

Product Carbon Footprint Verification Statement

The inventory of Product Carbon Footprint emissions of
1 ton of 182mm monocrystalline silicon wafer
which is made by

**Guangdong Gokin Solar Technology CO.,
LTD.**

North side of Hubin Road / west side of Airport North Road, Sanzao Town, Jinwan District, Zhuhai City,
Guangdong Province, P.R. China

has been verified meeting the requirements of
ISO 14067:2018

Total GHG emissions of 1 ton of 182mm monocrystalline silicon wafer
107167.79 Kilogram of CO₂ eq

For the life cycle assessment of product
[Cradle to Gate]

Authorized by

Date: 05 June 2022

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SGS-CSTC Standards Technical Services Co., Ltd. (hereinafter referred to as "SGS") has been commissioned by Guangdong Gokin Solar Technology CO., LTD. (hereinafter referred to as "Guangdong Gokin"), North side of Hubin Road / west side of Airport North Road, Sanzao Town, Jinwan District, Zhuhai City, Guangdong Province, P.R. China, for the verification the life cycle Greenhouse Gas emissions of product as provided by Guangdong Gokin in accordance with

ISO 14067:2018

Roles and responsibilities

The management of Guangdong Gokin is responsible for the organization's GHG information system, the development and maintenance of records and reporting procedures in accordance with that system, including the calculation and determination of the life cycle GHG emissions of product information and the reported life cycle GHG emissions of product.

It is SGS's responsibility to express an independent GHG verification opinion on the life cycle GHG emissions of 1 ton of 182mm monocrystalline silicon wafer.

SGS conducted a third-party verification of the provided GHG assertion against the principles of ISO 14067:2018, ISO 14040:2006 and ISO 14044:2006 on 28 May 2022. The verification was based on the verification scope, objectives and criteria as agreed between Guangdong Gokin and SGS.

Level of Assurance

The level of assurance agreed is that of reasonable assurance.

Scope

Guangdong Gokin has commissioned an independent verification by SGS of reported the life cycle GHG emissions of product of Guangdong Gokin arising from the manufacture of 1 ton of 182mm monocrystalline silicon wafer product activities, to establish conformance with ISO 14067:2018 principles within the scope of the verification as outlined below.

This engagement covers verification of emission from partial life cycle of the product of greenhouse gases included within the organization's boundary and is based on ISO 14067:2018.

- Title or description activities: GHG verification of the life cycle GHG emissions of 1 ton

of 182mm monocrystalline silicon wafer.

- Product Catalog Rule: there was not relevant PCR can be considered.
- Functional unit: 1 ton of 182mm monocrystalline silicon wafer.
- System boundary: Covers a “Cradle to Gate” assessment of the life cycle emissions, from raw material extraction to production completion. The system boundary be clearly defined in accordance with ISO 14040:2006, ISO 14044:2006 and ISO 14067:2018.
- Use phase: Excluded in system boundary
- Retail locations: Excluded in system boundary
- Disposal phase : Excluded in system boundary
- Data resources: The primary data collection from manufacture and own operation phase. The secondary data collection from Ecoinvent 3.7 and ELCD.
- Life cycle assessment tool and index using:
 - Software applied SimaPro 9 version.
 - IPCC 2013 GWP values are applied in this inventory.
- Cut-off rules: The flow is less than 1% of the cumulative mass of the model it be excluded, providing its environmental relevance is not a concern, a minimum 97% of the total mass for the system is captured.
- Allocation rules:
 - Multi-output: The allocations are based on the changes in the resource consumption and pollutant emissions following the changes in the studied system’s output product, or function or economical relationship.
 - Multi-input: The allocation is based on actual relationship. For example, the manufacturing process’s consumption may be affected by the change in recycled resource input.
- Manufacturing locations: Guangdong Gokin Solar Technology CO., LTD.
- Emissions arising from the life cycle of product included: Sources as presented in the inventory spreadsheet provided by Guangdong Gokin.
- Types of GHGs included: CO₂, CH₄, N₂O, Substances controlled by the Montreal Protocol, HFCs, PFCs, Fluorinated ethers, Perfluoropolyether, Hydrocarbons compounds.
- Directed actions: There is not GHG emissions offsetting be used at any point in the life cycle of the product.
- GHG information for the following production period was verified: 01 Nov 2021 to 30 Apr 2022, emissions covered the particular period.
- Intended user of the verification statement: Private

Objective

The purposes of this verification exercise are, by review of objective evidence, to independently

review:

- Whether the life cycle GHG emissions of product are as declared by the organization's GHG assertion
- The data reported are accurate, complete, consistent, transparent and free of material error or omission.

Criteria

Criteria against which the verification assessment is undertaken are the principles of ISO 14067:2018.

The IPCC 2013 AR5 GWP values are applied in this assessment of life cycle GHG emissions for the product.

Materiality

The materiality required of the verification was considered by SGS to 5%, based on the needs of the intended user of the GHG Assertion.

Conclusion

Guangdong Gokin provided the GHG assertion based on the requirements of ISO 14067:2018. The life cycle GHG information of product for the production period form 01 Nov 2021 to 30 Apr 2022 disclosing emissions of 107167.79 Kilogram of CO2 equivalent, covering a Cradle to Gate system boundary, are verified by SGS to a reasonable level of assurance, consistent with the agreed verification scope, objectives and criteria.

The life cycle GHG emissions of 1 ton of 182mm monocrystalline silicon wafer. are described as below:

Life Cycle Phase	GHG Emissions	Unit
Raw material	103365.35	kg CO ₂ eq
Manufacture phase	3802.44	kg CO ₂ eq
Total	107167.79	kg CO ₂ eq

SGS's approach is risk-based, drawing on an understanding of the risks associated with reporting the life cycle GHG emissions of product information and the controls in place to mitigate these. Our examination includes assessment, on a test basis, of evidence relevant to the amounts and disclosures in relation to the organization's reported the life cycle GHG emissions of product.

We planned and performed our work to obtain the information, explanations and evidence that we considered necessary to provide a reasonable level of assurance that the life cycle GHG emissions of 1 ton of 182mm monocrystalline silicon wafer.

We conducted our verification with regard to the GHG assertion of Guangdong Gokin which included assessment of GHG information system, monitoring and reporting plan/protocol. This assessment included the collection of evidence supporting the reported data, and checking whether the provisions of the protocol reference, were consistently and appropriately applied

In SGS's opinion the presented GHG assertion

- is materially correct and is a fair representation of the GHG data and information, and
- is prepared in accordance with ISO 14067:2018 on GHG quantification, monitoring and reporting.

This statement shall be interpreted with the GHG assertion of Guangdong Gokin.

Note: This Statement is issued, on behalf of Client, by SGS-CSTC Standards Technical Services Co., Ltd. ("SGS") under its General Conditions for Green Gas Verification Services available at http://www.sgs.com/terms_and_conditions.htm. The findings recorded hereon are based upon an audit performed by SGS. A full copy of this statement, the findings and the supporting GHG Assertion may be consulted at Guangdong Gokin Solar Technology CO., LTD., North side of Hubin Road / west side of Airport North Road, Sanzao Town, Jinwan District, Zhuhai City, Guangdong Province, P.R. China. This Statement does not relieve Client from compliance with any bylaws, federal, national or regional acts and regulations or with any guidelines issued pursuant to such regulations. Stipulations to the contrary are not binding on SGS and SGS shall have no responsibility vis-à-vis parties other than its Client.



声明书编号 CN22/00001233

产品碳足迹核查声明书

产品温室气体排放清单

1 吨 182 mm 单晶硅片

以上产品生产由

广东高景太阳能科技有限公司

中国广东省珠海市金湾区三灶镇湖滨路北侧/机场北路西侧

核查依据

ISO 14067:2018

1 吨 182 mm 单晶硅片的温室气体排放量为

107167.79 kg CO₂ eq.

被核查产品的生命周期阶段为

(从摇篮到大门)

授权人

日期：2022 年 06 月 05 日

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通标准技术服务有限公司（以下简称 SGS），经与广东高景太阳能科技有限公司（以下简称广东高景，中国广东省珠海市金湾区三灶镇湖滨路北侧/机场北路西侧）达成双边协议，依据 ISO14067:2018 的要求执行产品生命周期温室气体排放量的核查，确认符合以下标准要求

ISO 14067:2018

角色和职责

广东高景负责产品温室气体信息系统的管理，确保开发和维护的记录、报告流程符合该系统，包括产品生命周期内温室气体排放信息评价和报告确认。

SGS 负责出具本次核查产品“1 吨 182 mm 单晶硅片”的温室气体排放量核查意见。

SGS 于 2022.5.28 依据 ISO 14067:2018、ISO 14040:2006 和 ISO 14044:2006 相关准则对责任方提供的产品温室气体报告进行了第三方核查。核查是基于广东高景与 SGS 商定的核查范围、目标和准则。

保证等级

商定的保证等级为合理保证。

适用范围

广东高景委托 SGS 进行一次独立核查，以确保责任方所报告的“1 吨 182 mm 单晶硅片”的生命周期温室气体排放评价与 ISO14067:2018 相关标准要求的符合性，提出保证声明的涵盖内容如下：这一协议覆盖组织边界内产品生命周期温室气体排放的核查，且协议基于 ISO14067:2018

- 标题或活动描述：“1 吨 182 mm 单晶硅片”生命周期温室气体排放核查
- 产品类别规则：无相关 PCR 可以参考
- 功能单位：1 吨 182 mm 单晶硅片
- 系统边界：“被核查产品的生命周期阶段从“摇篮到大门”的系统边界，涵盖了从自然资源开采开始到产品生产阶段为止的生命周期阶段。系统边界按照 ISO 14067:2018、ISO 14040:2006 和 ISO 14044:2006 规范明确界定。
- 使用阶段：不包括在系统边界内
- 销售地点：不包括在系统边界内
- 废弃处置：不包括在系统边界内
- 数据资源：初级活动数据来源于制造和现场生产阶段的数据收集；次级活动数据来自 Ecoinvent 3.7 和 ELCD
- 生命周期评价工具和方法：
 - 使用 SimaPro 9 版本软件进行产品碳足迹的计算
 - 评价方法学应用 IPCC 2013 GWP 值
- 取舍准则：基于产品投入的比例，舍去质量/能量投入小于 1% 的材料/能量投入，但总的材料/能量舍去比例不超过 3%

- 分配原则：
 - 多重输出：基于资源消耗及污染排放的变化，依照研究系统的产品输出、功能、或经济关系等来分配
 - 多重输入：基于实际关系的分配。例如，制造过程中的排放，可能会受到废物流输入变化影响
- 制造地点：广东高景太阳能科技有限公司
- 产品生命周期内引起的温室气体排放包括：数据展示在广东高景提供的电子清单
- 评价所包括的温室气体类型有：CO₂、CH₄、N₂O 以及蒙特利尔议定书中控制的其他温室气体，如 HFCs、PFCs、氟化醚、全氟聚醚，以及其他碳氢化合物
- 核查的产品生产阶段为：2021 年 11 月 1 日-2022 年 4 月 30 日
- 核查声明的预期使用者：私人用户

目标

本次核查目的是通过客观证据审查：

- 产品生命周期温室气体排放是否如组织的温室气体报告所述
- 所报告的数据是准确的、完整的、一致的、透明的和没有实质错误或遗漏

准则

核查依据的准则为 ISO 14067:2018.

实质性

基于产品温室气体声明的预期使用者的需要，本次核查的实质性定为 5%。

结论

广东高景依据 ISO 14067:2018 要求提出产品温室气体核查声明。SGS 以客观公正的立场，评价在（2021 年 11 月 1 日-2022 年 4 月 30 日）期间产品生产的温室气体排放水平，1 吨 182 mm 单晶硅片的温室气体排放量如下，经 SGS 核查达到合理保证等级，与商定的核查范围、目标和准则一致。

1 吨 182 mm 单晶硅片各生命周期阶段温室气体排放描述如下：

生命周期阶段	温室气体排放量	单位
原材料阶段	103365.35	kg CO ₂ eq.
生产阶段	3802.44	kg CO ₂ eq.
合计	107167.79	kg CO ₂ eq.

SGS 采用风险评估方法为基础，理解所报告的温室气体信息相关的风险并加以控制，从而减轻风险。我们的检查包括评估与组织产品的生命周期温室气体排放相关数量证据和报告披露。

SGS 计划并执行相关工作来获取必要的信息、解释和证据，以提供合理保证等级，确保能公正地陈述责任方的 1 吨 182 mm 单晶硅片。

SGS 所提供的关于 1 吨 182 mm 单晶硅片的产品温室气体查证, 包括对温室气体排放信息系统进行评价、监控和报告计划或协议。这次评价包括收集用以支持所报告数据的证据, 以及检查所参考的协议条款是否被一致和适当地应用。

SGS 认为责任方报告的产品温室气体报告

- 是实质性准确的, 且为产品温室气体排放数据和信息的真实展现, 及
- 是依据 ISO 14067:2018 的要求对产品温室气体进行量化、监控和报告

此声明必须与广东高景的产品温室气体报告作为一个整体进行解释说明。

备注: 本核查声明遵照 SGS 碳足迹查证服务条款要求 http://www.sgs.com/terms_and_conditions.htm, 声明书内容由通标标准技术服务有限公司依据碳足迹核查结果进行编制, 并经客户同意后发行。此声明的内容基于核查结果编制, 可向责任方广东高景太阳能科技有限公司 (中国广东省珠海市金湾区三灶镇湖滨路北侧/机场北路西侧), 查询获得此核查声明及责任方碳足迹报告的副本。本核查声明不可解除客户应遵守国家法律法规、以及任何被发布国际指引的责任; 客户与 SGS 彼此为独立之个体, 客户非受 SGS 约束, 在此 SGS 除客户之外毋须代表其面对其他团体组织。此核查声明不对 SGS 造成约束, SGS 没有责任面对除其客户以外的任何一方。

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