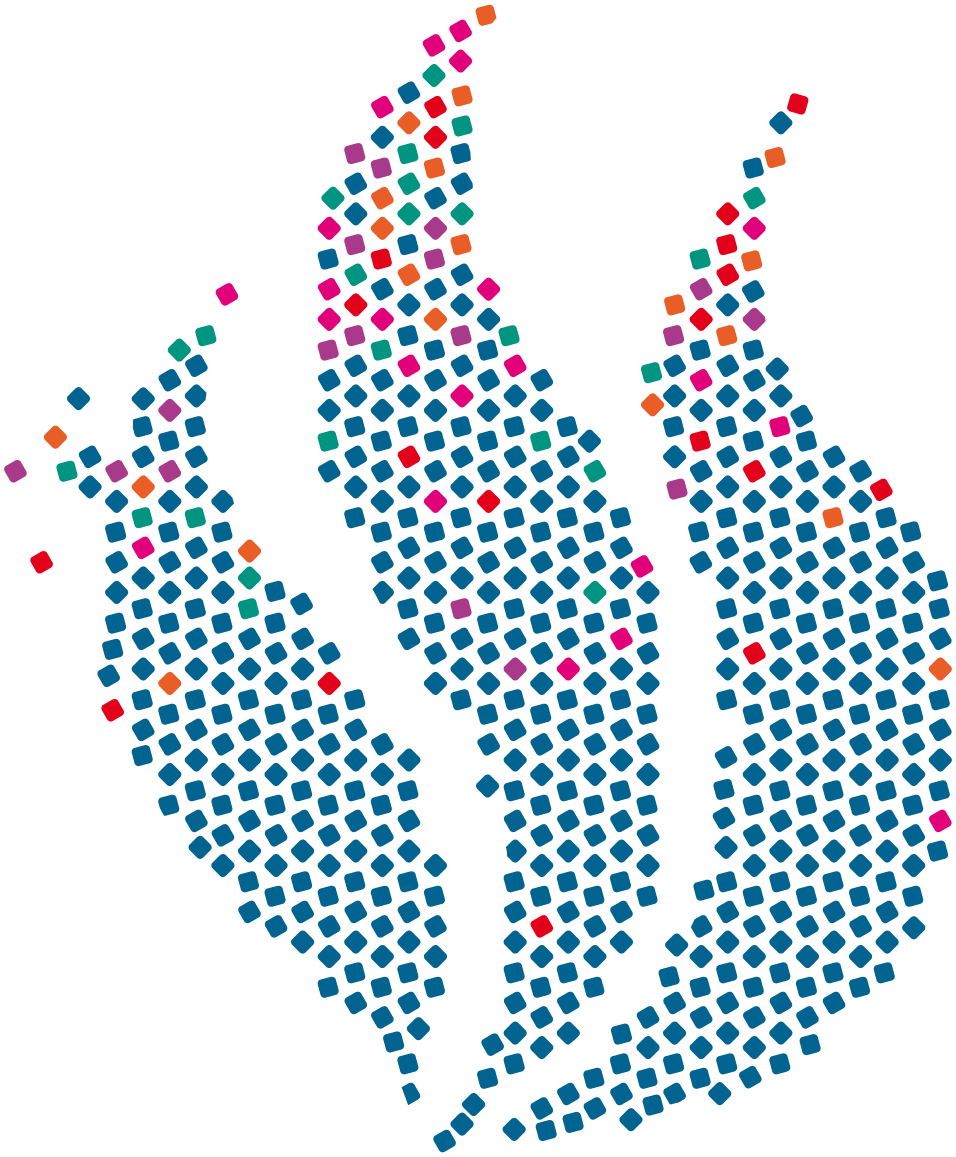
eurotec® engineering plastics



Intelligent Solutions for Flame Retardant Thermoplastics

Achieving Excellent Fire Protection with eurotec® Flame Retardant Engineering Thermoplastics

Due to miniaturization and increasing energy use in electric and electronic equipment, and rising levels of consumable and durable products in our homes, offices, and vehicles, we face an increasing potential of fire hazard.

As the fire risk increases, understanding the mechanism becomes more crucial. Fire starts with an ignition and spreads if it is not extinguished. Once the temperature rises up to critical point (flash over), all surrounding materials will ignite and endanger life.

More and more thermoplastics are used because of their easy processing, design freedom, low weight and high mechanical strength; most of them are inherently flammable which will contribute to the fire if not modified properly.

Flame Retardancy

Flame retardants are chemicals added to thermoplastics to minimize the risk of a fire starting in case of contact with a heat source or an electrical fault. In case of ignition, the flame retardant will slow down combustion and often prevent the fire from spreading to other items. Therefore flame retardant thermoplastics will interfere with the potential fire hazard by resisting ignition and delaying or preventing its propagation by extinguishing flames.

Flame retardant thermoplastics have various mechanisms which are;

- Gas phase; the additives decompose and suppress supply of oxygen
- Solid phase; the additives generate an isolative char layer which act as a barrier for oxygen and heat
- Cooling; the additives release water in order to cool the surface and extinguish flames.

Developing and formulating flame retardant thermoplastic compounds requires great expertise and know-how. Following parameters should be taken into consideration;

- Combustibility
- Ignitability
- Flame spread
- Heat release
- Smoke development
- Fire gas toxicity

Industry Specific Solutions

euro**tec**® is an independent compounder of engineering thermoplastics that creates and offers intelligent solutions based on innovative products and tailor made services.

euro**tec**® combines state of the art technology with high level of know-how and a dynamic, service oriented team, developing high quality products for applications where flame retardancy is needed.

When safety is the key factor, euro**tec**® offers a full range of flame retardant thermoplastic compounds according to a variety of test standards;

- Electric/Electronic and Household Appliances

  (UL 94, UL 746, IEC 60695, IEC 60112, ISO 4589)
- Building

  (EN 13501, EN 13823, EN 11925, EN 9239, BS 476, DIN 4102)
- Transportation

  (ISO 3795, BS 6853, NF F16-101, FMVSS 302, FAR 25.853)
- Upholstered furniture and textiles

  (BS 5852, DIN 4102)

Glow Wire
Flammability Index
IEC 60695-2-12

Glow Wire
Ignition Temperature
IEC 60695-2-13

Global Compliance with Environmental Regulations

Halogen Free Flame Retardant Thermoplastic Compounds

There are several restrictions on flame retardant compounds. European Union's RoHS (Restriction of Hazardous Substances) Directive is the major regulation which is also followed by many countries around the world. Although RoHS directive does not ban all halogenated flame retardants, current trend leads to more environmentally friendly solutions.

euro**tec**® has developed a comprehensive range of halogen free flame retardant compounds providing standard grades and customized solutions. Halogen free flame retardant grades from euro**tec**® both fulfill all fire resistance needs and give a global compliance with environmental regulations.

Tecomid® NB30 NL FA50 QL

PA6, unfilled

- UL94 V0 rating
- GWFI 960°C
- GWIT 775°C

Easy processing grade that shows improved surface quality, excellent colourability, outstanding toughness and low density for a variety of applications.

Tecomid® NB20 GP20 NL XZ50

PA6, 20% glass fiber reinforced, heat stabilized

- UL94 V2 rating
- GWFI 960°C

The grade combines thermal stability, heat resistance, with very good stiffness and surface aspect.

Tecomid® NB40 GR30 NL XA60

PA6, 30% glass fiber reinforced, heat stabilized

- UL94 V0 rating
- GWFI 960°C
- GWIT 800°C

This reinforced grade's high deformation temperature, mechanical strength and tracking resistance offers rigid, dimensionally stable and insulative products.

Tecomid® NA43 GR25 NL XA43

PA6.6, 25% glass fiber reinforced, heat stabilized

- UL94 V0 rating
- GWFI 960°C

Red phosphorus flame retardant grade delivers very good mechanical strength and superior self-extinguishing performance.

Tecomid® NT40 GR50 NL XA60

PPA, 50% glass fiber reinforced, heat stabilized

- UL94 V0 rating
- GWFI 960°C
- GWIT 875°C

High performance thermoplastic compound suitable for metal replacement with very high thermal stability, heat resistance, outstanding mechanical strength and elevated working temperature.

Tecotek® PC50 NL222 FA80

PC, transparent up to 2mm thickness

- UL94 V0 rating at 1.6mm
- GWFI 960°C at 2mm
- GWIT 825°C at 2mm

Tecotek® PC10 NL222 FA80

PC, transparent in any thickness

- UL94 V0 rating at 3.2mm
- GWFI 960°C at 2mm
- GWIT 850°C at 2mm

PC grades engineered to satisfy glass clear transparency, high impact strength and flame resistance needs in different thicknesses.

Tecolen® HP30 GR20 NL PU80

PPHP, 20% glass fiber reinforced, heat & UV stabilized

- UL94 V0 rating
- GWFI 960°C
- GWIT 825°C

Hydrolytically stable grade offers, good weatherability and heat resistance with a very low density for replacing polyamide grades under moist working conditions.

Tecotek® OP20 GR20 NL FB81 0B

PPO, 20% glass fiber reinforced, heat stabilized

- UL94 V1 rating
- GWFI 960°C

The grade combines, excellent dimensional stability, very good stiffness, very low moisture absorption and high level of heat resistance.

Very Low Smoke & Toxic Gas Grades

Fire Resistant Grades Especially for Indoors & Public Transportation

Whenever there is a fire hazard heat flux increases exponentially. Therefore especially for interior and public transport there is a narrow time gap for escape. Using flame retardant thermoplastic compounds delays the spread of fire assisting with safe evacuation. In most fire cases death or injuries occur due to smoke inhalation or tripping. High smoke densities will block the vision which will both delay escape and increase the chance for tripping. euro**tec**® offers special halogen free flame retardant thermoplastic compounds for their outstanding self-extinguishing performance and low smoke & toxic gas generation in case of a fire.

Tecomid® NB40 NL TD90 QF

PA6, unfilled

- UL94 V0 rating
- GWFI 960°C

The grade offers high impact resistance with a good stiffness over a wide range of working temperatures.

Tecomid® NB30 GR15 NL FS90

PA6, 15% glass fiber reinforced

- UL94 V0 rating
- GWFI 960°C
- GWIT 850°C

Specially formulated grade combines very good mechanical strength, stiffness, ignition resistance and excellent self-extinguishing performance with low smoke and toxic gas generation in the case of fire.

Tecolen® CP30 GR15 NL TD90 QF

PPCP, 15% glass fiber reinforced, impact modified

- UL94 V0 rating
- GWFI 960°C

Hydrolytically stable grade offers, excellent impact resistance, very good stiffness and exceptional self-extinguishing performance which enable to produce tough and water resistant products with FDA compliance.

Perfect Combination of Thermal Stability & Fire Resistance

RoHS Compliant Halogenated Flame Retardant Thermoplastic Compounds

Manufacturers often employ hot runner systems to reduce scrap and lower cycle times. If not installed correctly, hot runner systems produce high thermal stresses on the thermoplastic compounds. In order to deal with excessive thermal stress euro**tec**® can offer RoHS compliant halogenated flame retardant thermoplastic compounds for high thermal stability and outstanding self-extinguishing performance. Halogenated flame retardant compounds from euro**tec**® achieve high thermal stability and excellent fire ratings for most demanding applications.

Tecodur® PB70 NL TD70

PBT, unfilled, impact modified

- UL94 V0 rating
- GWFI 960°C

High flow grade while able to fill very thin sections, also provides excellent surface aspect. Moreover the grade delivers, dimensional stability under moist environment and very good flexibility for easy- assembly.

Tecomid® NB30 NL XC70

PA6, unfilled, heat stabilized

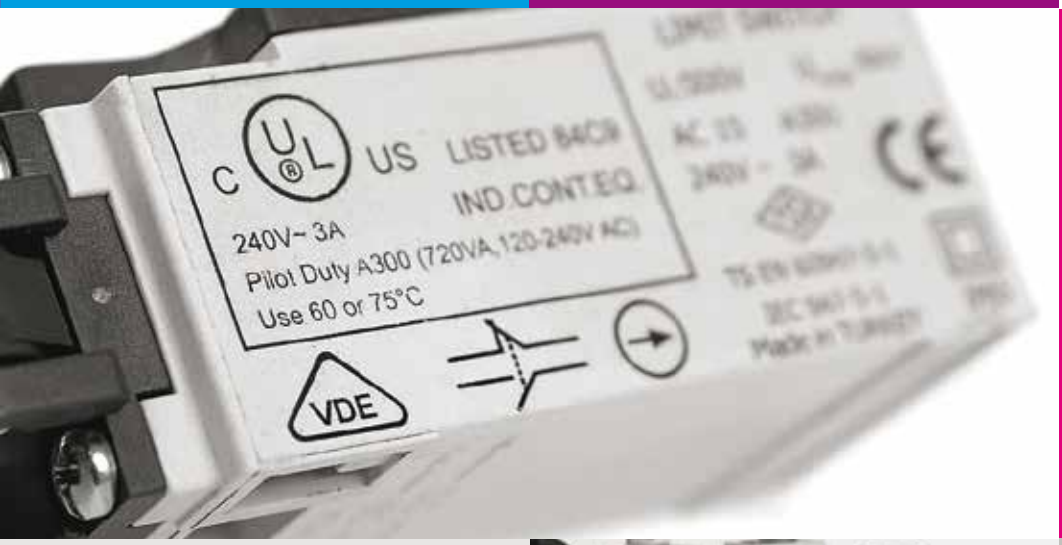
- UL94 V2 rating
- GWFI 850°C
- GWIT 775°C

Exceptional thermal stability of this grade can withstand long residence times during processing and shows outstanding heat aging performance that prevents discolouration during its service life.

Tecolen® CP30 NL XC30

- UL94 V2 rating
- GWFI 960°C
- GWIT 725°C

Cost effective flame retardant grade offers light weight, moisture resistance and very good self-extinguishing performance.



Tecodur® PB70 GR30 NL SV20

PBT, 30% glass reinforced, heat stabilized

- UL94 V0 rating
- UL94 5VA rating
- GWFI 960°C
- GWIT 725°C

High performance grade offers outstanding fire resistance, dimensional stability, excellent surface aspect and high mechanical strength with easy filling of thin sections.

Ignition Resistant Thermoplastic Compounds

Outstanding Glow Wire Performance

Current trends cause electric /electronic, lighting and home appliances sectors to develop small and compact products with more features. When circuit boards are reduced in size the electric current increases. As a consequence electronic components get subjected to more and more thermal stresses and the demand for ingintion resistant thermoplastics gets greater.

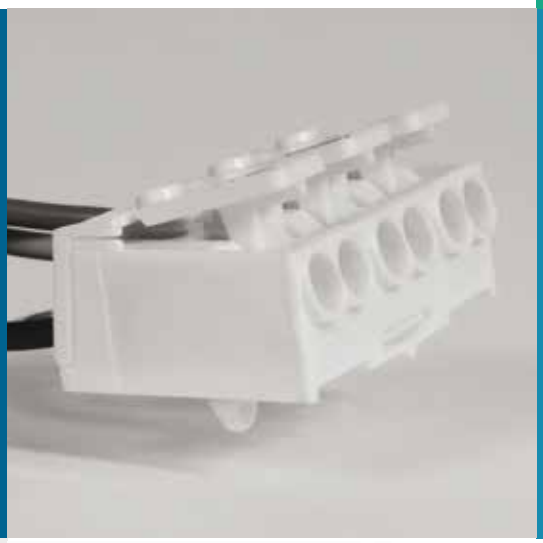
euro**tec**® has developed many solutions for ignition resistant compounds which can deliver superior mechanical properties and thermal resistance alongside with glow wire ignition resistance up to 925°C.

Tecopet® PT70 KK45 BK002 XA20 0B

PET, 45% glass fiber/mineral reinforced, heat stabilized

- UL94 V0 rating
- GWFI 960°C
- GWIT 875°C

Outstanding fire & ignition resistant grade combines, heft and thermal resistance of metals with excellent mechanical strength.



Tecotek® PC50 NL PU80

PC, unfilled, heat & UV stabilized

- UL94 V0
- GWFI 960°C
- GWIT 875°C

This specially formulated grade offers superior ignition resistance, UV stabilization, very high impact resistance and also generates low smoke and heat release in case of a fire.

Tecomid® NBX0 NL FW99

PA6, unfilled

- UL94 V2 rating
- GWFI 960°C
- GWIT 875°C

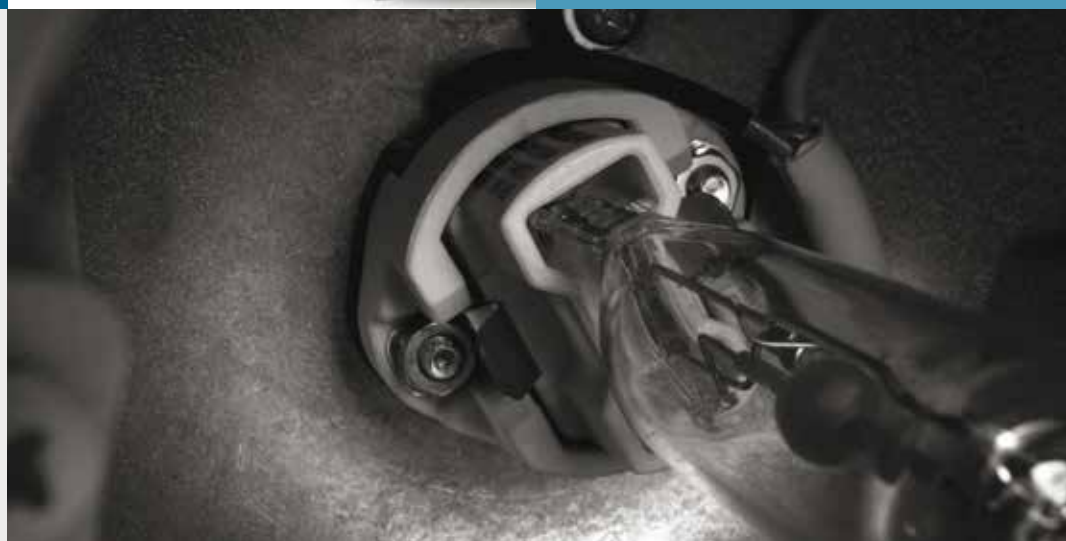
The grade combines mechanical strength, low density, excellent colourability with exceptional ignition resistance and easy filling of thin sections.

Tecotek® PC30 GR20 NL ZG20

PC, 20% glass fiber reinforced

- UL94 V0
- GWFI 960°C
- GWIT 925°C

Extremely ignition resistant grade offers very good mechanical strength, dimensional stability coupled with great surface for rigid and durable parts.



PROPERTY	CONDITION	UNIT	STANDARD	Tecomid® NB40 NL E QL P6, unfilled, natural	NB40 NL FY50 P6, unfilled, flame retardant - halogen & red phosphorus free, natural	NB30 NL XC70 PA6, unfilled, flame retardant - halogen (RoHS compliant), heat stabilized, natural	NBX0 NL FW99 PA6, unfilled, flame retardant - halogen (RoHS compliant), ignition resistant, natural	NB30 NL FA50 QL PA6, unfilled, flame retardant - halogen & red phosphorus free, natural
GENERAL								
Density	-	g/cm³	ISO 1183	1.13	1.16	1.32	1.26	1.17
Molding Shrinkage	Parallel / Normal	%	eurotec®	1.2 / 1.2	1.1 / 1.1	1.0 / 1.0	1.0 / 1.0	1.0 / 1.0
Moisture Content	-	%	ISO 960	-	<0.2	<0.2	<0.2	<0.2
Moisture Absorption	50% RH, 23°C	%	ISO 62	3.0	2.7	2.2	-	2.6
MECHANICAL								
Stress at Break	+23°C	MPa	ISO 527	-	70	70	70	70
Strain at Break	+23°C	%	ISO 527	-	-	-	-	-
Tensile Modulus	+23°C	MPa	ISO 527	3000	3250	3250	3750	3500
Yield Strength	+23°C	MPa	ISO 527	80	-	-	-	-
Izod Impact, notched	+23°C	kJ/m²	ISO 180/1A	6	7	7	5	6
Izod Impact, notched	-30°C	kJ/m²	ISO 180/1A	5	6	6	4	5
Izod Impact, un-notched	+23°C	kJ/m²	ISO 180/1U	NB	-	-	-	-
Izod Impact, un-notched	-30°C	kJ/m²	ISO 180/1U	NB	-	-	-	-
THERMAL								
Melting Temperature	10 K/min	°C	ISO 11357	223	223	223	223	223
Heat Deformation Temperature	0.45 MPa	°C	ISO 75	180	185	-	-	-
Heat Deformation Temperature	1.80 MPa	°C	ISO 75	65	75	75	75	70
Vicat Softening Temperature	50N	°C	ISO 306	200	200	-	-	-
ELECTRICAL & FLAMMABILITY								
Volume Resistivity	-	Ohm.cm	IEC 60093	1E+15	1E+15	1E+15	1E+15	1E+15
Surface Resistivity	-	Ohm	IEC 60093	1E+13	1E+13	1E+13	1E+13	1E+13
Comparative Tracking Index	solution A	V	IEC 60112	600	600	-	-	600
Glow Wire Flammability Index	2 mm plaque	°C	IEC 60695	-	960	850	960	960
Glow Wire Ignitability Temperature	2 mm plaque	°C	IEC 60695	-	775	775	875	775
Flame Rating	0.75 mm	-	UL94	V2	V2	V2	V2	V0
Flame Rating	1.6 mm	-	UL94	V2	V2	V2	V2	V0
Flame Rating	3.2 mm	-	UL94	V2	-	-	-	V0

* data are based on dry as molded

NB40 NL XA70 PA6, unfilled, flame retardant -halogen (RoHS compliant), natural	**NB40 NL FN70** PA6, unfilled, flame retardant -halogen (RoHS compliant), natural	**NB40 NL TD90 QF** PA6, unfilled, flame retardant - halogen & red phosphorus free, impact modified, natural, suitable for food contact	**NB20 GP20 NL XZ50** PA6, 20% glass fiber reinforced, flame retardant - halogen & red phosphorus free, heat stabilized, natural	**NB43 MF20 NL FY70** PA6, 20% mineral filled, flame retardant -halogen (RoHS compliant), natural	**NB40 GR15 NL XA70** PA6, 15% glass fiber reinforced, flame retardant -halogen (RoHS compliant), heat stabilized, natural	**NB30 GR15 NL FS90** PA6, 15% glass fiber reinforced, flame retardant - halogen & red phosphorus free, natural, low smoke & toxic gas grade	**NB40 GR20 NL XA70** PA6, 20% glass fiber reinforced, flame retardant -halogen (RoHS compliant), heat stabilized, natural	**NB40 GR20 NL XA60** PA6, 20% glass fiber reinforced, flame retardant -halogen & red phosphorus free, heat stabilized, natural	**NB40 GR30 NL XA70** PA6, 30% glass fiber reinforced, flame retardant -halogen (RoHS compliant), heat stabilized, natural	**NB40 GR30 NL XA60** PA6, 30% glass fiber reinforced, flame retardant -halogen & red phosphorus free, heat stabilized, natural
1.38	1.45	1.45	1.34	1.45	1.53	1.67	1.50	1.34	1.62	1.39
1.2 / 1.2	0.9 / 0.9	-	-	0.9 / 0.9	0.3 / 0.9	0.3 / 0.7	0.3 / 0.9	0.3 / 0.9	0.2 / 0.8	0.2 / 0.8
<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
2.0	2.0	1.1	-	1.7	1.7	1.1	1.7	1.7	1.4	1.5
65	70	45	65	60	100	70	125	100	125	120
-	-	5.0	3.0	3.5	2.5	2.0	3.0	2.5	2.0	2.5
3500	3750	4500	5500	5500	7500	9000	8000	8500	12500	9500
-	-	-	-	-	-	-	-	-	-	-
6	8	9	4	5	9	7	11	7	10	10
5	7	8	-	4	8	6	9	6	8	8
-	-	-	-	-	65	40	-	-	-	-
-	-	-	-	-	60	35	-	-	-	-
223	223	223	223	223	223	223	223	223	223	223
195	200	-	-	-	215	205	215	215	220	220
80	85	70	170	-	195	185	200	200	205	205
205	205	-	-	-	210	205	210	210	210	210
1E+15	1E+15	1E+15	1E+15	1E+15	1E+15	1E+15	1E+15	1E+15	1E+15	1E+15
1E+13	1E+13	1E+13	1E+13	1E+13	1E+13	1E+13	1E+13	1E+13	1E+13	1E+13
-	-	-	-	-	-	-	-	600	-	600
850	960	960	960	960	960	960	960	960	960	960
800	850	-	-	800	825	850	800	800	825	800
V2	V0	-	V2	V2	V0	V0	V1	V2	V0	V0
V0	V0	-	V2	V2	V0	V0	V0	V0	V0	V0
V0	V0	V0	-	-	V0	V0	V0	V0	V0	V0

PROPERTY	CONDITION	UNIT	STANDARD	Tecomid®				
				NA40 NL E QL PA6.6, unfilled, natural	**NA40 NL TN51** PA6.6/PA6, unfilled, flame retardant -halogen & red phosphorus free, impact modified, natural	**NA40 NL TW50** PA6.6, unfilled, flame retardant - halogen & red phosphorus free, surface modified, natural	**NA30 NL FA50 QL** PA6.6, unfilled, flame retardant - halogen & red phosphorus free, natural	**NA43 MF20 NL FY71** PA6.6/PA6, 20% mineral filled, flame retardant -halogen [RoHS complaint], heat stabilized, natural
GENERAL								
Density	-	g/cm³	ISO 1183	1.14	1.15	1.19	1.18	1.46
Molding Shrinkage	Parallel / Normal	%	eurotec®	1.4 / 1.4	1.2 / 1.2	1.3 / 1.3	1.3 / 1.3	1.0 / 1.0
Moisture Content	-	%	ISO 960	-	<0.2	<0.2	<0.2	<0.2
Moisture Absorption	50% RH, 23°C	%	ISO 62	2.7	2.4	2.3	2.3	1.7
MECHANICAL								
Stress at Break	+23°C	MPa	ISO 527	-	-	-	-	55
Strain at Break	+23°C	%	ISO 527	-	-	-	-	20
Tensile Modulus	+23°C	MPa	ISO 527	3200	3000	3250	3750	5000
Yield Strength	+23°C	MPa	ISO 527	85	60	55	75	-
Izod Impact, notched	+23°C	kJ/m²	ISO 180/1A	5	11	6	5	8
Izod Impact, notched	-30°C	kJ/m²	ISO 180/1A	4	8	5	4	7
Izod Impact, un-notched	+23°C	kJ/m²	ISO 180/1U	NB	-	-	-	55
Izod Impact, un-notched	-30°C	kJ/m²	ISO 180/1U	NB	-	-	-	45
THERMAL								
Melting Temperature	10 K/min	°C	ISO 11357	262	262	262	262	262
Heat Deformation Temperature	0.45 MPa	°C	ISO 75	210	-	-	225	-
Heat Deformation Temperature	1.80 MPa	°C	ISO 75	80	70	80	85	-
Vicat Softening Temperature	50N	°C	ISO 306	125	-	-	245	-
ELECTRICAL & FLAMMABILITY								
Volume Resistivity	-	Ohm.cm	IEC 60093	1E+15	1E+15	1E+15	1E+15	1E+15
Surface Resistivity	-	Ohm	IEC 60093	1E+13	1E+13	1E+13	1E+13	1E+13
Comparative Tracking Index	solution A	V	IEC 60112	600	600	600	600	-
Glow Wire Flammability Index	2 mm plaque	°C	IEC 60695	-	850	-	960	960
Glow Wire Ignitability Temperature	2 mm plaque	°C	IEC 60695	-	-	-	775	775
Flame Rating	0.75 mm	-	UL94	V2	V2	-	V0	V2
Flame Rating	1.6 mm	-	UL94	V2	V2	V2	V0	V0
Flame Rating	3.2 mm	-	UL94	V2	-	-	V0	V0

* data are based on dry as molded

NA40 GR15 NL XA70 PA6.6, 15% glass fiber reinforced, flame retardant-halogen (RoHS complaint), heat stabilized, natural	**NA40 GR25 NL XA70** PA6.6, 25% glass fiber reinfoced, flame retardant -halogen (RoHS compliant), heat stabilized, natural	**NA43 GR25 NL XA43** PA6.6, 25% glass fiber reinforced, flame retardant - red phosphorus, heat stabilized, natural	**NA43 GR25 NL TD43** PA6.6, 25% glass fiber reinforced, flame retardant - red phosphorus, impact modified, heat stabilized, natural	**NA43 GR25 NL XA60** PA6.6, 25% glass fiber reinforced, flame retardant -halogen & red phosphorus free, heat stabilized, natural	**NA43 GR35 NL XA43** PA6.6, 35% glass fiber reinforced, flame retardant - red phosphorus, heat stabilized, natural	**NA30 GR50 NL XA43** PA6.6, 50% glass fiber reinforced, flame retardant - red phosphorus, heat stabilized, natural	**NT40 NL XA60** PPA, unfilled, flame retardant -halogen & red phosphorus free, heat stabilized, natural	**NT40 GR30 NL XA60** PPA, 30% glass fiber reinforced, flame retardant - halogen & red phosphorous free, heat stabilized, natural	**NT40 GR50 NL XA60** PPA, 50% glass fiber reinforced, flame retardant - halogen & red phosphorous free, heat stabilized, natural	**NT40 CR30 NL XA60** PPA, 30% carbon fiber reinforced, flame retardant - halogen & red phosphorus free, heat stabilized, natural
1.48	1.58	1.40	1.38	1.39	1.50	1.56	1.24	1.45	1.63	1.34
0.3 / 1.1	0.3 / 1.1	0.2 / 1.0	0.2 / 1.0	0.3 / 1.1	0.2 / 1.0	0.2 / 0.8	1.1 / 1.1	0.2 / 0.9	0.2 / 0.7	0.1 / 0.7
<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
1.7	1.5	1.5	1.5	1.5	1.3	1.1	2.0	1.3	1.0	1.3
115	135	140	125	100	160	175	75	170	210	260
3.0	2.5	2.5	3.0	2.0	2.0	2.0	2.0	2.0	2.0	1.5
8000	9000	9000	8500	9000	11000	16000	4000	11500	18500	26000
-	-	-	-	-	-	-	-	-	-	-
8	9	8	12	7	11	12	4	8	12	6
7	8	7	10	6	9	11	3	7	11	5
-	-	50	-	40	60	-	-	-	-	-
-	-	45	-	-	50	-	-	-	-	-
262	262	262	262	262	262	262	315	315	315	315
-	-	250	245	-	250	260	-	-	-	-
245	250	245	240	240	245	250	130	280	285	280
-	-	-	-	-	-	250	-	-	-	-
1E+15	1E+15	1E+15	1E+15	1E+15	1E+15	1E+15	1E+15	1E+15	1E+15	<1E+3
1E+13	1E+13	1E+13	1E+13	1E+13	1E+13	1E+13	1E+13	1E+13	1E+13	<1E+1
225	225	>350	>350	600	>350	>350	600	600	600	-
960	960	960	960	960	960	960	960	960	960	960
-	-	-	-	825	-	-	775	850	875	875
-	-	V0	V0	V0	V0	V0	V0	V0	V0	V0
V0	V0	V0	V0	V0	V0	V0	V0	V0	V0	V0
V0	V0	V0	V0	V0	V0	V0	V0	V0	V0	V0

PROPERTY	CONDITION	UNIT	STANDARD	Tecodur® PB70 NL XA70 PBT, unfilled, flame retardant - halogen (RoHS compliant), heat stabilized, natural	PB70 NL SV20 PBT, unfilled, flame retardant - halogen (RoHS compliant), natural	PB70 NL TD22 PBT/PC, unfilled, flame retardant -halogen (RoHS compliant), impact modified, natural	PB70 NL TD70 PBT, unfilled, flame retardant -halogen (RoHS compliant), impact modified, natural	PB70 GR15 NL XA70 PBT, 15% glass fiber reinforced, flame retardant -halogen (RoHS compliant), heat stabilized, natural
GENERAL								
Density	-	g/cm³	ISO 1183	1.41	1.43	1.36	1.40	1.53
Molding Shrinkage	Parallel / Normal	%	eurotec®	1.5 / 1.5	1.5 / 1.5	1.4 / 1.4	1.6 / 1.6	0.4 / 1.1
Moisture Content	-	%	ISO 960	<0.08	<0.08	<0.08	<0.08	<0.08
Moisture Absorption	50% RH, 23°C	%	ISO 62	0.2	0.2	0.2	0.2	0.2
MECHANICAL								
Stress at Break	+23°C	MPa	ISO 527	60	60	50	45	100
Strain at Break	+23°C	%	ISO 527	-	-	-	-	3.0
Tensile Modulus	+23°C	MPa	ISO 527	2750	3000	2500	2500	6500
Yield Strength	+23°C	MPa	ISO 527	-	-	-	-	-
Izod Impact, notched	+23°C	kJ/m²	ISO 180/1A	6	5	12	8	7
Izod Impact, notched	-30°C	kJ/m²	ISO 180/1A	5	4	10	6	6
Izod Impact, un-notched	+23°C	kJ/m²	ISO 180/1U	-	-	-	NB	-
Izod Impact, un-notched	-30°C	kJ/m²	ISO 180/1U	-	-	-	NB	-
THERMAL								
Melting Temperature	10 K/min	°C	ISO 11357	225	225	225	225	225
Heat Deformation Temperature	0.45 MPa	°C	ISO 75	-	165	-	-	-
Heat Deformation Temperature	1.80 MPa	°C	ISO 75	65	65	70	55	185
Vicat Softening Temperature	50N	°C	ISO 306	-	-	-	-	-
ELECTRICAL & FLAMMABILITY								
Volume Resistivity	-	Ohm.cm	IEC 60093	1E+16	1E+16	1E+16	1E+16	1E+16
Surface Resistivity	-	Ohm	IEC 60093	1E+14	1E+14	1E+14	1E+14	1E+14
Comparative Tracking Index	solution A	V	IEC 60112	225	225	-	225	225
Glow Wire Flammability Index	2 mm plaque	°C	IEC 60695	960	960	960	960	960
Glow Wire Ignitability Temperature	2 mm plaque	°C	IEC 60695	-	-	-	-	-
Flame Rating	0.75 mm	-	UL94	V0	V0	V0	V2	-
Flame Rating	1.6 mm	-	UL94	V0	V0	V0	V0	V0
Flame Rating	3.2 mm	-	UL94	V0	V0	V0	V0	V0

* data are based on dry as molded

						Tecopet®				
PB70 GR17 NL FA20 PBT, 17% glass fiber reinforced, flame retardant - halogen (RoHS compliant), natural	**PB70 GR20 NL100 XA70** PBT, 20% glass fiber reinforced, flame retardant -halogen (RoHS compliant), heat stabilized, natural	**PB70 GR30 NL XA70** PBT, 30% glass fiber reinforced, flame retardant - halogen (RoHS compliant), heat stabilized, natural	**PB70 GR30 NL XA71** PBT/PET, 30% glass fiber reinforced, flame retardant - halogen (RoHS compliant), heat stabilized, natural	**PB70 GR30 NL SV20** PBT, 30% glass fiber reinforced, flame retardant -halogen (RoHS compliant), natural. 5VA flame rating	**PB70 GR30 NL XA60** PBT, 30% glass fiber reinforced, flame retardant - halogen & red phosphorous free, heat stabilized, natural	**PT70 GR15 NL100 PS20** PET, 15% glass fiber reinforced, flame retardant - halogen (RoHS compliant), heat stabilized, natural, fast crystallization grade	**PT70 GR30 NL100 PS20** PET, 30% glass fiber reinforced, flame retardant - halogen (RoHS compliant), heat stabilized, natural, fast crystallization grade	**PT70 GR30 NL100 XD70** PET, 30% glass fiber reinforced, flame retardant - halogen (RoHS compliant), high heat stabilized, natural	**PT74 GR30 NL XA60** PET, 30% glass fiber reinforced, flame retardant - halogen & red phosphorous free, heat stabilized, natural	**PT70 KK45 NL XA20 0B** PET, 45% glass fiber/ mineral reinforced, flame retardant -halogen (RoHS complaint), heat stabilized, natural
1.55	1.57	1.65	1.68	1.65	1.53	1.54	1.68	1.70	1.56	1.83
0.4 / 1.1	0.4 / 1.1	0.3 / 1.0	-	0.3 / 1.0	0.3 / 1.0	0.3 / 0.8	0.2 / 0.9	0.2 / 0.9	0.3 / 1.0	0.2 / 0.8
<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
110	120	130	135	130	100	90	120	130	90	100
3.0	3.0	2.0	2.0	2.0	2.0	2.0	1.5	2.0	1.5	1.5
6500	8000	11000	11000	11000	11000	7000	11500	12000	12500	13000
-	-	-	-	-	-	-	-	-	-	-
8	8	9	8	10	7	6	8	7	6	6
7	7	8	7	9	6	5	7	6	5	5
-	-	60	55	65	35	-	40	30	-	-
-	-	55	50	60	30	-	35	25	-	-
225	225	225	225	225	225	255	255	255	250	255
210	-	220	215	220	215	-	-	255	-	-
190	200	205	195	205	200	200	225	225	220	200
-	-	210	205	210	205	-	-	230	-	-
1E+16	1E+16	1E+16	1E+16	1E+16	1E+16	1E+16	1E+16	1E+16	1E+16	1E+16
1E+14	1E+14	1E+14	1E+14	1E+14	1E+14	1E+14	1E+14	1E+14	1E+14	1E+14
225	225	225	225	225	575	200	200	200	-	200
960	960	960	960	960	960	960	960	960	960	960
700	-	-	-	725	775	750	750	825	-	875
V0	-	-	-	V0	V0	-	-	V0	V0	V0
V0	V0	V0	V0	V0	V0	V0	V0	V0	V0	V0
V0	V0	V0	V0	V0	V0	V0	V0	V0	V0	V0

				Tecotek®				
PROPERTY	CONDITION	UNIT	STANDARD	**PC40 NL FA70** PC, unfilled, flame retardant - halogen (RoHS compliant), natural	**PC30 NL TD70** PC, unfilled, flame retardant - halogen (RoHS compliant), impact modified, natural	**PC43 NL TD70** PC, unfilled, flame retardant - halogen (RoHS compliant), impact modified, natural	**PC50 NL PU80** PC, unfilled, flame retardant - Br, Cl free, heat & UV stabilized, natural	**PC50 NL222 FA80** PC, unfilled, flame retardant - halogen free, transparent up to 2mm, natural
GENERAL								
Density	-	g/cm³	ISO 1183	1.23	1.21	1.22	1.21	1.18
Molding Shrinkage	Parallel / Normal	%	eurotec®	0.5 / 0.5	0.6 / 0.6	0.6 / 0.6	0.5 / 0.5	-
Moisture Content	-	%	ISO 960	<0.1	<0.1	<0.1	<0.1	<0.1
Moisture Absorption	50% RH, 23°C	%	ISO 62	0.2	0.2	0.2	0.2	0.2
MECHANICAL								
Stress at Break	+23°C	MPa	ISO 527	65	60	60	70	65
Strain at Break	+23°C	%	ISO 527	>20	>50	>20	>5	>50
Tensile Modulus	+23°C	MPa	ISO 527	2500	2250	2250	2500	2500
Yield Strength	+23°C	MPa	ISO 527	-	-	-	-	-
Izod Impact, notched	+23°C	kJ/m²	ISO 180/1A	8	50	35	10	11
Izod Impact, notched	-30°C	kJ/m²	ISO 180/1A	7	20	15	-	10
Izod Impact, un-notched	+23°C	kJ/m²	ISO 180/1U	-	NB	NB	-	-
Izod Impact, un-notched	-30°C	kJ/m²	ISO 180/1U	-	NB	NB	-	-
THERMAL								
Melting Temperature	10 K/min	°C	ISO 11357	-	-	-	-	-
Heat Deformation Temperature	0.45 MPa	°C	ISO 75	-	105	105	115	-
Heat Deformation Temperature	1.80 MPa	°C	ISO 75	120	95	95	105	135
Vicat Softening Temperature	50N	°C	ISO 306	-	130	130	120	-
ELECTRICAL & FLAMMABILITY								
Volume Resistivity	-	Ohm.cm	IEC 60093	1E+15	1E+15	1E+15	1E+15	1E+15
Surface Resistivity	-	Ohm	IEC 60093	1E+15	1E+15	1E+15	1E+15	1E+15
Comparative Tracking Index	solution A	V	IEC 60112	-	225	225	-	-
Glow Wire Flammability Index	2 mm plaque	°C	IEC 60695	960	960	960	-	960
Glow Wire Ignitability Temperature	2 mm plaque	°C	IEC 60695	-	900	875	-	-
Flame Rating	0.75 mm	-	UL94	V0	V0	V0	-	-
Flame Rating	1.6 mm	-	UL94	V0	V0	V0	V0	V0
Flame Rating	3.2 mm	-	UL94	V0	V0	V0	V0	V0

* data are based on dry as molded

PC10 NL222 FA80 PC, unfilled, flame retardant - halogen free, transparent, natural	**PC50 GR10 NL FA20** PC, 10% glass fiber reinforced, flame retardant - halogen (RoHS compliant), natural	**PC30 GR10 NL XA80** PC, 10% glass fiber reinforced, flame retardant - Br, Cl free, heat stabilized, natural	**PC44 GR10 NL XA80** PC, 10% glass fiber reinforced, flame retardant - Br, Cl free, heat stabilized, natural	**PC44 GR10 NL ZG70** PC, 10% glass fiber reinforced, flame retardant - halogen (RoHS compliant), natural	**PC30 GR20 NL ZG20** PC, 20% glass fiber reinforced, flame retardant - halogen (RoHS compliant), natural	**PC40 GR30 NL FA70** PC, 30% glass fiber reinforced, flame retardant - halogen (RoHS compliant), natural	**OP20 NL FA81 0A** PPE/PS, unfilled, flame retardant - halogen & red phosphorus free, natural	**OP20 NL FA81 0B** PPE/HIPS, unfilled, flame retardant - halogen & red phosphorus free, natural	**OP20 NL FA81 0C** PPE/PS, unfilled, flame retardant - halogen & red phosphorus free, high heat grade, natural	**OP20 GR20 NL FB81 0B** PPE/HIPS, 20%glass fiber reinforced, flame retardant - halogen & red phosphorus free, natural
1.19	1.29	1.27	1.27	1.31	1.38	1.45	1.09	1.09	1.08	1.23
-	0.5 / 0.5	0.5 / 0.5	-	0.5 / 0.5	0.5 / 0.5	0.4 / 0.4	-	-	-	-
<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2
0.2	0.2	0.2	0.2	0.2	0.2	0.2	-	-	-	-
65	80	110	100	100	110	110	50	60	70	100
>50	4.0	3.5	3.0	4.0	2.5	2.0	20	20	20	2.0
2500	4000	4500	4500	4500	7000	9000	2750	2750	2750	5500
-	-	-	-	-	-	-	-		-	-
75	11	8	7	7	10	9	9	8	7	11
15	9	7	6	6	8	8	8	7	6	10
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-
-	140	-	-	135	145	145	100	-	145	135
135	130	115	110	130	135	135	90	110	130	130
-	140	-	-	145	145	145	110	-	155	140
1E+15	1E+15	1E+15	1E+15	1E+15	1E+15	1E+15	-	-	-	-
1E+15	1E+15	1E+15	1E+15	1E+15	1E+15	1E+15	-	-	-	-
-	175	-	-	175	175	-	-	-	-	-
960	960	960	960	960	960	960	960	960	960	960
850	900	875	-	900	925	-	-	-	-	-
-	V0	V0	V0	V0	V0	-	V0	V0	V0	-
V2	V0	V0	V0	V0	V0	V0	V0	V0	V0	V1
V0	V0	V0	V0	V0	V0	V0	V0	V0	V0	-

PROPERTY	CONDITION	UNIT	STANDARD	Tecotek®			Tecolen®	
				BC40 UF85 NL XA80 PC/ABS, unfilled, flame retardant - Br, Cl free, heat stabilized, natural, high heat grade	**BC10 UF85 NL PU81** PC/ABS, unfilled, flame retardant - Br, Cl free, heat & UV stabilized, white, high heat grade	**BC41 GR15 NL XC81** PC/ABS, 15% glass fiber reinforced, flame retardant -Br, Cl free, heat stabilized, natural	**CP30 NL XC30** PPCP, unfilled, flame retardant -halogen (RoHS compliant), heat stabilized, natural	**CP30 NL PF30** PPCP, unfilled, flame retardant -halogen (RoHS compliant), heat & UV stabilized, natural
GENERAL								
Density	-	g/cm³	ISO 1183	1.18	1.20	1.30	0.93	0.92
Molding Shrinkage	Parallel / Normal	%	**eurotec®**	-	-	-	-	-
Moisture Content	-	%	ISO 960	-	-	-	-	-
Moisture Absorption	50% RH, 23°C	%	ISO 62	-	-	-	-	-
MECHANICAL								
Stress at Break	+23°C	MPa	ISO 527	60	60	100	20	25
Strain at Break	+23°C	%	ISO 527	-	>50	-	>100	>100
Tensile Modulus	+23°C	MPa	ISO 527	2500	2750	6000	1000	1250
Yield Strength	+23°C	MPa	ISO 527	-	-	-	-	-
Izod Impact, notched	+23°C	kJ/m²	ISO 180/1A	15	35	8	60	55
Izod Impact, notched	-30°C	kJ/m²	ISO 180/1A	-	12	7	10	10
Izod Impact, un-notched	+23°C	kJ/m²	ISO 180/1U	-	-	-	-	-
Izod Impact, un-notched	-30°C	kJ/m²	ISO 180/1U	-	-	-	-	-
THERMAL								
Melting Temperature	10 K/min	°C	ISO 11357	-	-	-	165	165
Heat Deformation Temperature	0.45 MPa	°C	ISO 75	-	-	-	-	-
Heat Deformation Temperature	1.80 MPa	°C	ISO 75	90	90	115	50	50
Vicat Softening Temperature	50N	°C	ISO 306	-	-	-	-	-
ELECTRICAL & FLAMMABILITY								
Volume Resistivity	-	Ohm.cm	IEC 60093	1E+13	1E+13	1E+13	1E+15	1E+15
Surface Resistivity	-	Ohm	IEC 60093	1E+15	1E+15	1E+15	1E+15	1E+15
Comparative Tracking Index	solution A	V	IEC 60112	-	-	-	-	-
Glow Wire Flammability Index	2 mm plaque	°C	IEC 60695	960	960	960	960	960
Glow Wire Ignitability Temperature	2 mm plaque	°C	IEC 60695	-	-	-	775	775
Flame Rating	0.75 mm	-	UL94	V2	-	V2	V2	V2
Flame Rating	1.6 mm	-	UL94	V0	V0	V2	V2	V2
Flame Rating	3.2 mm	-	UL94	V0	V0	-	-	-

* data are based on dry as molded

CP30 NL XA80 PPCP, unfilled, flame retardant - halogen & red phosphorus free, heat stabilized, natural	**CP30 NL TD90 QF** PPCP, unfilled, impact modified, flame retardant - halogen free, low smoke & toxic gas grade, suitable for food contact, natural	**CP20 MF20 NL XC30** PPCP, 20% mineral filled, flame retardant -halogen (RoHS compliant), heat stabilized, natural	**CP20 MF20 NL XA70** PPCP, 20% mineral filled, flame retardant -halogen (RoHS compliant), heat stabilized, natural	**CP30 GR15 NL TD90 QF** PPCP, 15% glass fiber reinforced, impact modified, flame retardant - halogen free, low smoke and toxic gas grade, suitable for food contact, natural	**CP20 GR20 NL XC30** PPCP, 20% glass fiber reinforced, flame retardant -halogen (RoHS compliant), heat stabilized, natural	**HP30 NL XC30** PPHP, unfilled, flame retardant -halogen (RoHS compliant), heat stabilized, natural	**HP30 NL XC81** PPHP, unfilled, flame retardant -halogen & red phosphorus free, heat stabilized, natural	**HP30 NL XA80** PPHP, unfilled, flame retardant -halogen & red phosphorus free, heat stabilized, natural	**HP30 GR20 NL PU80** PPHP, %20 glass fiber reinforced, flame retardant -halogen & red phosphorus free, heat & UV stabilized, natural	**OX20 WH200 XD85** Polyolefin mix, flame retardant - halogen free, heat stabilized, white
1.05	1.46	1.09	1.36	1.57	1.07	0.93	1.03	1.05	1.25	1.16
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-
20	10	30	20	30	50	30	25	25	70	-
-	20	40	10	3.0	5.0	>100	-	-	5.0	>100
1750	2000	2250	3500	5750	4000	1250	2000	2500	6500	100
-	-	-	-	-	-	-	-	-	-	-
10	25	15	15	12	25	8	5	4	8	25
4	-	5	5	7	-	3	4	3	7	-
-	NB	75	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-
165	165	165	165	165	165	170	170	170	170	-
-	-	-	-	-	-	-	-	-	-	-
60	45	55	60	80	90	65	60	70	140	30
-	-	-	-	-	-	-	-	-	-	-
1E+15	1E+15	1E+15	1E+15	1E+15	1E+15	1E+15	1E+15	1E+15	1E+15	1E+15
1E+15	1E+15	1E+15	1E+15	1E+15	1E+15	1E+15	1E+15	1E+15	1E+15	1E+15
600	-	-	-	-	-	-	600	600	-	-
960	960	850	960	960	850	960	960	960	960	-
875	-	775	725	-	800	775	-	875	825	-
V2	-	V2	V0	-	V2	V2	V2	V2	V0	-
V0	-	V2	V0	V0	V2	V2	V2	V0	V0	-
V0	V0	-	V0	V0	-	-	-	V0	V0	V0

Tecomid® PA6, PA6.6, PA6.6/6, and PA blends

Tecomid® HT PPA

Tecodur® PBT, and PBT blends

Tecopet® PET

Tecotek® PC, and PC blends

Tecotek® PPO, and PPO blends

Tecolen® PP, and PE speciality

Tecoform® POM

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- Material identification
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- Accelerated ageing tests against environmental and extraordinary conditions/ influences
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- Instrumental analysis
- Rheology and process ability applications
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eurotec® engineering plastics

European Free Zone
116/24 Velimese 59850 Corlu
Tekirdag - Turkey
T: +90 282 691 12 12 pbx
F: +90 282 691 12 18
www.eurotec-ep.com