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Praxair and TAFE Arc Spray 13% Chrome Steel Wire - 60T

Material Review:

Made exclusively for arc spraying. Characteristics of the coating are its excellent wearing quality and fair resistance to corrosion. It is excellent all-purpose steel for basic machine element work.

Arc Spray 60T Chrome Steel wire can be sprayed with any Praxair and TAFE Arc Spray gun.

Arc Spray 60T Chrome Steel wire meets Department of Defense Specification MIL-W-6712C, Table I, Stainless Steel, Chrome and Rolls Royce's MSRR 9507/103 Specification.

CAUTION: All Praxair and TAFE wires have been optimized for arc spraying. Use of alternate wires usually cause problems such as excessive tip wear, spitting and feeding problems. We only recommend Praxair and TAFE Certified wires.

Application Review:

This is by far the most widely used reclamation spray wire because of its wear resistance and low shrink. Recommended when a hard coating requiring some corrosion resistance is desired. The high chrome content provides fair high temperature oxidation resistance and provides a fair amount of corrosion protection.

In addition, the chrome steel serves as an electrical resistance coating. Successful shop applications have been resurfaced journal sections, cylinder liners, pistons, crankshaft bearings, hydraulic rams, and numerous other machine elements.

Some electrical power stations use only this steel for repair work.

Composition:	
Carbon	0.3
Phosphorus	Trace
Sulphur	Trace
Manganese	1.0
Nickel	1.0
Chromium	12/14
Silicon	0.08
Iron	Balance
Coating Physical Properties	
Wire Size	1/16" (1.6 mm)
Deposit Efficiency	78 Percent*
Melting Point	2600°F (1427°C) (approx.)
Bond Strength	4730 psi (32.6 MPa)
Coating Texture (as sprayed)	Variable** (see next page)
Finish Texture (ground)	6-15 Microinches aa **
Hardness	R _{15n} 80-82 (R _c 40-43) Converted
Coating Density	6.74 gm/cc**
Coating Weight	0.035 lbs/ft ² /mil
Shrink	0.0018 in/in (cm/cm)
Coefficient of Thermal Expansion	6.6 x 10 ⁻⁷ in/in °F (1000°F)
Spraying (inert chamber with argon):	
Spray Rate	10 lbs/hr/100 amps (4.5 kg/hr/100 amps)
Coverage (wire consumption)	0.8 oz/ft ² /0.001" (0.98 kg/m ² /100 microns)
Spray Pattern****(approximate 8" standoff)	Cross Nozzle/Positioner - 1" (2.5 cm) vertical height x 1-3/4" (4.4 cm) width Slot Nozzle/Positioner - 2" (5 cm) vertical height x 1" (2.5 cm) width
Length of wire per lb	96 ft. (1/16")

* Depends on air pressure, standoff, nozzle cap and target size.

** 6" standoff, 40 psi - 8830, depends on air pressure - fine with high psi, average with medium psi, and rough with low psi.

*** For higher hardness increase air pressure to 60 psi or higher do this only in final passes where wear will occur.

**** Higher air pressures, smaller wire (1/16), and lower amperage with red nozzle cap gives smallest diameter pattern.

Spraying Procedure:

Coating Type				
	Normal 8830/8835	Arc Jet 8830/8835	Arc Jet 9000	9000
Atomizing Air Pressure:Primary Secondary	50 ^c ---	50 ^c 40 ^c	60 ^c 60 ^c	60 ^c ---
Nozzle Cap	Blue	*	Green	Green
Nozzle/Positioner	Short Cross	**	Long Cross	Long Cross
Arc Load Volts ^a	29-30	29-30	30-32	30-32
Amps ^b	50-300	50-300	50-300	50-300
Standoff Inches	5-7	3-5	3-5	5-7
Coating Thickness/Pass-mils	5	5	5	5
Coating Texture-microinches aa	200-350	150-250	150-250	200-350

Using excessive voltage reduces quality of coating. Voltage should be adjusted to give minimum noise and smooth arc operation. Excessive voltage causes larger particles and poor spray pattern. Too low a voltage will cause popping.

Be sure not to overheat substrate even if this means stopping to allow cooling, use air jet cooling if greater speed is required. Note that on some applications where preheating is tolerable, preheating work to 300°F can improve bond and deposit efficiency.

NOTE: Standard air caps and positioners can be used in 8830, 8835 or 9000 systems.

- * P/N 450729 8830 Arc Jet Air cap
- ** P/N 620074 Arc Jet Modified Short Cross (8830 & 8835)

^a -----
When using power lead extensions other than the normal 12 foot furnished, the voltage must be increased by approximately 3.4 volts per 50 foot extension; i.e. add 3.4 volts to the recommended voltage setting for a given wire if the extension is increased to a 50 foot length.

^b Can vary between 50-300 depending on size of workpiece and traverse speed.

^c For finer finish, raise air pressure at point of finish.

Use of Praxair and TAFE's 75B™ Wire as a Bond Coat:

In most applications Praxair and TAFE's 75B BondArc® wire eliminates the need for surface roughening. The following section outlines steps to be followed when using this material.

Note again that the 75B coating does not self bond on many non-ferrous materials and normal surface preparation must be used.

Clean the surface to a white virgin metal by grit blasting, grinding or polishing clean surface with emery cloth.

It must be a clean white metal surface free of grease, oil and handprints.

DO NOT HANDLE AFTER THE SURFACE HAS BEEN PREPARED.

1. Use short nozzle/positioner and blue nozzle cap.
2. Set spray pressure air at 50-60 psig (do this while air is "ON" or flowing).
3. Run at 150 amps at 30 load volts
4. Gun distance from work 3 to 4 inches.
- 5.
6. Move gun over surface uniformly to give coverage over complete surface.
7. Continue buildup with selected material using 50 psig spray pressure on console (this 50 psig is for general metallizing; for coarser coatings decrease 5 psig; for finer coatings increase 5 to 10 psig, depending on the finish required).

Finishing:

The coating is usually best finished by grinding. The user may experiment with carbide tools, which gives only a medium finish. The preferred method of i.d. work is to carbide turn leaving a 0.020" deposit for honing to finish size. If deposit is initially ground, leave 0.005 inches for honing. Grind with silicon or alumina wheel with particle size of 30-50.

Shop Experience:

Spray Parameters	
Amps:	150
Volts:	29
Atomizing Pressure:	60 psi
Nozzle Cap:	Blue
Nozzle/Positioner:	Short Cross

Spraying was done by hand.

The parts were returned to the machine shop for finishing.

Grinding Parameters:	
Machine:	Brown & Sharpe 6" x 18" surface grinder
RPM:	3600
Wheel Size & Type:	Norton 32A46-H8VBE 7" x 1/2" x 1-1/4"
Coolant:	IRMCO (International Refining & Mfg. Co.) #120 Spray Mist
Feed:	Manual
Depth of Cut:	0.0015" roughening 0.0005" finish

Results:

A 32 microinch aa finish was obtained from both wheel face and side. Spray material did not chip from base metal or show cracks from heat in grinding.

Hazards:

All chromium alloys produce hazardous fumes. While spraying, all personnel should be made aware of the need for proper respirator protection. Observe normal spraying practices, and proper air flow patterns. For general spray practices, see AWS Publication AWS C2.1-73, "Recommended Safe Practices for Thermal Spraying" and AWS TSS-85, "Thermal Spraying, Practice, Theory and Application". Thermal spraying is a completely safe process when performed in accordance with proper safety measures. Become familiar with local safety regulations before starting spray operations. DO NOT operate your spraying equipment or use the spray material supplied before you have thoroughly read the Praxair and TAFE Instruction Manual.

A Material Safety Data Sheet will be sent with each initial purchase and updated as required.

DISREGARDING THESE INSTRUCTIONS MAY BE DANGEROUS TO YOUR HEALTH.

The information provided herein is believed to be accurate and reliable; however, results may vary with workpiece preparation and operator technique. Praxair and TAFE warrants only that the wires are free of defects in material and workmanship. No other warranty is expressed or implied.



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