

Co-Polyester
VYLON™



All the data showed in this brochure is only for your reference, not guaranteed values.
Please refer to safety data sheet (SDS) or delivery specification before using the grades listed.

Inquiries

TOYOBO MC Corporation
Hardlen and Vylon Sales Section

URL <https://en.toyobo-mc.jp/>

Adhesives and Coating Materials Unit

Sumitomo Corporation Kyobashi Building, 1-17-10,
Kyobashi, Chuo-ku, Tokyo, 104-0031, Japan
TEL : +81-3-6887-8883

FAX : +81-3-6887-8887

Inquiries by E-mail : <https://krs.bz/toyobo-mc/m?f=101>

Osaka Umeda Twin Towers South, 1-13-1
Umeda, Kita-ku, Osaka, 530-0001, Japan

TEL : +81-6-6348-3773/-3772

FAX : +81-6-6348-3752

Inquiries by E-mail : <https://krs.bz/toyobo-mc/m?f=101>

TOYOBO MC Corporation

<https://en.toyobo-mc.jp/>

“VYLON™” incorporates advanced technology to offer greater opportunities in the future.

"VYLON™", TOYOBO MC's co-polyester, has been developing new applications as the result of its high performance and unique properties.

“VYLON™” will keep on walking toward the future together with advanced technology.



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VYLON™ is high molecular weight co-polyester.

Highly advanced polymer designing is possible by combining various raw materials, such as stiff, soft and both stiff and soft properties.

We propose the most suitable resin according to the use, condition and demand characteristics.

VYLON™

“VYLON™” harmonizes with environment.

"TOYOBO MC" highly advanced polymerization technology has made "VYLON™" succeed to develop water-based co-polyester, "VYLONAL™" and hot melt adhesives to eliminate or decrease organic solvents.

And now it is on the way to develop functional biodegradable co-polyesters and non-halogen flame-retardant system, which are more friendly to the environment.

We are also promoting the development of environmentally friendly products.



VYLON™ gives an excellent adhesion to various substrate materials such as plastics and metals.

Also possible to bond dissimilar materials.

Suitable for paint, coating materials and adhesion, and can also apply to the various use.

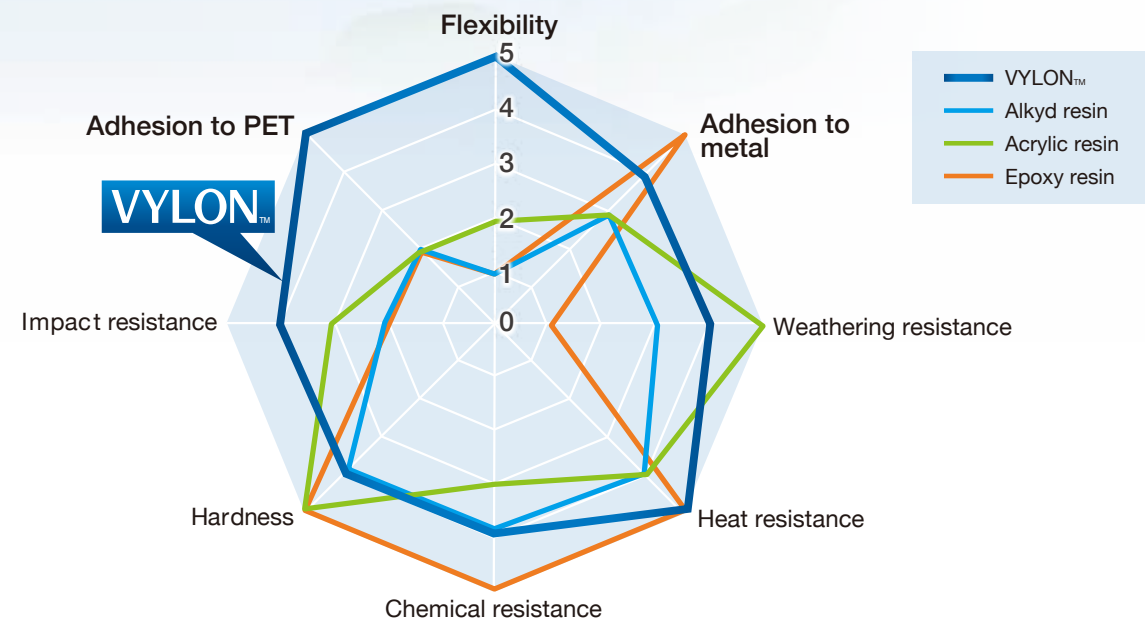
The polymerizing technology of VYLON™ gives an excellent flexibility, bending performance, workability, corrosion resistance, durability, heat-resistance, solvent solubility, pigment dispersibility and flame resistance.

One of the attractive characteristics of VYLON™ is to customize various well-balanced properties which other resin cannot provide.

Comparison with other resins

Thanks to its low content of low-molecular weight components, VYLON™ has an excellent sanitation performance.

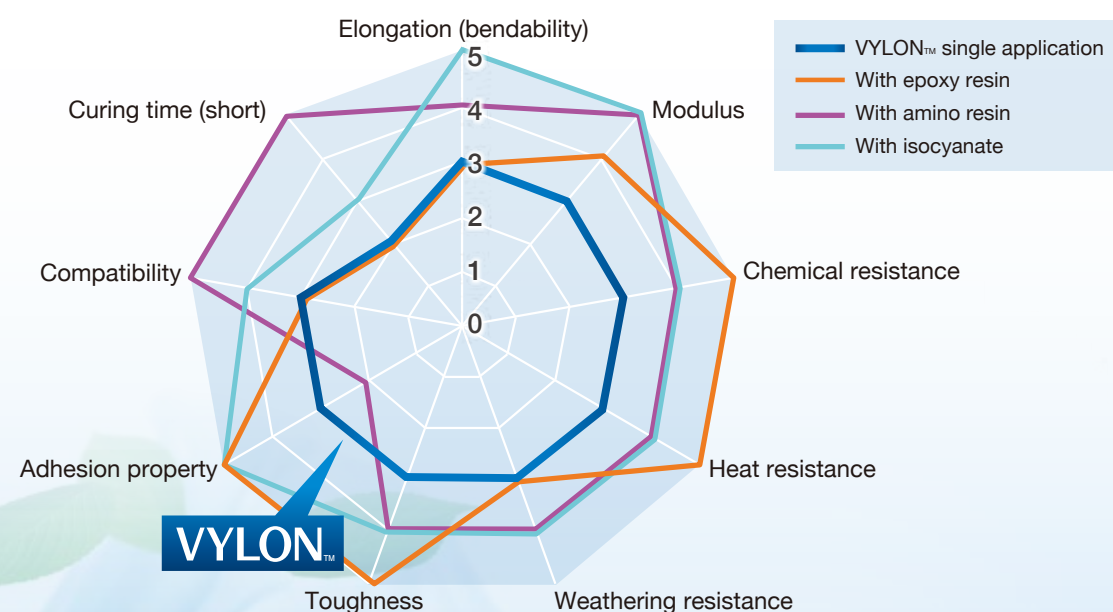
Also gives well-balanced properties such as hardness, flexibility, bending performance, adhesion strength, heat resistance, chemical resistance and the weathering resistance, etc.



Formulation examples

VYLON™ can use not only independently but also with general cross linkers (such as amino resin, epoxy resin and isocyanate etc.) which are possible to increase their performance. The level of the function is different depending on the kind, amount, combination and curing (the temperature, catalyst and the thickness).

We suggest most suitable grade to various kinds of customer's requirement.



Product line of VYLON™



Amorphous co-polyester (Solvent soluble type)

Features

- 1 Amorphous type of VYLON™ can be dissolve in methylethylketon, toluene or other generalpurpose organic solvents.
- 2 Amorphous type of VYLON™ gives good adhesion to metal, polyester film or PVC film.
- 3 Amorphous type of VYLON™ itself gives good formability, and it is cross linkable with melamine, isocyanate and epoxy, etc., when tough and durable coating layer is required.
- 4 The performances such as weather resistance, corrosion resistance, pigment dispersibility, formability and bending performance can be furnished by using highly advanced polymer designing technology.

Characteristic values

Amorphous co-polyester (Solvent soluble type)

	Grade	Form	Molecular weight (Mn)	Specific gravity (at 30°C)	Tg (°C)	Hydroxyl group value (KOHmg/g)	Acid value (KOHmg/g)	Features
High Tg	200	Pellet	17,000	1.26	67	6	< 2	Adhesion property, general purpose grade
	220	Flake	3,000	1.26	53	50	< 2	Low molecular weight, resin modification
	226	Pellet	8,000	1.26	65	20	< 2	Branched type
	240	Flake	15,000	1.27	60	9	< 2	Good adhesion to PET
	256	Pellet	16,000	1.27	65	3 ~ 7	4 ~ 8	High acid, good adhesion to metal
	270	Pellet	23,000	1.26	67	5	< 2	Toughness, general purpose grade
	802	Flake	3,000	1.26	60	37	< 1	High hydroxyl group value, solvent solubility
	822	Pellet	15,000	1.22	68	3	5	Adhesion to metal
	885	Pellet	8,000	1.28	79	16	< 2	Pigment dispersibility
	GK-250	Pellet/Flake	10,000	1.24	60	11	< 2	Solvent solubility
	GK-255	Pellet	10,000	1.24	60	7	7	High acid, good adhesion to glass
	GK-360	Pellet	16,000	1.24	56	7	5	Adhesion to metal, corrosion resistance
Medium Tg	GK-880	Pellet	18,000	1.28	84	5	< 4	High Tg, high toughness
	GK-888	Pellet	15,000	1.28	89	8	< 2	Recommend to can coating
	103	Pellet	23,000	1.25	47	5	< 2	High molecular weight, toughness
	601	Pellet	16,000	1.25	46	7	< 2	General purpose grade, adhesion property
	635	Sheet	21,000	1.21	25	5	< 2	Solvent solubility, adhesion property
	GK-140	Sheet	13,000	1.25	20	10	< 2	Toughness
	GK-150	Sheet	13,000	1.25	20	7	5	Adhesion to metal
	GK-367	Pellet/Flake	15,000	1.26	46	5 ~ 6	5 ~ 6	Recommend to can coating
Low Tg	GK-780	Sheet	11,000	1.26	36	11	3	Adhesion to metal, corrosion resistance
	GK-800	Flake	27,000	1.21	50	7	< 2	High molecular weight, reactivity
	GK-810	Flake	6,000	1.17	46	19	5	Solvent solubility, high hydroxyl group value
	560	Sheet	19,000	1.24	7	8	< 2	Branched type
	630	Sheet	23,000	1.20	7	5	< 2	Flexibility, solvent solubility
	670	Sheet	30,000	1.20	7	< 2	2	Adhesion to PET, adhesion to metal
	673	Sheet	30,000	1.21	13	< 2	2	Good adhesion to metal
	AC-202	Sheet	28,000	1.22	- 12	4	< 2	Good adhesion to metal
	GK-330	Sheet	17,000	1.21	16	9	< 2	Can coating
	GK-570	Sheet	19,000	1.20	0	6	< 2	Pigment dispersibility
	GK-680	Sheet	6,000	1.16	10	21	< 2	Corrosion resistance
	BX-1001	Sheet	28,000	1.19	- 18	8	< 2	Low Tg, vibration damping property

Applications

Amorphous co-polyester (Solvent soluble type)

Applications		Coatings				Printing inks			Adhesives						
		Interior can coating	Exterior can coating	Coil coating	Plastics	Screen ink	Gravure ink	T T R	P E T	P V C	Other plastics	Metal	Glass	Heat seal	F F C
High Tg	200	✓	✓✓			✓	✓	✓	✓✓	✓	✓			✓	✓✓
	220			✓											✓
	226				✓✓	✓									
	240					✓✓	✓	✓	✓✓	✓		✓			
	256	✓	✓	✓✓		✓	✓		✓	✓		✓✓	✓	✓	✓
	270					✓								✓	
	GK-250	✓	✓	✓		✓✓	✓						✓		
	GK-360	✓✓	✓✓			✓									
	GK-880	✓✓	✓					✓✓						✓	
Medium Tg	103					✓			✓	✓	✓				
	601	✓	✓✓					✓✓	✓	✓	✓				
	GK-800		✓✓						✓	✓		✓✓			
Low Tg	560								✓✓	✓✓	✓	✓	✓	✓	
	630	✓	✓✓		✓	✓			✓	✓	✓	✓		✓	
	670					✓			✓✓	✓	✓	✓✓		✓	✓✓
	BX-1001								✓		✓				✓

✓ = Useable application ✓✓ = Recommended application

The above are measurement values and are not guaranteed.

Solubility data Amorphous co-polyester (Solvent soluble type)

[illegible]

○ : Clear **MEK** Methyl ethyl ketone
 △ : Haze, insoluble partially **ECA** Ethyl carbitol acetate
 × : Separate

Compatibility with other VYLON™ grade①
Amorphous co-polyester (Solvent soluble type)

[illegible]

Solvent Ethyl acetate
 Solid contents 30%
 ○ : Clear
 △ : Haze, insoluble partially
 × : Separate

Compatibility with other VYLON™ grade ②
Amorphous co-polyester (Solvent soluble type)

[illegible]

Solvent Cyclohexanone

Solid contents 30%

○ : Clear

△ : Haze, insoluble partially

× : Separate

Crystalline co-polyester (Solvent insoluble type)

Features

- 1 Crystalline type of VYLON™ is insoluble in general purpose organic solvents because of its high crystalline level or high cohesive energy.
- 2 Crystalline type of VYLON™ is suitable to use as hotmelt adhesive, hotmelt(extrusion) coating or powder coating due to its insoluble nature to general purpose organic solvents.
- 3 Crystalline type of VYLON™ shows good adhesion to films, metal plates such as aluminum, iron, or formed plastic products made of polyester, vinyl chloride, and polycarbonate.
- 4 Crystalline type of VYLON™ can meet with various kind of customer's requirement thanks to highly advanced polymer designing technology. It is available at various forms, such as pellet, powder and sheet.

Applications

Adhesive and treating agent for textile and fiber

Extrusion coating agent for metal

Coating for electric wire and sealant for paper box etc.

VYLONAL™ (Water based co-polyester)

Features

- 1 VYLONAL™ is water dispersed co-polyester.
- 2 VYLONAL™ is self emulsification type (no surfactant is used) of water dispersion, and it shows same level of performances such as water resistance or adhesion strength as solvent soluble type of VYLON™.
- 3 By cross linking with water-based cross linkers such as melamine, blocked isocyanate, etc., tough and durable coating layer can be obtained.

Applications

Treating agent for textile

Film surface treating agent

Steel plate treating agent and coating agent for receptor of recording media etc.

Characteristic values VYLON™ (Crystalline co-polyester)

	Grade	Form	Molecular weight (Mn)	Melting point (°C)	Tg (°C)	Melt viscosity (dPa·s/200°C)	Features
High Tg	GM-925	Pellet	25,000	166	15	4000	Transparency, fabric application
	GA-1300	Pellet	20,000	167	-6	510	Solvent resistance, fuel filter
	GA-1310	Pellet	20,000	179	27	1500	Solvent resistance, fuel filter
	RN-9300	Pellet	25,000	198	73	3800**	High melt viscosity, extrusion performance
Medium Tg	GM-380	Pellet	35,000	138	8	2500	Adhesion property, solvent soluble
	GM-400	Pellet	25,000	143	19	4600	Dry cleaning resistance, fabric application
Low Tg	GM-900	Pellet	25,000	112	-15	1500	Texture, fabric application
	GM-913	Pellet	35,000	126	-70	6500	Adhesion property, moisture resistance
	GM-920	Pellet	30,000	107	-60	1000	Adhesion to PET, moisture resistance
	GM-990	Pellet	30,000	111	4	8000	High melt viscosity, hydrolysis resistance
	GA-6400	Pellet	30,000	96	-20	500	Low Tm, low temperature adhesion property
	30P	Pellet	25,000	125	-28	2000	Adhesion to metal

**Softening point **dPa·s/250°C

Characteristic values VYLONAL™ (Water-based co-polyester)

	Grade	Solid content (wt%)	Viscosity (dPa·s/25°C)	Molecular weight (Mn)	Tg (°C)	Hydroxyl group value (KOHmg/g)	Acid value (KOHmg/g)	Flash point (°C)	pH	Organic co-solvent (wt%)	Features
High Tg	MD-1200	34	20~80	15,000	67	6	< 3	—	4~7	n-BuCel (11)	Weather resistance, heat resistance
	MD-1245	30	0.5~3	20,000	61	5	< 3	—	5~7	t-BuCel (10)	Adhesion to PET, solvent resistance
	MD-1500	30	0.1~1	8,000	77	14	< 3	—	5~7	n-BuCel (15)	High Tg
	MD-2000	40	9	18,000	67	6	< 2	—	4~7	None	No co-solvent
Medium Tg	MD-1100	30	2~7	20,000	40	5	< 3	—	4~6	n-BuCel (15)	Flexibility
	MD-1480	25	< 1.0	15,000	20	6	3	—	4~6	None	No co-solvent
Low Tg	MD-1335	30	0.1~1.1	8,000	4	13	3	23	4~6	i-PrOH (30)	Low Tg
	MD-1985	27	0.1~1.3	25,000	-20	4	< 3	—	4~7	n-BuCel (9)	Crystallinity, adhesion to PET

n-BuCel : normal Butyl cellosolve t-BuCel : tertiary Butyl cellosolve

The above are measurement values and are not guaranteed.

VYLON™ UR Series (Polyester urethane)

Features

- 1 VYLON™ UR series is urethane modified co-polyester resin which is based upon the aromatic polymer technology.
- 2 Excellent adhesion property to PET, PVC, films or metals.
- 3 Excellent pigment (iron oxide, titanium dioxide, etc.) compatibility and dispersibility.
- 4 Excellent hydrolysis resistance and highly modulus obtained by aromatic polymer chain technology.

Applications

Binders for magnetic paint

Film surface treating agent

Coating for electric wire

etc.

VYLOMAX™ (Polyamideimide)

Features

- 1 VYLOMAX™ is polyamideimide resin developed by TOYOBO MC's advanced polymer technology.
- 2 VYLOMAX™ gives excellent heat resistance, chemical resistance, flexibility and toughness.
- 3 VYLOMAX™ offers grade that can be dissolved in low boiling point solvents or have clear and colorless feature.
- 4 VYLOMAX™ is crosslinkable with hardner. UV curable system will be also available by specially designing the polymer chain.

Applications

Chemical resistance paint

Heat resistance paint

Lubrication paint

Heat resistance film

etc.

Characteristic values VYLON™ UR series (Polyester urethane)

	Grade	Solid content (wt%)	Solution Viscosity (dPa·s/25°C)	Molecular weight (Mn)	Tg (°C)	Hydroxyl group value (KOHmg/g)	Acid value (KOHmg/g)	Features	Solvent composition (Weight ratio)
High Tg	UR-1400	30	40	40,000	83	2 ~ 3	< 1	Hardness	MEK/TOL =50/50
	UR-1700	30	1.5	16,000	92	19	26	Reactivity, toluene free	MEK=100
	UR-4410	40	0.6	10,000	56	11	< 2	Heat resistance, toluene free	MEK=100
	UR-4800	32	40	25,000	106	4 ~ 6	< 1	High Tg, pigment dispersability	MEK/TOL =50/50
	UR-8210	45	85	25,000	73	4 ~ 6	< 1	Pigment dispersibility, toluene free	MEK=100
Medium Tg	UR-1350	33	7	30,000	46	3 ~ 4	< 1	Adhesion to PET, no yellowing grade	MEK/TOL =65/35
	UR-3600	40	34	18,000	40	6	20	High acid, adhesion property	MEK/TOL =63/37
	UR-8300	30	15	30,000	23	3 ~ 4	< 1	Adhesion property, toughness	MEK/TOL =50/50
Low Tg	UR-3210	30	35	40,000	-3	2 ~ 3	< 1	Good adhesion, toluene free	MEK=100
	UR-3500	40	12	13,000	10	9	35	High acid, adhesion property	MEK/TOL =82/18
	UR-6100	45	100	25,000	-30	4 ~ 6	< 1	Low Tg, no yellowing grade	CHX/ARM/IPH =40/40/20

TOL : Toluene CHX : Cyclohexanone ARM : Aromatic solvent IPH : Isophorone

Characteristic values VYLOMAX™ (Polyamideimide)

Grade	Solid content (wt%)	Solution Viscosity (dPa·s/25°C)	Molecular weight (Mn)	Tg (°C)	Modulus (GPa)	Coefficient of thermal expansion ($\times 10^{-5}/^{\circ}\text{C}$)	Features	Solvent composition (Weight ratio)
HR-11NN	15	20	20,000	300	2.8	4.2	General purpose grade, toughness	NMP=100
HR-12N2	30	5	5,600	255	2.5	5	Low viscosity, reactivity	NMP/Xy/MEK =50/35/15
HR-15ET	25	4	6,000	260	2.7	5.7	Transparency, soluble in low	EtOH/TOL =50/50
HR-16NN	14	500	30,000	320	6.0	2.3	High mechanical property, low thermal expansion	NMP=100
HR-22BL	20	75	12,000	335	3.3	3.5	NMP free, high Tg	γ -BL/DMI =97/3

γ -BL : γ -Butyrolactone, DMI : 1,3-Dimethyl 2-Imidazolidinone Xy : Xylene

Laboratory scale How to dissolve VYLON™

Preparation

In case of dissolving sheet formed VYLON™, it is preferable to cut in small size (ex. 3cm × 3cm).



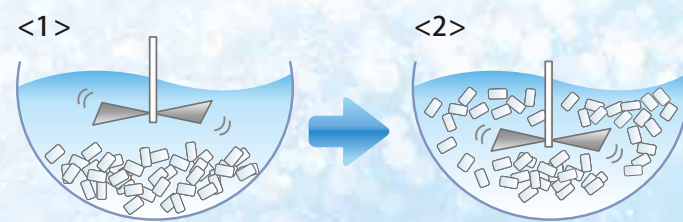
Charging and dissolving

- Charge VYLON™ and organic solvent into separable flask.
- Raise temperature up to 60-70°C.

<1> Only stirring solvent area (without touching resin) is recommended to make the resins well swelled. (1-2 hours)

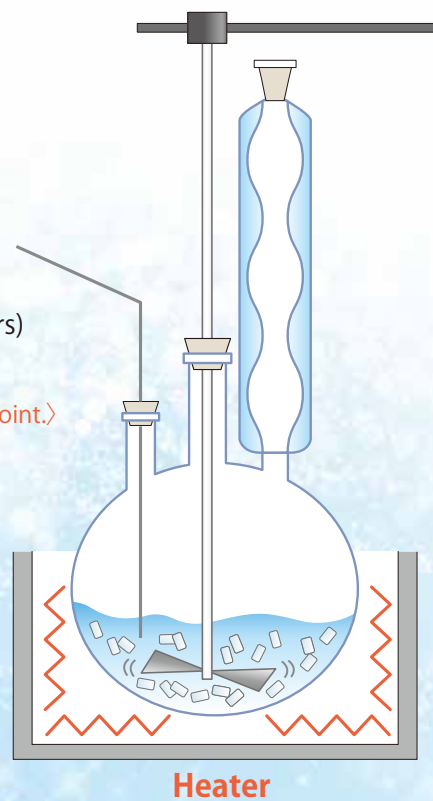
<2> Keep stirring to dissolve resin completely. (2-3 hours)

<※Be careful not to raise the temperature higher than the boiling point.>



Cooling down and filtering

Cool down to less than 40°C before filtering the solution.



Precautions when dissolving

Static electricity may be generated while handling.

Since there is a possibility of breaking fire with static electricity when handling flammable organic solvents, static electricity should be removed by neutralization apparatus or grounding, etc., and set up a good ventilation and exhaust system in the work area.

Global Network



- Head Office
- Subsidiaries
- Manufacturing

TOYOBO CHEMICALS (Thailand) Co., Ltd.

700/922 Moo 3 T.Nongkakha A. Phanthong
Chonburi 20160, Thailand
TEL: +66-3-821-2376
FAX: +66-3-821-2379

TOYOBO MC (SHANGHAI) CO., LTD.

Room 2301-A, Dawning Centre Tower B, No.500
Hongbaoshi Road, Shanghai, China
TEL: +86-21-6208-3030
FAX: +86-21-5257-0332

TOYOBO Korea Co., Ltd.

1002, 511, Yeongdong-daero, Gangnam-gu,
Seoul 06164, Korea (Samseong-dong, Trade Tower)
TEL: +82-2-555-6353
FAX: +82-2-555-6370

TOYOBO (TAIWAN) CO., LTD.

Room 702, 96 Chung Shan N. Rd., Sec. 2,
Taipei 10449, Taiwan
TEL: +886-2-2561-0325
FAX: +886-2-2537-1802

TOYOBO (THAILAND) CO., LTD.

No.944, Mitrtown Office Tower, 11th floor,
Unit 1103-1106, Rama 4 Road, Wangmai,
Pathumwan, Bangkok 10330, Thailand
TEL: +66-2-766-3942
FAX: +66-2-108-2677

TOYOBO Chemicals Europe GmbH

Berliner Allee 22, 40212 Dusseldorf, Germany
TEL: +49-211-976229-13
FAX: +49-211-976229-29

TOYOBO MC U.S.A, INC.

39555 Orchard Hill Place, Suite 230 Novi,
MI 48375, U.S.A
TEL: +1-248-449-3323
FAX: +1-248-449-3324

TOYOBO DO BRASIL LTDA.

Av. Doutor Chucri Zaidan, 771,
Vila Cordeiro, Sao Paulo, SP, Brasil
CEP 04583-913
TEL: +55-11-5509-7801
FAX: +55-11-5505-5990