CHEZACARB®

The **UNIPETROL** group is the biggest refinery and petrochemical company in the Czech Republic, where it is also the only processor of crude oil. Thanks to this specialisation, **UNIPETROL** has a unique position on the market and has become an indispensable part of Czech industry.

The **UNIPETROL** group is a significant producer and distributor of fuels, plastics, oils, lubricants, fertilisers and other products. It is also the operator of Benzina, the biggest network of filling stations in the Czech Republic. **UNIPETROL** has been part of the multinational **PKN Orlen** refinery and petrochemical group since 2005.

HIGHLY ELECTROCONDUCTIVE CARBON BLACKS AND MASTERBATCHES CHEZACARB® AC – MAKROPLUS® CC

18 states

2 R&D centers

48 years on the market

Unipetrol RPA, the producer of **CHEZACARB® AC**, has successfully expanded its portfolio with cost-effective electroconductive concentrates under the brand name **MAKROPLUS® CC**.

CHEZACARB® AC's competitive advantage, which makes it superior to other materials on the market today, are its particulatrly high electroconductive properties.

MAKROPLUS® CC products are available in all commonly used thermoplastics such as PP, LDPE, HDPE, EVA, PA6, PS, PC and POM. They are designed to either be diluted by suitable plastics or directly processed using typical plastic processing technologies such as injection moulding, extrusion, foil, container blow-moulding and foam moulding.

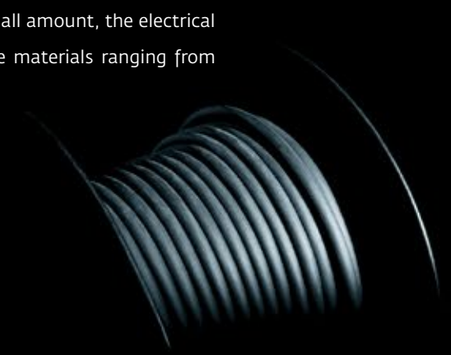
CHEZACARB® APPLICATIONS

Highly electroconductive carbon blacks for polymer materials

CHEZACARB® AC electroconductive carbon blacks originate as a by-product of what is referred to as "partial oxidation" where oil residues split off as a result of mixing oxygen and water steam at high temperatures around 1300° C.

The produced carbon blacks consist of elementary carbon, have a spherical shape and are oriented in aggregates and agglomerates. The purity and composition of these carbon blacks is virtually free of any inorganic impurities and extractable organic substances, with the content of amorphous carbon exceeding 97 %. It is produced in the shape of spherical pellets sized 0.5 – 2.5 mm, with the basic size of particles being around 20 nm.

Their extremely large specific surface area and highly developed porous structure determine the main field of their application. When they are added in a relatively small amount, the electrical conductivity of polymer materials is modified to provide versions of the materials ranging from antistatic to conductive.



TYPICAL APPLICATIONS

- pipes, piping
- cables
- containers, jerrycans, car mats
- transport boxes, pallets
- flooring
- geomembranes

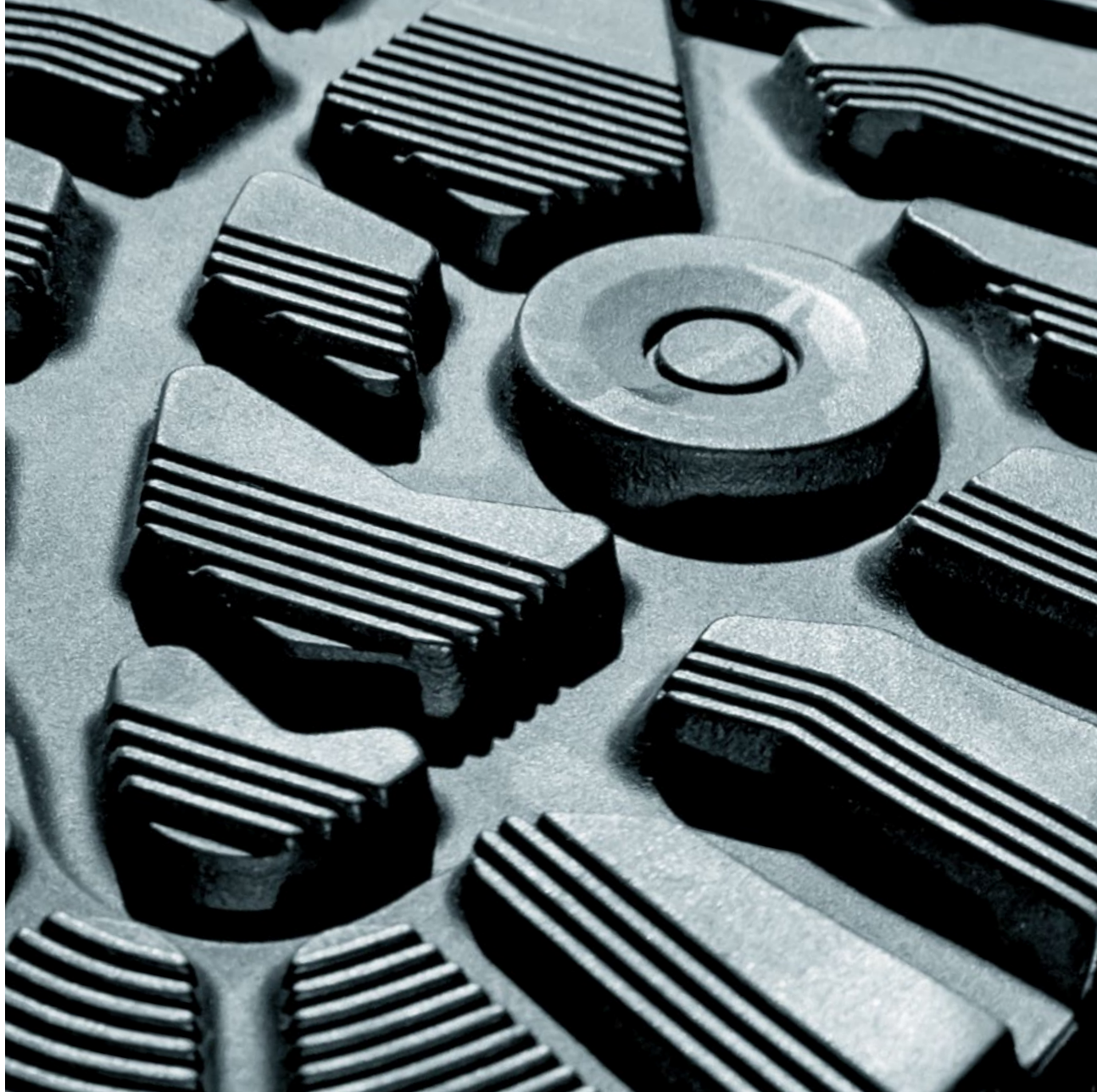
SPECIAL APPLICATIONS

- 3D print
- fibres
- glues
- paints

CHEZACARB® SPECIFICATIONS

Specific parameters	Unit	Test method	Chezacarb AC10	Chezacarb AC20	Chezacarb AC30	Chezacarb AC50	Chezacarb AC60	Chezacarb AC70	Chezacarb AC80	Chezacarb AC90
Nitrogen surface area	m^2/g	ASTM D 6556	815 - 1005	min. 810	min. 800	900 - 1100	min. 800	min. 800	min. 800	min. 800
Iodine adsorption number	mg/g	ASTM D 1510	1010 - 1140	1000 - 1200	min. 900	1050-1200	min. 950	min. 950	min. 950	min. 950
Oil absorption number	ml/100g	ASTM D 2414 - 13A	365 - 400	350 - 420	min. 340	390 - 450	min. 380	min. 390	min. 390	min. 390
Toluene extractables	% wt.	DIN 53553	<0,1	<0,1	---	<0,1	---	---	---	---
pH value		EN ISO 787-9	7,0 - 9,0	7,0 - 9,5	6,5 - 9,0	6,5 - 9,0	6,5 - 9,5	6,5 - 9,5	6,5 - 9,5	6,5 - 9,5
Volatile matter (105 °C)	% wt.	EN ISO 787-2	max. 0,30	max. 0,50	max. 0,80	max. 0,80	max. 0,80	max. 0,80	max. 0,80	max. 0,80
Ash content	% wt.	DIN 53586	max. 0,38	max. 0,4	max. 0,9	max. 1,6	max. 1,7	max. 1,8	max. 2	max. 5
Sulphur content	% wt.	ASTM D 1619	max. 0,23	max. 0,3	max. 0,5	max. 0,6	max. 0,6	max. 0,7	max. 0,8	max. 0,9
Fines content	% wt.	ISO 13322-2	max. 5	max. 8	max. 15	max. 10	max. 10	max. 20	max. 20	max. 20
Sieve residue o.045 mm	ppm wt.	ASTM D 1514	max. 50	max. 50	max. 500	max. 50	max. 500	max. 500	max. 500	max. 500
Bulk density	g/l	ISO 1306	min. 118	min. 115	min. 115	min. 115	min. 112	min. 112	min. 112	min. 105
Appar. density after tamping	g/l	EN ISO 787-11	140 - 160	140 - 160	---	<150	---	---	---	---
Pellets hardness avg.	g	ASTM D 3313	max. 10	max. 10	max. 10	max. 10	---	---	---	---
Pellets hardness hardest	g	ASTM D 3313	max. 20	max. 20	max. 20	max. 20	---	---	---	---
Specific electrical resistance	Ohm.cm	Philips method	max. 50	max. 70	max. 80	max. 80	max. 80	max. 30	max. 20	max. 10
Vanadium content	ppm	RTG	max. 1200	max. 2000	max. 3000	max. 5000	max. 6000 *	<8000 *	<8500 *	---
Nickel content	ppm	RTG	max. 500	max. 1000	max. 1500	max. 2500	max. 3000 *			---
Iron content	ppm	RTG	max. 300	max. 500	max. 1000	max. 1800	max. 2500 *			---

* Informative value, the exact value is not guaranteed.



CHEZACARB®
REGISTRATION, CERTIFICATION

INTEGRATED MANAGEMENT SYSTEM

Unipetrol RPA produces highly electroconductive carbon black **CHEZACARB® AC** using an Integrated Management System (IMS), which includes Quality, Environment, Safety and Energy Management Systems.

The IMS has been certified by Lloyd's Register Quality Assurance Limited (LRQA), according to the following standards:

ISO 9001:2015 (Quality Management System - QMS)

ISO 14001.2015 (Environmental Management System - EMS)

OHSAS 18001:2007 (Safety Management System - SMS)

ISO 50001:2011 (Energy Management System - EnMS).

ALL CB GRADES ARE IN COMPLIANCE WITH:

Regulation (EC) 1907/2006 REACH

Directive 94/62/EC (PPW)

Directive 2011/65/EU (EEE) (RoHS 2),

Directive 2015/863/EU (RoHS 3)

CHEZACARB®
PACKAGING, STORAGE AND TRANSPORT

PACKAGING:

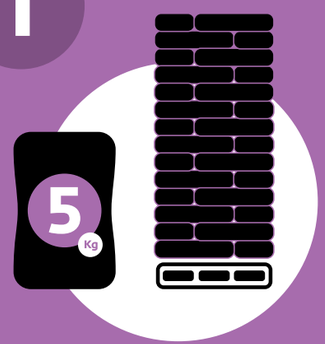
CHEZACARB® AC can be delivered in PE sacks or PP big bags laid on thermally treated wooden pallets and fixed with a stretch hood foil.

- **5 kg sacks**
  (3 sacks per layer, a total of 14 layers) – 210 kg pallet (pallet size: 790 × 1190 mm)
- **BB 180 kg**
  180 kg pallet (pallet size: 790 × 1190 mm)
- **BB 150 kg**
  300 kg pallet (pallet size: 1000 × 1100 mm)

Handling and Storage Instructions

For safe handling and storage, it is necessary to comply with all the fire-protection regulations (no smoking, no work with open flame, removal of all possible ignition sources) and to make sure that a person does not come into contact with the product (use of personal protective equipment is required). The product needs to be stored in a dry and well ventilated place with effective air extraction and away from heat sources. We recommend storage in roofed areas protected from the direct effects of sunlight and we recommend refraining from storing the product together with oils, other inflammable substances or oxidising agents. In intact packaging, the product can be stored for the service life of the packaging, provided that the ambient temperature does not exceed 63 °C. In a dry environment, the product can be stored for 12 months without the packaging, provided that temperature does not exceed 50 °C; the product needs to be protected from contact with water, oils or oxidising agents and it is recommended that the product should be processed as a priority so that fire initiation does not occur when a large quantity is stored. The goods cannot be stacked.

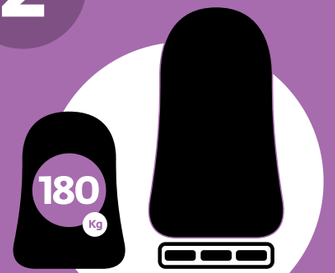
1



5 kg PACK:

3 sacks per layer
14 layers
210 kg pallet
pallet size: **790 x 1190 mm**

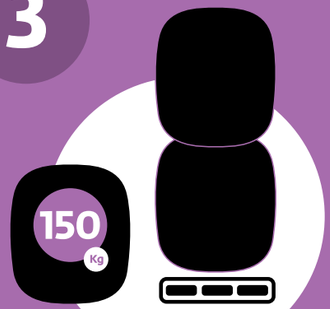
2



180 kg PACK:

180 kg pallet
pallet size: **790 x 1190 mm**

3



150 kg PACK:

300 kg pallet
pallet size: **1000 x 1100 mm**

CHEZACARB® CONTACT INFORMATION

BUSINESS CONTACT INFORMATION

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UNIPETROL, a.s. is a member of the UNIPETROL group.

The company is registered in the Companies Register administrated by the Municipal Court in Prague, Section B, File 3020.

www.chezacarbcarbonblack.com

Unipetrol

ORLEN GROUP

CHEZACARB® AC
COMMODITY PLASTICS

Commodity plastics (polyolefins and PS) are the most used polymers in the plastics industry and offer a wide range of processing and application possibilities. Blending them with **CHEZACARB® AC** increases the number of potential applications thanks to improved product conductivity. Possible applications include sheets, films, pipes, ESD boxes and trays, ESD shielding products and many others.

CHEZACARB® AC decreases the surface and volume resistivity of the final product and can be used in different matrices (LDPE, LLDPE, HDPE, PP and others) to achieve antistatic, static dissipative or conductive properties. You can find examples in the figures below.

The electrical and mechanical properties of the final products are determined by **CHEZACARB® AC** concentration, polymer type, processing technology and, to a lesser extent, by additives that affect the quality of carbon black dispersion.

Percolation curves describe the dependence of volume resistivity on carbon black concentration and are the first guides for selecting an appropriate amount of carbon black to achieve desired compound conductivity.

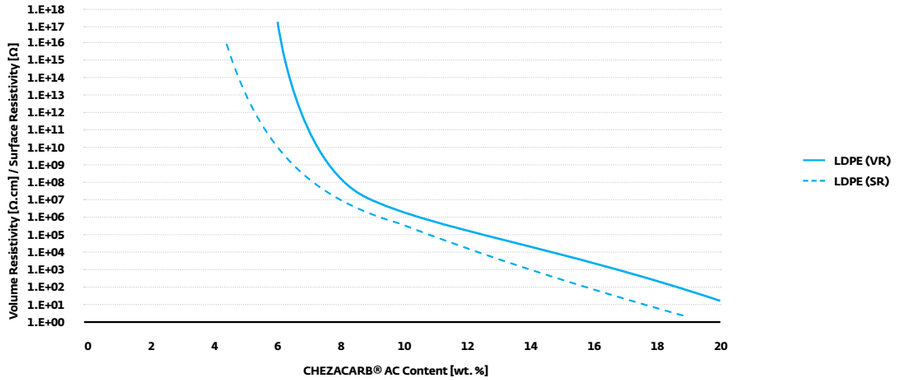
Using percolation curves in combination with mechanical property dependences or the surface and volume resistivity of **CHEZACARB® AC** helps estimate the effect of plastic converters on a compound's final mechanical parameters. The graphs shown below are recommended only as a guide for designing compounds in various plastic types.

Since compound electrical properties strongly depend on mixing quality and processing technique, Unipetrol recommends performing all tests in accordance with the technical standards applicable to the product before making a final decision about the product's composition.

CHEZACARB® AC
COMMODITY PLASTICS

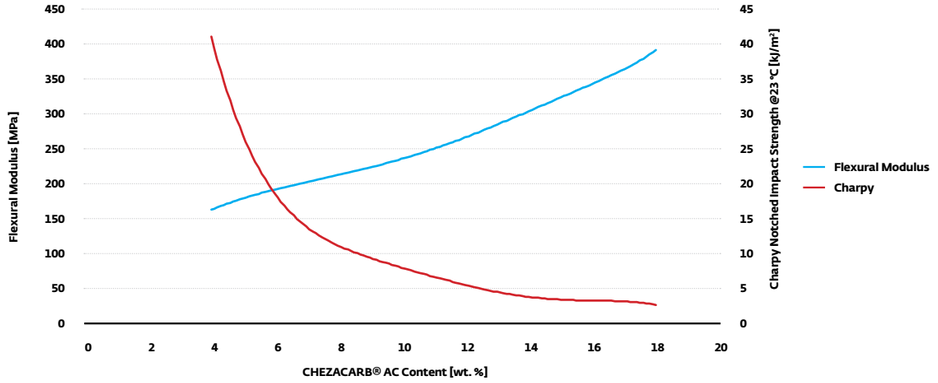
LDPE (MFR = 20 g/10 min @190 °C/2.16 kg)

measured on extruded sheets, thickness 1 mm



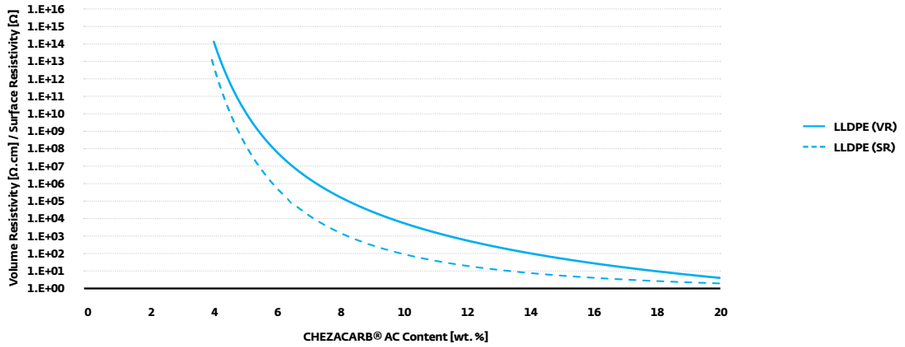
LDPE (MFR = 20 g/10 min @190 °C/2.16 kg)

measured on injection moulded specimens

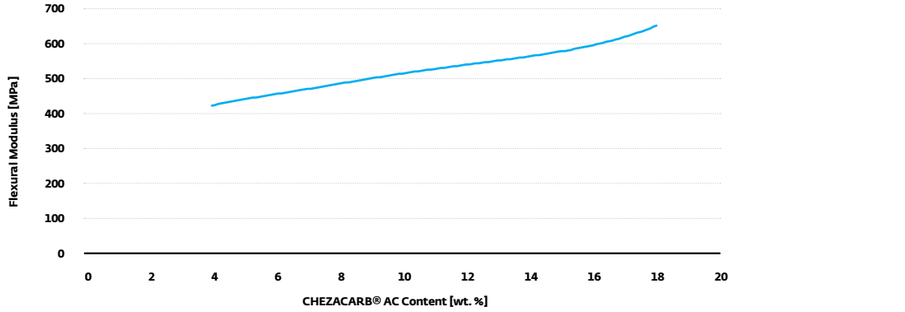


CHEZACARB® AC
COMMODITY PLASTICS

LLDPE (MFR = 20 g/10 min @190 °C/2.16 kg)
measured on extruded sheets, thickness 1 mm

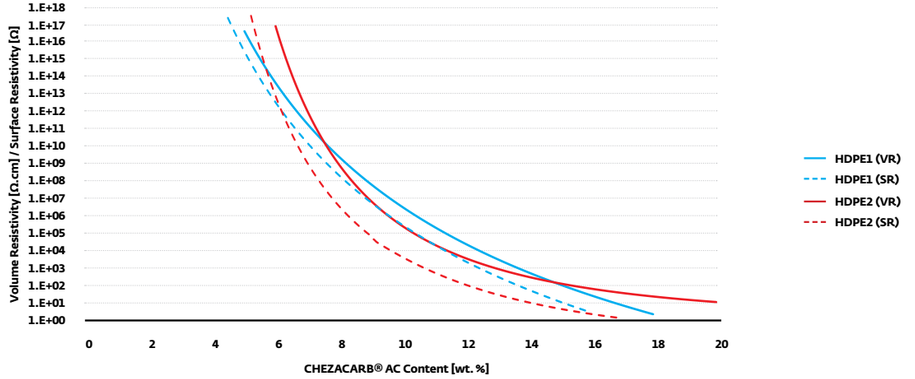


LLDPE (MFR = 20 g/10 min @190 °C/2.16 kg)
measured on injection moulded specimens

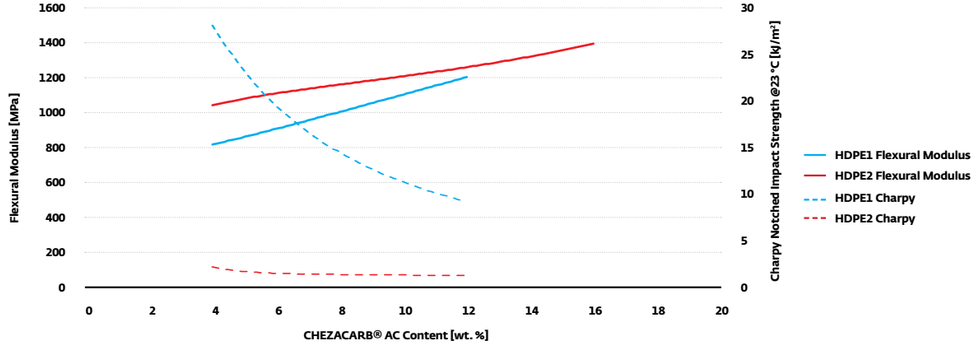


CHEZACARB® AC
COMMODITY PLASTICS

HDPE1 (MFR 0.15 g/10 min @190 °C/2.16 kg), HDPE2 (MFR 23 g/10 min @190 °C/2.16 kg)
measured on extruded sheets, thickness 1 mm

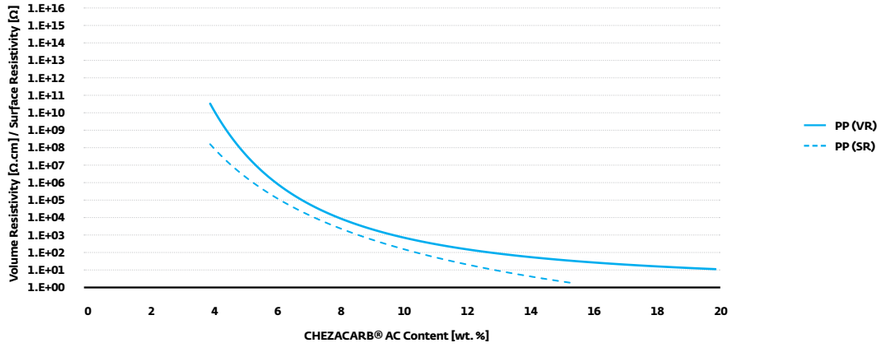


HDPE1 (MFR 0.15 g/10 min @190 °C/2.16 kg), HDPE2 (MFR 23 g/10 min @190 °C/2.16 kg)
measured on injection moulded specimens

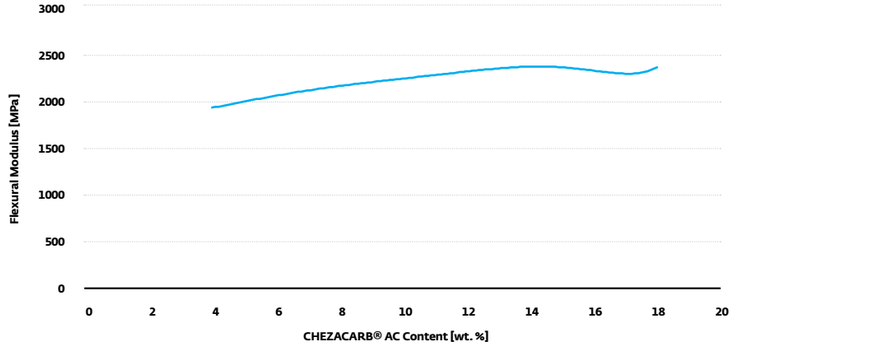


CHEZACARB® AC
COMMODITY PLASTICS

PP (MFR = 25 g/10 min @230 °C/2.16 kg)
measured on extruded sheets, thickness 1 mm

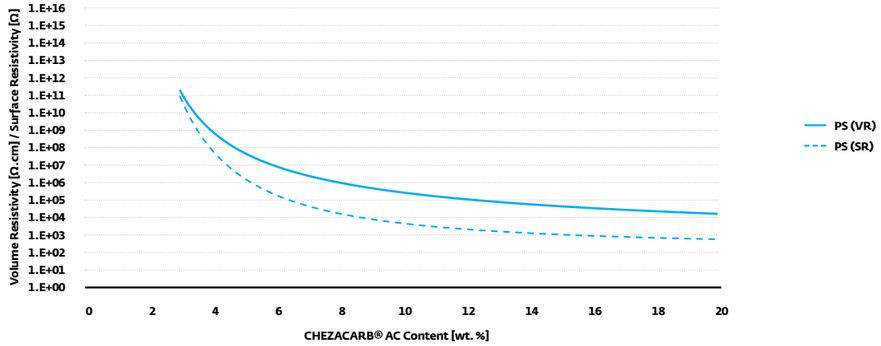


PP (MFR = 25 g/10 min @230 °C/2.16 kg)
measured on injection moulded specimens

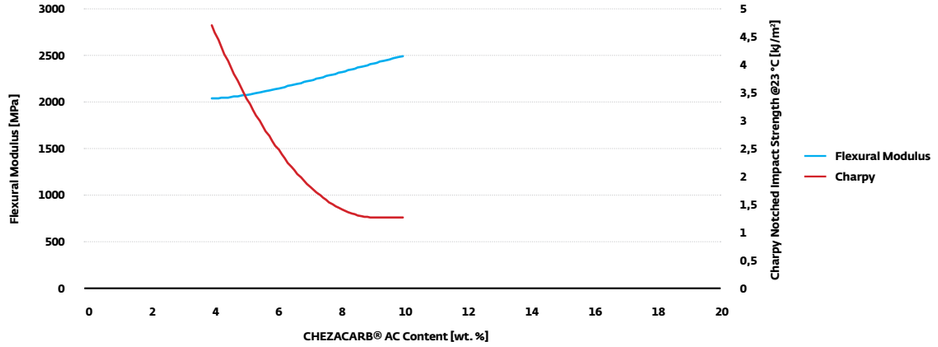


CHEZACARB® AC
COMMODITY PLASTICS

PS (MFR = 4 g/10 min @200 °C/5 kg)
measured on extruded sheets, thickness 1 mm



PS (MFR = 4 g/10 min @200 °C/5 kg)
measured on injection moulded specimens



CHEZACARB® AC
ENGINEERING PLASTICS

Engineering plastics are used as high-end and technical plastics for special technical, construction and other solutions.

Blending these plastics with **CHEZACARB® AC** increases the number of potential applications as it improves final product conductivity. Possible products include sheets, electrotechnical parts, special ESD trays, filaments and boxes.

CHEZACARB® AC decreases surface and volume resistivity and can be used in different matrices such as PET, PBT, PC, ABS, POM, polyamides and many others. Examples are given in the figures below.

The electrical and mechanical properties of the final products are determined by **CHEZACARB® AC** concentration, polymer type, processing technology and, to a lesser extent, by additives that affect the quality of carbon black dispersion.

Percolation curves describe the dependence of volume resistivity on carbon black concentration and are the first guides for selecting an appropriate amount of carbon black to achieve desired compound conductivity.

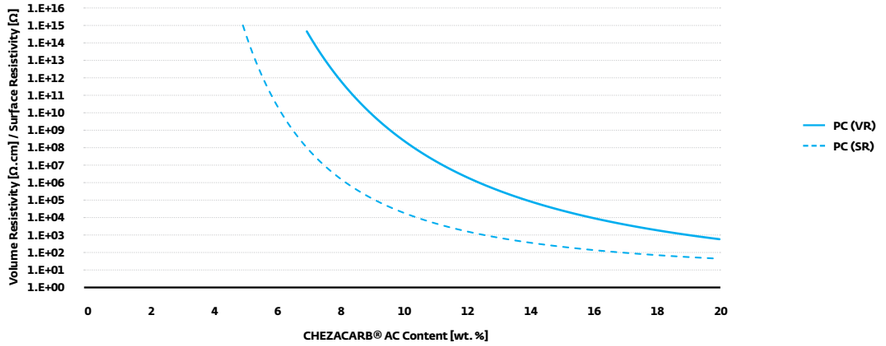
Using percolation curves in combination with the mechanical property dependences or the surface and volume resistivity of **CHEZACARB® AC** helps estimate the effect of plastic converters on a compound's final mechanical parameters. The graphs shown below are recommended only as a guide for designing compounds in various plastic types.

Since compound electrical properties strongly depend on mixing quality and processing technique, Unipetrol recommends performing all tests in accordance with the technical standards applicable to the product before making a final decision about the product's composition.

CHEZACARB® AC
ENGINEERING PLASTICS

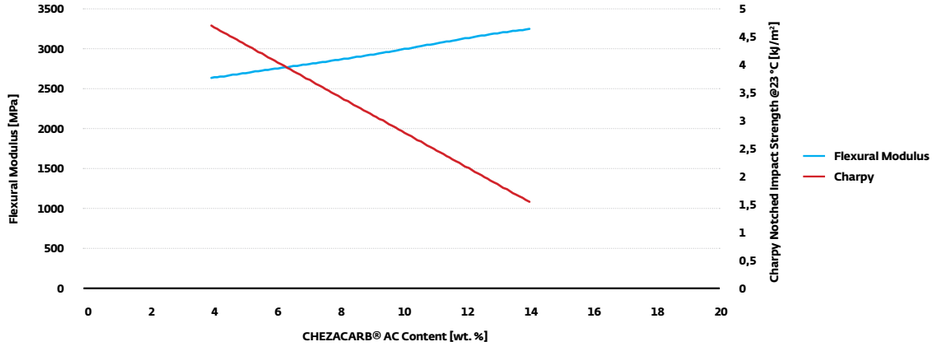
PC (MFR = 20 g/10 min @300 °C/1.9 kg)

measured on extruded sheets, thickness 1 mm



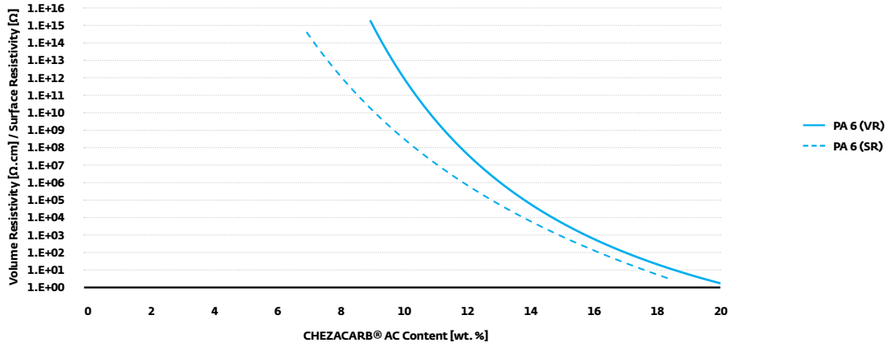
PC (MFR = 20 g/10 min @300 °C/1.9 kg)

measured on injection moulded specimens

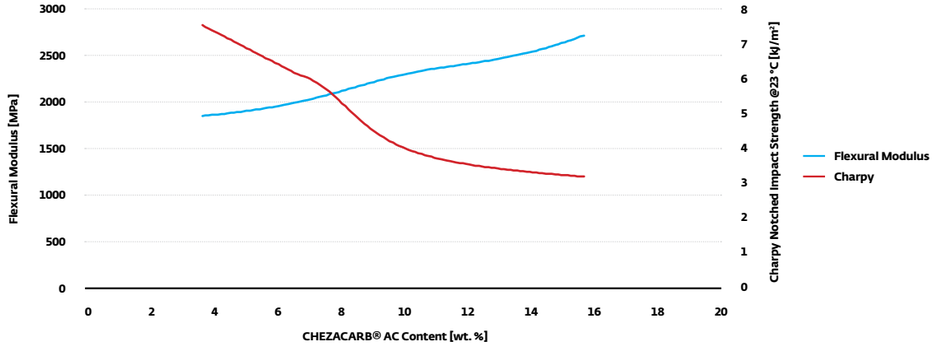


CHEZACARB® AC
ENGINEERING PLASTICS

PA 6 (MFR = 6 g/10 min @230 °C/2.16 kg)
measured on extruded sheets, thickness 1 mm

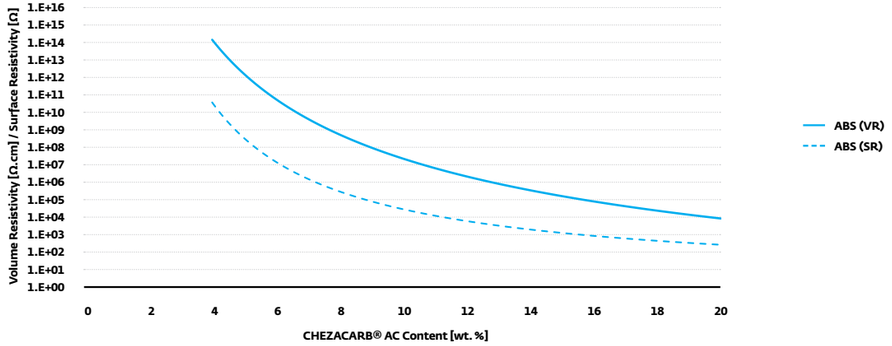


PA 6 (MFR = 6 g/10 min @230 °C/2.16 kg)
measured on injection moulded specimens

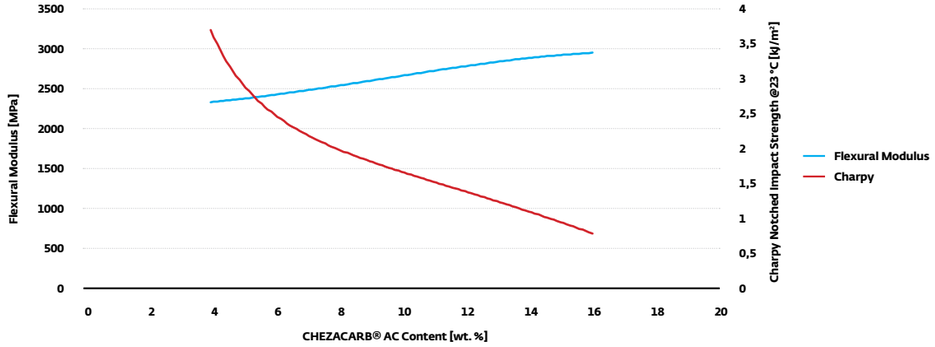


CHEZACARB® AC
ENGINEERING PLASTICS

ABS (MFR = 19 g/10 min @220 °C/10 kg)
measured on extruded sheets, thickness 1 mm



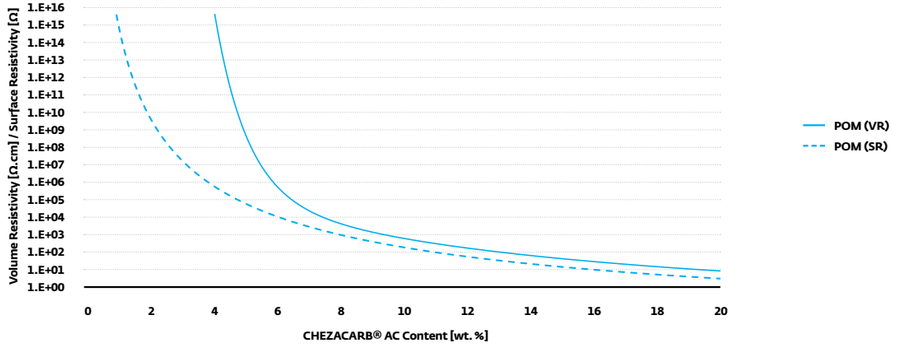
ABS (MFR = 19 g/10 min @220 °C/10 kg)
measured on injection moulded specimens



CHEZACARB® AC
ENGINEERING PLASTICS

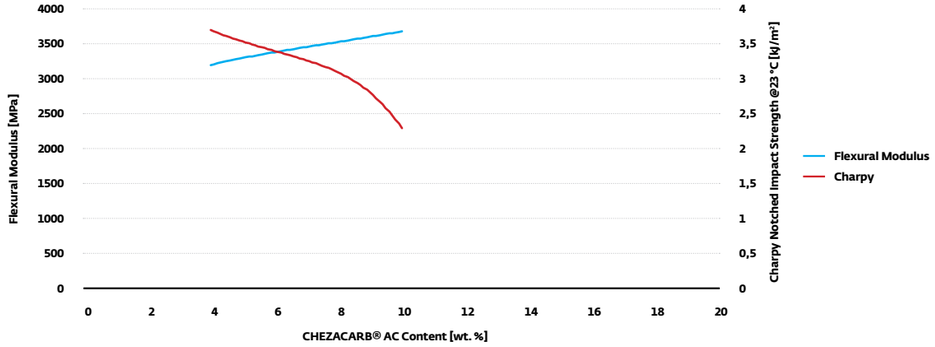
POM (MFR = 12 g/10 min @190 °C/2.16 kg)

measured on extruded sheets, thickness 1 mm



POM (MFR = 12 g/10 min @190 °C/2.16 kg)

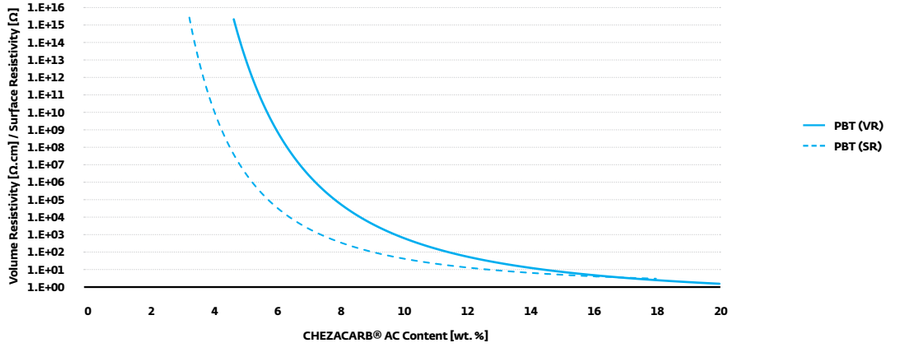
measured on injection moulded specimens



CHEZACARB® AC
ENGINEERING PLASTICS

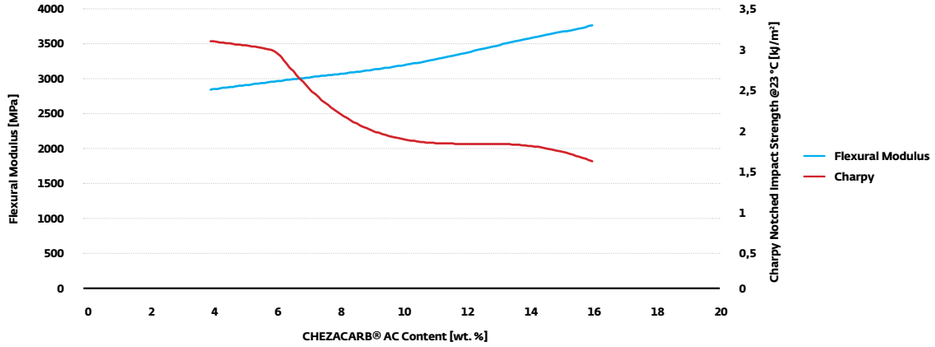
PBT (MFR = 24 g/10 min @250 °C/2.16 kg)

measured on extruded sheets, thickness 1 mm



PBT (MFR = 24 g/10 min @250 °C/2.16 kg)

measured on injection moulded specimens



CHEZACARB® AC
PVC

PVC is used in the plastics industry and offers a wide range of processing and application possiblities. Blending PVC with **CHEZACARB® AC** increases the number of potential applications as it improves final product conductivity. It can be used in pipes, sheets, flooring, cabling and numerous other applications.

CHEZACARB® AC decreases the surface and volume resistivity of the final product and can be used in different formulations. Application should be closely monitored as **CHEZACARB® AC** could absorb the plasticizer. Plasticizers also affect the product's final resistivity. Examples are given in the figures below.

The final product's electrical and mechanical properties are determined by **CHEZACARB® AC** concentration, polymer type, processing technology and, to a lesser extent, by additives that affect the quality of carbon black dispersion.

Percolation curves describe the dependence of volume resistivity on carbon black concentration and are the first guides for selecting an appropriate amount of carbon black to achieve desired compound conductivity.

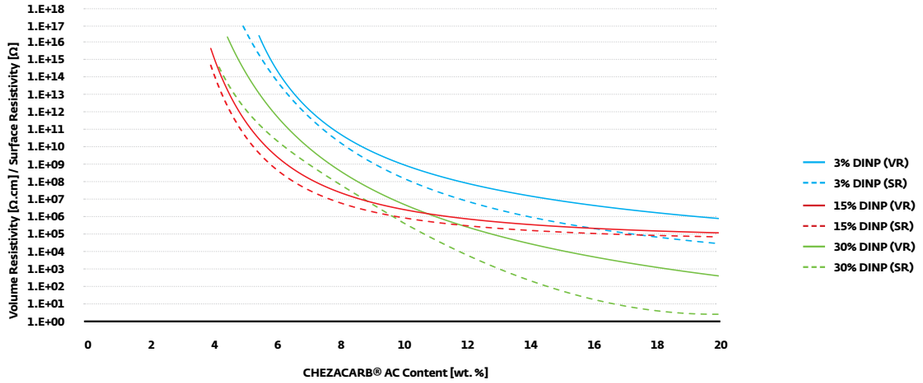
Using percolation in combination with the mechanical property dependences or the surface and volume resistivity of **CHEZACARB® AC** helps estimate the effect of plastic converters on a compound's final mechanical parameters. The graphs shown below are recommended only as a guide for designing compounds in various plastic types.

Since compound electrical properties strongly depend on mixing quality and processing technique, Unipetrol recommends performing all tests in accordance with the technical standards applicable to the product before making a final decision about the product's composition.

CHEZACARB® AC
PVC

PVC (K = 70) with 3%, 15% or 30% added DINP

measured on compression moulded sheets, thickness 1 mm



PVC (K = 70) with 3%, 15% or 30% added DINP

measured on compression moulded specimens