DISKS FOR ANTIBIOTIC SUSCEPTIBILITY TESTING
50 DISKS CARTRIDGE

Study of susceptibility to antimicrobial agents.

IVD CE

2020/05

1. INTENDED USE
Antibiotic disks are used to perform a semi-quantitative antimicrobial susceptibility testing using disk diffusion method.

2. SUMMARY AND EXPLANATION OF THE TEST
These disks are used to semi quantitatively evaluate the *in vitro* susceptibility to antimicrobial agents of rapidly growing bacteria and several difficult species by an agar diffusion method.
This method is based on a standardized procedure published by the WHO[1,2] and adopted as consensual standard by the CLSI[4] CA-SFM/EUCAST[6] and EUCAST[9] (it is periodically revised).
Consult the most recent CLSI[4,5], CA-SFM/EUCAST[6], EUCAST[7,8] documents for guidelines concerning antibiotic susceptibility testing and interpretation of the results.

3. PRINCIPLE OF THE PROCEDURE
Paper disks impregnated with a defined concentration of antimicrobial agent are deposited on the surface of an appropriate medium[A] previously inoculated with a calibrated inoculum[A] of pure and fresh culture of the bacterial strain to be tested. After incubation[A], the Petri dishes are examined and the zones of inhibition around the disks are measured and compared to critical values[A] for the various antimicrobial agents tested, in order to determine the clinical category of susceptibility (resistant, intermediate, susceptible…). The diameter of the zone of inhibition is proportional to the susceptibility of the bacterial strain tested.
[A]According to current guidelines CLSI[4], EUCAST[9].

4. REAGENTS

4.1 Description
Bio-Rad disks are 6.5 mm disks made from superior quality absorbent paper and impregnated with precise concentrations of antimicrobial agents. The disks are clearly identified by a code; comprising 3 letters, printed on each side of the disk (see Table 1). Bio-Rad disks are supplied in cartridges of 50 disks packaged in watertight containers containing a desiccant.

Table 1: Bio-Rad disks for antibiotic susceptibility testing

	DISK CONTENT	SYMBOL	PACK SIZE	Product code
Amikacin	30 µg	AKN30	4 x 50 Disks	66148
Amoxicillin	20 µg	AMO20	4 x 50 Disks	68042
Amoxicillin + Clavulanic Acid	2/1 µg 20/10 µg	AUG3 AMC30	4 x 50 Disks 4 x 50 Disks	66680 66178
Ampicillin	2 µg 10 µg	API2 AMP10	4 x 50 Disks 4 x 50 Disks	67288 66128
Ampicillin + Sulbactam	10/10 µg	SAM20	4 x 50 Disks	67018
Azithromycin	15 µg	AZM15	4 x 50 Disks	67008
Aztreonam	30 µg	ATM30	4 x 50 Disks	66928
Bacitracin	10 IU (130 µg)	BCT130	4 x 50 Disks	66158
Benzylpenicillin	1 IU	PNG1	4 x 50 Disks	67788
Carbenicillin	100 µg	CRB100	4 x 50 Disks	66198
Cefaclor	30 µg	CEC30	4 x 50 Disks	67498
Cefalexin	30 µg	CXN30	4 x 50 Disks	66208
Cefamandole	30 µg	FAM30	4 x 50 Disks	66238
Cefazolin	30 µg	CZN30	4 x 50 Disks	66258
Cefepime	30 µg	FEP30	4 x 50 Disks	66098
Cefixime	5 µg	FIX5	4 x 50 Disks	67588
Cefoperazone	75 µg 30 µg	CFP75 CPZ30	4 x 50 Disks 4 x 50 Disks	67618 66298
Cefoperazone + Sulbactam	75/30 µg	SCF105	4 x 50 Disks	66734
Cefotaxime	5 µg 30 µg	COX5 CTX30	4 x 50 Disks 4 x 50 Disks	67718 66368

	DISK CONTENT	SYMBOL	PACK SIZE	Product code
Cefotetan	30 µg	CTT30	4 x 50 Disks	66428
Cefoxitin	30 µg	FOX30	4 x 50 Disks	66228
Cefpirome	30 µg	CPO30	4 x 50 Disks	66468
Cefpodoxime	10 µg	CPD10	4 x 50 Disks	66918
Cefprozil	30 µg	CPR30	4 x 50 Disks	66488
Cefsulodin	30 µg	CFS30	4 x 50 Disks	66938
Ceftaroline	5 µg	CPN5	4 x 50 Disks	68658
Ceftazidime	10 µg 30 µg	CZD10 CAZ30	4 x 50 Disks 4 x 50 Disks	67298 66308
Ceftazidime + Avibactam	10/4 µg 30/20 µg	CZA14 CTA50	4 x 50 Disks 4 x 50 Disks	12008071 12012124
Ceftibuten	30 µg	CTB30	4 x 50 Disks	67638
Ceftobiprole	5 µg	BPR5	4 x 50 Disks	68039
Ceftolozane + Tazobactam	30/10µg	CLT40	4 x 50 Disks	68040
Ceftriaxone	30 µg	CRO30	4 x 50 Disks	66188
Cefuroxime	30 µg	CXM30	4 x 50 Disks	66358
Cephalothin	30 µg	CEF30	4 x 50 Disks	66218
Chloramphenicol	30 µg	CHL30	4 x 50 Disks	66278
Ciprofloxacin	5 µg	CIP5	4 x 50 Disks	68648
Clarithromycin	15 µg	CLR15	4 x 50 Disks	67058
Clindamycin	2 µg	CMN2	4 x 50 Disks	66328
Colistin	10 µg	COL10	4 x 50 Disks	67268
Doripenem	10 µg	DOR10	4 x 50 Disks	67348
Doxycycline	30 µg	DOX30	4 x 50 Disks	66388
Ertapenem	10 µg	ETP10	4 x 50 Disks	67518
Erythromycin	15 µg	ERY15	4 x 50 Disks	66448
Flumequine	30 µg	UBN30	4 x 50 Disks	68918
Fosfomycin	200 µg	FOS200	4 x 50 Disks	67658
Fusidic Acid	10 µg	FAD10	4 x 50 Disks	66518
Gentamicin	10 µg 10 IU (15 µg) 30 µg	GMN10 GMI15 GME30	4 x 50 Disks 4 x 50 Disks 4 x 50 Disks	66608 66548 67318
Gentamicin (high load)	120 µg 500 µg	HLG120 GEN500	4 x 50 Disks 4 x 50 Disks	67598 66578
Imipenem	10 µg	IPM10	4 x 50 Disks	66568
Kanamycin	30 µg	KMN30	4 x 50 Disks	66618
Kanamycin (high load)	1 mg	KAN1	4 x 50 Disks	66628
Levofloxacin	5 µg	LVX5	4 x 50 Disks	66858
Lincomycin	15 µg	LCN15	4 x 50 Disks	66678
Linezolid	10 µg 30 µg	LIN10 LZD30	4 x 50 Disks 4 x 50 Disks	67878 67388
Mecillinam	10 µg	MEC10	4 x 50 Disks	66768
Meropenem	10 µg	MEM10	4 x 50 Disks	67048
Metronidazole	4 µg	MTR4	4 x 50 Disks	68908
Mezlocillin	75 µg	MZN75	4 x 50 Disks	66708
Minocycline	30 µg	MNO30	4 x 50 Disks	66728
Moxalactam	30 µg	MOX30	4 x 50 Disks	66698
Moxifloxacin	5 µg	MXF5	4 x 50 Disks	67098
Mupirocin	200 µg	PUM200	4 x 50 Disks	67078
Nalidixic Acid	30 µg	NAL30	4 x 50 Disks	68618
Neomycin	30 IU	NEO30	4 x 50 Disks	66748
Netilmicin	10 µg 30 µg	NTM10 NET30	4 x 50 Disks 4 x 50 Disks	67798 66758
Nitrofurantoin	100 µg 300 µg	NFE100 FTN300	4 x 50 Disks 4 x 50 Disks	67328 68678
Nitroxolin	30 µg	NIR30	4 x 50 Disks	12007959
Norfloxacin	10 µg	NXN10	4 x 50 Disks	66338
Ofloxacin	5 µg	OFX5	4 x 50 Disks	68938
Oleandomycin	15 µg	OLE	4 x 50 Disks	66818
Oxacillin	1 µg 5 µg	OXC1 OXA5	4 x 50 Disks 4 x 50 Disks	66888 66848
Oxolinic Acid	10 µg	OAD10	4 x 50 Disks	68628
Pefloxacin	5 µg	PEF5	4 x 50 Disks	68228
Penicillin	6 µg (10 IU)	PEN10	4 x 50 Disks	67218

	DISK CONTENT	SYMBOL	PACK SIZE	Product code
Pipemidic Acid	20 µg	PIM20	4 x 50 Disks	68638
Piperacillin	30 µg 100 µg	PIL30 PIR100	4 x 50 Disks 4 x 50 Disks	68478 67228
Piperacillin + Tazobactam	30/6 µg 100/10 µg	PTZ36 TZP110	4 x 50 Disks 4 x 50 Disks	67338 67238
Polymixin	300 IU (50 µg)	PXB300	4 x 50 Disks	67248
Pristinamycin	15 µg	PTN15	4 x 50 Disks	67278
Quinupristin-Dalfopristin	15 µg	QDF15	4 x 50 Disks	67528
Rifampicin	5 µg	RIF5	4 x 50 Disks	66648
Spectinomycin	100 µg	SPT100	4 x 50 Disks	68798
Spiramycin	100 µg	SPN100	4 x 50 Disks	67378
Streptomycin	10 µg	SMN10	4 x 50 Disks	67418
Streptomycin (high load)	300 µg 500 µg	HLS300 STR500	4 x 50 Disks 4 x 50 Disks	67608 67428
Sulphonamides	300 µg 200 µg	SSS300 SUL200	4 x 50 Disks 4 x 50 Disks	67578 68408
Teicoplanin	30 µg	TEC30	4 x 50 Disks	68948
Temocillin	30 µg	TEM30	4 x 50 Disks	66068
Tetracycline	30 µg	TET30	4 x 50 Disks	67448
Ticarcillin	75 µg	TIC75	4 x 50 Disks	67458
Ticarcillin + Clavulanic Acid	75/10 µg	TCC85	4 x 50 Disks	67468
Tigecycline	15 µg	TGC15	4 x 50 Disks	67398
Tobramycin	10 µg	TMN10	4 x 50 Disks	67488
Trimethoprim + Sulfamethoxazole	1.25/23.75 µg	SXT25	4 x 50 Disks	68898
Trimethoprim	5 µg	TMP5	4 x 50 Disks	68888
Vancomycin	5 µg 30 µg	VNC5 VAN30	4 x 50 Disks 4 x 50 Disks	67828 68928

4.2 Storage and handling requirements

Cartridges of disks must be stored in their containers at a temperature between +2°C and +8°C in a dry place.
The expiry date applies exclusively to disks contained in intact cartridges stored according to the manufacturer's instructions. The expiry date and batch number are indicated on each packaging (cartridge and container).
The stability of the disks, of open cartridges placed in distributors (preserved according to the recommendations with desiccants) was validated in routine conditions during 6 weeks, except for the antibiotic discs marked with the symbol 

, for which the stability in weeks is shown inside this symbol.
If the cartridge remains in the distributor after dispatch, it is necessary to preserve at +2-8°C in a dry place **with desiccants inside.**

5. WARNING AND PRECAUTIONS

For *in vitro* diagnostic use by professional user in a laboratory environment.

5.1 Health and Safety precautions

- This test kit should be handled only by qualified personnel trained in laboratory procedures and familiar with their potential hazards. Wear appropriate protective clothing, gloves, eye/face protection and handle appropriately with the requisite Good Laboratory Practices.
- Dispose of all specimens and material used to perform the test as though they contain an infectious agent. Laboratory, chemical or biohazardous wastes must be handled and discarded in accordance with all local, regional and national regulations.
- Always observe the current techniques and precautions concerning protection against microbiological hazards. After use, sterilize the cultures and all contaminated material.

5.2 Precautions related to the procedure

- Follow the instructions of the current guidelines (CLSI[4,5], CA-SFM/EUCAST[6], EUCAST[9]).
- Do not use the kit if the packaging of components is damaged.
- Container must be allowed to adjust to room temperature (18-30°C) during 20 minutes before opening. After applying the disks, return unused cartridges into their container to a temperature between +2°C and +8°C.
- Do not use disks after the expiry date. Do not use any cartridge of disks left at room temperature (18-30°C) for more than 8 hours without verifying an acceptable level of performance before continuing to use this cartridge [10].

6. SPECIMENS

Disks must not be used for tests performed directly on biological samples.
Refer to the current guidelines (CLSI [4,5], EUCAST[9]) defining preparation of the inoculum from a pure, fresh culture.

7. PROCEDURE

7.1 Materials required but not provided

- Disk dispenser: 6-7 disks Ref. # 50294
  12-16 disks Ref. # 50295
- Culture media according to current guidelines (CLSI[4], CA-SFM/EUCAST[6], EUCAST[9]).
- Reagent.
- Bacterial strains for quality control • opacity control equivalent to the Mac Farland 0.5 standard.
- Laboratory equipment necessary for antibiotic susceptibility testing by the agar diffusion method.

7.2 Assay procedure

Refer to the instructions recommended by the CLSI[4,5], the CA-SFM/EUCAST[6] or the EUCAST[9] for all steps of antibiotic susceptibility testing and interpretation of the results: the CLSI[4], CA-SFM/EUCAST[6], or EUCAST[9] propose standardised techniques for preparation of the inoculum, inoculation of Petri dishes, the choice and arrangement of test disks, the incubation temperature and incubation time. Good laboratory practice should also be applied at all times.

7.3 Interpretation of the results

- Measure precisely the diameters of the zones of inhibition observed and refer to the critical diameters indicated by current guidelines (CLSI[5], CA-SFM/EUCAST[6], EUCAST[8]).
- A clinical category (intermediate resistant, susceptible or not susceptible…) is given to each micro-organism as a function of the observed diameter and the critical diameters for the antibiotic tested.
- These criteria of clinical categorization according to critical diameters are periodically revised by the CLSI[5], CA-SFM/EUCAST[6], EUCAST[8].

8. TEST LIMITATION

- Inhibition zone measure can vary according to user. It can influence clinical categorization (resistant, intermediate, susceptible and non-susceptible). This incertitude must be considered as soon as interpretation results are closed to a categorization change.
- Antimicrobial agents other than indicated in table 2 may be used. Susceptibility tests employing these agents should be interpreted on the basis of presence or absence of a definite zone of inhibition and should be considered as only qualitative until such time as interpretative zones have been established. All zone diameters should be recorded.
- The final interpretation, as for all laboratory interpretations, cannot be based on the results of one single test but on an overview of the clinical data and the biochemical, cytological and immunological results.
- The performances of the test depend not only on the activity of the disks, but also on factors such as the use of an appropriate inoculum and control strains, appropriate and previously tested culture media, an adequate storage.

9. PERFORMANCES CHARACTERISTICS / QUALITY CONTROL

The performances of antibiotic disks are systematically controlled by using following strains below (according to current guidelines CLSI[5], CA-SFM/EUCAST[6], EUCAST[7]):

Escherichia coli ATCC® 25922™ or ATCC® 35218™ for controls labeled with **	*Haemophilus influenzae* ATCC® 49247™ or ATCC® 49766™ for controls labeled with *
Staphylococcus aureus ATCC® 25923™ (CLSI)	*Neisseria gonorrhoeae* ATCC® 49226™
Staphylococcus aureus ATCC® 29213™ (EUCAST)	*Clostridium sporogenes* ATCC® 19404™
Pseudomonas aeruginosa ATCC® 27853™	*Clostridium perfringens* ATCC® 13124™
Enterococcus faecalis ATCC® 29212™	*Streptococcus pneumoniae* ATCC® 49619™
Klebsiella pneumoniae ATCC® 700603™	*Staphylococcus aureus* ATCC® BAA-1708™

Table 2 indicates, for each couple molecule/load, which guidelines they are associated with noted ✓. It summarizes also the acceptable limits for the inhibition diameters obtained by the agar diffusion method for the reference strains indicated below. Highlighted sign ✓ indicates the guidelines mentioning the displayed acceptable limits.

Table 2: Acceptable limits of inhibition diameter (mm) according to guidelines for antibiotic disks

	Disk Content	Guidelines			Acceptable inhibition zone diameter (mm) Quality control limits					
		CLSI	EUCAST	CASFM/ EUCAST	*E. coli* ATCC® 25922™ [**ATCC® 35218™]	*S. aureus* ATCC® 25923™ (CLSI) ATCC® 29213™ (EUCAST)	*P. aeruginosa* ATCC® 27853™	*S. pneumoniae* ATCC® 49619™	*E. faecalis* ATCC® 29212™	*H. influenzae* ATCC® 49766™ [*ATCC® 49247™]
Amikacin	30 µg	✓	✓	✓	19-26	20-26	18-26			
Amoxicillin	20 µg			✓	18-24					
Amoxicillin + Clavulanic acid	2/1µg		✓	✓		19-25				17-23
Amoxicillin + Clavulanic acid	20/10 µg	✓	✓	✓	18-24	28-36				
Ampicillin	2 µg		✓	✓					15-21	19-25
Ampicillin	10 µg	✓	✓	✓	15-22	27-35				
Ampicillin + Sulbactam	10/10 µg	✓	✓	✓	19-24	29-37				
Azithromycin	15 µg	✓				21-26				
Aztreonam	30 µg	✓	✓	✓	28-36		23-29			
Benzylpenicillin	1UI		✓	✓		12-18				
Carbenicilin	100 µg	✓			23-29		18-24			
Cefaclor	30 µg	✓			23-27	27-31				
Cefalexin	30 µg		✓	✓	15-21					
Cefamandole	30 µg	✓			26-32	26-34				
Cefazolin	30 µg	✓			21-27	29-35				
Cefepime	30 µg	✓	✓	✓	31-37	23-29	25-31			
Cefixime	5 µg	✓	✓	✓	20-26					
Cefoperazone	75 µg	✓			28-34	24-33	23-29			
Cefotaxime	5 µg		✓	✓	25-31					29-37
Cefotaxime	30 µg	✓			29-35	25-31	18-22			
Cefotetan	30 µg	✓			28-34	17-23				
Cefoxitin	30 µg	✓	✓	✓	23-29	24-30				
Cefpodoxime	10 µg	✓	✓	✓	23-28	19-25				
Cefprozil	30 µg	✓			21-27	27-33				
Ceftaroline	5 µg		✓	✓	24-30	24-30				
Ceftazidime	10 µg		✓	✓	23-29		21-27			
Ceftazidime	30 µg	✓			25-32	16-20	22-29			
Ceftazidime + Avibactam	10/4 µg		✓	✓	24-30					
Ceftazidime + Avibactam	30/20 µg	✓			27-35					
Ceftibuten	30 µg	✓	✓	✓	27-35					

	Disk Content	Guidelines			Acceptable inhibition zone diameter (mm) Quality control limits					
		CLSI	EUCAST	CASFM/ EUCAST	*E. coli* ATCC® 25922™ [**ATCC® 35218™]	*S. aureus* ATCC® 25923™ (CLSI) ATCC® 29213™ (EUCAST)	*P. aeruginosa* ATCC® 27853™	*S. pneumoniae* ATCC® 49619™	*E. faecalis* ATCC® 29212™	*H. influenzae* ATCC® 49766™ [*ATCC® 49247™]
Ceftobiprole	5 µg		✓	✓	25-31	22-28				
Ceftolozane + Tazobactam	30/10 µg	✓	✓	✓	25-31**		25-31			
Ceftriaxone	30 µg	✓	✓	✓	29-35	22-28	17-23			
Cefuroxime	30 µg	✓	✓	✓	20-26	27-35				
Cephalothin	30 µg	✓			15-21	29-37				
Chloramphenicol	30 µg	✓	✓	✓	21-27	19-26				
Ciprofloxacin	5 µg	✓	✓	✓	29-37	21-27	25-33			
Clarithromycin	15 µg	✓				26-32				
Clindamycin	2 µg	✓	✓	✓		24-30				
Colistin	10 µg	✓			11-17		11-17			
Doripenem	10µg	✓	✓	✓	27-35		28-35	31-37		
Doxycycline	30 µg	✓			18-24	23-29				
Ertapenem	10 µg		✓	✓	29-36					27-33
Erythromycine	15 µg	✓	✓	✓		22-30				
Fosfomycin	200 µg	✓	✓	✓	22-30					
Fusidic acid	10 µg	✓	✓	✓		26-32				
Gentamicin	10 µg	✓	✓	✓	19-26	19-27	17-23			
Gentamicin	30 µg		✓	✓					12-18	
Gentamicin	120 µg	✓							16-23	
Imipenem	10 µg	✓	✓	✓	26-32		20-28			
Kanamycin	30 µg	✓			17-25	19-26				
Levofloxacin	5 µg	✓	✓	✓	29-37	25-30	19-26			
Linezolid	10µg		✓	✓		21-27		23-29	19-25	
Linezolid	30 µg	✓				25-32				
Mecillinam	10 µg	✓	✓	✓	24-30					
Meropenem	10 µg	✓	✓	✓	28-35	29-37	27-33			
Mezlocillin	75 µg	✓			23-29		19-25			
Minocycline	30 µg	✓	✓	✓	19-25	25-30				
Moxalactam	30 µg	✓			28-35					
Moxifloxacin	5 µg	✓	✓	✓	28-35	28-35	17-25			
Mupirocin	200 µg	✓	✓	✓		29-38				
Nalidixic acid	30 µg	✓	✓	✓	22-28					
Netilmicin	10µg		✓	✓	18-24	20-26	15-21			
Netilmicin	30 µg	✓			22-30	22-31	17-23			
Nitrofurantoin	100µg		✓	✓		17-23			18-24	
Nitrofurantoin	300 µg	✓			20-25	18-22				
Nitroxoline	30 µg		✓	✓	18-24					
Norfloxacin	10 µg	✓	✓	✓	28-35	17-28	22-29			
Ofloxacin	5 µg		✓		29-33	21-27				
Oxacillin	1 µg	✓	✓	✓		18-24				
Pefloxacin	5 µg		✓	✓	26-32					
Penicillin	6 µg (10 IU)	✓				26-37				
Piperacillin	30 µg		✓	✓	21-27					
Piperacillin	100 µg	✓			24-30		25-33			
Piperacillin + Tazobactam	30/6 µg		✓	✓	21-27**		23-29			
Piperacillin + Tazobactam	100/10 µg	✓			24-30**	27-36	25-33			
Polymixin	300 IU (50 µg)	✓			13-19		14-18			

	Disk Content	Guidelines			Acceptable inhibition zone diameter (mm) Quality control limits					
		CLSI	EUCAST	CASFM/ EUCAST	*E. coli* ATCC® 25922™ [**ATCC® 35218™]	*S. aureus* ATCC® 25923™ (CLSI) ATCC® 29213™ (EUCAST)	*P. aeruginosa* ATCC® 27853™	*S. pneumoniae* ATCC® 49619™	*E. faecalis* ATCC® 29212™	*H. influenzae* ATCC® 49766™ [*ATCC® 49247™]
Quinupristin-Dalfopristin	15 µg	✓	✓	✓		21-28		19-24		15-21*
Rifampicin	5 µg	✓	✓	✓		26-34				
Sparfloxacin	5 µg	✓			30-38	27-33	21-29			
Streptomycin	10 µg	✓			12-20	14-22				
Streptomycin	300 µg	✓	✓	✓					14-20	
Sulfonamides	300 µg	✓				24-34				
Teicoplanin	30 µg	✓	✓	✓		15-21				
Tetracycline	30 µg	✓	✓	✓	18-25	24-30				
Ticarcillin	75 µg	✓	✓	✓	24-30		21-27			
Ticarcillin + Clavulanic acid	75/10 µg	✓	✓	✓	24-30	29-37	20-28			
Tigecycline	15 µg	✓	✓	✓	20-27	20-25		23-29		
Tobramycin	10 µg	✓	✓	✓	18-26	19-29	20-26			
Trimethoprim	5 µg	✓	✓	✓	21-28	19-26				
Trimethoprim + Sulfamethoxazole	1.25/23.75 µg	✓	✓	✓	23-29	24-32				
Vancomycin	5 µg		✓	✓				17-23	10-16	
Vancomycin	30 µg	✓				17-21				

For control limits:
Ceftazidime + Avibactam 10/4 µg: *K. pneumoniae* ATCC® 700603™ (18-24 mm).
Ceftazidime + Avibactam 30/20 µg: *K. pneumoniae* ATCC® 700603™ (21-27 mm).
Mupirocin 200 µg : *S. aureus* ATCC® BAA-1708™ (no zone – CLSI).
Neisseria gonorrhoeae ATCC® 49226™ is recommended to control spectinomycin disks with an acceptable diameter from 23 to 29 mm (CLSI).

Table 3 indicates the accepted limits for the diameters of inhibition obtained by the agar diffusion method for the reference strains indicated below.

	Disk content	Guidelines		Acceptable inhibition zone diameter (mm) Quality control limits			
		Internal	CA-SFM 2013[3]	*E. coli* ATCC® 25922™ [**ATCC® 35218™]	*S. aureus* ATCC® 25923™	*P. aeruginosa* ATCC® 27853™	*E. faecalis* ATCC® 29212™
Bacitracin	10 IU (130 µg)	✓			17-22		
Cefoperazone	30 µg	✓		26-30	23-28	21-25	
Cefoperazone + Sulbactam	75/30 µg	✓		27-33 24-32**	23-30		
Cefpirome	30 µg	✓		29-35	26-32	23-29	
Cefsulodin	30 µg	✓			20-28	25-32	
Flumequine	30 µg	✓		25-31			
Gentamicin	10 IU (15 µg)		✓	22-26	24-28	16-22	
Gentamicin	500 µg	✓			30-34		18-28
Kanamycin	1 mg	✓			≥ 14		≥ 14
Lincomycin	15 µg		✓		25-29		
Neomycin	30 IU	✓		17-23	18-27		
Oleandomycin	15 µg	✓			19-28		
Oxacillin	5 µg		✓		27-34		
Oxolinic acid	10 µg	✓		22-30			

	Disk content	Guidelines		Acceptable inhibition zone diameter (mm) Quality control limits			
		Internal	CA-SFM 2013[3]	*E. coli* ATCC® 25922™ [**ATCC® 35218™]	*S. aureus* ATCC® 25923™	*P. aeruginosa* ATCC® 27853™	*E. faecalis* ATCC® 29212™
Pipemidic acid	20 µg	✓		22-30			
Pristinamycin	15 µg		✓		27-32		
Spectinomycin	100 µg	✓		19-25			
Spiramycin	100 µg	✓			18-26		
Streptomycin	500 µg	✓			24-28		14-25
Sulfonamides	200 µg	✓			17-27		
Temocillin	30 µg	✓		17-23 22-28**			

For control limits (Internal standards):
Metronidazole 4 µg: *Clostridium perfringens* ATCC® 13124™ (≥ 15 mm), *Clostridium sporogenes* ATCC® 19404™ (≥ 15 mm).

10. BIBLIOGRAPHY REFERENCES

1. World Health Organization Expert Committee on Biological Standardization. 1977. Technical report series 610. W.H.O., Geneva. Annex 5 p. 123-138.
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Bio-Rad
3, boulevard Raymond Poincaré
92430 Marnes-la-Coquette France
Tel. : +33 (0) 1 47 95 60 00
Fax : +33 (0) 1 47 41 91 33
www.bio-rad.com

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