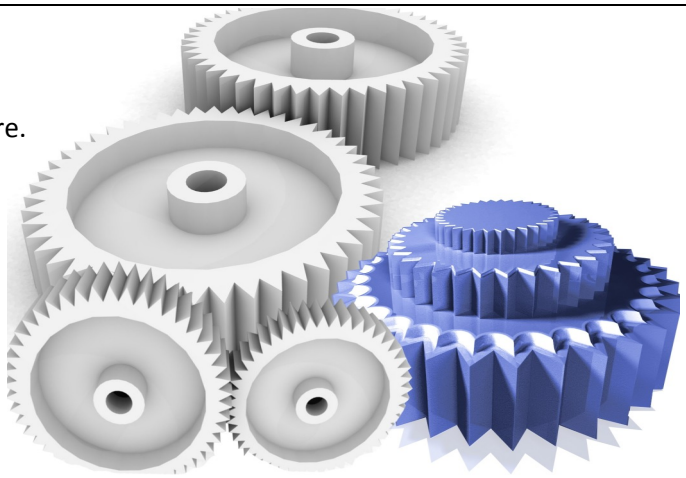
LION COPOLYMER

Application Bulletin

RoyalFlex™ - Maleic Anhydride grafted ethylene propylene elastomer

Polyamide performance enhanced :



- Outstanding notched Izod impact resistance at room temperature.
- Very high notched Izod impact resistance at -20°C.
- Improved flexibility.
- Reduced moisture sensitivity
- Significantly improved dimensional stability .
- Improve production of complex molded parts .
- Excellent impact resistance of glass-reinforced compositions

RoyalFlex™ (MAH) Maleic Anhydride grafted ethylene propylene elastomer is used to enhance the performance of a variety of engineered polymers. These are functionalized elastomeric polymers produced through reactive extrusion.

RoyalFlex™ impact modifiers improve characteristics such as resistance to impact at low temperature, homogeneity and surface appearance in filled compounds .

RoyalFlex™ *Impact modifiers*

Impact modifiers

RoyalFlex™ improves the overall toughness of polymers. Given optimal dispersion, even at lower concentrations, the elastomeric phase of RoyalFlex™ helps to improve impact strength and elongation. At higher levels, RoyalFlex™ can provide higher ductility in polyamide blends to low temperatures (down to -40°C/-40°F) .

Compatibilizers and Surfactant

RoyalFlex™ can act as surfactant with increased interphase adhesion and achieves compatibility between polar polymers and polyolefins.

Coupling agents

RoyalFlex™ promotes chemical bonding between fillers, reinforcements, and the polymer matrix.

Adhesion promoters

RoyalFlex™ modifiers enhance adhesion to substrates like metals, thermoset rubbers, and most polar substrates like glass, ceramics, and wood.

RoyalFlex™ 050

RoyalFlex™ 050 polymer resin is a low viscosity ethylene propylene elastomer functionalized with low levels of maleic anhydride by reactive extrusion. Its fully saturated backbone results in outstanding thermal and oxidative stability, leading to good weatherability.

This grade is a low level MAH graft product ideal for:

- Super-tough nylon applications without low temperature impact requirements.
- Medium / low toughness applications.
- Glass-filled impact modified applications.

RoyalFlex™ 120

RoyalFlex™ 120 polymer resin is a low viscosity, **semi-crystalline ethylene copolymer functionalized** with medium levels of maleic anhydride by reactive extrusion. Its fully saturated backbone results in outstanding thermal and oxidative stability leading to enhanced weather ability. Moreover, its elastomeric nature provides high impact resistance at room
temperature and at low temperature when blended with engineering polymers such as polyamide.

This grade is a Medium MAH grade designed to:

- Modify the impact characteristics of the full range of polyamides for temperatures as low as -20°C ,Depending on concentration
- In filled or non filled systems, modifies the impact characteristics of other engineering thermoplastics and technical polymers .
- Enhances compatibility between polyolefins and higher polar polymers .

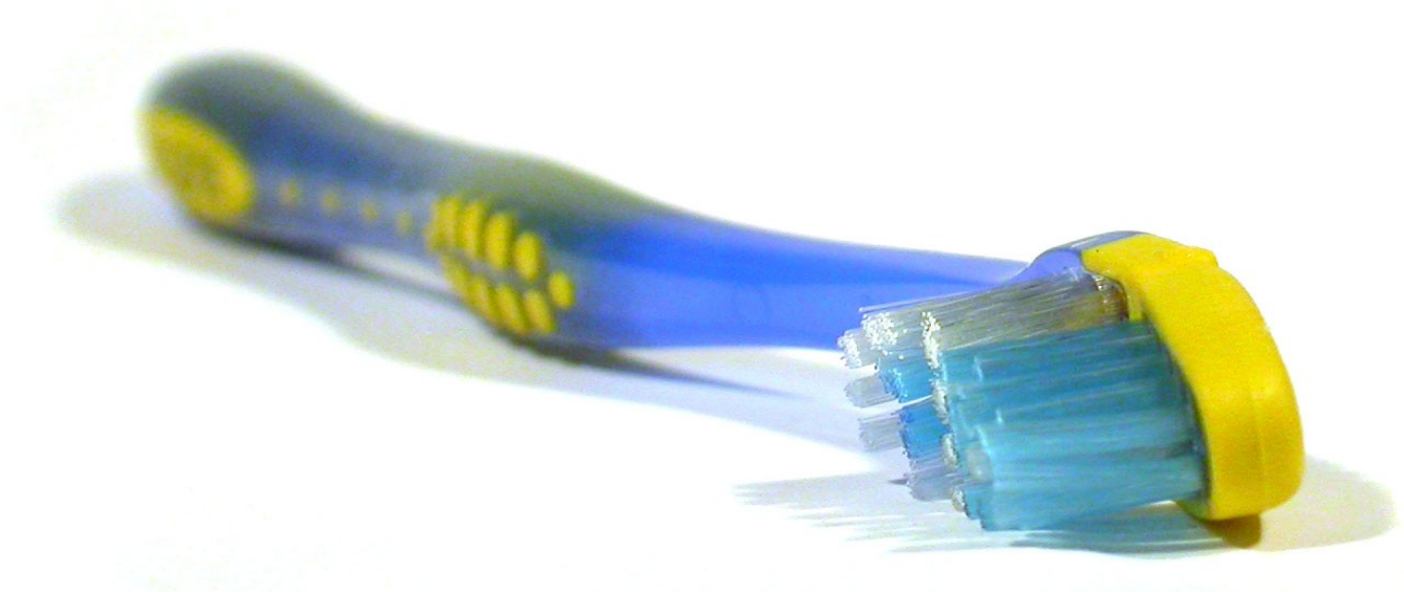
RoyalFlex™ 170

RoyalFlex™ 170 polymer resin is a low flow, semi-crystalline ethylene copolymer functionalized with high levels of maleic anhydride by reactive extrusion. Its fully saturated backbone results in outstanding thermal and oxidative stability leading to enhanced weatherability. Moreover, its elastomeric nature provides high impact resistance at room temperature and at low temperature when blended with engineering polymers such as polyamide.

This is a High MAH grade designed to:

- Allow lower levels to be used and still be effective.
- Modify the impact characteristics of the full range of polyamides for temperatures as low as -20°C ,Depending on concentration.
- In filled or non filled systems, modifies the impact characteristics of other engineering thermoplastics and technical polymers .
- Enhance compatibility between polyolefins and higher polar polymers .
- Higher levels of functionality to polymers.

Physical	RoyalFlex™ 050	RoyalFlex™ 120	RoyalFlex™ 170	Unit	Test Based On
Density	**0.88**	**0.88**	**0.88**	g/cm³	Lion Method
Mooney Viscosity	15	25	32		ASTM D1646
Melt -Flow Rate (MFR)					
230°C/5.0 kg	**8**	**7**	**1**	g/10 min	ASTM D1328
190°C/5.0 kg	**5**	**2**	**0.4**	g/10 min	
Maleic Anhydride Graft Level					Lion Method
-- [2]	**Low**	**Medium**	**High**		
-- [3]	**--**	**--**			
Volatiles	**< 0.15**	**< 0.15**	**< 0.15**	%	Lion Method
Yellowness Index	**< 50**	**< 50**	**< 50**	YI	ASTM E313



Typical Performance When Compounded with Nylon 6 or 66

Nylon 6 and 15% Impact Modifier

Impact Modifier	Royalflex 050	Royalflex 120	Royalflex 170
*FM, kpsi	201	175	159
RT **NI, ft-lbf/in	8	9	16

Nylon 66 and Three Levels of Royalflex 120

Royalflex 120, %	0	10	15	20
*FM, Kpsi	305	251	234	197
RT **NI, ft-lbf/in	1.1	3.4	3.9	13.5

Nylon 66 and 15% Impact Modifier

Impact Modifier	***RoyalEdge 4191P	Royalflex 050	Royalflex 120
*FM, kpsi	249	221	234
RT **NI, ft-lbf/in	0.9	4.3	3.9

Nylon 66 and 20% Impact Modifier

Impact Modifier	Royalflex 050	Royalflex 120	Royalflex 170
*FM, kpsi	193	197	180
RT **NI, ft-lbf/in	15.8	13.5	8.4

***FM:** flexural modulus
****NI:** notched izod
*****RoyalEdge 4191P:** EPDM

Optical	RoyalFlex™ 050	RoyalFlex™ 120	RoyalFlex™ 170	Unit	Test Lion

Additional Information	
RoyalFlex™ 050	Storage and Handling: Comprehensive material safety data sheets are provided to recommend safe practices during usage. For easy handling and storage, this grade is supplied as free-flowing pellets normally packed in 25 kg bags (50 bags per pallet) or 1 000 pounds Gaylord.
RoyalFlex™ 120	Storage and Handling: Comprehensive material safety data sheets are provided to recommend safe practices during usage. For easy handling and storage, this grade is supplied as free-flowing pellets normally packed in 25 kg bags (50 bags per pallet), or 1 000 pounds Gaylord.
RoyalFlex™ 170	Storage and Handling: Comprehensive material safety data sheets are provided to recommend safe practices during usage. For easy handling and storage, this grade is supplied as free-flowing pellets normally packed in 25 kg bags (50 bags per pallet) or 1 000 pounds Gaylord.

Legal Requirements	
	For detailed Product Stewardship information, please contact Customer Service.
RoyalFlex™ 050	This product, including the product name, shall not be used or tested in any medical application without the prior written acknowledgement of Lion Copolymer LLC as to the intended use.
	For detailed Product Stewardship information, please contact Customer Service.
RoyalFlex™ 120	This product, including the product name, shall not be used or tested in any medical application without the prior written acknowledgement of Lion Copolymer LLC as to the intended use.
	For detailed Product Stewardship information, please contact Customer Service.
RoyalFlex™ 170	This product, including the product name, shall not be used or tested in any medical application without the prior written acknowledgement of Lion Copolymer LLC as to the intended use.

Processing Statement	
RoyalFlex™ 050	RoyalFlex 050 resin may be added to polyamide to achieve optimum dispersion within the polymer matrix in order to obtain the best performance. Good engineering practice of Compounding parameters that can lead to optimized performance include extruder type, screw design, barrel temperature, screw speed, throughput and residence time. Our experienced technical service engineers and chemists are always on hand to help you in achieving the best performance from your processing and compounding operations.
RoyalFlex™ 120	RoyalFlex 120 resin may be added to polyamide to achieve optimum dispersion within the polymer matrix in order to obtain the best performance. Good engineering practice of Compounding parameters that can lead to optimized performance include extruder type, screw design, barrel temperature, screw speed, throughput and residence time. Our experienced technical service engineers and chemists are always on hand to help you in achieving the best performance from your processing and compounding operations.
RoyalFlex™ 170	RoyalFlex 170 resin may be added to polyamide to achieve optimum dispersion within the polymer matrix in order to obtain the best performance. This can be achieved easily because of the low viscosity of the product. Good engineering practice of Compounding parameters that can lead to optimized performance include extruder type, screw design, barrel temperature, screw speed, throughput and residence time. Our experienced technical service engineers and chemists are always on hand to help you in achieving the best performance from your processing and compounding operations.

Corporate info

North America Distributors

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All Other Technical:
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North America Distributors

OMYA

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