

EMISSIONS GENERATED DURING THE FUSION OF VINYL PLASTISOLS AND ORGANOSOLS

A vinyl plastisol is a liquid dispersion of polyvinyl chloride (PVC) resins, plasticizers, and miscellaneous additives. When baked, this liquid plastic becomes a fused solid. A vinyl organosol is a plastisol that contains volatile solvents to aid in processing.

During baking, plastisols, and organosols give off small amounts of fumes or vapors. These fumes may be irritating to the respiratory tract, eyes, or skin of some sensitive persons. These emissions might contain hydrogen chloride (HCL) and/or trace amounts of some form of the phthalate ester or petroleum hydrocarbon plasticizer (see below). Plastisols are typically less than 2% volatile by weight. Organosols are typically 5-15% volatile by weight, and their emissions would also contain some of the solvent in the formula.

Vinyl chloride monomer (VCM) is not expected to be present in the emissions in levels that even approach regulatory limits. The PVC resins that are used contain only trace amounts of VCM (typically < 8 ppm). No additional VCM will be created during baking, fusing or subsequent processing operations.

Baking or fusing plastisols and organosols requires local or mechanical exhaust sufficient to remove any emissions generated. In a properly ventilated workplace, the emissions should not present a significant health problem. Regulatory thresholds and analytical monitoring of the process should be utilized to determine that a company does not, in any way, harm its employees or the environment.

The following information is provided as a starting point in determining emissions generated during plastisol fusion. All numbers are estimates for reasonably anticipated by-products, and are not the results of laboratory analysis on a particular plastisol for a particular process.

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Plastisols are typically less than 2% volatile by weight, but the actual emissions depend on factors such as the configuration of the part made, the oven temperature, the residence time, etc. Assuming the plastisol is 2% volatile by weight when baked in the oven. The composition of the 2% emissions may be assumed to be:

- 99.0% Plasticizer
- 0.9% Alcohol (from the plasticizer)
- 0.1% HCl (from the PVC resin)

Based upon the total pounds of plastisol that are used per year, it can be assumed that:

1.980%	Plasticizer
0.018%	Alcohol (from the plasticizer)
+ 0.002%	HCl (from the PVC resin)
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2.000%	Emissions per pound per year

For organosols and plastisols with solvent added, the theoretical percent volatile by volume will be comprised of the 2% byproducts discussed above plus the amount of solvent.

These numbers do not take into account any emissions control devices that may be in place on the ovens or the exhaust systems.

When a plastisol is “overbaked” to the point that yellowing or burning occurs, a much larger amount of smoke is generated. This smoke would contain a higher level of HCl since the yellowing or burning indicates a degradation of the PVC in the plastisol.

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