



EHEDG method for assessing the in-place cleanability of food processing equipment

Availability/Compatibility of features:

Feature:	Availability/compatibility:
EHEDG Tested design	Sanitary Refractometer PR-23-A and PR-03-A

WHY EHEDG TEST?

To facilitate the design, testing and maintenance of hygienic food-processing equipment, it is important to be able to assess the relative cleanability of various components of the equipment using standardized test procedures. The European Hygienic Equipment Design Group (EHEDG) is an independent consortium formed to develop guidelines and test methods for the safe and hygienic processing of food.

A number of countries have national standards applicable to food machinery, but there are relatively few international standards; those that exist are predominantly dairy based, are too general, and are based on "experience" rather than scientific data.

In the USA, a number of guidelines have been developed for the dairy industry (the 3-A standards) and for food service equipment (the National Sanitation Foundation NSF). Unfortunately, however, the 3-A standards have no benchmark of cleanability, and the NSF standards are not applicable to the hygienic design of general food processing equipment.

This note describes a standard test procedure for assessing cleanability that has been developed by the EHEDG.

TEST METHOD FOR ASSESSING THE IN-PLACE CLEANABILITY

The test is designed to indicate areas of poor hygienic design of equipment in which product or micro-organisms are protected from the cleaning process. It can also be used to compare the in-place cleanability of different equipment designs. The method is based on comparing (in the laboratory) the cleanability of a test item with that of a straight piece of pipe.

The degree of cleanliness is based on the removal of a "soured milk soil" containing bacterial spores and is assessed by evaluating the number of spores remaining after cleaning with a mild detergent.

The method is intended as a screening test for hygienic equipment design and is not indicative of the performance of industrial cleaning processes (which depend on the type of soil).

K-PATENTS SANITARY REFRACTOMETER IN EHEDG TEST

The in-place cleanability of the K-Patents Sanitary Refractometer was assessed according to the test procedure of the EHEDG at the Biotechnological Institute in Denmark.

Before conducting the test program all elastomeric components were checked against the test strain for antimicrobial properties. Prior to testing, the test object and the reference pipe (having a $0.5 \mu\text{m}$ Ra internal roughness) were dismantled, thoroughly

cleaned and degreased by hand and steam-sterilized in-line autoclaved at 121°C for 30 minutes.

The test object and reference pipe were reassembled with an auxiliary pipe at each end and soiled under 5 bar (gauge) pressure with a soured milk solution with spores of the test strain *Bacillus stearothermophilus* var. *calidolactis*. The air pressure of 5 bar was applied 3 times to the closed assembly and held at pressure for 2 minutes on each occasion. Whilst under pressure, any movable parts of the test object were operated at total of ten times. After draining and drying by flushing with dry filtered air at a velocity of 1.0 m/s (for 2 to 4 hours), the test object was cleaned in-place by a test rig:

1. Rinsing with cold water for 1 minute
2. Circulating a 1% (w/v) detergent solution at 63°C +2°C for 10 minutes
3. Rinsing with cold water for 1 minute

At the end of both rinsing procedures samples of the outflowing water were taken and two 5 ml portions of each were pour plated with modified Shapton and Hinges agar (MSHA).

After cleaning the inner surface of the test object and reference pipe were covered with molten MSHA. After the agar had fully solidified the test object and reference pipe were placed in an incubator at 58°C for 24 hours. After incubation the test object and reference pipe were examined for the presence of yellow discoloration in the agar. The degree of discoloration in the agar taken from the test object was compared to the degree of discoloration in the agar taken from the reference pipe.

The test was conducted three times. The gasket, refractometer and flow cell showed no discoloration (0%), whereas the straight reference pipe showed average discoloration of 5%.