# Veradel® 3200

## Polyethersulfone

## Solvay Specialty Polymers

## Message:

Veradel® 3200 polyethersulfone (PESU) is a low melt flow, transparent grade that offers high heat deflection temperatures, excellent toughness and dimensional stability, and resistance to steam, boiling water and mineral acids. Other desirable properties include thermal stability, creep resistance and inherent flame resistance.

Veradel® 3200 is FDA compliant and is therefore approved for direct food contact.

Three other grades are available: Veradel® 3300, a medium melt flow grade suggested for general purpose injection molding; Veradel® 3400, a high melt flow grade designed for easy molding of parts with thin walls or long flow lengths; and Veradel® 3600, a very high melt flow grade suggested for compounding, especially of glass or carbon fiber reinforced compounds.

This grade was formerly marketed as Gafone™ PESU

General Information			
UL YellowCard	E36098-100168881		
Features	Acid Resistant		
	Flame Retardant		
	Food Contact Acceptable		
	General Purpose		
	Good Adhesion		
	Good Chemical Resistance		
	Good Creep Resistance		
	Good Dimensional Stability		
	Good Thermal Stability		
	Good Toughness		
	High Heat Resistance		
	High Tensile Strength		
	Hydrolysis Resistant		
	Medium Flow		
	Medium Molecular Weight		
	Medium Rigidity		
Uses	Adhesives		
	Coating Applications		
	Compounding		
	Film		
Agency Ratings	FDA Food Contact, Unspecified Rating		
RoHS Compliance	Contact Manufacturer		
Appearance	Transparent - Slight Yellow		
Forms	Powder		
Processing Method	Compounding		

# Extrusion

# Injection Molding

Specific Gravity         1,37         g/cm²         ASTM D792           Molt Mass-How Rate (MRR) (SBCYC.2.16 kg)         20         g/10 min         ASTM D1238           Molding Shrinkage - Flow         0.60         %         ASTM D955           Water Absorption (24 hr)         0.50         %         ASTM D570           Water Absorption (24 hr)         0.50         %         ASTM D570           Water Absorption (24 hr)         260         MPa         ASTM D638           Reside Modulus         2690         MPa         ASTM D638           Tensile Edongation (Yield)         6.5         %         ASTM D638           Tensile Edongation (Yield)         6.5         %         ASTM D638           Hexural Modulus         2620         MPa         ASTM D638           Hexural Modulus         2620         MPa         ASTM D50           Impact         Nominal Value         Unit         Test Method           Nominal Value         Unit         Test Method           Nominal Value         Unit         Test Method           Value Resistivity         1,76-15         AV/mm         ASTM D648           Cliff - Frow         3,5         ASTM D50         ASTM D50           Bielectric Strength	Physical	Nominal Value	Unit	Test Method
kg)         20         yf10 min         ASTM D1288           Molding Shrinkage - Flow         0.60         %         ASTM D955           Water Absorption (24 hr)         0.50         %         ASTM D970           Mechanical         19         %         ASTM D570           Mechanical         Nominal Value         Unit         Test Method           Tensile Modulus         2690         MFa         ASTM D688           Tensile Elongation (Yield)         6.5         %         ASTM D688           Flexural Modulus         2620         MFa         ASTM D780           Flexural Strength         125         MFa         ASTM D790           Impact         Nominal Value         Unit         Test Method           Impact         Nominal Value         Unit         Test Method           Impact         SE         Warm         ASTM D68           Thermal         Sominal Value         Unit         Test Method           Melectric Strength         15         C         ASTM D68           Electrical         Nominal Value         Unit         Test Method           Dielectric Strength         15         K/Ymm         ASTM D18           Dielectric Strength         15	Specific Gravity	1.37	g/cm³	ASTM D792
Water Absorption - 30 days         1.9         %         ASTM D570           Water Absorption - 30 days         1.9         %         ASTM D570           Mechanical         Nominal Value         Unit         Test Method           Tensile Modulus         2690         MPa         ASTM D638           Tensile Elengation (Yield)         6.5         %         ASTM D638           Tensile Elengation (Yield)         6.5         %         ASTM D638           Flexural Modulus         2620         MPa         ASTM D790           Flexural Strength         125         MPa         ASTM D790           Impact         Nominal Value         Unit         Test Method           Notched Izod Impact         53         J/m         ASTM D256           Thermal         Nominal Value         Unit         Test Method           Deflection Temperature Under Load (18         MPa, Annealed)         C         ASTM D648           CLTE - Flow         S2E-5         C mor/m/C         ASTM D648           Electrical         Nominal Value         Unit         Test Method           Volume Resistivity         17E+15         ohms cm         ASTM D150           Dielectric Strength         15         kV/mm         ASTM D150		20	g/10 min	ASTM D1238
Water Absorption - 30 days         1.9         %         ASTM D570           Mochanical         Nominal Value         Unit         Test Method           Tensile Modulus         2690         MPa         ASTM D638           Tensile Strength         88.9         MPa         ASTM D638           Flexural Modulus         2620         MPa         ASTM D790           Flexural Strength         125         MPa         ASTM D790           Impact         Nominal Value         Unit         Test Method           Notched Izod Impact         53         J/m         ASTM D536           Thermal         Nominal Value         Unit         Test Method           Deflection Temperature Under Load (18 MR2, Annealed)         200         "C         ASTM D648           CLTE - Flow         5.2E-5         cm/cm/"C         ASTM D649           Electrical         Nominal Value         Unit         Test Method           Volume Resistivity         1/E-15         ohms -cm         ASTM D649           Electrical         Nominal Value         Unit         Test Method           I MHz         3.51         ASTM D150         ASTM D150           I MHz         3.54         ASTM D150         ASTM D150	Molding Shrinkage - Flow	0.60	%	ASTM D955
Mechanical         Nominal Value         Unit         Test Method           Tensile Modulus         2690         MPa         ASTM D638           Tensile Strength         889         MPa         ASTM D638           Tensile Congation (Yield)         6.5         %         ASTM D638           Hexural Modulus         2620         MPa         ASTM D790           Flexural Strength         125         MPa         ASTM D790           Impact         Nominal Value         Unit         Test Method           Notched Ized Impact         53         J/m         ASTM D566           Thermal         Nominal Value         Unit         Test Method           Deflection Temperature Under Load (1.8 MPA, Annealed)         200         "C         ASTM D648           CLTE - Flow         5.2E-5         cm/cm/**C         ASTM D649           Electrical         Nominal Value         Unit         Test Method           Volume Resistivity         1.7E+15         ohms-cm         ASTM D549           Dielectric Strength         15         kV/mm         ASTM D540           1 kHz         3.51         ***         ***           1 kHz         3.54         ***         ***           Dissipation Factor	Water Absorption (24 hr)	0.50	%	ASTM D570
Tensile Modulus         2690         MPa         ASTM D638           Tensile Strength         88.9         MPa         ASTM D638           Tensile Elongation (Yield)         6.5         %         ASTM D638           Flexural Modulus         2620         MPa         ASTM D790           Flexural Strength         125         MPa         ASTM D790           Impact         Nominal Value         Unit         Test Method           Okothed Izod Impact         Nominal Value         Unit         Test Method           Deflection Temperature Under Load (1.8 MPa, Annealed)         Volume Rosistivity         ASTM D648           CLTE - Flow         5.2E-5         cm/cm/°C         ASTM D648           Electrical         Nominal Value         Unit         Test Method           Olielectric Strength         15         KW/mm         ASTM D59           Dielectric Constant         15         KW/mm         ASTM D150           60 Hz         3.51         XY/mm         ASTM D150           60 Hz         3.54         XY/mm         ASTM D150           1 MHz         3.54         XY/mm         ASTM D150           60 Hz         1.7E-3         XY/mm         ASTM D150           1 MHz <th< td=""><td>Water Absorption - 30 days</td><td>1.9</td><td>%</td><td>ASTM D570</td></th<>	Water Absorption - 30 days	1.9	%	ASTM D570
Tensile Strength         88.9         MPa         ASTM D638           Tensile Elongation (Yield)         6.5         %         ASTM D638           Flexural Modulus         2620         MPa         ASTM D790           Flexural Strength         125         MPa         ASTM D790           Impact         Nominal Value         Unit         Test Method           Notched Izod Impact         53         //m         ASTM D566           Thermal         Nominal Value         Unit         Test Method           Deflection Temperature Under Load (1.8 MPA, Annealed)         Vinit         ASTM D648           CLTE - Flow         5.2E-5         cm/cm/°C         ASTM D649           Electrical         Nominal Value         Unit         Test Method           Volume Resistivity         1.7E+15         ohrs.cm         ASTM D549           Dielectric Strength         15         kW/mm         ASTM D159           60 Hz         3.51         KW/mm         ASTM D150           1 MHz         3.54         SW/mm         ASTM D150           1 MHz         2.2E-3         KM D150         ASTM D150           1 MHz         2.6E-3         Unit         Test Method           1 MHz         5.6E-3	Mechanical	Nominal Value	Unit	Test Method
Frenche Elongation (Yield)         6.5         %         ASTM D638           Flexural Modulus         2620         MPa         ASTM D790           Flexural Strength         125         MPa         ASTM D790           Impact         Nominal Value         Unit         Teat Method           Notched Izod Impact         53         J/m         ASTM D256           Themal         Nominal Value         Unit         Teat Method           Deflection Temperature Under Load (18 MPa, Annealed)         200         "C         ASTM D648           CLTE - Flow         5.2E-5         cm/cm/"C         ASTM D648           Electrical         Nominal Value         Unit         Teat Method           Volume Resistivity         1.7E+15         ohms:cm         ASTM D150           Dielectric Strength         15         kV/mm         ASTM D150           60 Hz         3.51         V/mm         ASTM D150           1 kHz         3.54         V         ASTM D150           60 Hz         1.7E-3         ASTM D150           60 Hz         1.7E-3         V         ASTM D150           60 Hz         1.7E-3         V         ASTM D150           1 kHz         2.5E-3         V <t< td=""><td>Tensile Modulus</td><td>2690</td><td>MPa</td><td>ASTM D638</td></t<>	Tensile Modulus	2690	MPa	ASTM D638
Flexural Modulus         2620         MPa         ASTM D790           Flexural Strength         125         MPa         ASTM D790           Impact         Nominal Value         Unit         Test Method           Notched Izod Impact         53         J/m         ASTM D256           Thermal         Nominal Value         Unit         Test Method           Deflection Temperature Under Load (1.8 MPa, Annealed)         "C         ASTM D648           CLTE - Flow         5.2E-5         cm/cm/"C         ASTM D648           CLTE - Flow         5.2E-5         cm/cm/"C         ASTM D696           Electrical         Nominal Value         Unit         Test Method           Volume Resistivity         1.7E-15         ohms: cm         ASTM D150           Dielectric Strength         15         kV/mm         ASTM D150           60 Hz         3.51         S54         S54           Dissipation Factor         1.7E-3         ASTM D150           60 Hz         1.7E-3         ASTM D150           1 kHz         2.2E-3         Test Method           1 kHz         2.6E-3         Unit         Test Method           1 price from Rating <sup>1</sup> (1.50 mm)         V-0         Unit         Unit <td>Tensile Strength</td> <td>88.9</td> <td>MPa</td> <td>ASTM D638</td>	Tensile Strength	88.9	MPa	ASTM D638
Flexural Strength         125         MPa         ASTM D790           Impact         Nominal Value         Unit         Test Method           Notched Izod Impact         53         J/m         ASTM D256           Thermal         Nominal Value         Unit         Test Method           Deflection Temperature Under Load (1.8 MPa, Annealed)         200         °C         ASTM D648           CLTE - Flow         5.2E-5         cm/cm/°C         ASTM D648           Electrical         Nominal Value         Unit         Test Method           Volume Resistivity         1.7E+15         ohms cm         ASTM D257           Dielectric Strength         15         kW/mm         ASTM D150           60 Hz         3.51         W/mm         ASTM D150           1 kHz         3.50         W/mm         ASTM D150           60 Hz         1.7E-3         ASTM D150           1 kHz         2.2E-3         ASTM D150           60 Hz         1.7E-3         W/mm         ASTM D150           60 Hz         1.7E-3         W/mm         ASTM D150           1 kHz         2.2E-3         W/mm         ASTM D150           1 kHz         2.0E-3         W/mm         Method <tr< td=""><td>Tensile Elongation (Yield)</td><td>6.5</td><td>%</td><td>ASTM D638</td></tr<>	Tensile Elongation (Yield)	6.5	%	ASTM D638
Impact   Nominal Value   Unit   Test Method     Notched Izod Impact   53   1/m   ASTM D256     Thermal   Nominal Value   Unit   Test Method     Deflection Temperature Under Load (1.8 mPA, Annealed)   200 "C   ASTM D648     CLTE - Flow   5.2E - 5   cm/cm/"C   ASTM D646     Electrical   Nominal Value   Unit   Test Method     Volume Resistivity   1.7E + 15   ohms cm   ASTM D257     Dielectric Strength   15   kW/mm   ASTM D149     Dielectric Constant   3.51   ASTM D149     1 kHz   3.50   3.51     1 kHz   3.50   ASTM D150     1 kHz   3.54   ASTM D150     1 kHz   1.7E - 3     1 kHz   2.2E - 3     1 MHz   5.6E - 3     1 MHz   5.6E - 3     Flammability   Nominal Value   Unit   Test Method     Flame Rating   1.50 mm)   V-0   Unit   Test Method     Flame Rating   1.50 mm)   V-0   Unit     Dying Temperature   177   "C     Dying Temperature   149 to 163   "C     Injection Rate   Fast   Screw Compression Ratio   20.1.0     Compression Ratio   2.01.0     Comp	Flexural Modulus	2620	MPa	ASTM D790
Notched Izod Impact         53         J/m         ASTM D256           Thermal         Nominal Value         Unit         Test Method           Deflection Temperature Under Load (1.8 MPa, Annealed)         ZOO         "C         ASTM D648           CLTE - Flow         5.2E-5         cm/cm/"C         ASTM D696           Electrical         Nominal Value         Unit         Test Method           Volume Resistivity         1.7E+15         ohms·cm         ASTM D257           Dielectric Strength         15         kV/mm         ASTM D149           Dielectric Constant         3.51         STM D150           6 0 Hz         3.51         STM D150           1 kHz         3.54         STM D150           Dissipation Factor         ASTM D150           60 Hz         1.7E-3         ASTM D150           1 kHz         2.2E-3           1 kHz         5.6E-3           Flammability         Nominal Value         Unit         Test Method           Injection         Nominal Value         Unit         Test Method           Injection         Nominal Value         Unit         Test Method           Drying Temperature         177         *C           Drying Temperature	Flexural Strength	125	MPa	ASTM D790
Thermal         Nominal Value         Unit         Test Method           Deflection Temperature Under Load (1.8 MPa, Annealed)         200         "C         ASTM D648           CLTE - Flow         5.2E-5         cm/cm/"C         ASTM D696           Electrical         Nominal Value         Unit         Test Method           Volume Resistivity         1.7E+15         ohms·cm         ASTM D257           Dielectric Strength         15         kV/mm         ASTM D149           Dielectric Constant         3.51         ASTM D150           1 kHz         3.50         STM D150           1 MHz         3.54         STM D150           60 Hz         1.7E-3         STM D150           1 kHz         2.2E-3         STM D150           1 kHz         2.2E-3         STM D150           1 MHz         5.6E-3         STM D150           Flammability         Nominal Value         Unit         Test Method           Injection         Nominal Value         U	Impact	Nominal Value	Unit	Test Method
Deflection Temperature Under Load (1.8 MPa, Annealed)         200         °C         ASTM D648           CLTE - Flow         5.2E-5         cm/cm/°C         ASTM D696           Electrical         Nominal Value         Unit         Test Method           Volume Resistivity         1.7E+15         ohms· cm         ASTM D257           Dielectric Strength         15         kV/mm         ASTM D149           Dielectric Constant	Notched Izod Impact	53	J/m	ASTM D256
MPa, Annealed)         200         "C         ASTM D648           CLTE - Flow         5.2E-5         cm/cm/°C         ASTM D696           Electrical         Nominal Value         Unit         Test Method           Volume Resistivity         1.7E+15         ohms·cm         ASTM D257           Dielectric Strength         15         kV/mm         ASTM D149           Dielectric Constant	Thermal	Nominal Value	Unit	Test Method
Electrical         Nominal Value         Unit         Test Method           Volume Resistivity         1.7E+15         ohms·cm         ASTM D257           Dielectric Strength         15         kV/mm         ASTM D149           Dielectric Constant		200	°C	ASTM D648
Volume Resistivity         1.7E+15         ohms·cm         ASTM D257           Dielectric Strength         15         kV/mm         ASTM D149           Dielectric Constant	CLTE - Flow	5.2E-5	cm/cm/°C	ASTM D696
Dielectric Strength         15         kV/mm         ASTM D149           Dielectric Constant         ASTM D150           60 Hz         3.51         ************************************	Electrical	Nominal Value	Unit	Test Method
Dielectric Constant         ASTM D150           60 Hz         3.51	Volume Resistivity	1.7E+15	ohms·cm	ASTM D257
60 Hz         1 kHz       3.50         1 MHz       3.54         Dissipation Factor       ASTM D150         60 Hz       1.7E-3         1 kHz       2.2E-3         1 MHz       5.6E-3         Flammability       Nominal Value       Unit       Test Method         Injection       Nominal Value       Unit         Drying Temperature       177       °C         Drying Time       2.5       hr         Processing (Melt) Temp       343 to 385       °C         Mold Temperature       149 to 163       °C         Injection Rate       Fast         Screw Compression Ratio       2.0:1.0	Dielectric Strength	15	kV/mm	ASTM D149
1 kHz       3.50         1 MHz       3.54         Dissipation Factor       ASTM D150         60 Hz       1.7E-3	Dielectric Constant			ASTM D150
1 MHz       3.54         Dissipation Factor       ASTM D150         60 Hz       1.7E-3	60 Hz	3.51		
Dissipation Factor         ASTM D150           60 Hz         1.7E-3           1 kHz         2.2E-3           1 MHz         5.6E-3           Flammability         Nominal Value         Unit         Test Method           Injection         Nominal Value         Unit           Drying Temperature         177         °C           Drying Time         2.5         hr           Processing (Melt) Temp         343 to 385         °C           Mold Temperature         149 to 163         °C           Injection Rate         Fast           Screw Compression Ratio         2.0:1.0	1 kHz	3.50		
60 Hz       1.7E-3         1 kHz       2.2E-3	1 MHz	3.54		
1 kHz       2.2E-3         1 MHz       5.6E-3       Test Method         Flammability       Nominal Value       Unit       Test Method         Injection       Nominal Value       Unit         Drying Temperature       177       °C         Drying Time       2.5       hr         Processing (Melt) Temp       343 to 385       °C         Mold Temperature       149 to 163       °C         Injection Rate       Fast         Screw Compression Ratio       2.0:1.0	Dissipation Factor			ASTM D150
1 MHz5.6E-3FlammabilityNominal ValueUnitTest MethodFlame Rating 1 (1.50 mm)V-0UnitInjectionNominal ValueUnitDrying Temperature177°CDrying Time2.5hrProcessing (Melt) Temp343 to 385°CMold Temperature149 to 163°CInjection RateFastScrew Compression Ratio2.0:1.0	60 Hz	1.7E-3		
Flammability Nominal Value Unit Test Method  Flame Rating <sup>1</sup> (1.50 mm) V-0 UL 94  Injection Nominal Value Unit  Drying Temperature 177 °C  Drying Time 2.5 hr  Processing (Melt) Temp 343 to 385 °C  Mold Temperature 149 to 163 °C  Injection Rate Fast  Screw Compression Ratio 2.0:1.0	1 kHz	2.2E-3		
Flame Rating <sup>1</sup> (1.50 mm)  V-0  UL 94  Injection  Nominal Value  Unit  Drying Temperature  177  °C  Drying Time  2.5  hr  Processing (Melt) Temp  343 to 385  °C  Mold Temperature  149 to 163  °C  Injection Rate  Fast  Screw Compression Ratio  2.0:1.0	1 MHz	5.6E-3		
InjectionNominal ValueUnitDrying Temperature177°CDrying Time2.5hrProcessing (Melt) Temp343 to 385°CMold Temperature149 to 163°CInjection RateFastScrew Compression Ratio2.0:1.0	Flammability	Nominal Value	Unit	Test Method
Drying Temperature 177 °C  Drying Time 2.5 hr  Processing (Melt) Temp 343 to 385 °C  Mold Temperature 149 to 163 °C  Injection Rate Fast  Screw Compression Ratio 2.0:1.0	Flame Rating <sup>1</sup> (1.50 mm)	V-0		UL 94
Drying Time2.5hrProcessing (Melt) Temp343 to 385°CMold Temperature149 to 163°CInjection RateFastScrew Compression Ratio2.0:1.0	Injection	Nominal Value	Unit	
Processing (Melt) Temp 343 to 385 °C  Mold Temperature 149 to 163 °C  Injection Rate Fast  Screw Compression Ratio 2.0:1.0	Drying Temperature	177	°C	
Mold Temperature 149 to 163 °C Injection Rate Fast Screw Compression Ratio 2.0:1.0	Drying Time	2.5	hr	
Injection Rate Fast Screw Compression Ratio 2.0:1.0	Processing (Melt) Temp	343 to 385	°C	
Screw Compression Ratio 2.0:1.0	Mold Temperature	149 to 163	°C	
·	Injection Rate	Fast		
Extrusion Nominal Value Unit	Screw Compression Ratio	2.0:1.0		
	Extrusion	Nominal Value	Unit	

Drying Temperature	177	°C	
Drying Time	2.5	hr	
Cylinder Zone 1 Temp.	335 to 391	°C	
Cylinder Zone 2 Temp.	335 to 391	°C	
Cylinder Zone 3 Temp.	335 to 391	°C	
Cylinder Zone 4 Temp.	335 to 391	°C	
Cylinder Zone 5 Temp.	335 to 391	°C	
Adapter Temperature	327 to 371	°C	
Melt Temperature	343 to 391	°C	
Die Temperature	327 to 371	°C	
NOTE			

These flammability ratings are not intended to reflect hazards presented by these or any other materials under actual fire conditions.

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