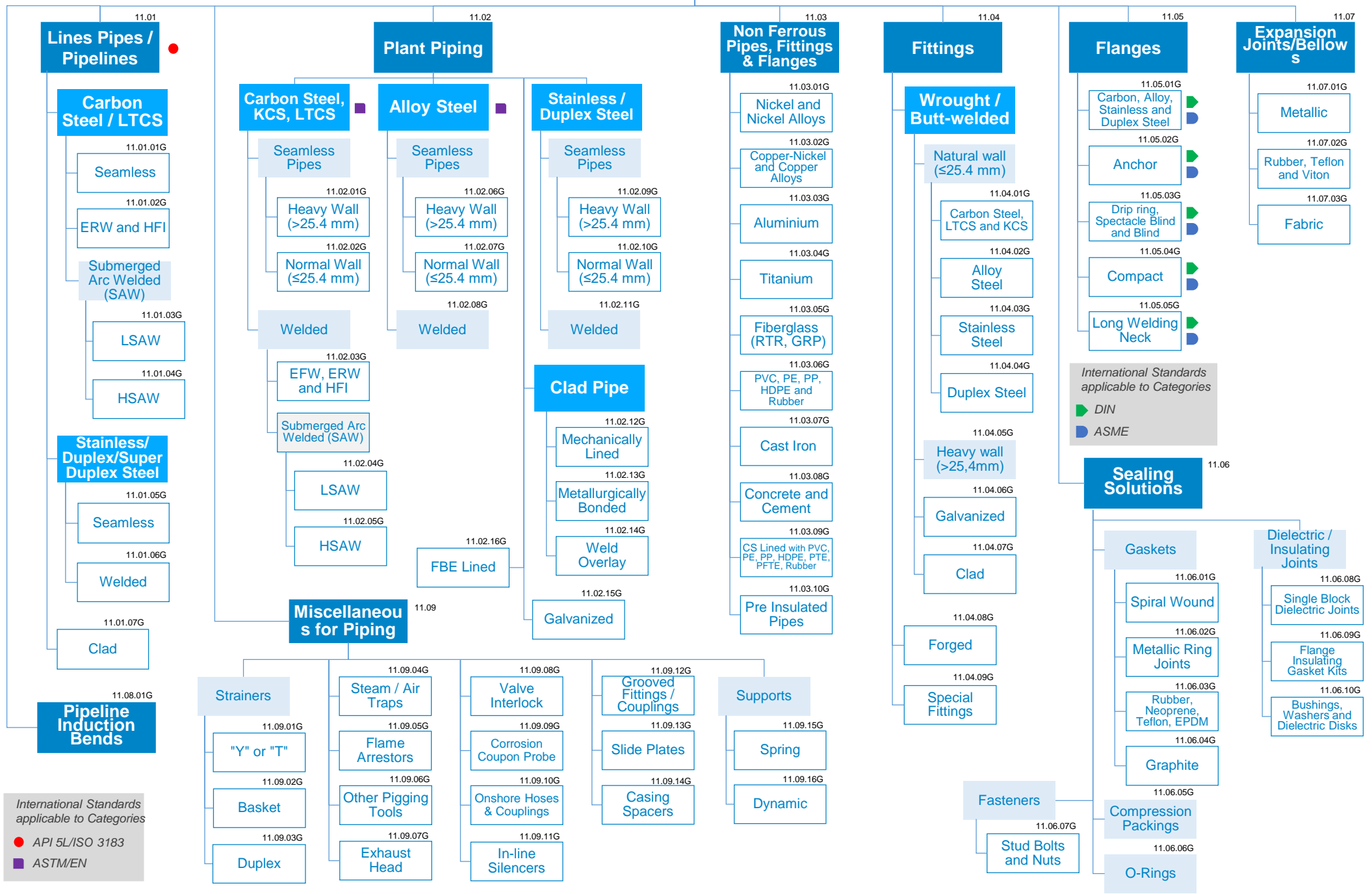


# 11 Piping, Fitting and Flanges



# Piping, Fitting and Flanges

This category focuses on one of the most important infrastructural components in the industrialized world, that is: the vast network of pipelines and plant piping.

Currently, the market for piping is very large, due to the need for such components in many industrial sectors, Oil&Gas, Construction and Power Generation to name a few. But also Water and Renewables (geothermal, ...).

## MAIN RATIONALES BEHIND THE STANDARD CATEGORIZATION

### Line Pipes / Pipelines

- A line Pipe is manufactured from high-strength Steels; It is used to convey gas, oil, or water from sources (e.g., reservoirs, steam plants, oil and gas wells, refineries) to local distribution centers.
- This family includes Pipes made of Carbon Steel, Stainless Steel, Duplex and Super Duplex Steels.
- There are 2 main different processes for metallic pipe manufacture:
  - Seamless: formed from a cylindrical bar of steel that is heated to a very high temperature and then is pierced with a probe to create the hole through the cylinder. This process requires high-level of competences.
  - Welded: formed by forming a steel plate or coil into a cylindrical shape, and closing the seam using a welding process. This operation can be done with different technologies:
    - ERW/HFI, using an electrical resistance
    - SAW, involving the formation of an arc between a continuously-fed bare wire electrode and the workpiece. This welding process can be carried out Longitudinally (LSAW) or Spirally (HSAW).
- Different welded types are expressed only for Carbon Steel because is more used in the normal operations thanks to its Yield and Tensile Strengths.

### Plant Piping

- The term “Plant piping” refers to the system of pipes that transport process fluids (e.g., air, steam, water, industrial gases, fuels, chemicals) around an industrial facility involved in the manufacture of products or in the generation of power.
- As for the Line Pipes, here, the main categorization principles are Material and productive process (Seamless or Welded).
- There is a third critical principle: Wall thickness of the Seamless pipes, since only few players in the market are able to make Seamless pipes wall above 25,4mm
- From a regulation point of view, it is appropriate to keep Stainless/duplex Steel and Clad Pipes separate from the other Plant pipes because they are used for particular applications, based on different requirements. They include 6MO.
- According to international standards, Pipes made with ERW and HSAW technologies are no longer allowed for complex “plant” applications (can be still used – for example – for water intake).

### Non Ferrous Pipes, Fittings & Flanges

- This family was included due to the specific competences needed by manufacturers to construct in materials such as titanium, PVC or concrete.
- Polyethylene (PE), Polypropylene (PP) and High-density polyethylene (HDPE).

### Fittings

- The rationale behind the division is the opposition of Forged vs Wrought fittings. Although Forged fittings are a subset of Wrought fittings, one of the main processes in forging is pressing, which requires special machinery and skills.
- Natural and Heavy wall (25,4mm) were separated since an inch thickness is a critical point that can separate manufacturers from one another.
- Special fittings include any fitting out of the ordinary, for example: parts required for Urea plants (that need to adhere to precise requirements), special t-joints etc.

### Flanges

- 11.05.01G is a general category which includes all common types of flanges made with the standard materials.
- The most demanded flanges (anchor, compact, etc.) were instead separated to allow more detail.

### Sealing Solutions

- The attention is focused on the most diffused and demanded gaskets.
- 11.06.05G includes Compression Packings of any material.

### Expansion Joints/Bellows

- Expansion Joints (also known as Bellows) are divided because depending on material they are used for different purposes.
- Dielectric Joints are divided by purpose because that is what differentiates manufacturers from another.
- 11.07.04G Slide Plates are devices used to reduce friction. The usual material for this category is Teflon.

### Pipeline Induction Bends

- Here it is worth noting the difference between Elbows and Bends. Bend is a generic term for any offset or change of direction in the piping. In short we can say that all Bends are Elbows but not all Elbows are Bends.
  - Pipeline Bends are generally manufactured as per the clients' need, on a project-by-project basis. Bends have generally a radius of more than twice the diameter;
  - Elbows have industrial standards and have limitations to size. Elbows generally have radius of curvature between one to two times the diameter of the pipe.

### Miscellaneous for Piping

- Strainers, are simple filters that are placed within pipes, not to confuse with the more complex Strainers in the Packages group.
- 11.09.12G Springs (also known as flexible supporters) accommodate movement according to thermal expansion, whilst Dynamics (11.09.13G) are used to protect the structure in more extreme cases stress such as during earthquakes or fluid disturbances.