



EPU Flooring: A New Generation Coating

EPU A hybrid technology by infusing urethane groups into epoxy polymer matrices where the functional properties of epoxy (adhesion, toughness and gloss) are combined with those of PU (abrasion resistance, flexibility and impact resistance). EPU Flooring systems deliver the toughest performance in the most aggressively abused areas and provide scientifically superior polymer hybrid technology, engineered for excellence in floor protection as well as decoration.

Hybrid chemistry Hybrid systems are combinations of two different types of polymers in the form of a cold mix or pre-condensate. These combinations unite specific properties of two polymers which could not be otherwise obtained while using a single polymer alone. For eg, ***Epoxy resins** have many unique properties such as adhesion, toughness, gloss and chemical resistance, but have some unwanted characteristics like poor flexibility and weak impact resistance. **Polyurethanes (PU)** are known for their outstanding abrasion resistance, flexibility and impact resistance, but having undesirable property like **water sensitivity**.* The incorporation of a PU component into epoxy polymer matrix leads to the enhancement of certain properties without adversely affecting the existing performance parameters of the epoxy system..

Benefits from PU modification include enhanced flexibility, improved wear resistance and impact strength, while retain in the pertinent properties of epoxy such as adhesion, gloss and toughness. Every one knows that the flexibility of an unmodified epoxy resin is less than 3%, which

is too low to take care of concrete expansion and contraction in different climatic cycles, whereas urethanes have a flexibility of over 100 %, which is not at all needed for concrete substrates. The hybrid, EPU polymer has an elongation of around 15-40% which is neither low nor high for concrete, which will prevent the coating from cracking and de bounding when the concrete expands and contracts during summer and winter. Similarly, the abrasion resistance of epoxy is in the range 80-100mg loss, where as EPU has an abrasion resistance of 30-60 mg loss. Impact test as per ASTM method (40 in-lb test, forward and reverse) conducted on an epoxy coating results in film cracking, where as the same test gets passed with EPU coating. Thus, the three superior characteristics such as flexibility, abrasion resistance and impact resistance, the three vital parameters needed for an industrial flooring, make EPU floorings ideal for auto and engineering industries, where as epoxies are mainly restricted to the use of floorings in Pharma sector. Comparison of properties of Epoxy v/s EPU self-levelling flooring is given in Table#1.



Impact test is being done on epoxy & epu panels. Epoxy coating breaks, while epu is resilient

“Epoxyes and polyurethanes behave differently when exposed to certain chemicals. For example polyurethanes are the preferred choice in food industries that have exposure to lactic acids. This the reason why many food processing companies that work in milk, dairy, cheese production choose polyurethanes to protect from organic acids. Epoxyes under such conditions may experience corrosion and yellowing. However when working for example in industries with sulfuric acids (like battery manufacturing etc) epoxy floors are much more resistant than polyurethanes. If you are working an industry with heavy exposure to chemicals, check with the manufacturer to see which product is more suitable for your industry.”



Source:
[apostolopoulos](https://www.linkedin.com/pulse/what-differences-between-epoxy-polyurethane-floors-apostolopoulos)

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Table# 1

Properties	Epoxy	P.U.	EPU
Flexibility	2-3%	25-55%	15-40%
Abrasion resistance, weight loss method, CS17 wheel, 1 Kg. weight	65-100 mg	30-35 mg	40-60 mg
Hazardous	No	PU Coating is hazardous	No
Impact Test, 40-in-lb test a. Forward b. Reverse	Fails Fails	Passes Passes	Passes Passes
Compressive Strength	62 N/mm2	65 N/mm2	62 N/mm2
Oil Resistance	Yes	Yes	Yes
Chemical Resistance	Yes	Yes	Yes
Clean- ability	Excellent	Excellent	Excellent
Antiskid-ness	Same	Same	Same
Cost Effectiveness	Yes	Normally Costlier than Epoxy And EPU	Yes

Source: The Master Builder| 2014