भारतीय मानक

Indian Standard

IS 18721 : 2024

ठोस जैव ईंधन – शब्दावली

Solid Biofuels — Vocabulary

ICS 01.040.75; 27.190 ; 75.160.10

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Price Group 6

Solid Mineral Fuels and Solid Biofuels Sectional Committee, PCD 07

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Solid Mineral Fuels and Solid Biofuels Sectional Committee, had been approved by the Petroleum, Coal and Related Products Division Council.

Solid biofuels are being considered as an alternative to fossil fuels to reduce the consumption of fossil fuels. Thus, a need has been felt to formulate a standard on glossary of terms used for solid biofuels.

This standard contains terms used only to describe solid biofuels within the scope of solid mineral fuels and Solid Biofuels Sectional Committee. Solid biofuels are produced from different sources. Terms and definitions are categorized based on the following facts that solid biofuels are produced/generated from different sources and are used to produce bioenergy:

a) Origin and source of solid biofuels in the overall supply chain;
b) The different traded forms as well as the different forms of biofuels produced within the preparation;
c) The most relevant solid biofuel properties, terms of sampling and testing, classification and specification;
d) The description of solid biofuels handling and processing given in the same structure as the biomass sources; and
e) Bioenergy as a result of solid biofuel conversion.

Most of the terms and definitions listed in this standard are adopted from ISO 16559 : 2022. However, few terms have been modified as used in India.

The composition of the Committee responsible for the formulation of this standard is given in Annex A.

Indian Standard

SOLID BIOFUELS — VOCABULARY

1 SCOPE

This standard prescribes the vocabulary used for solid biofuels. This standard includes only raw and processed material originating from agriculture, horticulture, forestry, arboriculture and aquaculture.

NOTES

1 Raw and processed material includes woody, herbaceous, fruit and aquatic biomass from the sectors mentioned above.

2 Chemically treated material does not include halogenated organic compounds or heavy metals at levels higher than those in typical virgin material values or higher than values of the country of origin.

2 REFERENCES

The standards given below contain provisions, which through reference in this text, constitute the provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of these standards:

IS No.	*Title*
IS 3810	Solid mineral fuels — Vocabulary:
(Part 2) : 2002	Terms relating to sampling, testing and analysis (*first revision*)
(Part 3) : 2023	Glossary of terms relating to solid mineral fuels: Part 3 Coke (*first revision*)
IS 17654 : 2021/ ISO 18125 : 2017	Solid biofuels — Determination of calorific value

3 TERMS AND DEFINITIONS

The following are the most relevant terms used for solid biofuels (sources, processes, in-process material or finished or semi-finished products):

3.1 Additive — Material which has been intentionally introduced into the fuel feedstock to improve quality of fuel (for example, combustion properties), to reduce emissions or to make production more efficient.

3.2 Agrofuels — Biofuels obtained from energy crops and/or agricultural by-products (agricultural residues).

3.3 Air-dried — Condition in which the solid biofuel has dried in air to equilibrium moisture content.

3.4 Animal Biomass — Biomass obtained from livestock.

3.5 Animal by Products/Animal Residues — Agricultural and animal by-products (or residues) obtained during livestock operations.

NOTE — It includes among others solid excreta of animals.

3.6 Aquatic Biomass — Biomass from plants that have adapted to living in or on aquatic environments.

3.7 As Analyzed/As Determined Basis — Reference moisture content of the material at the moment of analysis/determination.

3.8 As Received/As Delivered — Calculation basis for a material in the delivery state.

3.9 Ash/Ash Content/Total Ash — Mass of inorganic residue remaining after combustion of a fuel under specified conditions, typically expressed as a percentage of the mass of dry matter in fuel.

NOTES

1 Depending on the combustion efficiency the ash may contain combustibles.

2 If a complete combustion is realized ash contains only inorganic, non-combustible components.

3.10 As Deformation Temperature/Deformation Temperature — Temperature at which first signs of melting occur.

NOTE — Ash deformation temperature can be seen as rounding of the edges, smoothing of surfaces, expansion of the cylinder or general changing of the cylinder shape. If the test piece starts to swell or bubble without the edges being rounded, the temperature is registered as DT (since swelling and bubbling only occur when a fraction of the ash is melted).

3.11 Ash Flow Temperature — Temperature at which the ash is spread out over the supporting tile in a layer, the height of which is half of the height of the test piece at the ash hemisphere temperature.

3.12 Ash Fusibility/Ash Melting Behavior — Characteristic set of temperatures at which the ash undergoes certain physical stages of melting during heating under specific conditions.

3.13 Ash Hemisphere Temperature/Hemisphere Temperature — Temperature at which the test piece forms approximately a hemisphere, that is, when the height is half of the base diameter.

3.14 Ash Shrinkage Starting Temperature — Temperature at which the area of a test piece falls below 95 percent of the original test piece area under specific conditions due to shrinking of a test piece.

3.15 Bagasse/Sugarcane Bagasse — Dry pulpy residue left after the extraction of juice from sugarcane.

3.16 Bag weight — Weight of solid biofuel plus bag.

3.17 Bale/Baled Biofuel — Solid biofuel which has been compressed and bound to keep its shape and bulk density.

Example: Straw bales, bales of energy grass, bales of logging residues.

3.18 Bark — Organic cellular tissue which is formed by taller plants (trees, bushes) on the outside of the growth zone (cambium) as a shell for the wooden body.

3.19 Biobased — Derived from biomass.

3.20 Biobased Content — Fraction of a fuel that is derived from biomass.

NOTE — Normally expressed as a percentage of the total mass of the product.

3.21 Biobased Product/Biobased Industrial Product/Bioproduct — Product wholly or partly derived from biomass.

NOTE — The biobased product is normally characterized by the biobased carbon content or the biobased content.

3.22 Biochar/Biocarbon/Biocoke/Bio-charcoal/ Biocoal/Charcoal — Solid carbonaceous biofuel derived by carbonization or distillation or pyrolysis of biomass.

3.23 Bioenergy — Energy derived from Biomass.

3.24 Biofuel — Solid, liquid or gaseous fuel produced directly or indirectly from biomass.

3.25 Biofuel Blend — Biofuel resulting from intentionally mixing of different biofuels, for example, straw or energy grass with wood, dried bio sludge with bark.

3.26 Biofuel Briquette — Densified biofuel made with or without additives in pre-determined geometric form with at least two dimensions (length, width, height) of more than 25 mm, produced by compressing biomass.

3.27 Biofuel Mixture — Biofuel resulting from natural or unintentional mixing of different biofuel and/or different types of biomasses.

3.28 Biofuel Pellet — Densified biofuels made with or without additives (3.2) usually with a cylindrical form, random length typically 5 mm to 40 mm and diameter up to 25 mm and broken ends, produced by compressing biomass.

3.29 Biomass — Organic material, that is, plant or animal based, including energy crops, agricultural crops and trees, food, feed and fibre crop residues, aquatic plants, algae, forestry and wood residues, agricultural wastes, processing by-products and other non-fossil organic matters.

3.30 Biomass By-product/Biomass Residue — Biomass from well-defined side-streams from forestry, agriculture or aquaculture or biomass product generated during the production of something else.

Example: Sawdust when sawing timber, olive press cake after pressing of oil, logging residues.

3.31 Biomass Resource Owner — Body or enterprise with the right to exploit the biomass resources for energy purposes.

NOTE — The biomass resource owner can be a land or forest owner, a company etc.

3.32 Biomethane — Methane produced from biomass (for example, solid biofuels).

3.33 Biosludge — Sludge formed in the aeration basin during biological wastewater treatment or biological treatment process and separated by sedimentation or flotation.

3.34 Black Liquor — Fluid containing lignin removed from the wood in the pulping process.

NOTES

1 Black liquor also contains pulping chemicals.
2 Black liquor is not a solid biofuel. The term is included for information only.

3.35 Bulk Density — Mass of a portion (that is, a large quantity of particulate material) of a solid fuel divided by the volume of the container which is filled by that portion under specific conditions.

3.36 Bulk Volume — Volume of a material including space between the particles.

3.37 Bundled Biofuel — Solid biofuels which has been bound together and where there is a lengthwise orientation of the material.

3.38 Calorific Value/Heating Value — Energy

amount per unit mass or volume released on complete combustion (*see* IS 17654).

3.39 Cereal Crops — Annual crops grown with the main purpose of using the seed for food production.

Example: Barley, wheat, rye, oat.

NOTE — Some cereal crops can be used as a solid biofuel.

3.40 Certified Reference Material — Reference material one or more of whose property values are certified by a technically valid procedure, accompanied by or traceable to a certificate or other documentation which is issued by a certifying body.

3.41 Chemical Treatment — Any treatment with chemicals other than air, water or heat.

NOTE — The treatment with chemicals may take place in presence or absence of air, water or heat.

3.42 Chopped Straw — Straw which has been cut into small pieces.

3.43 Chunkwood — Wood cut with sharp cutting devices where most of the material have typical particle lengths of 50 mm to 150 mm, which are substantially longer and coarser than wood chips.

3.44 Coarse Pellet Fines — Particles with a size ranging from ≥ 3.15 mm to < 5.6 mm resulting from breakage of pellets during production or handling.

3.45 Coke — The solid residue of impure carbon obtained from carbon rich feedstock after removal of volatile material by destructive distillation. [*see* IS 3810 (Part 3)].

3.46 Combined Sample — Sample consisting of all the increments taken from a lot or a sub-lot.

NOTE — The increments may be reduced by division before being added to the combined sample.

3.47 Complete Tree — Tree, including limbs and root system.

3.48 Contamination — Occurrence of any undesirable matter such as chemical, physical and/or microbiological matter in the product.

3.49 Critical Control Point Quality Control Point — Point within or between processes at which relevant properties can be most readily assessed, quality control points also offer the greatest potential for quality improvement.

3.50 Cross Cut Ends — Short pieces of woody biomass which occur when the ends of logs or sawn timber are crosscut off, with or without bark.

3.51 Cutter Chips — Wood chips made as a by-product of the wood processing industry, with or without bark.

3.52 Delivery Lot — Solid biofuel batch on which the essential quality requirements for solid biofuel are focused.

NOTE — Delivery lot can be an individual delivery lot, which is an agreed quantity of solid biofuel (for example, a package, shipload or truck load) or continuous delivery, where several loads are delivered to the end-user during an agreed period of time (usually daily or weekly delivery).

3.53 Demolition Wood — Used wood arising from demolition of buildings or civil engineering installations.

3.54 Densified Biofuel Compressed Biofuel — Solid biofuel made by mechanically compressing (at normal or elevated temperature) biomass (or thermally treated biomass) to mould the solid biofuel into a specific size and shape such as cubes, pressed logs, biofuel pellets or biofuel briquettes.

3.55 Density — Ratio of mass to volume.

NOTES

1 It must always be stated whether the density refers to the density of individual particles or to the bulk density of the material and whether the mass of water in the material is included.

2 Also see bulk density and particle density.

3.56 Dry Ash Free basis — Calculation basis in which the solid biofuel is considered free from moisture and inorganic matter.

3.57 Dry Basis — Calculation basis in which the solid biofuel is considered free from moisture.

3.58 Dry Matter — Material remaining after removal of moisture under specific conditions.

3.59 Dry Matter Content — Portion of dry matter in the total material on mass basis expressed as a percentage of the total mass of the solid biofuel.

3.60 Dust — Fragmented material of small size passing a 500 µm sieve caused by a non-intentional process.

3.61 Edging Parts of Woody — Biomass which occur when trimming sawn timber and which show a remainder of the original rounded surface of the tree, with or without bark.

3.62 Energy Crops — Woody or herbaceous crops grown and harvested specifically for their fuel value.

3.63 Energy Density — Ratio of net energy content and bulk volume.

NOTE — The energy density is calculated using the net calorific value determined and the bulk density.

3.64 Energy Forest Trees — Woody biomass grown specifically for its fuel value in medium to long rotation forestry.

3.65 Energy Grain — Grain used for energy purpose.

3.66 Energy Grass — Herbaceous grass grown and harvested specifically for use as fuel.

Example: Sugarcane, miscanthus, reed canary grass.

3.67 Extraneous Ash — Ash from contaminants entering the material at harvest, logging, treatment, transport, storage etc.

3.68 Extraneous Substances — Foreign non biomass materials such as particles not belonging to the particular biomass such as stone, glass or clay etc entering the biomass or solid biofuel during any stage starting from harvesting to final storage for utilization.

3.69 Feedstock — Material that is further processed for conversion to bioenergy, biofuel and/or biobased products.

3.70 Fibre Saturation Point — Moisture content of woody material at which only the cell walls are completely saturated (all bound water) but no free water exists in the cell lumens typically about 27 percent total moisture (wet basis).

3.71 Fibre Sludge — Sludge formed in the sedimentation basin as a part of the wastewater treatment process in a pulp and paper mill and separated by sedimentation or flotation.

NOTE — The main component is pieces of wood fibres. The sludge can be dewatered and further processed into a solid biofuel.

3.72 Fines — Fraction of small sized particles as defined by a specification or user.

NOTE — In the solid biofuels, standards fines are always defined as particles passing a 3.15 mm round hole sieve.

3.73 Firewood — Cut and split oven-ready energy wood usually used in household wood burning appliances like stoves, fireplaces and central heating systems.

NOTE — Firewood usually has a uniform length, typically in the range of 15 cm to 100 cm.

3.74 Fixed Carbon — Remaining carbon calculated by subtracting total moisture, ash and volatile matter from 100 percent.

3.75 Flash Point — Temperature at which the vapor of a material will ignite when exposed to an ignition source.

3.76 Flammability — Propensity by gaseous, liquid or solid material to catch fire upon exposure to ignitable external source.

NOTE — For solids like dust from biomass the flammability is determined by testing method establishing the speed of burning in mm per time unit.

3.77 Foreign Material/Impurity — Material other than claimed, which has entered the fuel.

NOTE — Examples of impurities for biofuels are stones, soil, pieces of metal, plastics, rope.

3.78 Forest Chips — Forest wood in the form of wood chips.

3.79 Forest Fuels — Forest fuel is produced directly from forest wood or plantation wood by a mechanical process, the raw material has not previously had another use.

3.80 Forest Wood — Wood from forest, plantation and other virgin wood including segregated wood from gardens, parks, roadside maintenance, vineyards, fruit orchards and driftwood from freshwater.

3.81 Fruit Biomass — Part of a plant which holds seeds.

3.82 Fuel — Energy carrier intended for energy conversion.

NOTE — Fuels are solid, liquid or gaseous.

3.83 Fuel Powder/Fuel Flour — Pulverized fuel with a typical particle size less than 1 mm.

3.84 Fuel Specification — Description of origin and source, fuel traded form and fuel properties.

3.85 Fuel Wood/Energy Wood — Wood fuel where the original composition of the wood is maintained and which has only been threated mechanically.

3.86 General Analysis Sample — Sub-sample of a laboratory sample having a nominal top size of 1 mm or less and used for a number of chemical and physical analyses.

3.87 Green Biomass — Biomass with a moisture content close to fresh after harvesting but no further quality specified.

3.88 Green Chips/Fresh Chips — Wood chips produced from recently harvested woody biomass.

3.89 Grinding Dust — Dust-like wood residue formed in grinding/smoothening wood surfaces.

3.90 Gross Calorific Value (GCV)/Higher Heating Value (HHV) — Measured value of specific energy of combustion of a solid fuel burned in oxygen in a calorimetric bomb under such conditions that all the water of the reaction products is in the form of liquid water.

3.91 Gross Density — Ratio of the mass of a wooden body and its volume, including all cavities (pores and vessels), based on specific total moisture.

3.92 Heat Rate — Measure of the number of heating units required to generate output energy over a length of time expressed in kWh or MWh.

3.93 Heavy Extraneous Materials — Extraneous substances ≥ 3.15 mm with a specific density > 1 g/cm^3.

3.94 Herbaceous Biomass — Biomass from plants that has a non-woody stem and which dies back at the end of the growing season.

3.95 Herbaceous Fuels — All types of biofuels originating from herbaceous biomass.

3.96 Hog Fuel/Shred — Woodfuel that has pieces of varying size and shape, produced by crushing with blunt tools such as rollers, hammers or flails.

3.97 Hydrothermal Carbonized Biomass — Solid biofuel produced by hydrothermal carbonization of biomass, under specified conditions.

3.98 Increment — Portion of fuel extracted in a single operation of the sampling device.

3.99 Inorganic Matter — Non-combustible fraction of a fuel.

3.100 Laboratory Sample — Combined sample or a sub-sample of a combined sample for use in a laboratory.

3.101 Lignocellulose — Plant cell wall biomass composed primarily of cellulose, hemicelluloses and lignin.

3.102 Log Wood — Cut fuel wood in which most of the material has a length of 500 mm and above.

3.103 Logging Residues — Woody biomass residues created during wood harvesting.

NOTE — Logging residues include branches and treetops that can be salvaged when fresh or after seasoning.

3.104 Lot — Defined quantity of fuel for which the quality is to be determined.

3.105 Major Elements — The elements in the fuel that predominantly will constitute the ash, including aluminum (Al), calcium (Ca), iron (Fe), magnesium (Mg), phosphorus (P), potassium (K), silicon (Si), sodium (Na) and titanium (Ti).

3.106 Mass-reduction — Reduction of the mass of a sample or sub-sample.

3.107 Mechanical Durability — Ability of densified fuel units (for example, briquettes, pellets) to remain intact during handling and transportation.

3.108 Minor Elements — Elements in the fuel that are at small concentrations.

NOTE — Concerning solid biofuels, minor elements include, but not limited to elements (not all are metals) such as arsenic (As), cadmium (Cd), cobalt (Co), chromium (Cr), copper (Cu), mercury (Hg), manganese (Mn), molybdenum (Mo), nickel (Ni), lead (Pb), antimony (Sb), selenium (Se), tin (Sn), thallium (TI), vanadium (V) and zinc (Zn).

3.109 Moisture Sample — Sample taken specifically for the purpose of determining total moisture [*see* IS 3810 (Part 2)].

3.110 Municipal Solid Waste — Waste stream consisting of end-of-life-materials.

NOTE — Municipal solid waste can contain biomass fractions as well as non-biomass fractions.

3.111 Net Calorific Value (NCV)/Lower Heating Value (LHV) — Calculated value of specific energy of combustion of a solid fuel burned in oxygen under such conditions that all the water of the reaction products remain as water vapour.

3.112 Nominal Top Size — Smallest aperture size of the sieve through which at least 95 percent by mass of the material passes during the determination of particle size distribution of solid fuels.

3.113 Non-woody Biomass — Biomass originating from herbaceous, fruit or aquatic biomass as well as their blends or mixtures with woody biomass.

NOTE — Stem of fruit trees and energy crops, crop residues.

3.114 Non-woody Briquette — Biofuel briquette made from non-woody biomass

NOTES

1 The raw material for non-woody briquettes can be herbaceous, crop residues, fruit or aquatic biomass or biomass blends and mixtures.

2 Briquettes are usually manufactured in a piston press, with the total moisture content on wet basis usually being less than 15 percent of the mass.

3.115 Non-woody Pellet — Biofuel pellet made from non-woody biomass.

NOTE — The raw material for non-woody pellets is crop residues, herbaceous, fruits or aquatic biomass. Pellets are usually manufactured in a die, with total moisture content usually less than 15 percent of their mass on wet basis.

3.116 Off-gassing — Spontaneous emission of condensable (for example, terpenes) and non-condensable gases (for example, carbon monoxide, carbon dioxide, methane) from biomass.

3.117 Organic Matter — Combustible fraction of the fuel.

3.118 Oscillating Screen Classifier — Device containing one or multiple oscillating (flat) screens used to separate material into size classes for calculation of particle size distribution.

3.119 Oven Dry Matter — Biomass free of moisture, produced by drying to constant weight under specific conditions.

3.120 Oversize Particles — Particles exceeding a specific particle size limit value or values.

NOTE — Limit values may be given in three dimensions.

3.121 Particle — Any discrete unit of matter.

3.122 Particle Density — Density of a single particle.

NOTE — Pores within the particle are included.

3.123 Particle Size — Size of the particle as determined.

NOTES

1 Different methods of determination may give different results.
2 See also particle size distribution and fines.

3.124 Particle Size Distribution — Proportions of various particle sizes in a solid fuel.

3.125 Particle Size Reduction/Size Reduction — Reduction of the nominal top size of a sample or sub-sample.

3.126 Permeability in Storage/Bulk Permeability — Ability of gas such as air to pass through the void in biomass during storage.

NOTE — Permeability is measured in pressure (Pa) verses flow of gas ($m^3/s/m^2$) and depends on shape and orientation of particles and the bulk porosity of biomass.

3.127 Pressing Aid — Additive used for enhancing the production of densified fuels.

3.128 Primary Biomass — Biomass produced directly by photosynthesis and harvested or collected from the field or forest where it is grown.

Examples: Energy grain, perennial grasses, wood crops, crop residues and residues from logging.

3.129 Producer — Organization, unit or individual responsible for the production of the fuel.

NOTES

1 The producer can be responsible for any operation with the purpose of changing the biofuel properties.
2 The producer can also be the supplier of the fuel.

3.130 Product Declaration — Document dated and signed by the producer/supplier to the retailer or end-user, specifying origin and source, traded form and properties of defined lot, delivery period or delivery agreement.

3.131 Proximate Analysis — Quantitative analysis of a solid fuel reported in terms of prescribed methods for total moisture, volatile matter, ash content and fixed carbon measured at specified conditions.

3.132 Pulverized Fuel Grinded Fuel — Solid fuel in the form of dust and powder, produced by milling or grinding.

3.133 Recovered Construction Wood — Used wood arising from construction of buildings or from civil engineering works.

3.134 Reference Material — Material or substance, one or more of whose property values are sufficiently homogeneous and well established to be used for the calibration of an apparatus, the assessment of a measurement method or for assigning values to materials.

3.135 Rotary Screen — Device with cylindrical screens used to separate material into size classes for calculation of particle size distribution.

3.136 Sample — Quantity of material (all increments), representative of a larger quantity for which the quality is to be determined.

3.137 Sample Division — Division of a sample or sub-sample to an appropriate size which normally leads to a mass reduction of a sample or sub-sample.

3.138 Sample Preparation — Actions taken to obtain representative laboratory samples or test portions from the original sample.

3.139 Sampling Form — Document that shall be used during sampling to record data about the way in which the sampling is actually being carried out

3.140 Sampling Plan — Predetermined procedure for the selection, withdrawal, preservation, transportation and preparation of the portions to be removed from a population as a sample.

3.141 Sampling Certificate — Report which serves as a check list and provides the investigator with all necessary information about the sampling techniques applied at the site and any additional important information.

3.142 Sawdust — Fine particles created when sawing wood in which most of the material has a typical particle length of 1 mm to 5 mm.

3.143 Secondary Biomass — Residues and by-product streams from food, feed, fiber, wood and materials processing plants (such as sawdust, black liquor and cheese whey) and manures from animal feeding operations.

3.144 Short Rotation Coppice (SRC) — Production of woody biomass, generally on agricultural lands, by regenerating new stems (shoots) from the (stool) stump or roots and relying on rapid growth, (harvested) generally over a 1 year to 8 year cycle.

3.145 Short Rotation Forestry — Production of trees (generally) on forest land, that rely on rapid growth of individuals harvested in short cycles (of 5 year to 15 years).

3.146 Shredded Biofuel — Solid biofuel which has been mechanical treated into smaller particles with blunt tools.

Example: Chopped straw, shredded bark, wood and hog fuel.

3.147 Slab — Piece initially sawn from the length of a log when squaring up the log, with or without bark.

NOTE — Approximate length 200 cm to 800 cm.

3.148 Slag — Biofuel derived ash that is or has been in a molten (or liquid) state.

3.149 Smallwood — Fuel wood cut with sharp cutting devices and in which most of the material has a particle length typically 50 mm to 500 mm.

3.150 Solid Biofuel — Solid produced directly or indirectly from biomass.

3.151 Solid Recovered Fuel — Solid fuel prepared from non-hazardous waste to be utilized for energy recovery in incineration or co-incineration plants.

3.152 Solid Volume — Volume of a mass of particles excluding the volume of the void spaces between the particles.

NOTE — Typically determined by a fluid displaced by a specific amount of material.

3.153 Soot — Fine black particles, chiefly composed of carbon, produced by incomplete combustion of carbon rich feedstock.

3.154 Stacked Volume — Volume of stacked material including the space between the material pieces.

3.155 Stem Wood/Roundwood — Part of tree stem with the branches and top removed, with a length of more than 100 cm.

3.156 Stem Wood Chips — Wood chips made of stem wood, with or without bark.

3.157 Stump — Part of the tree stem below the felling cut, including the roots.

3.158 Supply Chain — The overall process of handling, transporting and processing raw materials from the point of collection to the point of delivery to the end-user.

3.159 Tertiary Biomass — Post consumer residues and wastes, such as fats, greases, oils, construction and demolition wood debris, other waste wood from urban environments, as well as packaging wastes, municipal solid wastes and landfill gases.

3.160 Test Sample — Laboratory sample after an appropriate preparation made by the laboratory.

3.161 Thermally Treated Biomass — Biomass whose chemical composition has been changed by heat (usually by temperatures of 200 °C to 300 °C and above).

3.162 Thinning Residues — Woody biomass residues originating from thinning operations.

3.163 Torrefied Biomass — Solid biofuel produced by torrefaction of biomass.

3.164 Total Carbon/Carbon Content — Content of carbon (C) within dry, moisture free fuel.

NOTES

1 Other element content (for example, hydrogen, oxygen, nitrogen, sulfur, chlorine) similarly defined.

2 For solid biofuels the amount of total oxygen is generally calculated as the remaining portion in the dry fuel from the sum of the total ash, the total carbon, the total hydrogen, the total nitrogen, the total sulphur and the total chlorine in the dry fuel.

3.165 Total Mass — Mass of all components of the solid fuel, including dry matter and moisture.

3.166 Total Moisture/Moisture Content — Total water in the fuel removable under specific conditions.

NOTE — Indicate reference (as received, as dried, as equilibrated) to avoid confusion.

3.167 Tree Section — Part of a tree (with branches) which has been cut into suitable length but not processed.

NOTE — Tree sections can be processed for example to pulpwood or forest fuel.

3.168 Ultimate Analysis/Elemental Analysis — Analysis of a fuel reported in terms of its total carbon, total hydrogen, total nitrogen, and total sulphur measured at specified conditions and total oxygen calculated by formula.

3.169 Used Wood — Wood substances or objects which have performed their intended purpose.

NOTE — *See* also recovered construction wood and demolition wood.

3.170 Volatile Matter — Material, which is released when a fuel is heated in the absence of oxygen under specific conditions and corrected for moisture of the material.

3.171 Whole Tree — Felled, undelimbed tree, excluding root system.

3.172 Whole Tree Chips — Wood chips made from whole trees.

3.173 Wood Briquette — Biofuel briquette made from woody biomass.

3.174 Wood Chips — Chipped woody biomass with a sub-rectangular shape and a typical length 5 mm to 50 mm typically in the form of pieces with a defined particle size produced by mechanical treatment with sharp tools such as knives.

3.175 Wood Fuels/Wood Based Fuels Wood Derives Biofuels — Solid wood-based fuel.

3.176 Wood Pellet — Biofuel pellet made from woody biomass.

3.177 Wood Processing Industry By-products Wood Processing Industry Residues — Woody biomass by-products (or residues) obtained from wood processing and from the pulp and paper industry.

3.178 Wood Shavings — Small slices or slivers from woody biomass created when shaping wood.

3.179 Woody Biomass — Biomass originating from trees, bushes and shrubs together with their fruit, leaves and needles inherent to the biomass **.**

NOTE — This definition includes forest, plantation and other virgin wood, wood processing industry by- products and residues, and used wood.

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Solid Mineral Fuels and Solid Biofuels Sectional Committee, PCD 07

Organization	*Representative(s)*
CSIR - Central Institute for Mining and Fuel Research, Dhanbad	PROF ARVIND KUMAR MISHRA **(*Chairperson*)**
Bharat Coking Coal Limited, Dhanbad	SHRI SAMIR KUMAR KUNDU SHRI G. VENUGOPAL (*Alternate*)
Bharat Heavy Electricals Limited, Tiruchirappalli	DR SIVAJI SEEPANA SHRI MANDA TEJA TARAKESH (*Alternate* I) SHRI AMAN SERAPHIM SURIN (*Alternate* II)
Cement Manufacturers Association, New Delhi	SHRI RAJU GOYAL SHRI VIPUL SINGH (*Alternate*)
Central Electricity Authority, New Delhi	SHRI S. K. THAKUR SHRI L. D. PAPNEY (*Alternate*)
Central Mine Planning and Design Institute Limited, Ranchi	SHRI N. RAMAKRISHNA MS ZEBA IMAM (*Alternate*)
Central Pollution Control Board, New Delhi	SHRI NAZIMUDDIN
Central Revenue Control Laboratory, New Delhi	SHRI V. SURESH DR MAHESH KUMAR (*Alternate*)
Coal Controller Organization, Kolkata	SHRI ANJANI KUMAR
Coal India Limited, Kolkata	SHRI SUBHASIS SAHU
CSIR - Central Institute for Mining and Fuel Research, Dhanbad	DR ASHOK KUMAR SINGH DR SUJAN SAHA (*Alternate*)
CSIR - Institute of Minerals and Materials Technology, Bhubaneswar	DR SUDDHASATWA BASU DR D. S. RAO (*Alternate* I) DR MANISH KUMAR (*Alternate* II)
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