Spanish Journal of Innovation and INTEGRITY
ISSN: 2792-8268
Volume: 38, Jan-2025
http://sjii.indexedresearch.org

Ways to Increase the Quality Indicators of Mechanical Engineering Details

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Annotation: *It is known that in mechanical engineering there are various ways to increase the quality indicators of metal objects, which are illuminated by the information on the selection, depending on the characteristics of the processing.*

Key words: *machine, galvanic, processing, quality, electrophysical, electrochemical, chromium, coating, density, surface, item.*

Increasingly widely used in mechanical engineering, galvanic coatings improve the quality of metal products with such indicators as mechanical properties of resistance to stretching, bending, compression and twisting, hardness or wear resistance in friction. Galvanic coatings are mainly processed into metals using electrophysical, electro-volatile, electroimpulsive, anode-mechanical, and electrochemical methods. The electrophysical processing method is based on the effect of electric discharges on the working area of the material. In this, there is an anode (tool) and a cathode (zagotovka), between which the generated electrical discharges pass into the working zagotovka, releasing heat in a large micdor. The processing site is evaporated and absorbed. This method includes electric spark, electroimpulsed, anodno-mechanical and ultrasonic methods. The electric spark method is based on the absorbent nature of the surface under the action of electric spark discharges, which are sent to the working area of materials in 1943 B.R. Lazorenko and N.I. Lazorenko discovered. In this method, the material to be processed (zagotovka) is connected to the positive pole of the invariant current source, and the instrument is connected to the negative pole. When the current voltage brings the instrument under the closer to a certain range (0.05 mm), under the influence of an electric field, the current of electrons begins to flow from the cathode to the anode, resulting in electric spark discharges between the electrodes. This method takes precise and flat-surface objects, the serunum method, but the process requires a lot of electricity consumption. The electroimpulsed method uses electrical pulses from a special generator. The difference between this method and the electric spark plug method familiar above is that in this case, the instrument acts as an anode, while the working zagotovka acts as a cathode.

The process is carried out at a small voltage (25-30 V), at a large current (50-500 a) in a pulse with a frequency not so large (400-800 pulses). This method is 8 - 10 times more fertile than the electric spark. The anode-mechanical method was introduced in 1943 by V.N. Gusev had discovered that it would only be used to cut and separate steel zagotovkas, sharpen hard alloy chisels, work stamps and matrices continuously (ultimately), and make other similar items. In this method, a special liquid electrolyte (a solution of sodium silicate in water) is introduced into the positive pole of the zagotovka invariant

current source, and the instrument into the negative pole, the zazor between them. In this case, as a result of an electrochemical process going on the surface of zagotovka, a current-proof curtain is formed, which is a product of a metal solution. When the tool is pushed, its tip goes from zagotovka to the curtain easily. Instead of this curtain, a new curtain is formed, which is also cut. In this way, the process is repeated and continues until the zagotovka tula is cut or the expected shaped and dimensional work is done. The arc discharge goes through it for a short time, as the height of the bulge on the surface of the developing zagotovka does not get out of the tool in such a large interval.

In doing so, the microscopic surface melts and the particles separate. In this case, zagotovka is polished in the anode-mechanical process, the current density increases from it, and metal processing from the surface goes at the expense of the electroerrosion process. The ultrasonic method is based on the fact that this method of metal processing is elastically-mechanically vibrated into the working zone with a frequency greater than the sound frequency generated in special acoustic heads (16-20 kgs). In this case, abrasive particles with water or oil vibrate elastically at a large frequency, giving a blow to the place of operation of the zagotovka. This method is used when working various hard, brittle and non-conductive materials, making holes of different shapes and sizes, and in other cases. Electrochemical machining is a zagotovka anode, and cathode plates are made of stainless steel, Pb, Cu and other materials and lowered into a container containing an electrolyte (acid, salt solution), the cathode plates are connected to the negative pole of the fixed current, the positive pole of the anode (zagotovka). In this case, due to the chemical reaction going through a constant current of a certain density, the surface of the anode is melted and transferred to the electrolyte. This method is used in processing such as polishing, polishing when cleaning burns, rust, etc.on the surface of zagotovka (details). It is worth noting that if it is necessary to clean the mechanical impurities (precipitation, etc.) on the surface of the zagotovka (detail), then as an electrolyte, not an acid or salt solution, alkaline acid is taken and treated in a small current, as seen above. This kind of processing is called electrolytic cleaning.

If it is necessary to polish chisels (Parma, milling), wheel teeth, valves, etc., the electrolytic is polished, in which, for example, if they are made of carbon and low-alloy steels, the electrolyte will contain 40% phosphoric acid, 5-12% sulfuric acid, 6 -8% chromium anhydride and 12-15% water. The constant current density is selected according to the nature of operation. After polishing, the surfaces become more refined and their corrosion, their durability and thoroughness increase. Improving the efficiency of production in all areas of folk Khojaly is inextricably linked with the saving of fuel, electricity, metal, spare parts, materials, as well as the full use of natural resources and environmental protection. One of the most important resource-saving reserves (reserves)is the restoration of the working capacity of the eaten details of machines, which requires 5-6 times less technological operas than when preparing new details for work. Up to 85 percent of the details, judging by the data from sources, are rubbed when their working surface is eaten up to a maximum of 0.3 mm, that is, a layer of not much thickness is covered during the restoration process. Restoration of crushed details allows you to solve several interconnected: the shortage of spare parts is reduced, other materials are saved on metal, and the cost of repairing machines is reduced. In engineering practice, electroplating (Galvanotechnical concentration of the amount of substance in one liter G/l) is the current that is spent to form a coating on the metal surface Determined by G.S. Levitsky method (Figure 1):

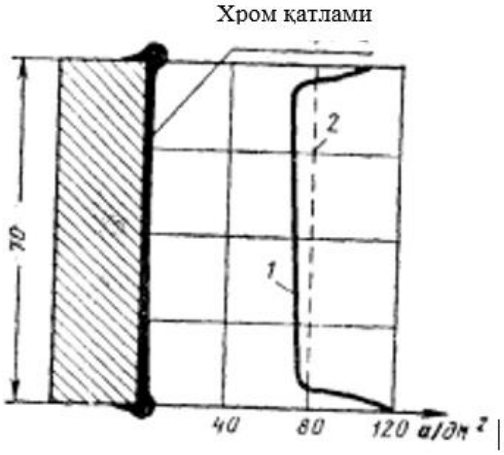
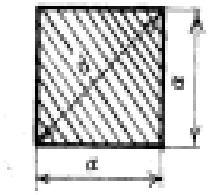
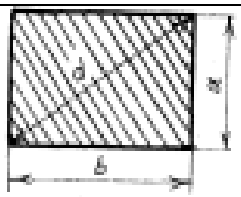
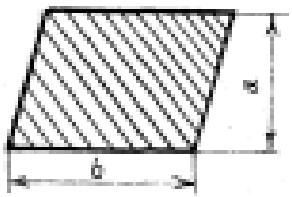
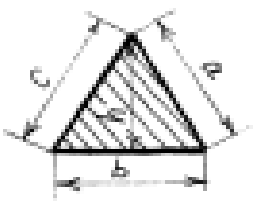
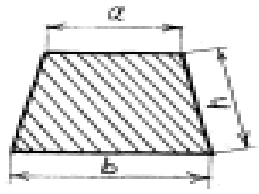
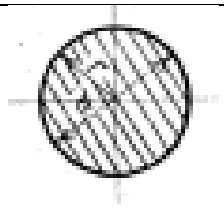
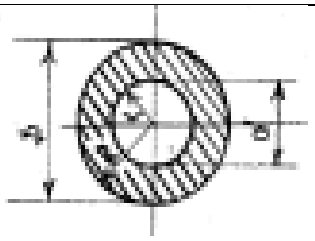
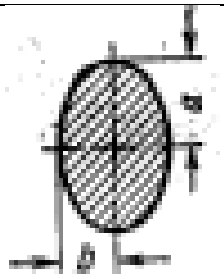
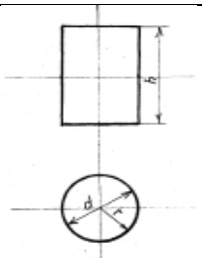
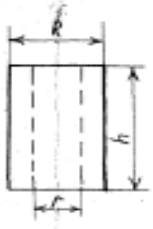


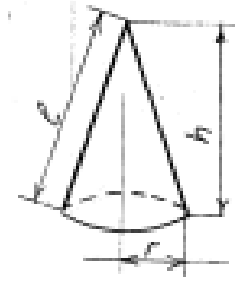
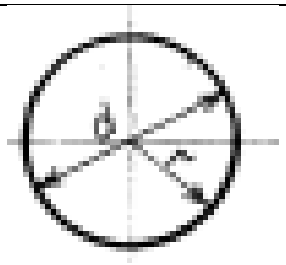
Figure 1. When chroming cylindrical surfaces, the distribution image of the spent current (G.S.Levitsky method): 1 - the density of the real current; 2 - the density of the calculated current.

The formulas for calculating detail surfaces in the galvanic coating of the surface of metals are presented in Table 1.

Table 1. Data on the calculation of detail surfaces

N	Naming the geometric shape of the detail	Drawing	Formula
1	Square		$F = a^2 = 1/2d^2$
2	Right angle		$F = ab$
3	Parallelogram		$F = ab$
4	Tripartite		$F = bh/2$; $P = 1/2(a+b+c)$

5	Trapesia		F = a+b/2 (h)
6	Circle		F = $\pi r^2 = \pi d^2/4$
7	Circle		F = $\pi(R^2 - r^2) = 1/4\pi (D^2 - d^2)$
8	Ellipse		F = πab
9	Cylinder		M = 2πrh=πdh
10	Hollow cylinder (groove)		M = ички + ташқи =2πh(R+r)

11	Conus		M = πrl
12	Ball		Г = 4 π r^2 = π d^2
Designation: G'–surface; R–semiperimeter; R–circle radius; r–radius; M–side surface.			

In practice, if the weight and thickness of an item are known, the surface is determined by expressions in the sheep:

For stamped list metals:

$S = 23P/H\gamma$, mm^2;

For the surface of the item made of wire

$S = 40P/d\gamma$, mm^2;

Tape for metals

$S = 20P(a+b)/ab\gamma$, mm^2.

Where S - the surface of the item, mm^2; P-rough steel, g; H - metallic steel, mm; γ- density of metal, d-provolki diameter, mm; a-tape thickness, mm; b-tape width, mm.

Taking into account the geometric shape of the detail in the galvanic processing of metal products, modern equipped galvanic and electroplating in machine-building enterprises are considered the main factors of the quality of the item in the preparation of products based on advanced technologies.

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