Advice & Counsel

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Lead &TRI Reporting

Dear Advice & Counsel,
***P&SF* is to be commended for keeping the industry up-to-date on regulatory issues, such as the TRI reporting of lead and lead compounds, which will present another math puzzle for many metal finishers this year. The September issue contained an "Enviroscope" article by Jeff Hannapel of The Policy Group, indicating the potential sources of lead compound manufactured, and your article last month gave some suggested calculations for processes used by one metal finisher. Perhaps you could go further and cover all of the processes we should be looking at, and give calculations for them as well.**

Signed, P. Lumbum

Dear Ms. Lumbium,
First, let's discuss threshold determination. The process of determining if you manufacture more than 100 pounds of lead compounds is so tedious and time consuming that, if you are currently submitting TRI reports for other reportable pollutants, you are best to "assume" you manufacture more than 100 pounds of lead compounds, and add that pollutant to your next report. This is totally legal, and reduces the problem to one of calculating your emissions, which is a less daunting task.

It is possible that some metal finishers have not filed a TRI report in the past, because they were **under** the threshold quantities. If any of these metal finishers processes a significant amount of leaded metal, or conducts tin-lead plating, the same argument applies, and they might as well go straight to calculating lead/lead compound emissions and submitting a TRI report.

Some of these metal finishers may wish to go through the manufacturing and processing "threshold determination" calculations to verify that they are below (or above) the 100-pound threshold for the manufacturing and/or processing of lead and lead compounds. For these metal finishers, we hope the following guidance is helpful.

I will not pretend to know all of the sources of lead used in metal finishing. The last article dealt with manufacturing lead compounds at one specific facility and its processes. However, I will try to broaden the discussion, using Mr. Hannapel's bulleted list as a starting point. Note that we are discussing manufacturing lead compounds in this article. We will discuss "processing" lead later.

1. Lead-bearing Base Metals

The most common metals containing a significant amount of lead are lead alloys, tin alloys, leaded steels, leaded brass, leaded bronze, and statuary castings. Lead can be found in low concentrations in numerous other alloys, and in "pure" metals as well. Some of these are listed in the table. Do not use these lead contents in your calculations, because they are given only to show the possible range levels of lead in these metals.

By cleaning, pickling, and etching, lead-bearing metals, lead compounds are "coincidentally" manufactured, according to EPA's interpretation, and the total amount manufactured in a year must be estimated and reported on your TRI report, which must be filed by July 1, 2002, for the year 2001.

In an alkaline cleaner, in the absence of a chelating agent, lead can form lead hydroxide by reaction with the sodium hydroxide. The cleaner will need to be analyzed for lead content. Use several samples over the life of the cleaner to obtain an average lead content. Using the heaviest molecular weight for lead hydroxide [$Pb_2O(OH)_2$], each pound of lead dissolved into the cleaner produces 2.24 pounds of lead hydroxide. If the cleaner contains chelating agents, you will need to get the correct factor from the cleaner supplier.

The acid most commonly used to pickle lead-containing metals is fluoboric acid. An analysis for lead content on several samples over the life of the acid will yield an average lead content. If fluoboric acid is used, each pound of lead will produce 1.84 pounds of lead fluoborate [$Pb(BF_4)_2$].

If nitric acid is used, each pound of lead will produce 1.6 pounds of lead nitrate. If nitric acid containing fluoride salts or hydrofluoric acid is used, I suggest you assume that all the lead is converted to lead nitrate.

2. Electroplating Processes

We covered zinc, nickel, bright acid tin, and cadmium plating last month. Other electroplating processes that produce lead compounds include chromium plating (hexa valent solution), tin-lead alloy plating, and lead plating. If your company utilizes these electroplating processes, it is likely that you

Lead Content of Some Metals & Alloys

Metal/Alloy	Typical lead content, %
Aluminum (AA1350, AA6262)	0.5-0.6
Copper (C18700)	1.0
Non-standard stainless steel (JS700)	0.005
Tin ("high commercial purity")	0.015
Zinc die castings	0.005
Wrought zinc alloys	0.1-0.35

do manufacture more than 100 pounds of lead compounds annually. For example, if we assume that the lead alloy anodes in a hexavalent chromium plating solution produce lead chromate exclusively (not completely true, but close) and that the formula for this compound is assumed to be $PbCrO_4$, then you would only need to buy 64 pounds of replacement anodes each year to exceed the threshold.

3. Waste treatment

The most common waste treatment system employs pH adjustment to render lead as insoluble lead hydroxide, or pH adjustment/DTC to render lead as a combination of lead hydroxide and lead sulfide. Some waste treatment systems convert the dissolved lead to lead carbonate. The heaviest of the three molecules is lead hydroxide, so you will be estimating on the "safe" side by assuming all the lead in your sludge is lead hydroxide. Use the factor of 2.24 to estimate on the "safe" side.

4. Stripping Solutions

If you utilize stripping solutions to remove lead-bearing coatings from reject parts, assume you are above the threshold, and file a TRI report.

Next month we will discuss emission calculations. **P&SF**