

Technology

Modern processing.

Tube bending as a process starts with loading a tube into a pipe bender and clamping it into place between two dies, the clamping block and the forming die. The tube is also loosely held by two other dies, the wiper die and the pressure die.

The process of tube bending involves using mechanical force to push stock material pipe or tubing against a die, forcing the pipe or tube to conform to the shape of the die. Often, stock tubing is held firmly in place while the end is rotated and rolled around the die. For some tube bending processing, a mandrel is placed inside the tube to prevent collapsing. The tube is also held in tension by a wiper die to prevent any creasing during stress. A wiper die is usually made of a softer alloy i.e. aluminum, brass to avoid scratching or damaging the material being bent.

Much of the tooling is made of hardened steel or tool steel to maintain and prolong the tools life. However wherever there is a concern of scratching or gouging the work piece, a softer material such as aluminum or bronze is utilized. For example, the clamping block, rotating form block and pressure die are often formed from the hardened steel because the tubing is not moving past these parts of the machine. On the other hand, the pressure die and the wiping die are formed from aluminum or bronze to maintain the shape and surface of the work piece as it slides by.

Pipe bending machines are typically human powered, pneumatic powered, hydraulic assisted, hydraulic driven, or electric servomotor.

Powder coating



Powder coating is a type of coating that is applied as a free-flowing, dry powder. The main difference between a conventional liquid paint and a powder coating is that the powder coating does not require a solvent to keep the binder and filler parts in a liquid suspension form. The coating is typically applied electrostatically and is then cured under heat to allow it to flow and form a "skin". The powder may be a thermoplastic or a thermoset polymer. It is usually used to create a hard finish that is tougher than conventional paint.

PVD coating

Physical vapor deposition (PVD) is a variety of vacuum deposition methods used to deposit thin films by the condensation of a vaporized form of the desired film material onto various workpiece surfaces (e.g., onto semiconductor wafers). The coating method involves purely physical processes such as high temperature vacuum evaporation with subsequent condensation, or plasma sputter bombardment rather than involving a chemical reaction at the surface to be coated as in chemical vapor deposition.



Plating



Plating is a surface covering in which a metal is deposited on a conductive surface. Plating has been done for hundreds of years, but it is also critical for modern technology. Plating is used to decorate objects, for corrosion inhibition, to improve solderability, to harden, to improve wearability, to reduce friction, to improve paint adhesion, to alter conductivity, for radiation shielding, and for other purposes. Thin-film deposition has plated objects as small as an atom, therefore plating finds uses in nanotechnology.

Stainless Steel

In metallurgy, stainless steel, also known as inox steel or inox from French "inoxydable", is a steel alloy with a minimum of 10.5% to 11% chromium content by mass. Stainless steel does not readily corrode, rust or stain with water as ordinary steel does, but despite the name it is not fully stain-proof, most notably under low oxygen, high salinity, or poor circulation environments. It is also called corrosion-resistant steel or CRES when the alloy type and grade are not detailed, particularly in the aviation industry. There are different grades and surface finishes of stainless steel to suit the environment the alloy must endure. Stainless steel is used where both the properties of steel and resistance to corrosion are required.

