DEGREASING & SOLVENT CLEANING OPERATIONS

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PROCESS DESCRIPTION:

Several volatile substances are released to the atmosphere from solvent cleaning and degreasing operations. Emissions of volatile ingredients can be estimated with mass balance techniques based on purchase records, inventory records, and waste shipment receipts. Emissions from typical solvent and degreasing operations may include TOG, ROG, acetone, benzene, isopropanol, toluene, xylenes, methylene chloride, 1,1,1-trichloroethane, perchloroethylene, glycol ethers, chlorofluorocarbons, and unspecified hydrocarbons. The standard estimation technique used by the District for emissions inventory purposes is a mass balance procedure based upon material usage and material composition:

Ea = (Ua - Wa) x D x Ci x (1 - e)

Eh = Ea / H

Where:

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

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

Ua = Total usage of each material containing a listed substance, (gals/year)

Wa = Annual waste solvent shipped offsite, (gal/year)

D = Density, (lbs/gal)

Ci = Concentration of each listed substance in each material used, (lbs/lb)

H = Hours of operation with lid open, (hours/year)

e = Control device capture & removal efficiency, (%)

EMISSIONS INFORMATION:

Information regarding material composition can be obtained from MSDS documentation. No control efficiency is assumed if all captured material (i.e.; from covers, vapor degreaser cooling coils, etc.) is returned to the tank and accounted for in usage records. Emissions are adjusted for waste disposal by estimating the volume of degreasing solvent shipped offsite. On site stills should not be quantified as additional emission points since the solvent released should already be accounted for in the annual usage records. Usage estimates should be based on material purchases and changes in inventory.

Ua = (Inventory (initial) + Purchases) - Inventory (final)

The facility should estimate the volume of waste solvent shipped offsite using waste manifest records adjusted for the actual solvent content.

ASSUMPTIONS / LIMITATIONS:

- Emission calculations assume no reaction, conversion, or breakdown of the degreasing solvent during use. It is also assumed that the solvent does not become part of the final product. Additionally, no other source of solvent usage (e.g., plating tank carry over, etc.) is assumed present other than materials charged to the degreaser.

- To avoid double counting, emissions from on-site stills are included with degreaser estimates. These stills should not be treated as additional sources and recovered material should not be added to purchase records when estimating usage. Likewise, material sent to on-site stills is not considered waste.

- Control efficiencies for degreasers are usually reflected in the material usage records. Additional control efficiency are not assigned to covers, lids, condensing coils, or other devices which return captured solvent for reuse. Additional control efficiency are applied to control devices that capture and destroy fugitive solvent emissions (i.e.; carbon adsorption beds transported offsite for regeneration, flares, catalytic oxidizers, etc.).

- Waste removed from degreasers and cleaning processes usually consists of solvent, solids, water, pigments, oils, rags, and/or sludge. Waste material composition should not be considered equivalent to virgin material (i.e., 100% solvent). The total volume of hazardous material shipped offsite for disposal must be adjusted for solvent content to correctly estimate the volume of waste 'solvent' shipped offsite. The solvent content may vary significantly between sites dependent upon differences in processes and standard operating procedures. Waste solvents evaporated on site for 'minimization' purposes are considered emissions.

- Most degreaser operations are vented to the work area and released to the atmosphere through the building HVAC system. Facilities should use the specifications of the nearest building exhaust point for AB2588 health risk assessment and modeling purposes. In some cases emissions may best be treated as area or fugitive sources.

- Many degreasing solvents composed primarily of 1,1,1-trichloroethane also include small quantities of 1,4-dioxane. The 1,4-dioxane emissions are often inadvertently omitted in the reporting forms. District staff should carefully review reported usage of 1,1,1-trichloroethane (listed as a non carcinogen) for the presence of 1,4-dioxane (listed as a carcinogen) since these emissions often have significant impacts on overall risk estimates.

FORMS:

In general, a separate entry should be completed for EACH material used in EACH degreasing unit and solvent cleaning operation. Usage records for individual solvents may be grouped together for reporting purposes where deemed appropriate by District staff.