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## Efficient quality management and quality control of insulating glass units

### 1 Introduction

DIN EN 1279 and its parts 1 to 6 are a series of standards relating to insulating glass units (IGU) which will oblige all manufacturers to affix the CE marking to insulating glass units produced by them. The obligation to affix the CE marking has been laid down by the Construction Products Directive and has been defined in Annex ZA of DIN EN 1279-5.

Annex ZA of DIN EN 1279-5 describes the mandatory conformity procedure, contents of the manufacturer's declaration of conformity, and the CE marking of the insulating glass unit. This mark is required for introducing a product onto the European market. The CE marking is thus a purely administrative mark for indicating that a product conforms with the relevant European rules and regulations. The declaration of conformity is made by the manufacturer itself, and falls under the liability of the respective manufacturer due to the fact that insulating glass is assigned to conformity level 3 (declaration of conformity by the manufacturer).

The CE marking neither provides information on product quality, compatibility and durability of the components of the IGU, nor does it refer to any minimum standard requirements. Consequently, CE marking is not a quality mark and is not suitable for use as a unique selling proposition by manufacturers. Manufacturers aiming to distinguish the insulating glass units produced by them from the competitors on the basis of product quality and special features will achieve this goal by using established certification and quality marks.

### 2 Product standard – Contents

#### 2.1 ITT

IGU are subject to an ITT (initial type test) as set out by DIN EN 1279 Parts 2 and 3. Selection of the test specimens falls under the responsibility of the manufacturer. This means that the manufacturer has to see to it that the selected test specimens are representative of the insulating glass system and the relevant production sites.

Evidence according to DIN 1286 Parts 1 and 2 is not admitted as historical data in place of the ITT as per DIN EN 1279 Parts 2 and 3. According to the product standard, the manufacturer is also obliged to provide evidence of compliance with the requirements for further characteristics ( $U$ -value,  $g$ -value, etc.).

The procedure for the selection of the test specimen and testing show also the weak spots of the product standard. For example, the  $g$ -value and



Figure 1 Pictographs representing the CE marking and an insulating glass unit – gas permeation as for ift Rosenheim



the emissivity can be determined using different test specimens. Due to the fact that these two values have an immediate effect on the  $U_g$ -value of the insulating glass, the selection process is likely to influence the test results of comparable systems in different ways.

## 2.2 Application of ITT

As set out in DIN EN 1279 Parts 2 and 3, the initial type test (ITT) must be performed for each individual line and manufacturing site. An exception is made in Part 5 of the product standard. One ITT can be used for several lines or manufacturing sites if the manufacturer meets the following requirements:

- Uniform system of factory production control (FPC),
- Direct relationship between the ITT, FPC and audit,
- Identical technical description of the product on all lines and at all locations,
- Assignment of a person responsible for implementing the requirements on all lines/at all locations.

Part 5 of the product standard DIN EN 1279 does not provide any procedure that allows manufacturers to rely on ITT and test evidence provided by a neutral body. This means that the system of insulating glass groups applied in Germany has not been taken into account by the product standard, because the relationship between licence owner and licence holder have not been addressed in this product standard. This part of the product standard is currently under revision to take this into account, but the revised version is not yet available.

In the context of the Construction Products Directive, “guidance papers” have been published, which are not binding. “Guidance Paper M” lays down non-binding guidelines for the Initial Type Testing of products and for Factory Production Control. The “Guidance Paper M” offers the licence holder the possibility of using results from the licence owner, with inclusion of the notified

body on the basis of a licence agreement. The same applies to other necessary test evidence (e.g.  $U_g$ -values, g-values, dB-values, etc.).

Within the framework of product certification for IGU, the ift has defined this voluntary procedure for licence owners and licence holders, and made it available to insulating glass groups and companies.

## 3 Concepts

### 3.1 ift product certification

Manufacturers clearly benefit from the procedures defined for product certification. The most important advantages are described below.

#### 3.1.1 Historical data

Existing evidence/documentation and test results from the manufacturer and/or licence owner are evaluated by the ift. This procedure is in conformity with the applicable standards and has been agreed with the DIBt on the basis of a validation concept. The following is ensured:

- for the manufacturer, that the existing data are transferable and informative,
- that the existing data can be used for purposes of CE marking,
- that new tests or calculations are performed only as necessary.

The manufacturer receives a document from the ift which confirms the validity and applicability of the relevant evidence/documentation as well as the product certification. This approach allows manufacturers to cut costs, since less testing is required.

#### 3.1.2 Substitution

Substitution of specific components from IGU is regulated by DIN EN 1279-1 and can be carried

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out by the manufacturer. However, the rules for substitution of components are very stringent, e.g. substitution of a butyl type is subject to the following::

- Evidence as per DIN EN 1279 Parts 2 and 3 regarding the new system (previous spacers, previous secondary seal, new butyl),
- Test of butyl as per DIN EN 1279 Part 4 MVTR (water vapour diffusion),
- Test of adhesion-cohesion behaviour of the new butyl,
- Gas permeability of the new primary sealant.

All of the above evidence must be provided and/or confirmed by a notified test institute.

The ift has taken these rules into account within the framework of product certification. Expenditure is reduced and manufacturers can be sure that the material combinations used for the insulating glass system are based on evidence in conformity with the requirements of the applicable product standard.

3.1.3 Product certification for companies with their own systems/for licence holders

Companies with their own systems

The possibilities and benefits offered by the ift-product certification to companies with their own insulating glass systems are as follows:

- Evaluation of evidence on the basis of validated processes by a notified body – reliable evidence,
- Confirmation of product conformity by the notified body - – ift certificate of conformity,
- Adherence to the rules and regulations of the product standard as regards implementation within the company – prevention of misinterpretations and thereby less risk,
- Confirmation of conformity of factory production control and of the manufactured products – Conformity of paper and product via third party control/surveillance of manufacturer by the ift.

Licence holders

In addition to the possibilities mentioned above, the ift-product certification also offers licence holders the following possibilities:

- Licence holders are permitted to use the results obtained from the ITT, and the evidence/documentation of the licence owner.
- The system documentation of the licence owner can be adapted to the individual manufacturer together with all relevant variants, and applied by the latter.
- The ift offers a concept for factory production control which can be applied by all manufacturers.



Figure 2 Example of an ift-certified mark

3.1.4 The ift-certified mark

Manufacturers who decide to take advantage of the benefits offered by ift product certification are entitled to affix the ift-certified mark to their products and use this mark for their companies.

This mark has already been introduced for various construction products and product characteristics at a European level. The manufacturer will benefit from this well-established mark,

- which confirms to the customer that the product is in conformity with the relevant rules and regulations,
- which stands for durable products of high functional quality,
- which indicates that the characteristics and functional values declared by the manufacturer



are based on test evidence in accordance with the relevant standards,

- which shows that the products originate from an audited production and that high product safety is assured.

This is confirmed to the manufacturers or licence holders in the form of the **ift** product passport. The latter confirms the conformity of the insulating glass system and of its components with the product standard DIN EN 1279-1-6, as well as the applicability of the evidence and test results. Furthermore, the **ift** will issue a certificate of conformity to the manufacturer, confirming the conformity of the factory production control, the third party control of the manufacturing site, and the conformity of the goods produced with the relevant evidence.

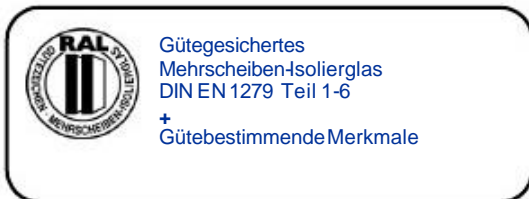


Figure 3 Example of RAL-quality mark for IGU

### 3.2 The RAL quality mark

The new RAL quality regulations and test specifications of the RAL quality association enable each company to meet the requirements of the product standard by implementing the RAL quality regulations and test specifications and affixing the CE marking to their product. The RAL quality assurance system also includes the **ift** validation concept. Furthermore, quality-specific characteristics have been specified for products bearing the RAL quality mark.

Requirements have been defined with regard to supplies (e.g. use of audited glass coatings), to allow the requirements of the product standard with regard to the control of incoming goods to be

fulfilled, which at the same time substantially reduces the manufacturer's expenditure.

Products must fulfil minimum requirements. With regard to the minimum overlap of the edge seal, for example, these serve to prevent substandard systems from obtaining the RAL quality mark, or being allowed to bear this mark.

Furthermore, processes are defined which ensure the compatibility of individual components. In the light of well-known problems in this regard, this is an important characteristic of the RAL quality-assured products.

The new RAL quality regulations and test specifications denote high product quality in and for the German market. The RAL quality mark will continue to be the quality mark of the German market, offering those operating in the German market the opportunity to affix an established quality mark to their products, and increase product safety significantly.

### 4 Summary

The product standard confronts manufacturers and licence owners with new requirements. For this, a structured and well-planned approach is required, or we will have to cope with a bureaucratic and inefficient system.

Every manufacturer can and should get hold of the information and details required. Efficient implementation of the product standard DIN EN 1279-1 to 6 will be beneficial in terms of a manufacturer's future success. With the help of the quality and certification marks, the industry can draw major benefits in terms of process and products safety, as well as market discrimination.

Manufacturers now have the possibility to organize the implementation of the relevant provisions in their plants as simply and efficiently as possible. They can rely on the expertise offered by the **ift** for the implementation process, and can make use of existing possibilities for meeting the rele-

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vant requirements and capitalizing at the same time on the benefits offered by the certification and quality marks, with maximum cost efficiency.



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1984 – 1987 Apprenticeship as carpenter for wood window

1987 – 1990 Employment in manufacturing and mounting of wood windows and doors

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