

Polyester and Vinyl Ester Coatings

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Polyester and vinyl ester resin-based linings are known for their solvent and chemical resistance. The different resins in these linings have broad resistance ranges, with acid resistance being a major strength. Some of the specific resins resist 1 or more chemicals or types of chemicals better than other resins, so systems often are fine-tuned by the choice of resin for a particular chemical environment.

Esters are the reaction product of an organic acid and an alcohol. Polymers used in this class of materials are the unsaturated polyesters formed by reaction of unsaturated dibasic acids and dihydric alcohols. Styrene or a similar vinyl-type monomer is used to cross-link the resin and form the film. The polymerization is initiated by a catalyst, with the reaction by free radical addition, which is a chemical reaction mechanism unique to this class of coatings.

The word "lining" in the coatings industry is commonly defined as a material used to protect the inside surface of a tank, vessel, or similar structure from highly corrosive or potentially highly corrosive exposures. Linings can be monolithic systems or built-up systems. Because of their typically thick application and use in severe chemical conditions, polyesters and vinyl esters normally are referred to as linings. They offer good adhesion to most substrates, although most applications are on steel or concrete.

These linings include several systems varying in thickness, type of

Table 1
Properties of Lining Fillers and Reinforcements

Silica Fillers	Most used, good permeation resistance, low cost
Carbon Fillers	Electrical conductivity or fluoride resistance
Hard Mineral Fillers	Increased abrasion resistance
Fiberglass Chopped Mat	Good chemical resistance
Fiberglass Woven Cloth	Strong, bidirectional reinforcement
Fiberglass "C" Grade Veil	Best chemical resistance
Synthetic Reinforcements	Where fluorides would attack glass
Glass Flakes	Best permeation resistance when aligned
Mica Flakes	Good permeation and chemical resistance

Tables courtesy of the author

fillers and reinforcement, and application method. For each lining system, various polyester and vinyl ester resin bases are used to achieve the desired chemical resistance.

History of Development

Since the 1960s, polyester and vinyl ester linings have been used extensively for their high chemical resistance. They previously had been used in mortars for chemical-resistant brick linings and fiberglass-reinforced plastic (FRP) structures such as tanks, pipes, and ducts, so their use in protective linings is a natural extension of their broad chemical resistance properties.

Early linings were reinforced with chopped fiberglass strands or woven fiberglass cloth (woven roving). Silica and other particulate fillers were incorporated to enhance physical

properties and minimize curing shrinkage, the release of heat after mixing, and a high coefficient of thermal expansion compared to the substrate. These linings were applied by trowel and roller up to 1/4 in. (6 mm) thick.

As these linings were developed, flake fillers were added to increase resistance to permeation by water vapor. This property is important for immersion or wet service at elevated temperatures. Glass and mica flakes were used to extend the service temperatures of the linings in hot, aqueous environments. This type of lining can withstand immersion temperatures of 180 to 212 F (82 to 100 C) at thicknesses of 60 to 150 mils (1.5 to 3.8 mm).

Thinner, spray-applied systems were formulated to reduce material cost and increase application rate.

Polyester And Vinyl Ester Coatings Paintsquare



Ulrich Poth

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Journal of Protective Coatings & Linings ,2008 **Paint and Coatings** P.E., Philip A. Schweitzer,2005-09-23 Paint and Coatings Applications and Corrosion Resistance helps designers engineers and maintenance personnel choose the appropriate coatings to best protect equipment structures and various components from corrosion degradation and failure The book addresses all factors including physical and mechanical properties workability co *Polyester and Alkyd Resins* Ulrich Poth,2020 Polyester and alkyd resins belong to the most diverse and important material classes of paint chemistry and their usage as binders has been established for a long time This standard work goes into detail on the composition structure and properties of these important binder groups and subjects previous findings in that field to a critical review It shows different precise calculation approaches in modern coatings development ways to formulate polyester and alkyd resins in experimental designs and how to vary them systematically A practice and future oriented reference book that should not be missing in any laboratory Applications of Unsaturated Polyester Resins Sabu Thomas,Cintil Jose Chirayil,2023-03-30 Applications of Unsaturated Polyester Resins Synthesis Modifications and Preparation Methods takes a practical approach to unsaturated polyester based materials and their preparation for implementation in a range of innovative areas Sections introduce the background of polyester and the fundamentals of unsaturated polyester resins UPRs including chemistry additives curing and processing methods Hydrolytic stability and structure property relationships are also discussed in detail along with coverage of modification strategies for UPR and the development of bio composites incorporating natural fiber with unsaturated polyester Subsequent chapters focus on the preparation of UPR for specific target applications including in construction marine and aerospace adhesives and coatings insulation systems electrics pipeline corrosion military biomedicine and tissue engineering Finally the advantages and disadvantages of UPR compared to other resins in terms of properties and performance as well as life cycle assessment are addressed and analyzed Presents processing methods morphology structure property relationship and modification strategies for unsaturated polyester Explores sustainability in terms of lifecycle assessment of unsaturated polyester and bio composites incorporating unsaturated polyester Guides the reader to advanced applications across construction marine and aerospace adhesives and coatings electrics and many more areas Waterborne and Solvent Based , Saturated Polyesters and their End User Applications F. Pilati,M. Toselli,M. Messori,H. van Dijk,S. G. Yeates,B. Petterson,N. Tuck,Brian Storer,David M. Howell,Graham Rayner,2000-03-01 Saturated polyester resins are used in a wide range of industrial applications including industrial paints automotive coatings and wood linings This volume presents the basic chemistry of these systems including step polymerisation design considerations and cross linking before discussing in detail the application of saturated polyester coatings in these and other areas Divided into nine comprehensive chapters Principles of Step Polymerisation Polyester Design Considerations The Chemistry Waterborne Saturated Polyesters Principles Derivatisation and Applications of Dendritic Polyesters Polyesters in Industrial Paints The

Applications of Saturated Polyester in OE and Refinish VR Coatings Saturated Polyester Resins Saturated Polyester Systems in Woodfinishing Paints, Coatings, and Solvents Dieter Stoye, 1993 Both a practical guide and a reference for chemists and chemical engineers presenting the articles Paints and Coatings and Solvents as published in the fifth edition of Ullmann's Encyclopedia of Industrial Chemistry An up to date overview of the industrial aspects of paints coatings and solvents including composition production processing uses and methods of analysis Special attention is given to toxicology and environmental protection matters Annotation copyright by Book News Inc Portland OR

Decoding **Polyester And Vinyl Ester Coatings Paintsquare**: Revealing the Captivating Potential of Verbal Expression

In a period characterized by interconnectedness and an insatiable thirst for knowledge, the captivating potential of verbal expression has emerged as a formidable force. Its ability to evoke sentiments, stimulate introspection, and incite profound transformations is genuinely awe-inspiring. Within the pages of "**Polyester And Vinyl Ester Coatings Paintsquare**," a mesmerizing literary creation penned by way of a celebrated wordsmith, readers set about an enlightening odyssey, unraveling the intricate significance of language and its enduring impact on our lives. In this appraisal, we shall explore the book's central themes, evaluate its distinctive writing style, and gauge its pervasive influence on the hearts and minds of its readership.

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