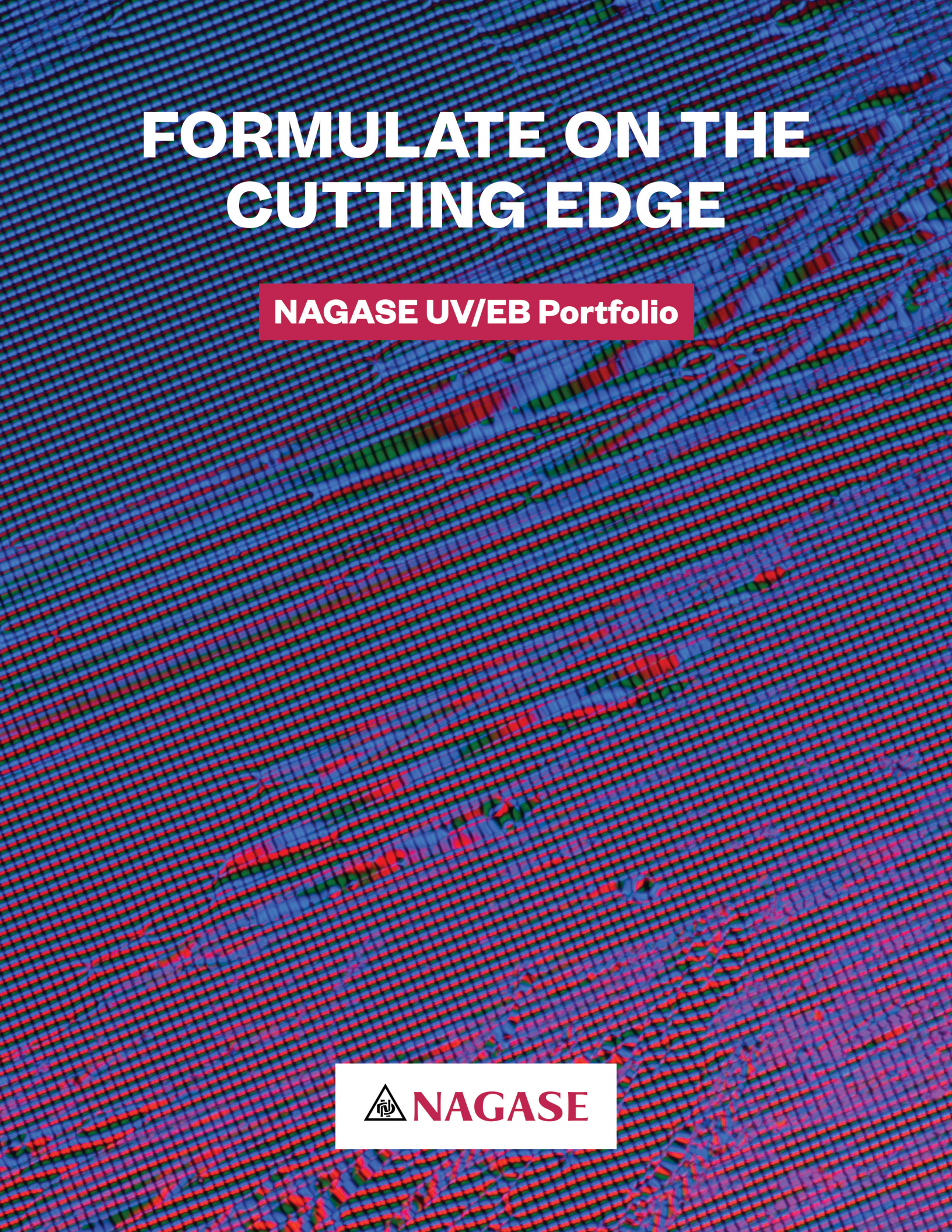
FORMULATE ON THE CUTTING EDGE
NAGASE UV/EB Portfolio
NAGASE

FORMULATE ON THE CUTTING EDGE.

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Section I.

MATERIAL PROPERTIES

Success in developing a UV formulation that is fine-tuned to the performance requirements of its specific end use is greatly enhanced by a formulator's ability to access a comprehensive range of raw materials with advanced and novel properties.

This section highlights key performance properties that end users can expect from a formulation.

It offers a selection of raw materials that will make it possible for the formulator to impart such properties to the final UV system.

ADHESION.

Adhesion is a key attribute of any UV system either as an intrinsic property for coatings and inks as they are applied to a variety of substrates, or as a performance property in adhesives used for bonding parts.

The **adhesion** properties of a formulation can be influenced by selecting raw materials that improve compatibility with specific substrates.

Figure 01.

Adhesion properties of a formulation are key in applications like bonding of optical lenses, where raw materials with functional groups will prove beneficial.

PRODUCT NAME	CHEMICAL IDENTITY	CAS NUMBER	VISCOSITY (cP, 25C)	FUNCTIONALITY	SUBSTRATE*
VEEA	2-(2-Vinyloxy Ethoxy) Ethyl Acrylate	86273-46-3	3.6	2	ABS, PC, PS
AOMA	Methyl 2-(allyloxymethyl)acrylate	219828-90-7	1.57	-	G, AL, ABS, PET
Denamer 1220	Hydrogenated Bisphenol A Diglycidyl Ether Diacrylate	Confidential	2,850 (60C)	2	AL,PET, ST, PC
DA-141	Epoxy Acrylate from Phenol	-	220	1	-
P-1M	2-Methacryloyloxyethyl Acid Phosphate		4,000 - 6,500	1	AL,ST, NY
P-1A (N)	2-Acryloyloxyethyl Hexahydrophthalate	32120-16-4	15,000 - 30,000	1	TBD
HO-MS(N)	2-Methacryloyloxyethyl Succinic Acid	-	-	1	AL,Cu, G,NY, ST
HOA-HH(N)	2-Methacryloyloxyethyl Hexahydropthalate	51252-88-1	-	1	-
HOA-MPL(N)	2-Acryloyloxy Ethyl Phthalate	30697-40-6	5,000 - 10,000	1	-
HOA-MS(N)	2-Acryloyloxy Ethyl Succinate	50940-49-3	170 - 190	1	-
Kayarad R-604	2-Propenoic Acid, {2-{1,1-dimethyl-2-{(1-oxo-2-propenyl)oxy}ethyl}-5-ethyl}-1,3-dixoane-5-yl}methyl ester	87320-05-6	200 - 400	2	-
Light Ester G	Glycidyl Methacrylate	106-91-2	-	2	-

*LEGEND: ABS- Acrylonitrile Butylstyrene, AL- Aluminum, G- Glass, PC- Polycarbonate, PET- Polyethylene Terephthalate, PS- Polystyrene, ST- Steel, NY- Nylon 66, Cu- Copper

BIO-BASED.

Most current energy cured formulations are based on raw materials derived from petroleum. Sourcing from renewable feedstocks has many advantages on both environmental impact and availability.

As the need for sustainable and environmentally friendly solutions is becoming a driving force, **bio-based materials** are being developed and offered as viable alternatives to current petroleum-based options.

Figure 02.

Corn husks, a largely available agricultural byproduct, are a renewable feedstock used in the production of bio-based raw materials.

PRODUCT NAME	CHEMICAL IDENTITY	CAS NUMBER	VISCOSITY (cP, 25C)	FUNCTIONALITY	SOURCE PERCENTAGE	SOURCE-BASED
Denamer 1221	1,5-Pentanediol Diacrylate (PDDA)	36840-85-4	5.5	2	48	Synthetic/ Corn Husk

FLEXIBILITY.

UV-cured systems applied to flexible surfaces need to be able to accompany the deformation of the substrate through its intended use without any compromise in key properties such as adhesion.

A selection of raw materials with varying functionality or backbone length and structure allows the formulation of systems that will preserve their integrity under strain.

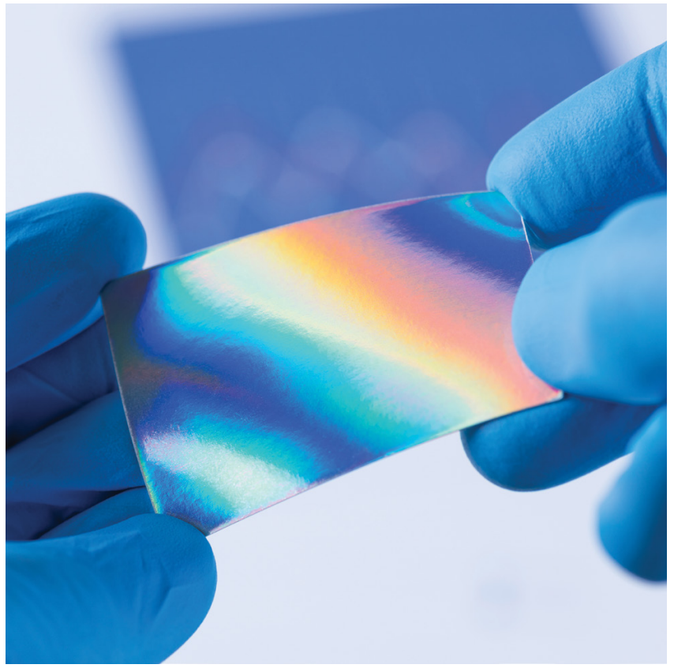


Figure 03.

Long-chain raw materials with varying degrees of functionality enable flexible formulations with no loss in other important properties.

PRODUCT NAME	CHEMICAL IDENTITY	CAS NUMBER	VISCOSITY (cP, 25C)	FUNCTIONALITY	Tg (C)
POB-A	(3-phenoxyphenyl)methyl 2-propenate	409325-06-0	18	1	6
DPCA-60	Caprolactone-modified DPHA	93294-97-4	1,500	6	
Epolead PB 3600	Epoxidized PolyButaDiene (vinyl + epoxy groups; H-terminated)	71342-74-0	28,000	-	110
VEEA	2-(2-Vinyloxy Ethoxy) Ethyl Acrylate	86273-46-3	3.6	2	

HARDNESS.

Hardness is measured as the resistance to deformation. It can be dialed into UV formulations through the selection of materials with backbones varying in intrinsic hardness and with a range of functionality allowing control of crosslink density.

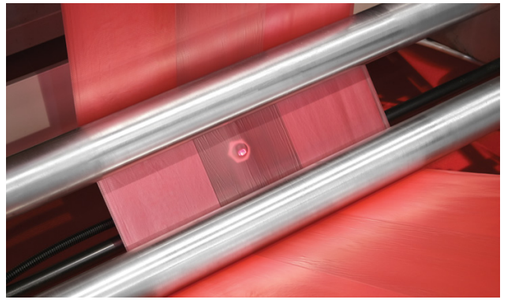
An extensive offering of raw materials allows the formulation of coatings that will perform in the harshest conditions and effectively protect the surfaces they are applied to.

Figure 04.

UV-cured coatings protect plastics used in the production of automotive headlights from abrasion, wear and impact damage.

PRODUCT NAME	CHEMICAL IDENTITY	CAS NUMBER	VISCOSITY (cP, 25C)	FUNCTIONALITY	Tg (C)
DPHA	Dipentaerythritol Penta/Hexaacrylate	29570-58-9	6,750	6	250
DPCA-60	Caprolactone-modified DPHA	-	1,500	6	-
MPD-A	3-Methyl-1,5-Pentanediol Diacrylate	64194-22-5	8	2	105
Denamer 1220	Hydrogenated Bisphenol A Diglycidyl Ether Diacrylate	Confidential	2,850 (60C)	2	92.5

LOW VISCOSITY.



Formulators are constantly looking for ways to lower the viscosity of final formulations without compromising on desired mechanical properties. Newly developed materials, including oligomers, allow systems such as UV inkjet inks or 3D printing resins with suitable low viscosities and mechanical properties more typical of higher viscosity systems.

Figure 05.

Low viscosity monomers act as reactive diluents in formulations like flexographic inks and can also impart desirable mechanical properties.

PRODUCT NAME	CHEMICAL IDENTITY	CAS NUMBER	VISCOSITY (cP, 25C)	FUNCTIONALITY
VEEA	2-(2-Vinyloxy Ethoxy) Ethyl Acrylate	86273-46-3	3.6	2
AOMA	Methyl 2-(allyloxymethyl)acrylate	219828-90-7	1.57	-
Denamer 1420	Low Viscosity Urethane Dimethacrylate	Confidential	117	2
Denamer 1221	1,5-Pentanediol diacrylate (PDDA)	36840-85-4	5.5	2
POB-A	(3-phenoxyphenyl)methyl 2-propenate	409325-06-0	18	1
DPCA-60	Caprolactone-modified DPHA	-	1,500	6
ACMO	Acryloyl Morpholine	5117124	12	1
1.9ND-A	1.9-Nonanediol Diacrylate	107481-28-7	10	2
Denamer 1610	3-Ethyl-3-(hydroxymethyl)oxetane	3047-32-3	15	1
Denamer 1620	3,3'-[Oxybis(methylene)]bis[3-ethyloxetane]	18934-00-4	10	2
Celloxide 2021P	Cycloaliphatic Diepoxide	2386-87-0	240	2
Cyclomer M100	Cycloaliphatic MonoEpoxide (MethAcrylate-functional)	82428-30-6	18 (30C)	2
Kayarad R-604	2-Propenoic Acid, {2-{1,1-dimethyl-2-{(1-oxo-2-propenyl)oxy}ethyl}-5-ethyl}-1,3-dixoane-5-yl}methyl ester	87320-05-6	200 - 400	2
MPD-A	3-Methyl-1,5-Pentanediol Diacrylate	64194-22-5	8	2

REFRACTIVE INDEX.

Refractive index is a value of importance for certain UV raw materials used in end applications like lenses or digital screens where optical properties must be carefully calibrated and compatibility between components is essential.

Figure 06.

High refractive index materials are increasingly prevalent in optoelectronic applications. They are primarily used in high-quality electronic displays, including LCDs, OLEDs, and quantum dot (QDLED) displays.

PRODUCT NAME	CHEMICAL IDENTITY	CAS NUMBER	VISCOSITY (cP, 25C)	FUNCTIONALITY	RI NUMBER
A-LEN-10	2-(o-Phenylphenoxy)ethyl acrylate	72009-86-0	131	1	1.577
POB-A	(3-phenoxyphenyl)methyl 2-propenate	409325-06-0	18	1	1.566
NMT-A	2-Propenoic acid, 1-naphthalenylmethyl ester	53223-83-9	30	1	1.595
HX-A	2-Propenoic acid, hexyl ester	2499-95-8	13	1	1.428
MPO-A	Methyl Phenoxyethyl Acrylate	105849-31-8	17	1	1.515

SARC.

Scratch and Abrasion Resistance (SARC) is an attribute that is frequently requested by end users of products meant to stand up to wear and tear of everyday use. **SARC** systems actively minimize scratches and other surface damage from coated objects.

Common applications of **SARC** are coatings for automotive applications, furniture, electronic cabinets, digital screens and optical coatings.

Figure 07.

A common application for SARC coatings is the protection of digital screens like those used in cell phones, laptops and tablets.

PRODUCT NAME	CHEMICAL IDENTITY	CAS NUMBER	VISCOSITY (cP, 25C)	FUNCTIONALITY	Tg (C)
AOMA	Methyl 2-(allyloxymethyl)acrylate	219828-90-7	1.57	-	84
DPCA-60	Caprolactone-modified DPHA	-	1,500	6	54
ACMO	Acryloyl Morpholine	5117124	12	1	145
Denamer 1610	3-Ethyl-3-(hydroxymethyl)oxetane	3047-32-3	15	1	-
Denacol EX-252	Hydrogenated Bisphenol A Diglycidyl Ether	30583-72-3	2,200	2	-
EHPE 3150	Multi-functional Cycloaliphatic Epoxy Oligomer	244772-00-7	Solid (Flake)	5	194

SHRINKAGE.

Minimizing the **shrinkage** that occurs in UV systems as they cure and crosslink is essential to maintaining key properties such as adhesion in coatings, inks or adhesives. Controlling this shrinkage is also critical in 3D printed systems in order to maintain dimensional accuracy and to prevent brittleness.

An example of the importance of shrinkage control is in can coatings. Excessive shrinkage would immediately compromise adhesion of the coating to cans.

Figure 08.

Controlling shrinkage in graphic arts applications is necessary to avoid undesirable edge curl.

PRODUCT NAME	CHEMICAL IDENTITY	CAS NUMBER	VISCOSITY (cP, 25C)	FUNCTIONALITY	SHRINKAGE (%)
Denacol EX-252	Hydrogenated Bisphenol A Diglycidyl Ether	30583-72-3	2,200	2	-
Denamer 1610	3-Ethyl-3-(hydroxymethyl)oxetane	3047-32-3	15	1	-
Denamer 1620	3,3'-[Oxybis(methylene)]bis[3-ethyloxetane]	18934-00-4	10	2	-
EHPE 3150	Multi-functional Cycloaliphatic Epoxy Oligomer	244772-00-7	Solid (Flake)	4.5	3.5
Celloxide 2021P	Cycloaliphatic Diepoxide	2386-87-0	240	2	6
Epolead PB3600	Epoxidized PolyButaDiene (vinyl + epoxy groups; H-terminated)	71342-74-0	28,000	-	1

TOUGHNESS.

Toughness is an essential quality in applications where a balance of strength and plasticity is required. The ability to absorb impact energy without permanent deformation or failure is a critical attribute of coatings, inks and adhesives in a variety of end uses.

Figure 09.

A great example of toughness in action is in wood or vinyl floor coatings. The surface needs to absorb the constant impact it is subjected to without deformation and without failure.

PRODUCT NAME	CHEMICAL IDENTITY	CAS NUMBER	VISCOSITY (cP, 25C)	FUNCTIONALITY
AOMA	Methyl 2-(allyloxymethyl)acrylate	219828-90-7	1.57	-
ACMO	Acryloyl Morpholine	5117-12-4	12	1
Denacol EX-252	Hydrogenated Bisphenol A Diglycidyl Ether	30583-72-3	2,200	2
EHPE 3150	Multi-functional Cycloaliphatic Epoxy Oligomer	244772-00-7	Solid (Flake)	4.5
Denamer 1610	3-Ethyl-3-(hydroxymethyl)oxetane	3047-32-3	15	1

3D PRINTING.

The addition of a z-axis in **3D printing** leads to particular challenges for example in terms of cure speed versus brittleness or the development of truly isotropic properties.

Exploration of novel materials like cyclizing monomers or hybrid systems combining free radical and cationic technologies paves the way to cutting edge formulations.

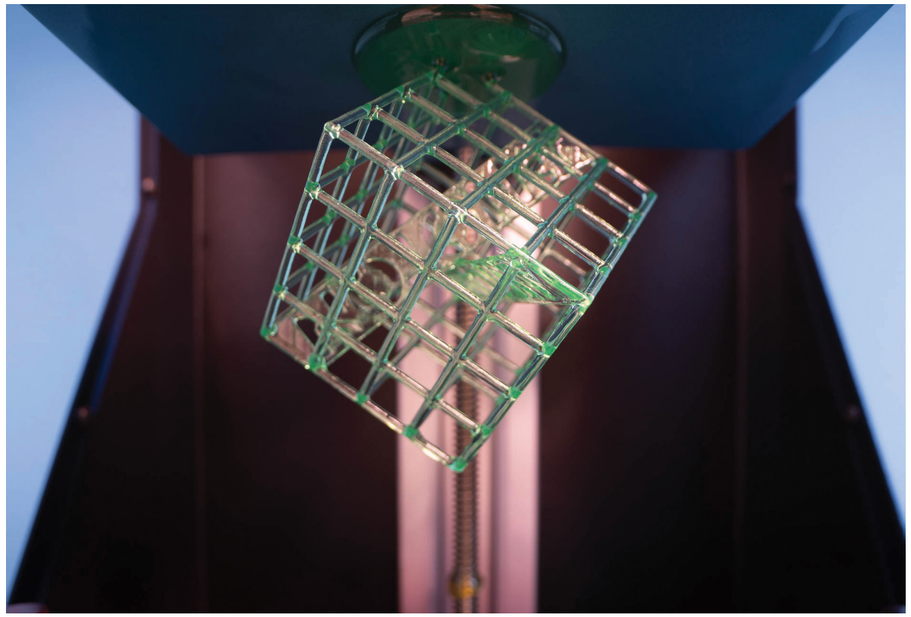


Figure 10.

3D printing poses a particular challenge as the need for cure speed can lead to brittleness and loss of dimensional accuracy.

PRODUCT NAME	CHEMICAL IDENTITY	CAS NUMBER	VISCOSITY (cP, 25C)	FUNCTIONALITY
AOMA	Methyl 2-(allyloxymethyl)acrylate	219828-90-7	1.57	-
VEEA	2-(2-Vinyloxy Ethoxy) Ethyl Acrylate	86273-46-3	3.6	2
Denamer 1420	Low Viscosity Urethane Dimethacrylate	Confidential	117	2
Denamer 1610	3-Ethyl-3-(hydroxymethyl)oxetane	3047-32-3	15	1
Denacol EX-252	Hydrogenated Bisphenol A Diglycidyl Ether	30583-72-3	2,200	2
Denamer 1220	Hydrogenated Bisphenol A Diglycidyl Ether Diacrylate	Confidential	2,850 (60C)	2

Section II.

STARTING POINT FORMULATIONS

Novel materials with advanced properties allow formulators not only to improve the performance of their existing systems, but also to develop effective solutions for more challenging applications.

In this section, a selection of **NAGASE**'s specialty materials is highlighted in starting point formulations designed for specific performance properties. They are benchmarked against more commonly used materials to demonstrate the potential they offer to experts looking to formulate on the cutting edge.

ADHESION.

Starting Point Formulation

PRODUCTS	CONTROL	Denamer 1220
Hexafunctional UA	39.2	39.2
Denamer 1220		45.6
2-EHA	11.3	5
IBOA	13.1	
HDDA	16.9	7.4
TMPEOTA	4.4	
Amine Synergist	7.1	7.1
Inhibitor	0.3	0.3
PBZ	3.9	3.9
CPK	2.6	2.6
TPO	1.3	1.3
Total	100	112.4

Test Results

SUBSTRATE	CONTROL	Denamer 1220
PET- 600 Tape	Pass	**Pass**
PET-810 Tape	Less than 2% Failure	**Pass**
Aluminum 600 Tape	10% Failure	**Pass**
Aluminum 810 Tape	15% Failure	**Less than 2% Failure**
Steel- 600 Tape	95% Failure	**Did not Stick**
Steel- 810 Tape	98% Failure	**Did not Stick**
Raw PET 600 Tape	Pass	**Pass**
Raw PET 810 Tape	Pass	**Pass**
Polycarbonate - 600 Tape	2% Failure	**Pass**
Polycarbonate- 810 Tape	2% Failure	**Pass**

Test Method: **CROSS HATCH** ASTM D3359

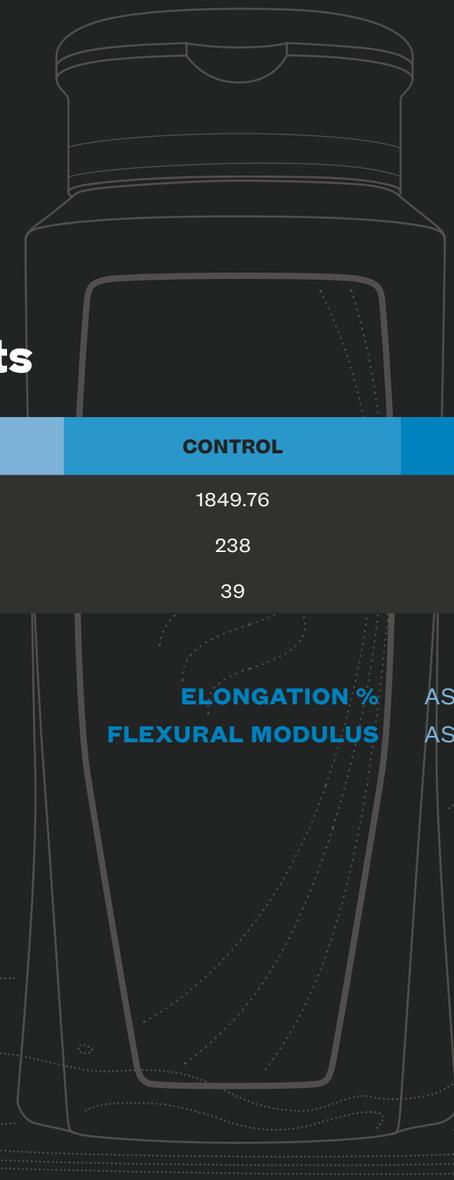
FLEXIBILITY.

Starting Point Formulation

PRODUCTS	CONTROL	VEEA
Hexafunctional UA	60	60
VEEA		13
2-EHA	5	
IBOA	8	
HDDA	7.4	7.4
TMPEOTA	4.4	4.4
Amine Synergist	7.1	7.1
Inhibitor	0.3	0.3
PBZ	3.9	3.9
CPK	2.6	2.6
TPO	1.3	1.3
Total	100	100

Test Results

TEST	CONTROL	VEEA
Flexural Modulus (MPa)	1849.76	**2765**
Elongation (%)	238	**250**
Max Stress (Mpa)	39	**31**



Test Method:

ELONGATION % ASTM D638

FLEXURAL MODULUS ASTM D790

HARDNESS.

Starting Point Formulation

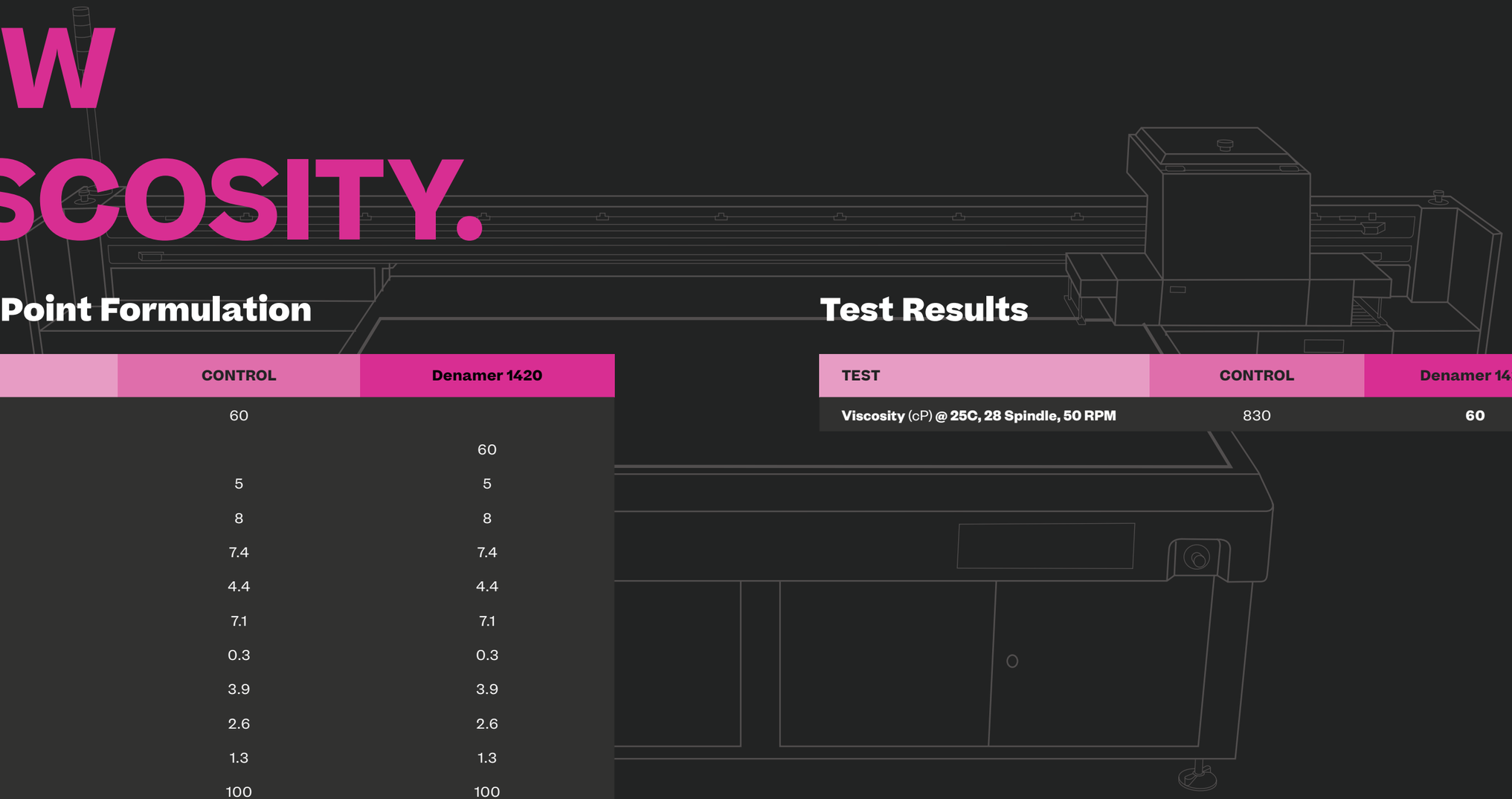
PRODUCTS	CONTROL	Denamer 1220
Hexafunctional UA	39.2	39.2
Denamer 1220		45.6
2-EHA	11.3	5
IBOA	13.1	
HDDA	16.9	7.4
TMPEOTA	4.4	
Amine Synergist	7.1	7.1
Inhibitor	0.3	0.3
PBZ	3.9	3.9
CPK	2.6	2.6
TPO	1.3	1.3
Total	100	112.4

Test Results

TEST	CONTROL	Denamer 1220
PET #3 rod DD	6H	**9H**

Test Method: **PENCIL HARDNESS** ASTM D3363

LOW VISCOSITY.



Starting Point Formulation

PRODUCTS	CONTROL	Denamer 1420
Hexafunctional UA	60	
Denamer 1420		60
2-EHA	5	5
IBOA	8	8
HDDA	7.4	7.4
TMPEOTA	4.4	4.4
Amine Synergist	7.1	7.1
Inhibitor	0.3	0.3
PBZ	3.9	3.9
CPK	2.6	2.6
TPO	1.3	1.3
Total	100	100

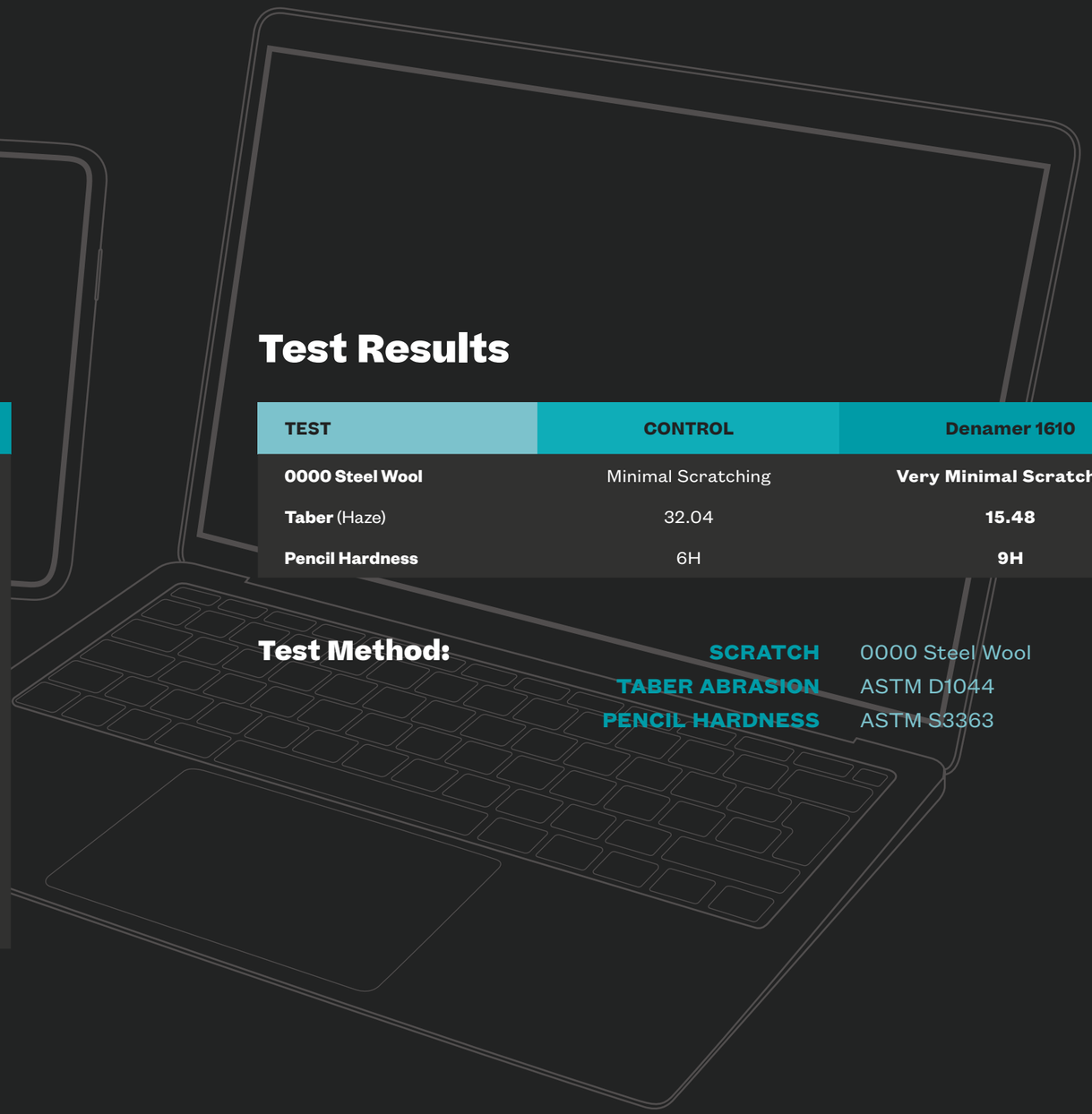
Test Results

TEST	CONTROL	Denamer 1420
Viscosity (cP) **@ 25C, 28 Spindle, 50 RPM**	830	**60**

SARC.

Starting Point Formulation

PRODUCTS	CONTROL	Denamer 1610
Hexafunctional UA	60	60
Denamer 1610		11.8
2-EHA	5	5
IBOA	8	8
HDDA	7.4	
TMPEOTA	4.4	
Amine Synergist	7.1	7.1
Inhibitor	0.3	0.3
PBZ	3.9	3.9
CPK	2.6	2.6
TPO	1.3	1.3
Total	100	100



Test Results

TEST	CONTROL	Denamer 1610
0000 Steel Wool	Minimal Scratching	**Very Minimal Scratching**
Taber (Haze)	32.04	**15.48**
Pencil Hardness	6H	**9H**

Test Method:

SCRATCH	0000 Steel Wool
TABER ABRASION	ASTM D1044
PENCIL HARDNESS	ASTM S3363

SHRINKAGE.

Starting Point Formulation

PRODUCTS	CONTROL	Denamer 1220 | 2021 | 1610 BLEND
Hexafunctional UA	60	
Denamer 1220		49
Daicel Celloxide 2021P		30
Denamer 1610		18
2-EHA	5	
IBOA	8	
HDDA	7.4	
TMPEOTA	4.4	
Amine Synergist	7.1	
Inhibitor	0.3	
Sulfonium Initiator		2
TPOL		2
PBZ	3.9	
CPK	2.6	
TPO	1.3	
Total	100	101

Test Results

TEST	CONTROL	Denamer 1220 | 2021 | 1610 BLEND
Laneta Chart (1=Flat, 3=Light Curl, 9=Full Curl)	3/9	**1**

Test Method: DRAW DOWN ON LANETA CHART

TOUGHNESS.

Starting Point Formulation

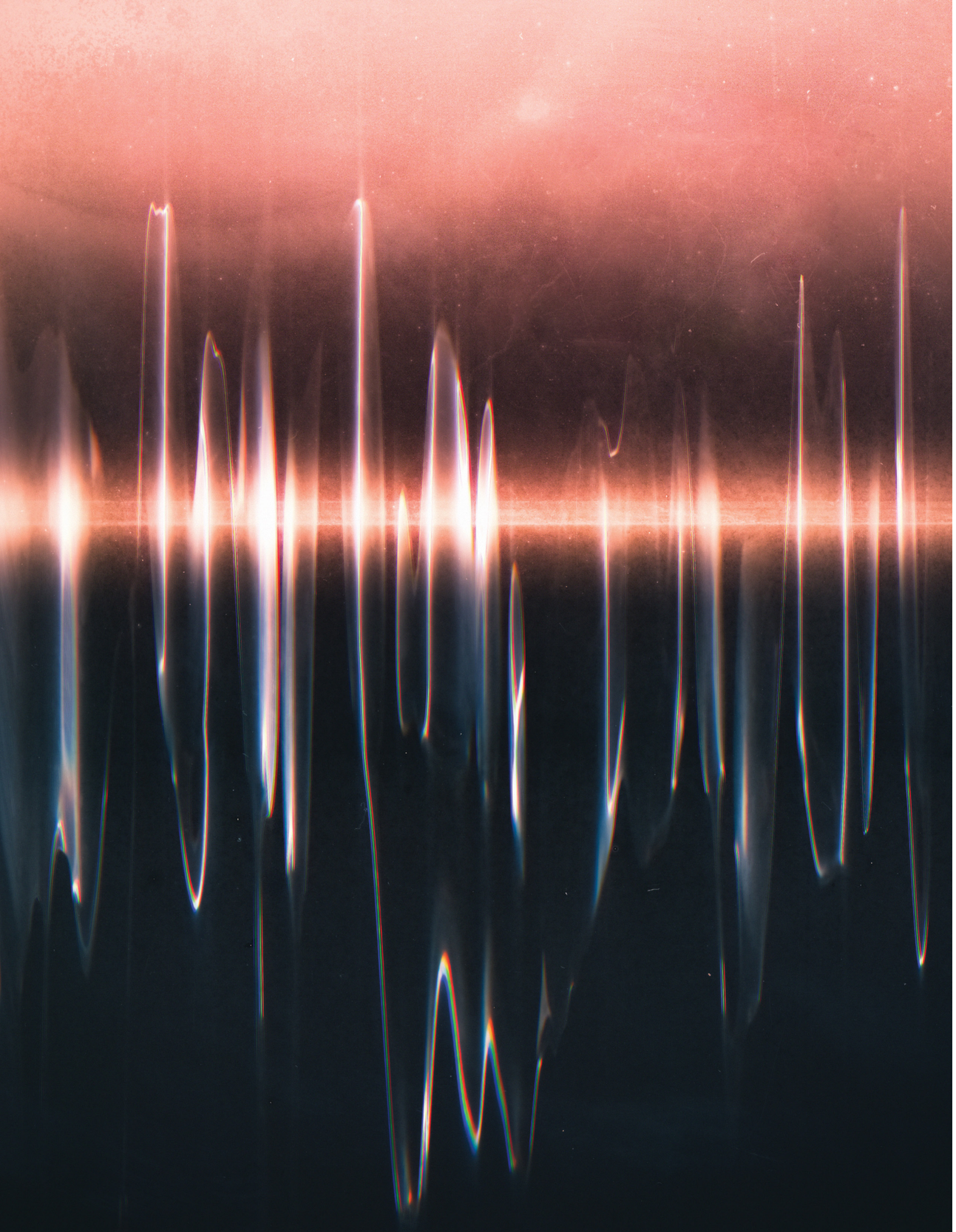
PRODUCTS	CONTROL	AOMA
Hexafunctional UA	60	60
AOMA		13
2-EHA	5	
IBOA	8	
HDDA	7.4	7.4
TMPEOTA	4.4	4.4
Amine Synergist	7.1	7.1
Inhibitor	0.3	0.3
PBZ	3.9	3.9
CPK	2.6	2.6
TPO	1.3	1.3
Total	100	100

Test Results

TEST	CONTROL	AOMA
Tensile Strength (MPa)	20	**17**
Elongation (%)	269	**237**
Tensile Modulus (MPa)	1218.87	**1321.25**
Impact Resistance (in-lb Units)	10	**6**

Test Method:

IMPACT RESISTANCE	ASTM D2794
TENSILE	ASTM D 638
TENSILE MODULUS	ASTM D 638



Section III.

HIGH-LIGHTED PRODUCTS

For ease of selection, the products highlighted in this section are categorized by type and cover both free radical and cationic technology. A broader array of advanced materials is available from **NAGASE**.

Whether you are improving a formulation or creating a new system, our technical experts will partner with you to develop cutting edge solutions.

ACRYLATES.

PRODUCT NAME	CHEMICAL IDENTITY	CAS NUMBER	VISCOSITY (cP, 25C)	FUNCTIONALITY	REGULATORY
Denamer 1220	Hydrogenated Bisphenol A Diglycidyl Ether Diacrylate	Confidential	2,850 (60C)	2	Listed (SNUR)
Denamer 1221	1,5-Pentanediol diacrylate (PDDA)	36840-85-4	5.5	2	R&D Exemption
DA-141	Epoxy Acrylate from Phenol	-	220	1	Listed
POB-A	(3-phenoxyphenyl)methyl 2-propenate	409325-06-0	18	1	Listed (SNUR)
MPO-A	Methyl Phenoxyethyl Acrylate	105849-31-8	17	1	R&D Exemption
DPCA-60	Caprolactone-modified DPHA	-	1,500	6	Listed
ACMO	Acryloyl Morpholine	5117-12-4	12	1	Listed (SNUR)
P-1A (N)	2-Acryloyloxyethyl Hexahydrophthalate	32120-16-4	15,000 - 30,000	1	Listed
HOA-MPL(N)	2-Acryloyloxy Ethyl Phthalate	30697-40-6	5,000 - 10,000	1	R&D Exemption
HOA-MS(N)	2-Acryloyloxy Ethyl Succinate	50940-49-3	170 - 190	1	Listed
MPD-A	3-Methyl-1,5-Pentanediol Diacrylate	64194-22-5	8	2	Listed (SNUR)
1.9ND-A	1.9-Nonanediol Diacrylate	107481-28-7	10	2	Listed (SNUR)
VEEA	2-(2-Vinyloxy Ethoxy) Ethyl Acrylate	86273-46-3	3.6	2	Listed (SNUR)
Kayarad R-604	2-Propenoic Acid, {2-{1,1-dimethyl-2-{(1-oxo-2-propenyl)oxy}ethyl}-5-ethyl}-1,3-dixoane-5-yl}methyl ester	87320-05-6	200 - 400	2	Listed

METHACRYLATES.

PRODUCT NAME	CHEMICAL IDENTITY	CAS NUMBER	VISCOSITY (cP, 25C)	FUNCTIONALITY	REGULATORY
Denamer 1420	Low Viscosity Urethane Dimethacrylate	Confidential	117	2	In Progress
M-3F	Trifluoroethyl Methacrylate	352-87-4	1	1	Listed
AOMA	Methyl 2-(allyloxymethyl)acrylate	219828-90-7	1.6	-	Listed (SNUR)
Light Ester G	Glycidyl Methacrylate	106-91-2	-	2	Listed
P-1M	2-Methacryloyloxyethyl Acid Phosphate	52628-03-2; 7664-38-2	4,000 - 6,500	1	Listed
HO-MS(N)	2-Methacryloyloxyethyl Succinic Acid	-	-	1	Listed
HOA-HH(N)	2-Methacryloyloxyethyl Hexahydropthalate	51252-88-1	-	1	R&D Exemption

CATIONIC.

PRODUCT NAME	CHEMICAL IDENTITY	CAS NUMBER	VISCOSITY (cP, 25C)	FUNCTIONALITY	REGULATORY
Denamer 1610	3-Ethyl-3-(hydroxymethyl)oxetane	3047-32-3	15	1	Listed
Denamer 1620	3,3'-[Oxybis(methylene)]bis[3-ethyloxetane]	18934-00-4	10	2	Listed (SNUR)
EHPE 3150	Multi-functional Cycloaliphatic Epoxy Oligomer	244772-00-7	Solid (Flake)	4.5	Listed
Celloxide 2021P	Cycloaliphatic Diepoxide	2386-87-0	240	2	Listed
Epolead PB3600	Epoxidized PolyButaDiene (vinyl + epoxy groups; H-terminated)	71342-74-0	28,000	-	Listed
EpoFriend AT501	Epoxidized styrene butadiene block copolymer	210057-91-3	Solid	-	Listed
Placcel 220EB	Aliphatic polyester diol	-	753 @ 75C	2	R&D Exemption

PHOTO-INITIATORS.

PHOTO-SENSITIZERS.

PRODUCT NAME	CHEMICAL IDENTITY	CAS NUMBER	TYPE	ABSORPTION (nm)	REGULATORY
Denacure 120	Mixed Sulfonium Hexafluoroantimonate / Propylene carbonate	71449-78-0; 89452-37-9; 108-32-7	Sulfonium	243, 293	Listed
Denacure 320	Bis(4-dodecylphenyl)iodonium hexaflurorantimonate / Propylene carbonate	71786-70-4; 108-32-7	Iodonium	234	Listed
Denacure 340	4-Isobutylphenyl-4'-methylphenyliodonium hexafluorophosphate / Propylene carbonate	344562-80-7; 108-32-7	Iodonium	241	Listed
Denacure 341	Bis(4-tert-butylphenyl)iodonium hexafluorophosphate	61358-25-6	Iodonium	245	Listed
Anthracure UVS-1101	9,10-Diethoxy anthracene Photosensitizer	68818-86-0	Anthracene	405	Listed
Anthracure UVS-1331	9,10-Diethoxy anthracene Photosensitizer	76275-14-4	Anthracene	405	Listed on REACH
Anthracure UVS-581	9,10-Bis(octanoyloxy)anthracene	1612244-59-3	Anthracene	395	R&D Exemption
CPI-101A	Triarylsulfonium Hexafluoroantimonate PAG	71449-78-0	Sulfonium	300	Listed
CPI-200K	Triarylsulfonium Salt; Propylene Carbonate	Confidential	Sulfonium	300	Listed
CPI-300K	Triarylsulfonium Salt in Propylene Carbonate	Confidential	Sulfonium	280	Listed (SNUR)
CPI-310B	Triarylsulfonium Salt	Confidential	Sulfonium	280	R&D Exemption
KT-3 (Formerly CPI-310FG)	Triarylsulfonium Salt	Confidential	Sulfonium	280	R&D Exemption
CPI-410S	Triarylsulfonium Salt	Confidential	Sulfonium	375	R&D Exemption
IK-1	Diaryliodonium Salt	1245634-39-2	Iodonium	240	R&D Exemption

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