QM308_e

Certification Programme for Coated Glass Products for Thermal and Solar Protection

Contents

ift Rosenheim GmbH
Theodor-Gietl-Str. 7-9
83026 Rosenheim
GERMANY

+49 8031 261-0
info@ift-rosenheim.de
www.ift-rosenheim.de

Notified Body 0757
PÜZ-Stelle BAY 18

Accredited Certification Body
Products + Services
EN ISO/IEC 17065

DAkkS Deutsche Akkreditierungsstelle D-ZE-11349-01-00

1 Preliminary remarks

Glass products with thermal and solar protection coatings are usually processed into multi-pane insulation glazing. The physical data of the coated semi-finished products are an essential quality attribute for the manufacturers who then process the insulating glass, for producers and for the consumer. In order to safeguard the product-relevant physical data of the coated glass, the company producing the coated semi-finished products can conclude a certification and monitoring contract with ift-Q-Zert.

The certification programme deals solely with inorganic coating on glass according to EN 1096-1:2012. This certification programme for coated float glass stipulates the measuring procedures and the test standards used for factory production control and external monitoring, together with the scope of monitoring. Products certified according to this certification programme fulfil the quality criteria according to the UEAtc directive and the requirements according to the Building Regulation List A, Annex 11.1 with regard to emission capability and total degree of energy transmission.

2 General

The certification programme stipulates the regulations and requirements for the certification and monitoring of coated glass products for thermal and solar protection. Certification and monitoring of coated glass products by ift-Q-Zert requires verification or submission of:

- A current type list approved by ift-Q-Zert which contains the product-relevant attributes
- A technical documentation, which contains the coated glass substrates, the used testing equipment and the test method; also a test schedule for the product-relevant attributes and documentation of the scope of tests to be performed;
- An identity card as per EN 1096-1:2012 for the coated semi-finished product;
- Instructions for the care, processing and storage of the coated basic glass;
- Documentation of the performed factory production control including the measuring procedures and frequency of measurements. A remark on the corresponding samples must indicate whether they were measured during the coating process, afterwards or in the laboratory;
- Verification of ift Rosenheim or approved recognised body of the durability of the coating as per EN 1096-3:2012;
- For each production facility, a contract with ift-Q-Zert for the certification and monitoring of the production of coated glass.

Crucial elements for certification and monitoring include

- A positively assessed first visit to the production facility including a positive first testing in the ift laboratory for each coating according to the type list

and the documents named below:

- Draft UEAtc technical guide for coated glass in the currently valid version,
- EN 1096-1:2012, EN 1096-2, EN 1096-3:2012 and EN 1096-4:2018, Glass in building, coated glass,
- EN 410:2011 Glass in building – Determination of luminous and solar characteristics of glazing
- EN 673:2011 Glass in building – Determination of thermal transmittance (U value) – calculation method,
- EN 12898:2019 Determination of emissivity
- Technical Documentation and type list for the coated glass being monitored, in the currently valid version,
- EN ISO/IEC 17065:2012 Conformity assessment - Requirements for bodies certifying products, processes and services.

3 Certificate

3.1 Issue and validity of the certificate

The certificate is issued for a period of three years.

The following points are checked separately before the certification expires after 3 years:

- Type list for the coated basic glass,
- Results of external monitoring and laboratory tests,
- In the case of external monitoring according to method A (chapter 5), system verification of all coatings featured in the type list.

Prerequisite for issuing a new certificate with new validity period is compliance with the product requirements and that the relevant coating has been tested in the ift laboratory within the last 12 months (see point 5.2). If there is no laboratory test within the above period, a new initial test is necessary to extend the certificate.

3.2 Marking

The product can be marked with the “ift-certified”-mark according to the Rules for Use of the "ift-certified“ mark. Besides marking on the delivery papers, marking on the packaging is also allowed.

The type and scope of marking will be stipulated and documented during the first visit.

The entitlement to show the “ift-certified”-mark expires with expiry of the validity date on the certificate and with the end of the monitoring contract.

4 Factory production control

4.1 General

The manufacturer undertakes to set up a system for factory production control which safeguards uniform attributes and execution of the coated basic glass. At the factory production control must be assured that the specification of EN 1096-4:2018 annex A is fulfilled.

The production company must name a person with corresponding authorisation, know-how and experience in coating glass products. This person is responsible for ensuring that the factory production controls are implemented correctly as stipulated in the Technical Documentation.

If the factory production control reveals unacceptable nonconformities in the physical data of the coating from the type list, the person responsible for factory production control shall implement corresponding measures to rectify the nonconformities, in consultation with the production manager.

When type tests (TT) are transferred from one manufacturing plant to another, the requirements of EN 1096-4:2018 (item 5.2.4 Multiple Lines/Multiple Sites) apply. The overarching uniform system of factory production control for the manufacturing plants may contain several variants for the type of test, test procedures and test frequencies. The specifications must be complied with and implemented by each individual manufacturing plant.

In each manufacturing plant, the documentation of the uniform, comprehensive plant production control must be available and the reference to the various manufacturing plants must be identifiable.

4.2 Proceeding with factory production controls

The measures for safeguarding the physical data of the coating featured in the Technical Documentation for factory production controls must be implemented and documented. Ift must be informed of any changes in the measuring procedure, testing equipment and testing intervals during the external inspections.

4.2.1 Online measurements during production

Continuous records (line and fixed dimensions) of the process and measuring data responsible for the product-relevant attributes must be documented and verifiable for every coating campaign.

In the case of coating procedures where continuous recording during the coating process is not possible, the quality-assuring measuring procedures are stipulated during the first visit. The corresponding stipulations must be documented in the Technical Documentation.

4.2.2 Laboratory measurements by the manufacturer

Once a week, the following tests are to be performed by the manufacturer on coated glass samples from on-going production referring to at least one produced coating:

- Measurement of the normal emissivity capability of the coating as per EN 12898:2019. If the measurement is carried out according to another procedure (e.g. by resistance measurement), a calibrated conversion procedure must be known and documented. In case of any doubt, the suitability of the used measuring procedure must be verified.
- Measurement of the degree of solar transmission and solar reflection of the coated basic glass according to EN 410:2011.
  If the measurement is performed by a method of approximation (e.g. in the visual spectral range), the suitability of the procedure must be verified and documented.
- The degree of total energy transmission for the coated multi-pane insulation glass is to be calculated as per EN 410:2011 for the standard structure specified in the type list (e.g. 4-16-4 with 90% argon gas filling). The standard float glass spectrum of the current Building Regulations List is used for the counter pane which is usually not coated.
- The degree of luminous transmission of the coated basic glass is to be ascertained according to EN 410:2011. Alternatively, the degree of luminous transmission can also be ascertained by a suitable measuring procedure on-line during production.

The results of the laboratory tests must be documented and verified for compliance with the limit values stated in the type list.

5 Inspection

5.1 Initial inspection and first test

The initial inspection by ift-Q-Zert serves to clarify whether the technical, personnel and testing prerequisites are available for proper production of coated glass products as specified in the technical documentation.

During the initial inspection, 9 samples are taken from a line or float glass panel normally measuring 321 cm x 150 cm for first testing according to a specified cross section plan from on-going production. The samples are taken in an area of the coated line declared to be usable by the production facility and stipulated in annex 1.

Sampling is not allowed in a peripheral edge area of 5 cm to the edge of the glass. If no lines are coated for sampling, then the used float glass panel must be coated across the full width of the production machine (as a rule 321 cm).

Alternative, the manufacturer can take out the samples considering the requirements and in accordance with ift and provide it to the ift for the first testing of coating.

At these samples all measurements are carried out. The determined results establish the basis for following measurements. On every coating there is to be made a first testing of the product at 9 samples.

The following measurements and calculations are carried out during first testing:

- Measurement of the normal emissivity capability of the coating as per EN 12898:2019.
- Measurement of the degree of solar transmission and solar reflection of the coated float glass pane in accordance with EN 410:2011.
- Measurement of the degree of light transmission and of light reflection as per EN 410:2011 for the coated float glass pane.
- For the standard structure determined in the type list (e.g. 4-16-4 with 90 % Argon gas filling) the total energy transmission for insulated glass units will be measured from the radiation property data. The standard float glass spectrum for a 4 mm float glass is used for the counter pane which is usually not coated.

The results of the laboratory tests are documented by ift in the form of an ift test report and verified for compliance with the values stated in the type list. The nominal values declared by the manufacturer are specified in the type list. If the company does not provide any nominal values, the values determined by the ift laboratory are indicated in the type list.

The values declared by the manufacturer must base on the values determined by the ift. The determined values from number 5.2.3 are to be considered and maintained. The values declared by the manufacturer are the basis for the results which are determined at the third party control.

A change in the values determined and documented in the type list, which are not covered by the normatively defined tolerances in relation to the initial test, leads to a new initial test.

All values and classifications given for certified products in the type list must have been determined by ift Rosenheim or a recognised body.

Requirements and procedures for bodies recognised by ift:

- Accredited test laboratory according to EN 17025 for the necessary test procedures
- Validation of the respective reports by ift Rosenheim (content and results).

The manufacturer of the coated basic glass can choose between two procedures for first testing and regular testing.

Procedure A

During the initial inspection, samples are taken from at least one coating for each coating machine from on-going production for first testing (laboratory measurement) at ift.

Samples are provided by the manufacturer for other coatings featured in the type list. Coatings which are not available are provided to ift-Q-Zert at the latest on taking up production.

During regular testing procedures, sampling is reduced to one coating per regular inspection (visit) and coating machine.

Procedure B

During the initial inspection, one coating is sampled for each coating machine from on-going production for first testing (laboratory measurement) at ift.

Each coating featured in the type list must undergo laboratory testing by ift once a year. Samples are taken by the manufacturer according to the specifications of the ift auditor. The samples are sent to the ift Rosenheim together with a sampling report.

Samples of coating not produced during the current calendar year are not included in the sampling procedure. ift-Q-Zert is to be informed accordingly. When production of this coating starts up again, samples of the first coating campaign are to be sent to ift.

5.2 Regular inspection and regular testing

Regular inspection serves to ascertain whether the technical and personnel prerequisites still apply for correct production of coated float glass products (semi-finished products for thermal and solar insulating glass). Regular inspection by ift-Q-Zert is performed at least twice a year for manufacturers with a certified QM system according to ISO 9001, including:

- verification of compliance of the entries made in the documents for factory production controls with the specification of the coatings in the type list,
- verification of the production conditions for the coating of glass products,
- verification of the measuring equipment used in the laboratory and in production for any obvious faults, and for the presence of valid calibration records and maintenance records for the measuring equipment. Verification of the measuring equipment must be documented,
- Verification of the procedure for registering and dealing with customer complaints.

If the manufacturer does not have a certified QM system, then the number of regular inspections is based on the UEAtc directive (draft).

5.2.1 Measurements in production

The measurements stated in the technical documentation during production which serve to secure the product-relevant data for the coated semi-finished products must be performed with adequate corresponding documentation.

Retraceability according to the stipulations in the technical documentation is verified during external monitoring on the basis of random samples and examined for any non-conformities (coatings outside the tolerance range for the physical data stated in the type list, rejected batches with coating flaws).

5.2.2 Laboratory measurements by the manufacturer

The records for the manufacturer's laboratory tests on the coatings are consulted and verified for compliance with the tolerance for spectrophotometric data and the emissivity stipulated in the type list.

5.2.3 Sampling for regular testing

Each coating certified by ift is tested once a year on 3 test specimens. Samples are taken in Procedure B by the manufacturer according to the specifications of the ift auditor. In procedure A, samples are taken from a layer certified by ift during the audit by the auditor.

The samples are to be identified clearly with the initials of the employee responsible for making the selection and sent to ift Rosenheim together with a sampling report.

Three samples measuring 80 mm x 70 mm shall be taken from a line or float glass panel normally measuring 321 cm x 150 cm according to the cross section plan in Annex 1. The samples are marked and divided (40 mm x 70 mm).

Supplementary to the UEAtc directive, the following stipulations apply:

For the taken samples the emissivity is determined according to EN 12898:2019, the solar transmittance and reflectance, radiant transmittance and reflectance, and the light transmittance and reflectance of the coated base glass.

For the samples taken, the emissivity is determined in accordance with EN 12898:2019, the solar transmittance and reflectance, radiant transmittance and reflectance, and the light transmittance and reflectance of the coated base glass.

The degree of total energy transmission as per EN 410:2011 for the multi-pane insulating glass structure is calculated. The standard float spectrum of the current Building Regulation List is used for the counter pane which is normally uncoated.

For each of the measured physical properties, an average value is calculated and rounded on the basis of the specifications of the currently valid standard.

The coating manufacturer submits his measured values immediately to ift-Q-Zert. The following deviations from the nominal values specified in the type list are permitted for the functional values of the coated semi-finished product:

1. Normal emissivity ε_n as per EN 12898:2019 : $\varepsilon_{n,m} \leq \varepsilon_n + 0.01$ of the nominal value ($\varepsilon_{n,m}$ = mean value of emissivity),
2. Solar transmission according to EN 410:2011: $\pm$ 0.03,
3. Solar reflection according to EN 410:2011: $\pm$ 0.03,
4. Light transmission according to EN 410:2011: $\pm$ 0.03,
5. Light reflectance according to EN 410:2011: $\pm$ 0,03
6. Total energy transmission according to EN 410:2011: $\pm$ 0.02.
7. Light transmittance of insulating glass in accordance with EN 410:2011: $\pm$ 0,03

The specification of the function values and the rounding of the mean values of the measured values are based on the specifications of the respective current standard.

The results from the standard test are evaluated on the basis of a target/actual comparison of the g-value and the emissivity.

5.3 Report and evaluation

One report each will be drawn up by ift-Q-Zert as part of the production inspection and laboratory tests. If one or several measured values for the coated semi-finished product are outside the specifications stipulated in the type list, the cause of the nonconformity must be clarified and rectified at short notice. After the faults have been rectified, the certification body decides whether further quality assurance measures are necessary ((e.g. special inspection, special on-site visit and/or repetition of laboratory testing)).

6 Deadline for eliminating flaws – special inspection

The deadline for eliminating any ascertained faults is stipulated by ift-Q-Zert depending on the fault and on production. It must not exceed 3 months.

In the case of significant nonconformity, special inspection by ift-Q-Zert is necessary. This consists of external inspection and/or the repeating of laboratory testin. The type and scope will be stipulated by the monitoring agency.

The deadline to eliminate any flaws ascertained during the special inspection is also set at 3 months.

Annex 1 Cross section plan for sampling as part of first testing