Solar Photovoltaic Thin Film Spray Coating and Drying Equipment

Argus 9524S Single-Sided HVLP Spray Unit

Argus International has provided spray equipment to customers around the world for a variety of applications. Now, Solar Panel Manufacturers turn to Argus for Thin Film Spray Technology.

Applications include spraying primary resist, cadmium chloride, copper acetate, and several other sprayable chemistries used for solar panel processes. The 9524S can spray solar panels ranging from 6 to 24 inches wide with an optional maximum width of 26.5 inches. Panels of any length are coated precisely, with controlled thickness and uniform coverage. The wide operation window, user-friendly touch screen interface, and simplicity of access for cleaning and maintenance make the Argus 9524S Single-Sided HVLP Spray Unit an excellent choice for Thin Film Coating.

Argus International's spray technology has been proven by our customer base to be superior to other methods of spray coating applications. A single traversing spray head enhances efficiency by reducing setup time and machine maintenance. High Viscosity Low Pressure (HVLP) Heated Gun Technology allows use of high-solids for increased efficiency, less material waste, and minimized environmental impact.

Argus 9524S Single-Sided HVLP Spray Unit	
Function	Thin Film Spray Coating System
Major Features	Precise Heated Spray Gun Control and Technology Single Spray Head for Uniform Spray Control - No Multiple Gun Balancing Minimal Overspray for Less Material Waste Precise Thin Film Spray Coating Control on Any Surface Exhaust Flows in the Direction of Spray for Optimal Spray Efficiency Rugged Conveyor Designed to Withstand and Convey Heavy Materials 10.4 Inch Operator Touch Screen Command Center Built-in Window Ports on Both Sides to View Spraying Process Easy Accessibly of Parts for Convenience in Cleaning and Maintenance
Panel Size	6 to 24 Inches Wide by Any Supported Length Optionally up to 26.5 Inches Wide Per Customer Request
Oven Integration	Integrates with **Argus 9724 Cross-Convection IR Drying Ovens**

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The Argus 9524S Single-Sided HVLP Spray Unit utilizes advanced spray technology to apply uniform coatings to solar panels. This is accomplished by sweeping the heated gun across the solar panel at high speeds as the solar panel passes through the spray chamber on a continuously moving edge-contact conveyor. This provides an efficient, reliable system which minimizes over-spray and produces a continuous, conveyorized throughput of the coated solar panels.

Key Benefits:

- Heated Spray Gun Technology has improved the ability of HVLP systems by reducing the usage of solvent as a Volatile Organic Compound (VOC) component.

- Settings are retained for stable processes even with operational stops or unexpected interruptions.

- Auto-Mode feature for automated controlled horizontal production lines.

- Typical spray operation provides 140 to 150 square feet of 1 mil thick dry coating per kilogram of spray material; this easily equals or exceeds the efficiency and economy of other methods of application.

- Simplicity of setup, speed of operation and uniformity of performance are supported by the single spray gun system. The 9524S is not subject to multiple gun spacing, placement, adjustment and pattern problems that can lead to inconsistent coating thickness. Our HVLP conveyorized spray does not require ultrasonic atomization.

- English Language with English Units comes standard with the touch screen controls. Upon customer's request, English Language with Metric Units is available as an option, and a secondary language can be installed with English Language with Metric Units; such as, Chinese, Danish, German, Italian, Russian and Spanish. Other secondary languages can be available upon customer's request.

- Machine can be CE compliant upon customer's request.

Please contact Argus International to confidentially discuss your production plans.

9724 Cross-Convection IR Drying Oven

Argus International spray technology has been proven superior to other methods. Our primary goal was to produce a spray system and a drying oven which could be linked through compatible conveyor systems to form a time and labor-efficient unit and to **eliminate the handling of wet panels**. A single, traversing spray head also increases efficiency by reducing setup time, and decreasing both machine cost and maintenance. HVLP-Heated Gun Technology allows use of high-solids for spraying for increased efficiency and minimized environmental impact.

Argus drying technology provides a major breakthrough in reduction of drying time. Typical convection systems require 35 to 45 minutes to dry coatings; the 9724 3 Zone Drying Oven reduces it to 3 or 4 minutes, and 9724 5 Zone Drying Oven reduces it to 6 or 7 minutes.

Argus 9724 Cross-Convection IR Drying Oven		
Function	3 Zone IR Drying Oven	5 Zone IR Drying Oven
Major Feature	Under 4 Minutes Drying Time	Under 7 Minutes Drying Time
Panel Size	6" to 24" Wide by any Supported Length	

The 9724 IR Drying Oven is designed to quickly and efficiently dry thin-coated solar panels. The unit consists of three individually controlled long-wave infrared heater zones, a forced-air circulation system, and a conveyor to move the boards through the oven. This highly innovative technology, developed by Argus International, provides a breakthrough in significantly reducing the drying time of coated solar panels. While convection-only ovens rely on air to transfer heat, the 9724 directly heats the panel with IR radiation and provides forced air circulation. This technique lowers the normal drying time from 35-45 minutes to 3-4 minutes, which represents about a 1200% improvement in drying efficiency!

Solar Photovoltaic Thin Film Spray Coating and Drying Equipment

Key Benefits:

- Traditional convection ovens use electric coils to heat the air; the air moves around and heats the coating; eventually the coating heats the substrate. Once the substrate gets hot enough to not heat-sink the coating, the coating dries from the outside.

- The Argus IR Drying Oven employs 5 to 8 micron IR emitters that directly transmit energy to the densest material, in this case the solar panel. Some residual heating occurs because the air and coating are between the emitter and the solar panel, but the bulk of the energy is absorbed by the panel. This means that the coating predominantly dries from the inside; that is, the junction between the solar panel and the coating, thus increasing the drying rate while reducing skin formation and solvent retention. Forced air circulation in the 9724 then rapidly removes the evaporated solvent from the solar panel surface.

- The real benefit to acquiring the complete 9000 Thin Film Coating System is that it allows the machines to be linked together so that application becomes a load-unload operation, **without handling of wet panels**. By placing equipment end to end, boards may be loaded at the entrance of the 9524S Spray Unit and removed at the exit of the 9724 Drying Oven just minutes later, fully coated and dried.

- With the PC9000 System, conveyor speeds of 4 feet per minute gives excellent production rates and provides economic benefits.

- Optional additional set of two heater zones to form a 5 Zone Drying Oven.

- English Language with English Units comes standard with the touch screen controls. Upon customer's request, English Language with Metric Units is available as an option, and a secondary language can be installed with English Language with Metric Units; such as, Chinese, Danish, German, Italian, Russian and Spanish. Other secondary languages can be available upon customer's request.

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