

# FTR™

Aromatic Hydrocarbon Resin



Mitsui Chemicals

# FTR™

**FTR™** is an Aromatic Hydrocarbon Resin developed by **mitsui chemicals, inc.** for use in hot melt adhesives, varieties of adhesive tapes and toner materials for copy machine on the basis of its proprietary oligomer manufacturing technology.



**FTR™** is colorless and transparent and shows excellent heat resistance, low odor, good compatibility with various plastics and elastomers, excellent high-temperature adhesion and color stability when used as tackifier.

Because of these characteristics, **FTR™** is used in the area of adhesive tapes using cellophane, polyester, polypropylene, etc. as their substrates. **FTR™** is also used widely in hot melt adhesives are made from EVA, EEA, SIS, SBS, SEBS etc.

Also, with its unique physical properties and characteristics, **FTR™** has found the use in varieties of other specialty areas like toner, thermal ink ribbon, just to name a few.

位置付け

## Hydrocarbon resins

### Natural

- Rosin, and rosin derivatives
- Terpene and modified terpene resin
- Terpene-phenol resin

### Synthetic

- Petroleum resin
  - C5(Aliphatic)
- Hydrogenated Petroleum resin
  - C9(Aromatic)
  - C5/C9(Copolymer)
- Synthetic aromatic resin**
- DCPD resin
- Coumarone resin
- Coumarone-Indene resin

特徴

## Characteristics of FTR™

1. Good color and heat stability
2. Good compatibility with various plastics, elastomers and wax
3. Good solubility in various solvents
4. Good adhesion at high temperature

# Grades and physical properties of FTR™

## Grades

Zero Series	$\alpha$ -Methyl styrene Homo polymer
2000 Series	$\alpha$ -Methyl styrene/Styrene copolymer
6000 Series	Unique-aromatic monomer / aliphatic monomer copolymer
7000 Series	Unique-aromatic monomer / $\alpha$ -Methyl styrene/Aliphatic monomer copolymer
8000 Series	Unique-aromatic monomer Homo polymer
FMR Series	Unique-aromatic monomer /Aromatic monomer copolymer

## Physical properties (Representative Values)

			Zero series		2000 series	
Physical Properties	methods	Unit	FTR 0100	FTR 0120	FTR 2120	FTR 2140
Appearance	MCI method	—	White flake		White flake	
Softening point	JIS K2207	°C	100	120	120	140
Color	JIS K0071-2	Grd.No.	<1	<1	<1	<1
		Hazen/APHA	30	100	125	100
Acid value	JIS K0070	KOHmg/g	<0.1	<0.1	<0.1	<0.1
Specific gravity		—	1.04	1.08	1.07	1.07
T <sub>g</sub>		°C	45	60	65	80
Melt viscosity (200°C) *Brookfield viscometer		mPa·s	280	1,160	1,040	2,750
Molecular Weight	GPC method	Mw	2,000	2,300	2,600	3,200
		Mn	1,000	1,300	1,600	1,900
		Mw/Mn	2.0	1.8	1.7	1.7
Characteristics			$\alpha$ -Methyl styrene oligomer. <b>Good compatibility with styrene phase of styrene block rubber.</b> <b>Contribution to improvement in cohesion.</b>		High molecular weight relative to softening point. <b>Contribution to improvement in cohesion</b> of hot melt adhesives.	

## Applications, Functions and Recommended Grades

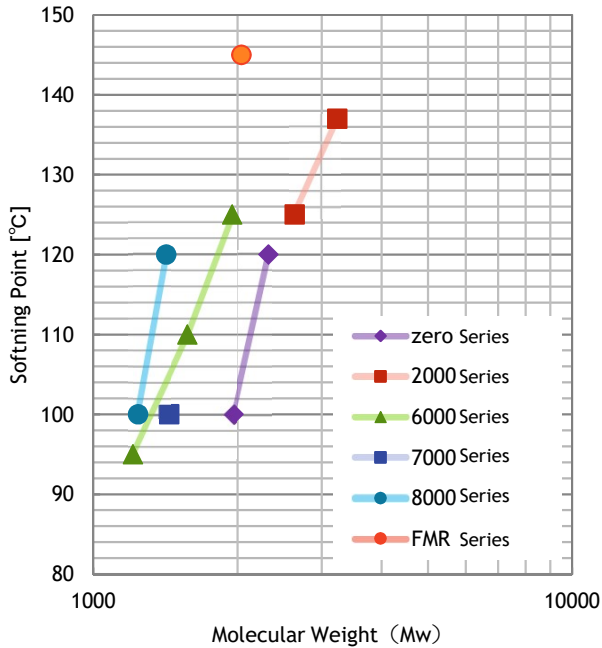
Application	Function	Recommended Grades
Hot melt adhesives	Tackifier	FTR Zero·2000·6000 Series
Acrylic adhesive	Tackifier	FTR 6000·8000 Series
Pressure sensitive tape ·Protective film/sheet	Tackifier	FTR 6000 Series
Molded film	Agent for improving Moldability	FTR 6000 Series
Sealant	Agent for giving water repellency	FTR 6000 Series
Thermal ribbon	Binder	FTR 8000 Series
Toner	Grinding medium	FTR 2000 Series
Specialty rubber	Modifier	FMR Series

6000 series			7000 series	8000 series		FMR series
FTR 6100	FTR 6110	FTR 6125	FTR 7100	FTR 8100	FTR 8120	FMR 0150
White flake			White flake	White flake		White flake
95	110	125	100	100	120	145
<1	<1	<1	<1	<1	<1	2
125	125	125	120	100	100	250
<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1.03	1.05	1.05	1.05	1.02	1.02	1.08
30	50	65	50	35	60	80
60	135	650	75	80	340	2,600
1,200	1,600	2,000	1,400	1,200	1,400	2,000
900	1,100	1,200	900	800	900	1,200
1.4	1.5	1.7	1.7	1.5	1.5	1.7
General-purpose grade. <b>Excellent compatibility with various elastomers.</b> Use as tackifier for hot melt adhesives and acrylic adhesives.			This grade has improved <b>more compatible with styrene phase of SBR's than 6000 series.</b>	This grade shows <b>excellent heat stability</b> and used for hot melt adhesives where high quality finish is required. Good compatibility with acrylic adhesives,.		This grade has <b>high softening point.</b> Contribution to improvement in heat resistance of SBR.

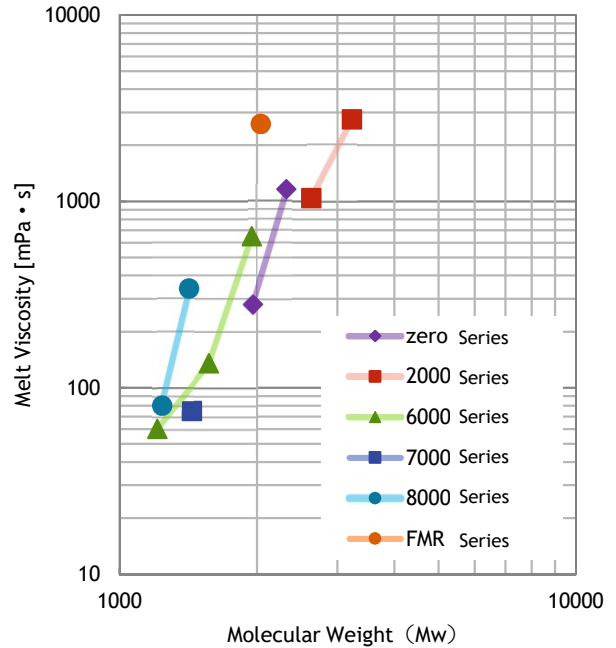
FTR 0100, FTR 0120, FTR 2120, FTR 2140, are comply with " FDA 21 CFR§ 175.105. Adhesives. "

# Physical Properties of FTR™

## Molecular Weight vs Softening Point

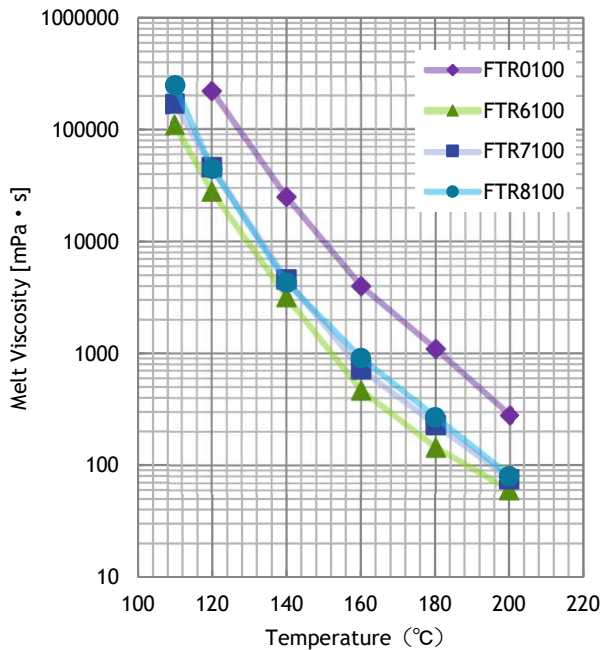


## Molecular Weight vs Melt Viscosity (at 200°C)



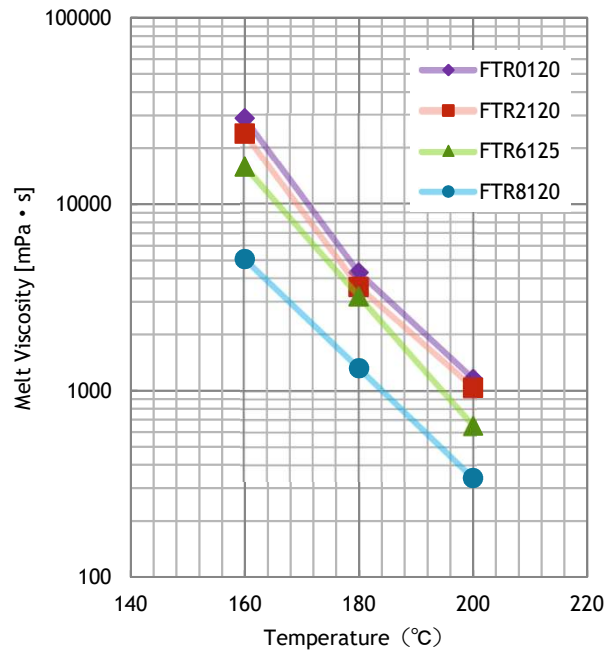
## Temperature vs Melt Viscosity

Comparison made among grades having a softening point of 100°C

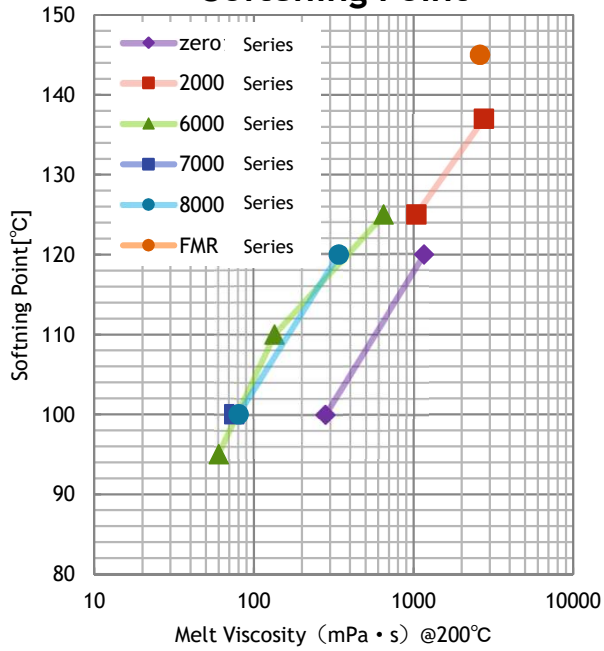


## Temperature vs Melt Viscosity

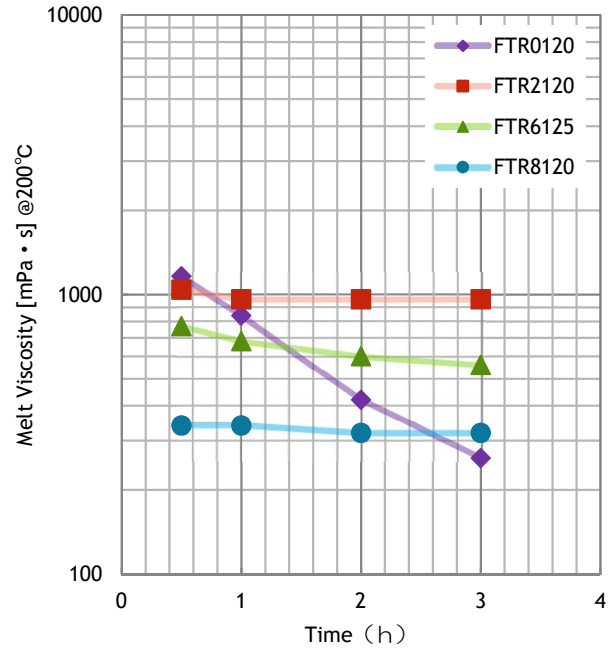
Comparison made among grades having a softening point of 120°C



### Melt Viscosity vs Softening Point

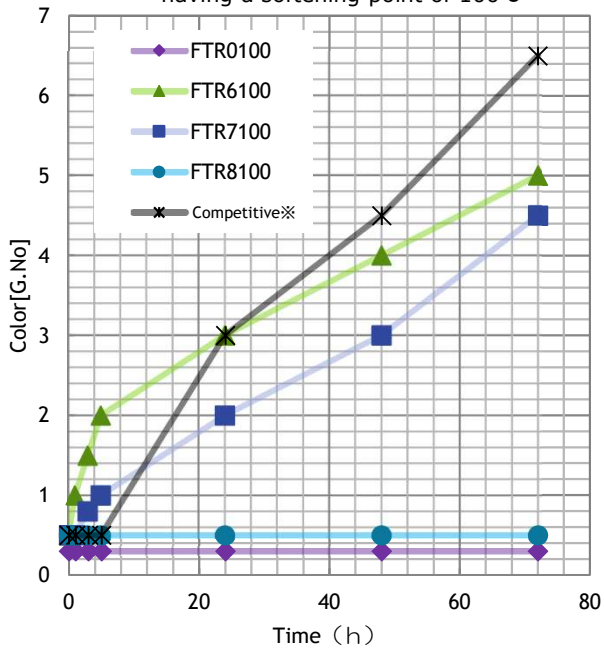


### Thermal Stability (at 200°C)



### Change in Color at 180°C

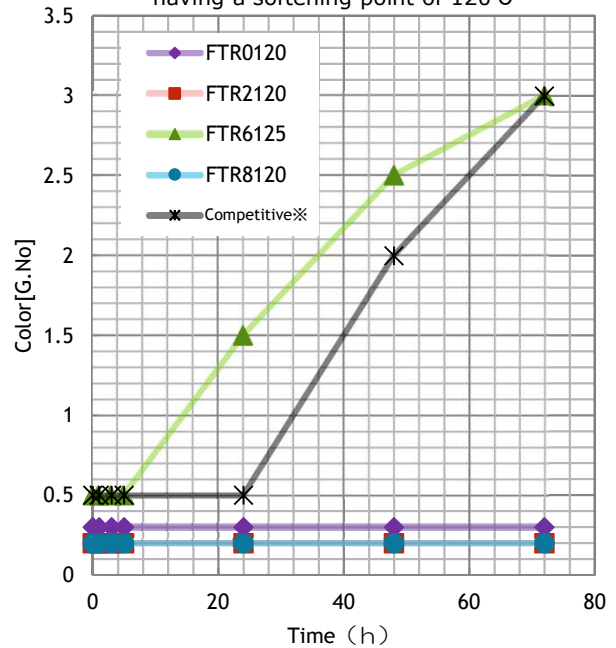
Comparison made among grades having a softening point of 100°C



※Hydrogenated Petroleum resin

### Change in Color at 180°C

Comparison made among grades having a softening point of 120°C



※Hydrogenated Petroleum resin

# Physical Properties of FTR™

FTR™/WAX=50/50 (@160°C)

	Fischer-Tropsch wax	Paraffin wax 140° F
FTR 0100	×	○
FTR 0120	×	○
FTR 6100	○	○
FTR 6125	○	○
FTR 7100	○	○
FTR 8100	○	○
FTR 8120	○	○
FMR 0150	×	○

○Transparent △Translucent ×Opaque

FTR™/elastomer=50/50 (@180°C)

	EVA (VA content[%] / MFR)						SIS
	40W (40/52)	150 (43/32)	220W (28/150)	250 (28/25)	310 (25/400)	410 (18/500)	
FTR 0100	—	—	△	—	△	—	△
FTR 0120	—	—	△	—	△	—	△
FTR 6100	—	—	○	○	○	○	○
FTR 6125	○	○	○	○	○	○	○
FTR 7100	—	—	○	○	○	○	○
FTR 8100	—	—	○	—	○	—	○
FTR 8120	—	—	○	—	○	—	○
FMR 0150	—	—	△	—	△	—	○

○Transparent △Translucent ×Opaque —ND



## FTR™/Acrylic Resin

	Solubility	
	2-ethylhexyl acrylate	2-ethylhexyl methacrylate
FTR 6100	○	○
C9 resin	×	×
DCPD resin	×	×
Method	1)Hydrocarbon resin/Acrylic resin=3/7 in toluene 2)Coating on glass, then drying	

○Transparent △Translucent ×Opaque

	Solubility
	Isobutyl methacrylate
FTR 6100	○
FTR 7100	○
FTR 8100	○
FTR 0100	○
FTR 2120	○
FMR 0150	△
method	FTR/Acrylic resin=1/1 in toluene

## FTR™/Solvent = 50/50 wt%

Hydrocarbon solvent	Hexane	○
	Heptane	○
	Octane	○
	Rubber solvent	○
	Benzene	○
	Toluene	○
	Xylene	○
	Naphtha	○
Chlorinated solvent	Carbon tetrachloride	○
	dichloroethane	○
	trichloroethylene	○
	tetrachloroethylene	○

Alcohol	Ethanol	×
	Isopropanol	×
	n-Butanol	×
	n-Octanol	△
Ketone	Acetone	○
	MEK	○
	MIBK	○
Ester	Ethyl acetate	○
	Butyl acetate	○

○Transparent △Translucent ×Opaque



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**mitsui** CHEMICALS, INC.

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HEAD OFFICE

Shiodome City Center, 1-5-2 Higashi-Shimbashi, Minato-ku, Tokyo  
105-7122

TEL: +81-3-6253-3559

FAX: +81-3-6253-4222