

## Product and Application

TruSHIELD 650 armor plate, provides excellent ballistic performance and has an outstanding weight-to-ballistic-protection ratio. This quenched and tempered product excels in downstream fabrication processes like bending, laser cutting and plasma cutting. This product is used widely in the commercial vehicle armoring, explosion protection, military equipment and commercial body armor applications.

Available in thicknesses up to 0.500", widths up to 60" and lengths up to 144".

## Mechanical Properties

Surface Hardness	625 - 700 HBW (aim 650 HBW)
Yield Strength	240 ksi (1655 MPa)
Tensile Strength	314 ksi (2165 MPa)
Charpy Impacts (typical @ -40° F)	10 ft-lbs (13.5 J)

\* Minimum values unless otherwise noted.

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". Charpy Impact values listed are adjusted to full size equivalent.

Hardness tested on each plate, but not reported.

## Dimensional Tolerances

<b>Flatness</b>	Flatness tolerances meet ASTM A6, Table 14, latest revision.
<b>Thickness</b>	+/- 0.012" to nominal thickness
<b>Length and Width</b>	Length and width tolerances meet ASTM A6, latest revision.

## Chemical Composition

	C	Mn	P	S	Si	Cu	Ni	Cr	Mo
<b>Max</b>	0.51	1.00	0.020	0.015	0.50	0.25	2.50	0.70	0.87
<b>CE* (typical):</b>			<b>1.00</b>		*Carbon Equivalency calculated using the following formula: $CEV = C + Mn/6 + (Cr+Mo+V)/5 + (Ni+Cu)/15$				

## Ballistic Performance

In appropriate thickness, TruSHIELD 650 meets various protection levels for NIJ, EN1063, EN1522, UL752, STANAG and VPAM commercial armor specifications upon request. May also be dual certified.

## Fabrication, Bending, Post-Delivery Heating and Welding

<b>Bending</b>	Material is formable based on application and conditions. Please inquire.
<b>Post-Delivery Heating</b>	TruSHIELD 650 armor plate achieves its properties through quenching and tempering processes. Heating in fabrication (such as post-weld stress relieving) or in service must not exceed 300° F without risk of lowering the strength and hardness of the material.
<b>Welding</b>	TruSHIELD 650 armor plates 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, using low hydrogen conditions.

*\*These statements are general guidelines. CMC Impact Metals is not responsible for the results of any welding work performed. Contact your CMC Impact Metals representative to receive more detailed technical information about any fabrication or machining processes.*

## Standard Delivery Conditions

<b>Surface Finish</b>	Shot blasting is provided and rust preventative applications are available. Please inquire.
<b>Test Reports</b>	Supplied with shipment for each production lot in the shipment. Reports include product description, heat number, chemical analysis and Brinell hardness value.