

The procedures for filling, threading, heat treating, and testing bases are described in this standardizing notice.

The procedure for making No. 6 basing cement is described in Stdzg. Not. 34C-C-6.

1. BASE FILLING

No. 6 basing cement may be used in the base filling machines as soon as it is made, should be consumed within 24 hours, and should not stand over 48 hours. Any cement stock held over night or longer must have alcohol dampened cloths or a small amount of alcohol placed upon it and be tightly covered. The alcohol will draw some of the resins to the surface and the batch should be remixed for 5 to 10 minutes before use.

Under no circumstances should any alcohol be added to the mixed cement other than for the above reason or the small quantity necessary to lubricate the nozzles of the base filling machines. To get a clean cut off of the cement from the nozzle it is necessary to have an adequate flow of alcohol onto the filling nozzle. Use only sufficient alcohol to give a smooth glossy finish on the exposed surface. An excess of alcohol may cause the cement to drop down in the base.

When transferring cement from the can to the base filling machine, use a clean spoon or other suitable utensil. Do not use gloves.

The amount of cement included in the bases should be sufficient to cover the seal bead but not enough to run into the flare tube. The weight of cement per thousand tubes is specified for each base in the tube construction data (Section 3-1K, 3-1P, etc.). **The weights of cement for receiving tube size bases are given below.

The weight of cement used should be checked at least once a day. This should be done soon after the bases are filled due to a slight variation caused by the alcohol evaporating.

**The following applies to receiving tube size bases only

Bulb Type	Base Shell Type		Weight of Cement	
	No.	Description	Grams/Base	Lb./1000
T9 with button stem (Red Line, etc.)	65	Short intermediate	0.90-1.20	2.3
GT	37	Intermediate	1.50-1.90	3.8
G	08,29	Small	1.85-2.30	5.6
GT	40	Metal shell	2.55-2.95	6.1
Old style G	02,06, 33,50	Medium	3.00-3.85	7.6

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SUPERSEDED DATE 3/22/44

1. BASE FILLING (Cont'd.)

To allow for evaporation of part of the alcohol from the filled bases, they should not be used before a period of 4 hours and should be used within 24 hours before excess evaporation takes place which increases the viscosity of the cement with a corresponding decrease in plasticity. To assist in keeping within these time limits the base trays may be marked with the time the bases were filled.

Base filling machine parts that come in contact with the cement should be thoroughly cleaned at least twice a week.

2. KEEPING FILLED BASES OVERNIGHT AND WEEK ENDS

It should be the usual practice to turn unused filled bases open end down and cover with another tray for keeping overnight.

Considerable judgment should be exercised in keeping filled bases. If too much alcohol evaporates the cement will harden, improper fitting of the base to the tube may occur, and the rate of cure is delayed causing blistered bases when sufficient heat is used to dissipate the green color. If too much alcohol is present the rate of cure will be accelerated causing a very puffy cement with decreased holding power. The length of time which filled bases can be successfully held depends on weather conditions and conditions of the atmosphere in which they are stored. If the conditions are such as to cause rapid evaporation extra precautions must be taken especially in handling filled bases which must be kept over Saturday and Sunday or over an extended shut down period, 48 hours being considered a maximum safe limit and should be used for week ends only, the 24 hour period being the limit during the week.

3. BASE THREADING

The lead wires are straightened and positioned with tweezers. Bases are threaded as shown in the tube construction data or in Stdzg. Notice No. 24-1-2. Base threading is performed as a separate operation or in conjunction with basing at the machine depending upon the manufacturing process used. In the former case the tubes are tested for shorts and open circuits after threading, and in the latter after basing. ***

4. BASE CEMENT TEMPERATURE INDICATOR

Malachite green has been used as a means of determining the baking temperature of the cement. It is known however from laboratory tests as well as factory experience that the decomposition of the indicator does not always mean a well baked or evenly heat treated product for many types of cement. Consequently, it was thought that more positive means of checking temperatures should be used. The temperature indicating device described in Stdzg. Notice No. 44-3-7, consisting of a thermocouple, cold junction loads, millivoltmeter and calibration curve serve that purpose.

***Indicates a deletion



5. MEASURING BASING TEMPERATURE

A temperature check at the front of the base is sufficient for ordinary work.

The end of the thermocouple is placed at the center of the cement both horizontally and vertically after the base is put on the tube and before being put into the machine. The maximum temperature is observed altho it is desirable to note the temperature at each position since the best heating condition is a gradual rise in temperature from minimum. Too rapid an application of heat in the first stages of baking will greatly increase the porosity thus causing crumbling.

At the present speed of the basing machines, optimum results will be insured with a cement temperature of 150°C. The time of heating and cooling will vary for the different type tubes and is as follows:

<u>Tube Type</u>	<u>Heating Time</u>	<u>Cooling Time</u>
8013A)		
830B)	5-1/2 min.	3/4 min.
808)		
803)		
814)	6-1/2 min.	1-1/3 min.
860)		
813	3-1/2 min.	1 min.
8025	5-1/2 min.	1-1/2 min.
930 & 931	4 min.	3/4 min.
Cathode Ray(All types)	10 min.	1-1/2 min.

The temperature is limited by the Bakelite base shell which blisters at approximately 190°C. The cement should be cooled to at least 90°C before the tube is removed from the machine.

NOTE - Good cement puffs and swells when heated, whereas if it is too old, it merely shrinks. If in doubt run a few bases without tubes and note how the cement acts.

6. SOLDERING

The method of soldering is described in Stdg. Notice No. 34-24-5A.

7. BASE TORSION TEST

The strength of the cement should be checked periodically with the base torsion testing machine described in Stdg. Notice No. 44-5-1.



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SUPERSEDED DATE 7/11/47

7. BASE TORSION TEST (Cont'd)

If every batch of cement is tested before being used for base fillings, there should be little question of cement quality. Possibly causes of failure would include improper temperature conditions, poor shoulders, too much or not enough cement, etc. Improper temperature is most likely to exist at starting up periods especially in the morning.

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Tubes to be tested are selected at random, one tube every two hours of reel operation, first tube of initial reel operation, and first tube of type change over. However, if a tube failure should occur, additional tubes will be tested until trouble is cleared up. Cut off load wires before placing tube on basing reel. Tubes are removed hot from basing reel in second air position at end of index, and base inserted immediately in adapter socket of torque machine (Ref. 44-5-1), which has previously been adjusted to zero reading. Apply torque of 30 inch-pounds for all types except Power tube types on which use torques of (1) 35 inch-pounds for medium micanol bases, (2) 40 inch-lbs. for medium bakelite or metal bases and (3) 45 inch-lbs. for jumbo or large bases. If union stays intact, reel operation and basing cement are considered satisfactory. A daily record sheet should include, tube type, date, time, number inch pounds applied and standard test torque, also base filling time, basing time, color and condition of cement. In the event of a failure the condition of the firest, bulb shoulder and mechanical condition of the basing machine should be noted with the idea of recording the probable cause or suggesting changes or improvements in the present conditions.

Basing reels should be equipped with gas and air flow meters enabling operators to maintain constant settings for each tube type, thus eliminating inconsistencies in starting-up periods.

* 8. BASE IMMERSION TEST

This test shall be performed on tubes and in the manner described below, to provide a control check over the quality of base-cement-bulb adherence under humid conditions and to periodically evaluate the adequacy of all other control tests covering the basing processes.

The base immersion test applies to all tube types (note 1) which are dependent (a) upon phenolic resin basing cements and (b) upon a curing (baking) process to (c) mechanically unify the base and bulb assembly.

The test consists of subjecting tubes of kind, quantity and frequency of sampling, as covered below, to a complete immersion in water at 50°C for a continuous period of 18 hours, thereupon removed and, after cooling to room temperature for one(1) hour plus such self-drying as may occur, the base and bulb assembly shall be capable of withstanding a base torsion test up to and including the following applied torques: (A loosening of a base up to stated torque limit (inclusive) shall be considered a basing defect.)



8. BASE IMMERSION TEST (Cont'd)

<u>Base Specification Identity</u> (Bogie Diameter)	<u>Factory Limit</u> (Minimum)	<u>Customer Limit</u> (Minimum)
1.5" bases or smaller (note 2)	40 in.lbs. (note 3)	20 in. lbs.
Bases over 1.5"	60 " "	40 " "

- Note 1. Excludes Lancaster types 207, 891, 891R, 892R, 204, 849 and 861.
- Note 2. Except types 927, 934, 1643, which have a customer minimum of 20 in. lbs. after a dry torsion test and factory minimum of 7 in. lbs. after an immersion test.
- Note 3. Except crimped-metal shell-wafer bases, which have same factory minimum customer minimum of 20 in. lbs. A failure of the crimping is considered a basing failure.

The tubes to be immersion tested shall be representative of the regular production tubes covering from each basing reel. Non-salvageable shrinkage tubes may be used, provided that they are mechanically satisfactory for immersion and base torsion test purposes.

A sample of tubes from each basing reel and at least for each base type (black bakelite, micanol, ceramic, crimped-metal and shell-wafer bases) shall be provided and immersion tested by the assigned quality control function, in accordance to the following frequency schedules and sampling plans:

Schedule	Immersion Test Frequency (At least)	First Sample			Second Sample Size	Combined Sample		
		Sample Size	Acceptance Number	Rej. No.		Sample Size	Acceptance Number	Rej. No.
A	1 sample wkly.	5	0	2	5	10	1	2
B	2 " "	5	0	2	5	10	1	2
C	1 " Daily	Use Single Sampling				10	1	2
D	1 " monthly	5	0	2	5	10	1	2
E	1 " "	2	0	1	0	2	0	1

NOTE: Acceptance and rejection numbers pertain to the number of loose base defects found in a sample. If a rejection number is equaled or exceeded, the test shall be considered as having failed base immersion test requirements.

Schedule A: Applies unless otherwise stipulated.

Schedule B: Applies to types having cemented-on top caps or side contact caps.

Schedule C: Becomes applicable and supersedes schedules A or B immediately upon the failure of a regular basing control immersion test. This schedule C is then to continue until a sequence of three (3) daily samples conforms to immersion test requirements, which indicates that satisfactory basing conditions have been reestablished and which allows the return to normal schedules A or B, whichever is applicable.

Schedule D: Applies when months production is 51 to 500 units.

Schedule E: " " " " " 10 " 50 "



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SUPERSEDED DATE

8. BASE IMMERSION TEST (Cont'd)

Any immersion test failing to pass on its first sample shall be reported immediately to the factory supervising engineer and to the Quality Control Department representative, in order that expedient remedial action can be taken.

Any test failing to pass the combined sample (first plus second sample) requirements shall be reported as above for reason given, but shall also be reported to the factory quality man, who shall institute the required hold-up and associated action in accordance with procedures for handling questionable product.

A second sample, when required, should be taken before correcting the basing process or from the same product originally represented by the first sample, so as to more accurately estimate basing quality of prior made product.

Tests run to isolate passable (acceptable) sub-lots of with-held product, or after correcting the basing process and to verify same, shall be in accordance with the single sampling plan of schedule C.

A weekly summary of base immersion test results, prepared by the assigned quality control function, shall be forwarded to the Quality Control Department Manager and other parties concerned therewith. If acceptance number is not exceeded the lot from which the sample was taken is considered satisfactory and is passed. If monthly production is less than ten units base immersion testing is not required. If acceptance number is exceeded on the first sample, but not the rejection number, a second sample is taken.

STANDARDIZING SECTION
ENGINEERING DEPT.