Certification of Building Products

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Consequences for Solar Thermal Systems

Dr. Werner Platzer, Fraunhofer ISE

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Product certification – barrier or chance?

- International trading with reduced efforts for testing and certification
- National, regional and global certification
- Product standards for a minimum quality
- Protect markets from „bad experiences“
- Standardized products for better cost/performance ratio
- Marketing
- Transparence

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Definitions

- Certification
- Accreditation
-
- Notified body

- Certification is the formal attestation by a neutral independent third party that products, processes, systems or persons meet defined requirements.
- Formal attestation by an accreditation authority (e.g. UKAS, DAKKS) that a test lab, factory production control certification body or product certification body meets defined requirements.
- Notified Bodies (NBs) are the only recognised third party bodies that can carry out a conformity assessments laid down in the relevant harmonised European standards or European Technical Assessment.

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Definitions

- Empowered certification body
  - Institutions allowed to issue certifications for a certain voluntary certification program
- Recognised test lab
  - Test lab accepted to perform testing related to a voluntary certification by an empowered certification body.
- Accredited test lab
  - Test lab with a formal attestation by an accreditation authority (e.g. UKAS, DAKKS) that it meets the defined requirements related to a certain standardized testing procedure.
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Keymark Certification

- Basic regulations
  - Initial type testing
  - Sample specifications
  - Quality management systems requirement
  - Regular retesting
- Specific regulations
  - Product families
  - Testing standards
  - Data sheet formats
  - Deviation from basic regulations (e.g. yearly reinspections)

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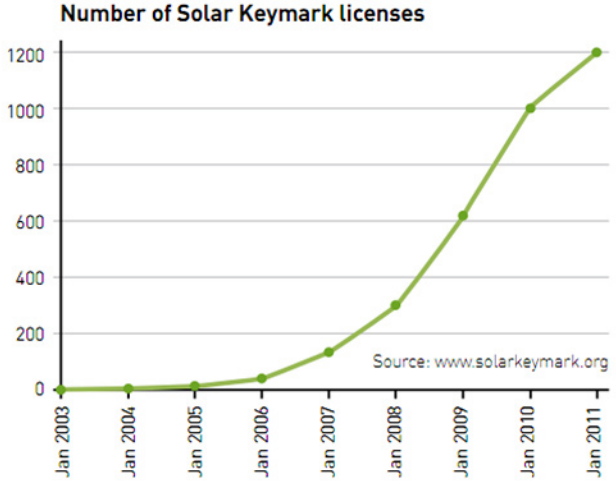
Solar Keymark Label

- Accepted in a growing number of countries
- Based on the well-established CEN Keymark certification scheme
- Operated by the existing network of accreditation bodies, empowered bodies, certification bodies and several accredited testing laboratories
- Many years of experiences
- Keeping track with innovation and improving quality by an active network



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Solar Keymark Scheme

- Solar Keymark was created to certify solar thermal products at European level. The aim is to reduce trade barriers and promote the use of high quality solar thermal products in the European market and beyond.

- The Solar Keymark is a voluntary third-party certification mark for solar thermal products, demonstrating to end-users that a product conforms to the relevant European standards and fulfils additional requirements. The Solar Keymark is used in Europe and increasingly recognized worldwide.

- Solar Keymark is a CEN/CENELEC European mark scheme, dedicated to:
  - Solar thermal collectors (based on EN 12975)
  - Factory made solar thermal systems (based on EN12976)
  - Complete systems and system components (based on EN 12977)

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Benefits of the Solar Keymark

- What are the benefits of the SK for manufacturers?
  - simpler testing procedure
  - one test valid for all European countries
  - freedom of choice amongst the accredited test labs
  - easier introduction of new products in different European countries
  - simplified procedures for replacing components in certified products
- What are the benefits of the SK for consumers?
  - high quality products
  - guarantee that the product sold is identical to the tested product
  - products are FULLY tested according to the relevant standards
  - eligibility for subsidies

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Solar Keymark Scheme

– The Solar Keymark was developed by the European Solar Thermal Industry Federation (ESTIF) and CEN (European Committee for Standardisation) in close co-operation with leading European test labs and with the support of the European Commission.

Information about the Keymark certification is available from www.cen.eu/cen/Certification/Keymark

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Solar Keymark - List of empowered certification bodies

- AENOR (ES)
- CERTIF (PT)
- EUROVENT CERTITA CERTIFICATION (FR)
- DIN CERTCO (DE)
- DQS Hellas Ltd. (GR)
- SP Certification (SE)
- And others

- Every CB has a list of recognised test labs

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Regulation (EU) No 305/2011

Construction Products Regulation

– Regulation No 305/2011 (Construction Products Regulation) of the European Parliament and of the European Council of 9 March 2011 replaces Construction Products Directive (89/106/EEC).
– The EU regulation shall simplify and clarify the existing framework for the placement of construction products in the market.
– The EU regulation lays down harmonised conditions for the marketing of construction products.

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Vision

- "ensure the free movement of all construction products within the European Union by harmonizing national laws with respect to the essential requirements applicable to these products in terms of health and safety.“
- "standardize the manufacturing of construction products and guarantee the unlimited use of these products within the EU.“

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Objectives

- The objective of the CPD (and the CPR alike) is not to define the safety of construction products, but to ensure that reliable information is presented in relation to their performance. This is achieved by providing, mainly in standards, a common technical language, to be used not only by manufacturers, but also by public authorities when defining their requirements on construction works, directly or indirectly influencing the demands placed on the products to be used in them.
- The CPD (and CPR) wants to harmonize the methods of testing, the methods of declaration of product performance values, and the method of conformity assessment.
  NOT: Harmonization of product regulation!
  Member States and public and private sector procurers were free to set their own requirements on the performance of works and therefore products. Choice of value for intended use, was left to the regulators in each Member State.

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Elements of CPD

- The CPD provides the following four main elements:
  - a system of harmonized technical specifications
  - an agreed system of attestation of conformity for each product family
  - a framework of notified bodies
  - the CE marking of products

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Information Process related to CPR

- The Declaration of Performance (DoP) is the key concept in the Construction Products Regulation (CPR).
- The DoP serves to deliver the information about the essential characteristics of the product that a manufacturer wants to make available on the market.
- The manufacturer shall draw up a Declaration of Performance when a product covered by a harmonised standard (hEN) or a European Technical Assessment (ETA) is placed on the market.
- The manufacturer, by drawing up a DoP, assumes the responsibility for the conformity of the construction product with the declared performance.
- A copy of the DoP of each product which is made available on the market shall be supplied either in paper form or by electronic means or on a website.

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Harmonized Technical Specifications

- The Construction Products Directive recognizes the following types of Harmonized Technical Specifications:
  - Harmonized European Standards
  - European Technical Approvals
  - European Technical Approvals without Guideline

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Harmonized Standards

- At the moment more than 550 harmonized standards are valid.
- Examples:
  - CEN EN 1279-5:2005+A2:2010
    Glass in building - Insulating glass units - Part 5: Evaluation of conformity
  - CEN EN 13162:2012
    Thermal insulation products for buildings - Factory made mineral wool (MW) products – Specification
  - CEN EN 14303:2009+A1:2013
    Thermal insulation products for building equipment and industrial installations - Factory made mineral wool (MW) products - Specification

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CE Marking

- CE Marking is a declaration by the manufacturer that the product meets certain public safety requirements. The public safety requirements are a set of essential characteristics that each product must satisfy and these characteristics are given in the product's harmonized standard. WP1
- Six essential requirements which need to be addressed (by committee) and satisfied, when relevant, by the product prior to being put on the market:
  - Mechanical resistance and stability
  - Safety in the case of fire
  - Hygiene, health and the environment
  - Safety in use
  - Protection against noise
  - Energy economy and heat retention

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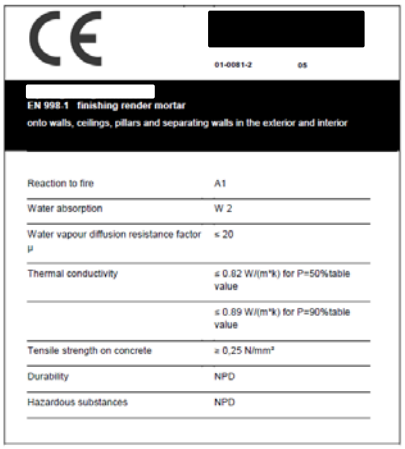
Folie 21

WP1 technical specifications?
Werner Platzer, 24/08/2014

CE Marking

– CE marking is affixed to construction products for which the manufacturer has drawn up a declaration of performance. By affixing the CE marking to a construction product, manufacturers indicate that they take responsibility for the conformity of that product with its declared performance.



– Misuse of CE mark

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CE Marking and Solar Thermal Sy

- Declaration of performance and conformity by manufacturer using respective test reports towards:
  - **Building Components Regulation**
  - Pressure Equipment Directive
  - Low Voltage Directive
  - ... maybe others
- Basing the CE on a „harmonized standard“ makes things much more easy (earliest with autumn 2014/spring 2015)

CE-marking related to Construction Product Regulation (CPR)

- CE-marking of solar collectors related to the Construction Product Regulation (CPR) is under preparation and will cover:
  - Mechanical resistance to climatic loads (wind, snow, …)
  - Fire safety (e.g. initiation, reaction to fire, risk to adjacent elements, …, as relevant)
  - Weather tightness (when relevant - i.e. for roof or façade integration)
- Attestation of conformity according to CPD Annex III.2.(ii), second possibility:
  - initial type-testing of the product by an approved laboratory
  - factory production control
- It is expected that this CE-marking will be in force in 2014-15
  - Requirement: CEN EN 12975-1

CE-marking related to Pressure Equipment Directive (PED)

- As solar collectors are pressurized, the question arises if they are touched by the regulations of the EU pressure equipment directive (PED).

- According to the rules and guidelines referred below:
- Large collector modules with PS*V BIGGER THAN 50 bar*litres SHALL be CE-marked in relation with the PED
- Normal collector modules with PS*V LOWER THAN 50 bar*litres CAN NOT be CE-marked in relation to the PED

- In Guideline 2/23 of March 31st, 2006 to the Pressure equipment directive 97/23/EC by the Commission's Working Group "Pressure", it is clarified that: "A typical solar panel would be classified as Article 3, paragraph 3 equipment, due to the maximum allowable pressure and volume"

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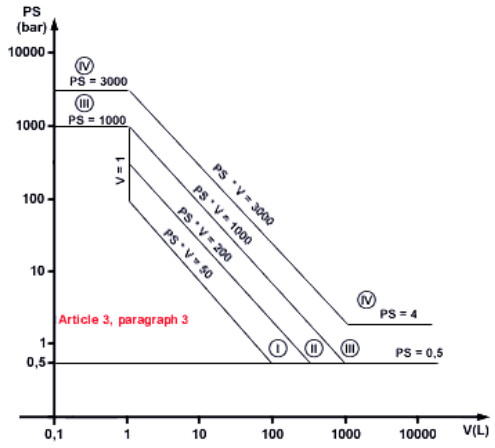
Pressure Equipment Directive (PED)

typical solar panel : volume 2-3 litres
typical pressure in closed solar thermal system : 4 bar



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CE-marking related to Pressure Equipment Directive (PED)

- It is seen that far most collectors are covered by the Article 3 Paragraph 3, stating: "Such equipment and/or assemblies must not bear the CE marking ...".
- However, in some cases CE-marking of solar thermal collectors is obligatory according to the curves above (large collector modules):
  - Collector volume in litres multiplied by the max. allowable pressure in bars > 50 litre*bar: Category I - Conformity Assessment Procedures: Module A applies
  - Collector volume in litres multiplied by the max. allowable pressure in bars > 200 litre*bar: Category II - Conformity Assessment Procedures: Modules A1, D1, E1 applies

- PS: In accordance with clause (5) of the preface of the PED, not a collector array, but a single collector has to be considered.

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Most relevant standards for solar thermal collector tests

Name	Topic	Accessible by a Solar Simulator
CEN/TC 312 Date: 2012-12 **FprEN 12975-1:2012.2**	Thermal solar systems and components — Solar collectors — Part 1: General requirements	partly
ISO/TC 180/SC Date: 2013-11-06 **ISO 9806:2013** Identical to: **EN ISO 9806:2014**	Solar energy — Solar thermal collectors — Test methods	partly

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FprEN 12975-1:2012.2

Scope (1)

- This European Standard specifies performance requirements for fluid heating collectors with respect to mechanical resistance to climatic loads, fire safety, weather tightness, release of dangerous substances, electrical safety, operating pressure, sound level, thermal output and collector efficiency.
- Fluids included are anti-freeze fluids, thermo oil, air and water which are not intended for human consumption. The intended use of the solar collector is to heat up the working fluid. This European Standard also includes provisions for evaluation of conformity to these requirements.

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FprEN 12975-1:2012.2

Scope (2)

- This European Standard covers only the solar collector consisting of its components: i.e. absorber, frame, insulation and glazing; It does not cover the fluid.
- It is applicable to glazed and unglazed solar collectors, flat plate solar collectors, evacuated tubular solar collectors, concentrating solar collectors, tracking solar collectors and thermal-electrical hybrid solar collectors (so called PVT solar collectors).
- It is not applicable to those solar collectors, in which the thermal storage unit is an integral part of the solar collector to such an extent, that the heat production process cannot be separated from the storage process for the purpose of making measurements of these two processes.

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CE Mark for Solar Thermal Collectors

CE

AnyCo Ltd, PO Box 21, B-1050

06

EN 12975–1:20XX

solar collectors, intended to be used in buildings

Mechanical resistance to climatic loads:
Positive load: 5 400 Pa
Negative load: 2 400 Pa

Reaction to fire: Class A1

Weather tightness: pass

Release of dangerous substances: no

Electrical safety: pass

Max. operating pressure: pass

Sound level: NPD

Thermal output: P_{peak} = 1 700 W

Efficiency: $\eta_{0,hem}$ = 0.80

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CE and Keymark

- CE-marking should go hand in hand with Keymarking:
  - CE-marking being the manufacturer declared (lower level) quality assurance scheme
  - Keymarking being the 3rd party certified (higher level) quality assurance scheme

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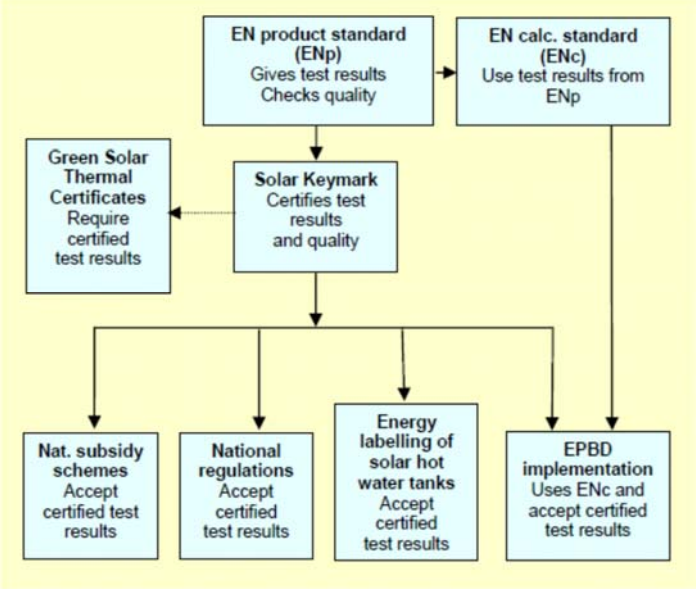
Relations between Product Certification and EBPD



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Emerging standard updates

Reference	Title	Drafting Body
prEN 12975-1	Thermal solar systems and components - Solar collectors - Part 1: General requirements	CEN/TC 312/WG 1
prEN 12976-1	Thermal solar systems and components - Factory made systems – Part 1: General requirements	CEN/TC 312/WG 2
prEN 12976-2	Thermal solar systems and components - Factory made systems – Part 2: Test methods	CEN/TC 312/WG 2

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Status

Reference	Last Milestone	Next Milestone
prEN 12975-1	Closure of enquiry / most likely proposal of new work item, revision and harmonization with EBPD	Dispatch of 2nd ENQ draft to CMC, DoA not before spring 2015
prEN 12976-1	Closure of Enquiry	Dispatch FV draft to CMC
prEN 12976-2	Closure of Enquiry	Dispatch FV draft to CMC

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Emerging standards for future certification

Reference	Title	Drafting Body
prEN ISO 22975-1	Solar Energy - Collector components and materials, Part 1: Evacuated tubes - Durablility and performance	ISO/TC180
prEN ISO 22975-2	Solar Energy - Collector components and materials, Part 2: Heat-pipes for evacuated tubes – Durability and performance	ISO/TC180
prEN 12975-3-1	Thermal solar systems and components - Solar collectors - Part 3-1: Qualification of solar absorber surface durability	CEN/TC 312/WG 1

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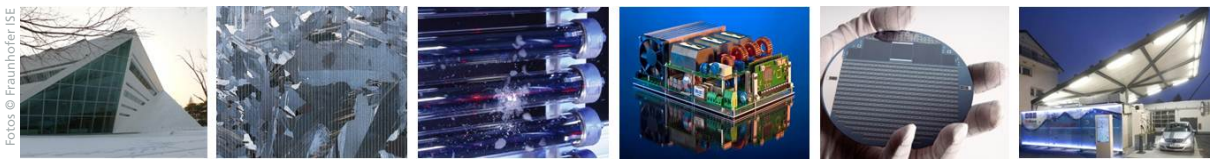
Thank you for your Attention!



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