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Solid recovered fuels — Vocabulary

Combustibles solides de récupération — Vocabulaire

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Foreword

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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 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 300, *Solid recovered fuels*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 343, *Solid Recovered Fuels,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

The terminology, definitions and descriptions included in this document are those needed to understand the scope of ISO/TC 300, *Solid recovered fuels*, and those that appear in two or more standards of ISO/TC 300.

Where a term is used in only one standard, the term will be defined in the individual standard.

Due to the development cycle of other standards of ISO/TC 300, *Solid recovered fuels*, there may be instances of the terms not following the above rule. Where possible, this document tries to follow the rules stated, however, users should check terms and the understanding of terms in other standards as well.

Following the ISO rules, this document does not include common and generic terms.

Annex A provides a list of terms grouped by sub-sections to enable the user to find terms more quickly.

Where there are several synonyms that can be used, the preferred one is written first.

Solid recovered fuels — Vocabulary

1 Scope

This document defines terms for solid recovered fuels to enable the user to understand the scope of the work of ISO/TC 300. Where a term and definition are required in a single standard, the term and definition will be referenced in that standard.

Vocabulary boundaries are described in Figure 1.

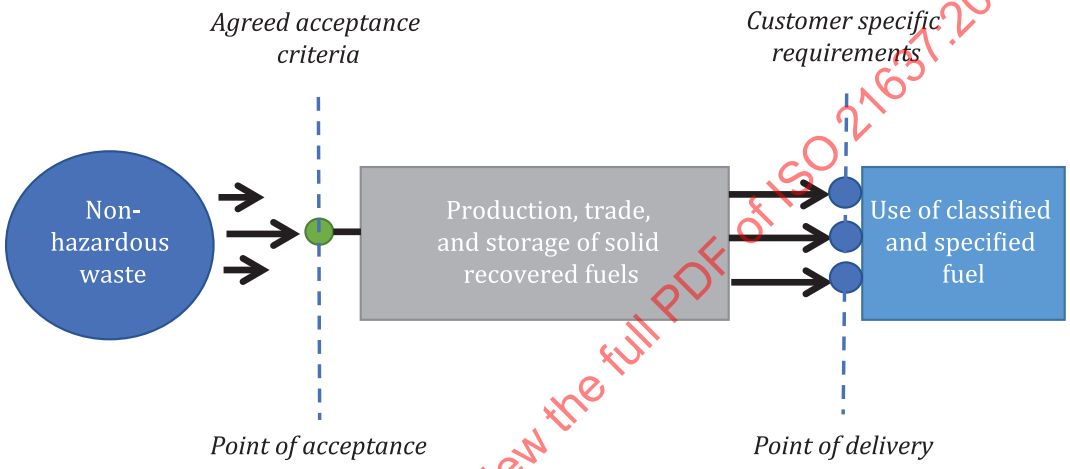

Figure 1 — Vocabulary boundaries for solid recovered fuels

NOTE Solid biofuels are covered by the scope of ISO/TC 238.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
analysis sample
sample (3.63) taken specifically for the purpose of determining specified parameters

3.2
as received
ar
calculation basis for material at delivery to the end user

3.3
ash
ash content on dry basis
total ash
A
mass of inorganic residue remaining after ignition of a fuel under specified conditions, also includes *removed ash contributors* (3.62)

Note 1 to entry: This is expressed as mass fraction in per cent of the *dry matter* (3.22) in the fuel.

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 16559:2014, 4.13, modified — "ignition" has replaced "combustion", details of the unit have been moved to a new Note 1 to entry, "also includes removed ash contributors" has been added, and the old Note 1 to entry has been removed.]

3.4
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 oxidizing or reducing conditions.

Note 2 to entry: See also *ash sphere temperature* (3.5).

[SOURCE: ISO 16559:2014, 4.16, modified — In Note 2 to entry, "ash shrinkage temperature" has been changed to "ash sphere temperature".]

3.5
ash sphere temperature
temperature where the height of a pyramidal and truncated-cone ash test piece is equal to the width of the base, or the edges of cubical or cylindrical ash test pieces are completely round with the height remaining unchanged

Note 1 to entry: Adapted from ISO 540:2008, 3.2.

3.6
bale
material which has been compressed and bound to keep its shape and density

3.7
biomass
material of biological origin excluding material embedded in geological formations and/or fossilized

[SOURCE: ISO 16559:2014, 4.32, modified — Notes 1 and 2 to entry have been removed.]

3.8
bridging
arching
tendency of particles to form a stable bridge across an opening and which restricts flow

3.9
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 16559:2014, 4.40]

3.10
calorific value
heating value
quantity of heat produced by the complete combustion, at a constant pressure equal to 1 013,25 mbar, of a unit volume or mass of gas, the constituents of the combustible mixture being taken at reference conditions and the products of combustion being brought back to the same conditions

[SOURCE: EN 437:2018, modified — The second paragraph and list have been removed.]

3.11
chips
chipped material with a typical length 5 mm to 50 mm commonly in the form of pieces with a defined particle size produced by mechanical treatment with sharp tools such as knives

3.12
classification of solid recovered fuels
categorizing of *solid recovered fuels* (3.75) into classes focusing on the key properties (net calorific value, chlorine and mercury) that are defined by boundary values

3.13
component
part or element of a larger whole of a *solid recovered fuel* (3.75) or a general material

3.14
composition
break down of *solid recovered fuels* (3.75) by types of *components* (3.13)

Note 1 to entry: This is typically expressed as a percentage of the mass fraction component in the fuel on an *as received* (3.2) basis (% in mass ar).

Note 2 to entry: Examples of components: wood, paper, board, textiles, plastics, rubber.

3.15
crushing
mechanical reduction of particle size by exerting mainly blunt deforming forces to a material

3.16
densified solid recovered fuel
solid recovered fuel (3.75) made by mechanically compressing loose material to mould it into a specific size and shape

Note 1 to entry: Examples are pellets and briquettes.

Note 2 to entry: The process can be aided by adding heat or binders.

3.17
distribution factor
correction factor for the *particle size distribution* (3.53) of the material to be sampled

3.18
drop flow
material flow falling over an overflow point or a drop point in a transport system

3.19
drying
process of removing water from a material

Note 1 to entry: For the purpose of test sample preparation, it may be useful to remove just the amount of water that could interfere with other processes involved (e.g. during *crushing* (3.15) or *milling* (3.42)). In order to minimise the alteration of the solid fuel during test portion preparation, removing the total amount of water present is not necessarily needed.

3.20
dry
dry basis
d
calculation basis in which the material is considered free from *moisture* (3.46)

[SOURCE: ISO 16559:2014, 4.72, modified — "Solid biofuel" has been replaced with "material" and the notes to entry have been removed.]

3.21
dry ash free
dry ash free basis
daf
calculation basis in which the material is considered free from *moisture* (3.46) and *ash* (3.3)

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

[SOURCE: ISO 16559:2014, 4.71, modified — "Solid biofuel" has been replaced by "material" and "inorganic matter" by "ash".]

3.22
dry matter
material remaining after removal of *moisture* (3.46) under specific conditions

[SOURCE: ISO 16559:2014, 4.73]

3.23
duplicate sample
two *samples* (3.63) taken under comparable conditions

Note 1 to entry: This selection may be accomplished by taking units adjacent in time or space.

3.24
effective increment size
minimum sample size (3.44) divided by the number of *increments* (3.39)

3.25
effective sample size
effective increment size (3.24) multiplied by the number of *increments* (3.39)

3.26
electromagnetic separation of non-ferrous metals
separation of non-ferrous metals by inducing temporary magnetic forces

Note 1 to entry: This term is also known as eddy current separation.

3.27
energy conversion
use of the *calorific value* (3.10) of the *solid recovered fuel* (3.75) for *energy purposes* (3.29), alone or with other fuels

Note 1 to entry: Solid recovered fuels may be an intermediary energy carrier and used directly or indirectly for the energy conversion such as in multi-stage production and use of synthetic gas. Examples of energy conversion processes are incineration, co-incineration, combustion, co-combustion, gasification and pyrolysis, in which energy is used for supplying heat, cooling and/or electric power.

3.28
energy density
E
ratio of net energy content and bulk volume

Note 1 to entry: The energy density is calculated by dividing the net calorific value by the *bulk density* (3.9).

[SOURCE: ISO 16559:2014, 4.79, modified — Note 1 to entry has been changed.]

3.29
energy purposes
use of the *calorific value* (3.10) within industrial processes or for the supply of heat and electrical power

Note 1 to entry: For industrial processes, the use of solid recovered fuel may contribute to the energy source within the process of producing specific materials, such as cement clinker, bricks and lime.

3.30
fines
small sized particles in fuel below a certain pre-defined size, as agreed by the *parties* (3.54)

Note 1 to entry: Typically, fines are measured through sieving. Small sized particles are typically <10 mm, however, the upper size of the fines may be smaller or larger.

3.31
fluff
loose material of low bulk density

Note 1 to entry: Usually in the range of a few centimetres.

3.32
fraction separation
process of dividing *components* (3.13), particles or layers if homogenisation of the *sample* (3.63) is practically not applicable and/or the analysis of different fractions or phases are appropriate

3.33
fundamental error
only error that remains when the sampling operation is "perfect", i.e. when all parts of the *sample* (3.63) are obtained in a probabilistic manner and each part is independent

Note 1 to entry: The fundamental error results when discrete units of the material to be sampled have different compositions with respect to the property of interest.

3.34
gross calorific value
GCV
calorific value where the water produced by combustion is assumed to be condensed

3.35
hazardous waste
waste (3.89), which has proprieties that may be harmful to human health or the environment

EXAMPLE Hazardous materials are in themselves or have characteristics, which are deemed to be hazardous. Discarded batteries can be considered solid hazardous waste due to the explosive nature of the products; matches, activated carbon and alkali metals are hazardous due to their flammable characteristics; washing powder is a poisonous solid if ingested enough to cause acute poisoning. Handling or treatment of a waste that is not hazardous waste but where the handling or treatment may cause danger or lead to danger, does not make the waste hazardous waste.

Note 1 to entry: These wastes are categorized by waste streams and hazardous characteristics. The hazardous characteristics relevant to solid wastes are: explosives substances; flammable solids; wastes liable to spontaneous combustion; wastes which, in contact with water emit flammable gases; wastes which oxidize; organic peroxides; toxic and infectious substances.

Note 2 to entry: Further identification of the waste's status can be determined using the Annex I and Annex III tables of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal.

Note 3 to entry: Additional categories of hazardous waste to those in the Basel Convention Annex I and Annex III may be established by stakeholders to the agreement or at a national level.

Note 4 to entry: Handling or treatment of a waste that is not hazardous waste but where the handling or treatment may cause danger or lead to danger, does not make the waste hazardous waste.

Note 5 to entry: Most nations have legislative and regulatory frameworks for hazardous waste. These might differ from nation to nation. The movement and trading of the material within the solid recovered fuel supply chain might be affected by several different legislative and regulatory frameworks.

3.36
heterogeneity
degree to which a property or type of particle of a *solid recovered fuel* (3.75) is not uniformly distributed throughout a quantity of material

3.37
homogeneity
degree to which a property or a type of particle of a *solid recovered fuel* (3.75) is uniformly distributed throughout a quantity of material

3.38
homogenization
process of combining of *components* (3.13), particles or layers into a more homogeneous state of the original *samples* (3.63) (in the case of composite samples) or pre-treated fractions of samples in order to ensure equal distribution of substances and properties of the sample

3.39
increment
portion of *solid recovered fuel* (3.75) extracted from a *lot* (3.40) or *sub-lot* (3.81) in a single operation of the sampling device

[SOURCE: ISO 16559:2014, 4.122, modified — "Fuel" has been replaced by "solid recovered fuel" and "extracted from a lot or sub-lot" has been added.]

3.40
lot
defined quantity of fuel for which the quality is to be determined

[SOURCE: ISO 16559:2014, 4.128]

3.41
mechanical durability
DU
ability of densified fuel units to remain intact during handling and transportation

Note 1 to entry: Typical measures of resistance are shock and/or abrasion as a consequence of handling and transportation processes, characterized by disintegration and fines formulation.

Note 2 to entry: Examples of densified fuels are briquettes and pellets.

[SOURCE: ISO 16559:2014, 4.131, modified — Note 1 to entry has been added and examples have been moved from the definition into Note 2 to entry.]

3.42
milling
processing of solid material into smaller pieces by grinding, *crushing* (3.15) or cutting

3.43
minimum increment size
minimum dimension or size of the *increment* (3.39) that is taken from a *lot* (3.40), from the point of view of preserving its representativeness

Note 1 to entry: The product of the minimum increment size and the number of increments to be taken should be never smaller than the minimum sample size.

3.44
minimum sample size
minimum size or dimension of the *sample* (3.63) required during *sampling* (3.68) and *sample preparation* (3.66) from the point of view of preserving its representativeness

Note 1 to entry: The minimum sample size is equal to the *effective increment size* (3.24) multiplied by the number of increments and is linked directly to the *nominal top size* (3.48).

3.45
mixed municipal solid waste
non-source separated municipal solid waste or residual fraction of municipal solid waste after source separation

Note 1 to entry: Municipal solid waste is waste collected and treated by or for municipalities. It typically covers waste from households, including bulky waste, similar waste from commerce and trade, office buildings, institutions and small businesses, as well as yard and garden waste, street sweepings, the contents of litter containers, and market cleansing waste if managed as household waste.

3.46
moisture
M
water removable under specific conditions

3.47
net calorific value at constant volume
lower heating value
calorific value where the water produced by combustion is assumed to be in the vapour state

3.48
nominal top size
d_{95}
smallest aperture size of the sieve used for determining the *particle size distribution* (3.53) of *solid recovered fuels* (3.75) through which at least 95 % by mass of the total material passes through the sieve

3.49
non-hazardous waste
waste (3.89) that is other than *hazardous waste* (3.35)

3.50
optical recognition
recognition of material particles by optical sensors

3.51
oversize particle
particle exceeding a specific particle size

Note 1 to entry: The definition of oversize particle is dependent on the application and determined between the *producer* (3.60) and user.

3.52
particle density
density of a single particle

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

[SOURCE: ISO 16559:2014, 4.148]

3.53
particle size distribution
proportions of various particle sizes in a solid fuel

3.54
party
two or more persons or organizations making a contract, agreement or decision

3.55
point of acceptance
point of raw material acceptance
last point where the *non-hazardous waste* (3.49) can be determined to meet the specified raw material description before determining whether it meets the requirements of *solid recovered fuels* (3.75) according to ISO 21640

Note 1 to entry: Specified raw material may be determined by agreed characteristics between the trading or operational parties.

Note 2 to entry: The point of acceptance may be the storage of raw material prior to acceptance (e.g. prior to commencement of processing) for solid recovered fuel where clear agreement is made between the raw material supplier and user.

Note 3 to entry: Refer to Figure 1.

3.56
point of delivery
last point at which the *solid recovered fuel* (3.75) is accessible; either at the point it has been determined to be a solid recovered fuel or before it has been converted into energy

Note 1 to entry: Many solid recovered fuels require processing in one way or another. Examples of further processing include, *crushing* (3.15), *milling* (3.42), blending and mixing with other fuels or materials, such as additives.

Note 2 to entry: Refer to Figure 1.

3.57
precision
closeness of agreement between independent test/measurement results obtained under stipulated conditions

3.58
pre-treated waste
waste (3.89) that has been treated to make it more suitable for recovery or disposal

[SOURCE: EN 13193:2000, 5.2.7]

3.59
probabilistic sampling
sampling (3.68) conducted according to the statistical principles of sampling

3.60
producer
organization or unit responsible for the production of *solid recovered fuel* (3.75)

Note 1 to entry: The producer can also be the supplier of the fuel.

Note 2 to entry: The producer may not directly produce or process *non-hazardous waste* (3.49) into solid recovered fuel but may receive material appropriate to its requirements and already meeting the minimum criteria of ISO 21640.

[SOURCE: ISO 16559:2014, 4.157, modified — "Fuel" has been replaced by "solid recovered fuel", Note 1 to entry has been removed and Note 2 to entry has been added.]

3.61
proximate analysis
analysis of a solid fuel reported in terms of *total ash* (3.3), total moisture, *volatile matter* (3.88), and fixed carbon measured at specified conditions

3.62
removed ash contributor
rac
coarse inert material (i.e. metals, glass, stones, tiles etc.) removed from the pre-dried sample before preparation, in order to avoid damage to the preparation equipment

3.63
sample
quantity of material, from a larger amount for which the quality is to be determined

Note 1 to entry: See also *increment* (3.39).

Note 2 to entry: For more detailed understanding of methods for sampling solid recovered fuels, refer to ISO 21645.

Note 3 to entry: The hierarchy of methods for chemical analysis can be found in ISO 78-2.

3.64
sample division by mass
reduction of the mass of a *sample* (3.63) or *sub-sample* (3.82)

3.65
sample division by size
reduction of the size of a *sample* (3.63) or *sub-sample* (3.82)

3.66
sample preparation
actions taken to obtain representative laboratory samples or *test portions* (3.83) from the original *sample* (3.63) *as received* (3.2)

3.67
sample size reduction
reduction of the *nominal top size* (3.48) of a *sample* (3.63) or *sub-sample* (3.82)

3.68
sampling
process of drawing or constituting a *sample* (3.63)

3.69
sampling form
document that is used during the *sampling* (3.68) to record data on the way in which the sampling is actually being carried out

[SOURCE: ISO 16559:2014, 4.174]

3.70
sampling plan
predetermined procedure for the selection, withdrawal, preservation, transportation and preparation of the portions to be removed from a population as a *sample* (3.63)

[SOURCE: ISO 16559:2014 4.175]

3.71
separate collection
collection of source-separated waste streams

3.72
shape factor
factor that corrects the minimum sample size if the particles in a *lot* (3.40) have not a regular shape (e.g. spherical or cubic)

3.73
shredding
mechanical reduction of particle size by tearing, cutting or other means

[SOURCE: EN 13965-2:2010, 3.46, modified — "treatment" has been replaced by "reduction".]

3.74
solid biofuel
solid fuel produced directly or indirectly from *biomass* (3.7)

[SOURCE: ISO 16559:2014, 4.187]

3.75
solid recovered fuel
SRF
solid fuel for *energy purposes* (3.29) according to ISO 21640, derived from *non-hazardous waste* (3.49)

Note 1 to entry: A number of terms can be used to describe fuels from waste that might (but not always) qualify as solid recovered fuels. For example, refuse derived fuel, refuse derived paper and plastics densified fuel, waste derived fuel, shredded light fraction, sewage sludge, end of life wood, fuel composed of either municipal solid waste, industrial waste, commercial waste, construction and demolition waste, animal waste (e.g. meat and bone meal).

Note 2 to entry: This definition does not consider the value of the waste.

Note 3 to entry: Whether the input material is hazardous or non-hazardous is determined through national laws and directives or by categorisation of the fuel through the annexes in the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal.

3.76
specification of solid recovered fuel
list of properties that characterize *solid recovered fuels* (3.75)

3.77
static lot
lot (3.40) that is not in motion during the *sampling* (3.68), or transported by a conveyor or alternative transport system

3.78
stratified sample
sample (3.63) constituted by *increments* (3.39) taken from identified subparts (strata) of the parent population

3.79
stratified arbitrary sample
stratified sample (3.78) constituted by *increments* (3.39) which are taken arbitrarily within each stratum

3.80
stratified random sample
stratified sample (3.78) constituted by *increments* (3.39) which are taken randomly within each stratum

3.81
sub-lot
part of a *lot* (3.40) for which a test result is required

[SOURCE: ISO 16559:2014 4.197, modified — "portion" has been replaced by "part".]

3.82
sub-sample
portion of a *sample* (3.63)

Note 1 to entry: A sub-sample is obtained by procedures in which the items of interest are randomly distributed in part of equal or unequal size.