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NER Testing Procedure for Liquid Tanks

Please be aware of your testing environment. Ensure tanks are shielded from heat sources, direct air movement, and excessive disturbances of the tank during NER testing which can increase liquid evaporation. Limit movement of the tank during testing.

1. Fill unit to approximately half full. Refer to OPERATION section step 1, 2 & 3 for details.
 - a. Open container that Dewar is in, open the lid, and remove cork/cover/accessories. Lift cork/cover straight up (do not twist). Keep canisters, racks, and other accessories out of the tank during the NER test.
 - b. Fill unit to desired level. Liquid level should never pass bottom of neck tube.
 - i. If you are working with a warm vessel, it is MVE's recommendation to slowly add small amount of liquid to the bottom of unit, and allow it to sit until the liquid nitrogen stops rapidly boiling to cool the unit. Position the vacuum port facing away from the operator or other personnel.
 - ii. Follow established safety practices and procedures for transferring LN2.
 - iii. Fill the vessel with a funnel or transfer line when possible. Transfer using LN2 hose with phase separator or pouring container using a funnel.
 - iv. If you are filling your vessel from a pressurized source, make sure it is a low pressure source (1.52 bar or below).
 - c. Replace cork/cover and allow unit to cool.
 - i. If there is excessive frost or sweating on the outside vessel after the first few hours, it would indicate either a weak or no vacuum. Examine the unit carefully.
2. Allow unit to stand for minimal 24 hours.
3. Weigh unit and record as First Weight, [kg].
4. Allow filled unit to sit undisturbed for another 24 (+/-0.25) hours.
5. Consider the accuracy and resolution of your scale to determine if additional days are required between the first and second weights in order to obtain an accurate NER. Make sure to record number of hours between first and second weight.
6. Weigh second time and record as Second Weight, [kg].
7. Calculate evaporation rate by using equation below. The difference between the first weight and the second weight is the daily evaporation rate in kg. This figure roughly signifies the normal evaporation rate, or N.E.R, [Liter/Day]

$$\frac{(First\ Weight - Second\ Weight) \times 29.6919}{Number\ of\ Hours}$$



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If there is major frost or condensation on outside of container during this time, it would indicate either a weak or no vacuum. Factors such as age of unit, quantity of inventory, ambient environment, shipping condition, and use of accessories, etc. can negatively affect unit NER.