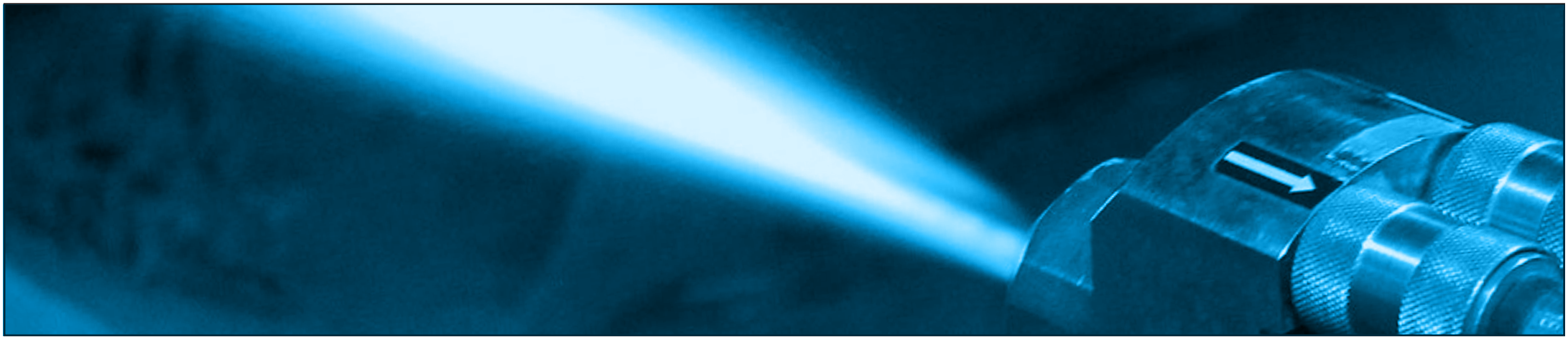
Met-PCC(HVOF-G)



Equipment Spec

Metallisation
thermal spray **solutions**

CE

Introducing the Met-PCC(HVOF-G)

Our gas fuelled High Velocity Oxygen Fuel (HVOF) systems

- Intuitive interface
- Low porosity
- High bond strength

A complete HVOF spraying system combining our MET-PCC(HVOF-G) control system with PC touch screen operator HMI and optional compatible pistol and 2022 Mass Flow Powder Feeder

High Velocity Oxygen Fuel (HVOF) is a process to apply very dense, strongly adhered coatings. The Met-PCC(HVOF-G) system uses simple control and operator interface features. It can be interfaced with non-Metallisation gas fueled pistols. The Met-PCC(HVOF-G) system has re-packaged the control elements and utilised the latest technology to optimise functionality and reliability. At the front end, the operator interface utilises an intuitive Graphical User Interface (GUI), including the option to integrate video images into the display. The interface runs on a familiar touchscreen Windows PC platform with Intel Dual Atom processor which is great for usability, integration and communication. Behind the scenes, the latest PLC runs the system with communication between devices via the reliable Ethernet protocol. The gases are all mass-flow controlled for optimum repeatability of coatings. All spray parameters can have real-time trending on the system. The result is a truly unique, compact design, flexible, easy to operate HVOF system, backed up by Metallisation's 100 year+ industry experience and support.

HIGH ENERGY THERMAL SPRAY

KEY APPLICATIONS

- Hard-chrome plate alternative.
- CGL mill rolls.
- Oil/Gas valves.
- Paper Rolls.
- Suspension Components.
- Landing Gear.
- Hydroelectric turbines.
- Automotive valves.
- Wire drawing blocks.

HIGH HARDNESS

LOW OXIDE LEVEL

System Overview

HIGH LEVEL SURFACE FINISH

COMPATIBLE PISTOLS

- Jet Kote™ Pistol
- Diamond Jet™ Pistol
- Alternative pistols can be interfaced - contact Metallisation for more information

CONTROL BOX

- Oxygen mass flow controller.
- Control PLC.
- Unlimited recipes.
- Fault indication Strobe.
- E-stop circuit with external interface.

HMI INTERFACE

- Industrial PC.
- 17” touch screen.
- Familiar Windows platform.
- Real time data logging.
- Full, on screen diagnostics.
- Intuitive and simple to use.

POWDER FEEDER

- Mass flow control.
- Volumetric feed.
- Two disc variant.
- Closed loop AC inverter.
- Multiple options with various sized hoppers.

HIGH QUALITY

DENSE COATING

PC CONTROL

HIGH BOND

Compatible Pistols

Metallisation's Met-PCC(HVOF-G) system can operate pistols from other manufacturers. The Metco Diamond Jet™ (hydrogen) and Deloro Stellite Jetkote™ (hydrogen) pistol have already been interfaced to the system but others could also be technically reviewed for suitability. Alternative pistols can either be supplied by the customer or Metallisation can offer similar pistols to those mentioned. The supplies package to each of the pistols would be bespoke to the specific system as the hose requirements will vary more with gas fuelled systems.

VERSATILE AND ADAPTABLE

OPTIONS

Part No.	Description
AK-DJ	Adaptor Kit for Diamond Jet (Hydrogen) Pistol & 5Mtr Input and 10Mtr Output supplies

Suitable for a wide range of substrates including metals, ceramics, composites & cermets

Deloro Stellite Jetkote™

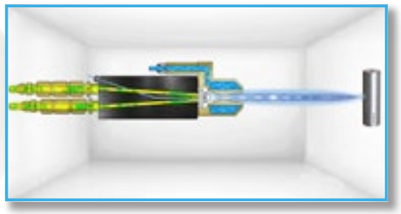
Metco Diamond Jet™

ALTERNATIVE PISTOLS CAN BE INTERFACED

PISTOL CHANGE OPTION ON HMI

PISTOL SPECIFIC PROCESS ANIMATIONS

Deloro Stellite Jetkote™



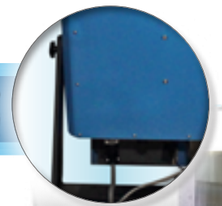
Metco Diamond Jet™

Control System

The MET(PCC) control console is the heart of the system. It consists of a PC with a touch-screen operator interface, a control box and a standard robot interface (robot master). It provides integration and control of the complex component parts of the HVOF system. The operator interface is via a 17" touch-screen panel and is designed to be intuitive and simple to use. For reliability of operation, the actual control of the individual operations of the system are controlled by PLC's in the control box and powder feeder. Repeatable operations are easily programmed and actioned for day to day operation or can be linked to barcode systems for even simpler programming. The system can also be used for more in-depth coating and parameter development, still with simple and intuitive interface.

OPTIONS

Part No.	Description
PCC(HVOF-G)-CTRL	Met-PCC(HVOF-G) Control Interface and Gas Box
MF-PF-G-CTRL	Mass Flow powder feeder kit to fit in HVOF-G gas box
PCC-DJ-KIT	Mass Flow Air Control Kit for PCC(HVOF-G)-CTRL (DJ)
MET-TROL	Metallisation Ancillary Trolley
9880W	HMI Mounting Bracket Kit (WALL MOUNT)



Freestanding, post or moving arm mounted HMI

Typical installation:
Control box = Inside spray booth.
Powder Feeder = Inside or outside spray booth.
HMI = Outside spray booth.

Industrial Touch Screen PC running MS Windows O/S

Integrated E-stop button

Keyboard with Integrated Track Pad

USB Powerable Ethernet Hub

Easy access to connecting hoses and cables

SAFETY INTERLOCKS

HYDROGEN GAS FUEL

PLC For Control

Robot Interface via Ethernet

E-stop circuit with external interface

System Operation

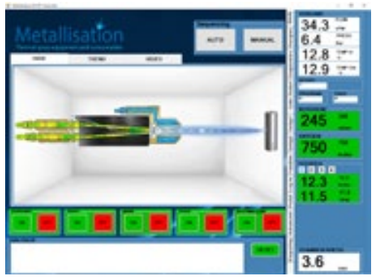
The operator interface utilises an intuitive Graphical User Interface (GUI), including the option to integrate video images into the display. The interface runs on a familiar touchscreen Windows PC platform with Intel Dual Atom processor which is great for usability, integration and communication. The system is operational in 2 basic modes: Manual and Auto with the additional option for an unlimited number of definable recipes to be pre-programmed. By selecting a recipe, all of the parameters will automatically program the system.

INDUSTRIAL VARIABLE POSITION ENCLOSURE

MONITORING TABS FOR COMPLETE CONTROL

MODES OF OPERATION

MANUAL MODE



Enabling the operator to manually enter values prior to spraying.

Values are entered into appropriate fields then controls are started on command.

AUTOMATIC MODE

Simplifying the process, allowing operation to be started by a single button press allowing the system to sequence through to feed and follow a designated program (only when robot is master).

RECIPE SELECTION

Allowing pre-programmed parameter tables to be loaded.

The desired program is selected before the spraying process begins.

Auto & Manual Modes

Recipe Selector

Video Tab Option

Powder Feeder

Our powder feeders are positive displacement feeders which use an offset disc that rotates and collects powder in small holes. At a certain point powder is blown from the holes into the powder feed line where the Argon gas carries the powder through the powder feed hose to the required point of exit.

The powder feed rate depends upon the size of holes and number of holes per minute i.e. RPM. This system cannot pack powder if blocked unlike screw type powder feeders.

CLOSED LOOP AC INVERTER

OPTIONS

Part No.	Description
2022MF-PF(2800)-G	Mass Flow Powder Feeder, 2.8Ltr Hopper-For GAS fuel systems
2022MF-PF(2.8)-QR-G	Mass Flow Powder Feeder, 2.8Ltr with Quick Release Hopper-For GAS fuel systems
QRPFH-2.8	Quick Release Powder Feeder Hopper (2.8 L)
QRPFH-BRKT	Quick Release Powder Feeder Hopper Support Bracket for 2 hoppers
MET-TROL	Metallisation Ancillary Trolley
6688C	Heater Jacket & Plug Assembly

2022MF-PF(2800)-G

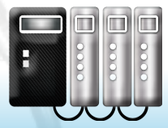
2022MF-PF(2.8)-QR-G

Direct control option for stand-alone operation

Optional Heater Jacket connection

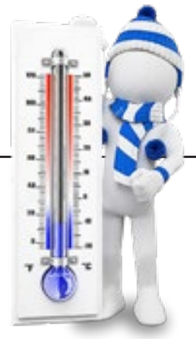
6688C - Heater Jacket & Plug Assembly

Two Disc Variants



PLC For Control

Easy To Clean



Chiller

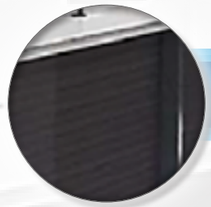
The Metallisation packaged water chiller is a complete, factory assembled unit, designed to provide chilled water for cooling HVOF systems. Designed specifcally for reliable and efficient process cooling. Immersed within a generously sized storage tank it ensures safe and reliable operation even during large fluctuations in cooling demand.

OPTIONS

Part No.	Description
JET4G CHILL-45	MET-JET4G refrigerated chiller, 45 celcius ambient
PCC(HVOF)CHILL-MAN	HVOF Chiller Manifold

Chillers are rated for operation at the ambient temperatures stated. Other ambient temperatures or chillers for non-Metallisation pistols can be accommodated. Please contact Metallisation for a specific quotation.

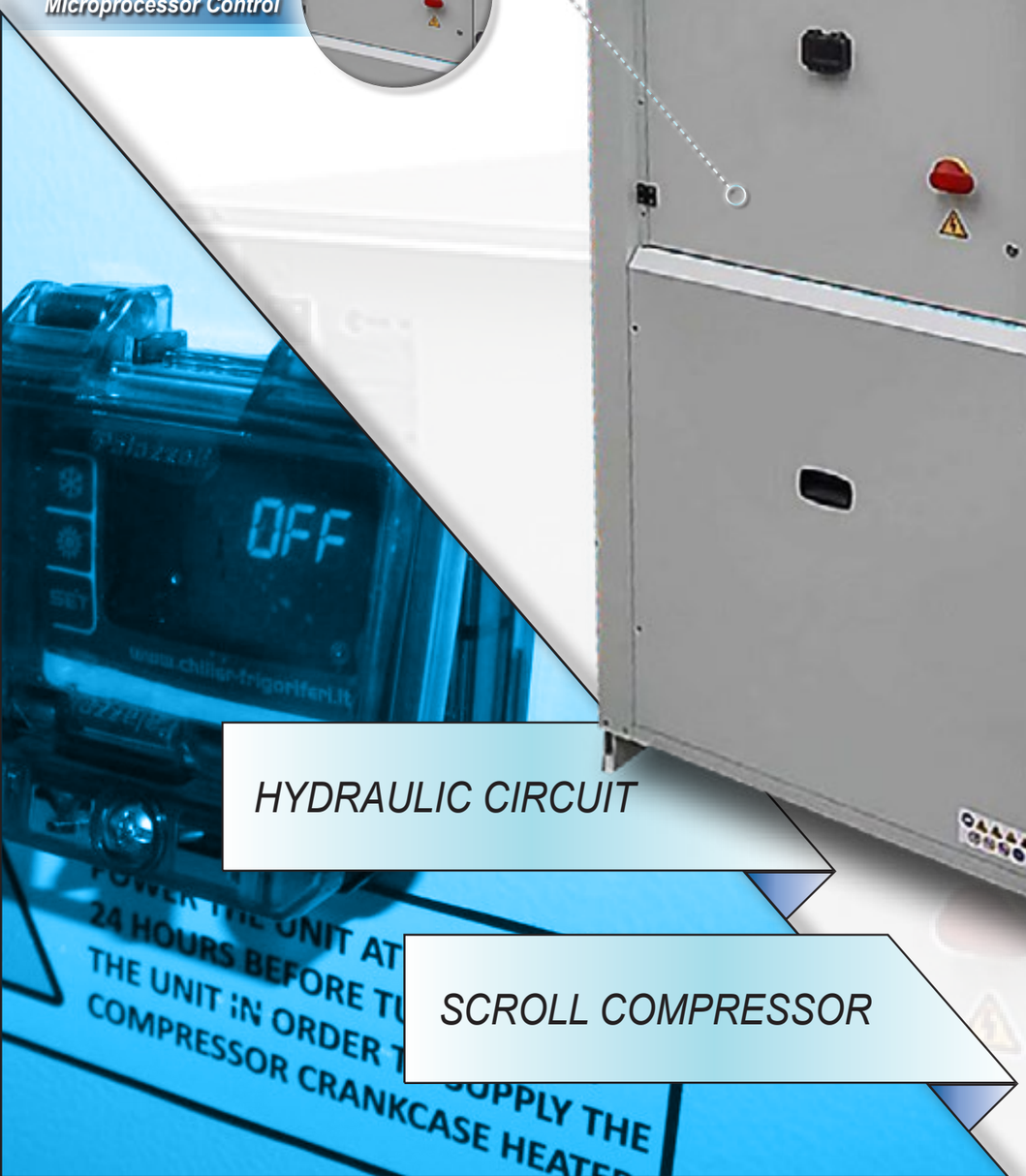
Electrical Panel with Microprocessor Control



Finned Coil Condensor

Axial Type Fans with IP54 Protection

Connecting Manifold at rear

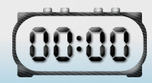


HYDRAULIC CIRCUIT

SCROLL COMPRESSOR

DESIGNED TO RUN CONTINUOUSLY

Freeze Protection



Electronic Controller

Motor Protection

Detailed Specifications

Key Information

Dimensions

Width	Control Box: 860 mm (33 ¾") Operator interface: 560 mm (22 ")
Depth	Control Box: 560 mm (22 ") Operator interface: 175 mm (6 ¾")
Height	Control Box: 1250 mm (49 ¼ ") Operator interface: 410 mm (16")
Weight	Control box: 100 kg (220.5 lbs) Operator interface: 20 kg (44.1 lbs)

Control System Supply Requirements

Hydrogen	950 l/min (2000 scfh) @ 13.5 bar (200 psi)
Oxygen	475 l/min (1000 scfh) @ 13.5bar (200 psi)
Argon	57 l/min (120 scfh) @ 10 bar (150 psi)
Air (Diamond Jet Only)	475 l/min (1000 scfh) @ 7.5 bar (110 psi)
Coolant – deionised water	Jet Kote™ – 30.3 to 51.1 l/min (8 to 13.5 US Gal/min) thru the system @ 2.76 to 14 bar (40 psi to 203 psi) Diamond Jet™ with DJ2600 - 9.5 l/min (2.5 US Gal/min) thru the system @ 2.76 bar (40 psi)
Typical coolant inlet temperature at the pistol	Jet Kote™ - 21 Degrees Celsius (70 Degrees Fahrenheit) Diamond Jet™ - 24 Degrees Celsius (75.2 Degrees Fahrenheit)
Electrical	240/110V 1ph, 8A/15A
Cooling requirements	Jet Kote™ = 87kW (297,055 BTU/Hr (24.75 Ton) at 30 Degrees C ambient (86 Degrees Fahrenheit) Diamond Jet™ = 8.8 KW (30,047 BTU/Hr (2.5 Ton) at 30 Degrees C (86 Degrees Fahrenheit) ambient

Diamond Jet is a brand name of Oerlikon Metco, Jetkote is a brand name of Kennametal Stellite,

CONTROL PCC(HVOF-G)-CTRL

Detailed Specifications

Control console:

- Mass flow control of oxygen and carrier gas = repeatability.
- Control PLC with relevant input/output interface.
- Control valves and switching for sequencing and safe operation of the system.
- E-stop circuit with external interface to integrate into the safety circuit of the spray booth. Signals from the booth door, extraction system, robot, etc can all be linked into the system.
- Interlocks to inhibit system operation unless the following are within preset limits: coolant pressure, temperature and flow; oxygen pressure and flow; liquid fuel flow; carrier gas pressure and flow.
- Fault indication strobe.
- Interface between the gas box, powder feeders and robot by Ethernet interface. Up to 255 items can be interfaced, allowing multiple powder feeders to be linked.
- New enclosure allowing supplies to exit to the front, rear or sides of the gas box.
- MF-PF-G-CTRL is an optional kit that can be factory fitted into the gas box to enable non-Metallisation powder feeders to be operated and mass flow controlled if they don't have their own mass flow controller.
- PCC-DJ-KIT Adds the additional Air Mass Flow Controller for use with a Diamond Jet pistol.

Operator Interface:

- Integrated PC with 17" touch screen, mounted in an industrial box with standard VESA mount.
- Security levels, password protected for operation or programming.
- Comes with Windows 10 as an operating system that is widely familiar.
- Parameter trending allows real-time monitoring of operation and setting of 'out-of'range' limits.
- Real time data logging with programmable intervals. System logs the required parameters and actual operating parameters (gas flows, powder feeder speeds, chamber pressure) against time and also logs sequence events and faults.
- Data log output via .csv data format through USB or Ethernet to enable remote SPC analysis.
- If touch screen operation is not desirable, USB interfaces are included to allow connection of a keyboard, mouse or other generic/custom USB input devices. Industrial keyboard is included.
- Full, on screen diagnostics to advise operator of the system status.

Detailed Specifications

Key Information

Dimensions

Width	Standard & QR Model: 400 mm (15.75 “)
Depth	Standard & QR Model: 400 mm (15.75“)
Height	Standard & QR Model: 700 mm (27.5 “)
Weight	Standard & QR Model: 40 kg (88.2 lbs)

Technical Specifications

Maximum Hopper Pressure	10 bar (145 psi)
Maximum Powder Volume	2.8 L

Supply Requirements	Nitrogen or Argon @ 4 bar (58 psi)
Power Requirements	240/110 V 1 ph, 5 A (use a suitable MCB or Motor / T rated fuses)

An inverter controls the disc RPM, and a Mass Flow Controller controls the gas flow. Both these devices are connected by a data bus to a Programmable Logic Controller. A separate data bus connects the powder feeder to other Metallisation or proprietary equipment for control purposes. It can also be used as a stand-alone unit.

POWDER FEEDER

Detailed Specifications

- Mass flow control of the carrier gases = repeatability.
- Volumetric feed via hopper and rotating disc design.
- Two disc variants to allow optimum feeding of a wide range of powders.
- Parameters are displayed on the powder feeder and also relayed to the operator interface unit for display and logging.
- Contains PLC for control and integration to the to operator interface unit.
- Feed disc rotational speed is controlled via a closed loop AC inverter for improved feeding accuracy.
- Control can either be via the operator interface or directly at the powder feeder for stand-alone operation.
- Multiple power feeders can be integrated into the system.
- Powder Feeder comes complete with the connection for a Hopper Heater Jacket.
- A 2.8 L canister.
- A compact, easy to mount design.
- Supplied with 1 x Powder Feeder control Ethernet cable from Control box to Powder Feeder Std 7m, longer lengths available at request.
- 4mm bore Anti-static powder feed hoses (max length of 5m) from powder feeder to the pistol. Optional 2.5mm bore powder feed hose (9641) available.
- Easy to fill, empty and clean – tilting hopper.
- Nitrogen/Argon carrier gas (Others on request).
- Various Powder Feeder options available with various sized hoppers, quick release hoppers or weigh scales to suit specific customer requirements.

2022MF-PF(2800)-G **2022MF-PF(2.8)-QR-G**

Detailed Specifications

Key Information

Dimensions (JET4G CHILL Models)

Width	1115 mm (44 ")
Depth	2720 mm (107 ")
Height	1980 mm (78 ")
Weight	690 kg (empty of water)

CHILLER - JET4G CHILL

Detailed Specifications

The Metallisation packaged water chiller is a complete, factory assembled unit, designed to provide chilled water for cooling HVOF systems.

- Self-contained, including all control items.
- Despatched with a running charge of refrigerant.
- Cool water is produced within the chiller and used to cool the pistol water.
- Demineralised water is pumped to the system via an integral pump.
- Units are designed to run continuously and will circulate chilled water as long as the unit is switched on.
- The chillers is rated for operation at the ambient temperatures stated. Other ambient temperatures or chillers can be accommodated. Please contact Metallisation for a specific quotation.

TROLLEY - MET-TROL

Information

- Ancillary Trolley sold separately.
- For use with HMI interface or Powder Feeder.

Detailed Specifications

Product Number and Description

SUP-PCC(HVOF-G)	Met-PCC(HVOF-G) 5Mtr Input and 10Mtr Output supplies pack for gas fuel systems (Jetkote)
AK-DJ	Adaptor Kit for Diamond Jet (Hydro-gen) Pistol & 5Mtr Input and 10Mtr Output supplies

The supplies package to each of the pistols would be bespoke to the specific system as the hose requirements will vary more with gas fuelled systems interchangeability of pistols if required.

Product Number and Description

21245	High Pressure Oxygen Regulator
21262	Inert Gas Regulator 3/8"BSP, 2 Stage, 0-10 Bar
21259	High Flow Hydrogen Regulator for JET-H2 Systems

SUPPLIES PACKAGE

SUP-PCC(HVOF-G) INCLUDES

- 5m input supplies for coolant (supply and return), oxygen and carrier gas into the gas box.
- 10m output supplies for coolant (supply and return), oxygen hose, fuel gas hose, anti-static powder feed hose and carrier gas hose.

AK-DJ INCLUDES

- Adapter fittings to interface between the end of our standard supplies pack hoses and the non-Metallisation pistol.
- Any additional hoses required, e.g. Diamond Jet style pistols require and additional air hose.

GENERAL INFORMATION

- The fittings stated are those at the free ends of the hoses and not the interface at the control box.
- Cabling to link the operator interface to the control box and powder feeder is included, 10m length plus the required plugs. Maximum possible distance is 250m.
- A 240/110v 1ph, 8A/15A supply will also be required to the control box and the powder feeder.
- The high tension ignition lead is included in the control box, 10m.

REGULATORS / ARRESTORS

Information

- 21245 bottle connection = 5/8” BSP.
- 21245 outlet connection = 3/4” BSP.
- 21262 bottle connection = 5/8” BSP.
- 21262 outlet connection = 3/8" BSP.
- 21259 bottle connection = 5/8” BSP.
- 21259 outlet connection = 3/8" BSP LH.
- Other bottle connections can be accommodated upon request.

Metallisation

thermal spray **solutions**

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