Environmental Safety Management Corporation
AIR QUALITY, MOLD TESTING, ERGONOMICS, OSHA

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September 13, 2019

Charles Yahara, C.E.F.M.
Director of Facility Services
Cape May County Special Services School District
148 Crest Haven Rd
Cape May Court House, NJ 08210

Dear. Mr. Yahara,

This report summarizes the results of the mercury vapor air sampling and air monitoring conducted in the gymnasium and surrounding areas at Ocean Academy. This preliminary assessment was conducted at your request to determine if the gymnasium has a rubberized polyurethane floor that contains mercury used as a catalyst during installation. Dr. Richard M. Lynch, Ph.D., CIH and Mr. Richard A. Lynch, MBA, CIEC conducted this investigation with the assistance of Mr. Charles Yahara.

Executive Summary of Findings

Initial findings revealed that the Gym within the Ocean Academy is not equipped with a mercury-catalyzed rubberized floor. The adjacent padded room does contain a mercury catalyzed padding that is releasing mercury vapor into the air of the padded room as well as the wall cavity separating the padded room from the gym. This was contributing to low levels of mercury detected within the gym and green room at levels below the NJDOH mercury guideline of 0.8 µg/m^3. Based upon these findings, recommendations for addressing the mercury containing rubberized padding were provided including discontinuing use of the padded room, installing an exhaust fan within the padded room, sealing the wall cavity opening to the gym and re-testing. After implementation of the recommendations above, a follow-up inspection conducted on September 12, 2019 revealed that airborne mercury levels within the gym, gym office and storage rooms, surrounding classrooms and hallways were equivalent to outdoor mercury levels. Recommendations for suggested next steps are contained at the end of this report.

I. Evaluation Criteria

Beginning in the 1960's through the early 2000's many manufacturers included phenyl mercuric acetate as a catalyst in its poured rubberized gym floor products. Some of these rubberized floors began to release elemental mercury vapor from the floors.

Elemental mercury is a metal that exists in liquid and vapor form, commonly used in many consumer products and is typically encountered in homes, schools, offices and industrial workplaces. The Federal OSHA and the New Jersey Public Employees Occupational Safety and Health (PEOSH) Act Permissible Exposure Limit (PEL) for airborne mercury exposure to workers (including teachers) is an 8-hour time weighted average of 0.1 milligrams per cubic meter (equivalent to 100 micrograms per cubic meter - µg/m^3) for a 40 -hour work week. The US Environmental Protection has developed an airborne exposure Reference Criteria (RfC) level for mercury vapor of 0.3 µg/m^3 for lifetime (>70 years) exposure that is unlikely to cause measurable risk for adverse, health effects. According to the EPA, this conservative

criterion protects all people, including sensitive individuals, such as pregnant women and children. Based upon this the EPA RfC, Agency for Toxic Substance Research (ATSDR) recommends that schools temporarily evacuate areas with mercury exceeding 10 µg/m^3 until levels have returned to below 3 µg/m^3. The Minnesota Department of Health (MDH) recommends that the general public should not be exposed to short-term (acute or one hour) mercury air concentrations above 1.8 micrograms mercury per cubic meter of air (µg/m^3). For longer exposures, MDH recommends that gym teachers should not be exposed to more than 0.750 µg/m^3 mercury vapor during 40-hour work weeks averaged over the school year and that children exercising in the gym be limited to an average of 0.750 µg/m^3 during 16 hours or less per week averaged over the school year. The New Jersey Department of Health guideline for mercury vapor exposure from rubberized gym floors is 0.8 µg/m^3 which is based upon protecting pre-school-aged children.

II. Methods

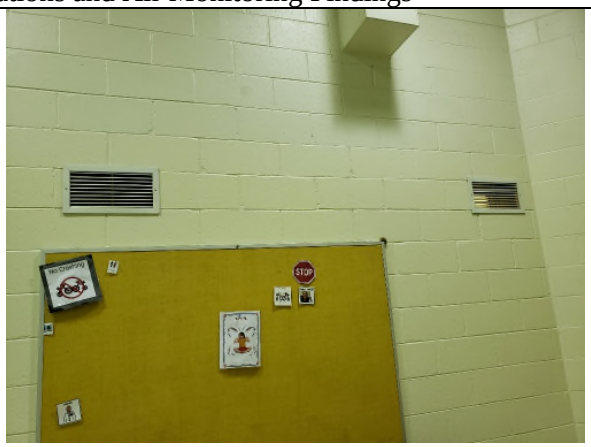
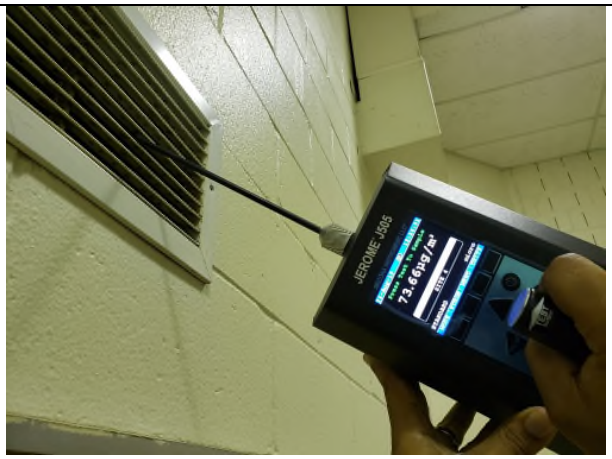
Based upon the above, the following methods were observed during our initial August 22, 2019 inspection:

1. A walkthrough inspection of the gym and the surrounding areas was conducted for signs of mercury catalyzed rubber floors on August 22, 2019
2. Air monitoring for airborne mercury within the gym, gym offices, gym storage rooms, surrounding rooms and areas, and outdoors was conducted using a Jerome J505 Atomic Fluorescence Spectroscopy Mercury Vapor Analyzer (lower limit of detection 0.05 µg/m^3).
3. Temperature and humidity were monitored using at Fluke 971 Temperature/Humidity Monitor.
4. A composite Bulk sample was collected from the padded room adjacent to the gym and hand-delivered to an AIHA Accredited Laboratory for mercury analysis via NIOSH 6009

III. Observations and Findings

- The Gym's overhead HVAC system was operating at the time of the inspection. Air temperature was approximately 70^{o}F. Fresh air dampers were closed based upon low carbon dioxide sensor levels.
- Efforts to collect a bulk sample resulted in chipping of the solid surface revealing concrete beneath.
- The adjacent gym storage areas had concrete floors at the same height as the gym floor.
- Based upon these observations, it is our opinion that the main gym floor was not comprised of a poured rubberized floor.
- Immediately adjacent to the gym there was a padded room as well as a non-padded "green" room. The green room had a passive vent opening shared with the gym, which allows gym air to be shared with the green room.
- The padded room had a similar passive vent opening shared with the gym which had been covered with the rubberized padded walls from within the padded room. Hence the passive vent from the gym terminated in the wall cavity between the gym and padded room.
- The padded room immediately adjacent to the gym contained a rubberized gym floor-like coating on the floors and walls.

Figure #1 - August 22, 2019 Observations and Air Monitoring Findings

	
Gym Center 0.38 µg/m^3	**Passive Vents to Padded Wall Cavity & Green Room**
	
Padded Room 1.25–1.3 µg/m^3	**Gym-Padded Room Wall Cavity 73.66 µg/m^3**

IV. August 22, 2019 Air Monitoring Findings

Bulk Sample Findings

- The Bulk sample composite collected from the padding in the padded room contained 460 mg/Kg of mercury. A copy of laboratory results is attached.

Air Monitoring Findings

- Outdoors
  - Outdoor levels ranged between 0.05 µg/m^3 and 0.07 µg/m^3 approximately equivalent to the lower detection limit for the J505 Mercury Vapor Monitor.

- Gym & Storage Areas
  - Airborne mercury monitoring with the gym measured 0.38µg/m^3 in the gym center and averaged 0.35 µg/m^3 when measuring connected storage rooms and offices. These values are below the New Jersey Department of Health guideline of 0.80µg/m^3
  - Airborne mercury monitoring in the **wall cavity** separating the gym and the padded room ranged **between 50 µg/m^3 and 73 µg/m^3.** This appears to be a source of the low-level mercury levels detected within the gym and green room.
- Padded Room
  - Airborne mercury monitoring measured **in the Padded room** adjacent to the gym averaged **1.25 µg/m^3.**
- Green Room
  - Airborne mercury monitoring conducted in the green room, adjacent to the gym and the padded room, measured 0.43 µg/m^3 due to a passive vent linking the green room and the gymnasium.
- Comparison areas – Areas surrounding the gym including room 101, the nurse's office, related service's office, and the student dining area all revealed no indications of elevated mercury, averaging 0.09 µg/m^3.

A summary of air monitoring findings is displayed in Table #1 below:

Table #1 Ocean Academy Gym & Surrounding Areas
Mercury Air Monitoring August 22, 2019

Table 1	Spot Monitoring Data			
Monitoring Location	HVAC Running	Mercury (µg/m^3)	Temp °F	Relative Humidity %
outside	n/a	0.07	92	59
gym center	yes	0.38	75	57
gym office	yes	0.32	76	53
gym storage #1	yes	0.36	75	59
gym storage #2	yes	0.35	76	57
padded room	yes	1.25	72	61
hall green room	yes	0.43	74	62
student dining room	yes	0.09	71	59
related services	yes	0.14	75	63
101	yes	0.07	74	61
nurse	yes	0.04	73	59

IV. Initial Conclusions and Recommendations Based upon August 22, 2019 Findings

Based upon the above, it is our professional opinion that the Gym within the Ocean Academy is not equipped with a mercury-catalyzed rubberized floor. The adjacent padded room does contain a mercury catalyzed padding that is releasing mercury vapor into the air of the padded room as well as the wall cavity separating the padded room from the gym. This is contributing to low elevations of mercury

within the gym and green room at levels below the NJDOH mercury guideline of 0.8 µg/m^3 .

Based upon these findings, the following recommendations for next steps to address airborne mercury from the padded room were provided:

1. Remove the padded room from use by staff and students.
2. Install and activate an exhaust fan to remove air from the padded room discharging directly above the roof. The minimum flow rate for this exhaust fan should be 100 cubic feet per minute to render the padded that room under negative pressure with respect to the gym, hallway and green room.
3. Seal the passive vent between the padded room and gym to reduce wall cavity vapors from entering the gym.
4. Arrange for ESMCorp to conduct follow-up air monitoring with the gym and surrounding areas after steps 1-3 have been completed.

V. September 12, 2019 Follow-up Inspection and Monitoring Findings

After notification that recommendations 1-3 had been implemented by Ocean Academy Facilities staff, Dr. Lynch of ESMCorp conducted a follow-up inspection and monitoring on September 12, 2019. Methods and evaluation criteria were identical to those previously described above.

The September 12, 2019 inspection was initiated at approximately 3:30 PM; approximately 1-hour following school dismissal and the automatic night setback deactivation of the gym's air handling system. Findings revealed the that the open wall cavity vent between the padded room and the gym had been sealed, and a new exhaust fan had been installed within the padded room, which operates whenever the hallway lights are on.

<u>Gym and Surrounding Classroom/Hallway Areas</u>

- Air monitoring findings revealed that airborne mercury levels within the gym were equivalent to outdoor levels, measured at 0.04 to 0.07 µg/m^3.
- Airborne mercury levels within the green room were approximately equivalent to gym and outdoor levels at 0.08 µg/m^3. Airborne mercury levels in the surrounding areas including room 101, the gym office, gym storage rooms, and the hallway outside of the gym were also equivalent to outdoor levels, ranging between 0.01 to 0.05 µg/m^3.
- Based upon the above, no airborne mercury hazard is suggested within the gym or surrounding classroom or hallway areas.

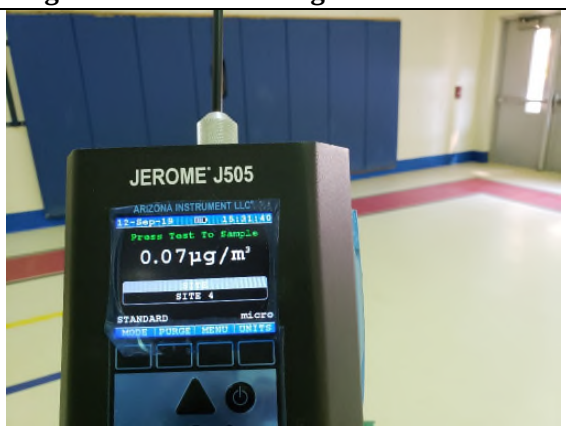
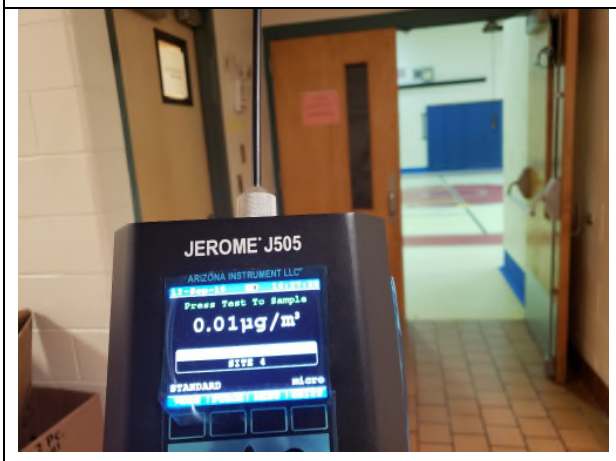
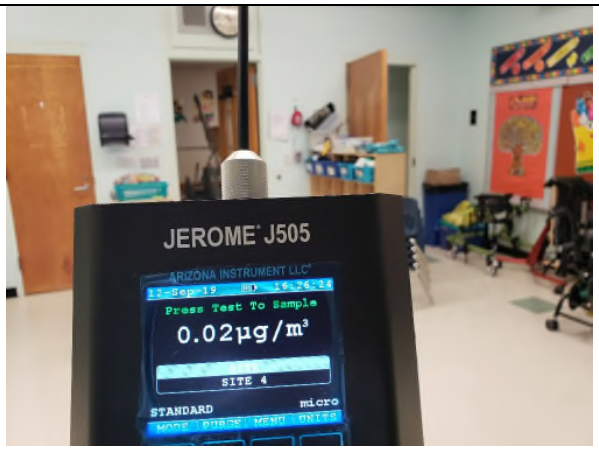
<u>Padded Room</u>

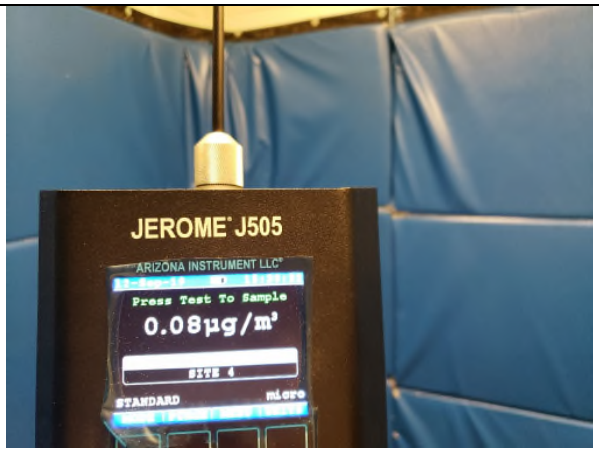
- Within the Padded Room, the newly installed exhaust fan was measured to be exhausting approximately 80 cubic feet per minute of air from the room, directly above the rooftop. This exhaust flow rendered the padded room under negative pressure with respect to the gym, hallway, and green room as anticipated. Smoke current tests confirmed that the net flow of air from the hallway to the padded room prevents escape of padded room air into the surrounding hallways and gym areas both with the gym's air handler off and while operating.

- Airborne mercury levels within the padded room, with the passive vent to the gym sealed were significantly higher than previously measured at 4.3 µg/m^3.

See Figure #2 below for photographs observations and air monitoring findings from the September 12, 2019 inspection:

Figure #2 – September 12, 2019 Findings and Air Monitoring Results

<table>
<tr><td> 
</td><td> 
</td></tr>
<tr><td>Outdoors 0.07-0.11 µg/m^3</td><td>Gym Center 0.04 - 0.07 µg/m^3</td></tr>
<tr><td> 
</td><td> 
</td></tr>
<tr><td>Hallway Outside Gym 0.01 µg/m^3</td><td>101 Classroom 0.01 µg/m^3</td></tr>
</table>

	
Sealed Padded Room 4.3 µg/m^3	**Green Room with New Padding 0.08 µg/m^3**

VI. Conclusions and Recommendations

Findings revealed that the Gym within the Ocean Academy is not equipped with a mercury-catalyzed rubberized floor. The adjacent padded room does contain a mercury catalyzed padding that is releasing mercury vapor into the air of the padded room as well as the wall cavity separating the padded room from the gym. This was contributing to low levels of mercury detected within the gym and green room at levels below the NJDOH mercury guideline of 0.8 µg/m^3. After sealing of the wall cavity between the gym and the padded room and installation of a dedicated exhaust fan within the padded room, airborne mercury levels within the gym and surrounding areas are within normal ranges.

Based upon the findings of this investigation, it is my professional opinion that the Ocean Academy gym and surrounding classrooms are safe for normal use by students, staff and visitors. The padded room should be kept out of service until all padding and flooring are professionally removed and air monitoring has demonstrated a return to normal conditions.

Based upon the findings of this investigation, the following recommendation should be considered:

1. Continue to operate the exhaust fan within the padded room to render the padded room under negative pressure with respect to all surrounding areas.
2. Plan to remove all rubberized padding from the padded room. Because of the high mercury content of the padding, this removal should be conducted by experienced professionals, under negative pressure isolation with Certified Industrial Hygiene oversight. Waste padding and backing must be disposed as hazardous waste. Dr. Richard Lynch of ESMCorp can assist with development of a specification for this removal and arrange for experienced vendors to provide pricing.
3. Inform stakeholders of the findings of this investigation in accordance with your district's public communication policies. Dr. Lynch is available to assist with this.
4. Provide a copy of this report to an experienced Occupational/Environmental Health physician to

5. assist with any health-related questions. We can provide you with contact information of a qualified physician to assist you with this.

ESMCorp is prepared to assist you with all of the above. Please contact us to coordinate next steps.

Thank you for the opportunity to assist you with the evaluation. Please contact me with any questions at (856)764-3557.

Sincerely,

Richard M. Lynch
Richard M. Lynch, Ph.D., CIH, FAIHA, CMC, CMRS, CHFM
Certified Industrial Hygienist
Certified Microbial Consultant
Certified Microbial Remediation Supervisor
Certified Healthcare Facility Manager
President
Environmental Safety Management Corporation

EMSL Analytical, Inc.
200 Route 130 North, Cinnaminson, NJ 08077
Phone: (856) 303-2500 Fax: (856) 858-4571 Email: EnvChemistry2@emsl.com

Attn: **Dr. Richard Lynch** 8/30/2019
Environmental Safety Management Corp.
21 E. Scott Street
Riverside, NJ 08075-3601
Phone: (856) 764-3557
Fax: (856) 764-3558

The following analytical report covers the analysis performed on samples submitted to EMSL Analytical, Inc. on 8/23/2019. The results are tabulated on the attached data pages for the following client designated project:

Ocean Academy 8/22/19

The reference number for these samples is EMSL Order #011910678. Please use this reference when calling about these samples. If you have any questions, please do not hesitate to contact me at (856) 303-2500.

Approved By:

Phillip Worby, Environmental Chemistry
Laboratory Director

The test results contained within this report meet the requirements of NELAP and/or the specific certification program that is applicable, unless otherwise noted.
NELAP Certifications: NJ 03036, NY 10872, PA 68-00367, CA ELAP 1877

EMSL Analytical, Inc.
200 Route 130 North, Cinnaminson, NJ 08077
Phone/Fax: (856) 303-2500 / (856) 858-4571
http://www.EMSL.com EnvChemistry2@emsl.com

EMSL Order: 011910678
CustomerID: ESMC62
CustomerPO:
ProjectID:

Attn: **Dr. Richard Lynch**
Environmental Safety Management Corp.
21 E. Scott Street
Riverside, NJ 08075-3601

Phone: (856) 764-3557
Fax: (856) 764-3558
Received: 08/23/19 3:10 PM

Project: **Ocean Academy 8/22/19**

Analytical Results

Client Sample Description Ocean Academy Padded ***Collected:*** 8/22/2019 ***Lab ID:*** *011910678-0001*

Method	*Parameter*	*Result*	*RL*	*Units*	*Prep Date & Analyst*	*Analysis Date & Analyst*
METALS						
7471B	Mercury	460		24 mg/Kg	8/28/2019 SW	08/28/19 0:00 SW

Definitions:

MDL - method detection limit
J - Result was below the reporting limit, but at or above the MDL
ND - indicates that the analyte was not detected at the reporting limit
RL - Reporting Limit (Analytical)
D - Dilution

Guidance for New Jersey Schools: Evaluating Mercury in Synthetic Flooring

The New Jersey Department of Health is providing this fact sheet to New Jersey school districts concerned about mercury exposure from synthetic flooring.

What types of floors contain mercury?

The types of floors that may contain mercury are solid, rubber-like synthetic flooring manufactured from about 1960 until the 1990s. Not all synthetic flooring contains mercury. Flooring made using a catalyst known as "phenyl mercuric acetate" may release mercury vapors into the air under certain conditions. Not all flooring that contains mercury emit mercury vapors into the air.

What should you do if your school has a synthetic floor?

- Check to see if you can determine if the flooring contains mercury by contacting the manufacturer/installer or reviewing the Safety Data Sheet (SDS).
- If you are able to determine that the flooring contains mercury or you suspect it contains mercury, work with a qualified environmental consultant to evaluate the flooring and determine next steps.
- If indoor air sampling is recommended, it should be done under normal school operating conditions.

What levels of mercury are considered safe for school children and staff?

The New Jersey Department of Health (NJDOH) has adopted Standards for Indoor Environment Certification and for Licensure of Indoor Environmental Consultants (N.J.A.C. 8:50). These regulations provide a risk assessment model that can be used to evaluate indoor air contaminants for school children and staff. Your indoor environmental consultant can use this risk model to determine a Maximum Contaminant Level (MCL) for mercury in your school. Alternatively, your consultant may evaluate the indoor air data to ensure that mercury levels are below 0.8µg/m^3 which is based on the exposure scenario in the risk model that is protective of preschool-aged children.

N.J.A.C. 8:50 is available on the NJDOH website at:
http://www.nj.gov/health/ceohs/documents/eohap/njac_850_adoption.pdf

AMETEK ARIZONA INSTRUMENT
800.528.7411 | (f) 602.281.1745 | www.azic.com
Exclusive Manufacturer of Computrac® Moisture Analyzers and Jerome® Mercury & Hydrogen Sulfide Analyzers

Certification of Instrument Calibration

AMETEK Arizona Instrument - New Unit
3375 N. Delaware Street
Chandler, AZ 85225

RMA # 2632201

This is to certify that the Jerome **J505-0005** Atomic Fluorescence Mercury Analyzer, Serial Number **50500325**, was calibrated with standard units traceable to NIST.

Calibration Status as Received: **New**

	Actual	Calibration Gas	Allowable Range
Incoming:	µg/m3 Hg	µg/m3 Hg	- µg/m3 Hg
	% RSD		<5%
Outgoing:	25.16 µg/m3 Hg	25.00 µg/m3 Hg	23.75 - 26.25 µg/m3 Hg
	0.04 % RSD		<3%
Calibration Verification:	µg/m3 Hg	0.300 µg/m3 Hg	0.255 - 0.345 µg/m3 Hg
	% RSD		<15%

Calibration Status as Left: **New**

Estimated Uncertainty of Calibration System: 3.5%

Calibration Date: 13-Dec-2018 Recalibration Date: 12-Dec-2019

Temperature °F: 71.30 % Relative Humidity: 31.20

Approved By:_____ Date Approved: 13-Dec-2018
Title: Johnny Padilla - Quality Control

Equipment Used:

Permeation Tube: 498-51337 **NIST#:** ISO13265; 072958
Calibration Date: 29-May-2018 **Calibration Date Due:** 29-May-2019

DynaCalibrator: M-812 **NIST#:** 18-2889
Calibration Date: 19-Sep-2018 **Calibration Date Due:** 20-Sep-2019

Digital Multimeter: 74620505 **NIST#:** 7002611
Calibration Date: 07-Apr-2018 **Calibration Date Due:** 07-Apr-2019

Mass Flow Controller: 54809 **NIST#:**210458
Calibration Date:23-Oct-18 **Calibration Date Due:** 23-Oct-19

Calibration Procedure Used: 730-0165

AMETEK Arizona Instrument certifies that the above listed instrument meets or exceeds all published specifications and has been calibrated using standards whose accuracy is traceable to the NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY within the limitations of the Institute's calibration services, or have been derived from accepted values of natural physical constants, or have been derived by the ratio type of self-calibration techniques.
Disclaimer: Any unauthorized adjustments, removal or breaking of QC seals, or other customer modifications on your Jerome Analyzer WILL VOID this factory calibration, because any of the above acts could affect the calibration and readings of the instrument. Further, AMETEK Arizona Instrument WILL NOT be responsible for any liabilities created as a result of using the instrument after such adjustments, seal removal, or modifications.