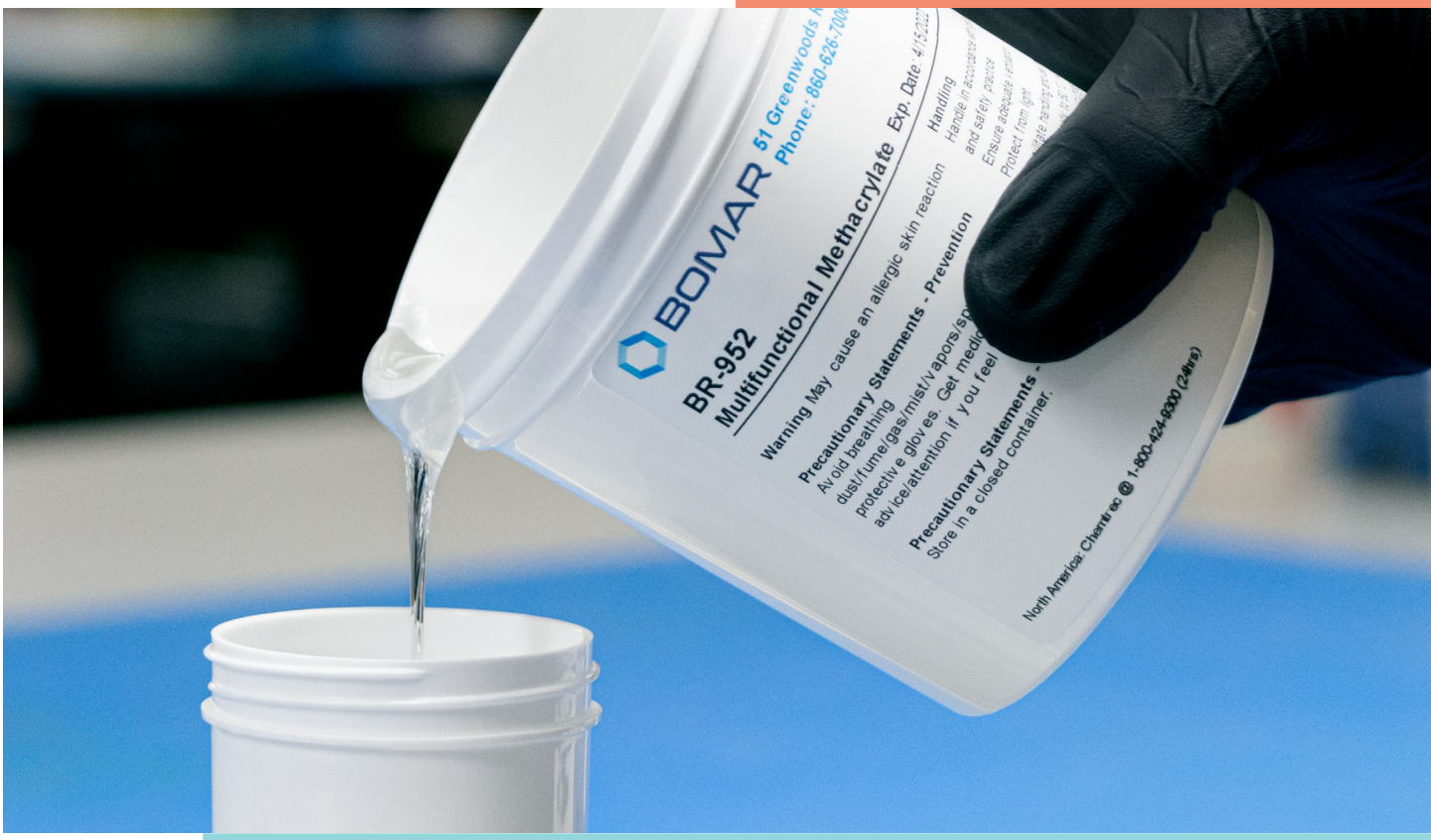
OLIGOMERS

Selector Guide



bomar-chem.com

BOMAR

UV / EB OLIGOMERS

ADDITIVES & DISPERSIONS

FILM–FORMING RESINS

SCALE UP & MANUFACTURING SERVICES

TECHNICAL EXPERTISE

At Bomar, we combine our product offering with our expert knowledge of light–cure technology. Where others only supply products, we are committed to developing a true collaborative partnership, bringing our total process knowledge to our customer's specific formulation challenges.

Because we understand the process as a whole, and not just individual aspects of it, we can offer our customers a solution where chemistry and equipment work seamlessly together with maximum efficiency. Our application engineering team works side–by–side with our customers, providing assistance with formulation, testing, evaluation, and equipment selection if needed. We are also available to provide assistance in custom blending, scale up, and other manufacturing services for coatings and inks.

ABOUT BOMAR

Bomar, formerly Dymax Oligomers & Coatings., is a leading innovator of advanced–performance materials for energy (UV/EB), light, and other free radical cure applications. For more than thirty years, Bomar oligomers have been used in a multitude of energy–cure applications worldwide. We have coupled our technical strength in acrylate and urethane chemistry with a strong emphasis on new product development. Our scientists synthesize a broad range of select developmental oligomers, custom–designed to satisfy the unique performance requirements of emerging application technologies, while providing customers an edge in formulating products with outstanding performance, reproducibility, and cost effectiveness.

At Bomar, we enjoy working with companies that are looking for something different, especially those developing cutting–edge applications for energy–cure systems. Driven by a culture of innovation, we thrive on the development of proprietary oligomers that are tailored to the unique application and performance requirements of our customers. In addition to our line of Bomar oligomers, we also provide assistance in coatings formulation, custom blending, scale up, and other manufacturing services for coatings and inks.

Our Facility and Locations

Bomar manufactures oligomers in its 30,000 square foot manufacturing facility located in Torrington, Connecticut USA. In addition to our team in the US, we also have regional sales partners located in Europe and Asia and a team of global distributors to assist customers with their applications.

Technical Consulting & Custom Oligomer Development

Our Application Engineering team is available to assist manufacturers in choosing the best manufacturing solutions for their application. Our application engineers are there every step of the way providing guidance and comprehensive testing to overcome any application challenges.

Formulators working with Bomar can request free product samples to do testing in their own lab and/or partner with our Application Engineering team for complete process design assistance. Lab testing is performed using the manufacturer's actual components or material samples. Our lab is also fully equipped to perform mechanical testing under a variety of environmental conditions per ASTM standards. When testing is completed, a summary report is provided along with components for final evaluation.

CHOOSING AN OLIGOMER FOR YOUR APPLICATION

How to Use This Guide

Bomar oligomers are available in a broad range of chemistries and can be used in a wide variety of industries around the world. This guide provides an overview of the different oligomer chemistries offered and provides selector tables so readers can easily compare the oligomers' properties (such as viscosity and durometer hardness) and special features. The selector tables also detail typical substrates and some of the adhesion capabilities of each Bomar oligomer. For your convenience, useful reference charts and tables have also been included on pages 21 and 22.

How to Choose an Oligomer

Step 1. Identify the oligomer chemistry necessary for your application. We offer a number of common oligomer chemistries as well as select novel oligomers. These chemistries can be found on pages 5–6.

Step 2. Define the particular substrate used in your application: i.e. plastics, metals, glass. Proceed to the adhesion chart on pages 19–20 to understand how each oligomer adheres to your substrate.

Step 3. Specify the particular product properties needed, such as hardness, viscosity, tensile strength, elongation, and chemical or environmental resistance.

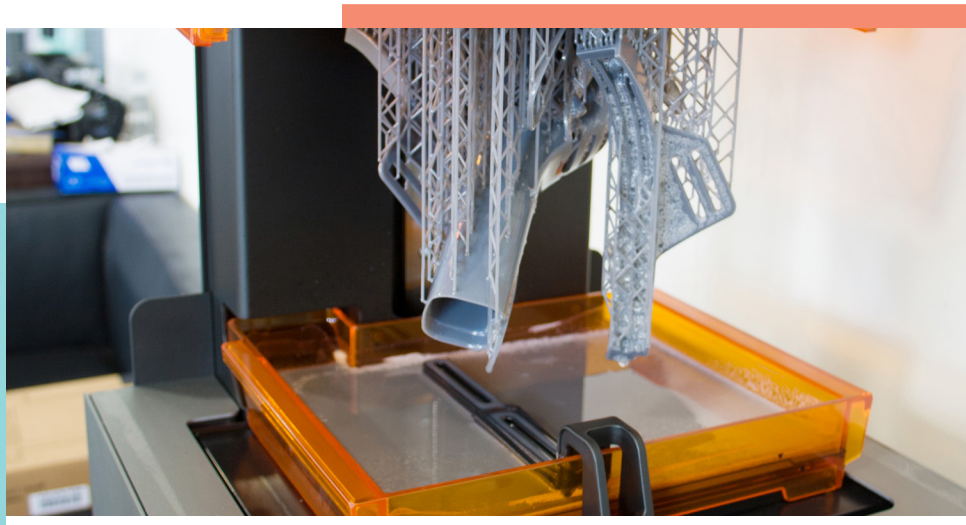
Step 4. Select the Bomar oligomer that best fits your specific needs by using the selector tables on pages 7–12. For more information on specific products, visit our website to download product data sheets.

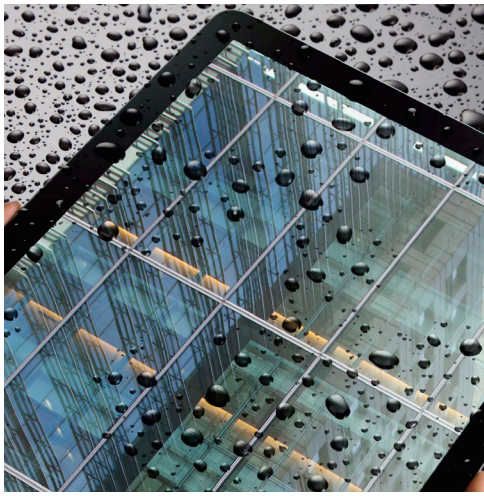
Step 5. Define your application method and curing system needs.

Step 6. Consult with your local Bomar Representative or Application Engineer to confirm your oligomer selection.

Potential Applications for UV/EB Oligomers

- 3D Printing Inks and Resins
- Nail Coatings
- UV Printing Inks
- Soft Touch Coatings
- Overprint Varnishes
- Hydrophobic Coatings for Electronics
- Roof and Floor Coatings
- UV Pressure Sensitive Adhesives (PSAs)
- Graphic Arts and Screen Printing
- Light–Curable Adhesives & Coatings
- Hard Protective Coatings
- Anti–Fog Coatings
- Thermoforming Coatings & Inks
- Reactive Tackifiers
- Weather–Resistant Coatings
- Scratch–Resistant Coatings
- Flexible Inks for Electronics



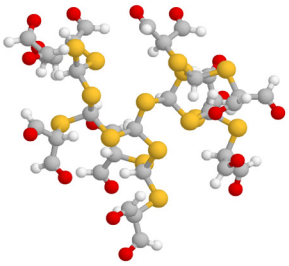


OLIGOMER CHEMISTRIES

Our oligomers are formulated into a wide variety of products including adhesives, inks, and coatings. In addition to their ability to undergo free radical polymerization, these versatile oligomers are the most significant contributor to the physical performance characteristics of your products – properties such as flexibility, toughness, chemical resistance, hardness, adhesion, abrasion resistance and more. The primary oligomer chemistries are:

Thioether Dendritic Acrylates

Dendritic acrylates mimic the performance of dendrimers, star– or ball–shaped polymers that are built up layer by layer, without all of the cost. Dendritics are more spherical than rod shaped, so they have significantly lower viscosity than typical linear oligomers of comparable molecular weights.



Hydrophobic Urethane Acrylates

Hydrophobic urethane acrylates provide similar adhesion benefits to polyester urethane acrylates but with excellent moisture barrier properties, enhanced flexibility at elevated temperatures, chemical resistance, weatherability, light stability, and optical clarity.

Multifunctional Acrylates

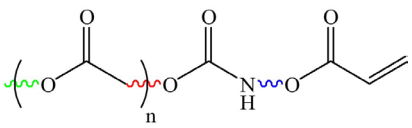
Multifunctional acrylates offer rapid cure and are ideal for coatings where premium performance is desired. Cured films range from stiff to flexible – all with excellent abrasion, stain, and chemical resistance plus good hydrolytic stability. They are used in the most demanding medical and electronic applications.

Polybutadiene Urethane Acrylates (PBDUA)

Designed to meet rigorous electronic applications, PBDUAs possess many desirable properties typical of polybutadiene (PBD) resins, combined with radiation curability via UV/EB. These oligomers are recommended for applications requiring low moisture pickup, thermal cycling resistance, and high dielectric constant.

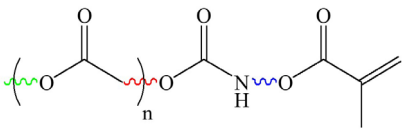
Polyester Urethane Acrylates

Polyester urethane acrylates exhibit good adhesion properties to a variety of substrates along with a balance of toughness and flexibility. They have higher viscosities compared to other urethane acrylates and, therefore, require more diluent. Aliphatic polyester urethane acrylates have excellent outdoor durability and UV resistance and provide excellent cured–film characteristics. Applications for aliphatic polyester urethane acrylates include adhesives and coatings where toughness and non–yellowing characteristics are required.



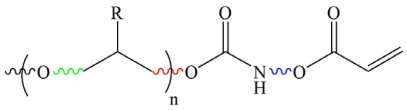
Polyester Urethane Methacrylates

Polyester urethane methacrylates are most commonly used in applications where low shrinkage and excellent adhesion are required. Polyester urethane methacrylates give slower cure response, and therefore need to be formulated accordingly. These oligomers are preferred over their acrylate counterparts for applications requiring ultra–low skin sensitivity.



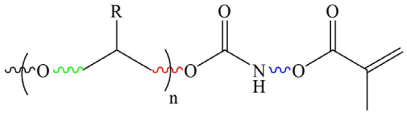
Polyether Urethane Acrylates

This is a workhorse family of urethane acrylate oligomer products. With polyether urethane acrylates, it is possible to cost effectively obtain a wide range of properties. Applications range from adhesives, including laminating and pressure–sensitive adhesives (PSA), to high–quality coatings for wood, metal, and glass.



Polyether Urethane Methacrylates

Polyether urethane methacrylates are preferred in applications where adhesion, gloss, and low skin sensitivity are required. They offer lower viscosities compared to their polyester urethane methacrylate counterparts.



Select Novel Oligomers

Silicone Urethane Acrylates

Bomar silicone urethane acrylates combine the characteristics of silicones and urethanes and possess acrylate functionality for UV/EB curing. These unique oligomers exhibit low shrinkage, hydrophobicity, chemical resistance, and higher temperature capability, making them ideally suited for producing films that are compounded for flexible systems, as well as hard coats. They are also strong candidates for consideration in formulating UV soft–touch coatings and for electronics applications.

Water–Dilutable Oligomers

Water–dilutable oligomers contain no water, but are infinitely dilutable with water. A key advantage of water–dilutable oligomers is their low viscosity. With good adhesion to most plastics and wood, these water–based oligomers have a hydrophilic nature when cured, which results in anti–fogging properties.

Additives

Jaylink® Additives

Exclusively manufactured by Bomar, Jaylink additives are acrylamidomethyl–substituted cellulose ester polymers. These materials are formulated as free–flowing white powders and are typically used as additives in formulations at 2–10% by weight for most applications. Formulas that incorporate these materials will have a rapid UV–cure response rate and improved surface hardness without impacting clarity.

Dispersions

Mech^{T} Dispersions

Mech^{T} dispersions combine Mechnano's novel discrete carbon nanotubes (CNTs) with (meth)acrylated resins for use in UV–curable 3D printing and CASE applications. While CNTs have been available industrially for many years, Mechnano's break–through technology allows for CNTs to be dispersed discretely and uniformly in resins, rather than agglomerated in clumps. This dispersion and functionalization technology unlocks the performance benefits of the CNTs, and enables improvements to electrical and thermal conductivity, impact resistance, tear resistance, adhesion, corrosion resistance and more, without degrading mechanical properties of the resin.

Product	Reactive Group*	Functionality	Tin Free	INCI Listed	Abrasion Resistance	Flexibility	Weatherability	Features & Select Applications	Neat		Formulated Properties with 30% IBOA & 2% Omnirad® 184			
									Nominal Viscosity, cP	Tg (DMA)**, °C	Nominal Viscosity, cP (25°C)	Durometer Hardness	Tensile at Break, MPa [psi]	Elongation at Break, %
Thioether Dendritic Acrylates														
BDT-1006	A	6	■		■	■		Very good chemical and thermal resistance (375°C); low shrinkage; rapid cure; low oxygen inhibition; abrasion and scratch resistance	1,500 at 25°C	200	200	89D	46 [6,700]	2.1
BDT-1015	A	15	■		■			Low shrinkage and warpage; tin free; rapid cure rate; superior thermal resistance (370°C); excellent stain, scratch, and chemical resistance; low oxygen inhibition	31,000 at 25°C	200	1,800	89D	30 [4,300]	3
BDT-4330	A	30	■		■			Excellent chemical and thermal resistance (395°C); low shrinkage; rapid cure; low oxygen inhibition; abrasion and scratch resistance	1,500 at 60°C	350	1,800	94D	39 [5,600]	1.7
XDT-1018	A	18	■	■	■			Low diluted viscosity; very good temperature (370°C) and chemical resistance; exceptional mechanical and physical properties	57,000 at 25°C	54	3,600	84D	28 [4,000]	6.7
Hydrophobic Urethane Acrylates														
BRC-4421	A	2			■	■	■	Improved balance of flexibility and toughness; excellent hydrophobicity; acid, alkaline, and abrasion resistance; non-yellowing	6,600 at 60°C	48	6,800	75D	21 [3,000]	120
BRC-443	A	2			■	■	■	Forms clear films with improved adhesion & hardness; non-yellowing; low water absorption; acid, alkaline, & abrasion resistance; gloss finish; high temperature resistance	20,000 at 60°C	34	14,500	58D	10 [1,500]	220
BRC-443D	A	2		■	■	■	■	Ideal for nail gel applications; low MeHQ; gloss finish; non-yellowing; low water absorption; improves adhesion; high temperature resistance; enhances hardness; provides acid & alkaline resistance	20,000 at 60°C	41	16,800	62D	19 [2,800]	200
BRC-841	A	2			■		■	Forms clear films with improved adhesion & hardness; non-yellowing; low surface energy for graphic art application; improved hydrolytic and outdoor stability of coatings; high tensile strength	12,500 at 60°C	96	13,000	86D	52 [7,500]	4.7
BRC-843	A	2			■	■	■	Forms clear films with improved adhesion & hardness; non-yellowing; low water absorption; alkaline and abrasion resistance; increases weatherability; gloss finish; high temperature resistance	90,000 at 25°C	32	5,700	52D	10 [1,400]	180
BRC-843D	A	2		■	■	■	■	Ideal for nail gel applications; low MeHQ; low water absorption; high temperature, abrasion, and alkaline resistance; non-yellow; gloss finish; hydrophobic	4,200 at 60°C	45	5,400	60D	22 [3,200]	210
BRC-843S	A	2				■	■	Softer, more flexible version of BRC-843; excellent temperature and humidity resistance for weathering and aggressive thermal cycling environments; excellent adhesion to glass, metals, and plastics	41,000 at 60°C	-9	23,600	36D	14 [2,100]	310
NEW BRC-843SD1	A	2				■	■	Softer, tougher, and more flexible version of BRC-843; non yellowing; low water absorption; alkaline resistance	33,000 at 60°C	6	29,000	43D	8 [1,200]	180
NEW BRC-8430E	A	1.6				■		Provides moisture and heat resistance; flexible; non yellowing; low water absorption; alkaline resistance	22,000 at 60°C	-0.15	29,000	70A	6 [900]	230

Uncured Properties Cured Properties * A = acrylate MA = methacrylate ** Peak tan delta; cured with 2 phr of Omnirad® 184

Product	Reactive Group*	Functionality	Tin Free	INCI Listed	Abrasion Resistance	Flexibility	Weatherability	Features & Select Applications	Neat		Formulated Properties with 30% IBOA & 2% Omnirad® 184			
									Nominal Viscosity, cP	Tg (DMA)**, °C	Nominal Viscosity cP (25°C)	Durometer Hardness	Tensile at Break, MPa [psi]	Elongation at Break, %
Multifunctional (Meth)acrylates														
BR-930D	A	3					■	Ideal for 3D printing resins; high heat-distortion temperature; provides good toughness and impact resistance; enhances weatherability; low skin irritation	7,700 at 60°C	95	4,400	87D	34 [5,000]	4.6
BR-941	A	6			■		■	Forms a clear, non-yellowing coating; fast cure response; hydrolytic stability; chemical and scratch resistant; superior hardness	4,000 at 60°C	200	4,400	92D	23 [3,300]	7
BR-952	MA	2	■	■	■			UDMA structure; ideal for nail gel applications; low MeHQ; low color; high gloss finish; non-yellowing; Bisphenol A free; provides toughness; low viscosity	9,300 at 25°C	153	500	89D	74 [10,800]	5.4
BR-970BT	A	2			■	■	■	Ideal for 3D printing resins; forms clear films with superior elongation; low viscosity; chemical and stain resistant; hydrolytic stability; low yellowing	10,000 at 25°C	59	1,000	75D	22 [3,200]	34
BR-970H	A	2			■		■	Ideal for 3D printing resins; high modulus; higher heat-distortion temperature; very low viscosity; low yellowing; chemical and stain resistant; hydrolytic stability	24,000 at 25°C	70	1,400	83D	32 [4,600]	6.5
BR-990	A	3			■	■	■	Forms a clear film with enhanced elongation, hardness, and strength; exhibits hydrolytic stability; non-yellowing	34,000 at 25°C	22	2,100	61D	14 [2,100]	38
Polybutadiene Urethane Acrylates (PBDUA)														
BR-640D	A	2				■		Low temperature flexibility; hydrophobic; low water absorption; excellent dielectric properties; acid/base resistant	5,000 at 60°C	33	14,700	76A	3 [500]	190
BR-641D	A	2				■		Forms clear, hydrophobic coatings for electronics; acid/base resistance; low temperature flexibility; excellent dielectric properties; gloss finish; outstanding adhesion and exceptional elongation	15,000 at 60°C	-20	11,800	85A	5 [700]	320
BR-641E	A	2				■		Improved version of BR-641D; hydrophobic; excellent flexibility & light stability; high temperature and chemical resistance; excellent moisture resistance; extremely low water absorption	25,000 at 60°C	-28	16,400	42A	0.4 [52]	85
BR-643	A	2				■		Hydrophobic; improves acid/base resistance; low temperature flexibility; improves adhesion; cures with radiation; excellent dielectric properties; exhibits hydrolytic stability	17,000 at 60°C	-16	18,900	84A	8 [1,100]	53

Uncured Properties Cured Properties * A = acrlylate MA = methacrylate ** Peak tan delta; cured with 2 phr of Omnirad® 184

Product	Reactive Group*	Functionality	Tin Free	INCI Listed	Abrasion Resistance	Flexibility	Weatherability	Features & Select Applications	Neat		Formulated Properties with 30% IBOA & 2% Omnirad® 184			
									Nominal Viscosity, cP	Tg (DMA)**, °C	Nominal Viscosity cP (25°C)	Durometer Hardness	Tensile at Break, MPa [psi]	Elongation at Break, %
Polyester Urethane (Meth)acrylates														
BR-441BI20	A	2					■	High tensile strength; weatherable; abrasion resistant; oil and chemical resistant	73,000 at 25°C	90	2,500	87D	40 [5,800]	4.7
BR-741	A	2			■		■	Ideal for 3D printing resins; enhances hardness; non-yellowing; adheres to steel, aluminum, and various plastics	74,000 at 60°C	79	34,000	59D	63 [9,200]	10
BR-741MD1	MA	2		■			■	High Tg, high tensile strength material with moderate elongation; low molecular weight; superior hardness; INCI listed for cosmetic use	2,000 at 60°C	111	2,600	90D	66 [9,600]	4
BR-742M	MA	2		■		■	■	Ideal for metal, glass, and nail gel coatings; improves adhesion; excellent balance of hardness and flexibility; low skin irritation; non-yellowing	28,000 at 60°C	61	16,500	79D	20 [2,900]	70
BR-742MS	MA	2				■	■	Ultra-low MeHQ version of BR-742M with non-detectable (<10 ppm) levels of MeHQ; non-yellowing; excellent adhesion to metals and glass	24,500 at 60°C	58	18,200	81D	16 [2,300]	66
BR-742S	A	2		■	■	■	■	Ideal for nail gel and 3D printing applications; high clarity and gloss; provides high abrasion resistance and impact strength; excellent balance of hardness and flexibility; non-yellowing	25,000 at 60°C	66	16,500	80D	31 [4,500]	76
BR-7432GB	A	2		■	■	■	■	Imparts toughness; high tensile strength; adheres to polymer films; elastomeric; provides impact & abrasion resistance	88,000 at 60°C	-4	65,000	65A	10 [1,400]	190
BR-7432GI30	A	2			■	■	■	Imparts toughness; high tensile strength; improves impact resistance; adheres to polymer films; elastomeric	68,900 at 25°C	40	6,700	45D	15 [2,200]	180
BR-744BT	A	2		■		■	■	Improves adhesion; provides impact resistance; enhances flexibility; non-yellowing; weather resistant; low MEHQ levels	46,000 at 60°C	8	22,800	75A	7 [1,000]	160
BR-744SD	A	2				■	■	Ideal adhesion promoter or reactive tackifier; promotes adhesion to various metal and plastic substrates; provides excellent flexibility and elasticity; imparts optical clarity	7,000 at 60°C	-9	8,300	65A	10 [1,400]	321
BR-771F	A	2					■	High tensile strength with moderate elongation; low color; excellent adhesion to plastics, particularly polycarbonate	41,600 at 60°C	69	42,500	82D	26 [3,800]	10
XR-741MS	MA	2		■	■		■	Forms a clear, non-yellowing protective coating; low skin irritation; superior hardness; chemical resistance	52,000 at 60°C	107	19,000	89D	56 [8,100]	4.5

Uncured Properties Cured Properties

* A = acrlylate MA = methacrylate

** Peak tan delta; cured with 2 phr of Omnirad® 184

Product	Reactive Group*	Functionality	Tin Free	INCI Listed	Abrasion Resistance	Flexibility	Weatherability	Features & Select Applications	Neat		Formulated Properties with 30% IBOA & 2% Omnirad® 184			
									Nominal Viscosity, cP	Tg (DMA)**, °C	Nominal Viscosity cP (25°C)	Durometer Hardness	Tensile at Break, MPa [psi]	Elongation at Break, %
Polyether Urethane (Meth)acrylates														
NEW **BR-1041MB**	MA	2	■	■				High biobased content; tin free; relatively low color; good impact resistance; low skin sensitivity; high tensile strength; good balance of toughness and flexibility	8,900 at 60°C	89	8,900	80D	23 [3,300]	35
NEW **BR-1042MB**	MA	2	■	■		■		High biobased content; tin free; low yellowing; low skin sensitivity; high tensile strength; good toughness and high flexibility	4,000 at 60°C	45	4,800	58D	12 [1,700]	75
NEW **BR-1043MB**	MA	2		■		■		High biobased content; low temp. flexibility; excellent elasticity; high rebound; low yellowing	5,100 at 60°C	19	6,700	70A	5.5 [800]	130
NEW **BR-1044MB**	MA	2	■	■		■		Very high biobased content; tin free; good balance of Mw and viscosity; high rebound; low yellowing; low temperature flexibility	**12,000 at 60°C**	**-48**	**10,500**	**55A**	**2 [230]**	**119**
BR-116	MA	3				■		Provides softness; low color; low shrinkage; oil & chemical resistance; improves adhesion and flexibility; exhibits hydrolytic stability	80,000 at 25°C	-18	5,200	38D	3 [400]	57
BR-144B	A	3		■	■		■	Ideal for 3D printing resins; rapid cure speed; low color/ non-yellowing; exhibits hydrolytic stability; provides abrasion & solvent resistance; low MEHQ levels; low skin irritation	23,000 at 60°C	56	21,000	80D	39 [5,200]	6.7
BR-144H15	A	3			■		■	Rapid cure speed; abrasion and solvent resistant; low color and non-yellowing; exhibits hydrolytic stability	65,400 at 25°C	70	2,900	87D	31 [4,500]	9.5
BR-202	MA	2				■		Aromatic; high bond strength; high elongation; low color; low neat viscosity; exhibits hydrolytic stability; improves adhesion	100,000 at 25°C	38	3,500	62D	12 [1,700]	110
BR-204	MA	2				■		Aromatic; high bond strength; high elongation; low color; low neat viscosity; exhibits hydrolytic stability	11,000 at 25°C	-47	2,100	39A	0.6 [90]	120
BR-302	A	2				■		Aromatic; excellent chemical resistance; exhibits hydrolytic stability; imparts toughness; improves adhesion; low cost	5,600 at 60°C	11	6,000	41D	8 [1,200]	102
BR-3042	A	2				■		Aromatic polyether urethane diacrylate; results in soft, highly elongative, tacky systems ideal for use in UV pressure sensitive adhesives (PSA), or UV-curable laminating adhesives; enhances adhesion and improves solvent resistance	7,700 at 60°C	-48	8,800	23A	0.4 [60]	150
BR-344	A	2			■	■	■	Non-yellowing; oil & chemical resistant; exhibits hydrolytic stability	19,400 at 25°C	-46	2,500	35A	0.7 [95]	75
BR-345	A	2				■		Ideal for 3D printing resins; color stability; low moisture absorption; low Tg; soft surface hardness; provides impact resistance	42,400 at 25°C	-42	5,500	21A	0.7 [95]	120
BR-3641AA	A	1.3				■	■	Low color and non-yellowing; tenacious adhesion; exhibits hydrolytic stability; enhances resilience; ideal for PSAs	7,000 at 60°C	-49	7,600	09A	0.2 [22]	170

Uncured Properties Cured Properties * A = acrlylate MA = methacrylate ** Peak tan delta; cured with 2 phr of Omnirad® 184 Biobased oligomer

Product	Reactive Group*	Functionality	Tin Free	INCI Listed	Abrasion Resistance	Flexibility	Weatherability	Features & Select Applications	Neat		Formulated Properties with 30% IBOA & 2% Omnirad® 184			
									Nominal Viscosity, cP	Tg (DMA)**, °C	Nominal Viscosity cP (25°C)	Durometer Hardness	Tensile at Break, MPa [psi]	Elongation at Break, %
Polyether Urethane (Meth)acrylates														
BR-3641AJ	A	1.3				■	■	Low color and improved optical clarity; tenacious adhesion; non-yellowing; exhibits hydrolytic stability; enhances resilience; ideal for PSAs	10,000 at 60°C	-36	9,500	17A	0.3 [49]	400
BR-371B	A	2		■	■		■	High tensile strength; provides superior hardness & scratch resistance; non-yellowing	67,000 at 60°C	86	41,700	86D	41 [6,000]	4.3
BR-371MS	MA	2		■				Ideal for hard nail gel coatings; high tensile strength; superior hardness; excellent adhesion to plastic; extremely low color; low heat generation; high Tg	64,800 at 60°C	110	33,200	89D	68 [9,800]	4.6
BR-372	A	2				■		Provides a balance of toughness and flexibility with very low color; low skin sensitivity for dental and cosmetic applications	8,500 at 60°C	36	9,500	65D	15 [2,200]	91.5
BR-374	A	2				■	■	Very low color; improves adhesion; chemical & oil resistant; non-yellowing; exhibits hydrolytic stability	35,000 at 25°C	-48	3,600	49A	4 [580]	285
BR-3741AJ	A	1.3				■		Enhances softness and flexibility; improved optical clarity; non-yellowing; improves adhesion; adheres to a wide range of substrates; exhibits hydrolytic stability; oil & chemical resistant; ideal for PSAs	23,000 at 60°C	-49	20,000	20A	0.4 [55]	320
BR-3747AE	A	2				■		Enhances flexibility; provides toughness; non-yellowing; improves adhesion; adheres to a wide range of substrates	10,400 at 60°C	-42	12,400	40A	1.3 [185]	366
BR-541MB	MA	2		■	■		■	High tensile strength; excellent optical clarity; low skin sensitivity	6,400 at 60°C	60	7,400	74D	28 [4,100]	85
BR-541S	A	2		■	■	■	■	Ideal for nail gel applications; stable color; gloss finish; optically clear; improves adhesion; weatherability	3,000 at 60°C	44	3,800	62D	21 [3,100]	120
NEW BR-5413MB	MA	2					■	Provides good impact resistance and weatherability; exhibits hydrolytic stability; high tensile strength; excellent optical clarity	4,000 at 60°	98	5,100	84D	35 [5,100]	7.5
BR-543	A	2			■	■	■	Abrasion resistance; exhibits hydrolytic stability; high clarity; high tensile strength; increases oil and chemical resistance	13,200 at 60°C	-47	14,000	56A	3.3 [480]	85
BR-543MB	MA	2		■		■	■	Ideal for nail gel coatings; high tensile strength; excellent optical clarity; oil resistant; improves impact resistance and adhesion; low skin sensitivity; exhibits hydrolytic stability	14,000 at 60°C	-55	15,000	60A	3.3 [600]	105

Uncured Properties Cured Properties * A = acrylate MA = methacrylate ** Peak tan delta; cured with 2 phr of Omnirad® 184

Product	Reactive Group*	Functionality	Tin Free	INCI Listed	Abrasion Resistance	Flexibility	Weatherability	Features & Select Applications	Neat		Formulated Properties with 30% IBOA & 2% Omnirad® 184			
									Nominal Viscosity, cP	Tg (DMA)**, °C	Nominal Viscosity cP (25°C)	Durometer Hardness	Tensile at Break, MPa [psi]	Elongation at Break, %
Polyether Urethane (Meth)acrylates														
BR-543TF	A	2	■			■	■	Abrasion resistant; enhanced flexibility; exhibits hydrolytic stability; provides oil and chemical resistance; high clarity. Tin free; excellent weatherability and dynamic mechanical properties	15,000 60°C	-59	15,000	30D	4.6 [665]	100
BR-551M	MA	2	■	■		■	■	A more flexible, lower modulus, lower viscosity alternative to BR-541MB; fast soak-off for nail gel applications; low color; low MeHQ content	60,000 at 25°C	53	5,100	55D	9 [1,300]	73.5
BR-551ME	MA	1.5		■		■	■	Low neat viscosity with good flexibility; ultra-fast soak-off with good durability for nail gel applications; low MeHQ content	17,000 at 25°C	68	1,300	70D	13.8 [2,000]	50
BR-5541M	MA	2				■	■	High elongation; low modulus for soft resin applications; good surface cure; excellent elasticity/rebound; improved tear strength; adhesion to a variety of substrates	24,000 at 60°C	-45	23,000	53A	3 [440]	265
BR-571	A	2				■	■	Provides toughness; solvent resistance; exceptionally low color; imparts hardness; exhibits hydrolytic stability	30,500 at 60°C	63	33,500	64D	23 [3,400]	75
BR-571MB	MA	2		■	■	■	■	Low yellowing; improves adhesion; provides abrasion resistance; enhances flexibility; weatherability; gloss finish	28,000 at 60°C	75	27,000	74D	31 [4,500]	110
BR-582E8	A	2.4				■	■	Develops impact resistance; imparts toughness; great tensile strength; enhances flexibility; weatherability; hydrolytic stability; gloss finish	26,200 at 60°C	29	29,000	86A	5.7 [830]	90
NEW BR-581MT	MA	2	■	■	■	■	■	Ideal for nail gel applications; provides a low color, tack-free cure under low intensity LED lamps; provides a balance of toughness and flexibility; low yellowing; high gloss finish; INCI listed; tin free; low MeHQ content	8,000 at 25°C	44	1,100	42D	2 [270]	50
BR-582I10	A	2.4				■	■	Develops impact resistance; provides a balance of toughness and flexibility; great tensile strength; exhibits hydrolytic stability; weatherability; gloss finish	57,000 at 60°C	29	43,000	53D	23 [3,400]	180
BR-5825I30	A	2.4				■	■	Lower viscosity alternative to BR-582; tough with good impact resistance; good hydrolytic stability and weatherability	3,000 at 60°C	46	4,600	65D	23 [3,300]	129
XR-145S	MA	3	■			■	■	Low color/non-yellowing; enhances impact resistance; low viscosity	60,000 at 25°C	63	3,000	38D	19 [1,100]	60
Silicone Urethane Acrylate														
BRS-14320S	A	2				■		Ideal for soft-touch coatings; low shrinkage; provides excellent chemical and temperature resistance; exhibits hydrolytic stability; enhances flexibility; improves adhesion	16,400 at 60°C	-112	1,800	46A	4 [600]	378
Water-Dilutable Oligomers														
XR-9416	A	3			■		■	Superior chemical & stain resistance; low viscosity; clear films with hydrophilic nature which result in anti-fogging properties; non-yellowing	5,000 at 25°C	65	550	84D	24 [3,500]	2

Uncured Properties Cured Properties * A = acrylate MA = methacrylate ** Peak tan delta; cured with 2 phr of Omnirad® 184

JAYLINK® ADDITIVES

Exclusively manufactured by Bomar, Jaylink additives are acrylamidomethyl–substituted cellulose ester polymers. These materials are formulated as free–flowing white powders and are typically used as additives in formulations at 2–10% by weight for most applications. Formulas that incorporate these materials will have a rapid UV–cure response rate and improved surface hardness without impacting clarity. They are frequently used in automotive, aerospace, food contact packaging, medical, flexographic printing, overprint varnish (OPV), UV printing ink, rapid prototyping, and graphic arts applications.

Product	Degree of Acrylate Substitution	Tin Free	INCI Listed	Features & Select Applications	Tg (DMA)*, °C	Formulated Properties with HDDA & 2% Omnirad® 184		Nominal Viscosity, cP (25°C)	Durometer Hardness	Tensile at Break, psi	Elongation at Break, %	Adhesion
Reactive Cellulose Acrylic Esters												
JL-106E	0.13	■	■	Accelerates cure; improves impact resistance; enhances surface hardness; mild thixotrope; provides chemical resistance; low haze; applications include UV/EB coatings, rheological additives, and hard coatings	118	BR-144B Dilution	Without JL-106E	390	75D	3,913	4	PC
							With 8% JL-106E	55,000	86D	4,379	3.5	AL GL PC SS

Uncured Properties Cured Properties * Peak tan delta; cured with 2 phr of Omnirad® 184

MECH^{T} DISPERSIONS

MechT dispersions combine Mechnano's novel discrete carbon nanotubes (CNTs) with (meth)acrylated resins for use in UV–curable 3D printing and CASE applications. While CNTs have been available industrially for many years, Mechnano's breakthrough technology allows for CNTs to be dispersed discretely and uniformly in resins, rather than agglomerated in clumps. This dispersion and functionalization technology unlocks the performance benefits of the CNTs, and enables improvements to electrical and thermal conductivity, impact resistance, tear resistance, adhesion, corrosion resistance and more, without degrading mechanical properties of the resin.

Product	Features	Select Applications	Neat		Formulated Properties with 30% IBOA & 2% Omnirad® 184				
			Nominal Viscosity, cP	Tg (DMA)*, °C	Nominal Viscosity cP (25°C)	Durometer Hardness	Tensile at Break, MPa [psi]	Elongation at Break, %	Volume Resistivity, (Ω*cm)
Mech^{T} Dispersions									
NEW **Mech^{T} E35A**	Stable dispersion of discrete nanotubes; promotes electrostatic dissipation in UV-curable formulations; no degradation of mechanical properties; capable of achieving 104-109Ω/sq resistivity; easy addition to a formula without high shear mixing; provides carbon content with no carbon trails	ESD 3D Printing Resins Low Surface Resistivity Coatings and Adhesives Conductive Inks	91,000 at 25°C	157	800	90D	76.5 [11,100]	4	2.90E+04

Uncured Properties Cured Properties * Peak tan delta; cured with 2 phr of TPO

LUMISET™
FILM–FORMING RESINS

Welcome to the future of simple, durable raw materials for long–wear and natural–light curable hybrid nail polishes! Bomar LumiSet film–forming polyurethane and polyurethane methacrylate resins offer excellent adhesion, easy removal, inherent toughness, and fast dry times.

LumiSet resins provide better flexibility than cellulose resins without suspect materials like TSF, DBP, or other plasticizers and adhesion promoters. Our resins are compatible with common organic solvents like butyl and ethyl acetate, and film formers like nitrocellulose.

Different materials are available for base/color coat or top coat formulations, allowing for improved adhesion or excellent intrinsic hydrophobicity. Both reactive and non–reactive versions of LumiSet resins are available.

Features & Benefits

- Great adhesion to nails – no base coat or adhesion promoters needed
- Inherent flexibility – no plasticizers needed
- Easy to formulate – compatible with organic solvents & common film formers
- Extreme toughness for improved durability and wear
- Fast, tack–free dry time – excellent properties dried, superior properties cured
- INCI registered & MeHQ free – compliant with requirements for retail nail polishes

Product	Functionality	Abrasion Resistance	Flexibility	INCI Listed	Hydrophobicity	Features & Select Applications	Neat Nominal Viscosity, cP	% Solids	Contact Angle, °	24 Hr. Sward Hardness		Tensile at Break, MPa [psi]		Elongation at Break, %	
										Air Dried	Sunlight Cured	Air Dried	Sunlight Cured	Air Dried	Sunlight Cured
LumiSet ™ Resins for Top Coats															
LSR-141	2	■	■	■		Resin for base and color coat applications; forms a clear tack-free film upon solvent evaporation; excellent adhesion, flexibility and toughness	24,800 at 25°C	50	81	4	6	3 [370]	21 [3,100]	410	300
LumiSet™ Resins for Top Coats															
LSR-241	2	■		■	■	Resin blend for top coat applications; forms a clear tack-free film upon solvent evaporation; intrinsic hydrophobicity; excellent flexibility and toughness; high gloss	400 at 25°C	24	99	12	15	31 [4,500]	36 [5,200]	6	6
NEW LSR-241P	2	■		■	■	Resin for top coat applications; dries tack free; excellent toughness and hydrophobicity; polymer is flexible without plasticizers	12,500 at 25°C	50	88	2	3	10 [1,500]	40 [5,800]	700	460

Uncured Properties Cured Properties

BOMAR PRODUCTS

Quality Standards

Bomar is dedicated to producing the highest quality materials and follows an ISO 9001 Quality Management System.

Safety and Handling

Caution should always be used when handling any light–curable material. Always avoid direct skin and eye contact with the material and only use the material in a well–ventilated area. Users should always read a product's Safety Data Sheet (SDS) and put on the proper protective clothing, gloves, and safety goggles before handling the light–curable material. SDS for Bomar products can be requested through our website.

Cleaning

Uncured material can be cleaned from an apparatus with isopropyl alcohol (IPA), MIBK, methyl ethyl ketone (MEK), or commercial alcohol–based cleaning solution.

NOTE: The information presented here represents our best available information and is believed to be reliable, but it does not constitute any guarantee or warranty. Inasmuch as Bomar has no control over the exact manner in which others may use this information, it does not guarantee the results to be obtained. Nor does the company make any expressed or implied warranty of merchantability, or fitness for a particular purpose concerning the effects or results of such use. Purchasers are further responsible for determining the suitability of the product for its intended use and the appropriate manner of utilizing the production processes and applications so as to ensure safety, quality, and effectiveness. Bomar makes no warranties and assumes no liability in connection with the use or inability to use this product.

Shelf Life

The majority of our oligomer products are warranted for 2 years from the manufacture date. We recertify our inventory products in time to ensure that every customer has a minimum of 1–year usable life. Jaylink additives have a 1–year shelf life. Please call Bomar to determine if the product you are interested in has a shorter shelf life.

Ordering Information

Package Sizes

Most Bomar oligomers are available in 18–kg pails, 204–kg drums, and 1,020–kg IBCs. Low density or solvent–diluted products are available in 16–kg pails, 170–kg drums, and 907–kg IBCs.

Pricing

Please contact Bomar or your authorized Bomar oligomer distributor for pricing. Quotes can also be requested through the Bomar website.

Lead Time

Bomar tries to keep the most popular oligomer formulations in stock. Unfortunately, this is not always possible and occasionally a product may be out of stock. If an oligomer is out of stock, lead time for that product is 3–4 weeks. To determine if a product is in stock, please call your authorized Bomar oligomer distributor or contact Bomar Customer Support.

SCALE UP & MANUFACTURING SERVICES

Manufacturing partnerships are built on a foundation of trust that comes from knowing your outsource partner can be relied upon to deliver high–quality solutions on time and on budget. With over 30 years of experience manufacturing oligomers and resins, intermediate coatings, and other chemical materials, Bomar has the technical background and expertise needed for successful scale up and manufacturing partnerships. Our technical and senior production staff work directly with companies to evaluate projects and provide cost–efficient manufacturing solutions. Each manufacturing partnership is unique and flexible, allowing short– to long–term product manufacturing.

When partnering with us, you can count on our expertise to scale up lab formulations and provide guidance to fully commercialize your products. We provide a cooperative and open dialogue, as well as mutual confidentiality agreements to assure a quick lab to scale–up production cycle. We have the capabilities to address any process challenge, the capacity to handle any size job, and the competency to deliver consistent product quality that you'll be proud to put your name on.

Specialty Materials: 3D Printing Resins & Nail Gel Coatings

Our technical experts have extensive experience designing custom oligomers for the 3D printing and nail gel coating industries. We offer assistance through the whole design and manufacturing process, from formulation to manufacturing to packaging. Our production team members can down–pack materials in a variety of containers using customers' custom labels, while ensuring that these materials are shipped in compliance with regulatory guidelines. Contact our Application Engineering team today to discuss your application.

What We Do

Formulation Blending Capabilities

Specialize in UV nail gel blending and 3D printing resins

- Light and moisture control capabilities
- Cold storage and shipping
- Final packaging options include 3 mL syringes, 1 L bottles, pails, drums, or other custom options
- Vacuum pressure down to 25 in Hg
- De–bubbling capabilities via vacuum in closed–head mixer or by 3–roll milling
- Custom labeling and SDS support

Newtonian formulations:

- Batch size capability from 2 – 5,100 kg
- Temperature control from 20°C–140°C
- Range of vessel options including planetary mixer and low shear vessels

Thixotropic formulations

- Open head mixer capabilities from 2 – 180kg for Thixotropic fluids up to 150,000
- Temperature control from 20°C–80°C
- Closed head mixer with planetary and dispersion blade

Reaction Synthesis Capabilities

- 316 Stainless steel reactors with 10, 55, 500, 1,000, and 1,500 gallon capacity
- Batch size capability from 18 kg to 5,100 kg
- Capable to 15–20 psi pressure
- Vacuum pressure down to 25 in Hg
- Dry air feeds into reactors via sparge or blanket
- Temperature control from 20°C–140°C
- Final viscosities up to 300,000 cP at temperature
- 100% solids or solvent–borne products
- Sold by the kilogram, standard packaging options include 18 kg pails, 204 kg drums or 1,020 kg totes (IBCs)
- Custom labeling and SDS support

ADHESION TABLE

This table shows oligomers from the previous pages that adhere to the following substrates.
(Various monomers utilized during testing. See PDS for specific test results.)

	BDT-1006	BDT-1015	BDT-4330	BR-1041MB	BR-1042MB	BR-1043MB	BR-1044MB	BR-116	BR-144B	BR-144H15	BR-202	BR-204	BR-302	BR-3042	BR-344	BR-345	BR-3641AA	BR-3641AJ	BR-371B	BR-371MS	BR-372	BR-374	BR-3741AJ	BR-3747AE	BR-441BI20	BR-541MB	BR-541S	BR-543	BR-543MB	BR-543TF	BR-551M	BR-551ME	BR-571	BR-571MB	BR-581MT	BR-582E8
ABS	■	–	■				■	–			■	■			■		■		■	■	■		■	■	■	■	–	■	■	■	–	–	■	–	■	■
HDPE			■				■	■																								–				
PC	■	■	■	■	■	■	■	■	■		■	■			■	■			■	■	■		■	■	■	■	■	■	■	■	■	■	■	■	■	■
PMMA	■		■		■		–	–	■	■	■	■			■		■		■	■	■		■	■			–	■			■	–		–		
AL							■				■													■								■		■		
C.R. STEEL		■					–	■			■								■				■	■			■					■				
GLASS							–		■		■				■									■			■							■		
SS							■				■		■		■						■	■		■			■					■				

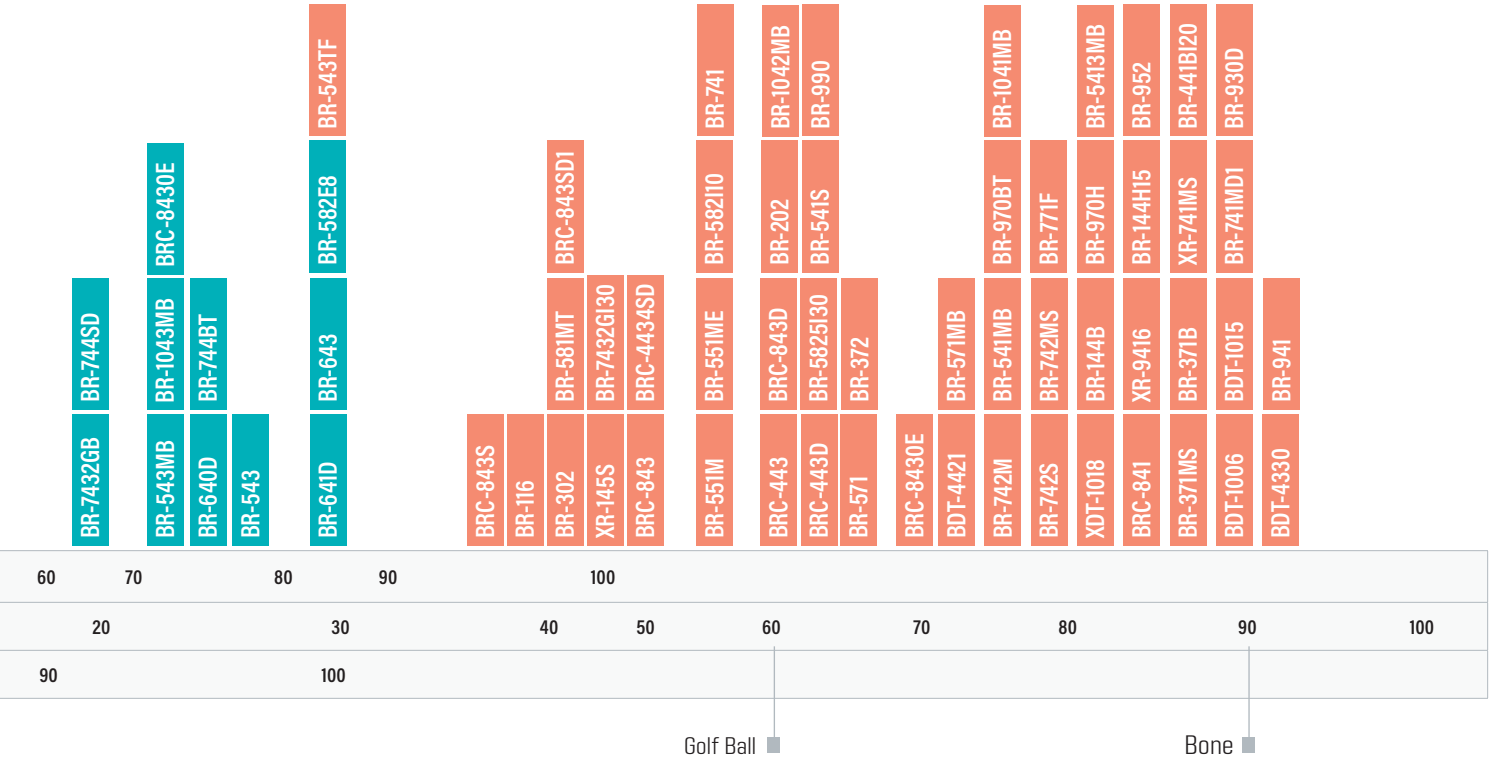
■ Recommended oligomer – Not tested

HARDNESS CHART

Formulated properties with 30% IBOA & 2% Omnirad® 184 (see PDS for test results with other monomers).

This chart is for comparison purposes only. It cannot be used for conversion references.

	BR-582I10	BR-5413MB	BR-5541M	BR-5825I30	BR-640D	BR-641D	BR-641E	BR-643	BR-741	BR-741MD1	BR-742M	BR-742MS	BR-742S	BR-7432GB	BR-7432GI30	BR-744BT	BR-744SD	BR-771F	BR-930D	BR-941	BR-952	BR-970BT	BR-970H	BR-990	BRC-443	BRC-443D	BRC-841	BRC-843	BRC-843D	BRC-843S	BRC-843SD1	BRC-8430E	BRC-4421	BRC-4434SD	BRS-14320S	E35A	XDT-1018	XR-145S	XR-741MS	XR-9416
ABS	■	■	■	■			■	■	–	■	■	■		■	■	■		■		–	■	■	–	■	–	–	■	–	–	–	■	■	■	–		■	■		■	■
HDPE												■																													
PC	■	■	■	■			■		■	■	■		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
PMMA	■						■		–	■	■		■	■	■	■	■	■	■		■	■		■	–	–	■	–	–	■	■	■	■	■	■		■	■	■	■	■
AL	■								■				■				■		■						■	■		■	■	■					■	■					
C.R. STEEL	■					■	■			■			■				■		■	■					■	■		■	■	■					■	■		■			
GLASS	■						■						■				■		■						■	■		■	■	■					■	■					
SS					■	■	■			■		■	■				■		■				■		■	■		■	■	■						■		■			



REFERENCE TABLES

Viscosity

In choosing a viscosity, consideration should be given to how the material must flow (or not flow) on the part after the material is applied. Part geometry, process design, and assembly speed and method should all be considered when selecting a viscosity. Viscosity is a material's resistance to flow. Low–viscosity materials flow more readily than high–viscosity materials. Thixotropic gels flow very slowly and are recommended when material flow on a part must be minimized after dispensing.

Typical Centipoise (cP/mPas)	Typical Reference Liquids at 20°C
1	Water
10	Kerosene
110	SAE 10 Oil
200	Maple Syrup
440	SAE 30 Oil
1,100	Castor Oil
3,000	Honey
10,000	Molasses
18,000	Chocolate Syrup
65,000	Vaseline
100,000	Sour Cream
200,000	Peanut Butter
1,500,000	Shortening

Estimating Usage

Thickness of the Coating		Theoretical Area Covered by Liter of Coating		
0.002"	(51 µm)	30,500 in^2	(212 ft^2)	(19.7 m^2)
0.005"	(127 µm)	12,200 in^2	(84.7 ft^2)	(7.88 m^2)
0.010"	(254 µm)	6,100 in^2	(42.4 ft^2)	(3.94 m^2)
0.015"	(381 µm)	4,070 in^2	(28.3 ft^2)	(2.63 m^2)

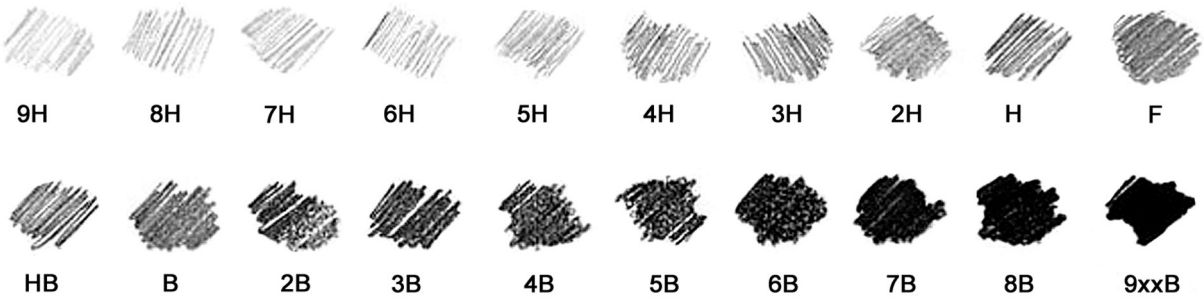
Curing Information for Coating

Pieces Every...	Minute	Hour	Day (8 Hours)	Week (40 Hours)	Month (21 Days)	Year (50 Weeks)
0.5 second	120	7,200	57,600	288,000	1,209,600	14,400,000
1 second	60	3,600	28,800	144,000	604,800	7,200,000
5 seconds	12	720	5,760	28,800	120,960	1,440,000
10 seconds	6	360	2,880	14,400	60,480	720,000
30 seconds	2	120	960	4,800	20,160	240,000
1 minute	1	60	480	2,400	10,080	120,000
5 minutes	-	12	96	480	2,016	24,000
10 minutes	-	6	48	240	1,008	12,000
30 minutes	-	2	16	80	336	4,000
1 hour	-	1	8	40	168	2,000

Substrate Abbreviation and Polymer Name

Plastic Substrates		Metal, Glass, Ceramic, & Other Substrates	
ABS	acrylonitrile-butadiene-styrene	**AL**	aluminum T3 or 2024
HDPE	high-density polyethylene	**C.R. STEEL**	cold rolled steel
PC	polycarbonate	**GL**	glass
PMMA	poly(methyl methacrylate)	**SS**	stainless steel 13 or 304

Pencil Hardness Chart



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