

# A METHOD FOR FRACTURE PROBABILITY ASSESSMENT IN FUNCTION OF J-INTEGRAL IN TRANSITION TEMPERATURE REGIME OF FERRITIC STEEL

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## Abstract

*In this paper is presented the 1-point method for material behaviour prediction, in terms of fracture toughness, of the ferritic steel EN 1.6310 in the transition temperature regime (-60°C and -90°C). Experiments were carried out at two different temperatures, representing two studies joined in one. Experimental testing was performed according to ASTM 1820 standard. This 1-point method is based on statistical processing (of 2-parameters Weibull statistics) of obtained experimental results, i.e. scattered J-integral values, of C(T) specimens with different geometries. Fixing value of one Weibull parameter and taking into account size-dependence of second one, fracture probabilities in the function of J-integral for large C(T)100 and C(T)200 were determined based on testing of C(T)50 specimen size. This research pointed out the sensitivity of proposed method on statistical sample size. One of the aims of proposed method was reducing the cost and price of laboratory tests in overall by predicting material behaviour and testing smaller C(T) specimen size. This research represents an upgrade of the Landes and Heerens works, and it is dedicated to their efforts in understanding and characterisation of transition temperature regime of ferritic steels.*

## Keywords

Fracture toughness, Weibull statistics, Transition temperature regime, J-integral, Ferritic steel.

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