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GLOSSARY OF TERMS

Aggregates	Crushed stone, sand and gravel. Concrete and mortar are made by using aggregates mixed with cement and water.
Absorbent	Solid material that removes components from a gas or liquid.
Alkaline conditions	Condition of high pH where acidic compounds could be neutralized or acid-base reactions can take place.
Bag filter	Dust collection device using fabric filter bags for cleaning exhaust gas from a process plant.
Baseline emission level	The historical or normal emission level of an entity in a process without changes to input material or changes to the process.
Best practice	Internationally recognized, most efficient / effective techniques applied in manufacturing and production processes.
Biomass	A material of biological nature that is continuously generated by industrial processes or human activity.
Blending silo	Stores and blends finely ground materials
Bypass system	Arrangement whereby material or gas flow is directed around the normal process equipment, and not through it.
By-products	By-products are materials which are co-produced in manufacturing processes. Fly ash from coal combustion in electricity generation, and blast furnace slag from the production of iron are two examples.
Calciner	See "Pre-calciner"
Carbonaceous Spent Pot	
Lining (CSPL)	The carbonaceous portion of the SPL is the carbon lining that forms the cathode material that is used in the aluminium smelting process.
Carcinogens	Cancer causing substance or agent.
Cement (Portland Cement)	Hydraulic cement (that not only hardens by reacting with water but also forms a water-resistant product) produced by grinding clinker, (essentially calcium silicates), together with about 5% gypsum (calcium Sulphate, which is added to regulate the cement setting time). The name "Portland cement" is derived from the similarity in colour of cement after setting to the grey slate from Portland, UK.
Clinker	Nodular to powdery material produced in a rotary kiln by heating a blended, finely ground mixture of limestone (or calcium carbonate), shale (or other suitable material for silica and alumina), and a source of iron oxide to a temperature of approximately 1450^{o}C
Coal mill	The plant required to dry and grind coal to produce a fuel for kiln firing.
Combustion	Reaction of a fuel with oxygen
Combustion efficiency	Indication of completeness of combustion of organic material (containing carbon) to carbon dioxide (CO_2)
Condensation	Phase change of vapour to liquid
Cooler	Cools the clinker discharged from a cement kiln (at about 1100^{o}C) to typically less than 200°C prior to transport to storage.
Cooler – Grate type	Cooling is achieved by cross-flow air blown through a clinker layer travelling slowly on a reciprocating grate which consists of perforated plates.

Cooler – satellite type	Nine to eleven tubes arranged peripherally at the discharge end of the rotary kiln. Hot clinker enters the tubes through inlet ports and passes through the tubes in counter current flow to cooling air. Also called a planetary cooler.
Co-processing	Utilization of alternative fuel and raw materials for the purpose of energy and resource recovery. Co-processing in cement manufacturing means substituting scarce primary energy and virgin raw materials with waste materials.
Counter current	Solid material and gas flowing in opposite directions. In all kiln systems the solid material moves counter current to the hot combustion gases.
"De novo" effect	The reformation of dioxins and furans is known to occur by "de novo" synthesis within the window of cooling from 450 to 200^{o} C.
Effluent	A liquid waste stream.
Excess air	Ensures complete combustion of fuel due to the presence of excess oxygen (O_2)
Extender (Pozzolanic)	See Pozzolan.
Extender (Filler)	See Non-Deleterious Materials
Flue gas	Exhaust gas from a combustion process.
Fly ash	A by-product from coal-fired power stations. Fly ash can be added to Portland cement as an extender or NDM (Non-Deleterious Materials)
Fossil fuel	A general term for combustible deposits of carbon in reduced (organic) form and of biological origin, including coal, oil, natural gas, and oil shale.
Greenhouse gases	Gases in the earth's lower atmosphere that may contribute to global warming, of which CO_2 is a major component
Hazardous Waste	A material defined by regulation or legislation as flammable, explosive, corrosive or toxic, therefore requiring special handling or disposal
Heavy metals	All metals heavier than Titanium (4.51 g/cm^3) are termed heavy metals. The heavy metals make up a small proportion of the materials in the earth's crust. Not all heavy metals are toxic and not all toxic heavy metals have the same toxicity.
Hydrocarbons	Chemical compounds consisting of the elements carbon and hydrogen used as building blocks in their structure
Incinerator	Plant used for the combustion of waste materials to yield a non-combustible residue or ash and exhaust gases, such as carbon dioxide and water.
Kiln dust	Particulate, solid material entrained in the exhaust gas from a cement kiln.
Kiln feed	Homogenised raw meal added to a rotary cement kiln at a controlled rate.
Leachate	Contaminated water or a solution with the potential to cause pollution, if the liquid is permitted to percolate through soil to ground water.
Lepol kiln	A kiln in which the feed is preheated on a horizontal travelling grate before entering the kiln.
Life cycle	Industrial processes involved in production including upstream extraction, manufacturing, distribution, use, and re-use or disposal of resulting waste materials

Limestone	Rock consisting essentially of carbonates with the most important constituents being calcite ($CaCO_3$).
Mineral additions	In blended (or "composite") cements, a portion of the cement consists of materials (mineral additions) originating from natural or industrial sources such as blast furnace slag
Non-Deleterious Materials	Materials that can be added at the clinker grinding stage that do not have any negative effects on the cement performance. There are limits to the quantities of extenders that can be added to the cements based on the relevant SANS specification (SANS 50197).
Organic material	Chemical compound from natural sources with carbon as its core element
Oxidizing conditions	High oxygen content allowing complete oxidation of compounds (see excess air)
Physico-chemical absorption	Absorption due to chemical reaction and physical inclusion
Planetary Clinker Cooler	Refer to Cooler – satellite type
Pozzolan	A material that, although itself not cementitious, contains silica (and alumina) in a reactive form and is able to combine with lime in the presence of water to form compounds with cementitious properties.
Pre-calciner	A fluidized reaction vessel located above the feed end of the kiln which enables preheated kiln feed to be calcined before entering the kiln.
Preheater	Before entering the kiln, the kiln feed is preheated by suspension in the hot kiln exhaust gas stream in several cyclone stages (from 1 to 6) arranged vertically. The cyclone tower is known as the preheater.
Quarrying	Extracting raw materials from the earth.
Raw meal	Raw materials that are dried and ground in defined and well-controlled proportions in a raw mill
Raw mill	The plant for proportioning, drying and grinding the raw materials used for cement production.
Reducing conditions	Low oxygen content not allowing complete oxidation of compounds by oxygen
Refractory Spent pot lining (RSPL)	Waste refractory bricks which have been used for thermal protection of the pots at an aluminium smelter
Residues	Unwanted materials left by a manufacturing process.
Retention time	Time taken for material to pass through a process at the optimal operating conditions.
Rotary kiln	An inclined rotating steel cylinder lined with refractory bricks used to produce cement clinker.
Rotary kiln burner	Positioned at the kiln discharge end (firing end) to introduce fuel to the kiln process.
Scrubber	Equipment to remove impurities from a gas stream using a wet or dry process.
Secondary materials	Waste or by-products used in cement manufacturing as alternatives to fossil fuels and natural raw materials.
Shale	An argillaceous sedimentary rock
Sintering	Formation of clinker minerals in the cement kiln.
Stack	A chimney that exhausts gas from various stages in the cement manufacturing process.

Sustainable development	The ability of the present generation to continually meet its needs without compromising the ability of future generations to meet theirs.
Trace elements	Chemical elements present in minute quantities.
Turbulence	Condition under which intense and aggressive mixing and contact of materials occurs.
Volatility	Tendency of a chemical compound to form vapour under a given set of conditions.
Waste	An undesirable or superfluous by-product, emission, or residue of a process or activity which has been discarded, accumulated or stored for the purpose of further use by another process.

ABBREVIATIONS

ACMP	Association of Cementitious Material Producers
AFR	Alternative fuels and raw materials
ANSI	American National Standards Institute
APPA	Atmospheric Pollution Prevention Act (No 45 of 1965)
BAT	Best Available Techniques
BCHS	Baseline Community Health Survey
BID	Background Information Document
BEP	Best Environmental Practice
CAPCO	Chief Air Pollution Control Officer
CHRA	Community Health Risk Assessment
DEAT	Department of Environmental Affairs and Tourism
DRE	Destruction and Removal Efficiency
DWAF	Department of Water Affairs and Forestry
EA	Environmental Assessment
EAP	Environmental Assessment Practitioner
EC	European Community
ECA	Environmental Conservation Act (Act 73 of 1989)
EIA	Environmental Impact Assessment
EMM	Emfuleni Metropolitan Municipality
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
ESP	Electrostatic Precipitator
ETR	Environmental technical Review
EU	European Union
FCC	Fluidized catalyst cracking
g	Gram
EC DEAET	Eastern Cape Department of Economic Affairs, Environment and Tourism
HAZOP	Hazard and operability study
HCS	Hazardous Chemical Substances
HM	Heavy metals
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
ISO	International Standards Organization
kg	Kilogram
kJ	Kilojoule
kPa	Kilopascal
LCA	Life Cycle Assessment

LOI	Loss on ignition
m^3	Cubic meter
MES	Marsh Environmental Services
MHSA	Mine Health and Safety Act (No 29 of 1996)
MJ	Megajoule
MSDS	Material safety and data sheet
NDM	Non-Deleterious Materials
NEMA	National Environmental Management Act (Act 107 of 1998)
ng	Nanogram (1 x 10^{-9} grams)
Nm^3	Normal or standard volume under standard conditions (0^oC & 1.01 bar)
OEL	Occupational exposure limits
OH&S	Occupational Health and Safety
OSHAct	Occupational health and safety act (No 85 of 1993)
OSHAS	Occupational health and safety management systems (British)
pH	Acidity scale 1 to 14
PM10	Particulate matter smaller than 10 µm
POPs	Persistent organic pollutants
PoSS	Plan of Study for Scoping
ppb	Parts per billion
PPC	Pretoria Portland Cement
PPE	Personal protective equipment
PPM	Public Participation Meeting
ppm	Parts per million
PPP	Public Participation Process
RDF	Refuse derived fuels
SANS	South African National Standard
SHE	Safety, Health & Environment
SHEQ	Safety, Health, Environment & Quality
SK1	PPC equipment terminology (Plant & Kiln number, S=Slurry; PE=Port Elizabeth; DB=Dwaalboom; H=Hercules; D=De Hoek, K=Kiln)
SM	Secondary materials
SP	Suspension (or cyclone) preheater kiln
PC	Calciner kiln (which also has a cyclone preheater)
SPL	Spent Pot Lining
SR	Scoping Report
T	Temperature
TEQ	Toxicity Equivalent
TCLP	Toxicity Characteristic Leaching Procedure
TOC	Total organic carbon

UNEP	United Nations Environment Program
VOC	Volatile organic compound
WBCSD	World Business Council for Sustainable Development
WDF	Waste derived fuel
WUL	Water use Licence
μg	Microgram

S=Slurry; PE=Port Elizabeth; DB=Dwaalboom; H=Hercules; D=De Hoek.

CHEMICAL ABBREVIATIONS

Ag	Silver
Al_2O_3	Aluminium oxide
As	Arsenic
Ba	Barium
Be	Beryllium
BTX	Benzene, toluene, xylene
C_6H_6	Benzene
$CaCO_3$	Calcium carbonate
CaO	Calcium oxide
$CaSO_4$	Calcium sulphate
$CaSO_4.2H_2O$	Gypsum
Cd	Cadmium
CFCs	Chlorofluorocarbons
CH_4	Methane
CO	Carbon monoxide
Co	Cobalt
CO_2	Carbon dioxide
Cr	Chromium
Cu	Copper
F	Fluoride
Fe_2O_3	Iron oxide
FeS_2	Iron sulphide
H_2O	Water
HCB	Hexachlorobenzene
HCl	Hydrogen chloride (hydrochloric acid)
HF	Hydrogen fluoride (hydrofluoric acid)
Hg	Mercury
K_2O	Potassium oxide
MgO	Magnesium oxide
Mn	Manganese
Mn_2O_3	Manganese trioxide
NH_3	Ammonia
N_2	Nitrogen
Na_2O	Sodium oxide
Na_2SO_4	Sodium sulphate
Ni	Nickel
NO_x	Nitrogen oxides

MARSH

O_2	Oxygen
P_2O_5	Phosphorus pentoxide
PAH	Polyaromatic hydrocarbons
Pb	Lead
PCBs	Polychlorinated biphenyls
PCDDs	Polychlorinated dibenzodioxins
PCDFs	Polychlorinated dibenzofurans
Pd	Palladium
Pt	Platinum
Rh	Rhodium
Sb	Antimony
Se	Selenium
SiO_2	Silicon dioxide
Sn	Tin
SO_2	Sulphur dioxide
SO_3	Sulphur trioxide
SOx	Sulphur oxides
TCE	Trichloroethylene
TCM	Tetra-chloromethane
Te	Tellurium
Ti	Titanium
TiO_2	Titanium dioxide
Tl	Thallium
V	Vanadium
Zn	Zinc
°C	Degrees Celcius