

**TEST REPORT  
NEBS COMPLIANCE  
CHOMERICS PREMIER™  
CONDUCTIVE PLASTIC**

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Chomerics Approved Signatory:

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The user, through its own analysis and testing, is solely responsible for making the final selection of the system and components and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application, follow applicable industry standards, and follow the information concerning the product in the current product catalog and in any other materials provided from Parker or its subsidiaries or authorized distributors.

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## 1. INTRODUCTION

This document is written to report compliance as specified by Network Equipment Building System (NEBS) for PREMIER fire retardant (FR) grades.

The requirements are in accordance with GR-63-CORE: Network Equipment Building System (NEBS) Requirements: Physical Protection. The full document can be obtained from Telcordia Technologies, Inc. NEBS is a systems test, therefore PREMIER complies with sections pertaining to material selection. Section 4.2.3, *Use of Fire-Resistant Materials, Components, Wiring, and Cable* is the pertinent section of the document that PREMIER complies to.

NEBS is the most common set of safety, spatial and environmental design guidelines applied to telecommunications equipment in the United States. NEBS is not a legal requirement, but a customer requirement of service providers in order to preserve network integrity.

## 2. ADMINISTRATIVE DATA

### 2.1 Test Facility

Testing is done both internally at Chomerics and externally by independent laboratories. All UL94 testing is done by Underwriters Laboratory (UL).

The results and/or conclusions within this test report refer and/or apply only to the unit(s) tested as defined by this report.

## 3. TEST SET UP AND CONFIGURATION

### 3.1 Section 4.2.3 Requirements

Compliance to section 4.2.3, *Use of Fire-Resistant Materials, Components, Wiring, and Cable* requires the material to meet the requirements of section 4.2 of ANSI T1.307-1990, *Fire-Resistance Criteria – Part 1: Ignitability Requirements for Equipment Assemblies, and Fire Spread Requirements for Interconnection Wire and Cable Distribution Assemblies*.

The requirements of section 4.2 of ANSI T1.307-1990 require the following to be met:

- The material shall have an oxygen index of 28% or greater as determined by ASTM D 2863-77, *Standard Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index)* and
- The material shall have a 94 V-1 or better rating as determined by Underwriters Laboratory (UL) 94, *Test for Flammability of Plastic Materials for Parts in Devices and Appliances*, per the paragraph titled *Vertical Burning Test for Classifying Materials 94 V-0, 94 V-1 or 94 V-2*.

3.2 Section 4.2.3 Apparatus and Test Specimen

3.2.1 Complete descriptions of the apparatus and test specimens for ASTM D 2863-77 are outlined in the standard. Copies of the standard may be obtained from the American Society for Testing and Materials (ASTM).

Test Apparatus

Test Chimney- consisting of a heat resistant glass tube.
Specimen Holder – Any small holding device that will support the specimen at its base and hold it vertically in the center of the chimney.
Gas Supplies – comprising pressurized sources of oxygen or nitrogen, or both.
Gas Measurement and Control Devices
Flame Igniter
Timing Device
Fume Extraction System
Thin Film Rolling Tool

3.2.2 Test Specimen

PREMIER test specimens are molded and machined to the proper size. Test specimen dimensions are:

- Length: 80-150 mm
- Width: 10 +/- .5 mm
- Thickness: ≤ 10.5 mm

3.3 Summary of Test Method

Complete details of the test method and procedure can be obtained from the American Society for Testing and Materials (ASTM).

This test method provides for the measuring of the minimum concentration of oxygen in a flowing mixture of oxygen and nitrogen that will just support flaming combustion of plastics. A small test specimen is supported vertically the mixture of oxygen and nitrogen flowing upwards through a transparent test chimney. The upper end of the specimen is ignited and the subsequent burning behavior of the specimen is observed to compare the period for which burning continues, or the length of the specimen burnt, with specified limits for each burning. By testing a series of specimens in different oxygen concentrations, the minimum oxygen concentration is determined. This value is referred to as the oxygen index (OI) and expressed as volume percent.

The PREMIER materials tested are A220-FR, A230-FRHF, A240-FRHF.

### 3.4 UL 94 Requirements

The requirements of section 4.2 of ANSI T1.307-1990 also require the material to have a 94 V-1 or better rating as determined by Underwriters Laboratory (UL) 94, *Test for Flammability of Plastic Materials for Parts in Devices and Appliances*, per the paragraph titled *Vertical Burning Test for Classifying Materials 94 V-0, 94 V-1 or 94 V-2*.

The UL 94 Flammability ratings are intended to provide an indication of a material's ability to extinguish a flame, once ignited. Ratings are primarily differentiated by the testing method.

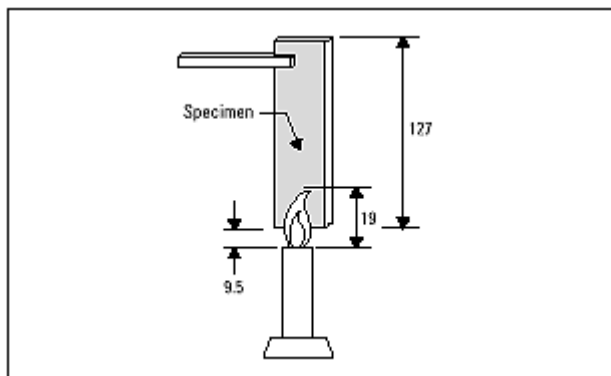
Summary of the UL 94 rating categories:

- 5VA (surface burn): Test specimens may not have a burn through (no hole). This is the highest (most flame retardant) UL94 rating.
- 5VB (surface burn): Test specimens may have a burn through (a hole).
- V-0 (vertical burn): Burning stops within 10 seconds. No flaming drips are allowed.
- V-1 (vertical burn): Burning stops within 30 seconds. No flaming drips are allowed.
- V-2 (vertical burn): Burning stops within 30 seconds. Flaming drips are allowed.
- H-B (horizontal burn): Slow burning on a horizontal specimen burning rate. This is the lowest (least flame retardant) UL94 rating.
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PREMIER FR grades have already been certified for UL V-0 at specified thicknesses. PREMIER conductive plastics are undergoing certification for UL94-5V.

#### 3.4.1 UL 94 Vertical Testing Procedure

Figure 1: UL 94 V-0, V-1, V-2 Vertical Testing Procedure



The 94V Vertical Burn Test uses a standard bar specimen which is held at one end in the vertical position. A burner flame is applied to the free end of the specimen for two 10 second intervals separated by the time it takes for flaming combustion to stop after the first application. Two sets of 5 specimens are tested. Burning times, glowing times, when dripping occurs, and whether or not the cotton beneath ignites, are all noted. Flaming drips, widely recognized as a main source for the spread of flames, distinguish V1 from V2.

#### 4. TEST RESULTS

##### 4.1 Oxygen Index Test Results for PREMIER FR materials.

Material	Oxygen Index (%)
A220-FR	32.4
A230-FRHF	36.0
A240-FRHF	36.0

Oxygen index values are averages of several samples. Test was run per ASTM D 2863, *Measuring The Minimum Oxygen Concentration To Support Candle-Like Combustion of Plastics (Oxygen Index)*.

##### 4.2 UL 94 Flammability Certification

##### PREMIER CONDUCTIVE PLASTICS UL 94 FLAMMABILITY CERTIFICATIONS

Material	Rating	Thickness
A220-FR	V-0	1.5 mm
A230-FRHF	V-0	1.5 mm
A240-FRHF	V-0	1.8 mm*

All materials are currently under certification testing for UL94-5V rating.

\* A240-FRHF has been tested at Chomerics and passed at 1.8 mm. Testing at UL is underway for certification for V-0 at 1.8 mm.

\*\* For a more detailed report on UL 94 testing for PREMIER, please refer to Chomerics report TR 1001 EN 0106.

#### 5. NEBS COMPLIANCE

The test results reported above show PREMIER FR grades comply with GR-63-CORE: Network Equipment Building System (NEBS) Requirements: Physical Protection, section 4.2.3, *Use of Fire-Resistant Materials, Components, Wiring and Cable* as it relates to the materials. All the FR grades of PREMIER meet both the requirements in ANSI T1.307-1990 by having an oxygen index of 28% or greater and having a UL 94 V-1 or better rating.