

## Expertise on Hygiene

(reduction)

Of efficiency of the HI-TECH NATURE SYSTEM (HTNS) of the Company EXPANSION ELECTRONIC Srl, Via delle Industrie 18, 36050 Cartigliano (VI), Vicenza, Italy for the abatement of living particles (microorganisms) and nonliving ones (dust) from air.

### Content of the report

On behalf of the Company EXPANSION ELECTRONIC Srl it was made a survey to test the efficiency of the HTNS of the Company EXPANSION ELECTRONIC Srl, on abatement of living particles (microorganisms) and nonliving ones (dust) from the air. For the realization of tests it was made available by the principal, a sample of the machine type HI-TECH NATURE SYSTEM (HTNS), model 115 / 3D Oil.

The determination of efficiency of abatement of HTNS was simultaneously performed by determining the concentration of microorganisms (*Micrococcus luteus*, *Rhodotorula Rubra*, mold, natural spectrum of outdoor air) and particles in the air before and after the electrostatic filtration unit, after each single emitter and the exit of the inlet jets (after neutralizers and revitalizer). As air to be tested, it was used outside air. Tests were led with different air speeds and with different relative air humidity.

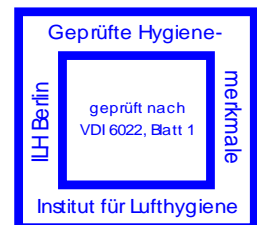
### Conclusion of test results

The HTNS is capable of eliminating from the air to be filtered airborne bacteria (*M. luteus*), yeasts (*R. rubra*) and molds with an efficiency that ranges from 98.53% to > 99.96% which depends on the type of germs and the relative humidity. Against airborne particles was determined with an efficiency between 98.24% and 99.48%. The HTNS produces hygienic, energetic and economic benefits and is recommended in a large number of applications, particularly as the second level of filtration in the following sectors: agri-food, pharmaceutical, clean room, hospital, textile production, printing and paper, tobacco production and ventilation and air conditioning systems in places with high air pollution (compares extended expertise).

From the results obtained in tests with the application of HTNS it's possible to signal the following advantages compared to traditional filters in extended surface (pockets, cells or boxes of glass fibers, synthetic or celluloses):

1. Higher efficiency of electrostatic filtration unit (comparable to H11 -H13 according to DIN EN 1882);
2. As a result of (1): the cleaning of the air ducts (the respect of the norm VDI 6022 is sure, Sheet 1 (7/98) which considers 10 g / m<sup>2</sup> of dust thickness);
3. Using pocket filters and bag ones there is a possible formation and release of toxic microbial products from decomposition such as endotoxins, while through the use of HTNS in electrostatic filters this is not to be expected, but in a negligible amount; this according to the results of the tests performed;
4. The reduction of electrostatic cell depends substantially on the diameter of the particles and by their ability to receive the electric charge. Since the size of the particles of *Legionella* and the *M. luteus* are in the same order of dimension, it is concluded that the removal of Legionella by the filter cell of HTNS as high as the Micrococcus luteus;
5. Minimum and almost constant pressure drops;
6. It must be expected for lower maintenance costs due to the multiple regenerability of electrostatic cells.

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