

Washington State Department of Ecology

Environmental Assessment Program

Standard Operating Procedure for Reagent Preparation

Version 1.0

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Please note that the Washington State Department of Ecology's Standard Operating Procedures (SOPs) are adapted from published methods, or developed by in-house technical and administrative experts. Their primary purpose is for internal Ecology use, although sampling and administrative SOPs may have a wider utility. Our SOPs do not supplant official published methods. Distribution of these SOPs does not constitute an endorsement of a particular procedure or method.

Any reference to specific equipment, manufacturer, or supplies is for descriptive purposes only and does not constitute an endorsement of a particular product or service by the author or by the Department of Ecology.

Although Ecology follows the SOP in most instances, there may be instances in which Ecology uses an alternative methodology, procedure, or process.

Environmental Assessment Program

Standard Operating Procedure for Reagent Preparation

1.0 Purpose and Scope

- 1.1 This Standard Operating Procedure (SOP) is for the preparation of chemical reagents used by the Coastal and Estuarine Assessment Unit.

2.0 Applicability

- 2.1 This SOP should be followed for all chemical reagent preparation by the Coastal and Estuarine Assessment Unit.

3.0 Definitions

- 3.1 MSDS – Material Safety Data Sheets provides both workers and emergency personnel with the proper procedures for handling or working with a particular substance. MSDS's include information such as physical data (melting point, boiling point, flash point, etc.), toxicity, health effects, first aid, reactivity, storage, disposal, protective equipment and spill/leak procedures.

4.0 Personnel Qualifications/Responsibilities

- 4.1 All laboratory staff must comply with the requirements of the EA Safety Manual (EA Program, 2006).

5.0 Equipment, Reagents, and Supplies

5.1 Preparation of 90% Acetone

- 5.1.1 Certified ACS 99% grade acetone. Acetone is not known to be carcinogenic or teratogenic; however, it does cause defatting of tissue on contact. The MSDS may be found at <https://fscimage.fishersci.com/msds/00140.htm>.
- 5.1.2 De-ionized water
- 5.1.3 Safety apron
- 5.1.4 Safety goggles
- 5.1.5 Nitrile exam gloves

5.2

Preparation of 10% Hydrochloric Acid (HCl)

- 5.2.1 Certified ACS grade concentrated hydrochloric acid (HCl). Hydrochloric acid is extremely poisonous and corrosive. Extreme caution should be taken when handling this chemical. The MSDS may be found at <http://www.jtbaker.com/msds/englishhtml/H3880.htm>.
- 5.2.2 De-ionized water
- 5.2.3 1 or 2 L polyethylene bottle designated for 10% acid use
- 5.2.4 funnel
- 5.2.5 1 L graduated cylinder
- 5.2.6 Safety apron
- 5.2.7 Safety goggles
- 5.2.8 Nitrile exam gloves

5.3 Preparation of 7.4% Formalin

- 5.3.1 37% certified ACS grade formaldehyde. Formaldehyde is a known carcinogen. The MSDS may be found at <http://www.vwrsp.com/msds/10/JT2/JT2106-8.htm>.
- 5.3.2 De-ionized water
- 5.3.3 Glass jar or bottle designated for use with formalin
- 5.3.4 Safety apron
- 5.3.5 Safety goggles
- 5.3.6 Nitrile exam gloves

5.4 Preparation of MgCO₃

- 5.4.1 Magnesium Carbonate (MgCO₃). The MSDS can be found at <http://www.vwrsp.com/msds/10/JT2/JT2437-1.htm>.
- 5.4.2 De-ionized water
- 5.4.3 Safety apron
- 5.4.4 Safety goggles
- 5.4.5 Nitrile exam gloves

6.0 Summary of Procedure

6.1 Preparation of 90% Acetone

6.1.1 **** Preparation of 90% acetone should be done in the fume hood. It is necessary to wear a laboratory coat, gloves and protective eyewear when handling acetone ****

6.1.2 **Measure** 100 mL of DI water in a graduated cylinder.

6.1.3 **Add** the water to a 1-L volumetric flask equipped with a screw cap.

6.1.4 **Pour** certified ACS grade 99% acetone (found in solvents cabinet) into the volumetric flask using a funnel to prevent spillage.

6.1.5 **Fill** the volumetric flask only to the graduation line on the flask.

6.1.6 **Screw** the cap on the flask and shake to mix the acetone and water. The level of liquid in the flask will be lower after shaking.

6.1.7 **Add** more certified ACS grade 99% acetone to bring the volume of liquid back up to the graduation line on the flask.

6.1.8 **Shake** the flask one more time and add more acetone, if necessary.

6.1.9 **Decant** the 90% acetone in a 4-L amber glass bottle that has been designated for use with 90% acetone.

6.1.10 **Store** 90% acetone in the solvent cabinet in the EAP Operation Center's Marine Lab.

6.1.11 **Clean** volumetric flask by rinsing three times with hot water, followed by a triple rinse with DI water.

6.1.12 **All acetone containers must bear a hazardous materials sticker (2 health hazard, 3 flammability, 0 reactivity, 3 contact), and identification of a contact person/phone, as well as the date it was prepared.**

6.2 Preparation of 10% Hydrochloric Acid

6.2.1 **** Preparation of 10% HCl should be done in the fume hood. It is necessary to wear a laboratory coat, gloves and protective eyewear when handling HCl ****

6.2.2 ****ALWAYS MEASURE WATER FIRST AND ADD ACID TO WATER ****

6.2.3 **Fill** 10% acid bottle with DI water up to the appropriate marking on the bottle.

- 6.2.4 **Add** certified ACS grade concentrated HCl to the fill line on the acid bottle.
- 6.2.5 **Cap** bottle and mix gently.
- 6.2.6 **Note:** Acid can also be mixed in a graduated cylinder and transferred to a bottle designated for use with HCl (e.g. add 100 mL HCl to 900 mL DI water in a 1-L graduated cylinder).
- 6.2.7 **Store** 10% HCl in the acid cabinet in the EAP Operation Center's Marine Lab.
- 6.2.8 **All HCl containers must bear a hazardous materials sticker (3 health hazard, 0 flammability, 2 reactivity, 4 contact), and identification of a contact person/phone, as well as the date it was prepared.**
- 6.3 Preparation of 7.4% Formalin
- 6.3.1 **** Preparation of 7.4% formalin should be done in the fume hood. It is necessary to wear a laboratory coat, gloves and protective eyewear when handling formalin ****
- 6.3.2 **** Labware for mixing formalin is kept under the fume hood. Use only labware marked with 'formalin' when mixing formalin. ****
- Fill** formalin bottle with DI water up to the appropriate marking on the bottle.
- 6.3.3 **Add** 37% certified ACS grade formaldehyde to the fill line on the formalin bottle.
- 6.3.4 **Cap** bottle and mix gently.
- 6.3.5 **Store** 7.4% formalin in a designated cabinet in the Hazardous Materials Storage Room at Ecology's HQ building.
- 6.3.6 **All formalin containers must bear a hazardous materials sticker (3 health hazard, 4 flammability, 0 reactivity), and identification of a contact person/phone, as well as the date it was prepared.**
- 6.4 Preparation of Magnesium Carbonate (MgCO₃)
- 6.4.1 **Dissolve** MgCO₃ powder in DI water in a squirt bottle until the solution is super-saturated. Super-saturation is noted when MgCO₃ remains at the bottom of the bottle.
- 6.4.2 **MgCO₃** solution may be stored in general storage (on the counter or shelf) in the EAP Operation Center's Marine Lab.

6.4.3 **All MgCO₃ bottles must bear a hazardous materials sticker (2 health hazard, 2 flammability, 1 reactivity, 2 contact), and identification of a contact person/phone, as well as the date it was prepared.**

7.0 Records Management

8.0 Quality Control and Quality Assurance Section

9.0 Safety

9.1 Follow general procedures for safety found in the *Environmental Assessment Program Safety Manual*.

9.2 Gloves and safety glasses should be worn when handling chemicals.

10.0 References

10.1 Environmental Assessment Program, 2006. Environmental Assessment Program Safety Manual. March 2006. Washington State Department of Ecology. Olympia, WA.