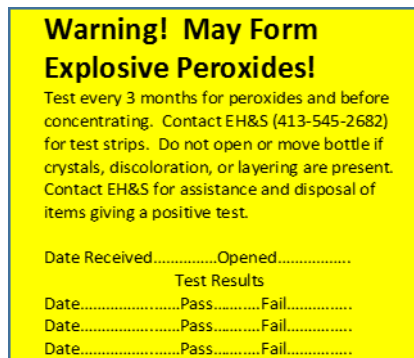


Peroxide Forming Materials Management Program

Peroxide forming materials are hazardous materials which under normal conditions of storage are capable of reacting with oxygen or other species to produce organic or inorganic peroxides. Peroxides produced in this manner present a risk of explosion as these material tend to be shock-sensitive and are capable of undergoing highly exothermic decomposition processes. Violent reactions may be initiated with exposure to friction, heat or light, particularly when these peroxides are concentrated. To mitigate this hazard, Environmental, Health and Safety (EH&S) has implemented a peroxide forming materials management program which details the measures required to ensure that these materials remain safe for storage and use.

1. When peroxide forming materials arrive on campus, they are received and identified as peroxide forming materials at CEMS.
2. CEMS will label each material with a peroxide forming material sticker (shown below) indicating the date the material was received. The material will also be barcoded and entered in the CEMS inventory system for tracking.



Warning! May Form Explosive Peroxides!

Test every 3 months for peroxides and before concentrating. Contact EH&S (413-545-2682) for test strips. Do not open or move bottle if crystals, discoloration, or layering are present. Contact EH&S for assistance and disposal of items giving a positive test.

Date Received.....Opened.....

Test Results

Date.....Pass.....Fail.....

Date.....Pass.....Fail.....

Date.....Pass.....Fail.....

3. CEMS will deliver each peroxide forming material to the appropriate location with a copy of this document. If test strips are not available in the lab already, they may be requested through EH&S at (413)-545-2682. Note that these test strips need to be stored in a refrigerator, and they do expire.
4. Fill in the opened date on the sticker when the material is first opened.
5. **Peroxide forming materials are required to be tested every three months.** This time interval begins on the received date. The testing protocol is provided with the test strips, and is also attached as the next page in this document. Testing is also recommended prior to concentrating peroxide forming materials.
6. A blue color (even faintly blue) on the test strip indicates a positive test. A white color indicates a negative test. Note the date of the testing and the result on the appropriate space on the sticker on the bottle.
7. Peroxide forming materials which yield a positive test result must be referred for disposal to EH&S. Fill out the hazardous waste disposal request form in CEMS, or contact EH&S at (413)-545-2682.

1.10011.001
1.10011.0002
1.10081.0001

Peroxide Test O_2^{2-}

1. Method

Peroxidase transfers peroxide oxygen to an organic redox indicator. This produces a blue oxidation product. The peroxide concentration is measured **semi-quantitatively** by visual comparison of the reaction zone of the test strip with the fields of a color scale.

2. Measuring range and number of determinations

| Cat. No. | Measuring range/color-scale graduation mg/l H_2O_2 | Number of determinations |
|------------------------------|--|--------------------------|
| 1.10011.0002 1.10011.0001 | 0.5 – 2 – 5 – 10 – 25 | 25 100 |
| 1.10081.0001 | 1 – 3 – 10 – 30 – 100 | 100 |

3. Applications

This test measures organic and inorganic peroxides in aqueous solutions and organic solvents. Polymeric peroxides are not all or only incompletely measured.

Sample material:

Simple ethers
UHT milk
Pickling and copper-stripping baths
Bleaching and oxidizing agents (paper and textile industries)
Disinfectant and rinsing solutions (e.g. food technology, laundries)
Swimming-pool water

4. Influence of foreign substances

This was checked in solutions with hydrogen peroxide concentrations from the middle of the respective measuring range with 0 mg/l H_2O_2 . The determination is not yet interfered with up to the concentrations of foreign substances given in the table.

| Concentrations of foreign substances in mg/l | | | |
|--|-----|---------------|----|
| CrO_4^{2-} | 10 | IO_4^- | 40 |
| $[Fe(CN)_6]^{4-}$ | 10 | MnO_4^- | 2 |
| $[Fe(CN)_6]^{3-}$ | 10 | $S_2O_8^{2-}$ | 20 |
| Hg^{+} | 250 | VO_3^- | 5 |

5. Reagents and auxiliaries

The test strips are stable up to the date stated on the pack when stored closed at +2 to +8 °C.

Package contents:

Tube containing 25 test strips
(Cat. No. 1.10011.0002)
Or
Congaing 100 test strips
(Cat. Nos. 1.10011.0001 and 1.10081.0001)

Other Reagents:

MColorpHast™ Universal indicator strips pH 0-14
Cat. No. 109535
Sodium acetate anhydrous GR for analysis,
Cat. No. 106268
Hydrochloric acid 1 mol/l TitriPUR®, cat. No. 109057
Diethyl ether for analysis EMSURE®
Cat. No. 100921
Hydrogen Peroxide 30 % H_2O_2 (Perhydrol®) GR for analysis, Cat. No. 107209

6. Preparation

- Samples containing more than 25 mg/l H_2O_2 (Cat. Nos. 110011) or 100 mg/l H_2O_2 (Cat. No.110081) must be diluted with distilled water or peroxide-free ether.
- **The pH of the aqueous sample must be within the range 2-12**
If necessary, buffer the sample wit sodium acetate or, respectively, adjust the pH with hydrochloric acid

7. Procedure

Protect the reaction zones from light (also during the reaction time)!

Determination in aqueous solutions:

Immerse the reaction zone of the test strip in the pretreated sample (**15 – 30 °C**) for **1 sec.**

Allow excess liquid to run off via the long edge of the strip onto an absorbent paper towel and **after 15 sec** (Cat. No. 110011) or **after 5 sec** (Cat. No. 110081) determine with which color field on the label the color of the reaction zone coincides most exactly.

Read off the corresponding result in mg/l H_2O_2

Determination in organic solvents (readily volatile ethers):

Immerse the reaction zone of the test strip in the pretreated sample (**15 – 30 °C**) for **1 sec.**

After the solvent has evaporated (gently fan the strip back and forth for **3 – 30 sec**), immerse the reaction zone in distilled water for **1 sec** and allow excess liquid to run off via the long edge of the strip onto an absorbent paper towel. **After 15 sec** (Cat. No. 110011) or **after 5 sec** (Cat. No. 110081) determine with which color field on the label the color of the reaction zone coincides most exactly.

Read off the corresponding result in mg/l H_2O_2

Notes on the measurement:

- Every blue coloration **within 3 min** can be interpreted as a positive result.
- If the color of the reaction zone is equal to or more intense than the darkest color on the scale of in another color emerges, repeat the measurement using **fresh** samples diluted with distilled water or, respectively, peroxide-free ether until a value of less than 25 mg/l/ H_2O_2 (Cat. No. 110011) or 100 mg/l (H_2O_2) (Cat. No. 110081) is obtained.

In the case of Cat. No. 110081 the reaction zone indicates values within the measuring range also for H_2O_2 contents from 5000 mg/l (0.5 %) up.

In such cases it is advisable to conduct a plausibility check of the measurement results y diluting the sample (e.g. 1:10, 1:100) Concerning the result of the analysis, the dilution (see also section 6) must be taken into account

Result of analysis = measurement value x dilution factor

8. Method control

To check test strips and handling:

Make up 5.0 ml of Perhydrol® (H_2O_2 30 % = 333 000 mg/l H_2O_2) to 500 ml with distilled water and mix. Take 1.5 ml of this solution; make up to 500 ml with distilled water, and mix. Subsequently analyze **immediately (solution is not stable)** as described in section 7. The content of H_2O_2 determined should be 10 mg/l

Additional notes see under www.qa-test-kits.com.

9. Note

Reclose the tube containing the test strips immediately after use.