

MATERIAL SAFETY DATA SHEET

UNLEADED GASOLINE (UNBRANDED)

MSDS No.
APPC975
Version: 1
Date
05/19/2003

IMPORTANT: Read this MSDS before handling and disposing of this product and pass this information on to employees, customers, and users of this product.

1. PRODUCT and COMPANY IDENTIFICATION

Material Identity	Unleaded Gasoline (Unbranded)		
Trade Name(s)	None		
Other Name(s)	Unleaded Motor Vehicle Gasoline, Unleaded Premium Gasoline, Unleaded Regular Gasoline or Petrol, Clear Gasoline.		
Chemical Description	Petroleum Hydrocarbons		
Manufacturer's Address	BP West Coast Products LLC Carson Business Unit 1801 E. Sepulveda Boulevard Carson, California 90749-6210	BP West Coast Products LLC Cherry Point Business Unit 4519 Grandview Road Blaine, Washington 98230	
Telephone Numbers	Emergency Health Information: Emergency Spill Information: Other Product Information: Customer Service:	1 (800) 447-8735 1 (800) 424-9300 CHEMTREC (USA) 1 (866) 4BP-MSDS (866-427-6737 Toll Free - North America) email: bpcares@bp.com 1 (800) 322-3736 INFO	

2. COMPONENTS and EXPOSURE LIMITS

<u>Component</u> ¹	<u>CAS No.</u>	<u>% Composition By Volume</u> ²	<u>ACGIH TLV</u>	<u>Exposure Limits</u>		
				<u>OSHA PEL</u> ³	<u>Units</u>	<u>Type</u>
GASOLINE ⁽²⁾⁽⁴⁾	8006-61-9	EQ 100	500 300	500 300	ppm ppm	STEL TWA
which contains:						
BENZENE ⁽¹⁾⁽²⁾⁽³⁾⁽⁴⁾	71-43-2	AP 1 to 5	2.5 0.5 skin	5 1	ppm ppm	STEL TWA
CYCLOHEXANE	110-82-7	LT 2	400 300	N/AP 300	ppm ppm	STEL TWA
ETHYLBENZENE ⁽²⁾	100-41-4	AP 1 to 3	125 100	125 100	ppm ppm	STEL TWA
HEXANE (N-HEXANE)	110-54-3	AP 2 to 5	50 skin	50	ppm	TWA
TOLUENE	108-88-3	AP 7 to 14	N/AP 50 skin	150 100	ppm ppm	STEL TWA
TRIMETHYL BENZENE (ALL ISOMERS)	25551-13-7	LT 5	25	25	ppm	TWA
1,2,4-TRIMETHYLBENZENE	95-63-6	AP 1 to 4	25	25	ppm	TWA

2,2,4 TRIMETHYLPENTANE	540-84-1	AP	3 to 10	N/AP	N/AP		
XYLENE	1330-20-7	AP	8 to 15	150 100	150 100	ppm ppm	STEL TWA
which may contain:							
ETHANOL	64-17-5	AP	0 to 10	1000	1000	ppm	TWA
METHYL TERTIARY BUTYL ETHER (MTBE) ⁽⁴⁾	1634-04-4	AP	0 to 15	40	N/AP	ppm	TWA

¹ Carcinogen displayed after Component Name. Listed by ⁽¹⁾ NTP, ⁽²⁾ IARC, ⁽³⁾ OSHA, ⁽⁴⁾ Other

² See Abbreviations on last page

³ The OSHA exposure limits were changed in 1993 due to a federal court ruling. ARCO has chosen to list the 1989 OSHA exposure limits in this document as they are generally more stringent and therefore more protective than the current exposure limits. (Refer to 29 CFR 1910.1000).

3. HAZARD IDENTIFICATION

IMMEDIATE HAZARDS

DANGER

HIGHLY FLAMMABLE! OSHA/NFPA Class IB flammable liquid. Keep away from heat, sparks, and open flame.

Never siphon gas by mouth. Harmful if swallowed. Contains petroleum distillates.

ASPIRATION HAZARD! If swallowed, do not induce vomiting since aspiration into the lungs may cause chemical pneumonia. Obtain prompt medical attention.

Prolonged or repeated liquid contact may cause irritation. High vapor concentrations (greater than 1000 ppm) may cause irritation to eyes and respiratory system and may cause dizziness and other nervous system effects.

Generally, human exposures to gasoline are considerably lower than levels which have caused adverse health effects in animal studies or human case studies of gasoline misuse or abuse (such as gasoline sniffing). Adverse health effects are not expected to occur at exposure levels typically encountered in the use of gasoline as a motor fuel.

Avoid breathing vapors or mists. Use only with adequate ventilation. Use as a motor fuel only. Do not use as a cleaning solvent, thinner or for other non-motor fuel use.

Wash hands thoroughly after handling.

ACUTE HEALTH HAZARDS

Routes of Exposure

Signs and Symptoms

Inhalation (Primary)	Exposures at airborne concentrations well above the recommended exposure limits in Section 2 may cause irritation of the nose, throat, and lungs, headache, dizziness, drowsiness, confusion, loss of coordination, fatigue, nausea, labored breathing and irregular heartbeats. May lead to unconsciousness, convulsions, and possibly death.
Eye Contact	May cause some transitory eye irritation but not expected to cause prolonged or significant eye irritation.
Skin Contact	Moderate skin irritation may occur upon short-term exposure. May be absorbed and contribute to the acute inhalation health effects (see above).
Ingestion	ASPIRATION HAZARD! This material can enter the lungs during swallowing or vomiting and may cause acute lung inflammation and damage which in severe cases may be fatal. Ingestion may cause irritation of the mouth, throat and gastrointestinal tract leading to nausea, vomiting, diarrhea, and restlessness. May cause headache, dizziness, drowsiness, confusion, loss of coordination, fatigue, nausea and labored breathing. May lead to unconsciousness, convulsions, and possibly death.

Summary of Chronic Hazards and Special Health Effects

Exposures at airborne concentrations well above the recommended exposure limits in Section 2 may aggravate medical conditions such as chronic respiratory diseases, cardiovascular disease, skin diseases, or blood disorders.

Prolonged/repeated exposures above the recommended exposure limits via skin contact, inhalation or ingestion of this material may result in adverse dermal or systemic effects. Avoid prolonged or repeated overexposure.

Contains benzene, a chemical known to cause cancer in humans. Repeated and prolonged overexposure to benzene vapors may cause leukemia, aplastic anemia, or other blood disorders, immunotoxicity, reproductive harm or fetal toxicity.

Neurotoxic effects have been associated with n-hexane, a component of this material upon prolonged or repeated overexposure.

Generally, human exposures to gasoline are considerably lower than levels which have caused adverse health effects in animal studies or human case studies of gasoline misuse or abuse (such as gasoline sniffing). Adverse health effects are not expected to occur at exposure levels typically encountered in the use of gasoline as a motor fuel.

See Section 11 for Additional Toxicological Information.

4. EMERGENCY and FIRST AID**Inhalation**

Immediately move personnel to area with fresh air. For respiratory distress, give oxygen, rescue breathing or administer CPR (cardiopulmonary resuscitation). Obtain prompt medical attention.

Eye Contact

Flush with clean, low-pressure water for at least 15 minutes, occasionally lifting the eyelids. If pain or redness is present after flushing, obtain medical attention.

Skin Contact

Immediately remove contaminated clothing. Wash affected skin thoroughly with soap and water. If irritation persists, obtain medical attention.

Ingestion

Do not induce vomiting. Obtain prompt medical attention.

ASPIRATION HAZARD: This material can enter the lungs during swallowing or vomiting and may cause lung inflammation and damage.

Emergency Medical Treatment Procedures

See above procedures.

5. FIRE and EXPLOSION**Flash Point (Method)***

AP -45°F **

Autoignition Temperature (Method)*

AP 536°F **

Flammable Limits (% Vol. in Air)*

Lower

AP 1.4

Upper

AP 7.6

* At Normal Atmospheric Temperature and Pressure

** Based on NFPA Gasoline

NFPA Hazard Rating:

Health: 1 = Slight

Fire: 3 = High

Reactivity: 0 = Insignificant

Special: = ---

Fire and Explosion Hazards

HIGHLY FLAMMABLE! Vaporizes easily at normal and below normal temperatures. When mixed with air in certain proportions and exposed to an ignition source, these vapors can burn in the open or explode in confined spaces. Being heavier than air, flammable vapors may travel long distances along the ground before reaching a point of ignition and flashing back.

May accumulate static electricity.

Liquid floats on water and may travel to a source of ignition and spread fire.

"Empty" containers retain liquid and vapor residues and, if exposed to source of ignition, may explode.

Extinguishing Media	Foam, Water fog, Dry chemical, Carbon Dioxide (CO ₂) Water and water spray may cool the fire but may not extinguish the fire.
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 combustion products and oxygen deficiencies. If firefighters cannot work upwind to the fire, respiratory protective equipment must be worn. Cool tanks and containers exposed to fire with water.

6. ACCIDENTAL RELEASE MEASURES

Precautions if Material is Spilled or Released	Eliminate all potential sources of ignition. Handling equipment and tools should be grounded to prevent sparking. Contain spill, evacuate non-essential personnel, and safely stop flow. Blanket spill with foam or use water fog to reduce vapor cloud. On hard surfaces, spilled material may create a slipping hazard. Equip cleanup crews with proper protective equipment (as specified in Section 8) and advise of hazards. Clean up by recovering as much spilled or contaminated materials as possible and placing into closed containers. Consult with an environmental professional for the federal, state and local cleanup and reporting requirements for spills and releases.
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7. HANDLING and STORAGE

Handling, Storage and Decontamination Procedures	Avoid exposure to liquid and gas vapors. Odor is not a reliable warning of overexposure. Use only with adequate ventilation. Keep away from sources of heat, flames, sparks or other ignition sources. Storage and use areas should be "No Smoking" areas. Containers should be bonded and grounded for transfers to avoid static sparks. Outside or detached storage is preferred. Inside storage should be in a standard flammable liquids storage warehouse, room or cabinet. Separate from oxidizing materials. Filling Portable Containers (less than 10 gallons) - to minimize static spark hazard: 1. Fill only metal containers or those approved to hold gasoline; 2. Place containers on the ground while dispensing fuel; 3. Keep hose nozzle in contact with the approved container during the entire filling process. DO NOT fill any portable container in or on a vehicle. "Empty" containers retain liquid and vapor residues and can be dangerous. Do not pressurize, cut, weld, drill, grind or expose to heat, flame, sparks, static electricity, or other sources of ignition containers with ANY residue; they may explode and cause injury or death. For determining National Electrical Code (NEC) Hazardous (Classified) Location requirements for electrical installation, consider this material Class 1, Group D. KEEP OUT OF REACH OF CHILDREN!
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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Where possible, use adequate ventilation to keep vapor and mist concentrations of this material below the occupational exposure limits shown in Section 2. Electrical equipment should comply with National Electrical Code (NEC) standards (see Section 7).
Respiratory	A NIOSH/MSHA-approved air-purifying respirator with an organic vapor cartridge may be permissible under certain circumstances where airborne concentrations may exceed the exposure limits in Section 2. Consult a health and safety professional for guidance in respirator selection. Respirator use should comply with OSHA 29 CFR 1910.134.

CAUTION: The protection provided by air-purifying respirators is limited. Use a positive pressure air-supplied respirator if there is any potential for an uncontrolled release, if exposure levels are not known, or if concentrations exceed the protection limits of the air-purifying respirator.

Eyes	Eye protection should be worn. If there is potential for splashing or spraying, chemical protective goggles and a face shield should be worn. If contact lenses are worn, consult an eye specialist or a safety professional for additional precautions. Suitable eye wash water should be available in case of eye contact with this material.
Skin	Avoid prolonged and/or repeated skin contact. If conditions or frequency of use make significant contact likely, clean and impervious clothing such as gloves, apron, boots and facial protection should be worn. Nitrile and Viton protective clothing material is recommended. Non-impervious clothing which becomes contaminated with this material should be removed promptly and not reworn until the material is effectively removed from the clothing.
Other Hygienic and Work Practices	Use good personal hygiene practices. In case of skin contact, wash with mild soap and water or a waterless hand cleaner. Wash hands and other exposed areas thoroughly before eating, drinking, smoking, or using toilet facilities.

9. PHYSICAL and CHEMICAL PROPERTIES

Boiling Point:	AP 35°F to 437°F
Viscosity Units, Temp. (Method):	N/AP
Dry Point:	AP 430°F
Freezing Point:	N/AP
Vapor Pressure, Temp. (Method):	AP 5 to 15 at 100°F (REID-PSIA)
Volatile Characteristics:	Appreciable
Specific Gravity (H₂O = 1 @ 39.2°F):	AP 0.7 to 0.8
Vapor Sp. Gr. (Air = 1.0 @ 60°F - 90°F):	AP 4
Solubility in Water:	Slight
PH:	N/AP
Appearance and Odor:	Colorless to straw-colored liquid; petroleum naphtha odor.
Other Physical and Chemical Properties:	Vapor pressure will vary seasonally in compliance with industry standards and federal and state regulations.

10. STABILITY and REACTIVITY

Stability	Stable
Hazardous Polymerization	Not expected to occur.
Other Chemical Reactivity	Reacts with oxidizing materials.

Conditions to Avoid	Heat, sparks, flame, and build up of static electricity.
Materials to Avoid	Halogens, strong acids, alkalis, and oxidizers.
Hazardous or Decomposition Products	Burning or excessive heating may produce carbon monoxide and other harmful gases or vapors including oxides and/or other compounds of sulfur. The inhalation of components of exhaust from combusted fuel can be fatal in high concentrations in an enclosed area. Exposure to exhaust from this fuel should be minimized.

11. TOXICOLOGICAL INFORMATION

Toxicological Information	The information found in this section is written for medical, toxicology, occupational health and safety professionals. This section provides technical information on the toxicity testing of this or similar materials or its components. If clarification of the technical content is needed, consult a professional in the areas of expertise listed above.
Inhalation	Toxicity studies on this material resulted in LC50 values greater than 5.0 mg/l indicating a low potency. There were signs of respiratory tract irritation and central nervous system depression.
Eye Contact	Minimal to no irritation in animal studies.
Skin Contact	Animal studies resulted in moderate skin irritation following short term or prolonged/repeated exposure. The acute dermal toxicity tests indicate LD50 values greater than 2.0 g/kg indicating a low potency. Exposure to sunlight does not increase skin irritation. This material appears to be non-sensitizing.
Ingestion	The acute oral toxicity tests produced LD50 values greater than 5.0 g/kg indicating a low potency. There were signs of gastrointestinal tract irritation and central nervous system depression.
Prolonged/ Repeated Exposures	Twenty-eight day dermal toxicity studies resulted in moderate skin irritation. In some studies changes in liver, kidney, testes and whole body weights were noted, but no significant systemic tissue changes characteristic of disease. Ninety-day dermal toxicity studies with similar material resulted in moderate skin irritation and not other significant observations or systemic tissue changes characteristic of disease. Twenty-eight day inhalation toxicity study similar materials resulted in kidney damage in male rats. A two-year inhalation study with a generic unleaded gasoline formulated by the American Petroleum Institute caused kidney damage and kidney tumors in male rats and liver tumors in female mice. These effects are considered specific to these laboratory animals and not applicable to humans. Exposure to components of gasoline such as benzene, toluene, xylene, ethylbenzene, trimethylbenzene, and N-hexane has also been shown to affect reproductive capacity and/or fetal development in laboratory animals. Studies with laboratory animals (dogs) indicate that exposure to extremely high concentrations of gasoline (greater than 50,000 ppm) may cause irregular heartbeats and sudden death. Exposures of laboratory animals to some components of this material at very high concentrations, well above the recommended exposure limits in Section 2, have resulted in cardiac sensitization with irregular heartbeats. Exposure to n-hexane at concentrations considerably higher than the current permissible exposure limit has reportedly been associated with peripheral neuropathy. Commercial hexane exposures up to 9000 ppm were not carcinogenic in laboratory animals. In animal studies and in workers with chronic benzene poisoning, alterations in structure of chromosomes in bone marrow and white blood cells have been observed.
Additional Ethanol Toxicity Information	Exposures to ethanol in gasoline are considerably lower than levels which have caused adverse health effects. Adverse health effects are not expected to occur at exposure levels typically encountered in the use of ethanol as a gasoline additive. Prolonged and repeated exposure to ethanol vapor above 1000 ppm may cause headache, lack of coordination, sleepiness, fatigue, and difficulty concentrating. Chronic ingestion of ethanol in the form of alcoholic beverages has resulted in liver, stomach, heart and nervous system damage as well as cancers of the mouth, pharynx, larynx, esophagus, and liver in humans. Repeated ingestion of ethanol in the form of alcoholic beverages by pregnant women has caused miscarriage, premature birth and low birth weight, and birth defects (fetal alcohol syndrome).
Additional MTBE Toxicity Information	MTBE at very high exposure levels (8000 ppm) did induce developmental toxicity in mice, but only at levels where there was also maternal toxicity. In rabbits exposed to the same MTBE levels, there were no indicators of any effects on the offspring, even in the presence of maternal toxicity. The abnormal findings in the mice (cleft palate, etc.) are well-recognized effects of stress in the pregnant mouse and have no correlation with development hazards in humans.

Chronic toxicity studies have been completed for MTBE. In these studies, B6C3F1 mice and F344 rats were exposed to 400, 3000, or 8000 ppm MTBE vapors, 6 hrs/day, 5 days/week for life. Few adverse effects were noted for either rats or mice.

Male and female mice exposed to 8000 ppm MTBE vapors developed a slightly higher incidence of benign liver tumors during their lifetime. No other adverse effects or increases in tumor incidences were found.

Male and female rats exposed to high concentrations of MTBE vapors developed an increasing incidence of chronic progressive kidney damage, an effect typically noted in aging rats. These effects were most severe in 3000 and 8000 ppm exposure groups and were accompanied by an increased incidence of kidney tumors (males only). These findings are consistent with kidney damage associated with accumulation of protein in cells, an effect which may be unique to the male rat. Benign testicular tumors were numerically increased in high dose MTBE male rats, but this is an age-related lesion which typically occurs in a very high proportion of control untreated rats.

MTBE does not appear to be a mutagen.

All of these effects either occur in tissues prone to the development of tumors or may occur by a mechanism not considered relevant to humans. The significance of these findings for human health hazards estimation is unclear. Furthermore, IARC has determined that MTBE is not classifiable as to its carcinogenicity to humans (Group 3).

12. ECOLOGICAL INFORMATION

Not Available

13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods	Consult an environmental professional to determine if state or federal regulations would classify this material as a hazardous waste. Use only approved transporters, recyclers, treatment, storage or disposal facilities. Comply with all federal, state and local laws pertaining to waste management.
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14. TRANSPORT INFORMATION

UN Proper Shipping Name	Gasoline
UN Hazard Class	3
UN Number	UN1203
UN Packing Group	PGII

15. REGULATORY INFORMATION

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (SARA), TITLE III**Section 311/312 Hazard Categories:**

Acute Health Hazard
Delayed (chronic) health hazard
Fire hazard

Section 313:

This product contains the following chemicals subject to the reporting requirements established by SARA Title III:

BENZENE
CYCLOHEXANE
ETHYLBENZENE
METHYL TERT-BUTYL ETHER
TOLUENE
XYLENE

TOXIC SUBSTANCES CONTROL ACT (TSCA)

All components of this product are listed on the TSCA Inventory.

COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA)

This material is covered by CERCLA's PETROLEUM EXEMPTION.
(Refer to 40 CFR 307.14)

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986 - PROPOSITION 65**PROP 65 WARNING LABEL:**

Chemicals known to the State to cause cancer, birth defects, or other reproductive harm are found in gasoline, crude oil, and many other petroleum products and their vapors, or result from their use. Read and follow label directions and use care when handling or using all petroleum products.

WARNING:

This product contains the following chemical(s) listed by the State of California as known to cause cancer or birth defects or other reproductive harm.

BENZENE ^(C) ^(R)
TOLUENE ^(R)

Other Prop 65 chemicals will result under certain conditions from the use of this material. For example, burning fuels produces combustion products including carbon monoxide, a Prop 65 reproductive toxin.

^(C) = Carcinogen

^(R) = Birth Defects or other Reproductive Harm

16. OTHER INFORMATION

General Comments

Because of volatility characteristics, gasoline vapors may have concentrations of components different from those of liquid gasoline. The major components of gasoline vapors from liquid gasoline are butane, isobutane, pentane and isopentane.

The information and conclusions herein reflect normal operating conditions and may be from sources other than direct test data on the mixture itself.

Abbreviations:

EQ = Equal
LT = Less Than
GT = Greater Than

AP = Approximately
UK = Unknown
TR = Trace

N/P = No Applicable Information Found
N/AP = Not Applicable
N/DA = No Data Available

Prepared by: Product Stewardship

Disclaimer of Liability

The information in this MSDS was obtained from sources which we believe are reliable. **HOWEVER, THE INFORMATION IS PROVIDED WITHOUT ANY WARRANTY, EXPRESS OR IMPLIED, REGARDING ITS CORRECTNESS.**

The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. **FOR THIS AND OTHER REASONS, WE DO NOT ASSUME RESPONSIBILITY AND EXPRESSLY DISCLAIM LIABILITY FOR LOSS DAMAGE OR EXPENSE ARISING OUT OF OR IN ANY WAY CONNECTED WITH THE HANDLING, STORAGE, USE OR DISPOSAL OF THE PRODUCT.**

This MSDS was prepared and is to be used only for this product. If the product is used as a component in another product, this MSDS information may not be applicable.

SUBMITTAL IDENTIFICATION SHEET

To be completed by Contractor/CM

WEBSTER UNIVERSITY ISB

PROJECT NAME

8274 BIG BEND BLVD

ADDRESS

NUMBER

WEBSTER UNIVERSITY

OWNER

CANNON DESIGN

ARCHITECT / ENGINEER

DEVIN D GATES

SUBMITTED BY

075323-001

CONTRACTOR / CM SUBMITTAL NO.

CANNON DESIGN SUBMITTAL NO.

DRAWING / DETAIL REFERENCE

075323

SPECIFICATION SECTION / PARAGRAPH

MANUFACTURER / SUPPLIER

ITEM / PRODUCT ID

REQUIRED DATE

PRIORITY

☐

CRITICAL

ITEM BEING SUBMITTED (check only one)

- ☐ Shop Drawings
☐ Samples
 (_____ copies)
☐ LEED Submittal
☐ Other _____
- ☐ Certification / Qualifications
☐ Record Documents
☐ Product Data
- ☐ Coordination Drawing
☐ Calculations
☐ Schedules
☐ O&M Manuals

ITEM BEING SUBMITTED FOR (check only one)

- ☐ Action
☐ Information Only
☐ Record

REMARKS OR DEVIATIONS

Email correspondence with KWA provided clarifications for requested information and warranty letter attached.

CONTRACTOR / CM CERTIFICATION
(SUBMITTALS NOT CERTIFIED WILL BE RETURNED WITHOUT REVIEW)



PARIC CORPORATION
SUBMITTAL STAMP

THIS SHOP DRAWING HAS BEEN REVIEWED BY PARIC CORPORATION

Subcontractor remains responsible for dimensions, quantities, coordination with other trades and compliance with contract documents.

By:

Devin D. Gates

DEVIN D GATES

REVIEWED BY

10/11/16

DATE

To be completed by Reviewer

07 5323-001 REV002

CANNON DESIGN SUBMITTAL NUMBER

10/11/16

RECEIVED DATE

- ☐ A. No Exceptions Taken
No further review of submittal is required.
- ☒ B. Make Corrections Noted
Incorporate corrections in work; resubmission is not required.
- ☐ C. Revise and Resubmit
Revise as noted, and resubmit for review.
- ☐ D. Rejected
Submittal is not in compliance with Contract Documents; provide new submittal.
- ☐ E. For Record / Information Only
Submittal was reviewed for Record / Information purposes only.
- ☐ F. Not Required for Review
Submittal is not required by Contract Documents and has not been reviewed.

Review is for conformance with the design concept of this project and for general compliance with contract documents. Contractor is responsible for quantities, dimensions and compliance with contract documents and for information that pertains to fabrication processes, construction techniques and coordination of this work with all trades which will be af
This review is null and void if submittal deviates from contra
and does not indicate or note deviations.

A/E COMMENTS

☐ See attached sheet(s) for additional comments

Final warranty must meet specification section 1.10. 2. requirements: wind speed coverage of that indicated on structural drawings (90 mph minimum), hail coverage for up to 2 inch diameter, and accidental puncture coverage of 16 man hours per year of warranty.

see comments below

Kathy Williams

REVIEWED BY

10/11/16

DATE

Gates, Devin

From: Scott Klingsick <scott@kwastl.com>
Sent: Friday, October 07, 2016 7:00 AM
To: Gates, Devin
Cc: kpatel@cannondesign.com
Subject: RE: Clarifications on returned EPDM shop drawings

Follow Up Flag: Follow up
Flag Status: Flagged

Yes this will be acceptable. We need the rest of the information revised and it to be resubmitted so we can approve submittal 075323-001. Thanks

Scott Klingsick, LEED Green Associate

Project Manager
9721 Litzsinger Rd.
St. Louis, MO 63124
(p) 314.962.2560 (f) 314.962.4057
scott@kwastl.com



KWA Architects

You have requested Kathy Williams and Associates, LLC dba KWA to supply electronic media containing plans for use by your company. Due to the potential that the information set forth on the electronic media can be modified, unintentionally or otherwise, the use of such electronic media will be at your company's sole risk and without any liability, risk or exposure to KWA LLC (Kathy Williams & Associates). You will not be automatically updated on revisions and/or modifications to the attached. **CONFIDENTIAL** The information, data and drawings embodied in this document are strictly confidential and are supplied with the understanding that they will not be disclosed to third parties without the prior written consent of the Owner.

From: Gates, Devin [mailto:ddgates@paric.com]
Sent: Thursday, October 06, 2016 4:59 PM
To: Scott Klingsick
Cc: kpatel@cannondesign.com
Subject: RE: Clarifications on returned EPDM shop drawings

Kelvin/Scott,

Were you able to take a look at this and does this resolve the impact resistance needs? I can resubmit formally as needed but with the back and forth I wanted to ensure we are all on the same page.

Thanks,

DEVIN GATES
SENIOR PROJECT ENGINEER

Cell: 314-348-8828
Main: 636-561-9500

- - - - -
77 Westport Plaza, Suite 250
St. Louis, MO 63146



Please consider your environmental responsibility before printing this e-mail

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From: Aaron Hammerstone [<mailto:aaron.hammerstone@kirberg.com>]
Sent: Tuesday, October 04, 2016 7:10 AM
To: Gates, Devin; scott@kwastl.com
Cc: kpatel@cannondesign.com
Subject: FW: Clarifications on returned EPDM shop drawings

All,

Please see the two attachments, as well as the information in the below email in regards to the ASTM testing on JM EPDM membrane.

Thanks

Aaron Hammerstone | Project Manager

314.333.4710 Direct | aaron.hammerstone@kirberg.com

314.792.3777 Mobile

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***** NOTICE *****

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From: Mark Tucker [<mailto:Mark@D7Reps.com>]
Sent: Monday, October 03, 2016 4:12 PM
To: Aaron Hammerstone

Cc: James Nunns; zac.stallings@jm.com; Jim Schriefer
Subject: RE: Clarifications on returned EPDM shop drawings

Aaron,

This JM EPDM 90NR data sheet shows we meet ASTM 4637 for EPDM. It's the same testing All EPDM is to meet, requiring minimum test results for numerous categories. There are three major manufacturers of EPDM: Johns Manville, Firestone, and Carlisle. NOTE: of the three, the latter two, have private label products, targeting a different market segment of contractors. The 3 major manufacturers are also, the only three members of the EPDM Roofing Association (ERA): <http://www.epdmroofs.org/about-era/members> . The goal of this organization is collectively establish current and accurate data documenting of EPDM.
<http://www.epdmroofs.org/about-era/who-we-are> .

Inside of **ASTM D 4637**, are individual tests for certain criteria. As a whole, make up ASTM D 4637.
Of which include the following:

ASTM D 5635 – Dynamic Puncture Resistance, 5J, Type 1 – Passes

ASTM D 5602 Static Puncture Resistance, 44.1 lbf, Type 1 – Passes

There are only two hail tests for the Single Ply Membranes (according to Jim D. Koontz- Crenshaw and Koontz).
Of which, the one most recognized, is FM's test, for approved Roof Nav assemblies per FM 4470.
For this project, we supplied the following two FM Nav #'s:

Assembly Properties

Assembly #:	392147-0-0	Slope:	1.0000
Roof System:	Single-Ply System	Wind Uplift*:	90
Application:	New Roof	Internal Fire:	1
Cover		Exterior Fire:	A
Securement:	Adhered		
Deck Type:	Steel	Hail:	SH
	For Use With Non-Combustible Walls:		No

AND

Assembly #:	374588-0-0	Slope:	1.0000
Roof System:	Single-Ply System	Wind Uplift*:	270
Application:	New Roof	Internal Fire:	NC
Cover		Exterior Fire:	A
Securement:	Adhered		
Deck Type:	Structural Concrete	Hail:	SH
	For Use With Non-Combustible Walls:		No

The roofing specification for this project, states in Part 1, paragraph 1.5, line 3, That the manufacturer must meet "Tested and listed by FM for class specified in "Performance Requirements" Article in Part 2 of this Section". In Part 2, **we met** Part 2, paragraph 2.2, A1. As noted, A2 criteria is for Modified Roofing. As such, A2 should be eliminated from requirements of the submittal, as **Part 2, 2.2, D.2** requires a Hail Resistance: SH. Of which, is met with both of the approved JOHNS MANVILLE Roof Nav Assembly numbers provided.

As for UL 2818, again is not a test used in the Single Ply industry. It is used primarily in the residential steep slope roofing market (shingles, tile, slate, metal roofs). The test requirement for this, is to test roof slopes at 6" in 12" or greater. This test was realized in 1996, by Major Property Insurers, the Institute of

Business and Home Safety (IBHS), and with United Laboratory. They developed ASMT 2218, to set a national standard, for roof impact resistance, for the residential steep slope market.

-
- A scope/ description, for the use of ASTM 2218, from the UL ASTM 2218 web page: <http://www.comm-2000.com/ProductDetail.aspx?UniqueKey=20884> click on "scope".
- 1 Scope

1.1 This test method provides impact resistance data for the evaluation of prepared roof covering materials. For purposes of this Standard prepared roof covering materials are considered to be small units, sheets or panels designed for installation with multiple layers of such materials installed in **overlapping rows normally on inclines exceeding 25 percent**.

We did a quick research of other manufacturers web sites, and on hand manufacturers data. Not one in the Single Ply manufacturing business, list or utilize the UL 2218 test. In fact, all manufacturers use the same testing, as it relates to the ASTM (see above for Static and Dynamic Puncturing) for that membrane. In this project instance, is EPDM (ASTM D 4637).

It appears to us, that there seems to be a mix of an EPDM specification, and a Modified/ Residential specification.

If this information does not satisfy the needs of the BID Documents, please let me know.

Mark

From: Aaron Hammerstone [<mailto:aaron.hammerstone@kirberg.com>]
Sent: Friday, September 30, 2016 2:25 PM
To: Mark Tucker <Mark@D7Reps.com>
Subject: Fwd: Clarifications on returned EPDM shop drawings

Thanks,

Aaron Hammerstone

Project Manager
Kirberg Company
(314)792-3777

Begin forwarded message:

From: Scott Klingsick <scott@kwastl.com>
Date: September 30, 2016 at 2:24:29 PM CDT
To: Aaron Hammerstone <aaron.hammerstone@kirberg.com>, "Gates, Devin" <ddgates@paric.com>
Cc: "Szachnieski, Jason" <JRSzachnieski@paric.com>, Kathy Williams <kathy@kwastl.com>
Subject: RE: Clarifications on returned EPDM shop drawings

Aaron,

Sorry for the confusion. The wrong ASTM number listed in the specification. It should have been ASTM D 4637-08 "Specification for EPDM Sheet Used in Single-ply Roof Membrane" and/or UL 2218 Standard for Impact Resistance of Prepared Roof Covering Materials. We need testing and product data to show compliance with the requirements impact resistance for the hail requirements on this project.

Scott Klingsick, LEED Green Associate

Project Manager
9721 Litzsinger Rd.
St. Louis, MO 63124
(p) 314.962.2560 (f) 314.962.4057
scott@kwastl.com



KWA Architects

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From: Aaron Hammerstone [<mailto:aaron.hammerstone@kirberg.com>]

Sent: Friday, September 30, 2016 12:13 PM

To: Gates, Devin; Scott Klingsick

Cc: Szachnieski, Jason

Subject: Re: Clarifications on returned EPDM shop drawings

ASTM D 3746 is for bituminous roofing. ASTM D 4272 is for plastic films.

This is an EPDM roof system. I think I'm missing something here.

Thanks,

Aaron Hammerstone

Project Manager
Kirberg Company
(314)792-3777

On Sep 30, 2016, at 11:26 AM, Gates, Devin <ddgates@paric.com> wrote:

Aaron,

See convo below regarding the shop drawing markups.

DEVIN GATES
SENIOR PROJECT ENGINEER

Direct: [636-561-9592](tel:636-561-9592)

Main: [636-561-9500](tel:636-561-9500)

Cell: [314-348-8828](tel:314-348-8828)

[77 Westport Plaza, Suite 250](#)
[St. Louis, MO 63146](#)

Sent from my iPhone

Begin forwarded message:

From: "Patel, Kelvin" <kpatel@CANNONDESIGN.COM>
Date: September 30, 2016 at 11:21:32 AM CDT
To: "Gates, Devin" <ddgates@paric.com>, "Szachnieski, Jason" <JRSzachnieski@paric.com>
Cc: "Grossman, Lynn" <lgrossman@CANNONDESIGN.COM>
Subject: FW: Clarifications on returned EPDM shop drawings

Devin,

See clarification from KWA below.

Thanks,

Kelvin Patel, CDT, LEED AP BD+C
Associate



T 314.425.8756

From: Scott Klingsick [<mailto:scott@kwastl.com>]
Sent: Friday, September 30, 2016 11:13 AM
To: Patel, Kelvin <kpatel@CANNONDESIGN.COM>; Kathy Williams <kathy@kwastl.com>
Cc: Grossman, Lynn <lgrossman@CANNONDESIGN.COM>
Subject: RE: Clarifications on returned EPDM shop drawings

Kelvin,

It is fine to show the building taller than 60' information.
We do need submittal for the 2.2 A.2. Impact
Resistance: Test reports and product data showing
compliance with ASTM D 3746 or ASTM D 4272. Thanks

Scott Klingsick, LEED Green Associate
Project Manager
9721 Litzsinger Rd.
St. Louis, MO 63124
(p) 314.962.2560 (f) 314.962.4057
scott@kwastl.com



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From: Patel, Kelvin [<mailto:kpatel@CANNONDESIGN.COM>]
Sent: Thursday, September 29, 2016 1:14 PM
To: Scott Klingsick; Kathy Williams
Cc: Grossman, Lynn
Subject: FW: Clarifications on returned EPDM shop drawings

Kathy / Scott,

Please review Paric's questions and provide comments.

Thanks,

Kelvin Patel, CDT, LEED AP BD+C

Associate



T 314.425.8756

From: Gates, Devin [<mailto:ddgates@paric.com>]
Sent: Thursday, September 29, 2016 1:04 PM
To: Patel, Kelvin <kpatel@CANNONDESIGN.COM>
Cc: Szachnieski, Jason <JRSzachnieski@paric.com>
Subject: Clarifications on returned EPDM shop drawings

Kelvin,

I have a couple of clarifications on two items from the attached rejected submittal.

1. On page 3 the perimeter and corner dimensions are crossed out for buildings taller than 60' however this building is higher than 60' in locations, is this note correct?
2. Can you please be more specific on what is being requested in the note "submit information for A2"? Johns Mansville did not feel like any of this section applies to the EPDM roof.

Thank you,

DEVIN GATES
SENIOR PROJECT ENGINEER

Cell: 314-348-8828
Main: 636-561-9500

77 Westport Plaza, Suite 250
St. Louis, MO 63146

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