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Issue: M11230  
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## Praxair and TAFE Arc Spray Zinc Wire-02Z

Made exclusively for arc spraying. Its primary uses are EMI/RFI shielding, capacitor end spraying and protective anti-corrosion coating for general oxidation resistance. Arc Spray 02Z Zinc is 99.99% pure, and is not contaminated in the arc spray process.

Arc Spray 02Z Zinc wire can be sprayed with any Praxair and TAFE Arc Spray gun.

Arc Spray 02Z Zinc wire meets Department of Defense Specification MIL-W-6712C, Table II, Zinc.

**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:

Traditional applications of zinc (along with aluminum) have been primarily for corrosion protection, both in the atmosphere and in the marine environment. For long term anti-corrosive applications, zinc should be covered with protective 5-8 mil layer of a suitable sealer in all but mild rural applications. Consult Praxair and TAFE for specifications. Typically a phosphate primer is sprayed directly on a freshly sprayed zinc surface followed by either a vinyl copolymer (colored or aluminum pigmented) or a coal tar epoxy, the latter for severest environments.

Zinc, sprayed as a coating, is much more pure than that achieved in the hot dip galvanizing process as it does not pick up the iron that occurs with immersion in molten zinc. Arc sprayed zinc is competitive in cost with plating or painting on all size elements but especially on larger elements when time and handling or location problems impose restrictions on the use of the traditional plating process; on smaller parts arc sprayed zinc provides better protection when they can be sprayed and finished by tumbling.

With a poor resistance to acids, zinc is not recommended for use in environments with a pH range below 6 and is much more resistant to corrosion with the use of hard water than with soft. A zinc coating has poor resistance in any water at temperatures above 140°F.

In addition, zinc is recommended as a primer for surfaces to be painted and for coating non-metallic matter for electrical conductivity.

Arc sprayed zinc coatings are popular and effective EMI/RFI shield for plastic electronic housings. They have higher dB ratings than conductive paints, higher bond strengths and do not flake or peel. Approximately 50 percent of the EMI/RFI coatings on the market are arc sprayed zinc.

Arc sprayed zinc is also used to spray large electronic Tempest rooms which house electronic gear. A special grade of this material is also used widely in spraying capacitors.

The material can be soldered to. The solder material which is used successfully in England is Ersin--Multi-Core, 60/40 tin lead alloy 366 flux (0.064" dia.). This material can be purchased from Multi-Core Solders, Ltd., Hemel, Hempstead, Hertz, England. Other sources are undoubtedly available.

Composition:	
<b>Zinc</b>	99.99 min.
<b>Copper</b>	0.004 max.
Coating Physical Properties	
<b>Wire Size</b>	1/16" (1.6 mm), 2.0 mm
<b>Deposit Efficiency</b>	70 Percent**
<b>Melting Point</b>	788°F (420°C) (approx.)
<b>Bond Strength</b>	1,224 psi blasted steel surface (8.4 MPa) 350-1000 psi blasted plastic surface (2.4-6.9 MPa)
<b>Coating Texture</b>	Variable*** (see next page)
<b>Hardness</b>	R <sub>15T</sub> 80-85 (R <sub>B</sub> 60-73 Converted)
<b>Coating Density</b>	6.36 gm/cm <sup>3</sup> (91%)****
<b>Coating Weight</b>	0.54 oz/ft <sup>2</sup> /mil = .66/Kg/m <sup>2</sup> /100 microns
<b>Shrink</b>	0.001 in/in (cm/cm)
<b>Coefficient of Expansion</b>	22.2 micro-in/in/°F = 331 micron/cm/°C
<b>Resistivity</b>	8.2 Micro ohms/cm (N <sub>2</sub> sprayed) 9.8 Micro ohms/cm (Air Sprayed)
Spraying:	
<b>Spray Rate</b>	21 lbs/hr/100 amps = (9.53 Kg/hr/100 amps)
<b>Coverage (wire consumption)</b>	0.9 oz/ft <sup>2</sup> /mil (approx.)* (1.10 kg/m <sup>2</sup> /100 microns)
<b>Spray Pattern***** (approximate 8" standoff)</b>	Cross Nozzle/Positioner - 1 1/4" (3.2 cm) vertical height x 2" (5 cm) width Slot Nozzle/Positioner - 2 1/4" (5.7 cm) vertical height x 1 1/4" (3.2 cm) width
<b>Length of wire per lb</b>	106 ft (1/16"), 66 ft (2 mm)

\* For grit blasted steel, depends on substrate material and deposit efficiency.

\*\* 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.

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

## Spraying Procedure:

These are starting parameters only. Optimum parameters will vary depending on application, utilities, environment, spray rate and equipment.

	Coating Type					
	Standard 8830/35	ArcJet 8830/35	Standard 8850	ArcJet 8850	Standard 9000	ArcJet 9000
Atomizing Air Pressure:Primary	60 <sup>c</sup>	50	60-75 <sup>c</sup>	60	60-75 <sup>c</sup>	60
Secondary	---	40		60	---	60
Nozzle Cap	Green	*	Green	Green	Green	Green
Nozzle/Positioner (Cross=†)	Long †	**	Long †	Long †	Long †	Long †
Arc Load Volts <sup>a</sup>	20-21	20-21	21-22	21-22	21-22	21-22
Amps <sup>b</sup>	50-300	50-300	50-300	50-300	50-300	50-300
Standoff Inches	3-10	3-10	3-10	3-10	3-10	3-10
Coating Thickness/Pass-mils	2-10	2-10	2-10	2-10	2-10	2-10
Coating Texture-microinches Ra	200-350	100-200	200-350	100-200	200-350	100-200

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, 8850 or 9000 systems.

\* P/N 450729

8830/8835 Arc Jet Air Cap

\*\* P/N 620074

Arc Jet Modified Short Cross (8830 & 8835)

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<sup>a</sup> 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.

<sup>b</sup> Can vary between 50-300 depending on size of workpiece and traverse speed.

<sup>c</sup> For finer finish, raise air pressure at point of finish.

## Finishing:

Most anti-corrosive coatings of sprayed zinc (as with aluminum) are put into service without additional machining. See Praxair and TAFE Bulletins on electrical shielding for more details and for special procedures when coating some plastics.

## Precautions:

Zinc fumes are toxic. While spraying, all personnel should be made aware of the need for complete respiratory protection.

## 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 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.

The dry collection of zinc, also must be done under controlled conditions because of the potential of fire hazards. Metallized dust and fume overspray, if collected dry or allowed to accumulate in large batches, can become a fire or explosion hazard. Consistent good housekeeping procedures should be adhered to. Do not allow large accumulations of dry dust in the spray booths or in other uncontrolled areas. If dry collection is used, consult Praxair and TAFE and other experts in the field relative to experience and recommendations.

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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