



# *Aria Polymer*



***There Is Always A Better Way***

Aria Polymer Pishgam / **Product Brochure**





Founded in Isfahan Science and Technology Town, 2009, **Aria Polymer Pishgam** started its job as a knowledge-based company whose mission was supplying high quality polymer products to promote its partners' business by means of modern technologies.

As an innovative, dynamic and blossoming company, **APP** aims to implement novel technologies in polymer industry. To achieve this goal, the company has produced various kinds of Coupling Agents, Adhesives, Additive Masterbatches, and Nano Compounds, in addition to settling an effective consultation system. In other words, **APP** has been always there to help its customers manufacture their products by providing them with the best quality materials and careful consultations, besides.

**Aria Polymer Pishgam's** products cover a wide range of the region's polymer industries, including compounds, packaging, automobile, pipes and fittings, etc.

Holding **ISO 9001** and **CE** certifications guarantees **APP's** quality and the reliability of its products, but most importantly, our internal lab, R&D department, elite engineers, experienced technicians, and the last but not the least, our technical values, have enabled us to serve our customers the best.

“

Iranian President,  
Visiting Aria Polymer's  
Booth.



## **Timeline**

**2008**

*The 4th Sheikh Bahaei Technopreneurship Festival Award*

**2013**

*Setting Up the 1st Production Line*

**2015**

*Isfahan Province Premier Technological Company Award  
The 11th Sheikh Bahaei Technopreneurship Festival Award  
Iranian Nano Technology Festival Best-rated Product Award  
ISO 9001, ISO 27001 & CE Establishment*

**2017**

*Starting Export to CIS Region*



**2009**

*Aria Polymer Pishgam Co. Establishment*

**2014**

*Transferring Technical Knowledge of Nano Products  
Iranian Plastic Society Successful Manager Award*

**2016**

*Asian Science Park Association Grand Prize*

**NOW**

*More than 30 Products in 4 Categories*



Automobile Industry								Packaging Industry						
Wood & Plastic Sheet	Automobile Bumper	Engineering Compounds	ABS Componds (Car Grilles)	Dashboard	Engine Parts (PA Compounds)	Gas Tank	Injected Parts	PE Bags (Nylon & Nylex)	Multilayer Bags Tetra Packs	Paper Bags	Starch-based Dishes Granule	PP Disposable Dishes	Vacuum Nylon (PP)	Cartonplast
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## Aria Polymer Products Guide

Aria Polymer Pishgam products are mainly classified in four categories, i.e. Additive Masterbatches, Maleic Anhydride Coupling Agents, Nano Additives and Tie Layer Adhesives. Being used in various industries, a better acquaintance with Aria Polymer products can help industry owners choose the most appropriate product.

Aria Polymer Products Guide provides an overview to display a functional introduction of products related to different industries.

Please contact our Commercial Department for further information.





Automobile Industry								Packaging Industry						
Wood & Plastic Sheet	Automobile Bumper	Engineering Compounds	ABS Componds (Car Grilles)	Dashboard	Engine Parts (PA Compounds)	Gas Tank	Injected Parts	PE Bags (Nylon & Nylex)	Multilayer Bags Tetra Packs	Paper Bags	Starch-based Dishes Granule	PP Disposable Dishes	Vacuum Nylon (PP)	Cartonplast
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## Aria Polymer Certification



QAL  
Certification

ISO 9001:2008



**BRITAA**  
British  
Accreditation  
Authority



QAL  
Certification

ISO 27001:2013



**BRITAA**  
British  
Accreditation  
Authority



# ***Aria Add***

***Additive Masterbatch***

*Aria Add has given a new life to plastic industry. Masterbatches are additive concentrates based on plastic resin. Masterbatches e.g. Slip Agent, Anti UV, Anti-Oxidant, Anti-Static, Clarifier Agent, etc. are used in every typical plastic process, such as injection molding, blow molding and extrusion molding.*



## Anti UV Masterbatch Aria Add 2173®

### Description

Aria Add 2173® is an Anti UV masterbatch as light stabilization system giving very good UV protection to polyethylene.

### Application

Aria Add 2173® is especially recommended for polyethylene film, sheet and tape applications.

### Technical Specification:

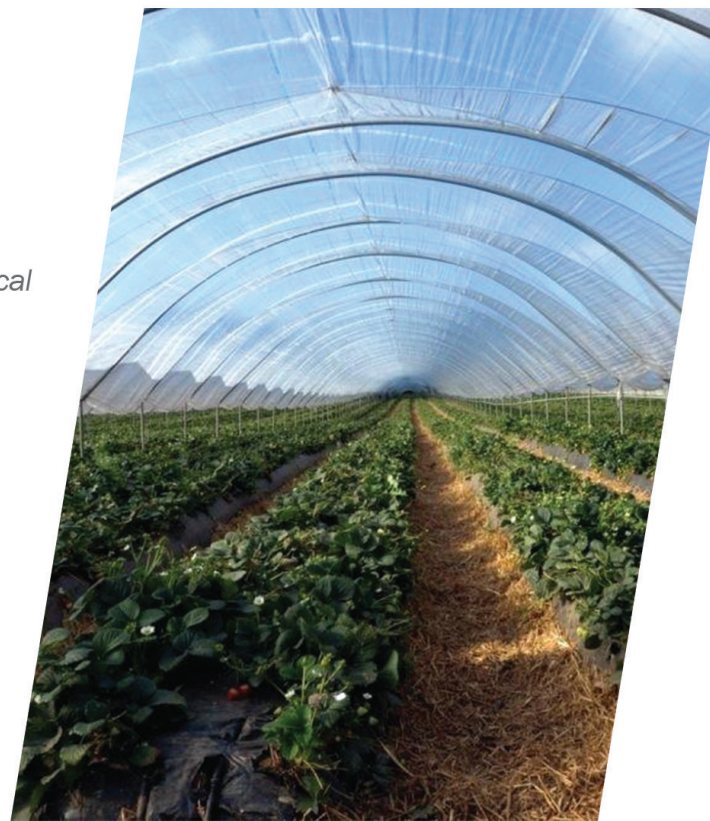
Aria Add 2173® consists of different HALS (Hindered Amine Light Stabilizer) and UV absorber additives, which gives the most effective light stabilization effect.

Physical Properties	Value	Method
Appearance	Yellowish Granules	–
Additives Content	>20 %	–
Carrier Resin	LDPE	–
Density	0.92±0.02 g/cm <sup>3</sup>	ASTM D792
Melt Flow Index @190oC /2.16kg	5±1 g/10 min	ASTM D1238
Usage Level	0.5-10 %	–

### Advantage:

Aria Add 2173®

- Increasing product lifetime.
- Increasing color stability.
- Preserving physical and mechanical degradation



## Advantage:

Aria Add 2273®

- Increasing product lifetime.
- Increasing color stability.
- Preserving physical and mechanical degradation.

## Technical Specification:

Physical Properties	Value	Method
Appearance	Granules	—
Additives Content	>20 %	—
Carrier Resin	PP	—
Density	0.92±0.02 g/cm <sup>3</sup>	ASTM D792
Melt Flow Index @190oC /2.16kg	4±1 g/10 min	ASTM D1238
Usage Level	1-5 %	—

## UV masterbatch Effectiveness

### Why we recommend Aria add 2273® for polypropylene

Typical degradation of polypropylene Jumbo in different denier with 2 wt% of Aria Add 2273® after 200 hr accelerated weathering test.



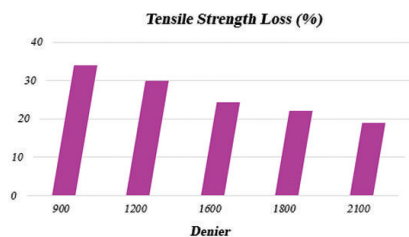
## Anti UV Masterbatch Aria Add 2273®

## Description

Aria Add 2273® is a high performance Anti UV masterbatch as light stabilization system for polyolefin products. It causes very good UV protection and avoids significant damage of polypropylene matrix.

## Application

Aria Add 2273® has different applications including in PP parts and packaging, especially PP woven and Jumbo bags, pipes and plastic furniture.



## Processing Aid Masterbatch Aria Add 2124®

### Description

Aria Add 2124® is an economical anti-block agent masterbatch containing additives managing the coefficient of friction as well as creating separation between the surfaces and improving performance characteristics in blown film and cast application. Typically, low compatibility of anti-block (10-12%) additives and polymers allows migration to the film surface. This product is based on LDPE carrier. Also, we are able to supply it by other carriers, e.g. HD, LD and LLD.

### Advantage:

Aria Add 2124®

- Improving melt flow control
- Lowering coefficient of friction
- Easy to open



### Technical Specification:

Product processing: sheet, film, PE tank & other extrusion process (HDPE, LDPE, LLD PE)  
The usage level depends on application (0.5-5%)

Physical Properties	Value	Method
Appearance	Milky Granules	–
Agent Content	>10 %	–
Carrier Resin	LDPE	–
Density	0.92±0.01 g/cm <sup>3</sup>	ASTM D792
Melt Flow Index @190oC /2.16kg	5±1 g/10min	ASTM D1238
Usage Level	0.5-2 %	–

## Technical Specification:

- Product processing: sheet, film, PE tank & other extrusion processes (HDPE, LDPE, LLD)
- The usage level depends on application.

Physical Properties	Value	Method
Appearance	Milky Granules	–
Slip Content	>10 %	–
Carrier Resin	LDPE	–
Density	0.92±0.01 g/cm <sup>3</sup>	ASTM D792
Melt Flow Index @190oC/2.16kg	4.5±1 g/10min	ASTM D1238
Usage Level	0.5-2 %	–

## Advantage:

### Aria Add 2125®

- Improving melt flow control
- Lowering coefficient of friction
- Easy to open



## Slip-Anti Block Agent Masterbatch

## Aria Add 2125®

## Description

Aria Add 2125® is an economical slip agent masterbatch containing additives managing the coefficient of friction as well as creating separation between the surfaces and improving performance characteristics in blown film and cast application. Typically, some of slip additives produce a range of slip and anti-block agents. Slip additives have a low compatibility with the polymer which allows migration to the film surface.

## Slip Agent Masterbatch

# Aria Add 2126®

## Description

Aria Add 2126® is an economical slip agent masterbatch containing additives managing the coefficient of friction as well as creating separation between the surfaces and improving performance characteristics in blown film and cast application. Typically, slip additives have a low compatibility with the polymer which allows fast migration to the film surface.

### Advantage:

Aria Add 2126®

- Improving melt flow control
- Lowering coefficient of friction
- High slip



### Technical Specification:

- Product processing: sheet, film, PE tank & other extrusion processes (HDPE, LDPE,)
- The usage level depends on application.

Physical Properties	Value	Method
Appearance	Milky Granules	-
Slip Content	>10 %	-
Carrier Resin	LDPE	-
Density	0.92±0.01 g/cm <sup>3</sup>	ASTM D792
Melt Flow Index @190oC /2.16kg	4.5±1 g/10min	ASTM D1238
Usage Level	0.5-2 %	-

## Technical Specification:

- Product processing: sheet, film, PE tank & other extrusion processes (HDPE, LDPE,)
- The usage level depends on application.

Physical Properties	Value	Method
Appearance	Milky Granules	–
Slip Agent Content	>10 %	–
Antiblock Agent Content	>10 %	–
Carrier Resin	LDPE	–
Density	0.98±0.02 g/cm <sup>3</sup>	ASTM D792
Melt Flow Index @190oC /2.16kg	4.5±1 g/10min	ASTM D1238
Usage Level	0.5-2 %	–

## Advantage:

### Aria Add 2136®

- Improving Melt Flow control
- Lowering Coefficient of Friction
- High Slip
- Excellent Openability



## Slip Agent Masterbatch

## Aria Add 2136®

## Description

Aria Add 2136® is an economical slip & anti-block masterbatch agent containing additives managing the coefficient of friction as well as creating separation between the surfaces and improving performance characteristics in blown film and cast application. The result is a significant improvement in openability, while yielding higher cost efficiency.



## Slip Agent Masterbatch

# Aria Add 2226®

## Description

Aria Add 2226® is an economical slip agent Masterbatch containing additives managing the coefficient of friction as well as creating separation between the surfaces and improving performance characteristics in blown film and cast application. Typically, slip additives have a low compatibility with the polymer which allows fast migration to the film surface.

## Technical Specification:

- Product processing: sheet, film & other extrusion processes (PP)
- The usage level depends on application.

Physical Properties	Value	Method
Appearance	Milky Granules	-
Slip Content	>10 %	-
Carrier Resin	PP	-
Density	0.92±0.01 g/cm <sup>3</sup>	ASTM D792
Melt Flow Index @190oC /2.16kg	3.5±1 g/10min	ASTM D1238
Usage Level	0.5-2 %	-

## Advantage:

### Aria Add 2226®

- Improving melt flow control
- Lower Coefficient of Friction
- High slip





## Advantage:

Aria Add 2161®

- Masking natural yellowing plastics
- Improving initial color
- Getting brilliance of colored articles

## Technical specification:

- Product processing: sheet, film & other extrusion processes (HDPE, LDPE, PP...).

Physical Properties	Value	Method
Appearance	Phosphoric Granules	–
Carrier Resin	LDPE	–
Density	0.92±0.01 g/cm <sup>3</sup>	ASTM D792
Melt Flow Index @190oC /2.16kg	1.5±0.2 g/10 min	ASTM D1238
Usage Level	0.5-1.5 %	–

## Optical Brightener Masterbatch

## Aria Add 2161®

## Description

Aria Add 2161® is an Optical brightener Masterbatch which is also called Fluorescent Whitening agent. These masterbatches work via a fluorescent mechanism absorbing light in the UV spectrum and emitting light in the blue region of visible spectrum to yield a brighter and fresher appearance.

## PP Clarifier Masterbatch

# Aria Add 2450®

## Description

Aria Add 2450® is PP clarifier masterbatch applying to improve the clarity of PP by making small crystallites during processing stage. It reduces haze and increases the transparency of sheet, film, blown & injection molded parts based on polypropylene.

## Technical Specification:

- Aria Add 2450® consists of combination of nucleating agent and some specialty additives in PP carrier resin.

Physical Properties	Value	Method
Appearance	Glassy Granules	–
Carrier Resin	PP	–
Density	0.92±0.01 g/cm <sup>3</sup>	ASTM D792
Melt Flow Index @190oC /2.16kg	0.5±0.2 g/10 min	ASTM D1238
Usage Level	1-3 %	–

## Applications

- Used in blown and injection part to reach high gloss
- Used in polypropylene sheet to produce thermoforming container





## Application

- Used in Packaging especially PP woven bag.

## Technical Specification:

- Aria Add 2451® consists of combination of nucleating agent and some specialty additives in polyolefin carrier resin.

Physical Properties	Value	Method
Appearance	Glassy Granules	–
Carrier Resin	PP	–
Density	0.92±0.01 g/cm <sup>3</sup>	ASTM D792
Melt Flow Index @190°C /2.16kg	9±1 g/10 min	ASTM D1238
Usage Level	1-3 %	–

## PP Clarifier & Dimension Stabilizer Masterbatch

## Aria Add 2451®

## Description

Aria Add 2451® is PP clarifier masterbatch applying to improve the clarity and dimension stability of PP in polypropylene films.

## Anti-Oxidant Masterbatch

# Aria Add 2130®

## Description

Aria Add 2130® is an anti-oxidant masterbatch with anti-oxidant additives as an active content. It is used in polymers to avoid the oxidative degradation at higher temperature in processing or application. It is versatile heat stabilizer with outstanding extraction resistance, low pigment interaction and long-term thermal stabilizer system.

## Technical Specification:

Product processing: Pipe, sheet and other extrusion process for HDPE, LDPE etc.

Physical Properties	Value	Method
Appearance	Milky Granules	-
Additives Content	>10%	-
Carrier Resin	HDPE	ASTM D1238
Density	0.93±0.01 g/cm <sup>3</sup>	ASTM D1238
Melt Flow Index @190oC /2.16kg	7±1 g/10min	-
Usage Level	1-3%	-

## Advantage:

Aria Add 2130 increases productivity over conventional anti-oxidant systems.

- Improving melt flow control
- Lowering initial color and outstanding color maintenance
- Lowering use levels leading to improved additive compatibility



## Advantage:

- Lower melt temperatures are required to achieve the same viscosity i.e. approximately 30oC lower mass temperature
- Pigment/color mixing may be improved due to decreased viscosity and better flow at a given temperature
- Filler mixing may be improving due to decreased viscosity and better flow rate
- Increasing production rate



## Technical Specification:

Product processing: extrusion processing of polypropylene (nonwoven, profile ...)

Physical Properties	Value	Method
Appearance	Whiteness Granules	–
Carrier Resin	PP	ASTM D1238
Density	0.90±0.01 g/cm <sup>3</sup>	ASTM D1238
Melt Flow Index @190oC /2.16kg	50 ≥g/10min	–
Usage Level	0.5-5%	–

## MFI Modifier Masterbatch

## Aria Add 2440®

## Description

Aria Add 2440® is a masterbatch in polypropylene base resin. It is designed as modified PP Viscosity to increase melt flow rate of polypropylene in fiber and molding applications. Some grades of PP have low melt flow rate and also have low price in comparison to other grades. Thus this additive could increase the melt flow rate and help processing conditions of these grades economically.

# Anti-Fog Masterbatch Aria Add 2116T101®

## Description

Aria Add 2116T101® is an anti-fog concentrate in polyethylene resin. It is used in plastics to alter the surface properties and increase the level of energy to prevent fogging on the surface and inhibit gathering condensed water droplets.

Anti-fogging additives allow water to spread into uniform transparent layer on the surface of polymeric films.

## Advantage:

Aria Add 2116T101®

- Increase clarity and light transmittance.
- Prevent adverse effects of water drops on protected materials.
- Keep the quality of foods and plants.



## Technical Specification:

Aria Add 2116T101® is applied in food packaging and agriculture greenhouse films.

Physical Properties	Value	Method
Appearance	Granules	–
Additives Content	>12%	–
Carrier Resin	PE	–
Melt flow index @190oC /2.16kg	4 ±0.5 g/10min	ASTM D1238
Usage level	7-10%	–

**Packaging & storage:** Aria Add 2116T101® is packed in 25kg bags. This bag should be stored in a cool and dry place below 40oC, protected from sunlight and tightly closed to avoid contamination

## Impact Modifier of UPVC

### Aria Add 1701®

#### Technical Specification:

Physical Properties	Value	Method
Appearance	Granule	-
Odor	Low	-
Usage level	0.5-1.5 %	-

- Raising up the impact properties
- Improving surface gloss of UPVC parts
- High compatibility with UPVC



## Description

Aria Add 1701® is a high performance butadiene base polymer resin. It has been designed to act as an impact modifier in UPVC parts especially pipes, fitting and profiles.



## Impact Modifier Based Polyethylene

# Aria Comp 303®

## Description

Aria Comp 303® polymer resin is a polyethylene base compound. It has been primarily designed to act as an impact modifier of polyethylene containers and parts.

## Technical Specification:

- Improving impact properties of polyolefin containers without changing in transparency.
- The use of Aria Comp 303® masterbatch has no negative influence on color of part surface.
- Maintaining the dimensional stability.

Physical Properties	Value	Method
Appearance	Milky Granules	–
Density	0.93±0.2	ASTM D792
Melt Flow Index @190oC /2.16kg	5 ±0.2	ASTM D1238
Usage Level	2 to 5%	According to formulation



### Technical Specification:

- Improving impact properties of polyolefin containers without changing in transparency.
- The use of Aria Comp 4191® masterbatch has no negative influence on color of part surface.
- Maintaining the dimensional stability



## Impact modifier based Polyethylene

### Aria Comp 4191®

## Description

Aria Comp 4191® polymer resin is a polyethylene base compound. It has been primarily designed to act as an impact modifier of polyethylene containers and parts.

Physical Properties	Value	Method
Appearance	Milky Granules	-
Density	0.93±0.2	ASTM D792
Melt Flow Index @190oC /2.16kg	1.6 ±0.2	ASTM D1238
Usage Level	2 to 5%	According to formulation

## Impact Modifier Based Polypropylene

# Aria Comp 4410®

## Description

Aria Comp 4410® polymer resin is a Polypropylene base compound. It has been primarily designed to act as an impact modifier of Polypropylene containers and parts.

Physical Properties	Value	Method
Appearance	Milky Granules	–
density	0.95	ASTM D792
Melt Flow Index @230oC /2.16kg	5.2±0.2	ASTM D1238
Usage Level	1 to 3%	According to formulation

### Why we recommend Aria Comp 4410® for polyolefin compound?

Impact resistance is characterized by falling weight impact test to determine the required fracture energy and height of weight to break the specimen.

Sample copolymer	Weight (gr)	Height (cm)	Fracture energy (J)
Without Aria Comp 4410®	400	100	4
With Aria Comp 4410®	400	160	6.4

### Technical Specification:

- Improving impact properties of polyolefin containers without changing in transparency
- Scratch resistance of PP plastic containers
- The use of Aria Comp 4410® masterbatch has no negative influence on color of part surface



### Technical Specification:

- Improving impact properties of polyolefin containers without changing in transparency
- Scratch resistance of PP plastic containers
- The use of Aria Comp 4411® masterbatch have no negative influence on color of part surface



## Impact Modifier Based Polypropylene

### Aria Comp 4411®

## Description

Aria Comp 4411® polymer resin is a Polypropylene base compound. It has been primarily designed to act as an impact modifier of Polypropylene containers and parts.

Physical Properties	Value	Method
Appearance	Milky Granules	–
density	0.95	ASTM D792
Melt Flow Index @190oC /2.16kg	5.5±0.5	ASTM D1238
Usage Level	1 to 3%	According to formulation

#### Why we recommend Aria Comp 4411® for polyolefin compound?

Impact resistance is characterized by falling weight impact test to determine the required fracture energy and height of weight to break the specimen.

Sample copolymer	Weight (gr)	Height (cm)	Fracture energy (J)
Without Aria Comp 4411®	400	100	4
With Aria Comp 4411®	400	160	6.4



# **Aria Couple**



## ***Coupling Agent***

*Maleic Anhydride has revolutionized all industries. Aria Couple is a Maleic Anhydride (MAH) grafted polymer in granular form. These polar materials have been specifically designed to provide adhesion between non-polar polymers, e.g. polyolefin and a filler such as wood, glass fiber, nylon, etc. Aria Adhesives are also a subcategory of Coupling Agents, used as tie layer adhesive in multilayer structures to bond different polymers together or to other materials.*

## Maleic anhydride grafted Polyethylene

### Aria Couple 1141®

## Description

Aria Couple 1141® polymer resin is a maleic anhydride functionalized polyethylene produced by reactive extrusion. It has been primarily designed to act as a compatibilizer for polyolefin and polar polymers or fillers.

### Technical Specification:

- Achieve compatibility between non-polar polyolefins and polar materials.
- Function as a coupling agent between reinforcing fillers and polyolefin polymers.
- Achieve dimensional stability and increase smooth surface of final products.
- Balance mechanical properties and cost efficiency.

Physical Properties	Value	Method
density	0.945	ASTM D792
Melt flow index @190oC /2.16kg	0.3±0.1	ASTM D1238
Maleic anhydride graft level	Very high	Titration method
Usage level	1.5-5%	–

### Packaging & storage

Aria Couple 1141® is packed in 25kg bags. This bag should be stored in a cool and dry place below 40oC, protected from sunlight and tightly closed to avoid contamination.

## Maleic Anhydride Grafted Polyethylene

### Aria Couple 1141®

## Description

Aria Couple 1141® polymer resin is a maleic anhydride functionalized polyethylene produced by reactive extrusion. It has been primarily designed to act as a coupling agent especially in wood flour reinforced polymer composites (WPC).

### Technical Specification:

Function as a coupling agent between reinforcing materials such as wood fillers and polyolefin in wood plastic composites.

- Eliminating output variation
- Achieving dimensional stability and increase smooth surface of final products
- balancing mechanical properties and cost efficiency
- Improving mechanical properties e.g. tensile strength, impact properties and flexural modulus



Physical Properties	Value	Method
Density	0.945	ASTM D792
Melt Flow Index @190oC /2.16kg	0.3±0.1	ASTM D1238
Maleic Anhydride Graft Level	Very high	Titration method
Usage Level	1.5-5%	-



### Technical Specification:

- Functioning as a coupling agent between reinforcing materials such as mineral fillers, glass fiber, wood flour, Halogen free flame retardant additives and polyethylene to improve mechanical properties
- Improving mechanical properties e.g. tensile strength, impact properties and flexural strength.
- Achieving dimensional stability and increase smooth surface of final products.
- Compatibilizer for dissimilar polymers like PA with PE and PP.

Physical Properties	Value	Method
density	0.925	ASTM D792
Melt flow index @190oC /2.16kg	0.8±0.1	ASTM D1238
Maleic anhydride graft level	high	Titration method
Usage level	1.5-3%	–

## Maleic Anhydride Grafted Polyethylene

### Aria Couple 1176®

### Description

Aria Couple 1176® polymer resin is a maleic anhydride functionalized Linear Low density polyethylene. It has been primarily designed to act as a coupling agent based on PE.



## Impact Modifier of UPVC

### Aria Add PEG 1100T205®

## Description

Aria Add PEG 1100T205® is a high performance Ethylene base polymer resin. It has been designed to act as an impact modifier in UPVC parts especially pipes, fitting and profiles to aid filler dispersion and obtain a balance of impact resistance and other properties.

### Technical Specification:

- Raise up the impact properties
- Improve surface gloss of UPVC parts
- No adverse effect on other properties
- No significant change in price by using 0.5-1.5 %.
- Good interaction with other components (fillers, lubricants, ...)



Typical Value	Value	Method
Appearance	powder	–
Odor	Low	–
Usage level	0.5-1.5 %	–

### Packaging & Storage

Aria Add PEG 1100T205 is packed in 25 kg bags. This bag should be stored in a cool and dry place below 50oC, protected from sunlight and tightly closed to avoid contamination.

## Impact Modifier of UPVC

### Aria Add PEG 41®

#### Technical Specification:

Physical Properties	Value	Method
Appearance	powder	–
odor	Low	–
Usage level	0.5-1.5 %	–

- Raising up the impact properties
- Improving surface gloss of UPVC parts



## Description

Aria Add PEG 41® is a high performance Ethylene base polymer resin. It has been designed to act as an impact modifier in UPVC parts especially pipes, fitting and profiles.

## Impact Modifier of UPVC

# Aria Add PEG 76®

## Description

Aria Add PEG 76® is a high performance Ethylene base polymer resin. It has been designed to act as an impact modifier in UPVC parts especially pipes, fitting and profiles.

- Raising up the impact properties
- Improving surface gloss of UPVC parts



## Technical Specification:

Physical Properties	Value	Method
Appearance	Powder	–
Odor	Low	–
Usage Level	0.5-1.5 %	–

## Maleic anhydride grafted Polypropylene

### Aria couple 1431®

## Description

Aria Couple 1431® polymer resin is a maleic anhydride functionalized homo-polypropylene produced by reactive extrusion. It has been primarily designed to act as a coupling agent between reinforcing materials such as mineral fillers and polypropylene.

### Technical Specification:

- Achieve optimum dispersion & distribution of filler in polymer matrix.
- Eliminate output variation.
- Achieve dimensional stability & increase smooth surface of final products.
- Improve mechanical properties e.g., tensile strength, impact resistance & flexural modulus.

Typical Value	Value	Method
Density	0.91	ASTM D792
Melt flow index @190oC /2.16kg	40±5	ASTM D1238
Melt flow index @230oC /2.16kg	≥100	ASTM D1238
Maleic anhydride graft level	High*	Titration method
Usage level	1.5-4%	–

\* Low <0.25wt%, Medium 0.25-0.5wt%, High 0.5-1.0wt%

**Packaging & storage:** Aria Couple 1431® is packed in 25kg bags. This bag should be stored in a cool and dry place below 40oC, protected from sunlight and tightly closed to avoid contamination.

## Maleic Anhydride Grafted Polypropylene

### Aria couple 1431®

## Description

Aria Couple1431® polymer resin is a maleic anhydride functionalized polypropylene produced by reactive extrusion. It has been primarily designed to act as a coupling agent in mineral fillers such as CaCO<sub>3</sub>, talc and mica filled polypropylene compounds.

## Technical Specification:

- Achieve suitable dispersion and distribution of filler in polymer matrix
- Improve mechanical properties
- Facilitate melting process and reduce mixing time

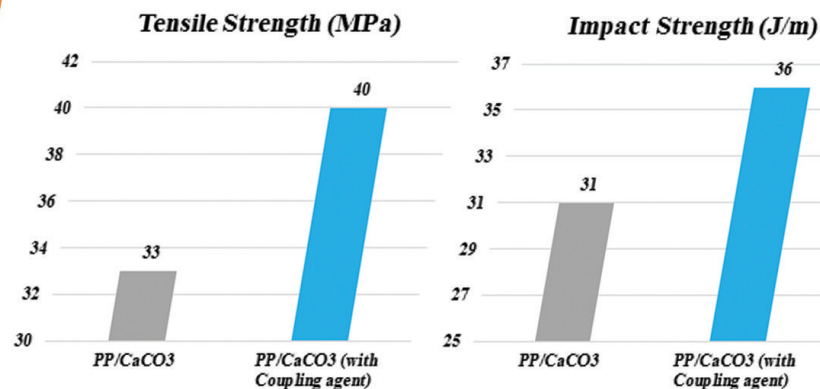


Physical Properties	Value	Method
density	0.91	ASTM D792
Melt flow index @190oC /2.16kg	45±5	ASTM D1238
Maleic anhydride graft level	High*	Titration method
Usage level	1.5-3%	—

\* Low <0.25wt%, Medium 0.25-0.5wt%, High 0.5-1.0wt%

### Why we suggested Aria couple 1431® for filled polypropylene

Effect of Aria couple 1431 as a coupling agent on mechanical properties of PP/ 40 wt% CaCO<sub>3</sub>



### Packaging & storage

Aria Couple1431® is packed in 25kg bags. This bag should be stored in a cool and dry place below 40oC, protected from sunlight and tightly closed to avoid contamination.

## Technical Specification:

Achieve optimum dispersion & distribution of glass fiber in polymer matrix & minimum crack in PP/GF morphology

- Eliminate output variation
- Achieve dimensional stability & increase smooth surface of final products
- Improve mechanical properties e.g., tensile strength, impact resistance & flexural modulus



Typical Value	Value	Method
Density	0.91	ASTM D792
Melt flow index @190oC /2.16kg	45±5	ASTM D1238
Melt flow index @230oC /2.16kg	≥100	ASTM D1238
Maleic anhydride graft level	High*	Titration method
Usage level	1.5-4%	-

\* Low <0.25wt%, Medium 0.25-0.5wt%, High 0.5-1.0wt%

### Maleic Anhydride Grafted Polypropylene Application Effectiveness

- Typical value of polypropylene resin reinforced with 30 wt% of fiber glass containing Aria couple 1432®.



Item	Unit	PP/GF	PP/GF/ Aria couple 1432
Tensile strength	MPa	64.4	78.4
Izod Notch impact strength	J/m	52.1	107.7

**Packaging & storage:** Aria Couple 1431® is packed in 25kg bags. This bag should be stored in a cool and dry place below 40oC, protected from sunlight and tightly closed to avoid contamination.

## Maleic anhydride grafted Polypropylene

### Aria couple 1431®

## Description

Aria Couple 1431® polymer resin is a maleic anhydride functionalized homopolypropylene produced by reactive extrusion. It has been primarily designed to act as a coupling agent between reinforcing materials such as glass fibers and polypropylene.

## Maleic Anhydride Grafted Polypropylene

### Aria couple 1431®

## Description

Aria Couple1431® polymer resin is a maleic anhydride functionalized polypropylene produced by reactive extrusion. It has been primarily designed to act as a coupling agent in mineral fillers such as CaCO<sub>3</sub>, talc and mica filled polypropylene compounds.

## Technical Specification:

- Achieve suitable dispersion and distribution of starch in polymer matrix
- Improve physical and mechanical properties of biodegradable containers
- Eliminate output variation
- Achieve dimensional stability and increase smooth surface of final products



Typical Value	Value	Method
Density	0.91	ASTM D792
Melt flow index @190oC /2.16kg	45±5	ASTM D1238
Melt flow index @230oC /2.16kg	≥100	ASTM D1238
Maleic anhydride graft level	High*	Titration method
Usage level	1.5-4%	—

\* Low <0.25wt%, Medium 0.25-0.5wt%, High 0.5-1.0wt%

### Why we suggested Aria couple 1431® for biodegradable compounds?

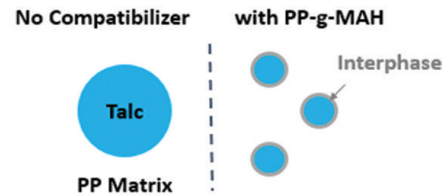
This table shows different of the mechanical properties of PP/ 50 wt% starch composites with Aria Couple1431®.

Coupling Agent	Tensile strength (MPa)	Young Modulus (MPa)	Elongation at Break (%)
Without Aria couple1431®	12.6	250	4.5
With Aria couple1431®	15.01	283	5.7

**Packaging & storage:** Aria Couple 1431® is packed in 25kg bags. This bag should be stored in a cool and dry place below 40oC, protected from sunlight and tightly closed to avoid contamination..

## Technical Specification:

- Achieve suitable dispersion and distribution of filler in polymer matrix
- Improve mechanical properties such as tensile strength, flexural strength and impact resistance
- Facilitate melting process and reduce mixing time

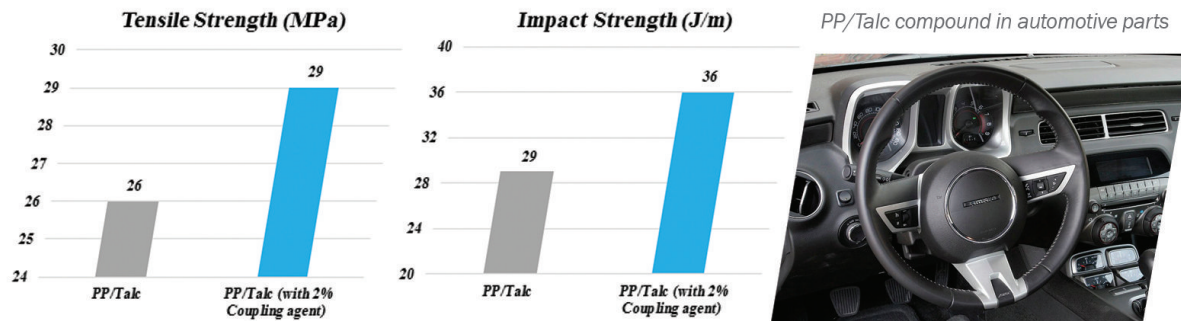


Typical Value	Value	Method
Density	0.91	ASTM D792
Melt flow index @190oC /2.16kg	45±5	ASTM D1238
Melt flow index @230oC /2.16kg	≥100	ASTM D1238
Maleic anhydride graft level	High*	Titration method
Usage level	1.5-3%	—

\* Low <0.25wt%, Medium 0.25-0.5wt%, High 0.5-1.0wt%

### Why we suggested Aria couple 1431® for filled polypropylene?

**Polypropylene/ Talc compounds** Effect of coupling agent (PP-g-MAH) on mechanical properties of PP/ 40 wt% Talc



**Aria couple1431®** has improved the impact resistance and tensile strength of PP/Talc compounds.

**Packaging & storage:** Aria Couple1431® is packed in 25kg bags. This bag should be stored in a cool and dry place below 40oC, protected from sunlight and tightly closed to avoid contamination.

## Maleic anhydride Grafted Polypropylene

### Aria couple 1431®

## Description

Aria Couple1431® polymer resin is a maleic anhydride functionalized polypropylene produced by reactive extrusion. It has been primarily designed to act as a coupling agent in mineral fillers such as CaCO<sub>3</sub>, talc and mica filled polypropylene compounds.



# Maleic Anhydride Grafted Polypropylene

## Aria couple 1433®

### Description

Aria Couple 1433® polymer resin is a maleic anhydride functionalized polyolefin produced by reactive extrusion. It has been primarily designed to act as a coupling agent in wood plastic composites based on a polyolefin such as PP. This grade is designed to function as a coupling agent in wood flour reinforced polymer composites (WPC).

### Technical Specification:

- Achieving suitable dispersion and distribution of wood in polymer matrix and minimum crack in WPC morphology
- Eliminating output variation
- Achieving dimensional stability and increase smooth surface of final products
- Improving mechanical properties e.g. tensile strength, impact properties and flexural modulus



Physical Properties	Value	Method
Density	0.91	ASTM D792
Melt Flow Index @190oC /2.16kg	13±2	ASTM D1238
Maleic Anhydride Graft Level	High*	Titration method
Usage Level	1.5-3%	—

### Maleic Anhydride Grafted Polypropylene Application Effectiveness

Typical value of polypropylene resin compounded with 50 wt% of wood flour containing Aria couple 1433®.



## Technical Specification:

- Functioning as a coupling agent in polyolefin compound to improve printability, paintability and surface hydrophilic of polymeric parts, e.g. bumpers
- Improving interfacial adhesion between the filler and polymer matrix
- Well dispersion of filler and enhancement of mechanical properties of parts namely wheel cover



## Maleic Anhydride Grafted Polyolefin

### Aria Couple 1401®

## Description

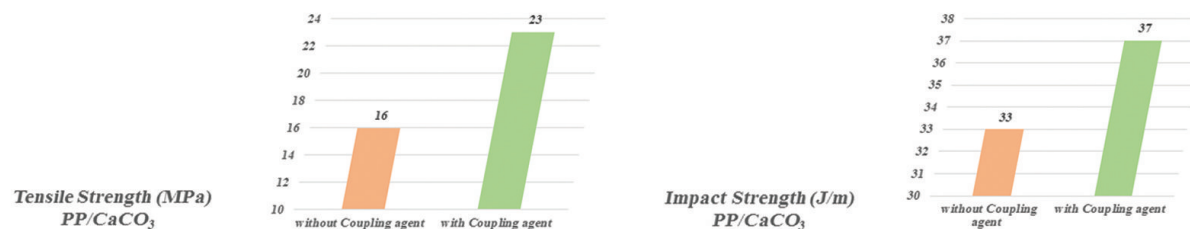
Aria Couple 1401® polymer resin is a maleic anhydride functionalized polyolefin produced by reactive extrusion. It has been primarily designed to act as a coupling agent in filled polyolefin compounds. The polar function in these materials facilitates printability, paintability and adhesion in compounds.

Physical Properties	Value	Method
Density	0.91	ASTM D792
Melt Flow Index @190oC/2.16kg	15±2	ASTM D1238
Maleic Anhydride Graft Level	High*	Titration method
Usage Level	1.5-2.5%	—

\* Low <0.25wt%    Medium 0.25-0.5wt%    High 0.5-1.0wt%

### Why we recommend Aria Couple 1401® for filled polyolefin?

Effect of coupling agent on mechanical properties of PP/ 30 wt% CaCO<sub>3</sub>/ 3 wt% coupling agent



# Maleic Anhydride Grafted Polyolefin

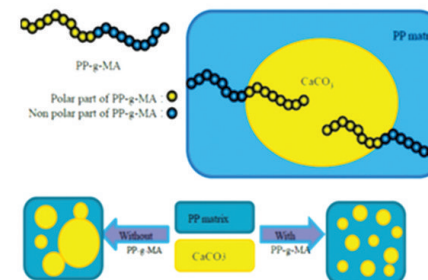
## Aria couple 1405®

### Description

Aria Couple1405® polymer resin is a maleic anhydride functionalized polyolefin produced by reactive extrusion. It has been primarily designed to act as a coupling agent in mineral fillers such as CaCO<sub>3</sub>, talc and mica filled polyolefin compounds.

### Technical Specification:

- Achieving suitable dispersion and distribution of filler in polymer matrix
- Improving mechanical properties
- Facilitating melting process and reduce mixing time



Physical Properties	Value	Method
Density	0.91	ASTM D792
Melt FlowIndex @190oC/2.16kg	13±3	ASTM D1238
Maleic Anhydride Graft Level	High*	Titration method
Usage Level	1.5-2.5%	

### Why we recommend Aria couple 1405® for filled polyolefin?

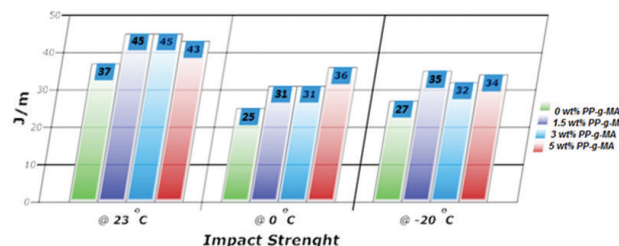
This table shows the difference between mechanical properties of HDPE/CaCO<sub>3</sub> composites, untreated carbonate, coated carbonate with stearic acid and Aria couple 1405®.

Coupling Agent	Tensile strength (MPa)	Flexural strength (MPa)	Impact strength (kJ/m <sup>2</sup> )	Elongation at Break (%)
Untreated CaCO <sub>3</sub>	14.01	19.87	10.28	18.77
Treated CaCO <sub>3</sub>	15.68	21.93	11.23	21.65
Treated CaCO <sub>3</sub> &Aria couple1405®	18.03	25.84	14.89	25.24

Treated CaCO<sub>3</sub>&Aria couple1405® has improved the mechanical properties considerably.

#### Polyolefin/ Talc compounds

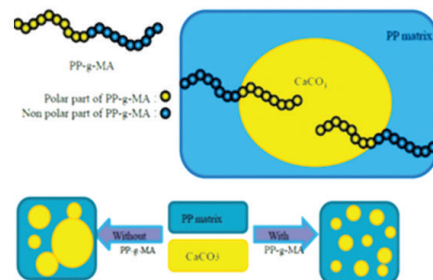
Effect of coupling agent on impact properties of PP/ 30 wt% talc at different temperature is shown in figure.



Aria couple1405® has improved the impact resistance even at low temperature.

### Technical Specification:

- Achieving suitable dispersion and distribution of filler in polymer matrix.
- Facilitating melting process and reduce mixing time.
- Improving mechanical properties.



Physical Properties	Value	Method
Density	0.93	ASTM D792
Melt Flow Index @190oC /2.16kg	12±2	ASTM D1238
Maleic Anhydride Graft Level	high	Titration method
Usage Level	1.5-3%	—

#### Polyolefin/ Talc compounds

Effect of Aria Couple 1405 and Aria couple 1405N on mechanical properties of PP/ 20 wt% talc.  
(Based on ASTM D 638)

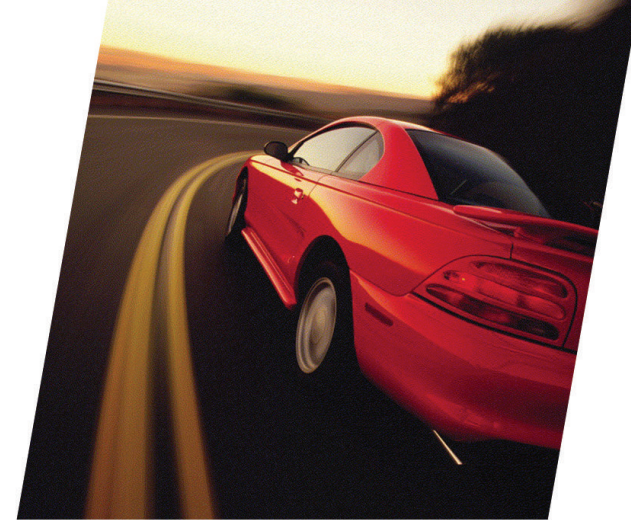
	Izod Impact (kJ/m <sup>2</sup> )	Stress at break (MPa)	Modulus (MPa)	Stress at Yield (MPa)	Strain at break (%)
Aria couple1405N®	22.7	14.9	2040	18.5	18
Aria couple1405®	14.8	15.1	2050	19	20

## Maleic Anhydride Grafted Polyolefin

### Aria couple 1405N®

## Description

Aria Couple1405N® polymer resin is a maleic anhydride functionalized polyolefin produced by reactive extrusion. It has been primarily designed to act as a coupling agent in mineral fillers such as CaCO<sub>3</sub>, talc and mica filled polyolefin compounds.



# Maleic Anhydride Grafted Polypropylene

## Aria couple 1432®

### Description

Aria Couple1432® polymer resin is a maleic anhydride functionalized polypropylene produced by reactive extrusion. It has been primarily designed to act as a coupling agent in mineral fillers such as CaCO<sub>3</sub>, talc and mica filled polypropylene compounds

### Technical Specification:

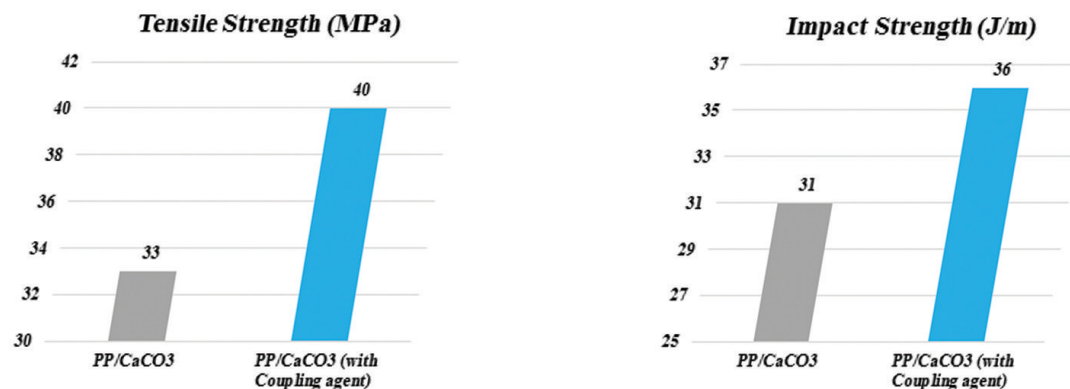
- Achieving suitable dispersion and distribution of filler in polymer matrix
- Improving mechanical properties
- Facilitating melting process and reduce mixing time

Physical Properties	Value	Method
Density	0.91	ASTM D792
Melt Flow Index @190oC /2.16kg	33±5	ASTM D1238
Maleic Anhydride Graft Level	High*	Titration method
Usage Level	1.5-3%	-

\* Low <0.25wt%, Medium 0.25-0.5wt%, High 0.5-1.0wt%

### Why we recommend Aria couple 1432® for filled polypropylene

Effect of Aria couple 1432 as a coupling agent on mechanical properties of PP/ 40 wt% CaCO<sub>3</sub>



## Technical Specification:

Achieving optimum dispersion & distribution of glass fiber in polymer matrix & minimum crack in PP/GF morphology

- Eliminating output variation
- Achieving dimensional stability & increase smooth surface of final products
- Improving mechanical properties e.g., tensile strength, impact resistance & flexural modulus



Typical Value	Value	Method
Density	0.91	ASTM D792
Melt Flow Index @190oC /2.16kg	33±5	ASTM D1238
Melt Flow Index @230oC /2.16kg	≥100	ASTM D1238
Maleic Anhydride Graft Level	High*	Titration method
Usage Level (for single screw extruder)	1.5-3%	-
Usage Level (for twin screw extruder)	1.5-2.2%	-

### Maleic Anhydride Grafted Polypropylene Application Effectiveness

- Typical value of polypropylene resin reinforced with 30 wt% of fiber glass containing Aria couple 1432®.



## Maleic anhydride grafted Polypropylene

### Aria couple 1432®

## Description

Aria Couple 1432® polymer resin is a maleic anhydride functionalized homo-polypropylene produced by reactive extrusion. It has been primarily designed to act as a coupling agent between reinforcing materials such as glass fibers and polypropylene.

Item	Unit	PP/GF	PP/GF/ Aria couple 1432
Tensile strength	MPa	64.4	78.4
Izod Notch impact strength	J/m	52.1	107.7

## ABS Grafted Maleic Anhydride

### Aria Couple 1732®

## Description

Aria couple 1732® polymer resin is a very high maleic anhydride functionalized Acrylonitrile Butadiene Styrene (ABS). It has been primarily designed to act as a compatibilizer in ABS compounds and alloys for improving mechanical properties.

### Technical Specification:

Functioning as a coupling agent between reinforcing materials such as glass fibers and ABS to achieve good mechanical properties

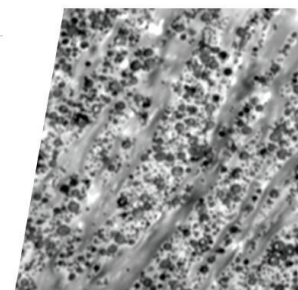
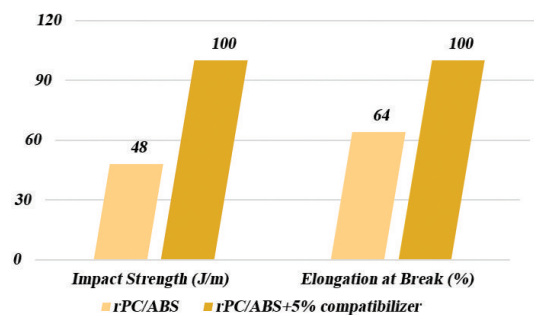
- Achieving effective compatibility between PC and ABS to reach high mechanical and thermal properties
- Improving interfacial properties recycled PC and ABS



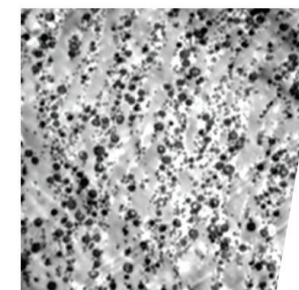
Typical Value	Value	Method
Density	1.06	ASTM D792
Melt Flow Index @230oC /5kg	11±1.5	ASTM D1238
Maleic Anhydride Graft Level	high	Titration method
Usage Level	3.5-7.5%	–

### Maleic Anhydride Grafted ABS Application Effectiveness

Typical value of recycled PC / ABS (75/25 w/w) containing 5 wt% Aria couple 1732



rPC/ABS



rPC/ABS/5% 1732

## Technical Specification:

- Functioning as a coupling agent between reinforcing materials such as glass fibers or mineral fillers and polyamide to achieve superior mechanical properties.
- Functioning as a coupling agent between PBT & glass fibers for high mechanical properties.
- Functioning as an impact modifier for toughening Nylon products such as PA6, PA66 & etc.



Physical Properties	Value	Method
Density	0.9	ASTM D792
Melt Flow Index @190oC /2.16kg	0.8±0.2	ASTM D1238
Maleic Anhydride Graft Level	high	Titration method
Usage Level	5-20%	–

### Maleic Anhydride Grafted TPE Application Effectiveness

Nylon toughener Aria Couple 1933® used for PA6 toughening. (PA6/ 30 wt% Glass fiber)

Item	PA6/GF	PA6/GF/5% 1933®
Tensile strength (MPa)	138	135
Elongation at break (%)	3.8	5.5
Izod Impact, Notched (KJ/m2)	9	18.5

These are typical properties of nylon toughener and not intended as specification.

Nylon toughener Aria Couple 1933® used for PA66 toughening. (PA66/ 30 wt% Glass fiber)

Item	PA66/GF	PA66/GF/5% 1933®	PA66/GF/10% 1933®
Tensile strength (MPa)	162	147	121
Notch impact strength(KJ/m2)	11	14	22

These are typical properties of nylon toughener and not intended as specification.

## TPE Grafted by Maleic Anhydride

### Aria Couple 1933®

## Description

Aria Couple 1933® polymer resin is a maleic anhydride functionalized TPE. It has been primarily designed to act as a coupling agent in filled polyamide compounds for high mechanical properties.



## Maleic Anhydride Grafted Polymer

### Aria Couple 1937®

## Description

Aria Couple 1937® polymer resin is a maleic anhydride functionalized ethylene copolymer produced by reactive extrusion. It has been primarily designed to use in adhesive formulation.

## Technical Specification:

Physical Properties	Value	Method
Density	0.9	ASTM D792
Melt Flow Index @190oC /2.16kg	0.6±0.2	ASTM D1238
Maleic Anhydride Graft Level	high	Titration method

\* Low <0.5wt%, Medium 0.5-0.8wt%, High ≥0.8%



The logo features a stylized white graphic of interconnected circles and lines, resembling a molecular or network structure, positioned to the left and right of the text.

# **Aria Adhesive**

***Tie Layer Adhesives***

*Let's be more connected via Tie Layer Adhesives! When polyolefin layers are supposed to be attached with PA, EVOJ, PET, etc. Aria Adhesives come to work to tightly attach the, together. Please see next pages to find more information about this revolutionized innovation.*

## Grafted Polyethylene adhesive (PFT)

### Aria Adhesive 4106®

## Description

Aria Couple 4106® is a maleic anhydride grafted adhesive designed for multilayer plastic fuel tanks (PFT) composed of PE and EVOH that is supplied in pellet form.

## Applications

Aria Adhesive 4106® is primarily designed to use as a tie layer resin in integrated plastic fuel systems. This high performance adhesive resin shows superior long term adhesion, toughness, aging resistance and enables fuel tanks to deliver fuel components with low permeation and superior durability.



### Technical specification:

Physical Properties of Aria Adhesive 4106®:

Properties	Test Method	Unit	Aria Adhesive 4107®
Melt Flow Rate (190 °C/2,16 kg)	ISO 1133	g/10min	1.2±0.3
Density	ASTM D792	g/cm <sup>3</sup>	0.94±0.01
Melting Temperature	ISO 113571	°C	140±4
Vicat Softening point	ISO 306	°C	96±2
Tensile Strain at Break(50 mm/min)	ISO 527	%	>600
Tensile Stress at Yield(50 mm/min)	ISO 527	MPa	11.7
Tensile Stress at Break(50 mm/min)	ISO 527	MPa	14
Hardness Shore D	ISO 868	-	50±5

### Shelf life

Shelf life at proper storage is at least 2 years from production date



### Technical Specification:

Properties	Test Method	Unit	Aria Adhesive 4107®
Melt Flow Rate (190 °C/2,16 kg)	ISO 1133	g/10min	1.5±0.5
Density	ASTM D792	g/cm <sup>3</sup>	0.94±0.01
Melting Temperature	ISO 113571	°C	140±4
Vicat Softening point	ISO 306	°C	96±2
Tensile Strain at Break(50 mm/min)	ISO 527	%	>600
Tensile Stress at Yield(50 mm/min)	ISO 527	MPa	11.7
Tensile Stress at Break(50 mm/min)	ISO 527	MPa	14
Hardness Shore D	ISO 868	-	55

#### Shelf life

Two years from delivery date in unopened condition. For usage above this, please contact our technical service team.

## Grafted Polyethylene Adhesive (Coating)

### Aria Adhesive 4107®

## Description

Aria Adhesive 4107® is a maleic anhydride grafted polyethylene adhesive resin in pellet form. It has been primarily designed to act as adhesive layer in PE 3 layers coated steel pipes.

## Applications

Improving adhesion between epoxy layer (FBE primer) and the top coat polyethylene in 3-layer coated steel pipes.

## Tie Layer Adhesive

### Aria Adhesive 4100T184®

## Description

Aria adhesive 4100T184® is a PE based adhesive resin designed as an intermediate layer between polyolefin layers with polar polymers in multilayer structure in flexible or rigid films in packaging industry.

## Applications

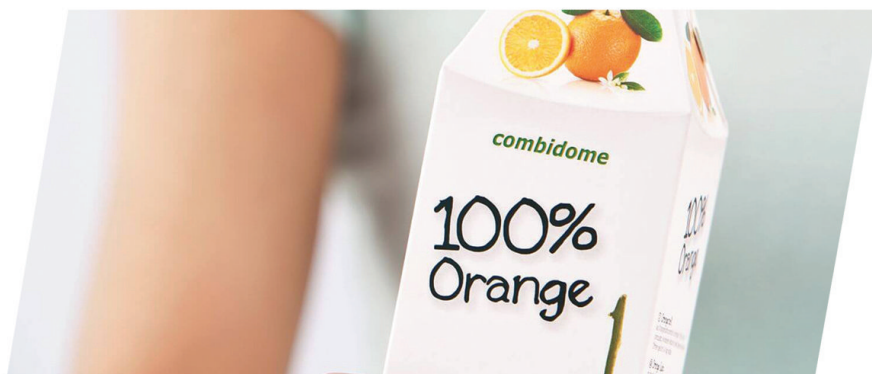
Aria Adhesive 4100T184® is primarily designed to use as a tie layer resin in cast or blown films producing by co-extrusion with high oxygen barrier performance for long term protection of foods in packaging industry.

### Technical Specification:

- High adhesion between PE layers and PA, EVOH, PET and AL.
- With no bad effect on gas barrier properties.
- Good peel strength.
- Transparent.



Properties	Test Method	Unit	Aria Adhesive 4100T184®
Melt Flow Rate (190 °C/2,16 kg)	ISO 1133	g/10min	2.25±0.3
Density	ASTM D792	g/cm <sup>3</sup>	0.93±0.01
Melting Temperature	ISO 113571	°C	130±4
Vicat Softening point	ISO 306	°C	92±2
Hardness Shore D	ISO 868	-	37±5



### Technical Specification:

Physical Properties of Aria Compound 4100T211®.

Properties	Test Method	Unit	Aria Comp 4100T211®
Melt Flow Rate (190 °C/2,16 kg)	ASTM D 1238	g/10min	2±0.5
Density	ASTM D 792	g/cm <sup>3</sup>	0.92±0.02
Peel test	ASTM D 1876	N	60±10
Hardness Shore D	ASTM D 2240	-	50-55
Hardness Shore A	ASTM D 2240	-	95-100

#### Shelf life

Shelf life at proper storage is at least 2 years from production date.

## Grafted Polyethylene Adhesive (Coating)

### Aria Adhesive 4107®

## Description

Aria Compound 4100T211® is a maleic anhydride grafted compound designed for multilayer plastics supplied in pellet form.

## Applications

Aria Compound 4100T211® is primarily designed to use as a tie layer resin between two plastic or PE and polar surface like polar plastics, metals. This high performance adhesive resin shows superior mechanical properties.

## Tie Layer Adhesive

### Aria Adhesive 4100T218®

## Description

Aria adhesive 4100T218® is a PE based adhesive resin designed as an intermediate layer between polyolefin layers with polar polymers in multilayer structure in flexible or rigid films in packaging industry.

## Applications

Aria Adhesive 4100T218® is primarily designed to use as a tie layer resin in cast or blown films producing by co-extrusion with high oxygen barrier performance for long term protection of foods in packaging industry.

## Technical Specification:

- High adhesion between PE layers and PA, EVOH and PET.
- With no bad effect on gas barrier properties.
- Good peel strength.
- Transparent.

Properties	Test Method	Unit	Aria Adhesive 4100T218®
Melt Flow Rate (190 °C/2,16 kg)	ISO 1133	g/10min	1.35±0.3
Density	ASTM D792	g/cm <sup>3</sup>	0.93±0.01
Melting Temperature	ISO 113571	°C	130±4
Vicat Softening point	ISO 306	°C	92±2
Hardness Shore D	ISO 868	-	37±5



# ***Aria Nano***



## ***Nano Additives***

*Aria Nano has strengthened plastic industry. Nano Additives have a very significant role on improving different properties of plastics. Aria Nano can enhance impact resistance of UPVC, i.e. pipes, fittings, door/window profiles, as well as PE and PP. In addition, it promotes surface gloss, and increases Vicat softening temperature.*



## UPVC Pipe Nano Additive

# Aria Nano 701®

## Description

Aria nano 701® is a special additive package containing nanoparticles and their carriers. It has been primarily designed to act as impact modifiers in UPVC pipe formulation.

### Technical Specification:

- Raising up the impact properties to about four times of standard.
- Increasing vicat softening point.
- Improving surface brightening of UPVC pipe.
- Improving degradation resistance of UPVC pipe in dichloromethane immersion test.



Title	Value
Physical shape	Powder
Color	Off - white
Odor	low
Dosage (for 100 kg PVC batch size)	0.800 to 1.75 Kg

### Formulation:

According to formulation, it is suggested that Aria Nano 701 use in high temperature and lower PE wax as lubricant.

Title	Value
Physical shape	Powder
Color	Off - white
Odor	low
Dosage (for 100 kg PVC batch size)	0.900 to 1.4 Kg

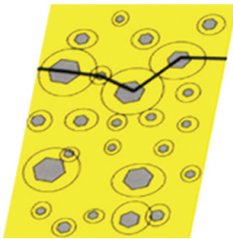
### Technical Specification:

- Raising up impact properties to about 5.5 times of standard
- Decreasing degradation of UPVC fitting in injection point
- Increasing vicat softening point

### Why Aria Nano 801®

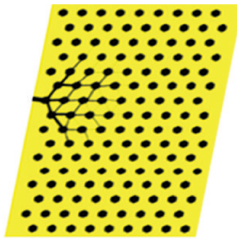
#### Mechanism

When we use nano particles, we have several cavities in polymer matrix. When a part is hit, impact energy is dissipated by these cavities and we have a ductile failure.



#### Large Particles

- concentrate stress
- propagate cracks
- brittle failure



#### Small Particles

- localized deformation
- absorb energy
- ductile failure

### Sample after 3.5 Heating

Without Nano Additive

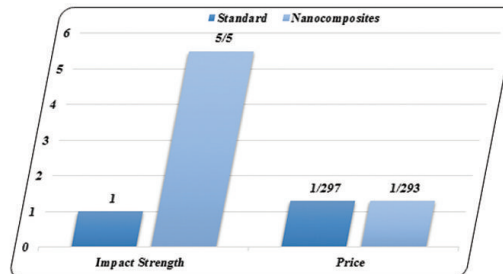


With Nano Additive



Failure Mechanism      Toughening Mechanism

### Good balance between properties and price



## UPVC Fitting Nano Additive

# Aria Nano 801®

## Description

Aria nano 801® is a special additive package, containing nanoparticles and their carriers. It has been primarily designed to act as impact modifier in UPVC fitting formulation.

## UPVC Profile Nano Additive

# Aria Nano 901®

## Description

Aria nano 901® is a special additive package containing nanoparticles and their carriers. It has been primarily designed to act as impact modifier in UPVC door and window profile formulation.

### Technical Specification:

- Raising up impact properties to about 3.5 times of standard
- Increasing vicat softening point
- Improving gelation of polymeric melt and surface brightening

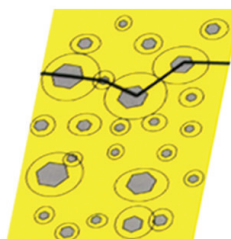


Title	Value
Physical shape	Powder
Color	Off - white
Odor	low
Dosage (for 100 kg PVC batch size)	0.650 to 1.5 Kg

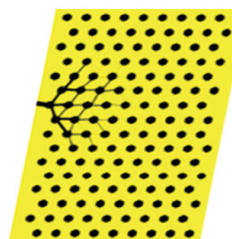
### Why Aria Nano 901®

#### Mechanism

When we use nano particles, we have several cavities in polymer matrix. When a part is hit, impact energy is dissipated by these cavities and we have a ductile failure.

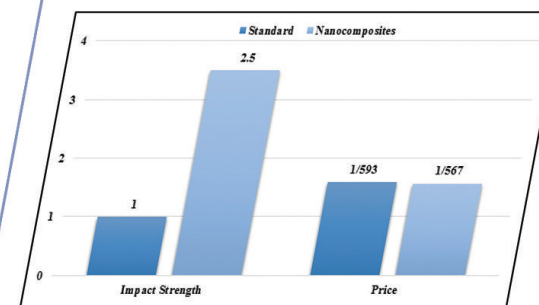


- Large Particles**
- concentrate stress
  - propagate cracks
  - brittle failure



- Small Particles**
- localized deformation
  - absorb energy
  - ductile failure

### Good balance between properties and price



## Anti-Scratch Masterbatch

### Aria Nano 5600

## Description

Aria Nano 5600® polymer resin is a polyolefin nano composite masterbatch for PP and TPO Compounds. It has been primarily designed to act as a scratch resistance in Talc, CaCO<sub>3</sub> filled polyolefin and TPO compounds.

## Technical Specification:

This grade is designed to function as scratch resistance of plastic compounds (PP/Talc) used for automotive applications such as dashboards, door panels and etc. The usage of Aria Nano 5600® masterbatch have no negative influence on color of part surfaces.

Physical Properties	Value	Method
Appearance	Milky Granules	–
Density	0.95	ASTM D792
Melt flow index @230oC /2.16 kg	12±2	ASTM D1238
Usage level	1 to 3 %	According to formulation

## Why we suggested Aria Nano 5600® for polyolefin compound?

This table shows different of the mechanical properties of PP/Talc compounds for dashboard without anti scratch additives, with silicon anti scratch additives, and Aria Nano 5600®.

Additives	ΔL Scratch	Tensile Strength (MPa)	Impact strength (kJ/m <sup>2</sup> )
With Silicon based Anti-scratch	<1	20.7	22.9
With Siloxane based Anti-scratch + 3 % Aria Nano 5600®	0.5	21.4	27.1



***There Is Always A Better Way***

Aria Polymer Pishgam

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