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## Praxair and TAFE Arc Spray High Carbon Steel Micromatrix-Composite Wire - 35MXC®

### Material Review:

Made exclusively for arc spraying, its characteristics are its resistance to wear and the ability to spray extremely rough, high profile, non-skid coatings, with significantly higher hardness properties. The bond strengths of arc sprayed 35MXC is superior to that of comparable high profile coatings of low- and high-carbon steel. 35MXC can be sprayed with any Praxair and TAFE Arc Spray gun.

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

### Application Review:

Anti-skid coatings have historically been applied by two commercial methods.

The first is a paint vehicle to hold abrasive particles. Such an approach limits the degree of roughness and corrosion protection.

The second method, arc spraying, involves the application of a rough coat of arc sprayed aluminum or high carbon 35MXC steel wire onto a metal substrate such as the deck of a ship, or a metal walkway.

For many years, manufacturers of walkway gratings have used low or high carbon steel wires to apply a non-skid coating. The new 35MXC material gives the ability to spray at a high spray rate, and produce extremely well-bonded high profile coatings. The 35MXC is a micromatrix-composite wire material, specially developed for this application, with significant advantages in terms of higher bond strengths, higher deposit efficiencies, and significantly higher hardnesses.

The coating can be galvanized, or top-coated with Praxair and TAFE 02Z Arc Sprayed zinc for corrosion resistance.

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## Procedures:

System I - in this case, a dense coating of 35MXC is applied to the steel for significantly higher bonding, followed by a rough anti-skid topcoat. Typically, 2 to 5 mils of 35MXC are applied, using the Praxair and TAFE Model 8830 or 8835 gun to obtain a dense, well-bonded coating. A second coat of 20 to 40 mils of non-skid material is then applied with special gun parameters.

System II - in this system, a one-step rough coating is directly applied without the bond layer; this system is used on certain substrates where adequate bond is achieved.

Application rates are calculated as follows:

$$\text{Anti-Skid Coat } 20 \text{ mils} \times 0.5 \text{ oz/ft}^2/\text{mil} \times 1/16 \text{ oz/lb} = 0.5 \text{ lbs/ft}^2$$

The cost of applying the coatings is as follows:

Metal Cost	\$4.50/lb
Anti-Skid Coating	$0.5 \text{ lbs/ft}^2 \times \$4.50/\text{lb} = \$2.25/\text{ft}^2$
Air & Electricity -	0.04
<b>TOTAL</b>	<b>= \$2.29/ft<sup>2</sup></b>

The above spray rates are wire consumption rates. In the case of anti-skid coatings, the spray rate at 350 amps yields 35 lbs/hr; i.e., 10 lbs/hr x 100 amps. Assuming 100% on-time, this yields an application rate of 140 ft<sup>2</sup>/hr at the rate of 350 amps with a 20 mil thick coating. This coating can be applied manually in small areas, but are best applied on large areas, using automated equipment.

## Surface Preparation:

Grit blast surface with 24-mesh aluminum oxide to a white, clean finish, using the pressure blaster. SSPC-5 or better is recommended.

Application Parameters	Anti-Skid Coat	Dense Wear Coat
Amperage	200-350	200-350
Volts	27-30	27-30
Nozzle Cap	Blue	Blue
Nozzle/Positioner (C=Cross; S=Slot)	Short C, S	Short C, S
Standoff	4 inches	5 inches
Air Pressure	15 psi	50 psi
Gun	8830 or 8835 (anti-skid module)	8830 or 8835
Wire Size	1/16"	1/16"
Thickness/pass	20 mils (on 1/4" substrate) for anti-skid coatings 2-5 mils for dense wear coatings	

NOTE: Air pressure, amperage (spray rate), coating thickness and standoff will vary with substrate thickness and roughness profile desired.

<b>Coating Physical Properties</b>	
<b>Wire Size</b>	1/16"
<b>Deposit Efficiency*</b>	90 Percent*
<b>Melting Point</b>	2500°F
<b>Bond Strengths*</b>	8420 psi (58.1 MPa) Blasted Surface
<b>Tensile Strength</b>	38000 psi (262 MPa)
<b>Coating Texture*</b>	Extremely Rough***
<b>Hardness* (superficial)</b>	15N 60-65
<b>Coating Density*</b>	6.78 gm/cc**
<b>Spraying:</b>	
<b>Spray Rate</b>	10 lbs/hr/100 amps (4.2 kg/hr/100 amps)
<b>Coverage (wire consumption)</b>	0.5 oz/ft <sup>2</sup> /0.001" (0.6 kg/m <sup>2</sup> /100 microns) - anti-skid coatings 0.9 oz/ft <sup>2</sup> /0.001" (1.10 kg/m <sup>2</sup> /100 microns) - dense wear coatings
<b>Spray Pattern (approximate 8" standoff)***</b>	Cross Nozzle/Positioner - 1 in (2.5 cm) vertical height x 1-3/4" (4.4 cm) width Slot Nozzle/Positioner - 2 in (5 cm) vertical height x 1" (2.5 cm) width

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

Be sure not to overheat the substrate even if this means stopping to allow cooling. Use air jet cooling, if greater speed is required.

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

\*\* Depends on atomizing air pressure, standoff, amperage.

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

## Hazards:

Observe normal spraying practices, respiratory protection and proper air flow patterns advised. For general spray practices, see AWS Publications 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 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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