

Vallourec & Mannesmann Tubes

# Retained **austenite** quantification in production

Vallourec & Mannesmann Tubes, a subsidiary of the Vallourec Group, put Cetim in charge of all its retained austenite analyses in order to certify the quality of the tubes they produce. A technique, implemented by the Center, ensures the quality and the fast delivery of the results.

**T**he Vallourec research centre wishes a fast, repetitive and unexpensive method for characterizing the amount of retained austenite in some martensitic steels. The aim is a better understanding of the phenomena involved in heat treatments. *"Formerly, this analysis was not necessarily absolute, and its interpretation remained difficult"*, says Anne-Laure Kaiser, R&D Manager at Vallourec research centre.

## A unique technique in France

The retained austenite quantification using energy dispersion x-ray diffraction

developed at Cetim is unique in France. For its use, the Center received the accreditation of Cofrac in 2005. This technique consists in bombarding the surface to be analyzed with a polychromatic beam of x-rays which generates 16 or 19 lines in the presence of iron  $\alpha$ , or 20 lines in the presence of iron  $\gamma$ . During the analysis, the experimental spectrum is compared with an ideal model in order to define the amount of austenite in the analyzed material. Whereas the traditional technique requires three to four hours, the retained austenite quantification by



Vallourec

x-ray dispersive technique lasts less than fifteen minutes for a similar precision.

## Optimizing products and processes

*"This technique allows to analyze a larger number of different samples, to work out a database of thermal treatment results and to optimize our products"*, declares Anne-Laure Kaiser. The results allow also optimizing the tubes production process. According to Anne-Laure Kaiser: *"this reliable, fast and unexpensive technique could also be applied for the analysis of new tubes produced with other materials and meeting other standards"*.

Tubes, under development, intended for Vallourec's various markets.

## OUR CUSTOMER

### Corporate name

Vallourec & Mannesmann Tubes, subsidiary of the Vallourec Group

### Sales turnover

6.437 millions euro in 2008

### Workforce

18.500 people in 2008

### Activity

Vallourec is world leader of the production of seamless steel tubes without weld intended mainly for the sectors of oil and gas, electrical energy and other industrial applications. The total annual production, about 3 million tons, covers the most extended dimensional range in the world for seamless steel tubes



## Cetim's asset

The determination of retained austenite using energy dispersive X-ray diffraction offers: a fast analysis, between 2 and 20 minutes compared with the 2-20 hours

required by the traditional technique; an increased precision (about 1% whereas the conventional technique is more difficult to implement below