MSDS ID: 8026720

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT PART NUMBER: 8026720
DESCRIPTION: 4488 BLACK

COMPANY:
Markem Corporation
150 Congress Street
Keene, NH 03431

EMERGENCY RESPONSE NUMBERS:
Transportation:
United States: (800) 424-9300
International: (703) 527-3887(collect)
Product Safety and Environmental:
(603) 352-1130

2. HAZARDOUS INGREDIENTS

COMPONENT	CAS #	PCT(WT)
N-butyl acetate	123-86-4	7-13
Ethylbenzene	100-41-4	0.1-1
Blocked hexamethylene diisocyanate polymer	153519-43-8	10-30
Carbon black	1333-86-4	10-30
Cyclohexanone	108-94-1	1-5
Dipropylene glycol monomethyl ether acetate	88917-22-0	1-5
Ethylbenzene	100-41-4	0.1-1
N-butyl acetate	123-86-4	7-13
Petroleum naphtha light aromatic	64742-95-6	0.5-1.5
Propylene glycol monomethyl ether acetate	108-65-6	5-10
Polyester/polyamine copolymer	UNKNOWN	1-5
1,2,4-trimethylbenzene	95-63-6	0.5-1.5

Exposure and physical property information is presented in Section 9.
If the total percentage is less than 100, the balance of this product is not considered to be hazardous as defined in the OSHA Hazard Communication Standard (29 CFR 1910.1200).

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

HMIS RATING SYSTEM
Health: 3
Flammability: 2
Reactivity: 1
Protection: B

NFPA RATING SYSTEM
Health: 3
Flammability: 2
Reactivity: 1

POTENTIAL HEALTH CONSIDERATIONS

3. HAZARDS IDENTIFICATION (Cont.)

LIKELY ROUTES OF ENTRY:
Contact; Inhalation; Absorption; Ingestion

TARGET ORGANS:
Eyes; Skin; Respiratory Tract; Nervous System; Liver; Kidneys; Lungs; Blood; Digestive Tract;

POTENTIAL IMMEDIATE EFFECTS FROM OVEREXPOSURE

EYE CONTACT
Can cause severe eye irritation, tearing and reddening, but not likely to permanently injure eye tissue. Temporary vision impairment (cloudy or blurred vision) is possible.

SKIN CONTACT
Corrosive to skin tissue, can cause chemical burns.
Skin Sensitizer! Avoid exposure. If sensitized, repeated exposures will result in skin irritation, even at very low concentrations.

SKIN ABSORBTION
Toxic if absorbed through the skin causing systemic damage.
Can be absorbed through the skin which can lead to permanent vision changes, loss of vision or total blindness.

INHALATION
Toxic by inhalation, can cause severe irritation or burns, pulmonary edema or lung inflamation. Central nervous system effects such as dizziness, weakness, fatigue, nausea, headache, unconsciousness and even asphyxiation are possible. Vapors may injure eyes, liver, kidneys, blood, and lungs. The degree of injury will depend on the concentration and duration of exposure.
High concentrations in immediate area can displace oxygen and can cause dizziness, unconsciousness and even death with longer exposure.
Respiratory Sensitizer! Avoid exposure. If sensitized, repeated exposures will result in respiratory irritation and shortness of breath, even at very low concentrations. These asthma-type symptoms may develop immediately or be delayed up to several hours.

INGESTION
Toxic. If swallowed, may cause abdominal discomfort, nausea, vomiting, diarrhea and systemic poisoning.
Aspiration of material into the lungs can cause chemical pneumonitis which can be fatal.

POTENTIAL LONG-TERM EFFECTS FROM OVEREXPOSURE:

CANCER INFORMATION
Contains a substance that can cause cancer in laboratory animals at high oral doses. Not a carcinogen according to NTP, IARC, or OSHA.
No IARC cancer hazard information available.
Contains a substance which is classified by ACGIH as A3: Confirmed animal carcinogen with unknown relevance to humans.
No NTP cancer hazard information available.

3. HAZARDS IDENTIFICATION (Cont.)

Classified by IARC as Group 2B: The agent (mixture) is possibly carcinogenic to humans.

REPRODUCTIVE SYSTEM INFORMATION
Contains a substance that is a possible reproductive hazard based on tests with laboratory animals.

ADDITIONAL HEALTH HAZARD INFORMATION
Butyl acetate: Throat irritation has been noted in human subjects at 200ppm. No information available.

MEDICAL CONDITIONS POTENTIALLY AGGRAVATED BY OVEREXPOSURE
Skin disease including eczema and sensitization, Liver disease, Kidney disease,

4. FIRST AID MEASURES

EYE CONTACT
Immediately flush eyes with plenty of water for at least 20 minutes retracting eyelids often. Get immediate medical attention.

SKIN CONTACT
Wash skin with soap and water. Immediately remove contaminated clothing and get medical attention. Launder or discard contaminated clothing at once.

INHALATION
Remove to fresh air. If not breathing, perform rescue breathing and, if available, have a trained person administer oxygen.
Get medical attention immediately.

INGESTION
Emergency personnel should be contacted immediately and be provided with this MSDS. For ingestion of small quantities of chemicals, the risk associated with inducing vomiting usually exceeds the poisoning risk.

5. FIRE FIGHTING MEASURES

FLAMMABILITY DATA
FLASH POINT: 101 F, 38 C
EXPLOSIVE/FLAMMABILITY LIMITS ESTIMATED FROM INGREDIENTS:
LOWER LIMIT: 1.0 %
UPPER LIMIT: 15.0 %
AUTOIGNITION TEMPERATURE ESTIMATED FROM INGREDIENTS:
500 F, 260 C

GENERAL HAZARDS
Vapors may be ignited by heat, sparks, flames or other sources of ignition giving rise to a Class B fire. Vapors are heavier than air and may travel to a source of ignition and flash back. Container may explode in heat of fire. Empty container may still contain residual material that can ignite and/or result in an explosion. Do not pressurize, cut, weld, braze, solder, drill,

5. FIRE FIGHTING MEASURES (Cont.)

grind, or expose empty container to heat, flame, sparks, static electricity, or other sources of ignition.

EXTINGUISHING MEDIA
Small Fires: Dry chemical, CO2, water spray or alcohol-resistant foam. Large Fires: Water spray, fog or alcohol-resistant foam. Move containers from fire area if it can be done without risk. Apply cooling water to containers that are exposed to flames until well after fire is out.

FIRE FIGHTING INSTRUCTIONS
Do not enter fire area without proper protection including self-contained breathing apparatus and full protective equipment. Fight fire from a safe distance and a protected location. Heat may build pressure and rupture closed containers, spreading fire and increasing risk of burns or injuries. Water may be ineffective in firefighting due to low flash point and limited miscibility with water. Flammable/combustible components of this material may be lighter than water and burn while floating on the surface. Use water spray/fog for cooling. Even if material is water soluble, it may not be practical to extinguish fire by water dilution. Notify authorities if liquid enters sewers or other public waters.

HAZARDOUS COMBUSTION PRODUCTS
carbon monoxide; hydrogen cyanide; nitrogen containing gases; carbon dioxide; aliphatic aldehydes

6. ACCIDENTAL RELEASE MEASURES

SPILL CLEAN-UP PROCEDURES
Shut off ignition sources; smoking, flames or other sources of ignition must not be permitted in the area. Small Spills: Take up with sand or other noncombustible absorbent material and put into properly labeled containers for disposal. Large Spills: Dike ahead of liquid spill area to minimize migration and vapor generation. Ventilate the area. Get professional help from outside contractors, the fire department or your trained spill brigade.

HEALTH CONSIDERATIONS AND PROTECTIVE EQUIPMENT
Information on the selection and use of personal protective equipment is found in Section 8 of this MSDS. Personal protective equipment needs must be evaluated based on information provided on this sheet and the special circumstances created by the spill including; material spilled, quantity, the area in which it occurred and the expertise of employees in the area responding to the spill. Never exceed any occupational exposure limits and consider that the evaporation of volatile solvents can lead to the displacement of air creating an environment that can cause asphxyiation.

7. HANDLING AND STORAGE

HANDLING
Avoid contact with material, avoid breathing vapors, use only in a well ventilated area, use bonding and grounding when transferring this material.

STORAGE
Store in a cool dry ventilated location, away from oxidizers, heat, flame or other incompatible conditions. Keep container(s) closed if possible.
Avoid exposure to light
Prevent contact with moisture

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

ENGINEERING CONTROLS
Local exhaust ventilation or other engineering controls may be needed when handling or using this product to keep exposure to airborne contaminants below the exposure limit. These controls should be explosion-proof when exhausting flammable vapors.

RESPIRATORY PROTECTION
If air monitoring indicates airborne concentrations at or above the limits, or symptoms of inhalation over-exposure occur, a respiratory protection program may be required. Engineering controls to reduce the exposure below acceptable limits are usually preferable to a respirator program.
Use engineering or administrative controls to minimize exposure in preference to using respirators. Protection provided by air purifying respirators is limited. Use a positive pressure air supplied respiratory if there is any potential for an uncontrolled release, exposure levels are not known, the work atmosphere may be deficient of oxygen, or any other circumstances where air purifying respirators may not provide adequate protection.

EYE PROTECTION
Chemically resistant safety glasses with side shields must be worn when handling this product. Further eye protection such as chemical splash goggles and/or face shield must be worn when the possibility exists for eye contact due to splashing or spraying liquid or airborne particles. Contact lenses should not be worn. An eye wash station should be available.

SKIN PROTECTION
Wear protective gloves and apron. Depending upon conditions of use other equipment may be required. Inspect gloves for chemical break-through and replace as required. Clean equipment after each use. An emergency eye wash in the area is recommended.
Insulating gloves should be used to protect against thermal burns when this product is used at elevated temperatures.
Appropriate gloves to be used for MARKEM products that are mixtures have not been determined. Glove type(s) for ingredients present at 10% or more (if known) are:
No information available

9. PHYSICAL AND CHEMICAL PROPERTIES - PRODUCT

APPEARANCE:	Liquid
COLOR:	Black
ODOR:	Characteristic
SPECIFIC GRAVITY(g/ml):	1.13
PERCENT VOLATILE:	23
VOC CONTENT(lb/gl):	2.447
VAPOR PRESSURE (Pa):	Not determined
BOILING PT OR RANGE(F):	ND
pH:	NA
VISCOSITY:	ND
VAPOR DENSITY:	Heavier than air
FREEZING POINT(F):	ND
EVAPORATION RATE:	0.5-2 (n-Butyl acetate = 1)

9.1 EXPOSURE, PHYSICAL AND CHEMICAL PROPERTIES FOR COMPONENTS

COMPONENT	ACGIH		OSHA	
	TWA\CEIL	STEL	TWA	CEIL
123-86-4	150 ppm	200 ppm	150 ppm	NE
100-41-4	100 ppm	125 ppm	100 ppm	NE
153519-43-8	NE	NE	NE	NE
1333-86-4	3.5 mg/m3	NE	3.5 mg/m3	NE
108-94-1	25 ppm	NE	50 ppm	NE
88917-22-0	100 ppm	150 ppm	100 ppm	NE
100-41-4	100 ppm	125 ppm	100 ppm	NE
123-86-4	150 ppm	200 ppm	150 ppm	NE
64742-95-6	NE	NE	NE	NE
108-65-6	NE	NE	NE	NE
95-63-6	25 ppm	NE	25 ppm	NE

COMPONENT CAS NUMBER	SPECIFIC GRAVITY	EVAP RATE N-BUTYL ACETATE=1	WATER SOLUBILITY Weight %	VAPOR PRESSURE mmHg at F
123-86-4	0.883	0.5-2	Minimal; 1-8.4 @ 20	
100-41-4	0.864	0.5-2	ND	10 mmHg @ 25.9°C
153519-43-8	1.000	ND	ND	<0.0075
1333-86-4	1.800	ND	Negligible;ND	
108-94-1	0.946	0.1-0.5	Minimal; 1-3.2 mmHg @ 20°C	
88917-22-0	0.972	<0.01	Complete; 1ND	
100-41-4	0.864	0.5-2	ND	10 mmHg @ 25.9°C
123-86-4	0.883	0.5-2	Minimal; 1-8.4 @ 20	
64742-95-6	0.750	ND	ND	ND
108-65-6	0.964	ND	Low; 10-24%	3.7
95-63-6	0.880	ND	ND	5 mmHg @ 38.3 °C

10. STABILITY AND REACTIVITY

STABILITY
May become unstable at elevated temperatures and/or pressure.

CONDITIONS TO AVOID
Heat, sparks, open flame, other ignition sources, oxidizing conditions, and elevated temperatures.

INCOMPATIBILITY
caustics (bases); strong oxidizing agents; water; acids; strong alkalines

HAZARDOUS DECOMPOSITION PRODUCTS
carbon monoxide; hydrogen cyanide; nitrogen containing gases; carbon dioxide; aliphatic aldehydes

11. TOXICOLOGICAL INFORMATION

n-Butyl acetate:
LC50 (inhalation, rat): 2000 ppm (4-hour exposure).
LC50 (inhalation, mouse): 6000 mg/m3 (1260 ppm) (2-hour exposure).
LD50 (oral, rat): 13100 mg/kg.
LD50 (oral, mouse): 7060 mg/kg.
LD50 (oral, rabbit): 7400 mg/kg.
LD50 (oral, guinea pig): 4700 mg/kg.
LD50 (dermal, rabbit): Greater than 5000 mg/kg.
TERATOGENICITY AND EMBRYOTOXICITY:
Rats exposed to 1500 ppm, 7 hours/day on days 1-16 of pregnancy showed signs of maternal toxicity and fetal toxicity (retarded growth).

Blocked homopolymer of hexamethylene diisocyanate:
This product contains a blocked isocyanate which is essentially unreactive at room temperature. Free isocyanate may be released if this product is heated to 50°C (122°F). If free isocyanate is inhaled it may cause respiratory conditions with asmathic and pneumonitis-like symptoms. Respiratory sensitization can occur with similiar symptoms.

Carbon black:

Carcinogenicity

NTP: Not classified
OSHA: Not classified
ACGIH: Not classifiable as a human carcinogen (A4)
IARC: Carbon black is possibly carcinogenic to humans (Group 2B)
Evaluation: There is inadequate evidence in humans for the carcinogenicity of carbon black. There is sufficient evidence in experimental animals for the carcinogenicity of carbon black. There is sufficient evidence in experimental animals for the carcinogenicity of carbon black extracts.
Overall evaluation: Carbon black is possibly carcinogenic to humans (Group 2B) [IARC. Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man. Geneva: World Health Organization, International Agency for Research on Cancer,1972-PRESENT. (Multivolume work).,p. 65 247 (1996)].

11. TOXICOLOGICAL INFORMATION (Cont.)

Summary of Data Reported and Evaluation:
Exposure data: In the late 1980s and early 1990s, more extensive studies in western Europe and the United States have found ... even lower exposures may occur among some workers in industries using carbon black, such as rubber, printing ink and paint manufacture, and exposures to carbon black in the use of rubber, printing ink or paint are negligible.
[IARC. Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man. Geneva: World Health Organization, International Agency for Research on Cancer,1972-PRESENT. VOL.: 65 (1996) (p. 149)].

LD50 (oral, rat): >8000 mg/kg

LC50 (inhalation, rat): 27000 mg/m3 (27 mg/L) (1-hour exposure).

CHRONIC INHALATION: Hamsters, mice, guinea pigs, rabbits and monkeys exposed to carbon blacks (channel black or furnace black) at concentrations of 85 mg/m3 (channel black) and 56 mg/m3 (furnace black) intermittently for periods up to 3000 hours (13,000 hours for monkeys) showed no significant effects other than accumulation of dusts in the lungs. The channel black contained extremely low levels of benzene-extractable material and the furnace black contained 0.28% extractable material.

SUBCHRONIC TOXICITY:
Rat, inhalation, duration 90 days
Target organ: lungs
Effect: inflammation, hyperplasia, fibrosis
NOEL =1.1 mg/m3

Cyclohexanone:
LD50 (rat, oral): 1535 mg/kg
LD50 (rat, oral): 1620 mg/kg
LD50 (rat, oral): 1840 mg/kg
LD50 (mouse, oral): 1400 mg/kg
LD50 (rabbit, percutaneous): 1000 mg/kg
LC50 (rat, inhalation): 8000 ppm (duration of exposure: 4 hr)

Propylene glycol monomethyl ether acetate:
A single dose of 3 mL/kg produced no deaths;
10 mL/kg caused death in 3 of 5 animals tested.

12. ECOLOGICAL INFORMATION

Butyl acetate:
LC50 Pimephales promelas (fathead minnow): 18 mg/l/96 hr ,
LC50 Lepomis macrochirus (Bluegill): 100 ppm/96 hr at 23 deg C.
LC50 Menidia peninsulae (tidewater silverside): 185 ppm/96 hr
If released to soil, n-butyl acetate may be susceptible to significant biodegradation based on its demonstrated biodegradability with a screening test. Chemical hydrolysis in moist alkaline soils (pH approaching 9 or higher) is expected to be important. Volatilization from dry soil surfaces is

12. ECOLOGICAL INFORMATION (Cont.)

is likely to rapid.
If released to water, biodegradation and volatilization are expected to be the important removal mechanisms. BOD studies using either a sewage inoculum or a natural river-water inoculum have demonstrated that n-butyl acetate is significantly biodegradable.
If released to air, the dominant removal mechanism will be the vapor-phase reaction with photochemically produced hydroxyl radicals which has an estimated half-life of about 6 days in an average atmosphere.
Cyclohexanone:
LC50 Pimephales promelas (fathead minnow) 527 mg/l 96 hr. If released to the atmosphere, cyclohexanone will degrade relatively rapidly by reaction with sunlight produced hydroxyl radicals (half-life of about 1 day) and by direct photolysis (half-life of about 4.3 days).
If released to water, cyclohexanone may degrade significantly through biodegradation photolysis. If released to soil, cyclohexanone will be susceptible to significant leaching.

13. DISPOSAL CONSIDERATIONS

Dispose of in accordance with all federal, state, local or provincial regulations.

14. TRANSPORT INFORMATION, DOT and IATA:

DOT: PRINTING INK, 3, UN1210, PG III
IATA: PRINTING INK RELATED MATERIAL, 3, UN1210, PG III,
LABEL REQUIRED: FLAMMABLE LIQUID

15. REGULATORY INFORMATION

Those ingredients appearing on the following list that do not appear in Section 2 are present at <0.1% for carcinogens, <1% for other hazardous substances, or are not considered hazardous in this product.
UNITED STATES OF AMERICA
FEDERAL REGULATIONS
CERCLA: The following components have CERCLA reportable quantities:

CASRN	DESCRIPTION	CERCLA RQ	WEIGHT%
123-86-4	BUTYL ACETATE	5000 lb final RQ; 2270 kg final RQ	11
100-41-4	ETHYLBENZENE	1000 lb final RQ; 454 kg final RQ	0

RCRA: The following components are subject to RCRA land disposal restrictions:

CASRN	DESCRIPTION
100-41-4	ETHYL BENZENE

SARA TITLE III
SECTION 302 Extremely Hazardous Substances (EHS)

CASRN	DESCRIPTION
None	

SECTION 311/312 Community Right to Know

15. REGULATORY INFORMATION (Cont.)

CASRN	DESCRIPTION
100-41-4	ETHYLBENZENE
95-63-6	1,2,4-TRIMETHYLBENZENE

SARA HAZARD CATEGORY INFORMATION
FIRE: YES
SUDDEN RELEASE OF PRESSURE: NO
REACTIVE: NO
IMMEDIATE (ACUTE) HEALTH HAZARD: YES
DELAYED (CHRONIC) HEALTH HAZARD: YES
SECTION 313 Toxic Chemical Release Inventory Reporting (TRI)

CASRN	DESCRIPTION	
100-41-4	ETHYLBENZENE	0
95-63-6	1,2,4-TRIMETHYLBENZENE	1

TSCA
SECTION 8(b) Inventory: All chemicals in this product appear in the inventory or are exempt from the listing requirements.
SECTION 12(b) Export: The following chemicals are subject to export reporting

CASRN	DESCRIPTION
123-86-4	N-BUTYL ACETATE

STATE REGULATIONS
CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65)
The following chemical(s) in this product are known to the State of California to cause cancer:

CASRN	DESCRIPTION	WGT%
71-43-2	BENZENE	0.001-0
1333-86-4	CARBON BLACK	10-30
91-20-3	NAPHTHALENE	<0.001

The benzene content of this material is <80 ppm. The bisphenol A and epichlorohydrin content is <1 ppm.
The following chemical(s) in this product are known to the State of California to be hazards to reproductive health:

CASRN	DESCRIPTION	WGT%
71-43-2	BENZENE	0.001-0

MASSACHUSETTS Right to Know Law

CASRN	DESCRIPTION	%
123-86-4	BUTYL ACETATE	7-13
100-41-4	ETHYL BENZENE	0.1-1
1333-86-4	CARBON BLACK	10-30
95-63-6	PSEUDOCUMENE	0.5-1.5

NEW JERSEY Right to Know Law

CASRN	DESCRIPTION	%
123-86-4	N-BUTYL ACETATE	7-13
100-41-4	ETHYL BENZENE	0.1-1
1333-86-4	CARBON BLACK	10-30
95-63-6	PSEUDOCUMENE	0.5-1.5

PENNSYLVANIA Right to Know Law

CASRN	DESCRIPTION	%
123-86-4	ACETIC ACID, BUTYL ESTER	7-13
100-41-4	BENZENE, ETHYL-	0.1-1
1333-86-4	CARBON BLACK	10-30
95-63-6	PSEUDOCUMENE	0.5-1.5

16. OTHER INFORMATION

Note: A CAS number in the form TSXXXX-XX-X is a trade secret.
NA= Not applicable
ND= Not determined
TS= Trade secret

MSDS prepared by Richard C. Berry

This information is offered in good faith as typical values and not as product specifications. No warranty, either expressed or implied, is made. The recommended industrial hygiene and safe handling practices are believed to be generally applicable, however each user must review the recommendations and determine the suitablity for their intended use.