QUALICHeCK
Towards better quality and compliance

QUALICHeCK input to BUILD UP Skills

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2 objectives of QUALICHeCK

- *To set up a series of actions which should result in more attention and practical initiatives for **actual compliance with the EPC for new and renovated buildings***

  i.e. 'Boundary conditions which force people to do what they declare';

- *To set up a series of actions, which should result in more attention and practical initiatives for **achieving a better quality of the works***

  i.e. 'Boundary conditions which stimulate and allow the building sector to deliver good quality of the works'.

Regulatory context

EPBD Directive 2010/31/EU

- Article 8 specifies the need to establish requirements for the proper installation, dimensioning, adjustment and control of technical building systems.
- Article 18: MS shall establish independent control systems meeting the verification requirements given in Annex II. According to this annex, the verifications shall be based on more or less extensive checks of the EPC input data, results stated in the certificates, and recommendations. Article 17 also requires Member States to implement penalties in case of infringements of the national provisions.
- Article 11 requires "to make it possible for owners or tenants of the building or building unit to compare and assess its energy performance".

RES Directive 2009/28/EC

- Article 14: Member States shall ensure … (3) that certification schemes or equivalent qualification schemes are available for installers of small-scale biomass boilers and stoves, solar photovoltaic and solar thermal systems, shallow geothermal systems and heat pumps and … (5) guidance is made available to planners and architects so that they are able properly to consider the optimal combination of renewable energy sources, of high-efficiency technologies and of district heating and cooling when planning, designing, building and renovating industrial or residential areas.

EE Directive 2012/27/EU

- *Article 16 (1):* Member State shall ensure that certification and/or accreditation schemes and/or equivalent qualification schemes, including, where necessary, suitable training programmes, are available for providers of energy services, energy audits, energy managers and installers of energy-related building elements.

Definition of “Quality of the works”

- "Quality of the works" refers to the potential gap between the works realised and the works expected to meet stated or implied needs.
- When looking specifically at how quality of the works impacts energy performance certificates, "quality of the works" may be further defined as a measure of the gap between the specifications of the works stated or implied to be consistent with the input values assumed to be used in the energy performance certificate, and the actual execution of the works. It is assumed that the desired level(s) of the corresponding input data is (are) explicitly defined.
- The quality of the works can be considered as "good" or "compliant" if this gap does not degrade the expected performance.
- Therefore, the quality of the works may be qualified as "good" or "compliant" if, for example:
  - a system is installed according to the technical specifications agreed within a given context (e.g. technical prescriptions, a technical approval, rules of a professional association, etc.) ;
  - products are installed according to the designer and manufacturer specifications
- Analysis of additional costs in the European construction sector caused by faults having occurred during the construction process identified nearly 10% of the turnover of the construction sector. Thus, quality of works is not only crucial for achieving EU energy and climate goals but also essential from the economic point of view.

Indications of quality problems - Overview

QUALICHeCK conducted 10 new field studies, each on samples of 25+ buildings; significant non-compliance issues were found e.g.:

- In Austria, 20% of the EPC input data had not been updated between design and completion, resulting in 5-28% errors in Space Heating Demand assessments.
- In Belgium, 46% of the cavity wall insulation of existing buildings investigated reported a wrongly reported single value for the cavity width.
- In Cyprus, 37% of the buildings examined did not comply with the applicable decree in terms of U-values.
- In Estonia, 68% of the buildings investigated did not comply with the regulatory summer comfort requirement.
- In Greece, 41% of the studied buildings were not compliant as concerns U-values of doors/windows, 56% of external insulation U-values and 73% for solar collectors area.
- In Romania, recalculation of the EPCs lead to a change in energy class in almost 40% of the sample for the total energy use, 50% for the space heating energy use.
- In Spain, significant differences were found between the results given using different EPC software tools.
- In Sweden, the non-compliance rate based on the availability of the EPC alone was found of 56% on a sample of 100 new houses.

In general, the field studies conducted by QUALICHeCK show:

- In many countries development with 5 years' step can be seen;
- Systemic changes evidently will need time, legislative changes are to be supported with relevant compliance procedures, supervision, commissioning, performance measurements, piloting, model solutions, guidelines, training etc.;
- More ambitious and sophisticated systems are more difficult to implement in practice – longer learning curves;
- Compliance frameworks must be extended in many countries to be able to assess as built performance.

Indications of quality problems - Overview

The QUALICHeCK Consortium also analysed 31 existing studies based on which it can be concluded that:

- Poor ventilation is seen as a major European problem as ventilation rates and noise typically did not comply with requirements;
- Ductwork air tightness is an issue in Central Europe, but was solved 30 years ago in North Europe;
- Building leakage showed both good and bad examples;
- Studies on transmission characteristics were quite limited and mostly inconclusive;
- Heat pumps, solar thermal and other renewables showed good performance if certified installers type schemes were applied;
- Available data on summer thermal comfort was very limited however the issue was somehow addressed in majority of building codes.
- In general, the studies highlighted critical issues, in particular, inappropriate product characteristics and workmanship, lack of competence or insufficient knowledge of technologies implemented.
- Over 50% of non-compliant ventilation provisions in France or The Netherlands, and serious indoor climate problems in nearly 2/3 of Estonian buildings.
- Numerous common problems in renewables in multi-energy systems in Austria, France, Germany and Sweden (e.g., 50% to 83% of unused pipe connections not insulated that degrade heat storage tank performance).

Indications of quality problems
Focus on transmission characteristics
Burgholzhof: Surveillance of Design and Construction Work

- 500 residential units in low energy level
- Fraunhofer IBP contracted by city of Stuttgart to check EP calculations, design of joints, realisation on site

- Quality check for all three parts was important:
  - Windows U-values and g-values did not meet specifications (at that time two types of U-values: measured acc. DIN and officially published with „safety“ allowances, g-values deemed less important)
  - Thermal separation of balcony plates not properly executed, filled partly with mortar or concrete, and damages in cases of thermal separation as part of pre-fabricated balconies (thermal bridges)
  - Overlap of wall insulation on window frame not properly understood/realized (danger for rainwater entering insulation and increased thermal bridges)
  - Window seams filled with polyurethane foam only (not durably elastic → holes → bad airtightness of window joints)
  - Insulation material with inferior thermal conductivity, smaller insulation thickness
  - Top mounted roller shutters create thermal bridges at the location where the shutters are on top of the wall
  - Additional insulation on the inner side of cellar walls problematic (pipes, fixtures)
  - Proofs of thermal protection had to be corrected, up to 4 times
  - Many of the details had to be improved/clarified by adding material descriptions, etc.

Indications of quality problems

Focus on transmission characteristics

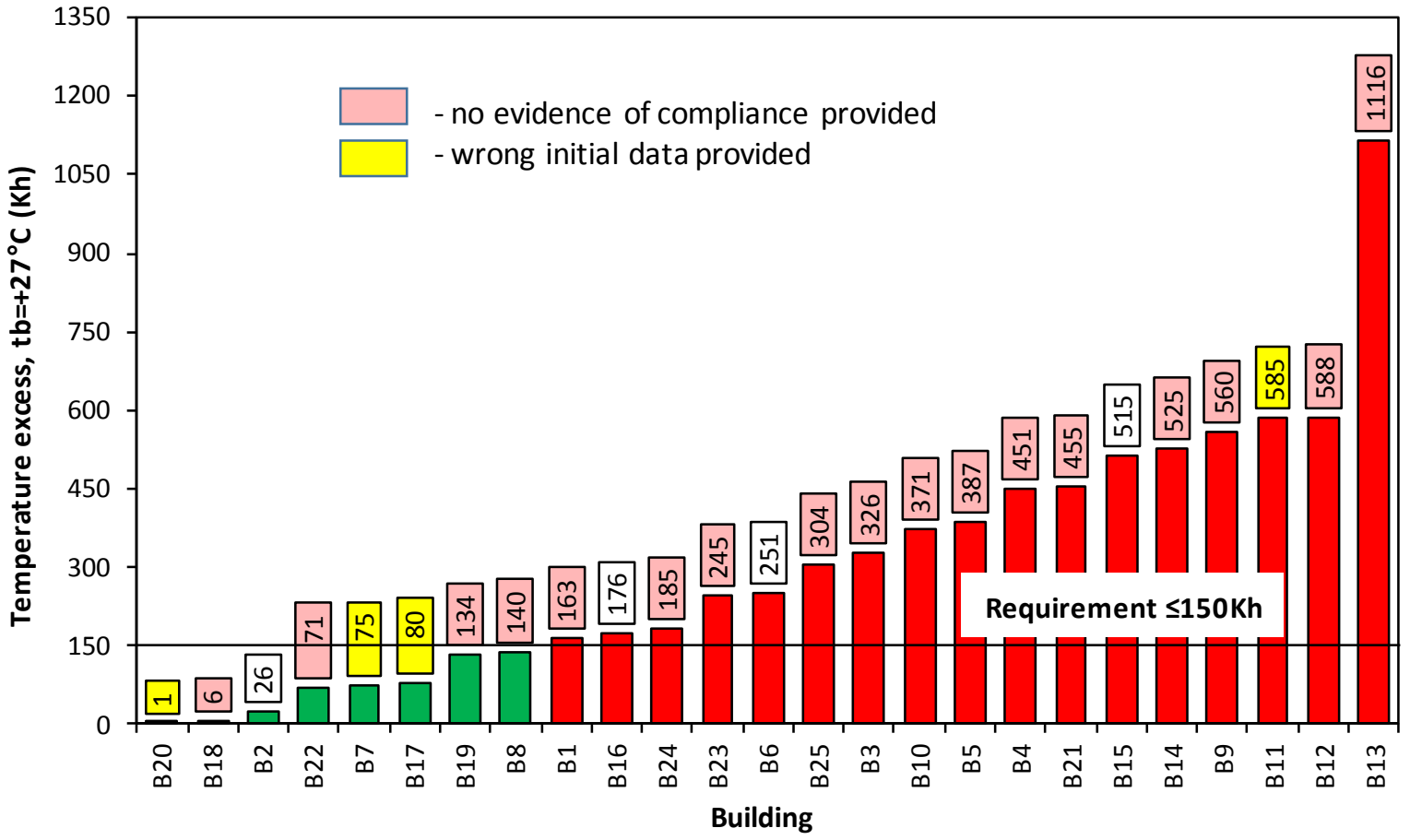
Wrong insulation material at loose fill insulations in attics, Sweden

- Mapping of the status of loose fill insulation in attics in Sweden:
  - the thickness of attic insulation is lower than ordered in ¼ of buildings;
  - there is damage in the form of cavities, created by for example mice, or decreased thickness due to people stepping on the insulation in 50 % of the buildings;
  - the wind protection has fallen onto the insulation in ¼ of buildings;
  - wind impact (and in some cases people) had caused the insulation to move in 13 % of the buildings;
  - some attic floor areas had no insulation at all;
  - the insulation settlement was in some buildings larger than expected.

Indications of quality problems

Focus on summer comfort

Overheating assessment of residential apartment buildings, Estonia



Assessment of overheating index in 25 buildings (based on simulated hourly mean room temperature in degree-hours above 27°C in "worse case" dwellings between 1st of July- 31st of August). Estonian study on 25 buildings (QUALICHeCK project).

Indications of quality problems

Focus on ventilation and air tightness

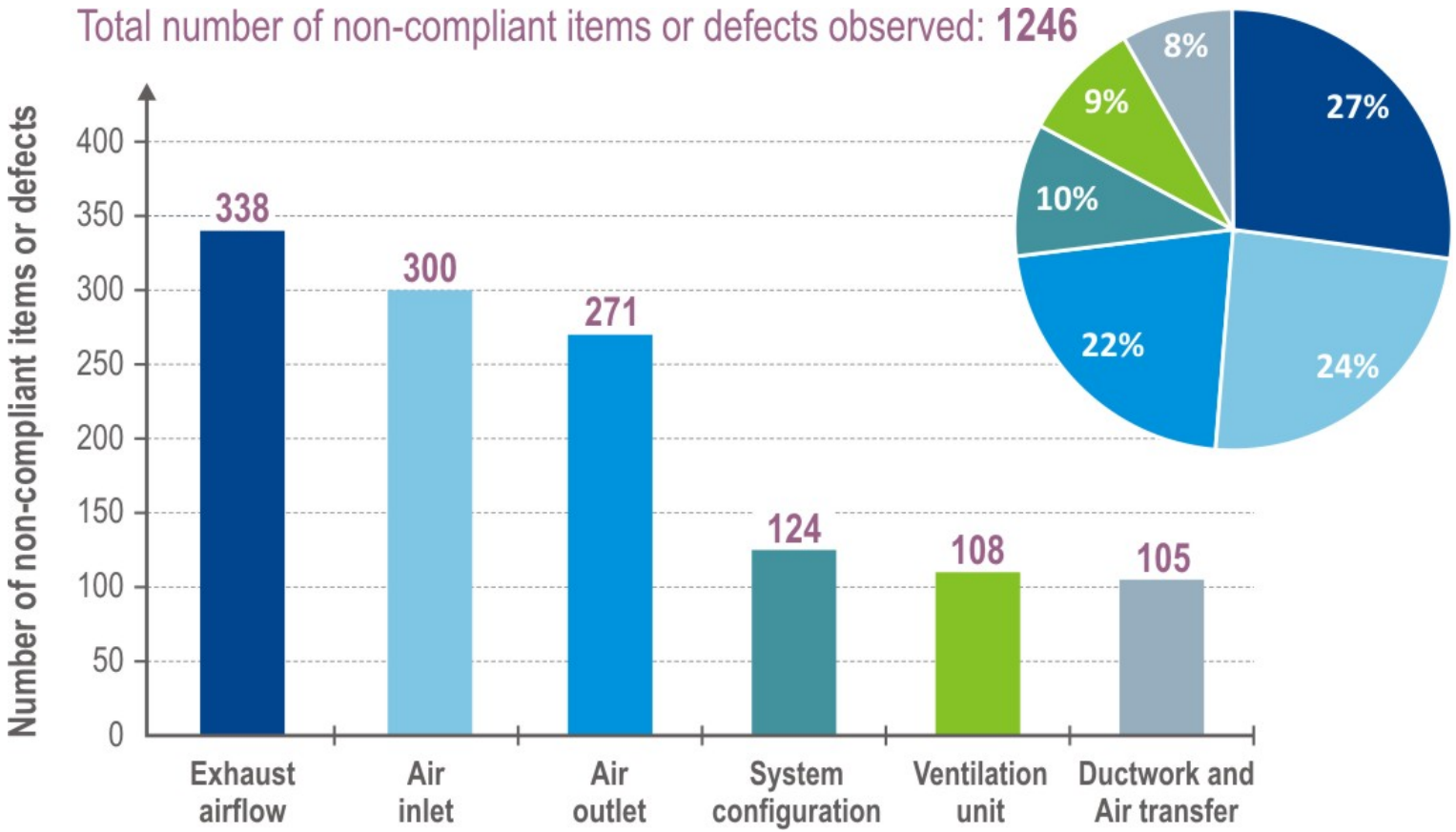
Quality of ventilation systems in residential buildings, Estonia

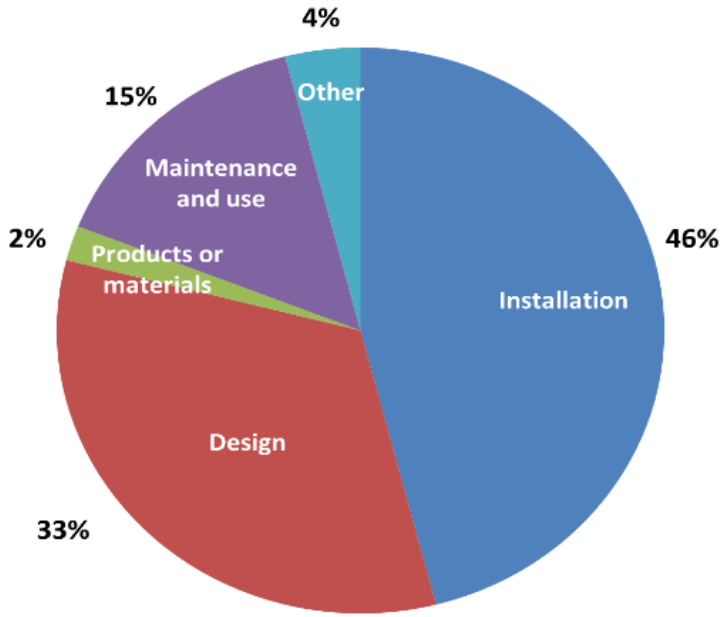
- In Estonia approximately 63% of the inhabitants live in apartments with serious indoor climate problems, including:
  - joints between windows and walls not watertight/airtight;
  - no accessibility for cleaning;
  - joints with other system components not airtight: fan, AHU;
  - wrong air flow rate settings, setting on default instead of specific necessary setting;
  - required filters not included;
  - installation without accessibility for maintenance

Indications of quality problems

Focus on ventilation and air tightness

Non-compliance or defects in residential ventilation systems, France





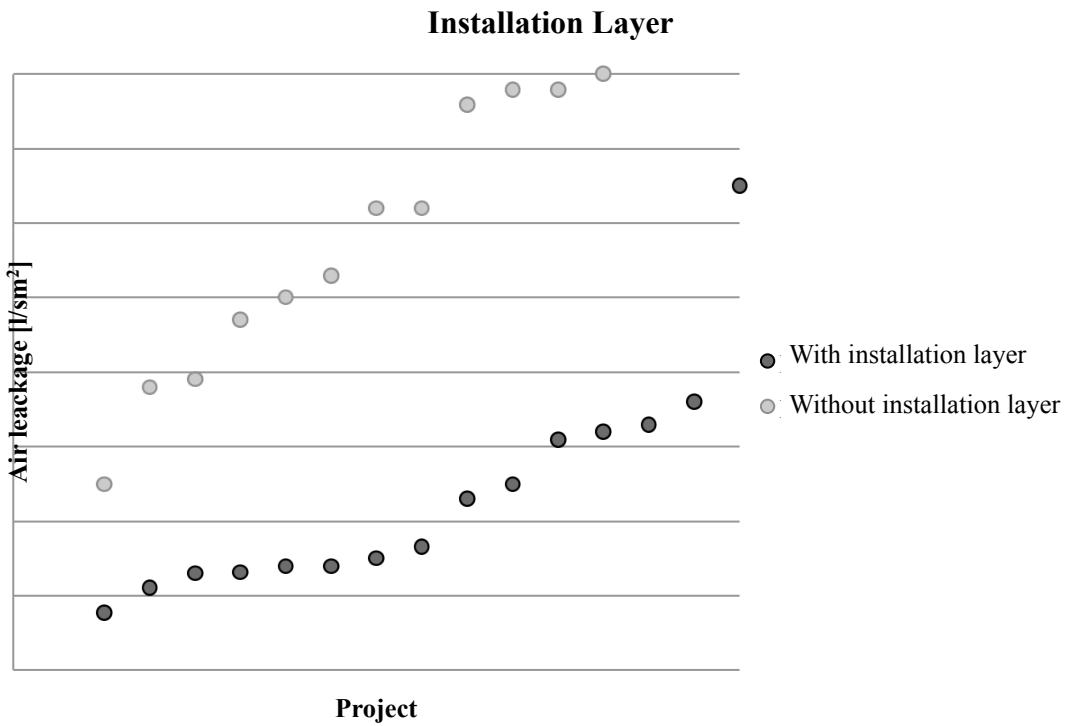
Number of non-compliance or defects found in residential ventilation systems (France), per category, on a sample of 1,287 dwellings[9], see QUALICHeCK fact sheet #6.

Indications of quality problems

Focus on ventilation and air tightness

Factors that affect a building's air tightness, Sweden

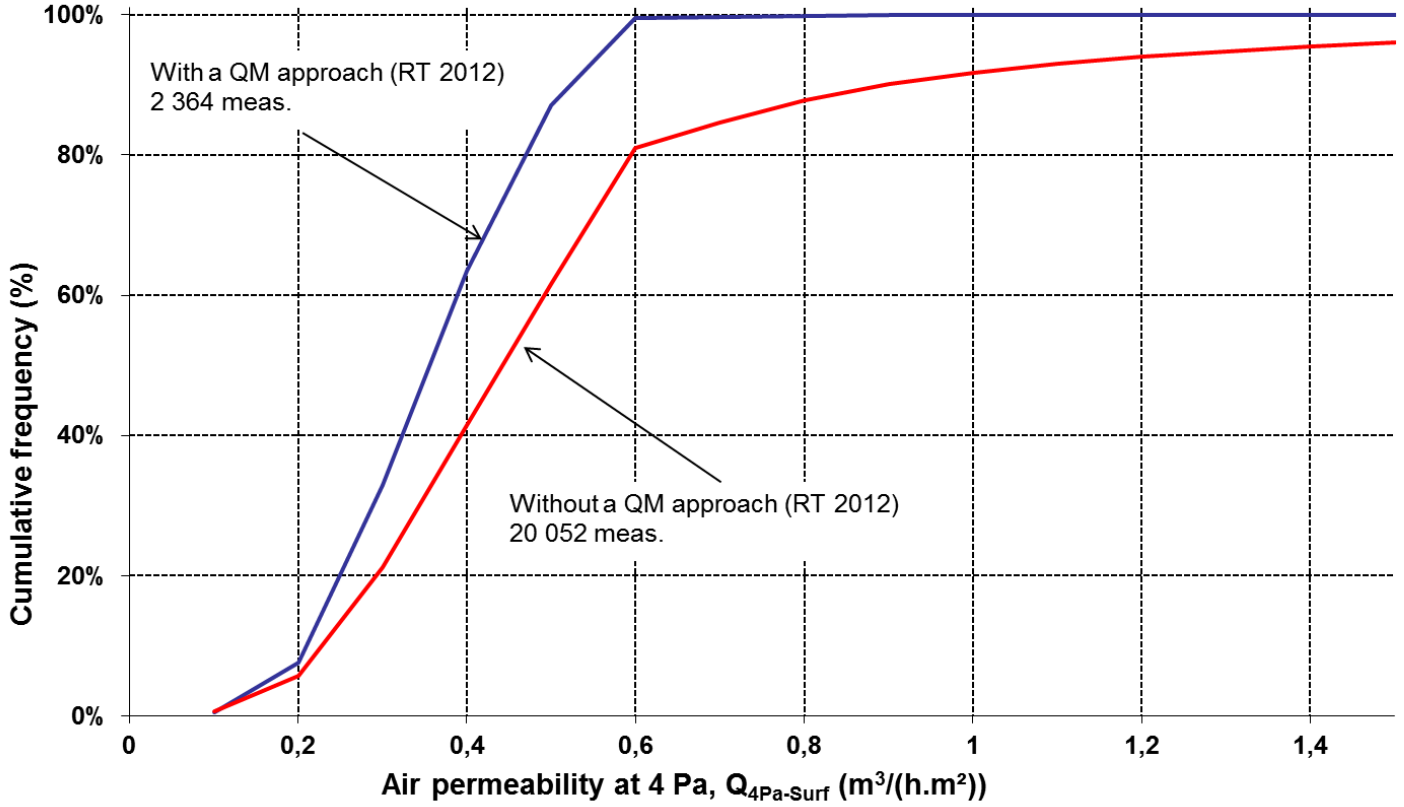
- A Swedish study showed that none of the 30 studied building projects without focus on air tightness reached lower air leakage than 0.4 l/sm² (of exterior envelope area).
- The biggest contribution in achieving an air leakage rate of 0.3 l/sm² would be the installation layer (recessed air barrier), in combination with other methods.
- More awareness, attention and commitment during execution would result in better tightness.



Indications of quality problems

Focus on ventilation and air tightness

Quality management scheme for building air tightness, France

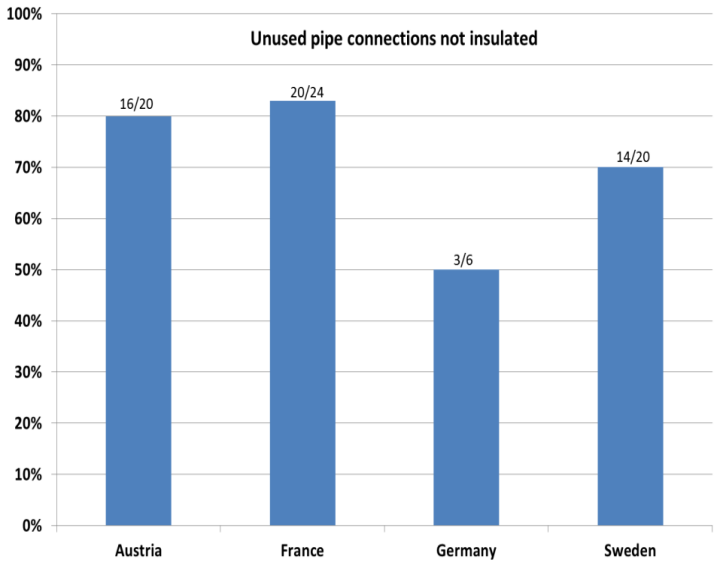


Distribution of measured airtightness of houses with and without implementation of a certified QM approach (see Fact Sheet #01[37]).

Indications of quality problems

Focus on Renewables in multi-energy systems

- Combisol project (Austria, France, Germany, Sweden) evaluated 70 solar thermal installations—45 of which monitored. Results met the expectations regarding solar yield and solar coverage, but adjustments had to be made to most installations. Frequent mistakes were found regarding, e.g., uninsulated pipe fittings, absence of thermosiphon heat traps, wrongly connected expansion vessels, poor integration in the building's heating circuit.



- An Austrian study showed common problems regarding combined solar thermal / heat pump installations, and calls for quality assurance as a priority task.
- Four court experts interviewed reported common problems of quality of works in domestic heat pump installations in France, incl.: oversizing, insufficient amount of refrigerant, wrong positioning of units, absence of drains, undersized pumps, nonoperational electrical resistance back up, inappropriate defrosting cycles, undersized surface of ground exchangers. The experts point out that very few problems occur at installations carried out by installers that hold the quality label QualiPac.

Points re quality of the works

Key elements that hinder good quality of the works:

- Poor specifications at level of projects, standards and/or regulations with respect to:
  a. materials to be used (e.g., characteristics of insulation, correct construction details (joints), etc.);
  b. performance levels to be achieved (e.g., air- and water-tightness, wind resistance for PV panels, acoustical performance of ventilation systems, etc.);
  c. execution method (e.g., under which conditions roofing may be installed).
- Lack of competence:
  a. at designer level;
  b. at execution level;
  c. with respect to language barriers.
- Critical economic conditions:
  a. critical financial conditions;
  b. critical timing conditions.
- Lack of control
  a. by parties involved in the project;
  b. by third parties (government, independent control organisations, ...).

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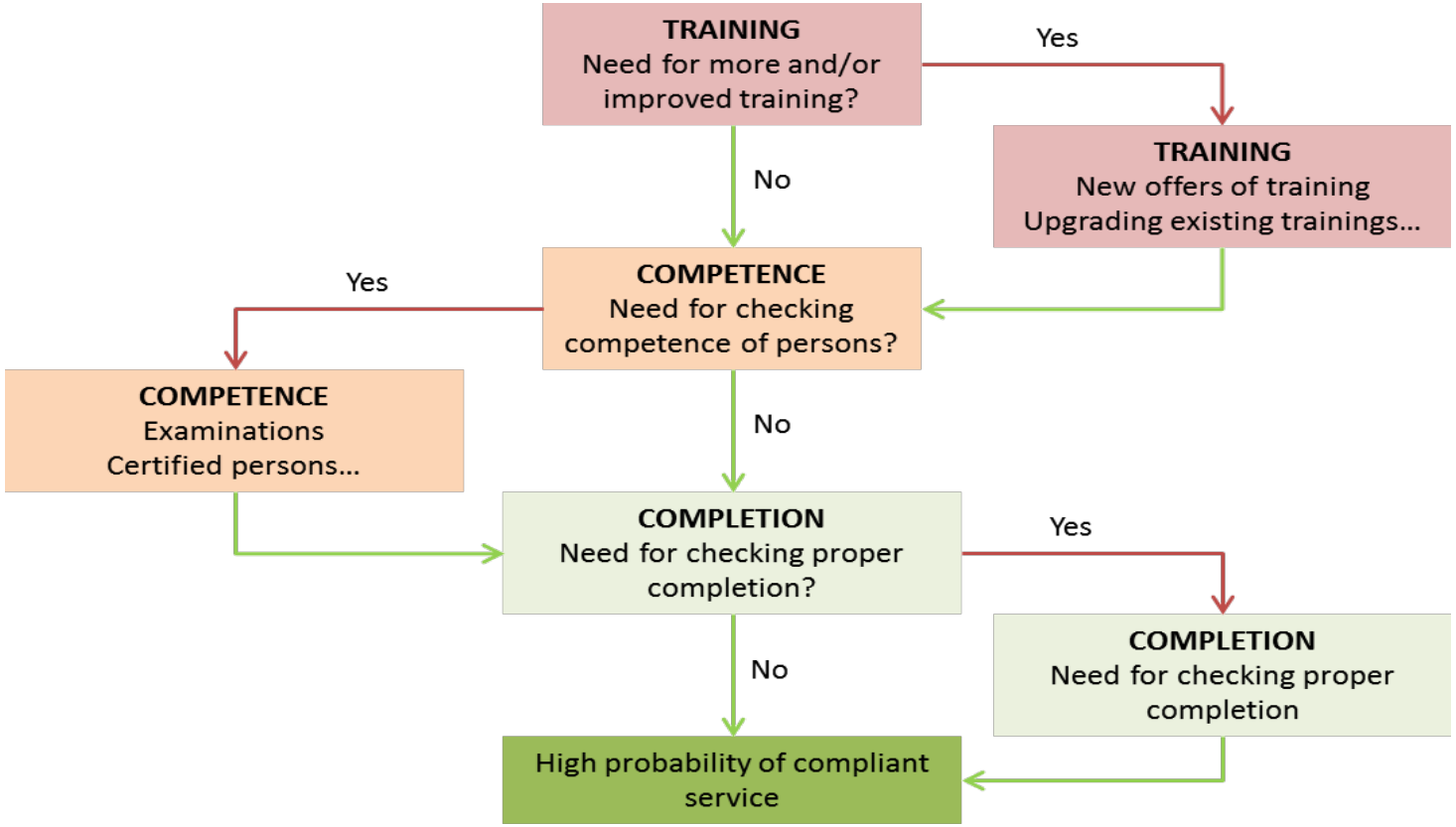
Reasons for good or poor quality of the works

Aspects which are important for good quality of the works	Reasons for good quality of the works	Reasons for poor quality of the works
Clear description of work specifications	Target groups have clear instructions how to install building and technical elements and what to consider	No consensus between target groups regarding responsibilities
Clear procedures to show evidence of compliance	From the beginning of the process a clear procedure is defined to show the evidence	Unclear what are the criteria and who checks them
Tracing procedures	A comprehensive continuous documentation allows early recognition of faults	All documentation will be checked at the final stage only, which does not allow the craftsmen to react in time
Handling of innovative solutions	Continually trained and experienced craftsmen	Overstrained craftsmen who have not followed the developments on the market
Usability of the specifications in practice	The craftsmen understand clearly, what is expected from them and where possible problems are	Incomplete specifications written in a difficult language style
Giving benefits to systems that have a high probability to perform well	Easy to implement technology in combination with other beneficial effects for the craftsmen	Technologies which need highly experienced craftsmen for the installation and have no beneficial effects for the craftsmen
Rewarding good practice	High motivation of the craftsmen	No sanctioning in case of poor quality of the works
Specific issues for existing buildings	The specific challenges in existing buildings are taken into account	Quality frameworks are not sufficiently specific
Quality management approaches	Advantage of a reduced effort for daily compliance procedures, if the company uses a collective compliance procedure	Too high costs for the compliance procedures leads to failure to comply
Market surveillance and integrating lessons learned	An organisation running a quality framework was involved	Reasons can be of different nature: too low requirements or too high and unnecessary costs
Interrelation with European and national legislations and standards	Possible synergies are investigated and made use of	Limitations are not respected causing refusal of the procedures, thus hindering implementation

Framework for providing compliant services



Path to question relevance of developing specific schemes for training, competence checks, and proper completion checks.

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Best practices

Best practice	Country	Covered areas	Type of solution	Application
Training and certification schemes for installers at AIT	AU	heat pumps, PV, solar thermal and ventilation systems	training and certification of installers	Voluntary, recommended by klimaaktiv
Guidelines, and commissioning protocols by professional associations		heat pumps, PV, solar thermal and ventilation systems	Guideline, checklist, commissioning protocol	Voluntary
Voluntary building certification including measurements		building envelope quality	Quality assess-ment by third party	Voluntary
IEE project WE-Qualify	CY	wet material, roller shutters	Education of workers	Recommendative/ voluntary
Scheme of Vocational Qualifications: I have the qualifi-cations. I certify!		Knowledge/training, specialisation	Education and certification of workers	Recommendative/ voluntary
RAL Window and Front Door Installation Guideline	DE	Windows, airtightness, water tightness, thermal bridges	Guideline and education of workers	Accepted rules of technology
RAL Certification of Window Installation		Windows, airtightness, water tightness, thermal bridges	Certification of manufac-turer including installation	Voluntary
Guidelines for dwelling designers, builders, owners	EE	Technical details, insulation layers, airtightness material, joints	Guideline	Voluntary
BUILD UP Skills QualiShell project	RO	building envelope (opaque and transparent), transmission characteristics, airtightness	Qualification schemes, mechanism for long lasting large scale implementation	Integrated in the national qualification system
Swedish guidelines on water¬proof layers in wet areas (GVK, BBV)	SE	Waterproof layers in wet areas	Education of workers, guidelines and authorisation of companies	Voluntary, several insurance companies require work according GVK/BBV
Quality framework for ducts		Air duct tightness	Airtightness test and certi-fication	Voluntary, but applied in 90-95 % of buildings
Guideline BuildE - Energy efficient		Communication between planners and contractors	Checklist, guidelines, standardisation of calculation tools	Voluntary
Quality framework CIGA for insulation of cavity walls	UK	Cavity wall insulation	Certificate for installers, guarantee for home owners	Voluntary
Quality framework SWIGA for insulation of solid walls	UK	Solid wall insulation	Certificate for installers, guarantee for home owners	Voluntary
Guideline for selecting cool roofs	GR	Cool roofs	Guideline	Voluntary

Tools and guidelines

Tools and guidelines to help designers and installers better specify and install their products:

- Austrian guidelines, commissioning protocols and checklists published by the Austrian Ministry of Agriculture, Forestry, Environment and Water Management in charge of climate protection that cover specific technologies or construction methods (e.g. building airtightness, pipe insulation, ventilation with heat recovery, solar thermal systems, etc), developed in the framework of the programme klimaaktiv which is based on stakeholders' voluntary commitment.
- Estonian guidelines for dwelling designers, builders, owners, explaining how to plan, design and build low-energy detached houses, including data for building envelope elements, windows, ventilation, heating, domestic hot water, etc.
- Swedish Guideline BuildE – Energy efficient
- RAL Guidelines, developed by the German association of manufacturers of windows, front doors and facades, binding product quality and installation quality. It summarises the accepted rules of technology and includes principles of joint formation, basics of building physics, fixation and sealing, planning and tender offers. More specifically, the guideline addresses the preparation of the components before sealing, the different levels of sealing, the sealing functions, where to place the sealing system within the seam, the preferable seam size, and different sealing systems. It presents exemplary installation technologies for different types of window systems and situations.
- US Department of Energy Guidebook to help building owners and installers understand the principles and technologies of cool roofing and help them determine if cool roofing is appropriate for a specific building.

Qualification and certification

- Two Swedish schemes for waterproof layers in wet areas, GVK and BBV, involving about 440 and 600 companies, respectively, include qualification of companies and workers based on validation of trainings and application of guidelines, as well as random control of the service provided. The demand for these schemes is highly supported by several insurance companies that require these qualifications as pre-condition to offer insurance.
- In the UK, the Cavity Insulation Guarantee Agency (CIGA) and the Solid Wall Insulation Guarantee Agency (SWIGA) are two independent bodies that provide since 1995 and 2010, respectively, 25-year guarantees for cavity and solid wall insulation fitted by registered installers.
- Belgian framework, the installer confirms conformity of the installation with the technical guidelines and transfers a declaration of conformity to the client, which can be used for several purposes (confirmation of the compliance of the process, application to government subsidies, use of performance data as input data in EPC, etc.)

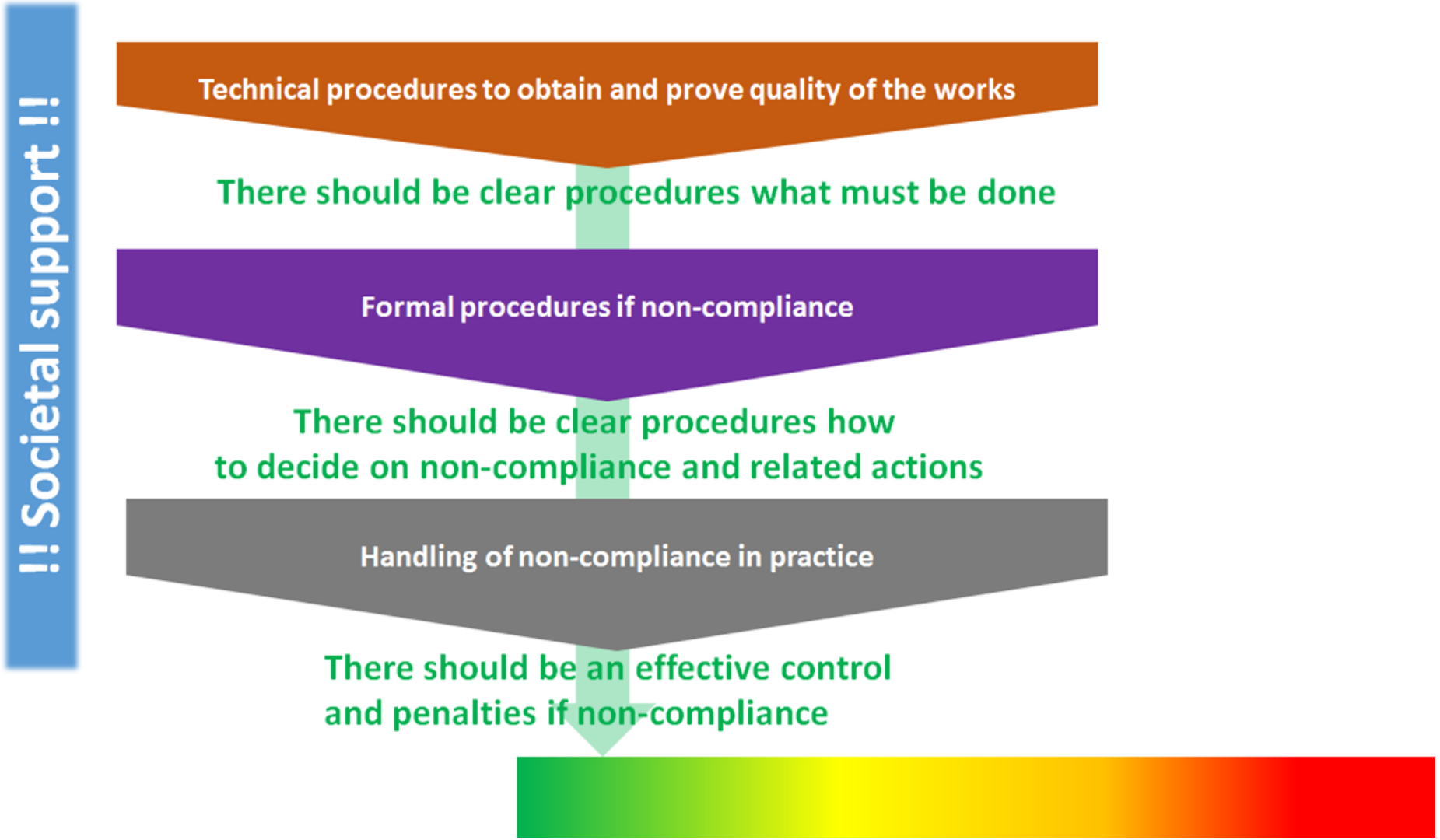
Commitment to integrated frameworks

- The Swedish example of AMA is interesting in that it has been very effective to drive the market towards high quality HVAC installations in Sweden. AMA consists of a collection of books of specifications developed since the 1950s, widely used by designers and installers to specify and follow quality requirements on products and systems as well as on design, installation, commissioning and maintenance. The AMA requirements are specified in measurable units and in such a way that the tenderers and contractors understand them and are able to calculate a price for their commitments. The AMA scheme has governed all major building projects in Sweden since a long time, likely because following the guidelines reduce risks for contractors.

Control and enforcement frameworks

- Self control in the framework of voluntary quality assurance schemes
- Second party control: by the client, the owner, the architect, consulting engineers, a quality surveyor, …
- Third party control: by a legally independent entity, imposed by government, public body, social housing company, voluntary schemes, private builder

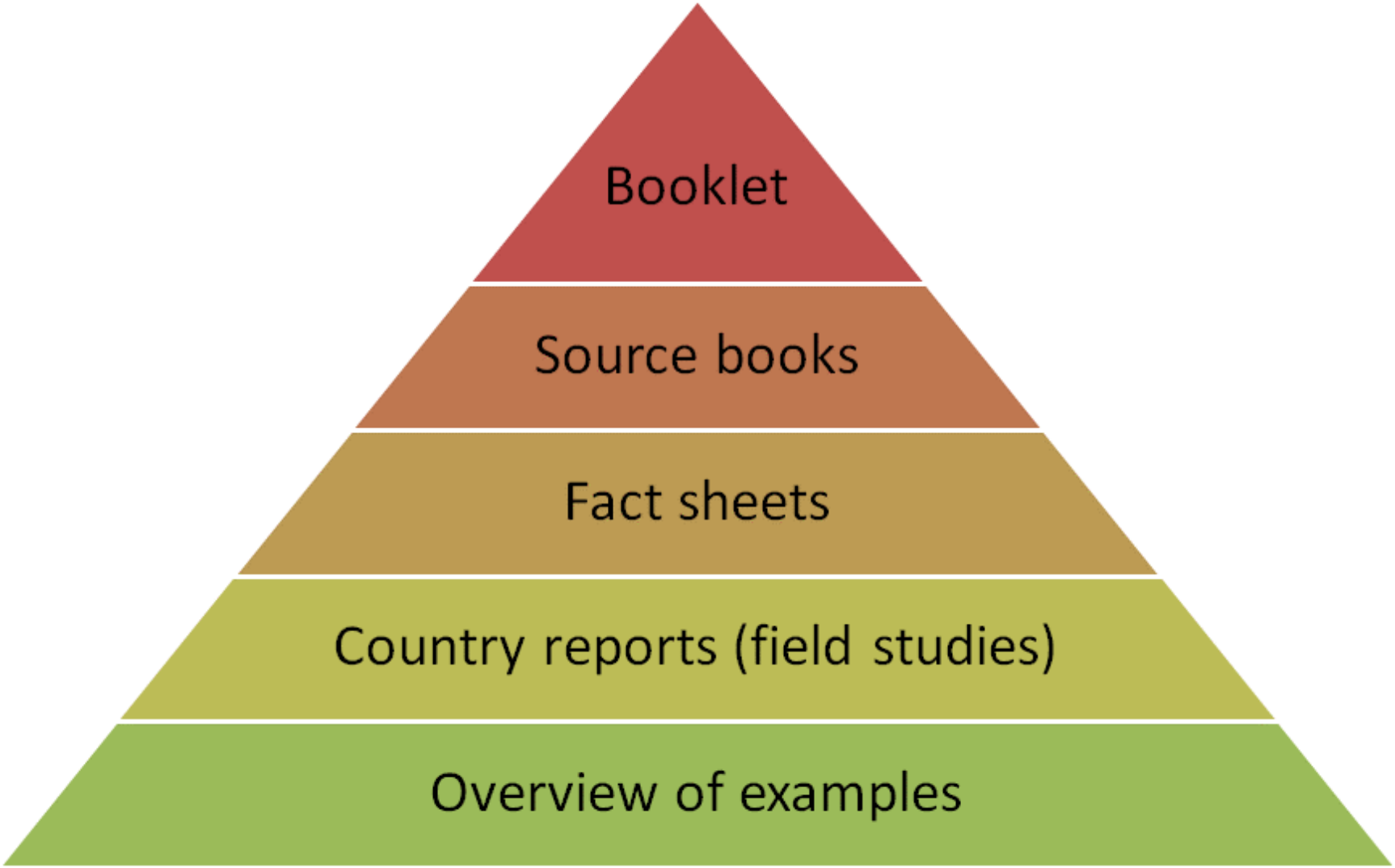
QUALICHeCK approach to better enforcement frameworks



Structuring an approach to effective compliance

Key questions to address	Elements to consider to address key questions
What is the scope of the framework?	Issues found in the field and needs identified in terms of training, competence development, and checks. The scope can concern, for instance: all EPC input data, a selection or a unique EPC input data (e.g., envelope airtightness), ventilation airflow rates, window installation, cavity wall insulation, renewable energy systems, etc.
At which level and on which basis should it be imposed?	Various levels (project, sector, real estate development, bank or insurance company, local authority, government) and bases (regulation, subsidies, risk management, market differentiation, specific awareness) depending on the regulatory context, financial incentives, and private initiatives.
On which type of requirement should it be based, and which type of control should it foresee?	Any combination of qualification, certification, declaration, contractual specifications or technical rules, consistently with the controls foreseen—focus on actual service provided (direct) or on the actual competence or responsibility of the EPC input provider or the workers (indirect).
What are the procedures to comply with?	Written documents explaining technical and non-technical procedures to achieve and to show compliance, compatible with EU or national legislation.
What are the procedures for identifying and handling non-compliance?	Written documents allowing checks and identifying liabilities, as well as proportionate and dissuasive penalties. In a concern for efficiency, they should minimise interference with court system.
How will it be implemented in practice?	Political and stakeholders' support, appropriate financial and human resources, use of information technologies, learning periods and scheme evaluation.

QUALICHeCK relevant outputs



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QUALICHeCK reports

www.qualicheck-platform.eu/results/reports

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QUALICHeCK Factsheets

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QUALICHeCK Towards better quality and compliance fact sheet #22

2016.6

Author
Marina Kyprianou Dracou (CyI)

Technology	Aspect	Country
Transmission characteristics, ventilation and airtightness, sustainable summer comfort technologies, renewables in multi-energy systems	Quality of the works	Cyprus

SCHEME OF VOCATIONAL QUALIFICATIONS IN CYPRUS "I HAVE THE QUALIFICATIONS. I CERTIFY!"

The main objective of the Cypriot scheme of vocational qualifications "I certify!" is to develop human resources through the knowledge and skills certify professional qualifications. This also applies to the building i implemented under the Operational Program "Employment, Human Capital an

✓ Residential buildings ☑	✓ Non-residential buildings ☑	Spe
✓ New buildings ☑	✓ Existing buildings ☑	

Context

One of the eight economic sectors and professions that the Cypriot scheme of v have the qualifications. I certify!" covers is the building industry. In specific, it construction/building works, construction of molds, carpentry, processing and a concrete reinforcing, plumbing, electrical installations, central heating systems conditioning systems, installation and maintenance of lifts, painting-decorative systems, dry building, application of windows, raised floors, and project supervi qualifications for the areas mentioned above, are classified in five levels which of required knowledge and skills, as well as the degree of responsibility involvec

Objectives and problems addressed

The scheme is aimed at men and women, workers, either employed or unemplo inactive, who wish to be considered for certification of their qualifications in or security or career prospects.

The examination is carried out in by HRDA approved centres, by a two-member examiners and one evaluator, who monitor the performance of work of particip conditions and/or accepted simulated conditions. This is followed by a short, or

QUALICHeCK Towards better quality and compliance fact sheet #13

2016.6

Author
Arnold Janssens (UGent)

Technology	Aspect	Country
Transmission characteristics	Quality of the works	Belgium

QUALICHECK STUDY BELGIUM - ASSESSMENT OF THE BELGIAN QUALITY CONTROL FRAMEWORK FOR INSTALLATION OF THERMAL INSULATION IN EXISTING CAVITY WALLS

Since 2012, a quality control system is in operation in Belgium to provide c the works of cavity wall insulation in existing cavity walls. When the works control framework, the installer may provide a declaration of conformity t client can use to receive subsidies or as an input for an energy performanc

A field study was performed to analyse the relationship between the infor in the declaration of conformity, the results of the conformity checks perf organisation and the effective cavity wall performance measured on site.

Residential buildings ☑	Non-residential buildings ☑	Spe
New buildings ☐	Existing buildings ☑	

Context

The mass market application of cavity wall insulation in existing walls is an i a reduction of the energy use and greenhouse gas emissions related to heatir stock. Approximately 25% of the existing Flemish housing stock still has non-i ≈ 1.5 W/m²K), with cavity widths larger than 50 mm in more than 80% of the

Since 2012, a quality control system is in operation in Belgium to provide cor works of cavity wall insulation in existing cavity walls. This technique allows walls by blowing or pumping insulation product into the empty cavity throug outer or inner masonry leaf.

Existing cavity walls are considered suitable for correct installation of therm conditions: (1) the minimum cavity width is 50 mm; (2) the façade and wall a sign of damage or cracks; (3) the driving rain load is limited - façade height 8m; (4) the indoor moisture load is limited (STS 2012).

For cavity wall insulation to perform correctly, three criteria must be met: (inspected and shown to be suitable; (2) the insulation system must have bee number of criteria; and (3) trained technicians must carry out the installatio 2012, Janssens et al. 2012).

When the works are performed according to these criteria, the installer may conformity to the client. In the Flemish region in Belgium the authorities sub

QUALICHeCK Towards better quality and compliance fact sheet #09

2016.02

Author
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Technology	Aspect	Country
Transmission characteristics Ventilation & airtightness	Quality of the works	Sweden

AMA - GENERAL MATERIAL AND WORKMANSHIP SPECIFICATIONS

AMA (General material and workmanship specificati years. The different parts of AMA are used as referer 90 and 95% of all building projects in Sweden refer t

Residential buildings ☑	Non-residential b
New buildings ☑	Existing building

Context

In the building industry many different entrepreneur common framework and language makes communicat phases in the project easier.

QUALICHeCK Towards better quality and compliance fact sheet #02

2015.3

Authors
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Technology	Aspect	Country
Transmission characteristics, ventilation, heating, hot water, cooling	Quality of the works	Germany

THE GERMAN CONTRACTOR'S DECLARATION: SUPPORTING COMPLIANCE

Upcoming QUALICHeCK webinars

www.qualicheck-platform.eu/events/webinars

WEBINAR | Ventilative cooling potential and compliance — Status and perspectives in Spain and Germany

Posted on 2016/11/23 by Maria Dimitropoulou

Thursday 1 December 2016, 10:00 am Brussels time (CET)

Summary

Ventilative coo
to cool indoor
demand in buildings, under summer or

This webinar is part of a broader series
context of compliance with building regu

In the first presentation, Prof. Dr. Serva
School of University of Seville, Spain, w
cooling potential by night ventilation is g
southern Spain) why does a cooling dem
ventilative cooling, and possible ways to

In the second presentation, Dipl. Ing. Jo
Indoor Climate at the Fraunhofer Institu
examining the influence of night ventilat
Germany. Ing. Schrade will explain why
to influence the indoor climate, so that

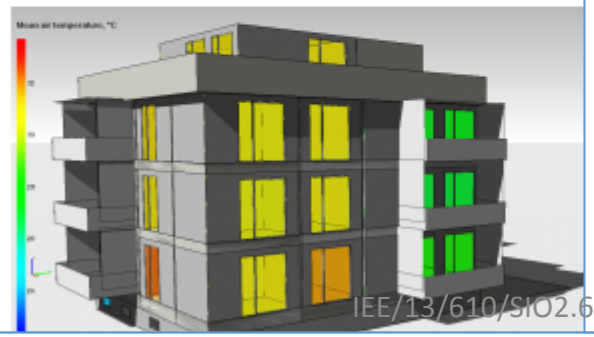
WEBINAR | Status on the ground: Prevention of summer overheating — methods and results

Posted on 2016/11/23 by Maria Dimitropoulou

Friday 2 December 2016, 10:00 am Brussels time (CET)

Summary

This webinar will focus on summer therma
related assessment methods as well as the



WEBINAR | A guide for policy makers to develop better frameworks for EPC compliance and enforcement

Posted on 2016/11/11 by Maria Dimitropoulou

Tuesday 13 December 2016, 10:00 Brussels time (CET)

Register here

Summary

Checking and enforcing building compliance with the requirements set
Directive 2010/31/EU (EPBD – Energy Performance of Buildings Directi
essential in order to achieve the EU-wide agreed energy efficiency and CO2-reduction targets by
and beyond. The first contribution to this webinar presents lessons learnt and best practices on

Upcoming QUALICHeCK workshops

www.qualicheck-platform.eu/events/workshops

QUALICHeCK International Workshop | Performance of thermal insulation in low energy buildings and advanced building renovation projects, 15 December 2016, Brussels, Belgium

Posted on 2016/09/02 by Maria Dimitropoulou

Securing the compliance of product data and the quality of installed systems to reach high levels of energy performance

Description

The objective of this workshop is to discuss a
quality of installed insulation systems as well
compliance of product and system data, there
declared values on the Energy Performance C
expected energy performance.

Three aspects will be more specifically addressed:

- how to improve the quality of the installation works;
- how to provide compliant input data used to issue an Energy Perform
- how to enforce compliance, and how to define/apply penalties in case

The workshop discussions will be based on detailed presentations of sch
under development. Interaction between participants will allow exchang

You may download the workshop flyer and the latest version of the ager

QUALICHeCK International Workshop | Renewable heating and cooling systems for buildings, 17 January 2017, Lyon, France

Posted on 2016/10/13 by Maria Dimitropoulou

International workshop on securing the compliance of product data and the quality of installed systems, to reach high levels of energy performance

Objective

The objective of this workshop is to discuss and identify ways to better secure the compliance of renewable heating and cooling product data as well as the quality of installed systems, thereby increasing the confidence in declared values on the Energy Performance Certificate (EPC) and achieving the expected energy performance.

Three aspects will be more specifically addressed:

- how to provide compliant input data used to issue an Energy Performance Certificate;
- how to improve the quality of the installation works;
- how to enforce compliance, and how to define/apply penalties in case of non-compliance.

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Looking forward to
see you at one of QUALICHeCK's upcoming events
exchange ideas with you and
receive your feedback!

www.qualicheck-platform.eu

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