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SIGMA CAT – AMINE CATALYSTS

Purpose

Sigma Cure and Biocure phenolic urethane cold box systems use vaporized amine as the catalyst which initiates reaction between the phenolic resin and an isocyanate resin, to form a urethane polymer. TEA (triethylamine), DMIPA (dimethylisopropylamine) and DMEA (dimethylethylamine) are used in the vapor form as catalysts in this process.

Characteristics

These amine catalysts are corrosive, flammable, alkaline liquids and need to be stored and used with the proper precautions. All tertiary amines have a very distinct and strong ammonia-like odor. The OSHA PEL (Permissible Exposure Limit) for TEA is 25 parts per million (PPM). There is currently no established level for DMIPA or DMEA.

Given below are typical physical properties for the three catalysts.

Typical Properties	Sigma Cat 2185 (TEA)	Sigma Cat 2190 (DMIPA)	Sigma Cat 2195 (DMEA)
Specific Gravity (g/cc)	0.73	0.72	0.66
Density (lbs/gal)	6.08	6.00	5.50
Flash Point (°F, TCC)	-20	-16	-50
Purity (%)	>99.0	>99.0	>99.0
Water (%)	<0.2	<0.2	<0.2
OSHA PEL (ppm)	25	Not Established	10 recommended; Not established

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Performance Characteristics

Sigma Cat 2185 (TEA)	Sigma Cat 2190 (DMIPA)	Sigma Cat 2195 (DMEA)
Lower Cost	Faster Cure	Fastest Cure
Low Odor	Lowest Odor	Better cure of difficult low permeability cores

Rate of Usage

Rate of use of these catalysts will vary with core configuration, which can range from bulky to thin and delicate. For this reason, general rules of use are normally based on weight of core. For TEA, a typical operation will use between 2-5 lbs. of catalyst per ton of sand. For DMEA, which is a faster curing catalyst, a typical operation will use between 1-3 lbs. of catalyst per ton of sand. DMIPA falls between these two ranges. For any of the catalysts, higher amounts will be necessary for thin, delicate cores with lesser amounts needed for thicker cores.

Precautions for Use and Storage of Amines

The following minimum precautions are recommended when handling TEA, DMIPA and DMEA:

- Read and understand the MSDS (Material Safety Data Sheets) before handling the material.
- Handle amines with care. Avoid leaks and spills.
- Keep the product away from heat, sparks, direct flame and oxidizing agents.
- Do not store in direct sunlight.
- Avoid contact with eyes, skin and clothing.
- Wear protective butyl rubber gloves, boots, apron and chemical face shield if there is any possibility of amines contacting the body.
- Maintain appropriate respiratory protective equipment near storage and use areas, i.e., an approved air supplied or self-contained breathing apparatus. Always use this equipment when cleaning up spills and when cleaning or repairing storage tanks.
- When not in use, keep containers closed.

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Precautions cont'

- The amine vapors are heavier than air and tend to flow and collect in low areas. Ventilation should maintain the level of airborne contaminants below the (PEL) values.
- Avoid exposure to vapor.
- Wash thoroughly after handling.
- Wash clothing thoroughly before reuse.
- In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. CALL A PHYSICIAN
- In case of fire, use alcohol foam, dry chemical or CO₂
- In case of a small spill, contain spill. Neutralize with sodium bisulphate and spray with water.
- Use only vapor proof lighting fixtures and spar-proof electrical equipment in storage and use areas.
- Use non-sparking tools. Avoid sparks from any source. Use ground wires on all transfer equipment.

NOTE: Copper and copper containing alloys, i.e. brass or bronze, should not be used with amine catalysts.

Safe Handling of Bulk Cylinders

Although TEA, DMIPA and DMEA cylinders are delivered non-pressurized, except for any pressure resulting from vaporization of the volatile amine, they are typically pressurized during use. Pressurized cylinders can be dangerous and special safety precautions are needed. For example a pressurized cylinder can turn into a missile if the cylinder valve is broken off. The following suggestions will reduce the associated hazards.

- Store cylinders outdoors and out of direct sunlight whenever possible.
- Store cylinders in well ventilated areas.
- Keep the cylinder valves closed when not in use.
- Keep the cylinders away from heat, sparks and oxidizing agents.
- Treat all cylinders as if they are pressurized at all times.
- Use ground wires on all transfer equipment.

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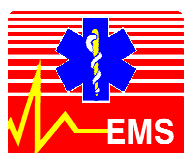
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Safe Handling of Bulk Cylinders cont'

- Use non-sparking tools. Avoid sparks from any source.
- Do not remove the 2" bung.
- Use nitrogen to pressurize the cylinder.
- Relieve pressure when the cylinder is empty.

Packaging

HAI Product Name	Manufacturing Facility	HAI Cylinder Item Code	Cylinder Weight (lbs)	HAI Drum Item Code	Drum Weight (lbs)
Sigma Cat 2185 (TEA)	Chicago Heights, IL	323240	650	323541	330
Sigma Cat 2190 (DMIPA)	Chicago Heights, IL	340002	618	340003	309
Sigma Cat 2195 (DMEA)	Chicago Heights, IL	337307	572	337308	286



**For Emergency Medical Assistance Please Call:
Health & Safety Information Services: 1-866-303-6949**

For additional health and safety or regulatory information, call 630-575-5722 or 630-575-5705.

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