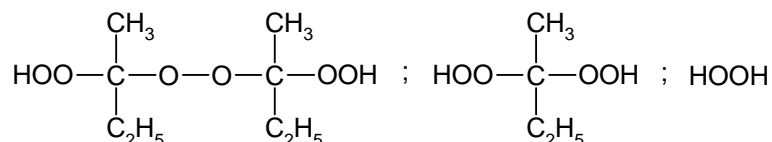


## Butanox<sup>®</sup> M-50 VR

**Product description** Methyl ethyl ketone peroxide in dimethyl phthalate



CAS No. : 1338-23-4  
 EINECS/ELINCS No. : 215-661-2  
 TSCA status : listed on inventory

**Specifications** Appearance : clear liquid  
 Total active Oxygen : 8.8-9.0%

**Characteristics** Density, 20°C : 1.180 g/cm<sup>3</sup>  
 Viscosity, 20°C : 24 mPa.s

**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, Akzo Nobel recommends a maximum storage temperature (T<sub>s</sub> max.) for each organic peroxide product.

For *Butanox* M-50 VR T<sub>s</sub> max. = 25°C

When stored under these recommended storage conditions *Butanox* M-50 VR will remain within the Akzo Nobel specifications for a period of at least three months after delivery.

**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.

For *Butanox* M-50 VR SADT : 60°C

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).

**Major decomposition products** Carbon dioxide, water, acetic acid, formic acid, propionic acid, methyl ethyl ketone.

\* SADT = Self Accelerating Decomposition Temperature

## Packaging and transport

The standard packaging is a 30-liter HDPE can (Nourytainer®) for 25 kg peroxide.

Both packaging and transport meet the international regulations. For the availability of other packed quantities contact your Akzo Nobel representative.

*Butanox M-50 VR* is classified as Organic peroxide type D; liquid; Division 5.2; UN 3105; PG II.

## Safety and handling

Keep containers tightly closed. Store and handle *Butanox M-50 VR* 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 Material Safety Data Sheet (MSDS) for further information on the safe storage, use and handling of *Butanox M-50 VR*. This information should be thoroughly reviewed prior to acceptance of this product.  
The MSDS is available at [www.akzonobel-polymerchemicals.com](http://www.akzonobel-polymerchemicals.com).

## Applications

*Butanox M-50 VR* is a general purpose methyl ethyl ketone peroxide (MEKP) for the curing of unsaturated polyester resins in the presence of a cobalt accelerator at room and elevated temperatures.

*Butanox M-50 VR* offers all the advantages of a standard MEKP i.e. *Butanox M-50*. The *Butanox M-50 VR* includes a vanishing red indicator system that in most cases virtually disappears during cure. The red color is there when you need it i.e. during the mixing step, but will disappear during cure.

The curing system *Butanox M-50 VR*/cobalt accelerator is particularly suitable for the curing of gelcoat resins, laminating resins, lacquers and castings; moreover the manufacture of light resistant parts may be possible contrary to the curing system benzoyl peroxide/amine accelerator.

Practical experience throughout many years has proven that by the guaranteed low water content and the absence of polar compounds in *Butanox M-50 VR*, this peroxide is very suitable in GRP products for e.g. marine applications.

For room temperature application it is necessary to use *Butanox M-50 VR* together with a cobalt accelerator (e.g. Accelerator NL-49P).

## Dosage

Depending on working conditions, the following peroxide and accelerator dosage levels are recommended:

<i>Butanox M-50 VR</i>	1 - 4 phr *
Accelerator NL-49P	0.5 - 3 phr

\* phr = parts per hundred resin

*Cure Characteristics*

In a high reactive standard orthophthalic resin in combination with Accelerator NL-49P (= 1% cobalt) the following application characteristics were determined:

**Gel times at 20°C**

2 phr <i>Butanox</i> M-50 VR + 0.5 phr Acc. NL-49P	12 minutes
2 phr <i>Butanox</i> M-50 VR + 1.0 phr Acc. NL-49P	7 minutes

**Cure of 1 mm pure resin layer at 20°C**

The speed of cure is expressed as the time to reach a Persoz hardness of respectively 30, 60 and 120 s.

	Persoz:	30	60	120	s
2 phr <i>Butanox</i> M-50 VR + 0.5 phr Acc. NL-49P		2.4	4.1	13	h
2 phr <i>Butanox</i> M-50 VR + 1.0 phr Acc. NL-49P		1.7	3.0	9.5	h

**Cure of 4 mm laminates at 20°C**

4 mm laminates have been made with a 450 g/m<sup>2</sup> glass chopped strand mat. The glass content in the laminates is 30% (w/w).

The following parameters were determined:

- Time-temperature curve.
- Speed of cure expressed as the time to achieve a Barcol hardness (934-1) of 0-5 and 25-30 respectively.
- Residual styrene content after 24 h at 20°C and a subsequent postcure of 8 h at 80°C.

	Gel time min.	Time to Peak min.	Peak exotherm °C
2 phr <i>Butanox</i> M-50 VR + 0.5 phr Acc. NL-49P	13	36	44
2 phr <i>Butanox</i> M-50 VR + 1.0 phr Acc. NL-49P	8	26	64

	Barcol		Res. styrene	
	0-5	25-30	24 h 20°C	+ 8 h 80°C
	h	h	%	%
2 phr <i>Butanox</i> M-50 VR + 0.5 phr Acc. NL-49P	3	15	6	0.3
2 phr <i>Butanox</i> M-50 VR + 1.0 phr Acc. NL-49P		1	5	0.1

### Pot life at 20°C

Pot lives were determined of a mixture of *Butanox* M-50 VR and a non pre-accelerated UP resin at 20°C.

2 phr <i>Butanox</i> M-50 VR	12 h
4 phr <i>Butanox</i> M-50 VR	7 h

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