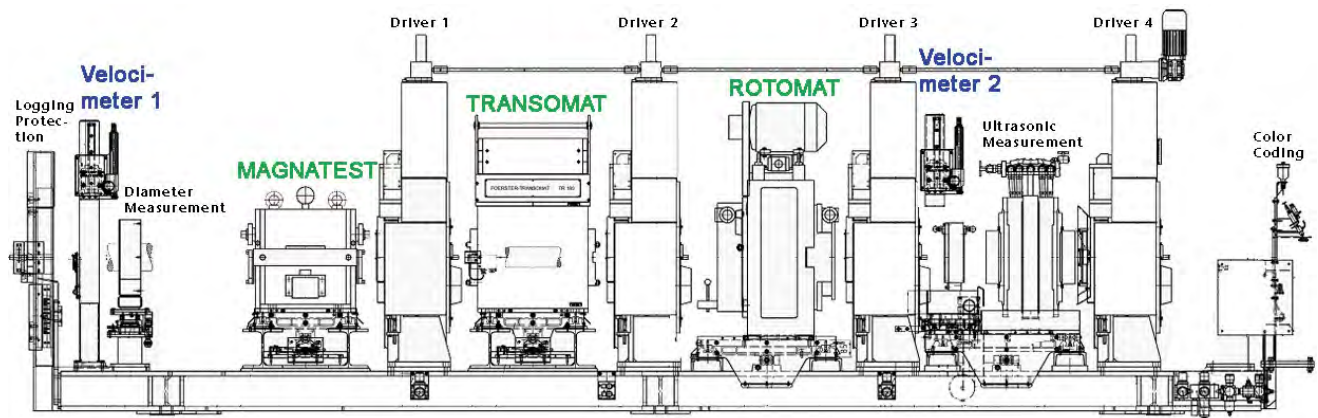


Fig. 3: Schematic diagram of testing line.

the flaw but also the type of flaw.

The following test systems are integrated:

- Foerster Rotomat identifies longitudinally oriented inner and outer defects using Flux Leakage Testing
- Foerster Transomat identifies transversely oriented inner and outer defects using Flux Leakage Testing
- Foerster Magnatest encircling coils are used to prevent damages of the test heads due to fish tails
- Water-coupled ultrasonic wall thickness testing by General Electric

The following measurement equipment from other manufacturers are also integrated:

- Laser diameter measurement by Zumbach
- Laser speed measurement with the LSV-1000-30 Laser Velocimeter by Polytec

The new LSV-1000-30 Laser Velocimeter by Polytec provides a millimeter "clock", which is processed by the Foerster test electronics. It is used to determine

- the length of test pieces
- the flaw position for logging and color marking

Both the laser head and the electronics are now integrated into one compact housing which permits a simple integration into the testing line.

Behind the third driver there is a second LSV-1000-30 velocimeter. This velocimeter is used to recognize speed variation of test pieces due to the enormous extraction forces (more than 3000 N) caused by the Flux Leakage Testing.



Fig. 5: The second Velocimeter follows the third driver.

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