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CRASH COURSE

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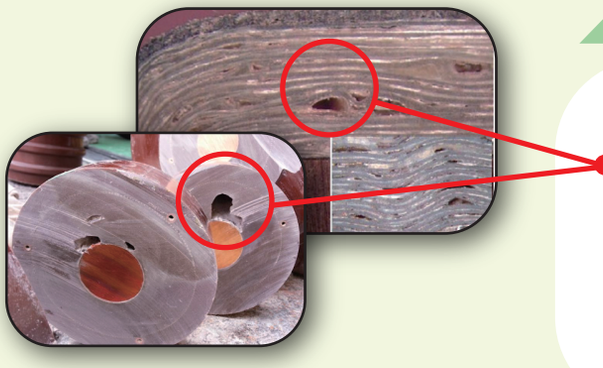
Partial Discharge Explained, Easy-peasy!



The basics

Partial discharge is a localized dielectric breakdown of a small portion of electrical insulation.
It's caused by voids, cracks, or inclusions within a solid dielectric material. These voids are small as is their capacitance. When voltage is applied between electrodes, high voltage flows through the void(s) and it exceeds the breakdown electrolysis of the air and discharges. This phenomenon is called partial discharge.

The testing dilemma: *withstand voltage vs. partial discharge*

During a withstand voltage test, high voltage (typically AC) is applied to a device under test (DUT) and the leakage current that flows through it is measured and judged. Under this model, dielectric breakdown is determined by an increase in current. So, if there is no increase, the product is deemed acceptable. However, there are instances when partial discharge occurs and the DUT still passes the withstand voltage test.

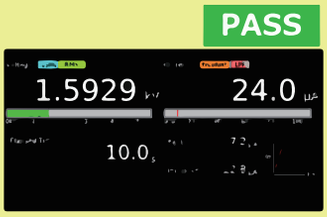
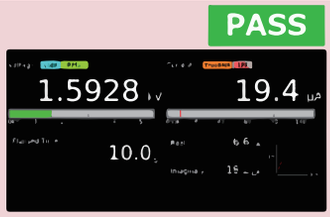
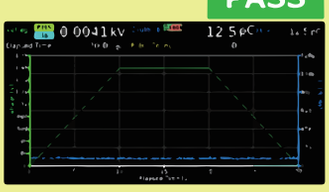
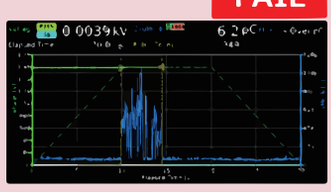
Test conditions

- Test voltage: 1.6kV
- Test time: 10s
- Voltage rise time: 10s/ fall time: 10s

Test comparison

Test summary

A withstand voltage and partial discharge test are conducted on a good product (sample A) and a defective product with low insulation performance (sample B).

	Sample A (good product)	Sample B (defective)
ACW	PASS 	PASS 
PD	PASS 	FAIL 

RESULTS

Sample A passes the 1.6kV withstand voltage and partial discharge test.

Sample B passes the 1.6kV withstand voltage test, but the partial discharge test detects discharge phenomenon, and a potential defect is found resulting in a FAIL.

***In the partial discharge test, the state before the dielectric breakdown is measured, so potential defects and manufacturing variations that cannot be identified by conventional withstand voltage tests can be identified later with a partial discharge test.**

•Detect electrical discharge!
•Catch potential insulation defects before it's too late!