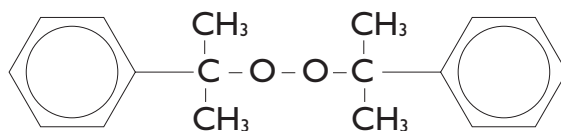


LUPEROX[®] DC40P-SP2



Scorch Protected Dicumyl Peroxide

Luperox[®] DC40P-SP2 is a highly scorch protected evolution of the Luperox[®] DC40P. It is a 40% dicumyl peroxide formulation extended on calcium carbonate and silica. It has been specifically designed to provide efficient scorch protection for injection molding processes in any type of elastomer system including EPDM, HNBR, BR, etc.... The chemical formula of the active substance is



Dicumyl peroxide
CAS No: 80-43-3 - M.W.: 270.4 g/mol

Typical Properties

Appearance	powder
Peroxide content	40%
Active oxygen	2.4%

Scorch Protection

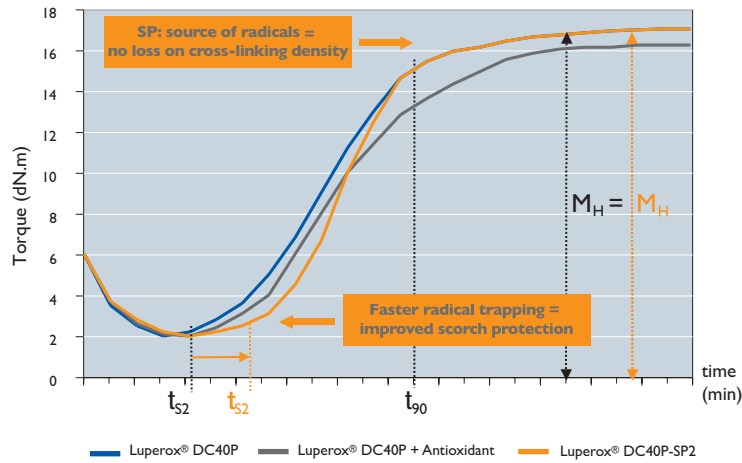
Luperox[®] DC40P-SP2 provides outstanding scorch protection and overcomes the usual limitations encountered with classical "scorch retarders."

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

- faster free radical trapping leading to better scorch protection;
- consistent crosslinking level (no loss of crosslinking density).



Fig. 1: Comparison of curing profiles of Luperox® DC40P / Luperox® DC40P + Antioxidant / Luperox® DC40P-SP2



Performance

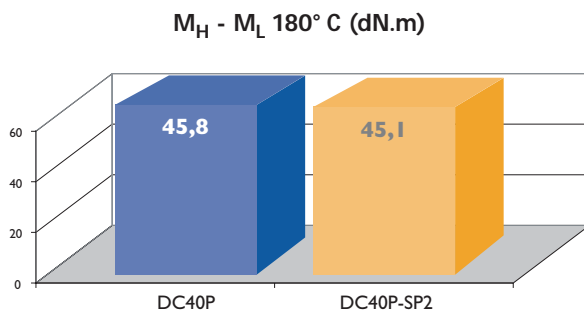
Luperox® DC40P-SP2 has been evaluated in an EPDM injection molding compound (EPDM Vistalon V2504N). The reference compound cured with standard Luperox® DC40P contains a combination of two antioxidants to provide adequate scorch protection: 0.5 phr TMQ (1,2-dihydro-2,2,4-trimethylquinoline) and 0.5 phr MBI (2-mercapto benzimidazole).

These two antioxidants have been removed in the compound cured with Luperox® DC40P-SP2.

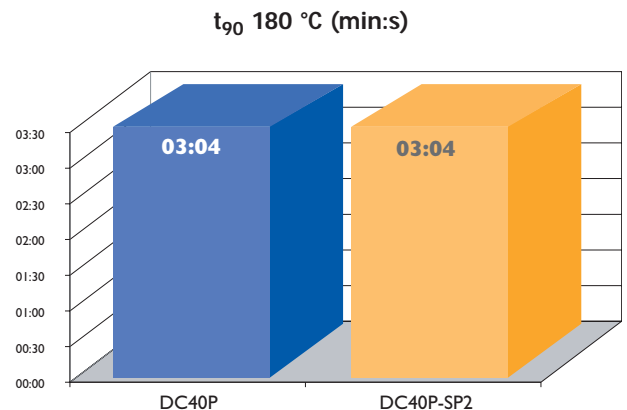
(phr)	Reference	Experiment
Luperox® DC40P	7.6	/
Luperox® DC40P-SP2	/	6.6
TRIM	2.3	2.3
TMQ	0.5	/
MBI	0.5	/

The rheometer test (RPA) run at 180°C provides the following results:

- ◆ Able to provide a similar crosslinking density ($M_H - M_L$) with 13% less peroxide, when eliminating the use of classical antioxidants used as scorch retarders.

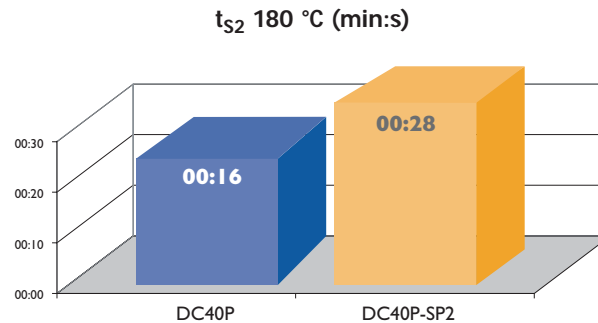


- ◆ Cure time (t_{90}) is unchanged.



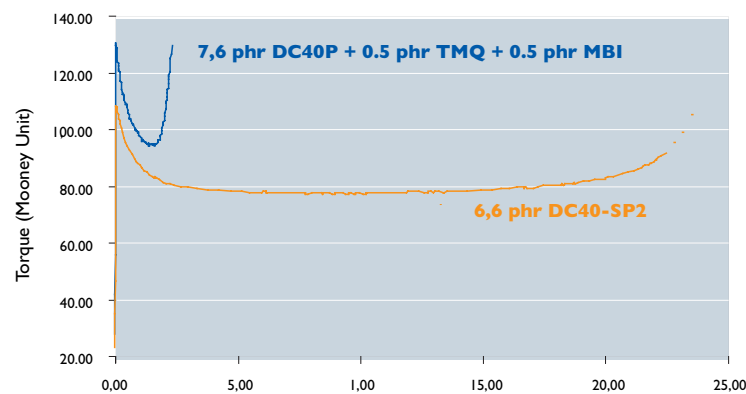


◆ The protection time or “Scorch Time at curing temperature” (t_{S2} at 180°C) is increased by 70% !!



The Mooney viscometer test run at 130°C shows an exceptional Scorch Protection. The Scorch Time (t_{S05}) is 7 times longer with Luperox® DC40P-SP2 than Luperox® DC40P.

Mooney MV 2000: Scorch time t_{S05} at 130° C



Advantages

The exceptional Scorch Protection offered by Luperox® DC40P-SP2 brings multiple advantages:

Double reduction of the formulation cost:

- Possible to **reduce the amount of antioxidant** in the formulation thanks to the outstanding Scorch Protection provided by Luperox® DC40P-SP2 it-self.
- Possible to **reduce the amount of peroxide** in the formulation since the Scorch Protection agent contained in Luperox® DC40P-SP2 does not consume the peroxide.

Compounding:

- Possible to **speed up the process** by increasing the mixing speed.
- Possible to envision a **one-step mixing** process when not applicable with a standard grade.
- Improved scorch protection should allow for longer mixing and a **better consistency** of the final compound.

Curing:

- In an **injection molding** process, the longer protection time will lead to the reduction of the scrap. The design of the molds can be optimized (more prints per mold cavity) allowing higher productivity and much more possibilities for peroxide-cured molded rubber goods. Moreover, the temperature of the mold can be increased, resulting in a significant improvement of productivity: faster filling of the mold and faster curing.
- With an **extrusion process**, both the temperature and the speed of the extrusion process can be increased, resulting in a higher productivity.

The improved scorch protection should also reduce the downtime devoted to the equipment cleanup (gels), also leading to more production time.



Main applications

Luperox® DC40P-SP2 has been specifically designed to provide a very efficient scorch protection in stringent conditions such as injection molding processes or for the curing of reactive polymers such as HNBR or BR. Therefore, it can be used for many types of applications including:

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

Dosage

Typical ranges of Luperox® DC40P-SP2 concentration used for some polymers are listed in the following table:

Polymer	Luperox® DC40P-SP2
EPM	6 - 12
EPDM	6 - 12
EVA	3 - 5

The appropriate quantity of Luperox® DC40P-SP2 depends on the required characteristics of the finished product.

Decomposition products

The major decomposition products of Luperox® DC40P-SP2 in inert media are the same than DC40P:

- acetophenone;
- hydroxyisopropylbenzene;
- methane.

Safety, handling, storage and transport

Please refer to the Material Safety Data Sheet.

A global chemical player, Arkema combines 3 related and integrated business segments: Vinyl Products, Industrial Chemicals, and Performance Products. Present in over 40 countries with 18400 employees, Arkema achieves sales of 5.7 billion euros (2005). With its research centers in France, the United States and Japan, and internationally recognized brands, Arkema holds leadership positions in its principal markets.

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See MSDS for Health & Safety Considerations



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