Astralloy
a NUCOR company





Trip-L-Tuff®

Chromium Carbide Overlay Wear Plate, Pipe and Elbows

Chemical Composition of Overlay* – % Weight				
C	Mn	Si	Cr	Fe
6.0	3.0	1.0	28.0	Balance

TRIP-L-TUFF PLATE

Advantages over other wear materials

Metal: Trip-L-Tuff has significant advantages in some areas over AR products. Trip-L-Tuff has the yield strength of mild steel, making it easy to bend. It has no memory, so it holds shape. It is not heat treated, so welding does not affect its properties. It can be formed to a radius as small as 3" (on thin plate.) With the relaxed condition of the Trip-L-Tuff base material, the forming will not create cracks on the outer bend, and with the consistency of the Trip-L-Tuff weld material,no spalling or breakage will occur on the inner surface.

Base material is ASTM A 36 structural steel. The overlay consists of predominantly hard chromium carbides in a tough iron-base matrix. Nominal hardness is 555 – 653; microhardness of chromium carbide is 1800 VPH.

Trip-L-Tuff combines a super hard, tough surface on a ductile and weldable mild steel backing to provide the ultimate wear-resistant plate. Superior metallurgical properties achieved in a highly controlled process, utilizing the proper blend of elements, result in an overlay with an abundance of ultra-hard chromium carbide particles evenly distributed in an extremely hard, tough matrix. These carbides are 3 to 4 times as hard as steel as measured in microhardness tests.

The combination of the hard overlay with a structural steel backing facilitates ready adaptation to a variety of field wear situations. The composite plate can be moderately formed and readily welded or bolted in place.

Trip-L-Tuff will typically exhibit stress relief cracks in the overlay surface. These cracks are an inherent feature of hard-facing and develop as the overlay cools following deposition at 5/8" to 2" spacing transverse to the weld bead. They are confined to the overlay and do not penetrate into the base plate nor propagate in service.

TRIP-L-TUFF PIPE AND ELBOWS

The overlay applied to Trip-L-Tuff pipe has the same chemistry and properties as the plate overlay. It is applied to the inside or outside of the pipe, as required. All sizes are available down to 2” inside diameter.

Applications and Uses

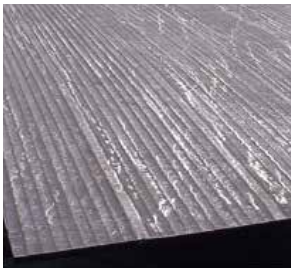
Trip-L-Tuff pipe is used primarily for wear due to friction. With plate, this could be from coal, rock, or gravel moving through or across a chute, liner, cyclone, sizing screen, dozier blade, breaker plate, etc. With the pipe, applications may include slurry, coke, coal dust, etc.

Advantages over other wear materials

Ceramic: Trip-L-Tuff also has certain advantages over ceramics. Given the high price of ceramics, cost is a major factor. Installation costs are also a factor due to the thickness and attachment procedures necessary for the fragile ceramic.

Chipping is another factor inherent in ceramic. Ceramic cannot handle impact whatsoever, whereas the Trip-L-Tuff will handle moderate to (in some cases) severe impact. Attachment failure is yet another drawback to glued on ceramic pieces. In piping, Astralloy Trip-L-Tuff is particularly better suited than ceramic.

Note: The data contained in this document is accurate at time of printing, and intended for use as a general guide.
* Typical maximum values. Mill certifications are available upon request.


Trip-L-Tuff®

Due to the thickness of ceramics, special “odd-ball” mechanical tubing and elbow sizes, as well as flanges must be located and purchased, or fabricated. Astralloy Trip-L–Tuff can be applied to every pipe or elbow size, from a minimum of 2” inside diameter. Flanges, couplings, and connections are no longer a concern.

CUTTING

* Plasma arc cutting is recommended for making holes, cutting shapes, or beveling. Carbon air-arc method may be used for gouging or non-precision holes. Cut from the mild steel side.

FORMING

* Trip-L-Tuff can be formed by conventional shop procedures. The overlay side must be on the inside of any formed radii. Protect bending rolls with 3/16” plate over hard-faced sides.

MACHINING

* Electrical discharge machining (EDM) methods are used for precision machining of Trip-L-Tuff. Conventional cutting tools, ceramics, and carbide will not cut Trip-L-Tuff.
* The hard chromium carbide overlay can be ground using a hard grit wheel having a soft bond.

WELDING

* A hard-facing pass of Hardalloy 58 (or equal) restores a wear surface such as exposed areas from piercing or joining.
* Type 312 stainless is recommended for an intermediate pass between hard-facing and base plate steel.

PROCESSING CAPABILITIES

* Plasma Cutting
* Oxy Fuel Cutting
* Laser Cutting
* Forming
* Drilling
* Welding

STANDARD PLATE SIZES

Overlay Thickness	Base Metal Thickness	Standard Plate Size
1/8"	1/4"	48" x 96"/60" x 120"
1/8"	5/16"	48" x 96"/60" x 120"
1/8"	3/8"	48" x 96"/60" x 120"
1/8"	1/2"	48" x 96"/60" x 120"
1/4"	1/4"	48" x 96"/60" x 120"
1/4"	3/8"	48" x 96"/60" x 120"
1/4"	1/2"	48" x 96"/60" x 120"
1/4"	5/8"	48" x 96"/60" x 120"
1/4"	3/4"	48" x 96"/60" x 120"
3/8"	3/8"	48" x 96"/60" x 120"
3/8"	1/2"	48" x 96"/60" x 120"
3/8"	5/8"	48" x 96"/60" x 120"
3/8"	3/4"	48" x 96"/60" x 120"

Astralloy Steel Products is a wholly-owned subsidiary of Nucor Corporation, the largest producer of steel in the United States. (09/16)

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