The committee agrees that the item should remain assigned to the task group.

WWMA 2023 Annual Meeting: Vince Wolpert, Cannabis Task Group Co-Chair requested that this item remain Assigned. It was also stated that the analysis of moisture loss has been completed, and is being compiled by Craig VanBuren, Michigan. The Cannabis Task Group will be making recommendations regarding moisture loss once that data has been compiled and analyzed. This may include water activity information as well.
Matt Douglas, California Department of Food and Agriculture, Division of Measurement Standards supported an Assigned status, and is looking forward to the report.

The WWMA L&R Committee recommends this item remain Assigned to the Cannabis Task Group.

SWMA 2023 Annual Meeting: The SWMA recommends that this item remained assigned and awaits the upcoming data.

NEWMA 2023 Interim Meeting: Lou Sakin, Holliston MA, representing the Cannabis Task Group – This item is not ready to move forward. Awaiting data from testing results Craig VanBuren, MI.
The committee recommends this as an assigned item.

Additional letters, presentation and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

NET-24.1 Section 3.11. Ice Cream Novelties.

Source:
County of Los Angeles Department of Agriculture Commissioner/Weights and Measures

Purpose:
Add to the procedure and provide technical guidance on the preparation and maintenance of ice water at the required temperature to test ice cream novelties such as ice cream bars, ice cream sandwiches, or cones.

Item Under Consideration:
Amend Handbook 133, Checking the Net Contents of Packaged Goods, as follows:

3.11. FACTORY PACKAGED ICE CREAM AND SIMILAR FROZEN PRODUCTS

Note: The following procedure can be used to test packaged products that are solid or semisolid and that will not dissolve in, mix with, absorb, or be absorbed by the fluid into which the product will be immersed. ~~For example, i~~Ice cream and frozen novelties labeled by volume can be tested using ~~ice~~chilled water ~~or kerosene~~ as the immersion fluid.

Exception: Pelletized ice cream is beads of ice cream which are quick frozen with liquid nitrogen. The beads are relatively small but can vary in shape and size. On April 17, 2009, the FDA issued a letter stating that this product is considered semisolid food, in accordance with 21 CFR 101.105(a). The FDA also addresses that the appropriate net quantity of content declaration for pelletized ice cream products be in terms of net weight.
(Added 2010)

The following volume displacement procedure uses a displacement vessel specifically designed for ice cream novelties such as ice cream bars, ice cream sandwiches, or cones. The procedure determines the volume of the novelty by measuring the amount of water displaced when the novelty is submerged in the vessel. Two displacements per sample are required to subtract the volume of sticks or cups.

The procedure first determines if the densities of the novelties are the same from package to package (in the same lot) so that a gravimetric test can be used to verify the labeled volume. If a gravimetric procedure is used, compute an average weight for the declared volume from the first two packages and weigh the remainder of the sample. If the gravimetric procedure cannot be used, use the volume displacement procedure for all of the packages in the sample.

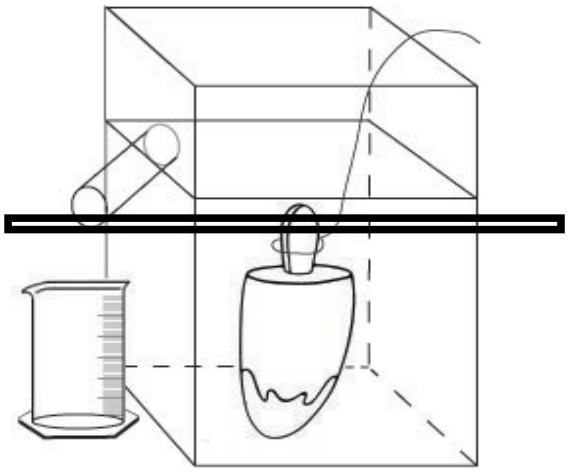
3.11.1. Test Equipment

- A scale that meets the requirements in Section 2.2. "Measurement Standards and Test Equipment"

- Volumetric measures

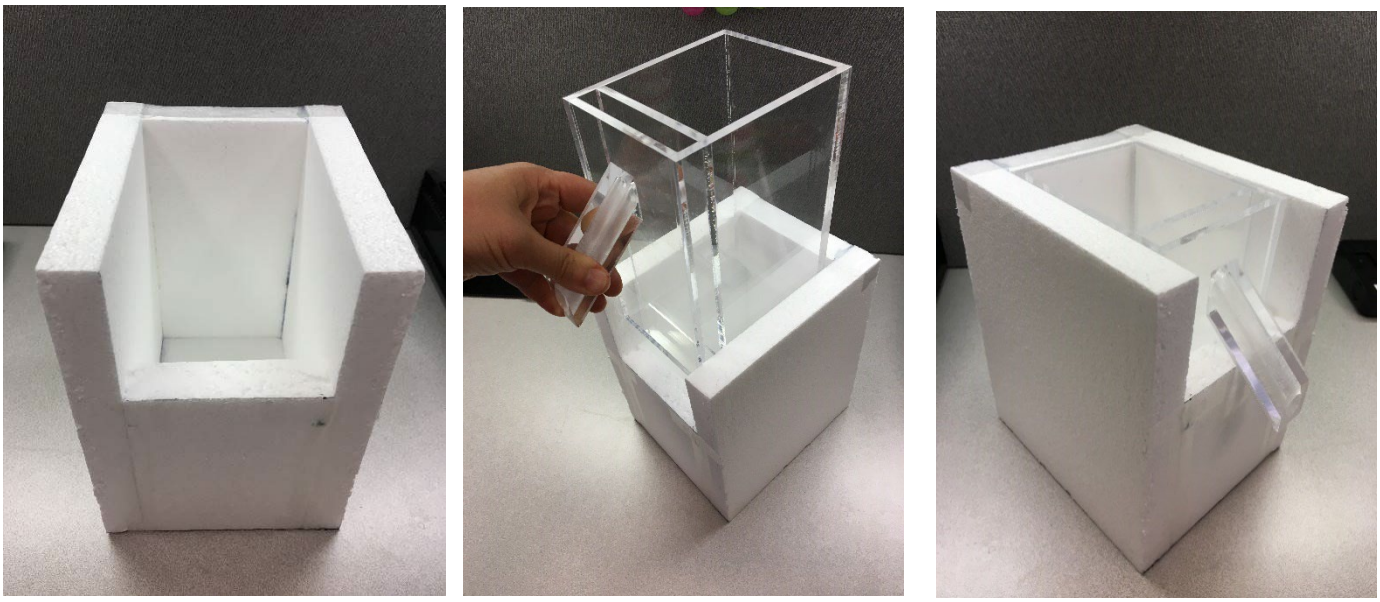
- Displacement vessel with dimensions appropriate for the size of novelties being tested (see Figure 3-7**(a)**, "Example of a Displacement Vessel"). It should include an interior baffle that reduces wave action when the novelty is inserted and a downward angled overflow spout to reduce dripping. Other designs may be used.

Figure 3-7(a). Example of a Displacement Vessel.



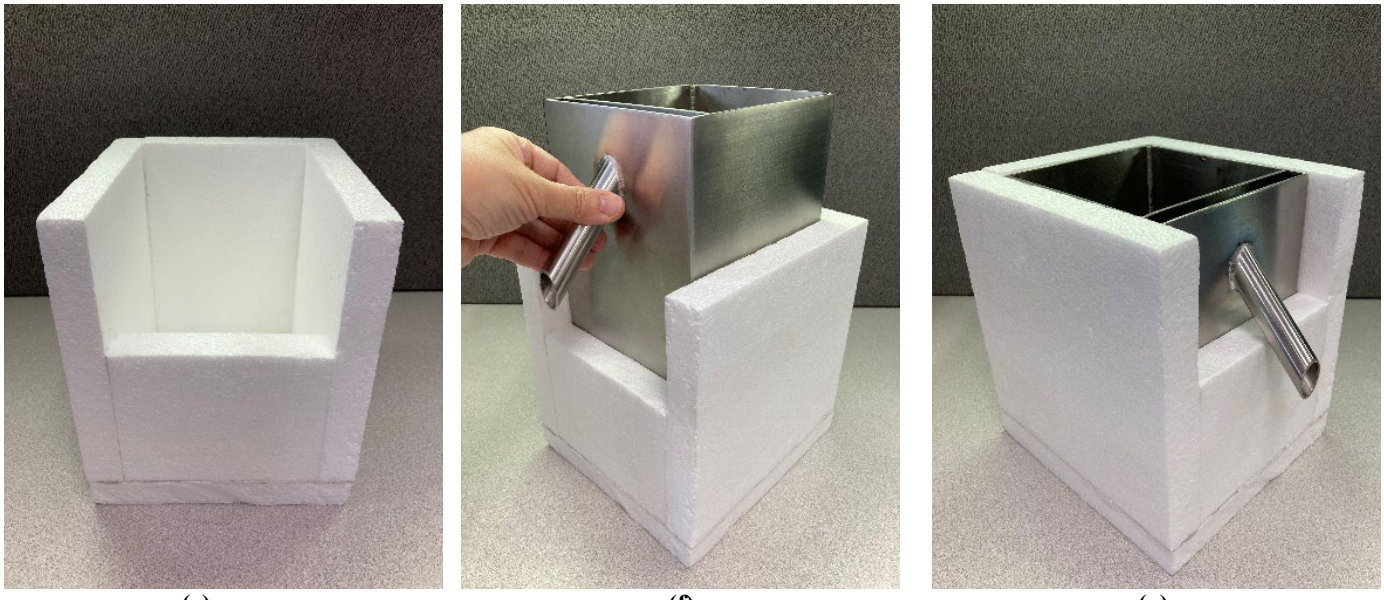
- **Insulation shield**
  - **Styrofoam Board – minimum one-inch-thick**
  - **Styrofoam glue**

Figure 3-7(b)(c)(d). Example of an Insulation Shield with Acrylic Displacement Vessel.



(b) **(c)** **(d)**

Figure 3-7(b)(c)(d). Example of an Insulation Shield with Acrylic Displacement Vessel,



(e) **(f)** **(g)**

Figure 3-7(e)(f)(g). Example of an Insulation Shield with Metal Displacement Vessel

- Thin wire, clamp, or tongs

- **Freezer or ice chest**

- Single-edged razor or sharp knife (for sandwiches only)

- **Prepared, chilled** water **~~/kerosene~~** maintained at 1 °C (33 °F) or below

  ➢ Ice Cubes and Dry Ice

  (Safe Handling and Storage of Dry Ice | OSHA Safety Manuals Safe Handling and Storage of Dry Ice OSHA Safety Manual: https://www.safetymanualosha.com/safe-handling-and-storage-of-dry-ice/)

- **Cryogenic gloves (for handling dry ice)**

- **Preparation container for prepared, chilled water with insulation (for protection from thermal transfer from ambient environment)**

- **Straining device to catch ice cubes and dry ice chunks from flowing into displacement vessel**

- Indelible marker (for ice pops only)

- Level, at least 152 mm (6 in) in length

- Partial immersion thermometer or equivalent with 1 °C (2 °F) graduations and a − 35 °C to + 50 °C (− 30 °F to + 120 °F) accurate to ± 1 °C (± 2 °F)

- A tabletop, laboratory-type jack of sufficient size to hold the displacement vessel

- Stopwatch

3.11.2. Test Procedure

1. Follow the procedures in Section 2.3.1. "Define the Inspection Lot." Use a "Category A" sampling plan in the inspection; and select a random sample.
2. **Place the assembled displacement vessel and insulation shield in a freezer or an ice chest filled with dry ice for at least 30 minutes prior to testing. It is advisable to pre-chill water for use as immersion fluid in a sufficient volume to fill the displacement vessel and to replenish as needed throughout the testing procedures by placing a container of water in a refrigerator or ice chest during the same period.** **Note: The insulation shield should be assembled with dimensions that will cover as much surface area of the displacement vessel and minimal gaps between the seams (see Figure 3-7(b)(c)(d), "Example of an insulation shield with displacement vessel"). The purpose of the insulation shield is to reduce thermal transfer from the ambient environment to the displacement vessel to maintain the immersion fluid at 1 °C (33 °F) or below, as consistently as possible during testing.** Maintain the **ice cream or frozen novelty** samples at the reference temperature for frozen products that is specified in Table 3-1. "Reference Temperatures for Liquids." Place the samples in the freezer or ice chest until they are ready to be tested, and then remove packages from the freezer one at a time.
3. According to the type of novelty, prepare the sample products as follows:
➢ ***Ice-pop**. Mark on the stick(s) with the indelible marker the point to which the ice-pop will be submerged in the **prepared, chilled** water. (After the ice-pop contents have been submerged, remove the novelty to determine the volume of the stick.)
➢ ***Cone**. Make a small hole in the cone below the ice cream portion to allow air to escape.

- **Sandwich**. Determine whether the declared volume is (a) the total volume of the novelty (that is, including the cookie portion) or (b) the volume of the ice-cream-like portion only. If the declared volume is the volume of only the ice-cream-like portion, shave off the cookie with a razor or knife, leaving some remnants of cookie to ensure that no ice cream is accidentally shaved off. Work quickly and return the novelty to the freezer before the sandwich softens.
- **Cup**. Remove the cap from the cup.

4. Prepare immersion fluid to a temperature of 1 °C (33 °F) or below by adding dry ice and ice cubes to water in a preparation container.

For best results, use insulated preparation container to prevent thermal transfer from ambient air. Monitor the water temperature throughout this procedure by placing the thermometer in the center position of the pitcher.

Note: Be cautious while handling dry ice due to its very low temperature (-109 ˚F); handle it with cryogenic gloves to prevent frostbite or freezer burns to skin.

Note: Dry ice (-109 ˚F) is the key ingredient for the chilled water immersion fluid preparation because of its very low temperature. However, while the dry ice lowers the water mixture temperature, the water surface that is in contact with the ambient air in the testing environment is also constantly gaining heat due to heat transfer. To resolve this problem, add ice cubes to the water; the ice cubes will float and form an insulation barrier, thereby, allowing water temperature to be maintained at the required temperature. The approximate ratio to make the prepared, chilled water (can reach as low as 31.6 °F) are as follows:

Water : Dry ice : Ice cubes = 6 parts : 1 part : 2 parts

Note: Monitoring of the temperature of the chilled water immersion fluid should be conducted throughout the testing. At any time that the chilled water temperature exceeds 1 °C (33 °F), a new batch of chilled water at the required temperature will need to be prepared to validate the testing procedure.

5. When the displacement vessel and the insulation shield are both chilled and ready to be used, remove from freezer and set up on testing surface.

6. ~~**4.**~~ Fill the displacement vessel with ~~**ice**~~ **prepared, chilled** water until it overflows the spout. **Use a strainer to prevent ice cubes or dry ice chunks from flowing into the displacement vessel.** Allow it to sit until dripping stops. Raise the displacement vessel **with a tabletop laboratory-type jack** as necessary and place the graduate **of appropriate capacity** beneath the spout.

7.~~**5.**~~ Remove a package from the freezer, determine its gross weight, and record it.

8.~~**6.**~~ Submerge the novelty as suggested until it is below the surface level of the water.

- **Ice-pop**. Use a clamp, tongs, or your fingers to hold the stick(s) and submerge the ice-pop to the level marked in Step 3 of the Test Procedure.
- **Cone**. Shape the wire into a loop, and use it to push the cone, headfirst (ice cream portion first) into the **prepared, chilled** water. Do not completely submerge the cone immediately: let water fill the cone through the hole made in Step 3 of the Test Procedure before completely submerging the novelty.
- **Sandwich or cup**. Skewer the novelty with the thin wire or form a loop on the end of the wire to push the sandwich or ice cream portion or cup completely below the liquid level.

9.~~**7.**~~ Record the total water volume in the graduate.

- For a cone or sandwich, record the water volume as the net volume and go to Step 9.

- For ice-pops or cups, record the water volume in the graduate as the gross volume and go to Step 8.

10.~~8.~~ Refill the displacement vessel with **prepared, chilled** water to overflowing and reposition the empty graduate under the spout. After the cup and novelty contents have been submerged, remove the novelty from the cup to determine the volume of the cup.

- **Ice-pop**. Melt the ice-pop off the stick or sticks. Submerge the stick or sticks to the line marked in Step 3. Record the volume of tare material (i.e., stick) by measuring the water displaced into the graduate. The net volume for the ice-pop is the gross volume recorded in Step 7 minus the volume of the tare materials in this step. Record this volume as the "volume of novelty." To determine the error in the package, subtract the labeled quantity from the volume of novelty.
- **Cup**. Remove the novelty from the cup. Rinse the cup, and then submerge it in the displacement vessel. Small pinholes in the base of the cup can be made to make submersion easier. Record the volume of water displaced into the graduate by the cup as the volume of tare material. The net volume for the novelty is the gross volume determined in Step 7 minus the volume of the tare materials determined in this step. Record this as the net volume of the novelty. To determine the error in the package, subtract the labeled quantity from the volume of novelty.

11.~~9.~~ Clean and air-dry the tare materials (sticks, wrappers, cup, lid, etc.). Weigh and record the weight of these materials for the package.

12.~~10.~~ Subtract the tare weight from the gross weight to obtain the net weight and record this value.

13.~~11.~~ Compute the weight of the labeled volume for the package using the following formula and then record the weight:

Product Density = (product net weight in Step 10) ÷ (the total water volume in Step 7 – volume of tare material in Step 8)

Weight of labeled volume = (labeled volume) × (Product Density)

14.~~12.~~ Repeat Steps 3 through 11 for a second package.
Note: Monitoring of the temperature of the prepared, chilled water should be conducted throughout the testing. At any time that the chilled water temperature exceeds 1 °C (33 °F), a new batch of chilled water at the required temperature will need to be prepared to validate the testing procedure.

Repeat prepared, chilled water preparation and freezing of insulation shield and displacement vessel as needed throughout inspection time period.

15.~~13.~~ If the weight of the labeled volumes in Step 11 for the two packages differs from each other by more than one division on the scale, the gravimetric test procedure cannot be used to test the sample for compliance. If this is the case, use Steps 3 through 8 for each of the remaining packages in the sample to determine their net volumes and package errors. Then go to evaluation of results. If the weights of the labeled volumes agree within one division, continue to Step 14 to test the rest of the sample using the gravimetric test procedure.*

16.~~14.~~ Use Section 2.3.5.1. "Determination of Tare Sample and Average Tare Weight" to determine the Average Used Dry tare Weight of the sample.

17.~~15.~~ Find the Average Product Density by adding the densities of the product from the two packages and dividing the sum by two.

18.~~16.~~ Using the weight of labeled volume determined in Step 11, calculate the Average Product Weight by multiplying the weight of the labeled volume by the average product density.

**Average Product Weight = Labeled Volume × Average Product Density*

19.~~17.~~ Calculate the "nominal gross weight" using the formula:

Nominal Gross Weight = Average Product Weight + Average Used Dry Tare Weight

20.~~18.~~ Weigh the remaining packages in the sample.
21.~~19.~~ Subtract the nominal gross weight from the gross weight of each package to obtain package errors in terms of weight.
Note: Compare the sample packages to the nominal gross weight.
22.~~20.~~ Determine the average package error by totaling all package errors and dividing by the number of packages in the sample.
To convert the average error or package error from weight to volume, use the following formula:
Package Error in Volume = (Package Error in Weight) ÷ (Average Product Density)

3.11.3. Evaluation of Results

Follow the procedures in Section 2.3.7. "Evaluate for Compliance" to determine lot conformance.

Previous Action:

2024: New Proposal

Original Justification:

The existing Handbook 133 procedure does not include guidance on the preparation of chilled water as an immersion fluid at the required temperature [1 °C (33 °F) or below]. As such, it can be difficult to maintain the immersion fluid for a reliable duration at the required temperature [1 °C (33 °F) or below] after the chilled water is poured into the displacement vessel. Water temperature exceeding 1 °C (33 °F) will result in the potential melting or softening of the ice cream or frozen novelty, thus resulting in inaccurate testing data and consequently invalidate or invite challenges to the inspection findings.

Testing Data

Data Analysis and Summary Justification

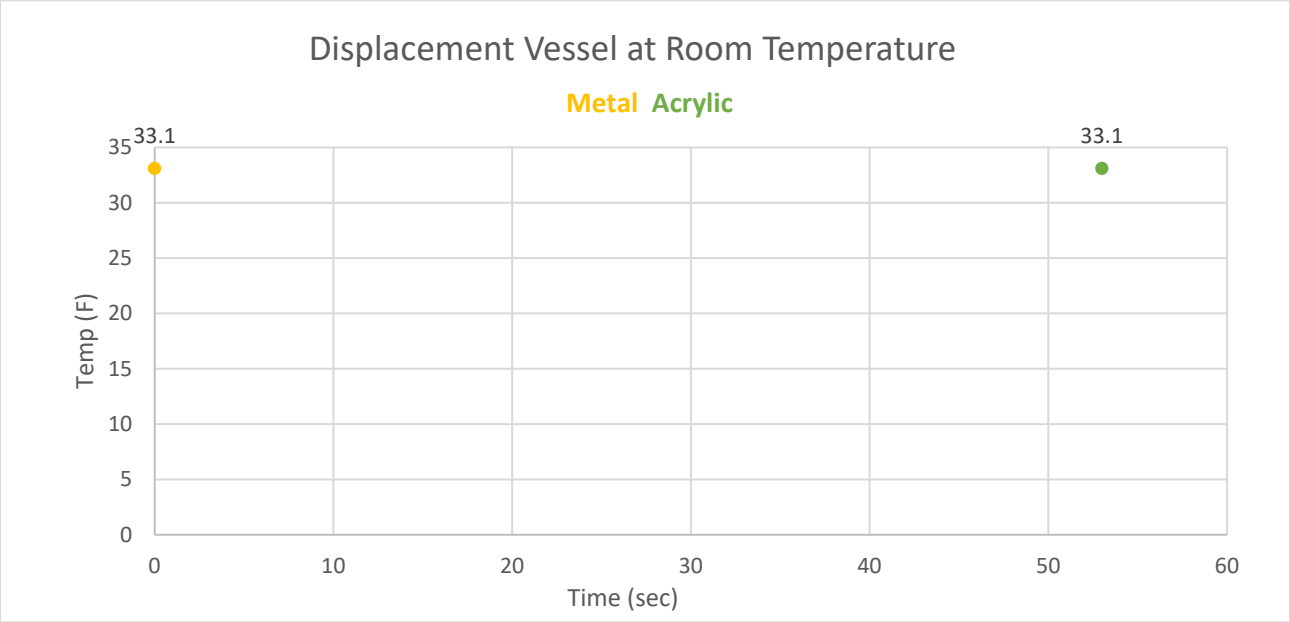
The following data summarizes the test of various materials for displacement vessels for this procedure. Materials considered were acrylic and metal in a variety of settings (ambient, with insulation, with insulation and prior chilling in freezer). These materials were chosen to reflect the variety used in typical, current displacement vessel fabrication.

The acrylic displacement vessel, combined with the insulation shield (with prior chilling), had the most favorable and reliable results for temperature stability. With the insulation and prior chilling, temperature stability in the acrylic displacement vessel significantly increased from 53 seconds of maintaining the temperature below 33.1 ˚F to 93 minutes and 53 seconds.

I. Displacement Vessel at Room Temperature (Without Insulation Shield)

Data below recorded length of time that water temperature stayed below 33.1˚F.

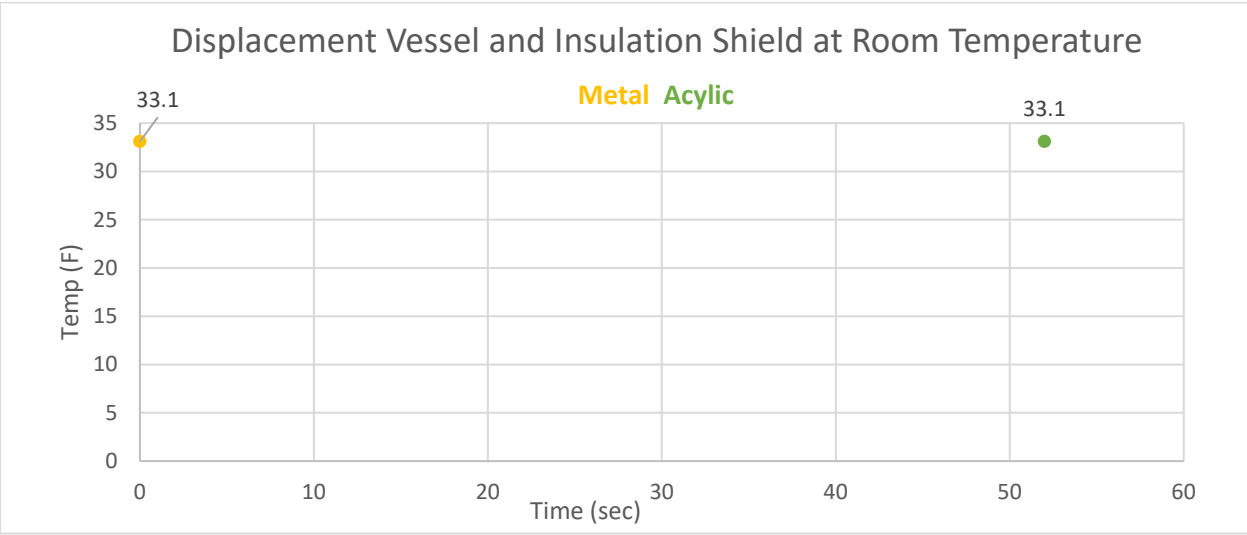
Tester Material	Time (min: sec)
Metal	00:00
Acrylic	00:53



II. Displacement Vessel at Room Temperature (With Insulation Shield)

Data below recorded length of time that the water temperature stayed below 33.1˚F.

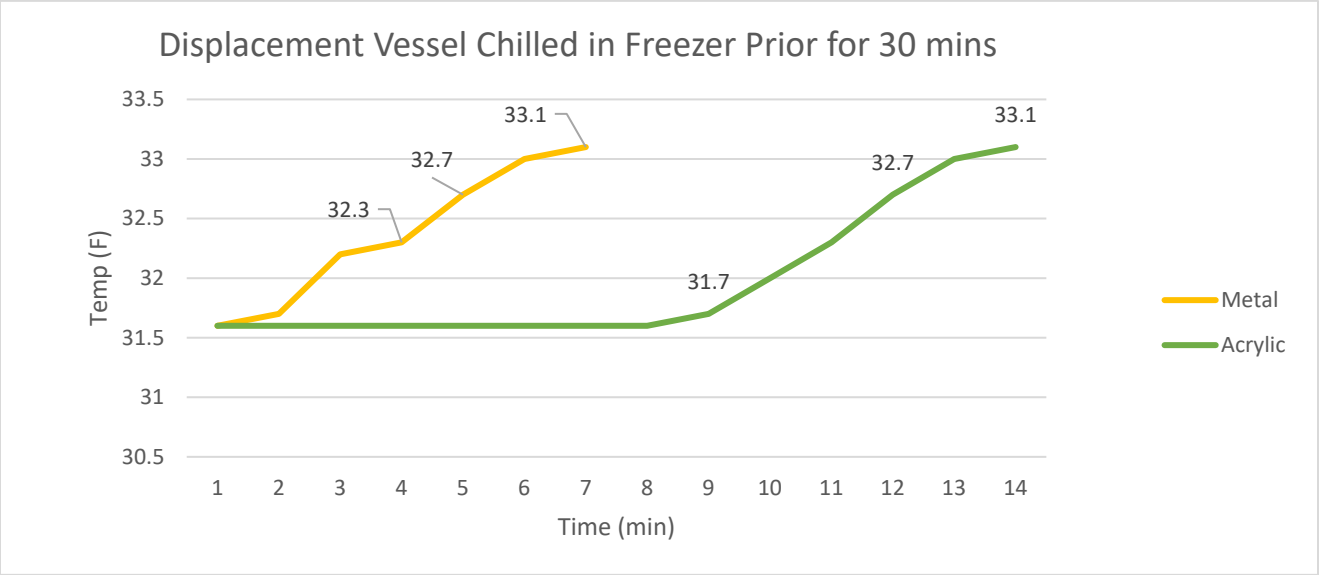
Tester Material	Time (min: sec)
Metal	00:00
Acrylic	00:52



III. Displacement Vessel Chilled in Freezer for 30 minutes Prior to Test (Without Insulation Shield)

Prior to the testing, the displacement vessel was chilled in freezer prior to test for half an hour (30 mins). Data below recorded length of time that the water temperature stayed below 33.1˚F.

Tester Material	Time (min: sec)
Metal	06:30
Acrylic	13:22



IV. Displacement Vessel and Insulation Shield Chilled in Freezer for 30 minutes Prior to Test

Prior to the testing, displacement vessel and insulation shield chilled in freezer for half an hour (30 mins). Data below recorded length of time that the water temperature stayed below 33.1˚F.

Tester Material	Time (min: sec)
Metal	36:16
Acrylic	93:50