

LG Chem

Introduction to LUCENE™ POE/POP



■ Introduction

LUCENE™ Polyolefin Elastomer and Plastomer (POE/POP) are ethylene α -olefin copolymers produced with LG Chem's unique Metallocene polymerization catalyst under the solution process technology. LUCENE™ POE/POP can offer customers a wide range of products to meet the specifications of their various applications and requirements.

Compound Applications

Automotive Exterior/Interior



Acoustics



Footwear/Foam

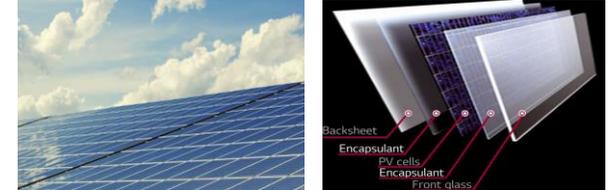


Wire & Cable



Other Applications

Photovoltaic Encapsulant (PVEN)



Hot Melt Adhesive (HMA)



Film & Packaging Applications

Lamination Film



Food Packaging



Stretch Film



POE for Compounds

Polyolefin Elastomer (POE) is used extensively impact

modifiers with polypropylene and engineered polymers for automotive exterior and interior.

The characteristics of the products are :

- Excellent impact resistance in TPO products
- Light weight via lower density polymers
- High filler loading
- Free flowing pellet form

Characteristics of EBR & EOR

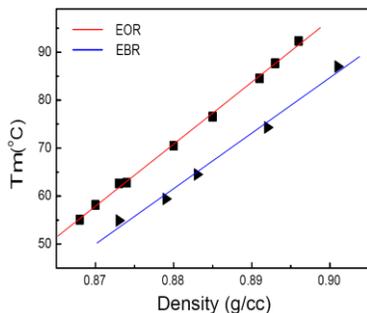
Most commercially available polyolefin elastomers are copolymers of either ethylene-1-butene (EBR) or ethylene-1-octene (EOR).

EBR compared to EOR at the similar MI & density :

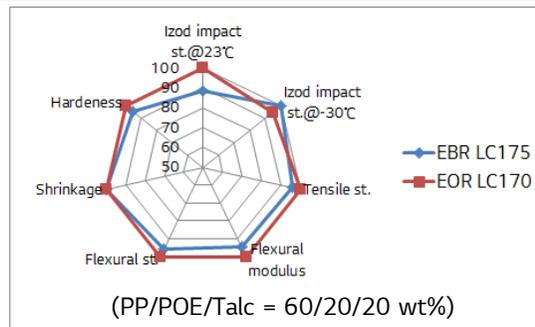
- Lower melting point → less crystallinity, more soft

Advantages of EBR and EOR in PP Compounds

- EBR
 - Impact strength at low temp.
 - Cost effectiveness
- EOR
 - Excellent mechanical strength
 - Balance of toughness & stiffness



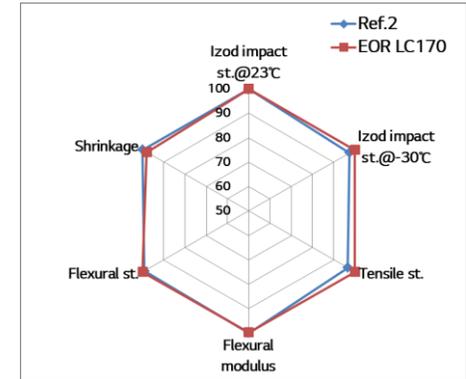
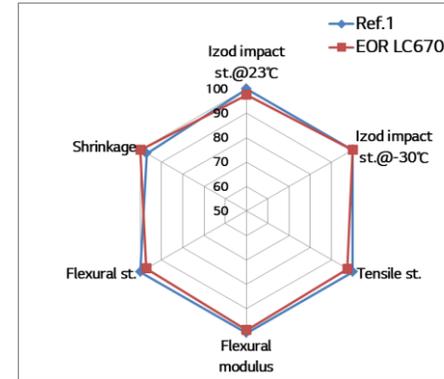
Melting point of POE



PP Compound properties with POE

Comparison of EOR grades in PP Compounds

LG EOR POEs have similar performance compared to competitor's.

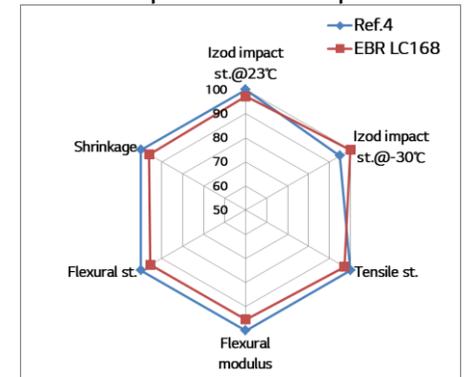
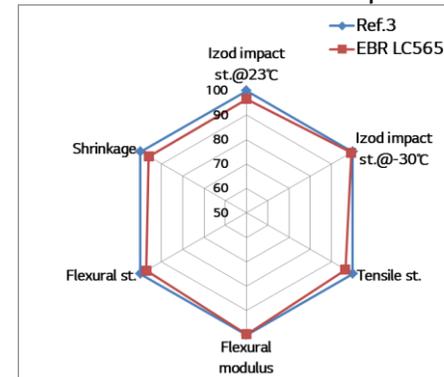


-PP/POE/Talc = 60/20/20 wt%

-MI / Density : LC670 (5.0 / 0.870), LC170(1.1/0.870)

Comparison of EBR grades in PP Compounds

LG EBR POEs have similar performance compared to competitor's.



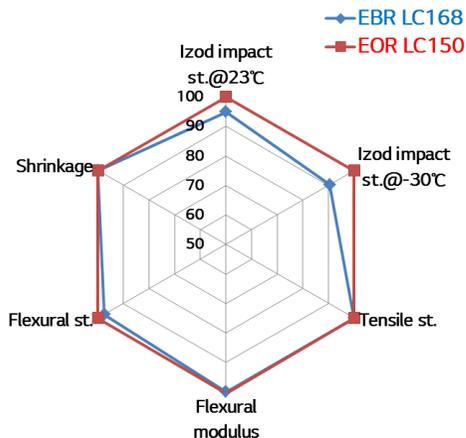
-PP/POE/Talc = 60/20/20 wt%

-MI / Density : LC565 (5.0 / 0.865), LC168(1.2/0.862)

POE for Compounds : LUCENE™ LC150 for Polymer Modification

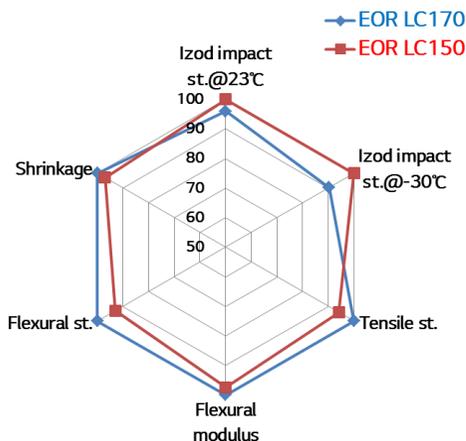
PP Compound properties

- Impact strength of EOR LC150 is superior to that of EBR LC168.



-PP/POE/Talc = 60/20/20 wt%
 -MI / Density : LC168(1.2 / 0.862), LC150(1.0 / 0.858)

- Impact strength of EOR LC150 is superior to that of EOR LC170.

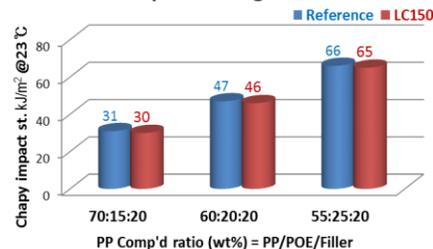


-PP/POE/Talc = 60/20/20 wt%
 -MI / Density : LC170 (1.1 / 0.870), LC150 (1.0 / 0.858)

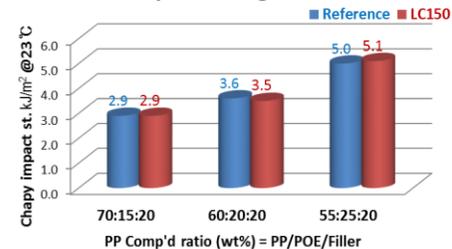
PP Compound properties with various POE Contents

- LC150 has similar performance compared to reference.

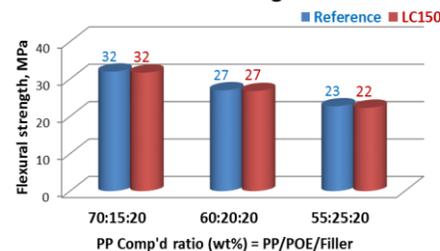
Izod impact strength @23 °C



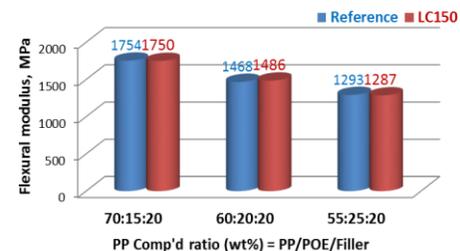
Izod impact strength @-30 °C



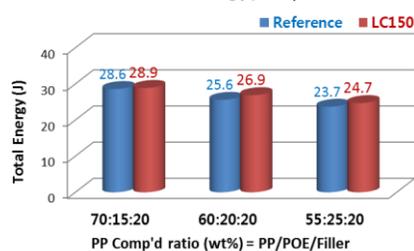
Flexural strength



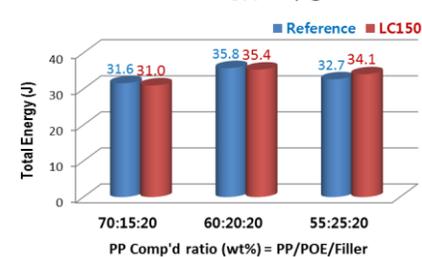
Flexural modulus



Total Energy(MAI)*



Total Energy(MAI) @-30°C



*MAI : Multiaxial impact

POP for Film & Packaging

Polyolefin Plastomer (POP) is used extensively in food

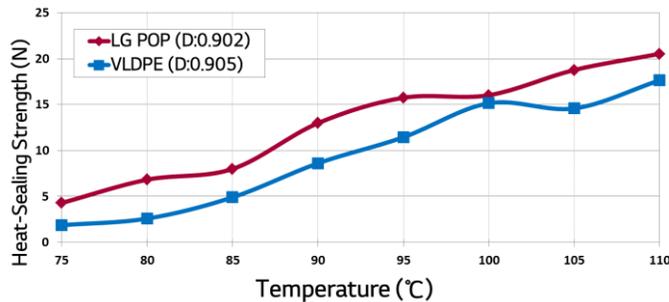
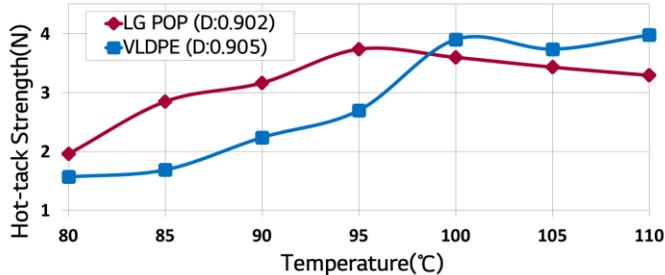
Packaging application as a mono-layer or multi-layer.

The characteristics of the products are :

- Excellent sealing performance
- Superb toughness
- Exceptional clarity
- Good strength

Characteristics of POP

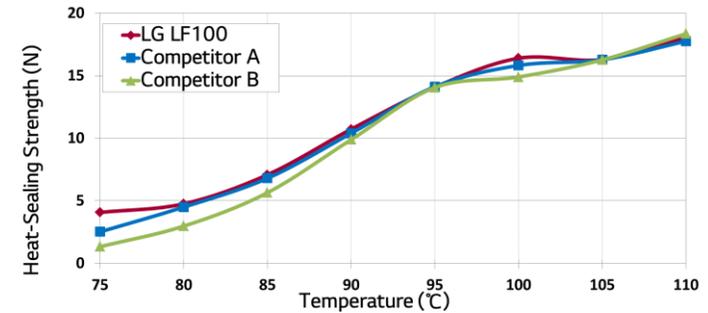
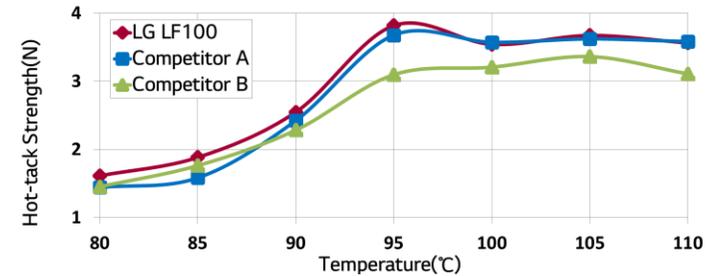
LUCENE™ POP shows excellent sealing performance at low temperature. So it is widely applicable to packaging film application for meats, cheeses, fresh-cut products, dry foods, and even for flowable material pouches.



Advantages of LG POP in packaging

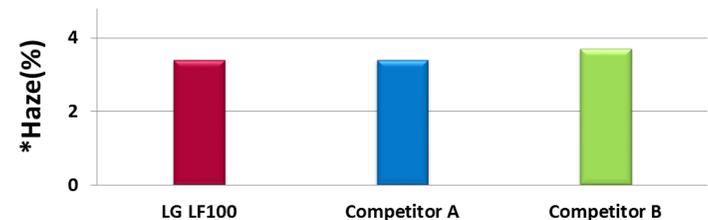
• Sealing performance

LG POP has higher sealing performance, especially at low temperature



• Optical property

LG POP has low haze and good optical properties



* Measured on 50µm

POE for HMA (Hot-Melt Adhesive)

High-flow Polyolefin Elastomer (POE) is used to

formulate HMA which has excellent adhesion at a broader temperature range, with outstanding performance and processing.

The characteristics of the products are :

- Fast setting (set time)
- Workability (low viscosity)
- Heat & cold resistance
- Flexibility
- Bonding strength
- Color
- Virtually odor free

Properties of HMA POE

- Typical properties

Characteristics ⁽¹⁾	Test Method	LA0570	LA1070
Physical			
Density (g/cm ³)	ASTM D1505	0.874	0.870
MFR ⁽²⁾ (190°C, 2.16kg, g/10min)	ASTM D1238	500	1000
Brookfield Viscosity (Pa·s at 180°C)	ASTM D3236	17.0	8.0

(1) The properties data in this table are typical values, and not guaranteed specification.

(2) Value is approximate; The point is outside normal testing range.

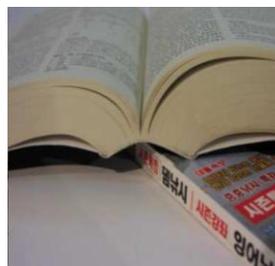
Advantage of LUCENE™ POE

- LUCENE™ POE has a better heat resistance & color stability to competitors.

Condition	Competitor	LA0570	Competitor	LA1070
YI ⁽¹⁾	24 h	15	14	13
	72 h	22	23	22
	120 h	25	33	29

(1) YI after heat aging using oven (180°C)

Application of HMA



Book binding



Straw attachment



Sleeve label



Air filter

Typical Properties of LUCENE™ POE/POP

POE

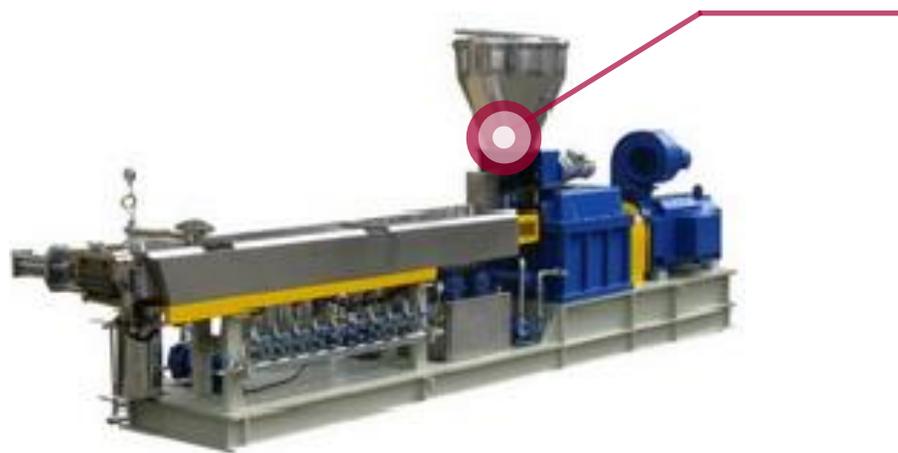
Item			Ethylene Octene Copolymer							Ethylene Butene Copolymer					Under developing grade				
															Ethylene Octene Copolymer			Ethylene Butene Copolymer	
Properties ⁽¹⁾	Test (ASTM)	Unit	LC150	LC160	LC161	LC170	LC670	LC180	LC100	LC168	LC565	LC175	LC875	LC870	LA0570	LA1070	LC885	LC775	
Melt Index	D1238	g/10min	1.0	0.5	0.5	1.1	5.0	1.2	1.2	1.2	5.0	1.1	33	30	500	1000	20	17	
Density	D1505	g/cm ³	0.858	0.863	0.868	0.870	0.870	0.885	0.902	0.862	0.865	0.870	0.870	0.870	0.874	0.870	0.882	0.877	
Melting Temp.	LG	°C (°F)	42 (108)	46 (115)	54 (129)	58 (136)	58 (136)	73 (163)	96 (205)	32 (90)	36 (97)	42 (108)	57 (135)	-	-	-	-	-	
Tensile Strength ⁽²⁾	D638	MPa	2.7	6.1	9.4	9.5	5.5	25	36	1.8	1.8	4.4	1.4	-	-	-	-	-	
Elongation ⁽²⁾	D638	%	>1,000	>900	>900	>900	>900	>800	>600	>800	>550	>900	>400	-	-	-	-	-	
Hardness (Shore A)	D2240	-	43	57	67	71	70	86	91	46	54	63	55	-	-	-	-	-	
Application	-	-	Compound													HMA		PVEN	

POP

Item			Ethylene Octene Copolymer			Under developing grade					
						Ethylene Octene Copolymer					
Properties ⁽¹⁾	Test (ASTM)	Unit	LF180	LF100	LF100A ⁽³⁾	LF090	LF060	LF170	LF670	LF300	LF600
Melt Index	D1238	g/10min	1.2	1.2	1.2	0.8	0.5	1.1	5.0	3.0	6.0
Density	D1505	g/cm ³	0.885	0.902	0.902	0.895	0.868	0.870	0.870	0.902	0.900
Melting Temp.	LG	°C (°F)	73 (163)	100 (212)	98 (208)	-	54 (129)	58 (136)	58 (136)	101 (214)	99 (210)
Tensile Strength (MD/TD)	D882	MPa	39/43	45/48	45/48	-	21/24	21/23	15/18	64/73	56/57
Elongation (MD/TD)	D882	%	580 /650	570 /650	570 /650	-	400 /780	500 /810	830 /980	720 /850	800 /890
Elmendorf tear (MD/TD)	D1922	Kgf/mm	2.4 /7.5	12.8 /19.3	6.2 /17.3	-	1.0 /2.0	1.3 /3.8	3.1 /5.4	19 /23	19 /22
Haze	D1003	%	3.0	3.4	7.0	-	2.5	2.5	1.0	0.5	0.5
Application	-	-	Film & Packaging (Blown film)				Film & Packaging (Cast film)				

- (1) The data in this table are considered as typical values, and not guaranteed specification from LG Chem.
(2) Values are measured on a standard compression molded specimens, Speed of 500mm/min.
(3) LF100A has slip and anti-blocking agent.

■ Material Handling Guide for LUCENE™ POE/POP



| Processing |

LUCENE™ POE can be applied to most of thermoplastic processing equipment with a good compatibility.

It is recommended that hopper feed throat to be cooled down to below 30°C to prevent pellets from bridging

| Storage and Handling |

- Do not double-stack pallets to minimize the potential effect of static load.
- The storage temperature is recommended at between 10~25°C (50~77°F).
- Store the resin in the warehouse to protect from exposure to elevated temperatures, not to exceed 35 °C (95°F).
- Consume the resins on a “first-in, first-out” basis.
- Keep away from the source of ignition, such as heat, spark and flame.
- Before handling the product, it is recommended to read the Safety Data Sheet (SDS).
- Contact your LG Chem representative if you encounter any trouble.

