ERTACETAL® C

QUADRANT ENGINEERING PLASTIC PRODUCTS

PRODUCT DATA SHEET

ERTACETAL C is Quadrant's copolymer acetal grade. Next to the standard natural and black grades, there is also a series of special colours available all showing an FDA food contact compliant composition.
The acetal copolymer is more resistant against hydrolysis, strong alkalis and thermal-oxidative degradation than the acetal homopolymer.

Physical properties (indicative values ■)

PROPERTIES		Test methods	Units	VALUES
Colour		-	-	natural (white)/ black
Density		ISO 1183-1	g/cm³	1.41
Water absorption:				
- after 24/96 h immersion in water of 23 °C (1)		ISO 62	mg	20/37
		ISO 62	%	0.24/0.45
- at saturation in air of 23°C / 50 % RH		-	%	0.20
- at saturation in water of 23 °C		-	%	0.80
Thermal Properties (2)				
Melting temperature (DSC, 10 °C/min)		ISO 11357-1/-3	°C	165
Glass transition temperature (DSC, 20 °C/min) - (3)		ISO 11357-1/-2	°C	-
Thermal conductivity at 23 °C		-	W/(K.m)	0.31
Coefficient of linear thermal expansion:				
- average value between 23 and 60 °C		-	m/(m.K)	110 x 10^{-6}
- average value between 23 and 100 °C		-	m/(m.K)	125 x 10^{-6}
Temperature of deflection under load:				
- method A: 1.8 MPa		ISO 75-1/-2	°C	100
Max. allowable service temperature in air:				
- for short periods (4)		-	°C	140
- continuously : for 5,000 / 20,000 h (5)		-	°C	115/100
Min. service temperature (6)		-	°C	-50
Flammability (7):				
- "Oxygen Index"		ISO 4589-1/-2	%	15
- according to UL 94 (3 / 6 mm thickness)		-	-	HB / HB
Mechanical Properties at 23 °C (8)				
Tension test (9):				
- tensile stress at yield / tensile stress at break (10)	+	ISO 527-1/-2	MPa	66 / -
	++	ISO 527-1/-2	MPa	66 / -
- tensile strength (10)	+	ISO 527-1/-2	MPa	66
- tensile strain at yield (10)	+	ISO 527-1/-2	%	20
- tensile strain at break (10)	+	ISO 527-1/-2	%	50
	++	ISO 527-1/-2	%	50
- tensile modulus of elasticity (11)	+	ISO 527-1/-2	MPa	2800
	++	ISO 527-1/-2	MPa	2800
Compression test (12):				
- compressive stress at 1 / 2 / 5 % nominal strain (11)	+	ISO 604	MPa	19 / 35 / 67
Creep test in tension (9):				
- stress to produce 1 % strain in 1000 h ($\sigma_{1/1000}$)	+	ISO 899-1	MPa	13
	++	ISO 899-1	MPa	13
Charpy impact strength - Unnotched (13)	+	ISO 179-1/1eU	kJ/m²	150
Charpy impact strength - Notched	+	ISO 179-1/1eA	kJ/m²	7
Izod impact strength - Notched	+	ISO 180/A	kJ/m²	7
	++	ISO 180/A	kJ/m²	7
Ball indentation hardness (14)	+	ISO 2039-1	N/mm²	140
Rockwell hardness (14)	+	ISO 2039-2	-	M 84
Electrical Properties at 23 °C				
Electric strength (15)	+	IEC 60243-1	kV/mm	20
	++	IEC 60243-1	kV/mm	20
Volume resistivity	+	IEC 60093	Ohm.cm	> 10^{14}
	++	IEC 60093	Ohm.cm	> 10^{14}
Surface resistivity	+	IEC 60093	Ohm	> 10^{13}
	++	IEC 60093	Ohm	> 10^{13}
Relative permittivity ε_r : - at 100 Hz	+	IEC 60250	-	3.8
	++	IEC 60250	-	3.8
- at 1 MHz	+	IEC 60250	-	3.8
	++	IEC 60250	-	3.8
Dielectric dissipation factor tan δ: - at 100 Hz	+	IEC 60250	-	0.003
	++	IEC 60250	-	0.003
- at 1 MHz	+	IEC 60250	-	0.008
	++	IEC 60250	-	0.008
Comparative tracking index (CTI)	+	IEC 60112	-	600
	++	IEC 60112	-	600

Note: 1 g/cm³ = 1,000 kg/m³ ; 1 MPa = 1 N/mm² ; 1 kV/mm = 1 MV/m.

Legend:

\+ : values referring to dry material
++ : values referring to material in equilibrium with the standard atmosphere 23 °C / 50 % RH

(1) According to method 1 of ISO 62 and done on discs ∅ 50 x 3 mm.
(2) The figures given for these properties are for the most part derived from raw material supplier data and other publications.
(3) Values for this property are only given here for amorphous materials and not for semi-crystalline ones.
(4) Only for short time exposure (a few hours) in applications where no or only a very low load is applied to the material.
(5) Temperature resistance over a period of 5,000/20,000 hours. After these periods of time, there is a decrease in tensile strength – measured at 23 °C – of about 50 % as compared with the original value. The temperature values given here are thus based on the thermal-oxidative degradation which takes place and causes a reduction in properties. Note, however, that the maximum allowable service temperature depends in many cases essentially on the duration and the magnitude of the mechanical stresses to which the material is subjected.
(6) Impact strength decreasing with decreasing temperature, the minimum allowable service temperature is practically mainly determined by the extent to which the material is subjected to impact. The value given here is based on unfavourable impact conditions and may consequently not be considered as being the absolute practical limit.
(7) These estimated ratings, derived from raw material supplier data and other publications, are not intended to reflect hazards presented by the material under actual fire conditions. There is no 'UL File Number' available for the ERTACETAL C stock shapes.
(8) The figures given for the properties of dry material (+) are for the most part average values of tests run on test specimens machined out of rods Ø 40 - 60 mm. Except for the hardness tests, the test specimens were then taken from an area mid between centre and outside diameter, with their length in longitudinal direction of the rod (parallel to the extrusion direction).
Considering the very low water absorption of ERTACETAL C, the values for the mechanical and electrical properties of this material can be considered as being practically the same for dry (+) and moisture conditioned (++) test specimens.
(9) Test specimens: Type 1 B
(10) Test speed: 50 mm/min [chosen acc. to ISO 10350-1 as a function of the ductile behaviour of the material (tough or brittle)].
(11) Test speed: 1 mm/min
(12) Test specimens: cylinders ∅ 12 x 30 mm
(13) Pendulum used: 15 J
(14) Measured on 10 mm thick test specimens (discs), mid between centre and outside diameter.
(15) Electrode configuration: ∅ 25 / ∅ 75 mm coaxial cylinders ; in transformer oil according to IEC 60296 ; 1 mm thick test specimens.
Please note that the electric strength of ERTACETAL C black can be considerably lower than the figure listed in the table which refers to natural material.

■ This table is a valuable help in the choice of a material. The data listed here fall within the normal range of product properties. However, they are not guaranteed and they should not be used to establish material specification limits nor used alone as the basis of design.

AVAILABILITY

Round Rods: Ø 3-400 mm - **Sheets/Plates:** Thicknesses 0.5-120 mm - **Tubes:** O.D. 20-350 mm

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