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## Product Information

### SULFURIC ACID, ACS REAGENT

Product Number **S 1526**

**25,810-5 is an exact replacement for S 1526**

**CAS NUMBER:** 7664093-9

**SYNONYMS:** Oil of vitriol; dihydrogen sulfate; battery acid

#### PHYSICAL DESCRIPTION:

Appearance: Clear, colorless liquid, somewhat viscous

Molecular formula:  $H_2SO_4$

Molecular weight: 98.07

Concentration: The commercial reagent contains 93-98%  $H_2SO_4$ , the balance being water. Its effective concentration is 18 M (36N).

Freezing point: Anhydrous sulfuric acid freezes at  $10^\circ C$ ; 98% sulfuric acid freezes at  $+3^\circ C$ .<sup>1</sup>

Boiling point: approximately  $290^\circ C$ , decomposing into sulfur trioxide and water at  $340^\circ C$ .<sup>1</sup>

Specific gravity: 1.83 at  $20^\circ C$ <sup>2a</sup>

Viscosity of 24.2 centipoise (compared to ethanol at 1.1 cp or glycerol at 934 cp).<sup>2b</sup>

#### STORAGE / STABILITY AS SUPPLIED:

Sulfuric acid is stable indefinitely at room temperature, but should be stored tightly sealed in a vented cabinet away from bases or reducing agents.

#### SOLUBILITY / SOLUTION STABILITY:

Sulfuric acid is miscible in water or alcohol in all proportions, but extreme care must be taken when diluting concentrated acid, since the process is highly exothermic. **TO MAKE AN AQUEOUS SOLUTION, THE CONCENTRATED ACID SHOULD ALWAYS BE ADDED SLOWLY TO WATER.**<sup>3</sup> Adding water to the acid is extremely dangerous, since the released energy may cause splattering of the acid and water mixture.

Solutions are stable at room temperature indefinitely, but should be stored tightly sealed and clearly labeled, since they look like water.<sup>4</sup>

## GENERAL REMARKS:

Sulfuric acid has a very high affinity for water, and can be used as a drying agent for air and many organic materials. It will remove the elements of water from wood or sugar, charring them.

Sulfuric acid is widely used commercially in the manufacture of fertilizers, metal treatments, car batteries, etc. It is the top-selling inorganic chemical in the United States, produced in excess of 90 billion pounds annually.<sup>5</sup>

Due to its concentration and oxidation properties, sulfuric acid has been used in conjunction with potassium dichromate to prepare an extremely powerful "chromic acid cleaning solution". Since chromium(VI)ion is potentially a significant health hazard, this particular usage is no longer advised. A safer alternative is Nochromix<sup>®</sup>, available from Sigma-Aldrich (Prod. No. 32,869-3).

As an ACS Reagent, this product meets or exceeds limits set for trace impurities, and assays between 95 and 98%, based on test methods described by the American Chemical Society.<sup>6</sup>

## REFERENCES:

1. *Merck Index*, 11th ed., #8953 (1989).
- 2a. *Handbook of Chem. and Physics*, 74th ed. (CRC Press, 1994), p. 15/22.
- 2b. *Handbook of Chem. and Physics*, 74th ed. (CRC Press, 1994), p. 6/198.
3. The old saying "Do as you oughter: add acid to water!" is familiar to many chemist.
4. This similarity is the basis of a classic poem often recited in Chemistry I classes.
5. *Chemical and Engineering News*, June 24, p. 40 (1996).
6. *Reagent Chemicals*, 8th ed. (American Chemical Society Press, 1993), pp.737-740.

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