**Description**

The technology of cold gas-dynamic spraying (CGDS) is intended for deposition of powder coatings of metals, alloys, powder mixtures, including non-metals, polymers, etc., on items made of metals and dielectrics, i.e. ceramics and glass. It can be used for compacting of new materials as well. A high-speed flow of ‘cold’ powder particles accelerated by a supersonic gas jet is sprayed at the temperature significantly lower than the powder melting point. Resulting absence of a gas release (a pore-formation) and oxidizing processes provides high corrosion resistance and electric conductivity of the coatings. In particular, a technology of spraying protective coatings on aluminum cable lugs (CL) has been developed, which allows cooper lugs and combined lugs taken out from production to be replaced by the lugs of new construction.

![Installation for cold gasdynamic spraying of cable lugs](image)

**Technical appraisal and economic benefits**

A relatively low-temperature spraying of solid-state (unmelted) powder ensures high quality (absence of through pores, minimal content of oxides, etc.). Power inputs are lower than for thermal spraying. Fine-dispersed powders (particle size ≤ 50 µm) can be used. The technology of production of the cable lugs yields 50-fold saving of non-ferrous metals as compared to the technology of manufacturing combined copper-aluminum CL. The CGDS technology has no analogs in the Russian Federation and abroad.

**Application areas**

Metallurgy, mechanical engineering, aircraft construction, motor-car engineering and instrument making, etc.

CGDS is used for spraying anticorrosive (on tubes, rolled metal, sheet products and structural shapes, etc.), hardening, antifriction and other coatings. CGDS-treated electric adaptors are used in the electric power supply systems at industrial enterprises, power engineering objects and transport, etc.
**Development stage**

Pilot prototypes and experimental models were commissioned to MAI, Moscow; Company “Rik-C”, Moscow; Daimler-Benz, Germany; Institute of Metal Research, Chinese Academy of Sciences, Hengiang, China; International Advanced Research Center for Powder Metallurgy and New Materials, Hyderabad, India. The technology and equipment for spraying conductive protective coatings on aluminum cable lugs (CL) were designed; series of the samples were manufactured for testing their conformance with national standards, as a result, an adequate amendment to the national standards was introduced.

**Patent situation**

The technology is patented in RF, USA, Europe, and France.

**Commercial offers**

Selling of the equipment and licenses, production of cable lugs with conducting protective coatings, establishment of joint ventures.

**Estimated cost**

The cost of a transportable facility (gun type without a compressor) is at least US $ 8,000.

The cost of the stationary plant (without compressor) depending on its productivity and size, type of items to be sprayed and coating type is US$ 15,000 – $50,000.

CGDS of lugs depending on the dimension-type is 2-10 ruble per unit.

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