



*Specialized Steel Solutions for the
Mining & Recycling Industries*

www.astralloy.com





Astralloy-V Plate®

Abrasion & Impact Resistant, Air-Hardened Wear Steel Plate

Astralloy-V is a unique, deep air-hardened steel that is rich in chemical composition and physical properties. It is through-hardened and unsurpassed in resistance to impact and abrasion.

With continuous impact and abrasion, Astralloy-V can reach a hardness in excess of 550 BHN without brittleness.

Chemical Composition* - % Weight

C	Mn	P	S	Si	Ni	Cr	Mo
.29	1.20	.015	.010	.40	4.00	2.00	.50

Physical Properties - Typical Values at 68°F

BHN Hardness	Tensile Strength (ksi)	Yield Strength (ksi)	Elongation in 2"	Charpy Test Toughness Index (ft. lbs.)
418 - 512	241	157	12%	22 @ RT

Comparative Benefits

Astralloy-V Air Hardened

1. Hardness combined with toughness
2. Work hardenability up to 550 BHN
3. Lower coefficient of friction
4. Excellent cold weather properties
5. Cold and hot formable and weldable, without loss of properties

Quenched & Tempered Wear Steel

1. Hardness with less toughness
2. No work hardening ability
3. Higher coefficient of friction
4. Loss of properties at lower temperatures
5. Loss of properties during heating and welding

Thickness

3/16" - 6"

Additional thicknesses available upon request

*Typical maximum values. Mill certifications are available upon request.

EB-450®

EB-450 is a liquid, quenched and tempered, through-hardened, high impact alloy steel with excellent abrasion-resistant properties. Its balanced boron, modified nickel-chrome, molybdenum chemistry is ideal for achieving an optimum hardness to toughness ratio.

EB-450 boasts a longer wear life due to its through-hardness which is more uniform than what is found in conventional carbon/manganese steels. This quenched-hardened material is competitively priced for optimum cost/wear ratios. This steel's resistance to atmospheric corrosion further reduces surface pitting. EB-450 is field proven in extremely abrasive bulk handling systems.

Chemical Composition* - % Weight

C	Mn	P	S	Si	Ni	Cr	Mo
.27	1.00	.025	.010	.20	.70	1.75	.30

Physical Properties - Typical Values at 68°F

BHN Hardness	Tensile Strength (ksi)	Yield Strength (ksi)	Elongation in 2"	Charpy Test Toughness Index (ft. lbs.)	Reduction of Area
418-495	235	190	12%	28 @ RT 20 @ -40°F	42%

Benefits

- * Higher wear resistance, when compared to conventional steels, due to its uniform hardness.
- * Easy to weld with normal low hydrogen simple techniques.
- * May be flame cut with oxyacetylene, plasma or similar methods.
- * Cold formable with heavy presses or rolls.
- * The high hardness and toughness in combination with its high friction coefficient, reduces maintenance costs.
- * EB-450 may be easily cut, welded, machined and cold formed, as required.

Thickness

1/4" - 3 1/2"

Additional thicknesses available upon request.



Astralloy 4800®

Astralloy 4800 is a wear resistant steel offering up to 50% additional in-service life compared with a 400 HB water-quenched steel. Rather than just using a high hardness level, the steel achieves this state by using proven and controlled metallurgical mechanisms. Depending on the thickness, various combinations of an enriched chemical analysis (Cr, Mo, Ti) and controlled quenching rate are used, along with the reinforcement of the structure with titanium carbides which help maintain the properties and wearability of Astralloy 4800. Using Astralloy 4800 in processing operations like cutting, machining and forming is no more difficult than processing AR400 water-quenched steel. Astralloy 4800 is designed to provide the optimum combination of wear resistance, controlled hardness and ease of processing.

Chemical Composition* - % Weight

C	Mn	P	S	Ni	Cr	Mo	Ti
≤.20	≤ 1.60	≤.018	≤.005	≈0.20	≤ 1.90	≤.40	≤.20

Physical Properties - Typical Values at 68°F

BHN Hardness	Tensile Strength (ksi)	Yield Strength (ksi)	Elongation in 2"	Charpy Test Toughness Index (ft. lbs.)
370	174	130	12%	27 @ RT

Astralloy 4800 is an ideal steel for applications such as:

- * Quarries - Public works
Blades, Bucket liners, crushers, lateral stiffeners, screens, dumper bodies and trommels.
- * Mining
Extraction equipment, conveyor bottom plates, hoppers, helical gravity and screw conveyors, skips, ventilators, discharge plates.
- * Cement
Wheel excavators, buckets, crushers, lateral shields, clinker chutes, buckets, ventilators, dust separators, bagging machines.
- * Steelmaking
Guiding plates, hoppers, chutes, discharge plates, scrap containers/charging boxes.

Thickness

3/16" - 4"

Additional thicknesses available upon request.



Astralloy-V Round Bar®

Astralloy-V round bars have the same chemistry, uniform toughness and hardness as plate, from surface to core.

Astralloy-V's ultra-fine grain structure, free of massive carbide particles due to its lower carbon content, provides better machinability at its higher strength/hardness level than quenched and tempered alloys.

Chemical Composition* - % Weight

C	Mn	P	S	Si	Ni	Cr	Mo
.29	1.05	.015	.010	.35	3.90	1.75	.45

Physical Properties - Typical Values at 68°F

BHN Hardness	Tensile Strength (ksi)	Yield Strength (ksi)	Elongation in 2"	Charpy Test Toughness Index (ft. lbs.)
320 - 388	175	153	15%	27 @ RT

Benefits

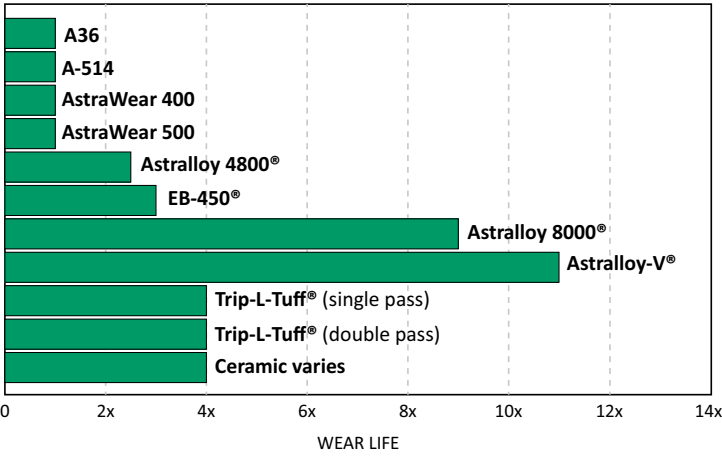
- * Uniform hardness throughout the bar (340 BHN) to resist abrasion and promote slidability, and toughness to absorb impact without cracking.
- * Maintains its toughness and hardness without brittleness at temperatures of up to -75°F (-60°C) and as low as -40°F.
- * Hardenability will reach a range of 550 BHN by impact or sliding action, without deformation or brittleness.
- * Astralloy-V's small oxide surface quickly disappears, exposing a slick, durable surface.
- * Can be hot worked and allowed to air cool without loss of hardness or toughness and without warpage problems.

Diameter

1" - 10"	Hot Rolled Rounds
10-1/4" - 20-1/4"	Astralloy-V® RTF (Rough Turned Forgings)

Larger diameters are available upon request. Please call for details.

High Temperature Wear Life (at 900°F)



Field Study Comparison of Abrasion Resistant Steels

Material	Duration (hrs)	Cost* (USD)	Tons Processed	Cost/Ton (USD/Ton)	Comparative Duration	Tons/Hr	Mine Stoppages per Change Out
Astralloy 8000®	1,491	\$1,568	67,095	0.0234	1.85	45	2
Tri-Braze™	1,100	\$1,764	49,500	0.0356	2.82	45	3
Astralloy-V®	3,100	\$1,764	139,500	0.0126	1.00	45	1
Hardox® 500	1,178	\$1,764	53,010	0.0333	2.63	45	3
Bucyrus Blades (CAST)	1,197	\$1,764	53,865	0.0327	2.59	45	3

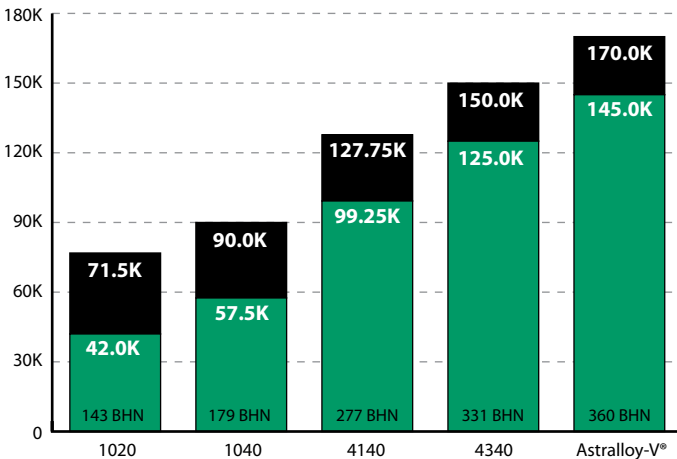
Material	Cost/Ton (USD/Ton)
Astralloy 8000®	0.0234
Tri-Braze™	0.0356
Astralloy-V®	0.0126
Hardox 500®	0.0333
Bucyrus Blades (CAST)	0.0327

DISCLAIMER: This comparison document has been compiled from publicly available manufacturer data. Astralloy Steel Products makes no representation regarding the accuracy or completeness of this data and assumes no liability. Astralloy Steel Products is not associated with Tri-Braze™, SSAB or Bucyrus Blades. These trials were run at Sabinas Polymetallic Mine (Penoles Group) in Zacatecas Mexico during a two year period. The materials mined were Zinc, Silver, Copper and Gold.

* The costs shown are average prices for finished bucket tips and are equalized for the purpose of this study.

Comparison Rate of Mechanical Properties (Tensile & Yield)

(All items tested were 4" round bar)



Astralloy Steel Products

* Offering superior customer service with readily available inventory of proprietary and quenched and tempered steel grades

* Extensive product line of abrasion resistant and specialty steel plate and bar

* Unparalleled experience with thousands of applications across various markets and industries

Processing Capabilities

* 1,000 ton 20' press brake

* 30" plate rolls capable of rolling 2" mild steel 10' wide

* High definition plasma and precision oxyacetylene cutting

* CAD/CAM and nesting software

* Bar sawing capacity of 20" diameter

Quality Assurance

* ISO 9001:2008 Certified

* Original Certified Mill Test Reports

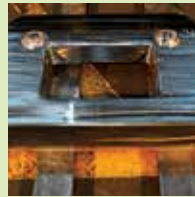
Our Locations



Specialized Steel Solutions for the Mining & Recycling Industries

For more than 50 years, Astralloy Steel Products has been providing innovative and cost effective solutions. We have an extensive product line of abrasion resistant and specialty steel plate and bar.

SPECIALTY PLATE



Astralloy-V Plate®

- * Ideal for extreme impact and abrasion applications with through hardness and toughness.
- * High temperature abrasion to 1100°F.
- * Hardness: 418-512 BHN.



Astralloy 8000®

- * A high performance oil quenched, work hardening steel suitable for impact and abrasion and high temperature abrasion up to 900°F.
- * Up to 50% longer service life than AR 500.
- * Supplied at 470 BHN average hardness; work hardening in service to approximately 540 BHN.



Astralloy 4800®

- * Suitable for all types of abrasion, sliding, or impact, dry or wet media including high temperature abrasion up to 660°F.
- * Up to 50% longer service life than AR 400.
- * Supplied at 370 BHN average hardness; work hardening in service to approximately 440 BHN.



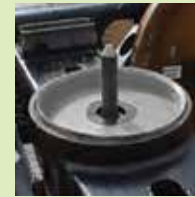
EB-450®

- * Liquid quenched and tempered, through-hardened, high impact, excellent high temperature abrasion resistant up to 800°F, alloy steel.
- * Through hardened up to 3" thickness.
- * Hardness: 418-495 BHN.



Trip-L-Tuff®

- * Ideal for severe sliding and abrasion applications and moderate impact.
- * 28% chromium carbide overlay plate, pipe and fabricated wear parts.
- * Hardness: 555-652 BHN.



Rol-Man®

- * 11 - 14% manganese steel plate.
- * Work hardening abrasion resistant steel plate. Excellent for severe impact applications.
- * Non-magnetic and anti-galling.

ALLOY PLATE



AstraWear 550

- * Severe sliding abrasion.
- * Water quenched and tempered.
- * Hardness: 514-600 BHN.



AstraWear 500F

- * Moderate impact and severe sliding abrasion.
- * Produced for enhanced formability and ease of welding.
- * Hardness: 470-530 BHN.



AstraWear 450F

- * Excellent resistance to impact and sliding abrasion.
- * Produced for enhanced formability and ease of welding.
- * Hardness: 430-480 BHN.



AstraWear 400F

- * Excellent resistance to impact and sliding abrasion.
- * Produced for enhanced formability and ease of welding.
- * Hardness: 360-444 BHN.



A-514

- * Structural steel plate for wear applications in multiple industries.
- * Offers the optimum in strength, toughness, corrosion resistance, and impact-abrasion resistance.
- * Quenched and tempered alloy with high yield strength at 100,000 minimum yield.

ALLOY ROUND BAR



Astralloy-V® Round Bar

- * Air hardened process produces a through hardened round bar from outer to inner core.
- * High toughness at low temperatures approaching -60°F and high temperature resistance to 1100°F.
- * Hardness: 320-388 BHN.



4330 V-Mod Round Bar

- * Nickel alloy round bar.
- * Normalized, quenched and tempered, stress relieved round bar with excellent toughness.
- * Minimum 150 ksi yield; Hardness: 321-375 BHN.



4145 H-Mod Round Bar

- * Quenched and tempered for uniformity in strength, shock resistance, ductility and hardness.
- * One of the most versatile machinery steels.
- * Minimum 125 ksi yield; Hardness: 287-332 BHN.

US & CANADA SALES

INTERNATIONAL SALES