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## Product Information

**HYDROGEN PEROXIDE, ACS REAGENT**  
Sigma Prod. No. **H 0904**  
**21,676-3 is an exact replacement for H 0904**

**CAS NUMBER:** 7722-84-1 (for pure compound, not solution)  
**STRUCTURE:** H-O-O-H

### PHYSICAL DESCRIPTION:

Appearance: Clear colorless liquid with an assay between 29.0 and 32.0% (w/w) hydrogen peroxide in water (redox titration).<sup>1</sup>

Molecular formula: H<sub>2</sub>O<sub>2</sub>

Molecular weight: 34.01

Density: 1.11 g/mL, giving a molarity of 9.8 M.<sup>2</sup>

pK<sub>a</sub> = 11.6 in water at 25°C<sup>3</sup>, and the pH of the 30% solution is typically between 3 and 4.<sup>1</sup>

The product contains 0.5 ppm stannate-containing compounds and 1 ppm phosphorus-containing compounds to stabilize the solution.<sup>4</sup>

Hydrogen peroxide is a powerful corrosive and oxidizing agent. Please consult the Material Safety Data Sheet for information on handling this product. The product should be stored in a closed but vented container, protected from possible contamination. Its decomposition to oxygen and water is exothermic and catalyzed by many metallic compounds, including manganese dioxide (MnO<sub>2</sub>) and potassium iodide crystals (KI).<sup>1</sup>

### STABILITY / STORAGE AS SUPPLIED:

When stored in the dark at 2-8°C, this product has retained full purity (by titration) for five years.<sup>1</sup>

### SOLUBILITY AND SOLUTION STABILITY:

The product can be diluted in water, but more dilute solutions tend to be more light-sensitive than the concentrate product, and should be stored in dark containers.

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**GENERAL REMARKS:**

Hydrogen peroxide has a wide range of uses, from disinfectants to bleaches. It is naturally present in tissues as a result of cellular metabolism. Its mechanism of action has been well studied, and as a disinfectant, hydrogen peroxide has been shown to be generally effective with very safe by-products. Extensive information has been reported.<sup>5</sup> Due to the presence of low levels of catalase or peroxidase enzyme in cellular tissue, very dilute solutions can be rendered ineffective as disinfectants.<sup>6</sup> A 3% hydrogen peroxide solution has been used to "block endogenous peroxidase activity" in tissue sections.<sup>7</sup>

The concentration of a given solution can be determined using an oxidation-reduction titration method using potassium permanganate.<sup>8</sup> A spectrophotometric method reports a molar extinction coefficient of 43.6 at 240 nm.<sup>9</sup>

**REFERENCES:**

1. Sigma quality control data; laboratory data.
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4. Supplier information.
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6. *Ibid.*, p. 636.
7. *Lectins: Biology, Biochem. and Clinical Biochem.*, Vol. 8, eds. Van Driessche, E. et al., (1993), pp. 291-302.
8. *Reagent Chemicals*, 8th Ed., (AMERICAN CHEMICAL SOCIETY, 1993), p. 376-378.
9. Hildebrandt, A.G. and Roots, I., *Arch. Biochem. Biophys.*, 171, 385-397 (1975).