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Fire & Rescue Division Hazardous Materials Section

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SAMPLING JAR STERILITY STANDARDS

THE REASON FOR A STERILITY STANDARD:

The question is often asked, "Why do we need sampling jars and containers that meet an EPA clean standard, and, what is the standard?"

Emergency responders in California trained to either the Cal OES CSTI Haz-Mat Technician (160 hour HMT) or Haz-Mat Specialist (240 hour HMS) levels are instructed on how to obtain samples of unknown liquid or solid materials using various types of sampling equipment. These items usually include some type of glass sampling tubes, and glass or plastic jars in which to place the sample. It is important to remember that these items are most likely used to capture an unknown substance for the purpose of identifying the product and its potential hazardous characteristics during the field sampling and hazardous materials categorization process. First responders will then be better able to make decisions regarding the degree of hazard the material poses, the best means for its disposal, and the cleanup of any contaminated areas.

On some occasions, there may be an interest in using this information as evidence to prosecute a case in court regarding disposal, storage, transportation, and/or environmental crimes involving hazardous materials or hazardous waste. Whenever this occurs, first responders must be aware that the standard of care for obtaining chemical samples to use as criminal evidence is much greater than that used to obtain samples simply for characterization and disposal.

Most importantly, emergency responders must be able to testify under oath that nothing they did while obtaining the samples influenced the laboratory analysis results. These influences can include the equipment used and the techniques employed. In particular, any equipment that touches the materials to be sampled, including sampling devices such as a "drum thief" or a "coliwasa" (**CO**lumn **L**iquid **WA**ste **S**ampling **A**pparatus) tube, as well as sample jars and vials, must be certified as being clean.

WHAT ARE THE E.P.A. STERILITY STANDARDS?

The federal Environmental Protection Agency (EPA) has established several sterility standards (protocols) for the cleansing of glass storage, sampling, and transportation jars, vials and vessels. The cost of incorporating a sterility protocol for these items may range from very inexpensive to extremely expensive. The sterility protocols most applicable to emergency response personnel and Haz-Mat Teams for field testing and sample gathering are of the lesser expense and are very reasonable. The higher end of the EPA sterility standards, those that are very

expensive, are intended for glassware used by testing laboratories and certifying entities such as Underwriters Laboratories, and do not apply to emergency response personnel use.

Protocols “A” and “B” are the most commonly specified and are most applicable to emergency responders:

- “EPA Cleaning Protocol A” (sometimes referred to as Class 3000)
- “EPA Cleaning Protocol B” (sometimes referred to as Class 2000)

These protocols state specifically what steps the manufacturer must take in cleaning the items prior to packaging and sale. They include steps such as washing with a biodegradable, nonphosphate detergent, rinsing with tap water and de-ionized water multiple times, and drying in an oven (see chart below). For glass jars and vials, the lid should be equipped with a Teflon seal, and the lid is then attached and screwed tight by the manufacturer.

MANUFACTURER’S CLEANING PROCEDURES	
EPA Cleaning Protocol “A” (Class 3000)	EPA Cleaning Protocol “B” (Class 2000)
<ol style="list-style-type: none"> 1. Wash bottles, liners, and caps in laboratory grade, biodegradable, non-phosphate detergent. 2. Rinse three times with tap water. 3. Rinse with 1:1 nitric acid. 4. Rinse three times with ASTM Type 1 de-ionized water. 5. Oven dry. 6. Rinse with methylene chloride. 7. Oven dry. 8. Assemble and package in organic-free environment 	<ol style="list-style-type: none"> 1. Wash bottles, liners, and caps in laboratory grade, biodegradable, non-phosphate detergent. 2. Rinse three times with tap water. 3. Rinse three times with ASTM Type 1 deionized water. 4. Oven dry. 5. Assemble in organic-free environment.

HOW TO SPECIFY A STERILITY CLEANLINESS WHEN PURCHASING:

It is important, therefore, to remember that when ordering a supply of these sampling items to be compliant with the FIREScope *Hazardous Materials Standardized Equipment List* (SEL), that the **order requisition** or **purchase order** specify that they shall meet a specific degree of sterility and cleanliness. This can be done by specifying and purchasing only those items that meet “EPA Protocol B” (sometimes referred to as Class 2000 in Supply House catalogs) or “EPA Protocol A” (sometimes referred to as Class 3000 in Supply House catalogs), and is slightly more stringent than Protocol B.

STORAGE AND MAINTENANCE:

Upon arrival, inspect the product to insure it is exactly as specified and that it does indeed meet the desired EPA sterility protocol. These jars and vials are packaged in quantities of 6, 12, or 24 to a case. There are several ways to verify and insure that the jars and / or vials are pre-cleaned to an EPA protocol:

- The product Statement or the Delivery Invoice included in the shipment should verify that the jars or vials meet the appropriate EPA protocol. **DO NOT DISCARD** – Save this statement or delivery invoice and always maintain with your inventory, or;
- The exterior of the cardboard packaging sometimes has a label that verifies the contents meet an EPA protocol. **DO NOT DISCARD THIS SHIPPING CONTAINER AND RE-PACKAGE.** It is your guarantee that the contents as so stated are indeed sterile, or;
- Sometimes a manufacturer of the glassware (i.e. I-CHEM) will attach a small bar-code type label to the individual jars or vials. **DO NOT REMOVE THESE LABELS,** or;



- Sometimes a manufacturer of the glassware will include a separate Certificate of Analysis sheet inside the shipping container to verify that the contents (jars or vials) meet an EPA sterility protocol. DO NOT DISCARD THIS DOCUMENTATION.

Emergency responders and Haz-Mat Team personnel who use glassware that does meet an EPA sterility protocol must always maintain some sort of documentation as noted in the statements above. Such documentation may come in handy when a response agency must verify in incident documentation, deposition, or testimony in a court of law that the sampling glassware used did indeed meet an EPA sterility protocol.



The lids of these jars and vials should never be removed except when ready to be used in the field, otherwise the guarantee of cleanliness and/or sterility has been compromised. Additionally, some manufacturers enclose each individual jar or vial in a separate individually sealed clear plastic wrapping. These plastic wrappings also should never be broken and/or removed until the jars are to be used in the field. Once a manufacturer's seal or jar lid seal is broken, first responders cannot simply reseal the individual items or lids with adhesive tape or any other procedure.



The FIREScope *Standardized Equipment List* (SEL) specifies at a minimum that some sampling equipment meet EPA Protocol "B". Equipment meeting EPA Protocol "A" will be acceptable because it exceeds the requirements. Equipment meeting EPA Protocol "C" WILL NOT be acceptable. See table below copied from the SEL.

Inv. #:	Item Name and Description	Requirement	Certification Or Standard	Type I	Type II	Type III
3.3.1	SAMPLE JARS, Sterile, Clear Glass, 16 oz: Short, EPA Class 2000, wide mouth with Teflon lined lids	6	Class 2000 EPA Protocol B	Opt	Opt	Opt
3.3.2	SAMPLE JARS, Sterile, Clear Glass, 8 & 4 oz: Short, EPA Class 2000, wide mouth with Teflon lined lids	Compliment of 12 (Rev2009)	Class 2000 EPA Protocol B	R	R	R
3.3.3	SAMPLE JARS, Sterile, Amber Glass, 16 oz, EPA Class 2000, wide mouth with Teflon lined lids	2	Class 2000 EPA Protocol B	Opt	Opt	Opt
3.3.4	SAMPLE JARS, Sterile, Amber Glass, 8 & 4 oz: EPA Class 2000, wide mouth with Teflon lined lids	Compliment of 4	Class 2000 EPA Protocol B	R	R	R
3.3.5	SAMPLE JARS, Non-Sterile, Plastic, 8 oz: Ideal for solids or powder samples, polypropylene, with wide mouth screw lids; Not recommended for solvents; Not recommended for evidence or lab analysis collection.	12	None	Opt	Opt	Opt
3.3.6	SAMPLE JARS, Non-Sterile, Glass, 8 oz: Ideal for corrosive liquids and solvents, glass, with wide mouth screw lids. Not recommended for evidence or lab analysis collection.	12	None	Opt	Opt	Opt
3.3.7	SAMPLE VIALS, Sterile, Clear Glass, 1.3 oz: Borosilicate glass vials, with closed Teflon lined cap	12	Class 2000 EPA Protocol B	R	R	R

The above information was taken largely from an article written by Mr. Steven M. De Lisi for Fire Engineering Magazine. The article is *Hazmat Survival Tips: Obtaining Evidence for Prosecution of Environmental Crimes: Beyond the Rule of Thumb (Survival Tip 41)*. Mr. De Lisi is employed by Tetra Tech EM Inc. as a program manager responsible for planning, training, and exercise activities related to hazardous materials response. Additional information has been added to further explain the purchasing, specifying, and storage of this glassware.