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# Technological Processes Of Manufacturing Of Body Parts

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## ABSTRACT

The article analyzes the peculiarities of the process of designing the production of body details. In addition, the necessary recommendations are given in the design of the production of body details.

## KEYWORDS

Body details, racks, similar parts, tolerance, roughness, carbon steels, workpiece.

## INTRODUCTION

Body parts are the basic parts of machines and mechanisms. They contain a system of holes and planes that are coordinated relative to each other. These include frames, plates, transmission housings, engine cylinder blocks, drums of multi-spindle automatic machines, frames of weaving and spinning machines, housings of various pumps, etc. This group

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includes racks, traverses, squares, and similar parts.

## MAIN PART

These parts are characterized by the presence of support sufficiently extended and precise planes, precise holes coordinated with each other and relative to the base surfaces, and secondary fixing, lubricating and other holes.

According to the generality of solving technological problems, body parts are divided into two main groups: a) prismatic (box-type) with large flat surfaces and main holes, the axes of which are located parallel or at an angle; b) flanged type with planes that are the end surfaces of the main holes. Prismatic and flanged housing parts can be detachable and non-removable.

Technical requirements for the manufacture of body parts are set depending on the type and purpose of the part. In general, the following requirements apply to the body parts:

- The accuracy of the diameters of the main holes for bearings is performed according to the 7 quality with a roughness of Ra = 1.6...0.4 microns; less often-according to the 6 quality with Ra = 0.4...0.1 microns;
- Accuracy of center-to-center hole spacing for cylindrical gears with center-to-center spacing 50...800 mm from ±25 to ±280 microns;
- The accuracy of the distances from the axes of the holes to the mounting planes varies widely from 6 to 11 quality;
- For holes intended for the installation of rolling bearings, the roundness tolerance and the cross-section profile tolerance should not exceed 0.25. .. 0.5 of the diameter tolerance field, depending on the type and accuracy of the bearing;
- The tolerance of straightness of the contact surfaces is set in the range of 0.05...0.20 mm over the entire length;
- Bearing hole alignment tolerance-within half of the tolerance field for the diameter of the smaller hole;
- The tolerance of parallelism of the axes of the holes - within 0.02... 0.05 mm per 100 mm of length;
- The tolerance of the perpendicularity of the end surfaces to the axes of the holes is within 0.01...0.1 mm per 100 mm radius;
- For split housings, the mismatch of the axes of the holes with the plane of the connector is in the range of 0.05...0.3 mm, depending on the diameter of the holes.

The roughness of the surfaces of the holes Ra = 1.6...0.4 microns (for the 7th quality), Ra =0.4...0.1 microns (for the 6th quality); the contact surfaces-Ra = 6.3...0.63 microns; the sliding surfaces-Ra = 0.8... 0.2 microns; the end surfaces-Ra = 6.3... 1.6 microns.

## MATERIAL

As a material in mechanical engineering, gray cast iron, modified and ductile cast iron, carbon steels are most often used; in turbine construction and nuclear engineering — stainless and heat-resistant steels and alloys; in aircraft construction-silumins, aluminum and magnesium alloys; in instrument engineering — plastics.

**Blanks of body parts.** Cast iron billets are obtained by casting into earthen molds. The quality of castings and the amount of processing allowances depend on the size of the parts, the accepted molding method, the type of models and the skill of the moulder. In single and serial production, manual molding is used in the manufacture of cast iron castings. Machine molding on metal models is used in the manufacture of small castings in large-scale and mass production.

For small workpieces weighing 50 kg...60 kg of non-ferrous metal alloys and cast iron are used in coquille casting. For thin-walled parts, casting in shell molds is used. Welded body billets are welded from many parts made of sheet material. Welded frames are made of sheet steel with a thickness of 10... 15 mm. The metal capacity of such mills is 30%...40% less metal consumption of cast iron. Replacement of cast blanks with welded ones is made to reduce weight and save material. In this case, the thickness of the housing walls can be reduced by 30...40% compared to cast housings.

**Processing allowances**. The values of allowances for cast-iron workpieces are assigned depending on the position of the surface when pouring metal into the mold. The lower and side surfaces are assigned smaller allowances than the upper and inner surfaces. Internal cavities and holes are formed with the help of rods, which are often displaced during molding and pouring. To ensure that there are no rough untreated surfaces left during processing, the allowance in this case is also increased. The allowances for casting steel blanks in the coquille are 1.0...3.5 mm per side, and for casting in shell molds-0.3...0.8 mm per side.

**Technological bases**. When processing blanks of body parts, the following basing methods are used:

- Processing from the plane, i.e. in the first operation, the installation plane (the main base) is finally processed and then the exact holes are processed relative to it;
- Hole processing, i.e. in the first operation, a hole or two holes lying on the same axis (the main base) are processed, and then a plane is processed from it.

If the workpiece is unstable or it does not have a flat surface sufficient for installation, then additional bases are made on the workpiece in the form of tides, bosses, platiks, etc.

The main operations in the processing of body parts can be divided into two groups. The first group is milling or planing and, if necessary, grinding flat surfaces. The second group is the boring, unfolding, or grinding of precise holes connected by precise center-to-center distances.

Minor operations are drilling inaccurate small holes, drilling and threading in mounting holes, countersinking chamfers, making all kinds of grooves, etc.

Installation errors occur due to inaccuracies in the processing of technological bases, deformation of the base surfaces, small size of the bases, volumetric deformations of the workpiece when it is fixed in the device or on the machine table, inaccuracies in the installation elements of the device, contact deformations on the installation surfaces of the workpiece and devices, incorrect application of clamping forces.

## CONSCLUSION

Processing errors are associated with wear and bluntness of the tool, errors in the geometric shape of the tools, errors in the guide parts of

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the device, pressing tools, adjustment errors. Such errors account for about 30% of all errors.

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