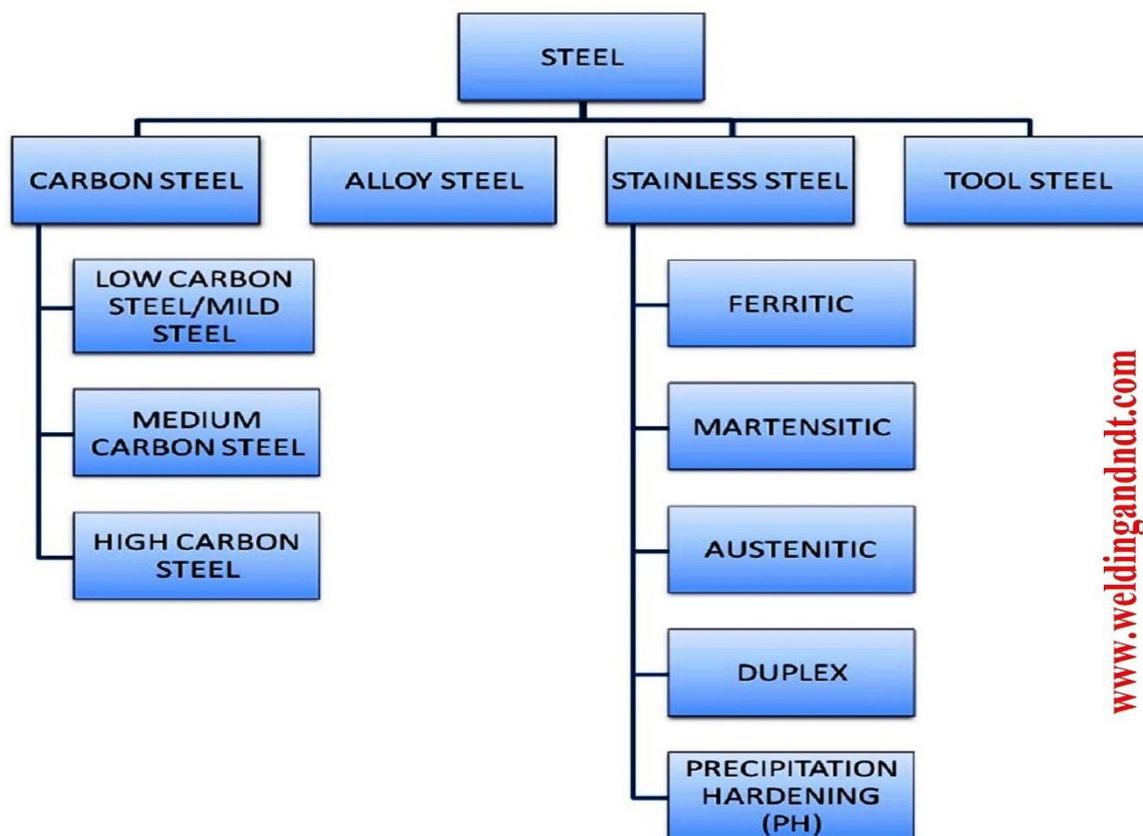


2.8 STEEL

Steel is an alloy of iron and iron carbide in which the maximum percentage of carbon is 1.5%



Low-Carbon Steel

Low-carbon steel is characterized by a low ratio of carbon to iron. By definition, low-carbon consists of less than 0.30% of carbon. Also known as mild steel, it costs less to produce than both medium-carbon and high-carbon steel. In addition to its low cost, low-carbon steel is more pliable, which may improve its effectiveness for certain applications while lowering its effectiveness for other applications.

Properties

1. Low hardness and cost.
2. High ductility, toughness, machinability and weldability.

Applications

1. Steel Frame Buildings.

Chosen for its unique structural **properties**, low carbon steel has good enough strength for building frames in **construction** projects. ...

2. Machinery Parts.

Steel in its most basic form, is a combination of two elements; carbon and iron used in steel Industries.

3. Production of Cookware materials.

4. Pipeline manufacturing Industries.

Medium-Carbon Steel

Medium-carbon steel has a higher ratio of carbon to iron than low-carbon steel but still less than that of high-carbon steel. While low-carbon steel consists of less than 0.30% carbon, medium-carbon steel contains anywhere from 0.30% to 0.60% carbon. Many automotive parts are made of medium-carbon steel. It's stronger and more durable than low-carbon steel but still offers at least some ductility.

Properties

1. Carbon content in the range of 0.3 – 0.6%.
2. Can be heat treated - austenitizing, quenching and then tempering.
3. Most often used in tempered condition – tempered martensite.
4. Medium carbon steels have low hardenability.
5. Addition of Cr, Ni, Mo improves the heat treating capacity.
6. Heat treated alloys are stronger but have lower ductility.

Applications

1. Used in railway tracks and wheels, gears, crankshafts.

High-Carbon Steel

High-carbon steel, of course, has the highest ratio of carbon to iron. It consists of more than 0.60% carbon, thereby changing its physical properties. Also known as carbon tool steel, it

has around 0.61% to 1.5% carbon. With such a high carbon content, high-carbon steel is stronger and harder but less ductile than low-carbon and medium-carbon steel.

Properties

High carbon steel properties include a very **high strength**, extreme **hardness** and **resistance** to wear, and moderate **ductility**, a measure of a material's **ability** to tolerate being deformed without actually breaking.

Applications

Common **applications of higher carbon steels** include forging grades, rail **steels**, spring **steels** (both flat rolled and round), pre-stressed concrete, wire rope, tire reinforcement, wear resistant **steels** (plates and forgings), and **high** strength bars.