Total

Quick quality control of moulded valves

Total chose Cetim-Trius - an ultrasonic method that relies on analysing the grain size of the steel microstructure - to improve the quality control of the heat treatment of its moulded carbon steel valves. Carry on reading to find out how!

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Manufacturers of steel-moulded valves generally check the impact strength of their parts (low temperature impact resistance) using a destructive method on test samples taken from an ingot. But is a single sample really representative of a batch of valves? This question becomes even more acute for customers who purchase worldwide. François Dupoiron, materials expert at Total, explains: *"In order to improve the safety and reliability of our production centres, we wanted to be able to control the quality of the bodies of the moulded carbon steel valves that are delivered to us; and we wanted to use a simple, quick and low-cost method"*.

A reliable, mobile solution

Cetim tested three different methods (Barkhausen noise, eddy current and ultrasound), all of which were based on the grain size of the steel microstructure. This size has a significant impact on resilience and is heavily dependent on the heat treatment.

The ultrasonic method was eventually chosen as it enables the volume to be measured. It works on the following principle: an ultrasonic wave is emitted by a probe positioned on the surface of the material to be inspected and is propagated. The opposite surface of the part reflects the wave, which is then received by the same probe. The frequency spectrum of the ultrasonic signal, which is directly influenced by the size of the grains, is analysed. The result obtained is then compared to a pre-determined threshold that allows the valves to be classified into three categories: conforming, non-conforming or questionable. The measurements are repeated on different parts of the valve to check the uniform nature of its structure.

François Dupoiron further explains: *"To confirm the accuracy of the ultrasonic measurements undertaken by Cetim, we inspected sixty or so valves by checking the grain size using the metallographic replicas method"*. The Cetim-Trius solution, developed in collaboration with Total, was awarded the Total Technology prize. As it is mobile, it can be used almost anywhere.

Cetim's advantage

Cetim is expert in most NDT techniques, including characterisation methods. It can offer solutions that best fit customer requirements. Our approach, undertaken in consultation with the customer, results in "turnkey" applications.

OUR CUSTOMER

Company Name
Total

Turnover
Approximately 184 billion Euros in 2011

Workforce
Nearly 96,000 worldwide

Area of Business
Exploration and production of oil and natural gas, refining and distribution, new energies, trading and chemical processes.

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