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2) Please refer to the SDS (Safety Data Sheet) for safety and details.

3) This product is not designed for use in the implantation of the human body or for medical applications that come in contact with body fluid or body tissues, ASAHI GLASS CO., LTD. carries out no test as to the fitness of the product for any medical applications.

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AGC Chemicals, Fluoropolymers Group
ASAHI GLASS CO., LTD.
Shin-Marunouchi Bldg.,1-5-1 Marunouchi Chiyoda-ku,Tokyo 100-8405 Japan Phone: +81-3-3218-5875 Facsimile: +81-3-3218-7856
http://www.agc.com/
Fluon® Website http://www.fluon.jp/

AGC Chemicals Americas, Inc.
55 East Uwchlan Ave. Suite 201, Exton, PA 19341 USA Phone: +1-610-423-4300 Facsimile: +1-610-423-4301

AGC Chemicals Europe, Ltd.
PO Box 4, Thornton Cleveleys, Lancashire, FY5 4QD UK Phone: +44-1253-861957 Facsimile: +44-1253-861950

AGC Asia Pacific Pte. Ltd.
460 Alexandra Road #30-02, PSA Building ,119963 Singapore Phone: +65-6273-5656 Facsimile: +65-6276-8783

AGC Chemicals Trading (Shanghai) Co., Ltd.
Room 2701-2705, Metro Plaza, 555 Lou Shan Guan Road,Chang Ning Ward, Shanghai, 200051 China
Phone: +86-21-6386-2211 Facsimile: +86-21-6386-5377

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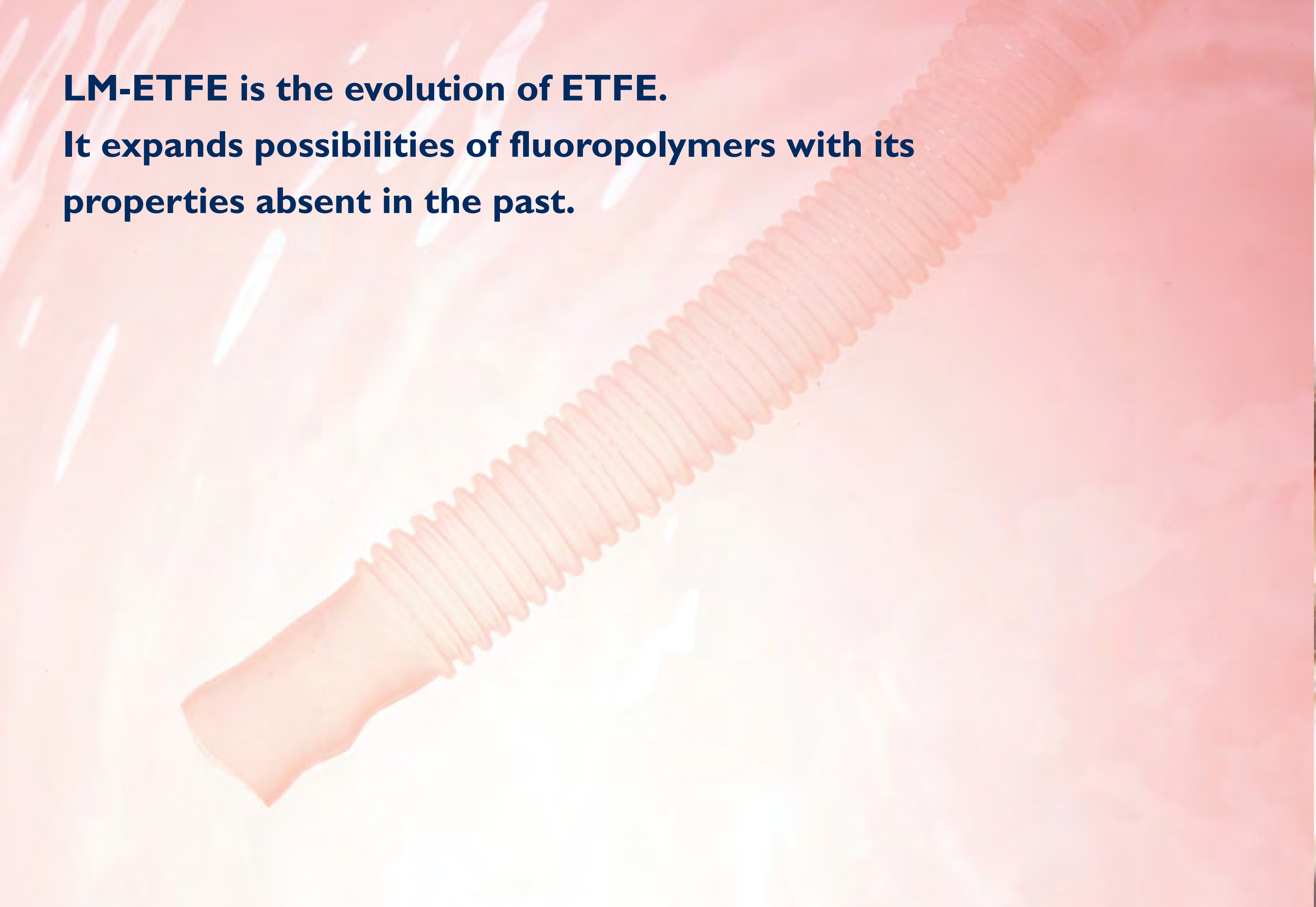
AGC Chemicals

AGC

Fluon® LM-ETFE

ETHYLENE-TETRAFLUOROETHYLENE COPOLYMER

LM-ETFE is the evolution of ETFE.
It expands possibilities of fluoropolymers with its properties absent in the past.



Fluon® LM-ETFE is a thermoplastic fluoropolymer with unique properties absent in the conventional ETFE.
Processing can be performed in various molding methods in a wide temperature range because of its superior processability.
New application can be realized, including moldings with its excellent surface smoothness, and films with its transparency, etc.

Excellent processability depends on its lower melting point.

Melting point is as low as 225°C. It has lower viscosity over 240°C, so processing is possible at temperatures 50°C lower than conventional ETFE.

Excellent heat resistance. Usable over a wide temperature range.

It has a higher heat resistance than the ETFE resin, so it is usable over a wide temperature range from -200 to 180°C. Continuous usage at 180°C is also possible. It also maintains table electrical properties.

Excellent flexibility and mechanical properties.

It has higher flexibility and mechanical strength. In particular, LM-ETFE withstands flex life for over 100,000 times. Further, LM-720AP has a higher elongation at high temperature.

Excellent chemical resistance and electrical properties.

It has excellent resistance to almost all chemical agents and solvents. It has excellent electric insulation property, and exhibits higher dielectric strength even as a thin film. In a wide frequency range, the dielectric constant similar to that of the conventional ETFE is presented.

Nonflammable and safety

Nonflammable material conforming to UL standards 94V-O. Tasteless, odorless and nonpoisonous. Recommended for the food industry. Moreover, Fluon® LM-ETFE is US FDA compliance, and registered in the inventory of Food Contact Substances at #481.

High transparency

It has higher transparency than the conventional ETFE from visible to ultraviolet range.

Excellent surface property

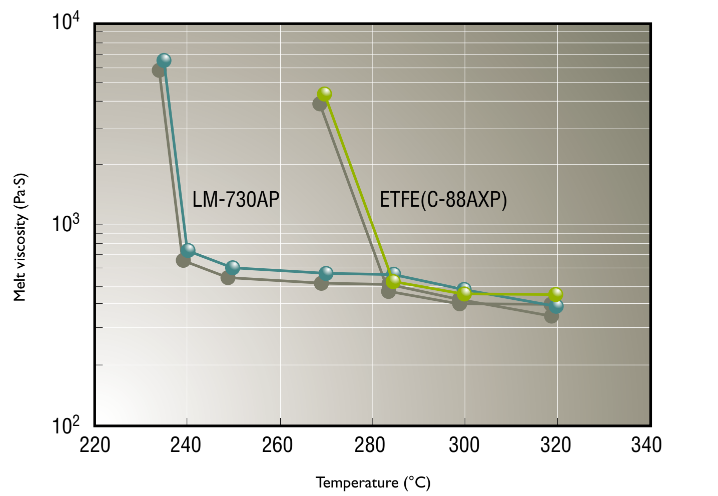
It possesses lower frictionality, anti-stick, and excellent water and oil repellency. It possesses higher surface smoothness, and reduces resistance of fluids.

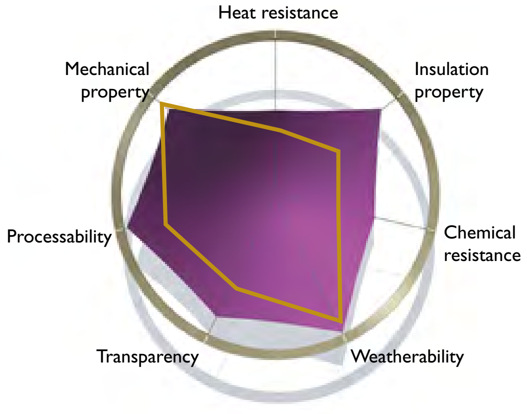
LM-ETFE   ETFE

Thermal magic in ETFE
Lower melting point fluoropolymer with improved heat resistance

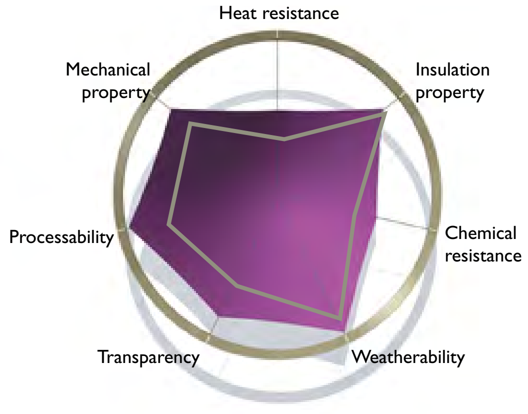
Heat resistance and lower melting point. This insoluble contradiction is solved by our advanced technique. ETFE resin now becomes easier to use with better performance. Fluon® LM-ETFE is a thermoplastic fluoropolymer developed by Asahi Glass Co, Ltd,. The melting point of LM-ETFE is lower by 30 to 40°C than conventional ETFE, enabling processing over a wider temperature range with remarkably improved processability. LM-ETFE has better heat resistance than conventional ETFE. Optimum properties have been pursued to fit the needs at actual production sites. It is a magic in fluorine chemistry, realized by Asahi Glass Co., Ltd.

□ Temperature dependence on melt viscosity (Orifice 1mmø x 10mm, shear rate 60.8/sec)





〈LM-ETFE and PVdF in Comparison〉

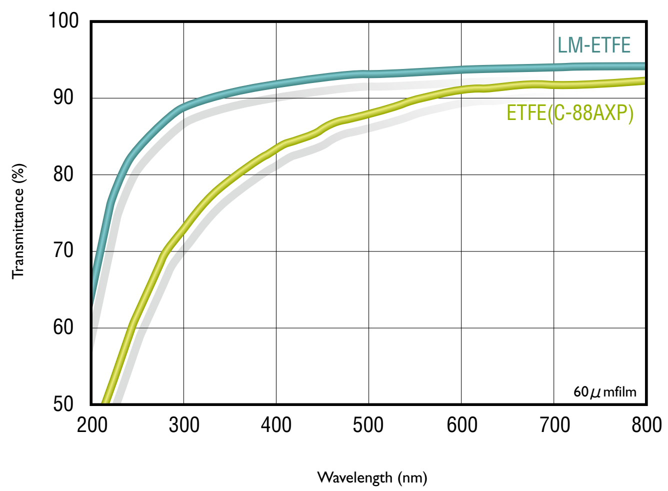


〈LM-ETFE and ECTFE in Comparison〉

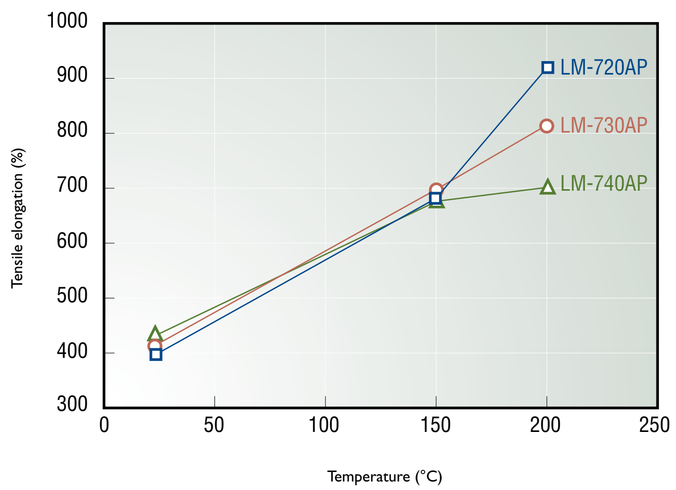
Properties

	Item	Test Method	Units	Fluon® LM-ETFE	Fluon® ETFE
	Item	Test Method	Units	LM-720AP	C-88AXP
Physical Properties	MFR	ASTM-D3159(297℃× 49N)	g/10min	10～20	12
	Specific gravity	ASTM-D792		1.78	1.74
	Melting point	DSC	°C	225	260
	Glass transition temperature		°C	65	80
	Continuous service temperature		°C	180	150
	Linear thermal expansion coefficient	ASTM-D696	10^{-5}/k	11～14	11～14
	Heat distortion temperature (181N)	ASTM-D7207	°C	43	63
	10% weight loss temperature	TGA	°C	410	390
	Specific heat		kJ/ (kg・K)	1.2	1.2
	Thermal conductivity	ASTM-D177	W/(m・K)	0.17	0.17
	Gas permeability (oxygen)	ASTM-D1434	10^{-16}mol・m/m^2・s・Pa	4.7	3.1
	Gas permeability (nitrogen)	ASTM-D1434	10^{-16}mol・m/m^2・s・Pa	1.6	1.0
	Flammability	UL94V		V-0	V-0
	Poisson's ratio			0.44	0.43
Mechanical properties	Tensile strength at break	ASTM-D638	MPa	43	48
	Tensile elongation at break	ASTM-D638	%	380	415
	Flexural strength	ASTM-D790	MPa	27	25
	Flexural modulus	ASTM-D790	MPa	716	890
	Compression modulu	ASTM-D695	MPa	590	720
	Durometer hardness	D method		65	67
	Stress crack resistance	Mandrel Wrap method	Numbers of cracks/tests=0/3(OK)	0/3 (OK)	0/3 (OK)
Electrical properties	Dielectric constant	ASTM-D150 10^3Hz		2.4	2.5
		10^6Hz		2.4	2.5
	Dielectric loss tangent	ASTM-D150 10^3Hz		0.0007	0.0007
		10^6Hz		0.0082	0.0080

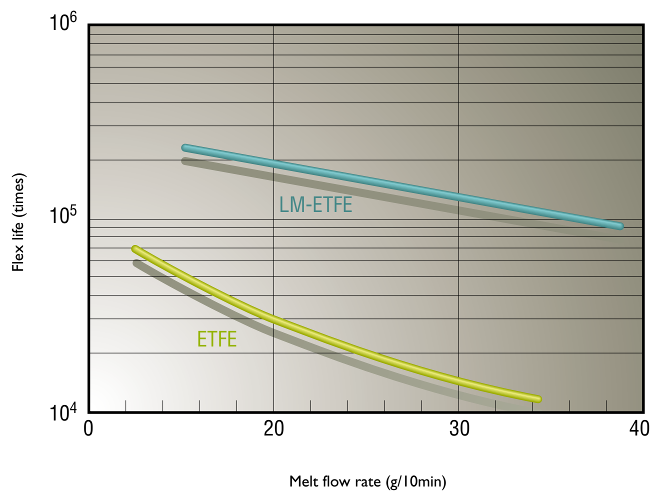
Ultraviolet to visible absorption spectrum 60μmfilm



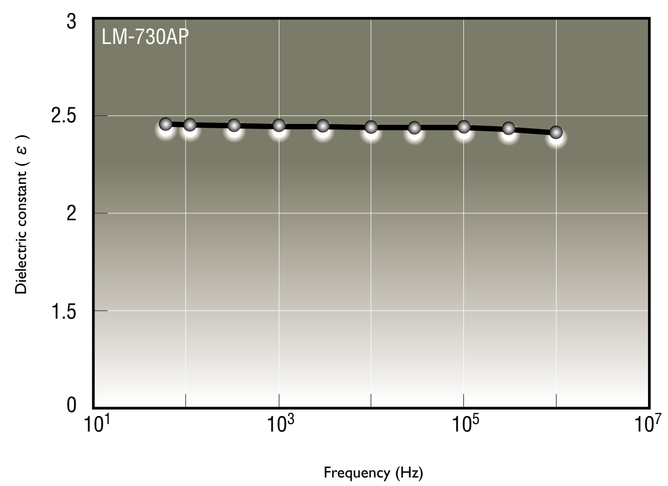
Temperature dependence on tensile elongation



Folding endurance (MIT method at room temperature)



Frequency dependence on dielectric constant (at 25°C)



Grades

Grade	MFR(ASTM-D3159)
LM-720AP	10～20 g/10min
LM-730AP	20～30 g/10min
LM-740AP	30～40 g/10min

Fluoropolymer as Environment-symbiotic Technology

Nowadays, environmental protection is regarded as the highest priority theme in every industrial field. Fluoropolymer and fluoroelastomer have been applied into environmental friendly products and process techniques. The properties of fluoropolymer and fluoroelastomer such as weatherability, nonflammability and chemical resistance, give longer life to various products and save resources and reduce industrial wastes. For examples, Fluon® ETFE is used for fuel hose of automobile to reduce its fuel permeation, and F-CLEAN® ETFE film is used as film for agricultural house because of its long life. AGC helps your continuous effort for environment protection, through our development, improvement, and enhanced applications of these products. Simultaneously, AGC as a manufacturer of fluorine chemicals establishes recycling process technique and anti-pollution process technique in actual production sites, to continuously effort to reduce the environmental load by the fluorine products themselves. AGC believes that the technology of fluoropolymer with advantageous possibilities contributes to solve environmental problems and plays an important role in realizing a safe and comfortable society of environment-symbiotic type.