

Paint Manufacturing

Process Description

Consumer paint products can be either solvent-based or water-based. Both types are manufactured in a two-step process. The first step, *primary dispersion*, uses dedicated pipes or transfer containers and mixing tanks to disperse and mix together pigments, plasticizers and the solvent or water base. The second step, *let down*, includes final mixing, dilution, filtering and transferring the final product for packaging into containers, such as one-gallon buckets or large drums. During the *let down* process, additives, such as toners, may be added for features, such as gloss levels.

Waste Streams

Paint manufacturing's waste streams include waste solvents, paint sludge, accidental paint spills, discarded paint products, waste filter cartridges, and caustic cleaners and rinse water with residues from equipment. POTWs can be impacted from contaminants in wastewater generated in cleaning operations and accidental spills to the sanitary sewer system. Environmental concerns include high pH; biochemical oxygen demand (BOD); caustic solutions; ammonia from water-based paints; solvent residues from solvent-based paints; and, dissolved heavy metals, including chromium, zinc and lead; and other toxins in pigments. Lead-based paint is no longer manufactured, but lead may be found in older paints.

Air wastes result from the releases of volatile organic compounds (VOCs), especially from the mixing processes. The VOC emissions often contain hazardous air pollutants (HAPs) such as toluene or benzene. Solid and hazardous waste streams originate from discarded cleanup materials and off specification materials unable to be reused.

Pollution Prevention Opportunities

Paint manufacturing's key pollution prevention opportunities are materials substitution and best management practices (BMPs). Replacing solvents with water-based materials and finding substitutes for hazardous materials used in processing and cleaning can minimize and eliminate releases of volatile organic compounds, lead/chromate and mercury-based bactericides. Best management practices include less frequent equipment cleaning, rinse water reduction and management, and spill management.

Methods to reduce cleaning needs, rinse water generated and wastewater discharges are: dedicating tanks to a single formulation; increasing the length of production runs; reducing the number of passes through a mill or using high speed mixers to eliminate multiple passes; sequencing batches from light to dark; cleaning equipment before paint residual dries; using steam cleaners and/or high-pressure spray nozzles; reducing paint residual in tanks by using manual or automatic wiper blades, drains or Teflon-coated tanks; and, cleaning dirty tanks with a recycled "dirty" cleaning solution first, followed by a "clean" cleaning solution.

Ways to reduce and reuse rinse water are collecting solvent rinses and water washes from solvent-based paints and water-based paints to reuse in compatible batches; and, reclaiming cleaning solutions, on-site, through distillation. Spill management can include using dry

absorbents to soak up spilled liquids and avoid washing spilled materials down the drain. If wet, cleanup is necessary, use low-volume, high-efficiency spraying equipment (high-pressure spray nozzles), as well as recycled water for the initial cleanup of a spill.

Releases of volatile organic compounds can be reduced by reformulation of product without VOCs, keeping all containers and vessels out of excessive heat, and closing all lids with a tight seal whenever possible.

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Pollution Prevention Checklist

- Substitute solvents and other hazardous materials with water-base or less-hazardous materials (eliminate lead/chromate, chlorinated compounds, and mercury-based bactericides).
- Increase paint production runs to reduce changeovers and cleanups.
- Process similar paints in sequence.
- Sequence manufacturing runs of lighter to darker paints.
- Utilize high speed mixers for higher efficiencies during primary dispersion.
- Promptly clean equipment upon completion of a batch.
- Utilize wiper blades or Teflon coating on tanks to prevent paint clingage.
- Utilize steam cleaners or high pressure nozzles for equipment cleaning and spill cleanup if dry cleanup is not applicable.
- Reuse rinse water for cleaning like-batch tanks (followed by a rinse of virgin cleaning solution).
- Practice solvent recovery and reuse for any cleaning solvent.
- Whenever possible, cover and seal all tanks during mixing and storing
- Keep all tanks and containers out of excessive heat.