

**GEN<sup>3</sup>**  
**SYSTEMS**

**AutoCAF<sup>2</sup>**  
Conductive Anodic Filament Monitoring System

Introducing the new  
AutoCAF System from  
Gen3 Systems

Measuring the influences of  
sub-surface electro-chemical  
reactions

Features:

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Measurement Time:  
256 Channels <8 seconds

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Applied Voltage:  
+1V to 1000V

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Measurement Range:  
 $10^6 \Omega$  to  $10^{14} \Omega$

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Measurement Method:  
Continuous on all selected  
channels

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Measurement Test  
Intervals:  
Fully Selectable from  
minimum of 1 minute



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## Conductive Anodic Filament Monitoring System

As electronic circuits become ever smaller so  
CAF incidents has increased.

AutoCAF is able to measure up to 256 individual  
measurement sites under conditions of high  
humidity and temperature in accordance with  
IPC-TM-650 2.6.25 Test Method & IPC 9691 CAF  
Test Users Guide.

Conductive anodic filament (CAF) failure is  
copper corrosion within a printed board. It is  
electro-migration of the copper from Anode to  
Cathode between two conductors of different  
potential, whereas growth from Cathode to  
Anode is a dendrite.

A combination of bias voltage and high  
humidity enhance CAF failures. Electrical  
failure results when a filament grows between  
electrically isolated nets. See IPC-9691 for  
further information on CAF.

The NEW AutoCAF 2 was developed in  
conjunction with a major CAF research project  
conducted by the British NPL.

For over 30 years, Gen3 Systems has worked  
closely with the National Physical Laboratory  
(NPL). This unique relationship has helped in  
our development of our various test systems  
as well as helping us define new measurement  
techniques and equipment.

Gen3 Systems actively participates in standards  
development work with IEC, IPC, ISO, BSI and  
other official standards authorities

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# CAF Failures



A combination of bias voltage and high humidity enhance CAF failures. Electrical failure results when a filament grows between electrically isolated nets. See IPC-9691 for further information on CAF.

The following conditions contribute to CAF failure:

- A weakened or damaged resin-glass interface caused by hole drilling, poor glass treatment, lamination defects, mechanical stress, thermal stress, or poor chemical resistance of the resin system
- Temperature and humidity to activate the reaction (there may be a humidity threshold)
- A pH gradient that is conducive for CAF formation
- A voltage gradient between conductors that may be as low as 3 volts to perhaps 800 volts
- Certain soldering flux ingredients (polyglycol) or other ionic contaminants from processing

High density circuits are more at risk with possible failures occurring between holes, holes to features, features to features in plane, and features to features out of plane. CAF can grow from other initiation sites, but times to failure are much longer.

# The NEW AutoCAF Measurement System

Truly continuous monitoring and measurement.

When the measurement and test bias are the same, no switching takes place as the voltages are continuously applied.

A measurement range of  $10^6$  to  $10^{14} \Omega$  remains at the heart of the system.

Measurements from all 256 channels can be taken in <8 seconds.

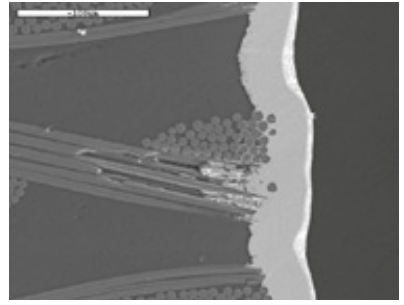
Capable of testing to all existing test specifications IPC - IEC - JNC and other user specifications.

Future-proofed design.

Adaptable and flexible software operating with Windows® 7 and 8.

AutoCAF 2 is available with 64, 128 or 256 channel configurations.

On connection the system runs a self test.



*Filament growth usually occurs along the glass fibres of the support system*

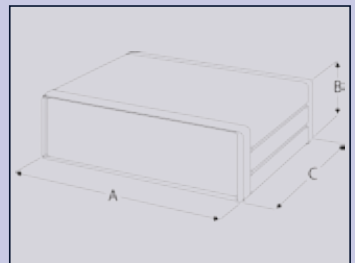
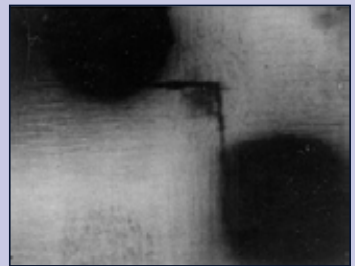
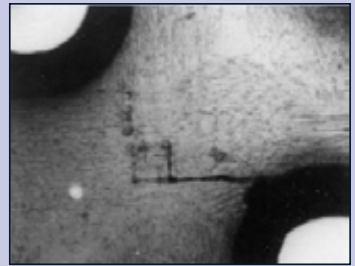
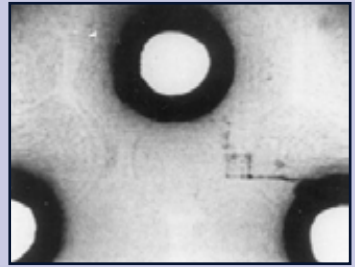
## GEN3 Systems - Setting the Standard



*AutoCAF 2 with optional test rack and computer*

# Specifications

Number of Channels	64 or 128 or 256
Measurable range of insulation resistance	$10^6$ to $10^{14} \Omega$
Internal Bias Voltage	0V; 3.3V; 5V; 10V; $\pm 50V$ & $\pm 100V$
External Bias Voltage	1V to 1000V
Measurement Method	Continuous on all selected channels
Measurement Test Intervals	Fully selectable from minimum of 1 Minute
Measurement Time	256 channels <8 seconds
Maximum Test Duration	Unlimited
Current measuring cable	Fully shielded
System status LED'S	Power Communications Low resistance Temperature and humidity Bias Voltage Out of Range / Failure
Data collection	Sampling Time, Elapsed Time, Resistance, Current, Applied Voltage, Temperature, Humidity
Applicable OS	Windows® 7 & 8
Power requirement	110V / 230V Switchable mains single phase
Dimensions	[A] 515mm (20½") [B] 170mm (6½") [C] 390mm (15")
Weight	10.5 kgs (371 lbs)



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