

MATERIALS OF CONSTRUCTION FOR THE STORAGE OF HYDROGEN PEROXIDE

INTRODUCTION

There are three primary materials of construction that are recommended for the storage of hydrogen peroxide; low-carbon stainless steel, high-purity aluminum, and high-density polyethylene. There are advantages and disadvantages to each material.

STAINLESS STEEL

Low-carbon grades of stainless steel are excellent for the storage of hydrogen peroxide. Alloys which are suitable include 304, 304L, 316 and 316L. Properly passivated stainless steel provides a very stable surface for the storage of hydrogen peroxide.

The corrosivity of hydrogen peroxide on stainless steel is minimal, so a typical tank should last thirty years or more.

Equipment fabricated of stainless steel must have proper surface preparation. It must also be chemically passivated prior to use with hydrogen peroxide. This removes surface impurities and creates an inert layer on the surface of the metal. Stainless steel can easily be repaired.

ALUMINUM

High-purity aluminum (>95% aluminum) is the most compatible material for storage of hydrogen peroxide. Alloys that have high aluminum content include 1060 and 5254. Aluminum provides the most stable surface for the storage of hydrogen peroxide.

The corrosivity of stabilized hydrogen peroxide on aluminum is minimal, so a typical tank should last thirty years or more. There are some special grades of hydrogen peroxide that are corrosive to aluminum. Aluminum is subject to attack from chlorides, which may be introduced with water used for dilution.

Equipment fabricated of aluminum must have proper surface preparation. It must also be chemically passivated prior to use with hydrogen peroxide. This removes any surface impurities and creates an inert layer on the surface of the metal. Aluminum can be repaired but requires special welding skills.

HIGH-DENSITY POLYETHYLENE

High-density polyethylene (HDPE) is a suitable material of construction for the storage of hydrogen peroxide. Different resins react differently and can be degraded by hydrogen peroxide. HDPE provides a very stable surface.

At higher concentrations, hydrogen peroxide can cause environmental stress cracking and embrittlement of HDPE. Thus the use of HDPE is restricted to hydrogen peroxide concentrations of 50% or less. Embrittlement and stress cracking can also be caused by UV attack from sunlight and use in a high-temperature environment (>90°F). HDPE tanks typically last between three and ten years in hydrogen peroxide service, but the actual lifespan is difficult to predict because of the various factors involved. Cross-linked HDPE and UV stabilizers are typically used to provide some increased resistance. The tank must be inspected periodically for structural integrity. A visual inspection is helpful, but only destructive test methods can fully determine the integrity of the tank.

HDPE tanks can be put into service after a simple cleaning. Since cross-linked HDPE becomes a thermoset material after molding, it is not weldable and repairs cannot be made.



HYDROGEN PEROXIDE

Materials of Construction

Technical Data Sheet

**Before using, read Safety Data Sheet (SDS) for this chemical.
Solvay Chemicals, Inc.
24-hour Emergency Phone Number – 800-424-9300 (CHEMTREC®)**

To our actual knowledge, the information contained herein is accurate as of the date of this document. However, neither Solvay Chemicals, Inc., nor any of its affiliates, makes any warranty, express or implied, or accepts any liability in connection with this information or its use. This information is for use by technically skilled persons at their own discretion and risk and does not relate to the use of this product in combination with any other substance or any other process. This is not a license under any patent or other proprietary right. The user alone must finally determine suitability of any information or material for any contemplated use in compliance with applicable law, the manner of use and whether any patents are infringed. This information gives typical properties only and is not to be used for specification purposes. Solvay Chemicals, Inc. reserves the right to make additions, deletions or modifications to the information at any time without prior notification.

Trademarks: Trademarks and/or other Solvay Chemicals, Inc. products referenced herein are either trademarks or registered trademarks of Solvay Chemicals, Inc. or its affiliates, unless otherwise indicated.

Before using, read the Safety Data Sheet (SDS) for the chemical, available at www.solvay.com.

Solvay Chemicals, Inc.

H2O2_Materials_Construct_Storage 08/19
Copyright 2004-2019
All Rights Reserved
1-800-765-8292
www.solvay.com

