

INFORMATION BULLETIN



CONSTRUCTION SAFETY ASSOCIATION OF ONTARIO

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Latex vs Oil-Based Paints

Introduction

The paints used on jobsites today are a blend of pigments, resins, solvents, and additives. The pigments provide colour and hiding ability and the resins determine the physical properties such as adhesion, abrasion resistance, and exterior durability. Common types of resins found in paint include alkyd, acrylic, vinyl, and polyurethane. Solvents keep paints in liquid form so they can be applied easily. The solvent may constitute up to 90% of the paint by weight or volume. Solvent-borne (oil-based) paints use hydrocarbons produced from oil as the solvent. Water-borne (latex) paints use water as the main solvent, but usually in combination with one or more other solvents made from hydrocarbons.

Solvent-borne paint

Most solvent-borne paints contain hydrocarbon solvents such as stoddard solvent, mineral spirits, and varsol. High performance coatings such as epoxy paints may contain other solvents such as ketones, xylene, or toluene.

Water-borne paint

Water-borne paints use mostly water as the solvent. Glycols or other solvents are also commonly present in water-borne paints but they typically constitute at most 10% of the total weight.

The chemistry of water-borne paints is more diverse and complex than that of solvent-based paints. For example, water-borne paints contain many additives such as preservatives and fungicides, surfactants, and solvents.

Additives in paints are used to adjust the acidity (pH) of the paint or add special properties such as resistance to microorganisms. In water-borne paints there may be small amounts (typically less than 1%) of ammonia, alcohol, glycol ether, and formaldehyde. Most manufacturers have stopped using ammonia and formaldehyde because of the unpleasant odours and potential health effects. The preservatives and fungicides such as methylisothiazolinone currently contained in water-borne paints do not evaporate readily and are present in very small amounts.

Health effects

Paint components usually enter the body through inhalation of vapour and skin contact with liquid paint. The hydrocarbon solvents used in conventional alkyd paints can produce high vapour concentrations during painting and for several hours afterward. Painters and other workers have complained about eye irritation, the unpleasant odour, and even dizziness and nausea from the use of solvent-borne paints. In areas with poor ventilation, deaths have occurred.



Long-term exposure to organic solvents from paint has been shown to cause brain damage in painters. This occupational disease, called Painter's Syndrome, is characterized by mood disturbances and a decrease in learning, motor, and visual abilities. There is also some evidence of increased rates of cancer thought to be related to the hydrocarbon solvent.

Skin contact with solvent-borne paints and the solvents needed to remove paint from the skin can dry out the skin and in some cases lead to long-term skin problems (dermatitis). Contact with water-borne paints can also lead to skin problems because some preservatives are known to cause allergic reactions.

A recent study published in the journal **Occupational and Environmental Medicine** found that water-borne paints cause less discomfort and airway irritation than the earlier solvent-based paints. Although the adverse general health effects were less of a problem among painters using water-borne paints, some reported skin problems and frequent urination.

Flammability

The solvents used in solvent-borne paint are flammable and may build up to explosive concentrations in areas with poor ventilation. Explosions resulting in fatalities have occurred during the painting of tanks and the painting of floors in residential basements.

Water-borne paints normally do not pose a fire hazard.

Disposal

Hydrocarbon solvents should never be dumped into sanitary or storm sewers. A fire or explosion may result or damage to the environment could occur. Leftover paint containing hydrocarbon solvent and the

solvent used to clean brushes, rollers, and spray guns should be recycled or sent to a hazardous waste facility. Brushes, rollers, and spray guns used with water-borne paints can be rinsed with tap water and allowed to flow into the sanitary sewer. Leftover paint, however, should be recycled or sent to a hazardous waste facility.

Procedures

When using paint of any kind, open windows and doors to maximize the available fresh air. This is especially important when using a solvent-borne paint. Studies have shown that the concentration of solvent in the air can exceed recommended levels after only ten minutes of painting. Sometimes fans are required to ensure adequate air movement. For applying solvent-borne paint in enclosed areas, respiratory protection is recommended. A half-mask respirator with an organic vapour cartridge and a dust/mist prefilter is recommended where there is some air movement. Ensure adequate ventilation when painting in basements—explosions have occurred. For confined spaces, special precautions and equipment as outlined in section 60 of the construction Regulation 213/91 are necessary.

Water-borne paints generally pose less of a hazard than solvent-based paints. The use of a half-mask respirator with dust/mist cartridges is recommended for spraying water-borne paint. In bathrooms and other enclosed areas, a half-mask respirator with organic vapour cartridges and a dust/mist prefilter is recommended.

Skin contact with any type of paint should be minimized. Wear rubber or PVC gloves during brush and roller cleanup. Clean hands and other contaminated areas frequently. Commercially available soaps are generally better for the skin than varsol or mineral spirits.