

## **Drawing Tools And Design Elements In Geometric Drawing**

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**ANNOTATION:** A drawing is an image made with the help of special drawing tools in accordance with certain laws and regulations, which gives us complete information about the object, that is, its internal and external structures, dimensions. Drawing has a special place in modern production. Because every day our factories produce a variety of machines and mechanisms, household items and much more. And they can't be made without drawings. Depending on the drawings, individual parts of machines and tools are made, and complex mechanisms are assembled from ready-made parts. This article gives you a brief overview on drawing materials, tools and equipment.

**KEYWORDS:** drawing papers; millimeter paper; kalka; reishshina; lekalolas.

The following items, tools, and equipment are required to complete the drawings.

Drawing papers. The quality of the drawing, its appearance, as well as the time spent on the drawing, depends on the nature of the paper used for the drawing. The following basic drawing papers are used in the design bureaus and drawing departments of all manufacturing organizations, as well as in educational institutions: white drawing paper, millimeter paper and chalk. Drawing paper is a thick, smooth white paper on which the parts drawn in pencil can be erased several times. The lines drawn in the afternoon on such papers do not spread. White drawing paper - produced in accordance with GOST 597-56 in grades B and O and cut in sheet form in A4, A3, A2, A1, A0 formats. It is sometimes sold in rolls. Recently, a 10-sheet drawing paper cut in A3 format and placed in a folder has been launched. This is especially useful for school drawings. B-grade paper is of high quality and draws important drawings that will last a long time. O-grade paper is used for drawing in design bureaus and educational institutions, which do not require long-term storage.

A millimeter paper. Produced in the form of rolls or sheets in accordance with GOST 334-56. Millimeter paper is used to draw diagrams, schemes and various graphs, as well as sketches of details.

A kalka. It is a thin transparent paper, produced in roll form according to GOST 892-47. According to GOST 1111-61, U and D brand pencils are also produced. Drawings on these pens are drawn directly with a pencil. Kalka is used to copy from the original drawing and to duplicate multiple copies of the copied original.

Pencils. To draw, you need a set of pencils of different hardness. There are hard, medium and soft pencils. Hard pencils made in Russia are marked with the letters T, medium pencils TM and soft pencils M. The letters T and M are preceded by numbers that indicate the degree of hardness and softness of the pen. Pencils of different hardness "Constructor" are used for drawing. H (hard), B (soft) and HB (medium hard) foreign pencils are also used in drawing. The stamps of the pencils are drawn from the unmarked end. Graphite pencils for drawing thin lines are tapered. To draw thin lines in a compass, the tip of the pencil is prepared by rubbing a one-sided sandpaper. The graffiti of the soft pencils is sharpened in the shape of a spatula to run with a pencil over the drawing lines. The clarity and beauty of the drawing line depends on choosing the right pencil and sharpening it. When choosing a pencil for drawing, pay attention to the strength of the paper on which you draw. If the paper is thick and firm, use a pencil to draw and darken the line thicker, and a softer pencil on soft paper. If the pencil is selected incorrectly, the drawing may be scratched, stained, or inaccurate. Sterile pencils of various hardness and softness are currently on sale. They can also be used.

An eraser. The eraser should be soft. An incorrectly selected eraser will leave a mark on the paper and spoil the appearance of the drawing. When you use the eraser, it is switched off to one side. Otherwise, the paper will crack and the surface will be damaged.

Triangles. Triangles are one of the tools you need to draw drawings. They allow you to draw perpendicular and parallel lines accurately and quickly. They are made of wood, plastic and celluloid in the form of a right triangle. Drawings should have two triangles with acute angles of  $45^\circ$  and  $30^\circ$  and  $60^\circ$ . The triangle is placed on the drawing paper with the ruler and the flight is held with the left hand. Before using triangles with solid and straight edges, the accuracy of the right angles must be checked. To do this, one of the legs of the triangle is plastered to the upper edge of the plane. Then a vertical line is drawn. Then turn the triangle  $180^\circ$  and draw a vertical line again. If the vertical lines overlap, the production of the triangle will be accurate, otherwise it will be incorrect.

A drawing board. Drawing boards are made of soft wood species in A3, A2, A1 formats of drawing paper in accordance with GOST 6671-85. To draw a drawing well and efficiently, you need to attach the drawing paper to the drawing board. First, the top left corner of the drawing paper is fastened with a package. Then a flywheel is placed on the top edge of the paper. The top edge of the drawing paper is rotated until it is parallel to the edge of the drawing board, and the upper right corner, then the left corner, is wrapped. The paper is then tightened and the lower right corner and then the left corner are secured with the wrapper. The drawing board should be slightly sloping on the table for easy work. To do this, place something under the drawing board or a special sloping base made of wood.

A reishshina. The flight consists of a long ruler and 2 short slats attached to it in two layers at right angles. To use the reishshina correctly and efficiently, its bar is glued to the left edge of the drawing board with the left hand. With the right hand, the ruler is pressed onto the drawing paper, and then with the left hand, a horizontal line is drawn while maintaining the initial position of the rudder. To

create lines parallel to the drawn line, the planer bar is moved with the fingers of the left hand down or up by pressing the plaster on the left edge of the drawing board, and then the line is drawn. It greatly speeds up the process of drawing using a ruler and ensures accuracy in drawing. With the help of triangles and lines, you can draw parallel and perpendicular lines in different directions in the drawing.

Lekalolas. Draw curves that cannot be drawn with a compass lekalolas are used for. Patterns are made of thin plywood or plastic. Typically, the points found on the curve are joined by a thin line with a hand pencil. To make the curve smooth, the edge of the pattern is set so that 3-4 points of the drawn curve correspond to 1, 2, 3, respectively. To draw the rest of the curve, place the edge of the pattern so that it corresponds to the next 4, 5, 6, 7, 8, 9, 10 points. These points are then connected. It is then drawn with a pencil or pencil on a thin line connecting all the dots. There should be several sets of patterns to connect the points of the curve drawn with the help of a pattern.

A conveyor. A conveyor is used to measure or make different angles. Packaging. The packaging is used to attach the drawing paper to the drawing board. Gotovalnya. Gotovalnya consists of a set of drawing tools in a holster, which is manufactured in accordance with GOST 6100-68. It is recommended to use U10, U11 and U14 hotels in educational institutions.

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