THE GERMAN INSTITUTE OF REHYGIENIZATION

Engineering services in the dairy, food, brewery and beverage industry

- Sales and marketing of special medias to realize spray shadow-/ retention tests
- Consultations in microbiology, aseptic and hygienic manners and design
- Research and Development

GIR - The German Institute of Rehygienization GmbH, Massbrucher Weg 25, D-32657 Lemgo

Office Lemgo
Massbrucher Weg 25,
D-32657 Lemgo

Fon: +49 (0) 5261 / 9348380
Fax: +49 (0) 5261 / 9217613
Email: ret-m@institute-gir.com

Product Description

Retention test medium for spray shadow test (RET-medium)

Solution for application on food-grade surfaces for the determination of spray shadows (bare patches) and non hygienic designed components as well as testing the rehygienization of pumps, ventiles, armatures and inline measurement devices.

The product is sold as a concentrate (Type K) without ethanol. To get the ready to use solution, ethanol or propanol (96 %vol.) has to be added. The canister that contains the 1,79 l premix has to be filled up to the upper mark of the 5 liter can. The ready to use solution has a alcohol strength of >60,0 %vol.

1.	**Ingredients**	
	1.1 (Type K):	HPC, azo-colour compound, water
	1.2 (Type A):	HPC, azo-colour compound, water, ethanol
2.	**Application area:**	Determination of cleaning efficiency in food-grade surfaces, to apply by pressure sprayer (e.g. Mesto Hochdrucksprühgerät 3595F), application pressure minimum is 2,5 bar (36,3 psi), or brush in the commercial sector
3.	**Appearance:**	high-viscous red liquid
4.	**Durableness:**	2 years after production
5.	**Details:**	For external use only. highly flammable (RTD solution)! Keep away from ignition sources Keep tightly closed and out of reach of children. In case of spilling the solution neccessarry, appopriate measures against fire and explosions have to be taken. Appropriate measures e.g. are: picking up the spilled liquid with water, the ventilating of the room as well as the elimination of ignition sources. Colored surfaces are easy swept off with alcohol.

6. Packaging: 5,0-Liter can

7. Item number: 16.302.7001

8. Manufacturer: FINK TEC GmbH, Oberster Kamp 23, D-59069 Hamm

9. Sales: GIR – The German Institute of Rehygienization GmbH,
Massbrucher Weg 25, D-32657 Lemgo
Fon: +49 (0) 5261 9348380
Fax: +49 (0) 5261 9217613
E-Mail: ret-m@institute-gir.com

10. Target-setting

The routine check-up of the installed cleaning system is necessary to control the present hardware, because nozzles as well as sprayheads can be affected in it´s orientation and functionality . These can be caused by maintenance or inspection works at the packaging- or filling machine. Therefore it is recommended to check up the cleaning system with the RET-medium quarterly. The expenditure of time for the RET-test is 60 minutes.

The requirements for the rehygienisation, if the clean room from UltraClean (category IV) and asepitk (category V) filling lines, are given in the VDMA-Fachverbandsschriften as well as in the new VDI-Guidline 4066 sheet 1 and sheet 4. These recommendations and guidlines represent the state-of-the-art technology. The interior of the common filling lines are raleted to categoy III.

middle logarithmic germ reduction post VDMA u. VDI 4066	**packing machine**		
	category III	**category IV**	**category V**
packaging		MLK ≥ 4	MLK ≥ 5
Machine interior	MLK ≥ 2	MLK ≥ 3	MLK ≥ 4

Accordingly clean rooms and insulators ,depending on the category of the filling line, have to reach germ reduction rates between > log 3 and > log 4 for the interior. For classic filling lines no recommendations exist. Nevertheless there are guidlines for the classic filling lines. According to these guidlines no spray shadows are allowed and by now the germ reduction for the endpointtest must reach > log 3 in the interior of the machine. These guidlines for classic filling lines are created to avoid a potential buildup of a biofilm through product residues.

11. Process Description

Proof of biofilms can be made by using swab samples (SWAPS) and suitable culture media. Not cleaned organic material can also be proved through the ATP-measurement method. To control the efficiency of an installed interior cleaning system such as a beverage filler "*just-in-time*" visually, therefore a spray shadow test or the retention test is performed. For classic bottling plants the area of filler and capper, for the aseptic filling plant outflow of the rinser to outlet belt are relevant for the hygienic status. The composition of the media applied for this continued to develop since the initial application in 2002 and presents them in history as follows.

Composition	Nutrient	Note
Diatomite (Kieselgur) with water	[no]	abrasiv, 24 h drying on
Diatomite with alcohol-water	[no]	abrasiv, dries quickly
Cellulose with alcohol-water	[no]	no liability
Sugar syrup with red beet juice	[yes]	good liability, dries quickly
Glucose syrup with cherry juice	[yes]	good liability, dries quickly
Starch with water and food-dye	[yes / no]	medium liability
Alcohol-water and food-dye	[no]	no liability
Cellulose with a fluorescence dye	[no]	medium liability / UV- detection
RET-medium with alcohol and azo dye	[no]	good liability, dries quickly

Yoghurt and whey are also occasionally applied; in this case the problem of a nutrient entry and thus a potential risk of an accelerated or induced growth of microorganisms in non-functioning cleaning systems exists. The test medium therefore is an alcoholic solution of a special cellulose compound and an azo dye which cannot be utilized by beverage spoiling microorganisms. The accomplished investigations demonstrate the microbiological immunity of this newly developed solution. In addition the advantage is the high surface liability despite easily rinsing off the process fluid at the outer CIP and SIP, whether adhesive foam, adhesive gel or CIP media is used. The viscosity is higher or in the range of the usual beverages. The depth of colour is deliberately set relatively high in order to define the interpretation of spray shadows and “bleeding“.

In order to send this retentiontest-medium (RET-medium) without transport limitations (hazardous materials), a concentrate, i.e. without the addition of alcohol was developed. The concentrate is also transported in a 5.0 litre container and must be filled up locally with commercial methylated spirit or alternatively isopropyl alcohol up to the mark and then be shaken for about 1 minute to mix it properly. Thus this newly developed retention test medium can be used without difficulty around the world, due to the fact that the concentrate not has to be transported as a hazardous material.

The ready-made test-solution is usually applied with a high-pressure sprayer (e.g.Mesto Hochdrucksprühgerät 3595F), application pressure minimum 2,5 bar (36,3 psi), on the machine surfaces and left there to dry up for about 10-20 minutes. Then the check-up of cleaning and disinfection can be done by starting the appropriate cleaning and disinfection programs. The same applies in the same sense to check for installed jetting nozzles for the removal of product residues in conventional bottling plants for beer and beer-mixed drinks. To avoid misinterpretations, the re-sanitation programs should be performed twice, so that the statement about the potential spray shadows and the lack of cleaning efficiency is revealed.

Step 1: Application of the RET-medium – thereby disinfection of the machine surfaces
Step 2: Drying of the RET-medium
Step 3: Start CIP and SIP of the exterior rehygienization
Step 4: Visual inspection of spray shadows
Step 5: Visual inspection of “bleeding ” (hygienic design) with swabs

The examination for spray shadows is made visually and partially with swabs. It an be documented photographically. Running down of the test medium, the so called “bleeding” out of gaps, pleats and machine components suggests an indication for a non-hygienic design (QHD) and the necessary dismantling for manual cleaning. Rough surface structures can also be recognized as well as not suitable sealants or plastic structures according to DIN EN ISO 14159-2008 Safety of Machinery – Hygiene requirements for the Design of machinery , the DIN EN 1672-2 Food Processing Machinery - Part 2 Hygiene requirements, der EHEDG DOC 08 D-2004 Hygigenic Equipment Design Criteria as well as VDI-Guideline 4066 Sheet 1 Not appropriate sealing Materials respectively plastic constructions.

Furthermore the structure of the cleaning program, the foam and thin film-stability as well as the intensity of injection pressures is evaluated. Also a proper rinsing of machine surfaces and components has to be guaranteed. Latter efficiency is checked by using pH test strips.

The retention test should be integrated into the monitoring surveillance operation in order to carry out at regular intervals, respectively twice a year, a revision of the installed nozzle system for exterior cleaning and/or disinfection.

Further operational areas of the RET-medium are the check-ups of containers and tanks regarding the cleaning efficiency and spray shadows in the interior.

Lemgo, the 1st Septermber 2017