Mercury Hazards

Since the mid 1600s mercury has been used in the measurement of temperature and atmospheric pressures. Unfortunately, these measurements are not without hazard. Broken thermometers and manometers containing mercury pose a much greater hazard than the possibility of being cut by the broken glass. Elemental mercury is the only liquid metal in the periodic table of elements. Its liquid form is incredibly mobile and will roll across horizontal surfaces, easily becoming lodged in minute cracks and crevices it passes along the way. Mercury gives off a colorless, odorless vapor that is highly toxic. The NIOSH recommended exposure limit (REL) is 0.05 mg/m³ of air. (ACGIH also assigns a threshold limit value, TLV, for mercury vapor skin exposure of 0.025 mg/m³.) The nervous system is very sensitive to all forms of mercury, but especially sensitive to mercury vapor because of its ability to easily reach the brain. Short-term exposure to small amounts may cause severe nervous disturbances (such as hand tremors, memory loss, insomnia, irritability and depression), loosening of teeth, excessive salivation and kidney damage. Harmful effects can be passed from mother to fetus.

Spill Clean-up and Costs

Besides the toxic hazards of mercury, the costs for spill clean up and disposal are extremely high. When mercury is spilled inside heat producing devices, such as ovens and incubators, the devices are extremely difficult to decontaminate and the hazard is magnified because heat accelerates vaporization of any released mercury. Mercury released into water baths also results in a large quantity of contaminated water that must be managed as hazardous waste. In the first six months of 2004, the Desert Research Institute spent over $7500 for metallic mercury clean up and disposal. (In addition, another $254.00 was spent to dispose of 10 gallons of low level mercury waste.)

Reducing Mercury Use

Many universities and hospitals have instituted programs to reduce the use of mercury. In 1998, the American Hospital Association made a commitment with the EPA to phase out mercury containing hospital wastes by 2005. Many communities have encouraged residents to turn in mercury fever thermometers in an attempt to keep metallic mercury from entering the domestic sewer. There are several reasonable alternatives to mercury thermometers and manometers. Think before you purchase the next thermometer or manometer for your lab or field project. Does it have to be mercury?

DRI Policy regarding Metallic Mercury Use

Because of the high probability of breakage (verifiable by historical DRI EH&S spill disposal data), unprotected mercury thermometers shall not be used in water baths, ovens, refrigerators, freezers, in the field or in other ways where they could be broken. (See attached guidance on mercury free alternatives.)

Fortunately, alternatives to using mercury are available.

Thermometers: Electronic digital thermometers and thermometers filled with alcohol or mineral spirits now meet the calibrations standards of the National Institute of Standards and Technology (NIST). Some digital thermometers feature high/low alarms, high/low memory, data printouts and chemical resistant cases. If you must purchase a mercury thermometer, buy one with a Teflon coating to help contain the mercury release in case of breakage.

Manometers and Other Pressure Gauges: Pressure transducers can substitute for manometers. Digital manometers measure a large vacuum, are portable, have clear digital readings, and measure positive, negative and differential pressures. Accuracy is 0.5% and most digital manometers can store up to 20 readings in memory.

Switches: There are digital electronic versions of most mercury switches. Labs that are unable to eliminate use of metallic mercury shall purchase mercury spill clean up materials in quantities appropriate to handle a spill of their entire metallic mercury inventory.

Additional Information: To learn more about the Desert Research Institute’s mercury reduction program, call EH&S.
Instructions for Reuniting Separated Fluid Column of Non-Mercury Thermometer*

Heating Method

1. Heat the thermometer’s bulb by placing the thermometer in an upright position away from your face in warm liquid, air, or over a soft flame sufficient to allow the liquid column to rise slowly until the separated portion of the column enters the expansion chamber at the top of the thermometer. (Note: Heat slowly over low heat and watch the separated portion of the column’s movement. Over filling the expansion chamber will break the thermometer.)

2. Tap the thermometer gently on the surface of a large rubber stopper while holding the thermometer in an upright position. This will aid in moving the gas separation in the column above the column.

3. Place the thermometer in an upright position and allow it to slowly cool to room temperature.

Cooling Method

1. Prepare a solution of shaved ice and salt or CO₂ (Dry-Ice) and alcohol. Place the thermometer bulb only in the solution. Keep the thermometer upright.

2. Allow the liquid column to retreat into the bulb. Then swing the thermometer (bulb down) in an arc. This motion releases the entrapped gas thereby permitting it to escape above the fluid column. Be careful not to strike the thermometer against another object.

3. Place the thermometer in an upright position and allow it to slowly warm to room temperature.

*Note: Non-mercury thermometers must be stored upright or the liquid inside will separate.
CLEANUP OF MERCURY SPILLS

Metallic mercury has high chronic toxicity and can cause significant damage to the central nervous system if prolonged exposure occurs. Mercury has a relatively high vapor pressure at room temperature and high airborne levels can accumulate if the spill is not thoroughly cleaned up. Spills involving a mercury volume greater than that contained in one to two laboratory thermometers (a few millimeters) should be cleaned up using dedicated equipment, followed by air monitoring to ensure adequate cleanup. For mercury spills greater than this quantity, or if the spill occurs in an area with an elevated temperature (such as an oven or heating block), contact EH&S immediately.

Cleaning up a broken thermometer (or a mercury spill of similar quantity)

1. Isolate the immediate spill area to avoid traffic and spreading of the mercury.

2. If the mercury spill is in a confined area (poor ventilation), ventilate the area as much as possible by opening windows, using fans, etc.

3. While wearing goggles, lab coat, and chemical resistant gloves, pick up any broken glass and debris using tongs or tweezers.

4. Consolidate the mercury as much as possible using thin cardboard or plastic.

5. Pick up the mercury using a suction device. A filter flask hooked to a vacuum source at the side arm, with Tygon tubing and a Pasteur pipette at the inlet can be used. DO NOT USE AN ORDINARY (HOUSE or SHOP) VACUUM TO PICK UP MERCURY.

6. After the gross contamination is picked up, sprinkle the affected area with mercury adsorbent. The adsorbent forms an amalgam that “ties up” the mercury and reduces vaporization. The resulting amalgam material can be swept up for disposal.

7. Place the recovered mercury and any contaminated clean up materials in a plastic bag, tape the top of the bag shut, place this bag in a second plastic bag for disposal, and tape the top of the second bag shut. Label the outside bag as “Mercury Waste.”

8. Remember to reorder spill supplies after you have used them.

If the amount of mercury spilled is greater than that contained in one to two laboratory thermometers (more than a few milliliters), the spill is located in a confined area that cannot be ventilated, or if proper clean up materials are not available, call EH&S. If a mercury spill involving one of these scenarios occurs during off-hours, secure the affected area, post warning signs, and evacuate the area. Notify EH&S as soon as possible during normal working hours.
## Thermometers

<table>
<thead>
<tr>
<th>Thermometer Type</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bi Metal (cost range $25 - $100)</td>
<td>No spill risk, accuracy $\pm 1%$ of dial range</td>
<td>Must have a traceable thermometer for recalibrating</td>
</tr>
<tr>
<td>Red Liquid (cost range $15 - $75)</td>
<td>If broken, handled the same as broken glassware; accurate (meets or exceeds NIST and ANSI/SAMA tolerances)</td>
<td>Prone to fluid separation (as are mercury thermometers); risk of injury if broken; not available in high temperature ranges ($&gt;300^\circ C$)</td>
</tr>
<tr>
<td>Digital (cost range $24 - $725)</td>
<td>No spill risk; offers the widest temperature range; accurate (i.e., meets NIST standards and most are certified traceable); some models have additional features such as high/low alarms, memory, chemical resistant cases and printout capabilities</td>
<td>Remote probe needed to measure temperature extremes; recalibration may be required after 2 years; some use batteries that need to be managed as universal waste.</td>
</tr>
</tbody>
</table>

## Mercury Manometers

<table>
<thead>
<tr>
<th>Type</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vacuum Gauge (cost range $55 - $110)</td>
<td>Measures a large vacuum</td>
<td>Accuracy is $\pm 1%$ mid-range; but only $2-3%$ on extremes</td>
</tr>
<tr>
<td>Digital (cost range $200 - $275)</td>
<td>Measures a large vacuum; portable; clear readings; measures positive; negative and differential pressures; accuracy is $\pm 0.5%$; nine unit conversions; stores up to 20 readings</td>
<td>Storage and use temperature must be between -4 and 176$^\circ F$; yearly calibration is recommended (but is generally free); requires battery.</td>
</tr>
</tbody>
</table>

---

1 Thermometer replacement alternatives follow this page
## Mercury Thermometer Replacement Alternatives

<table>
<thead>
<tr>
<th>Thermometer Description</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-Mercury VWR Enviro-Safe®</td>
</tr>
<tr>
<td><strong>Total Immersion</strong></td>
<td></td>
</tr>
<tr>
<td>-10°F to 30°C / 1°C</td>
<td>350mm</td>
</tr>
<tr>
<td>-10°F to 100°F / 1.0°C</td>
<td>N/A</td>
</tr>
<tr>
<td>-10°F to 50°C / 1.0°C</td>
<td>305mm</td>
</tr>
<tr>
<td>-10°F to 60°C / 2.0°C</td>
<td>N/A</td>
</tr>
<tr>
<td>-5°F to 50°C / 1.0°C</td>
<td>305mm</td>
</tr>
<tr>
<td>-10°F to 50°C / 0.5 - 1.0°C</td>
<td>N/A</td>
</tr>
<tr>
<td>-35°F to 70°F / 1.0°C</td>
<td>N/A</td>
</tr>
<tr>
<td>-35°F to 110°F / 0.5 - 1.0°C</td>
<td>N/A</td>
</tr>
<tr>
<td>-20°F to 110°F / 1.0°C</td>
<td>N/A</td>
</tr>
<tr>
<td>-15°F to 150°F / 1.0°C</td>
<td>305mm</td>
</tr>
<tr>
<td>-10°F to 150°F / 1.0°C</td>
<td>200mm</td>
</tr>
<tr>
<td>0°F to 250°F / 2.0°F</td>
<td>200mm</td>
</tr>
<tr>
<td>0°F to 300°F / 2.0°F</td>
<td>200mm</td>
</tr>
<tr>
<td>0°F to 350°F / 0.5°C</td>
<td>N/A</td>
</tr>
<tr>
<td>0°F to 400°F / 0.5°C</td>
<td>N/A</td>
</tr>
<tr>
<td>20°F to 450°F / 2.0°F</td>
<td>435mm</td>
</tr>
</tbody>
</table>

| **76 mm Immersion**     |        |                      |                                            |
| -10°F to 100°F / 1.0°C  | N/A    | N/A                  | 405mm                                       |
| -10°F to 50°C / 1.0°C   | 305mm  | 305mm                | 305mm                                       |
| -5°F to 50°C / 1.0°C    | 305mm  | 305mm                | 152mm, 305mm                               |
| -10°F to 70°F / 0.5°C   | N/A    | 305mm                | 305mm                                       |
| -10°F to 100°F / 1.0°C  | N/A    | 305mm                | 305mm                                       |
| -10°F to 120°F / 1.0°C  | N/A    | 305mm                | N/A                                         |
| -20°F to 110°F / 0.5 - 1.0°C | N/A   | 305mm                | N/A                                         |
| -20°F to 150°F / 1.0°C  | 305mm  | 306mm, 305mm         | 305mm, 356mm                               |
| -15°F to 60°F / 1.0°C   | 305mm  | 300mm, 305mm, 325mm  | 305mm                                       |
| -10°F to 70°F / 0.5°C   | 297mm  | N/A                  | N/A                                         |
| -10°F to 110°F / 1.0°C  | N/A    | N/A                  | 225mm                                       |
| -10°F to 200°F / 1.0°C  | N/A    | N/A                  | 356mm                                       |
| -10°F to 210°F / 1.0°C  | N/A    | 305mm                | N/A                                         |
| -10°F to 250°F / 1.0°C  | N/A    | 380mm                | N/A                                         |
| -10°F to 260°F / 1.0°C  | N/A    | 375mm, 380mm         | N/A                                         |
| -1 to 31°F / 0.1°C A    | 405mm  | 405mm                | 381mm                                       |
| -1 to 101°F / 0.1°C A   | N/A    | 405mm                | N/A                                         |
| 0°F to 61°F / 0.1°C A   | 425mm  | N/A                  | N/A                                         |
| 0°F to 230°F / 2.0°F    | 305mm  | 300mm, 305mm         | N/A                                         |
| 0°F to 250°F / 2.0°F    | 305mm  | 300mm, 305mm         | N/A                                         |
| 20°F to 30°F / 2.0°F    | N/A    | 305mm                | N/A                                         |

All thermometers listed meet the accuracy standards from the National Institute of Standards and Technology (NIST) or the National Committee for Clinical Laboratory Standards (NCCLS). Contact the vendor for specifics.
## Mercury Thermometer Replacement Alternatives

<table>
<thead>
<tr>
<th>Thermometer Description</th>
<th>VWR Enviro-Safe®</th>
<th>Non-Mercury Fisherbrand®</th>
<th>Non Mercury Brooklyn Thermometer Company, Inc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>76 mm Immersion Corr'lt.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 to 50°F / 2°C</td>
<td>355mm, 405mm</td>
<td>405mm</td>
<td>N/A</td>
</tr>
<tr>
<td>30 to 40°F / 2°C</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Partial Immersion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range/Immiscion Division</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-100 to 20°C / 150mm - 30°C / 1°C</td>
<td>N/A</td>
<td>380mm - 533mm</td>
<td>N/A</td>
</tr>
<tr>
<td>-20 to 25°C / 150mm - 30°C / 1°C</td>
<td>N/A</td>
<td>280mm - 533mm</td>
<td>N/A</td>
</tr>
<tr>
<td>-20 to 10°C / 25mm - 45°C / 1°C</td>
<td>N/A</td>
<td>255mm - 685mm</td>
<td>N/A</td>
</tr>
<tr>
<td>-10 to 10°C / 50mm / 1°C</td>
<td>200mm</td>
<td>8in</td>
<td>N/A</td>
</tr>
<tr>
<td>-10 to 10°C / 50mm / 1°C</td>
<td>200mm</td>
<td>8in</td>
<td>N/A</td>
</tr>
<tr>
<td>-10 to 25°C / 25mm - 45°C / 1°C</td>
<td>N/A</td>
<td>325mm - 762mm</td>
<td>N/A</td>
</tr>
<tr>
<td>0 to 230°F / 50°C / 2°F</td>
<td>200mm</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>0 to 300°F / 50°C / 2°F</td>
<td>200mm</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Specialty Thermometers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range/Immiscion Division</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 to 100°C / 35mm / 1°C (heat block)</td>
<td>225mm</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>-30 to 0°C / total 0.5°C (freezer)</td>
<td>135mm</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>-5 to 20°C / total 0.5°C (blood bank)</td>
<td>135mm</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>-5 to 15°C / total 0.5°C (refrigerator)</td>
<td>135mm</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>15 to 50°C / total 0.5°C (incubator)</td>
<td>135mm</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>20 to 130°C / total 1°C (oven)</td>
<td>145mm</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>50 to 200°C / total 2°C (oven)</td>
<td>145mm</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>20 to 60°C / total 2°C (refrigerator)</td>
<td>135mm</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>-90 to 30°C / total 1°C (ultra low freezer)</td>
<td>145mm</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

All information was obtained from the following companies, please call to verify all information. Other mercury free thermometers may be available.

VWR: (800) 932-5000
Fisher Scientific: (800) 926-6060
Brooklyn Thermometer Company
Inc.: (800) 241-6316

All thermometers listed meet the accuracy standards from the National Institute of Standards and Technology (NIST) or the National Committee for CLINical Laboratory Standards (NCCLS). Contact the vendor for specifics.

Page 6 of 8
**LabReporter**

**Banish Mercury...Go Digital!**

Inexpensive and traceable to NIST by an ISO 17025 A2LA-accredited cal lab

**TRACEABLE DIGITAL THERMOMETER**
- Resolution: 0.1°C
- Computer output
- Accuracy: ±0.05°C
- -50° to +150°C (-58° to +302°F)

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalog No.</th>
<th>Each</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital Thermometer</td>
<td>15-077-8</td>
<td>$45.66</td>
</tr>
</tbody>
</table>

**TRACEABLE REFRIGERATOR/FREEZER THERMOMETER**
- Probe is sealed in nontoxic solution
- Minimum/maximum temperature memory
- High and low settable alarms

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>Range</th>
<th>Accuracy</th>
<th>Catalog No.</th>
<th>Each</th>
</tr>
</thead>
<tbody>
<tr>
<td>-50° to +70°C (-58° to +158°F)</td>
<td>±0.5°C</td>
<td>06-664-11</td>
<td>$43.40</td>
</tr>
<tr>
<td>-40° to +50°C</td>
<td>±0.5°C</td>
<td>06-664-23</td>
<td>$47.43</td>
</tr>
</tbody>
</table>

**TRACEABLE LONG-STEM THERMOMETER**
- Stainless-steel 11" (28 cm) or 14½" (36.5 cm) probe
- Simple operation, °F/°C switchable range
- Long stem permits taking readings while stirring
- -50° to +150°C (-58° to +302°F) and wide range -50° to +250°C (-58° to +482°F)

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>Description</th>
<th>Accuracy</th>
<th>Catalog No.</th>
<th>Each</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long Stem Thermometer with 11&quot; probe</td>
<td>±1°C</td>
<td>15-077U</td>
<td>$29.65</td>
</tr>
<tr>
<td>Long Stem Thermometer Ultra with 11&quot; probe</td>
<td>±0.2°C</td>
<td>14-616-12</td>
<td>$32.64</td>
</tr>
<tr>
<td>Wide-Range Long-Stem Thermometer with 14½&quot; probe</td>
<td>±1°C</td>
<td>15-077-99</td>
<td>$28.04</td>
</tr>
<tr>
<td>Wide-Range Long-Stem Thermometer Ultra with 14½&quot; probe</td>
<td>±0.5°C</td>
<td>15-077-81</td>
<td>$40.24</td>
</tr>
</tbody>
</table>

**TRACEABLE LOLLIPOP WATERPROOF/SHOCKPROOF THERMOMETER**
- Resolution 0.1°
- Minimum/maximum temperature memory
- -50° to +300°C (-58° to +572°F)

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>Description</th>
<th>Accuracy</th>
<th>Catalog No.</th>
<th>Each</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lollipop Thermometer</td>
<td>±1°C</td>
<td>14-640-44</td>
<td>$21.02</td>
</tr>
<tr>
<td>Lollipop Thermometer</td>
<td>±0.2°C</td>
<td>06-664-27</td>
<td>$40.77</td>
</tr>
</tbody>
</table>

**TRACEABLE BIG-DIGIT MEMORY THERMOMETER**
- View from up to 25° (7.6 ft)
- External probe and internal ambient sensor
- Minimum/maximum temperature memory
- -50° to +300°C (-58° to +572°F)

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalog No.</th>
<th>Each</th>
</tr>
</thead>
<tbody>
<tr>
<td>Big-Digit Thermometer</td>
<td>15-677-22</td>
<td>$40.29</td>
</tr>
</tbody>
</table>

**TRACEABLE FULL-SCALE THERMOMETER**
- Switchable wide range 0°-220°C
- Readings are updated every second
- Flip-open case for standing on lab bench, 10" (30 cm) cable
- -50° to +250°C (-58° to +500°F), Plus and Plus Ultra are -50° to +300°C (-58° to +572°F)

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>Description</th>
<th>Accuracy</th>
<th>Catalog No.</th>
<th>Each</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full-Scale Thermometer</td>
<td>±1.0°C</td>
<td>15-077-23</td>
<td>$44.81</td>
</tr>
<tr>
<td>Full-Scale Thermometer Plus</td>
<td>±0.5°C</td>
<td>06-664-36</td>
<td>$40.05</td>
</tr>
<tr>
<td>Full-Scale Thermometer Plus Ultra</td>
<td>±0.5°C</td>
<td>06-664-34</td>
<td>$51.00</td>
</tr>
</tbody>
</table>

For more information, check 806.
### Traceable Infrared Thermometer Gun
- Laser-beam sighting
- Fast, noncontact readings
- Field of view is 8:1
- -20°C to +420°C (-4°F to +788°F)

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalog No.</th>
<th>Each</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infrared Thermometer Gun</td>
<td>06-664-38</td>
<td>$101.50</td>
</tr>
</tbody>
</table>

### Traceable SENTRY Thermometer °F/°C
- Minimum/maximum temperature memory
- Simple one-button operation
- Waterproof probe
  \( \frac{1}{8} \text{ in. dia. x } 10' \text{ L} \)
- -50°C to +70°C (-58°F to +158°F)

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalog No.</th>
<th>Each</th>
</tr>
</thead>
<tbody>
<tr>
<td>SENTRY Thermometer (°F)</td>
<td>15-677-17A</td>
<td>$45.50</td>
</tr>
<tr>
<td>SENTRY Thermometer (°C)</td>
<td>15-677-17B</td>
<td>$44.96</td>
</tr>
</tbody>
</table>

### Traceable Total Range Thermometer
- Designed for rough handling
- Water-resistant case with O-ring gasket
- Fast-response microprocessor updates the display twice a second
- -260°C to +1,370°C (-458°F to +2,498°F)

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalog No.</th>
<th>Each</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test-Range Thermometer</td>
<td>15-677-14</td>
<td>$109.51</td>
</tr>
</tbody>
</table>

### Traceable Food Thermometer
- Waterproof/shockproof
- Large, readable LCD
- Stainless-steel piercing tip
- -50°C to +280°C (-58°F to +536°F)

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalog No.</th>
<th>Each</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Thermometer</td>
<td>14-664-43</td>
<td>$21.02</td>
</tr>
<tr>
<td>Food Thermometer Ultra</td>
<td>06-664-35</td>
<td>$40.90</td>
</tr>
</tbody>
</table>

### Traceable RTD Platinum Thermometer
- "Fuzzy logic" chip
- Platinum (100ohm), intrusive probe
- Provides 0.1° and 0.01° resolution
- -50°C to +400°C (-58°F to +752°F)

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalog No.</th>
<th>Each</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTD Platinum Thermometer</td>
<td>15-677-55</td>
<td>$233.10</td>
</tr>
</tbody>
</table>

### Traceable Thermometer/Clock/Humidity Monitor
- Displays temperature and humidity
- Time-of-day clock
- Minimum/maximum temperature and humidity memory
- 0° to 50°C (32° to 122°F)

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalog No.</th>
<th>Each</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermometer/Clock/Humidity Monitor</td>
<td>06-662-4</td>
<td>$40.37</td>
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</tbody>
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**Traceable Certificate Supplied**

All products listed are provided with an individually serial-numbered Traceable Certificate from an ISO-17025 calibration laboratory accredited by A2LA (The American Association for Laboratory Accreditation). These certificates indicate traceability to standards provided by NIST (National Institute of Standards and Technology).