



OREVAC®

TERPOLYMER ETHYLENE – VINYL ACETATE – MALEIC ANHYDRIDE



Let's progress together



Thermo Adhesive Films

OREVAC® Terpolymer is a material of choice to produce adhesive films used to bond different types of solid substrates such as PA, PET & PU films, metal foils, textiles, fibreglass fabrics, artificial leather, wood and natural fibres products, non woven and foams.

OREVAC® Terpolymer films (monolayer or multilayers) extruded by blown or cast film technology, are applied in a second step, under pressure and heat activation.

Electrically heated transfer calenders, infra red roll calender, flame bonding machines, flatbed calenders, compression moulding and laminating machines are possible application processes.



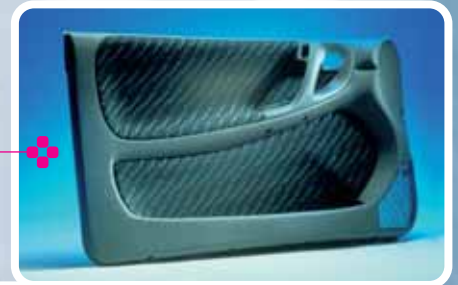
Furniture

End-use applications

OREVAC® Terpolymer films find applications in:

- **Automotive Industry:** assembling of door panels, seats and roofing (bonding of textile substrates in seats covers and headliners), carpets, sound proofing and heat insulation materials.
- **Sports & Leisure:** skis, sails, shoes (textile uppers, liners).
- **Furniture:** decorative films, mattress, seats, wall covering (bonding of foams on woven and non woven).

Automotive Industry



Thermo Adhesive Films



Benefits and Features

→ The Vinyl Acetate content allows softness, flexibility and polarity of **OREVAC® Terpolymer** to be adjusted. They have a low melting temperature, crystallinity and crystallisation rate, leading to very good mechanical adhesion on porous or fibrous substrates. **OREVAC® Terpolymers** can be laminated at low temperatures, with no risk of thermal degradation of the substrates.

OREVAC® Terpolymer	Minimum Lamination Temperature (°C)
9304	95
9307 Y	105
9318	100

→ Maleic Anhydride gives reactivity, leading to versatile adhesive properties to polar and non polar substrates in lamination and to molten polymers. Adhesive properties are far better than EVA copolymers.

→ As an ethylene copolymer, **OREVAC® Terpolymers** are fully compatible with PE, and virtually all other ethylene copolymers. **OREVAC® Terpolymers** can be dry blended with other polyolefins (EVA, PE, grafted polyolefins) or used pure.

→ **OREVAC® Terpolymers** have low smell (key point for automotive applications).

→ **OREVAC® Terpolymer** films also bring barrier properties to protect one substrate from other layers (water, water vapour, chemicals, for example blowing agents and plasticizers...).



Films

OREVAC® Terpolymer is a high clarity tie-layer based on EVA and MAH for multilayer structures such as Polyethylene and Polyamide.

It is particularly adapted for the production of shrinkable bags, lids for trays and tubular films when outstanding optical properties combined with good adhesion are required.

OREVAC® Terpolymer provides a high cohesion to barrier films for PE/PA structures produced with different processes such as mono and double bubble blown film as well as cast film.

Recommended grades: OREVAC® T 9314, 9318, 9304

Films

Wire and Cable compounds

OREVAC® Terpolymers are effective coupling agents for EVA and/or Elastomers based HFFR compounds.

The ease of processing is one of the great qualities of **OREVAC® Terpolymers**. All types of mixing technologies are suitable to convert **OREVAC® Terpolymers**. The best results are achieved with internal mixers where, thanks to its low melting point, a good dispersion and a complete melting of the product at low process temperatures are achieved. Due to the excellent compatibility with other polyolefins, in particular with EVA, adhesion to the tools is reduced.

OREVAC® Terpolymers increase the tensile strength and elongation a break of HFFR wires and cables due to a better homogeneity of the initial compound. The homogeneity is achieved by a chemical reaction between the anhydride group of the **OREVAC® Terpolymer** product and the OH group of the mineral filler ATH (Aluminium Tri-Hydrate) or MDH (Magnesium Di-Hydroxyde). Due to its chemical nature, **OREVAC® Terpolymers** have the same high filler acceptance as an EVA.

For specific cable applications **OREVAC® Terpolymers** are used in combination with other coupling agents such as **LOTADER®** or grafted Polyolefins to adjust the final characteristics of the cable.

Recommended grades: Orevac T®9304, 9318



Wire and Cable



Tubes

Co-extruded tubes are currently used for conveying beverages such as beer. In such tubing, Polyamide is used as the inner layer for food contact and Polyethylene or Ethylene Vinyl Acetate Copolymers as the external layer. **OREVAC® Terpolymers** give the best properties to combine these materials. Reactivity of **OREVAC® Terpolymer** towards PA provides good adhesion. **OREVAC® Terpolymers** improve the flexibility of EVA based structures.

Recommended grade: OREVAC® T 9309



Tubes

Pipe Coatings - Shrink Sleeves and Tapes

Adhesive modifier for shrink sleeves – tapes – 2 layer PE coatings - for corrosion protection of pipeline and welded joints.

Thanks to their fluidity, polarity, and outstanding reactivity with a variety of substrates, **OREVAC® Terpolymers** are ideal modifiers to improve adhesion, viscosity and processing of adhesive layers of tapes and shrink sleeves. **OREVAC® Terpolymers** are powerful compatibilizers between mineral fillers and olefinic resins.

OREVAC® Terpolymers provide adhesion in two-layers PE coatings between steel and PE top coat.

Recommended grades: Orevac T® 9305, 9307 Y



Photo Total - Roussel Marc

Pipe coatings

Hot Melt Adhesives



Hot Melt Adhesives

OREVAC® Terpolymers are used when good adhesion is required. They enhance bonding where classical polyolefin based hot melt adhesives suffer from a lack of adhesion to non-porous and polar surfaces. A significant improvement is achieved on the following substrates:

- glass
- metal foils (aluminium, steel,...)

OREVAC® Terpolymers are formulated exactly like EVA copolymers, with waxes, tackifying resins, plasticizers and fillers.

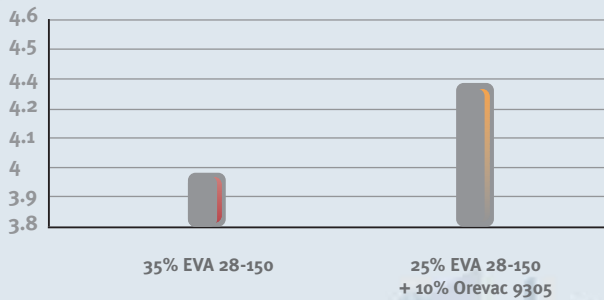
Hot Melt Formulation

To optimise cost/performance, **OREVAC® Terpolymers** are combined with **EVATANE®**. Adhesion tests have been performed in a classical Hot melt formulation to reinforce the improved adhesion properties of **OREVAC® Terpolymers** on non-porous substrates.

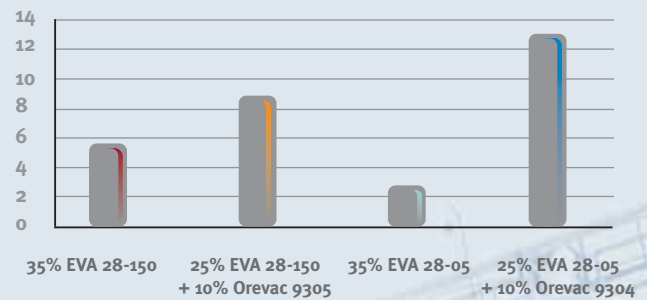
Formula: Polymer / tackifying resin / wax / antioxidant: 35/50/15/0.2

Recommended grades: Orevac T® 9304, 9305

Peel Strength (N/25mm) Alu/Alu



Peel Adhesion 90° Alu/Glass N/25mm



Bonding Aluminium to Aluminium: T Peel Test



Bonding Aluminium to glass: 90° peel



Hot Melt PU

The functional group Maleic Anhydride in the backbone of **OREVAC® Terpolymers** react with isocyanates. For this reason they are the polymer of choice to improve green strength and global adhesion performances of Polyurethane Hot Melts (HMPU).

Recommended grades: Orevac T® 9304, 9305

CHARACTERISTICS		Unit	Test Method ISO	9309	9314	9307 Y	9318	9304	9305		
MAH MINI. (UNIT: PPM)	RANGE OF EVA TERPOLYMERS										
	Vinyl Acetate Content	%	Arkema	8 – 9.5	13 – 15	13 – 15	17 – 20	23.5 – 26.5	26 – 30		
	Melt Index (190°C – 2.16kg)	g/10 mn	ASTM D 1238	3.3 – 4.7	1.5 – 2.5	9.5 – 11.5	6 – 8	5.5 – 9.3	150 – 210		
	MAH Mini.	PPM		1600	800	1600	1600	1600	3200		
PROPERTIES	Density	g/cm3	ASTM D 1505	0.932	0.938	0.939	0.943	0.950	0.951		
	Melting Point	°C	D.S.C.	105	95	93	86	80	68		
	Vicat Softening Point	°C	ASTM D 1525	79	71	66	54	49	<40		
	Ring and Ball Temperature	°C		182	>200	145	158	153	92		
	Tensile properties	Strength at yield	MPa	ASTM D 638	6	4.7	4.8	3.5	2.6	1.8	
		Strength at break	MPa		18	23	19	20	26	4.5	
		Elongation at break	%		600 – 900	700 – 900	600 – 900	600 – 900	600 – 900	700 – 900	
	Young Modulus	MPa	ISO R 527	110	67	69	40	23	12		
	Shore Hardness A	ISO 868 ASTM D 2240	91	92	91	84	82	71			
	EXTRUDING CONDITION	Film properties	Strength at yield	MPa	ASTM D 882	6	5.5	5.6	4.3	4	-
Strength at break			MPa	22		25	26	24	26	-	
Thickness : 50 µm		Elongation at break	%	500 – 700		500 – 700	700 – 900	600 – 800	700 – 900	-	
Longitudinal		Haze	%	ASTM D 103		7.6	4.7	3.5	2.5	4.6	-
		Dart Test	g	ASTM D 1709		355	365	180	250	400	-

RANGE OF EVA TERPOLYMERS		9309	9314	9307 Y	9318	9304	9305
MAIN APPLICATION	Blown Film Coextrusion	PE / PA • Ionomers / PA	■	■		■	■
	Cast Film Coextrusion	PE / PA • Ionomers / PA	■	■		■	
	Coextrusion Tube	PE / PA		■		■	
	Skin Packaging Adhesive	Any type of Cardboard			■		
	Thermo-Adhesive Films	PA, PET, PU, Aluminium	■	■	■	■	■
	Hot Melt Adhesives	Polar Substrates				■	■

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Tel: +33 (0)1 49 00 80 80
Mail: info@functional-polyofins@arkema.com
www.arkema.com

www.orevac.com