

# AIR & EMISSIONS

Matrices consisting of organic, inorganic, and particulate matter for testing emissions and ambient air. Standards are designed to meet regulations of the United States Environmental Protection Clean Air Act and may be used to satisfy PT requirements worldwide.

## Air & Emissions PT Schedule 2022

### Air & Emissions

	Scheme #	Opens	Closes
Q	AE 59	Jan 31	Mar 17
Q	AE 60	Apr 25	Jun 9
Q	AE 61	Jul 29	Sep 12
Q	AE 62	Oct 28	Dec 12

## 2023

### Air & Emissions

	Scheme #	Opens	Closes
Q	AE 63	Jan 30	Mar 16
Q	AE 64	Apr 28	Jun 12
Q	AE 65	Jul 28	Sep 11
Q	AE 66	Oct 27	Dec 11

Schedule subject to change – see Waters ERA's website at [eraqc.com](http://eraqc.com)

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**CRM:** A reference material characterized by a metrologically valid procedure for one or more specified properties, accompanied by a reference material certificate that provides the value of the specified property, its associated uncertainty, and a statement of metrological traceability.

A complete listing of ERA's CRMs can be found on our Scope of Accreditation for general requirements for competence of reference material producers available at [www.eraqc.com/AboutERA/Accreditations](http://www.eraqc.com/AboutERA/Accreditations).

**PT:** A Proficiency Test (PT) is an analysis of what is often referred to as a blind sample or a sample with unknown concentrations of analytes for the purpose of evaluating a laboratory's analytical performance.

**QR:** Similar to a Proficiency Test, a QuiK Response (QR) is a sample with unknown concentrations. However, unlike a scheduled PT, QR is on-demand and available at any time. Plus, your results are returned within two business days. QuiK Response can be used as a bilateral PT as referenced in the IUPAC/CITAC guide: Selection and use of PT schemes for a limited number of participants – chemical analytical labs.

**RM:** A material, sufficiently homogeneous and stable with respect to one or more specified properties, which has been established to be fit for its intended use in a measurement process.

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**Q** All Waters ERA Air & Emissions PTs open quarterly. Quarterly months are January, April, July, and October.

## Volatiles

## Volatiles in Gas Cylinder\*

RM** Cat. #1100	PT Cat. #1000	Q	QR Cat. #1100QR
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One pressurized gas cylinder containing 87 L of gas at 1500 psig (103 bar) for use with EPA methods TO-14, TO-15, or other applicable methods. Contains at least 10 analytes, randomly selected from the list below, at 2-50 ppbv (4-100 ppbv) for Total Xylenes.

Acetone	1,1-Dichloroethane	Styrene
Benzene	1,2-Dichloroethane	1,1,2,2-Tetrachloroethane
Benzyl chloride	1,1-Dichloroethylene	Tetrachloroethylene
Bromodichloromethane	cis-1,2-Dichloroethylene	Toluene
Bromoform	trans-1,2-Dichloroethylene	Trichloroethene
Bromomethane	1,2-Dichloropropane	1,2,4-Trichlorobenzene
1,3-Butadiene	cis-1,3-Dichloropropylene	1,1,1-Trichloroethane
2-Butanone (MEK)	trans-1,3-Dichloropropylene	1,1,2-Trichloroethane
Methyl tert-butyl ether (MTBE)	1,2-Dichlorotetrafluoroethane	Trichlorofluoromethane
Carbon disulfide	(Freon 114)	(Freon 11)
Carbon tetrachloride	Ethyl acetate	Trichlorotrifluoromethane
Chlorobenzene	Ethylbenzene	(Freon 113)
Chlorodibromomethane	p-Ethyltoluene	1,2,4-Trimethylbenzene
Chloroethane	n-Heptane	1,3,5-Trimethylbenzene
Chloroform	Hexachlorobutadiene	Vinyl bromide
Chloromethane	n-Hexane	Vinyl chloride
Cyclohexane	2-Hexanone	Xylenes, total
1,2-Dibromoethane (EDB)	Isopropyl alcohol	m&p-Xylene
1,2-Dichlorobenzene	Methylene chloride	o-Xylene
1,3-Dichlorobenzene	Methyl methacrylate	
1,4-Dichlorobenzene	4-Methyl-2-pentanone (MIBK)	
Dichlorodifluoromethane	Methyl tert-butyl ether (MTBE)	
(Freon 12)	Propylene	

\*Volatiles in Gas Cylinder ships as dangerous goods.

\*\* Reference Material (RM)

## Volatiles on Sorbent

CRM Cat. #1101	PT Cat. #1001	Q	QR Cat. #1101QR
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One 2 mL flame-sealed ampule for spiking client-specific sorbent. Use with EPA Methods TO-17, 0030, 0031, or other applicable methods. Contains at least 24 analytes, randomly selected from the list below, at 50–2000 ng/sample (200–3000 ng/sample for Total Xylenes) after preparation.

Acetone	1,1-Dichloropropene	Methylene chloride
Acetonitrile	1,2-Dibromo-3-chloropropane	4-Methyl-2-pentanone (MIBK)
Acrolein	(DBCP)	Naphthalene
Acrylonitrile	1,2-Dibromoethane (EDB)	Nitrobenzene
Benzene	Dibromomethane	n-Propylbenzene
Bromobenzene	1,2-Dichlorobenzene	Styrene
Bromochloromethane	1,3-Dichlorobenzene	1,1,2-Tetrachloroethane
Bromodichloromethane	1,4-Dichlorobenzene	1,1,2,2-Tetrachloroethane
Bromoform	Dichlorodifluoromethane	Tetrachloroethene
Bromomethane	(Freon 12)	Toluene
2-Butanone (MEK)	1,1-Dichloroethane	1,2,3-Trichlorobenzene
n-Butylbenzene	1,2-Dichloroethane	1,2,4-Trichlorobenzene
sec-Butylbenzene	1,1-Dichloroethene	1,1,1-Trichloroethane
tert-Butylbenzene	cis-1,2-Dichloroethene	1,1,2-Trichloroethane
Carbon disulfide	trans-1,2-Dichloroethene	Trichloroethylene
Carbon tetrachloride	1,2-Dichloropropane	Trichlorofluoromethane
Chlorobenzene	cis-1,3-Dichloropropene	1,2,3-Trichloropropane
Chlorodibromomethane	trans-1,3-Dichloropropene	1,2,4-Trimethylbenzene
Chloroethane	Ethylbenzene	1,3,5-Trimethylbenzene
2-Chloroethyl vinyl ether	Hexachlorobutadiene	Vinyl acetate
Chloroform	Hexachloroethane	Vinyl chloride
Chloromethane	2-Hexanone	Xylenes, total
2-Chlorotoluene	Isopropylbenzene	m&p-Xylene
4-Chlorotoluene	4-Isopropyltoluene	o-Xylene
1,3-Dichloropropane	Methyl tert-butyl ether	
2,2-Dichloropropane	(MTBE)	

## Semivolatiles on Polyurethane Foam

CRM Cat. #1110	PT Cat. #1010	Q	QR Cat. #1110QR
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Two 2 mL flame-sealed ampules plus one polyurethane foam. Use with EPA Method 0010, or other applicable methods. Contains at least 42 analytes, randomly selected from the list below, at 10–225 µg/sample (200–1000 µg/sample for Benzidine) after preparation.

Acenaphthene	1,3-Dichlorobenzene	N-Nitroso-di-n-propylamine
Acenaphthylene	1,4-Dichlorobenzene	2,2'-Oxybis(1-chloropropane)
Aniline	3,3'-Dichlorobenzidine	Pentachlorobenzene
Anthracene	Diethyl phthalate	Phenanthrene
Benzidine	Dimethyl phthalate	Pyrene
Benzo(a)anthracene	2,4-Dinitrotoluene	Pyridine
Benzo(b)fluoranthene	2,6-Dinitrotoluene	o-Toluidine
Benzo(k)fluoranthene	Di-n-octyl phthalate	1,2,4,5-Tetrachlorobenzene
Benzo(g,h,i)perylene	Fluoranthene	1,2,4-Trichlorobenzene
Benzo(a)pyrene	Fluorene	Benzoic Acid
Benzyl alcohol	Hexachlorobenzene	4-Chloro-3-methylphenol
4-Bromophenyl phenyl ether	Hexachlorobutadiene	2-Chlorophenol
Butyl benzyl phthalate	Hexachlorocyclopentadiene	2,4-Dichlorophenol
Carbazole	Hexachloroethane	2,6-Dichlorophenol
4-Chloroaniline	Indeno(1,2,3-cd)pyrene	2,4-Dimethylphenol
Bis(2-chloroethoxy)methane	Isophorone	2,4-Dinitrophenol
Bis(2-chloroethyl)ether	2-Methylnaphthalene	2-Methyl-4,6-dinitrophenol
Bis(2-ethylhexyl)phthalate	Naphthalene	2-Methylphenol (o-Cresol)
1-Chloronaphthalene	2-Nitroaniline	4-Methylphenol (p-Cresol)
2-Chloronaphthalene	3-Nitroaniline	2-Nitrophenol
4-Chlorophenyl phenyl ether	4-Nitroaniline	4-Nitrophenol
Chrysene	Nitrobenzene	Pentachlorophenol
Dibenz(a,h)anthracene	N-Nitrosodiethylamine	Phenol
Dibenzofuran	N-Nitrosodimethylamine	2,3,4,6-Tetrachlorophenol
Di-n-butyl phthalate	(NDMA)	2,4,5-Trichlorophenol
1,2-Dichlorobenzene	N-Nitrosodiphenylamine	2,4,6-Trichlorophenol

## Organochlorine Pesticides on Polyurethane Foam

CRM Cat. #1111	PT Cat. #1011	Q	QR Cat. #1111QR
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One 2 mL flame-sealed ampule plus one polyurethane foam. Use with EPA Methods TO-04A, TO-10A, or other applicable methods. Contains at least 16 analytes, randomly selected from the list below, at 1–20 µg/sample after preparation.

Aldrin	4,4'-DDD	Endrin
alpha-BHC	4,4'-DDE	Endrin aldehyde
beta-BHC	4,4'-DDT	Endrin ketone
delta-BHC	Dieldrin	Heptachlor
gamma-BHC (Lindane)	Endosulfan I	Heptachlor epoxide (beta)
alpha-Chlordane	Endosulfan II	Methoxychlor
gamma-Chlordane	Endosulfan sulfate	

**Brian Stringer**  
Principal Proficiency Testing  
Technical Specialist



## PCBs on Polyurethane Foam

CRM Cat. #1112	PT Cat. #1012	Q	QR Cat. #1112QR
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One 2 mL flame-sealed ampule plus one polyurethane foam. Use with EPA Methods TO-04A, TO-10A, or other applicable methods. Contains one aroclor, randomly selected from the list below, at 2–10 µg/sample after preparation.

Aroclor 1016	Aroclor 1242	Aroclor 1260
Aroclor 1221	Aroclor 1248	
Aroclor 1232	Aroclor 1254	

## PAHs on Polyurethane Foam

CRM Cat. #1113	PT Cat. #1013	Q	QR Cat. #1113QR
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One 2 mL flame-sealed ampule plus one polyurethane foam. Use with EPA Method TO-13A, or other applicable methods. Contains at least 13 analytes, randomly selected from the list below, at 10–200 µg/sample after preparation.

Acenaphthene	Benzo(g,h,i)perylene	Indeno(1,2,3-cd)pyrene
Acenaphthylene	Benzo(a)pyrene	1-Methylnaphthalene
Anthracene	Chrysene	2-Methylnaphthalene
Benzo(a)anthracene	Dibenz(a,h)anthracene	Naphthalene
Benzo(b)fluoranthene	Fluoranthene	Phenanthrene
Benzo(k)fluoranthene	Fluorene	Pyrene

## Aldehydes &amp; Ketones on Sorbent

CRM Cat. #1114	PT Cat. #1014	Q	QR Cat. #1114QR
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One 2 mL flame-sealed ampule to be spiked onto sorbent. Use with EPA Method TO-11A, or other applicable methods. Contains at least four analytes, randomly selected from the list below, at 0.5–10 µg/sample after preparation.

Acetaldehyde	Crotonaldehyde	Propionaldehyde (Propanal)
Acetone	2,5-Dimethylbenzaldehyde	o-Tolualdehyde
Benzaldehyde	Formaldehyde	m-Tolualdehyde
2-Butanone (MEK)	Hexaldehyde (Hexanal)	p-Tolualdehyde
Butyraldehyde (Butanal)	Isovaleraldehyde	Valeraldehyde (Pentanal)

CRM – Certified Reference Material  
PT – Proficiency Testing  
QR – QuiK Response  
RM – Reference Material

Q All Waters ERA Air & Emissions PTs open quarterly. Quarterly months are January, April, July, and October.



**Debby Updyke**  
Senior Proficiency Testing  
Technical Specialist

# Metals

## Metals on Filter Paper

CRM Cat. #1125	PT Cat. #1025	<b>Q</b>	QR Cat. #1125QR
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One filter paper sample packaged in a 50 mm polystyrene petri dish containing a single 47 mm tissue quartz filter ready for use with EPA Method 29 or other applicable methods.

Antimony.....	25-250 µg/filter
Arsenic.....	20-250 µg/filter
Barium.....	20-250 µg/filter
Beryllium.....	10-250 µg/filter
Cadmium.....	10-250 µg/filter
Chromium.....	15-250 µg/filter
Cobalt.....	10-250 µg/filter
Copper.....	10-250 µg/filter
Lead.....	20-350 µg/filter
Manganese.....	10-250 µg/filter
Nickel.....	20-250 µg/filter
Phosphorus.....	10-250 µg/filter
Selenium.....	20-250 µg/filter
Silver.....	30-250 µg/filter
Thallium.....	30-250 µg/filter
Zinc.....	20-250 µg/filter

## Metals in Impinger Solution

CRM Cat. #1126	PT Cat. #1026	<b>Q</b>	QR Cat. #1126QR
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One impinger solution sample packaged in a 15 mL screw-top vial containing approximately 14 mL of standard concentrate for use with EPA Method 29, or other applicable methods.

Antimony.....	0.25-20 µg/mL
Arsenic.....	0.2-20 µg/mL
Barium.....	0.15-25 µg/mL
Beryllium.....	0.05-20 µg/mL
Cadmium.....	0.1-20 µg/mL
Chromium.....	0.2-20 µg/mL
Cobalt.....	0.1-25 µg/mL
Copper.....	0.2-20 µg/mL
Lead.....	0.2-20 µg/mL
Manganese.....	0.1-20 µg/mL
Nickel.....	0.15-30 µg/mL
Phosphorus.....	0.15-25 µg/mL
Selenium.....	0.15-25 µg/mL
Silver.....	0.5-20 µg/mL
Thallium.....	0.15-25 µg/mL
Zinc.....	0.15-25 µg/mL

## Mercury on Filter Paper

CRM Cat. #1127	PT Cat. #1027	<b>Q</b>	QR Cat. #1127QR
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One 2 mL flame-sealed ampule containing approximately 2 mL of standard concentrate and a 50 mm polystyrene petri dish containing a single 47 mm glass fiber filter. Sample is ready for use with EPA Method 29, or other applicable methods.

Mercury.....	1-75 µg/filter
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## Mercury in Impinger Solution

CRM Cat. #1128	PT Cat. #1028	<b>Q</b>	QR Cat. #1128QR
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One impinger solution sample packaged in a 15 mL screw-top vial containing approximately 14 mL of standard concentrate for use with EPA Methods 29, 101a, or other applicable methods.

Mercury.....	0.9-200 ng/mL
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## Lead on Filter Paper

CRM Cat. #1129	PT Cat. #1029	<b>Q</b>	QR Cat. #1129QR
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One filter paper sample packaged in a 50 mm polystyrene petri dish containing a single 47 mm tissue quartz filter spiked with lead ready-for-use with EPA Method 12 or other applicable methods.

Lead.....	20-350 µg/filter
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## Lead in Impinger Solution

CRM Cat. #1130	PT Cat. #1030	<b>Q</b>	QR Cat. #1130QR
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One impinger solution sample packaged in a 15 mL screw top vial containing approximately 14 mL of standard concentrate for use with EPA Method 12, or other applicable methods.

Lead.....	0.2-120 µg/mL
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## Chromium on Filter Paper

CRM Cat. #1131	PT Cat. #1031	<b>Q</b>	QR Cat. #1131QR
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One filter paper sample packaged in a 50 mm polystyrene petri dish containing a single 47 mm fiber film filter for use with CARB Method 425, or other applicable methods.

Total chromium.....	1-20 µg/filter
Hexavalent chromium.....	1-20 µg/filter

## Hexavalent Chromium in Impinger Solution

CRM Cat. #1132	PT Cat. #1032	<b>Q</b>	QR Cat. #1132QR
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One impinger solution sample packaged in a 15 mL screw top vial containing approximately 14 mL of standard concentrate for use with EPA Method 0061/7199, or other applicable methods.

Hexavalent chromium.....	45-880 µg/L
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## Hydrogen Halides & Halogens in Impinger Solution

CRM Cat. #1140	PT Cat. #1040	<b>Q</b>	QR Cat. #1140QR
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Two impinger solution samples packaged in 15 mL screw-top vials containing approximately 14 mL of standard concentrate for use with EPA Methods 26, 26a, or other applicable methods.

Total halides.....	15-1500 mg/L
Total halogens.....	10-200 mg/L
Hydrogen chloride.....	5-500 mg/L
Hydrogen fluoride.....	5-500 mg/L
Hydrogen bromide.....	5-500 mg/L
Bromine.....	5-100 mg/L
Chlorine.....	5-100 mg/L

## Fluoride in Impinger Solution

CRM Cat. #1141	PT Cat. #1041	<b>Q</b>	QR Cat. #1141QR
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One impinger solution sample packaged in a 15 mL screw-top vial containing approximately 14 mL of standard concentrate for use with EPA Methods 13a, 13b, 14, or other applicable methods.

Fluoride.....	1-50 mg/dscm
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## Nitrogen Oxide in Impinger Solution

CRM Cat. #1142	PT Cat. #1042	<b>Q</b>	QR Cat. #1142QR
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One impinger solution sample packaged in a 15 mL screw-top vial containing approximately 14 mL of standard concentrate for use with EPA Method 7, or other applicable methods.

Oxides of nitrogen (NOx).....	100-2000 mg/dscm
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## Sulfur Dioxide in Impinger Solution

CRM Cat. #1143	PT Cat. #1043	<b>Q</b>	QR Cat. #1143QR
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One impinger solution sample packaged in a 15 mL screw-top vial containing approximately 14 mL of standard concentrate for use with EPA Method 6 and Method 8, or other applicable methods.

Sulfur dioxide.....	50-2000 mg/dscm
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## Sulfuric Acid & Sulfur Dioxide in Impinger Solution

CRM Cat. #1144	PT Cat. #1044	<b>Q</b>	QR Cat. #1144QR
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One impinger solution sample packaged in a 15 mL screw top vial containing approximately 14 mL of standard concentrate for use with EPA Method 8, or other applicable methods.

Sulfuric acid.....	5-150 mg/dscm
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## Ammonia in Impinger Solution

CRM Cat. #1145	PT Cat. #1045	<b>Q</b>	QR Cat. #1145QR
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One impinger solution sample packaged in a 15 mL screw-top vial containing approximately 14 mL of standard concentrate for use with EPA CTM 027, or other applicable methods.

Ammonium.....	0.1-10 mg/L
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## Particulate Matter on Filter Paper

CRM Cat. #1150	PT Cat. #1050	<b>Q</b>	QR Cat. #1150QR
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One filter paper sample packaged in a 50 mm polystyrene petri dish containing a single 47 mm tissue quartz filter ready for use with EPA Methods 5, 5A, 5B, 5D, 5F, or other applicable methods.

Particulate matter.....	50-600 mg/filter
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## Particulate Matter in Impinger Solution

CRM Cat. #1151	PT Cat. #1051	<b>Q</b>	QR Cat. #1151QR
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One impinger solution sample packaged in a 250 mL polyethylene bottle containing approximately 250 mL of standard ready for use with EPA Methods 5, 5A, 5B, 5D, 5F, or other applicable methods.

Particulate matter.....	140-675 mg/L
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CRM - Certified Reference Material

PT - Proficiency Testing

QR - QuiK Response

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Learn more about Air & Emissions products