ExxonMobil
Signature Polymers

Brochure

Exceed™ Exceed™ Flow Exceed™ Tough ExxonMobil™ PP Exact™ POE

Advancing automotive performance with ExxonMobil Signature Polymers

Polypropylene and polyolefin elastomers (POE) are integral to delivering high performance in a wide variety of applications, including automotive, hygiene and medical, packaging, and more. In the automotive sector, these advanced materials deliver an exceptional balance of lightweight design, durability, and cost efficiency—critical for improving fuel economy and reducing emissions.

With a comprehensive portfolio of performance polypropylene and POE, ExxonMobil Signature Polymers offer innovative solutions for interior, exterior, under-the-hood and battery components, and help vehicles meet stringent performance standards.

- Enhanced polyolefinic portfolio
- Potential cost and efficiency advantages
- Supply reliability
- Technical support

Data and results presented herein apply specifically to the noted application under this brochure.
Your results may differ depending on factors such as operating conditions, equipment and materials used.

ExxonMobil product portfolio

Polypropylene (PP) portfolio

Material trends in the automotive industry are evolving rapidly, with growing demand for superior mechanical performance, lightweight solutions, and aesthetic appeal. ExxonMobil can help customers meet these evolving needs through our deep expertise and a portfolio of innovative polymer solutions.

Whether you're optimizing for durability, reducing vehicle weight, or enhancing design flexibility, our portfolio of impact copolymer polypropylene (ICP) is engineered to support innovation and performance across a wide range of automotive applications.

Exceed™ high performance PP: Challenge reality and rethink what's possible in automotive performance. Exceed high performance PP eliminates trade-offs and unlocks new opportunities for customers.

ExxonMobil™ PP: ExxonMobil™ PP delivers consistent, high-quality products to meet stringent industry demands. For over 50 years, we have been committed to offering reliable supply and technical support.

Polypropylene grade slate for automotive

Grades	MFR (230°C/2.16kg) (g/10min) ASTM D1238	Flexural Modulus (MPa) at 1.3 mm/min ASTM D790A	Flexural Modulus (MPa) at 2.0 mm/min ISO 178	Notched Izod Impact (J/m) at 23°C ASTM D256A	Notched Izod Impact (kJ/m²) at 23°C ISO 180/1A
Exceed™			**Typical values**		
AP3N	10	1580	1570	110	9.4
AP3AW	10	1410	1300	120	14
PP7123KNE1	11	1570	1680	85	6.9
PP8864E1	14	1050	1110	740	51
AP03B	30	1380	1380	85	10
PP7355E1	35	1110	1110	187	16
PP7585E1	50	1220	1310	64	6.2
PP7755KNE1	75	1320	1280	80	7.2
Exceed™ Tough			**Typical values**		
PP8285E1	30	993	1020	No break	46
Exceed™ Flow			**Typical values**		
PP7935E1	60	1650	1660	44	5.6
PP7985E1	65	1590	1610	60	6.1
PP7945E1	115	1800	1810	32	4.5
ExxonMobil™			**Typical values**		
PP7032E3	4.0	1210	1140	No break	53
PP7032KN	4.0	1380	1360	No break	52
PP7033E3	8.0	1140	1190	280	13
PP7033N	8.0	1360	1260	210	13
PP7555KNE2	50	1340	1270	94	7.4

Exact™ Polyolefin Elastomers (POE) portfolio

Exact™ polyolefin elastomers (POE) that are used for automotive compounding applications are ethylene alpha olefin copolymers with butene (C4) or octene (C8) comonomers.

At ExxonMobil, we continue to demonstrate commitment to the global automotive industry. In addition to our global supply of Exceed™ high performance PP and ExxonMobil™ PP, we are enhancing our polyolefin product solutions to automotive compounding by expanding the Exact™ POE portfolio, with grades available globally.

Ethylene octene grades	**Melt Index (MI)** 190°C/2.16kg ASTM D1238 g/10min	**Density** ASTM D1505 g/cm³	**Durometer Hardness** Shore A*	**Flexural Modulus - 1% secant** ExxonMobil Method MPa (psi)	**Vicat Softening Temperature** ExxonMobil Method °C (°F)
Typical values					
Exact™ 5171	1.0	0.868	70	14 (2000)	54.4 (130)
Exact™ 5371	5.0	0.868	68	13 (1900)	50.6 (123)
Exact™ 5061	0.50	0.868	70	13 (1800)	55.5 (132)

* Data generated based on various test methods, e.g. ExxonMobil Method and ASTM D2240

Ethylene butene grades	**Melt Index (MI)** 190°C/2.16kg ExxonMobil Method g/10min	**Density** ExxonMobil Method g/cm³	**Durometer Hardness** Shore A*	**Flexural Modulus - 1% secant** ASTM D790 MPa (psi)	**Vicat Softening Temperature** ExxonMobil Method °C (°F)
Typical values					
Exact™ 9061	0.50	0.863	60	8.0 (1200)	43.8 (111)
Exact™ 9162	1.2	0.862	44	4.1 (590)	38.3 (101)
Exact™ 9361	3.5	0.864	51	5.3 (769)	36 (97)

* Data generated based on various test methods, e.g. ExxonMobil Method and ASTM D2240

I. Solutions for automotive interior and exterior compounds

Toughness | Stiffness and flow | Appearance

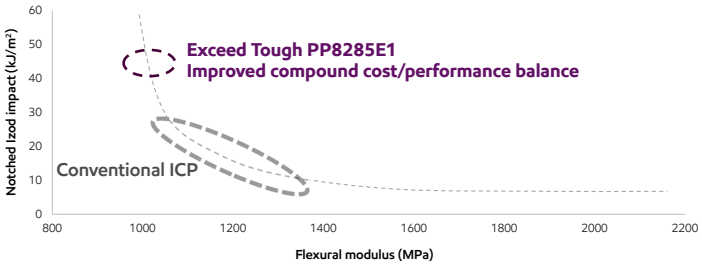
Data and results presented herein apply specifically to the noted application under this brochure.
Your results may differ depending on factors such as operating conditions, equipment and materials used.

A. Step-out toughness

A1. Exceed™ Tough PP8285E1 for step out toughness and flow

Exceed Tough PP8285E1 demonstrates improved balance of compound cost and performance. It offers 33% higher impact and 19% improved toughness at low temperature compared to conventional ICP.

Chart 1: Exceed Tough PP8285E1 neat resin comparison



Typical physical properties

Test item	Typical value	Test method based on
Melt Flow Rate (MFR) @ 230°C/2.16kg	30 g/10min	ASTM D1238
Flexural Modulus @ 2mm/min	1020 MPa	ISO 178
Notched Izod Impact strength @ 23°C	46 kJ/m²	ISO 180/1A

Chart 2: Exceed Tough PP8285E1 performance

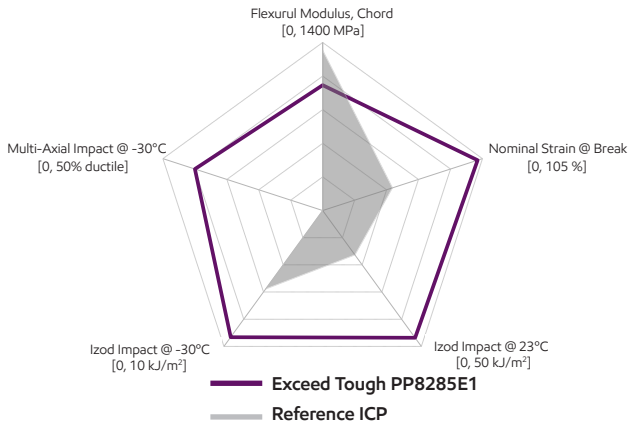
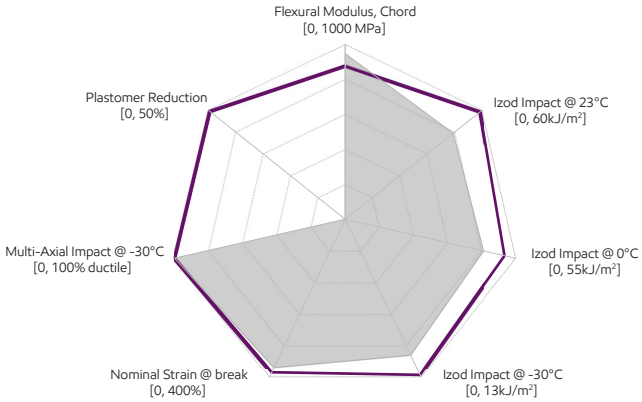


Chart 3: Exceed Tough PP8285E1 based compound comparison



	Exceed Tough PP8285E1	Reference ICP
ICP	90%	80%
Plastomer	10%	20%

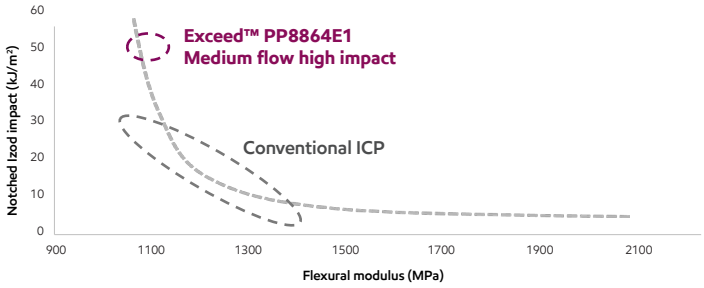
Exceed Tough PP8285E1 shows superior capabilities in a range of performance areas:

- Compound formulation uses 10% plastomer vs 20% plastomer in a standard compound formulation
- Maintains ductility with reduced plastomer loading
- Improves impact with balanced stiffness

A2. Exceed™ PP8864E1 for medium flow high impact

Exceed PP8864E1 is ideal for good impact with balanced stiffness and ductility at low temperature. It also provides advantages like better flowability and improved manufacturing efficiency

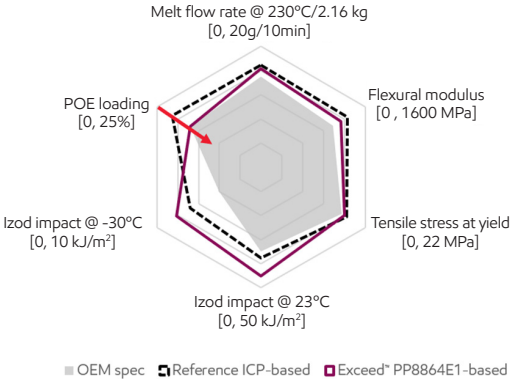
Chart 4: Exceed PP8864E1 neat resin comparison



Typical physical properties

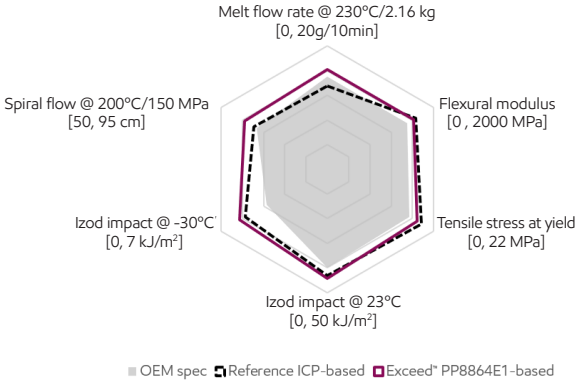
Test item	Typical value	Test method based on
Melt Flow Rate (MFR) @ 230°C/2.16kg	14 g/10min	ASTM D1238
Flexural Modulus @ 2mm/min	1110 MPa	ISO 178
Notched Izod Impact strength @ 23°C	51 kJ/m²	ISO 180/1A

Chart 5: Exceed PP8864E1 based compound performance in exterior compounds



Note: Minimum value of melt flow rate and POE loading is not provided in the spec.
The estimated minimum values of 15 g/10min & 17% POE loading are shown in the chart.
POE represents Polyolefin Elastomer.
All properties tested per ExxonMobil method.
OEM information is classified.

Chart 6: Exceed PP8864E1 based compound performance in interior compounds



Exceed™ PP8864E1/Reference ICP + other ICP (MFR: 115 g/10 min, RTNI: 5.1 kJ/m2) + POE + 20% Talc.
POE represents Polyolefin Elastomer.
All properties tested per ExxonMobil method.
OEM information is classified.

Exceed PP8864E1 medium flow high impact compound enables below in exterior compounds:

- The ability to meet the OEM bumper main physical property spec
- Cost saving potential from reduced POE use vs. reference ICP compound
- ~20% higher impact at room temperature & low temperature vs. reference ICP compound
- Comparable flowability and tensile stress
- Allow flexible tool design with thin-wall trend
- Possible to achieve faster cycles

In ExxonMobil testing, Exceed PP8864E1 compound can offer below in interior compounds:

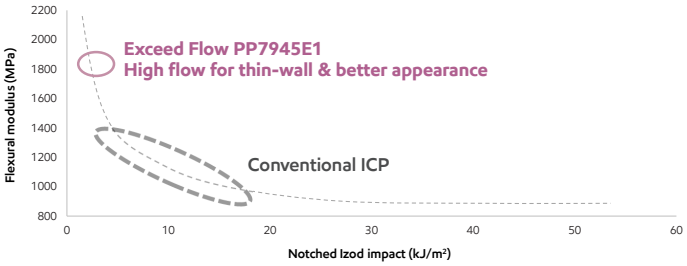
- The ability to meet the OEM interior main physical property spec
- 20% higher flowability (potential for thin wall) and comparable physical properties vs. reference ICP compound

B. Step-out stiffness and flow

B1. Exceed™ Flow PP7945E1 for outstanding stiffness and flow

Exceed Flow PP7945E1 is ideal for thin-wall parts production due to its high melt flow rate (MFR) and can help reduce wall thickness to achieve light weight for automotive.

Chart 7: Exceed Flow PP7945E1 neat resin comparison



Typical physical properties

Test item	Typical value	Test method based on
Melt Flow Rate (MFR) @ 230°C/2.16kg	115 g/10min	ASTM D1238
Flexural Modulus @ 2mm/min	1810 MPa	ISO 178
Notched Izod Impact strength @ 23°C	4.5 kJ/m²	ISO 180/1A

Chart 8: Spiral flow length

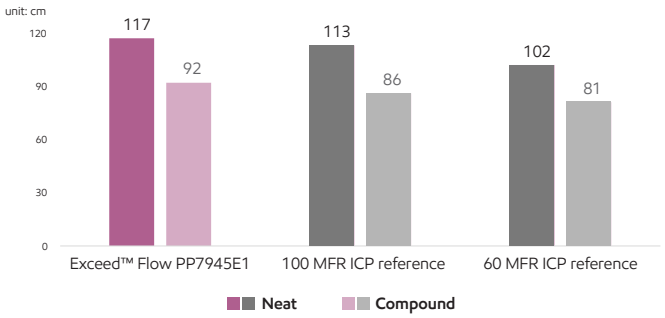
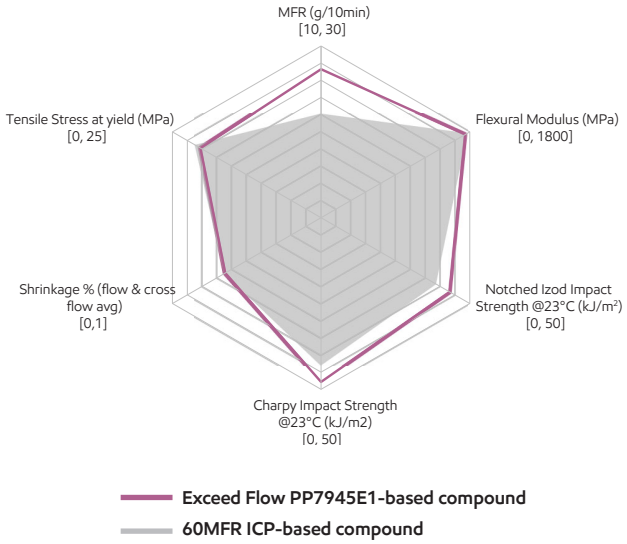


Chart 9: Exceed Flow PP7945E1 based compound comparison



Exceed Flow PP7945E1 high flow ICP resin compound enables:

Compounder

- Enable flexible raw material selection
- Reach better flow and keep physical balance
- Achieve challenging OEM targets
- Potentially improve extruder run-rate

Tier 1

- Allow flexible tool design with thin-wall trend
- Possible to achieve faster cycles

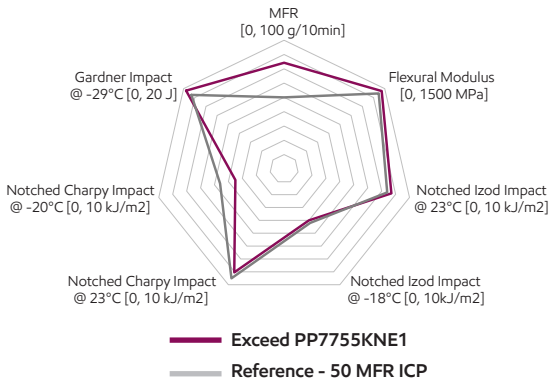
OEM

- Possible to seek lighter demands

B2. Exceed™ PP7755KNE1 for high flow medium-high impact

Exceed PP7755KNE1 is ideal for functioning as an effective flow modifier and enhancing processability and cycle time efficiency in polymer blends.

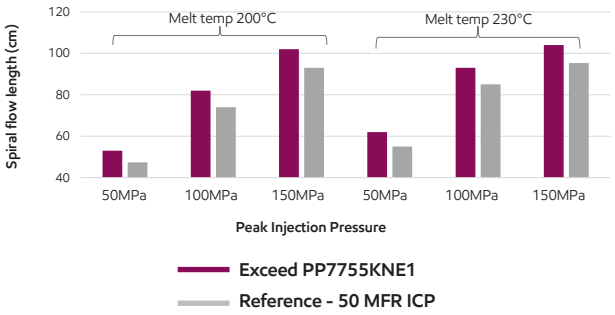
Chart 10: Mechanical properties



Typical physical properties

Test item	Typical value	Test method based on
Melt Flow Rate (MFR) @ 230°C/2.16kg	75 g/10min	ASTM D1238
Tensile stress @ yield (50mm/min)	23.9 MPa	ISO 527
Flexural Modulus @ 2mm/min	1280 MPa	ISO 178
Notched Izod Impact strength @ 23°C @ 0°C @ -20°C	 7.2 kJ/m² 5.2 kJ/m² 4.6 kJ/m²	ISO 180/1A

Chart 11: Flow length (cm) @ 50 mm/s injection speed



Exceed PP7755KNE1 high flow medium-high impact ICP enables significantly higher flowability than 50MFR reference ICP with comparable stiffness-impact properties in automotive compounds.

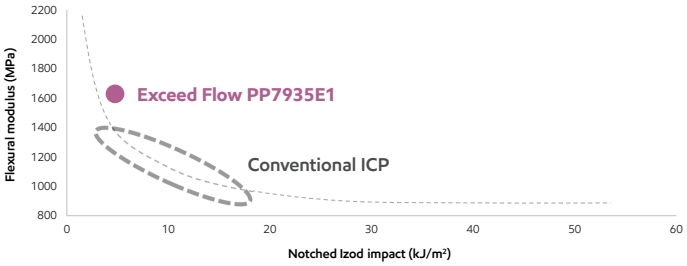
Potential benefits:

- Functions as an effective flow modifier
- Enhances processability
- Cycle time efficiency improvement in polymer blends

B3. Exceed™ Flow PP7935E1 for improved flow and stiffness

Exceed Flow PP7935E1 is ideal for parts requiring medium melt flow rate (MFR), balanced mechanical properties and high stiffness for automotive.

Chart 12: Exceed Flow PP7935E1 neat resin comparison



Typical physical properties

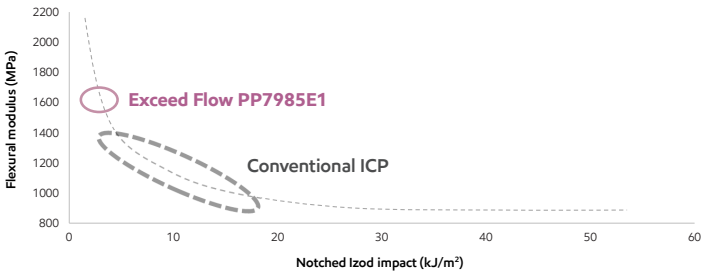
Test item	Typical value	Test method based on
Melt Flow Rate (MFR) @ 230°C/2.16kg	60 g/10min	ASTM D1238
Flexural Modulus @ 2mm/min	1660 MPa	ISO 178
Notched Izod Impact strength @ 23°C	5.6 kJ/m²	ISO 180/1A

C. Superior appearance

C1. Exceed™ Flow PP7985E1 for improved flow and superior appearance

Exceed Flow PP7985E1 is ideal for parts requiring high melt flow rate (MFR), balanced mechanical properties and requiring superior appearance for automotive.

Chart 13: Exceed Flow PP7985E1 neat resin comparison



Typical physical properties

Test item	Typical value	Test method based on
Melt Flow Rate (MFR) @ 230°C/2.16kg	65 g/10min	ASTM D1238
Flexural Modulus @ 2mm/min	1610 MPa	ISO 178
Notched Izod Impact strength @ 23°C	6.1 kJ/m²	ISO 180/1A

Chart 14: Exceed Flow PP7985E1 based compound comparison

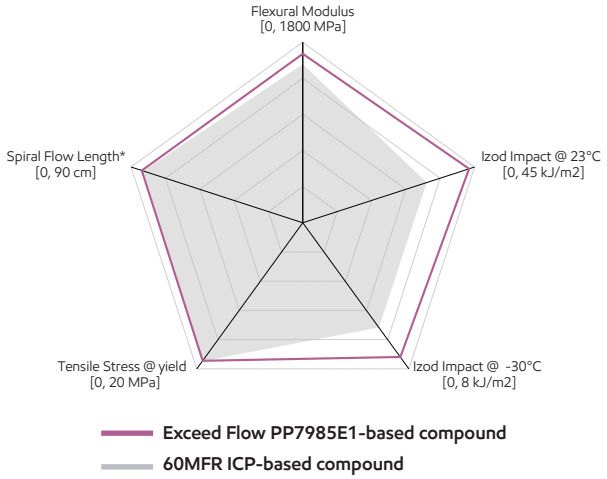
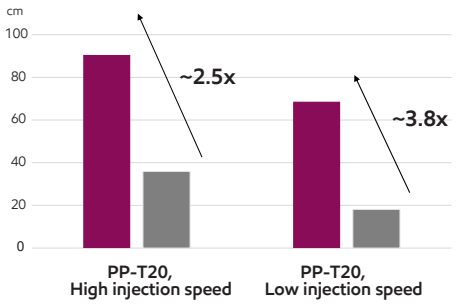
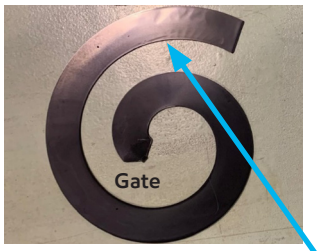


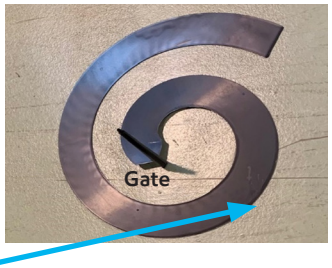
Chart 15: Tiger stripe (start from gate point)



Exceed Flow PP7985E1



Reference ICP



Tiger stripe start position

Exceed Flow PP7985E1 high flow ICP resin compound enables:

Compound: Excellent mechanical properties

- ~45% higher impact at room temperature
- ~40% better toughness at low temperature
- ~8% higher stiffness
- Comparable in-mold flowability
- Potential to reduce POE for cost saving

Tier 1

- Achieve much better aesthetic surface
- Simplify mold design
- Allow broader process window

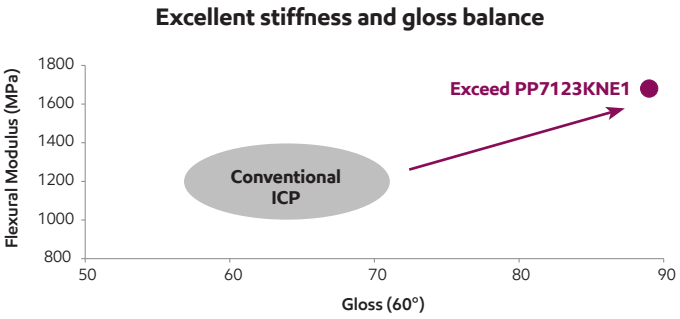
OEM

- Allow flexibility in large part design

C2. Exceed™ PP7123KNE1 for superior high gloss appearance

Exceed PP7123KNE1 is ideal for functioning as an effective ICP for achieving superior high gloss appearance in compounds.

Chart 16: Exceed PP7123KNE1 neat resin comparison



Typical physical properties

Test item	Typical value	Test method based on
Melt Flow Rate (MFR) @ 230°C/2.16kg	11 g/10min	ASTM D1238
Flexural Modulus @ 2mm/min	1680 MPa	ISO 178
Notched Izod Impact strength @ 23°C	6.8 kJ/m^2	ISO 180/1A
Gloss @ 60°	89 GU	ASTM D523

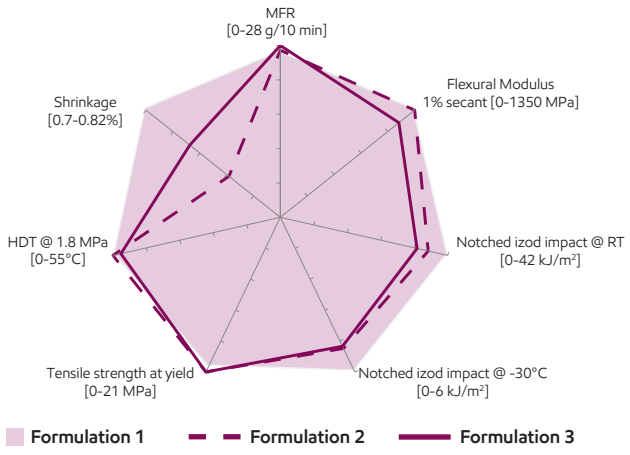
Exceed™ PP7123KNE1 is a good fit for:

- Low/ medium MFR
- High gloss
- High stiffness
- Good impact

C3. Exceed™ PP7585E1 for low shrinkage

Exceed PP7585E1 is ideal for functioning as an effective modifier for controlling the shrinkage of automotive compounds, especially in compounds with lower level of talc dosage.

Chart 17: Exceed PP7585E1 compound mechanical properties

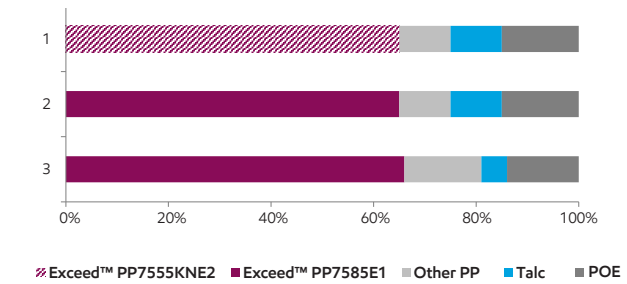


Typical physical properties

Test item	Typical value	Test method based on
Melt Flow Rate (MFR) @ 230°C/2.16kg	50 g/10min	ASTM D1238
Flexural Modulus @ 2mm/min	1310 MPa	ISO 178
Notched Izod Impact strength @ 23°C	6.2 kJ/m^2	ISO 180/1A

Exceed PP7585E1 enables the compound to reduce up to ~5% talc with lower shrinkage and balanced properties.

Exceed PP7585E1 compound formulations



C4. Exact™ polyolefin elastomers for high and low gloss

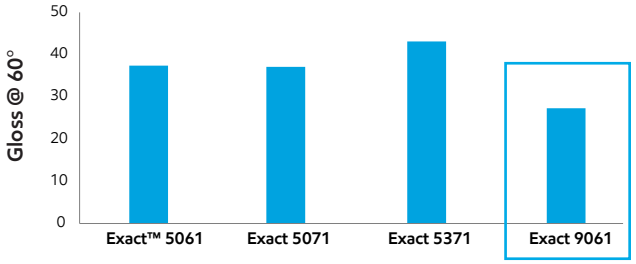
Exact polyolefin elastomers are high-performance elastomeric materials engineered for demanding automotive applications. They deliver an optimal balance of flexibility, durability, and thermal stability, ensuring reliable performance under vibration, temperature extremes, and dynamic operating conditions.

They support lightweight design, enhanced durability, and compliance with global automotive standards—helping manufacturers improve safety, efficiency, and vehicle longevity.

Low gloss solution for interior applications

Exact™ 9061 in combination with ExxonMobil™ PP7555KNE2 demonstrates excellent low gloss solution for interior applications

Chart 18: Gloss levels, interior applications



The above graph represents gloss levels of compounds when test specimens were molded using A1 surface mold polish.

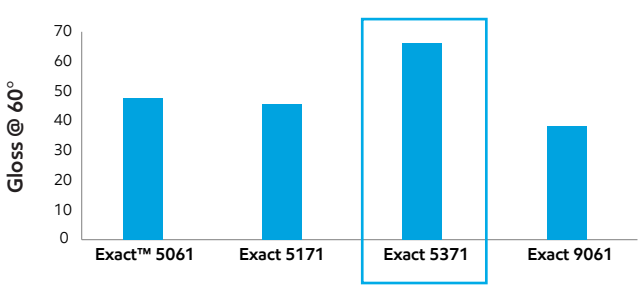
Tests were conducted on typical 15% talc filled compounds for interior application: ExxonMobil™ PP7555KNE2 (75%) + Exact™ (10%) + Talc (15%).

ExxonMobil test method

High gloss solution for exterior applications

Exact™ 5371 in combination with Exceed™ Flow PP7945E1 demonstrates excellent high gloss solution for exterior applications

Chart 19: Gloss levels, exterior applications



The above graph represents gloss levels of compounds when test specimens were molded using A1 surface mold polish.

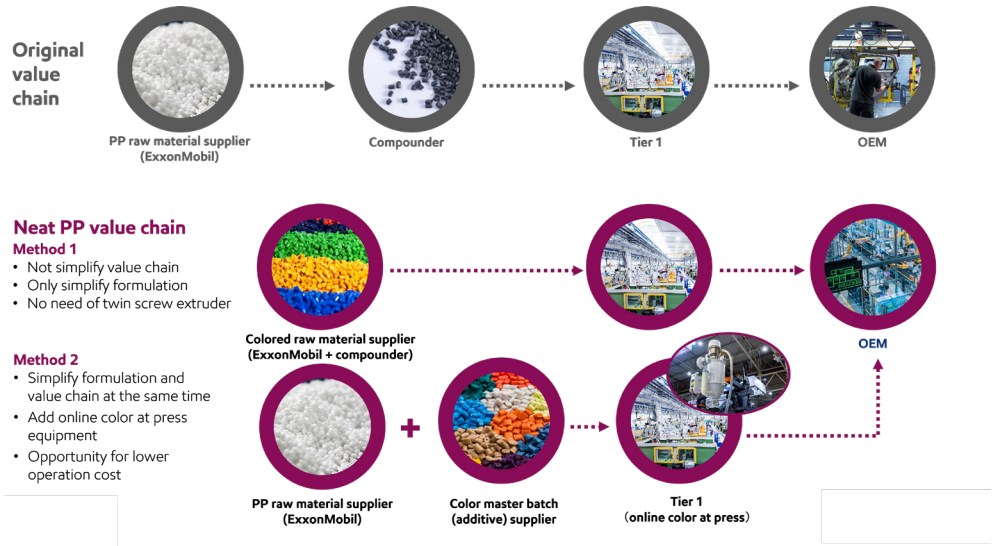
Tests were conducted on typical 20% talc filled compounds for exterior application: Exceed™ Flow PP7945E1 (50%) + ExxonMobil™ PP7032E3 (10%) + Exact™ (20%) + Talc (20%).

ExxonMobil test method

II. Neat PP solutions

The EV market is interested in extending range, and the ICE market is interested in fuel efficiency improvements. Thin walling is already phenomena happening and other method of lightweighting is by reduction of density of compounds by having no-filler formulations.

Two-wheeler (2W) OEMs are increasingly transitioning toward Neat Polypropylene (PP) in vehicle applications, particularly for exterior, interior, and semi-structural plastic parts. This shift is driven by a combination of cost optimization, light weighting, manufacturing efficiency, and evolving regulatory requirements.



Some of the possible **4-wheeler** parts for neat PP are:

- Door panel – door trim panel, map pocket, scuff plate, rocker panel trim
- Pillar lower panel
- Lift gate – panel (upper & lower), rocker panel trim, trunk tail plate
- Instrument panel end cap
- Seat back

Some of the possible **2-wheeler** parts for neat PP are:

- Housing headlamp rear
- Panel rear
- Front and rear fender

Potential benefits for the value chain

Compounder

- Offers lightweighting opportunity*
- Enables opportunity to lower cost
- No added filler can reduce possibility of dust pollution and damage to equipment

Tier 1

- Enables opportunity to lower cost
- Optimize inventory space

OEM

- Offers lightweighting opportunity
- Offers raw material consistency
- Design for recyclability**

Data and results presented herein apply specifically to the noted application under this brochure. Your results may differ depending on factors such as operating conditions, equipment and materials used.
* Based on typical density of 0.90 g/cm3 for no filler compared to 0.98 g/cm3 for T10 and 1.05 g/cm3 for T20.
** Potential to design with features intended to support recyclability where automotive parts are collected. Actual recyclability depends on factors such as local collection, sortation, and recycling infrastructure, as well as the condition and configuration of the product after use.

Possible grades	MFR (230°C/2.16kg) (g/10min) ASTM D1238	Flexural Modulus 1% secant (MPa) at 1.3 mm/min ASTM D790A	(MPa) at 2.0 mm/min ISO 178	Notched Izod impact (J/m) at 23°C ASTM D256A	(kJ/m²) at 23°C ISO 180/1A
Exceed™ AP03B	30	1380	1380	85	10
Exceed™ Tough PP8285E1	30	993	1020	No break	46
Exceed™ PP8864E1	14	1050	1110	740	51

III. Solutions for battery cases

Exceed™ AP3AW is an impact copolymer (ICP) polypropylene (PP) resin designed for high performance automotive and other battery case applications.

Enhanced product performance

Exceed™ AP3AW is a medium melt flow rate (MFR10 g/10min) ICP PP resin providing an enhanced stiffness-impact balance, low warpage and good weldability for demanding battery case applications.

Good heat and UV resistance

The good heat and UV resistance makes it especially suitable for use at higher service temperatures and in outdoor environments for extended periods.

Cost reduction opportunities

This medium MFR ICP PP resin offers opportunities to reduce costs through improved cycle times, while reducing or eliminating flow marks for better appearance.

Distinct ivory appearance

It is formulated to have a distinct ivory appearance for natural color battery cases, making it appealing to consumers in the after-sales market.

Exceed™ AP3AW resin - thermal stability and UV stability (Xenon weathering) test properties

Properties	Test method based on	Unit	Typical value	
MFR (230°C/2.16 kg)	ASTM D1238	g/10 min	10	
Flexural modulus (2.0 mm/min)	ISO 178	MPa	1300	
Heat deflection temperature (0.45 MPa)	ISO 75-2/Bf	°C	91.7	
Gardner impact strength (-29°C, 3.18 mm, Geometry GC)	ASTM D5420	J	17.6	
Thermal stability (150°C)	ASTM D3012	Hours	456	
UV stability on natural color (1250 kJ/m² at 340nm)	SAE J2527		As molded	After 45 days
Tensile strength at yield (50 mm/min)	ISO 527-2	MPa	26.1	26.4
Elongation at yield (50 mm/min)	ISO 527-2	%	4.6	5.7
Notched Izod impact strength (23°C)	ISO 180/1A	kJ/m²	9.1	6.3 (69% retention)
Appearance				
Color change, ΔE	SAE J1545			2.6
60° gloss retention	ASTM D523	%		125

Value given are typical and should not be interpreted as specifications. Data generated by or on behalf of ExxonMobil.

Potential benefits:

- Supply reliability
- Quality consistency
- Technical support through research centers

ExxonMobil Signature Polymers

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