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**TESTED[®]
DEVICE**

HITACHI CABLE VIETNAM CO., LTD
Multi pair UL2464-SB (FLEX)
Report No. HI 1803-1021

DUPLICATE

Statement of
Qualification

Particle Emission

Statement of Qualification

Customer HITACHI CABLE VIETNAM CO., LTD
Plot CN 6.1-2, Tan Truong IZ, Cam Giang Dist.
Hai Duong Province
Vietnam

Component tested

Category: Energy Supply
Subcategory: Cable Systems
Product name: Multi pair UL2464-SB (FLEX) with shield
(manufacturing date: 1/2018; color: black; serial number: UL2464-SB (FLEX))
Tested objects:

- Cable 2Px28AWG (19/0.08TA) LF (batch number: E90/1-1801356)
- Cable 15Px28AWG (19/0.08TA) LF (batch number: E90/1-1801359)
- Cable 2Px26AWG (30/0.08TA) LF (batch number: E90/1-1801320)
- Cable 15Px26AWG (30/0.08TA) LF (batch number: E90/1-1801360)
- Cable 2Px25AWG (40/0.08TA) LF (batch number: E90/1-1801319)
- Cable 15Px25AWG (40/0.08TA) LF (batch number: E90/1-1802004)
- Cable 2Px23AWG (60/0.08TA) LF (batch number: E90/1-1801321)
- Cable 15Px23AWG (60/0.08TA) LF (batch number: E90/1-1801328)

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:

- Energy chain:..... igus E61.29.080.150.0
- Bending radius:r = 150 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 series Multi pair UL2464 SB (FLEX) with shield 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
$v_1 = 0.5 \text{ m/s}$; $a_1 = 1.0 \text{ m/s}^2$	4
$v_2 = 1.0 \text{ m/s}$; $a_2 = 2.0 \text{ m/s}^2$	2
$v_3 = 2.0 \text{ m/s}$; $a_3 = 4.0 \text{ m/s}^2$	2
Overall result	4

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

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Department of Ultraclean Technology and Micromanufacturing

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Report No. current document

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Place, current date

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on behalf of 
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