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# On the improvement of measurement accuracy of retained austenite in steel with X-ray diffraction

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## Abstract

An improved measurement scheme for the determination of the retained austenite fraction with X-ray diffraction is extended to area detectors. The scheme reduces the error due to crystallographic texture in phase analysis of steel by averaging the results of diffraction patterns at different sample positions. The method is based on the standard ASTM E975, but it can be easily extended to other crystal structures, multi-phase materials or X-ray wavelengths.

Phase transformation, induced by mechanical sample preparation, may lead to a significant reduction of the retained austenite fraction. Electropolishing before the measurement is beneficial to remove the layer affected by sample preparation.

*Keywords:* X-ray diffraction, retained austenite, phase quantification

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## 1. Introduction

The phase composition in the microstructure of innovative steel grades is of major importance for the exact adjustment of the mechanical properties. Therefore, exact quantification of phase amounts is crucial for the development and optimization of modern advanced high strength steel (AHSS) grades [1; 2], such as dual phase steels (DP) [3; 4; 5], complex phase steels (CP) [6], transformation

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