

SUPEROX[®] 46-731

DESCRIPTION

Superox[®] 46-731 is a clear solution of acetyl acetone peroxide (AAP), or 2, 4-Pentanedione peroxide in a phlegmatizer. Superox[®] 46-731 is a very effective polymerization initiator for the room temperature cure of unsaturated polyester resins and gives exceptionally fast cure times without significantly affecting gel times in most resin systems. This performance characteristic is especially beneficial in resin transfer molding (RTM), cast polymers, and other applications requiring fast mold turnaround for production efficiencies.

Superox[®] 46-731 has the added advantage of being a low fire or explosion hazard. In the U.S., the precautionary organic peroxide yellow label is not required for shipping.

TYPICAL PROPERTIES

Active Oxygen	4.4 %, min.
Form	Liquid
Color	Water white to straw
Specific Gravity	1.15
Viscosity	16.0 cps
Flash Point (SETA C.C.)	150°F / 66°C, min.
Insoluble in	Aromatic, chlorinated, and aliphatic hydrocarbons
Soluble in	Water, ethers, ketones, and alcohols

APPLICATION

Superox[®] 46-731 is an extremely effective initiator for an accelerated cure without significantly shortening the gel time in many resin systems. Superox[®] 46-731 is best suited for singly promoted resins using cobalt promotion alone. Levels of cobalt (naphthenate or octoate in 6% solutions) should be in the range of 0.1 to 0.5%. In some cases, the addition of 0.1% to 0.3% diethyl- or dimethylaniline speeds the resin further and gives extremely high exothermic cures. The resin inhibitor type and the level also have an important effect on the performance of Superox[®] 46-731. In general, high inhibitor levels are usually not desirable, and some quaternary ammonium salts can cause significantly yellowing of the resin. Also, quaternary ammonium compounds can have an inhibiting affect on the resin system gel and cure properties.

APPLICATION RESULTS

Tables I & II demonstrate results that can be obtained using Superox[®] 46-731 compared to a standard MEKP formulation.

TABLE I

Gel & Cure Data – Marble Resin
10g mass with 1% Peroxide @ 77°F/ 25°C
Cure defined as 10 (935 Impressor)

	Time (min)			935 / 934 Hardness				
	<u>Gel</u>	<u>Gel to Cure</u>	<u>Peak Exotherm</u> ⁽¹⁾	<u>1 hr</u>	<u>2 hrs</u>	<u>3 hrs</u>	<u>4 hrs</u>	<u>24 hrs</u>
Superox [®] 46-701	15.6	70	292°F	0(5)	20(5)	60(5)	70(5)	16(4)
Superox [®] 46-731	15.6	10	300°F	32(4)	34(4)	36(4)	37(4)	38(4)

⁽¹⁾ 100g Mass @ 77°F

TABLE II

Gel & Cure Data – Laminating Resin
10g mass with 1% Peroxide @ 77°F/ 25°C
Cure defined as 10 (935 Impressor)

<u>Product Name</u>	Time (min)			935 / 934 Hardness				
	<u>Gel</u>	<u>Gel to Cure</u>	<u>Peak Exotherm</u> ⁽¹⁾	<u>1 hr</u>	<u>2 hrs</u>	<u>3 hrs</u>	<u>4 hrs</u>	<u>24 hrs</u>
Superox [®] 46-701	8.0	80	356°F	15(5)	41(5)	43(5)	61(5)	14(4)
Superox [®] 46-731	7.0	34	345°F	53(4)	65(5)	69(5)	69(5)	18(4)

⁽¹⁾ 100g Mass @ 77°F

While Superox[®] 46-731 is a very effective initiator when used by itself, this peroxide is often used in combination with standard MEKP formulations. This blend will give intermediate results between the two products, depending on the mixing ratio. Tables III & IV compare gel and cure properties of several AAP/MEKP mixtures in cast polymer and laminating resins.

TABLE III

Gel & Cure Data – Onyx Resin
120g mass (33% resin/ 67% filler)
2% Peroxide @ 77°F/ 25°C
Cure defined as 10 (935 Impressor)

<u>Product Name</u>	Time (min)			935 / 934 Hardness			
	<u>Gel</u>	<u>Gel to Cure</u>	<u>Peak Exotherm</u> ⁽¹⁾	<u>3 hrs</u>	<u>4 hrs</u>	<u>5 hrs</u>	<u>24 hrs</u>
Superox [®] 46-701	32.9	177	89°F	0(5)	10(5)	31(5)	40(4)
Superox [®] 46-731	31.9	88	101°F	40(5)	55(5)	13(4)	45(4)
(3:1) MEKP/46-731	28.5	110	97°F	30(5)	50(5)	55(5)	42(4)
(1:1) MEKP/46-731	29.7	100	97°F	46(5)	59(5)	10(4)	45(4)

⁽¹⁾ 100g Mass @ 77°F

TABLE IV

Gel & Cure Data – Laminating Resin
 20g mass with 1% Peroxide @ 77°F/ 25°C
 Cure defined as 10 (935 Impressor)

<u>Product Name</u>	<u>Time (min)</u>		<u>935 / 934 Hardness</u>				
	<u>Gel</u>	<u>Gel to Cure</u>	<u>2 hrs</u>	<u>3 hrs</u>	<u>4 hrs</u>	<u>5 hrs</u>	<u>24 hrs</u>
Superox [®] 46-701	14.8	76	38(5)	58(5)	64(5)	8(4)	27(4)
Superox [®] 46-731	10.5	16	66(5)	10(4)	12(4)	20(4)	30(4)
(3:1) MEKP/46-731	13.1	53	58(5)	1(4)	5(4)	12(4)	30(4)
(1:1) MEKP/46-731	11.8	32	62(5)	5(4)	9(4)	15(4)	30(4)

The resins tested in the preceding tables were selected to demonstrate the advantages that can be gained through the proper use of Superox[®] 46-731. While similar results can be expected for many of the unsaturated resins and applications, there will be resins in which the use of this initiator provides minimal advantages. Therefore, it is essential that Superox[®] 46-731 be evaluated on a small scale before full production use.

SUPEROX[®] 46-731

STORAGE

- Storage at 80°F or below is recommended. Storage below 70°F is recommended for maximum shelf life.
- Store in original containers **away** from flammables and all sources of heat, sparks, or flames; out of direct sunlight; and **away** from **cobalt naphthenate**, other promoters, accelerators, oxidizing or reducing agents and strong acids or bases.
- **Leaking containers** – Remove and isolate in a safe area. Re-package or dispose immediately (see **spills**).
- **Never** store in refrigerators containing food and/or beverages.
- Consult National Fire Protection Association (NFPA) Code 432 and/or local regulatory agencies.
- Rotate stock, use oldest date first.

HANDLING

- Inform all personnel of procedures for safe handling and review MSDS with them.
- Remove from storage area only the amount needed for one shift.
- Wear safety glasses or goggles and chemical resistant gloves.
- Keep away from heat, flames, and sparks.
- Avoid breathing vapors.
- Dilution is not recommended. Never dilute with acetone.
- **Never** add peroxides directly to promoters or vice-versa, violent decomposition can occur.
- Prevent contamination such as contact with dust, over spray, wood, and combustible material.
- Avoid contact with materials other than polyethylene, polypropylene, Teflon®, Tygon®, or similar materials, glass or glass-lined steel, and 304 or 316 stainless steel or equivalent.

FIRST AID

- EYES – Flush immediately with large amounts of fresh water and continue washing for at least 15 minutes. **Medical attention is needed.**
- SKIN – Wash with soap and water.
- INGESTION – Administer large amounts of milk or water and call a physician immediately. Do not induce vomiting. As an aid to the physician, suggest calling your local Poison Control Center.

SPILLS

- Clean up immediately by absorbing with inert material – vermiculite or sand.
- After absorbing, moderately wet immediately with water and place in a clean plastic bag inside a plastic pail.
- Dispose of immediately in accordance with local, state, and federal regulations.
NOTE: Spilled peroxides, if not immediately cleaned up, can become contaminated and ignite or decompose in a hazardous, violent manner.

FIRE

- 46-731 is difficult to ignite, but will burn.
- Use water from a safe distance – preferably with a water-fog nozzle.
- For very small fires, an extinguisher with carbon dioxide, foam, or dry chemical may be effective.
- In case of fire in or near a storage area, cool stored containers with water spray.

PACKAGING, SHIPPING & AVAILABILITY

- The standard package sizes of Superox[®] 46-731 are cases of 4x8 lb. and 4x4 kg polyethylene bottles; and 40 lb. or 20 kg Hedpacks. For custom package sizes, please contact your local distributor or Syrgis Performance Initiators, Inc.
- Classification – Please refer to the specific Superox[®] 46-731 Material Safety Data Sheet under section 14, Shipping Description. Superox[®] 46-731 is available through a nation-wide distributor network. Call Syrgis Performance Initiators, Inc. for the name of the distributor in your area.
NOTE: MSDS's for all our products may be requested thru the website www.syrgisperformanceinitiators.com

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