



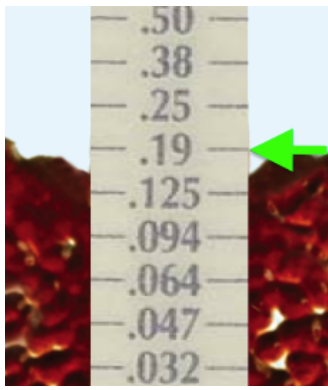
Liofilchem® MIC Test Strip Photographic Guide

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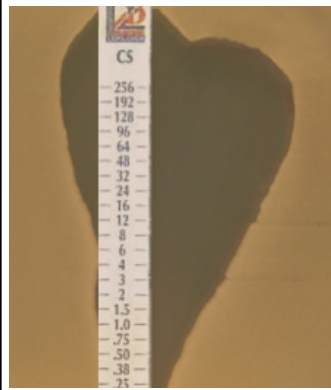
Aerobic bacteria

Drug effect			
<p>Bacteriostatic drug: read at 80% inhibition</p>	<p>Tigecycline: read at 80% inhibition.</p>	<p>Linezolid: read at 90% inhibition.</p>	<p>Bactericidal drug: read hazes and microcolonies.</p>
<p>Bactericidal drug: read micro and macro colonies.</p>	<p>Intrinsic activity of clavulanate, extrapolate curve.</p>	<p>Paradox effect of Beta-lactams, read all growth.</p>	<p>Slim ellipse of glycopeptides, read end of dip.</p>
<p>Slim ellipse of polypeptides, read bottom of dip.</p>	<p>Polypeptides, read colonies in the dip.</p>	<p>Tedizolid: read at 90% inhibition.</p>	

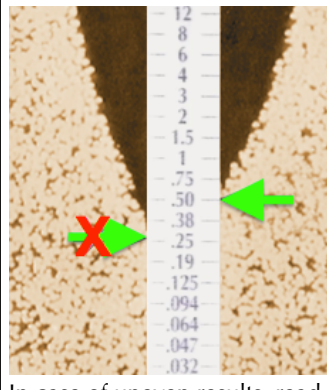
Technical and handling



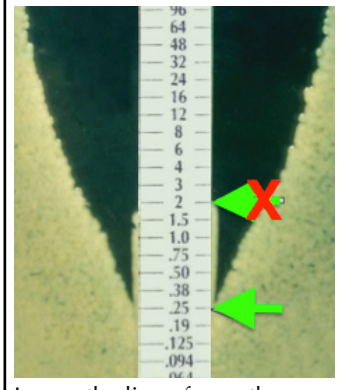
Read upper values between markings.



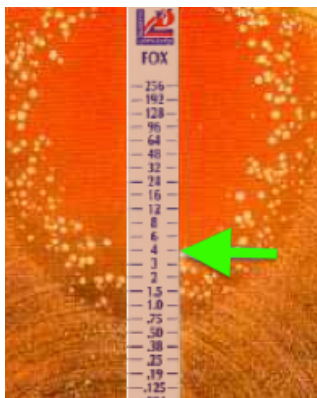
Wet surface, distorted ellipse, repeat the test.



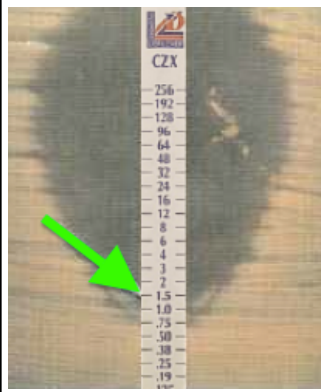
In case of uneven results, read the upper value. Repeat the test if the discrepancy is >1 dilution.



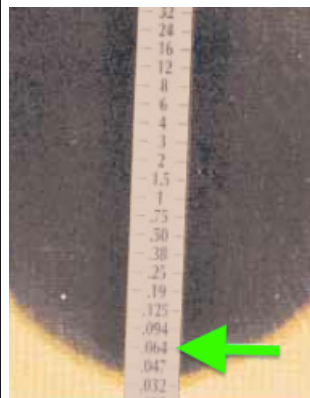
Ignore the line of growth alongside the strip.



Read where isolated resistant colonies are completely inhibited.

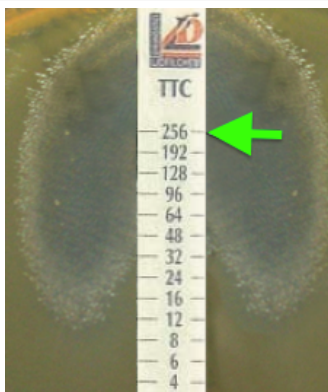


Partial regrowth at the edge zone. Read the MIC at complete inhibition.



Hazy edge zone. Read at complete inhibition.

Resistance effects



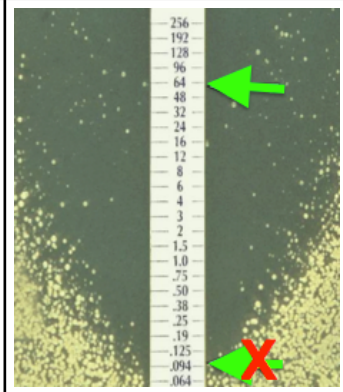
Beta-lactamase induction by clavulanic acid.



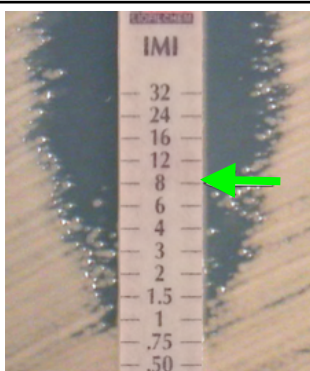
Small colony variants for bactericidal drugs.



Read at complete inhibition for GISA/hGISA.

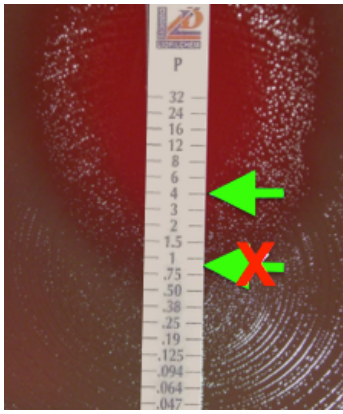


Read at complete inhibition for ORSA. (Oxacillin)

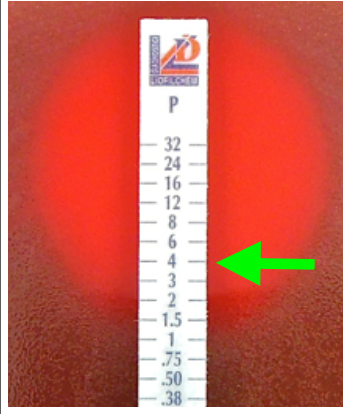


KPC: read at complete inhibition.

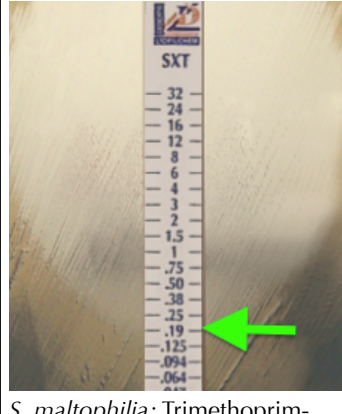
Effects of microorganisms



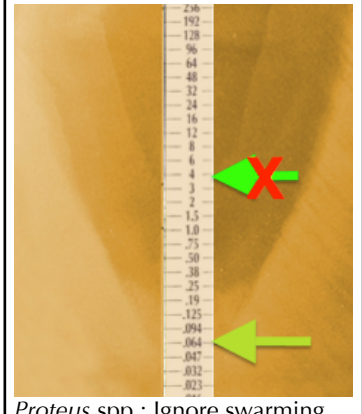
Pneumococci: read the beta-lactams at complete inhibition.



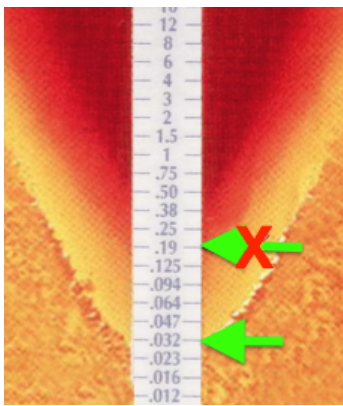
Pneumococci: read haze and inner colonies for beta-lactams.



S. maltophilia: Trimethoprim-Sulfamethoxazole, ignore hazes in the ellipse.



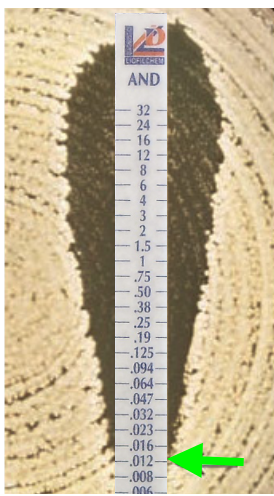
Proteus spp.: Ignore swarming.



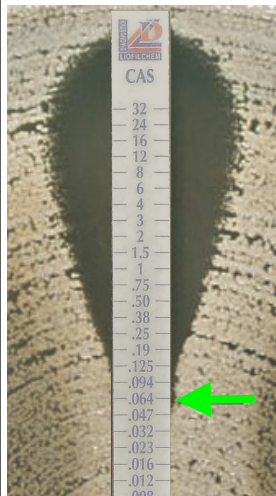
Streptococcus spp.: ignore the hemolysis.

Yeasts

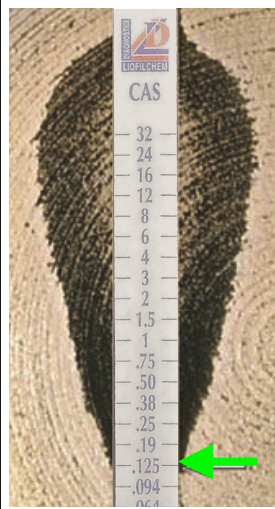
Echinocandins



Candida spp.: read at 80% inhibition, ignore microcolonies.



C. albicans: dip effect. Read at the bottom of the dip.

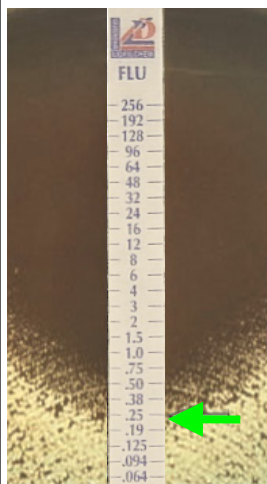


C. tropicalis: ignore regrowth at high concentration.

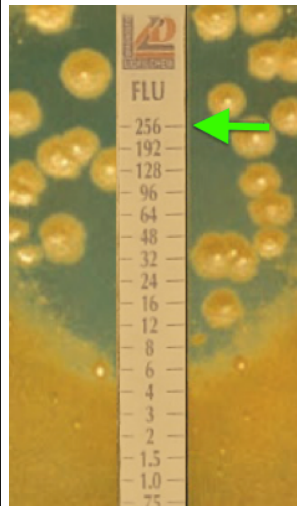
Azoles



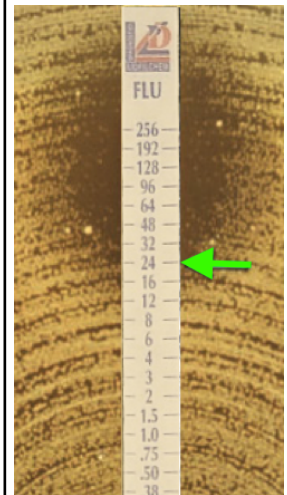
C. albicans: Ignore lawn of microcolonies, read at 80% inhibition.



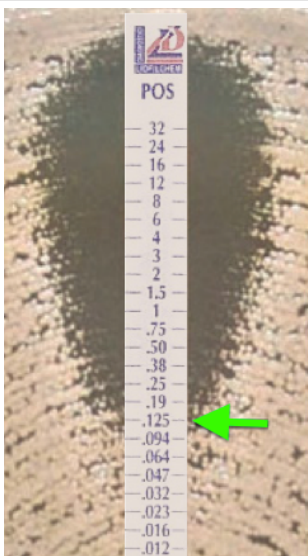
C. parapsilosis: trailing microcolonies



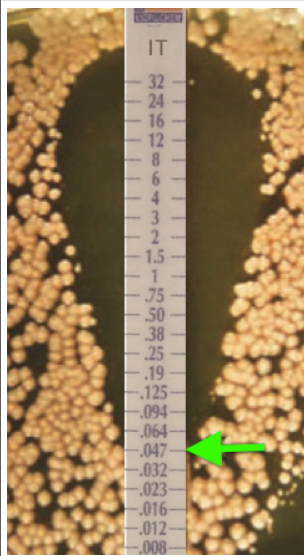
C. krusei: read the macrocolonies in the ellipse.



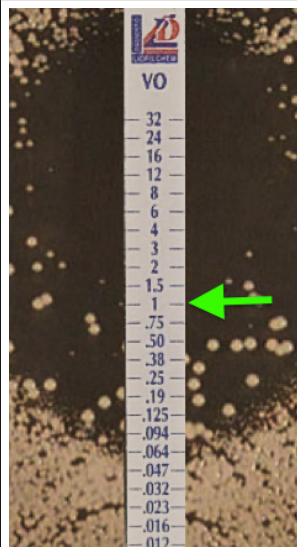
C. glabrata: higher MIC with trailing colonies.



Candida spp.: Slim ellipse with trailing microcolonies.

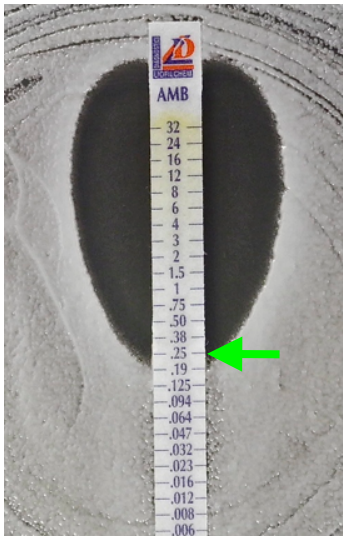


C. albicans: clear endpoint.

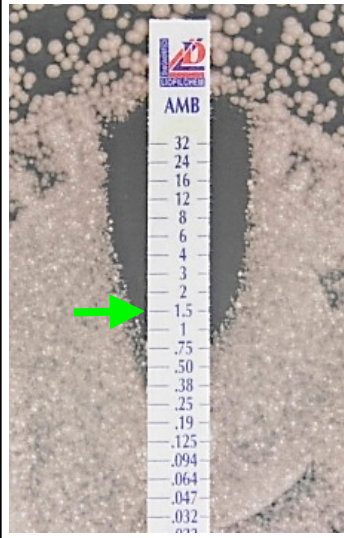


Candida spp.: read the macrocolonies.

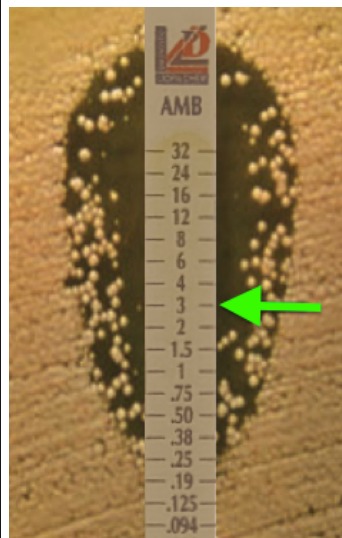
Amphotericin B



Candida spp.: clear endpoint.

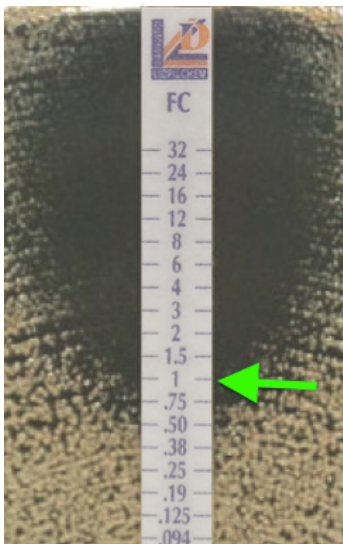


Candida spp.: slim ellipse, read all growth and microcolonies.

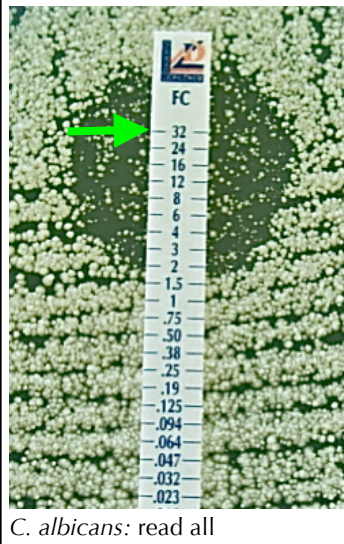


Candida spp.: read at complete inhibition.

Flucytosine



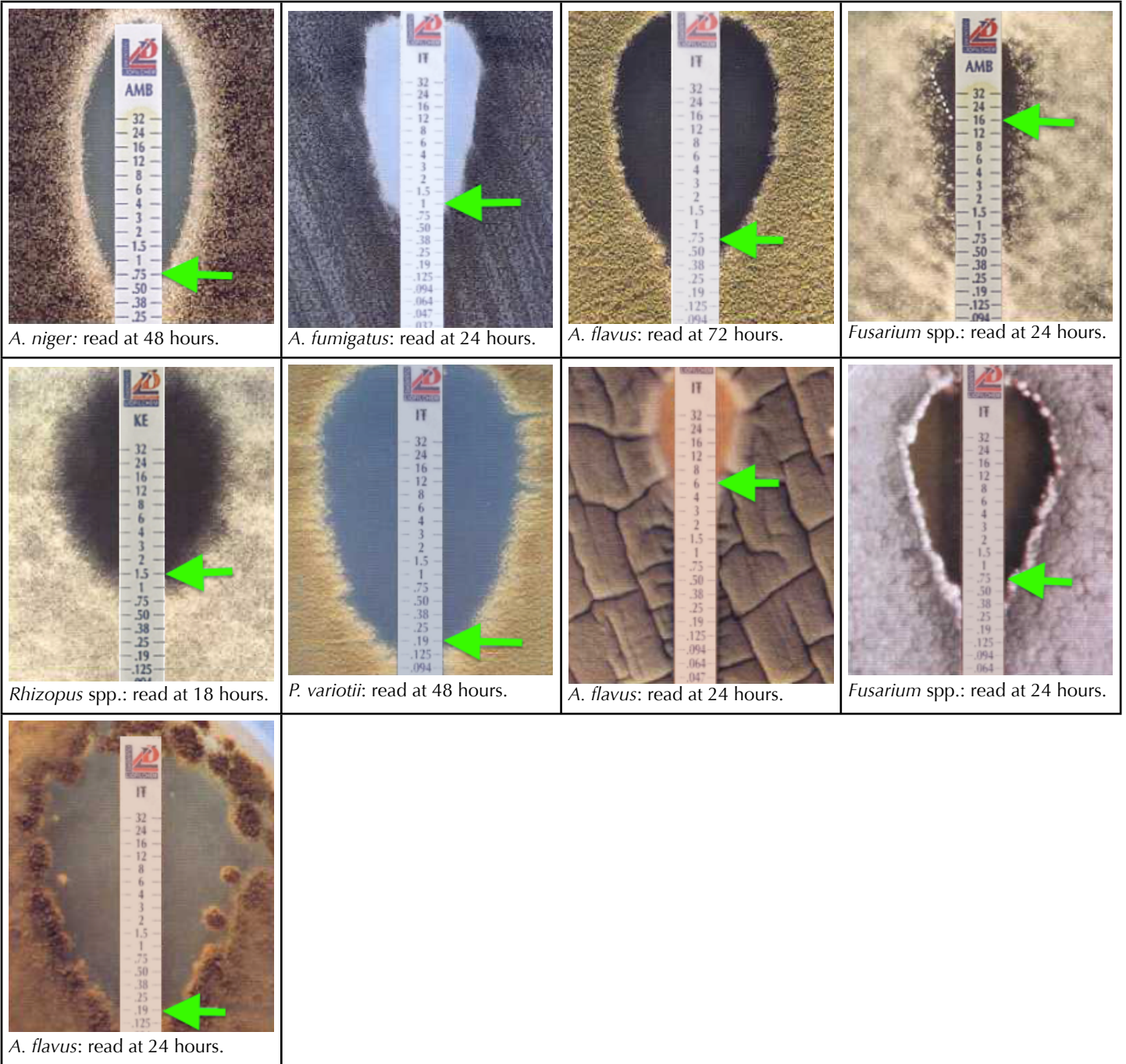
C. tropicalis: read at 90% inhibition. Ignore microcolonies.



C. albicans: read all macrocolonies in the ellipse



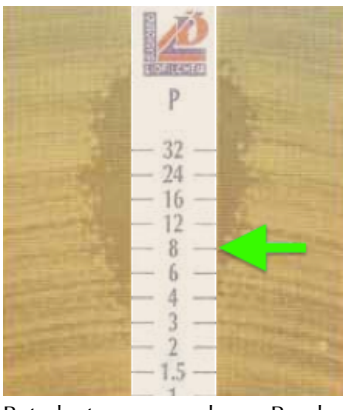
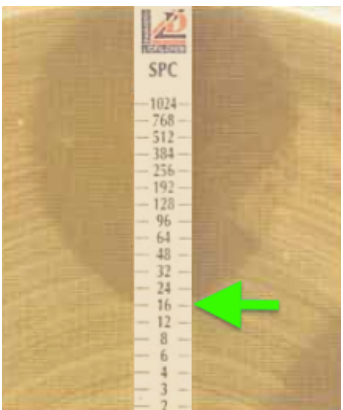


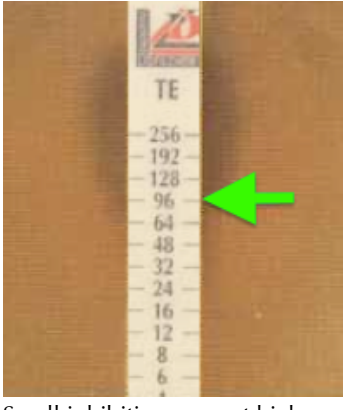
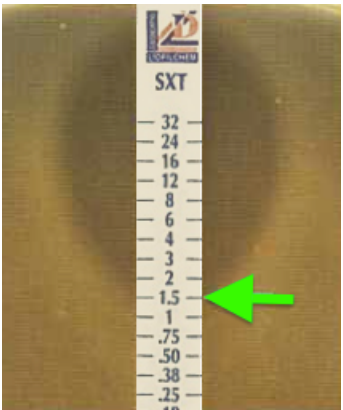
Refer to MIC Test Strip **Technical Sheet Yeast** for further details:
http://www.liofilchem.net/login.area.mic/technical_sheets/MTS24.pdf

Moulds



Refer to MIC Test Strip **Technical Sheet Moulds** for further details:
http://www.liofilchem.net/login.area.mic/technical_sheets/MTS06.pdf

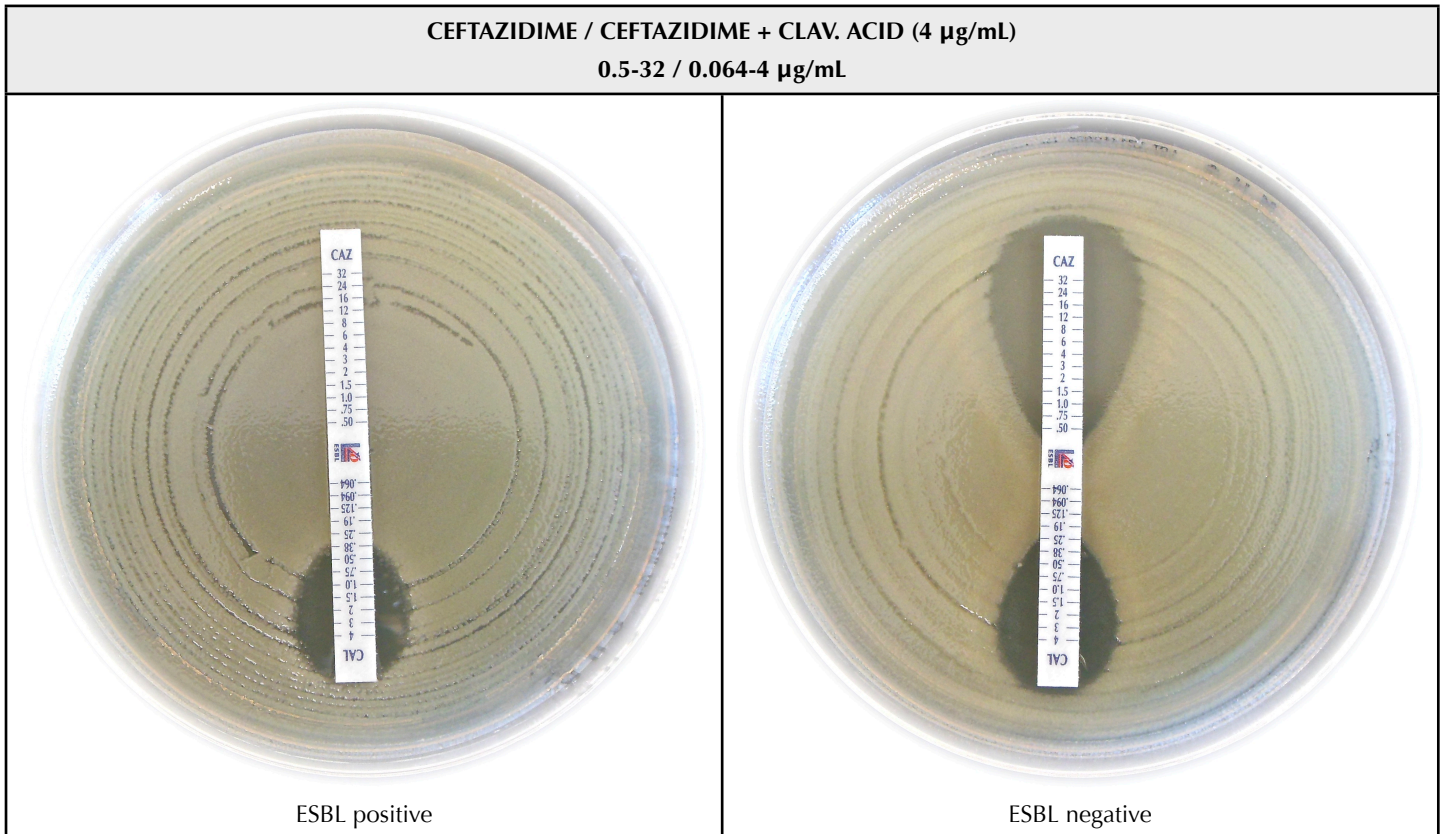
Gonococci

 <p>Reduced susceptibility to Penicillin G. Sharp end point.</p>	 <p>Ignore the clearing along the strip.</p>	 <p>Beta-lactamase producer. Read at complete inhibition.</p>	 <p>Sharp end point to Spectinomycin.</p>
 <p>Double zone in case of heavy inoculum.</p>	 <p>Microcolonies at the end point.</p>	 <p>Small inhibition zone at high MIC values.</p>	 <p>Bacteriostatic drug: diffuse edge zone. Read at 80% inhibition.</p>

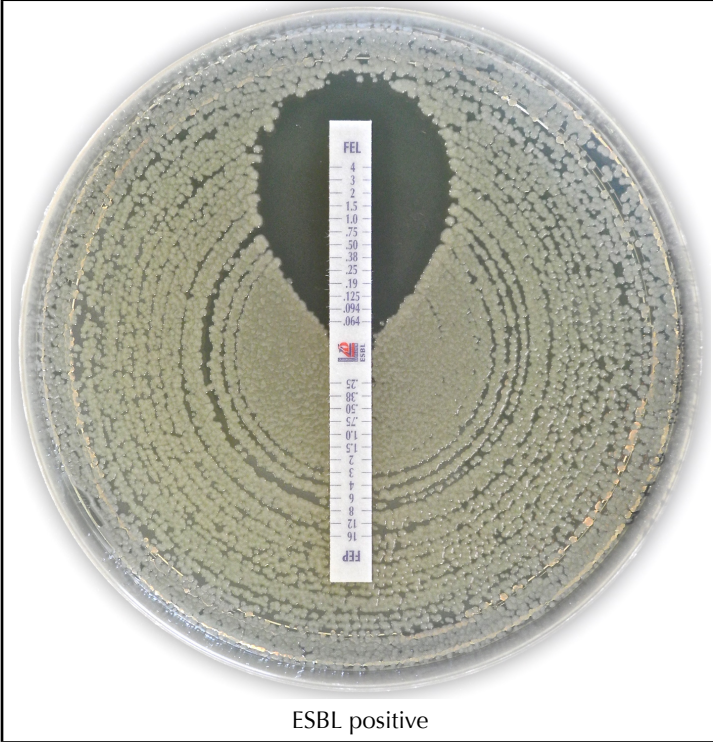
Refer to MIC Test Strip **Technical Sheet Gonococci** for further details:
http://www.liofilchem.net/login.area.mic/technical_sheets/MTS13.pdf

ESBL

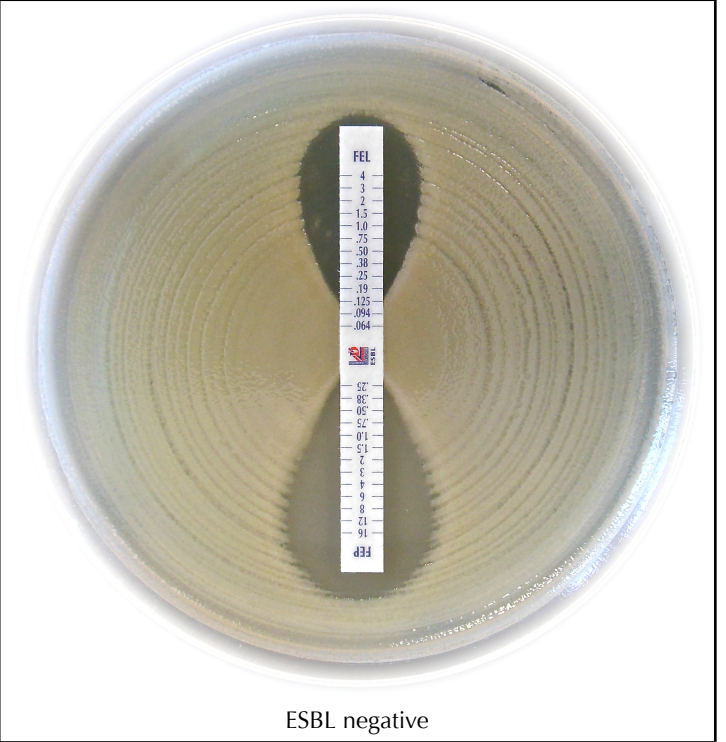
ESBL	M.I.C. Ratio	Reporting
Positive	M.I.C. CTX \geq 0.5 and CTX/CTL ratio \geq 8 or M.I.C. CAZ \geq 1 and CAZ/CAL ratio \geq 8 or M.I.C. FEP \geq 0.25 and FEP/FEL ratio \geq 8 or "Phantom" zone or deformation of the CTX, CAZ or FEP ellipse.	ESBL producer and resistant to all penicillins, cephalosporins and aztreonam (CLSI M100-S series).
Negative	M.I.C. CTX $<$ 0.5 or CTX/CTL ratio $<$ 8 and M.I.C. CAZ $<$ 1 or CAZ/CAL ratio $<$ 8.	ESBL non-producer and report actual MICs of relevant drugs as determined by a M.I.C. method.
ND (non determinable)	M.I.C. CTX $>$ 16 and M.I.C. CTL $>$ 1 and M.I.C. CAZ $>$ 32 and M.I.C. CAL $>$ 4 and M.I.C. FEP $>$ 16 and M.I.C. FEL $>$ 4 or when one strip is ESBL negative and the other ND.	ESBL non-determinable and report actual M.I.C.s of relevant drugs as determined by a M.I.C. method. If ESBL is suspected, confirm results with genotyping.



CEFEPIME / CEFEPIME + CLAV. ACID (4 µg/mL)
0.25-16 / 0.064-4 µg/mL

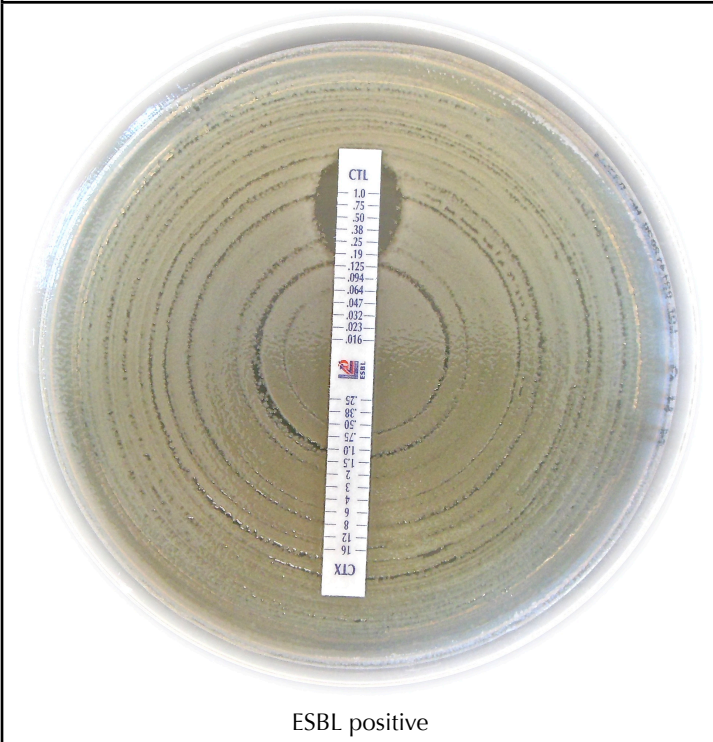


ESBL positive

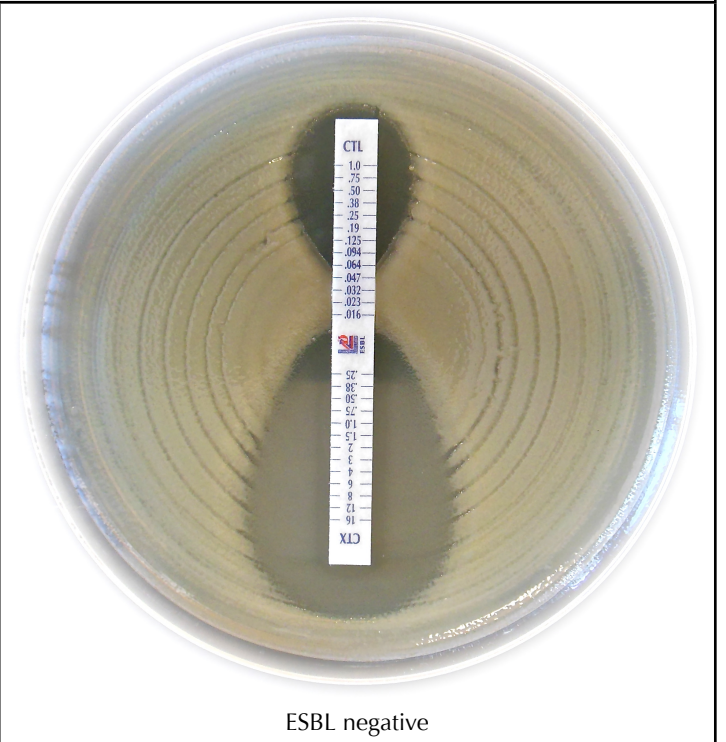


ESBL negative

CEFOTAXIME / CEFOTAXIME + CLAV. ACID (4 µg/mL)
0.25-16 / 0.016-1 µg/mL



ESBL positive



ESBL negative

Refer to MIC Test Strip **Technical Sheet ESBL** for further details:
http://www.liofilchem.net/login.area.mic/technical_sheets/MTS26.pdf

MBL

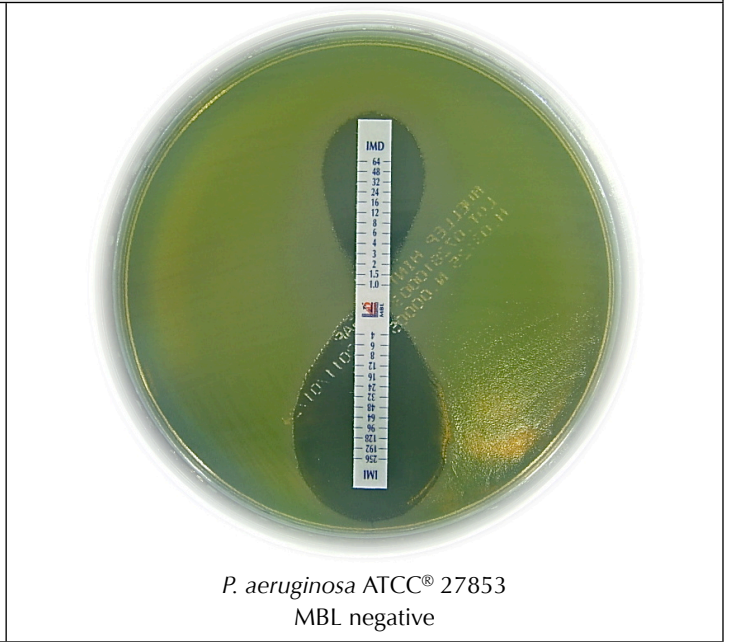
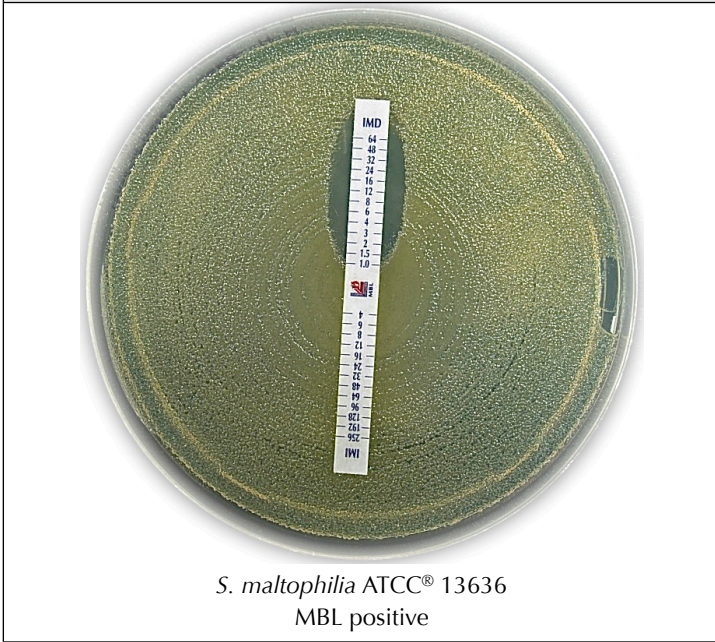
Interpretation

MIC ratio of IMI/IMD or MRP/MRD of ≥ 8 or ≥ 3 log₂ dilutions indicates MBL production. Phantom zone or deformation of the ellipse is also positive for MBL regardless of the IMI/IMD or MRP/MRD ratio.

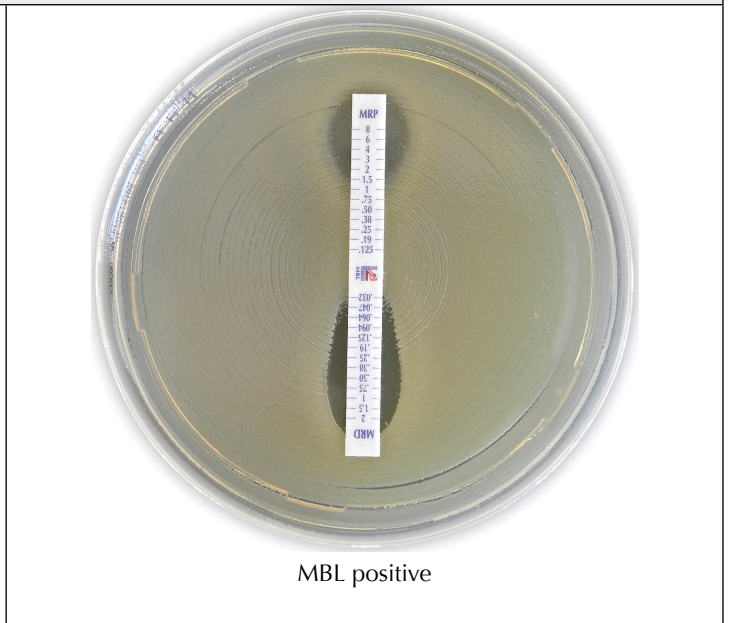
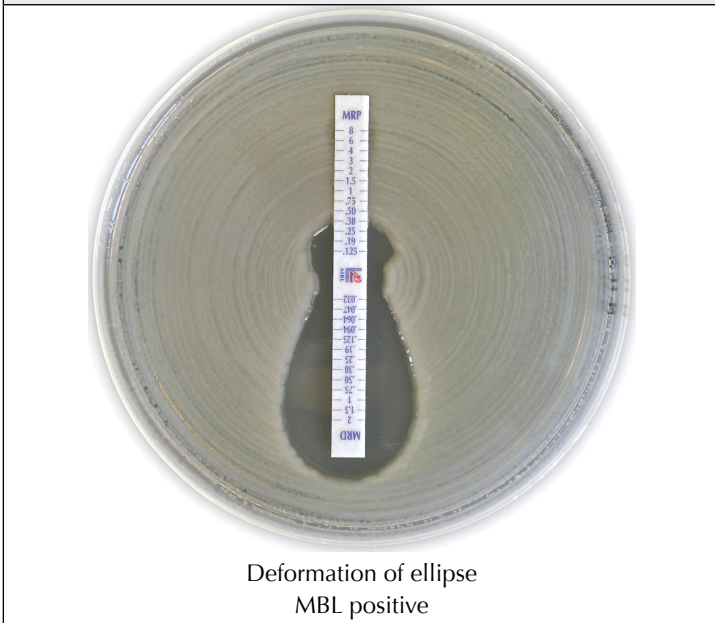
Examples of how to interpret M.I.C. results and ratios for IMI/IMD and MRP/MRD:

IMI/IMD 128/12 = 10.7	= MBL +	MRP/MRD 4/0.25 = 16	= MBL +
IMI/IMD >256/<1 = >256	= MBL +	MRP/MRD >8/0.032 = >250	= MBL +
IMI/IMD 64/<1 = >64	= MBL +	MRP/MRD 2/0.032 = <1	= MBL -
IMI/IMD 64/>64 = <1	= MBL -	MRP/MRD <0.025/<0.032 = 3.9	= MBL -
IMD >256/>64 or <4/<1	= Non Determinable	MRP/MRD >8/>2 = >4	= Non Determinable

IMIPENEM / IMIPENEM + EDTA 4-256 / 1-64 µg/mL



MEROPENEM / MEROPENEM + EDTA 0.125-8/0.032-2 µg/mL



Refer to MIC Test Strip **Technical Sheet MBL** for further details:
http://www.liofilchem.net/login.area.mic/technical_sheets/MTS27.pdf

GRD

GRD (Glycopeptide Resistance Detection) for the detection of GISA (Glycopeptide Intermediate *Staphylococcus aureus*) or hGISA (hetero-GISA) phenotypes.

Read the M.I.C. values for VA and TEC where the relevant inhibition ellipses intersect the strip, after a proper incubation time and only when an even lawn is clear.

The M.I.C. value is superior or equal to (\geq) the highest value on the scale in case of no inhibition ellipse (growth along the entire gradient). The M.I.C. value is inferior to ($<$) the lowest value when the inhibition ellipse intersects below the lower end of the scale.

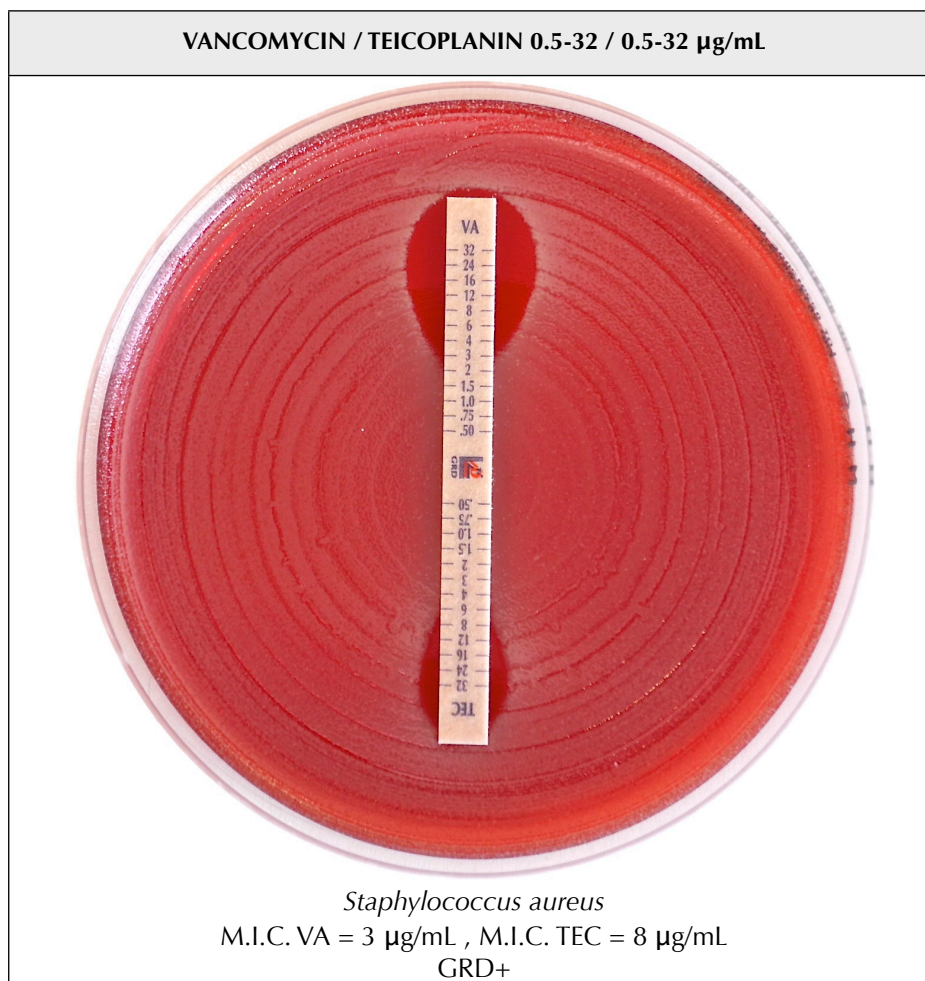
In case of mutant colonies present in the inhibition ellipse, read the M.I.C. where those colonies are completely inhibited. Inhibition ellipses may be small or not clearly determinable for high M.I.C. values.

Interpretation

GRD+ for GISA or hGISA VA or TEC $\geq 8 \mu\text{g/mL}$

i) GISA: GRD+ and standard VA M.I.C. $\geq 4 \mu\text{g/mL}$

ii) hGISA: GRD+ and standard VA M.I.C. $<4 \mu\text{g/mL}$



Refer to MIC Test Strip **Technical Sheet GRD** for further details:

http://www.liofilchem.net/login.area.mic/technical_sheets/MTS28.pdf

KPC

Ertapenem (ETP)/Ertapenem + Phenylboronic Acid (EBO) and Meropenem (MRP)/Meropenem + Phenylboronic Acid (MBO) are designed to detect *Klebsiella pneumoniae* Carbapenemase (KPC) producing bacteria

Reading

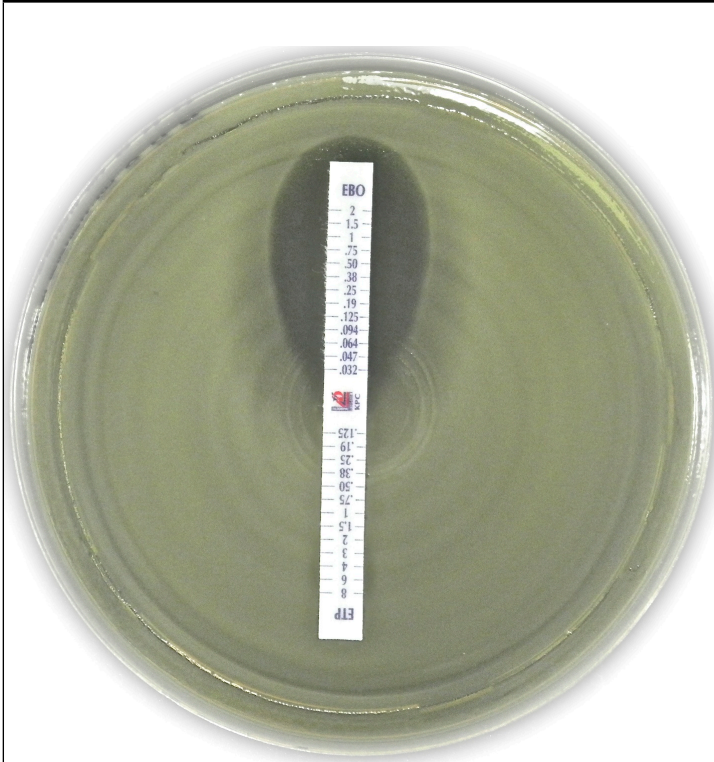
When mutant colonies are present in the inhibition ellipse, read the M.I.C. where these colonies are inhibited. For ETP and MRP M.I.C. values in the high range, inhibition ellipses may be very small or not clearly distinguishable. Occasionally, an extra zone (phantom zone) may be seen between the ETP/EBO sections or between the MRP/MBO sections. The ETP/EBO and MRP/MBO inhibition ellipses may also be deformed at the tapering ends. The presence of a phantom zone or ellipse deformation indicate KPC production and is caused by the boronic acid diffusion from the EBO or MBO section to ETP or MRP section, respectively.

Interpretation

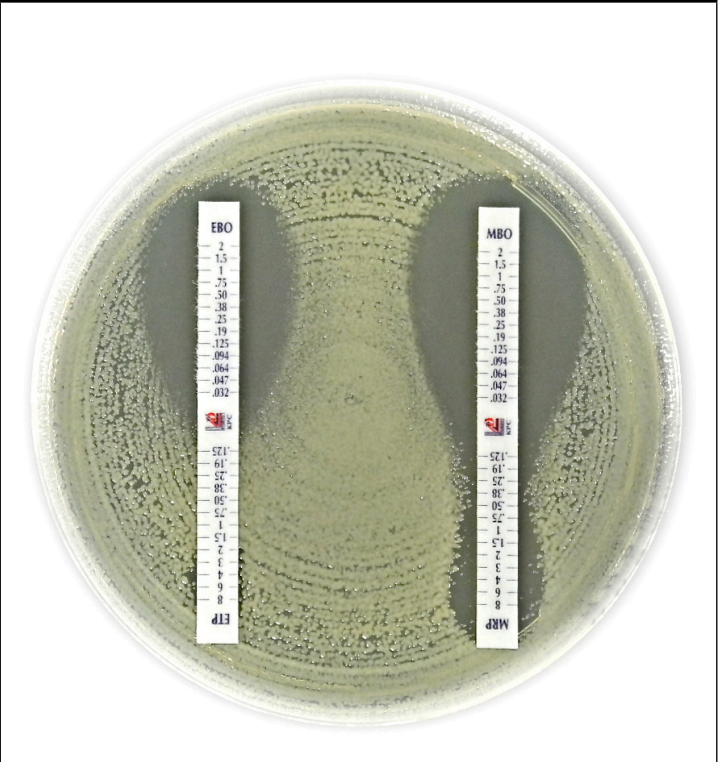
MIC ratio of ETP/EBO or MRP/MBO of ≥ 8 or ≥ 3 log₂ dilutions indicates KPC production. Phantom zone or deformation of the ellipse is also positive for KPC regardless of the ETP/EBO or MRP/MBO ratio.

ETP/EBO 4/0.25 = 16	= KPC +	MRP/MBO 4/0.25 = 16	= KPC +
ETP/EBO >8/0.032 = >250	= KPC +	MRP/MBO >8/0.032 = >250	= KPC +
ETP/EBO 2/0.032 = <1	= KPC -	MRP/MBO 2/0.032 = <1	= KPC -
ETP/EBO <0.025/<0.032 = 3.9	= KPC -	MRP/MBO <0.025/<0.032 = 3.9	= KPC -
EBO >8/>2	= Non Determinable	MRP/MBO >8/>2	= Non Determinable

MEROPENEM / MEROPENEM + Phenylboronic Acid 0.125-8 / 0.032-2 µg/mL
ERTAPENEM / ERTAPENEM + Phenylboronic Acid 0.125-8 / 0.032-2 µg/mL



Klebsiella pneumoniae
MIC Test Strip ETP / EBO
KPC+



Klebsiella pneumoniae
MTS ETP / EBO and MTS MRP / MBO
KPC+

Refer to MIC Test Strip **Technical Sheet KPC** for further details:
http://www.liofilchem.net/login.area.mic/technical_sheets/MTS35.pdf