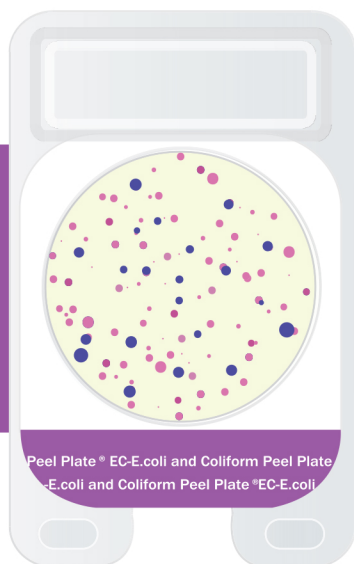
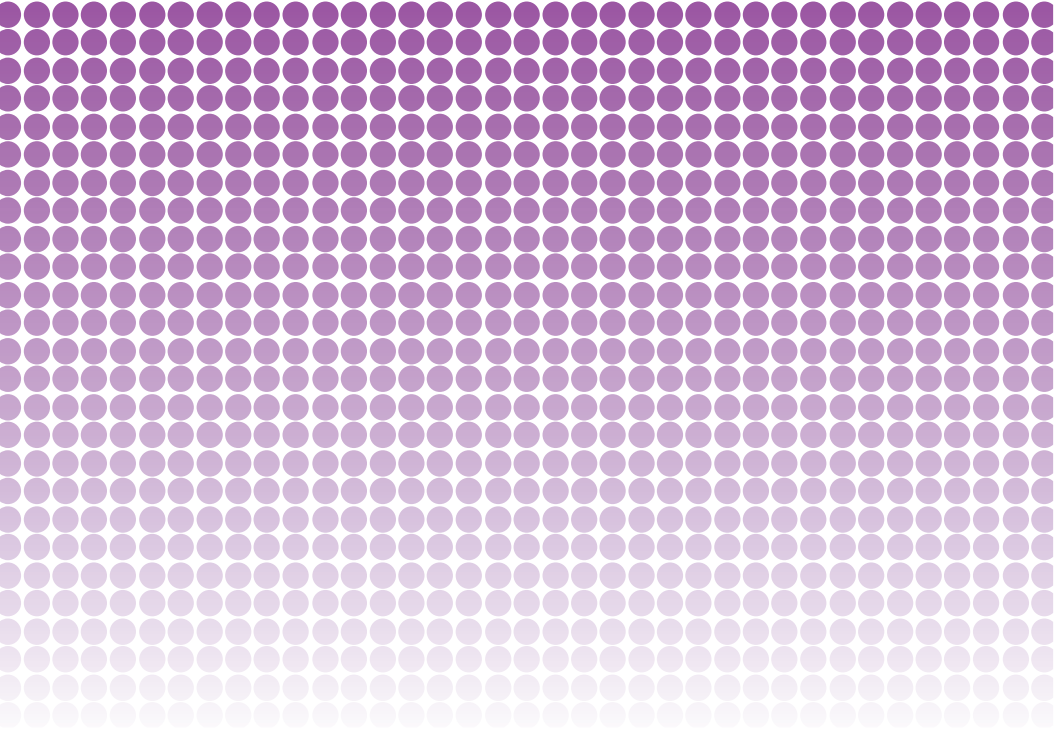




OPERATOR'S MANUAL FOR FILTERED SAMPLES



FOR DETECTION AND ENUMERATION OF TOTAL COLIFORM AND *E. COLI*/
BACTERIA USING FILTERED SAMPLES



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Kit Information

Introduction

Peel Plate® EC *E.coli* and Coliform tests are quantitative analysis for total coliform bacteria including *E.coli*. The method is applicable for determining coliform and *E.coli* in water samples and determining potability of water in 100 mL filtered samples. A mixed-cellulose 0.45 µm membrane filter is employed for filtration. After sample filtration, the filter is added to a rehydrated Peel Plate EC test and incubated at 35 °C ± 1 for 24 hours. The method principle of detection is described in the Peel Plate EC test operator's manual OM-600. The method is intended for water quality stakeholders such as farmers, field environmentalists, and water municipalities. The method limit of detection is 1 or greater colony forming units per 100 milliliters (CFU/100 mL) of the test sample.

Kit Contents, Storage, and Testing Conditions

A test kit contains 100 Peel Plate EC tests in foil bags containing a blue indicator desiccant. Supplied separately are 0.45 µm mixed-cellulose filters for sample collection and pipet tips or disposable pipet bulbs for test hydration.

Store kits in foil bag in refrigerator (0 to 7 °C) for up to 12 months or in room temperature for up to 1 month.

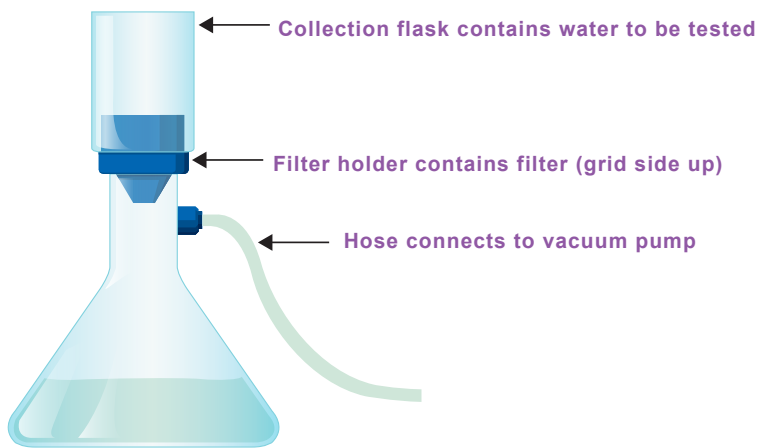
Kits are not required to be shipped refrigerated.

Perform testing in a clean dry environment at ambient temperature. Remove number of plates needed for analysis. Reseal using the bag zip closure to store unused tests. Moisture, heat, or storage abuse will cause the plates have a yellow discoloration. Do not use discolored tests or tests from bags with pink/white desiccant indicator.

Plates held at room temperature for 1 hour or more will peel more easily.

Equipment Needed

Water sample filtration apparatus including vacuum, collection flask, and filter holder with stopper to flask.



Applicability

The Peel Plate EC test has been certified by the AOAC Research Institute as Performance Tested Method #061501. This test kit's performance was reviewed by AOAC-RI and was found to perform to the manufacturer's specifications. At $35\text{ }^{\circ}\text{C} \pm 1$, the Peel Plate EC test with use of filtration has been validated to distinguish coliform from *E.coli* by $0.45\text{ }\mu\text{m}$ filtered bottled water, irrigation water and vegetable/fruit process waters. The method was found not significantly different from FDA-BAM or USDA-FSIS or EPA official reference methods. Samples should be 10-fold serially diluted into the countable range of 1 to 154 CFU/mL.

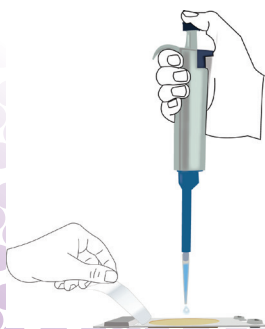
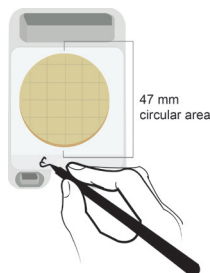
Precautions

Observe Good Laboratory Practices for microbial testing. Avoid specimen contamination.

- Perform tests with clean and gloved hands, assuming potential pathogenic bacteria.
- Test on a level surface, in a clean area and free of dust and drafts.
- If taking samples from spigot, run water for 30 seconds to flush water line before sampling.
- Avoid hand contact with test samples, water containers, and Peel Plate EC medium.

- After plating, replace adhesive cover so it lies flat with no wrinkles to avoid drying out during incubation.

Procedure



Step 1

- Place filter into filtration apparatus, grid side up. See diagram in **Equipment Needed**.
- Pour sample into filter unit.
- Apply partial vacuum to draw water through the filter membrane.

Step 2

- Label plate on clear side using marker or bar code strip. Do not mark or label the uplifted 47 mm circular area.

Step 3

- Place Peel Plate test onto a level surface. Lift tab and apply pressure with fingers to the back platform as shown.
- Pull the adhesive cover back enough to completely expose the culture disk. To lessen potential contamination, do not entirely remove the cover.

Step 4

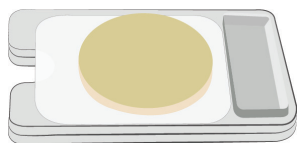
- Use pipet to vertically dispense 1.5 mL of water sterile deionized water^A or preferred sterile broth to the center of the exposed Peel Plate disc. Expel pipet contents evenly, within 2 to 4 seconds.
- Liquid will wick to the edges as the disc rehydrates.



Step 5

- Use sterile tweezers to aseptically remove the filter from filter apparatus.
- Place the filter, grid side up, centered onto the wetted Peel Plate disc. Roll the filter into position to avoid trapping air.
- Lightly press edges of the filter with tweezers to adhere filter to Peel Plate disc.
- Re-apply the adhesive cover. Press around the edges of the plate to ensure proper seal.

Step 6



- Incubate the plates with filter and cover inverted.
- Incubate $35 \pm 1^\circ\text{C}$ for 24 ± 2 hours.
- Plates can stack up to 20 by aligning the 2 feet. Stacking will not affect plate heat transfer.

^Anote- for surface waters use $5\ \mu\text{g/mL}$ cefsulodin solution to reduce interfering pigmented bacterial growth

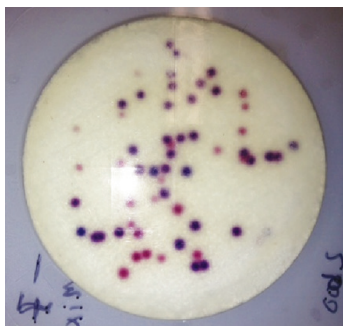
Analysis of Results

At the end of the incubation period, observe plates for colonies viewed from both the non-adhesive side and the adhesive side after removal of adhesive cover.

- Each colored spot, red and blue/green/purple, represents one coliform colony forming unit (CFU).
- The sum of all spots is reported as the total coliform CFU/filtered volume. The sum of blue/green/purple colonies are *E.coli* CFU/filtered volume.* Salmon/red colored colonies are coliform CFU/filtered volume.
- Surface waters may present cultured bacteria that are non-coliform with pink pigmentation. The light pink pigment is distinguishable from the dark red coliform colony and therefore the pink should not be counted. Rehydration of the Peel Plate test with an antibiotic, such as 5 µg/mL cefsulodin, may reduce interference from non-coliform in surface waters.
- Counts of 1 to 154 CFU/filter are considered countable, while counts outside that range are considered estimates. Samples with results outside the countable range should be diluted and retested.
- An estimated count of plates with greater than 154 colonies or Too Numerous to Count (TNTC) may be done using the etched grids on the bottom side of the Peel Plate test. Choose a 1 cm grid with representative growth and count, or choose 5 grids and calculate the average, and multiply by 17.4, the area of the plate. This is the estimate of the counts per filter.

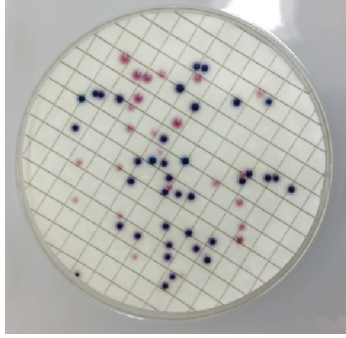
Colonies as viewed through Peel Plate underside

- *E.coli* are fecal coliform and are distinguished by their blue, or purple, or greenish color. Other coliform bacteria will be red (salmon) color.



Colonies as viewed on filter with adhesive cover removed

- In case of spreading bacteria, score one CFU for each dark spot and separated color circle. Blended colonies are scored as a single CFU.



*Avoid misinterpretation of results

- *E.coli* H0157 and some other verotoxigenic *E.coli* strains do not produce the enzyme β -glucuronidase and are detected as a coliform only (red colony) at $35\text{ }^{\circ}\text{C} \pm 1$.
- In the presence of red coliform, absence of blue colonies should not be necessarily be interpreted as absence of *E.coli*.
- Peel Plate EC plates have been evaluated in claimed foods and water, but have not been evaluated with all possible food and water products, processes, testing protocols or with all possible microorganism cultures.
- Bottled water has been evaluated, but the method has not been evaluated for municipal water testing in compliance with EPA Total Coliform Rule.

Quality Control

Quality control should be performed according to Good Laboratory Practices, and with the frequency determined by laboratory standard operating procedures. Common practices call for a Dilution Control, Negative Control, and Positive Control.

- **Negative Control:** Test 1 mL of sterile water on a Peel Plate test to verify no detectable bacteria on the Peel Plate test after incubation.
- **Filter Negative Control:** Prepare Negative Control by autoclaving 100 mL water at 121 °C for 15 minutes. Cool, then filter sample and test. Verify no detectable bacteria on the filter.
- **Positive Control:** Spike a 100 mL water sample with known coliform culture to make a Positive Control.

Disposal

Microbiological cultures and reagents should be collected into biohazard bags and autoclaved. Dispose according to local, state, and federal regulations.

Technical Support

For questions, contact your local representative or Charm Sciences at +1.978.687.9200 or support@charm.com.

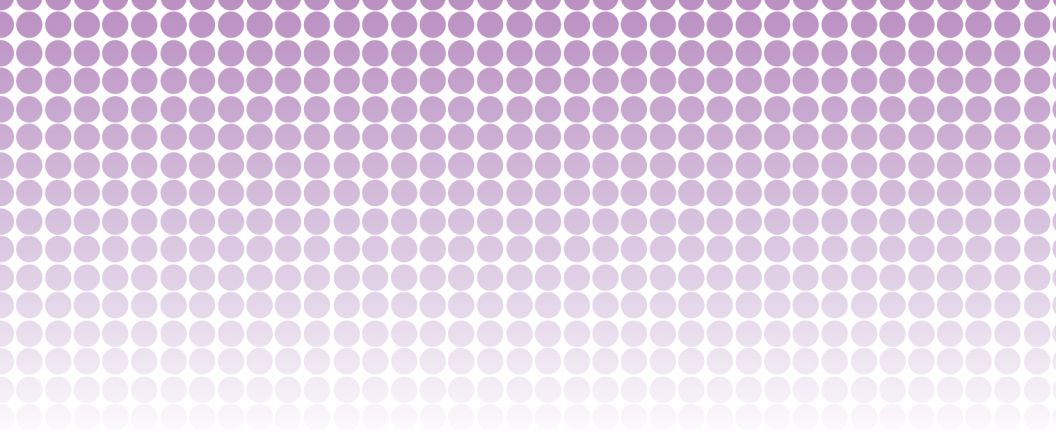
Order Information

Item No.	Mfr. Item No.	Description	Qty
4150-10	PP-EC-100K	Coliform and E. Coli Peel Plate	Pack/100
4150-11	PP-ECHV-25K	Coliform and E. Coli Peel Plate High Volume	Pack /25
4150-30	PP-ECHV-100K	Coliform and E. Coli Peel Plate High Volume	Pack /100
4150-25	PP-EC-C-HV-25K	E. Coli Peel Plate High Volume for Hard Cheese	Pack /25
4150-27	PP-EC-C-HV-100K	E. Coli Peel Plate High Volume for Hard Cheese	Pack /100
4150-21	BUF-NAS03	Sodium Bisulfate Concentrate	30 mL

Peel Plate tests for *E. coli* and coliforms, total coliform, enterobacteriaceae, aerobic bacteria, and heterotrophic bacteria are also available. Visit Charm Sciences' website at www.charm.com to learn more.

Warranty

Charm Sciences, Inc. ("Charm") warrants each reagent product, including but not limited to test kits, to be free from defects in materials and workmanship and to be free from deviations from the specifications and descriptions of Charm's reagent products appearing in Charm's product literature, when stored under appropriate conditions and given normal, proper and intended usage, until the expiration of such reagent product's stated shelf life, or, if none is stated, for one year from the date of delivery of such reagent product to the end-user purchaser. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, WHETHER STATUTORY, EXPRESS, IMPLIED (INCLUDING WARRANTIES OF TITLE, NON-INFRINGEMENT, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND ALL WARRANTIES ARISING FROM COURSE OF DEALING OR USAGE OF TRADE). The warranty provided herein may not be altered except by express written agreement signed by an officer of Charm. Representations, oral or written, which are inconsistent with this warranty are not authorized and if given, should not be relied upon. In the event of a breach of the foregoing warranty, Charm's sole obligation shall be to replace any reagent product or part thereof that proves defective in materials or workmanship within the warranty period, provided the customer notifies Charm promptly of any such defect prior to the expiration of said warranty period. The exclusive remedy provided herein shall not be deemed to have failed of its essential purpose so long as Charm is willing to replace any nonconforming reagent product or part. Charm shall not be liable for consequential, incidental, special or any other indirect damages resulting from economic loss or property damages sustained by any customer from the use of its reagent products. Except for Charm's obligation set forth above to replace any reagent product that proves defective within the warranty period, Charm shall not be liable for any damages of any kind arising out of or caused by any incorrect or erroneous test results obtained while using any such reagent product, whether or not caused by a defect in such reagent product.



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OM-607-002 Dec-2016