Executive Office of Environmental Affairs

Office of Technical Assistance
www.state.ma.gov/ota

Fact Sheet
Reporting Lead and Lead Compounds

Lower TRI and TURA Reporting Threshold for Lead and Lead Compounds:

On January 17, 2001, the Environmental Protection Agency (EPA), under the Emergency Planning and Community Right-to-Know Act (EPCRA) Section 313, modified the reporting requirements for both lead and the lead compounds category and lowered the Toxics Release Inventory (TRI) reporting threshold. The Massachusetts Toxics Use Reduction Act, M.G.L. c. 21I (TURA), adopted these modified reporting requirements. The reporting threshold for both lead and lead compounds is 100 pounds per calendar year, except for lead contained in stainless steel, brass and bronze alloys; those thresholds remain unchanged.

Classification of Lead and Lead Compounds:

The EPA classified lead and lead compounds as Persistent, Bioaccumulative, and Toxic (PBT) chemicals. PBT chemicals are a concern because they are highly toxic, do not break down easily in the environment, and accumulate in living tissues. The reduced thresholds of this category for federal and state chemical reporting requirements is part of a nationwide initiative to reduce the risks to human health and the environment from exposure to PBT pollutants.

Examples of products that contain lead:

- Lead acid batteries
- Lead solder
- Plating anodes
- Aluminum alloys

Lead compounds are found in:

- Chrome pigments, industrial paint pigments, anti-corrosion pigments
- Heat stabilizer in vinyl and plastic
- Varnish, paint drier, high temperature lubricants
- Optical glass

Lead and lead compounds are present in trace quantities in various fuels and their combustion emissions, such as coal, oil, and wood. Other industry and process sources of lead and lead compounds are listed in Table 1.

Who Must File TURA Form S for Lead or Lead Compounds?

Under the reporting requirements, a facility must file a Form S for lead and lead compounds if it meets ALL THREE of the following criteria:

1. Has one of the following SIC codes: 10-14, 20-40, 44-51, 72, 73, 75, or 76; AND
2. Has 10 or more full-time employees or the equivalent of 20,000 total hours worked per year; AND
3. Manufactures (including imports), processes or otherwise uses 100 pounds per year or more of lead (not contained in stainless steel, brass, or bronze alloys), or;

   Manufactures (including imports) or processes 25,000 lbs or otherwise uses 10,000 pounds per year or more of lead, regardless of whether it is contained in stainless steel, brass, or bronze alloys, or;

   Manufactures (including imports), processes or otherwise uses 100 pounds per year or more of lead compounds.

Reporting Lead and Lead Compounds:

The amount of lead and lead compounds that is manufactured, including coincidentally manufactured, processed or otherwise used must be accounted for in determining if a facility meets the reporting threshold.

Separate thresholds must be determined for both lead (by using the weight of the metal) and for lead compounds (by using the weight of the entire compound). However, if the threshold for both is exceeded, only one TRI Form R and TURA Form S is necessary and the reportable amount on the Form S is the sum of the weight of the lead and lead compounds and is reported in the lead compounds category.

For examples of threshold determinations refer to the EPA "EPCRA – Section 313: Guidance for Reporting Releases and Other Waste Management Activities of Toxic Chemicals: Lead and Lead Compounds" document (EPA Lead Guidance), available at: http://www.epa.gov/tri/guidance.htm

Contact the Massachusetts Department of Environmental Protection to request a TURA Form S reporting package at 617-292-5582 or www.mass.gov/dep/bwp/dhm/tura/turapubs.htm

Table 1. Industries and process sources of lead and/or lead compounds.

Industry/Process & SIC	Lead or lead compounds
Incineration of municipal and various industrial wastes: 4953	lead and lead compounds
Bulk petroleum stations – trace constituent in petroleum products: 5171 or 4226 (not TURA)	lead compounds
Wholesale distribution of lead chemicals and compounds: 2819	lead and lead compounds
Fabricated metal products – article component (e.g., ammunition, galvanized products, pipe organs): 34XX	lead and lead compounds
Electronic product components (e.g., batteries, electroplating of printed circuit boards, solder): 36XX	lead
Other product components (e.g., blown glass, dental amalgam fillings, lead cable coating, lead oxides in pigments)	lead and lead compounds
Paper manufacturing – present in wood and chemicals: 26XX	lead
Plastic materials and resin manufacture – formulation component	lead compounds
Chemical manufacture – organo-lead compound production, rubber, reactants, and catalysts: 28XX	lead and lead compounds
Carbon black production – trace constituent in crude oil: 2895	lead compounds
Petroleum refining – trace constituent in petroleum crude: 2911	lead compounds
Cement – trace constituent in raw materials: 3273	lead
Coal, oil, wood combustion (electric utilities, other facility electricity generation) – traces in fuels: 4911	lead and lead compounds
Waste treatment and solvent recovery – trace constituent in waste stream	lead and lead compounds

Quantifying Lead and Lead Compounds Use and Releases:

The quantity of lead and lead compounds must be determined for each activity – manufacture, process, or otherwise use. It is required that a facility subject to reporting under TRI and TURA use the best readily available data applicable to their operations. The following are potential data sources.

For emissions (listed from most accurate to least):

1. Facility-specific monitoring data.
2. Facility-specific emission factors.
3. EPA default emission factors provided in the EPA guidance document.

For use: MSDS, mass balance calculations, product specification sheets, contact your supplier.

Lead in Fuels

The content of lead and lead compounds in fuels used for combustion on site is considered otherwise used. In the absence of any other data, assume that the form of lead in the fuel is elemental lead. During combustion, lead and lead compounds are converted to the oxide form of the metal (manufactured). Unless a facility has information that indicates otherwise, it should be assumed that PbO is manufactured during combustion and that 100% of the lead, either elemental or in the lead compound, is converted to PbO. The EPA's average default values for lead content in common fuels and average emission factors are shown in Table 2. For determining coincidental manufacturing values, the content values in fuels should be adjusted by the weight ratio of lead oxide (PbO) to elemental lead, a factor of 1.08.

Lead is also present in combustion residuals. Typical amounts of lead concentrations in combustion residuals are:

- coal fly ash: 2,120 ppm
- coal bottom ash: 1,082 ppm
- oil ash: 100,000 ppm

Lead in Products

Products or devices that meet EPA's definition of an article and contain lead or lead compounds may qualify under the article exemption and therefore the lead and lead compounds in these articles would not be reported under TRI and TURA. For example, lead in a lead acid battery being used in a forklift would not be counted toward threshold amounts since this is an article.

Modification of Reporting Procedures:

Reporting procedures for PBTs have been modified and apply to both lead and the lead compounds category.

De minimis Exemption Eliminated: The amount of all lead and lead compounds (except for the lead contained in stainless steel, brass, or bronze alloys) must be quantified to determine whether reporting is required, regardless of how minimal the concentration.

Range Codes Prohibited: An actual amount must be reported for lead and lead compounds (except for the lead contained in stainless steel, brass, or bronze alloys). Using range codes is not an option for PBT reporting.

Data Precision: Lead and lead compounds (except for the lead contained in stainless steel, brass, or bronze alloys) must be reported precisely, based on the accuracy of supporting data. The minimum reportable amount is 0.1 pounds. If the amount is less than 0.05 pounds, "0" should be recorded rather than "N/A" (not applicable).

Exclusion from Form A: The use of Form A for reporting lead and lead compounds is prohibited once the 100 pound threshold has been exceeded (except for qualifying alloys).

Table 2. EPA average default values for lead content, threshold quantities, and emission factors for common fuels.

Fuel	Average Lead Content	Quantity needed to meet 100 lb otherwise use lead threshold	Emission Factor
No.2 fuel oil	0.50 ppmw[a]	$2.82*10^7$ gallons[b]	8.9 lbs/10^{12} BTU (uncontrolled)
No.6 fuel oil	1.0 ppmw	$1.27*10^7$ gallons[b]	0.00151 lb lead emitted/1000 gal #6 oil
Bituminous coal	3 to 111ppmw	$3.33*10^7$ lbs to $9.01*10^5$ lbs	(c)
Wood	20 ppmw	$5.00*10^6$ lbs	0.0029 lb/ton (uncontrolled)[d]
Aviation gas	1,750 ppmw	$9.25*10^3$ gallons	(c)
Natural gas	<0.05 mg/m^3	>$9.08*10^8$ m^3	(c)

(a) ppmw = parts per million by weight
(b) Assumes the following densities: No. 2 Fuel Oil: 7.1 lb/gallon; No. 6 Fuel Oil: 7.9 lb/gallon
(c) Contact your supplier or refer to Appendix C in EPA Lead Guidance document for default values.
(d) See EPA Lead Guidance section 5.1 for additional wood combustion emission factors

Nuances in Filing Form S:

The thresholds for PBT classified chemicals are the same for state and federal regulations; therefore many Massachusetts companies are required to file both TRI Form R and TURA Form S. Though the reporting procedures for both forms are similar, there are some differences in filing Form S. These are:

- Massachusetts TURA regulations have a broader SIC coverage than the federal EPCRA regulations.
- A facility filing a Form S must report chemical use as well as waste/byproduct generation.

OTA Assistance Services

The Office of Technical Assistance (OTA) provides one-on-one technical assistance on pollution prevention (P2), toxics use reduction (TUR) and compliance – as well as guidance in the form of workshops, case studies, manuals and other materials. OTA helps toxics users in Massachusetts to identify TUR/P2 opportunities within their operations and initiate planning efforts. Contact OTA at:

251 Causeway Street, Suite 900, Boston, MA 02114
Phone: (617) 626-1060 or on-line at www.state.ma.gov/ota

Example 1

A Massachusetts facility (SIC 3679) is covered by both TURA and TRI and has more than 10 full-time employees. The facility uses tin-lead solder in its wave soldering operation to mount components to printed circuit boards. They also have hand held soldering operations on site. They use only 63/37% tin-lead solder and solder paste. In 2001, the facility added 1,200 lbs of solder to its wave soldering machine; used 800 pounds of solder paste in wave soldering operations; and used 127 lbs of spool solder in its hand soldering operation.

The facility has a recycling permit that allows them to accumulate and recycle lead dross. From the analysis performed by their supplier, they determined that the 400 lbs of lead dross shipped off-site during the year contained 30% lead; from their hazardous waste manifest they determined they shipped 500 lbs of solder paste off-site as a hazardous waste. Calculating the manufacturing, processing, and otherwise use thresholds for lead, the use for this facility is:

Lead:

Manufacturing: 0 lbs Pb

Processing:

1,200 lbs solder * 0.37 lbs Pb/lb solder	= 444.0 lbs Pb
800 lbs of solder paste * 0.37 Pb/lb paste	= 296.0 lbs Pb
127 lbs solder * 0.37 lbs Pb/lb solder	= 47.0 lbs Pb
Total Processed	= 787.0 lbs Pb

Otherwise use: 0 lbs Pb

Byproduct:

400 lbs Pb dross * 0.30 lbs Pb/lb Pb dross	= 120 lbs Pb
500 lbs paste * 0.37 lbs Pb/lb paste	= 185 lbs Pb
Total Byproduct	= 305 lbs Pb

Section 1.2 of the Form S for lead from example 2 would be completed as follows:

1.2a Manufactured:	0	1.2d Generated as Byproduct:	305
1.2b Processed:	787	1.2e Shipped in or as Product:	482
1.2c Otherwise Used:	0		

The facility exceeded the 100 lb threshold for processing lead. The facility must file a federal Form R and state Form S for lead. The facility must calculate all uses, releases and waste management related to the manufacturing, processing, and otherwise use of lead.

Example 2:

A Massachusetts facility (SIC 3089) is covered by both TURA and TRI and has more than 10 full-time employees. In 2001, the facility burned 126,600 gallons of No. 6 fuel oil in its boiler [an otherwise use of 1 pound of lead and a coincidental manufacture of 1.1 pounds of a lead compound (PbO)]; processed 2 pounds of lead in a non-qualifying alloy used in wire jacketing; processed 20,000 pounds of PVC pellets containing 2.0% dibasic lead phthalate ($2PbO \bullet Pb(COO)_2C_6H_4$). The facility sent off-site 600 pounds of PVC scrap for disposal. Calculating the manufacturing, processing, and otherwise use thresholds for lead and lead compounds separately, the use for this facility is:

Lead:

Manufacturing: 0 lb Pb

Processing: 2 lbs Pb

Otherwise use: 1 lb Pb

The unit ppmw (parts per million by weight) for lead in No. 6 fuel oil is equivalent to 1 lb Pb/1*10^6 lbs oil. Therefore, the otherwise use of lead in No.6 fuel oil for this facility is: 126,600 gal oil * 7.9 lbs oil/gal * 1 lb Pb/10^6 lbs oil = 1 lb Pb

Lead Compounds:

Manufacturing: 1 lb Pb x 1.08 = 1.1 PbO

Otherwise use: 0 lb Pb compound

Processing:

20,000 lbs PVC pellets x .02 lb $2PbO \bullet Pb(COO)_2C_6H_4$/lb PVC pellets = 400 lbs of $2PbO \bullet Pb(COO)_2C_6H_4$

The only threshold that the facility exceeded was the 100 lb threshold for processing lead compounds. The facility must file a federal Form R and state Form S for lead compounds only. The facility must calculate all uses, releases and waste management related to the manufacturing, processing, and otherwise use of lead compounds. Had the facility also exceeded the 100 lb lead threshold, it would file one Form S for lead compounds (reporting the combined weights of the lead and lead compounds) and one Form R for lead compounds that reports all releases of lead from non-exempt activities involving lead and lead compounds.

Byproduct:

600 lbs PVC * 0.02 lb $2PbO \bullet Pb(COO)_2C_6H_4$/lb PVC * (621.6 mol wt Pb/ 817.6 mol wt $2PbO \bullet Pb(COO)_2C_6H_4$) = 9.1 lbs Pb

1.1 lbs PbO * (207.2 mol wt Pb/ 223.2 mol wt PbO) = 1.0 lb Pb

Total Byproduct = 10.1 lbs Pb

Sections 1.2 and 1.3 of the Form S for the lead compounds category from example 1 would be completed as follows:

1.2a Manufactured:	1.1	1.2d Generated as Byproduct:	10.1
1.2b Processed:	400	1.2e Shipped in or as Product:	388
1.2c Otherwise Used:	0		

1.3 Optional Question. When the amounts reported in 1.2a, 1.2b, and 1.2c are added together, the sum will (in many cases) equal the sum of 1.2d and 1.2e. In other words, the left and right columns will often form a “materials balance”. If the two columns are not in approximate balance, you may use this block to explain why. Mark all reasons that apply, or indicate the number of pounds in the appropriate block below (i.e. 4,000 Chemical was held in inventory).

_____ Chemical was recycled on-site

_____ Chemical was consumed or transformed

_____ Chemical was held in inventory

__X__ Chemical is a compound

_____ Other (explain)