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AN IMPORTANT FACTOR OF DRAWING DRAWINGS IN TEACHING STUDENTS OF ENGINEERING GRAPHICS ON THE BASIS OF STATE STANDARDS

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Annotation

In this article, theoretical data, rules, drawing methods based on the state standard, which is one of the main factors in teaching typing in educational institutions.

Keywords: Standard, blueprint drawings, spontaneous thinking, pupils, lesson reproduction, didactic standards, rules, readings, duration.

INTRODUCTION

It is important that students master the standards for drawing. Drawing, reading, and drawing are done according to standards. Many errors in the drawing are also due to poor mastery of the standards. For this reason, standards are the basis for drawing up drawings.

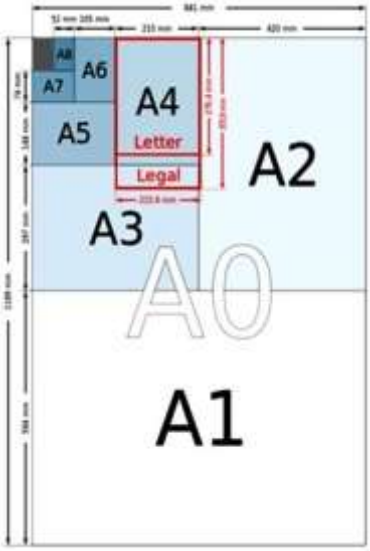
State standards. International state standards (GOST for short) are established to improve the quality of all products to ensure that they have a certain size and quality. There are also the following types of standards: OST - standard of the national economy; RST-Republican standards; STP - enterprise standards. Standards play an important role in advancing technology, increasing social productivity and improving the well-being of the people. It is the law for all businesses, design organizations and educational institutions. Since 1926, standards have been applied to the drawing course in order to standardize the products of all enterprises. At the end of 1928, for the first time, a single system of rules and norms of mechanical drawings was developed and published. State standard for drawings OST 350–358. Since then, work on all standards has continued. In 1934, 1939, 1946, 1952, 1959, 1965, 1966, 1968, 1972, 1980, 1986, and ODS 2006, the drawing standard was revised. The application of the standards to the drawings allowed for the same requirements for the drawings.

Standards are modified to speed up drawing, make it easier to read, innovate, and incorporate design suggestions.

In 1971, the Unified System of Design Documents (ESKD) was introduced. Standards are mandatory for all design organizations, industrial and construction enterprises, and educational institutions, and their violation and non-compliance is strictly prohibited.

Drawing formats. Formats of drawing sheets, frame sizes, basic inscriptions (stamps). Given that the drawings are kept in a certain order, they are drawn in basic formats with exact dimensions, without drawing on paper of any size.

There are basic and additional formats, the size of which is determined in accordance with GOST 301-68. The format with sides 1189X841 mm and a surface area of 1 m2 is called the basic format. Regardless of the type of drawing (original, copy, duplicate, original drawing, copied, second copy, sketch), the formats in which they are drawn are made in accordance with the requirements of the above GOST. The format of the drawing sheets is determined by the outer frame drawn with a thin line (Figure 1). The basic formats are defined as 44, 24, 22, 12, 11, and the larger side of the 44 formats is divided into two equal series, forming the smaller ones, i.e., 24, 22, 12, 11 formats. The dimensions of the main formats are indicated in accordance with GOST 9327-60, the symbol of the paper format used (for reference) and the surface area of the format (m2). The multiplication of a two-digit number, which represents the sign of the format, indicates how many of the 11 formats are in that format.



1-figure.

For example: 24 format, where 2X4 = 8, so 24 format consists of 8 to 11 formats. Or 2 indicates that the format is 2x297 = 594 mm wide, and 4 indicates that the format is 4X210 = 841 mm tall. The actual size of the 11 format is 210X297 mm (210.25X297.25 mm). If the width of the main format is given, the length of the neck can be determined. The technical documentation of production and educational institutions also allow the use of small formats formed as a result of the division of 11 formats into equal parts. Its sign is -1 / 2-1 (ie 148X210 mm). Formats are divided into two equal parts by the point of intersection of the diagonals. When

you create additional formats, for example, if you increase the width of 11 formats by three, you get 13 formats, if you multiply by four, you get 14 formats, and so on. The scheme of formation of the main and additional formats is shown in Figure 2.

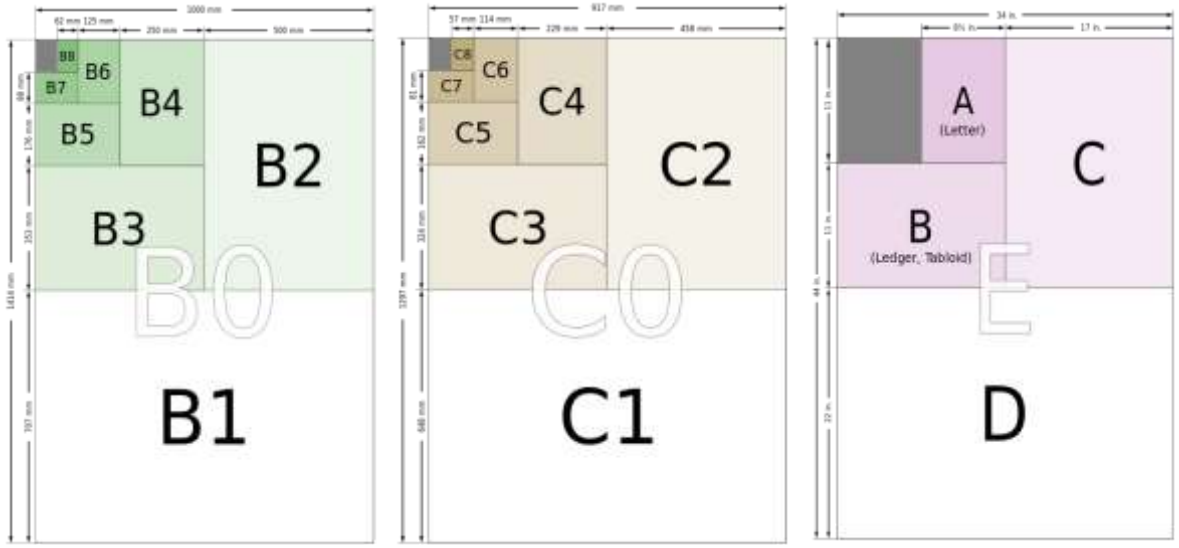
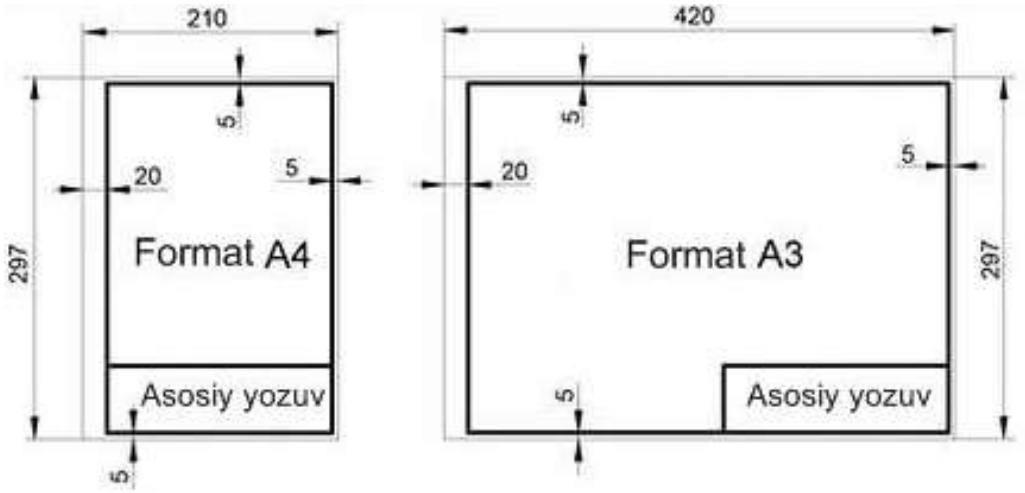


Figure 2

It describes the main formats with a dashed line and additional formats with a thin dashed line. In additional formats, the dimensions of the sides, such as 2.11 or 10.4, are separated by dots. Drawing papers are made in 24 formats, slightly larger than buttons. Therefore, once the drawing is on the throne, the excess of the format must be trimmed. 12, 22, 24 (A1, A11, A111) formats are often used in educational institutions for drawing.

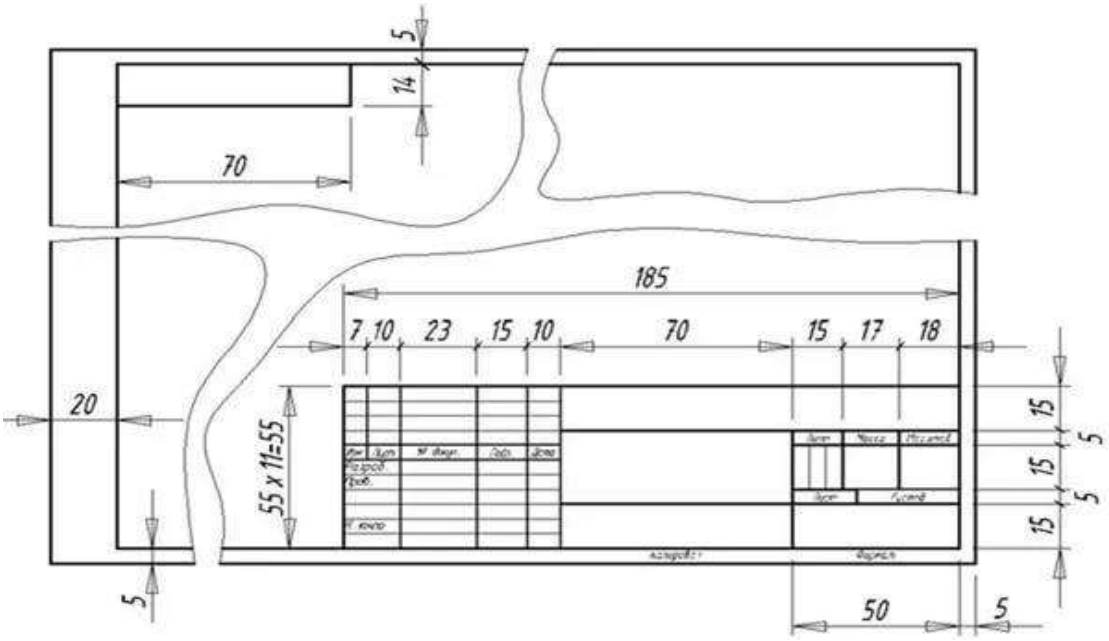
Frame. Typically, a frame is drawn for each drawing format. An example of drawing a frame is shown in Figure 3. The remaining 20 mm distance is adapted to store the drawings as a sewing album. If some drawing formats are larger than the album, you are only allowed to fold the drawing in the format size.



3-figure

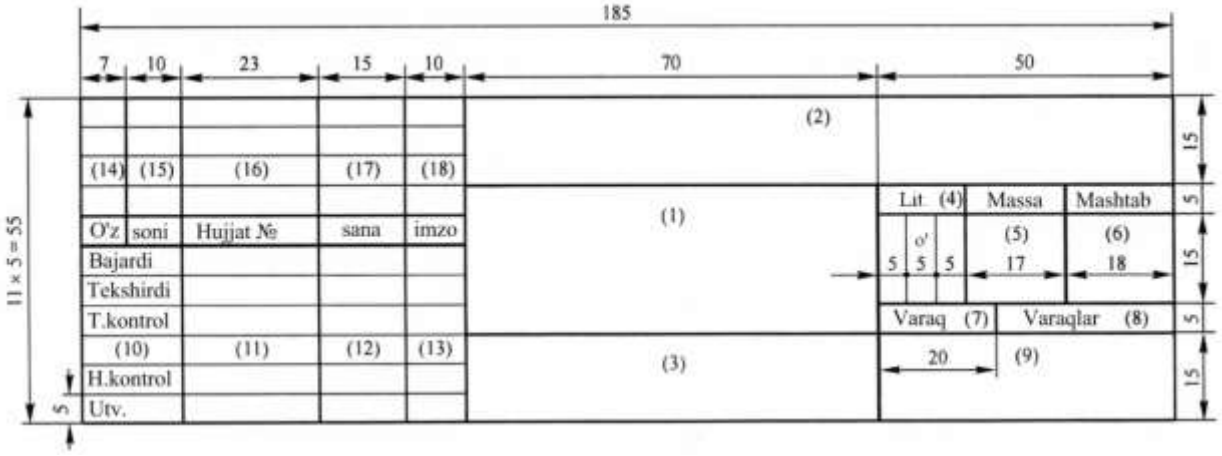
Basic text. The basis of any drawing is the inscription. The main text is placed in the lower right corner of the format, adjacent to the inner frame line. If the drawing is drawn in 11

formats (297x 210), the main text is always placed on the short side of the format (Figure 4). The main record is made in the design documentation in accordance with GOST 2.104-68. The form of the main notes in the training drawings is different from the form of the notes in the production drawings. Therefore, there are special requirements for the replacement of the main record. In accordance with GOST 2.104-68 there are record forms for all drawings and diagrams, as well as for textual design documents. Concepts of these forms are given mainly in the section of mechanical drawings. We will look at the basic notation used in geometry, projection drawing, and construction drawing. An example of drawing such a form is shown in Figure 5.



5-figure

It is recommended that the entries in the first, second, seventh, eighth, and ninth rooms be in the 5th or 7th font, and that the entries in the remaining rooms be in the 3.5th or 2.5th font. The drawing frame and the main writing line On the main connecting line, some lines of the main writing (see Figure 6) are drawn on a thin connecting line.

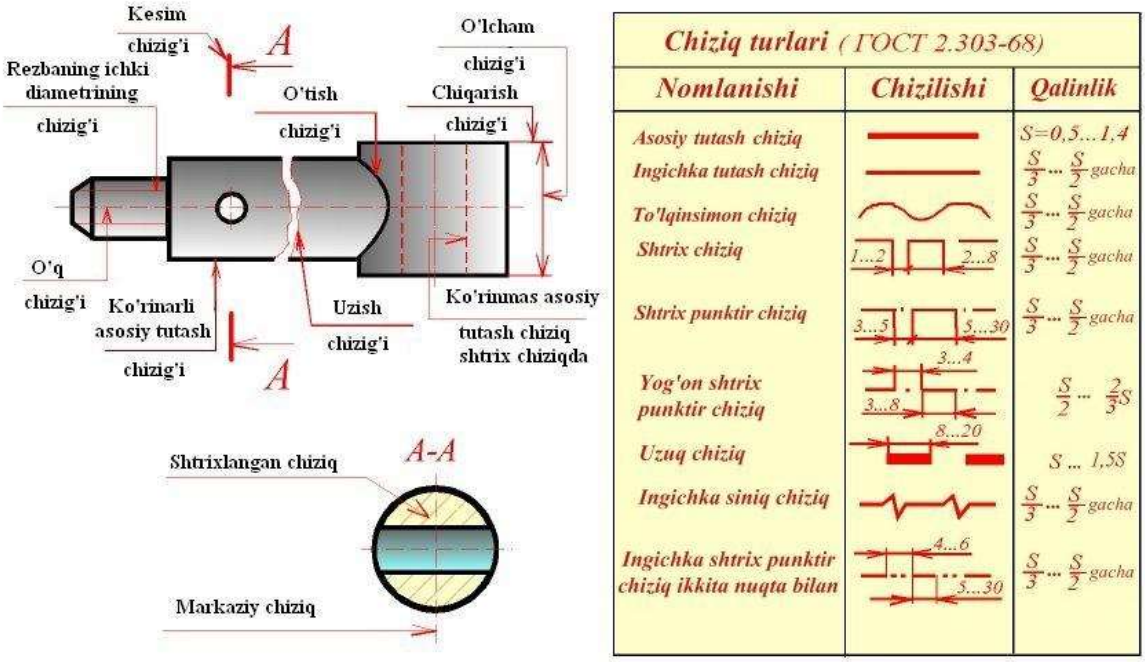


6-figure

Drawing lines. If the line is drawn with lines of the same thickness, it will be very difficult to read. Proper reading and quality output of a drawing depends on the proper use of the drawing lines.

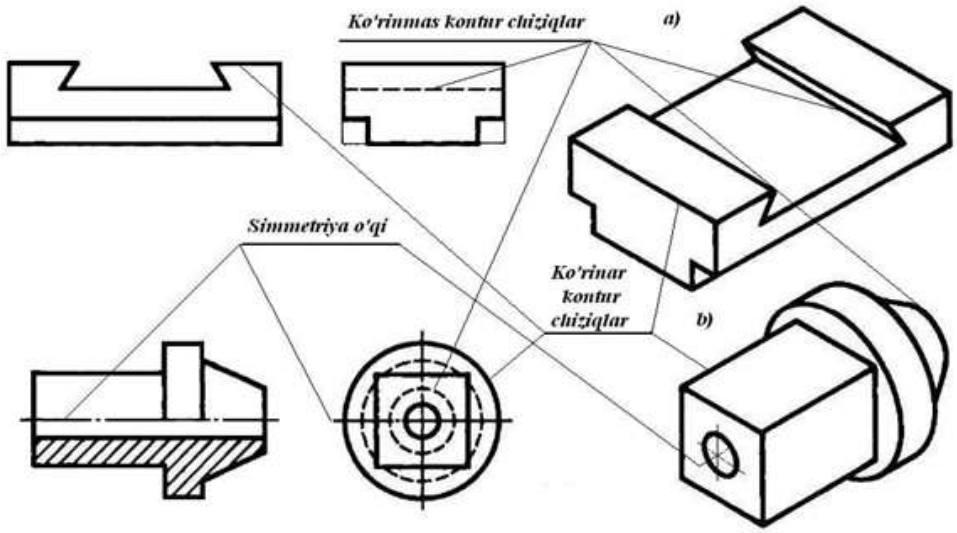
Nine types of lines approved in GOST 2. 303–68 are used. However, these lines did not form spontaneously, but went through a certain historical period. In the 18th century, contour and bar-dotted lines were used as the main lines of the drawing. The dotted line was used to represent invisible contours, dashes, and later dimension lines and dimension lines in the drawing. Beginning in the 1840s, lines were depicted in blue with a solid dashed line. After a number of changes, the line grids shown in Figure 6, which are easy to draw and copy, began to be used.

The thickness of the main line (s) is selected depending on the size and complexity of the image and the format of the drawing (s = 0.6 ... 1.5 mm). For drawings on the same scale, all images in the drawing must be the same thickness. The thickness of the other lines is chosen depending on the thickness of s. If the thickness of s is not less than 0.9 mm and the drawing is done in the afternoon, the use of lines of thickness s is allowed.



6-figure

The thinnest line and the smallest distance between the lines should be selected according to the format of the drawing. In engineering graphics, it is advisable to choose the thickness of the main connecting lines as 5 = 0.8 ... 1 mm for drawing. The use of lines in the drawings is shown in Figure 7.

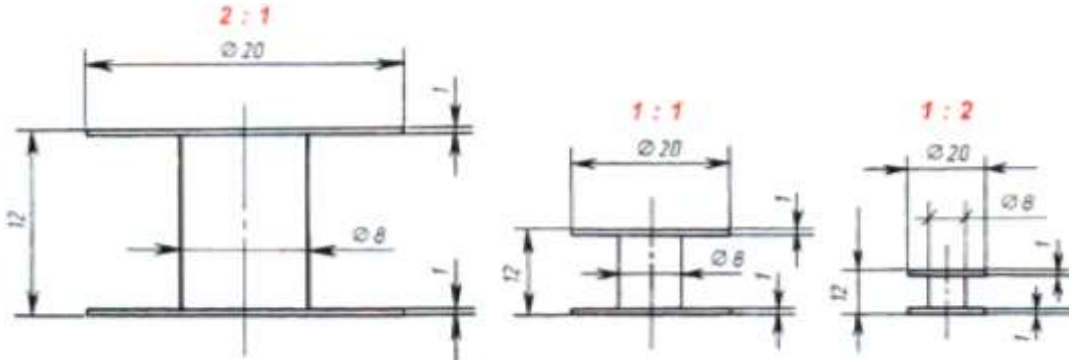


7-figure

A scale is a number that indicates how many times the image of an object has been enlarged or reduced in relation to the original, or the letter M is placed in front of the scale that determines the actual dimensions of the object relative to the size of its drawing.
Own DSt 2.302. The following scales are available in accordance with standard 97:
M 1: 1 is the scale to describe the actual size of the item.

Item shrinking scale: 1: 2; 1: 2.5; 1: 4; 1: 5; 1:10; 1:20; 1:25; 1:40; 1:50; 1:75; 1: 100; 1: 200; 1: 400; 1: 800; 1: 1000.

Enlarged scale of the item: 2: 1; 2.5: 1; 4: 1; 5: 1; 10: 1; 20: 1; 25: 1; 40: 1; 50: 1; 75: 1; 100: 1; 200: 1; 400: 1; 800: 1; 1000: 1.
The letter M is omitted if the scale is written in the main text. In the remaining cases, M 1: 1, M 1: 2, M 2: 1, ... are written in the order (Figure 8). Images marked with a local view or individual letters or numbers are written as follows: $\frac{A}{M2:1}$; $\frac{II}{M4:1}$



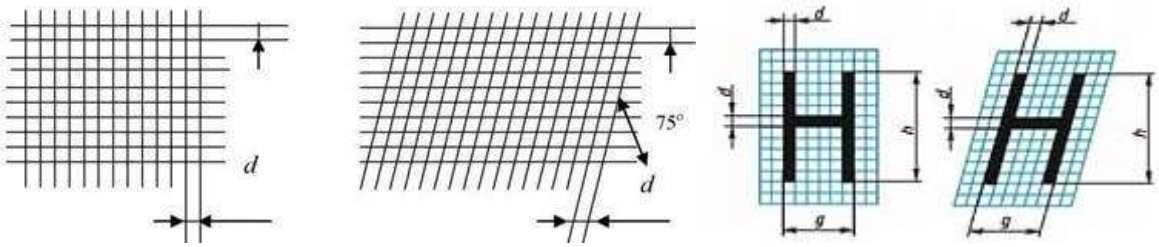
8-figure

The importance of your notes in the drawing. A font is a collection of graphic symbols that give all letters and numbers the same character and appearance. Fonts vary in spelling and format. For example, topographic fonts used in the printing of newspapers, books and posters,

original art fonts, optional fonts and drawing fonts. The increasing sophistication of technology and the mass production of items by the beginning of the 19th century required the addition of numerical dimensions to drawings. These dimensions were to be written in letters and numbers that were easy to read and write, describing the technology of making the items and the process of assembling them. In order to achieve this, special drawing fonts such as "Rondo", "Kapitalniy", "Kursivniy", "Relefniy" and "Kirpichniy" were created. A new font was introduced in 1919 to simplify the writing of these fonts and improve their printability. These fonts have been applied to mechanical drawing since 1926 in accordance with OST 353. In 1934, the font was redesigned and lowercase (written) letters were added. In 1939, as a result of some changes, OST 3533 was replaced by OST 7535-39. In 1946, a new standard of fonts was approved by GOST 3454-46, and in 1952 by GOST 3454-52, and from 1959 GOST 3454-59 was introduced. GOST 2304-68 fonts have been used since 1968.

Standard fonts are superior to other fonts in terms of simplicity of writing, quality of printing, etc. If the drawing is drawn in high quality, its dimensions, the inscriptions on the drawing are not written in standard font, it will be difficult to read such a drawing, and therefore the product made on this drawing will be of poor quality. Therefore, the entries in the drawings should be written in a clearly legible standard font.

In constructive documents, the entries are made in the font specified in Oz DSt 2.304.97. These standards specify the shape, height, thickness, spacing, and more. Drawings and technical documents for all branches of industry, drawing fonts for drawing notes are given in the following sizes: 2.5; 3.5; 5; 7; 10; 14; 20; 28; 40. Font size should be understood as the height h of the capital letters in millimeters. Technical drawings use fonts with size h = 2.5 to h = 14. Own DSt 2.304. 97 contains graphic letters of the Cyrillic, Latin, and Greek alphabets, as well as numbers. These standards are mainly divided into Cyrillic and Latin alphabets and Arabic numerals, which are structurally basic and wide. The font is used in all drawings and text documents. Broad fonts are used when you need to fill a line with a few words, as well as diagrams, tables, presentation drawings, title pages, and so on. The normal font is written in 750 lines relative to the main line (Figure 9).



9-figure

Names, titles, and captions can be spelled correctly. Computer-aided drawing is rapidly evolving with images. Currently, computer programs have been developed to write the Russian, Latin, Arabic, and Greek alphabets in drawings and documents, and all of the

requirements of Oz DSt 2.304.97 have been developed and entered into computer memory. We can enter the font parameters we need into a computer, type the text we want, and print it out using a printer or graphopostroitel. Therefore, we did not cover the font writing rules in the article. The importance of students mastering these standards is that all technical and artistic higher education institutions teach graphic geometry and engineering graphics. These subjects are based on the knowledge of the standards shared by the students.

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