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Solid biofuels — Terminology, definitions and descriptions (ISO 16559:2014)

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National foreword

This British Standard is the UK implementation of EN ISO 16559:2014. It supersedes BS EN 14588:2010 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PTI/17, Solid biofuels.

A list of organizations represented on this committee can be obtained on request to its secretary.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN ISO 16559:2014) has been prepared by Technical Committee ISO/TC 238 "Solid biofuels" in collaboration with Technical Committee CEN/TC 335 “Solid biofuels” the secretariat of which is held by SIS.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by January 2015, and conflicting national standards shall be withdrawn at the latest by January 2015.

This document supersedes EN 14588:2010.

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Endorsement notice

The text of ISO 16559:2014 has been approved by CEN as EN ISO 16559:2014 without any modification.

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2. www.iso.org/directives

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 238, *Solid biofuels*.

Introduction

This International Standard has been written in accordance with ISO 10241. This International Standard is based on European standard EN 14588:2010[6] as well as on approved national standards and manuals. Some of the terms included in this International Standard are only used in particular countries.

In this International Standard instead of the legal definition *waste* the technical terms *residue*, and *by-product* are used to describe co-products from forestry and arboriculture, agriculture and horticulture, and aquaculture as well as related industries. The terms and definitions are harmonized as far as possible with the current language used in management as well as in regulatory activities.

Solid biofuels — Terminology, definitions and descriptions

1 Scope

This international standard determines the terminology and definitions for solid biofuels. According to the scope of the ISO/TC 238 this standard only includes raw and processed material originating from

— forestry and arboriculture,

— agriculture and horticulture,

— aquaculture

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

NOTE 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 typical values of the country of origin.

Materials originating from different recycling processes of end-of-life-products are not within the scope but relevant terms are included for information. Areas covered by ISO/TC28/SC7 “Liquid biofuels” and ISO/TC193 “Natural gas” are excluded.

Other standards with a different scope than this International Standard may have different definitions than this standard.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Not applicable.

3 Principle

This International Standard only contains terms used to describe solid biofuels within the scope of ISO/TC 238, see Figure 1.

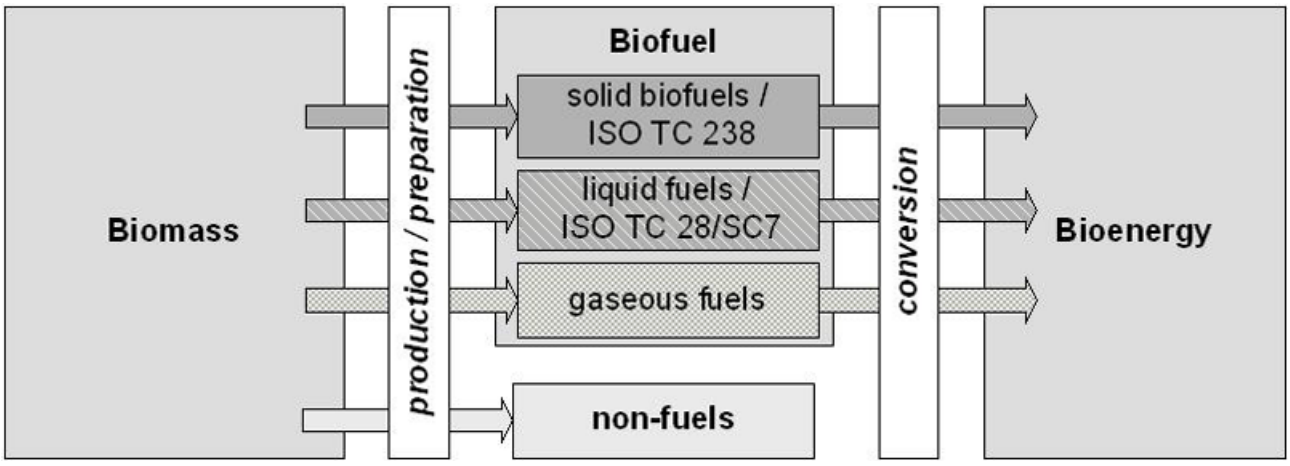

Figure 1 — ISO/TC 238 within the biomass-biofuel-bioenergy field

Solid biofuels are produced from different sources, which are defined within the scope of ISO/TC 238 "Solid Biofuels". Terms and definitions are categorised in a logical structure based on the fact that solid biofuels are produced from different sources and that solid biofuels are used to produce bioenergy:

— origin and source of solid biofuels in the overall supply chain,

— the different traded forms as well as the different forms of biofuels produced within the preparation processes,

— the most relevant solid biofuel properties and terms of sampling and testing as well as classification and specification

— the description of the solid biofuels itself as well as their handling and processing given in the same structure as the biomass sources

— bioenergy as the result of solid biofuel conversion

Appropriate terms for sampling and testing as well as classification and specification of properties have to be defined and described together with the category *source/origin, type and properties of solid biofuels.* The necessarity of terms defined in this International Technical Standard is in many cases based on the classification system of solid biofuels given in ISO 17225-1, in which the classification of solid biofuels is specified in more detail.

4 Terms and definitions

4.1
absorption
phenomenon whereby atoms, ions, or molecules from a gas, liquid, or dissolved solid permeates or is dissolved by a liquid or solid (the absorbent)

Note 1 to entry: Adsorption is a surface-based process while absorption involves the whole *volume* of the material.

[SOURCE: ISO 18757:2003]

4.2
adsorption
phenomenon whereby atoms, ions, or molecules from a gas, liquid, or dissolved solid adheres to a surface whereby the process creates a film of the adsorbate on the surface of the adsorbent

[SOURCE: ISO 18757:2003]

4.3
additive
material which has been intentionally introduced into the *fuel feedstock* to improve *quality* of *fuel* (e.g. combustion properties), to reduce emissions or to make production more efficient

Note 1 to entry: Trace amounts of e.g. grease or other lubricants that are introduced into the *fuel* processing stream as part of normal mill operations are not considered as *additives*.

[SOURCE: ISO 17225-2:2014]

4.4
agrofuels
biofuels obtained from *energy crops* and/or agricultural by-products (agricultural residues)

[SOURCE: FAO unified *bioenergy* terminology (UBET)]

4.5
air dried
condition in which the *solid biofuel* has dried in air to equilibrium *moisture content*

[SOURCE: ISO 1213-2:1992]

4.6
angle of repose
critical angle of repose
steepest angle of descent measured in degrees of the slope of material relative to the horizontal plane when granular material on the slope face is on the verge of sliding

Note 1 to entry: The slope may be the convex perimeter of a conical pile on a flat surface.

[SOURCE: ISO 4324:1977]

4.7
angle of drain
steepest angle of descent measured in degrees of the slope of material relative to the horizontal plane when granular material on the slope face is on the verge of sliding

Note 1 to entry: When *biomass* is held in a silo or hopper and drained through a gate at the bottom the material is usually forming a cone within which the material, especially material with high *particle* aspect ratio such as pellets, partially becomes interlocked before released by the forces of gravity.

Note 2 to entry: The angle of drain is normally a few degrees higher than the angle of repose.

4.8
animal biomass
biomass obtained from livestock

4.9
animal by-products
animal residues
agricultural by-products (or agricultural residues) obtained from livestock operations

Note 1 to entry: It includes among others solid excreta of animals.

[SOURCE: EN 14588:2010]

4.10
aquatic biomass
biomass from so called hydrophytic plants or hydrophytes, which are plants that have adapted to living in or on aquatic environments

[SOURCE: ISO 17225-1:2014]

4.11
as analysed
determined basis
condition in which the *moisture content* of the *solid biofuel* is the content of the material at the moment of analysis/determination

[SOURCE: ISO 1213-2:1992]

4.12
as received
as delivered
ar
calculation basis for a material in the delivery state

Note 1 to entry: The abbreviation of as received is ar.

[SOURCE: ISO 15357:2011]

4.13
ash
ash content
total ash
A
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 *fue*l

Note 1 to entry: See also *ash fusibility, natural ash, extraneous ash*.

Note 2 to entry: Depending on the combustion efficiency the ash may contain combustibles.

Note 3 to entry: If a complete combustion is realized ash contains only inorganic, non-combustible components.

[SOURCE: ISO 1213-2:1992]

4.14
ash deformation temperature
DT
temperature at which first signs of rounding due to melting of the edges of the *ash* test piece occur

[SOURCE: EN 14588:2010]

4.15
ash flow temperature
FT
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*

[SOURCE: EN 14588:2010]

4.16
ash fusibility
ash melting behaviour
characteristic physical state of the *ash* obtained by heating under specific conditions

Note 1 to entry: *Ash fusibility* is determined under either oxidising or reducing conditions.

Note 2 to entry: See also *ash deformation temperature, ash flow temperature, ash hemisphere temperature* and *ash shrinkage starting temperature.*

[SOURCE: EN 14588:2010]

4.17
ash hemisphere temperature
HT
temperature at which the height of a test piece, prepared from *ash* by a specific procedure, is equal to half the width of the base, and its shape becomes approximately hemispherical

[SOURCE: EN 14588:2010]

4.18
ash shrinkage starting temperature
SST
temperature at which shrinking of the test piece occurs

Note 1 to entry: This temperature is defined as when the area of the test piece falls below 95 % of the original test piece area at 550°C.

4.19
bag weight
weight of the *fuel* plus the bag

4.20
baled biofuel
bale
solid biofuel which has been compressed and bound to keep its shape and *density*

EXAMPLE Straw bales, bales of *energy grass*, bales of treetops and branches.

[SOURCE: EN 14588:2010]

4.21
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

[SOURCE: EN 14588:2010]

4.22
basic density
ratio of the mass on *dry basis* and the *solid volume* on green basis

[SOURCE: EN 14588:2010]

4.23
biobased
derived from *biomass*

[SOURCE: EN 16575:2013]

4.24
biobased content
fraction of a fuel that is derived from biomass

Note 1 to entry: Normally expressed as a percentage of the total mass of the product.

[SOURCE: EN 16575:2013]

4.25
biobased product
biobased industrial product
bioproduct
product wholly or partly derived from biomass

Note 1 to entry: The *biobased product* is normally characterized by the biobased carbon content or the *biobased* content.

[SOURCE: EN 16575:2013]

4.26
bioenergy
energy derived from biomass

Note 1 to entry: *Biomass may either be directly converted into energy or processed into solids, liquids or gases.*

[SOURCE: EN 14588:2010]

4.27
biofuel
solid, liquid or gaseous *fuel* produced directly or indirectly from *biomass*

[SOURCE: EN 14588:2010]

4.28
biofuel blend
biofuel resulting from intentionally mixing of different *biofuels*

EXAMPLE Straw or *energy grass* with wood, dried *biosludge* with *bark.*

[SOURCE: EN 14588:2010]

4.29
biofuel briquette
densified biofuel made with or without *additives* in the form of cubiform, polyhedral, polyhydric or cylindrical units with a diameter of more than 25 mm, produced by compressing *biomass*

Note 1 to entry: Usually the *biomass* has been milled before densification.

Note 2 to entry: See also *non-woody briquette* and *wood briquette.*

[SOURCE: ISO 17225-3:2014]

4.30
biofuel mixture
biofuel resulting from natural or unintentional mixing of different *biofuels* and/or different types of *biomass*

[SOURCE: EN 14588:2010]

4.31
biofuel pellet
biofuel made with or without *additives* in the form of cubiform, polyhedral, polyhydric or cylindrical units with a diameter up to 25 mm, produced by compressing *biomass*NOTE 1 to entry: Usually the biomass has been milled before densification.

Note 1 to entry: See also *non-woody pellet* and *wood pellet.*

[SOURCE: EN 14588:2010]

4.32
biomass
material of biological origin excluding material embedded in geological formations and/or fossilized

Note 1 to entry: Biomass is organic material that is plant or animal based, including but not limited to dedicated 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.

Note 2 to entry: See also *herbaceous biomass, fruit biomass*, and *woody biomass.*

[SOURCE: EN 14588:2010]

4.33
biomass by-product
a secondary product which is made incidentially during the production of something else

EXAMPLE Sawdust when sawing timber.

4.34
biomass residue
biomass from well-defined side-streams from forestry, agricultural, aqua cultural and related industrial operations

EXAMPLE Olive cake after pressing of oil, logging residues.

[SOURCE: EN 14588:2010]

4.35
biomass resource owner
body or enterprise with the right to exploit the *biomass* resources for energy purposes

Note 1 to entry: The *biomass* resource owner can be a land or forest owner, a company etc.

[SOURCE: EN 14588:2010]

4.36
biomethane
methane produced from *biomass* (e.g. *solid biofuels*)

Note 1 to entry: Biomethane is not a *solid biofuel*. The term is included for information only.

4.37
biosludge
sludge formed in the aeration basin during biological waste water treatment or biological treatment process and separated by sedimentation or flotation

Note 1 to entry: Biosludge has to be treated to transfer into solid biomass.

[SOURCE: EN 14588:2010]

4.38
black liquor
liquor obtained from wood during the process of pulp production, in which the energy content is mainly originating from the content of lignin removed from the wood in the pulping process

Note 1 to entry: Black liquor contains also pulping chemicals.

Note 2 to entry: Black liquor is not a *solid biofuel*. The term is included for information only.

[SOURCE: EN 14588:2010]

4.39
bridging
arching
hindering flow that occurs when *particles* form stable arch across an opening

[SOURCE: Woodcock and Mason. Bulk Solids Handling]

4.40
bulk density
ρ
mass of a portion (i.e. 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

[SOURCE: ISO 1213-2:1992]

4.41
bulk volume
loose volume
volume of a material including space between the *particle*s

[SOURCE: EN 14588:2010]

4.42
bundled biofuel
bundle
solid biofuels which has been bound together and where there is a lengthwise orientation of the material

EXAMPLE Bundles of *energy forest trees* and *logging residues*, small trees, or branches and tops.

[SOURCE: EN 14588:2010]

4.43
calorific value
heating value
q
energy amount per unit mass or *volume* released on complete combustion

Note 1 to entry: See also *gross calorific value, energy density, net calorific value.*

[SOURCE: EN 14588:2010]

4.44
cereal crops
annual crops grown with the main purpose of using the seed for food production

Note 1 to entry: Some cereal crops can be used as a *solid biofuel*.

EXAMPLE Barley, wheat, rye, oat.

[SOURCE: EN 14588:2010]

4.45
certified reference material
CRM
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

[SOURCE: ISO 16967]

4.46
char
solid partially or non-agglomerated carbonaceous material produced from thermo-chemical *conversion* of *solid fuels*

[SOURCE: ISO 1213-2:1992]

4.47
charcoal
biochar
biocarbon
biocoke
biocoal
solid biofuel derived from carbonization distillation and *pyrolysis* of *biomass*

[SOURCE: ANSI/ASABE S593]

4.48
chemical treatment
any treatment with chemicals other than air, water or heat

[SOURCE: ISO 17225-7:2014]

4.49
chopped straw
straw which has been cut into small pieces

[SOURCE: EN 14588:2010]

4.50
chunkwood
wood cut with sharp cutting devices where most of the material have typical *particle* lengths of 50 to 150 mm, which are substantially longer and coarser than *wood chips*

[SOURCE: EN 14588:2010]

4.51
coke
the solid *residue* of impure carbon obtained from carbon rich *feedstock* after removal of volatile material by destructive distillation

[SOURCE: ANSI/ASABE S593-2006]

4.52
combined sample
sample consisting of all the *increments* taken from a *lot* or a *sub-lot*

Note 1 to entry: The *increments* may be reduced by division before being added to the combined *sample*.

[SOURCE: EN 14780:2011]

4.53
complete tree
tree, including limbs and root system

Note 1 to entry: See also *whole tree.*

[SOURCE: EN 14588:2010]

4.54
condensable gas
gas which is going through transition from gaseous to liquid or solid state at a certain temperature

Note 1 to entry: The process is reversible but not necessarily at the same temperature.

4.55
contamination
exposure to impurity such as poisonous or polluting substance to a *fuel*

[SOURCE: EN 14588:2010]

4.56
coproduct
any of two or more products coming from the same unit process or product system

[SOURCE: ISO 14040:2006]

4.57
critical control point
quality control point
CCP
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

[SOURCE: EN 14588:2010]

4.58
cross-cut ends
short pieces of *woody biomass* which occur when the ends of logs or sawn timber are cross cut off, with or without *bark*

[SOURCE: EN 14588:2010]

4.59
customer
organization or person that receives a product

[SOURCE: ISO 9000:2005]

4.60
cutter chips
wood chips made as a *by-product* of the wood processing industry, with or without *bark*

[SOURCE: EN 14588:2010]

4.61
deflagration
violent event describing subsonic combustion propagating by means of hot burning material (usually dust) heating the next layer of cold material and igniting it in consecutive sequence

Note 1 to entry: The process can be characterized as an exploding fire whereby the burning material partly deposits on surfaces in its path and causing significant damage and injuries.

[SOURCE: EN 13857-1:2003]

4.62
deflagration index
measure in bar meter per second and a product of the pressure rate and propagation of an explosion as established by testing standards

4.63
delivery agreement
contract for *fuel* trade, which specifies e.g. origin and source, *quality* and quantity of the *fuel*, as well as delivery terms

[SOURCE: EN 14588:2010]

4.64
delivery lot
solid biofuel batch on which the essential *quality* requirements for *solid biofuel* are focused

Note 1 to entry: The *delivery lot* can be an individual *delivery lot*, which is an agreed quantity of *solid biofuel* (e.g. 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).

Note 2 to entry: In continuous delivery, the *delivery lot* is the amount of *solid biofuel* delivered during a specified period of time, e.g. 24 h, unless otherwise agreed by *supplier* and *end-user*. If the *delivery lot* in continuous delivery is more than 1,500 to 2,000 m^3 in 24 h, it is recommended that it should be divided into two or more individual *lots*.

[SOURCE: EN 14588:2010]

4.65
demolition wood
used wood arising from demolition of buildings or civil engineering installations

[SOURCE: EN 13965-1:2004]

4.66
densified biofuel
compressed biofuel
solid biofuel made by mechanically compressing *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*

Note 1 to entry: See also *biofuel briquette* and *biofuel pellet.*

[SOURCE: EN 14588:2010]

4.67
density
ratio of mass to volume or ratio of energy content to volume

Note 1 to entry: It must always be stated whether the *density* refers to the *density* of individual *particle*s or to the *bulk density* of the material and whether the mass of water in the material is included.

Note 2 to entry: See also *bulk density, solid density*, *particle density and energy density*

[SOURCE: EN 14588:2010]

4.68
desorption
phenomenon whereby a substance is released from or through a surface

Note 1 to entry: The process is the opposite of sorption.

4.69
detonation
violent event generated by sudden expansion of gas in to a supersonic shock wave (molecular speed higher than the speed of sound) not followed by fire

[SOURCE: EN 13857-1:2003]

4.70
devolatilization
process (usually pyrolysis or gasification) whereby *volatile matter* is removed from carbon rich *feedstock* (e.g. *biomass*)

[SOURCE: ANSI/ASABE S593]

4.71
dry ash free
dry ash free basis
daf
calculation basis in which the *solid biofuel* is considered free from *moisture* and *inorganic matter*

Note 1 to entry: The abbreviation of dry ash free is daf.

[SOURCE: EN 14588:2010]

4.72
dry
dry basis
d
calculation basis in which the *solid biofuel* is considered free from *moisture*

Note 1 to entry: See oven dry.

Note 2 to entry: The abbreviation of *dry basis* is d.

[SOURCE: EN 14588:2010]

4.73
dry matter
material remaining after removal of *moisture* under specific conditions

[SOURCE: EN 14588:2010]

4.74
dry matter content
portion of *dry matter* in the total material on mass basis

Note 1 to entry: Expressed as a percentage of the *total mass* of the *solid biofuel.*

[SOURCE: EN 14588:2010]

4.75
dust
fragmented material of small size caused by a non-voluntary process as opposed to powder which is normally manufactured to size

Note 1 to entry: There is no official definition of what constitutes dust in terms of physical size.

4.76
edgings
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*

[SOURCE: EN 14588:2010]

4.77
end-user
consumer (private person, enterprise, utility etc.) using *fuel* for energy purposes

[SOURCE: EN 14588:2010]

4.78
energy crops
woody or herbaceous crops grown and harvested specifically for their *fuel* value

Note 1 to entry: See also *energy forest trees, energy grass.*

[SOURCE: EN 14588:2010]

4.79
energy density
E
ratio of net energy content and *bulk volume*

Note 1 to entry: The *energy density* is calculated using the *net calorific value* determined and the *bulk density*.

[SOURCE: EN 14588:2010]

4.80
energy forest trees
woody biomass grown specifically for its *fuel* value in medium to long rotation forestry

[SOURCE: EN 14588:2010]

4.81
energy grain
grain used for energy purpose

[SOURCE: EN 14588:2010]

4.82
energy grass
herbaceous *energy crop*

EXAMPLE Sugar cane, Miscanthus, Reed canary grass.

[SOURCE: EN 14588:2010]

4.83
explosibility
propensity by gaseous, liquid or solid material to ignite and violently transform to high pressure gas while emitting sound and light and normally followed by fire

4.84
explosion (primary and secondary)
violent event emitting sound and light immediately followed by fire

Note 1 to entry: An initial explosion followed by fire may dislodge dust deposited on beams, floor, machinery etc. and ignite this material resulting in a secondary explosion, usually a few seconds after the first explosion.

Note 2 to entry: Thermal energy is transferred from the first to the second explosion through deflagration.

[SOURCE: EN 16256-1:2012]

4.85
extraneous ash
ash from contaminants entering the material at harvest, logging, treatment, transport, storage etc

[SOURCE: EN 14588:2010]

4.86
extraneous substances
foreign materials entering the *biomass* or *solid biofuel* during any stages of the overall *supply chain*

EXAMPLE *Particles* not belonging to the particular *biomass* such as stone, glass or corn in wood pellets.

4.87
feedstock
material that is further processed for *conversion* to bioenergy, *biofuel* and/or *biobased products*

4.88
fibre saturation point
FSP
the *moisture content* at which only the cell walls are completely saturated (all bound water) but no free water exists in the cell lumens – typically about 30 % *total moisture (on wet basis)*

Note 1 to entry: Below the fibre saturation point the physical and mechanical properties of wood begin to change as a function of *moisture content.*

4.89
fibre sludge
sludge formed in the sedimentation basin as a part of the waste water treatment process in a pulp and paper mill and separated by sedimentation or flotation

Note 1 to entry: The main component is pieces of wood fibres. The sludge can be dewatered and further processed into a *solid biofuel*.

[SOURCE: EN 14588:2010]

4.90
fines
F
Small sized *particles* in *fuel* below a certain pre-defined size, usually less than 3.15 mm

Note 1 to entry: The amount of fines can be different after completion of production, bagging, transportation, unloading, distribution etc.

4.91
firewood
cut, and split *fuelwood* usually with a length of 20 to 100 cm used in household appliances like stoves, fireplaces and central heating devices

[SOURCE: EN 14588:2010]

4.92
fixed carbon
remaining carbon after removal of water, *ash* an *volatile matter*

[SOURCE: ISO 1213-2:1992]

4.93
flash point
propensity by vapour of a material to ignite under atmospheric conditions in the presence of a thermal source at a temperature and as determined by testing method

Note 1 to entry: A lower flash point temperature indicates higher flammability.

4.94
flammability
propensity by gaseous, liquid or solid material to catch fire upon exposure to ignitable external source

Note 1 to entry: For solids like dust from *biomass* the flammability is determined by testing method establishing the speed of burning in mm per time unit.

4.95
flowability
ability of a solid to flow

Note 1 to entry: See also *bridging* or *arching.*

[SOURCE: EN 14588:2010]

4.96
foreign material
impurity
material other than claimed, which has entered the *fuel*

Note 1 to entry: Examples of impurities for *biofuels* are stones, soil, pieces of metal, plastics, rope, ice and snow.

[SOURCE: EN 14588:2010]

4.97
forest chips
forest wood in the form of *wood chips*

[SOURCE: EN 14588:2010]

4.98
forest fuels
fuelwood
forest fuel is produced directly from forest wood or plantation wood by a mechanical process, the raw material has not previously had another use

[SOURCE: EN 14588:2010]

4.99
forest wood
plantation and other virgin wood
wood from forest, plantation and other virgin wood including segregated wood from gardens, parks, roadside maintenance, vineyards, fruit orchards and driftwood from freshwater

Note 1 to entry: See also *complete tree, energy forest trees, logging residues, stump, thinning residues, tree section*, *whole trees,* drift wood from fresh water.

[SOURCE: EN 14588:2010]

4.100
fruit biomass
part of a plant which holds seeds

EXAMPLE Nuts, olives, oil palm fruit.

[SOURCE: EN 14588:2010]

4.101
fuel
energy carrier intended for energy conversion

Note 1 to entry: Fuels are solid, liquid or gaseous.

[SOURCE: EN 14588:2010]

4.102
fuel classification
division of *fuels* into defined *fuel* classes

Note 1 to entry: The aim of classification can be to describe the *fuel* and/or to physically separate certain *particle* types.

[SOURCE: EN 14588:2010]

4.103
fuel dust
pulverised fuel with a typical *particle size* of 1 to 5 mm

EXAMPLE *Saw dust.*

[SOURCE: EN 14588:2010]

4.104
fuel powder
fuel flour
pulverised fuel with a typical *particle size* less than 1 mm

EXAMPLE Wood powder, wood flour, straw powder.

[SOURCE: EN 14588:2010]

4.105
fuel specification
description of *fuel* properties

[SOURCE: EN 14588:2010]

4.106
fuelwood
energy wood
wood fuel where the original composition of the wood is preserved, unaltered from original form

[SOURCE: EN 14588:2010]

4.107
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

[SOURCE: EN 14780:2011]

4.108
green biomass
material with a moisture content close to fresh after cutting but no further quality specified

4.109
fresh chips
green chips
Wood chips produced from recently harvested *woody biomass*

[SOURCE: EN 14588:2010]

4.110
grinding dust
dust-like wood *residue* formed in grinding timber and wood boards

[SOURCE: EN 14588:2010]

4.111
gross calorific value
$Q_{v,gr}$
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

Note 1 to entry: The result of combustion are assumed to consist of gaseous, oxygen, nitrogen, carbon dioxide and sulfur dioxide, of liquid water (in equilibrium with its vapor) saturated with carbon dioxide under conditions of the bomb reaction, and of solid *ash*, all at the reference temperature and at constant *volume*.

Note 2 to entry: Another term is *higher heating value*.

[SOURCE: EN 14918:2009]

4.112
gross density
ratio of the mass of a wooden body and its *volume*, including all cavities (pores and vessels), based on specific *total moisture*

Note 1 to entry: See also *particle density*

[SOURCE: EN 14588:2010]

4.113
heat rate
measure of the number of heating units required to generate output energy over a length of time expressed in MWh

Note 1 to entry: MWh is used to express thermal efficiency of thermal conversion facilities such as power plants.

[SOURCE: EN 14588:2010]

4.114
herbaceous biomass
biomass from plants that has a non-woody stem and which dies back at the end of the growing season

Note 1 to entry: See also *energy grass.*

[SOURCE: BioTech's Life Science Dictionary]

4.115
herbaceous fuels
all types of *biofuels* originating from *herbaceous biomass*

[SOURCE: EN 14588:2010]

4.116
higher heating value
see gross calorific value

4.117
hog fuel
shred
fuelwood that has pieces of varying size and shape, produced by crushing with blunt tools such as rollers, hammers, or flails

[SOURCE: EN 14588:2010]

4.118
hygroscopic
material with propensity to adsorb or absorb *moisture* from the air

4.119
hydrophilic
material with propensity to attract water

4.120
hydrophobic
material with propensity to repel water

4.121
hydrothermal carbonised biomass
solid biofuel produced by hydrothermal carbonisation of biomass

Note 1 to entry: Hydrothermal carbonisation is a thermo-chemical conversion process of biomass performed in pressurized hot (liquid) water, typically at temperatures between 160 °C to 250 °C and at pressures between 6 bar to 40 bar.

4.122
increment
portion of *fuel* extracted in a single operation of the *sampling* device

[SOURCE: EN 14780:2011]

4.123
inorganic matter
non-combustible fraction of a fuel

[SOURCE: EN 14588:2010]

4.124
laboratory sample
combined *sample* or a sub-*sample* of a combined *sample* for use in a laboratory

[SOURCE: EN 14588:2010]

4.125
lignocellulose
plant cell wall *biomass* composed primarily of cellulose, hemicelluloses and lignin

[SOURCE: ANSI/ASABE S593]

4.126
log wood
cut *fuelwood* in which most of the material has a length of 500 mm and above

[SOURCE: EN 14588:2010]

4.127
logging residues
woody biomass residues created during wood harvesting

Note 1 to entry: *Logging residue*s include branches and tree tops that can be salvaged when fresh or after seasoning.

[SOURCE: EN 14588:2010]

4.128
lot
defined quantity of *fuel* for which the *quality* is to be determined

Note 1 to entry: See also *sub-lot.*

[SOURCE: EN 14780:2011]

4.129
major elements
the elements in the *fuel* that predominantly will constitute the *ash*; including aluminium (Al), calcium (Ca), iron (Fe), magnesium (Mg), phosphorus (P), potassium (K), silicon (Si), sodium (Na) and titanium (Ti)

[SOURCE: EN 14588:2010]

4.130
mass-reduction
reduction of the mass of a *sample* or *sub-sample*

[SOURCE: EN 14778:2011]

4.131
mechanical durability
DU
ability of *densified fuel* units (e.g. briquettes, pellets) to remain intact during handling and transportation

[SOURCE: EN 14588:2010]

4.132
minor elements
elements in the *fuel* that are at small concentrations

Note 1 to entry: The term trace elements is often used synonymous to *minor elements*; if the elements are metal, the term trace metals also is used.

Note 2 to entry: 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).

[SOURCE: EN 14588:2010]

4.133
moisture analysis sample
sample taken specifically for the purpose of determining *total moisture*

[SOURCE: EN 14780:2011]

4.134
municipal solid waste
MSW
waste stream consisting of end-of-life-materials

Note 1 to entry: Municipal solid waste can contain *biomass* fractions as well as non-*biomass* fractions.

Note 2 to entry: Only separated and not contaminated *biomass* fractions could be *solid biofuels,* see also *solid recovered fuels.*

Note 3 to entry: The term is included for information only.

[SOURCE: EN 14588:2010]

4.135
natural ash
ash of uncontaminated *solid biofuel*

[SOURCE: EN 14588:2010]

4.136
net calorific value
lower heating value
$q_{p,\,net}$
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

Note 1 to entry: The net calorific value is calculated from the *gross calorific value* at either constant pressure or at constant volume. The net calorific value at constant pressure is however the one generally used.

[SOURCE: EN 14918:2009]

4.137
nominal top size
aperture size of the sieve through which at least 95 % by mass of the material passes during the determination of *particle size distribution* of solid *fuels*

[SOURCE: EN 14780:2011]

4.138
non-woody biomass
biofuel made from herbaceous, fruits or aquatic biomass as well from blended or mixture

Note 1 to entry: Stem of fruit trees and *energy crops* like poplar and willow are included in *woody biomass*.

4.139
non-woody briquette
densified biofuel made with or without additives in form of cubiform, prismatic or cylindrical unit with diameter of more than 25 mm produced by compressing milled biomass

Note 1 to entry: The raw material for non-woody briquettes can be herbaceous, fruit or aquatic biomass or biomass blends and mixtures.

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

[SOURCE: ISO 14588:2010]

4.140
non-woody pellet
biofuel made from herbaceous, fruits or aquatic biomass as well from blends and mixtures with or without additives in the form of cubiform, polyhedral, polyhydric or cylindrical units, random length and typically 3,15 mm to 40 mm, a diameter up to 25 mm and with broken ends

Note 1 to entry: The raw material for non-woody pellets is herbaceous, fruits or aquatic biomass in accordance with Table 1 of ISO 17225-1. Pellets are usually manufactured in a die, with a total moisture content usually less than 15 % of their mass on wet basis.

[SOURCE: EN 14588:2010]

4.141
off-gassing
spontaneous emission of condensable (e.g. terpenes) and non-condensable gases (e.g. carbon-monoxide, carbon-dioxide, methane) from *biomass*

4.142
operator
body or enterprise, which is responsible for one or several activities in the *fuel supply chain*

Note 1 to entry: The *operator* can be, for example, a *biofuel producer* or a subcontractor to the *biofuel supplier*.

Note 2 to entry: The first *operator* is a body or an enterprise which operates at the beginning of the *supply chain*.

[SOURCE: EN 14588:2010]

4.143
organic matter
combustible fraction of the fuel

[SOURCE: EN 14588:2010]

4.144
oscillating screen classifier
device containing one or multiple oscillating (flat) screens used to separate material into size classes for calculation of *particle size distribution*

[SOURCE: EN 14588:2010]

4.145
oven dry matter
biomass free of *moisture,* produced by drying to constant weight under specific conditions

[SOURCE: EN 14588:2010]

4.146
over size particles
*particle*s exceeding a specific particle size limit value or values

Note 1 to entry: Limit values may be given in three dimensions.

[SOURCE: EN 14588:2010]

4.147
particle
any discrete unit of matter

[SOURCE: EN 14588:2010]

4.148
particle density
DE
density of a single particle

Note 1 to entry: Pores within the *particle* are included.

[SOURCE: EN 14588:2010]

4.149
particle size
P
size of the *particle* as determined

Note 1 to entry: Different methods of determination may give different results.

Note 2 to entry: See also *particle size distribution* and *fines.*

[SOURCE: EN 14588:2010]

4.150
particle size distribution
proportions of various *particle sizes* in a solid *fuel*

[SOURCE: ISO 1213-2:1992]

4.151
particle size reduction
reduction of the nominal top size of a sample or sub-sample

[SOURCE: EN 15443:2011]

4.152
peat
sedentarily accumulated material consisting partly of dead organic material

Note 1 to entry: The term is included for information only.

[SOURCE: Parish, F., Sirin, A., Charman, D., Joosten, H., minayeva, T., Silvius, M. and Stringer, L. 2008 Assessment on Peatlands, Biodiversity and Climate Change: Main Report. Global Environment Centre, Kuala Lumpur and Wetlands International, Wageningen]

4.153
permeability in storage
bulk permeability
ability of gas such as air to pass through the void in *biomass* during storage

Note 1 to entry: Permeability is measured in pressure (Pa) vs. flow of gas ($m^3/s/m^2$) and depends for example on the viscosity and *density* of the gas (including *moisture content* and temperature), shape, and orientation of *particles* and the bulk porosity of *biomass.*

4.154
point of delivery
location specified in the delivery agreement, at which the proprietary rights of and responsibilities for a *fuel lot* are transferred from one organization or unit to another

[SOURCE: EN 14588:2010]

4.155
pressing aid
additive used for enhancing the production of *densified fuels*

[SOURCE: EN 14588:2010]

4.156
primary biomass
biomass produced directly by photosynthesis and harvested or collected from the field or forest where it is grown

Note 1 to entry: Examples are *energy grain*, perennial grasses and wood crops, crop *residue*s and *residue*s from logging.

[SOURCE: ANSI/ASABE S593]

4.157
producer
organization or unit responsible for the production of the *fuel*

Note 1 to entry: The *producer* can be responsible for any operation with the purpose of changing the *biofuel* properties.

Note 2 to entry: The *producer* can also be the *supplier* of the fuel.

[SOURCE: EN 14588:2010]

4.158
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

4.159
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

[SOURCE: ISO 1213-2:1992]

4.160
pulverised fuel
grinded fuel
solid *fuel* in the form of dust and powder, produced by milling or grinding

Note 1 to entry: See also *fuel dust* and *fuel powder.*

[SOURCE: EN 14588:2010]

4.161
quality
degree to which a set of inherent characteristics fulfils requirements

[SOURCE: ISO 9000:2005]

4.162
quality assurance
part of *quality* management, focused on providing confidence that the *quality* requirements will be fulfilled

[SOURCE: ISO 9000:2005]

4.163
quality control
part of *quality* management, focused on fulfilling *quality* requirements

[SOURCE: ISO 9000:2005]

4.164
recovered construction wood
used wood arising from construction of buildings or from civil engineering works

[SOURCE: EN 13965-1:2004]

4.165
reference material
RM
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

[SOURCE: EN 15297:2011]

4.166
repeatability
precision from independent test results when the same method was used in the same laboratory on representative portions taken from the same test sample material

[SOURCE: EN 14588:2010]

4.167
reproducibility
precision from test results when the same method was used by different laboratories by different *operators* using different equipment on representative portions taken from the same test sample material

[SOURCE: ISO 1213-2:1992]

4.168
retailer
supplier of fuels (usually packaged in small quantities) to end-user

Note 1 to entry: Retailers are usually *supplier*s to the private household consumers.

[SOURCE: EN 14588:2010]

4.169
rotary screen
device with cylindrical screens used to separate material into size classes for calculation of *particle size distribution*

[SOURCE: EN 14588:2010]

4.170
sample
quantity of material (all *increments*), representative of a larger quantity for which the *quality* is to be determined

Note 1 to entry: See also *combined sample, general analysis sample, increment, laboratory sample, moisture analysis sample, size analysis sample,* and *sub-sample.*

[SOURCE: EN 14780:2011]

4.171
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*

[SOURCE: EN 14780:2011]

4.172
sample preparation
actions taken to obtain representative *laboratory samples* or *test portions* from the original *sample*

[SOURCE: EN 14588:2010]

4.173
sampling
process of drawing or constituting a *sample*

[SOURCE: ISO 3534-1:2006]

4.174
sampling form
document that shall be used during *sampling* to record data about the way in which the *sampling* is actually being carried out

[SOURCE: EN 14588:2010]

4.175
sampling plan
predetermined procedure for the selection, withdrawal, preservation, transportation, and preparation of the portions to be removed from a population as a *sample*

[SOURCE: EN 14778:2011]

4.176
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

[SOURCE: EN 14778:2011]

4.177
sawdust
fine *particles* created when sawing wood, in which most of the material has a typical *particle* length of 1 mm to 5 mm

[SOURCE: EN 14588:2010]

4.178
secondary biomass
*residue*s 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

[SOURCE: ANSI/ASABE S593]

4.179
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 – 8 year cycle

4.180
short rotation forestry
production of trees (generally) on forest land, that rely on rapid growth of individuals harvested in short cycles (of 5-15 years)

4.181
shredded biofuel
solid *biofuel* which has been mechanical treated into smaller *particles* with blunt tools

EXAMPLE Chopped straw, shredded *bark, wood* and *hog fuel*.

[SOURCE: EN 14588:2010]

4.182
size analysis sample
sample taken specifically for the purpose of determining *particle size distribution*

[SOURCE: EN 14588:2010]

4.183
size-reduction
reduction of the nominal top size of a sample or sub-sample

[SOURCE: EN 14588:2010]

4.184
slab
parts of *woody biomass* created when cuts are made into the edges of logs and whereby one side shows the original rounded surface of the tree, either completely or partially, with or without *bark*

Note 1 to entry: Approximate length 200 cm to 800 cm.

[SOURCE: EN 14588:2010]

4.185
slag
biofuel derived *ash* that is or has been in a molten (or liquid) state

[SOURCE: ANSI/ASABE S593]

4.186
smallwood
fuelwood cut with sharp cutting devices and in which most of the material has a *particle* length typically 50 mm to 500 mm

EXAMPLE *Chunkwood, firewood.*

[SOURCE: EN 14588:2010]

4.187
solid biofuel
solid *fuels* produced directly or indirectly from *biomass*

[SOURCE: EN 14588:2010]

4.188
solid density
density of solid material excluding any interior pores

4.189
solid recovered fuel
solid *fuel* prepared from non-hazardous waste to be utilised for energy recovery in incineration or coincineration plants

Note 1 to entry: This term is for information only.

[SOURCE: EN 15359:2011]

4.190
solid volume
volume of the individual *particle* excluding the *volume* of the void between the *particles*

Note 1 to entry: Typically determined by a fluid displaced by a specific amount of material.

[SOURCE: EN 14588:2010]

4.191
soot
fine black *particle*s, chiefly composed of carbon, produced by incomplete combustion of carbon rich *feedstock*

[SOURCE: ANSI/ASABE S593]

4.192
sorption
phenomenon whereby a substance is absorbed or adsorbed through a surface or adsorbed on a surface

Note 1 to entry: Sorption also applies to desorption processes.

4.193
stacked volume
volume of stacked material including the space between the material pieces

[SOURCE: EN 14588:2010]

4.194
stem wood
roundwood
part of tree stem with the branches and top removed, with a length of more than 100 cm

[SOURCE: EN 14588:2010]

4.195
stem wood chips
wood chips made of *stem wood*, with or without *bark*

[SOURCE: EN 14588:2010]

4.196
stump
part of the tree stem below the felling cut

Note 1 to entry: In total-tree utilization the root system is included in the stump.

[SOURCE: EN 14588:2010]

4.197
sub-lot
portion of a *lot* for which a test result is required

[SOURCE: EN 14780:2011]

4.198
sub-sample
portion of a *sample*

[SOURCE: EN 14588:2010]

4.199
supplier
organization or person that provides a product

Note 1 to entry: One supplier may deliver to the *end-user* directly and take responsibility for *fuel* deliveries from several *producer*s as well as delivery to the end-user.

[SOURCE: ISO 9000:2005]

4.200
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*

[SOURCE: EN 14588:2010]

4.201
tertiary biomass
post consumer *residue*s 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

Note 1 to entry: The term is for information only.

[SOURCE: ANSI/ASABE S593]

4.202
test portion
sub-sample either of a laboratory sample or a test sample

[SOURCE: EN 14588:2010]

4.203
test sample
laboratory sample after an appropriate preparation made by the laboratory

[SOURCE: EN 14588:2010]

4.204
thermally treated biomass
biomass whose chemical composition has been changed by heat (usually by temperatures of 200 to 300°C and above)

EXAMPLE torrefied biomass, charcoal

Note 1 to entry: Drying is not considered thermal treatment in this definition.

4.205
thinning residues
woody biomass residues originating from thinning operations

[SOURCE: EN 14588:2010]

4.206
torrefied biomass
solid biofuel produced by torrefaction of *biomass*

Note 1 to entry: Torrefaction is a mild pyrolysis process performed at temperatures between 200 - 300°C in inert atmosphere. For example under those conditions, *biomass* is altered to an intermediate between wood and *charcoal*

Note 2 to entry: Torrefied biomass contains typically 60 – 70 % of the initial mass and 90 % of the initial net calorific value

4.207
total carbon
carbon content
content of carbon (C) within *moisture* free *fuel (dry)*

[SOURCE: ISO 1213-2:1992]

4.208
total chlorine
chlorine content
content of chlorine (Cl) within *moisture* free *fuel (dry)*

[SOURCE: EN 14588:2010]

4.209
total hydrogen
hydrogen content
content of hydrogen (H) within *moisture* free *fuel (dry)*

[SOURCE: ISO 1213-2:1992]

4.210
total mass
mass of all components of the solid *fuel*, including *dry matter* and *moisture*

[SOURCE: EN 14588:2010]

4.211
moisture
moisture content
total moisture
M, U
water in the *fuel* removable under specific conditions

Note 1 to entry: Indicate reference (*total mass / wet basis or dry matter / dry basis*) to avoid confusion.

[SOURCE: ISO 18134]

4.212
total nitrogen
nitrogen content
content of nitrogen (N) within *moisture* free *fuel (dry)*

[SOURCE: ISO 1213-2:1992]

4.213
total oxygen
oxygen content
content of oxygen (O) within *moisture* free *fuel (dry)*

Note 1 to entry: 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 sulfur and* the *total chlorine* in the dry *fuel*.

[SOURCE: EN 14588:2010]

4.214
total sulphur
sulphur content
content of sulphur (S) within *moisture* free *fuel (dry)*

[SOURCE: ISO 1213-2:1992]

4.215
tree section
part of a tree (with branches) which has been cut into suitable length but not processed

Note 1 to entry: *Tree section*s can be processed for example to pulpwood or forest *fuel*.

[SOURCE: EN 14588:2010]

4.216
ultimate analysis
elementary 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

[SOURCE: ISO 1213-2:1992]

4.217
used wood
wood substances or objects which have performed their intended purpose

Note 1 to entry: See also *recovered construction wood* and *demolition wood.*

[SOURCE: EN 14588:2010]

4.218
volatile matter
VM
mass loss, corrected for *moisture*, when a *fuel* is heated in the absence of air under specific conditions

[SOURCE: ISO 1213-2:1992]

4.219
volume
amount of space that is enclosed within an object

Note 1 to entry: It must always be stated whether the *volume* refers to the *solid volume* of individual *particle*s, the *bulk volume,* or the *stacked volume* of the material and whether the mass of *moisture* in the material is included.

Note 2 to entry: See also *bulk volume, solid volume,* and *stacked volume.*

[SOURCE: EN 14588:2010]

4.220
water soluble content
amount of an element which can be extracted with water using a specified extraction procedure

[SOURCE: EN 14588:2010]

4.221
wet basis
condition in which the *solid fuel* contains *moisture*

[SOURCE: EN 14588:2010]

4.222
wettability
ability of a liquid to maintain contact with a solid surface, resulting from intermolecular interactions when the two are brought together

Note 1 to entry: The degree of wetting (wettability) is determined by a force balance between adhesive and cohesive forces.

4.223
whole tree
felled, undelimbed tree, excluding root system

[SOURCE: EN 14588:2010]

4.224
whole-tree chips
wood chips made from whole trees

EXAMPLE *Wood chips* containing stems with *bark*, branches, needles/leaves.

[SOURCE: EN 14588:2010]

4.225
wood briquette
biofuel made with or without *additives* in the form of cubiform or cylindrical units and a diameter of over 25 mm produced by compressing pulverised woody biomass

Note 1 to entry: The raw material for wood briquettes is *woody biomass* in accordance with Table 1 of ISO 17225-1[16].

Note 2 to entry: *Biofuel* briquettes are usually manufactured in a piston press, with the total *moisture content* usually being less than 15 % of the mass.

[SOURCE: ISO 14588:2010]

4.226
wood chips
chipped *woody biomass* in the form of pieces with a defined *particle size* produced by mechanical treatment with sharp tools such as knives

Note 1 to entry: Wood chips have a subrectangular shape with a typical length 5 to 50 mm and a low thickness compared to other dimensions.

Note 2 to entry: See also *cutter chips, forest chips, green chips, stem wood chips*, and *whole-tree chips.*

[SOURCE: ISO 14588:2010]

4.227
wood fuels
wood based fuels
wood-derived biofuels
all types of *biofuels* originating from *woody biomass*

[SOURCE: FAO unified *bioenergy* terminology (UBET)]

4.228
wood pellet
biofuel made from woody biomass with or without *additives* in the form of cubiform, polyhedral, polyhydric or cylindrical units, random length and typically 3.15 mm to 40 mm, a diameter up to 25 mm and with broken ends

Note 1 to entry: The raw material for wood pellets is *woody biomass* in accordance with Table 1 of ISO 17225-1. Pellets are usually manufactured in a die, with total *moisture content* usually less than 10 % of their mass wet basis.

Note 2 to entry: The woody biomass used as feedstock for pellet making is milled to size in accordance with customer specification. Determination of the particle size distribution of the constituent of pellets is done by ISO 17830.

[SOURCE: ISO 14588:2010]

4.229
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

Note 1 to entry: See also *bark,* cork *residues,* cross-cut ends, edgings, fibre sludge, grinding dust, *saw dust, slabs,* and *wood shavings.*

[SOURCE: EN 14588:2010]

4.230
wood shavings
cutter shavings
shavings from *woody biomass* created when planing wood

[SOURCE: EN 14588:2010]

4.231
woody biomass
biomass originating from trees, bushes and shrubs

Note 1 to entry: This definition includes forest, plantation and other virgin wood, wood processing industry by-products and residues, and used wood.

[SOURCE: EN 14588:2010]

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