U.S. ADHESIVES - DEFINITIONS AND ABBREVIATIONS

TECHNOLOGIES

ChemQuest views non-pressure sensitive adhesives to be comprised of seven different formulative technologies, and pressure sensitive adhesives to be comprised of five different formulative technologies as shown below. These technologies are defined at the end of this report.

Non-Pressure Sensitive	Pressure Sensitive
Solvent Borne	Solvent Borne
Water Borne	Water Borne
Hot Melt	Hot Melt
Radiation Curable	Radiation Curable
Powder	Calendered
1-Part Reactive	
2-Part Systems	

DEFINITION OF TECHNOLOGY TYPES

SOLVENT BORNE SYSTEMS - Refers to all adhesives wherein organic solvents comprise more than 50% of the volatile content (excluding 2-part solvent borne systems).

WATER BORNE SYSTEMS - Refers to all adhesives wherein water comprises more than 50% of the volatile content (excluding 2-part water borne systems).

HOT MELTS - Refers to all adhesives which are essentially solventless solid materials at ambient temperature and must be applied to the bonding surface at elevated temperatures to permit adequate flow.

RADIATION CURABLE SYSTEMS - Refers to all compositions whose useful bonding characteristics are developed only after exposure to a high energy radiation source, such as UV, electron beam or X-ray (IR and microwave are not radiation sources included in this technology).

POWDERS - Refers to all non-pressure sensitive adhesives applied as a powder and then heated to fuse the polymer.

1-PART REACTIVE - Refers to all non-pressure sensitive adhesives with a minimum non-volatile content of 95% and which are usually applied to bonding surfaces at ambient temperature (e.g., 1-part epoxies and urethanes, film adhesives, cyanoacrylates, anaerobics, etc.)

2-PART SYSTEMS - Refers to all non-pressure sensitive adhesives, whether solvent borne, water borne, or non-volatile types, which require the blending of two or more components shortly before use.

CALENDERED - Refers to all tackified, 100% solid, elastomeric, pressure sensitive materials manufactured with a calender.

© 2004 The ChemQuest Group, Inc.
All Rights Reserved

CLASSIFICATION OF RAW MATERIALS

ChemQuest evaluates raw material trends in each market segment by force fitting all raw materials into 41 different categories and then evaluating their use in each formulative technology. These raw material categories are listed in the table below. A careful review shows that they extend from naturally occurring materials such as bitumens, casein, starches and dextrines to high value synthetics such as anaerobics and cyanoacrylates. Tackifying resins are subdivided into hydrocarbon resins, rosin derivatives and terpenes. Additionally, polyesters and urethanes are subdivided into thermoplastic (TP) and thermosetting (TS).

Acrylics	**ACRYLICS** - Polymers formed from the polymerization of acrylic, substituted acrylic and methacrylic acids, plus their salts and esters. Because of industry terminology, styrene acrylics are also part of this classification.
Acryl/VA	**ACRYLIC VINYL ACETATE COPOLYMERS** - All copolymers of vinyl acetate with acrylic, substituted acrylic and methacrylic acid esters.
Aminplast	**AMINOPLASTS** - Principally the ethylated and butylated melamines plus urea formaldehyde resins.
Anaerobics	**ANAEROBICS** - One component liquid resins, typically a hydroxyalkyl methacrylate-diisocyanate addition product or the reaction of a diol, diisocyanate and hydroxyalkyl methacrylate, whose polymerization is air-inhibited. A free radical cure mechanism begins when air is eliminated in contact with metal, which serves as a catalyst.
Animal/Fis	**ANIMAL AND FISH PRODUCTS** - All raw materials extracted from animal hides, as well as animal and fish bones and blood.
Bitumens	**BITUMENS** - Naturally occurring pitches and asphalts or their counterparts from petroleum fractionation residues.
BlockCop	**BLOCK COPOLYMERS (E.G., KRATON D AND G)** - Polymers in which homopolymer units exist as distinct domains; typically SIS and SEBS copolymers.
ButylRub	**BUTYL RUBBER** - All types, including the halogenated and high molecular weight copolymerized grades containing isobutylene and less than 3% isoprene.
Casein	**CASEIN** - A natural protein derived from milk by-products.
Cellulosic	**CELLULOSICS** - All commercial cellulose esters and derivatives; e.g., nitrocellulose, cellulose acetobutyrate (CAB), ethyl cellulose, carboxymethyl cellulose.

© 2004 The ChemQuest Group, Inc.
All Rights Reserved

Cyanoacryl	**CYANOACRYLATES** - Monomers of 2-cyanoacrylate modified with polymethacrylates, polyacrylates, polyvinyl acetates, cellulose esters and/or polylactic acid.
Epoxies	**EPOXIES** - Includes the epoxy resins as well as the hardeners, pre-condensates and modifiers.
EVA	**ETHYLENE** Vinyl Acetate Copolymers (50+% Ethylene) - A family of high ethylene content copolymers widely used in hot melts.
Filler	**FILLERS** - Includes all inorganic materials, such as calcium carbonate, clays, and various extenders, used to fill and/or extend an adhesive formulation.
Hydrocarb	**HYDROCARBON RESINS** - Synthetic hydrocarbon polymers including (but not limited to) those derived from coumarone-indene, cyclo and dicyclopentadiene, etc.
NatRubbr	**NATURAL RUBBER** - All grades, milled and unmilled.
NitrileR	**NITRILE RUBBER (NBR)** - Copolymers of unsaturated nitriles with dienes. Typically, the copolymers of butadiene and acrylonitrile.
OthPolym	**OTHER POLYMERS** - This is a miscellaneous category that includes all copolymers that do not fit well into the other polymer classifications noted above. The identity of these polymers is usually revealed in the profiles in which they are found.
OthVinyl	**OTHER VINYL ACETATE (COPOLYMERS)** - Vinyl acetate-vinyl chloride and vinyl acetate-dibtylmaleate copolymers are typical examples.
Phenolics	**PHENOLICS** - All unmodified, alkylated or otherwise modified phenolformaldehyde condensation products.
Plasticiz	**PLASTICIZERS** - Includes the wide variety of low molecular weight polymers, oils and waxes used to soften and plasticize a variety of polymers.
Polyamide	**POLYAMIDES** - The condensation product of a dianhydride and a primary diamine.
Polychloroprene	**POLYCHLOROPRENE** - All grades of polychloroprene polymers.
TP-P/Estr	**POLYESTERS (THERMOPLASTIC)** - The reaction product of polyhydridic alcohols and oil-free, saturated dibasic acids.

© 2004 The ChemQuest Group, Inc.
All Rights Reserved

TS-P/Estr	**POLYESTERS (THERMOSETTING)** - The reaction product of polyhydric alcohols and oil-free, unsaturated dibasic acids.
Polyethyl	**POLYETHYLENE** - Linear homopolymers of ethylene.
Polyibuty	**POLYISOBUTYLENE/POLYBUTENE** - Polyisobutylene is linear polymers of isobutylene of varying average molecular weight. Polybutene is a viscous, non-dying, liquid polymer, which results from the copolymerization of 1-and 2-butene with a small quantity of isobutylene.
Polypropy	**POLYPROPYLENE -** Primarily atactic polypropylene polymers.
PVA	**PVA (VINYL ACETATE HOMOPOLYMER)** - All molecular weight ranges for polymers formed from the homopolymerization of vinyl acetate monomer.
PVC	**PVC (POLYVINYL CHLORIDE)** - All molecular weight ranges for polymers formed from the homopolymerization of vinyl chloride monomer.
RecRubber	**RECLAIM RUBBER** - All grades and types.
RosinDer	**ROSIN AND ROSIN ESTERS** - Naturally occurring resins derived from pine trees and/or tall oil which have been polymerized, hydrogenated or reacted with pentaerythritol to yield a variety of products.
Silicones	**SILICONES** - A family of vulcanizing liquid elastomers composed principally of various silanols (hydroxy terminated polydimethyl siloxanes).
Silicates	**SODIUM SILICATE** - A water soluble, inorganic compound widely used as a modifying ingredient in water borne adhesives.
Strch/Dxtr	**STARCHES & DEXTRINES** - Starches and dextrines are both polysaccharides derived from a variety of natural sources. A dextrine is a specially processed (dextrorotary) polysaccharide.
StrucAcry	**STRUCTURAL ACRYLICS** - In situ free radical polymerizable fluids comprised of high molecular weight polymers dissolved or dispersed in blends of low molecular weight monomers or oligomers, commonly methacrylate esters.
S B Coply	**STYRENE BUTADIENE (RANDOM SBR)** - Includes all solvent and water borne polymers of styrene and butadiene in which the monomers are randomly polymerized.
Terpenes	**TERPENE RESINS** - A family of polymers based upon alpha and beta pinene, limonene and related compounds

© 2004 The ChemQuest Group, Inc.
All Rights Reserved

UrethneTP **URETHANE (THERMOPLASTIC)** - Includes all types of thermoplastic urethane resins as well as the isocyanate compounds. Also includes blended compositions in which a urethane is the main constituent.

UrethneTS **URETHANE (THERMOSETTING)** - All thermosetting urethane resins conforming to the above definition.

VAE **VINYL ACETATE ETHYLENE COPOLYMERS (50%+ ACETATE)** - A family of high vinyl acetate content copolymers widely used as emulsion resins in water borne adhesives.

© 2004 The ChemQuest Group, Inc.
All Rights Reserved