



# FORCHEM TOR

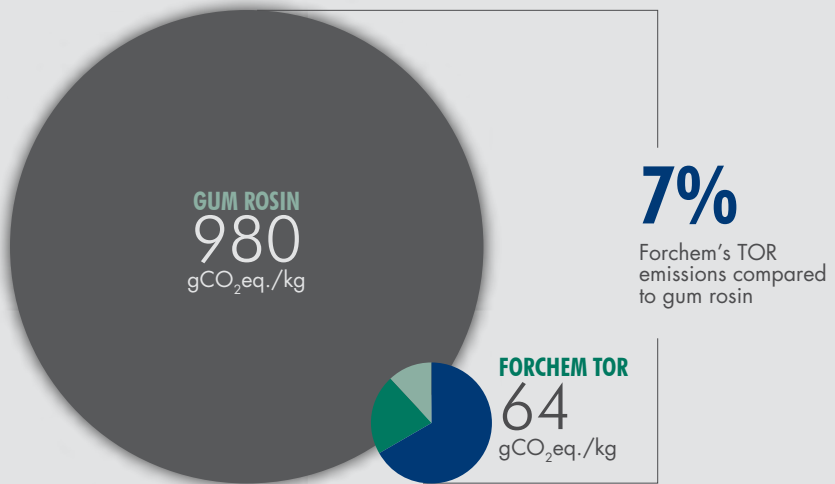
At the forefront of low carbon solutions

## TOR TALL OIL ROSIN FOR85

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.

### Forchem TOR vs. Gum Rosin



● OWN MANUFACTURING ● RAW MATERIAL ● TRANSPORTATION

Forchem TOR has a lower carbon footprint compared to production of gum rosin. Forchem's TOR has only 7% of emissions compared to its substitute gum rosin.

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

Gum rosin emission factor is from a substitute producer. The rosin acid composition and reactivity of Forchem's TOR products are comparable to gum rosin.

## THE GREENER CHOICE

Product carbon footprint is the sum of greenhouse gas emissions and greenhouse gas removals of a product system, expressed in CO<sub>2</sub> equivalents.

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.

Formulators and producers are increasingly using Forchem products when developing new, technically advanced and more sustainable products.

The European produced Forchem TOR is used to satisfy the demands of today's environmentally aware consumers and global markets.



## 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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