

Water-Borne Floorings & Coatings for Industrial Flooring Segment- A Challenge or an Opportunity?



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While epoxy coatings and floorings have become ubiquitous in the industrial sector and polyurethane playing a catching game, it is pertinent to ask as to whether it is preferable to use solvent-free or solvent-borne systems or water-borne systems. Today, solvent-free floorings and solvent-borne coatings rule the roost in more than 70% of the products being used, water-borne polyurethane screed systems have shown their merit in many food and healthcare sectors due to their increased durability and impact resistance properties. In this article, an attempt is being made to look at emerging use of water-borne systems, its advantages and limitations and its future in industrial and commercial use.

What are the main reasons that drive water-borne technology?

1. Regulatory demands: Obviously, there is a strong regulatory push towards reducing volatile organic compounds (VOCs) in floorings and coatings and the reason is obvious. VOCs are carbon-containing compounds that evaporate at relatively low temperatures, and, in the presence of nitrogen oxides and carbon monoxide, undergo a photochemical reaction with sunlight to produce ozone at levels close to the ground. Ground level ozone is the major ingredient of smog, a form of air pollution found in many parts of the world, and is considered a health hazard.
2. Application requirements: More often than not, the necessity arises that floorings/coatings have to be applied over new concrete or concrete with high moisture content. Rising moisture was found to be one of the major factors for failure of epoxy floorings in our country. Water-

borne coatings is an ideal solution under these conditions.

3. Breathable systems: The ability of the floorings to breathe through the matrix to alleviate the vapour-pressure build-up is important in certain situations.
4. Green building initiatives: Apart from a regulatory push, asset owners and architects have started pursuing products that are environmental-friendly and sustainable, thus increasing the demand for water-borne flooring/coating products.
5. Inherent advantages: Water-borne products that are low VOC, odourless, non-flammable/non-combustible with easy application/clean-up with balanced performance properties make them more preferable in many situations

However, the enhanced performance of solvent-free floorings/coatings such as high-gloss, higher abrasion/impact resistance and higher chemical resistance continue to dominate the floorings market and commendable efforts of manufacturers of resin, hardeners & additives for water-borne systems are continuing to match up to the performance of solvent-free systems.

The products using the following chemistries are in vogue presently:

1. Water-borne epoxy floorings
2. Single-component PU dispersions
3. Three-component PU flooring systems
4. Acrylic-Epoxy hybrid systems

Now let us take a closer look at some of the products based on these technologies and their application potential.



Epoxy cement composite system as moisture-barrier (Water-borne epoxy)

This product is generally formulated with liquid epoxy resin and water-dispersible amine hardener using cement and quartz sand as filler to provide a breathable, tough self-levelling underlay. This system is ideally suitable where the sub flooring is damp or expected to contain moisture and can be used as underlay where rising moisture is expected. This product has excellent bond to concrete and provides very good compressive strength over which epoxy or PU flooring/coatings can be applied

Epoxy cement composite system as topping (Water-borne epoxy)

This product is formulated with liquid epoxy resin and new-age amine hardener that forms an emulsion with epoxy resin and using cement and quartz sand as filler to provide a very high-strength self-levelling topping. A break-through technology product, it is capable of operating between -10°C to +80°C with a uniform surface texture. It can also resist intermittent temperature exposure up to 100°C and highly suitable for wet areas as well as over 7 days old new concrete.

This product is suitable for

- Warehouses, depots and logistic centres, wash areas and dispatch areas in pharma units
- Airport hangars and other heavy-traffic areas
- Food processing industry especially where areas are continuously wet
- Electrical, Automobile and auto-ancillaries including welding areas
- Very high abrasion areas such as assembly lines, card-punching etc

Polyurethane dispersion coating (Water-borne PU)

This product is formulated with a single-component, self-curing PU dispersion. Typically, PUD coatings are used for wall



coatings in healthcare industries as well as anti-carbonation wall coatings in parking decks and other structures exposed to carbonation and chloride attack. These coatings exhibit an excellent scrub resistance as well as mild chemical resistance. Easy to apply, these coatings have a good bond strength and highly durable.



Three-component PU flooring systems:

These products provide seamless, joint less self-leveling water-based PU flooring system, for use where exceptional chemical, abrasion & impact resistance are required. A complex blend of resins and additives make these capable of operating between -40°C to +80°C (depending on thickness) with a uniform surface texture. It can also resist intermittent temperature exposure upto 100°C

These products are best-in-class flooring systems that are widely used in food industries that require steam washing and to resist heavy movement as well impact. They also are very fast setting, thus providing an ideal system to bring the surface back to service within a very short time.

Acrylic-epoxy hybrid systems

These coatings are new kid on the block which combines the bond strength of epoxy and UV resistance of acrylics. These are two component, water based, VOC compliant epoxy-hybrid coatings with a revolutionary technology. No other product can



offer a pot-life as high as 24 hours, but can dry within 3 hours of its application. It acts as a tough abrasion resistant coating that not only withstands wear and tear, but also withstands UV resistance, which is a common weakness found in typical epoxy formulations. These are a cost-effective environment-friendly solution for a variety of applications involving protection of concrete from weathering and/or chemical attack.

These coatings find applications in:

- Interior and exterior as protection coat for concrete slabs
- As a final protection coat over epoxy coated steel.
- Fountains, water bodies, swimming pools and other wet surfaces
- Sports floors and kids play areas
- Durable coating for interior & exterior walls, retainer walls etc
- Can also be used as water-proofing coating where elongation is not required



Thus the future looks bright water-borne technology to come out of shadows of solvent-borne systems and form the main backbone of the industrial and commercial floorings/coatings. With the advent of new technological advances made by the manufacturers of various resins and additives, along with the rising demand from the asset-holders and architects of our country to use green and sustainable materials, water-borne technology will be sure to overtake solvent-borne technology. ■