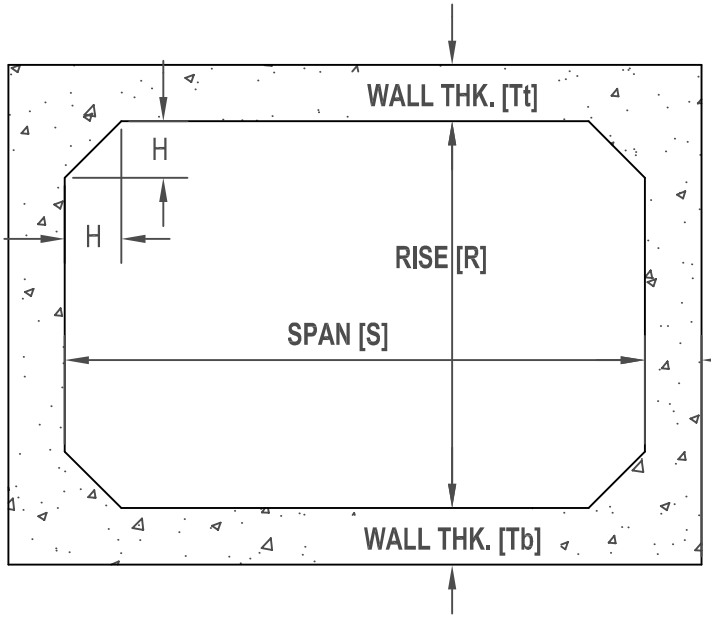
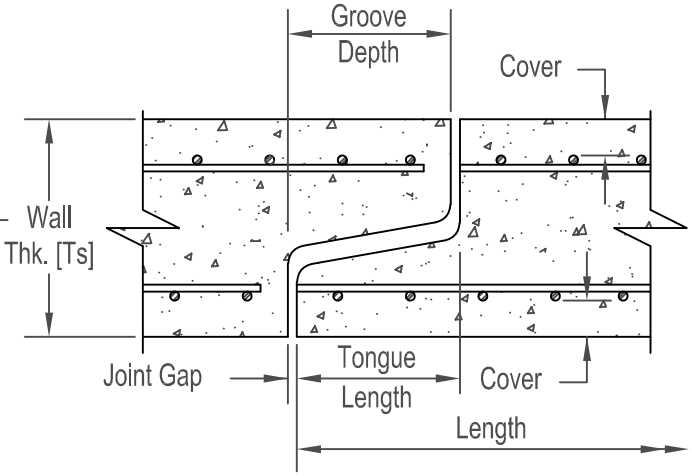
Reinforced Concrete Box Culvert Detail



Section thru Box Culvert



Section thru Box Joint

NOTES:

1. Box culverts produced to current ASTM Specification of C1433 HS 20 loading/C1577 HL 93 loading.
2. This Drawing is not intended to show Reinforcement Design - either as to placement or Steel Area. Actual Project Specification or current ASTM Specifications will govern.
3. Consult local representative for further information and/or details not listed on this drawing.

Dimensions and Approximate Weights of Concrete Box Sections

Greater than 2' fill - ASTM C1433/C1577						Less than 2' fill - ASTM C1433/C1577				
Dimensions Span x Rise	Top Slab	Bottom Slab	Wall	Waterway Area (sq. ft.)	Approx. Weight (lbs./ft.)	Top Slab	Bottom Slab	Wall	Waterway Area (sq. ft.)	Approx. Weight (lbs./ft.)
3' x 2'	5	5	5	5.8	870	8	6	5	5.8	1025
3' x 3'	5	5	5	8.5	940	8	6	5	8.5	1175
4' x 2'	5	5	5	7.7	988	8	6	5	7.7	1230
4' x 3'	5	5	5	11.7	1112	8	6	5	11.7	1354
4' x 4'	5	5	5	15.7	1238	8	6	5	15.7	1480
5' x 2'	6	6	6	9.1	1334	8	7	6	9.1	1558
5' x 3'	6	6	6	14.5	1483	8	7	6	14.5	1708
5' x 4'	6	6	6	19.5	1633	8	7	6	19.5	1858
5' x 5'	6	6	6	24.5	1783	8	7	6	24.5	2008
6' x 2'	7	7	7	11.1	1738	8	7	7	11.1	1827
6' x 3'	7	7	7	17.3	1912	8	7	7	17.3	2002
6' x 4'	7	7	7	23.3	2088	8	7	7	23.3	2177
6' x 5'	7	7	7	29.3	2262	8	7	7	29.3	2352
6' x 6'	7	7	7	35.3	2438	8	7	7	35.3	2527
7' x 2'	8	8	8	13.1	2366	8	8	8	13.1	2366
7' x 3'	8	8	8	20.1	2566	8	8	8	20.1	2566
7' x 4'	8	8	8	27.1	2766	8	8	8	27.1	2766
7' x 5'	8	8	8	34.1	2966	8	8	8	34.1	2966
7' x 6'	8	8	8	41.1	3166	8	8	8	41.1	3166
7' x 7'	8	8	8	48.1	3366	8	8	8	48.1	3366
8'x 2'	8	8	8	15.1	2566	8	8	8	15.1	2566
8' x 3'	8	8	8	23.1	2766	8	8	8	23.1	2766
8' x 4'	8	8	8	31.1	2966	8	8	8	31.1	2966
8' x 5'	8	8	8	39.1	3166	8	8	8	39.1	3166
8' x 6'	8	8	8	47.1	3366	8	8	8	47.1	3366
8' x 7'	8	8	8	55.1	3566	8	8	8	55.1	3566
8' x 8'	8	8	8	63.1	3766	8	8	8	63.1	3766
9' x 3'	9	9	9	25.0	3338	9	9	9	25.0	3338
9' x 4'	9	9	9	34.0	3563	9	9	9	34.0	3563
9' x 5'	9	9	9	43.9	3788	9	9	9	43.9	3788
9' x 6'	9	9	9	52.9	4012	9	9	9	52.9	4012
9' x 7'	9	9	9	61.9	4238	9	9	9	61.9	4238
9' x 8'	9	9	9	70.9	4462	9	9	9	70.9	4462
9' x 9'	9	9	9	79.9	4688	9	9	9	79.9	4688
10' x 3'	10	10	10	28.0	3967	10	10	10	28.0	3967
10' x 4'	10	10	10	38.0	4217	10	10	10	38.0	4217
10' x 5'	10	10	10	48.6	4466	10	10	10	48.6	4466
10' x 6'	10	10	10	58.6	4716	10	10	10	58.6	4716
10' x 7'	10	10	10	68.6	4966	10	10	10	68.6	4966
10' x 8'	10	10	10	78.6	5216	10	10	10	78.6	5216
10' x 9'	10	10	10	88.6	5466	10	10	10	88.6	5466
10' x 10'	10	10	10	98.6	5716	10	10	10	98.6	5716
11' x 4'	11	11	11	42.3	4929	11	11	11	42.3	4929
11' x 6'	11	11	11	64.3	5479	11	11	11	64.3	5479
11' x 8'	11	11	11	86.3	6029	11	11	11	86.3	6029
11' x 9'	11	11	11	97.0	6304	11	11	11	97.0	6304
11' x 10'	11	11	11	108.3	6579	11	11	11	108.3	6579
11' x 11'	11	11	11	119.3	6854	11	11	11	119.3	6854
12' x 4'	12	12	12	46.0	5700	12	12	12	46.0	5700
12' x 6'	12	12	12	70.0	6300	12	12	12	70.0	6300
12' x 7'	12	12	12	82.0	6600	12	12	12	82.0	6600
12' x 8'	12	12	12	94.0	6900	12	12	12	94.0	6900
12' x 9'	12	12	12	106.0	7200	12	12	12	106.0	7200
12' x 10'	12	12	12	118.0	7500	12	12	12	118.0	7500
12' x 12'	12	12	12	142.0	8100	12	12	12	142.0	8100

Material Safety Data Sheet

AmeriTex Pipe & Products LLC

Section I - Product and Company Identification			
Material Identity (Trade Names): Concrete Pipe and Box			
Manufacturer's Name: AmeriTex Pipe		Emergency Telephone Number:	830.372.2300
Address: 3960 Hwy 90 East Seguin, TX 75155		Telephone Number for Information:	830.372.2300

Section II - Hazardous Ingredients/Identity Information					
Hazardous Components (Chemical Identity/Common Names)	CAS No.	OSHA PEL	ACGIH TLV	MSHA PEL	%
Quartz (SiO_2) $\frac{10mg/M^3}{\%SiO_2 + 2}$ (as free Crystalline Silica)					

Section III - Physical/Chemical Characteristics			
Boiling Point	N/A	Specific Gravity (H_2O = 1)	N/A
Vapor Pressure (mm Hg)	N/A	Melting Point	N/A
Vapor Density (Air = 1)	N/A	Evaporation (Butyl Acetate = 1)	N/A
Solubility in Water:	Not Soluble		
Appearance and Odor:	Odorless Solid		

Section IV - Fire and Explosion Hazard Data			
Flash Point: Not Combustible	Flammable Limits: Not Flammable	LEL: N/A	UEL: N/A
Extinguishing Media: This material is noncombustible. Use extinguishing media appropriate to surrounding fire.			
Unusual Fire and Explosion Hazards: None			

Section V - Reactivity Data			
Stability:	Unstable		Conditions to Avoid: None
	Stable	X	
Incompatibility (Materials to Avoid): None			
Hazardous Decomposition or Byproducts: None			
Hazardous Polymerization: Not known to occur			

Section VI - Health Hazard Data			
Route(s) of Entry:	Inhalation? yes	Skin? no	Ingestion? yes
Health Hazards: Sawing or grinding may result in release of dust particles which may cause minor irritation of the eyes or nose.			
Chronic Effects: Result in lung disease (Silicosis) if exposed to excessive amounts for prolonged periods.			

Section VI - Health Hazard Data (continued)			
Carcinogenicity:	NTP	IARC Monographs	OSHA Regulated
	no	no	no
Signs and Symptoms of Exposure: Irritation of the eyes and nose, shortness of breath.			
Medical Conditions Generally Aggravated by Exposure: Pre-existing lung disease such as Emphysema or Asthma.			
Emergency and First-Aid Procedures: Eyes: Flush eyes generously with water for 15 minutes. If irritation persists, contact a physician. Inhalation of Dust: Remove exposed person to fresh air and support breathing as needed. Consult a physician immediately if irritation persists.			

Section VII - Precautions for Safe Handling and Use
Steps to Be Taken in Case Material is Released or Spilled: Sweep up and discard.
Waste Disposal Method: Dispose of as common waste.
Precautions to Be Taken in Handling and Storing: None
Precautions: Wear NIOSH approved respirator and tight fitting goggles when sawing or grinding.

Section VIII - Control Measures			
Resiratory Protection: NIOSH approved particulate respirator.			
Ventilation:	Local Exhaust:	Other:	
	Mechanical (General): In confined area.	Special:	
Skin Protection:		Eye Protection: Tight fitting safety goggles.	
Other Protective Clothing or Equipment: None			
Work/Hygienic Practices: N/A			

Disclaimer: The information contained in this Material Safety Data Sheet is based on technical data that the company believes to be accurate.

MARTIN ASPHALT

POLYMER MODIFIED CONCRETE JOINT SEALANT

Martin Asphalt is a concrete joint sealant made with a unique blend of asphalts enriched with high-grade polymer. Available in convenient strips, Martin Asphalt is a preformed, ready-to-use, flexible gasket that provides an excellent seal for concrete pipes, culverts, manholes and other precast concrete joints.

MEETS STATE AND FEDERAL REQUIREMENTS

Martin Asphalt meets or exceeds all requirements of ASTM C 990, U.S. Federal Specifications SS-S-210A, Type 1, Rope Form and AASHTO Designation M-198 75 I, Type B. Certified to meet or exceed highway department specifications.

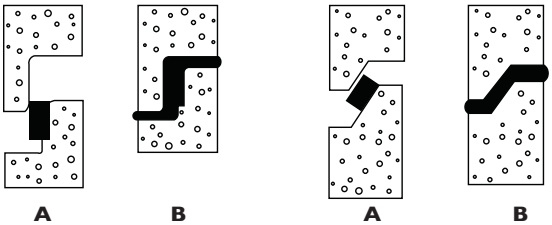
SAFE PREPARATION

Concrete surfaces to which sealant is to be applied must be clean and dry. Remove all mud, dirt, grease, oil and loose particles.

APPLICATION

Remove release paper from one side of sealant. Leave the outside paper in place to protect the sealant from contamination and stretching. Attach the sealant end-to-end to the leading edge of the tongue or groove of each pipe joint until a continuous gasket is established around the entire circumference of the pipe joint. Press material firmly into place through the outside paper. Remove the outside paper just prior to jointing the pipe. Avoid contaminating the exposed sealant with any foreign materials. Any contaminated sealant should be removed and replaced. Do not disturb the gasket placement. Any displaced sealant should be repositioned prior to jointing the pipes.

Read pipe manufacturer's instructions for proper pipe jointing procedures. The trench can be backfilled as soon as the joining process has been completed.



A) Sealant Placement
B) Joint After Compression

ADVANTAGES

A polymer modified sealant, Martin Asphalt offers significant advantages over non-modified sealants:

- 60% more adhesive strength
- 366% more cohesive strength
- Greater elasticity
- 40% higher ductility
- Consistent performance over a wider range of temperatures
- Provides watertight seal
- For concrete joints of all sizes and shapes
- Extruded strips for easy application
- Available in standard sizes and lengths
- Asbestos free
- Odorless
- 100% solids
- No primer necessary
- No shrinkage

Martin Asphalt-STRIPS
POLYMER MODIFIED CONCRETE JOINT SEALANT

MARTIN ASPHALT COMPANY

Martin Asphalt-STRIPS

POLYMER MODIFIED CONCRETE JOINT SEALANT

Packaging (English Standard)		
Sealant Size	**Pieces/Carton**	**FT./Carton**
3/4" x 2'6"	50	125 ft
1" x 2'6"	35	87.5 ft
1" x 3'6"	35	122.5 ft
1 1/4" x 3'6"	28	98 ft
1 1/2" x 3'6"	20	70 ft
1 3/4" x 3'6"	13	45.5 ft
2" x 3'6"	10	35 ft

Packaging (Metric)		
Sealant Size	**Pieces/Carton**	**FT./Carton**
19mm x 762mm	50	38.1m
25.4mm x 762mm	35	26.7m
25.4mm x 1067mm	35	37.3m
31.75mm x 1067mm	28	29.9m
38.1mm x 1067mm	20	21.3m
44.45mm x 1067mm	13	13.9m
50.8mm x 1067mm	10	10.7m

WORKING CONDITIONS

Conditions must preclude contamination of the sealant during the installation process by any foreign material such as silt or mud.

STORAGE

Store in a dry area protected from the elements. Do not stack cartons over six high.

CLEAN UP

Scrape excess sealant off surfaces. Asphalt stains can be removed with non-hazardous, biodegradable cleaners. Use waterless hand cleaner on skin. Follow cleaner manufacturer's instructions carefully. Do not use flammable or combustible petroleum-based solvents.

Properties & Performance Data	
Bitumen, % by wt.	50-70
Inert filler content, % by wt.	30-50
Volatile matter, max. % by wt.	2.0
Properties	
Specific gravity @ 770 F/250 C, (gr/ml)	1.2-1.35
Ductility @ 770 F/250 C, (cm), min.	5.0
Min. softening point	320˚ F/160˚ C
Min. flash point, C.O.C.	600˚ F/315˚ C
Penetration @ 770 F/250 C, 150 gms, 5 sec. (dmm)	50-120
Adhesion and hydrostatic pressure	No leaks (24 hrs.)
Sag or flow resistance	No sagging
Chemical resistance	No visible deterioration

MARTIN ASPHALT COMPANY

GULF STATE ASPHALT CO. L.P.
P.O. BOX 508
South Houston, Texas 77587
1-800-662-0987

MATERIAL SAFETY DATA SHEET

MARTIN ASPHALT COMPANY

Manufacturer's Name:	Martin Asphalt Company	Date: January, 2011	
Telephone Number:	800-662-0987	Address: 300 Christy Place	
For Emergency Assistance Call: (713) 941-4410		South Houston, TX 77587	

NFPA HAZARD IDENTIFICATION	DEGREE OF HAZARD	HAZARD RATINGS
	HEALTH: 1 FIRE: 1 REACTIVITY: 0	0= LEAST 1= SLIGHT 2= MODERATE 3= HIGH 4= EXTREME

SECTION 1 - COMPONENT DATA	
PRODUCT NAME	EVERGRIP 990 POLYMER MODIFIED CONCRETE JOINT SEALANT
CHEMICAL NAME	PETROLEUM ASPHALT (BITUMEN)
CHEMICAL FAMILY	PETROLEUM HYDROCARBON

SECTION 2 - PHYSICAL DATA	
BOILING POINT, °F:	>900
SPECIFIC GRAVITY:	1.20-1.35
VAPOR PRESSURE (mm HG):	*ND
MELTING POINT,°F:	>320
SOLUBILITY IN WATER:	NEGLIGIBLE
VAPOR DENSITY (AIR=1):	*ND
EVAPORATION RATE (N-BUTYL) ACETATE =1):	*ND
PH:	NEUTRAL
APPEARANCE AND ODOR:	BLACK SOLID. ASPHALT ODOR.

HAZARDOUS INGREDIENTS		
COMPONENT	**CAS NUMBER**	**PERCENT**
ASPHALT	8052-42-4	55-70

SECTION 3 - FIRE AND EXPLOSION HAZARDS	
FLASH POINT AND METHOD:	>500 °F (COC)
FLAMMABLE LIMITS: % VOLUME IN AIR	LOWER: *ND UPPER: *ND
EXTINGUISHING MEDIA	DRY CHEMICAL OR FOAM PREFERRED. WATER FOG MAY BE USED ON FLAT SURFACES SUCH AS ROADS.
SPECIAL FIRE FIGHTING PROCEDURES AND PRECAUTIONS	MATERIAL WILL NOT BURN UNLESS PREHEATED. DO NOT ENTER CONFINED FIRE SPACE WITHOUT FULL BUNKER GEAR (HELMET WITH FACE SHIELD, BUNKER COATS, GLOVES AND RUBBER BOOTS), INCLUDING A POSITIVE PRESSURE NIOSH APPROVED SELF-CONTAINED BREATHING APPARATUS. COOL FIRE EXPOSED CONTAINERS WITH WATER.
UNUSUAL FIRE AND EXPLOSION HAZARD	DO NOT HEAT ABOVE FLASH POINT. SULFUR OXIDES AND HYDROGEN SULFIDE, BOTH OF WHICH ARE TOXIC, MAY BE RELEASED UPON COMBUSTION. H2S VAPORS ARE HEAVIER THAN AIR, MAY ACCUMULATE IN LOW AREAS AND TRAVEL ALONG THE GROUND TO A REMOTE IGNITION SOURCE; IF IGNITED WILL FLASH BACK TO ORIGINAL CONTAINER.

*NA=NOT APPLICABLE **ND=NOT DETERMINED

SECTION 4 – REACTIVITY DATA	
STABILITY:	STABLE
HAZARDOUS POLYMERIZATION:	WILL NOT OCCUR
CONDITIONS AND MATERIALS TO AVOID	UNDER NORMAL CONDITIONS, PRODUCT IS STABLE.
HAZARDOUS DECOMPOSITION PRODUCTS	THERMAL DECOMPOSITION PRODUCTS ARE HIGHLY DEPENDENT ON THE COMBUSTION CONDITIONS. A COMPLEX MIXTURE OF AIRBORNE SOLID, LIQUID, PARTICULATES AND GASES WILL EVOLVE WHEN THIS MATERIAL UNDERGOES PYROLYSIS OR COMBUSTION. CARBON MONOXIDE, HYDROGEN SULFIDE AND OTHER UNIDENTIFIED ORGANIC COMPOUNDS MAY BE FORMED UPON COMBUSTION.

SECTION 5 - HEALTH HAZARD DATA	
THE HEALTH EFFECTS NOTED BELOW ARE CONSISTENT WITH REQUIREMENTS UNDER THE OSHA HAZARD COMMUNICATIONS STANDARD (29 CFR 1910.1200)	
EYE CONTACT	BASED ON ESSENTIALLY SIMILAR PRODUCT TESTING, PRODUCT IS PRESUMED TO BE MINIMALLY IRRITATING TO THE EYES.
SKIN CONTACT	BASED ON ESSENTIALLY SIMILAR PRODUCT TESTING, PRODUCT IS PRESUMED TO BE MINIMALLY IRRITATING TO THE SKIN.
INHALATION	VAPORS (GENERATED AT HIGH TEMPERATURES) MAY CAUSE IRRITATION TO NOSE, THROAT, AND RESPIRATORY TRACT.
SIGNS AND SYMPTOMS OF OVEREXPOSURE	IRRITATION AS NOTED ABOVE.
AGGRAVATED MEDICAL CONDITIONS	PREEXISTING EYE, SKIN, AND RESPIRATORY DISORDERS MAY BE AGGRAVATED BY EXPOSURE TO THIS PRODUCT.
HAZARDOUS INGREDIENT: ASPHALT	CARCINOGENICITY
NTP LISTED	NO
IARC LISTED	YES
OSHA REGULATED	NO
OCCUPATIONAL EXPOSURE LIMITS:	

	OSHA		ACGIH		
COMPONENT	PEL/TWA	PEL/CEILING	TLV/TWA	TLV/STEL	OTHER
ASPHALT			5 MG/M^3		

SECTION 6 - EMERGENCY AND FIRST AID PROCEDURES	
EYE CONTACT	FLUSH EYES WITH PLENTY OF WATER FOR 15 MINUTES WHILE HOLDING EYELIDS OPEN. GET MEDICAL ATTENTION.
SKIN CONTACT	REMOVE CONTAMINATED CLOTHING/SHOES AND WIPE EXCESS FROM SKIN. FOLLOW BY WASHING WITH SOAP AND WATER. USE OF A WATERLESS HAND CLEANER WILL HELP TO REMOVE THE PRODUCT IF NEEDED. IF IRRITATION OCCURS, GET MEDICAL ATTENTION. DO NOT REUSE CLOTHING UNTIL CLEANED.
INHALATION	NOT SIGNIFICANT
INGESTION	DO NOT INDUCE VOMITING. IN GENERAL, NO TREATMENT IS NECESSARY UNLESS LARGE QUANTITIES OF PRODUCT ARE INGESTED. HOWEVER, GET MEDICAL ADVICE.

SECTION 7 – PERSONAL HEALTH PROTECTION INFORMATION	
PROTECTIVE CLOTHING	AVOID CONTACT WITH EYES. WEAR SAFETY GLASSES OR GOGGLES, GLOVES, APRON AND OTHER PROTECTIVE CLOTHING AS REQUIRED TO PREVENT CONTACT. AVOID PROLONGED OR REPEATED CONTACT WITH SKIN.

*NA=NOT APPLICABLE **ND=NOT DETERMINED

RESPIRATORY PROTECTION	AVOID PROLONGED OR REPEATED BREATHING OF VAPORS. IF EXPOSURE MAY OR DOES EXCEED OCCUPATIONAL EXPOSURE LIMITS USE A NIOSH/MSHA APPROVED RESPIRATOR TO PREVENT OVEREXPOSURE. IN ACCORD WITH 29 CFR 1910.134 USE EITHER AN ATMOSPHERE-SUPPLYING RESPIRATOR OR AN AIR-PURIFYING RESPIRATOR FOR ORGANIC VAPORS.

SECTION 8 – SPILL, LEAK & DISPOSAL PROCEDURES	
STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED	MAY BURN ALTHOUGH NOT READILY IGNITABLE. WEAR PROTECTIVE CLOTHING AS APPROPRIATE. DIKE AND CONTAIN. DISPOSE OF PROPERLY.
WASTE DISPOSAL METHOD	ALL DISPOSALS MUST COMPLY WITH FEDERAL, STATE, AND LOCAL REGULATIONS. THE MATERIAL, IF SPILLED OR DISCARDED, MAY BE A REULATED WASTE. REFER TO STATE AND LOCAL REGULATIONS. CAUTION! IF REGULATED SOLVENTS ARE USED TO CLEAN UP SPILLED MATERIAL, THE RESULTING WASTE MIXTURE MAY BE REGULATED. DEPARTMENT OF TRANSPORTATION (DOT) REGULATIONS MAY APPLY FOR TRANSPORTING THIS MATERIAL WHEN SPILLED. WASTE MATERIAL MAY BE LANDFILLED OR INCINERATED AT AN APPROVED FACILTIY. MATERIALS SHOULD BE RECYCLED IF POSSIBLE.

SECTION 9 - SPECIAL PRECAUTIONS/ADDITIONAL INFORMATION	
WHEN ASPHALTIC PRODUCTS ARE HEATED, THEY OFTEN GIVE OFF SMALL AMOUNTS OF HYDROGEN SULFIDE. HYDROGEN SULFIDE IS AN EXTREMELY FLAMMABLE, HIGHLY TOXIC GAS. BREATHING HYDROGEN SULFIDE MUST BE AVOIDED. MINIMIZE BREATHING OF VAPORS, FUMES, OR MIST; WHEN POSSIBLE, USE VENTILATION OR WORK UPWIND OF SOURCE OF VAPORS, FUMES AND MIST. LAUNDER CONTAMINATED CLOTHING BEFORE USING. DISCARD LEATHER GOODS WHEN THEY CANNOT BE DECONTAMINATED. OBSERVE GOOD PERSONAL HYGIENE. WASH THOROUGHLY AFTER WORKING WITH ASPHALT AND BEFORE EATING OR SMOKING.	
D.O.T. CLASSIFICATION:	NOT REGULATED.
D.O.T. PROPER SHIPPING NAME:	POLYMER MODIFIED CONCRETE JOINT SEALANT
OTHER REQUIREMENTS:	NONE
THE COMPONENTS OF THE PRODUCT ARE LISTED ON THE EPA/TSCA INVENTORY OF CHEMICAL SUBSTANCES.	

THE INFORMATION CONTAINED HEREIN IS BASED ON THE DATA AVAILABLE TO US AND IS BELIEVED TO BE CORRECT. HOWEVER, MARTIN ASPHALT COMPANY MAKES NO WARRANTY, EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THIS DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF. THIS INFORMATION AND PRODUCT IS FURNISHED ON THE CONDITION THAT THE PERSON RECEIVING THEM SHALL MAKE THEIR OWN DETERMINATION AS TO THE SUITABILITY OF THE PRODUCT FOR THEIR PARTICULAR PURPOSE AND ON THE CONDITION THAT THEY ASSUME THE RISK OF USE THEREOF.

*NA=NOT APPLICABLE **ND=NOT DETERMINED