

Glossary of Steel Terms

Steel Terms Explained.

Below we list some of the most common steel terms and explain what they mean.

| | |
|----------------------------|--|
| AISI | Abbreviation for the American Iron and Steel Institute. |
| Alloy | Two or more chemical elements, of which one at least is metal. |
| Alloy Steel | A steel containing more than one alloying element. |
| Annealing | A process to soften steel and remove any stresses. The process usually involves heating the steel in a furnace and allowing to cool slowly. |
| ASTM | Abbreviation for the American Society for Testing and Materials, now known as ASTM International. |
| Austenitic | A range of stainless steels which have austenite as their primary phase, with a face centred cubic crystal structure. Commonly these are 18/8 stainless steel types with an average composition of 18% chromium and 8% nickel. |
| Bar | Steel is rolled or forged from billet into long lengths in round, flat, square and hexagon bar. |
| Brinell (HB) | A measurement of the surface hardness of a steel. |
| Bright Drawn | A 'bright drawn' steel is produced by drawing steel bar through a die without pre heating to obtain a smooth finish with tight tolerances. |
| Carbon Steel | A steel with key components of carbon, silicon and manganese but normally has no or very low content of other alloying elements. |
| Case Hardening | A heat treatment process for steel, usually low carbon steel and alloy steel grades. The process hardens the outside case of the steel by infusing elements in the steel surface, whilst giving good strength to the steel core. Also known as carburising or surface hardening. |
| Cast Iron | An alloy of iron that contains a carbon content of between 1.8% to 4.5%, combined with silicon and manganese. Cast Iron is more brittle than steel and has a lower melting temperature. |
| Centreless Grinding | The method of finishing round steel bar by removing the surface with a grinding wheel. Centreless ground steel bar is produced to very tight tolerances. |

| | |
|-----------------------------|--|
| Charpy Test | A charpy test measures the amount of energy absorbed by a steel during fracture. |
| Creep | A metal failure caused by elongation due to continuous stress. |
| DIN Standards | Commonly referring to DIN steel specifications introduced by Deutsches Institut für Normung in Germany. DIN steel standards are combination of letters and numbers. |
| Duplex | Duplex is a stainless steel with an austenitic ferritic chromium, nickel, molybdenum composition. Duplex combines improved resistance to stress corrosion cracking, pitting, crevice corrosion and offers high strength when compared with other stainless alloys. |
| Electric Arc Furnace | A steel furnace that uses an electric arc to generate heat. After melting the steel is commonly cast into blooms, slabs or billets. |
| Ferrous | Any steel, metal or alloy which is primarily made up of iron. |
| Fatigue | Progressive and structural damage which occurs when a steel is subjected to repeated cyclic stressing or loading. |
| Flame Cutting | A process used to cut carbon steel plate using an oxy-fuel gas flame. |
| Forging | A process of shaping or forming steel by using compressive forces such as hammering, upsetting, rolling or pressing. |
| Grade | The name and designation of a steel defined by its composition and properties. |
| Hardening | A process used to increase the hardness of steel. The process usually requires heating, quenching, tempering and cooling. |
| Hardness | The hardness of a steel is measured by its ability to resist surface penetration. Common measurements of hardness include Rockwell, Brinell and Vickers. |
| Heat Treatment | A process to change the mechanical properties of a steel. Typical heat treatment processes are hardening, annealing, normalising and nitriding. |
| High Carbon Steel | Usually a steel suited to heat treatment with a minimum of 0.5% carbon content. |
| High Speed Steel | High Speed Steel has more advantages to the |

| | |
|--------------------------------|---|
| | standard tool steel grades offering high hardness at temperature and high wear resistance. |
| Impact | Impact testing measures energy absorption by fracturing a steel test bar at high velocity. |
| Lumsden Grinding | The method of finishing steel plate by removing the surface with a reciprocating or rotary grinding machine. |
| Manganese Steel | Commonly referring to the 11% to 14% manganese steel plate. A work hardening steel that becomes increasingly hard when the surface is subject to repeated abrasion or impact. |
| Martensitic | A range of stainless steel grades which are magnetic and can be hardened and tempered. |
| Mechanical Properties | Steels can achieve different measurements of strength, toughness and hardness, dependent on composition and heat treatment – commonly known as the mechanical properties of steel. |
| Meehanite | A continuous cast iron type material. |
| Modulus of Elasticity | A measurement of the resistance of a steel to be deformed elastically and how it will restore it to its original shape after distortion. |
| Non Ferrous Metal | A metal or alloy that has no iron content. |
| Normalising | A heat treatment process to remove stresses from steel, often used after flame cutting of higher carbon steel grades. The steel is heated and held at a temperature above its upper critical limit for a designated amount of time and then allowed to cool in air. |
| Oxidation | When a steel is exposed to oxygen, commonly atmospheric conditions it may oxidise giving the surface a stain, discolouration or rust. |
| Physical Properties | Relating to the physics of a steel rather than mechanical properties, usually include such properties as density, coefficient of thermal expansion and electrical conductivity. |
| Plasma Cutting | A process used to cut stainless steel plate using a plasma torch. An inert gas is blown at high speed through a nozzle forming an electrical arc which forms a hot plasma for penetrating and cutting. |
| Precipitation Hardening | Commonly a heat treatment process for certain types of stainless steel, in which a constituent precipitates |

from a supersaturated solid solution. Also known as age hardening.

| | |
|--|--|
| Precision Grinding | The method of finishing steel plate by removing the surface with a surface grinding machine, to achieve tight tolerances. |
| Quenching | A heat treatment term where a steel is rapidly cooled after heating (common cooling mediums include oil, water and air) |
| Rockwell | A measurement of the surface hardness of a steel. |
| Spheroidal Graphite Iron | A ductile cast iron, commonly known as S G Iron. |
| Spring Steel | A medium to high carbon steel or an alloy or stainless steel which, when heat treated, has a high yield strength. |
| Stainless Steel | Highly alloyed steel grades giving good resistance to corrosion and oxidation. |
| Steel | An iron based alloy containing various quantities of carbon, silicon, manganese and other elements. |
| Steel Analysis | The chemical composition and make up of a steel specification. |
| Steel Elements | A steel element is a pure chemical substance defined by its atomic number (the number of protons in its nucleus). |
| Tempering | A heat treatment term where a steel is re heated to a desired temperature after quenching and allowed to cool to give the required hardness or mechanical properties. |
| Tensile Strength | A measurement of the maximum load per unit a steel test piece will achieve before fracturing. |
| Tolerances (of steel bar and plate) | The tolerance is the permissible limits or limits of variation from a specified dimension. |
| Tool Steel | Commonly steels that are suitable for heat treatment to a high hardness, which offer good tooling characteristics such as abrasion resistance and ability to hold a cutting edge. Tool steel types include cold work tool steel, hot work tool steel and plastic mould tool steel. |
| Tool Steel Brand Names | Commonly referring to tool steel producers of old who give a steel specification its own company brand name. |

UNS

Abbreviation for 'unified numbering system'.

Werkstoff

German steel specifications commonly shown as a number followed by a full stop then four more numbers (i.e. 1.2379).

Yield Strength

The yield strength or yield stress of a steel relates to the level of stress in steel where plastic deformation commences.
