

LOG3 - Plasma generator for electric hand dryers

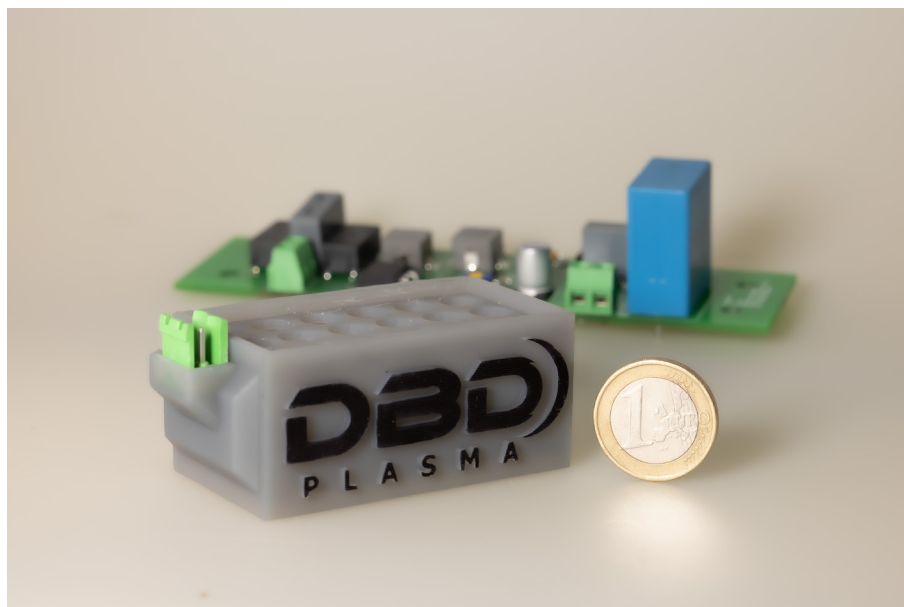
LOG3 is a miniaturized cold plasma generator, which can be installed in almost all hand dryers - the core of this solution. The air that exits the dryer is germ-free, and the drying process kills viruses and bacteria on the hands. The air flow generated by the hand dryer is used unchanged as a carrier medium for the particles that achieve the disinfection.

LOG3 guarantees safe disinfection according to the standards of the German Society for Hygiene and Microbiology (DGHM), which requires the elimination of at least 99.9 % of microorganisms for effective disinfection, a 1000-fold reduction in germs. LOG3 achieves significantly more than 99.99 %. Test series in the specialist laboratory have confirmed a germ reduction of up to 40000 times.

The design ensures a cost-effective integration into the design of most hand dryers on the market.

With the integration of LOG3, hand dryer manufacturers bring a whole new class of performance to the market. No longer would the hand dryers be considered germ spreaders but rather the opposite: disinfection now comes with the territory.

The buyer incurs no additional consumption costs, for example for chemical disinfection products, or filter changes. In addition, this process does not attack the human skin like conventional disinfection solutions or solutions based on UV-C.



Front: Design draft for the generator.

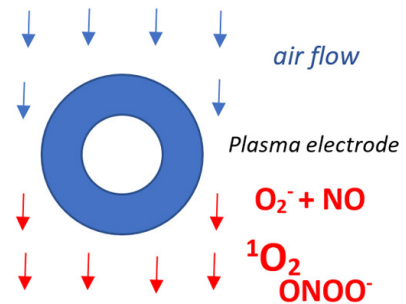
Background: Example of power and control electronics.

The dimensions of both components are finally adapted to the integrating dryer.

Operating principle

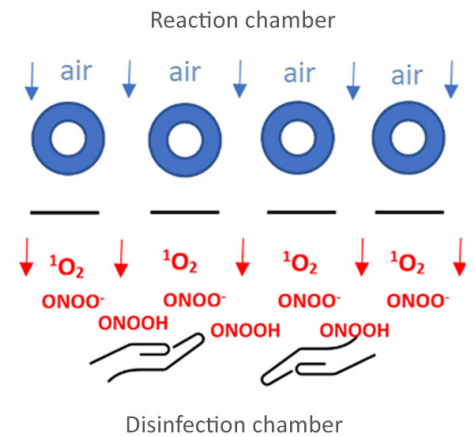
Which reactive particles are formed in the plasma?

Numerous reactive particles are formed in air plasma. However, only a few are so long-lived that they can still act outside the discharge area. One exception is the reactive oxygen species (ROS). These are either as stable as the singlet oxygen (1O_2) and interact directly with the target molecules, or radicals are formed which are also long-lived. Thus, the superoxide radical (O_2^-) is formed in the plasma which reacts with nitric oxide (NO-) to form reactive nitrogen species (RNS), the peroxynitrites (ONOO-) and (ONOOH).



How far can ROS / RNS be transported?

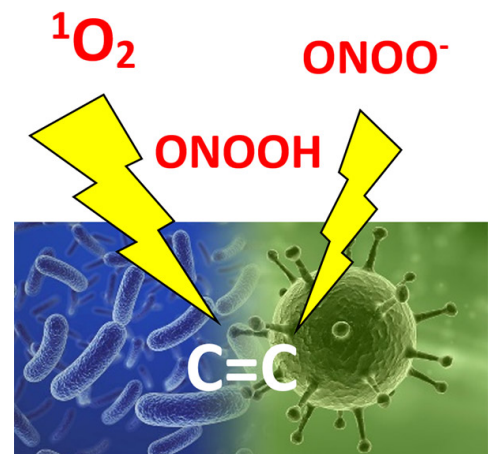
The range can be estimated very well via their life span. The average flow velocity of the blower unit is approx. 16 m/s. Peroxynitrite has a lifetime of about 10 ms, which means that it is still effective at a distance of 16 cm from the discharge source. For singlet oxygen, the lifetime is at least 50 ms, which means that even longer transport distances of about 80 cm from the discharge source are possible. In a two-chamber system as shown on the left, the reactive species can easily be used for disinfection at a comfortable distance from the discharge unit.



How do the ROS / RNS work?

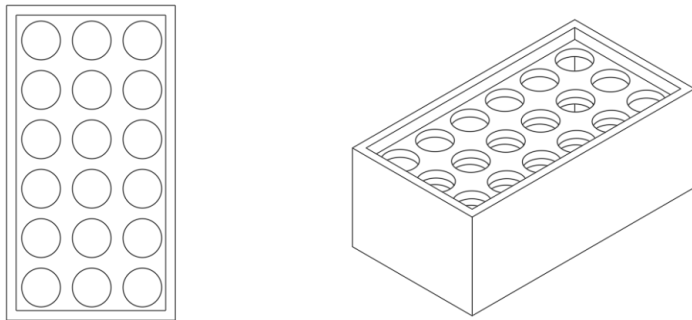
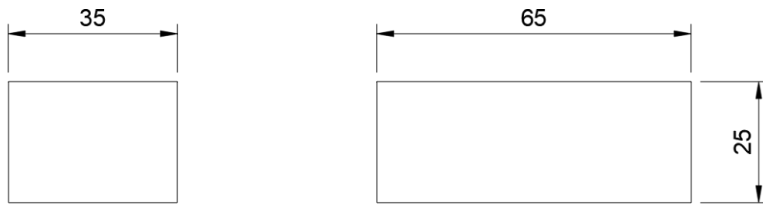
The target molecules are the cell building blocks of germs, bacteria and viruses, whose common basic structure is formed by amino acids. The main active ingredient singlet oxygen reacts directly with the carbon double bonds (C=C) of the amino acids within nanoseconds and oxidizes them to peroxides, which kill and inactivate the dangerous pathogens via protein, DNA and membrane damage.

A supporting parallel process happens via the presence of the peroxynitrites, which can react in a liquid environment with the same active principle. This is the case when the hands are still wet from washing.



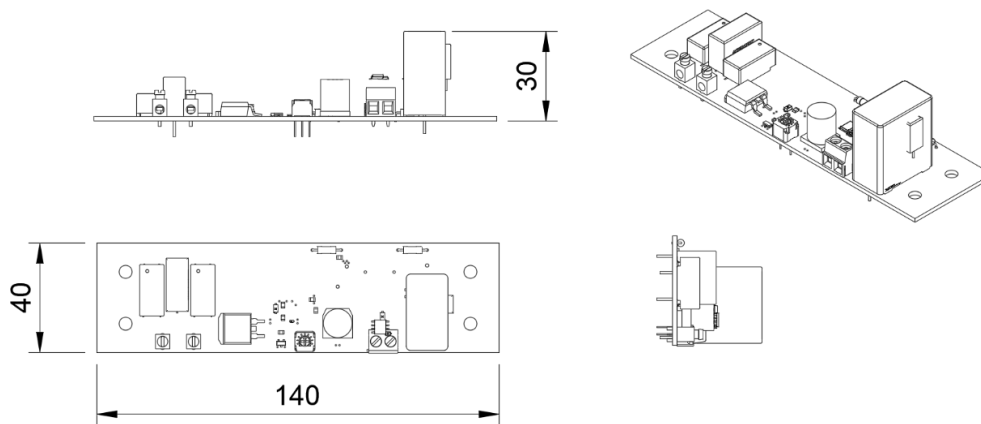
Technical data

Generator:



Length mm 65
Width mm 35
Height mm 25
Plasma active area [mm²] 200

Control and power electronics:



Length mm 140
Width mm 40
Height mm 30
Input voltage VAC 230
Output voltage kVAC 12
Input power W 20