



NATIONAL METALLURGICAL ACADEMY OF UKRAINE

COMPLEX TECHNOLOGY FOR STRENGTHENING TREATMENT OF DUAL-USE PRODUCTS

(THERMAL TREATMENT OF A PRODUCT WITH FURTHER ION-PLASMA AND THERMAL TREATMENT OF FUNCTIONAL COATING ON A WORKING SURFACE OF A PRODUCT)

Purposes and implication

Technology allows to manufacture various large dimension high strength steel products (according to the criterion of metal proportionality limit ≥ 1400 MPa with protective chromium or other coating of hole surface) such as main gun of a tank and other weapon system platforms that work under high gas pressure and are exposed to corrosion and wear-and-tear, and have to perform ≥ 500 shots.



Photo of test equipment for covering working surface with functional coating

Key characteristics of the developed technology

The technology was first developed in Ukraine and tested in Yuzhnoye Design Office (Dnipro). Ukrainian industry manufactures equal products without protective coating with proportionality limit ≤ 1200 MPa whereas developed countries (including NATO) manufacture tank guns with protective chromium (or other) coating of hole surface with metal proportionality limit ≥ 1400 MPa.

Complex development allows to receive the same possible level of metal strength as in NATO countries (with metal proportionality limit ≥ 1400 MPa) after final thermal treatment with maximum wall thickness ≥ 100 mm and allows to cover hole surface with protective coating (chromium, tantalum, etc.) with further thermal treatment that allows to perform ≥ 500 shots.

To cover hole surface of large dimension products with protective coating and perform further thermal treatment there has been developed structural and technological parameters for the equipment as well as combined processing mode. Pilot industrial testing has shown the possibility of covering hole surface of the manufactured product (with $\sigma_{\text{нл}} \sim 1200$ MPa) with chromium coating that significantly prolongs operational period of products.

Comparison with the world analogues

The technology corresponds to the best world analogues and allows to receive operational properties of the product required by NATO countries.

Intellectual property rights protection

There are over five patents for the utility model.

Market demand

The technology has been industrially tested with chromium coating technique in Yuzhnoye Design Office (Dnipro) and can be implemented in machinery and metallurgical plants in Ukraine to satisfy state demand for tank guns with metal proportionality limit over 1200 MPa.

DEPARTMENT OF INTELLECTUAL PROPERTY AND
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