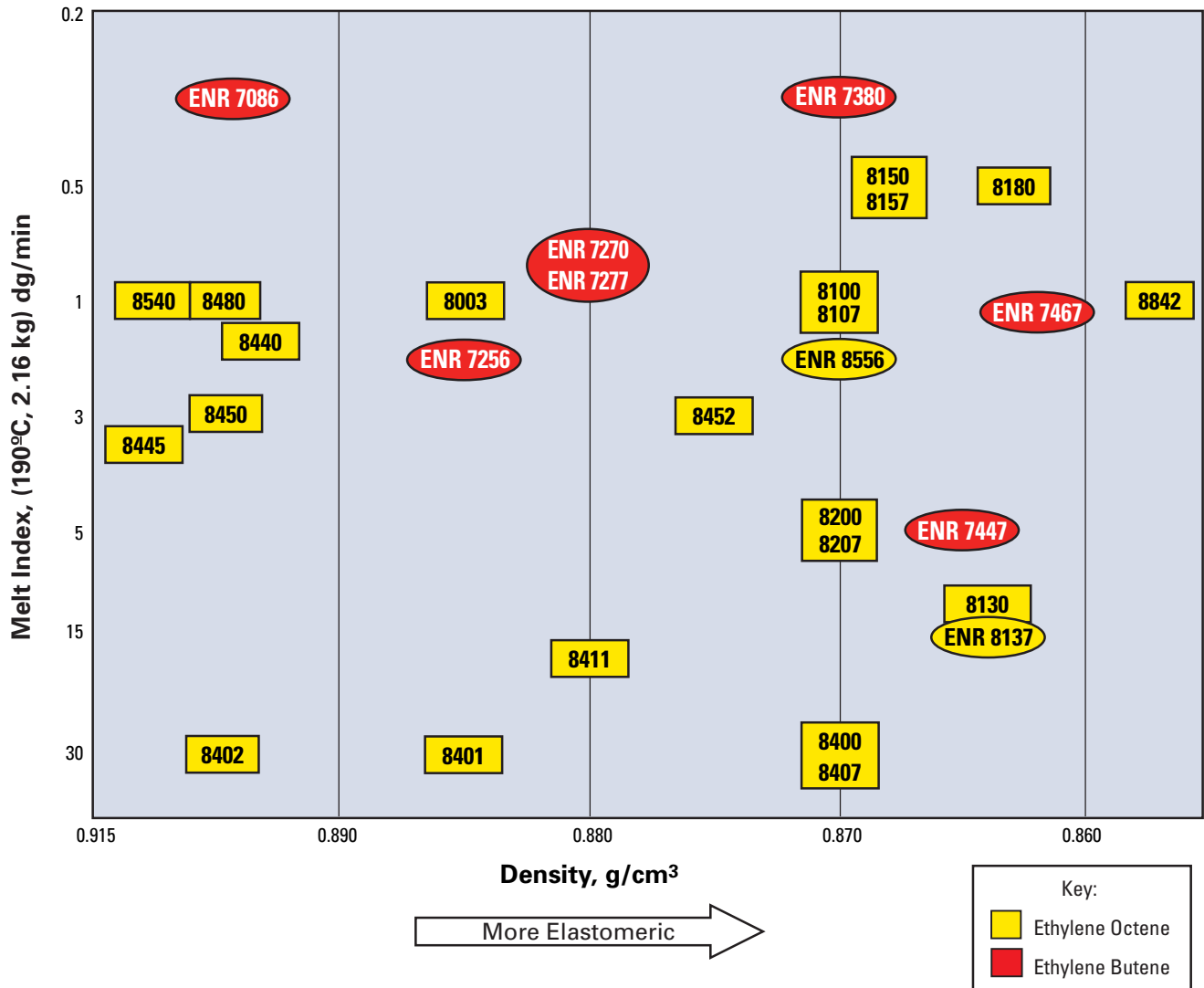




Product Grade Chart



Engage® polyolefin elastomers and ENR* developmental products offer customers new options for replacing or modifying materials across a broad spectrum of processes. The next generation ethylene butene copolymers are an excellent complement to the existing ethylene octene grades and together offer exceptional performance and a unique balance of properties when used “neat” or in blends and compounds.

Designed to improve impact performance, melt strength, or overall processability, these innovative 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 and your bottom line. Applications include: automotive TPO; plastics modification; TPEs; wire and cable; consumer goods; foams; footwear; NVH; and extrusion or injection molded goods.

* Note: ENR designates a developmental grade. When using developmental products, customers are reminded that: quality specifications may not be fully determined; hazards may not be fully known; and DuPont Dow reserves the right to change specifications and/or discontinue production of the product at any time.

Typical Properties *part 1*

Product Grade ¹	Ethylene Butene Grades					
	ENR 7467 ²	ENR 7447 ²	ENR 7380	ENR 7270 ENR 7277 ²	ENR 7256	ENR 7086
Density, g/cm ³ ASTM D-792	0.862	0.865	0.87	0.88	0.885	0.901
Melt Index, dg/min ASTM D-1238 190°C, 2.16 kg	1.2	5	< 0.5	0.8	2	< 0.5
Mooney Viscosity ASTM D-1646 ML 1 + 4 at 121°C	20	8	48	28	16	26
Total Crystallinity % ⁵	12	13	16	19	23	29
Molecular Weight Distribution, Rheology Ratio ⁴	L	L	L	L	M	M
Durometer Hardness, Shore A ASTM D-2240	56	57	68	78	79	88
DSC Melting Peak, °C Rate 10°C/min	36	42	48	62	73	93
Glass Transition Temperature, °C DSC Inflection Point	-56	-57	-52	-45	-45	-35
Flexural Modulus, MPa ASTM D-790 2% Secant	7.9	7.2	13.5	24.1	27.2	67.9
Ultimate Tensile Strength, MPa ASTM D-638 508 mm/min	2.6	2.3	10.6	15	11.7	20

¹ Ultimate elongation for all grades exceeds 600%.

² This grade is talc dusted; properties are measured before the addition of talc.

³ Engage® 8400 is available in the European region. Engage® 8407 is available in the Americas and Asia Pacific.

⁴ L-Low, M-Medium and H-High are DuPont Dow Elastomers measures.

⁵ DuPont Dow Method

Typical Properties *part 2*

Product Grade ¹	Ethylene Octene Grades								
	8842 ²	8180	8130 8137 ²	8150/ 8157 ²	8100/ 8107 ²	ENR 8556	8200/ 8207 ²	8400/ 8407 ^{2,3}	8452
Density, g/cm ³ ASTM D-792	0.857	0.863	0.864	0.868	0.87	0.87	0.87	0.87	0.875
Melt Index, dg/min ASTM D-1238 190°C, 2.16 kg	1	0.5	13	0.5	1	2	5	30	3
Mooney Viscosity ASTM D-1646 ML 1 + 4 at 121°C	26	35	< 5	35	23	16	8	< 5	11
Total Crystallinity % ⁵	13	16	13	16	18	19	19	21	20
Molecular Weight Distribution, Rheology Ratio ⁴	L	L	L	L	L	M	L	L	L
Durometer Hardness, Shore A ASTM D-2240	50	66	60	75	75	68	72	75	77
DSC Melting Peak, °C Rate 10°C/min	33	49	50	55	60	55	60	60	67
Glass Transition Temperature, °C DSC Inflection Point	-61	-58	-59	-56	-55	-55	-56	-57	-53
Flexural Modulus, MPa ASTM D-790 2% Secant	3.5	8.3	6.9	11.8	13.6	11	12.1	12.1	16.6
Ultimate Tensile Strength, MPa ASTM D-638 508 mm/min	2.1	8.8	2	10.9	10.3	7.2	6.9	3.3	9.8

¹ Ultimate elongation for all grades exceeds 600%.

² This grade is talc dusted; properties are measured before the addition of talc.

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⁵ DuPont Dow Method

Typical Properties *part 3*

Product Grade ¹	Ethylene Octene Grades								
	8411	8003	8401	8440	8480	8450	8402	8540	8445
Density, g/cm ³ ASTM D-792	0.88	0.885	0.885	0.897	0.902	0.902	0.902	0.908	0.91
Melt Index, dg/min ASTM D-1238 190°C, 2.16 kg	18	1	30	1.6	1	3	30	1	3.5
Mooney Viscosity ASTM D-1646 ML 1 + 4 at 121°C	< 5	22	< 5	16	18	10	< 5	18	8
Total Crystallinity % ⁵	24	25	25	27	33	29	34	34	37
Molecular Weight Distribution, Rheology Ratio ⁴	L	L	L	L	L	L	L	L	L
Durometer Hardness, Shore A ASTM D-2240	81	86	85	92	94	94	94	96	96
DSC Melting Peak, °C Rate 10°C/min	72	78	78	94	100	98	98	103	103
Glass Transition Temperature, °C DSC Inflection Point	-52	-49	-51	-44	-41	-42	-44	-39	-38
Flexural Modulus, MPa ASTM D-790 2% Secant	21.9	35.1	25.8	59.2	78.1	72.6	69.9	104	110.1
Ultimate Tensile Strength, MPa ASTM D-638 508 mm/min	6.5	21.8	6.4	24.5	25.8	24.8	12.9	28.9	21

¹ Ultimate elongation for all grades exceeds 600%.

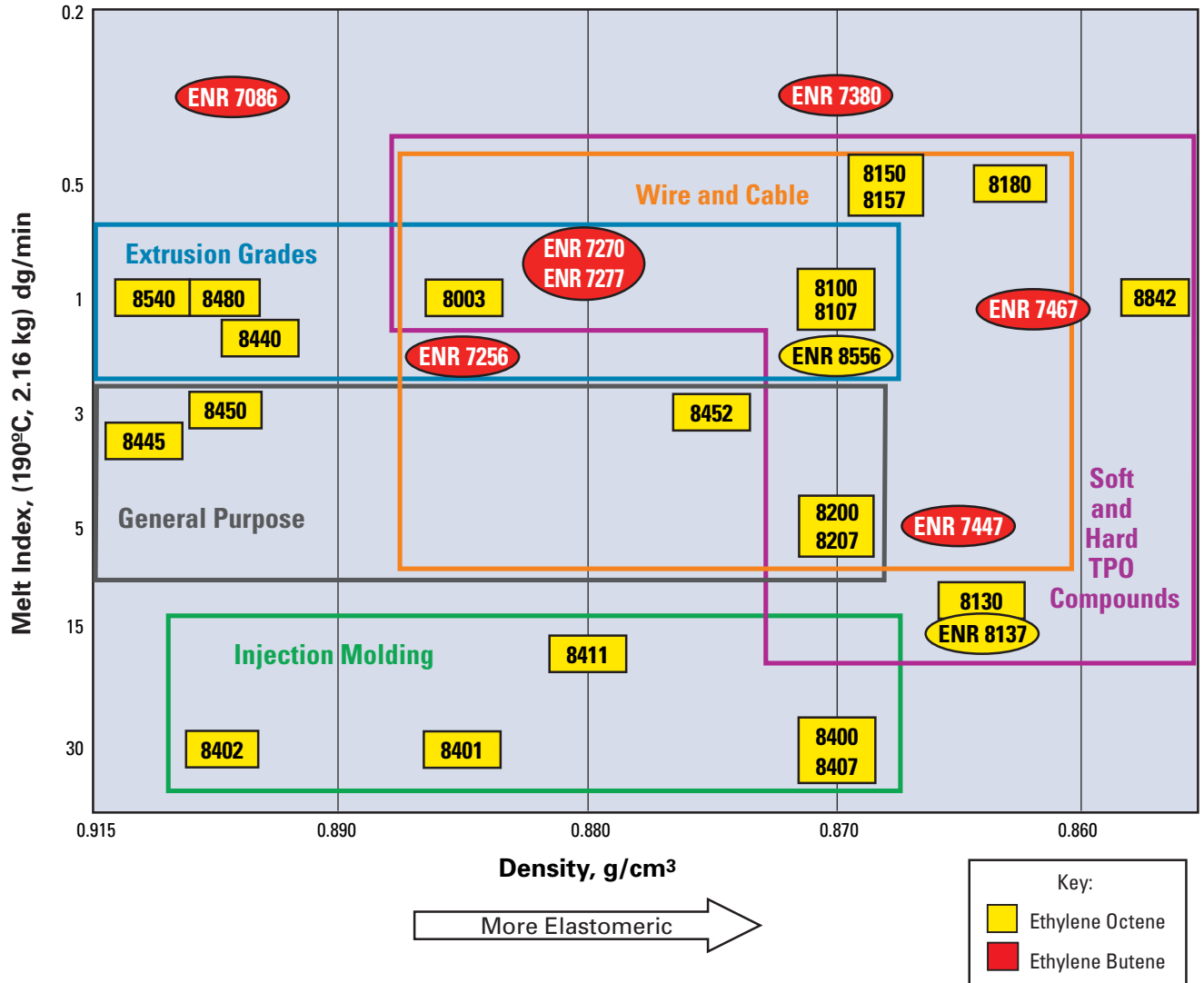
² This grade is talc dusted; properties are measured before the addition of talc.

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⁵ DuPont Dow Method

Market Application Matrix



Property Trends

Property Value	As Density Increases	As Melt Index Increases
Tensile Strength	Increases	Decreases
Stiffness	Increases	Decreases
Abrasion Resistance	Increases	Decreases
Hardness	Increases	Decreases
Softening Point	Increases	Decreases
Chemical Resistance	Increases	Decreases
Melt Strength	Increases	Decreases
Gloss	Increases	Increases
Shrinkage	Increases	Decreases
Impact Strength	Decreases	Decreases
Low Temperature Ductility	Decreases	Decreases
Stress Crack Resistance	Decreases	Decreases
Permeability	Decreases	Increases
Haze	Decreases	Decreases
Processability	No change	Increases
Tear Strength	Increases	Decreases

Innovative Solutions for Your Processes and Applications

Enhances Performance in Applications

Soft and Hard TPO Compounds

- Excellent physical properties including elasticity, toughness and low temperature ductility
- Excellent impact resistance, balance of properties and long term performance

Wire and Cable

- Enhances physical properties when combined with fillers or crosslinked

General Purpose

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

Extrusion Grades

- Tough yet flexible
- Faster extrusion rates for more parts production per cycle
- Improved melt strength grades available

Injection Molding

- Better impact resistance properties and performance
- Excellent thermal stability, UV resistance and heat resistance

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
- New broad molecular weight materials for improved processing
- 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 responsibility

Standard Packaging Availability

Ethylene Butene Grades	ENR 7086	ENR 7256	ENR 7270	ENR 7277*	ENR 7380	ENR 7447*	ENR 7467*
20 kg Bags	x	x	x		x	x	x
1300 lb Octagonal Boxes	x	x	x		x	x	x
US Railcars (180,000 lb)	x	x		x			

Ethylene Octene Grades	ENR																	ENR						
	8003	8100	8107*	8130	8137*	8150	8157*	8180	8200	8207*	8400	8401	8402	8407*	8411	8440	8445	8450	8452	8480	8540	8556	8842*	
US 20 kg Bags	x	x	x	x	x	x	x	x			x	x	x	x	x	x	x	x	x	x	x	x	x	x
US 1300 lb Octagonal Boxes	x	x			x	x		x	x			x	x	x	x	x	x	x	x	x	x	x	x	x
US Railcars (180,000 lb)	x		x				x			x														
Europe 20 kg Bags	x	x				x		x	x		x					x			x	x				
Europe 500 kg Boxes	x	x				x		x	x		x					x			x	x				

*Talc dusted

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