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(*02.10*)

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To the

Ressourcen Saving GmbH

Alserbachstraße 2

A - 1090 Wien / Austria

Att.: Mr. Ing. Werner Krenek

Mödling, am 24. Juli 2022

Transmission to: office@ecoturbino.at

Subject: ECOTURBINO®

Hygienic type testing

Dear Mr. Werner Krenek,

Please find below my expert medical opinion on the hygienic type examination for the product ECOTURBINO®.

Subject of the expertise

The subject of this report is the hygienic type examination for the product ECOTURBINO® ET 9 / 10 / 11.

According to the order, the specific question is whether the use of ECOTURBINO® in health care facilities can be approved from a hygienic point of view.

The subject of this report is not the possible positive effect of ECOTURBINO® for the prevention of Legionella and Pseudomonas aeruginosa through the passive draining of the shower hose.

Assessment bases

(1) On 11.08.2011 a sample of ECOTURBINO® was handed over by Ing. Werner Krenek (Ressourcen Saving GmbH, 1090 Vienna) for hygienic evaluation.

(2) On 11.08.2011 the following documents were submitted on data carriers by Ing. Werner Krenek (Ressourcen Saving GmbH, 1090 Vienna):

- Information folder on ECOTURBINO® A3 1 page, undated).

- Sample - Tender specification for ECOTURBINO®, 2 pages, undated)
- CO2 - reduction calculation for the ECOTURBINO® prepared by TÜV Austria (4 pages, dated 16.08.2010).
- Presentation on ECOTURBINO®; ppt - presentation with 18 slides, undated).

(3) On 11.08.2011, further information on the machinability of ECOTURBINO® was submitted electronically by Ing. Werner Krenek.

(4) A current expert report on ECOTURBINO® by Mr. SV August Krenn, generally sworn and judicially certified expert for sanitary installations and sanitary systems (field 73.45) dated 14.01.2015 is published on your website (retrieved on 24.07.2015 at www.ecoturbino.com).

(5) Based on the additional information you provided by email dated 23.07.2015, no calcification occurs in the ECOTURBINO®) due to the high flow velocity (inner diameter 3.0mm) no calcification occurs in practice.

Brief description of the ECOTURBINO®

The ECOTURBINO® is a fitting for reducing the water flow rate of hand showers by adding air according to the Venturi principle.

In the ECOTURBINO® , the flow velocity of the water is increased during water withdrawal due to the tapering of the passage opening. The resulting negative pressure draws in air via a bypass and mixes it with the water flowing through. The volume of the water jet is increased by the addition of the air, so that despite the water savings there is no noticeable loss of comfort when showering.

The ECOTURBINO® is made of brass with chrome-plated surface in contact with water. The assembly of the ECOTURBINO® can be done in about 5 minutes using the existing threads.

Based on the test series described in the expert report by Mr. Krenn from 01/2015, the water saving through the ECOTURBINO® is 36% (reduction from 13.2 l per minute to 8.4 l per minute). A deviation of +1- 20% depending on the design of the fitting, operating pressure, pipe dimensioning and operation must be conceded according to the expert opinion.

The former product WATERREDUCER® was renamed ECOTURBINO® in August 2015. No technical changes have taken place as part of the renaming.

Benefits/advantages of ECOTURBINO® according to manufacturer's information

According to the manufacturer, the advantages of the ECOTURBINO® are (1) the water savings, (2) the energy savings in water heating due to the lower volume of hot water required, (3) the associated reduction in CO2 emissions, and (4) the water jets described as "noticeably softer".

Furthermore, passive draining of the shower hose can take place through the ECOTURBINO®. This can reduce stagnation of the water in the hose and effectively counteract contamination with Legionella or Pseudomonas aeruginosa.

EXPERT MEDICAL OPINION

Initial situation

In healthcare facilities (hospitals, sanatoria/nursing homes, outpatient clinics and surgeries), the prevention of Legionella and Pseudomonas aeruginosa is of particular importance.
Legionella (especially L. pneumophila, serogroup 1) are pathogens of pneumonia (,'Legionnaires' disease') and febrile ("Legionnaires' disease") and febrile illnesses ("Pontiac fever"). Pseudomonas aeruginosa is a common pathogen of wound infections.

Both Legionella and Pseudomonas aeruginosa can multiply in water distribution systems (Legionella from about 21.0°C, Pseudomonas aeruginosa from about 17.0°C).

According to the guidelines No. 8 and 22 of the Working Group for Hygiene in Health Care Facilities of the MA 15, representative water sampling points in health care facilities must be tested for the pathogens mentioned at least once a year. In Lower Austria, the sampling procedures are described in the supplement to the standard decree of the Office of the Lower Austrian Provincial Government 07-01101-0236 ("Hospital Hygiene - Technical Control Plan"). Pseudomonas aeruginosa must not be detectable in 100 ml of water. Legionella are only harmless in a concentration below 10 CFU (colony forming units) per 100ml (cf. ÖNORM B5019, Table 5

Contamination is always favored by factors such as (1) stagnation of water/low water withdrawal, (2) calcification of the terminal pipes/jet regulator, and (3) lack of thermal/chemical treatability of the water pipes.

Hygienic evaluation of the ECOTURBINO®

To evaluate the hygienic acceptability of ECOTURBINO® for use in healthcare facilities, the following points must be considered:

(1) Is germination of the ECOTURBINO® favored by the nature of the surface?

(2) Is calcification/contamination of the ECOTURBINO® promoted by the channel routing?

(3) Can the ECOTURBINO® be reprocessed by machine on an occasion-related basis??

(4) Does the addition of air to the water stream promote aerosolization/dusting of the water, thus facilitating Legionella transmission?

Ad (1): Properties of the ECOTURBINO® surfaces

The surfaces of the ECOTURBINO® in contact with water are made of chrome-plated brass. Plastic seals, which are particularly susceptible to contamination with Pseudomonas aeruginosa, are not present in the ECOTURBINO®.

Roughness is only present to a very small extent in the form of the corrugated surface of the passage opening.

Overall, the surfaces of the ECOTURBINO® are sufficiently smooth. Based on the visual assessment, germination with Legionella or Pseudomonas aeruginosa is not favored by the nature of the surfaces.

Ad (2): Water channeling in ECOTURBINO®

In addition to the passage opening for the water jet, the ECOTURBINO® has the bypass opening for the suction of air according to the Venturi principle. This bypass has a length of about 5.0 mm and a diameter of about 1.0 mm.

The bypass draws in air when the water is running, but can also be pressurised with water after the negative pressure has collapsed (i.e. after the water has been turned off).

The bypass appears to be less susceptible to the formation of limescale than common aerators®, but it can promote the deposition of limescale, which must be taken into account when determining the interval for descaling (see below).

Ad (3): Reprocessability of ECOTURBINO®

Even if the ECOTURBINO® itself is not a source of germs when handled hygienically, it can be exposed to germs from the upstream pipe network, so that reprocessing (disinfection) is necessary.

From a hygienic point of view, machine cleaning with subsequent machine thermal disinfection is preferable. According to the manufacturer's instructions, ECOTURBINO® can be cleaned mechanically (e.g. with the cleaning agents of the Neodisher® series, Chemische Fabrik Dr. Weigert GmbH & Co. KG, D - 20539 Hamburg), and machine - thermally disinfectable at 85.0°C. In addition, the ECOTURBINO® can be autoclaved at 134.0°C if required.

The occasion-related reprocessability of ECOTURBINO® thus meets the hygienic requirements.

AD (4): Influence of the admixture of air on the aerosolisation/dusting of the water

The higher the pressure of the water at the outlet from the shower head, the more likely it is that there will be a significant aerosolisation/dusting of the escaping water.

It can therefore be assumed that the proportion of aerosolised/atomised water tends to be reduced by adding air to the water jet.

Hygienic requirements when using ECOTURBINO®

From the above evaluation of the ECOTURBINO® , the requirement arises from a hygienic point of view that the ECOTURBINO® must be decalcified at regular intervals.

In this respect, the ECOTURBINO® is to be treated similarly to the aerators (Perlatoren®; cf. guideline no. 8 of the working group for hygiene in health care facilities of the MA 15, or supplement to the standard decree of the Office of the Lower Austrian Provincial Government 07-01/01-0236: "Hospital hygiene - plan for technical controls").

In contrast to conventional shower heads (economy shower heads), which often have to be replaced annually according to the hygiene plan, the ECOTURBINO® does not have to be replaced. In products that have been in use for more than 10 years, no deformation of the inner part could be detected, this is due to the high passage speed.

From a hygienic point of view, however, the variant as a set (hand shower - shower hose - ECOTURBINO) should be given priority over retrofitting the ECOTURBINO ®. The hand shower and shower hose should be descaled every year as with conventional products. This can be done, for example, as follows:

(1) Insert the hand shower - separately from the shower hose - in decalcifying solution (household quality) according to the manufacturer's instructions.

(2) Machine cleaning with thermal disinfection (A0 - value k 30)

SUMMARY

There is no objection to the use of ECOTURBINO® ET 9 / 10 /11 in health care facilities from a hygienic point of view.

The hand shower set is recommended for retrofitting the ECOTURBINO® in clinics and retirement homes.

An increased susceptibility of the hot water or cold water distribution system to contamination with Legionella or Pseudomonas aeruginosa with the use of ECOTURBINO® is not to be expected.

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