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).\(^1\)
Molecular formula: \(\text{H}_2\text{O}_2\)
Molecular weight: 34.01
Density: 1.11 g/mL, giving a molarity of 9.8 M.\(^2\)
p\(\text{K}_a\) = 11.6 in water at 25\(^\circ\)C\(^3\), and the pH of the 30% solution is typically between 3 and 4.\(^1\)

The product contains 0.5 ppm stannate-containing compounds and 1 ppm phosphorus-containing compounds to stabilize the solution.\(^4\)

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 (\(\text{MnO}_2\)) and potassium iodide crystals (KI).\(^1\)

STABILITY / STORAGE AS SUPPLIED:
When stored in the dark at 2-8\(^\circ\)C, this product has retained full purity (by titration) for five years.\(^1\)

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.\(^5\) Due to the presence of low levels of catalase or peroxidase enzyme in cellular tissue, very dilute solutions can be rendered ineffective as disinfectants.\(^6\) A 3% hydrogen peroxide solution has been used to "block endogenous peroxidase activity" in tissue sections.\(^7\)

The concentration of a given solution can be determined using an oxidation-reduction titration method using potassium permanganate.\(^8\) A spectrophotometric method reports a molar extinction coefficient of 43.6 at 240 nm.\(^9\)

REFERENCES:

1. Sigma quality control data; laboratory data.
4. Supplier information.
6. Ibid., p. 636.