

Mittal Steel USA Technical Report

ABSTRACT

The Effect of PWHT on Normalized Base-Metal Properties of ASTM A516 Steel

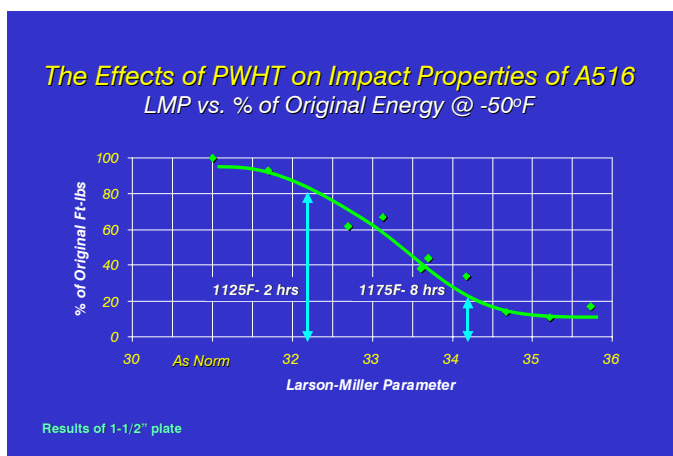
Kenneth E. Orié
Senior Metallurgical Engineer
Customer Technical Service
Mittal Steel USA - Plate
Coatesville, PA

Charles R. Roper
Senior Metallurgical Engineer
Research
Mittal Steel USA - Plate
Coatesville, PA

WRC Bulletin 481 (ISSN 0043-2326, May 2003) details the investigations conducted by Mittal Steel USA (formerly ISG Plate) into the behavior of ASTM A516 Grade 70 steel plate subjected to post-weld heat treatment (PWHT). The results and conclusions described therein were offered to the Pressure Vessel Research Council (PVRC) and specifically the Committee on Thermal and Mechanical Effects on Materials (TME) to complement the studies the council had commissioned as Part 2 of this bulletin. Those studies were initiated to characterize the effects of PWHT on hardness and notch toughness of welded joints, and, while they contained some base-metal data, it was limited and thus unable to establish any trends, especially pertaining to any parametric analysis.

Earlier work performed by Mittal Steel USA as Lukens Steel, and later Bethlehem-Lukens Plate, and ISG Plate, demonstrated a well-defined correlation between base-metal strength, toughness and time-temperature relationships. This is summarized in Part 1 of the bulletin along with additional investigations conducted in an attempt to improve normalized base-metal toughness and improve internal guidelines for predicting properties of post-weld heat treated material conforming to ASTM A516 Grade 70. These new data reinforce previous conclusions that PWHT has a detrimental and predictable effect on base-metal properties that needs to be considered when evaluating the application of PWHT. Additional information along with some of the original data that formed the basis for this study can be found in our literature on pressure vessel steels at <http://www.arcelormittal.com>.

WRC Bulletin 481 is now available from The Welding Research Council by visiting the Welding Research Council's website at: <http://www.forengineers.org/store.php>.



Contact Ken Orié at
610-383-2587