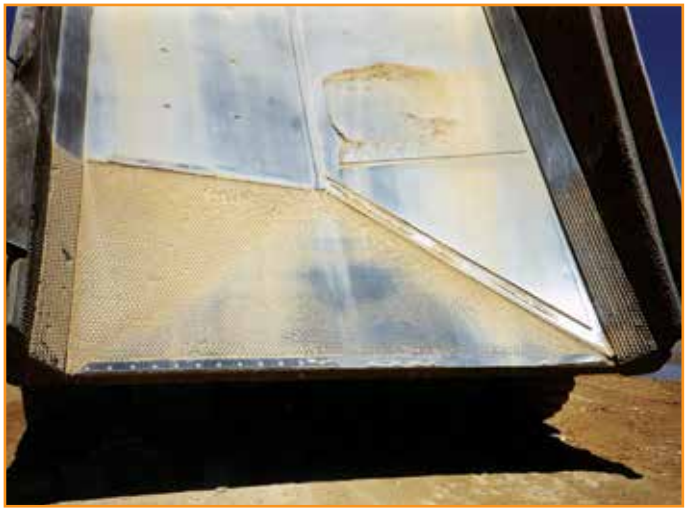
Stud Welding Products, Inc.

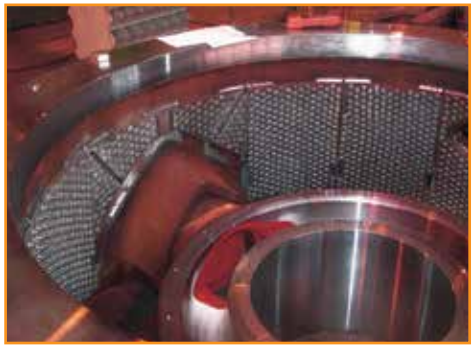
your number one stud

TUFFSTUDDS® Wear Protection System

Superb Wear and Abrasion Protection for Mining and Earth Moving Equipment





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Proven Technology with Excellent Performance

Equipment for mining, earth moving and related industries are subject to severe wear and abrasion. TUFFSTUDDS® Wear Protection System protects this equipment cost effectively, increasing efficiency and service life.

An excellent performer in the roughest of environments, TUFFSTUDDS® Wear Protection System is an innovative approach to protect areas exposed to high wear and abrasion. The TUFFSTUDDS® system is a state-of-the-art improvement to hard facing technology and is especially designed for heavy mining and construction environments.

What are TUFFSTUDDS® ?
TUFFSTUDDS® are chromium carbide-laden, wear-resistant alloy studs that are readily applied onto alloy castings or plate. In most applications, the applied pattern becomes embedded with mineral debris, causing a dead bed effect over 70% of the area, which enhances wear protection. The TUFFSTUDDS® Wear Protection System has proven to be an outstanding performer in the roughest environments.

The applications for TUFFSTUDDS® is as extensive as your imagination. Use TUFFSTUDDS® to provide wear protection and reap the benefits of longer service life for your valuable ground-engaging and process equipment.




A Reliable Process, Simple to Apply

TUFFSTUDDS® are applied using a stud welding system that employs a stud gun powered by a transformer/rectifier with solid state weld timing and amperage control. For field applications requiring maximum portability, an AC generator with a minimum capacity of 85 kW can power the DC welding system. Each TUFFSTUDD® takes only 0.6 to 1.2 seconds of arc time to apply. Simply load a TUFFSTUDD® and a ceramic arc shield (ferrule) into the stud welding gun, position on the work surface and pull the trigger.

TUFFSTUDDS® are simple to apply:


The stud welding gun

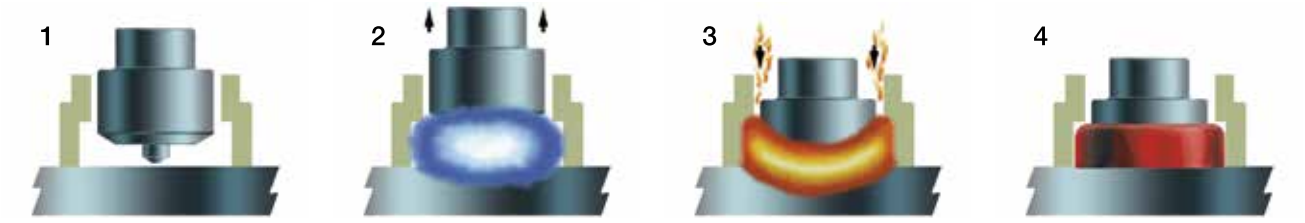

Load a TUFFSTUDD®


Load a ceramic arc shield (ferrule)


Final installation


Position on the work piece and pull the trigger

The TUFFSTUDDS® Stud Welding Process



1) A TUFFSTUDD® is positioned in contact with the work surface.

2) The operator pulls the welding gun trigger, initiating the welding arc and automatically lifting the stud.

3) The main welding current melts a portion of the stud and the work surface. Within a second, the TUFFSTUDD® is plunged into the molten pool.

4) The ceramic arc shield (ferrule) retains the molten metal in the weld area for maximum strength and safety, and the TUFFSTUDD® is metallurgically bonded to the work surface at the weld interface.

Wear Coverage Optimized for the Application

TUFFSTUDDS® are normally applied in a close, dense, ferrule-to-ferrule pattern. They are placed in staggered rows to optimize dead-bedding, which prevents washing out of the base material.

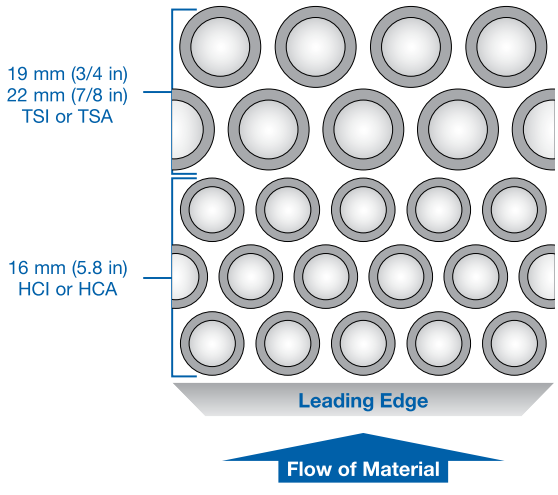
- High wear areas require a TUFFSTUDDS® coverage factor of 30%, based on cross-sectional area, which is achieved with an applied minimum density of:

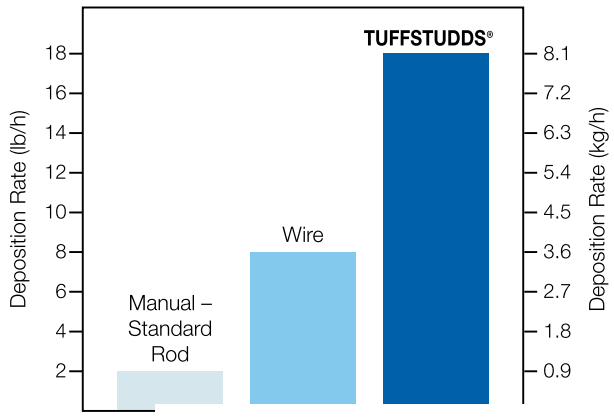
  1500/m^2 (140/ft^2) for 16 mm (5/8 in) TUFFSTUDDS®
  1075/m^2 (100/ft^2) for 19 mm (3/4 in) TUFFSTUDDS®
  750/m^2 (70/ft^2) for 22 mm (7/8 in) TUFFSTUDDS®

The remaining 70% of the area is protected with dead-bedded material that wears on itself. This provides the best form of wear protection available!

Low profile, 16 mm (5/8 in) TUFFSTUDDS® are recommended for leading edges exposed to high impact, shear conditions.

High profile and large diameter, 19 mm (3/4 in) or 22 mm (7/8 in) TUFFSTUDDS® are used on large areas to reduce installation time and should be installed behind 16 mm (5/8 in) TUFFSTUDDS® to avoid shear impact.



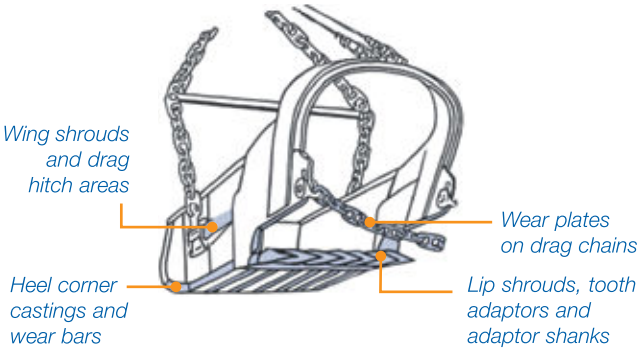


TUFFSTUDDS® quickly, mi

Typical Applications

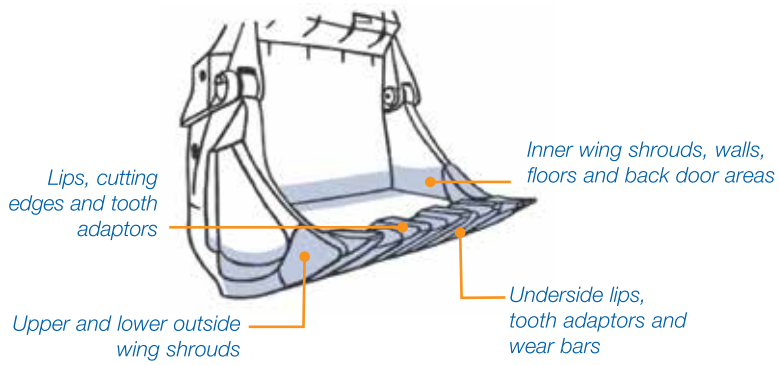
Protect your equipment with TUFFSTUDDS® Wear Protection System and realize significant benefits. TUFFSTUDDS® virtually eliminates the expensive task of cutting and rewelding worn components. The use of TUFFSTUDDS® reduces costs in many ways, including less downtime, reduced labor for maintenance and lower overall cost of component replacement.

Dragline Buckets and Dippers

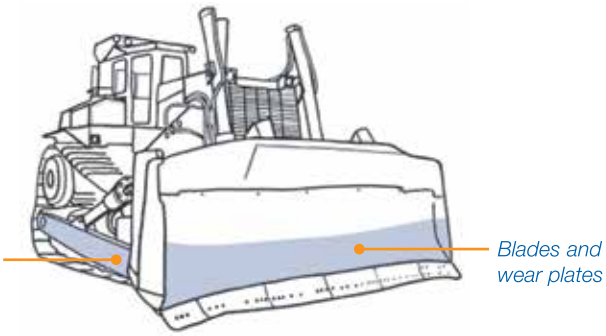


TUFFSTUDDS® provides excellent wear protection; safely replacing hard-facing or welding without inducing straight-line stress concentration or under bead cracking. Furthermore, TUFFSTUDDS® can be applied multiple times, maximizing service life.

Shovel and Loader Buckets



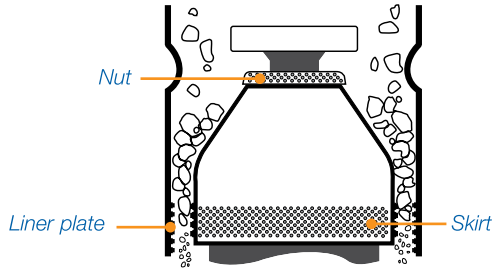
Dozer Blades



Typical Applications

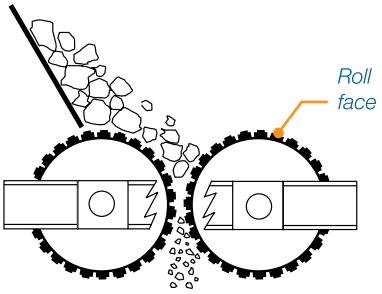
Crushers and Chutes

Short Head Gyratory Crushers



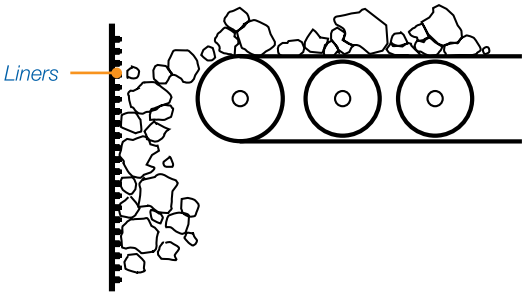
- Low heat prevents shrinkage; therefore, there is no need to re-machine threads.
- Easily installed on skirts without the need for the expensive fixturing or pre-fabricated plates.
- Easily welded onto plates while in position and offer quick and easy repair capability.
- Can be welded to manganese.

Roll Crushers



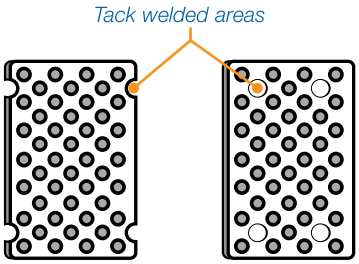
- Superior grip — no back sliding
- Excellent wear protection
- Fast and easy installation

Chutes



- Easily installed on out-of-position areas
- No need to lift, fit and weld heavy plate
- Creates a dead-bed or rock-box effect for longer wear life

TUFFSTUDDS® ® Steel Plates (for ease of installation)



- Apply TUFFSTUDDS® to wear plates for ease of installation
- Easy to handle 152x304x6mm (6x12 x1/4in) steel plates
- Tack weld in holes or scalloped areas for quick installation

Mine Eperience

Discharge Chute Primary Crushing

- Plates with TUFFSTUDDS® had a life 5-6 times original "non-studded" plates

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Designed to Suit a Variety of Applications

TUFFSTUDDS® Wear Protection System combines abrasion and impact resistance. TUFFSTUDDS® are easily and economically applied to mining and construction equipment using a lightweight stud welding gun.

TUFFSTUDDS® should always be applied in a closely packed (ferrule to ferrule), staggered pattern to minimize "washing out" between the rows.

TUFFSTUDDS® are available in two alloys to suit different wear environments:

HCI or TSI grade TUFFSTUDDS® are designed for low impact, severe sliding abrasion conditions.

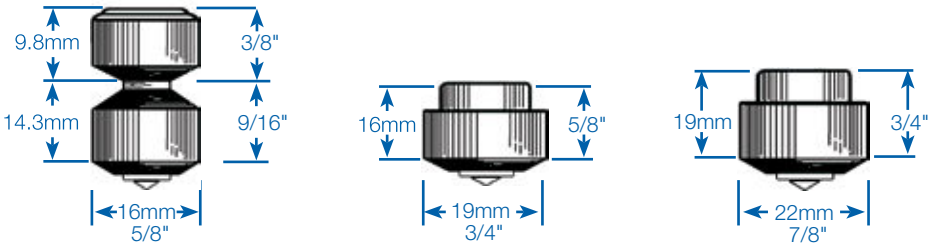
HCA or TSA grade TUFFSTUDDS® are designed for use in high impact conditions.

For best results on leading edges, apply as follows:

Use low profile, 16 mm (5/8 in) diameter HCI or HCA TUFFSTUDDS® for the first two or three rows.

Use higher profile 19 mm (3/4 in) or 22 mm (7/8 in) TSI or TSA TUFFSTUDDS® for the following rows.

Before Weld Length



	Series 58*	Series 68	Series 78
Alloy Selection			
A-Series Alloy	Medium-high carbon chromium carbide in an iron-molybdenum alloy matrix		
Series Number	HCA-58	TSA-68	TSA-78
Hardness (Rc)	48 – 52		
Ductility (in compression)	13 – 15%		
Recommended Use	Very good abrasion and excellent impact resistance.		
I-Series Alloy	High carbon chromium carbide in an iron alloy matrix		
Series Number	HCI-58	TSI-68	TSI-78
Hardness (HRC)	55 – 60		
Ductility (in compression)	1 – 3%		
Recommended Use	Excellent abrasion resistance and good impact resistance; recommended for applications with moderate impact and heavy sliding, abrasive wear.		
Stud Size			
Diameter	16 mm (5/8 in)	19 mm (3/4 in)	22 mm (7/8 in)
Height (as welded)	10.9 mm (7/16 in)	13 mm (1/2 in)	16 mm (5/8 in)
Welding Parameters			
Preheat	None required. Minimal during cold weather to remove condensation.		
Position Capability	horizontal, vertical, overhead	horizontal, vertical	horizontal
Power	800 – 1000 A	1000 – 1100 A	1200 – 1400 A
Timer	0.60 – 0.70 s	0.70 – 0.85 s	0.85 – 1.0 s
Application			
Rate (per hour — typical)	200 – 250	200 – 250	200 – 250
Coverage (per hour — typical)	0.13 – 0.17 m^2 (1.4 – 1.8 ft^2)	0.185 – 0.24 m^2 (2.0 – 2.6 ft^2)	0.26 – 0.325 m^2 (2.8 – 3.5 ft^2)
Stud Spacing			
Normal Conditions	1500 / m^2 (140 / ft^2)	1075 / m^2 (100 / ft^2)	750 / m^2 (70 / ft^2)
Severe Conditions	1590 / m^2 (148 / ft^2)	1160 / m^2 (108 / ft^2)	818 / m^2 (76 / ft^2)
Packaging (includes ceramic ferrules)			
Quantity per Carton[2]	500 studs	250 studs	250 studs
Coverage per Carton (typical)	0.32 – 0.33 m^2 (3.4 – 3.6 ft^2)	0.21 – 0.23 m^2 (2.3 – 2.5 ft^2)	0.31 – 0.33 m^2 (3.3 – 3.6 ft^2)
Carton Weight	23 kg (50 lb)	11 kg (24 lb)	16 kg (35 lb)
Minimum Order	500 studs	500 studs	500 studs

**** Low profile, knock-off design***

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Stud Welding Equipment

The application of TUFFSTUDDS® Wear Protection System is safe, reliable and easily applied using equipment designed for the stud welding process.

Our stud welding equipment package is fully featured, and will provide many years of dependable and trouble-free service, whether in your facility or at the job site. It is easy to operate and maintenance costs are low.

The **TWE-6800** is a fully regulated, stud welding power supply available in single or dual gun versions. Rectifier power source is constant current - variable voltage. A setup mode allows adjustment of the desired weld time and current prior welding, which is displayed on the front panel digital meters. A specially designed electronic gun control circuit has been incorporated into the system. If a fault condition occurs as a result of a shorted gun solenoid or a faulty control cable, the circuit will prevent gun re-triggering and eliminate damage to the circuit board.

Diesel driven field systems are available upon request.

Heavy Duty Stud Welding Gun is shaped-to-the-hand, semi-automatic heavy duty stud welding tool. It is capable of welding any size TUFFSTUDD® with an easy changeover of chunks, ferrule grips and foot pieces. The standard legs, foot piece and gun cable (whip lead), combo weld/control and ground cables are included.

TWE-6800
Stud Welder

TWE-1700
HD Stud Gun

If you require any additional information related to the stud welding equipment, please contact us.

Installed Hard Facing Cost To Installed TUFFSTUDD® Cost*

Example: TO APPLY EQUAL LBS OF WEAR PROTECTION				HARDFACING		TUFFSTUDS
				HI CHROME	20LBS	TSA -78
MATERIAL*						
Purchase price/lb.				$15.00/lb		$28.71
Deposit Efficiency (estimated)				60%		100%
Effective Material Cost/Lb.				$25		$28.71
		Total Lbs		20		20
TOTAL MATERIAL COSTS				$499.95		$574.00
LABOR*		Total Lbs	Lbs per hr			
Time to install		20	1,4	14,81		
		20	18,2			1,10
	Hourly Rate			$60.00		$60.00
	(assume same rate for welder)					
	Total Labor			$888.89		65.93
	TOTAL LABOR & MATERIAL			$1,388.84		$640.13
	INSTALLED COST PER POUND			$69.44		$32.01
	SAVINGS PER LB. installed					$37.43
	TOTAL SAVINGS for Application					$845.51
	% Savings pf Tuffstudds vs Hardfacing					60%

NOTES: TUFFSTUDDS - 11 pcs. Per pond - 220 studs (25lbs) @$2.61 each
Electrode Depostion - 4.5 pounds per Hour @ 30% duty cycle equals 1.35lbs/hour
TUFFSTUDDS DEPOSTION - 200pcs/hour or 18.2 lbs per hour Electrode
deposit effiency = 0.6lbs deposited per pound burned.
To deposit 20lbs of HF - 33.33 lbs of wire is consumed at $15.00/lb = 499.95 6/5/2024

*Cost will vary due to location.

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The Many Benefits of TUFFSTUDDS® Wear Protection

Convenience, speed of application and longer life are synonymous with TUFFSTUDDS® Wear Protection and the applications for TUFFSTUDDS® are as extensive as your imagination. Try TUFFSTUDDS® and discover the benefits of reduced operating costs, lower maintenance costs and increased service life for your valuable ground-engaging and process equipment.

Convenience:
- Uses a stud welding system with simple controls
- Automatic sequencing of the welding cycle
- Smokeless operation
- Horizontal, vertical and overhead capability
- Stud welding processes minimizes heat input to the base material, reducing stress, distortion and warping
- Repair and re-stud previously studded surfaces

Longer Life:
- Hard, cast chromium carbide studs (Hardness: 50 – 60 RC) increases service life up to three times longer than non-studded surfaces, reducing equipment downtime and costs to replace components.

Speed:
- A conservative and realistic application rate is 200 to 250 studs per hour — up to 0.28 m^2 (3 ft^2) coverage.

Fast Deposit Rate (based on 200 studs/hour):
- Maximized wear protection: 98 kg/m^2 (20 lb/ft^2)
- Lightweight wear protection: 32 kg/m^2 (6.5 lb/ft^2)

Lighter Weight:
- Other wear protection systems can add more than 122 kg/m^2 (25 lb/ft^2), increasing wear on bearings, hydraulics and other moving mechanical parts. TUFFSTUDDS® weigh only 32 kg/m^2 (6.5 lb/ft^2), increasing the life of these components.