



# Fraunhofer

## TESTED<sup>®</sup> DEVICE

Voir  
Dust-free toline B002  
**Report No. HU 2210-1353**

DUPLICATE

Statement of  
Qualification

Single product  
Particle Emission

# Statement of Qualification · Single product

**Customer**  
 Huizhou Voir Science&Technology Co.,Ltd  
 Haibao Industrial Zone, Sandong Digital Park  
 516025 Huicheng District, Huizhou City, Guangdong Province  
 China

**Component tested**  
 Category: Energy Supply  
 Subcategory: Cable Systems  
 Product name: Cable system Dust-free toline(VA-HFFC06-B002)  
 (manufacturing date: 9/21/2022; color: white; batch number: 20220921002; serial number: VA-HFFC06-B002)

**Random sampling of particle emissions (airborne) at representative sites**  
 Standards/Guidelines: ISO 14644-1, -14  
 The norms stated generally refer to the version valid at the time of the tests.  
 Test devices: Optical particle counter:  
 LasAir II 110 and LasAir III 110 with measuring ranges  $\geq 0.1 \mu\text{m}$ ,  $\geq 0.2 \mu\text{m}$ ,  $\geq 0.3 \mu\text{m}$ ,  $\geq 0.5 \mu\text{m}$ ,  $\geq 1.0 \mu\text{m}$  and  $\geq 5.0 \mu\text{m}$   
 Test environment parameters:  
 • Cleanroom Air Cleanliness Class (according to ISO 14644-1):..... ISO 1  
 • Airflow velocity:.....0.45 m/s  
 • Airflow pattern:..... vertical laminar flow  
 • Temperature: .....22 °C  $\pm$  0.5 °C  
 • Relative humidity: ..... 45 %  $\pm$  5 %  
 Test procedure parameters:  
 • Bending radius: .....r = 100 mm  
 • Stroke length:..... s = 820 mm  
 • Parameter Set 1:..... $v_1 = 0.5 \text{ m/s}$ ;  $a_1 = 1.0 \text{ m/s}^2$   
 • Parameter Set 2:..... $v_2 = 1.0 \text{ m/s}$ ;  $a_2 = 2.0 \text{ m/s}^2$   
 • Parameter Set 3:..... $v_3 = 2.0 \text{ m/s}$ ;  $a_3 = 4.0 \text{ m/s}^2$

**Test result / Classification**  
 When operated under the specified test conditions, the cable system Dust-free toline(VA-HFFC06-B002) is suitable for use in cleanrooms fulfilling the specifications of the following Air Cleanliness Classes according to ISO 14644-1:

Test parameter(s)	Air Cleanliness Class
$v_1 = 0.5 \text{ m/s}$ ; $a_1 = 1.0 \text{ m/s}^2$	1
$v_2 = 1.0 \text{ m/s}$ ; $a_2 = 2.0 \text{ m/s}^2$	1
$v_3 = 2.0 \text{ m/s}$ ; $a_3 = 4.0 \text{ m/s}^2$	1
<b>Overall result</b>	<b>1</b>

Please note: Transport damages, incorrect installation, aging behavior, etc. can influence the test result.

The measuring devices used for the qualification tests are calibrated at regular intervals; their results can be traced back to national and international standards. In cases where no national standards exist, the test procedure implemented complies with the technical regulations and norms applicable at the time of the test. The relevant documentation can be viewed on request at any time.

Detailed information and parameters of the test environment can be found in the Fraunhofer IPA test report.

Fraunhofer Institute for Manufacturing Engineering and Automation IPA

HU 2210-1353  
 Report No. first document

Stuttgart, November 4, 2022  
 Place, date of first document issued

Department of Ultraclean Technology and Micromanufacturing

--  
 Report No. current document

--  
 Place, current date

Nobelstrasse 12  
 70569 Stuttgart  
 Germany

on behalf of   
 Dr.-Ing. Frank Bürger, Project Manager Fraunhofer IPA