Household Cleaners

Days of Operation: Assume 250 days/yr of operation if not given.

Assume PMN concentration of 0.5% if not given.

Basis: Accounting for soap and detergent use only, a small site will consume a minimum of approximately 18 to 100 kg PMN substance/yr (assuming 250 days of operation). This is based on an EPA (1973) model small soap plant with a capacity of 4 million pounds/yr and a model small liquid detergent plant with a capacity of 25 million pounds/yr, and a minimum PMN concentration of 0.001 percent in the final product (see "Market Profile"). Typical plant sizes for other industries using fragrances are not available; it is assumed that these plants will use the PMN at a similar rate.

Worker Exposure: Assume 6-12 (Number of workers is not expected to be more than those potentially exposed during manufacturing).

The number of workers potentially exposed to powdered soap dust (see Inhalation scenario below) is expected to be approximately 10 percent of the total number of workers. This is based on the market share of fragrances used in soap (27 percent, from Frost and Sullivan, 1982) and the value of powdered soap produced as compared to all soap (30 percent, from DoC, 1987).

A. Inhalation

Inhalation estimates will vary depending on the physical state of the fragrance formulation and the end use. If the physical state of the PMN is not given, assume liquid. (Billot (1975) provides formulation information for several fragrances; in all cases, these are formulated with water or alcohol in a liquid state.) If the PMN end use is not specific, assume it will be used for powdered soap manufacture and exposure to product dust may result.

1. If PMN is in a solid state leaving the manufacturing site or is used for powdered soap manufacture, there is a potential for dust inhalation. NIOSH has measured detergent dust concentrations in the air at two manufacturing plants. The following results were obtained:

Site	Particle concentration, $mg.m^{-3}$		% < 10 µm
	Median	Range	
Clorox (NIOSH 1980, 45 samples)	0.52	0.19-3.71	76
Purex (NIOSH 1978, 25 samples)	3.26	1.1-18.9	14
Respirable particles, both sites	0.38	0.14-2.82	

If the PMN is in a solid state leaving the manufacturing site and the concentration is not given, assume 0.5 to 5 percent. If powdered soap end use is being evaluated and the concentration is not given, assume 0.004 to 0.1 percent.

2. If PMN is in a liquid state leaving the manufacturing site, use the CEB Manual if the vapor pressure is significant. Worker activities include product transfer, packaging, and sampling. Therefore, Tables 4-11 (for packaging) and 4-12 (for sampling) in the Manual may be appropriate.

B. Dermal

Assume 3,900 mg/day x PMN Concentration, from routine 2-hand contact of the

perfume oil prior to incorporation into the final product. If the concentration leaving the manufacturing plant is not known, assume 0.5 to 5 percent.

Environmental Release:

A. **Air**

If it is appropriate to assume the fragrance may be incorporated into powdered soap, use total air releases of dust at 0.7 percent of the use volume (AP-42, 1988). Use the previously calculated number of sites and number of days to calculate air releases on a kg/site-day basis.

B. **Water**

Water releases should be limited to equipment cleanout.

C. **Land**

Releases to land should be limited to container residue.