

ANNEX 5 – GLOSSARY

Bars

Long steel products that are rolled from billets. Merchant bar and reinforcing bar (rebar) are two common categories of bars. Merchant bar includes rounds, bulb flats, angles, squares and channels that are used by fabricators to manufacture a wide variety of products, such as frames, joists, ceilings, storage racks, stair railings, fencing, farm equipment, auto parts and shipbuilding components. Rebar is used to strengthen concrete in highways, bridges and buildings.

Basic oxygen furnace (BOF)

A pear-shaped furnace, lined with heat-resistant (refractory) bricks, that refines molten iron from the blast furnace and scrap into steel through the oxidising action of oxygen blown into the melt under a basic slag. The basic oxygen process is a widely used steelmaking method. About 70% of the crude steel in the world is made in BOFs.

Beneficiation (enrichment, concentration)

Complex treatment of mined material to make it more concentrated or richer. Uses crushing, grinding and often froth flotation to remove waste rock from ore. The metal content increases as waste is removed.

BF-grade pellets

Pellets that have the chemical composition and physical properties required for the reduction of iron in blast furnaces. The iron content in BF grade pellets usually does not exceed 66%, while the basicity is greater than 0.1 and can vary.

Blast furnace (BF)

A towering cylinder lined with heat-resistant (refractory) bricks and used by integrated steel mills to smelt iron from ore. Its name comes from the 'blast' of hot air and gases forced up through the iron ore, coke and limestone that are charged into the furnace. Under extreme heat, chemical reactions among the ingredients release liquid iron from the ore.

Bloom

A semi-finished continuous cast or rolled steel product with a round, square or rectangular cross-section that is used for rolling heavy long products with large dimensions.

Coils

Hot- or cold-rolled flat products supplied in regularly wound coils. These flat products can also be treated with metallic or organic coatings.

Coke

The solid product obtained from the dry distillation of coking coal in the absence of oxygen. Depending on its properties, coke is known as hard coke, soft coke and metallurgical coke.

Coking coal

Coal suitable for making into coke. Coking coal needed to produce blast furnace coke (the type of fuel/reductant needed for a blast furnace) is characterised by certain specific properties in terms of composition: for example, low ash (up to 10%), volatile matter (17% to 26%), low sulphur and phosphorous.

Cold rolling

Plastic deformation of a metal at room temperature that might result in substantial increases in strength and hardness. The end product is characterised by improved surface, desired thickness and enhanced mechanical properties compared with hot-rolled steels. Cold-rolled products typically include sheets, coils, strips and rebar, among others.

Continuous casting

A method of casting steel into a billet, bloom or slab directly from its molten form. Continuous casting avoids the need for large, expensive mills for rolling ingots into semi-finished products. Continuously cast slabs and billets also solidify in a few minutes, compared with several hours for an ingot. As a result, the chemical composition and mechanical properties are more uniform. Steel from the basic oxygen or electric arc furnace is poured into

a tundish (a shallow vessel that looks like a bathtub) atop the continuous caster. As steel carefully flows from the tundish down into the water-cooled copper mould of the caster, it solidifies into a ribbon of red-hot steel to form slabs or blooms.

Crude steel

Steel in the first solid state after melting, suitable for further processing or for sale. Synonymous with raw steel.

Crusher and conveyor system (CCS)

Equipment for ore size reduction and a transportation system used to move bulk materials from mine shafts and open pits to the surface for further processing.

Customer relations management (CRM) system

An information technology system used to manage customer data and support the sales teams, delivering analytical insights for improving work with existing and potential clients.

Decarbonisation

The process of reducing greenhouse gas emissions into the atmosphere caused by human activity with the goal of achieving net zero carbon emissions.

Direct reduced iron (DRI)

The solid metallic iron product obtained through the direct reduction of high-grade iron ore in a solid state without being converted into liquid form as happens in a blast furnace. DRI is also known as sponge iron because of its spongy microstructure. Merchant DRI product is delivered mainly in the form of pellets or briquettes.

DR-grade pellets

Higher-quality pellets that are used for iron production by direct reduction technologies. These pellets usually have a basicity less than 0.1 and typical Fe content of at least 67%.

Downstream

In manufacturing, this term refers to processes that happen later in a production sequence or production line.

Electric arc furnace (EAF)

A furnace that uses heat generated by an electric arc to melt metals and other materials. The EAF and basic oxygen processes are the two modern ways of making steel.

Enterprise resource planning (ERP)

An integrated system of software applications used by companies to monitor all core aspects of their business. These include purchasing, manufacturing and sales, facilitating information sharing and allowing managers to make decisions informed by a global view of the supply chain.

Environmental, social and governance (ESG) reporting

A system of reporting built around three central factors underlying sustainability. ESG reporting covers both mandatory and best-practice voluntary reporting of the non-financial, sustainability aspects of a company's performance. Effective ESG reporting is a central component for a company's adoption of integrated reporting, an emerging global set of standards for demonstrating in company disclosures how financial and non-financial factors contribute to create value in an organisation.

Fatality frequency rate (FFR)

An internationally recognised safety indicator (also called the fatal accident frequency rate), the FFR is the ratio of fatalities per million hours worked.

Fe content

The chemical symbol for iron, Fe comes from the Latin word 'ferrum'. Fe content refers to the percentage of iron in the ore.

Ferroalloys

Alloys consisting of certain elements (such as manganese, silicon, molybdenum, vanadium, nickel, boron and chromium) combined with iron and used in steelmaking to reach the necessary chemical composition and properties of steel products. In some cases, ferroalloys may serve as deoxidisers.

Finished products

Products that emerge at the end of a manufacturing process. In metallurgy, they are obtained from hot rolling, cold rolling, forging and other processing of semi-finished steel (blooms, billets and slabs). They cover two broad categories of products, namely long and flat.

Flat products

Finished steel products having rectangular cross sections, the width being much greater than the thickness. These are supplied in hot-rolled, cold-rolled or in coated condition, depending on the requirement. Flat products include plates, sheets, and wide and narrow strips, that are produced from slabs on rolling mills.

Forging

Shaping ferrous and non-ferrous metals and alloys while hot by repeated hammer blows.

Fresh water

Water with concentration of total dissolved solids equal to or below 1,000 mg/l.

Galvanised steel

Steel coated with a thin layer of zinc to provide corrosion resistance.

Greenhouse gas (GHG)

For a steelmaker, the main type of GHG emissions is carbon dioxide (CO₂), although they also include methane (CH₄). They are generated primarily from blast furnaces, but also from mining, transportation and office energy consumption.

Hard coking coal (HCC)

A type of coking coal with better coking properties. It is traditionally measured by coke strength, which is usually about 60% for HCC.

Heavy plate

Thick, flat finished product with widths from 500 millimetres to five metres and a thickness of at least three millimetres. Heavy plate is normally produced and supplied in hot-rolled condition with or without specific heat treatment. It is mainly used

for construction, machinery, shipbuilding or large-diameter pipe fabrication.

Hot rolling

Rolling of steel at above the recrystallisation temperature (normally above 1,000°C) to produce hot-rolled long and flat products from semis. Ingots are also hot rolled to obtain semis.

Human capital management

An approach to employees that perceives people as human capital consisting of knowledge and skills, enhanced by training.

Human resources (HR)

The people who make up the workforce of a company. The term also frequently refers to the management function responsible for ensuring the recruitment and retention of qualified employees, managing goal setting and assessments, overseeing the process of training and further education to meet company needs and employee potential, and other processes required to maintain an effective workforce.

Ingot

The primary solid product obtained on solidification of liquid steel in conventional vertical cast iron moulds, which are intended for rolling into intermediate/semi-finished products after re-heating.

Integrated steelmaking plant

A plant that converts iron ore into semi-finished or finished steel products. Traditionally, this process requires coke ovens, sintering machines, blast furnaces, steelmaking furnaces and rolling mills.

Iron ore

A naturally occurring mineral from which iron (Fe) is extracted in various forms, mainly for producing hot metal and direct-reduced iron.

Iron ore concentrate

Iron ore containing the valuable minerals of an ore from which most of the waste material has been removed.

JORC Code

The code of the Joint Ore Reserves Committee (JORC) of The Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and The Minerals Council of Australia for reporting of exploration results, mineral resources and ore reserves. It is an internationally recognised reporting standard for mineral exploration results, mineral resources and ore reserves that is adopted worldwide for market-related public reporting and financial investments. The code was first published in 1989 and has been regularly updated since, the last time in 2012.

Liquid steel

The immediate hot molten steel product during steelmaking.

Long products

Finished steel products normally produced by hot rolling or forging blooms, billets or 'pencil ingots' into useable shapes and sizes, such as rounds, bulb flats, angles, squares, rebars and channels. They are normally supplied in cut lengths, except wire rod which is wound in coils. Long products are used in all industrial sectors, particularly construction and engineering.

Lost-time injury frequency rate (LTIFR)

An internationally recognised safety indicator, the LTIFR is the ratio of lost-time injuries per million hours worked. It is calculated using the total number of incidents leading to the loss of one day/shift or more from work.

Merchant

A term used to differentiate products sold to third parties from those consumed internally.

Mineral

A natural, inorganic substance having a definite chemical composition and physical characteristics, or any chemical element or compound occurring naturally as a product of inorganic processes.

Mineral resources

A concentration or occurrence of solid material with geological characteristics known, estimated or interpreted from specific geological evidence and knowledge and having reasonable prospects for economic extraction. For coal, the term "Coal resources" could be used interchangeably with "Mineral resources".

Open-hearth furnace (OHF)

A furnace for melting metal, in which the bath is heated by the combustion of hot gases over the surface of the metal and by radiation from the roof. The furnace is used to derive steel from pig iron and scrap. The open-hearth process has been replaced by the basic oxygen process or electric arc method in most modern facilities.

Operational efficiency

The ability of a business to deliver outputs, for example products and services for customers or returns for debt and equity providers, more efficiently by reducing relative costs, often through such processes as automation, centralisation or improved working practices. Also known as operational improvement or operational excellence.

Ore reserves (proven, probable)

Proven ore reserves are the part of measured resources that can be mined in an economically viable fashion. They include diluting materials and allowances for losses that occur when the material is mined. Proven ore reserves represent the highest confidence category of a reserve estimate. Probable ore reserves are the part of indicated and, in some circumstances, measured mineral resources that can be mined in an economically viable fashion. They include diluting material and allowances for losses, which may occur when the material is mined. Probable ore reserves have a lower level of confidence than proven ones but are of sufficient quality to serve as the basis for a decision to develop a deposit. For coal, the term "Coal reserves" could be used interchangeably with "Ore reserves".

Overburden

Used in mining to describe material that lies above a zone of economic interest: for example, the rock and soil above an iron ore body. Overburden is removed during surface mining, but is typically not contaminated with toxic components and may be used to restore a mining site to a semblance of its appearance before mining began.

Pelletising

The process of compressing or moulding a product into the shape of a pellet. When doing so with iron ore concentrate, spheres of typically 8 millimetres to 18 millimetres (0.31 inches to 0.71 inches) in diameter are produced. The process combines agglomeration and thermal treatment to convert the raw ore into pellets with characteristics appropriate for use in blast furnace and DRI processes.

Pelletising machine

Equipment designed for production of pellets (see Pelletising).

Pellets

An enriched form of iron ore shaped into small balls that are used as raw material in the iron making process (see Pelletising). There are two types of pellets: BF-grade pellets, which are used in blast furnaces, and DR-grade pellets, which have a quality suitable for use in the direct iron reduction process.

Permit-to-work procedure

A process used to control work that is identified as possibly hazardous.

Pickling line

Specialised equipment for the chemical removal of surface oxides (scale) and other contaminants such as dirt from a steel product by immersion in an aqueous acid solution. The most common pickling solutions are sulphuric and hydrochloric acids.

Pig iron

High-carbon (above 2.14%) iron alloy made by reducing iron ore in a blast furnace. A product in solid form is obtained on solidification of hot metal in a pig casting machine.

Pulverised coal injection (PCI)

Technologies whereby pulverised, granulated or dust coal is injected into a blast furnace through the tuyeres (nozzles) along with the blast to replace natural gas and a part of the coke requirement.

Resale

The act of selling third-party products.

Roasting machine

One type of equipment used in the process of thermal treatment of iron ore pellets.

Rolled products

Products obtained from hot rolling semi-finished steel (blooms, billets and slabs) or cold rolling hot-rolled steel.

Scrap

Steel waste that is not usable in its existing form and is re-melted to produce crude steel or sold. Depending on its form and type, it is classified as heavy melting scrap, light melting scrap or turnings/borings and other categories.

Sections

Hot-rolled long products obtained by rolling blooms or billets. They include angles, channels, girders, joists, I-beams, H-beams, rails and other profiles. Some sections can also be produced by welding together pieces of flat products. They are used for a wide variety of purposes in the construction, machinery and transportation industries.

Semi-finished products (semis)

Intermediate solid steel products in the form of blooms, billets or slabs obtained by hot rolling or forging ingots, or by continuously casting liquid steel. They are intended for further rolling or forging to produce finished steel products.

Sinter

An aggregate that is normally produced from relatively coarse fine iron ore, mixed with coke breeze (fine coke), limestone, dolomite fines and various metallurgical return wastes used as an input/raw material in blast furnaces. Sinter improves blast furnace operation and productivity and reduces coke consumption.

Slab

A semi-finished rectangular steel product used to make finished hot-rolled flat products such as plates, sheets and coils.

Smelter (ore-thermal furnace)

A closed electric arc furnace for melting and reduction processes. It is equipped with a roof with seals. The furnace steel shell is lined inside with refractory (heat resistant) materials. Electric current is fed into the bath filled with charge through self-sintering electrodes. Charge materials are heated and melted mainly due to a powerful electric arc, but also due to heat released when current passes through the charge and melt. The temperature is 1,500-2,000°C. Melt and slag are tapped alternately through tapholes, as in a blast furnace. Smelting is considered as low-carbon technology.

Square billet

A semi-finished steel product with a square cross section of up to 200 millimetres x 200 millimetres. This product is used as input material to make finished long steel products such as bars, rods and light sections.

Stakeholder

According to the Global Reporting Initiative, this term is defined as an individual or group that has an interest that is affected or could be affected by an organisation's activities. Stakeholders can include business partners, civil society organisations, consumers, customers, employees and other workers, governments, local communities, non-governmental organisations, shareholders and other investors, suppliers, and trade unions, among others.

Tails and tailings

Waste generated by mine processing plants as part of their normal functioning that consist of ground rock and effluent and are stored as tailings in special ponds or dumps secured behind dams. The flow between the plants and tailings is maintained as a closed cycle of clarified water to prevent contamination of nearby ground and river water. Tailings ponds and dams must be regularly monitored to ensure their stability and the safety of surrounding facilities and communities.

Water consumption

The use of water withdrawn from water bodies in production operations.

Water discharge

Sum of effluents, used water and unused water released to surface water, ground water or sea water, for which the organisation has no further use, over the course of the reporting period.

Water intake

Withdrawal from water bodies for consumption or storage.

Wire

A broad range of products produced by cold-reducing hot-rolled wire rod through a series of dies or rolls to improve surface finish, dimensional accuracy and the physical properties. Typical applications include nets, screws, rivets, upholstery springs, furniture wire, concrete wire, electrical conductors, rope wire and structural cables.

Wire rod

Hot-rolled coiled plain bar and rods of up to 18.5 millimetres in diameter. Wire rod is normally used to make steel wire, cold-rolled rebar and hardware, such as nuts, bolts, screws and latches.