

TECHNICAL SPECIFICATION FOR 13.8kV STARTING CAPACITOR BANKS

1. Equipment Size / Ratings

System operating voltage (line-to-line): 13.8kV, 3 phase, 60Hz. Capacitors nameplate rating shall be a minimum 7.96kV, 1 phase for unfiltered banks.

Total kVAr required at system voltage at present: _____

Total kVAr required at system voltage for future: _____

2. Capacitors

Individual capacitors shall be CSA approved, 1 phase, liquid filled, and of a self-healing design utilizing a low loss metallized film dielectric system. Single phase capacitors must be 2 bushing design - live casings are not acceptable. Capacitor casing shall be of a stainless steel design. Electrical losses shall be less than 0.2 watts per kVAr. Dielectric fluid shall be high flash point, biodegradable, non-toxic and contain no PCB's.

Capacitors shall be equipped with either internal element fusing or external fuses. Expulsion fuses are not acceptable. Fuses must be coordinated to clear before a 10% probability of capacitor case rupture. Capacitor fuses shall not clear during inrush. Capacitors with external fusing are not acceptable if grounding switches are required. Only internal element fusing will be considered.

Capacitor mounting feet shall have an unpainted area for grounding connection of the capacitor casing.

Capacitors shall be rated for a minimum of 180% continuous current overload and 110% continuous voltage overload based on the rated voltage of the capacitors. For capacitors with internal element fusing the minimum continuous current overload shall be 135%.

Where possible use standard size capacitors in the most cost effective combinations as possible. One size of capacitor is preferred to keep replacement parts requirements to a minimum.

Capacitors shall be suitable for -40°C to +45°C ambient temperature or have suitable heating / ventilation to provide the -40°C to +45°C rating.

Capacitor connection can be either delta or wye.

3. Discharge Resistors

Adequate discharge resistors shall be provided inside each capacitor casing to reduce the capacitor terminal voltage to 50 Volts or less in five minutes after disconnection of supply voltage.

4. Inrush Current Limiters

Inrush current limiters may be required in the capacitor bank assembly. Inrush current limiters shall be single phase air core type. Inductance shall be a minimum of 40 μ H per phase. Inrush current limiter amperage and voltage ratings shall be sized to match the maximum continuous current rating of the capacitors.

Inrush current limiters required: Yes No

5. Grounding Switch

Grounding switches may be required in the capacitor bank assembly. Grounding switches shall be 4 pole gang

operated when wye connected capacitors are used and 3 pole gang operated when delta connected capacitors are used. Ground switch handles shall be located on the outside of the enclosure.

An interlock shall prevent operating the grounding switches when the disconnecting means for the capacitor bank is closed. Keylocks are to be provided by the vendor and keyed to the disconnect keylock.

Externally fused capacitors are not acceptable when grounding switches are required, internal element fusing is mandatory.

"Wait 5 minutes after disconnecting supply before operating this switch" labels shall be provided for each ground switch handle.

Grounding switches required: Yes No

6. Wire and Bus Bar

All bus bar shall be tin plated copper. Suitable bracing shall be included.

7. Termination

A termination section shall be included in the enclosure. NEMA 2 hole patterns shall be provided on tin plated copper bus bar for crimp lug connections. Ground terminals shall also be provided for ground wire termination in the termination enclosure.

The termination enclosure shall be suitable for both bottom and top cable entry.

A separate control enclosure shall be provided with room for termination of the required 120 Volt supplies.

Adequate grounding provisions shall be provided on each corner of the enclosure for grounding.

8. Controls

Thermostatically controlled Anti-condensation heaters shall be provided in each enclosure section for outdoor equipment.

120 Volt supplies shall be provided by the buyer to operate the heaters.

9. Enclosure

Enclosures shall be of at least the minimum gauge steel as required by code. Hot dipped galvanized floor mounting sills shall be provided to bolt down the enclosure. Sills shall raise the enclosure 2" above floor height.

All doors must be both lockable with a key and boltable. All components must be suitably mounted to provide ease of replacement. All enclosure mounting hardware and framework shall be either galvanized steel or zinc plated steel for grounding continuity. Painted mounting hardware and framework with paint removed for grounding is not acceptable. All enclosure parts other than mounting hardware and framework shall be powder coated ASA 61 Grey.

Enclosures shall be suitable for the location installation. As a minimum each enclosure section shall be equipped with at least one set of ventilation louvres to vent capacitor casing ruptures. The ventilation louvres shall be equipped with removable screens which can be replaced from the outside of the enclosure without danger to site personnel. As a minimum each louver kit shall have a washable aluminum mesh screen to prevent accidental entry of metal objects.

Enclosure rating required: NEMA _____

Ambient Temperature range: _____ °C to _____ °C

10. Labelling

A "Wait five minutes after disconnection from supply" label shall be located on the enclosure door. A "Wait five minutes after disconnection from supply" label shall be provided loose for the disconnecting device. Both labels shall be worded as per code requirements.

Appropriate "Danger High Voltage" labelling shall be provided to each door which provides access to the high voltage compartments.

The all doors shall be have "Caution more than 1 live circuit" labelling. All components, terminals, fuses etc within the control box shall be labelled.

"Warning - short circuit CT before disconnecting" labels shall be applied where applicable.

11. Testing

Testing shall be performed as per CSA standards. For filtered units a confirmation of the filter tuning frequencies must be performed prior to shipment to minimize on site tap adjustments.

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