

# Progress in European standards relevant for CCPs

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## Progress in European standards

### Summary (*Presentation in one slight!*)

- **All standards have to be revised** to meet requirements of the **Construction Products Regulation**
- **Two reasons for delays: formal or technical aspects**
- **Consequences:**
  - **formal aspects:** the revised standards passed Formal Vote but are not in line with regulation
  - **technical aspects:** standards where **new classes** have to be introduced are delayed as **not covered by mandate** (finally also formal!)

**result: not published in the official journal (OJEU) or postponed**

Good news: the former standards can be used further!

**BUT**

**There is a need to act before EC will do it for CEN (e.g. BWR3 – VOC)!!!**

- 1. Introduction / Construction Products Regulation  
CPR / delegated acts / BWR3 / BWR7**
- 2. Status of European product and testing standards**
  - ongoing product standards (cement, lime, hydraulic road binders, aggregates,...)
  - ongoing testing standards (free lime determination, wet sieving, ..)
- 3. Implementation of BWR3 in harmonised product standards**
- 4. Preparation phase: EN 450-1 Fly ash for concrete**
- 5. Conclusions**

# 1 Introduction / Construction Products Regulation



REGULATION (EU) No 305/2011 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL  
of 9 March 2011

laying down harmonised conditions for the marketing of construction products and repealing  
Council Directive 89/106/EEC

(Text with EEA relevance)

Since July 2013, the Construction Products Regulation (EU 305/2011) replaces completely the Construction Products Directive (89/106/EEC).

The goals of the Regulation are the same as those of the Construction Products Directive (CPD):

***to foster the free movement and use of construction products in the internal market!***

# 1 Introduction / Construction Products Regulation



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laying down harmonised conditions for the marketing of construction products and repealing  
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(Text with EEA relevance)

**CPR focus i.a.: Basic Requirements for “Construction Works for an economi-cally reasonable working life”**

**Subject to extension mandates for product standards**



- 1. Mechanical resistance and stability**
- 2. Safety in case of fire**
- 3. Hygiene, health and the environment**
- 4. Safety and accessibility in use**
- 5. Protection against noise**
- 6. Energy economy and heat retention**
- 7. Sustainable use of natural resources**

# 1 Introduction / Construction Products Regulation

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Since 1 July 2013, the Regulation is fully in force. The following activities for producers and third parties had to be considered:

- Third parties have to be accredited and notified
- Producers have to prepare a declaration of performance
- A new annex ZA is to be implemented in all standards
- Information on requirements for BWR3 “Hygiene, Health and Environment and BWR7 on “Sustainability” has to be provided
  - BWR3: only possible when mandates are changed and CEN product TCs have agreed on parameters. Requested for a few products by now
  - Horizontal test standard are nearly finished
  - BWR7: voluntary by now and no official force to deal with
- A **philosophy switch** to producers responsibility is established.  
Most important: **Declaration of performance (DOP)**

### EN 197-1 Cement

- had to be revised for CPR needs
- Main change in the revised version is the introduction of low clinker ternary cements.  
The standardisation of these cements is based on the work of TC 51 dating back to 2006 on possible standardization of new cements produced with traditional constituent materials and manufacturing methods, but according to composition limits out of the limits defined so far in EN 197-1.
- **Standard is ready but Formal Vote would most likely not be positive and/or standard most likely not published in the Official Journal of the EU (OJEU)**
- Reason for this is a pending mandate M 114

**Formal**

### Other standards and documents for cement

- CEN/TR 16912 “Guidelines for a procedure to support the European standardization of cement”
  - approved by TC 51 on 2016-10-02 (doc. CEN/TC 51 N 1301).
  - draft was submitted to CCMC on 2016-04-28 and published in May 2016
  
- EN 16908 “Product Category Rules”
  - prEN was approved in the CEN Enquiry on 2015-11-13 and accepted by CEN/TC 350.
  - Formal Vote started (25.8.-17.10. 2016)
  
- EN 14216 “Very low heat special cement” and EN 15743 “Supersulfated cement”
  - revised with amended annex ZA
  - accepted and published (2016-04-08 and 2015-11-13 resp.)



## 2 Status revision of European product standards

- EN 459-1:2015-04: **Lime and hydraulic lime**
  - standard has been revised taking into account the requirements of CPR, but published with a template for Annex ZA which does not correspond to the latest version of Annex ZA.
  - standard has **not been published in the OJEU**, for CE-marking EN 459-1:2010-09 has to be referenced.
- EN 459-2: 2010-09; **Test procedures**
  - standard in the 5-years revision.
  - work **postponed** due to new **Round Robin Test** to evaluate the procedures described in the standard compared with test procedures used in daily routine testing.
- EN 459-3:2015-04: **Conformity Evaluation**
  - standard to be has been revised to have a version in line with the CPR

Formal  
Formal

- ▶ **EN 13282-1:** Composition, specification and conformity criteria of **rapid** hardening road binders. *These are **cement based binders** which follow the requirements as already known from prEN13282.*  
**Published implemented since 1.11.2014**
- ▶ **prEN 13282-2:** Composition, specification and conformity criteria of **normal** rapid hardening road binders. *Tese **binders have lower cements contents**, the compressive strength have to be **tested after 56 days** (part 1 at 28 days). **A slaking procedure** was implemented to guarantee that also lime rich mixtures can be evaluated in the laboratory. Also **FBC ash** of specific composition can be used as a main constituent of HRB.*  
**Revised and positive FV, but not published in OJEU due to declaration of composition which is not in the mandate**
- ▶ **EN 13282-3:** Conformity evaluation  
**Published implemented since 1.11.2014**

### Aggregates Standards

- EN 12620 aggregates for concrete
- EN 13043 aggregates or bituminous mixtures and surface treatments...
- EN 13139 aggregates for mortars
- EN 13242 aggregates for unbound and hydraulically bound materials

- Status
- all standards were already revised in 2013 but were not published in the OJEU or national lists for formal reasons and could therefore not be used.
  - all standards are again revised and ready to start Formal Vote. Publication is likely although some basic requirements of the CPR are not considered (BWR3)

**Formal**

### Aggregates Standards

EN 13285 aggregates for unbound mixtures

#### Status

- standards was already revised in 2013 but was not published in the OJEU or national lists for formal reasons and could therefore not be used.
- standard was again revised and is ready to start Formal Vote. Publication is likely although some basic requirements of the CPR are not considered (BWR3)
- standard will also become a harmonised product standard (requiring auto and third party control!)

Formal

### EN 13055 for lightweight aggregates

EN 13055- Part 1: “Lightweight aggregates for concrete, mortar and grout” and EN 13055-2 Lightweight aggregates - Part 2: Lightweight aggregates for bituminous mixtures and surface treatments and for unbound and bound applications” were merged into one standard according a decision of TC 154.

The **new standard EN 13055** will be entitled “Lightweight aggregates for concrete, mortar, grout, bituminous mixtures, surface treatments and for unbound and bound applications“.

**The standard was again revised and send to UAP.  
Standard will be available soon.**

Note: New procedure for density determination based on former BVK procedure implemented (parameters adjusted to be valid also for other lightweight aggregates

**Formal**

## 2 Revision of European product standards

### Why are these standards important?

In future normative!

### Annex A of the standards for source materials

Nr	Source	Subnr.	Specific material	History of use	Special requirement in standard	Additional requirement in standard
.....						
C	Coal Power Generation Industry	C1	Coal fly ash	Yes	No	Yes
		C2	Fluidised bed combustion fly ash (FBCFA)	Yes	No	No
		C3	Boiler slag	Yes	No	Yes
		C4	Coal bottom ash	Yes	No	Yes
		C5	Fluidised bed combustion bottom ash (FBCFA)	Yes	No	No
	.....					

Columns removed in final version

Excerpt of table A.1 in revised aggregate standards

## In May 2012, the revision of prEN 14227 on „ soil treatment“

- part 10: by cement
- part 11: by lime
- part 12: by slag
- part 13: by hydraulic road binders
- part 14: by fly ash

was started. Following the basic requirement of CEN the standards were merged into one part and published as

- **prEN 14227-15 for "hydraulically stabilized soils".**

**Status:**           ▪ published

**Note:**            ▪ Standard may be tackled by new standard on soil treatment as developed by TC 396:  
**prEN16907-4: soil treatment with lime and/or hydraulic binders** (Enquiry ended 02.2016)

## 2 Status revision of European testing standards

- EN 451-1**    **Method of testing fly ash — Part 1: Determination of free calcium oxide content**
- EN 451-2**    **Method of testing fly ash — Part 1: Determination of fineness by wet sieving**

**Both standards are revised and Formal Vote will start on November 1.**

**Both standards represent the reference procedures for testing fly ash!**



## BWR3 “Hygiene, Health and Environment”

Responsible: CEN TC 351 on "Construction products: Assessment of release of dangerous substances“

Task: **Development of testing standards for release into indoor air and into soil and ground.**

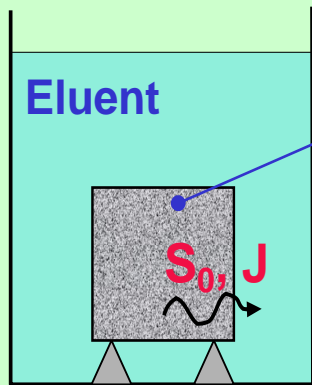
Status: The standards for release into indoor air and emission into soil and ground of bound materials are published as draft standards.

The standard for release into soil and ground of unbound material was under severe discussion as only one defined test procedure will be accepted by the Commission. Finally a compromise was found which was accepted by all parties.

### 3 Implementation of BWR3 in harm. product standards

#### DSLIT (Tank Leaching

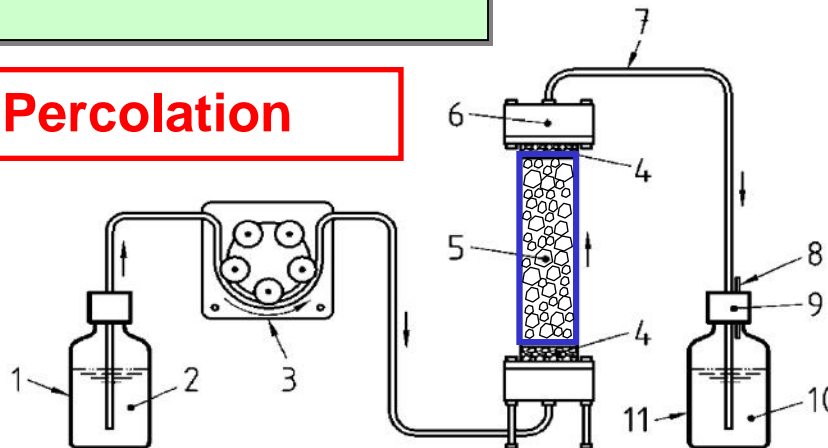
#### Standtest (Labor)



Prüfkörper  
(a = 100 mm)

Ergebnis, z. B.:  
 $E_{t = 56 \text{ days}}$   
= XX mg/m<sup>2</sup>  
für Nickel

#### Up-flow Percolation Test



### BWR3 “Hygiene, Health and Environment”

#### TC 351 – Horizontal Standardisation

Set of proposed standard for leaching test into soil and ground

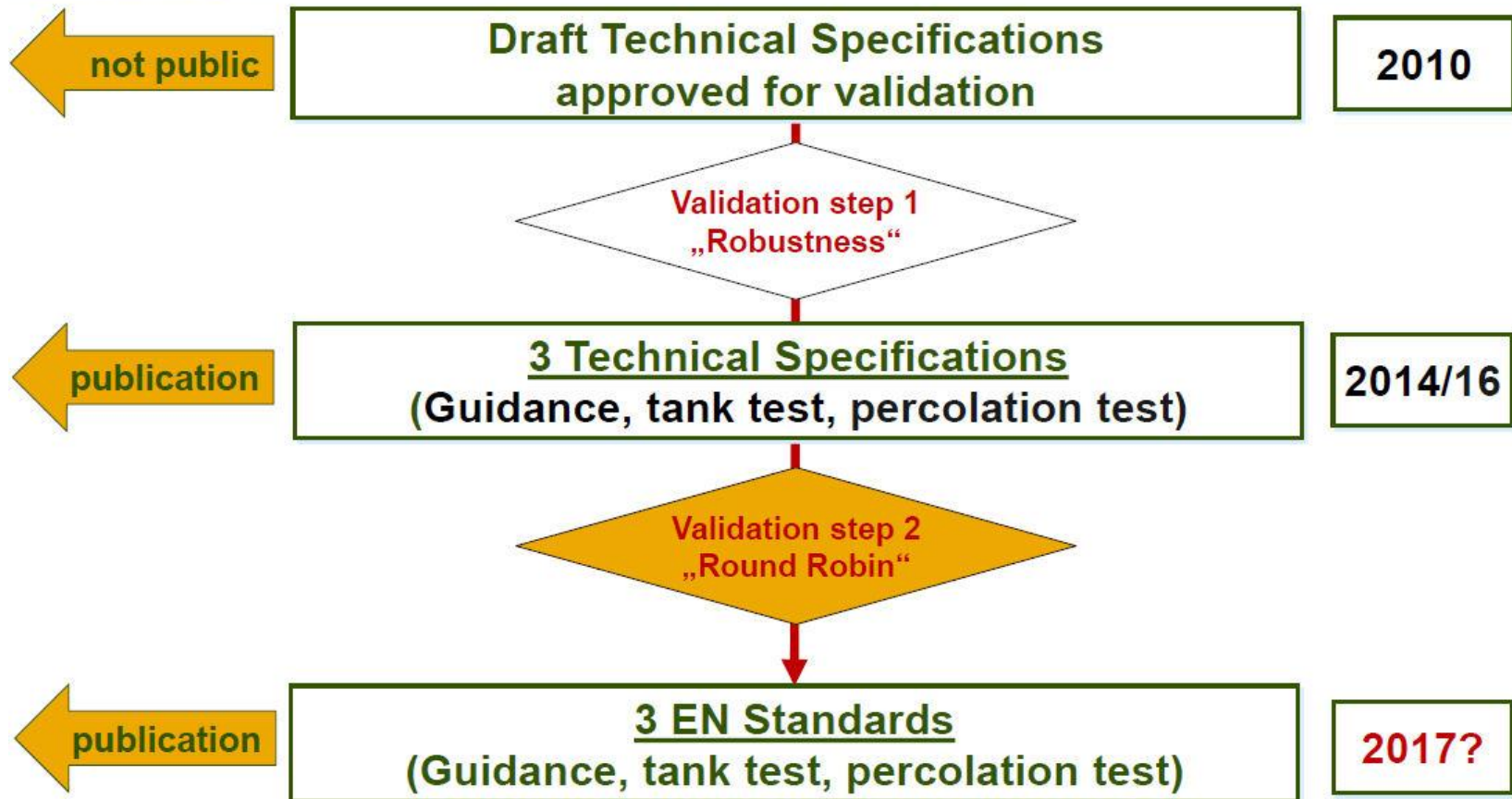
#### Legende

- 1 Vorratsgefäß
- 2 Elutionsmittel
- 3 Mehrkanalpumpe
- 4 Quarzsandschicht
- 5 Säule mit Probenmaterial
- 6 Säulenverschlusskappe (PTFE)
- 7 inertes Schlauchmaterial
- 8 Entlüftungskanüle
- 9 Schraubverschluss mit PTFE-Einlage
- 10 Eluat
- 11 Glassammelgefäß

### 3 Implementation of BWR3 in harm. product standards

## CEN/TC 351/WG1 – Time schedule for test standards/specifications

Dr.-Ing. Udo Wiens



**CEN/T...16637-1, 16637-2 and 16637-3**

#### CEN TC 351/WG 3 Radiation from construction products:

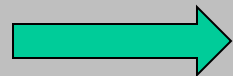
- **TS 003510014** “Construction products — **Assessment of release of dangerous substances** — Determination of activity concentrations of radium-226, thorium-232 and potassium-40 in construction products using gamma-ray spectrometry”
  - Based on the relevant Dutch standard NEN 5697
  
- **TR 00351020** “Construction products: Assessment of release of dangerous substances — radiation from construction products — **Dose assessment of emitted gamma radiation**”
  - Taking into account MS regulations, EC RP 112, BSS Directive
  - ....

## 4 Preparation phase EN 450-1 Fly ash for concrete

EN 450-1:2012 published (and valid!!)

Technical proposals to consider in the next revision

- a note on fineness regarding sample size and pressure (as agreed by ECOBA)



Finally not accepted by WG4

Formal needs to consider in the next revision

- **Annex ZA** (formal link to CPR regarding parameters and Assessment and Verification of Constancy of Performance (AVCP))
- Revised wording for CPR needs
- **Implementation of BWR 3**  
(due to existing notified regulations!)

### Impacts on DoP and CE-mark

In principle there are two ways for implementation of BWR3

- a) Place parameters and procedures
  - parameters most likely with **declared values**
  
- b) Place parameters, procedures and evaluation scheme
  - evaluation based on **classes or levels**  
(will give problems with CEN/EC)

**BUT!!!**

- no trace element concentration in DoP and CE- mark

# 4 Preparation phase EN 450-1

## Essential characteristics in DoP

Essential characteristic	Performance	Harmonised technical specification
Activity index	Pass	DIN EN 450-1:2005 + A1:2007
Fineness	category N {declared value} ± 10 percentage points	
Soundness - Expansion - Free CaO	pass pass	
Loss on ignition	category A	
Composition: - Sum of contents of silicon dioxide, aluminium oxide und iron oxides - Total content of alkalis - Reactive silicon dioxide - Sulphate content - Chloride - Reactive calcium oxide - Magnesium oxide - Soluble phosphate - Total phosphate	pass pass pass pass pass pass pass pass	
Particle density	{declared value} ± 200 kg/m <sup>3</sup>	
Initial setting time	pass	
Durability	given based on declared performance above for use in concrete, mortar and grout	
Release of dangerous substances and emissions of radioactivity		

content


Parameter	test procedure	declared value* [mg/kg]
arsenic (As)	EN ISO 11885	
lead (Pb)		
cadmium (Cd)		
chromium, total (Crtot)		
copper (Cu)		
nickel (Ni)	EN 1483	
mercury (Hg)		
thallium (Tl)		
vanadium (V)	EN ISO 11885	
zink (Zn)		

Concrete leaching

Parameter	test procedure	declared value* [mg/m <sup>2</sup> ]
antimony (Sb)	NEN 7345 or DAfStb guidance** or CEN/TS 16637-2	
arsenic (As)		
barium (Ba)		
lead (Pb)		
bromium (Br)		
cadmium (Cd)		
chromium VI (CrVI)		
chromium, total (Crtot)		
cobalt (Co)		
copper (Cu)		
molybdenium (Mo)		
nickel (Ni)		
mercury (Hg)		
selenium (Se)		
thallium (Tl)		
vanadium (V)		
zink (Zn)		
Chloride (Cl-)		
Fluoride (F-)		
Sulfate (SO42-)		

# 4 Preparation phase EN 450-1

## Essential characteristics in CE-Mark

 01234	
AnyCo Ltd, PO Box 21, B-1050, Brussels, Belgium	
12	
01234-CPR-00234	
EN 450-1:2012  Fly ash_XXYY  For use in concrete, mortar and grout	
Activity Index:	pass
Fineness:	categorie N (declared value) ± 10 percentage points
Soundness:	pass
Loss on ignition:	Category: A
Particle density:	{declared value} ± 200 kg/m <sup>3</sup>
Initial setting time:	pass
Durability:	given
Release of dangerous substances and emissions of radioactivity	

CE marking, consisting of the "CE"-symbol

Identification number of the product certification body

Name and the registered address of the manufacturer, or identifying mark

Last two digits of the year in which the marking was first affixed

Reference number to the DoP

N<sup>o</sup>. of this European standard  
Unique identification code of the product type  
Intended use of the product as laid down in the European standard applied

Level or class of the performance declared

content

Parameter	test procedure	declared value*
		[mg/kg]
arsenic (As)	EN ISO 11885	
lead (Pb)		
cadmium (Cd)		
chromium, total (Crtot)		
copper (Cu)		
nickel (Ni)	EN 1483	
mercury (Hg)		
thallium (Tl)	EN ISO 11885	
vanadium (V)		
zink (Zn)		

Concrete leaching

Parameter	test procedure	declared value*
		[mg/m <sup>2</sup> ]
antimony (Sb)	NEN 7345  or  DAfStb guidance**  or  CEN/TS 16637-2	
arsenic (As)		
barium (Ba)		
lead (Pb)		
bromium (Br)		
cadmium (Cd)		
chromiumVI (CrVI)		
chromium, total (Crtot)		
cobalt (Co)		
copper (Cu)		
molybdenium (Mo)		
nickel (Ni)		
mercury (Hg)		
selenium (Se)		
thallium (Tl)		
vanadium (V)		
zink (Zn)		
Chloride (Cl-)		
Fluoride (F-)		
Sulfate (SO42-)		

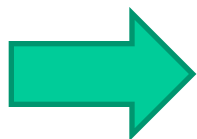


## 4 Preparation phase EN 450-1 Fly ash for concrete

### Essential characteristics in DoP and CE-marking

Conclusion for declared values:

- **Member states have to introduce an implementing regulation on set of parameters to test and regarding sequence for autocontrol and third party control. –**  
**OR**  
**to define „NPD“ - not performance determined (better: no test required)**
- Further parameters expected in upcoming discussion




**De facto no change to existing situation with national approvals – additional testing when used in different member states**

## 4 Preparation phase EN 450-1

### Alternative by classes/levels

Essential characteristic	Performance	Harmonised technical specification
Activity index	Pass	DIN EN 450-1:2005 + A1:2007
Fineness	categorie N (declared value) ± 10 percentage points	
Soundness - Expansion - Free CaO	pass pass	
Loss on ignition	categorie A	
Composition: - Sum of contents of silicon dioxide, aluminium oxide and iron oxides - Total content of alkalis - Reactive silicon dioxide - Sulphate content - Chloride - Reactive calcium oxide - Magnesium oxide - Soluble phosphate - Total phosphate	pass pass pass pass pass pass pass pass	
Particle density	(declared value) ± 200 kg/m <sup>3</sup>	
Initial setting time	pass	
Durability	given based on declared performance above for use in concrete, mortar and grout	
Release of dangerous substances and emissions of radioactivity		

Parameter	test procedure	evaluation
Release of dangerous substances	-	Class 1 Class 2 NPD
Radioactivity (AI)	XXXX	Declared value NPD
.....		

 01234
AnyCo Ltd, PO Box 21, B-1050, Brussels, Belgium
12
01234-CPR-00234
<b>EN 450-1:2012</b> <b>Fly ash_XXYY</b> For use in concrete, mortar and grout
<b>Activity index:</b> pass <b>Fineness:</b> categorie N (declared value) ± 10 percentage points <b>Soundness:</b> pass <b>Loss on ignition:</b> Category: A <b>Particle density:</b> (declared value) ± 200 kg/m <sup>3</sup> <b>Initial setting time:</b> pass <b>Durability:</b> given Release of dangerous substances and emissions of radioactivity

CE marking, consisting of the "CE"-symbol
Identification number of the product certification body
Name and the registered address of the manufacturer, or identifying mark
Last two digits of the year in which the marking was first affixed
Reference number to the DoP
N <sup>o</sup> . of this European standard Unique identification code of the product type Intended use of the product as laid down in the European standard applied
Level or class of the performance declared

### Note:

- Authorities can define classes in implementing regulation consisting of parameters and limits ...
- this way is not supported by CEN/EC
- it requires a change of the mandate (subject to verification) and
- a delegated act (also subject to verification)

## Conclusions

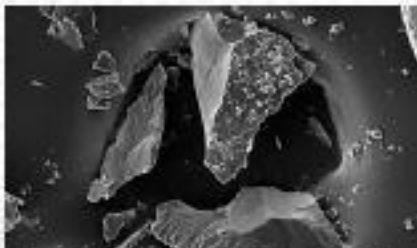
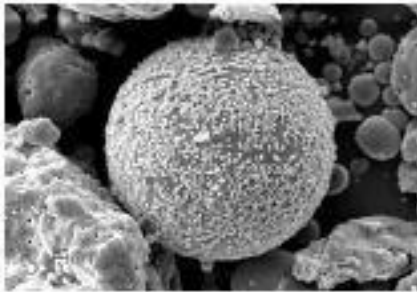
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- All product and conformity evaluation standards have to be revised to meet the requirements of the Construction Product Regulation.
- Revision of formal aspects are mostly addressing CPR wording and the informative annex ZA in the product standards and evaluation of conformity of constancy of performance in all conformity evaluation standards
- Most of the revised standards are delayed for formal reasons (not meeting CPR Terminology or format (Annex ZA, BWR3) or for Technical changes (classes which are not covered by mandate)
- CEN TC 104 WG4 started to prepare a revision of EN 450-1 including implementation of existing environmental regulations.
- Parameters, test procedures and declared values are most likely the result of many product TCs
- Preparation for environmental classes is seen the preferable way
- Horizontal test procedures prepared by TC 351 will be available end 2017/early 2018!

Thank you for your attention!  
Perhaps we meet again in Brno?

# EUROCOALASH 2017

INNOVATIONS IN POWER PLANT TECHNOLOGY  
AND CCP UTILISATION



6-8TH FEBRUARY,  
BRNO, CZECH REPUBLIC

