

How a Rotary Bell Atomizer Works

The ProBell is a rotary atomizer that's used in automated finishing processes. Three areas of ProBell operations include:

- Air and fluid flow through the applicator
- Spraying, cup washing and purging
- Electrostatics

Air and fluid flow through the applicator

Three fluid lines are connected to the ProBell: the fluid supply, the solvent supply, and the dump line. There are also nine airline connections for various functions, such as triggering valves, bearing air and shaping air.

A low-voltage cable supplies low voltage to the power supply. A magnetic pickup monitors the speed or rotational speed of the turbine.

The air bearing supply should be set between 70 and 100 psi. It should be on all the time to keep the bearing in a floating condition.

The turbine is a match-fit to the air bearing, so there's a dimensional tolerance that will require a clean, dry air supply. See manual 334452 for the specific requirements.

The bearing air has a return line that provides a pneumatic signal back to the controller pressure switch, so the controller has verification that the air supply to the air bearing is active and ready for operation.

The inner shaping airflow captures and propels the paint towards a part being painted.

The outer shaping airflow assists in bringing the pattern together to help define the pattern shape and improve the transfer efficiency.

Dual shaping air provides a higher degree of pattern control, pattern adjustability, and makes it easier to paint into small spaces and corners.

Turbine air is used to drive the turbine at a rotational speed, ranging from 10,000 to 60,000 rpm (revolutions per minute). A valve-to-piston (V-to-P) ratio is used to adjust this airflow to the turbine to maintain the program speed.

Brake air is used to reduce the speed of the turbine for fast speed changes. The magnetic pick up sensor monitors the rotation of the turbine, providing feedback to the controller by fiber optics.



Spraying, cup washing and purging

During spraying, an air signal goes to the paint valve, and the paint valve becomes active. The paint travels through the topside of the dump valve, through the paint valve, and continues on out to the bell cup. The rotation of the bell cup, with the assistance of the inner and outer shaping air, then creates atomization.

For a cup wash, the paint valve is shut off, and an air signal is sent to the solvent valve. When a solvent valve is triggered, solvent goes to both the inside of the cup and the outside of the cup. The bell cup continues rotating to assist in the wash.

For the paint line purge, the paint and solvent valves are shut off. An air signal triggers the dump valve to go active. Solvent from a feed source, such as a color change valve or a proportioner's purge sequence, flushes the fluid line. Once the fluid line is clean, then the paint valve can be triggered to flush the bell cup.

Air from an outside source, such as a color change valve, can be introduced to remove the solvent from the gun in preparation for service. If a service is not required, solvent can be left in the system.

Electrostatics

The electrostatics operation of the ProBell includes these steps:

- When loading the ProBell with paint, the electrostatics must be off.
- Once paint is loaded out to the bell cup, the electrostatics can be turned on.
- The controller sends a signal to the ProBell's internal power supply through a low-voltage cable.
- The power supply then amplifies the signal up to 100 kV or 100 kilovolts.
- The high voltage is sent to the turbine, the air cap, and the bell cup.

When the electrostatics are turned off, the high voltage power is bled back to the power supply's internal resistor.

For more information on the ProBell rotary atomizer, visit graco.com/probell or contact your local distributor.