International Organization for Standardization
Organisation internationale de normalisation
Международная организация по стандартизации

TMB Secretariat
Vote Form
Number: **05/2023**
Date: 2023-01-14

ISO TECHNICAL MANAGEMENT BOARD

SUBJECT

IWA on Domestic glass types - crystal glass, crystal and lead crystal glass - specifications and test methods

BACKGROUND

In October 2022, AFNOR (France) submitted a proposal to the TMB Secretariat for the development of an ISO International Workshop Agreement (IWA) on *Domestic Glass Types - crystal glass, crystal and lead crystal glass - specifications and test methods.*

During the two-week informal review by the TMB, many comments were received on the IWA. These comments were shared with AFNOR who revised the IWA proposal based on the feedback (see Annex 3).

AFNOR is willing to provide the secretariat for the development of this IWA.

SPCG assessment:

The proposal was shared with the SPCG who informed that there is no interest in this particular IWA which is outside the remit of ITU-T and IEC.

Please find attached as annex:

- Annex 1 - The IWA proposal form
- Annex 2 – The Draft IWA on *Domestic Glass Types - crystal glass, crystal and lead crystal glass - specifications and test methods*
- Annex 3 – AFNOR response to TMB comments (2-week informal review)

ACTION

The members of the Technical Management Board are invited to:

- Approve the proposal for an IWA on *Domestic glass types – crystal glass, crystal and lead crystal glass – specifications and test methods*, and
- Allocate the secretariat to AFNOR (France)

By 11 February 2023.

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PROPOSAL FOR AN INTERNATIONAL WORKSHOP AGREEMENT

A proposal for an International Workshop Agreement (IWA) shall be submitted to the secretariat of the Technical Management Board at ISO/CS (tmb@iso.org). Proposals will be referred to the ISO Technical Management Board for approval (4-week ballot).

Once the proposal for the IWA is approved by the TMB, the proposer will be requested to prepare an announcement/ invitation to the workshop, which will be circulated to the ISO members by ISO/CS. Please note that the announcement must be made at least 90 days in advance of the agreed date to allow potential attendees adequate time to plan on attending the workshop (Annex SI.3).

See the ISO Supplement Annex SI for full details of the Procedure for the development of IWAs.

Proposer

A proposal to hold an ISO workshop for the purpose of developing one or more IWAs on a particular subject may come from any source, including ISO member bodies, liaison organizations, corporate bodies etc. An organization that is not an ISO member body or liaison organization, or is not international in scope, shall inform the ISO member body in its country of its intent to submit such a proposal.

European Domestic Glass (EDG) together with AFNOR (Association française de normalisation-French standardization body)

The European Domestic Glass Association, set up in 1966, groups together the domestic glass industry's collaborative activity on European legislative issues, managed under a single membership structure. The association represents the common interests of European domestic glass producers and promotes the use and reuse of domestic glass in a more social, environmental and responsible way.

Contact details of proposer

Name: Paola Di Discordia & Gwenola Hardouin

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Title of the proposed IWA

DOMESTIC GLASS TYPES - CRYSTAL GLASS, CRYSTAL AND LEAD CRYSTAL GLASS - SPECIFICATIONS AND TEST METHODS

Purpose and justification

Context

Domestic glass is largely used for consumer goods, such as tableware, containers (e.g. bottles, decanters, perfume jars), giftware, jewellery, home decor, decorative components (e.g. for the jewellery, textile, lighting), furniture and luminaries. Other industrial or technical applications, such as glass in building, automotive, medicine and laboratories are not considered as domestic glass.

There has been recent significant technical progress and market evolution with regard to high quality crystal glass types for domestic use. A huge market shift occurred from lead crystal glass to innovative crystal glass, driven by progress in industrial processes. Three decades of research also led to the development of new formulas without intentionally added lead oxide:

1. manufacturers do not use lead oxides anymore among the starting raw materials to obtain crystal glass,
2. it is now possible to obtain a new glass, 'crystal', the characteristics of which are far superior to those of crystal glass, in terms of refractive index and density, and are very close to those of lead crystal glass.

See in annex the main characteristics of lead crystal glass, 'crystal' and crystal glass.

Thanks to these innovations an entirely new product ('crystal') is now being put on the market. Consequently, its definition is expected, in order to request an update of the Harmonized System of Customs Codes.

There is an urgent need to ensure that consumers are not confused or misled by these innovations. Therefore, one purpose of this proposal is to provide a timely and clear definition of 'crystal' on the market.
Moreover, consumers, in particular those of younger generations, may be more prone to consider the environmental footprint of articles before taking a purchasing decision. Information on the characteristics of high-quality domestic glass types would facilitate consumers' decision-making.

Purpose

The purpose of the IWA is to establish specifications for high quality crystal glass, 'crystal' and lead crystal glass at international level. It is expected that these specifications would address the three categories of material, in terms of density, refractive index, and composition. The IWA is also expected to refer to existing and relevant test methods and possibly identify complementary tests if necessary.
The purpose is to focus on material definition, other considerations such as occupational health and safety requirements and release limit values are excluded.

Justification

A clear characterization of crystal glass, 'crystal' and lead crystal glass would be beneficial to recognize and properly identify product specifications. In this way, it will facilitate commercial exchanges on a global scale. With regard to 'crystal' and crystal glass, a lead content criterion will address potential lead contamination, aiming at reinforcing their recognition and thereby facilitating their marketing, use, and recyclability.

There is currently no internationally standardized criterion matching the new formulas regarding the elimination of lead oxides from the starting raw materials, which is a major concern for the market.

This approach is similar to the one already chosen in IWA 8:2009 that became ISO 24117:2020 "Tableware, giftware, jewellery and luminaries, made of glass — Glass clarity — Classification and test method" including an iron content criterion in relation to glass clarity. Nevertheless, both the materials covered, and the purpose of these normative documents, are different. ISO 24117:2020 relates to specifications relative to lightness, chroma and iron oxide content, while the proposed IWA focuses on starting raw materials, density, refractive index and lead content.

There is also no recognized definition for 'crystal', despite its specifications of high quality. In such case, 'crystal' would only be assimilated to mainstream glass in terms of marketing and customs.
It is therefore highly needed to rapidly agree on relevant definitions and test methods, especially since 'crystal' is starting to be put on the market.

After careful review of existing ISO technical bodies, we conclude that there is currently no technical committee that could host the development of an ISO deliverable for the purpose of only developing the specification of the three categories of material. However, there are already existing test methods that can be referred to or adapted.

An IWA is the best option to promptly discuss and share a definition meeting market expectations.
After the publication of the IWA, its promotion to an international standard will be considered and could be proposed under the most appropriate standardization technical body.

Contribution to Sustainable Development Goals (SDGs):

A specification of different crystal glass types and, in particular, a lead content criterion for those crystal glass types, would contribute to Goal 9 "Industries, Innovation and infrastructures" by finding lasting solutions to both economic and environmental challenges, such as the reduction of hazardous starting raw materials while ensuring a solid and durable product over time.

Meetings

There will be no participation fees to participate in the workshop; however, the participants will be expected to cover their own expenses.
Meetings will be held in presence at AFNOR premises (11 rue Francis de Pressensé, 93571 La Plaine Saint-Denis, France). Connection via Zoom will be provided for those who would be unable to attend.
Meetings will be chaired by Paola Di Discordia (EDG), the secretariat will be held by Gwenola Hardouin (AFNOR).
The workshop language will be English.

Action plan

Upon TMB approval,

1) Preparatory work: EDG and AFNOR will elaborate an initial draft proposal of IWA.
2) Initial Consultation: A first draft proposal will be circulated among participants to seek their comments, by correspondence. Their feedback will then be compiled in preparation of a 1st workshop meeting, which will appropriately address all comments, concerns and objections.
3) 1st workshop meeting, hosted in AFNOR premises, La Plaine Saint Denis, France.

Participants are expected to

- comment successive versions of the draft,

- consider and discuss all comments received,
- possibly agree on a final version of the draft for publication as an IWA.

4) Optional: 2nd workshop meeting, as necessary.
5) Finalization and submission of the draft IWA. EDG and AFNOR to update the final draft IWA taking into account all changes agreed upon, and to circulate this final version and send it to ISO Central Secretariat for publication.

Timetable

Step	Earliest estimated dates
TMB Approval → Notice of the kick-off meeting	February 2023
Preparatory work	March-April2023
Initial consultation of workshop members	May 2023
1st workshop meeting	June 2023
Optional 2nd workshop meeting	July 2023
Finalization and Submission of Agreement	August 2023

Does the proposed IWA relate to or impact on any existing work in ISO committees?

☐ Yes ☒ No

Please list any relevant documents and/or ISO committees

This IWA targets crystal glass materials used in a wide variety of applications in consumer goods, including but not necessarily items for food contact.
Such work does not fall in the scope of ISO/TC 63 “Glass containers” or ISO/TC 166 “Ceramic ware, glassware and glass ceramic ware in contact with food”. However, these technical committees have developed test methods, for example to assess lead and cadmium release limit values, which may be referred to by in the IWA. No overlap with existing standards is thus foreseen.

Many sectors include crystal glass as a material, e.g. decorative items, furniture and home decor but would not have been a proper setting for this work as it addresses the material rather than specific products.

The IWA is therefore not expected to duplicate nor to negatively affect any ongoing work within ISO.

The following relevant documents have already been identified for consideration:

- ASTM E1621-22 XRF Standard Guide for Elemental Analysis by Wavelength Dispersive X-Ray Fluorescence Spectrometry
- ASTM C729-11 (2022) Test Method for Density of Glass by the Sink-Float Comparator
- ASTM C693-93(2019) Standard Test Method for Density of Glass by Buoyancy
- ASTM C1648-12(2018) Standard Guide for Choosing a Method for Determining the Index of Refraction and Dispersion of Glass
- DIN 51086-2 :2002 (Inactive) Testing of oxidic raw materials and materials for ceramics, glass and glazes – Part 2: Determination of Ag, As, B, Ba, Be, Bi, Ca, Cd, Ce, Co, Cr, Cu, Er, Fe, La, Mg, Mn, Mo, Nd, Ni, P, Pb, Pr, S, Sb, Se, Sn, Sr, Ti, V, W, Y, Yb, Zn, Zr by optical emission spectrometry with inductively coupled plasma (ICO OES)
- DIN 51001 2003:08 General procedures for the X-ra fluorescence analysis (XRF) of oxidic raw materials
- DIN 66137-1: 2003-11 Principles of solid state density; Part 1: Principles
- EN 2155-3:1993-04 Aerospace series; test methods for transparent materials for aircraft glazing; part 3: determination of refractive index
- EUR 8137 EN Certification report on BCR-126A and BCR-126B
- NF B30-004: Crystal and crystal glass

Relevant stakeholders (list of organizations that may be interested)

The following organizations will be targeted for participation and dissemination of the opportunity to participate, as they are recognized for their expertise on domestic glass and the breadth of their constituency:

European Domestic Glass
International Crystal Federation

As per the ISO Directives, all details will be announced by the workshop secretariat, the ISO Central Secretariat and EDG, inter alia.

Member body willing to act as secretariat

AFNOR

Number of meetings to be held (if more than one is envisaged) and proposed dates

2 meetings (expected in June 2023, and July 2023 if necessary)

Annexes are included with this proposal (give details)

An annex is attached with an outline of the IWA.

ANNEX

REQUEST FOR AN IWA
DOMESTIC GLASS TYPES -
CRYSTAL GLASS, CRYSTAL AND LEAD CRYSTAL GLASS -
SPECIFICATIONS AND TEST METHODS

OUTLINE

1. SCOPE

This document provides specifications and test methods for domestic glass types of high quality: crystal glass, crystal and lead crystal glass (composition, density, refractive index and lead content).

Domestic glass applications cover consumer goods such as tableware, containers (e.g. bottles, decanters, perfume jars), giftware, jewellery, home decor, decorative components (e.g. for the jewellery, textile, lighting), furniture and luminaries. Other industrial or technical applications, such as glass in building, automotive, medicine and laboratories are not considered.

2. SPECIFICATIONS

- Definition of crystal glass types:
  - crystal glass
  - crystal
  - lead crystal glass

- Technical characteristics

Description domestic glass types of high quality	**Characteristics**			
	Metal oxides	Density	Refractive index	Remarks
Crystal glass	Σ (ZnO, BaO, K2O, SrO, Al2O3, TiO2, ZrO2, Sb2O3) ≥10%	≥2.45	≥1.520	Max permissible lead content
Crystal	Σ (ZnO, BaO, K2O, SrO, Al2O3, TiO2, ZrO2, Sb2O3) ≥ 24%	≥2.67	≥ 1.535	Max permissible lead content

Lead Crystal glass	PbO ≥ 24%	≥2.9	≥ 1.545	N/A

3. TEST METHODS

[Development or reference to test methods]

- **Chemical analysis**
- **Tests on physical properties**
  - Density
  - Refraction index

4. Bibliography

- The following relevant documents have already been identified for consideration:
- ASTM E1621-22 XRF Standard Guide for Elemental Analysis by Wavelength Dispersive X-Ray Fluorescence Spectrometry
- ASTM C729-11 (2022) Test Method for Density of Glass by the Sink-Float Comparator
- ASTM C693-93(2019) Standard Test Method for Density of Glass by Buoyancy
- ASTM C1648-12(2018) Standard Guide for Choosing a Method for Determining the Index of Refraction and Dispersion of Glass
- DIN 51086-2 :2002 (Inactive) Testing of oxidic raw materials and materials for ceramics, glass and glazes – Part 2: Determination of Ag, As, B, Ba, Be, Bi, Ca, Cd, Ce, Co, Cr, Cu, Er, Fe, La, Mg, Mn, Mo, Nd, Ni, P, Pb, Pr, S, Sb, Se, Sn, Sr, Ti, V, W, Y, Yb, Zn, Zr by optical emission spectrometry with inductively coupled plasma (ICO OES)
- DIN 51001 2003:08 General procedures for the X-ra fluorescence analysis (XRF) of oxidic raw materials
- DIN 66137-1: 2003-11 Principles of solid state density; Part 1: Principles
- EN 2155-3:1993-04 Aerospace series; test methods for transparent materials for aircraft glazing; part 3: determination of refractive index
- EUR 8137 EN Certification report on BCR-126A and BCR-126B
- NF B30-004: Crystal and crystal glass

The proposal of an ISO workshop agreement was reviewed considering the comments received:

Concerning the use of the term 'crystal' (ANSI, SAC), it is the purpose of the future IWA to provide definitions and clarification among domestic glass types of high quality. The title was clarified in the following terms: "*Domestic glass types – crystal, crystal glass and lead crystal glass – specification and test methods*"**.**

The new material belongs to the group of domestic glass types of high quality which all display the wording 'crystal'. On the one hand, confusion could arise by not using the term 'crystal' for a material that has characteristics close to lead crystal glass. On the other hand, the word 'crystal glass' is used for a material with lower grade characteristics than the proposed 'crystal'.
The terms 'crystal' and crystal glass can also be defined as referring to products free of intentionally added lead oxides.

The IWA is expected to have positive effects on the circulation of products on a global scale (ANSI)

<u>'Crystal'</u>
A new material was created with characteristics close to those of lead crystal glass while being manufactured without intentional addition of lead oxides in the composition batch of starting raw materials. This new material lacks a clear and well-defined definition in order to allow its recognition by the market. Moreover, such a definition is awaited to be able to request an update of the Harmonized System of Customs Codes, needed to allow the free circulation and monitoring of such articles under an appropriate entry.

<u>Crystal glass</u>
Research led to the elimination of lead oxides from the composition batch of starting raw materials for the production of crystal glass. The concern over the presence of lead oxides in the starting composition is more and more reflected in consumers' choices of articles. This is why it is necessary to reflect the progress in the production of crystal glass, now without any intentional addition of lead oxides. An accurate information will facilitate the circulation and marketing of articles and foster transparency.

Moreover, the circular economy requires to enhance recycling in terms of volume and opportunities. Internationally recognized characteristics in the composition of domestic glass materials of high quality, without intentional addition of lead oxides, would promote the circulation of such articles.

It will also provide advantages for consumers (ANSI)
Consumers, in particular those of younger generations, may be more prone to consider the environmental footprint of articles before taking a purchasing decision. Information on the characteristics of high-quality domestic glass types would facilitate consumers' decision-making.

The proposal was updated with the following documents to be considered (including ANSI proposals):

- ASTM E1621-22 XRF Standard Guide for Elemental Analysis by Wavelength Dispersive X-Ray Fluorescence Spectrometry
- ASTM C729-11 (2022) Test Method for Density of Glass by the Sink-Float Comparator
- ASTM C693-93(2019) Standard Test Method for Density of Glass by Buoyancy

- ASTM C1648-12(2018) Standard Guide for Choosing a Method for Determining the Index of Refraction and Dispersion of Glass
- DIN 51086-2 :2002 (Inactive) Testing of oxidic raw materials and materials for ceramics, glass and glazes – Part 2: Determination of Ag, As, B, Ba, Be, Bi, Ca, Cd, Ce, Co, Cr, Cu, Er, Fe, La, Mg, Mn, Mo, Nd, Ni, P, Pb, Pr, S, Sb, Se, Sn, Sr, Ti, V, W, Y, Yb, Zn, Zr by optical emission spectrometry with inductively coupled plasma (ICO OES)
- DIN 51001 2003:08 General procedures for the X-ra fluorescence analysis (XRF) of oxidic raw materials
- DIN 66137-1: 2003-11 Principles of solid-state density; Part 1: Principles
- EN 2155-3:1993-04 Aerospace series; test methods for transparent materials for aircraft glazing; part 3: determination of refractive index
- EUR 8137 EN Certification report on BCR-126A and BCR-126B
- NF B30-004: Crystal and crystal glass

However, the Becke line test only works relatively to an immersion liquid (or the neighboring mineral). It can be quickly and easily determined whether the glass has a higher refractive index, with an oil having exactly the limit value of glass tableware types. The problem is that to determine the value absolutely, series of oils are needed. This represents a lot of work, and the need for the availability and handling of all these oils, some of them being toxic. Besides, this method is mainly used in the mineralogy and not for glass, therefore it won't be considered in this IWA.

Concerning comments on the scope (DIN, SAC):

The scope encompasses high quality domestic glass types 'crystal', crystal glass and lead crystal glass, and has to be accurate as well as exhaustive in order to avoid any ambiguity in the application of the IWA :

Scope:

> "**This document provides specifications and test methods for domestic glass types of high quality: crystal glass, crystal and lead crystal glass (composition, density, refractive index and lead content).** Domestic glass applications cover consumer goods such as tableware, containers (e.g. bottles, decanters, perfume jars), giftware, jewellery, home decor, decorative components (e.g. for jewellery, textile, lighting), furniture and luminaries. Other industrial or technical applications, such as glass in building, automotive, medicine and laboratories are not considered."

Industry is already working on the draft text of the IWA, and it is anticipated that the IWA text will not exceed 5 pages. A recapitulative Annex will also be provided under the form of a table (one page).

The scope includes containers as it covers high quality domestic glass current businesses, such as perfume bottles, jam jars, decanters, drink bottles etc. but the IWA will not develop any release limit values in relation to any kind of application.

As the IWA will only refer to test methods relative to the validation of high-quality domestic glass types characteristics, independently of the applications, it is not necessary to split it in several sections. Here again, this IWA is not intended to provide any release limit value in relation to any application.

The proposed IWA does not intend to address release limit values nor any restriction/ condition in relation to any application. It doesn't need to be split into food / non-food sections.

The issue of the potential overlap with the ISO standard on clear / ultraclear glass was raised (JISC)
This question is understandable as both initiatives relate to domestic glass types and most applications are common. However, there is no overlap with the IWA 8 nor with the ISO 24117:2020 on glass clarity, which bear upon specifications concerning lightness, chroma and iron oxide content, while the proposed IWA is about crystal types and bears upon starting raw materials, density, refractive index and lead content.

The IWA is the most appropriate ISO deliverable at this stage, as 'crystal' is about to be marketed and quickly needs commonly agreed market recognition.

One high quality domestic glass type is completely new: the one called 'crystal' which was developed in order to approximate lead crystal glass specifications while excluding intentional addition of lead oxides from the starting composition batch. Without an adequate definition, 'crystal' would be considered as regular soda-lime glass and would lack the necessary market recognition to be acknowledged as a high quality domestic glass type.
Moreover, such an ISO recognition is also necessary and urgently awaited in order to launch a request for a modification of the Harmonised System of Customs Codes under the current official WCO modification round.

With this in view, an IWA appears to be the most appropriate normative deliverable at the moment, given the market expectations to specify the new material 'crystal', which is currently lacking any official specifications definition.

After this first step, if the document is approved in the future, as an ISO standard, the most relevant standardization technical body could be proposed.

The proposal has been updated along the above-mentioned elements.