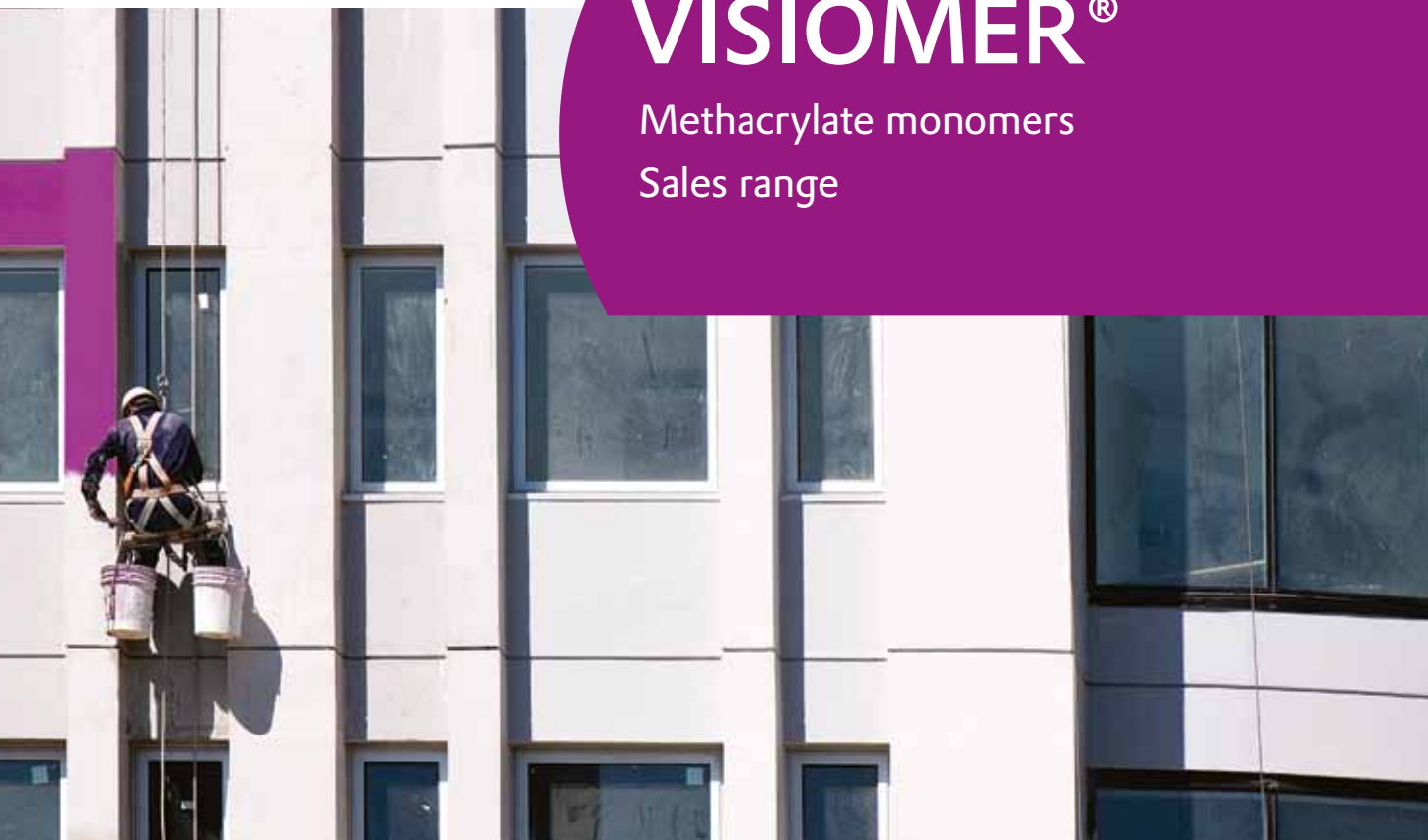


VISIOMER®

Methacrylate monomers

Sales range



VISIOMER®

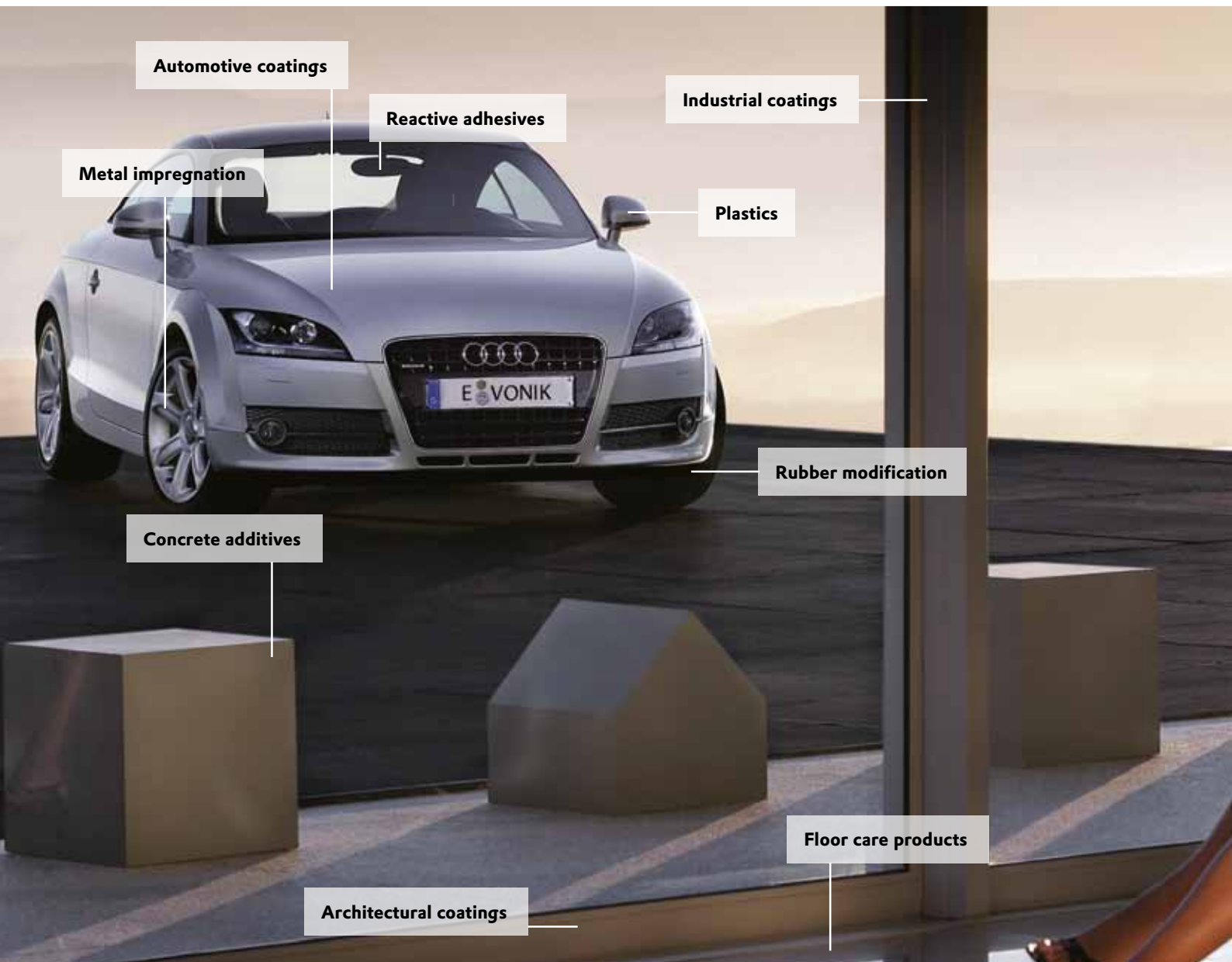
The broadest range of products for a variety of applications

Versatile properties make methacrylate monomers the product of choice for a variety of applications. Hard or soft, hydrophobic or hydrophilic, VISIOMER® methacrylate monomers offer functionality and flexibility to solve specific application and performance challenges. Furthermore, Evonik Industries offers one of the broadest monomer product portfolios available.

VISIOMER® methacrylate monomers can be found everywhere and when it comes to specialties – that's where VISIOMER®'s innovative solutions really shine! Discover inspiring examples in paints and coatings, automotive, construction and adhesives applications just to name a few.

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VISIOMER® – the brand for methacrylate monomers

In 1901, Dr. Otto Röhm, a pioneer in methacrylate polymer chemistry, began the long standing tradition of innovation within Evonik Industries.

Since then, Evonik and its predecessor companies have grown to become a preferred industry partner for innovative solutions in methacrylate monomers, some of the most versatile building blocks for polymer chemistry. Evonik`s methacrylate monomers are globally promoted under the trademark VISIOMER®.



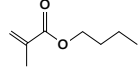
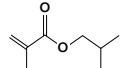


One source, one partner, a multitude of solutions

From joint product development and specialized technical support to vendor managed inventory and warehousing, we develop solutions by means of strategic partnerships. From production to application, we provide know-how for an end to end solution.

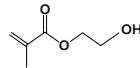
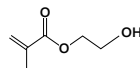
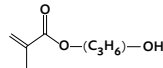
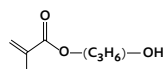
Through our international network of ISO 9001 certified, strategically located, and integrated production facilities, we are able to develop tailored solutions based on the local needs of our customers while guaranteeing consistently high quality products.

Basic methacrylates

VISIOMER®	Chemical name	Formula	Molecular weight g/mol	Boiling point °C/hPa	Glass transition temperature Tg °C	Standard stabilization ppm HQME*	Applications
MMA	Methyl methacrylate	 CAS-No. 80-62-6	100.1	100/1013	105	100 ± 10	1.1 1.2 2.1 2.2 3.2 3.3 5.1 5.2 5.6 6.1 7.1 7.2
GMAA	Methacrylic acid	 CAS-No. 79-41-4	86.1	161/1013	185	200 ± 20	1.1 1.2 2.1 2.2 3.2 3.3 3.5 5.1 5.2
n-BMA	n-Butyl methacrylate	 CAS-No. 97-88-1	142.2	163/1013	20	100 ± 10	1.1 1.2 2.1 2.2 5.1 6.1 7.2
i-BMA	i-Butyl methacrylate	 CAS-No. 97-86-9	142.2	155/1013	53	100 ± 10	1.1 1.2 2.1 2.2 5.1 6.1

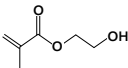
*HQME = Hydroquinone monomethyl ether

Hydroxyesters

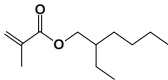
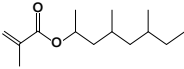
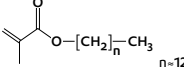
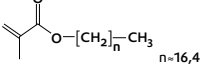
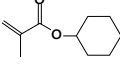
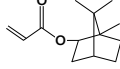
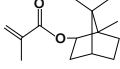
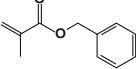
VISIOMER®	Chemical name	Formula	Molecular weight g/mol	Boiling point °C/hPa	Glass transition temperature Tg °C	Standard stabilization ppm HQME	Applications
HEMA 97	2-Hydroxyethyl methacrylate	 CAS-No. 868-77-9	130.1	213/1013	55	200 ± 20	1.2 2.2 3.3 5.1 5.2 5.4 5.7
HEMA 98	2-Hydroxyethyl methacrylate	 CAS-No. 868-77-9	130.1	213/1013	55	200 ± 20	1.2 2.2 3.3 5.1 5.2 5.4 5.7
HPMA 97	Hydroxypropyl methacrylate	 CAS-No. 27813-02-1	144.2	209/1013	73	200 ± 20	1.2 2.2 3.3 5.1 5.2 5.4 5.5 5.7
HPMA 98	Hydroxypropyl methacrylate	 CAS-No. 27813-02-1	144.2	209/1013	73	200 ± 20	1.2 2.2 3.3 5.1 5.2 5.4 5.5 5.7

Hydroxyesters are recommended for heat or ambient cured, thermoset coatings with permanent marring and solvent resistance, high gloss retention and weatherability. Hydroxyfunctional prepolymers, for example, can be crosslinked via melamine resins, blocked isocyanates (one-component systems), or multifunctional isocyanates (two-component systems). Hydroxyesters also serve as adhesion promoters in reactive resins for bonding to metal surfaces.

Contact lens HEMA

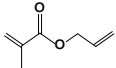
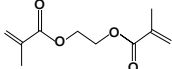
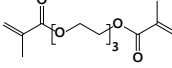
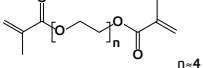
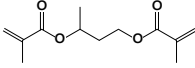
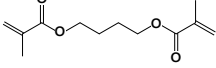
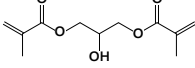
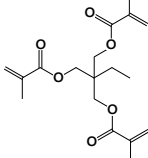
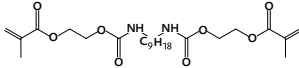
VISIOMER®	Chemical name	Formula	Molecular weight g/mol	Boiling point °C/hPa	Glass transition temperature Tg °C	Standard stabilization ppm HQME	Applications
UHP HEMA	Ultra high purity 2-Hydroxyethyl methacrylate	 CAS-No. 868-77-9	130.1	213/1013	55	10 ± 3	6.3

Alkyl/aryl (meth)acrylates

VISIOMER®	Chemical name	Formula	Molecular weight g/mol	Boiling point °C/hPa	Glass transition temperature Tg °C	Standard stabilization ppm HQME	Applications
EHMA	2-Ethylhexyl methacrylate	 CAS-No. 688-84-6	198.3	218/1013	-10	50 ± 10	1.1 1.2 2.2 3.2 3.4 5.1
IDMA	Isodecyl methacrylate	 CAS-No. 29964-84-9	226.0	> 250/1013	-70	100 ± 25	1.1 1.2 2.2 3.2 5.1
C13-MA	Methacrylic ester 13.0	 CAS-No. 90551-76-1	268.0	> 300/1013	-46	100 ± 25	1.1 1.2 3.2 5.1
C17.4-MA	Methacrylic ester 17.4	 CAS-No. 90551-84-1	330.0	> 250/1013	-22	100 ± 25	1.1 1.2 3.2 5.1
c-HMA	Cyclohexyl methacrylate	 CAS-No. 101-43-9	168.2	210/1013	110	50 ± 5	1.1 1.2 5.1
IBOA	Isobornyl acrylate	 CAS-No. 5888-33-5	208.3	275/1013	96	250 ± 25	1.1 1.2 2.1 5.1 5.2 5.4
IBOMA	Isobornyl methacrylate	 CAS-No. 7534-94-3	222.3	258/0.6	150	150 ± 30	1.1 1.2 5.1 5.2
BNMA	Benzyl methacrylate	 CAS-No. 2495-37-6	176.0	243/1013	54	50 ± 5	1.1 1.2 5.1

Alkyl methacrylate monomers are primarily used as building blocks for polymeric binders, generally known as synthetic resins. The excellent weather resistance of methacrylate polymers results from their purely aliphatic structure and effective steric hindrance of the polymer chains. There is hardly any oxidative degradation or ester hydrolysis in methacrylate polymers. A definitive example is acrylic glass, which is almost exclusively made of methyl methacrylate. With our range of monomers, polymer softening temperatures can be adjusted from approx. -70 °C to 150 °C. Long-chain esters, such as C17.4-MA, show wax-like polymer properties in their natural state. Esters with bulky side chains provide solution polymers with reduced viscosity and thus allowing higher solids content.

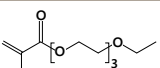
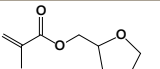
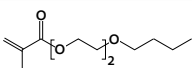
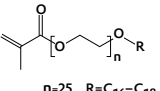
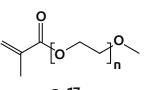
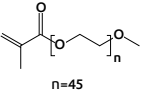
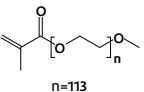
Crosslinkers

VISIOMER®	Chemical name	Formula	Molecular weight g/mol	Boiling point °C/hPa	Glass transition temperature Tg °C	Standard stabilization ppm HQME	Applications
AMA	Allyl methacrylate	 CAS-No. 96-05-9	126.2	141/1013	–	100 ± 20	7.2 8.1
EGDMA	Ethylene glycol dimethacrylate	 CAS-No. 97-90-5	198.2	240/1013	–	100 ± 10	3.4 5.1 5.6 5.7 6.3 7.3
TRGDMA	Triethylene glycol dimethacrylate	 CAS-No. 109-16-0	286.3	139/1	–	100 ± 20	3.4 5.1 5.2 5.3 6.1 6.3
PEG200DMA	Polyethylene glycol 200 dimethacrylate	 CAS-No. 25852-47-5	336.0	> 200/0.13	–	200 ± 20	3.4 5.1 5.2 6.3
1,3-BDDMA	1,3-Butanediol dimethacrylate	 CAS-No. 1189-08-8	226.3	110/4	–	200 ± 20	5.1 5.2 5.3 5.5 5.6 5.7 7.3
1,4-BDDMA	1,4-Butanediol dimethacrylate	 CAS-No. 2082-81-7	226.3	> 200/1013	–	100 ± 10	5.1 5.2 5.3 5.5 5.6 5.7 7.2 7.3
GDMA	Glycerol dimethacrylate	 CAS-No. 1830-78-0	228.2	110/1013	–	200 ± 20	5.1 5.2
TMPTMA	Trimethylolpropane trimethacrylate	 CAS-No. 3290-92-4	338.3	> 200	–	100 ± 10	5.1 5.2 5.3 5.6 5.7 7.3
HEMATMDI	Diurethane dimethacrylate	 CAS-No. 72869-86-4	471.0	283/1013	–	225 ± 25 ¹⁾	5.4 6.1

¹⁾ BHT: 2,6-Di-tert-butyl-4-methylphenol

These products are characterized by a minimum of two polymerizable groups in one molecule. Polymerization leads to crosslinked and insoluble structures. Allyl methacrylate offers exceptional performance with two double bonds of different reactivity, allowing graft copolymerization in emulsions. Crosslinkers are ideally suited for hot and cold curing reactive adhesives and for peroxide crosslinking of high performance elastomers due to their low volatility and high reactivity.

Ether methacrylates

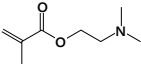
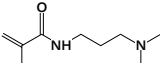
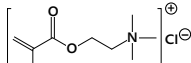
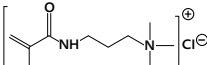
VISIONER®	Chemical name	Formula	Molecular weight g/mol	Boiling point °C/hPa	Glass transition temperature T _g °C	Standard stabilization ppm HQME	Applications
ETMA	Ethyltriglycol methacrylate	 CAS-No. 39670-09-2	246.3	292/1013	-31	100 ± 25	5.2
THFMA	Tetrahydrofurfuryl methacrylate	 CAS-No. 2455-24-5	170.2	222/1013	40	100 ± 10 + 150 ± 15 ¹⁾	5.1 5.4
BDGMA	Butyl diglycol methacrylate	 CAS-No. 7328-22-5	230.3	271/1013	60	100 ± 25	1.1 5.1 5.4
C18 PEG 1105 MA W	Methacrylic ester (25 EO) C16-C18 fatty alcohol (in water/GMAA)	 n=25 R=C16-C18 CAS-No. 70879-51-5	1432	200/1013	-	200 ± 20 ²⁾	2.1 3.2 3.4 3.5 6.2
MPEG 750 MA W	Methoxypolyethylene glycol 750 methacrylate (50% in water)	 n=17 CAS-No. 26915-72-0	818	100/1013	-	200 ± 20	2.1 3.2 3.4 3.5 6.2
MPEG 2005 MA W	Methoxypolyethylene glycol 2000 methacrylate (50% in water)	 n=45 CAS-No. 26915-72-0	2000	100/1013	-	200 ± 20	3.2 3.4 3.5 6.2
MPEG 5005 MA W	Methoxypolyethylene glycol 5000 methacrylate (50% in water)	 n=113 CAS-No. 26915-72-0	5000	100/1013	-	200 ± 20	3.2 3.4 3.5 6.2

¹⁾ BHT: 2,6-Di-tert-butyl-4-methylphenol

²⁾ 2,4-Dimethyl-6-tert-butylphenol


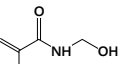
The favorable solution property of the ether functionality is combined with the high monomer reactivity of the methacrylate functionality. Unbranched ether methacrylates behave as internal plasticizers and provide polymers with very low glass transition temperatures. Due to their low volatility, these monomers can be used as reactive diluents for reactive systems. Long polyether side chains make the corresponding polymers water-soluble and capable of ion chelation.

Aminofunctional monomers

VISIOMER®	Chemical name	Formula	Molecular weight g/mol	Boiling point °C/hPa	Glass transition temperature Tg °C	Standard stabilization ppm HQME	Applications
MADAME™	2-Dimethylaminoethyl methacrylate	 CAS-No. 2867-47-2	157.2	182/1013	18	800 ± 80	1.1 3.2 4.1 4.2 4.3 5.2 6.2
DMAPMA	3-Dimethylaminopropyl methacrylamide	 CAS-No. 5205-93-6	170.0	263/1013	96	675 ± 75	1.1 3.2 4.1 4.2 4.3 5.2 6.2
TMAEMC	2-Trimethylammoniumethyl methacrylate chloride (aqueous solution)	 CAS-No. 5039-78-1	207.7	100/1013	–	600 ± 60	3.5 4.1 4.2 4.3 6.2
MAPTAC	3-Trimethylammoniumpropyl methacrylamide chloride (aqueous solution)	 CAS-No. 51410-72-1	220.5	100/1013	–	200 ± 20	3.5 4.1 4.2 4.3 6.2

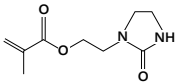
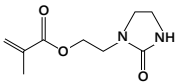
Predominantly used in their quaternized form, these products provide water-soluble cationic polymers with ionic groups. Combining these products with either hydrophilic or hydrophobic co-monomers results in a wide variation of the physical properties of these polymers. Copolymers containing these monomers are excellent flocculation agents and can furthermore be used as cationic thickeners.

Methacrylamides

VISIOMER®	Chemical name	Formula	Molecular weight g/mol	Boiling point °C/hPa	Glass transition temperature Tg °C	Standard stabilization ppm HQME	Applications
MAAamide	Methacrylamide	 CAS-No. 79-39-0	85.1	215/1013	250	–	2.1 3.1 3.3 6.2 7.1
N-MMAA	N-Methylol methacrylamide (aqueous solution)	 CAS-No. 923-02-4	115.1	100/1013	59	120 ± 20	3.3

Combinations of methacrylamide and acetal-modified methacrylamides are recommended for heat activated self-crosslinking resins. Methacrylamide alone can be used as a polar co-monomer with high Tg, for improving solvent resistance and cohesion. In a special application, methacrylamide can be grafted onto natural fibers (silk weighting).



Specialty methacrylates

VISIOMER®	Chemical name	Formula	Molecular weight g/mol	Boiling point °C/hPa	Glass transition temperature Tg °C	Standard stabilization ppm HQME	Applications
MEEU 50 W	N-(2-Methacryloyloxyethyl) ethylene urea (50 % in Water)	 CAS-No. 86261-90-7	198.2	100/1013	–	800 ± 100 + 150 ± 50 ¹⁾	2.1
MEEU 25 M	N-(2-Methacryloyloxyethyl) ethylene urea (25% in methyl methacrylate)	 CAS-No. 86261-90-7	198.2	100/1013	–	500 ± 100 + max. 100 ¹⁾	2.1

¹⁾ Phenothiazine

The advantage of the MEEU ureidofunctional monomer can be found in emulsion polymers which are able to obtain desired wet adhesion properties. It improves the adhesion properties of the emulsion polymers especially on wood or aged alkyd paint surfaces as well as the wet scrub resistance of the final products.

Intermediate products

VISIOMER®	Chemical name	Formula	Molecular weight g/mol	Boiling point °C/hPa	Glass transition temperature Tg °C	Standard stabilization ppm HQME	Applications
ECH	Ethylene cyanohydrin	 CAS-No. 109-78-4	71	221/1013	–	–	8.1
ACH	Acetone cyanohydrin	 CAS-No. 75-86-5	85.1	120/1013 ¹⁾	–	3000 ²⁾	8.1

¹⁾ decomposition ²⁾ Sulfuric Acid

Based on our highly flexible production processes for this wide variety of monomers, we have developed expertise in a number of key technologies, allowing us to offer several intermediate products suitable for organic synthesis.

Evonik is a highly experienced partner in the development of specific products based on methacrylate chemistry. New monomers have been developed resulting in specific property enhancements as well as special grades of existing products, all tailored to the special needs of our customers.

Regulatory information

It is our aim to have all of our products registered and made available to customers, wherever there is a need, worldwide.

All VISIOMER® products conform to the REACH regulations (REACH = Registration, Evaluation, Authorisation and Restriction of Chemicals) and have been either registered or pre-registered under REACH to ensure continuous supply availability.

Please refer to the materials safety data sheet for current status of registration, or contact customer service at: +49 6151 18-1002

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Product application matrix

	Products
Basic methacrylates	Methyl methacrylate
	Methacrylic acid
	n-Butyl methacrylate
	i-Butyl methacrylate
Hydroxyesters	2-Hydroxyethyl methacrylate 97% / 98%
	2-Hydroxypropyl methacrylate 97% / 98%
	2-Hydroxyethyl methacrylate UHP
Alkyl/aryl (meth)acrylates	2-Ethylhexyl methacrylate
	Isodecyl methacrylate
	Methacrylic ester 13.0
	Methacrylic ester 17.4
	Cyclohexyl methacrylate
	Isobornyl acrylate
	Isobornyl methacrylate
	Benzyl methacrylate
Aminofunctional monomers	2-Dimethylaminomethyl methacrylate
	3-Dimethylaminopropyl methacrylamide
	2-Trimethylammoniummethyl methacrylate chloride
	3-Trimethylammoniumpropyl methacrylamide chloride
Methacrylamides	Methacrylamide
	N-Methylol methacrylamide
Crosslinkers	Allyl methacrylate
	Ethylene glycol dimethacrylate
	Triethylene glycol dimethacrylate
	Polyethylene glycol 200 dimethacrylate
	1,3-Butanediol dimethacrylate
	1,4-Butanediol dimethacrylate
	Glycerol dimethacrylate
	Trimethylolpropane trimethacrylate
	Diurethane dimethacrylate
Ether methacrylates	Ethyltriglycol methacrylate
	Tetrahydrofurfuryl methacrylate
	Butyl diglycol methacrylate
	Methacrylic ester of an ethoxylated fatty alcohol
	Methoxypolyethylene glycol 750 methacrylate
	Methoxypolyethylene glycol 2000 methacrylate
	Methoxypolyethylene glycol 5000 methacrylate
Specialty methacrylates	N-(2-Methacryloyloxyethyl) ethylene urea 25% in MMA or 50% in water
Intermediate products	Ethylene cyanohydrine
	Acetone cyanohydrine

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® = registered trademark

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