

# WATER-BORNE PAINTS

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**Water-borne paints** (latex paints) are the paints formulated on the base of water as the major solvent serving as a vehicle carrying the solid components (binders, pigments and additives).

Water-borne paints commonly contain up to 15% of Hydrocarbon solvents, which control the paint viscosity and wettability.

Most polymer resins may be used as the binders in water-borne paints:

- Epoxies
- Acrylics
- Vinyls
- Polyesters
- Alkyds
- Styrene-butadiene
- Urethanes

There are two possible mechanisms of drying water solved paints:

- Physical drying** controlled by the evaporation of water.
- Chemical curing** of the resin binder, molecules of which are cross-linked at elevated temperature in the presence of cross-linking agents (eg., melaminine resins).

The paint binder may be dispersed in the solvent either in form of true solutions (molecular dispersion) or as Colloids.

- Water soluble paints**
- Emulsion paints**
- Advantages and disadvantages of water-borne paints**

## Water soluble paints

**Water soluble paints** are the water-borne paints, in which the resin binders are dispersed in the solvent in molecular form (true solutions).

The the water soluble binders are low molecular mass (less than 50000) resins:

- Polyesters
- Vinyl acetate copolymers
- Polyacrylates
- Epoxy esters

Water soluble paints contain 30-40% of solids dissolved in the water-based dispersion media consisting of water and up to 15% of water miscible organic Solvents(eg., alcohols, glycol ethers).

Water solved paints provide good corrosion protection and high gloss.  
Some water soluble paints are water sensitive.

## Emulsion paints

**Emulsion paints** (latex paints) are the water-borne paints, in which the resin binders are dispersed in the solvent in form of small insoluble resin particles (colloids and coarse dispersions)).

The the emulsion paints contain resins binders with high molecular mass (up to 1 million):

- ☐ Polyvinyl acetate
- ☐ Styrene-butadiene copolymers
- ☐ Acrylics
- ☐ Alkyds
- ☐ Polyesterene

Emulsion paints contain 50-60% of solids dispersed in the water-based dispersion media consisting of water and up to 5% of water miscible organic Solvents(alcohols, glycol ethers).

Solvent is added to water in order to promote the coalescence of the dispersed binder particles during the paint drying.

Emulsion paints provide permeable ("breathing") coatings with lower disposition to peeling. Emulsion paints are characterized by moderate corrosion protection and low gloss.

## Advantages and disadvantages of water-borne paints

Advantages of water-borne paints:

- ☐ Low toxicity due to low content of VOC (volatile organic compounds).
- ☐ No/low fire hazard.
- ☐ Various types of substrates (wood, metal, plastic, glass, concrete) may be coated.
- ☐ Different application techniques may be used (brushing, spraying, dip, flow, roller)

Disadvantages of water-borne paints:

- ☐ Low drying rate at high humidity.
- ☐ May be more expensive than Solvent-borne paints.
- ☐ Limited coating thickness (up to 1.2 minch/30 mkm).
- ☐ Corrosion resistant equipment (tanks, pipes, fittings) is required.
- ☐ Long flash-off times.