



THE **ADHESIVE** AND **SEALANT** COUNCIL, INC.

THE FEICA-ASC ADHESIVES & SEALANTS
CLASSIFICATION MANUAL

2008

INTRODUCTION

In 1996, FEICA published the first European classification manual. The document printed in three languages was very well received by the Industry. By standardizing the Adhesive classification of the products and their fields of application, it enabled a better interpretation of market reports issued by FEICA.

In this 2008 edition, the classification manual features a larger scope by adding Sealant technologies and applications to Adhesives. Moreover, the classification is fully aligned with the classification used by the ASC in the USA, thereby achieving harmonized and consistent definitions across both regions.

We wish to express our thanks for the contributions provided by: ASC, FEICA Working Group Statistic, Monique von Dungen (Chem-Research) and David Nick (DPNA International).

The classification manual defines the market segments and the product categories of Adhesives and Sealants used mainly in both Europe and the USA.

The new classification has been used to update FEICA's 2007-10 European Market Report as compiled by Chem-Research as well as the ASC's 2007-10 North America Market Report and Asia Supplement as compiled by DPNA International.

These reports are available upon request by contacting FEICA or ASC.

DEFINITIONS OF SEALANT – ADHESIVE – PRESSURE SENSITIVE ADHESIVE

A sealant is a soft, pliable material that is used to seal cracks of joints where structural strength is not required. The sealant, initially fluid or semi-fluid, placed between two opposing solid materials, becomes solid itself (by solvent evaporation or chemical reaction), bonds to the surfaces it is applied to and accommodates joint movement. It prevents excessive absorption of adhesive or penetration of liquid or gaseous substances. A sealant has the adhesive and cohesive properties to form a seal.

An adhesive is a compound that adheres or bonds two items together. Adhesives may come from either natural or synthetic sources. Some modern adhesives are extremely strong, and are becoming increasingly important in modern construction and industry. Adhesive is a general term and includes among others cement, glue, mucilage, and paste. All of these terms are loosely used interchangeably.

The strength of attachment, or adhesion, between an adhesive and its substrate depends on many factors, including the means by which this occurs. Adhesion may

occur either by mechanical means, in which the adhesive works its way into small pores of the substrate, or by one of several chemical mechanisms.

In some cases an actual chemical bond occurs between adhesive and substrate. In others electrostatic forces, as in static electricity, hold the substances together. A third mechanism involves the van der Waals forces that develop between molecules. A fourth means involves the moisture-aided diffusion of the glue into the substrate, followed by hardening.

A pressure-sensitive adhesive is a distinct category of adhesive tapes and adhesives which in dry (solvent free) form are aggressively and permanently tacky at room temperature and firmly adhere to a variety of dissimilar surfaces upon mere contact without the need of more than finger or hand pressure. They require no activation by water, solvent or heat in order to exert a strong adhesive holding force toward such materials as paper, plastic, glass, wood, cement and metals. They have a sufficiently cohesive holding and elastic nature so that, despite their aggressive tackiness, they can be handled with the fingers and removed from smooth surfaces without leaving a residue.

1. ADHESIVES - MARKET SEGMENTS

1.1 Paper, Board and related products

1.1.1 Converting/Packaging

- case and carton manufacture
- paper products and paper bags
- envelopes
- tube winding
- plastic bags
- flexible packaging
- remoistenable gummed tapes, labels, stamps
- tissues and towels
- sterilized medical packages
- case and cardboard carton sealing
- labelling cans, bottles and other containers
- wrapping of foods, etc
- cigarette manufacture and cigarette packaging
- paper-to-board lamination

1.1.2 Dry Lamination

(film-to-film, film-to-foil, film-to-paper, etc.)

1.1.3 Wet Lamination

(foil-to-paper)

1.1.4 High-Gloss Laminating for Graphic Arts
(OPP-to-paper/cardboard, other including cellulose acetate-to-paper/cardboard)

1.1.5 Bookbinding, Graphic Art Industry integral binding of :

- paperback books
- edition-bound books
- magazines
- catalogues
- directories, etc.

1.1.6 Nonwoven Fabrics (Disposables)

- construction of disposable diapers
- feminine hygiene products
- incontinence products
- surgical gowns, etc.

1.1.7 Pressure Sensitive Adhesives

- labels
- tapes
- decals
- signs
- stamps
- transfer films, etc.

1.1.1* Exclusions

- Binding agents for the manufacture of corrugated board

1.2. Transportation

- 1.2.1 Passenger Cars/Light Trucks
Assembly and Components (OEM)
- 1.2.2 Repair and Maintenance (aftermarket)
- 1.2.3 Trucks and buses (OEM)
- 1.2.4 Bicycles, motorcycles and recreational vehicles (caravans)
- 1.2.5 Aircraft/aerospace
- 1.2.6 Railway (including light rail vehicles-tram)
- 1.2.7 Shipbuilding and offshore

1.3 Footwear and Leather

- 1.3.1 Footwear
(soling/sole attaching, lasting, box toes and counters, repair aftermarket and other applications)
- 1.3.2 Leather Goods
(handbags, travel goods, purses, etc.)

1.4 Consumer/Do-It-Yourself (Retail)

solid and liquid adhesives sold through retail channels in smaller package units, including glue sticks

- 1.4.1 Household and Do-It-Yourself (DIY)
(incl. school, office use; all-purpose glues; contact adhesives; instant glues, wood glues, two-component glues; hot melt sticks, etc.)

1.5 Building/Construction/Civil Engineering/Craftsmen

1.5.1 On-site Applications for new work, repair, maintenance, and renovations including:

- flooring : textile, PVC and linoleum, wooden and laminated, rubber and ceramic tile adhesives
- wall covering including ceramic tile and textile adhesives
- attachment of ceiling and sandwich panels
- wooden subflooring
- thermal insulation materials, etc.

1.5.2 Civil Engineering (bridges, etc.)

1.5.3 Off-Site applications

- Factory Assembled Parts (roof trusses, wall sections, laminated beams, etc.)
- Prefabricated Houses

1.6 Woodworking and Joinery

1.6.1 Cabinet making

1.6.2 Furniture Manufacture (attachment of high-pressure laminates; membrane pressing, edge gluing/banding; veneering; general assembly; etc.)

1.6.3 Window Frames, Door Manufacture

1.6.4 Upholstery

1.6*Exclusions

- Primary wood bonding (forest products) binding agents for producing particle board (chipboard, medium density fibreboard, hardboard) and plywood

1.7 Assembly Operations/Other

1.7.1 Sandwich Panel Manufacture

1.7.2 Appliances and electrical/electronic equipment

1.7.3 HVAC
(Heating, Ventilation, Air Conditioning)

1.7.4 Mechanical Equipment

1.7.5 Flexible Materials
(Fabric/apparel, e.g., engineered textiles, foam, synthetic and natural leather, rubber products)

1.7.6 Medical Applications
(assembly of medical equipment; medical/surgical applications)

1.7.7 Sports Equipment and Toys

1.7.8 Abrasives, filters

1.7.9 Others
(all other adhesives not included in any market segments or application sectors listed above)

1.7*Exclusions

- Binder agents for foundry sand and adhesives/coatings for rug backing (carpets)

2. ADHESIVES - PRODUCT CATEGORIES

2.1 Adhesives Based on Natural Polymers

2.1.1 Vegetable Adhesives (dextrins and starches)

2.1.2 Protein Adhesives (casein, soybean, milk albumen etc.)

2.1.3 Animal glues, blood, hides, bones, etc.

2.1*Exclusions

- Adhesives raw material based on natural rubber (covered under 2.2.6)

2.2 Polymer Dispersion/Emulsion Adhesives

2.2.1 Vinyl acetate polymers (PVAc)

2.2.2 Ethylene vinyl acetate co-and terpolymers (incl. pressure polymers)

2.2.3 Acrylics and acrylic copolymers (incl. styrene acrylate terpolymers)

2.2.4 Styrene-butadiene rubber (SBR)

2.2.5 Other synthetic rubber latices

2.2.6 Natural rubber latex

2.2.7 Polyurethane (PUD)

2.2.8 Others

2.2*Exclusions

- Cement based screeds, levelling compounds and tiling/flooring adhesives with a content of less than 50% synthetic polymers.

2.3 Hot Melt Adhesives

(including moisture-cure (reactive) types)

2.3.1 Polyolefin (PE, PP, APP)

2.3.2 Ethylene vinyl acetate (EVA)

2.3.3 Polyamide (PA)

2.3.4 Polyester, saturated (SP)

2.3.5 Styrene block copolymers (e.g., SBS, SIS, SEBS)

2.3.6 Polyurethane (thermoplastic, plus moisture-curing)

2.3.7 Acrylic and acrylic copolymers

2.3.8 Others (e.g., Polyimide)

2.4 Solvent Based Adhesives

2.4.1 Polychloroprene (CP)

2.4.2 Polyurethane (PUR)

2.4.3 Natural and synthetic rubbers

2.4.4 Acrylic

2.4.5 Silicone

2.4.6 PVC copolymers

2.4.7 Other

2.5 Reactive Adhesive Systems

(includes single and two-part thermoset plus UV/EB cure)

2.5.1 Epoxy (EP)

2.5.2 Polyurethane

(including moisture-curing types)

2.5.3 Polyester, unsaturated (UP)

2.5.4 Acrylics

(including cyanoacrylate, dimethacrylate/anaerobics; methacrylate, SGA – second generation acrylics/structural acrylics)

2.5.5 Silicones

(one and two part curing systems).

2.5.6 Formaldehyde Condensates

(phenolic, urea, melamine, resorcinol)

2.5.2* Exclusions

- Polyurethane hot melt types (listed under hot melts)

2.5.6* Exclusions

- Formaldehyde condensates used as binders in the manufacture of particleboard (chipboard, MDF, OSB, hard board) and in the manufacture of plywood

2.6 Adhesives Based on Water-Soluble Polymers

2.6.1 Polyvinyl Alcohol

2.6.2 Cellulose Ethers

2.6.3 Methylcellulose

2.6.4 Carboxymethylcellulose

2.6.5 Polyvinylpyrrolidone

2.6.6 Other (e.g., Polyvinylmethylether)

2.7 Other Adhesives

General (all other adhesives not included in any categories listed above, e.g., elastoplastic types)

3. SEALANTS - MARKET SEGMENTS

3.1 Construction

3.1.1 Construction and renovation

(residential, commercial, industrial, mobile/prefab home, metal buildings, roofing, etc.)

3.1.2 OEM and/or Maintenance Applications

(involving subcomponent fabrication, e.g., countertops, prefabricated trusses, curtain walls)

3.1.3 Insulating Glass, Glazing

(OEM, factory glazing, in-house glazing, etc.)

3.1.4 Heavy Construction

(highways, airfields, bridges, tunnels, etc.)

3.2 Transportation

3.2.1 Passenger cars/Light Trucks Assembly and Components
(OEM, glazing, NVH¹, body sealants, thread locking, etc.)

3.2.2 Trucks, buses, trailers
(OEM, NVH¹, glazing, body sealants, etc.)

3.2.3 Repair and maintenance
(aftermarket including glazing, body sealants, gasketing, etc.)

3.2.4 Commercial and recreational Watercraft
(OEM, glazing, body sealants, etc.)

3.2.5 Aircraft/aerospace
(glazing and body sealants, NVH¹, private, commercial)

3.2.6 Railway
(including light rail vehicles/mass transit, NVH¹, subcomponent fabrication)

3.2.7 Ships
(primarily engine and equipment bedding plus LNG tanks, Offshore oil platform)

3.3 Consumer/Do-It-Yourself (Retail)

3.3.1 Household, Do-It-Yourself
(includes caulks and/or sealants intended for retail sale in small packages)

Note: In some countries, this segment includes purchases by tradesmen of five or less employees.

¹ NVH : Noise, Vibration, Harshness

3.4 Assembly/Other

3.4.1 Appliances

(e.g. refrigerators and freezers, HVAC¹)

3.4.2 Electronic Equipment Assembly

3.4.3 Metal Cabinets and Housings

3.4.4 Other

(caulks and sealants usage not included in market segments or applications listed above)

¹ HVAC : Heating, Ventilation, Air Conditioning

4. SEALANTS - PRODUCT CATEGORIES

4.1 Oil-Base Caulks

(includes Polymer modified versions)

4.2 Acrylics

(water-latex and solvent based, including “siliconised” versions)

4.3 Polyvinyl Acetate

4.4 Butyls

(Polyisobutylene)

4.4.1 Solvent based PIB Sealants

4.4.2 Preformed PIB strips

4.4.3 Hot Applied PIB Sealants

4.4.4 Gun-Dispensable and Pumpable Sealants

4.4.5 Reactive PIB Sealants

4.5 Polysulfides

(1- and 2-part systems)

4.6 Polyurethanes

(1- and 2-part systems, sealants and foams)

4.7 Silicones

(1- and 2- part sealants and foams including moisture curing systems, water based, addition curing and reactive hot melt)

4.8 Silane Modified Polymers

(1- and 2-part systems, reactive hot melt, sealants and foams)

4.8.1 Silyl-terminated Polyethers (includes “MS” polymers)

4.8.2 Silyl-terminated Polyisobutylene (SiPiB)

4.8.3 Silyl-terminated Polyurethanes

4.8.4 Silicone modified Polyacrylate

4.8.5 Polyurea backbone

4.8.6 Mixed polymers

4.8* Exclusion

- “siliconised” water-based products containing < 5% silane.

4.9 Other Sealants (not included above)

This can include :

- processed-formulated bitumens
- PVC body sealants
- preformed elastomeric
- tapes.