



# 4KTEC® COMPOUNDS

PA6, PA66, PP-H, PP-C, ABS, BLENDS

4KTEC®  
COMPOUNDS BY KORRELS



Photo: Henri van der Beek

# WHO WE ARE

We are specialist and generalist in one. We Create!

4KTEC® is a brand of the KORRELS group. KORRELS has gained a great reputation by taking on the most diverse challenges in the field of plastic materials.

With a lot of knowledge, translated into smart material solutions, a strong reputation was built. Resulting in customer-specific solutions, but the versatile portfolio also includes many standard compounds.

We produce PA6, PA66, PP-H, PP-C, ABS & Blends on request, i.e. customer-specific. In addition, you will find a selection of our standard compounds in this brochure. If your compound is not listed, let us know.

The KORRELS group is located in Wapenveld, The Netherlands. For more than two decades we have been committed to providing our customers with high quality materials and services. But what makes us even more proud is that we continue to grow year after year. Our attention to material, knowledge, staff and customer has helped us to make our company grow.

Our people are the core of our success. We have a dedicated and skilled team working day in and day out to provide the best products and services to our customers. Our employees are passionate about their work and are highly committed to deliver the best results. Together We Create!



# WE LIVE OUR VALUES!

Having a clear set of values helps to understand what we stand for. Our company values also give guidance to our work and a sense of security. As a result, we are more likely to make the right decisions; the decisions that help us achieve our company's vision and goals.



FAIRNESS



INNOVATION



CARE



PASSION



ACCOUNTABILITY



RESPECT



TEAMWORK

**FAIRNESS** is woven into everything we do: aiming to make good decisions that serve the needs of the business without harming anyone. **INNOVATION** is driven by wisdom, which is a combination of knowledge and character. **WE CARE** deeply about our products and their quality, as well as the environment and the afterlife of our products. Our stakeholders, including customers and their unique needs, are also a top priority. We approach our work with **PASSION**, finding it interesting

and exciting, and we actively engage with the day-to-day efforts to satisfy our customers. **ACCOUNTABILITY** is crucial, as each of us is responsible for our words, actions, and results. **RESPECT** is a core value, as we value everyone and treat people with dignity and professionalism. **TEAMWORK** is key to our success, as we achieve more when we collaborate and work together with our colleagues and customers.

# 4KTEC® PA6 COMPOUNDS

4KTEC® PA6 compounds are designed to deliver exceptional impact resistance and outstanding mechanical performance. This is achieved through an innovative blend of mineral fillers and glass fibers. This unique formulation enhances the material's rigidity, dimensional stability, and resistance to warping, making it well-suited for products with large surface areas.

The 4KTEC product line offers a variety of options with different viscosities and enhanced features. These include resistance to UV light, impact modification, the ability to be laser-marked, heat stabilization, and flame retardance, among other capabilities.

Customized 4KTEC formulations can be tailored to meet the specific needs of different industries. Furthermore, 4KTEC is fully recyclable and maintains its desirable properties even after regrinding.

- > Excellent impact resistance and toughness at low and high temperatures
- > High dynamic strength
- > Very good abrasion resistance
- > Hydrolytic stability (special grades)
- > Excellent chemical resistance
- > Highest stress resistance, even at cold temperatures
- > High wear and fatigue resistance even at high temperatures
- > Good electrical properties, easy processability
- > Flame retardant compound with halogen and halogen free UL94 V-2 or V-0 classifications
- > Glow wire flammability index
- > Glow wire ignition behavior (no flame)
- > Low smoke density and toxicity



# 4KTEC® PA66 COMPOUNDS

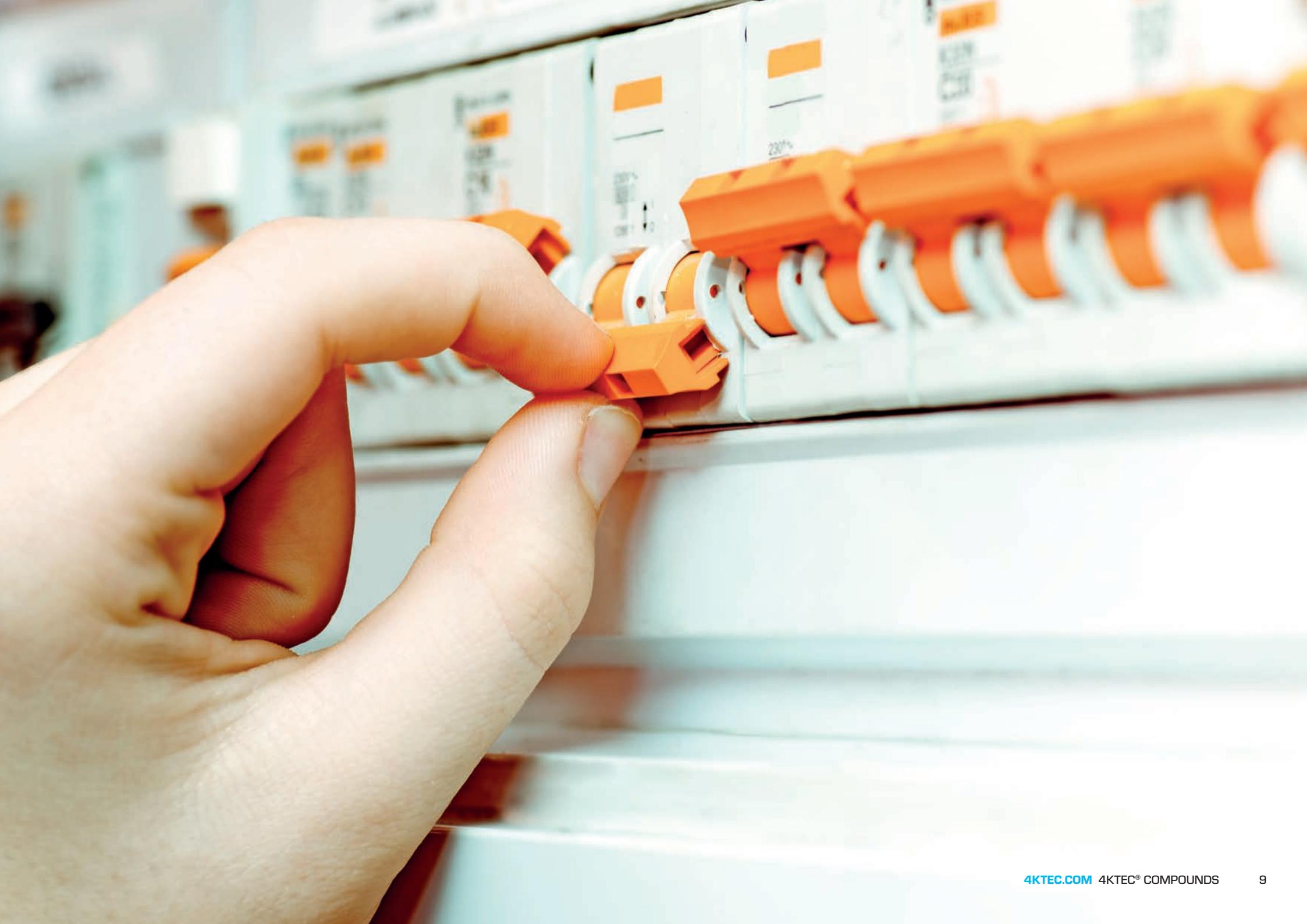
Polyamide 66 has a more compact molecular structure compared to Polyamide 6. This is due to stronger hydrogen bonding and better alignment of the molecular chains. This structure gives Polyamide 66 increased resistance to crushing, matting, and stain penetration, making it stronger and more durable than Polyamide 6.

PA66 has lower sensitivity to moisture compared to PA6, making it better suited for high-temperature applications. 4KTEC® PA66 offers high impact resistance and exceptional mechanical performance.

The product line includes materials enhanced with glass fibers, mineral fillers, and specialized for UV/light stability, impact modification, laser markability, heat resistance, flame retardancy, and various other additives.

Formulations of 4KTEC® PA66 can be customized to meet specific market needs. It is a fully recyclable material that maintains its properties even after regrinding.

- > High stiffness, strength and temperature resistance
- > Excellent impact resistance and toughness at low and high temperatures
- > High dynamic strength
- > Very good abrasion resistance
- > Hydrolytic stability (special grades)
- > Excellent chemical resistance
- > High wear and fatigue resistance even at high temperatures
- > Good electrical properties
- > Flame retardant compound with halogen and halogen free UL94 V-2 or V-0 classifications
- > Glow wire flammability index
- > Glow wire ignition behavior (no flame)
- > Low smoke density and toxicity



# 4KTEC® PP-H COMPOUNDS

4KTEC® PP-H is a versatile polypropylene-based compound that offers impressive physical, mechanical, thermal, and electrical characteristics. It is competitively priced, highly resistant to chemicals and corrosion, and maintains strong performance even in cold environments.

This semi-crystalline thermoplastic is easy to process and can be modified with features like glass fiber reinforcement, UV stabilization, and flame retardancy. This makes it useful for a variety of products in the automotive, household and construction industries.

4KTEC® PP-H is fully recyclable and maintains its properties after regrinding. It is available in various custom colors, ensuring precise color matching even in lighter shades. Users must verify that mixed materials meet specific application standards.

- > Attractive economics
- > Good balance of properties among stiffness
- > Durability and impact resistance
- > UV stability
- > Low specific gravity
- > Good chemical resistance
- > High stiffness and abrasion resistance
- > Excellent resistance to chemical agents
- > Low hygroscopic specialty
- > Easy process ability
- > Flame retardant compound with halogen and halogen free UL94 V-2 or V-0 classifications
- > Glow wire ignition behavior (no flame)
- > Low smoke density



# 4KTEC® PP-C COMPOUNDS

4KTEC® PP-C is a versatile and cost-efficient polypropylene-based compound that is renowned for its exceptional mechanical, thermal, and electrical properties.

4KTEC® PP-C is designed to excel in cold environments, effectively resisting organic solvents, degreasers, and corrosion. It is more robust and durable than 4KTEC® PP-H, with enhanced impact resistance and improved performance in low temperatures.

This compound can be tailored with features like glass fiber reinforcement, UV stabilization, and flame retardancy, making it suitable for a variety of sectors, including automotive and household appliances. 4KTEC® PP-C is fully recyclable and maintains its qualities after regrinding.

It is essential for users to ensure that the recycled material meets the specific requirements of the intended application. Customized formulations are also available to address a wide range of market demands.

- > Attractive economics
- > Good balance of properties among stiffness
- > Durability and impact resistance
- > UV stability
- > Low specific gravity
- > Good chemical resistance
- > High stiffness and abrasion resistance
- > Excellent resistance to chemical agents
- > Low hygroscopic specialty
- > Easy process ability
- > Flame retardant compound with halogen and halogen free UL94 V-2 or V-0 classifications
- > Glow wire ignition behavior (no flame)
- > Low smoke density



# 4KTEC® ABS COMPOUNDS

4KTEC® ABS, is a high-quality Acrylonitrile-Butadiene-Styrene copolymer, known for its glossy finish and robust composition.

4KTEC® ABS combines different components to achieve a balance of desirable properties. The styrene component allows for easy processing, the acrylonitrile provides chemical resistance and surface hardness, and the butadiene contributes impact strength and toughness.

Key features of this material include high rigidity, heat resistance, scratch resistance, and minimal shrinkage. Modifications can be made to further enhance its impact resistance and thermal stability.

4KTEC® ABS excels in hardness, gloss, toughness, and electrical insulation. It is also resistant to a variety of chemicals including acids, alkalis, and oils. Custom formulations can be developed to meet specific application needs.

This fully recyclable material maintains its properties after regrinding. Users should ensure compatibility and performance of mixed materials for specific applications.



- > High chemical resistance
- > High surface brightness
- > Excellent impact resistance
- > Even at low temperature
- > Low shrinkage levels
- > Excellent dimensional stability
- > Excellent surface aspect

# 4KTEC® BLENDS

4KTEC® high-performance blends combine strength, durability, chemical and heat resistance, and aesthetic quality to optimize cost and manufacturability. These compounds are well-suited for challenging environments and are used in a variety of industries, including electronics, food, office furniture, information technology, medical, and automotive.

The 4KTEC® resin line is an excellent choice for designs that prioritize appearance and long-lasting performance. These formulations can be customized to meet specific market needs and are available in a range of precise, custom colors, including lighter shades.

Glass fibers, glass beads, carbon fibers, aramid fibers, and mineral fillers are offered in various contents and combinations. Additionally, materials filled with PTFE and molybdenum disulfide are available, making them ideal for bearing applications due to their low friction and enhanced wear resistance. To improve specific properties, various additives are used in both non-reinforced and reinforced grades, such as heat stabilizers, hydrolysis stabilizers, lubricants, UV stabilizers, and electrical conductives.



# 4KTEC® SMART POLYMERS

4KTEC® has developed maleic anhydride (MAH) grafted polymers. These polymers are created through a reactive extrusion process, where the base polymer is chemically bonded with MAH.

4KTEC®'s smart polymers enhance the functionality of various polymers by blending them with customized levels of maleic anhydride (MAH) grafting to meet your specific requirements.

4KTEC® is eager to work with you to develop tailored solutions, ensuring that our smart polymers meet your exact specifications.

Maleic anhydride (MAH) grafted polymers are versatile materials used to improve the adhesion between polymers and other components like fibers, fillers, and reinforcements. This makes them particularly valuable in composite materials, where enhanced bond strength and mechanical properties are crucial.

Beyond composites, MAH compounds are also used to increase the compatibility of different polymer blends. This improves the overall stability and durability of the final product. These attributes make MAH-grafted compounds essential in industries like automotive, aerospace, and construction, where high-performance materials are required.



# 4KTEC® HIGH PERFORMANCE ENGINEERING PLASTICS

The high-performance engineering plastics from 4KTEC® are designed to excel in extreme environments, with operating temperatures exceeding 150°C. These plastics offer outstanding properties, including low friction, chemical resistance, and high temperature endurance.

Specifically developed to replace metals, these compounds enhance durability and performance in various industries, notably automotive, transportation, and manufacturing.

4KTEC®'s extensive product line features polyphenylene sulfide (PPS) and polyphthalamide (PPA) based compounds.



# 4KTEC® ECOMPOUNDS

ECOmpounds® is the registered trademark for recycled plastic compounds produced by Korrels, favored for their environmental benefits and reduced reliance on fossil resources.

ECOmpounds® transforms old plastics into new, high-quality compounds.

These products are crafted using our proprietary formulas, enhanced with fiberglass reinforcement, elastomer modifications, heat stabilization, and mineral fillers, with virgin materials added to closely match the quality of original compounds.

ECOmpounds® compounds are energy and water-efficient, generate minimal residual waste, and produce more top-quality material.

ECOmpounds® recycles widely-used and valuable materials in various grades and colors, and can tailor formulations to specific market requirements.

ECOmpounds® are supplied with quality certificates such as a COA, TDS and MSDS. As a result, you are assured of consistent quality as standard, so that the use of an ECOmpound® does not disrupt the production process.

**Modification of recycled plastics by compounding with glass fiber, mineral fillers and other additives produces a substantial change in the properties of the base material and gives to compositions based on ecompounds the following properties:**

- **Tolerances as tight as virgin grades**
- **Larger processing window**
- **Sufficient mechanical properties**
- **Product available in specific colors**



Photo: Henri van der Beek

# 4KTEC® SUSTAINABLE COMPOUNDS

Because we care about our planet we can develop your compounds with a share of renewable materials or post-consumer waste. The exact content of sustainable ingredients can be adjusted to your wishes while maintaining the quality.

## RENEWABLE BASED

These compounds are made from renewable sources, which simply means coming from natural sources that can be constantly replenished without harming our planet. These are not sources that are in the food chain.

The used basic components of these compounds are renewable raw materials such as: rubbers, polymers and fillers. Depending on the percentage and the wishes you have for your product, we can compose the compound with a combination of these three raw materials.

## POST CONSUMER WASTE

These compounds are made from post consumer waste. Post consumer waste refers to waste generated by individuals or households after a product has served its intended purpose and has been discarded or recycled.

The used basic parts of these compounds are recycled raw materials such as: rubbers, polymers and fillers. Depending on the percentage and the wishes you have for your product, we can compose the compound with a combination of these three raw materials.



# 4KTEC® SPECIAL SOLUTIONS

## METAL DETECTABLE PRODUCTS

Ensuring the absence of foreign objects during food preservation and packaging is crucial to prevent contamination, including that from plastics. Plastics labeled as "metal detectable" contain additives that allow them to be detected by metal detectors. This capability is vital as it helps minimize risk and liability in food production.



Using metal detectors and ensuring that items such as scrapers, buckets, ladles, shovels, tools, knife handles, and conveyors are made from detectable materials is a standard safety protocol in food preparation environments. Moreover, detectable grades of plastics can typically be molded using the same equipment as conventional plastics, which helps keep development and production costs low. This approach not only enhances food safety but also streamlines manufacturing processes.

## E-VEHICLE SOLUTIONS

The rise of electric vehicles (EVs) has become a growing priority in recent years, mainly due to their eco-friendly advantages. At 4KTEC, we're actively involved in this expanding industry by creating engineering plastics that meet relevant regulations and industry standards.



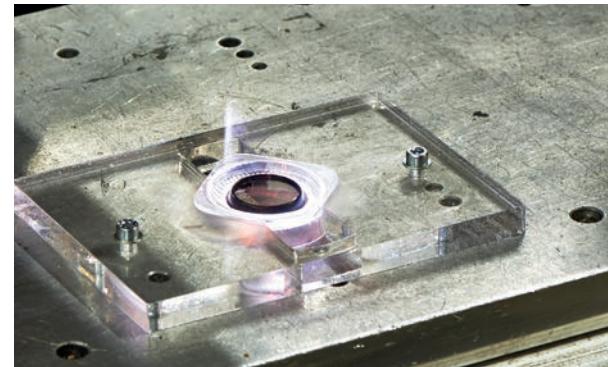
These plastics are tailored for various EV applications, providing different features to cater to the diverse needs of this market. If you're curious to learn more about our solutions and how they can support your projects, please reach out to us to discuss your specific requirements.

## ELECTRICAL CONDUCTIVE SOLUTIONS



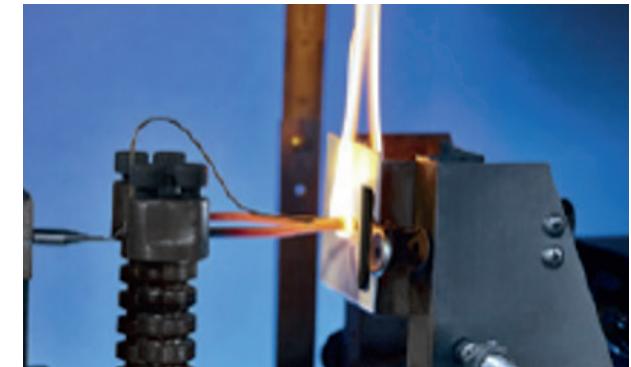
4KTEC specializes in creating products with a wide range of surface conductivity, from 10 to 1 trillion ohms. These products are designed to meet the specific needs and usage areas of our customers. Our formulations are compatible with both injection molding and extrusion processes, using the desired polymer base. We take naturally insulative plastics and enhance them with advanced technologies and additives to give them conductive properties. Our specialized compounds are engineered to be anti-static, static discharge (ESD) resistant, or conductive, ensuring they meet the conductivity requirements of your application.

## LASER MARKABLE PRODUCTS



Laser marking is a technique that uses a powerful beam of light to create markings on products without physically touching them or using any consumable materials like ink or acid. This sets it apart from traditional marking methods such as printing, engraving, burning, and embossing. Laser marking is becoming increasingly popular across many industries because it offers a cleaner and more environmentally-friendly process.

## FLAME RETARDANT COMPOUNDS



The use of self-extinguishing engineering plastics is on the rise globally. 4KTEC has extensive expertise in compounding flame-retardant grades with various polymer resins. Our engineers are skilled at developing products with different flame-retardant systems to meet our customers' requirements for diverse markets.





# 4KTEC® EXAMPLES OF APPLICATIONS

- 1 LAMP HOUSING PBT FLAME RETARDANT
- 2 OFFICE CHAIR PP LONG FIBERGLASS
- 3 CEILING LIGHT POLYCARBONATE
- 4 SHOWER HEAD ABS
- 5 REFRIGERATOR POLYSTYRENE
- 6 EXTERIOR MIRROR PA6 GF 50
- 7 INTERIOR CAR MIRROR PA6 GF
- 8 TAIL LIGHT PBT GF
- 9 REFLECTOR PC
- 10 WIPER PBT/PET GF 30
- 11 SADDLE PP COMPOUND
- 12 PEDALS PP COMPOUND
- 13 GEARS PA 4.6
- 14 DECKING PP WOOD COMPOUND
- 15 SWIMMING POOL PROFILE PC
- 16 WATER PUMP PPH GF
- 17 FLOWER POT PP COMPOUND
- 18 CHAIR PP NATURAL FIBER COMPOUND

# 4KTEC® CHEMICAL RESISTANCE

Chemical resistance is a crucial property of plastics that determines how well they are able to withstand the harmful effects of chemicals. Different types of plastics vary greatly in their ability to resist chemical degradation.

	PA6	PA66	PP-H	PP-C	ABS
Acid Dilute	Poor	Poor	Good-fair	Good-fair	Good-fair
Acids Concentrated	Poor	Poor	Good-fair	Good-fair	Fair-poor
Alkalies	Good-fair	Good-fair	Good	Good	Good-fair
Alcohols	Good	Good	Good	Good	Good-fair
Aromatic Hydrocarbon	Good	Good	Fair	Fair	Poor
Oils and Grases	Good	Good	Good-fair	Good-fair	Good-poor
Halogenated Hydrocarbon	Good-Poor	Good-poor	Good-poor	Good-poor	poor
Ketones	Good	Good	Good	Good	poor

# 4KTEC® MARKETS

4KTEC® COMPOUNDS are widely spread and divided over a number of market segments. We can divide these segments roughly between these markets:

## TECHNICAL COMPOUNDS

- > Automotive
- > Home appliances
- > Electric & electronics
- > White appliances
- > Construction
- > Sport equipment
- > Toys
- > Safety equipment
- > Office and garden furniture

## SMART POLYMERS

- > Compounding
- > Multilayer pipes
- > Composite panels
- > Halogen-free flame retardant cables
- > Metal coating
- > Co-extrusion
- > Cast and blow films
- > Recycling

## 4KTEC / ECOMPOUNDS

- > Automotive
- > Home appliances
- > Electrics and electronics
- > Construction
- > Sport equipment
- > Office and garden furniture

# 4KTEC® PA6 COMPOUNDS

														25% MINERAL REINFORCED, IMPACT MODIFIED, NATURAL	30% MINERAL FILLED, HEAT STABILIZED, BLACK
GENERAL	PROPERTY	METHOD	UNIT	STANDARD	UNFILLED, NATURAL	UNFILLED, NATURAL	IMPACT MODIFIED, NATURAL, LOW IMPACT	IMPACT MODIFIED, NATURAL, MEDIUM IMPACT	IMPACT MODIFIED, NATURAL, HIGH IMPACT	IMPACT MODIFIED, BLACK	UNFILLED, MOS2; MODIFIED	UNFILLED, CONDUCTIVE BLACK	UNFILLED, CONDUCTIVE BLACK	UNFILLED, IMPACT MODIFIED, NATURAL	30% MINERAL FILLED, HEAT STABILIZED, BLACK
	Density	-	g/cm³	ISO 1183	1.12-1.14	1.12-1.14	1.09-1.11	1.06-1.09	1.03-1.06	1.03-1.06	1.12-1.14	1.16-1.18	1.28-1.30	1.34-1.37	
MECHANICAL	Molding Shrinkage	Parallel/Normal	%	ISO 294-4	1.2-1.3	1.2-1.3	1.3-1.5	1.3 / 1.5	1.4 / 1.6	1.4 / 1.6	1.2 / 1.3	1.1 / 1.2	0.9-1.1	0.7 / 0.9	
	Moisture Content	-	%	ISO 15512	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	
	Tensile Stress at Break	+23 C	Mpa	ISO 527	-	-	-	-	-	-	-	-	60-70	55-65	70-90
	Tensile Strain at Break	+23 C	%	ISO 527	-	-	-	-	-	-	-	-	-	-	-
	Tensile Modulus	+23 C	Mpa	ISO 527	2500-3000	2500-3000	2250-2500	1900-2250	1500-1800	1500-1800	2750-3250	2500-3000	3000-4000	5000-6000	
	Yield Strength	+23 C	Mpa	ISO 527	65-75	75-80	60-70	55-65	45-55	40-50	75-80	-	-	-	
	Izod Impact Strength, notched	+23 C	kJ/m²	ISO 180 / 1A	5-7	6-8	15-25	45-60	60-80	60-70	6-8	5-7	12-16	8-12	
	Izod Impact Strength, notched	-30 C	kJ/m²	ISO 180 / 1A	4-6	5-7	10-15	15-20	20-25	20-25	5-7	4-6	6-8	-	
	Izod Impact Strength, un-notched	+23 C	kJ/m²	ISO 180 / 1U	NB	NB	NB	NB	NB	NB	NB	-	-	-	
	Izod Impact Strength, un-notched	-30 C	kJ/m²	ISO 180 / 1U	NB	NB	NB	NB	NB	NB	NB	-	-	-	
THERMAL	Melting Temperature	10 K / min	C	ISO 11357	220-225	220-225	220-225	220-225	220-225	220-225	220-225	220-225	220-225	220-225	
	Heat Deflection Temperature	0.45 Mpa	C	ISO 75	170-180	180	-	-	-	-	180	-	-	-	
	Heat Deflection Temperature	1.80 Mpa	C	ISO 75	65	65	55	55	50	50	65	65	70	80	
	Vicat Softening Temperature	50N	C	ISO 306	200	200	-	-	-	-	200	-	-	-	
FLAMMABILITY	Volume Resistivity	-	Ohm.cm	IEC 60093	1E+15	1E+15	1E+15	1E+15	1E+15	1E+15	1E+15	<1E+5	1E+15	1E+15	
	Surface Resistivity	-	Ohm	IEC 60093	1E+13	1E+13	1E+13	1E+13	1E+13	1E+13	1E+13	-	1E+13	1E+13	
	Comparative Tracking Index	solution A	V	IEC 60112	600	600	600	600	600	600	600	-	550	500	
	Flame Rating	0.75 mm	-	UL94	V2	V2	HB	HB	HB	HB	HB	HB	HB	HB	
	Flame Rating	1.6 mm	-	UL94	V2	V2	HB	HB	HB	HB	HB	HB	HB	HB	

This is a selection of our wide range of standard compounds, if your compound is not listed, please contact your local sales agent.

40% GLASS FIBER / MINERAL REINFORCED, NATURAL	30% GLASS FIBER / GLASS- BEAD REINFORCED, NATURAL	30% GLASS FIBER REINFORCED, NATURAL	10% GLASS FIBER REINFORCED, NATURAL	30% GLASS FIBER REINFORCED, HEAT STABILIZED, NATURAL	15% GLASS FIBER IMPACT MODIFIED, NATURAL	20% GLASS FIBER REINFORCED, NATURAL	25% GLASS FIBER REINFORCED, NATURAL	25% GLASS FIBER REINFORCED, BLACK	30% GLASS FIBER REINFORCED, IMPACT MODIFIED, NATURAL	30% GLASS FIBER REINFORCED, HYDROLYSIS STABILIZED, NATURAL	30% GLASS FIBER REINFORCED, HEAT STABILIZED, NATURAL	50% GLASS FIBER REINFORCED, IMPACT MODIFIED, NATURAL	10% CARBON FIBER REINFORCED, BLACK	20% CARBON FIBER REINFORCED, BLACK
1.34-1.37	1.45-1.47	1.35-1.37	1.35-1.37	1.18-1.21	1.34-1.36	1.20-1.22	1.25-1.27	1.29-1.32	1.29-1.32	1.29-1.31	1.34-1.36	1.31-1.33	1.53-1.55	1.13-1.15
0.7 / 0.9	0.3 / 0.8	0.4-0.6	0.3 / 0.6	0.3 / 0.6	0.1 / 0.3	0.2 / 0.4	0.2 / 0.4	0.2 / 0.35	0.2 / 0.35	0.3 / 0.5	0.1 / 0.3	0.15-0.35	0.05 / 0.2	0.4 / 1.1
<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
70-90	90-110	70-80	110-130	90-120	165-185	100-110	120-140	140-160	130-150	135-150	165-185	135-150	190-200	90-110
-	-	-	-	3-4	3-4	3-4	3-4	3-3.5	2.5-3	4.0-5.0	3-4	3-4	2-3	3-4
5000-6000	7500-8500	5000-5500	5500-6500	4500-5000	9000-10000	5000-6000	6000-7500	7500-8500	7000-8000	7500-8500	9000-10000	8000-9000	13000-14000	7000-8000
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8-12	5-7	6-8	7-10	08-11	15-20	13-15	10-13	12-14	10-13	26-30	15-20	18-20	20-22	8-13
-	-	-	-	6-8	12-15	10-12	7-9	10-12	8-10	16-20	12-15	13-15	18-20	-
-	45-50	-	-	-	-	70-75	50-60	70-80	60-70	NB	-	85-90	NB	-
-	40-45	-	-	-	-	60-65	45-55	60-70	50-60	NB	-	75-90	NB	-
220-225	220-225	220-225	220-225	220-225	220-225	220-225	220-225	220-225	220-225	220-225	220-225	220-225	220-225	220-225
-	-	200	215	210	210	215	210	210	205	200	210	215	220	-
80	180	90	195	185	200	185	205	200	200	185	200	200	210	200
-	-	-	-	-	-	-	210	210	210	205	210	210	210	205
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+5
1E+13	1E+13	1E+13	1E+13	1E+13	1E+13	1E+13	1E+13	1E+13	1E+13	1E+13	1E+13	1E+13	1E+13	-
500	500	500	500	500	500	500	500	500	500	500	500	500	500	-
HB	HB	HB	HB	HB	HB	HB	HB	HB	HB	HB	HB	HB	HB	HB
HB	HB	HB	HB	HB	HB	HB	HB	HB	HB	HB	HB	HB	HB	HB

# 4KTEC® PA66 COMPOUNDS

				UNFILLED, NATURAL	IMPACT MODIFIED, NATURAL	IMPACT MODIFIED, LOW, NATURAL	IMPACT MODIFIED, MEDIUM, NATURAL	IMPACT MODIFIED, HIGH, NATURAL	UNFILLED, MOS2 MODIFIED	30% GLASSBEAD REINFORCED, HEATSTABILIZED, NATURAL	30% GLASSFIBER / GLASS BEAD REINFORCED, HEATSTABILIZED, NATURAL	15% GLASSFIBER REINFORCED, HEATSTABILIZED, NATURAL	20% GLASSFIBER REINFORCED, HEATSTABILIZED, NATURAL
PROPERTY	METHOD	UNIT	STANDARD										
Density	-	g/cm³	ISO 1183	1.13-1.15	1.09-1.11	1.07-1.09	1.05-1.07	1.03-1.05	1.13-1.15	1.35-1.37	1.35-1.37	1.22-1.24	1.26-1.28
Molding Shrinkage	Parallel/Normal	%	ISO 294-4	-	1.5 / 1.5	1.5 / 1.5	1.6 / 1.6	1.7 / 1.7	1.4 / 1.4	0.2 / 0.5	0.2 / 0.4	0.2 / 0.5	0.2 / 0.45
Moisture Content	-	%	ISO 15512	1.4 / 1.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Tensile Stress at Break	+23 C	Mpa	ISO 527	-	-	-	-	-	-	80-85	130-150	120-130	130-150
Tensile Strain at Break	+23 C	%	ISO 527	-	-	-	-	-	-	-	2-3	2-3	2-3
Tensile Modulus	+23 C	Mpa	ISO 527	3000-3500	2100-2500	1900-2300	1500-1900	1300-1600	3000-3500	4000-5000	6500-7500	5500-6500	6500-7500
Yield Strength	+23 C	Mpa	ISO 527	80-85	60-65	55-60	50-55	40-50	75-85	-	-	-	-
Izod Impact Strength, notched	+23 C	kJ/m²	ISO 180 / 1A	5-6	15-18	45-50	60-70	80-85	5-6	5-6	6-8	6-8	8-10
Izod Impact Strength, notched	-30 C	kJ/m²	ISO 180 / 1A	4-5	10-12	15-20	20-25	20-25	4-5	4-5	5-7	5-7	7-9
Izod Impact Strength, un-notched	+23 C	kJ/m²	ISO 180 / 1U	NB	NB	NB	NB	NB	NB	-	50-55	40-50	50-60
Izod Impact Strength, un-notched	-30 C	kJ/m²	ISO 180 / 1U	NB	NB	NB	NB	NB	NB	-	45-50	40-45	45-55
Melting Temperature	10 K / min	C	ISO 11357	260-265	260-265	260-265	255-260	255-265	260-265	260-265	260-265	260-265	260-265
Heat Deflection Temperature	0.45 Mpa	C	ISO 75	210	-	-	-	-	220	210	260	250	255
Heat Deflection Temperature	1.80 Mpa	C	ISO 75	80	65	65	65	60	80	90	250	245	245
Vicat Softening Temperature	50N	C	ISO 306	-	-	-	-	-	-	245	250	250	250
Volume Resistivity	-	Ohm.cm	IEC 60093	1E+15	1E+15	1E+15	1E+15	1E+15	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	1E+13	1E+13	1E+13	1E+13	1E+13
Comparative Tracking Index	solution A	V	IEC 60112	600	600	600	600	600	-	500	500	500	500
Flame Rating	0.75 mm	-	UL94	V2	HB	HB	HB	HB	HB	HB	HB	HB	HB
Flame Rating	1.6 mm	-	UL94	V2	HB	HB	HB	HB	HB	HB	HB	HB	HB

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# 4KTEC® PP-H COMPOUNDS

				20% CALCITE FILLED, NATURAL	30% CALCITE FILLED, NATURAL	40% CALCITE FILLED, NATURAL	60% CALCITE FILLED, NATURAL	50% BARIUM SULPHATE FILLED, NATURAL	10% TALC FILLED, NATURAL	20% TALC FILLED, NATURAL	30% TALC FILLED, NATURAL	40% TALC FILLED, NATURAL	10% GLASS FIBER REINFORCED, NATURAL	
PROPERTY	METHOD	UNIT	STANDARD											
GENERAL	Density	-	g/cm <sup>3</sup>	ISO 1183	1.05-1.08	1.10-1.15	1.22-1.28	1.51-1.57	1.40-1.45	0.96-1.0	1.04-1.08	1.14-1.18	1.22-1.28	0.95-0.98
MECHANICAL	Tensile Stress at Break	+23 C	Mpa	ISO 527	25-30	20-30	15-25	10-15	15-25	25-35	25-35	25-35	20-30	40-50
MECHANICAL	Tensile Strain at Break	+23 C	%	ISO 527	>20	>10	>10	>10	>10	>20	>15	>10	>5	>5
MECHANICAL	Tensile Modulus	+23 C	Mpa	ISO 527	1000-2000	1500-2250	1750-2500	2000-2500	1000-2000	1500-2500	1500-2500	2000-3000	2000-3000	2500-3000
MECHANICAL	Izod Impact Strength, notched	+23 C	kJ/m <sup>2</sup>	ISO 180 / 1A	6-9	5-8	4-7	4-6	4-8	6-8	5-8	4-7	3-5	5-7
Thermal	Melting Temperature	10 K / min	C	ISO 11357	165-170	165-170	165-170	165-170	165-170	165-170	165-170	165-170	165-170	165-170
Thermal	Heat Deflection Temperature	1.80 Mpa	C	ISO 75	60	60	60	60	65	90	70	75	80	110
ELECTRICAL & FLAMMABILITY	Volume Resistivity	-	Ohm.cm	IEC 60093	1E+15	1E+15	1E+15	1E+15	1E+15	1E+15	1E+15	1E+15	1E+15	1E+15
ELECTRICAL & FLAMMABILITY	Surface Resistivity	-	Ohm	IEC 60093	1E+15	1E+15	1E+15	1E+15	1E+15	1E+15	1E+15	1E+15	1E+15	1E+15
ELECTRICAL & FLAMMABILITY	Comparative Tracking Index	solution A	V	IEC 60112	-	-	-	-	-	-	-	-	-	-
ELECTRICAL & FLAMMABILITY	Glow Wire Flammability Index	2 mm plaque	C	IEC 60695	-	-	-	-	-	-	-	-	-	-
ELECTRICAL & FLAMMABILITY	Glow Wire Ignitability Temperature	2 mm plaque	C	IEC 60695	-	-	-	-	-	-	-	-	-	-
ELECTRICAL & FLAMMABILITY	Flame Rating	0.75 mm	-	UL94	HB	HB	HB	HB	HB	HB	HB	HB	HB	HB
ELECTRICAL & FLAMMABILITY	Flame Rating	1.6 mm	-	UL94	HB	HB	HB	HB	HB	HB	HB	HB	HB	HB

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20% GLASS FIBER REINFORCED, NATURAL	30% GLASS FIBER REINFORCED, NATURAL	35% GLASS FIBER REINFORCED, NATURAL	40% GLASS FIBER REINFORCED, NATURAL	30% GLASS FIBER / GLASS BEAD REINFORCED, HEAT STABILIZED, NATURAL	20% GLASS BEAD REINFORCED, NATURAL	20% CARBONFIBER BLACK	FLAME RETARDANT- HALOGEN, HEAT STABILIZED, NATURAL	FLAME RETARDANT- HALOGEN FREE, HEAT STABILIZED, NATURAL	10% TALC FILLED	20% TALC FILLED	30% TALC FILLED	25% GLASS FIBER REINFORCED
1.02-1.05	1.11-1.14	1.14-1.17	1.18-1.22	1.11-1.14	1.02-1.05	0.99-1.01	0.93-0.96	1.03-1.06	1.25-1.30	1.30-1.40	1.40-1.50	1.25-1.30
60-70	75-80	80-90	85-100	60-70	20-30	50-60	25-35	20-30	20-30	20-30	20-30	70-80
>3	>3	>2	>2	>3	-	-	>100	-	>10	>10	>5	>10
3000-4500	5000-6000	6000-7500	7000-8000	4000-5000	1500-2000	8500-9500	1000-1500	1500-2500	2000-2500	2500-3000	3000-33000	6500-7500
7-10	9-11	9-12	9-12	8-10	2-4	3-4	7-10	3-5	5-7	4-6	3-5	2-4
165-170	165-170	165-170	165-170	165-170	165-170	165-170	165-170	165-170	165-170	165-170	165-170	165-170
120	120	140	145	145	-	-	65	60	70	145	70	70
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	1E+15	1E+15	1E+15	1E+15
-	-	-	-	-	-	-	-	600	600	600	600	600
-	-	-	-	-	-	-	960	960	960	960	960	960
-	-	-	-	-	-	-	775	750	700	800	725	725
HB	HB	HB	HB	HB	HB	HB	V2	V2	V0	V0	V0	V0
HB	HB	HB	HB	HB	HB	HB	V2	V0	V0	V0	V0	V0

# 4KTEC® PP-C COMPOUNDS

				HEAT & UV STABILIZED, NATURAL	15% CALCITE FILLED, NATURAL	30% CALCITE FILLED, NATURAL	10% TALC FILLED, NATURAL	20% TALC FILLED, NATURAL	30% TALC FILLED, NATURAL	40% TALC FILLED, NATURAL	20% TALC FILLED, UV AND HEAT STABILIZED, NATURAL	40% BARIUM SULFATE FILLED, NATURAL	30% GLASS BEAD REINFORCED, NATURAL	
PROPERTY	METHOD	UNIT	STANDARD											
GENERAL	Density	-	g/cm <sup>3</sup>	ISO 1183	0.90-0.92	0.98-1.02	1.13-1.18	0.96-1.0	1.04-1.08	1.12-1.18	1.23-1.27	1.04-1.08	1.40-1.46	1.11-1.14
MECHANICAL	Tensile Stress at Break	+23 C	Mpa	ISO 527	-	20-30	15-25	15-25	20-30	20-30	20-30	20-30	15-25	10-20
	Tensile Strain at Break	+23 C	%	ISO 527	>150	>30	>20	>25	>15	>10	-	>15	>9	>50
	Tensile Modulus	+23 C	Mpa	ISO 527	750-1000	1000-2000	1000-2000	800-1500	1000-2500	1500-2500	2500-3500	1000-2500	1500-2000	1000-1500
	Izod Impact Strength, notched	+23 C	kJ/m <sup>2</sup>	ISO 180 / 1A	>55	>15	>5	>10	>7	>7	>4	>7	>6	4-6
	Izod Impact Strength, un-notched	+23 C	kJ/m <sup>2</sup>	ISO 180 / 1U	NB	NB	NB	NB	NB	NB	NB	NB	NB	-
	Izod Impact Strength, un-notched	-30 C	kJ/m <sup>2</sup>	ISO 180 / 1U	NB	NB	NB	NB	NB	NB	NB	NB	NB	-
THERMAL	Melting Temperature	10 K / min	C	ISO 11357	160-165	160-165	160-165	160-165	160-165	160-165	160-165	160-165	160-165	160-165
	Heat Deflection Temperature	1.80 Mpa	C	ISO 75	40	55	55	60	65	80	75	60	-	60
ELECTRICAL & FLAMMABILITY	Volume Resistivity	-	Ohm.cm	IEC 60093	1E+15	1E+15	1E+15	1E+15	1E+15	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	1E+15	1E+15	1E+15	1E+15	1E+15
	Glow Wire Flammability Index	2 mm plaque	C	IEC 60695	-	-	-	-	-	-	-	-	-	-
	Glow Wire Ignitability Temperature	2 mm plaque	C	IEC 60695	-	-	-	-	-	-	-	-	-	-
	Flame Rating	0.75 mm	-	UL94	HB	HB	HB	HB	HB	HB	HB	HB	HB	HB
	Flame Rating	1.6 mm	-	UL94	HB	HB	HB	HB	HB	HB	HB	HB	HB	HB

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10% GLASSFIBER REINFORCED, NATURAL	20% GLASSFIBER REINFORCED, NATURAL	30% GLASSFIBER REINFORCED, NATURAL	50% GLASSFIBER REINFORCED, NATURAL	FLAME RETARDANT- HALOGEN, HEAT STABILIZED, NATURAL	FLAME RETARDANT- HALOGEN FREE, HEAT STABILIZED, NATURAL	20% MINERAL FILLED, FLAME RETARDANT- HALOGEN, HEAT STABILIZED, NATURAL	20% GLASSFIBER REINFORCED, FLAME RETARDANT- HALOGEN, HEAT STABILIZED, NATURAL
0.96-1.0	1.04-1.08	1.09-1.13	1.25-1.30	0.93-0.96	1.03-1.06	1.34-1.38	1.15-1.20
35-40	40-50	50-70	70-85	10-20	10-20	10-20	40-50
>6	>5	>4	>2	>100	-	-	-
2000-2500	2500-4000	4000-5500	6500-8000	800-1000	1000-2000	2000-3000	3000-4000
10-20	20-25	15-25	10-20	50-60	8-10	10-15	15-25
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
160-165	160-165	160-165	160-165	160-165	160-165	160-165	160-165
110	120	135	145	50	60	60	90
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
-	-	-	-	960	960	960	850
-	-	-	-	775	875	725	800
HB	HB	HB	HB	V2	V2	VO	V2
HB	HB	HB	HB	V2	VO	VO	V2

# 4KTEC® ABS COMPOUNDS

				UNFILLED UV IMPACT MODIFIED; ALL COLORS	10% GLASS FIBER REINFORCED, NATURAL	20% GLASS FIBER REINFORCED, NATURAL	UNFILLED, FLAME RETARDANT-HALOGEN, NATURAL	10% GLASS FIBER REINFORCED, FLAME RETARDANT-HALOGEN, NATURAL	10% GLASS BEADS REINFORCED, FLAME RETARDANT-HALOGEN, NATURAL	
PROPERTY	METHOD	UNIT	STANDARD							
GENERAL	Density	-	g/cm <sup>3</sup>	ISO 1183	-	1.17-1.20	1.20-1.25	1.20-1.24	1.20-1.25	1.15-1.18
	Molding Shrinkage	Parallel/Normal	%	ISO 294-4	0.6 / 0.7	0.6 / 0.7	0.5 / 0.5	0.5 / 0.6	0.2 / 0.4	0.3 / 0.6
	Moisture Content	-	%	ISO 15512	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Tensile Stress at Break	+23 C	Mpa	ISO 527	50-60	-	50-65	30-40	30-40	25-35
MECHANICAL	Tensile Strain at Break	+23 C	%	ISO 527	-	120-130	-	2-3	2-4	3-5
	Tensile Modulus	+23 C	Mpa	ISO 527	2000-2500	1500-2500	4000-5000	2000-3000	2000-3000	1500-2500
	Izod Impact Strength, notched	+23 C	kJ/m <sup>2</sup>	ISO 180 / 1A	18-25	15-20	5-6	9-10	9-11	10-12
	Volume Resistivity	-	Ohm.cm	IEC 60093	1E+15	1E+15	1E+15	1E+15	1E+15	1E+15
ELECTRICAL & FLAMMABILITY	Surface Resistivity	-	Ohm	IEC 60093	1E+15	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	-
	Glow Wire Ignitability Temperature	2 mm plaque	C	IEC 60695	-	-	-	900	900	-
				Flame Rating	0.75 mm	-	UL94	VO	VO	-
				Flame Rating	1.6 mm	-	UL94	VO	VO	-

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# 4KTEC® BLENDS

				ABS/PC UNFILLED, UV NATURAL	ABS/PA 20% GLASSFIBER REINFORCED, NATURAL	PC/ABS 20% GLASSFIBER, NATURAL	PC/ABS 10% GLASSFIBER REINFORCED, BLACK	PC/ABS UNFILLED, FLAME RETARDANT- HALOGEN, NATURAL	PBT/PET 15% GLASSFIBER REINFORCED, NATURAL	PBT/PET 15% GLASSFIBER REINFORCED, HEATSTABILIZED, NATURAL
PROPERTY	METHOD	UNIT	STANDARD							
Density	-	g/cm <sup>3</sup>	ISO 1183	1.13-1.15	1.17-1.22	1.24-1.26	1.18-1.20	1.17-1.19	1.40-1.43	1.45-1.47
Moisture Content	-	%	ISO 15512	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Tensile Stress at Break	+23 C	Mpa	ISO 527	50-53	70-80	70-75	70-75	55-60	85-100	115-125
Tensile Strain at Break	+23 C	%	ISO 527	4.5	4.5	-	-	-	-	-
Tensile Modulus	+23 C	Mpa	ISO 527	2000-2500	4500-5000	5000-6000	3500-4000	2000-2500	4500-5500	8000-9000
Izod Impact Strength, notched	+23 C	kJ/m <sup>2</sup>	ISO 180 / 1A	45	8-12	10-20	9-12	40-50	9-12	5-6
Izod Impact Strength, notched	-30 C	kJ/m <sup>2</sup>	ISO 180 / 1A	-	-	-	-	-	-	5
Izod Impact Strength, un-notched	+23 C	kJ/m <sup>2</sup>	ISO 180 / 1U	-	-	-	-	-	-	40
Izod Impact Strength, un-notched	-30 C	kJ/m <sup>2</sup>	ISO 180 / 1U	-	-	-	-	-	-	35
Melting Temperature	10 K / min	C	ISO 11357	240-270	230-250	230-260	230-260	250-280	225-255	225-255
Heat Deflection Temperature	0.45 Mpa	C	ISO 75	-	101	-	-	-	-	-
Heat Deflection Temperature	1.80 Mpa	C	ISO 75	108	-	115	120	114	200	210
Volume Resistivity	-	Ohm.cm	IEC 60093	1E+16	1E+16	1E+13	1E+13	1E+16	1E+16	1E+16
Surface Resistivity	-	Ohm	IEC 60093	1E+14	1E+14	1E+15	1E+15	1E+14	1E+14	1E+14
Glow Wire Flammability Index	2 mm plaque	C-	IEC 60695	-	-	-	-	960	-	-
Flame Rating	0.75 mm	-	UL94	HB	HB	HB	HB	-	HB	HB
Flame Rating	1.6 mm	-	UL94	HB	HB	HB	HB	VO	HB	HB

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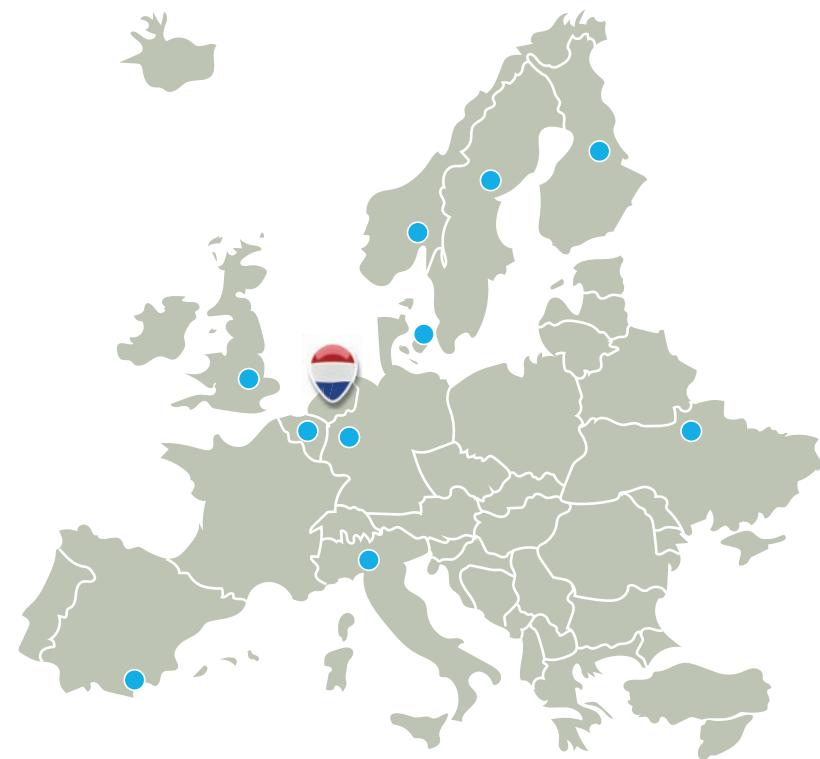
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