



Date
Gothenburg, 9 December 2022

Your date

Our reference.
Håkan Stripple

Your reference
Mark Lienhart

Gränges Americas Inc.
501 Corporate Centre Dr
Suite 280
Franklin, TN 37067
USA

Review of study - Carbon footprint assessment of Gränges aluminium products – Salisbury plant

Carbon footprint study for review and verification

Carbon footprint assessment of Gränges' aluminium products - Climate impact of flat rolled aluminium products made by Gränges Americas Inc. in Salisbury, NC, USA, Version: 1.0, Date: November 25, 2022, Issued by: SVP Procurement & Commercial HVAC Sales, Gränges Americas Inc.

Gränges' internal LCA/CF tool - Routines and procedures, Gränges Americas Salisbury Plant, Version: 1.0, Date: November 25, 2022, Issued by: SVP Procurement & Commercial HVAC Sales, Gränges Americas Inc.

Author(s)

The Carbon footprint study is prepared by:

Mark Lienhart, SVP Procurement and Commercial HVAC Sales, Gränges Americas Inc., USA.

Sofia Hedevåg, SVP Sustainability, Gränges AB, Sweden.

Study commissioned by:

Gränges Americas Inc., USA.

Date of the study:

25 November 2022

Verifier

Håkan Stripple, IVL Swedish Environmental Research Institute Ltd. is the verifier. Håkan Stripple is an LCA reviewer and an independent individual verifier in the International EPD system¹.

¹ <https://www.environdec.com/resources/verifiers>

Background and Scope

Gränges focuses on rolled aluminium products for heat exchangers and selected niche applications. Gränges' advanced aluminium products are the result of a long-term commitment to research and innovation, and of close development work with customers. Gränges' production site in Salisbury manufactures flat rolled aluminium products primarily for heat exchanger applications but also for other segments.

Gränges has a strong commitment to develop sustainable products, minimize the environmental impact of its operations, uphold ethical business practices, and provide a safe and good working environment. Gränges also has a long experience of efforts to reduce the environmental impacts from its production as well as developing new aluminium products in collaboration with their customers along the entire value chain.

In this case, the environmental performance of a large number of products at product article level have been studied by the development of a calculation model to calculate carbon footprints (CF) for different products produced by Gränges Americas Inc. in Salisbury, NC, USA. The CF model and methodology aims to, on demand or for the entire assortment, be able to calculate CFs for the various products that Gränges Salisbury manufactures. CFs have thus not been calculated for all the products, but the review instead aims to review the calculation model and the methodologies used as well as the instructions and routines that exist to ensure and verify the development of future CFs for Gränges products. This includes the calculation and control of the CFs as well as the operation and maintenance of the model, including annual updates and changes as well as requirements for reverification. This review thus has some similarities with the EPD Process Certification that exists within the international EPD system. Gränges will mainly use and communicate the CFs for the products in a Carbon footprint certificate for each or several products, but other use may also exist.

The task of the verifier was to review the study including layout and methodology of the study, the CF report, the CF model, Gränges' internal LCA/CF tool - Routines and procedures, the CF background information, underlying data, and general calculations. The product group included in the verification are unclad aluminium sheet products produced by Gränges Americas Inc. at Salisbury, NC, USA. The verification is performed in order to check and verify the calculations and validity of the system boundaries chosen and product model defined, as well as consistency with the steering documents, which mainly are ISO14040:2006, ISO14044:2006 and ISO14067:2018.

Review process

The critical review of this study has been carried out as a parallel review, i.e. the reviewer was engaged early in the study already in the study of the Huntingdon plant and has thus reviewed the study step by step to ensure a good final result. The review has been carried out as a normal review of an LCA/CF study but in this case, the final results of each product has not been reviewed because the final results for each product was not calculated in the study. Only example products were calculated. The focus for the review has instead been the methods and model to be used in the calculation of the carbon footprint for each product. If the entire calculation chain of the carbon footprints can be ensured and verified, the final results from the calculations will also be ensured.

Gränges Americas Inc., Salisbury, NC, USA has developed this study according to the ISO standard procedures for LCA and Carbon footprint and with addition of standardised procedures, documentation and their updated internal and external data covering their production in a system perspective. IVL/Håkan Stripple has reviewed the study according to the standardised procedures for a critical review for LCA and CF described in the ISO standards. The review is based on the written materials from the study (the LCA/CF report, internal routine report, CF model and CF certificate) and sample checks of this and other materials. Thus, not all data and calculations are checked. The review statement and conclusions are given with regard to the current state of art and the information, which has been received from Gränges Americas Inc., Salisbury. The comments and corrections are documented directly in the documents. The information in the review process is thus traceable throughout the entire review process.

Due to the use of a parallel review and verification process, online meetings were held in order to follow up the development process of the LCA/CF study. The final documentation was sent to the verifier for review by e-mail. After reading and comments, the different remarks were discussed and commented by Gränges' personnel online as well as in a review meeting. The report *Carbon footprint assessment of Gränges' aluminium products - Climate impact of flat rolled aluminium products made by Gränges Americas Inc. in Salisbury, NC, USA* and the internal governing document *Gränges' internal LCA/CF tool - Routines and procedures, Gränges Americas Salisbury Plant* were mainly reviewed.

The reports explain the goal and scope, methodologies, and main assumptions. After discussions and request in the review process, including the technical processes at site, editorial aspects and layout, CF model calculations, recycling in production, system boundaries and completeness, specification of CH₄, N₂O and PFCs (CF₄ and C₂F₆), internal and external recycling, allocation at production site, use of units, naming of parameters in the CF model, satisfactory changes were

made. The reviewer has checked the entire product chain including upstream data, core processes, and downstream data (recycling data). The reviewer has checked the product specifications, the product systems and boundaries, the data gaps and cut offs, the methodology applied, the data used, and assumptions made in the study, electricity production, and end-of-life treatment. The procedure for calculations and the selection of studied product has also been checked. In this review, a special focus has been on Gränges' internal calculation procedures for carbon footprint including the CF calculation model and the internal governing documents for performing the calculation and maintaining and upgrading the procedure. The review process also includes minor editorial changes.

All remarks were accounted for in a satisfactory manner in the revised versions of the CF model, LCA/CF report, and governing documents.

Statement

The verification covers the above-mentioned study *Carbon footprint assessment of Gränges' aluminium products - Climate impact of flat rolled aluminium products made by Gränges Americas Inc. in Salisbury, NC, USA* including the internal governing document *Gränges' internal LCA/CF tool - Routines and procedures, Gränges Americas Salisbury Plant*. The undersigned verifier verifies that the attached study LCA/CF reports are in consistency with the steering documents identified under the above-mentioned scope of this review and has relevant data sources. Also, the sample check of methodology and calculations are reasonable and acceptable.

IVL Swedish Environmental Research Institute Ltd.



Håkan Stripple

M.Sc.Chem.Eng. LCA specialist