

*WebCorr Corrosion Consulting Services Presents*

## Electrochemical Migration (ECM), Conductive Anodic Filament (CAF) Formation and Surface Insulation Resistance (SIR) Testing

Date: As published on website Venue: As published on website

### Course Overview

Corrosion is responsible for more than 50% of microelectronic device failures. Electrochemical corrosion of metallic conductors, electrochemical migration or dendrite growth, and conductive anodic filament (CAF) formation on a printed wiring board can lead to circuit failures. It is important to understand the cause of these failures in order to select materials and processes for soldering and cleaning that will minimize the occurrence of these failures. This course thoroughly and systematically covers the causes and processes of electrochemical migration (ECM), dendrites formation, conductive anodic filament (CAF) formation, their effects on surface insulation resistance (SIR), and the industry standard methods and procedures for SIR testing.

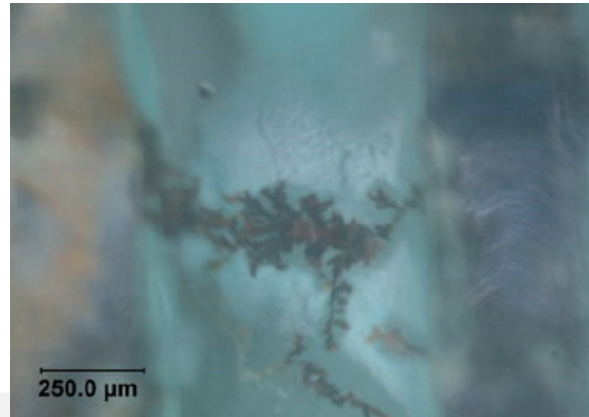
This 1-day short course can be taken as in-house training course, online course and distance learning course worldwide. It can also be customized to meet the specific needs of your organization.

### Who Should Attend

Engineers, designers, and QA/QC personnel working in the microelectronics and semiconductor industry.

### Course Outline

1. Electrochemical Migration (ECM)
  - 1.1 Definition of Electrochemical Migration (ECM)
  - 1.2 ECM Processes and Dendrites Formation
  - 1.3 Reactions on the Anode
  - 1.4 Reactions on the Cathode
  - 1.5 Factors Influencing ECM and Dendrites Formation
  - 1.6 Electrochemical Migration Testing
  - 1.7 Electrochemical Migration (ECM) vs Electromigration (EM)
  - 1.8 Electrochemical Migration Failure Analysis and Prevention
2. Conductive Anodic Filament (CAF) Formation
  - 2.1 Definition of Conductive Anodic Filament (CAF)
  - 2.2 Mechanisms of CAF Formation and Growth



- 2.3 Factors Influencing CAF Formation
  - 2.3.1 Substrate materials
  - 2.3.2 Conductor configuration
  - 2.3.3 Voltage gradient
  - 2.3.4 Solder flux and HASL fluid
  - 2.3.5 Cleaning
  - 2.3.6 Temperature
  - 2.3.7 Humidity
- 2.4 Catastrophic Field Failures Due to CAF Formation
- 2.6 Conductive Anodic Filament vs Dendrite
3. Surface Insulation Resistance (SIR) Testing
  - 3.1 Definition of Surface Insulation Resistance (SIR)
  - 3.2 Basic Principles of SIR Testing
  - 3.3 The Importance of SIR Testing
  - 3.4 Effects of Electrochemical Migration (ECM) and Conductive Anodic Filament (CAF) on SIR
  - 3.5 SIR Testing: Industry Standards and Test Procedures
  - 3.6 SIR Testing: IPC J-STD-004A vs J-STD-004B
  - 3.7 SIR Testing: Factors Influencing SIR Test Results
  - 3.8 SIR Testing: Hourly vs Daily Readings
  - 3.9 SIR Testing: Pass/Fail Criteria
  - 3.10 Failures During SIR Testing
4. End-of-Course Examination

### Course Registration

Please register online at [www.corrosionclinic.com](http://www.corrosionclinic.com)  
Or use the form below (photocopies of this form may be used for multiple bookings).

Dr/Mr/Ms \_\_\_\_\_

Organization \_\_\_\_\_

Contact Person \_\_\_\_\_

Contact Dept \_\_\_\_\_

Telephone \_\_\_\_\_ Fax \_\_\_\_\_

Email \_\_\_\_\_

Payment should be made by TT or online banking. Currencies in Australian Dollar, Canadian Dollar, US Dollar, Euro and Sterling Pound can be transferred directly without conversion. Our bank details can be found at the link below:

<https://www.corrosionclinic.com/payment.html>

### Course Fee and Discount

**Standard:** \$3,500      **Discount:** \$3,150

The fee includes a hardcopy of course note, certificate, light lunch, coffee breaks each day during the course.

Discount applies to a group of 3 or more persons from the same organization registering at the same time, or early-birds making payment at least 8 weeks before the course commencing date.

#### Cancellation and Refunds

Cancellation or replacement should be conveyed to WebCorr in writing (email or fax). An administration charge of 50% of the course fee will be levied if the cancellation notice is received from 14 to 7 days before the course commencing date. No refund will be made for cancellation notice received 6 days and less. No refunds will be given for no-shows. Should WebCorr find it necessary to cancel a course, paid registrants will receive full refund. Refund of fees is the full extent of WebCorr's liability in these circumstances.



WebCorr has NACE certified Corrosion Specialist (#5047) providing customized in-house training, online and distance learning corrosion courses, corrosion seminars and workshops on corrosion, materials, metallurgy, paints and metallic coatings. Our corrosion courses are developed and taught by NACE certified Corrosion Specialist with over 30 years of practical experience in the field. Our training success is measured by your learning outcome.