



# McFarland PMS Turbidity Standard

## Polymer Microparticle Suspension

(1/2)  
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McFarland PMS standards are equivalent turbidity standards to the original McFarland BSS standards.

- PMS = Polymer Microparticle Suspension  
Turbidity equivalence suspension of polymer microparticles.
- BSS = Barium Sulphate Suspension  
Suspension of barium sulphate precipitated from barium chloride and sulfuric acid according to the original McFarland Standards.

McFarland PMS standards correspond to the turbidity values of the McFarland BSS standards. The optimized polymer microparticle suspension separates more slowly than McFarland BSS standards and has a longer shelf life.

The CLSI (Clinical and Laboratory Standards Institute) accepts the use of polymer polystyrene / latex particle suspension turbidity standards to produce standardized bacterial suspensions. [2, 5]

### Principle

Adjusting a bacterial suspension turbidity to these standards produces a bacterial suspension in expected density range.

### Reagents

McFarland PMS Turbidity Standards contain polymer microparticles suspended in a special buffer solution. The turbidity standards are equivalent to the absorption (625 nm; 10 mm) of the McFarland BSS Turbidity Standards. The shelf life in originally closed condition is indicated on the label. Each tube is marked with a traceable LOT number. After opening, there is a reduced shelf life depending on storage and contamination. Shelf life after opening and storage at +2 ... +8 °C is about 2 weeks. Do not freeze or overheat.

### Storage

We recommend storage protected from direct light (UV) in the transparent but UV light resorbing special packaging. Avoid breakage by storage in the package.



### Product stability

This product should not be used if any of the following points occurs:

- There is any evidence of dehydration or volume reduction.
- Product is contaminated.
- The color changed.
- Exp. Date has passed.
- There are other signs of deterioration.

### Risks and Safety

Please observe the necessary precautions for use of laboratory reagents and body fluids; as well as possibly also of microbiological samples. Applications should be performed by expert personnel only. Follow the national and laboratory internal guidelines for work safety and infection control. Wear suitable protective clothing and disposable gloves while handling.

It is important to ensure effective protection against infection according to laboratory guidelines.



International  
[www.sds-id.com](http://www.sds-id.com)

For additional safety information please refer to the information on the label and the corresponding Safety Data Sheet (SDS).

Download by QR-Code or link:

[www.sds-id.com/100116-3](http://www.sds-id.com/100116-3) (McFarland Standard PMS)

### Contents/Main Components

050025-... 050039- McFarland PMS Turbidity Standard  
Polymer particle suspension equivalent to Abs. (625 nm; 10 mm) of the McFarland BSS standards.

### Additionally required or recommended materials

050005-... Plain Tubes (⇒ ordering information).  
The tube size Ø 16.1 × 112.5 mm is suitable for most McFarland photometers for cell density determination and corresponds to common glass tubes used in microbiology.

050007-0001 Wickerham Card (⇒ ordering information).

Optional Spectrophotometer or McFarland Photometer

### Specimen

Suspension of bacteria.

### Procedure

#### Resuspending

The turbidity standards must be resuspended before use. Proceed as follows:

- Mix the tube sufficiently on a vortexer. Check the tube for possible sedimentation. Mix the tube again if necessary.
- Allow the tube to stand for 2 to 5 minutes to allow all air bubbles to rise.
- Invert the tube carefully before comparison.

#### Visual Comparison

1. Invert the tube to suspend the microparticles. Avoid air bubbles.
- 2a. Compare the turbidity of a bacterial suspension, prepared from a 18...24 hour culture with the appropriate McFarland Standard. \*
- 2b. For visual comparison evaluate the tubes against the "Wickerham Card" with white/black contrast lines and use adequate light.
3. Bacterial suspensions are standardized when distortion/attenuation of black lines is equal to that of the corresponding McFarland Standard.

\* Note:

The bacterial suspension tubes should be of similar diameter as the McFarland standard tubes. Plain tubes are available.

#### Spectrophotometrical Comparison

Please also refer to the operating instructions for your spectrophotometer.

1. Invert the tube to suspend the microparticles. Avoid air bubbles.
2. Calibrate your measuring system with the McFarland standards.
3. Compare the turbidity of a bacterial suspension, prepared from a 18...24 hour culture with the appropriate McFarland Standard. \*

\* Note:

The bacterial suspension tubes should be of similar diameter as the McFarland standard tubes. Plain tubes are available.

Produktinformation  
McFarland PMS Turbidity Standards

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(en)

050025-PR01

## Analysis

### McFarland PMS Standards

The table below refers to McFarland PMS Turbidity Standards.

Wavelength:..... 625nm

Optical path length:..... 10mm

MFU	Approximate Cell Density	Absorbance Range
0.5 MFU	$1.5 \times 10^8$ Cells/ml	**
1.0 MFU	$3.0 \times 10^8$ Cells/ml	**
2.0 MFU	$6.0 \times 10^8$ Cells/ml	**
3.0 MFU	$9.0 \times 10^8$ Cells/ml	**
4.0 MFU	$12 \times 10^8$ Cells/ml	**
5.0 MFU	$15 \times 10^8$ Cells/ml	**
6.0 MFU	$18 \times 10^8$ Cells/ml	
7.0 MFU	$21 \times 10^8$ Cells/ml	
8.0 MFU	$24 \times 10^8$ Cells/ml	

MFU = McFarland Units

\* Use wavelength 600nm or 625 nm depending on the literature standard method used. [2, 3]

\*\* Download certificate of analysis.  
 [www.lotdocs.com/bioanalytic](http://www.lotdocs.com/bioanalytic)

## Quality Controls and Proficiency Test

Each LOT / batch number of the McFarland Standards has been spectrophotometrically tested and passed quality control.

## Capability Characteristics

### Limitations

In general, typical limitations are known for all McFarland standards. Please refer to the literature for your method, normative documents or other available information. When comparing with bacterial suspensions, the inherent staining and, in particular, the inherent turbidity of the medium must be taken into account.

Visual comparison of McFarland PMS standards and bacterial suspensions under black light illumination can lead to incorrect results.

McFarland PMS standards are recommended for visual comparison or for use with calibrated spectrometers at the correct wavelength.

## Notes

This product information is only valid for the reagent listed here. In particular, it cannot be used for similar products of other manufacturers.

Please check our website regularly to ensure that this product information is up to date.

### Instruction for Use

For professional use only.

To avoid errors, the use of qualified personnel is carried out. National guidelines for work safety and quality assurance must be followed.

The used equipment must comply with the state of technology and the laboratory requirements.

All samples and used tubes/vials must be marked clearly identifiable to exclude any confusion.

### Protection against infection

It is important to ensure effective protection against infection according to laboratory guidelines.

Laboratory personnel working with human samples should at a minimum be immunized against Hepatitis B (HBV).

### Classifications

EU: EDMA: 14 50 01 00 00; IVD Class A.

### Support / Information service

For methodological and technical support, please contact us by E-Mail at [support@bioanalytic.de](mailto:support@bioanalytic.de) (German, English).

Periodically check for updates of this product information on our website.

### Feedback

Information from users can be reported to [support@bioanalytic.de](mailto:support@bioanalytic.de) (German, English).

Suggestions for further developments will be considered. **Waste Man-**

## agement

Please observe your national laws and regulations.

Used and expired solutions must be disposed of in accordance with your local regulations.

Inside the EU, national regulations apply that are based on the current, amended version of Council Directive 67/548/EEG on the approximation of the laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances.

Decontaminated packaging can be disposed of as household waste or recycled, unless otherwise specified.

## Ordering Information

The following McFarland PMS Turbidity Standards are available:

050030-0010	0.0	McFarland PMS Turbidity Standard
050031-0010	0.5	McFarland PMS Turbidity Standard
050032-0010	1.0	McFarland PMS Turbidity Standard
050033-0010	2.0	McFarland PMS Turbidity Standard
050034-0010	3.0	McFarland PMS Turbidity Standard
050035-0010	4.0	McFarland PMS Turbidity Standard
050036-0010	5.0	McFarland PMS Turbidity Standard
050037-0010	6.0	McFarland PMS Turbidity Standard
050038-0010	7.0	McFarland PMS Turbidity Standard *
050039-0010	8.0	McFarland PMS Turbidity Standard *

\* Extended range. Special manufacturing on request.

### Accessories:

050005-6001	10 pcs	McFarland Empty tubes (Glass) Specification: $\varnothing 16.1 \times 112.5$ mm, Aluminium-cap with seal, autoclavable.
050007-0001	1 St.	Wickerham Card Bioanalytic. Laminated background comparison card with black and white stripes for visual turbidity assessment.

## Literature & Footnotes

Legends for the graphic symbols and tags used follow relevant norms or are available on our internet pages.

- [1] McFarland, J; 1907; JAMA. 14:1176-1178
- [2] CLSI / Clinical and Laboratory Standards Institute: Performance Standards for Antimicrobial Disk Susceptibility Tests; 2009; 10th ed. M2-A10. Wayne, PA.
- [3] Doern, G. V. and Jones, R. N.: Antimicrobial Agents Chemother; 1988; 32: 1747-1753.
- [4] Lorian, V.: Antibiotics in Laboratory Medicine; 1986; 2nd ed. ; Williams & Wilkins, Baltimore, MD
- [5] CLSI / Clinical and Laboratory Standards Institute: Performance Standards for Antimicrobial Disk Susceptibility Tests; 2012; vol32. M2-A11. Wayne, PA. (Replaces [2] M2-A10):