



MIC Test Strip Application Guide

MICROORGANISM	SPECIFIC PHENOTYPE	MEDIA	INOCULUM		INCUBATION 36 ± 1°C		SUGGESTED M.I.C. PANEL ¹⁾
			TURBIDITY	SUSPENSION MEDIUM	TIME	ATMOSPHERE	
AEROBES							
Staphylococci		MUELLER HINTON II AGAR (ref. 10031)	0.5 McFarland	PHYSIOLOGICAL SOLUTION (ref. 20095)	24 h	Ambient	Teicoplanin (TEC) Vancomycin (VA) Clindamycin (CD) Amoxicillin-clavulanic acid (AUG) Linezolid (LNZ) Rifampicin (RD)
	ORSA ORCNS	MUELLER HINTON II AGAR + 2% NaCl (ref. 11206)	0.5- 1 McFarland	PHYSIOLOGICAL SOLUTION (ref. 20095)	24 h 48 h ORCNS	Ambient	Oxacillin (OX)
	BORSA	MUELLER HINTON II AGAR + 2% NaCl (ref. 11206)	0.5- 1 McFarland	PHYSIOLOGICAL SOLUTION (ref. 20095)	24 h	Ambient	Oxacillin (OX) Amoxicillin-clavulanic acid (AUG)
	VISA/hVISA	BRAIN HEART INFUSION AGAR (ref. 10060)	2 McFarland	MUELLER HINTON BROTH (ref. 24107)	24 h confirm 48 h	Ambient	Vancomycin (VA) Teicoplanin (TEC)
	VRSA	MUELLER HINTON II AGAR (ref. 10031)	0.5 McFarland	PHYSIOLOGICAL SOLUTION (ref. 20095)	24 h	Ambient	Vancomycin (VA)
	ORSA secondary panel	MUELLER HINTON II AGAR (ref. 10031)	0.5 McFarland	PHYSIOLOGICAL SOLUTION (ref. 20095)	16 – 20 h (VA 24 h)	Ambient	Clindamycin (CD) Daptomycin (DAP) Linezolid (LNZ) Quinupristin-dalfopristin (QDA) Vancomycin (VA) Rifampicin (RD)
	Non-ORSA secondary panel	MUELLER HINTON II AGAR (ref. 10031)	0.5 McFarland	PHYSIOLOGICAL SOLUTION (ref. 20095)	16 – 20 h (VA 24 h)	Ambient	Penicillin G (P) Erythromycin (E) Linezolid (LNZ) Trimethoprim-sulfamethoxazole (SXT) Vancomycin (VA) Ciprofloxacin (CIP)

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Enterococci		MUELLER HINTON II AGAR (ref. 10031)	0.5 McFarland	PHYSIOLOGICAL SOLUTION (ref. 20095)	16 – 20 h	Ambient	Ampicillin (AMP) Ciprofloxacin (CIP) Erythromycin (E) Gentamicin (CN) Tetracycline (TE) Vancomycin (VA)
	VRE	BRAIN HEART INFUSION AGAR (ref. 10060)	2 McFarland	MUELLER HINTON BROTH (ref. 24107)	24 h confirm 48 h	Ambient	Vancomycin (VA) Teicoplanin (TEC) note: Intended for phenotype detection, not intended for M.I.C. determination.
		MUELLER HINTON II AGAR (ref. 10031)	0.5 McFarland	PHYSIOLOGICAL SOLUTION (ref. 20095)	16 – 20 h (VA 24 h)	Ambient	Ampicillin (AMP) Daptomycin (DAP) Linezolid (LNZ) Quinupristin-dalfopristin (QDA) Vancomycin (VA) Minocycline (MN)
	HLAR	MUELLER HINTON II AGAR (ref. 10031)	0.5-1 McFarland	PHYSIOLOGICAL SOLUTION (ref. 20095)	16 – 18 h	Ambient	Gentamicin (CN) high range Streptomycin (S) high range
Enterobacteriaceae		MUELLER HINTON II AGAR (ref. 10031)	0.5 (1- Mucoid) McFarland	PHYSIOLOGICAL SOLUTION (ref. 20095)	16 – 20 h	Ambient	Gentamicin (CN) Piperacillin-tazobactam (TZP) Cefepime (FEP) Ciprofloxacin (CIP) Imipenem (IMI) Aztreonam (ATM)
	ESBL	MUELLER HINTON II AGAR (ref. 10031)	0.5 (1- Mucoid) McFarland	PHYSIOLOGICAL SOLUTION (ref. 20095)	16 – 20 h	Ambient	Cefotaxime/Cefotaxime+clavulanic acid (CTX/CTL) Ceftazidime/Ceftazidime+clavulanic acid (CAZ/CAL) Cefepime/Cefepime+clavulanic acid (FEP/FEL)
Non-Enterobacteriaceae <i>Pseudomonas</i> spp.		MUELLER HINTON II AGAR (ref. 10031)	0.5 (1- Mucoid) McFarland	PHYSIOLOGICAL SOLUTION (ref. 20095)	16 – 20 h 48 for slow growers	Ambient	Ceftazidime (CAZ) Gentamicin (CN) Aztreonam (ATM) Ciprofloxacin (CIP) Imipenem (IMI) Piperacillin-tazobactam (TZP)
<i>Acinetobacter</i> spp.		MUELLER HINTON II AGAR (ref. 10031)	0.5 (1- Mucoid) McFarland	PHYSIOLOGICAL SOLUTION (ref. 20095)	20 – 24 h 48 for slow growers	Ambient	Ceftazidime (CAZ) Meropenem (MRP) Amikacin (AK) Ampicillin-sulbactam (AMS) Levofloxacin (LEV) Minocycline (MN)

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<i>Burkholderia cepacia</i>		MUELLER HINTON II AGAR (ref. 10031)	0.5 (1- Mucoid) McFarland	PHYSIOLOGICAL SOLUTION (ref. 20095)	20 – 24 h 48 for slow growers	Ambient	Trimethoprim-sulfamethoxazole (SXT) Ceftazidime (CAZ) Levofloxacin (LEV) Meropenem (MRP) Minocycline (MN)
<i>Stenotrophomonas maltophilia</i>		MUELLER HINTON II AGAR (ref. 10031)	0.5 (1- Mucoid) McFarland	PHYSIOLOGICAL SOLUTION (ref. 20095)	20 – 24 h 48 for slow growers	Ambient	Trimethoprim-sulfamethoxazole (SXT) Ceftazidime (CAZ) Levofloxacin (LEV) Minocycline (MN) Ticarcillin-clavulanic acid (TTC)
	MBL	MUELLER HINTON II AGAR (ref. 10031)	0.5 (1- Mucoid) McFarland	PHYSIOLOGICAL SOLUTION (ref. 20095)	16 – 20 h 48 for slow growers	Ambient	Imipenem/Imipenem+EDTA (IMI/IMD)
FASTIDIOUS ORGANISMS							
Pneumococci		MUELLER HINTON II AGAR + 5% Sheep Blood (ref. 10131) or MH + 20 mg/l β-NAD + 5% horse blood ² (ref. 10132)	0.5 (1- Mucoid) McFarland	MUELLER HINTON BROTH (ref. 24107)	20 – 24 h	5% CO ₂	Meropenem (MRP) Cefotaxime (CTX) Penicillin G (P) Clindamycin (CD) Vancomycin (VA) Trimethoprim-sulfamethoxazole (SXT)
Streptococci		MUELLER HINTON II AGAR + 5% Sheep Blood (ref. 10131) or MH + 20 mg/l β-NAD + 5% horse blood ² (ref. 10132)	0.5 (1- Mucoid) McFarland	MUELLER HINTON BROTH (ref. 24107)	20 – 24 h	5% CO ₂	Penicillin G (P) Cefotaxime (CTX) Chloramphenicol (C) Ofloxacin (OFX) Linezolid (LNZ) Vancomycin (VA) Daptomycin (DAP)
<i>Abiotrophia</i> and <i>Granulicatella</i> spp.		Mueller Hinton Chocolate + 0.001% pyridoxal HCl + 0.01% cysteine	1 McFarland	MUELLER HINTON BROTH (ref. 24107)	20 – 24 h	5% CO ₂	
<i>Haemophilus</i> spp.		HAEMOPHYLUS TEST AGAR (ref. 10080) or MH + 20 mg/l β-NAD + 5% horse blood ² (ref. 10132)	0.5 (1- Mucoid) McFarland	MUELLER HINTON BROTH (ref. 24107)	20 – 24 h	5% CO ₂	Amoxicillin-clavulanic acid (AUG) Cefotaxime (CTX) Meropenem (MRP) Trimethoprim-sulfamethoxazole (SXT) Chloramphenicol (C)

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<i>Moraxella catarrhalis</i>		MUELLER HINTON II AGAR + 5% Sheep Blood (ref. 10131) or MH + 20 mg/l β-NAD + 5% horse blood ² (ref. 10132)	0.5 McFarland	MUELLER HINTON BROTH (ref. 24107)	20 – 24 h	5% CO ₂	
Anaerobes		BRUCELLA BLOOD AGAR w HEMIN AND VITAMIN K (ref. 10245)	1 McFarland	THIOGLYCOLLATE MEDIUM (ref. 24124)	24 – 72 h	Anaerobic system	Metronidazole (LZ) Clindamycin (CD) Cefoxitin (FOX) Imipenem (IMI) Piperacillin-tazobactam (TZP) Penicillin G (P)
<i>Helicobacter pylori</i>		MUELLER HINTON II AGAR + 5% Sheep Blood (ref. 10131)	3 McFarland	MUELLER HINTON BROTH (ref. 24107) + 5% serum (ref. 83830)	72 h or longer	Microaerophilic LZ first 24 h anaerobic	Amoxicillin (AML) Chlarithromycin (CLR) Metronidazole (LZ) Tetracycline (TE)
Gonococci		GC Agar Base + defined supplements or MUELLER HINTON CHOCOLATE AGAR (ref. 10335)	0.5 McFarland	MUELLER HINTON BROTH (ref. 24107)	20 – 24 h	5% CO ₂	Ciprofloxacin (CIP) Penicillin G (P) Tetracycline (TE) Ceftriaxone (CRO) Spectinomycin (SPC)
Meningococci		MUELLER HINTON II AGAR + 5% Sheep Blood (ref. 10131)	0.5 McFarland	MUELLER HINTON BROTH (ref. 24107)	24 h	5% CO ₂	Ciprofloxacin (CIP) Penicillin G (P) Trimethoprim-sulfamethoxazole (SXT) Meropenem (MRP) Ceftriaxone (CRO)
<i>Campylobacter spp.</i>		MUELLER HINTON II AGAR + 5% Sheep Blood (ref. 10131)	1 McFarland	MUELLER HINTON BROTH (ref. 24107)	48 – 72 h	Microaerophilic	Ciprofloxacin (CIP) Gentamicin (CN) Erythromycin (E) Doxycycline (DXT)

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FASTIDIOUS GRAM-POSITIVE ORGANISMS							
<i>Arcanobacterium</i> spp., <i>Bacilli</i> <i>Listeria monocytogenes</i> , <i>Bacillus</i> , <i>Corynebacterium</i> , <i>Erysipelothrix</i> , and <i>Lactobacillus</i> spp. <i>Cocci</i> <i>Rothia</i> , <i>Pediococcus</i> , <i>Leuconostoc</i> and <i>Gemella</i> spp.		MUELLER HINTON II AGAR + 5% Sheep Blood (ref. 10131) or MH + 20 mg/l β-NAD + 5% horse blood ² (ref. 10132)	1 McFarland	MUELLER HINTON BROTH (ref. 24107)	24 – 48 h (longer if required)	5% CO ₂ (if needed)	
FASTIDIOUS GRAM-NEGATIVE ORGANISMS							
<i>Bartonella</i> spp.		MUELLER HINTON + 1% Hemoglobin + 1% IsoVitalex	1 McFarland	MUELLER HINTON BROTH (ref. 24107)	3 – 5 d	5% CO ₂	
<i>Bordetella pertussis</i>		MUELLER HINTON II AGAR + 5% Sheep Blood (ref. 10131)	3 McFarland	MUELLER HINTON BROTH (ref. 24107)	3 – 5 d	Ambient air in bags (moist)	
<i>Capnocytophaga</i> spp.		BRUCELLA BLOOD AGAR w HEMIN AND VITAMIN K (ref. 10245)	1 McFarland	MUELLER HINTON BROTH (ref. 24107)	48 h	5% CO ₂	
<i>Legionella</i> spp.		Legionella BCYE Agar (ref. 10051)	1 McFarland	MUELLER HINTON BROTH (ref. 24107)	3 – 5 d	5% CO ₂	
<i>Pasteurella</i> spp.		MUELLER HINTON II AGAR + 5% Sheep Blood (ref. 10131) or MH + 20 mg/l β-NAD + 5% horse blood ² (ref. 10132)	1 McFarland	MUELLER HINTON BROTH (ref. 24107)	48 h	5% CO ₂	Penicillin G (P) Levofloxacin (LEV) Doxycycline (DXT) Trimethoprim-sulfamethoxazole (SXT)
HACEK group		MUELLER HINTON + 1% Hemoglobin + 1% IsoVitalex or BRUCELLA BLOOD AGAR w HEMIN AND VITAMIN K (ref. 10245)	1 McFarland	MUELLER HINTON BROTH (ref. 24107)	24 – 72 h	5% CO ₂	Ceftriaxone (CRO) Imipenem (IMI) Piperacillin-tazobactam (TZP) Trimethoprim-sulfamethoxazole (SXT)

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MYCOBACTERIA AND NOCARDIA							
<i>Mycobacterium tuberculosis</i>		Middlebrook 7H11 + 10% OADC Agar	3-4 McFarland	Middlebrook 7H9 broth + 0.5% Tween or 2% glycerol, vortex 3-5 min with glass beads, allow to settle for 20 min and adjust supernatant to correct turbidity	5 – 10 days	5-10% CO ₂	Ethambutol (EB) Ethionamide (ET) Isoniazide (IZ) Rifampicin (RD)
<i>Nocardia</i> spp.		MUELLER HINTON II AGAR + 5% Sheep Blood (ref. 10131)	1 McFarland	Brain Heart Infusion Broth (ref. 24101)	48 – 72 h	Ambient	Amikacin (AK) Trimethoprim-sulfamethoxazole (SXT) Ciprofloxacin (CIP) Clarithromycin (CLR) Imipenem (IMI)
FUNGI							
Yeasts		RPMI AGAR (ref. 11509)	0.5 McFarland (1 <i>Cryptococcus neoformans</i>)	PHYSIOLOGICAL SOLUTION (ref. 20095)	24 – 48 h (48-72 h <i>Cryptococcus neoformans</i>)	Ambient, moist	Fluconazole (FU) Itraconazole (ITC) Amphotericin B (AMB) Flucytosine (FC) Voriconazole (VO) Caspofungin (CAS)
Moulds		RPMI AGAR (ref. 11509)	0.5 McFarland <i>Aspergillus</i> spp. (1 <i>Fusarium/Rizopus</i> spp.)	PHYSIOLOGICAL SOLUTION (ref. 20095) + Tween 80 (ref. 80031)	16 – 72 h depending on genus	Ambient, moist	Itraconazole (ITC) Amphotericin B (AMB) Posaconazole (POS) Voriconazole (VO) Caspofungin (CAS)

1. Examples of M.I.C. panels:

CLSI M100-S25 Performance Standards for Antimicrobial Susceptibility Testing, January 2015.

CLSI M27-A3 Reference method for Broth Dilution Antifungal Susceptibility Testing of Yeasts; Approved Standard - Third Edition.

CLSI M27-S4 Reference method for Broth Dilution Antifungal Susceptibility Testing of Yeasts; Fourth Informational Supplement.

2. EUCAST Disk Diffusion Method, Version 5.0, January 2015.

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