



Filter Adhesives



Royal Adhesives and Sealants manufactures and markets a full line of filter adhesives based on epoxy, polyurethane and UV-curable polymer technologies under the Hardman brand name. These adhesives and sealants are proven in a broad range of gas and liquid filters:

Air and Gas Filtration Applications

General Air Filters

Air/liquid and air/solid
Gas purification/permeator
Compressor/separator
Transportation
Vacuum
High or low temperature

HEPA Filters

HEPA – Industrial and consumer
HEPA – Critical cleanroom

Liquid Filtration Applications

Chemical and Fluid Filters

Solvent and hydrocarbon
Oil and gasoline
Aviation fuel
Hydraulic fluid
Aviation hydraulic fluid
Coolant
High temperature
Water and brine

Reverse Osmosis

Reverse osmosis - sheet
Reverse osmosis - tubular
Permeators
FDA

EPOCAP® Adhesives and Encapsulants feature epoxy's versatility of adhesion and structural integrity in harsh and varying environments. Our broad product family offers the correct adhesive for a wide range of filter performance and processing convenience.

EPOWELD® Epoxy Adhesives are designed to bind and seal filaments in micro-filtration, ultra-filtration, and reverse osmosis units.

These two-component epoxy systems produce hard, strong filter composites. They tolerate higher temperatures and more demanding environments than polyurethane systems.

MONOPOXY® One-Component Epoxy Adhesives offer fast setting, strong bonds to galvanized metals and stainless steel end caps. MONOPOXY adhesives exhibit proven performance in a variety of harsh environments including gasoline, oil, hydraulic fluid, aviation fluids and many solvents and hydrocarbons. Epoxy's inherent chemistry provides excellent adhesion properties in high temperature air and liquid filter applications.

MONOPOXY adhesives require no mixing prior to application. They dispense as liquids and cure to a solid polymer after exposure to heat.

KALEX® Adhesives and Sealants are two-component polyurethanes designed for demanding applications. The product family offers a range of processing options and performance properties. These polyurethane adhesives offer the performance properties required for specialty gas filtration, demanding chemical applications, and reverse osmosis (RO).

KALEX adhesives are ideal for air filter and HEPA (High Efficiency Particulate Arrestor) filter potting and sealing. The systems combine convenient processing with reliable adhesion and sealing. Polyurethane's inherent flexibility ensures tight seals with molded end caps.

All the KALEX products feature the convenience of room temperature processing. Their quick processing supports economical production. All cure within 24 hours at ambient conditions. Mild heat increases the production rate and reduces the cure time.

ECLIPSE® Light-Cure Adhesives and Sealants feature innovative UV technology for bonding, tacking and sealing. They are environmentally friendly and convenient to use. These 100% solids, single-component liquids fully polymerize in seconds with exposure to UV-A or visible light. They require no premixing, preheating or mixing equipment. Hardman designed the ECLIPSE chemistry to generate no VOC's during the curing process, contain no solvents, and require neither moisture nor additional heat to achieve full cure.

Light-cure technology provides the following benefits over conventional two-component systems:

- Increase productivity through rapid cure
- Reduce work in process (WIP)
- Eliminate mixing equipment
- Reduce waste and scrap
- Enable "just-in-time" manufacturing

ECLIPSE 300 Series of adhesives and ECLIPSE 700 Series of sealants offer the advantages of rapid cure (in seconds) and automation. They can be used to seal side seams and end caps for many types of gas filters including air, HEPA and vacuum.

Custom Products

Our business is to provide value to our customers. Many customers have unique requirements and we satisfy them with custom products. If you have an important application and you cannot find the right adhesive or sealant please contact us and we will custom design one for you.

Air and Gas Filter Adhesives

Air and gas filters are used in virtually every industry and in many consumer and residential applications. They include air/solid, air/liquid, air/air separation for industrial, medical, transportation, commercial and consumer markets.

Hardman brand polyurethane and epoxy systems are designed to achieve the required filter performance, to process easily, and to deliver the best value for both the filter producer and the filter user.

Air	Gas Purification/Permeators	Compressors/Separators	Vacuum	High Temperature
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EPOCAP Epoxy Encapsulants and Adhesives

EPOCAP	Key Attributes				
3648A/101B	End sealant for tubular permeators. Excellent high pressure & temperature tolerance. Good resistance to fuel and oil. Good tensile strength and flexural strength. Mild heat cure.		X		O
16620A/114B	Excellent resistance to synthetic lubricants and motor oil. Excellent adhesion to filter media and metal end-caps. Room temperature cure.	O		X	O
17446A/B	Designed for gas separation permeators. Low shrinkage, low exotherm and high heat distortion temperature. Excellent for large castings. Mild heat cure.	O	X		
17451A/B	Designed to cast or form rigid end caps in hydrogen gas separation permeators. Rigid. Excellent creep resistance and high temperature / pressure resistance. Mild heat cure.		X		
17499A/ 17451B	Similar to 17451 with a longer work life.		X		
19414A/114B	Designed for lightweight air filters for aviation industry. Meets FAR 25.853 flame retardancy. Excellent adhesion to air filter media and to aluminum. Room temperature cure syntactic epoxy.	X			
19451A/ 25297B	Designed for bonding and sealing filter media to metal end caps. Excellent resistance synthetic lubricants. Good thermal shock resistance (10 °C to 110 °C). Room temperature cure.	O		X	O

KALEX Polyurethane Adhesives and Sealants

KALEX	Key Attributes				
16605A/B	Spin casting seals for filters used in facemasks for chemical contaminants, noxious gases and HEPA filters. Good adhesion to most filter media. Stable in water, mild acid, and some solvents. Green, flexible, and fast-curing.	X			X
16864A/B	Designed for general air filters. Tough and flexible. Fast cure and demolding time.	X			O
17621A/16805B	Designed for automotive filters. Excellent combination of shear strength and peel strength. Good impact and fatigue resistance. 2:1 system. Fast setting.	X			
17631A/B	Similar to 16605. Much tougher polyurethane with FDA approved components. Easy 1:1 system.	X			X
19410A/B	Flame retardant without phosphorus. Low-viscosity, fast-curing, flexible sealant for HEPA and other air filters.	X			X
19440A/B	Excellent structural sealant. Low-viscosity A & B mix to form a black, thixotropic paste. Excellent combination of shear strength and peel strength. Good impact and fatigue resistance. Easy to sand or machine. Convenient 1:1 mix ratio.	X			O
25134A/B	Cast or form flexible end caps for filters and permeators. Low viscosity, fast system for automated production.	O			X
25170A/B	Thicker, more economical version of 25134 with better resistance to oil & fuel.	O			X
25342A/B	Economical, flame retardant sealant with good adhesion to galvanized metal.	X			O

ECLIPSE Light-Cure Adhesives and Sealants

ECLIPSE	Key Attributes				
303	Hard, environmentally resistant, self-leveling UV-curable acrylic adhesive for tacking, sealing and bonding.	X			
321	UV-curable epoxy adhesive for general-purpose air filters requiring low stress and good impact resistance.	O			O
322	Highly filled. UV-curable epoxy adhesive with good chemical and high temperature resistance for bonding porous surfaces bonding and sealing.	O			O
323	UV-curable epoxy for filters requiring hard, highly durable, environmentally resistant adhesives or sealants.	O			O
703	UV-curable, semi-rigid, no sag, urethane acrylic gel designed to fill holes and voids.	X			

X = Recommended O = Suitable

HEPA Filter Adhesives

High Efficiency Particulate Arrestors (HEPA) filters encompass a broad spectrum of industries and applications. They range from the strict requirements of the Class 1 cleanroom for semiconductor fabrication to the filters in consumer vacuum cleaners.

Hardman chemists have developed many proprietary and custom adhesives and sealants for HEPA filters. Our family of products offers a selection of key benefits:

- Flame retardancy
- Low out gassing
- FDA compliance
- Adhesion and penetration
- Sealant strength
- Temperature and chemical tolerance
- Material and processing economics
- Processing speed
- Viscosity
- Flexibility
- Room-temperature processing

Each of our standard products offers a different combination of properties to ensure that it delivers the key requirements for our customers' products.

HEPA	HEPA – Semiconductor/Clean Room
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KALEX Polyurethane Adhesives and Sealants

KALEX	Key Attributes	HEPA	HEPA – Semiconductor/Clean Room
16605A/B	Spin casting seals for filters used in facemasks for chemical contaminants, noxious gases and HEPA filters. Good adhesion to most filter media. Stable in water, mild acid, and some solvents. Green, flexible, and fast-curing.	X	
16864A/B	Designed for general air filters. Tough and flexible. Fast cure and demolding time.	O	
17631A/B	Similar to 16605. Much tougher polyurethane with FDA approved components. Easy 1:1 system.	X	
19410A/B	Designed for critical cleanroom environments. 100% solids, contains no phosphorous. Low viscosity, fast curing, flexible sealant with good adhesion to metal.	X	X
19454A/B	Designed for economical filters for clean rooms. Low viscosity components for ease of mixing. Versatile room temperature or heat cure.	X	O
25134A/B	Designed to cast or form flexible end caps for air filters and pemeators. Low viscosity, fast system for automated production.	X	O
25170A/B	Thicker, more economical version of 25134 with better resistance to oil & fuel.	X	O
25342A/B	Economical, flame retardant sealant with good adhesion to galvanized metal.	X	O

ECLIPSE Light-Cure Adhesives and Sealants

ECLIPSE	Key Attributes	HEPA	HEPA – Semiconductor/Clean Room
321	UV-curable epoxy adhesive for general-purpose air filters requiring low stress and good impact resistance.	O	
322	Highly filled. UV-curable epoxy adhesive with good chemical and high temperature resistance for bonding porous surfaces bonding and sealing.	O	
323	UV-curable epoxy for filters requiring hard, highly durable, environmentally resistant adhesives or sealants.	O	

X = Recommended O = Suitable

Chemical and Fluid Filter Adhesives

Transportation, industrial, and commercial customers use filters for thousands of separation and purification applications. Many of these require filters assembled with industrial adhesives and sealants. Hardman designs epoxy and polyurethane adhesives and sealants for many of these demanding applications.

EPOCAP Two-Component Epoxy Adhesives and Encapsulants offer excellent chemical, water, and temperature tolerance and a variety of performance and processing options.

MONOPOXY One-Component Epoxy Adhesives offer the best chemical, temperature, and adhesion properties in an easy-to-process liquid. Our product family offers consistent properties and a variety of processing options.

KALEX Polyurethane Adhesives and Encapsulants offer easier processing and more flexible polymers. The charts show some of the commercial products. Hardman has the expertise and experience to modify these products and develop new products for important opportunities.

Solvent	Hydrocarbon	Oil	Gasoline	Aviation Fuel	Hydraulic Fluid	Aviation Hydraulic Fluid	Coolant	High Temperature	Water
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EPOCAP Epoxy Encapsulants and Adhesives

EPOCAP	Key Attributes	Solvent	Hydrocarbon	Oil	Gasoline	Aviation Fuel	Hydraulic Fluid	Aviation Hydraulic Fluid	Coolant	High Temperature	Water
13031A/79B	Good chemical resistance. Very low shrinkage. Excellent creep, pressure and high temperature resistance. Room temperature cure.	X	O	O	O	O	O	X	X	X	O
14526A/B	Excellent chemical resistance. Easier processing version of 20216A/79B. 4:1 system, room temperature cure.	X	X	X	X	O	X	X	X	X	X
16811A/B	Excellent adhesive for side seams. High speed processing and good chemical resistance. Good penetration.	O	X	X	O	O	O		O	O	O
17446A/B	Casting & forming end caps for chemical filters & permeators. Tolerates high temperature & pressure. Low exotherm, mild heat cure.	X	X	X	X	X			X	X	X
17451A/B	Higher viscosity version of 17446.	X	X	X	X	X			X	X	X
17499A/ 17451B	Very long work life, low shrinkage and low exotherm. Excellent creep and high pressure and temperature resistance.	X	X	X	X	X			X	X	X
19451A/ 25297B	Room temperature cure. Low shrinkage and fast gel time. Excellent resistance to high temperatures and pressures.		O	X	O	O			X		O
20216A/79B	Harsh liquid filtration applications. Low shrinkage and fast gel time. Excellent for high temperatures and pressures. 100:7 ratio.	X	X	X	X	O	X	X	X	X	X
25164A/101B	Room temperature cure. Excellent adhesion to galvanized metals for end capping of filter media. Low exotherm and long work-life.	X	X	X	X	O	X		X	X	X

MONOPOXY One-Component Adhesives

MONOPOXY	Key Attributes	Solvent	Hydrocarbon	Oil	Gasoline	Aviation Fuel	Hydraulic Fluid	Aviation Hydraulic Fluid	Coolant	High Temperature	Water
20283	Medium viscosity, light gray. Excellent chemical resistance, good adhesion.	X	X	X	X	X	X	X	X	X	X
20408	Lowest viscosity, white. Excellent chemical resistance, good adhesion.	X	X	X	X	X	X	X	X	X	X
25333	Excellent heat and chemical resistance. 20,000 cPs, white.	X	X	X	X	X	X	X	X	X	X
25340	Excellent heat and chemical resistance. 175,000 cPs, dark gray.	X	X	X	X	X	X	X	X	X	X
25346	Excellent heat and chemical resistance. Thixotropic, dark gray.	X	X	X	X	X	X	X	X	X	X

KALEX Polyurethane Adhesives and Sealants

KALEX	Key Attributes	Solvent	Hydrocarbon	Oil	Gasoline	Aviation Fuel	Hydraulic Fluid	Aviation Hydraulic Fluid	Coolant	High Temperature	Water
14536A/B	Ideal for casting & forming end caps. Low shrinkage. Fast demold time. Good resistance to hydraulic fluids, oils, aviation fuel, & most solvents.	O	X	X	X	X	X			X	X
25134A/B	Cast or form flexible end caps. Low viscosity, fast system for automated production.		O	X	O	O					
25170A/B	Excellent resistance to motor oil. Flexible, fast-setting system. Convenient mix ratio.		O	X	O	O					

X = Recommended O = Suitable

Reverse Osmosis Filter Adhesives

Reverse osmosis (RO) systems and the associated filter units have several demanding adhesive and sealing requirements. Component manufacturers vary widely in their production processes, and their adhesive systems must fit their assembly environment. Hardman offers custom and proprietary adhesives and encapsulants for most of these applications.

R.O. - Sheet	R.O. - Tubular	Permeators	FDA
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EPOCAP Epoxy Encapsulants and Adhesives

EPOCAP	Key Attributes	R.O. - Sheet	R.O. - Tubular	Permeators	FDA
3648A/101B	Mild heat cure. High heat distortion temperature, tensile strength and flexural strength. Excellent creep and high pressure and temperature resistance. Good resistance to salt water.		X	X	O
3648A/25341B	Designed for tubular reverse osmosis and general aqueous filtration applications. Low viscosity. Long work life, low exotherm and excellent water resistance.		X	O	O
3648A/25344B	Designed for tubular and sheet RO filters. Low viscosity and long work life. Low exotherm and water resistance.	X	X	X	O
17446A/B	Mild heat cure. Low shrinkage, low exotherm and high heat distortion temperature. Facilitates large castings without adversely affecting membranes.			X	
17451A/B	Mild heat cure. Rigid, Low exotherm. Low shrinkage. Permits large castings without adversely affecting synthetic membrane media. Excellent creep resistance and high temperature / pressure resistance.			X	
17499A/17451B	Very long work life, low shrinkage and low exotherm. Highly cross-linked. Excellent creep and high pressure and temperature resistance.			X	
25164A/101B	Room temperature cure. Low exotherm and long work-life. Excellent adhesion to galvanized metals for end capping of filter media. Components listed in Chapter 21 CFR Part 175 – Indirect Food Additives.		X	X	O

EPOWELD Two-Component Adhesives

EPOWELD	Key Attributes	R.O. - Sheet	R.O. - Tubular	Permeators	FDA
20348A/B	Low-viscosity, room-temperature system for hard, rigid applications that require structural strength. Designed for FDA 175.105 and 175.300 filter applications.	X	X	X	O
20362A/B	Thixotropic paste that cures at room temperature. Designed for FDA 175.300 applications.	O	X	X	O

KALEX Polyurethane Adhesives and Sealants

KALEX	Key Attributes	R.O. - Sheet	R.O. - Tubular	Permeators	FDA
16722A/B	Binds and seals filaments in ultra filtration, nano filtration and RO filters. Room temperature or mild heat cure. Hydrophobic. Flexible. Excellent membrane wetting and sag resistance. Components listed under FDA 175.105 or 175.300.	X		X	O
17631A/B	Designed for spin casting operations used to form edge seals on filter media. Very fast curing and demolding. Maintains flexibility over a wide temperature range. Components are listed under the FDA -CFR Title 21, Part 175 Subpart B.		X	O	O
19417A/B	Designed to bind and seal filaments in ultra filtration, nano filtration and both wet and dry RO filters. 1:1 mix ratio. Components are listed in FDA 175.105 or 175.300.	X			O
19421A/19423B	Designed for reverse osmosis filters. Room temperature cure. Hydrophobic. Excellent membrane wetting and sag resistance. All the components are listed in FDA 175.105 or FDA 175.300.	X			O

X = Recommended O = Suitable

Filter Adhesive Selection Chart

		Air and Gas					HEPA		Chemical and Fluid								R.O. and Permeator							
		Air	Gas Purification/ Permeators	Compressors/ Separators	Vacuum	High Temperature	HEPA	HEPA – Semiconductor	Solvent	Hydrocarbon	Oil	Gasoline	Aviation Fuel Fluid	Hydraulic Fluid	Aviation Hydraulic Fluid	Coolant	High Temperature	Water	R.O. – Sheet	R.O. – Tubular	Permeators	FDA		
Two-Component Epoxies	EPOCAP 3648A/101B		X			O			O	O	O	O	O		O	O	O			X	X	O	O	
	EPOCAP 3648A/25341B																X			X	O	O	O	
	EPOCAP 3648A/25344B																	X	X	X	X	O	O	
	EPOCAP 13031A/79B			O		O			X	O	O	O	O	X	X	X	O							
	EPOCAP 14526 A/B	O				O			X	X	X	X	O	X	X	X	X							
	EPOCAP 16220 A/114B	O		X		O			O	O	O	O		O	O	O	O							
	EPOCAP 16811 A/B								O	X	X	O	O		O	O	O							
	EPOCAP 17446 A/B	O	X						X	X	X	X	X		X	X	X					X		
	EPOCAP 17451 A/B		X						X	X	X	X	X		X	X	X					X		
	EPOCAP 17499A/17451B		X						X	X	X	X	X		X	X	X					X		
	EPOCAP 19414A/114B	X																						
	EPOCAP 19451A/25297B	O		X	O		O			O	X	O	O		X		O							
	EPOCAP 20216A/79B	O				O			X	X	X	X	O	X	X	X	X							
	EPOCAP 20348A/B																		X	X			X	
	EPOCAP 25164A/101B	O	O			O			X	X	X	X	O	X		X	X	X			X	X	O	
EPOWELD 20348 A/B																		X	X	X	O			
EPOWELD 20362 A/B	O	O							O	O	O		O		O	O	X	O	X	X	O			
One-Component Epoxies	MONOPOXY 20283	O	X		X			X	X	X	X	X	X	X	X	X	X							
	MONOPOXY 20408	O	X		X			X	X	X	X	X	X	X	X	X	X							
	MONOPOXY 25333	O	X		X			X	X	X	X	X	X	X	X	X	X							
	MONOPOXY 25340	O	X		X			X	X	X	X	X	X	X	X	X	X							
	MONOPOXY 25346	O	X		X			X	X	X	X	X	X	X	X	X	X							
Two-Component Polyurethanes	KALEX 14536 A/B	O				O			X	X	X	X	X			X	X							
	KALEX 16605 A/B	X			X		X																	
	KALEX 16722 A/B	O			O		O										X	X		X	O			
	KALEX 16864 A/B	X			O		O										O							
	KALEX 17621A/16805B	X							O	O	O	O												
	KALEX 17631 A/B	X			X		X										X			X	O	O		
	KALEX 19410 A/B	X			X		X	O																
	KALEX 19417 A/B	O															X	X				O		
	KALEX 19421A/19423B	O															X	X				O		
	KALEX 19440 A/B	X			O		O																	
	KALEX 19454 M-1 A/B	O			O		X	O																
	KALEX 25134 A/B	O			X		X	O		O	X	O	O											
	KALEX 25170 A/B	O			X		X	O		O	X	O	O											
KALEX 25342 A/B	X			O		X	O																	
UV-Curable Polymers	ECLIPSE 303	X																						
	ECLIPSE 321	O				O	O		O	O			O	O										
	ECLIPSE 322	O				O	O		O	O			O	O										
	ECLIPSE 323	O				O	O		O	O			O	O										
	ECLIPSE 703	X																						

X = Recommended O = Suitable



Hardman brand formulates adhesive and sealants that resist the chemical, heat, pressure and other destructive forces of filtration environments. ECLIPSE[®], EPOCAP[®], EPOWELD[®], KALEX[®], MONOPOXY[®] and adhesives are used in a wide range of filtration/separation devices and permeators. They are performance proven in air, water, solvents, aviation & specialty fuels, oils and hydraulic fluids.

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