12.17 Miscellaneous Lead Products

12.17.1 General[1]

In 1989 the following categories (in decreasing order of lead usage) were significant in the miscellaneous lead products group: ammunition, cable covering, solder, and type metal. However, in 1992, U. S. can manufacturers no longer use lead solder. Therefore, solder will not be included as a miscellaneous lead product in this section. Lead used in ammunition (bullets and shot) and for shot used at nuclear facilities in 1989 was 62,940 megagrams (Mg) (69,470 tons). The use of lead sheet in construction and lead cable sheathing in communications also increased to a combined total of 43,592 Mg (48,115 tons).

12.17.2 Process Description

12.17.2.1 Ammunition And Metallic Lead Products[8] -

Lead is consumed in the manufacture of ammunition, bearing metals, and other lead products, with subsequent lead emissions. Lead used in the manufacture of ammunition is melted and alloyed before it is cast, sheared, extruded, swaged, or mechanically worked. Some lead is also reacted to form lead azide, a detonating agent. Lead is used in bearing manufacture by alloying it with copper, bronze, antimony, and tin, although lead usage in this category is relatively small.

Other lead products include terne metal (a plating alloy), weights and ballasts, caulking lead, plumbing supplies, roofing materials, casting metal foil, collapsible metal tubes, and sheet lead. Lead is also used for galvanizing, annealing, and plating. In all of these cases lead is usually melted and cast prior to mechanical forming operations.

12.17.2.2 Cable Covering[8,11] -

About 90 percent of the lead cable covering produced in the United States is lead-cured jacketed cables, the remaining 10 percent being lead sheathed cables. The manufacture of cured jacketed cables involves a stripping/remelt operation as an unalloyed lead cover that is applied in the vulcanizing treatment during the manufacture of rubber-insulated cable must be stripped from the cable and remelted.

Lead coverings are applied to insulated cable by hydraulic extrusion of solid lead around the cable. Extrusion rates of typical presses average 1360 to 6800 Mg/hr (3,000 to 15,000 lb/hr). The molten lead is continuously fed into the extruder or screw press, where it solidifies as it progresses. A melting kettle supplies lead to the press.

12.17.2.3 Type Metal Production[8] -

Lead type, used primarily in the letterpress segment of the printing industry, is cast from a molten lead alloy and remelted after use. Linotype and monotype processes produce a mold, while the stereotype process produces a plate for printing. All type is an alloy consisting of 60 to 85 percent recovered lead, with antimony, tin, and a small amount of virgin metal.

12.17.3 Emissions And Controls

Tables 12.17-1 and 12.17-2 present emission factors for miscellaneous lead products.

Table 12.17-1 (Metric Units). EMISSION FACTORS FOR MISCELLANEOUS SOURCES[a]

Process	Particulate	EMISSION FACTOR RATING	Lead	EMISSION FACTOR RATING	Reference
Type Metal Production (SCC 3-60-001-01)	0.4[b]	C	0.13	C	2,7
Cable Covering (SCC 3-04-040-01)	0.3[c]	C	0.25	C	3,5,7
Metallic Lead Products:					
Ammunition (SCC 3-04-051-01)	ND	NA	≤ 0.5	C	3,7
Bearing Metals (SCC 3-04-051-02)	ND	NA	Negligible	NA	3,7
Other Sources of Lead (SCC 3-04-051-03)	ND	NA	0.8	C	3,7

[a] Factors are expressed as kg/Mg lead (Pb) processed. ND = no data. NA = not applicable.
[b] Calculated on the basis of 35% of the total (Reference 2). SCC = Source Classification Code.
[c] Reference 8, p. 4-301.

Table 12.17-2 (English Units). EMISSION FACTORS FOR MISCELLANEOUS SOURCES[a]

Process	Particulate	EMISSION FACTOR RATING	Lead	EMISSION FACTOR RATING	Reference
Type Metal Production	0.7 [b]	C	0.25	C	2,7
Cable Covering (SCC 3-04-040-01)	0.6 [c]	C	0.5	C	3,5,7
Metallic Lead Products:					
Ammunition (SCC 3-04-051-01)	ND	NA	1.0	C	3,7
Bearing Metals (SCC 3-04-051-02)	ND	NA	Negligible	NA	3,7
Other Sources of Lead (SCC 3-04-051-03)	ND	NA	1.5	C	3,7

[a] Factors are expressed as lb/ton lead (Pb) processed. ND = no data. NA = not applicable.
[b] Calculated on the basis of 35% of the total (Reference 2). SCC = Source Classification Code.
[c] Reference 8, p. 4-301.

12.17.3.1 Ammunition And Metallic Lead Products[8] -

Little or no air pollution control equipment is currently used by manufacturers of metallic lead products. Emissions from bearing manufacture are negligible, even without controls.

12.17.3.2 Cable Covering[8,11] -

The melting kettle is the only source of atmospheric lead emissions and is generally uncontrolled. Average particle size is approximately 5 micrometers, with a lead content of about 70 to 80 percent.

Cable covering processes do not usually include particulate collection devices. However, fabric filters, rotoclone wet collectors, and dry cyclone collectors can reduce lead emissions at control efficiencies of 99.9 percent, 75 to 85 percent, and greater than 45 percent, respectively. Lowering and controlling the melt temperature, enclosing the melting unit and using fluxes to provide a cover on the melt can also minimize emissions.

12.17.3.3 Type Metal Production[2,3] -

The melting pot is again the major source of emissions, containing hydrocarbons as well as lead particulates. Pouring the molten metal into the molds involves surface oxidation of the metal, possibly producing oxidized fumes, while the trimming and finishing operations emit lead particles. It is estimated that 35 percent of the total emitted particulate is lead.

Approximately half of the current lead type operations control lead emissions, by approximately 80 percent. The other operations are uncontrolled. The most frequently controlled sources are the main melting pots and drossing areas. Linotype equipment does not require controls when operated properly. Devices in current use on monotype and stereotype lines include rotoclones, wet scrubbers, fabric filters, and electrostatic precipitators, all of which can be used in various combinations.

Additionally, the VOC/PM Speciation Data Base has identified phosphorus, chlorine, chromium, manganese, cobalt, nickel, arsenic, selenium, cadmium, antimony, mercury, and lead as occurring in emissions from type metal production and lead cable coating operations. All of these metals/chemicals are listed in CAA Title III as being hazardous air pollutants (HAPs) and should be the subject of air emissions testing by industry sources.

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