



# COLD PLASMA GENERATOR HPG 2



The  
Cold Plasma  
Generator  
eliminated:  
Bacteria  
Viruses  
Mould  
Odours



## PLASMA GENERATOR HPG 2

The generator is very compact size and has a very low power consumption.  
This generator was studied for applications in residential homes and condominiums.

**Each generator can handle from 200\* to 400\* m<sup>3</sup>/h of air in Forced Ventilation System.  
Each generator can cover from 60\* to 140\* m<sup>2</sup> of surface in Ducted Air  
Conditioning system & similar.**

**\*NOTE : For air flow less of 200 m<sup>3</sup>/h it is advisable to control the generator with a cyclic timer to reduce proportionally the running time.**

The main effect of the high-voltage electric field and high frequency is the creation of a plasma generated in ambient temperature and pressure and therefore commonly referred as **<COLD PLASMA>**.

Cold plasma gives rise to the creation of polarized particles and reactive chemicals, among which H<sup>+</sup> and OH<sup>-</sup> which are the most abundant and reactive.

This cold plasma is generated in the air and has at least four effects : Polarization of particles, catalysis of reactions not commonly obtainable at ambient conditions; Sterilization of bacteria & viruses & moulds; aggregation of particles.

**The Cold Plasma effects not are selective! This means that the demolition is contemporary on all pollutant, also if the performance can be different from one and other.**

The benefits of to install a Plasma Generator are :

- Total dusts: Demolition up to 99%
- Metals: Demolition up to 90%
- Ammonia: Demolition up to 65%
- Hydrocarbons: Demolition up to 50%
- Carbon monoxide: Demolition up to 80%
- Nitrogen oxides: Demolition up to 90%
- Sulphur oxides SO<sub>x</sub>: Demolition up to 70%
- VOC: Demolition up to 95%
- Total bacteria: Demolition up to 99%
- Total viruses: Demolition up to 99%
- Moulds : Demolition up to 99%

If the system is recirculating air, the effectiveness increases, reaching even 100% of demolition in a few hours of operation.

**To ensure the best performance and advise on the use of the Plasma Generator will not hesitate to contact us**



## DATA SHEET HPG 2

**ATTENTION : The Plasma Generators cannot be used with mixtures of gas and dusts explosive. The risk must be evaluate with experts or supplier, if need to treat this mixtures.**

### Electrical Data

Input power 220-240 Vac  
Input frequency 50 – 60 Hz  
Power absorption max 10 VA  
Operation 100% continuous

### Field characteristics HPG 2

Cold Plasma field generation in invisible spectrum with DBD.  
Ozone generation less than 20 mg/h for unit.  
Max air temperature flow = + 60°C

### Field Use

For demolition or reduction of VOC, CO, NOx, Hydrocarbons  
Organic dust, Bacteria, Viruses, Moulds, in environment when it  
Is require a low level of Ozone.

### EMC

EMC design is another important feature to ensure the lowest emissions and noise.  
All the electronic circuitry and electrodes are wrapped in a special Faraday cage.  
On power line is inserted special noise suppressor.  
The Faraday cage and the noise suppressor are connected to the grounding wire

**For proper operation and protection of people sure to connect the ground wire!**

## BUILD SPECIFICATION



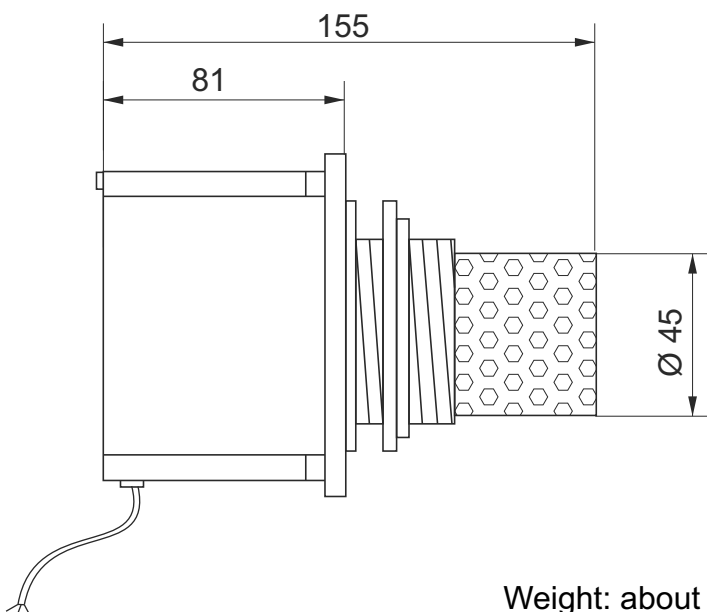
In normal use environment, without very aggressive chemicals, the life of one HPG 3 is around 26000 hours. It can be more or less in function of air temperature, working hours at day, chemicals in the flow, and other.

The air flow trough the electrode can have:

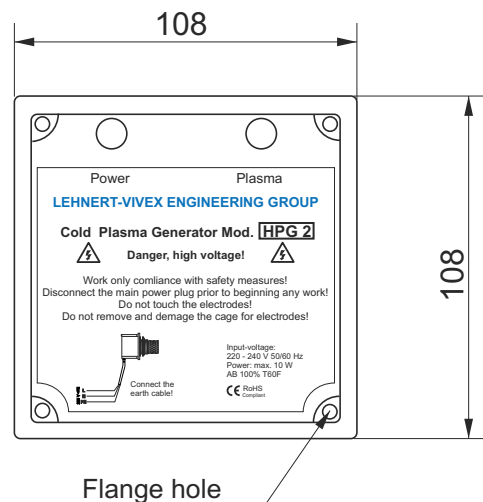
**Max Temperatur = + 60°C**  
**Min Temperatur = - 10°C**

The inside air temperature of build GP:

**Max Temperatur = + 40°C**  
**Min Temperatur = - 10°C**



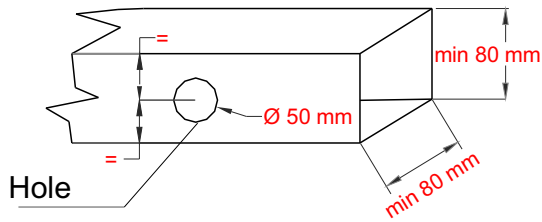
Weight: about 0,70 kg



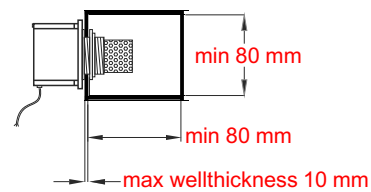
## EXAMPLES OF INSTALLATION

### Generator in square duct

Hole predisposition



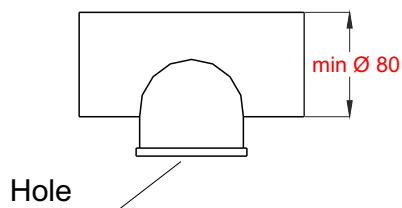
Seen in section



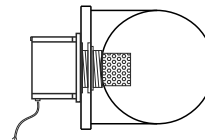
In square duct the HPG 2 can install on a wall directly with plug or with 4 screws in the flange.

### Generator in round duct

Hole predisposition



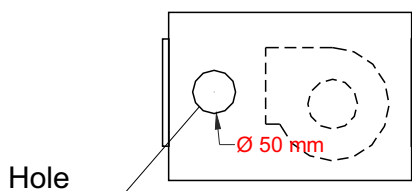
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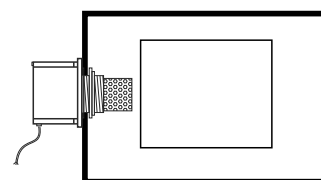
In round duct insert a T-junktion with a cap. The HPG 2 can install on cap directly with plug or with 4 screws in the flange.

### Generator in fan box

Hole predisposition



Seen in section



In fan box or in AHU or other, the HPG 2 can install on a wall directly with plug or with 4 screws in the flange.

## COLD PLASMA GENERATOR

Table of ozone production and relative level in air to different value of air flow rate, with NOTE.

| Model | Ozone production | Air flow rate<br>m3/h | Ozone level |       |     |
|-------|------------------|-----------------------|-------------|-------|-----|
|       | mg/h             |                       | ppm         | mg/m3 |     |
| HPG 2 | 20               | 200                   | 0,047       | 0,100 | (1) |
| HPG 2 | 20               | 300                   | 0,032       | 0,067 |     |
| HPG 2 | 20               | 400                   | 0,024       | 0,050 |     |
| HPG 3 | 100              | 500                   | 0,095       | 0,200 | (2) |
| HPG 3 | 100              | 1000                  | 0,047       | 0,100 | (2) |
| HPG 3 | 100              | 1500                  | 0,032       | 0,067 |     |

(1) NOTE : For air flow less of 200 m3/h it is advisable to control the generator with a cyclic timer to reduce proportionally the running time.

(2) NOTE : For air flow less of 1000 m3/h it is advisable to control the generator with a cyclic timer to reduce proportionally the running time.

### COMPARISON BETWEEN THE DIFFERENT TECHNOLOGIES FOR AIR PURIFICATION

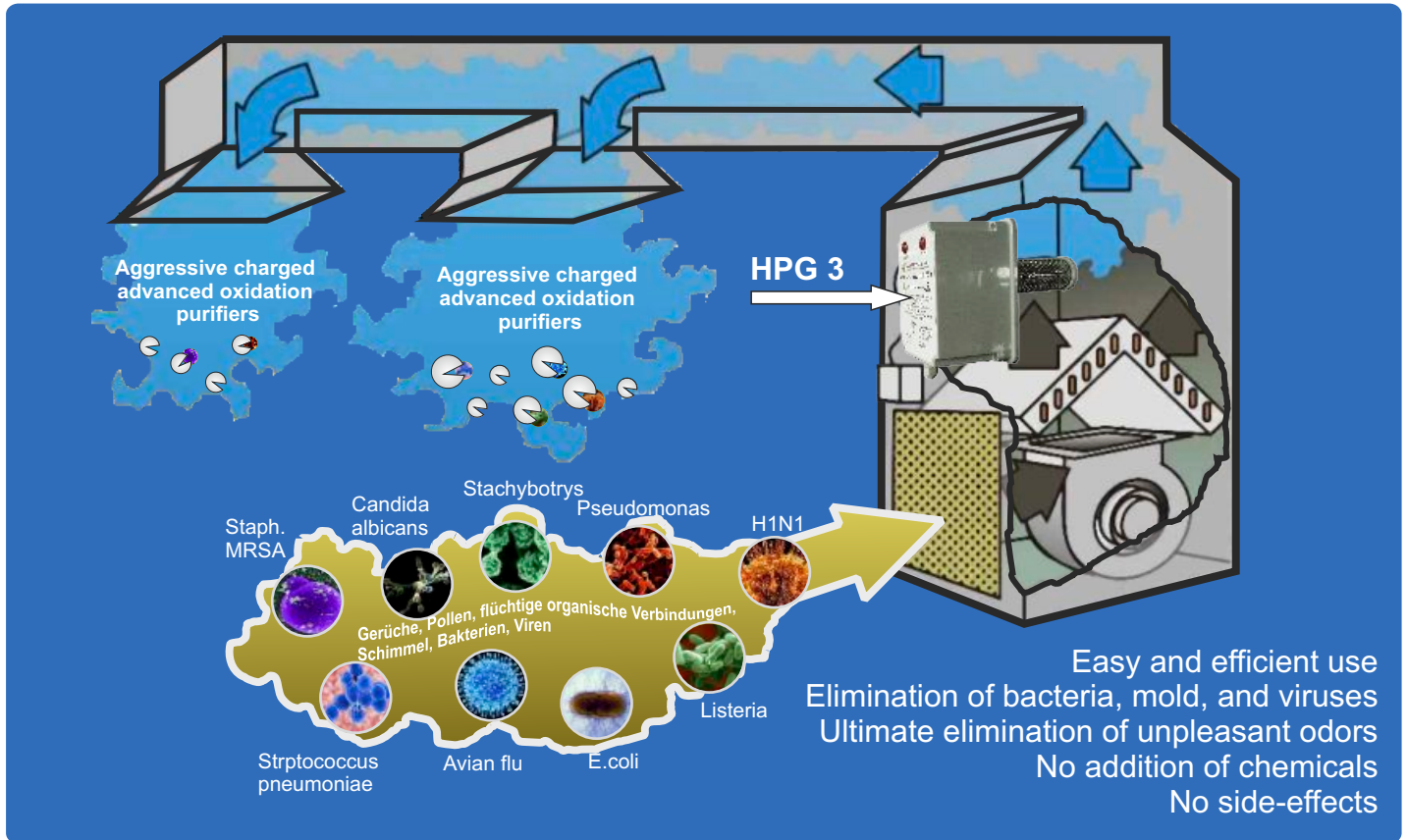
The Indoor and the Outdoor Air contain many pollutants that can be classified as follow:

- A** Gas and steam ( CO, CO2, SOx, NOx, VOC, Radon, Ammonia, Hydrocarbons, etc.)
- B** Biological contaminants (Bacteria, Viruses, Mold, Spores, organic materials, etc.)
- C** Solids as Dusts & Smoke ( Rubber, Minerals, Paper, Microfiber, etc.) classified in PM.
- D** Liquids as Fog or Suspension (Water, Gasoline, Oil, etc.)

|    |                   |             | EFFECTIVE ON<br>(1) | EFFICIENCY<br>(1) | INIZIAL COST<br>(1) | SELECTIVE<br>(1) | RIGENERABLE<br>(1) | AVERAGE LIFE<br>(1) | OVERALL DIMENSIONS<br>(1)-(2) | PRESSURE DROP<br>(2) |
|----|-------------------|-------------|---------------------|-------------------|---------------------|------------------|--------------------|---------------------|-------------------------------|----------------------|
| 1  | MECHANICAL FILTER | STANDARD    | <b>C</b>            | LOW-MEDIUM        | LOW                 | YES              | YES                | LOW-MEDIUM          | MEDIUM                        | MEDIUM               |
| 2  | MECHANICAL FILTER | HEPA        | <b>B+C</b>          | HIGH              | LOW-MEDIUM          | YES              | NO                 | LOW                 | MEDIUM                        | MEDIUM-HIGH          |
| 3  | ELECTROFILTER     | ESP         | <b>C+D</b>          | MEDIUM-HIGH       | MEDIUM              | YES              | YES                | HIGH                | MEDIUM                        | LOW                  |
| 4  | ACTIVATED CARBON  | STANDARD    | <b>A+B</b>          | MEDIUM            | MEDIUM              | YES              | NO                 | LOW                 | MEDIUM                        | MEDIUM-HIGH          |
| 5  | ACTIVATED CARBON  | IMPREGNATED | <b>A</b>            | MEDIUM-HIGH       | MEDIUM-HIGH         | YES              | NO                 | LOW                 | MEDIUM                        | MEDIUM-HIGH          |
| 6  | IONIZING          |             | <b>C+D</b>          | MEDIUM            | MEDIUM              | YES              | YES                | HIGH                | LOW                           | LOW                  |
| 7  | IONIZING + UV     |             | <b>B+C+D</b>        | MEDIUM-HIGH       | MEDIUM-HIGH         | YES-NO           | YES                | HIGH                | LOW                           | LOW                  |
| 8  | PHOTOCATALYTIC    |             | <b>A</b>            | LOW               | HIGH                | YES              | YES                | HIGH                | HIGH                          | LOW                  |
| 9  | COLD PLASMA       |             | <b>A+B+C+D</b>      | MEDIUM-HIGH       | MEDIUM              | NO               | YES                | HIGH                | LOW                           | LOW                  |
| 10 | COLD PLASMA       | + WATER     | <b>A+B+C+D</b>      | HIGH              | MEDIUM-HIGH         | NO               | YES                | HIGH                | MEDIUM-HIGH                   | LOW-MEDIUM           |

- NOTES :
- (1) Average rating of the different systems on the market.
  - (2) Rated at equal flow of treated air at standard conditions

**Main principle of a professional air purification system for air ventilation- and air conditioning systems**



**Virulent germs**

It has been proved that bacteria and viruses are more often related to the genesis of cancer, than commonly assumed.

Cancer is the most dreaded diseases in Germany. At present, there are known more than 100 different types of cancer. Scientists were able to prove that the initial cause for cancer is significantly often related to viral, bacterial, or parasitic infections. Recent studies have shown that one in six cases of cancerous diseases is caused by an infection. In 2008, 1.5 billions of deaths could be related to gastric bacteria (*Helicobacter pylori*), human papilloma-virus or hepatitis and other pathogenic viruses.

A study conducted by the World Health Organization WHO and published in the trade journal "Lancet Oncology", points out to the importance of the inoculation and use of antibiotics against bacteria.

**Professional air purification system with unique qualities**

The issues related to antibiotics are commonly known; viruses and bacteria adapt to them and develop immunity against the agent. Hence, antibiotics lose their effectiveness.

**Wouldn't it be a better decision to destroy viruses, bacteria, mold, and other micro organisms before they even get the chance to make us sick or infect us?!**

Mold, viruses, bacteria, and odors are present in every interior, which is absolutely normal, actually. However, if their concentration starts to increase, we get sick. This affects especially day care centers, schools, nursing homes, residential care homes, hospitals, hotels, restaurants, the food industry and many others.

Our air purification system are outstanding for their easy and fast effectiveness, elimination of bacteria, germs, and mold, as well as for their capability of killing unpleasant odors without the use of chemicals or side-effects in the long run.

The air purification systems are suitable for all purposes.



## LEHNERT-VIVEX ENGINEERING GROUP + PRODUCTION GERMANY



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### Journey

