Impact AR500F Plate

Product and Application

Low alloy steel plate, quench and tempered to a nominal hardness of 500 HBW. After heat treatment, product is intended for use in applications requiring a combination of high abrasion resistance and weldability.

Chemical Composition

<table>
<thead>
<tr>
<th>Element</th>
<th>Max</th>
<th>Mn</th>
<th>P</th>
<th>S</th>
<th>Si</th>
<th>Cu</th>
<th>Ni</th>
<th>Cr</th>
<th>Mo</th>
<th>AL</th>
<th>C.E.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>0.32</td>
<td>1.50</td>
<td>0.020</td>
<td>0.015</td>
<td>0.45</td>
<td>0.20</td>
<td>0.75</td>
<td>0.65</td>
<td>0.55</td>
<td>.060</td>
<td>.72</td>
</tr>
</tbody>
</table>

*Carbon Equivalency calculated using the following formula:

\[
C.E. = C + \frac{Mn}{6} + \frac{(Cr+Mo+V)}{5} + \frac{(Ni+Cu)}{15}
\]

Mechanical Properties

Surface hardness: 470 – 540 HBW (aim 500 HBW)
Yield Strength (typical): 220 ksi (1516 MPa)
Tensile Strength (typical): 235 ksi (1620 MPa)
Charpy impacts* (typical): 18 ft - lbs (24 Joules) @ -40° F

Typical mechanical testing values other than Brinell hardness listed for information only and are not performed unless specified at time of order.

*Charpy impact specimens, when performed, are subsize on thicknesses < 0.375”. Typical charpy impact values listed are adjusted to full size equivalent.

Material tested per heat, per size, and per heat treat lot

Dimensional Tolerances

Flatness*: Meets 1/2 tolerance of ASTM A6, table 14, latest revision
Thickness*: +/- 0.012" to nominal thickness
Width*: Per ASTM A6, latest revision
Length*: Per ASTM A6, latest revision

*More stringent flatness/dimensional tolerances may be available upon request. Please inquire for more information.

Packaging

Plates 144" and less in length stacked with blocking for forklift unload.
Plates over 144" stacked for overhead crane unload

Surface Finish

As-heat treated surface with protective scale. Shot blasting and rust preventative application are available. Please inquire.

Test Reports

Supplied with shipment for each production lot in the shipment. Reports include product description, heat number, chemical analysis, and Brinell Hardness value.
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**Fabrication, Post-Delivery Heating and Welding**

**Drilling, Machining, Punching**
Impact AR500F plate is more challenging to drill, machine, and punch compared to as-rolled steels (grade 50-80K) due to higher hardness levels, but can be successfully accomplished with appropriate tools. Carbide tipped tools are recommended, but high speed steel tools can be used. Slightly lower speeds and higher pressures compared to as-rolled grades are recommended for proper chip formation.

**Bending**
Free bending should be performed utilizing maximum allowable bend radius to prevent cracking. Impact AR500F plates 0.250” (6.35 mm) thick and less can be bent using minimum radius of 4T. Larger bend radius is recommended for thicker plates.

**Post-Delivery Heating**
Impact AR500F plate achieves its properties through quenching and tempering processes. Heating in fabrication (such as post-weld stress relieving) or in service must not exceed 400 Fahrenheit without risk of lowering the strength and hardness of the material.

**Welding**
Impact AR500F can be welded by conventional processes such as SMAW, SAW and GMAW provided that the weld procedures used are suitable for this grade and design of the welded structure. Proper weld procedures should include the following:
1. Low Hydrogen conditions must be used.
2. Excessive preheating (>350 F) should be avoided to prevent softening.
3. Slow cooling rates should be avoided to prevent low toughness in the HAZ.

*These statements are general guidelines. CMC Impact Metals is not responsible for the results of any welding work performed.*