



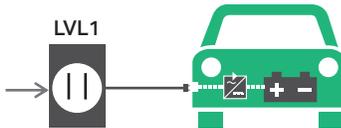
# Material Solutions for Electric Vehicle Supply Equipment

Covestro offers material solutions for every charging equipment configuration. Our products are not only compliant with regulatory standards but also cost-effective, scalable and brand-enhancing.

## Charging options

### LEVEL 1

USA, Japan: 120V AC  
 Europe: 230V AC  
 China: 230V AC

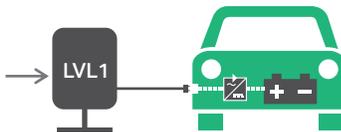


- Portable unit
- Car trunk or indoor
- 8-20+ hours charge time

**RESIDENTIAL**

### LEVEL 2

240V AC  
 up to 70amp

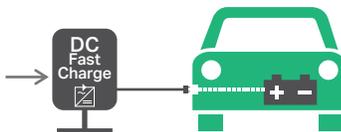


- "Wallbox" or free-standing
- Indoor and outdoor
- 4-8 hours charge time

**RESIDENTIAL  
 WORKPLACE  
 PUBLIC  
 PRIVATE**

### DC FAST CHARGE

480-600V DC  
 up to 120amp



- High-profile free-standing
- Outdoor
- 30 minutes, 80% charge

**WORKPLACE  
 PUBLIC  
 PRIVATE**

## Applicable standards

	USA	EUROPE & JAPAN	CHINA
Level 1 & 2	UL 2594	IEC/EN 61851-1 & 22	GB/T 18487.1 *
DC Chargers	UL 2202	IEC/EN 61851-23	NB/T 33008

\* Chinese GB/T standards are based on the listed IEC/EN standards

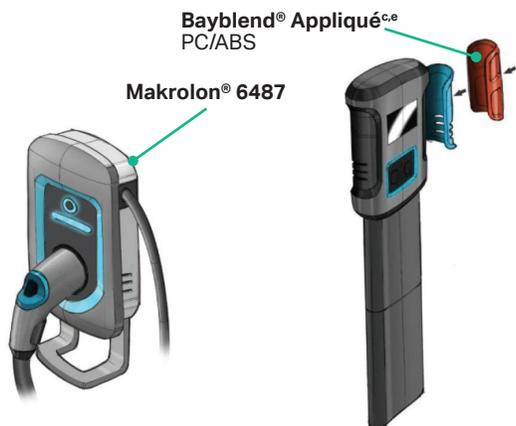
- IEC & UL standards require specific environmental, drop, impact and thermal cycling performance from the enclosure
- Drop, drive-over and impact tests demand the use of tough, ductile enclosure materials
- UL 746C f1-rated materials comply with the environmental requirements of the most stringent standard, UL 2594
- Typical requirements for enclosures include flammability rating of V-1 for portable units and 5V for permanent units
- UL and IEC-listed Level 1, Level 2 and DC chargers currently use Covestro's materials

# Materials and design solutions

## LEVEL 1



## LEVEL 2



### KEY PROPERTIES

	Unit of measure	Makrolon® 6487 <sup>a</sup>	Makrolon® 6557 <sup>b</sup>	Bayblend® FR3030 <sup>c</sup>	Bayblend® FR3010 <sup>c</sup>
<b>MVR (ISO 1133)</b>	cm <sup>3</sup> /10 min	10 300°/ 1.2kg	9 300°/ 1.2kg	11 260°/ 5kg	15 240°/ 5kg
<b>Mold Shrinkage (typical)</b>	%	0.6-0.8	0.6-0.8	0.5-0.7	0.5-0.7
<b>Tensile Strain at break (ISO 527)</b>	%	115	130	>50	105
<b>Puncture Energy (23°C, ISO 6603-2)</b>	J	50	60	45	45
<b>RTI (UL 746B: Elec. / with impact / without impact)</b>	°C	125 / 115/ 125	125 / 115/ 125	95 / 80/ 85	95 / 85/ 85
<b>UL 94 @ 1.5mm / @ 3.0mm</b>	-	V-0 / 5VA	V-2 / V-0	V-0 / 5VA	V-0 / 5VA
<b>UL746C rating for outdoor suitability</b>	-	f1	f1	-	-

## DC FAST CHARGE



### notes :

- Makrolon 6487 could be substituted by Makrolon 9417 (10% glass-filled) for increased stiffness. Alternatively, Bayblend TP4065 provides additional low temperature impact and chemical resistance.
- Makrolon 6557 is a clear FR grade which could be used for displays and LED indicators. Other Makrolon grades specially formulated for LED optics or light diffusing applications are also available.
- Appliques can use non-FR Bayblend PC/ABS appliqué or Makrolon film as long as they are decorative and the underlying material is still f1 rated.
- Bayblend FR3030 sheet can be precision formed to create "designer-style" DC fast chargers.
- For outdoor use a coating is recommended.



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