

PARALOID™ BTA 731 MBS Impact Modifier

Description

PARALOID BTA-731 is a core-shell general purpose MBS modifier having a poly(butadiene/styrene) core with a polymethyl methacrylate shell. It is designed to improve the impact performance of transparent Vinyl containers, either blow molded or thermoformed. It is a particularly efficient impact modifier at low temperatures because of the low glass transition temperature of the rubber core. It also provides good chemical resistance and deters water blush. Because of the core-shell structure, the improvement in impact performance is obtained with only minor effect on other mechanical properties such as modulus and heat distortion temperature. PARALOID BTA-731 finds utility in a variety of conversion processes typically encountered for Vinyl, including blow molding, calendering, thermoforming, extrusion and injection molding.

Applications/Uses

1. Blow molded containers (bottles/jars)
2. Calendered sheet (blister pack applications)
3. Extruded sheet (transparent signs)
4. Injection molded clear fittings

Physical Characteristics

Chemical Description: Methacrylate/Butadiene/Styrene (MBS) Polymer
 Appearance: PARALOID BTA-731 is a free-flowing white powder

Product Specifications

Property	Unit	Value
Bulk Density (loose)	g/cc	0.33 - 0.39
Foreign Particles	Weight Counted	≤4
Total Residual Volatiles Moisture Determination	%	≤0.3
Notched Izod Impact	ft. - lbs./in.	20 - 30
Screens Analysis		
% on 20 mesh	%	≤3
thru 325 mesh	%	≤15
Transparency		
White Light	%	70 - 80
Haze	%	2 - 12

Packaging

- Unitized pallet of 50 x 50 lb. bags (2500 lb. net)
- Unitized pallet of 2 x 1000 lb. bags (2000 lb. net)

Impact Resistance

PARALOID BTA-731 is an efficient MBS impact modifier. In the Bruceton Staircase drop test, bottles with PARALOID BTA-731 at a level of 12 parts outperformed those with competitive modifiers offered for these applications. For sheet applications where the Masland low-temperature brittleness test or Izod impact testing is indicative of performance, PARALOID BTA-731 is comparable to competitive impact modifiers.

**Comparison of Impact Resistance Characteristics
PARALOID BTA-731 vs. Competitive Modifier at 12 PHR**

ASTM	Bruceton	Masland ²	Notched Izod on 1/8" plaques ²			
	Bottle Drop D2463 50% Failure feet ¹	Impact D1790 0.012"	@23°C		@10°C	
		% pass @ -30°C	ft.-lbs./in.	% Ductile	ft.-lbs./in.	% Ductile
PARALOID BTA-731	7.8	50 (±10)	20 (1.2)	100	11.1 (7.4)	60
Competitor X	7.3	50 (±10)	23 (0.7)	100	12.9 (8.6)	60

Notes: 1. Measured in a commercial formulation.
2. Measured in screening formulation. This formulation is similar to commercial container formulations but with lubricant levels reduced to accentuate variations in laboratory studies.

Appearance

Lower haze is achieved when Vinyl is modified with PARALOID BTA-731 than with the competitive modifiers. Vinyl modified with PARALOID BTA-731 is exceptionally defect-free because of the low gel level experienced with this easily dispersed additive. PARALOID BTA-731 gives moderate crease whitening in Vinyl for sheet use.

**Comparison of Appearance Characteristics
PARALOID BTA-731 vs. Competitive Modifier at 12 PHR**

	Clarity Transmittance White Light	% Haze	Crease Whitening Whiteness HunterLab 'L' 30 = no white to 140=opaque white Direction		
			mil	cross	average
PARALOID BTA-731	75.5	5.3	92	90	91
Competitor X	74.0	7.0	116	116	116

The optical characteristics in the table were determined on milled and molded 1/8-inch plaques with a HunterLab colorimeter. For crease whitening evaluation, the plaques are bent at 90°.

Impact Resistance

Vinyl formulated with BTA-731 and a competitive impact modifier was evaluated in Brabender and Haake torque rheometers for fusion characteristics and dynamic thermal stability. The formulation modified with PARALOID BTA-731 displayed the best balance of rapid fusion and long time to degrade.

**Comparison of Processing Characteristics
PARALOID BTA-731 vs. Competitive Modifier at 12 PHR**

Brabender Bowl	Haake Rheometer							
	Fusion			Equilibrium		Onset of Degradation		
	Time sec	Torque MG	Temp °C	Torque MG	Temp °C	Time min:sec	Torque MG	Temp °C
PARALOID BTA-731	26	4769	158	1144	204	14:16	1347	204
Competitor X	28	4854	156	1092	204	12:18	1300	204
Term Conditions:	150°C/45 rpm			190°C/60 rpm		190°C/60 rpm		

Other Typical Formulations

5 Gallon Water Container Formulation

Component	
Vinyl (K=57)	100 PHR
ADVASTAB™ TM-2080	1.5 PHR
Internal Lube (ADVALUBE™ F-1070)	1.0 PHR
External Lube (Oxidized Polyethylene)	0.2 PHR
PARALOID K-120ND/K-130D	2.0/1.5 PHR
PARALOID K-175	1.0 PHR
PARALOID BTA-733	15 PHR
U-V ABSORBER (Tinuvin-P*)	0.25 PHR
TONER	As required (to produce blue color)

*Tinuvin-P is a registered trademark of Ciba-Geigy

Typical General Purpose Vinyl Bottle Formulation

Vinyl (K-Value 57)	100 PHR
Heat Stabilizer (ADVASTAB TM-2080)	1.5 PHR
Internal Lube (ADVALUBE F-1040L)	1.0 PHR
External Lube (Oxidized Polyethylene)	0.1 PHR
Process Aid (K-120ND)	2.0 PHR
Lubricative PA (K-175)	0.5 PHR
Impact Modifier (PARALOID BTA-731)	10-15 PHR
TONER	As required (to produce blue color)

Recommended Use Levels

Depending on the end-use application, the use levels of BTA-731 are 2-12 phr for Vinyl sheet and film and 10-15 phr for Vinyl bottles/containers.

FDA Clearance

PARALOID BTA-731 has clearance under FDA Food Additive Regulation 21CFR178.3790 governing its use in semi-rigid and rigid Vinyl plastics for food packaging and food-contact applications. The maximum allowable amount of modifier depends on the number, quantity and type of modifiers in the formulation.

Formulations

The formulation used to determine all data except Bottle Drop data is shown below:

Vinyl (K-58)	100.0
Impact Modifier (PARALOID BTA-731)	12.0
ADVASTAB TM-2080	1.5
ADVALUBE F-1060L	0.5
ADVALUBE E-2100	0.2
Processing Aid (PARALOID K-120ND)	1.0

Storage and Handling

Standard recommended storage conditions are as follows:

- Store indoors, protected from sunlight, UV and moisture.
- Temperature should not exceed 120 deg. F.
- Opened bags should be covered and used within one month.

When stored correctly in the original packaging, the shelf life is:

- 2.5 years from date of manufacture

Safe Handling Information

Avoid high concentrations of dust in the air and accumulation of dust on equipment. An airborne dust of this material can create a dust explosion. When handling and processing this material, local exhaust ventilation may be required to control dust and reduce exposure to vapors. To prevent dust explosions, employ bonding and grounding for operations capable of generating static electricity. Dispose by placing powder or pellets in air tight bags. Incinerate or landfill at a permitted facility in accordance with local, state and federal regulations.

Material Safety Data Sheets (MSDS)

Material Safety Data Sheets are available outlining hazards and safe handling methods. Contact Rohm and Haas for copies of the MSDS for this product and for other handling information.

The Plastics Additives business of Kureha Chemical was purchased by Rohm and Haas Company in 2002. Some products formerly sold under the Kureha name have been re-branded PARALOID.



Morton International was purchased by Rohm and Haas Company in 1999.

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