

Choosing the Right Liquid Spray Technology

When purchasing liquid spray equipment, choosing the best technology for your application is key. And because there are many factors that should be taken into consideration when making this decision, it helps to understand the advantages and differences between Air Spray, Airless or Air-Assisted Airless technologies.

Air Spray

Air Spray uses a low-pressure fluid stream that is mixed with compressed air at the aircap to atomize material in a controlled manner. It's used for the application of low to medium viscosity fluids for products requiring a high quality, Class A or decorative finish.

Due to changing requirements for environmental regulations, different versions of Air Spray technologies have been developed:

- **Conventional** is the traditional form of Air Spray technology and delivers the highest finish quality and production speeds. To achieve these advantages, a lot of air is used, resulting in low transfer efficiency.
- **High Volume, Low Pressure (HVLP)** was developed for EPA regulated areas. To meet the regulation, the amount of air used is limited to 10 psi at the aircap. The result is a low velocity pattern with good finish quality and higher transfer efficiency than Conventional.
- **Compliant** technology is commonly referred to as Low Volume, Medium Pressure (LVMP) and was developed to meet European standards. This requirement means



that the air pressure cannot exceed 29 psi at the air inlet. This allows for an aircap design which delivers a high finish quality while achieving transfer efficiency that is equal to or better than HVLP.

There are three options for supplying fluid to an Air Spray gun:

- **Pressure-feed guns** are usually fed through a hose from a low pressure pump or a pressure tank. This option is used in industrial applications that need to move large amounts of fluid through the system.
- **Gravity feed guns** have a cup mounted above the centerline of the gun and gravity enhances the fluid flow. They are best suited to jobs using smaller quantities of fluid, like touchup or repair.
- **Suction feed guns** have a cup mounted below the front of the gun. The suction is created by air flowing from the aircap which draws fluid from the cup to the fluid nozzle. This option is used for handling small amounts of fluid, frequent small volume color changes and low production rates.

Airless

Airless spraying uses a high-pressure fluid supply for atomization without the use of compressed air, only fluid pressure. It's used for medium to high viscosity fluids, delivers

a lower finish quality and is ideal for speed and transfer efficiency.

Airless spray atomization is created by hydraulic force pushing material through an orifice. As the fluid exits the orifice, friction between the fluid stream and atmosphere disrupts the stream into small particles. The tip size and pressure is what determines the material flow rate. High pressure is used to create a complete pattern, therefore, the higher the material viscosity, the more pressure required.

Air-Assisted Airless

Air-Assisted Airless uses a high-pressure fluid supply for atomization and compressed air at the cap for pattern control. It's used to spray medium to high viscosity fluids and delivers a finish quality that is better than Airless, but not as high quality as Air Spray.

Air-assisted airless spray atomization is created by hydraulic force, which is less than airless so it atomizes the center of the pattern. A fluid tip is used to determine the pattern size and fluid flow rate. Air is then applied to assist in filling out the pattern. An aircap is used to complete the spray pattern and eliminate the tails.

Air-assisted airless solves many problems that arise with the use of high-viscosity and high-solids coatings, and issues associated with heating and using higher fluid pressures to aid in the atomization of more viscous materials. Many waterborne materials require the higher fluid pressure of air-assisted airless. The lower pressure and the air-assist create finer atomization for a finer finish than airless.

Summary

Overall, there are advantages and disadvantages to each spray technology. Air Spray is best for products requiring a high quality, Class A or decorative finish, but doesn't have a very good transfer efficiency rate. Airless has a higher transfer efficiency rate and is often used for protective, rather than decorative coatings. Air-Assisted Airless offers high production levels and a relatively high quality finish. Determining the highest requirement for your production line will assist you in identifying which spray technology will fit your application.

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