Sample Submission, Coliform & E. coli Testing at the State Laboratory

A behind the scenes look
Contact Information

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517-335-8184

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Using the State MDEQ Laboratory for sample testing purposes

- Regulatory and compliance testing
- Health investigations
- Criminal & civil investigations
- Potable water, beach water, surface water, swimming pools & spas
- EPA audited and certified Drinking Water Laboratory
How do I get a sampling kit?

• Call MDEQ Laboratory at 517.335.8184

• [http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4155-10695--,00.html](http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4155-10695--,00.html)

• Complete Requisition For Water Sample Units Form & e-mail to:

• DEQ-RRD-DW-Bottles@michigan.gov or fax to (517) 335-8562
Sampling Kit Contents (Unit 30)

- Return Shipping Materials
- Sample Submission Form
- Sample Test Bottle
- Latest Fee Schedule
COMPLETE FORM!

- **Payment Type:** Account / Check
- **Where do you want the results sent:** Collector, Date & Time Collected required
- **Sample Location**
- **What test do you need?**
Customers are advised to check one of these 2 boxes on the form. Note the default if no box is selected.

- Do NOT analyze my sample(s) if received past the EPA specified hold time. (Hold times are indicated on the sample bottle.) THE DATE AND TIME COLLECTED MUST BE FILLED OUT!
- Analyze my sample(s) even if received beyond the EPA specified hold time.

NOTE: If a selection is not made, your sample(s) will be analyzed. Although samples analyzed beyond hold time typically cannot be used for compliance purposes, the results may still have informational value.

There are clients who want their sample tested even if it is outside established EPA hold times.
Helpful Tips for Submitters

• Put an email address on your completed form. This will speed up turn around for your results.

• Follow sample collection instructions for the unit you are submitting, (found on the back of the form).

• Make sure your form is legible.

➢ We will not analyze a sample that has the “Do Not Analyze” box checked but no date and time filled out until the customer is contacted for information.
All bottles supplied by DEQ to the County Health Departments must be returned to DEQ Laboratories.

The cost of materials/shipping of 1 Unit 30 to a County HD is approximately $3.00.

Advise customers wanting more than 5 bottles to call the DEQ Laboratory to place an order.

All Certified Laboratories have a bottle program in place and should be using their own bottles for testing in their laboratories.

DO NOT ADVISE CLIENTS TO TAKE DEQ BOTTLES TO ANOTHER LABORATORY!
Sample Delivery Issues

• USPS is downsizing and combining distribution hubs statewide.

• Samples that customers send to the lab using the Priority Mail option are no longer reaching the Lab in a timely fashion for short hold time analysis.

• Customers are being advised to use the USPS Express Mail option or UPS/FEDEX overnight delivery

• Cost for using these suggested options are significantly higher than Priority Mail and customers often opt out.
Options for shipping water bottles to DEQ Drinking Water Laboratory:

- **US Post Office**
  - [www.usps.com](http://www.usps.com)
  - (Visit your local post office)

- **UPS**
  - [www.ups.com](http://www.ups.com)
  - 1-800-742-5877

- **FedEx**
  - [www.fedex.com](http://www.fedex.com)
  - 1-800-463-3339

Post office delivery to DEQ Lab is 7:30 am daily
UPS/FedEx delivery to DEQ Lab is 11:00am daily

Please account for holding times when choosing your mailing options

Post Office Express Mail – Next Day Delivery starts at $14.10, visit your local post office for actual rates for next day or two day delivery.

**Unit 30 must be next day delivery**
**Unit 32 must be delivered within 48 hours of collection**
The weights of the most common tests are:

<table>
<thead>
<tr>
<th>Bottle #</th>
<th>Weight/lbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 only</td>
<td>0.5</td>
</tr>
<tr>
<td>31 no cooler</td>
<td>1.1</td>
</tr>
<tr>
<td>32 w cooler</td>
<td>2.5</td>
</tr>
<tr>
<td>31 w cooler</td>
<td>2.8</td>
</tr>
<tr>
<td>HAA/XTM w cooler</td>
<td>4.2</td>
</tr>
<tr>
<td>VO w cooler</td>
<td>2.4</td>
</tr>
<tr>
<td>36CC</td>
<td>2.5</td>
</tr>
<tr>
<td>36ME</td>
<td>0.9</td>
</tr>
<tr>
<td>36PT</td>
<td>3.9</td>
</tr>
<tr>
<td>36HB</td>
<td>1.6</td>
</tr>
<tr>
<td>Unit 37</td>
<td>10.1</td>
</tr>
</tbody>
</table>

*Rates will vary per location/store and actual weight of package.

*Rates will vary if you use a business account with UPS or Fed Ex

*Rates may be cheaper if customer provides their own shipping cartons or uses the containers that DEQ provides
## Estimated costs for Lower Peninsula

<table>
<thead>
<tr>
<th>Pkg Wgt (lbs)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPS Ground (1 day COB)</td>
<td>$8.61</td>
<td>$9.16</td>
<td>$9.30</td>
<td>$9.51</td>
<td>$9.80</td>
<td>$12.52</td>
</tr>
<tr>
<td>UPS 2nd Day Air</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>UPS Next Day Air Saver</td>
<td>$23.76</td>
<td>$25.42</td>
<td>$27.29</td>
<td>$29.39</td>
<td>$29.89</td>
<td>$36.19</td>
</tr>
<tr>
<td>FedEx 2 day</td>
<td>$16.45</td>
<td>$16.67</td>
<td>$16.78</td>
<td>$17.27</td>
<td>$17.82</td>
<td>$22.17</td>
</tr>
</tbody>
</table>

(BY 3 PM)

## Estimated costs for Upper Peninsula

<table>
<thead>
<tr>
<th>Pkg Wgt (lbs)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPS Ground (1 day COB)</td>
<td>$9.14</td>
<td>$9.75</td>
<td>$10.18</td>
<td>$10.47</td>
<td>$10.62</td>
<td>$12.78</td>
</tr>
<tr>
<td>UPS 2nd Day Air</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>UPS Next Day Air Saver</td>
<td>$32.27</td>
<td>$34.14</td>
<td>$36.19</td>
<td>$38.45</td>
<td>$38.62</td>
<td>$51.22</td>
</tr>
<tr>
<td>FedEx 2 day</td>
<td>$16.83</td>
<td>$17.16</td>
<td>$17.71</td>
<td>$18.32</td>
<td>$18.92</td>
<td>$26.07</td>
</tr>
</tbody>
</table>
Typically the Laboratory receives 1 large delivery from USPS by 7:30 am every day (including Saturday). Samples are opened/assigned Laboratory ID Numbers and distributed to the various parts of the laboratory generally by 11:00-11:30 am.

UPS/FEDEX makes daily deliveries by 11:00 am. Typically these samples are opened/assigned Laboratory ID numbers and distributed to various parts of the laboratory by 5:00.

Customer deliveries are accepted from 7:00am through 5:00 pm. Short hold time samples received after 4:30pm are assigned ID numbers and analyzed the next morning.

Pre-approved Couriers make deliveries 24/7. Typically these are the infrequent water testing specimens that come in with Department of Community Health specimens.
Sample and Specimen Receiving

Access for sample/specimen delivery is restricted to authorized personnel and the regulated community with proper identification. Follow signs to the north lobby entrance by gate.
Personal Delivery of Samples to the Laboratory

1) Call ahead to arrange delivery

2) Have picture ID ready at the gate

3) Check in at the guard station and sign in.

4) Make sure paperwork is complete and with the samples

5) Place samples on the cart
Opening the packages
Checking in the Sample
Kit Components Split 3 ways

TESTING
Sample goes to test area

ACCOUNTING
Payment (checks)

Data Coding
Forms go to staff for client demographics
## Three Test Media

<table>
<thead>
<tr>
<th>Colilert -18</th>
<th>Colilert</th>
<th>Colisure</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-22 hrs @ 35° +/- 0.5° C</td>
<td>24-28 hrs @ 35° +/- 0.5° C</td>
<td>24-48 hrs @ 35° +/- 0.5° C</td>
</tr>
<tr>
<td>Coliforms metabolize ONPG to turn substrate yellow</td>
<td>Coliforms metabolize ONPG to turn substrate yellow</td>
<td>Coliforms metabolize CPRG to turn substrate from yellow to magenta</td>
</tr>
<tr>
<td>E. Coli metabolize MUG to create fluorescence</td>
<td>E. Coli metabolize MUG to create fluorescence</td>
<td>E. Coli metabolize MUG to create fluorescence</td>
</tr>
</tbody>
</table>
Why the different media?

Sample interferences:
- Color, matrix

Using these three media also allows the Lab to receive and analyze bacteriological samples 6 days a week with minimal cost in overtime.
SAMPLE PROCESSING

ONCE SAMPLES ARE LOGGED IN AND NUMBERED, THEY ARE TAKEN TO THE BACTERIOLOGY LABORATORY FOR PROCESSING.

HERE THE SAMPLES ARE INOCULATED WITH THE APPROPRIATE MEDIA

THE TIME THAT THE BATCH IS PLACED INTO INCUBATION IS RECORDED ON THE 1ST SAMPLE IN THE BATCH, ON THE LOG SHEET FOR THE BATCH AND ON THE BENCH SHEET FOR THE BATCH.
SAMPLE PROCESSING

SAMPLES ARE PLACED IN INCUBATION FOR A PERIOD OF TIME AS DEFINED BY THE MEDIA USED.

INCUBATION TEMPERATURE IS RECORDED 2X’S DAILY AND MONITORED REMOTELY 24/7.

A BENCH SHEET IS CREATED FOR THE SAMPLES THAT WERE ANALYZED.

A BATCH ID NUMBER IS ASSIGNED BY THE LIMS SYSTEM.

BENCH SHEET IS USED TO RECORD RESULTS AFTER PROPER INCUBATION TIME IS ATTAINED.
“SPECIAL” SAMPLES

• Too Much Chlorine
  • Sample containing 700-1000 ppm of chlorine will flash blue
  • These samples are not appropriate for testing and the client must resubmit sample for analysis

• Insufficient Sample
  • Samples containing less than 100 ml of water will be qualified with a comment on their report
  • Regulatory community will determine the validity of the results

➢ Samples containing ice
  • Samples containing ice in them or that are frozen are not appropriate for testing
  • These samples are invalid and the client must resubmit the sample for analysis
Positive Coliform Test

**COLILERT AND COLILERT-18**
- TC Negative
- TC Positive

**COLISURE**
- TC Negative
- TC Positive
Positive E. coli Fluorescence

COLILERT AND COLILERT-18
NEGATIVE
COLISURE

EC Positive  EC Negative  EC Positive
SAMPLE PROCESSING

• Samples are evaluated by analyst

• Results are recorded on bench sheet

➤ Results are entered into LIMS system
Verification

- Peer review by comparing LIMS entry with bench sheets
- Manager review and final approval
- Client/regulator notified within 24 hours of EC Positive result
- Final Reports printed, mailed, e-mailed twice daily
- Copies e-mailed to LHD Environmental Health Program staff
- Data uploaded into database for DEQ Drinking Water Program Regulators
Quality Control

• **Bottle/Media Lot # QC Check**

  – ALL BOTTLES GO THROUGH RIGOROUS QUALITY CONTROL CHECKS AS DEFINED BY FEDERAL AND STATE REGULATIONS AND REQUIREMENTS

  – ALL LOTS OF MEDIA GO THROUGH RIGOROUS QUALITY CONTROL CHECKS UPON RECEIPT AS DEFINED BY FEDERAL AND STATE REGULATIONS AND REQUIREMENTS

  – ALL MEDIA LOTS THAT REMAIN ON SITE AFTER 90 DAYS ARE RE-EVALUATED USING THE SAME QUALITY CONTROL CHECKS DEFINED ABOVE.

  – ALL DOCUMENTATION OF QUALITY CONTROL/SAMPLE RESULTS ARE KEPT PER DEQ CRITERIA (50 YEARS).

• **Yellow Comparator Standard**