

Triten Overlay Product Systems



A DIVISION OF TRITEN CORPORATION

When you specify Triten Bulkwelding, you're getting the one-and-only "original"

During the 1950's, our company was in the business of manufacturing abrasion resistant piping and in rebuilding slide valves. The valve technology of the times was placing extreme demands on the working parts, especially those used in the petroleum refining industry. High temperature solid catalyst was moving at greater and greater velocities, causing abrasion damage to hydrocarbon processing units.

We believed there was an opportunity to improve the welded hardfacing that was used to resurface these units. The old hardfacing was expensive, time-consuming to apply, and wearing out more quickly than desired. This led to an extensive R&D effort spearheaded by our founder, Roman F. Arnoldy. The end result was a totally new and original, patented process for hardfacing named Bulkwelding, introduced in 1961.

It was cost-efficient, extremely hard, and longer wearing. Even today, we continue to lead in Bulkwelding applications, with over 14 U.S. and foreign patents or patents pending on processes, equipment and products that utilize this technology.

The advantages of Bulkwelding brought a reputation for innovation to our firm, the Texas Alloy Products Company (TAPCO). This unique process now made it possible for us to produce hardfaced plate, pipe and fabricated systems in quantity. Demand for these products was high, and that led us to establish a brand new division in 1975, Overlay Product Systems (OPS).

Currently, both OPS and TAPCO operate under the Triten Corporation banner. And our position as a supplier of overlays has not changed, over the years. We are still the innovator, the leader, and provide the industry standard by which all overlays are measured.

How Bulkwelding produces a wear-resistance second to none.

We pioneered the overlay process known as Bulkwelding. Today it remains the most resistant cladding commercially available for abrasion and impact problems, and produces

the highest abrasion resistance per dollar of expense for virtually any application.

The process capitalizes upon the addition of a controlled amount of Bulkwelding powder—composed of metal alloys—to an automatic welding system.

In the Bulkwelding diagram, you can see that there is a base metal of carbon steel, and that the overlay is welded to the base. The welding mechanism feeds a granulated Bulkweld powder to the workpiece just ahead of the welding electrode.

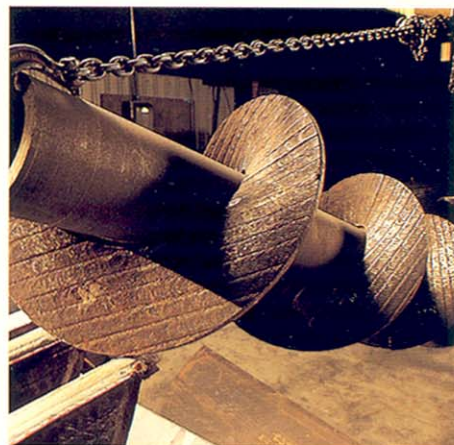
The particular chemistry of the resulting weld is governed by which types of alloys are used in the Bulkweld powder, and by how they combine with the electrode, as well as with the diluted base material.

In addition to laying down a highly wear-resistant cladding, there are many advantages to the Bulkwelding process, itself.

Bulkwelding substantially increases the deposition rates of weld metal over those obtainable with normal single wire operation, but with no increase in welding current, dilution or heat input. This enables us to provide a more competitively-priced product to our customers.

Another economy stems from there being less distortion in Bulkwelding, because of lower heat input. So there is less re-working of the piece, after Bulkwelding.

And, where ordinary submerged arc welding produces large carbides in the microstructure, in Bulkwelding, the carbides are smaller and finer, allowing them to be more densely packed. Ultimately, this particular quality gives a Bulkwelded product its extremely high abrasion resistance.



Screw conveyer



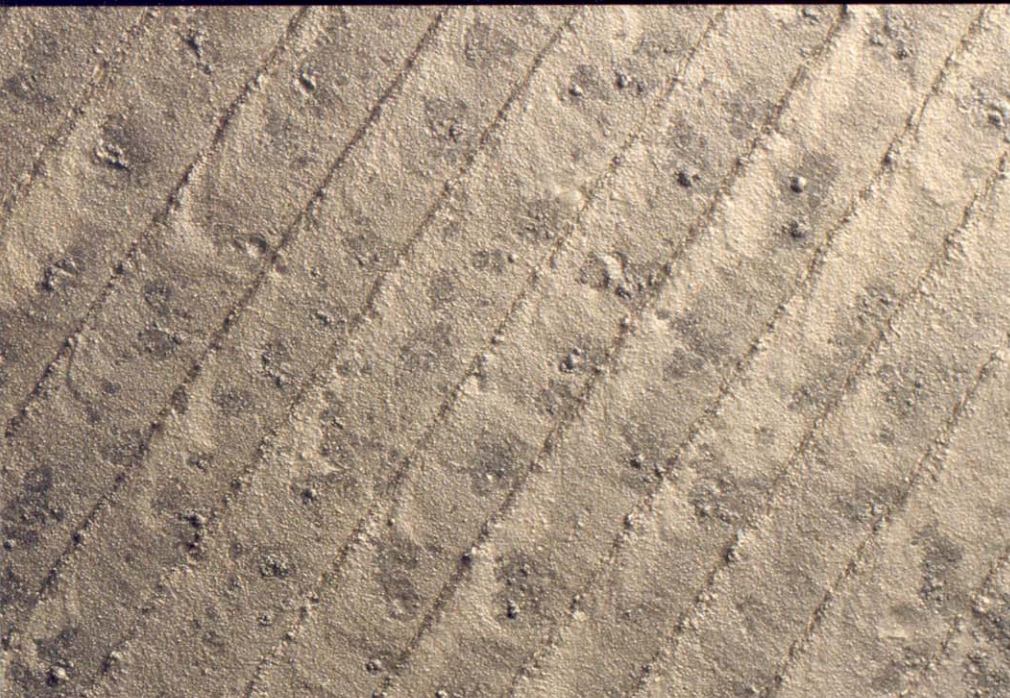
Blast furnace piping



Calcined coke cooler



Triten T-200X[®] Overlay



Triten T-200X is the industry standard for hardfacing.

Remember the name: T-200X. This is a very popular chromium-carbide overlay whose qualities provide extended life in applications of extreme abrasion, impact and heat. The overlay has a dense concentration of chromium carbides which are uniformly distributed throughout their matrix. It is welded to a carbon steel base, and the plate can be cut, formed or rolled into most any shape or configuration. T-200X can be purchased as plate, pipe or fabricated products, and its versatility makes it an ideal choice for a variety of industries.

T-200X Chemistry

This pre-mixed alloy contains chromium, carbon, manganese, molybdenum and iron. This combination of elements result in an extreme saturation of chromium carbides throughout the weldment matrix, accounting for about 40% of the T-200X overlay. These carbides have a high Vickers hardness, approximately 1,750 VHN, and are surrounded by an iron chromium matrix which results in an overall, minimum average surface hardness of 630 VHN (543 BHN). This makes T-200X excellent for abrasion and impact, as well as for sustained temperatures up to 1200°F.

T-200X Plate

The standard sheet size is 90 by 117 inches, and is available in single-overlay thicknesses of $\frac{1}{8}$ or $\frac{1}{4}$ inch, and double-overlay thicknesses of $\frac{5}{16}$ or $\frac{3}{8}$ inch.

The standard base plate can be as thin as $\frac{3}{16}$ inch; as thick as $1\frac{1}{4}$ inch. Normally, a thick base is not needed as its main purpose is to provide backing for the overlay, and to make it easy to attach. Different base metals and thicknesses, other than standard ones, can be supplied.

T-200X Pipe

Overlay can be applied to either the inside or outside diameters of pipe. Choose from straight sections, mitered elbows, long radius bends, flanges and couplings. The minimum inside diameter is 3 inches, while there is no limit to maximum diameter.

We build major engineered products to fit any installation.

When you require a component for a special application, we can design, engineer, manufacture and, if needed, supervise the installation. Just show us the problem that has to be solved, and we'll take it from there, performing a total turnkey job.

Triten overlays are easy to fabricate and attach.

Fabrication is easy with any of our overlaid products. After the piece has been cut to size by air or plasma arc and formed, it can then be bolted or welded into place.

For bolting a piece, use countersunk bolts or Nelson studs.

For attaching a piece, use any electric arc process to make peripheral edge welds or plug welds to the base metal. A standard carbon steel electrode works fine; no heat treatment is required on the base metal.

Triten overlay wear life is superior to A-R plate.

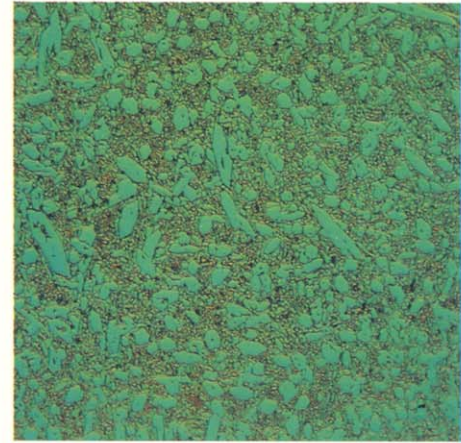
In applications where high abrasion and/or high temperature, or impact, cause material failures, studies show that Triten overlays will substantially outwear A-R plate, alloys or ceramics.

Triten overlays are available to fit virtually any application.

The amount of abrasion, heat or impact acting upon a piece of machinery will vary, depending upon its particular operating conditions.

For that reason, Triten overlays are produced in a wide range of alloys whose wear qualities cover the full spectrum of applications. If needed, we can also custom-mix an alloy for you.

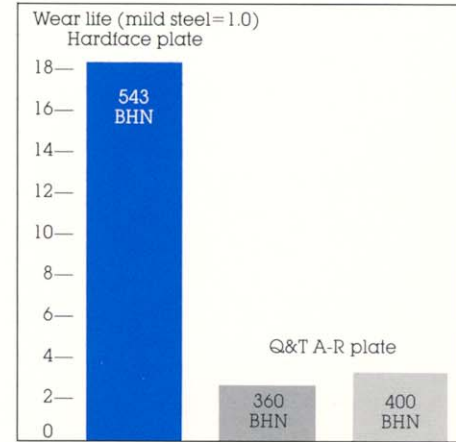
For basic specifications, check our descriptive charts on chrome-carbide and cobalt base Triten overlays.



T-200X Microstructure (200 mag.)
Primary chrome carbides are green.

Chromium Carbide Iron Base Overlays

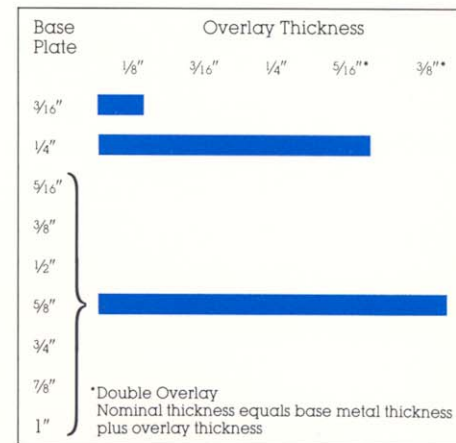
Product	Description	Composition	Characteristics	Applications
Triten 211	For severe abrasion and moderate impact. Temperatures up to 1200°F.	Alloy content: 39% Consisting of Fe, Cr, C, Mn, Mo and Si.	Typical hardness: 1 Pass: 56-58 Rc 2 Pass: 58-60 Rc Surface conditions: As welded with slight stress checks.	Fan blades, chute liners, and slurry pumps
Triten 200X	For high abrasion and moderate impact. Temperatures up to 1200°F.	Alloy content: 38% Consisting of Fe, Cr, C, Mn, Mo and Si.	Typical hardness: 1 Pass: 54-56 Rc 2 Pass: 56-58 Rc Surface condition: As welded with slight stress checks.	Shovels, buckets, fan blades, screws, chutes, pipes and valves.
Triten 153	For moderate to high abrasion and severe impact. Temperatures up to 1200°F.	Alloy content: 24% Consisting of Fe, Cr, C, Mn, Mo and Si.	Typical hardness: 1 Pass: up to 50 Rc 2 Pass: 50-55 Rc Surface condition: As welded with slight stress checks.	Crusher rolls and liners, target plates, and shot blast liners.
Triten 421	A high carbon, martensitic stainless steel. For high impact and moderate abrasion. Temperatures up to 1200°F.	Alloy content: 14% Consisting of Cr, C, Mn and Si.	Typical hardness: 1 Pass: 42-48 Rc 2 Pass: up to 54 Rc Surface condition: As welded with a crack-free surface (up to 52 Rc).	Steel mill rolls, paper rolls, cable drums, trunnions, shafts and valve seats.



Relative wear life

High Temperature Cobalt Base Overlays

Product	Description	Composition	Characteristics	Applications
Triten 282	For severe abrasion resistance and high hot hardness. Temperatures up to 1600°F.	Alloy content: 58% Consisting of Co, Mo, Cr, Ni, Si and C.	Typical hardness: 52-54 Rc Surface condition: As welded with stress cracking.	Feed injection nozzles, guides and discs, valve seats and flue gas dampers.
Triten 100	For high abrasion and hot hardness. Temperatures up to 1400°F.	Alloy content: 48% Consisting of Co, Cr, W, C and Si.	Typical hardness: 48-52 Rc Surface condition: As welded with stress cracking.	Feed injection nozzles, valve seats, guides and discs, table rolls and steam nozzles.
Triten 600	For moderate abrasion and hot hardness. Temperatures up to 1400°F.	Alloy content: 40% Consisting of Co, Cr, W, C and Si.	Typical hardness: 34-40 Rc Surface condition: As welded with smooth surface and some stress cracking.	Feed injection nozzles, valve seats, guides and discs, pumps, table rolls and steam nozzles.



Standard product offering

Relief patterns make Triten overlays easier to form.

As overlay material is deposited on the base metal, the hardfacing will expand and contract, resulting in a surface with hairline cracks.

These cracks extend through the overlay, and terminate at the fusion line. The benefit of this action on the overlay is that it serves as a built-in relief mechanism, and will help to eliminate any further cracking when the plate is shaped or bent to form a fabricated piece.

Industries using Triten overlays.

Aluminum	Oil refining
Asphalt	Petrochemicals
Cement	Power
Dredging	Pulp and paper
Food processing	Refuse processing
Glass	Steel
Mining	Synfuels

Typical Triten overlay applications.

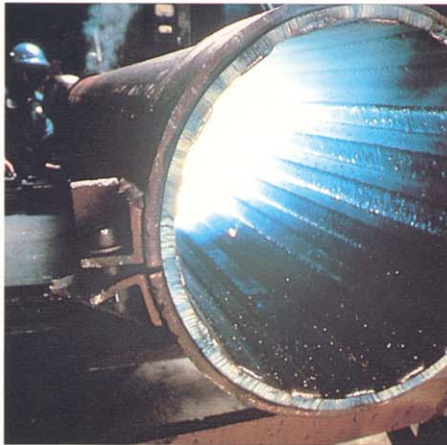
Blast furnace bells	Grizzly bars
Blowers	Hoppers
Buckets and teeth	Loaders
Chutes	Pipes
Conveyer liners	Rolls
Crushers	Screens
Cyclones	Screw conveyers
Deflectors	Shredder knives
Elbows	Target plates
Fan blades	Troughs
Feed nozzles	Valves

For the ultimate in protection, specify Triten Overlay Product Systems.

Throughout the world, industry depends upon the superior protection our overlays provide in the toughest of applications. Whenever extreme abrasion, impact or heat is a factor in wear, you'll find our products protecting key parts and components.

No overlays give better protection. Our people have led the industry for over four decades, and their reputation for innovation, quality and service is without parallel.

So if you have a problem with any type of excessive wear, contact a Triten representative. He can show you which Triten overlays will work best for you. And if special fabrication work is needed for your particular application, our engineering and production staffs will provide you with a custom solution.



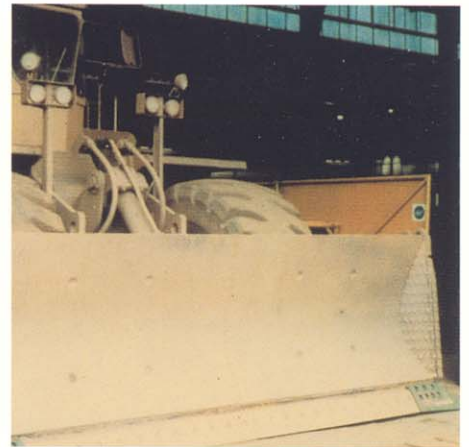
Dredge pipe



Grizzly bars



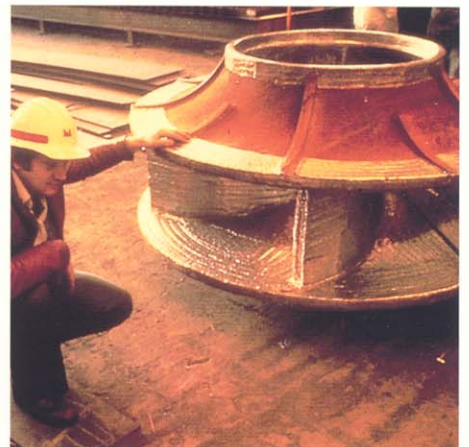
Cyclones



Blade liners



Hardfaced plate



Pump impeller