

Steel processes and products

Josep Poch March 07

Steel coil in a factory

Carbon steel and alloy steel

- ▶ **Carbon steel** contains only iron (Fe) and carbon (C) with a percentage of C between 0.02% and 1.76%
- ▶ **Alloy steel** contains Fe, C and other chemical elements that provide different properties



Stainless steel 18/20, with 18% of chrome and 20% of nickel

Which steel will we use?

Mild steel	0.15% - 0.35% of C	Tough, ductile and malleable. Poor resistance to corrosion	General-purpose engineering material
Medium carbon steel	0.35% - 0.7% of C	Strong, hard and tough but less ductile than mild steel	General-purpose engineering material
High carbon steel	0.7% - 1.5% of C	Even harder than medium carbon steel, and more brittle	Cutting tools, ball bearings
High speed steel	medium carbon steel with tungsten, chromium, vanadium	Very hard and heat-resistant	Cutting tools for machines

Which steel will we use?

- The more carbon it has, the harder and the more brittle it gets

Mild steel	High carbon steel	High speed steel
 		

Stainless steel

- ▶ Alloy of iron and carbon with 16-26% chromium, 8-22% nickel and 8% magnesium
- ▶ Hard and tough, resists corrosion
- ▶ Used in **cutlery, kitchen equipment...**



Heat treatments

- ▶ **Tempering** refers to heating steel above a critical temperature, then cooling it rapidly
 - Steel becomes **tougher** and with a **higher mechanical resistance**
- ▶ **Annealing** is done by heating the steel, maintaining it at a suitable temperature, and then cooling very slowly
 - **Plasticity rises** and **hardness lowers**. It gets **softer**

Steel products

**Flat
products**



**Tubular
products**



Profiles



Bars



Flat products

Sheet



Coil



Plate



Tubular products

- ▶ Tubes and pipes may be square, rectangular, round or oval
- ▶ Tubes are usually thinner than pipes
- ▶ If the shape is more complex they are considered profiles



Bars

- Bars can be round, square, rectangular, hexagonal or half round

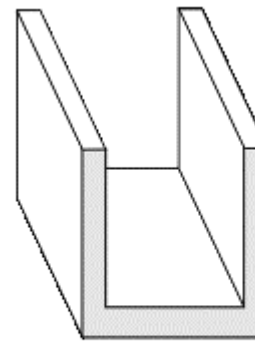


Profiles

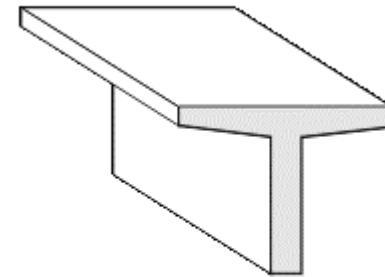
- They can be L, T, U, I-shaped or with any other shape



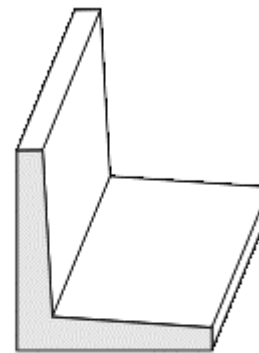
Profile of a railway track and other common sections



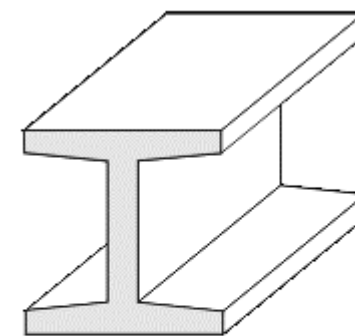
U-SECTION



T-SECTION

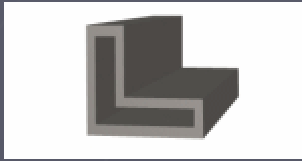


L-SECTION

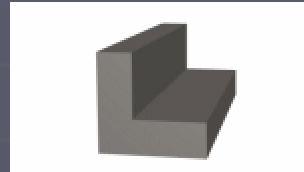


I-SECTION

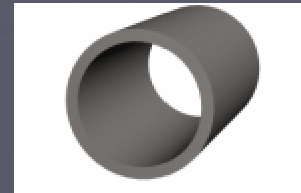
Which steel products are?



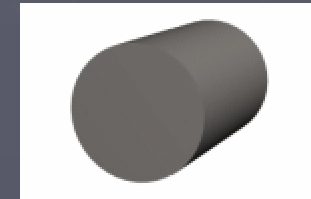
1. _____



2. _____



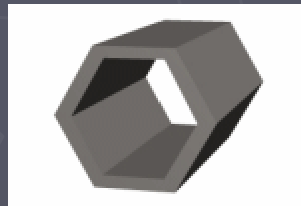
3. _____



4. _____



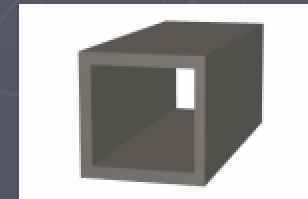
5. _____



6. _____



7. _____



8. _____

Stainless Steel tanks for
the storage of wine

