



THERMAL SPRAY SHED

Thermal Spray Facility (TSF) is designed to provide current and future applied research required in the field of protective coatings for energy and manufacturing sectors e.g., metallurgy, chemical (valves, shafts, reactors, piping etc.) and power (boiler tubes, turbine blades etc.). TSF was established in 2017 with funding from HEC, USAID and NUST. TSF is the pioneer lab in the academic space of Pakistan equipped with systems for all major coating techniques including atmospheric plasma spraying, high velocity oxygen fuel spraying, wire arc spray and combustion powder spray. TSF is also equipped with substrate preparation facility for smoothing or roughing the sample as per requirement using sandblaster. This facility has good potential to provide services in the field of protective coatings to academia, public and private sector organizations.

LAB MISSION

To develop durable protective coatings and provide engineering solutions for energy and manufacturing sector of Pakistan.

RESEARCH PORTFOLIO

Thermal Barrier Coatings for Gas Turbine Engines, High Temperature Fuel Cells, Wear Resistant Coatings, Corrosion Resistance Coatings, Ceramic Coatings, Sacrificial Coatings for Protection of Metals.



RESEARCH EQUIPMENT

Equipment	Description	Specification
Atmospheric Plasma Spraying (APS) System	<p>In APS process, the depositing material is in semi-molten or molten form. The material to be deposited is fed into heating chamber. After heating, the material particles move towards substrate with high speed and strike to its surface.</p> <p>It can be used for spraying many kinds of ceramic, cermet and metallic coatings for energy and automotive industries.</p>	<p>Model: SX 80 Guangzhou Sanxin Metal S&T Co., Ltd</p> <p>Power Supply: 85 kW (Max. power output is 80 kW)</p>
High Velocity Oxygen Fuel (HVOF) Spraying System	<p>HVOF process starts when oxygen and fuel gases are introduced into combustion chamber. Combustion produces heat, pressure and the produced gas is allowed to pass through the nozzle which increases the velocity. Powder is fed along with carrier gas where it is heated and accelerated towards substrate.</p> <p>Any metallic and cermet material can be deposited in this process.</p>	<p>HVOF SX-5000 Spray System Guangzhou Sanxin Metal S&T Co., Ltd</p> <p>Key components include spray gun, powder feeding machine, control system, heat-exchanger system and pipeline system.</p>
Wire Arc Spray System	<p>In Wire Arc spraying process metal in the wire form is used as depositing material. Heating occurs when two opposite electrically charged</p> <p>wires which consists of spray material comes together in such a way that a controlled arc occurs, molten metal is then atomized and propelled towards the substrate by a stream of compressed air.</p> <p>Many metals such as Zinc, aluminum and their alloys can be deposited by this method on substrates to protect them from degradation by corrosion.</p>	<p>SX 400 Wire Arc System Guangzhou Sanxin Metal S&T Co., Ltd</p> <p>Power: 380 V, 50 Hz, 400 A Max.</p> <p>Wire diameter: 1.2mm-3mm</p>
Combustion Powder Spray System	<p>During combustion Powder Spray, powder material is heated by the combustion of fuel gases after that a highly pressurized stream of air atomizes the molten material and propels it towards the substrate. There are many advantages of flame spraying method such as high deposition rates, low capital and maintenance cost and relative ease of operation.</p> <p>The technique is capable of coating powders of different materials over diverse substrates.</p>	<p>SX 6016 Wire Arc System Guangzhou Sanxin Metal S&T Co., Ltd</p>