

TREND CURVES FOR IAEA REFERENCE STEEL JRQ

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ABSTRACT

IAEA reference material JRQ – steel of ASTM A 533-B with increased content of phosphorus and copper has been successfully used in several IAEA Co-ordinated research programs and also as a reference material in some of RPV surveillance programs.

Thanks to the increased content of phosphorus and copper, it has higher sensitivity to radiation damage-embrittlement and thus can serve as a material monitor.

Specimens from this steel have been irradiated at temperature 270 as well as 290 °C, partially in experimental reactors and also in surveillance programs in RPVs. Results of transition temperatures shifts, determined by Charpy impact tests as well as static fracture toughness tests, show to a monotonic dependence on neutron fluence without any tendency to saturation up to very high fluences (approx. $5 \times 10^{24} \text{m}^{-2}$) when transition temperatures reaches the irradiation temperature, i.e. 270 °C.

Paper gives statistically evaluated large data sets of results that can be used as reference curves. Moreover, comparison of results from irradiation in experimental reactors with lead factor more than 100 with irradiation in surveillance specimens channels in RPVs has not shown to any pronounced neutron flux effect.