

Program of glass products standardization in Russia

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Abstract

In 2008 Glass Enterprises Union initiated program of national standards development in the field of flat glass and glass products with building and technical applications was established. It is supposed that 62 new standards will be developed during 2008 - 2011 both in substitution of operating standards and new ones. Currently 34 projects are developing; all these projects have to be approved during 2009. Central objectives of standards development are the following: creating of normative base for controlling of fulfillment of mandatory requirements to the glass concerning safety issues in application as provided by technical regulations, standards harmonization in terms using and test methods, new product types standardization, maximum possible unification of technical requirements and test methods between Russian standards and ISO and CEN standards, exclusion of obsolete requirements and test methods.

Introduction

Analysis of Russian normative base shows that 38 standards include requirements to the flat glass quality and methods of its testing. Most of these standards were developed in 1970s-80s, they are obsolescence and no up-to-date, have a weak connections with international standards and standards of European countries. There are a lot of modern widely used in Russia product types, which have no standards. There are not standards for glazing characteristics calculations, for many glass and glass products test categories applied in European countries and USA. Table 1 consists of comparative data for the standards. Standards preparation is carried out extremely slow – only 6 standards were developed during last 8 years. Coordination of work, unification of terminology and test methods is absent. To correct composed situation in 2008 Glass Enterprises Union of Russia adopted decision about development of the standards set for various types of flat glass and its products, testing methods and characteristic calculations for them.

Table 1

Standards status	Standards quantity		
	ISO	CEN	Russia
Functional, from them:	61	70	38
- approved in 2005 – 2008	15	11	3
- approved before 1990 inc.	17	0	27
Newly developing and revising	21	20	1

During preparations of the national standards development program decision was made that it is necessary to review or to newly develop standards for the following mostly asked-for types of products, adjusting them in accordance with up-to-date requirements from international and European standards:

- Flat colorless glass – in substitution of GOST 111-2001;
- Flat tinted glass – new standard;
- Patterned glass – in substitution of GOST 5533-86;
- Wired glass (including polished) – in substitution of GOST 7481-78;
- Tempered glass – in substitution of GOST 30698-2000;
- Heat-strengthened glass – new standard;
- Chemically toughened glass – new standard;
- Glass with low-emissivity hard coating – in substitution of GOST 30733-2000;
- Glass with low-emissivity soft coating – in substitution of GOST 31364-2007;
- Solar control glass with hard coating – new standard;
- Solar control glass with soft coating – new standard;
- Mirrors – in substitution of GOST 17716-91;
- Opaque glass – new standard;

- Lacquered glass – new standard;
- Laminated glass – in substitution of GOST 30826-2001, GOST R 51136-2008;
- Insulated glass units – in substitution of GOST 24866-99, 52172-2003.

It is supposed with it that the standards will be applied both to building products and to products for other purposes, for example, for furniture, household appliances and transport.

According to Russian working regulations of national standardization, the product standard of “Specifications” or “General specifications” types must include, besides technical requirements to the product, some additional sections including the following:

- Terms and definitions;
- Marking rules;
- Packaging rules;
- Acceptance rules;
- Control (test) methods;
- Storage and handling;
- Recommendations for application;
- Safety requirements;
- Environment protection;
- Manufacturer's warranty.

These sections contain adequate rules or reference to other standards which contain such rules.

For unification of the mentioned rules and reduction of the product standard volumes, we also plan to develop following standards:

- Glass and glass products. Terms and definitions – new standard;
- Glass and glass products. Defects. Terms and definitions – new standard;
- Glass and glass products. Acceptance rules – new standard;
- Glass and glass products. Marking, packaging, handling and storage – new standard.

Concerning control and testing methods, it was decided to develop separate standard for every specific technique, if possible. As a result following list was formed contained supposed for preparation standards for control, testing and calculation methods:

1. Glass and glass products. Control methods for geometrics and appearance – new standard.
2. Glass and glass products. Methods for determination of optical properties:
 - 2.1. Optical distortion measurement – new standard;
 - 2.2. Determination of light and solar characteristics – new standard;
 - 2.3. Determination of color coordinates – new standard;
 - 2.4. Determination of refractive index – new standard.
3. Glass and glass products. Methods for determination of residual internal stresses – new standard.
4. Glass and glass products. Methods for determination of thermal characteristics:
 - 4.1. Determination of emissivity coefficient – new standard;
 - 4.2. Calculation of thermal resistance – new standard;
 - 4.3. Determination of thermal resistance – new standard.
5. Glass and glass products. Methods for testing of resistance to climatic effects:
 - 5.1. Humidity resistance testing – new standard;
 - 5.2. Radiation resistance testing – new standard;
 - 5.3. Boiling test (temperature stability) – new standard;
 - 5.4. Salt spray test – new standard;
 - 5.5. Frost resistance testing – new standard;
 - 5.6. Dew point measurement – new standard;
 - 5.7. Longevity test – in substitution of GOST 30779-2001.
6. Glass and glass products. Methods for determination of mechanical properties:
 - 6.1. Soft body shock test – new standard;
 - 6.2. Steel ball shock test – new standard;
 - 6.3. Axe and hammer tests – new standard;
 - 6.4. Dummy test – new standard;
 - 6.5. Fracture pattern testing – new standard;
 - 6.6. Abrasion resistance testing – new standard;
 - 6.7. Flexural strength testing – new standard;

- 6.8. Static loading stability testing – new standard;
- 6.9. Impact strength testing – in substitution of GOST 11067-85;
- 6.10. Determination of bending elasticity in lateral static bending – in substitution of GOST 9900-85;
- 6.11. Hardness testing – new standard.
- 7. Glass and glass products. Methods for determination of thermostability – in substitution of GOST 25535-82.
- 8. Glass and glazing. Methods for determination of sound insulation – new standard.
- 9. Glass and glazing. Methods for fire resistance test – new standard.
- 10. Glass and glazing. Methods for blast effects resistance test – new standard.
- 11. Glass and glazing. Methods for bullet-proof abilities test – new standard.
- 12. Glass and glazing. Methods for wind loading resistance test – new standard.
- 13. Glass and glass products. Methods for determination of chemical durability:
 - 13.1. General requirements – in substitution of GOST 10134.0-82;
 - 13.2. Water resistance test – in substitution of GOST 10134.1-82;
 - 13.3. Acid resistance test – in substitution of GOST 10134.2-82;
 - 13.4. Alkali resistance test – in substitution of GOST 10134.3-82 ;
 - 13.5. Surface chemical stability test – new standard.

Developing standards will be harmonized if possible or take into account some requirements of European and international standards. However direct using of ISO and CEN standards majority in Russia does not seem possible, because national standards must take into consideration specific features of the country, including climatic, economical, technical, cultural, legal aspects and so on. Particularly, it is very important to take into account in development of the standards for glass and its products following factors:

- Climatic factors: maximum and minimum of air temperature, temperature drops during a year or a day, quantity of 0 °C transition during a year, air humidity, solar radiation intensity, precipitation values, force and direction of prevailing winds, possibility and probability of hurricanes, earthquakes, floods;
- Economical factors: possibilities for people and business to pay for applied materials and constructive decisions, possibilities and conditions of building crediting and insurance;
- Technical factors: manufacturing capability of glass and its products producers, builders technological capabilities to use such materials, technical instrumentation of the manufacturers and customers by control, technical equipment of testing centers and scientific laboratories;
- Cultural factors: the most prevailed types of the buildings (multistory or low-rise, stone or wood etc.), aesthetic preferences of the people, traditional priorities of the customers (which quality indexes are more or less important);
- Legal factors: product safety legislation, protection of consumers' rights, requirements to the maintenance and registration and so on.

During several last years ecological factors also started to gain significance. For example, environmental pollution during manufacturing and using of glass products is very important factor. Naturally, all these factors are different in every country and have various significance, that is reproduced in national standards.

Originally the program covers the development of 62 standards during 2008 – 2011. But because of formed economical situation standards quantity and development periods could be possibly corrected. First redactions of 34 projects are ready as yet. From them there are 14 standards of “Specifications” and “General specifications” types for various flat glass products and 20 standards for testing and calculation methods. In 2009 they must be discussed by interested organizations and passed to approval in Rostekhnregulirovanie.

Next six prepared standard project almost fully harmonized with corresponded international and European standards:

1. “Glass and glass products. Methods for determination of optical properties. Determination of light and solar characteristics” corresponds to ISO 9050:2003 Glass in building – Determination of light transmittance, solar direct transmittance, total solar energy transmittance, ultraviolet transmittance and related glazing factors.
2. “Glass and glass products. Methods for determination of thermal characteristics. Calculation of thermal resistance” corresponds to EN 673:1998 Glass in building – Determination of thermal transmittance (U value) – Calculation method.
3. “Glass and glass products. Methods for determination of thermal characteristics. Determination of thermal resistance” corresponds to ISO 10293:1997 Glass in building – Determination of steady-state U values (thermal transmittance) of multiple glazing – Heat flow meter method.
4. “Glass and glazing. Methods for determination of sound insulation” corresponds to ISO/PAS 16940:2004 Glass in building – Glazing and airborne sound insulation – Measurement of mechanical impedance of laminated glass.

5. "Glass and glazing. Methods for wind loading resistance test" corresponds to ISO 16932:2007 Glass in building – Destructive-windstorm-resistant security glazing – Test and classification.
6. "Glass and glazing. Methods for blast effects resistance test" corresponds to ISO 16933:2007 Glass in building – Explosion-resistant security glazing – Test and classification by arena air-blast loading.

Conclusion

Realization of this program of the Russian national standards development will allow to close normative base, applied in Russia, to international and European standards. This approximation includes both covered products types, requirements to them and test methods. In turn, it will make easier international cooperation in the field of manufacturing and applications of glass and its products.

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