

# General Lab Criteria

Criteria	Standard Methods Requirement		Rating
<b>Balance</b>		Acceptable?	
• Standard Weights	• Either NIST Class s or ASTM/ANSI Class 1 weights <sup>1,2</sup>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
• Calibration Frequency / Documentation	• Calibration verification required at least once each day the balance is used. <sup>3</sup>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
• Cleanliness, air movement, vibration	• Cleanliness of balance is a must and air movement and vibration needs to be kept to a minimum <sup>1</sup>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
• Other	• Service and recalibrate annually (manufacturer representative or comparable) <sup>1</sup>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	• Must be able to measure to 0.1 grams <sup>4</sup>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	• Instrument manual available	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	• Log book maintained <sup>2</sup>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Comments: :			
Criteria	Standard Methods Requirement		Rating
<b>Drying Oven (Suspended Solids)</b>		Acceptable?	
• Temperature Recordkeeping	• Temperature recorded with each use <sup>4</sup>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	• Log book maintained <sup>2</sup>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
• Calibration Frequency / Documentation	• Thermometer calibrated annually with NIST traceable thermometer <sup>1,2</sup> . Correction factor posted on thermometer / equipment <sup>1</sup>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
• Other	• Thermometer temperature accurate to 0.5° Celsius <sup>5</sup>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	• Acceptable temperature range is 103° – 105° C <sup>4</sup>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	• Instrument manual available	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Comments: :			

# General Lab Criteria

Criteria	Standard Methods Requirement		Rating
<b>pH Meter</b>			Acceptable?
<ul style="list-style-type: none"> <li>• Calibration Frequency / Documentation</li> </ul>	<ul style="list-style-type: none"> <li>• Calibration verification required for testing over long period of time (e.g. 12 hrs.), or after a large number of samples (every 10 samples)<sup>3</sup></li> </ul>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	<ul style="list-style-type: none"> <li>• Logbook maintained<sup>2</sup></li> </ul>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<ul style="list-style-type: none"> <li>• Minimum of 2 point calibration</li> </ul>	<ul style="list-style-type: none"> <li>• Calibration per manufacturer specification and calibration buffers must bracket anticipated result<sup>7</sup></li> </ul>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<ul style="list-style-type: none"> <li>• Slope Documentation / Acceptability</li> </ul>	<ul style="list-style-type: none"> <li>• Slope acceptable range indicated on benchsheet<sup>2</sup></li> </ul>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<ul style="list-style-type: none"> <li>• Buffer Expiration Date</li> </ul>	<ul style="list-style-type: none"> <li>• Buffers must not be expired</li> </ul>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<ul style="list-style-type: none"> <li>• Other</li> </ul>	<ul style="list-style-type: none"> <li>• Instrument manual available</li> </ul>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	<ul style="list-style-type: none"> <li>• Teflon covered magnetic stirrer or equivalent for mixing<sup>8</sup></li> </ul>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Comments: :			
Criteria	Standard Methods Requirement		Rating
<b>Dissolved Oxygen Meter</b>			Acceptable?
<ul style="list-style-type: none"> <li>• Calibration Method</li> </ul>	<ul style="list-style-type: none"> <li>• Air or known DO calibration method<sup>10</sup></li> </ul>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	<ul style="list-style-type: none"> <li>• Calibration per manufacturer specification<sup>10</sup></li> </ul>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<ul style="list-style-type: none"> <li>• Calibration Frequency / Documentation</li> </ul>	<ul style="list-style-type: none"> <li>• Logbook maintained<sup>2</sup></li> </ul>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	<ul style="list-style-type: none"> <li>• Calibration verification required at least once each day the meter is used.<sup>3</sup></li> </ul>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<ul style="list-style-type: none"> <li>• Other</li> </ul>	<ul style="list-style-type: none"> <li>• Small to no bubble present under membrane (must be smaller than the lead in number 2 pencil)<sup>11</sup></li> </ul>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	<ul style="list-style-type: none"> <li>• Instrument manual available</li> </ul>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Comments:			

# General Lab Criteria

Criteria	Standard Methods Requirement		Rating
<b>Incubator (CBOD/ E-Coli)</b>		Acceptable?	
<ul style="list-style-type: none"> <li>• Temperature Recordkeeping</li> </ul>	<ul style="list-style-type: none"> <li>• Temperature checked / recorded twice daily for each shelf in use<sup>1</sup>(E-Coli)</li> </ul>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	<ul style="list-style-type: none"> <li>• Temperature checked / recorded daily<sup>2</sup> (CBOD)</li> </ul>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	<ul style="list-style-type: none"> <li>• Acceptable temperature range (CBOD) is 20<sup>o</sup> C ±1.0<sup>o</sup> <sup>12</sup></li> </ul>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	<ul style="list-style-type: none"> <li>• Acceptable temperature range (E-Coli) is 35<sup>o</sup> C ±0.5<sup>o</sup> <sup>22</sup></li> </ul>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	<ul style="list-style-type: none"> <li>• Logbook maintained <sup>2</sup></li> </ul>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<ul style="list-style-type: none"> <li>• Temperature Calibration / Documentation</li> </ul>	<ul style="list-style-type: none"> <li>• Thermometer calibrated annually with NIST traceable thermometer<sup>1, 2</sup></li> </ul>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	<ul style="list-style-type: none"> <li>• Temperature correction information posted on incubator<sup>1</sup></li> </ul>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<ul style="list-style-type: none"> <li>• E-Coli can use multiple tubes (five 20 ml or ten 10 ml), or mfg's multi-well tray</li> </ul>	<ul style="list-style-type: none"> <li>• E-coli Ultraviolet lamp (365 nm wave length, 6 W bulb) <sup>23</sup></li> </ul>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<ul style="list-style-type: none"> <li>• Other</li> </ul>	<ul style="list-style-type: none"> <li>• Instrument manual available</li> </ul>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	<ul style="list-style-type: none"> <li>• Temperature Log (thermometer accurate to 0.5 Celsius).<sup>1</sup></li> </ul>	<input type="checkbox"/> Yes	<input type="checkbox"/> No

Comments: :

Criteria	Standard Methods Requirement		Rating
<b>Refrigerator</b>		Acceptable?	
<ul style="list-style-type: none"> <li>• Temperature Recordkeeping</li> </ul>	<ul style="list-style-type: none"> <li>• Temperature Log (thermometer accurate to 0.5 Celsius).<sup>5</sup></li> </ul>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<ul style="list-style-type: none"> <li>• Temperature Calibration / Documentation</li> </ul>	<ul style="list-style-type: none"> <li>• Thermometer calibrated annually with NIST traceable thermometer<sup>1, 2</sup></li> </ul>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<ul style="list-style-type: none"> <li>• Other</li> </ul>	<ul style="list-style-type: none"> <li>• Thermometer held in water bath. <sup>1</sup></li> </ul>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	<ul style="list-style-type: none"> <li>• Refrigerator temperature ≤6<sup>o</sup> Celsius.<sup>13</sup></li> </ul>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	<ul style="list-style-type: none"> <li>• Do not store volatile solvents, food, or beverages.<sup>14</sup></li> </ul>	<input type="checkbox"/> Yes	<input type="checkbox"/> No

Comments:

# General Lab Criteria

Criteria	Standard Methods Requirement		Rating
<b>Chlorine Meter</b>			Acceptable?
• Calibration Frequency / Documentation	• pH / millivolt meter read to 0.1 mV <sup>15</sup>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	• Calibration verification required for testing over long period of time (e.g. 12 hrs.), or after a large number of samples (every 10 samples) <sup>3</sup>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
• Calibration Method	• Calibration using three iodate solutions 0.2, 1.0, 5.0 milliliters or calibration per manufacturer specification <sup>16</sup>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	• Standards used for calibration not expired	<input type="checkbox"/> Yes	<input type="checkbox"/> No
• Slope Documentation / Acceptability	• Calibration curve (acceptable slope)	<input type="checkbox"/> Yes	<input type="checkbox"/> No
• Other	• Electrode free of deposits and foreign material	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	• Log book being maintained. <sup>2</sup>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	• Instrument manual available	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Comments: :			
<hr/>			
Criteria	Standard Methods Requirement		Rating
<b>Ammonia Meter</b>			Acceptable?
• Calibration Frequency / Documentation	• Calibration verification required for testing over long period of time (e.g. 12 hrs.), or after a large number of samples (every 10 samples) <sup>3</sup>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	• Log book being maintained <sup>2</sup>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
• Slope acceptability	• Verify calibration slope is acceptable (per mfg. spec.).	<input type="checkbox"/> Yes	<input type="checkbox"/> No
• Calibration Method	• Standards used for calibration (3 ammonia solutions of 10 mg/l, 1 mg/l, and 0.1 mg/l) or per mfg. spec. <sup>17</sup>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	• Standards used for calibration not expired	<input type="checkbox"/> Yes	<input type="checkbox"/> No
• Other	• Electrode free of deposits and foreign material	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	• Teflon covered magnetic stirrer or equivalent for mixing <sup>18</sup>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	• Instrument manual available	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Comments: :			



# General Lab Criteria

Criteria	Standard Methods Requirement	Acceptable?		Rating
<b>Hot Water Bath (Fecal Coliform/E. Coli)</b>				
• Temperature Recordkeeping	• Temperature Log (thermometer accurate to 0.2° C) <sup>21</sup>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
	• Incubator temperature 44.5° C ± 0.2 <sup>21/24</sup>			
• Temperature Calibration / Documentation	• Thermometer calibrated annually with NIST traceable thermometer <sup>1,2</sup>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
	• Log book being maintained <sup>2</sup>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
• Water Level	• Thermometer total immersion or partial (line on thermometer to ID immersion depth) <sup>1,5</sup>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	

Comments:

Criteria	Standard Methods Requirement	Acceptable?		Rating
<b>Autoclaves/Steam Sterilizers</b>				
• All apparatus utilized is adequately sterilized before use	• Sterilizing temperature 121° C <sup>25</sup>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
	• 10 to 30 minutes time based on material being sterilized <sup>26</sup>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
• Documentation	• Verify the autoclave temperature weekly by using a maximum registering thermometer (MRT) to confirm that 121°C has been reached as measured in the exhaust. <sup>1</sup>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
	• Date, contents, sterilization time and temperature, total time in autoclave, and analyst's initials should be recorded each time the autoclave is used <sup>1</sup>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
• Temperature Calibration / Documentation	• Thermometer calibrated annually with NIST traceable thermometer <sup>1,2</sup>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
	• Log book being maintained <sup>2</sup>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
• Performance Checks	• Test monthly for efficacy using a biological such as commercially available <i>Geobacillus stearothermophilus</i> in spore strips, suspensions, or capsules <sup>1</sup>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	

Comments:

# General Lab Criteria

Criteria	Standard Methods Requirement		Rating
<b>Final Effluent Temperature Monitoring</b>		Acceptable?	
<ul style="list-style-type: none"> <li>• General Criteria</li> </ul>	<ul style="list-style-type: none"> <li>• Thermometer calibrated annually with NIST traceable thermometer <sup>1,2</sup></li> </ul>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	<ul style="list-style-type: none"> <li>• Thermometer scaled to 0.1° Celsius and accurate to 0.5° C <sup>5</sup></li> </ul>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	<ul style="list-style-type: none"> <li>• Log book being maintained <sup>2</sup></li> </ul>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Comments:			
<b>Number of Criteria Rated:</b>			<b>Acceptable</b>
			<b>Marginal</b>
			<b>Unacceptable</b>
			<b>Total Number of Areas Rated</b>
<p><b>Acceptable Ratings</b> – No action required (recommend SOP's written or updated, perform DMRQA's for all onsite analysis, recommend voluntary lab analyst certification, written response not required).</p>			
<p><b>Marginal Ratings</b> – Improvements required, written response required (recommend SOP's be written or updated, recommend they perform DMRQA's for all onsite analysis, recommend voluntary lab analyst certification, require deficiencies to be addressed in written response).</p>			
<p><b>Unsatisfactory Rating</b> - Improvements required, written response required, NOV issued (recommend SOP's be written or updated, recommend they perform DMRQA's for all onsite analysis, recommend voluntary lab analyst certification, require deficiencies to be addressed in written response to NOV).</p>			
<p>Consider recommending PAI Audit from DES when:</p>	<p>&gt;60% of ratings are Marginal &gt;45% of ratings are a combination of Marginal or Unacceptable &gt;30% of ratings are Unacceptable</p>		

## Notation of Referenced Method

- |                            |                              |
|----------------------------|------------------------------|
| 1 Method 9020-B, Item 3    | 14 Method 1060A, Item 1      |
| 2 Method 1020-A, Item 1    | 15 Method 4500-CI I, Item 2  |
| 3 Method 1020-B, Item 10   | 16 Method 4500-CI I, Item 4  |
| 4 Method 2540-B, Item 2    | 17 Method 4500-NH3 D, Item 4 |
| 5 Method 2550-B, Item 1    | 18 Method 4500-NH3 D, Item 2 |
| 6 Method 1020-A, Item 1    | 19 Method 1060-B, Item 2     |
| 7 Method 4500-H B, Item 4  | 20 Method 1060-B, Item 1     |
| 8 Method 4500-H B, Item 2  | 21 Method 9222D, Item 1      |
| 9 Method 1020-B, Item 2    | 22 Method 9223 B, Item 2     |
| 10 Method 4500-O B, Item 3 | 23 Method 9223 B, Item 3     |
| 11 Method 4500-O G, Item 3 | 24 Method 1603, Item 2       |
| 12 Method 5210-B, Item 5   | 25 Method 9030-B, Item 3     |
| 13 CFR 136.3, Table II     | 26 Method 9020 B, Table IV   |

# General Lab Criteria

Equipment Logbook Content - all maintenance performed on a piece of equipment should be documented in the logbook. This should include parts replacement and routine maintenance activities. Entries should include date, maintenance performed and initials of person making entry.

## Preservation and Holding Times

Parameter	Container	Min. Sample Size (mL)	Sample Type	Preservation	Maximum Storage Time	
					Recommended	Regulatory
BOD / CBOD	P, G	1000	G, C	Refrigerate $\leq 6^{\circ}\text{C}$	6h	48h
TSS	P, G	200	G, C	Refrigerate $\leq 6^{\circ}\text{C}$	7 d	7 d
pH	P, G	50	G	Analyze immediately	0.25h	0.25 h
NH <sub>3</sub> -N	P, G	500	G, C	Analyze as soon as possible or add H <sub>2</sub> SO <sub>4</sub> to pH <2, Refrigerate $\leq 6^{\circ}\text{C}$	7 d	28 d
TRC	P, G	500	G	Analyze immediately	0.25h	0.25 h
DO (electrode)	G, BOD Bottle	300	G	Analyze immediately	0.25h	0.25 h
Temperature	P, G	--	G	Analyze immediately	0.25h	0.25 h
Metals, general	P, G	1000	G, C	For dissolved filter immediately and add HNO <sub>3</sub> to pH <2	6 months	6 months
Purgeables by purge and trap	G (PTFE lined lid)	40 (X2)	G	HCl to pH <2, Refrigerate $\leq 6^{\circ}\text{C}$	7 d	14 d
Base/Neutrals and acids	G (solvent rinsed or baked)	1000	C, G	Refrigerate $\leq 6^{\circ}\text{C}$	7 d	7 days until extraction 40 days after extraction
Pesticides	G (PTFE lined lid)	1000	C	Refrigerate $\leq 6^{\circ}\text{C}$	7 d	7 days until extraction 40 days after extraction
Fecal Coliform / E-Coli	G, P (Sterilized)	100	G	Refrigerate $\leq 10^{\circ}\text{C}$ If chlorine present, add sodium thiosulfate tablet	6 hrs transport Start analysis within 2 hrs of receipt in lab.	
Oil and Grease	G	1000	G	HCl or H <sub>2</sub> SO <sub>4</sub> to pH <2, Refrigerate $\leq 6^{\circ}\text{C}$	28 d	28 d

## Approved Standard Methods

CBOD / BOD 5 Day	Std Methods 5210-B
Ammonia, Selective Electrode Method	Std Methods 4500-NH <sub>3</sub> D
Total Residual Chlorine, DPD Colorimetric Method	Std Methods 4500-Cl G
Total Suspended Solids, Dried at 103-105 °C	Std Methods 2540-D
Dissolved Oxygen, Membrane Electrode Method	Std Method 4500-O G
pH, Electrometric Method	Std Methods 4500-H+ B
Fecal Coliform, Membrane Filter Procedure	Std Methods 9222D
Escherichia Coli, Enzyme Substrate Test	Std Method 9223B
Escherichia Coli Membrane Filtration Procedure	EPA Method 1603
Oil and Grease	USEPA 1664A or Std Methods 5520B
Metals, general	USEPA 200, Std Methods 3111B or C, or 3120B
Volatiles (Purgeables by purge and trap)	USEPA 6210, Std Methods 624
Semi-Volatiles (Base/Neutrals and acids)	USEPA 6410, Std Methods 625
Pesticides	USEPA 6410 and 6630, Std Methods 608