# QUANTIFICATION OF RETAINED AUSTENITE IN ASTM A743 GRADE CA6NM CAST MARTENSITIC STAINLESS STEEL THROUGH X-RAY DIFFRACTION

Rojas Marín, Jessika Viviana, Toro Betancur, Alejandro.
Tribology and Surfaces Group, School of Materials Engineering, National University of Colombia

Martensitic stainless steels are widely used for manufacturing hydraulic components such as turbines, impellers and liners, due to their excellent mechanical properties, which are, to some extent, related to the amount of retained austenite in the microstructure.

Diverse methods have been used to determine the amount of retained austenite in steels, such as quantitative metallographic analysis, magnetic methods, dilatometric measurements, differential thermal analysis and Mossbauer spectroscopy. One of the most successful techniques for this purpose is, however, X-Ray diffraction, mainly because the results obtained are quite reliable once the preparation of the samples is adequate. Nevertheless, a major drawback arises when retained austenite from a region close to the surface of the samples transforms to martensite during polishing, which avoids proper quantification of phases in the material.

In this work, X-Ray Diffraction was used to identify and quantify retained austenite in an AISI A743 grade CA6NM martensitic stainless steel. The analyses were carried out at several temperatures, which were selected according to typical tempering treatments applied to hydraulic turbines. Also, improved surface preparation techniques were developed to allow measurement of retained austenite at room temperature. The results obtained by X-ray diffraction were compared to and validated with dilatometric measurements.