Dymet Technology: Overview

Technology principles

The Dynamic Metallisation (Dymet) technology is based on the idea of kinetic bombing of substrate with metal powder particles. Due to supersonic velocity the particles bond with the treated surface on subatomic level, which guarantee high adhesion of interface and high cohesion of a homogenous coating.

The equipment is designed in a manner that the compressed gas (air) passes through the heater and then the nozzle, where the metal powder is fed in. The air and powder particles form supersonic air jet in the nozzle. The material accelerated in the supersonic nozzle deposits onto the treated surface.

Unlike thermal spray processes Dymet technology operates almost at room temperature. The sprayed materials experience little or no oxidation during the process and the coatings show high densities and conductivities. The technology implies surface interaction of metal particles moving at extremely high velocities with the substrate. The acceleration of the powder particles to high velocities is achieved in supersonic nozzles of the DYMET® series devices. This equipment has no analogues in traditional coating methods.

Dymet Key Advantages

- Easy to operate - doesn’t require highly qualified personnel;
- Portable - can be operated in field conditions;
- Environmentally friendly (no gas, electric arc, ions, flame or plasma used);
- Totally integrable with pneumatic and electrical control systems;
- Variety of applications – from decorative and protective coatings to aerospace and hi-tech;
- Independent of surface and atmosphere conditions.

The uniqueness and high efficiency of this technology is determined by the following facts:

- Low temperature spraying does not lead to deformations, mechanical and thermal stresses and structural changes of metal parts
- Localised spraying jet does not affect adjacent areas
- Restoration of thin wall parts is feasible where the other methods cannot be used
- Dymet is adaptable for any industrial enterprise or small business

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Basic Characteristics of Dymet Coatings

- high adhesion (30-100 MPa);
- high cohesion (30-100 MPa);
- uniform coating structure;
- low porosity (1-3%);
- strong adhesion of coating to a surface without cracks or cavities providing reliable electrical galvanic contact between coating and a surface;
- coating roughness is Rz = 20-40 providing high adhesion of paint materials to it;
- coating could have any thickness depending on chosen operation mode of the deposition;
- coatings could be mechanically treated by any known method;
- special thermal treatment can add new features to a coating;
- coatings could be deposited onto any metal, ceramic or glass surfaces.

Types of Dymet Coatings

Multi-component Metal Coatings For Repair And Restoration Of Damaged Or Worn Products

Fixing a hole in the wall of 2-stroke engine. Thickness of the wall - 2 mm.

Multi-component Metal Coatings For Repair Of Defected Metal Castings


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Anticorrosive Coatings Of Welded Seams And Parts

Zinc coatings for corrosion protection of welded parts and structures.

Anticorrosive Coatings Of Automotive Parts

Exhaust pipe before and after applying protective coating. Coating material - aluminium.

Coatings With Low Gas Penetrability (Hermetic Coatings)

Sealing a joint of aluminium and copper pipes. Filling a hole in an industrial refrigerator.

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Electroconductive Coatings

Conductive copper coatings on ceramic insulators and steel welding electrodes.

Decorative Coatings

Reflective (mirror) coatings on colour glass.
Decorative coatings on glasses.

Special Coatings

Anti-spark coatings on tools for dangerous conditions.
Heat-resistant coatings. The right part was heated for 100 days at 1100°C.

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Special Coatings

Anti-seizure coatings on propeller bolts. Antifrictional coatings on well drilling pipes.

Consumables And Spare Parts

Special metal powders are used for coatings deposition by DYMET® equipment. These powders are specially formulated for particular applications.
Nozzle inserts, which are worn out during the equipment exploitation, can be also considered as the consumed materials.
The consumed materials are supplied in accordance with customer orders.

Industries Served

The major industries where the technology can be used are as follows. However, this list is not exhaustive.
• Aerospace and Aviation
• Agriculture
• Automotive and Transportation
• Chemical
• Construction
• Electrical and Electronics
• Food Processing
• Manufacturing
• Marine
• Metal Casting and Machining
• Mining
• Mould and Tool Making
• Oil and Gas
• Pipe Production and Lining
• Power Generation and Transmission
• Prototyping
• Repair and Maintenance