

For greater precision use... **PETRO BOND**®

You get smoother finishes and closer tolerances in aluminum, magnesium, bronze, silicon bronze, manganese bronze, and brass castings when you use PETRO BOND bonding agent.

Why PETRO BOND?

- Foundrymen using PETRO BOND bonding agent are obtaining greater precision in their castings.
- PETRO BOND sands are reusable again and again with only infrequent re-mulling and re-bonding, resulting in greater profits.
- PETRO BOND is a formulated bonding agent, bonding sand with oil instead of water.
- Less gas is formed permitting use of finer sands with lower permeability. PETRO BOND gives a finer finish.
- PETRO BOND produces near die cast quality casting with green sand practice.
- PETRO BOND is ideal for limited run or one-of-a-kind casting.
- Ideal for pattern shop use. You can count on precision castings using ordinary foundry equipment when you use PETRO BOND.

COVER PHOTO courtesy of Tazewell Machine Works;
2015 South Second Street; Pekin, Illinois 61554.

The History of PETRO BOND

Bentonite Corporation recognized the need for a method of producing precision castings using equipment and skills found in green sand foundries. Die casting requires high volumes and continuing markets. Water bonded sands just did not give the finish required. Using organophilic clay technology developed and patented by Bentonite Corporation, PETRO BOND was developed in foundries, for foundries, by foundries.

The key to its success is the use of oil as the tempering agent instead of water. The excellent reducing atmosphere results in an exceptional finish. Additionally, water expands to 80 times its original volume when turning to steam, while oil develops a much lower volume increase when vaporizing. This allows the use of fine sands without the problems associated with reduced permeability.

In 1987, a second product, PETRO BOND® II bonding agent, was introduced. PETRO BOND II does not require P-1 Catalyst as a separate ingredient and develops more green strength in shorter mull cycles than the original PETRO BOND. Both products are produced and inventoried for the individual foundry customer preference.

What Is A PETRO BOND Sand?

A PETRO BOND sand consists of a mulled mixture of sand, oil, PETRO BOND bonding agent, and a small amount of P-1 Catalyst*. PETRO BOND sand contains oil instead of water and needs less, if any, venting. The amount and type of oil used creates considerably less gas than is created in ordinary water sands. This permits the use of much finer sands with lower permeability than allowable with water sand molds. The result - precision castings using ordinary foundry equipment!

How It Benefits You!

1. **PETRO BOND and PETRO BOND II are economical to use.** Do not look at the price of PETRO BOND per pound, look at the finishing cost of your castings. Finishing is one of your most expensive cost centers. If PETRO BOND reduces your finishing costs and your scrap, it will be less expensive than clays. Properly used, PETRO BOND will reduce your cost per ton poured due to savings in finishing and scrap. Only moderate maintenance of heap or system sand is required.

*P-1 Catalyst is not required for PETRO BOND II

2. **No new equipment investment.** If you mull sand, if you produce castings, you have everything you need.
3. **PETRO BOND sands are reusable.** Depending upon alloy poured and sand to metal ratio, only moderate maintenance of heap or system sand is required.

Catalyst

P-1 Catalyst speeds and enhances the development of green strength in PETRO BOND sands. It is not required when PETRO BOND II is used.

How To Use PETRO BOND in Preparing A Mold

Sand

The type and grade of sand has an important effect upon the physical properties and surface finish of the casting. Silica sands with a clay content below .5% give very good results. Sand with a high natural clay content produce less desirable results and should be avoided. The reason for this is the ability of the clay to absorb water, oil, and PETRO BOND and then release it upon contact with the metal, preventing the development of optimum green strength.

Use of a finer grained silica or olivine sand promotes a smoother casting surface with greater detail. A grain fineness number of 120 to 180 has been used successfully in research laboratories and commercial foundries for casting aluminum and copper base alloys. Coarser sands should be used for casting higher melting temperature alloys and when producing relatively heavy castings to prevent penetration.

Selection of the right sand is very important. Many commercial foundries have indicated this to be a primary source of trouble. The sand is reusable. The only sand loss on reuse is a small portion adhering to the casting. The use of a dried premium quality silica or olivine is advisable because trouble-free operation is assured.

Oil

One of the most important ingredients in making a good PETRO BOND sand is the oil. Special petroleum oils are available for this purpose. Oils containing inhibitors, such as specialized industrial oils and lubricating oils, are not recommended as they may interfere with the PETRO BOND reaction.

Suitable, conventionally refined oils without inhibitors can be obtained from your local Bentonite Corporation distributor. Bentonite Corporation maintains a list of suitable oils available from your local oil company jobber. Qualifying suitable oils is a continuing process, and it is recommended that you consult your Bentonite Corporation foundry products distributor for their recommendations on the oil most suitable for use in your foundry.

A Typical Mix

In order to prepare a typical mix, add the following materials in the sequence shown:

PETRO BOND	PETRO BOND II
100 lb. dried silica sand	100 lb. dried silica sand
5 lb. PETRO BOND	5 lb. PETRO BOND II
2 lb. PETRO BOND Oil	2 lb. PETRO BOND Oil
1 oz. P-1 Catalyst	P-1 Catalyst not required

It is recommended that all ingredients be carefully weighed.

PETRO BOND Mixing Procedure

1. Weigh 100 lb. sand and 5 lb. PETRO BOND into the muller. Mull dry for 30 seconds.
2. Add 2 lb. PETRO BOND Oil (about 2 pints) to the muller. Mull 3 minutes.
3. Add 1 oz. P-1 Catalyst. Mull 8 minutes. Sand is now ready to use.

PETRO BOND II Mixing Procedure

1. Weigh 100 lb. sand and 5 lb. PETRO BOND II into the muller. Mull dry for 30 seconds.
2. Add 2 lb. PETRO BOND Oil (about 2 pints) to the muller. Mull 6 minutes. Sand is now ready for use.

Mixing

The sand mixture should be mixed in a sand muller. The time of mixing varies with the type of muller used and can be determined by varying the mixing time until the desired strength is obtained. The mix can then be stored indefinitely and will be usable at any time without further treatment.

Figure I indicates that the green strength continually increases with mulling time. Over 85% of the maximum green strength is achieved in 6 to 11 minutes of mulling depending upon PETRO BOND or PETRO BOND II usage (12.0 psi being considered maximum).

If this mix results in stronger sand than desired, it may be cut with clean sand.

As the sand is used, it may become contaminated with coarse particles of core sand. If this contamination proceeds to the point where the overall percentage of fines in the sand is noticeably reduced, it is advisable to add iron oxide during one of the re-mulling cycles. Such additions help restore the correct balance between fines and coarser sand. The usual procedure is to add the iron oxide at the rate of one to two pounds per 100 pounds of sand. This addition will also result in a tougher but drier sand. It may then be necessary to add additional oil to restore proper moldability.

General Instructions For Use

1. Since PETRO BOND sands are completely reusable, it is advantageous to make the entire mold out of PETRO BOND sand in order to eliminate contamination.
2. When PETRO BOND sand is used for the entire mold, after the casting has solidified and has been shaken out, it is only necessary to aerate or riddle the sand before reusing. The sand can be used without re-mulling until the green strength has been reduced sufficiently to cause scabbing, washing, or sand inclusions.
3. PETRO BOND sand may be used as a facing for green sand molds. When PETRO BOND sand is used as a facing, the burned sand readily mixes with the green backing sand.
4. For both types of use, best finishes are obtained when the mold hardness is 80 or higher.
5. Maintenance additions of PETRO BOND and oil may be made to a sand system in the same manner that bentonite, sea coal, or a custom blend and water would be added in a water-tempered system. This results in a very uniform system with uniform casting quality.

Equipment

Patterns made of wood, plaster, aluminum, brass, steel, etc., can all be used, bearing in mind that the accuracy and finish of the casting produced can be no better than the pattern. Steel flasks are preferable in order to ram the mold to the desired hardness. Flask pins should be tight to eliminate mismatch on the parting line. A dry parting agent is recommended. Dry PETRO BOND powder may be used as a parting agent.

Results

The large and increasing number of foundries using PETRO BOND molding sand successfully for casting magnesium, aluminum, copper base, and other non-ferrous alloys indicates PETRO BOND has extraordinary performance. It is ideal for producing all weights of castings. A 4,200 pound bronze propeller has been cast successfully. In casting with magnesium, the mix is modified with the usual inhibitors. All familiar, non-ferrous alloys have been cast in this mix without any limitations as to casting weight.

The superior surface finish and detail obtained with this sand mix, in comparison to water base mixes, is due to absence of water and use of a finer sand.

Reuse of PETRO BOND Sand

When a PETRO BOND sand mix is used, the color of the mix darkens until it becomes blackened in appearance. When strength and molding characteristics become inadequate, it must be revitalized by adding and mixing PETRO BOND and PETRO BOND Oil. The quantity and frequency of additions varies considerably depending on the metal cast, the pouring temperature, the ratio of sand to metal, etc. It is good practice to discard all burnt sand adhering to the casting which will eventually dilute the bond. In some cases, virgin mixes should be added to the system periodically to maintain good grain distribution. The virgin mix may be added as a facing or blended into the heap in order to ensure a constant blend of old and new material. Periodic additions of PETRO BOND and oil may be made with acceptable results.

One method to follow is to use the original mixture without binder additions or re-mulling, but aerating until the green strength has been reduced to a minimum level. At this stage, binder additions and mulling must be employed. Addition of 1% PETRO BOND and 1% PETRO BOND Oil is a good starting point. The ratio of oil to PETRO BOND used is slightly higher than that suggested for the original mix. The oil requirement increases slightly as the mixture is used because of the accumulation of dead material which absorbs oil. The order of addition and the mulling time are half that of the original mix.

The above suggestions are illustrative since the amount and frequency of additions to the mix will vary and will be governed by your own experience. For example, a batch of sand was successfully used for a period of 22 months in a small foundry where no physical testing equipment was employed. This illustrates that intelligent use of the mix will keep the binding material required for revitalizing to a minimum. In some cases,

little effort or attention is necessary to maintain a quality sand system.

The increase in strength with mulling time, as shown for a virgin mix in Figure 1, also applies for revitalized mix; therefore, the maximum economic mull time should be used.

The time to shake the casting out of the mold depends on the amount of metal and the pouring temperature. Foundries have reported that a better looking surface is obtained if the casting is allowed to cool as long as possible. Cooling time should be longer than with water sands and as long as practical. This allows oil to recondense in the sand, minimizing smoke and oil consumption.

Trouble-Shooting

The following difficulties usually can be eliminated by using the procedures described. If the trouble continues, carefully check all materials, equipment, and procedures being used.

Low Green Strength

The minimum green strength of 8.5 psi should be obtained if the mix is adequately mulled.

1. **Improper Mulling.** The formula may be correct and the ingredients good, but the actual mulling achieved may be inadequate. The muller must be clean and dry to provide intensive mixing. The wheels of the muller should be lowered to the pan to provide the proper mulling action. Plows that are too worn will not provide proper mixing. If portable mulling equipment is being used, the mulling time may need to be increased (above the time required for mulling by heavier stationary equipment) in order to get a mix of proper green strength.
2. **PETRO BOND content too low.** Check the amounts of materials being used in the mix. Make sure you have used the amounts and the ratio of PETRO BOND to oil that are prescribed on the foregoing pages of the bulletin. Be sure the PETRO BOND is uniformly dry-mixed and the oil is added slowly to avoid leakage.
3. **Too much moisture in sand.** Check the sand to make certain that the moisture content is less than .25%.
4. **Oil is not the proper type.** Recheck the oil being used to make certain that the oil is approved for use by Bentonite Corporation or your foundry distribu-

tor. If the finished mix has a glossy appearance, it usually indicates that the oil is probably not of the proper specifications.

Poor Finish Castings

1. **Incorrect mold hardness.** Check your mold hardness. Make sure that its hardness is 80 or better. If you are using a very high green strength in your mix, make certain that the mold is rammed properly to give a minimum mold hardness of 80.
2. **Wrong parting agent.** Check the amount and type of parting agent being used. Do not use a liquid parting agent with PETRO BOND. A dry parting agent is necessary if loose patterns are used, especially if they are wooden patterns that have been shellacked. PETRO BOND may be used as a dry parting agent.

Turbulent Metal Flow or Lack of Effective Choke Feeding

To assure smooth metal flow and adequate filling of the cavity, it may be necessary to choke the flow of metal to eliminate turbulence. Most metals can be poured at lower temperatures due to absence of the chilling effect of water and the lower heat conductivity of the oil.

Cutting and Washing in Molds

1. **Improper ramming of the mold.** Make certain that the mold is rammed hard. Check the ingates and sprues to ensure they are properly cut. Ingates and sprues should be smaller in the PETRO BOND molds than in conventional sand molds.
2. **Improper pouring of molds.** PETRO BOND sand molds can be poured at considerably lower temperatures. If the surface of the PETRO BOND mold is very smooth, the flow of metal should be reduced or restricted. This can be accomplished by using strainer cores or by changing the gating system so that the metal enters the mold without turbulence.
3. **Low sand strength.**
4. **Improper oil selection.**

Non-Uniform Reproduction of Pattern

1. **Improper mold hardness.** If it is found that the cope and drag surfaces of the casting are smooth but the side walls are not, it is an indication that the mold has not been rammed hard enough. The mold hardness should be uniform on all the mold

surfaces. Cope and drag and match plate equipment give the best reproduction.

Out of Dimension Castings

1. **Insufficient cooling time.** When castings are removed too soon, there is a tendency for the casting to warp because of non-uniform solidification. It is essential to leave the casting in the sand long enough to have it properly solidified.

Gas Problems - Blows, Cold Shuts, Etc.

1. **Too much oil in the mix.** When excessive amounts of oil are used in PETRO BOND mixes, the surface of the metal may show slight imperfections. To eliminate this condition, mull 2% iron oxide into the mix to absorb the excess oil. Another method is to rebalance the formula by adding clean silica sand and PETRO BOND to bring the mix to the proper green strength.

2. **Too much P-1 Catalyst in the mix.** When excessive amounts of P-1 Catalyst are used, a significant increase of oil absorption is observed, resulting in a "dry" feel and texture to the sand. Oil is often added to improve feel. *Resist this temptation.* Blows occur at oil contents over 10%. If you used more than 10 ounces catalyst per bag (50 lb.) of PETRO BOND, you have used too much.

3. **Permeability should be checked.** Molds made with PETRO BOND are poured at considerably lower permeability than molds made with water-bonded sand. There is, however, a minimum level of permeability. This is particularly true when pouring high temperature alloys. The optimum must be established in order to give proper castings.

FIGURE I

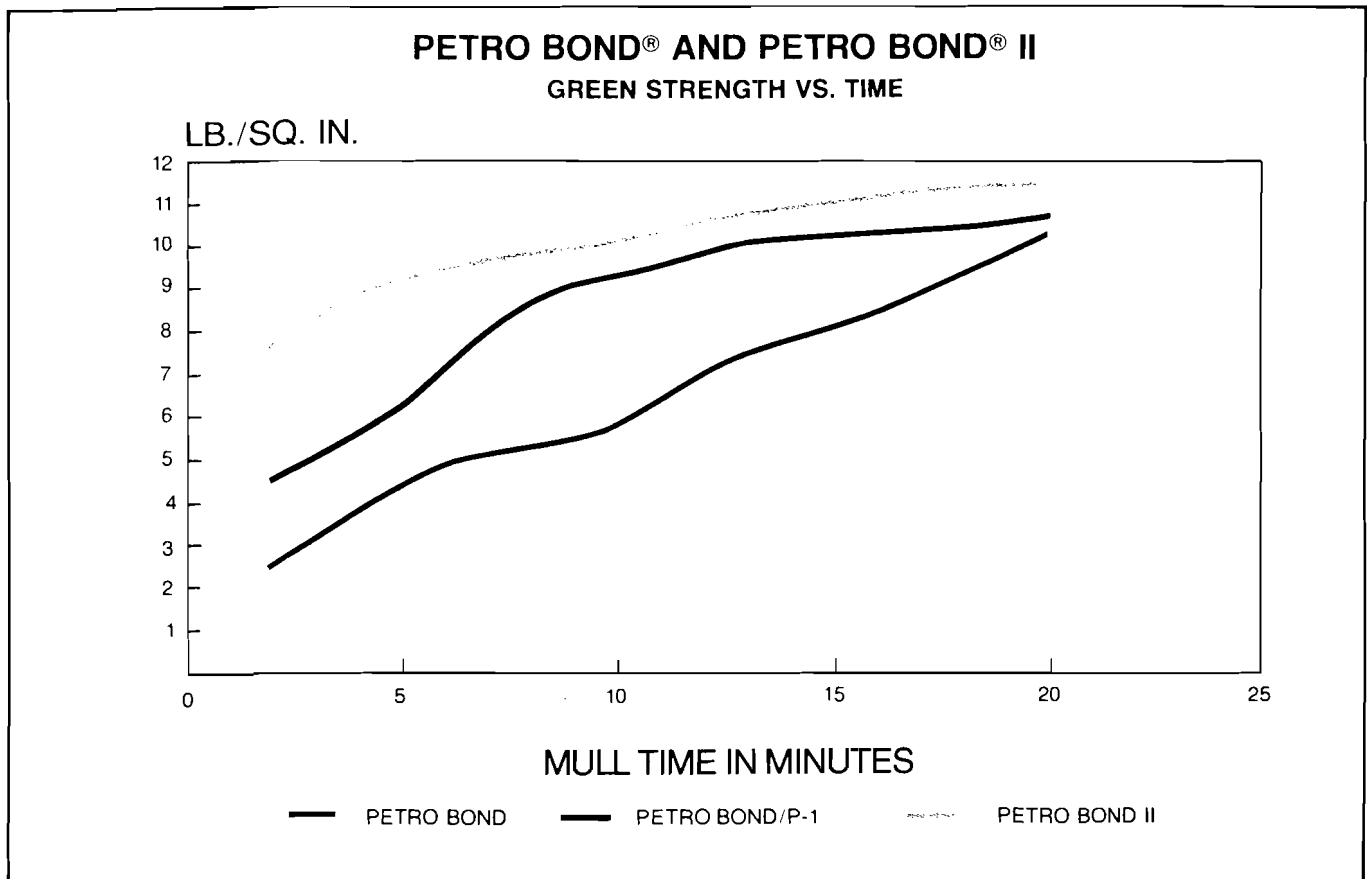


FIGURE II

**Average Properties of Mixes Containing
5% PETRO BOND, 2% PETRO BOND OIL,
1 oz. P-1 Catalyst**

Mixes were made with 100 lb. of washed and dried silica sand (GFN-140) in a laboratory muller. The mulling cycle consisted of dry mixing ½ minute, adding oil and mixing 3 minutes, and adding P-1 Catalyst and mixing 8 minutes.

GREEN PROPERTIES

Compression Strength, psi	12
Flowability	87
Green Deformation, in./in.	0.010 to 0.014
Hardness of standard 2-inch AFS Specimen, rammed three times	84

HOT PROPERTIES

Soaking Time, Minutes	2	4	6	12
Temperature, °F	Hot Strength, psi			
1500	17	34	36	42
2000	23	33		42
2500		27		245

"A" Sintering temperature	above 2700°F
Hot deformation at 2000°F, soaked 4 minutes, in./in.	0.0278
Shock load expansion at 1800°F, 1 psi load, 22.5 seconds, in./in.	0.0010
Restrained load	nil



PETRO BOND® Green Sand

Created By: Niki Maestas on 10/22/98 at 09:28 AM
Category: MSDS
Reviewed 3-9-09 by Budget Casting Supply LLC

SECTION I - Product Identification

Trade Name:	PETRO BOND® Green Sand	
Generic Description:	Molding Sand (Quartz)	(CAS # 14808-60-7)
	Sodium Montmorillonite	(CAS # 1302-78-9)
	Quarternary Amine	(CAS # 61789-80-8)
	Parafin Pale Oil	(CAS # 64726-50)

SECTION II - Hazardous Ingredients

MATERIAL OR COMPONENT

Quartz (90 - 93%)	CAS # 14808-60-7
Cristobalite (0-0.1%)	CAS # 14464-46-1

HAZARD DATA: Crystalline silica (SiO₂) in the form of Quartz, is present (See Section V).

Health: 2 Flammability: 1 Reactivity: 0 Ratings based on NFPA

SECTION III - Physical Data

Boiling Point: NA	Freezing Point: ND
Specific Gravity: (H ₂ O = 1): 1.7 - 2.50	Vapor Pressure (mm Hg): NA
Vapor Density (Air = 1): > 1	Solubility in Water, % by weight: 8%
% Volatiles by Volume: 4%	Evaporation Rate (Butyl Acetate = 1): NA
Density @ 20°C (Uncompacted): ND	pH: ND
Appearance and Odor: Red solids with slight organic odor	Melting Point: ND

SECTION IV - Fire and Explosion Data

Flash Point: NA **Flammable Limits:** NA
Fire Extinguishing Media: Use media applicable to surrounding area (product will not support combustion).

Special Firefighting Procedures: Wear full protective equipment including self contained breathing apparatus. Keep containers cool with water spray.

Unusual Fire and Explosion Hazard: May give off toxic vapors when burned.

SECTION V - Health Hazard Information

Carcinogenicity: This product contains crystalline silica which is considered a hazard by inhalation. During October 1996, IARC reviewed the literature for polymorphs of crystalline silica and determined that:

- there is *sufficient evidence* in humans for the carcinogenicity of inhaled crystalline silica in the forms of quartz or cristobalite from occupational sources.
- there is *inadequate evidence* in humans for the carcinogenicity of amorphous silica.
- there is *sufficient evidence* in experimental animals for the carcinogenicity of quartz and cristobalite.
- there is *limited evidence* in experimental animals for the carcinogenicity of tridymite.
- there is *inadequate evidence* in experimental animals for the carcinogenicity of diatomaceous earth.
- there is *inadequate evidence* in experimental animals for the carcinogenicity of synthetic amorphous silica.

Overall Evaluation¹: Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (Group 1).

The OSHA Permissible Exposure Limits from Table Z-3 Mineral Dusts are:

Silica: Crystalline	10 mg/m ³
Quartz (Respirable)	% SiO ₂ + 2
Quartz (Total Dust)	30 mg/m ³
	% SiO ₂ + 2

If cristobalite or tridymite is detected, use one half the value calculated from formulae for quartz.

Effects of Exposure (Acute): Material is an irritant.

Effects of Exposure (Chronic): Prolonged inhalation of powder may result in silicosis, a noncancerous lung disease.

Eye Contact: Dust may cause irritation or redness. **Skin Contact**: Dust may cause skin irritation.

Inhalation: Dust may cause irritation to nose, throat, and lungs.

FIRST AID PROCEDURES:

Eye Contact: Flush eyes with water for at least 15 minutes. Hold back eyelids during flushing. GET MEDICAL ATTENTION.

Skin Contact: Flush areas of contact with water.

Ingestion: Do not induce vomiting. Drink two glasses of water. GET MEDICAL ATTENTION.

Inhalation: If overcome by dust, remove to fresh air. If breathing is difficult, give oxygen. If breathing has stopped, give artificial respiration. GET MEDICAL ATTENTION.

SECTION VI - Reactivity Data

Stability: Material is stable.

Conditions to avoid: None documented.

Hazardous Decomposition Products: Burnig may release carbon monoxide, carbon dioxide, oxides of nitrogen, chlorine.

Conditions Contributing to Hazardous Polymerization: None

SECTION VII - Precautions for Safe Handling and Use

Steps to be Taken if Material is Released or Spilled: Sweep up material using normal housekeeping procedures and hold for disposal.

Waste Disposal Method: Dispose of in accordance with all Federal, State, and Local regulations.

Precautions to be Taken in Handling and Storage: Wear appropriate protective equipment when handling. Close container when not in use. Do not reuse empty container.

SECTION VIII - Industrial Hygiene Control Measures

PERSONAL PROTECTIVE EQUIPMENT

Respiratory Protection: A NIOSH approved mechanical filter respirator should be used when dust levels exceed OSHA PELs.

Ventilation Requirements: Use with adequate ventilation.

Eye Protection: Safety glasses/goggles **Gloves**: Butyl rubber.

Other: Eyewash station, apron, coveralls

SECTION IX - Special Precautions

Precautionary Statements: Avoid Prolonged Inhalation

Recommended Labeling:

Front Panel:

CAUTION: See back panel for caution before using.

Back Panel:

CAUTION: This product contains crystalline silica which according to the IARC is carcinogenic to humans (Group 1). Prolonged inhalation of the powder may result in silicosis, a noncancerous lung disease. Avoid creating dusty conditions and use a NIOSH approved dust respirator.

SECTION X - Transportation Information

Proper Shipping Name: Not regulated

Hazard Ingredients: NA

Label: None Required.

Placards: NA

Identification Number: NA

Reportability Quantity: NA

SECTION XI - Regulatory Information

Status on Substance Lists

Comprehensive Environmental Response, Compensation and Liability Act of 1980, (CERCLA) requires notification of the National Response Center of release of quantities of Hazardous Substances equal to or greater than the reportable quantities (RQs) in 40 CFR 302.4. Components present in this product which may require identification are:

Chemical: None

CAS#:

Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires emergency planning based on Threshold Planning Quantities (TPQs) and release reporting based on RQs. Components present in this product at a level which could require reporting under the statute are:

Chemical: None CAS#:

SARA requires the submission of annual reports of toxic chemicals that appear in 40 CFR 372 (for SARA 313). This information must be included in all MSDS that are copied and distributed for this material. Components present in this product at a level which could require reporting under the statute are:

Chemical: None CAS#:

Toxic Substances Control Act (TSCA). The ingredients of this product are on the TSCA inventory.

SECTION XII - State Right to Know

Quartz is on Canadian WHMIS (Workplace Hazardous Material Information System) Ingredient Disclosure System, Massachusetts Substance List, New Jersey Right to Know Hazardous Substance List, and Pennsylvania Hazardous Substance List.

NA - Not Applicable

ND - Not Determined

P - Proprietary

All information, recommendations, and suggestions herein concerning our products are based upon tests and data believed to be reliable; however, it is the user's responsibility to determine the safety, toxicity, and suitability for his own use of the product described herein. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Bentonite Performance Minerals as the effects of such use, by others, of the product referred to herein. Nor is the information herein to be construed as absolutely complete since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulation.

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¹ In making the overall evaluation the Working Group noted that carcinogenicity was not detected in all circumstances studied. Carcinogenicity may be dependent on inherent characteristics of crystalline silica or to external factors affecting its biological activity or distribution or its polymorphs.

Petro Bond® Green Sand MSDS

PREPARED BY: WJM, Bentonite Performance Minerals, Denver Colorado

Revision Date: October 22, 1998

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Reviewer Log



PETRO BOND® Oil

Created By: Niki Maestas on 01/20/99 at 10:52 AM

Category: MSDS

Reviewed 3-9-09 by Budget Casting Supply Llc

Section I - Product Identification

Trade Name: PETRO BOND® Oil
Generic Description: Paraffin Pale Oil (CAS #64726-50)

Section II - Hazardous Ingredients

MATERIAL OR COMPONENT

Solvent dewaxed heavy paraffinic petroleum distillates (100%)

HAZARDOUS DATA: Health: 1 Flammability: 1 Reactivity: 0 (Ratings based on NFPA)

Section III - Physical Data

Boiling Point: N/A **Melting Point:** ND
Specific Gravity (H₂O = 1): 0.91 @ 15.6°C **Vapor Pressure (mm Hg):** NA
Vapor Density (Air = 1): NA **pH:** not applicable
Solubility in Water, % by weight: Insoluble **Pour Point:** - 14C (max)
Density @20°C (Uncompacted): ND **% Volatile by Volume:** 100%
Evaporation Rate (Butyl Acetate = 1): NA **Appearance and Odor:** Amber liquid

Section IV - Fire and Explosion Data

Flash Point: 480° F (COC) **Flammable Limits:** NA
Fire Extinguishing Media: Use carbon dioxide, dry chemical, foam, or water fog.
Special Firefighting Procedures: For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment. this may include self-contained breathing apparatus to protect against the hazardous effects of normal products of combustion or oxygen deficiency. Read the entire MSDS.
Unusual Fire and Explosion Hazards: do not weld, heat, or drill container. residue may ignite with explosive violence if heated sufficiently.
CAUTION! Do not use pressure to empty drum or explosion may result.

Section V - Health Hazard Information

Effects of Exposure (Acute): Material is an irritant.
Eye contact: Expected to cause no more than minor eye irritation.
Skin Contact: Expected to cause no more than minor skin irritation following prolonged or frequently repeated contact.
Inhalation: Not expected to be acutely toxic by inhalation. Breathing mineral oil mist at concentrations in air that exceed the Federal OSHA exposure standard can cause respiratory irritation or discomfort.
Ingestion: Not expected to be acutely toxic by ingestion.
FIRST AID PROCEDURES
Eye Contact: Flush eyes with water for at least 15 minutes. Hold back eyelids during flushing. GET MEDICAL ATTENTION.

Skin Contact: Wash skin thoroughly with soap and water. Launder contaminated clothing.

Ingestion: If swallowed, give water or milk to drink and telephone for medical advise. Consult medical personnel before inducing vomiting. If medical advise cannot be obtained, then take the person and the product to the nearest medical emergency treatment center or hospital.

Inhalation: If overcome by vapor, remove to fresh air. If breathing is difficult, give oxygen. If breathing has stopped, give artificial respiration. GET MEDICAL ATTENTION.

Section VI - Reactivity Data

Stability: Material is stable.

Conditions to Avoid: May react with strong oxidizing materials.

Hazardous Decomposition Products: Normal combustion forms carbon dioxide and water vapor; incomplete combustion can produce carbon monoxide.

Conditions Contributing to Hazardous Polymerization: None

Section VII - Precautions for Safe Handling and Use

Steps to be Taken if Material is Released or Spilled: Stop the source of the leak or release. clean up releases as soon as possible. Contain liquid to prevent further contamination of soil, surface water, or ground water. Clean up small spills using appropriate techniques such as sorbent materials or pumping. where feasible and appropriate, remove contaminated soil. Follow prescribed procedures for reporting and responding to larger releases.

Waste Disposal Method: Place contaminated materials in disposable containers and bury in appropriate dumping area. Dispose of in accordance with all federal, state, and Local regulations.

Section VIII - Industrial Hygiene Control Measures

PERSONAL PROTECTIVE EQUIPMENT

Ventilation Requirements: Use with adequate ventilation.

Respiratory Protection: None normally required; however, if operating conditions create airborne concentrations which exceed the exposure standard, the use of an approved respirator is recommended.

Eye Protection: None necessary.

Gloves: Butyl rubber.

Other: Eyewash station, apron, coveralls.

Section IX - Transportation Information

Precautionary Statements: Avoid Prolonged Inhalation.

Section X - Special Precautions

Proper Shipping Name: Not regulated.

Label: None required.

Identification Number: Not applicable.

Hazardous Ingredients: Not applicable

Placards: Not applicable

Reportability Quantity: Not applicable

Section XI - Regulatory Information

Status on Substance Lists

Comprehensive Environmental Response, Compensation and Liability Act of 1980, (CERCLA), requires notification of the National Response Center of release of quantities of Hazardous Substances equal to or greater than the reportable quantities (RQs) in 40 CFR 302.4. components present in this product which may require identification are:

Chemical: NONE

CAS #:

Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires emergency planning based on Threshold Planning Quantities (TPQs) and release reporting based on RQs. Components present in this product at a level which could require reporting under the statute are:



P1 Catalyst

Created By: Niki Maestas on 01/22/99 at 11:01 AM

Category: MSDS

Reviewed 3-9-09 by Budget Casting Supply LLC

Section I - Product Identification

Trade Name: P1 Catalyst
Generic Description: Propylene Carbonate CAS# 108-32-7

Section II - Hazardous Ingredients

MATERIAL OR COMPONENT

Methylene-1,3-Dioxian-2-One (90-100%) **OSHA PEL - 100 ppm**

HAZARDOUS DATA: Health: 1 Flammability: 1 Reactivity: 0

(Ratings based on NFPA)

Section III - Physical Data

Boiling Point: 466 F (241C) **Melting Point:** -56F (-49C)
Specific Gravity (H₂O = 1): 1.20 **Vapor Pressure (mm Hg):** 0.03 @ 20C (68F)
Vapor Density (Air = 1): NA **Solubility in Water, % by weight:** Soluble
Density @20°C (Uncompacted): NA **Evaporation Rate (Butyl Acetate = 1):** ND
% Volatiles by Volume: None **pH:** not applicable
Appearance and Odor: Colorless liquid

Section IV - Fire and Explosion Data

Flash Point: 275°F (PMCC) **Flammable Limits:** NA
Fire Extinguishing Media: According to the National Fire Protection Association guide, use water spray, dry chemical, foam, or carbon dioxide. Water or foam may cause frothing. Use water to cool fire exposed containers. If a leak or spill has not ignited, use water spray to disperse the vapors and to provide protection for persons attempting to stop the leak.
Special Firefighting Procedures: Wear full protective equipment including self contained breathing apparatus. Keep containers cool with water spray.
Unusual Fire and Explosion Hazards: May give off toxic vapors when burned.

Section V - Health Hazard Information

Carcinogenicity: Not on NTP, IARC, or OSHA lists.
Effects of Exposure (Acute): Material is an irritant.
Eye contact: May cause irritation or redness.
Skin Contact: Effects of dermal contact slight, if any.
Inhalation: May cause irritation to nose, throat, and lungs.
Ingestion: Anemia in dogs, and adverse changes, some serious, to the lungs, liver, gastrointestinal and reproductive organs of rats and mice have been observed in laboratory animals after prolonged ingestion of 2.0 grams per kilogram of body weight per day of propylene carbonate.

FIRST AID PROCEDURES

Eye Contact: Flush eyes with water for at least 15 minutes. Hold back eyelids during flushing. GET MEDICAL ATTENTION.

Skin Contact: flush areas of contact with water.

Ingestion: None considered necessary

Inhalation: If overcome by vapor, remove to fresh air. If breathing is difficult, give oxygen. If breathing has stopped, give artificial respiration. GET MEDICAL ATTENTION.

Section VI - Reactivity Data

Stability: Material is stable.

Conditions to Avoid: None documented.

Hazardous Decomposition Products: Burning may release carbon dioxide, carbon monoxide.

Conditions Contributing to Hazardous Polymerization: None

Section VII - Precautions for Safe Handling and Use

Steps to be Taken if Material is Released or Spilled: Use absorbent granules and sweep up material using normal housekeeping procedures and hold for disposal. Material is slippery when wet.

Waste Disposal Method: Dispose of in accordance with all Federal, State, and Local regulations.

Precautions to be Taken in Handling and Storage: Wear appropriate protective equipment when handling. Close container when not in use. Do not reuse empty container. Misuse of empty containers can be hazardous. Empty containers can be hazardous if used to store toxic, flammable, or reactive materials cutting or welding of empty containers might cause fire, explosion, or toxic fumes from residues. Do not pressurize or expose to open flame or heat.

Section VIII - Industrial Hygiene Control Measures

PERSONAL PROTECTIVE EQUIPMENT

Ventilation Requirements: Use with adequate ventilation.

Respiratory Protection: None necessary when handled at ambient temperatures.

Eye Protection: Chemical goggles. Do not wear contact lenses.

Gloves: Butyl rubber.

Other: Eyewash station, apron, coveralls.

Section IX - Transportation Information

Precautionary Statements: Avoid Prolonged Inhalation.

Section X - Special Precautions

Proper Shipping Name: Not regulated.

Label: None required.

Identification Number: Not applicable.

Hazardous Ingredients: Not applicable

Placards: Not applicable

Reportability Quantity: Not applicable

Section XI - Regulatory Information

Status on Substance Lists

Comprehensive Environmental Response, Compensation and Liability Act of 1980, (CERCLA), requires notification of the National Response Center of release of quantities of Hazardous Substances equal to or greater than the reportable quantities (RQs) in 40 CFR 302.4. Components present in this product which may require identification are:

Chemical: NONE CAS #:

Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires emergency planning based on Threshold Planning Quantities (TPQs) and release reporting based on RQs. Components present in this product at a level which could require reporting under the statute are:

Chemical: NONE CAS #:

SARA requires the submission of annual reports of toxic chemicals that appear in 40 CFR 372 (for SARA 313). this information must be included in all MSDS that are copied and distributed for this material.

Components present in this product at a level which could require reporting under the statute are:

Chemical: NONE CAS #:

Toxic Substances control Act (TSCA)

The ingredients of this product are on the TSCA inventory.

Section XII - State Right to Know

NA - Not Applicable

ND - Not Determined

P - Proprietary

All information, recommendations, and suggestions herein concerning our products are based upon tests and data believed to be reliable; however, it is the users responsibility to determine the safety, toxicity, and suitability for his own use of the product described herein. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Bentonite Performance Minerals as to the effects of such use, by other, of the product referred to herein. Nor is the information herein to be construed as absolutely complete since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or governmental regulation.

BENTONITE PERFORMANCE MINERALS

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P1 Catalyst MSDS

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