Institute of solar Research

Introduction of DLR QUARZ® scope assessment label for independent product tests of CSP key components

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Introduction

Knowledge about the performance and durability of CSP components is crucial for purchase decisions in solar power plant projects. Various laboratories, like the DLR QUARZ® Center, offer independent measurements. Due to the current lack of legal international standards the variety of heterogeneous test reports complicates the assessment of components for CSP projects. The proposed label aims to alleviate this situation with a standardized classification of the underlying conditions of a QUARZ test report.

Methodology

The goal of the label is to support the end customer of CSP components in assessing the product quality based on the test report. This is achieved by classifying the test reports regarding two categories: The completeness of the characterization is a comparison of performed vs. possible tests. The significance characterizes the amount of tested samples and the sampling conditions. The final evaluation of the test results remains task of the end customer as only they can take into account the individual service conditions and economic conditions. The label provides transparency about the quality of the basis of valuation for the QUARZ test report in a standardized manner.

Although in the detailed test report specific test results may be classified or even be subject to pass-fail criteria, the aim of the label is not to state a pass/fail judgment result regarding the quality of the tested product but to classify the quality and relevance of the test itself.

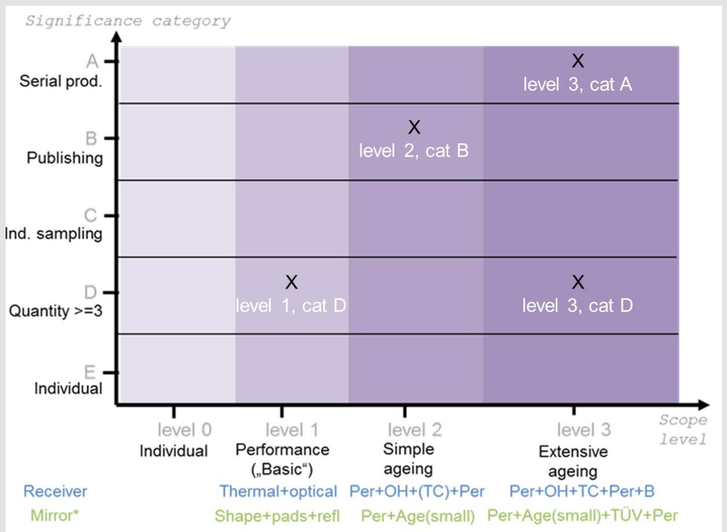

Fig. 1: Graphic representation of the assessment criteria with 4 exemplary scopes

Quality criteria

The criteria for classifying the product tests are divided in the two dimensions "scope level" and "significance category" as shown in Fig 1.

The **scope level** distinguishes between the following general levels regarding the performed tests:

- "basic performance" (level 1)
- "simple ageing" (level 2)
- "extensive ageing" (level 3).

Miscellaneous tests, e.g. for support in R&D, are marked with level 0. These general levels are independent of the type of component (e.g. mirrors or receivers). The specific tests required for the respective scope levels are defined specifically for each type of component.

Aspects of significance in terms of the possible assessment of the product quality in the market are covered by the dimension **significance category**. The following categories are distinguished:

- quantity of samples is n<3 (cat E)
- quantity of samples is n≥3 (cat D)
- independent sampling from larger quantity, at least according to Solar Keymark (cat C)
- published report (cat B)
- independent sampling from serial production (cat A)

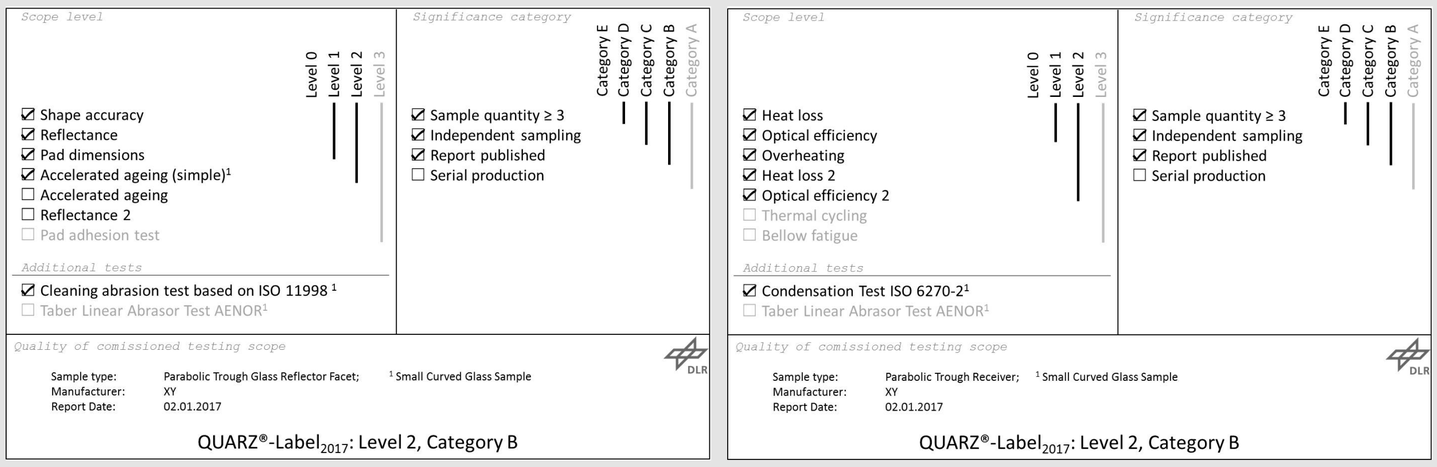

Fig. 2: Exemplary design of standardized representation in a QUARZ report for receivers (left) and mirrors (right)

Both dimensions are organized hierarchically, i.e. a certain level or category can only be achieved if the criteria for the previous ones are exceeded. The label is marked with the year date as levels and categories are adapted to always represent the current technical possibilities.

Representation of label

The aim of the standardized representation of the label is to provide a transparent overview allowing for a quick perception of the quality of the performed tests especially in the context of possible tests and boundary conditions. Exemplary designs for parabolic trough receiver and mirror tests are shown in Fig. 2. The representation of the label is followed by a process map in which the recommended tests as well as the performed tests are displayed. A summary of the performed testing, its essential boundary conditions and results are shown in an overview as well before all results are discussed in detail.

Summary

The label supports the end customer of CSP components in assessing the product quality based on the detailed test report. It provides a classification of the quality and relevance of the underlying tests which have been performed in the test assignment regarding a) the completeness of the characterization and b) their significance in terms of sampling conditions.

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