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| **TEMPLATE FOR SENDING COMMENTS ON BIS DOCUMENTS** |

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| Date: | 11-11-2024 | Document No.: | | CHD 10 (19298) | Title of the Document: | Coated Glass — Specification | | |
| Name of the Commentator/  Organization: | | |  | | | | Abbreviation of the Commentator/Organization: |  |

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| **Abbreviation of the Commentator/Organization** | | **Clause/ Subclause No.**  (e.g. 3.1) | | **Paragraph No. /**  **Figure No. /**  **Table No.**  (e.g. Table 1) | | **Type of Comment1)** | | **Comments/Suggestions along with Justification for the Proposed Change** | | **Proposed Change/Modified Wordings** |
| **(1)** | **(2)** | | **(3)** | | **(4)** | | **(5)** | | **(6)** | |

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| Nagendra Kumar | Forward | 1 | te | (Coated glass uses the principle of increasing the direct reflection to maximize solar attenuation).  "Coated glass uses the principle of blocking/reflecting UV and Infrared Radiations subsequently blocking the heat associated with them. in comparison with clear glass, its absorption of solar energy is also increased due to presence of heat absorbing layer." | The wordings lead somehow to think of a glass closer to a mirror.  It also suggests more reflections better the performance glass, higher reflection is always not desirable, there are other properties as well which are crucial. |
| Shri Parag Shah | Foreword | Table | te | As per Foreword details, the considerable assistance is derived from various standard which includes following standards:  EN 12898:2001 – Determination of Emissivity  ASTM C 1376 – Standard specification for pyrolytic and vacuum deposition coatings on flat glass | The above-mentioned standard should be selected for the latest version which is having changes compared to its last version.  For EN 12898, the latest version is of 2019 whereas for ASTM C 1376, the latest version is of 2021.  The consideration of latest version of EN 12898 will lead to changes in Annex A – Emissivity measurement. The important aspect that will change is calculation of corrected emissivity and removal of Table A-2 Ration of normal emissivity to corrected emissivity |
| ADITYA DAS | 1.1 | 1 | ed | Currently, the phrasing indicates that the standard is for coating whereas it is for coated glass | The first para - which reads: This standard defines the characteristics, properties, test methods, sampling, classification and requirements for coatings applied on flat float glass or tempered glass which may be clear or  tinted, using either pyrolytic, sol-gel or vacuum (sputtering) deposition methods for use in  building glazing, may be modified as follows:    This standard defines the characteristics, properties, test methods, sampling, classification and requirements for flat float glass or tempered glass which may be clear or tinted, which has been coated using either pyrolytic, sol-gel or vacuum (sputtering) deposition methods for use in building glazing. |
| SACHINSMENON | 1.1 | 1 | te | Scope may be rephrased for better coherence and comprehensiveness | May be modified as follows -  This standard prescribes the classification, requirements, methods of sampling and tests for coated glass which may be made from clear or tinted glass substrates using pyrolytic, sol-gel or vacuum (sputtering) deposition methods, and used for glazing in commercial or residential buildings. |
| SACHINSMENON | 1.1 | 1 | te | In the draft, glass substrates are currently limited to float and tempered. | Other glass types like heat strengthened and patterned are also used in manufacture of coated glasses, and may be included in the standard. |
| Shri Parag Shah | 1 | 1.1 | te | This standard defines the characteristics, properties, test methods, sampling, classification and requirements for coatings applied on flat float glass or tempered glass which may be clear or tinted, using either pyrolytic, sol-gel or vacuum (sputtering) deposition methods for use in building glazing. This standard is applicable to coated glass used for glazing in commercial or residential applications. | The statement – “for coatings applied on flat float glass or tempered glass which may be clear or tinted” signifies that flat float glass having coating on it and tempered glass having coating on it will be having inclusion under scope.  Hence, the coated glass which will be toughened in later stage will remain out of scope of this standard even though the product being as coated glass. This will also exclude the coated glass in which the glass substrate is as Laminated Glass, Drawn sheet glass.  For this subject matter, section 5.0 of EN 1096-1 should be referred to and scope could be defined.  Also, it covers only pyrolytic, sol-gel and vacuum method. It misses out the coated glass through CVD, WCM and Power Coating method. These methods are covered under EN 1096-1. Section 4.0 of the same is to be referred. |
| Shri Parag Shah | 3 | Terminology | te | Currently, the definition related to various solar, ultraviolet, thermal and visible properties do not have any defined symbolic representation for easy tracing, identification and understanding. | The separate table consisting of details on symbol of various solar, visible, thermal, and ultraviolet properties is to be defined in standard to have better clarity and understanding of various properties and its identification. |
| Nagendra Kumar | 3.10 | 1 | ed | Fraction of the incident solar radiation that is reflected by the coated glass when the radiation is incident on the coated side. | Fraction of the incident solar radiation that is reflected by the coated glass when the radiation is incident on the coated side. |
| Shri Parag Shah | 3.14 | Normal Emissivity | te | The ratio of the emissive power of coated surface of the glass to the emissive power of a black body in a direction normal to surface | The definition of Normal emissivity is to be reviewed and corrected as follows:  The ratio of the emissive power of coated surface of the glass in a direction normal to surface to the emissive power of a black body in a direction normal to surface. |
| Shri Parag Shah | 3.20 | first | ed | The definition of solar direct reflectance does not have word "of: after first word "fraction" which changes the meaning of definition | In definition 3.20 – Solar direct reflectance of coated side is to be corrected for addition of word “of” after the first word “fraction”. |
| SACHINSMENON | 3.3 | 1 | ed | 'To' is missing | Insert ‘to’ between ‘substrate’ and ‘which’ |
| Shri Parag Shah | 4.0 | All | te | As of now, this section does not give information on who shall declare the class of product. | The responsibility of declaration of class of product needs to be defined. The testing carried out for durability of coating are dependent on the class of the product.  EN 1096-1 says that the coated glass manufacturer declares the applicable |
| Shri Parag Shah | 4.3 & 4.4 | - | te | 4.3 Class C: The coated glass shall be used only in sealed multiple glazing units  4.4 Class D: The coated glass shall be incorporated into sealed units, with the coated surface facing into the unit cavity, as soon as they are coated. They are not available as monolithic glass | The understanding of sealed multiple glazing unit is that there will not be any air or gas gap which provides insulation. This changes the meaning from Insulated Glass Units.  4.3 Class C – Replace “Sealed multiple glazing unit” with “Insulating Glass Units”  4.4 Class D – Replace “Sealed Units” with “Insulating Glass Units”  4.4 Class D – Replace “Not Available” with “Not suitable” for the last line related to monolithic glass. This statement is as a NOTE in EN 1096-1 whereas it is added as requirement statement in draft standard.  Reference can be considered of EN 1096-1. |
| SACHINSMENON | 6 | 1 | te | Requirements for glass substrates are not explicitly mentioned. | A separate clause ‘SUBSTRATES’ may be added, and in this clause, it may be prescribed that the different glass substrate shall satisfy the requirements of the corresponding Indian Standard. |
| Shri Parag Shah | 6.1 and Table 1 | - | te | Column (5) – Requirement for SI No. 1,2,3 and 5 mention tolerance of +/- 3 unit which is represented as +/- 3% which means the relevant properties of mentioned SI. Nos. are in Percentage. At the same time, SI. NO. 4 – Emissivity mentions the tolerance of + 0.02. | The basic formula for all of the characteristics to be viewed for the kind of UOM of values that are returned by the formula and based on this, UOM of tolerance has to be mentioned in line with UOM of values to avoid confusion in interpretation.  Same has to be reviewed for table 4 – requirements for classes A, B and S and for table 6 – requirements for coating types Class C and D type.  Also, the emissivity mentioned in table 1 is defined as Corrected emissivity where the EN defines it as Normal Emissivity, which is required to be review, as appropriate and applicable thorough verification.  EN criteria image |
| Shri Parag Shah | 6.1 | Table 1 | te | Point no. 04 in table 1 describes the emissivity as "Corrected Emissivity" and criteria are defined in line with corrected emissivity. | The EN 1096-4 describes about emissivity as "Normal Emissivity" and criteria are defined in line with Normal Emissivity. We should consider the method and criteria of EN to ensure the product interchangeability in global market. |
| Shri Parag Shah | 6.1 | Table 1 | te | The corrected emissivity calculation mentioned in point no. 04 of table 1 does not define scenario for range of declared emissivity values. | The consideration should be to align standard with EN 1096-4 and consider defining the normal emissivity value considering the range for value of declared value which will results in two difference formula for two different range. |
| Shri Parag Shah | 6.1 | Table 1 - iv | ge | For emittance, unit is not clear | Please mention in bracket (absolute) |
| Shri Parag Shah | 6.2, Table 2 | - | te | Scratches:  Central Area:  >75 mm; not allowed.  <= 75 mm; allowed  Edge Area:  >75 mm; allowed as long as they are not visually disturbing.  <=75 mm; allowed  B-5 Punctual Defects:  For scratches determine whether or not they are in the main or edge area. Measure the length of any scratches noted. For scratches >75 mm long, determine the distance between adjacent scratches. For scratches ≤ 75 mm long, note any area where their density produces visual disturbance. | The contradiction in criteria defined in Table – 2 and condition mentioned in Point 5 of Annexure B has to be aligned. Reference can be considered from EN 1096-1. |
| SACHINSMENON | Table 2 | iii | te | Acceptance criteria of 75 mm seems too lenient. | The requirement may be reviewed vis-à-vis corresponding requirement in IS 14900 and IS 2553 (part 1). |
| Shri Parag Shah | 6.2 & Table 2 | - | te | Uniformity/Stain  Central Area:  Allowed as long as not visually disturbing and ΔE shall be ≤ 4.5.  Edge Area:  Allowed as long as not visually disturbing and ΔE shall be ≤ 4.5. | The impact and importance for inclusion of Color Delta (ΔE) shall be evaluated as EN 1096-1 has only considered visual aspects, not a criteria of ΔE |
| Shri Parag Shah | 6.2.1 | ANNEX C, C-2.1 | te | Spectrometer is more advanced in hardware and can measure qualities that a colourimeter can't | Add Spectrometer as well along with colourimeter |
| ADITYA DAS | 7.2.1 | 1 | te | The test piece dimensions should be specified in case of coated glass of size less than 300 mm × 300 mm, given that glass size is not standardized | The test method specifies that a sample of 300 mm × 300 mm shall be taken for each test. However, in case the product itself is smaller than the test specimen dimensions, different test piece size may be required, which may be specified. |
| Shri Parag Shah | 7.6 | Table 3 ANNEX-F | te | SO2 gas is used in Annex-F, which is toxic and hazardous, so alternate test procedure such as with HCl or any other equivalent test to be included | Alternate test procedure such as with HCl or any other equivalent test to be included |
| Shri Parag Shah | 7.7.2 | Table 4 | ed | Test characteristics are not matching with Actual Test Method's Annexure (as in Table 3) | Test Method Annexures to be corrected |
| ADITYA DAS | 8.1.1 | 1 | te | The test piece dimensions should be specified in case of coated glass of size less than 1000 mm × 500 mm, given that glass size is not standardized | The test method specifies that a sample of size 1000 mm × 500 mm shall be taken. However, in case the product itself is smaller than the test specimen dimensions, different test piece size may be required, which may be specified. |
| ADITYA DAS | 9 | 1 | ge | The type of coating needs to be known to ascertain conformity to certain tests e.g. As per Col 5 Row 1 of Table 4 - For a glass claiming to have a low emissivity coating, the reflectance at 8μm shall not decrease by more than 2 units | In the packing and marking details, type of coating i.e. reflective or low-emissivity should be specified |
| Shri Parag Shah | Annex. A | - | te | The current Annexure A is defined based on the reference considered from the standard EN 12898 of version 2001. | Annexure A is to be defined based on the latest version 2019 of the standard EN 12898.  It has a significant impact on the calculation of corrected emissivity. Hence, the annexure is to be reviewed and aligned with version 2019 which could lead to modification in Table A-2 – Ratio of normal emissivity to corrected emissivity. |
| Shri Parag Shah | Annex. B | Sec. 5 | te | Under the conditions of examination given in B-3, note any spots, pinholes and/or scratches that are visually disturbing. For spots/pinholes measure the size and note the number relative to the size of the pane. If there are any clusters found their position relative to the through vision area shall be determined. For scratches determine whether or not they are in the main or edge area. Measure the length of any scratches noted. For scratches >75 mm long, determine the distance between adjacent scratches. For scratches ≤ 75 mm long, note any area where their density produces visual disturbance. | The criteria defined in Section 5 of Annexure B is to be reviewed along with criteria of scratches defined in SI. No. 3 of Table 2 under section 6.2 – Defects in coated glass. |
| Shri Parag Shah | Annex. D | D 1.2 & D 2 | te | For coating types C and D – Two square test pieces of dimensions 250 mm × 250 mm or the nearest size to those that can be manufactured.  **D-2 Spectrophotometric measurements**  As measurement samples cannot be cut from the test pieces, the measurements cannot be made using standard spectrophotometric equipment. The measurements can however be done using non-standard spectrophotometric equipment or by other means, for example, laser | The section D-1 and D-2 of this Annex D can be determined based on Annex A of EN 1096-3 and EN 1096-2 and its relevant clauses in mentioned standards. |
| Shri Parag Shah | Annex. G | G-2 | te | The G-2 section of Annexure G seems to have mixture of NSS test and other test as the images and some statement appears as of other tests. | The Annexure G – Neutral Salt Spray Test and its relevant clauses should be defined considering the standard ISO 9227 as reference. |
| Shri Parag Shah | All | - | te | In each clause where the temperature is defined as 27 +/- 2 degree celsius which is a bit high for laboratory conditions. The criteria for humidity is also required to be reviewed. | Each temperature range mentioned in standard has to be aligned with the criteria of EN standard which has a mention of range of 23 +/- 5 degree celsius. This will help us to ensure the inter changeability of product in global market. Also, the criteria for the humidity is to be aligned with criteria of EN |
| Shri Ambrose Royson C | - | - | - | I agree with the Draft |  |
| Shri Najmul Hassan Khan | - | - | - | I agree with the Draft |  |
| Shri Harbans Wadhwa | - | - | - | I agree with the Draft |  |
| Ajay Joshi | - | - | - | I agree with the Draft |  |