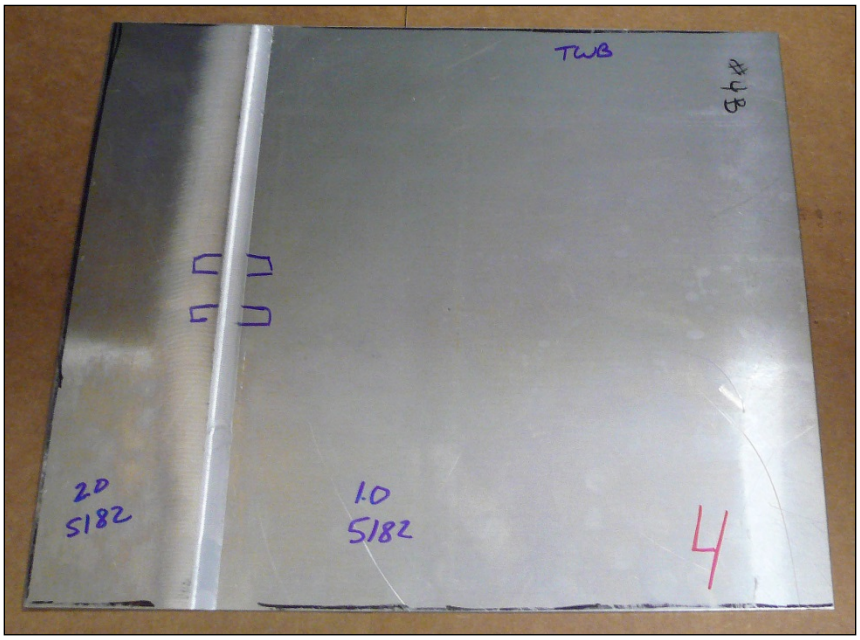
RTI PAST PERFORMANCE		
RTI Tracking Number:	1212125	Date: 12/4/2012
Core Task:	Metallurgical Testing	
Analytical Techniques	Surface Roughness/Feature/ Microhardness/Photo	

Metallographic observations:

A welded sample was received for analysis (see fig.1). The target of the analysis was to revealed quality of the friction stir welding process. The results of the analyses are provided below.

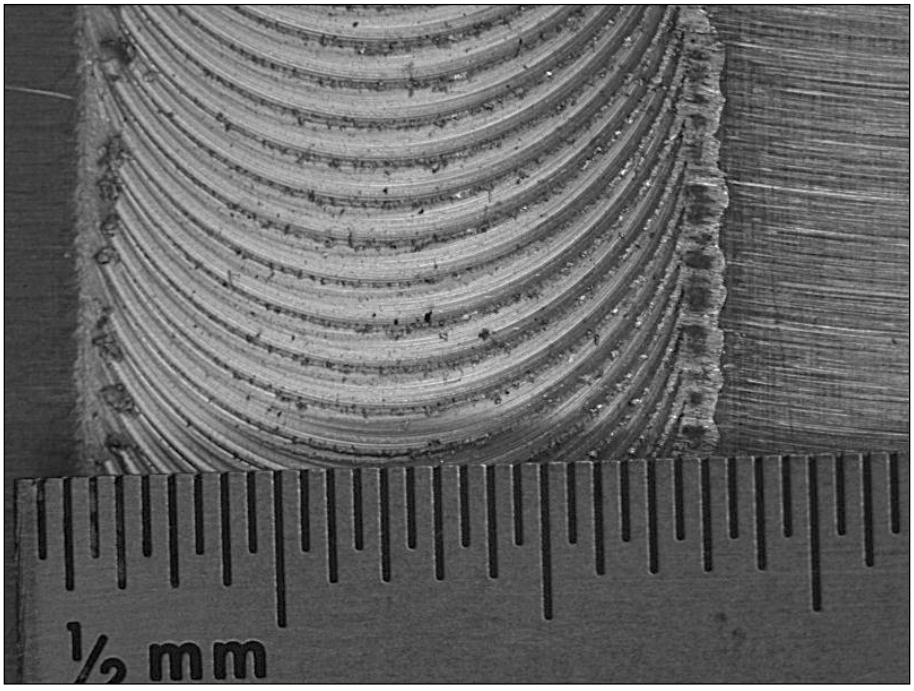


As-received for analysis. Figure 1. Reduced size.

Surface Roughness:
by Mitutoyo Model: SJ-201P surftest profilometer.

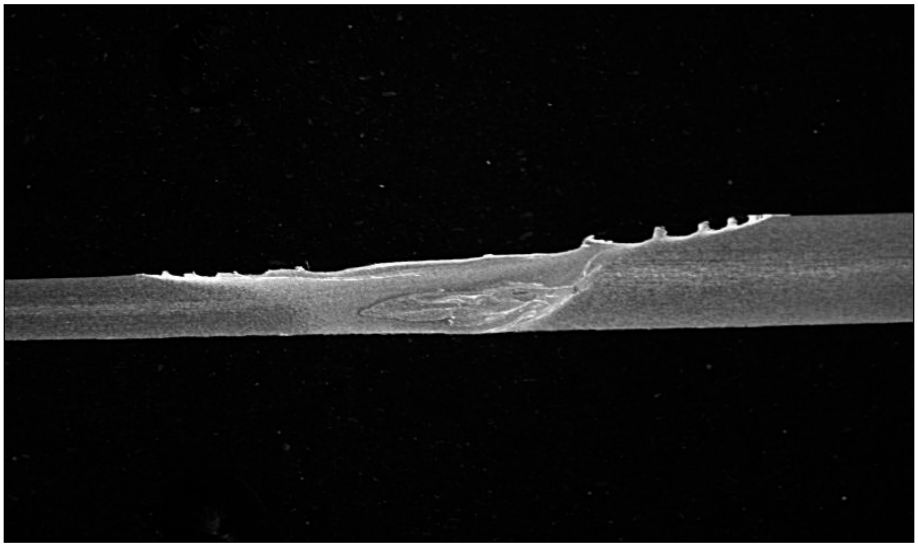
Analytical method ASTM D7127-07

Description	Result	Units
Roughness, surface maximum Rz	137	µm
Roughness, surface average Ra	29.4	µm



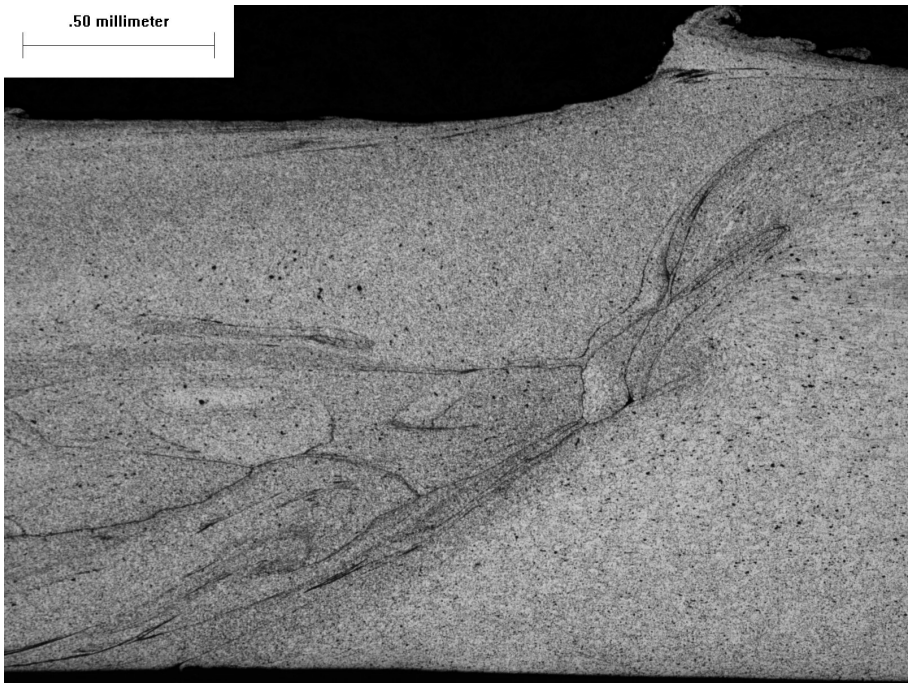
As-received for analysis. Figure 2. 7X
Macro-image illustrates top view of the welded region.

Welded sample submitted for investigation was sectioned transversally through the welded region, metallographically prepared in accordance with ASTM E3-11, and microscopically examined in the as-polished and etched conditions at critical location. Please see micro-images of representative structure and description on following pages.

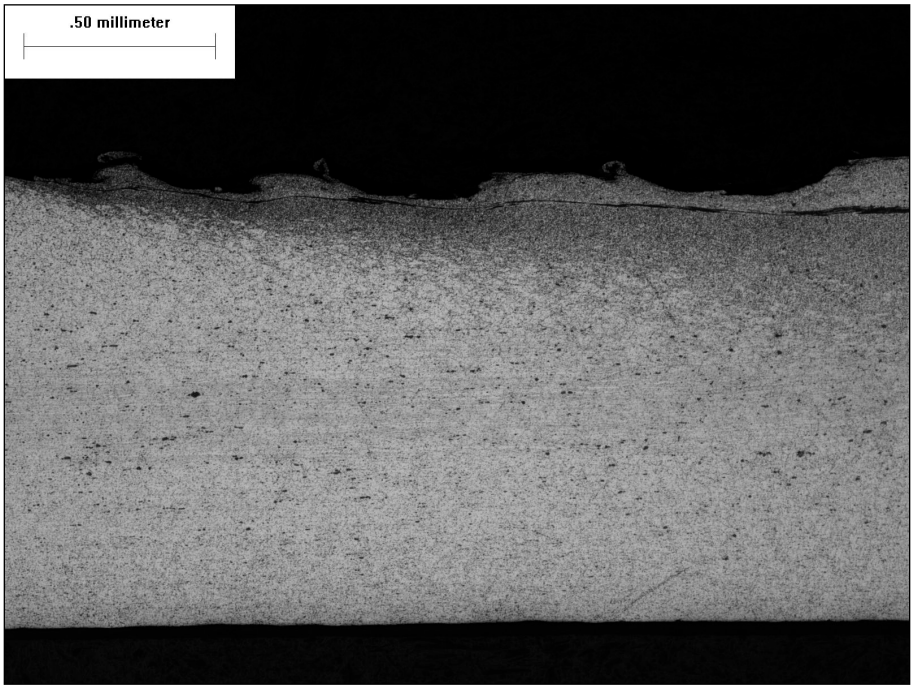


Etched condition Figure 3 7x
Macro-image illustrates transverse cross-section through the stir-welded region.

Etched condition Figure 4 50x
Micro-image illustrates center region of the stir-welded.



Etched condition Figure 5 50x
Micro-image illustrates HAZ at the right side of the stir-weld region.



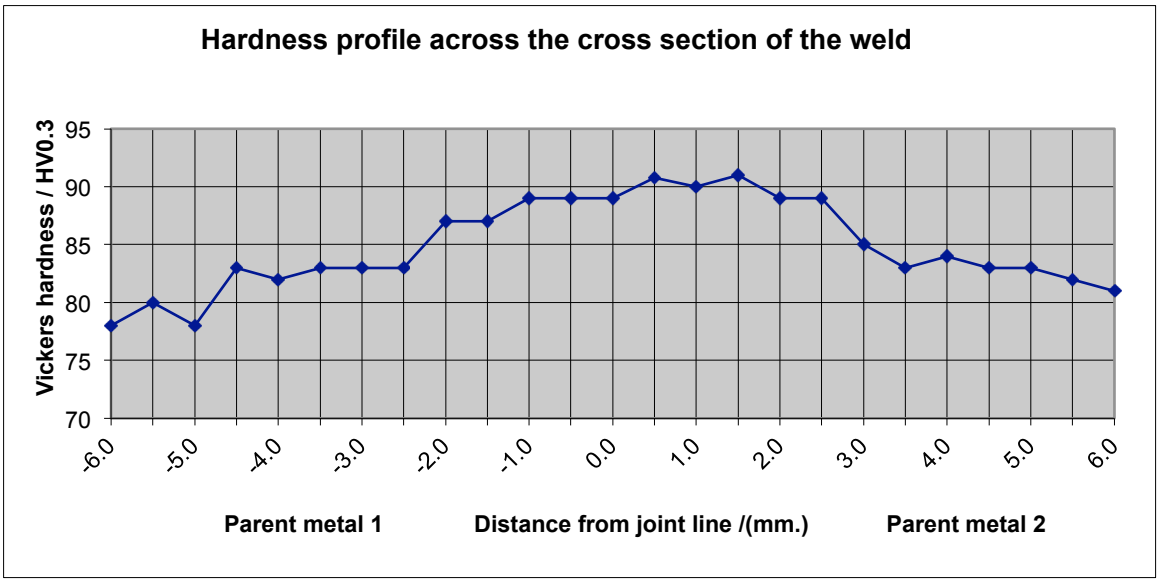
Etched condition Figure 6 50x
Micro-image illustrates HAZ at the left side of the stir-weld region.

Physical tests:

Analytical Method: ASTM E384-10$^{\varepsilon 1}$

Micro-hardness traverse readings were taken on the transversally sectioned and mounted sample from Parent metal side "1", through welded region, to Parent metal side "2" using Vickers at 300 gram-force load.

Distance from joint line (mm.)	Vickers micro-hardness $HV_{0.3}$	
	Parent metal "1"	Parent metal "2"
0.00	89	
±0.5	89	91
±1.0	89	90
±1.5	87	91
±2.0	87	89
±2.5	83	89
±3.0	83	85
±3.5	83	83
±4.0	82	84
±4.5	83	83
±5.0	78	83
±5.5	80	82
±6.0	78	81



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