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Vandar® PBT

Thermoplastic Polyester Alloy (PBT)

Short-Term Properties Guide

Vandar® resins offer outstanding ductility and stiffness, combined with the excellent chemical and environmental resistance properties of thermoplastic polyester. These resins are easy to mold and retain their impact strength, even down to -20˚F (-29˚C).

Unfilled grades exhibit high impact while providing structural strength and stiffness. Vandar 8000 is rated V-0 in the UL94 flammability test at 1/32 in. (0.79 mm).

Reinforced grades have higher modulus and strength, while maintaining excellent toughness. The unreinforced and higher flexibility grades offer high impact with a flexibility between that of thermoplastics and elastomers.

Vandar PB T – Grade Characteristics	
Grade	**Description**
2100	Unreinforced; high impact at low temperature, paintable, printable
2500	Unreinforced; high impact, good colorability, paintable
4602Z	Unreinforced; good chemical resistance and weatherability
8000	Unreinforced; UL94 V-0 @ 1/32 in. (0.79 mm)
4612R	7% glass-fiber; high impact and toughness
4632Z	15% glass-fiber; high strength and stiffness
4662Z	30% glass-fiber; highest stiffness

Vandar PB T – Typical Molding Conditions	
Cylinder Temperature, °F (°C)	
Rear	470 (243)
Center	480 (249)
Front	490 (254)
Nozzle	490 (254)
Melt Temperature, °F (°C)	470-510 (243-266)
Mold Temperature, °F (°C)	100-250 (38-121)
Injection Pressure, psi (MPa)	
First Stage	15,000 (103)
Second Stage	14,500 (100)
Screw Speed	30% of machine range (lower if glass reinforced)
Back Pressure, psi (MPa)	Low, 0-50 (0-0.3) (none if glass reinforced)
Cushion, in. (mm)	1/8 (3.2)
Drying*	Dehumidifying hopper dryer for 3-4 hours @ 225°F (107°C) Pellet moisture content not to exceed 0.02%

* It is extremely important to dry polyester based resins such as Vandar® Therm plastic Polyester Alloys. Failure to properly dry this resin can lead to degradation during processing and loss of toughness and other physical properties. Desiccating bed hopper dryers capable of dewpoints of -20˚F (-29˚C) or lower are recommended.

Application Areas

Appliances
- Lids
- Power tool housings
- Panels

Automotive
- Brake and fuel-line clips
- Bumper facias
- Headlamp bezels/covers
- Strut dust covers
- Vertical body parts
- Wheel covers

Electrical/Electronic
- Telephone-line splice cases
- Switches
- Connectors
- Housings

Recreation
- Ski boots
- Jet ski hulls
- Snowmobile and golf cart cowls
- Ski tops

Furniture
- Seat backs and bottoms
- Kick panels
- End caps
- Lateral panels

Lawn and Garden
- Air cleaner housings
- Shrouds
- Tractor hoods and panels

Vandar® PBT Properties Guide									
Properties	**Units**	**Method**	**2100UV**	**2500**	**4602Z**	**8000**	**4216R**	**4632Z**	**4662Z**
PHYSICAL PROPERTIES									
Density	kg/cm³	ISO 1183	1230	1250	1250	1370	1300	1340	1470
Melt volume rate (MVR)	cm³/10min	ISO 1133	5.5	—	9	—	8.5	7	5.5
MVR test temperature	°C	ISO 1133	250	—	250	—	250	250	250
MVR test load	kg	ISO 1133	5	—	5	—	5	5	5
Mold shrinkage – parallel	%	ISO 294-4	1.7-2.2	1.7-2.2	1.7-2.2	2.5-2.8	0.6-0.8	0.4-0.6	0.3-0.5
Mold shrinkage – normal	%	ISO 294-4	1.7-2.2	1.7-2.2	1.7-2.2	—	1.2-1.4	1.2-1.4	1.2-1.4
Water absorption (23°C-sat)	%	ISO 62	0.45	0.45	0.45	0.45	0.45	0.45	0.45
Humidity absorption (23°C/50%RH)	%	ISO 62	0.2	—	0.2	0.2	0.20	0.20	0.2
MECHANICAL PROPERTIES									
Tensile modulus (1mm/min)	MPa	ISO 527-2/1A	1763	1450	1500	1700	2800	4000	7000
Tensile stress at yield (50mm/min)	MPa	ISO 527-2/1A	38	35	40	30	50	—	—
Tensile strain at yield (50mm/min)	%	ISO 527-2/1A	4.4	5	6	4.5	4	—	—
Nominal strain at break (50mm/min)	%	ISO 527-2/1A	174	>50	>50	>50	6	—	—
Tensile stress at 50% strain (50mm/min)	MPa	ISO 527-2/1A	26	—	26	32	—	—	—
Tensile stress at break (5mm/min)	MPa	ISO 527-2/1A	—	—	—	—	45	60	80
Tensile stress at break (50mm/min)	MPa	ISO 527-2/1A	29	—	—	—	—	—	—
Tensile strain at break (5mm/min)	MPa	ISO 527-2/1A	—	—	—	—	—	4	3.5
Tensile strain at break (50mm/min)	MPa	ISO 527-2/1A	247	—	—	50	—	—	—
Flexural modulus (23°C)	MPa	ISO 178	1674	1500	1400	1650	2700	3800	6700
Flexural strength (23°C)	MPa	ISO 178	47.0	50	45	50	75	100	130
Charpy impact strength @ 23°C	kJ/m²	ISO 179/1eU	NB	203	NB	NB	60	65	70
Charpy impact strength @ -30°C	kJ/m²	ISO 179/1eU	NB	168	NB	NB	50	62	70
Charpy notched impact strength @ 23°C	kJ/m²	ISO 179/1eU	80.0	88	70	75	14	18	20
Charpy notched impact strength @ -30°C	kJ/m²	ISO 179/1eU	19.0	9	10	15	5	8	10
Notched impact strength (Izod) @ 23°C	kJ/m²	ISO 180/1A	NB	NB	NB	NB	13	17	21
Notched impact strength (Izod) @ -30°C	kJ/m²	ISO 180/1A	—	—	10	—	—	7	10
Reverse notch impact strength (Izod) @ 23°C	kJ/m²	ISO 180/1C	—	—	NB	—	—	45	50
Reverse notch impact strength (Izod) @ -30°C	kJ/m²	ISO 180/1C	—	—	NB	—	—	45	—
Rockwell hardness	M-Scale	ISO 2039-2	109	104	101	105	111	109	112
THERMAL PROPERTIES									
Melting temperature (10°C/min)	°C	ISO 11357-1,-2,-3	225	225	225	225	225	225	225
Glass transition temperature (10°C/min)	°C	ISO 11357-1,-2,-3	60	70	60	72	60	60	60
DTUL @ 1.8 MPa	°C	ISO 75-1,-2	50	50	48	52	92	154	175
DTUL @ 0.45 MPa	°C	ISO 75-1,-2	110	125	110	127	200	210	218
Vicat softening temperature B50 (50°C/h 50N)	°C	ISO 306	137	—	130	—	170	180	190
Coefficient of linear thermal expansion (parallel)	E-4/°C	ISO 11359-2	1.3	1.3	1.2	0.89	0.4	0.25	0.15
Coefficient of linear thermal expansion (normal)	E-4/°C	ISO 11359-2	—	1.34	1.14	1.1	1.38	1.41	1.27
Flammability at thickness h	Class	UL94	HB	—	HB	V-0	HB	HB	HB
Thickness tested (h)	mm	UL94	1.6	—	0.85	0.85	0.85	1.5	1.5
Melt point (peak)	°C	ISO 3146	225	—	—	—	225	—	—
ELECTRICAL PROPERTIES									
Relative permittivity at 100Hz		IEC 60250	4.0	—	4.4	4	4.3	4.6	4.9
Relative permittivity at 1MHz		IEC 60250	3.6	—	3.9	3.6	3.8	4.1	4.3
Dissipation factor at 100Hz	E-4	IEC 60250	70	—	75	45	60	70	70
Dissipation factor at 1MHz	E-4	IEC 60250	200	—	310	170	390	290	260
Volume resistivity	Ω*cm	IEC 60093	1E12	—	1E12	1E12	>1E12	>1E12	>1E12
Surface resistivity	Ω	IEC 60093	1E14	—	1E14	1E14	>1E14	>1E14	>1E14
Electric strength	KV/MM	IEC 60243-1	24	—	24	24	26	30	33
Comparative tracking index (CTI)		IEC 60112	—	—	600	—	425	425	425

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ENGINEERED MATERIALS

celanese.com/engineered-materials

Engineered Materials

- Celanex® thermoplastic polyester (PBT)
- Hostaform® and Celcon® acetal copolymer (POM)
- Celstran,® Compel® and Factor® long fiber reinforced thermoplastic (LFRT)
- Celstran® continuous fiber reinforced thermoplastic (CFR-TP)
- Fortron® polyphenylene sulfide (PPS)
- GUR® ultra-high molecular weight polyethylene (UHMW-PE)
- Impet® thermoplastic polyester (PET)
- Riteflex® thermoplastic polyester elastomer (TPC-ET)
- Thermx® polycyclohexylene-dimethylene terephthalate (PCT)
- Vandar® thermoplastic polyester alloy (PBT)
- Vectra® and Zenite® liquid crystal polymer (LCP)

Contact Information

Americas
8040 Dixie Highway, Florence, KY 41042 USA

Product Information Service
t: +1-800-833-4882 t: +1-859-372-3244

Customer Service
t: +1-800-526-4960 t: +1-859-372-3214
e: info-engineeredmaterials-am@celanese.com

Europe
Am Unisys-Park 1, 65843 Sulzbach, Germany

Product Information Service
t: +(00)-800-86427-531 t: +49-(0)-69-45009-1011
e: info-engineeredmaterials-eu@celanese.com

Asia
4560 Jinke Road, Zhang Jiang Hi Tech Park
Shanghai 201203 PRC

Customer Service
t: +86 21 3861 9266 f: +86 21 3861 9599
e: info-engineeredmaterials-asia@celanese.com

PBT-020_VandarPBTShortTermPropBro_Global_0613