BROMMA

Carbon footprint
declaration

Hydraulic spreader - STS45

Assembled at:
Bromma, Ipoh, Malaysia

In accordance with ISO 14040, ISO 14044, and ISO 14067

Introduction

This carbon footprint declaration summarizes the results of a life cycle assessment (LCA) conducted for Bromma's hydraulic spreader.

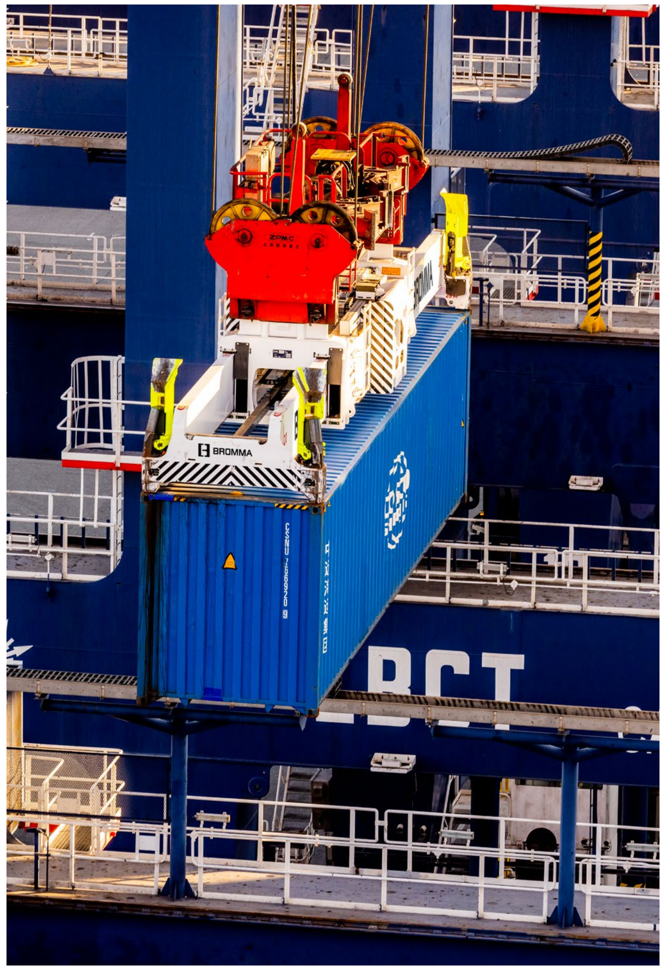
Bromma In Brief
Bromma is the industry market leader in ship-to-shore spreaders, mobile harbour crane spreaders, and yard crane spreaders. A pioneer in the container handling industry, Bromma is focused on lifting the productivity of its customers through more reliable spreaders. Bromma has delivered crane spreaders to 500 terminals in 90 nations on 6 continents, and Bromma spreaders are in service today at 99 out of the world's largest 100 container ports. Bromma's industry-leading all-electrics spreaders and recent products such as the Spreader Monitoring System are part of this continuing effort.

Life cycle assessment methodology

This carbon footprint declaration is a summary of the results of a thorough life cycle assessment (LCA), which is based on the internationally recognised ISO 14067 standard. The LCA study has been critically reviewed by a third party to ensure it meets the requirements of the ISO standard.

Table 2. LCA information

LCA INFORMATION	
Scope	Cradle-to-grave, with options.
Functional unit / declared unit	1 unit of STS45 spreader (Total weight: 12,5 tons)
Reference service life	80 000 hrs
Cut-off rules	A cut-off of 3% is applied
Allocation	Mass balance and time-based allocation
Geographical coverage & time period	Europe, year 2023
Background data source	"LCA for experts" and ecoinvent LCA databases
Software	GABI v10
Critical reviewer	Vladimir Koci, LCA STUDIO



Product information

The Bromma STS45 is a separating twin-lift spreader for use in ship-to-shore cranes. The twin-lift function makes it possible to lift a broad variety of container sizes and combinations. The separating function allows two containers to be moved synchronized towards one another and apart from one another, which is of importance when the containers are being transported on the landside. Bromma spreaders are made from European high- quality, high-strength steel which ensures a light and robust design. STS45 has a user-friendly design and all components are easily accessible for inspection and maintenance.

Table 1. Percentage share of material

MATERIAL CLASS	% OF SHARE
Core structure	85,9
Power drive	10,1
Flipper or guide	1,98
Hydraulic oil	1,28
Electronics	0,77

Description of life cycle and system boundaries

The LCA includes raw material extraction, manufacturing of components by suppliers, in-house assembly, use phase and maintenance of the Hydraulic spreader.

The **product manufacturing** phase includes raw material extraction, manufacturing of components, and assembly of the hydraulic spreader.

The **use phase** consists of the operation of the hydraulic spreader. The spreader operates on a hydraulic mechanism using electrical energy from the machine to which it is attached to so it does not have its own power source. The use phase covers the electricity usage in 80 000 operating hours which is the designed operating hours. EU average electric grid mix is used with a GWP100 of 0,324 kgCO_2 eq./kW.

The **maintenance phase** includes production of all components and oils that are typically replaced during the lifetime of the product.

The **transportation phase** includes transport from Kalmar site in Bromma, Malaysia to the customers site. Transport during the manufacturing and other life cycle phases are taken into account based on estimates and averages due to unavailability of primary data.

The **end-of-life phase** is modeled according to the cut-off method. Therefore, it is excluded from the main results as it was modeled using generic data and no primary data was available on how the equipment is treated at the End-of-life.

Figure 1. Life cycle phases

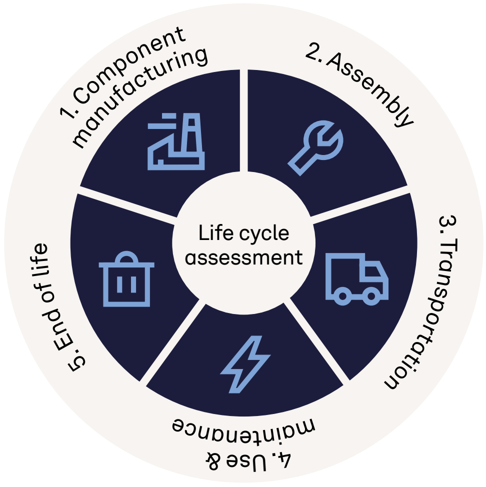
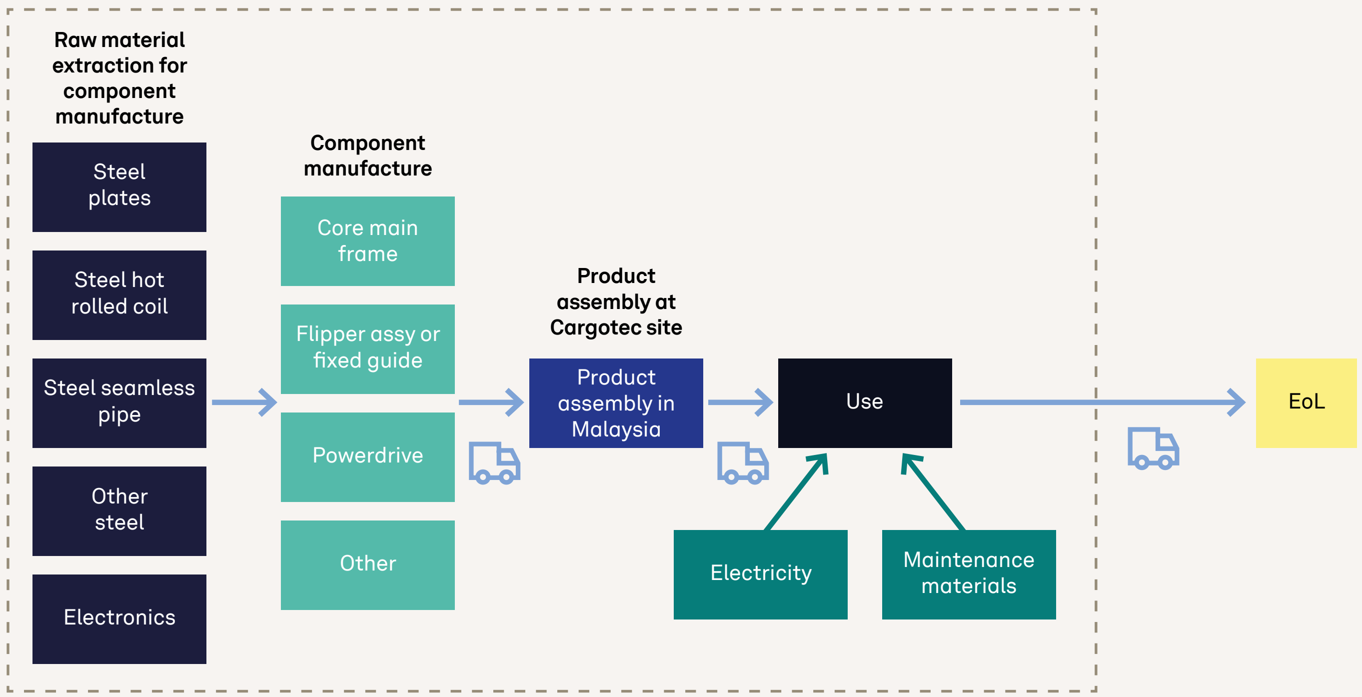


Figure 2. System boundry STS45



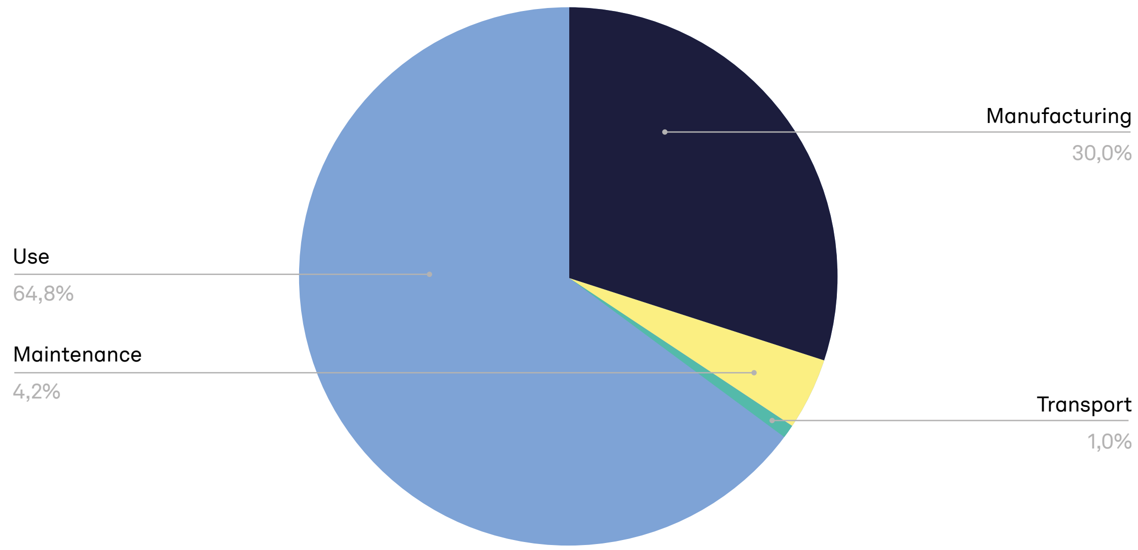
Results - Carbon footprint

Table 3 lists the Greenhouse Gas emissions results for each greenhouse gas emission type and life cycle phase, according to ISO 14067. The contribution of each life cycle phase on the total carbon footprint is further examined in Figure 3.

Table 3. Carbon footprint results

KG CO_2 EQ.	PRODUCTION	TRANSPORT	USE	MAINTENANCE	TOTAL
ISO14067 GWP100, Aircraft emissions	0,01	0,00	0,09	0,00	0,10
ISO14067 GWP100, Net Biogenic GHG emissions	22,9	-26,5	600,0	26,5	622,9
ISO14067 GWP100, Emissions from land use change (dLUC)	21,3	9,9	7,7	0,8	39,7
ISO14067 GWP100, Fossil GHG emissions	33182,0	1070,0	71000,0	4660,0	109912,0
Total GWP100	**33226,2**	**1053,4**	**71607,8**	**4687,3**	**110574,7**

Figure 3. Total carbon footprint share of different lifecycle phases



Use phase is the hotspot of the life cycle of the Hydraulic spreader.

The life cycle assessment showed that the use phase is the hotspot for the GHG emission contributing to 65% of the life cycle emission in the STS45*.

In addition to the carbon footprint, the LCA study also evaluates other environmental impacts according to the PEF method.

We continue to develop these data points and will update this statement when we receive new information

* Calculated with an average EU electricity mix. Assuming that these products have longer lifetime than the warranteed time, the spreaders are expected to have a second life and therefore are used somewhere else due to which the end-of-life has been excluded from the system boundaries.

Manufacturing and assembly
The manufacturing phase has the second largest contribution (30,1%) to the life cycle emissions of the product compared to other phases. The **Core structure** is the biggest contributor in this phase to the carbon footprint of the product. It is also the component that makes up the most weight in the product.

Use phase
The use phase is the largest contributor (65%) in the life cycle of the product. The emissions originate from electricity generation required during the lifetime of the product. An EU-average grid mix from GaBi was used at this stage.

Transport
The emissions from the transportation required for the manufacturing and distribution of the product has a low contribution (1%) when compared to the other life cycle phases.

Maintenance
This phase has a low contribution (4,2%) to the carbon footprint of the product. Emissions in this phase are associated with the replacement of components and oils.

End-of-life and circularity
The end of life phase is calculated according to the cut-off approach as Cargotec does not own live data on how the equipment is treated after the first life. It is assumed, even if the product does not have a second life after usage, the majority of it would likely be recycled as recycled steel is a valuable material.

References

ISO 14040:2006: Environmental Management-Life Cycle Assessment - Principles and framework.

ISO 14044:2006: Environmental Management-Life Cycle Assessment - Requirements and guidelines.

ISO 14067:2018: Greenhouse gasses — Carbon footprint of products — Requirements and guidelines for quantification.

LCA report: “Bromma STS model LCA report (UPDATED) 20.10.2023”

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We reserve the right to change the design and technical data without prior notice.

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