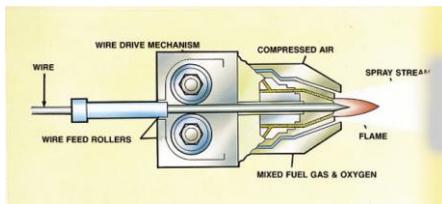
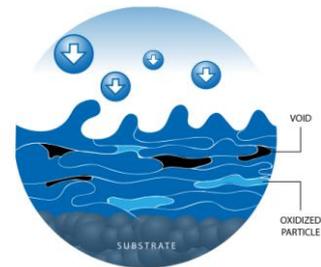


## The Metallisation Wire Flamespray Process

Metal spraying (also commonly called thermal spraying) is a coating process in which metals or ceramics are melted or softened and sprayed onto an object. There are four commonly used processes in thermal spraying; Flamespray, Arcspray, Plasma Spray and High Velocity Oxygen Fuel (HVOF). In this piece, we will focus on flamespray.

All methods of thermal spraying involve the projection of melted or softened particles onto a prepared surface, where they adhere and form a continuous coating. To create the molten particles, a heat source, a spray material and an atomisation/projection method are required.



In the Metallisation Wire Flamespray process, the raw material in the form of a single wire or cord, is fed by a driven roller system into the centre of an oxygen-gas flame where it is melted. An annular air nozzle then applies a jet of high-pressure air, which atomises and projects the molten material towards the work piece. The molten spray solidifies instantly on the component surface to form a dense, strongly adherent coating that has no drying or curing time. The driving of the wire is typically via an air motor and gearbox that forms part of the pistol.

The gas fuel used varies, depending on the wire to be sprayed and in some cases, the application. The two most common gas fuels used are Propane and Acetylene.

Propane gas is most commonly used for spraying low melting point materials such as zinc, aluminium and their alloys at high throughput rates. Propane can also be used to spray bronzes, coppers, Babbitt, nickel, tin/zinc and some steels, although optimum throughput rates may not be achieved with these materials. The Metallisation MK73 system uses propane gas.

... more ...

Acetylene gas is most commonly used for spraying higher melting point materials such as varying grades of steel, nichrome and molybdenum. When spraying with acetylene, parameters can be easily changed that will give different coating properties. For example, molybdenum coatings can be applied as either a soft, strongly adherent bond coating or as a harder top coating, just by changing the ratio's of gas to oxygen. Similarly, some decorative coatings of copper and bronzes can have their final colour appearance influenced by the spray parameters. As with propane gas, acetylene gas systems can also spray the lower melting point materials of zinc, aluminium and their alloys, but again, not necessarily at their optimum conditions. The Metallisation MK61 system uses acetylene gas.

Acetylene fuelled systems are also used to spray ceramic cords and rods. The principle is the same, but instead of wire, the spray material is in the form of a flexible cord available on a plastic reel or a solid ceramic rod.

The spray wire is usually dispensed from coils or production packs (drums). As a general principle, the throughput rate of the spray system is linked to the wire diameter, for example, a 1.6mm wire will spray considerably slower than a 4.76mm wire. Commonly, anti-corrosion wire ( zinc, aluminium etc.) diameters are 3.17mm (1/8") or 4.76mm (3/16") as the areas to be sprayed are typically large and a high throughput is beneficial. Engineering wires like steels are commonly 3.17mm (1/8") diameter as this gives a good balance of throughput rate with the ease of feeding a stiffer material. Some more specialist applications will use 1.6mm or 2.3mm diameter wires where areas are small and a very fine finish is required.

Typical applications can be broken down into two different categories – anti-corrosion and engineering coatings.

Anti-corrosion coatings are applied to generally protect steelwork from a corrosive atmosphere with the most commonly sprayed materials being zinc, aluminium and their alloys. Common application examples include the spraying of steel bridges, in-situ pipework in petro-chemical refineries, street furniture and vehicle chassis'.

Engineering coatings cover a much wider range of applications where the coating could, for example, provide a wear protection surface, a thermal barrier coating or an electrically conductive path. Common applications include spraying steels to build up worn or mis-machined areas on a variety of components, conductive heater elements on carbon fibre wing edges and hard molybdenum coatings on selector forks.

... more ...

Metallisation offer a full range of wire flame spray systems.

The MK73 oxy-propane system is most commonly used for manual spraying in anti-corrosion applications. The system has the highest flamespray throughput rates on the market, combined with a start/stop facility that gives the operator the choice to stop the wire feed whilst moving around a job, saving on wire usage.

The MK61 oxy-acetylene system is most commonly used for manual or semi-automatic engineering applications (although sometimes used for anti-corrosion where propane is not as readily available as acetylene). The system can be supplied as stop/start or continuous spraying, the latter giving a slightly higher throughput than the former.

The MK66E system is most commonly used for automatic or semi-automatic applications. It can be offered for use with either propane or acetylene gas, depending on the application. As a semi-automatic system, the pistol would be manually lit but the wire feed automatically controlled. This is commonly used on low throughput ERW tube mills to apply a fine zinc coating to the tube weld area. As a fully automatic system, the pistol is automatically lit/extinguished, gases and parameters are mass flow controlled and wire feed is automatically adjusted. These systems are commonly used in production automation and robotic applications.

In 2010, Metallisation launched a new deflected Flamespray extension to fit its MK73 and MK61 Flamespray systems, as a direct result of customer requests for a system that could apply good quality coatings in difficult access areas. The new robust Metallisation deflected flame spray extension has been designed specifically for onsite use. It comes in three lengths, 150mm, 300mm and 450mm and can be used with either 3.17mm or 4.76mm wires. The new extension uses the same consumable spares as standard Metallisation pistols.

The deflected Flamespray extension unit can spray directly forward or at a deflected angle, which can range from 0° to 90° by varying the deflector air pressure. The deflection nozzle can also be rotated through 180° to allow spraying in a 360° arc around the pistol. The extension fits directly to the Metallisation MK73 oxy propane and MK61 oxy-acetylene flame spray pistols. A video showing the Flamespray process can be seen on the Metallisation website [www.metallisation.com](http://www.metallisation.com).

For more information on Flamespray projects, processes or equipment, please contact Stuart Milton, Sales and Marketing Manager, Metallisation on 01384 252 464.