Building Better Barriers
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In applications from food packaging to automotive fuel systems, EVAL™ barrier resins hold the key to new possibilities and better products.
What are Eval Resins?

EVAL resins are ethylene vinyl alcohol (EVOH) copolymer resins manufactured by EVAL, the undisputed leader in EVOH barrier solutions. These unique polymers are characterized by their unsurpassed gas, odor and flavor barrier properties as well as resistance to solvents, chemicals and hydrocarbons.

EVAL resins offer both excellent processability and barrier properties. The key to this remarkable balance is the combination of the proper copolymerization ratio of ethylene to vinyl alcohol and our proprietary manufacturing process.

The EVAL family of products includes both films and resins. It comprises the world’s widest range of EVOH grades, making it ideal for a diverse array of applications, including food, medical, pharmaceutical, cosmetic, agricultural and industrial packaging as well as automotive and fuel containment applications.
Preserving Food and Beverage Quality

Thanks to its superior gas barrier properties, EVAL resins are used as a functional barrier polymer in food and beverage packaging applications. Keeping oxygen out, an EVAL layer preserves the flavor and quality of the food. In addition, with juices or baby formula, EVAL barrier properties are used to protect and preserve sensitive vitamin content.

Reducing Fuel Emissions

In automotive fuel systems, EVAL barriers keep fuel vapor inside the system, making today’s plastic fuel tanks both lightweight and environmentally friendly. Multi-layer plastic fuel tanks are safer and lighter in weight than steel. The excellent gas barrier properties of EVAL ensure a minimal permeation of fuel gases through the walls of plastic fuel tanks and pipes, facilitating compliance with strict regulatory emission standards. By including an EVAL layer in automotive plastic fuel tanks, a highly effective barrier against fuel vapor permeation is achieved. The same is true for EVAL layers in plastic fuel tanks for small engines, fuel lines and fuel pipes.

Resisting Industrial Chemicals

EVAL resins resist oils and chemical agents, making them particularly suitable for packaging organic solvents, agricultural pesticides and various oils while maintaining the advantages of plastics. Containers with an EVAL layer allow for the safe handling of solvents and other chemical substances while protecting their integrity.

EVAL Barrier Resins

Excellent barrier properties against the permeation of flavor, aroma, fuel vapor and gas including oxygen, nitrogen, carbon dioxide, helium and hydrocarbons.

Exceptional Durability:
- Resistance to solvents
- Long-term thermal stability
- UV resistance
- Radiation resistance
- Flex-crack resistance

EXCELLENT OPTICS:
- High clarity
- High gloss
Extending the Appeal of Cosmetics
Multilayer cosmetic packages using an EVAL layer will considerably enhance the preservability of fragrances and ensure that cosmetic agents maintain their quality and effectiveness over a long period of time.

Safeguarding Homes And Buildings
EVAL resins are widely used for under-floor heating systems in homes and commercial buildings. Its barrier properties prevent oxygen from dissolving into the circulating hot water and thereby corroding the metal parts in the heating element. Multilayer pipes containing an internal EVAL barrier layer meet strict building standards and provide a flexible and easy-to-install alternative to metal pipes.

Easy Processing
With a wide variety of resin grades available, EVAL resins can easily be processed on conventional fabrication equipment.
- Blown film coextrusion
- Cast film coextrusion
- Coextrusion orientation for multilayer barrier films with the double-bubble or the tenter process
- Thermoforming
- Profile coextrusion
- Sheet thermoforming
- Coextrusion blow molding
- Injection stretch blow molding
- Injection molding
- Coating
- Pipe and tube coextrusion

Reduce and Recycle with EVAL Resins.
The excellent gas barrier properties of EVOH resins permit downguaging without any loss of performance or protection. As a result, packaging can be made lighter in weight, with less raw material, and without environmentally harmful chemicals. Packages containing EVAL can also be recycled.
**Excellence In R&D and Technical Support**

To offer premium, accessible technical service and development assistance to our customers, Kuraray America and our parent company, Kuraray Co., Ltd, have established a world-class research and development center on the site of our Pasadena, Texas, manufacturing facility. Here, we develop new applications for EVAL EVOH resins and provide insightful technical service to our customers through joint development projects, analytical support and effective troubleshooting.

**Global Resources**

Kuraray Company Ltd. operates EVAL production facilities all over the world.

- **Asia-Pacific** — with a capacity of 22 millions pounds per year, our Japanese plant serves primarily the Asian-Pacific and Japanese markets.

- **United States** — expansion efforts at our Pasadena, Texas facility will increase its capacity to 104 million pounds per year.

- **Europe** — EVAL Europe N.V. serves the European, African and Middle Eastern markets with a production capacity of 54 million pounds per year.

**A Commitment to Quality**

EVAL resins are manufactured using Kuraray’s unique production technology under strict and continuous quality control. The EVAL facility in Pasadena, Texas, is certified by Det Norske Veritas for compliance to ISO 9001 quality management standard. Since 2003, EVAL has maintained the additional ISO 9001:2000 certification of its quality systems used for the design, manufacturing and sale of EVOH copolymers. This ISO certification includes both our Pasadena plant and corporate headquarters in Clear Lake, Texas.

**Environmental Stewardship**

At Kuraray America, we strive to incorporate environmental responsibility into all our business endeavors. We employ environmentally friendly manufacturing practices and always seek to conserve energy, reduce emissions and ensure strict environmental compliance. Our Pasadena facility is ISO 14001 certified for environmental management standards.

**FDA and European Regulatory Compliance**

EVAL resins may be used in applications involving direct food contact as outlined by the Food and Drug Administration regulations, 21 CFR, Section 177.1360.

EVAL resins may be used for indirect food contact as outlined in 21 CFR, Section 175.105.

EVAL resins comply with food additive regulations covering material used for the packaging of foods sterilized under retort conditions.

EVAL resins meet the requirements of the U.S. Department of Agriculture and the Canadian Ministry of Agriculture for use in contact with meat and poultry products.

EVAL resins also comply with the strict hygienic regulations of many European countries and with the EC Directive for food packaging.
Whether your goal is to reduce costs, improve product performance or find better ways to meet environmental standards, EVAL barrier resins can be the competitive advantage you’ve been looking for. For more information, visit us at www.kuraray.us.com or call 1-800-423-9762.

EVAL Films
Kuraray also markets EVAL Films, which are widely used in flexible food packaging; lids for thermoformed food packaging; pouches for sauces, coffee, tea, and soup; self-standing pouches; and wall-paper. EVAL films offer a unique array of performance properties:

- Superior barrier properties against oxygen and other gases
- Outstanding barrier to flavor and aroma permeation
- Excellent resistance to oil and organic solvents
- Easily printed without special treatment or loss of barrier performance
- Suitable for thermoforming
- Excellent resistance to pinholing when flexed
EVAL™ ethylene vinyl alcohol (EVOH) copolymer resins are characterized by their outstanding gas barrier properties and by their excellent processability.

The key to this balance of characteristics is the combination of the proper copolymerization ratio of ethylene to vinyl alcohol. Kuraray’s unique proprietary manufacturing process has produced the world’s widest available range of EVOH grades.

- **EVAL™ L** type has a very low ethylene content and is suitable as an ultra high-barrier grade in several applications.
- **EVAL™ F** type offers superior barrier performance and is widely used for automotive, bottle, film, tube and pipe applications.
- **EVAL™ C** type can be used for high-speed co-extrusion coating and cast flexible applications.
- **EVAL™ H** type has a perfect balance between high barrier properties and long-term run stability and is especially suitable for blown film.
- **EVAL™ E** type has a higher ethylene content which allows for greater flexibility and even easier processing. Different versions have been especially designed for cast and blown film as well as for pipe.
- **EVAL™ G** type has the highest ethylene content, making it the best candidate among standard EVAL™ grades for stretch and shrink film applications.

**EVAL™ SP** resins are a family of resins that combine the gas barrier performance of traditional EVOH resins with improved orientability. This “softer” EVOH is ideal for applications where orientation is key and a more flexible barrier polymer is needed.