Qualification Report No. L14/0202

Testing of the qualification ability for HACCP and cleaning power of steam cleaners of the **BlueEvolution** series for use in food processing

The company beam GmbH produces steam cleaners under the name of **BlueEvolution** for the professional use in e.g. catering, office buildings, food processing. These devices should be used for cleaning various surfaces and in particular floors as well as glass and mirror surfaces. As soon as these steam cleaners are used in the area of catering, kitchen, food processing and so forth, the devices have to be integrated into the HACCP-system of the facility. Our task was to evaluate whether the steam cleaners BlueEvolution S and BlueEvolution XL can be qualified for the use within the HACCP environment.

The cleaning process is based on water vapor with temperatures between 140 and 160 °C, an additional optional removal of the dirt with hot water as well as, if needed, the mechanical exposure through brushes with different brush heads at the steam nozzle. The removed residual dirt are vacuumed by the cleaner and transported via a hose to the waste water tank.

The main task of the cleaner is the cleaning process. Therefore, we tested the performance of the removal of dried coagulated sheep blood according to DIN ISO/TS 15883-5 as well as standard soil according to IKW of PVC surfaces and ceramic tiles. The results are summarized in the results section of the qualifications report. In addition, it is important for the user in the HACCP environment that the manual is descriptive, so the user is able to use the cleaner correctly and complies with the necessary safety instructions. The results of the tests are also summarized in the results section.

1 General Information and Material

1.1 Client

Client:	beam GmbH, Mr. Robert Wiedemann, Illertalstraße 3, DE – 89281 Altenstadt, Germany
Date of order:	16/06/2014 and 09/07/2014

1.2 Identification of Test Laboratory

Location:	Dr. Brill + Partner GmbH · Institut für Hygiene und Mikrobiologie, Stiegstück 34, 22339 Hamburg, Germany
Study manager:	Dipl.-Biol. Dr. rer. nat. Florian H. H. Brill
Scientific assistant:	Dipl.-Biol. Henrik Gabriel, Dipl.-Biol. Dr. rer. nat. Jan-Hendrik Klock
Laboratory technicians:	Dipl.-Biol. Richard Daniel

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1.4 Identification of Sample

Name of product group:	**BlueEvolution**
Identification of tested product:	BlueEvolution S
Additional products of product range:	BlueEvolution XL
Manufacturer:	beam GmbH, DE – 89281 Altenstadt, Germany
Date of delivery:	03/06/2014
Storage conditions:	room temperature and darkness
Product description:	steam cleaner with various nozzles and brush heads
Are of use:	cleaning of surfaces e.g. floors, glass and mirror surfaces
Cleaning process:	water vapor with a temperature of min. 140 °C, additional, if needed, hot water with a temperature of min. 70 °C, additional brush heads in order to increase the mechanical exposure

1.5 Test Conditions

Test period:	20/06/2014 - 25/08/2014
Product settings:	steam level 3
Test temperature:	20°C ± 1°C
Tested surfaces:	standard ceramic tiles, size: 30 x 50 cm
	PVC-tiles according to prEN 16615, size 40 x 50 cm
Standard soil:	with protamine sulphate coagulated sheep blood (Fiebig Nährstofftechnik, 65510 Idstein – Niederauroff) (DIN ISO/TS 15883-5)
	IKW standard soil (Fitzner und Asmuß 2004, produced by Dr. Brill + Partner GmbH)

2 Methods

The product range **BlueEvolution** consists of the devices BlueEvolution S and BlueEvolution XL. Both devices are identical in terms of the cleaning process and construction as well as the manual. The cleaner BlueEvolution XL is larger and therefore designed to be used on large surfaces. Due to this reason we used the cleaner BlueEvolution S. However, the results for the cleaning performance and the manual are applicable to both devices. In addition, different accessory components are available, different nozzles and brush heads are for different applications or surfaces. However, as the cleaning process is identical, the results apply independently from the brush head and even if one component was tested only. At best, the cleaning performance can be improved by using brush heads for very tough dirt by additional mechanical exposure. However, this was not used in this test.

The cleaning performance was tested on ceramic tiles und PVC-tiles. For the purpose of soiling sheep blood according to DIN ISO/TS 15883-5 "Washer-disinfectors - Part 5: Test soils and methods for demonstrating cleaning efficacy (ISO/TS 15883-5:2005); German version CEN ISO/TS 15883-5:2005" was used and spread on both materials by using a pattern (4 times 5 cm x 5 cm) and dried for 24 h at 20°C ± 1°C (see also Figure 1 and Figure 2).

The IKW standard soil was produced according to "A. Fitzner, U. Aßmus für den IKW-Fachausschuss „Putz- und Pflegemittel (FP)": Empfehlung zur Qualitätsbewertung der Produktleistung von Allzweckreinigern, SÖFW-Journal, 130, 10-2004, Seite 83 bis 93. This dirt was dried on the ceramic tiles at 100 °C for 24 h. On the PVC-tiles at 100 °C for 1 h (see also Figure 3 and Figure 4).

The prepared test surfaces were lying on the floor while treated with the test device BlueEvolution S by using the highest steam level 3, the extraction nozzle (238 mm) and rubber lip. The cleaning performance was evaluated optically. At 3 test surfaces a semi quantitative test of protein residues was done exemplary for the soil of sheep blood .

In addition, a manual was provided that described the usage as well as the risks while using the **BlueEvolution** cleaner. These information were also evaluated in order to see whether the devices can be used correctly and whether all relevant safety instructions are available.

3 Results

3.1 Results of the cleaning tests

Figure 1 to 9 show the photo documentation of the tests. The device BlueEvolution S was able to remove the test soil of sheep blood and IKW standard soil completely and rapidly. These tough contaminations were removed with the highest steam level 3. The cleaning performance of the device is completely sufficient for using it within the HACCP environment. In the semiquantitative protein test in 3 exemplary cases no residues of proteins were detected after cleaning the test surfaces soiled with sheep blood . Therefore, the cleaning process fulfills the requirements for cleaning in the medical area e.g. for surgical instruments.

3.2 Results of the verification of the manual

The tested manual for the device BlueEvolution S does not include a date or version. Therefore, it is not identifiable whether the latest version of the manual is available while using the device. This has to be implemented.

The manual describes perfectly and with many pictures the construction of the device and how to use the device. It can be expected that the user can use the device accurately after studying the manual and that no further introductions are required. However, it is recommended to offer a personal instruction to the user in order to eliminate any misapplications.

Furthermore, all relevant and important warnings for a safe application are mentioned in the manual.

The chapter "Inbetriebnahme Dampf" mentioned that the device has three different steam levels. Even if it is deductive that the highest amount of steam is for the toughest soil, it is recommended to mention the different steam levels and their application areas.

The manufacturer recommends keeping the device running for approximately 2 minutes after using it in order to avoid that any waste water gets out of the hose. This recommendation should be mentioned in the manual, too.

Overall, it is a cleaning process with steam incl. extraction. In chapter "Standardzubehör und Anwendung" the different nozzles and brush heads are described. The accessory components allows the usage of the devices in different areas and is based e.g. on the strength of the dirt as well as the surface that has to be cleaned. The installation is clear in general. However, it could be explained a bit more in detail which component should be used for which application area, e.g. when the hot water should be used. In addition, it is mentioned that the level of steam should be reduced when working on sensitive surfaces e.g. parquet. However, it is not clear what it means. Therefore, the wording should be more precise e.g. the steam level has to be reduced to level 1 on sensitive surfaces such as parquet. Furthermore, it is recommended to define sensitive surfaces, e.g. surfaces that are heat-sensitive or absorb water such as parquet.

The performance of the devices is not described in detail. It is recommended to amend this and which type of dirt can be removed in the manual.

The cleaning and disinfection of the hose is evaluated as a useful and target-oriented maintenance task in order to avoid a biofilm formation inside the hose and therefore to avoid a possible spread of microorganisms. However, the method is not explained clearly enough. It has to be explained what kind of cleaning agents and disinfectants have to be used for which conditions. As it is mainly organic soiling, a mildly alkaline cleaning agent is recommended. For disinfection a VAH-listed surface disinfectant based on peroxides is recommended. The exposure times are based on the manufacturer's information. It is recommended to evaluate the method in accordance with its performance for cleaning and disinfection of the hose.

It is also recommended to define a minimum exchanging frequency for the air filter of e.g. 1 year. Furthermore, the filter should be exchanged if the suction power has been reduced significantly.

The supplementary sheet "Entkalkung und Reinigung" should be integrated into the manual. It also should be evaluated by the expert.

4 Conclusion

The devices BlueEvolution S and BlueEvolution XL are considered to be qualified for the HACCP environment in terms of their cleaning performance as well as its manual quality. Therefore, they can be recommended for use within the HACCP environment. The devices are qualified for HACCP.

Hamburg, 31/08/2014

Dipl.-Biol. Dr. rer. nat. Florian H. H. Brill
Study Manager

Dipl.-Biol. Dr. rer. nat. Jan-Hendrik Klock
Deputy Head of Laboratory

Photo Documentation of the Cleaning Tests

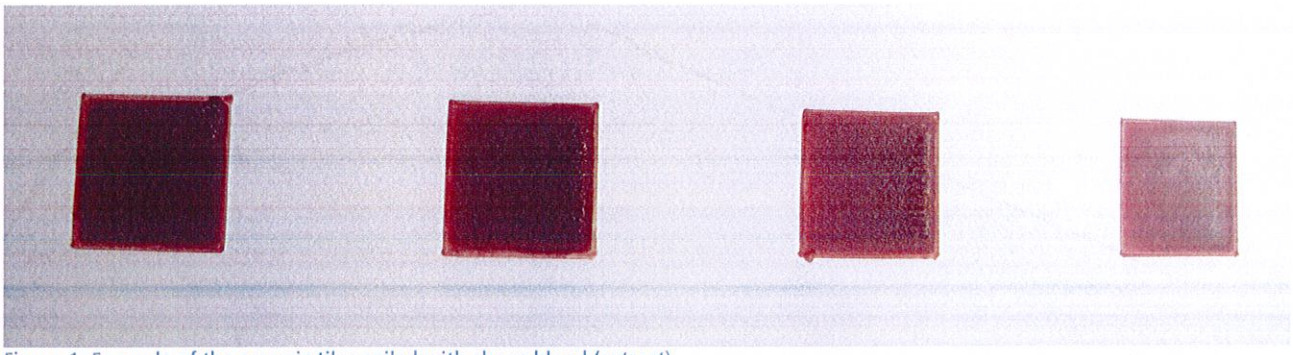

Figure 1: Example of the ceramic tiles soiled with sheep blood (extract).

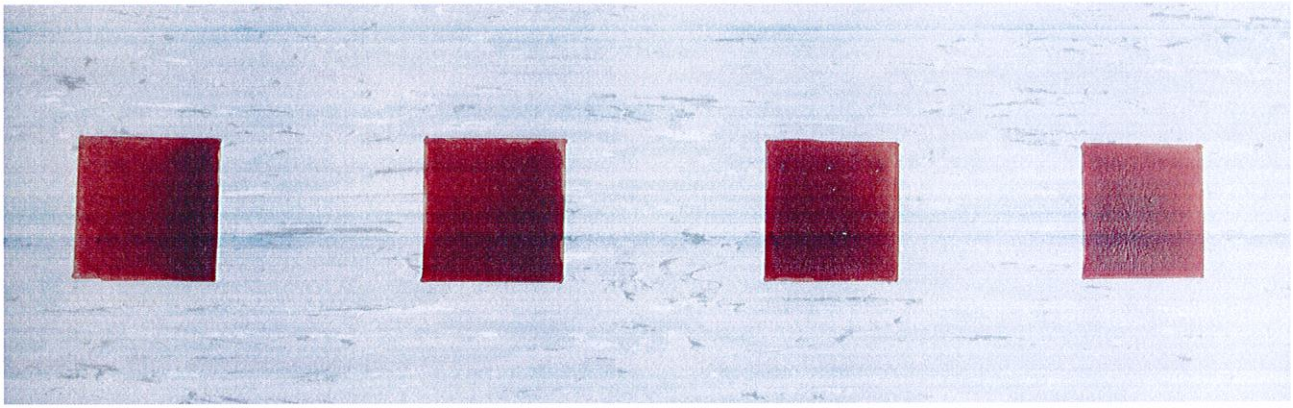

Figure 2: Example of the PVC-tiles soiled with sheep blood (extract).

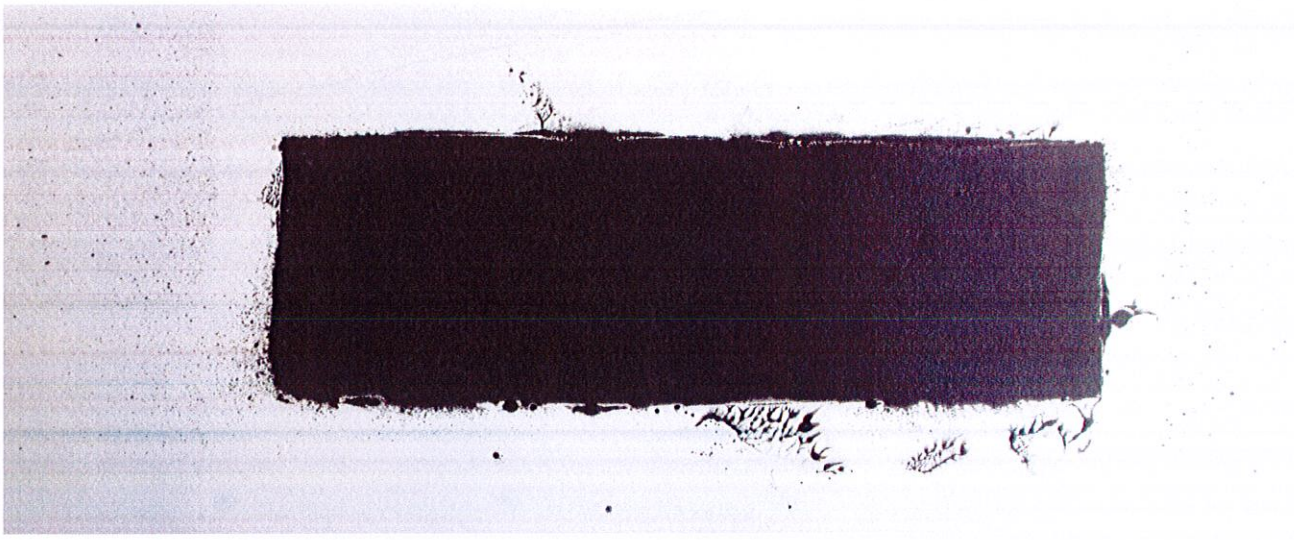

Figure 3: Example of the ceramic tiles soiled with IKW standard soil (extract).

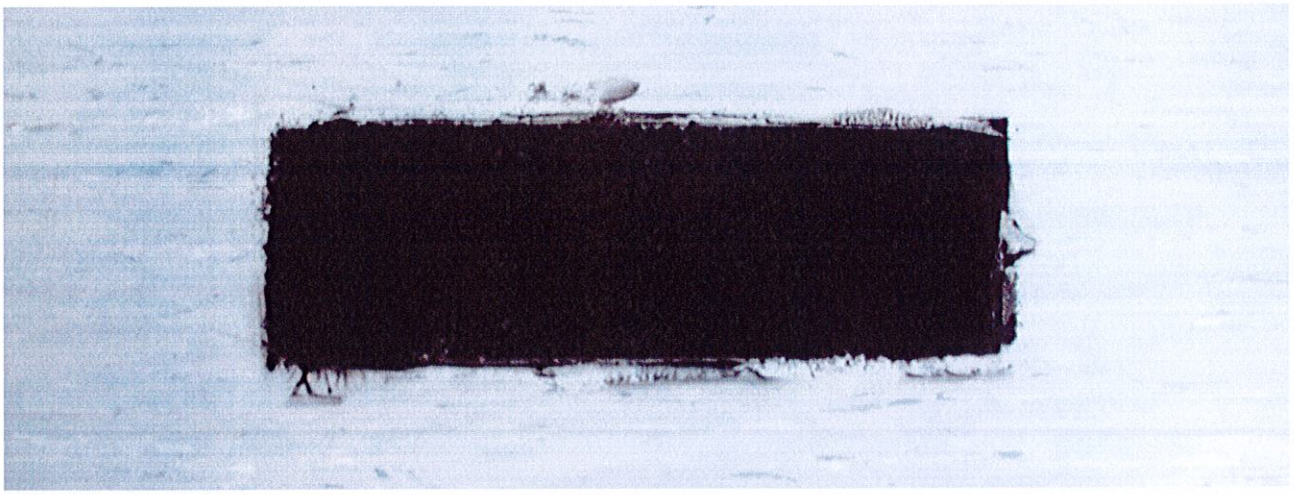

Figure 4: Example of the PVC-tiles soiled with IKW standard soil (extract).

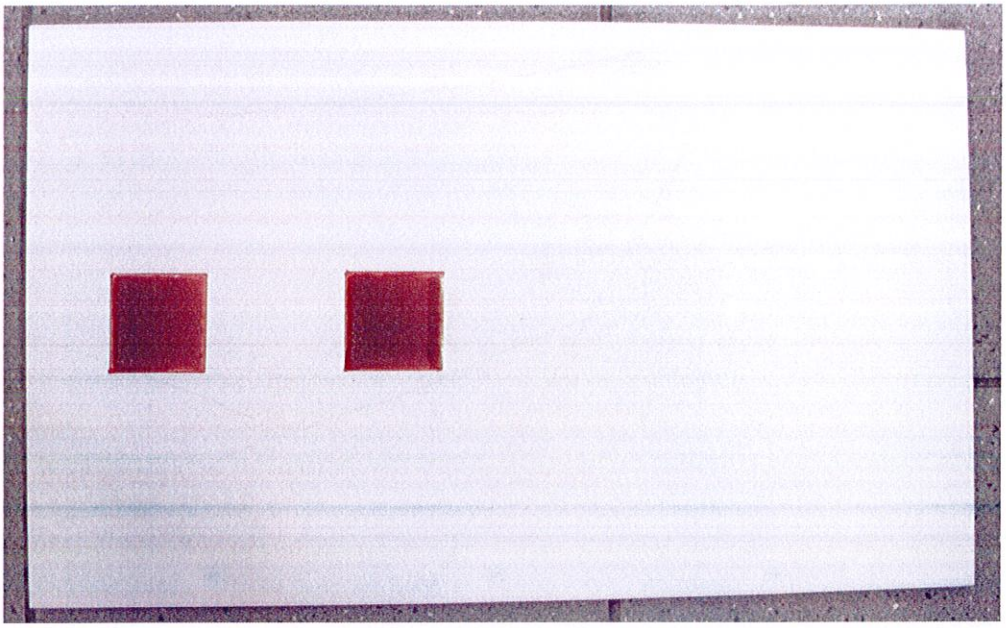

Figure 5: Example ceramic tiles: partly cleaned of sheep blood –soiling.

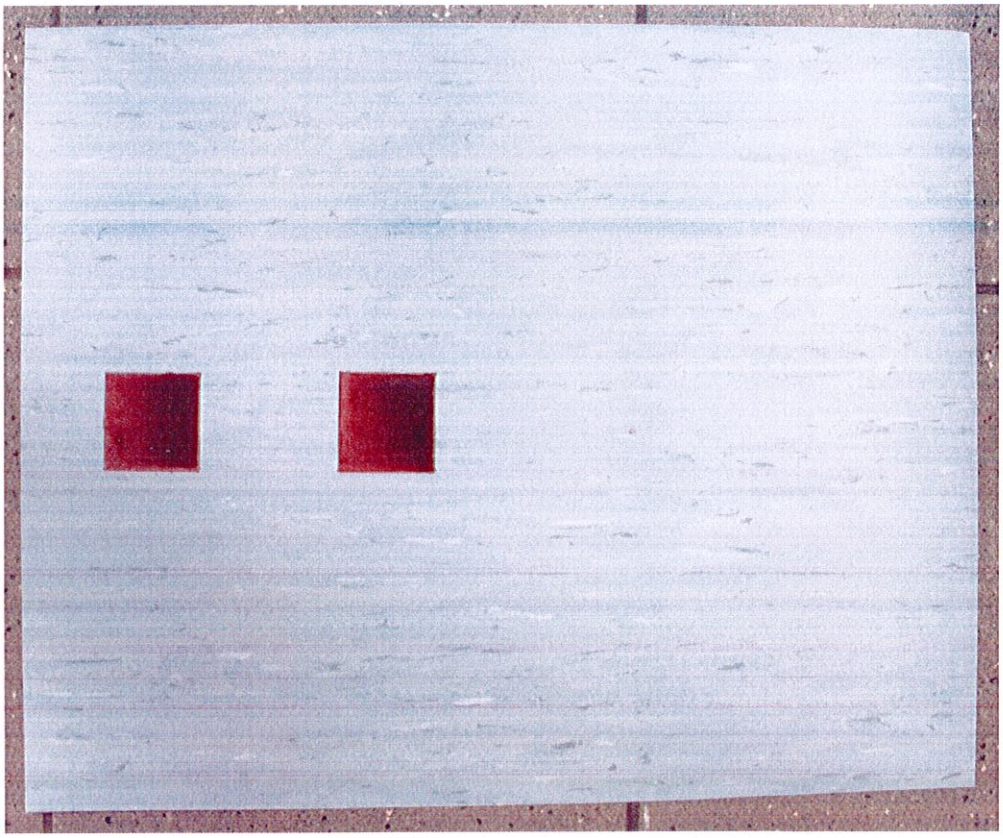

Figure 6: Example PVC-tiles: partly cleaned of sheep blood –soiling.

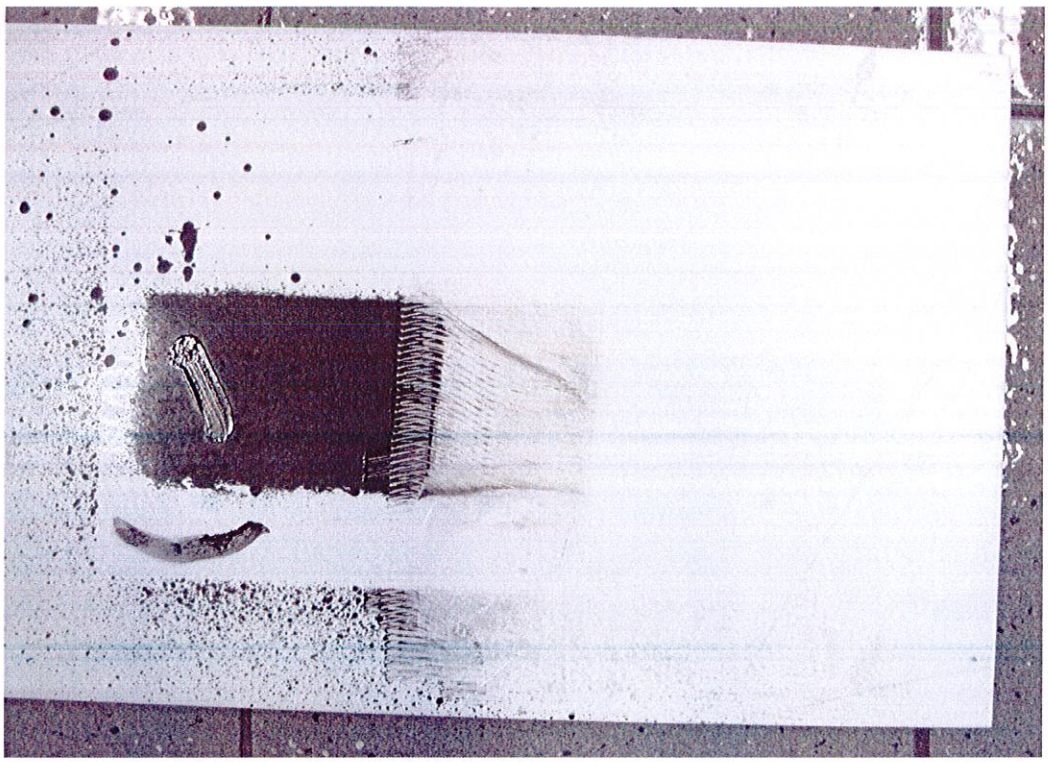

Figure 7: Example ceramic tiles: partly cleaned of IKW standard soil.

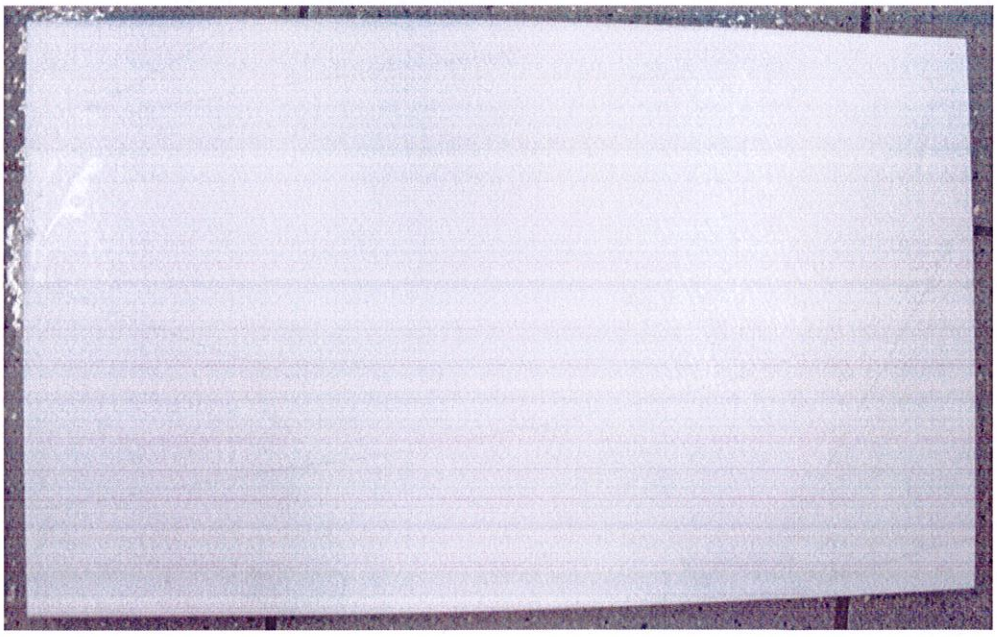

Figure 8: Example for completely cleaned ceramic tiles.

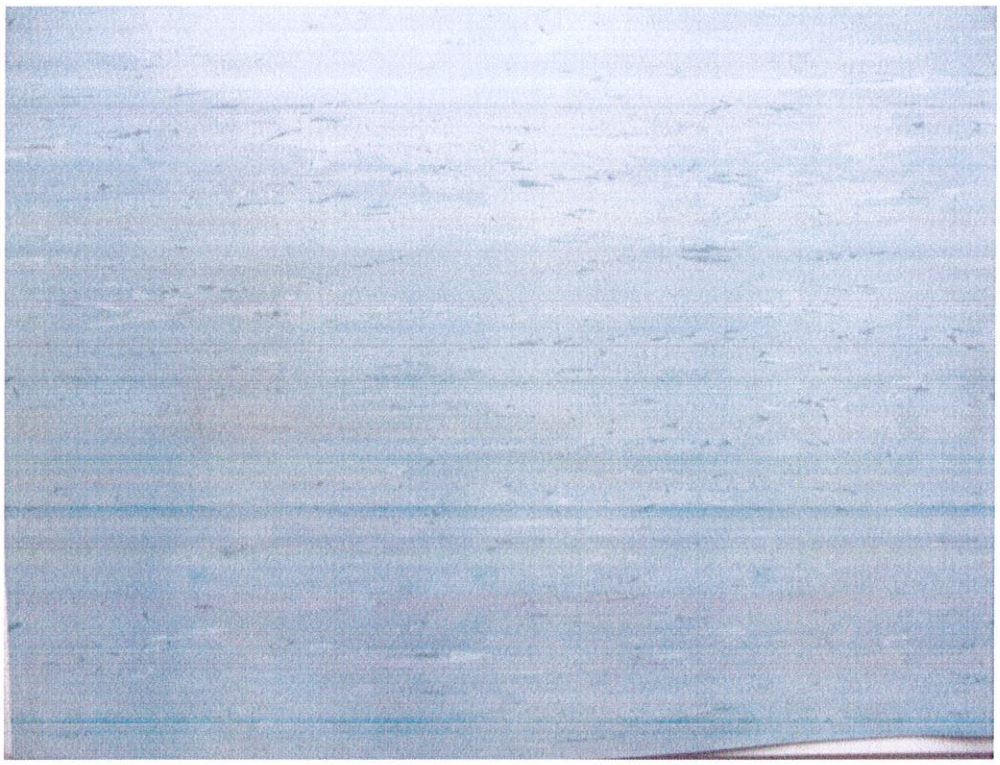

Figure 9: Example for completely cleaned PVC-tiles.

5 List of Abbreviations

HACCP	=	Hazard Analysis of Critical Control Points
IKW	=	Industrieverband Körperpflege- und Waschmittel e. V.
PVC	=	polyvinyl chloride