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**Poly Klear**  
FIBERGLASS + RESIN

## Material Safety Data Sheet

### BUTANOX M-50 VR

#### 1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION

**Product Identifier**

Butanox M-50 VR - methyl ethyl ketone peroxide, solution in dimethyl phthalate

**Relevant identified uses of the substance or mixture**

Curing agent.

#### 2. HAZARDS IDENTIFICATION

May cause fire.  
Harmful if swallowed.  
Causes burns.

**GHS classification**

Description	Applicable
Organic peroxide	Type D
Acute toxicity (inhalation)	category 4
Acute toxicity (oral)	category 4
Acute toxicity (dermal)	category 5
Eye irritation	category 1
Skin corrosion/ irritation	category 1B
Aquatic environment, acute	category 3

**Pictogram(s) (GHS)****Signal word/Hazard statement(s) (GHS)**

Code	Description
Signal word: DANGER	
H242.	Heating may cause a fire.
H302.	Harmful if swallowed.
H313.	May be harmful in contact with skin.

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H314.	Causes severe skin burns and eye damage.
H332.	Harmful if inhaled.
H402.	Harmful to aquatic life.

**Precautionary statement(s) (GHS)**

Code	Description
P210.	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P220d.	Keep away from dirt, rust, chemicals in particular.
P234.	Keep only in original container.
P260e.	Do not breathe vapors.
P264a.	Wash hands and contaminated skin thoroughly after handling.
P270.	Do not eat, drink or smoke when using this product.
P271.	Use only outdoors or in a well-ventilated area.
P273.	Avoid release to the environment.
P280d.	Wear protective gloves, eye/face protection and protective clothing.
P301+P330+P331.	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303+P361+P353.	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
P304+P340.	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305+P351+P338.	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310.	Immediately call a POISON CENTER or doctor/physician.
P378d.	Use waterspray, foam, sand, dry chemical powder or CO2 for extinction.
P403+P235.	Store in a well-ventilated place. Keep cool.
P410.	Protect from sunlight.
P501a.	Dispose of contents and container according to local regulation.

**3. COMPOSITION/INFORMATION ON INGREDIENTS**

Information on hazardous ingredients

**Chemical description**

Methyl ethyl ketone peroxide, solution in dimethyl phthalate

**Composition / information on ingredients**

Number	% w/w	CAS-number	Chemical name
1	55 - 70	000131-11-3	Dimethyl phthalate
2	30 - 36	001338-23-4	Methyl ethyl ketone peroxide
3	1 - 5	000078-93-3	Methyl ethyl ketone

**Other information**

Balance: non-hazardous ingredients.

**4. FIRST AID MEASURES**

**Most important symptoms and effects**

Harmful if swallowed. Causes burns. Causes injury to the cornea and eyelids. Risk of serious damage to eyes.

**Description of first aid measures**

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**General**

Call a physician immediately.

**Inhalation**

Move to fresh air, rest, half upright position, loosen clothing. Oxygen or artificial respiration if there is difficulty in breathing. Remove contaminated clothing. Always seek medical attention.

**Skin**

Remove all contaminated clothing immediately. Wash off with plenty of soap and water. Always seek medical advice. Launder clothes before reuse.

**Eye**

Rinse immediately and as long as possible with plenty of water. Eyelids should be held away from the eyeball to ensure thorough rinsing. Always seek medical advice.

**Ingestion**

Rinse mouth with water. Do NOT induce vomiting. Call a physician immediately !

**Indication of any immediate medical attention and special treatment needed**

Symptomatic treatment is advised.

**5. FIRE-FIGHTING MEASURES**

**Extinguishing media**

waterspray, foam, sand, dry chemical powder, Carbon dioxide.

**Unsuitable extinguishing media**

halons.

**Hazardous decomposition / combustion products**

Carbon dioxide, Carbon monoxide, Water, Acetic acid, Formic acid, Propanoic acid, Methyl ethyl ketone

**Protective equipment**

Firefighters must wear fire resistant protective equipment. Wear approved respirator and protective gloves.

**Other information**

Evacuate all non-essential personnel. Extinguish a small fire with powder or carbon dioxide then apply water to prevent re-ignition. Cool closed containers with water. Water used to extinguish a fire should not be allowed to enter the drainage system or water courses. After a fire, ventilate thoroughly the area and soak with water, clean the walls and metallic surfaces.

**Fire and explosion hazard**

CAUTION: reignition may occur. Decomposition under effect of heating (See also Section Hazardous decomposition products). If involved in a fire, it will support combustion. Vapors may form explosive mixtures with air. In case of fire and/or explosion do not breathe fumes.

**6. ACCIDENTAL RELEASE MEASURES**

**Personal precautions**

Do not breathe fumes/vapor. Avoid contact with skin and eyes. For personal protection see Section 8.

**Environmental precautions**

Do not allow to enter drains or water courses.

**Methods and material for containment and cleaning up**

Stop leakage if possible. Eliminate all sources of ignition, and do not generate flames or sparks. Transfer remaining product from leaking container to a clean and suitable container. Cover the remainder with inert absorbent (e.g. vermiculite) for disposal. Keep contents moist. The waste should NOT be confined. Flush surroundings with large amounts of water and soap.

**Other information**

CAUTION: reignition may occur. Vapors are heavier than air and may spread along floors. Vapors may travel to a source of ignition and flash back. Evacuate personnel to safe area.

**7. HANDLING AND STORAGE**

**Precautions for safe handling**

Never weigh out in the storage room. When using do not eat, drink or smoke. Do not pipet by mouth. Do not breathe fumes/vapor. Handle in well ventilated areas. Eliminate all sources of ignition, and do not generate flames or sparks. Keep away from reducing agents (e.g. amines), acids, alkalies and heavy metal compounds (e.g. accelerators, driers, metal soaps). Keep product and emptied container away from heat and sources of ignition. Confinement must be avoided. Avoid contact with skin and eyes.

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Use explosion protected equipment. Keep away from sources of ignition - No smoking. Vapors are heavier than air and may spread along floors.

**Conditions for safe storage**

Store in accordance with local/national regulations. Keep away from food, drink and animal feedingstuffs. Store in a dry well ventilated place away from sources of heat and direct sunlight. Keep only in the original container. Keep container upright to prevent leakage. Keep container upright to prevent leakage.

**Storage**

For maximum quality store below: 25 °C.

**Other information**

It is recommended to use electrical equipment of temperature group T3. However, autoignition can never be excluded. Wash hands thoroughly after handling or contact. Keep work clothes separate and do not take them home.

**8. EXPOSURE CONTROLS/PERSONAL PROTECTION****Control parameters**

Ensure good ventilation and local exhaustion of the working area. Explosion proof ventilation recommended.

**Personal protection****Respiratory**

In case of insufficient ventilation wear suitable respiratory equipment (respirator with Filter AX).

**Hand**

Wear suitable protective gloves of neoprene or synthetic rubber.

**Eye**

Wear eye/face protection.

**Skin and body**

Wear suitable protective clothing.

**Other information**

Laundry clothes before reuse. Emergency-shower and facilities for rinsing eyes must be accessible.

**Methyl ethyl ketone**

Short Term Exposure Limit (STEL)

600 mg/m<sup>3</sup>

Time Weighted Average (TWA)

300 mg/m<sup>3</sup>

**9. PHYSICAL AND CHEMICAL PROPERTIES****Appearance**

clear liquid

**Color**

red

**Odor**

faint

**Boiling point/range**

not applicable (Decomposes)

**Melting point/freezing point**

Solidifies at or below -10 °C

**Flash point**

Above the SADT value

**Flammability**

Decomposition products may be flammable

**Explosive properties**

no.

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**Oxidizing properties**

not applicable

**Vapor pressure**

not determined

**Density**1180 kg/m<sup>3</sup> (20°C)**Bulk density**

not applicable

**Solubility in water**

slightly Miscible (20°C)

**Solubility in other solvents**

Miscible with phthalates (20°C)

**pH value**

weak acid

**Partition coefficient n-octanol/water**

not determined

**Relative vapor density (air=1)**

not determined

**Viscosity**

approx. 20 mPa.s (20°C)

**Active oxygen content**

6.0-9.9 %

**Peroxide content**

30-36 %

**Autoignition temperature**

Test method not applicable. (See Section 7)

**SADT**

60 °C. See also Section 10.

**Upper/lower flammability or explosive limits**

not determined

**Specific conductivity**

not determined

**10. STABILITY AND REACTIVITY****Chemical stability**

SADT(Self accelerating decomposition temperature): 60 °C.

SADT is the lowest temperature at which self accelerating decomposition may occur with a substance in the packaging as used in transport.

A dangerous self-accelerating decomposition reaction and, under certain circumstances, explosion or fire can be caused by thermal decomposition at and above the SADT

Contact with incompatible substances can cause decomposition at or below the SADT.

**Conditions to avoid**

To maintain quality store in original closed container below: 25 °C.

Avoid shock and friction. Confinement must be avoided.

**Incompatible materials**

Avoid contact with rust, iron and copper. Contact with incompatible materials such as acids, alkalies, heavy metals and reducing agents will result in hazardous decomposition. Do not mix with peroxide accelerators. Use only Stainless steel 316, PP, polyethylene or glass-lined equipment. Contact Akzo Nobel for more information.

**Hazardous decomposition products**

Water, Acetic acid, Formic acid, Propanoic acid, Methyl ethyl ketone

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**Other information**

Emergency procedures will vary depending on conditions. The customer must have an emergency response plan in place. Contact Akzo Nobel for assistance with developing an emergency response plan.

**11. TOXICOLOGICAL INFORMATION**

No experimental toxicological data on the preparation as such available. The following data are applicable to the ingredient(s) listed below.

**Dimethyl phthalate****Acute toxicity****Oral LD50**

rat: &gt;2400 mg/kg

**Dermal LD50**

rabbit: &gt;10.000 mg/kg

**Inhalation LC50**9300 mg/m<sup>3</sup> (6.5 hours)**Irritation****Skin**

Mildly irritating

**Eye**

Minimally irritating

**Methyl ethyl ketone peroxide, 40 % in Dimethyl phthalate****Acute toxicity****Oral LD50**

rat: 1017 mg/kg

**Dermal LD50**

rat: 4000 mg/kg

**Inhalation LC50**

rat: 17 mg/l; 4 hours exposure time

**Irritation****Skin**

Corrosive

**Eye**

Corrosive

**Sensitization**

Not sensitizing

**Genotoxicity**

Ames test: Not mutagenic

**Methyl ethyl ketone****Acute toxicity****Oral LD50**

rat: 2737 mg/kg

**Dermal LD50**

rabbit 6480 mg/kg

**Inhalation LC50**rat 23.5000 mg/m<sup>3</sup>**Irritation****Skin**

Moderately irritating

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## 12. ECOLOGICAL INFORMATION

No experimental ecological data are available on the preparation as such. The following data are applicable to the ingredient(s) listed below.

**Dimethyl phthalate****Ecotoxicity****fish**

Lepomis macrochirus: 96h-LC50: 420 ppm

**algae**

Sclerodermis capricornutum: 39.8 mg/l ( 96h-IC50 )

**Fate****Degradation Biotic**

Readily biodegradable.

**Other information**

Bio Concentration Factor (BCF) fish 5.4 (24 hours )

**Methyl ethyl ketone peroxide, 40 % in Dimethyl phthalate****Ecotoxicity****fish**

Acute toxicity, 96h-LC50 = 44.2 mg/l. ( Poecilia reticulata.)

**bacteria**

Activated sludge respiration inhibition test EC50 = 48.0 mg/l.

**Fate****Degradation Biotic**

Readily biodegradable ( Closed bottle test ).

**Methyl ethyl ketone****Ecotoxicity****fish**

Lepomis macrochirus: 96h-LC50: 3.22 g/l

**Fate****Degradation Biotic**

Readily biodegradable.

**Other information**

Naturally occurring substance

## 13. DISPOSAL CONSIDERATIONS

**Product**

Waste disposal in accordance with regulations (most probably controlled incineration).

**Contaminated packaging**

According to local regulations.

**Other information**

For further advice contact manufacturer.

## 14. TRANSPORT INFORMATION

**Land transport****Transport hazard class**

5.2

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<b>Packing group</b> II
<b>UN number</b> 3105
<b>Proper Shipping Name</b> Organic peroxide, type D, liquid; ( Methyl ethyl ketone peroxide.)
<b>Required labels</b> 5.2

<b>Sea transport (IMO / IMDG-code)</b>
<b>Transport hazard class</b> 5.2
<b>UN number</b> 3105
<b>EMS</b> F-J, S-R
<b>Marine pollutant</b> no
<b>Proper Shipping Name</b> Organic peroxide type D, liquid; ( Methyl ethyl ketone peroxide (s) )
<b>Other information</b> Label(s); 5.2

<b>Air transport (ICAO-TI / IATA-DGR)</b>
<b>UN number</b> 3105
<b>Transport hazard class</b> 5.2
<b>Proper Shipping Name</b> Organic peroxide type D, liquid; ( Methyl ethyl ketone peroxide (s) )
<b>Other information</b> Label(s); 5.2

**15. REGULATORY INFORMATION**

<b>Product label name</b> Methyl ethyl ketone peroxide, solution in dimethyl phthalate
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<b>Hazard classes</b>	
<b>Description</b>	<b>Applicable</b>
Chinese classification	This product is classified CORROSIVE in accordance with "Chinese regulation of classification and labeling of dangerous chemicals"(GB 13690-92).
Chinese classification	This product is classified POISON in accordance with "Dangerous Chemicals List" .
Chinese classification	This product is classified ORGANIC PEROXIDE in accordance with "Chinese regulation of classification and labeling of dangerous chemicals"(GB 13690-92).
Dangerous Chemical Regulation	Regulation on the Safety Management of Hazardous Chemicals (take effect from December 1, 2011) gives out the corresponding requirements on dangerous chemicals in the areas of safe production, use, storage, transportation, load and unload etc..

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R(isk) phrase(s) (EU classification)	
Code	Description
R07.	May cause fire.
R22.	Harmful if swallowed.
R34.	Causes burns.

S(afety) phrase(s) (EU classification)	
Code	Description
S03/07.	Keep container tightly closed in a cool place.
S14B.	Keep away from reducing agents (e.g. amines), acids, alkalies and heavy metal compounds (e.g. accelerators, driers, metal soaps).
S36/37/39.	Wear suitable protective clothing, gloves and eye/face protection.
S45.	In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S50D.	Do not mix with peroxide-accelerators or reducing agents.

## Classification according to 67/548/EC as ammended

CORROSIVE (C)	OXIDIZING (O)

## Other information

Substance and/or product listed in Directive 96/82/EC.

## 16. OTHER INFORMATION

Relevant hazard statements		
Chemical name	Hazard statement(s) (GHS-classification)	

History
Date of printing/ pdf file generated 2014/01/21
Revision 0.06
Composed by Regulatory Affairs - Europe

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**Changes were made in section**

**3 ( EEA (European Economic Area): Classification), 8 ( EEA (European Economic Area) )**

This information only concerns the above mentioned product and does not need to be valid if used with other product(s) or in any process. The information is to our best present knowledge correct and complete and is given in good faith but without warranty. It remains the user's own responsibility to make sure that the information is appropriate and complete for his special use of this product.

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*The data and information contained in this Material Safety Data Sheet is provided to the best of our knowledge and ability on existing hazards, properties and handling of this product as recommended. It is recommended that the user tests the product according to its purpose. The user is responsible for the proper, safe and lawful use of this product. The information contained in this MSDS is subject to change without further notice. © 20*

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## TECHNICAL DATA SHEET

### Butanox® M-50 VR

#### Product description

Butanox M-50 VR - 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, AkzoNobel 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 AkzoNobel specifications for a period of at least 6 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

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### Packaging and transport

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 AkzoNobel 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.

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

\* phr = parts per hundred resin

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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 Butanox M-50 VR + 0.5 phr Acc. NL-49P	12 minutes
2 phr Butanox 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 Butanox M-50 VR + 0.5 phr Acc. NL-49P		2.4	4.1	13	h
2 phr Butanox 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 Butanox M-50 VR + 0.5 phr Acc. NL-49P	13	36	44
2 phr Butanox M-50 VR + 1.0 phr Acc. NL-49P	8	26	64

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

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#### 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 *Butanox* M-50 VR  
4 phr *Butanox* M-50 VR

12 h  
7 h

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