

'WST' GAS FUEL HVOF SPRAY SYSTEM MODEL: MACHJET-I



WST offers gas fuel HVOF spray system Model: MACHJET-I for spraying carbides, alloys, Stellite, self-fluxing alloys, etc powders using High Velocity HVOF spray gun MACHJET-2700. The system has light weight hand held powder flame spray gun MACHJET-2700 which is unique in design and easy to operate. The WST's HVOF system MACHJET-I is ideal for continuous thermal spray needs and a good choice for high volume coating jobs.

The WST's MACHJET-I HVOF Spray System consists of the following items:

1. WST HVOF Spray Gun, MACHJET-2700
2. WST Control Panel, MJ-3100
3. WST Powder Feeder, PFD-3500
4. Gas control unit
5. Air Control Unit
6. Gas & air hose set
7. Portable Trolley
8. Set of recommended spare parts

WST HVOF SPRAY GUN, MACHJET-2700



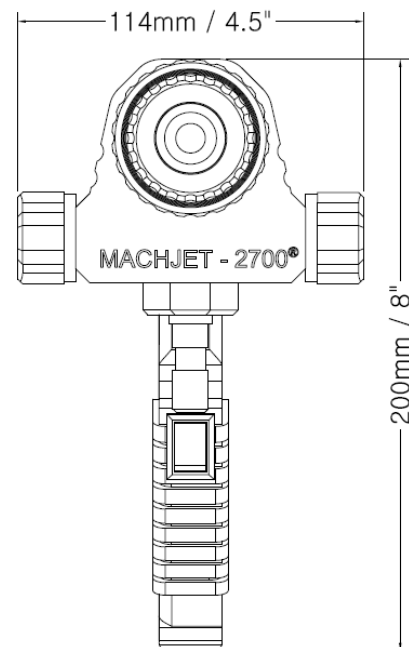
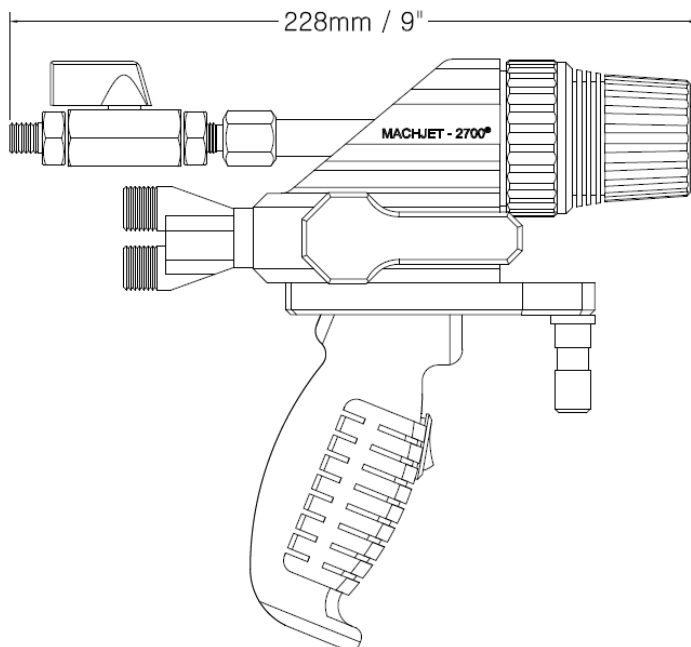
The MACHJET-2700 is most versatile and user friendly HVOF spray gun developed to produce high integrity coatings of metals, alloys, superalloys and carbides. Coatings sprayed by MACHJET-2700 gun exhibit high density, low oxide content, superior micro hardness and high adhesion with excellent machinability.

The gun has a hand-held selector switch that starts or stops the flow of powder during the spraying operation. The gun ignites at 45 degree of the rotation of valve core lever and runs in full mode at 90 degree of the handle rotation.

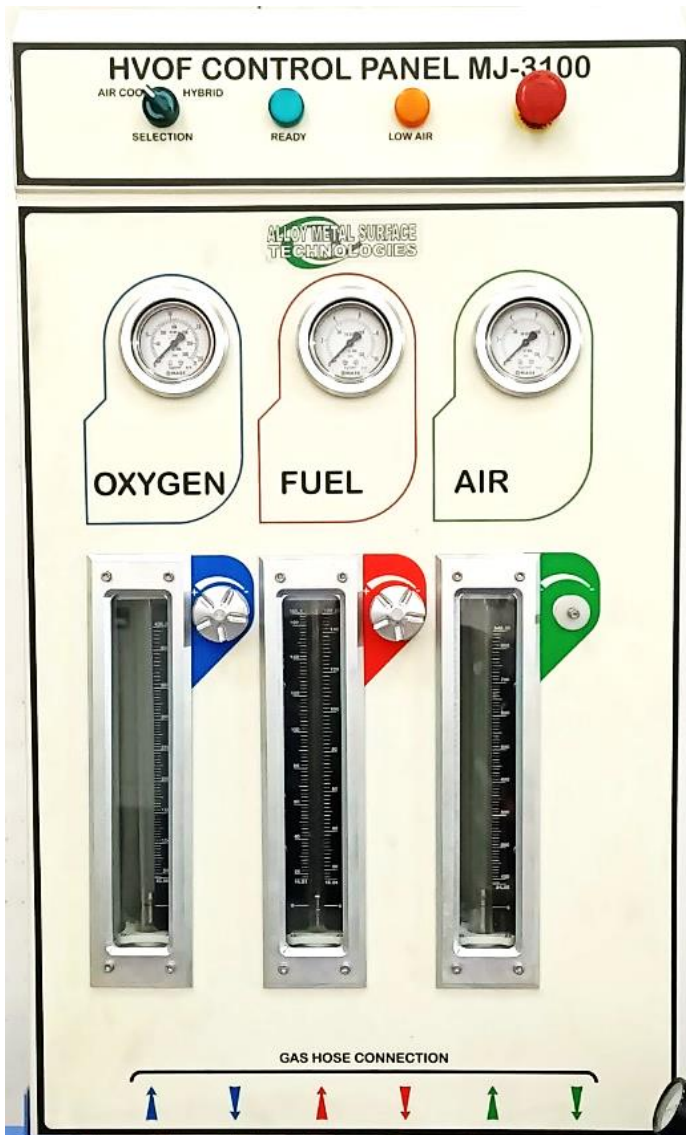
The standard fuel used in the gun is LPG/Propane. The gun is offered with powder On/Off valve at the back of the gun and gun hose connection block is fitted with NRV / Check valves to arrest the back flow of the gases in the unlikely event of backfire.

- **Choice of machine-mount and handheld models**
- **Optionally water cooled hybrid jacket is offered for dense coating**
- High spray rate with low gas consumption
- Extension modules for internal bore applications
- Module shaft length options
 - 610 mm (24 in)
 - 900 mm (36 in)
- Low process gas consumption compared to other HVOF spray guns.
- Water consumption for water-cooled guns is minimal, with only potable water quality required.
- Axial powder feed eliminates coating material buildup on the extended air cap, increasing gun service life.

Weight of the gun	:	1.75 Kgs Approx
Gas Velocity	:	1370m/s Approx
Total heat output	:	113kW Approx
Propane/LPG Flow	:	40 - 90 NLPM
Oxygen Flow	:	220 - 305 NLPM
Compressed air	:	400 – 650 NLPM



WST CONTROL PANEL, MJ-3100



The MJ-3100 control panel is designed & offered a semi-automatic controls, monitoring and operation of WST gas-fueled HVOF thermal spray systems MACHJET-I. Offered control panel is user friendly and is provided with gas flow meter / rotameter for Fuel, Oxygen & Compressed air. Operator can easily adjust the knob to regulate the flow and set the float to the desired value on the twin scale shows flow range in NLPM/SCFH.

The scales are pre-calibrated for accuracy and reliability. The panel is offered with an interlock of compressed air to make the system healthy only when air at required pressure is available. Suitable pressure gauges analog type are provided at the front of the panel to view pressure values of each gas.

- Accurately and reliably regulates HVOF gas fuel spray parameters for consistent coating quality.
- Versatile, allowing use of propylene, propane, ethylene or natural gas (methane) for the HVOF fuel gas.
- Large, easy to read flowmeter / rotameters and pressure gauges.
- Meets rigorous safety codes.
- Suitable Check valve and flashback arrestor in the Oxygen line.
- Standard power requirement 1Ø/220V/50Hz. Optionally for 110V is available.
- A positive pressure condition is maintained in the electrical enclosure to prevent entrance of spray dust or process gases.

WST POWDER FEEDER UNIT, PFD-3500



A volumetric metering type powder feeder unit is offered to feed the gun with coating powder from feeder canister outlet. The powder canister is designed to have top lid with viewing glass to see the level of powder and to charge the powder in the canister. The feeder is designed to have tilting canister assembly for easy emptying of the powder from the canister without removing the canister from the body. The feeder has rotameter type flowmeter for measuring carrier gas flow readout.

The powder feeder has rotating stainless steel disk with suitable number and size of the holes which allows specific quantity of the powder volume passes through the holes at specific period of time as per RPM of the rotating disk, thus allows required metered quantity of powder to the gun. The RPM of disk can be varied by a potentiometer which controls the speed of DC motor.

Powder Canister Capacity	:	3300 C.C (3.3 Ltrs) Volumetric
Power Requirement	:	Less than 0.1 kW
Electric input	:	220V/1Ph/50 Hz
Carrier Gas Flow	:	Nitrogen / Argon (Flowmeter)

GAS CONTROL UNIT (LPG/PROPANE & OXYGEN)



Gas control unit consists of two regulators viz, each for Oxygen & Fuel. Oxygen regulator is double stage type and can be easily mounted on the respective cylinders. The two stage regulator drops high gas pressure to the permissible pressures for the HVOF spray process. Each unit has two pressure gauges, for cylinder inlet pressure and regulator outlet pressure respectively.

AIR CONTROL UNIT (COMPRESSED AIR)



Air Control unit is offered for the compressed air pressure regulation and allows filtered air only to the spray gun for the cooling / to the 2PSA air cooling unit for job cooling.

The air control unit is wall mounted and is offered with suitable pressure gauges for the operator to read the air pressure settings during spraying process.

GAS & AIR HOSE SET :



A twin hoses type set is offered for fuel and oxygen and pneumatic rubber hose for compressed air. The unit is offered in two length viz, 7.5 mtrs from flowmeter to the gun and 3 mtrs from cylinder to the inlet of flow meter. Both ends of the hoses are provided swivel female connections with cap nipple set for leak proof connection.

PORTABLE TROLLEY WITH STAND :



A portable trolley is offered for mounting control panel, placing powder feeder, vaporizer, gun mount stand, air control unit and storing hose sets. The trolley is constructed from heavy duty pipe and sheet metal construction for strength & rigidity. Four heavy duty castors are offered for the ease of movement of the trolley at site on the floor. Trolley is designed to meet aesthetic looks and engineering strength.

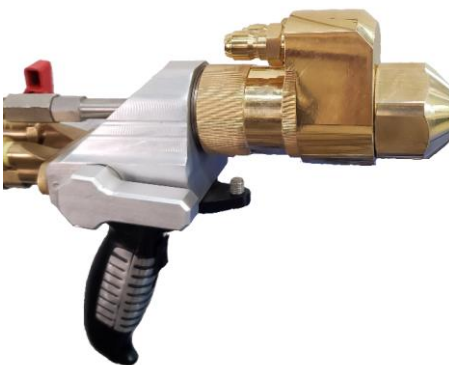
BUYER'S SCOPE OF ITEMS/WORK/ACCESSORIES AT NO COST TO SELLER:

1. Dry and oil free compressed air 35 CFM @ 90 psig upto gun control panel
2. Acetylene fuel in cylinders & Oxygen gas in cylinders
3. Thermal spray powders of suitable specifications.
4. Electrical supply 220V, 1Ph, 50 Hz and its connection to the vibrator panel.
5. Dust disposal arrangement
6. Operator safety wear, as applicable.
7. Spray booth and proper dust extraction system.

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OPTIONAL ITEMS / ACCESSORIES (To be purchased separately) :

WATER COOL JACKET:



WST water cool jacket is offered as replacement of air cooled jacket to offer cooling of MACHJET-I HVOF gun using cold water from industrial chiller. The jacket has one inlet & one outlet connection for water and has envelope of water around the extended air cap to cool down the jacket parts during HVOF coating operation. Using water jacket offers dense coating and allows coating for long duration. Water jacket is connected to the water jam box module with water hoses.

WATER JAM MODULE (WST-JBM) :



WST offers water jam module for monitoring return hot water from the water cool jacket of the HVOF gun. Jam module has a temperature sensor to measure the return water temperature and also displays the water temperature on a digital display provided on the jam module. If the water temperature goes more than the set values on thermostat, the system stops. Jam module is designed to hang on the wall of the chamber ergonomically positioned to have easy view of the display at the operator's viewing level.

LPG VAPORIZER :



WST offers a LPG vaporizer to vaporize the liquid content in the LPG gas so that liquid particles convert to gaseous state and thus allows smooth ignition of the HVOF gun. The gaseous state of the LPG fuel offers high quality melting of the coating powders due to proper combustion of the fuel.

Water is filled in the tank of vaporizer from the top opening and a water heater with copper coils are offered to heat the water. A thermostat is mounted on the top of the vaporizer by which water temperature can be set as per required coating properties. LPG vaporizer has a controller which displays the real-time water temperature on the digital display. Also has indicator to show the status of operation. The control can be mounted on the LPG vaporizer or on the portable trolley.

OXYGEN GAS MANIFOLD SYSTEM :



WST offers gas manifold system for oxygen gas supply to the panel. To achieve uninterrupted gas supply to the control panel, series of six cylinders can be connected to the manifold system with one outlet supply. The system has flexible hose supply with opening valve, NRV, double stage regulator and pressure gauges. The thread size offered is as per Indian gas cylinders however connectors can be offered to meet load thread requirements, if customer give thread details.



WORLD SURFACE TECHNOLOGIES

Complete solution for surface preparation & metal spray

SAFETY & USE OF EQUIPMENT

All safety features and ergonomic principles have been considered in the design and manufacturing of the systems to keep the operator comfortable and safe as well as the coating environment.

General :

It is a completely safe process when performed by a capable operator with proper understanding of flame spraying practices, knowledge of the equipment, care in operation, and one who follows the recommended precautionary measures. The possibility of hazards can be isolated by proper handling of high pressurized fuel gases and hose connections. **MACHJET-I HVOF spray equipment has been expressly designed for HVOF spraying. Not intended for any other purpose such as welding, soldering, brazing and their likes.**

Reduction of fire & explosion hazards :

The stream of sprayed metal is hot. Always point the lighted gun towards the job. Carelessness in pointing the gun at paper or oily rags can result in fire. Special care should be taken to protect the hoses from spray stream.

Gases :

A regular inspection is required for all gas equipment such as Fuel gas, Oxygen and airlines, compressors, regulators, etc. for leaks and loose connections. The backfire of the spray gun can be prevented by using pure gases and regular checking of nozzles and air caps.

Equipment maintenance:

Total maintenance schedule and procedure has been described in the MACHJET-I HVOF Operation Manual and we recommend them strongly for safe and long serviceability of the system.

Metal dusts :

The greatest care should be used in handling to minimize the danger of the dust explosion resulting from flame spraying, adequate ventilation must be provided for spray booths and other confined spaces, to prevent the accumulation of fumes and dust.

Good housekeeping in the work area is essential. Inspect and clean regularly to assure that there is no potentially dangerous accumulation of dust. All types of dust having considerable calorific value can be explosive. This dust includes flour, starch, hard rubber dust, wool flour, aluminum dust and the dust of other metals. Aluminum and magnesium dusts are particularly hazardous. The dust must be wetted down and remain immersed in water. Accumulation of dry or partially wet dust should not be permitted. A SPRAY BOOTH is recommended to fulfill the requirements of the dust collection of system. All closed collectors should be provided with blow out holes or relief panels. All fans, pipes, dust arresters motors should be electrically grounded.

Address : 42A Penjuru Road, Singapore 609164

Office: Level 6, Lobby 1 | Workshop: Level 4, Bay 1

Tel: +65 6864 0960 | Fax: +65 6861 0965

sales@wwg.sg

www.wwgengineering.com



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Gas Cylinder Precautions :

Charged gas cylinders are potentially dangerous. Never put a gas cylinder in hazardous position. Keep cylinders away from heat and moisture. Always chain them to keep from toppling. Put the valve caps on the cylinders when they are not connected for use. Do not hang a flame spray gun or its hoses on regulators or cylinder valves as a fire or explosion may result. Reduction of respiratory hazards: Fumes or dusts of powders can be toxic and hazardous. Efficient spray booth and exhaust system are therefore essential while spraying these. Besides, the operator is recommended to wear a suitable mask with respiratory protection. Reduction of noise hazard: The operator and other personnel close to the flame spray operation should be protected from prolonged exposure to noise. Keep an ear protector while moving near to the spray process, maintain possible isolation from the process because the noise level in a thermal spray system is an unavoidable issue while the operator is in the working area (within the acoustic chamber).

The noise levels of MACHJET-I ranges from 125-130 dBA.

Eye protection: Always wear eye protectors when operating, or watching the flame spray operation. Inspect the eye protectors frequently. Lenses and over plates, which are scratched, pitted or damaged, can impair vision and seriously reduce protection.

WST TAKES SAFETY OF THERMAL SPRAY VERY SERIOUSLY INSTEAD AN OPTION. ALL OF OUR HVOF SYSTEMS ARE ENGINEERED AND BUILT FOR PRODUCTIVE AND SAFE OPERATION. WST WILL STRONGLY RECOMMEND THE OPERATOR TO FOLLOW THE SAFETY SYMBOLS WHICH ARE AFFIXED ON EACH SUBSYSTEM WHILE OPERATING THE MACHJET-I THERMAL SPRAYS SYSTEM.

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