

EPIL TEST REPORT

Project No.: H13-60003

Equipment under Test: MV Capacitor

Type	: PK 200/19.05 EDRI
Serial Number	: T-T-19.05
Rated Voltage	: 19.05 kV
Rated Power	: 200 kVAR
Rated Capacitance	: 1.76 μ F
Rated Frequency	: 50 Hz
Rated Current	: 10.5 A
Insulation Level	: 50/145 kV
Temperature Category	: -40/55°C

Manufactured by: PARTO KHAZEN Co.

Applicant: PARTO KHAZEN Co.



Trade Mark:

Tested According to: IEC 60871-1:2014

Reception Date of Sample: 10-Mar-2021

Testing Date: 06-Apr-2021 **Issue Date:** 10-April-2021

Test Result: See pages 4 to 7

No. of Pages: 10

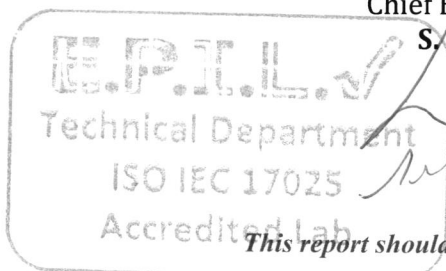
Prepared and Tested by: Test Engineer
A. Takzare

Verified by: Technical Manager
H. Jahangir

Chief Executive Officer
S.M. Mirsadri

Approved:

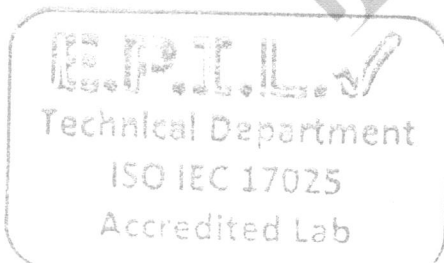
Engineering Deputy of
Test and Inspection
Prof. B. Vahidi



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1. GENERAL INFORMATION

1.1. Product Information

Equipment under Test	: MV Capacitor
Manufacturer	: PARTO KHAZEN Co.
Type	: PK 200/19.05 EDRI
Serial Number	: T-T-19.05
Rated Voltage	: 19.05 kV
Rated Power	: 200 kVAR
Rated Capacitance	: 1.76 μ F
Rated Frequency	: 50 Hz
Insulation Level	: 50/145 kV
Temperature Category	: -40/55°C
Normative Document	: IEC 60871-1:2014

1.2. Client Information

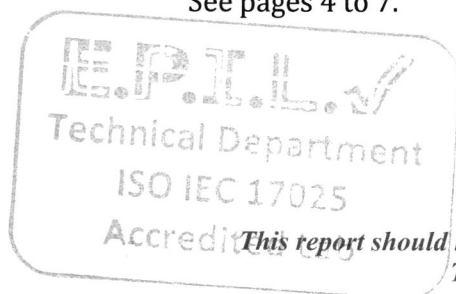
Applicant	: PARTO KHAZEN Co.
Telephone	: +98-21-88882956
Fax	: +98-21-88882959

1.3. Performed Tests

Test	Test According to	Result
Test of Internal Discharge Device (Routine Test)	IEC 60871-1:2014	Passed
Lightning Impulse Voltage Test between Terminals and Container (Type Test)	IEC 60871-1:2014	Passed
Short Circuit Discharge Test (Type Test)	IEC 60871-1:2014	Passed

1.4. Test Results and Descriptions:

See pages 4 to 7.



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2. PERFORMANCE and RESULTS of TESTS

2.1 Test of Internal Discharge Device (Routine Test)

2.1.1 Test data

Equipment Under Test (EUT)	: MV Capacitor
Manufacturer	: PARTO KHAZEN Co.
Location	: E.P.I.L
Date	: 06-Apr-2021
Test Expert	: Ms. Takzare
Normative Document	: IEC 60871-1:2014

2.1.2 Ambient conditions

Ambient Temperature	: 19.1 °C
Relative Humidity	: 29.7 %

2.1.3 Performance of test

The resistance of the internal discharge device, is checked by a resistance measurement.

2.1.4 Acceptance conditions of test

According to annex D of IEC 60871-1:2014, the discharge resistance in single phase unit is computed from the equation:

$$R \leq \frac{t}{C \ln\left(\frac{U_N \sqrt{2}}{U_R}\right)}$$

2.1.5 Result of test

Table 1. Test of internal discharge device

Measured Resistance	Acceptance Criteria	Result
30.8 MΩ	≤ 58 MΩ	Passed

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2.2 Lightning Impulse Voltage Test between Terminals and Container (Type Test)

2.2.1 Test data

Equipment Under Test (EUT)	: MV Capacitor
Manufacturer	: PARTO KHAZEN Co.
Location	: E.P.I.L
Date	: 06-Apr-2021
Test Expert	: Ms. Takzare
Normative Document	: IEC 60871-1:2014

2.2.2 Ambient conditions

Ambient Temperature	: 19.2 °C
Relative Humidity	: 29.7 %

2.2.3 Performance of test

The EUT is subjected to fifteen impulses of positive polarity followed by 15 impulses of negative polarity between the terminals (joined together) and the container. The lightning impulse test is done in accordance with IEC 60060-1 but with a wave of 1.2/50 μ s having a crest value corresponding to 18.1 of IEC 60871-1.

2.2.4 Acceptance condition of test

The capacitor is considered to have passed the test if:

- No puncture has occurred.
- Not more than two external flashovers occurred at each polarity.
- The waveshape has revealed no irregularities or significant deviation from recordings at reduced test voltage.



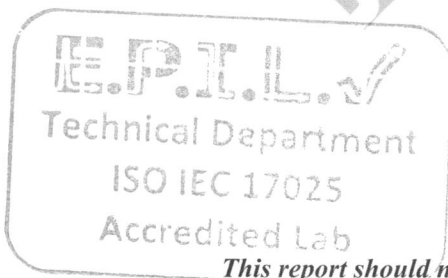
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2.2.5 Result of Test

Table 2 shows the results of the test.

Table 2: Result of lightning impulse test between terminals and container

Rated Voltage (kV)	Applied Voltage (kV)	Number of Impulses	Result
19.05	145	15+/15-	Passed



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2.3 Short Circuit Discharge Test (Type Test)

2.3.1 Test data

Equipment under Test (EUT)	: MV Capacitor
Manufacturer	: PARTO KHAZEN Co.
Location	: E.P.I.L
Date	: 06-Apr-2021
Test Expert	: Ms. Takzare
Normative Document	: IEC 60871-1:2014

2.3.2 Ambient conditions

Ambient Temperature	: 22.1 °C
Relative Humidity	: 28.0 %

2.3.3 Performance of test

The EUT is charged by means of d.c. and then discharged through a gap situated as close as possible to the capacitor. The EUT is subjected to five such discharges within 10 min with test voltage of $2.5 U_N$.

2.3.4 Acceptance conditions of test

The capacitance shall be measured before and after the discharge tests. The differences between the two measurements shall be less than an amount corresponding to either breakdown of an element.

2.3.5 Result of Test

Table 3 shows the results of the test.

Table 3: Result of short circuit discharge test

Applied d.c. Voltage (kV)	Measured Capacitance before the Test (μF)	Measured Capacitance after the Test (μF)	Result
47.6	1.75	1.74	Passed

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3. FIGURES

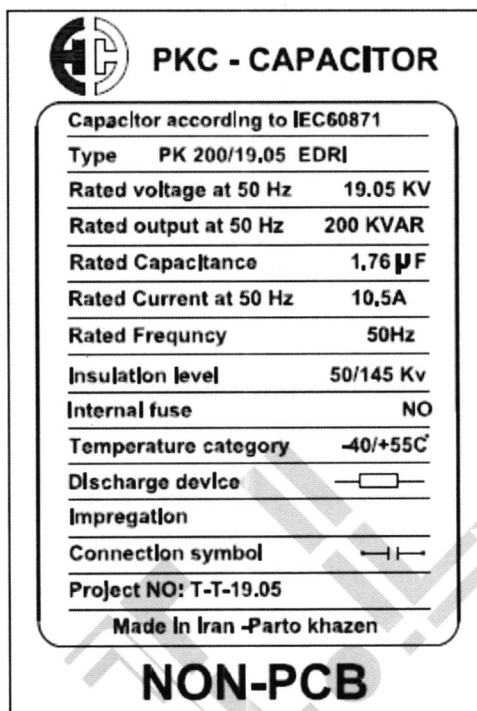
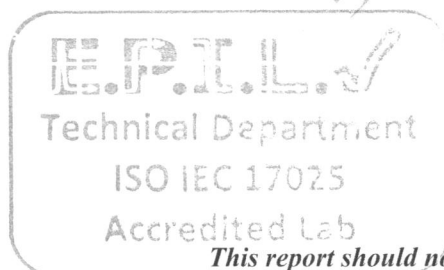


Figure 1: Nameplate of equipment under test



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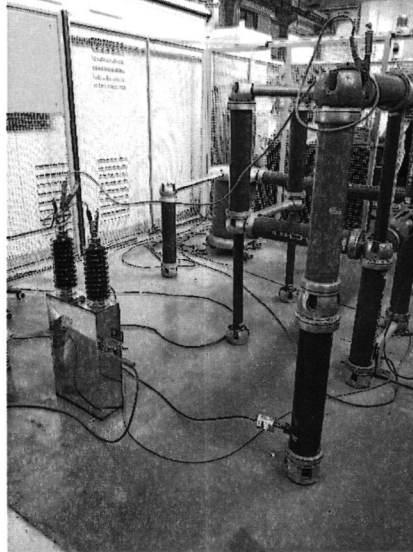


Figure 2: Equipment under lightning impulse voltage test between terminals and container

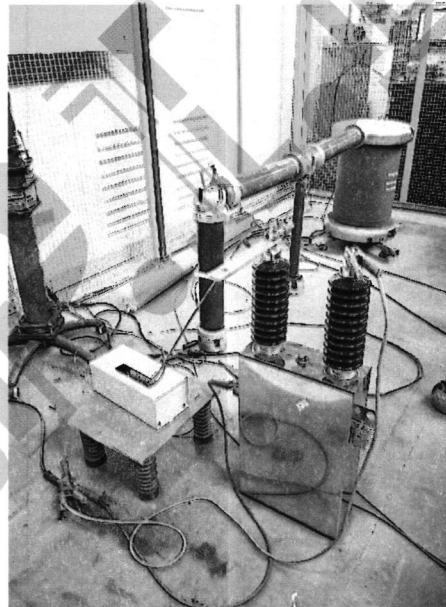



Figure 3: Equipment under short circuit discharge test


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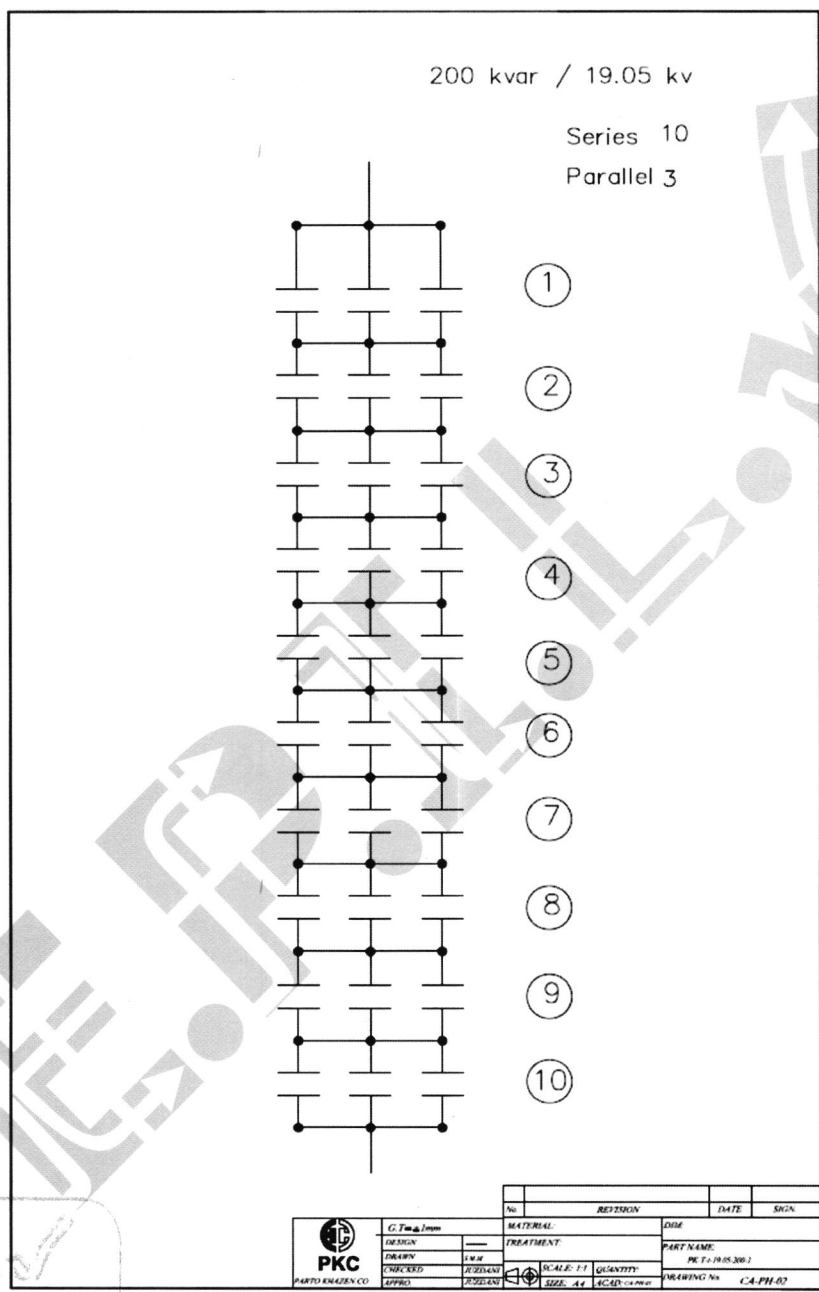
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ANNEX A: EUT ELEMENT CONFIGURATION



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