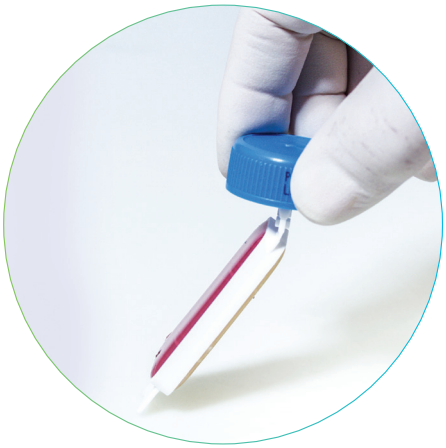
The use of contact slides for microbial monitoring of surfaces and liquids in the food industry according to ISO 18593:2018



In some food chain processes, surface control can be a critical control point to avoid, prevent or reduce a food safety hazard to acceptable levels. Correct sampling methods are indispensable to ensure correct detection of microorganisms when they are present. Depending on the type of surface, and other specific requirements, using a contact slide or a sterile sponge can be a more convenient sampling method compared to other classic methods.

A contact slide is a ready to use device, with two media coated on a plastic support used for the microbial monitoring of surfaces and liquids, even in the presence of residues and disinfectants. The contact slide has one medium on one side and another medium on the other. Depending on the medium, the slide can be used for total bacterial count, enterobacteria, yeasts and moulds, Staphylococci, Pseudomonas, Coliform, Streptococci, etc. Detection with contact slides is a semi-quantitative method. After incubation, colony-forming units (CFUs) are analysed by visual inspection (Figure 1).

Sterile sponges are used mainly for microbiological sampling of Listeria, Salmonella and other food-borne pathogenic microorganisms; these are usually available in transport bags that protect the sample during transport before and after sampling (Figure 3).

TABLE 1: Contact slides.

Descriptions	Pk	Cat. No.
For total bacterial count (agar type: PCA + TTC + disinfectant neutralisers) and enterobacteria (agar type: VRBG + disinfectant neutralisers)	20	**525262V**
For total bacterial count (agar type: PCA + TTC + disinfectant neutralisers) and for the detection of *E. coli* and coliform (agar type: Chromogenic and selective medium that allows the detection of *E. coli* and differentiation from other enterobacteria)	20	**525392V**
For total bacterial count (agar type: TSA + disinfectant neutralisers) and detection of yeasts and moulds (agar type: Rose Bengal agar)	20	**525482V**
For total bacterial count (agar type: TSA + disinfectant neutralisers) on both sides of the slide	20	**525472V**
For total bacterial count (agar type: PCA+TTC+disinfectant neutralisers) and for detection of yeasts and moulds (agar type: Rose Bengal CAF agar+disinfectant neutralisers)	20	**525272V**
For total bacterial count (agar type: PCA+TTC+disinfectant neutralisers) on both the sides of the slide	20	**525322V**

TABLE 2: Sampling sponges.

Descriptions	Pk	Cat. No.
Dehydrated surface sampling sponges in a 450 ml bag	400	**710-1020**
Sampling sponges with buffer	100	**300-0229**
Dehydrated surface sampling sponges in a 450 ml bag with gloves	400	**710-0860**
Surface sampling sponges pre-moistened with neutralising buffer	100	**300-0230**
Surface sampling sponges pre-moistened with Dey/Engley neutralising buffer	100	**300-0231**
Sterile transport bags and surface sampling sponges with handle, pre-moistened with neutralising buffer	100	**300-0232**
Sterile transport bags and surface sampling sponges with handle, pre-moistened with Dey/Engley neutralising buffer	100	**300-0240**

Sampling procedure

Location
Sampling location depends on the process and historical data linked to each site. A thorough examination of the process, and all steps involved, should be performed to identify critical control points.

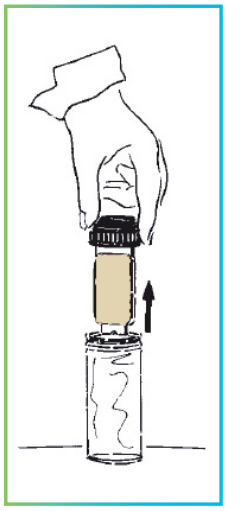
Area
A clear indication of the sampling area should be defined. This area doesn't always need to be defined by numerical size, it just needs to be clearly described and representative of the surface sampled. For the detection of Listeria, Salmonella and other food-borne pathogenic microorganisms, it is recommended that you sample between 1000 and 3000 cm^2. For simple enumeration of microorganisms, the area can be smaller or equal to 100 cm^2.

Sampling techniques
For flat surfaces, contact plates and flexible contact slide methods represent the easiest method of surface sampling; for hard to reach areas, swabs are the best choice, and for large surfaces (1000 to 3000 cm^2, for instance the research of Listeria and Salmonella) a sterile sponge should be used (Figure 3).

Time of sampling and frequency
Sampling time and frequency should be clearly specified in the producer's sampling procedure, depending on the sampling objective. In general, if sampling is not done daily, it should not always be performed on the same day(s) of the week.
Areas where contamination is possible should be sampled frequently, but storage areas should also be considered for sampling less frequently.

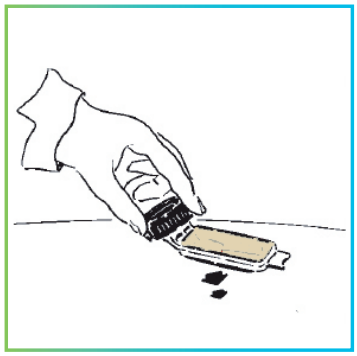
Contact slide sampling method

01. Take a slide from the refrigerator and leave it at ambient temperature for about 5 minutes, unscrew and extract the slide from its cylindrical container. Avoid any contact with the agar surface.
02. For surface monitoring, flex the cap forming a 90° angle and press each side of the slide firmly against the surface to be examined for 10 seconds. Alternatively, use a swab for sampling the area, afterwards roll the swab gently over the agar surface. For examination of liquids, hold the slide by the cap and immerse it completely into the test fluid.
03. Reinsert the slide into its tube, screw it tight and incubate following conditions specified in an appropriate International Standard (Figure 1).
04. After incubation, microbial growth is evaluated.



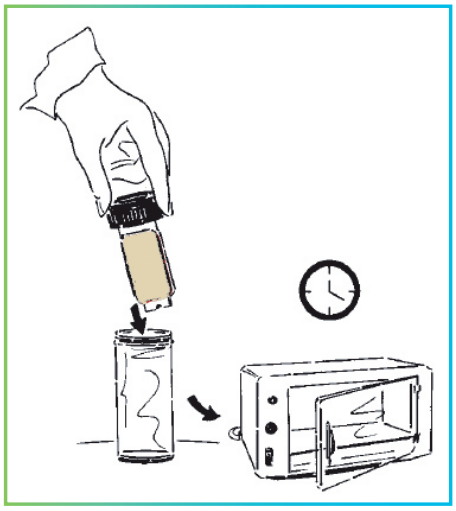
1. Remove the contact slide from its container, avoiding agar contact with hands

2.A **ON SURFACES**
Establish uniform adherence between agar and surface of product

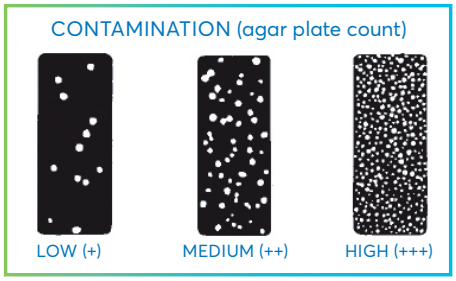


ALTERNATIVELY

2.B **IN LIQUIDS**
Submerge the contact slide in the liquid product



3. Replace the contact slide in its container and incubate as requested to obtain colony growth



4. After contact slide incubation, microbial growth is evaluated as shown on the right

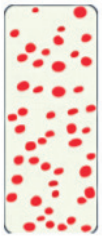
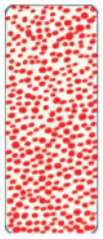
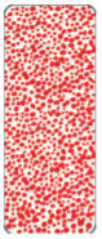
FIGURE 1: Instructions for contact slide use.

Contact slide storage & transportation

The delay between sampling and testing should be as short as possible. Samples should be incubated within 48 hours from sampling, and should be stored and/or transported at 1 to 8 °C without risk of contamination in between. Alternatively, the samples can be transported in insulated transport containers to maintain a consistent temperature, again in a way that no contamination can occur.

Microbiological analysis of the contact slide

Use an appropriate International Standard to incubate the contact slide according to the type of microorganisms to be enumerated. After incubation, the surface contamination can be estimated by counting the number of developed colonies (Figure 2).

Bacteria/yeasts				
CFU/side	<25	25 - 50	50 - 200	>200
Surfaces (CFU/100 cm^2)	<200	200 - 400	400 - 1600	>1600
Liquids (CFU/ml)	10^3	10^4	10^5	10^6

Moulds			
CFU/side	<10	10 - 20	>20
Surfaces (CFU/100 cm^2)	<80	80 - 160	>160
Liquids (CFU/ml)	10^2	10^3	10^4

FIGURE 2: Interpretation of contact slide results after incubation.

Expression of results & calculation

Divide the number of characteristic colonies by the surface area of the plate. Report the count as the number of colony-forming units per sampled surface.

VWR contact slides

Surface and liquid-flexible slides for simple and effective microbiological monitoring and hygiene testing of surfaces and fluids.

- **Two tests with one slide:** Each slide is coated on both sides either with the same agar or with a different agar on each side
- **Long shelf life:** 9 months from production.
- Clear instructions allow a straightforward way to evaluate the microbiological contamination of fluid and surfaces (low, medium or high)
- Specifically formulated for total bacterial count and for detecting yeast and moulds, enterobacteria, *E. coli* and coliform
- Easily used and transported away from the laboratory to control the surfaces of production plants
- Easy to use thanks to the screw cap

Literature

ISO 18593:2018 Microbiology of the food chain - Horizontal methods for surface sampling.

FIGURE 3: Surface sampling sponge with handle.

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