



# Fraunhofer

## TESTED<sup>®</sup> DEVICE

THOMAS CABLE Co., Ltd.  
THOMFLEX-CLEANROOM  
**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: THOMFLEX-CLEANROOM series (black)  
• TP 01: 2 x 0.25 mm<sup>2</sup> (Manufacturing date: 07/22/2013)  
• TP 02: 4 x 1.5 mm<sup>2</sup> (Manufacturing date: 07/22/2013)  
• TP 03: 4 x 6.0 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 01: ..... l=870 mm
- Cable length TP 02: ..... l=850 mm
- Cable length TP 03: ..... l=840 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 THOMFLEX-CLEANROOM 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 1
<b>Overall result</b>	<b>ISO 1</b>

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The measuring equipment used for the qualification is regularly calibrated and is based on national and international standards. In the case where no national standards exist, the measuring procedure used corresponds with technical regulations and norms valid at the time of the measurement. The documents drawn up for this procedure are available for viewing.

The validity of this certificate applies only to the mentioned product in this particular condition for a duration of 5 years.  
Further information: [www.tested-device.com](http://www.tested-device.com).

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Stuttgart, February 11, 2014  
Place, Date

*W. B. ...*  
Project manager