

Product Information

July 2004

Ultrason[®] E 1010 natural

(PES)



Product description

Unreinforced, low viscosity injection moulding grade, flows very readily.
Abbreviated designation according to ISO 1043-1: PESU

Physical form and storage

Ultrason pellets are supplied in 25 kg bags and octabins. The bulk density ranges between 700 and 800 g/l. Provided the packaging remains undamaged, Ultrason can be stored indefinitely. Ultrason pellets absorb moisture very rapidly. Therefore, the pellets need to be dried at least 4h at 130 °C to 150 °C in a vacuum or dry air drier prior to processing.

Product safety

From our experience and information, proper treatment and reasonable use of the product will not have any health hazardous effects.

In view of the high temperatures involved in processing Ultrason, great care must be exercised - even more than for other thermoplastics- in handling the machinery, molds, moldings and residual melts. If there are concerns or doubts on the thermal capacity and limits, the machinery manufacturer should be consulted.

Any product that has decomposed during injection molding must be removed from the barrel by injection into the atmosphere and simultaneous reduction of the barrel temperature. Noxious odors that could form during this procedure can be reduced by rapid cooling of the degraded material, e.g. in a water bath. If the degraded material is not pumped out of the barrel, gas pressure may build up, particularly if nozzle shutoff devices are used. The built-up pressure could then release violently into the vicinity of the nozzle or hopper and explosions would therefore be expected in the course of pumping.

If the normal precautions are taken and the upper temperature limit, i.e. 390 °C, is not exceeded, no health hazardous vapors are formed while Ultrason is being processed. In common with all other thermoplastics, Ultrason decomposes on exposure to excessive heat, for instance if the melt temperature is too high and/or the residence time in the plasticizing unit is too long or if residues are burned off during cleaning of the machinery. The figures laid down for the maximum allowable dust concentrations (e.g. MAK value in Germany) must be met in further processing.

The work place must be well ventilated, preferably by means of an exhaust system installed above the barrel unit. Irrespective of this, all precautions relating to accident prevention must strictly be taken. Under no circumstances may the plasticizing units be dismantled after a breakdown while they are still hot.

Note

The information submitted in this publication is based on our current knowledge and experience. In view of the many factors that may affect processing and application, these data do not relieve processors of the responsibility of carrying out their own tests and experiments; neither do they imply any legally binding assurance of certain properties or of suitability for a specific purpose. It is the responsibility of those to whom we supply our products to ensure that any proprietary rights and existing laws and legislation are observed. In order to check the availability of products please contact us or our sales agency.

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Typical values at 23 °C (73 °F) ¹⁾	Test method	Unit	Condition	Values
Properties				
Symbol	ISO 1043	-	-	PES
Density	ISO 1183	g/cm ³	-	1.37
Viscosity number (in 0,01g/ml Phenol/ortho-Dichlorobenzene, 1:1)	ISO 307	ml/g	-	48
Colors: natural (n), colored (c), black (bk)	-	-	-	n
Water absorption, saturation in water at 23°C (73°F)	ISO 62	%	-	2.10
Water absorption, saturation in air at 23°C (73°F)/50% r.h.	ISO 62	%	-	0.80
Processing				
Method: Injection molding (M), Extrusion (E), Film extrusion (F), Blow molding (B)	-	-	-	M
Melt volume rate MVR 360 °C /10 kg (680 °F/22.05 lbs)	ISO 1133	cm ³ /10 min	-	150
Melt temperature range, injection molding/extrusion	-	°C	-	340 - 390
Mold temperature range, injection molding	-	°C	-	140 - 170
Molding shrinkage, free, longitudinal/transverse ²⁾	-	%	-	0.60 / 0.68
Molding shrinkage, restricted, longitudinal/transverse ³⁾	-	%	-	0.71 / 0.86
Flammability				
Flammability according to UL-Standard at d = 0,8 mm thickness	UL 94	class	-	V-2
Flammability according to UL-Standard at d = 1,6 mm thickness	UL 94	class	-	V-1
Flammability according to UL-Standard at d = 3,2 mm thickness	UL 94	class	-	V-0
Mechanical properties				
Tensile modulus of elasticity	ISO 527-2	MPa	cond.	2700
Yield stress (v = 50 mm/min), Stress at break (v = 5 mm/min)*	ISO 527-2	MPa	cond.	90
Yield strain (v = 50 mm/min)	ISO 527-2	%	cond.	6.7
Nominal strain at break, Strain at break*	ISO 527-2	%	cond.	40
Tensile creep modulus, 1000 h, elongation ≤ 0,5%, +23°C (73°F)	ISO 899-1	MPa	cond.	2700
Charpy impact strength ⁴⁾ +23°C(73°F)/-30°C(-22°F)	ISO 179/1eU	kJ/m ²	cond.	N / N
Charpy notched impact strength +23°C(73°F)/-30°C(-22°F)	ISO 179/1eA	kJ/m ²	cond.	6.5 / 7.0
Izod notched impact strength 1A +23°C(73°F)/-30°C(-22°F)	ISO 180/1A	kJ/m ²	cond.	6.5 / 7.0
Ball indentation hardness H 358/30, H 961/30*	ISO 2039-1	MPa	dry	150
Thermal properties				
Heat deflection temp. under 0.45 MPa load (HDT B)	ISO 75-2	°C	-	216
Max. service temperature, up to a few hours ⁵⁾	-	°C	-	220
Temp. index for 50% loss of tensile strength after 20000h ⁶⁾	UL 746-B	°C	-	180
Therm. coefficient of linear expansion, longitud. 23-80°C (73-176°F)	DIN 53752	10 ⁻⁴ /K	-	0.55
Therm. coeff. of linear expansion, longitud. 140°C (284°F), 180°C (356°F)*	DIN 53752	10 ⁻⁴ /K	-	0.59*
Dielectric properties				
Dielectric constant at 100 Hz/ 1 MHz	IEC 60250	-	cond.	3.9 / 3.8
Dissipation factor at 100 Hz/ 1 MHz	IEC 60250	10 ⁻⁴	cond.	17 / 140
Volume resistivity	IEC 60093	Ω · m	cond.	>10 ¹⁴
Surface resistivity	IEC 60093	Ω	cond.	>10 ¹⁴
Dielectric strength K20/K20	IEC 60243-1	kV/mm	cond.	37
Comparative tracking index CTI, test solution A	IEC 60112	-	cond.	125
Comparative tracking index CTI M, test solution B	IEC 60112	-	cond.	125
Optical properties				
Refractive index (specimen thickness = 1mm)	ISO 489	-	-	1.650
Light transmission (specimen thickness = 2mm)	ASTM D 1003	%	-	83
Molecular weight				
Mw (light scattering in NMP)	-	g/mol	-	
Mw/Mn (GPC in DMF) ⁷⁾	-	-	-	

Footnotes:

1) for uncolored product, unless defined otherwise in the product name

2) Plate with film gate, dimensions: 110*110*2mm³.

3) Test box with central gating, base dimensions: 107*47*1,5mm³, longitud.= length of base, transv.= width of base.

4) N = not broken.

5) empirical values for parts repeatedly exposed to this temperature for several hours at a time over a period of years, provided that shaping and processing were in accord to the material.

6) in part expected values

7) Reference material: poly(ethylene oxide)/ polyethylene glycol.