



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, Fluorocarbons, Methane and Ammonia are normally measured and reported.

COMPANY NAME: EAG Space Systems	
SEAL RGA NO: RNumber	
DATE TESTED: July 31, XXXX	
QUANTITY TESTED: 5	LOT NUMBER: Engineering Evaluation
PACKAGE TYPE: Integrated Circuit	DATE CODE: None
PART NUMBER: None	P.O. NUMBER: 42346799

SAMPLE ID	SAMPLE 1	SAMPLE 2	SAMPLE 3	SAMPLE 4	SAMPLE 5
NITROGEN	99.9 %	99.6 %	99.1 %	94.3 %	96.7 %
OXYGEN	ND	ND	ND	ND	ND
ARGON	ND	ND	ND	ND	ND
CO2	256 ppm	400 ppm	481 ppm	463 ppm	437 ppm
MOISTURE	1300 ppm	1776 ppm	1978 ppm	1483 ppm	2199 ppm
HYDROGEN	165 ppm	389 ppm	327 ppm	408 ppm	246 ppm
HELIUM	26 ppm	10.1 %	6.6 %	5.4 %	9.9 %
FLUOROCARBONS	ND	ND	ND	ND	ND
CH4	ND	29 ppm	287 ppm	294 ppm	246 ppm
NH3	ND	ND	ND	ND	ND

COMMENTS:

TEST WAS PERFORMED TO MIL-STD-883A, METHOD 1018, MIL-STD-750-3, METHOD 1018.5

PRESSURE - INTERNAL PACKAGE PRESSURE
 ND - NONE DETECTED
 1% = 10,000 ppm
 PRE-BAKE TEMPERATURE - 150 C
 PRE-BAKE TIME - 16-24 HOURS

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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 our 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.

Eurofins | EAG Laboratories' 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, our staff 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 Eurofins | EAG Laboratories:

- 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

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