

## ELECTROLYTIC CAPACITORS TESTING PROCEDURES

### 1. GENERAL

1.01 This section describes methods of testing electrolytic capacitors and associated wiring by means of the No. 73A test set and standard 600-ohm transmission measuring equipment, when requirements are shown on circuit drawings. Section 032-110-701 covers the procedures to be followed for those cases where the requirements are not shown on the circuit drawings.

1.02 This section is reissued to incorporate material from the addendum in its proper location.

1.03 The tests are made in accordance with the conditions specified in the electrolytic capacitor test requirements which appear on the circuit drawings. These requirements specify the allowable 1000-cycle transmission losses for the capacitor alone or for the associated fuses and wiring and indicate the points at which the test connections must be made.

1.04 The testing apparatus or equipment under test may be damaged if the order of procedure stated in this section is not followed. This is particularly true where the circuit potential is above 60 volts and where the capacitors under test are of high capacitance.

1.05 When making connections to a polarized electrolytic capacitor or to any circuit containing a polarized electrolytic capacitor, extreme care should be used to see that the connections are correctly made with respect to the polarity of the capacitor. Reversal of polarity or application of ringing or ac will not only damage the capacitor but also may cause injury to personnel or damage to equipment if the capacitor should explode. The positive and negative terminals of a capacitor may be designated, respectively, POS and NEG, + and -, or by colored markings: red for positive and/or black or white for negative. Polarity of the terminals may also be designated by numbers or symbols which can be interpreted by referring to information on the case of the capacitor or in the circuit schematic. In every case, the proper manner of connection should be determined before making connections to a capacitor or to a circuit containing a capacitor.

Caution: Capacitors may retain their charge for some time after being disconnected from power. The terminals and the metal container of the capacitor may be above ground

potential. Therefore, care should be exercised when replacing capacitors or working near them to avoid electrical shock or short circuits.

### 2. APPARATUS

2.01 No. 73A Test Set.

2.02 Two WLAD Cords (furnished as part of the No. 73A Test Set).

2.03 12B or other 600-ohm Transmission Measuring Set capable of measuring up to 15 db loss.

2.04 KS-5472 Portable Set or other source of 600-ohm 1000-cycle 1 mw supply.

2.05 Patching cords or wire for connecting the measuring set to the 1 mw supply for bridging tests.

2.06 One of the following cords when the transmission measuring set is equipped with jacks:

(a) Patching cord, W2L Cord, five feet long, equipped with a No. 309 (or No. 109) Plug and two No. 35 Cord Tips. (2W11A)

(b) Patching cord, W2BC Cord, five feet six inches long, equipped with a No. 310 (or No. 110) Plug and two No. 35 Cord Tips. (2W27A)

2.07 Miscellaneous wires as required where the transmission measuring set or power supply terminates on binding posts.

### 3. PREPARATION

3.01 Connect the transmission measuring set to the 1000-cycle 1 mw supply for a bridging test, using patching cords or wire, as required.

3.02 Calibrate the transmission measuring set in the regular manner.

Note: If necessary, this calibration should be repeated at intervals during the course of the tests in accordance with the requirements of the particular transmission measuring set used.

3.03 If the transmission measuring set is provided with jacks, connect the plug of the W2L or W2BC cord to one of the jacks and connect the cord tips of this cord to binding posts 1 and 2 of the No. 73A test set. If the transmission measuring set is provided with binding

posts or terminals instead of jacks, connect wires between binding posts 1 and 2 of the No. 73A test set and the binding posts or terminals of the transmission measuring set.

#### 4. METHOD

4.01 Connect the two test cords (WLAD) to the particular terminals of the No. 73A test set indicated in the electrolytic capacitor test requirements or in Table 2 for the test required.

4.02 In order to provide a checking test, clip the test clips of the test cords together, thus placing a short circuit at the terminals which are being used. Operate the key in the No. 73A test set. Repeat the test with the short circuit removed. The indicated loss in db should be as given in Table 1.

Table 1

Terminals Used in No. 73A Test Set	Loss in db.	
	With Test Cords Short-Circuited	With Short Cir- cuit Removed From Test Cords
3-7	13.6 ± 0.8	.1 ± .1
3-6	13.3 ± 0.8	.1 ± .1
3-5	13.0 ± 0.6	.1 ± .1
3-4	12.0 ± 0.5	.1 ± .1

4.03 Release the key.

4.04 Make sure that the lamp in the test set is not burned out. This may be accomplished by touching the clips which are attached to the test cords to a source of battery and ground of a potential of 60 volts or less. Observe that the lamp lights.

4.05 If the potential normally connected across the capacitor to be tested is 60 volts or less, prepare the circuit as indicated in the electrolytic capacitor test requirement table, connecting the test clips as specified.

4.06 If the potential normally connected across the capacitor to be tested is in excess of 60 volts, make sure that the battery or the capacitor is disconnected from the circuit before proceeding with the tests. Discharge the capacitor, making use of any arrangement in the circuit which may be provided for this purpose, or bridge a 20,000-ohm resistance composed of

18-type resistances across the terminals of the capacitor for a period of 10 seconds.

Caution: A large amount of energy may be involved in discharging a capacitor of this type, particularly where high potentials and large capacitances are involved. Great care should, therefore, be taken in carrying out this part of the procedure, avoiding in particular the placing of a short circuit on the capacitor at any time.

Connect the clips to the terminals indicated in the electrolytic capacitor test requirement table or directly to the terminals of the capacitor under test.

Table 2

Rated Capacitance in Microfarads	Terminals Used on 73A Test Set
8-30	3-7
31-125	3-6
126-500	3-5
Over 500	3-4

4.07 If the lamp in the test set does not light or flashes momentarily and then goes out, operate the key.

Caution: Do not operate the key if a steady lamp signal is displayed as this indicates that the battery supply has not been disconnected from the capacitor under test.

4.08 The measured db loss shall be within the requirements specified in the electrolytic capacitor test requirements on the circuit drawing.

4.09 If the measured db loss is outside of the allowable loss given in the electrolytic capacitor test requirements on the circuit drawing, the capacitor is approaching the end of its useful life and needs to be replaced.

4.10 When the tests are concluded, remove all cords or disconnect all wires which are associated with the test set or testing equipment.

4.11 If the capacitor has been disconnected from the circuit, it is important to see that it is prepared for connecting in the proper manner with reference to polarity.

4.12 When preparing to make the final connections, a lamp or a resistance of sufficient value to protect the fuse, as determined by the voltage on the circuit, the capacity of the capacitor and the current carrying capacity of the fuse, placed in series with the capacitor and the source of power for a few minutes will allow the capacitor to charge and avoid the chance of the fuse blowing. Permanent connections should be completed immediately after removal of the lamp or resistance while the capacitor is still charged.

4.13 Where a lamp or resistance is not available, the capacitor can sometimes be

charged without blowing the fuse by tapping the final connections together several times before completing the permanent connection. This allows the capacitor to take on some charge at each contact of the connection. This method will not be successful if the total load represents too much of the fuse capacity, and should not be attempted with voltage above 60. In such cases 4.12 must be followed.

## 5. REPORTS

5.01 The required record of these tests should be entered on the proper form.