

STEEL TERMS AND DEFINITIONS

A

Age Hardening Degeneration of steel that increases hardness and strength while decreasing ductility. This process normally follows rapid cooling or cold working.

AISI (American Iron and Steel Institute) A North American Trade Association with 50 member companies and over 100 associate members. These companies represent the United States, Canada and Mexico in all aspects of the steel industry.

Alloying Element The adding of any metallic element in steel production in order to increase hardness, strength, or corrosion resistance. Molybdenum, nickel and chromium are common alloying elements in stainless steel.

Alloy Steel Steel that contains more than 1.65% manganese, 5% silicon, 0.6% copper, or other minimum quantities of alloys such as chromium, molybdenum, nickel, or tungsten.

Alloy Surcharge The producer's selling price plus a surcharge added to offset the increasing costs of raw materials caused by increasing alloy prices.

Annealing A process of heating cold steel to make it more suitable for bending and shaping and prevents breaking and cracking. Batch Box annealing consists of heating coils for days in an oxygen-free environment. Continuous annealing consists of running the coils through heated vertical loops to obtain certain physical properties.

Anodic Protection Polarisation to a more oxidising potential to achieve a reduced corrosion rate by the promotion of passivity.

Argon-Oxygen Decarburisation (AOD) A process of further reducing the carbon content of stainless steel during refinement. AOD is closely related to Electric Arc Furnaces (EAF), but has a shorter operating time and requires lower temperatures.

Austenitic Steel Non-magnetic steels that contain nickel and 18% chromium to increase the resistance to corrosion. Austenitic steels are the most widely used category of steel.

Automatic Gauge Control A hydraulic roll force system where steel makers can monitor a steel sheet's thickness while it moves through the mill at over 50mph (80 km/h). The computer's gap sensor adjusts and monitors the thickness 50 to 60 times per second.

B

Bars Steel formed into long shapes from billets. Merchant bar and reinforcing bar are two kinds of bars.

Beam Long pieces of squared-off metal, normally steel, which are used in building construction.

Bend Tests Tests used to assess the ductility and malleability of steel when subjected to bending.

Billet A semi-finished form of steel that is used for long products such as bars and channels. Billets are usually two to seven inches square.

Blast Furnace A tall cylindrical furnace lined with heat resistant bricks that smelts iron from iron ore. Hot air

and gases are blasted from the iron ore, coke and limestone that fuel the furnace.

Blank A section of sheet steel that has the outer dimensions of a specific part but has not yet been stamped by the end user. This lowers steel processor's labour and transportation costs.

Bloom A semi-finished form of steel, whose cross section is more than eight inches, that will be further processed into beams, rods, bars or tubing products.

Brittle Fracture A fracture that has little or no plastic deformation.

Burr A subtle ridge on the edge of strip steel resulting from cutting operations such as slitting, trimming, shearing, or blanking. For example, as a sheet processor trims the sides of the sheet steel parallel or cuts a sheet of steel into strips, its edges will bend with the direction of the cut.

Butt-Weld Pipe The standard pipe used in plumbing. Heated skelp is passed continuously through welding rolls, which form the tube and squeeze the hot edges together to make a solid weld.

C

Carbon Steel Steel that is composed mostly of carbon and relies on it for its structure. It is the most widely produced steel.

Case Hardening Hardening a ferrous alloy to make the outside (case) much harder than the inside (core). This can be done carburising, cyaniding, nitriding, carbonitriding, induction hardening and flame hardening.

Cathodic Corrosion Corrosion caused by a reaction of an amphoteric metal with the alkaline products of electrolysis.

Cathodic Inhibitor A chemical substance that prevents or slows a cathodic or reduction reaction.

Cathodic Protection Reducing the corrosion of a metal by making the particular surface a cathode of an electrochemical cell.

Cavitation The rapid formation and depletion of air bubbles that can damage the material at the solid/liquid interface under conditions of severe turbulent flow.

Chemical Treatment A chemical coating normally applied to the steel surface to resist oxide formation and corrosion.

Charge The act of loading material into a furnace. For example iron ore, coke and limestone are charged into a Blast Furnace; a Basic Oxygen Furnace is charged with scrap and hot metal.

Chloride Stress Corrosion Cracking Cracking due to the combination of tensile stress and corrosion in the presence of water and chlorides.

Chromium (Cr) An alloying element that is used in stainless steel to deter corrosion.

Cladding Application of a stainless steel coating to a lower-alloy steel by means of pouring, welding, or coating to increase corrosion resistance at a lower cost

than using stainless steel exclusively.

Coils A sheet of steel that has been rolled to facilitate transportation and storage.

Coke A process form of coal that is used as fuel in blast furnaces in the smelting of iron. Burning steadily and thoroughly, coke is very dense and will not collapse from the weight of the iron ore.

Coke Oven Battery A combination of oven that process coal into coke. These batteries are often the dirtiest part of a steel mill due to the exhaust fumes and emissions.

Cold Reduction Process of rolling cold coils of pickled hot-rolled sheet through a press to make the steel stronger, thinner and smoother by applying pressure.

Cold-Rolled Strip (Sheet) Pickled sheet steel that has been run through a cold-reduction mill. It has a width of approximately 12 inches while a sheet may be more than 80 inches wide. Cold-rolled steel is thinner and stronger than hot-rolled sheet and is more expensive.

Cold-Finished Steel Bars Hot-rolled carbon steel bars with a higher surface quality and strength produced from secondary cold-reduction.

Cold Working (Rolling) Changing the structure and shape of steel by rolling, hammering or stretching the steel at room temperature to increase the hardness and strength of the steel.

Consumption The physical use of steel by end users. Consumption predicts changes in inventories, unlike demand figures.

Continuous Casting Processes of pouring steel into a billet, bloom or slab directly from the furnace. This process avoids the need for large, expensive mills and also saves time because the slabs solidify in minutes rather than the several hours it takes for an ingot to form.

Converter/Processor Steel customers demanding steel in a more finished state such as tubing, pipe and cold-rolled strip from rerollers and tube makers. This steel is generally not contracted, causing the converter segment of the steel mill's revenues more price sensitive than their supply contracts to auto manufacture.

Corrosion The natural degradation of steel due to atmospheric conditions or other factors.

Corrosion Fatigue Cracking due to repeating and fluctuating stresses in a corrosive environment.

Corrosion Potential The potential of a corroding surface in an electrolyte relative to a reference electrode under open-circuit conditions.

Corrosion Rate The rate at which an object corrodes.

Corrosion Resistance A metal's ability to resist corrosion in a particular environment.

Creep Strain caused by stress that occurs over time.

Crevice Corrosion Corrosion of a metal surface that is fully shielded from the environment but corrodes because it is so close to the surface of another metal.

Critical Pitting Potential The lowest value of oxidizing potential at which pits can form and grow. The value depends on the test method used.

Cut-to-Length Cutting flat-rolled steel into a desired length and then normally shipped flat-stacked.

D

Deburring Removing the subtle ridge from the edge of strip metal that results from cutting operation such as slitting, trimming, shearing or blanking.

Desulphurisation The removal of sulphur from a ladle full of hot metal via chemical injection before it is charged into the basic Oxygen Furnace. This is done because sulphur reduces welding and forming capabilities.

Die Casting The principal processes for casting near net shapes of non-ferrous metals such as zinc, aluminium, and zinc-aluminium alloy.

Drawn-Over-Mandrel To produce specialty tubing, this procedure uses a drawbench to pull tubing through a die and over a mandrel, allowing excellent control of the inside diameter and wall thickness. These specialty tubes are marketed mainly to automotive markets and for hydraulic cylinders.

Drill Pipe A seamless pipe used to drill an oil or gas well. Drill pipe is the conduit between the wellhead motor and the drill bit.

Ductility The ability of steel to be formed, shaped or altered permanently at room temperature without being damaged.

Duplex Stainless steel comprised of austenitic and ferritic steels that contain high amounts of chromium and nickel. This combination is stronger than both of the individual steels. Duplex steels are highly resistant to corrosion and cracking and are often used in heat exchangers, destination plants and marine applications.

E

Edge Rolling (Edge Conditioning) To facilitate customer manipulation, strips of steel are rolled to smooth the edges and remove any burrs.

Electric Arc Furnace (EAF) A steel producing furnace where scrap generally makes up 100% of the charge. Heat is supplied from electricity that arcs from the electrodes to the metal bath. These furnaces may operate on AC or DC.

Electric Resistance Welded (ERW) Pipe Pipe made from strips of hot-rolled steel, which are passed through forming rolls and welded. ERW pipe technology is advancing and now consists of approximately 48% of OCTG shipments by tonnage.

Embrittlement A material's loss of malleability due to chemical treatment or physical change.
Environment Cracking The cracking and corroding of a normally ductile material due to environment conditions.

Erosion The continuous depletion of a material due to mechanical interaction with a liquid, a multi-component fluid or solid particles carried with the fluid.

Erosion Corrosion An accelerated loss of material concerning corrosion and erosion that results from corrosive material interacting with the material.

Extrusion A shaped piece of normally ferrous metal, produced by forcing the blooms, bar or rod through a die of the appropriate shape.

F

Fabricator An intermediate product producer that purchases materials and processes them specifically for a particular project.

Fastmet The reduction of iron ore to iron pellets that can be loaded into an electric arc furnace with an equal amount of scrap. This process allows producers to bypass the coke oven-blast furnace route to produce hot metal from iron ore.

Fatigue A condition leading to the eventual fracture of a material due to constant or repeated stresses that exert less pressure than the tensile strength of the material.

Ferrite The body-centred cubic crystalline phase of iron-based alloys.

Ferritic Magnetic steels that have a low carbon content and contain chromium as the main alloying element, usually between 13% and 17%. It is the second most widely used steel. Ferritic steels are generally used in automotive trim and exhaust systems, hot water tanks and interior architectural trim.

Ferroalloy Metal products such as ferrochrome, ferromanganese and ferrosilicon that are commonly used as raw materials to aid various stages in steel making. Certain stages could be de-oxidization, desulphurisation, and strength adding.

Ferrochrome A common raw material in stainless steel production. This alloy consists of iron and up to 72% chromium.

Ferrous Any metal that is primarily composed of iron.

Finish The final condition of the surface after the last phase of production.

Finishing Facilities These facilities process semi-finished steel into ready-made forms that can be used by others. Some facilities are rolling mills, pickle lines, tandem mills, annealing facilities and temper mills.

Flat-Rolled Steel Category of steel that includes shapes such as sheet, strip, and tin plate.

Flux An iron cleaning agent that consists of limestone and lime. These products react with impurities in the metallic pool and float to the top of the liquid iron.

Foil Metal with a maximum width of .005 inches.

Forging Forming a hot or cold metal into a fixed shape by hammering, upsetting, pressing or rolling.

Fouling An accumulation of marine organism deposits on a submerged metal surface. Fouling also refers to the accumulation of normally inorganic deposits on heat exchanger tubing.

Fretting Corrosion Deterioration at the interface of two contacting surfaces under load which is accelerated by their relative motion.

G

Galvanic Corrosion Accelerated corrosion of a metal because of an electrical contact with a more noble metal or non-metallic conductor in a corrosive electrolyte.

Galvanised Steel Steel coated with a thin layer of zinc to protect products such as garbage cans, storage tanks, fencing wire and underbody auto parts from corrosion.

Gauge The thickness of a certain steel. High quality steel has a consistent gauge to prevent weak spots or deformation.

H

Heat Term referring to a batch of refined steel; a charged oxygen or electric furnace full of steel. A heat of steel can be used to cast several slabs, billets or blooms.

Heat-Affected Zone (HAZ) The part of a metal that is not melted during cutting, brazing or welding, but whose microstructure and physical properties are altered by these processes.

Heat Treatment Altering the properties of steel by subjecting it to a series of temperature changes. To increase the hardness, strength or ductility of steel so that it is suitable for additional applications.

High-Carbon Steel Steels that contain at least 0.3% carbon. If more carbon is added, the steel becomes less malleable and tougher to utilize. These steels are suitable for plow blades, bed springs, shovels and other high wear applications.

High-Strength/Low-Alloy Steel Steel that contains less than 5% hardening or strengthening alloys such as nickel, chromium, silicon, manganese, tungsten, molybdenum and vanadium.

High Temperature Hydrogen Attack A loss of strength and malleability of steel due to high temperature reactions of absorbed hydrogen with carbides in the steel resulting in decarburisation and internal fissuring.

Hollow Structural Sections A high-strength, cold-formed steel tubing used in used for structural purposes in a broad range of applications. Its biggest advantage is the high strength-to-weight ratio it possesses.

Hot Band (Hot-Rolled Steel) Steel that has been rolled on a hot-strip mill. It can be sold directly to customers or further processed into other finished products.

Hydroforming A process in which a tube is placed in a forming die and is formed to the shape of the mold by internal water pressure. This process is ideal for automotive parts because it allows for major shape deformation and holes can be made in the tube almost anywhere.

Hydrogen Embrittlement Stepwise internal cracks that connect adjacent hydrogen blisters on different planes in the metal or to the metal surface.

Hydrogen Stress Cracking Cracking of a metal resulting from the combination of hydrogen and tensile stress.

I

Ingot Semi-finished steel that has been poured into moulds and then solidified. The moulds are then removed and the steel is ready for rolling or forging.

Integrated Mills Steel making facilities that process iron ore and other raw materials in blast furnaces. These mills differ from mini mills only on the hot end side of production. Most integrated mills specialize in flat-rolled steel or plate steel.

Intergranular Corrosion Preferential corrosion at or along the grain boundaries of a metal.

Intergranular Stress Corrosion Cracking Stress corrosion cracking in which the cracking occurs along grain boundaries.

Iron Ore A mineral that contains enough iron to be a factor in steel production.

Iron-Based Superalloys These alloys are at the highest end of the range of temperature and strength. Additives

such as chrome, nickel, titanium, manganese, molybdenum, vanadium, silicon, and carbon may be used. These superalloys are also referred to as "super chrome steels".

L

Levelling Line A machine that smoothes any physical deficiencies in the sheet before it is shipped to the customer.

Life Cycle Costing An accounting method of costing where expenses are allocated over the life of the product. Life cycle costs are often lower for stainless steel than for alternatives despite a higher initial outlay, because stainless products generally last longer and require little maintenance.

Light-Gauge Steel A very thin sheet of steel that has either been temper rolled or passed through a cold reduction mill. This steel is usually plated with chrome or tin for use in food and beverage containers.

Line Pipe A pipe extending over long distances that transports oil, natural gas and other fluids.

Long Products Category of steel that includes rods, bars and structural products that are described as long rather than flat.

Low-Carbon Steel Steel containing less than .3% carbon. This steel is ductile steel that can be stretched or rolled for automotive parts.

M

Martensite A hard supersaturated solid solution of iron characterized by an acicular (needle-like) microstructure.

Martensitic A small category of magnetic steels typically containing 12% chromium, a moderate level of carbon and a very low level of nickel.

Mechanical Properties Physical properties of a material concerning its elasticity when force is applied, particularly stress and strain.

Metal Dusting An extreme breakdown of a metal due to exposure to a carbonaceous gas at an elevated temperature.

Mini-Mills Steel mills that melt scrap metal to produce commodity products. They have the same production requirements as integrated mills, but they utilize different labour relations, minimum size, product markets, etc.

Molybdenum (Mo) An alloying element that enhances corrosion resistance along with chromium in stainless steels.

N

Nickel (Ni) An alloying element used in stainless steels to enhance ductility and corrosion resistance.

Nickel-Based Superalloys Alloy metal produced for high-performance, high-temperature applications such as nickel-iron-chrome alloys and nickel-chrome-iron alloys.

Non-Ferrous Metal Metal or alloy that contains no iron.

O

Oil Country Tubular Goods (OCTG) Category of pipe products used by petroleum exploration customers. Labels bearing OCTG are applied to casings, drill pipes, oil well tubing, etc.

Ore An iron-containing material used primarily in the blast furnace.

Oscillating A method of winding a narrow strip of steel over a much wider roll. This allows for more steel per roll and allows the customer to have longer processing runs.

Oxidation Rust or corrosion due to exposure to oxygen.

P

Passivation A reduction of the anodic reaction rate of an electrode involved in corrosion.

Passive A state of a metal in which a surface reaction product causes a marked corrosion rate to that in the absence of the product.

Pickling Process where steel coils are cleaned using hydrochloric baths to remove impurities such as rust, dirt and oil.

Pig Iron Melted iron production in a blast furnace that contains at least 1.5% carbon. Named long ago when molten iron was poured through a trench in the ground to flow into shallow earthen holes, the arrangement looked like newborn pigs suckling. The central channel became known as the "sow" and the moulds were "pigs".

Piling (Sheet Piling) A structural steel product with interlocking edges generally used in cofferdams and riverbank reinforcement.

Pipe Term that originally defined a tube used to transport fluids or gases. Now, pipe and tube are used interchangeably.

Pitting Localised corrosion (in the form of pits) of a metal surface that is confined to a small area.

Pitting Factor The ratio of the depth of the deepest pit resulting from corrosion divided by the average penetration as calculated from mass loss.

Plate Sheet steel measuring more than eight inches wide with a thickness ranging from one quarter of an inch to more than one foot.

Postweld Heat Treatment Heating and cooling a weldment in such a way as to obtain desired properties.

Powder Metals Fabricating technique where fine metallic powder is compacted and heated under high pressure to solidify the material.

Precipitation Hardening (PH) A small category of steels resembling martensitic steels that have great strength and hardness due to heat treatment.

Pretreated Steel that is chemically treated to prepare it for future surface treatment and to prevent corrosion prior to future alterations.

R

Reducing Process of adding natural gas or coal to remove oxygen from iron ore to produce a scrap substitute. Iron ore can be heated as natural gas passes through it or combined with ground or gasified coal and heated. Oxygen in the ore combines with carbon and hydrogen reducing the iron.

Reinforcing Bar (Rebar) A commodity-grade steel used to reinforce concrete in highway and building structures.

Residuals The impurities remaining in a mini-mill steels resulting from the wide variety of metals entering the process.

Reversing Mill A stand of rolls that passes steel back and forth between the rolls in order to reduce the steel sheet or plate. The distance between the rolls is reduced after each pass.

Rod Semi-finished steel that is rolled from a billet and is commonly used for wire products, bolts and nails.

S

Scale Rust from iron that forms on the surface of steel after it is heated.

Scrap (Ferrous) Iron-containing material that is normally remelted and recasted into new steel. Home scrap is left over steel generated from edge trimming and rejects within the mill. It is usually sent straight back to the furnace. Prompt or industrial scrap that is trimmed by stampers and auctioned to buyers. Obsolete scrap is iron bearing waste such as old storage bins and junk cars that can be remelted in mini-mills.

Seamless Pipe Pipe produced from a solid billet that is heated and rotated under pressure. This rotating pressure creates a hole in the middle of the billet, which is then formed into a pipe by a mandrel.

Secondary Steel Steel that has been rejected by an original customer because of a defect in the chemistry, gauge or surface quality. Mills then search for another customer that will accept the steel at a discount.

Semi-Fabricated Steel Semi-processed forms of metal such as bars, sheets, rods, etc.

Semi-Finished Steel Steel products such as blooms, billets or slabs that are then rolled and processed into beams, bars, sheets, etc.

Service Centre An operation that buys metal, stores it (often processing it in some way) and then sells it in a slightly different form than it was purchased from the producing mills.

Shape Correcting Levellers, edge trimmers and temper mills reshape processed steel to meet customers' specifications. Reshaping is needed from processes that cause deformities in the steel.

Shearing Trimming of the edges of sheet and strip to make them parallel. This is done at either the steel mill or at the steel processor.

Sheet Steel Steel that is thin, flat and rolled in a coil, it is created in a hot strip mill by flattening a slab, but keeping the side dimensions the same. The steel will lengthen as it is rolled. The most common differences among steel bars, strip, plate and sheet are merely their physical dimensions of width and thickness.

Shredded Scrap Small steel scrap that is produced from shredded automobiles. The steel is separated by magnets and consumed by mini-mills for use in electric arc furnace operations.

Shot Blasting Blast cleaning using steel shot as the abrasive.

Shot Peening Stressing the surface layer of a material by bombarding it with a selected medium (usually round steel shot) under controlled conditions.

Sigma Phase An extremely brittle Fe-Cr phase that can form at elevated temperatures in Fe-Cr-Ni and Ni-Cr-Fe alloys.

Sintering A process that combines iron-bearing particles into small pellets that were recovered from environmental control filters. The pellets can be used as charge in a blast furnace.

Slab A very common type of semi-finished steel usually measuring 10 inches thick by 30-85 inches wide and average 20 feet long. After casting, slabs are sent to a strip mill where it is rolled and coiled into sheet and plate products.

Slag The impurities in a molten pool of iron. Flux may be added to congregate the impurities into a slag. Slag is lighter than iron and will float allowing it to be skimmed.

Slitting Cutting a sheet of steel into a smaller strip to meet customer' demands.

Solution Heat Treatment Heating a metal to a higher temperature and maintaining it long enough for one or more constituents to enter the solid solution. The solution is then cooled rapidly to retain the constituents within.

Solvent Cleaning The removal of contaminants such as oil, grease, dirt, salts, etc by cleaning with a solvent steam, vapour, alkali or emulsion.

Specialty Alloys Metals with distinct chemical and physical properties. These alloys are produced for very specific applications; considered to be on the low end of superalloys.

Specialty Steel Category of steel (normally high in carbon or other alloy) that includes electric, alloy, stainless and tool steels.

Specialty Tube A wide variety of high quality, specialised tubular products. It is usually found in the automotive and agricultural industries, construction equipment, hydraulic cylinders, etc.

Stainless Steel Group of corrosion resistant steels containing at least 10% chromium and may contain other alloying elements. These steels resist corrosion and maintain its strength at high temperatures.

Steckel Mill A reversing steel sheet reduction mill with heated coil boxes at each end. Steel sheet or plate is sent through the rolls of the versing mill and coiled at the end of the mill, reheated in the coil box, and sent back through the Steckel stands and recoiled. By reheating the steel prior to each pass, the rolls can squeeze the steel thinner per pass and impart a better surface finish.

Strain The amount of elongation, force or compression that occurs in a metal at a given level of stress. Generally in terms of inches elongation per inch of material.

Strength The ability of steel to oppose applied forces when considering resistance to stretching, forming, compressing, etc.

Stress Corrosion Cracking (SCC) Slowly developing cracks that form in stainless steel due to mechanical stress and exposure to a corrosive environment.

Stress Relieving Heating a metal to the appropriate temperature, maintaining it long enough to reduce residual stresses and then cooling it slowly in order to minimise the development of residual stresses.

Strip A thin, flat piece of steel that is generally narrower than sheet steel and the gauge is monitored more carefully. It may be cut from a steel sheet with a slitting machine.

Structurals An architectural steel product group that includes I-beams, H-beams, wide-flange beams and sheet piling. These products are used in multi-storey buildings, bridges, vertical highway supports, etc.

Superalloys Lightweight metal alloys designed specifically to withstand extreme conditions. Conventional alloys are iron-based, cobalt-based, nickel-based and titanium-based.

Sulphidation The reaction of a metal or alloy with a sulphur-containing species to produce a sulphur compound that forms on or beneath the surface of the metal or alloy.

Sulphide Stress Cracking Cracking of a metal under the combined actions of tensile stress and corrosion in the presence of water and hydrogen sulphide (a form of hydrogen stress cracking).

T

Taconite A natural mineral containing less than 30% iron and is the primary ore used in blast furnaces today. It is used because domestic supplies of iron-rich ores were largely depleted in the 1940s and steel companies can process this lower grade mineral to make it useful.

Tailored Blanks A section of sheet steel that is cut to the manufacturer's desire. Excess steel is trimmed away to save transportation costs and is ready for the stamper to shape with a die press.

Tandem Mill A cold-rolling mill that gives greater strength, a more uniform and smoother surface, and a reduced thickness to the steel sheet. This mill rolls steel through a series of rolls, to achieve a desired thickness and surface quality.

Tantalum (Ta) A by-product of tin processing, this refractory metal is used as a barrier to corrosion of chemical processing and carbide cutting tools and still growing use as electronic capacitors and filaments. Melts at 2415 degrees Fahrenheit.

Titanium (Ti) A very ductile and malleable white metal that is used in aviation, aerospace, etc because of its high strength and light weight.

Titanium-Based Superalloys Lightweight corrosive-resistant alloys suitable for high temperatures. These alloys are very practical for airplane parts. Titanium alloys can be blended with aluminium, iron, vanadium, silicon, cobalt, tantalum, zirconium and manganese.

Tool Steels Hardened steels that are used in the manufacturing of tools and dies.

Ton Unit of measure for steel scrap and iron ore. Gross Ton: 2,240 pounds. Long (net) Ton: 2,240 pounds. Short (net) Ton: 2,000 pounds. Normal unit of statistical raw material input and steel output in the United States. Metric Tonne: 1,000 kilograms (2,204.6 pounds or 1,102 short tons).

Tubing When referring to OCTG, tubing is a separate pipe used within the casing to conduct the oil or gas to the surface. Depending on conditions and well life, tubing may have to be replaced during the operational life of a well.

Tungsten (W) Grey metal with high tensile strength. It is ductile, malleable and resistant to atmospheric elements and all acids except strong alkalis.

V

Vacuum Oxygen Decarburisation (VOD) A refinement of stainless steel that reduces carbon content. Molten, unrefined steel is heated and stirred by an electrical current while oxygen enters from the top. Many undesirable gases escape from the steel and are evacuated by a vacuum pump. Alloys and other additives are then mixed in to refine the molten steel further.

Vanadium (V) A grey metal that is normally used as an alloying agent for iron and steel. It is also used as a strengthener of titanium-based alloys.

W

Width The lateral dimension of rolled steel, as opposed to the length or the gauge. If width of the steel strip is not controlled during milling, the edges must be trimmed.

Y

Yield Strength The stress at which a material exhibits a specified deviation from the proportionality of stress to strain. The deviation is expressed in terms of strain by either the offset method (usually at a strain of .2% or the total-extension-under-loads method (usually at a strain of .5%).

Z

Zirconium (Zr) A strong, ductile metal obtained by the chemical processing of zircon-bearing sands. It has good corrosion resistance at high temperatures and is used as a structural material in nuclear reactors and cladding material for uranium.