



Concrete Crack **Epoxy** Resin Injection Repair Guide

The information for waterproofing cracks in poured concrete has been compiled from several professional sources as recommended guidelines. Due to the variability in poured wall conditions, the selection of the proper material for the intended application and installation is the sole responsibility of the applicator.

REPAIR KIT CONTENTS

The Mar-flex kit includes all of the materials and accessories for low-pressure injection and repair of approximately 6-10 linear feet of cracks.

- 2 jars Mar-flex Crack Seal and Port Adhesive (1 jar 8 oz. Part A, 1 jar 8 oz. Part B)
- 2 wooden sticks
- 15 surface ports and caps
- 2 cartridges Mar-flex Injection Epoxy Resin
- 2 1/4x32 mixing nozzles (for use with Injection Resin)
- 1 injection hose assembly with white plastic shut-off valve
- Safety glasses
- 2 pair nitrile gloves
- 1 plastic trowel
- 1 wire brush
- 1 drop cloth
- Complete instructions & instructional CD
- Product Data Sheets & MSDS

TOOLS REQUIRED

- Standard caulking gun
- Paper plate or scrap cardboard for mixing Surface Seal and Port Adhesive.
- Clean used plastic bottle (soap, ketchup) filled 1-2 cups of water

CRACK PREPARATION

Place drop cloth on the floor in front of work area. Clean the surface surrounding the crack using the wire brush. Remove loose or flaking concrete, efflorescence, paint or coating to approximately 1-2 inches on either side of the crack. Wipe the surface clean of dust after brushing. The surface must be dry for proper installation of injection ports and surface seal. For best results if the surface is wet, wait a few days until dry or if necessary, use a hot air gun, hair drier, or oil free compressed air to dry.

SURFACE PORT PLACEMENT

Ports are placed apart the thickness of the concrete wall (usually about 8") centered over the crack, starting at a point closest to the floor (vertical cracks). Mark port locations on the wall.

SURFACE PORT ATTACHMENT AND SEALING OF THE CRACK

1. Prepare Crack Seal & Port Adhesive using **separate** wooden sticks to remove equal amounts of Parts A and Part B, about 1/3 of each jar. Sticks should not be shared between containers to prevent remaining material from hardening. Place equal amounts of adhesive on a scrap piece of cardboard and mix with the trowel (repeat this

step each time you run out of mixed adhesive). Remove the cap from the surface port then apply a small amount of mixed adhesive to the bottom of the port base. Place the first port starting at the bottom of the crack and repeat every 8" until the entire crack is ported. *NOTE! Do not allow epoxy to block the bottom of the port opening or the crack under it.*

2. The next step is to work the mixed surface seal epoxy paste along the entire length of the crack using the plastic trowel. The recommended epoxy paste application is 1/8" thick and 2" wide. Make sure to mound sufficient extra epoxy around the base of the ports. Expect to use 16 ounces, the total amount provided, for an 8-foot crack. Do not work the epoxy "into" the crack, just paste over the surface.
3. Let the surface seal and port adhesive cure before beginning injection, about 2-4 hours until fingernail hard. (Not recommended to wait overnight.)

INJECTION PROCEDURE

1. Flush the crack with 1-2 cups of water poured into the top port using plastic bottle or by filling the hose assembly several times. Water should come out of every port below the top port indicating that the crack is contiguous and that ports are not blocked by epoxy. Water is also necessary to flush the crack and aid in resin activation.
2. Place the Mar-flex Injection Resin cartridge in your caulking gun. Remove the plastic cap and pull to remove the plastic seal. Place the 3/8 X 24 mixing nozzle over the end of the cartridge attaching with the plastic nut.
3. Attach the flexible hose assembly (wide end) over the mixer tip by pushing firmly.
4. For vertical cracks attach the small end of the hose assembly into the **lowest** port by pressing firmly. For horizontal cracks begin at either end if one is not lower than the other.
5. Begin injecting slowly through the port with low pressure (allowing the resin time to flow into and fill all small fissures) until the resin begins to flow from the port above it. Use the white plastic pinch valve on the hose assembly to turn off resin flow, plugging the first port with the cap provided, and move up to the next port. Repeat this procedure until the entire crack has been injected with resin. *Note! The secret to effective crack injection is patient low-pressure introduction of the resin. Small or hairline cracks will require 3 - 4 minutes at each port for proper filling to take place.*

The ports can be removed by striking with a hammer after epoxy injection is set in about 24 or 48 hours. The surface seal epoxy is paintable if desired. Place all disposable items on drop cloth which is a garbage bag and dispose of properly.



Guía Para Reparar Grietas en Estructuras de Concreto, Usando el Sistema de Inyección de Resina de **Epoxy**

La información siguiente de como impermeabilizar grietas en estructuras o paredes de cemento ha sido compilada de entre varias fuentes de información profesional y las recomendamos como guías. Debido a la variedad de condiciones de estas paredes de cemento, la selección e instalación del material apropiado para dicho trabajo depende enteramente de quién esté a cargo de aplicarlo.

CONTENIDO DEL KIT DE REPARACIÓN:

El "kit" Mar-flex incluye todos los materiales y accesorios necesarios para "inyección" a baja presión para reparar grietas de unos 6-10 pies lineares (o sea un metro y medio a 3 metros lineares).

- 2 latas de "Mar-flex" o sea el sellador de grietas y el pegamento (una lata de 8 onzas - Parte A; una lata de 8 onzas - Parte B)
- 2 palitos para mezclar
- 15 "tubos cilíndricos" con tapas
- 2 cartuchos de "Mar-flex" para inyectar la resina de Epoxy
- 2 tubos recto mezclador (1/4x32) para mezclar el Epoxy
- 1 montaje completo incluyendo la manguera con válvula para parar el líquido de inyección
- Gafas o anteojos protectores
- 2 pares de guantes de nitrilo
- 1 paleta plástica (trowel)
- 1 cepillo de alambre
- 1 tela protectora
- CD con instrucciones detalladas; Páginas de información detallada del producto y MSDS

HERRAMIENTAS REQUERIDAS

- Cilindro para calafatear
- Plato de Cartón (o un pedazo de cartón) para hacer la mezcla del sellador y pegamento para el port (tubo cilíndrico)
- Botella de plástico – limpia – llena con 1-2 tazas (8 onzas) de agua

MODO DE PREPARAR LA GRIETA

Extienda en el piso la tela protectora frente al área donde se hará el trabajo. Limpie la superficie al rededor de la grieta usando el cepillo de alambre. Quite los pedacitos de concreto o partículas de pintura o cualquier otro material en un área de más o menos una o dos pulgadas, a cada lado de la grieta. Limpie de nuevo el área del trabajo quitando todo el polvo. La superficie debe estar perfectamente seca para poder instalar los "tubos cilíndricos" (ports) a través de los cuales se introducirá el pegamento en la grieta. Para obtener el mejor resultado, si la superficie estuviera húmeda es mejor esperar unos días hasta que esté bien seca (si fuere necesario, se puede usar un secador de aire caliente, como un secador de pelo).

COMO COLOCAR LOS "TUBOS CILÍNDRICOS" Y COMO SELLAR LA GRIETA

1. Prepare el "pegamento de grietas" usando una de los palitos de madera para sacar del envase plástico igual cantidad de cada una parte A y parte B mas o menos 1/3 parte de cada envase. Es importante que se use los palitos separadamente es decir un palitos para cada envase, así se evita que el material se endurezca antes de tiempo. Coloque cantidades iguales del sellador en un pedazo de cartón y mézclelo con la paleta plástica (trowel). Repita el procedimiento ya indicado, cada vez que necesite más mezcla de pegamento. Saque la tapa del "tubo cilíndrico", entonces aplique una pequeña cantidad del ya mezclado pegamento en el fondo de la base del "tubo cilíndrico" (port). Coloque o pegue el primer "tubo cilíndrico" en la parte baja de la grieta y continúe colocando los demás "tubos" a una distancia como de 8 pulgadas (20 centímetros) hasta completar a

lo largo de toda la grieta. ATENCIÓN: Tenga mucho cuidado de que el "epoxy" no tape el fondo de la cavidad del tubo cilíndrico, o la grieta debajo de este.

2. El próximo paso a seguir es aplicar la mezcla o pasta selladora a lo largo de toda la grieta usando la paleta plástica. Recomendamos que la aplicación de la pasta "epoxy" sea de 1/8 de pulgada (31 milímetros) de espesor y unas 2 pulgadas (5 ½ centímetros) de ancho. Asegúrese de poner suficiente "extra epoxy" al rededor de las bases de los "tubos cilíndricos" (ports). calcule que usará unas 16 onzas o sea el total de la cantidad provista para reparar una grieta de más o menos 8 pies (o sea 2 metros y medio). No aplique el "epoxy" dentro de la grieta solamente sobre la superficie de la misma.

3. Dele tiempo adecuado a la mezcla selladora y al pegamento, antes de empezar a inyectar, más o menos de 2 a 4 horas hasta que esté dura como una uña. No recomendamos que espere tanto como una noche.

COMO HACER LA INYECCIÓN

1. Lave la grieta con 2 tazas de agua vertiendo la dentro del "tubo cilíndrico" usando para esto la botella plástica (indicada anteriormente) o llenando el montaje de la manguera varias veces. El agua debe chorrear de cada uno de los "tubos cilíndricos", estos por cierto consecutivamente debajo del primer "tubo", lo cual indica que la grieta está contigua y que los "tubos cilíndricos" no están obstruidos por el "epoxy". Agua es también necesaria para lavar la grieta y ayuda a activar la resina.

2. Coloque el cartucho de la resina para la inyección en su herramienta de calafateo. Quite la tuerca plástica y jale para sacar el sello plástico. Coloque el piton (o caño) mezclador (de 3/8 x 24 pulgadas) al extremo del cilindro inyector (cartucho) colocando luego la tuerca plástica.

3. Coloque el montaje de la "manguera flexible" en la punta del mezclador empujando con fuerza.

4. Para grietas verticales, adiera el extremo angosto del montaje de manguera al "tubo cilíndrico" situado en la parte baja de la grieta. Para esto deberá presionar firmemente. Para grietas horizontales, empiece en cualquier de los extremos – siempre que no esté a desnivel.

5. Comiense a inyectar lentamente a través del "tubo cilíndrico" con poca presión (dándole a la resina tiempo para penetrar y llenar todas las endiduras pequeñas) hasta que la resina empiece a correr (o chorrear) procedente del tubo de encima. Use la válvula plástica blanca del montaje de la manguera para parar el curso de la resina y tape o pare también el fluido de resina proveniente del primer "tubo cilíndrico" usando la tapa que le corresponde, y continúe el proceso igualmente con los demás tubos. Repita el procedimiento hasta que toda la grieta haya sido inyectada con la resina.

NOTA: El secreto de como inyectar una grieta consiste en, con paciencia, introducir la resina a baja presión.

Grietas muy angostas requieren no más de 3 a 4 minutos para llenar cada tubo apropiadamente.

Para sacar los "tubos cilíndricos" golpédos con un martillo después de que la espuma haya llegado a completarse o sea en 3 o 4 horas. La superficie del epoxy (sellador) puede pintarse si así lo desea.

Al finalizar la obra, ponga en la tela protectora todos los objetos que sea basura. Que deberá ser desechada en forma apropiada.

PRODUCT DATA SHEET

Mar-flex

500 Business Parkway, Carlisle, OH 45005

www.Mar-flex.com 1-800-498-1411

Mar-flex Injection Epoxy

PRODUCT PRESENTATION

MAR-FLEX INJECTION EPOXY 1:1 LV is a two-component, 100% solid, moisture insensitive epoxy resin system which has a high modulus of elasticity. MAR-FLEX INJECTION EPOXY 1:1 LV is formulated to meet ASTM C-881 specifications. It is unique in that it rapidly thickens in the crack, even those less than 1/32 of an inch, so that material cannot leak out the back for more than 10-20 minutes (unlike conventional products which can flow out hours after injection). You can now confidently replace whatever may have leaked out in those twenty minutes knowing that no more can leak out, unless all the initial injection has leaked out the back of the crack within 20 minutes (unlikely to happen). This overcomes the most common epoxy crack repair failure, namely the incomplete injection of epoxy into a crack arising when material leaks out the back of a crack after injection.

USES

- A) Structural repair of cracked concrete by pressure injection, grouting.
- B) Monolithic restoration of delaminated concrete.
- C) Grouting material when mixed with aggregate.

SURFACE PREPARATION

All surfaces must be clean and free of dirt, dust, oil, grease or any contaminant that could adversely affect the bond of the surface seal. Surfaces must be structurally sound. Surfaces may be dry or damp. However, due to the many variables in bonding damp surfaces, be certain to make a test application under the same conditions as the full scale work.

APPLICATION

Injection Pressure: The material can be injected into cracks down to .002 inches with pressures ranging from 20 to 300 psi. Inject through plastic ports. Depending upon the depth of the slab, place them every 6" to 2' along the length of the crack. Wherever possible, seal all surfaces of the crack.

Begin injection of the mixed material with the lowest port or at one end of the crack. Continue pumping until resin flows from the next port. Then seal the first port and move onto the next one using the same procedure along the length of the crack.

Gravity Feeding Slab: "Vee" out the cracks. Blow and clean out thoroughly with oil-free compressor air. Fill the cracks with RESIN. More than one application may be required.

TECHNICAL DATA

PROPERTIES (UNCURED)

	<u>PART A</u>	<u>PART B</u>	<u>MIXED</u>
Viscosity, cps	200-400	300-600	Not Avail.
Shelf Life	1 year	1 year	
Pot Life: (50 gm)	_____	_____	10 min.
Tack Free Time (Thin Film)	_____	_____	1-3 hours
Final Cure (75% ultimate strength)	_____	_____	1-2 days

PHYSICAL PROPERTIES AFTER CURE OF 14 DAYS @ 75°F. AT 50% R.H.

Tensile Strength, psi	ASTM D-638	8500
Tensile Elongation	ASTM D-638 modified	2-4%
Compressive Strength, psi	ASTM D-695	12,000
Compressive Modulus, psi	ASTM D-695 (28 days)	500,000
Shear Strength, psi	ASTM D-732	5,100
Deflection temp: @ 264 psi	ASTM D-648	126°F
Bond Strength, psi	ASTM C-882	2,800

WARRANTY

Recommendations concerning the performance or use of this product are based upon independent test reports believed to be reliable. If the product is proven to be defective, at the option of the Manufacturer, it will be either replaced or the purchase price refunded. The Manufacturer will not be liable in excess of the purchase price. The user will be responsible for deciding if the product is suitable for his application and will assume all risk associated with the use of the product. This warranty is in lieu of any other warranty expressed or implied, including but not limited to an implied warranty of merchantability or an implied warranty of fitness for a particular use.

MATERIAL SAFETY DATA SHEET

MANUFACTURER: MAR-FLEX

500 Business Parkway, Carlisle, OH 45005

EMERGENCY TELEPHONE 800-535-5053

SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: MAR-FLEX INJECTION EPOXY PART A

SYNONYM: THERMOSETTING RESIN

CHEMICAL FAMILY: EPOXIDE

DATE: FEBRUARY, 2010

SECTION II - HAZARDOUS INGREDIENTS AND OTHER COMPONENTS

<u>INGREDIENT</u>	<u>% BY WEIGHT</u>	<u>EXPOSURE LIMITS</u>	<u>CAS #</u>
Diglycidyl ether resin mixture	65-95%	N.E.	25068-38-6
Proprietary diluent	5-35%	50 PPM-PEL	98-00-0
N-Butyl glycidylether	0-10%	_____	2426-08-6

SECTION III - PHYSICAL DATA

Boiling Point: >200°F

VP: N.A.

VD: N.A.

Solubility in water: SLIGHT

Evaporation rate: N.A.

SP GR: 1.1 - 1.2

% Volatile by volume: <3%

Color: Clear

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: 490°F CL.

Flammable Limits: UK

Extinguishing Media: Carbon dioxide, foam, water spray

Special fire fighting procedures: Use self-contained breathing apparatus. Unusual fire and explosion hazards: Decomposition and combustion products may be toxic.

SECTION V - HEALTH HAZARD DATA

Primary Route(s) of Entry: Inhalation, skin contact.

Toxicological Data: LD SOs provided are the lowest values for typed of bisphenol A, diglycidal ether resins used. Oral: LD₅₀ (rabbit) > 4000 MG/KG

Skin irritation: (rabbit) moderate irritation

Eye irritation: (rabbits) mild irritation

Sensitization: Sensitizer

Effects of Overexposure: Irritation, sensitization and dertitis.

Medical conditions generally aggravated by exposure: allergy eczema, skin conditions

PART A (CONT'D)

Carcinogenicity: None of the components of this material are listed as carcinogens by NTP, LARC, or OSHA.

In order to comply with California Proposition 65, we feel obligated to advise that some of our products may conceivably contain trace contaminants of some of the listed chemicals. While not necessarily added to our products as ingredients, some listed chemicals may be present in the raw materials from suppliers and over which we have no control. Therefore, even though some of the listed substances may not be present, a significant risk as defined by the regulations in order to comply with California law, we feel obligated to make the following statement:

WARNING: Our products may contain trace amounts of some chemicals considered by the State of California to be carcinogens or reproductive toxicants.

Emergency and first aid procedures:

Eyes: Flush with water for at least 15 minutes. If any ill effects develop, seek medical attention.

Skin: Wash with soap and water. Wash contaminated clothing before reuse.

Inhalation: Remove to fresh air and give oxygen if breathing is difficult.

Ingestion: Give large quantities of water and induce vomiting. Get medical attention.

SECTION VI - REACTIVITY DATA

Stability: Stable

Conditions to Avoid: Elevated temperatures

Incompatibility Materials to Avoid: Strong oxidizers, strong acids or bases in bulk.

Hazardous Decomposition Products: Carbon monoxide, carbon dioxide, aldehydes and other organics.

SECTION VII - SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled: Avoid all personal contact. Wipe with rag for small spills. For larger spills, use absorbent material. Collect waste in designated container. Flush contaminated areas with water.

Waste Disposal Method: Dispose in accordance with federal, state and local regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION

Respiratory Protection: Avoid breathing vapors. Use adequate ventilation.

Ventilation: Good mechanical ventilation and local exhaust.

Eye Protection: Safety glasses.

Protective Gloves: Rubber or polyethylene.

Protective Equipment: Disposable containers and paper on work area. Use of barrier cream recommended. Use appropriate equipment to prevent eye or skin contact.

SECTION IX - SPECIAL PRECAUTIONS

Precautions to be taken in handling and storage: Causes irritation. May cause allergic skin reaction. Avoid contact with eyes, skin and clothing. Store in cool, dry area in closed cartridges.

Other precautions: Avoid breathing vapors, use with good ventilation. Wash hands thoroughly with soap and water after every use.

Health	Flammability	Reactivity	Personal Protection
2	1	0	B

All statements, technical information and recommendations contained herein are based upon available scientific test or data which we believe to be reliable since we cannot anticipate all conditions under which this information and our products or the products of other manufacturers in combination with our products may be used. Emecole makes no warranties, express or implied, and assumes no responsibility in connection with any use of this information.

MATERIAL SAFETY DATA SHEET

MANUFACTURER: MAR-FLEX

500 Business Parkway, Carlisle, OH 45005
EMERGENCY TELEPHONE 800-535-5053

SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: MAR-FLEX INJECTION EPOXY PART B

SYNONYM: EPOXY HARDENER

CHEMICAL FAMILY: MODIFIED POLYAMINE/POLYAMIDE COMPOSITION

DATE: FEBRUARY, 2010

SECTION II - HAZARDOUS INGREDIENTS AND OTHER COMPONENTS

<u>INGREDIENT</u>	<u>% BY WEIGHT</u>	<u>EXPOSURE LIMITS</u>	<u>CAS #</u>
Proprietary Polyamine/ Polyamide Blend	<70	N.E.	UK
Proprietary Diluent	10-15	10 PPM-ACGIH-TWA	98-00-0
Diethylene Triamine	<5	1 PPM-SKIN-ACGIH	111-40-0
Proprietary Polymercaptan	<15	N.E.	N.E.

SECTION III - PHYSICAL DATA

Boiling Point: NOT DETERMINED (>200° F)

VD: N.A.

Solubility in water: SLIGHT

Evaporation Rate: N.A.

SP. GR: .98 - .99

% Volatile by Weight: <3%

Color: Straw

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: 185 f PMCC

Flammable Limits: Unknown

Extinguishing Media: Foam, dry chemicals, CO2

Unusual Fire and Explosion Hazards: None

Special Fire Fighting Procedures: Avoid breathing smoke. Self-contained breathing apparatus.

SECTION V - HEALTH HAZARD DATA

Primary Route(s) of Entry: Inhalation, skin contact

Toxicological Data: Polyamine resin, oral rat LD 50 <5 CC/KG

Irritation Data: Polyamine resin eye – rabbit conjunctival irritant. Skin rabbit – mild irritant

Effects of Overexposure:

Acute: Will cause burns to skin and eyes. High concentrations of vapor can cause irritation of respiratory tract, nausea and vomiting. Chronic prolonged or repeated exposure may cause asthma and skin sensitization or other allergic response.

Medical conditions generally aggravated by exposure: Allergy, eczema, skin conditions.

PART B (CONT'D)

Carcinogenicity: None of the components of this material are listed as carcinogens by NTP, LARC, or OSHA.

In order to comply with California Proposition 65, we feel obligated to advise that some of our products may conceivably contain trace contaminants of some of the listed chemicals. While not necessarily added to our products as ingredients, some listed chemicals may be present in the raw materials from suppliers and over which we have no control. Therefore, even though some of the listed substances may not be present, a significant risk as defined by the regulations in order to comply with California law, we feel obligated to make the following statement:

WARNING: Our products may contain trace amounts of some chemicals considered by the State of California to be carcinogens or reproductive toxicants.

Emergency and first aid procedures:

Eyes: Flush with water for at least 15 minutes. If any ill effects develop, seek medical attention.

Skin: Immediately deluge skin with plenty of water. Remove contaminated clothing and shoes.

Inhalation: Remove to fresh air if affected. Administer oxygen if necessary. Seek medical attention.

Ingestion: If swallowed and conscious, give plenty of water and induce vomiting. Seek medical attention.

SECTION VI - REACTIVITY DATA

Stability: Stable

Incompatibility (materials to avoid): Strong oxidizing agents, acids.

Hazardous Decomposition Products: Carbon monoxide, carbon dioxide, nitrogen oxides.

Hazardous Polymerization: Will not occur.

Conditions to Avoid: Mixing with oxidizers or epoxy resins in quantities over 1#.

SECTION VII - SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled: Soak up with inert material or scrape up. Collect waste in designated waste containers. Avoid personal contact. Flush contaminated area with water.

Waste Disposal Method: Dispose in accordance with federal, state and local regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION

Respiratory Protection: Use adequate ventilation. Avoid breathing vapors.

Ventilation: Normal ventilation should be adequate. Local if vapors are vented.

Eye Protection: Safety glasses.

Protective Gloves: Rubber or impervious gloves recommended.

SECTION IX - SPECIAL PRECAUTIONS

Precautions to be taken in handling and storage: Store away from heat and open flame.

Other Precautions: Avoid breathing vapors of heated material. Wash hands with soap and water after every usage. Use adequate ventilation. Keep containers tightly closed when not in use.

Health	Flammability	Reactivity	Personal Protection
2	2	0	B

All statements, technical information and recommendations contained herein are based upon available scientific test or data which we believe to be reliable since we cannot anticipate all conditions under which this information and our products or the products of other manufacturers in combination with our products may be used. Emecole makes no warranties, express or implied, and assumes no responsibility in connection with any use of this information.

PRODUCT DATA SHEET

Mar-flex

500 Business Parkway, Carlisle, OH 45005

www.Mar-flex.com 1-800-498-1411

Mar-flex Crack Seal and Port Adhesive

GENERAL DESCRIPTION

Mar-flex Crack Seal and Port Adhesive 1:1 is a high modulus epoxy gel designed for surface sealing of cracks prior to injection and for attaching surface ports. It can also be used for bonding miscellaneous materials to concrete.

AREAS OF APPLICATION

As with any epoxy adhesive, surface preparation is critical. Concrete surfaces should be cleaned by wire brushing or other mechanical means. All loose or unsound material must be removed. Surfaces should be dry and dust free to insure a superior bond. Application onto wet surfaces is not recommended.

CLEAN UP

Use M.E.K. Xylene, or any other solvent. Clean equipment immediately after use.

SAFETY PRECAUTIONS

This product can cause skin irritation. Always wear protective clothing. Wash contaminated area with soap and water never solvent. In case of eye contact, flush with water for 15 minutes; immediately see a physician.

TECHNICAL DATA

<u>PROPERTIES</u>	<u>PART A</u>	<u>PART B</u>	<u>MIXED</u>
Solids by Volume	100%	100%	_____
Color	White	Black	Grey
Shelf Life	1 year	1 year	_____
Weight by Gallon	9.9 - 10.1 lbs	9.9-10.1 lbs	9.9 - 10.1 lbs
Mix Ratio (Vol.)	_____	_____	1:1
Pot Life: (3 oz)	_____	_____	10-20 minutes
Gel Time (5 mil)	_____	_____	1 - 2 hours
Final Cure	_____	_____	1 - 3 days
Viscosity	_____	_____	Non sag gel
Hardness (Shore)	_____	_____	80-D
Ultimate Pull Out Strength	_____	_____	18,000 lbs (Concrete Failure)

PHYSICAL PROPERTIES

Tensile Strength,	ASTM D - 638	6,000 psi
Tensile Elongation	ASTM D - 638	3-4%
Compressive Strength	ASTM D - 695	13,500 psi
Bond Strength	ASTM C - 321	2,400 psi
Flexural Strength	ASTM D -790	8,000 psi
Deflection temp	ASTM D - 648	190°F

Warranty

Recommendations concerning the performance or use of this product are based upon independent test reports believed to be reliable. If the product is proven to be defective, at the option of the Manufacturer, it will be either replaced or the purchase priced refunded. The Manufacturer will not be liable in excess of the purchase price. The user will be responsible for deciding if the product is suitable for his application and will assume all risk associated with the use of the product. This warranty is in lieu of any other warranty, expressed or implied, including but not limited to an implied warranty of merchantability or an implied warranty of fitness for a particular use.

MATERIAL SAFETY DATA SHEET

MANUFACTURER: MAR-FLEX

500 Business Parkway, Carlisle, OH 45005
EMERGENCY TELEPHONE 800-535-5053

SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: MAR-FLEX CRACK SEAL AND PORT ADHESIVE, PART A

SYNONYM: THERMOSETTING RESIN

CHEMICAL FAMILY: MODIFIED EPOXY RESIN

DATE: FEBRUARY, 2010

SECTION II - HAZARDOUS INGREDIENTS AND OTHER COMPONENTS

<u>INGREDIENT</u>	<u>% BY WEIGHT</u>	<u>EXPOSURE LIMITS</u>	<u>CAS #</u>
Bisphenol a/diglycidyl Ether Resin	50-90	NE.	25068-38-6
Inert Powder	10-50	NE.	14807-96-6
Fumed silica	0-5		067762-90-7

SECTION III - PHYSICAL DATA

Boiling Point: >200°F

VP: >1 TORR @ 180°C

VD: >1 (air = 1)

Evaporation Rate: <1 (butyl acetate = 1)

Solubility in Water: Insoluble

SP GR: 1.32 (water = 1)

% Volatile by VL: NIL

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: >200°C

Flammable Limits: Acrid smoke/fumes

Extinguishing Media: Carbon dioxide, dry chemicals, foam, water spray.

Explosive Limits: LEL – NE

Special fire fighting procedures: Use self-contained breathing apparatus.

Unusual fire and explosion hazards: Decomposition and combustion products may be toxic.

SECTION V – HEALTH HAZARD DATA

Primary Route(s) of Entry: Inhalation, skin contact

Toxicological Data: LD SOs provided are the lowest values for type of bisphenol A diglycidal ether resins used.

Oral LD₅₀: (rabbit) > 4000 mg/kg

Skin Irritation: (rabbits) Moderate irritation

Eye Irritation: (rabbits) Mild irritation

Sensitization: Sensitizer

PART A (CONT'D)

Effects of Overexposure: Irritation, sensitization, and dermatitis.

Medical Conditions Generally Aggravated by Exposure: Allergy, eczema, skin conditions

Carcinogenicity: None of the components of this material are listed as carcinogens by NTP, IARC, or OSHA.

In order to comply with California Proposition 65, we feel obligated to advise that some of our products may conceivably contain trace contaminants of some of the listed chemicals. While not necessarily added to our products as ingredients, some listed chemicals may be present in the raw materials from suppliers and over which we have no control. Therefore, even though some of the listed substances may not be present, a significant risk as defined by the regulations in order to comply with California law, we feel obligated to make the following statement:

WARNING: Our products may contain trace amounts of some chemicals considered by the State of California to be carcinogens or reproductive toxicants.

Emergency and first aid procedures:

Eyes: Flush with water for at least 15 minutes. If any ill effects develop, seek medical attention.

Skin: Wash with soap and water. Wash contaminated clothing before reuse.

Inhalation: Remove to fresh air and give oxygen if breathing is difficult.

Ingestion: Give large quantities of water and induce vomiting. Get medical attention.

SECTION VI – REACTIVITY DATA

Stability: Stable

Conditions to Avoid: Elevated temperatures

Incompatibility Materials to Avoid: Strong oxidizers, strong acids or bases in bulk.

Hazardous Decomposition Products: Carbon monoxide, carbon dioxide, aldehydes and other organics.

SECTION VII - SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled: Avoid all personal contact. Wipe with rag for small spills. For larger spills, use absorbent material. Collect waste in designated container. Flush contaminated areas with water.

Waste Disposal Method: Dispose in accordance with federal, state and local regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION

Respiratory Protection: Avoid breathing vapors. Use adequate ventilation.

Ventilation: Good mechanical ventilation and local exhaust.

Eye Protection: Safety glasses.

Protective Gloves: Rubber or polyethylene.

Protective Equipment: Disposable containers and paper on work area. Use of barrier cream recommended. Use appropriate equipment to prevent eye or skin contact.

SECTION IX - SPECIAL PRECAUTIONS

Precautions to be taken in handling and storage: Causes irritation. May cause allergic skin reaction. Avoid contact with eyes, skin or clothing. Store in cool, dry area in closed cartridges.

Other precautions: Avoid breathing vapors, use with good ventilation. Wash hands thoroughly with soap and water after every use.

Health	Flammability	Reactivity	Personal Protection
2	1	0	B

All statements, technical information and recommendations contained herein are based upon available scientific test or data which we believe to be reliable since we cannot anticipate all conditions under which this information and our products or the products of other manufacturers in combination with our products may be used. Mar-flex makes no warranties, express or implied, and assumes no responsibility in connection with any use of this information.

MATERIAL SAFETY DATA SHEET

MANUFACTURER: MAR-FLEX

500 Business Parkway, Carlisle, OH 45005
EMERGENCY TELEPHONE 800-535-5053

SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: MAR-FLEX CRACK SEAL AND PORT ADHESIVE, PART B

SYNONYM: EPOXY HARDENER

CHEMICAL FAMILY: MODIFIED POLYAMINE

DATE: FEBRUARY, 2010

SECTION II - HAZARDOUS INGREDIENTS AND OTHER COMPONENTS

<u>INGREDIENT</u>	<u>% BY WEIGHT</u>	<u>EXPOSURE LIMITS</u>	<u>CAS #</u>
Proprietary Polyamine/polyamide blend	<70	NE.	UK
Inert Powders	60-80	NE.	14807-96-6
Fumed silica	0-5	NE.	067762-90-7

SECTION III - PHYSICAL DATA

Appearance: Paste

Boiling Point: Not Determined (>200°F)

VP: N.D.

VD: Not determined (air = 1)

Evaporation Rate: <1 (butyl acetate = 1)

Solubility in Water: Appreciable

Color: Black

SP GR: >1.91 +/- .02 (water = 1)

% Volatile by VL: <1

Odor: Skunk like, pinc -0. 1

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: 185°F (PMCC)

Flammable Limits: Unknown

Extinguishing Media: Foam, dry chemicals, CO2

Special fire fighting procedures: Avoid breathing smoke. Use self-contained breathing apparatus.

SECTION V - HEALTH HAZARD DATA

Primary Route(s) of Entry: Inhalation, skin contact

Toxicological Data: Polyamine Resin

Oral LD₅₀: (rat) LD50-<5 CC/KG

Skin Irritation: (rabbits) Mild irritant

Eye Irritation: (rabbits) Conjunctival irritant

Effects of Overexposure: **Acute:** Will cause burns to skin and eyes. High concentrations of vapor can cause irritation of respiratory tract, nausea, and vomiting. **Chronic:** Prolonged or repeated exposure may cause asthma and skin sensitization or other allergic response.

Medical Conditions Generally Aggravated by Exposure: Allergy, eczema, skin conditions

Carcinogenicity: None of the components of this material are listed as carcinogens by NTP, IARC, or OSHA.

PART B (CONT'D)

In order to comply with California Proposition 65, we feel obligated to advise that some of our products may conceivably contain trace contaminants of some of the listed chemicals. While not necessarily added to our products as ingredients, some listed chemicals may be present in the raw materials from suppliers and over which we have no control. Therefore, even though some of the listed substances may not be present, a significant risk as defined by the regulations in order to comply with California law, we feel obligated to make the following statement:

WARNING: Our products may contain trace amounts of some chemicals considered by the State of California to be carcinogens or reproductive toxicants.

Emergency and first aid procedures:

Eyes: Flush with water for at least 15 minutes. Seek medical attention.

Skin: Immediately deluge skin with plenty of water. Remove contaminated clothing and shoes.

Inhalation: Remove to fresh air and give oxygen if breathing is difficult. Seek medical attention

Ingestion: If swallowed and conscious, give plenty of water and induce vomiting. Seek medical attention.

SECTION VI – REACTIVITY DATA

Stability: Stable

Conditions to Avoid: Mixing with oxidizers or epoxy resins in quantities over 1#.

Incompatibility Materials to Avoid: Strong oxidizing agents, acids.

Hazardous Decomposition Products: Carbon monoxide, carbon dioxide, nitrogen oxides.

Hazardous Polymerization: Will not occur.

SECTION VII - SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled: Soak up with inert material or scrape up. Collect waste in designated waste containers. Avoid personal contact. Flush contaminated area with water.

Waste Disposal Method: Dispose in accordance with federal, state and local regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION

Respiratory Protection: Avoid breathing vapors. Use adequate ventilation.

Ventilation: Normal ventilation should be adequate. Local if vapors are vented.

Eye Protection: Safety glasses.

Protective Gloves: Rubber or impervious gloves recommended.

SECTION IX - SPECIAL PRECAUTIONS

Precautions to be taken in handling and storage: Store away from heat and open flame.

Other precautions: Avoid breathing vapors of heated material. Wash hands with soap and water after every use.

Adequate ventilation: Keep containers tightly closed when not in use.

Health	Flammability	Reactivity	Personal Protection
2	1	0	B

All statements, technical information and recommendations contained herein are based upon available scientific test or data which we believe to be reliable since we cannot anticipate all conditions under which this information and our products or the products of other manufacturers in combination with our products may be used. Mar-flex makes no warranties, express or implied, and assumes no responsibility in connection with any use of this information.