

RTI PAST PERFORMANCE		
RTI Tracking Number:	1303990	Date: 4/18/2013
Core Task:	Mechanical Testing	
Analytical Techniques	Mechanical/Charpy	

## - Report of Analytical Services -

**RTI Lab#:** 1303990

**Sample Receipt Date:** 3/28/2013

Eight (8) sets of steel plates were received for analysis and were identified as follows:

- 1 – 0.020” plain
- 2 – 0.020” embossed
- 3 – 0.030” plain
- 4 – 0.030” embossed
- 5 – 0.040” plain
- 6 – 0.040” embossed
- 7 – 0.050” plain
- 8 – 0.050” embossed

The target of the analysis was to characterize the impact strength and bend strength. In addition, chemical analysis was to be performed on a plain piece not heat treated. The results of the analysis are provided on the following pages.

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**Charpy Impact Strength (ASTM E23):**

Testing was performed at room temperature on non-standard piece sizes (1/2" X gauge depth). The resulting impact strengths are recorded below:

Sample ID	Impact Strength (ftlbs)	Lateral Expansion (X 0.001")	Percent Shear (%)
Non-heat treat emboss 1	10.5	No separation	No separation
Non-heat treat emboss 2	10.5	No separation	No separation
Non-heat treat emboss 3	10.0	No separation	No separation
0.020" emboss 1	4.0		
0.020" emboss 2	4.0		
0.020" plain no v-notch	1.5		
0.020" plain w/v-notch	1.0	5	<10
0.030" emboss 1	3.0		
0.030" emboss 2	1.0		
0.030" emboss 3	0.5		
0.030" plain no v-notch 1	1.0		
0.030" plain no v-notch 2	1.0		
0.030" plain w/v-notch 1	0.5	5	<10
0.030" plain w/v-notch 2	0.5	3	<10
0.040" emboss 1	<0.5		
0.040" emboss 2	<0.5		
0.040" plain no v-notch	1.5		
0.040" plain w/v-notch	<0.5	3	<10
0.050" emboss 1	<0.5		
0.050" emboss 2	0.5		
0.050" emboss 3	<0.5		
0.050" emboss 4	<0.5		
0.050" plain no v-notch 1	0.5		
0.050" plain no v-notch 2	0.5		
0.050" plain w/v-notch 1	<0.5	5	<10
0.050" plain w/v-notch 2	<0.5	3	<10

**Bend Strength (ASTM A370):**

Mechanical specimens were prepared and submitted for bend testing on a 3.5" end point span and center point at the midpoint of the span. The resulting bend strengths are summarized below. It must be noted that for the sample identified as "0.020" emboss", the emboss side is in contact with the span points and discrete slippage is noted.

Sample ID	Peak Load (LbF)
0.020" emboss	41
0.020" plain	156
0.030" emboss	83
0.030" plain	118
0.040" emboss	83
0.040" plain	131
0.050" emboss	78
0.050" plain	129

**Chemical Analysis (ASTM E415):**

Sample ID: Non-heat treat plain

<b>Parameter</b>	<b>Result (%)</b>
Carbon	0.038
Manganese	0.20
Phosphorus	<0.005
Sulfur	0.008
Silicon	<0.01
Nickel	0.02
Chromium	0.03
Copper	0.04
Molybdenum	<0.01
Niobium	<0.005
Aluminum	0.04
Titanium	<0.005
Vanadium	<0.005

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