



Residual Gas Analysis (RGA)

DLA Laboratory Suitability for MIL-STD-883 and MIL-STD-750, Method 1018 Internal Water Vapor Content

Packages

DIP'S, Quad Packs, TO-x Cans, Metal Lidded Devices, Filler Gas Containers and many other geometries can be analyzed.

Volumes

0.01cc to 25cc volumes can be analyzed. Precision radiographic techniques are used to determine the volume of the package.

Analysis

All gases with molecular weights between 1 - 140 mass units can be identified with a survey scan, or up to 12 components can be preselected for quantitative analysis.

Gases Analyzes

Nitrogen, Oxygen, Argon, Carbon Dioxide, Moisture, Hydrogen, Helium,

COMPANY NAME: EAG Space Systems	
MIL RGA NO: RXXXXXX	
DATE TESTED: July 31, XXXX	
QUANTITY TESTED: 5	LAT NUMBER: Engineering Evaluation
PACKAGE TYPE: Integrated Device	DATE TESTED: None
PART NUMBER: None	LOT NUMBER: 4206769

SAMPLE ID	SAMPLE 1	SAMPLE 2	SAMPLE 3	SAMPLE 4	SAMPLE 5
HYDROGEN	99.9 %	99.9 %	99.9 %	99.9 %	99.7 %
MOISTURE	500	500	500	500	500
ARGON	999	999	999	999	999
CH4	200	200	200	200	200
NO2	1000	1000	1000	1000	1000
AMMONIA	100	100	100	100	100
HELIUM	99.999	99.999	99.999	99.999	99.999
NEON	999	999	999	999	999
CO2	100	100	100	100	100
NITROGEN	99.999	99.999	99.999	99.999	99.999
O2	99.999	99.999	99.999	99.999	99.999
UNID	999	999	999	999	999
UNID	999	999	999	999	999



Fluorocarbons, Methane and Ammonia are normally measured and reported. Additional gases can be added to the list upon request.

The lifetime of electronic components follows a predictable trend. A significant number of components fail prematurely at a very early age ("infant mortality"). Once past this initial failure stage, they usually perform for a long period of time with a

very low probability of failure. High reliability electronic components are often required to operate for long periods of time, having little or no opportunity for replacement. Orbiting satellites are good examples of this situation. Parts that meet the requirement for “space usage” are also used in applications where replacement is difficult and/or failure engenders great risk. The infant mortality problem can be addressed by the implementation of stringent quality controls during manufacturing. SEM examination of metallization, glassivation analysis, thorough precap inspection, electrical burn-in and DPA procedures will identify the respective problems. Old age failures are usually related to either transient phenomena, such as ESD or EOS, mechanical shock, thermal excursions or chemical reactions, such as corrosion. In order to eliminate failures caused by chemical reactions, the internal gas composition of the component must be known. MIL-STD-883, method 1018 and MIL-STD-750 are generally the accepted specifications for internal water vapor content. These methods define procedures for RGA equipment calibration and device testing, as well as the maximum acceptable limit for water vapor content. RGA is useful for more than moisture content analysis. Because EAG

Laboratories' RGA system can detect all masses up to 140 AMU, the common gases can be identified and quantified. Samples of process atmospheres and unusual sealing environments can be analyzed to detect the evolution or resorption of gases.

EAG's RGA system software can determine the moisture content, as well as analyze an entire spectrum of gases contained in the component. In addition to providing routine RGA data, the staff at EAG has the technical expertise to identify the origin of “problem” internal gases and provide corrective action to minimize outgassing and lower the moisture content within the devices.

Other MIL-STD-883 testing available at EAG:

- Destructive Physical Analysis (DPA)
- Failure Analysis
- Fine Leak/Gross Leak
- Die Shear
- Radiography
- SEM Inspection
- P.I.N.D. Testing
- Bond Pull Strength Test

EAG is a DLA (Defense Logistics Agency) approved laboratory

