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Significant changes in TPE nomenclature

The new ISO Standard 18064

There is a new milestone on the way to establish thermoplastic elastomers as a precisely defined independent family of materials. The revised edition of the ISO standard 18064 which defines the nomenclature and abbreviated terms, is available since April 2022. As TPEs exhibit a combination of the properties and characteristics of rubber and thermoplastic materials it is crucial that any classification system will be acceptable for both the rubber and the plastics industries. Members of the TPE Forum have been actively involved in the successful revision process.

By Günter Scholz

The revised edition of TPE nomenclature, the ISO 18064, is published. In the year 2018 the German standard association (DIN) took the initiation to bring the running version into a more fortune form. But why? The last version from 2014 did not mirror the state of the art in the market of Thermoplastic Elastomers (TPE). That business is a continuous growing one including new developments in recipes and compounds. This

is mainly driven by the companies who use these materials for their application. When the standard of nomenclature does not follow, people use names and abbreviations which are not equal worldwide. One big advantage of a norm is the easier communication. Everybody should have the same idea of a TPE material when a name is presented. This is an essential goal of that ISO 18064.

On the other way around, a norm should provide a good compromise to be precise and simple enough getting a high acceptance in market and in the literature. But it should be up to date. And this happened as a project in the ISO group concerning the title 18064. The TPE family is quite a young one in the plastics industry and literally be covered under the rubber world either or the engineering plastics organization. Both is understandable because the TPE are squeezed among them like the 18064 says: polymer or blend of polymers that has properties at its service temperature similar to those of vulcanized rubber but can be processed and reprocessed at elevated temperature like a thermoplastic. Meanwhile a market of 5-6 million tonnes are expected in the world and the TPE are about to become an own product group and to get a visibility in that capacity. Important enough to revise that standard, initiated and discussed in the expert reunion of TPE Forum in Germany. Additionally, it was the vehicle to create an official TPE working group in the DIN.

Which crucial points in the ISO 18064 are touched?

For instance, the TPO are defined as a polymer blend of olefinic materials, in most cases PP and EPDM. This is still the case, but since many years, olefinic copolymers are established in the market and not covered in this nomenclature standard. The goal is to differentiate between them, designated as TPO-C for copolymers and TPO-M for polymer mixtures. Another big part is the situation on the TPS, the styrenic based elastomers. One important information should be provided: Is the TPS saturated or still unsaturated, means, keeps it double bonds which can be attacked by oxygen and weaken the material during a long-term use. Regarding the multitude of TPS variations, it is

hardly reasonable to name the grade, like SEBS or SEPS. And in technical application TPS is a compound in nearly all cases. Beside these two big sections, a few other little adaptions are made and the agreement on these changes is fixed. The status of Final Draft International Standard (FDIS) is closed and the norm is published now.

Let us hope, that the reworked norm will find much more follower and the terms in the ISO 18064 will be used commonly. The TPE-Forum continues its activities to establish TPE as an independent product family among the engineering plastics and rubber elastomers. The latest initiation is to create a frame of few property ranges where a TPE is covered. Strict lines can never be set, but a guideline will be helpful to make clear. "This is a TPE". Let us be curious about that process. (See the Position Paper on p. 16 of this issue of TPE Magazine)

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Thermoplastic elastomers - Nomenclature and abbreviated terms (ISO/DIS 18064:2021); German and English version prEN 18064:2021

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AUTHOR:

Dr. Günter Scholz
guenter.alfreds@gmail.com
 Senior Expert TPE-Forum
 Lemförde, Germany
www.tpe-forum.com

Abbreviated terms TPE according to ISO 18064 – since 2022

| | | | |
|------------|---|---|--|
| TPA | Thermoplastic Polyamide Elastomer | -EE | soft segment with ether and ester linkages |
| | | -ES | polyester soft segment |
| | | -ET | polyether soft segment |
| | | -CE | polycarbonate soft segment |
| TPC | Thermoplastic Polyester Elastomer | equally like for TPA | |
| TPO | Thermoplastic Polyolefin Elastomer | -C | block copolymer |
| | | -M | polymer mixture (e.g. PP+EPDM) |
| TPS | Thermoplastic Polystyrene Elastomer | -H | fully-hydrogenated soft segment |
| | | -N | partially or non-hydrogenated soft segment |
| | | M | for mixture can be added |
| TPU | Thermoplastic Polyurethane Elastomer | EE | soft segment with ether and ester linkages |
| | -AR... aromatic hard segment | ES | polyester soft segment |
| | -AL... aliphatic hard segment | ET | polyether soft segment |
| | | CE | polycarbonate soft segment |
| TPV | Thermoplastic Elastomer Vulcanisate (representative) | -(PP+EPDM) | |
| | | cross-linked EPDM finely dispersed in a continuous PP phase | |