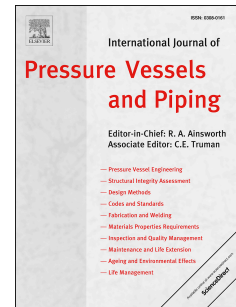


# Accepted Manuscript

A complete reassessment of standard residual stress uncertainty analyses using neutron diffraction emphasizing the influence of grain size

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PII: S0308-0161(16)30081-3

DOI: [10.1016/j.ijpvp.2017.09.002](https://doi.org/10.1016/j.ijpvp.2017.09.002)

Reference: IPVP 3647

To appear in: *International Journal of Pressure Vessels and Piping*

Received Date: 19 February 2016

Revised Date: 22 September 2017

Accepted Date: 29 September 2017

Please cite this article as: Wimpory RC, Martins RenéV, Hofmann M, Kornmeier JR, Moturu S, Ohms C, A complete reassessment of standard residual stress uncertainty analyses using neutron diffraction emphasizing the influence of grain size, *International Journal of Pressure Vessels and Piping* (2017), doi: 10.1016/j.ijpvp.2017.09.002.

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## A complete reassessment of standard residual stress uncertainty analyses using neutron diffraction emphasizing the influence of grain size.

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### Keywords

Fitting uncertainty, grain size effect, grain size statistics, slits, spiral slit, oscillating radial collimator, residual strain, residual stress, uncertainty estimation, neutron diffraction, high-energy synchrotron radiation, strain scanning, welding, austenitic steel.

### Synopsis

The peak fitting uncertainty is often not enough to describe completely the true random uncertainty of a neutron strain measurement and resultant stress determinations. Detecting not enough diffracting grains also contributes to the random uncertainty. A simple model to estimate the extra random uncertainty contribution due to the so-called grain size statistics is applied and verified.

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