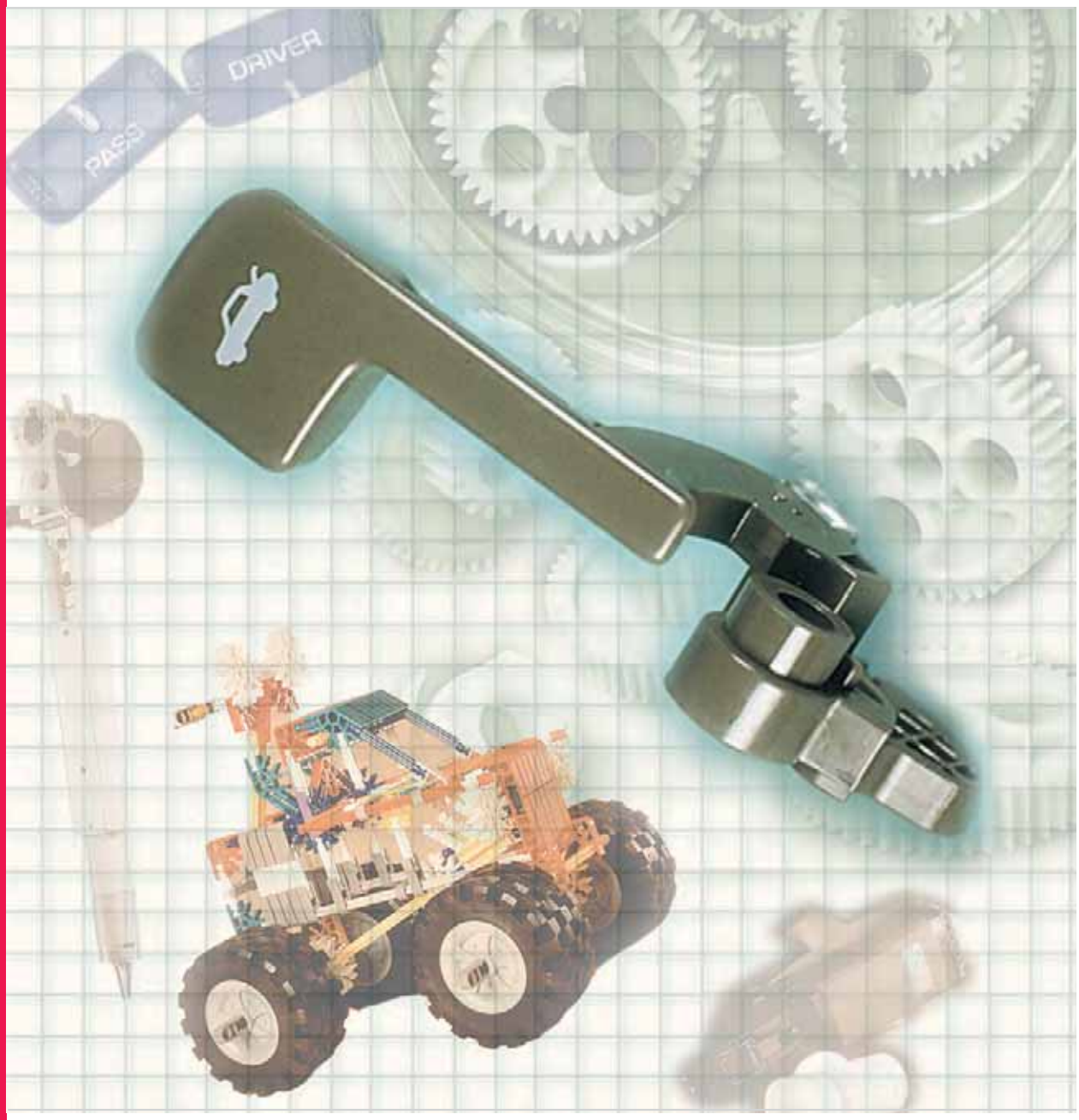
Ticona
Engineering Polymers

Celcon® acetal copolymer Short Term Properties Brochure

acetal copolymer



CE-4

Celcon® *acetal copolymer*

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Grade Characteristics

M25 High melt strength for extrusion, high molecular weight for maximum toughness in injection molding.

M50 Intermediate grade offering improved toughness and elongation vs. M90 and improved flow vs. M25.

M90™ General purpose injection molding grade acetal copolymer.

M140 Offers improved flow characteristics vs. M90.

M270™ Low melt viscosity for fast cycling, thin walled injection molding.

M450 Lowest melt viscosity for fast cycling in injection molding parts having long flow paths and thin walls.

M15HP Offers high strength and stiffness combined with significantly improved impact properties along with toughness and superior fatigue properties

MR90B Media resistant Standard flow grade for performance against intermittent bleach exposure. Refer to our website for additional grade offerings.

GB25 25% glass bead filled grade for low shrinkage and warp resistance in large, flat and thin walled parts.

GC25A 25% glass-coupled acetal for maximum strength and stiffness.

GC25T 25% glass fiber coupled acetal copolymer grade with higher strength than the standard Celcon GC25A, exceptional resistance to fuels, and is FDA compliant.

GC25TF 25% fiber coupled acetal copolymer based on Celcon M450 for higher flow in thin walled and small parts with exceptional resistance to fuel especially oxygenated fuels.

LW90 Low wear grade for high speed, low load service against metals.

LW90-F2 PTFE modified M90 with good wear characteristics for applications that cannot tolerate silicone additives.

LW90-S2 2% silicone modified M90 for wear resistance against glass, metal or plastic.

LWGC-S2 2% silicone modified GC25A used to provide stiff parts requiring good wear resistance.

M90AW Low wear grade designed for gears and other low wear applications, especially where reducing noise and wear in low load-high velocity applications.

M90SW Low wear grade designed for gears and other low wear applications when wear against the same mating surface is important. May be preferred in high load - low velocity applications.

MC90 Mineral coupled M90 material for producing flat and dimensionally stable parts (normal flow).

MC90-HM Highly mineral coupled M90 material for producing very flat and dimensionally stable parts (normal flow).

MC270 Mineral coupled M270 material for producing flat and dimensionally stable parts (higher flow).

MC270-HM Highly mineral coupled M270 material for producing very flat and dimensionally stable thin parts (higher flow).

UV25Z M25 based material stabilized for use where ultraviolet radiation exposure is a problem. Available in custom matched colors specifically formulated to meet automotive UV requirements (SAE J1885).

M25UV UV stabilized version of M25 for color and property retention in artificial and indirect sunlight exposure. Available in natural color only.

UV90Z M90 based material having UV and color characteristics similar to UV25Z. Colors available specifically formulated to meet automotive UV requirements (SAE J1885).

M90UV UV stabilized version of M90 for color and property retention in artificial and indirect sunlight exposure. Available in natural color only.

UV270Z M270 based material having UV and color characteristics similar to UV25Z. Colors available specifically formulated to meet automotive UV requirements (SAE J1885).

M270UV UV stabilized version of M270 for color and property retention in artificial and indirect sunlight exposure. Available in natural color only.

WR25Z M25 based material stabilized for maximum UV radiation resistance where outdoor weathering is required (black only). Formulated for automotive exterior applications (SAE J1960).

WR90Z M90 based material having the same weathering characteristics as WR25Z (black only). Formulated for automotive exterior applications (SAE J1960).

UV15HPZ M15HP based material having UV and color characteristics similar to UV25Z but with strength and stiffness of M15HP.

LM25 2.5 melt flow acetal copolymer that is capable of being permanently marked by a laser.

LM90 9.0 melt flow rate acetal copolymer that is capable of being permanently marked by a laser.

LM90Z UV stable, 9.0 melt flow acetal copolymer which is capable of being permanently marked by a laser.

AS270 M270 based material formulated to reduce static build-up on molded parts.

CF801 General purpose electrostatic dissipative (ESD) grade.

CF802 Electrostatic dissipative (ESD) grade based on stainless steel fibers for fuel applications.

EC-90PLUS Semi-conductive grade of acetal copolymer for applications requiring rapid dissipation of static build-up and impact resistance.

TX90 M90 based material tailored to provide moderate improvement in impact strength and flexibility.

TX90PLUS M90 based material modified to provide significant improvement in impact strength and flexibility.

Celcon© Acetal Copolymer –Typical Properties

Property	ISO Test Method	Units	Unfilled						High Performance	Media Resistant
			M25	M50	M90	M140	M270	M450	M15HP	MR90B
Physical										
Density	1183	g/cm^3	1.41	1.41	1.41	1.41	1.41	1.41	1.40	1.41
Mold Shrinkage – Flow Direction	294-3,-4	%	2.2		2		1.7		2.3	2.2
Mold Shrinkage – Transverse Direction	294-3,-4	%	1.8		1.9		1.6		1.9	2.2
Melt Flow Rate	1133	gm/ 10 min	2.5	5	9	14	27	45	1.5	9
Melt Volume Rate MVR (1st value)	1133	ml/ 10 min	2.2	4.3	8	12	23	39	1.3	8
Water Absorption (23°C-sat)	62	%	0.65	0.65	0.65	0.65	0.65	0.65		
Moisture Absorption (23°C/50%/RH)	62	%	0.2	0.2	0.2	0.2	0.2	0.2		
Mechanical										
Tensile Modulus (1 mm/min)	527	MPa	2,460	2,500	2,760	2,800	2,820	2,890	2,800	2,750
Tensile Stress @ Yield (50 mm/min)	527	MPa	63	63	66	66	67	66	68	65
Tensile Stress @ Break (5 mm/min)	527	MPa								
Tensile Strain @ Break (5 mm/min)	11359-2	%								
Flexural Modulus	178	MPa	2,430	2,500	2,550	2,640	2,750	2,820	2,750	
Charpy Notched Impact Strength @ 23°C	179/1eA	kJ/m^2	9.1	8.7	6	6	5.2	4.4	10	5.8
Notched Impact Strength (Izod) @ 23°C	180/1A	kJ/m^2	8.3	7.5	5.7	5.7	5.4	4.7	8.9	
Thermal										
Melting Temperature	11357	°C	166	166	166	166	166	166	172	165
DTUL @ 1.8 MPa	75	°C	94	97	100	100	102	103	101	100
CLTE - Parallel	11359-2	10 $^{-4}$/°C	1.2	1.2	1.2	1.2	1.1	1.1	1.1	
CLTE - Normal	11359-2	10 $^{-4}$/°C	1.2	1.2	1.2	1.2	1.2	1.2	1.2	
Electrical										
Volume Resistivity	IEC 60093	ohm-cm	NR	NR	NR	NR	NR	NR	NR	NR
Surface Resistivity	IEC 60093	ohms	NR	NR	NR	NR	NR	NR	NR	NR

NR - Not recommended for ESD or conductive applications.

Refer to the individual product data sheets on our website for the most up-to-date product information.

Celcon© Acetal Copolymer –Typical Properties

Property	ISO Test Method	Units	Glass Filled				Low Wear			
			GB25	GC25A	GC25T	GC25TF	LW90	LW90-F2	LW90-S2	LWGC-S2
Physical										
Density	1183	g/cm^3	1.58	1.58	1.57	1.58	1.41	1.41	1.38	1.55
Mold Shrinkage – Flow Direction	294-3,-4	%	1.5	0.4	0.4		1.8	2.3	1.9	0.7
Mold Shrinkage – Transverse Direction	294-3,-4	%	1.3	1.2	1.2		1.5	1.9	1.6	0.9
Melt Flow Rate	1133	gm/ 10 min					9	9	9.7	
Melt Volume Rate MVR (1st value)	1133	ml/ 10 min					8	8	8.4	
Water Absorption (23°C-sat)	62	%	0.65	0.65	0.65	0.65	0.65			
Moisture Absorption (23°C/50%/RH)	62	%	0.2	0.2	0.2	0.2	0.2			
Mechanical										
Tensile Modulus (1 mm/min)	527	MPa	3,700	8,600	8,630	8,720	2,500	2,650	2,500	8,200
Tensile Stress @ Yield (50 mm/min)	527	MPa					64	63	56	
Tensile Stress @ Break (5 mm/min)	527	MPa	46	103	129	120				94
Tensile Strain @ Break (5 mm/min)	527	%	4	2	3	2				2
Flexural Modulus	178	MPa	3,540	8,700	8,520	8,710	2,630	2,620	2,400	7,900
Charpy Notched Impact Strength @ 23°C	179/1eA	kJ/m^2	2.4	6.4	8.7	6.4	6.8	5	6.8	6
Notched Impact Strength (Izod) @ 23°C	180/1A	kJ/m^2	2.6	6	8	6.4	5.7	5.1	5.3	6.1
Thermal										
Melting Temperature	11357	°C	165	165	165	165	166	166	166	165
DTUL @ 1.8 MPa	75	°C	105	160	161	162	98	100	94	161
CLTE - Parallel	11359-2	$10^{-4}/°C$	0.7	0.3	0.3	0.3	1.1			0.2
CLTE - Normal	11359-2	$10^{-4}/°C$	0.8	1.2	1.3	1	1.2			1.3
Electrical										
Volume Resistivity	IEC 60093	ohm-cm	NR	NR	NR	NR	NR	NR	NR	NR
Surface Resistivity	IEC 60093	ohms	NR	NR	NR	NR	NR	NR	NR	NR

Celcon© Acetal Copolymer –Typical Properties

Property	ISO Test Method	Units	Low Wear		Mineral Coupled				Ultraviolet Light Resistant		
			M90AW	M90SW	MC90	MC90-HM	MC270	MC270-HM	M25UV	M90UV	M270UV
Physical											
Density	1183	g/cm^3	1.36	1.41	1.48	1.57	1.48	1.57	1.40	1.40	1.41
Mold Shrinkage – Flow Direction	294-3,-4	%			1.9	1.5	1.9	1.5			
Mold Shrinkage – Transverse Direction	294-3,-4	%			1.6	1.3	1.6	1.3			
Melt Flow Rate	1133	gm/ 10 min	9	9					2.5	9	27
Melt Volume Rate MVR (1st value)	1133	ml/ 10 min	8	8					2.2	8	23
Water Absorption (23°C-sat)	62	%								0.65	
Moisture Absorption (23°C/50%/RH)	62	%								0.2	0.2
Mechanical											
Tensile Modulus (1 mm/min)	527	MPa	2,430	2,600	3,010	3,570	3,156	3,750	2,480	2,610	2,800
Tensile Stress @ Yield (50 mm/min)	527	MPa	55	49	57	45	57	45	62	65	66
Tensile Stress @ Break (5 mm/min)	527	MPa									
Tensile Strain @ Break (5 mm/min)	527	%									
Flexural Modulus	178	MPa	2,400	2,560	2,850	3,490	3,100	3,740	2,410	2,700	2,750
Charpy Notched Impact Strength @ 23°C	179/1eA	kJ/m^2	4.7	5	6.8	6.3	5.4	4.8	8.5	6.1	4.5
Notched Impact Strength (Izod) @ 23°C	180/1A	kJ/m^2	5.2	5.4	6.3	6.1	5.5	5.3	7.6	5.8	4.9
Thermal											
Melting Temperature	11357	°C	167	166	165	165	165	165	166	166	166
DTUL @ 1.8 MPa	75	°C	86	90	97	103	91	105	93	101	102
CLTE - Parallel	11359-2	$10^{-4}/°C$			1	0.6	1	0.6	1.2	1.1	1.1
CLTE - Normal	11359-2	$10^{-4}/°C$			1.2	0.9	1.2	0.9	1.2	1.2	1.2
Electrical											
Volume Resistivity	IEC 60093	ohm-cm	NR	NR	NR	NR	NR	NR	NR	NR	NR
Surface Resistivity	IEC 60093	ohms	NR	NR	NR	NR	NR	NR	NR	NR	NR

Celcon© Acetal Copolymer –Typical Properties

Property	ISO Test Method	Units	Ultraviolet Light Resistant						Laser Markable		
			UV25Z	UV90Z	UV270Z	WR25Z	WR90Z	UV15MPZ	LM25	LM90	LM90Z
Physical											
Density	1183	g/cm^3	1.41	1.41	1.41	1.41	1.41	1.42	1.41	1.41	1.41
Mold Shrinkage – Flow Direction	294-3,-4	%	2.2	1.9	1.7		1.7	2.6			
Mold Shrinkage – Transverse Direction	294-3,-4	%	1.8	1.7	1.6		1.6	2.3			
Melt Flow Rate	1133	gm/ 10 min	2.5	9	27	2.5	9	1.5	2.5	9	9
Melt Volume Rate MVR (1st value)	1133	ml/ 10 min	2.2	8	23	2.2	8	1.3	2.2	8	8
Water Absorption (23°C-sat)	62	%	0.65	0.65		0.65					
Moisture Absorption (23°C/50%/RH)	62	%		0.2							
Mechanical											
Tensile Modulus (1 mm/min)	527	MPa	2,460	2,700	2,760	2,620	2,660	2,840	2,490	2,750	2,750
Tensile Stress @ Yield (50 mm/min)	527	MPa	62	64	64	61	63	65	64	64	63
Tensile Stress @ Break (5 mm/min)	527	MPa									
Tensile Strain @ Break (5 mm/min)	527	%									
Flexural Modulus	178	MPa	2,420	2,470	2,760	2,570	2,540	2,700	2,500	2,700	2,670
Charpy Notched Impact Strength @ 23°C	179/1eA	kJ/m^2	8.1	6	4.7	6.4	5.5	5.8	5.7	4.7	4.7
Notched Impact Strength (Izod) @ 23°C	180/1A	kJ/m^2	7	5.7	5.1	6.2	5.5	5.9	5.7	5.2	5.2
Thermal											
Melting Temperature	11357	°C	166	166	166	166	166	172	167	167	167
DTUL @ 1.8 MPa	75	°C	90	91	90	92	95	103	98	98	95
CLTE - Parallel	11359-2	10 $^{-4}/_{°C}$	1.1	1.1	1.1	1	1	1.2		1.2	
CLTE - Normal	11359-2	10 $^{-4}/_{°C}$	1.1	1.2	1.2	1.1	1.1	1.2		1.2	
Electrical											
Volume Resistivity	IEC 60093	ohm-cm	NR	NR	NR	NR	NR	NR	NR	NR	NR
Surface Resistivity	IEC 60093	ohms	NR	NR	NR	NR	NR	NR	NR	NR	NR

Celcon© Acetal Copolymer –Typical Properties

Property	ISO Test Method	Units	Anti-Static	Electrically Conductive			Improved Impact		
			AS270	EC-90 Plus	CF801	CF802	TX90	TX90PLUS	M25HT
Physical									
Density	1183	g/cm^3	1.41	1.37	1.38	1.47	1.38	1.37	1.35
Mold Shrinkage – Flow Direction	294-3,-4	%		1.9	2	1.7	1.8	1.5	
Mold Shrinkage – Transverse Direction	294-3,-4	%		1.7	1.9	1.6	1.6	1.4	
Melt Flow Rate	1133	gm/ 10 min	27	2.5			9.7	7	3.2
Melt Volume Rate MVR (1st value)	1133	ml/ 10 min	23	2.2			8.5	6	2.8
Water Absorption (23°C-sat)	62	%		2.8			0.65	0.65	
Moisture Absorption (23°C/50%/RH)	62	%		0.3			0.2	0.3	
Mechanical									
Tensile Modulus (1 mm/min)	527	MPa	2,700	1,880	2,450	3,100	2,150	1,700	1,290
Tensile Stress @ Yield (50 mm/min)	527	MPa	64	37	49	60	55	46	38
Tensile Stress @ Break (5 mm/min)	527	MPa							
Tensile Strain @ Break (5 mm/min)	527	%							
Flexural Modulus	178	MPa	2,700	1,660	2,400	3,000	1,970	1,560	1200
Charpy Notched Impact Strength @ 23°C	179/1eA	kJ/m^2		4.3	4.3	4.5	10.5	11	15.4
Notched Impact Strength (Izod) @ 23°C	180/1A	kJ/m^2	4.7	4.4	4.4	4.8	8.6	9.8	15.6
Thermal									
Melting Temperature	11357	°C	166	165	165	167	165	165	167
DTUL @ 1.8 MPa	75	°C	100	70	90	100	84	80	65
CLTE - Parallel	11359-2	10 $^{-4}$/°C		1	1.1	1	1.2	1.2	
CLTE - Normal	11359-2	10 $^{-4}$/°C		1.1	1.1	1.2	1.2	1.4	
Electrical									
Volume Resistivity	IEC 60093	ohm-cm	NR	$<10^4$	$<10^4$	$<10^4$	NR	NR	NR
Surface Resistivity	IEC 60093	ohms	NR	$<10^4$	$<10^4$	$<10^4$	NR	NR	NR

Ticona
Engineering Polymers

Products Offered by Ticona

- Celanex® thermoplastic polyester (PBT)
- Celcon® and Hostaform® acetal copolymer (POM)
- Celstran® and Compel® long fiber reinforced thermoplastics (LFRT)
- Fortron® polyphenylene sulfide (PPS)
- GUR® ultra-high molecular weight polyethylene (UHMW-PE)
- Impet® thermoplastic polyester (PET)
- Riteflex® thermoplastic polyester elastomer (COPE)
- Vandar® thermoplastic polyester alloy (PBT)
- Vectra® liquid crystal polymer (LCP)

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Celcon® *acetal copolymer*