



Quick Facts: Arizona Chemical's Environmental Stewardship

Arizona Chemical embraces sustainability and environmental stewardship as core corporate values and has done so for decades.

In light of the concerns surrounding global warming and climate change, we decided to assess the carbon footprint of our North American operations and products as one of the steps within a broader environmental strategy.

Compared with similar chemical operations, the green house gas emissions of Arizona Chemical's North American operations are modest.

Measured against alternatives such as petrochemicals and vegetable oils, the Crude Tall Oil (CTO) and Crude Sulfate Turpentine (CST) derivatives manufactured by our bio-refineries help avoid 185,000 metric tons of carbon emissions.

Of the total tons of carbon emissions saved by Arizona Chemical's operations:

- [Tall oil fatty acids](#) (TOFA) prevent emissions of about 13,000 tons by replacing vegetable-based fatty acids that may also find applications in food and feed.
- [Distilled tall oils](#) (DTO) avoid 27,000 tons of carbon emissions through the substitution of petroleum sulfonates in metal-working fluids.
- [Rosin resins](#) avoid emissions of 106,000 tons through the substitution of gum rosin derivatives in tires, inks, and adhesives.
- [Pitch fuel](#) provides substitutes to heavy petroleum fuel oil in the amount of 39,000 tons of avoided emissions.

If CTO, BLS and CST are burned as fuel:

- 2.2 million barrels of petroleum would be imported and used as raw materials by other firms to replace the CTO Arizona Chemical would have used for our products, with the associated increases in greenhouse gas emissions, and we estimate it will require in total the import of 4.5 million barrels of petroleum to replace all the CTO used for the U.S. manufacturing of these products.
- Commercial substitutes replacing Arizona Chemical products will increase equivalent CO₂ by 77 percent.

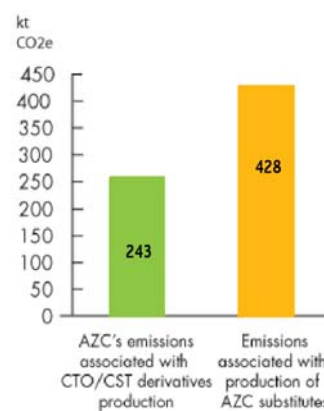
Arizona Chemical Greenovations

Tall Oil Fatty Acids

- As an additive to diesel, TOFAs are an efficient way to create low-sulfur diesel, lowering air pollution from transport.
- In paints, TOFAs reduce the emission of volatile organic compounds by 50%.
- In printing industries, TOFAs replace VOC hydrocarbon solvents.

Arizona Chemical North American Operations

A most favorable carbon footprint balance



Crude Tall Oil-Based Upgraded Products

- Are used in the production of bio-based cosmetics, thus reducing the dependency on synthetic ingredients.
- Function as biodegradable lubricants, hydraulic fluids and other industrial total loss lubrication, such as chain saws.

Tall Oil Rosin based tackifiers

- Replace mineral oils in high performance tires to increase safety and efficiency.
- Replace hydrocarbon products from petrochemical sources in adhesives.

Sterols produced by our joint venture with Arboris are used in food products to block cholesterol absorption and help reduce cholesterol in humans, improving public health.

Success Stories

Lower Sulfur Emissions with TOFA as a Lubricity Additive

Around the world, several fuel standards regulate the maximum quantity of sulfur in diesel fuel. The reduction of sulfur in diesel helps to mitigate acid rain. As the desulphurization process also removes the lubricating properties, low-sulfur diesel causes wear in transport diesel engines. Arizona Chemical's tall oil fatty acid (TOFA) from the pine tree is used as a natural lubricity additive in low-sulfur diesel. Today, TOFA is used to produce more than 200 million tons of environmentally friendly low-sulfur diesel each year.

Less Use of Metallic-Based Gelling Agents with SYLVAPRINT[®] HSR ink resins

Arizona Chemical's Tall Oil Fatty Acid Esters used as ink solvents are true green alternatives: they eliminate the need for hydrocarbon solvents and allow non-VOC high-gloss varnishes for the global printing industry. The Heat-Stable Resin technology of SYLVAPRINT[®] HSR ink resins enable lithographic printing inks to use less metallic-based gelling agent, which contributes to a cleaner environment.

Less Hydrocarbon-Based Waste with Biodegradable Hydraulic Fluids

Non-biodegradable lubricants spilled onto soil or water can be harmful to the environment. Hence, the use of environmentally acceptable lubricants in areas where lubricants may come into close contact with the environment is greatly encouraged. Arizona Chemical's SYLVATAL[®] Distilled Tall Oil, as a substitute for mineral oils, provides excellent lubricity and oxidative stability while enabling production of biodegradable hydraulic fluids, which, in turn, help reduce the hydrocarbon waste in the environment.

Sustainable Alternative to Petrochemicals with Rosin Based Tackifiers

Tall Oil Rosin-based tackifiers are truly green alternatives to petroleum-based hydrocarbon tackifiers. Arizona Chemical's products enable its partners in diverse industries to meet the needs of the present generation without compromising the ability of future generations to meet their needs. For example, Arizona Chemical Tackifiers address the increasing concerns on sustainability of rubber compound components, and offers a sustainable and high-performance alternative to mineral oils in tire construction.

Greater Green Effect with Dimer Acids and Polyamides

UNI-REZ[®] Polyamides manufactured using Tall Oil Fatty Acid based UNIDYME[®] Dimer Acids provide performance benefits and have a greater proportion of sustainable constituents compared to alternatives. UNI-REZ[®] Alcohol-Soluble Ink Polyamides pioneered the elimination of hazardous solvent usage in flexographic printing inks.

For additional information on Arizona Chemical's sustainability initiatives, visit arizonachemical.com.