European standardization of Solid Recovered Fuels

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Workshop:
Processing routes for Solid Recovered Fuels
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Outline

- Objectives and Challenges
- Background
- Mandate 325 and CEN/TC 343 Solid Recovered Fuels
- Important issues and present status

Objectives & Challenges 1(2)

- In order to comply with Sustainable Development there is a trend towards Integrated Resource and Waste Management. European environmental and energy policies include measures to enhance recovery of residual waste as well as to promote energy from biomass and waste. **Waste derived fuels are indigenous fuels that help achieve Security of Supply and the targets of the Kyoto Protocol.**

- **European Standards for Solid Recovered Fuels will support the free trade of these fuels on the Internal Market.** They will also be of help to equipment producers and permitting authorities, and they will help to build acceptance and trust among the public.

Objectives & Challenges 2(2)

- The full implementation of the Landfill Directive (LD) significantly reduces the disposal of combustible waste in landfill.
- In Europe there is not enough incineration capacity to meet the targets of the LD. The use of waste derived fuels for the generation of heat and/or power or for the production of material products, e.g. clinker for cement, is a valid option.
- The Solid Recovered Fuels market needs to be developed rapidly with the help of pan-European procedures, which are accepted also by the permitting authorities.

Background

- ***Fuel and Energy Recovery*** 1997 - 1998
  EC JOULE-THERMIE: DIS-1375-97-FI
  Report available at jan.zeevalkink@mep.tno.nl
- ***Waste to Recovered Fuel*** 1999 - 2002
  EC Fifth Framework Program: NNE5-1999-533
  CBA available at www.gua-group.com/cba-wtrf

CEN BT/TF 118 *Solid Recovered Fuels* 2000 - 2002
Work Programme and Report (CEN/TR 14745:2003)

- UNI 9903 *Non mineral refuse derived fuels RDF* 1992 (IT)
- SFS 5875 *Solid Recovered Fuel - Quality Control System* 2000 (FIN)
- RAL-GZ 724 *Quality Assurance of Solid Recovered Fuels* 2001 (D)

Mandate 325 Solid Recovered Fuels 1(2)

- First step: **Develop a set of Technical Specifications (TSs),** i.e. “pre-standards”.
- Second step: **Transform this set of TSs into European Standards (ENs).**
- These ENs shall be presented as a package, after validation of a minimum number of TSs as agreed between the Commission and CEN BT.

Mandate 325 Solid Recovered Fuels 2(2)

The standards shall include:

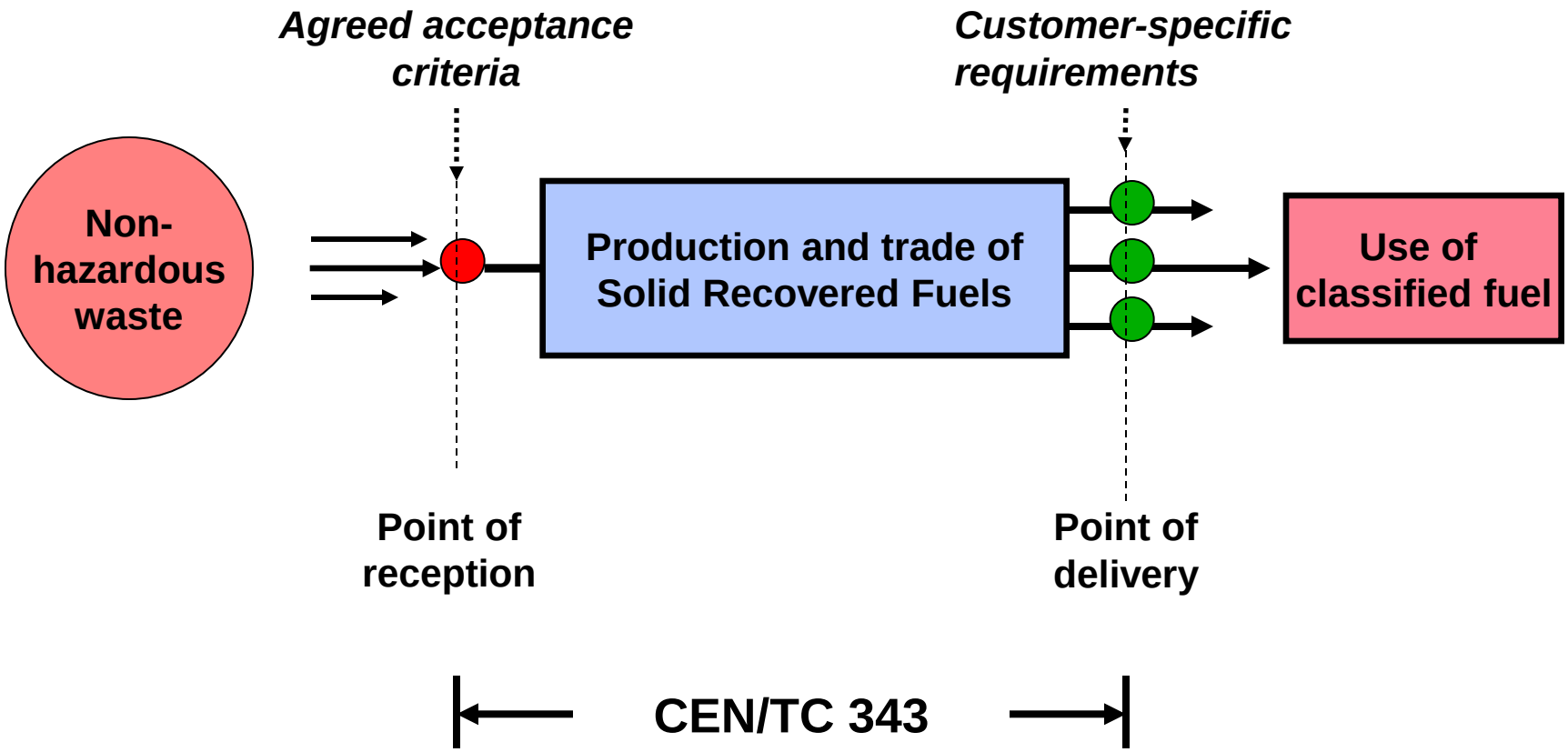
- All standards listed in the Work Programme developed by CEN TF 118 Solid Recovered Fuels (equal to those of CEN/TC 335 Solid Biofuels.

- A set of standards on the determination of the biodegradable fraction, as defined in Directive 2001/77/EC and/or the biogenic fraction of SRF and the higher and lower heating values of these fractions. CEN will provide the Commission … with a report on the relative difference between these two fractions of waste in order to decide whether there is a need to develop two different standards or only one.

CEN TC 343 Solid Recovered Fuels

- Established on 13 March 2002
- Secretariat held by the Finnish Standards Association
- Scope
  "Elaboration of Standards, Technical Specifications and Technical Reports on solid recovered fuels (RDF, etc.) prepared from non-hazardous waste to be utilised for energy recovery in waste-incineration or co-incineration plants, excluding those fuels that are included in the scope of CEN/TC 335 Solid Biofuels"

European Standardisation of Solid Recovered Fuels



Organization

27 Work Items grouped in 5 Working Groups

1. Terminology and Quality Assurance (IT)
2. Fuel specifications and classes (SE)
3. Sampling and supplementary test methods (NL)
4. Physical/mechanical tests (D)
5. Chemical tests (IT)

Important issues

- WG1: Quality Management System based on ISO 9001
- WG2: Classification system and Specification template
- WG3: Determination of biodegradable/biogenic = biomass content

Classification system of CEN/TS 15359

Classification Property	**Statistical Measure**	**Unit**	**Classes**				
			1	**2**	**3**	**4**	**5**
Net calorific value **(NCV)**	Mean	MJ/kg/(ar)	**≥ 25**	**≥20**	**≥15**	**≥10**	**≥ 3**
Classification Property	**Statistical Measure**	**Unit**	**Classes**				
			1	**2**	**3**	**4**	**5**
Chlorine **(Cl)**	Mean	% (d)	**≤0,2**	**≤0,6**	**≤1,0**	**≤1,5**	**≤3**
Classification Property	**Statistical Measure**	**Unit**	**Classes**				
			1	**2**	**3**	**4**	**5**
Mercury **(Hg)**	Median	mg/MJ (ar)	**≤0,02**	**≤0,03**	**≤0,08**	**≤0,15**	**≤0,50**
	80^{th} percentile	mg/MJ (ar)	**≤0,04**	**≤0,06**	**≤0,16**	**≤0,30**	**≤1,00**

Validation of a set of TSs

- **26 Technical Specifications (TS) were published by 2006.**
- These were validated within the EU funded multi-stakeholder project **QUOVADIS** (Quality Management Organisation, Validation of Standards, Developments and Inquiries for SRF) lead by Cesi Ricerca, Italy.
- The validation focussed on TSs on QMS, sampling, sample preparation as well as physical and chemical test methods, including inter-laboratory Round Robin and Robustness evaluations.
- A report is available at http://quovadis.erse-web.it

Present status of TC 343 1(4)

- **6 Technical Reports (CEN/TRs) have been published.**

  - 14980:2004 Report on relative difference between biodegradable and biogenic fractions of SRF
  - 15441:2006 Guidelines on occupational health aspects
  - 15508:2006 Key properties on solid recovered fuels to be used for establishing a classification system
  - 15591:2007 Determination of the biomass content based on the ^{14}C method
  - 15716:2008 Determination of combustion behaviour
  - 15404:2010 Methods for the determination of ash melting behaviour by using characteristic temperatures

Present status of TC 343 2(4)

- **The following European Standards (EN) have been published:**

  - **15357 Terminology, definitions and descriptions**
  - **15358 Quality management systems**
  - **15359 Specifications and classes (decided on 2011-10-19)**
  - 15400 Method for the determination of calorific value
  - 15402 Determination of content of volatile matter
  - 15403 Determination of ash content
  - 15407 Methods for the determination of C, H and N content
  - 15408 Methods for the determination of S, Cl, F and Br content
  - 15410 Methods for the determination of major elements
  - 15411 Methods for the determination of trace elements

Present status of TC 343 3(4)

- **(Published ENs cont.):**
  - 15414-3 Determination of moisture content using the oven dry method
  - 15415-1 Determination of particle size distribution
  - **15440 Methods for the determination of biomass content**
  - 15442 Methods for sampling
  - 15443 Methods for the preparation of the laboratory sample
  - 15413 Methods for the preparation of the test sample from the laboratory sample
  - 15590 Determination of potential rate of microbial self heating using the real dynamic respiration index

Present status of TC 343 4(4)

- **The following Technical Specifications have been published**:
  - 15401:2010 Determination of bulk density
  - 15405:2010 Determination of density of pellets and briquettes
  - 15406:2010 Determination of bridging properties of bulk material
  - 15412:2010 Methods for the determination of metallic Al
  - 15414-1:2010 Determination of total moisture by a reference method
  - 15414-2:2010 Determination of total moisture by a simplified method

- **The following prENs have been sent to CEN/CMC for Formal Vote:**
  - 15415-2 Maximum projected length method for large dimension particles
  - 15415-3 Method by image analysis for large dimension particle

Biomass content 1(2)

- EN 15440 *SRF – Methods for the determination of biomass content* gives the following definitions:
  - **3.2 biodegradable**

  material capable of undergoing biological anaerobic or aerobic decomposition under conditions naturally occurring in the biosphere

  NOTE definition on ***biodegradable waste*** in the Landfill Directive 1999/31/EC)
  - **3.3 biogenic**

  produced in natural processes by living organisms but not fossilized or derived from fossil resources
  - **3.4 biomass**

  NOTE 1. This term is defined in several Directives and Decisions:
    a) RES-E Directive: “the biodegradable fraction of products, waste and residues from ….
    b) Decision on monitoring GHG: “non-fossilised and biodegradable organic material originating from plants, animals and micro-org. …

Biomass content 2(2)

- EN 15440 specifies 3 normative determination methods based on:
  - Selective dissolution in sulphuric acid and hydrogen peroxide,
  - Manual sorting, or
  - 14C content
- It expresses the result by:
  - Weight,
  - Energy content, or
  - Carbon content
- It suggests method depending on the purpose of the measurement
- It describes the methods in Normative Annexes A, B and C
- It indicates limitations to the methods in informative Annex D
- It lists materials considered as CO2-neutral in informative Annex E
- It gives performance data obtained from inter-laboratory tests in informative Annex F

Example of a SRF in Finland (1/2)

- Class Code: NCV 3; Cl 2; Hg 1
- Origin: Commercial and Industrial waste
- Composition (ar): 45 % paper, 25 % plastics, 10 % wood, 20 % other
- **Biomass content:**
  Biogenic Carbon, 60 % of total C
  Emission Factor (ar), 31 tCO_2/TJ

Example of a SRF in Finland (2/2)

Property	Typical	Limit
NCV, MJ/kg (ar)	18	> 16
Moisture, % (ar)	< 20	
Ash, % (d)	< 10	
Cl, % (d)	0,4	< 0,6
Hg, mg/kg (d)	< 0,05	
Al, metallic, % (d)	< 0.1	

Thank you for your attention