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INFINITE POSSIBILITIES



Garware Hi-Tech Films Limited



Garware Hi-Tech Films Limited is the first and one of the largest manufacturer & exporter of Polyester films in India. Our vertically integrated plants located at Aurangabad, India has world class facilities for producing polyester films of highest quality. We have established since 1975 and grown to be a force to reckon within the polyester film industry.

We are continuously diversifying to meet new challenges and reach new horizons.

We have a wide product range with films for Packaging, Industrial, Electrical & electronic components, Graphic arts, Labels, Speciality Film, Safety and Windows Films. With thickness ranging from 10 microns to 350 microns to serve the various needs of different industries.

We are an ISO 9001:2015 company with a customer base that spans the globe.

APPLICATIONS:

Packaging Applications:

Food packaging general uses, film for flexible pouches, peel-able seals, lids, snacks, barrier films, can laminations, liquid packaging, Heat sealable films.

Industrial Applications:

Photo-resist films,,Metallic yarns Adhesive tapes Plastic cards (including “smart” cards) Lamination films,,Medical applications,,Films for transfer printing Fiberglass Reinforced Panels, Printing Ink Duct., Montage, Musical Drums, Siliconising, Thermal Lamination, SEQUEIN, Label Base film for Safety and Window films.



Garware Hi-Tech Films Limited

Electrical & Electronics Components:

Hermetically sealed compressor motors for refrigerator and air conditioner, Motor Insulation, Transformer insulation films, Membrane touch switches (computer and calculator keyboards), Flexible printed circuit films, General purpose electrical insulation (EIP).

Graphic Arts:

Printing and pre-press films, Laser drafting film, Printing plates, Drawing office drafting film, Wide format displays, Reprographics

Speciality Films :

High and Medium Shrink films for shrink labels

Peelable sealable film for lidding with & without Antifog effect (GARSEAL, PS2, PSAF).

HSAF for Lock seal, Silicone PT016, PT026 for release liner

Component for Solar Back sheet - EM6HR, EM6-LO-HR & EM6LOCOEX-HR

Capabilities:

We have In-line coating, Off-line coating, and Corona Treatment and Co-extrusion capabilities for value added polyester film products.

Offline coated products for Label Application. Variety of Extrusion lamination on BOPET & BOPP film.

PRODUCT RANGE

Sr. No	Name of product	Main Feature	Available thickness(μ)	Pretreatment	Main application
Packaging Films					
1	ER	Slightly Hazy film	10, 12, 15, 18	No	Flexible Packaging, Lamination, Metallising
2	ERC	one side corona traetment	10, 12, 15, 23	corona	Flexible Packaging, Lamination, Metallising & General purpose application
3	ERT-PT069	One side chemically coated Film for better Metal & Ink adhesion.	10, 12	Co-Polyeter	Packaging, Lamination & Metallising with improved bond strength
4	ERT-PT007	One side chemically coated Film for better Metal & Ink adhesion.	10, 12	Acrylic	Packaging, Lamination with improved Ink adhesion.
5	ERX	Slightly Hazy film with one side corona Other side chemical	12	Chemical/ Corona	Packaging
6	METPET - Corona	One side metallised other side corona	10, 12	Corona	Packaging
Industrial					
7	ERL	Slightly hazy film with balance shrinkage	10, 12, 15, 18, 23	NO	Thermal Lamination
8	ERLT	Slightly hazy film with balance shrinkage & One side chemical coated	10, 12, 15, 18, 23	Chemical	Thermal Lamination
9	ERY	Slightly Hazy film with Nil shrinkage in TD.	13, 23	NO	Metallic Yarn.
10	EM	Clear film	75, 100, 125, 175	NO	Photo Lamination, Release, OHP
11	EMCL	Optically clear film with low haze	23, 36, 50, 75, 100, 125, 150		Sequin, OHP
Electrical & Electronics					
12	ER/ERE	Hazy film	12, 19, 23, 36, 50, 100, 125, 190, 250, 350	NO	Electrial Insulation, Cable Insulation, General purpose
13	EM6	Milky White Film	36, 50, 75, 100, 125, μ 190, 250, 300, 350	NO	Motor Insulation, Electrical laminates
14	EM6-L.O.	Milky White Film with Low oligomer content	75, 125, 190, 250, 300, 350	NO	Hermetically sealed compressor motor insulation.
Graphics					
15	ERT-PT008	Hazy film with One or Both side chemical treatment	75, 100, 125	Chemical	Industrial (Reprographic, Siliconising)
16	OPAque	Opaque	50, 100, 175		Reprographics
17	EMCL	Optically clear with low haze film	75, 100, 125		Reprographics
18	LDF	Laser Drafting Film.	75, 125		Printing Industry (CMYK)
19	TRDR	Tracing Drafting Film.	36, 50, 75, 100, 125		Screen/Offset Film, textile design & tracing, PCB design
20	GAR DIGI		125, 135, 175, 185		Photo album, Manuals, Visiting Cards, Posters, Certificates, Glow Sign Indoor Boards.

PRODUCT RANGE

Sr. No	Name of product	Main Feature	Available thickness(μ)	Pretreatment	Main application
Shrink Films					
21	High Shrink-PT814	Mono Axially Oriented Co polyester High Shrink Film	40, 45, 50	Chemical	Shrink sleeves for label application.
22	High Shrink-PT814 -UVOB	Mono Axially Oriented co polyester High Shrink Film with UV tracability.	40, 45, 50	Chemical	Shrink sleeves for label application.
23	Medium Shrink-PT814	Mono Axially Oriented co polyester Medium Shrink Film	40, 45, 50	Chemical	Shrink sleeves for label application.
24	Solid white High Shrink-PT814	Mono Axially Oriented co polyester solid white High Shrink Film.	45, 50	Chemical	Shrink sleeves for label application.
Heat Sealable					
25	PT005	Co-Extruded Film with one side Heat sealable	12, 15, 20, 23, 25, 30	-	Food Packaging, Lock seal film for trays.
26	PT055	Co-Extruded Film with one side Heat sealable	15, 20, 23, 25		FRP Bonding film, Steel Lamination
27	PT055 UV	Co-Extruded Film with one side	15, 20, 23, 25		FRP Bonding film.
Silicone Liner					
28	PT016	Release Film (Ultra Clear)	23		Release
29	PT026	Release Film	23 & 30		Release film
30	SIPET	Release Film Offline Coated	23, 30, 36, 50, 75, 100, 125		Release film
Matt Film					
31	MATT (TL)	Translucent film with medium gloss	12, 23, 50		Thermal Lamination ,Metallising
32	MATT MT-21	Translucent film with medium gloss	19, 23		Hot Stamping foil ,Release,
Lidding					
33	PS /PS2	Peelable Sealable film.	19, 21, 23, 25, 32		Lidding for APET & CPET trays
34	PSAF	Peelable Sealable film with antifog effect	21, 25, 32		Lidding for APET & CPET trays
35	HSAF	heat sealable film with Anti Fog Effect			Lidding for APET & CPET trays
36	UPSC-PRT	Peelable Sealable film	21, 25		Lidding for APET, CPET, PS, PVC, PP Trays,
37	Garseal White Opaque	Peelable Sealable film	50		Lidding for APET, CPET, PS, PVC, PP Trays,
38	Garseal MET GLOSS	Peelable Sealable film	38, 55		Lidding for APET, CPET, PS, PVC, PP Trays, with OTR and MVTR Barrier
Components For Solar Back Sheet.					
39	EM6-HR	White film with hydraulic resistance & UV stabilizers	50	NO	Solar Back Sheet component.
40	EM6-LO-HR	Milky White film with Hydraulic resistance	190	NO	Solar Back Sheet component.
41	EM6-LO COEX-HR	2 layer PET film with UV , Hydraulic resistance film.	250	NO	Solar Back Sheet component.

► PACKAGING FILMS

Sr. No.	Properties	UNIT	Test Method	ER			
1	General						
	Thickness	mic	GPL	10	12	15	18
	Yield	m ² /Kg	GPL	71.4	59.5	47.6	39.7
	MVTR (38 Deg C, 90% RH)	gm/m ² /24 hrs	ASTM-F-1249	40	38	35	32
	OTR (23 Deg C, 65% RH)	cc/m ² /24 hrs	ASTM-D-1434	100	96	96	90
	Density	gm/cc	ASTM-D-1505	1.4			
	Wetting Tension - PT007	dyne/cm	ASTM-D-2578	NA			
	Wetting Tension - PT069						
	Wetting Tension - Corona						
2	Mechanical						
	Tensile Strength						
		MD	Kg/cm ²	ASTM-D-882	2000		
		TD	Kg/cm ²	ASTM-D-882	2000		
	Elongation						
		MD	%	ASTM-D-882	120		
		TD	%	ASTM-D-882	100		
	COF - Static (One side to other)		-	ASTM-D-1894	0.4		
3	Optical						
	Haze		%	ASTM-D-1003	4.0		
	Total Luminous Transmission		-	ASTM-D-1003	86		
	Optical Density				NA		
4	Thermal						
	Shrinkage @ 150 Deg C						
		MD	%	ASTM-D-1204	2.0		
		TD	%	ASTM-D-1204	0.4		
	Melting Point		Deg C	DSC	250		
	Coefficient of thermal expansion between		1/K (cm/cm Deg C)	-	35 x 10 ⁻⁶ (MD) 28 x 10 ⁻⁶ (TD)		
	20 Deg C 50 Deg C						
	Specific Heat @ 23 Deg C		cal/gm Deg C		0.32		

MD - Machine Direction
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 GPL - Garware Polyester Ltd Method
 NA - Not applicable

Disclaimer

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ERX	ERC				ERT - PT007		ERT - PT069		MET PET-Corona
12	10	12	15	23	10	12	10	12	12
59.5	71.4	59.5	47.6	59.5	71.4	59.5	71.4	59.5	59.5
40	42	40	37	25	42	40	42	40	NA
96	100	96	96	86	100	96	100	96	NA
1.4	1.4				1.4		1.4		1.4
40	NA				40		NA		NA
56					NA		56		NA
54	54				NA		NA		54 / 54
2000	2000				2000		2000		1800
2000	2000				2000		2000		-
110	110				110		110		70
100	100				100		100		-
0.6	0.5				0.4		0.5		
4.0	4.0				4.0		4.0		NA
86	86				86		86		NA
NA	NA				NA		NA		2.3
2.0	2.0				2.0		2.0		2.0
0.4	0.4				0.4		0.4		1.0
250	250				250		250		
NA	NA				17 x 10 ⁻⁶ (MD) 16 x 10 ⁻⁶ (TD)		19 x 10 ⁻⁶ (MD) 16 x 10 ⁻⁶ (TD)		NA
NA	NA				NA		0.32		NA

* The Films are complied with the FDA legislations
 ** ROHS / SVHC Free

general guide to material properties and not as design data.

▶ Industrial

Sr. No	Properties	UNIT	Test Method	ERL		
1	General					
	Thickness	mic	GPL	10	12	23
	Yield	m ² /Kg	GPL	71.4	59.5	31.1
	Density gm/cc	ASTM-D-1505		1.4		
	Wetting Tension (PT069) Dyne / cm	ASTM-D-2578		NA		
	Wetting Tension (PT007)			NA		
2	Mechanical					
	Tensile Strength					
	MD	Kg/cm ²	ASTM-D-882	2000		
	TD	Kg/cm ²	ASTM-D-882	2000		
	Elongation					
	MD	%	ASTM-D-882	115	115	160
	TD	%	ASTM-D-882	105	105	130
	COF - Static (One side to other)	-	ASTM-D-1894	0.4		
3	Optical					
	Haze	%	ASTM-D-1003	3.0		
	Total Luminous Transmission	-	ASTM-D-1003	86		
4	Thermal					
	Shrinkage @ 150 Deg C / 30 mins					
	MD	%	ASTM-D-1204	2.0		
	TD	%	ASTM-D-1204	1.4		
	Melting Point	Deg C	DSC	250		
	Coefficient of thermal expansion between					
	20 Deg C	1/K (cm/cm Deg C)		NA		
	50 Deg C	1/K (cm/cm Deg C)		NA		

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ERLT			ERY		EM				EM CL						
10	12	15	13	23	75	100	125	175	23	36	50	75	100	125	150
71.4	59.5	47.6	54.9	31.1	9.5	7.1	5.7	4	31.1	19.8	14.3	9.5	7.1	5.7	4.7
1.4			1.4		1.4				1.4						
56			NA		NA				NA						
40															
2000			2000	2000	2000				2000	2000	2000	2000	2000	1900	1900
2000			2000	2000	2000				2000	2000	2000	2000	2000	2000	2000
115	115	125	120	130	160	160	160	160	130	140	140	140	140	150	150
105	105	110	110	110	120	125	135	140	120	130	130	120	120	120	120
0.5			0.4		0.35				0.5	0.4					
3.0			3.5		4.0				2.0	2.5	3.0	3.5	3.5	3.5	3.5
86			86		86				86						
2.0			1.6		1.2				1.4	1.2	1.2	1.2	1.2	1.2	1.2
1.4			0		0.4				0.4	0	0	0	0	0	0
250			250		250				250						
NA			NA		NA				19 x 10 ⁻⁶ (MD)						
NA			NA		NA				16 x 10 ⁻⁶ (TD)						

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 RoHS complied
 SVHC Free

general guide to material properties and not as design data.

▶ ELECTRICAL & ELECTRONICS

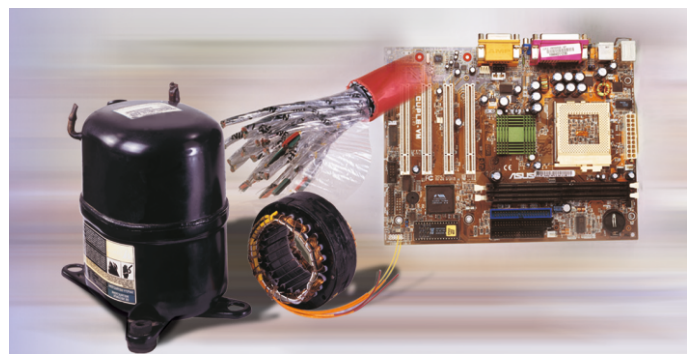
Sr. No	Properties	UNIT	Test Method	ER/ERE						
1	General									
	Thickness	mic	GPL	12	19	23	36	50	75	
	Yield	m ² /Kg	GPL	59.5	37.5	31	19.8	14.3	9.5	
	Density	gm/cc	ASTM-D-1505	1.4						
	Water Absorption (MAX)	%	ASTM-D-570	0.8						
	Service Temperature	Deg C	GPL	- 70 to 150						
	Oligomer Extraction	%	GPL	NA						
2	Mechanical									
	Tensile Strength	MD	Kg/cm ²	ASTM-D-882	2000					
		TD	Kg/cm ²	ASTM-D-882	2000					
	Elongation	MD	%	ASTM-D-882	110	120	120	140	140	150
		TD	%	ASTM-D-882	100	100	100	130	130	120
	COF - Static (One side to other)	-	ASTM-D-1894	0.5						
3	Optical									
	Haze	%	ASTM-D-1003	4.0	4.0	4.5	6.8	8.0	10.0	
4	Thermal									
	Shrinkage @ 150 Deg C / 30 mins	MD	%	ASTM-D-1204	2.0	1.8	1.8	1.4	1.4	1.2
		TD	%	ASTM-D-1204	0.4					
	Shrinkage @ 190 Deg C / 5 mins	MD	%	ASTM-D-1204	NA					
		TD	%	ASTM-D-1204	NA					
	Melting Point	Deg C	DSC	250						
	Coefficient of thermal expansion between 20 Deg C & 50 Deg C	1/K (cm/cm Deg C)		34 x 10 ⁻⁶ (MD) 28 x 10 ⁻⁶ (TD)						
	Specific Heat @ 25 Deg C	Cal/gm Deg C		NA						
5	Electrical									
	Break Down Voltage (2 nd Electrode)	KV	ASTM-D-149	3.5	4.5	5.5	7.5	9.5	12.5	
	Surface Resistivity	Ohm	ASTM-D-257	10 ¹²						
	Volume Resistivity	Ohm/m	ASTM-D-257	10 ¹⁶						
	Dielectric Constant		ASTM-D-150	NA						
	Permittivity		--	IEC 250						
		23 Deg C, 50 Hz			3.26					
		23 Deg C, 1kHz			3.24					
		23 Deg C, 10kHz			3.21					
		0 Deg C, 50 Hz			3.26					
		50 Deg C, 50 Hz			3.27					
		100 Deg C, 50 Hz			3.35					
	Dissipation Factor	150 Deg C, 50 Hz			3.65					
			--	IEC 250						
		23 Deg C, 50 Hz			0.002					
23 Deg C, 1kHz				0.0055						
23 Deg C, 10kHz				0.011						
0 Deg C, 50 Hz				0.004						
50 Deg C, 50 Hz				0.0015						
100 Deg C, 50 Hz			0.007							
150 Deg C, 50 Hz			0.006							
6	Chemical Resistance									
	Dilute Acids & Alkalis			Good						
	Concentrated Alkalis			Poor						
	Concentrated Hydrochloric Acid			Fair						
	Concentrated Sulphuric Acid			Poor						
	Grease, Oils and Fats			Good						
	Organic Solvents, Alcohol & Hydrocarbons			Good						
	Ketones, Esters and Chlorinated compounds			Fairly Good						
	Phenols, Cresols & Chlorinated phenols			Poor						

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 NA - Not applicable

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ER/ERE					EM6								EM 6 - L.O.					
100	125	190	250	350	36	75	100	125	190	250	300	350	75	125	190	250	300	350
7.1	5.7	3.7	2.8	2.0	19.8	9.5	7.1	5.7	3.7	2.8	2.3	2.0	9.5	5.7	3.7	2.8	2.3	2.0
1.4					1.4								1.4					
0.8					0.6								0.6					
- 70 to 150					- 70 to 150								- 70 to 150					
NA					1.3								0.70	0.65	0.6	0.55	0.55	0.55
1900					2000	2000	2000	1900	1900	1900	1800	1700	2100	2100	2100	2100	1900	2000
1900					2000	2000	2000	1900	1900	1900	1800	1700	2100	2100	2100	2100	1900	1700
140	140	160	180	170	150	150	165	160	160	170	170	170	145	150	170	170	170	170
120	130	140	160	170	120	125	135	140	150	150	170	170	130	150	160	170	170	170
0,35					0,35				0,3				NA					
10.0	10.0	15.0	25.0	30.0	50.0	65.0	80.0	85.0	92.0	94.0	95.0	95.0	70.0	80.0	85.0	92.0	92.0	95.0
1.2	1.2	1.2	1.0	1.0	1.4	1.2	1.2	1.2	1.0	1.0	1.0	1.0	1.6	1.2	1.0	1.0	1.0	1.0
0.4					0.2								0.4	0.2	0.2	0.2	0.2	0.2
NA					NA								3.8	3.8	3.6	3.8	2.4	2.2
NA					NA								0.8	0.8	0.8	1	0.6	0.4
250					250								250					
34 x 10 ⁻⁶ (MD)					36 x 10 ⁻⁶ (MD)								36 x 10 ⁻⁶ (MD)					
28 x 10 ⁻⁶ (TD)					23 x 10 ⁻⁶ (TD)								23 x 10 ⁻⁶ (TD)					
NA					0.32								0.32					
14	15.5	18.5	19.5	22.5	7.5	12.5	13.5	15.5	18.5	19.5	21.5	22.5	12.5	15.5	18.5	19.5	21.5	22.5
10 ¹²					10 ¹²								10 ¹²					
10 ¹⁶					10 ¹⁶								10 ¹⁶					
NA					2.8-4.0								2.8 - 4.0					
3.26					3.26								3.26					
3.24					3.24								3.24					
3.21					3.21								3.21					
3.26					3.26								3.26					
3.27					3.27								3.27					
3.35					3.35								3.35					
3.65					3.65								3.65					
0.002					0.002								0.002					
0.0055					0.0055								0.0055					
0.011					0.011								0.011					
0.004					0.004								0.004					
0.0015					0.0015								0.0015					
0.007					0.007								0.007					
0.006					0.006								0.006					
Good					Good								Good					
Poor					Poor								Poor					
Fair					Fair								Fair					
Poor					Poor								Poor					
Good					Good								Good					
Good					Good								Good					
Fairly Good					Fairly Good								Fairly Good					
Poor					Poor								Poor					

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general guide to material properties and not as design data.

▶ Graphic

Sr. No	Properties	UNIT	Test Method	GARDIGI		
1	General					
	Thickness	mic	ASTM E 252	125	135	
	Yield	m ² /Kg	GPL	5.4	5	
	Density	gm/cc	ASTM-D-1505	1.475		
2	Mechanical					
	Tensile Strength	MD	Kg/cm ²	ASTM-D-882	1700	1700
		TD	Kg/cm ²	ASTM-D-882	1700	1700
	Elongation	MD	%	ASTM-D-882	100	
		TD	%	ASTM-D-882	80	
3	Optical					
	Opacity	%	ASTM-D-1003	107	107	
	Total Luminous Transmission	%	ASTM-D-1003	6.5		
4	Thermal					
	Shrinkage @ 150 Deg C / 30 sec	MD	%	ASTM-D-1204		
		TD	%	ASTM-D-1204		

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TD - Transverse Direction

DSC - Differential Scanning Calorimeter

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▶▶ Reprographic

Sr. No	Properties	UNIT	Test Method	ERT-PT008		
1	General					
	Thickness	mic	GPL	75	100	125
	Yield	m ² /Kg	GPL	9.5	7.1	5.7
	Density	gm/cc	ASTM-D-1505	1.4		
	Wetting Tension (PT008/PT088)	dyne/cm	ASTM-D-2578	56		
2	Mechanical					
	Tensile Strength	MD/TD	Kg/cm ²	ASTM-D-882	2000	
		TD	Kg/cm ²	ASTM-D-882	2000	
	Elongation	MD	%	ASTM-D-882	140	
		TD	%	ASTM-D-882	120	
	COF - Static (One side to other)	-	ASTM-D-1894	0.5		
3	Optical					
	Haze	%	ASTM-D-1003	10.0		
	Transmission	-	ASTM-D-1003	86.0		
4	Thermal					
	Shrinkage @ 150 Deg C / 30 mins	MD	%	ASTM-D-1204	1.2	
		TD	%	ASTM-D-1204	0	
	Melting Point	° C	DSC	250		
	Coefficient of thermal expansion	20 Deg C	1/K (cm/cm Deg C)			
		50 Deg C	1/K (cm/cm Deg C)	-		

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		LDF		TRACING & DRAFTING				
175	185	75	100	36	50	75	100	125
3.8	3.6	9.5	7.1	19.8	14.3	9.5	7.1	5.7
		1.4		1.4				
1700	1700	1900	1900	2000	2000	2000	1900	1900
1700	1700	1900	1900	2000	2000	2000	1900	1900
		150		140			140	
		150		130			140	
107	107	27	27	27	27	27	27	27
		87		86.5				
1.2				1.2				
0.3				0.4				

GPL - Garware Polyester Ltd (Internal Method) NA - Not applicable

regarded as a general guide to material properties and not as a design data.

EMCL			OPAQUE			
75	100	125	50	100	125	175
9.5	7.1	5.7	13.6	6.8	5.4	3.9
1.4		1.4				
NA		NA				
2000	2000	2000	1600	1600	1600	1500
2000	2000	2000	1600	1600	1600	1500
140	150	150	125	130	140	140
120	120	120	100	110	110	110
		0.35				
2.0		---				
89		12	10	8	5	
1.2	1.2	1.2	1.2			
0.4		0.4				
250		250				
19 X 10-6(MD)		NA				
16 X 10-6(TD)		NA				

GPL - Garware Polyester Ltd (Internal Method) NA - Not applicable

regarded as a general guide to material properties and not as a design data.

► Shrink - Films

Sr. No	Properties	UNIT	Test Method	High Shrink-PT814		
1	General					
	Thickness	mic	ASTM E 252	40	45	50
	Yield	m ² /Kg	GPL	18.9	16.8	15.1
	Density	gm/cc	ASTM-D-1505	1.32		
	Wetting Tension - Coated Side 814	Dyne / cm	ASTM-D-2578	48		
	Wetting Tension - Un coated Side			42-44		
2	Mechanical					
	Tensile Strength					
		MD	Kg/cm ²	ASTM-D-882	600	
		TD	Kg/cm ²	ASTM-D-882	3100	
	Elongation					
		MD	%	ASTM-D-882	550	
		TD	%	ASTM-D-882	65	
	COF - Static (One side to other)	-	ASTM-D-1894	0.5		
3	Optical					
	Haze	%	ASTM-D-1003	5.0		
	Total Luminous Transmission	%	ASTM-D-1003	86		
	Gloss @ 60 Deg	%	ASTM-D-2457	160		
	UV Absorbance @ 380nm	%	UV spectrophotometer	---		
4	Thermal					
	Shrinkage @ 100 Deg C / 30 sec					
	(in Hot Water)					
		MD	%	GPL	< 5.0	
		TD	%	GPL	78	

MD - Machine Direction
 TD - Transverse Direction
 DSC - Differential Scanning Calorimeter

GPL - Garware Polyester Ltd (Internal Method)
 NA - Not applicable

Disclaimer

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High Shrink UVOB -PT814			Solid White Shrink -PT814		Medium Shrink -PT814		
40	45	50	45	50	40	45	50
18.9	16.8	15.1	18.9	16.8	18.9	16.8	15.1
1.32			1.32		1.32		
48			48		48		
42-44			42-44		42-44		
600			600		500		
3100			3100		3000		
550			550		550		
65			60		60		
0.5			0.5		0.5		
5.0			5.0		5.0		
86			45		86		
160			90		160		
> 0,3			---		---		
< 5.0			< 5.0		< 5.0		
78			78		< 65		

* The Films are complied with the FDA legislations
 RoHS complied
 SVHC Free

guide to material properties and not as design data.

▶▶ Heat Sealable

Sr. No	Properties	UNIT	Test Method	PT005 Plain				
1	General							
	Thickness	mic	GPL	12	15	20	23	30
	Yield	m ² /Kg	GPL	59.5	47.6	35.7	31.1	23.8
	MVTR (38 Deg C, 90%RH)	gm/m ² /24 hrs	ASTM-F-1249	30	28	25	22	20
	OTR (23 Deg C, 65 %RH)	cc/m ² /24 hrs	ASTM-D-1434	90	75	65	55	45
	Density	gm/cc	ASTM-D-1505	1.4				
	UV Absorbance @ 355 nm	%	GPL	NA				
	Wetting Tension-Corona			NA				
2	Mechanical							
	Tensile Strength							
	MD/TD	Kg/cm ²	ASTM-D-882	1750				
	Elongation							
	MD	%	ASTM-D-882	115				
	TD			100				
	COF - Static (One side to other)	-	ASTM-D-1894	0.6				
3	Optical							
	Haze	%	ASTM-D-1003	3.5	3.5	4.0	4.5	5.0
	Total Luminous Transmission	-	ASTM-D-1003	86				
4	Thermal							
	Shrinkage @ 150 Deg C / 30 mins							
	MD	%	ASTM-D-1204	2.0				
	TD	%	ASTM-D-1204	0.2				
	Melting Point	Deg C	DSC	250				
	Coefficient of thermal expansion between 20 Deg C & 50 Deg C	1/K (cm/cm Deg C)	-	19 x 10 ⁻⁶ (MD) 16 X 10 ⁻⁶ (TD)				
	Sealing temp range	Deg C	GPL	120-200				
	Heat Seal Strength HS - HS surface (min) @ 140 Deg C, 2.8 Kg/cm ² Pressure and 1 sec dual time	gm/25 mm	GPL	500	500	600	800	800

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 DSC - Differential Scanning Calorimeter
 GPL - Garware Polyester Ltd (Internal Method)
 NA - Not applicable

FDA complied
 RoHS complied
 SVHC Free

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PT005 Corona					PT055				PT055-UV			
12	15	20	23	30	15	20	23	30	15	20	23	30
59.5	47.6	35.7	31.1	23.8	47.6	35.7	31.1	23.8	47.6	35.7	31.1	23.8
30	28	25	22	20	28	25	22	20	28	25	22	20
90	75	65	55	45	75	65	55	45	75	65	55	45
1.4					1.4				1.4			
NA					NA				Min 1.8			
54					NA				NA			
1750					1750				1750			
115					115				115			
100					100				100			
0.6					0.6				0.6			
3.5	3.5	4.0	4.5	5.0	4	4.5			4	4.5		
86					86				86			
2.0					2.0				2.0			
0.2					0.2				0.2			
250					250				250			
19 x 10 ⁻⁶ (MD) 16 X 10 ⁻⁶ (TD)					19 x 10 ⁻⁶ (MD) 16 X 10 ⁻⁶ (TD)				19 x 10 ⁻⁶ (MD) 16 X 10 ⁻⁶ (TD)			
120-200					120-200				120-200			
500	500	600	800	800	500	600	800	800	500	600	800	800

PT004 - A laminate of PT004 either printed or metallised does not delaminate when tested in boiling water for 15 minutes.
 PT055-UV - This film has outstanding exterior stability to sunlight.

general guide to material properties and not as design data.

▶▶ Lidding Films

Sr No	Property	Units	Test Method	PS			
1	GENERAL						
	Thickness	micron	ASTM-E-252	21	25	32	
	Yield	m2/Kg	GPL	34	29	22.6	
	Density	g/cc	ASTM-D-1505	1.4			
	MVTR (38 Deg C, 90% RH)	g/m2/24 Hrs	ASTM-F-1249	25	22	22	
	OTR (23 Deg C, 65% RH)	cc/m2/24 Hrs	ASTM-D-3985	65	55	55	
2	MECHANICAL						
	Tensile strength						
		MD	Kg/cm2	ASTM-D-882	1800	2000	2000
		TD	Kg/cm2	ASTM-D-882	1800	2000	2000
	Elongation						
		MD	%	ASTM-D-882	100		
		TD	%	ASTM-D-882	90		
3	OPTICAL						
	Haze (Max)	%	ASTM-D-1003	10	10	10	
	Total Luminous Transmission	%	ASTM-D-1003	86			
4	THERMAL DATA						
	Shrinkage @ 150 Deg/ 30 min)						
		MD	%	ASTM-D-1204	2.0		
		TD	%		-0.2		
	Heat Seal Strength HS to HS Surface (min)@ 140 Deg C, 2.8 Kg/cm2 Pressure and 1 Sec dual time.	g/25 mm	GPL	600	600	600	

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RoHS complied
SVHC Free

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PS2			PSAF		HSAF		
22	26	33	20	25	20	25	30
32.5	27.5	21.6	35.7	28.5	35.7	28.5	23.8
1.4			1.4				
22	22	22	22	22	25	22	20
55	55	55	55	55	65	55	45
2000	2000	2000	2000	2000	1700	1700	1700
2000	2000	2000	2000	2000	1700	1700	1700
100			100		90		
90			90		80		
10	10	10	15	15	6	6	6
86			86		86		
2.0			2.0		1.8		
-0.2			-0.2		0.2		
800	800	800	700	700	800	800	800

guide to material properties and not as design data.

▶ SPECIALTY-MATTE



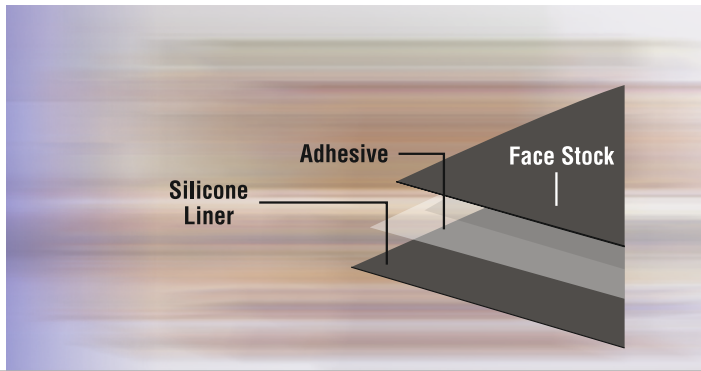
Sr. No.	Properties	UNIT	Test Method	Matte (Thermal Lamination)			Matte (MT-21)	
1	General							
	Thickness	mic	GPL	12	23	50	19	23
	Yield	m ² /Kg	GPL	59.5	31	14.3	37.6	31
	Density	gm/cc	ASTM-D-1505	1.4			1.4	
2	Mechanical							
	Tensile Strength			1900			1900	
		MD/TD	ASTM-D-882	1900			1900	
	Elongation			120			120	
		MD/TD	ASTM-D-882	120	130	150	120	
				100	120	130	100	
	COF - Static (One side to other)	-	ASTM-D-1894	0.3			0.3	
	Surface Roughness (Ra)	mic	DIN-4768	0.18	0.23	0.23	0.3	
3	Optical							
	Haze	%	ASTM-D-1003	43.0	65.0	80.0	75	65
	Gloss @ 60 Deg C	%	ASTM-D-2457	NA			35	40
4	Thermal							
	Shrinkage @ 150 Deg C / 30 mins							
		MD	ASTM-D-1204	1.8			1.4	
		TD	ASTM-D-1204	1.2			0	
	Melting Point	°C	DSC	250			250	
	Coefficient of thermal expansion between							
	20 Deg C	1/K (cm/cm Deg C)	-	19 x 10 ⁻⁶ (MD)			19 x 10 ⁻⁶ (MD)	
	50 Deg C			16 x 10 ⁻⁶ (MD)			16 x 10 ⁻⁶ (MD)	
5	Chemical Resistance							
	Dilute Acids & Alkalis			Good			Good	
	Concentrated Alkalis			Poor			Poor	
	Concentrated Hydrochloric Acid			Fair			Fair	
	Concentrated Sulphuric Acid			Poor			Poor	
	Grease, Oils and Fats			Good			Good	
	Organic Solvents, Alcohol & Hydrocarbons			Good			Good	
	Ketones, Esters and Chlorinated compounds			Fairly Good			Fairly Good	
	Phenols, Cresols & Chlorinated phenols			Poor			Poor	

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Sr. No.	Properties	UNIT	Test Method	Release Liner PT016	
1	General				
	Thickness	mic	GPL	23	
	Yield	m ² /Kg	GPL	31	
	Dyne value (uncoated side)	dyne/cm	ASTM-D-2578	40	
2	Mechanical				
	Tensile Strength at break				
		MD	Kg/cm ²	ASTM-D-882	2100
		TD	Kg/cm ²	ASTM-D-882	2100
	Elongation				
		MD	%	ASTM-D-882	130
		TD	%	ASTM-D-882	100
	Slip(COF)-Static		%	ASTM-D-1894	0.25
	Peel Strength (Tesa 7475 Tape)		g/25 mm		< 10
3	Optical				
	Haze (max)		%	ASTM-D-1003	2.5
4	Thermal				
	Shrinkage @ 150 Deg C / 30 mins				
		MD	%	ASTM-D-1204	1.4
		TD	%	ASTM-D-1204	0

guide to material properties and not as design data.

► Components For Solar Back Sheet

Sr. No.	Property	Unit	Test Method
1	General		
	Thickness	Micron	ASTM E 252
	Yield	M2/Kg	GPL
	Density	g/cc	ASTM D-1505
	Opticl Density@ 355nm		---
2	Mechanical		
	Tensile Strength at break(MD/TD)		
		MD	Kg/cm2
		TD	Kg/cm2
	Elongation		
		MD	%
		TD	%
3	Optical		
	Haze	%	ASTM D-1003
	Total Luminous Transmission	%	ASTM D-1003
4	COF- Static (One side -Other Side)	---	ASTM D 1894
5	Break Down Voltage -In Air	KV	ASTM D 149
6	Thermal		
	Shrinkage @150oC/30 min		
		MD	%
		TD	%
7	MD Elongation Retention after 60Hrs	%	PCT @ 120°c /
	MDElongation Retention after 72Hrs	%	2 bar

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EM6-HR	EM6-L.O.HR	EM6-L.O. CO-EX HR
50	190	250
28	3.8	2.9
1.4		
---	---	250
2000	2100	1650
2000	2000	1800
140	160	150
140	130	125
--	85	98
25	65	20
0.35	0.3	0.3
9.5	18.5	19.5
1.4	1.2	1.2
0	0.2	0.4
73	52	60
50	24	10

guide to material properties and not as design data.

GLOBAL PRESENCE



GARWARE PRODUCTS ARE EXPORTED TO ABOUT 85 COUNTRIES ACROSS THE GLOBE.



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