

Applications

For Polymer Production: Polymerization of ethylene: Trigonox 42S is an efficient initiator for the ethylene polymerization under high pressure in both autoclave and tubular processes. To obtain a wide spectrum of polymerization temperatures, combinations with other peroxides are applied in practice. Depending on reaction conditions, Trigonox 42S is active in the temperature range of 210-240°C. Polymerization of acrylates and methacrylates: Trigonox 42S can be used as initiator for the solution (co)polymerization of acrylates and methacrylates in the temperature range of 90-175°C, amongst others for the manufacture of coatings. Trigonox 42S can also be applied as an initiator for the bulk and suspension (co)polymerization of acrylates and methacrylates in the temperature range of 90-130°C. Polymerization of styrene: Trigonox 42S may be used for the (co)polymerization of styrene in the temperature range of 90-140°C. For Thermoset: Trigonox 42S, tert-butylperoxy-3,5,5-trimethylhexanoate, is a perester which is used for the curing of unsaturated polyester resins at elevated temperatures. Trigonox 42S is preferred for the curing of UP resin based Hot Press Moulding formulations (SMC, DMC, BMC etc.) in the temperature range of 120 - 170°C. In combination with a cobalt accelerator (e.g. Accelerator NL-53N, 10% cobalt) Trigonox 42S is also applicable for the cure of UP resins in the temperature range of 70°C and higher. Application area can be air drying lacquers, diplacquers, filament winding etc. Trigonox 42S has in comparison with Trigonox C, tert-butylperbenzoate, a somewhat higher reactivity in the pure resin as well as in HPM formulations.

Half-life data

The reactivity of an organic peroxide is usually given by its half-life ($t_{1/2}$) at various temperatures. For Trigonox 42S in chlorobenzene:

0.1 hr	135°C (275°F)
1 hr	114°C (237°F)
10 hr	94°C (201°F)
Formula 1	$k_d = A \cdot e^{-E_a/RT}$
Formula 2	$t_{1/2} = (\ln 2)/k_d$
Ea	140.78 kJ/mole
A	1.94E+15 s ⁻¹
R	8.3142 J/mole·K
T	(273.15+°C) K

Thermal stability

Organic peroxides are thermally unstable substances, which may undergo self-accelerating decomposition. The lowest temperature at which self-accelerating decomposition of a substance in the original packaging may occur is the Self-Accelerating Decomposition Temperature (SADT). The SADT is determined on the basis of the Heat Accumulation Storage Test.

SADT	55°C (131°F)
Method	The Heat Accumulation Storage Test is a recognized test method for the determination of the SADT of organic peroxides (see Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria - United Nations, New York and Geneva).

Storage

Due to the relatively unstable nature of organic peroxides a loss of quality can be detected over a period of time. To minimize the loss of quality, Nouryon recommends a maximum storage temperature (T_s max.) for each organic peroxide product.

Ts Max.	25°C (77°F)
Ts Min.	-20°C (-4°F)
Note	When stored under these recommended storage conditions, Trigonox 42S will remain within the Nouryon specifications for a period of at least 3 months after delivery.

Packaging and transport

In North America Trigonox 42S is packed in non-returnable, 5 gallon polyethylene containers of 35 lb net weight. In other regions the standard packaging is a 30-liter HDPE can (Nourytainer) for 25 kg peroxide solution. Both packaging and transport meet the international regulations. For the availability of other packed quantities contact your Nouryon representative. Trigonox 42S is classified as Organic peroxide type D; liquid, Division 5.2; UN 3105.

Safety and handling

Keep containers tightly closed. Store and handle Trigonox 42S in a dry well-ventilated place away from sources of heat or ignition and direct sunlight. Never weigh out in the storage room. Avoid contact with reducing agents (e.g. amines), acids, alkalis and heavy metal compounds (e.g. accelerators, driers and metal soaps). Please refer to the Safety Data Sheet (SDS) for further information on the safe storage, use and handling of Trigonox 42S. This information should be thoroughly reviewed prior to acceptance of this product. The SDS is available at nouryon.com/sds-search

Major decomposition products

Carbon dioxide, Methane, tert-Butanol, Acetone, 2-tert-Butyloxy-2,4,4-trimethylpentane

All information concerning this product and/or suggestions for handling and use contained herein are offered in good faith and are believed to be reliable. Nouryon, however, makes no warranty as to accuracy and/or sufficiency of such information and/or suggestions, as to the product's merchantability or fitness for any particular purpose, or that any suggested use will not infringe any patent. Nouryon does not accept any liability whatsoever arising out of the use of or reliance on this information, or out of the use or the performance of the product. Nothing contained herein shall be construed as granting or extending any license under any patent. Customer must determine for himself, by preliminary tests or otherwise, the suitability of this product for his purposes. The information contained herein supersedes all previously issued information on the subject matter covered. The customer may forward, distribute, and/or photocopy this document only if unaltered and complete, including all of its headers and footers, and should refrain from any unauthorized use. Don't copy this document to a website.

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The Nouryon logo consists of a stylized orange 'N' followed by the word 'ouryon' in a lowercase, sans-serif font, all in orange.