



The basics of material science

Procedure:

Useful information about wood, metal and plastic

Different materials, such as wood, metal and plastic, have different properties. We will explain these and tell you what you should know when working on them.

- 1 Wood is by far the most commonly used material by DIYers. Its properties are dependent on how it has been processed into, for example, boards and planks. Wood is usually divided into soft and hard woods. Native softwoods are poplar, willow, lime, birch, alder, spruce and fir. Hardwoods from native forests, on the other hand, include beech, pine, chestnut, ash, walnut and hornbeam. The strength of wood refers to its resistance to external forces that can act on it, i.e. tensile, compressive or buckling strength. The term “plasticity” is used to refer to wood that can be bent without springing back into its previous shape. The term “elastic” refers to wood that resumes its original shape after bending. A small number of tools are sufficient for working by hand: In addition to a cross-peen hammer and a wood or soft face hammer, a mallet (for striking against tools with a wood handle) is required. There are several types of drill bits and chisels specially for wood, which are some of the classical joiner’s tools. A set of screwdrivers is also required.
- 2 Most metals are highly resilient materials that are often used in house construction. When using metals, be aware that iron and ferrous parts are susceptible to rust if they come into contact with water. Paint alone will not offer sufficient protection here. You have to use a rust converter on a rusted wrought-iron fence; it provides a tough undercoat for subsequent coats of paint. Copper does not require a protective coat because it develops the much valued patina of its own accord over the years. Brass parts are normally only used in houses for fittings on doors and windows. Painted brass parts can easily be treated with a chemical paint stripper. If you then polish them thoroughly, they will look like new again. Aluminium is used in house construction for door frames and aluminium-alloyed window frames. They are weatherproof, even without a protective coat of paint. While hammers, screwdrivers, chisels and pliers are universal tools, special tools are required for cutting, shaping and joining metal. Metal saws have finely toothed saw blades, which are specially toughened. Metal plates are cut using metal shears and there are special blades for electric jigsaws for cutting steel. Metals are joined by means of screwdriving or riveting (force closure) and by means of soldering or welding (material closure).
- 3 Plastics have established themselves as a material in virtually all areas because many of their properties are superior to those of other materials. Most plastics that we use in day-to-day life are thermoplastics. These can be moulded by applying heat to them; however, they melt if the temperature is too high. These characteristics distinguish them from thermosets, which disintegrate rather than melting when they are heated. The third type of plastic is elastomers. The main feature of these plastics is that they stretch to at least twice their length and return to their original shape when released. The DIYer has to be particularly cautious and somewhat adept when working on plastics. You should use the fastest possible machines and saw blades with tungsten-carbide teeth to cut thermosets such as acrylic or PVC. Furthermore, the material and the tool must always be cooled with a suitable coolant when drilling and sawing thermosets. Foils, soft PVC, perspex and plastic pipes 2–4 mm thick can be cut with an electric shear without difficulty. Please note: Cutting perspex with machines produces chips with very sharp edges. In the interests of your safety, the machine should be equipped with a dust extraction mechanism. You yourself should wear protective glasses and a protective mask.



BOSCH

Invented for life

Bosch does not accept any responsibility for the instructions stored here. Bosch would also like to point out that you follow these instructions at your own risk. For your own safety, please take all the necessary precautions.