

15 - INSPECTION, TESTING AND MAINTENANCE

Title: Inspection, Testing, and Maintenance

Doc. No. 2015-MMTS-15

Approval Signatures and Date

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Initial Release	Annual Review/No Revision Required	Annual Review/Update (see history below)	

NOTE: This document will be reviewed at least annually to ensure its suitability.

Revision History

Rev. No.	Change description	Author
1	Change description Crosswalk Between NDEP CAPP Review Comments (dated 2014-12-09, 2015-01-30 and 2015-02-26) and Mercury Storage and Transfer Program Document Contents March 10, 2015	Burton Packard and Renee Rodriguez

NOTE: Hard copies of this document may not be the current version. Refer to the "IAmTheKey" to verify the current version.

Reference Documents

Document number	Document title
QP.EMS.HG.0006	Mechanical Integrity Procedure (Tier 1)
	Manufacturer's Equipment Information
QP.EMS.HG.0007	Management of Change (Tier 1)
Procedure 2015-MMTS-10	Waste Management
Procedure 2015-MMTS-13	Data Acquisition and Inventory Management
Chapter 10, SOC.OHS.SP.0002	Hot Work Permit
Chapter 12, SOC.OHS.SP.0002	Lockout/Tag Out

15.1 PURPOSE

This procedure addresses inspection, testing and maintenance of the mercury transfer equipment within the MMTS, equipment related to worker and environmental health and safety, the air handling equipment within the MMTS, the power supplies and instrumentation within the MMTS and the equipment specific to the MMTS. This procedure is designed to address CAPP requirements as defined by the HWAD Mechanical Integrity Procedure. The purpose of the Mechanical Integrity Procedure is to ensure that critical process equipment associated with the MMTS is designed, installed, maintained, and operated correctly. That procedure verifies that operations and maintenance activities follow generally accepted sound engineering practices for the purpose of minimizing the risk of unintentional releases of elemental mercury (Hg).

NOTE: Activities related to the data acquisition system are covered in Procedure 2015-MMTS-13, "Data Acquisition and Inventory Management." Site Hot Work Permit and/or Lockout/Tagout procedures may apply to some steps within this procedure.

15.2 SCOPE

This procedure applies to staff and contractors that inspect, test, or maintain the mercury transfer equipment located within the MMTS, equipment related to health and safety, the air handling equipment located within the MMTS, the power supplies and instrumentation located within the MMTS, and the equipment specific to the MMTS.

15.3 INSPECTION AND TESTING

15.3.1 Health and Safety

- Prior to any maintenance operations, the electrician and/or instrument technician shall:
 - Verify that all MMTS processes are in a safe standby mode.
 - Verify that power has been removed from all equipment to be checked for all inspections.
 - Verify that high voltages are not exposed for any calibration checks that require energized circuits.
- Ensure that all workers responsible for maintenance of the electrical and instrumentation systems of the MMTS use the following PPE when performing hands-on work on energized systems: safety glasses with side shields, insulating gloves and cotton work clothes. Additionally, remove all jewelry, including rings, and watches, from hands.

NOTE: PPE requirements apply when engaging voltages >50 V, including 120 VAC circuits.

NOTE: All operations should be conducted with the module under consideration powered down if possible. Live hands-on testing should be minimized.

NOTE: All site-established electrical and instrumentation guidelines are to be followed in conducting test and maintenance of equipment. This procedure does not supersede site requirements.

NOTE: The Facility Manager and SOC supervisor shall be notified if any planned tasks cannot be adequately completed or if any off normal conditions are noticed.

15.3.2 Equipment Needed

- Inspection and Testing Forms—See Tables 15.1-15.4 below.
- Tools
 - As specified in the manufacturer’s testing, inspection and maintenance instructions
 - Conductivity probe to test the conductivity sensor on the MT container transfer fitting.

15.3.3 Inspection and Testing

- Facility Manager identifies the equipment subject to this procedure and identifies the schedule for conducting inspections and tests based on manufacturer’s recommendations, good engineering practices, or more frequently if determined to be necessary by previous experience in operating the equipment.

Staff (or contractors) perform inspections and tests of the CAPP-regulated equipment. Safe work practices, such as the HWAD Lockout/Tagout and Hot Work supporting procedures, apply to equipment identified in this procedure.

Manual shutdown of the Process Control and Data Acquisition System (PCDAS) and the Mercury Monitoring System (MMS) is a rare event other than for maintenance on those systems. If a power outage will extend beyond 60 minutes (the nominal rating for the UPSs is 80 minutes), perform a manual shutdown of PCDAS and MMS by following the instructions in Section 13.3.2.

15.3.4 Items to be Inspected and Tested

The mercury transfer equipment items to be inspected or tested and the recommended frequency of inspection/testing are listed below. Information to be documented is given on the form shown in Section 15.7.

- Peristaltic pump and foot-activated on/off switch—verify that the speed and roller-compression are optimal and that the foot-operated on/off switch is in working order.

NOTE: Upon receipt of a replacement peristaltic pump install a tag on the pump reminding maintenance and operating staff that the pump must be reprogrammed before use. Ensure that all peristaltic pumps in the MMTS have the reminder tag. Ensure and verify that each replacement peristaltic pump installed in the MMTS has been properly reprogrammed so that after a power failure in MMTS, the pump remains turned off when power is re-established. The default programming from the manufacturer is such that the pump will be energized, i.e. resume operating, if it was operating when power was lost.

- Tygon[®] tubing at pump station
- Scales and shutoff control for pump (see note above)
- QD transfer fitting—conductivity sensor
- Flask trays
- Shaker tray
- Fume hood face velocity sensor
- Tubing from pump to MT container
- Emergency pump shut off (“E-stop”) at Supervisor’s station and at Fume Hood 2
- Flooring

Table 15.1. Equipment list for inspection and testing of the mercury transfer equipment

Equipment item	Inspection/test frequency
Peristaltic pump; foot-activated switch control; E-stop switch	Operability/pump settings - Before start of shift and per manufacturers recommended schedule
Tygon [®] tubing at pump station	Cracks, discoloration - Before the start of each shift; replace weekly until operating experience assures that a less frequent replacement is appropriate.
Digital scales	Visual and pump shutoff setting - Before start of shift, quarterly check, and annual calibration
QD transfer fitting/conductivity sensor	Operability - Monthly
Flask trays	Cracks or visible mercury contamination - Weekly
Fume hood face velocity sensor	Alarm activation and screen readout - Before start of shift
Tygon [®] tube connections from the pump to the MT container – integrity of tube clamps	Cracks, discoloration - Before start of shift

inside and outside the fume hood, and at the QD transfer fitting	
Pump "E" stops	Operability - Before start of shift
Flooring	Tears or punctures that may allow mercury to pass through the floor liner - monthly and following any incident where heavy sharp objects are dropped or heavy objects are moved around within the MMTS

The air handling equipment items to be inspected or tested and the frequency of inspection/testing are listed in Table 15.2, Information to be documented is shown on the form in Section 15.7. Specific actions to be taken during inspection and testing are shown in Attachment 4, Section 15.8.

Table 15.2. Equipment list for inspection and testing of the air handling equipment

Equipment item	Inspection/test frequency
Fans	Daily
	Annually
Spare fans	Quarterly
HEGA filters	TBD
Offgas (OG) filters	Monthly until sufficient operating experience is gained to suggest a different interval is appropriate
Heat pump	Daily
	Annually
Fume hood	Annually
Snorkel	Annually
OG and HVAC ducts	Annually
HVAC registers	Annually

The power supplies and instrumentation items to be inspected or tested are listed below, and related information documented on the form shown in Table 15.3. Information to be documented is shown on the form in Section 17.7.

- Power connections
- Cooling fans and cooling fins

- Sensor calibration
- Power supply calibration

Table 15.3. Equipment list for inspection and testing of the power supplies and instrumentation

Equipment item	Inspection/test frequency
Power connections	Monthly - check for frayed wiring and/or bad connections and/or corrosion
Cooling fans and fins	Monthly - check for dust that might reduce cooling efficiency
Sensor calibration	Annually - consistent with vendor-supplied test and maintenance guidelines
Power supply calibration	Annually - consistent with vendor-supplied test and maintenance guidelines

The MMTS-specific equipment items to be inspected or tested are listed below, and related information documented on the form shown in Table 15.4. Information to be documented is shown on the form in Section 17.7.

- Building tie-downs
- Stabilizers
- Tires
- Electrical connections

Access doors and alarms

Table 15.4. Equipment list for inspection and testing of the MMTS-specific equipment

Equipment item	Inspection/test frequency
Building tie-downs	Annually or more frequently if specified by vendor or experience
Stabilizers	Annually or more frequently if specified by vendor or experience
Tires	Annually or more frequently if specified by vendor or experience
Electrical connections	Monthly or more frequently if specified by vendor or experience
Access doors and alarms	Monthly or more frequently if specified by vendor or experience

Table 15.5. Safety systems and mercury monitoring frequencies

Equipment item or task	Inspection/test frequency
Eyewash stations	Monthly or more frequently if specified by vendor or experience (see below for specific inspection details)
Portable snorkels	Monthly or as specified by vendor or experience to assess efficacy of charcoal/sulfur filters
Mercury levels in work areas	Weekly or more frequently if specified by vendor or experience
Mercury levels in dress areas	Weekly or more frequently if specified by vendor or experience
Mercury levels in office/general access areas	Weekly or more frequently if specified by vendor or experience
Mercury levels in break room and rest rooms	Weekly or more frequently if specified by vendor or experience

The emergency eyewash station(s) shall be inspected monthly for condition and adequate operation. Details of testing will be according to the manufacturer’s operation and maintenance manual with; consideration of following basics elements: highly visible signage should be in place, the eyewash should be easily activated, water should flow equally from both nozzles at the same height in a steady stream until turned off, and water should drain adequately.

NOTE: Reference, www.uottawa.ca/services/ehss/docs/eyewash_inspection_2009.pdf

- Mercury detection should consist of a visual inspection and mercury vapor analysis near floors, work surfaces, change lockers, and personnel trailer eating surfaces and restrooms.

15.3.5 Documentation of Inspection and Testing

Staff (or contractors) document the following on the appropriate inspection/testing form(s); refer to Section 15.7:

- Date of the inspection or test,
- Name of the person who performed the inspection or test,
- Serial number or other identifier of the equipment on which the inspection or test was performed,
- Description of the inspection or test performed, and

Results of the inspection or test.

If there is a deficiency, staff (or contractor) will contact personnel at the Trouble Desk to prepare a follow-on Work Order, and/or they will contact their supervisor.

15.4 MAINTENANCE

15.4.1 Maintenance Staff

Staff (or contractors) correct any deficiencies in the equipment that are outside the acceptable limits that are described in the MMTS process safety information before using the equipment again.

NOTE: Deficiencies posing immediate threat to safety, health, or the environment, as identified in this procedure, are corrected immediately. Otherwise, deficiencies are evaluated and prioritized by the Facility Manager and corrected accordingly.

15.4.2 Quality Assurance/Quality Control

- The Facility Manager or designee changes and checks new equipment, instruments, and controls before implementation/installation to ensure suitability with the process. This is to be achieved by following the Process Safety Information, Process Hazard Analysis, Management of Change, and Pre-Startup Safety Review procedures.

NOTE: Replacement peristaltic pumps must be reconfigured from the factory default to ensure that the pump will not start automatically following a power outage. Follow the manufacturer's instructions to accomplish the reconfiguration.

- The Facility Manager or designee ensures that maintenance materials, spare parts, and equipment are suitable for the process for which they will be used.
 - Part replacement will occur as needed or required by operation maintenance procedures. All parts removal/replacement shall be performed in accordance with instructions cited in the manufacturer's operations and maintenance manuals or Best Engineering Practices. If there are competing instructions or recommendations, the most conservative (personnel safety protective) instructions will be followed.
 - Parts will be replaced using exact replacements when possible. When exact replacement parts cannot be obtained, Management of Change will be followed to determine the appropriate replacement parts.
- Quality Control will be performed in accordance with the HWAD-specific maintenance/quality control procedures.
- After verification that the part/component has been installed correctly, the lock out/tag out devices shall be removed and the system energized if required.
- Verify replacement part is functional and operates in accordance with operating manual or best engineering practices.

15.4.3 Scheduled Maintenance

The peristaltic pump and the digital scales shall be maintained according to the manufacturers' recommended procedures as described in their maintenance and operations manuals. The digital scales shall be checked quarterly and calibrated annually and the date of calibration affixed to each scale.

The Tygon[®] tubing that passes through the peristaltic pump head is to be replaced weekly when operations in MMTS begin, until an experience base is established. Thereafter, monthly (after approximately 16-20 hours of pump-on time) or sooner if its transparency is lost. Twenty hours is significantly less than the manufacturer's data suggests; therefore that timeframe may be changed as operating experience is gained.

Maintenance of the MMTS-specific equipment shall be performed on a schedule determined by the Facility Manager in consultation with HWAD maintenance staff based on experience, standards, and vendor/manufacture recommendations.

15.5 METRICS

Daily, weekly, monthly, quarterly and/or annual inspections, tests and maintenance will be tracked and the results documented. Deficiencies found will be trended and that information will be used to evaluate the need for more or less frequent inspections or tests.

15.6 RECORDS

Inspection, testing and maintenance records for each piece of regulated equipment are to be maintained for a period of at least five (5) years after the inspection/test/maintenance activity.

Nonconformance Reports

Management of Change records

Records specific to air handling equipment – MMTS log including Data Acquisition System readings

Records specific to instruments and power supplies – All instrument and power supply calibration results should be kept in a calibration log.

15.7 FORMS

Inspection and Testing Form for Mercury Transfer Equipment

Equipment item	Inspection/ test frequency	Date of inspection/ test	Performed by	Equipment Serial No.	Description of inspection/ test	Results
Peristaltic pump; foot-activated switch control; E-stop switch	Before start of morning shift; manufacturer's schedule				Visual and pump settings; emergency stop; manufacturers recommended maintenance	
Digital scales	Before start of morning shift quarterly; annual				Visual to ensure zero settings and pump shutoff setting; operability check; calibration	
Tubing from the pump to the MT container	Before start of morning shift				Visual for piping/tubing connections and proper installation of transfer fitting in MT container	
Pump "E" stops	Before start of morning shift				Pressing E-stop must turn off pump	
Fume hood face velocity sensor	Before start of morning shift				Moving sash above threshold level must trip audible alarm and register on the digital readout screen	

Flooring	Monthly and following any incident where heavy sharp objects are dropped or heavy objects are moved around within the MMTS				Visual for tears or punctures that may allow mercury to pass through the floor liner	
Flask trays	Weekly				Visual for cracks and Hg contamination	
QD Transfer fitting/conductivity sensor	Monthly				Verify that closed circuit of conductivity sensor turns off pump	
Tygon® tubing	1 month or 20 hrs. of pump-on operation				Visual for cracks, discoloration	

Inspection and Testing Form for Air Handling Equipment

Equipment item	Inspection/ test frequency	Date of inspection/ test	Performed by	Equipment Serial No.	Description of inspection/ test	Results
Fans	Daily				Visual. general noise level	
Heat pump	Daily				Data Acquisition System readings	

OG filters	Monthly replacement until sufficient operating experience is gained to suggest a different interval is appropriate				Records of the roughing filter pressure drop accumulated by the PCDAS should be examined and compared with performance of the air flow at the fume hoods. A 1-in. w.g. pressure increase may indicate that the filter needs replacement.	
Spare fans	Quarterly				Rotate shaft	
Fans	Annual				Overall system check	
Heat pump	Annual				Data Acquisition System readings and overall system check	
Fume hoods	Annual				Overall system check	
Snorkels	Annual				Overall system check	
OG and HVAC ducts	Annual				Overall system check	
HVAC registers	Annual				Clean	
HEGA filters	TBD				Observe changes in vapor readings	

Inspection and Testing Form for Power Supplies and Instrumentation

Equipment item	Inspection/ test frequency	Date of inspection/ test	Performed by	Equipment Serial No.	Description of inspection/ test	Results
Power connections	Monthly				Visual – check for frayed wiring and/or bad connections and/or corrosion	
Cooling fans and fins	Monthly				Visual – check for dust that might reduce cooling efficiency	
Sensor calibration	Annually				As directed in vendor-supplied test and maintenance guidelines	
Power supply calibration	Annually				As directed in vendor-supplied test and maintenance guidelines	
Generator inspections and testing	Weekly, Monthly, Annually and based on hours of operation				As directed in Procedure 24 and in vendor-supplied test and maintenance guidelines	

Inspection and Testing Form for MMTS-Specific Equipment

Equipment item	Inspection/ test frequency	Date of inspection/ test	Performed by	Equipment Serial No.	Description of inspection/ test	Results
Electrical connections	Monthly or more frequently if specified by vendor or experience				As recommended by vendor	
Access doors and alarms	Monthly or more frequently if specified by vendor or experience				As recommended by vendor	
Building tie-downs	Annually or more frequently if specified by vendor or experience				As recommended by vendor	
Stabilizers	Annually or more frequently if specified by vendor or experience				As recommended by vendor	
Tires	Annually or more frequently if specified by vendor or experience				Measure air pressure; perform visual inspection for dry rot	

Nonconformance Report

MMTS	MMTS Receipt Inspection	Report Number
Section 1 <i>To be completed by the Inspector</i>		
<p>16 Contract number and Item Number(s):</p> <p>17 Contract title:</p> <p>18 Contractor:</p> <p>19 Item identification:</p> <p>20 Requirement:</p> <p>21 Description of the non-conformance:</p> <p>22 Proposed remedial action: <input type="checkbox"/> use as is <input type="checkbox"/> rework <input type="checkbox"/> repair <input type="checkbox"/> reject <input type="checkbox"/> alt. use</p> <p>23 List of attachments:</p> <p>24 Proposed non-conformance category: <input type="checkbox"/> MINOR non-conformance <i>(Report to be sent to DLA for information and remedial action implemented)</i> <input type="checkbox"/> MAJOR non-conformance <i>(Remedial action to be implemented only after DLA written acceptance)</i></p>		
Contractor's Responsible Officer		Contractor's Quality Officer
<i>Name</i>	<i>Date</i>	<i>Signature</i>
Contractor's Responsible Officer		Contractor's Quality Officer
<i>Name</i>	<i>Date</i>	<i>Signature</i>
Section 2 <i>To be completed by DLA</i>		
Technical Responsible Officer Decision:		QA Technical Officer Comment:
<i>Name</i>	<i>Date</i>	<i>Signature</i>
Chief Engineer Comment:		
<i>Name</i>	<i>Date</i>	<i>Signature</i>

15.8 ATTACHMENTS

This section has five attachments, as follows:

- Masterflex® I/P® pump drive, EW-77411-00 (Attachment 15.1)

- Conductivity probe, ELC-9-1 (Attachment 15.2)
- Digital scales, Arlyn 5200 Series, Large Floor Scale (Attachment 15.3)
- Digital scales, PDS-1000 Drum Scale (Attachment 15.4)
- Specific actions to be taken during inspection and testing of air handling equipment (Attachment 15.5)

ATTACHMENT 15.1 Masterflex® I/P® pump drive, EW-77411-00.

MASTERFLEX®

I/P®



77411-00 pump drive

Model Nos.
N° de modele
Modelnummer
Número de modelo
Modello n°

77410-10
77411-00

**OPERATING MANUAL:
PUMP DRIVES**

pages 1-10

**MODE D'EMPLOI:
ENTRAÎNEMENTS
DE POMPES**

F1-F10

**BETRIEBSANLEITUNG:
PUMPENANTRIEBE**

D1-D10

**MANUAL DE FUNCIONAMIENTO:
MOTOR DE BOMBAS**

E1-E10

**MANUALE DI ISTRUZIONI:
UNITÀ DI
CONTROLLO POMPA**

T1-T10



Cole-Parmer Instrument Co.
1-800-MASTERFLEX (627-8373) (U.S. and Canada only)
11 (847) 549-7600 (Outside U.S.) • (847) 549-7600 (Local) • www.masterflex.com



Barnant Company
1-800-637-3739 (U.S. and Canada only)
11 (847) 381-7050 (Outside U.S.) • (847) 381-7050 (Local) • www.barnant.com



A-1295-1037
Edition 02

ATTACHMENT 15.2 Conductivity Probe, ELC-9-1

Liquid Level Sensors, Liquid Level Sensor - Advanced Control...

[http://www.actsensors.com/custom_sensors/liquid-level_sensors/...](http://www.actsensors.com/custom_sensors/liquid-level_sensors/)



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Toll Free
1-877-806-8820

Email
info@actcontrol.com

Liquid Level Sensor

Electronic Level Control ACT ELC-9-1 for tank control pump up or down

Application:

Detect conductive liquids with probes set at high and low control points and cycle the output relay between these probes. Pump Up (filling) or Pump Down (emptying independently field selectable).



Features:

- ✓ 100,000 ohms conductivity range
- ✓ Double power connections
- ✓ AC probe signal prevents probe plating
- ✓ SPDT output relay
- ✓ Control functions field selectable

Options:

- ✓ Enclosures
- ✓ Power relays
- ✓ Snap in mounting hardware

A.C.T. will modify controls to provide the best solution for your application.

Specifications:

Board size 4"x3"
Sensitivity range (ohms) 100,000

Ordering Information

Select Qty:	Part Number	Image & Data	Supply voltage	Output relay	Power consumption	Probe voltage	Qty. in Stock
0	ELC-9-1-12DA-S-Q		120 VAC	10 amp SPDT	4.5 watts	6 VAC	1400

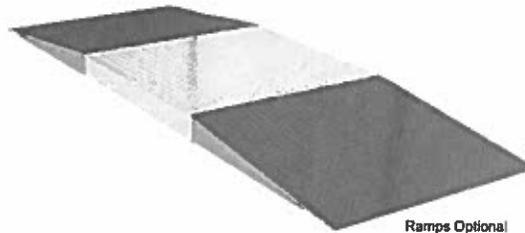
Quantities greater than 10 qualify for quantity discounts.

ARLYN SERIES 5200 LARGE FLOOR SCALES

THE FIRST LARGE PLATFORM SCALE WITH ONE INEXPENSIVE FEATURE- THE PRICE!

Don't be fooled. The new Arlyn Series 5200 all electronic Large Floor Scales boast expensive features. Instead of aluminum or plated steel, there are four heavy duty stainless steel load sensors, for maximum ruggedness. While inexpensive scales use a simple enamel paint, Arlyn applies a 3-part galvanized epoxy coating for maximum protection. Others use a cheap readout. Arlyn provides a water resistant, fully graphical, fully programmable, large LCD display. In fact, the only inexpensive feature you'll find on these scales is the price. But that's perfectly understandable. Because ARLYN electronic scales are shipped to you direct from the factory, and require no dealer services. So instead of paying for a scale and a dealer, you pay only for the scale you need and nothing more.

Weights in lbs., grams, kg., ounces, troy, grains, etc.



EXPENSIVE SCALE FEATURES (Features found on scales costing 3 to 5 times as much as Series 5200)

- HIGH ACCURACY** - High weight resolution to 0.5 lbs.
 - Internal resolution to 1 part in 500,000
- EXTREMELY DURABLE** - Rugged heavy-duty construction
 - Stainless steel "ArlynLOAD" cell system
 - Large diamond plate low profile platform
 - 3-part galvanized epoxy platform coating
 - Adjustable large diameter leveling legs
 - Remote mount water resistant display

- ELIMINATES MAINTENANCE** - No moving parts
- EASY OPERATION** - Pushbutton functions for automatic and keyboard tare, tare functions with memory, net/gross
 - Unit conversion with mode indicators
 - Movable display head for easy viewing
- NO SET UP OR DEALER SERVICES** -
 - Automatic calibration functions

Most other sizes and capacities are available, up to 8' x 10' and up to 30,000 lbs. CALL!

All other models also available in ss (stainless steel construction) →

Model number	5-3305	5-4404	5-4405	5-4405ss	5-5510
Capacity	5000 lb. 2200 kg	2500 lb. 1150 kg	5000 lb. 2200 kg	5000 lb. 2200 kg	10000 lb. 4400 kg
Repeatability	1 lb. .5 kg	5 lb. .2 kg	1 lb. .5 kg	1 lb. .5 kg	2 lb. 1 kg
Internal Res.	1 part in 500,000				
Platform Dimensions	3' x 3'	4' x 4'	4' x 4'	4' x 4'	5' x 5'

ADDITIONAL SPECIFICATIONS

POWER REQUIREMENTS-
AC-117 VAC, 50/60 Hz, (220VAC Optional)
DC-Rechargeable Battery approx. 20 hours use, 4 hour recharge
ACCURACY- 0.1% of full scale
DIMENSIONS- 4' x 4' x 2.8"
350 lb. shipping weight
TARE, ZERO RANGE- 100% of full scale
OPERATING TEMP.- 14°F to 104°F
DISPLAY- 1" high, easy-to-read Graphics LCD Display with status annunciators
DISPLAY SPEED- 0.4 seconds, adjustable

OVERLOAD CONDITION- Display warning message at 102% of scale capacity.
ELECTRONICS-
32-bit microcomputer circuitry, self test feature. All electronics on 1-plug-in board for easy service.
WEIGHING FEATURES- Adjustable filter constants, adjustable display update, automatic calibration
OPTIONS-
USB Computer port
RS-232 Computer port, adjustable rates
Time and Date output
4-20 ma or 0-5vdc analog output
Label, page and ticket printers
Automatic Setpoints - Battery Pack
Post for display
Aluminum platform
Stainless steel platform



ARLYN SCALES www.arlynscales.com
CALL TOLL FREE 1-800-645-4301 - Fax# 516-593-4607
59 2ND St., E. Rockaway, NY 11518 (in NY 516-593-4465)

ATTACHMENT 15.4 Digital scales, PDS-1000 Drum Scale

FWI Drum Scale

http://www.scaleline.com/fwi_drum_scale.htm

PDS-1000 Drum Scale

[\[Home \]](#) [\[Up \]](#)

A and A Scales LLC

Phone 800-481-4114 or 973-800-3965

Open 7 days a week

No sales tax for customers outside New Jersey

We will not be undersold!



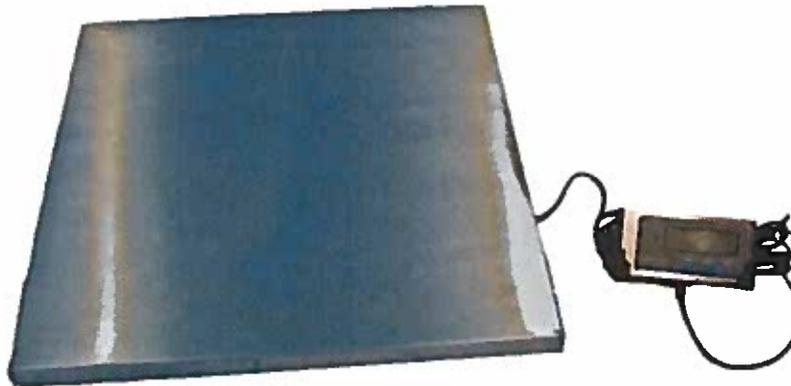
E-MAIL

PDS-1000 Drum Scale

1000 lb x 0.5 lb

Price: \$499

Free shipping



- * 24" x 24" - 1000 lb capacity platform
- * Stainless Steel cover, painted steel substructure
- * Digital Display is battery / Electric powered
- * Low profile scale platform
- * Easy to read LCD display
- * Digital Display comes standard with wall mounting bracket
- * 15 ft cable from platform to display

ATTACHMENT 15.5 Actions to be taken during Inspection and Testing of Air Handling Equipment

Fans (to be checked periodically: daily, quarterly, and yearly)

- (a) **Daily:** On a daily basis, the fans should be checked for nascent problems by Ventilation Area walkthrough. General noise level may be monitored, along with cowling checks for indications of overheating or excessive vibration. Noise or vibration meters may be used, or simple qualitative changes from recent observations may be noted. Emerging problems noted on such walkthroughs should be used in maintenance planning.
- (b) **Quarterly:** On at least a quarterly basis, the shaft of the spare fan should be rotated at least one turn to prevent bearing set. Failure to do this may result in eccentric shaft rotation on future use.
- (c) **Annually:** On an annual basis, and in coordination with other annual maintenance actions, MMTS operations should cease and the fan should be turned off under Lockout/Tagout, to allow for annual checks and maintenance. Immediately after turning the fan off, the hood and snorkels should be closed. Bearings should be checked, repacked or replaced. Belts should be checked and replaced if they show signs of wear, cracking, fraying, or stretching. The sheave-sheave belt connection between motor and impeller should be retightened. Vibration mounts should be checked to ensure they show no play but firmly support the fan load without bottoming out. After deficiencies are remedied, and the remainder of the Exhaust Ventilation system is readied, the system should be monitored on start-up.

Roughing Filters (to be checked as needed)

- (a) **Roughing filters:** Until sufficient operating experience has been gained, the roughing filters should be replaced monthly. Records of the roughing filter pressure drop accumulated by the PCDAS should be examined and compared with performance of the air flow at the fume hoods. An increase in roughing filter pressure drop by 1.0 in. water gauge (w.g.) suggests filter loading. Staff should start planning for an opportune time to change the filters. Until replacement can occur, staff should increase monitoring of flow at hood, and draw on snorkels.
- (b) Replacement should be planned for off-shift, and is begun with fan shutdown and snorkel and hood closure. The MMTS log should be reviewed for notes on the most recent filter changes, which may facilitate the replacement operation. Full PPE, including a full-face respirator with mercury-rated cartridge or a self-contained breathing apparatus will be required. Portable mercury vapor analyzer and Airfiltronix[®] snorkel should be available in the Ventilation Area. Materiel should be prepared and arranged by the HEGA housing doors and the filters should be installed, one at a time, in accord with the recommendations in the manufacturer's operation and maintenance manual. The old, bagged filters should be labeled, and managed as waste for disposal (see Procedure 2015-MMTS-10, Waste Management). On successful filter change, the date of change and any notable observations should be included in the MMTS log to assist future maintenance planning.
- (c) **HEGA filters:** The HEGA filters are sized such that they should last the entire expected ~15-year MMTS life without change. Proper roughing filters changes, as detailed in the

prior section, will ensure the HEGA filter adsorption surfaces do not become clogged with dust. If the pressure drop does increase, this is a peripheral indication of improper roughing filter seat, and a warning that the HEGA filters may no longer be fully serviceable. However, the main indication of need for change is from MMS-16 vapor readings. A climb in mercury vapor readings with time indicates a need to plan for a HEGA filter change.

- (d) HEGA filter change is performed in a similar manner to roughing filter changes. The Vesti Heftilift HYD-10 or equivalent is used to lift and position the ~ 200 lb HEGA filters. Both filters should be changed sequentially in a HEGA changeout. On fan restart, a notably low HEGA pressure drop (i.e., well less than 4.1 in. w.g.) suggests improper seating, the best measure is pre- and post- HEGA measure of Hg vapor levels. If (low) pressure drop or poor Hg vapor reduction are noted, then the HEGA filter should be checked for reseal. Like the roughing filter, a used HEGA filter should be bagged, and labeled as waste (refer to 2015-MMTS-10, Waste Management).

Heat Pump (Checking Period: daily by the Data Acquisition System; yearly by staff and AAON)

- (a) **Daily:** The AAON heat pump has two in-series filters on the clean air intake: 1) A 30% - efficient 2-in. pre-filter, and 2) an 85% - efficient 4-in. MERV-13 main filter. Windy or dusty days may quickly load the filters and loaded filters may cause automatic shutdown of the heat pump (by the P6250 “dirty filter sensor”). To prevent this, the filter pressure drop should be checked, and the Data Acquisition System has a real-time measure so that roof access is not regularly needed. A normal, clean filter reading is 0.09 in. w.g., and at or near 0.44 in. w.g. the heat pump clogged filter trip will engage. Therefore, filter change is recommended by 0.30 in. w.g. to prevent sudden system shutdown and impact on MMTS operations.
- (b) **Annual:** An MMTS maintenance representative should review the MMTS log, locate any materiel, arrange for a vendor representative visit, and attend the maintenance actions. Unlike the exhaust ventilation system, only fresh or HEGA-filtered air enters the HVAC system, so the system should be clean and no special PPE is needed for filter change or maintenance. A vendor representative or HWAD maintenance staff should perform all the checks and replacements specified in the manufacturer’s operation and maintenance manual. Record pressure drop on the data acquisition system, and check for proper system control and operation in both heating and cooling modes. Dispose of heat pump wastes as nonhazardous (refer to 2015-MMTS-10, Waste Management). Any needed materiel should be (re)ordered, including motor, belts, filters, and any high-frequency and long-lead parts that appear reasonable for order from review of maintenance trends.

Miscellaneous Materiel (Checking Period: variable)

- (a) **Fume Hood:** Hood inspection should occur on at least a yearly basis, and it is recommended to be coordinated with annual heat pump and fan inspections. Sash condition and unbound operation should be checked. Counterweight or track dry lube may be required if sash movement is difficult. Sash windows should be inspected for visibility sufficient for operation, and for cracks which may compromise safety. Mercury film or liquid should be cleaned up and removed.

- (b) Snorkels: Weekly checks should be performed on snorkels, for general condition, and snug end attachment to nipple and plug. Changeout for a new segment should be performed if the user-end of the snorkel is dirty, or if cracks are seen. Process as non-hazardous waste.
- (c) Exhaust Ventilation and HVAC ducting: Coupled with the annual review, the ceiling tiles should be removed so that Exhaust Ventilation and HVAC ducting can be visually inspected. The entire run of each system should be inspected, from intake to discharge, and the recirculation leg between the two systems should be checked as well. With a flashlight, the systems should be checked for signs of seam-opening, gasket integrity, duct buckling or sagging, free and unbound butterfly actuation, and hanger or support integrity (to include stack and guide wire condition). Where necessary, a ladder and appropriate PPE should be used for close inspection. Any deficiencies should be judged for immediacy of needed repair, and scheduled accordingly.
- (d) HVAC registers: Annual check should also be performed on registers. HVAC supply register position should be marked, and then the accessible areas should be cleaned. On restart of the HVAC and Exhaust Ventilation systems, the air flow should be checked with an anemometer and, if necessary, the registers should be re-trimmed for comfort and fullest coverage. At this time, infiltration from walls, windows and roof penetrations, as well as personnel/roll-up doors for signs of precipitation or dust infiltration may also be noted and addressed by normal means, such as common weather stripping.