Shreem

TEST REPORT

REPORT NO. IN 42804 VOC

STANDARD NO.IEC NO: 60931-1 **Test date: 14/08/2021-20/08/2021**

P/I NO. : IR-20210523-2 **DTD:23.05.2021**

PRODUCT NAME: 20 kVAr, 440V, 50 HZ, 3PHASE, APP OIL FILLED CAPACITOR WITH TERMINAL COVER .

TEST CONDITIONS: AS PER IEC-60931-1

Sr. No.	REQUIREMENT /TEST	SPECIFICATIONS	RESULT	REMARK
1	kVAr Rating	20 kVAr on an average	20.39 kVAr	PASS
2	Voltage Rating	440 V	440 Volts	PASS
3	Basic µfd Value (in µfd)	164.42 µfd on an average	167.67 µfd	PASS
4	Sr. No. of the Capacitor	SJG-1886 to 1910	SJG-1886 to 1910	PASS
5	Capacitor Type	APP	APP	PASS
6	Frequency	50 Hz or 60Hz	50 Hz.	PASS
7.1	Capacitance Measurement and Output Calculation before HV	-5% to +15% of basic µF for units and banks upto 100 kVAr	167.67 µfd +1.95 %	PASS
7.2	Capacitance Measurement and Output Calculation after HV	-5% to +15% of basic µF for units and banks upto 100 kVAr	167.67 µfd +1.95 %	PASS
8	Measurement of the tangent of the loss angle (tan δ) of the capacitor	Shall not exceed value declared by manufacture max. value 0.5W/kVAr	0.22 W/kVAr	PASS
9	Voltage tests between Terminals (High Voltage test)	4.3 x Rated Voltage for 10 sec	Withstood	PASS
10	Voltage tests between terminals and container	3 KV AC for 10 Sec	Withstood	PASS
11	Test of internal discharge device	In 3 min reduce to 75 V or less	Withstood	PASS
12	Sealing Test (Leakage Test)	75°C for 2 Hrs	No leakage of Impregnant.	PASS

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13	**Guide for Installation and Operation of L.T. Power Capacitors:**	
	General Installation Special Service conditions Switching and protective devices and connections	The installation manual attached separately
	Choice of rated Voltage	
	Operating temperature	
	High Ambient air temperature	
	Evaluation of losses	
	Over voltages	
	Overload currents	
	Capacitors connected to system with Audio frequency remote control EMC Immunity	

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TEST CONDITIONS: AS PER IEC-60931-1

TYPE TEST

Capacitor specification: 50 kVAr, 440 V, 3 Phase, 50 Hz, APP (Film + Foil) Type capacitor.

Sr. No : SST-0001/18 SST-0002/18 SST-0003/18	INS Level : 3/15 kV	Temp Category : -5 /+55˚C	kVAr : 50	Voltage : 440 Volts
Capacitance: 411µF	I_N: 65.61Amps	Discharge Device : Externally Fitted	Freq: 50 Hz	Phase : 3
Connection: Delta Connected	Impregnant : NPCB	Year : 2018	Fuse : Internal	Standard : IEC : 60931 (Part 1) 1996.

Sr. No	Test conducted as per the IEC	Specifications of the test as per the standard	Requirement as per the specification	Test result
1	Thermal Stability test as per Cl. No 13.	The Magnitude of the voltage throughout the last 24 Hrs of the test shall be adjusted to give a output using the measured capacitance, of at least 1.44 times its rated output. Throughout the last 6 Hrs of the test , the temp rise shall not increase by more than 1°C. At the end of the thermal stability test the difference between the measured temperature of the container and ambient air shall be recorded. Before and after the test the capacitance shall be measured within the standard temperature range for testing, and these two measurements shall be corrected to the same dielectric temperature. A measurement of Tangent of dielectric loss angle shall be made before and after the Thermal Stability test, at a temp of approximately 20°C.	No change in capacitance greater than 2% shall be apparent from the readings. The value of the second measurement of the Tangent of loss angle shall be not greater than that of the first by more than 2×10^{-4} .	The change in capacitance is less than 2% and change in the value of the Tan δ is less than 2×10^{-4}. Hence passed
2	Measurement of the Tangent of the loss angle (tan δ) of the capacitor at elevated	The capacitor losses (tan δ) shall be measured at the end of the thermal stability test. The measuring voltage shall be that of the thermal stability test.	The value of the tan δ , measured in accordance with Cl. No 14.1 of IEC shall not exceed the value declared by the manufacturer for the	The Tan δ value is lesser than the agreed value. Hence

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	temperature Cl. No. 14		temp and voltage of the test, or the value agreed between the manufacturer and the purchaser.	the test is passed.
3	Voltage test between terminals and containers, as per the Cl. No. 10.2	Units having all the terminals insulated from the container shall be subjected a test according to 10.1 / 10.2 for a duration of 1 min with a voltage of 3 kV, if the rated voltage of the capacitor is UN ≤ 660 V, or with a voltage of 6 kV if Un >660 V.	During the test Neither the puncture nor the Flash over shall occur	Neither Puncture Nor Flashover occurred. Hence the test passed
4	Lightning Impulse Voltage test between terminal and container	Only units having all the terminals insulated from the container and intended for exposed installations shall be subjected to this test. Unless otherwise agreed between manufacturer and purchaser, the impulse test shall be performed with a wave of 1.2 / 50 µs to 5 / 50 µs, having a peak value of 15 kV, if the rated voltage of the capacitor is UN ≤660 V, or having peak value of 25 kV, if UN ≥ 660 V. Three Impulses of positive polarity followed by three impulses of negative polarity shall be applied between terminals joined together and the container. The absence of failure during this test , shall be verified by a cathode ray oscillograph, which is used to record the voltage and check the wave shape.	During the test Neither the puncture nor the Flash over shall occur	No flash over or puncture has occurred during the test . Hence the test passed
5	Discharge test Cl. No 16	The unit shall be charged by means of a DC Voltage and discharged through a gap situated as close as possible to the capacitor. It shall be subjected to five such discharges within 10 min. The test voltage shall be be equal to 2 UN. Within 5 Mins after this test, the unit shall be subjected to a voltage test between terminals. The capacitance shall be measured, before and after the voltage test.	The measurements shall not differ by an amount corresponding either to Breakdown of an element, or to blowing of an internal fuse, or by more than 2%.	No Breakdown of an element, or blowing of an internal fuse or the change in capacitance is less than 2%. Hence the test passed.

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6	Ageing Test as per Cl. No 17 of IEC 60931 -2.	During the test No permanent break down, interruption or flash over shall occur. At the end of the test capacitor shall cool down freely to the ambient temperature, and the capacitance shall then be measured, under the same conditions, as before the test. The maximum permitted variation of capacitance compared to the values measured before the test shall be 3% averaged over all the phases and 5% on one phase. Voltage test between terminals and container shall be carried out. The sealing test shall be repeated.	During the test No permanent break down interruption or flash over shall occur. The maximum permitted variation of capacitance compared to the values measured before the test shall be 3% averaged over all the phases and 5% on one phase.	No permanent breakdown or interruption took place. Change in capacitance is within the permitted limits. No leakage of fluid observed. Hence the test is passed.
7	Disconnecting test on internal fuses as per Clause 5.3 of IEC 60931-3:	- Before opening, no significant deformation of the container shall be apparent. - After opening the container, a check shall be made to ensure that: a) no significant deformation of sound fuses is apparent; b) No more than one additional fuse (or one-tenth of fused elements directly in parallel) has been damaged.	No significant deformation, No damage of additional fuses .	Capacitor withstood all conditions. Hence passed the test.
8	Maximum permissible voltage	Capacitor units shall be suitable for operation at voltage levels according to table 3 of IEC 60931-1.		Confirmed and passed
9	Maximum permissible current	Capacitor units shall be suitable for continuous operation at an r.m.s. line current of 1.3 times the current that occurs at rated sinusoidal voltage and rated frequency, excluding transients. Taking into account the capacitance tolerances of 1.15 C_N, the maximum current can reach 1.5 I_N.		Confirmed and passed
10	Discharge Device	Each capacitor unit and/or bank shall be provided with a means for discharging each unit in 3 min to 75 V or less, from an initial peak voltage of fi times rated voltage UN.	Voltage measured after 3 mins found to be less than 75 V.	Provided externally. passed

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11	Container connections	To enable the potential of the metal container of the capacitor to be fixed, and to be able to carry the fault current in the event of a breakdown to the container, the metallic container shall be provided with connection capable of carrying the fault current.		Provided.
12	Protection of the environment	When capacitors are impregnated with products that shall not be dispersed into the environment, the necessary precautions shall be taken.		The liquid is environment friendly.

RATING PLATE DETAILS

MANUFACTURER	M/s.SHREEM ELECTRIC LIMITED
IDENTIFICATION NUMBER AND MANUFACTURING YEAR	SJG-1886/21 to 1910/21
RATED OUTPUT QN IN kVAr	20 kVAr
RATED VOLTAGE U_N IN VOLTS	440 Volt
RATED FREQUENCY f_N IN Hz	50 Hz
Basic µfd Value (in µfd)U_N	164.42 µfd
TEMPERATURE CATEGORY	-40/D
DISCHARGE DEVICE	Externally Fitted
CONNECTION SYMBOL	Delta (Δ)
PHASE	3 Phase
INTERNAL FUSES	Yes
IMPREGNANT	NPCB
WEIGHT	13 Kg APPROX
INSULATION LEVEL U_i IN kV	3/15 kV
REFERENCE TO IEC 60931	IEC 60931-1

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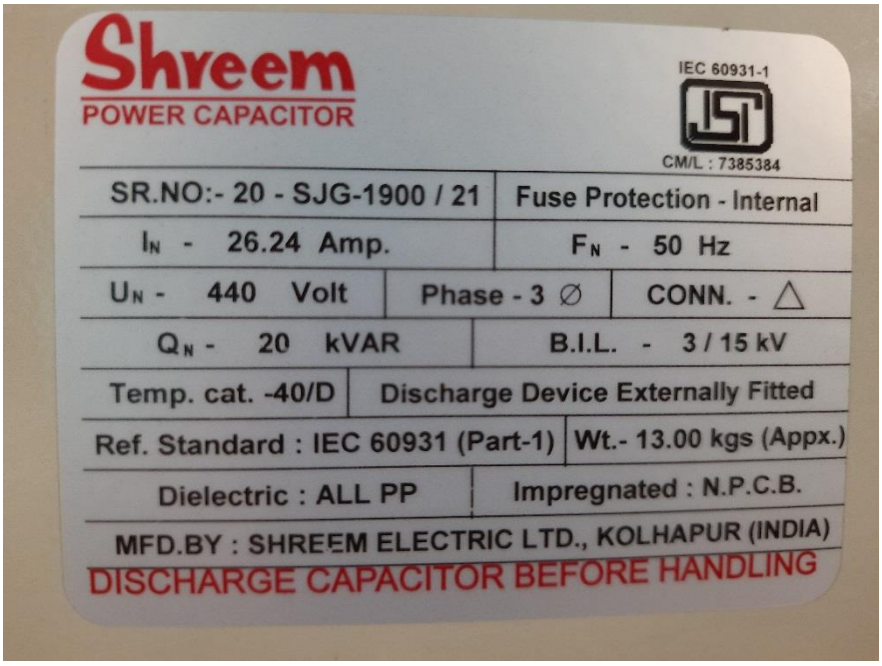

CONCLUSION: Place and date of inspection at Shreem Electrical Limited located in Kolhapur, India on 14.08.2021 and the sample test performed by manufacturer from 14.08.2021 to 20/08/2021. Sample test witnessed by our SAI inspector in laboratory of the manufacturer and concluded that the goods are in conformity with standard No.: **IEC 60931-1.**

Furthermore, we confirm that the test report is acceptable and the manufacturer's laboratory found to be as qualified.

Manufacturer's Representative S.A.I. Representative

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