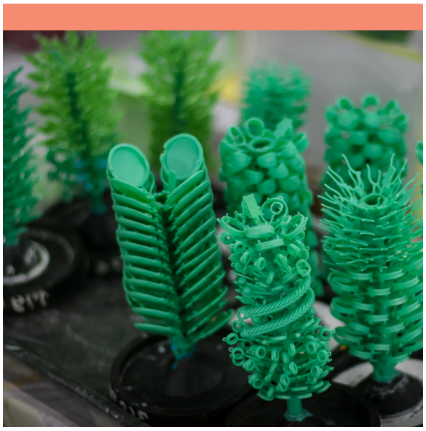
Bio–based Oligomer Technology

Bio–based oligomers are wholly or partly derived from renewable raw materials such as plants and mitigate the supply chain risk of relying on petroleum–based products, as well as offer other advantages such as lower irritation and toxicity or the possibility to formulate products with innovative characteristics. Over the past few years, stricter regulations around product safety and growing consumer performance are shifting towards products made from bio–based sources.



In addition to market trends increasing the desirability of bio–based feedstocks, growing environmental and health concerns within certain markets have resulted in constraints on tin–based metal catalysts that have been used for urethane systems for over 50 years. Health organizations, such as ECHA (European Chemical Agency), have restricted the use of certain organotin catalysts in cosmetic applications, while other agencies and industrial markets have suggested concentration restrictions of such chemistries. As the world focuses on safer and greener chemistries, the reduction of organotin catalysts and the development of oligomers that contain bio–sourced raw materials are highly desired.

Bio–based Oligomers for Environmentally Sustainable Formulations

Bomar has developed a range of bio–based polyether urethane methacrylate products with significant bio–based content and formulated with a tin–free catalyst. The high bio–based backbone and methacrylate functionality make these excellent candidates for consumer applications with low irritancy requirements. This range offers low MeHQ content to meet the latest cosmetic guidelines for inhibitor content. Compared to traditional bio–based products, Bomar BR–104xMB oligomers show very low coloring and are therefore ideal to use in applications where yellowing is critical. Overall, the mechanical properties of these Bomar bio–based oligomers are very similar, if not better, compared to corresponding petro–based products. They also show excellent low–temperature flexibility, elasticity, and excellent dynamic properties and rebound with a lower viscosity versus similar polyether chemistries. These oligomers provide a higher degree of heat resistance to the cured formulation vs other polyether oligomers and contribute excellent properties to nail coatings, 3D printing resins, and impact resistant coatings.

Features

- High bio–based content
- Tin–free catalyst
- Low color / low yellowing
- Low temperature flexibility
- High rebound
- Excellent elasticity
- Excellent mechanical properties to meet improved performance requirements
- Reduced / Lower MEHQ content to meet latest cosmetic guidelines

Application Areas

- Nail coatings
- Impact–resistant coatings
- Flexible / tough 3D printing resins

		BR-1041MB	BR-1042MB	BR-1043MB	BR-541MB	BR-543MB
	Oligomer Type	Bio-based	Bio-based	Bio-based	Traditional	Traditional
	Bio-Content	45%	60%	74%	0%	0%
	Tin-Free	Yes	Yes	No*	No*	No
Neat (Undiluted)	Viscosity (cP @60°C)	8,900	4,000	5,100	6,500	14,000
	Color (APHA)	43	53	40	17	20
	Tg (°C)	89	45	19	60	-55
	HDT (°C)	73	24	-52	50	-46
	IZOD Impact Strength (J/m)	115	No Break	No Break	125	No Break
30% IBOA Dilution	Viscosity (cP @25°C)	8,900	4,800	6,700	7,400	15,000
	Tensile at Break (psi)	3,300	1,700	800	4,100	600
	Elongation at Break (%)	35	75	130	85	110
	Young's Modulus (ksi)	160	11	1.3	83	1.1
	Hardness (Shore D Durometer)	80	58	22	74	16
	Solvent Resistance (MEK Double Rubs)	186	61	41	73	5

* Tin–free formula in development

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