SOLUTION DATA SHEET

# New ESTANE® EV TPU for Electric Vehicle Charging System Cables

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| **Markets** | Electric vehicle (EV) charging system and transportation cables |
| **Polymer** | ESTANE® EV thermoplastic polyurethane (TPU) |
| **Key Benefits** | • Non-Halogenated Flame retardancy<br>• Sustainable alternative<br>• Low toxicity and low volatiles<br>• Easy processability<br>• Very good aesthetics<br>• Low or no odor |

Europe has seen the largest growth in EVs. 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.



http://go.lubrizol.com/EP

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 µS/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. Our grades are compliant with the following standards: IEC 62893 and EN 50620.

The above-mentioned ESTANE grades: ESTANE EV 90AT2 TPU, ESTANE EV 88AT2 TPU, ESTANE ZHF 58202 and ESTANE 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.

| Physical property | Unit | ESTANE® ZHF 58202 NAT 02 | ESTANE® EV 90AT2 NAT 01 | ESTANE® EV 88AT2 NAT 01 | ESTANE® ZHF 58370 NAT 01 |
|---|---|---|---|---|---|
| **Feature** | | **Differentiated Halogen-free FR** | **Halogen-free FR** | **Halogen free FR** | **Differentiated Halogen-free FR** |
| Hardness | Shore A | 91 | 90 | 89 | 86 |
| Specific Gravity | $g/cm^3$ | 1.23 | 1.19 | 1.18 | 1.20 |
| Tensile at break | MPa | 28 | 29 | 34 | 31 |
| Elongation at break | % | 632 | 523 | 529 | 653 |
| Abrasion resistance | $mm^3$ | 65 | 46 | 45 | 91 |
| Oxygen Index | % | 25 | 22 | 22 | 23 |
| 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 | | 8.1 | 8.5 | 8.9 | 7.3 |
| Gas conductivity | µS/mm | <35 | <40 | <35 | <10 |
| IEC 60332-1-2 | / | PASS | PASS | PASS | PASS* |
| IEC62893/EN50620 compliance | | IEC62893/ EN50620 | EN50620 | IEC62893/ EN50620 | IEC62893/ EN50620 |

**Dependent on cable construction*

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

Lubrizol's ESTANE ZHF TPU portfolio for EVs is backed by many years' experience in the development of durable and high-performing polymers and has been designed factoring in the latest trends for safer and regulatory-compliant materials.

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