



# Fraunhofer

## TESTED<sup>®</sup> DEVICE

THOMAS CABLE Co., Ltd.  
THOMTRONIC-CLEANROOM C TP  
**Report No. TH 1312-682**

DUPLICATE

Statement of  
Qualification

# Statement of Qualification

**Customer:** THOMAS CABLE Co., Ltd.  
20-4, Yeochon-Ri  
Ochang-Myun, Cheongwon-Kun  
Chungbuk 363-884  
South Korea

**Component tested:**

Category: Energy Supply  
Subcategory: Cable Systems  
Type: THOMTRONIC-CLEANROOM C TP series (black)  
• TP 07: 1 x 2 x 0.25 mm<sup>2</sup> (Manufacturing date: 07/22/2013)  
• TP 08: 1 x 2 x 0.5 mm<sup>2</sup> (Manufacturing date: 07/22/2013)  
• TP 09: 5 x 2 x 1.0 mm<sup>2</sup> (Manufacturing date: 07/22/2013)

**Random check measurements of particle emission (airborne) at representative points**

Test procedure: According to VDI 2083-9.1, ISO 14644-1  
Each standard stated refers to the version valid at the time of testing.

Measuring instruments: Optical Particle Counter:  
Model LasAir II 110 with measuring channels of  $\geq 0.1 \mu\text{m}$ ,  $\geq 0.2 \mu\text{m}$ ,  
 $\geq 0.3 \mu\text{m}$ ,  $\geq 0.5 \mu\text{m}$ ,  $\geq 1.0 \mu\text{m}$  and  $\geq 5.0 \mu\text{m}$

Test parameters of the test environment:

- Cleanroom Air Cleanliness Class (according to ISO 14644-1):..... ISO 1
- Air flow velocity:..... 0.45 m/s
- Air flow guidance: .....vertical unidirectional air flow
- Temperature: .....22 °C  $\pm$  0.5 °C (71.6 °F  $\pm$  0.9 °F)
- Relative humidity: ..... 45 %  $\pm$  5 %

Test parameters of the test execution:

- Energy chain: ..... igus E61.29.50.075.0
- Chain bending radius: ..... r=75 mm
- Stroke length:..... s=820 mm
- Cable length TP 07: ..... l=825 mm
- Cable length TP 08: ..... l=830 mm
- Cable length TP 09: ..... l=845 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 results / Classification:**  
(according to ISO 14644-1)

The THOMTRONIC-CLEANROOM C TP series is suitable for use in cleanrooms fulfilling the following Air Cleanliness Class:

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

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.

For further information about the test environment and parameters, please refer to the Fraunhofer IPA test report.

Fraunhofer Institute for  
Manufacturing Engineering and Automation IPA

Stuttgart, February 11, 2014

Place, date of first document issued

Department of Ultraclean Technology  
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