

# Maximizing building energy efficiency: Ensuring quality of works



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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.

**Keywords:** quality of works; energy efficiency; proper execution; NZEB; QUALICHeCK

## Point of departure: what is the importance of quality of the works?

New buildings as well as the existing building stock must become much more energy efficient to achieve the EU energy and climate goals [1] envisaged for the years 2020, 2030 and beyond. In fact, it will be possible to almost completely cut emissions from residential and office buildings by around 90% in 2050, compared to 1990, if all efforts undertaken are successful. These efforts include quality of the works, meaning that it is not sufficient aiming at an excellent energy performance stated by design descriptions and energy calculations, but also at good quality of the works. Proper execution of building works according to plan and without errors is the precondition to achieve high building energy performance in reality, resulting in actual reductions in energy consumption and emissions. In this regard,

experience shows that there are various cases where the quality of the works is an issue of concern, sometimes even causing major difficulties leading to higher expenses.

## Status on the ground: what are the actual challenges?

A report [2], written in the context of the IEE project QUALICHeCK, summarises critical situations on the construction site putting the careful execution and thus the high quality of works at risk. This is dealt with in the light of the importance of high quality constructions and their realisation on the building site in connection with the trend towards high performance buildings such as the nearly zero-energy buildings required by the Energy Performance of Buildings Directive (Recast) [3] for 2019 respectively 2021.

## QUALICHeCK source book: how to tackle the challenges?

The QUALICHeCK source book [4] is available as draft version and aims to guide and support persons and organizations' interested in determining whether a better enforcement of the quality of the works is needed. If it turns out to be relevant, the source book will help them to identify the possibilities and points for attention for implement a more effective enforcement framework.

In this respect, it is necessary to touch on a definition of terms briefly: What does Quality of the works mean? Work can be defined as a physical or mental effect or activity towards the production or accomplishment of something. In the context of this source book, works

are all the activities directed to produce or refurbish a building. What is crucial in the context of this source book is that "quality of the works" for a given activity (e.g. installation of a PV system) has to be clearly defined. As such, one can come to a quite different set of specifications ("stated needs") for the same activity and, in order to minimise the risk of disputes, one should try to minimise the number of implied needs, as different parties might have a completely different view on the implied needs.

**Table 1** presents particular findings from the QUALICHeCK project in an overview of reasons for good or poor quality of the works relating to practical procedures.

**Table 1.** analysis of 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

## Success factors for effective quality frameworks

In order to achieve good quality of the works, societal support is important, meaning that stakeholders understand and accept the need for energy efficiency requirements, the need for compliance and the need to check and enforce compliance.

A three-step approach has been identified in the QUALICHeCK source book how to achieve good compliance:

- There should be clear procedures what requirements must be fulfilled in order to achieve good quality of the works
- There should be clear procedures how to decide on compliance and related actions in case of non-compliance
- There should be effective control and penalties mechanisms to be applied in cases of non-compliance

The detailed description of these 3 steps is documented in the QUALICHeCK source book, as well as the handling of innovation as a key element for progress. The reader will find information how to implement second or third party control and enforcement frameworks without hindering innovation. Emphasis is also put on the fact, that control and enforcement schemes introduce always some extra costs, but as explained in the introductory part of this text, non-existence of control and enforcement schemes might be even more expensive.

## Be part of the QUALICHeCK solution: Comments and suggestions are very welcome

During the next months, a review of the source book will be performed by public consultation of stakeholders. Please read the document on the QUALICHeCK project website\* and send feedback to the authors. ■



### Source book on Guidelines for better enforcement of quality of the works



Draft report for discussion with stakeholders, 30 March 2016.  
[A final report, including information from other experiences and feedback from stakeholders, is planned to be published in February 2017]

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[www.qualicheck-platform.eu](http://www.qualicheck-platform.eu)



## Literature

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\* <http://qualicheck-platform.eu/2016/03/report-source-book-on-guidelines-for-better-enforcement-of-quality-of-the-works-draft/>