CERTIFIED EXCELLENCE CERTIFICATE

Certification Type:	**Equipment Air Filter**
Certification Criteria:	**Telcordia, GR-63-CORE NEBS™ Requirements: Physical Protection, Issue 5, December 2017***
	Telcordia, SR-4048 Telecommunications Equipment Air Filter Certification, Issue 3, April 2003
	TYPE 0 – Air Filter Media
Manufacturer/Authorized Site:	**Universal Air Filter Company, Inc. 1624 Sauget Industrial Parkway Sauget, IL 62206**
Products:	**Quadrafoam FF, PF, FS and FL Series Polyester PE and PFPE Series**
Certification Ends:	**December 31, 2022**
Certificate Number	**070001**

*Telcordia in now part of Ericsson.

The Universal Air Filter Quadrafoam and Polyester filter media are 100% conformant to the SR-4048 TYPE 0 Air Filter Media criteria and GR-63 Equipment Frame Filter criteria. The filter media and assemblies have achieved Telcordia NEBS™ Certification.

Universal Air Filter Company may use the Certification Mark according to the terms and conditions stated in the Certification Assessment and Certification Mark Support Service Orders.

Test Criteria	Requirement Reference	Requirement Number	Results
Polyester Equipment Frame Filter Media Criteria			
Material/Components Fire Resistance	GR-63 Issue 5	R4-57 [90]	Conforms
Minimum Dust Arrestance (Equipment Occupying Greater Than 2U Vertical Rack Space Criteria **80%**)	GR-63 Issue 5	R4-20 [139]	Conforms
Minimum Dust Arrestance (Equipment Occupying 2U or Less Vertical Rack Space Criteria **65%**)	GR-63 Issue 5	R4-21 [176]	Conforms
Quadrafoam Equipment Frame Filter Media Criteria			
Material/Components Fire Resistance	GR-63 Issue 5	R4-57 [90]	Conforms
Minimum Dust Arrestance (Equipment Occupying Greater Than 2U Vertical Rack Space Criteria **80%**)	GR-63 Issue 5	R4-20 [139]	Conforms
Minimum Dust Arrestance (Equipment Occupying 2U or Less Vertical Rack Space Criteria **65%**)	GR-63 Issue 5	R4-21 [176]	Conforms
General Equipment Frame Filter Assembly Criteria			
UL Classification Mark	GR-63 Issue 5	R4-22 [140]	Conforms
Prevention of Air Bypass	GR-63 Issue 5	R4-23 [141]	Conforms
Rigid Frame Filter Assembly	GR-63 Issue 5	R4-24 [142]	Conforms
Disposable Single-Use Filters	GR-63 Issue 5	R4-27 [145]	Conforms
Recyclable Filter Materials	GR-63 Issue 5	O4-28 [194]	Conforms

These criteria are based on those in GR-78-CORE, ***Generic Requirements for the Physical Design and Manufacture of Telecommunications Products and Equipment***.

Forced air-cooled equipment shall be fitted with suitable filters to remove particulate matter that has not yet been filtered out by the return air systems of the building. These particles are usually greater than 2 microns in size and are generated by people and mechanical processes within the switch room. They usually include human debris, paper and textile fibers, and coarse dust carried in from outside by the building occupants.

FAN = FILTER

* R4-18 [138] All fan-cooled equipment occupying greater than 1U of vertical rack space (45 mm [***1.75 in***]) shall be equipped with filters. Fan filters shall be replaceable with equipment operating. Rectifiers, distribution bays, and sealed equipment with only outside fan cooling do not require filters.

1U HIGH

* O4-19 [206] It is an objective that fan-cooled equipment occupying 1U of vertical rack space (45 mm [***1.75 in***]) or less should be equipped with filters. These air filters should be replaceable with equipment operating. Rectifiers, distribution bays, and sealed equipment with only outside fan cooling do not require filters.

SHOULD HAVE FILTERS!

Given the increasing heat release, and increasing airflow needs of chassis, filtration is important to prevent ingress of dust and particulates that can result in damage from conductive contamination. It is recognized that for some 1U chassis designs, it is challenging to provide a means for air filtration. However, it is preferable to have air filters on 1U chassis that meet the filtration criterion stated in R4-21 [176]. An air filter with lower dust arrestance or MERV rating than the filtration criterion of R4-21 [176] is preferred over no air filter in 1U chassis.

80% ≥ 3U

* R4-20 [139] All equipment fan filters used in equipment occupying over 2U of vertical rack space (90 mm [***3.5 in***]) shall have either a

- Minimum dust arrestance of 80%, per ASHRAE Standard 52.1-1992, ***Gravimetric and Dust-Spot Procedures for Testing Air Cleaning Devices Used in General Ventilation for Removing Particulate Matter***, or
- Minimum Efficiency Rating Value (MERV) of 4, per ASHRAE Standard 52.2-2017, ***Method of Testing General Ventilation Air Cleaning Devices for Removal Efficiency by Particle Size***.

65% ≤ 2U

* R4-21 [176] All equipment fan filters used in equipment occupying 2U of vertical rack space (90 mm [***3.5 in***]) or less shall have either a

- Minimum dust arrestance of 65%, per ASHRAE 52.1-1992, or
- Minimum Efficiency Rating Value (MERV) of 2, per ANSI/ASHRAE 52.2-2017.

UL MARK

* R4-22 [140] Fan filters shall meet the minimum fire rating of Underwriters Laboratories, UL 900-2015, ***Standard for Air Filter Units***, plus revisions, and be marked "UL Classified."

NOTE: Polymer filter media must also meet the fire-resistance requirements per Section 4.2.3.1, "Materials, Components, Wire, and Cable Fire-Resistance Criteria."

R4-23 [141] Construction and system fit of equipment fan filters shall prevent any air bypass. Inadvertent leakage that may result from mechanical fits or tolerances, (examples may include spaces between circuit pack face plates, connector or cable matrices, chassis screw or mounting holes, etc.), is not considered bypass.

R4-24 [142] Equipment shall have a provision for fan-filter replacement without particulate contaminants from the filter being introduced into equipment. If filters can be changed with fans operating, filter replacement methods that minimize touching the media and/or dislodging captured particulates shall be specified. Filter designs with rigid frames that are withdrawn from the airflow for removal satisfy the intent of this requirement.

R4-25 [143] The equipment manufacturer shall provide a method for determining equipment fan filter replacement schedules. This guideline shall be included in the product documentation.

O4-26 [144] If possible, active alarming should be provided to indicate the need for fan filter replacement.

R4-27 [145] Equipment fan filters shall be single use and not the types that require cleaning.

O4-28 [154] It is an objective that equipment fan filters utilize recyclable materials.

4.1.6 Heat Dissipation and Energy Efficiency

Management of energy consumed and heat dissipated by telecommunications equipment is a major challenge for TSPs. Crucial to this management is accurate reporting of expected equipment power and heat loads. The heat-dissipation criteria of this section are based on the cooling capacities of traditional network facilities. For additional information on equipment and room cooling methods, refer to GR-3028-CORE, ***Thermal Management in Telecommunication Central Offices: Thermal GR-3028.***

R4-29 [77] The rate of heat release and method of cooling (e.g., natural convection, forced-air fans) shall be documented for all equipment.

- For circuit packs, document the rate of heat release in Watts (W).
- For floor-mounted equipment, document the rate of heat release in Watts, as well as the rate of heat dissipation based on floor area in W/m^2 or W/ft^2.
- For equipment shelves, document the rate of heat release in Watts, as well as the rate of heat dissipation in W/m^2 per meter or W/ft^2 per foot of frame vertical height used.