

Laminar Air Flow Compliancy

Maquet PowerLED II Surgical Light

Laminar air flow ceilings are essential in operating theatres to limit the levels of contaminants in the air and thus the risks of post-operative infections for patients. The vertical outflows are generated by ceiling outlets recovering the zone to be protected, and it is crucial that surgical lights do not disturb the air flow. Maquet PowerLED II surgical lights were sent to a centre of expertise in air filtration systems, in order to determine its impact on laminar flows in actual operating theatre conditions.

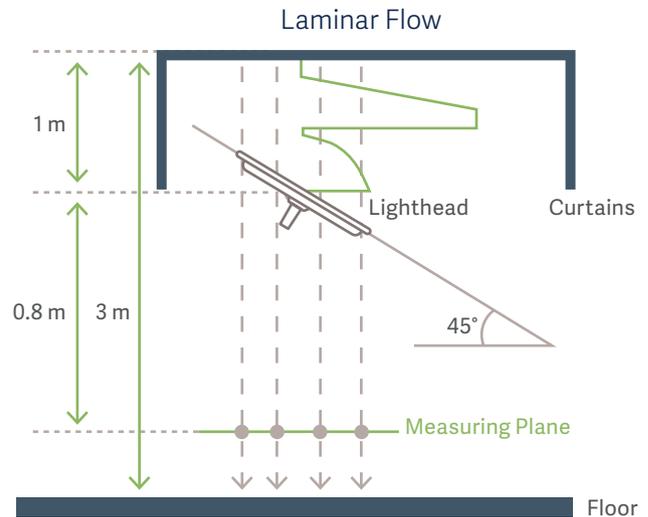


Figure 1: examination of the mist distribution above and below the light head.

Visual tests

The lights were positioned in the center 1 m underneath the laminar flow ceiling as described in figure 1. After switching on the lights, an aerosol mist was emitted

50 cm above and 150 cm below the light head so that the mist distribution can be visually observed (potential lifting effects, reversal of the flow direction). This test is very important, as heat dissipation can create buoyancy (lifting effects), responsible for carrying airborne particles and germs potentially leading to infections.

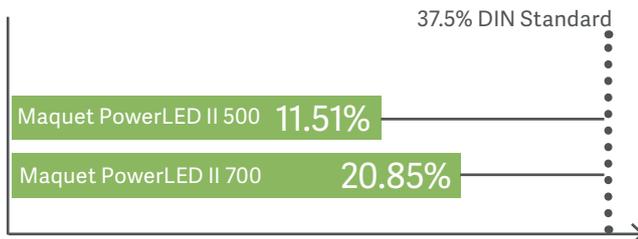


Figure 2: results for Maquet PowerLED II surgical lights according to Appendix B and E of DIN 1946-4: 2018-09.

Turbulence intensity measurements

Determination of "turbulence intensity" is conducted without light, with the operating light switched OFF and ON. Three parameters such as flow velocity, temperature and turbulence degree are determined in the measuring rectangular plane 1 m below the light under surface as shown in figure 1.

Results: There was no visible uprise of air towards the ceiling caused by Maquet PowerLED II surgical lights, and no flow inversion was detected by the testing fog. This confirms that the well controlled heat dissipation from Maquet PowerLED II surgical lights does not disturb the laminar flow effectiveness.

For the Maquet PowerLED II 500 light head, the elimination time of the fog is on average 69s. The light creates only 11.51% turbulence level. For the Maquet PowerLED II 700 light head, the elimination time of the fog is on average 55s. The light creates only 20.85% turbulence level. Its unique design, its smooth surface and its low heat dissipation ensure an optimum operating environment for both patients and surgeons.