SLOVENSKI STANDARD
SIST EN 1279-6:2004

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Steklo v stavbah ï Izolacijski stekleni elementi ï 6. del: Kontrola proizvodnje v tovarni in periodiļ ni preskusi

Glass in building - Insulating glass units - Part 6: Factory production control and periodic tests

Glas im Bauwesen - Mehrscheiben-Isolierglas - Teil 6: Werkseigene Produktionskontrolle und Auditprüfungen

Verre dans la construction - Vitrage isolant préfabriqué scellé - Partie 6 : Contrôle de production en usine et essais périodiques

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EUROPEAN STANDARD

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

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Contents

Foreword

This document EN 1279-6:2002 has been prepared by Technical Committee CEN/TC 129 "Glass in building", the secretariat of which is held by IBN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by January 2003, and conflicting national standards shall be withdrawn at the latest by January 2003.

The described testing and inspections are part of routine production of insulating glass units.

This Part of the standard does not stand alone, it is part of one standard:

- prEN 1279-1, Glass in building - Insulating glass units - Part 1: Generalities, dimensional tolerances and rules for the system description.
- prEN 1279-2, Glass in building - Insulating glass units - Part 2: Long term test method and requirements on moisture vapour penetration.
- prEN 1279-3, Glass in building - Insulating glass units - Part 3: Long term test method and requirements for gas leakage rate and for gas concentration tolerances.
- EN 1279-4, Glass in building - Insulating glass units - Part 4: Methods of test for the physical attributes of edge seals.
- prEN 1279-5, Glass in building - Insulating glass units - Part 5: Evaluation of conformity.
- EN 1279-6, Glass in building - Insulating glass units - Part 6 Factory production control and periodic tests.

The annexes A, B and C are normative. The annexes D, E, F, G, H, J and K are informative.

This standard includes a Bibliography.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard is the product standard for insulating glass units, which defines insulating glass units, and ensures by means of an adequate evaluation of conformity to this standard that over time:

- energy savings are made because the U-value and solar factor do not change significantly;
- health is preserved because sound reduction and vision do not change significantly;
- safety is provided because mechanical resistance does not change significantly.

It covers additional characteristics that are of importance for trade. Marking conditions are included.

For glass products with electrical wiring or connections for e.g. alarm or heating purposes, this standard covers only wiring subject for electrical potential difference to earth less than 50 V a.c. or less than 75 V d.c.

The main intended uses of the insulating glass units are installations in buildings and constructions such as in windows, doors, curtain walling, roofs and partitions where there exists protection against direct ultraviolet radiation at the edges.

NOTE 1 In cases where there is no protection against direct ultraviolet radiation at the edges, such as structural sealant glazing systems, additional European technical specifications should be followed.

NOTE 2 Units where the nature is only artistic are not part of this standard.

This Part of the standard, which is inextricably bound up with the other Parts of the standard, covers the routine factory production control (annex A), the periodic testing and inspection (annex B) and fogging test (annex C) to verify that production conforms with the system description.

2 Normative references

This European Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies (including amendments).

prEN 1279-1, *Glass in building - Insulating glass units - Part 1: Generalities, dimensional tolerances and rules for the system description.*
prEN 1279-2, *Glass in building - Insulating glass units - Part 2: Long term test method and requirements on moisture vapour penetration.*
prEN 1279-3, *Glass in building - Insulating glass units - Part 3: Long term test method and requirements for gas leakage rate and for gas concentration tolerances.*
EN 1279-4, *Glass in building - Insulating glass units - Part 4: Methods of test for the physical attributes of edge seals.*
EN 10204, *Metallic products - Types of inspection documents.*
prEN 13022, *Glass in building - Structural sealant glazing.*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions in prEN 1279-1 apply, as well as the following terms and definitions.

3.1
factory production control
permanent control of production exercised by the manufacturer. All the elements, requirements and provisions adopted by the manufacturer are documented in a systematic manner in the form of written policies and procedures. This production control documentation system ensures a common understanding of quality assurance and enable the

achievement of the required product characteristics and the effective operation of the production control to be checked

3.2
information from the supplier
information which is based on periodic measurements and on the fact that the supplier operates a quality assurance system which ensures that no significant deviations occur between measurements. See 5.2.6

3.3
lot
amount of products of a continuous production run, which can be a fixed number (e.g. 5, 100, 3 000) or manufactured in a fixed interval (e.g. 1 hour, half a day, a shift, one day)

3.4
periodic tests
series of tests for checking the continuing conformity of the product with the technical specifications

4 Quality assurance and factory production control

A manufacturer operating under a third party surveillance Quality Assurance System according to EN ISO 9001 (Bibliography [4]), in which the quality procedures cover to the relevant annex(es) of this Part of the standard has the benefit of being presumed to comply with this EN 1279-6.

5 Factory production control requirements

5.1 Organisation

5.1.1 Responsibility and authority

The responsibility, authority and the interrelation of all personnel who manage, perform and verify work affecting quality shall be defined, particularly for personnel who need the organizational freedom and authority to:

a) initiate action to prevent the occurrence of product non-conformity;
b) identify and record any product quality problems.

5.1.2 Management representative for factory production control

At every factory unit, where the insulating glazing units are manufactured, the manufacturer shall appoint a person who shall have defined authority, appropriate knowledge and experience of the production of the insulating glass, to be responsible for the conduct and supervision of factory production control procedures, including assessment of the qualifications of any subcontracted testing and inspection body.

NOTE Accreditation to EN 45000 series would be a sufficient but not a necessary qualification for such a body (see Bibliography [1], [2] and [3]).

It will also be the responsibility of the appointed person to ensure that the requirements given in this standard are implemented and maintained.

5.1.3 Management review

The production control system shall be reviewed at appropriate intervals by the manufacturer's management staff to ensure its continuing suitability and effectiveness in respect to this Part of the standard. Records of such reviews shall be maintained.

5.2 Quality system

5.2.1 General

The manufacturer shall establish and maintain a documented system as a means of ensuring that the product conforms to this standard. The following requirements hereafter shall be fulfilled.

5.2.2 Personnel

The manufacturer shall appoint personnel for the inspections and production control tests that will be carried out before, during and after production (e.g. incoming materials), or the manufacturer can subcontract to a testing or inspection body.

5.2.3 Documentation

The manufacturer's documentation and procedures shall be relevant to the production and process control of the insulating glass unit, and in this quality manual and associated documentation shall describe adequately the following:

a) the quality aims and the organizational structure, responsibilities and powers of the management, especially the management representative for the factory production control, with regard to product conformity;
b) the procedures for specifying and verifying the raw and constituent materials or components;
c) the product, the production control and other techniques, processes and systematic actions that will be used;
d) the inspections and tests that will be carried out before, during and after production, and the frequency with which they will be carried out;
e) provisions for defining, keeping and using the records of the results of inspections and tests;
f) the test reports in accordance with all other relevant Parts of this standard;
g) the provisions taken for control of products that fail the specified criteria;
h) documents of conformity made available by suppliers.

The documents shall be maintained during a period which shall be laid down in the quality manual. Records may be in the form of any type of media, such as hard copy or electronic, e.g. by means of a declaration in accordance with EN 10204.

5.2.4 Test equipment

Test equipment necessary for factory production control shall be calibrated as described in the quality manual.

NOTE The precision of calibration required is implied by the accuracy of the test method and tolerances specified.

5.2.5 Inspection and testing

Inspection and testing depends on the design of the insulating glass units. The different inspection and testing schemes are described in the annex A and annex B.

Annex A details the inspection and tests: the requirements and the records are normative, the frequency and test methods are recommended and therefore only given as information. Those recommended frequencies are sufficient for production. If no testing scheme, method or frequency is described in the annex A, and/or another testing scheme is used, it shall be described in detail in the quality manual.

Annex B describes the periodic, low frequency test.

Annex C describes the fogging test.

Annex D onwards describes the tests referred to in annex A as recommendations.

5.2.6 Quality contracts

Inspection and tests on incoming materials (the Material control part of the tables in the Annex A) can be reduced on the basis of quality contracts between the supplier and the insulating glass unit manufacturer, on condition that the contract refers to the appropriate tables in annex A.

Quality contracts shall include the possibility of an audit of the supplier.

The quality contracts can also include the documents demonstrating conformity to this European Standard. If so, and supplying manufacturers who comply with EN ISO 9001, the inspection and tests on incoming material may be further reduced, so that the inspection and tests are not unnecessarily duplicated.

Where contractually requested, quality records shall be made available by suppliers for evaluation by the customer's representative for an agreed period.

6 Handling, storage, packaging and delivery

The manufacturer shall establish, document and maintain procedures for handling, storage, packaging and delivery of the insulating glass units. The procedure shall be adequate to guarantee the quality of the product.

Delivered individual products or product batches shall be identifiable and traceable with regard to their production data. For this purpose, the manufacturer shall establish and maintain the records required in the relevant technical specification, and shall mark the insulating glass units or their delivery documents correspondingly.

7 Training of personnel

The manufacturer shall establish and maintain procedures for the training of all personnel activities affecting quality. Personnel performing specific assigned tasks shall be qualified on the basis of appropriate education training and/or experience, as required. Appropriate records of training shall be maintained.

Annex A
(normative)

Inspection and testing tables of insulating glass units

A.1 General

The tables in A.2 onwards in this annex deal with particular design of insulating glass units. When a modified or new design cannot find tables fitting with its production method, appropriate tables shall be defined. These new tables can be incorporated in the standard when revision of the standard takes place.

NOTE 1 In the meantime, a CEN report containing the draft new tables can be elaborated, so that placing the product on the market may proceed without interruption.

Each of A.2 till A.7 in this annex onwards, dealing with a particular design, consists of two parts: additional definitions related to the specific design, and a table containing three sections:

– first section: Material control;
– second section: Production Control;
– third section: Product control.

Due to the nature of products used, it is reasonable to carry out some tests simultaneously on line. This is acceptable providing sufficient controls are incorporated into the system to allow change/replacement if a test failure occurs.

Some inspections in the product control section can be, and therefore may be performed during production (e.g the determination of the intended thickness of sealant on the back of the spacer can be performed during placing the spacer onto the glass). In those cases, and to prevent duplication of inspections, the production control documentation shall contain the relevant instructions.

The product control section of the tables refer to a random sample inspection plan. That inspection plan is a recommended plan. See Table A.1 in NOTE 2. Use of this plan, or plans with the same statistical accuracy (e.g. based on ISO 2859, Bibliography [6]) can be helpful for passing successfully periodic inspections by independent bodies.

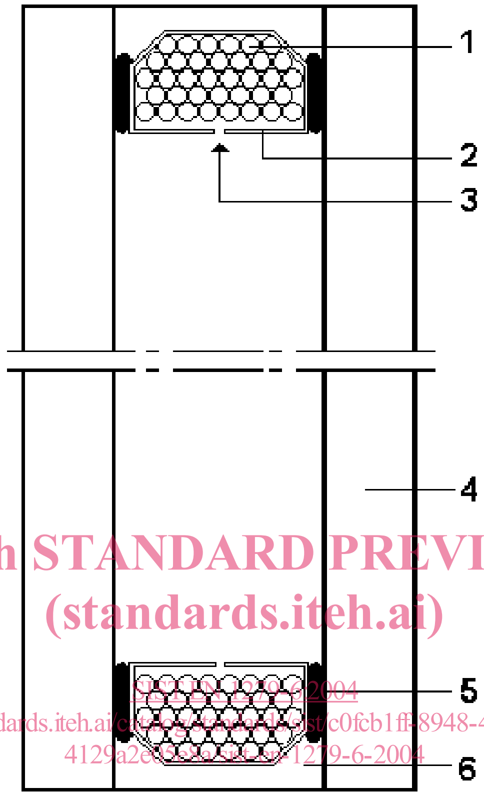
NOTE 2 **Table A.1 - Recommended random sample inspection plan for finished insulating glass units** (decision is to be made by the manufacturer)

Lot or day's production	Number of test pieces for inspections	Maximum number of units falling outside the system description
2 – 15	2	0
16 – 25	3	0
26 – 90	5	0
91 – 150	8	1
151 – 500	13	1
501 – 1 200	20	2
1 201 – 9 999	32	3

To be effective, Table A.1 should be used in the following way. When the inspection of a lot or a day's production reveals more than the acceptable number of occurrences which exceed the absolute limits described in the system description (for the rules of the system description, see prEN 1279-1), all the units of the lot or day's production should be re-inspected. Any units which exceed the absolute limit(s) should be repaired or re-manufactured. Decision is to be made by the manufacturer.

A.2 Air filled organic sealed insulating glass units with hollow spacer

The listed inspections and tests relate to organic sealed (without hot melt butyl as outer seal) air-filled insulating glass units with hollow spacer. Figure 1 gives the principle of this system of insulating glass units.



Key 1 Desiccant; 2 Spacer bar; 3 Diffusion openings; 4 Glass; 5 Inner seal; 6 Outer seal

Figure A.1 - A principle of an organic sealed insulating glass units with hollow spacer

When a manufacturing process is such that one or more of the listed inspections or tests are not applicable or physically not possible, the relevant inspection or test shall be ignored.

The inspections and/or tests on the raw materials should be carried out in time to react in the case of non-conformance of the material.

Volatile content tests are only to be carried out if the cavity of the unit is in contact with a material with a volatile content so high that condensation can occur, and if there is no information from the supplier that the volatile content is below a certain limit. This limit is defined as 1,5 times the value for the volatile content of the material for use in construction of the samples which were prepared for the fogging test, and when the same adequate heating procedure is used for both. For the volatile test parameters, see annex G. In connection with the volatile contents in Table A.2, one has to read "recommended limits" instead of "requirements".

No volatile content test is required when fogging tests are carried out.

The required records in the following tables can be any documents such as order documents, production documents, logbook, etc. as described in the quality procedures and associated documentation. When no record is required, this is valid only if there are no complaints. In case of complaint, records shall always be kept.

Adjustments of machinery and equipment used for manufacturing insulating glass units are periodically checked according to defined parameters for optimum results, and/or according to the recommendations of the manufacturer or the supplier of the machinery or equipment and in any case when non conformity of the products occurs.

Table A.2 - Inspection and test table for air-filled organic sealed insulating glass units with hollow spacer *(continued)*

Section 1: Material Control (See also 5.2.6)					
Ref.	**Material, inspection or test**	**Recommended method** (decision to be made by manufacturer)	**Requirement**	**Recommended frequency** (decision to be made by manufacturer)	**Record**
1	**Glass**				
1.1	packaging and label	Visual	See purchase specification	Each batch: 1	No
1.2	identification (glass/coated glass, according to relevant standards)	Visual	See purchase specification	Each batch	Yes
1.3	dimensions (length/width/shape when applicable)	Measurement	See purchase specification	Each batch, package and thickness: 1	No
2	**Spacer bar:**				
2.1	packaging and label	Visual	See purchase specification	Each batch: 1	No
2.2	straightness	Visual	See purchase specification	Each batch: 2	No
2.3	dimensions (height, width)	Measurement	See purchase specification	Each batch: 1 samples/type	Yes
2.4	shape	Visual	see purchase specification	each batch: 1 sample/type	No
2.5	surface condition	Adhesion test (e.g. annex F.)	See product description	Each batch: 2 samples/type	Yes
2.6	diffusion openings	Visual	See product description	Per shift and per type: 1 (See note 1)	No
2.7	undesired openings (if relevant e.g. welded on back)	Visual (see annex H)	No openings	2 samples of the amount used per shift	Yes
2.8	volatile content (if no information from supplier is available)	Weight loss	See purchase specification	Each batch: 2 samples/type	Yes
3	**Spacer tape:**				
3.1	packaging and label	Visual	See purchase specification	Each batch: 1	No
3.2	dimensions	Measurement	See purchase specification	Each batch: 2 samples/type	Yes
3.3	adhesion	Adhesion test (annex F.3)	See product description	Each batch: 2 samples/type	Yes
3.4	volatile content (if no information from supplier is available)	Weight loss	See product description	Each batch: 2 samples/type	Yes
4	**Desiccant:**				
4.1	packaging and label	Visual	See purchase specification	Each batch: 1	No
4.2	activity : test method shall be in agreement with desiccant supplier, eg. ΔT measurement	See annex K	initial H_2O content ≤ 3 %	Each batch: 1	Yes
NOTE 1 Per shift means minimal 1 per day and maximal 3 per day and per type					