

thermo scientific



**Safe. Clean. ISO compliant.**

Guide to bacteriological testing of water  
according to ISO standards

**ThermoFisher**  
SCIENTIFIC

# Simple and complete testing

As a manufacturer, service provider or a contract laboratory, you know the importance of safeguarding your customers from potential hazards associated with water whether in your products or used alongside them. Adherence to published standards is paramount. This Guide to bacteriological testing of water provides an overview of the standard procedures, and illustrates how our extensive range of microbiology products for the isolation, identification and enumeration of waterborne pathogens and quality indicators can meet your testing needs.

Our range of products for water testing includes dehydrated and prepared media, membrane filters, and quality control organisms, as well as the equipment you need to deliver reliable results.

- **Safe** - media formulations that are compliant with ISO Standards for the testing of water
- **Conform to ISO standard** - quality control testing methods are accredited in accordance with ISO 17025:2017
- **Proven and certified** - all Certificates of Analysis (CoAs) confirm testing in accordance with the ISO 11133:2014 standard, including membrane filter testing
- **Support** - our team of microbiology experts is at hand to help with your technical queries


<b>thermoscientific</b>		OXOID Deutschland GmbH Am Lippeglacis 4-8 D-46483 Wesel	
<b>CERTIFICATE OF ANALYSIS</b>			
<b>PRODUCT</b>	<b>PO5074A</b>	<b>LEGIONELLA GVPC SELECTIVE MEDIUM</b>	
<b>LOT NUMBER</b>	2133625		
<b>EXPIRY DATE</b>	2017.06.28		
<hr/>			
<b>General Characteristics</b>	<b>Results</b>	<b>Specification</b>	
Colour	Conforms	Jet black - Traffic black	
Appearance	Conforms	Opaque	
pH	6.8	6.7 -7.1	
Packaging / Presentation	Conforms	Label & Print check	
Sterility @ 25 & 36 ± 1°C for 72 hours	Conforms	Within Limits	
Membrane filter 1	Lot 1603173	Product Code GFS11	
Membrane filter 2	Lot 1600693	Product Code GFS12	
	Lot 1604003	Product Code GFS12	
Membrane filter 3	Lot 1180883	Product Code NG147-0045	
	Lot 1183847	Product Code NG147-0045	
Membrane filter 4	Lot F6NA27518	Product Code NG02056045	
<hr/>			
<b>Microbiological Performance</b>	<b>Control c.f.u</b>	<b>Test Result</b>	<b>Specification</b>
Strains tested by membrane filtration method with above listed lots			
Legionella pneumophila ATCC®33152	50 - 120	Conforms	Recovery >= 50%, grey-blue colonies
WDCM 00107			
Legionella anisa ATCC®35292	50 - 120	Conforms	Recovery >= 70%, grey-blue colonies
WDCM 00106			
Strains tested by spread plate method			
Legionella pneumophila ATCC®33152	67	51	2- 6mm, grey-blue colonies
WDCM 00107			
Legionella anisa ATCC®35292	55	49	2- 4mm, grey-blue colonies
WDCM 00106			
Escherichia coli ATCC®8739	1E+04 - 1E+05	Conforms	Total or partial inhibition
WDCM 00012			
Pseudomonas aeruginosa ATCC®27853	1E+04 - 1E+05	Conforms	Total or partial inhibition
WDCM 00025			
Enterococcus faecalis ATCC®19433	1E+04 - 1E+05	Conforms	Total inhibition
WDCM 00009			
<hr/>			
The quality control methods meet requirements of ISO 11133:2014.			
		The testing laboratory of Oxoid Deutschland GmbH is accredited by the German accreditation body DAkkS according to DIN EN ISO/IEC 17025 for the performance testing of media for microbiology to DIN EN ISO 11133:2014 and registered under D-PL-20190-01-00.	

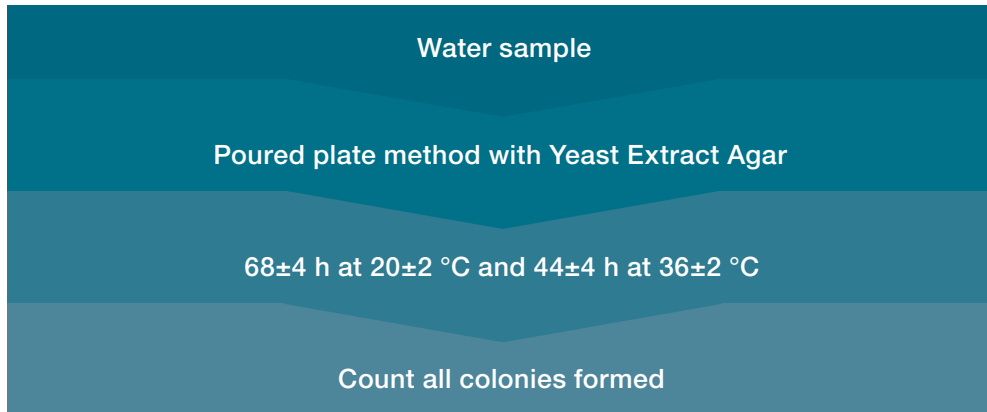
Figure 1. Example of Certificate of Analysis (Legionella GVPC Selective Medium)

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# Detection of microorganisms – Colony counts at 22 °C and 36 °C

Method according to EN ISO 6222:1999

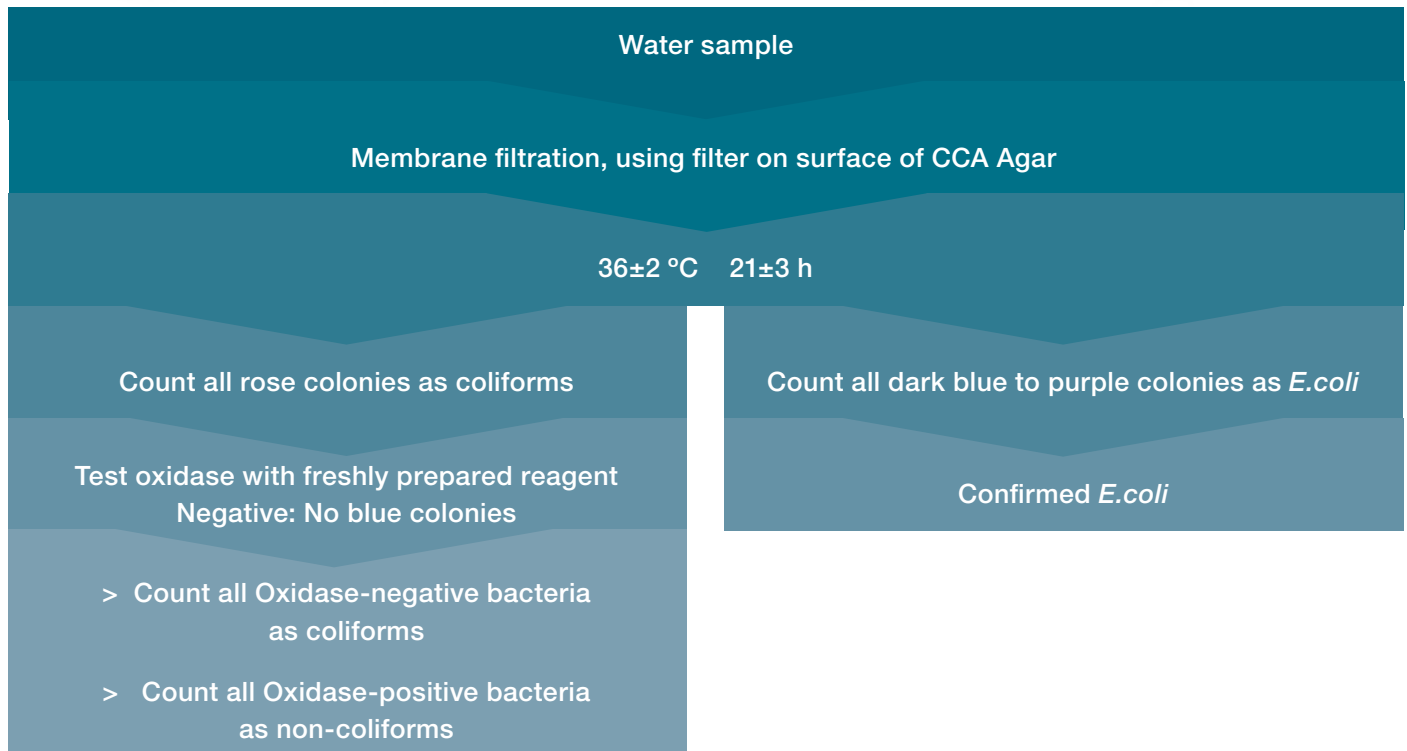


## Detection of microorganisms – Colony count number at 22 °C and 36 °C

Method	Media	Product	Format	Product code
<b>EN ISO 6222:1999</b>				
Pour plate	Yeast Extract Agar	Plate Count Agar for water testing (ISO)	500 g Dehydrated culture media	CM1012B
		Plate Count Agar	10 x 100 mL bottles Prepared media	BO0055M
			10 x 200 mL bottles Prepared media	BO0055R

# Escherichia coli / Coliform bacteria

Method according to ISO 9308-1:2014

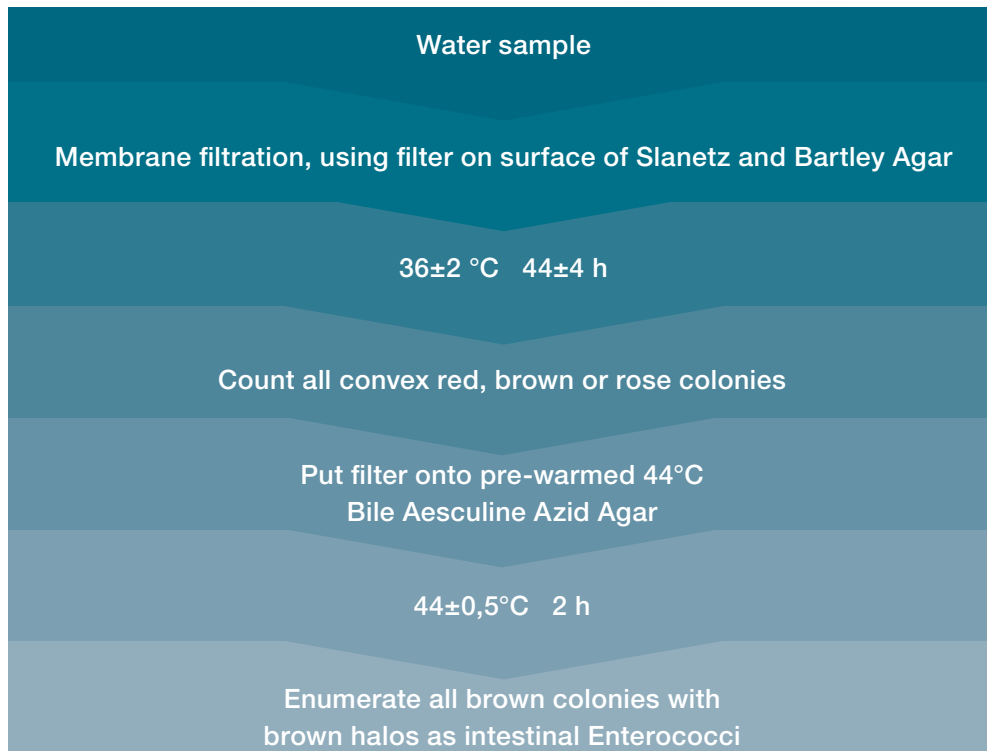


## Escherichia coli and coliform

Method	Media	Product	Format	Product code
<b>EN ISO 9308-1:2014 Standard test</b>				
Membrane filtration	CCA Agar	Thermo Scientific™ Chromogenic Coliform Agar	500 g Dehydrated culture media	CM1205B
			10 x 90 mm plates Prepared media	PO5318A
			10 x 55 mm plates Prepared media	PO5428J
Oxidase test	Tryptone Soya Agar (TSA)	CASO AGEN (TSA)	500 g / 5 kg Dehydrated culture media	CM0131B/T
			10 x 90 mm plates Prepared media	PO5012A
	Oxidase Reagent	Thermo Scientific™ BactiDrop™ Oxidase Reagent	50 vials Dehydrated culture media	R21540
			10 x 90 mm plates Prepared media	PO5321A
		Thermo Scientific™ Microbact™ Oxidase Strips	50 strips Dehydrated culture media	MB0266A

# Enterococci

## Method according to ISO 7899-2:2000



## Enterococci

Method	Media	Product	Format	Product code
<b>EN ISO 7899-2:2000</b>				
Membrane filtration	Slanetz Bartley Agar	Slanetz Bartley Agar	500 g Dehydrated culture media	CM0377B
			10 x 90 mm plates Prepared media	PO5018A
			10 x 55 mm plates Prepared media	PO5410J*
			10 x 55 mm plates Prepared media	PO5423J*
Confirmation	Bile Aesculine Azide Agar	Enterococcus Selective Medium (Bile Aesculine Azid Agar) <sup>1</sup>	10 x 90 mm plates Prepared media	PO5062A
		or Kanamycin Aesculin Azide Agar Base <sup>2</sup>	500g Dehydrated culture media	CM0591B
			10 x 90 mm plates Prepared media	PO5059A

\* Minimum order quantity required.

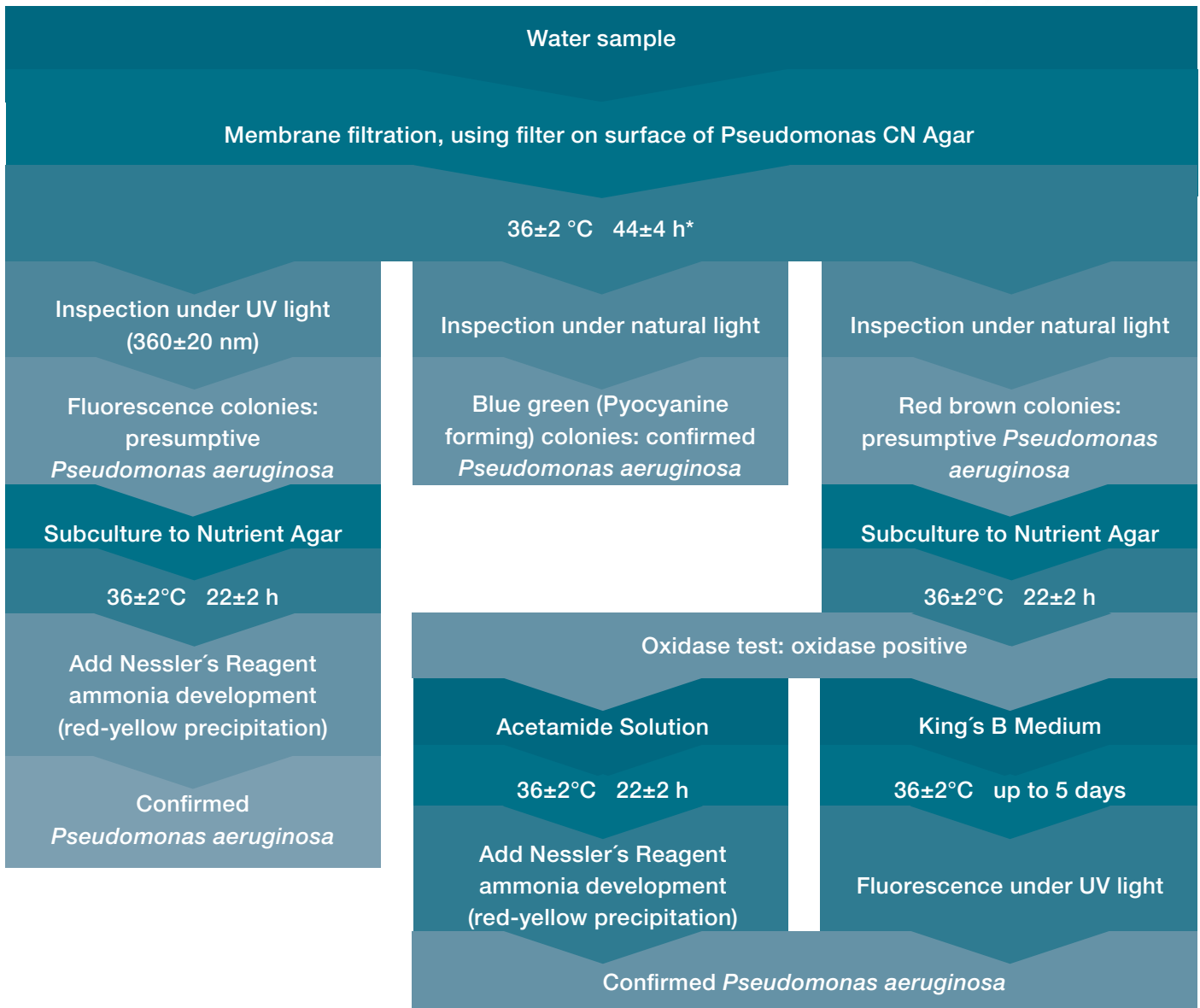
1. This medium is slightly different to the medium formulation according to ISO 7899-2:2000. The medium has additional sodium citrate and 20 g/l ox bile instead of 10 g/l and 0.55 g/l sodium azide instead of 0.15 g/l.

2. This medium is slightly different to the medium formulation according to ISO 7899-2:2000. It contains sodium citrate instead of ox bile and Kanamycin.



# *Pseudomonas aeruginosa*

Method according to ISO 16266:2006



***Pseudomonas aeruginosa***

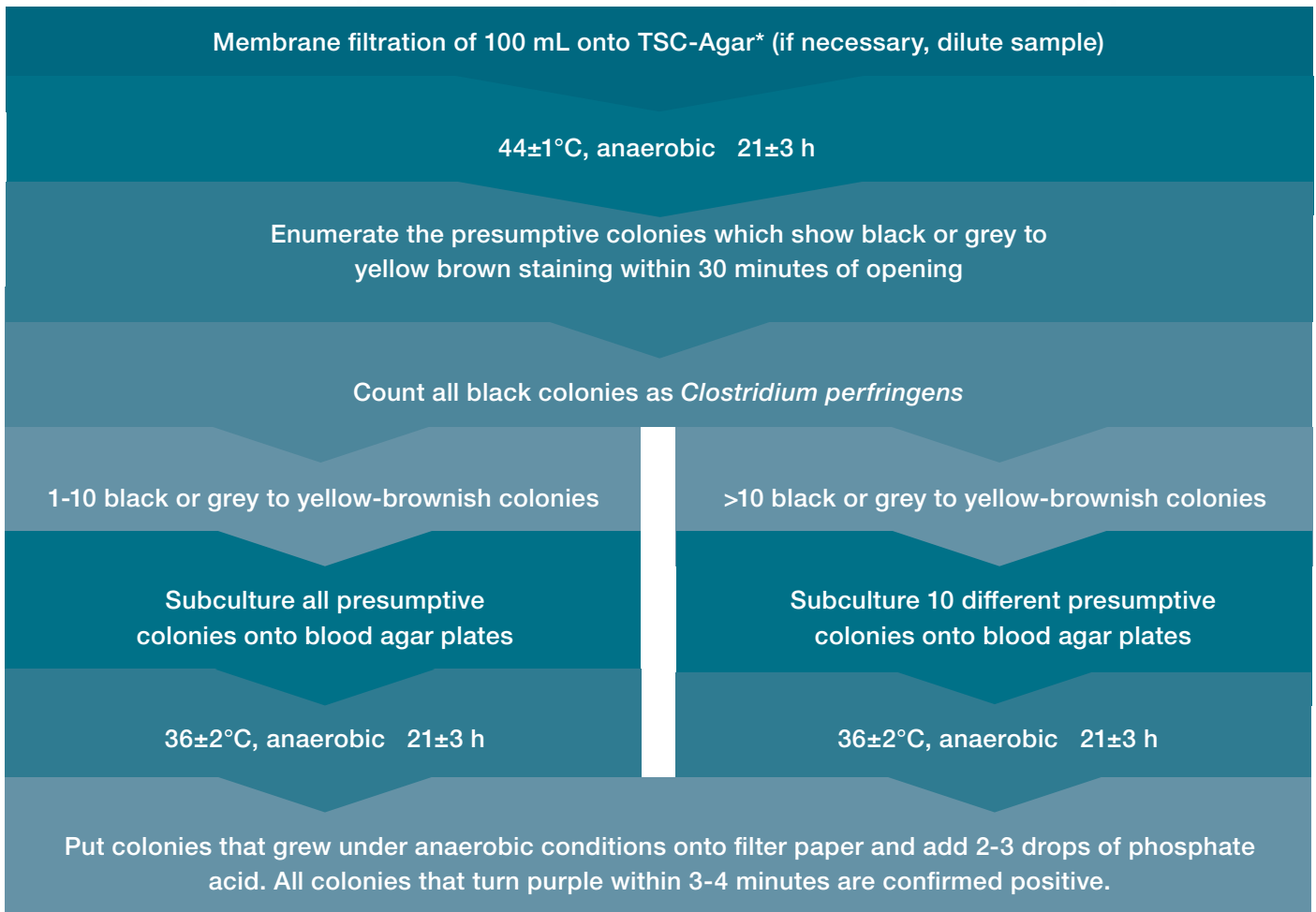
Method	Media	Product	Format	Product code
<b>EN ISO 16266:2006</b>				
Membrane filtration	Pseudomonas Selective Agar / CN Agar	Pseudomonas Centrimide Selective Agar	10 x 90 mm plates Prepared media	PO5076A
			10 x 55 mm plates Prepared media	PO5413J*
		Pseudomonas Agar Base	500 g Dehydrated culture media	CM0559B
			10 tubes Dehydrated culture media	SR0102E
Confirmation				
Fluorescence	King's B Media			
Hydrolysis of acetamide to ammonia	Acetamide Solution Nessler Reagent			
Oxidase Test	Nutrient Agar	Nutrient Agar	500 g Dehydrated culture media	CM0003B
			Oxidase Reagent	BactiDrop Oxidase Reagent
		Microbact Oxidase Strips	50 strips Dehydrated culture media	MB0266A

\* Minimum order quantity required.

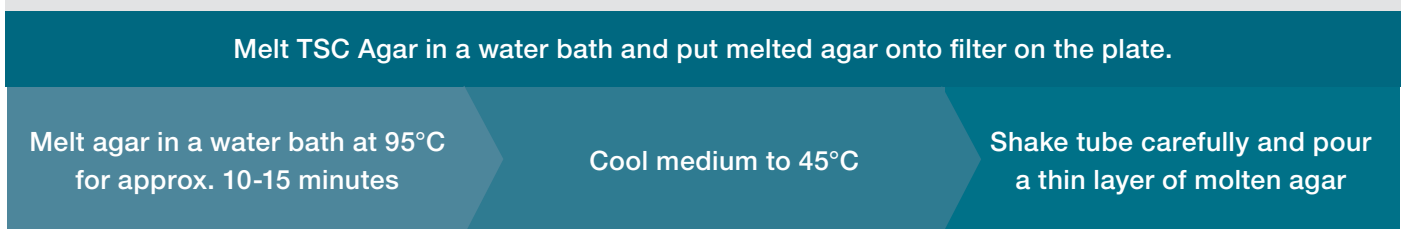


# *Clostridium perfringens* (including spores)

Method according to ISO 14189:2013



\*ATTENTION: Alternatively, a thin layer (approximately 5 mL to 10 mL) of molten TSC Agar (TV5204G TSC Agar Base), as an overlay on the filter can be used. Allow to solidify before anaerobic incubation. This method may enhance the blackening of the colonies. Medium without cycloserine; e.g. TV5204G TSC Agar Base, 20 mL.



***Clostridium perfringens***

Method	Media	Product	Format	Product code
<b>ISO 14189:2013</b>				
Membrane filtration	TSC Agar	TSC Selective Agar	10 x 90 mm plates Prepared media	PO5315A
		TSC Agar Base +	500 g Dehydrated culture media	CM0587B
			50 tubes Prepared media	TV5204G
		TSC Selective Supplement	10 tubes Dehydrated culture media	SR0088E
			10 x 100 mL bottles Prepared media	BO0634M
			10 tubes Prepared media	SR0088E
Anaerobic atmosphere		Thermo Scientific™ AnaroGen™ System	10 sachets Prepared media	AN0025A
		Thermo Scientific™ AnaroJar™ 2,5 L Anaerobic System	1 pot Prepared media	AG0025A
		Thermo Scientific™ AnaeroBox™ Rectangular Anaerobic System	1 pot Prepared media	AB0025A

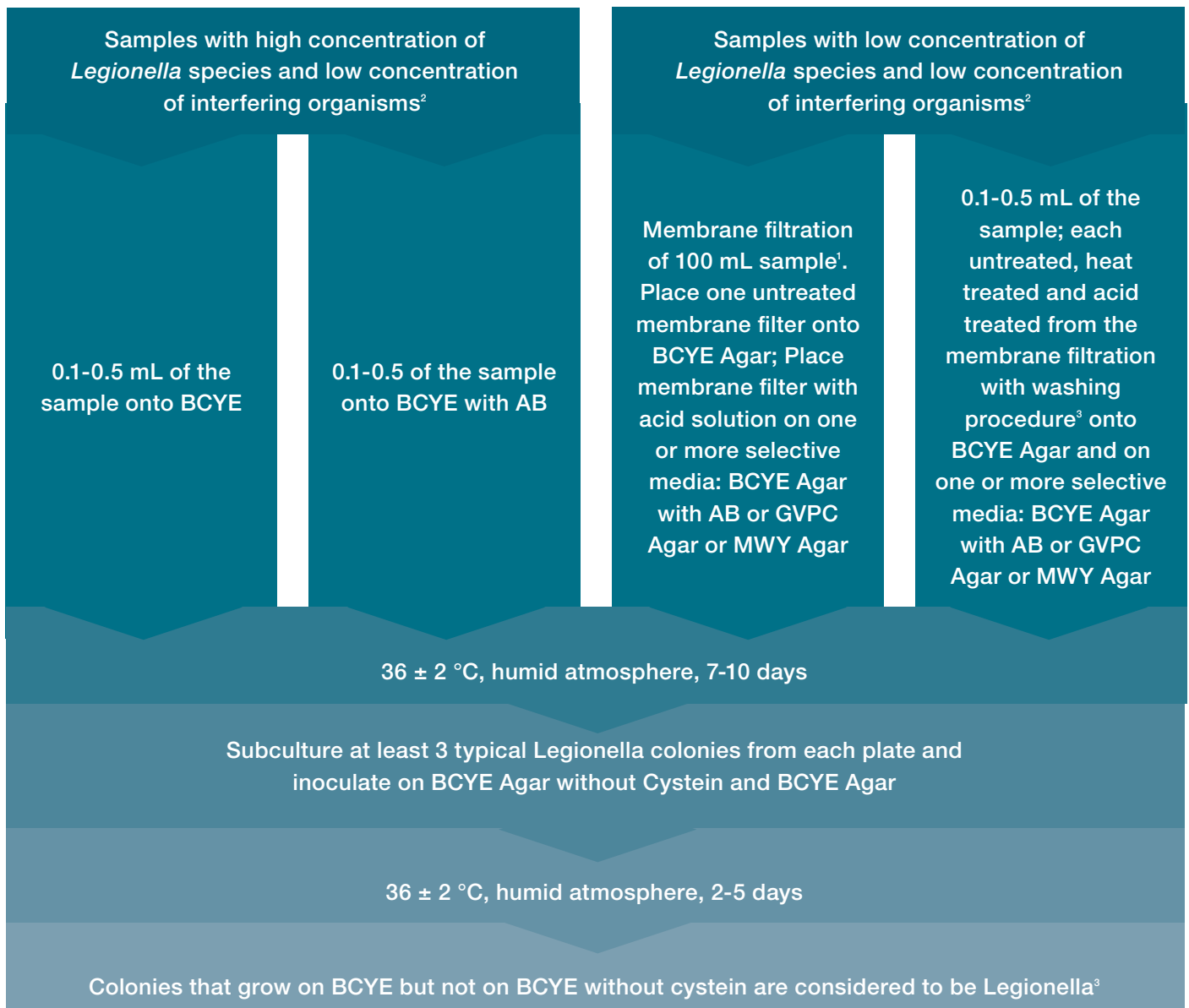
## Methods according to ISO 11731:2017

### Sample preparation

**Heat treated** - Put sample into water bath for 30+/-2 minutes at 50 °C

**Acid treated** - 1 part sample to 9 parts of acid buffer. Mix well and leave it for 5+/- 0.5 minutes.

**Acid treated filter** - Put 30 mL of acid solution onto the membrane filter. Leave it for 5 +/- 0.5 minutes and remove the solution by filtration. Wash with 20 mL of either sterile Aqua dest., Pages Saline, Ringer Solution or PBS.



1. 10 – 1000 mL sample volume according to ISO 11731-2.

2. The choice of the method for the enumeration of *Legionella* species depends on the origin/characteristics of the sample and the reason for sampling or investigation. A decision matrix can be found in the ISO 11731:2017, Annex J.

3. Further information, please see ISO 11731:2017.

## Legionella

Method	Media	Product	Format	Product code
<b>ISO 11731:2017 and EN ISO 11731-2</b>				
Sample preparation	Acid Buffer	Legionella Acid Buffer Solution	6 x 1 L bottles Prepared media	GFB01
Direct and membrane filtration	Legionella GVPC Agar	Legionella GVPC Selective Agar	10 x 90 mm plates Prepared media	PO5074A
			10 x 90 mm plates Prepared media	PO0245A
		Legionella CYE Agar-Base +	500 g Dehydrated culture media	CM1203B
		Legionella BCYE Supplement +	10 tubes (500 mL) Dehydrated culture media	SR0251C
		Legionella GVPC Selective Supplement	10 tubes (500 mL) Dehydrated culture media	SR0252E
	Legionella GVPC Agar with antibiotics	Legionella BCYE Agar with antibiotics	10 x 90 mm plates Prepared media	PO5325A
	Legionella BCYE Agar	Legionella BCYE Agar	10 x 90 mm plates Prepared media	PO5072A
		Legionella CYE Agar Base +	500 g Dehydrated culture media	CM1203B
		Legionella BCYE Supplement	10 tubes (500 mL) Dehydrated culture media	SR0251C
		Legionella MWY Selective Supplement	10 tubes (500 mL) Dehydrated culture media	SR0255B
	Legionella MWY Agar	Legionella MWY Agar	10 x 90 mm plates Prepared media	PO5071A
		Legionella CYE Agar Base +	500 g Dehydrated culture media	CM1203B
		Legionella BCYE Supplement +	10 tubes (500 mL) Dehydrated culture media	SR0251C
Subculture	Legionella BCYE Agar without Cystein	Legionella BCYE Agar without Cystein	10 x 90 mm plates Prepared media	PO5028A
			10 x 90 mm plates Prepared media	PO0255A*
		Legionella CYE Agar Base +	500 g Dehydrated culture media	CM1203B
		Legionella BCYE without Cystein Supplement	10 tubes (100 mL) Dehydrated culture media	SR0253A
	Legionella BCYE Agar	Legionella BCYE Agar	10 x 90 mm plates Prepared media	PO5072A
		Legionella CYE Agar Base +	500 g Dehydrated culture media	CM1203B
		Legionella BCYE Supplement	10 tubes (500 mL) Dehydrated culture media	SR0251C

\* Minimum order quantity required.

# Filter Funnels and Membranes

Thermo Scientific™ Nalgene™ Membrane Filters are cellulose nitrate membranes that are certified for microbiological QC testing and analysis of water.

Product	Size or Quantity	Cat. No.
<b>Nalgene Disposable Analytical Funnels equipped with membrane filter</b>		
Sterile Analytical Filter Units, 100 mL, 47 mm, 0.45 µm, white/black	50 pieces	NG145-0045
Sterile Analytical Filter Units, 250 mL, 47 mm, 0.45 µm, white/black	50 pieces	NG145-2045
Sterile Analytical Filter Units, 100 mL, 47 mm, 0.45 µm, grey/black	50 pieces	NG147-0045
Sterile Test Filter Funnel, 250 mL, 0.45 µL	50 pieces	NG147-2045
<b>Membrane filter</b>		
Membrane Filter for water testing, sterile, CN, 47 mm, 0,45 µm, white/black	100 pieces	NG0205-4045
Membrane Filter for water testing, sterile, CN, 47 mm, 0,45 µm, grey/black	100 pieces	NG0210-6045
<b>Accessories</b>		
Vacuum Manifold	1 piece	NG0345-0001
Filter Stopper, non-sterile, no. 8 rubber	3 pieces	NG0396-0080
Filter Forceps, bent tip	1 piece	NG0399-0001
Filter Forceps, straight tip	1 piece	NG0399-0002
Filter Funnel Adapter, non-sterile	25 pieces	NG0397-0010
Vacuum Gasket, non-sterile thermoplastic elastomer	6 pieces	NG0395-0708
<b>Nalgene Reusable Analytical Filters and accessories</b>		
Filter Funnels with Clamp, 250 mL	1 piece	NG0315-0047
Filter Holders with Receiver, 500 mL, 500 mL	4 pieces	NG0300-4000
Filter Holders with Receiver, 250 mL, 250 mL	4 pieces	NG0300-4050
Filter Holders with Receiver, 500 mL, 1000 mL	4 pieces	NG0300-4100
Filter Holders with Funnel, 250 mL	1 piece	NG0310-4000
Filter Holders with Funnel, 500 mL	1 piece	NG0310-4050
Reusable Bottle Top Filters, 250 mL	1 piece	NG0320-2545
Reusable Bottle Top Filters, 500 mL	1 piece	NG0320-5033
Reusable Bottle Top Filters, 500 mL	1 piece	NG0320-5045

# Culti-Loops QC Organisms

For quality control testing according to ISO 11133:2014

Product	Sample numbers	Cat. No.
<b>Escherichia coli QC Organisms for testing of CCA Agar</b>		
<i>Escherichia coli</i> ATCC® 8739™*	WDCM 00012	R4607085
<i>Escherichia coli</i> ATCC® 25922™*	WDCM 00013	R4607050
<i>Enterobacter aerogenes</i> ATCC® 13048™*	WDCM 00175	R4607080
<i>Pseudomonas aeruginosa</i> ATCC® 27853™*	WDCM 00025	R4607060
<i>Pseudomonas aeruginosa</i> ATCC® 9027™*	WDCM 00026	R4605210
<i>Enterococcus faecalis</i> ATCC® 19433™*	WDCM 00009	R4601990
<i>Enterococcus faecalis</i> ATCC® 29212™*	WDCM 00087	R4607030
<b>Enterococci QC Organisms for testing of Slanetz and Bartley Agar</b>		
<i>Escherichia coli</i> ATCC® 8739™*	WDCM 00012	R4607085
<i>Escherichia coli</i> ATCC® 25922™*	WDCM 00013	R4607050
<i>Staphylococcus aureus</i> subsp. aureus ATCC® 6538™*	WDCM 00032	R4607016
<i>Staphylococcus aureus</i> subsp. aureus ATCC® 25923™*	WDCM 00034	R4607010
<i>Enterococcus faecalis</i> ATCC® 29212™*	WDCM 00087	R4607030
<i>Enterococcus faecalis</i> ATCC® 19433™*	WDCM 00009	R4601990
<b>Pseudomonas aeruginosa QC Organisms for testing of Pseudomonas CN Agar</b>		
<i>Pseudomonas aeruginosa</i> ATCC® 27853™*	WDCM 00025	R4607060
<i>Pseudomonas aeruginosa</i> ATCC® 9027™*	WDCM 00026	R4607060
<i>Pseudomonas aeruginosa</i> ATCC® 10145™*	WDCM 00024	R4607065
<i>Escherichia coli</i> ATCC® 8739™*	WDCM 00012	R4607085
<i>Escherichia coli</i> ATCC® 25922™*	WDCM 00013	R4607050
<i>Enterococcus faecalis</i> ATCC® 19433™*	WDCM 00009	R4601990
<i>Enterococcus faecalis</i> ATCC® 29212™*	WDCM 00087	R4601990
<b>Clostridium perfringens QC Organisms for testing of TSC Agar</b>		
<i>Bacillus subtilis</i> ATCC 6633	WDCM 00003	R4601221
<b>QC organisms for testing GCVP Agar (Legionella method)</b>		
<i>Legionella pneumophila</i> ATCC® 33152™*	WDCM 00107	R4603950
<i>Legionella anisa</i> NCTC 11974™	WDCM 00106	R4601315
<i>Enterococcus faecalis</i> ATCC® 19433™*	WDCM 00009	R4601990
<i>Enterococcus faecalis</i> ATCC® 29212™*	WDCM 00087	R4607030
<i>Pseudomonas aeruginosa</i> ATCC® 27853™*	WDCM 00025	R4607060
<i>Pseudomonas aeruginosa</i> ATCC® 9027™*	WDCM 00026	R4605210
<i>Escherichia coli</i> ATCC® 8739™*	WDCM 00012	R4607085
<i>Escherichia coli</i> ATCC® 25922™*	WDCM 00013	R4607050
<b>Prepared Media for the Quality Control testing according to ISO 11133:2014</b>		
CASO Agar (ISO 11133)		PO5321A



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