Crosslinking Peroxides for Elastomers and Thermoplastics

Perkadox® and Trigonox®
Ketjenblack®

Nouryon

Nouryon Creates Everyday Essentials

Nouryon is your partner in essential solutions for a sustainable future

We are a global, specialty chemicals leader. Markets and consumers worldwide rely on our essential solutions to manufacture everyday products, such as personal care, cleaning goods, paints and coatings, agriculture and food, pharmaceuticals, and building products. Furthermore, the dedication of approximately 8,200 employees with a shared commitment to our customers, business growth, safety, sustainability and innovation has resulted in a consistently strong financial performance. We operate in over 80 countries around the world with a portfolio of industry-leading brands.

Within our Polymer Specialties business, we produce everyday essentials for the global polymer, recycling and polymer processing industries. We are among the world's leading producers of organic peroxides, metal alkyls and organometallic specialties, which are essential ingredients for the thermoplastic, composite and rubber industries. We are widely known for our world-class products, including, Trigonox®, Perkadox® and other brands.

Trigonox®

Perkadox®

A global partner

Our manufacturing sites and distribution centers are found all around the globe. Our global distribution network allows us to deliver our products to you anywhere in the world. That's how we ensure security of supply and easy access to quality products wherever you are.

All our sites are ISO 9001 and ISO 14001 certified to ensure the highest product quality and strict compliance with environmental regulations. We continually invest in manufacturing techniques, high quality standards, safety, innovation, active technical support and a reliable supply chain.

Contributing to a Sustainable Future

We partner with our customers, suppliers and employees to deliver innovative solutions, drive progress and create a safe and sustainable today and tomorrow for everyone.

Our 'Commitment to a Sustainable Future,' is based on three pillars:

CONTINUOUSLY IMPROVE

our safety and environmental performance

GROW AND INNOVATE

to create sustainable solutions enabling customers to be more sustainable

ENGAGE AND PARTNER

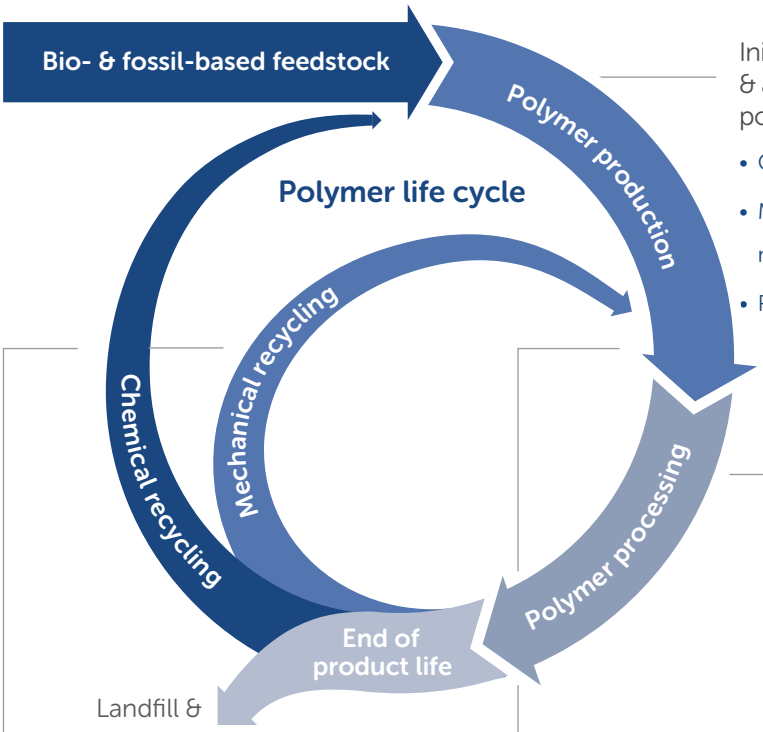
with employees, customers, suppliers, and society to drive sustainable progress

Our effort to **IMPROVE** our environmental performance includes ambitious targets:

Safety ambition: zero injuries and harm
2030
By the end of 2030, we have targeted reducing our absolute Scope 1 & 2 Greenhouse Gas (GHG) emissions by **40%**, vs. a 2019 base year
By the end of 2030, we have targeted reducing our total waste intensity by **10%**, and water consumption intensity by **10%**, vs. a 2019 base year
2050
By 2050, we aspire to be a **net zero** organization

Empowering the Polymer Cycle

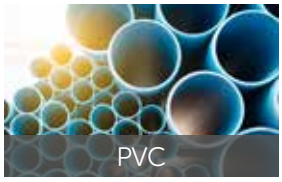
Building on a sustainability driven strategy. We deliver essential ingredients that enhance and support the polymer cycle.



Initiators, co-catalysts & additives to produce polymers

- Organic peroxides
- Metal alkyls & complex metalorganics
- Reactor additives


PP LDPE HDPE


PVC


EPS


Acrylic resins

Curatives & additives to create products

- Organic peroxides
- Polymer & processing additives

Landfill & energy recovery

Modifiers to upgrade polymer properties

- Organic peroxides


Modified polymers


Crosslinked PE


Rubber goods


Composites

Your Safety is our Priority

Nouryon is recognized as the global leader in organic peroxide safety. Our proven success in safely handling organic peroxides is due to our long-term commitment to developing and maintaining high safety standards. We at Nouryon always place safety as our top priority.

Sharing our experience in safety is one of the most important resources we offer. Through our safety programs we provide expert advice on the handling of our products including:

- classroom review of safety and handling of organic peroxides
- consultation on storage and dosing facility design
- demonstrations on the safe use, handling and control of organic peroxides
- online E-learning module on safe handling and use of organic peroxides

Our Safety Research Laboratory in Deventer, The Netherlands is heavily involved in R&D, ensuring the development of safe products and processes.

Studies are carried out, in order to provide a high level of safety in manufacturing, handling, storage and transport of dangerous goods.

Storage temperatures

The Ts max. given in the product list on pages 8-11 is the recommended maximum storage temperature at which the product is stable and quality loss over time will be minimal.

In some cases, also a minimum storage temperature (Ts min.) is indicated. Storage above Ts min. is recommended for quality or safety reasons. A Ts min. is given, for example, if solidification of the product is known to occur below the temperature indicated.

UN Numbers

All products accepted for transport are assigned to generic entry numbers according to classification principles as described in the recommendations by the United Nations Committee of Experts on the Transport of Dangerous Goods. An explanation of all relevant UN numbers is given in the table below.

Classification of organic peroxides

UN No.	Classification	Nouryon hazard rating	Maximum container size
1325	Flammable solid, organic	Low	IBC's / Tanks
3103	type C; liquid	High	50 kg
3104	type C; solid	High	50 kg
3105	type D; liquid	Medium	50 kg
3106	type D; solid	Medium	50 kg
3107	type E; liquid	Low	400 kg
3108	type E; solid	Low	400 kg
3109	type F; liquid	Very low	IBC's / Tanks
3110	type F; solid	Very low	IBC's

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A Complete Range of Crosslinking Peroxides

Nouryon's range of organic peroxides for the crosslinking of elastomers and thermoplastics is very extensive. Companies all over the world depend on our Trigonox® and Perkadox® organic peroxide brands. Why? Because they are an important ingredient in the production of products, ranging from hi-tech automotive parts such as hoses and belts to shoe soles and power distribution cables.

Examples include:

- **Trigonox® 311**
  PEX pipes, rotomolding
- **Trigonox® 145**
  PEX pipes, rotomolding
- **Trigonox® 101**
  PEX pipes, polymer modification, technical rubber goods
- **Trigonox® T**
  wire & cable (direct peroxide injection)
- **Perkadox® 14**
  wire & cable, technical rubber goods, footwear
- **Perkadox® BC**
  wire & cable, footwear, technical rubber goods
- **Trigonox® 117 and Trigonox® 131**
  for EVA and POE encapsulant films
- **Trigonox® 29**
  for fast on-set of cure, rubber goods
- **Perkadox® PM-50S-PS and Perkadox® PD-50S-PS**
  extruded silicone rubber articles such as silicone rubber cable, seals & tubes

Much of our success is due to our philosophy of creating close partnerships with our customers. What do you want to achieve? From optimizing applications, improving efficiencies, resolving difficulties or even developing new crosslinking peroxides, we're happy to meet with you to discuss your requirements.

This product guide provides an overview of our main, commercially available crosslinking peroxides. We invite you to visit us at www.nouryon.com for complete product listings.

Formulations with phlegmatizers and carriers or concentrations other than those indicated, as well as unique custom made peroxide compositions can be made available with due observance of safety characteristics and the appropriate environmental and transportation regulations. Whatever your particular requirements, we can develop the product to match.

Uses of Crosslinking Peroxides

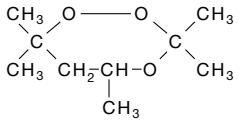
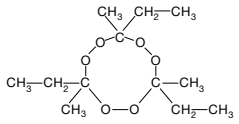
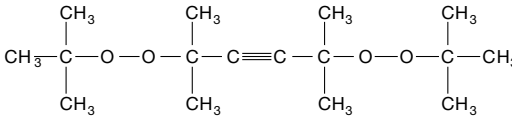
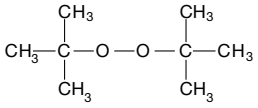
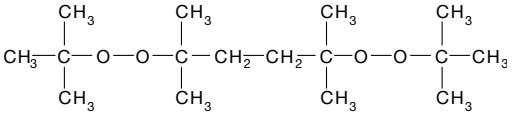
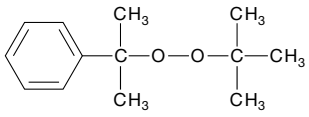
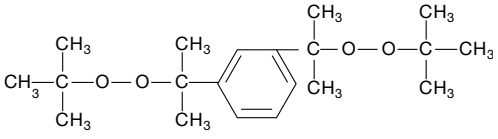
Peroxides are used to crosslink	
NR	Natural rubber
IR	Polyisoprene
BR	Polybutadiene
CR	Polychloroprene
SBR	Styrene butadiene rubber
NBR	Nitrile rubber
HNBR	Hydrogenated nitrile rubber
Q	Silicone
AU/EU	Polyurethane
EPM	Ethylene propylene copolymer
EPDM	Ethylene propylene terpolymer
POE	Polyolefin elastomer
T	Polysulfide
PE	Polyethylene
CM	Chlorinated polyethylene
CSM	Chlorosulfonated polyethylene
EVA	Ethylene vinylacetate copolymer
ABS	Acrylonitrile butadiene styrene copolymer
AEM	Ethylene acrylic
EBA	Ethylene butylacrylate copolymer
FKM	Fluoro elastomers

and blends of
NBR/EPDM
SBR/EPDM
PP/EPDM (TPV's)
PE/EVA
NBR/EVA
POE/EP(D)M

Organic peroxides also find growing use in polymer modification (CR-PP), recycling, grafting processes (silane, maleic anhydride) and dynamic vulcanization (TPV production).

Peroxides find limited use or cannot be used to crosslink	
ACM	Polyacrylate
IIR	Butyl rubber
CIIR	Chlorobutyl rubber
CO	Epichlorohydrin
ECO	Epichlorohydrin copolymer
PP	Polypropylene
PB	Polybutene-1
PIB	Polyisobutene
PVC	Polyvinylchloride

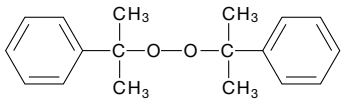
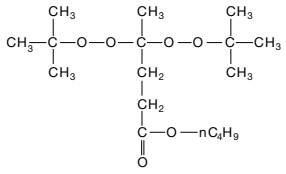
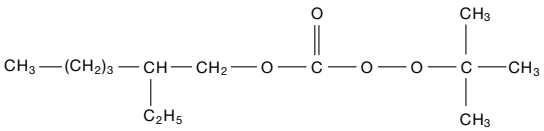
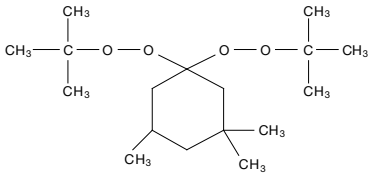
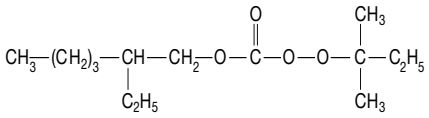
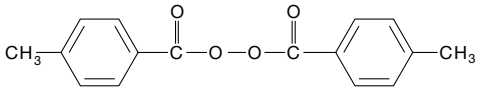
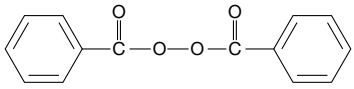
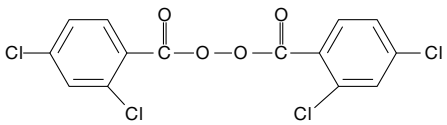
Our Crosslinking Products

PRODUCT NAME	CHEMICAL NAME [CAS NO.]	GENERAL DATA		
		Mol. weight	Assay (%)	Physical form
	3,3,5,7,7-Pentamethyl-1,2,4-trioxepane [215877-64-8]	174.3		
TRIGONOX 311			95	liquid
	3,6,9-Triethyl-3,6,9-trimethyl-1,4,7-triperoxonane [24748-23-0]	264.3		
TRIGONOX 301			41	solution
	2,5-Dimethyl-2,5-di(tert-butylperoxy)hexyne-3 [1068-27-5]	286.4		
TRIGONOX 145-E85			85	solution
	Di-tert-butyl peroxide [110-05-4]	146.2		
TRIGONOX B [3]			99	liquid
	2,5-Dimethyl-2,5-di(tert-butylperoxy)hexane [78-63-7]	290.4		
TRIGONOX 101			>92	liquid
TRIGONOX 101-50D (-PD)			50	powder
TRIGONOX 101-45B (-GR)			45	granules
TRIGONOX 101-45D (-PD)			45	powder
TRIGONOX 101-45S (-PS)			45	paste
	tert-Butyl cumyl peroxide [3457-61-2]	208.3		
TRIGONOX T			>95	liquid
	Di(tert-butylperoxyisopropyl)benzene [25155-25-3; 2212-81-9]	338.5		
PERKADOX 14S / 14S-FL			>96 / 98	solid / flakes
PERKADOX 14-40B (-GR/PD)			40	granules / powder
PERKADOX 14-40K (-PD)			40	powder
PERKADOX 14-EP40			40	granules

[1] See page 5 for definitions of Ts max. and Ts min.
[2] See page 12-13 for definitions of safe processing and typical crosslink temperature
[3] Trigonox® B has a boiling point of 110°C and a flash point of 6°C. Therefore, it is not recommended for standard rubber mixing procedures carried out in closed mixers (Banbury-type) or on an open two-roll mill. In addition, we do not recommend the use of Trigonox® B for food contact or drinking water applications.

	STORAGE DATA [1]			PROCESSING DATA [2]		STANDARD PACKAGE
Main carrier / solvent	Ts max. (°C)	Ts min. (°C)	UN No.	Safe processing temperature	Typical crosslink temperature	
				180	220	
	40	15	3107			HDPE can
				145	185	
iso-paraffins	40	10	3105			HDPE can
				145	185	
mineral oil	30	10	3103			HDPE can
				145	180	
	40	-25	3107			HDPE can / steel drum
				135	175	
	40	10	3103			HDPE can
silica	30	0	3108			carton
calcium carbonate	30	0	3108			carton
silica	30	0	3108			carton
silicone oil	30	10	3108			pail
				135	175	
	40	16	3109			HDPE can / HDPE drum
				135	175	
	30 / 20		3106			HDPE can / carton
calcium carbonate	30		1325			carton
clay	30		1325			carton
POE, calcium carbonate	30		1325			carton
						carton

Our Crosslinking Products

PRODUCT NAME	CHEMICAL NAME [CAS NO.]	GENERAL DATA		
		Mol. weight	Assay (%)	Physical form
	Dicumyl peroxide [80-43-3]	270.4		
PERKADOX BC-FF			≥99	solid / crystals
PERKADOX BC-40B (-GR/PD)			40	granules / powder
PERKADOX BC-40K (-PD)			40	powder
PERKADOX BC-40S (-PS)			40	paste
PERKADOX BC-EP40			40	granules
	Butyl 4,4-di(tert-butylperoxy)valerate [995-33-5]	334.5		
TRIGONOX 17-40B (-GR/PD)			40	granules / powder
TRIGONOX 17-40MB (-GR)			40	granules
	tert-Butylperoxy 2-ethylhexyl carbonate [34443-12-4]	246.3		
TRIGONOX 117			≥95	liquid
	1,1-Di(tert-butylperoxy)-3,3,5-trimethylcyclohexane [6731-36-8]	302.5		
TRIGONOX 29-40B (-GR/PD)			40	granules / powder
TRIGONOX 29-40MB (-GR)			40	granules
	tert-Amylperoxy 2-ethylhexyl carbonate [70833-40-8]	260.4		
TRIGONOX 131			≥96	liquid
	Di(4-methylbenzoyl) peroxide [895-85-2]	270.3		
PERKADOX PM-50S			50	paste
	Dibenzoyl peroxide [94-36-0]	242.2		
PERKADOX L-50S			50	paste
	Di(2,4-dichlorobenzoyl) peroxide [133-14-2]	380.0		
PERKADOX PD-50S			50	paste

[1] See page 5 for definitions of Ts max. and Ts min.
[2] See page 12-13 for definitions of safe processing and typical crosslink temperature

	STORAGE DATA [1]			PROCESSING DATA [2]		STANDARD PACKAGE
Main carrier / solvent	Ts max. (°C)	Ts min. (°C)	UN No. [3]	Safe processing temperature	Typical crosslink temperature	
				130	170	
	30		3110			carton / Liquabin / drum
calcium carbonate	30		1325			carton
clay	30		1325			carton
silicone oil	30		1325			pail
POE, calcium carbonate	30		1325			carton
				125	160	
calcium carbonate	30		3108			carton
EPR, calcium carbonate	30		3108			carton
				120	150	
	20		3105			HDPE can
				115	145	
calcium carbonate	30		3110			carton
EPR, calcium carbonate	30		3110			carton
				100	140	
	20		3105			HDPE can
				85	110	
silicone oil	30		3106			pail
				85	105	
silicone oil	30		3108			pail
				75	90	
silicone oil	30		3104			pail

Processing Data

Safe processing and typical crosslink temperatures

In the application of crosslinking peroxides, it is very important to know the safe processing and the typical crosslink temperature.

The safe processing temperature is defined as the temperature at which the scorch time (t_{s2}) is longer than 20 minutes.

The typical crosslink temperature is defined as the temperature at which optimal cure (t_{90}) is reached within about 12 minutes. This means that within this time 90% of the total possible crosslinks in the compound are formed. Scorch and optimal cure times have been determined at various temperatures.

The results are presented in the table on the right. From the values the safe processing and typical crosslink temperatures can be extracted.

		Scorch time (t_{s2}) and optimal cure time (t_{90}) in minutes at various					
		70	80	90	100	110	120
Trigonox 311	t_{s2}						
	t_{90}						
Trigonox 145	t_{s2}						
	t_{90}						
Trigonox B	t_{s2}						
	t_{90}						
Trigonox 101	t_{s2}						
	t_{90}						
Trigonox T	t_{s2}						
	t_{90}						
Perkadox 14	t_{s2}						
	t_{90}						
Perkadox BC	t_{s2}						
	t_{90}						
Trigonox 17	t_{s2}						
	t_{90}						
Trigonox 117	t_{s2}						14
	t_{90}						261
Trigonox 29	t_{s2}						9
	t_{90}						99
Trigonox 131	t_{s2}					11	4
	t_{90}					175	65
Perkadox PM	t_{s2}			29	6	2	1
	t_{90}			96	32	11	4
Perkadox L	t_{s2}			25	7	2	1
	t_{90}			100	25	9	5
Perkadox PD	t_{s2}	54	10	3	1		
	t_{90}	121	32	10	5	2	1

[1] The data were determined in a rheometer, using a moving die, according to ISO 6502: 1991.
Data were determined in the compounds listed in the table on page 15.

s temperatures (°C) [1]												
	130	140	150	160	170	180	190	200	210	220	230	240
							14	6	3	1		
							107	45	19	9	4	2
				15	5	2	1					
				110	40	17	7	4				
			29	11	4	1						
			246	94	35	12	5	3				
			11	4	2	1						
			140	40	13	5	2					
			9	3	1							
			100	30	10	4	2					
			7	2	1							
			95	30	11	4	2					
		10	4	2	1							
		136	47	16	6	2	1					
	12	4	2	1								
	150	46	16	6	3	1						
	5	2	1									
	80	27	10	4	2							
	3	1										
	34	11	4	2	1							
	2	1										
	31	13	6	3								
	2	1										
	2											

Dosage Levels

Amounts of peroxide required for crosslinking various polymers. Peroxide addition levels for the crosslinking of different types of elastomers and thermoplastics are given below.

Satisfactory mechanical properties can be obtained at the lowest peroxide dosage levels indicated.

Compression set properties improve with higher peroxide amounts. The highest addition levels listed should not be surpassed, since other mechanical properties may decrease.

However, higher peroxide dosage may be necessary when the compound contains free radical consuming materials such as sulfur, certain antioxidants or non-paraffinic mineral extender oils.

The negative influence of these components may be partly compensated for by a higher amount of peroxide or the use of coagents.

Whereas the crosslink density is mainly affected by the amount of peroxide, the rate of crosslinking is mainly determined by the temperature and the type of peroxide.

Very short crosslinking times can be achieved by raising the temperature to approximately 40°C above the typical crosslink temperatures mentioned. Because of the excellent plateau effect of peroxide crosslinking, no reversion will be observed.

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Peroxide	Trigonox 29-40	Trigonox 17-40	Perkadox BC-40	Perkadox 14-40	Trigonox 101-45
Safe Processing Temperature	115	125	130	135	135
Typical Crosslink Temperature	145	160	170	175	175
Polymer	parts of peroxide per 100 parts of polymer				
NR; IR	2.3 - 4.5	2.5 - 5.0	2.0 - 4.1	1.3 - 2.5	1.3 - 2.4
BR	1.0 - 2.1	1.1 - 2.3	0.9 - 1.9	0.5 - 1.2	0.5 - 1.2
CR	1.1 - 3.0	1.3 - 3.3	1.0 - 2.7	0.6 - 1.7	0.6 - 1.6
SBR	1.9 - 4.1	2.1 - 4.6	1.7 - 3.7	1.1 - 2.3	1.1 - 2.2
NBR	2.6 - 4.5	2.9 - 5.0	2.4 - 4.1	1.5 - 2.5	1.4 - 2.4
HNBR	6.8 - 11.3	7.5 - 12.5	6.1 - 10.1	3.8 - 6.3	3.7 - 6.1
POE[1]	6.8 - 11.3	7.5 - 12.5	6.1 - 10.1	3.8 - 6.3	3.7 - 6.1
EPM[1]; EPDM	6.8 - 11.3	7.5 - 12.5	6.1 - 10.1	3.8 - 6.3	3.7 - 6.1
PE	1.5 - 7.6	1.7 - 8.4	1.4 - 6.8	0.8 - 4.2	0.8 - 4.0
CM [1]	6.8 - 10.6	7.5 - 11.7	6.1 - 9.5	3.8 - 5.9	3.7 - 5.7
EVA	2.6 - 5.3	2.9 - 5.8	2.4 - 4.7	1.5 - 3.0	1.4 - 2.9
Q [2]			1.0 - 2.0	0.4 - 0.8	0.4 - 0.8

[1] Addition of a coagent is recommended.

[2] Silicone rubber can also be crosslinked with Perkadox® PD-50S, Perkadox® L-50S and Perkadox® PM-50S.
Required amounts of peroxide: 1.1 - 2.3 phr, 0.7 - 1.4 phr and 0.8 - 1.6phr respectively.
Typical crosslink temperatures 90°C, 105°C and 110°C and safe processing temperatures 75°C, 85°C and 85°C respectively.

Kinetic Data

Half-life

The most important characteristic of a crosslinking peroxide is its rate of decomposition expressed by its half-life ($t_{1/2}$). The half-life is the time required to reduce the original amount of peroxide at a given temperature by 50%.

The half-life can be calculated from the Arrhenius equation

$$k_d = A \cdot e^{-E_a/RT} \text{ and } t_{1/2} = \ln 2/k_d$$

The residual concentration of organic peroxide can be calculated by means of the equation

$$[I] = [I_0] \cdot e^{-k_d \cdot t}$$

It can be calculated that less than 1% of the orginal amount of peroxide will remain, after roughly 7 times the half-life of a peroxide.

The crosslinking peroxides in the table below are arranged in ascending order of activity, based on the 0.1 hour half-life temperature.

k_d = rate constant for the initiator dissociation in s^{-1}
A = Arrhenius frequency factor in s^{-1}
E_a = Activation energy for the initiator dissociation in J/mole
R = 8.3142 J/mole.K
T = temperature in K
$t_{1/2}$ = half-life in s

$[I_0]$ = original peroxide concentration
[I] = peroxide concentration at time t
t = time measured from the start of decomposition in s

			T (°C) for $t_{1/2}$				
		Polymer type [1]	0.1 h	1.0 h	10 h	E_a (kJ/mole) [2]	A (s^{-1}) [2]
TRIGONOX 311	3,3,5,7,7-Pentamethyl-1,2,4-trioxepane	HDPE	213	184	158	144.6	6.58E+12
TRIGONOX 301	3,6,9-Triethyl-3,6,9-trimethyl-1,4,7-triperoxonane	HDPE	181	156	134	150.8	4.35E+14
TRIGONOX 145	2,5-Dimethyl-2,5-di(tert-butylperoxy)hexyne-3	EPDM	177	152	130	148.7	3.49E+14
TRIGONOX B [3]	Di-tert-butyl peroxide	HDPE	176	151	129	146.3	1.98E+14
TRIGONOX 101	2,5-Dimethyl-2,5-di(tert-butylperoxy)hexane	EPDM	166	143	121	147.4	6.41E+14
TRIGONOX T	tert-Butyl cumyl peroxide	EPDM	164	140	118	142.9	2.30E+14
TRIGONOX T	tert-Butyl cumyl peroxide	LDPE	172	146	123	138.9	3.55E+13
PERKADOX 14	Di-tert-butylperoxyisopropyl)benzene	EPDM	164	140	118	143.5	2.68E+14
PERKADOX BC	Dicumyl peroxide	EPDM	158	134	112	137.8	9.77E+13
TRIGONOX 17	Butyl 4,4-di(tert-butylperoxy)valerate	EPDM	149	125	103	134.2	8.23E+13
TRIGONOX 117	tert-Butylperoxy 2-ethylhexyl carbonate	EVA	139	114	92	124.0	1.04E+13
TRIGONOX 29	1,1-Di(tert-butylperoxy)-3,3,5-trimethylcyclohexane	EPDM	135	111	89	124.5	1.69E+13
TRIGONOX 131	tert-amylperoxy 2-ethylhexyl carbonate	EVA	129	103	80	112.1	7.29E+11
PERKADOX PM	Di(4-methylbenzoyl) peroxide	VMQ	106	84	64	115.6	1.69E+13
PERKADOX L	Dibenzoyl peroxide	VMQ	106	83	63	112.5	5.97E+12
PERKADOX PD	Di(2,4-dichlorobenzoyl) peroxide	VMQ	89	68	49	112.4	3.21E+13

[1] Half-life times have been determined using different substrates; HDPE = Borpex® HE1878 E, EPDM = Keltan® 578 incl 70 phr. SRF 55 c.b 70 phr. FEF 762 c.b. and 50 phr. Sunpar® 2280. EVA = Elvax® PV1400 VMQ = HV3-611

[2] Kinetic parameters have been determined using the well-known Arrhenius equation: k = K0 * EXP(-Eact/RT), t1/2 = ln2/k)

[3] Trigonox® B (Di-tert-butyl peroxide) has a boiling point of 110°C and a flash point of 6°C. herefore, this peroxide is NOT recommended for standard rubber mixing procedures carried out in closed mixers (Banbury-type) or on an open two-roll mill.

Packaging

We continuously develop new and innovative packaging making logistics more efficient and improving safety standards even beyond existing transport regulations. From bottles to tank trucks we offer a variety of packaging options for both liquid and solid organic peroxides.

Liquid organic peroxides

Liquid peroxides from Nouryon are available in packages shown in Table 1. Package sizes expressed in gallons are only available in North America.

We also understand the need to innovate our packaging. For instance our Nourytainer®.

Developed by Nouryon it is recognized as the world's benchmark in liquid organic peroxide packaging. And we're continually looking for new ways to optimize safe transport, handling and storage of organic peroxides.

Solid organic peroxides

Standard packages for our crosslinking peroxides are shown in Table 2.

Most solid peroxides are packaged in polyethylene bags inside non-returnable corrugated boxes. The number of bags per box varies, depending on the weight of crosslinking peroxide per bag.

For the availability of our products in non-standard packages, please consult your Nouryon account manager.

Table 1. Standard packages for liquid peroxides

PACKAGE	VOLUME	NET WEIGHT	COMMENTS
HDPE can	20-30 liter	15-25 kg	single component, polyethylene container (Nourytainer®)
Drum	200 liter	150 kg	steel drum
	220 liter	165-190 kg	returnable polyethylene drum

Table 2. Standard packages for solid initiators

PACKAGE	NET WEIGHT	COMMENTS
Pail	15 - 20 kg	for pastes
Cardboard box	varies with product	polyethylene bags inside non-returnable cardboard box
Pallet box	varies with inner package	polyethylene bags inside cardboard box
Drum	20-50 kg	fiber drum
Liquabin	1600 kg	reusable stainless steel container with heating coil

Looking for a dust-free solution?

We will help you

We are offering brand new masterbatches, Perkadox® 14-EP40 and Perkadox® BC-EP40. These products consist of elastomeric pellets that contain 40% of our high quality organic peroxides on polyolefin elastomer as carrier.

Our Research Development and Innovation department is continuously exploring opportunities to assist our customers in improving the application of our products.

This specific invention emerged from the realization that polyolefin elastomers are compatible with a diverse range of elastomers and polymers.

You as valued customer can benefit from the following advantages of these new masterbatches:

- pellets are dust free, allowing minimal exposure of workers to chemicals masterbatches easily incorporate into rubbers or polyolefins when milled or mixed, we observed improved dispersion speeds
- pellets are free flowing and very low in color.

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Perkadox®

Nouryon

Superconductive Carbon Blacks

Ketjenblack®

Nouryon has a leading position in the electro-conductive carbon black market. Our Ketjenblack® superconductive carbon blacks offer the highest electrical conductivity at the lowest concentration in the industry.

Ketjenblack® provides your products with excellent antistatic or electro-conductive properties in order to attain the highest level of safety in their end use.

Our high purity superconductive blacks are used in a wide range of applications. These include protective packaging for electronics, safety shoes, fuel tanks and hoses, conductive flooring, medium and high voltage cables, and electrostatic paintable plastics including automotive parts.
Ketjenblack® also finds use in non-polymer applications such as batteries, fuel cells and conductive coatings.

Due to the unique morphology of Ketjenblack®, substantially lower amounts are needed to obtain the desired properties when compared to conventional electroconductive carbon blacks. As a result the mechanical properties of the final compound show minimal impact.

Ketjenblack® EC-600JD is recognized in the industry as a unique product giving the highest electroconductivity at the lowest addition levels.

Packaging

- paper bag
- big bag

Product name	Description	Application	Physical form	Polymer	Typical dosage (%)	Total BET surface area (m^2/g)	Packaging
Ketjenblack EC-300J	Superconductive black with very high purity	Making polymers conductive with minimum impact on mechanical properties	Soft pellets	All polymers Resins, coatings and inks	8-10	800	10 kg PE bag, 180 kg big bag
Ketjenblack EC-600JD	Top end super-conductive black with very high purity	Provides the same conductive properties as Ketjenblack EC-300J with half of the dosage	Soft pellets	All polymers Batteries and fuel cells	4-5	1400	8 kg PE bag, 140 kg big bag

Online Safety Training

Safety Essentials of Crosslinking Peroxides for the Rubber and Thermoplastic Industry

As a global leader in specialty chemical safety, we prioritize educating our customers on best safety practices. To support this mission, we have developed a comprehensive training program focusing on the latest safety protocols for handling organic peroxides in the crosslinking industry.

Engaging, interactive online sessions accessible from your facility

Available in 12 languages

Contact your Nouryon representative to participate

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Nouryon

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For product inquiry and ordering information, please contact your Nouryon account manager or regional sales office.

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Additional information

Product Data Sheets (PDS) and Safety Data Sheets (SDS) for our polymer crosslinking products are available at nouryon.com