ABRASIVE BLASTING OPERATIONS

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PROCESS DESCRIPTION:

Abrasive blasting operations in San Diego commonly use silica sand, steel grit, garnet, steel shot, shot peen, slags, walnut shell, glass bead, and aluminum oxide as blast materials. A variety of blast materials may be used on a wide range of coated and uncoated parts at one or more locations within a facility. These operations produce particulate matter emissions composed of the blast material, trace contaminants in the blast material, paint pigments, scale, and/or rust. The particulate emissions may contain varying concentrations of crystalline silica, aluminum, arsenic, cadmium, copper, chromium, iron, lead, manganese, nickel, zinc, and inert substances. Process parameters that affect emission rates include type of blast material, blast equipment, velocity, blast angle, distance to part, part dimensions, and dust controls. Accurate emission estimates require an evaluation of the blast area, procedures, and control equipment to determine particulate generation, collection, and removal efficiencies.

For processes with little daily variation in parts and materials, PM10 emissions are best measured and speciated using actual source test results. As an alternative, generic factors developed by the District for permitting and emissions inventory purposes can be used to estimate overall particulate releases. Emissions speciation can be predicted from the analysis of site specific blast waste screened for fine particulates. Where site specific analyses do not exist, ARB particulate profile #353 (8/91) can be used to provide default trace metal factors. The standard District estimation techniques are as follows:

Ea = Ua x EF x Ci x (1 - e)

Eh = Uh x EF x Ci x (1 - e)

Where:

Ea = Annual emissions of each listed substance, (lbs/year)

Eh = Maximum hourly emissions of each listed substance, (lbs/hour)

Ua = Annual usage of each type of blasting material, (tons/year)

Uh = Maximum hourly usage of each type of blasting material, (tons/hr)

EF = Emission Factor for particulate matter, (lbs PM10 emitted/ton abrasive used)

Ci = Average concentration of listed substances in particulate emissions, (lbs/lb)

e = Control equipment collection and removal efficiency, (%)

EMISSIONS INFORMATION:

Generic factors based on material usage are often necessary to characterize emissions despite differences in blast equipment, blasted parts, and operating procedures. Testing is only recommended for extremely large operations (>100 tons/yr) using toxic blast materials (copper slag, etc.) with little variation in daily process parameters. Facilities which recycle blast material or process parts with highly toxic coatings (lead chromate, etc.) may also require additional investigation. A general emission factor of 10 lbs PM10/ton is assumed for unspecified blast material. Site specific control efficiencies, emission factors, and spent waste analyses should be used where appropriate.

ASSUMPTIONS / LIMITATIONS:

- Abrasive blasting operations performed by outside contractors should be included as part of reported facility emissions for each location at which these operations occur. All listed substances released from the site should be included in facility reports and health risk assessments.

- All particulate emission factors for abrasive blasting are estimated as lbs PM10/ton blast material sprayed.

- Blast material usage is considered the amount of material sprayed. Sites that do not recycle should estimate annual usage from purchase and inventory records. Operations that recycle blast medium may spray the same material several times. Recycled blast material continues to break down into finer particulates each time it is sprayed. These sites should estimate annual usage from spray rate and hourly operation records.

- The composition of blast waste is highly dependent upon facility recycling activities. Trace concentrations of metals, paint pigments, scale, and other listed substances will increase as blast material is reused. Obtaining "representative" samples of "average" concentrations

is difficult under typical field conditions and requires some judgment. Waste blast material disposed offsite may contain the "maximum" concentrations of trace contaminants.

- District staff should review reported control efficiencies for customized abrasive blasting booths with unique control devices. Many of these "devices" have evolved over the years as emission standards have become more stringent. Source testing may be required.

- Enclosed blast cabinets vented to the work area are currently exempt from District permit requirements and appear to be insignificant emission points for emissions inventory purposes due to highly efficient control devices. This equipment should be identified but may be exempted from quantification requirements where appropriate.

- Unless site specific information indicates otherwise, chromium emissions from blasting are not considered hexavalent.

- Crystalline silica emissions are assumed negligible for all blast materials except silica sand.

FORMS:

The reporting form developed for abrasive blasting operations may be used by all sizes of equipment. Particulate emission factors and speciation profiles may be modified where site specific data exists. A separate entry must be made for each type of blast material used in each device.