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## Model 8835 Electric Drive Arc Spray Gun

The purpose of this bulletin is to give a detailed description of the 8835 Electric Drive Arc Spray Gun, specifications, advantages, and service requirements.

The 8835 was developed as a high performance 350 Ampere gun. Modular design benefits you through highest performance, lowest cost, and expandability as your needs change - no need to worry about obsolescence.

Praxair and TAFE has developed a broad line of interchangeable arc spray gun components and flexible control units. This provides many benefits, especially the easy assembly of many different systems, each designed to do the job best.

The 8835 unit was developed as a precision spray rate, extra heavy duty, machine mounted, electric drive arc spray gun with capability to 350 Amps. Design features which include: rugged construction; exposed wire rollers for easy cleaning; four driven wire rolls which provide twice as much pull force on wires without damaging wire (this increases wire feed reliability dramatically), easy loading and unloading of wire; quick disconnect wire conduits for positive attachment, reduced maintenance; continuous operation capability; and oversized d.c. motor drive and control features are described in more detail later.

### Advantages of Electric Drive

- More constant spray rate
- Lower stable spray rate with most wires 40 ampere (4.0 lbs/hr with steel, 2.4 lbs/hr with aluminum).
- Positive, soft start throughout spray range.
- Designed for tool post mounting
- Motor controller is readily interfaced with automated systems.

- Electric motor can be mounted up or down to suit requirements.
- Remote control of spray rate (wire feed).



### Modular Design Yields

#### Optimized Coating Quality:

The 8835 gun is available with many spray configurations, as well as various spray pattern shapes. This optimizes coating quality with both low melt and high melt metals and gives the right coating density and finishability for each job.

#### Minimum Weight and Size:

The 8835 gun is normally a machine mounted unit and can be assembled from selected components to match the spray rate of the power unit. Result: minimum gun weight for each system.

## Optional Features

1. Model 839 Small Diameter Right Angle Spray Head: Available as an add on feature or a separate unit, the Model 839 can spray into pipes and small spaces only two inches in diameter with standard lengths of 1, 2 and 3 feet.. Consult factory for longer lengths, A Model 839S Straight Ahead Extension is also available (see Buletin 1.1.8.3)
2. Model 851 ArcJet® - high velocity attachment that minimizes spray stream width and maximizes velocity, producing dense coatings.
3. Longer Gun Leads: Extra length gun leads for operation in hard to get at places.
4. CE Version: Permits single point operation of torch with one switch. Permits integration into automatic systems.

## Spray Gun Specifics

The gun is rated at 350 Ampere, 100 percent duty cycle. NOTE: All Praxair and TAFE arc spray guns are designed so that the serrations produced by the wire drive rollers are on the top and bottom of the spray wires as they pass through the contact tips, while the actual electrical contact (rubbing on the tips) occurs at 90 degrees. This reduces contact tip wear considerably compared with competitive units, while maintaining a positive pull and push on the wire to maintain constant and reliable spray rates.

## Contact Tubes & Atomizing Systems

The purpose of the contact tip and tube are to transfer current to the wire, to direct the wire at the appropriate angle to the axis of the torch, and to precisely maintain the relative position of the wires.

The 8835 spray head system maintains a constant wire position, arc length, and atomizing gas geometry. Coating type (density, particle size, surface roughness, and finishability) are simply varied by selecting components and atomizing gas pressure.

Inexpensive contact tips are used to guide the wire into the arc region. These screw into contact tubes from the front of the gun thereby making tip change very rapid. Tips should be considered a consumable and changed regularly when 0.005 inch (125 microns) wear occurs. This consumable cost is very low and is a worthwhile expenditure to keep coating quality consistent; i.e., misaligned wires produce an erratic spray pattern and variable coating quality, hard starts, wire sizing, and less downtime.

## Wire Sizes

Praxair and TAFE recommends the use of 1/16 inch and 2 mm diameter wires. From our experience, this small diameter gives a more uniform particle distribution and a better looking, superior coating. It has been our experience that 11 gauge wire is more difficult to handle relative to stiffness when attached to the gun, increases tip wear, and gives a coarser coating with wider particle size distribution and subsequent poorer finishing characteristics. Because of this, and gun design characteristics, Praxair and TAFE does not recommend that 11 gauge wire be used in the 8835. The use of smaller diameter wire is possible - consult factory.

## The Control Console

The 8835 control console regulates the atomizing air, wire feed rate (amperage), voltage, and the on/off sequencing of the gun. The console gauges display amperage and voltage and the air pressures for primary and ArcJet air. Control knobs regulate wire feed rate (amperage), the voltage, and air pressures. An emergency stop with a lock allows operators to perform maintenance on the gun or power supply without anyone operating the system remotely.

The control console is maintenance free with reliable PLC based circuitry. The PLC constantly monitors all functions of the console and gun and wire feeds for safe, consistent spraying.



**8835 console**

Optional cables allow the control console, the gun, and the wire drive unit to be as much as 100 feet [30.5m] away from the power supply.

## Wire Drive

A single electric wire drive motor is furnished for all applications. The specific motor shipped as standard on the 8835 rotates at a high speed and through a reduction gear, reduces to a roll speed range which permits 1/16 inch wires to be sprayed over the range of amperages permissible in the gun (40 to 350 Ampere) with wire feed rates of 0 to 3120 ft/hr with controlled adjustable pull force on wire.

### Wire Feed Unit

This unit uses a proven, double yoke system which retains constant mesh of all gearing, both in the open and closed position. Ball and needle bearings are used throughout. The wire is easily fitted into the gun. The infinitely variable roller tensioning mechanism is controlled by a simple thumb operated lever. Specially designed and hardened rollers contact the wire, give long life and are simply replaced. Roller covers protect this area from dust yet are easily removed. All four wire drive rollers are driven, providing twice as much wire pull and push force without damaging wire, thereby dramatically increasing wire feed reliability. Both drive rolls open. This assures centering of all wire diameters in wire guides.

## Arc Shield

A permanent arc shield is built into the gun to shield the operator from arc radiation (arc temperatures reach 4000°C (7232°F) at the point where the two wires meet). With such a shield, the operator needs to wear only tinted safety glasses. (Many plastics do not screen out ultraviolet rays which gives eye burn - use glass). This shield is made only long enough to do an adequate job of shielding the operator. Caution must be used when spraying on reflective surfaces; in such applications wear tinted glass safety glasses with side shields - follow all safety procedures outlined in the 8835 Instruction Manual.

## Counter Weight

An adjustable counterweight hook is available to almost eliminate gun weight (see Part Number 450585).

## Amperage Rating of Gun

The maximum continuous amperage rating (100 percent duty cycle) of the 8835 gun is 350 Ampere. The following table indicates the spray rates as a function of wire type and amperage.

Spray Rates for 8835 Gun	
	Lbs/hr/100 Amps
Steel	10
Aluminum Bronze	9
Bronze	11
Copper	11
Cored Wires (Nickel Alloys)	8.5
Aluminum	6
Zinc	24

## Advantages of Arc Spray over Combustion

- The arc spray is a far more simplified system for reproducibility. If the air pressure is kept constant with proper regulation and the amperages set (indicating constant wire feed), then one can always reproduce the same melt power and coating conditions. This is not the case with a combustion gun which involves adjustment of flame intensity, oxy/fuel ratio, etc.
- The arc spray gun is an instant on/off device. When the wire feed switch is activated one immediately begins to spray at the proper rate. In addition, there is no need to allow the wire to pass through the gun after the flame is shut down to assure that plugging of tips does not occur.
- The arc spray gun is very reproducible from operator to operator and Friday night to Monday morning. There is only one setting. When the system is shut down, you do not need to readjust any of the air flow, current, or wire feed settings. Thus, when the unit is started up, exact settings are reproduced.
- All of the above characteristics of the arc spray gun lead to less operator judgment and, therefore, more reproducible coatings.
- Because the arc spray melts the wire with an electric arc, a higher particle temperature is achieved and one is guaranteed of complete melting. This results in higher bond strengths with the higher melting point materials--with most materials, two and one-half times that of a gas gun.
- Considerably less energy is consumed by the Arc Spray gun (1/9th that of a gas gun). This combined with instant on/off results in considerable cost savings.

## Spray Settings and Coating Selection

For specific spraying details, amperage levels, coating properties, standoffs, etc. See Wire Bulletin Series 1.9.1.2-.

For further details on coating selection, surface preparation, use of bond coats and other useful application and spray knowledge -- See Bulletin 2.1.1.1.

Patented Atomizing System Produces Denser, Higher Quality Coatings at Lower Air Pressures and flows

**NOTE:** The Model 8835 arc spray gun can reproduce optimum spray patterns for each wire type and thus produce the highest quality coating with the highest density and bond strength. The basic design is keyed to the smallest diameter wires and operates under the lowest possible air pressure and flow rates with low to moderate amperage (spray rates) for each application; i.e., the gun setup is tailored to the specific coating properties.

For example, by using the finest spray setting with 1/16 inch (1.6 mm) aluminum, a dense, smooth coating can be laid down at very reasonable air pressure (40 psi). This lower pressure reduces noise and increases deposit efficiency, while maintaining a consistent coating quality. Finer, denser coatings can be achieved by increasing spray pressures. Fineness and density of the coating can be varied by adjusting console spray pressure and nozzle cap diameter.

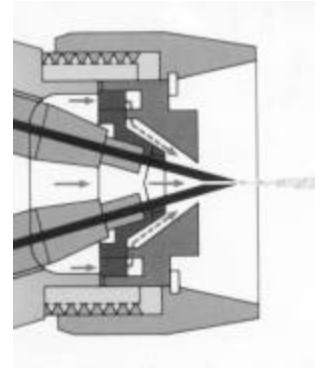
Low pressures give coarse coatings; exceptionally low pressures in the range of 15 psi produce very rough coatings with 1/8 inch (3.2 mm) peak-to-valley coating roughnesses. With pressures above 45 psi; for example, 80 psi, the 8835/350/350 system gives extremely fine particle size distribution, densest coatings, and smoothest coating surfaces.



1-7/8" Inside Diameter Spray Attachment  
Model 839 Mounted on 186 Movement

The spray pattern shape can be varied by changing the nozzle/positioner insert in the spray head. The slot orifice gives an oval pattern, while the cross nozzle/positioner produces a circular pattern. Either spray pattern shape can be made fine or coarse by adjusting pressure and nozzle cap diameter as discussed previously.

Again, See specific Wire Bulletin Series 1.9.1.2-) for detailed settings for each wire and dimensions of spray patterns.



**Nozzle Assembly**

**NOTE:** Extreme care should be exercised when changing pressures and nozzle caps from those recommended because coating properties such as hardness, bond strength, oxide content, finishability, density and deposit efficiency can vary widely from the optimum. When in doubt, run test coupons.

## Noise Level

The noise level from these devices is related to air flow, amperage, and material sprayed. At 350 Ampere, decibel ranges of 102-105 are achieved. However, as the amperage is reduced, noise level is reduced. With prolonged exposure to the gun, the operator should wear ear protection. **NOTE:** Different atomizing heads, air pressures, and wires also influence sound level.

See Instruction Manual for details. Operation is simple and initial operator training takes less than one hour. Wire Bulletin Series 1.9.1.2- gives specific spraying conditions.

## Operation

Generally, the arc spray coatings appear dense and quite attractive to the experienced eye. Consult Praxair and TAFE for more detailed information, demonstration, and recommendations on specific applications. Praxair and TAFE operate a complete coatings laboratory, including metallurgical analysis for new coating application development.

## Spray Pattern

With 8 inch standoff, two patterns are possible: 1" (2.1 cm) x 1 3/4" (4.4 cm) width or 2" (5 cm) x 1" width. For special patterns e.g., 1/4" diameter - consult factory.

## Service Requirements

Compressed Air: 50 cfm at 60 psig, 68 cfm with the Model 851 ArcJet attachment. Air should be free from foreign matter and moisture. Actual flow 30 cfm at 35 psi, 42 cfm at 50 psi, 58 cfm at 70 psi.

Voltages: 230/460/575 volts 60 Hz. and 220/400 volts 50 Hz.

System Specifications							
System	DC Amperes (Max)	Typical Spray Rate lbs/hr		Air (scfm)	Gun Weight lbs	Power Unit lbs	Dimensions System W"xH"xL"
		Steel	Zinc				
8835	350	4-35	6-84	2050	8.7	345	16¼x42x30¼



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