

Butanox® M-60

Product description

Methyl ethyl ketone peroxide, solution in dimethyl phthalate

CAS No. : 1338-23-4 EINECS/ELINCS No. : 215-661-2

TSCA status : listed on inventory

Specifications

Appearance : Clear and colorless liquid

Total active oxygen : 9.8-10.0%

Characteristics

Density, 20°C : 1.170 g/cm³ Viscosity, 20°C : 25 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_s max.) for each organic peroxide product.

For Butanox M-60 T_s max. = 25°C

When stored under the recommended storage conditions, *Butanox* M-60 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-60 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.

Packaging and transport

The standard packaging is a 30 I HDPE can (Nourytainer®) for 30 kg peroxide solution.

In Asia Pacific the standard packaging is a 30 I HDPE can for 20 kg peroxide solution.

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

Butanox M-60 is classified as Organic peroxide type D; liquid; Division 5.2; UN 3105.

Applications

Butanox M-60 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-60 is a 10% higher concentrated version of Butanox M-50.

The curing system *Butanox* M-60/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-60, this peroxide is very suitable in GRP products for e.g. marine applications.

For room temperature application it is necessary to use *Butanox* M-60 together with a cobalt accelerator (e.g. Accelerator NL-49P).

Dosage

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

Butanox M-60 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-60 + 0.5 phr Acc. NL-49P	10 minutes
2 phr <i>Butanox</i> M-50 + 0.5 phr Acc. NL-49P	12 minutes
2 phr <i>Butanox</i> M-60 + 1.0 phr Acc. NL-49P	6 minutes
2 phr <i>Butanox</i> M-50 + 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-60 + 0.5 phr Acc. NL-49P 2 phr <i>Butanox</i> M-50 + 0.5 phr Acc. NL-49P		3.8 4.1		h h	
2 phr <i>Butanox</i> M-60 + 1.0 phr Acc. NL-49P 2 phr <i>Butanox</i> M-50 + 1.0 phr Acc. NL-49P		2.5 3.0	9 9.5	h h	

Cure of 4 mm laminates at 20°C

4 mm laminates have been made with a 450 g/m² 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 Peal min.	k	Peak exotherm °C	
2 phr <i>Butanox</i> M-60 + 0.5 phr Acc. NL-49P 2 phr <i>Butanox</i> M-50 + 0.5 phr Acc. NL-49P	13 13		33 36		50 44	
2 phr <i>Butanox</i> M-60 + 1.0 phr Acc. NL-49P 2 phr <i>Butanox</i> M-50 + 1.0 phr Acc. NL-49P	7 8		23 26		71 64	
		arcol 25-30		24 h	Res. styrene 24 h + 8 h 20°C 80°C	
	h	h		%	%	
2 phr <i>Butanox</i> M-60 + 0.5 phr Acc. NL-49P 2 phr <i>Butanox</i> M-50 + 0.5 phr Acc. NL-49P	2	13 15		5.7 6	0.3 0.3	

Pot life at 20°C

Pot lives were determined of a mixture of *Butanox* M-60 and a non-preaccelerated UP resin at 20°C.

2 phr *Butanox* M-60 10 h 4 phr *Butanox* M-60 6 h

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