

FORCHEM FORTOP600

for material use

At the forefront of low carbon solutions

The limited availability of the earth's resources and growing consumer demand has turned the availability of natural resources and the state of the environment into a globally important question. Forchem tall oil products have a low carbon footprint, generating minimal volumes of greenhouse gases compared to alternative materials.

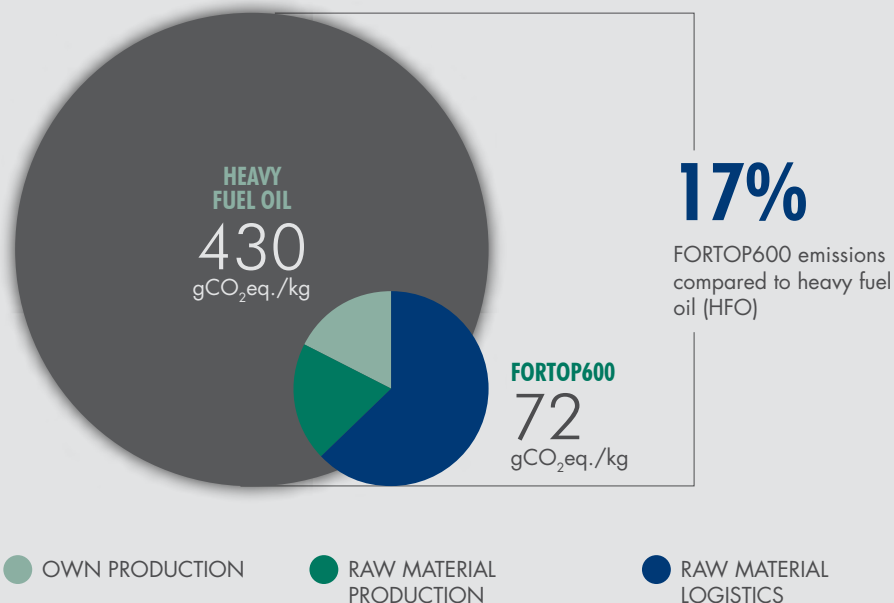
Our raw material, crude tall oil (CTO) is an industrial by-product derived from the kraft pulping process. There is no additional use of natural resources. Forchem's modern bio refinery is powered by 99% bioenergy.

THE GREENER CHOICE: FORTOP600 VERSUS HFO

Carbon footprint is the total set of carbon dioxide emissions caused directly and indirectly by an individual, organization, event or a product. Carbon footprint for Fortop600 liquid biofuel produced by Forchem in Rauma refinery is 72 gCO₂eq./kg*.

These results include emissions from raw material production and transportation, and operations in Rauma refinery (cradle-to-gate). Emissions are for year 2012.

Forchem utilizes almost entirely bioenergy, which enables climate-friendly operations. The production facility is located next to a pulp mill, minimizing the emissions from raw material logistics.



Fortop600 is a liquid biofuel, which replaces heavy fuel oil (HFO) in customer applications. Carbon footprint of Fortop600 is 72 gCO₂eq./kg, whereas heavy fuel oil (HFO) causes emissions of 430 gCO₂eq./kg*. **FORTOP600 has only 17% of emissions compared to its substitute heavy fuel oil (HFO).**

* Heavy fuel oil (HFO) emission factor is from Ecoinvent v2.1 database. Heavy fuel oil (HFO) emissions include all cradle-to-gate emissions.

METHODOLOGY FOR CARBON FOOTPRINT CALCULATIONS

gaia  This calculation was conducted by Gaia Consulting Ltd. 2013

- Calculations are conducted following life cycle assessment standards ISO 14040 and ISO 14044.
- The results include emissions from raw material production, transportation and operations in Rauma refinery (cradle-to-gate).
- Primary data was collected and used for all processes under the control of Forchem.
- Secondary data was collected from reliable databases and used to estimate the emissions of raw material production and transportation.
- Emissions of crude tall oil production (CTO) were assumed to be 3.5% of the emissions of sulfate pulp production. This is based on the average amount of CTO produced as side-product in sulfate pulp processes in Finland (mass basis).
- Emission factor for average Nordic pulp mill is utilized as most of the CTO originates from Nordic pulp mills.
- Calculations were conducted by Gaia Consulting Ltd. (www.gaia.fi) for business-to-business purposes only.

Forchem assumes no responsibility or liability for the completeness and correctness of this analysis and this document including the data and information collected from raw material suppliers

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