

Understanding Airless Spraying Technology

The contractor's airless paint spray machine is a complete machine to do coating applications. Simply suck the product from its tin/bucket and apply it to the surface.....

Airless spray is a method of atomising a fluid without the use of compressed air. The fluid is pumped to a high pressure and delivered through a high pressure airless spray hose to a spray gun. The fluid is then forced through an accurately sized small orifice at this high pressure. The orifice, or spray gun nozzle, is normally referred to as a spray tip. The restriction created and the shape of the spray tip's orifice creates an atomised spray fan.

All fluids have two distinct properties that are crucial to the process of atomization. The first is the burst pressure, which is the minimum pressure required to burst the fluid into small globules. The other is the maximum particle size of the solids, however this is not normally known to someone using a paint - this will restrict the minimum spray tip size that the product will be able to pass through. Most product data sheets from reputable paint manufacturers will have the relevant information pertaining to this.

There are two distinctly different types of pumps that are manufactured for airless spraying. The diaphragm pump and piston pump. The fast oscillating diaphragm pump works by sucking in and transferring a small amount of paint through a compression chamber into a pressurising chamber, this happens at a very high cycle rate. The piston pump works on a displacement principle, one stroke collects fluid into one chamber while pressurising the fluid in the other. The second stroke transfers collected fluid into the pressurising chamber, while sucking new fluid into the pump. Both have their advantages and disadvantages and both have their place in the market.

All airless sprayers have pressure adjustment; this makes you able to set your spraying pressure to exactly what the liquid needs for perfect atomisation. The maximum fluid volume pumped however is constant per stroke, that is precisely why there are so many different models of spraying machine. When buying a sprayer or striper always compare the specifications of maximum tip size (in thousandths of inches) and flow rate (litres per minutes). From our experience most well established manufacturers have very close pricing for similar equipment (due to the very competitive USA market) - always compare apples with apples because you generally get what you pay for.

Airless pumps range from 100bars to over 500bars of spraying pressure only because the nature of paints differ when sprayed. Airless Spraying has some distinct advantages: It creates less overspray, solvent clouds and bounce back than conventional spray equipment. Airless has transfer efficiency of about 70-80%. More liquid can be applied per single pass if required and normally paints need not be thinned to make them sprayable. There are also many products that can ONLY be applied with airless spray.

The spraying pressure, and as a result, the exit velocity and force at the spray tip is very high, this creates a high risk of injection injuries. An operator must never spray the gun at someone nor should they ever put their hands in front of the spray fan. To make matters worse in the event of an accident many doctors are not experienced with toxic injection injuries. They do

not follow the correct procedures to treat such injuries, and this may result in blood poisoning and even amputation. Thankfully these injuries are rare. (AUTHOR: M GISI 2008)