INDUSTRIAL HYGIENE SAMPLING GUIDE
for
COMPREHENSIVE INDUSTRIAL HYGIENE LABORATORIES
(CIHLs)

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June 7, 2018

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INTRODUCTION

This guide contains a compilation of sampling and analytical method recommendations for specific chemicals which the Navy has in-house analytical capability through its two Comprehensive Industrial Hygiene Laboratories (CIHLs) located in Norfolk, VA and San Diego, CA. The CIHLs are detachments of the Navy and Marine Corps Public Health Center (NAVMCPUBHLTHCEN). This guide is a concise reference for the industrial hygienist in the proper submission of industrial hygiene, environmental, bulk and biological samples. This guide lists the analyte or substance, the Chemical Abstracts Service Registry Number (CAS #) for the substance, analytical method used by the laboratory in performing the analysis, reporting limit (RL), sampling media, recommended air volume, sampling rate, special instructions for the industrial hygienist submitting the sample, and location of the CIHL which can analyze the sample. Customers should submit samples to the CIHL located nearest them. If that CIHL does not have the desired analytical capability, call the CIHL to verify that the capability does not exist there. The CIHL will work with the requestor to obtain the required service by confirming that the other CIHL can do the analysis, by sending the sample out for contract analysis, or by helping the customer identify a laboratory that the customer can contract with directly for the analysis. Since both CIHLs are constantly updating their analytical services, always check with the closest CIHL first.

Each CIHL welcomes comments and suggestions regarding its services, additional method development requirements, alternate sampling techniques, and any other input. All questions regarding laboratory service/capability should be addressed to the CIHL which provides the service. Working hours are generally 0730 to 1600 hours Monday through Friday. If the CIHL can't be reached or additional information is required, please contact the CIHL Program Manager at NAVMCPUBHLTHCEN, to which both laboratories report, using the contact information below. All comments concerning CIHL program management and additions, corrections and changes to this guide, should be addressed to the CIHL Lab Directors.

LABORATORY ORGANIZATION

The mission of the NAVMCPUBHLTHCEN is to be the Navy and Marine Corps center for public health services, and to provide leadership and expertise to ensure mission readiness through disease prevention and health promotion in the support of the National Military Strategy. The CIHLs' specialized qualitative and quantitative analyses of samples support that mission by providing objective data for occupational health and industrial hygiene investigations, assessments, recommendations, and risk management.

On 1 October 1989, all Navy medical department industrial hygiene laboratories, then named Consolidated Industrial Hygiene Laboratories, became part of the then Navy Environmental Health Center (NEHC) - now NAVMCPUBHLTHCEN. The CIHLs are now renamed Comprehensive Industrial Hygiene Laboratories. The following information for the two CIHLs is provided:

1 - Navy Environmental Preventative Medicine Unit-Five
Comprehensive Industrial Hygiene Laboratory (CIHL) Detachment West
3235 Albacore Alley
San Diego, CA 92136-5199

Laboratory Director
Phone: (619) 556-1427 DSN: 526-1427
FAX: (619) 556-1492

CIHL Det West Phone: (619) 556-7070
DSN: 526-7070 FAX: (619) 556-1492

2 - Navy Environmental Preventative Medicine Unit-Two
Comprehensive Industrial Hygiene Laboratory (CIHL) Detachment East
1285 West D Street, Bldg U-238
Norfolk, VA 23511-3394

Laboratory Director
Phone: (757) 953-6562; DSN: 377-6562
FAX: (757) 953-7213

CIHL Det East Phone: (757) 953-6622
DSN: 377-6622 FAX: (757) 953-7213

GENERAL POLICY

The CIHLs provide analytical support services for samples submitted through the BUMED Industrial Hygiene Program Offices. The analytical services available at the CIHLs are primarily designed for quantitative analyses of occupational health samples and selected industrial hygiene samples.

SPECIFIC POLICIES

POLICY ON STANDARD OPERATING PROCEDURES AND LOCAL OPERATING PROCEDURES

Standardization among the laboratories is an essential part of the CIHL program. The written CIHL Standard Operating Procedures (SOPs) document the quality assurance guidance for operation and standardization between the CIHLs. Based on these SOPs, each CIHL develops its own Local Operating Procedures (LOPs). The LOP (which implements instructions and any laboratory procedural changes) contains current procedures in use at each laboratory. Historical records are kept of the dates when procedures are implemented and taken out of service.

POLICY ON SAMPLE ACCEPTANCE/REJECTION

Sample submissions must be accompanied by an appropriate completed NMCPHC 5100/13, 5100/14, or 5100/16 form (Note: Every information category must be completed.) when submitted by the industrial hygienist. Forms should not be modified from the Navy accepted form. Samples must be properly preserved, as appropriate, packaged and shipped by the proper method. Refer to the Sample Packaging and Shipping Requirements Section. Properly documented, preserved, packaged, and shipped samples will be accepted by the CIHL and analyzed as routine unless the submission is marked "URGENT". Urgent samples must arrive by a one- or two-day express shipping service. Urgent samples must be previously approved by lab personnel. Urgent samples are reserved for situations such as a work stoppage.

If samples are taken incorrectly and/or incompletely documented, every effort will be made by the CIHL to obtain the necessary information to convert the invalid sample into a valid sample. Samples will only be returned to the customer when requested by the customer. Documentation may be returned for correct completion; however, the samples will remain at the laboratory.

In order to assure a quick laboratory turnaround time, please ensure samples are taken according to this guide, shipped appropriately, and the submission Forms are correct and complete.

When samples are received and are not able to be corrected for validity (e.g., fiber counts submitted on PVC filters), the customer will be notified by phone, fax, e-mail or letter in order to determine the disposition of the sample(s). Such samples will be returned to the customer upon the customer’s request.

POLICY ON ANALYTICAL METHODS

Rarely are analytical methods either complete or fully comprehensive to preclude some interpretation, change or modification of the method. (NOTE: This is the reason for the CIHL requirement that a LOP manual be available at each CIHL.) Most methods are single analyte methods while most samples contain multiple contaminants. Most analytical methods used by the CIHLs are taken from the analytical methods published by the National Institute for Occupational Safety and Health (NIOSH) or the Occupational Safety and Health Administration (OSHA). Since OSHA does not require specific analytical methods, unless stated in a stressor-specific standard, any method (e.g., ASTM, scientific literature, journal articles, etc.) can be used as long as it meets NIOSH criteria of accuracy within ±25% at the 95% confidence level. All NIOSH and OSHA methods in this document are potentially "modified methods". The modification is necessary because of the variance in: analytical columns (types, sizes); desorbing agents; digesting acids/bases; analytical equipment conditions (temperatures, pressures, flow rates). All these modified methods are evaluated and validated for the NIOSH accuracy of ±25% at the 95% confidence level by each CIHL, and the method changes are documented as modifications.

POLICY ON COEFFICIENTS OF VARIATION

Randomly distributed errors occurring in industrial hygiene sampling are normal and are commonly included in analytical reports as the coefficient of variation (CV). The CV is a useful index for differentiating the true mean of known data points and laboratory reported data. The total CV (CV_T) of the sampling and analytical method is based on a statistical standard normal deviation for 95% two-sided confidence limits. The statistical decision techniques developed by NIOSH and OSHA are implemented in the CIHLs' use of the CVs. In order to obtain accurate CVs contact the lab that completed the analysis. The CVs can vary based on instrumentation.

For Time-Weighted Average (TWA) sampling, the CV criteria originally adopted by NIOSH of ± 25% accuracy, with 95% confidence limits, is usually cited, but accuracy specifications may vary from one standard to the next. Substances which have Permissible Exposure Limits (PELs), but for which no specific standard has been promulgated, do not have specific accuracy requirements. For these substances, the CIHLs consider the method acceptable (e.g., OSHA, NIOSH, literature cited methods) if it can meet the ±25% accuracy requirement with 95% confidence.

POLICY ON REPORTING ANALYTICAL RESULTS

The CIHLs are reporting air samples results in "total mass of contaminant per sample" and in mg/M^3. Blanks submitted with the samples are also reported in "total mass of contaminant per sample." The CIHL will notify the customer when the blank values are elevated more than normal. It is the responsibility of the customer to take the analytical results and compute TWAs as necessary. If you need assistance, please contact your local industrial hygienist or the CIHL.

POLICY ON LIMIT OF QUANTIFICATION

It is not unusual for the Limit of Quantification (LOQ) of an analyte to vary from day to day. Instrumental conditions and environments vary day to day and this variation often affects the LOQ. If you envision detection levels (e.g., a short duration sample) to be a problem, please contact the CIHL performing the analyses, preferably before collecting the sample. Often the laboratory can modify a method to increase the sensitivity and selectivity; however, the analyst must know your requirements before the analyses are performed using the standard analytical method.

POLICY ON SPIKED SAMPLES OR FIELD-SUBMITTED QC SAMPLES

The CIHLs are required by their accreditation through the American Industrial Hygiene Association (AIHA) to have a comprehensive quality assurance/quality control (QA/QC) program which involves, at a minimum:

- A written QA/QC plan,
- A designated Quality Assurance/Quality Control Coordinator (QA/QCC) responsible for the QA/QC program,
- Participation in the Proficiency in Analytical Testing (PAT) program for all categories of analytes performed for the customer,
- Records which demonstrate the routine introduction of control samples of known content along with samples for analysis,
- Records which demonstrate routine checks, calibrations, maintenance of equipment and instruments are performed to ensure adequate performance,
- Quality control data stored in an accessible manner,
- Routine checks made of procedures and reagents, and
- Inter-laboratory, as well as intra-laboratory, QC.

Occasionally the customer may feel uncomfortable with laboratory results and therefore "challenge" the QA/QC program of the laboratory by submitting blind QA/QC samples to the laboratory.

The only recommended method of challenging the laboratory is purchasing past PAT rounds from the AIHA and submitting these as controlled spikes. Literature articles have proven that side by side duplicate monitoring very rarely produces duplicate samples. The use of a duplicate sampling manifold will not produce duplicate samples; however this method of sampling is superior to the use of two independent sampling systems side by side. Contact the AIHA (phone number (703) 846-0765 for the purchase of PAT metals, solvents, fibers and crystalline free silica samples. PLEASE NOTIFY THE LABORATORY ONCE YOU RECEIVE THE RESULTS OF YOUR QC SAMPLE SO THE LABORATORY MAY DOCUMENT ITS QA/QC PROGRAM TO INCLUDE THIS BLIND QC SAMPLE. THIS SAMPLE THEN WILL BE IDENTIFIED IN THE CIHL DATABASE AS A TRUE QC BLIND. Also the laboratory will recharacterize the results for this sample in the Laboratory Information Management System (LIMS) database if you have identified the sample as a field sample (e.g., assigned fictitious breathing zone sample

information).

Please realize that if there is a quality problem with the CIHLs, the labs want to be the first to know so they can identify and resolve the problem. The labs welcome and expect feedback from the customers.

POLICY ON BLANK MEDIA

The CIHLs follow NIOSH policy for submitting blanks and ask the customer to submit two (2) blanks with each batch of samples. One should be a "Field Blank". A "Field Blank" is an unopened cassette/tube/etc. taken to the work site where the sampling will be performed. The blank cassette/tube/ etc. is then opened on site and immediately closed, sealed and labeled. NO air is pumped through the "Field Blank". This "Field Blank" is used to check for contamination due to sampling process and the background contamination due to the work site. If sampling is occurring on multiple days then a field blank is required per day of sampling. The second blank submitted should be a "Media Blank". A "Media Blank" is an unopened cassette/tube/etc. from the same lot number as the sampling cassettes that is NEVER opened. This blank is sealed, labeled and sent off to the laboratory with the "Field Blank" and the samples. The "Media Blank" is used to check the media analyte background levels and also as a check for laboratory reagents and methodology. Note that these blanks should be labeled with field sample ID numbers and listed on the sample request form as the type of blank that they are along with the samples.

If you are sampling for different types of analytes in the same operation please submit a complete set of blanks for each type of analyte. For example if you are sampling for cellosolves and toluene, even though both are collected on charcoal tubes the samples are processed differently so you should submit two sets of charcoal tube blanks with your request. Please consult the CIHL if you are uncertain whether more than one set of blanks may be needed.

Blanks are treated and analyzed the same way as samples. If the total amount of analyte found exceeds the Limit of Quantification (LOQ) for that analyte, then the results are reported as the total amount of analyte per blank (e.g., 0.7 μg of Cd). If the amount found is less that the LOQ then the result is reported as less than the LOQ (e.g.., < 0.5 μg of Cd). Note that it is not unusual for the LOQs to vary depending on the instrument used for the analysis, the methodology and other experimental factors. If you are concerned about potential problems with the LOQ because of short sampling times, please contact the CIHLs. There are ways they can modify the procedure which will increase sensitivity and lower the LOQ but they must know your requirements IN ADVANCE.

The CIHLs also follow NIOSH policy concerning the blank correction. In short, blank value(s) are NOT SUBTRACTED from sample values unless stated otherwise on the Laboratory Report. If the client is concerned about high blank values (i.e., possible contamination) they should contact the laboratory for assistance in determining the correct course of action. However it is ultimately the responsibility of the client to decide if the sample values should be blank corrected.

POLICY ON USE OF DISCLAIMERS

The CIHLs recognize that there are field situations when samples cannot be taken according to required sampling methods (e.g., "a once in a lifetime opportunity sample"). In such cases, the laboratory will usually analyze the sample if taken on appropriate sampling media, and report a result possibly accompanied by one of the disclaimer statement listed below:

- INSUFFICIENT AIR VOLUME - The air volume is less than the amount recommended for this method. Consequently the coefficient of variation (CV) published for the method may not apply. Professional judgment should be used in the interpretation of results.
- QUESTIONABLE FLOW RATE - The flow rate differs from the recommended method's rate. Therefore, professional judgment should be used in the interpretation of results.
- INCORRECT SAMPLING MEDIUM – If the incorrect media is used, the lab will reject the samples.
- NON-NIOSH/NON-OSHA METHOD - The analytical method is not one currently recommended by NIOSH, OSHA or the latest edition of NAVMCPUBHLTHCEN's Industrial Hygiene Sampling Guide for CIHLs. Therefore, professional judgment must be used in the interpretation of results.
- SHIPPING ERROR - Bulk samples were received in the same shipping package as air samples for the same contaminant. Samples were not preserved or did not arrive at the laboratory within the recommended shipping time. Therefore, professional judgment must be used in the interpretation of results.
- BLANK(s) NOT SUBMITTED – No field blank was submitted as required by the sampling and analytical method. Therefore, professional judgment must be used in the interpretation of results.
- OTHER - Other laboratory specific comments requiring a disclaimer.

QUALITY ASSURANCE (QA)

The CIHLs are accredited by COLA, Clinical laboratory Improvement Program (CLIP), and AIHA which requires participation in all applicable round robin testing programs. The AIHA accreditation program specifies operational guidelines for maintaining satisfactory performance, including qualified personnel, proficiency in analytical testing, adequate facilities, quality controls, equipment maintenance, documentation and site audits. In addition to this accreditation program, CIHLs participate in several quality control programs for monitoring daily performance. Both internal and external quality control samples are analyzed to assure accuracy and precision of results. Some of the QA techniques used include replicate analyses, recycles, spiked controls, commercial reference controls, daily instrument calibration, control charts, regression analyses, data review, reagent and media blanks. Each CIHL maintains its own quality control manual, which gives extensive description of the quality assurance program. Please address specific QA questions to the CIHL performing the analytical work.

LAB ANALYTICAL EQUIPMENT

The primary analytical instrumentation in each laboratory consists of gas chromatographs, atomic absorption spectrophotometers (graphite furnace), ultraviolet/visible spectrophotometers, high performance liquid chromatographs, ion chromatographs, microbalances and microscopes (both phase contrast and polarizing light), inductively coupled plasma (ICP) spectrometers, and gas chromatograph/mass detectors, are located in the CIHL laboratories. A few instruments, such as the X-ray diffractometer, are only present in one of the CIHLs.

SUBMISSION REQUIREMENTS

SAMPLE SUBMISSION FORM

Air samples must be submitted on NAVMCPUBHLTHCEN forms NMCPHC 5100/13 and 5100/14. Bulk or wipe samples must be submitted on NAVMCPUBHLTHCEN form NMCPHC 5100/16. Copies of these forms and instructions for completion are provided in the Industrial Hygiene Field Operations Manual (available on the NAVMCPUBHLTHCEN website) or may be requested from the CIHLs. Do not make alterations on the forms.

BIOLOGICAL SAMPLES

Biological samples must be submitted with sample submission documentation containing at least the following:

- Name of medical treatment facility submitting samples,
- Name of person submitting samples,
- Date of submission,
- Name of person sampled (i.e., patient first and last name),
- Sample number [Complete Social Security Number (SSN) of the patient and the. CHCS number],
- Age of person sampled (required for blood lead samples only),
- Date sample was collected,
- Name of test requested,
- Occupational code of patient,
- Patient's command UIC.

Because most medical treatment facilities use a computerized system for medical records, biological samples submitted for blood lead/ZPP and urine mercury may be submitted with a computerized transmittal list. Please refer to section below entitled "ROUTINE BIOLOGICAL SAMPLES" for specific guidance on this transmittal list.

Biological samples for blood lead/ZPP and urine mercury may be submitted on Standard Form 557 (Miscellaneous Chemistry Request). The request must be signed and dated by the submitting MD, RN, PA, or Hospital Corps person. All biological samples must be properly packaged and labeled in accordance with Navy, Federal, State and local regulations. It is recommended that a commercial express package delivery service be used to transport samples to the CIHL (i.e. FedEx). Please contact the carrier for their shipping and labeling requirements. In general, the samples must be placed in a sealed, waterproof primary container that contains absorbent material sufficient to absorb all possible leakage. The primary container must then be placed in a sealed, secondary container. The secondary container can then be placed in an outer container for shipment. All containers should be adequately cushioned so the samples do not become loose and move during shipment. Freezer ice packs should be used to keep the samples cold. Do not use ice or dry ice, and do not freeze the samples. An Etiological Agent/Biomedical Material label must be affixed to the outside of the outer shipping container.

When samples are sent by U.S. Postal Service (USPS), Express Mail Delivery is required. Each package of samples using USPS cannot contain more than a total of 50 milliliters (1.7 ounces) of sample. If more than 50 milliliters of samples (e.g., approximately 7 blood lead samples) are sent to the lab, consider using a commercial express package delivery service. For more information on the shipment of samples, consult U.S. Postal Service Publication 52 entitled " Hazardous, Restricted, or Perishable Mail" dated July 1999 and NAVSUPINST 4610.31A entitled "Preparation of Medical Material Requiring Freeze or Chill Environment for Shipment."

SAMPLING REQUIREMENTS

Always review the preferred method of sampling given in this guide and amplified by the appropriate analytical method (e.g., NIOSH or OSHA analytical method manuals, etc.). If the recommendation cannot be followed, contact the laboratory prior to sampling for additional guidance.

The recommended air volumes provided in this guide are usually a range of volumes, with the higher value recommended for the majority of sampling. The lower air volume should only be used when: 1) the exposure may be at an unsafe/unhealthful exposure level such as an exposure exceeding the Time-Weighted Average (TWA) value given in the Occupational Safety and Health Administration's Final Rule Limits, 2) the application of a Short-Term Exposure Limit (STEL) or a Ceiling value is applicable to the substance, and 3) the operation limits the amount of sampling time. In the last two cases the maximum recommended sampling rate should be used to obtain as much sample volume as possible. As a general rule, the recommended sampling volumes will allow a detection limit of 10-50% of the TWA.

SAMPLE PACKAGING AND SHIPPING REQUIREMENTS

(See Biological Samples Section for requirements on shipping Biological Samples.)

Small sample media such as sorbent tubes and filter cassettes should be bound together (i.e., rubber band) or placed in plastic bags to reduce the possibility of being overlooked or discarded. Sample cassettes and sorbent tubes should NOT be wrapped in tape. Simply affix a legible sample submission number (preferably a preprinted label) to each sample and blank and neatly package it to avoid shipping damage. Never ship air samples and bulk solvent (i.e. fuels, naphthas) samples in the same shipping package.

Submit separate request forms for each type of analyses as follows: Segregate and ship your samples in individual categories of air, bulk, wipe, and biological samples subdivided by metals and organics.

Many solvents can be analyzed simultaneously unless they are incompatible. Always check compatibility information to ascertain the organic contaminants collected on charcoal tube media are compatible with each other and with the analytical procedure. Call the laboratory regarding compatibility when in doubt. Please note that hexavalent chromium, mercury, and organic tin are analyzed separately and may not be combined with other metal analyses. Individual metals may be ordered or an ICP metal scan may be requested. Unusual situations requiring additional analyses should be coordinated with the laboratory prior to sample collection.

When necessary, small quantities of bulk organic solvents may be shipped in small screw cap glass containers (5-15 ml size) with a tight fitting Teflon-lined cap. One, but not the only, suitable container is the Fisher Scientific 12 ml glass sample vial with PTFE-lined cap (Cat. # 03-340-60C). Prior to shipment place a permanent ink mark at the level to which the vial is filled. This allows the chemist to determine potential leakage during shipment. Rarely will more than 5 milliliters of sample be required. Place each vial in a zip-lock bag and then place that bag in another zip-lock bag to provide double bag security against leakage. Never ship the bulk and air samples in the same shipping package. Provide information telling the chemist which bulk sample corresponds to the air samples. The CIHL only needs bulk samples for organic mixtures such as Stoddard's Solvent, Petroleum Naphtha, mineral spirits, etc. Do not send bulk samples of paints as they cannot be analyzed successfully. When in doubt, call the lab and ask for guidance.

Most determinations require a minimum of two blanks or one blank for every ten samples submitted, whichever is larger. The blanks are analyzed by the CIHLs and reported as micrograms (ug) of "contaminant" per sample (e.g., per filter, per tube, etc.).

All references to water in this guide mean deionized or double-distilled water.

When submitting a sample for elemental analysis of hard metal alloys, the bulk sample must be in the form of fine filings, powder or very thin wire to facilitate digestion prior to analysis.

The preferred refrigerant for samples that require refrigeration is freezer packs or frozen gel blocks. Ice may be used for hand-carried lab samples, however the ice must be doubly wrapped in plastic zip-lok bags to avoid leakage. Never use ice or dry ice when shipping by U.S. Postal Services or commercial delivery services.

Shipping containers should be appropriately labeled such as "Fragile", "Refrigerated Material", "Liquid Samples", "Etiologic Agent/Biomedical Material", etc.

All samples and materials being packaged, labeled and shipped are governed by Federal, State and local regulations. Compliance with these regulations is the responsibility of the person submitting the samples.

In the case of unusually large shipments or high priority samples, please contact the laboratory prior to submission.

SAMPLE TURNAROUND TIMES

Samples will be analyzed on a "first come, first served" basis. Urgent samples will be given special priority and analyzed in one to five working days when the laboratory has been notified in advance of the shipment, sufficient production capacity is available and the samples have arrived by expedited shipment, e.g., hand delivery within 24 hours, FedEx overnight or USPS express mail. More than 90% of routine samples are analyzed within 10 working days after receipt of the sample. If you have not received your analytical report after 20 working days, please notify the laboratory to check on the status of the samples.

SAMPLE COMPATIBILITY

Since sampling and analytical methods are normally evaluated for a single analyte, care should be taken in the interpretation of a method's CV. When in doubt concerning multi-component samples, take individual samples. The following compounds require special processing for analysis and consequently the lab cannot analyze for other compounds in the same sample:

- Acetic Acid
- Acetonitrile
- Acrolein
- All cellosolves can be analyzed from the same tube, e.g., butyl-, methyl-, etc., **HOWEVER** cellosolves and common organics cannot be analyzed from the same solid sorbent tube.
- All isocyanates
- Ammonia
- 2-Butanone
- Butyl Cellosolve
- Camphor
- Cellosolve

- Chlordane
- Chromic Acid or Chromium (VI)
- Coal Tar Pitch Volatiles
- Cresols
- Ethylene glycol
- Ethylene oxide
- Ethyl ether
- Formaldehyde
- Hydrazine
- Methanol
- Methyl Cellosolve
- Methyl methacrylate
- 2-Nitropropane
- PCBs
- PGDN (Otto Fuel II)
- Phenol

The following groups of compounds require special processing for analysis. More than one compound within each group can be analyzed in the same sample, but compounds outside the group are incompatible and cannot be analyzed from the same sample:

- Group I – Ethyl Alcohol, Isopropyl Alcohol, and t-Butyl Alcohol
- Group II – n-Butyl Alcohol, sec-Butyl Alcohol, iso-Butyl Alcohol and n-Propyl Alcohol
- Group III – Iso-Amyl Alcohol, Diacetone Alcohol, and Cyclohexanol
- Group IV – 2-Methoxyethanol, 2-Ethoxyethanol, and 2-Butoxyethanol

LAB SPECIFIC SAMPLES

Both of the CIHLs have specific areas of unique expertise and only those laboratories should be used in those specialty areas. The areas and labs are:

Area	Laboratory
Multi-element analysis using Inductively Coupled Plasma (ICP) Spectrometry	Both
Advanced High Performance Liquid Chromatography	Both
Gas Chromatography/Mass Spectrometry	Both
X-Ray Diffraction	San Diego

ROUTINE BIOLOGICAL SAMPLES

Both CIHLs are accredited under COLA and CLIP.

Consult the section on Submission Requirements for Biological Samples for general policies of sampling, packaging, labeling and shipping biological samples.

BLOOD LEAD AND ZINC PROTOPORPHYRIN

Collect in one of the following Becton Dickinson (BD) Vacutainer Systems listed below:

BD Number	Top Color	Description
6527	Dark Blue	Sodium heparin tube for whole blood (Specifically for trace element studies)
6450	Lavender	15% EDTA tube for whole blood & Zinc Protoporphyrin (ZPP)

Samples must be thoroughly mixed with the heparin or EDTA immediately following collection. Keep samples refrigerated (do not freeze) and hand deliver or ship to the nearest laboratory using priority shipping methods. Use an insulated shipping container, such as a styrofoam shipper. For shipping long distances, freezer packs and express delivery are required.

URINE MERCURY

See the section on Submission Requirements for Biological Samples for general policies of sampling, packaging, labeling and shipping biologicals.

Per BUMED INSTRUCTION 6260.2, dated 7 November 1988, biological monitoring for mercury is no longer required. The potential for personnel exposure to elemental mercury vapor has been greatly reduced by the use of pre-encapsulated amalgams. Industrial hygiene surveys have shown routine use of pre-encapsulated amalgams does not result in overexposure of dental personnel to elemental mercury vapor. Therefore, per this BUMED instruction, neither biological sampling nor air sampling is specifically required. Occasionally mercury urine may be prescribed by an occupational health professional as circumstances warrant.

If urine mercury analysis is necessary, collect the sample (first morning void, if possible) in the standard drug screening plastic bottle (NSN 6640-00-165-5778) and add 100 milligrams of potassium persulfate, a preservative. Please do not send more than 20 milliliters of urine per sample. Hand tighten the lid, place parafilm around the lid, and place each bottle in a zip-lock bag to contain any leakage during transit to the laboratory. Refrigerate during storage and ship, as soon as possible, in an insulated shipping container, using freezer packs (gel blocks) and express delivery.

SPECIAL SAMPLING & ANALYSES

BULK SAMPLE SUBMISSIONS

The primary function of the CIHLs is the analysis of breathing zone air samples to document occupational exposure levels. The CIHLs do not analyze samples for facility inventory purposes (e.g., materials suspected to contain asbestos) or as an aid to production planning (e.g., heavy metals in paint chips, materials suspected to contain asbestos) or analysis of bulk samples to determine whether a product meets manufacturer's specifications. Information for the latter is available by writing the manufacturer and requesting product literature and Safety Data Sheets. Products for which this information is not available should not be used in the Navy system. Bulk samples should be submitted to the laboratories only under the following conditions:

- When the laboratory requests a bulk, as is required in the analytical method (e.g., PCBs, Naphthas, etc.).
- When all other means of obtaining information on the chemical composition of the material have been exhausted and prior approval has been given by the CIHL Director.

CHROMIUM AND CHROMATES

Chromium metal, (or total Chromium) Cr (II) and Cr (III) compounds are collected on mixed cellulose ester filters (MCEF) and analyzed using ICP. Hexavalent Chromium (Cr (VI)) compounds cannot be determined if sampled on a MCEF; MCEF filters have a high background for Cr(VI).

Chromium in the +6 oxidation state (i.e., Cr (VI) or Hexavalent Chromium, chromic acid, chromium trioxide, all chromates and dichromates must be collected on PVC filters, with backup pads. If other filter materials are used, the Cr (VI) may be reduced to the Cr (II) or Cr (III) states and thus give a diminished value for Cr (VI). Note: You no longer need to separate the filter from the backup pad prior to shipping the sample. Simply ship the PVC filters in their sampling cassettes.

OSHA has issued a revised version of the OSHA ID-215 method for hexavalent chromium sampling. Method Number ID-215 (version 2), Control Number T-ID215-FV-02-0604-M. The significant modification (related to sample collection) in the method is that when using the 37 or 25 mm PVC filter with cellulose back-up pad for welding operations, or chromium plating operations, special handling requirements have been added.

A summary of the special handling requirements *for samples collected from welding or plating operations* follows:

- Samples collected on PVC filters from welding or plating operations must be shipped overnight to the laboratory within 24 hours of sampling.
- Samples collected on PVC filters from welding operations must be analyzed within 8 days of sampling.

- Samples collected on PVC filters from chromium plating operations must be analyzed within 6 days of sampling or be stabilized at the laboratory upon receipt.
- Please make sure that the shop operation is plainly stated on your IH Air Sample Survey Form, e.g., welding, plating, painting, abrasive blasting. This allows the CIHL to verify that expedited analysis is not required but the examples of painting and abrasive blasting do NOT imply that samples arising from those operations require special handling or expedited analysis.

Your analytical results could potentially be jeopardized if the above requirements are not adhered to. We are **not** requiring that the NaOHqz filters be used for the chromium plating operations at this time. We will preserve the samples with the appropriate buffers when received in our laboratory if the samples cannot be analyzed within the days required by the new method changes.

ENVIRONMENTAL LEAD SAMPLES

Both CIHLs are accredited by AIHA under the Environmental Lead Laboratory Accreditation Program (ELLAP) and accept paint chips and dust wipes for lead analyses.

FIBER COUNTS AND ASBESTOS IDENTIFICATION

Laboratories performing asbestos analyses must be proficient in the appropriate quality assurance (QA) programs. For fiber counts and bulk asbestos identification the appropriate QA program is the AIHA Proficiency Analytical Testing (PAT) program. Both CIHLs are proficient in the PAT program and also accredited by AIHA under the Industrial Hygiene Laboratory Accreditation Program (IHLAP) and accept air and bulk samples for asbestos analyses.

POLYCHLORINATEDBIPHENYLS (PCBs)

The laboratories do not routinely analyze to the EPA standard of 50 ppm for waste disposal purposes.

SILICA (CRYSTALLINE SILICA) ANALYSIS

This method determines silica in respirable and total dust by the OSHA method. The sample filter used is a 5 um PVC filter. SKC Cat No. 225-8-01 (low silica homopolymer PVC), the Omega SILICAL PVC filters, or equivalent low silica homopolymer PVC filter should be used. The respirable dust sample is collected at 1.7 LPM to obtain 800 to 1,000 liters of air. A smaller air volume may be used if filter loading greater than 2.0 milligrams is expected.

Bulk samples can be semi-quantitatively analyzed for quartz and cristobalite.

CONVERSION FACTORS

In a metal scan, Iron (Fe), Zinc (Zn) and Vanadium (V) concentrations (in mg/m^3) are reported instead of the metal oxide concentrations (i.e., Fe_2O_3, ZnO, and V_2O_5) for which one is actually sampling. Therefore, a conversion factor must be used to "convert" the reported result for the metal to the equivalent concentration of the metal oxide for comparison with the PEL/Threshold Limit Values (TLV) listed for the oxide. The following are examples of how to calculate a conversion factor and use it to calculate the concentration of metal oxide:

CONVERSION OF ZINC TO ZINC OXIDE

Calculate the conversion factor - MW of ZnO / MW of Zn = 81.4 / 65.4 = **1.245**

Multiply the conversion factor times the result reported as Zn to obtain the amount of ZnO.

The correction factor is applied to any Zn results reported by the lab that should be assessed as ZnO.

The OSHA PELs and American Conference of Governmental Industrial Hygienists (ACGIH) TLVs are for ZnO (zinc oxide); therefore, the conversion factor is used for results reported as Zn for ZnO exposures. The OSHA PELs are for total dust, or as a fume, and the ACGIH TLVs are for the respirable fraction. If sampling for ZnO as a dust is performed to compare against the TLV for ZnO as a respirable dust, it would then typically be sampled as a respirable dust. Technically, that means sampling with a cyclone. (However, if the total dust result (typical sampling method for metal scan) is below the respirable TLV then there should not be an exposure problem since the sampling method would overestimate the respirable fraction. But, if the total dust sample result exceeds the TLV, then the IH should sample the respirable fraction to accurately assess ZnO as compared to the respirable TLV.) This discussion on respirable fractions does not affect ZnO total dust or fume results for comparison to the total dust or fume PELs

CONVERSION OF VANADIUM TO VANADIUM PENTOXIDE

Calculate the conversion factor - MW of V_2O_5 / MW of V_2 = 181.9 / 101.9 = **1.785**

Multiply the conversion factor times the result reported as V to obtain the amount of V_2O_5.

The correction factor is applied to any Vanadium (V) results reported by the lab that should be assessed as V_2O_5.

The OSHA PELs are for V_2O_5 (vanadium pentoxide); therefore, the conversion factor is used for results reported as V for V_2O_5 exposures. The OSHA PELs are for respirable dust, or as a fume. If sampling for V_2O_5 as a dust is performed to compare against the OSHA PEL for V_2O_5 as a respirable dust, it would then then typically be sampled as a respirable dust. Technically, that means sampling with a cyclone. (However, if the total dust result (typical sampling method for metal scan) is below the respirable PEL then there should not be an exposure problem since the

sampling method would overestimate the respirable fraction. But, if the total dust sample result exceeds the PEL, then the IH should sample the respirable fraction to accurately assess V_2O_5 as compared to the respirable PEL.) This discussion on respirable fractions does not affect V_2O_5 fume results for comparison to the fume PEL. The ACGIH TLV is for V_2O_5 as V; therefore no conversion factor is needed.

CONVERSION OF IRON TO IRON OXIDE

Calculate the conversion factor - MW of Fe_2O_3/MW of Fe_2 = 159.7 / 111.7 = **1.43**

Multiply the conversion factor times the result reported as Fe_2 to obtain the amount of Fe_2O_3.

The correction factor is applied to any Fe_2 results reported by the lab that should be assessed as Fe_2O_3.

The OSHA PEL and ACGIH TLV is for Fe_2O_3 (iron oxide), therefore, the conversion factor is used for results reported as Fe_2 for Fe_2O_3 exposures. The OSHA PEL is for fume, and the ACGIH TLV is for the respirable fraction. If sampling for Fe_2O_3 as a dust is performed to compare against the TLV for Fe_2O_3 as a respirable dust, it would then typically be sampled as a respirable dust. Technically, that means sampling with a cyclone. (However, if the total dust result (typical sampling method for metal scan) is below the respirable TLV then there should not be an exposure problem since the sampling method would overestimate the respirable fraction. But, if the total dust sample result exceeds the TLV, then the IH should sample the respirable fraction to accurately assess Fe_2O_3 as compared to the respirable TLV.) This discussion on respirable fractions does not affect Fe_2O_3 fume results for comparison to the fume PEL

CONVERSION OF CR(VI) TO CHROMATES (AS CRO_3)

Calculate the conversion factor - MW of CrO_3/atomic weight of Cr(VI) = 99.9 / 51.9 = **1.92**

Multiply the conversion factor times the result reported as Cr(VI) to obtain the amount of CrO_3.

The correction factor is applied to any Cr(VI) results reported by the lab that should be assessed as CrO_3.

- Chromic Acid (CAS # 7738-94-5): The OSHA PELs for chromates as CrO_3 apply only to any operations or sectors for which the exposure limit in the OSHA Cr(VI) standards for the various industries is stayed or is otherwise not in effect. The results reported by the laboratory when using a **PVC** filter are as total Cr(VI); therefore, the conversion factor is used to convert these sampling results to as CrO_3, as needed for assessing these operations or sectors for chromate compounds where the OSHA Cr(VI) standards do not apply.

- Hexavalent Chromium Cr(VI) (CAS # 18540-29-9): However, **NO** conversion factor is used if sampling and assessing chromate compounds covered under the OSHA Cr(VI) standards where the results are reported as Cr(VI). This is because the OSHA Cr(VI) standards' PEL is as Cr(VI) and not as CrO_3. This also holds true when comparing Cr(VI) results reported from the lab to ACGIH TLVs for chromate compounds where the TLVs are as Cr(VI).
- Note: Laboratory results reported for an **MCEF** filter are for "total Cr", that is, all forms of chromium. Therefore, you may overestimate certain chromium exposures if there are other forms of chromium generated by the process being evaluated. Also, Cr (VI) compounds cannot be determined if sampled on a MCEF; MCEF filters have a high background for Cr(VI).

SOURCES FOR ANALYTICAL SUPPLIES

MANUALS

The NIOSH analytical manuals may be obtained from:
https://www.cdc.gov/niosh/docs/2003-154/default.html

The OSHA analytical manuals may be obtained from:
http://www.osha.gov/dts/sltc/methods/index.html

ACGIH Publications
1330 Kemper Meadow Drive
Cincinnati, OH 45240-1634
Phone: (513) 742-2020 FAX: (513) 742-3355
[Publications #4542, #4544 and #4545]
http://www.acgih.org/

FILTERS AND SORBENT TUBES

Filters and sorbent tubes may be obtained from a number of sources; however, this manual cites SKC order number for filters and tubes (listed in the SPECIAL INSTRUCTIONS column in the Laboratory Sampling Guide), simply because of convenience and uniformity.

Special attention should be given to SKC Guide to NIOSH/OSHA Air Sampling Standards which is in the SKC Comprehensive Catalog and Air Sampling Guide (Request free copy from SKC.)

SKC, Inc. World Headquarters
863 Valley View Road
Eight Four, PA 15330-9614
Phone: (800) 752-8472 FAX: (800) 752-8476
Website: http://www.skcinc.com/

SKC, Gulf Coast
9827 Whithorn Drive
Houston, TX 77095-5027
Phone: (800) 225-1309 FAX: (800)752-4853

SKC, West
P.O. Box 4133
Fullerton, CA 92634-4133
Phone: (800) 752-9378 FAX: (800) 752-1127

Supelco, Inc.
Supelco Park
Bellefonte, PA 16823-0048
Phone: (800) 247-6628 FAX: (800) 447-3044
Technical information only phone: (800) 359-3041
Website: http://www.sigma-aldrich.com/

PASSIVE MONITORS

3 M Company
Occupational & Environmental Safety Division
3 M Center, Bldg 224-5S-04
St. Paul, MN 55144-1000
Phone: (800) 752-3623 (Federal System Group orders)
Technical information only phone: (800) 243-4630
Website: http://www.3m.com/

PRINTED SAMPLE NUMBER LABELS

Shamrock Scientific
34 Davis DR, Bellwood, IL 60104
Phone: (800) 323-0249
Website: http://www.shamrocklabels.com/

SAMPLE COLLECTION BOTTLES, VIALS, AND SUPPLIES

Supelco, Inc.
Supelco Park, Bellefonte, PA 16823-0048
Phone: (800) 247-6628
Website: http://www.sigma-aldrich.com/

SKC, Inc.
863 Valley View RD
Eighty Four, PA 15330-9614
Phone: (800) 752-8472
Website: http://www.skcinc.com/

DUST WIPE MEDIA

Ghost Wipe
Available from Environmental Express, 490 Wando Park Blvd., Mt. Pleasant, CA 29464
Phone: (800) 343-5319
Website: http://www.envexp.com/

NOTE:
The mention of specific company names and products does not constitute endorsement by the laboratories, NAVMCPUBHLTHCEN, or Department of Navy (DoN). Similarly, the omission of a specific company name or product does not imply that they or their product is not recommended for use it only means that this is not and cannot be an all-inclusive listing.

ABBREVIATIONS

C	Contract laboratory
N	Norfolk laboratory (CIHL East)
S	San Diego laboratory (CIHL West)
@	At the concentration of
AMBERSORB	Special type of adsorption tube
aq	Aqueous
CASRN	Chemical Abstract Service Registry Number
CAS#	Chemical Abstract Service registry number
CIHL	Comprehensive Industrial Hygiene Laboratory
CHROMOSORB	Special type of adsorption tube
CT	Charcoal tube (see special instructions for part number)
CV	Coefficient of Variation
FLORISIL	Special type of adsorption tube
FLT	Filter
GFF	Glass fiber filter
HOPCALITE	Special type of adsorption tube for Mercury vapor
ICP	Inductively Coupled Plasma (analyzes multiple metals per sample)
INHOUSE	Laboratory method developed within the organization
L	Liters
LPM	Liters per minute
LOD	Limit of Detection (an amount equal to three times the standard deviations of the analytical noise or three times that of a blank, whichever is more appropriate)
LOQ	Limit of Quantitation (the lowest concentration at which a contaminant can be reliably reported)
0.8 MCEF	Mixed cellulose ester filter, 0.8 micrometer pore size
mg/m^3	Milligrams per cubic meter
ml	Milliliters
mm	Millimeter
MW	Molecular weight
NIOSH	National Institute for Occupational Safety and Health
NOS	Not otherwise specified
ORBO	Adsorption tube trade marked by Supelco
OSHA	Occupational Safety and Health Administration
OVS	OSHA Versatile Sampler--Special collection device for pesticides, available from SKC # ST 226-30-16.
ppm	Parts per million
PTFE	Polytetrafluoroethylene filter
PVC	Polyvinylchloride filter, 5 micrometer pore size
QCC	Quality Control Coordinator
SG	Silica gel sampling tube
ST	Sorbent tube
TENAX	Special type of adsorption tube
um	Micrometer
XAD	Special type of adsorption tube

SUBSTANCE	CAS NO	METHOD (modified) *not modified	LOQ (ug)	SAMPLING MEDIA	SAMPLE VOLUME (L)	SAMPLING RATE (LPM)	INSTRUCTIONS	LAB
ACETIC ACID	64-19-7	OSHA PV2119	6	CT (100/50)	48	0.2	ST 226-01 Not compatible with other organics.	C
ACETONE	67-64-1	NIOSH 1300	10	CT (100/50)	0.5 - 3 L	0.01 - 0.2	ST 226-01 or 3M OVM	ALL
ACETONE	67-64-1	OSHA 69	10	CT (130/65)	3 L	0.05	ORBO 91 Carbosieve S-III CMS	ALL
ACETONITRILE	75-05-8	NIOSH 1606	10	CT (400/200)	1L @ 40ppm - 25 L	0.01 - 0.2	ST 226-09 Not compatible with other organics.	ALL
ACIDS, INORGANIC (H2SO4)	7664-93-9	NIOSH 7903 (S) OSHA ID-165SG (N)	3	SG (400/200) prewashed, or ORBO 53	3 - 100 L	0.2 - 0.5	ST 226-10-03 (may contain high sulfate) Supelco 2-0265M is preferred; send blanks	ALL
ACIDS, INORGANIC (H2SO4)	7664-93-9	OSHA ID-113	1	0.8 um MCEF	480 L	1 - 3 LPM	FLT 225-5 Remove filter and ship in glass vial.	N
ACIDS, INORGANIC (H3PO4)	7664-38-2	NIOSH 7903 (S) OSHA ID-165SG (N)	2	SG (400/200) prewashed, or ORBO 53	3 - 100 L	0.2 - 0.5	ST 226-10-03 (may contain high sulfate) Supelco 2-0265M is preferred; send blanks	ALL
ACIDS, INORGANIC (H3PO4)	7664-38-2	OSHA 111	1	0.8 um MCEF	960 L	2	FLT 225-5 Remove filter and ship in glass vial; send blanks	N
ACIDS, INORGANIC (HBr)	10035-10-6	NIOSH 7903 (S) OSHA ID-165SG (N)	2	SG (400/200) prewashed, or ORBO 53	3 - 100 L	0.2 - 0.5	ST 226-10-03 (may contain high sulfate) Supelco 2-0265M is preferred; send blanks	ALL
ACIDS, INORGANIC (HCl)	7647-01-0	NIOSH 7903 (S) OSHA ID-174SG (N)	1	SG (400/200) prewashed, or ORBO 53	3 - 100 L	0.2 - 0.5	ST 226-10-03 (may contain high sulfate) Supelco 2-0265M is preferred; send blanks	ALL
ACIDS, INORGANIC (HF)	7664-39-3	NIOSH 7903 (S) NIOSH 7902(N)	1	SG (400/200) prewashed, or ORBO 53	3 - 100 L	0.2 - 0.5	ST 226-10-03 (may contain high sulfate) Supelco 2-0265M is preferred; send blanks	ALL
ACIDS, INORGANIC (HF)	7664-39-3	NIOSH 7906	1	MCEF	1-800 L	1-2	FLT 225-5	N
ACIDS, INORGANIC (HNO3)	7697-37-2	NIOSH 7903 (S) OSHA ID-165SG (N)	1	SG (400/200) prewashed, or ORBO 53	3 - 100 L	0.2 - 0.5	ST 226-10-03 (may contain high sulfate) Supelco 2-0265M is preferred; send blanks	ALL
ACRYLAMIDE	79-06-1	OSHA 21	2	GFF & SG	120 L	1	Supelco 2-0229 & 2-3376	N
ACRYLONITRILE	107-13-1	NIOSH 1604	1	CT (100/50)	3.5 L @ 2ppm - 20 L	0.01 - 0.2	ST 226-01 Not compatible with other organics.	N
ALDEHYDE SCREEN	Contact lab for list	NIOSH 2016 (Modified)	1	2,4-DNPH Silica Gel or GFF; Waters XPO SURE 2,4-DNPH Pouch media	12 L to 96 L	0.2 Long Term 1.5 Short Term	SKC ST 226-119 or Waters WATO 47205. Refrigerate & ship to lab promptly.	S
ALUMINUM and compounds as (Al) except Al2O3	7429-90-5	NIOSH 7300 (S) OSHA ID-206 (N)	1	0.8 um MCEF	100 L	1-4 LPM NIOSH 2 LPM OSHA	FLT 225-5	ALL
AMINOETHANOL (Ethanolamine)	141-43-5	OSHA 60	5	XAD-2 with 1-Napthylisothiocyanate	10 L for TWA 1.5 L for STEL	0.1	ST 226-30-18	S
AMMONIA	7664-41-7	NIOSH 6016	5	SILICA GEL(SULFURIC ACID)	1.5-24L	0.1-0.5	ST 226-10-06	C
AMYL ACETATE, iso-	123-92-2	NIOSH 1450	5	CT (100/50)	1 - 10 L	0.01 - 0.2	ST 226-01 OR 3M OVM Ship cold	ALL
AMYL ACETATE, n-	628-63-7	NIOSH 1450	5	CT (100/50)	1 - 10 L	0.01 - 0.2	ST 226-01 OR 3M OVM Ship cold	ALL
AMYL ACETATE, sec	626-38-0	NIOSH 1450	5	CT (100/50)	1 - 10 L	0.01 - 0.2	ST 226-01 OR 3M OVM Ship cold	ALL
AMYL ALCOHOL, iso	123-51-3	NIOSH 1405	10	CT (100/50)	1 - 10 L	0.01 - 0.2	ST 226-01 OR 3M OVM Not compatible with other organics.	ALL
ANTIMONY (Sb)	7440-36-0	NIOSH 7300 (S) OSHA ID-206 (N)	2	0.8 um MCEF	480 L	1-4 LPM NIOSH 2 LPM OSHA	FLT 225-5	ALL
ARSENIC and compounds as As	7440-38-2	NIOSH 7300 (S) OSHA ID-206 (N)	1	0.8 um MCEF	30-2000 L	1-4 LPM NIOSH 2 LPM OSHA	FLT 225-5	ALL
ASBESTOS IDENTIFICATION OF BULK MATERIAL		NIOSH 9002*	< 1 %	Bulk, Clear 4"X4" ZipLok	<10 Grams, 2x2x2 cm		4"x4" Zip-lok bag 8105-00-837-7753, Asbestos ID may be done locally. (Must be rated proficient).	ALL
BARIUM (Ba)	7440-39-3	NIOSH 7300 (S) OSHA ID-206 (N)	2	0.8 um MCEF	480 L	1-4 LPM NIOSH 2 LPM OSHA	FLT 225-5	ALL
BENZENE	71-43-2	OSHA 1005	2	CT (100/50)	2 - 10 L	0.01 - 0.2	ST 226-01 or 3M OVM	ALL
BENZYL ALCOHOL	100-51-6	OSHA PV 2009	10	XAD-7	24 L	0.2 LPM	ST 226-95 Not compatible with other organics.	ALL
BENZYL CHLORIDE	100-44-7	NIOSH 1003	10	CT (100/50)	10 L	0.1 - 0.2	ST 226-01 or 3M OVM	N

LAB: ALL = Both Labs
N = Norfolk
S = San Diego
C = Contract Lab

LOQ = Limit of Quantitation

SUBSTANCE	CAS NO	METHOD (modified) *not modified	LOQ (ug)	SAMPLING MEDIA	SAMPLE VOLUME (L)	SAMPLING RATE (LPM)	INSTRUCTIONS	LAB
BERYLLIUM and compounds as Be	7440-41-7	NIOSH 7300 (S) OSHA ID-206 (N)	0.05	0.8 um MCEF	600 L	1-4 LPM NIOSH 2 LPM OSHA	FLT 225-5	ALL
BISPHENOL A	80-05-7	OSHA 1018	0.4	GFF	180 L	1.0 LPM	FLT-225-7	C
BROMINE	7726-95-6	NIOSH 6011	1.6	1 Teflon pre-filter & 1 Silver membrane filter	8 - 360 L	0.3 - 1.0	FLT-225-9006 Protect from light	N
BROMOFORM (tribromomethane)	75-25-2	NIOSH 1003	10	CT (100/50)	4 L @ 0.5 ppm – 70 L NIOSH 1 - 10 L OSHA	0.01 - 0.2	ST 226-01 or 3M OVM	ALL
BROMOPROPANE, -1	106-94-5	NIOSH 1025	10	CT (100/50)	1 - 12 L	0.01 - 0.2	ST 226-01 or 3M OVM	S
BROMOPROPANE, -2	75-26-3	NIOSH 1025	10	CT (100/50)	1 - 12 L	0.01 - 0.2	ST 226-01	S
BROMOTRI-FLUOROMETHANE (R 13B1)	75-63-8	NIOSH 1017	50	Two CT (400/200)	0.1 L @ 1000ppm - 1 L	0.01 - 0.05	ST 226-09 & 226-01 Sample in series, disconnect and cap each for shipment	N
BUTADIENE, 1,3-	106-99-0	OSHA 56	1	CT Treated	3 L	0.05	ST 226-73	N
BUTANONE, 2- (See Methyl Ethyl Ketone or MEK)	78-93-3	NIOSH 2500 or OSHA 84	10	Anasorb 747 (140/70)	0.25 L @ 200ppm - 12 L NIOSH; 3L OSHA	0.01 - 0.2 NIOSH; 0.5 OSHA	ST 226-81A. NIOSH Method compatible with MIBK or Acetone	ALL
BUTOXYETHANOL (butyl cellosolve)	111-76-2	OSHA 83 or NIOSH 1403	10	CT (100/50)	1 - 12 L	0.01 - 0.05	ST 226-01 or 3M OVM Not compatible with other organics. Store in FREEZER.	ALL
BUTYL ACETATE, iso-	110-19-0	NIOSH 1450	5	CT (100/50)	1 - 10 L	0.01 - 0.2	ST 226-01 OR 3M OVM Ship cold	ALL
BUTYL ACETATE, n-	123-86-4	NIOSH 1450	5	CT (100/50)	1 - 10 L	0.01 - 0.2	ST 226-01 OR 3M OVM Ship cold	ALL
BUTYL ACETATE, sec-	105-46-4	NIOSH 1450	5	CT (100/50)	1 - 10 L	0.01 - 0.2	ST 226-01 OR 3M OVM Ship cold	ALL
BUTYL ACETATE, tert-	540-88-5	NIOSH 1450	5	CT (100/50)	1 - 10 L	0.01 - 0.2	ST 226-01 OR 3M OVM Ship cold	ALL
BUTYL ALCOHOL, iso-	78-83-1	NIOSH 1405	10	CT (100/50)	1 - 10 L	0.01 - 0.2	ST 226-01 OR 3M OVM Not compatible with other organics. Store in freezer	ALL
BUTYL ALCOHOL, n-	71-36-3	NIOSH 1405	10	CT (100/50)	1 - 10 L	0.01 - 0.2	ST 226-01 OR 3M OVM Not compatible with other organics. Store in freezer	ALL
BUTYL ALCOHOL, sec-	78-92-2	NIOSH 1405	10	CT (100/50)	1 - 10 L	0.01 - 0.2	ST 226-01 OR 3M OVM Not compatible with other organics.	ALL
BUTYL ALCOHOL, tert-	75-65-0	NIOSH 1405	10	CT (100/50)	1 - 10 L	0.01 - 0.2	ST 226-01 OR 3M OVM Not compatible with other organics.Store in freezer	ALL
BUTYL GLYCIDYL ETHER (BGE)	2426-08-6	NIOSH 1616	10	CT (100/50)	1 - 10 L	0.2	ST 226-01	ALL
BUTYL LACTATE	138-22-7	OSHA PV 2080	20	CT (100/50)	10 L	0.2	ST 226-01, Not compatible with other organics	N
CADMIUM and compounds as Cd	7440-43-9	NIOSH 7300 (S) OSHA ID-206 (N)	0.05	0.8 um MCEF	200 L	1-4 LPM NIOSH 2 LPM OSHA	FLT 225-5	ALL
CADMIUM PANEL (Blood & Urine) (Includes Blood Cd, Urine Cd, Ur B2-Microglogulin, & Ur Creatinine)		AA-GFF + In-House Methods	0.3	EDTA vacutainer (Lavender) or Sodium Heparin (Royal Blue Top)	3-mL Whole Blood; plus 5-mL random urine sample		Mix blood thoroughly immediately after collection; Adjust Urine pH to 6-8 after collection. Refrigerate urine & ship cool using overnight courier service	S
CALCIUM and compounds as Ca	7440-70-2	NIOSH 7300 (S) OSHA ID-206 (N)	1	0.8 um MCEF	50 L	1-4 LPM NIOSH 2 LPM OSHA	FLT 225-5	ALL
CAMPHOR	76-22-2	IN HOUSE CONTRACT LAB	50	CT (100/50)	1 - 25 L	0.01 - 0.2	ST 226-01 3M OVM Not compatible with other organics.	C
CARBARYL (Sevin)	63-25-2	OSHA 63	1	OSHA Versatile Sampler (OVS) XAD-2 + GFF	60 L	1.0 LPM	ST 226-30-16	ALL
CARBON BLACK	1333-86-4	NIOSH 5000	0.03	Tared 5um PVC or dual MCEF	85 L @ 3.5 mg/m3 - 570 L	1.5 - 2	FLT 225-8-01 or FLT 225-8202 (matched weight)	ALL
CARBON DISULFIDE	75-15-0	NIOSH 1600	10	CT (100/50)	2 L@ 10 ppm – 25 L	0.01 - 0.2	ST 226-01 Not compatible with other organics.	C
CARBON TETRACHLORIDE	56-23-5	NIOSH 1300	10	CT (100/50)	1 - 15 L	0.01 - 0.2	ST 226-01 OR 3M OVM	ALL
CATHECOL	120-80-9	OSHA PV 2014	30	OVS-7	100 L	1.0 LPM	ST 226-57 OR ST 226-95	N

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N = Norfolk
S = San Diego
C = Contract Lab

LOQ = Limit of Quantitation

SUBSTANCE	CAS NO	METHOD (modified) *not modified	LOQ (ug)	SAMPLING MEDIA	SAMPLE VOLUME (L)	SAMPLING RATE (LPM)	INSTRUCTIONS	LAB
CHLORDANE	57-74-9	OSHA 67	0.1	OSHA Versatile Sampler (OVS) XAD-2 + GFF	480 L	1.0 LPM	ST 226-30-16	ALL
CHLORINE	7782-50-5	NIOSH 6011	0.6	1 Teflon pre-filter & 1 Silver membrane filter	2 - 90 L	1.0 LPM	FLT-225-9006 Protect from light	N
CHLOROBENZENE	108-90-7	NIOSH 1003	10	CT (100/50)	1.5 L @ 75ppm – 40 L	0.01 - 0.2	ST 226-01 OR 3M OVM	S
CHLOROBENZYLIDENE MALONONITRILE (CS GAS)	2698-41-1	NIOSH 304	0.5	OVS-Tenax	15 – 90 L	< 1.5 LPM	ST 226-56	N
CHLOROFORM (Trichloromethane)	67-66-3	NIOSH 1003	5	CT (100/50)	1 L @ 50 ppm - 50 L	0.01 - 0.2	ST 226-01 OR 3M OVM	ALL
CHLORODIFLUOROMETHANE (FC-22)	75-45-6	NIOSH 1018		Two CT (400/200&100/50)	1 L @ 1000ppm - 4 L	0.01 - 0.5	ST226-09 & 226-01; sample tubes in series; separate; cap; send to lab	ALL
CHLORPYRIFOS (Dursban)	2921-88-2	OSHA 62	1	OSHA Versatile Sampler (OVS)	60 L	1.0 LPM	ST 226-30-16	C
CHROMIUM and compounds as total Cr	7440-47-3	NIOSH 7300 (S) OSHA ID-206 (N)	1	0.8 um MCEF	100 L	1-4 LPM NIOSH 2 LPM OSHA	FLT 225-5	ALL
CHROMIUM VI (Hexavalent Chromium, CrO3)	18540-29-9	OSHA ID-215V2	0.05	5 um PVC	960 L --Full shift sample. 30 L --15 min ceiling	1 - 4 LPM	FLT 225-802 **Send samples immediately. Samples must be analyzed or stabelized by 5 days from sample taken.**	ALL
COBALT and compounds as Co	7440-48-4	NIOSH 7300 (S) OSHA ID-206 (N)	1	0.8 um MCEF	100 L	1-4 LPM NIOSH 2 LPM OSHA	FLT 225-5	ALL
COPPER DUST / FUME as Cu	7440-50-8	NIOSH 7300 (S) OSHA ID-206 (N)	1	0.8 um MCEF	100 L	1-4 LPM NIOSH 2 LPM OSHA	FLT 225-5	ALL
CRESOL (ALL ISOMERS)	1319-77-3	NIOSH 2546 (N) OSHA 32 (S)	26	XAD-7 (100/50)	1 - 24 L	0.01- 0.1	ST 226-95	ALL
CUMENE (isopropyl benzene)	98-82-8	NIOSH 1501	10	CT (100/50)	1 - 10 L	0.01 - 0.2	ST 226-01 OR 3M OVM	ALL
CYANIDES, as CN	74-90-8	NIOSH 6010	1	Soda Lime (200/600)	2 L @ 5 ppm – 90 L	0.05-0.2	ST 226-28	C
CYCLOHEXANE	110-82-7	NIOSH 1500	10	CT (100/50)	5 L	0.01 - 0.2	ST 226-01 OR 3M OVM	ALL
CYCLOHEXANOL	108-93-0	NIOSH 1405	10	CT (100/50)	1 - 10 L	0.01 - 0.2	ST 226-01 OR 3M OVM Not compatible with other organics.	ALL
CYCLOHEXANONE	108-94-1	NIOSH 1300	10	CT (100/50)	1 - 10 L	0.01 - 0.2	ST 226-01 OR 3M OVM	ALL
CYCLOHEXANONE	108-94-1	OSHA 1	10	Chromosorb 108	10 L	0.2	ST 226-110	N
CYCLOHEXENE	110-83-8	NIOSH 1500	10	CT (100/50)	5 L	0.01 - 0.2	ST 226-01 OR 3M OVM	ALL
CYCLOHEXYLAMINE	108-91-8	OSHA PV 2016	2	COATED XAD-7	10 L	0.1	ST 226-98	N
CYCLONITE (RDX)	121-82-4	OSHA In-House	1	GFF	120 L	1.0 LPM	FLT 225-7	N
DDVP (Dichlorovos)	62-73-7	OSHA 62	0.7	OVS-2	480L	1.0 LPM	ST 226-30-16	N
DESFLURANE	57041-67-5	OSHA 106	5	ANASORB 747 (140/70)	3 L	0.05	ST 226-81A Store samples at reduced temperatures.	ALL
DIACETONE ALCOHOL	123-42-2	NIOSH 1405	10	CT (100/50)	1 - 10 L	0.01 - 0.2	ST 226-01 or 3M OVM Not compatible with other organics.	ALL
DIAZINON	333-41-5	OSHA 62	1	OSHA Versatile Sampler (OVS) XAD-2 + GFF	480 L	1.0 LPM	ST 226-30-16	N
DIBUTYL PHTHALATE (DBP)	84-74-2	OSHA 104	5	OVS-Tenax	240 L	1.0 LPM	ST 226-56	ALL
DICHLOROBENZENE, 1,2- (ortho)	95-50-1	OSHA 7	10	CT (100/50)	1 L @ 50 ppm - 60 L	0.01 - 0.2	ST 226-01OR 3M OVM	ALL
DICHLOROBENZENE, 1,4- (para)	106-46-7	OSHA 7	10	CT (100/50)	1 - 10 L	0.01 - 0.2	ST 226-01 OR 3M OVM	ALL
DICHLORODI-FLUOROMETHANE (FC-12)	75-71-8	NIOSH 1018	10	Two CT (400/200 + 100/50)	1 L @ 1000 ppm – 4 L	0.01-0.5	ST 226-09 & 226-01 Sample with tubes in series, separate, cap each, ship to lab.	ALL
DICHLOROETHANE, 1,1-	75-34-3	NIOSH 1003	10	CT (100/50)	0.5 L @ 100 ppm – 15 L	0.01 - 0.2	ST 226-01 OR 3M OVM	S
DICHLOROETHANE, 1,2- (Ethylene dichloride)	107-06-2	IN HOUSE	10	CT (100/50)	1 L @ 50 ppm - 50 L	0.01 - 0.2	ST 226-01 OR 3M OVM	ALL

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DICHLOROETHYLENE, 1,2-	540-59-0	NIOSH 1003	10	CT (100/50)	0.2 L @ 200 ppm – 5 L	0.01 - 0.2	ST 226-01 OR 3M OVM	S
DICHLOROFLUROMETHANE (FC-21)	75-43-4	NIOSH 2516	50	Two CT (400/200)	0.25 L @ 1000 ppm - 3 L	0.01 - 0.05	ST 226-09 Sample with tubes in series, separate, cap each, ship to lab.	N
DIELDRIN	60-57-1	NIOSH S283	0.1	GFF	180 L	0.1 - 1.5	FLT 225-7 Ship in glass vial (Supelco#2-3297)	N
DIESEL EXHAUST Particulate		NIOSH 5040	2-10	Quartz-Fiber (Heat treated)	142 L minimum Volume.	2-4 L	ST 225-401 (Call lab for special media) Media supplied & shipped.	C
DIESEL FUEL MARINE		NIOSH 1550 (N) OSHA 48 (S)	75	Large CT (200/400)	1-20 L	0.2	ST 226-09 Provide 1 ml bulk sample.	ALL
DIETHYLENE GLYCOL MONOBUTYL ETHER (BUTYL CARBITOL)	112-34-5	OSHA PV 2095	10	CT (100/50)	10 L	0.2	ST 226-01, Not compatible with other organics	N
DI-(2-ETHYL HEXYL) PHTHALATE (DEHP)	117-81-7	OSHA 104	10	OVS-Tenax	240 L	1.0 LPM	ST 226-56	ALL
DIETHYL PHTHALATE (DEP)	84-66-2	OSHA 104	10	OVS-Tenax	240 L	1.0 LPM	ST 226-56	ALL
DIETHYLENE TRIAMINE (DETA)	111-40-0	OSHA 60	1	XAD-2 with 1-Napthylisothiocyanate	10 L	0.1	ST 226-30-18	S
DIISOBUTYL KETONE	108-83-8	NIOSH 1300	10	CT (100/50)	1 - 10 L	0.01 - 0.2	ST 226-01 or 3M OVM	ALL
DIMETHYLFORMAMIDE (DMF)	68-12-2	NIOSH 2004	10	SG (150/75)	15 L @ 30 mg/m3 – 80 L	0.01 - 1.0	ST 226-10	ALL
DIMETHYLACETAMIDE (N,N)	127-19-5	NIOSH 2004	10	SG (150/75)	15 - 80 L	0.01 - 1.0	ST 226-10	N
DIMETHYL PHTHALATE (DMP)	131-11-3	OSHA 104	10	OVS-Tenax	240 L	1.0 LPM	ST 226-56	ALL
DINITROTOLUENE, 2,4-	121-14-2	OSHA 44	1	GFF-Tenax	60 L	1.0 LPM	ST 226-56	N
DINITROTOLUENE, 2,6-	606-20-2	OSHA 44	1	GFF-Tenax	60 L	1.0 LPM	ST 226-56	N
DIOCTYL PHTHALATE (DOP)	117-84-0	OSHA 104	10	OVS-Tenax	240 L	1.0 LPM	ST 226-56	ALL
DIOXANE (1,4 Diethylene dioxide)	123-91-1	NIOSH 1602	10	CT (100/50)	0.5 L @ 100 ppm – 15 L	0.01 - 0.2	ST 226-01 or 3M OVM	ALL
DIPROPYLENE GLYCOL METHYL ETHER	34590-94-8	NIOSH 2554	10	CT (100/50)	10 L	0.01 - 0.2	ST 226-01 OR 3M OVM Not compatible with other organics.	ALL
D-LIMONENE	5989-27-5	OSHA PV 2036	10	CT (100/50)	10 L	0.05 - 0.2	ST 226-01 Not compatible with other organics.	N
DIVINYL BENZENE	108-57-6	OSHA 89	70	CT TBC Treated	12 L	0.5	ST 226-73	N
DURSBAN (Chlorpyrifos)	2921-88-2	OSHA 62	1	OSHA Versatile Sampler (OVS) XAD-2 + GFF	480 L	1.0 LPM	ST 226-30-16	N
DUST (RESPIRABLE)		NIOSH 0600	50	TARED 5um PVC + CYCLONE	75 L @ 5 mg/m3 – 1000 L	1.7	PVC, FLT 225-8-01 or 225-8202 (matched wt) FIELD	ALL
DUST (TOTAL NUISANCE)		NIOSH 0500	50	Tared 5um PVC Filter or matched weight MCEF	25 L @ 5 mg/m3 – 133 L	1.5 - 2.0	FLT 225-8-01 or 225-8202 (matched wt) FIELD	ALL
ELEMENTAL CARBON (Diesel Particulate)		NIOSH 5040	2-10	Quartz-Fiber (Heat treated)	142 L minimum Volume.	2-4 LPM	ST 225-401 (Call lab for special media) Media supplied & shipped.	C
EPICHLOROHYDRIN	106-89-8	OSHA 7	10	CT (100/50)	20 L	0.01 - 0.2	ST 226-01	ALL
ETHANOLAMINE (Aminoethanol)	141-43-5	OSHA 60	5	XAD-2 with 1-Napthylisothiocyanate	10 L=TWA 1.5 L=STEL	0.1	ST 226-30-18	S
ETHOXYETHANOL, 2- (Ethyl cellosolve)	110-80-5	NIOSH 1403	10	CT (100/50)	1 - 6 L	0.01 - 0.05	ST 226-01 Not compatible with other organics. Store in FREEZER.	ALL
ETHOXYETHANOL, 2- (Ethyl cellosolve)	110-80-5	OSHA 79	1	CT (100/50)	15 - 48 L	0.1 - 1.0	ST 226-01 Not compatible with other organics. Store in FREEZER. Larger volume for lower PEL	N
ETHOXYETHYL ACETATE, 2- (Cellosolve acetate)	111-15-9	NIOSH 1450	10	CT (100/50)	1 - 10 L	0.01 - 0.02	ST 226-01 Not compatible with other organics. Store in FREEZER. Ship cold.	ALL
ETHOXYETHYL ACETATE, 2- (Cellosolve acetate)	111-15-9	OSHA 79	10	CT (100/50)	15 - 48 L	0.1 - 1.0	ST 226-01 Not compatible with other organics. Store in FREEZER. Larger volume for lower PEL. Ship cold.	N
ETHYL ACETATE	141-78-6	NIOSH1457	10	CT (100/50)	6 L	0.01 - 0.2	ST 226-01 OR 3M OVM	ALL

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ETHYL ACRYLATE	140-88-5	OSHA 92	10	CT TBC Treated	12 L	0.01-0.2	ST 226-73 ship cold	N
ETHYL ACRYLATE	140-88-5	NIOSH 1450	10	CT (100/50)	1 - 10 L	0.01 - 0.2	ST 226-01 OR 3M OVM Ship cold	ALL
ETHYL ALCOHOL (ETHANOL)	64-17-5	NIOSH 1400	10	CT (100/50)	0.1 - 1.0 L	0.05	ST 226-01 OR 3M OVM Not compatible with other organics. Refrigerate shipment.	ALL
ETHYL ALCOHOL (ETHANOL)	64-17-5	OSHA 100	10	ANASORB 747 (140/70)	12 L	0.05	ST 226-82 Two tubes in series	ALL
ETHYLAMINE	75-04-7	OSHA 36	0.3	XAD-7 Coated (100/50)	10 L	0.2	ST 226-96	S
ETHYL BENZENE	100-41-4	NIOSH 1501	5	CT (100/50)	10 - 24 L	0.01 - 0.2	ST 226-01 OR 3M OVM	ALL
ETHYL BUTYL KETONE (3-heptanone)	106-35-4	NIOSH 1301	10	CT (100/50)	1 - 25 L	0.01 - 0.2	ST 226-01 OR 3M OVM	ALL
ETHYL ETHER	60-29-7	NIOSH 1610	10	CT (100/50)	0.25 - 3.0 L	0.01 - 0.2	ST 226-01 OR 3M 3520 Not compatible with other organics.	ALL
ETHYL ETHOXY PROPIONATE	763-69-9	KODAK INHOUSE	2.4	CT (100/50)	10 L	0.2	ST 226-01 Not compatible with other organics.	N
ETHYL FORMATE	109-94-4	NIOSH 1452	10	CT (100/50)	10 L	0.01 - 0.2	ST 226-01 OR 3M OVM	S
ETHYLENE DIAMINE (EDA)	107-15-3	OSHA 60	3.7	XAD-2 with 1-Napthylisothiocyanate	10 L	0.1	ST 226-30-18	S
ETHYLENE DICHLORIDE (1,2 Dichloroethane)	107-06-2	NIOSH 1003	5	CT (100/50)	1 -10 L	0.01 - 0.2	ST 226-01	ALL
ETHYLENE GLYCOL	107-21-1	NIOSH 5523	10	OVS-XAD (200/100)	5 - 60 L	0.5 - 2.0	ST 226-57	ALL
ETHYLENE GLYCOL DINITRATE (EGDN)	628-96-6	NIOSH 2507	0.6	Tenax GC (100/50)	3 - 100 L	0.2-1.0	Supelco 2-0832	C
ETHYLENE GLYCOL MONOBUTYL ETHER ACETATE	112-07-2	OSHA 83	7.2	CT (100/50)	48 L	0.1	ST 226-01 Not compatible with other organics.	ALL
ETHYLENE OXIDE (EtO)	75-21-8	NIOSH 1614	1	HBR Coated CT (100/50)		1L @5ppm-24 L	ST 226-38-03 Not compatible with other organics.	C
ETHYLENE OXIDE (3M passive monitor)	75-21-8	3M METHOD	1	3M EtO Monitor	15 minutes - 8 hours	0.0493	3M EtO Monitor #3551	C
FIBER COUNT (Personal Monitoring or Area Clearance Sampling)		NIOSH 7400*	5.5 f/100 flds	0.8 um MCEF (25 mm)	400 L @ 0.1 f/cc (Personal) 1200 L (Area Clearance)	0.5 - 2.5 (Pers) 1.0 - 16 L (Area)	FL/CL 225-321 or 225-321A Adjust volume for fiber density = 100-1300 f/mm2. Do not overload filter.	ALL
FIBROUS GLASS (As Total Nuisance Dust)		NIOSH 0500*	50	Tared 5um PVC Filter or matched weight MCEF	25 L @ 5 mg/m3 – 133 L	1.5 - 2.0	FLT 225-8-01 or 225-8202 (matched wt) FIELD	ALL
FIBROUS GLASS (by fiber count)		NIOSH 7400	5.5 f/100 flds	0.8 um MCEF (25 mm)	400 L @ 0.1 f/cc	0.5 - 2.5	FL/CL 225-321 or 225-321A Adjust volume for fiber density = 100-1300 f/mm2. Do not overload filter.	ALL
FORMALDEHYDE	50-00-0	NIOSH 2016 (Modified)	1	2,4-DNPH Silica Gel	12 L to 96 L	0.5 for 226-119 1.0 for 226-119-7	SKC ST 226-119 and 226-119-7. Refrigerate & ship to lab promptly.	ALL
FORMALDEHYDE	50-00-0	NIOSH 2016 (Modified)	1	Waters XPO SURE; 2,4-DNPH Pouch media	22.5 L to 96 L	0.2 Long Term 1.5 Short Term	Waters WATO 47205. Refrigerate & ship to lab promptly.	ALL
GASOLINE	8006-61-9	NIOSH 1550 (N) OSHA 48 (S)	75	CT (100/50)	1.3 L @ 400 mg/m3 – 20 L	0.01 - 0.2	ST 226-01 or 3M OVM Provide 5ml bulk sample.	ALL
GLUTARALDEHYDE	111-30-8	NIOSH 2532	0.5	2,4-DNPH Silica Gel	15 L	1.0 LPM	SKC ST 226-119 or WATO 47205	ALL
GLUTARALDEHYDE	111-30-8	OSHA 64	0.5	2,4-DNPH GFFs	15 L	1.0 LPM	SKC 225-9003	N
HALOTHANE (Fluothane)	151-67-7	OSHA 103	5	ANASORB 747 (140/70)	12 L	0.05	ST 226-81A Store samples at reduced temperatures.	ALL
HALOTHANE (Fluothane)	151-67-7	OSHA 29	15	Two CT (100/50)	10 L	0.05	ST 226-01, 2 Tubes in series. Or st 226-09. Not compatible with other organics	N

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HEPTACHLOR	76-44-8	OSHA PV 2029	0.5	OSHA Versatile Sampler (OVS) XAD-2 + GFF	60 L	1.0 LPM	ST 226-30-16	ALL
HEPTANE,n-	142-82-5	NIOSH 1500	10	CT (100/50)	4 L	0.01 - 0.2	ST 226-01 or 3M OVM	ALL
HEPTANONE,3- (Ethyl Butyl Ketone)	106-35-4	NIOSH 1301	10	CT (100/50)	1 - 25 L	0.01 - 0.2	ST 226-01 or 3M OVM	ALL
HEPTANONE,2- (Methyl n-Amyl Ketone)	110-43-0	NIOSH 1301	10	CT (100/50)	1 - 10 L	0.01 - 0.2	ST 226-01 or 3M OVM	ALL
HEXACHLOROETHANE	67-72-1	NIOSH 1003	10	CT (100/50)	1 - 25 L	0.01 - 0.2	ST 226-01 or 3M OVM	S
HEXAMETHYLENE DIISOCYANATE (HDI)	822-06-0	OSHA 42	1	Treated 37mm GFF	3 L @ 1ppm – 70 L	1.0 LPM	FLT 225-9002 or Call LAB for coated filters; Sample open faced.	N
HEXAMETHYLENE DIISOCYANATE (HDI)	822-06-0	OSHA 42 & OSHA 18 (Modified)	0.35	Treated 37mm GFF	15 - 240 L	1.0 LPM	Call LAB for coated filters; Sample open faced.	S
HEXAMETHYLENE DIISOCYANATE (HDI Oligomers)	28182-81-2	OSHA 42 & OSHA 18 (Modified)	1	Treated 37mm GFF	15 - 240 L	1.0 LPM	Call LAB for coated filters; Sample open faced.	S
HEXAMETHYLENE DIISOCYANATE BIURET (HDIB)	4035-89-6	OSHA PV 2030	1.1	Treated 37mm GFF	15 - 240 L	1.0 LPM	FLT 225-9002 or Call LAB for coated filters; Sample open faced.	N
HEXAMETHYLENE DIISOCYANATE HOMOPOLYMER	28182-81-2	OSHA PV 2125	0.35	Treated 37mm GFF	15 - 240 L	1.0 LPM	Call LAB for coated filters; Sample open faced.	N
HEXANE, n-	110-54-3	NIOSH 1500	10	CT (100/50)	4 L	0.01 - 0.2	ST 226-01 or 3M OVM	ALL
HEXANONE,2- (Methyl n-Butyl Ketone or MBK)	591-78-6	NIOSH 1300	10	CT (100/50)	1 - 10 L	0.01 - 0.2	ST 226-01 or 3M OVM	ALL
HEXONE (Methyl Isobutyl Ketone or MIBK)	108-10-1	NIOSH 1300	10	CT (100/50)	1 - 10 L	0.01 - 0.2	ST 226-01 or 3M OVM	ALL
HEXYLENE GLYCOL	107-41-5	NIOSH 1403	10	CT (100/50)	1-10 L	0.01-0.5	ST 226-01, Not compatible with other organics	N
HYDROGEN CYANIDE, as CN	74-90-8	NIOSH 6010	1	Soda Lime (200/600)	2 L @ 5 ppm – 90 L	0.05-0.2	ST 226-28	C
HYDROGEN CHLORIDE	7647-01-0	NIOSH 7903 (S) OSHA 165SG (N)	1	SG (400/200) prewashed, or ORBO 53	3 - 100 L	0.2 - 0.5	ST 226-10-03 (may contain high sulfate) Supelco 2-0265M is preferred; send blanks	ALL
HYDROGEN FLUORIDE	7664-39-3	NIOSH 7903 (S) OSHA 165SG (N)	1	SG (400/200) prewashed, or ORBO 53	3 - 100 L	0.2 - 0.5	ST 226-10-03 (may contain high sulfate) Supelco 2-0265M is preferred; send blanks	ALL
HYDROGEN SULFIDE	7783-06-04	NIOSH 6013	11	CT (400/200), washed, sulfur-free	1.2 - 40 L	0.1 - 1.5 recommend 0.2 LPM	Supelco ORBO 34	S
HYDROGENATED MDI (HMDI, not HDI)	5124-30-1	OSHA PV 2092	0.7	Treated 37mm GFF	15 - 240 L	1.0 LPM	FLT 225-9002.Call LAB for coated filters; Sample open faced. Note: HMDI is not the same chemical as HDI	N
HYDROQUINONE	123-31-9	NIOSH 5004	10	0.8 um MCEF	30 L @ 2 mg/m3 - 180 L	1 - 3 LPM	FLT 225-5 Ship filter in 10ml 1% aq Acetic Acid; ship in glass vial.	C
IRON FUME and particulate as Fe	1309-37-1	NIOSH 7300 (S) OSHA 206 (N)	5	0.8 um MCEF	30 L minimum	1-4 LPM NIOSH 2 LPM OSHA	FLT 225-5	ALL
ISOFLURANE	26675-46-7	OSHA 103	5	ANASORB 747 (140/70)	10 L Maximum	0.1	ST 226-81A OR 3M OVMS Store samples at reduced temperatures.	ALL
ISOPHORONE	78-59-1	NIOSH 2508	20	CT (100/50)	2 - 25 L	0.01 - 1.0	ST 226-81A	ALL
ISOPHORONE DIISOCYANATE	4098-71-9	OSHA PV 2092	0.3	Treated 37mm GFF	15 - 240 L	1 LPM	FLT 225-9002 or Call LAB for coated filters; Sample open faced.	ALL
JP4		NIOSH 1550 (N) OSHA 48 (S)	75	CT (100/50)	1.3 L @ 400 mg/m3 – 20 L	0.01 - 0.2	ST 226-01 Provide 1 ml bulk sample.	ALL
JP5	64741-77-1	NIOSH 1550 (N) OSHA 48 (S)	75	CT (100/50)	1.3 L @ 400 mg/m3 – 20 L	0.01 - 0.2	ST 226-01 Provide 1 ml bulk sample.	ALL
JP8	64742-81-0	NIOSH 1550 (N) OSHA 48 (S)	75	CT (100/50)	1.3 L @ 400 mg/m3 – 20 L	0.01 - 0.2	ST 226-01 Provide 1 ml bulk sample.	ALL
KEROSENE	8008-20-6	NIOSH 1550 (N) OSHA 48 (S)	75	CT (100/50)	1.3 L @ 400 mg/m3 – 20 L	0.01 - 0.2	ST 226-01 Provide 2 ml bulk sample.	ALL

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LEAD in Bulk Paint	7439-92-1	NIOSH 7300 (S) OSHA ID-206 (N)	0.01%	Dry paint chips	50-100 mg	N/A	Ship dry paint chip material in 4"x4" Zip-lok bag 8105-00-837-7753 or use a sample vial.	ALL
LEAD in Dust Wipes	7439-92-1	NIOSH 7300 (S) OSHA ID-206 (N)	1-10 ug	Ghost Wipes--(Pre-moistened)	Do either the IH 10 x 10 cm or the HUD 1 ft sq wipe area	Include 2 Blank wipes per batch.	Environmental Express Cat # 4210. Ship each wipe in 4"x4" Zip-lok bag or use a sample vial.	ALL
LEAD in Air and inorganic compounds as Pb	7439-92-1	NIOSH 7300 (S) OSHA ID-206 (N)	1	0.8 um MCEF	100 - 480 L	1-4 LPM NIOSH 2 LPM OSHA	FLT 225-5	ALL
LEAD In blood	7439-92-1	NIOSH 8003 lab modified	< 3 ug/dL	EDTA vacutainer (BD #6488;#6527;#6541)	3 ml Whole Blood		Mix thoroughly immediately after collection; refrigerate shipment using overnight courier service	ALL
LITHIUM	7439-93-2	OSHA ID-206	5	0.8 um MCEF	100 L	1-4 LPM NIOSH 2 LPM OSHA	FLT 225-5; Collect separately	N
MAGNESIUM OXIDE FUME as Mg	1309-48-4	NIOSH 7300 (S) OSHA ID-206 (N)	1	0.8 um MCEF	50 L	1-4 LPM NIOSH 2 LPM OSHA	FLT 225-5	ALL
MALATHION	121-75-5	OSHA 62	0.5	OSHA Versatile Sampler (OVS) XAD-2 + GFF	60 L	1 LPM	ST 226-30-16	C
MANGANESE (Mn)	7439-96-5	NIOSH 7300 (S) OSHA ID-206 (N)	1	0.8 um MCEF	100 L	1-4 LPM NIOSH 2 LPM OSHA	FLT 225-5	ALL
MERCURY PARTICULATE as Hg	7439-97-6	OSHA ID-145	0.05	0.8 um MCEF	10 L - 100 L	2 LPM	FLT 225-5 AND GHOST WIPE	C
MERCURY VAPOR as Hg	7439-97-6	NIOSH 6009	0.05	ANASORB C300 (200mg) Hopcalite	2 L @ 0.05 mg/m3 - 100 L	0.15 - 0.25	ST 226-17-1A Send two unexposed for blanks	S
MERCURY in urine	7439-97-6	NIOSH 165 lab modified	5 ug/L	Drug screening bottle			Immediately add 100 milligrams potassium persulfate as preservative. Ship refrigerated using overnight courier service.	S
MESITYL OXIDE	141-79-7	IN HOUSE CONTRACT LAB	5	CT (100/50)	1 - 25 L	0.01 - 0.2	ST 226-01 or 3M OVM	C
METAL SCAN-ICP (13 Metals) (As, Cd, Co, Cr, Cu, Fe, Mo, Mn, Ni, Pb, Sr, V, Zn)		NIOSH 7300 (S) OSHA ID-206 (N)	1-5 call lab	0.8 um MCEF	50 - 480 L	1-4 LPM NIOSH 2 LPM OSHA	Standard metals for cutting, welding, abrasive blasting operations. Additional metals can also be added by request.	ALL
METHANOL (Methyl Alcohol)	67-56-1	NIOSH 2000	10	SG (100/50)	1 L @ 200 ppm – 5 L	0.02 - 0.2	ST 226-51 Not compatible with other organics. Use larger tubes when high quantities of methanol are expected ST 226-10.	ALL
METHOXYETHANOL, 2- (Methyl cellosolve)	109-86-4	NIOSH 1403	10	CT (100/50)	6 - 50 L	0.01 - 0.5	ST 226-01 or 3M OVM Not compatible with other organics. Store in FREEZER.	ALL
METHOXYETHANOL, 2- (Methyl cellosolve)	109-86-4	OSHA 79	10	CT (100/50)	15 - 48 L	0.1 - 1.0 (1.0ml for STEL)	ST 226-01 or 3M OVM Not compatible with other organics. Store in FREEZER.	ALL
METHOXYETHYL ACETATE, 2-	109-49-6	OSHA 79	10	CT (100/50)	15 - 48 L	0.1 - 1.0 (1.0ml for STEL)	ST 226-01 Not compatible with other organics. Store in FREEZER.	ALL
METHYL ACETATE	79-20-9	NIOSH 1458	10	CT (100/50)	7 L	0.01 - 0.2	ST 226-01 or 3M 3520	ALL
METHYL CHLOROFORM (1,1,1-Trichloroethane)	71-55-6	NIOSH 1003	10	CT (100/50)	0.1 L @ 350 ppm – 8 L	0.01 - 0.2	ST 226-01	ALL
METHYL ETHYL KETONE (2-Butanone or MEK)	78-93-3	NIOSH 2500 or OSHA 84	10	Anasorb 747 (140/70)	0.25 L @ 200ppm - 12 L NIOSH; 3L OSHA	0.01 - 0.2 NIOSH; 0.05 OSHA	ST 226-81A or 3M OVM. NIOSH Method compatible with MIBK or Acetone	ALL
METHYL ETHYL KETONE (2-Butanone or MEK)	78-93-3	OSHA 16	10	Silica Gel	3.0 L	0.1	ST 226-10 or 3M OVM	N
METHYL ISOBUTYL KETONE (MIBK) HEXONE	108-10-1	NIOSH 2500 or OSHA 84	10	ANASORB 747 (140/70)	1 - 10 L	0.01 - 0.2	ST 226-81A. NIOSH Method compatible with MEK or Acetone	ALL

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METHYL ACRYLATE	96-33-3	OSHA 92	10	CT TBC Treated	12 L	0.05	st 226-73 or 3M OVM	N
METHYLAL	109-87-5	NIOSH 1611	10	CT (100/50)	1 - 3 L	0.01 - 0.2	ST 226-01 or 3M OVM Not compatible with other organics.	N
METHYLAMINE	74-89-5	OSHA 40	1	XAD-7 COATED (100/50)	10 L	0.2	ST 226-30-13-07	S
METHYLCYCLOHEXANE	108-87-2	NIOSH 1500	10	CT (100/50)	4 L	0.01 - 0.2	ST 226-01 or 3M OVM	ALL
METHYLENE BIS-CHLOROANILINE, 4,4',2- (MOCA)	101-14-4	OSHA 71	0.05	GFF Treated	100 L	1 LPM	FLT 225-9004 Transfer to vial w/ 2ml DI water.	N
METHYLENE BISPHENYL ISOCYANATE, 4,4'- (MDI)	101-68-8	OSHA 47	0.5	Treated 37mm GFF	15 - 240 L	1.0 LPM	FLT 225-9002 or Call LAB for coated filters; Sample open faced.	N
METHYLENE BISPHENYL ISOCYANATE, 4,4'- (MDI)	101-68-8	OSHA 47 & OSHA 18 (Modified)	0.5	Treated 37mm GFF	15- 240 L	1.0 LPM	Call LAB for coated filters; Sample open faced.	S
METHYLENE CHLORIDE (Dichloromethane)	75-09-2	NIOSH 1005	2	Two CT (100/50)	0.5 L @ 500 ppm – 2.5 L	0.01 - 0.2	ST 226-01 OR 3M OVM Tubes in series; separate & cap, ship to LAB	ALL
METHYLENE CHLORIDE (Dichloromethane)	75-09-2	OSHA 80	2	CT (130/65)	0.25 - 3.0 L	0.05	ORBO 91 Carbosieve S-III CMS	ALL
METHYLENE DIANILINE, 4,4'-	101-77-9	OSHA 57	0.01	GFF Treated	100 L	1.0 LPM	FLT 225-9004 Transfer to vial w/ 2ml DI water.	N
METHYL ISOAMYL KETONE	110-12-3	OSHA PV2042	10	CT (100/50)	10 L	1.0 LPM	ST 226-01 OR 3M OVM	ALL
METHYLAL	109-87-5	NIOSH 1611	10	CT (100/50)	1 - 3 L	0.01 - 0.2	ST 226-01 Not compatible with other organics.	N
METHYL METHACRYLATE	80-62-6	OSHA 94	2	CT TBC Treated	3 L	0.05	ST 226-73	ALL
METHYL-2-PYRROLIDINONE	872-50-4	IN HOUSE CONTRACT LAB	2	CT (100/50)	0.5- 125 L	0.05 - 0.2 L/min	ST 226-01	C
MINERAL SPIRITS	8052-41-3	NIOSH 1550 (N) OSHA 48 (S)	75	CT (100/50)	1.3 L @ 400 mg/m3 – 20 L	0.01 - 0.2	ST 226-01 Provide 2 ml bulk sample.	ALL
MOLYBDENUM (Mo)	7439-98-7	NIOSH 7300 (S) OSHA ID-206 (N)	1	0.8 um MCEF	50 L	1-4 LPM NIOSH 2 LPM OSHA	FLT 225-5	ALL
MORPHOLINE	110-91-8	OSHA 60	1.5	XAD-2 with 1-Napthylisothiocyanate	20 L	0.1	ST 226-30-18	S
NAPHTHALENE	91-20-3	OSHA 35	4	CHROMOSORB 106 (100/50)	10 L	0.2	ST 226-110	ALL
NAPHTHAS (REFINED PETROLEUM SOLVENTS)	8030-30-6	NIOSH 1550 (N) OSHA 48 (S)	75	CT (100/50)	1.3 L @ 400 mg/m3 – 20 L	0.01 - 0.2	ST 226-01 OR 3M OVM Provide 2 ml bulk sample.	ALL
NICKEL (Ni)	7440-02-0	NIOSH 7300 (S) OSHA ID-206 (N)	1	0.8 um MCEF	100 L	1-4 LPM NIOSH 2 LPM OSHA	FLT 225-5	ALL
NITROGEN DIOXIDE	10102-44-0	OSHA ID-182	1	Molecular Sieve Tube	3 L	0.2	ST 226-40-02	ALL
NITROGEN DIOXIDE / NITRIC OXIDE (NOX)	10102-43-9	OSHA ID-182 & OSHA ID-190	1	Molecular Sieve Tube	3 L	0.01 - 0.025	ST 226-40	ALL
NITROGLYCERIN (NG)	55-63-0	NIOSH 2507 & OSHA 43	0.6	TENAX (100/50)	15 L	0.2 - 1.0	ST 226-35-03	N
NITROMETHANE	75-52-5	NIOSH 2527	0.3	CHROMOSORB 106 (600/300)	1.2 - 3 L	0.01 - 0.5	ST 226-111A	N
NITROPROPANE, 1-	108-03-2	OSHA 46	0.4	XAD-4 (80/40)	4 L	0.01 - 0.1	ST 226-93	S
NITROPROPANE, 2-	79-46-9	OSHA 46	0.4	XAD-4 (80/40)	4 L	0.01 - 0.1	ST 226-93	S
NITROUS OXIDE (FIELD IR METHOD)	10024-97-2	NIOSH 6600	1 ppm				Analyze in field using portable IR equipment.	Field
NONANE	111-84-2	NIOSH1500	10	CT (100/50)	10 L	0.2	ST 226-01 OR 3M OVM	N
N-METHYL-2-PYRROLIDINONE	872-50-4	NIOSH 1302 (S) OSHA PV 2043 (N)	10	CT (100/50)	10 L	0.2	ST 226-01or 3M OVM Not compatible with other organics (PV2043)	ALL
OCTANE, n-	111-65-9	NIOSH 1500	10	CT (100/50)	4 L	0.01 - 0.2	ST 226-01 or 3M OVM	ALL
OIL MIST, MINERAL	8012-95-1	NIOSH 5026	50	37mm 0.8 MCE or 37mm 5-um PVC or 37 mm GFF	20 - 500 L	1 - 3 LPM	FLT 225-5 or FLT-225-8-01 or FLT 225-709. Provide 2 ml bulk mineral oil sample.	C
ORGANIC SCREEN	ASK LAB	IN HOUSE METHOD		CT (100/50)	2-25 L	0.01-0.2	ST 226-01 OR 3M OVMS	S

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OZONE	10028-15-6	OSHA ID-214	1	Two Treated GFF (nitrite-impregnated)	45 L	1.0 LPM	Call LAB for instructions on filters. Special order limited shelf filters: SKC 225-9014 and send 4 extra.	ALL
PARATHION	56-38-2	OSHA 62	1	OVS XAD -2 + GFF	480 L	1.0 LPM	ST 226-30-16	N
PENTACHLOROPHENOL (PCP)	87-86-5	OSHA 39	1	GFF + two XAD-7 (80/40)	48 L	0.01 - 0.2	ST 226-30-11-07 & FLT 225-7	ALL
PENTANE, n-	109-66-0	NIOSH 1500	10	CT (100/50)	2 L	0.01-0.05	ST 226-01 OR 3M OVM	ALL
PENTANONE, 2- (Methyl Propyl Ketone)	107-87-9	NIOSH 1300	10	CT (100/50)	1 - 10 L	0.01 - 0.2	ST 226-01 OR 3M OVM	ALL
PERCHLOROETHYLENE (Tetrachloroethylene)	127-18-4	NIOSH 1003	5	CT (100/50)	1- 10 L	0.01 - 0.2	ST 226-01 OR 3M OVM	ALL
PERMETHRIN	52645-53-1	OSHA 70	1	OSHA Versatile Sampler (OVS) XAD-2 + GFF	60 L	1.0 LPM	ST 226-30-16	S
PERMETHRIN	52645-53-1	OSHA In-House	1	37mm GFF	60 L	1.0 LPM	ST 225-7	N
PETROLEUM ETHER	8032-32-4	NIOSH 1550 (N) OSHA 48 (S)	75	CT (100/50)	1.3 L @ 400 mg/m3 – 20 L	0.01 - 0.2	ST 226-01 Provide 2 ml bulk sample.	ALL
PHENOL	108-95-2	OSHA 32	1	XAD-7 (100/50)	24 L	0.01 - 0.1	ST 226-95 Not compatible with other organics.	ALL
PHENYL-1-CYCLOHEXENE, 4-	4994-16-5	OSHA IN HOUSE	10	CT (100/50)	10 L	0.2	ST 226-01	N
PHENYL GLYCIDYL ETHER (PGE)	122-60-1	NIOSH 1619	10	CT (100/50)	80 L @ 1 ppm - 150 L	0.01 - 1.0	ST 226-01 OR 3M OVM	N
POLYCHLOROBPHENYLS (PCBs, AROCLORS)	53469-21-9	NIOSH 5503	0.3	GFF + FLORISIL (100/50)	1 L @ 0.5 mg/m3 – 50 L	0.05 - 0.2	FLT 225-16 & ST 226-39 Ship in glass vials; Provide 1ml bulk	ALL
POLYNUCLEAR AROMATIC HYDROCARBONS (PNAH)		NIOSH 5506	0.2	PTFE + XAD2 (150/75)	200 - 1000 L	2 LPM	FLT 225-17-07 & ST 226-30-04 Ship immediately in Aluminium foil wrapped glass vial.	S
POTASSIUM (K)	7440-09-7	NIOSH 7303	10	0.8 um MCEF	30-960L	1 - 4 LPM	FLT 225-5; Collect separately.	C
PROPYL ACETATE, iso-	108-21-4	NIOSH 1454	10	CT (100/50)	10 L	0.01 - 0.2	ST 226-01	ALL
PROPYL ACETATE, n-	109-60-4	NIOSH 1450	10	CT (100/50)	1 - 10 L	0.01 - 0.2	ST 226-01 OR 3M OVM Ship cold	ALL
PROPYL ALCOHOL, iso	67-63-0	NIOSH 1400	10	CT (100/50)	0.2 - 3 L	0.01 - 0.2	ST 226-01 Not compatible with other organics. Store in FREEZER.	ALL
PROPYL ALCOHOL, n-	71-23-8	NIOSH 1401	10	CT (100/50)	1 - 10 L	0.01 - 0.2	ST 226-01 Not compatible with other organics. Store in FREEZER.	ALL
PROPYLENE GLYCOL DINITRATE (PGDN OR OTTO FUEL)	6423-43-4	NIOSH 2507	0.5	Tenax (100/50)	2 L @ 0.5 mg/m3 - 10 L	0.2 - 1.0	ST 226-35-03 2 blanks are absolutely required. Not compatible with other organics.	ALL
PROPYLENE GLYCOL ETHYL ETHER	1569-02-4	NIOSH 1403	10	CT (100/50)	1 – 10 L	0.01 – 0.5 LPM	ST 226-01 Not compatible with other organics.	N
PROPYLENE GLYCOL MONOMETHYL ETHER	107-98-2	OSHA 99	10	CT (100/50)	10 L	0.1	ST 226-01 OR 3M OVM Not compatible with other organics.	N
PROPYLENE GLYCOL MONOMETHYL ETHER ACETATE	108-65-6	OSHA 99	10	CT (100/50)	10 L	0.1	ST 226-01 OR 3M OVM Not compatible with other organics.	ALL
PYRETHRUM	8003-34-7	OSHA 70	1	OSHA Versatile Sampler (OVS) XAD-2 + GFF	60 L	1.0 LPM	ST 226-30-16	ALL
PYRIDINE	110-86-1	NIOSH 1613	20	CT (100/50)	18 - 150 L	0.01 - 1.0	ST 226-01 Not compatible with other organics.	S
RDX (Cyclonite)	121-82-4	OSHA In-House	1	GFF	120 L	1	FLT 225-7	N
SELENIUM COMPOUNDS as (Se)	7782-49-2	NIOSH 7300 (S) OSHA ID-206 (N)	1	0.8 um MCEF	100 L	1-4 LPM NIOSH 2 LPM OSHA	FLT 225-5	ALL
SEVIN (Carbaryl)	63-25-2	OSHA 63	1	OSHA Versatile Sampler (OVS) XAD-2 + GFF	60 L	1	ST 226-30-16	S
SEVOFLURANE	28523-86-6	OSHA 103	5	ANASORB 747 (140/70)	12 L	0.05 LPM	ST 226-81 A	ALL
SILICA (CRYSTALLINE, CRISTOBALITE)	14464-46-1	OSHA ID-142	10	5 um PVC + Cyclone	400 L @ 0.05 mg/m3 – 1000 L	Nylon= 1.7; Aluminum= 2.5	FLT 225-8-01; CYCL 225-105	S

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SILICA (CRYSTALLINE, QUARTZ)	14808-60-7	OSHA ID-142	10	5 um PVC + Cyclone	400 L @ 0.05 mg/m3 – 1000 L	Nylon= 1.7; Aluminum= 2.5	FLT 225-8-01; CYCL 225-105	S
SILVER and soluble compounds as Ag	7440-22-4	NIOSH 7300 (S) OSHA ID-206 (N)	1	0.8 um MCEF	250 L	1-4 LPM NIOSH 2 LPM OSHA	FLT 225-5	ALL
SODIUM (Na)	7440-23-5	NIOSH 7303	10	0.8 um MCEF	30-960 L	1 - 4 LPM	FLT 225-5; Collect separately	C
SODIUM HYDROXIDE	1310-73-2	NIOSH 7401	5	1.0 um PTFE	13 - 200 L	1 - 4	FLT 225-1715	C
STODDARD SOLVENT (PD-680)	8052-41-3	NIOSH 1550 (N) OSHA 48 (S)	75	CT (100/50)	1.3 L @ 400 mg/m3 – 20 L	0.01 - 0.2	ST 226-01 OR 3M OVM Provide 2 ml bulk sample.	ALL
STRONTIUM (Sr)	7440-24-6	NIOSH 7300 (S) OSHA 206 (N)	1	0.8 um MCEF	100 L	1-4 NIOSH 2 OSHA	FLT 225-5	ALL
STYRENE (MONOMER)	100-42-5	NIOSH 1501	10	CT (100/50)	5 - 14 L	0.1 - 1.0	ST 226-01 OR 3M OVM	ALL
STYRENE (MONOMER)	100-42-5	OSHA 89	10	CT TBC Treated	12 L	0.05	ST 226-73	N
SULFUR DIOXIDE	7446-09-5	OSHA 200	0.5	ANASORB 747 (140/70)	1.5 - 12 L	0.1	ST 226-80	N
TETRACHLOROETHYLENE (Perchloroethylene)	127-18-4	OSHA 1001	5	CT (100/50)	1 – 10 L	0.01 - 0.2	ST 226-01	ALL
TETRAHYDROFURAN	109-99-9	NIOSH 1609	10	CT (100/50)	5 L	0.2	ST 226-01 OR 3M OVM	ALL
TIN (Inorganic Compounds) as Sn	7440-31-5	OSHA 206	1	0.8 um MCEF	100 L	2	FLT 225-5	ALL
TITANIUM DIOXIDE	13463-67-7	NIOSH 0500	50	Tared PVC	100 L	2	FLT 225-8-01, Preweighed filter required or 225-8202 (Matched wt)	ALL
TITANIUM	7440-32-6	OSHA ID-206	50	0.8 um MCEF	50 - 480 L	2	FLT225-5	N
TOLUENE	108-88-3	NIOSH 1501	5	CT (100/50)	2 - 8 L	0.01 - 0.2	ST 226-01 OR 3M OVM	ALL
TOLUENE-2,4-DIISOCYANATE (2,4-TDI)	584-84-9	OSHA 42	0.5	Treated 37mm GFF	15 - 240 L	1	FLT 225-9002 or Call LAB for coated filters; Sample open faced.	ALL
TOLUENE-2,6-DIISOCYANATE (2,6-TDI)	91-08-7	OSHA 42	0.5	Treated 37mm GFF	15 - 240 L	1	FLT 225-9002 or Call LAB for coated filters; Sample open faced.	ALL
TRIBROMOMETHANE	75-25-2	NIOSH 1003	5	CT (100/50)	1 - 10 L	0.01 - 0.2	ST 226-01 OR 3M OVM	ALL
TRICHLOROETHANE, 1,1,2-	79-00-5	NIOSH 1003	5	CT (100/50)	1 - 10 L	0.01 - 0.2	ST 226-01	ALL
TRICHLOROETHANE, 1,1,1-(Methylchloroform)	71-55-6	NIOSH 1003	5	CT (100/50)	1 - 10 L	0.01 - 0.2	ST 226-01	ALL
TRICHLOROETHYLENE	79-01-6	NIOSH 1003	5	CT (100/50)	1 - 10 L	0.01 - 0.2	ST 226-01 OR 3M OVM	ALL
TRICHLOROFLUOROMETHANE (FC-11)	75-69-4	NIOSH 1006	75	Two CT (400/200&100/50)	0.3 - 7 L	0.01-0.05	ST 226-09 & 226-01 Sample with tubes in series, separate, cap each, ship to lab.	N
TRICHLOROPROPANE (1,2,3 TCP)	96-18-4	NIOSH 1003	5	CT (100/50)	1 - 10 L	0.01 - 0.2	ST 226-01 OR 3M OVM	ALL
TRICHLOROTRIFLUOROETHANE (FC-113)	76-13-1	NIOSH 1020	5	CT (100/50)	0.1 L @ 1000 ppm - 3 L	0.01 - 0.05	ST 226-01 REFRIGERATE Shipment to LAB	ALL
TRIETHANOLAMINE	102-71-6	OSHA IN HOUSE	182	GFF	120 L	1	FLT 225-7	N
TRIETHYLENE TETRAMINE (TETA)	112-24-3	OSHA 60	3.7	XAD-2 with 1-Napthylisothiocyanate	10 L	0.1	ST 226-30-18	S
TRIGLYCIDYL ISOCYANURATE, 1,3,5	2451-62-9	OSHA PV2055	2	GFF Treated wih HBr	60 L	1	CALL SKC FOR SPECIAL MEDIA	N
TRIMETHYLAMINE	75-50-3	OSHA PV2060	20	COATED XAD-7	20 L	0.2	ST 226-98	C
TRIMETHYLBENZENE, 1,2,3-	526-73-8	OSHA 1020	10	CT (100/50)	10 L	0.1	ST 226-01 OR 3M OVM	ALL
TRIMETHYLBENZENE, 1,2,4-	95-63-6	OSHA 1020	10	CT (100/50)	10 L	0.1	ST 226-01 OR 3M OVM	ALL
TRIMETHYLBENZENE, 1,3,5-	108-67-8	OSHA 1020	10	CT (100/50)	10 L	0.1	ST 226-01 OR 3M OVM	ALL
TRINITROTOLUENE, 2,4,6- (TNT)	118-96-7	OSHA 44	1.2	GFF+Tenax (100/50)	60 L	0.1 - 1.0	FLT 225-7 & ST 226-35-03 OR ST 226-56	N
TRIORTHOCRESYL PHOSPHATE (TOCP)	78-30-8	NIOSH 5037	0.1	0.8 um MCEF	100 L	<1.5	FLT 225-5	ALL

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TRIPHENYL PHOSPHATE	115-86-6	NIOSH 5038	10	0.8 um MCEF	10 L @ 3 mg/m3 – 400 L	1 - 3	FLT 225-5	ALL
TURPENTINE	8006-64-2	NIOSH 1551	75	CT (100/50)	1 L @ 560 mg/m3 – 10 L	0.01 - 0.2	ST 226-01 Provide 1 ml bulk sample.	ALL
VANADIUM FUME & DUST as V	1314-62-1	NIOSH 7300 (S) OSHA ID-206 (N)	1	0.8 um MCEF	200 L	1-4 NIOSH 2 OSHA	FLT 225-5	ALL
VINYL CHLORIDE (MONOMER)	75-01-4	NIOSH 1007	0.04	Two CT (100/50)	0.7 - 5 L	0.05	ST 226-01 Tubes in series; separate & cap, ship to LAB OR 3M OVM	N
VINYL ACETATE	108-05-4	OSHA 51	1	AMBERSORB XE 347	24 L	0.1	Supelco ORBO 92 (160/80) OR 3M OVM	N
VINYL TOLUENE	2503-15-4	NIOSH 1501	10	CT (100/50)	24 L	0.2	ST 226-01 OR 3M OVM	N
VINYLIDENE CHLORIDE	75-35-4	OSHA 19	10	CT (100/50)	3 L	0.2	ST 226-01 OR 3M OVM	N
VM & P NAPHTHA	8032-32-4	NIOSH 1550 (S) OSHA 48 (N)	75	CT (100/50)	1.3 L @ 400 mg/m3 – 20 L	0.01 - 0.2	ST 226-01 OR 3M OVM Provide 2 ml bulk sample.	ALL
WAX (PARAFFIN FUME)	8002-74-2	OSHA In-House	18	GFF	100 L	1	FLT 225-7	N
XYLENE DIAMINE, m-	1477-55-0	OSHA 105	0.33	Two Treated GFF	15 L	1	SKC 225-9004	N
XYLENES (all isomers, o-,m-,p-)	1330-20-7	OSHA 1002	10	CT (100/50)	12 - 23 L	0.01 - 0.2	ST 226-01OR 3M OVM	ALL
ZINC and compounds as Zn	7440-66-6	NIOSH 7300 (S) OSHA ID-206 (N)	1	0.8 um MCEF	100 L	1-4 NIOSH 2 OSHA	FLT 225-5	ALL
ZINC PROTOPORPHRYIN in blood	15442-64-5	Lab method	5 ug/dL	EDTA vacutainer (BD #6488;#6527;#6541)			Mix thoroughly immediately after collection; refrigerate shipment using overnight courier service	ALL

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