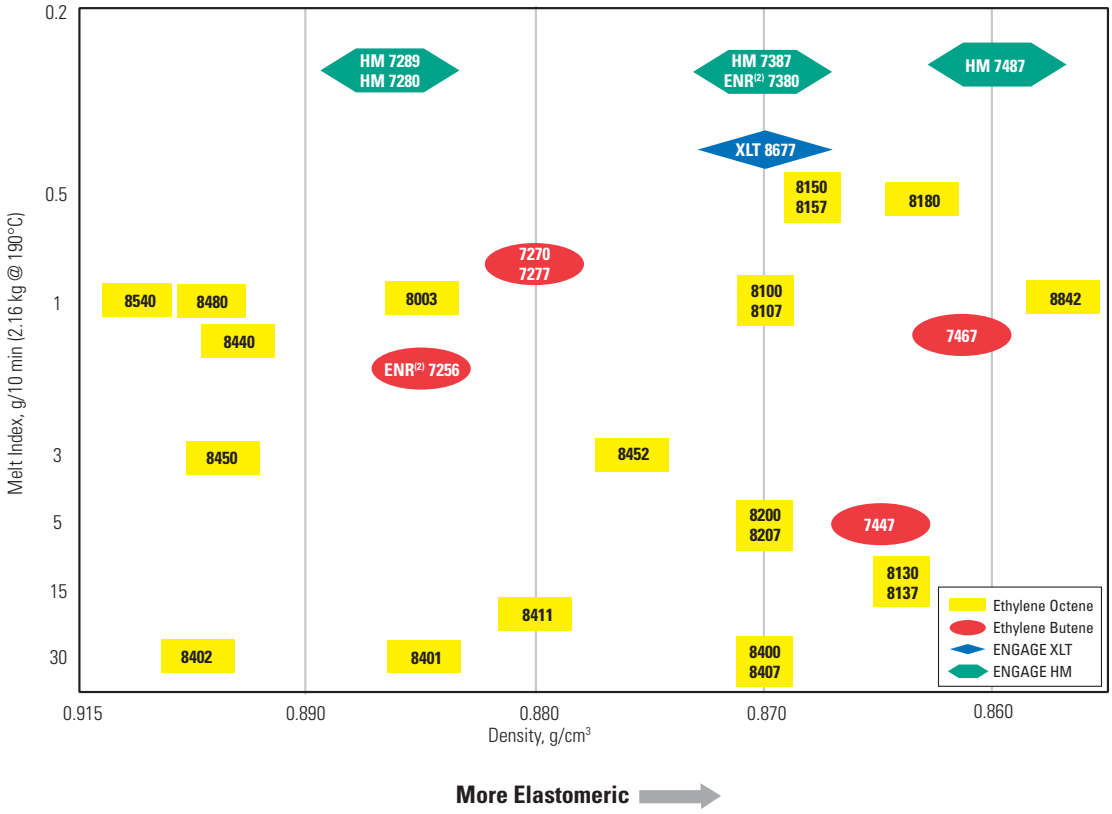
Technical Information

Product Selection Guide

ENGAGE™ Polyolefin Elastomers (POE) are designed to offer customers improved impact performance, melt strength, and processability over a broad spectrum of markets and appli-ations. They can offer exceptional performance and a unique balance of properties when used alone or in blends and compounds. The grade breadth includes ethylene octene and ethylene butene copolymers over a wide range of densities and melt flow rates.

In addition, the ENGAGE HM POE product line places increased emphasis on high melt strength and toughness. And, our most recent innovation – ENGAGE XLT POE – offers opportunities to produce lighter, thinner thermoplastic olefin (TPO) parts with increased stiffness, comparable impact strength, improved fit and finish, and reduced cycle times versus the leading impact modifier.

Figure 1: ENGAGE™ Polyolefin Elastomer Products [1,3]



More Elastomeric

[1] All grades shown are commercialized as ENGAGE™ Polyolefin Elastomer products, except for grades noted as ENR.
[2] ENR designates a developmental grade. If products are described as "experimental" or "developmental": (1) product specifications may not be fully determined; (2) analysis of hazards and caution in handling and use are required; (3) there is greater potential for Dow to change specifications and/or discontinue production; and (4) although Dow may from time to time provide samples of such products, Dow is not obligated to supply or otherwise commercialize such products for any use or application whatsoever.
[3] Typical properties; not to be construed as specifications. Users should confirm results by their own tests.

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Table 1: Typical Properties of ENGAGE™ POE Ethylene Octene Grades [1]

	Ethylene Octene Grades															
Property	**8842[2]**	**8180**	**8130 8137[2]**	**8150 8157[2]**	**8100 8107[2]**	**8200 8207[2]**	**8400[3] 8407[2,3]**	**8452**	**8411**	**8003**	**8401**	**8440**	**8480**	**8450**	**8402**	**8540**
Density, g/cm^3 ASTM D 792	0.857	0.863	0.864	0.868	0.870	0.870	0.870	0.875	0.880	0.885	0.885	0.897	0.902	0.902	0.902	0.908
Melt Index, g/10 min (2.16 kg @ 190°C) ASTM D 1238	1	0.5	13	0.5	1	5	30	3	18	1	30	1.6	1	3	30	1
Mooney Viscosity, MU (ML 1+4 @ 121°C) ASTM D 1646	25	37	4	33	24	8	2	11	3	23	2	13	20	10	2	20
Total Crystallinity, %[4]	13	16	13	16	18	19	21	20	24	25	25	27	33	29	34	34
Durometer Hardness (Shore A) ASTM D 2240	54	63	63	70	73	66	72	74	81	84	84	86	89	90	88	90
Durometer Hardness (Shore D) ASTM D 2240	11	16	13	20	22	17	20	24	27	31	26	36	42	43	34	47
DSC Melting Peak, °C Rate 10°C/min[4]	38	47	56	55	60	59	65	66	76	77	80	93	99	97	96	104
Glass Transition Temperature, °C DSC Inflection Point[4]	-58	-55	-55	-52	-52	-53	-54	-51	-50	-46	-47	-33	-31	-32	-36	-32
Haze, % ASTM D 1003[5]	N.D.	2	3	4	9	2	5	2	8	10	6	11	17	23	45	56
2% Secant Flexural Modulus, MPa ASTM D 790	4.0	7.7	7.3	14.4	13.1	10.8	10.5	16.8	20.5	32.6	30.6	54.3	81.5	78.3	72.0	107.8
Ultimate Tensile Strength, MPa (508 mm/min) ASTM D 638	3.0	6.3	2.4	9.5	9.76	5.7	2.8	11.2	7.3	18.2	8.5	20.4	24.8	22.4	11.3	27.9
Ultimate Tensile Elongation, % (508 mm/min) ASTM D 638	>600	>600	>600	>600	>600	>600	>600	>600	>600	>600	>600	>600	>600	>600	>600	>600

[1] Typical properties only, compression molded samples; not to be construed as specifications. Users should confirm results by their own tests.
[2] This grade is talc dusted for improved product handling; properties may be measured before the addition of talc.
[3] ENGAGE™ 8400 Polyolefin Elastomer is available in the European region. ENGAGE™ 8407 Polyolefin Elastomer is available globally.
[4] Dow Method. Complete protocols and results available upon request.
[5] Haze measured only for non-talc containing products. "N.D." indicates no data available.

Innovative Solutions for Your Processes and Applications

Designed to improve impact performance, melt strength, or overall processability, ENGAGE™ Polyolefin Elastomers are available in a wide range of grades to meet the most demanding processing and performance needs. They are compatible with most olefinic materials and offer unique capabilities that can enhance your product. Applications include: automotive TPOs; plastics modification; thermoplastic elastomers (TPEs); wire and cable coatings; consumer goods; foams; footwear; noise vibration harshness (NVH) applications; and extrusion or injection molded goods. Some of the features and benefits relative to these applications follow.

Soft and Hard TPO Compounds

- Excellent physical properties including elasticity, toughness, and low temperature ductility
- High melt strength grades that enhance extrusion thermoform processing and reduce surface gloss
- High-efficiency grades, including ENGAGE XLT, for superior impact performance

Wire and Cable Coatings

- Enhance physical properties when combined with fillers or when peroxide- or irradiation-crosslinked

General Purpose

- Improve look and feel of soft and hard goods
- Lighter weight, more flexible parts
- Improve resiliency for foam applications
- Excellent filler acceptance for masterbatch applications

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Table 2: Typical Properties of ENGAGE™ POE Ethylene Butene, HM, and XLT Grades [1]

	Ethylene Butene Grades				HM Grades				XLT Grade
Property	**7467[2]**	**7447[2]**	**7270 7277[2]**	**ENR[3] 7256**	**HM 7487[2]**	**HM 7387[2] ENR[3] 7380**	**HM 7280**	**HM 7289**	**XLT 8677[2]**
Density, g/cm^3 ASTM D 792	0.862	0.865	0.880	0.885	0.860	0.870	0.884	0.891	0.870
Melt Index, g/10 min (2.16 kg @ 190°C) ASTM D 1238	1.2	5	0.8	2	<0.5	<0.5	<0.5	<0.5	0.5
Mooney Viscosity, MU (ML 1+4 @ 121°C) ASTM D 1646	19	7	24	13	47	54	42[4]	74[4]	45
Total Crystallinity, %[5]	12	13	19	23	13	16	24.7	27.5	13
Durometer Hardness (Shore A) ASTM D 2240	52	64	80	82	58	66	84	88	51
Durometer Hardness (Shore D) ASTM D 2240	12	12	26	28	14	22	29	31	11
DSC Melting Peak, °C Rate 10°C/min[5]	34	35	64	75	37	50	99	99	118
Glass Transition Temperature, °C DSC Inflection Point[5]	-58	-53	-44	-45	-57	-52	-46	-52	-65
Haze, % ASTM D 1003[6]	N.D.	N.D.	3	6	N.D.	56	N.D.	N.D.	N.D.
2% Secant Flexural Modulus, MPa ASTM D 790	4	7.6	22.1	27.2	1.2	11.5	25.3	43.5	6.3
Ultimate Tensile Strength, MPa (508 mm/min) ASTM D 638	2.0	2.4	13.9	11.2	2.4	9.1	5.1	3.7	3.0
Ultimate Tensile Elongation, % (508 mm/min) ASTM D 638	>600	>600	>600	>600	>600	>600	310	200	>1000

[1] Typical properties only, compression molded samples; not to be construed as specifications. Users should confirm results by their own tests.
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[4] Measured at 150°C.
[5] Dow Method. Complete protocols and results available upon request.
[6] Haze measured only for non-talc containing products. "N.D." indicates no data available.

Extrusion Applications

- Tough, yet flexible
- Several extrusion grades are available for faster extrusion rates for more parts production per cycle
- Excellent clarity and low haze
- High melt strength grades available for improved forming capability

Injection Molding Applications

- Better impact resistance properties and performance
- Excellent adhesion to other polyolefins for overmolding

Excellent Processability

- Versatility for use in thermoplastic and thermoset applications
- Can be used as a "neat" polymer or as a value-enhancing ingredient in compound formulations
- Differentiated HM grades offer melt strength and shear thinning for extrusion, thermoforming, and blow molding applications
- ENGAGE™ XLT POEs help reduce cycle times via improved flow and faster setting
- Compatible with most olefins
- Pellet form for easy handling, mixing, forming, and processing on plastic or rubber equipment
- Recyclable for in-process scrap re-use advantages and for environmental sustainability

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Published March, 2012. Printed in U.S.A.
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Form No. 774-00101-0312X SMG
SMG 11606