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GLOSSARY OF TERMS RELATING TO SOLID WASTES

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Indian Standard

GLOSSARY OF TERMS RELATING TO SOLID WASTES

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 28 July 1980, after the draft finalized by the Solid Wastes Sectional Committee had been approved by the Chemical Division Council.

0.2 This standard has been formulated with a view to eliminating ambiguity and confusion arising from different interpretations of terms relating to solid wastes and establishing a generally recognized usage.

1. SCOPE

1.1 This standard defines the terms commonly used in the field of solid wastes.

2. TERMS AND DEFINITIONS

A

Abrasion — Wearing away of surface material by scouring action of moving solids, liquids or gases, for example abrasion of hammers in a hammermill.

Actinomycetes — A large group of moldlike micro-organisms having an odour similar to that of rich earth. These organisms play an important role in composting of solid wastes.

Aeration — The process of exposing the material (solid or liquid) to air.

Aerobic — Able to live and grow only in the presence of free oxygen.

Afterburner — A device used to burn or oxidize the combustible constituents remaining in effluent gases.

Aggregate — Crushed rock or gravel prepared for use in road surface, concrete or bituminous mixes.

Air — The mixture of gases comprising the earth's atmosphere.

Air, Stoichiometric — *See* Combustion Air, Theoretical.

Air, Underfire — Air that may be forced or induced in a controlled quantity and direction and is supplied below a grate and passes through a fuel bed.

Air Deficiency — The shortage of air, as compared to theoretical combustion air in an air-fuel mixture.

Air Heater — A heat exchanger in which the flowing air is heated by hot combustion gases.

Air Jets — Streams of high velocity air issuing from a nozzle in an incinerator to provide turbulence, combustion air or a cooling effect.

Air Pollutant — A substance which when present in adequate amount adversely affects the environment.

Air Pollution — The presence in ambient atmosphere of substances, generally resulting from the activity of man, in sufficient concentration, present for a sufficient time and under circumstances to interfere significantly with comfort, health or welfare of persons or with full use or enjoyment of property.

Air Quality — The composition of air with respect to quantities of pollutants therein.

Air Quality Standards — The maximum acceptable pollutant concentration in the outside air that cannot be exceeded during a specified time in a specified area.

Alkalinity — The quantitative capacity of aqueous media to react with hydrogen ions.

Alley Collection — Removal of solid wastes from containers placed adjacent to an alley

Ambient Air — The surrounding air.

Anaerobic — Able to live and grow in the absence of free oxygen.

Analysis, Proximate — Analysis of a solid fuel to determine its moisture, volatile matter, fixed carbon and ash content. Usually the fuel's heat value is also determined.

Analysis, Ultimate — The chemical analysis of a solid, liquid or gaseous fuel. In the case of solid fuel, the amount of carbon, hydrogen, sulphur, nitrogen, oxygen and ash are determined.

Angle of Repose — The maximum acute angle that the inclined surface of a pile of loose material can make with horizontal.

Aquifer — An underground water bearing geological formation.

Arch, Furnace — A structure that extends into a furnace to deflect gases.

Arch, Ignition — A refractory furnace arch or surface located over a fuel bed to radiate heat and accelerate ignition.

Ash-Pit — A pit or hopper located below a furnace where residue accumulates before its removal.

Ash-Sluice — A trench or channel through which ash is transported by water from ash-pit to collection or disposal point.

Auxiliary Fuel Firing Equipment — Equipment used in an incinerator to supply additional heat by burning an auxiliary fuel so that the resulting higher temperature:

a) dries and ignites waste material,

b) maintains ignition, and

c) effects complete combustion of combustible solids, vapours and gases.

B

Backfill — The material used to refill a ditch or other excavation or the process of doing so.

Backhoe Tamping — A processing step in which a conventional backhoe is used to compact waste contained in an open-top transport vehicle.

Bacteria — Primitive micro-organisms, generally free of pigment, which reproduce by dividing in one, two or three planes. They occur as single cells, groups, chains, or filaments. They may be grown by special culturing out of their native habitats.

Baffle — A structure used to change direction of fluid flow.

Baffle Chamber — A chamber following the combustion chamber in which baffles change the direction of and/or reduce the velocity of combustion gases so as to promote settling of flyash or coarse particulate matter.

Baffle, Water-cooled — A baffle composed mainly of closely spaced boiler tubes.

Bagasse — Fibrous residue remaining after juice is extracted from sugarcane or sugar beets.

Baler — A machine used to compress and bind solid waste or other material.

Bangalore Process — An anaerobic composting process in which refuse and human excreta are put in alternate layers in a pit which is finally covered by a thick soil layer.

Bearing Capacity — The maximum load that a given material can support before failing.

Beccari Process — A process developed by Dr Beccari in 1922. In this process, anaerobic fermentation is followed by partial aerobic action in final stages.

Biodegradable — A substance that can be broken drown by micro-organisms.

Blast Gate — A sliding metal damper provided in a duct to regulate flow of forced air.

Blower — A fan used to force air or gas under pressure.

Boom — A heavy beam hinged at one end having a weight lifting device at the other.

Booster Cycle — The period during which additional hydraulic pressure is exerted to push the last charge of solid waste into a transfer trailer or container attached to stationary compactor.

Breeching — The passage through which products of combustion pass to a stack or chimney.

Breeching Bypass — An arrangement whereby breechings and dampers permit the intermittent use of two or more passages to direct or divert the flow of combustion products.

Briquetter — A machine that compresses the material into small pellets.

Bucket — An open container affixed to the movable arms of a wheeled or tracked vehicle to spread and/or excavate material.

Bullclam — A tracked vehicle equipped with a blade having a hinged curved bowl on its front top.

Bulldozer — A tracked vehicle equipped with an earth blade.

Burner, Conical — A hollow cone shaped combustion chamber having an exhaust vent at its top and a charging door at the bottom. It is also called a teepee burner.

Burner, Primary — A burner that dries and ignites material in the primary combustion chamber.

Burner, Refuse — A device for central or on-site burning of refuse. It is very simple in construction and all the factors of combustion are not controlled.

Burner, Residential — A device used to burn refuse generated in individual dwellings.

Burner, Secondary — A burner installed in the secondary combustion chamber to maintain a specified minimum temperature and complete combustion of incompletely burnt gases.

Burning Area — Horizontal projection of a grate, hearth or both.

Burning Rate — The quantity of solid waste incinerated (expressed as kg/m^2 h) or the amount of heat released (expressed as cal/m^2 h) during incineration.

C

Calorific Value — Number of heat units obtained by complete combustion of unit mass of a fuel.

Calorific Value (Lower) — *See* Heat Value (Low)

Calorific Value (Higher) — *See* Heat Value (High)

Capacity (of Incinerator)

a) *Design* — Quantity (expressed as tonnes/24 h) that it will be able to process, if specified criteria are met.

b) *Firm* — The processing capacity when its largest independent unit is not operating.

c) *Rated* — Quantity (expressed as tonnes/24 h) that is possible to process, when specified criteria prevail.

Capillary Water — Underground water that is held above ground water table by capillary action.

Carbon Dioxide — A colourless, odourless, nonpoisonous gas produced during thermal degradation and microbial decomposition of solid wastes.

Carbon Dioxide Recorder — An instrument that continuously monitors (in percent by volume) carbondioxide in flue gases.

Carbon Monoxide — A colourless poisonous gas having a faint metallic taste and odour. It is produced during thermal degradation and microbial decomposition of solid wastes when the oxygen supply is limited.

Carbon-Nitrogen Ratio — The ratio of mass of carbon to that of nitrogen present in compost or material being composted.

Carbonaceous Matter — Pure carbon or carbon compounds present in the fuel or residue after combustion.

Catalytic Combustion System — A process in which a substance is introduced into an exhaust gas stream to burn or oxidize vaporized hydrocarbons or odorous contaminants and the substance itself remains intact.

Cell — Compacted solid waste enclosed in natural soil or cover material in a sanitary landfill.

Cell Height — The vertical distance between top and bottom of the cell.

Cell Thickness — The perpendicular distance between the cover materials placed over last working faces of two successive cells in a sanitary landfill.

Charge — Quantity of solid waste fed into an incinerator at a time.

Charging Chute — An overhead passage through which waste material is fed into an incinerator.

Charging Cut-off Gate — A modified charging gate provided in a continuous fed furnace which does not have high temperatures near the charging hopper.

Charging Gate — A horizontal movable cover that closes the opening on a top charging furnace.

Charging Hopper — An enlarged opening at the top of a charging chute.

Checker Work — A pattern of multiple openings in a refractory wall through which products of combustion pass and accelerated turbulent mixing of gases occurs.

Chimney — A vertical passage through which products of combustion are let into atmosphere.

Chipper — A device having sharp blades attached to a rotating shaft which chips off pieces from objects.

Clamshell Bucket — A vessel having two jaws that clamp together when it is lifted by attached cables. It is used to hoist and convey materials.

Clinker — Hard, sintered or fused pieces of residue formed in a fire by agglomeration of ash, metals, glass and ceramics.

Collection — Removal of solid wastes from different collection points of a primary source.

Collection Frequency — The number of times collection is made in a given period of time.

Collection Method :

a) *Daily Route* — A method in which collection crew is assigned a weekly route that is divided into daily routes.

b) *Definite Working Day* — A definite route is allotted to different crew. The crew starts work and proceeds along the route till the end of working day. Next day collection starts from the point where it stopped the previous day. This goes on till the whole route is covered. Then the process is repeated.

c) *Group Task* — In this method, more than one crew is assigned to a few routes and they complete the job together.

d) *Large Route* — In this method, each crew is assigned a large route which it completes in one week.

e) *Reservoir Route* — A method in which several crews are used to pick up on a centrally located route after having collected on peripheral routes.

f) *Single Load* — A variation of the daily route method in which areas or routes are laid out that normally provide a full load of solid waste.

g) *Swing Crew* — In this method, one or more reserve work crews are provided which go wherever help is needed.

h) *Variable Size Crew* — In this method, depending upon the amount and condition of work on particular routes, variable number of collectors are provided.

Collection Stop — A stop made by a vehicle and crew to collect solid waste from one or more service sites.

Collector (of Incinerator)

a) *Bag Type* — A filter having a fabric cylindrical bag as filtering medium.

b) *Cyclone* — A collector in which inlet gas stream moves vertically when the centrifugal force drives the suspended particles to its wall.

c) *Dust* — A device used to remove dust from exhaust gases.

d) *Flyash* — A device to remove flyash from combustion gases.

e) *Mechanical* — A device in which inertial and gravitational forces separate dry dust from gas.

f) *Multicyclone* — In this device a number of cyclone collectors are provided in parallel. The volume and velocity of combustion gas is regulated by dampers over a given load range.

Combustion — Chemical combining of oxygen with a substance which results in the production of heat and usually light.

Combustion Air — Air used for burning a fuel.

Combustion Air, Excess — Air that is supplied in excess of theoretical air. It is normally expressed as a percentage of theoretical air.

Combustion Air, Primary — Air that is added to combustion system at the point where fuel is first oxidized.

Combustion Air, Secondary — Air introduced above or beyond a fuel bed by natural, induced or forced draft. It is generally referred to as overfire air, if supplied above the fuel bed through the side walls or the bridge wall of primary chamber.

Combustion Air, Theoretical — The amount of air required to completely burn the waste. The amount is calculated from the chemical composition of the waste and is also known as stoichiometric air.

Combustion Chamber

a) *Primary* — The chamber of an incinerator where the waste is ignited and burned.

b) *Secondary* — The chamber of an incinerator where combustible solids, vapours and gases from the primary chamber are burnt and flyash removed.

Combustion Gases — A mixture of gases and vapours produced by combustion.

Compaction Pit Transfer System — A transfer system in which solid waste is compacted in a storage pit by a crawler tractor before being pushed into an open top transfer trailer.

Compactor

a) *Mobile* — A vehicle with enclosed body wherein mechanical devices convey the materials inside the body and compress it.

b) *Sanitary Landfill* — A vehicle equipped with a blade and rubber tyres sheathed in steel or hollow steel cores to provide compaction and crushing effect.

c) *Stationary* — A machine that reduces volume of solid wastes by forcing it into a container.

Compost — Relatively stable decomposed organic material.

Composting — A controlled process involving microbial degradation of organic matter.

Composting, Mechanical — The process of composting involving the use of a number of mechanical devices.

Composting, Ventilated Cell — The method in which the composting material is mixed and aerated by being dropped through a number of vertical cells.

Composting, Windrow — The method in which compostable material is placed in windrows or piles which are occasionally turned.

Container

a) *Carrying* — A receptacle constructed of plastics or aluminium carried by a collector in backyard carryout service.

b) *Disposable* — Paper or plastics sacks for storage of solid waste.

c) *Lift and Carry* — A large container that can be lifted onto a service vehicle and transported to disposal site for emptying.

d) *Roll on/Roll off* — A large container (15-30 m^3) that can be mechanically pulled onto a service vehicle and transported to disposal site for emptying.

Container Train — A number of trailers connected in series and pulled by a motor vehicle. The system is utilized to collect and transport solid wastes.

Contract — A written agreement in which rights and duties of contractual parties are clearly set forth for collection of solid wastes.

Conversion — Action of changing the condition of a secondary material.

Conveyor

a) *Apron* — It has one or more continuous chains that are supported and moved by a system of sprockets and rollers which carry overlapping or interlocking plates that move bulky materials on their upper surface.

b) *Drag* — A conveyor that uses vertical steel plates fastened between two continuous chains to drag material across a smooth surface.

Cooling Air — Ambient air that is added to hot combustion gases to cool them.

Cooling Spray — Water spray directed into flue gas stream to cool it and remove flyash.

Corrosion — The alteration of a material by chemical action.

Cover Material — Material (normally soil) used to cover compacted solid waste in a sanitary landfill.

Crane

a) *Bridge* — A lifting unit that can manouvre horizontally in two directions.

b) *Monorail* — A lifting unit suspended from a single rail which can move in one horizontal direction.

Cullet — Clean colour sorted crushed glass used in glass-making to hasten melting of silica sand.

Cut — Portion of a land surface or an area from which earth or rock has been or will be excavated.

Cut and Cover — Trench method of landfilling.

Cut-off Trench — A trench that is filled with material that is impermeable to the flow of gas and water to prevent movement or intercept and direct them to another location.

D

Damper — A manually or mechanically controlled valve or plate fixed in a breeching, duct or stack that is used to regulate a draft or rate of flow of air or other gases.

Damper, Barometric — A hinged or pivoted plate that automatically regulates the flow of air.

Damper, Butterfly — A plate or blade installed in the duct or stack which rotates on an axis to regulate flow of gases.

Damper, Guillotine — An adjustable plate installed vertically in a breeching to regulate the flow of gases.

Damper, Sliding — A plate normally installed perpendicular to the direction of flow and arranged to slide across it to regulate the flow.

Dano Biostabilizer System — An aerobic system in which the material is retained in a revolving drum for 1-5 days under controlled air and moisture supply. The product is windrowed.

Dead Animals — Animals that have died from any cause except those slaughtered or killed for human use.

Decomposition — It involves reduction of the net energy level and change in chemical composition of organic matter.

Demolition Waste — Building materials and rubble resulting from construction, remodelling, repair and demolition operation.

Density

a) *Sanitary Landfill* — Ratio of combined mass of refuse and soil cover to combined volume of refuse and soil cover.

b) *Solid Waste* — Ratio of mass of solid waste to its volume.

Destructive Distillation — Heating of organic matter in the absence of air which results in the evolution of volatile substances and produces a solid char consisting of fixed carbon and ash.

Digester, Fairfield Hardy — A patented process for stabilization of garbage, sewage sludge, industrial and other organic wastes by a controlled continuous aerobic thermophilic process.

Digestion, Wet — Anaerobic decomposition of solid organic waste in open digestion pond.

Direct Dump Transfer System — In this, the material is unloaded from a collection vehicle directly in an open top transfer trailer or container.

Dispersion — A uniform distribution in finely divided state of a substance in a dispersion medium.

Disposal

a) *Ocean* — The disposition of a waste into an ocean or estuarine body of water.

b) *On-site* — The use of methods or processes to eliminate or reduce the volume or mass of solid waste at the point of generation.

c) *Waste* — An orderly process of discarding useless or unwanted material.

Downpass — A chamber or gas passage placed between two combustion chambers to carry the combustion products downwards.

Draft — Difference between the pressure in an incinerator or any component part and that of the atmosphere.

Draft, Forced — Draft caused by positive pressure exerted by the action of a fan or blower.

Draft, Induced — Negative pressure caused by the action of a fan, blower or ejector.

Draft, Natural — The negative pressure created by the height of a stack or chimney and the difference in temperature between flue gases and atmosphere.

Draft Controller — An automatic device which by regulating a damper maintains a uniform furnace draft.

Dragline — A revolving shovel that carries a bucket by cables and digs by pulling the bucket towards it.

Drag Plate — Plate below a travelling stoker used to support the returning grates.

Drum Mill — A long inclined steel drum which rotates and grinds solid wastes in its rough interior. The drum has its end portion in the form of a sieve.

Dulongs Formula — A formula for calculating approximate heat value of solid fuel based on its ultimate analysis.

Dump — A land site where disposal of solid waste occurs without proper measures for environmental protection.

Dumping — An indiscriminate method of disposing of solid waste.

Dump Plate — A hinged plate in an incinerator which supports residue. The plate can be rotated to discha.ge the residue.

Dust — Solid particles predominantly larger than colloidal ones and capable of temporary suspension in air or other gases. They do not tend to flocculate except under electrostatic forces; they also do not diffuse but settle

under the influence of gravity. Derivation from larger masses through the application of physical force is usually implied.

Dust Loading — The amount of dust in a given amount of gas. Usually applied to the contents of collection ducts and the emissions from stacks.

E

Earth Blade — A heavy plate connected at the front of a tractor to push and/or spread soil or other material.

Ecology — Science that deals with the interrelationship of organisms and their living and nonliving surroundings.

Ecosystem — The interdependence of organisms and their surroundings.

Effluent

a) A liquid which flows out of a containing place.

b) Sewage, water or other liquid, partially or completely treated, or in its natural state, as the case may be, flowing out of a reservoir, basin, or treatment plant or part thereof.

Electrostatic Precipitator — A device for collecting particulates by placing an electric charge on them and then attracting them to a collecting electrode.

Elutriation — Separation of solid waste into heavy and light fractions by washing.

Emissions — The sum of total substances discharged into air from a stack, vent or any other discrete source. It is generally applicable to harmful and injurious substances.

Emission Standard — A rule or measurement established to regulate or control the amount of a given pollutant which may be discharged into the atmosphere from the source.

Engine Sidescreen — A rugged screen fitted on the engine housing of a vehicle used at sanitary landfill to keep paper and other objects from accumulating and damaging the engine.

Environment — The conditions, circumstances and influences surrounding and affecting the development of an organism or group of organisms.

Environmental System — The interaction of an organism or group of organisms with its natural and man-made surrounding.

Erosion

a) *Accelerated* — Erosion occurring at a rate faster than the natural rate.

b) *Refractory* — The wearing away of refractory surface by the action of moving liquids or gases.

Evase Stack — An expanding connection provided on the outlet of a fan or in an airflow passage which converts kinetic energy into static pressures.

Expansion, Permanent — It is the ability of some refractories to increase in size permanently at temperature within their useful range. It is also known as secondary expansion.

Expansion Joint, Refractory — An open joint which allows the refractories to expand thermally or permanently.

F

Facultative — Able to live and grow with or without free oxygen.

Fan, Induced Draft — A fan for exhausting hot gases from heat absorbing equipment, dust collectors or scrubbers.

Fan, Overfire Air — A fan used to provide air above a fuel bed.

Field Capacity — The amount of water retained in solid waste, which after saturation is allowed to drain freely. It is also known as moisture holding capacity.

Filter Bag — A device having one or more fabric bags for recovering particles from dust laden gas or air.

Filter Fabric — A device to remove particles from a carrier gas by passing it through a porous (fabric) medium.

Firebrick — Refractory brick made from fireclay.

Fireclay — A sedimentary clay containing only small amounts of fluxing impurities which is capable of withstanding high temperature.

Fixed Carbon — Ash-free carbonaceous material that remains after the volatile matter is driven off during proximate analysis of the solid waste sample.

Flareback — A burst of flame from a furnace in a direction opposite to the normal gas flow.

Flue — A passage designed to carry combustion gases and entrained particles.

Flue Dust — Solid particles smaller than 100 microns carried in the products of combustion.

Flue Gas — Waste gas from a combustion process.

Fluidized Bed Technique — A combustion process in which heat is transferred from finely divided particles such as sand to combustible materials when kept in a fluidized state in a combustion chamber.

Fly Ash — The finely divided particles of ash entrained in flue gases arising from the combustion of fuel. The particles of ash may contain incompletely burned fuel. The term has been applied predominantly to gas-borne ash from boilers with spreader stoker, underfeed stoker, and pulverized fuel (coal) firing. The particles fall to the ground close to the point of release.

Food Processing Waste — Wastes resulting from operations that alter the form or composition of agricultural products for marketing purposes.

Food Waste — Animal and vegetable waste resulting from the handling, storage, sale, preparation, cooking and serving of foods; commonly called garbage.

Front End Loader — A collection vehicle with arms that engage a detachable container, move it over the cab and empty it in a container and return it to the ground.

Fuel Bed — Layer of solid fuel or waste on a furnace grate or hearth.

Fume — Gas containing particles less than one micron in diameter in suspension.

Fungi — Multicellular nonphotosynthetic plants.

Furnace — Chambers of an incinerator where drying, ignition and combustion occur.

Furnace Volume — The total internal volume of a combustion chamber.

Fusion Point — Temperature at which a particular complex mixture of minerals can flow under the weight of its own mass.

G

Garbage — Waste food material originally intended for or associated with food for human consumption.

Garbage Grinder, Central — A conveniently located facility that mechanically pulverizes food waste collected from various sources in a community.

Garchey System — A patented system in which refuse is first stored in a water filled flushing device under a sink from where it is conveyed through tubes to a central holding tank.

Gasification — The process of converting a solid or liquid fuel into a gaseous fuel.

Generation — Act or process of producing solid wastes.

Grader — A pneumatic wheeled vehicle having a centrally located blade which can be angled to cast to either side.

Gradient — Degree of slope.

Grapples — A clamshell type bucket having 3 or more jaws. It is also called a star or orange peel bucket.

Grate — A device which supports solid fuel or solid waste during drying, ignition and combustion and the openings in it permit air to pass through it.

Grate, Fixed — A grate without any moving parts.

Grate, Movable — A grate with moving parts.

Grinding — Mechanical pulverization of solid wastes.

Ground Water — Water in the ground beneath the surface. In a strict sense the term applies only to water below the water table but in the general sense it covers water derived from wells and springs.

Ground Water, Free — Ground water in aquifers that are not bound or confined in impervious strata.

Ground Water, Run-off — It is that portion of ground water which is discharged into a stream as spring or seepage water.

Grouser — A cleat extending across the track of a crawler tractor to improve its traction.

Grout — A cementing mixture containing cement, water, sand, sawdust and other fillers.

H

Hammermill — A category of high speed equipment which have pivoted or fixed hammers to crush or shred solid waste.

Haul Distance

a) The distance between last collection point of a refuse vehicle and transfer station or processing or disposal facility.

b) The distance between a transfer station or processing facility and disposal site.

c) The distance through which cover material has to be transported from excavation or stockpile to the working face of a sanitary landfill.

Haul Time — The time spent in transporting solid waste between two specific locations.

Hearth

a) *Burning*— A solid surface, without any air openings, to support the solid fuel or soil waste in a furnace during drying, ignition or combustion.

b) *Cold Drying* — A surface upon which unheated waste material is placed for drying or burning. The process is aided by hot combustion gases passing over it.

c) *Drying* — A solid surface in an incinerator where the wet waste material is kept before burning to dry or burn with the aid of hot combustion gases.

d) *Hot Drying* — A surface upon which waste material is kept to dry or burn. The hot combustion gases first pass over and then under the hearth.

Heat Available — The amount of useful heat produced per unit of fuel completely burnt minus the heat values of dry fuel gases and water vapour.

Heat Balance — An account carried out on hourly basis of the heat input and output of an incinerator.

Heat Exchanger — An equipment which transfers heat from one fluid to another without allowing them to mix.

Heat of Combustion — The heat released when a unit quantity of waste or fuel is burned.

Heat Release Rate — The amount of heat released during complete combustion. Generally it is expressed as kcal/m^3 (of internal volume of furnace) h.

Heat Value, High — The amount of heat, expressed in kilocalories liberated when a kilogram of solid waste is completely burnt and the products of combustion are cooled to initial temperature of solid waste as in a calorimeter.

Heat Value, Low — The high heat value minus the latent heat of vaporization of water formed by burning the hydrogen in fuel.

Heavy Media Separation — Separation of solid wastes into heavy and light fractions with the aid of a fluid medium having density between the two.

Hog Feeding — Utilization of heat treated food waste as livestock feed.

Humus — Stabilized organic matter.

Hydraulic Scooper — A self-propelled crawler vehicle having hydraulically operated arms which lift, empty and replace containers carried on a transfer trailer bed.

Hydraulic Tipper — A device which unloads a transfer trailer by raising its front end to a 70° angle.

Hydrology — Science dealing with the occurrence, properties, distribution and flow of water in nature.

I

Ignition Temperature — Lowest temperature at which a fuel can be burnt by a self-sustaining combustion reaction.

Impact Mill — A machine which grinds material by throwing it against heavy metal projections rigidly attached to a rapidly rotating shaft.

Incineration — It is a controlled combustion process in which the waste is burnt and converted into gases and a residue containing little or no combustible material.

Incinerator — An engineered apparatus used to burn waste substances and in which all factors of combustion, such as, temperature, retention time, turbulence and combustion air can be controlled.

Incinerator, Batch Fed — An incinerator in which one charge is fed and only after it is completely burnt, the next charge is added.

Incinerator, Cell Type — An incinerator whose grate areas are divided into cells, each of which has its own ash pit and air supply.

Incinerator, Central — A facility located at a convenient point which burns waste collected from different sources.

Incinerator, Chute Fed — An incinerator that is charged through a chute which extends two or more floors above it.

Incinerator, Continuous Fed — An incinerator into which solid waste is fed more or less continuously to maintain a steady rate of burning.

Incinerator, Controlled Air — An incinerator having more than one combustion zone in each of which distribution of air is controlled.

Incinerator, Direct Fed — An incinerator in which solid waste is fed directly in the combustion chamber.

Incinerator, Flue Fed — An incinerator that is charged through a shaft which functions as a chute for charging waste and has a flue to carry the products of combustion.

Incinerator, Industrial — An incinerator designed to burn industrial wastes.

Incinerator, Multiple Chamber — An incinerator consisting of two or more chambers arranged as in line (known as in-line type) or retort types (known as retort type), interconnected by gas passage ports or ducts.

Incinerator, Municipal — An incinerator primarily designed to burn municipal (residential and commercial) solid wastes.

Incinerator, On-site — An incinerator which burns the waste on the same premises which generates it.

Incinerator, Open Pit — A burning device that has an open top and a system of closely spaced nozzles that place a stream of high velocity air over the burning zone.

Incinerator Gas — *See* Flue Gas.

Inclined Plate Conveyor — A separating device in which material is fed onto an inclined steel plate belt conveyor. Heavy and resilient materials like glass bounce down the conveyor while light and inelastic materials are carried forward by motion of the belt.

Indore Process — It is an aerobic composting method in which refuse and human excreta are put in alternate layers in a pit. The material is turned twice to ensure composting remains aerobic.

Inoculum — Micro-organisms placed in a culture medium, soil, compost, etc.

J

Junk — Unprocessed material suitable for reuse or recycling.

K

k-Factor — The thermal conductivity of a material expressed as kcal/m h deg.

Kerb Collection — Collection of solid waste from containers placed adjacent to a thoroughfare.

L

Land Disposal — Deposition of waste on or into trenches or uneven land surface.

Landfill Blade — A U-blade having an extension at the top so that a larger volume of solid waste can be pushed and spread and protects the operator from any debris.

Lantz Process — Destructive distillation of solid waste in which combustible components are converted into gas, charcoal and a number of distillates.

Leachate — Liquid that has travelled through solid waste or other medium and has extracted dissolved or suspended material from it.

Lift — A compacted refuse layer and the top cover material in sanitary landfill.

Lining — The refractory material used on the inside of a furnace wall.

Litter — Carelessly discarded material.

Load Bearing Capacity

a) *Safe* — Ratio of ultimate bearing capacity divided by a factor of safety.

b) *Ultimate* — It is the load intensity transmitted by base of footing of foundation to soil and causes the soilmass to rupture or fail in shear.

Lysimeter — A device used to measure rate of movement of water through or from a soil layer or used to collect percolated water for quality analysis.

M

Manure — Excreta of animals which may contain some spilled feed or bedding.

Material Balance — An account on hourly basis of material entering and leaving a processing unit such as an incinerator.

Membrane Barrier — A thin layer of material impermeable to flow of gas or water.

Metals — In the secondary materials industry, metals include all ferrous, nonferrous and alloy materials.

Methane — A colourless, odourless, asphyxiating gas that can explode under certain conditions, and can be produced by anaerobic decomposition of solid wastes.

Milled Refuse — Solid waste which has been mechanically reduced in size.

Mixing Chamber — A chamber normally placed between primary and secondary combustion chambers where products of combustion are thoroughly mixed by turbulence created by increased velocity of gas, change of flow direction etc.

Moisture Content — Percentage ratio of loss in mass to the original mass when the sample is dried to a constant mass at a temperature of 100-105°C.

Moisture Penetration — The depth to which water penetrates the solid before its rate of flow becomes negligible.

Municipal Collection — Collection of solid wastes by municipal employees and equipment carried out under the supervision and direction of a municipal department or official.

O

Odour Threshold — The lowest concentration of a substance in air at which its odour is perceptible.

Offal — Intestines and discarded parts including paunch manure of slaughtered animals.

Open Burning — Uncontrolled burning in open.

Open Dump — *See* dump.

Organic Content — It is synonymous with volatile solids except for some small traces of some inorganic materials such as calcium carbonate which lose mass at temperatures used in determining volatile solids.

Organism — Any living thing.

Orsat Apparatus — An apparatus used to volumetrically analyse flue gases by measuring amounts of carbon dioxide, oxygen and carbon monoxide present.

P

Pathogen — An organism capable of producing disease.

Peephole Door — A small door or a hole in an incinerator through which combustion can be observed.

Percolation — Downward movement of water through soil, solid waste or other porous medium.

Permeability — The capacity of a porous medium to conduct or transmit fluids.

***p*H** — Logarithm to the base 10 of reciprocal of hydrogen ion concentration.

Picking Table (or Belt) — Table or belt on which solid waste is manually sorted and some constituents removed.

Pollution — Presence in the environment of some substances of such type and quantity that the quality of the environment is impaired or rendered offensive to life.

Polyvinyl Chloride — A common plastics material which releases hydrochloric acid when burned.

Private Collection — The collection of solid waste by individuals or companies from residential, commercial or industrial premises; the arrangements for the service are made directly between the owner or occupier of the premises and the collector.

Processing — A method or process to change the physical form or chemical content of solid wastes.

Products of Combustion — Gases, vapours and solids resulting from the combustion of a fuel.

Pulverization — Crushing of material into small pieces.

Putrefaction — Microbial decomposition of organic matter accompanied by odours.

Pyrolysis — Destructive distillation of a material in the absence of oxygen.

Pyrometer — An instrument for measuring temperature.

Pyrometer, Optical — A pyrometer based on optical principles.

Pyrometer, Radiation — A pyrometer which measures temperature of a material from the intensity of radiation at all wavelengths emitted by it.

Q

Quench Trough — A water filled trough to receive burning residue from an incinerator.

R

Rasper (Rasp Mill) — A size reduction unit having a large vertical drum with heavy hinged arms rotating horizontally over a rasp and sieve floor.

Rated Load (of Crane) — The maximum load that a crane can handle.

Reclamation — Restoration to a better or more useful state or the obtaining of useful materials from solid wastes.

Recovery — The process of obtaining materials or energy resources from solid wastes.

Recycling — The process by which waste materials are transformed into new products in such a manner that the original products lose their identity.

Refuse — It includes all kinds of wastes in solid state, excepting excreta, coming from residential, commercial and industrial areas.

Refuse Chute — A pipe, duct or trough through which solid waste is conveyed to a central storage area.

Refuse Train — *See* container train.

Residue — Material remaining after gases, liquids or solids have been removed.

Residue Conveyor — A conveyor, usually a drag or flight type used to remove incinerator residue from a quench trough to a discharge point.

Residue, Incinerator — All solid material collected after incineration process is completed.

Reuse — The reintroduction of a commodity into the economic stream without any change.

Ringelmann Chart — Printed or photographically reproduced illustration of 4 shades of grey used to estimate density of smoke from a source.

S

Salvage — Utilization of waste material.

Salvaging — Controlled removal of waste material for utilization.

Sanitary Landfill — A site where solid waste is disposed of by using method of sanitary landfilling.

Sanitary Landfilling — An engineering method of disposing of solid wastes by spreading it in layers, compacting it to the smallest practical volume and covering it by a soil layer at the end of the day or more frequently.

Sanitary Landfilling Method

a) *Area* — A method which utilizes uneven surface of ground. The waste is spread on the undulating surface, compacted and then covered by soil layer.

b) *Quarry* — A variation of area method in which the wastes are spread and compacted in a depression. Cover material is brought from elsewhere.

c) *Ramp* — Another variation of area method where the cover material is obtained by excavating in front of working face.

d) *Trench* — A trench is excavated and the space filled by refuse which is compacted. The excavated soil is used as cover material.

e) *Wet Area* — Method used in swampy area where first inert layer is given till it rises above normal water level and then normal area method is used.

Sanitation — Control of all such factors which affect the physical environment which can affect human health, survival and development.

Satellite vehicle — A small vehicle which discharges its contents into an accompanying large vehicle.

Scavenger — A person involved in uncontrolled removal of material at any point in a solid waste stream.

Scrap — Discarded or rejected materials or parts resulting during fabrication and manufacture, which can be reprocessed.

Scrap, Home — Scrap that is reprocessed in the place where it is produced.

Scrap, Obsolete — Scrap that results when the material gets worn out and cannot be used for its original purposes.

Scrap, Prompt Industrial — Scrap left over from the fabrication of iron and steel products.

Screen

a) *Rotary* — An inclined cylindrical mesh rotating on its axis which screens material placed at its upper end.

b) *Vibrating* — Inclined screen which is mechanically vibrated to screen material placed over it.

Screw Conveyor — A rotating helical shaft that moves material along a trough or tube.

Scrubber, Flue Gas — Equipment to remove fly ash and other objectionable material from flue gas by use of sprays, wet baffles etc.

Secator — A separating device which throws mixed material onto a rotating shaft. Heavy and resilient materials bounce off one side of the shaft while light and inelastic materials land on the other and are cast in the opposite direction.

Secondary Material — A material that is used in place of primary or raw material in the manufacture of a product.

Separator

a) *Ballistic* — A device in which mixed materials having different physical characteristics are dropped on a high speed rotary impeller when they are hurled at different velocities and fall in separate collection bins.

b) *Inertial* — A device that relies on gravity separation of materials having different physical characteristics.

c) *Magnetic* — A device which removes ferrous metals by a magnet.

Settlement — A gradual subsidence of materials.

Settlement, Differential — Non-uniform subsidence of material from a fixed horizontal reference plane.

Settling Chamber — A chamber to reduce velocity of fluid to help separate out suspended solids.

Sewage Sludge — A semiliquid containing settled sewage solids and varying amounts of water and dissolved material.

Shear Shredder — A size reduction unit which cuts material between two large blades or between a blade and a stationary edge.

Shredder — A device to reduce discarded automobiles and other low grade sheet and coated metal in a continuous operation to small pieces.

Siftings — The fine material which falls from fire bed through grate openings in incineration.

Sintering — A heat treatment that causes adjacent particles of a material to cohere below a temperature that would cause them to melt.

Slag — A substance formed by chemical action and fusion at furnace operating temperatures.

Slagging of Refractories — Destructive chemical action which forms slag on refractories subjected to high temperatures. It also refers to molten or viscous coating produced on refractories by ash particles.

Sloughing — Disattachment of slime and solids accumulated on a contact surface as in tricking filters.

Sludge — A semiliquid sediment.

Smoke — A suspension in air or gas of particulates produced by incomplete combustion of carbonaceous material.

Smoke Alarm — An alarm given by an instrument which continuously measures density of smoke on the basis of obscuring of a beam of light and gives an alarm when the smoke density exceeds a preset value.

Smoke Eye — A device consisting of a light source and a photoelectric cell that measures the degree to which smoke in a flue gas obscures light.

Solid Waste — *See* Refuse.

Solid Waste, Agriculture — Solid waste resulting from processing of field crops and orchards and from rearing and slaughtering of animals.

Solid Waste, Commercial — Solid waste generated by shops, offices and other commercial activities which do not actually turn out a product.

Solid Waste, Industrial — Solid waste resulting from industrial and manufacturing processes.

Solid Waste, Institutional — Solid wastes originating from educational, health care and research facilities.

Solid Waste, Municipal — It includes commercial and residential wastes generated from a community.

Solid Waste, Pesticide — Residue resulting from manufacturing, handling or use of chemicals for killing animal and plant pests.

Solid Waste, Residential — Solid waste generated from residential environment. It is also called domestic solid waste.

Solid Waste, Management — A purposeful systematic control of the generation, storage, collection, transport, processing and disposal of solid waste.

Spalling of Refractories — Breaking or crushing of a refractory unit due to thermal, mechanical or structural causes.

Spray Chamber — A chamber equipped with water sprays to cool products of combustion passing through it.

Stack — *See* Chimney.

Stack Effect — Vertical movement of hot gases in a stack occurring due to its being lighter than atmosphere.

Stack Sampling — Collection of representative sample of gases and particulate matter flowing through a stack.

Stoker — A mechanical device to feed solid fuel or solid waste to furnace.

Stoker, Chain Grate — A stoker having a moving chain as a grate surface. The grate consists of links mounted on rods to form a continuous surface which is generally driven by a shaft with sprockets.

Stoker, Incinerator — A mechanically operable moving grate arrangement for supporting, burning, and transporting solid waste in a furnace and discharging the residue.

Stoker, Inertial Grate — A stoker consisting of a fixed bed of plates carried on rollers and activated by an electrically driven mechanism. It draws the bed slowly back against a spring and then releases it so that the entire spring bed moves forward until stopped abruptly by another spring. The inertia of solid waste carries it a small distance forward along the stoker surface and then the cycle is repeated.

Stoker, Oscillating Grate — A stoker in which the entire grate surface oscillates to move the solid waste and residue over grate surface.

Stoker, Reciprocating Grate — A stoker consisting of a bed of bars or plates so arranged that alternate pieces or rows of pieces slowly reciprocate in a horizontal sliding mode and act to push the solid waste along the stoker surface.

Stoker, Rocking Grate — A stoker consisting of a bed of bars or plates on axles which are rocked in a coordinated manner to lift and advance the solid waste along the grate surface.

Stoker, Rotary Kiln — An inclined rotating cylindrical unit in which solid waste cascades and moves forward.

Stoker, Travelling Grate — A stoker in the form of a moving chain belt carried on sprockets and covered with separated small metal pieces called keys. The entire top surface acts as grate which moves to the bottom side at end of furnace and again enters the furnace at other end.

Storage Pit — A pit for storing solid waste before processing.

Street Refuse — Refuse collected from streets when they are cleaned either manually or mechanically.

T

Tailings — Second grade or waste material obtained when raw material is screened or processed.

Teepee Burner — *See* Burner, Conical.

Tempering Air — *See* Air, Cooling.

Thermocouple — Device to measure temperature in which two lengths of wires made from different kind of homogeneous metals are used.

Tipping Floor — Unloading area for vehicles which deliver solid waste to a processing plant.

Toe — Bottom of working face of a sanitary landfill.

Topsoil — Topmost soil layer which is normally expected to contain humus and support plant growth.

Transfer Station — A site at which solid waste is transferred from one set of vehicles to another directly or after compaction.

Transport — Movement of solid wastes subsequent to collection.

Trash — *See* rubbish.

Trommel Screen — *See* screen rotary.

U

U-Blade — A dozer blade having projections on either side at an obtuse angle so that larger volume of waste can be handled.

Unloading Bulkhead — A steel plate to eject waste out of the rear door of an enclosed transfer trailer.

V

Vector, Disease — A carrier capable of transmitting a pathogan from one vector to another.

Volatile Matter — Material lost from a dry solid waste sample which is heated till red in a closed crucible.

Volatile Solids — Material lost from a dry solid waste sample which is heated till red in an open crucible in a ventilated furnace.

W

Wall, Air Cooled — A refractory wall having a lane directly behind it through which cool air passes.

Wall, Core — The central course of the common wall between the two combustion chambers which is not exposed on either side.

Wall, Curtain — A refractory construction or baffle which deflects combustion gases downwards.

Wall, Water Cooled — A furnace wall composed of boiler tubes.

Waste — *See* also solid waste.

Waste, Bulky — Very large sized waste, the handling of which poses problem in normal collection, processing or disposal methods.

Waste, Construction or Demolition — Building material or rubble resulting from construction, remodelling, repair and demolition operations.

Waste, Hazardous — Wastes that need special handling to avoid illness or injury to persons or damage to property.

Wastes, Special — Needing extraordinary management.

Waste Processing — Operations which change the physical or chemical properties of wastes.

Waste, Sources of — Various activities which generate wastes.

Wet Milling — Mechanical size reduction of solid waste which has been wetted to soften the paper and paper product constituents.

Wet Pulping — *See* wet milling.

Working Face — That portion of sanitary landfill where collection vehicles discharge material prior to placement of cover material.

Y

Yard Tractor — Small tractor used exclusively for manouvring trailers into and out of loading position.

Z

Zone of Aeration — Zone above water table the pores of which are not completely filled with water.

Zone of Capillarity — Zone above water table where some or all of the pores are filled with water that is held by capillarity.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	*Unit*	*Symbol*
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	*Unit*	*Symbol*
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	*Unit*	*Symbol*	*Definition*
Force	newton	N	1 N = 1 kg. m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2