

SUBJECT CAPPING PROCESS

SUPERSEDED DATE 1/ 9/43

Supersedes former 24-11-1.

To obtain satisfactory results on the water immersion and torsion tests, the following specifications must be maintained.

### 1. CAP FILLING

The cap filling machine for caps #3933 (small) and #3907-A (large) must be cleaned thoroly at least twice a week using a new or fresh cement after each cleaning. Particular attention should be paid to the inside of the cement container at the bottom outlet. Semi-dry or hard cement will accumulate in this place and eventually will retard some of the flow regardless of the stroke of the cap filling plunger and the applied air pressure. Insufficient cement in caps is a definite cause of torsion failures. The amount of cement flowing into the caps depends upon the applied pressure, the stroke or displacement the plunger, size of plunger and plunger orifice, the speed of the machine, and the viscosity of the cement.

### 2. CEMENT WEIGHT PER CAP

The following weight limits can be maintained with the present balance supplied to the cap filling machine operator for that purpose. In determining the weight of the filled caps, no less than 10 caps of either size should be placed on the balance. The number of filled caps can be balanced against the same number of empty caps on this balance, thereby obtaining the weight of the cement directly. The cement weight in the caps should be determined at least once an hour thruout the cap filling operation because of the steady decreasing amount of cement in the cement container.

- a. For large caps such as #3907-A - 0.37-0.41g/cap
- b. For small caps such as #3933 - 0.14-0.16g/cap

### 3. STORAGE OF FILLED CAPS

Freshly filled caps must be exposed to normal room temperature for a period not exceeding 2 hours at which time they should be placed in a humidor containing a saturated atmosphere of alcohol. The 2 hour exposure before storage allows the capping reel operator to take caps directly from the cap filling machine operator or the humidor for immediate use. Otherwise the caps would contain an excessive amount of alcohol and an "appearance" (quality) shrinkage would result, also soldering difficulties and some possible torsion test failures may be encountered. Caps that have been removed from the humidor after the 2 hour exposure period should not be returned to the humidor for re-softening for future use. Filled caps are not to be used sooner than 2 hours after filling nor more than 24 hours after filling. A minimum amount of filled caps should be stored in humidor for shut-downs exceeding 24 hours after filling.

\* General revision.



STANDARDIZING  
 NOTICE

34-24-3A

SUBJECT CAPPING PROCESS

SUPERSEDED DATE 7/8/44

4. TOP CAP TEMPERATURE CONTROL: Actual tests have indicated that the capping reel temperature of cement should not fall below 200°C. nor exceed 220°C. with present cement weight limits. Inasmuch as a thermocouple indicating temperature device is awkward to apply to the rotating reel, a color code for frequent temperature control has been found very satisfactory. This temperature control is very simple and can be applied by one with fair ability for distinguishing the colors brown, green, and tan. With specified cement weight maintained, the following conditions must be adhered to rigorously.
- a. Remove caps from tubes immediately after withdrawing tubes from reel and note color of cement in cap and on tubulation of glass dome.
  - b. Any green coloration whatsoever in cement of cap or tubulation indicates a low temperature - stop capping and notify foreman immediately.
  - c. A tan or light brown color indicates a satisfactory temperature.
  - d. A definite brown or dark brown indicates excessive temperature - stop capping and notify foreman immediately.
  - e. Satisfactory adherence of cement to glass bead or dome indicates good cement flow properties, especially when area on glass dome directly below rim of metal cap is completely covered. Otherwise, conditions indicate a hard or too dry a cement and more recently filled caps should be used immediately. Cap (before filling), glass bead and dome must be free from oil and soldering flux before any adhesion, whatsoever, takes place.
  - f. Temperature control and adhesion characteristic samples should be taken at least every 2 hours and more frequently in the starting-up period.

5. CAP TORSION TEST - Using Model No. 786D Tester (44-5-2)  
 Every other day make following cap immersion torsion test on at least 10 tubes (random selection) from previous 2 days production: \*\*Lancaster M & P Section shall test 5 tubes per cap type per capping reel each week. (See exception §below). Tubes shall be tested to destruction within limitation of test equipment. Electrical reject tubes shall be used provided they meet all other mechanical specifications. When production is less than 100 per week 10% or a maximum of 5 tubes per week are to be tested.

Assembled tubes shall be completely immersed in water at 50°C. for 18 hrs. then cooled at room temperature for 1 hour. Caps shall be capable of withstanding following torques without loosening:

**	Customer	§Factory
	Min.	Min.
	1.5	2.0
	3.0	4.0
		0.566" dia. and smaller
		0.800" dia.

If torsion test failures exceed 10% of number tested, repeat test on at least 10 more. If retest results (more than 10% failures) do not permit acceptance of product, treat the two days production lot as follows:

Make a random selection of at least 20 tubes and pass through capping reel, so that caps are heated to a temp. between 200°C. and 220°C., as specified in Sect. 4. Then subject these tubes to prescribed immersion and torsion test. If failures exceed 10% of number tested, the two days production must be recapped.



SUBJECT

CAPPING PROCESS

SUPERSEDED DATE

5. CAP TORSION TEST (Cont)

If failures do not exceed 10%, heat remainder of questionable production in same manner. Make a random selection of at least 20 more tubes and test again. If torsion test failures in latter test do not exceed 10% release 2 days production. If failures exceed 10%, recap all tubes. All tubes used in immersion test must be recapped and then shall be considered as regular product. Government inspection requires a cap immersion test, described above. Not more than 10% of tubes (taken at random), so tested, shall fail. Therefore, such tubes shall be subjected to a cap torsion test immediately after capping, equivalent to the cap torsion test after immersion, on starting up and on changing to a different size cap.

§ Includes all Lancaster tubes except 207, 891, 891R, 892, 892R, 204A, 849, 861, and receiving tubes.

ENGINEERING SECTION  
 STANDARDIZING