

## PRODUCT INFORMATION AND QUALITY CONTROL SHEET

# 0.5 McFarland Turbidity Standard

### INTENDED USE

The 0.5 McFarland standard is used to adjust the turbidity (concentration) of the inoculum for antimicrobial susceptibility tests.

### SUMMARY AND EXPLANATION

One of the earliest uses of turbidity for the estimation of bacterial populations was in the preparation of vaccines.<sup>1</sup> In 1907, McFarland developed a series of barium sulfate solutions to approximate the numbers of bacteria in solutions of equal turbidity, as determined by plate counts.<sup>2,3</sup>

Susceptibility testing requires the use of standardized inocula. The 0.5 McFarland standard is recommended for use in the preparation of inocula for performing the antimicrobial disk diffusion susceptibility test.<sup>4</sup>

### PRINCIPLES OF THE PROCEDURE

The 0.5 McFarland turbidity standard is prepared by adding barium chloride to sulfuric acid. The mixture of the two chemicals forms a precipitate, that when in suspension is equivalent to approximately  $1.5 \times 10^8$  colony forming units/ml.

### TYPICAL FORMULA AND APPEARANCE

Appearance = clear fluid, slightly turbid  
(Approximate formula per liter of processed water)

Barium Chloride	1.0 g
Sulfuric Acid (concentrated)	10 ml

### PRECAUTIONS

This product is for IN VITRO diagnostic use only. Culture specimens may contain microorganisms, which can be potentially infectious to the user. Strict adherence to aseptic techniques and established precautions against microbiological hazards should be followed throughout the procedure. Carefully dispose of all items which contact patient specimens or isolated bacteria.

### STORAGE/SHELF LIFE

Tubes should be stored at 2-25°C, protected from light. DO NOT FREEZE. Product that has exceeded the assigned expiration date noted on the label should not be used.

### MATERIALS PROVIDED

0.5 McFarland Turbidity Standard tubes (10 each per box)

### MATERIALS REQUIRED BUT NOT PROVIDED

Ancillary culture media, reagents and laboratory equipment as required for susceptibility testing.

### PROCEDURE

Before each use, shake well, mixing the fine white precipitate of barium sulfate in the tube. The accuracy of the density of a prepared McFarland standard should be checked by using a spectrophotometer with a 1-cm light path; for the 0.5 McFarland standard, the absorbance at a wavelength of 625 nm should be 0.08 to 0.1. Alternately, the accuracy of the McFarland standard may be verified by adjusting a suspension of a control strain (e.g., *E. coli* ATCC 25922) to the same turbidity, preparing serial 10-fold dilutions, and then performing plate counts. The adjusted suspension should give a count of  $10^8$  colony forming units/ml.<sup>4</sup>

### REFERENCES

1. Loran, V. (ed.), 1986. Antibiotics in laboratory medicine, 2<sup>nd</sup> ed. Williams & Wilkins, Baltimore.
2. McFarland, J. 1907. The nephelometer: an instrument for estimating the numbers of bacteria in suspensions used for calculating the opsonic index for vaccines. J. Am. Med. Assoc. 49:1176-1178.
3. Baron, E.J., and S.M. Finegold. 1990. Bailey & Scott's diagnostic microbiology, 8<sup>th</sup> ed. The C.V. Mosby Company, St. Louis.
4. National Committee for Clinical Laboratory Standards: M2-A5. Methods for dilution antimicrobial susceptibility tests for bacteria that grow aerobically. 2<sup>nd</sup> ed. National Committee for Clinical Laboratory Standards, Villanova, Pa.

### USER QUALITY CONTROL PROCEDURES AND INFORMATION

HealthLink recommends that the following quality assurance and quality control procedures be performed on each batch of product.

### QUALITY ASSURANCE

The following quality assurance procedures must be performed to assure the product will perform according to its intended use within the assigned expiry date:

Daily, document that product storage refrigerator maintains temperature within the recommended range: 2-8°C.

### QUALITY CONTROL

The following incoming inspection procedure must be performed for each batch (batch = same lot, same shipment) of culture media received in the laboratory:

Examine tubes for signs of deterioration: microbial contamination, discoloration, evaporation or other signs of deterioration.

Note: Notify Technical Service immediately if media does not meet the inspection criteria.

### TECHNICAL SERVICE

HealthLink provides a toll free technical service line (1-800-638-2625) to assist with product usage. To have technical questions answered; please call between the hours of 9:00 am to 5:00 pm EST.

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June, 1999

Product No. 3195 Rev. No. New