



# MIC Test Strip Technical Sheet **Staphylococci**

## Specimen

Blood, wounds, sterile sites (tissues, bone, joints, fluids, CNS) and indwelling devices.

## Procedure

**Medium:** Mueller Hinton II Agar (ref. 10031).

**Inoculum:** Suspension in physiological solution to 0.5 McFarland (Ref. 80400).

**Incubation:** 35 ± 2°C / ambient / 16-20 hours. Interpret vancomycin and oxacillin after 24 hours.

**Interpretation of results:** Bactericidal drugs: interpret the M.I.C. at complete inhibition of growth including microcolonies, hazes and isolated colonies. Bacteriostatic drugs: interpret the M.I.C. at 80% inhibition when trailing is seen.

## Methicillin/Oxacillin Resistant Staphylococci

**ORSA** (Oxacillin resistant *S. aureus*), **OR-CNS** (Oxacillin resistant Coagulase Negative Staphylococci), **BORSA** (Borderline Oxacillin Resistant *S. aureus*).

**Medium:** Mueller Hinton Agar + 2% NaCl (Ref. 11206).

**Inoculum:** Suspension in physiological solution to 0.5-1 McF (heavier inoculum improves detection of low level R).

**Incubation:** 35 ± 2°C / ambient / 24 hours for ORSA/ BORSA, 48 hours for ORCNS.

**Interpretation of results:** Interpret at complete inhibition of all growth; watch for microcolonies, hazes and isolated colonies.

## Glycopeptide non-susceptible *Staphylococcus aureus*

**GRSA** (Glycopeptide resistant *S. aureus*), **GISA** (Glycopeptide Intermediate *S. aureus*), **hGISA** (heteroresistant glycopeptide intermediate *S. aureus*).

### Macro gradient test

**Medium:** Brain Heart Infusion Agar (Ref. 10060).

**Inoculum:** Suspension in broth to 2 McF (heavier inoculum improves detection of hetero-resistance).

**Incubation:** 35 ± 2°C / ambient / interpret at 24 hours and confirm at 48 hours.

**Interpretation of results:** Interpret at complete inhibition; watch for hazes, microcolonies and isolated colonies. Use a magnifying glass, oblique light and tilt the plate.

	Quality Control (M.I.C. µg/mL)	CLSI INTERPRETATION M.I.C. Criteria (µg/mL)			EUCAST INTERPRETATION M.I.C. Criteria (µg/mL)		Examples of ANTIBIOGRAM					
		<i>S. aureus</i> ATCC® 29213	<i>S. aureus</i> ATCC® 43300	S	I	R	S	R	ORSA/ORCNS/ BORSA (Mueller Hinton + 2% NaCl) 90 mm petri dish	Detection of glycopeptide resistance 90 mm petri dish	For confirmed ORSA/ORCNS (Muller Hinton Agar) 140 mm petri dish	For Non-ORSA/ ORCNS (Mueller Hinton Agar) 140 mm petri dish
<b>AUG</b> AMOXICILLIN/CLAVULANIC ACID 2/1 <sup>1</sup>	0.12-0.5			≤4	-	≥8			✓			
<b>P</b> PENICILLIN G	0.25-2			≤0.12	-	≥0.25	≤0.12	>0.12				✓
<b>C</b> CHLORAMPHENICOL	2-16			≤8	16	≥32	≤8	>8				
<b>CIP</b> CIPROFLOXACIN	0.12-0.5			≤1	2	≥4	≤1	>1				✓
<b>CD</b> CLINDAMYCIN	0.06-0.25			≤0.5	1-2	≥4	≤0.25	>0.5			✓	✓
<b>DAP</b> DAPTOMYCIN	0.12-1			≤1	-	-	≤1	>1			✓	
<b>E</b> ERYTHROMYCIN	0.25-1			≤0.5	1-4	≥8	≤1	>2				✓
<b>CN</b> GENTAMICIN	0.12-1			≤4	8	≥16	≤1	>1				
<b>LNZ</b> LINEZOLID	1-4			≤4	-	≥8	≤4	>4			✓	✓
<b>RD</b> RIFAMPICIN	0.004-0.015			≤1	2	≥4	≤0.06	>0.5				
<b>TEC</b> TEICOPLANIN <i>S. aureus</i> Coagulase Negative Staphylococci	0.25-1			≤8	16	≥32	≤2 ≤4	>2 >4				

		Quality Control (M.I.C. µg/mL)		CLSI INTERPRETATION M.I.C. Criteria (µg/mL)			EUCAST INTERPRETATION M.I.C. Criteria (µg/mL)		Examples of ANTIBIOGRAM			
		<i>S. aureus</i> ATCC® 29213	<i>S. aureus</i> ATCC® 43300	S	I	R	S	R	ORSA/ORCNS/ BORSA (Mueller Hinton + 2% NaCl) 90 mm petri dish	Detection of glycopeptide resistance 90 mm petri dish	For confirmed ORSA/ORCNS (Muller Hinton Agar) 140 mm petri dish	For Non-ORSA/ ORCNS (Mueller Hinton Agar) 140 mm petri dish
<b>TE</b>	TETRACYCLINE	0.12-1		≤4	8	≥16	≤1	>2				
<b>TGC</b>	TIGECYCLINE	0.03-0.25					≤0.5	>0.5				
<b>SXT</b>	TRIMETHOPRIM / SULFAMETHOXAZOLE 1/19 <sup>1</sup>	≤0.5		≤2	-	≥4	≤2	>4				✓
<b>VA</b>	VANCOMYCIN <i>S. aureus</i> <i>Staphylococcus</i> spp. Coagulase Negative Staphylococci	0.5-2		≤2 ≤4	4-8 8-16	≥16 ≥32	≤2 ≤4	>2 >4			✓	
	<b>Methicillin/Oxacillin Resistant Staphylococci</b>											
<b>OX</b>	OXACILLIN <i>S. aureus</i> and <i>S. lugdunensis</i> Coagulase Negative Staphylococci except <i>S. lugdunensis</i>	0.12-0.5	>4	≤2 ≤0.25	- -	≥4 ≥0.5	≤2 ≤0.25	>2 >0.25	✓			
<b>FOX</b>	CEFOXITIN <i>S. aureus</i> and <i>S. lugdunensis</i>	1-4	>4	≤4	-	≥8	≤4	>4				

**Notes**

1. Value on the M.I.C. scale refers to the first component of the combination.

**Macro gradient test for determining Glycopeptide non-susceptible *Staphylococcus aureus***

M.I.C. (µg/mL)		GRSA, GISA or hGISA
TEICOPLANIN	VANCOMYCIN	
≥12	Do not test	Positive
8	≥8	Positive
<8	Do not test	Negative

This test gives an indication of reduced vancomycin susceptibility but note that the readings are not MICs.

**References**

- CLSI M100-S24, 2014. Performance Standards for Antimicrobial Susceptibility Testing.
- CLSI M7-A9, 2012. Methods for Dilution Antimicrobial Susceptibility Tests for Bacteria that Grow Aerobically.
- EUCAST. Breakpoint tables for interpretation of MICs and zone diameters Version 4.0, 2014.
- EUCAST guidelines for detection of resistance mechanisms and specific resistances of clinical and/or epidemiological importance. Version 1.0, 2013.

MIC Test Strip, Patent No. 1395483

 **LIOFILCHEM® s.r.l.**  
Via Scozia zona ind.le, 64026 Roseto degli Abruzzi (Te) Italy  
Tel. +39 0858930745 Fax +39 0858930330 www.liofilchem.net liofilchem@liofilchem.net



IVD