

Sulfolane

C₄-H₈-O₂-S

CAS No: 126-33-0

Description and Grades

Sulfolane is a highly polar and stable organosulfur compound, making it a versatile solvent for many organic material applications. Chevron Phillips manufactures three grades of Sulfolane with distinct properties (See Figure 1) to suit different applications and handling needs.

Applications

BTX Extraction

Sulfolane, in conjunction with processing technology offered by Axens and UOP, can be used in the extraction process to separate BTX (benzene, toluene, and xylene) aromatic hydrocarbons from refinery reformat. Aromatic compounds are essential in the blending of fuels to boost octane, however, they are limited by fuel regulations due to environmental impact. BTX aromatics are also valuable petrochemical materials. The volatilities and boiling points of aromatic and nonaromatic hydrocarbons are very similar, making distillation difficult. Sulfolane preferentially extracts aromatics since non-aromatic hydrocarbons have low solubility in it. The aromatic rich Sulfolane stream is then distilled, with the Sulfolane being recycled. Chevron Phillips' Sulfolane W is used for this application.

HF Vapor Suppressant

Sulfolane is added to hydrogen fluoride, or hydrofluoric acid (HF) as a safety measure to lower the vapor pressure for the purpose of minimizing risks associated with handling or transportation. HF is highly toxic, further complicated by the ease with which HF is vaporized into the atmosphere. The combination of Sulfolane in HF reduces the amount of HF that will vaporize and enter the atmosphere in the case of an accidental exposure. If needed, the Sulfolane can then be separated from the HF at the final destination for usage. Chevron Phillips' Sulfolane A is used for this application.

Natural Gas Processing

Sulfolane is used with processing technology offered by Shell (Sulfinol®-X) for the pre-treatment of natural gas. The pre-treatment process is dependent on the type and concentration levels of the contaminant. While most natural gas requires minimal treatment, sour natural gas requires a chemical absorption process. Although various formulated amine solvents are effective in removing H₂S, CO₂, and COS, the addition of Sulfolane provides mercaptan and other organic sulfur compound removal capabilities. Sulfolane also acts as a foam inhibitor, increasing process reliability. Chevron Phillips' Sulfolane W is used for this application.

Other Specialty Applications

Sulfolane can also be utilized for dyeing applications to improved dispersion, for jet printing formulation to improve stability and reduce printer nozzle clogging, exchange reactions for the creation of various fluoro-aromatic compounds, as a solvent for the synthesis of pharmaceutical intermediates, in electrolyte solutions for lithium batteries solutions, and as well as a solvent for various acid catalyzed, oxidation, nitration, and condensation reactions. Chevron Phillips' Sulfolane A is used for these applications (a low color grade is also available). Chevron Phillips also has available Sulfolane E for electronic applications such as circuit board cleaning and photoresist stripping for semiconductors where metal ion impurities are a concern.

Safety and Handling

Sulfolane is classified as category 1B reproductive hazard according to the Globally Harmonized System. Sulfolane is classified as not regulated as a hazardous material or dangerous good for transportation by USDOT. Sulfolane's oral and skin acute toxicity are low. Sulfolane is not expected to cause skin or eye irritation. Sulfolane also has low skin penetration in comparison to other solvents. Sulfolane should be kept under a nitrogen blanket and out of contact with oxygen and strong oxidizing agents such as chlorates, nitrates, and peroxides that can cause degradation. Sulfolane is not considered corrosive to steel, although by-products from Sulfolane decomposition can cause corrosion issues. See Figure 2 for solubility of Sulfolane in various organic solvents. Sulfolane is thermally stable to approximately 430°F, when it starts to breakdown into sulfur dioxide and polymeric material. Anhydrous Sulfolane should be stored at temperatures between 85°F and 105°F due to its high freezing point (79°F). Storing at higher temperatures may affect product color. Sulfolane's freezing point can be depressed significantly with small amounts of water (Chevron Phillips' Sulfolane W grade). See Figure 3. However, the effect diminishes considerably beyond water levels of 3% weight.

Figure 1 – Typical Sulfolane Properties

Characteristics	A	E	W
Purity WT%	99.9	97.1	97.1
Water WT%	0.07	2.9	2.9
Density (lbs/gal)	10.41	10.30	10.30
Freezing Point (°F)	79	44	44
Color (APHA)	71	20	71
Flash Point (°F)	330	330	330
SO ₂ Stability	8.3	4.0	4.0
Ash, WT%	0.003	0.006	0.006

Figure 2 – Solubility in Various Compounds at 77°F

Solvent	Solubility (g/100 g)
Benzene	Miscible
Toluene	Miscible
Mixed Xylenes	Miscible
Perchloroethylene	1.6
Hexene – 1	1.0
Cyclohexane	0.4
n-Hexane	0.3
2,3-Dimethylbutane	0.3

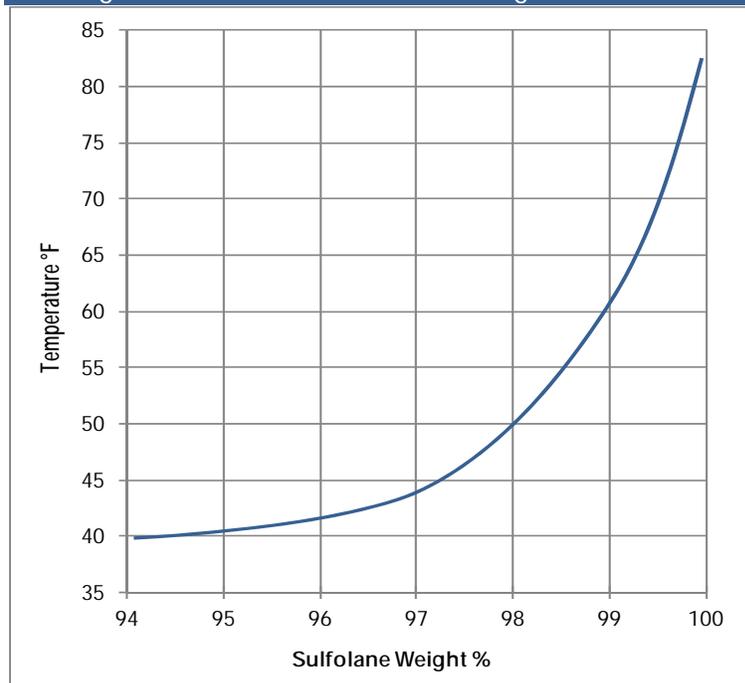
Product Safety Information

Safety Data Sheets are available upon request and on our website:



www.cpchem.com/specialtychemicals

Figure 3 – Sulfolane/Water Freezing Point Curve



Before using this product, the user is advised and cautioned to make its own determination and assessment of the safety and suitability of the product for the product for the specific use in question and is further advised against relying on the information contained herein as it may relate to any specific use or application. It is the ultimate responsibility of the user to ensure that the product is suited and the information is applicable to the user's specific application. Chevron Phillips Chemical Company LP does not make, and expressly disclaims, all warranties, including warranties of merchantability or fitness for a particular purpose, regardless of whether oral or written, express or implied, or allegedly arising from any usage of any trade or from any course of dealing in connection with the use of the information contained herein or the product itself. The user expressly assumes all risk and liability, whether based in contract, tort or otherwise, in connection with the use of the information contained herein or the product itself. Further, information contained herein is given without reference to any intellectual property issues, as well as federal, state or local laws which may be encountered in the use thereof. Such questions should be investigated by the user.