

## **Mechanical Properties of Metals**

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**Abstract:** This article provides information about the mechanical properties of metals: strength, hardness, flexibility, plasticity.

**Key words:** Metals, hardness, elasticity, plasticity, deformation, mechanical energy.

### **I.Introduction**

Metals have mechanical properties such as strength, hardness, flexibility, plasticity, etc. In this, various metal samples are tested on appropriate machines. It is necessary to pay special attention to the hardness of metals, because in the engineering industry there are methods of changing the hardness of metals, and it is of great importance. the metal will be softer and vice versa. Hardness of metals refers to the metal's ability to resist sinking a harder object into it. Hardness is one of the most basic properties of a metal, and this property represents its suitability or unusability in the preparation of details. The harder the metal, the more power is required to work it. The hardness of metals is determined in different ways. Among the methods, the most commonly used methods are those that are determined by dipping a ball, conical diamond, or pyramidal diamond into the sample.

The mechanical properties of metals reflect the ability of materials to resist the loads applied to them. The main mechanical properties of materials are determined during testing. Variable variable, dynamic and static tests are distinguished depending on the nature of the effect on the unit of load. The mechanical properties of metals are also manifested by the application of external

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loads to the product. In particular, tests are carried out with bending, twisting, compression, stretching and other effects. The mechanical properties of metals are also manifested during deformation. This process is understood as a change in the size and shape of the article under the influence of loads. Deformation in solids is divided into plastic and elastic. In the first case, the product does not return to its size and shape after carrying the load, and in the second case, it returns to its original state before applying the force.

Usually, the mechanical properties of metals are described by hardness. This is the most important quality of the products. Hardness is the ability to resist deformation of metal. The quantitative indicator of this ability is most often found in product quality control. The next important property of metal is strength. By this quality, we mean the ability of the product to resist destruction and deformation. When a crack occurs, the process of crack formation causes the material to split into pieces. The power amplifier is determined during the tests. The plasticity of the material represents its ability to plastic deformation. In other words, this quality determines the possibility of obtaining residual changes in size and shape without destroying the integrity. Plasticity is an important criterion in the selection of products for pressure treatment. The ability of a part to absorb mechanical energy from an external force through plastic deformation is called viscosity. A special place among alloys is occupied by cast iron (iron-carbon alloy). It contains more than 2.14% of carbon and impurities. Iron-carbon aluminum residues are high.

The most common types in industrial production are white, gray and high-strength cast iron. For example, the first has high hardness values, which resists wear. At the same time, white gravel is pea. In addition, the material is not well processed by cutting. Accordingly, high-strength casting has good castings and physical properties. Among non-ferrous metals and alloys, aluminum should be distinguished. They are equipped with high indicators of corrosion resistance, they are easily processed by extrusion and pressure. Copper alloys are very common raw materials in production. These mixtures have good antifriction, technological

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and physical properties. Titanium alloys are characterized by high corrosion resistance, heat resistance, and high strength. They also have low density. There are magnesium alloys that are well machined by cutting.

### Conclusion:

Mechanical processing of metals - giving different shapes and sizes to details by grinding. It is performed on metal cutting tools (chisel, drill, countersink, reamer, milling machine, etc.) and metal cutting machines (lathes, grinding machines, planing machines, etc.). Pressing of metals - metal welding and preparation of products without scraping. Based on the use of plasticity of metals. The main types: rolling - passing metal between rotating cylinders (grooves) (rayem, a); stretching - pulling a metal zagotovka through a hole smaller than its own size (rayem, b); pressing - squeezing metal out of a closed cylinder hole (rayem, v); hammering - hitting metals with a hammer or press many times and repeatedly, bringing them to the required shape and size (rayem, g); sheet stamping - deformation of sheet, tape or strip metal without affecting its thickness (rayem, d); in which the metal takes the shape corresponding to the working part of the punch and die. Volume stamping - deformation (rayem, ye) by changing all dimensions of metal (zagotovka); in which the metal takes the form of a special tool (stamp) cavity. The solutions form a thin oxide film on the metal surface that protects it from corrosion. The oxide layer protects the metal from the influence of the external environment, makes it more beautiful. Metal does not react with any substance. Iron, nickel, cobalt, chromium, manganese, aluminum and other metals are "passivated", that is, treated with special substances - oxidizing agents (eg, chromates).

### References:

1. Mirboboyev V. A., Vasiliev G. P., Metallar technology, T., 1971; [1]
2. Torakhonov A. S. Metallar tehnologiya, T., 1974. [2]
3. www.ziyonet.uz[3]

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4.[www.library.uz](http://www.library.uz)[4]