Ticona Introduces New Line of Flame Retardant Celanex® PBT

Celanex® 14 Series PBTs Meet UL94-V0 Specs in Thinner Walls; Also Aid Processing with Higher Flow and Faster Cycle Times

Summit, New Jersey; Kelsterbach, Germany, Sept. 24, 2003 – Ticona has introduced a line of flame retardant polybutylene terephthalate (PBT) resins, the Celanex® 14 Series resins, having improved performance and processability. The new line, which includes two unfilled grades and three glass fiber-reinforced grades, is expected to be used in connectors, housings, relays, switches, motor end caps, and other electrical and electronic applications.

Celanex® 14 Series flame retardant resins provide flame retardancy in exception-ally thin-walled components. The 30 percent glass-filled grade, for example, meets the UL94-V0 specification for flame retardancy at wall thicknesses down to 0.39 mm. Competing PBT resins satisfy this specification at wall thicknesses of 0.71 mm or more.

The new line offers better processability than competing PBTs, e.g., they provide 15 to 20 percent higher flow and 10 to 15 percent faster cycle times. In general, they also have a wider processing window, greater thermal stability during processing, and better mechanical strength and electrical properties than comparable PBTs from other producers.

"We've tailored the 14 Series line to meet the needs of today's market," says Ken Fletcher, Product Marketing Manager for Polyesters. "Since these PBTs process easier, they help manufacturers reduce part cost. Their higher flow and lower fill pressure and barrel temperature translate into faster cycle times, less energy use, and better productivity and throughput. Given the many benefits they offer, we plan to extend the technology used to create them to other polyester resin families that we offer."

The five grades in the 14 Series line of flame retardant PBT resins are:
· Celanex® 3314 PBT, a 30 percent glass fiber reinforced grade,
· Celanex® 3214 PBT, a 15 percent glass fiber reinforced grade,
· Celanex® 3114 PBT, a 7.5 percent glass fiber reinforced grade,
· Celanex® 2014 PBT, an unfilled grade, and
· Celanex® 4014 PBT, an unfilled and toughened grade.

Celanex® 14 Series PBTs are available globally in natural and black, and can be custom-colored for specific end uses. They also are non-blooming, so molded parts are essentially free of surface deposits, which eliminates post-molding cleanup and improves appearance. Parts made with these resins can contain up to 25 percent regrind.

Additional Information Available
For information on Celanex® 14 Series PBTs and other Celanex® PBT resins, contact: Ticona, 90 Morris Avenue, Summit, New Jersey, 07901, USA. Phone: 1-800-833-4882 or 1-908-522-7500. Email: **prodinfo@ticona.com**. In Europe: Ticona GmbH, Professor-Staudinger-Straße, D-65451 Kelsterbach, Germany. Phone: +49-(0)180-584-2662 (DE) or +49-(0)693-051-6299 (EU). Email: **infoservice@ticona.de**. Or visit **http://www.ticona.com**.

Data sheets for specific Celanex® 14 Series PBT resins can be found online for:
· **Celanex® 3314 PBT**
· **Celanex® 3214 PBT**
· **Celanex® 3114 PBT**
· **Celanex® 2014 PBT**
· **Celanex® 4014 PBT**

About Ticona and Celanese
Ticona, the technical polymers business of Celanese AG, Frankfurt, produces and markets a broad range of engineering polymers and achieved sales of € 757 million in 2002. Ticona has approximately 2,400 employees at production, compounding and research facilities in the USA, Germany and Brazil.

Celanese AG is a global chemicals company with leading positions in its key products and world class process technology. The Celanese portfolio consists of five main businesses: Acetyl Products, Intermediates, Acetate Products, Technical Polymers Ticona and Performance Products.

Celanese AG generated sales of around € 4.3 billion in 2002 and has about 10,700 employees. The company has 25 production plants and six research centers in 11 countries mainly in North America, Europe and Asia. Celanese AG shares are listed on the Frankfurt Stock Exchange (symbol CZZ) and on the New York Stock Exchange (symbol CZ).

*For further information about Ticona and Celanese, please visit our websites: **http://www.ticona.com** and **http://www.celanese.com**.*

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CELANEX® 3314 - Data Sheet

Celanex 3314 is a flame retarded, 30% glass reinforced polybutylene terephthalate providing a good balance of mechanical and electrical properties. This grade is rated UL94 V-0 down to 0.028 inch thick and is recommended for all electrical/electronic applications. Celanex 3314 is non-exuding.

Property	Method	Value	Units
Physical Properties			
Density	ISO 1183	1670	kg/m^3
Mechanical Properties			
Tensile modulus (1mm/min)	ISO 527-2/1A	10000	MPa
Tensile stress at break (5mm/min)	ISO 527-2/1A	136	MPa
Tensile strain at break (5mm/min)	ISO 527-2/1A	2.6	%
Flexural modulus (23°C)	ISO 178	10000	MPa
Flexural strength (23°C)	ISO 178	210.0	MPa
Charpy notched impact strength @ 23°C	ISO 179/1eA	7.9	KJ/m^2
Notched impact strength (Izod) @ 23°C	ISO 180/1A	8	KJ/m^2
Notched impact strength (Izod) @-30°C	ISO 180/1A	8	KJ/m^2
Thermal Properties			
DTUL @ 1.8 MPa	ISO 75-1, -2	210	°C
DTUL @ 0.45 MPa	ISO 75-1, -2	220	°C
Coeff. of linear therm expansion (parallel)	ISO 11359-2	0.2	E-4/°C
Flammability at thickness h	UL94	V-0	Class
thickness tested (h)	UL94	0.39	mm
Electrical Properties			
Volume resistivity	IEC 60093	>1.0E14	ohm-m
Surface resistivity	IEC 60093	>1.0E17	ohm
Electric strength	IEC 60243-1	33	KV/mm

Processing Conditions:

Parameter	Range	Units
Rear temperature	450-470(230-240)	°F (°C)
Center temperature	460-480(235-250)	°F (°C)
Front temperature	470-500(240-260)	°F (°C)
Nozzle temperature	480-500(250-260)	°F (°C)
Melt temperature	460-500(235-260)	°F (°C)
Mold temperature	150-200(65-93)	°F (°C)
Back pressure	0-50	psi

Drying Conditions

4 Hrs. at 250F, <0.02% moisture

Regrind

Up to 25%, Clean and Dry

Disclaimer:
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To the best of our knowledge, the information contained in this publication is accurate; however, we do not assume any liability whatsoever for the accuracy and completeness of such information. It is the sole responsibility of the users to investigate whether any existing patents are infringed by the use of the materials mentioned in this publication.

Moreover, there is a need to reduce human exposure to many materials to the lowest practical limits in view of possible adverse effects. To the extent that any hazards may have been mentioned in this publication, we neither suggest nor guarantee that such hazards are the only ones which exist. We recommend that persons intending to rely on such recommendation or use any equipment, processing technique, or material mentioned in this publication should satisfy themselves that they can meet all applicable safety and health standards.

We strongly recommend that users seek and adhere to the manufacturer's or supplier's current instructions for handling each material they use. Please consult the nearest Ticona Sales Office, or call the telephone numbers listed above for additional technical information. Call Customer Services for the appropriate Materials Safety Data Sheets (MSDS) before attempting to process these products.

Product is not intended for use in medical or dental implants.

CELANEX® 3214 - Data Sheet
Celanex 3214 is a non-exuding (UL approved V-0 at 1/32 inch),15% fiberglass reinforced polybutylene terephthalate which has an excellent balance of mechanical properties and processability. It is well suited for electrical connector applications.

Property	Method	Value	Units
Physical Properties			
Density	ISO 1183	1520	kg/m^3
Mechanical Properties			
Tensile modulus (1mm/min)	ISO 527-2/1A	6200	MPa
Tensile stress at break (5mm/min)	ISO 527-2/1A	100	MPa
Tensile strain at break (5mm/min)	ISO 527-2/1A	2.9	%
Flexural modulus (23°C)	ISO 178	6200	MPa
Flexural strength (23°C)	ISO 178	165.0	MPa
Charpy impact strength @ 23C	ISO 179/1eU	25.7	KJ/m^2
Charpy notched impact strength @ 23°C	ISO 179/1eA	5.4	KJ/m^2
Rockwell hardness	ISO 2039-2	87	M-Scale
Thermal Properties			
Melting temperature (10 C/min)	ISO 11357-1,-2,-3	225	°C
DTUL @ 1.8 MPa	ISO 75-1, -2	192	°C
DTUL @ 0.45 MPa	ISO 75-1, -2	215	°C
Coeff. of linear therm expansion (parallel)	ISO 11359-2	0.42	E-4/°C
Flammability at thickness h	UL94	V-0	Class
thickness tested (h)	UL94	0.8	mm
Electrical Properties			
Relative permittivity - 100Hz	IEC 60250	3.7	
Relative permittivity - 1MHz	IEC 60250	3.5	
Dissipation factor - 100Hz	IEC 60250	33	E-4
Dissipation factor - 1MHz	IEC 60250	160	E-4
Volume resistivity	IEC 60093	>1.0E14	ohm-m
Surface resistivity	IEC 60093	>1.0E17	ohm
Electric strength	IEC 60243-1	35	KV/mm
Comparative tracking index CTI	IEC 60112	250	-

Processing Conditions:

Parameter	Range	Units
Rear temperature	450-470(230-240)	°F (°C)
Center temperature	460-480(235-250)	°F (°C)
Front temperature	470-490(240-255)	°F (°C)
Nozzle temperature	480-490(250-255)	°F (°C)
Melt temperature	460-490(235-255)	°F (°C)
Mold temperature	150-200(65-93)	°F (°C)
Back pressure	0-50	psi

Drying Conditions
4 Hrs. at 250F, <0.02% moisture

Regrind
Up to 25%, Clean and Dry

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Product is not intended for use in medical or dental implants.

CELANEX® 3114 - Data Sheet
Celanex 3114 is a flame retarded, nonexuding, 7.5% glass reinforced polybutylene terephthalate providing a good balance of mechanical and electrical properties. This grade is rated UL94 V-0 down to 1/32 inch thickness and is recommended for all electrical/electronic applications.

Property	Method	Value	Units
Physical Properties			
Density	ISO 1183	1490	kg/m^3
Mechanical Properties			
Tensile modulus (1mm/min)	ISO 527-2/1A	5100	MPa
Tensile stress at break (5mm/min)	ISO 527-2/1A	67	MPa
Flexural modulus (23°C)	ISO 178	4100	MPa
Charpy notched impact strength @ 23°C	ISO 179/1eA	2.9	KJ/m^2
Thermal Properties			
Melting temperature (10 C/min)	ISO 11357-1,-2,-3	225	°C
Flammability at thickness h	UL94	V-0	Class
thickness tested (h)	UL94	0.8	mm
Electrical Properties			
Volume resistivity	IEC 60093	>1.0E14	ohm-m
Surface resistivity	IEC 60093	>1.0E17	ohm
Electric strength	IEC 60243-1	35	KV/mm
UL Properties			
UL94 flame class	UL94	V-0	

Processing Conditions:

Parameter	Range	Units
Rear temperature	450-470(230-240)	°F (°C)
Center temperature	460-480(235-250)	°F (°C)
Front temperature	470-490(240-255)	°F (°C)
Nozzle temperature	480-490(250-255)	°F (°C)
Melt temperature	480-490(250-255)	°F (°C)
Mold temperature	150-200(65-93)	°F (°C)
Back pressure	0-50	psi

Drying Conditions
4 Hrs. at 250F, <0.02% moisture

Regrind
Up to 25%, Clean and Dry

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CELANEX® 2014 - Data Sheet
Celanex 2014 is a non-exuding flame retarded (UL approved V-0 at 1/32 inch), unreinforced polybutylene terephthalate which has an excellent balance of mechanical properties and processability. It is well suited for electrical connector applications.

Property	Method	Value	Units
Physical Properties			
Density	ISO 1183	1440	kg/m^3
Mechanical Properties			
Tensile modulus (1mm/min)	ISO 527-2/1A	3000	MPa
Tensile stress at yield (50mm/min)	ISO 527-2/1A	64	MPa
Tensile strain at yield (50mm/min)	ISO 527-2/1A	7.0	%
Nominal strain at break (50mm/min)	ISO 527-2/1A	12	%
Flexural modulus (23°C)	ISO 178	3000	MPa
Flexural strength (23°C)	ISO 178	90.0	MPa
Charpy notched impact strength @ 23°C	ISO 179/1eA	4.0	KJ/m^2
Notched impact strength (Izod) @ 23°C	ISO 180/1A	4.5	KJ/m^2
Rockwell hardness	ISO 2039-2	79	M-Scale
Thermal Properties			
Melting temperature (10 C/min)	ISO 11357-1,-2,-3	225	°C
DTUL @ 1.8 MPa	ISO 75-1, -2	66	°C
DTUL @ 0.45 MPa	ISO 75-1, -2	134	°C
Coeff. of linear therm expansion (parallel)	ISO 11359-2	1.39	E-4/°C
Flammability at thickness h	UL94	V-0	Class
thickness tested (h)	UL94	0.8	mm
Electrical Properties			
Relative permittivity - 100Hz	IEC 60250	3.6	
Relative permittivity - 1MHz	IEC 60250	3.5	
Dissipation factor - 100Hz	IEC 60250	47	E-4
Dissipation factor - 1MHz	IEC 60250	185	E-4
Volume resistivity	IEC 60093	>1.0E14	ohm-m
Surface resistivity	IEC 60093	>1.0E17	ohm
Electric strength	IEC 60243-1	37	KV/mm
Comparative tracking index CTI	IEC 60112	325	-
UL Properties			
UL94 flame class	UL94	V-0	

Processing Conditions:

Parameter	Range	Units
Rear temperature	450-470(230-240)	°F (°C)
Center temperature	460-480(235-250)	°F (°C)
Front temperature	470-490(240-255)	°F (°C)
Nozzle temperature	480-490(250-255)	°F (°C)
Melt temperature	460-490(235-255)	°F (°C)
Mold temperature	150-200(65-93)	°F (°C)
Back pressure	0-50	psi

Drying Conditions
4 Hrs. at 250F, <0.02% moisture

Regrind
Up to 25%, Clean and Dry

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CELANEX® 4014 - Data Sheet
Unfilled,UL94 V-0, nonexuding

Property	Method	Value	Units
Physical Properties			
Density	ISO 1183	1450	kg/m^3
Mechanical Properties			
Tensile modulus (1mm/min)	ISO 527-2/1A	2700	MPa
Tensile stress at yield (50mm/min)	ISO 527-2/1A	55	MPa
Tensile strain at yield (50mm/min)	ISO 527-2/1A	3.8	%
Charpy notched impact strength @ 23°C	ISO 179/1eA	8.5	KJ/m^2
Thermal Properties			
Melting temperature (10 C/min)	ISO 11357-1,-2,-3	225	°C
Flammability at thickness h	UL94	V-0	Class
thickness tested (h)	UL94	0.85	mm

Processing Conditions:

Parameter	Range	Units
Rear temperature	450-470(230-240)	°F (°C)
Center temperature	460-480(235-250)	°F (°C)
Front temperature	470-490(240-255)	°F (°C)
Nozzle temperature	480-490(250-255)	°F (°C)
Melt temperature	460-490(235-255)	°F (°C)
Mold temperature	150-200(65-93)	°F (°C)
Back pressure	0-50	psi

Drying Conditions
4 Hrs. at 250F, <0.02% moisture

Regrind
Up to 25%, Clean and Dry

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