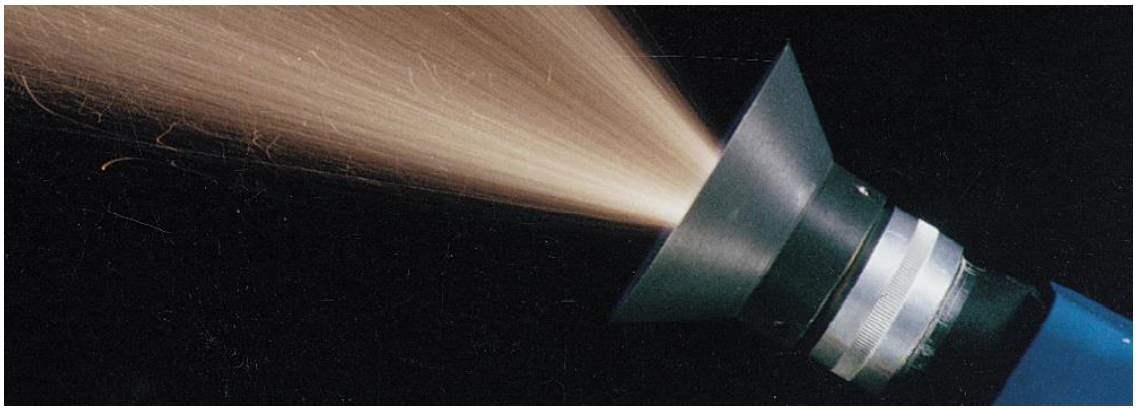
MSSA METAL SPRAY SUPPLIES AUSTRALIA

Product Solutions
Engineered Surfaces for Exceptional Performance



Welcome to MSSA NewsWire Issue 3

Welcome to our third edition of MSSA's newsletter, in this edition we aim at giving you a better understanding of the limitless possibilities the metal spray process can bring.

In our section "Interesting Facts" we will discuss a few of the more unusual applications of metal spray, giving you a glimpse of its diversity. Just one example is that under certain conditions it is possible to spray your bare hand with molten metal, read on and view the video, and see other interesting ways metal spray can be used in our video demonstrations. We also introduce you to some artistic ideas using metal spray, an interesting read.

MSSA are pleased to announce we can offer a new Laboratory Testing service, in conjunction with MEC, we provide you with details on the types of testing we can do for you. See more details under "MSSA New Services".

Our feature article, "Anti-Corrosion Protection" discusses the basics of the metal spraying technology, giving you a good understanding of the process. We also provide you with many related links for more detailed information. We conclude our newsletter with a "Product Focus" on our popular product, "White High Temperature Masking Compound", used to protect areas adjacent to the surface in which a HVOF coating is applied to.

Interesting FACTS - expect to be SURPRISED

MSSA recently received an enquiry from a customer in Canberra that is looking to apply metal to wood! They are looking to apply the metal coating onto bar counters in a restaurant after seeing it being done in the USA. To assist our customer MSSA provided coating samples of Copper, Zinc and Pewter.

The application of Metalspray usually applies to metal being coated for various reasons i.e. reclamation of worn parts, anti corrosion etc. In fact, Metalspray can be applied to Wood, Plastic, Glass, Paper, Ceramics

etc. you can even spray onto your hand, as shown in our video below, however we strongly recommend you do not do this.

Some 20 to 25 years ago a vinyl record was sprayed to produce a negative and the negative sprayed to produce a positive we then played it on a record player and it worked!!!!

The deposited coating has a dull appearance due to Oxidation during spraying but with a suitable abrasive the shiny surface can soon be revealed, to maintain the shiny appearance it will be necessary to apply a clear sealant otherwise further Oxidation will occur. Acids can also be used to produce a patina effect on some materials.

As a visual demonstration of the diversity of applications possible with Metal Spray, we provide you the opportunity to view the following videos:

Demonstration of Metalspraying onto Wood, great visual results, and also includes some examples of different metalspray applications:

Demonstrating the Metalspraying of a Bare Hand - WARNING DON'T TRY THIS

Demonstration of Metal Spraying Paper, and Business Cards - proving you can successfully metal spray just about anything!

It is even possible to Metal Spray onto Plastic, in this demonstration a coke bottle is used.

Artistic Finishes using Metalspray

Artistic Metals, based in Uckfield, UK, specialise in metal spray finishing with an aesthetic twist and provide a wide range of diverse decorative items ranging from a bronzed pear, dining tables and chairs through to the revolving doors of the Houses of Parliament. Click here to keep reading.

MSSA New Services - Laboratory Testing Facilities

More and more Metalspray projects/contracts are requiring testing of coatings to prove that the coating has been applied to the correct specification. Although Laboratories in Australia exist the reading of the test results can be open to interpretation e.g. when checking a micrograph of a carbide-based coating how do you differentiate between porosity and pluck out during preparation of the sample?

MSSA can now offer the services of qualified personnel and laboratory through MEC (Metallizing Company of India).

MEC offer the following tests:

- Energy dispersive X-ray analysis (EDXA)
- Tensile test to measure bond adhesion strength
- Micro Hardness Test
- Porosity level test
- Micro structure analysis using Scanning Electron Microscope (SEM)
- Dry Abrasion Test in accordance with ASTM G-65
- Abrasive Jet Erosion in accordance with ASTM G-76

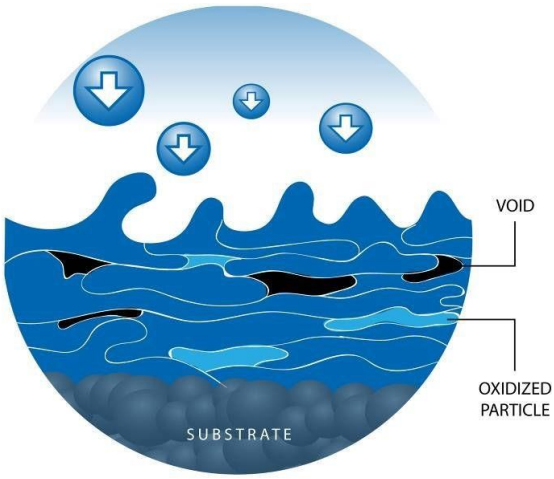
If this is of interest to you please contact our Sales Department who will assist you with your enquiry.

Feature Article - Anti-Corrosion Protection - Metal Spray Solutions

Metal or thermal spraying is a technology, which protects and greatly extends the life of a wide variety of products in the most hostile environments and in situations where coatings are vital for longevity. The variety of metallised coatings is vast but can be broken down into two main categories. These include finishing coatings, such as anti- corrosion or decorative coatings, and engineering coatings such as wear resistant and thermal barrier coatings.

Metal spraying is carried out in a wide range of anti-corrosion and engineering markets, including oil and gas, construction, petrochemical and marine. Corrosion is a major problem for these industries. There are four commonly used processes in thermal spraying; Flamespray, Arcspray, Plasma Spray and High Velocity Oxygen Fuel (HVOF), but only two of these, Flamespray and Arcspray are normally used for finishing coatings.

The Basics

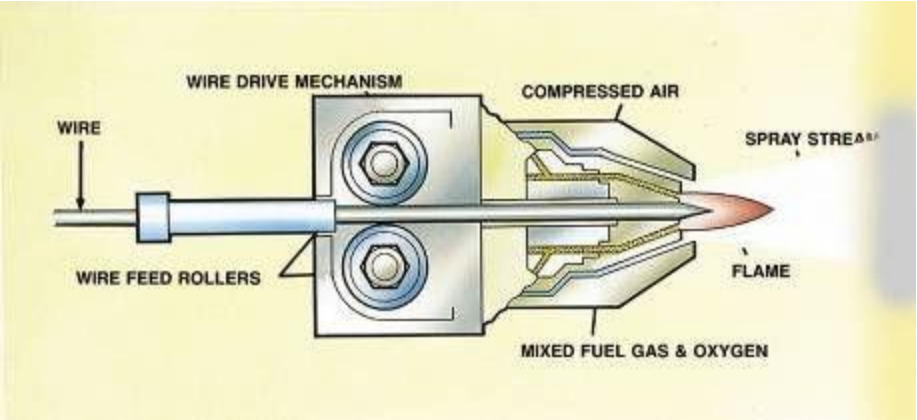


All methods of thermal spraying involve the projection of small molten particles onto a prepared surface where they adhere and form a continuous coating. To create the molten particles, a heat source, a spray material and an atomisation/projection method are required. Upon contact, the particles flatten onto the surface, freeze and mechanically bond, firstly onto the roughened substrate and then onto each other as the coating thickness is increased.

As the heat energy in the molten particles is small relative to the size of the sprayed component, the process imparts very little heat to the substrate (typically considerably less than 100°C. As the temperature increase of the coated parts is minimal, heat distortion is not normally experienced. This is a major advantage over hot-dipped galvanising.

Wire Flame Spray

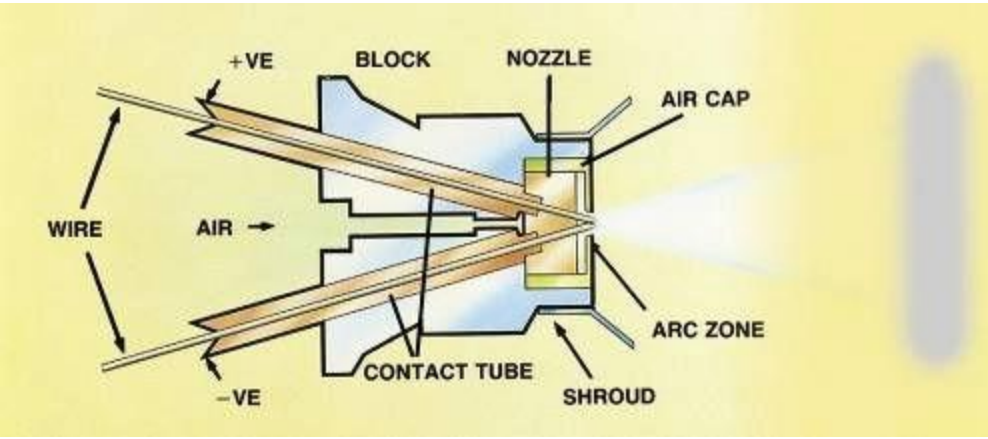
In the wire flame process used for most anti-corrosion coatings, a wire is fed by a driven roller system through the centre of an oxygen- propane flame where it is melted. An annular air nozzle then applies a jet of high-pressure air, which atomises and projects the molten material onto the work piece. The driving of the wire is typically via an air motor and gearbox that forms part of the pistol.



Wire diameters that can be flame sprayed as standard range from 1.6mm to 4.76mm (1/16" to 3/16"). Wire is typically dispensed from coils or production packs (drums).

Twin Wire Arc Spray

In the Arcspray process, two electrically charged wires are driven and guided so that they converge at a point and form an arc. An air nozzle atomises the molten metal produced and projects it towards the work piece. The driving of the wires is typically either by air motor or electric motor and gearbox arrangement. The wires can be driven in three different ways, all which offer individual benefits.



1. Push only, where the wire is pushed from a drive unit to the pistol.
2. Pull only, where the wire is pulled by a drive unit mounted in the pistol.
3. Push/Pull, this method is obviously a combination of these two methods, where the wire is driven to and pulled from the pistol. Wire can typically be dispensed from portable MIG reels, coils or production packs (drums) depending on the application requirements.



Why use flame or arc?

This sounds like it should be an easily answered question, but, as with many engineering situations, a clear and precise answer is not available. In some instances, the coating properties achievable by one or the other processes does provide a simple answer. For example, arc sprayed Aluminium has a bond strength that is approximately 2.5 times higher than flame sprayed Aluminium.

Other factors include deposit efficiency, ease of operation, safety/spray environment, changeover time, maintenance time and costs, coating finish and ease of automation.

The above considerations give an insight into the wide range of variables when choosing which process to use. It is worth mentioning that a matter of personal or local market preference can also be added into the decision matrix.

Effectiveness of metallised coatings

Metal (Thermal) Spraying is not a new process. It has proved itself to be extremely effective in the 90 years of its existence in all manner of applications ranging from coatings in gas turbines to corrosion protection on park benches. As a protective system for structural steelwork it is unsurpassed being the only system, recommended by International and European standards EN ISO 14713 as giving greater than 20 years to first maintenance in very aggressive environments such the marine splash zone (category lm2) as well as all other categories.

Corrosion Protection Figures Table
(Extracted from BS EN ISO14713)

g) Corrosivity category Im2: Temperature sea water [d,e]: zinc corrosion rate typically 10 µm /year to 20 µm/year; 70g/m^2/year to 150g/m^2/year		
Typical life to first maintenance years	General description and suitability	Mean coating thickness on each surface µm (minimum)
Very long (≥ 20)	Sealed sprayed aluminium conforming to ISO 2063 Sealed sprayed zinc conforming to ISO 2063	150 250
Long (10 to < 20)	As above or: Hot dip galvanized (see footnote c under table 2f) Sealed sprayed zinc conforming to ISO 2063	150 to 200 150
Medium (5 to < 10)	As above or: Hot dip galvanized (thick coating – See note 2 at end of table 2)	115
Short (< 5)	As above or: Hot dip galvanized conforming to ISO 1461 (steel = 3mm)	70 to 85
[d] Hot dip galvanized tube, sheet and fittings normally have additional protection when used in sea water [e] Brackish water may be more or less corrosive than sea water and no general estimates of durability can be given		

Metal Selection and Typical Applications

As can be seen from the above table, two commonly used materials for corrosion protection are Aluminium and Zinc. A third material is Zinc/Aluminium alloy (85%Zn / 15%Al). The choice of material to be used is a vast topic with many factors to be taken into consideration such as environment (corrosive atmosphere, temperature etc.), local authority specifications, life expectancy of the coating, adhesion requirements, availability of material to name but a few.

In general terms, Zinc is used in reasonably less corrosive environments such as water tanks, some bridges and general structural steelwork. Aluminium is used in harsher corrosion environments such as saltwater and splash- zone areas. In addition, Aluminium is used in high temperature applications such as flare booms on offshore oilrigs as the Aluminium effectively dissolves into the substrate (aluminises) when exposed to high temperatures. Zinc/Aluminium alloy is used in environments where the corrosion resistance of zinc is borderline.

Metal spraying is a very flexible process. The range or materials that can be sprayed is almost limitless. In effect, if a material can be heated to its melting point without boiling away, the material can be sprayed. Other common materials used in finishing applications are Copper, Aluminium/Bronze and Phosphor/Bronze, often used for decorative purposes. Also, a wide range of steel materials can be used for corrosion and wear protection.

The range of applications that metalspraying is used for has mainly developed as a result of the limitations of other available processes. For example, new bridge sections are often sprayed to offer maximum corrosion protection. The 'I' beams can be as much as 40m (120ft) long, 4m (12ft) high and 2m (6ft) wide. Obviously, this is too large for the average hot-dip galvanising tank. The process is also transportable, so structural steelwork can also be sprayed on-site or repaired where on-site welding has removed the galvanising.

Other common anti-corrosion application areas are off-shore oil platforms, ships, fences, underground pipes, electric rolled welded (ERW) tube manufacture, multi-void Aluminium tube manufacture, LPG

cylinders, water / fuel tanks, external and internal steelwork and playground furniture. This is a very short summary of a virtually endless list of applications.

For more specific information on protective Metal Spray coatings and also some examples of different types of applications used in the market place, please review the following articles from the MSSA Website:

Link to: Protection Against Corrosion - The Benefits of Sprayed Metallic Layers
Link to: Metal Coatings for the Protection of Iron and Steel against Corrosion
Link to: Did you know an alternative to Galvanizing Exists
Link to: Metalspray and The Architect: The Burj Al Arab Hotel, Dubai

Interested in Anti-Corrosion - Click Here for More Information

Product Focus: White High Temperature Masking Compound (WMC)

W.M.C HVOF Masking Compound is a semi-soft, conformable material similar in appearance and feel to modelling clay. It is used to protect areas of a part adjacent to those which receive an HVOF applied coating. After spraying, W.M.C is easily and quickly stripped from the part, leaving a residue free surface with good line definition.

Versatile, easy to use, economical, W.M.C is the only choice for HVOF masking.

Click Here: Technical Bulletin on WMC (White Masking Compound)

Feature Article in next issue of Newswire : AUTOMOTIVE

Do you know about?

Metal Spraying	Flame Spraying	Arc Spraying
HVOF Spraying	Plasma Spraying	Masking

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