

HARDFACING WIRES for the Cement Industry

Stoody Hardfacing and High Alloy Joining

Stoody®, a leading innovator and producer of hardfacing and high alloy products, has worked closely with customers the world over carefully researching the various types of wear and corrosion that occur in the harshest industrial environments. This ongoing collaboration has led to an extensive product line of engineered hardfacing alloys particularly suited for the cement industry for both the overlay of new crusher components and the restoration of worn, spent parts.

New components protected by Stoody hardfacing alloys are more wear resistant resulting in greater productivity with less unplanned downtime and reduced replacement and maintenance cost. Worn or damaged parts can be restored and returned to service for a fraction of the cost of new replacement components thanks to Stoody buildup alloys. Once restored, these parts can perform better than new with an extended service life.

As a industry professional, you owe it to yourself to learn how Stoody products can be utilized to rebuild and protect your vulnerable components from the ravages of wear and corrosion. Then you too can experience greater productivity and reduced operating costs thanks to Stoody engineered hardfacing solutions.

www.stoody.com.

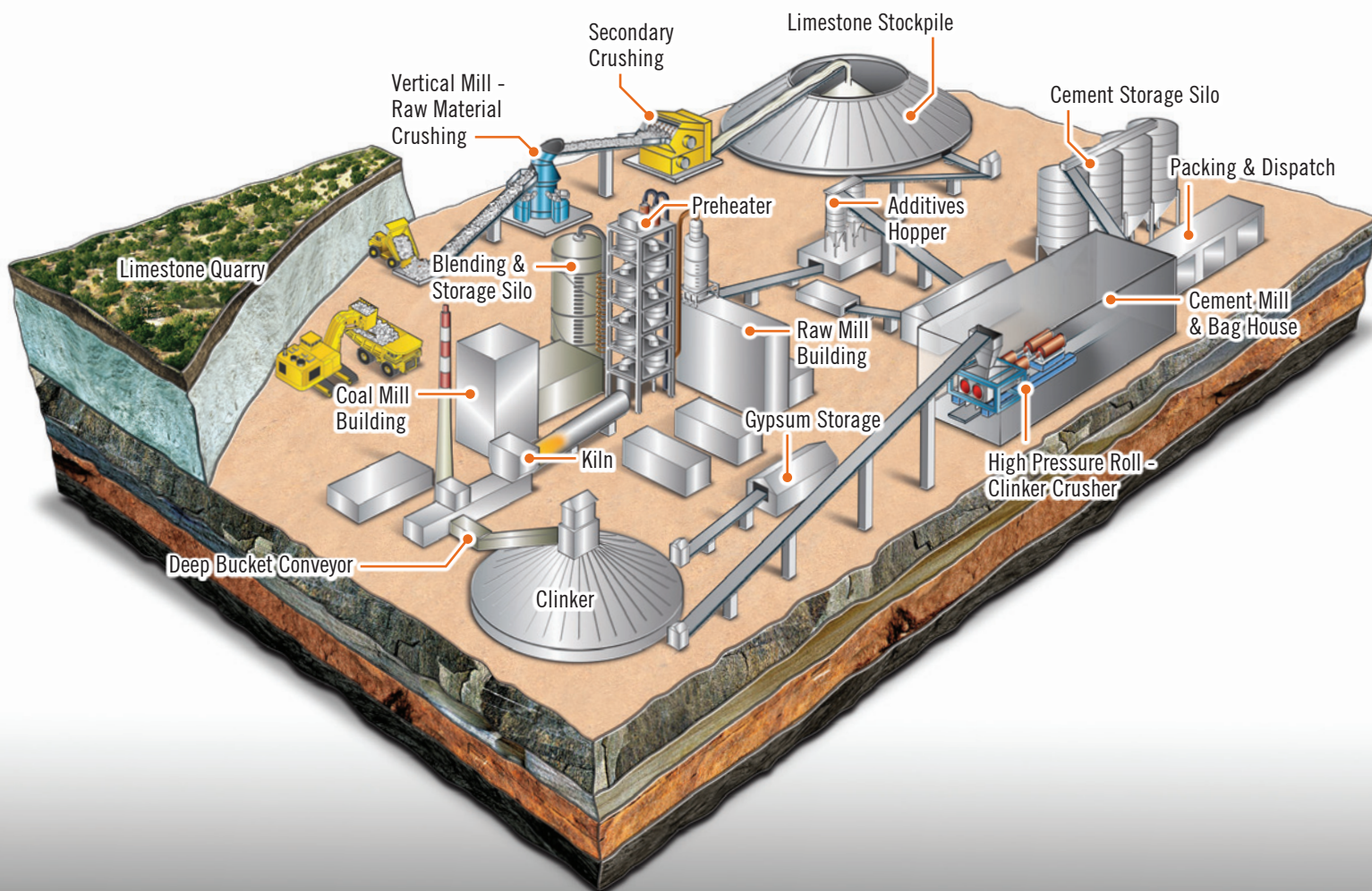


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This information is accurate to the best of our knowledge at the time of printing and is subject to change at any time at Stoody's sole discretion.



Grinding ring repair with Stoodly CP-2000



Segment roll repair with Stoodly 100HD



High pressure cement roll repaired with Theraclad Roll Build 3 and hardfaced with Stoodly 600



Crusher Roll Repair with Stoodly 100HD



Crusher Roll Repair with Stoodly 100HC



Auger repair with Stoodly 101HC



Flat ID pipe cladding with Stoodly CP-2000



Horizontal ID pipe cladding with Stoodly CP-2000



Wear plate with Stoodly 100HD

Applications Table & Wear Comparison Chart

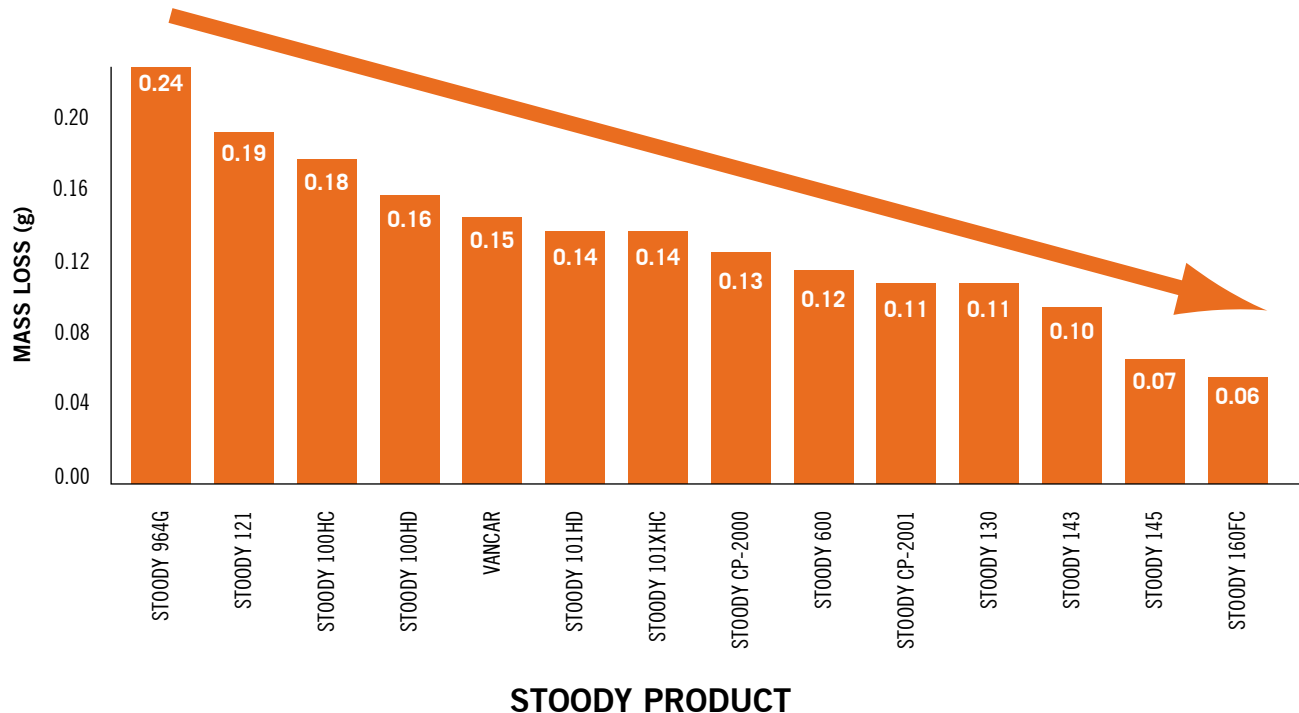
COMMON APPLICATIONS IN THE CEMENT/CONCRETE INDUSTRIES

Application	Recommended Semi-Automatic Wire	Application	Recommended Semi-Automatic Wire
Auger Repair	Stoody 101HC	Drag Chain Rider Blocks	Stoody 121
Bolt Heads (Liner Plates)	Stoody 100HD, Stoody CP-2000 & Stoody CP-2001	Drive Shaft Bearings and Bushings	Stoody 121
Cement Chutes	Stoody 100HD, Stoody CP-2000 & Stoody CP-2001	Feed Screw Flights	Stoody 130 & Stoody 160FC
Clinker Mill Liner Plates	Stoody 100HD, Stoody CP-2000 & Stoody CP-2001	Feed Spouts	Stoody 100HD
Concrete Block Mixer Deflector Angles	Stoody 100HD, Stoody CP-2000 & Stoody CP-2001	Grinding Ring Repair	Stoody CP-2000 & Stoody 100HD
Concrete Block Pug Mill Paddles	Stoody 100HD, Stoody CP-2000 & Stoody CP-2001	High Pressure Roll Repair and Hardfaced	ThermaClad Roll Build 3 & Stoody 600
Concrete Mixer Chutes	Stoody 100HD	Mill Paddles	VANCAR
Concrete Pipe Forming Shoes	Stoody 121	Pipe ID Cladding	Stoody CP-2000
Crusher Roll Repair	Stoody 100HD or Stoody 100HC	Segment Roll Repair	Stoody 100HD
Drag Chain Idlers	Stoody 121	Tube Mill Feeder Screws	Stoody 121 & Stoody 100HD
Drag Chain Latches and Keepers	Stoody 965 AP-G	Tube Mill Feeder Screens	Stoody 121 & Stoody 100HD
		Wear Plate	Stoody 100HD

Applications & Wear

COMPARATIVE WEAR DATA

Cement industry Wires Wear Data Table: ASTM G65 (2-Layer Mass Loss)



BUILD-UP AND JOINING ALLOYS

A. BUILD-UP OF CARBON STEELS

STOODY BUILD-UP-G & BUILD-UP-O

STOODY BUILD-UP is a low alloy fabricated wire that has excellent compressive strength and resistance to plastic deformation. This is an excellent alloy for use as an underbase for subsequent hardfacing. Several diameters are available for use both with and without shielding gases. This material has good machinability in the "as-welded" condition using carbide tools. It is not recommended for manganese steel or cast iron and will workharden under impact.

Welding Procedures/Characteristics: Can be applied AC or DC, either polarity (DCEP reverse preferred) in either stringer or weave beads 1/2" (12.7 mm) to 3/4" (19 mm) wide. Can be applied out of position with proper welding techniques. Slag removal is very good. This wire is not recommended for joining applications. Vertical welding can be done by welding a horizontal shelve approximately 2" (50.8 mm) wide and then going up.

Applications: Hammers, Wheel Burns, Repairing Battered Rail, Steel Mill Wobblers and Pods, Carbon Steel Shovel Pads, Shafting, Rolls, Pump Parts

Nominal Composition:

Alloy Content – 4% (Manganese, Chromium, Silicon, Molybdenum, Carbon)
 Iron Base

Typical Mechanical Properties:

Base Metal	Layers	Hardness
0.10% C	2	24 – 28 HRC
0.40% C	2	30 – 35 HRC
0.80% C	2	38 – 42 HRC

Part Number	Pkg	Wire Dia.	Shielding Gas	Welding Parameters Wire Ext. Amps Volts
Build-Up-G				
• 11423800	33 lb WB (15 kg)	.045" (1.2 mm)	98% Ar / 2% O or 75% Ar / 25% CO ₂	1/2 – 3/4" (13 – 19 mm) 175 – 225 18 – 24
• 11423900	10 lb PS (4.5 kg)	.045" (1.2 mm)	98% Ar / 2% O or 75% Ar / 25% CO ₂	1/2 – 3/4" (13 – 19 mm) 175 – 225 18 – 24
Build-Up-O				
• 11304900	33 lb WB (15 kg)	1/16" (1.6 mm)	Open-arc or CO ₂	1/2 – 3/4" (13 – 19 mm) 250 – 300 23 – 26
• 11258300	50 lb PP (22.7 kg)	1/16" (1.6 mm)	Open-arc or CO ₂	1/2 – 3/4" (13 – 19 mm) 250 – 300 23 – 26
• 11183600	60 lb Coil (27.2 kg)	3/32" (2.4 mm)	Open-arc	1 – 1 1/2" (25 – 38 mm) 150 – 500 26 – 29
• 11000100	60 lb Coil (27.2 kg)	7/64" (2.8 mm)	Open-arc	1 – 1 1/2" (25 – 38 mm) 150 – 500 26 – 29
11142800	110 lb QP (50 kg)	7/64" (2.8 mm)	Open-arc	1 – 1 1/2" (25 – 38 mm) 150 – 500 26 – 29
11813100	200 lb HP (90.7 kg)	7/64" (2.8 mm)	Open-arc	1 – 1 1/2" (25 – 38 mm) 150 – 500 26 – 29
11869900	500 lb POP (226.8 kg)	7/64" (2.8 mm)	Open-arc	1 – 1 1/2" (25 – 38 mm) 150 – 500 26 – 29

B. BUILD-UP AND JOINING OF MANGANESE STEEL

DYNAMANG-G & DYNAMANG-O

DYNAMANG is an austenitic manganese material containing chromium and nickel. It produces a tough, high strength deposit that workhardens under impact. Primarily used for the build-up, repair and joining of manganese steel. Deposit thickness is unlimited and can be flame cut without difficulty.

Welding Procedures/Characteristics: DCEP (reverse polarity) recommended, using either stringer or weave beads 1/2" (12.7 mm) to 3/4" (19 mm) wide. Wire extension (arc length) is very important. If it becomes too long, excessive spatter results; if too short, "stubbing" will occur. The use of CO₂ shielding gas reduces the amount of spatter with the 1/16" (1.6 mm) diameter wire. Limit interpass temperature to 500°F (260°C) maximum.

Applications: Crusher Rolls, Jaw Crushers, Hammer Crushers, Dredge Pump, Cutters, Shovel Pads, Buckets and Teeth, Gyratory Crusher Mantles

Nominal Composition:

Alloy Content – 20% (Manganese, Chromium, Nickel, Carbon)
 Iron Base

Typical Mechanical Properties:

Tensile Strength	120 ksi (825 MPa)
Yield Strength	70 ksi (480 MPa)
Elongation in 2" (50.8 mm)	42%
Hardness:	
All weld metal	200 BHN
Workhardened to	500 BHN

Part Number	Pkg	Wire Dia.	Shielding Gas	Welding Parameters Wire Ext. Amps Volts
Dynamang-G				
• 11996700	33 lb WB (15 kg)	.045" (1.2 mm)	98% Ar / 2% O	1/2 – 3/4" (13 – 19 mm) 175 – 225 22 – 26
Dynamang-O				
• 11836400	33 lb WB (15 kg)	.045" (1.2 mm)	Open-arc or CO ₂	1/2 – 3/4" (13 – 19 mm) 150 – 180 25 – 27
• 11446700	33 lb WB (15 kg)	1/16" (1.6 mm)	Open-arc or CO ₂	3/4 – 1" (19 – 25 mm) 200 – 250 23 – 27
11470200	50 lb PP (22.7 kg)	1/16" (1.6 mm)	Open-arc or CO ₂	3/4 – 1" (19 – 25 mm) 200 – 250 23 – 27
• 11249900	60 lb Coil (27.2 kg)	7/64" (2.8 mm)	Open-arc	1 1/2 – 2" (38 – 51 mm) 220 – 350 25 – 28
• 11250100	110 lb QP (50 kg)	7/64" (2.8 mm)	Open-arc	1 1/2 – 2" (38 – 51 mm) 220 – 350 25 – 28
• 11250200	200 lb HP (90.7 kg)	7/64" (2.8 mm)	Open-arc	1 1/2 – 2" (38 – 51 mm) 220 – 350 25 – 28

Hardfacing Product Details

BUILD-UP AND JOINING ALLOYS

C. BUILD-UP AND JOINING OF BOTH CARBON AND MANGANESE STEELS

STOODY 110-G, 110-O, or 110MC*

STOODY 110 is a modified high chromium high manganese steel widely used in the rebuilding of manganese steel parts subject to severe impact loading. This material offers excellent cavitation resistance; good toughness and wear resistance; and is sometimes used as the final hardfacing layer in extreme impact situations.

Welding Procedures/Characteristics: DCEP (reverse polarity) recommended, using either stringer or weave beads 1/2" (12.7 mm) to 3/4" (19 mm) wide. Deposits cannot be flame cut, are machinable with carbide tools, are non-magnetic and are not recommended for cast iron. The addition of CO₂ shielding gas with the 1/16" (1.6 mm) diameter wire reduces the amount of spatter and improves the weldability.

Applications: Drive Tumblers, Shovel Pads, Shovel Teeth, Turbine Cone, Wobbler Feeder, Manganese Frogs, Crusher Rolls

Nominal Composition:

Alloy Content – 35% (Chromium, Manganese, Nickel, Silicon, Carbon)
Iron Base

*MC = "Metal Cored"

Typical Mechanical Properties:

Tensile Strength 119 ksi (820 MPa)
Yield Strength 76.4 ksi (525 MPa)
Elongation in 2" (50.8 mm) 40%
Hardness:
All weld metal 17 HRC
Work hardened to 55 HRC

Part Number	Pkg	Wire Dia.	Shielding Gas	Welding Parameters Wire Ext.	Amps	Volts
110-G						
• 11452600	33 lb WB (15 kg)	.045" (1.2 mm)	98% Ar / 2% O ₂ or 75% Ar / 25% CO ₂	1/2 – 3/4" (13 – 19 mm)	135 – 185	18 – 24
110-O						
• 11424400	33 lb WB (15 kg)	1/16" (1.6 mm)	Open-arc or CO ₂	1/2 – 1" (13 – 25 mm)	150 – 210	22 – 26
• 11345000	50 lb PP (22.7 kg)	1/16" (1.6 mm)	Open-arc or CO ₂	1/2 – 1" (13 – 25 mm)	150 – 210	22 – 26
• 11214400	60 lb Coil (27.2 kg)	3/32" (2.4 mm)	Open-arc	3/4 – 1 1/4" (19 – 32 mm)	175 – 375	25 – 28
• 11000300	60 lb Coil (27.2 kg)	7/64" (2.8 mm)	Open-arc	3/4 – 1 1/4" (19 – 32 mm)	175 – 375	25 – 28
• 11143400	110 lb QP (50 kg)	7/64" (2.8 mm)	Open-arc	3/4 – 1 1/4" (19 – 32 mm)	175 – 375	25 – 28
• 11140900	200 lb HP (90.7 kg)	7/64" (2.8 mm)	Open-arc	3/4 – 1 1/4" (19 – 32 mm)	175 – 375	25 – 28
110-MC						
• 11836900	60 lb Coil (27.2 kg)	7/64" (2.8 mm)	Open-arc	3/4 – 1 1/4" (19 – 32 mm)	175 – 375	25 – 28
• 11836800	110 lb QP (50 kg)	7/64" (2.8 mm)	Open-arc	3/4 – 1 1/4" (19 – 32 mm)	175 – 375	25 – 28

STOODY THERMACLAD® ROLL BUILD 3

STOODY ThermoClad Roll Build 3 deposit is a low alloy steel designed for an optimum combination of strength and toughness. The low carbon content of the deposit lends to good weldability and the substitutional strengthening lends to excellent mechanical properties that are insensitive to welding conditions as well as roll service conditions. The thickness of the deposit is unlimited.

Welding Procedures/Characteristics: DCEP (reverse polarity) is recommended using stringer or weave beads. No limit to layers.

Applications: Cement and Refractory: Roll Build Up, Shaft Rebuilding.

Nominal Composition:

Alloy Content – C: 0.06%, Mn: 1.5%, Si: 0.4%, Cr: -, Ni: 2.6%, Mo: 0.6%

Deposit Characteristics:

Abrasion Resistance Excellent
Impact Resistance Good
Hardness (3 layers) 22 HRC

Part Number	Pkg	Wire Dia.	Flux	Welding Parameters Wire Ext.	Amps	Volts
11864000	500 lb POP (226.8 kg)	1/8" (3.2 mm)	R-20	1 1/4 – 1 1/2" (32 – 38 mm)	400 – 500	26 – 30
11937700	750 lb POP (340.2 kg)	1/8" (3.2 mm)	R-20	1 1/4 – 1 1/2" (32 – 38 mm)	400 – 500	26 – 30

MODERATE TO SEVERE IMPACT & MODERATE TO SEVERE ABRASION

STOODY 965-G & 965-0

STOODY 965 can be categorized as a general purpose hardfacing alloy that offers a good balance of impact and abrasion resistance. Analysis and properties are very similar to Stoodly Self-Hardening. Applications would include both metal-to-metal and metal-to-earth. Deposits are martensitic, forgeable, and are not readily machinable. Can be applied to carbon, low alloy and manganese steel.

Welding Procedures/Characteristics: DCEP (reverse polarity) recommended using either stringer or weave beads. Weldability is very good in flat and horizontal applications. The addition of CO₂ shielding gas with the 1/16" (1.6 mm) diameter wire reduces the amount of spatter and improves the weldability

Applications: Tillage Tools, Drag Line Bucket Lips, Tamper Feet, Chisel Plows, Dredge Parts, Extruded Screws, Muller Tires

Nominal Composition:

Alloy Content – 10% (Chromium, Manganese, Silicon, Carbon)
 Iron Base

Mechanical Properties Typical Rockwell Hardness:

Base Metals .20% C
 Layers: 2
 Hardness 56-60 HRC

Part Number	Pkg	Wire Dia.	Shielding Gas	Welding Parameters Wire Ext. Amps Volts
965-G				
• 11929300	5 lb PS-LLW (2.3 kg)	.035" (0.9 mm)	75% Ar / 25% CO ₂	1/2 – 5/8" (13 – 16 mm) 80 – 130 15 – 20
• 11933300	25 lb PS (11.3 kg)	.035" (0.9 mm)	98% Ar / 2% O ₂ or 75% Ar / 25% CO ₂	1/2 – 3/4" (13 – 19 mm) 150 – 200 25 – 29
• 11423100	33 lb WB (15 kg)	.045" (1.2 mm)	98% Ar / 2% O ₂ or 75% Ar / 25% CO ₂	1/2 – 3/4" (13 – 19 mm) 150 – 200 25 – 29
• 11501500	33 lb WB (15 kg)	1/16" (1.6 mm)	98% Ar / 2% O ₂ or 75% Ar / 25% CO ₂	3/4 – 1" (19 – 25 mm) 200 – 250 27 – 31
• 11823900	50 lb PP (22.7 kg)	1/16" (1.6 mm)	98% Ar / 2% O ₂ or 75% Ar / 25% CO ₂	3/4 – 1" (19 – 25 mm) 200 – 250 27 – 31
• 11864500	200 lb HP (90.7 kg)	1/16" (1.6 mm)	98% Ar / 2% O ₂ or 75% Ar / 25% CO ₂	3/4 – 1" (19 – 25 mm) 200 – 250 27 – 31
• 11875500	400 lb NTP (181.4 kg)	1/16" (1.6 mm)	98% Ar / 2% O ₂ or 75% Ar / 25% CO ₂	3/4 – 1" (19 – 25 mm) 200 – 250 27 – 31
965-0				
• 11427100	33 lb WB (15 kg)	1/16" (1.6 mm)	None or CO ₂	3/4 – 1 1/4" (19 – 32 mm) 200 – 250 27 – 31
• 11427000	50 lb PP (22.7 kg)	1/16" (1.6 mm)	None or CO ₂	3/4 – 1 1/4" (19 – 32 mm) 200 – 250 27 – 31

STOODY 965 AP-G

STOODY 965 AP-G is a gas-shielded, flux cored, all position, general purpose hardfacing alloy which offers a good balance of impact and abrasion resistance. It can be used in both metal-to-metal and metal-to-earth applications. Deposits are forgeable but not readily machinable. Stoodly 965 AP-G has a smooth semi-spray transfer and can be applied to carbon, low alloy, and manganese steels. It is magnetic on carbon and low alloy steels but not on manganese steels. Analysis and properties are similar to Stoodly Self-Hardening covered electrode.

Welding Procedures/Characteristics: DCEP recommended using 75% Argon, balance CO₂ shielding gas. This wire has excellent out-of-position characteristics. It has a smooth semi-spray transfer and can be applied to carbon and low alloy steels.

Applications: Tillage Tools, Dredge Parts, Sliding Metal Parts, Tire Shredder Knives, Drag Line Bucket Lips, Extruder Screws, Tamper Feet, Churn Drills, Muller Tires

Nominal Composition:

Alloy Content – 11% (Carbon, Chromium, Manganese, Molybdenum, Silicon)
 Iron Base

Typical Mechanical Properties:

Abrasion Resistance Good
 Impact Resistance Good
 Deposit Layers..... 2 Normal, 3 Max.
 Hardness (2 Layers)..... 57 – 62

Part Number	Pkg	Wire Diameter	Shielding Gas	Welding Parameters Wire Ext. Amps Volts
• 11807800	33 lb WB (15 kg)	.045" (1.2 mm)	75-80% Ar, Bal. CO ₂	1/2"-3/4" (13-19 mm) 140-225 26-29
• 11808600	33 lb WB (15 kg)	1/16" (1.6 mm)	75-80% Ar, Bal. CO ₂	1/2" - 3/4" (13-19 mm) 170-275 24-30

STOODY 964-G & 964-0

STOODY 964-G deposit is a specially formulated wear resistant alloy which produces a uniform distribution of small primary carbides in a martensitic matrix. The small carbides provide greatly improved wear resistance over martensitic steel, many tool steels, and some conventional chromium carbide alloys. 964-G possesses excellent resistance to impact and plastic deformation. Deposits are crack free on carbon 300 stainless and manganese steels. Other base metals should be preheated and post heated appropriately. The material is characterized by a high hardness and excellent wear resistance. 964-G is recommended for parts where cross checking is undesirable. 964-G offers improved weldability over chromium carbide and many other tool steel welding wires.

Applications: Slitter Blades, Auger Flights, Rendering Screws, Tamper Tools, Extruder Screws, Tamper Feet, Tillage Tools, Dredge parts, Drag Line Bucket Lips

Structure:

Small Primary Carbides in a Martensitic Matrix

Deposit Characteristics:

Abrasion Resistance..... Excellent
 Hardness 60 – 65 HRC
 Impact Resistance Good
 Deposit Layers 2 Max
 Surface Cross Checks..... None
 Magnetic
 on Stainless Steel Slightly
 on Carbon Steel Yes
 on Manganese Steel..... Yes

Part Number	Pkg	Wire Dia.	Shielding Gas	Welding Parameters Wire Ext. Amps Volts
964-G				
• 11965300	33 lb WB (15 kg)	.045" (1.2 mm)	75% Ar / 25% CO ₂	1/2 – 3/4" (13 – 19 mm) 125 – 230 18 – 22
• 11965800	33 lb WB (15 kg)	1/16" (1.6 mm)	75% Ar / 25% CO ₂	1/2 – 3/4" (13 – 19 mm) 275 – 500 18 – 22
964-0				
• 11981300	33 lb WB (15 kg)	1/16" (1.6 mm)	None	3/4 – 1" (19 – 25 mm) 250 – 450 24 – 26

Hardfacing Product Details

MODERATE TO SEVERE IMPACT & MODERATE TO SEVERE ABRASION

STOODY 121-G & 121-O

STOODY 121 gives a semi-austenitic matrix with uniformly dispersed chromium carbides and is recommended for applications where abrasion is severe and impact is only moderate. Provides excellent service on a wide variety of heavy equipment and earth engaging tools. Typically cross-checks when applied and is not machinable. Can be applied to carbon, low alloy and manganese steels

Welding Procedures/Characteristics: DCEP (reverse polarity) recommend using either stringer or weave beads. The addition of CO₂ shielding gas with the 1/16" (1.6 mm) diameter wire reduces the amount of spatter and improves the weldability. Limit deposits to 2 layers maximum in the downhand position only..

Applications: Scraper Sides, Scraper Cutters, Vibrator Ditcher Shank, Post Hole Augers, Augers, Pug Mill Paddles, Tamper Tools

Nominal Composition:

Alloy Content – 21% (Chromium, Carbon, Manganese, Silicon)
Iron Base

Typical Mechanical Properties:

Base Metal	Layers	HRC
.20% C	1	40 – 43
.20% C	2	48 – 50
Mang. Steel.....	1	40 – 44
Mang. Steel.....	2	47 – 51

On carbon steel or low alloy steel: Slightly magnetic

On Mang. steel: Non-magnetic not forgeable or machinable

Part Number	Pkg	Wire Dia.	Shielding Gas	Welding Parameters		
				Wire Ext.	Amps	Volts
121-G						
• 11423200	33 lb WB (15 kg)	.045" (1.2 mm)	98% Ar / 2% O ₂ or 75% Ar / 25% CO ₂	1/2 – 3/4" (13 – 19 mm)	175 – 200	22 – 26
121-O						
• 11408300	33 lb WB (15 kg)	1/16" (1.6 mm)	Open-arc or CO ₂	1/2 – 1" (13 – 25 mm)	205 – 255	24 – 28
• 11420600	50 lb PP (22.7 kg)	1/16" (1.6 mm)	Open-arc or CO ₂	1/2 – 1" (13 – 25 mm)	205 – 255	24 – 28
• 11086600	60 lb Coil (27.2 kg)	3/32" (2.4 mm)	Open-arc	3/4 – 1 1/4" (19 – 32 mm)	200 – 350	24 – 28
• 11087700	200 lb HP (90.7 kg)	3/32" (2.4 mm)	Open-arc	3/4 – 1 1/4" (19 – 32 mm)	200 – 350	24 – 28
• 11000500	60 lb Coil (27.2 kg)	7/64" (2.8 mm)	Open-arc	3/4 – 1 1/4" (19 – 32 mm)	200 – 350	24 – 28
• 11143700	110 lb QP (50 kg)	7/64" (2.8 mm)	Open-arc	3/4 – 1 1/4" (19 – 32 mm)	200 – 350	24 – 28

STOODY 100HC

STOODY 100HC is a high chromium-iron alloy recommended for applications subject to severe abrasion and moderate impact and heat. Develops very tight cross checking pattern and is frequently used in crushing applications. Generally limited to 2 layers although in the rebuilding of coal pulverizer rolls multiple layers can be applied using specific welding procedures. Deposits are not machinable or forgeable and can be used in hot wear applications up to 900°F (480°C).

Welding Procedures/Characteristics: DCEP (reverse polarity) recommended using either stringer or weave beads. Increased deposition can be achieved using straight polarity but weld soundness will suffer. Can be applied to carbon, low alloy, and manganese steels. Recommended for downhand welding only. When multiple layers are to be run, stringer beads must be run and deposit must have tight (3/8 – 1/2" [9.5 – 12.7 mm]) cross checking pattern in order to be successful.

Applications: Gyratory Mantles, Cage Pins, Scrubbers, Crusher Rolls

Nominal Composition:

Alloy Content – 34% (Chromium, Carbon, Manganese, Silicon, Molybdenum)
Iron Base

Typical Mechanical Properties:

Hardness:	
2 Passes on mild steel.....	58 – 62 HRC
2 Passes on Mang. steel.....	51 – 55 HRC
On carbon or low alloy steel: Slightly magnetic	
On Mang. steel: Non-magnetic	

Part Number	Pkg	Wire Dia.	Shielding Gas	Welding Parameters		
				Wire Ext.	Amps	Volts
• 11313400	60 lb Coil (27.2 kg)	3/32" (2.4 mm)	Open-arc	3/4 – 1 1/4" (19 – 32 mm)	200 – 400	26 – 30
• 11001000	60 lb Coil (27.2 kg)	7/64" (2.8 mm)	Open-arc	3/4 – 1 1/4" (19 – 32 mm)	200 – 400	26 – 30
• 11144100	110 lb QP (50 kg)	7/64" (2.8 mm)	Open-arc	3/4 – 1 1/4" (19 – 32 mm)	200 – 400	26 – 30
• 11141700	200 lb HP (90.7 kg)	7/64" (2.8 mm)	Open-arc	3/4 – 1 1/4" (19 – 32 mm)	200 – 400	26 – 30
• 11235400	500 lb POP (226.8 kg)	7/64" (2.8 mm)	Open-arc	3/4 – 1 1/4" (19 – 32 mm)	200 – 400	26 – 30
• 11867100	110 lb QP (50 kg)	1/8" (3.2 mm)	Open-arc	1 1/4 – 1 1/2" (32 – 38 mm)	400 – 550	31 – 34
• 11807700	500 lb POP (226.8 kg)	1/8" (3.2 mm)	Open-arc	1 1/4 – 1 1/2" (32 – 38 mm)	400 – 550	31 – 34

MODERATE TO SEVERE IMPACT & MODERATE TO SEVERE ABRASION

STOODY 101HC-G & 101HC-O

STOODY 101HC is a high chromium-iron alloy recommended for applications subject to severe abrasion and moderate impact and heat. Develops very tight cross checking pattern and is frequently used for applications involving severe metal-to-earth abrasion. Generally limited to 2 layers. Deposits are not machinable or forgeable and can be used in hot wear applications up to 900°F (480°C).

Welding Procedures/Characteristics: DCEP (reverse polarity) recommended using either stringer or weave beads. Can be applied to carbon, low alloy, and manganese steels. The small diameter (.045" [1.2 mm] and 1/16" [1.6 mm]) wires can be run out of position using relatively fast travel speeds and no oscillation. The addition of CO₂ shielding gas with the 1/16" (1.6 mm) diameter wire reduces the amount of spatter and improves its weldability for out of position work.

Applications: Scraper Sides, Cutters, Blades, Ripper Shanks and Teeth, Shovel Bucket Tooth Adapters, Clam Shell Bucket, Bucket Sides and Lips, Tillage Tools, Augers and Auger Flights, Conveyor Screws

Nominal Composition:

Alloy Content – 26% (Chromium, Carbon, Manganese, Silicon)
 Iron Base

Typical Mechanical Properties:

Base Metal	Layers	Hardness
.20% C	1	55 – 58 HRC
.20% C	2	62 – 64 HRC
Hardness:		
1 Pass on mild steel		55 – 64 HRC
2 Passes on mild steel		59 – 64 HRC
On mild steel: Slightly magnetic		
On Mang. steel: Magnetic		

Part Number	Pkg	Wire Dia.	Shielding Gas	Welding Parameters Wire Ext. Amps Volts
101HC-G				
• 11929200	5 lb PS-LLW (2.3 kg)	.035" (0.9 mm)	98% Ar / 2% O ₂ or 75% Ar / 25% CO ₂	1/2 – 5/8" (13 – 16 mm) 80 – 185 15 – 24
11933400	25 lb PS (11.3 kg)	.035" (0.9 mm)	98% Ar / 2% O ₂ or 75% Ar / 25% CO ₂	1/2 – 5/8" (13 – 16 mm) 80 – 185 15 – 24
• 11440300	10 lb PS (4.5 kg)	.045" (1.2 mm)	98% Ar / 2% O ₂	1/2 – 3/4" (13 – 19 mm) 150 – 200 22 – 26
• 11436300	33 lb WB (15 kg)	.045" (1.2 mm)	98% Ar / 2% O ₂	1/2 – 3/4" (13 – 19 mm) 150 – 200 22 – 26
• 11874600	50 lb PP (22.7 kg)	.045" (1.2 mm)	98% Ar / 2% O ₂	1/2 – 3/4" (13 – 19 mm) 150 – 200 22 – 26
11891500	300 lb NTP (136 kg)	.045" (1.2 mm)	98% Ar / 2% O ₂	1/2 – 3/4" (13 – 19 mm) 150 – 200 22 – 26
101HC-O				
11421000	10 lb PS (4.5 kg)	1/16" (1.6 mm)	Open-arc	1/2 – 1" (13 – 25 mm) 200 – 260 24 – 28
• 11304700	33 lb WB (15 kg)	1/16" (1.6 mm)	Open-arc	1/2 – 1" (13 – 25 mm) 200 – 260 24 – 28
• 11304800	50 lb PP (22.7 kg)	1/16" (1.6 mm)	Open-arc	1/2 – 1" (13 – 25 mm) 200 – 260 24 – 28
11865500	33 lb WB (15 kg)	5/64" (2.0 mm)	Open-arc	3/4 – 1 1/4" (19 – 32 mm) 225 – 375 24 – 28
• 11325200	50 lb PP (22.7 kg)	5/64" (2.0 mm)	Open-arc	3/4 – 1 1/4" (19 – 32 mm) 225 – 375 24 – 28
11849200	110 lb QP (50 kg)	5/64" (2.0 mm)	Open-arc	3/4 – 1 1/4" (19 – 32 mm) 225 – 375 24 – 28
• 11901700	500 lb POP (226.8 kg)	5/64" (2.0 mm)	Open-arc	3/4 – 1 1/4" (19 – 32 mm) 225 – 375 24 – 28
11862500	60 lb Coil (27.2 kg)	7/64" (2.8 mm)	Open-arc	1 1/4 – 1 1/2" (32 – 38 mm) 350 – 450 27 – 29
11861300	200 lb HP (90.7 kg)	7/64" (2.8 mm)	Open-arc	1 1/4 – 1 1/2" (32 – 38 mm) 350 – 450 27 – 29
11873200	500 lb POP (226.8 kg)	7/64" (2.8 mm)	Open-arc	1 1/4 – 1 1/2" (32 – 38 mm) 350 – 450 27 – 29

STOODY 100HD

STOODY 100HD is a high chromium-iron alloy developed for high deposition rate hardfacing of large surface areas for extreme abrasion resistance. It develops a very tight cross checking pattern. Stooddy 100HD is generally limited to 3 layers. Deposits are not machinable or forgeable and can be used in hot wear applications up to 900°F (480°C).

Welding Procedures/Characteristics: DCEP (reverse polarity) (electrode positive) recommended using stringer or weave beads. Multiple layers require stringer bead technique and deposits must show a tight (3/8" - 1/2" [9.5 - 12.7 mm]) cross check pattern.

Applications: Wear Plate Manufacturing, Crusher Roll Rebuilding, Large Tillage Tool Repair, Coal Pulverizer Rolls and Grinding Rings.

Nominal Composition:

Alloy Content – 36.5% (Chromium, Carbon, Manganese, Silicon)
 Iron Base

Typical Mechanical Properties:

Hardness: 55 – 62 HRC

Part Number	Pkg	Wire Dia.	Shielding Gas	Welding Parameters Wire Ext. Amps Volts
11848200	60 lb Coil (27.2 kg)	7/64" (2.8 mm)	Open-arc	3/4 – 1 1/4" (19 – 32 mm) 425 – 650 27 – 30
• 11501100	200 lb HP (90.7 kg)	7/64" (2.8 mm)	Open-arc	3/4 – 1 1/4" (19 – 32 mm) 425 – 650 27 – 30
• 11484500	500 lb POP (226.8 kg)	7/64" (2.8 mm)	Open-arc	3/4 – 1 1/4" (19 – 32 mm) 425 – 650 27 – 30
11905600	750 lb POP (340.2 kg)	7/64" (2.8 mm)	Open-arc	3/4 – 1 1/4" (19 – 32 mm) 425 – 650 27 – 30
11859000	60 lb Coil (27.2 kg)	1/8" (3.2 mm)	Open-arc	1 – 1 1/2" (25 – 38 mm) 450 – 650 30 – 34
11435900	200 lb HP (90.7 kg)	1/8" (3.2 mm)	Open-arc	1 – 1 1/2" (25 – 38 mm) 450 – 650 30 – 34
11489700	500 lb POP (226.8 kg)	1/8" (3.2 mm)	Open-arc	1 – 1 1/2" (25 – 38 mm) 450 – 650 30 – 34

Hardfacing Product Details

MODERATE TO SEVERE IMPACT & MODERATE TO SEVERE ABRASION

STOODY 100XHC

STOODY 100XHC is a high chromium-iron alloy recommended for applications subject to severe abrasion and moderate impact and heat. Develops very tight cross checking pattern and is frequently used in crushing applications. Generally limited to 2 layers. Deposits are not machinable or forgeable and can be used in hot wear applications up to 900°F (480°C).

Welding Procedures/Characteristics: DCEP (reverse polarity) recommended using either stringer or weave beads. Increased deposition can be achieved using straight polarity but weld soundness will suffer. Can be applied to carbon, low alloy, and manganese steels. Recommended for downhand welding only.

Applications: Backhoe Sidecutters, Clinker Grinding Rolls, Catalyst Piping, Crushers, Tool Joints

Nominal Composition:

Alloy Content – 34% (Chromium, Carbon, Manganese, Silicon, Molybdenum)
Iron Base

Typical Mechanical Properties:

Hardness:

1 Pass on mild steel.....	55 – 59 HRC
2 Passes on mild steel.....	60 – 66 HRC
1 Pass on Mang. steel.....	46 – 50 HRC
2 Passes on Mang. steel.....	51 – 55 HRC

On carbon or low alloy steel: Slightly magnetic
On Mang. steel: Non-magnetic

Part Number	Pkg	Wire Dia.	Shielding Gas	Welding Parameters		
				Wire Ext.	Amps	Volts
11370000	60 lb Coil (27.2 kg)	7/64" (2.8 mm)	Open-arc	3/4 – 1 1/4" (19 – 32 mm)	225 – 375	24 – 28
11384700	200 lb HP (90.7 kg)	7/64" (2.8 mm)	Open-arc	3/4 – 1 1/4" (19 – 32 mm)	225 – 375	24 – 28

STOODY CP-2000

STOODY CP2000 is a specially formulated chromium carbide alloy designed to produce a high concentration of uniformly distributed small primary chromium carbides in an austenitic matrix. The formulation has been optimized to result in superior weldability for a broad range of single and multiple layer applications. The high concentration of small primary carbides greatly improves wear resistance and toughness over conventional chromium carbide alloys. It can be applied to carbon, low alloy and manganese steels. In special applications such as coal pulverizer rebuilding, it can be applied to cast irons. The deposits can not be machined or forged and can be used in hot wear applications up to 900°F (480°C).

Applications: Pipe & Elbow ID Cladding, Hardface Plate Cladding, Gyratory Mantles, Multiple layer hardface build up application on Coal & Cement Pulverizer Rolls & Grinding Rings

Structure:

Primary Chromium Carbides in an Austenitic Matrix

Deposit Characteristic:

Hardness.....	58 – 64 HRC
Impact Resistance.....	Moderate
Surface Cross Check.....	Yes
Machinability.....	No
Magnetic.....	
on Carbon Steel.....	Slightly
on Manganese Steel.....	No

Part Number	Pkg	Wire Dia.	Shielding Gas	Welding Parameters		
				Wire Ext.	Amps	Volts
• 11907600	33 lb WB (15 kg)	.045" (1.2 mm)	Open-arc	1/2 – 3/4" (13 – 19 mm)	175 – 225	22 – 26
• 11886500	33 lb WB (15 kg)	1/16" (1.6 mm)	Open-arc	3/4 – 1" (19 – 25 mm)	200 – 250	24 – 28
12025100	400 lb NTP (181.4 kg)	1/16" (1.6 mm)	Open-arc	3/4 – 1" (19 – 25 mm)	200 – 250	24 – 28
11876600	50 lb PP (22.7 kg)	5/64" (2.0 mm)	Open-arc	1 1/4 – 1 1/2" (32 – 38 mm)	250 – 300	25 – 28
• 11890000	60 lb Coil (27.2 kg)	7/64" (2.8 mm)	Open-arc	1 1/4 – 1 1/2" (32 – 38 mm)	400 – 650	28 – 32
• 11870400	200 lb HP (90.7 kg)	7/64" (2.8 mm)	Open-arc	1 1/4 – 1 1/2" (32 – 38 mm)	400 – 650	28 – 32
• 11879800	500 lb POP (226.8 kg)	7/64" (2.8 mm)	Open-arc	1 1/4 – 1 1/2" (32 – 38 mm)	400 – 650	28 – 32
11870500	500 lb POP (226.8 kg)	1/8" (3.2 mm)	Open-arc	1 1/4 – 1 1/2" (32 – 38 mm)	450 – 650	29 – 33

STOODY 600

STOODY 600 is an open arc wire which produces a titanium carbide bearing deposit. It has excellent abrasion resistance, yet maintains toughness for good impact resistance. Stody 600 exhibits good operational characteristics and excellent slag removal when compared to other titanium carbide wires. It is particularly suited to high stress application such as cement clinker crusher rolls.

Welding Procedures/Characteristics: An open arc wire designed for DCEP (reverse polarity). It can be applied in multiple layers to carbon and low alloy steel as well as manganese.

Applications: High Pressure Cement Rolls, Bucket Lips, Muller Tires, Hammer Crushers, Tillage Tools, Chisel Plows, Tamper Feet, Hard Banding

Nominal Composition:

Alloy Content – 19% (Carbon, Manganese, Silicon, Chromium, Molybdenum, Titanium)
Iron Base

Deposit Characteristic:

Abrasion Resistance.....	Very Good
Impact Resistance.....	High

Mechanical Properties Typical Rockwell Hardness:

Hardness:

1 Layer on mild steel.....	59 HRC
2 Layer on mild steel.....	41 HRC
3 Layer on mild steel.....	37 HRC

Part Number	Pkg	Wire Dia.	Shielding Gas	Welding Parameters		
				Wire Ext.	Amps	Volts
• 11930300	33 lb WB (15 kg)	.045" (1.2 mm)	Open-arc	1/2 – 3/4" (13 – 19 mm)	150 – 225	22 – 26
11934300	200 lb HP (90.7 kg)	.045" (1.2 mm)	Open-arc	1/2 – 3/4" (13 – 19 mm)	150 – 225	22 – 26
• 11886600	33 lb WB (15 kg)	1/16" (1.6 mm)	Open-arc	3/4 – 1" (19 – 25 mm)	200 – 300	22 – 26
11928000	200 lb HP (90.7 kg)	1/16" (1.6 mm)	Open-arc	3/4 – 1" (19 – 25 mm)	200 – 300	22 – 26
11846000	60 lb Coil (27.2 kg)	3/32" (2.4 mm)	Open-arc	1 1/4 – 1 1/2" (32 – 38 mm)	300 – 400	25 – 27
11916600	500 lb POP (226.8 kg)	3/32" (2.4 mm)	Open-arc	1 1/4 – 1 1/2" (32 – 38 mm)	300 – 400	25 – 27
11814400	60 lb Coil (27.2 kg)	7/64" (2.8 mm)	Open-arc	1 1/4 – 1 1/2" (32 – 38 mm)	400 – 500	26 – 28
11929400	500 lb POP (226.8 kg)	7/64" (2.8 mm)	Open-arc	1 1/4 – 1 1/2" (32 – 38 mm)	400 – 500	26 – 28

MODERATE TO SEVERE IMPACT & MODERATE TO SEVERE ABRASION

STOODY 143

STOODY 143 deposit consists of primary chromium carbides and secondary Niobium carbides in an austenitic matrix. Deposits possess high abrasion resistance and maintain hardness up to 1100°F (590°C).

Welding Procedures/Characteristics: DCEP (reverse polarity) is recommended using stringer or weave beads. Can be applied to carbon, low alloy or manganese steels. Limited to three layers maximum.

Applications:

Coal and Steel Industry: Exhaust Fan Blades, Crushers, Coke Pusher Shoes, Wear Plates, Hoppers, Shoots and Screens

Cement and Refractory: Cement Screws, Cement Dryers, Hot Cement Cones, Cement Furnace Parts, Mixer Blades, Presses

Non-Ferrous Metals: Copper Ladels, Zinc Pots, Tin Mill Parts, Copper Bar Guides, Zinc Scrapers

Mining: Wear Plates, Excavator Bucket Teeth, Conveyor Screws, Slurry Pipes

Nominal Composition:

Alloy Content – 37% (Carbon, Chromium, Manganese, Niobium, Silicon)
Iron Base

Typical Mechanical Properties:

Abrasion Resistance..... Very Good
Impact Resistance..... Low
Hardness (3 layers)..... 60 HRC

Part Number	Pkg	Wire Dia.	Shielding Gas	Welding Parameters Wire Ext.	Amps	Volts
11877000	33 lb WB (15 kg)	1/16" (1.6 mm)	Open-arc	3/8 – 1/2" (10 – 13 mm)	170 – 220	24 – 26
11867800	60 lb Coil (27.2 kg)	7/64" (2.8 mm)	Open-arc	1 – 1 1/2" (25 – 38 mm)	280 – 550	28 – 32
11857800	500 lb POP (226.8 kg)	7/64" (2.8 mm)	Open-arc	1 – 1 1/2" (25 – 38 mm)	280 – 550	28 – 32

STOODY CP-2001

STOODY CP-2001 is a specially formulated chromium carbide alloy designed to produce a high concentration of uniformly distributed small primary chromium carbides and secondary niobium and vanadium carbide in an austenitic matrix. The formulation has been optimized to result in superior weldability for a broad range of single and multiple layer applications. The high concentration of small carbides greatly improves wear resistance and toughness over conventional chromium carbide alloys. It can be applied to carbon, low alloy, and manganese steels. In special applications such as tar sand slurry pipes, coal pulverizer rebuilding, it can be applied to cast irons. The deposits can not be machined or forged.

Applications: ID pipe & elbow cladding, Hardface plate cladding, Gyratory mantles, Multiple layer hardface build up application on coal & cement pulverizer rolls & grinding

Structure:

Primary Chromium Carbides and Secondary Niobium and Vanadium Carbides in an Austenitic Matrix

Deposit Characteristic:

Hardness..... 63 – 67 HRC
Impact Resistance..... Moderate
Surface Cross Check..... Yes
Machinability..... No
Magnetic
on Carbon Steel..... Slightly
on Manganese Steel..... No

Part Number	Pkg	Wire Dia.	Shielding Gas	Welding Parameters Wire Ext.	Amps	Volts
11931000	25 lb PS-LLW (11.3 kg)	1/16" (1.6 mm)	Open-arc	3/4 – 1" (19 – 25 mm)	200 – 250	24 – 28
11961200	60 lb Coil (27.2 kg)	7/64" (2.8 mm)	Open-arc	1 1/4 – 1 1/2" (32 – 38 mm)	400 – 650	28 – 32
11925000	200 lb HP (90.7 kg)	7/64" (2.8 mm)	Open-arc	1 1/4 – 1 1/2" (32 – 38 mm)	400 – 650	28 – 32
11923400	500 lb POP (226.8 kg)	7/64" (2.8 mm)	Open-arc	1 1/4 – 1 1/2" (32 – 38 mm)	400 – 650	28 – 32
11923300	500 lb POP (226.8 kg)	1/8" (3.2 mm)	Open-arc	1 1/4 – 1 1/2" (32 – 38 mm)	450 – 650	29 – 33

STOODY 145

STOODY 145 is a highly alloyed open arc wire with high abrasion resistance, high corrosion resistance and high hardness at elevated temperatures. The Stooddy 145 alloyed wire contains columbium (niobium), which contributes to its excellent high temperature abrasion resistance up to 1500°F (816°C).

Welding Procedures/Characteristics: DCEP (reverse polarity) is recommended using stringer or weave beads. Can be applied to carbon, low alloy or manganese steels. Limited to two layers maximum.

Applications:

Iron and Steel Industry: Guides, Sinter Plant Parts, Blast Furnace Parts, Slag Rakes, Hot Guide, Hot Ash Elbows, Exhaust Fan Blades, Crushers, Coke Pusher Shows, Hot Screens, Tilt Fingers, Hot Billet Handlers.

Cement and Refractory: Cement Screws, Cement Dryers, Hot Cement Cones, Cement Furnace Parts, Mixer Blades, Presses

Non-Ferrous Metals: Copper Ladles, Slag Ladels, Zinc Pots, Tin Mill Parts, Copper Bar Guides, Zinc Scrapers

Mining: Wear Plates, Excavator Bucket Teeth, Conveyor Screws, Slurry Pipes

Typical Mechanical Properties:

Abrasion Resistance..... Excellent
Impact Resistance..... Low
Hardness (2 layers)..... 59 – 61 HRC

Part Number	Pkg	Wire Dia.	Shielding Gas	Welding Parameters Wire Ext.	Amps	Volts
11944900	60 lb Coil (27.2 kg)	3/32" (2.7 mm)	Open-arc	3/4" – 1 1/4" (19 – 32 mm)	250 – 500	26 – 30
11414300	60 lb Coil (27.2 kg)	7/64" (2.8 mm)	Open-arc	3/4" – 1 1/4" (19 – 32 mm)	300 – 550	28 – 34
11484700	200 lb HP (90.7 kg)	7/64" (2.8 mm)	Open-arc	3/4" – 1 1/4" (19 – 32 mm)	300 – 550	28 – 34
11440200	500 lb POP (226.8 kg)	7/64" (2.8 mm)	Open-arc	3/4" – 1 1/4" (19 – 32 mm)	300 – 550	28 – 34
11949200	200 lb HP (90.7 kg)	1/8" (3.2 mm)	Open-arc	1 1/2" – 1 3/4" (38 – 45 mm)	400 – 600	32 – 34
11871300	500 lb POP (226.8 kg)	1/8" (3.2 mm)	Open-arc	1 1/2" – 1 3/4" (38 – 45 mm)	400 – 600	32 – 34

Nominal Composition:

Alloy Content – 45% (Carbon, Chromium, Molybdenum, Manganese, Niobium, Tungsten, Vanadium, Silicon)

Iron Base

Hardfacing Product Details

MODERATE TO SEVERE IMPACT & MODERATE TO SEVERE ABRASION

STOODY 130

STOODY 130 wire provides the ultimate wear resistance and the ability to cut earth formations because of the tungsten carbide particles contained in the wire.

Welding Procedures/Characteristics: To maximize the benefits of this open arc wire, the welding current should be kept to an absolute minimum. DCEP (reverse polarity) is recommended using stringer beads in a single layer; relief checks. Bonds readily to carbon and low alloy steels

Applications: Scoop Lips and Teeth, Ripper, Muller Plows Augers, Pug Mill Knives, Chisel Plow, Ammonia Injectors, Auger Flights, Cultivator Chisels, Ditcher Teeth, Swing Hammers, Ensilage Knife, Raymond Mill Plows, Tillage Tools of All Types

Nominal Composition:

Alloy Content – 60% (Tungsten Carbide)
Iron Base

Typical Mechanical Properties:

Hardness of Borium Particles..... 9.9 on Moh's Scale
On carbon or low alloy steel: magnetic
Not recommended for Mang. steel.
Not forgeable or machinable.

Part Number	Pkg	Wire Dia.	Shielding Gas	Welding Parameters		
				Wire Ext.	Amps	Volts
• 11413200	33 lb WB (15 kg)	1/16" (1.6 mm)	Open-arc	1/2" (13 mm)	90 – 120	18 – 24
11001100	60 lb Coil (27.2 kg)	7/64" (2.8 mm)	Open-arc	1/2" (13 mm)	120 – 150	18 – 24

VANCAR-O

VANCAR-O deposits contain vanadium carbides. Vanadium carbide is close to the wear resistance of tungsten carbide, with superior impact resistance. A unique feature of this product is that the vanadium carbides dissolve and reform in the deposit.

Welding Procedures/Characteristics: An open arc wire for DCEP (reverse polarity) welding that can be applied in multiple layers.

Applications: Ripper Shanks and Teeth, Dozer End Bits, Auger Bits, Tiller Tines, Dry Cement Pump Screw, Ammonia Injector, Pug Mill Knife, Cultivator Chisel

Nominal Composition:

Alloy Content – 29% (Vanadium, Tungsten, Carbon, Silicon, Manganese, Molybdenum, Nickel)
Iron Base

Typical Mechanical Properties:

2400 KHN (100g) Carbide Hardness
Deposits are magnetic.
Deposits cannot be flame cut
Various Carbides..... 8.9 – 9.5 Moh's Scale

Part Number	Pkg	Wire Dia.	Shielding Gas	Welding Parameters		
				Wire Ext.	Amps	Volts
11904300	25 lb PS (11.3 kg)	1/16" (1.6 mm)	Open-arc or CO ₂	1/2 – 3/4" (13 – 19 mm)	150 – 200	22 – 26
• 11420200	33 lb WB (15 kg)	1/16" (1.6 mm)	Open-arc or CO ₂	1/2 – 3/4" (13 – 19 mm)	150 – 200	22 – 26
• 11420100	50 lb PP (22.7 kg)	1/16" (1.6 mm)	Open-arc or CO ₂	1/2 – 3/4" (13 – 19 mm)	150 – 200	22 – 26
• 11333700	60 lb Coil (27.2 kg)	3/32" (2.4 mm)	Open-arc	1 – 1 1/4" (25 – 32 mm)	200 – 300	25 – 27

STOODY 160FC

STOODY 160FC deposit consists of tungsten carbide particles in a nickel silicon boron matrix. Due to higher tungsten carbide content, Stooddy 160FC is an ideal hardfacing overlay with a microstructure that delivers superior toughness and resistance to corrosion and fine particle erosion in slurry type applications. It also provides improved weldability through enhanced wetting, tie-in and arc stability.

Applications: Dredge Rotary Cutter Heads, Pipe ID & Filtering Screens, Drill Bits & Stabilizers

Deposit Characteristic:

Abrasion Resistance..... Excellent
Matrix Hardness Single Layer..... 38 – 45 HRC
Matrix Hardness Two Layer..... 40 – 50 HRC
Deposit Layers..... 2 Maximum
Surface Cross Check..... Depends on application
Machinability..... No

Part Number	Pkg	Wire Dia.	Shielding Gas	Welding Parameters		
				Wire Ext.	Amps	Volts
• 12022500	33 lb WB (15 kg)	1/16" (1.6 mm)	92% Ar / 8% CO ₂ or 75 – 80% Ar, Balance CO ₂	1/2 – 5/8" (13 – 16 mm)	130 – 200	17 – 18
12027100	50 lb PP (22.7 kg)	3/32" (2.4 mm)	92% Ar / 8% CO ₂ or 75 – 80% Ar, Balance CO ₂	1/2 – 5/8" (13 – 16 mm)	130 – 200	17 – 18

RECOMMENDATIONS FOR BUILD UP AND HARDFACING OF HIGH PRESSURE CEMENT CLINKER ROLLS

For years Stooddy has worked alongside end users to develop new alloys for the build up and hardfacing of High Pressure Cement Clinker Rolls. The alloys recommended for this are Stooddy ThermaClad Roll Build 3 for building up of worn rolls and or the buffer layers on new rolls. For the Hardfacing layers Stooddy 600 is recommended. ThermaClad Roll Build 3 is a high strength build up that produces a sound base for hardfacing. Stooddy 600 produces a tough, titanium carbide hardfacing, providing a combination of good wear resistance along with high toughness and impact strength.

Typical base metals of clinker rolls that are suitable for hardfacing are; AISI 4130, 4135, 4140, and 4142 type alloy steels. Base metals not recommended for build and hardfacing for this application are Ni Hard or High Chrome castings.

The following recommendations are based on in-shop repair facilities that can control preheat and interpass temperature and have automatic welding system suitable for continuous welding operation.

- **Hardfacing New Rolls:** Machine new roll to allow for two to three buffer layers of ThermaClad Roll Build 3 and three to four hardfacing layers of Stooddy 600.
- **Repairing Worn Rolls:** Remove old hardfacing by arc gouging. For best results use Arcair's N7500 automatic arc gouging system. After removing the old hardfacing, machine roll surface to sound, crack free base metal. Preheat and apply the ThermaClad Roll Build 3 build up materials to required dimensions, allowing for three to four layers of Stooddy 600 hardfacing. Note: During the build up phase it is recommended that you stress relieve every 1" (25 mm) of build up thickness.
- **Preheat:** 600°F (315°C) is recommended to apply the first layer of build up materials. Allowing 15 minutes per 1" (25 mm) of base metal thickness once roll face has reached preheat temperature for a thorough preheat.
- **Interpass Temperature:** Maintain 500°F (260°C) minimum for remaining buildup and hardfacing layers.
- **Base Metal Buildup:** Use stringer beads and a 50% overlap of prior bead. Apply ThermaClad Roll Build 3 using Stooddy R-20 submerged arc flux. (Use Data Sheet for Weld Parameters)
- **Hardface Layers:** Using stringer beads and a 50% overlap apply Stooddy 600 open arc wire, three layers in thickness of solid overlay with the fourth layer being a gripper bead pattern of choice.

Note: For best results it is recommended that each layer of Stooddy 600 be cleaned using needle gun and or wire brush. It is not necessary however to remove all the slag.

- **Weld Parameters:** For newest weld parameters please reference our product data sheets on each product. The roll rotation speed start point is 20 – 25 in/min (51 – 64 cm/min). Rotation speed should be adjusted to produce proper bead shape. Typical build up thickness is 1/8" (3.2 mm) per layer. After all welding operations are complete, slow cool roll down to 248°F (120°C) at a rate 92°F (33°C) per hour.
- **Hydrogen Soak Heat Treatment:** After roll has cooled to 248°F (120°C), reheat roll to 482 – 500°F (250 – 260°C) and hold for 7 hours. After hydrogen soak, allow roll to cool down at a rate of 92°F (33°C) per hour.
- **Stress Relieve Heat Treatment:** Heat roll at a rate of 92°F (33°C) to a temperature of 950°F (510°C) + 50°F (10°C) and hold for 2 hours. Slow cool roll down at a rate of 82°F (28°C) per hour.

Note: Flux exposed to high humidity conditions for long periods of time should be baked at 400°F (204°C) for three to four hours before using.

RECOMMENDATIONS FOR BUILD UP AND HARDFACING OF HIGH PRESSURE CEMENT CLINKER ROLLS

Tips for finishing roll edges without having to change position roll.

After welding the roll edges may require some additional work. The following are suggestions on how to dress up roll edges.

1. Remove excess weld metal and slag in the areas to be welded by grinding.
2. Using 7/64" (2.8 mm) or 3/32" (2.4 mm) Stooddy 600, reduce wire feed speed to 20 – 22 in/min (50 – 55 cm/min) and lower voltages 1 – 2 volts. Increase rotation speed to 40 – 50 in/min (101 – 127 cm/min).
3. Position weld head at a 45 degree angle to the area requiring build up. (See Figure 1).
4. Start first weld bead at lowest point. After each revolution, you will need to decide whether to index up or continue to stack weld beads. (See Figure 1) For best results always start at the bottom outside and index in.
5. With position capabilities, position roll for best results. (See Figure 2)

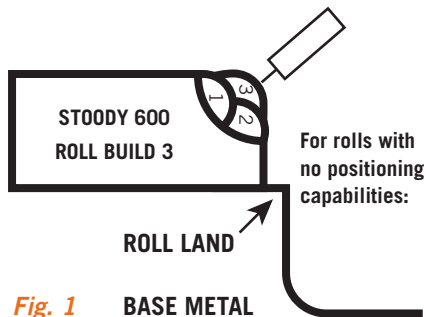


Fig. 1

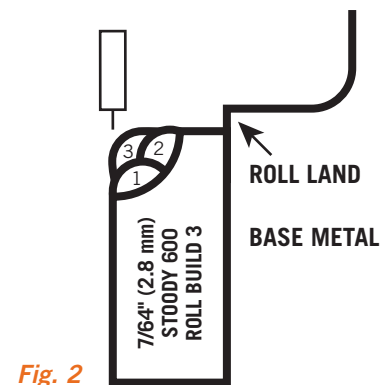


Fig. 2

End Capping Hardfacing:

End capping hardfacing (See Figure 3) is desirable to reduce wear on sides of the roll. This reduces spillage and material being trapped between the mill side wear plates, causing them to wear out prematurely.

Rolls with positioning capabilities. (See Figure 4)

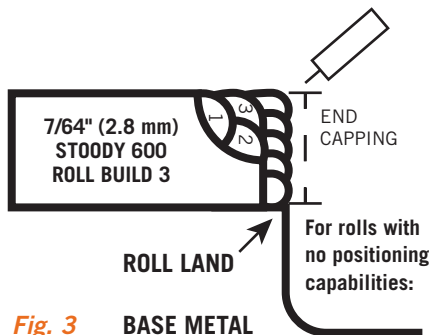


Fig. 3

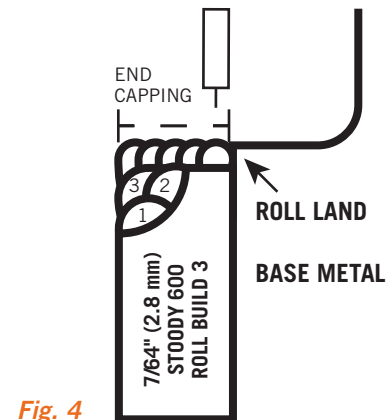


Fig. 4

CEMENT VERTICAL MILL AND CLINKER CRUSHER HARDFACING

For years now Stooddy has worked with contractors and directly with the cement plants across the world in Canada, India, Japan, China, Thailand, Vietnam and more to develop durable wear resistant hardface coatings for all types of wear applications in the manufacturing of cement. The primary lead application development was focused on hardface repair of the high pressure clinker crusher rolls systems and vertical raw material crusher rolls and grinding rings systems. This is an automated welding process using specialized hardface welding wire products applied with specialized automated equipment. The high pressure clinker crusher and the vertical raw material crusher rolls and rings are entirely two different applications when it comes to hardface material selections. In the following pages we will help guide you through these differences and the mechanics of these applications and the recommended hardface procedures.

Vertical Mill Crushers crushing raw materials for manufacturing of cement:

The Vertical Mills in a cement plant have two basic types of crusher component profiles, one having a tire shape roller riding in a U-Shaped grinding ring and the other have a conical shape roller riding on a tapered grinding ring. There are other type vertical mill profiles with different configuration but all operate similar.

The special multiple layer alloys used for this application are, Stooddy 100HC, Stooddy 100HD, Stooddy CP-2000 and Stooddy CP-2001. These 1st, 2nd, 3rd and 4th generation of alloys have been developed over the years offering a good balance between wear resistance and toughness to address differences in wear issues in the cement vertical mill crusher and also for the coal pulverizer.

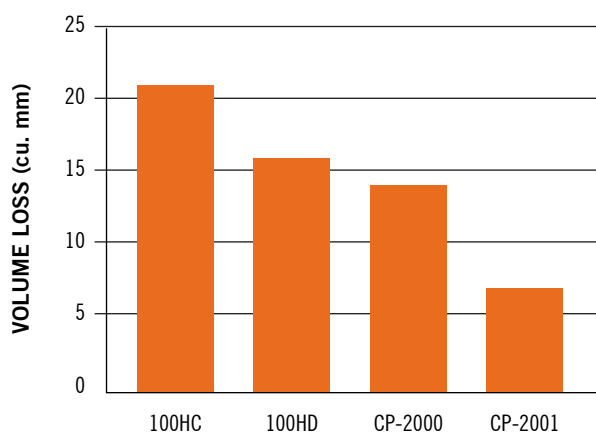
Stooddy 100HC is a first generation multiple layer chromium carbide hardfacing wire used for all types of coal pulverizer's and cement vertical mill crushers.

Stooddy 100HD is our second generation multiple layer chromium carbide hardfacing wire and became an industry standard.

Stooddy CP-2000 is our third generation multiple layer hardfacing wire and is a micro alloyed chromium carbide producing a high concentration of uniformly distributed small primary chromium carbides in an austenitic matrix.

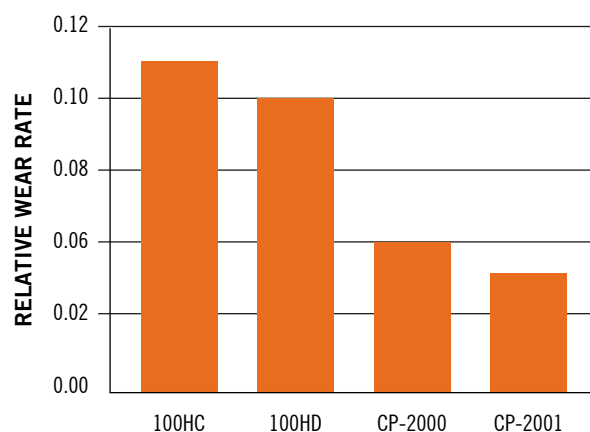
Stooddy CP-2001 is our fourth generation multiple layer hardfacing wire and is a micro alloyed complex chromium carbide producing a high concentration of uniformly distributed small primary chromium carbides with secondary niobium and vanadium carbides in an austenitic matrix.

ASTM G65 Procedure A / Wear Test Results



G65 Low Abrasion Tests,
Cr Carbide Wires

ASTM G99 PIN-ON-DISC TEST



High Stress Pin-on-Disc Tests

Alloy Applications Overview

CEMENT VERTICAL MILL AND CLINKER CRUSHER HARDFACING

Vertical Mill Roll and Grinding Ring Basic Recommendation for Rebuilding and Hardfacing

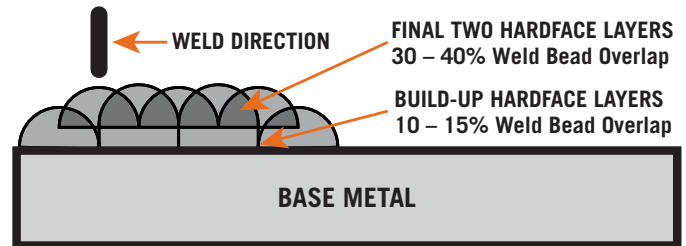
Basic Multiple Layer Hardfacing Rules:

To start let's review the basic rules for multiple layer hardfacing, keep in mind that all hardfacing's cannot be applied multiple layer, just the Stooddy hardfacing products listed in this section. For best results, apply stringer beads with 10 – 15% tie-in (bead overlap) for the hardface build up layers and tighten the tie-in to 30 – 40% for final two layers. This will reduce stresses in the coating and improve cross check patterns which is important for multiple layer hardfacing. Cross-checking cracks are perpendicular hairline fractures across the bead face 1/4" – 5/8" (6.4 – 16.0 mm) apart.

Preheat: When hardfacing Ni-Hard or ductile cast iron base metals, they should be preheated slowly to 200°F (95°C). This helps to reduce the amount of thermal shock the part experiences during the welding process and helps promotes a tighter cross-check pattern in the weld deposit.

Typical preheat time to temperature after roll face has reached 200°F (95°C) is one hour for every 1" (25 mm) thickness in base metal. Slow cool is still air after welding.

Interpass Temperature: Not to exceed 500°F (260°C)



Previously Hardfaced Grinding Rolls & Rings

If parts have been previously hardfaced you will need to inspect the hardfacing for soundness before welding. A simple test method is to strike the suspected area with a hammer and listen for a ring tone which indicates soundness or a dull thud sound indicating loose and unattached hardfacing. All loose hardfacing will need to be removed.

Another issue with previously hardfaced parts is that the old hardfacing will likely have cement dust embedded in the cross checks. One way to remove the cement dust is to remove a thin layer of the old hardfacing using an arc gouging process, then wire brush and reapply new hardfacing. Another way would be to apply 2 – 3 layers of Stooddy PR2009 over the old hardfacing which has a higher level of deoxidizer in the alloy formulation allowing the impurities to pass through the weld, reducing porosity and improving bonding of the new hardfacing.

Note: It is important to remove old hardfacing evenly so that the new hardfacing can be applied using a mechanized process.



CEMENT VERTICAL MILL AND CLINKER CRUSHER HARDFACING

- **Key to multiple layer hardfacing build up**, is to first select the proper hardfacing materials and then apply them using high speed stringer weld beads that produce a thin cross-check in a regular pattern ranging from 1/4" – 5/8" (6.4 – 16.0 mm) apart. The cross-checking in the weld overlay produces a self stress relieving action allowing for multiple layers of hardfacing to be applied without lifting or spalling.
- **Weld travel speed range** is 50" – 60" (13 – 17 cm) per minute. Adjust travel speed as required for changes in diameter or radius to maintain bead shape and dimensions.
- **Key to Good Cross Check Pattern**, is the weld bead shape. Convex type weld beads ranging from 5/16" – 3/8" (8 – 9 mm) in width and 1/8" – 3/16" (3.2 – 5 mm) in thickness produce the best cross check pattern. Caution: Heavy thick weld beads do not cross-check properly and will cause lifting and or spalling.
- **Minimum power source requirements** is a constant potential (constant voltage) power source with a minimum of 650 amps of continuous duty cycle.



Typical Welding Parameters

	Wire Diameter	
	7/64" (2.8 mm)	1/8" (3.2 mm)
Volts	28 – 31	30 – 32
Amps	375 – 550	450 – 650
Wire Feed Rate, per minute	100 – 220" (254 – 558 cm)	150 – 200" (381 – 508 cm)
IPM Travel	50 – 60" (127 – 152 cm)	50 – 65" (127 – 165 cm)
Preheat Temperature	200° F / 93° C	200° F / 93° C

Trouble Shooting Welding Process

- **Inconsistent weld bead:** Check wire feeder. Check travel speed. Check voltage and amperage settings.
- **Weld bead too flat:** Check and reduce voltage if required. Check and increase amperage if required. Check nozzle position.
- **Weld bead too ropy:** Check and increase voltage if required. Check and reduce amperage if required. Check nozzle position.

Packaging Details

COATED ELECTRODE SIZE	COATED ELECTRODE LENGTH	STANDARD SHIPPING CONTAINER WEIGHT	UNITS IN STANDARD PACKAGING	UNIT CONTAINER
3/32" (2.4 mm)	9" (231 mm)	30 lb (13.6 kg)	6	5 lb (2.27 kg)
1/8" (3.2 mm), 5/32" (4.0 mm), 3/16" (4.8 mm), 1/4" (6.4 mm), 5/16" (7.9 mm)	14" (356 mm)	60 lb (27.2 kg)	6	10 lb (4.54 kg)

PALLET WEIGHTS FOR STOODY® PRODUCTS	
ITEM	PALLET WEIGHT
Manual Rods & Electrodes	
10 lb (4.5 kg) Vacuum Packages	1440 lb (653 kg)
10 lb (4.5 kg) Boxes	1440 lb (653 kg)
60 lb (27.2 kg) Bulk Packages	1800 lb (816 kg)
<i>Note: Bare cast rods come in 5 lb (2.27 kg) tubes</i>	
Stainless Steel, Cobalt and Nickel Wires	
25 lb (11.3 kg) Spools	600 lb (272 kg)
33 lb (15 kg) Wire Baskets	792 lb (359 kg)
50 lb (22.7 kg) PP	1200 lb (544 kg)
60 lb (27.2 kg) Coils	1440 lb (653 kg)
Submerged Arc Wires	
33 lb (15 kg) Wire Baskets	792 lb (359 kg)
50 lb (22.7 kg) PP	1200 lb (544 kg)
60 lb (27.2 kg) Coils	1440 lb (653 kg)
500 lb (226.8 kg) POP	500 lb (227 kg)
110 lb (50 kg) QP	220 lb (100 kg)
200 lb (90.7 kg) HP	400 lb (181 kg)

PACKAGING	
5 lb and 10 lb plastic spools measure 2" I.D. x 8" O.D. 25 lb and 33 lb wire baskets measure 2" I.D. x 12" O.D. 50 lb Polypaks and 60 lb coils have 12" I.D.	
Packaging Abbreviations	
HP = Half Pak (200 lb)	PP = Polypak
LLW = Level Layer Wound	PS = Plastic Spool
NTP = No Twist Pak	QP = Quarter Pak (110 lb)
POP = Payoff Pak (500 lb)	WB = Wire Basket

METRIC CONVERSION CHART	
0.035" = 0.9 mm	7/64" = 2.8 mm
0.045" = 1.2 mm	1/8" = 3.2 mm
0.052" = 1.3 mm	5/32" = 4.0 mm
1/16" = 1.6 mm	3/16" = 4.8 mm
5/64" = 2.0 mm	1/4" = 6.4 mm
3/32" = 2.4 mm	5/16" = 8.0 mm
1 lb = 0.4536 kg	

Products marked by the " • " symbol are typically stocked items. All others manufactured upon customer request - may require a minimum quantity and/or may be subject to production lead time. Contact customer care or your sales representative with any questions.

WARNING Protect yourself and others. Before you use this product, read and understand this label, the appropriate Material Safety Data Sheet (MSDS), the manufacturer's instructions and your employer's safety practices. The MSDS is available upon request from your distributor, your employer.

HEAT RAYS (INFRARED RADIATION from flame or hot metal), from oxyfuel process can injure eyes.

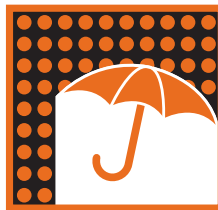
ELECTRIC SHOCK can kill. ARC RAYS can injure eyes and burn skin. FUMES AND GASES can be hazardous to your health.

- Keep your head out of fumes, the primary entry route for welding fumes and gases is by inhalation. Short-term over-exposure to welding fumes may result in fever, dizziness, nausea, or dryness or irritation of nose, throat or eyes and may aggravate pre-existing respiratory conditions. Long term over-exposure to welding fumes may harm your respiratory function and pulmonary function and may lead to siderosis (iron deposits in the lungs). Manganese over-exposure may affect the central nervous system, resulting in impaired speech and movement. OSHA considers chromium and nickel compounds carcinogens.
- Use enough ventilation and exhaust at the arc (flame) to keep fumes and gases from your breathing zone and general area. If you are concerned

about the ventilation of your work area, request that your employer conduct appropriate testing.

- This product contains or produces a chemical known to the state of California to cause cancer and birth defects (or other reproductive harm). (California Health and Safety Code 25249.5 et seq.)
- Wear correct eye, ear, and body protection.
- Do not permit electrically live parts to touch skin, clothing or gloves. Insulate your self from work and ground.
- IN CASE OF EMERGENCY: Immediately call for medical aid. Employ first aid techniques recommended by the Red Cross.
- See American National Standard Z49.1 Safety In Welding, Cutting and Allied Processes, published by the American Welding Society, PO Box 351040, Miami, FL 33135; OSHA Safety and Health Standards, 29 CFR 1910, available from the US Government Printing Office, Washington, DC 20402.

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The Quality System of
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requirements of ISO 9001

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