



Product carbon footprint

In accordance with ISO 14067 & ISO 14025

Top Hammer drill bits

Sandvik Mining and Construction Tools AB



EPD HUB, Carbon footprint number HUB-4726

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Created with One Click LCA

General information

Manufacturer

| | |
|-----------------|---|
| Manufacturer | Sandvik Mining and Construction Tools AB |
| Address | Valsverksstråket 14, 811 43 Sandviken Sweden |
| Contact details | info@sandvik.com |
| Website | https://www.mining.sandvik/en/ |

Standards, scope and verification

| | |
|--------------------|---|
| Program operator | EPD Hub, hub@epdhub.com |
| Reference standard | ISO 14067 and ISO 14025 |
| PCR | EPD Hub Core PCR version 1.2, 24 Mar 2025 |
| Sector | Manufactured product |
| Scope | Cradle to gate |
| Author | Magnus Selling and Susanne Lejon, Sandvik Mining and Construction Tools AB |
| Verification | Independent verification of this carbon footprint and data, according to ISO 14025: <input type="checkbox"/> Internal verification <input checked="" type="checkbox"/> External verification |
| Verifier | Yazan Badour, as authorized verifier acting for EPD HUB Limited |

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Product

| | |
|-----------------------------------|-----------------------|
| Product name | Top Hammer drill bits |
| Additional labels | - |
| Product reference | - |
| Place(s) of raw material origin | Europe |
| Place of production | Sandviken, Sweden |
| Place(s) of installation and use | - |
| Period for data | Calendar year 2023 |
| Averaging | Multiple products |
| Variation in GWP-fossil for A1-A3 | -16%, +15% |

Environmental data summary

| | |
|--|-------------------------|
| Declared unit | 1 kg of Top Hammer Bits |
| Declared unit mass | 1 kg |
| GWP-fossil, A1-A3 (kgCO₂e) | 5,23 |
| GWP-total, A1-A3 (kgCO₂e) | 5,02 |
| Secondary material, inputs (%) | 86% |
| Secondary material, outputs (%) | 0 |
| Total energy use, A1-A3 (kWh) | 40,3 |
| Total water use, A1-A3 (m³e) | 0,23 |

Product and manufacturer

About the manufacturer

Sandvik is a global, high-tech engineering group providing solutions that enhance productivity, profitability and sustainability for the manufacturing, mining and infrastructure industries. In 2024, the group had approximately 41,000 employees, sales in more than 150 countries and revenues of about SEK 123 billion. Business area Mining is a global leading supplier in equipment and tools, parts, service and technical solutions for the mining and infrastructure industries. Applications include rock drilling, rock cutting, loading and hauling, tunneling and quarrying.

Product description

Sandvik top hammer drill bits are used for blast hole drilling in mining and construction applications. The Sandvik bits are designed to offer extended wear life, higher penetration rates, straighter holes and longer bit life. Ranging from 28-178 mm in diameter, threaded button bits use a proprietary grade of cemented carbide throughout. Various button shapes (spherical, semi-ballistic, and conical) and skirt designs deliver optimal performance in different rock formations. This assessment includes TH bits with weights ranging from 0.27 kg to 26.0 kg. The average weight for TH bits is 1,4 kg.

For further information, visit: <https://www.mining.sandvik/en/>.

Product raw material main composition

| Raw material category | Amount, mass- % | Material origin |
|-----------------------|-----------------|-----------------|
| Metals | 99,9% | EU |
| Minerals | - | - |
| Fossil materials | 0,08% | EU |
| Bio-based materials | - | - |

Biogenic carbon content

Product's biogenic carbon content at the factory gate

| | |
|--|--------|
| Biogenic carbon content in product, kg C | 0 |
| Biogenic carbon content in packaging, kg C | 0,0378 |

Functional unit and service life

| | |
|------------------------|-------------------------|
| Declared unit | 1 kg of Top Hammer Bits |
| Mass per declared unit | 1 kg |
| Functional unit | - |
| Reference service life | - |

Product life cycle

System boundary

This carbon footprint covers the life-cycle modules listed in the following table.

| Product stage | | | Assembly stage | | Use stage | | | | | | | End of life stage | | | | Beyond the system boundaries | | |
|---------------|-----------|---------------|----------------|----------|-----------|-------------|--------|-------------|---------------|------------------------|-----------------------|-------------------|-----------|------------------|----------|------------------------------|----------|-----------|
| A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D | | |
| x | x | x | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | |
| Raw materials | Transport | Manufacturing | Transport | Assembly | Use | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | Deconstr./demol. | Transport | Waste processing | Disposal | Reuse | Recovery | Recycling |

Modules not declared = ND. Modules not relevant = MNR.

Manufacturing and packaging (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in production as well as packaging materials and other ancillary materials. Also, fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

Cut-to-size steel bar is supplied to our manufacturing units and machined in soft state before it is heat treated in our internal facility. After heat treatment, machining in hard state take place which includes drilling of holes for cemented carbide inserts. When the inserts are shrink-fit into the hard machined steel bodies, the drill bits are then ready for painting and subsequent packing. To some degree

subcontractors are used for soft and hard machining.

Steel and carbide manufacturing are subject to high energy consumption, direct process emissions and use of chemicals. Production losses from machining of steel are included in the analysis as well as treatment of steel waste and ancillaries used in production. Our internal processes require electric energy in heat treatment and machining with limited amounts of fuels and gases used. Packing materials made from cardboard, wood and plastics is included.

Transport and installation (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

A4-A5 is not in scope for this assessment.

Product use and maintenance (B1-B7)

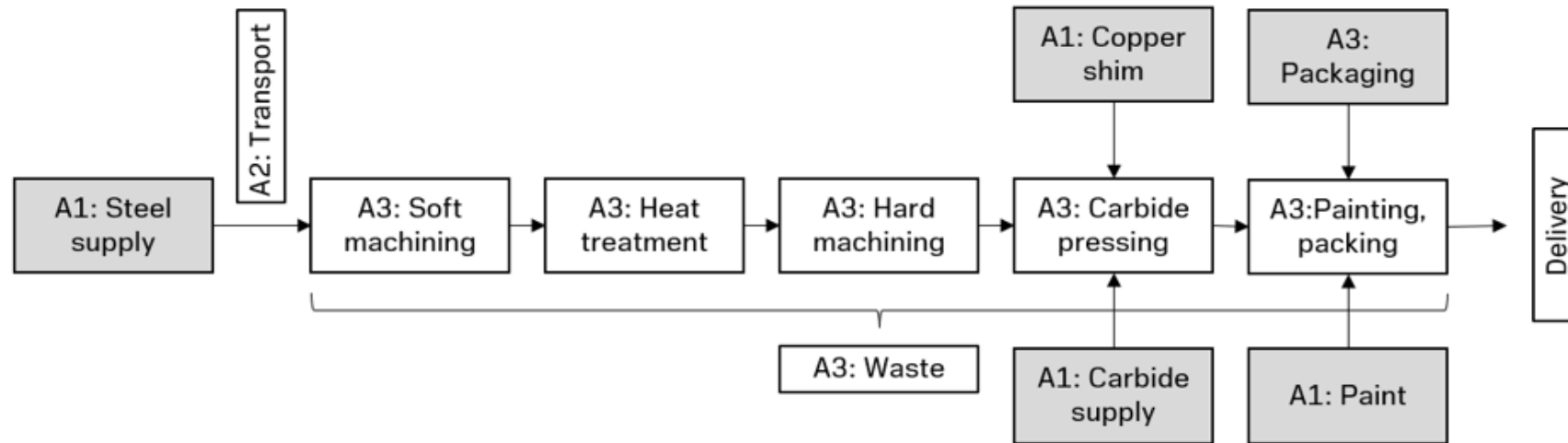
Air, soil, and water impacts during the use phase have not been studied.

B1-B7 is not in scope for this assessment.

Product end of life (C1-C4, D)

C1-C4, D is not in scope for this assessment.

Manufacturing process



Life cycle assessment

Cut-off criteria

The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

The production of capital equipment, construction activities, and infrastructure, maintenance and operation of capital equipment, personnel-related activities, energy and water use related to company management and sales activities are excluded.

This LCA study includes the provision of all materials, transportation, energy and emission flows cradle to gate. Transport to installation, installation, use-phase and end-of-life phases are not covered. All industrial processes from raw material acquisition and pre-processing, production are included. For easier modelling and because of lack of accuracy in available modelling resources some constituents under 1% of product mass are excluded. These include some ancillary materials which are all present in the product only in very small amounts and have no serious impact on the emissions of the product.

The production of capital equipment, construction activities, and infrastructure, maintenance and operation of capital equipment, personnel-related activities, energy and water use related to company management and sales activities are excluded.

Validation of data

Data collection for production, transport, and packaging was conducted using time and site-specific information, as defined in the general information section on page 1 and 2. Upstream process calculations rely on generic data as defined in the Bibliography section. Manufacturer-provided specific and generic data were used for the product’s manufacturing stage. The analysis was performed in One Click LCA EPD Generator, with the 'Cut-Off, EN 15804+A2' allocation method, and characterization factors according to EN 15804:2012+A2:2019/AC:2021 and JRC EF 3.1.

Allocation, estimates and assumptions

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. All allocations are done according to reference standards and the applied PCR. In this study, allocation has been done in the following ways:

| Data type | Allocation |
|--------------------------------|-----------------------------|
| Raw materials | No allocation |
| Packaging materials | Allocated by mass or volume |
| Ancillary materials | Allocated by mass or volume |
| Manufacturing energy and waste | Allocated by mass or volume |

All estimations and assumptions regarding the cut off criteria and the allocation are declared in the part “Cut-off Criteria except the estimations/assumptions below:

- Module A1: Steel raw materials used in the product come from scrap-based process (Electric Arc Furnace) and have a recycled content of 94-97%. GWP data used in the LCA is supplier specific data from the two steel suppliers used (Ovako and ABS). Cemented carbide used in this product is

manufactured within Sandvik group. The Life cycle inventory for the GWP calculation used paper published by the Furberg et al (Environmental life cycle assessment of cemented carbide (WC-Co) production). Impact analysis for the cemented carbide was conducted in Oneclick LCA considering our Sandvik internal prerequisites considering energy supply and transportation. - Module A2: Vehicle capacity utilization volume factor is assumed to be 1 which means full load. It may vary but as the role of transportation emission in total results is small, the variety in load is assumed to be negligible. To be conservative, empty returns are included in this study as implemented through an average load factor in the Ecoinvent transport datapoints.

Averages and variability

| | |
|-----------------------------------|-----------------------------------|
| Type of average | Multiple products |
| Averaging method | Based on a representative product |
| Variation in GWP-fossil for A1-A3 | -16%, +15 % |

Since cemented carbide has a significantly higher carbon footprint compared to steel, the variation was modelled using products that included the lowest and highest weight percentages of carbide.

| | Diameter | Weight | GWP fossil A1-A3 (kg CO2/kg product) | Variability |
|---------|----------|---------|--------------------------------------|-------------|
| Minimum | 178 mm | 22,0kg | 4,4 | -16% |
| Average | | 1,4kg | 5,2 | |
| Maximum | 45 mm | 0,81 kg | 6,0 | +15% |

The result of this CFP is representative for the average (by weight) Top hammer drill bit that is sold by Sandvik Rock Tools and produced in the factory in Sandviken Sweden.

LCA software and bibliography

This EPD has been created using One Click LCA EPD Generator. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. The EPD Generator uses Ecoinvent v3.10.1/3.11 and One Click LCA databases as sources of environmental data. Allocation used in Ecoinvent 3.10.1/3.11 environmental data sources follow the methodology 'allocation, Cut-off, EN 15804+A2'.

The article "Environmental life cycle assessment of cemented carbide (WC-Co) production" (Furberg, Arvidsson, Molander) was used in assessing GWP of cemented carbide.

Environmental impact data

The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

Core environmental impact indicators – EN 15804+A2, EF 3.1

| Impact category | Unit | A1 | A2 | A3 | A1-A3 |
|---------------------------|----------------------|----------|----------|-----------|-----------|
| GWP – total ¹⁾ | kg CO ₂ e | 4,25E+00 | 4,94E-01 | 2,83E-01 | 5,02E+00 |
| GWP – fossil | kg CO ₂ e | 4,21E+00 | 4,94E-01 | 5,26E-01 | 5,23E+00 |
| GWP – biogenic | kg CO ₂ e | 2,29E-02 | 1,34E-04 | -2,53E-01 | -2,30E-01 |
| GWP – LULUC | kg CO ₂ e | 9,28E-03 | 2,15E-04 | 9,84E-03 | 1,93E-02 |

1) GWP = Global Warming Potential.

Scenario documentation

Data sources

Manufacturing energy scenario documentation

1. Electricity production, nuclear, boiling water reactor, Sweden, Ecoinvent, 0.0077 kgCO₂e/kWh
2. Market for heat, district or industrial, other than natural gas, Europe, Ecoinvent, 0.0707 kgCO₂e/MJ

Verification process for this carbon footprint

This carbon footprint has been verified in accordance with ISO 14025 by an independent, third-party verifier by reviewing results, documents and compliancy with reference standard, ISO 14025 and ISO 14040/14044, following the process and checklists of the program operator for:

- This Product Carbon Footprint
- The Life-Cycle Assessment used in this carbon footprint
- The digital background data for this carbon footprint

Why does verification transparency matter? Read more online

This carbon footprint has been generated by One Click LCA EPD generator, which has been verified and approved by the EPD Hub.

Third-party verification statement

EPD Hub declares that this EPD is verified in accordance with ISO 14025 by an independent, third-party verifier. The project report on the Life Cycle Assessment and the report(s) on features of environmental relevance is filed at EPD Hub. EPD Hub PCR and ECO Platform verification checklist are used.

EPD Hub cannot identify any unjustified deviations from the PCR and ISO 14067 in the Environmental Product Declaration and its project report. EPD Hub maintains its independence as a third-party body; it was not involved in the execution of the LCA or in the development of the declaration and has no conflicts of interest regarding this verification.

The company-specific data and upstream and downstream data have been examined as regards plausibility and consistency. The publisher is responsible for ensuring the factual integrity and legal compliance of this declaration.

The software used in creation of this LCA and EPD is verified by EPD Hub to conform to the procedural and methodological requirements outlined in ISO 14025:2010, ISO 14040/14044, ISO 14067, and EPD Hub Core Product Category Rules and General Program Instructions.

Verified tools

Tool verifier: Magaly Gonzalez Vazquez

Tool verification validity: 27 March 2025 - 26 March 2028

Yazan Badour, as authorized verifier acting for EPD HUB Limited
23.12.2025