

EVRAZ North America produces a wide range of steel armor plate specifications for the defense and security industries. End uses include heavy, medium, and light military vehicles, add-on armor kits, VIP armored cars, personnel protection, and security structures.

## SPECIFICATION

Armalloy 650UHH complies with MIL-DTL-32332 and a variety of other military and commercial applications.

## DIMENSIONS AND TOLERANCES (other dimensions available upon request)

T	0.1575" to 0.500"	4.0mm to 12.7mm
W	48" to 102"	1220mm to 2590mm
L	96" to 480"	2.4m to 12m

1/2 ASTM A6/A6M thickness & flatness tolerances. All other tolerances per ASTM A6/A6M unless otherwise agreed.

## CHEMICAL COMPOSITION (heat analysis - % maximum)

C	Mn	P	S	Si	Ni	Cr	Mo	Al	B	CE*
0.46	1.00	0.02	0.005	1.0	2.00	1.0	0.5	0.06	0.003	0.86

\*Carbon Equivalence (CE) =  $C + Mn/6 + (Cr + Mo + V)/5 + (Cu + Ni)/15$

Delivery condition: Water quenched and tempered

## MECHANICAL PROPERTIES (typical values)

Hardness	Yield	Tensile	Elongation	Toughness (CVN)	
				Transverse -40°	Longitudinal -40°
590 to 670 BHN	230 Ksi 1,585 MPa	325 Ksi 2,240 MPa	8% min. in 2" (50mm)	inquire	inquire
<b>BALLISTIC TESTING:</b>	As agreed per customer order				
<b>MATERIAL TEST REPORT:</b>	Chemical composition, BHN hardness, toughness (CVN) testing per heat lot				
<b>EDGE CONDITION:</b>	Mill edge or cut edge as agreed				
<b>SURFACE CONDITION:</b>	Per ASTM A6/A6M Shot-blast and primer coating available upon request				
<b>HEAT TREATMENT:</b>	May not be heated above 400°F (225°C) during fabrication or the certified hardness cannot be maintained				

## FABRICATION

**COLD-FORMING:** Due to the ultra high hardness, extreme care must be taken during cold bending. Please contact our sales service department for more information before attempting to cold bend.

**FLAME CUTTING:** Standard thermal cutting (oxy-fuel, plasma, laser, water jet) can be used. Plasma cutting under water can be used to 0.5" (12.7mm thickness). Preheating is recommended – refer to welding section below. The HAZ hardness will be softened by elevated heat input. The HAZ softening can be eliminated by using abrasive water jet cutting.

**WELDING:** Armalloy 650UHH has been successfully welded using standard industry welding techniques. When welding, use austenitic (stainless) weld wire.

The potential for cracking increases with plate thickness; therefore it is recommended to preheat based on material thickness per the table below:

Recommended Preheat Temperatures				
Thickness	0.1575"	0.25"	0.50"	
	4mm	6.35mm	13mm	
	70°F/22°C		200°F/100°C	

When ambient temperature is below 50°F (10°C), the recommended preheat should be increased by 70°F (22°C). Please contact our sales service department for additional information on welding.



# ARMALLOY 650UHH Armor Plate

MIL-DTL-32332

## BALLISTIC PROPERTIES ARMALLOY 650UHH

Specifications	Ammunition	Velocity (ft/s)	Velocity (m/s)	Min Thick (in.)	Min Thick (mm)
<b>NIJ</b>					
3	7.62 x 51 M80	2750 +/- 49	838 +/- 15	0.250	6.35
4	30.06 M2, AP	2850 +/- 49	869 +/- 15	0.375	9.50
<b>STANAG</b>					
	5.56 x 45 M193	3073 +/- 66	937 +/- 20		
1	7.62 M80	2733 +/- 66	833 +/- 20	0.250	6.35
	5.56 x 45 SS109/M855	2953 +/- 66	900 +/- 20		
2	7.62 x 39 API BZ	2280 +/- 66	695 +/- 20	0.250	6.35
<b>EN</b>					
FB5	5.56 x 45 SS109/M855	3116 +/- 32	965 +/- 10	0.187	4.75
FB5	5.56 x 45 SS109/M855	3116 +/- 32	965 +/- 10	0.236	6.00
FB6	7.62 M80	2722 +/- 32	830 +/- 10	0.236	6.00
FB7	7.62 x 51 P80 AP	2690 +/- 32	820 +/- 10	0.315	8.00

\*Additional ballistic properties not listed above are available upon request

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