



# Fraunhofer

## TESTED<sup>®</sup> DEVICE

Rite-Hite Corporation  
LS Clean US 05 / 2021  
**Report No. RI 2108-1247**

Statement of  
Qualification

Single product  
Outgassing Behavior  
VOC/SVOC

Customer	Rite-Hite Material Handling Equipment (Kunshan) Co., Ltd. 110 Donglong Road Kunshan Jiangsu 215300 China
Component tested	
Category:	Material
Subcategory:	Plastics
Product name:	VINYL,27OZ,WHITE,TOPCOAT, 118" (delivery date to Rite-Hite: 4/8/2021; color: 907907; article number: 8556)

Emission chamber measurements with purge-and-trap thermodesorption method and gas chromatography combined with mass spectrometry (TD-GC/MS)	
Standards/Guidelines:	ISO 14644-8, -15; ISO 16000-6, -9, -11, -25; VDI 2083 Part 17 The norms stated generally refer to the version valid at the time of the tests.
Testing equipment:	<ul style="list-style-type: none"><li>Measuring station: .....PerkinElmer Clarus 600, Clarus 600T, ATD 650</li><li>Sampling chamber:.....Markes International µCTE</li></ul>
Sample storage:	<ul style="list-style-type: none"><li>Pre-conditioning:<ul style="list-style-type: none"><li>Cleanroom Air Cleanliness Class (according to ISO 14644-1): ..... ISO 1</li><li>Airflow velocity: .....0.45 m/s</li><li>Airflow type:..... vertical laminar flow</li><li>Temperature: .....22 °C ±0.5 °C</li><li>Relative humidity: ..... 45 % ± 5 %</li><li>Purified air: ..... VOC-filtered</li></ul></li></ul>
Test procedure parameters:	<ul style="list-style-type: none"><li>Retention range (VOC): ..... C6 to C16</li><li>Outgassing test temperatures: ..... 23 °C and 90 °C</li></ul>


Test result / Classification	The outgassing behavior of VINYL,27OZ,WHITE,TOPCOAT, 118" at the stated temperatures was investigated according to VDI 2083 Part 17 and ISO 14644-15. Based on the outgassing rates determined for the specific surfaces, the following material classification was made for the corresponding Contaminant Category:
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Contaminant Category (x)	SER <sub>a</sub> <sup>1)</sup> 23 °C [g/m²s]	SER <sub>a</sub> <sup>1)</sup> 90 °C [g/m²s]	ISO-ACC <sub>m</sub> Class (x) based on 23 °C
VOC	2.8 x 10 <sup>-6</sup>	2.4 x 10 <sup>-5</sup>	-5.6
SVOC	1.1 x 10 <sup>-6</sup>	1.8 x 10 <sup>-5</sup>	-6.0
Amines	< 2.8 x 10 <sup>-10</sup>	< 1.7 x 10 <sup>-9</sup>	--
Organophosphates	< 2.8 x 10 <sup>-10</sup>	< 1.7 x 10 <sup>-9</sup>	--
Siloxanes	< 2.8 x 10 <sup>-10</sup>	6.9 x 10 <sup>-9</sup>	--
Phthalates	< 2.8 x 10 <sup>-10</sup>	< 1.7 x 10 <sup>-9</sup>	--

<sup>1)</sup>SER<sub>a</sub>: Area-specific emission rate<sup>9</sup>

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.

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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	

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