

CLL Laboratory Water Test Packages

Laboratory Water Packages offered by CLL

American Society for Testing and Materials - Reagent Water (ASTM) D1193-91				
	Type I*	Type II**	Type III***	Type IV
Electrical Conductivity Max. ($\mu\text{S}/\text{cm}$ @ 25°C)	0.056	1	0.25	5
Electrical Resistivity				
Min. ($\text{M}\Omega\text{-cm}$ @ 25°C)	18	1	4	0.2
pH @ 25°C	-	-	-	5.0 - 8.0
TOC max. ($\mu\text{g}/\text{L}$)	100	50	200	No limit
Sodium max ($\mu\text{g}/\text{L}$)	1	5	10	50
Silica max. ($\mu\text{g}/\text{L}$)	3	3	500	No limit
Chloride max. ($\mu\text{g}/\text{L}$)	1	5	10	50
Sample Quantity Required	1 Litre	1 Litre	1 Litre	1 Litre
Test Charges / Package	#REF!	#REF!	#REF!	#REF!

Key:

- *Requires the use of 0.2 μm membrane filter
- ** Prepared by distillation
- *** Requires the use of a 0.45 μm membrane filter

When bacterial levels need to be controlled, reagent grade types should be further classified as follows:				
	Type A	Type B	Type C	Analytical Services
Total Bacterial Count max. CFU/100 ml	1	10	1000	250
Endotoxin max. IU/ml	0.03	0.25	-	900

National Committee for Clinical Laboratory Standards (NCCLS) (1988)				
	Type I	Type II	Type III	
Bacteria (CFU/ml)	< 10	< 1000	NA	
pH	NA	NA	5.0 - 8.0	
Resistivity ($\text{M}\Omega\text{-cm}$ @ 25°C)	> 10*	> 1	> 0.1	
SiO ₂ mg/L	< 0.05	< 0.1	< 1	
Total Solids mg/L	0.1	1	5	
Total Oxidizable Organic Carbon mg/L	< 0.05	< 0.2	< 1	
Type I water must be free of particulate matter larger than 0.2 μm				
* Resistivity of Type I must be measured in-line				
Sample Quantity Required	1 Litre	1 Litre	1 Litre	1 Litre
Test Charges / Package	0	0	0	0

Type I - Test methods requiring minimal interference and maximum precision and accuracy:

- Atomic absorption
- Flame emission spectrometry
- Ligand assays
- Trace metals
- Enzymatic procedures sensitive to trace metals
- Electrophoretic procedures
- High sensitivity chromatographic procedures
- Fluorometric procedures
- Buffer solutions
- Standard solutions

Type II - Test methods in which the presence of bacteria can be tolerated:

- General reagents without preservatives
- Microbiology systems (not to be sterilized)
- Test methods for which requirements leading to the choice of Type I or Special Purpose waters do not apply:
 - Stains and dyes for histology
 - General reagents with preservatives
 - Microbiology systems (to be sterilized)

Type III - General washing and feedwater for producing higher grade water, as well as bacteriological media preparation.

- Special Purpose - Procedures requiring removal of specific contaminants:
 - Removal of pyrogens for tissue/cell cultures
 - Removal of trace organics for HPLC

International Organization for Standardization**Specification for water for laboratory use ISO 3696: 1987**

Parameter	Grade 1	Grade 2	Grade 3
pH value at 25°C inclusive range	N/A	N/A	5.0 to 7.5
Electrical conductivity $\mu\text{S/cm}$ 25°C, max.	0.1	1	5
Oxidizable matter Oxygen (O_2) content mg/L max.	N/A	0.08	0.4
Absorbance at 254 nm and 1 cm optical path length, absorbance units, max.	0.001	0.01	Not specified
Residue after evaporation on heating at 110°C mg/kg, max.	N/A	1	2
Silica (SiO_2) content mg/L, max.	0.01	0.02	Not specified
Sample Quantity Required	1 Litre	1 Litre	1 Litre
Test Charges / Package	0	0	0

College of American Pathologists (CAP) - 1988**Suggested minimum specifications**

Parameter	Type I	Type II	Type III
Resistivity ($\text{M}\Omega\cdot\text{cm}$ @ 25°C)			
a. (In-Line)	10	-	-
b. (Effluent)	-	2.0	0.1
pH	N/A	N/A	5.0 - 8.0
Silicate (mg/l at SiO_2)	0.05	0.1	1.0
Microbiological Content	10	1000	N/A
Particulate matter	#		
Sample Quantity Required	1 Litre	1 Litre	1 Litre
Test Charges / Package	0	0	0

: - Type I water should be free of particles (< 500 particles/litre) greater than 0.2 μm .

Suggested water quality uses:

Type I: Tissue or cell culture, ultra-micro analysis, critical analytical procedures, standard preparations.

Type II: Most routine laboratory methods, immunology, haematology and other areas.