PRODUCT DATA

QUALITY | SERVICE | INTEGRITY
W. R. MEADOWS®
A Family Company Since 1926

DATA SHEET NO. 8138-115

CEM-KOTE FLEX CR

Flexible, Hydrogen Sulfide Resistant, Cementitious Waterproofing

FEATURES

- Excellent resistance to sulfuric acid (MIC generated)
- Flexible
- Good chemical resistance
- Long-term crack resistance
- Superior freeze/thaw resistance
- Excellent bond to clean substrate
- Self-curing
- Breathable
- Very low shrinkage
- Vermin proof
- Non-toxic
- Easy application

PRODUCT DESCRIPTION

Basic Use

CEM-KOTE FLEX CR is primarily designed for waterproofing and protection of concrete structures exposed to sulfuric acid, generated by micro-biological oxidation of hydrogen sulfide. This includes concrete structures in waste water treatment facilities, such as digesters, sludge tanks, clarifiers, manholes, and sewer systems. It is also used in waterproofing and restoration of concrete structures in thin sections, where superior flexibility, chemical resistance, and breathability are required. It protects and waterproofs structures subjected to various chemicals, such as concrete floors, tanks, and secondary containment structures. It also acts as excellent protection for concrete against carbonation.

Composition and Materials

CEM-KOTE FLEX CR provides excellent waterproofing and protection for concrete exposed to sulfuric acid (generated by microbiological oxidation of hydrogen sulfide), wastewater plant digesters, sludge tanks, clarifiers, manholes, and sewer systems. Thin, highly flexible, and breathable, CEM-KOTE FLEX CR delivers superior waterproofing and protection for concrete exposed to attack by various chemicals, such as industrial floors, tanks and secondary containment structures, and protects concrete against carbonation.

The selection of the system 1, 2, or 3 depends primarily on hydrogen sulphide concentration exposure.

Refer to current technical data sheets and guide specifications for application instructions. Contact Gemite technical service for advice on the suitable system for your project.

System #1 - "Open" structures (with H2S freely escaping)
System #1 = 2 coats CEM-KOTE FLEX ST - min. 2 mm (80 mils)
Use when hydrogen sulfide can escape - channels, clarifiers, and other "open" concrete structures.

System #2 - "Closed" structures (H2S 20 - 50 PPM)
1st coat - CEM-KOTE BARRIER COTE 100 - min. 1 mm (40 mils)
2nd coat - CEM-KOTE FLEX CR - min. 1 mm (40 mils)
Use when hydrogen sulfide cannot escape + concentrations are between 20-50 PPM - closed sludge tanks, digesters, pumping/lift stations and other "closed" concrete structures.

System #3 - Heavy-Duty Chemical Protection
1st coat - CEM-KOTE BARRIER COTE 100 - min. 1 mm thick
2nd – 2 coats of GEM-COTE EP 100 - min. 0.5 mm (20 mils)
For "closed" structures, when hydrogen sulfide concentrations exceed 50 PPM, such as chemical storage tanks, secondary containment structures and industrial floors.
Note: Some new treatment technologies may result in much higher H2S concentrations than 50 PPM.

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TECHNICAL DATA

PROPERTY	TEST METHOD	TYPICAL TEST RESULTS
Ultimate Tensile Strain at 20° C Non-Reinforced: Reinforced:	ASTM D412 Modified	20 - 25% 25 - 30%
Ultimate Tensile Stress at 20° C, Non-Reinforced: reinforced:	ASTM D412 Modified	1.0 - 1.3 MPa (145 - 188 psi) 2.0 - 2.5 MPa (290 - 362 psi)
Crack Spanning at 20° C, Non-reinforced: Reinforced:	ISO TP 005	0.5 mm (20 mils) 1.6 mm 63 mils)
Water Vapor Permeance, 1.6 mm thick:	ASTM E96, wet cup	350 ng/Pa.s.m^2 (6.42 perms)
Salt Scaling Resistance	ASTM 672	Excellent
Chemical Resistance Sulfuric Acid, pH 1 - Sewer Test chamber, 1 year exposure Sulfuric Acid 5% - ISO TP 24		No deterioration or delamination 8% weight increase after 140 days exposure
Hydraulic Impermeability, (Negative Side), 2 mm thickness:	TT-P-1411	Waterhead >39.8 m (>130')
CEM-KOTE FLEX CR exhibits high resistance to the majority of mineral acids in moderate concentrations. It is highly resistant to concentrated salt solutions and caustic environments. For more detail, contact Gemite technical service.		

Limitations
Do not apply CEM-KOTE FLEX CR when temperatures expect to be below 4° C within 48 hours or when rain is imminent. Follow hot weather concreting procedures when applying CEM-KOTE FLEX CR above 25° C.

Health and Safety
CEM-KOTE FLEX CR is non-toxic. Skin may be sensitive to hydraulic cement or the liquid additive. Rubber gloves are recommended. Avoid contact with eyes and prolonged contact with skin. If contact occurs, flush immediately with water. Seek medical advice if irritation occurs. Harmful if digested. Keep product out of reach of children. For industrial use only. Consult SDS for additional information.

Colour
Dark Grey.

Packaging
CEM-KOTE FLEX CR kit = Comp. A - 22.7 kg (50 lb.) bag + Comp. B - 6.8 L (1.8 USG) plastic bottle.

Yield
CEM-KOTE FLEX CR yields 14.75 L (0.52 $ft.^3$) and covers approx. 14.7 m^2 @ 1.0 mm (156 $ft.^2$ @ 40 mils) per kit - applied in 1 (one) coat.

In projects requiring two coats of CEM-KOTE BARRIER COTE 100. the coverage is approx. 9.2 m^2 @ 1.6 mm (104 $ft.^2$ @ 60 mils) per kit applied in 2 (two) coats.

The actual coverage depends on surface roughness and thickness applied. The applicator must carry out a test application to determine the actual coverage for the given substrate and application thickness. Refer to CEM-KOTE BARRIER COTE 100 and GEM-COTE EP 100 data sheets for yield and coverage information.

Storage and Transportation
When stored in a dry area, the material has a shelf life of 12 months. The liquid Component B must not freeze.

INSTALLATION
Current guide specification and application instructions contain additional information specific to each application and must be followed. Consult GEMITE or W. R. MEADOWS Technical Service to ensure correct surface preparation, application procedures, and chemical compatibility for specific application.

Surface Preparation … Remove all deteriorated and loose concrete, form release agents, oil, grease, laitance, dust, dirt, and efflorescence by dry or wet sandblast or shotblast to achieve a concrete surface profile (CSP) of CSP 3 as per the International Concrete Repair Institute (ICRI). Repair deeper areas using GEM-PLAST TC [up to 12.7 mm (½")] or FIBRE-PATCH OV [coving and repairs above 12.7 mm (½")]. The proper surface preparation is essential for a successful installation.

Reinforcing Steel … Remove all loose rust from any exposed reinforcing steel and apply two coats of FIBRE-PRIME rustproofing.

Crack Treatment … All cracks must be treated using CEM-KOTE FLEX CR or CEM-KOTE BARRIER COTE 100.

Mixing … Mixing procedures for CEM-KOTE FLEX CR and CEM-KOTE BARRIER COTE 100 are identical.

Thoroughly mix liquid Component B prior to use. Use a clean paddle, helix mortar mixer, or heavy duty drill (400 -600 RPM) with a helix screw mixer to achieve thorough mixing. Pour approximately 80% of the Component B into the mixer, gradually adding the dry material into the liquid, while mixing, and mix until a smooth lump-free mix is obtained. Add the remaining liquid (as required) for a given application consistency. A small amount of water can be added at higher ambient temperatures, if required.

Application Method … 1st coat - apply CEM-KOTE BARRIER COTE 100, minimum 1 mm (0.04") thick, to a saturated surface damp surface.

2nd coat - apply CEM-KOTE FLEX CR minimum 1.0 mm (40 mils) thick, but not more than 3 mm (120 mils). Allow CEM-KOTE BARRIER COTE 100 to dry for 1 - 2 days and pressure wash with 3,000 - 5,000 psi before applying CEM-KOTE FLEX CR. The total minimum thickness of both coats should be approximately 2 mm (80 mils). If this is not possible. please contact Gemite Technical Services for more information.

Reinforcing Fabric … When using REINFORCING FABRIC HD throughout the entire area, first apply a thin layer of CEM-KOTE BARRIER COTE 100 by brushing or spraying. When spraying, brush each coat to eliminate all pinholes. Embed REINFORCING FABRIC HD into the first coat and follow with the second coat of CEM-KOTE BARRIER COTE 100. Let cure for 1 - 2 days and pressure wash with 3000 - 5000 psi before applying CEM-KOTE FLEX CR. REINFORCING FABRIC HD must be fully covered. The total minimum applied thickness of CEM-KOTE BARRIER COTE 100 and CEM-KOTE FLEX CR, including REINFORCING FABRIC HD, must be 2 mm (80 mils).

Curing … Cure CEM-KOTE FLEX CR by air-drying for a minimum of three days prior to continuous exposure to water. Protect fresh applications from rain, strong wind, and intense sunlight for 12 hours. When working under tarps at freezing temperatures, use electrical heaters to prevent carbonation of the material. When applying over GEM-PLAST TC, air cure CEM-KOTE BARRIER COTE 100/CEM-KOTE FLEX CR for a minimum five days prior to filling with water.

Cleanup … All tools must be cleaned with water immediately after use. Cured material can only be removed mechanically.

MAINTENANCE
Some maintenance may be required depending upon the type of chemical environment and the length of exposure.

WARRANTY
A limited 12-month material replacement warranty is available. For details, contact GEMITE or W. R. MEADOWS technical service.

MASTERFORMAT NUMBER AND TITLE
07 16 13 – Polymer Modified Cement Waterproofing

LEED INFORMATION
May help contribute to LEED credits:
- EAp2: Minimum Energy Performance
- EAc2: Optimize Energy Performance
- MRc9: Construction and Demolition Waste Management

MANUFACTURER
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Phone: 905-672-2020 Fax: 905-672-6780
Website: www.gemite.com

2019-10-23

SAFETY DATA SHEET

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

Product: CEM-KOTE™ FLEX CR COMPONENT A

Manufacturer: Gemite Products Inc.

Address: 1787 Drew Road
Mississauga, ON L5S 1J5 CANADA

Telephone: (905) 672-2020

In case of emergency, dial (800) 424-9300 (CHEMTREC)

Revision Date: 7/5/2017

Product Use: Flexible Cementitious Waterproofing

SECTION 2: HAZARDS IDENTIFICATION/EXPOSURE LIMITS

HMIS	
|Health|	| 2 |
|Flammability|	| 0 |
|Reactivity|	| 0 |
|Personal Protection|	| |

HAZARD STATEMENTS

DANGER!

May cause cancer.
May cause skin irritation/burns.
May cause burns to the eyes.
May cause skin sensitization.
May cause respiratory irritation.
Causes lung damage through repeated/prolonged exposures.

PRECAUTIONARY STATEMENTS

Avoid direct contact.
Avoid dust inhalation.
Use appropriate Personal Protective Equipment.

SECTION 3: HAZARDS COMPONENTS

Chemical Name:	CAS Number	% by Weight	SARA 313	Vapor Pressure (mm Hg@20°C)	LEL (@25°C)
1. Microcrystalline Silicon Dioxide	14808-60-7	70-75	No	N/A	N/A
2. Aluminum Cement	65997-16-2	25-30	No	N/A	N/A

Under the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1966 (SARA) and 40 CFR Part 372, chemicals listed on the 313 List (40 CFR Part 373.65) are identified under the heading "SARA 313." *N/A: Not Applicable*

SECTION 4: EMERGENCY AND FIRST AID PROCEDURES

EYE CONTACT: Immediately flush eyes with water for fifteen (15) minutes. Seek immediate medical attention.

SKIN CONTACT: Remove contaminated shoes/clothing. Flush affected areas with water. If irritation develops/persists, seek medical attention.

INHALATION: Remove victim from exposure source. Treat symptomatically. If symptoms persist, seek medical attention.

INGESTION: Do not induce vomiting. If vomiting spontaneously occurs, keep the head below the hips to prevent lung aspiration. Seek immediate medical attention.

MOST IMPORTANT SYMPTOMS/EFFECTS, ACUTE AND CHRONIC: See Section Eleven for Symptoms/Effects.

SECTION 5: FIRE AND EXPLOSIVES HAZARDS

FLASHPOINT: None.

EXTINGUISHING MEDIA: Not applicable--product will not burn.

CHEMICAL/COMBUSTION HAZARDS: None recognized. Material will not support combustion.

PRECAUTIONS/PERSONAL PROTECTIVE EQUIPMENT: Avoid inhalation of dust if bags are broken. Use appropriate respiratory protection.

SECTION 6: ACCIDENTAL RELEASE MEASURES

SPILL OR LEAK PROCEDURES: Evacuate unauthorized personnel. Clean up using methods that will minimize dust creation or wet methods. Avoid inhalation of dust. Place in marked/non-leaking containers for disposal. Flush affected areas to remove trace residue.

SECTION 7: HANDLING AND STORAGE

SAFE HANDLING PROCEDURES: Avoid direct contact with this material as well as the creation of dust.

SAFE STORAGE: Store in cool, dry location away from moisture sources.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

	OSHA				ACGIH			
Chemical Name:	PEL	PEL/CEILING	PEL/STEL	SKIN	TWA	TLV/CEILING	TLV/STEL	SKIN
1. Microcrystalline Silicone Dioxide	*See Below	N/E	N/E	N/E	0.025 mg/m^3	N/E	N/E	N/E
2. Aluminum Cement	10 mg/m^3	N/E	N/E	N/E	5 mg/m^3	N/E	N/E	N/E

*: TWA Total Dust (30)/(%SiO2 + 2) mg/m^3 TWA Respiratory Fraction (10)/(%SiO2 + 2) mg/m^3 *N/E: Not Established*

ENGINEERING CONTROLS: Use equipment to keep dust levels below established exposure limits.

PERSONAL PROTECTIVE EQUIPMENT: Safety glasses and chemical-resistant gloves.

SAFETY DATA SHEET

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT: Not Applicable
EVAPORATION RATE: Not Applicable
WEIGHT PER GALLON: Not Applicable
ODOR: No Odor
FLASH POINT: See Section 5
VAPOR PRESSURE: N/D
PARTITION COEFFICENT: N/D
VISCOSITY: N/D
VAPOR DENSITY: Not Applicable
pH LEVEL: 10-12 (hydrated)
PRODUCT APPEARANCE: Gray Solid
ODOR THRESHOLD: N/D
FLAMMABILITY: N/D
RELATIVE DENSITY: N/D
AUTOIGNITION TEMPERATURE: N/D
% VOLATILE BY VOLUME: Not Applicable
% VOLATILE BY WEIGHT: Not Applicable
VOC CONTENT: 0 g/L
MELTING/FREEZING POINT: N/D
UEL/LEL: N/D
SOLUBILITY: N/D
DECOMPOSITION TEMPERATURE: N/D
N/D: Not Determined

SECTION 10: STABILITY/REACTIVITY

STABILITY: Stable.
HAZARDOUS POLYMERIZATION: Will not occur.
CONDITIONS AND MATERIALS TO AVOID: When hydrated -- acids, ammonium salts, aluminum metal.
HAZARDOUS DECOMPOSITION PRODUCTS: None recognized.

SECTION 11: TOXICOLOGICAL INFORMATION

EYE CONTACT: Direct contact may result in severe irritation and possible chemical burns.
SKIN CONTACT: May cause moderate skin irritation. Prolonged contact may result in chemical burns. Prolonged/repeated contact may cause sensitization reactions in susceptible individuals.
INHALATION: Exposure may cause moderate irritation of the nose, throat, respiratory tract, and other mucous membranes. Inhalation of silica dust may result in lung disease (Silicosis).
INGESTION: May cause mild to moderate irritation of the digestive tract. May cause stomach upset and vomiting.
SIGNS AND SYMPTOMS: Symptoms of eye exposure include pain, burning, redness, and swelling. Symptoms of skin irritation include redness, burning, swelling, and rash. Symptoms of respiratory irritation include runny nose, shortness of breath, chest discomfort, and reduced lung function. Symptoms of gastrointestinal exposure include abdominal pain, nausea, and vomiting.
AGGRAVATED MEDICAL CONDITIONS: Pre-existing skin, eye, and respiratory disorders may be aggravated by exposure to this product.
OTHER HEALTH EFFECTS: Silicon dioxide is listed by the IARC and NTP as being carcinogenic to humans (IARC Group 1A).

SECTION 12: ECOLOGICAL INFORMATION

ECOTOXICITY: N/E
DEGRADABILITY: N/E
BIOACCUMULATIVE POTENTIAL: N/E
SOIL MOBILITY: N/E
OTHER ADVERSE EFFECTS: N/E

SECTION 13: WASTE DISPOSAL INFORMATION

WASTE DISPOSAL INFORMATION: Hydrated material will solidify to a non-hazardous solid. Landfill dispose.

SECTION 14: TRANSPORTATION INFORMATION

HAZARDOUS/NON-HAZARDOUS MATERIAL: Non-hazardous material.
UN NUMBER: None.
HAZARD CLASS: None.
PACKING GROUP: None.
UN PROPER SHIPPING NAME: None.
ENVIRONMENTAL HAZARDS: None.
BULK TRANSPORTATION INFORMATION: Not applicable; product is not shipped in bulk configuration.
SPECIAL PRECAUTIONS: None.

SECTION 15: REGULATORY INFORMATION

OTHER REGULATORY CONSIDERATIONS: None.

SECTION 16: OTHER INFORMATION

PREPARATION DATE: 7/5/2017
PREPARED BY: Gemite Products Inc.

The information contained herein is based on the data available to us and is believed to be correct. However, we make no warranty, expressed or implied regarding the accuracy of this data or the results to be obtained from the use thereof. We assume no responsibility for injury from the use of this product described herein.

SAFETY DATA SHEET

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

Product: **CEM-KOTE™ FLEX CR COMPONENT B**

Manufacturer: **Gemite Products Inc.**

Address: 1787 Drew Road
Mississauga, ON L5S 1J5 CANADA

Telephone: (905) 672-2020

In case of emergency, dial (800) 424-9300 (CHEMTREC)

Revision Date: 7/5/2017

Product Use: Flexible Cementitious Waterproofing

SECTION 2: HAZARDS IDENTIFICATION/EXPOSURE LIMITS

HMIS	
|Health|	|1|
|Flammability|	|0|
|Reactivity|	|0|
|Personal Protection|	| |

This product is non-hazardous and under WHMIS criteria is not a controlled product.

SECTION 3: HAZARDS COMPONENTS

Chemical Name:	CAS Number	% by Weight	SARA 313	Vapor Pressure (mm Hg@20°C)	LEL (@25°C)

1. None

Under the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1966 (SARA) and 40 CFR Part 372, chemicals listed on the 313 List (40 CFR Part 373.65) are identified under the heading "SARA 313."

SECTION 4: EMERGENCY AND FIRST AID PROCEDURES

EYE CONTACT: Flush eyes with water for fifteen (15) minutes. If symptoms persist, seek medical attention.

SKIN CONTACT: Wash affected areas with mild soap and water. Remove contaminated shoes/clothing. If symptoms persist, seek medical attention.

INHALATION: Not expected to be an exposure route as supplied. If respiratory symptoms develop, seek medical attention.

INGESTION: Dilute with liquid unless the victim is unconscious or very drowsy. Do not induce vomiting. If vomiting spontaneously occurs, prevent lung aspiration. Seek immediate medical attention.

MOST IMPORTANT SYMPTOMS/EFFECTS, ACUTE AND CHRONIC: See Section Eleven for Symptoms/Effects.

SECTION 5: FIRE AND EXPLOSIVES HAZARDS

FLASHPOINT: >100° C

EXTINGUISHING MEDIA: Not Applicable. Product will not support combustion.

CHEMICAL/COMBUSTION HAZARDS: Not applicable. Product will not support combustion.

PRECAUTIONS/PERSONAL PROTECTIVE EQUIPMENT: None required.

SECTION 6: ACCIDENTAL RELEASE MEASURES

SPILL OR LEAK PROCEDURES: Avoid direct contact. Dike and contain spilled material. Remove source of spill if safe to do so. Apply absorbent and place clean-up material in sealed/marked containers for proper disposal. Clean-up materials will be classified as non-hazardous waste.

SECTION 7: HANDLING AND STORAGE

SAFE HANDLING PROCEDURES: Avoid direct contact.

SAFE STORAGE: Do not allow product to freeze.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

	OSHA				ACGIH		
Chemical Name:	PEL	PEL/CEILING	PEL/STEL	SKIN	TWA	TLV/CEILING	TLV/STEL	SKIN

1. None

ENGINEERING CONTROLS: None required under normal use conditions.

PERSONAL PROTECTIVE EQUIPMENT: Safety glasses, chemical-resistant gloves.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT: 100 degrees C	**VAPOR DENSITY:** N/A	**% VOLATILE BY VOLUME:** N/E
EVAPORATION RATE: As Water	**pH LEVEL:** N/A	**% VOLATILE BY WEIGHT:** N/E
WEIGHT PER GALLON: 8.41	**PRODUCT APPEARANCE:** Opaque liquid	**VOC CONTENT:** < 5 g/L
ODOR: None	**ODOR THRESHOLD:** N/D	**MELTING/FREEZING POINT:** N/D
FLASH POINT: See Section 5	**FLAMMABILITY:** N/D	**UEL/LEL:** N/D
VAPOR PRESSURE: N/D	**RELATIVE DENSITY:** N/D	**SOLUBILITY:** N/D
PARTITION COEFFICENT: N/D	**AUTOIGNITION TEMPERATURE:** N/D	**DECOMPOSITION TEMPERATURE:** N/D
VISCOSITY: N/D	*N/A: Not Applicable*	*N/D: Not Determined*

SAFETY DATA SHEET

SECTION 10: STABILITY/REACTIVITY

STABILITY: Stable. **HAZARDOUS POLYMERIZATION:** Will not occur.
CONDITIONS AND MATERIALS TO AVOID: None recognized.
HAZARDOUS DECOMPOSITION PRODUCTS: None recognized.

SECTION 11: TOXICOLOGICAL INFORMATION

EYE CONTACT: Direct contact may cause mild irritation.
SKIN CONTACT: Direct contact may cause slight skin irritation. Prolonged/repeated contact may result in irritation.
INHALATION: Not anticipated to be an exposure route.
INGESTION: Not anticipated to be an exposure route.
SIGNS AND SYMPTOMS: Symptoms of eye irritation include tearing, reddening, and swelling. Symptoms of skin irritation include redness and swelling. Gastrointestinal irritation symptoms include nausea, vomiting, and abdominal discomfort.
AGGRAVATED MEDICAL CONDITIONS: None recognized.
OTHER HEALTH EFFECTS: None recognized.

SECTION 12: ECOLOGICAL INFORMATION

ECOTOXICITY: N/E **DEGRADABILITY:** N/E **BIOACCUMULATIVE POTENTIAL:** N/E
SOIL MOBILITY: N/E **OTHER ADVERSE EFFECTS:** None recognized

SECTION 13: WASTE DISPOSAL INFORMATION

WASTE DISPOSAL INFORMATION: Non-hazardous waste if disposed.

SECTION 14: TRANSPORTATION INFORMATION

HAZARDOUS/NON-HAZARDOUS MATERIAL: Not regulated by DOT.
UN NUMBER: None. **HAZARD CLASS:** N/A **PACKING GROUP:** N/A
UN PROPER SHIPPING NAME: N/A
ENVIRONMENTAL HAZARDS: None recognized.
BULK TRANSPORTATION INFORMATION: None.
SPECIAL PRECAUTIONS: None recognized.

SECTION 15: REGULATORY INFORMATION

OTHER REGULATORY CONSIDERATIONS: None recognized.

SECTION 16: OTHER INFORMATION

PREPARATION DATE: 7/5/2017
PREPARED BY: Gemite Products Inc.

The information contained herein is based on the data available to us and is believed to be correct. However, we make no warranty, expressed or implied regarding the accuracy of this data or the results to be obtained from the use thereof. We assume no responsibility for injury from the use of this product described herein.

Revised: November 1st, 2017

System #2 - Cem-Kote Flex CR Guide Specification for Waterproofing & Protection of Concrete in Wastewater treatment facilities - New construction or Repair.

GEMITE WATERPOOFING AND PROTECTIVE SYSTEMS

The selection of the System #1, #2 or #3 depends primarily on hydrogen sulphide concentration exposure.

System #1 - Guide Specification for Cem-Kote Flex ST in Wastewater Treatment facilities.

System #1 is used in all "open" concrete structures, (hydrogen sulphide is escaping directly to air), such as channels, clarifiers and other "open" concrete structures.

System #1 = 2 (two) coats of Cem-Kote Flex ST.

System #2 - Guide Specification for Cem-Kote Flex CR in Wastewater Treatment facilities.

System #2 is used in "closed" structures (hydrogen sulphide can't escape to air), and when the hydrogen sulphide concentration is between 20-50 ppm. This may be closed sludge tanks, digesters, pumping/lift stations and other "closed" concrete structures.

System #2 = 2 (two) coats – 1st coat Cem-Kote Barrier Cote 100 + 2nd coat Cem-Kote Flex CR

System #3 - Guide Specification for Gem-Cote EP 100 in Wastewater Treatment facilities.

System #3 is used in "closed" structures - when hydrogen sulphide concentration is higher than 50 ppm. It is also used in protection of concrete in chemical storage tanks, secondary containment structures and floors.
Note: Some new treatment technologies may result in much higher H_2S concentrations than 50 ppm.

System #3 = 3 (three) coats – 1st coat Cem-Kote Barrier Cote 100 + 2 coats of Gem-Cote EP 100

Note: Moisture in concrete is a major cause of failures when using non-breathable polymer systems (epoxies and urethanes). All three Systems are insensitive to moisture in concrete or ground water behind wall and below the slab.

1 GENERAL

1.1 Description

A. This specification is for installation of System # 2 - Cem-Kote Barrier Cote 100 & Cem-Kote Flex CR, flexible cementitious waterproofing coating manufactured by **Gemite Products Inc**. Cem-Kote Flex CR is suitable for concrete waterproofing, finishing and protection of concrete in restoration projects**,** such as waste water treatment facilities, manholes, especially in protection of concrete exposed to sulfuric acid generated by microbiological conversion of hydrogen sulphide, e.g. in digesters, clarifiers, pumping (lift) stations, sludge tanks, manholes and sewers. This specification should be read in conjunction with Cem-Kote Flex CR, Gem-Plast TC and Cem-Kote Barrier Cote 100 Product Data Sheets and Installation Instructions. **Gemite Products Inc**. offers comprehensive technical assistance to consultants when specifying Gemite's products and systems. Please contact Gemite Products Inc. Technical Service for further information.

B. Note: *Specification* prepared by *a Specifier / Engineer* for a specific project "*has Precedence over*" this Guide Specification. Contact the *Specifier / Engineer* if the project specification is "in conflict" with this Guide Specification.

C. The general conditions, supplementary conditions and general requirements of this document apply to General Contractors, Sub-Contractors, Material Suppliers and all other persons furnishing labor and materials under this section.

D. This specification combines Metric measurements and US. Brackets ( ) indicate choice, alternative, data required or need for the specifier to make a decision.

1.2 Work Included

Provide all labor, material and equipment necessary to apply Cem-Kote Barrier Cote 100/Cem-Kote Flex CR and other products in application over concrete surfaces as shown on the contract drawings and specified herein.

Note: *Concrete surfaces in restoration projects exhibit various degree of surface erosion, (deterioration), depending on many variables, including age, sludge water chemistry, concrete quality, concrete finishing and other factors. The depth of deterioration can vary from very shallow and superficial 1-2 mm (40-80 mils), to much deeper 6-9 mm, (1/4"-3/8"). The surface preparation makes the erosion depth deeper by approximately 1-2 mm (40-80 mils) or more, depending on erosion.*

In majority of new projects, Cem-Kote Barrier Cote 100/Cem-Kote Flex CR is applied without installation of the levelling course.

In restoration projects, the deterioration maybe too deep and the owner, Specifier, or Engineer may require the levelling course prior to application of Cem-Kote Barrier Cote 100/Cem-Kote Flex CR. This Guide Specification covers both situations.

The project specification must clearly state if only Cem-Kote Barrier Cote 100/Cem-Kote Flex CR, or both the levelling course of Gem-Plast TC and Cem-Kote Barrier Cote 100/ Cem-Kote Flex CR must be applied.

Contact Gemite Products Inc. in all application, where Cem-Kote Flex CR thickness, over 2 mm, (80 mils), is considered.

In applications where thickness of more than approx.12 mm (½") is required to repair and level the existing surface, consider using Fibre-Patch OV, Spray-Con WS ST Premix or Spray-Con W ST Concentrate, instead of Gem-Plast TC. Please contact Gemite Products Inc. for further information. The concrete surfaces in new construction may have "bug holes", poor compaction areas, "honeycombing", "form displacements" and other imperfections. These may have to be repaired / levelled prior to application of the Cem-Kote Barrier Coat 100/Cem-Kote Flex CR waterproofing system. The project specification must identify the responsibility for levelling/repairing these imperfections. The causes for formation of "bug holes" on formed concrete surface are very complex and their formation is often unpredictable. Their excessive formation may occur despite correct specification and good concrete placement practice. The additional problem is that in some cases "bug-holes" become visible only after surface preparation. Therefore, it is important for all parties involved in the given project, to account for a possible, unpredictable, surface preparation effort required, in obtaining a smooth, "bug-hole" free surface, important for a long-term performance of the coating material.

1.3 Related Work

Insert list of divisions and sections where related or allied work is specified, such as concrete slab, wall, tank balconies and other types of concrete waterproofing, finishing and protection. See Cem-Kote Barrier Cote 100, Cem-Kote Flex CR and Gem-Plast TC Product Data Sheets.

1.4 Quality Assurance

A. The contractor will provide the proper equipment, manpower and supervision at the job site to install Cem-Kote Barrier Cote 100/Cem-Kote Flex CR, Gem-Plast TC (the leveling course) in compliance with the project plans and specifications.

B. Prepare a site sample approximately 1200 mm x 1200 mm (4' x 4'). This sample will be regarded as the minimum standard of workmanship acceptable for this project.

C. The applicator must be an approved applicator by Gemite Products Inc. Key tradesmen on the site must be factory trained in the product mixing and for this project.

D. Maintain a record of the batch numbers of all materials supplied for this project.

1.5 Submittals

A. Provide owner with manufacturer's literature, including Specification Guides, Product Data Sheets and installation instructions, for all products used to complete project

B. Submit documentation that Quality Assurance criteria have been met

1.6 Product Delivery, Storage and Handling

A. Deliver materials to the site in original, unopened and undamaged packaging with manufacturer's identification and labels intact.

B. Store Cem-Kote Flex CR and Cem-Kote Barrier Cote 100 in a clean, dry area protected from direct sunlight, weather and other damage. Store all wet materials at a temperature of not less than 5ºC (41ºF) at all times.

C. Safety Data Sheets (SDS/MSDS) will be available at the job site.

1.7 Alternates

Obtain written permission from the owner's representative at least ten days prior to close of tender. The alternate material must have been in use in the repair of concrete structures exposed to hydrogen sulphide or for a minimum of ten years.

1.8 Standards - Cem-Kote Barrier Cote 100 and Cem-Kote Flex CR

All reference standards will be the most current version of these specifications:

a. Rubber Properties in Tension (ASTM D 412 – modified)

b. Water Vapor Transmission (ASTM E 96 "Wet Cup" procedure)

c. Salt Scaling Resistance (ASTM C 672)

d. Hydraulic Impermeability (TT-P-1411)

e. Tensile Properties of Thin Cement Composites (Gemite ISO TP (Test Procedure) 005-97)

1.9 Job Site Conditions

A. Cem-Kote Barrier Cote 100/Cem-Kote Flex CR and all other materials must never be applied if ambient temperatures cannot be kept above 5ºC (41ºF) during application and for 48 hours thereafter. Avoid applications at temperatures above 28ºC (82º F). Contact Gemite Products Inc. when need to apply products at higher temperatures.

B. Protect surrounding surfaces from damage due to work of this trade.

1.10 Co-ordination/Scheduling

The work in this section requires close co-ordination with related sections and trades.

2 PRODUCTS

2.1 Manufacturers

A. Manufacturer's materials are specified by brand name to establish a standard quality, by general description of product and by performance requirements. The Engineer will consider substitutions for brand name products specified, if the procedures set out for substitutions are followed. The Engineer reserves the right to reject any material, which, in his opinion, will not produce the quality of work, specified herein.

B. The following are acceptable manufacturers: **Gemite Products Inc.** or approved equal.

2.2 Materials - General

A. Cem-Kote Flex CR- supplied as a Kit, comprising of dry Component A + Liquid Component B, as manufactured by Gemite Products Inc.

B. Cem-Kote Barrier Cote 100 – supplied as a Kit, comprising of dry component A + Liquid Component B, as manufactured by Gemite Products Inc.

C. Reinforcing Fabric HD, supplied by Gemite Products Inc.- 24 cm (9.5") x 45.7 m (150') for application over coves, and 122 cm (48") x 45.7 m (150'), when application on the entire surface is necessary.

D. Gem-Plast TC or other leveling products - thin set concrete restoration mortar, manufactured by Gemite Products Inc. Both can be hand or spray applied.

E. Fibre-Patch OV - restoration mortar for coving of corners, and thin to thick repairs, manufactured by Gemite Products Inc.

3 EXECUTION

3.1 Inspection

A. Inspect surfaces to which Cem-Kote Barrier Cote 100/Cem-Kote Flex CR, or Gem-Plast TC will be applied. Prior to application the contractor must have pre-installation meeting with the Gemite representative and project engineer to discuss the surface preparation and other issues, (e.g. detailing), related to the specific project.

B. Report to owner's representative, in writing, any defects in previously prepared work, or unsatisfactory site conditions. Proceed with work under this section only when such defects have been entirely corrected.

C. Starting work under this section means acceptance of the surface and previously prepared work.

3.2 Preparation

A. **Surface Preparation:** Use grit blasting (wet or dry sandblast) to achieve CSP #3 (International Concrete Repair Institute), and then use a pressure wash to remove dust just prior to application. In some cases, the sand blast can't be used. In such situation contact Gemite Technical Service.

B. Saturate the surface thoroughly with water prior to the application to achieve water saturation and surface damp condition prior to application of Cem-Kote Barrier Cote 100, Cem-Kote Flex CR or Gem-Plast TC. Avoid leaving behind "small puddles" on the horizontal surface after high pressure cleaning. "Spread" them out or vacuum-clean them. They collect the "muck" from cleaning and if left to dry form small areas of "dust layers" bonded to concrete. These could later cause de-bonding in that area.

C. **Surface Repair:** Cracks must be repaired (as per section E below) prior to application of Cem-Kote Barrier Cote 100/Cem-Kote Flex CR. The surface around the cracks, where the Reinforcing Fabric HD is applied, must be even a smooth. Use Gem-Plast TC to achieve even, smooth surface. Build corner coves (as per section G below).

D. **Surface Repair - Gem-Plast TC leveling course.** Gem-Plast TC is either hand trowel applied, or spray applied, and float finished, using recommended spraying equipment. It must be applied to saturated, surface damp surface. The typical application consists of spraying a "scratch coat" that must be brushed, and consecutive coat(s) applied in thickness varying from 6 mm (1/4") to 12 mm (1/2"), depending on degree of deterioration.

The surface of Gem-Plast TC must be cleaned to obtain CSP # 3 (International Concrete Repair Institute Standard). In early stages of curing (typically next day), a high- pressure water 5,000 psi can be used to obtain "open porosity" and CSP #3 surface profile. Otherwise a grit blast must be used to obtain the CSP #3 surface.

Notes: The cracks in the substrate must be treated prior to application of Gem-Plast TC as per procedure E below. The 2" by 2" corner coves must be installed using Fibre-Patch OV.

The thickness of the Gem-Plast TC layer required to level the deteriorated surface varies. The thickness and the extent of leveling must be indicated in the project specification.

The resulting surface of the Cem-Kote Flex CR must be pin-hole free.

E. **Treatment of Existing Non-Structural Cracks & Joints:** Identify the existing Non-Structural cracks and construction joints, and apply a layer of Cem-Kote Barrier Cote 100, approx. 25 cm (10") wide and 0.5-1.0 mm (20-40 mils) thick, by trowel or brush. Concrete surface must be smooth and even to allow proper installation of the Reinforcing Fabric HD Embed the strip of the Reinforcing Fabric HD and work it into the Cem-Kote Barrier Coat 100, using a trowel**.** Let dry to get sufficient adhesion and apply the of Cem-Kote Barrier Coat 100 to cover the strip of the Reinforcing Fabric HD with the total thickness of about 1-1.5 mm (40-60 mils).

Note: in some underground projects, the concrete wall/slab might be completely saturated with water. The water leaking cracks indicate this situation. Alternatively, the general information about the structure also indicates the possibility of "water head" behind wall or below the slab.

In such situation always use a strip of the Reinforcing Fabric HD to treat the cracks, to allow better drying/curing of Cem-Kote Barrier Cote 100 over the crack. The active water leaking crack must can be sealed using either, "cut and fill method" with hydraulic water plugs, or by urethane injection. The crack must be free of water leaks for at least three days, to allow the Cem-Kote Barrier Cote 100/Cem-Kote Flex CR to cure/dry over the cracks and become watertight. In project with installation of the levelling course of Gem-Plast TC, the cracks are repaired prior to application of Gem-Plast TC over the entire surface.

Additional Details - please contact Gemite Products Inc. For instructions how to seal pipe protrusions, plates and equipment anchoring. When the waterproofing system "ends" in water, cut the reglet, 3 mm (1/8 in) by 6 mm (¼) in deep to "lock" the coating application at its termination. In exterior application with exposed, horizontal ledge of tank walls, waterproof the ledge. Water penetrating through cracks or concrete ledge, getting behind the coating, could cause de-bonding.

F. **Corner Coves (cants)** - build corner coves 5 x 5 cm (2" x 2") using Fibre-Patch OV, let harden overnight and apply 2 (two) coats of Cem-Kote Barrier Cote 100, with a strip of the Reinforcing Fabric HD in-between.

VERY IMPORTANT *- when placing Reinforcing Fabric HD in the "coved" corner, pay close attention to junction between the cove and the wall, and cove and the floor (ceiling). Improper installation of the*

Reinforcing Fabric HD may result in forming a "channel" behind the Reinforcing Fabric HD. The Reinforcing Fabric HD must be completely covered with Cem-Kote Barrier Cote 100, since even one imperfection in covering it may lead in water penetration and the "formed channel" may then distribute the water elsewhere.

Notes

1. In new construction, the Reinforcing Fabric HD may be used throughout, if System # 2 (Cem-Kote Barrier Cote 100/Cem-Kote Flex CR) is applied less than 6 weeks after casting concrete (not a sufficient time to allow for drying shrinkage cracking in concrete to take place). The Reinforcing Fabric HD is used to allow the maximum crack spanning during the formation of a crack after installation of the membrane. Please contact Gemite Technical Service for further information, when considering the use of the Reinforcing Fabric HD on the entire surface of the tank.

2. When Reinforcing Fabric HD is used over the entire surface, overlap the Reinforcing Fabric HD by a min. of 2.5 cm (1").

3. In existing facilities, or those "older" than 6 weeks, the Reinforcing Fabric HD is used only over the existing (non-structural) cracks and cold joints. Structural or expansion joints must be respected.

4. The Reinforcing Fabric HD is used over the coved corners.

5. *When the Reinforcing Fabric HD is used on the entire surface, the minimum thickness of Cem-Kote Barrier Cote 100/Cem-Kote Flex CR system must be 2 mm.*

3.3 Mixing Cem-Kote Barrier Cote 100/Cem-Kote Flex CR

A. Mix the dry Component A (bag) with the liquid Component B. Use a heavy-duty drill (400-600 RPM) with a helix screw mixer to achieve a thorough mixing. Pour the liquid component B into the mixing container (mixer) and **gradually add the dry Component A into the liquid** and mix until a smooth and lump free mix is obtained. Lumps will form if the dry material is added suddenly into the liquid. A small amount of water - 8 oz. cup (300-400 ml) can be added, if required, for brushing, spraying and at high ambient temperatures, sunny and wind conditions.

3.4 Mixing Gem-Plast TC

Mix the dry content of 22.7 kg (50 lbs.) bag with 4.2 L (1.1 USG) of water for hand application, or 4.4-4.6 L (1.16-1.2 USG) of water for spray application, using ½" drill with paddle, or conventional mortar mixer.

3.5 Application (Cem-Kote Barrier Cote 100 & Cem-Kote Flex CR)

Apply 1st coat of Cem-Kote Barrier Cote 100 by brushing, or spraying and brushing, to a min. thickness of approx. 1 mm (40 mils). As soon as the 1st coat allows, apply Cem-Kote Flex CR coat at approx. 1 mm (40 mils) as a 2nd coat. The total minimum thickness of both coats should be approx. 2 mm (80 mils). The application of 2nd coat can be done in about 15-30 minutes (or longer), depending on the environmental conditions such as temperature, relative humidity, sun, wind, etc. If the 1st coat is left to dry overnight or longer, use 24 MPa (3,500 psi) to clean the surface before application of the 2nd coat.

Contact Gemite's technical Service for recommendations regarding spraying equipment for the Gem-Plast TC. Gemite HD Peristaltic Spray pump is suitable for spraying both Gem-Plast TC and Cem-Kote Flex products.

IMPORTANT: in the repair and waterproofing of deep eroded concrete surfaces without leveling, several layers of Cem-Kote Barrier Cote 100/Cem-Kote Flex CR may have to be applied.

3.6 Application (Gem-Plast TC)

Gem-Plast TC can be hand applied using a trowel, in a manner similar to stucco application; a "scratch" coat and the second (third) coat), and finish using a float, to obtain an "open structure" of Gem-Plast TC surface. When spraying, apply first a thin "scratch" coat, brush the surface to obtain continuity and then apply the second (third) coat – "wet to green condition". Compact the material using a trowel to eliminate entrapped air and finish with float to obtain "open structure" surface. If Gem-Plast TC layer must be left over-night prior to application of consecutive coat, leave the surface "rough" and pressure wash with a minimum 24 MPa (3,500 psi) water.

Air dry cure Gem-Plast TC for a minimum 3 days prior to application of Cem-Kote Barrier Cote 100.

Clean the surface of Gem-Plast TC in the same manner as described above in cleaning of the concrete surface. The surface roughness must be a minimum CSP #3 (ICRI - International Concrete Repair Institute).

Note: Pressure washing the Gem-Plast TC surface the next day, while the material has not developed a full strength, makes the surface preparation of Gem-Plast TC for application of Cem-Kote Flex CR easier, without sandblasting, but the CSP#3 must be achieved.

Notes:

- *When spraying Cem-Kote Barrier Cote 100/Cem-Kote Flex CR, EACH coat must be brushed - to eliminate the "pin holes".*
- *Cem-Kote Flex Barrier Cote 100/Cem-Kote Flex CR can be applied at the total minimum thickness of 2 mm (80 mils). In applications over deteriorated, (eroded), concrete, the Cem-Kote Flex thickness will be higher. It is necessary to apply a sample, approximately 1.2 x 1.2 m, (4 x 4 ft.) for approval of residual surface unevenness by owner or specifying engineer. The test sample is also important for determination of actual coverage of Cem-Kote products or Gem-Plast TC. In application over the repair course (layer) of Gem-Plast TC, the application of the minimum thickness 2 mm (80 mils) is used, unless otherwise specified.*
- *When applying Cem-Kote Barrier Cote 100/Cem-Kote Flex CR over rough, deteriorated, (eroded), concrete, pin-holing due to escaping of entrapped air can occur. Please contact Gemite Products Inc. for instructions how to eliminate or reduce pin-holing. It is important that the coating Cem-Kote Barrier Coat 100/ Cem-Kote Flex CR provides continuity free of openings or pin-holes.*
- *Cem-Kote Barrier Cote 100/Cem-Kote Flex CR can be applied at the total maximum thickness of 3 mm (1/8"), if necessary.*
- *Protect against surface water evaporation. Under hot, sunny and windy conditions, extreme care must be given to protect the surface against rapid evaporation of water.*
- *When using the Reinforcing Fabric HD throughout, the minimum thickness of* Cem-Kote Flex CR *layer must* be *2 mm (80 mils).*

3.7 Finishing

A. Cem-Kote Barrier Cote 100**/**Cem-Kote Flex CR is left with "brushed" surface. In application where a smooth surface is required, the surface can be "closed" with steel trowel.

3.8 Curing

A. Air-dry cure Cem-Kote Barrier Cote 100/Cem-Kote Flex CR for 72 hours at 20 ^{o}C (68^{o}F) and 70-80% RH, prior to filling with water. Longer curing/drying time will be required with cooler temperatures and a higher relative humidity. When applying over Gem-Plast TC air-cure Cem-Kote Barrier Cote 100/Cem-Kote Flex CR for a minimum 5 days prior to filling with water.

B. Hot Weather Application**:** Protect the surface against rapid drying. Contact Gemite Technical Service.

C. Cold Weather Application**:** Apply in temperatures above 5^{o}C (41^{o}F) and protect the material against freezing for additional 48 hours.

Note: *Use electrical (**NOT propane)** heaters or hot air generators, to avoid carbonation and carbonation cracking.*

3.9 Site Cleanup

All excess and waste materials are to be removed from the job site by the contractor in accordance with contract provisions. Surrounding areas where the material has been applied will be left free of debris.