NOTICE OF VALIDATION

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ASTM B732-84(R89), adopted on 11 March 1986 has been reviewed and determined to be current.

Custodians:
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AMERICAN SOCIETY FOR TESTING AND MATERIALS
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Standard Test Method for Evaluating the Corrosivity of Solder Fluxes for Copper Tubing Systems[1]

This standard is issued under the fixed designation B 732; 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.

ε1 NOTE—Keywords were added editorially in October 1993.

1. Scope

1.1 This test method describes an accelerated test to evaluate the corrosivity of solder fluxes (Refs 1–5[2]) that are used in the assembly of copper-tubing system joints. The test involves exposure of copper tube half-sections with pre-positioned flux to a controlled elevated temperature/humidity environment.

NOTE 1—Various fluxes may behave differently to temperature from the corrosion standpoint. The ideal test must incorporate a spectrum of temperatures ranging from overheated, resulting in charring, to slightly warmed, which is insufficient to melt the flux. Attack may occur either under the flux puddle or at its periphery with pitting being the dominant mode of attack. The attack has been observed extending as far as 12 in. (300 mm) from the joint in a "u" or "v" shaped flux puddle in horizontal tube failures. This test procedure is designed to produce a temperature spectrum on a single specimen to facilitate speed of testing.

1.2 This test method is the product of a laboratory study designed to investigate the role of fluxes in the corrosion failure of plumbed systems.

1.3 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

1.4 *This standard does not purport to address all of the safety problems, 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 hazards, see 6.7.

2. Referenced Documents

2.1 The following documents of the issue in effect on the date of material purchase form a part of this specification to the extent referenced herein:

2.1.1 *ASTM Standards:*

B 88 Specification for Seamless Copper Water Tube[3]

B 88M Specification for Seamless Copper Water Tube [Metric][3]

3. Significance And Use

3.1 All tubing is assembled with a system of joints, many of which are soldered. Solder-joint efficiency is dependent on the effectiveness of the solder flux. Solder fluxes are employed to remove residual traces of oxides, to promote wetting, and to protect the surfaces to be soldered from oxidation during heating. Because fluxes must be chemically reactive, they should be used sparingly on cleaned surfaces to facilitiate rapid soldering. Excessive amounts may lead to continuing corrosive action (to a point of total destruction) long after the joint has been completed.

4. Apparatus

4.1 *Syringe*—A removable plunger 1 mL minimum volume syringe is required.

4.2 *Bunsen Burner*, standard 13 mm with temperature-monitoring capability.

4.3 *Adjustable Stand* with a 2 to 3° incline.

4.4 *Stereomicroscope.*

4.5 *Humidity Cabinet* capable of 90 % humidity at 40 to 60°C (104 to 140°F).

5. Test Specimen

5.1 The test specimen shall be ¾ in. nominal size (see Note 2), H temper (drawn), Type M copper water tube (Specification B 88). The specimen shall be approximately 12 in. (300 mm) long and cut length wise along the equator. The saw cut is approximate. The cut edge must be smooth enough to glide a syringe barrel along while applying flux. No coolant shall be used during cutting. No subsequent cleaning of the specimen is permitted prior to testing.

NOTE 2—Alternatively, the test specimen shall be 22 mm nominal size, H temper (drawn), Type C copper water tube (Specification B 88M).

6. Procedure

6.1 Fill the syringe with an appropriate flux by means of a vacuum pump as shown in Fig. 1.

6.2 Disperse flux from the syringe approximately ⅛ in. (3 mm) below each of the saw cut longitudinal edges for the entire 12 in. (300 mm) length along the inner tube surface. Approximately 1 mL of flux is used per specimen.

6.3 Place the test specimen on a stand at a 2 to 3° angle with the end to be heated approximately 4 in. (100 mm) above the burner (Fig. 2). The angle will allow the flux to flow to the cool end (Fig. 3).

6.4 Heat the specimen to 450°C (842°F) in 21 ± 1 s. Temperature may be monitored by attaching a thermo-

[1] This test method is under the jurisdiction of ASTM Committee B-5 on Copper and Copper Alloys and is the direct responsibility of Subcommittee B05.06 on Methods of Test.

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[2] The boldface numbers in parentheses refer to the list of references at the end of this method.

[3] *Annual Book of ASTM Standards*, Vol 02.01.