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**Greenhouse gases - Quantification method and requirements
for the carbon footprint of products - Photovoltaic glass**

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Foreword

4.1 Correlation The data and methods selected are suitable for evaluating the GHG emissions generated by the quantified system.

4.2 Integrity The carbon footprint quantification of photovoltaic glass products includes all direct emissions during the raw material production stage, the raw material transportation stage, and the product manufacturing stage. The total of emissions, including indirect emissions, should be calculated to avoid double counting or omissions.

4.3 Consistency Throughout the entire process of quantifying the carbon footprint of photovoltaic glass products, the same assumptions, methods, and data sources are used to obtain results consistent with the objectives and scope. The conclusion reached.

4.4 Uniformity Adopting internationally recognized methods, standards, and guidelines already applied to specific product categories to improve the carbon footprint of photovoltaic glass products. Comparability.

4.5 Accuracy The quantification of the carbon footprint of photovoltaic glass products is accurate, verifiable, relevant, and non-misleading, minimizing bias and uncertainty. Qualitative analysis.

4.6 Transparency Document all relevant issues using an open, comprehensive, and understandable method of information presentation. Disclose all relevant assumptions and, appropriately, the methods used. The methods and data sources.

5. Quantification Objectives This document quantifies the carbon footprint of photovoltaic glass at selected stages of its lifecycle, expressed in carbon dioxide equivalent (CO₂e). The

purpose of the document in quantifying carbon footprint includes, but is not limited to, the following.

- a) Used for communication of greenhouse gas emissions information between producers and upstream/downstream supply chains or consumers;
- b) Used for producers to design and improve products to reduce their carbon footprint and for comparison with similar products;
- c) Used for information exchange regarding product carbon footprint.

6 Quantification range

6.1 Product Description Describe the product system and its functions according to the product standards corresponding to photovoltaic glass, and clearly describe the product name, product specifications, and product characteristics. Information such as energy and uses.

6.2 System Boundary

6.2.1 The system boundary for quantifying the carbon footprint of photovoltaic glass products includes the raw material production stage, the raw material transportation stage, and the product manufacturing stage. See Figure 1 for the section.

6.2.2 The raw material and auxiliary material production stage begins with the extraction of primary resources from nature and ends when the raw materials and auxiliary materials arrive at the photovoltaic glass factory, including raw materials. Production (such as limestone mining, silica-alumina raw material mining and processing, corrective raw materials, gypsum, and mixed materials), auxiliary material production (such as packaging material processing) process).

Note. Raw materials are materials that enter the product and are related to the product's function and performance; auxiliary materials are materials other than the main raw materials.

6.2.3 The raw material and auxiliary material transportation stage begins when the raw materials and auxiliary materials are transported from the place of origin to the photovoltaic glass production plant and ends when they arrive.

6.2.4 The product manufacturing stage begins when raw materials and auxiliary materials arrive at the photovoltaic glass manufacturing plant and ends when the product leaves the factory, including raw material processing, melting, etc. Chemical processing, molding, annealing, cutting, stacking, packaging and shipping, waste heat power generation, and in-plant transportation.

6.3 Declaration of Unit The declared entity should include the following information.

---The unit quantity of product is measured in 1 ton (t);

---Key performance indicators or specifications, such as thickness, photovoltaic transmittance, etc.;

---Product name, such as ultra-clear patterned glass, ultra-clear float glass, or float glass.

6.4 Selection Criteria The material (energy) data in this document should comply with the following selection criteria.

a) All energy inputs must be listed;

b) All raw and auxiliary materials must be listed; if they meet requirements

c) and d), they can be ignored.

c) Neglected individual material (energy) flows or unit processes contribute no more than 1% to the product's carbon footprint;

7.1 Data Quality Requirements

7.1.1 The data and data quality shall meet the relevant requirements of 6.3.6,

6.3.8 in GB/T 24067-2024.

7.1.2 The activity data must meet the following requirements.

a) Completeness. The system should be checked for any missing unit processes or input/output substances in accordance with the data selection criteria (see 6.4). Activity data should ideally be collected from the company's production statistics for one calendar year or 12 consecutive months.

b) Accuracy. Energy and raw material consumption data in the activity data should be derived from the company's actual production statistics records. All activity data should be accurate. It should be converted to be based on the declared unit, and relevant activity data, data sources, calculation processes, etc. should be recorded in detail.

7.1.3 The carbon footprint factor meets the following requirements.

a) Representativeness. Field data or emission factor data provided by suppliers should be used first; secondly, the latest data published by the state should be used. And relevant database data that has been evaluated; finally, publicly published literature data and industry statistical recommendations are used;

b) Completeness. This should cover all unit processes defined at the system boundaries.

7.2 Data Collection and Verification

7.2.1 The following data should be collected during the raw material and auxiliary material production stage.

---The consumption of raw materials and auxiliary materials is uniformly converted into mass (t);

--- Carbon footprint factors of raw material and auxiliary material production processes.

Note. When the raw materials such as limestone and dolomite are sourced from our own mines, the consumption of explosives, lubricating oil, diesel oil, etc., is collected and converted into mass (t).

7.2.2 The following data should be collected during the raw material transportation stage.

---The transport weight and consumption of raw materials and auxiliary materials are uniformly converted into mass (t);

---Transportation distance and mode of transport for raw materials and auxiliary materials. If there are multiple suppliers of raw materials and auxiliary materials, a weighted average transportation distance can be used. The weight refers to the transport weight of raw materials and auxiliary materials;

---Carbon footprint factors for different modes of transportation.

7.2.3 The following data should be collected during the product manufacturing stage.

---Regarding fuel transportation volume, mode of transport, and distance, if multiple suppliers exist, a weighted average transportation distance can be used, with the weight being the transportation distance. weight;

---Consumption of energy sources such as electricity, fuel, and heat;

---The lower heating value of the fuel;

---The carbon footprint of energy production, including electricity, fuel, and heat;

---Carbon footprint factor of fuel transportation;

7.4 Allocation

7.4.1 During system boundary settings or data collection, if it is found that at least one unit process's inputs and outputs contain multiple products, then... Distribute the allocation.

7.4.2 The allocation method is as follows:

- a) Avoid data allocation by collecting data from detailed unit processes, such as using metering or statistical data by process or time period to replace data allocation across the entire plant. Annual statistics;
- b) If data allocation cannot be avoided, prioritize allocation based on physical relationships, such as product quality;
- c) If physical allocation is not feasible, the economic value of the product shall be used for