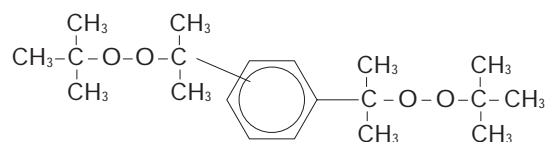


LUPEROX® F40M-SP



Masterbatch Scorch Protected

Luperox® F40M-SP is a scorch-protected evolution of the easy dispersible Luperox® F40ED. It is a 40% extended grade on calcium carbonate + EPM carrier belonging to the masterbatch range. The chemical formula of the active substance is:



1,3 1,4-Bis (tert-butylperoxyisopropyl) benzene
CAS No: 25155-25-3 - M.W.: 338.5 g/mol

Typical properties

Appearance	pellets
Peroxide content	40%
Active oxygen	3.8%

Scorch protection

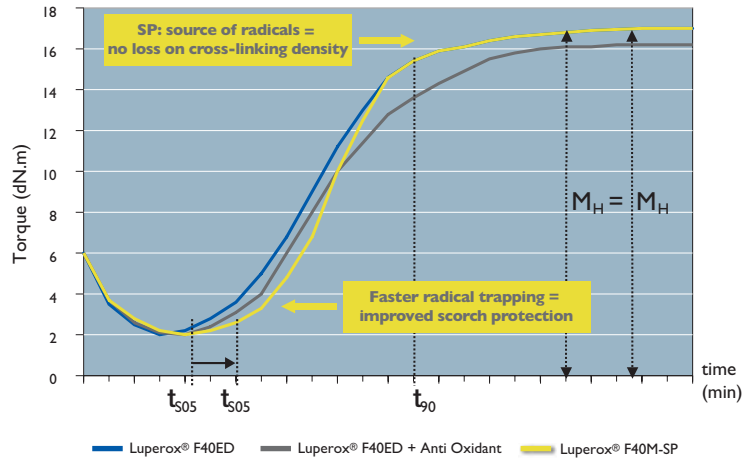
Luperox® F40M-SP provides an outstanding scorch protection and overcomes the usual limitations encountered with classical "scorch retarders".

As shown in *fig. 1*, the main advantages over classical "scorch retarders" lie in:

- the faster free radical trapping process leading to a better scorch protection;
- the steady crosslink level (no loss of cross-linking density).



Fig. 1: Comparison of curing profiles of Luperox® F40ED / Luperox® F40ED + Scorch retarder / Luperox® F40M-SP

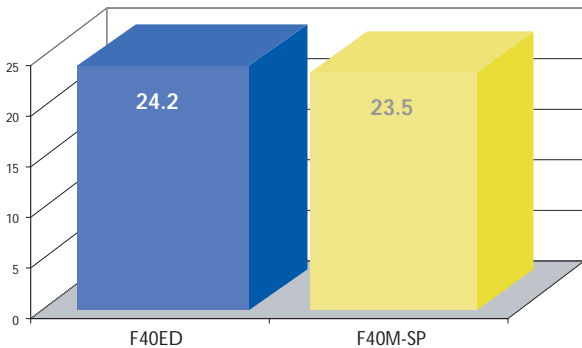


Performances

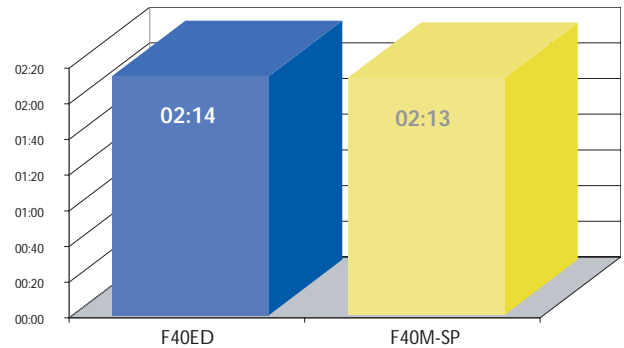
Compared to Luperox® F40ED, Luperox® F40M-SP offers in an EPDM compound:

- ◆ similar cure time (t_{90}) and cross-linking density (M_H);

M_H 190 °C (dN.m)

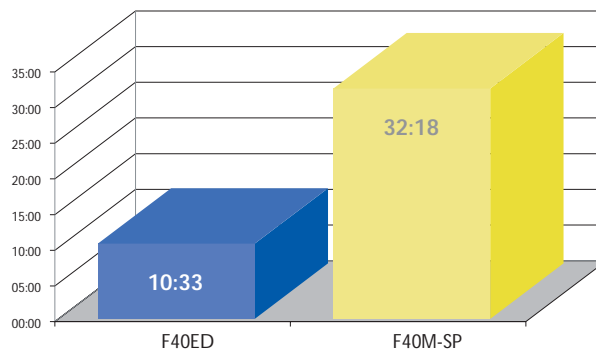


t_{90} 190 °C (min:s)



- ◆ a scorch time (t_{s05}) which is three times higher at standard compounding temperatures (around 125 °C);

t_{s05} 125 °C (min:s)



Scorch time has been measured at various temperatures between 120 °C and 160 °C. It can be observed that the lower the temperature the greater the advantage using F40M-SP.

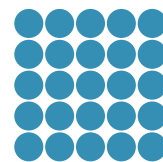
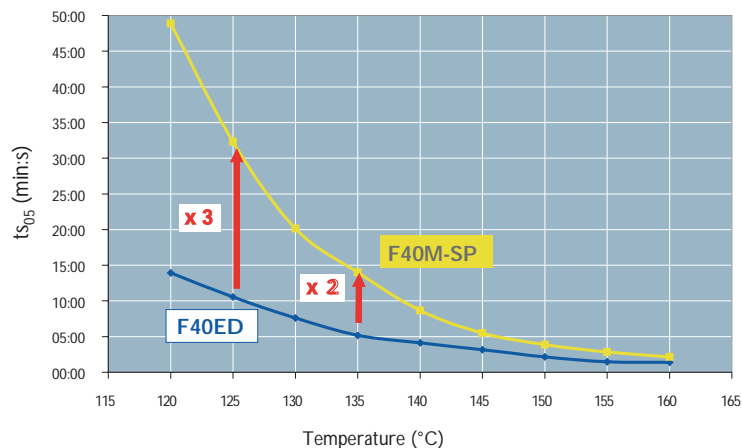


Fig. 2: Scorch time measured on an EPDM compound using 8 phr of Luperox® F40ED and Luperox® F40M-SP



Advantages

The improved scorch protection is beneficial at each step of the transformation process.

Compounding:

- It is possible to **speed up the process** by increasing the mixing speed. Typically, the compounding temperature can be up to 10-15 °C higher with no additional scorch threat.
- It is even possible to go to a **one-step mixing** operation when not applicable with standard grade.
- Moreover, a better scorch protection should bring a better **consistency** of the mixing.
- In the rubber formulation, it is possible to **reduce the amount of antioxidant**, which behaves in some extent as a scorch protector.

Forming:

- In **injection molding** process, temperature of the mold can be increased, resulting in a significant improved productivity: faster filling of the mold, faster curing.
Design of the molds can be optimized: the number of prints can be increased leading to higher productivity. It is also possible to envision new possibilities for peroxide-cured molded rubber goods.
- With an **extrusion process**, temperature of extrusion as well as speed can be increased resulting in a higher productivity.
The improved scorch protection should also reduce the downtime devoted to the equipment cleanup leading to more production time.

Masterbatch

Luperox® F40M-SP has been designed to offer an improved compatibility with EP(D)M based compounds, leading to a faster dispersion.

It is demonstrated that the use of a masterbatch such as Luperox® F40M-SP enables:

- a lower mixing time which gives rise to a higher productivity. This is especially advantageous with soft compounds where low friction hinders the distribution of hard filler particles in the rubber matrix;
- a clean and non-dusty metering operation;
- a uniform peroxide dispersion in the compound, which is essential to assure a higher batch-to-batch uniformity and to reduce scrap.



Main applications

Luperox® F40M-SP is mainly used as a curing agent to manufacture:

- hoses and profiles;
- rubber seals and gaskets;
- technical goods;
- wires and cables;
- golf balls;
- EPDM and EVA based shoe soles.

Dosage

Typical ranges of Luperox® F40M-SP concentration used for some polymers are listed in the following table:

Polymer	Luperox® F40M-SP (phr)
EPM	4 - 8
EPDM	4 - 8
EVA	2 - 6

The appropriate quantity of Luperox® F40M-SP depends on the required characteristics of the finished product.

Decomposition products

The major decomposition products of Luperox® F40M-SP in inert media are:

- acetone;
- tert-butyl alcohol;
- methane;
- m,p-diacetyl benzene;
- m,p-diisopropanol-benzene.

Safety, handling, storage and transport

Please refer to the Material safety data sheet.

Arkema, established legally on October 1st, 2004 as part of the reorganization of Total's Chemicals Branch, includes three coherent and well-balanced business segments: Vinyl Products, Industrial Chemicals, and Performance Products.

The new structure has sales of 5 billion euros and a workforce of 19,300 employees, and enjoys a global presence through its 90 industrial facilities and 6 research centers across Europe, North America and Asia. It also boasts a solid industrial foundation with a large number of processes developed in-house, boosted by innovative R&D focused on customer service and application development. Arkema can claim a portfolio of world-renowned activities and brandnames, most of which rank among market leaders.

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