




















## Product Instructions

-  (EN) Rapid Aerobic Count Plate
-  (FR) Test Rapide pour la numération de la Flore Totale Aérobie
-  (DE) Rapid Aerobe Gesamtkeimzahl Auszählplatte
-  (IT) Piastra per la conta aerobica rapida
-  (ES) Placa Recuento Aeróbico Rápido
-  (NL) Snelle Aeroob Kiemgetal Telplaat
-  (SV) Rapid Aerobic Count odlingsplatta
-  (DA) Rapid Aerobic Count Plate
-  (NO) Hurtigfilm for totalkim
-  (FI) Rapid Aerobien Kasvatusalusta
-  (PT) Placa para Contagem Rápida de Aeróbios
-  (EL) Πλακίδιο Ταχείας Αερόβιας Απαρίθμησης
-  (PL) Płytko do szybkiego oznaczania ogólnej liczby drobnoustrojów
-  (RU) Тест-пластина для экспресс-подсчета ОМЧ
-  (TR) Hızlı Toplam Canlı Sayım Plakası
-  (JA) 生菌数迅速測定用プレート
-  (ZH) 快速菌落总数测试片
-  (TH) แผ่นอาหารเลี้ยงเชื้อสำเร็จรูปสำหรับนับจำนวนแอโรบิคแบคทีเรียอย่างรวดเร็ว
-  (KO) 속성 일반세균 측정용 플레이트

# Rapid Aerobic Count Plate

# Product Instructions

## Product Description and Intended Use

The 3M™ Petrifilm™ Rapid Aerobic Count (RAC) Plate is a sample-ready-culture-medium system which contains nutrients, a cold-water-soluble gelling agent, and a dual-sensing indicator technology that facilitates colony enumeration. 3M Petrifilm RAC Plates are used for the enumeration of aerobic bacteria in the food and beverage industries. 3M Petrifilm RAC Plate components are decontaminated though not sterilized. 3M Food Safety is certified to International Organization for Standardization (ISO) 9001 for design and manufacturing. 3M Petrifilm RAC Plates have not been evaluated with all possible food products, food processes, testing protocols or with all possible microorganism strains.

## Safety

The user should read, understand, and follow all safety information in the instructions for the 3M Petrifilm RAC Plate. Retain the safety instructions for future reference.

**⚠ WARNING:** Indicates a hazardous situation, which, if not avoided, could result in death or serious injury and/or property damage.

## ⚠ WARNING

**To reduce the risks associated with exposure to biohazards and environmental contamination:**

- Follow current industry standards and local regulations for disposal of biohazardous waste.

**To reduce the risks associated with release of contaminated product:**

- Follow all product storage instruction contained in the instructions for use.
- Do not use beyond the expiration date.

**To reduce the risks associated with bacterial infection and workplace contamination:**

- Perform 3M Petrifilm RAC Plate testing in a properly equipped laboratory under the control of a skilled microbiologist.
- The user must train personnel in current proper testing techniques: for example, Good Laboratory Practices<sup>1</sup>, ISO 17025<sup>2</sup> or ISO 7218<sup>3</sup>.

**To reduce the risks associated with misinterpretation of results:**

- 3M has not documented 3M Petrifilm RAC Plates for use in industries other than food and beverage. For example, 3M has not documented 3M Petrifilm RAC Plates for testing water, pharmaceuticals, or cosmetics.
- Do not use 3M Petrifilm RAC Plates in the diagnosis of conditions in humans or animals.
- Do not use 3M Petrifilm RAC Plates for U.S.-recognized laboratory pasteurized counts.
- Acceptance of the 3M Petrifilm RAC Plate method for the testing of water per an accepted local government regulation is at the sole discretion and responsibility of the end-user.
- 3M Petrifilm RAC Plates do not differentiate any one microorganism strain from another.

Consult the Safety Data Sheet for additional information.

If you have questions about specific applications or procedures, please visit our website at [www.3M.com/foodsafety](http://www.3M.com/foodsafety) or contact your local 3M representative or distributor.

## User Responsibility

Users are responsible for familiarizing themselves with product instructions and information. Visit our website at [www.3M.com/foodsafety](http://www.3M.com/foodsafety), or contact your local 3M representative or distributor for more information.

When selecting a test method, it is important to recognize that external factors such as sampling methods, testing protocols, sample preparation, handling, and laboratory technique may influence results.

It is the user's responsibility in selecting any test method or product to evaluate a sufficient number of samples with the appropriate matrices and microbial challenges to satisfy the user that the chosen test method meets the user's criteria.

It is also the user's responsibility to determine that any test methods and results meet its customers' and suppliers' requirements.

As with any test method, results obtained from use of any 3M Food Safety product do not constitute a guarantee of the quality of the matrices or processes tested.

## Limitation of Warranties / Limited Remedy

EXCEPT AS EXPRESSLY STATED IN A LIMITED WARRANTY SECTION OF INDIVIDUAL PRODUCT PACKAGING, 3M DISCLAIMS ALL EXPRESS AND IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO, ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE. If any 3M Food Safety Product is defective, 3M or its authorized distributor will, at its option, replace or refund the purchase price of the product. These are your exclusive remedies. You must promptly notify 3M within sixty days of discovery of any suspected defects in a product and return it to 3M. Please call Customer Service (1-800-328-1671 in the U.S.) or your official 3M Food Safety representative for a Returned Goods Authorization.

## Limitation of 3M Liability

3M WILL NOT BE LIABLE FOR ANY LOSS OR DAMAGES, WHETHER DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO LOST PROFITS. In no event shall 3M's liability under any legal theory exceed the purchase price of the product alleged to be defective.

## Storage

Store unopened 3M Petrifilm RAC Plate pouches refrigerated or frozen (-20 to 8°C / -4 to 46°F). Just prior to use, allow unopened pouches to come to room temperature before opening (20-25°C / <60% RH). Return unused 3M Petrifilm RAC Plates to pouch. Seal by folding the end of the pouch over and applying adhesive tape. **To prevent exposure to moisture, do not refrigerate opened pouches.** Store resealed pouches in a cool dry place for no longer than one month. It is recommended that resealed pouches of 3M Petrifilm RAC Plates be stored in a freezer (see below) if the laboratory temperature exceeds 25°C (77°F) and/or the laboratory is located in a region where the relative humidity exceeds 50% (with the exception of air-conditioned premises).

To store opened pouches in a freezer, place 3M Petrifilm RAC Plates in a sealable container. To remove frozen 3M Petrifilm RAC Plates for use, open the container, remove the plates that are needed and immediately return remaining plates to the freezer in the sealed container. 3M Petrifilm RAC Plates should not be used past their expiration date. The freezer that is used for open pouch storage must not have an automatic defrost cycle as this would repeatedly expose the plates to moisture which can damage the plates.

Do not use 3M Petrifilm RAC Plates that show discoloration. Expiration date and lot number are noted on each package of 3M Petrifilm RAC Plates. The lot number is also noted on individual 3M Petrifilm RAC Plates.

## △ Disposal

After use, 3M Petrifilm RAC Plates may contain microorganisms that may be a potential biohazard. Follow current local, regional, national and industry standards for disposal.

## Instructions for Use

Follow all instructions carefully. Failure to do so may lead to inaccurate results.

## Sample Preparation

1. Use appropriate sterile diluents:

Butterfields phosphate buffer, 0.1% peptone water, peptone salt diluent, buffered peptone water, saline solution (0.85-0.90%), bisulfite-free letheen broth or distilled water. See section "Specific Instructions for Validated Methods" for specific requirements.

**Do not use diluents containing citrate, bisulfite or thiosulfate with 3M Petrifilm RAC Plates; they can inhibit growth.** If citrate buffer is indicated in the standard procedure, substitute with one of the buffers listed above, warmed to 40-45°C (104-113°F).

2. Blend or homogenize sample per standard.
3. For optimal growth and recovery of microorganisms in acidic products (<pH 5), adjust the pH of the sample suspension to a pH greater than pH 5. For acidic products, adjust the pH with 1N NaOH.

## Plating

1. Place the 3M Petrifilm RAC Plate on a flat, level surface.
2. Lift the top film and with the pipette perpendicular dispense 1 mL of sample suspension onto the center of bottom film.
3. Roll the top film down onto the sample to prevent trapping bubbles.
4. Place the 3M™ Petrifilm™ Flat Spreader (6425) on the center of the 3M Petrifilm RAC Plate. Press on the center of the spreader to distribute the sample evenly. Spread the inoculum over the entire 3M Petrifilm RAC Plate growth area before the gel is formed. Do not slide the spreader across the film.

5. Remove the 3M Petrifilm Flat Spreader and leave the 3M Petrifilm RAC Plate undisturbed for at least one minute to permit the gel to form.

## Incubation

Incubate 3M Petrifilm RAC Plates in a horizontal position with the clear side up in stacks of no more than 40\*. Several incubation times and temperatures can be used depending on current local reference methods, some of which are listed in the Specific Instructions section.

\*For Standard Methods for the Examination of Dairy Products<sup>4</sup> maximum stack height is 20.

## Interpretation

1. 3M Petrifilm RAC Plates can be counted using a standard colony counter or other illuminated magnifier. Count all colonies regardless of color, size or intensity.
2. The circular growth area is approximately 30 cm<sup>2</sup>. Gridlines are visible with the use of a backlight to assist with estimated enumeration. Estimates can be made on 3M Petrifilm RAC Plates containing greater than 300 colonies by counting the number of colonies in two or more representative squares and determining the average number per square. Multiply the average number by 30 to determine the estimated count per plate.
3. High concentrations of colonies on the 3M Petrifilm RAC Plates will cause the entire growth area to become blue or red. Occasionally, on overcrowded 3M Petrifilm RAC Plates, the center may lack visible colonies, but many small colonies can be seen on the edges. When any of these occurs, record results as too numerous to count (TNTC). When an actual count is required, plate at a higher dilution.
4. Food samples may occasionally show interference on the 3M Petrifilm RAC Plates, for example:
  - a. A uniform light blue background color (often seen from the organisms used in cultured products) should not be counted as TNTC.
  - b. Intense, pinpoint blue specs (often seen with spices or granulated products) should not be counted as colonies.
5. Where necessary, colonies may be isolated for further identification. Lift the top film and pick the colony from the gel. Test using standard procedures.
6. If the 3M Petrifilm RAC Plates cannot be counted within 1 hour of removal from the incubator, they may be stored for later enumeration by freezing in a sealable container at temperatures less than or equal to minus 15°C (5°F) for no longer than one week.

For further information refer to the “3M™ Petrifilm™ Rapid Aerobic Count Plate Interpretation Guide.” If you have questions about specific applications or procedures, please visit our website at [www.3M.com/foodsafety](http://www.3M.com/foodsafety) or contact your local 3M representative or distributor.

## Specific Instructions for Validated Methods

AOAC® Official Methods<sup>SM</sup> 2015.13

AOAC® Performance Tested Certificate #121403



In AOAC Official Methods of Analysis (OMA) and Performance Tested Method (PTM) studies, the 3M Petrifilm Rapid Aerobic Count Plate method was found to be equivalent to or better than the average log counts of the FDA/BAM Chapter 3 reference method and the Standard Methods for the Examination of Dairy Products Chapter 6.

## Scope of Validation:

Raw ground beef, raw ground pork, ground turkey, chicken carcass rinsate, fresh swai, fresh tuna, fresh tiger shrimp, easy-peel shrimp, cherry tomato wash, frozen blueberries, Mediterranean apricots, creamy salad dressing, fresh pasta, vanilla ice cream, dry milk powder, and pasteurized skim milk.

## Incubation:

### Dairy (not including powders) & Seafood:

Incubate 3M Petrifilm Rapid Aerobic Count Plates 24 hours ± 2 hours at 32°C ± 1°C.

### All other foods:

Incubate 3M Petrifilm Rapid Aerobic Count Plates 24 hours ± 2 hours at 35°C ± 1°C.

### Dairy powders including whey powders:

Incubate 3M Petrifilm Rapid Aerobic Count Plates 48 hours  $\pm$  3 hours at 32°C  $\pm$  1°C.

### NF Validation by AFNOR Certification

NF Validation certified method in compliance with ISO 16140<sup>7</sup> in comparison to ISO 4833<sup>8</sup>

Use the following details when implementing the above Instructions for Use:

#### Scope of the validation:

For testing dairy products

#### Sample preparation:

Use only ISO listed diluents<sup>6</sup>.

#### Incubation:

For non-powdered dairy products: Incubate 3M Petrifilm RAC Plates 28 hours  $\pm$  2 hours at 30°C  $\pm$  1°C.

For powdered milks: Incubate 3M Petrifilm RAC Plates 48 hours  $\pm$  3 hours at 30°C  $\pm$  1°C.

#### Interpretation:

Calculate the number of microorganisms present in the test sample according to ISO 7218<sup>3</sup> for one plate per dilution. For calculation, take into account only 3M Petrifilm RAC Plates that contain up to 300 colonies. Estimates are outside of the scope of the NF Validation Certification (cf. interpretation part paragraph 3).



3M 01/17 –11/16

### ALTERNATIVE ANALYTICAL METHODS FOR AGRIBUSINESS

<http://nf-validation.afnor.org/en>

For more information about end of validity, please refer to NF VALIDATION certificate available on the website mentioned above.

### References

1. U.S. Food and Drug Administration. Code of Federal Regulations, Title 21, Part 58. Good Laboratory Practice for Nonclinical Laboratory Studies.
2. ISO/IEC 17025. General requirements for the competence of testing and calibration laboratories.
3. ISO 7218. Microbiology of food and animal feeding stuffs – General requirements and guidance for microbiological examinations.
4. Wehr, Michael H. and Joseph F. Frank, *Standard Methods for the Examination of Dairy Products*. American Public Health Association, Jan. 1, 2004. 17th ed.
5. FDA. Bacteriological Analytical Manual (BAM), Reagents Index for BAM found at: <http://www.fda.gov/Food/FoodScienceResearch/LaboratoryMethods/ucm055791.htm>.
6. ISO 6887. Microbiology of food and animal feeding stuffs – Preparation of test samples, initial suspension and decimal dilutions for microbiological examination.
7. ISO 16140. Microbiology of food and animal feeding stuffs – Protocol for the validation of alternative methods.
8. ISO 4833 Microbiology of food and animal feeding stuffs – Horizontal method for the enumeration of microorganisms – Colony-count technique at 30°C

### Explanation of Symbols

[www.3M.com/foodsafety/symbols](http://www.3M.com/foodsafety/symbols)

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