

Background image: © Covestro AG and Christopher Weimlich



**Makrolon® Makroblend® Bayblend® Apec®**

Design and material solutions for  
electric vehicle supply equipment



# Covestro and the EV charging industry

Engineering plastics enable customers to create individual designs for electric vehicle (EV) charging stations while meeting global market requirements. Our strong, lightweight package of weatherproof materials meets electrical insulation standards, making it ideal for both robust outdoor EV charging solutions and stylish wall box designs. As a true high-tech material, polycarbonate is not only robust, breakproof, and lightweight, but it also offers a high degree of design freedom. These properties are advantageous for the EV charging industry.

Covestro is partnering with innovation leaders along the EV value chain to make electric car charger materials reliable, affordable, and more sustainable. Our Makrolon® polycarbonate resins and Bayblend® polycarbonate blends can be used in charger housings, front covers, display lenses, light guides, and connectors for both indoor and outdoor charging stations. Elastomers, polyurethanes, and thermoplastic polyurethanes such as Texin® and Desmopan® can be used for decorative parts and in

charging connectors and their associated holders and power cables.

Covestro offers Makrolon® grades with UL flame class rating (UL 94 V-0/1.5 mm and 5VA/3.0 mm) and f1 listing to meet global EV charging requirements.

## Co-design of EV charging devices

All of our EV charging station solutions build on our extensive expertise in electrical and automotive applications and partnerships with leading electrical vehicle supply equipment providers. The combination of industrial and material-specific knowledge is what drives value-adding services, which include:

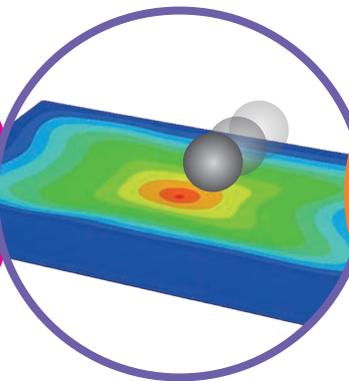
- Color and design services
- Color, Material, Finish (CMF) services
- Mechanical testing
- Computer-aided engineering (CAE) analysis
- Processing technology advisory

## Material solutions that meet the high requirements of the EV charging industry



### Weathering resistance

Shields EV supply equipment against harsh weather conditions



### Impact resistance

Protects electronic components against impact loads, e.g. vandalism, hail, etc.



### Aesthetic design

Surface finishing with style-match design for OEMs



### Safety

Flame retardant and secure against high currents

# Main components for EV chargers



Outdoor weatherability



Impact resistance



Low temperature impact resistance



Flame retardancy (UL 94)



Heat resistance



Light guide light diffusion



Signal transmittance



Colour & finish



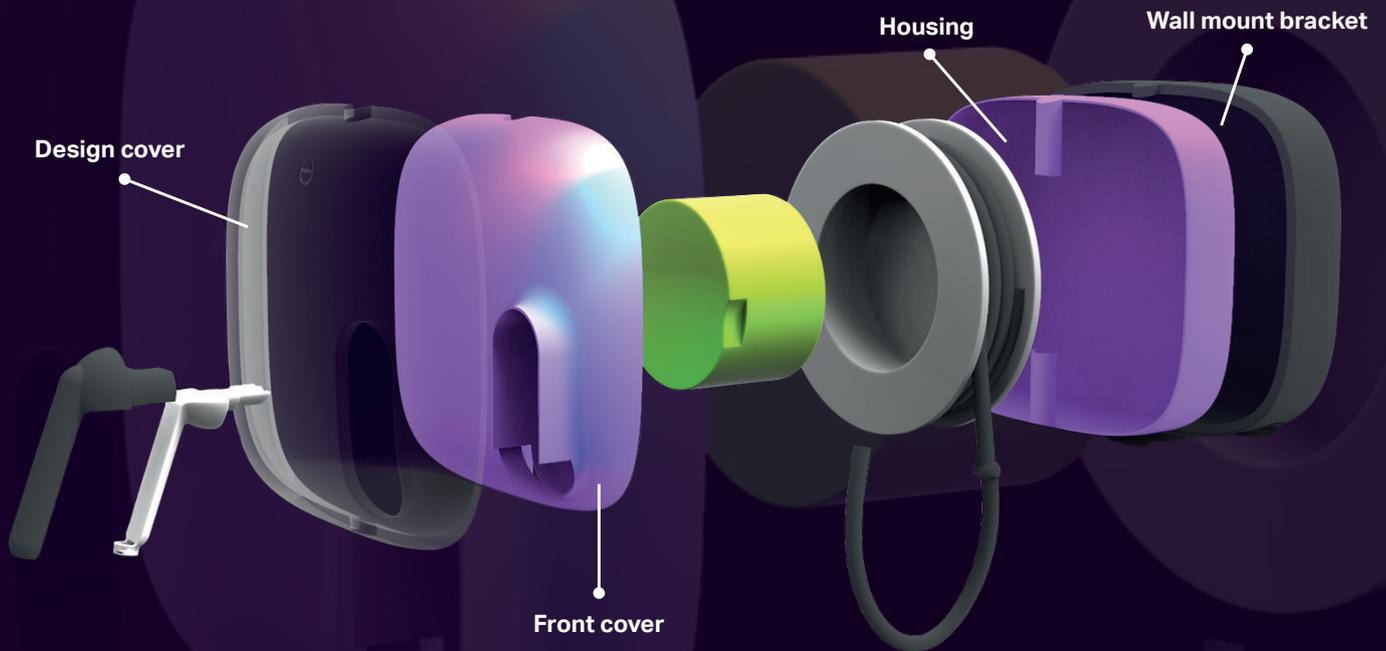
Chemical resistance



Bio-circular-attributed material



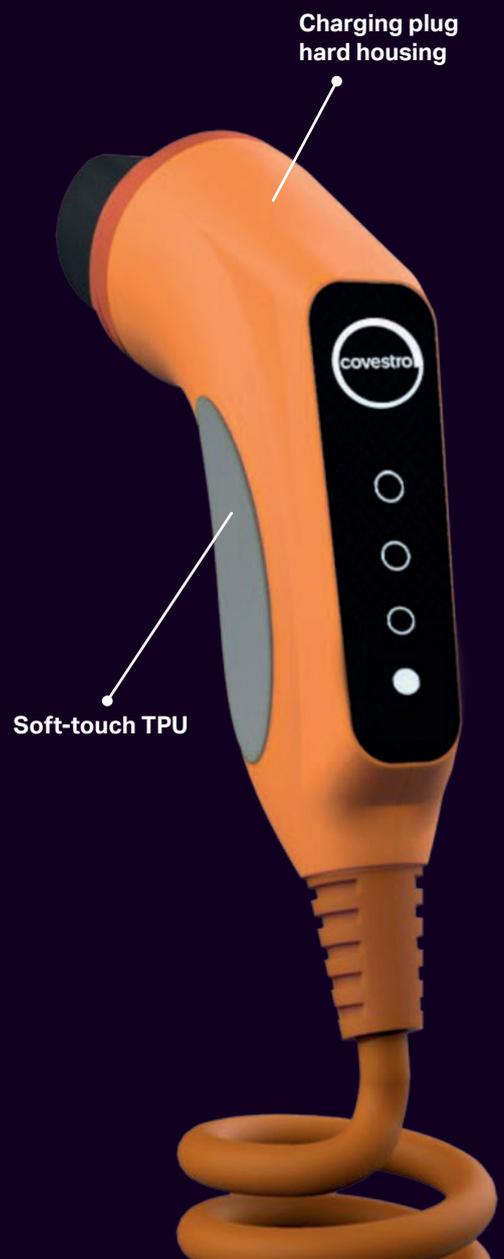
# Housing and cover design recommended grades



# Electric vehicle connector housing



Background image: © Covestro AG and Rebekka Quiroz Wiberg



Background image: © Covestro AG and Amanda Wallgren

# Design cover

		Makrolon® 6557	Makrolon® 6557 RE	Makrolon® LED5902 FR	Makrolon® 6717	Makrolon® 2807	Makrolon® 2807 RE
<b>Material</b>		PC	PC	PC	PC	PC	PC
<b>Sustainable share</b>		-	up to 71.5% bio-circular*	-	-	-	up to 71.5% bio-circular*
<b>MVR (300 °C; 1.2 kg)</b>	cm³/10 min	10	10	6	3	9	9
<b>UL 94 classification</b>	mm	UL 94 V-2/1.5 mm, V-0/3.0 mm, all colors	UL 94 V-2/1.5 mm, V-0/3.0 mm, all colors	UL 94 V-0/1 mm, 5VA/3 mm, CL	UL 94 V-0/2.0 mm, all colors	UL 94 V-2/0.75-2.4 mm, HB/2.5 mm, all colors	UL 94 V-2/0.75-2.4 mm, HB/2.5 mm, all colors
<b>Izod notched impact</b>	(ISO 21305 / based on ISO 180/A), [kJ/m²] at 23 °C#	65	65	50	60	70	70
	[kJ/m²] at different T [°C]	12 at -30 °C	12 at -30 °C	-	-	-	-
<b>UV stabilized</b>		yes	yes	yes	yes	yes	yes
<b>f1 listed</b>		yes	yes	pending	no	yes	yes

\*Only in available in Asia

#Makrolon® grades tested at 3 mm and Bayblend® grades at 4 mm

\*Attributed share of bio-circular feedstock via mass balance, ISCC PLUS (International Sustainability and Carbon Certification) certified

\*\*Partly made from post-industrial recycled (PIR) content or post-consumer recycled (PCR) content

\*\*\*Contact us for more information about Bayblend® and Makrolon® RE products



# Housing, front cover, and wall mount bracket

Makrolon® 6487	Makrolon® 6487 RE	Makrolon® 6485 GR	Makrolon® FR6007 R20 <sup>1</sup>	Makrolon® FR6020 RE	Makrolon® FR6040	Makrolon® 9417	Bayblend® FR3010 BBS910	Bayblend® FR3016 W
PC	PC	PC	PC	PC	PC	PC GF	PC+ABS	PC+ASA
-	up to 70.8% bio-circular*	30% PCR**	20% PCR**	up to 65,4 % attributed share	-	-	-	-
9	9	10	9	9	10	6	15 (240 °C/5 kg)	32 (240 °C/5 kg)
UL 94 V-0/1.5 mm, 5VA/3.0 mm, all colors	UL 94 V-0/1.5 mm, 5VA/3.0 mm, all colors	UL 94 V-0/1.5 mm, 5VA/3.0 mm, all colors	UL 94 V-0/1.5 mm, 5VB/3.0 mm, all colors	UL 94 V-0/1.5 mm, 5VA/3.0 mm, all colors	UL 94 V-0/1.5 mm, 5VA/3.0 mm, all colors	UL 94 V-0/1.5 mm, 5VA/3.0 mm, all colors	UL 94 V-0/1.5 mm, @2 mm	UL 94 V-0/0.75 mm, f1/3.0 mm
65	65	13	74	67	60	10	35	12
12 at -30 °C	12 at -30 °C	9	-	46 at -20 °C	45 at -30 °C	-	10 at -30 °C	5 at -30 °C
yes	yes	no	no	yes	yes	yes	yes	yes
yes	yes	no	no	yes	yes	yes (BK, GY)	-	yes

# Sustainability

The polycarbonate RE grades are ISCC Plus certified\* with partially bio-circular content, attributed via mass balance. Makrolon® RE and Bayblend® RE are renewable attributed grades that serve as drop-in solutions for their conventional complements. They give bio-waste a second life, leave a very low carbon footprint, and possess the same properties as standard grades for high-quality applications. Selected Makrolon® RE grades are even climate-neutral\*\*. Our portfolio also includes mechanically recycled Makrolon® R and Bayblend® R grades with partially post-consumer or post-industrial recycled content. The transition to a global cir-

cular economy is a large-scale project that can only be achieved through cross-sector collaboration. We are always looking to join forces with industry partners to become fully circular together.

Covestro supports its customers with tailor-made material solutions. These solutions aim to reduce greenhouse gas emissions, create components from a recycling perspective, and establish material cycles to accelerate the transition to a circular economy.



\*The methodology of our Life Cycle Assessment is based on the ISO 14040 standard, critically reviewed by TÜV Rheinland, considering biogenic carbon uptake. The calculation considers biogenic carbon sequestration based on preliminary supply chain data and the replacement of electricity grid mix with renewable electricity used for the manufacturing process. No offsetting measures have been applied.

\*\*Climate neutrality is proven via an assessment of a partial product life cycle from resource extraction (cradle) to the factory gate, also referred to as cradle-to-gate assessment.



# Innovation

We work with established designers and innovators and create partnerships with future talents. As a result, we are driving innovation in EV applications and envisioning the EV charging stations of the future. We create aesthetic, functional and circular designs with more sustainable material choices for EV chargers through integrated functionalities such as smart electronics, lighting, touch surfaces, connectivity (wireless, 4G/5G, NFC) and pave the way for a circular economy.



Here you find more information about our innovative material solutions for charging stations





# Lighting

Status indicators can also be implemented (e.g. standby mode and charging).

# Lighting DQ

		Makrolon® DQ5122	Makrolon® DQ5142	Makrolon® DQ5162	Makrolon® DQ5922FR	Makrolon® DQ5942FR	Makrolon® DQ5962FR	Makrolon® 6557
<b>Material</b>		PC, diffusive	PC, diffusive	PC, diffusive	PC, diffusive	PC, diffusive	PC, diffusive	PC, transparent
<b>Sustainable share</b>		-	-	-	-	-	-	-
<b>MVR (300 °C; 1.2 kg)</b>	cm³/10 min	34	34	34	5	5	5	10
<b>UL 94 classification</b>	mm	UL 94 V-2/0.75- 2.2 mm	UL 94 V-2/0.75- 2.2 mm	UL 94 V-2/0.75- 2.2 mm	UL 94 V-0/0.8, 5VA 3 mm	UL 94 V-0/0.8, 5VA 3 mm	UL 94 V-0/0.8, 5VA 3 mm	UL 94 V-2/1.5 mm, V-0/3.0 mm, all colors
<b>Izod notched impact</b>	(ISO 21305 / based on ISO 180/A), [kJ/m²] at 23 °C	12 / based on ISO 179eA	12 / based on ISO 179eA	12 / based on ISO 179eA	9	7	12	65
	[kJ/m²] at different T [°C]	12 at -30 °C	12 at -30 °C	12 at -30 °C				12 at -30 °C
<b>UV stabilized</b>		yes	yes	yes	yes	yes	yes	yes
<b>f1 listed</b>		yes	yes	yes	pending	pending	pending	yes

#Makrolon® grades tested at 3 mm and Bayblend® grades at 4 mm

\*Attributed share of bio-circular feedstock via mass balance, ISCC (International Sustainability and Carbon Certification) Plus certified

\*\*Contact us for more info about our RE series, PCR portfolio or further products

# Lighting Transparent

# Charging plug housing

		Makrolon® 6557 RE	Makrolon® 6717	Makrolon® LED5902 FR
<b>Material</b>		PC, transparent	PC, transparent	PC, transparent
<b>Sustainable share</b>		up to 71.5% bio-circular*	-	-
<b>MVR (300 °C; 1.2 kg)</b>	<b>cm³/10 min</b>	10	3	6
<b>UL 94 classi- fication</b>	<b>mm</b>	UL 94 V-2/1.5 mm, V-0/3.0 mm, all colors	UL 94 V-0/2.0 mm, all colors	UL 94 V-0/1.0 mm, V-0, 5VA 3 mm
<b>Izod notched impact</b>	<b>(ISO 21305 / based on ISO 180/A), [kJ/m²] at 23 °C</b>	65	60	50
	<b>[kJ/m²] at different T [°C]</b>	12 at -30 °C	15 at -30 °C	
<b>UV stabi- lized</b>		yes	yes	yes
<b>f1 listed</b>		yes	no	yes

		Makrolon® FR6020	Makrolon® FR6020RE	Makrolon® FR6040	Makrolon® FR6011
<b>Material</b>		PC	PC	PC	PC
<b>Sustainable share</b>		-	up to 65.4% bio-circular*	-	-
<b>MVR (300 °C; 1.2 kg)</b>	<b>cm³/10 min</b>	9	9	10	4
<b>UL 94 classi- fication</b>	<b>mm</b>	UL 94 V-0/1.5 mm, 5VA/3.0 mm all colors	UL 94 V-0/1.5 mm, 5VA/3.0 mm all colors	UL 94 V-0/1.5 mm, 5VA/3.0 mm all colors	UL 94 V-0/1.5 mm, all colors
<b>Izod notched impact</b>	<b>(ISO 21305 / based on ISO 180/A), [kJ/m²] at 23 °C</b>	67	67	60	70
	<b>[kJ/m²] at different T [°C]</b>	46 at -20 °C	46 at -20 °C	45 at -30 °C	20 at -30 °C
<b>UV stabi- lized</b>		yes	yes	yes	yes
<b>f1 listed</b>		yes	yes	yes	no

#Makrolon® grades tested at 3 mm and Bayblend® grades at 4 mm

\*Attributed share of bio-circular feedstock via mass balance, ISCC (International Sustainability and Carbon Certification) Plus certified

\*\*Contact us for more info about our RE series, PCR portfolio or further products

# Get in touch with us

## **Iman Fotovat**

Market Development EMEA  
iman.fotovat@covestro.com

## **Diana Ren**

Marketing Electrical & Electronics APAC  
diana.ren@covestro.com

## **Joel Matsco**

Marketing Electrical & Electronics NAFTA  
joel.matsco@covestro.com

## **Dr. Niklas Meine**

Marketing Electrical & Electronics EMEA  
niklas.meine@covestro.com



Special thanks to our collaboration partner Umea Institute of Design and the involved students. Designs from the following students were featured in this brochure: Christoffer Weinreich (pages 1, 10, 11, 12, 13), Amanda Wallgren (pages 2, 5, 6, 7), Lovisa Lund (page 4), and Rebekka Quiroz Wiberg (pages 5, 9).

Recharge your inspiration together with our experts and contact us:

Iman Fotovat  
Market Development EMEA  
iman.fotovat@covestro.com

Diana Ren  
Marketing Electrical & Electronics APAC  
diana.ren@covestro.com

Joel Matsco  
Marketing Electrical & Electronics NAFTA  
joel.matsco@covestro.com

Covestro Deutschland AG  
Business Entity: Engineering Plastics,  
D-51365 Leverkusen  
Germany

plastics@covestro.com  
plastics.covestro.com

This information and our technical advice – whether verbal, in writing, or by ways of trial – are given in good faith but without warranty, and this also applies where proprietary rights of third parties are involved. The information is provided by Covestro without assumption of any liability. If any of the above-mentioned regulations change after the date of declaration, this declaration is no longer valid. Covestro will strive to keep this information up-to-date. Our advice does not release you from the obligation to verify the information provided – especially that contained in our safety data and technical information sheets – to check for updates of any information provided by us, and to test our products as to their suitability for the intended processes and uses. The application, use, and processing of our products and the products manufactured by you on the basis of our technical advice are beyond our control and, therefore, entirely your own responsibility. Our products are sold in accordance with the current version of our General Conditions of Sale and Delivery.

Edition: 2022 · Order No.: COV00073614 · Printed in Germany