

# Population Assay Instructions

## EZTest H<sub>2</sub>O<sub>2</sub> and Stainless Steel Discs

### I. List of Components:

Mesa Labs, Bozeman Manufacturing Facility sells components for performing population assays. These include:

**PAK-G** includes: four 19.5 x 145 mm, sterilized, flat bottom glass tubes with four 6 mm beads and cap; twelve 16 x 125 mm, sterilized, borosilicate dilution blank tubes; two 10 mL pipettes; two 5 mL pipettes; eight 2 mL pipettes; eight 1 mL pipettes

**PAK-M** includes: one 250 mL Wheaton bottle containing 240 mL of sterile Difco brand growth medium

Items required are growth medium, sterilized flat-bottom tube with four 6mm beads, sterilized blank tubes for dilution, pipettes, 160 mL purified sterile water\*, a pre-heated (according to Table 1) heat-shock bath and incubator, an instrument used for holding the melted growth medium at 45 - 50°C, a timing device, a vortex machine, an ice bath, and 15 x 100 mm petri plates.

**NOTE:** When adding volumes of sterile fluid to vortexed units in flat-bottomed tubes, be careful not to contaminate the tip of a pipette by touching it to a receiving tube.

\*Throughout this procedure when sterile purified water is referenced this includes; Sterile distilled, DI or RO water. WFI, phosphate buffers or physiological saline solutions are not recommended.

### II. Preparing the Growth Medium for use:

**NOTE:** If you have purchased growth medium from Mesa Labs, the medium was prepared according to Good Manufacturing Practices (GMP) and has been tested for sterility and its growth promotion ability (see Certificate of Performance).

1. The growth medium must be completely melted prior to use. This can be accomplished by using a microwave oven. **CAUTION:** Melting agar presents a significant risk of explosion if not performed properly. It is important to loosen the screw cap on the bottle prior to placing into the oven. This will prevent pressurization of the bottle. Recommended power setting and operating time will vary depending on the oven type; however, the oven should **ONLY** be operated at **LOW POWER SETTINGS**.
2. When completely melted, the agar should be tempered at 45 to 50°C until ready for use.
3. A control plate should be poured with each assay. The purpose of the control plate is to verify the sterility of the growth medium. The control plate should be prepared upon completion of the assay and it consists of pouring the remaining growth medium into a sterile Petri plate. The control plate should be incubated with the plates from the assay and should result in no growth.

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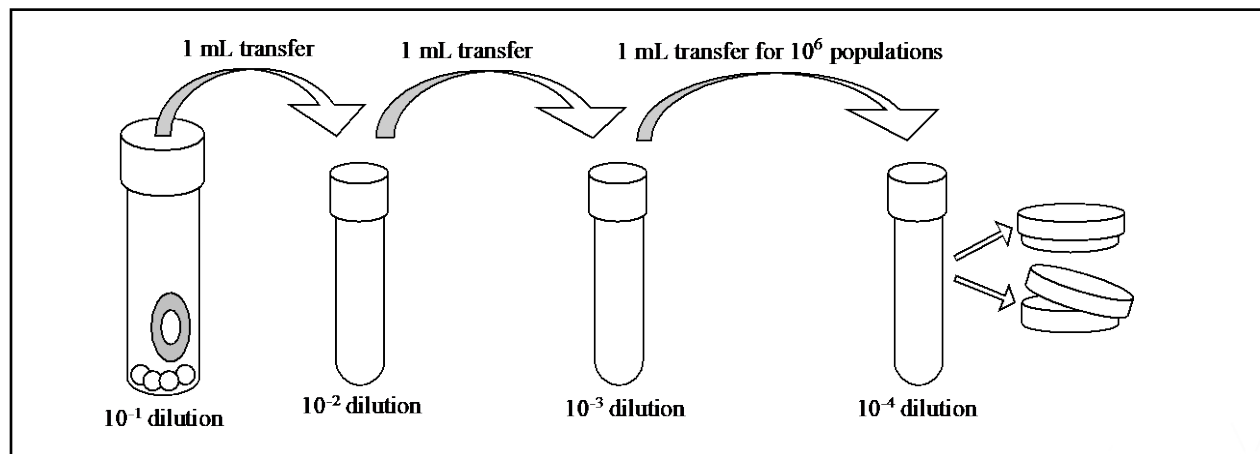
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### III. EZTest H<sub>2</sub>O<sub>2</sub> and Stainless Steel Disc Population Assay (method for assaying 10<sup>6</sup> spores per disc)

1. Using the glass bead 19.5 x 145mm flat bottom tubes, place four discs (randomly selected inoculated carriers) individually into the sterilized glass flat bottom tubes. Add 10ml of sterile purified water. Do not place more than one BI in each flat bottom tube.
2. Use one 10 mL pipette to transfer 9 mL of sterile purified water into each 16 x 125 mm dilution blank tube.
3. Sonicate the glass bead 19.5 x 145mm flat bottom tubes with the BI sample inside for not less than 16 minutes.
  - 3.1 De-gas the sonic bath by turning on for 5 minutes before placing the tubes in the wire rack.
  - 3.2 Rack should be all metal, preferably stainless steel.
  - 3.3 Tubes should be equidistant from each other.
  - 3.4 Ensure the rack in the sonic bath is suspended above the bottom of the bath, so that sonic energy reaches the test tubes uniformly.
  - 3.5 Move the tubes to different locations within the rack halfway through the sonication process.
4. In a pre-heated bath, heat-shock each 19.5 x 145mm flat bottom tube according to the test organism (see Table 1) starting the timing immediately upon insertion of the sample into the preheated bath.
5. Remove tubes and cool rapidly in ice bath.
6. Vortex the heat-shocked tube with glass beads and BI immediately before beginning the dilution process for not less than 60 seconds.
7. Complete the required dilution scheme for each sample to obtain an estimated 30-300 CFU/plate. The dilution scheme represented below is for a carrier inoculated with >1e6 spores.
8. From each tube, transfer a 1ml aliquot to a dilution tube containing 9.0ml of sterile purified water.
9. Vortex the tube for not less than 10 seconds.
10. Repeat as needed until the proper plating dilution is reached but do not plate.
11. From each final dilution tube, use a 2-mL pipette to withdraw 2-mL. Pipette 1 mL per plate into two 15 x 100-mm Petri plates for a total of 8 plates.

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12. Pour approximately 20 mL of melted growth medium cooled at 45° to 50°C into the Petri plates. Swirl to ensure adequate mixing and allow the agar to solidify. Do not use agar that has been melted and held longer than eight hours.
13. Pour control plate.
14. Allow to solidify then invert and incubate plates according to test organism (see Table 1).
15. After 48 hours of incubation, remove the plates from the incubator and count the colony forming units (CFU) on each plate. Preferably plates with counts between 30 and 300 CFU should be used, per ISO and USP.
16. Average the counts and then multiply by the inverse of the dilution factor to calculate the population per original unit.
17. Document all information.

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**Table 1. Heat-shock and Incubation Temperatures for Mesa Labs, Bozeman Manufacturing Facility Biological Indicator Test Organisms**

Test Organism	Heat shock**	Incubation
<i>G. stearothermophilus</i>	95 - 100°C for 15 minutes	55 - 60°C for 48 hours*
<i>B. atrophaeus</i>	80 - 85°C for 10 minutes	30 - 35°C for 48 hours
<i>B. subtilis</i> '5230'	80 - 85°C for 10 minutes	30 - 35°C for 48 hours
<i>B. subtilis</i> subsp. <i>spizizenii</i> '6633'	80 - 85°C for 10 minutes	30 - 35°C for 48 hours
<i>B. smithii</i>	95 - 100°C for 15 minutes	48 - 52°C for 48 hours*
<i>B. pumilus</i>	65 - 70°C for 15 minutes	30 - 35°C for 48 hours

\* Bag plates to avoid dehydration of media at this temperature.

\*\* Start timing immediately upon insertion of sample into preheated bath.

## Appendix 1

### Removing the Stainless Steel Carrier from EZTest

1. Firmly grasp the base of the EZTest in one hand. While a firm grip is necessary, excessive pressure could cause the media ampoule to break. If this occurs, the EZTest will need to be killed and discarded; one should not attempt to assay the stainless steel carrier if it has become saturated with media from the glass ampoule.
2. Grasp the cap of the unit in the other hand and use a repetitive back-and-forth twisting motion as you attempt to pull the cap off the base of the EZTest. Using pliers will greatly facilitate this process; one may find it impossible to remove the cap without aid from a tool (see photo).
3. Once the cap has been removed the filter material may have remained in the cap or it may still be on the EZTest unit. If the latter, remove the filter material.
4. Begin tilting the EZTest to allow the media ampoule to slide out for easy removal. Care should be taken that the disc does not slide out as well.
5. Use sterile forceps to extract the inoculated stainless steel carrier from the EZTest or pour the disc into the flat bottom tube.



## REFERENCE DOCUMENT:

LP-306

Population Assay on Non-Cellulose Carriers (Based on)