AERAFIN™ polymers

Propylene-rich polyolefin polymers

Introduction

AERAFIN™ polymers are propylene-rich polyolefin polymers characterized by consistent quality, low color, excellent thermal stability, low odor and broad compatibility with numerous elastomers, polymers, and tackifiers.

The balance of softening point, crystallinity and molecular weight makes AERAFIN™ polymers desirable as base polymers in hot-melt adhesives, sealants and for plastic modification. The AERAFIN product family offers a broad range of viscosities with crystallinities optimized for a variety of hot melt adhesive applications. AERAFIN polymers have broad compatibility with polyolefin polymers and can be used as primary or secondary polymers in a wide variety of applications.

AERAFIN™ polymers are compatible with a wide range of hydrocarbon tackifying resins that enable processing the finished adhesive at a broad range of temperatures and operating conditions. Fully hydrogenated resins with ring and ball softening points (RBSP) under 125°C are most compatible with AERAFIN polymers. It is noteworthy that resins with as much as 7% aromatic content or with RBSP as high as 142°C have useful levels of compatibility with AERAFIN polymers; therefore, the resins can be used in AERAFIN polymer-based formulations.

AERAFIN™ polymers can be processed with standard extrusion, roll-coating, spray, slot and hot melt adhesive application equipment.

AERAFIN™ key benefits at a glance


Excellent thermal stability

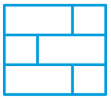

Good adhesion with excellent peel strength


Excellent sprayability at lower temperatures


Low odor


Appropriate for high polymer loading formulation


Fit-for-use in a wide range of applications

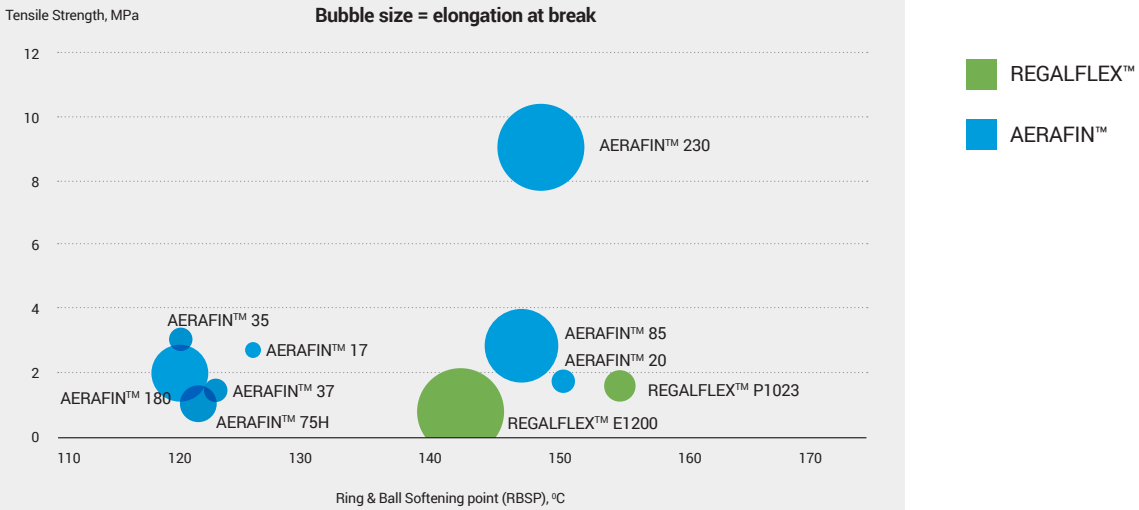

Good cohesion

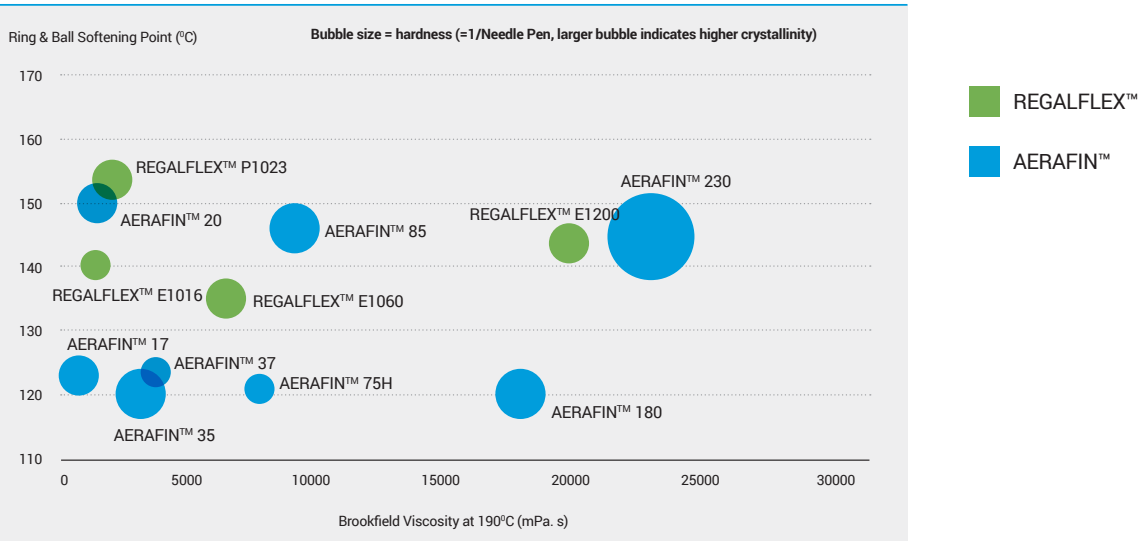

Low density

Comparison of AERAFIN™ and select REGALFLEX™ product properties

The range of available Thermosel™ viscosities and Ring and Ball softening points (RBSP) is shown in Figure 1. The bubble size of each product represents polymer hardness, with larger bubbles indicating higher crystallinity and storage modulus (cohesive strength). AERAFIN polymers have a different balance of hardness (needle penetration) to RBSP compared to Synthomer REGALFLEX™ Amorphous Polyolefin polymers, which makes AERAFIN polymers useful in different applications. Thermal stability data for AERAFIN polymers is available upon request.

Figure 1:
Comparison of AERAFIN™ and selective REGALFLEX™ product properties.





Typical properties

AERAFIN™ polymers are all propylene-ethylene copolymers.
All AERAFIN grades are available in pellet form.

Table 1
AERAFIN™ Polymer– Typical properties

Polyolefin Polymers	Brookfield viscosity at 190°C, mPa.s	R&B Softening Point, °C	Glass transition temperature, °C	Penetration hardness, dmm	Tensile strength, MPa	Elongation at Break, %	Open time, s	Shear modulus at 23°C, MPa	SAFT , °C
	ASTM method								
(ASTM) Method	D3236	E28	D3418	D5	D412c	D412c	D4497-10	DMA	PP/PP
AERAFIN™ 17	1,500	125	-38	20	2	21	7	4	97
AERAFIN™ 20	1,900	151	-20	20	2	42	40	3	128
AERAFIN™ 35	3,300	120	-40	14	3	45	20	9	97
AERAFIN™ 37	3,500	122	-38	25	1	45	55	4	93
AERAFIN™ 75H	7,500	122	-40	27	1	80	60	2	90
AERAFIN™ 85	8,500	150	-18	10	3	460	20	14	135
AERAFIN™ 180	18,000	120	-38	20	2	260	30	4	94
AERAFIN™ 230	23,000	147	-22	5	9	570	10	26	138

Tensile strength and elongation at break were determined by Synthomer internal method based on ASTM D412 die C.

Open time: Determination of open time in the lab was done by Synthomer internal method based on ASTM D4497-10

Shear modulus at 23°C: The viscoelastic properties were evaluated using ARES-G2 rheometer, 8 mm parallel plate geometry, a temperature ramp of 6°C/min from -60°C to 180°C, at 10 rad/s. Storage moduli (G') at 23°C were reported as shear modulus for each product.

SAFT (PP/PP): Shear Adhesion Failure Temperature (SAFT) was tested with two PP substrates bonded with the polymer. The polymer was melted at 180-200°C for at least 20 minutes, and a 1"x1" bond area with polymer thickness 0.5-0.7 mm was prepared. SAFT temperature measurement followed ASTM D4498-07 "Standard Test Method for Heat-Fail Temperature in Shear of hot Melt Adhesives." The static load was 1 Kg.

Properties reported here are typical of average lots. Synthomer makes no representation that the material in any particular shipment will conform exactly to the values given.

Filtration

Applications and features

AERAFIN™ polyolefin polymers offer combinations of viscosity and crystallinity optimized for a variety of hot melt adhesive applications.

Table 2

AERAFIN™ Polymer– Typical applications

Products	Applications								Key features
	Hygiene	Packaging	Mattress	Automotive Interior	Wood-working	Filter	IG sealant	General assembly	
AERAFIN™ 17	●	●	●	–	–	●	–	●	• Lowest viscosity with good processability, • High crystallinity with short open/set time
AERAFIN™ 20	–	●	–	●	–	●	–	–	• Low viscosity • High heat resistence
AERAFIN™ 35	●	–	●	●	–	●	●	●	• Low viscosity, high crystallinity with improved cohesion
AERAFIN™ 37	●	–	–	–	–	●	–	–	• Low viscosity allows for high polymer content • Medium open time and set time suitable for faster line speeds • High adhesion to low surface energy materials • Ability to maintain good aged peel strength • Good spray and slot die application at temperatures as low as 130°C
AERAFIN™ 75H	●	●	●	–	●	●	–	●	• Lowest crystallinity, medium-to-low viscosity • Ability to maintain aged peel strength • High polymer loading • Long open time • Good sprayability and slot coating at temperatures as low as 130°C
AERAFIN™ 85	–	–	–	●	●	●	–	●	• Lower viscosity with medium open time suitable for multiple applications • High heat resistance enables very good high temperature performance • High tensile strength with elongation while displaying excellent adhesion on low surface energy materials
AERAFIN™ 180	●	●	●	–	–	●	–	●	• Low crystallinity, medium viscosity • Broad processing window
AERAFIN™ 230	–	–	–	●	●	●	–	●	• Excellent high temperature resistance while displaying low RBSP (<160°C) • High tensile strength with elongation, high crystallinity, medium viscosity • Good adhesion to low surface energy substrates

AERAFIN™ Rheology

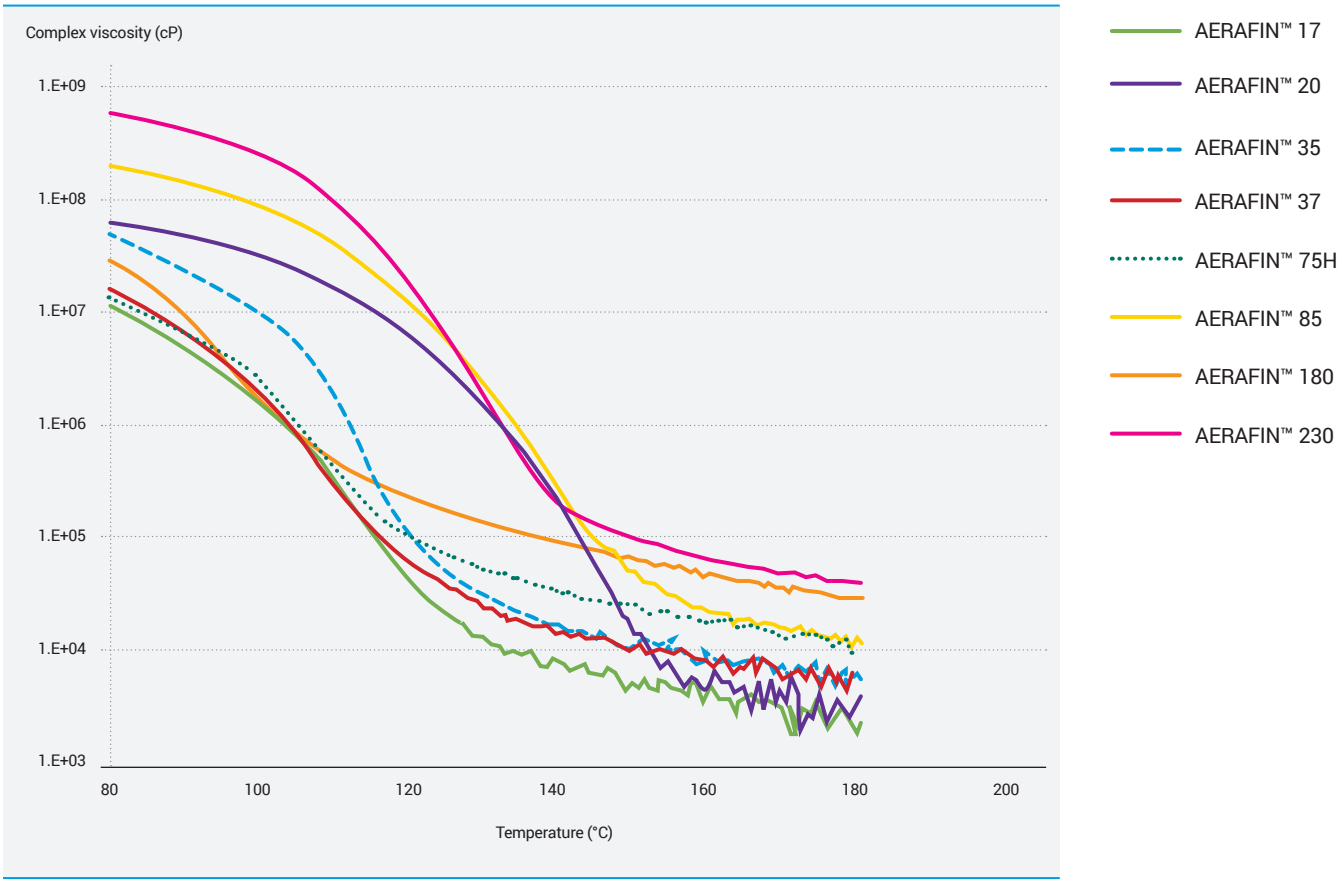
The complex viscosity and storage modulus (G') of AERAFIN™ polymers

The complex viscosity as a function of temperature is presented for the AERAFIN™ polymers in Figure 2. The viscosity temperature profile gives an overview of the handling temperature for each product.

The storage modulus (G') as a function of temperature is presented for the AERAFIN™ polymers in Figure 3. The modulus temperature profile gives information on heat resistance, cohesive strength at a given temperature, and melting performance for each product.

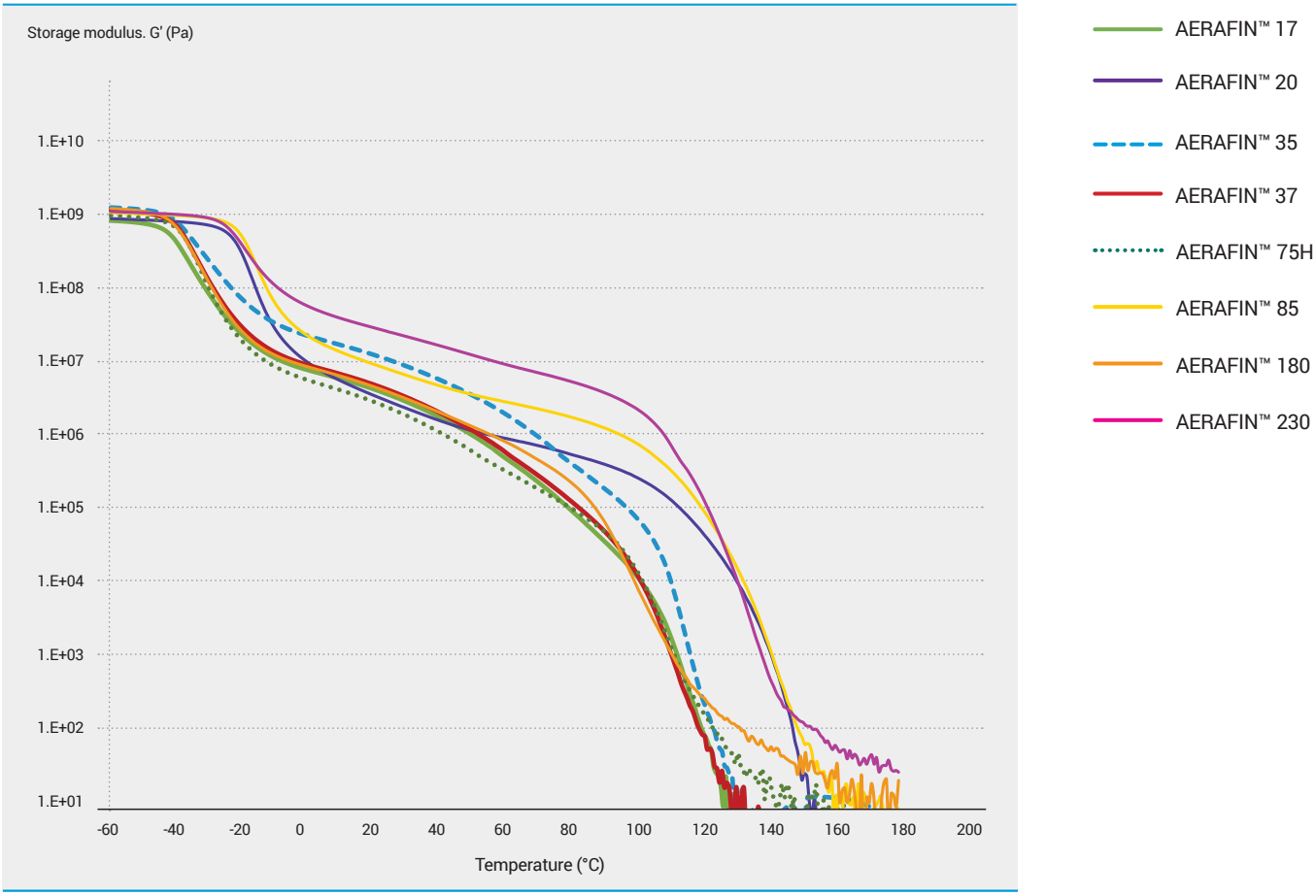
For further details, contact your Synthomer representative at the email provided at the end of this brochure.

Figure 2
Complex viscosity as a function of temperature



AERAFIN™ Rheology

Figure 3
Storage modulus as a function of temperature



Mattress assembly

Woodworking

More information

AERAFIN™ polymer product forms & packaging

All AERAFIN grades are available in pellet form, coated with low-density polyethylene or polypropylene powder to improve the flowability of the product. AERAFIN™ pellets are packaged in bags (50-lb net weight, 22.7 kg), 2,250-lb net weight per pallet.

Select AERAFIN™ grades can be delivered in North America in molten bulk form in railcars or tank trucks from the production site in Longview, Texas, USA. For related information, please contact a Synthomer representative through the e-mail below.

Regulatory status

The manufacturer is responsible for testing and ensuring the suitability of the product for the desired end-use. Contact Synthomer for further details on current Regulatory clearances of AERAFIN™ polymers for use in food contact applications

AERAFIN™ polymers are products of Synthomer and are produced under the following U.S. patent and the foreign equivalents: 9,593,179. The polymers, compositions comprising the polymers, and articles that could comprise the polymers would be protected under one or more of the following U.S. patents and the foreign equivalents: 9,382,351; 9,399,686; 9,428,598; 9,611,341; 10,214 600; 10,308,740; 10,647,795; 10,696,765; 10,723,824; 10,725,406; 11,267,916 and 11,390,701.

Want to know more?

For product information and support, please contact a Synthomer representative through the e-mail below.

Contact for more information:
Synthomer Adhesive Technologies, LLC
25435 Harvard Road, Beachwood, Ohio 44122 USA
Adhesive.Technologies@synthomer.com
synthomer.com