WEIGHING CHRONIC TESTS

1. SCOPE AND APPLICATION

1.1. This procedure is used to determine the dry weight of organisms used in chronic bioassays described in test methods found in EPA 821-R-02-013 and EPA 821-R-02-014. Tests that use this procedure are BSY-CD-FFS, BSY-CS-FFS, BSY-CS-MFS, BSY-CD-MFS, BSY-CS-MMY, and BSY-CD-MMY.

2. SUMMARY OF METHOD

2.1. Labeled weigh boats are prepared in advance of test termination. They are dried in a drying oven and stored in a desiccator. Empty weigh boats are determined and recorded. Organisms to be weighed are placed in labeled weigh boats, and are then dried in a drying oven to then be stored in a desiccator. Final weights are measured and recorded in the appropriate logbook.

2.2. Prior to weighing, the user must weigh and record in the appropriate logbook the weights of two Class 1 weights (or other certified weights, such as Class 2 weights) that bracket the expected weight of the weigh boats to be weighed.

2.3. Interferences include airflow and vibrations which interfere with the balance, weigh boats contaminated by moisture or body-oils, an improperly calibrated balance, and/or contaminated Class 1 or Class 2 weights.

3. EQUIPMENT AND SUPPLIES

3.1. Weigh Boats

- 3.1.1. Aluminum foil
- 3.1.2. Fine tip, black permanent marker
- 3.1.3. Glass Carolina dish
- 3.1.4. Scissors
- 3.1.5. Volumetric flask stopper
- 3.1.6. Forceps
- 3.1.7. Ruler, 30 cm
- 3.1.8. Weigh-boat form block (located on shelf above the MHWCD carboys in Room B246)
  - 3.1.8.1. A block of wood approximately 1.85 cm × 7 cm × 2 cm with 12 circular holes drilled to an approximate depth of 6 mm.
- 3.1.9. Desiccator with desiccant

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3.1.9.1. Desiccant must be blue or white in color. A pink color indicates that the desiccant is hydrated. Dry desiccant in oven before use until blue or white color returns.

3.2. Weighing

3.2.1. Weigh boats

3.2.2. Forceps

3.2.3. Autoclave gloves

3.2.4. Organisms to be weighed

3.2.5. Mettler Toledo XA105DU balance (SN B314195659) (located in the micro lab), calibrated and used per SOP BB-36

3.2.6. Drying oven maintained at either 100 ˚C (dry time >6 but <8 hours during business hours only) or 60 ˚C (dry time ~ 24 hours when drying overnight)

3.2.7. Certified Class 1 weights (in B246 Cabinet A2) or Class 2 weights (beside XA105DU balance)

3.2.8. *Mettler Toledo XA 105DU Daily Use* log

3.2.9. *Weights for Chronic Bioassay and SRT* logbook

3.2.10. The appropriate *Chronic Bioassay Bench Sheet* for the test being conducted

4. SAMPLE COLLECTION, PRESERVATION, AND HANDLING

4.1. See SOP FS 1000 for sample collection and preservation.

5. PREPARATION OF WEIGH BOATS

5.1. Wearing gloves, lay a (~30 cm X 30 cm) sheet of aluminum foil on a flat surface. Using a ruler, mark 2 cm intervals along opposite ends of the foil. Use the ruler to connect the marks. Do the same on the other two sides of the sheet. The foil should now be marked off into 2 cm squares.

5.2. Carefully cut along one set of 2 cm lines to form 2 cm × 30 cm long aluminum foil strips, with lines every 2 cm. This should form 16 squares per strip.

5.3. As needed, lay the appropriate number of strips shiny side down on a flat surface. (Number of strips is dependent upon the test/tests the weigh boats are to be used for). Use the permanent marker to clearly number both sides of the strips (same number and same square). Underline the single numerals 2, 6, 5 and 9 to avoid confusion. The numbers should be written as close to the center of each square as practical. Begin with number 1 and continue to 24 (more or less) for fish tests or 48 (more or less) for mysid tests.

5.4. After numbering, cut the squares from the strips. If the squares are not needed right away, clip them with a binder clip and store them in a glass Carolina dish.

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5.5. Using forceps, find the first square in series and center over one of the holes in the weigh boat form block. Carefully form the aluminum foil boat by placing the bottom of the plastic flask stopper on top of the foil square and gently press into the hole of the form block. Remove the stopper and carefully remove the boat from the hole using the forceps.

5.5.1. After the boat is formed, make sure the number is still legible. If not, discard the boat and make a new one.

5.6. Place formed boats in a small Carolina dish in numerical order.

5.7. Repeat step 5.5 - 5.7 until all weigh boats have been made. Cover the dish with foil and label with test type to prevent dust and dirt particles from falling into the weigh boats.

5.8. Open the door of the desiccator and place Carolina dish on any shelf. Empty weigh boats should go in the desiccator on the left and weigh boats with organisms should go in the desiccator on the right located next to the balance. Make sure the desiccant is blue before placing weigh boats in. Desiccant can be dried in the oven at 100°C for one hour if the color is not blue.

6. WEIGHING TESTS

6.1. Before termination (day 7) of chronic test

6.1.1. Remove the Carolina dish containing the weigh boats from the desiccator and place it in the drying oven. The foil should be folded or removed to allow air exchange. Set the oven temperature to 100˚C and allow the weigh boats to dry for at least one hour.

6.1.2. After at least one hour at 100˚C, remove the Carolina dish containing the weigh boats from the drying oven and return it to the desiccator to cool.

6.1.3. When cool, remove the Carolina dish containing the weigh boats from the desiccator and place it next to the Mettler XA105 balance in the micro lab. Fold back the foil and allow the Carolina dish to set for 15-20 minutes to acclimate the weigh boats to the room conditions.

6.1.4. Weigh the weigh boats. Use the forceps to avoid touching the weigh boats with bare skin. Weigh the weigh boats one at a time in ascending numeric order. After the fifth weigh boat and each subsequent 5 weigh boats, reweigh the first weigh boat (#1). Continue until all weigh boats have been weighed and are within ± 0.05 mg (0.00005 g as seen on the scale) of the first boat. If any of the first boat weights are > ±0.05 mg of the first time it was weighed, completely start over.

6.1.5. Record the weights on the *Weights for Chronic Tests* logbook and the appropriate *Chronic Bioassay Bench Sheet*. Enter weights into the “organism final weight” folder located here:

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6.2. Day 7 of Chronic test

6.2.1. Take the weigh boats to the test termination area in B246. Load the boats per the *Test Termination* procedure in the appropriate chronic bioassay SOP (TA-07.09, TA-07.14, TA-07.15).

6.2.2. Place the Carolina dish containing the loaded weigh boats immediately into the drying oven.

6.2.3. Weigh boats **with organisms** should be dried at **100 ˚C** for a minimum of **6 hours.** If dried at **60 ˚C**, the drying time should be a minimum of **24 hours**.

6.2.3.1. If an oven fails, temperatures between 60 ˚C and 100 ˚C can be used for drying, if the laboratory can demonstrate that the organisms are dried to a constant weight.

6.3. Day 8 (after termination) of Chronic test

6.3.1. After the weigh boats containing fish have appropriately dried, remove the Carolina dish containing the weigh boats from the drying oven. Weigh the boats as in Steps 6.1.4 - 6.1.5 and record the weights on the *Weights for Chronic Bioassay and SRT* logbook, the appropriate *Chronic Bioassay Bench Sheet* logbook and in the Excel sheet in the “organism final weight folder”.

7. DATA ARCHIVAL

7.1. Use a black, waterproof pen for all bench sheets and logbooks.

7.2. To correct raw data entries, place a single line through the incorrect or illegible entry. Write the corrected entry near the error, date and initial the correction. Do not overwrite entries.

7.2.1. The corrected entry is written as near its appropriate space as possible or else in the comment box on the appropriate bench sheet.

7.2.2. If the correction requires an explanation, write a comment, and reference the error. Initial and date the explanation. Do not attempt to put all information (correction and comments) into a small space.

7.2.3. Use sequential alphabetical annotation to identify errors and corresponding comments (use A for first error and use A for corresponding explanatory comment; use B for second error, etc.).

7.3. Record weights on the *Weights for Chronic Bioassay and SRT* logbook, the appropriate *Chronic Bioassay Bench Sheet* logbook, and the “final organism weight” Excel sheet.

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8. QUALITY CONTROL

8.1. The balance is checked on the day of use to ensure it is reading accurately. Two certified Class 1 or Class 2 weights are weighed such that they bracket the expected weights of the objects being weighed.

8.1.1. The weights are not handled with bare hands to prevent contamination from body oils. There are forceps specific to the weight set in the box. They are also kept in a closed box to prevent dirt and dust from contaminating them.

8.2. Weights are measured using a balance (Mettler XA105DU) set on a padded marble slab to minimize vibrations which could interfere with the balance.

8.3. The balance is covered to minimize air flow.

8.4. Weigh boats are desiccated to eliminate moisture as an interference in the weighing process.

8.5. Transcription of weights onto bench sheets is verified by two people.

8.6. Forceps are used to handle the weigh boats to prevent body oils from contaminating them and affecting the weight.

8.7. If a problem occurs during the sample processing or testing, the following steps are performed:

8.7.1. Lab supervisor is notified.

8.7.2. Client is notified (client makes decision for additional testing).

8.7.3. Program administrator is notified.

8.7.4. A non-conformance report (NCR) is submitted describing the problem and the corrective action.

8.7.4.1. To create an NCR: open LIMS and go to Laboratory/Administrative/Non-Conformance Report

8.8. Refer to the Laboratory Quality Manual for corrective action and handling out-of-control data.

9. SAFETY/HAZARDOUS WASTE MANAGEMENT

9.1. Proper laboratory protection, including lab hood or ventilation system, lab coat, gloves, and safety glasses, is required when working with chemicals and unprocessed samples.

9.2. Refer to the Laboratory Quality Assurance Manual for sample disposal.

9.3. Refer to the Laboratory Health and Safety Manual and Hazardous Waste Management and read MSDS sheets for reagent handling and disposal.

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10. REFERENCES

10.1. EPA 821-R-02-013, *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, 4th Ed. October 2002*

10.2. EPA 821-R-02-014, *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms, 3rd Ed. October 2002*

10.3. DEP SOP BB-36, *Calibration, Use and Maintenance of Mettler Toledo XA105DU Balance*

10.4. DEP SOP FS-1000, *General Sampling*

10.5. DEP SOP TA-07.09, *Pimephales promelas and Cyprinella leedsi Chronic Toxicity Testing Methods*

10.6. DEP SOP TA-07.14, *Menidia beryllina Chronic Toxicity Testing Methods*

10.7. DEP SOP TA-07.15, *Americamysis bahia Chronic Toxicity Testing Methods*

10.8. FDEP Laboratory Quality Assurance Manual

10.9. FDEP Laboratory Health and Safety Manual

10.10. MSDS Information Sheets

APPENDIX OF CHANGES

08/16/2013 Combined SOPs TA-06.20-1.15 and TA-06.21-2.0. Reformatted the combined SOP to produce TA-06.21-3.0.

02/09/2015 Formatted for 508 compliance.

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