



#### INTRODUCTION

One of the many factors affecting life and operating efficiency of vapor-cooled tubes is the purity of the water in the cooling system. If impurities are present, "foaming" may occur which will inhibit transfer thereby lowering the cooling efficiency of the system. This bulletin lists impurities which may cause foaming and describes how to perform a foaming test.

#### FOAM-PRODUCING IMPURITIES

Impurities which most frequently produce foaming are:

- (1) Cleaning-compound residue
- (2) Detergents
- (3) Joint-sealing compounds
- (4) Oily rust preventives in pumps and other components
- (5) Valve-stem packing
- (6) Impurities in tap water

#### FOAMING TEST

Make this test after each water change, or system cleaning or modification.

#### Equipment

The following items are needed to perform this test:

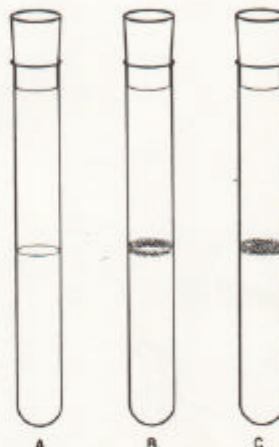
- (1) 1/2" x 4" glass test tube with rubber stopper
- (2) 1-pint glass or polypropylene bottle with cap

#### Procedure

- (1) Fill cooling system with water and circulate until thoroughly mixed (about 30 minutes).
- (2) Drain sample of water into bottle and cool to room temperature.
- (3) If water sample stands for more than one hour, slowly invert capped bottle about 10 times. Avoid shaking bottle as this will create air bubbles in water. (When water is static, foaming impurities tend to collect at surface. This step mixes sample without generating foam.)
- (4) Using sample water, rinse test tube and stopper three times.
- (5) Half fill test tube with sample water.
- (6) Shake test tube vigorously for 15 seconds.

(7) Let sample stand for 15 seconds.

(8) Observe amount of foam remaining on top of water and compare with Sketches A, B, and C (below).



#### Evaluation

A completely foam-free water surface and test tube wall indicates no foam-producing impurities (see Sketch A).

If the water surface and test tube wall are partly covered with foam, but a circle of clear water appears in the center, the impurity level is temporarily acceptable (see Sketch B). A second test should be made in about one week.

If the foam layer completely bridges the inside of the test tube, the system should be flushed and cleaned (see Sketch C).

#### Cleaning

Proper cleaning and flushing procedures are outlined in Application Engineering Bulletin AEB-32.