

Assessing ionizing radiation from construction products under CPR 305/2011

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Who

- Pekka Vuorinen
 - Director, Environment & Energy
- Finnish Association of Construction Product Industries RTT
 - Part of Confederation of Finnish Construction Industries RT
 - RT is a member of Confederation of Finnish Industries EK
- RTT is also a standard writing body nominated by Finnish Standards Association SFS
 - Responsible for 33 CEN TCs and 14 ISO TCs in Finland
 - CEN/TC 350 Sustainability of construction works
 - CEN/TC 351 Construction products - Assessment of release of dangerous substances
 - chairman of WG3 “Radiation from construction products”



Dangerous substances under the CPR 305/2011

BRCW 3: Hygiene, health and the environment

“The construction works must be designed and built in such a way that they will, throughout their life cycle, not be a threat to the hygiene or health and safety of workers, occupants or neighbours, nor have an exceedingly high impact, over their entire life cycle, on the environmental quality or on the climate during their construction, use and demolition, in particular as a result of any of the following:

- ... the emissions of dangerous substances, volatile organic compounds (VOC), greenhouse gases or dangerous particles into indoor or outdoor air;
- **the emission of dangerous radiation;**
- the release of dangerous substances into ground water, marine waters, surface waters or soil;
- the release of dangerous substances into drinking water or substances which have an otherwise negative impact on drinking water ...”



Dangerous substances under the CPR



- Market entry only possible with CE marking (if hEN or ETA exists)
- Meeting the environmental requirements of Member States
- Declaration of Performance
- Allows reuse of recycled materials in construction products



Scope of CEN/TC 351 "Construction products - Assessment of release of dangerous substances"

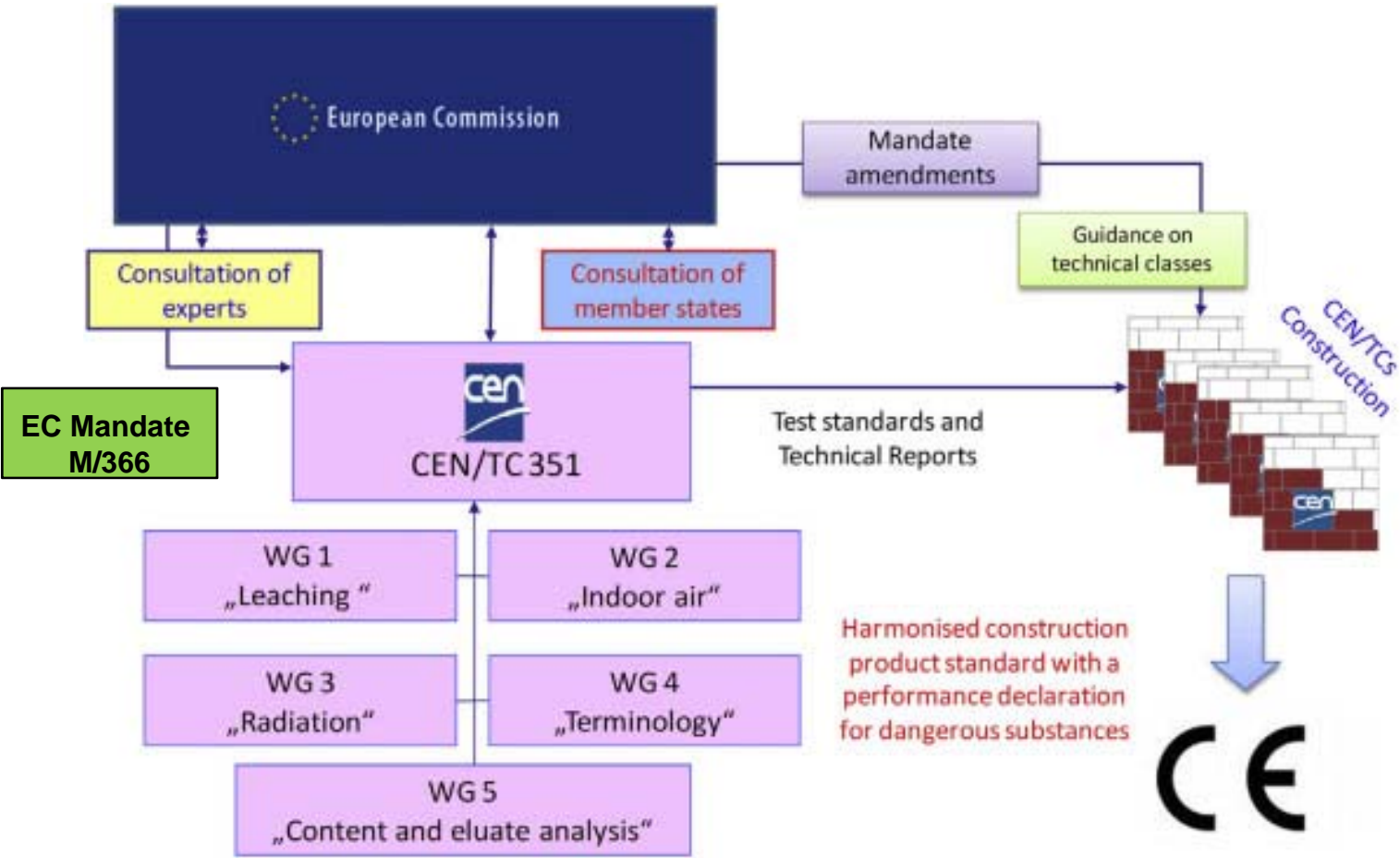
Development of:

- **horizontal** standardised assessment methods
- for **harmonised** approaches
- relating to the **release** to soil and indoor air
- of **regulated dangerous substances**
- under the **CPD*** taking into account
- the **intended conditions of use** of the product
- Mandate M/366 to CEN

* since 1 July 2013, the CPR has replaced the CPD



CEN/TC 351 Construction products - Assessment of release of dangerous substances



Relevant for

- **Products** and product groups that are mandated under the CPR → **CEN/TCs to adapt Annex ZA of hENs**
- **Producers** that place products on the market in Member States with regulations regarding DS from or in construction products → **to decide on intended use and to declare class or value**
- **National or vertical method** for assessment of release of DS → **to be replaced by horizontal harmonised European method**



Substances

- European Commission's database on regulated dangerous substances (to be updated...)
- Substances that are **now** under **notified** national regulations or under **European** regulations
- Review of existing product mandates to incorporate DS in harmonised standards still on-going in the Commission



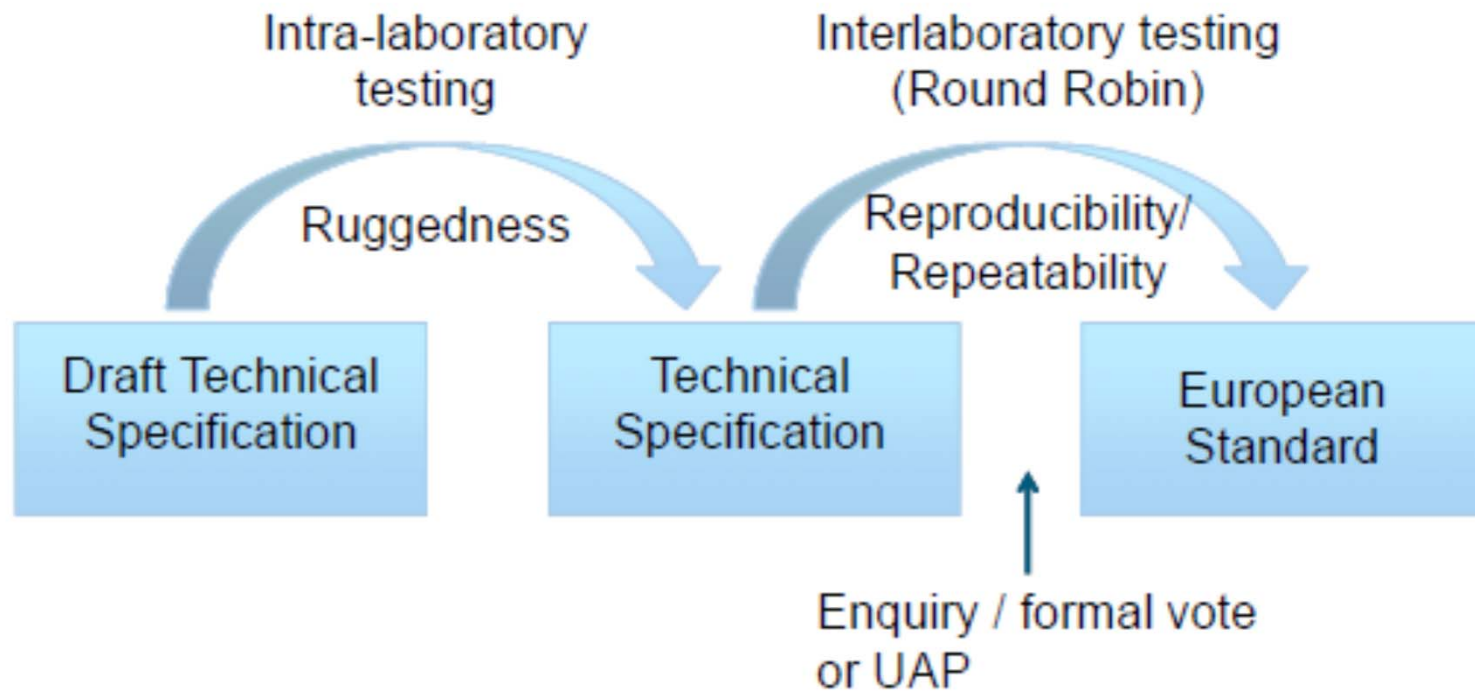
Quality

According to mandate M/366 and required by Member State representatives and construction products industry:

- **Quality** of test methods needs to be assessed and known
- Before publication as EN, **validation** needs to be executed
- Quality needs to meet regulatory requirements and FPC **reproducibility/repeatability**



Validation



Source: CEN Guide 13 *Validation of environmental test methods*



CEN/TC 351 and radiation from construction products - History

- **CEN/TC 351 Workshop on Radiation from Construction Products 30 October 2009 in Brussels**
 - **Recommendation 1**
 - *Develop (in CEN/TC 351) a standardised measurement method for activity concentrations of radioactivity (gamma radiation)*
 - **Recommendation 2**
 - *If it is necessary to develop a harmonised method for the calculation of the dose caused by gamma radiation, this should be covered in a separate standard.*
 - **Recommendation 4**
 - *Radon exhalation (noticed)*
- **CEN/TC 351 Resolution in Prague 2010**
 - Original TG 6 → a new Working Group: **WG 3 'Radiation from construction products'**; first meeting February 2011

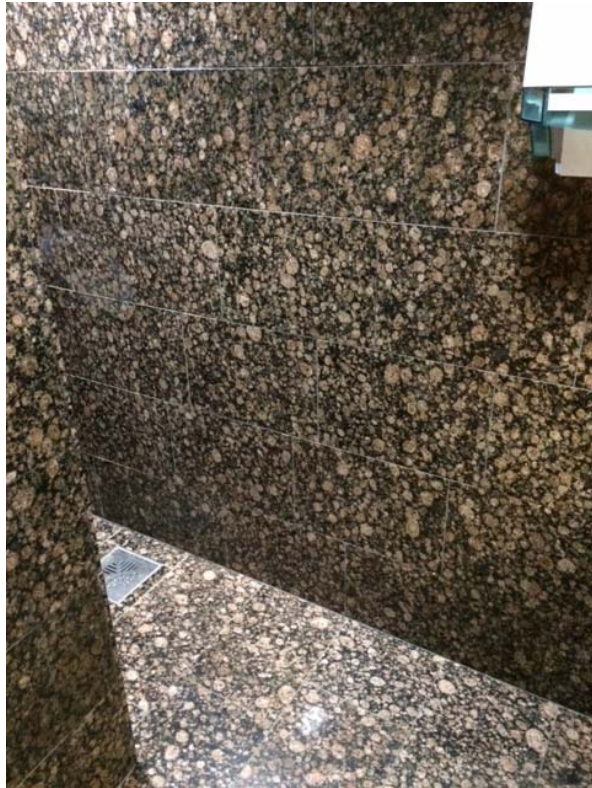


WG3 Radiation from construction products – who and how

- High level of knowledge
 - Regulators, high level officers also from EC (not common in CEN work)
 - Experienced testing and industrial experts
- Has noticed shortcomings of existing tools (still well established)
 - EC Radiation Protection RP 112, MS regulations
- A common aim to develop European harmonized tools (standards) for both
 - Measurement of gamma radiation (EN)
 - Dose assessment (first step TR; later EN or something else?)
 - After having noticed MS regulations and also **needs of the BSS Directive**



EN for gamma radiation – why needed



The BSS Directive in its article 75 “Gamma radiation from building materials” addresses building materials (\approx construction products) and sets a reference level as follows

- 1) *“The reference level applying to indoor external exposure to gamma radiation emitted by building materials, in addition to outdoor external exposure, shall be 1 mSv per year.”*
- 2) *“For building materials which are identified by the Member State as being of concern from a radiation protection point of view, taking into account the indicative list of materials set out in Annex XIII with regard to their emitted gamma radiation, Member States shall ensure that, before such materials are placed on the market:*
 - *the activity concentrations of the radionuclides specified in Annex VIII are determined, and that,*
 - *information to the competent authority on the results of measurements and the corresponding activity concentration index, as well as other relevant factors, as defined in Annex VIII, are provided if requested”*



Draft TR “Dose modelling” – why needed



- “Fair treatment” of different building materials/products and solutions from assessment of ionizing radiation point of view
- BSS Directive / Annex VIII presents
 - activity concentration Index I, as a screening tool, asking determination of three radionuclides of gamma radiation (EN on measurement of gamma radiation to be used)
 - a need to specify dose more precisely in certain cases (*...The calculation of dose needs to take into account other factors such as density, thickness of the material as well as factors relating to the type of building and the intended use of the material (bulk or superficial); in this case the draft TR on dose assessment could/will serve as a calculation tool*)



WG3 Radiation from construction products; current state

- 1 method for measurement of activity concentrations of thorium-232, radium-228 and potassium-40 (based on NEN 5697); waiting for robustness validation
- TR on determination of dose assessment of emitted gamma radiation; facilitating new Basic Safety Standards Directive (2013/59/EURATOM)
- Radon exhalation measurement method: postponed

Tendering procedure for robustness validation was completed in April 2013; since then waiting for contract signature by the EC

- **Signed 7/2015 → the work will continue!**

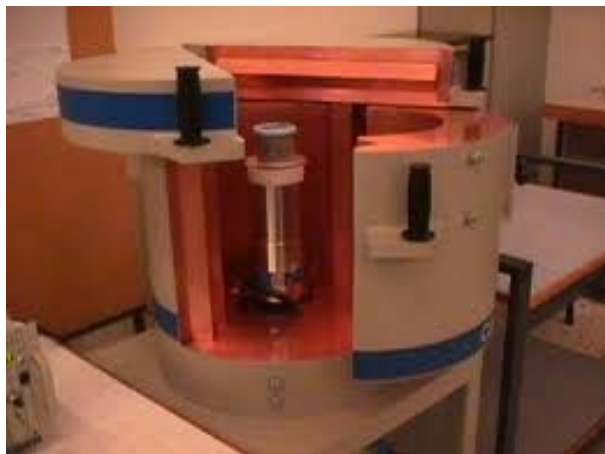


CEN/TC 351/WG3 Radiation from construction products: active WIs

- **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”**
 - MS regulations, EC RP 112, BSS Directive... taken into account



Measurement: gamma ray spectrometry (TS 003510014)



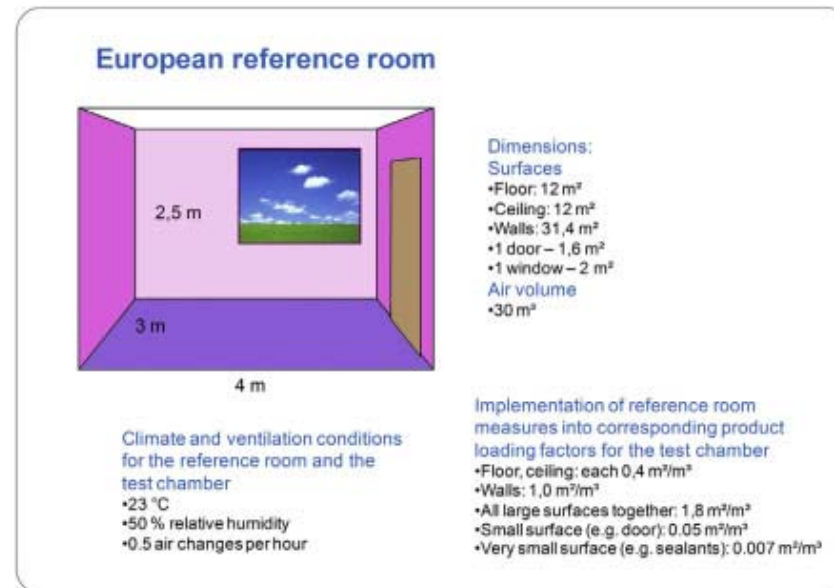
- Well established
 - based on NEN 5697
- Annex C (normative): Method for the determination of the activity concentration in a composite product
 - To determine the activity concentration of a composite construction product where each of the components is tested individually, the results from each component shall be processed using the following equation:

$$A_i = \sum_{j=1}^c A_{i,j} f_j$$



Draft TR “Dose modelling”

- EU regulatory framework
 - **Use of Index I (formula)**
 - **1 mSv/a reference level** established in the EU-BSS Directive (2013/59/EURATOM)
 - **1 mSv/a $\approx I=1$**
 - **0,3 mSv/a $\approx I=0,5$!!!**
- Dose assessment; parameters for calculation
 - European reference (model) room!
 - Occupancy
 - Shielding effect of materials
 - Conversion factor for absorbed dose in air
 - Material thickness aspects
 - Material density aspects
 - **Density/thickness corrected formula**
- A proposal for “classification” (calculation steps)



More information and contact

www.centc351.org

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Thank you for your interest!

