

SOLUTION DATA SHEET

# ESTANE® EV TPU for Electric Vehicle Charging System Cables



<b>Markets</b>	Electric vehicle (EV) charging system and transportation cables
<b>Polymer</b>	ESTANE® EV thermoplastic polyurethane (TPU)
<b>Key Benefits</b>	<ul style="list-style-type: none"> <li>• Non-Halogenated Flame retardancy</li> <li>• Sustainable alternative</li> <li>• Low toxicity and low volatiles</li> <li>• Easy processability</li> <li>• Very good aesthetics</li> <li>• Low or no odor</li> </ul>

In general, there has been a large growth in the EV industry. Lubrizol Engineered Polymers has developed in recent years a portfolio of polymer solutions that are halogen-free flame retardant TPUs for all types of wire and cable. These materials are commercialized as the ESTANE® ZHF series (for zero halogens flame retardants), and it has been expanded with several new grades to cater for the different needs of wire and cable customers.

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With the growth of EV and the focus on finding more sustainable alternatives, Lubrizol's scientists and application experts have worked jointly to release, in a short time, a range of material solutions specifically for EV charging system cables.



Our actual portfolio of four grades is based on differentiated, non-halogenated flame retardant (NHFR) technology with low toxicity/smoke and showing an advantage in conductivity ( $<35 \mu\text{S}/\text{mm}$ ). We have used materials that are easy to process like conventional TPUs, none of our grades use dangerous substances and they contain either a low number of volatiles or none at all. Most of our grades are compliant with the following standards: IEC 62893 and EN 50620.

The above-mentioned ESTANE grades: ESTANE EV 90AT2, EV 89AT9, EV 85AT8 & ZHF 58370 are plasticizer-free and low odor. All of these aspects are appreciated beyond the International Standards.

Moreover, cables are no longer 'all-black'. Sometimes, cables are required in fancy light or pastel colors and when used outdoors, there could be the formation of blooming/white plate on the surface. ESTANE polymers for EVs have taken this into account and provide a durable, long-lasting effect even on such cables, no blooming or whitening.

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Physical Property	Unit	ESTANE® EV 90AT2	ESTANE® EV 89AT9	ESTANE® EV 85AT8	ESTANE® ZHF 58370
<b>Feature</b>		<b>Halogen-free FR</b>	<b>Differentiated Halogen-free FR</b>	<b>Halogen-free FR</b>	<b>Differentiated Halogen-free FR</b>
Hardness	Shore A	90	89	85	86
Specific gravity	g/cm <sup>3</sup>	1.19	1.23	1.16	1.20
Tensile at break	MPa	29	35	51	31
Elongation at break	%	523	567	530	653
Abrasion resistance	mm <sup>3</sup>	46	54	40	91
Vertical burn test	Rating	V-2 @ 1.9 mm	V-2 @ 1.9 mm	V-2 @ 1.9 mm	V-2 @ 1.9 mm
pH value		8.5	9.0	6.2	7.3
Gas conductivity	μS/mm	<40	<35	<10	<10
IEC 60332-1-2	/	PASS	PASS	PASS*	PASS*
IEC62893/EN50620 compliance		EN 50620	IEC 62893/EN 50620	IEC 62893/EN 50620	IEC 62893/EN 50620

\*Dependent on cable construction

**Table 1:** Overview of halogen-free, flame-retardant grades for EV charging cables

Lubrizol’s ESTANE ZHF TPU portfolio for electric vehicles is backed by many years’ experiences in the development of durable and high-performing polymers and has been designed factoring in the latest trends for safer and regulatory-compliant materials. We have other NHFR resins available for wire and cables.

For more information, please visit our web site: [www.lubrizol.com/Engineered-Polymers](http://www.lubrizol.com/Engineered-Polymers)

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