



Testing Laboratory No. 1206, accredited by CAI pursuant to ČSN EN ISO/IEC 17025 standard

National Institute of Public Health (NIPH)
Centre of Laboratory Activities
Laboratory for Physical Factors



Report No. 1.6/ČP/15/31
Measuring number of solid aerosol particles
Accredited test No. 82

Expertise No.: EX 151518, SZÚ/4101/2015
Customer : ELKOVO ČEPELÍK s.r.o.
Chutnovka 77, 511 01 Mírová pod Kozákovem - Turnov
Date of measurement: 7th December 2015
Reason of measurement: **use of LED luminaires in cleanrooms**
Place of measurement: Institute of Haematology and Blood Transfusion (IHBT),
Prague 2
- cleanroom – class 3 pursuant to ISO 14644-1
Present during measurement: Petr Niesig, ELKOVO ČEPELÍK s.r.o.
Jana Bejšovcová, IHBT
Measurement performed by: Ing. Z. Mathauserová, Ing. L. Prokšová-Zuská, NIPH

The place of measurement was the clean box of IHBT with defined environment fulfilling cleanliness class 3 pursuant to ČSN EN ISO 14644-1.

Methodology of measurement and evaluation

The methodology for measuring *d u s t i n e s s* in clean rooms was used, i.e. determining the number of solid aerosol particles with dimensions $\geq 0.5 \mu\text{m}$ and $\geq 5.0 \mu\text{m}$ pursuant to Annex B of ČSN EN ISO 14644-1 Cleanrooms and associated controlled environments - Part 1: Classification of air cleanliness and pursuant to the document of the Laboratory for Physical Factors – SOP No. 2/1.6 Determination of classes of cleanliness of defined cleanrooms. One measurement (one piece of data displayed on the equipment) represents a two-minute taking of a sample of air at the rate-of-flow of the air through the particle counter equal to $1 \text{ ft}^3/\text{min}$ – the results are recalculated to the volume of 1 m^3 of air pursuant to the requirements of the respective standard.

Used equipment

Particle counter - CI-200 model, manufacturing. No. 034316, KL No. 8018-KL-R0049-14, which determines and registers numbers of dust particles in 6 dimension intervals from 0.2 to $10 \mu\text{m}$.

Conditions of measurement

The parameters of the validated cleanroom were verified during half an hour measurement, afterwards the luminaires were inserted and switched on and then monitoring followed whether their placement in the cleanroom does not lead to increase of the number of solid aerosol particles. The subject of monitoring were LED luminaires, types Best Clean, Clean,





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LOS+Sklo, manufacturer ELKOVO ČEPELÍK s.r.o.

Results of measurement

For a copy of the sample of the measurement record see Annex 1, only final average values are stated in Table 1, i.e. the number of solid aerosol particles in 1 m³ of taken air (measured in 1 ft³).

Table 1: Average measured values of the number of solid aerosol particles with dimensions $\geq 0.5 \mu\text{m}$ and $\geq 5.0 \mu\text{m}$ in 1 m³ of air

Place of measurement	Numbers of particles in 1 m ³ of air	
	$\geq 0.5 \mu\text{m}$	$\geq 5.0 \mu\text{m}$
Cleanroom	0	0
Cleanroom with installed luminaires	0	0

Note: Due to the measured values and the nature of measurement, uncertainty of measurement was not set.

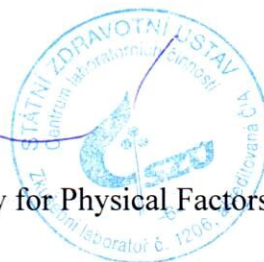
CONCLUSION

No solid aerosol particles were released into the clean box atmosphere from operation of the installed luminaires, designated as LED luminaires, types Best Clean, Clean, LOS+Sklo, manufacturer ELKOVO ČEPELÍK s.r.o., the Czech Republic, **the luminaires are suitable for the use in all types of cleanrooms.**

The Laboratory declares that all results apply to the given measurements only. This report may be reproduced only in its entirety, a part thereof may be reproduced only with the written permission of the technical head of the Laboratory.

Date: 15th December 2015

Prepared by: Ing. Z. Mathauserová
Technical head of the Laboratory for Physical Factors



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