



# **Quality Certification and Standards for Solid Biofuels**

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# Presentation

- **Product Quality Classification of Solid Biofuels**
- **Product Quality Testing Standards**
- **Wood Pellets Quality Certification**
  - Europe
  - USA



# Historical Background for Solid Biofuels

- **Mix of National Biomass Classifications, Product Quality Standards and Testing Standards**
  - Germany (DIN, DIN Plus)
  - Sweden (SS)
  - Austria (ÖNORM)
  - UK (BSI)
  - Italy (CTI)
  - USA (PFI, ASTM, ASABE)
  - Finland (SFS)
  - The Netherlands (NTA)
  - Denmark (DK)
  - Norden (NT)
  - Australia (AS)
  - Japan (JIS)



# **CEN Technical Committee 335**

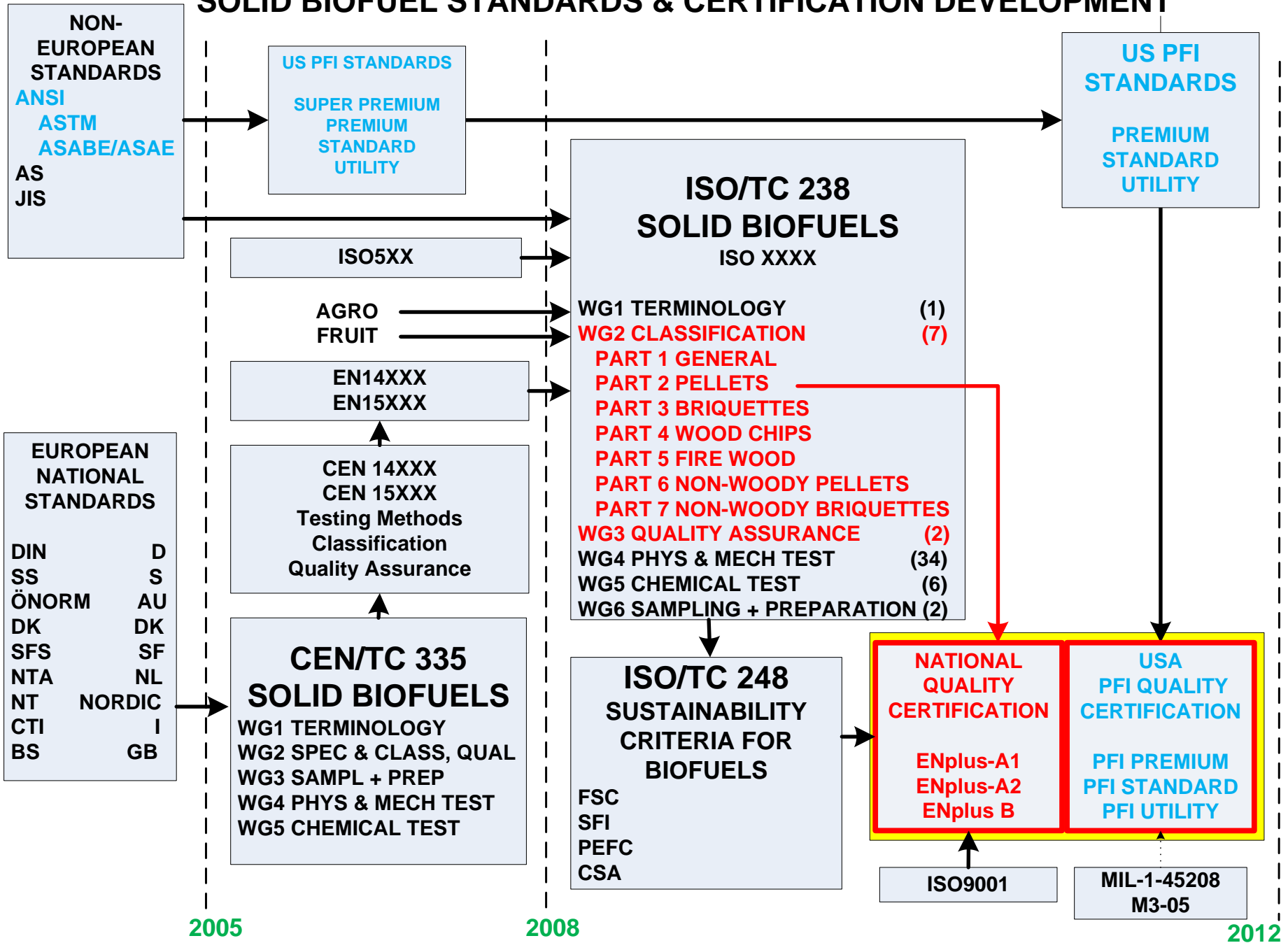
- **28 EN Standards published 2004 to 2011**
  - **1 Terminology and Definitions**
  - **1 Classification of Biomass**
  - **1 Quality Assurance**
  - **2 Sampling and Sample Preparation**
  - **17 Physical and Mechanical Testing Methods**
  - **6 Chemical Testing Methods**
- **Future new standards transferred to TC 238**
  - **Vienna Agreement**



# ISO Technical Committee 238

- **Started 2007 driven by escalating intercontinental trade**
- **Currently 29 nation members (P or O members)**
- **Canada participate through Standards Council of Canada**
- **TC 335 new initiatives to TC 238 (Vienna Agreement)**
- **All TC 335 EN Standards (28) are being upgraded to ISO/EN**
- **An additional 28 Standards to be added to ISO (total 56)**
- **Global assessment of solid biomass standards**

# SOLID BIOFUEL STANDARDS & CERTIFICATION DEVELOPMENT





# ISO Technical Committee 238

- **New Work Items (Determination of Characteristics)**
  - **8 Explosibility (dust cloud and layer)**
  - **Flammability**
  - **Grindability**
  - **Hydrophobicity**
  - **Wettability**
  - **Off-gassing and Self-heating**
  - **Angle of repose and Drain**
  - **Chemical X-ray Fluorescence Spectrometry (XRF)**





## **DRIVERS FOR CERTIFICATION OF FUEL PELLETS**

- **DIN Plus in Germany since 2002**
- **ENplus in Europe**
  - **Development based on DIN Plus**
  - **Implementation started in late 2010 (so far Germany, Austria) with other nations to join**
- **PFI in USA**
  - **Currently in final preparation for implementation (late 2011)**

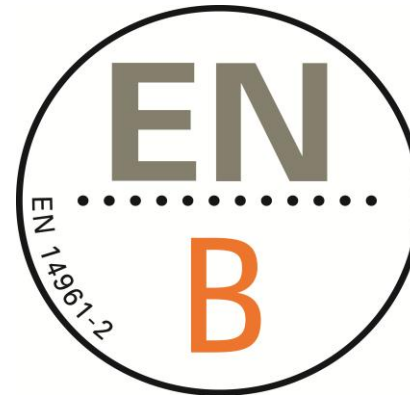


# ENPIus CERTIFICATION OF FUEL PELLETS

- **Developed by the German Pellet Institute (DEPI)**
- **Licensed to European Biomass Association (AEBIOM)**
- **Managed by the European Pellet Council (EPC)**
- **Sub-licensing to Accredited National Certifying Agencies in Europe or outside Europe**
  - **Under consideration in Canada**
- **ISO 9000 Quality Management System required**
- **Certification of pellets primarily for residential use (low ash)**
- **Certification of pellets for industrial use under development**



# ENPlus CERTIFICATION OF FUEL PELLETS



Parameter	Unit	ENplus-A1	ENplus-A2	EN-B	Test accrdng. to
Diameter	Mm	6 ( $\pm 1$ ) oder 8 ( $\pm 1$ ) <sup>2)</sup>			<sup>5)</sup>
Length	Mm	3.15 $\leq$ L $\leq$ 40 <sup>3)</sup>			<sup>5)</sup>
Bulk Density	kg/m <sup>3</sup>	$\geq 600$			EN 15103
Heat Value	MJ/kg	$\geq 16.5$	$\geq 16.3$	$\geq 16.0$	EN 14918
Moisture Content	Max.-%	$\leq 10$			EN 14774-1
Fine Material (< 3.15mm)	Max.-%	$\leq 1$			EN 15149-2
Mechanical Durability	Max.-%	$\geq 97.5$ <sup>4)</sup>		$\geq 96.5$	EN 15210-1
Ash Content	Max.-% <sup>2)</sup>	$\leq 0.7$	$\leq 1.5$	$\leq 3.0$	EN 14775
Ash Softening Temp.	(DT) $^{\circ}$ C	$\geq 1200$	$\geq 1100$		EN 15370-1
Chlorine Content	Max.-% <sup>1)</sup>	$\leq 0.02$	$\leq 0.03$		EN 15289
Sulfur Content	Max.-% <sup>1)</sup>	$\leq 0.05$			EN 15289
Nitrogen Content	Max.-% <sup>1)</sup>	$\leq 0.3$	$\leq 0.5$	$\leq 1.0$	EN 15104
Copper Content	mg/kg <sup>1)</sup>	$\leq 10$			EN 15297
Chrome Content	mg/kg <sup>1)</sup>	$\leq 10$			EN 15297
Arsenic Content	mg/kg <sup>1)</sup>	$\leq 1$			EN 15297
Cadmium Content	mg/kg <sup>1)</sup>	$\leq 0.5$			EN 15297
Mercury Content	mg/kg <sup>1)</sup>	$\leq 0.1$			EN 15297
Lead Content	mg/kg <sup>1)</sup>	$\leq 10$			EN 15297
Nickel Content	mg/kg <sup>1)</sup>	$\leq 10$			EN 15297
Zinc Content	mg/kg <sup>1)</sup>	$\leq 100$			EN 15297

<sup>1)</sup> In water-free condition (wf).  
<sup>2)</sup> Diameter must be indicated.  
<sup>3)</sup> Maximum 1% of the pellets longer than 40 mm, max. length 45 mm.  
<sup>4)</sup> If measured by the Lignotester, the threshold value is  $\geq 97.7$  Max.-%.  
<sup>5)</sup> EN 15103, EN 14918, EN 14774-1, EN 15149-2, EN 15210-1, EN 15370-1, EN 15289, EN 15104, EN 15297




# USA CERTIFICATION OF FUEL PELLETS

- **Demanded by US EPA in March 2010 under the New Source Performance Standard (NSPS) emission regulations**
- **Applicable to all pellets marketed in USA**
- **Synchronized with new NSPS regulations for space heaters**
- **Developed by Pellet Fuels Institute (PFI)**
- **Gradually in effect from late 2011**



# USA CERTIFICATION DECLARATION

- Additives less than 2%
- Type of feedstock stated
- HHV stated “as-received” with guaranteed min BTU value
- Additional guarantees such as ash
- All values to be audited

**PFI CERTIFIED FUEL**  Pellet Fuels Institute

**PFI Densified Fuel Grade: Premium**

**Grade Requirements:**  
Reg. #1234

Bulk Density:	40–46 lbs/ft <sup>3</sup>
Diameter:	.230–.285 in/5.84–7.25 mm
Durability:	≥96.5
Fines:	≤0.50%
Ash Content (as received):	≤1%
Length:	≤1% >1.5 in.
Moisture:	≤8.0%
Chlorides:	≤300 ppm

**Manufacturers Guaranteed Analysis As Audited:**

Type of Material:	Softwood fiber
Additives:	2.0% corn oil by weight
Minimum Higher Heating Value (as received):	8,000 BTU

Other Manufacturers Guarantees:

© For more information, please visit the PFI website at [www.pelletheat.org](http://www.pelletheat.org).

# PELLET FUELS INSTITUTE PRODUCT SPECIFICATION

Fuel Properties		PFI Premium	PFI Standard	PFI Utility	Testing Standard
<b>Normative Information - Mandatory</b>					
Bulk density	lb/cuft	40.0 - 46.0	38.0 - 46.0	38.0 - 46.0	ASTM E 873
Diameter inches	inch	0.23 - 0.285	0.23 - 0.285	0.23 - 0.285	NIST
Diameter, mm	mm	5.84 - 7.25	5.84 - 7.25	5.84 - 7.25	NIST
Length, greater than 1.50 in	%	≤ 1.0	≤ 1.0	≤ 1.0	NIST
Pellets Durability Index	%	≥ 96.6	≥ 96.6	≥ 96.6	LD2668.T4 1962 Y68
Fines, at mill gate	%	≤ 0.5	≤ 0.5	≤ 0.5	
Inorganic ash	%	≤ 1.0	≤ 2.0	≤ 6.0	D 1102-84
Moisture	%	≤ 8.0	≤ 10.0	≤ 10.0	ASTM E 871
Chloride	ppm	≤ 300	≤ 300	≤ 300	ASTM E 776
<b>Informative Only - Not Mandatory</b>					
Ash Fusion	degree F	NA	NA	NA	ASTM D 1857
Heating Value	BTU/h	NA	NA	NA	ASTM E 711
Additives and binders	%	NA	NA	NA	



# CERTIFICATION OF CANADIAN PELLETS

- **Options for Canadian producers of pellets**
  - **Export to Europe**
    - Certification and audits directly under European Pellet Council (EPC)
    - Certification and audits under a proposed compatible Canadian system
  - **Export to USA**
    - Certification and audits directly under Pellet Fuels Institute (PFI) in USA
    - Certification and audits under a proposed compatible Canadian system
  - **Export to other regions**
    - Certification under a whatever local system is marketable or regulated
- **Certification requirement is a potential trade barrier**



# PROSPECT FOR GLOBAL PELLET CERTIFICATION

- **Similarities between ENplus and PFI Classification parameters although some significant differences, such as**
  - **Fines content definition, ash content**
  - **Sustainability criteria missing in PFI**
  - **PFI certifies only producers (not traders)**
  - **ENplus is CEN/ISO based and PFI is ASTM based**
  - **ENplus metric and PFI Imperial measures**
- **ISO WD 14961 Classification includes I1 and I2 classes**
- **ENplus certification (voluntary) is selling feature for producers**
- **PFI certification (regulated) is initially resisted by producers**
- **Driver is North American export compliance with ENplus**