TBS/MMDC 9 (6485) P3 - Mineral Processing Terminologies - Part 2 - Concentration
0 Foreword

This draft Tanzania Standard is being prepared by the Mineral Processing and Equipment Technical Committee (MMDC 9), under the supervision of the Mining and Minerals Standards Divisional Committee (MMDC).

This document has been prepared in order to standardize and co-ordinate technical terms currently used in the mining industry and ensure expertise of other type of mining activities.

Need for this document arose from the widely varying interpretation of terms used within the industry and the prevalent use of more than one synonym.

This document consists of the following parts:

Part 1: Comminution
Part 2: Concentration
Part 3: Metal recovery processes
Part 4: Metallurgical accounting
Part 5: Mine effluent detoxifications

1 Scope

This document covers the terms and definitions used in mineral processing industry in connection with concentration as classified in the following unit operations:

1.1 Gravity
1.2 Flotation
1.3 Leaching
1.4 Magnetic and electrostatic

2 Normative references

This document does not contain normative references

3.0 Terms and definitions

3.1.0 Gravity

3.1.1 Apex

the bottom opening of a cyclone through which the underflow discharge
3.1.2 Automatic mode
controller operating mode in which the controller changes the manipulated variable to effect control

3.1.3 Bypass
an alternative path, in a duct or pipe, for a fluid to flow from one point to another, with the direction determined by the opening or closing of valves or dampers in the main line as well as in the bypass or arrangement of screens and chutes, or of piping, allowing material to be passed around a given part of a flow line used to avoid feeding fine ore through a relatively coarse crusher, thus reducing load, wear, and chance of blockage

3.1.4 Concentrate
the valuable mineral(s) separated from ore after undergoing a specific treatment

3.1.5 Centrifugal force
the force that push a rotating object outward

3.1.6 Centrifugal concentration
accelerated settlement of finely divided particles from pulp, removal of moisture, or classification into relatively coarse and fine fractions by centrifuging

3.1.7 Classification
the separation of a mixture containing particles of different size into a stream containing coarse particles and stream containing fine particles

3.1.8 Classifier
device used in separation of a mixture containing particles of different sizes into a stream containing coarse particles and a stream containing fine particles

3.1.9 Cyclone
classifier which uses centrifugal force to separate a mixture containing particles of different sizes into course stream and fine stream

3.1.10 Concentration
process of separation of valuable minerals from the other raw materials

3.1.11 Cut Size
the particle size at which the classifier feed particles have an equal chance of going to the coarser/finer product stream

3.1.12 Dense (or Heavy) Media Separation
the simplest of all gravity processes and has long been a standard laboratory method for separating minerals of different specific gravity. Heavy liquids of suitable density are used, so that those minerals lighter than the liquid float, while those denser than it sink.

3.1.13 Dry cyclone

an air cyclone uses gravitational force to remove coarse dry particles from a contaminated air stream moving in a vortex.

3.1.14 Feed

slurry entering the classifier.

3.1.15 Free settling

refers to the sinking of particles in a volume of fluid which is large with respect to the total volume of particles, hence particle crowding is negligible.

3.1.16 Heavy media liquid

heavy liquid is a solution or liquid chemical substance with a high density and a relatively low viscosity. Heavy liquids are often used for determination of density in mineralogy, for density gradient centrifugation and for separating mixtures.

3.1.17 Hydraulic classifiers

are characterized by the use of water additional to that of the feed pulp, introduced so that its direction of flow opposes that of the settling particles normally consist of a series of sorting columns through each of which a vertical current of water is rising and particles are settling out.

3.1.18 Hydrocyclone

cyclone whose feed is slurry of water and particles it is also called a wet cyclone.

3.1.19 Hydrosizers

development of column classifiers that use the principal of particle settling to achieve the separation between fine particles and coarse particle s in an environment of a rising flow of water in the tank generated by injection water through a manifold about two thirds f the way down the tank which creates an overflow of the former and an underflow of the latter.

3.1.20 Hindered settling

the proportion of solids in the pulp increases, the effect of particle crowding becomes more apparent and the falling rate of the particles begins to decrease.

3.1.21 Gravity concentration

the separation of minerals based on differences in specific gravity, the process is designed to recover very high grades of valuable ore material into very small mass.

3.1.22 Gravity methods

refers to a separation process whereby gravity is utilized to effect separation between particles of greatly different densities.
3.1.23 Grizzlies

static screens static grizzlies with no vibration mechanism are used in scalping applications. They are installed at a slope of 35-50° to assist material flow.

3.1.24 Jigging separation

a method of gravitational preparation of natural resources, based on separation of mineral mixture on density in vertically oscillating water stream of variable direction, the end products of jigging are concentrate with high content of useful component and wastes

3.1.25 Liberated particle

a particle composed mostly of single mineral

3.1.26 Liberation

the fundamental step of mineral processing by which the valuable minerals are free from the gangue mineral, liberation takes place through size reduction

3.1.27 Knelson concentrator

the type of gravity concentration equipment for recovery of fine particles

3.1.28 Marcy scale

an apparatus used to measure the density of slurry

3.1.29 Mesh size

the number of opening per linear inch in a screen size varies by factor of square root of two

3.1.30 Moisture

weight of water in a product divided by weight of product expressed as a percentage

3.1.31 Overflow

the undersize material that leaves a cyclone

3.1.32 Oversize

the particle stream that leaves a classifier or the large particle size that leave classifier as underflow stream

3.1.33 Panning

simple method of separating particles of greater specific gravity (especially gold) from soil or gravels by washing in a pan with water, panning is one of the principal techniques of the individual prospector for recovering gold and diamonds in placer (alluvial) deposits
a plot which describes how the particles fed to a classifier are divided between the undersize and oversize, a partition curve gives the percentage of feed particles that report to the oversize for each particle size

3.1.35 Particle size analysis
analysis which is used to characterize the size distribution of particles in a sample

3.1.36 Percentage (%) Solids
the percentage by weight of solids in a slurry (often called pulp or slurry density)

3.1.37 PID controller
a common controller which compensate proportionally to the error (P-proportional) compensate for sustain error (I- integral) and compensate for changes in error (D-derivative)

3.1.38 Pneumatic
the utilization of compressed air in an industry in order to perform mechanical work and control

3.1.39 Recovery
the fraction of the total valuable material present that is actually recovered, expressed as a percentage

3.1.40 Reciprocating screen
horizontal solids separation screen oscillated back to forth by eccentric gear used for solid classification

3.1.41 Rotor
the rotating electrical component consists of a group of electro-magnets arranged around a cylinder, with the poles facing toward the stator poles

3.1.42 Sedimentation
settling of solid particles as a result of either gravity or centrifugal action

3.1.43 Shaking table separation
the principle of separation is the motion of particles according to specific gravity and size moving in slurry, across an inclined table which oscillates backwards and forwards essentially at right angles to the slope in conjunction with riffles which hold back the particles which are closest to the deck

3.1.44 Sharpness of Separation
measure of classification efficiency

3.1.45 Sieve
laboratory screen used to separate particles according to their size
3.1.46 Size classification
the process of separating particles from each other based on their sizes

3.1.47 Sizing
a separation of communnition products on basis of size

3.1.48 Specific gravity
the mass of a substance compared to the mass of an equal volume of water. It is calculated by dividing the density of the substance by the density of water

3.1.49 Sluice
basically an inclined slope, over which slurry containing particles of different specific gravity flows, due to gravitational and frictional forces occurring and narrowing of the deck, segregation occurs with the finer heavier particles migrating to the bottom of the flowing film and the lighter coarser to the top

3.1.50 Screen
an equipment consisting of a perforated or meshed sheet that is used to separate coarse particles from fine particles

3.1.51 Spirals
basically an inclined chute with a complex cross section wrapped around the central column

3.1.52 Size classification
process of separating particles from each other based on their sizes

3.1.53 Slurry Density
percentage of solids by mass

3.1.54 Trommel machine
a mechanical screening machine used to separate materials, mainly in the mineral and solid-waste processing industries consists of a perforated cylindrical drum that is normally elevated at an angle at the discharge end

3.1.55 undersize
the particle stream that leaves a classifier

3.1.56 Vibrating screen
the separation of a bulk material with various grain sizes in vibratory screening machines is effected by the vibration of the screen deck, which conveys the product across the screen in throwing micro motions

3.1.57 Vortex finder
the top opening of cyclone through which the overflow discharge

3.2.0 Flotation

3.2.1 Agitator/agitation

device or mechanism to put materials in motion by shaking or stirring

3.2.2 Assays

a process of analyzing a substance to determine its composition or quality

3.2.3 Carboxy Methyl Cellulose (CMC)
a depressant that absorbs in preference to collectors and give hydrophilic products

3.2.4 Cell launders

launders located outside the overflow lip of flotation cell to collect and transport the froth or concentrate product out of the cell

3.2.5 Cleaner cell

cells which utilize a low separating force to upgrade the rougher concentrate by removing misplaced waste material

3.2.6 Conditioning tank

tank designed to give sufficient time for the slurry overflow from the primary cyclone cluster to mix with the reagents required in the rougher circuit before flowing through into the first rougher cell

3.2.7 Collectors

chemical compound containing a hydrogen-carbon group and an ionised group of atoms chosen for its ability to adsorb selectively in a froth flotation process and render adsorbing surfaces relatively hydrophobic (water-repellent)

3.2.8 Contact angle

the measure of the wettability of a surface or material

3.2.9 Density

weight of a substance per unit volume, often expressed in grams per litre, the density of slurry is proportional to the percentage of solids in the slurry

3.2.10 Depressants and regulators

reagents which regulates conditions for hydrophobization of a particular collector

3.2.11 Dewatering rate

Speed at which water is forced from solid materials or filter cake
3.2.12 Entrainment
capture of particles and water in the froth due to the action of the air bubbles gathering together

3.2.13 Enrichment ratio
ratio of the percentage of valuable material in the concentrate to the percentage of the valuable material in the original material

3.2.14 Filter cake
compacted solid or semisolid material separated from a liquid and remaining on a filter after pressure is applied

3.2.15 Filtrate
the liquid that is separated from the solid by the filtration process

3.2.16 Filtration
process of separating solids from liquids using a fine-mesh cloth, metal filter, or other material, the filtration step may be aided by applying either a vacuum or pressure to increase the rate of liquid removal

3.2.17 Floac
fine particles of suspended particles that agglomerate into larger particles in solution

3.2.18 Flocculant
reagent that causes the agglomeration of fine particles that are suspended in a liquid, often used in thickeners

3.2.19 Frother
reagent used in a flotation process to make air bubbles sufficiently stable so that they can withstand forces within the cell and, without breaking

3.2.20 Gangue
worthless rock or mineral in which valuable minerals are found

3.2.21 Grade
the relative quantity or the percentage of ore-mineral or metal content in an ore body

3.2.22 Grade/Recovery curve
graph of the recovery of the valuable metal achieved versus the product grade at that recovery, and is particularly useful for comparing separations where both the grade and the recovery are varying

3.2.23 Hydrophilic
water loving minerals
3.2.24 Hydrophobic
water repellent minerals

3.2.25 Hydrophobicity
the physical property of a molecule that is seemingly repelled from a mass of water, (there is no repulsive force involved; it is an absence of attraction)

3.2.26 %Metal recovery
percentage of the metal in the original feed that is recovered in the concentrate, can be calculated using weights and assays, as (Cc)/ (Ff) ·100, where c concentrate grade and f is feed grade

3.2.27 %Metal loss
the opposite of the % Metal Recovery, and represents the material lost to the Tailings, calculated simply by subtracting the % Metal Recovery from 100%

3.2.28 Metal
an element that readily forms positive ions and has metallic bonds

3.2.29 Methly Isobutyl Carbinol (MIBC)
chemical used in flotation process as a frother

3.2.30 Middling
the particles of locked valuable mineral and gangue, i.e. liberation has not been attained

3.2.31 Mineral
solid substances with economic value that are present in nature and can be made of one element or more elements combined together (chemical compounds)

3.2.32 Modifiers/Regulators
in the flotation process, the function of the regulators or modifiers is to modify the action of the collector, either by enhancing or by reducing its hydrophobic effect on the mineral surface

3.2.33 Non polar molecule
molecule that has no separation of charge, so no positive or negative poles are formed, in other words, the electrical charges of nonpolar molecules are evenly distributed across the molecule

3.2.34 pH
logarithmic scale that indicates the acidity or alkalinity of an aqueous liquid or slurry, at 25°C, pH 7 is neutral

3.2.35 Particle size
a notion introduced for comparing dimensions of solid particles (flecks), liquid particles (droplets), or gaseous particles (bubbles)

3.2.36 Polar –molecule

molecule containing polar bonds where the sum of all the bond's dipole moments is not zero, formed when there is a difference between the electronegativity values of the atoms participating in a bond

3.2.37 potassium amyl xanthate (PAX)

collectors on grade and recovery in the froth flotation of a sulfide ores

3.2.38 Pressure filter

filter in which pressure is applied to increase the solids removal rate from slurry, the effluent is normally reused in the process

3.2.39 Ratio of concentration

the weight of the feed relative to the weight of the concentrate, the ratio of Concentration is F/C, where F is the total weight of the feed and C is the total weight of the concentrate

3.2.40 Reagents

chemicals used in a processing i.e Xanthate, Aerophine and frother

3.2.41 Recovery

fraction of the total valuable material present that is actually recovered, expressed as a percentage

3.2.42 Rougher cell

cell used to upgrade the run-off-mill feed to produce low grade preliminary concentrate (reject low-grade tailings at an early stage)

3.2.43 Residence time

measure of how much time the material spends in given volume of vessel

3.2.44 Sample

representative part or item from a larger whole or group

3.2.45 Scavengers cell

an additional bank of flotation cells provided to recover small quantities of valuable mineral from a low-grade tailings stream before it is rejected as waste

3.2.46 Stator

an important component of mechanical flotation cell which surround the impellers and acts as an internal baffle useful in reducing pulp vortex in the cell
3.2.47 Slurry

solid-liquid suspension, such as that produced when ground ore is mixed with water

3.2.48 Spurger

used to inject gases, usually air in to the pulp

3.2.49 Sump

refer to a floor sump (a pit used to collect spilled water or slurry) or can refer the pump box

3.2.50 Surface tension

the process caused by the molecules in liquid phase being attracted to each other

3.2.51 Tailings

the materials left over after the process of separating the valuable fraction from the uneconomic fraction (gangue) of an ore

3.2.52 Viscosity

the resistance of a fluid to flow

3.2.53 Thickening

the process of removing water to increase the concentration or density

3.2.54 Wetting

refers to the study of how a liquid deposited on a solid (or liquid) substrate spreads out or the ability of liquids to form boundary surfaces with solid

3.3.0 Leaching and Adsorption

3.3.1 Activated Carbon

porous materials with high surface area used in the cyanide leach tanks to absorb the dissolved gold

3.3.2 Adsorption

a process in which molecules from within a fluid are concentrated on the surface of a solid by chemical forces, physical forces or both

3.3.3 Agitation

an intimately mixing of slurry, cyanide, lime and oxygen (reactants) to prevents the solids from settling out and bogging the tanks

3.3.4 Air lances

fabricated pipes which are connected to compressed air for unblocking tanks, intertank screens and launders
3.3.5 Anti-scalant
chemical reagents added to water or solutions to minimize the effect of scale build up on pipes and tanks

3.3.6 Baffles
structures installed in leach tanks to disturb the flow of slurry for thoroughly mixing

3.3.7 Bed level
interface between the settled slimes and the supernatant, a clear liquid in a pond, tank, or thickener

3.3.8 Bed pressure/Bed mass
pressure used to indicate the static pressure of the vertical leg of the thickener contents as a sum of the mud bed depth and supernatant depth

3.3.9 Bypass gates
gates that allow or prevent slurry from leaving or entering into another tank during operation

3.3.10 Candle strainers
screens installed on outlets of elution column for retaining carbon in the column and allow only solution to pass through during elution

3.3.11 Carbon activity
the ability of activated carbon to adsorb gold and it is expressed in percentage

3.3.12 Carbon Profile
the distribution of amount of carbon by weight in leach tanks

3.3.13 Carbon safety screen
the screen which prevents loss of carbon to tailings storage facility in case the final intertank screen is holed

3.3.14 Carbon-in-Leach (CIL)
the process where cyanide dissolves gold into solution and whereby gold is then absorbed onto carbon in the leach tanks

3.3.15 Carbon-in-pulp (CIP)
the process where leaching takes place in tanks dedicated for leaching followed by adsorption onto carbon in tanks dedicated for adsorption

3.3.16 Clarification
the process of separating particulate matter from dilute slurry by allowing solids to settle in a large tank (called a thickener) and be removed as underflow

3.3.17 CN
chemical symbol for cyanide

3.3.18 Counter-current flow
mechanism where slurry and carbon move in opposite directions to each other in leach tanks

### 3.3.19 Cyanicides
minerals which cause excess consumption of cyanide in leaching due to their affinity for cyanide ion. Examples are copper, nickel, iron and sulphide minerals

### 3.3.20 Dart Valve
plug-type valve commonly used in launders, tank bottoms for slurry on/off flow control

### 3.3.21 Density
weight of a substance per unit volume often expressed in grams per litre (g/L), the density of a slurry is proportional to the percentage of solids in the slurry

### 3.3.22 Dissolved Oxygen (DO)
amount of oxygen that is able to dissolve in slurry at a particular temperature and pressure

### 3.3.23 DO Meter
an instrument which is used to measure the amount of dissolved oxygen in leach tanks

### 3.3.24 Online Cyanide Detectors
fixed device for measuring amount of free cyanide

### 3.3.25 Feed box
an input box to distribute slurry to tanks, hoppers, screens, or launders

### 3.3.27 Flocculation
process by which fine particles in a solid-liquid suspension aggregate into larger clumps, which speeds up solid-liquid separation

### 3.3.29 Flow meter
a device that measures flow rate of a liquid or gas

### 3.3.30 Free body
the height above the interface in leaching tank to the edge of the tank which is used to calculate the amount of slurry as well as carbon in a particular leach tank

### 3.3.31 Free Cyanide
amount portion of the total cyanide that occurs as HCN gas and CN-. It is the most poisonous form of cyanide

### 3.3.32 Gold in Circuit (GIC)
the total gold inventory in all circuits which is done at the beginning, mid and end of month

### 3.3.33 International Cyanide Management Institute (ICMI)
the board established for the purpose of administering the manufacture, transport and use of cyanide in the production of gold

### 3.3.34 Inter-tank screen
screens which allow slurry to pass through out of the tank while at the same time preventing carbon from passing through so that carbon stays in the tank

3.3.35 Key Performance Indicators (KPI’s)
important factors which need to be monitored for a better performance of a plant

3.3.36 Launder
a trough, usually inclined, that transfers liquid or slurry from one area to another

3.3.37 Leaching
dissolution from ore or concentrates after suitable comminution to expose the valuable minerals, by aqueous and chemical attack

3.3.38 Leach feed
incoming slurry into the leach tanks that contains a high amount of valuable minerals

3.3.39 Sample cutter
sampler intermittently takes a cut of the leach feed and collects in a bucket

3.3.40 Leach tail
slurry that has undergone leaching and therefore bears a small amount of gold compared to the amount fed

3.3.41 Lime
reagent used to control pH

3.3.42 Live capacity
the portion of the total volume of the leach tank that contains slurry

3.3.43 Lock out
isolation of the equipment/locking a valve so that it cannot be operated while work is being performed

3.3.44 Man hole
circular opening at the bottom of leach tank which gives access to the inside of the tank

3.3.45 Motor Control Centre (MCC)
the electrical room where most of the main motor controls are located

3.3.46 Micron (μm)
Used as an alternate to mesh sizing, particularly in the fine-size range

3.3.47 Monotox
personal HCN detectors used to show free cyanide values when working at cyanide areas

3.3.48 Material Safety Data Sheets (MSDS)
a sheet that provides information regarding a hazardous material
3.3.49 Overflow/Supernatant
the clarified or separated liquid output from the solid-liquid suspension added to a thickener

3.3.50 Oxy-viva
equipment that contains 100% oxygen gas that is used to treat cyanide poisoning

3.3.51 Oxygen consumers
are minerals which react with oxygen during cyanidation hence reducing the rate of gold dissolution. Examples arsenic

3.3.53 Percentage solids chart
chart used to determine grindability of ore by reading percentage solids before and after performing wet screening

3.3.55 pH meter
an instrument used to measure the pH of slurry

3.3.56 Picric acid
an organic compound that is used in WAD analyzer to determine amount of WAD cyanide in leach tails

3.3.57 Parts per million (ppm)
measure how the parts of valuable mineral that makes up within one million parts of the whole solution

3.3.58 Preg-robbing
the term used to describe the adsorption of cyanide-leached gold by ore components which are usually carbonaceous (contain carbon) in nature

3.3.59 Process water
water that is used for mill processing and frequently recycled for mill use and bears processing chemicals

3.3.60 Pulp
grinded ore mixed with water

3.3.61 Rake
thickener has a large powerful rake at its base to move the settled solids to the discharge point and out in the underflow

3.3.62 Recover
to extract minerals from an ore

3.3.63 Recovery
the fraction of the total valuable material present that is actually recovered. Expressed as a percentage
3.3.64 Remote control
controlling a process from a distant location, such as the control room. The opposite of local control

3.3.66 Rhodanine
an indicator used in cyanide titration to determine concentration

3.3.68 Sample bucket
container with one litre volume used for density measurements

3.3.69 Scale
A mineral deposit produced when dissolved minerals precipitate out of solution

3.3.70 Scoop
tool used to take slurry sample from leach tanks

3.3.71 Screen Wipers
device fitted in leach tanks to prevent blockage of inter-tank screen

3.3.72 Set point
the digital setting of an instrument corresponding to the desired control point or target for process control

3.3.73 Settling rate
the measure of how fast solids settle to the bottom of the thickener and separate from the liquid

3.3.74 Silver Nitrate (AgNO₃)
a chemical used in cyanide titration for determination of free cyanide in the slurry

3.3.75 Slaked lime
lime formed by treating quick lime (Calcium oxide) with water to produce calcium hydroxide with evolution of heat

3.3.76 Slimes
extremely fine-sized solid particles, such as clays, which do not settle readily

3.3.78 Solid loss
undissolved gold in leach tails that report to tailings dam

3.3.79 Soluble
capable of being dissolved in a liquid

3.3.80 Solution
combination of gases, liquids, or solids dissolved into a liquid mixture

3.3.81 Solution loss
unrecovered dissolved gold cyanide complex solution reporting to tailings dam
3.3.82 **Sparge**
to agitate a liquid or slurry by means of air or gas under pressure introduced through a pipe

3.3.83 **Specific gravity**
the weight of a substance compared with the weight of an equal volume of pure water

3.3.84 **Sodium Metabisulphate (SMBS)**
chemical used to detoxify free cyanide source of sulphurdioxide which form less toxic cyanide gas

3.3.85 **Sodium cyanide (NaCN)**
reagent used in CIL circuit to dissolve gold into solution from the ore and it is also used in elution circuit increase ionic strength for the strip solution

3.3.86 **TAC analyser**
an online automatic titration unit that measures the cyanide concentration and pH of the slurry

3.3.87 **Tailings/Tails**
the waste product (or gangue) from an ore treatment process

3.3.88 **Thicken**
to increase the density of slurry by removing water

3.3.89 **Thickeners**
large shallow tanks used to separate solids from liquids in gold processing plants

3.3.90 **Cyanide titration**
technique that is used to measure the amount of cyanide concentration in sample

3.3.91 **Torque**
the force that must be applied to overcome resistance to turning

3.3.92 **Total cyanide**
all the WAD cyanide, free cyanide and other cyanide which has formed chemical bonds with Iron (Fe)

3.3.93 **Trash screen**
an inclined vibrating screen used to remove tramp oversize materials (such as wood fibre, cloth, plastic) from CIL feed

3.3.94 **Trend**
a line of development or direction of movement of some process variable

3.3.95 **Trip**
to automatically stop an equipment item, usually because of interlock or overload
3.3.96 Two-point calibration
the technique of calibrating DO meter by both air and solution with a known value of DO

3.3.97 Underflow
the discharge from the bottom of a thickener, which should have a high concentration of settled waste solids from the solid-liquid suspension added to a thickener

3.3.98 Vat leaching process
rectangular containers (drums, barrels, tanks or vats), usually very big and made of wood or concrete, lined with material resistant to the leaching media in such a series the leachate collected from one container is added to another vat with fresher ore

3.3.99 WAD analyser
an automatic machine used for online WAD cyanide determination in leach tails

3.3.100 WAD cyanide (Weak Acid Dissociable cyanide)
this means cyanide complexes that can dissolve in weak acids such as free cyanides and copper cyanides

3.4.0 Magnetic and Electrostatic
3.4.1 Air drag force (Fa)
magnetic separation force which is determined by particle size, density and air velocity

3.4.2 Cyclic Separators
a separator used for applications with low magnetic content in the feed (< 4% weight)

3.4.3 Continuous Separators (Carousels)
a separator used for applications with higher magnetic content in the feed (> 4% by weight)

3.4.4 Counter-current separator
separator whereby the tailings are forced to travel in the opposite direction to the drum rotation and are discharged into the tailings chute

3.4.5 Diamagnetic
material which is repelling along the lines of magnetic force to a point where the field intensity is smaller

3.4.6 Dry LIMS – Drum Separator (DS)
separator used for separation of all types of dry ferromagnetic separation processes like Iron and steel slag treatment, Reduced pyrite ash separation, Calcined ilmenite production, Iron metal powder production, Magnetite or supergrade magnetite production
3.4.7 Dry LIMS – Belt Separator (BSA)
a separator used for coarse particles minus 200 mm, used for separation of coarse ferromagnetic ores and slags

3.4.8 Dry LIMS - Belt Separator (BSS)
a separator used for coarse particles minus 300 mm, used for separation of coarse ferromagnetic ores and slags

3.4.9 Drum separators
the most common machines in current use for cleaning the medium in DMS circuits and are widely used for concentrating finely ground iron ore

3.4.10 Electrical separation
process which utilises the difference in electrical conductivity between the various minerals in the ore feed

3.4.11 Field intensity (H)
the magnetizing force which induces the lines of force through a material

3.4.12 Gravitational force (Fg)
magnetic separation force which is determined by particle size and particle density

3.4.13 Hydraulic force (Fd)
magnetic separation force which is determined by particle diameter, shape, liquid viscosity and velocity

3.4.14 High Gradient Magnetic Separators (Wet HGMS)
magnetic separator dealing with wet separation of paramagnetic particles

3.4.15 High Gradient Magnetic Filter – HGMF
a magnetic filter used to remove magnetic or weakly magnetic particles from liquids

3.4.16 High Gradient Magnetic Separators (Dry HGMS)
magnetic separator dealing with dry separation of paramagnetic particles

3.4.17 High-intensity separators
separator whereby very weakly paramagnetic minerals can only be effectively removed from an ore feed if high intensity fields of 2 Tesla and more can be produced

3.4.18 High-gradient magnetic separators
Separator which separates paramagnetic minerals of extremely low magnetic susceptibility, high magnetic forces must be generated

3.4.19 **Induced roll magnetic separators, IRMs**
separator which is widely used to treat beach sands, wolframite, tin ores, glass sands, and phosphate rock

3.4.20 **Lifting effect**
process whereby particles are lifted from the separating surface towards the electrode

3.4.9 **Low-intensity magnetic separation**
the separation which is confined mainly to the concentration of coarse sands which are strongly magnetic, the process being known as cobbing, and often being carried out in drum separators

3.4.21 **Low Intensity Magnetic Separator (Wet LIMS)**
magnetic separator dealing with wet separation of ferromagnetic particles

3.4.22 **Low Intensity Magnetic Separators (Dry LIMS)**
magnetic separator dealing with dry separation of ferromagnetic particles

3.4.23 **Magnetic susceptibility (S)**
the ratio of the intensity of magnetization produced in the material to the magnetic field which produces the magnetization

3.4.24 **Magnetic induction/magnetic flux density**
the number of lines of force passing through a unit area of material

3.4.25 **Magnetite ore**
the ore which exhibit different magnetic properties

3.4.26 **Magnetic separation**
process of exploit the difference in magnetic properties between the ore minerals and are used to separate either valuable minerals from non-magnetic gangue, e.g. magnetite from quartz, or magnetic contaminants or other valuable minerals from the non-magnetic values

3.4.27 **Paramagnetic**
the material which is attracting along the lines of magnetic force to points of greater field intensity

3.4.28 **Pinning effect**
process whereby non-conducting mineral particles, having received a surface charge from the electrode, retain this charge and are pinned to the oppositely charged separator surface by positive-negative attraction
3.4.29 Remanence
the Ferromagnetic materials which have very high susceptibility to magnetic forces and retain some magnetism when removed from the field

3.4.30 Superconducting separators
magnetic separator which is lie in the use of high magnetic forces

3.4.31 Tesla (T)
the unit of measurement of magnetic flux density or magnetic induction

3.4.32 Wet low intensity magnetic separation (LIMS) - Concurrent (CC)
primary separation (cobber), "working horse" for large capacities and coarse feeds, mainly in iron ore industry

3.4.33 Wet LIMS - Countercurrent (CTC)
separation used as a rougher and finisher for multistage concentration of magnetic iron ore which improved grade and recovery

3.4.34 Wet LIMS - Counter Rotation (CR)
separation used same as CTC above when sedimentation is at risk, mainly in the iron ore industry which is good separation with high recoveries

3.4.35 Wet LIMS - Dense Media Recovery (DM)
separation used for extremely high recoveries of very fine particles