



Our curing systems  
for thermoset resins

**Nouryon**

## Nouryon is your partner in essential chemistry for a sustainable future

Nouryon is a global specialty chemicals leader. Markets worldwide rely on our essential chemistry for the manufacture of everyday products such as paper, plastics, building materials, food, pharmaceuticals, and personal care items. Building on our nearly 400-year history, the dedication of our 9,700 employees, and our shared commitment to safety, business growth, strong financial performance, sustainability, and innovation, we have established a world-class business and built strong partnerships with our customers. We operate in more than 80 countries around the world.

Throughout our history, we built up a wealth of expertise, forged long-term partnerships, and earned a place among the best performing companies in our industry. Now that we're Nouryon, we're putting even greater focus on what it takes to be a global specialty chemicals leader.

Nouryon is a responsible organization that takes its obligations seriously – to the planet, to our customers and to our own people. We believe the only way to grow is by developing sustainable, innovative solutions that benefit our customers and we're constantly looking for ways to reduce our impact on the environment.

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

**Butanox®**

## Committed to a sustainable future

Chemistry is essential for thousands of products we use every day and at Nouryon, we believe good chemistry is key to a sustainable future. Our approach to sustainability is based on three pillars: further improving our environmental footprint and safety performance; growing sales of our portfolio of sustainable solutions; and continuing to engage with our people and society to drive progress together.

### Improve

We continuously work on further improving our environmental footprint and safety performance. We are a top-quartile performer in safety, and we have reduced our carbon footprint per ton of product by almost a third between 2009 and 2019. We are committed to reducing our impact on the environment even further – working with customers, suppliers and new technology start-ups to become even safer and more efficient every day.

### Grow

We work together with customers, suppliers, and other partners to develop new and leading solutions that have smaller footprints or enable our customers to deliver benefits in more sustainable ways – ranging from a growing share of bio-based and biodegradable products to new, circular, raw materials. Many of our products have a lower footprint than the mainstream market alternative and over 20% of our 2019 revenue came from solutions which make our customers' products more sustainable.

### Engage

We strive to have a positive impact on people's lives through our products every day. We develop, listen to, and empower our employees, partners, and local communities to make our industry safer and more sustainable in all dimensions.

Our employees are essential for our competitive edge. Therefore, we invest in learning and development at all levels of the company and are committed to create a high-performing, diverse and inclusive workplace, where our people feel valued and are engaged to perform at their best.



## The first online safety training for Thermoset

We offer an interactive E-learning module with certification in 12 languages to all our customers. Please ask your Nouryon representative to be enrolled for the course.



# A global partner

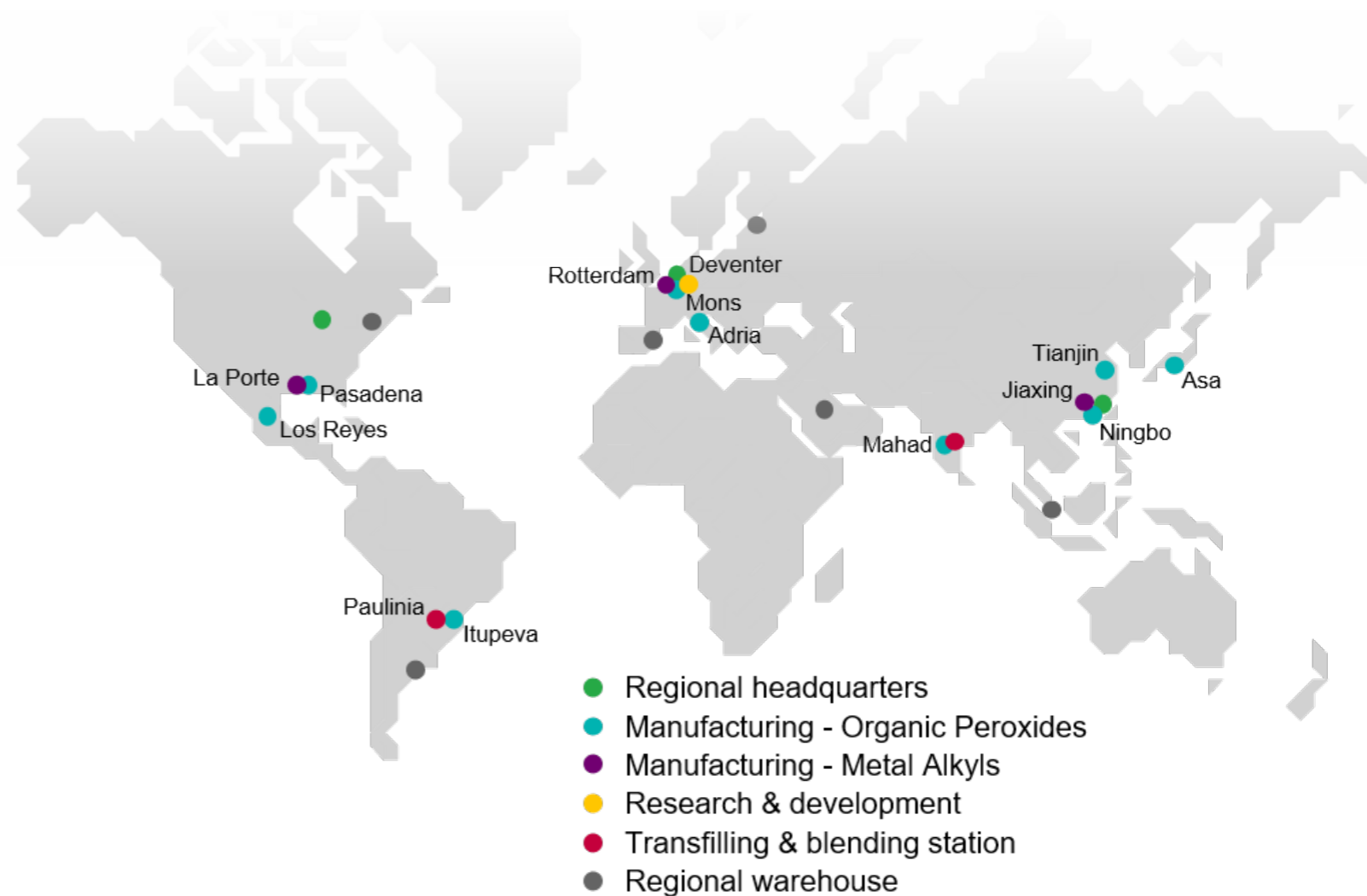
Our manufacturing sites and distribution centers are found all around the globe. Our global distribution network allows us to deliver our products to you anywhere around the world. That's how we ensure security of supply and easy access to quality products wherever you are.

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 new manufacturing techniques, high quality standards, safety, innovation, active technical support and a reliable supply chain.

## Our expertise is your expertise

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 designing new curing systems, we're happy to meet with you to discuss your requirements.

From wind turbines and composite lift bridges to racing yachts and chemical storage tanks, we help shape the world around us. Sharing our thermoset experience is one of the biggest resources we offer. Whatever your particular requirements, we can develop the product to match.



# Innovation

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 around the world. That's how we ensure security of supply and easy access to quality products wherever you are.

Our thorough understanding and knowledge of free radical chemistry and thermoset technology is the basis for the development of innovative and sustainable products, designed with you in mind.

As a innovative company, we have a stream of new, high-value products to maintain our leadership. Recently we have introduced cure systems based on copper and iron sold as Nouryact which are targeted for a long term sustainable alternatives to Cobalt. Interestingly, our Nouryact accelerators proved to be non-sensitive to the presence of water in a cure system and therefore allow for using wet (i.e. non-dried) fillers. This is of particular interest when using biofibers which carry high amounts of water that hampers the cure of traditional Cobalt based cure systems.

We've also led the way with new peroxide formulations. Such as Perkadox 16-40XPS which is a pumpable paste-form of peroxydicarbonate which offers savings in operational costs as the peroxide dissolves in less than a minute in the UP or acrylic resin. The product can ideally be used in combination with liquid dosing pumps in applications like RTM, CIPP and pultrusion processes.

On top of our innovative products we have an obligation to keep strengthening our existing portfolio such as Nouryon's Butanox M-50, the global standard for MEKP. This low water content methyl ethyl ketone peroxide contains no polar components and is the best possible answer to the problem of osmosis in boat building.

In addition, we provide safety and technical support from our fundamental peroxide R&D laboratories in Deventer - The Netherlands, plus manufacturing & support in Pasadena (TX) - USA, Los Reyes - Mexico, and Tianjin - China.

Our researchers are based in dedicated customer-focused business teams. They perform research, product and process development and technical support to translate market needs into new innovative products. They understand the needs of our customers and are committed to their success.



# Your safety 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. At Nouryon we 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 how to safely handle 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, to provide a high level of safety in the manufacturing, handling and transport of dangerous goods.

In general, organic peroxides are thermally unstable components which can decompose at relatively low temperatures. However, knowledge of proper handling techniques, carefully designed facilities and thorough training of personnel can overcome the hazards. Personnel who understand and pay proper attention will be better able to handle organic peroxides confidently and safely.

## Storage temperatures

### SADT: Self-Accelerating Decomposition Temperature

The SADT is the lowest temperature at which self-accelerating decomposition may occur with a substance in the packaging as used in transport. Transportation temperatures are derived from the SADT according to the recommendations by the United Nations Committee of Experts on the Transport of Dangerous Goods.

### $T_s$ max.

The  $T_s$  max. given in the product list on pages 10-14 is the recommended maximum storage temperature at which the product is stable and quality loss will be minimal.

### $T_s$ min.

A minimum storage temperature ( $T_s$  min.) is given if phase separation, crystallization or solidification of the product is known to occur below the temperature indicated. We recommend that you store the product above the  $T_s$  min. indicated for quality and in some cases safety reasons.

### $T_{em}$ : Emergency temperature

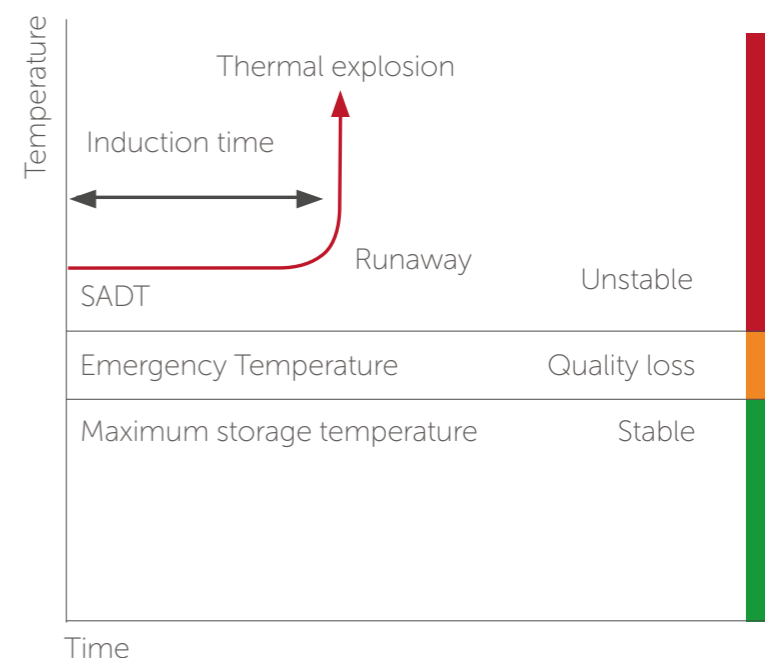
The  $T_{em}$  is derived from the SADT and is the temperature at which emergency procedures must be triggered.

### $T_c$ : Control temperatures

The  $T_c$  is also derived from the SADT and is the maximum temperature at which the product can be safely transported. A  $T_c$  is not required if the SADT exceeds 50°C.

Both the  $T_{em}$  and  $T_c$  are related to safety and do not relate to product quality. To maintain product quality the recommended storage temperatures ( $T_s$  min. and max.) should be observed.

## Thermal stability of organic peroxides



## 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 table 1.

UN no.	Classification	Nouryon hazard rating	Maximum container size
<b>Organic peroxides</b>			
3102	type B; solid	Very high	25 kg (55 lb)
3103	type C; liquid	High	50 kg (110 lb)
3104	type C; solid	High	50 kg (110 lb)
3113	type C; liquid, temperature controlled	High	50 kg (110 lb)
3114	type C; solid, temperature controlled	High	50 kg (110 lb)
3105	type D; liquid	Medium	50 kg (110 lb)
3106	type D; solid	Medium	50 kg (110 lb)
3115	type D; liquid, temperature controlled	Medium	50 kg (110 lb)
3116	type D; solid, temperature controlled	Medium	50 kg (110 lb)
3107	type E; liquid	Low	400 kg (880 lb)
3108	type E; solid	Low	400 kg (880 lb)
3117	type E; liquid, temperature controlled	Low	400 kg (880 lb)
3109	type F; liquid	Very low	IBC's / Tanks
3110	type F; solid	Very low	IBC's / Tanks
3119	type F; liquid, temperature controlled	Very low	IBC's / Tanks
<b>Self-reactive substances</b>			
3234	type C; solid, temperature controlled	High	50 kg (110 lb)
3236	type D; solid, temperature controlled	Medium	50 kg (110 lb)

### NFPA classification system for organic peroxide formulations

Class I	Formulations that are capable of deflagration but not detonation.
Class II	Formulations that burn very rapidly and that present a severe reactivity hazard.
Class III	Formulations that burn rapidly and that present a moderate reactivity hazard.
Class IV	Formulations that burn in the same manner as ordinary combustibles and that present a minimal reactivity hazard.
Class V	Formulations that burn with less intensity than ordinary combustibles or do not sustain combustion and that present no reactivity hazard.

## NFPA Class

The NFPA Code 400, Hazardous Materials Code for the Storage of Organic Peroxides Formulations is set by the US National Fire Protection Association to provide enhanced fire protection and storage requirements for organic peroxides.

The system is based on the behavior of certain specific formulations in their US Department of Transportation- or Canadian Ministry of Transport-approved shipping containers and under conditions of fire exposure.

As one of the US recognized standards, we have included all classifications that were available at the time of publication of this product catalog. We encourage you to obtain a copy NFPA Code 400 from the NFPA website at [www.nfpa.org](http://www.nfpa.org).



# Packaging

We offer a variety of packaging options for both liquid and solid organic peroxides. The maximum package size for each organic peroxide is regulated by the United Nations, based on the hazard classification of the peroxide as shown in table 1 on page 6.

## Liquid organic peroxides

Liquid peroxides from Nouryon are available in packages shown in table 2.

We also understand the need to innovate our packaging. Our Nourytainer® is recognized as the world's benchmark container for liquid organic peroxide handling. We are continually looking for new ways to optimize safe transport, handling and storage of organic peroxides.

Table 2. Standard packages for liquid peroxides

Package	Volume	Net weight	Comments
Bottle	3.8 liter (1 gallon)	3.2-3.6 kg (7-7.9 lb)	packaged as 4 polyethylene bottles per non-returnable carton
Pail	18.9 liter (5 gallon)	20.4 kg (45 lb)	polyethylene bucket
HDPE can	20-30 liter (5.3-7.9 gallon)	15-25 kg (33-55 lb)	single component, polyethylene container (Nourytainer®)
Drum	57-208 liter (15-55 gallon)	45-204 kg (99-450 lb)	lined steel drum
	208 liter (55 gallon)	159 kg (350 lb)	fiber drum
	208 liter (55 gallon)	186 kg (410 lb)	polyethylene drum

Table 3. Standard packages for solid and paste-form peroxides

Package	Net weight	Comments
Carton	varies with product	polyethylene bags inside non-returnable cardboard box
Drum	20-25 kg (44-55 lb)	fiber drum

## Solid organic peroxides

Standard packages for our solid and paste-form peroxides are shown in table 3.

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



# Packaging - Nourytainer®

## Your safety our priority

Nouryon is home to the best-known ketone peroxide brands like Butanox M-50, the work horse of the thermoset composites industry. The material was introduced to the Thermoset composites industry in the 1960's and ever since has been the reference grade for MEKP's. The quality of Butanox M-50 is outstanding and is the product of choice for many composite applications, such as boats, pipes, engineered stone, gelcoats and others.

We offer a variety of packaging options for both liquid and solid organic peroxides.

### Enhanced advantages and safety features

- Easy operating, screw cap anti-glug device
- Ergonomically designed handle for ease and safety of handling
- Opaque exterior to protect contents from harmful UV rays
- Shaped for promotion of optimal air circulation while stacked
- Unique interior features allow more complete drainage

Ventilation screw-cap to prevent splashing

4 interlocking points for improved stacking stability

2 types of caps

Made of 100% HDPE

Unique design that makes it fully drainable

Profile ribs on each corner to improve strength

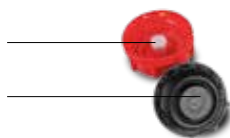
Grip-aid in the bottom for easy handling

2 special caps

Depending on the type of organic peroxide, we have developed special caps to meet all safety requirements

Venting cap  
Membrane type

Standard cap  
Closed cap type

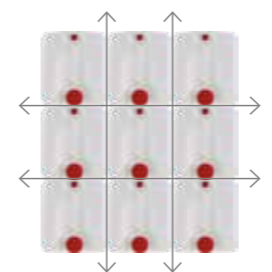


Size  
20 liter: 324x324 mm  
30 liter: 337x424 mm



Stable palletizing  
4 interlocking points  
to improve palletizing

Palletization on pallets  
of 1000x1200mm:  
20 liter: 36 per pallet  
30 liter: 24 per pallet



Ventilation  
Temperature control is vital.  
Our Nourytainer is designed  
to have optimal air circulation  
when stacked.

## Directives for the safe handling and storage of organic peroxides

### Storage

Organic peroxides should be protected against all sources of heat, even direct sunlight. Storage together with other chemicals, especially accelerators, other reducing materials and inflammable products must be avoided.

### Handling

#### Fire hazard

No smoking, no naked lights, no sparks, or other sources of ignition.

#### Explosion hazard

Avoid direct contact of organic peroxides with accelerators - add each component separately to the resin. Contamination with dust, heavy metals and their compounds, as well as chemicals in general, should be avoided.

#### Eye and skin injury

Always wear safety goggles and protective gloves, since organic peroxides have a corrosive effect on eyes and skin.

### Additional information

On request we also provide specific publications on the use and the safe handling and storage of our products.



Check out our video  
about our safety services





# Butanox<sup>®</sup> M-50

## Track record of 60 years consistency

Nouryon is home to the best-known ketone peroxide brand, Butanox M-50, the work horse of the thermoset composites industry. The material was introduced to the Thermoset composites industry in the 1960's and ever since has been the reference grade for MEKP's since. The quality of Butanox M-50 is outstanding and is the product of choice for most composite applications, such as boats, pipes, engineered stone, gelcoats and others.

### Quality in every step we take

Our customers need to be able to rely on a cure system with reproducible consistent performance. They know Butanox is the safe choice for more than 60 years.

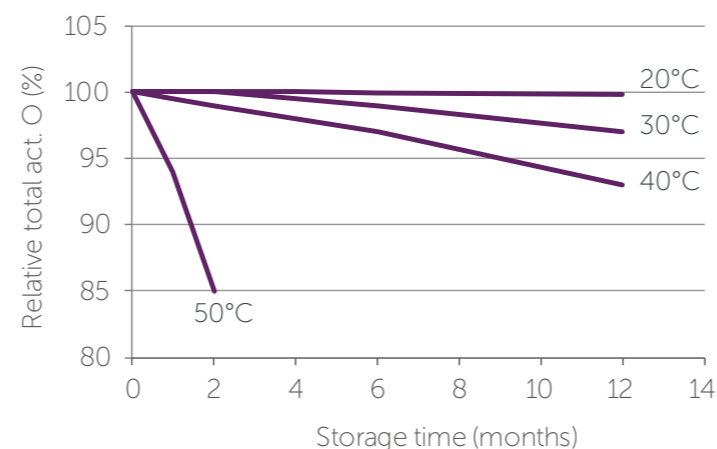
Manufacturing a safe and high-quality Ketone Peroxide with consistent curing performance requires a lot of dedication and attention to detail. From the automated process to the raw materials used through the packaging & quality control systems employed we have mastered the art of producing consistent quality.

Butanox is produced without additives and the absence of polar solvents making Butanox suitable for the most demanding applications.

We pride ourselves on being so reliable in quality that many UP Resin manufacturers use our Butanox as the calibration standard to set the reactivity of their resins.

### Storage stability

The quality composition of Butanox M-50 provides excellent storage stability which supports sales across the globe including areas with high ambient temperatures such as the Middle East. The higher temperatures in certain areas have limited effect on the quality as shown in stability graph below.



When kept according to recommended storage conditions, the products will remain in specifications for an extended time. Even if the product is exposed to slightly higher temperatures for a limited amount of time there is limited influence on the stability. The graph below is representative for Butanox M-50, but not for other competitive MEKP grades on the market.

### Vanishing Red, Seeing is believing

Our Vanishing Red curing systems allows you to monitor the curing process without the disadvantages of red peroxides which stay red. With VR, you can visually monitor curing conditions to improve efficiency and reduce cycle times.

The Vanishing Red series of organic peroxides includes a red indicator system that literally disappears in front of your eyes. The red color vanishes during the cure and is only there when you need it to monitor. When the red color has completely disappeared, it is safe to demold the fully cured part.



Advantages include:

- Monitoring of the cure progress
- Visualize hot (peroxide or resin rich) & cold spots
- Visualize thermal effects (heat sink) from core materials

In addition they

- Initiator presence
- Good mixing
- Helps isolate dead flow zones



Scan QR code to check our video on Vanishing Red

# Main applications of our curing agents

	Ketone peroxides			Ketone peroxide mixtures								Diacyl peroxides					Peroxesters			Peroxyketals				Hydroperoxides				Peroxy(di)carbonates				Others																																				
	CADOX D-50*	CADOX L-30A*	CADOX L-50A*	CADOX M-30A*	CADOX M-50A*	BUTANOX M-50	BUTANOX D-50	BUTANOX L-50	TRIGONOX 44B*	TRIGONOX 44K*	TRIGONOX 63A*	TRIGONOX 178*	TRIGONOX 263*	PERKADOX GB-50L	PERKADOX L-W75	PERKADOX L-W78	TRIGONOX 23-C75	TRIGONOX 141	TRIGONOX 121	TRIGONOX 121-C75	TRIGONOX 21-C50	TRIGONOX 21S	TRIGONOX 131	TRIGONOX 42S	TRIGONOX 93	TRIGONOX C	LAUROX	PERKADOX BC-FF	TRIGONOX 101	TRIGONOX 122-C80	TRIGONOX 29-C75	TRIGONOX 22-C80	TRIGONOX 161-C65	TRIGONOX KSM-C75	TRIGONOX 239	TRIGONOX K-90	TRIGONOX A-W70	PERKADOX 16	PERKADOX 16-GB70	PERKADOX 16-40XPS	TRIGONOX EHP-C75	TRIGONOX EHPTS	PERKADOX 26	TRIGONOX 117	TRIGONOX BPIC-C75	PERKADOX AIBN	PERKADOX AMBN																					
SPECIAL RESINS	cipp													1							1	1	1	1		1										2	1						1																									
	acrylics														1	1	1		3					2		1			1	1	1												1								1	1				1	1											
	vinylesters		1	1				1							1				1		1	1	1	1	1	1	1	1					1								2	1				1	1	1	1	1	1																	
HIGH TEMPERATURE	hot press molding														1	1	1			1		1	1	1	1	1	1	1						1	1	1			3									1				1	1															
	pultrusion														1				1	1	1	1	1	1	1	1	1	1						3	3	3					1											1	1	1														
ELEVATED TEMPERATURES	gelcoats				1				1																			1																						3	3																	
	continuous laminating	1	1			1	1	1	2		1	1									1			2	1	1	1						1	1												1				3																		
	resin transfer molding	1	1				1	1	2		2	2	3	3											1	1	1						1	1	1																																	
	filament winding		1	1				1			3	2	2	2		1										3	3																										1															
	centrifugal casting	1	1	1	1	1	1	1	1	1															3	3																													1													
AMBIENT TEMPERATURE	coatings	1	1			1	1	1	1																			3																										1	1													
	chemical anchors & mine bolts																												2																																							
	body fillers	1	1			1	1	1	1							1																																																				
	gelcoats	1	1	1				1	1																																																											
	polymer concrete & marble	1		1	1	1	1	1	1	1	1	2																																										1	1	1												
	resin transfer molding	1	1	1			1	1	1	1	1	2		3		1	2	2																																			2	1														
	hand lay-up and spray-up	1	1	1	1	1	1	1	1	1						2	3	3																																							2	1										
	page	12	12	12	12	12	12	12	12	12					12	12	12						12	12	12	12	12	13	13	13	13	13	13								13	13										14	14	14				14	14					14	14			14

\* Vanishing Red (VR) and Red versions available on request.  
 Please contact us for advice on the best curing system for your specific application.

1

Industry standard

2

Added value / Special purpose

3

Alternative curing characteristics

# Perkadox<sup>®</sup> GB-50L

—

Our innovative phthalate free  
Benzoyl Peroxide (BPO) powder

- produced in North America
- phthalate free
- typical applications:
  - road marking and flooring
  - pultrusion
  - mine bolts & chemical anchors
  - acrylic composites

**Nouryon**



## Our curing agents

Chemical name [CAS no.]	Assay (%)	Active oxygen (%)	Physical form	Storage temperatures		Half-life temperatures		Activation SADT	temp.	NFPA Class	UN no.	Reactivity	Features
Product name				Ts max. (°C)	Ts min. (°C)	1.0 hr [°C(°F)]	0.1 hr [°C(°F)]	[°C(°F)]	[°C(°F)]				
<b>Methyl ethyl ketone peroxide [1338-23-4]</b>													
CADOX D-50		8.9	solution in TXIB	30 (86)				60 (140)	50 (122)	IIIb*	3105	medium	general purpose MEKP
CADOX L-30A		5.3	solution in TXIB	30 (86)				60 (140)	50 (122)	III*	3107	low	low concentration for summer
CADOX L-50A		8.9	solution in TXIB	30 (86)				60 (140)	50 (122)	IIa*	3105	low	low H <sub>2</sub> O <sub>2</sub> for gel coats & VE resins
CADOX M-30A		5.3	solution in TXIB	30 (86)				60 (140)	50 (122)	III*	3107	medium	low concentration for summer
CADOX M-50A		8.9	solution in TXIB	30 (86)				60 (140)	50 (122)	IIb*	3105	high	fast reactive MEKP
BUTANOX D-50		8.9	solution in DMP/TXIB	30 (86)				60 (140)	50 (122)	IIa*	3105	medium	general purpose MEKP
BUTANOX L-50		8.9	solution in DMP	30 (86)				60 (140)	50 (122)	IIa*	3105	low	low H <sub>2</sub> O <sub>2</sub> for gel coats & VE resins
BUTANOX M-50		8.9	solution in DMP	30 (86)				60 (140)	50 (122)	IIa*	3105	high	fast reactive MEKP
<b>Acetylacetone peroxide [37187-22-7]</b>													
TRIGONOX 44B		4.1	in solvent mixture	30 (86)	-10 (14)			60 (140)	50 (122)	IV, III	3107	high	delayed gel with fast GTP
<b>Ketone peroxide mixtures</b>													
<b>Acetylacetone peroxide and tert-butyl peroxybenzoate [37187-22-7]</b>													
TRIGONOX 44K		3.5	in solvent mixture	30 (86)	-10 (14)			60 (140)	50 (122)	III*	3107	high	modified for through cure
<b>Mixture of methyl ethyl ketone peroxide and acetylacetone peroxide [37187-22-7; 1338-23-4]</b>													
TRIGONOX 63A		6.5	in solvent mixture	30 (86)				55 (131)	50 (122)	III*	3105	high	for balanced gel & GTP
<b>Methyl ethyl ketone peroxide and cumyl hydroperoxide [1338-23-4; 80-15-9]</b>													
TRIGONOX 178		9.1	solution in TXIB	30 (86)				60 (140)	50 (122)	III*	3105	low	for suppressing very high exotherms
TRIGONOX 263		9.0	solution in TXIB	30 (86)				60 (140)	50 (122)		3105	low	for suppressing exotherm
<b>Diacyl peroxides</b>													
<b>Dibenzoyl peroxide [94-36-0]</b>													
PERKADOX GB-50L	50	3.3	powder with ethylene glycol ibenzoate	25 (77)				55 (131)	70 (158)	IIb*	3106	medium	low water
PERKADOX L-W75	75	5.0	suspension in water	40 (104)				80 (176)	70 (158)	IIb*	3104	high	standard granular
PERKADOX L-W78	78	5.2	suspension in water	40 (104)				80 (176)	70 (158)	I	3102	high	granular
<b>Peroxyesters</b>													
<b>tert-Butyl peroxyneodecanoate [26748-41-4]</b>													
TRIGONOX 23-C75	75	4.9	solution in odorless mineral spirits	-10 (14)	-20 (-4)	64 (147)	84 (183)	20 (68)	40 (104)	IIa	3115	high	fast primary, needs cold storage
<b>2,5-Dimethyl-2,5-di(2-ethylhexanoylperoxy)hexane [13052-09-0]</b>													
TRIGONOX 141	90	6.8	liquid	20 (68)	-20 (-4)	86 (187)	106 (223)	35 (95)	60 (140)	IIa	3113	high	primary, good with Br-resins
<b>tert-Amyl peroxy-2-ethylhexanoate [686-31-7]</b>													
TRIGONOX 121	95	6.6	liquid	5 (41)	-20 (-4)	91 (196)	111 (232)	35 (95)	60 (140)	IIa	3115	high	fast secondary, needs colder storage
TRIGONOX 121-C75	75	5.2	solution in odorless mineral spirits	10 (50)		91 (196)	111 (232)	35 (95)	60 (140)	IIa	3115	high	fast phthalate free secondary

\* Cadox & Butanox products are available in RED and Vanishing Red versions

\*\* Estimated from NFPA 400 based on similar formulations

## Our curing agents

Chemical name [CAS no.]	Assay (%)	Active oxygen (%)	Physical form	Storage temperatures		Half-life temperatures		Activation SADT	temp.	NFPA Class	UN no.	Reactivity	Features
Product name				Ts max. (°C)	Ts min. (°C)	1.0 hr [°C(°F)]	0.1 hr [°C(°F)]	[°C(°F)]	[°C(°F)]				
<b>tert-Butyl peroxy-2-ethylhexanoate [3006-82-4]</b>													
TRIGONOX 21-C50	50	3.7	solution in odorless mineral spirits	10 (50)	-30 (-22)	91 (196)	113 (235)	40 (104)	60 (140)	IIb	3117	medium	phthalate free secondary
TRIGONOX 21S	97	7.2	liquid	10 (50)	-30 (-22)	91 (196)	113 (235)	35 (95)	60 (140)	IIa	3113	medium	needs colder storage
<b>tert-Amylperoxy 2-ethylhexyl carbonate [70833-40-8]</b>													
TRIGONOX 131	94	5.8	liquid	20 (68)		113 (235)	134 (273)	55 (131)	60 (140)		3105	medium	high efficiency for HPM
<b>tert-Butyl peroxy-3,5,5-trimethylhexanoate [13122-18-4]</b>													
TRIGONOX 42S	97	6.7	liquid	25 (77)	-20 (-4)	114 (237)	135 (275)	55 (131)	80 (176)	IIa	3105	medium	lowest ambient storage peroxyester
TRIGONOX 42PR	90	6.2	solution with acetylacetone	25 (77)	-20 (-4)				70 (158)	IIa		medium	pre-promoted for elevated ambient cure
<b>tert-Butyl peroxybenzoate [614-45-9]</b>													
TRIGONOX 93	79	6.5	solution with acetylacetone	25 (77)		122 (252)	142 (288)	55 (131)	70 (158)	IIa*	3103	medium	pre-promoted for elevated ambient cure
TRIGONOX C	98	8.0	liquid	25 (77)	10 (50)	122 (252)	142 (288)	60 (140)	80 (176)	IIa	3103	low	standard finishing
<b>Dialkyl peroxides</b>													
<b>Dilauroyl peroxide [105-74-8]</b>													
LAUROX	99	4.0	flakes	30 (86)		79 (174)	99 (210)	50 (122)		IIb	3106	medium	acrylic curing
<b>Dicumyl peroxide [80-43-3]</b>													
PERKADOX BC-FF	99	5.9	crystals	30 (86)		132 (270)	154 (309)	75 (167)		IV	3110	low	olefinic crosslinking
<b>2,5-Dimethyl-2,5-di(tert-butylperoxy)hexane [78-63-7]</b>													
TRIGONOX 101	92	10.1	liquid	40 (104)	10 (50)	134 (273)	156 (313)	80 (176)		IIb	3105	low	olefinic crosslinking
<b>Peroxyketals</b>													
<b>1,1-Di(tert-amylperoxy)cyclohexane [15667-10-4]</b>													
TRIGONOX 122-C80	80	8.9	solution in odorless mineral spirits	30 (86)		106 (223)	126 (259)	55 (131)	70 (158)	IIa	3103	medium	intermediate/finishing
<b>1,1-Di(tert-butylperoxy)-3,3,5-trimethylcyclohexane [6731-36-8]</b>													
TRIGONOX 29-C75	75	7.9	solution in odorless mineral spirits	25 (77)		105 (221)	128 (262)	60 (140)	70 (158)	IIa	3103	low	standard finishing phthalate free
<b>1,1-Di(tert-butylperoxy)cyclohexane [3006-86-8]</b>													
TRIGONOX 22-C80	80	9.8	solution in odorless mineral spirits	25 (77)		113 (235)	134 (273)	60 (140)	70 (158)	IIa	3103	medium	phthalate free for thin parts
<b>Peroxyketal mixtures</b>													
<b>1,1-Di(tert-butylperoxy)cyclohexane and tert-butyl peroxy-2-ethylhexanoate [3006-86-8; 3006-82-4]</b>													
TRIGONOX 161-C65	65	6.8	solution in odorless mineral spirits	10 (50)	-30 (-22)			40 (104)	50 (122)	III*	3113	medium	special blend
<b>Mixture of tert-butyl peroxy-2-ethylhexanoate and 1,1-Di(tert-butylperoxy)-3,3,5-trimethylcyclohexane [3006-82-4; 6731-36-8]</b>													
TRIGONOX KSM-C75	75	6.3	solution in odorless mineral spirits	20 (68)	-20 (-4)			40 (104)	50 (122)	III*	3117	medium	foregiving phthalate free blend for colors

\* Estimated from NFPA 400 based on similar formulations

## Our curing agents

Chemical name [CAS no.] Product name	Assay (%)	Active oxygen (%)	Physical form	Storage temperatures		Half-life temperatures		Activation SADT temp.	NFPA Class	UN no.	Reactivity	Features	
				Ts max. (°C)	Ts min. (°C)	1.0 hr [°C(°F)]	0.1 hr [°C(°F)]						
<b>Hydroperoxides</b>													
<b>Cumyl hydroperoxide (80-15-9)</b>													
TRIGONOX 239	46	4.8	in solvent mixture	25 (77)		166 (331)	195 (383)	55 (131)	135 (275)	III*	3109	medium	pre-promoted CHP for VE resins
TRIGONOX K-90	90	9.5	solution in aromatic solvent mixture	40 (104)	-30 (-22)	166 (331)	195 (383)	70 (158)	135 (275)	III	3109	low	standard CHP
<b>tert-Butyl hydroperoxide [75-91-2]</b>													
TRIGONOX A-W70	70	12.4	solution in water	35 (95)	0 (32)	185 (365)	207 (405)	80 (176)		IV	3109	low	standard for adhesives
<b>1,1,3,3-tetramethylbutyl peroxy-2-ethylhexanoate</b>													
TRIGONOX 421	90	5.87	solution in water	5 (49)	-20 (4)	109 (228)	88 (190)	30 (86)		IIa	3115	medium	for acrylate/methacrylate
<b>Peroxy(di)carbonates</b>													
<b>Di(4-tert-butylcyclohexyl) peroxydicarbonate [15520-11-3]</b>													
PERKADOX 16	96	3.9	powder	20 (68)		64 (147)	82 (180)	40 (104)	40 (104)	I	3114	high	best all around primary
PERKADOX 16-GB70	70	2.81	powder	20 (68)		64 (147)	82 (180)	40 (104)		IIb	3116	high	easy to dissolve powder
PERKADOX 16-40 XPS	40	1.55	paste	20 (68)		64 (147)	82 (180)	45 (113)	40 (104)	IV	3116	high	pumpable paste
<b>Di(2-ethylhexyl) peroxydicarbonate [16111-62-9]</b>													
TRIGONOX EHP-C75	76	3.5	solution in odorless mineral spirits	-15 (5)	-25 (-13)	64 (147)	82 (180)	5 (41)	40 (104)	IIa	3115	high	primary, needs cold storage
TRIGONOX EHPTS	96	4.4	stabilized	-5 (23)		64 (147)	83 (181)	15 (59)	40 (104)		3113	high	safer primary, cold storage
<b>Dimyristyl peroxydicarbonate [53220-22-7]</b>													
PERKADOX 26	96	3.0	flakes	15 (59)		65 (149)	84 (183)	35 (95)	45 (113)	III	3116	high	alternate primary option
<b>tert-Butylperoxy 2-ethylhexyl carbonate [34443-12-4]</b>													
TRIGONOX 117	95	6.2	liquid	20 (68)		117 (243)	137 (279)	60 (140)	80 (170)	IIa	3105	low	higher efficiency
<b>tert-Butylperoxy isopropyl carbonate [2372-21-6]</b>													
TRIGONOX BPIC-C75	75	6.8	solution in odorless mineral spirits	25 (77)	-20 (-4)	117 (243)	137 (279)	70 (158)		IIb	3103	low	most efficient styrene scavenger
<b>Others</b>													
<b>2,2'-Azodi(isobutyronitrile) [78-67-1]</b>													
PERKADOX AIBN	98		solid	25 (77)		82 (180)	101 (214)	50 (122)			3234	high	special purpose azo initiator for acrylics
<b>2,2'-Azodi(2-methylbutyronitrile) [13472-08-7]</b>													
PERKADOX AMBN	98		solid	25 (77)		84 (183)	104 (219)	45 (113)			3236	high	special purpose azo initiator for acrylics

## Auxiliaries

Product name	Chemical name [CAS number]	Assay (%)	Physical form	Standard package
<b>Cobalt-free accelerators</b>				
NOURYACT CF12N	Copper complex [142-71-2]		in solvent mixture	25 kg HDPE can
NOURYACT CF30	Iron complex		in solvent mixture	25 kg HDPE can
NOURYACT CF40	Iron complex		in hydroxyethylmethacrylates (HEMA)	25 kg HDPE can

Auxiliaries may be available upon request.

\* Estimated from NFPA 400 based on similar formulations



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## Additional information

Product Data Sheets (PDS), Safety Data Sheets (SDS) and ISO Certificates are available at [nouryon.com](http://nouryon.com)

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