

**SPECIFICATION NUMBER ENG99-13**

**SPECIFICATION**

**FOR**

**DOUBLE BUSHING, SINGLE PHASE CAPACITORS**

**AND THREE PHASE BANKS**

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**LAKELAND ELECTRIC**

**ELECTRIC SYSTEM ENGINEERING**

**LAKELAND, FLORIDA**

# LAKELAND ELECTRIC SPECIFICATION

ENG99-13

FOR DOUBLE BUSHING, SINGLE PHASE CAPACITORS

AND THREE PHASE BANKS

## 1.0 SCOPE

1.10 This specification covers electrical and mechanical characteristics of single phase all film type capacitors of 100, 150, and 200 KVAR and banks of capacitors composed of single phase 100 KVAR and 200 KVAR, all film units.

1.20 Characteristics, definitions and terminology except as specifically covered in this specification, shall be in accordance with ANSI Standard C-55.1, latest revision and NEMA Standard Publication CP-1, latest revision.

## 2.0 RATING

2.10 The capacitors shall be rated for a voltage of 7620V, 95 KV BIL.

2.20 The capacitors shall be suitable for use in a grounded WYE installation.

2.30 Capacitors shall be rated for 60 Hz operation.

2.40 Capacitors shall be capable of operating at 110% of rated voltage continuously.

2.50 Capacitors shall be capable of operating at 135% of rated KVAR continuously.

## 3.0 CONSTRUCTION

3.10 The capacitor case shall be constructed of corrosion resistant stainless steel.

3.20 All units shall be of the shorter case design and standard width. The following dimensions shall apply:

1. Bottom of mounting bracket to top of bushing: 17-1/2"
2. Bottom of mounting bracket to bottom of case: 9"
3. Width: 4"

- 3.30 The capacitor case shall be painted as per ANSI Z55.1 no. 70 gray, latest revision, (Munsell 5BG 7.0/0.4).
- 3.40 Each capacitor shall have two equal sized bushings equipped with parallel groove clamps capable of accepting # 6- # 2- copper stranded conductor and provide suitable protection from birds and climbing animals.
- 3.50 Each capacitor shall be of all film design.
- 3.60 The manufacturer shall supply information with the quotation stating the design voltage stress on the capacitor dielectric, type and thickness of dielectric material, number of series and parallel sections, and watts loss per KVAR.
- 3.70 Each individual capacitor shall have lifting provisions.
- 3.80 Each capacitor shall have an internal discharge device assuring no more than 50 volts residual charge bushing to bushing five minutes after the unit is de-energized.
- 3.90 Each capacitor shall be filled with the proper quantity of new or highly refined insulating fluid containing no detectable PCBs and meeting all other EPA regulations.

#### 4.0 CAPACITOR BANKS

##### 4.10 Rack Construction

- 4.11 Racks shall be constructed of corrosion resistant aluminum alloy sufficiently strong to support all equipment intended to be supported on them under any foreseeable operating condition.
- 4.12 All assembly hardware (nuts, bolts, washers) shall be constructed of corrosion resistant material.
- 4.13 Racks shall have transformer type mounting brackets suitable for mounting on  $\frac{3}{4}$ " bolts spaced nominally 18" apart.
- 4.14 Racks shall be suitable for mounting on wooden pole with 7"-15" diameter or concrete poles 6"-10" square or round diameter.

4.15 Racks shall be 3 position, 1 position per phase for 300 and 600 KVAR banks and 6 position, 2 position per phase for 1200 KVAR banks; each in a straight line configuration. Bank configuration shall be as follows:

300 KVAR Banks- 3-100 KVAR Units  
600 KVAR Banks- 3-200 KVAR Units  
1200 KVAR Banks- 6-200 KVAR Units

4.16 Capacitors shall be interconnected with #4 or larger copper wire. This wire, and all terminals, shall be covered to provide suitable wildlife protection with a gray (ANSI-70 or equiv.) durable, weather resistant, ultra-violet inhibited material that has a minimum insulation value of 5kV.

4.20 Vacuum Switches

4.21 Vacuum switches shall be single phase and rated at 15 kV, 200 Ampere, 95kV BIL, 120V control voltage.

4.22 Vacuum switches shall be mounted on outriggers specifically designed for this purpose. They shall not interfere with any of the three or six capacitor mounting positions.

4.23 Switch terminals shall be equipped with covers to provide suitable protection from birds and climbing animals.

4.24 Switch control terminals shall be a weatherproof five pin connector.

4.25 Vacuum switch shall be Joslyn Hi-Voltage Corp. type VSV or owner approved equal.

4.30 Junction Box

4.31 An aluminum junction box shall be provided on each rack allowing easy access to the switch control circuits. The box shall be weatherproof and shall have "knock outs" on the bottom and sides suitable for attaching 1" rigid conduit.

4.32 Each junction box shall have 3 five position terminal blocks, one per switch, with clearly marked terminals designating the function and proper connection of each.

4.33 Connecting cables from each switch to its respective terminal block shall be supplied and installed on all banks.

4.40 Grounding

4.41 A grounding terminal shall be supplied on a structural member of the rack and shall be capable of accepting #6-#4 solid or stranded copper.

5.0 NAMEPLATE

5.10 The nameplate shall be of corrosion resistant material which will remain easily legible throughout the life of the device.

5.20 Every individual capacitor unit shall have a nameplate.

5.30 The nameplate information shall include:

Name of manufacturer  
ID number or type, model, style or catalog number  
Rated KVAR  
Weight in pounds  
Number of phases  
Rated frequency  
Rated voltage  
Statement that capacitor contains an internal discharge device.  
Month and year to indicate date of manufacturer, uncoded.  
B.I.L.

6.0 EXCEPTIONS

6.10 Should the manufacturer wish to make exceptions to these specifications, he shall provide written specification and any supporting drawings on the equipment he proposes to furnish. Written approval on any exceptions must be obtained from the Engineering Division of Lakeland Electric prior to submitting his bid.

6.20 Failure to comply with these specifications may cause the removal of the manufacturer from the approved list and cancellation of the material order covered by the specification.