Designation: D 3224 – 02

Standard Test Method for Water Solubility of Auxiliary Solvent for Wood Preserving Solutions[1]

This standard is issued under the fixed designation D 3224; 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. Scope

1.1 This test method covers the determination of the water solubility of an organic solvent used as an auxiliary or cosolvent for pentachlorophenol or other biocides in wood preserving solutions. Conversely, the solvent solubility in the water may also be determined. Auxiliary solvents are used to either formulate high concentrations of penta or other biocides for shipment of liquid concentrate for subsequent dilution with an oil, or to boast the biocide solvency of the petroleum solution when mixed for treating.

1.2 *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.*

2. Referenced Documents

2.1 *ASTM Standards:*

D 1193 Specification for Reagent Water[2]

D 3225 Specification for Low-Boiling Hydrocarbon Solvent for Oil-Borne Preservatives[3]

3. Summary of Test Method

3.1 Fill the 100 mL graduated cylinder with 50 mL of water and 50 mL of the solvent. After 10 inversions, allow to stand for 30 min. Then, record the volume at the interface.

4. Significance and Use

4.1 Water solubility of auxiliary solvents is important in preventing emulsions at the treating plant, and to prevent precipitation of the biocide from solution due to loss of solvency (see Specification D 3225).

5. Apparatus

5.1 *Graduated Cylinder*, 100-mL, with glass stopper.

6. Reagents

6.1 *Purity of Water*—Unless otherwise indicated, references to water shall be understood to mean reagent water conforming to Specification D 1193.

7. Procedure

7.1 Bring the water, solvent, and glassware to temperature equilibrium at 75 ± 1°F (23.9 ± 0.5°C).

7.2 Add 50.0 mL of water to the cylinder.

7.3 Add solvent to the 100-mL mark.

7.4 Stopper the cylinder and invert ten times, and allow to stand 30 min.

7.5 Read and record the volume at the interface between the water and solvent layers.

8. Calculation

8.1 In most cases the auxiliary solvent will be lighter than water, will float, and will be the upper layer in this test. If heavier than water, reverse the definitions of calculations.

8.2 If the volume at the interface is more than 50.0 mL, the solvent is soluble in water. Calculate the percent solubility, *S*, as follows:

$$S = (A - 50.0) \times 2 \quad (1)$$

where:

A = observed interface volume, mL.

8.3 If the volume at the interface is less than 50.0 mL, the water is soluble in the solvent. Calculate the percent solubility, *S*, as follows:

$$S = (50.0 - A) \times 2 \quad (2)$$

9. Precision and Bias

9.1 *Precision*—No information can be presented on the precision of the procedure because no research has been performed to determine repeatability or reproducibility. However, the results of this test should not be considered suspect unless duplicate determinations result in a difference of greater

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[2] *Annual Book of ASTM Standards*, Vol 11.01.

[3] *Annual Book of ASTM Standards*, Vol 04.10.

than one (1) percentage point (as expressed in the result of the calculation in Section 8).

9.2 *Bias*—No information can be presented on the bias of the procedure because the results are dependent on the properties of the solvent being tested.

10. Keywords

10.1 auxiliary solvent; preservative; water solubility