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# Standard Test Method for Liquid Holding Capacity ~~(LHC)~~ of ~~Clay~~ Granular Carriers[1]

This standard is issued under the fixed designation E 1521; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

[1] This test method is under the jurisdiction of ASTM Committee E-35 on Pesticides and is the direct responsibility of Subcommittee E35.22 on Pesticide Formulation and Application Systems.

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## 1. Scope

1.1 This test method is used to determine the liquid holding capacity (LHC) of ~~clay~~ granular carriers.

1.2 The values stated in either SI or inch-pound units are to be regarded as standard. The values given in parentheses are for information only.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* For specific precautionary statements, see Section 5.

## 2. Summary of Test Method

2.1 Incremental amounts of ~~kerosene~~ suitable fluids are added to a known weight of granular carrier. The point at which the granules stick to the sides of the container allows calculation of the LHC.

## 3. Significance and Use

3.1 This test method has been designed principally for ~~clay~~ granular ~~carriers. Its accuracy~~ carriers with ~~other materials has not been determined.~~ LHC greater than 5.0%. The incremental amount of suitable fluid added can be adjusted down as needed for carriers with LHC less than 5.0%.

3.2 This test method is applicable to granules in the range from 4 to 100 mesh (4.75 to 0.150 mm).

## 4. Apparatus and Reagents

4.1 *Buret Stand*.

4.2 *Buret*, 10 to 25 mL, accurate to 0.2 mL.

4.3 *Glass Bottle*, 1 oz (29.6 mL), with poly seal cap (7 by 3.5-cm outside diameter).

4.4 *Glass Bottle*, 8 oz (236.8 mL), wide mouth with poly seal cap.

4.5 ~~*Deodorized Kerosene* (CAS No. 8008-20-6).~~ Suitable Fluids—, dearomatized mixed aliphatic solvents like Exxsol(R) D110 from Exxon Mobile Chemical Company, that boil in the range of 250–275°C and have a specific gravity of 0.80–0.82

4.6 *Balance*, accurate to ±0.1 g.

## 5. Safety Precautions

5.1 Before testing, read the precautionary statements on the product label and material safety data sheet. Take proper precautions to prevent skin contact and inhalation of the fines and vapors. Take care to prevent contamination of the surrounding area. Always wear the appropriate safety equipment and, where indicated, wear respiratory devices approved by NIOSH for the product being tested.

## 6. Procedure

6.1 Weigh 7.0 ± 0.1 g of granular carrier for LHC determination into a 29.6-mL glass bottle.

6.2 From a buret, add ~~kerosene~~ a suitable fluid as follows: 0.5-mL increments until 2.0 mL is reached, ~~shaking~~ or the carrier meets one end point conditions. Shake between increments by hand or mechanical shaker until completely absorbed. (A few sharp taps with the heel of the hand may be necessary to break up a saturated portion.) Shaking should not exceed 2 min.

6.3 After the first 2.0 mL is added, decrease the increments to 0.2 mL and proceed as described in 6.2 until the end point is reached. The end point is indicated by two or more of the following:

6.3.1 C~~lay~~rrier darkens or appears wet.

6.3.2 Granules cease to be free flowing.

6.3.3 Granules stick to sides of bottle.

6.3.4 Granules stick to bottom of bottle when inverted slowly.

6.4 An alternate procedure is to use 50 g of ~~clay.~~ carrier. Follow the instructions given in 6.1-6.3, but use the 236.8-mL jar. Add an initial 15 mL of ~~kerosene~~ fluid in 5-mL increments, as described in 6.2. Thereafter, follow the steps outlined in 6.3.

6.5 For carriers with low LHC the initial increments of fluid added may have to be adjusted down so the end points are not exceeded.

## 7. Calculation

7.1 Calculate % LHC as follows:

$$\% \text{ LHC} = \frac{(\text{g kerosene} \times 100)}{(\text{g granules}) + (\text{g kerosene})} \quad (1)$$

$$\% \text{ LHC} = \frac{(\text{ml fluid}) \times (\text{fluid specific gravity}) \times (100)}{(\text{g granules}) + ((\text{ml fluid}) \times (\text{fluid Specific gravity}))} \quad (1)$$

7.2 Round the % LHC to the nearest whole number.

7.3 Use Eq 2 as the alternate calculation to provide an LHC value as if the liquid (kerosene) density were 1.0:

$$\frac{(\text{g kerosene}) \times 1.25 \times 100}{(\text{g granules}) + [(\text{g kerosene}) \times 1.25]} = \% \text{ LHC (density 1.0)} \quad (2)$$

7.4 The value reported should note the formula used.

## 8. Disposal of Sample

8.1 Store all materials in a safe manner after testing, and dispose of used material in accordance with the product label directions and material safety data sheet.

## 9. Keywords

9.1 formulations; granular carriers; liquid holding capacity; pesticides