



National Water Main Cleaning Company
15551 Okeechobee Blvd, Loxahatchee, FL 33470
Tel: 561-508-6135

Shayna Agosta – Bids and Contract Coordinator

sagosta@nwmcc.com

(561) 508-6135

Curt Maring – Executive Vice President

cmaring@nwmcc.com

(561) 879-0063

City of Key West RFP-RFP26-004
General Services for Manhole & Concrete Rehabilitation



ADDENDUM NO. 1
General Services for Manhole & Concrete Rehabilitation
RFP 26-004

This addendum is issued as supplemental information to the Request for Proposal package for clarification of certain matters of both a general and a technical nature. The referenced Request for Proposal package is hereby amended in accordance with the following items:

1. **Clarification:** [No Changes]
2. **Changes to Submission Requirements:** [No Changes]
3. **Updates to Project Timeline:** [No Changes]
4. **Responses to Questions:**

- 1) What are these deadlines for?

Clarification Submittal Deadline: February 27, 2026, 3 P.M. LOCAL TIME
Clarification Response Deadline: March 4, 2026, 3 P.M. LOCAL TIME

Answer: The Clarification Submittal Deadline of February 27, 2026, at 3:00 P.M. (Local Time) represents the final date and time for vendors to submit written questions or requests for clarification regarding this solicitation. No clarification requests will be accepted after this deadline.

The Clarification Response Deadline of March 4, 2026, at 3:00 P.M. (Local Time) is the date by which the City will issue its official written responses to all clarification requests received by the submittal deadline. Responses will be provided via formal addendum and distributed to all prospective bidders.

Only written clarifications issued by the City through addendum shall be considered official or binding.

5. **Additional Resources:** [No Changes]

National Water Main Cleaning Company



Signature

Curt Maring - Executive Vice President

Name of Business



ADDENDUM NO. 2
General Services for Manhole & Concrete Rehabilitation
ITB 26-004

This addendum is issued as supplemental information to the Request for Proposal package for clarification of certain matters of both a general and a technical nature. The referenced Request for Proposal package is hereby amended in accordance with the following items:

1. **Clarification:** [No Changes]
2. **Changes to Submission Requirements:** [No Changes]
3. **Updates to Project Timeline:** [No Changes]
4. **Responses to Questions:**

- 1) We would like to bid this project but the bidding requirements call for:

The successful Bidder shall furnish documentation showing that they are in compliance with the licensing requirements

of the State and the provisions of Chapter 66 Section 87 of the Code of Ordinances of the City of Key West; within ten

(10) days following the Notice of Award and must demonstrate that they hold at a minimum, the following licenses & certificates.

A. City of Key West Business Tax License Receipt

B. A valid Certificate of Competency issued by the Chief Building Official of Key West, Florida.

C. A valid occupational license issued by the City of Key West, Florida

We are located in Hialeah, Florida; therefore, we do not have any license, certificate of competency issued by the City of Key West.

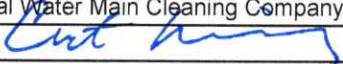
Please confirm if we can submit our bid.

Answer: Per the solicitation requirements, City of Key West licensing items (including the City Business Tax License Receipt and Certificate of Competency) are **post-award requirements** and are due **within ten (10) days following issuance of the Notice of Award**, not at the time of bid submission. Proposers located outside the City of Key West are permitted to submit proposals, provided they can obtain and furnish the required City licenses and certifications if selected for award.

At the time of proposal submittal, firms must demonstrate that they hold the appropriate **State of Florida licenses/certifications** to perform the work outlined in the RFP. City-specific licensing will be required only upon award.

5. Additional Resources: [No Changes]

National Water Main Cleaning Company



Signature

Curt Maring - Executive Vice President

Name of Business

NOTE TO BIDDER: Use preferably black ink or typewritten for completing this Bid Form.

BID FORM

To: The City of Key West
Address: 1300 White Street, Key West, Florida 33040
Project Title: **Manhole Rehabilitation and Concrete Spalling Repair General Utilities Contract**
RFP #26-004

Bidder's contact person for additional information on this bid:

Company Name: National Water Main Cleaning Company

Contact Name & Telephone #: Curt Maring 561-508-6135

Email Address: BidsFl@nwmcc.com

BIDDER'S DECLARATION AND UNDERSTANDING

The undersigned, hereinafter called the Bidder, declares that the only persons or parties interested in this bid are those named herein, that this bid is, in all respects, fair and without fraud, that it is made without collusion with any official of the City, and that the bid is made without any connection or collusion with any person submitting another bid on this contract.

The Bidder further declares that they have carefully examined the Contract Documents for the construction of the project, and satisfied themselves as to the quantities involved, including materials and equipment, and conditions of work involved, including the fact that the description of the quantities of work and materials, as included herein, is brief and is intended only to indicate the general nature of the work and to identify the said quantities with the detailed requirements of the Contract Documents, and that this bid is made according to the provisions and under the terms of the Contract Documents, which documents are hereby made a part of this bid.

CONTRACT EXECUTION AND BONDS

The Bidder agrees that, if their bid is accepted, they will, within ten (10) calendar days—excluding Sundays and legal holidays—after receipt of the Notice of Award, execute the contract in the form attached hereto. At that time, the Bidder shall also provide the City with examples of the Performance Bond and Payment Bond, evidence of all required licenses and certifications, and shall furnish, to the extent of their bid, all necessary machinery, tools, equipment, and materials to perform and complete all work as specified or indicated in the Contract Documents.

CERTIFICATES OF INSURANCE

Bidder agrees to furnish the City, before commencing the work under this contract, the Certificates of Insurance (COI) as specified in these documents.

START OF CONSTRUCTION AND CONTRACT COMPLETION TIME

The Bidder further agrees to begin work within ten (10) calendar days after receiving the Notice to Proceed for each authorized Task Order. Period of performance for each authorized Task Order shall be

negotiated with Owner prior to receiving the Notice to Proceed.

ADDENDA

The Bidder hereby acknowledges that they have received Addenda No's. 1, 2,

_____, _____, _____, _____, _____, _____, _____, _____, _____, _____,
(Bidder shall insert No. of each Addendum received) and agrees that all addenda issued are hereby made part of the Contract Documents, and the Bidder further agrees that their bid(s) includes all impacts resulting from said addenda.

SALES AND USE TAXES

The Bidder agrees that all federal, state, and local sales and use taxes are included in the stated bid prices for the work.

LUMP SUM ITEMS

The Bidder further proposes to accept as full payment for the work proposed herein the amounts computed under the provisions of the Contract Documents and based on the following unit prices. The Bidder agrees that the unit prices represent a true measure of the labor, materials, equipment, and all other costs required to perform each type of work called for in these Contract Documents, including allowances for overhead and profit.

Total payment for each item will be determined by multiplying the unit price by the actual quantity of work performed and accepted by the City. The sum of these calculated amounts will constitute full compensation for the work completed in accordance with the Contract Documents.

UNIT PRICE SCHEDULE – Manhole Rehabilitation and Concrete Spalling Repair

Manhole Rehabilitation and Spalling Repair RFP 26-004

Item #	Item Description	Quantity	Unit	Unit Cost	Total Cost
A	Performance and Payment Bonds	1	Per \$1,000	\$7.00	\$7,000.00
A	Mobilization/Demobilization (In no case shall the amount bid for this item exceed five (5) percent (%) of the Total Base Bid. This item shall include MOT, General & Supplementary Conditions, Certified AutoCAD as Built's)	1	LS	\$10,000.00	\$10,000.00
A	Epoxy Resin Based Coating 48" Diameter 1/4" Minimum Thickness	180	VF	\$610.00	\$109,800.00
B	Epoxy Resin Based Coating 60" Diameter 1/4" Minimum Thickness	60	VF	\$770.00	\$46,200.00
C	Structure Epoxy Resin Based Coating 1/4" Minimum Thickness	1000	SF	\$45.00	\$45,000.00
D	125 MIL Variance (1/8")	200	SF	\$36.00	\$7,200.00
A	Removal of Existing Manhole or Wetwell Lining System (Excluding T-Lock or Similar Liner)	200	SF	\$110.00	\$22,000.00
B	Removal of Existing Manhole or Wetwell T-Lock or Similar Lining System	800	SF	\$16.21	\$12,968.00
C	Patching & Profiling - Cementitious Grout Only	3000	SF	\$22.00	\$66,000.00
D	Infiltration Control - Cementitious or Chemical Grout	600	GAL	\$95.00	\$57,000.00
E	Bonding Compound	120	GAL	\$25.00	\$3,000.00
F	Bench and Invert Channel Repair	100	LF	\$22.61	\$2,261.00
G	Chimney Repairs	100	VF	\$391.00	\$39,100.00
A	Cleaning Manholes / Structures	40	EA	\$225.00	\$9,000.00
B	Televising / Photographs / Inspection Report	40	EA	\$50.00	\$2,000.00
A	Bypass Pumping – 4"	5	Day	\$25.00	\$125.00
B	Bypass Pumping – 6"	5	Day	\$50.00	\$250.00
C	Bypass Pumping – 8"	5	Day	\$300.00	\$1,500.00
D	Vac-Truck	40	Hr	\$250.00	\$10,000.00
E	Maintenance of Traffic - City	5	EA	\$25.00	\$125.00

F	Maintenance of Traffic - FDOT	1	EA	\$125.00	\$125.00
A	Slab Repair: Spalling/Surface Patching	400	SF	\$60.00	\$24,000.00
B	Slab Repair: Spalling/Surface Patching w/Reinforcement Steel	200	SF	\$70.00	\$14,000.00
C	Vertical or Overhead Concrete Repair: Cracks	1000	LF	\$56.00	\$56,000.00
D	Vertical or Overhead Concrete Repair: Surface Patching (Depth<1")	1000	SF	\$85.00	\$85,000.00
E	Vertical or Overhead Concrete Repair: Spalling/Surface Patching (1"<Depth<3")	300	SF	\$165.00	\$49,500.00
F	Vertical or Overhead Concrete Repair: Spalling/Surface Patching w/Reinforcement Steel (3"<Depth<6")	200	SF	\$400.00	\$80,000.00
G	Concrete Repair: Tie Holes	100	EA	\$65.00	\$6,500.00
H	Joint Repair	50	LF	\$90.00	\$4,500.00
I	Joint Sealant: Remove & Replace	200	LF	\$135.00	\$27,000.00

Manhole and Spalling Repair BASE BID:

\$ 797,154.00

In Words:

Seven Hundred Ninety Seven Thousand One Hundred Fifty Four Dollars & **Zero** Cents

Payment for materials & equipment authorized by the Owner in a written Change Order but not listed in the Schedule of Values will be provided at suppliers' invoice plus 15 %.

(This space intentionally left blank)

SUBCONTRACTORS

The Bidder further proposes that the following subcontracting firms or businesses will be awarded subcontracts for the following portions of the work if the Bidder is awarded the contract:

Basic Engineering

Name

2601 East 7th Ave, Tampa, FL, 33605
Street City State Zip

Name

_____, _____, _____, _____
Street City State Zip

Name

_____, _____, _____, _____
Street City State Zip

Name

_____, _____, _____, _____
Street City State Zip

SURETY

Arthur J. Gallagher Risk Management Services, LLC whose address is

300 S. Riverside Plaza, Suite 1500, Chicago, IL, 60606
Street City State Zip

BIDDER

The name of the Bidder submitting this bid is _____

National Water Main Cleaning Company doing business at

15551 Okeechobee Blvd, Loxahatchee, FL, 33470
Street City State Zip

which is the address to which all communications concerned with this Bid and with the Contract shall be sent.

The names of the principal officers of the corporation submitting this bid, or of the partnership, or of all persons interested in this bid as principals are as follows:

If Sole Proprietor or Partnership

IN WITNESS hereto the undersigned has set their (its) hand this _____ day of _____ 2026.

of Bidder _____

Signature

Title

If Corporation

IN WITNESS WHEREOF the undersigned corporation has caused this instrument to be executed, and its seal affixed by its duly authorized officers this 11 day of March 2026.

(SEAL)

National Water Main Cleaning Company

Name of Corporation

By Curt Maring

Title Curt Maring - Executive Vice President

Attest S. Agosta
Shayna Agosta - Bids & Contract Coordinator

Sworn and subscribed before this 11 day of March, 2026

NOTARY PUBLIC, State of Florida, at Large

My Commission Expires: 12/25/26

Billie Jo Allen





NATIONAL WATER MAIN CLEANING

A Carylton Company

15551 Okeechobee Blvd.
Loxahatchee Groves, FL 33470

tf: (800) 242-7257

p: (561) 508-6135

f: (561) 855-4916

www.nwmcc.com

Miami-Dade, FL-MH Rehab

Jose Alvarez, Construction Manager

20900 SW 117th Avenue

Miami, FL 33177

Office: (786) 552-4365

Mobile: (786) 236-5325

Jose.alvarez@miamidade.gov

Contract # P0213

Start Date: 11/16/2022

End Date: October 7/31/2024

Contract Amount: \$961,571.32

Rehabilitation of 500 Manholes Inflow & Infiltrations utilizing cementitious lining methods. As well as performing a pre and post 360° video inspection on each assigned asset.

Miami-Dade, FL-MH Rehab

Jose Alvarez, Construction Manager

20900 SW 117th Avenue

Miami, FL 33177

Office: (786) 552-4365

Mobile: (786) 236-5325

Jose.alvarez@miamidade.gov

Contract # P20171

Start Date: 06/13/24

End Date: Ongoing

Contract Amount: \$2,778,642.00

Rehabilitation of 900 Manholes Inflow & Infiltrations utilizing cementitious lining methods. As well as performing a pre and post 360° video inspection on each assigned asset.



NATIONAL WATER MAIN CLEANING

A Carylon Company

15551 Okeechobee Blvd.
Loxahatchee Groves, FL 33470

tf: (800) 242-7257

p: (561) 508-6135

f: (561) 855-4916

www.nwmcc.com

Miami-Dade, FL-MH Rehab

Marcos Caines, Construction Manager
3071 SW 38 Avenue, Suite 344-18,
Miami, Florida 33146
Office: (786) 552-4367
Mobile: (786) 495-5914
Marcos.caines@miamidade.gov

RFP # P20108

Start Date: 11/16/2024

End Date: October 4/9/2025

Contract Amount: \$657,370.00

Rehabilitate 15 heavily tuberculated manholes in Downtown Miami over top of existing 60" and 72" Trunk line sewer mains.

City of St. Petersburg-MH Rehab

Matt Wilson, Engineer II
ECID Engineering and Capital Imp Dept.
Municipal Services Center
1 4th St N, St. Petersburg, FL 33701
(727) 415-0192
Matthew.Wilson@stpete.org

Contract # 20088-111

Start Date: 03/2022

End Date: 11/2024

Contract Value: \$1,500,000.00

Scope: Man Hole Rehabilitation - 2,225 VF of sanitary sewer manhole.



NATIONAL WATER MAIN CLEANING

A Carylton Company

15551 Okeechobee Blvd.
Loxahatchee Groves, FL 33470
t: (800) 242-7257
p: (561) 508-6135
f: (561) 855-4916
www.nwmcc.com

Broward County, FL-MH Rehab/CIPP Lining/Sanitary Cleaning & CCTV

David A. Campbell
Construction Project Manager
2555 West Copans Road, Pompano Beach, FL 33069
Office: (954) 831-0910
DACAMPBELL@broward.org

Contract # PNC2119049B
Start Date: 11/01/19
End Date: Current (Due to Contract Renewal)

Contract Value: \$10,031,680.00

Multi District Inflow and Infiltration Reduction Program
Scope: Video, clean, grout, point repair lining, lateral grouting and lining, MH Rehab of 200,000 LF of sewer pipe.

Palm Beach County, FL MH Rehab

Carlos Echevarria
50 South Military Trail, Suite 110
West Palm Beach, FL 33415
Office: (561) 301-1562
CEchevarria@pbcwater.com

Contract # 16-046/ZG
Start Date: June 2017
End Date: February 2021

Contract Amount: \$371,100.00

Sewer Pipeline and Manhole Cleaning and Inspection Services of 150,000 LF



NATIONAL WATER MAIN CLEANING

A Carylon Company

15551 Okeechobee Blvd.
Loxahatchee Groves, FL 33470
t: (800) 242-7257
p: (561) 508-6135
f: (561) 855-4916
www.nwmcc.com

Toho Water Authority-MH Rehab/Sanitary Cleaning & CCTV

Janine Alexander
951 Martin Luther King Blvd.
Kissimmee, FL 34741-4929
Office: (321) 388-5178
janine.alexander@tetrattech.com

Contract # IFB-19-086
Start Date: October 2020
End Date: August 2023

Contract Amount: \$2,691,424.00

Manhole, Wet Well and Structure Sealing, Coating and Lining Services. Manhole and Wet Well coating of 6,080 VF and 2,000 SF of repair. Cleaning and TV of 2,400 LF.

Contract # IFB-20-133
Start Date: October 2020
End Date: October 2023

Contract Amount: \$319,680.00

Gravity sewer cleaning and inspection services of 250,000 LF.

Hillsborough County-Manhole Rehabilitation

Timothy N. Ducharme, Project Manager
925 East Twiggs Street
Tampa, FL 33602
Office: (813) 599-6185
DucharmeT@hillsboroughcounty.org

Contract # **23362**
Start Date: 2022
End Date: Ongoing

Contract Amount: \$2,265,597.56

Manhole, Wet Well and Structure Sealing, Coating and Lining Services. Manhole and Wet Well coating of 6,080 VF and 2,000 SF of repair.

ANTI-KICKBACK AFFIDAVIT

STATE OF Florida)

: SS

COUNTY OF Palm Beach)

I, the undersigned hereby duly sworn, depose and say that no portion of the sum herein proposal will be paid to any employees of the City of Key West as a commission, kickback, reward or gift, directly or indirectly by me or any member of my firm or by an officer of the corporation.

By: Curt Maring - Executive Vice President *Curt Maring*

Sworn and subscribed before me this 11 day of March 2026.

NOTARY PUBLIC, State of Florida at Large

My Commission Expires: 12/25/26

Billie Jo Allen



**SWORN STATEMENT UNDER SECTION 287.133(3)(A)
FLORIDA STATUTES, ON PUBLIC ENTITY CRIMES**

THIS FORM MUST BE SIGNED IN THE PRESENCE OF A NOTARY PUBLIC OR OTHER OFFICER AUTHORIZED TO ADMINISTER OATHS.

1. This sworn statement is submitted with Proposal or Proposal for _____

2. This sworn statement is submitted by National Water Main Cleaning Company
(name of entity submitting sworn statement)
whose business address is 15551 Okeechobee Blvd, Loxahatchee, FL 33470

and (if applicable) its Federal Employer Identification Number (FEIN) is _____

22-1753261

(If the entity has no FEIN, include the Social Security Number of the individual

signing this sworn statement _____

3. My name is Curt Maring
(please print name of individual signing)

and my relationship to the entity named above is Executive Vice President

4. I understand that a "public entity crime" as defined in Paragraph 287.133(1)(g), Florida Statutes, means a violation of any state or federal law by a person with respect to and directly related to the transaction of business with any public entity or with an agency or political subdivision of any other state or with the United States, including but not limited to, any proposal or contract for goods or services to be provided to any public or an agency or political subdivision of any other state or of the United States and involving antitrust, fraud, theft, bribery, collusion, racketeering, conspiracy, material misrepresentation.

5. I understand that "convicted" or "conviction" as defined in Paragraph 287.133(1)(b), Florida Statutes, means a finding of guilt or a conviction of a public entity crime, with or without an adjudication guilt, in any federal or state trial court of record relating to charges brought by indictment information after July 1, 1989, as a result of a jury verdict, nonjury trial, or entry of a plea of guilty or nolo contendere.

6. I understand that an "affiliate" as defined in Paragraph 287.133(1)(a), Florida Statutes, means

1. A predecessor or successor of a person convicted of a public entity crime; or
2. An entity under the control of any natural person who is active in the management of the entity and who has been convicted of a public entity crime. The term "affiliate" includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in the management of an affiliate. The ownership by one person of shares constituting controlling interest in another person, or a pooling of equipment or income among persons when not for fair market value under an arm's length agreement, shall be a prima facie case that one person controls another person. A person who knowingly enters into a joint venture with a person who has been convicted of a public entity crime in Florida during the preceding 36 months shall be considered an affiliate.

7. I understand that a "person" as defined in Paragraph 287.133(1)(8), Florida Statutes, means any natural person or entity organized under the laws of any state or of the United States with the legal power to enter into a binding contract and which proposals or applies to proposal on contracts for the provision of goods or services let by a public entity, or which otherwise transacts or applies to transact business with public entity. The term "person" includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in management of an entity.

8. Based on information and belief, the statement which I have marked below is true in relation to the entity submitting this sworn statement. (Please indicate which statement applies).

Neither the entity submitting this sworn statement, nor any officers, directors, executives, partners, shareholders, employees, members, or agents who are active in management of the entity, nor any affiliate of the entity have been charged with and convicted of a public entity crime subsequent to July 1, 1989, AND (Please indicate which additional statement applies.)

There has been a proceeding concerning the conviction before a hearing of the State of Florida, Division of Administrative Hearings. The final order entered by the hearing officer did not place the person or affiliate on the convicted Contractor list. (Please attach a copy of the final order.)

The person or affiliate was placed on the convicted Contractor list. There has been a subsequent proceeding before a hearing officer of the State of Florida, Division of Administrative Hearings. The final order entered by the hearing officer determined that it was in the public interest to remove the person or

affiliate from the convicted Contractor list. (Please attach a copy of the final order.)

____ The person or affiliate has not been put on the convicted Contractor list.
(Please describe any action taken by or pending with the Department of General Services.)

Curt Maring
(signature) Curt Maring - Executive Vice President

03/11/26
(date)

STATE OF Florida

COUNTY OF Palm Beach

PERSONALLY APPEARED BEFORE ME, the undersigned authority,

Curt Maring - Executive Vice President who, after first being sworn by me, affixed his/her
(name of individual signing)

signature in the space provided above on this 11 day of March, 2026.

My commission expires: 12/25/26

Billie Jo Allen
NOTARY PUBLIC



CITY OF KEY WEST INDEMNIFICATION FORM

To the fullest extent permitted by law, the Contractor expressly agrees to indemnify and hold harmless the City of Key West, their officers, directors, agents and employees *(herein called the "indemnitees") from liabilities, damages, losses and costs, including but not limited to, reasonable attorney's fees and court costs, such legal expenses to include costs incurred in establishing the indemnification and other rights agreed to in this Paragraph, to persons or property, to the extent caused by the negligence, recklessness, or intentional wrongful misconduct of the Contractor, its Subcontractors or persons employed or utilized by them in the performance of the Contract. Claims by indemnitees for indemnification shall be limited to the amount of Contractor's insurance or \$1 million per occurrence, whichever is greater. The parties acknowledge that the amount of the indemnity required hereunder bears a reasonable commercial relationship to the Contract and it is part of the project specifications or the proposal documents, if any.

The indemnification obligations under the Contract shall not be restricted in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for the Contractor under Workers' Compensation acts, disability benefits acts, or other employee benefits acts, and shall extend to and include any actions brought by or in the name of any employee of the Contractor or of any third party to whom Contractor may subcontract a part or all of the Work. This indemnification shall continue beyond the date of completion of the work.

CONTRACTOR: 15551 Okeechobee Blvd, Loxahatchee, FL 33470

SEAL:

Address

Curt Maring

Signature

Curt Maring - Executive Vice President

Print Name

Executive Vice President

Title

DATE:

03/11/26



EQUAL BENEFITS FOR DOMESTIC PARTNERS AFFIDAVIT

STATE OF Florida)

: SS

COUNTY OF Palm Beach)

I, the undersigned hereby duly sworn, depose and say that the firm of _____

National Water Main Cleaning Company

provides benefits to domestic partners of its employees on the same basis as it provides benefits to employees' spouses, per City of Key West Code of Ordinances Sec. 2-799.

By: Curt Maring - Executive Vice President



Sworn and subscribed before me this 11 day of March 2026.

NOTARY PUBLIC, State of Florida at Large

My Commission Expires: 12/25/26



CONE OF SILENCE AFFIDAVIT

STATE OF Florida _____)

: SS

COUNTY OF Palm Beach _____)

I, the undersigned hereby duly sworn, depose and say that all owner(s), partners, officers, directors, employees and agents representing the firm of National Water Main Cleaning Company have read and understand the limitations and procedures regarding communications concerning City of Key West Code of Ordinances Sec. 2-773 Cone of Silence.

By: Curt Maring - Executive Vice President



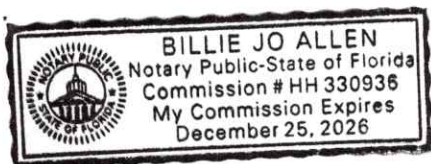
Sworn and subscribed before me this

11 day of March 2026.



NOTARY PUBLIC, State of Florida _____ at Large

My Commission Expires: 12/25/26



**LOCAL CONTRACTOR CERTIFICATION
PURSUANT TO CITY OF KEY WEST CODE OF ORDINANCES
SECTION 2-798**

The undersigned, as a duly authorized representative of the Contractor listed herein, certifies to the best of his/her knowledge and belief, that the Contractor meets the definition of a "Local Business." For purposes of this section, "local business" shall mean a business which:

- a. Principle address as registered with the FL Department of State located within 30 miles of the boundaries of the city, listed with the chief licensing official as having a business tax receipt with its principle address within 30 miles of the boundaries of the city for at least one year immediately prior to the issuance of the solicitation.
- b. Maintains a workforce of at least 50 percent of its employees from the city or within 30 miles of its boundaries.
- c. Having paid all current license taxes and any other fees due the city at least 24 hours prior to the publication of the call for proposals or request for proposals.
 - Not a local Contractor pursuant to Code of Ordinances Section 2-798
 - Qualifies as a local Contractor pursuant to Code of Ordinances Section 2-798

If you qualify, please complete the following in support of the self-certification & submit copies of your County and City business licenses. Failure to provide the information requested will result in denial of certification as a local business.

Business Name _____

Phone: _____

Current Local Address: _____

Fax: _____

(P.O Box numbers may not be used to establish status)

Length of time at this address _____

N/A

N/A

Signature of Authorized Representative _____

_____ Date

STATE OF N/A

COUNTY OF N/A

The foregoing instrument was acknowledged before me this N/A day of N/A, 20N/A.

By N/A, of _____

(Name of officer or agent, title of officer or agent)

Name of corporation acknowledging)

or has produced N/A

_____ as identification

(type of identification)

N/A

Signature of Notary

N/A

Return Completed form with

Supporting documents to:

City of Key West Purchasing

Print, Type or Stamp Name of Notary

N/A

Title or Rank

THE CITY OF KEY WEST E-VERIFY AFFIDAVIT

Beginning January 1, 2021, Florida law requires all contractors doing business with The City of Key West to register with and use the E-Verify System in order to verify the work authorization status of all newly hired employees. The City of Key West requires all Contractors who are awarded contracts with the City to verify employee eligibility using the E-Verify System. As before, Contractors are also required to maintain all I-9 Forms of their employees for the duration of the contract term. To enroll in the E-Verify System, Contractors should visit the E-Verify Website located at www.e-verify.gov.

In accordance with Florida Statute § 448.095, **it is the responsibility of the Awarded Contractor to ensure compliance with all applicable E-Verify requirements.**

By executing this affidavit, the undersigned contractor verifies it compliance with Florida Statute § 448.095, stating affirmatively that the individual, firm, or corporation which is engaged in the performance of services on behalf of the City of Key West, has registered with, is authorized to use, and uses the U.S. Department of Homeland Security’s E-Verify system.

Furthermore, the undersigned contractor agrees that it will continue to use E-Verify throughout the contract period, and should it employ or contract with any subcontractor(s) in connection with the performance of services pursuant to this Agreement with The City of Key West, contractor will secure from such subcontractor(s) similar verification of compliance with Florida Statute § 448.095, by requiring the subcontractor(s) to provide an affidavit attesting that the subcontractor does not employ, or subcontract with, an unauthorized alien. Contractor further agrees to maintain records of such compliance during the duration of the Agreement and provide a copy of each such verification to The City of Key West within five (5) business days of receipt.

Failure to comply with this provision is a material breach of the Agreement and shall result in immediate termination of the Agreement without penalty to the City of Key West. Contractor shall be liable for all costs incurred by the City of Key West to secure replacement Agreement, including but not limited to, any increased costs for the same services, and costs due to delay, and repropoed costs, if applicable.

03/11/26

Date



(Signature of Authorized Representative)

Curt Maring - Executive Vice President

State of Florida

County of Palm Beach

Personally Appeared Before Me, the undersigned authority, Curt Maring - Executive Vice President who, being personally know or having produced his/her signature in the space provided above on this

11 day of March, 2026.

Billie Jo Allen
Signature, Notary Public

12/25/26
Commission Expires

Stamp/Seal:



**AFFIDAVIT ATTESTING TO NONCOERCIVE CONDUCT
FOR LABOR OR SERVICES**

Entity/Contractor Name: National Water Main Cleaning Company

Contractor FEIN: 22-1753261

Contractor's Authorized Representative: Curt Maring - Executive Vice President
(Name and Title)

Address: 15551 Okeechobee Blvd

City: Loxahatchee State: Florida Zip: 33470

Phone Number: 561-508-6135

Email Address: BidsFL@nwmcc.com

As a nongovernmental entity executing, renewing, or extending a contract with a government entity, Contractor is required to provide an affidavit under penalty of perjury attesting that Contractor does not use coercion for labor or services in accordance with Section 787.06, Florida Statutes.

As defined in Section 787.06(2)(a), coercion means:

1. Using or threatening to use physical force against any person;
2. Restraining, isolating, or confining or threatening to restrain, isolate, or confine any person without lawful authority and against her or his will;
3. Using lending or other credit methods to establish a debt by any person when labor or services are pledged as a security for the debt, if the value of the labor or services as reasonably assessed is not applied toward the liquidation of the debt, the length and nature of the labor or service are not respectively limited and defined;
4. Destroying, concealing, removing, confiscating, withholding, or possessing any actual or purported passport, visa, or other immigration document, or any other actual or purported government identification document, of any person;
5. Causing or threatening to cause financial harm to any person;
6. Enticing or luring any person by fraud or deceit; or
7. Providing a controlled substance as outlined in Schedule I or Schedule II of Section 893.03 to any person for the purpose of exploitation of that person.

As a person authorized to sign on behalf of Contractor, I certify under penalties of perjury that Contractor does not use coercion for labor or services in accordance with Section 787.06. Additionally, Contractor has reviewed Section 787.06, Florida Statutes, and agrees to a proposal by same.

Certified By: Curt Maring - Executive Vice President, who is authorized to sign on behalf of the above referenced company.

Authorized Signature: 

Print Name: Curt Maring - Executive Vice President

Title: General Services for Manhole & Concrete Rehabilitation

**CONTRACTOR CERTIFICATION REGARDING
SCRUTINIZED COMPANIES LISTS**

Respondent Contractor Name: National Water Main Cleaning Company

Contractor FEIN: 22-1753261

Contractor's Authorized Representative Name and Title: Curt Maring - Executive Vice President

Address: 15551 Okeechobee Blvd

City: Loxahatchee State: Florida Zip: 33470

Phone Number: 561-508-6135

Email Address: BidsFl@nwmcc.com

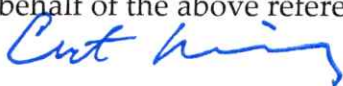
Section 287.135(2)(a), Florida Statutes, prohibits a company from proposing on, submitting a proposal for, or entering into or renewing a contract for goods or services of any amount if, at the time of contracting or renewal, the company is on the Scrutinized Companies that Boycott Israel List, created pursuant to section 215.4725, Florida Statutes, or is engaged in a boycott of Israel. Section 287.135(2)(b), Florida Statutes, further prohibits a company from proposing on, submitting a proposal for, or entering into or renewing a contract for goods or services over one million dollars (\$1,000,000) if, at the time of contracting or renewal, the company is on either the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, both created pursuant to section 215.473, Florida Statutes, or the company is engaged in business operations in Cuba or Syria.

As the person authorized to sign on behalf of Respondent, I hereby certify that the company identified above in the section entitled "Respondent Contractor Name" is not listed on either the Scrutinized Companies that Boycott Israel List, Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List I understand that pursuant to section 287.135, Florida Statutes, the submission of a false certification may subject such company to civil penalties, attorney's fees, and/or costs and termination of the contract at the option of the awarding governmental entity.

Certified By: Curt Maring - Executive Vice President

Print Name *Print Title*

who is authorized to sign on behalf of the above referenced company.

Authorized Signature: 



NATIONAL WATER MAIN CLEANING

A Carylton Company

15551 Okeechobee Blvd.
Loxahatchee Groves, FL 33470

tf: (800) 242-7257

p: (561) 508-6135

f: (561) 855-4916

www.nwmcc.com

Company Profile



National Water Main Cleaning Company **“The Management of Underground Infrastructure”**

At National Water Main Cleaning Company (NWMCC), we focus on the importance of maintaining the underground infrastructure for Environmental Protection. We utilize state of the art technologies to aid communities in their Regulatory Compliance Efforts. These technologies provide cost effective solutions that extends our clients rehabilitation budgets.

National Water Main Cleaning Company (NWMCC) has been in existence since 1899 and part of Carylon Corporation since 1964 and provides an unmatched guarantee that “YOU MUST BE COMPLETELY SATISFIED OR YOU PAY ABSOLUTELY NOTHING FOR OUR SERVICES”.

National Water Main Cleaning Company (NWMCC), as a member of National Association of Sewer Service Companies (NASSCO) has certified all of our technicians to the rigorous PACP, MACP & LACP Inspection protocols. Utilizing these industry standards allows us to provide our clients with the highest level of reporting which allows for better decision making in selecting rehabilitation methods and compliance with asset management requirements.

We continually invest in the latest technology which keeps both our company and clients on the cutting edge of innovation to solve today’s toughest environmental problems.

Services Provided:

- Sewer System Studies
 - (MH Inspections, Smoke testing, Flow Isolation, Flow Metering)
- Sewer, Storm Drain, & Catch Basin Cleaning
- Internal CCTV Inspection
- Sonar & Laser Pipeline Inspection
 - (also known as Multi – Sensor Inspection MSI)
- Chemical Grouting
- Lateral Inspection & Rehabilitation
- Manhole Rehabilitation
- CIPP Spot Repairs/ Short Liners
- UV Lining
- Epoxy & Cementitious Structural Rehabilitation
 - Manholes, Wet Well, Tanks
- Vacuum Excavation
- Inspection of Pressurized Pipes
 - (Water mains, Force main, Etc.)
- Rehabilitation of Sanitary and Storm Water Pipes using CIPP & CCCP technologies
- System Leak Detection
- Hydrant Inspection

We look forward to demonstrating our capabilities and helping you to better operate your Infrastructures. Find us on our website www.nwmcc.com

New Jersey Office
1806 Newark Turnpike
Kearny, NJ 07032
P: 973.483.3200
Email: bidreg@nwmcc.com

New York Office
928 Broadway
Utica, NY 1350
P: 315.624.9520
Email: boston@nwmcc.com

Boston Office
25 Marshall St.
Canton, MA 02021
P: 781.828.0863
Email: boston@nwmcc.com

Connecticut Office
1000 (rear) Elm St.
Rocky Hill, CT 06067
P: 860.793.2808
Email: boston@nwmcc.com

Florida Office
15551 Okeechobee Blvd.
Loxahatchee Groves, FL
561.508.6135
Email: bidreg@nwmcc.com



**NATIONAL WATER
MAIN CLEANING**

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www.nwmcc.com

Company Brochure



OUR STRENGTH RUNS DEEP

Your single-source resource
to tackle the toughest environmental
infrastructure challenges



**NATIONAL WATER
MAIN CLEANING-FL**

A Carylon Company

PROVEN TRACK RECORD

National Water Main Cleaning Co., a Carylon company, specializes in the inspection and planned maintenance of sewer pipes and water mains, giving you the knowledge and data you need to prevent backups and breaks. We have a long track record of success providing the expertise, equipment, technology and training to quickly, safely and reliably take on any infrastructure challenge.



Extensive training, experienced supervision

With National Water Main Cleaning, you know who will be working on every project: the best of the best. Our extensive training program and experienced field supervision ensure that every job gets done right the first time - and every time. Because when you're facing tough, gritty, real-world applications, you want a partner you can count on to deliver quality results.

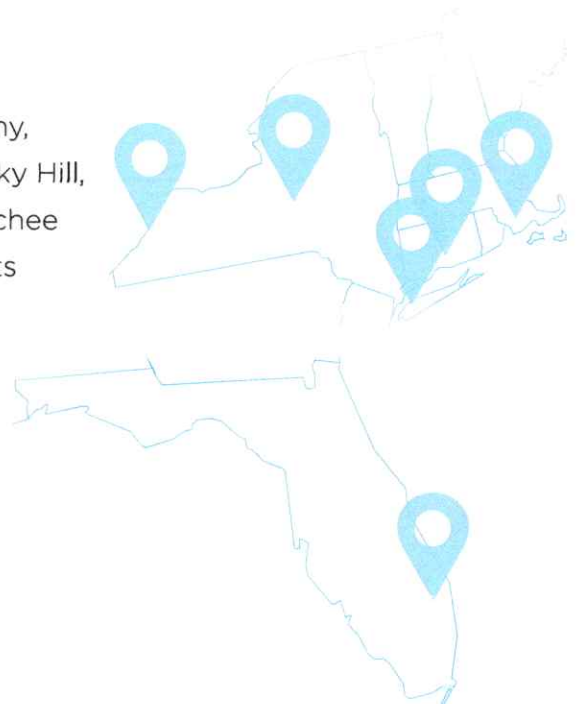
Guaranteed to get the job done right

As part of the Carylon family, National Water Main Cleaning has the resources and expertise to offer the best possible service available anywhere and back every project with a guarantee that is unmatched in the industry.



Local presence, national footprint

National Water Main Cleaning is headquartered in Kearny, New Jersey, with offices in Canton, Massachusetts; Rocky Hill, Connecticut; Buffalo and Utica, New York; and Loxahatchee Groves, Florida. We have the ability to complete projects nationwide. Our Florida market presence also lets us leverage knowledge of relevant environmental issues so we can respond quicker to an infrastructure threat or emergency.



BROAD RANGE OF SERVICES

It doesn't matter if your project calls for the use of one piece of equipment or multi-disciplinary crews and a fleet of specialized equipment. National Water Main Cleaning is uniquely positioned to work side-by-side with municipalities, utilities and industrial companies to deliver proven, scalable solutions.

Core Services:

Sewer Services

- *Digital TV Inspection*
- *Manhole Rehabilitation*
- *Sewer Cleaning*
- *Chemical Grouting*
- *Mini-Cam TV Inspection*
- *Lateral Service Line Inspection & Sealing*
- *No-Dig CIPP Repairs*
- *Root Removal*
- *Sewer System Studies*

Industrial Services

- *Tank Cleaning*
- *Wet/Dry Vacuum Cleaning*

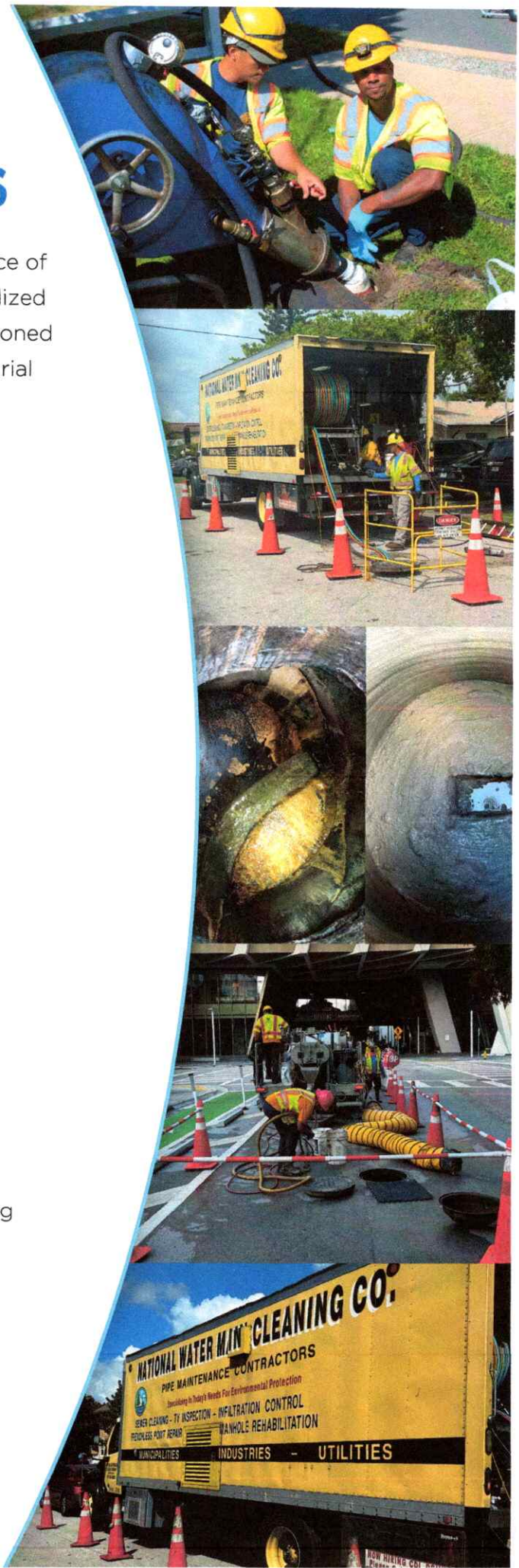
Water Services

- *Pipeline Diagnostics & Assessment*
- *Pipeline Cleaning*
- *Pipeline Rehabilitation*

Put our strengths to work for you.

Contact us today to learn how National Water Main Cleaning can solve your next environmental challenge.

Visit us at: www.nwmcc.com



NATIONAL WATER MAIN CLEANING CO.

A CARYLON COMPANY

Carylon Corporation is the nation's leading expert in environmental infrastructure maintenance. Our best-in-class regional operating companies offer specialized services in sewer system maintenance, water supply maintenance and soil/sludge remediation to maintain critical environmental infrastructure.

Today, from locations throughout the United States, Carylon offers the most comprehensive environmental maintenance services in the country.

www.caryloncorp.com



For a free job-site survey and cost estimate, contact:



**NATIONAL WATER
MAIN CLEANING-FL**

A Carylon Company

Loxahatchee Groves, FL | 800-242-7257 | www.nwmcc.com



**NATIONAL WATER
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Corporation Resolution

CERTIFICATE OF CORPORATE AUTHORITY

At a duly authorized meeting of the Board of Directors of **National Water Main Cleaning Company (the "Corporation")** held on **July 10, 2024**, Directors were present or waived notice, **Curt Maring** was elected as **Executive Vice President** of this Corporation and is authorized to do any and all acts and things and to execute any and all agreements, consents, certificates and documents as in his opinion, or in the opinion of counsel to the Corporation, may be necessary or appropriate in order to carry out the purposes and intent of the Corporation.

Corporate Address:

15551 Okeechobee Boulevard

Loxhatchee, FL 33470

I hereby certify that I am the **Secretary Treasurer** of **National Water Main Cleaning Company**
(Title) (Name of Corporation)
that **Curt Maring** is the duly elected **Executive Vice President** of said Corporation, and the
(Name of Officer) (Title)
above vote has not been amended or rescinded and remains in full force and effect as of the date hereof.

Signature:



Name/Title:

Rocco Paciello - Secretary Treasurer

Date:

07/10/24

National Water Main Cleaning Company was incorporated in New Jersey on 7/2/1964.



**NATIONAL WATER
MAIN CLEANING**

A Carylton Company

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Loxahatchee Groves, FL 33470

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Company Submittal Book



NATIONAL WATER MAIN CLEANING COMPANY

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Loxahatchee Groves, FL 33470
Tel: (561) 508-6135
www.nwmcc.com

SUBMITTAL BOOK

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National Water Main Cleaning Company Submittal Book

1	Table of Contents
2	Underground Utility & Excavation License
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5	NASSCO Membership Certificate
6	Equipment List
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13	General Work Procedures
14-24	Organizational Flow Chart and Resumes
25	Stockholder Disclosure Certification
26	Corporate Resolution



Ron DeSantis, Governor

Melanie S. Griffin, Secretary



**STATE OF FLORIDA
DEPARTMENT OF BUSINESS AND PROFESSIONAL REGULATION**

CONSTRUCTION INDUSTRY LICENSING BOARD

THE UNDERGROUND UTILITY & EXCAVATION CO HEREIN IS CERTIFIED UNDER THE
PROVISIONS OF CHAPTER 489, FLORIDA STATUTES

MARING, CURTIS ALAN

NATIONAL WATER MAIN CLEANING COMPANY
1806 NEWARK TURNPIKE
KEARNY NJ 07032

LICENSE NUMBER: CUC1226418

EXPIRATION DATE: AUGUST 31, 2026

Always verify licenses online at MyFloridaLicense.com

ISSUED: 05/14/2025

Do not alter this document in any form.

This is your license. It is unlawful for anyone other than the licensee to use this document.



State of Florida



Department of State

I certify from the records of this office that NATIONAL WATER MAIN CLEANING COMPANY is a New Jersey corporation authorized to transact business in the State of Florida, qualified on April 29, 2014.

The document number of this corporation is F14000002034.

I further certify that said corporation has paid all fees due this office through December 31, 2023, that its most recent annual report/uniform business report was filed on January 6, 2023, and its status is active.

I further certify that said corporation has not filed a Certificate of Withdrawal.

Given under my hand and the
Great Seal of the State of Florida
at Tallahassee, the Capital, this the
Twenty-second day of December, 2023



CR2E022 (01-11)

Cord Byrd
Secretary of State

State of Florida

Department of State

I certify from the records of this office that NATIONAL WATER MAIN CLEANING COMPANY is a New Jersey corporation authorized to transact business in the State of Florida, qualified on April 29, 2014.


The document number of this corporation is F14000002034.

I further certify that said corporation has paid all fees due this office through December 31, 2024, that its most recent annual report/uniform business report was filed on August 23, 2024, and that its status is active.

I further certify that said corporation has not filed a Certificate of Withdrawal.

*Given under my hand and the
Great Seal of the State of Florida
at Tallahassee, the Capital, this
the Twenty-third day of August,
2024*




Secretary of State

Tracking Number: 9530116660CC

To authenticate this certificate, visit the following site, enter this number, and then follow the instructions displayed.

<https://services.sunbiz.org/Filings/CertificateOfStatus/CertificateAuthentication>

CERTIFICATE OF MEMBERSHIP



NASSCO

THIS CERTIFICATE IS PROUDLY PRESENTED TO

National Water Main Cleaning Company

This document hereby certifies that through **April 14, 2026**, the company above is a member in good standing of NASSCO, Inc., the National Association of Sewer Service Companies.

As a member of NASSCO, the above-named has made a commitment to work with others to set industry standards for the assessment, maintenance and rehabilitation of underground infrastructure, and to assure the continued acceptance and growth of trenchless technologies.

A handwritten signature in black ink that reads "Sheila Joy". The signature is written in a cursive style and is positioned above a horizontal line.

Sheila Joy
Executive Director

Florida Vehicles and Equipment					3/4/2026
Vehicle Numbers	Make	Type	Year	VIN #	Plate #
JC384	Volvo	Jet-Vac	2000	4V5JC2UFXYN871248	AF612P
JC396	Western Star	Jet-Vac	2017	5KXXAMCG3HPJF8499	AU664N
JC397	Western Star	Jet-Vac	2017	5KXXAMCG7HPJF8487	AU675N
JC398	Western Star	Jet-Vac	2017	5KXXAMCG0HPJF8492	AU275P
JC409	Western Star	Jet-Vac	2018	5KXXAM001JPJX3729	AU601X
JC410	Western Star	Jet-Vac	2018	5KXXAM008JPJX3730	AU602X
JC476	FRE	Jet Vac	2018	IFVHG3DVXJHJM6354	AY574P
JC479	GRA	Jet Vac	2024	IU202505930008000	AY103W
JC492	Western Star	Jet-Vac	2025	5KKBWBFM7SLVR0335	AZ161U
JC503	Western Star	Jet-Vac	2025	3BJMBWVFMXTDWG6850	
JC504	Western Star	Jet-Vac	2025	5KKBWVFG4TLWG6858	H156AA
RCY408	Western Star	Jet-Vac	2018	5KXXAM008JPJX3727	AY574P
CT2	Mercedes	Van	2018	WD3PF4CC5JP648513	XHA19
TV30	Isuzu	TV Truck	2021	JALE5W16XM7302498	XKHV30
TV73	Isuzu	TV Truck	2007	JALE5B16677300826	XEMU60
TV206	Isuzu	TV Truck	2007	JALE5B16577300798	XCTL21
TV270	Chevy - Silverado	TV Truck	2005	1GBE4C1255F501776	XM186A
TV292	Chevy - Silverado	TV Truck	2018	JALEEW160J730027	XGAJ21
TV334	Chevy - Silverado	TV Truck	2023	1HTKHPVK6PH364703	XNVL62
TV371	Chevy - Silverado	TV Truck	2024	1HTKHPVK7RH522758	XRFY45
TV381	Chevy - Silverado	TV Truck			
TV387	FORD F550	LAMP II TV	2016	1FDUF5GT0GEC18347	
VV65	FRE	Grout/TV	2010	1FVACXDT4ADAS0312	AX508J
VV77	FRT	Grout/TV	2013	1FVACXDT1DHBW7152	AW887G
ATT-32	Freightliner	Attenuator Truck	2025	1FVACWFC9SHVT8365	XRXE76
T213	International	Rack	2001	1HTSLAAM61H366316	XHYC56
T241	Chevy - Silverado	Rack	2015	1GB4CYCG0FF558702	XPWG64
T264	Chevy - Silverado	Rack	2017	1GB4KYCG8HF127238	XEMU52
T266	Chevy - Silverado	Rack	2017	1GB4KYCG7HF128512	XEMU54
T287	Fre	Attenuator Truck	2007	1FVACYDC07HX70245	AU192B
T371	Fre	Rack	2008	1FVACXDT78HZ76609	AX507J
T391	Chevy	Rack	2022	1GB3WREYONF192916	XPLD96
T385	Chevy - Silverado	Rack	2024	1GB4WREY3RF172718	XJWF40
T402	Chevy - Silverado	Rack	2025	1FVACXFCXSHVX5317	XPWF32
T416	Freightliner	Rack	2025	1FVACXFC3SHVX5319	AZ573S
T244	Chevy - Silverado 1500	Pick Up	2015	1GCVKPEC3FZ248114	W88FCY
T270	Chevy - Silverado 1500	Pick Up	2017	3GCPCNEC8HG279033	XEMU57
T292	Chevy - Silverado 1500	Pick Up	2018	3GCPCNEC6JG226563	XFWF47
T293	Chevy - Silverado 1500	Pick Up	2018	3GCPCNEC1JG221786	XFWF45
T294	Chevy - Silverado 1500	Pick Up	2018	3GCPCNEC7JG221226	XFWF46
T377	Chevy - Silverado 1500	Pick Up	2018	1GCVKREC4JZ372848	K12RRB
TJ7	SEW	Jetter Trailer	2008	159KU21X8C381561	TWU78U
TR10	Cro (Enclosed)	Easement Trailer	2016	58E1W1426G1002928	TVG80L
TR11	Emp (Enclosed)	Easement Trailer	2018	7F81E1220JD003845	TVG79L
TR35	Ari (Enclosed)	Duc Camera	2022	5YCBE1016NH002798	TZL23R
TR38	BIG (Open)	Easment Trailer	2024	16V1U1529R3304730	Z84TAG
TR39	BIG (Open)	Easment Trailer	2024	1BV1U152XR3332486	TWU45U
?????-07	EPOXY Trailer	Epoxy	2022		
MJ2	Har	Lining Trailer	2010	1H9X1510XAC122011	K70TAD
MJ7	Har	Lining Trailer	2014	1H9T18201EC122001	TMT92W
MT8	EU	Concrete Trailer	2019	F3L10118277768	TXF46W
MT11	MOB	Concrete Trailer	2022	1S9BA22DONPB16002	TZW31F
MT14	Madewell	Concrete Trailer	2024	1R9BF182XR1535696	R16TBF
MT15	Strong	Concrete Trailer	2024	1S9BA23D9RP616002	C56TBV
T422(Mechanic/Jesse)	Chevy - Silverado 1500	Pick Up	2025	2GCPACED7S1139249	E23VTE
T374 (Frank)	Chevy - Silverado SL(Z71)	Pick Up	2021	3GCUYEETXMG365734	H70RNX
T380 (Dagny)	Chevy - Silverado 1500	Pick Up	2023	2GCPACED7P1101737	H97JRH
T381 (Erik)	Chevy - Silverado 4X4	Pick Up	2023	2GCUDEDBP1150509	B20SNF
T382 (Matt)	Chevy - Silverado 4X4	Pick Up	2024	1GCUDEDD1PZ325836	M68SWN
T409 (Curt)	Chevy - Silverado SL(Z71)	Pick Up	2025	2GCUKEED8S1107535	U58VEH
T410 (Marck)	Chevy - Silverado 4X4	Pick Up	2025	2GCPACED4S1136020	M67VJA
T417 (Mike)	Chevy - Silverado 1500	Pick Up	2025	2GCPACED2S1170408	P82VNZ
NYC20	Toyota - Pruis	Car	2013	JTDKN3DUJ2D0353676	G10GZN
A28	Chevy- Malibu	Car	2018	1G1ZD5ST2KF167422	P88PSV



NATIONAL WATER MAIN CLEANING

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f: (561) 855-4916

www.nwmcc.com

NWMCC FL REFERENCES & EXPERIENCE:

City of St. Petersburg-Sanitary/Storm Clean & CCTV

John Stanton, Superintendent
ECID Engineering and Capital Imp Dept.
Municipal Services Center
1 4th St N, St. Petersburg, FL 33701
(727) 460-3049
john.stanton@stpete.org

Contract No. 228273
Start Date: 12/2019
End Date: 10/2022

Contract Value: \$3,750,000.00

Maintenance Services, Sanitary Sewer Cleaning
Scope: Cleaning and CCTV of sewer pipes and inspections of manholes within the city's sanitary sewer collection system for an estimated 4,822,689 LF.NWMCC 220,000 LF

Broward County, FL-MH Rehab/CIPP Lining/Sanitary Clean & CCTV

David A. Campbell
Construction Project Manager
2555 West Copans Road, Pompano Beach, FL 33069
Office: (954) 831-0910
dacampbell@broward.org

Contract # PNC2119049B1
Start Date: 11/01/19
End Date: Current due to contract renewal

Contract Value: \$10,031,680.00

Multi District Inflow and Infiltration Reduction Program
Scope: Video, clean, grout, point repair lining, lateral grouting and lining, MH Rehab of 200,000 LF of sewer pipe.

New Jersey Office
1806 Newark Turnpike
Kearny, NJ 07032
P: 973.483.3200
Email: bidreg@nwmcc.com

New York Office
928 Broadway
Utica, NY 1350
P: 315.624.9520
Email: boston@nwmcc.com

Boston Office
25 Marshall St.
Canton, MA 02021
P: 781.828.0863
Email: boston@nwmcc.com

Connecticut Office
1000 (rear) Elm St.
Rocky Hill, CT 06067
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Florida Department of Transportation (FDOT)-Storm Cleaning & CCTV

Heriberto Jimenez, Project Admin
District 5
2400 Camp Road
Oviedo, FL 32765
Mobile: (407) 832-1694
heriberto.jimenez@dot.state.fl.us

Contract # E5X55
Start Date: 05/24/23
End Date: Date: Ongoing (Contract Renewal)

Contract Amount: \$200,000.00 per year

Completed approx.. 55,190 LF of 0-60" Stormwater pipe desilting and inspection in Orange County, District 5 Florida Department of Transportation.
Also completed approx. 2,638 LF of CIPP lining for 0-60" Stormwater pipe. Also completed the internal sealing of approx.. 162 stormwater pipe joints.

Miami Beach, FL-Storm Water/Sanitary Clean & CCTV

Stanley Payne, Storm Water Superintendent
451 Dade Blvd., 2nd Floor
Miami Beach, FL
Tel: (305) 673-7000 ext. 2343
StanleyPayne@miamibeachfl.gov

Contract #ITB 2018-080-ND
Start Date: December 2018
End Date: Ongoing (contract renewed)

Contract Amount: \$1,197,500.00

For Routine and Emergency Sanitary Sewer and Storm Water Pipes Cleaning, and Closed Circuit Television Inspection Services

Scope: Storm water maintenance of 7,800 drainage structures, pipes, culverts, catch basins, outfalls, and 37 pump stations - 110 miles of storm water pipes, 57 miles force mains, over 3,600 manholes and 23 wastewater lift stations.

New Jersey Office 1806 Newark Turnpike Kearny, NJ 07032 P: 973.483.3200 Email: bidreg@nwmcc.com	New York Office 928 Broadway Utica, NY 1350 P: 315.624.9520 Email: boston@nwmcc.com	Boston Office 25 Marshall St. Canton, MA 02021 P: 781.828.0863 Email: boston@nwmcc.com	Connecticut Office 1000 (rear) Elm St. Rocky Hill, CT 06067 P: 860.793.2808 Email: boston@nwmcc.com	Florida Office 15551 Okeechobee Blvd. Loxahatchee Groves, FL 561.508.6135 Email: bidreg@nwmcc.com
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NATIONAL WATER MAIN CLEANING

A Carylton Company

15551 Okeechobee Blvd.
Loxahatchee Groves, FL 33470
t: (800) 242-7257
p: (561) 508-6135
f: (561) 855-4916
www.nwmcc.com

Miami-Dade, FL-MH Rehab

Jose Alvarez, Construction Manager
20900 SW 117th Avenue
Miami, FL 33177
Office: (786) 552-4365
Mobile: (786) 236-5325
Jose.alvarez@miamidade.gov

RFP No. P0213
Start Date: 11/16/22
End Date: 07/31/24

Contract Amount: \$961,571.32

Rehabilitation of 500 Manholes Inflow & Infiltrations utilizing cementitious lining methods. As well as performing a pre and post 360' video inspection on each assigned asset.

Palm Beach County, FL MH Rehab

Carlos Echevarria
50 South Military Trail, Suite 110
West Palm Beach, FL 33415
Office: (561) 301-1562
CEchevarria@pbwater.com

Contract #16-046/ZG
Start Date: June 2017
End Date: February 2021

Contract Amount: \$371,100.00

Sewer Pipeline and Manhole Cleaning and Inspection Services of 150,000 LF

New Jersey Office
1806 Newark Turnpike
Kearny, NJ 07032
P: 973.483.3200
Email: bidreg@nwmcc.com

New York Office
928 Broadway
Utica, NY 1350
P: 315.624.9520
Email: boston@nwmcc.com

Boston Office
25 Marshall St.
Canton, MA 02021
P: 781.828.0863
Email: boston@nwmcc.com

Connecticut Office
1000 (rear) Elm St.
Rocky Hill, CT 06067
P: 860.793.2808
Email: boston@nwmcc.com

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f: (561) 855-4916
www.nwmcc.com

Toho Water Authority-MH Rehab/Sanitary Clean & CCTV

Janine Alexander
951 Martin Luther King Blvd.
Kissimmee, FL 34741-4929
Office: (321) 388-5178
janine.alexander@tetrattech.com

Contract No. IFB-19-086
Start Date: October 2020
End Date: August 2023
Contract Amount: \$2,691,424.00

Manhole, Wet Well and Structure Sealing, Coating and Lining Services. Manhole and Wet Well coating of 6,080 VF and 2,000 SF of repair. Cleaning and TV of 2,400 LF.

Contract No. IFB-20-133
Start Date: October 2020
End Date: October 2023
Contract Amount: \$319,680.00

Gravity sewer cleaning and inspection services of 250,000 LF.

New Jersey Office 1806 Newark Turnpike Kearny, NJ 07032 P: 973.483.3200 Email: bidreg@nwmcc.com	New York Office 928 Broadway Utica, NY 1350 P: 315.624.9520 Email: boston@nwmcc.com	Boston Office 25 Marshall St. Canton, MA 02021 P: 781.828.0863 Email: boston@nwmcc.com	Connecticut Office 1000 (rear) Elm St. Rocky Hill, CT 06067 P: 860.793.2808 Email: boston@nwmcc.com	Florida Office 15551 Okeechobee Blvd. Loxahatchee Groves, FL 561.508.6135 Email: bidreg@nwmcc.com
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MIAMI-DADE COUNTY, FLORIDA

Capital Improvements Information System

Department of Transportation and Public Works

Contractor Evaluation

MCC Contract: MT 20240080
 Contractor: NATIONAL WATER MAIN CLEANING CO
 Department Contact: Mercedes Barreras 305-375-1733
 Site Project Name: Emergency Response for Storm Drain Cleaning
 Site Location: Multiple of Site Locations

Evaluation Type: Standard Evaluation
 FEIN: 221753261
 Award Amount: \$2,958,000.00

Evaluator ID: E327060

Date: 3/17/2025

Period: Completion of construction

Rating_*						Criteria
4	3	2	1	N/A		
1-	✓					Schedule - Quality of schedule & adherence to schedule resulting in timeliness and minimizing delay to the owner and community.
2-	✓					Cost effectiveness & efficiency - Budget compliance & value of work.
3-	✓					Vision - Design - Concepts or adherence to criteria.
4-	✓					Cooperation - Teamwork & relationship with owner, subs and suppliers.
5-	✓					Coordination - Ability to organize, schedule and complete tasks in adherence to the schedule.
6-	✓					Accuracy & Technical Skills - Cost estimating, scheduling, shop and other drawings, plans, manuals, project documentation and conflict resolution.
7-	✓					Completeness - Compliance with contract documents, permits, Codes & standards.
8-	✓					Responsiveness - Timely, clear & concise responses to owner comments and correspondence.
9-	✓					Commitment - Intangibles & contribution to project success.
10-	✓					Personnel - Quality and dedication of project staff.
11-	✓					Management - Leadership ability.
12-	✓					Quality - Work performed correctly the first time.

Overall Performance Average: 4.0

Documentation that supports this evaluation and Contractor's/Consultant's comments can be obtained by contacting:

Juan Gonzalez at Phone# 305-608-9702

Evaluation Reviewed by: Supervisor Division Chief Assistant Director Director

Reviewer Name: Mercedes Barreras

Reviewer Signature: _____

The method of delivery of this evaluation to contractor/consultant: Certified Mail EMail Fax Hand

(Unresponsive Performance by contractor/consultant requires 2 delivery methods, one MUST be Certified Mail.)

Evaluation delivered to: National Water Main Cleaning Co.

* Rating Key

- 4 Superior performance - Exemplary quality, no intervention required - project completed on time or early at or below budget with no change orders or amendments other than owner requested changes.
 - 3 Satisfactory performance - Minor errors noted, addressed with timely corrective action. No serious errors noted or corrective action needed.
 - 2 Guarded performance Errors and Omissions documented in writing with timely corrective action.
 - 1 Unresponsive performance documented in writing without timely corrective action.
- N/A. No Information
-

GENERAL APPROACH & WORK PROCEDURE

A physical survey of the job site will be made upon receiving a work request. If it is not possible to visit the site because of facility operations or timing, then the work plans will be reviewed. After the survey and/or plan review is done, a cost estimate will be developed and forwarded to the engineer for review. Upon approval and order by the owner, personnel and equipment will be dispatched to the job site at the time directed by the Engineer.

All video inspection activities will begin at the farthest upstream manhole and work in a downstream direction from there. If the camera cannot pass from access to access due to any obstructions, the camera will be positioned on the downstream access and a reverse set-up will be conducted to attempt to complete the inspection of the entire sewer reach.

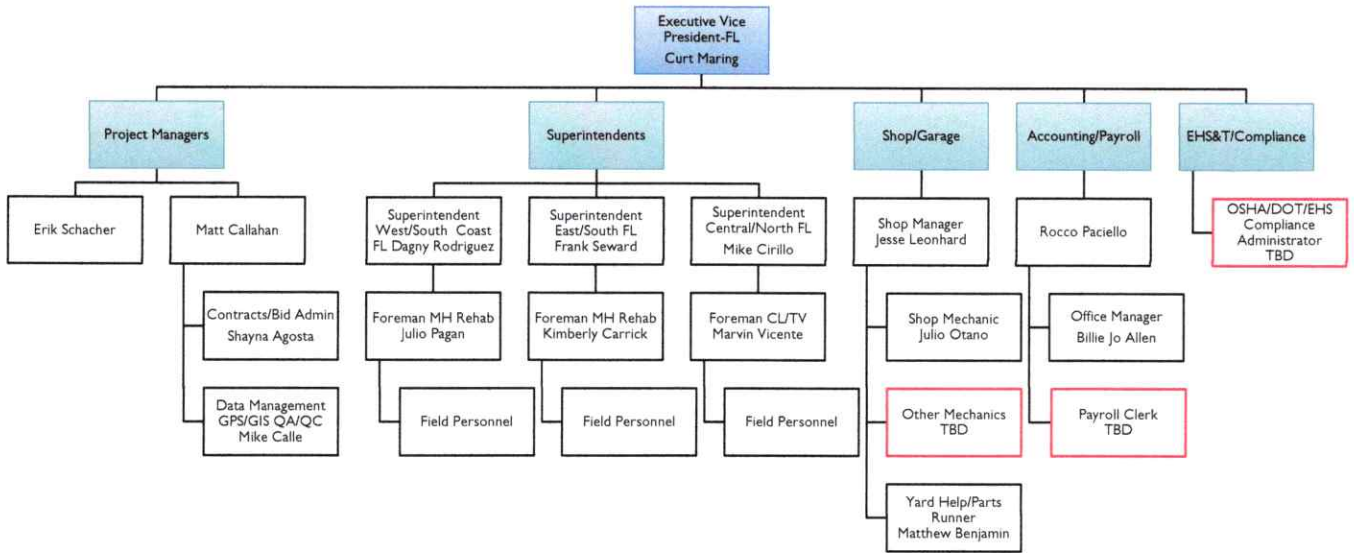
If no access is possible at the upstream manhole, then we will use the downstream manhole; and the camera will be passed from access to access.

There will be onscreen information such as date, job street name, upstream manhole number, downstream manhole number, or any other data you feel is important and a continuous footage read out so you can track the camera's location.

If conditions are ideal - a straight pipe from manhole to manhole, and then it is our intention to use our Multi-Angle Camera (MAC) main line system to conduct the inspection. In lines with deflections or elbows where the MAC camera cannot pass, we will use one of the alternative closed circuit color mini camera systems to conduct the inspection. The only drawback is you do not have the pan and tilt head capability.

All observations will be recorded on the videotape and an audio commentary will accompany the video inspection. Computer generated television inspection reports created with WinCan Software v7.16 will be produced at the conclusion of the job and submitted with the tapes or if requested by the customer, the videotapes can be converted to Compact Discs (CD) or Digital Video Discs (DVD+R), which last longer than videotapes and allow the user to navigate through a video clip easily. Each section of pipe will be indexed so that the viewer can jump to a specific observation without the hassle of having to fast forward and rewind as it is currently done with conventional videotapes.

At the conclusion of the cleaning and television inspection operation, two copies each of all videotapes/CD's/DVD's produced and copies of our written reports will be submitted to the customer.



Curt Maring
Executive Vice President
National Water Main Cleaning Company – Loxahatchee Groves, FL

START DATE: October 2022

Skills/Certifications

- Team Management
- Project Constructability
- Project Estimating
- Proficient in Microsoft Suite
- Certified NASSCO PACP/MACP/LACP Trainer
- Team Collaboration
- Training
- Safety
- Scheduling

Experience:

National Water Main Cleaning Company
October 2022 - Present

Manage projects, overseeing the entire workforce in the Florida division, cost estimating projects and generate project proposals, customer relations, oversee all aspects of the ongoing projects.

2020 – 2022

OPERATIONS Director, - FLOTECH ENVIRONMENTAL, LLC-FLORIDA

Oversight of company operations and procedures. Implementation of safety, fleet maintenance and new equipment operational procedures. Continued company growth through new services and the opening of new field office locations along with the acquisition of new equipment and experienced personnel. Fortified/established training programs to promote advancement from within.

2017 – 2020

Senior Project Manager, - HINTERLAND GROUP, INC-RIVIERA BEACH, FL

Developed, implemented and reviewed operational policies and procedures. Developed and maintained video QAQC standards per NASSCO. Managed CIPP projects won through the bid process. As a NASSCO certified trainer, I performed in house PACP/MACP/LACP training for the CCTV operators.

2012 – 2017

PM/Senior Estimator, - LANZO TRENCHLESS-POMPANO BEACH, FL-DETROIT-MI

Coordinated and managed estimating team. Held regular bid/estimating meetings with estimating team to determine best fit projects for the organization. Attended site visits to determine best methods of constructability. Managed CIPP projects won through the bid process. As a NASSCO certified trainer, I performed in house PACP/MACP/LACP training for the CCTV operators.

2006 – 2012

PM/Estimator, INLAND PIPE REHABILITATION-DETROIT, MI

Prepared bids pertaining to any form of pipeline maintenance or rehabilitation. Upon award, managed same projects from start to finish. As a NASSCO certified trainer, I performed in house PACP/MACP/LACP training to the CCTV operators. Established and managed a QAQC video program.

1998 – 2006

Supervisor/Operator, LANZO LINING SERVICES-POMPANO BEACH, FL

Responsible for day-to-day supervision and scheduling of CCTV/ lateral cutting crews. Operation of cleaning, CCTV and lateral cutting equipment in support of CIPP lining crews.

Matthew Callahan
Project Manager
National Water Main Cleaning Company – Loxahatchee Groves, FL

START DATE: April 2024

RESPONSIBILITIES:

- Setting up Major Projects & Coordinating Various Equipment
- Submitting schedules
- Monitor job progress
- QA/QC of video submissions
- Customer interactions to include progress meetings, NTP meetings,

RELEVANT PROJECTS WITH NWMCC:

- FDOT (Florida Department of Transportation)
Clean drainage structures
- North Miami
Lateral Lining and sewer main point repairs
- City of Miami Beach
Cleaning of storm water catch basins, inlets, outfalls, and manholes
- Miami Dade
Manhole rehabilitation
- City of Hialeah
Manhole Rehabilitation

SPECIAL TRAINING & CERTIFICATIONS:

- 10 Hour OSHA in Construction Safety and Health
- Certified by the Florida Department of Transportation in Temporary Traffic Control
- Confined Space Training

EXPERIENCE:

- | | |
|--|--------------------------|
| • RoMaDa Construction Co., Inc.
Corporate Secretary | January 1993 – June 1998 |
| • Curtis Contractors & Associates, Inc.
Civil Estimator | June 1998 – April 2004 |
| • Taylor Contracting, Inc.
Project Manager/Estimator | April 2004—August 2008 |
| • Miller Pipeline, LLC
Operations Manager | October 2008—April 2024 |

Erik Schacher
Superintendent
National Water Main Cleaning Company – Loxahatchee Groves, FL

START DATE: March 2019

RESPONSIBILITIES:

- Supervise various Operators and Crew Members
- Setting up Major Projects & Coordinating Various Equipment
- Scheduling Daily Activities for Crews
- Communicate with Project Manager daily on job progress
- Quality of Service
- Training of employees in correct use of various equipment
- Upkeep and maintenance of Video Inspection Equipment
- Upkeep and maintenance of Safety Equipment and Video Inspection Equipment

RELEVANT PROJECTS WITH NWMCC:

- FDOT (Florida Department of Transportation)
Clean drainage structures
- Palm Beach County
Sewer pipeline and manhole cleaning and inspection services.
- City of St. Petersburg
Maintenance Services, Sanitary Sewer Cleaning
- City of Miami Beach
Cleaning of storm water catch basins, inlets, outfalls, and manholes
- Broward County
Inflow & Infiltration, Clean & TV sewers
- Miami Dade
Manhole rehabilitation
- Toho Water Authority
Manhole, wet well, and structure sealing, coating, and lining services

SPECIAL TRAINING & CERTIFICATIONS:

- 10 Hour OSHA in Construction Safety and Health
- Certified by the Florida Department of Transportation in Temporary Traffic Control
- Asbestos Awareness Course
- Confined Space Training
- FMCSA DOT Hours of Service

EXPERIENCE:

- B&D Enterprises July 2014 – March 2019
Project Manager
- Disney's Coronado Springs Resort Springs June 2010 – July 2014
Assistant General Manager

Frank Seward

(C) 386-241-8590

FSeward@nwmcc.com

Responsibilities:

- Supervise various projects and crew members
- Help set up projects with the proper equipment and personal by forecasting needs
- Communicate and work directly with the project manager daily
- Train employees on the proper use and maintenance of equipment
- Ensure the quality of workmanship on projects
- Ensure crew is performing their work in a safe and efficient manner
- Train employees in NWMCC's environmental safety practices

Relevant Projects with NWMCC:

- Palm Beach FDOT
- Miami FDOT
- Broward County - Clean, TV, and Smoke Testing
- Miami Dade - Manhole Rehab

Special Training:

- 10 hours OSHA
- Confined space training
- Certified in: NASSCO / PACP / LACP / MACP

Experience:

- National Water Main Cleaning Company (Loxahatchee Groves, FL) 2023-Present - Superintendent
- Lanzo Lining (Michigan) 2004-2006 - Crew Lead, Operator
- Inland Water Pipe Rehabilitation (Michigan) 2006-2014 - Crew Lead, Operator
- National Industrial Maintenance (Michigan) 2014-2023 - Supervisor, Operator

Dagny Rodriguez
Superintendent
National Water Main Cleaning Company – Loxahatchee Groves, FL

START DATE: January 2018

RESPONSIBILITIES:

- Supervise various Operators and Crew Members
- Setting up Major Projects & Coordinating Various Equipment
- Scheduling Daily Activities for Crews
- Communicate with Project Manager daily on job progress
- Quality of Service
- Training of employees in correct use of various equipment
- Upkeep and maintenance of Video Inspection Equipment
- Upkeep and maintenance of Safety Equipment and Video Inspection Equipment

RELEVANT PROJECTS WITH NWMCC:

- FDOT (Florida Department of Transportation)
Clean drainage structures
- Palm Beach County
Sewer pipeline and manhole cleaning and inspection services.
- City of St. Petersburg
Maintenance Services, Sanitary Sewer Cleaning
- City of Miami Beach
Cleaning of storm water catch basins, inlets, outfalls, and manholes
- Broward County
Inflow & Infiltration, Clean & TV sewers

SPECIAL TRAINING & CERTIFICATIONS:

- 10 Hour OSHA in Construction Safety and Health
- Certified by the Florida Department of Transportation in Temporary Traffic Control
- Asbestos Awareness Course
- Confined Space Training
- FMCSA DOT Hours of Service

EXPERIENCE:

- | | |
|---|-------------------------------|
| • American Water Services
TV Operator | February 2002 - November 2009 |
| • Insituform Technologies Inc.
TV Operator | November 2009 – October 2011 |
| • Layne Inliner LLC
Superintendent | October 2011 – January 2018 |

Mike J. Cirillo

Contact

Phone: 407.385.7205

Email: cirillo1972@icloud.com

Web: [LinkedIn](#)

Education

Pima Community College

Tucson, AZ

2007 – Commercial Drivers License

Wilcox Technical High School

Meriden, CT

1992 – Building and Remodeling Certification

Key Skills

Construction Management
Project Management
Time Management
Heavy Equipment Operations
Hand Tools
Heavy Lifting

Objective

Construction worker with 25+ years of experience in the construction, maintenance, and repair of small repair jobs to multi-million-dollar municipal projects. I am aspiring to apply my deep knowledge of construction equipment, techniques, and safety guidelines to serve as a valued asset to your team successfully.

Possess a CDL license.

Experience

September 2016 –Present

Superintendent • Inliner Solutions

- Performed a variety of construction duties involved in the maintenance of multi-million+ municipal storm and sewer rehab projects.
- Strictly adhere to the company's safety rules, regulations, and procedures, thereby ensuring the safety of my coworkers.
- Operations of Heavy Equipment (Boiler Trucks water & Steam)
- UV Lining practices.
- Submit all jobsite and timesheet records on time and fully complainant with company standards.

November 2008 - September 2016

Heavy Equipment Operator • Volusia County Government

- Operated heavy equipment associated with maintenance of county property to include carpentry needs.
- Maintained all OSHA safety requirements for the county.

References

[Available upon request.]

Dalton N. Pritt

Palm Beach Gardens, FL, 33460

dpritt2023@fau.edu

(878) 787-0443

www.linkedin.com/in/dalton-pritt

Education

Florida Atlantic University- *Civil Engineering*

Expected Graduation: May 2027

Ohio University- *Bachelor of Science in Communications*

Graduated: May 2020

WORK EXPERIENCE

IT/Video Specialist – National Water Main Cleaning Company

December 2023-Present

- Obtain and Compile videos to deliver to client
- Check videos for quality and correct labeling
- Organize videos into online database

November 2021 – December 2023

Audio/Visual Technician- The Breakers at Palm Beach

- ▶ Utilized a schematic to prepare the project setup, review the relevant equipment, and adjust for efficient production.
- ▶ Contributed to training of new team members with attention to industry standards and safety protocols

Front Desk Associate/Auditor - Fairfield Inn and Suites

May 2020 - October 2020

- ▶ Handled drif and drof at the end of each night
- ▶ Calculated simple math problems for audit numbers
- ▶ Checked people in and out of hotel at various hours
- ▶ Tidied work area for guests and co-workers
- ▶ Setup breakfast in the morning for guests

Food Courier, Catering Coordinator, Front of House- Kisers BBQ

September 2018-May 2019

- ▶ Streamlined Catering to accelerate speed of customers receiving orders
- ▶ Maintained an above standard restaurant friendly environment

Golf Course Beautification Crew Member - Montour Heights Country Club

June 2018 -August 2018

- ▶ Maintained ground and landscape of professional golf course
- ▶ Mowed grass, trim bushes, filling and raking sand traps
- ▶ Mulched, trim trees, pressure wash, clean and service all equipment

Sales Associate - Home Depot

April 2016 - September 2017

- ▶ Demonstrated problem solving abilities
- ▶ Applied product knowledge to better help customers' needs

Mike Calle

West Palm Beach, FL 33407

mcalle@nwmcc.com

(728) 230-5087

Education

FIU- *IT- Data Management*

Graduated: May 2022

WORK EXPERIENCE

IT/Video Specialist – *National Water Main Cleaning Company*

December 2023-Present

- Obtain and Compile videos to deliver to client
- Check videos for quality and correct labeling
- Organize videos into online database

November 2021 – December 2023

Audio/Visual Technician- *The Breakers at Palm Beach*

- ▶ Utilized a schematic to prepare the project setup, review the relevant equipment, and adjust for efficient production.
- ▶ Contributed to training of new team members with attention to industry standards and safety protocols

Front Desk Associate/Auditor- *Fairfield Inn and Suites*

May 2020 - October 2020

- ▶ Handled drif and drof at the end of each night
- ▶ Calculated simple math problems for audit numbers
- ▶ Checked people in and out of hotel at various hours
- ▶ Tidied work area for guests and co-workers
- ▶ Setup breakfast in the morning for guests

Francisco Nunes
Crew Lead
National Water Main Cleaning Company – Loxahatchee Groves, FL

START DATE: March 2018

RESPONSIBILITIES:

- Maintaining and Servicing Jet Combo Equipment
- Performed routine inspections for pipes and pumps
- Communicate with Project Manager daily on job progress
- Quality of Service
- Training of employees in correct use of various equipment
- Implemented safety and environmental regulations
- Upkeep and maintenance of Safety Equipment and Video Inspection Equipment

RELEVANT PROJECTS WITH NWMCC:

- FDOT (Florida Department of Transportation)
Clean drainage structures
- Palm Beach County
Sewer pipeline and manhole cleaning and inspection services.
- City of St. Petersburg
Maintenance Services, Sanitary Sewer Cleaning
- City of Miami Beach
Cleaning of storm water catch basins, inlets, outfalls, and manholes
- Broward County
Inflow & Infiltration, Clean & TV sewers

SPECIAL TRAINING & CERTIFICATIONS:

- 10 Hour OSHA in Construction Safety and Health
- Certified by the Florida Department of Transportation in Temporary Traffic Control
- Asbestos Awareness Course
- Confined Space Training
- FMCSA DOT Hours of Service
- **Adept in using tools, machines and equipment**
-

EXPERIENCE:

- Operate and maintain water and/or wastewater treatment equipment, ensuring compliance with state and federal environmental protection limits
- Operates pumps, dewatering equipment (tanker), compressors and chemical injection equipment
- Valid Driver's Licenses and a safe driving record
- Logging of reports and jobs
- Use hand tools and perform minor maintenance, including but not limited to, greasing of moving parts, checking hydraulic system fluid levels

Kim Carrick

Crew Lead

National Water Main Cleaning Company – Loxahatchee Groves, FL

START DATE: October 2021

Professional Summary

Dedicated and skilled Field Operator and Crew Lead with over 3 years' experience of performing CCTV inspections of underground utilities, particularly sewer systems, in compliance with NASSCO standards. Adept at operating advanced CCTV trucks and specialized equipment to assess the condition of pipes and identify defects.

RELEVANT PROJECTS WITH NWMCC:

- FDOT (Florida Department of Transportation)
Clean drainage structures
- Palm Beach County
Sewer pipeline and manhole cleaning and inspection services.
- City of St. Petersburg
Maintenance Services, Sanitary Sewer Cleaning
- City of Miami Beach
Cleaning of storm water catch basins, inlets, outfalls, and manholes
- Broward County
Inflow & Infiltration, Clean & TV sewers
- Miami Dade County
Manhole inspection and rehabilitation

SPECIAL TRAINING & CERTIFICATIONS:

- 10 Hour OSHA in Construction Safety and Health
- Certified by the Florida Department of Transportation in Temporary Traffic Control
- Asbestos Awareness Course
- Confined Space Training
- FMCSA DOT Hours of Service
- **Adept in using tools, machines and equipment**
- **PACP Certification**

EXPERIENCE:

- Operated CCTV Inspection trucks and equipment to conduct video inspections of sewer and storm pipelines to identify structural defects, blockages, and other maintenance concerns in accordance with PACP guidelines
- Collaborated with field teams to ensure efficient setup and operation of the CCTV systems, maintaining optimal equipment function throughout inspections.
- Managed Safety protocols during field operations to adhere to OSHA guidelines and ensure the protection of personnel and equipment.

NATIONAL WATER MAIN CLEANING COMPANY OWNERSHIP
 Carylton Corporation -100% Ownership of NWMCC
 2500 W. Arthington Street, Chicago, IL 60612

CARYLTON CORPORATION OFFICERS AND DIRECTORS

NAME	TITLE	ADDRESS
Ari Mervis	CEO / Chairman	2500 W. Arthington St. Chicago, IL 60612
Kathy Lunskey	COO / Director	2500 W. Arthington St. Chicago, IL 60612
Jaclyn Maloney	General Counsel / Director	2500 W. Arthington St. Chicago, IL 60612
Violet Clark	Independent Director	2500 W. Arthington St. Chicago, IL 60612
Lori Queisser	Interim Chief Compliance Officer	2500 W. Arthington St., Chicago, IL 60612
Kevin Igli	Independent Director	2500 W. Arthington St. Chicago, IL 60612
Jeremy Lapon	Chief Technology Officer	2500 W. Arthington St. Chicago, IL 60612
Andrea Brunner	Corporate Secretary	2500 W. Arthington St. Chicago, IL 60612
Raymond Lindsley	Treasurer	2500 W. Arthington St., Chicago, IL 60612

CARYLTON CORPORATION OWNERSHIP

NAME	ADDRESS	PERCENT
Ari Mervis, Rebecca Mervis and Jonathan Mervis as Beneficial Owners of Julius L Hemmelstein Revocable Trust	2500 W. Arthington St. Chicago, IL 60612	27.0%
Ari Mervis as Trustee of Carylton Employee Stock Ownership Plan	2500 W. Arthington St. Chicago, IL 60612	24.5%
Ari Mervis, Rebecca Mervis and Jonathan Mervis as Beneficial Owners of Marcie Mervis Exempt Trust	2500 W. Arthington St. Chicago, IL 60612	21.2%
Ari Mervis, Rebecca Mervis and Jonathan Mervis as Beneficial Owners of Marcie Hemmelstein Exempt Trust	2500 W. Arthington St. Chicago, IL 60612	14.9%
Ari Mervis as sole Owner and CEO of Carylton Acquisition Corp.	2500 W. Arthington St. Chicago, IL 60612	10.3%
Richard Reisin as Trustee of Ari Mervis Gift Trust	2500 W. Arthington St. Chicago, IL 60612	.7%
Richard Reisin as Trustee of Rebecca Mervis Gift Trust	2500 W. Arthington St. Chicago, IL 60612	.7%
Richard Reisin as Trustee of Jonathan Mervis Gift Trust	2500 W. Arthington St. Chicago, IL 60612	.7%

Home address for Ari Mervis - 486 Columbus Avenue, Boston, MA

Curt Maring - Executive Vice President



CERTIFICATE OF CORPORATE AUTHORITY

At a duly authorized meeting of the Board of Directors of **National Water Main Cleaning Company (the "Corporation")** held on **July 10, 2024**, Directors were present or waived notice, **Curt Maring** was elected as **Executive Vice President** of this Corporation and is authorized do any and all acts and things and to execute any and all agreements, consents, certificates and documents as in his opinion, or in the opinion of counsel to the Corporation, may be necessary or appropriate in order to carry out the purposes and intent of the Corporation.


Corporate Address:

15551 Okeechobee Boulevard

Loxhatchee, FL 33470

I hereby certify that I am the **Secretary Treasure** of **National Water Main Cleaning Company**
(Title) (Name of Corporation)
that **Curt Maring** is the duly elected **Executive Vice President** of said Corporation, and the
(Name of Officer) (Title)
above vote has not been amended or rescinded and remains in full force and effect as of the date hereof.

Signature:



Name/Title:

Rocco Paciello - Secretary Treasurer

Date:

07/10/24

National Water Main Cleaning Company was incorporated in New Jersey on 7/2/1964.



**NATIONAL WATER
MAIN CLEANING**
A Carylon Company

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Loxahatchee Groves, FL 33470
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Company COI



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Cememtitious MH Rehab(GEOPSPRAY- RAVEN)



NATIONAL WATER MAIN CLEANING COMPANY

15551 Okeechobee Boulevard
Loxahatchee Groves, FL 33470
Tel: (561) 855-6905
www.nwmcc.com

MH Rehabilitation Submittals

SPECIFICATION SECTION

Manhole Rehabilitation

Infiltration Repair

Manholes having severe water infiltration shall be sealed by pressure chemical grouting. A hole shall be drilled at the point of infiltration through the wall of the manhole to the surrounding ground area. A grouting packer device shall be inserted into the hole and chemical grout pumped into the ground surrounding the manhole until the infiltration has stopped. This procedure may have to be exercised in multiple locations in a given manhole.

Manholes Requiring Outside Grout - Drilling and Injection

- A. Injection holes shall be drilled through the manhole wall in the area surrounding the infiltration.
- B. Grout shall be injected through the holes under pressure with a suitable probe. Injection pressure shall not cause damage to the manhole structure or surrounding surface features.
- C. The procedure shall be repeated until the infiltration is externally sealed with grout. Additional injection points shall be drilled as needed to fully seal all leaks.
- D. Injection holes shall be cleaned and patched with a waterproof quick setting mortar.

Chemical Grout Materials

The chemical grout to be used will be Avanti International's AV-100 with the AV-101 Catalyst T+. It will be combined with Avanti International's AV-102 Catalyst AP per the manufacturer specifications. Quadex Company's Hyperform and Plug shall be utilized as the quick setting patching cements.

Cementitious Manhole Lining

The floor and interior walls of the manhole shall be thoroughly cleaned and made free of all foreign materials including dirt, grit roots, grease, sludge and all debris or material that may be attached to the wall or bottom of the manhole. Minor infiltration will be stopped by hand application of fast drying plug. Cementitious lining of the manhole interior will be completed via trowel and/or spray nozzle.

Manhole Cleaning & Preparation

- A. High pressure water blasting with a minimum of 3,500 psi shall be used to clean free all foreign material within the manhole.
- B. All materials resulting from the cleaning of the manhole shall be removed prior to application of the cement based coating.
- C. All loose or defective brick, grout, ledges, steps and protruding ledges shall be removed to provide an even surface prior to application of cement based coating.

Sealing Active Leaks

The work consists of hand applying a dry quick-setting cementitious mix designed to instantly stop running water or seepage in all types of concrete and masonry structures. The applicator shall apply material in accordance with manufacturer's recommendations and following specifications:

- A. The area to be repaired must be clean and free of all debris per the guidelines set forth in the section titled Manhole Cleaning and Preparation.
- B. Once cleaned, prepare crack or hole by chipping out loose material to a minimum depth and width of $\frac{3}{4}$ inch.
- C. With gloved hand, place a generous amount of the dry quick-setting cementitious material to the active leak, with a smooth fast motion, maintaining external pressure for 30 seconds, repeat until leak is stopped.
- D. Proper application should not require any special mixing of product or special curing requirements

Application of Cementitious Manhole Liner

The work consists of spray applying a cementitious based liner to the inside of the existing manhole. The necessary equipment and application methods to apply the cementitious based liner materials shall be only as approved by the material manufacturer.

- A. Material shall be mixed with water in accordance with manufacturer's specifications and pumped via mono pump for spray application. Material shall be atomized by the introduction of air at the nozzle, creating a low-velocity spray pattern for material application.
- B. Material shall be spray applied only when manhole is in a damp state, with no visible water dripping or running over the manhole walls.
- C. Spraying shall be performed by starting at the base of the manhole and progressing up the wall to the corbel and chimney areas. Material shall be applied to a uniform minimum thickness of $\frac{1}{2}$ inch. Material shall be applied to the bench area in such a manner as to provide for proper drainage without ponding.

Cementitious Lining Materials

Quadex Quad Plug will be used as a rapid set patching cement and mortar. Cementitious lining will be completed using GEOSPRAY. Epoxy coating material will be RAVEN 405.



AVANTI
Stop leaks. Stabilize soil.
Control groundwater. Permanently.

Rev03.2014

TECHNICAL DATA SHEET

AV-100 CHEMICAL GROUT

GRANULES / LIQUID CHEMICALLY REACTIVE GEL

DESCRIPTION

AV-100 is an ultra-low viscosity chemically reactive gel available as either granules or liquid. Having the same viscosity as water, AV-100 can permeate anywhere water can travel and cures within a controllable time frame anywhere from 5 seconds to ± 10 hours. Once it cures, it creates an effective, long-lasting water barrier while providing superb soil stabilization.

APPLICATION

- Stops water infiltration into manholes, sanitary and storm sewer mainlines, joints, laterals, tunnels, mines, and various other geotechnical applications and underground structures by stabilizing external substrate
- Ground modification/slope stability for prevention of landslides, erosion, or any place where site conditions or project requirements dictate modification of the existing soil properties

FEATURES AND BENEFITS

- Thinnest product on the market
- Can be injected through remote packer equipment
- Controllable reaction times from seconds to hours
- Will not undergo syneresis
- Half-life of 362 years as determined by U.S. Dept. of Energy
- No suspended solids
- Higher strength compared to acrylates
- Greater longevity compared to silicates
- Available in granular or liquid form

GROUTING TECHNIQUES

- Tube-a-manchette (TAM) Grouting
- Probe Grouting
- Curtain Grouting
- Remote Packer

HOW IT WORKS

AV-100 is injected using a stainless steel, dual-component pump from two containers (see mix procedure). Injecting a 1:1 ratio into the soil or external substrate will produce a strong, impermeable gel obtained via a copolymerization reaction. Additives are available to modify the reactions and cured gel characteristics.

OPTIONAL ADDITIVES

- AC-50W Root Inhibitor – inhibits future root growth (add to grout tank)
- AV-257 Icoset – increases strength and adhesive qualities (add to grout tank)
- KFe (Potassium Ferricyanide) – extends gel time (add to grout tank)
- AV-105 Gel Guard – reduces freezing point (add equal amounts to both tanks)
- Dyes – used extensively for tracking grout flow

PACKAGING

- Product packaged by weight based on specific gravity.
- Tote = Net Wt. 2,300 lbs. / Volume 258 – 265 gal.
 - Drum = Net Wt. 130 lbs. / Volume 14.6 – 15 gal.

SHIPPING

- Motor class 77.5
- Hazard class 6.1
- Motor freight available
- Air freight available

PROPERTIES*

UNCURED (solid)

Appearance:	White granules
Specific Gravity:	1.15 @ 72°F (22°C) $\pm 3\%$
Bulk Density:	1938 lb/yd ³ $\pm 3\%$ (1150 kg/m ³ $\pm 3\%$)
Toxicological:	See MSDS

UNCURED (liquid)

Appearance:	Clear water-white liquid
Viscosity:	1 – 2 cP @ 72°F (22°C) in solution
Specific Gravity:	1.04 @ 72°F (22°C) $\pm 3\%$
Weight:	8.66 lb/gal $\pm 3\%$ (1.038 kg/L $\pm 3\%$)
Toxicological:	See MSDS

CURED

Appearance:	Clear gel mass/translucent
Hydraulic	
Conductivity:	< 10 ⁻⁸ m/s
Static Pressure:	120 psi (2585 kPa)
Toxicity:	Non-toxic

*Laboratory Results

MIX PROCEDURE (See Mixing Instructions)

Tank A: Add 10 gallons (37.8 L) of water, add one bag (granules) or one liquid drum of AV-100 to solution, add 0.5 gallons (1.9 L) of AV-101 and fill with water up to 30 gallons. Tank B: Add 10 gallons (37.8 L) of water, add 5 lbs (2.27 kg) of AV-102, and then bring to 30 gallons with water. Makes a 60 gallon (227 L) batch. Note: Ingredients are only compatible with stainless steel or plastic.

PERFORMANCE

Performance will be influenced by site conditions. If site temperatures are low, heat the product to recommended operating temperatures of 60°F – 100°F (16°C – 38°C). Decreasing pH may extend cure time. High minerals/metals content may adversely affect gel time. Refer to AV-100 Technical Manual for complete product information.

CLEANING PRODUCTS

Use water with light detergent.

STORAGE

Store in temperatures within or near 60°F – 100°F (16°C – 38°C) in a dry atmosphere.

SAFETY

Use of AV-100 is authorized by Avanti International only after completion of the required Safe Operating Practices Program (SOPP). Always use OSHA-approved personal protective equipment (PPE). Refer to the MSDS for complete safety precautions. The MSDS, mixing instructions, and Technical Manual are available by request or via download at www.AvantiGrout.com.

NOTICE

The data, information and statements contained herein are believed to be reliable, but are not construed as a warranty or representation for which Avanti International assumes any legal responsibility. Since field conditions vary widely, users must undertake sufficient verification and testing to determine the suitability of any product or process mentioned in this or any other written material from Avanti for their own particular use. NO WARRANTY OF SUITABILITY OR FITNESS FOR A PARTICULAR PURPOSE IS MADE. In no case shall Avanti International be liable for consequential, special, or indirect damages resulting from the use or handling of this product.



Section 1: Identification

GHS Product Identifier: AV-100 Chemical Grout (Liquid)
Classification: Chemically Activated Gel
Product Use: Industrial Use Only

Supplier
 Avanti International
 1100 Hercules Ave., Suite 320
 Houston, TX 77058
 Phone: 800.877.2570
 Fax: 281.486.7300

24 HR. EMERGENCY TELEPHONE NUMBER
 Chemtrec: 800.424.9300

Section 2: Hazards Identification

GHS Classification

Hazard Class	Category	
Acute tox.	4	Acute Toxicity (Oral)
Acute tox.	4	Acute Toxicity (Inhalation)
Skin irrit.	2	Skin Corrosion/Irritation
Eye irrit.	2A	Eye Irritation/Damage
Skin sens.	1	Skin Sensitization
Muta.	1	Germ Cell Mutagenicity
Carc.	1	Carcinogenicity
Repro. Tox.	2	Reproductive Toxicity
STOT RE	1	Specific target organ toxicity (Oral) - Peripheral Nervous System
Acute aq.	3	Acute aquatic toxicity

GHS Label Elements

Hazard pictograms:



Signal Word:	Danger
Hazards Statements:	
H302	Harmful if swallowed.
H315	Causes Skin Irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H340	May cause genetic defects.
H350	May cause cancer.
H361	Suspected of damaging fertility or the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure.
Precautionary Statements:	Prevention:
P201	Obtain Special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/gas/mist/vapors.

P264	Wash hands, face and any exposed skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in well-ventilated area.
P272	Contaminated work clothing must not be allowed out of the workplace.
P273	Avoid release to the environment.
P280	Wear protective gloves/protective clothing/eye protection/face.
	Response:
P301 + P312 + P330	IF SWALLOWED: Call a poison center or doctor/physician if you feel unwell. Rinse mouth.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.
P305 + P351 +P338	IF IN EYES Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/attention.
P333 + P313	If skin irritation or rash occurs: Get medical advice/attention.
P337 + P313	If eye irritation persists: Get medical advice/attention.
P362	Take off contaminated clothing and wash before reuse.
	Storage:
P405	Store locked up.
	Disposal:
P501	Dispose of contents and container in accordance with existing federal, state, and local environmental control laws.

Hazards not otherwise classified

No specific dangers known, if the regulations/notes for storage and handling are considered.

Section 3: Composition/Information on Ingredients

Weight %	Components	CAS-No.	Classification
30 - 50	Acrylamide	79-06-1	Acute toxicity Category 3 - Oral. Acute toxicity Category 4 – Dermal Acute toxicity Category 4 - Inhalation Skin irritation Category 2. Eye irritation Category 2A. Skin sensitization Category 1. Germ Cell Mutagenicity Category 1. Carcinogenicity Category 1. Reproductive Toxicity Category 2. Specific target organ toxicity - repeated exposure Category 1. Acute aquatic toxicity Category 3.
30 – 50	Water	7732-18-5	Not classified for physical or health hazards under GHS.
Trade Secret	Proprietary	CAS# is a Trade Secret	Acute toxicity Category 4 – Dermal

The specific chemical identity and/or exact percentage of component(s) have been withheld as a trade secret.

Section 4: First-Aid Measures

Description of First-Aid Measures

General advice:

Show this safety data sheet to the doctor in attendance. Remove contaminated clothing.

If inhaled:

Remove the affected individual into fresh air and keep the person calm. Assist in breathing if necessary.

Immediate medical attention required.

If on skin:

Wash off immediately with soap and plenty of water for at least 15 minutes. If symptoms persist, call a physician.

May cause an allergic skin reaction.

If in eyes:

Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Keep eye wide open while rinsing. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation develops and persists. Do not rub affected area.

If swallowed:

Rinse mouth immediately and drink plenty of water. Never give anything by mouth to an unconscious person. Do NOT induce vomiting. Get medical attention.

Most important Symptoms and effects, both acute and delayed:

Burning sensation. Coughing and/ or wheezing. Difficulty in breathing. Itching. Rashes. Hives.

Notes to Physician:

May cause sensitization of susceptible persons. Treat symptomatically.

Section 5: Fire-Fighting Measures

Suitable Extinguishing Media:	Dry chemical, Carbon dioxide (CO ₂), Foam.
Unsuitable Extinguishing Media:	Use of water spray when fighting fire may be inefficient.
Fire-fighting Procedure	Firefighters should wear NFPA compliant structural firefighting protective equipment, including self-contained breathing apparatus and NFPA compliant helmet, hood, boots and gloves. Avoid contact with product. Decontaminate equipment and protective clothing prior to reuse.
Hazardous Decomposition Products	By Fire and High Heat: Carbon dioxide (CO ₂), carbon monoxide (CO), oxides of nitrogen (NO _x)
Unusual Fire/Explosion Hazards	None

Section 6: Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures

Avoid contact with skin, eyes or clothing. Ensure adequate ventilation. Use personal protective equipment as required. Avoid generation of dust. Do not breathe dust. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak.

Environmental Precautions

Do not discharge into drains/surface waters/groundwater.

Methods and Material for Containment and Cleaning-Up

Dry: Collect/contain granules and spray area with water.

Catalyzed/mixed liquid: Do not allow to dry. Dam up. Take up mechanically and collect in small suitable containers and cure with oxidizer. Spray spill area with potassium persulfate and sodium metabisulfite solutions to neutralize any possible remaining acrylamide. Do not allow material to contaminate surface or ground water. Prevent product from entering drains.

Section 7: Handling and Storage

Precautions for Safe Handling

Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes or clothing. Do not eat, drink or smoke when using this product. Take off contaminated clothing and wash before reuse. Ensure adequate ventilation. In case of insufficient ventilation, wear suitable respiratory equipment. Do not breathe dust. Avoid generation of dust.

Conditions for Safe Storage (Including Any Incompatibilities)

Segregate from foods and animal feeds. Segregate from acids, bases and oxidizing agents.

Suitable materials for containers: High density polyethylene (HDPE), Low density polyethylene (LDPE), Stainless steel 1.4301 (V2)

Further information on storage conditions: Keep containers tightly closed in a dry, cool and well-ventilated place. Keep out of the reach of children. Store away from other materials. Store locked up.

Storage stability:

Storage temperature: 45 - 95 °F

Section 8: Exposure Controls/Personal Protection

Components with Occupational Exposure Limits

Acrylamide

OSHA PEL

CLV 0.03 mg/m³

ACGIH TLV

TWA 0.3 mg/m³;

Advice on system design:

Provide local exhaust ventilation to control vapors/mists.



Personal Protective Equipment

Respiratory Protection:

If exposure exceeds occupational exposure limits, use an appropriate NIOSH approved full-face piece respirator, half-face piece respirator with splash goggles, or powered, filtered air-supplied hood.

Skin Protection:

Chemical resistant protective gloves, Suitable materials, chloroprene rubber (Neoprene), chlorinated polyethylene, polyvinylchloride (Pylox), butyl rubber, fluoroelastomer (Viton), nitrile rubber (Buna N) and chemical suit (Tychem or equivalent).

Eye Protection:

Tightly fitting safety goggles (chemical goggles). Wear face shield if splashing hazard exists.

General Safety and Hygiene Measures:

Wear protective clothing as necessary to prevent contact. Eye wash fountains and safety showers must be easily accessible. Observe the appropriate PEL value. Wash soiled clothing immediately. Contaminated equipment or clothing should be cleaned after each use or disposed of.

Section 9: Physical and Chemical Properties

Appearance: Clear transparent liquid

Odor: odorless

Odor Threshold: Not determined

pH: 6.0 – 8.0

Freezing Point: 43°F (6°C)

Boiling Point: 210-220°F (99-104°C)

Flashpoint: Not determined

Evaporation Rate: Not determined

Flammability: Not flammable

Lower Explosion Limits: Not determined

Upper explosion limits: Not determined

Vapor Pressure: 15.2 mmHg @ 68°F (20°C)

Vapor Density: Not determined

Relative Density: 1.03 @ 77°F (25°C)

Solubility in Water: soluble

Partition Coefficient n-octanol/water: Not determined

Auto-ignition Temperature: Not determined

Decomposition Temperature: Not determined

Viscosity: Not determined

Section 10: Stability and Reactivity

Chemical stability

The product is stable if stored and handled as prescribed/indicated.

Possibility of hazardous reactions

Light Sensitive. May polymerize on exposure to light. The solid is stable at room temperature but may polymerize violently on melting or when heated above 38 °C. Reacts spontaneously with hydroxyl-, amino-, and sulfhydryl-containing compounds. Reacts vigorously with acids, bases producing ammonia salts and acrylic acid. Spontaneous polymerization does not readily occur, but requires the presence of dimethylaminopropionitrile (DMAPN) or Triethanolamine (TEA) catalyst and ammonium persulfate. Also, Acrylamide may polymerize upon contact with oxidizing materials e.g. peroxides.

Conditions to avoid

Excess heat, dust generation, incompatible materials.

Incompatible materials

Reactive with oxidizing agents, acids, alkalis, moisture, copper, brass, aluminum, iron and iron salts. Free radical initiators.

Hazardous decomposition products

Decomposition products:

Hazardous decomposition products: carbon monoxide, carbon dioxide and nitrogen oxide

Section 11: Toxicological Information

Primary routes of exposure

Routes of entry for solids and liquids are ingestion and inhalation, but may include eye or skin contact.

Acute Toxicity/Effects

Acute toxicity

Oral

ATE_{mix}: 333.33 mg/kg

Information on: Acrylamide

Type of value: LD50

Species: Mouse (male/female)

Value: 107 mg/kg

Literature Data

Inhalation

ATE_{mix}: 3.94 mg/l

Information on: Acrylamide

Type of value: LC50

Species: Rat (male/female)

Value: >1,500 mg/m³

Literature Data

Dermal

ATE_{mix}: 3,030 mg/kg

Information on: Acrylamide

Type of value: LD50

Species: Rabbit (male/female)

Value: 1,141 mg/kg

Literature Data

Assessment Other Acute Effects

No data available

Irritation / Corrosion

Assessment of irritating effects: Irritating to eyes.

Skin

Information on: Acrylamide

Species: Rabbit

Result: Not irritating.

Literature Data

Eye

Information on: Acrylamide

Species: Rabbit

Result: Irritating.

Literature Data

Sensitization

Information on: Acrylamide

Species: Guinea Pig

Result: May cause allergic skin reaction

Literature Data

Chronic Toxicity/Effects**Repeated Dose Toxicity**

Assessment of repeated dose toxicity: *information on Acrylamide: Oral - Causes damage to organs through prolonged or repeated exposure. - Peripheral nervous system.*

Literature Data.

Genetic Toxicity

Assessment of mutagenicity: *information on Acrylamide: the substance was mutagenic in vivo test. May alter genetic material.*

Literature Data.

Carcinogenicity

Assessment of carcinogenicity This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification. Possible human carcinogen (Acrylamide)

IARC: 2A - Group 2A: Probably carcinogenic to humans (Acrylamide)

NTP: Reasonably anticipated to be a human carcinogen (Acrylamide)

OSHA: No components of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Literature Data

Reproductive toxicity

Assessment of reproduction toxicity: *information on Acrylamide: animal testing did not show any effects on fetal development. (Acrylamide)*

May cause reproductive disorders. Suspected human reproductive toxicant (Acrylamide)

Literature data.

Teratogenicity

Assessment of teratogenicity: No data available

Development

No data available

Additional Information

Acrylamide toxicity is manifested as a sensorimotor peripheral neuropathy. Drowsiness, loss of balance, confusion.

Liver - Irregularities - Based on Human Evidence

Liver - Irregularities - Based on Human Evidence (Acrylamide).

Literature Data

Section 12: Ecological Information

Toxicity

Aquatic Toxicity

Assessment of aquatic toxicity: The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Toxicity to fish

LC_{50m}: 239 mg/l

Information on: *Acrylamide*

LC50 (96 h) 90 mg/l, *Pimephales promelas* (static)

Aquatic invertebrates

EC_{50m}: 422 mg/l

Information on: *Acrylamide*

EC50 (48 h) 160 mg/l, *Daphnia magna* (OECD Guideline 202, part 1, static)

Microorganisms/Effect on Activated Sludge

Toxicity to Microorganisms

OECD Guideline 209 static activated sludge/EC20 (180 min): > 100 mg/l

Nominal concentration. The product has not been tested.

The statement has been derived from substances/products of a similar structure or composition.

Persistence and Degradability

Assessment Biodegradation and Elimination (H₂O)

100% readily biodegradable (*Acrylamide*). The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Bioaccumulation Potential

Bioaccumulation : 710 µg/l (72h), *Oncorhynchus mykiss* (*Acrylamide*)

Bioconcentration factor: 1.65 (*Acrylamide*)

The product has not been tested. The statement has been derived from the properties of the hydrolysis products.

Mobility in soil

Assessment transport between environmental compartments

No data available.

Additional information

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Harmful to aquatic life.

Section 13: Disposal Considerations

Dispose of in accordance with local, state, and federal regulations.

Section 14: Transport Information

DOT (Department of Transportation)

Proper Shipping Name: *Acrylamide*, solution

Hazard Class: 6.1

UN Number: 3426

Packing Group: III

Label: Toxic or Poison 6.1

Placard: Toxic or Poison 6.1

NMFC (National Motor Freight Carriers)

Freight Class: 77.5

Section 15: Regulatory Information

EPCRA 302:

CAS Number Chemical name

79-06-1 Acrylamide

EPCRA 311/312 (hazard categories): Acute; Chronic

EPCRA 313:

CAS Number Chemical name

79-06-1 Acrylamide

CERCLA RQ CAS Number Chemical name

5000 lbs. 79-06-1 Acrylamide

State regulations

State RTK CAS Number Chemical name

MA, NJ, PA 79-06-1 Acrylamide

CA Prop. 65:

CAS Number Chemical name

79-06-1 Acrylamide

WARNING: THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER AND BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

NFPA Hazard codes:

Health : 1 - Fire: 0 - Reactivity: 0 - Special:

HMIS III rating

Health: 1* - Flammability: 0 - Physical hazard:1

Section 16: Other Information

The information provided in this Safety Data Sheet is correct to the best of Avanti International's knowledge, information and belief at the date of this publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any other process, unless specified in the text. AVANTI INTERNATIONAL MAKES NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR COURSE OF PERFORMANCE OR USAGE OF TRADE. Given the variety of factors that can affect the use and application of this product, some of which are uniquely within the user's knowledge and control, it is essential that the user evaluate the product to determine whether it is fit for a particular purpose and suitable for user's method of use or application. Each user is also responsible for evaluating the conditions of use and designing the appropriate protective mechanisms to prevent employee exposures, property damage, or release to the environment. Avanti International assumes no responsibility for injury to the recipient or third persons or for any damage to any property resulting from misuse of the product.



AVANTI

Stop leaks. Stabilize soil.
Control groundwater. **Permanently.**

Rev10.2013

TECHNICAL DATA SHEET

AV-101 CATALYST T+

TRIETHANOLAMINE (TEA) / ACTIVATOR

DESCRIPTION

AV-101 Catalyst T+ (often referred to as CAT-T) is a colorless liquid which is used as an activator for reaction of **AV-100** Chemical Grout, **AV-118** Duriflex, and **AV-160** SuperGel. The special blend of ingredients in **AV-101** reduces its freezing point to 0°C and enhances the final gel.

USED WITH

- AV-100 Chemical Grout
- AV-118 Duriflex
- AV-160 SuperGel

PACKAGING

- Please contact Avanti for more information.

SHIPPING

- Motor Class 60
- Non-Hazardous
- Air freight available

PROPERTIES*

Appearance:	Clear liquid
Dynamic Viscosity:	150 cP @ 77°F (25°C)
pH:	Not available
Boiling Point:	244°F (117.8°C)
Freezing Point:	-44°F (-42°C)
Melting Point:	Not applicable
Flash Point:	No test data available
Lower Flammable Limit:	No test data available
Upper Flammable Limit:	No test data available
Autoignition Temperature:	No test data available
Vapor Pressure:	0.96 kPa @ 68°F (20°C)
Specific Gravity:	1.119 @ 68°F (20°C)
Vapor Density:	2.4
Evaporation Rate:	0.7
Solubility:	100% @ 68°F (20°C)

*Laboratory Results

MIX PROCEDURE

If mixing with **AV-100** or **AV-118**, add ½ gallon (standard mix) to the grout-side tank. When adding additional **AV-101** to Tank A, an equal amount of **AV-102** or **AV-103** should be added to Tank B. See complete mixing instructions at www.AvantiGrout.com.

CLEANING PRODUCTS

Use water with light detergent.

STORAGE

Store in a tightly closed container in a cool, ventilated, dry atmosphere.

SAFETY

Always use OSHA-approved personal protective equipment (PPE). Refer to the MSDS for complete safety precautions. The MSDS is available by request or via download at www.AvantiGrout.com.

NOTICE

The data, information and statements contained herein are believed to be reliable, but are not construed as a warranty or representation for which Avanti International assumes any legal responsibility. Since field conditions vary widely, users must undertake sufficient verification and testing to determine the suitability of any product or process mentioned in this or any other written material from Avanti for their own particular use. **NO WARRANTY OF SUITABILITY OR FITNESS FOR A PARTICULAR PURPOSE IS MADE.** In no case shall Avanti International be liable for consequential, special, or indirect damages resulting from the use or handling of this product.



Section 1: Identification

GHS Product Identifier: AV-101 Catalyst T+
Classification: Additive
Product Use: Industrial Use Only

Supplier

Avanti International
 1100 Hercules Ave., Suite 320
 Houston, TX 77058
 Phone: 800.877.2570
 Fax: 281.486.7300

24 HR. EMERGENCY TELEPHONE NUMBER

Chemtrec: 800.424.9300

Section 2: Hazards Identification

GHS Classification

Hazard Class	Category	Exposure Route
Acute tox.	5	Acute toxicity (Oral)
Skin irrit	2	Skin irritation
Resp. sens.	1	Respiratory sensitization
Skin sens.	1	Skin sensitization
Carc.	2	Carcinogenicity
STOT RE	2	Specific target organ toxicity – repeated exposure

GHS Label Elements

Hazard pictograms:



Signal Word:	Warning
Hazards Statements:	
H303	Maybe harmful if swallowed.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H351	Suspected of causing cancer.
H373	May cause damage to organs through prolonged or repeated exposure.
Precautionary Statements:	Prevention:
P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/fume/gas/mist/vapors/spray.
P261	Avoid breathing dust/fume/gas/mist/vapors/spray.
P264	Wash skin and face thoroughly after handling.
P272	Contaminated work clothing must not be allowed out of the workplace.
P280	Wear protective gloves/protective clothing/eye protection/face.
P284	In case of inadequate ventilation wear respiratory protection.
	Response:
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for

	breathing.
P308 + P313	IF exposed or concerned: Get medical advice/attention.
P312	Call a poison center or doctor/physician if you feel unwell.
P314	Get medical advice/attention if you feel unwell.
P333 + P313	If skin irritation or rash occurs: Get medical advice/attention.
P342 + P311	If experiencing respiratory symptoms: Call a poison center or doctor/physician.
P362 + P364	Take off contaminated clothing and wash before reuse.
	Storage:
P405	Store locked up.
	Disposal:
P501	Dispose of contents and container in accordance with existing federal, state, and local environmental control laws.

Hazards not otherwise classified

No specific dangers known, if the regulations/notes for storage and handling are considered.

Section 3: Composition/Information on Ingredients

Weight %	Components	CAS-No.	Classification
72.5%	Triethanolamine	102-71-6	Not classified for physical or health hazards under GHS.
15%	Diethanolamine	111-42-2	Acute toxicity Category 5 Oral. Skin irritation Category 2. Respiratory sensitization Category 1. Skin sensitization Category 1. Carcinogenicity Category 2 Specific target organ toxicity - Repeated exposure Category 2
12.5%	Water	7732-18-5	Not classified for physical or health hazards under GHS.

Section 4: First-Aid Measures

Description of First-Aid Measures

General advice:

Remove contaminated clothing.

If inhaled:

Move victim to fresh air. If not breathing, give artificial respiration. Get medical attention.

If on skin:

Wash affected areas thoroughly with soap and water. If irritation develops, seek medical attention.

If in eyes:

In case of contact with the eyes, rinse immediately for at least 20 minutes with plenty of water holding eyelids open. Get medical attention.

If swallowed:

Rinse mouth and then drink plenty of water. Do not induce vomiting. Never induce vomiting or give anything by mouth to an unconscious victim. Get medical attention.

Most important symptoms and effects, both acute and delayed:

The most important known symptoms and effects are described in section 2 and or section 11.

Section 5: Fire-Fighting Measures

Suitable Extinguishing Media:

Dry chemical, foam, sand and soil, carbon dioxide and water spray for large fires.

Fire-fighting Procedure

Firefighters should wear NFPA compliant structural firefighting protective equipment, including self-contained breathing apparatus and NFPA compliant helmet, hood, boots and gloves. Avoid contact with product. Decontaminate equipment and protective clothing prior to reuse. Prevent, by any means available, spillage from entering drains or water courses. Use water delivered as a fine spray to control fire and cool adjacent area. DO NOT approach containers suspected to be hot. Cool fire exposed containers with water spray from a protected location. If safe to do so, remove containers from path of fire.

Hazardous Decomposition Products

By Fire and High Heat: Carbon dioxide (CO₂), carbon monoxide (CO), oxides of nitrogen (NO_x)

Unusual Fire/Explosion Hazards

N/A

Section 6: Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures

Clear danger area. Ensure adequate ventilation. Remove ignition sources. Wear suitable personal protective clothing and equipment.

Environmental Precautions

Do not discharge into drains/surface waters/groundwater.

Methods and Material for Containment and Cleaning-Up

Use appropriate tools to put the spilled solid in suitable container for recovery or disposal.

Section 7: Handling and Storage

Precautions for Safe Handling

Avoid ingestion, inhalation, skin and eye contact. Avoid inhalation of vapor or mist. Handle in accordance with good industrial hygiene practice and any legal requirements.

Conditions for Safe Storage (Including Any Incompatibilities)

Storage incompatibility: Avoid oxidizers

Suitable materials for containers: HDPE, metal

Storage stability:

Storage temperature: 45 - 95 °F

Section 8: Exposure Controls/Personal Protection

Components with Occupational Exposure Limits

Diethanolamine

ACGIH TLV

TWA value 1 mg/m³

OSHA PEL

Not established

Liver damage

Kidney damage

Confirmed animal carcinogen with unknown relevance to humans

Danger of cutaneous absorption

ACGIH TLV

TWA value 5 mg/m³

Triethanolamine

Advice on system design:

Provide local exhaust ventilation to control vapors/mists.



Personal Protective Equipment

Respiratory Protection:

If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.

Hand Protection:

Chemical resistant protective gloves, Suitable materials, chloroprene rubber (Neoprene), chlorinated polyethylene, polyvinylchloride (Pylox), butyl rubber, fluoroelastomer (Viton), nitrile rubber (Buna N)

Eye Protection:

Tightly fitting safety goggles (chemical goggles). Wear face shield if splashing hazard exists.

General Safety and Hygiene Measures:

Keep away from food, drink and animal feeding stuffs. Do not eat, drink or smoke when using this product. Wash hands before breaks and after shifts. Wear protective clothing as necessary to prevent contact. Eye wash fountains and safety showers must be easily accessible. Observe the appropriate PEL value. Wash soiled clothing immediately. Contaminated equipment or clothing should be cleaned after each use or disposed of.

Section 9: Physical and Chemical Properties

Appearance: Clear liquid

Odor: Odorless

Odor Threshold: Not determined

pH: 10.5 – 11.5 (@ 14.9% solution)

Freezing Point: -40°F (40°C)

Boiling Point: Decomposes

Flashpoint: Not determined

Evaporation Rate: Not determined

Flammability: Not flammable

Lower Explosion Limits: Not determined

Upper explosion limits: Not determined

Vapor Pressure: Not determined

Vapor Density: Not determined

Relative Density: 1.124 @ 72°(22°C)

Solubility in Water: Completely soluble

Partition Coefficient n-octanol/water: Not determined

Auto-ignition Temperature: Not determined

Decomposition Temperature: Not determined

Viscosity: Solid

Section 10: Stability and Reactivity

Reactivity

No data available

Chemical stability

The product is stable if stored and handled as prescribed/indicated.

Possibility of hazardous reactions

No data available

Conditions to avoid

Air exposure to moisture and light.

Incompatible materials

Acids, Oxidizing agents, Copper; Zinc, Iron.

Hazardous decomposition products

No data available

Section 11: Toxicological Information

Primary routes of exposure

Routes of entry for solids and liquids are ingestion and inhalation, but may include eye or skin contact. Routes of entry for gases include inhalation and eye contact. Skin contact may be a route of entry for liquefied gases.

Acute Toxicity/Effects

Acute toxicity

Oral

Information on Triethanolamine (TEA)

Type of value: LD50

Species: rat (male/female)

Value: 5,530 mg/kg

Literature Data

Information on Diethanolamine (DEA)

Type of value: LD50

Species: rat (male/female)

Value: 710 mg/kg

Literature Data

ATEmix: 2,941 mg/kg

Inhalation

No Data

Dermal

Information on Triethanolamine (TEA)

Type of value: LD50

Species: rabbit (male/female)

Value: > 2,250 mg/kg

Literature Data

Information on Diethanolamine (DEA)

Type of value: LD50

Species: rabbit (male/female)

Value: 12,000 mg/kg

Literature Data

ATEmix: 3,030 mg/kg

Assessment Other Acute Effects

Assessment of STOT single: no data.

Irritation / Corrosion

Assessment of irritating effects:

Information on Triethanolamine (TEA): Skin Rabbit (no irritation-24hr) Eyes Rabbit (no eye irritation-24hr)

Information on Diethanolamine (DEA): Skin Rabbit (mild irritation-24hr) Eyes Rabbit (severe eye irritation-24hr)

Sensitization

Assessment of sensitization: No data

Chronic Toxicity/Effects

Repeated Dose Toxicity

Assessment of repeated dose toxicity: No data

Genetic Toxicity

Assessment of mutagenicity: No Data.

Carcinogenicity

Information on Diethanolamine (DEA):

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Diethanolamine)

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Literature Data

Reproductive toxicity

Assessment of reproduction toxicity: No data

Teratogenicity

Assessment of teratogenicity: No data.

Development

No Data

Additional information

Information on Triethanolamine (TEA)

RTECS: KL9275000

Kidney injury may occur., Dermatitis

Liver - Irregularities - Based on Human Evidence

Liver - Irregularities - Based on Human Evidence

Information on Diethanolamine (DEA):

RTECS: KL2975000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Liver - Irregularities - Based on Human Evidence

Liver - Irregularities - Based on Human Evidence

Section 12: Ecological Information

Toxicity

Aquatic Toxicity

Assessment of aquatic toxicity: Acutely harmful for aquatic organisms. The inhibition of the degradation activity of activated sludge is not anticipated when introduced to biological treatment plants in appropriate low concentrations.

The product may hydrolyze. The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Toxicity to fish

Information on Triethanolamine (TEA)

LC50 (96 h) 450 – 1,000 mg/l, Lepomis macrochirus (Bluegill)

Literature data.

Information on Diethanolamine (DEA)

LC50 (96 h) 1,460 mg/l, Pimephales promelas (fathead minnow)

Literature data.

Aquatic invertebrates

Information on Triethanolamine (TEA)

EC50 - Daphnia (water flea) - 609.98 mg/l - 48 h

Literature data

Information on Diethanolamine (DEA)

EC50 - *Daphnia magna* (Water flea) - 55 mg/l - 48 h
Literature data

Microorganisms/Effect on Activated Sludge

The product has not been tested.

Persistence and Degradability

Assessment Biodegradation and Elimination (H2O)

Information on Triethanolamine (TEA)

Result: 96 % - Readily biodegradable

Literature data

Information on Diethanolamine (DEA)

Result: > 90 % - Readily biodegradable

Literature data

Bioaccumulation Potential

No data. The product has not been tested.

Mobility in soil

No data.

Additional information

None

Section 13: Disposal Considerations

Dispose of in accordance with local, state, and federal regulations.

Section 14: Transport Information

DOT (Department of Transportation)

Proper Shipping Name: Not regulated if shipped in container less than RQ amount.

Hazard Class: Not applicable

UN Number: Not applicable

Packing Group: Not applicable

Label: Not applicable

Placard: Not applicable

NMFC (National Motor Freight Carriers)

Freight Class: 60

RQ: 666.66 lbs.

Section 15: Regulatory Information

EPCRA 311/312 (hazard categories): Acute; Chronic

CAS Number Chemical name

102-71-6 Triethanolamine

111-42-2 Diethanolamine

EPCRA 313:

CAS Number Chemical name

111-42-2 Diethanolamine

CERCLA RQ CAS Number Chemical name

111-42-2 Diethanolamine Reportable quantity: 100 lbs.

State regulations

State RTK CAS Number Chemical name

MA, NJ, PA 102-71-6 Triethanolamine

MA, NJ, PA 111-42-2 Diethanolamine

CA Prop. 65:

WARNING: This product contains a chemical known to the State of California to cause cancer.
Diethanolamine Carcinogenic.

NFPA Hazard codes:

Health : 0 - Fire: 1 - Reactivity: 0 - Special:

HMIS III rating

Health: 1 - Flammability: 1 – Physical Hazard:1 – PPE: K (Hood, Gloves, Protective Suit & Boots)

Section 16: Other Information

The information provided in this Safety Data Sheet is correct to the best of Avanti International's knowledge, information and belief at the date of this publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any other process, unless specified in the text. AVANTI INTERNATIONAL MAKES NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR COURSE OF PERFORMANCE OR USAGE OF TRADE. Given the variety of factors that can affect the use and application of this product, some of which are uniquely within the user's knowledge and control, it is essential that the user evaluate the product to determine whether it is fit for a particular purpose and suitable for user's method of use or application. Each user is also responsible for evaluating the conditions of use and designing the appropriate protective mechanisms to prevent employee exposures, property damage, or release to the environment. Avanti International assumes no responsibility for injury to the recipient or third persons or for any damage to any property resulting from misuse of the product.



AVANTI

Stop leaks. Stabilize soil.
Control groundwater. Permanently.

Rev07.2014

TECHNICAL DATA SHEET

AV-102 CATALYST AP

AMMONIUM PERSULFATE / INITIATOR

DESCRIPTION

AV-102 Catalyst AP (often referred to as AP) is a white crystalline solid used with AV-100 Chemical Grout as a polymerization initiator. Ammonium persulfate is a powder that is a required grout component and can be increased from 5 lbs (1% by weight, 60 oz by volume) to a maximum of 15 lbs (3% by weight, 180 oz by volume). AV-102 is a strong oxidizing material which decomposes over time.

USED WITH

- AV-100 Chemical Grout

PACKAGING

- Please contact Avanti for more information.

SHIPPING

- Motor Class 65
- Hazard Class 5.1
- Air freight available

CLEANING PRODUCTS

Use water with light detergent.

PROPERTIES*

Appearance:	White crystals
Viscosity:	1-2 cP in solution
pH:	4 - 6 (1% solution)
Boiling Point:	N/A
Melting Point:	Decomposes
Flash Point:	Non-combustible
Flammable Limit:	Non-combustible
Autoignition Temperature:	N/A
Vapor Pressure:	N/A
Evaporation Rate:	N/A
Vapor Density:	N/A
Specific Gravity (water=1):	1.98
Solubility:	85% by weight @ 77 °F (25°C)

*Laboratory Results

MIX PROCEDURE

When mixing with AV-100, add 5 lbs (standard mix) to the catalyst-side tank. When adding additional AV-101 to Tank A, an equal amount of AV-102 should be added to Tank B. See complete mixing instructions at www.AvantiGrout.com.

STORAGE

Store in a tightly closed container in a cool, ventilated, dry atmosphere.

SAFETY

Always use OSHA-approved personal protective equipment (PPE). Refer to the MSDS for complete safety precautions. The MSDS is available by request or via download at www.AvantiGrout.com.

NOTICE

The data, information and statements contained herein are believed to be reliable, but are not construed as a warranty or representation for which Avanti International assumes any legal responsibility. Since field conditions vary widely, users must undertake sufficient verification and testing to determine the suitability of any product or process mentioned in this or any other written material from Avanti for their own particular use. NO WARRANTY OF SUITABILITY OR FITNESS FOR A PARTICULAR PURPOSE IS MADE. In no case shall Avanti International be liable for consequential, special, or indirect damages resulting from the use or handling of this product.

Section 1: Identification

GHS Product Identifier: AV-102 Catalyst AP
Classification: Catalyst
Product Use: Industrial Use Only

Supplier

Avanti International
1100 Hercules Ave., Suite 320
Houston, TX 77058
Phone: 800.877.2570
Fax: 281.486.7300

24 HR. EMERGENCY TELEPHONE NUMBER

Chemtrec: 800.424.9300

Section 2: Hazards Identification
GHS Classification

Hazard Class	Category	Exposure Route
Oxi.	3	Oxidizing solid
Acute tox.	4	Acute Toxicity (Oral)
Skin irrit.	2	Skin Irritation
Eye irrit.	2	Eye Irritation/Damage
Resp. irrit.	1	Respiratory Sensitization
Skin sens.	2	Skin Sensitization
STOT SE	3	Specific target organ toxicity – single exposure

GHS Label Elements

Hazard pictograms:



Signal Word:	Danger
Hazards Statements:	
H272	May Intensify fire; oxidizer
H302	Harmful if swallowed
H315	Causes Skin Irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H335	May cause respiratory irritation.
Precautionary Statements:	Prevention:
P210	Keep away from heat/sparks/open flames/hot surface. - No smoking.
P220	Keep/store away from clothing/combustible.
P221	Keep any precaution to avoid mixing with combustibles.
P261	Avoid breathing dust/fume/gas/mist/vapors/spray.
P264	Wash skin and face thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in well-ventilated area.
P272	Contaminated work clothing must not be allowed out of the workplace.
P280	Wear protective gloves/protective clothing/eye protection/face.

P284	In case of inadequate ventilation wear respiratory protection. The type of respiratory protection selected must comply with the requirements set forth in OSHA's Respiratory Protection Standard (29CFR1910.134) or regional standards. For additional details, See Section 8 of the SDS.
	Response:
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305 + P351 +P338	IF IN EYES Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P301 + P312	IF SWALLOWED: Call a poison center or doctor/physician if you feel unwell.
P312	Call a poison center or doctor/physician if you feel unwell.
P314	Get medical advice/attention if you feel unwell.
P330	Rinse mouth.
P333 + P311	If skin irritation or rash occurs: Call a poison center or doctor/physician.
P337 + P311	If eye irritation persists: Call a poison center or doctor/physician.
P342 + P311	If experiencing respiratory symptoms: Call a poison center or doctor/physician.
P362 + P364	Take off contaminated clothing and wash before reuse.
P363	Wash contaminated clothing before reuse.
P370 + P378	In case of fire: Use sand or foam
	Storage:
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
	Disposal:
P501	Dispose of contents and container in accordance with existing federal, state, and local environmental control laws.

Hazards not otherwise classified

No specific dangers known, if the regulations/notes for storage and handling are considered.

Section 3: Composition/Information on Ingredients

Weight %	Components	CAS-No.	Classification
>98%	Ammonium Persulfate	7727-54-0	Oxidizing Solid Category 3 Acute toxicity Category 4 Oral. Skin irritation Category 2. Eye irritation Category 2. Respiratory sensitization Category 1. Skin sensitization Category 2. Specific target organ toxicity - single exposure Category 3

Section 4: First-Aid Measures

Description of First-Aid Measures

General advice:

Remove contaminated clothing.

If inhaled:

Move victim to fresh air. If not breathing, give artificial respiration. Get medical attention.

If on skin:

Wash affected areas thoroughly with soap and water. If irritation develops, seek medical attention.

If in eyes:

In case of contact with the eyes, rinse immediately for at least 20 minutes with plenty of water holding eyelids open. Get medical attention.

If swallowed:

Rinse mouth and then drink plenty of water. Do not induce vomiting. Never induce vomiting or give anything by mouth to an unconscious victim. Get medical attention.

Most important symptoms and effects, both acute and delayed:

Contact with combustible material may cause fire; Harmful if swallowed; Irritating to eyes, respiratory system and

skin; May cause sensitization by inhalation and skin contact;

Section 5: Fire-Fighting Measures

Suitable Extinguishing Media:	Dry chemical, foam, sand and soil, water spray for large fires.
Unsuitable Extinguishing Media:	Do not use CO ₂ or other gas filled fire extinguishers; they will have little effect on decomposing persulfate.
Fire-fighting Procedure	Firefighters should wear NFPA compliant structural firefighting protective equipment, including self-contained breathing apparatus and NFPA compliant helmet, hood, boots and gloves. Avoid contact with product. Decontaminate equipment and protective clothing prior to reuse. Prevent, by any means available, spillage from entering drains or water courses. Use water delivered as a fine spray to control fire and cool adjacent area. DO NOT approach containers suspected to be hot. Cool fire exposed containers with water spray from a protected location. If safe to do so, remove containers from path of fire.
Hazardous Decomposition Products	By Fire and High Heat: Carbon dioxide (CO ₂), carbon monoxide (CO), oxides of nitrogen (NO _x), sulfur
Unusual Fire/Explosion Hazards	Emits toxic fumes under fire conditions. Decomposes under fire conditions to release oxygen that intensifies the fire.

Section 6: Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures

Clear danger area. Ensure adequate ventilation. Remove ignition sources. Wear suitable personal protective clothing and equipment.

Environmental Precautions

Do not discharge into drains/surface waters/groundwater.

Methods and Material for Containment and Cleaning-Up

Use appropriate tools to put the spilled solid in suitable container for recovery or disposal, avoid raising dust.

Section 7: Handling and Storage

Precautions for Safe Handling

Avoid ingestion, inhalation, skin and eye contact. Minimize dust generation and accumulation. Handle in accordance with good industrial hygiene practice and any legal requirements.

Conditions for Safe Storage (Including Any Incompatibilities)

Storage incompatibility: Flammable/combustible material, Organic peroxides/hydroperoxides, strong alkalis, Zinc, Silver etc. Material to avoid.

Suitable materials for containers: HDPE

Storage stability:

Storage temperature: 45-95 °F

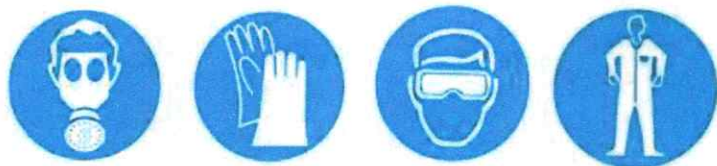
Section 8: Exposure Controls/Personal Protection

Components with Occupational Exposure Limits

Ammonium Persulfate	ACGIH TLV	TWA value 0.1 mg/m ³
	OSHA PEL	Not established

Advice on system design:

Provide local exhaust ventilation to control vapors/mists.



Personal Protective Equipment

Respiratory Protection:

If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.

Hand Protection:

Chemical resistant protective gloves, Suitable materials, chloroprene rubber (Neoprene), chlorinated polyethylene, polyvinylchloride (Pylox), butyl rubber, fluoroelastomer (Viton), nitrile rubber (Buna N)

Eye Protection:

Tightly fitting safety goggles (chemical goggles). Wear face shield if splashing hazard exists.

General Safety and Hygiene Measures:

Keep away from food, drink and animal feeding stuffs. Do not eat, drink or smoke when using this product. Wash hands before breaks and after shifts. Wear protective clothing as necessary to prevent contact. Eye wash fountains and safety showers must be easily accessible. Observe the appropriate PEL value. Wash soiled clothing immediately. Contaminated equipment or clothing should be cleaned after each use or disposed of.

Section 9: Physical and Chemical Properties

Appearance: Crystalline Solid

Odor: Odorless

Odor Threshold: Not determined

pH: 5.2 (1% solution)

Freezing Point: Not determined

Boiling Point: Decomposes

Flashpoint: Not determined

Evaporation Rate: Not determined

Flammability: Not flammable

Lower Explosion Limits: Not determined

Upper explosion limits: Not determined

Vapor Pressure: 1.47×10^{-23} mmHg @ 25°C (77°F)

Vapor Density: Not determined

Relative Density: 1.98 @ 72°(22°C)

Solubility in Water: 790 g/l @ 25°C (77°F)

Partition Coefficient n-octanol/water: Not determined

Auto-ignition Temperature: No evidence of combustion up to 600 °C

Decomposition Temperature: Not determined

Viscosity: Solid

Section 10: Stability and Reactivity

Reactivity

Oxidizing properties: oxidizer.

Chemical stability

The product is stable if stored and handled as prescribed/indicated.

Possibility of hazardous reactions

Use of persulfates in chemical reactions requires appropriate precautions and design considerations for pressure

and thermal relief. Decomposing persulfates will evolve large volumes of gas and/or vapor, can accelerate exponentially with heat generation, and create significant and hazardous pressures if contained and not properly controlled or mitigated. Use with alcohols in the presence of water has been demonstrated to generate conditions that require rigorous adherence to process safety methods and standards to prevent escalation to an uncontrolled reaction.

Conditions to avoid

Avoid heat (decomposes at 527°F (275°C)) and moisture.

Incompatible materials

Acids, bases, amines, Halides, strong reducing agents, combustible materials.

Hazardous decomposition products

Decomposition products:

Oxygen which supports combustion; Sulfur oxides.

Section 11: Toxicological Information

Primary routes of exposure

Routes of entry for solids and liquids are ingestion and inhalation, but may include eye or skin contact. Routes of entry for gases include inhalation and eye contact. Skin contact may be a route of entry for liquefied gases.

Acute Toxicity/Effects

Acute toxicity

Oral

Type of value: LD50

Species: rat (male/female)

Value: 740 mg/kg

Literature Data

Inhalation

Type of value: LC50

Species: rat (male/female)

Value: >2.95 mg/l

Literature Data

Dermal

Type of value: LD50

Species: rabbit (male/female)

Value: > 2,000 mg/kg

Literature Data

Assessment Other Acute Effects

Assessment of STOT single: Causes temporary irritation of the respiratory tract.

Irritation / Corrosion

Assessment of irritating effects: Irritating to respiratory system and skin.

Sensitization

Assessment of sensitization: Sensitization after skin contact possible. The substance may cause sensitization of the respiratory tract. Literature data

Chronic Toxicity/Effects

Repeated Dose Toxicity

Assessment of repeated dose toxicity: No data

Genetic Toxicity

Assessment of mutagenicity: In vivo tests did not show mutagenic effects. In vitro tests did not show mutagenic effects.

Literature Data.

Carcinogenicity

Assessment of carcinogenicity: Did not show carcinogenic effects in animal experiments.

Literature Data

Reproductive toxicity

Assessment of reproduction toxicity: No data

Teratogenicity

Assessment of teratogenicity: No data.

Development

No data

Symptoms of Exposure

The most important known symptoms and effects are described in the labelling (see section 2) and/or in section 11

Section 12: Ecological Information

Toxicity

Aquatic Toxicity

Assessment of aquatic toxicity: Acutely harmful for aquatic organisms. The inhibition of the degradation activity of activated sludge is not anticipated when introduced to biological treatment plants in appropriate low concentrations. The product may hydrolyze. The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Toxicity to fish

LC50 (96 h) 107.6 mg/l, Turbot

Literature data.

Aquatic invertebrates

EC50 (5d) >11 mg/l, Abra alba

Literature data

Microorganisms/Effect on Activated Sludge

The product has not been tested.

Persistence and Degradability

Assessment Biodegradation and Elimination (H2O)

Does not pertain to inorganic substances

Bioaccumulation Potential

Does not significantly accumulate in organisms. The product has not been tested.

Mobility in soil

Dissociates into ions.

Additional information

None

Section 13: Disposal Considerations

Dispose of in accordance with local, state, and federal regulations.

Section 14: Transport Information

DOT (Department of Transportation)

Proper Shipping Name: Ammonium Persulfate

Hazard Class: 5.1

UN Number: 1444

Packing Group: III

Label: Oxidizer 5.1

Placard: Oxidizer 5.1

NMFC (National Motor Freight Carriers)

Freight Class: 65

Section 15: Regulatory Information

EPCRA 311/312 (hazard categories): Acute; Fire

EPCRA 313:

CAS Number Chemical name

7727-54-0 Ammonium Persulfate

CERCLA RQ CAS Number Chemical name

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

State regulations

State RTK CAS Number Chemical name

none

CA Prop. 65:

WARNING: None

NFPA Hazard codes:

Health : 2 - Fire: 1 - Reactivity: 3 - Special: OX

HMIS III rating

Health: 2 - Flammability: 1 - Physical Hazard: 3 - PPE: E (Safety goggles, gloves, protective clothing, dust and vapor respirator)

Section 16: Other Information

The information provided in this Safety Data Sheet is correct to the best of Avanti International's knowledge, information and belief at the date of this publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any other process, unless specified in the text. AVANTI INTERNATIONAL MAKES NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR COURSE OF PERFORMANCE OR USAGE OF TRADE. Given the variety of factors that can affect the use and application of this product, some of which are uniquely within the user's knowledge and control, it is essential that the user evaluate the product to determine whether it is fit for a particular purpose and suitable for user's method of use or application. Each user is also responsible for evaluating the conditions of use and designing the appropriate protective mechanisms to prevent employee exposures, property damage, or release to the environment. Avanti International assumes no responsibility for injury to the recipient or third persons or for any damage to any property resulting from misuse of the product.

Quad-Plug®

TYPICAL PERFORMANCE CHARACTERISTICS*

- **Compressive Strength (ASTM C39)**
30 min. >1,500 psi | 10.34 MPa
- **Bond Strength (ASTM C882)**
28 day >500 psi | 3.45 MPa

* The values stated in inch-pound units are to be regarded as the standard. The values given in International System are for information only.

RECOMMENDED FOR

- Sewer Pipes and Manholes
- Concrete Tanks
- Elevator Pits
- Cisterns
- Basements
- Concrete & Masonry Walls

FEATURES AND BENEFITS

- Stops running water immediately
- Non-Shrink, expands as it sets
- Contains no calcium chloride
- Non-Metallic
- Sulfate resistant
- Easily applied
- No Mixing

Fast Setting Waterstop

DESCRIPTION

Quad-Plug® is a blended material formulated to instantly stop running water or seepage in all types of concrete and masonry structures.

PACKAGING

Quad-Plug is supplied in a 50 lb. | 11.34 kg. plastic pail.

YIELD

Quad-Plug will yield approximately 0.49 cu. ft. | 0.014 cu. m. per pail.

APPLICATION INFORMATION

To Seal Running Water or Leaks

Prepare crack or hole by chipping out loose material to a minimum depth and width of 0.75 in. | 19.05 mm. Using a rubber gloved hand, place a generous amount of dry Quad-Plug to active leak and maintain external pressure for 60 seconds. Repeat until leak stops.

WARRANTY

Quadex, LLC warrants its products to be free of defects in material and workmanship. Unless superseded by project specifications and terms agreed upon in writing between installer and Quadex prior to bid, if within one year from purchase, any Quadex, LLC product is proven defective, the company will replace said product or refund its purchase price at its sole discretion. The company's obligation shall be limited solely to such replacement or refund. There are no other warranties by Quadex, LLC, expressed or implied. There is no warranty if Quadex products are used contrary to Quadex, LLC's written directions.

PRECAUTIONS

Avoid eye contact or prolonged contact with skin. Wash thoroughly after use. Persons using Quad-Plug should wear necessary eye protection, dust mask and rubber gloves. Read all product labels and technical literature.





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 Spartanburg, SC 29303
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 geotreesolutions.com

National Water Main Cleaning Company
 Curt Maring
 Executive Vice President
 15551 Okeechobee Blvd.
 Loxahatchee, FL 33470

April 2025

Re: GeoSpray for Manhole Lining

To Whom it May Concern:

GeoSpray Geopolymer Mortar is a cementitious geopolymer made from a trade secret formulation of materials which contain activated pozzolanic materials that react to form an inorganic ceramic polymer with the addition of water. It is generally designed and suited for both pipe and manholes commonly found in storm water and sanitary sewer infrastructure. When highly acid environments are expected as part of the service life of the infrastructure, specifically sanitary sewer applications, GeoSpray HCE (for Highly Corrosive Environments).

Below is a product comparison matrix with one of the approved products noted in the specs. An attached current technical data sheet for GeoSpray Geopolymer Mortar indicates GeoSpray is a functional equivalent to existing approved product. GeoTree Solutions has a detailed quality assurance procedure to ensure that the minimum specifications listed on the GeoSpray technical data sheet are met with each production lot.

COMPARISON OF SAPL MORTAR SYSTEMS		
Properties	GeoSpray	ML-72
Compressive Strength (ASTM C-109)	1 Day: 2,500 psi 28 Day: 8,000 psi	1 Day: 3,000 psi 28 Day: 10,000 psi
Flexural Strength	7 Day: 750 psi 28 Day: 1,500 psi (ASTM C-78)	1 Day: 500 psi 28 Day: 1,500 psi (ASTM C-293)
Tensile Strength (ASTM C-496)	28 Day: 800 psi	28 Day: 900 psi
Shrinkage	0% (ASTM C-1090)	0% (ASTM C-596)
Bond Strength to Concrete (ASTM C-882)	1 Day: 900 psi 28 Day: 2,500 psi	28 Day: 3,400 psi
Set Time (ASTM C-807)	Initial: 60-75 min Final: 90-110 min	N/A
Corrosion Resistance	DIN XWW1-XWW3	Suited for corrosive environments with pH of 3.0 or higher
Freeze Thaw Durability (ASTM C666, 300 Cycles)	100%	323 Cycle Pass

Sincerely,

Richard Goodrum
 Southeast Region Manager
 GeoTree Solutions
 Encl.: GeoSpray TDS

GeoSpray[®] Geopolymer for Manhole Rehab



BEFORE



CLEANED



COMPLETE



www.GeoTreeSolutions.com
1-855-655-6750

GEOSPRAY®

Geopolymer Mortar



**DON'T REPLACE,
REHABILITATE**

GeoSpray® geopolymer mortar is used for rehabilitation of large diameter pipes and structures in Civil Infrastructure and Industrial applications. It is the first geopolymer mortar specifically designed as a structural and corrosion-resistant solution for large diameter storm and sanitary pipes, manholes, wet wells, and treatment plant structures.

GeoSpray geopolymer is a fiber reinforced mortar that looks and feels like Portland cement, but with higher performance properties. Unlike other cementitious liners, the unique GeoSpray mortar chemistry provides superior flexural and compressive strength, as well as ultra-low porosity and high self-bonding which eliminates cold joints. GeoSpray geopolymer is intended for use through multiple application techniques including pouring, troweling, spraying, or centrifugal/spin casting.

ENGINEERED

- ◆ Highest flexural strength repair mortar – 1500 psi at 28 days (ASTM C78)
- ◆ High early and ultimate strength
- ◆ Unique chemistry promotes self-bonding – Eliminating cold joints between applications
- ◆ Inherently resistant to H₂S corrosion mechanisms
- ◆ Adapts to any shape including: bends, curves and angles
- ◆ Most extensive third-party testing in the industry

COST EFFICIENT

- ◆ Typically lower installed lifecycle cost compared with alternative rehabilitation methods including: CIPP, slipline and spiral wound
- ◆ The larger the diameter the bigger the cost savings
- ◆ Minimal installation footprint
- ◆ Quick return to service with lower by-pass costs, flexible by-pass options tuned to your project needs
- ◆ Eliminate excavation with equipment that fits through 20 inch manholes

SAFE & SUSTAINABLE

- ◆ Styrene free with no leachable toxins
- ◆ NSF 61 and WRAS certification for potable water
- ◆ Third-party evaluation from EPA and other independent laboratories
- ◆ Reduces greenhouse gas emissions over Portland cement based systems



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GEOSPRAY®

Geopolymer Mortar



APPLICATIONS

- ◆ Sewers
- ◆ Culverts
- ◆ Pipes
- ◆ Manholes
- ◆ Sediment Basins
- ◆ Wet Wells

GeoSpray® geopolymer is a high-performance fiber reinforced mortar specifically designed for structural rehabilitation. This high-strength, ultra-low porosity material is made from natural mineral polymers and industrial waste streams. The GeoSpray system is designed for use through multiple application techniques including pouring, placing, trowelling, spraying, or centrifugal casting.

BENEFITS

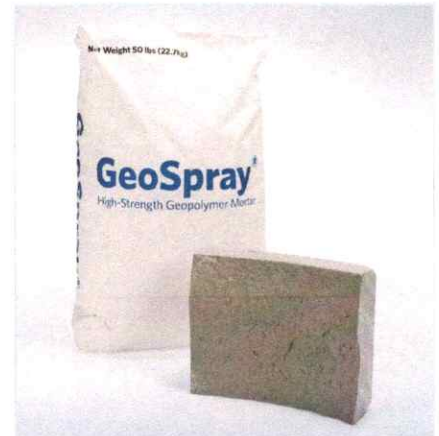
- ◆ Provides physical properties associated with cement mortars, but with the chemistry similar to that of an engineered stone
- ◆ Prevents cold joints between layers from its unique chemical nature
- ◆ Can be applied monolithically to any shape pipe, including right angles and curves
- ◆ Safe and sustainable

TEST METHOD	DURATION	GEOSPRAY
Compressive Strength ASTM C-39/C-109	1 Day 28 Days	Min. 2,500 psi / 17 MPa Min. 8,000 psi / 55 MPa
Flexural Strength ASTM C-78	7 Day 28 Days	750 psi / 5.2 MPa 1500 psi / 10.3 MPa
Modulus of Elasticity ASTM C-469	1 Day 28 Days	3,000,000 psi / 20700 MPa 5,800,000 psi / 40000 MPa
Bond Strength to Concrete ASTM C-882	1 Day 28 Days	Min 900 psi / 6.2 MPa Min. 2,500 psi / 17 MPa
Set Time ASTM C-807 Initial Cure Time	Initial Set Final Set	60 - 75 Minutes 90 - 110 Minutes
Freeze Thaw Durability ASTM C-666	300 Cycles	100% Zero loss
Shrinkage ASTM C-1090	28 Days	0.00% @ 65% R. H.
Tensile Strength ASTM C-496	28 Days	Min. 800 psi / 5.5 MPa

Data shown above reflects results in laboratory controlled conditions.
Reasonable variation of data to be expected.

TYPICAL USES

GeoSpray geopolymer can be used for rehabilitation of pipes and structures in the Civil Infrastructure and Industrial Markets.



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GEOSPRAY®

Geopolymer Mortar



WATER/WASTEWATER

COMPOSITION

A proprietary micro-fiber reinforced ultra dense geopolymer mortar designed for mechanical pumping and spraying. GeoSpray is an inorganic polymeric system that adheres strongly to prepared cement surfaces and itself.

CHARACTERISTICS

A dark grey mortar with near-zero porosity. Wet density of ~127 lbs/ft³, or 2035 kg/m³. Largest particle size: 3.0 mm.

YIELD AND COVERAGE

Yields 0.43 ft³ (0.012 m³) per 50 lbs. For one 50lb bag, coverage is 10.3 ft² at 0.5" depth (0.96m² per 12mm depth)

PACKAGING

GeoSpray is available in 50lb (22.7kg) sealed bags or in 2,000lb (908kg) super sacks.

CLEANING AND PREPARATION

The surface shall be thoroughly cleaned. Use high-pressure water blasting with a minimum of 3500 psi (or as required by local provisions) to clean and free all foreign material, including dirt, grit, roots, grease, sludge or other material that may be attached to the existing surface. All loose or defective brick, grout, or surface irregularities should be removed to provide an even surface prior to application of GeoSpray. When grease and oil are present, an approved detergent or muriatic acid shall be used integrally with the high pressure cleaning water. All materials resulting from the cleaning of the pipe shall be removed prior to application of GeoSpray.

MIXING

Do not exceed a 0.20 w/c ratio. Always add GeoSpray to the water. Follow normal industry standards for batching and mixing.

WORK TIME

Work time is 60 - 90 minutes at 80°F (27°C).

APPLICATION

Once mixed to proper consistency and homogeneity, GeoSpray can be hand troweled as a repair mortar for crack repair prior to spraying.

GeoSpray should be pumped from a horizontal mix auger cavity via an adjustable rotor stator pump through a hose for delivery to the appropriate application device (spray nozzle or spinner head), and shall be applied to a damp surface.

STORAGE

GeoSpray geopolymer should be stored in a cool, dry location. Stored under proper conditions, shelf life is one year.

FINISHING

If necessary, troweling of materials can begin following the spray application. Initial troweling shall be in an upward motion, to compress the material into voids and solidify the pipe wall. Take precautions not to over trowel.

GeoSpray can be finished using a magnesium float, wood float, sponge float, broom or brush, depending on the surface texture desired. Do not use a steel trowel.

CURING

Optimum curing occurs in a moist and moderate environment. General underground conditions are usually adequate to meet this requirement. If dry and/or hot conditions are present, the use of a wind barrier and fogging spray will be required. During hot weather conditions, chilled water may be used to mix GeoSpray geopolymer. GeoSpray geopolymer cement should be maintained at a temperature lower than 90°F (32°C). Standard industry practices may be used to maintain proper temperature.

Alternatively, GeoSpray should not be placed when the temperature in the curing environment is below 37°F (3°C). During cold weather conditions, heaters, thermal breaks, and other methods may be used to maintain temperature above that threshold.

QUALITY CONTROL & MATERIAL TESTING

For each section length designated by the owner in the contract documents or purchase order, GeoSpray will be collected at the end of the hose near the discharge point. Use 4" by 8" cylinders in accordance with Test Method ASTM C 39/39M.

HEALTH & SAFETY

GeoSpray, is a cementitious powder, is alkaline and may cause significant skin and eye irritation. Adequate health and safety precautions should be observed during all storage, handling, use and drying periods. For safety and health precautions, reference the current version of the Safety Data Sheet for GeoSpray. When using GeoSpray in a confined space or closed area, consult the current OSHA or ANSI bulletins on safety requirements. Do not take internally. If swallowed, call a physician immediately.

WARRANTY

GeoTree Solutions warrants this product to be free of defects in material and manufacturing. Should the product prove to be defective, the liability to GeoTree Solutions shall be limited to replacement of the product, exfactory. GeoTree Solutions makes no warranties as to merchantability or fitness for a particular purpose. This warranty is in lieu of all other warranties expressed or implied. Users should determine the suitability of the product for the intended use and assume all risk and liability in connection therewith.



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GEOSPRAY® HCE

Geopolymer Mortar for Highly Corrosive Environments



APPLICATIONS:

Wastewater/Industrial/Sewer
/Manhole

GeoSpray HCE geopolymer is the next generation of high-performance fiber reinforced geopolymer mortars. Specifically formulated for highly corrosive environments, this high strength, ultra-low porosity single component material raises the performance level of mortars for use in municipal and industrial wastewater applications, such as sanitary sewers, manholes, wet wells, lift stations tanks and containment areas.

GeoSpray HCE maintains the industry leading attributes that have made GeoSpray the preeminent geopolymer mortar:

- ◆ High flexural, tensile and bond strength
- ◆ Minimizes cold joints between layers
- ◆ Consistent performance from bag to bag and truckload to truckload
- ◆ Designed for use in multiple application techniques, including pouring, troweling, spraying and centrifugal/spin casting

BENEFITS

- ◆ Provides physical properties associated with cement mortars, but with the chemistry similar to that of an engineered stone
- ◆ Superior corrosion resistance verified through 3rd party testing to DIN 19573 standard XWW4
- ◆ Can be applied monolithically to any shape pipe, including right angles, curves, boxes and ellipses
- ◆ Safe and sustainable

TEST DATA

Compressive Strength (ASTM C-39/C-109)	1 Day 28 Days	Min. 2,500 psi / 17 MPa Min. 8,000 psi / 55 MPa
Flexural Strength (ASTM C-78)	7 Day 28 Days	750 psi / 5.2 MPa 1500 psi / 10.3 MPa
Set Time (ASTM C-807)	Initial Set Final Set	60 - 75 Minutes 90 - 110 Minutes
Freeze Thaw Durability (ASTM C-666)	300 Cycles	100% Zero loss
Shrinkage (ASTM C-1090)	28 Days	0.00% @ 65% R. H.
Tensile Strength (ASTM C-496)	28 Days	Min. 800 psi / 5.5 MPa
Chemical Resistance (DIN-19573)	-	XWW1-XWW4 Certification

WITH GEOSPRAY HCE TYPICAL USES:

- ◆ Very Corrosive sewer or industrial applications
- ◆ pH < 2.0
- ◆ High H₂S environments



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GEOSPRAY HCE

Geopolymer Mortar for Highly Corrosive Environments



WATER / WASTE WATER

COMPOSITION

A proprietary fiber reinforced ultra- dense geopolymer mortar designed for mechanical pumping and spraying. GeoSpray HCE is an inorganic polymeric system that adheres strongly to prepared cement surfaces and itself.

CHARACTERISTICS

A dark grey mortar with near-zero porosity. Wet density of ~127 lbs/ft³, or 2035 kg/m³. Largest particle size: 3.0 mm.

YIELD AND COVERAGE

Yields 0.43 ft³ (0.012 m³) per 50 lbs. For one 50lb bag, coverage is 10.3 ft² at 0.5" depth (0.96m² per 12mm depth)

PACKAGING

GeoSpray HCE is available in 50lb (22.7kg) sealed bags or in 2,000lb (908kg) super sacks.

CLEANING AND PREPARATION

The surface shall be thoroughly cleaned. Use high-pressure water blasting with a minimum of 3500 psi (or as required by local provisions) to clean and free all foreign material, including dirt, grit, roots, grease, sludge or other material that may be attached to the existing surface. All loose or defective brick, grout, or surface irregularities should be removed to provide an even surface prior to application of GeoSpray HCE. When grease and oil are present, an approved detergent or muriatic acid shall be used integrally with the high pressure cleaning water. All materials resulting from the cleaning of the pipe shall be removed prior to application of GeoSpray HCE.

MIXING

The mortar should be batched or mixed to a consistency that matches the requirements of application and pumping on site. Typically the range of water to material ratio is between 0.15 and 0.18, do not exceed 0.20 w/m ratio.

Always add GeoSpray HCE to the water. Follow normal industry standards for batching and mixing.

STORAGE GeoSpray HCE geopolymer should be stored in a cool, dry location. Stored under proper conditions, shelf life is one year.

WORK TIME

Work time is 60 - 90 minutes at 80°F (27°C) if mixed continuously.

APPLICATION

Once mixed to proper consistency and homogeneity, GeoSpray HCE can be hand troweled as a repair mortar for crack repair prior to spraying.

GeoSpray HCE should be pumped from a horizontal mix auger cavity via an adjustable rotor stator pump through a hose for delivery to the appropriate application device (spray nozzle or spinner head), and shall be applied to a damp surface.

GeoSpray HCE has an ultra-low abrasion rate on hoses and equipment; they will last much longer, with fewer interruptions and remobilizations.

FINISHING

If necessary, troweling of materials can begin following the spray application. Initial troweling shall be in an upward motion, to compress the material into voids and solidify the pipe wall. Take precautions not to over trowel.

GeoSpray HCE can be finished using a magnesium trowel, wood float, sponge float, broom or brush, depending on the surface texture desired. Do not use a steel float.

CURING

Optimum curing occurs in a moist and moderate environment. General underground conditions are usually adequate to meet this requirement. If dry and/or hot conditions are present, the use of a wind barrier and fogging spray will be required.

During hot weather conditions, chilled water may be used to mix GeoSpray HCE geopolymer. GeoSpray HCE geopolymer cement should be maintained at a temperature lower than 90°F (32°C).

Standard industry practices may be used to maintain proper temperature.

Alternatively, GeoSpray HCE should not be placed when the temperature in the curing environment is below 37°F (3°C). During cold weather conditions, heaters, thermal breaks, and other methods may be used to maintain temperature above that threshold.

QUALITY CONTROL & MATERIAL TESTING

For each section length designated by the owner in the contract documents or purchase order, GeoSpray HCE will be collected at the end of the hose near the discharge point. Use 4" by 8" cylinders in accordance with Test Method ASTM C 39/39M or sprayed panels in accordance with ASTM C1140.

HEALTH & SAFETY

GeoSpray HCE, is a cementitious powder, is alkaline and may cause significant skin and eye irritation. Adequate health and safety precautions should be observed during all storage, handling, use and drying periods. For safety and health precautions, reference the current version of the Safety Data Sheet for GeoSpray HCE. When using GeoSpray HCE in a confined space or closed area, consult the current OSHA or ANSI bulletins on safety requirements. Do not take internally. If swallowed, call a physician immediately.

WARRANTY

GeoTree Solutions warrants this product to be free of defects in material and manufacturing. Should the product prove to be defective, the liability to GeoTree Solutions shall be limited to replacement of the product, exfactory. GeoTree Solutions makes no warranties as to merchantability or fitness for a particular purpose. This warranty is in lieu of all other warranties expressed or implied. Users should determine the suitability of the product for the intended use and assume all risk and liability in connection therewith.



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Before using any GeoTree product, the user must review the most recent version of the product's technical data sheet, safety data sheet and other applicable documents, available at www.geotreesolutions.com or by calling +1.855.655.6750.

V: 07.21.2020

GEOSPRAY® HCE

(Highly Corrosive Environments)
Geopolymer Mortar



Structurally restore manholes
with a one-step corrosion
resistant lining

OVERVIEW

When it comes to restoring manholes, there are many factors to consider:

- Type of repair needed
- Total installation cost and lifecycle cost
- Time to repair
- Traffic delays
- Environmental regulations
- Long-term corrosion resistance

Do your current repair methods help provide the following?

- Strength and microbial induced corrosion resistance in one application
- Proven field performance in manhole rehabilitation
- Superior 28-day compression, flexural, bonding and abrasion resistance
- Corrosion resistance to sulfuric acid from H₂S or MIC
- Reduced time needed for surface preparation and installation

Benefits of GeoSpray HCE Geopolymer:

- Restores long-term manhole structural integrity
- Extends the lifecycle of newly installed structures
- Speeds return to service
- Apply with thickness of ¼" to 3" in single or multiple passes
- Allows application in wet or moist conditions
- Fill voids (parge) and line the surface with the same, single product
- Creates a monolithic structure without cold joints (self bonding)
- Not subject to holidays and pin holes
- Eliminates the need for spark testing to validate proper installation
- Contains no volatile organic compounds (VOCs) or styrene
- Superior corrosion resistance verified through 3rd party testing to DIN 19573 standard XWW4

Washington, D.C. (Manhole Rehab)



Before



After

Arlington, VA



Before



After

GeoSpray HCE (Highly Corrosive Environments) geopolymer is made of a high performance fiber-reinforced geopolymer mortar. Unlike other cementitious mortars for manhole lining, GeoSpray HCE geopolymer mortar is highly MIC resistant while easily and consistently sprayable.

GeoSpray HCE geopolymer is faster to install than many other repair or rehabilitation products. The result is improved performance and strength with lower total installed costs than alternative methods.

Uses:

- pH < 2.0
- Moderate to High H₂S environments



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GEOSPRAY HCE

(Highly Corrosive Environments)
Geopolymer Mortar



Inman, SC



Before



After

Garyville, LA



Before



After

Cheektowaga, NY



Before



After

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Before using any GeoTree product, the user must review the most recent version of the product's technical data sheet, safety data sheet and other applicable documents, available at www.geotreesolutions.com or by calling +1.855.655.6750



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GEOPLUG®

Rapid Set Water-Stop



STORM + SANITARY

The GeoPlug® water-stop is a rapid setting water infiltration patch. GeoPlug powder is uniquely designed to quickly fill, plug and restore blemishes in host pipes during or prior to rehabilitation. GeoPlug powder immediately stops leaks in corrugated metal pipe, precast concrete pipe, tanks, floors, wells, manholes, pump station and similar structures. GeoPlug powder is a temporary repair to stop active flow of water until a structural repair can be completed.

TYPICAL USES

GeoPlug water-stop can be used to immediately stop leaks in structures, such as:

- ◆ Corrugated metal pipe
- ◆ Precast concrete pipe
- ◆ Pump stations
- ◆ Tanks
- ◆ Floors
- ◆ Wells
- ◆ Manholes

MATERIAL DATA

INFORMATION

METHOD

GeoPlug Water-Stop	50 lb. (22.7 kg) buckets	
Working Time	3 to 5 minutes at 80°F (27°C)	
Working Temp.	40°F to 95°F / 5°C to 38°C	
Compressive Strength	540 psi (3.70 MPa) 1hr	ASTM C-109
	780 psi (5.40 MPa) 24hr	

BENEFITS

- ◆ Rapid setting fill that expands in to holes and crack
- ◆ Easily mixed and applied
- ◆ Low cost solution when compared to chemical grouts



STORAGE

GeoPlug water-stop shall be stored in a cool, dry location. Stored under proper conditions, shelf life is one year.

Fast setting - stiffens in 45-90 seconds



Total work time 3-5 minutes



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GEOPLUG®

Rapid Set Water-Stop



STORM + SANITARY

COMPOSITION

A proprietary cementitious water-stop mortar. Powder is fine light brown. Combined with water creates a moldable pliable putty.

YIELD AND COVERAGE

Coverage per pail approximately 0.49 ft³/ 800 in³/0.014 m³

PACKAGING

GeoPlug water-stop is available in ready to mix 50 lbs (22.7 kg) containers.

MIXING

GeoPlug water-stop only needs a small amount of water added to the powder until the material becomes a workable putty. This is achieved by adding 1 parts water to 8 parts powder by volume. GeoPlug water-stop is designed to set quickly so do not mix more material than can be placed in 5 minutes.

The material can be mixed by hand with proper PPE (gloves) into a workable putty or be used as a dry powder and water from the infiltration or leak.

WORK TIME

GeoPlug water-stop mortar starts working the moment water is introduced. Once in place. GeoPlug water-stop will begin to stiffen in 45 to 90 seconds and will lose pliability and workability in 3-5 minutes. Work time is approximately 3 to 5 minutes at 80°F (27°C)

Additional water will NOT retard or prolong workability time. GeoPlug water-stop requires continual mixing or agitation until it is applied, and continues to cure after it is in place.

SURFACE PREP

Chip away soft, deteriorated, unsound substrate. Clean cavity completely.

APPLICATION

GeoPlug water-stop should be applied when material becomes warm and putty like. Press material into patch area by hand or with trowel and hold until patch becomes hard. To stop in-filtration water, seal crack from top to bottom. Continue this process until the patch area is completely filled with GeoPlug water-stop.

Once area to be repaired is filled with putty, dust surface with dry GeoPlug water-stop mortar to set putty faster and assure leaking has completely stopped.

In hot weather above 85°F (30°C) GeoPlug water-stop will set faster and should be protected from heat. Use cold water to delay setting and give more working time.

GeoPlug water-stop has an ultra-low abrasion rate on hoses and equipment; they will last much longer, with fewer interruptions and remobilizations.

In cold weather below 50°F (10°C) GeoPlug water-stop may set slower. Warm unmixed GeoPlug powder and mix with warm water to accelerate set.

Excess material should be wiped off the repaired area while smoothing and blending the compound into the surrounding surface.

With a gloved hand Plug minor leaks first working from the edges. Place GeoPlug mix firmly into the crack or hole. For large opening, form compound into carrot shape, when firm, ram into cavity and the strike flush with surface.

CURING

No special curing process is required. Once material is hardened, curing will be complete in less than 5 minutes.

HEALTH & SAFETY

Before using GeoPlug water-stop, read the Safety Data Sheet (SDS) for safe use, health and physical hazard information. An SDS sheet was provide with the material when it was de-livered. GeoPlug water-stop, is a cementitious powder and may cause significant skin and eye irritation. Directions for treating these prob-lems are clearly listed on the SDS sheet. This sheet contains health and safety information for the protection of workers and customers.

GeoPlug powder when mixed with water will create an exothermic reaction that will generate significant heat.

The manufacture recommends that the SDS sheet be available at the work site at all times for access to these treatment solutions if need-ed. Use with adequate ventilation. Do not take internally. Keep out of reach of children.



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GT INVERT REPAIR

Geopolymer Mortar



WATER/WASTEWATER

GT Invert Repair Mortar is a high-performance fiber reinforced geopolymer material designed as a flowable fill for civil structures. This high-strength, ultralow porosity material is made from natural mineral polymers and industrial waste streams. GT Invert Repair Mortar can be pumped long distances and quickly sets to superior physical properties.

BENEFITS

- Provides physical properties associated with cement mortars, but with the chemistry similar to that of an engineered stone
- Prevents cold joints between layers from its unique chemical nature; compatible with GeoSpray geopolymer for structural pipe rehabilitation
- Extended working time while pumping
- Ideally suited for pipe invert paving and protection
- Safe and sustainable

TEST METHOD DURATION GT INVERT REPAIR

Compressive Strength ASTM C-39/C-109	1 Day 28 Days	Min. 5,000 psi / 34 MPa Min. 11,500 psi / 79 MPa
Flexural Strength ASTM C-78	7 Days 28 Days	750 psi / 5.2 MPa 1500 psi / 10.3 MPa
Bond Strength to Concrete ASTM C-882	28 Days	Min. 3,000 psi / 20 MPa
Set Time ASTM C-807 Initial Cure Time	Initial Set Final Set	35 - 50 Minutes 85 - 110 Minutes
Freeze Thaw Durability ASTM C-666	300 Cycles	100% Zero Loss
Shrinkage ASTM C-1090	28 Days	0.00% @ 65% R. H.
Tensile Strength ASTM C-496	28 Days	Min. 800 psi / 5.5 MPa

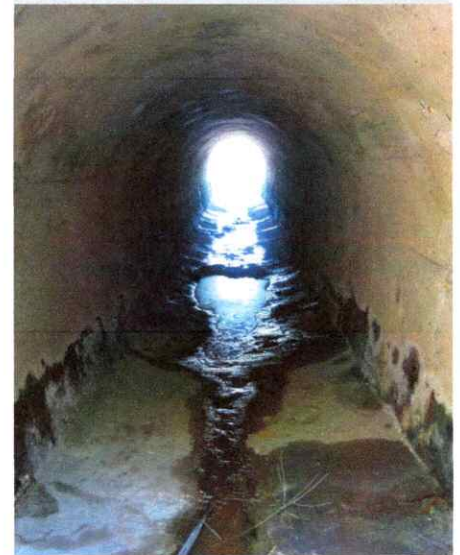
Data shown above reflects results in laboratory controlled conditions. Reasonable variation of data to be expected.

APPLICATIONS

- ♦ Sewers
- ♦ Culverts
- ♦ Pipes
- ♦ Channels
- ♦ Sediment Basins
- ♦ Tunnels

TYPICAL USES

GT Invert Repair geopolymer can be used for rehabilitation of pipes and structures in the Civil Infrastructure and Industrial Markets.



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GT INVERT REPAIR

Geopolymer Mortar



WATER/WASTEWATER

COMPOSITION

A proprietary micro-fiber reinforced ultra dense flowable geopolymer mortar designed for mechanical pumping GT Invert Repair.

CHARACTERISTICS

A dark grey mortar with near-zero porosity. Wet density of ~127 lbs/ft³ or 2035 kg/m³. Largest particle size: 3.0 mm.

YIELD AND COVERAGE

Yields 0.43 ft³ (0.012m³) per 50 lbs. For one 50lb bag, coverage is 10.3 ft² at a 0.5" depth (0.96m² per 12mm depth).

PACKAGING

GT Invert Repair is available in 50 lb (22.7kg) sealed bags or in 2,000 lb (908 kg) super sacks.

CLEANING AND PREPARATION

The surface shall be thoroughly cleaned. Use high-pressure water blasting with a minimum of 3500 psi (or as required by local provisions) to clean and free all foreign material including dirt, grit, roots, grease, sludge or other material that may be attached to the existing surface. All loose or defective brick, grout, or surface irregularities should be removed to provide an even surface prior to application of GT Invert Repair. When grease and oil are present, an approved detergent or muriatic acid shall be used integrally with the high pressure cleaning water. All materials resulting from the cleaning of the pipe shall be removed prior to application of GT Invert Repair.

MIXING

Do not exceed a 0.14w/c ratio. Always add GT Invert Repair to the water. Follow normal industry standards for batching and mixing.

WORK TIME

Working time is 20- 40 minutes at 80°F (27°C) if mixed continuously.

APPLICATION

GT Invert Repair should be pumped from a horizontal mix auger cavity via an adjustable rotor stator pump through a hose for delivery to the appropriate application device.

FINISHING

If necessary, troweling of materials can begin following the application. Initial troweling shall be in an continuous motion to compress the material into voids. Take precautions not to over trowel.

GT Invert Repair can be finished using a magnesium float, wood float, sponge float, broom or brush, depending on the surface texture desired. Do not use a steel trowel.

CURING

Optimum curing occurs in a moist and moderate environment. General underground conditions are usually adequate to meet this requirement. If dry and/or hot conditions are present, the use of a wind barrier and fogging spray will be required. During hot weather conditions, chilled water may be used to mix GT Invert Repair geopolymer. GT Invert Repair geopolymer material should be maintained at a temperature lower than 90°F (32°C). Standard industry practices may be used to maintain proper temperature.

Alternatively, GT Invert Repair should not be placed when the temperature in the curing environment is below 37°F (3°C). During cold weather conditions, heaters, thermal breaks, and other methods may be used to maintain temperature above that threshold. Refer to the GeoTree Cold Weather manual.

QUALITY CONTROL & MATERIAL TESTING

For each section length designated by the owner in the contract documents or purchase order, GT Invert Repair mortar will be collected at the end of the hose near the discharge point. Use 4" x 8" cylinders in accordance with Test Method ASTM C 39/39M.

HEALTH & SAFETY

GT Invert Repair is a cementitious powder, is alkaline, and may cause significant skin and eye irritation. Adequate health and safety precautions should be observed during all storage, handling, use and drying periods. For safety and health precautions, reference the current version of the Safety Data Sheet for GT Invert Repair. When using GT Invert Repair in a confined space or closed area, consult the current OSHA or ANSI bulletins on safety requirements. Do not take internally. If swallowed, call a physician immediately.

WARRANTY

GeoTree Solutions warrants this product to be free of defects in material and manufacturing. Should the product prove to be defective, the liability to GeoTree shall be limited to replacement of the product, ex-factory. GeoTree makes no warranties as to merchantability or fitness for a particular purpose. *This warranty is in lieu of all other warranties expressed or implied. Users should determine the suitability of the product for the intended use and assume all risk and liability in connection therewith.*

STORAGE

GT Invert Repair geopolymer should be stored in a cool, dry location. Stored under proper conditions, shelf life is one year.



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Before using any GeoTree product, the user must review the most recent version of the product's technical data sheet, safety data sheet and other applicable documents, available at www.geotreesolutions.com or by calling +1.855.655.6750.

FUNDAMENTALS OF SPRAY-APPLIED GEOPOLYMER LININGS

INDUSTRY
INSIGHTS

In the 2017 Infrastructure Report Card, the American Society of Civil Engineers (ASCE) issued a grade of D+ for the condition of the country's wastewater systems. ASCE classifies wastewater to include sewage treatment plants, sanitary sewer pipelines and collection systems, stormwater management and combined sewer overflows (CSOs). The aged and decaying state of wastewater systems is not only unique to the United States but is also a global concern. While many local and federal agencies around the world have begun to develop asset management plans for their wastewater systems, and thousands of pipeline rehabilitations are conducted annually, one area of key concern is large-diameter wastewater pipelines. Typical dig-and-replace technologies are often not practical because, in most urban areas, these degrading pipes are located directly under critical infrastructure such as major roadways or other assets. As the diameter of these pipes becomes larger (more than 36 inches), the cost of many traditional trenchless technologies like cured-in-place pipe (CIPP) becomes exponentially more expensive and often requires significant excavation around access points that present additional issues related to community disturbance, traffic control, noise and general disruption. Other techniques like slip-lining would require an even greater excavation diameter for an access hole to install new liners. Additionally, other issues related to either the shape (round, arched, elliptical) or the layout (straight, curved, bends of various radii) can make these repair technologies impractical.

During the last decade, additional trenchless technologies have been developed to help fill the need for larger diameter pipe repairs at effective costs — all with little or no excavation requirements and minimal community disruptions. One such technological advance is the use of centrifugally cast geopolymer mortars to create a new pipe inside of the existing pipe. This technique allows for a cementitious pipe to be created within the existing structure, using the pipe as a form, and can be designed so that a new and fully structural pipe is created. The flexibility of the technique allows for pipes of all shapes and layouts to be repaired either using automated mechanical casting or manually controlled material placement. The necessary equipment can easily fit down standard manholes and all excavation can typically be avoided if there are access points located at least every 800 linear feet.



ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

2017
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REPORT CARD



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FUNDAMENTALS OF SPRAY-APPLIED GEOPOLYMER LININGS

INDUSTRY INSIGHTS

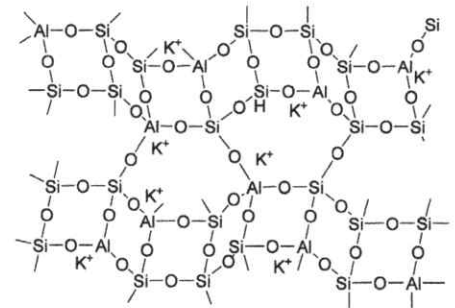
HISTORY OF GEOPOLYMERS

Geopolymer is a term originally coined by French researcher Joseph Davidovits to describe a class of “cement” formed from aluminosilicates. While ordinary portland cement (OPC) — the most common type of cement used in building and construction — relies on the absorption of water to create its strength, geopolymers cure by forming much stronger covalent bonds between the molecules in the presence of a basic or alkaline environment. Geopolymers are commonly referred to in the industry as “alkali-activated cement” or “inorganic polymer concrete.” Geopolymers provide comparable or better performance to OPC in terms of physical properties, such as compressive or tensile strengths, but with the added advantages of significantly reduced greenhouse emissions, increased fire and chemical resistance and reduced water utilization. The use of geopolymers in modern industrial applications has become increasingly popular based on their intrinsic environmental and performance benefits.

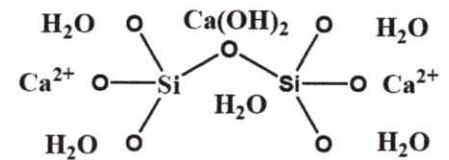
The structure of a geopolymer is a cross-linked inorganic polymer network consisting of covalent bonds between aluminum, silicon and oxygen molecules that form an aluminosilicate backbone with associated metal ions. The materials that react to form the geopolymer are also commonly referred to as pozzolanic materials. In contrast, OPC is a hydrated complex of small molecules that are not covalently bonded but associated and held by the hydrogen bonding power of the water molecule. This is done with no long chain covalently bonded backbone or network structure.

While there is no perfect test for determining that a geopolymer structure has formed, there is a simple rule of thumb that will ensure the material is not just a standard OPC. The complete mixture should contain at least 70 percent pozzolanic material. At this level of pozzolanic content, a standard OPC material would not adequately build strength. Typical pozzolanic molecules present are metal oxides such as Al_2O_3 , SiO_2 , MgO and Fe_2O_3 , among others.

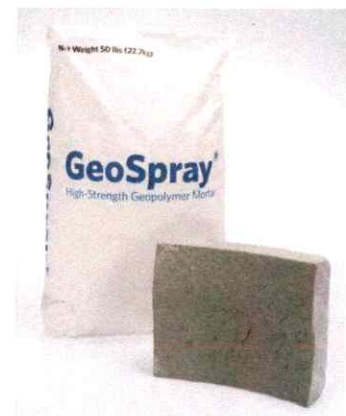
In 2011, GeoTree Solutions developed and introduced the first geopolymer mortar material specifically designed for trenchless wastewater rehabilitation: GeoSpray® geopolymer mortar. The development of geopolymers for large-scale industry-applicable systems required the creation of a “just add water” mixture that avoided the necessity of alkaline solutions used to create the proper reaction conditions. To date, more than 40 million pounds of GeoSpray mortar have been applied successfully around the world on more than 200 unique projects — totaling well over 100,000 linear feet of large-diameter pipelines.



Geopolymer structure of bonded network



Ordinary portland cement (OPC) chemistry with associated water molecules



GeoSpray geopolymer mortar was the first geopolymer mortar material designed for trenchless wastewater rehabilitation.

BENEFITS OF GEOPOLYMERS

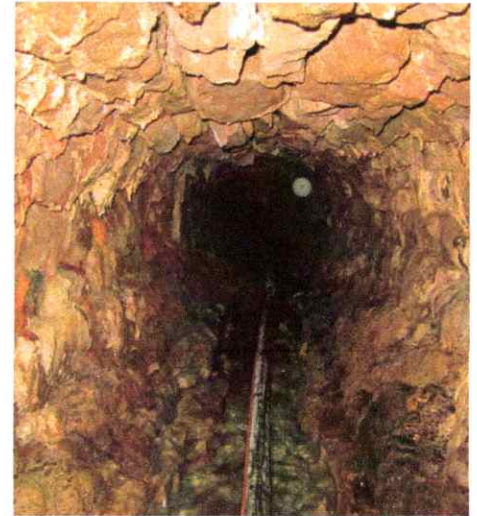
Geopolymer mortars provide some unique advantages when compared to OPC mortars or other trenchless technologies such as CIPP or slip-lining.

FLEXURAL STRENGTH

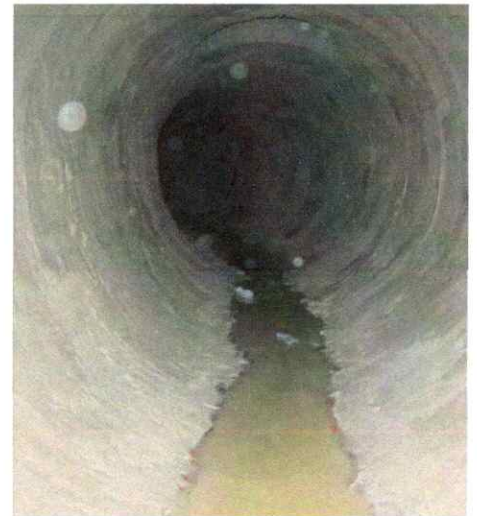
Geopolymers and other cementitious materials, such as OPC, are typically considered rigid liners when compared to CIPP or slip-lining, which are classified as flexible liners. These liners will be designed differently based on their failure modes. The failure mode of flexible liners is often buckling, while rigid liners like reinforced concrete pipes (RCPs) would fail by longitudinal cracking. The key design parameter of a rigid geopolymer lining would be flexural strength.

The covalently bonded network of a geopolymer helps the materials develop higher flexural strength values as compared to OPC materials. In addition, inorganic fibers can often be incorporated in the geopolymer formulation. These fibers react into the system and become part of the polymer backbone, providing further benefit to an enhanced flexural strength. A properly formulated and cured geopolymer material can have between 25-50 percent higher flexural strength compared to standard OPC formulations.

For cementitious materials, there are several standard test methods for flexural strength, so it is important that design engineers use the most conservative methods when providing design values. Methods that apply third-point loading, such as ASTM C78, give more conservative values and should be preferred as compared to center point loading methods, such as ASTM C293 or ASTM C348.



Brick sewer before geopolymer mortar application.



Rehabilitated sewer using GeoSpray mortar.

FUNDAMENTALS OF SPRAY-APPLIED GEOPOLYMER LININGS

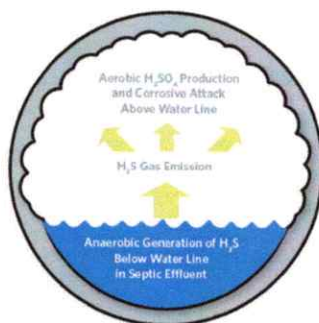
INDUSTRY INSIGHTS

SELF-BONDING & COLD JOINTS

One of the major drawbacks of standard OPC materials is the common formation of cold joints. Cold joints are undesired discontinuities between two layers of concrete that typically occur due to the inability of a freshly poured layer of wet cement to intermingle and bind with an already hardened layer. Geopolymer chemistry helps avoid this issue. The condensation reaction that forms the geopolymer backbone is really a living chemistry, and new layers of material will directly react with the existing pour materials no matter the amount of time between applications. Due to practical job site constraints, most geopolymer and OPC pipe linings are placed in multiple lifts. However, the unique chemical nature of GeoSpray geopolymer mortar helps ensure that those layers are intimately and chemically bonded, so they do not become the weak point of the structure as they do with OPC.

CHEMICAL RESISTANCE

In sanitary sewage environments, cementitious materials are susceptible to a degradation process known as microbial-induced corrosion (MIC), which might be referred to as H_2S corrosion. This is the typical cause for long-term failure of most existing large-diameter concrete sewer pipes. The H_2S gas emitted from the sewer effluent is digested by microbes to create sulfuric acid, which attacks unreacted calcium hydroxide in the cementitious material. OPC grouts contain between 2-5 percent of free calcium hydroxide, a byproduct of the manufacturing process, which remains unreacted after the concrete is cured. Geopolymers typically contain significantly less than 1 percent of the free calcium hydroxide, which makes them more chemically resistant to the corrosion process than OPC materials.



Mechanism of microbial-induced corrosion (MIC).



Day 0 | Day 1 | Day 7 | Day 14 | Day 28
GeoSpray geopolymer slant shear cylinders tested in compression don't have cold joints.



Day 0 | Day 1 | Day 7 | Day 14 | Day 28
Cylinders of common pipe rehab OPC product shear on the cold joint in all cases tested.



Day 0 | Day 81 | Day 0 | Day 81
OPC loses 50% of its mass when exposed to 7% sulfuric acid; geopolymer mortar is an order of magnitude better in performance.

FUNDAMENTALS OF SPRAY-APPLIED GEOPOLYMER LININGS

INDUSTRY INSIGHTS

ENVIRONMENTALLY FRIENDLY

Geopolymers have a variety of environmental advantages compared to a wide range of pipe rehabilitation technologies.

Geopolymer advantages include:

- Styrene-free
- Greater than 75 percent reduction in greenhouse gas emissions from raw material production
- A significant percentage of post-industrial waste streams

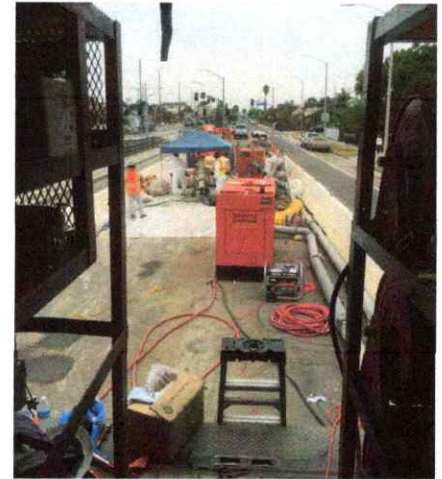
Additional trenchless advantages include:

- Minimal community disruption
- Little to no site excavation
- Greater than 50 percent reduction of greenhouse gas emissions from the installation process

RELIABLE

GeoTree Solution's GeoSpray geopolymer mortar has been tested, investigated or certified by a variety of independent consultants and governing bodies including:

- US Environmental Protection Agency (US EPA)
- Water Research Center (WRc) – WRc Approval
- Water Regulations Advisory Scheme (WRAS) – WRAS Approved
- Australian Water Quality Centre – AS/NXS 4020: 2005 Drinking Water Contact
- Certified NSF/ANSI 61 Section 5 & NSF/ANSI 372 Drinking Water Certifications for pipes greater than 6" diameter or tanks greater than 300 gallons
- More than 20 explicitly approved product listings (APL) for Departments of Transportation (DOTs) and local municipalities



Example geopolymer installation project site. View from truck.

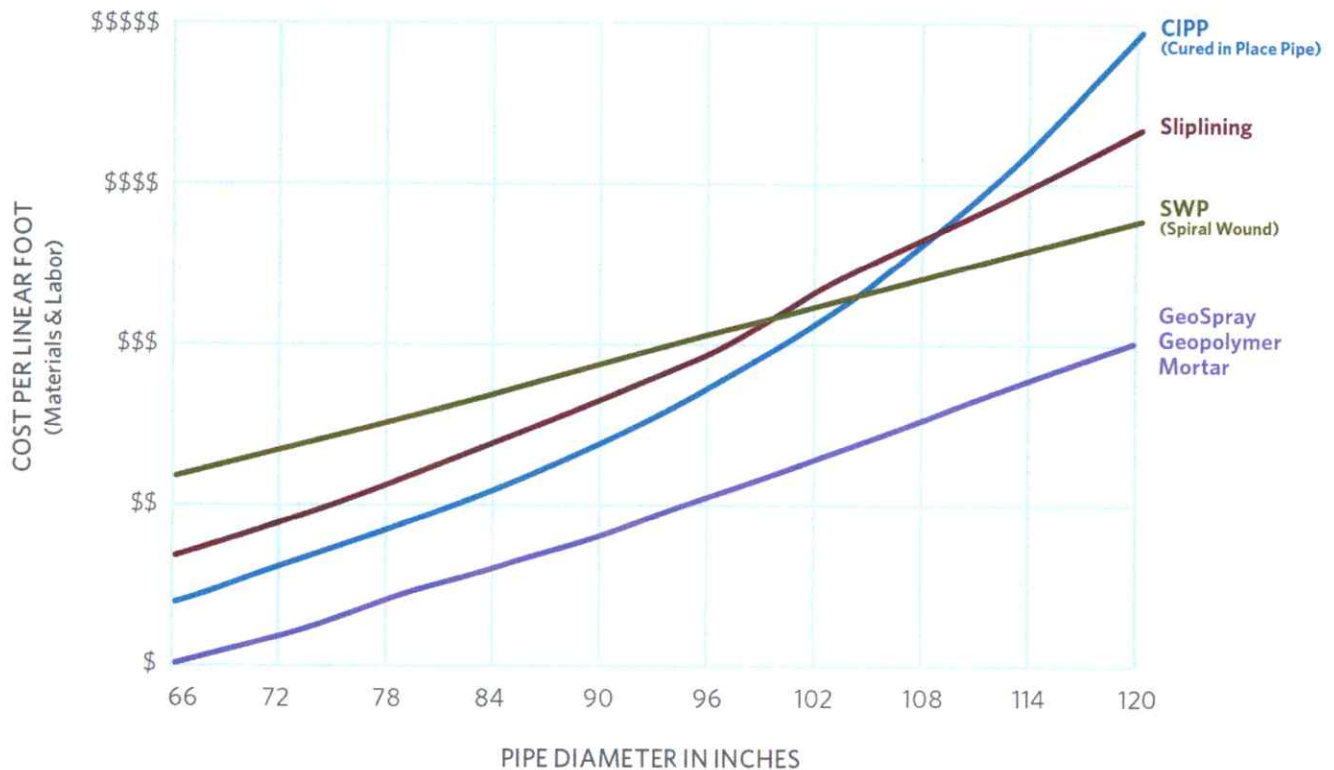


FUNDAMENTALS OF SPRAY-APPLIED GEOPOLYMER LININGS

INDUSTRY INSIGHTS

COST

It has been well-established that the cost of trenchless technologies (where a pipe can be repaired instead of replaced) is significantly lower than dig and replace options in most urban environments. Estimates suggest that trenchless technologies of any kind have between a 50-70 percent advantage over the cost of open-trench solutions. Among trenchless technologies, spray-applied geopolymer linings are often the most cost-effective method for wastewater pipes with greater than a 48" diameter. Geopolymers may also offer an advantage in smaller diameters based on specific site details. As the pipe diameter increases, the cost of repairs dramatically increases due to the cost of materials and labor required to clean, prepare and repair the pipe. Spray-applied geopolymer linings can often be between 20-50 percent less expensive in comparison to CIPP, the market's leading solution for pipes larger than 60".



FUNDAMENTALS OF SPRAY-APPLIED GEOPOLYMER LININGS

INDUSTRY INSIGHTS

GEOPOLYMER LINING APPLICATIONS

To date, spray-applied geopolymer linings have been used in a myriad of applications, including:

- Host Pipe Sizes: 24" diameter to greater than 18' diameter
- Host Pipe Materials: Brick, Stacked Stone, Reinforced Concrete (RCP), Unreinforced Concrete, Corrugated Metal (CMP), HDPE, Steel, and Aluminum Plate
- Host Pipe Shape: Boxes, Arches, Egg-Shaped, Elliptical, Round
- Host Pipe Applications: Sanitary, Storm, Culverts, Manholes, Drinking Water, Industrial, Gravity, Force Main
- Host Pipe Features: Size changes, non-round, bends or curves any angle, missing inverts, less than 20 percent deflected

GEOPOLYMER APPLICATION PROCESS:

Prior to the spray application of a geopolymer lining, the host pipe is cleaned in place, typically with high-pressure water-blasting of 3,500 psi or more. To ensure adhesion of the geopolymer to the damaged substrate, it is sometimes necessary to perform an additional cleaning with an environmentally friendly detergent to remove excess oil and grease from the existing pipe walls. If there are large leaking holes, the pipe can be plugged with a thin application of a plugging compound, hydraulic cement or chemical grout. Active water flow should be stopped.

The geopolymer mortar is usually centrifugally cast from atop a sled, which is slowly removed from the pipe to provide a uniform application. Typical application thicknesses range between 1-3" (25-75 mm), depending on the type of pipe, local soil and water conditions, current condition of the existing pipe and the design life requirements of the pipe in question. Hand-spray application for difficult-to-reach areas, host pipes greater than 10' in diameter and non-round shapes are common circumstances as well

QUALITY CONTROL:

Geopolymer mortar applications typically have three levels of quality control:

- Internal manufacturing test of raw material quality and final physical property testing
- Field verification of compressive strength by certified third-party independent test labs
- Installer lead verification of application thickness



CMP culvert



Brick culvert



Concrete culvert



Manhole

FUNDAMENTALS OF SPRAY-APPLIED GEOPOLYMER LININGS

INDUSTRY INSIGHTS

ENGINEERING METHODOLOGY

Multiple third-party external firms, universities and research centers have tested and evaluated field-applied geopolymer liners. More than 60 lined pipe samples have been tested to failure to determine an appropriate engineering design methodology for the proper structural thickness and design life. These studies have been through a rigorous peer-reviewed process. All standalone structure applications using GeoSpray geopolymer mortars are designed using this conservative approach.

CONCLUSION:

Spray-applied geopolymer mortar linings are quickly becoming the preferred structural rehabilitation technology for large-diameter pipeline repairs. With a significant advantage over traditional OPC materials and other trenchless methods, geopolymer repairs might just be the ideal solution for your wastewater rehabilitation needs.

If you are not sure or need more information to determine if spray-applied geopolymer mortar linings are the right choice for your project, GeoTree Solutions engineers are available to answer any questions and concerns. Contact us via our website, geotreesolutions.com, or by calling 855-655-6750.



Published papers are available upon request.



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A Sampling of Case Studies for GeoSpray Geopolymer - Manhole Applications

Document Description

The information provided in this document package is intended for confidential consideration by the Owner or the Engineer as identified in the project plans and specifications. The information provided herein is an accurate representation of typical performance of GeoSpray Geopolymer Mortar used for Large Diameter Pipe and Manhole Rehabilitation and is updated periodically. The information provided is not exhaustive and may be supplemented as deemed appropriate by the reviewer at the reviewers request.

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GEOSPRAY®

Geopolymer Mortar



CASE STUDY:

Garyville, LA Industrial Manhole Rehabilitation

PROJECT OVERVIEW

A southeastern US oil refinery decided to evaluate the condition of its process sewer manholes at one of its refinery sites. Refinery officials discovered the leaks while conducting a routine five year inspection of the process sewer line. Inspection results revealed that many of the manholes and catch basins had begun to leach where the trunk lines entered these structures.

After conducting an initial assessment of the most critical areas, it was determined the primary source of the leaks were coming from poorly sealed annular space around the pipes where they penetrated into the manholes. Although not all the manholes appeared to be leaking, the owner proactively chose to have all of them thoroughly inspected and repaired as necessary.

REPAIR OPTIONS

1. Epoxy Spray Lining

The use of an epoxy system meant extended downtime to clean and dry the manholes prior to application of the epoxy. With these systems, the manhole needs to be dry to avoid delamination and failure of the spray lining.

2. Dig & Replace

Several attempts had been made to dig and replace the manholes. The cost, downtime and effort far exceeded the expectations and was more disruptive to plant operations than a trenchless solution.

3. GeoSpray Spray Lining

The use of a geopolymer lining that could be centrifugally cast, hand sprayed or troweled. The preparation time for the manhole rehab was reduced since a simple jet cleaning and then immediate application of the liner could be completed. There was no need to wait for the manhole to dry.

SOLUTION

The GeoSpray mortar liner was selected due to speed of application, chemical resistance and the ability to provide a long-term structural solution.

All manholes were washed and several required an acid bath to remove chemical build-up. All voids and excessive annular space was filled with an hydraulic cement or non-cementitious grout to stop leaks and infiltration.

The GeoSpray mortar was applied using a 5000 rpm rotary spinner. Although a one-inch thick application would provide a fully structural repair, the client chose a 1.5-inch thick lining to extend the life of the manholes.

PROJECT DETAILS

Location: Garyville, LA

Application: Industrial Manhole Rehabilitation

Client: US Oil Refinery

Installation: Summer 2013

Installer: Inland Pipe Rehabilitation



Completed manhole ready for service after eight hours.



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CASE STUDY:

Garyville, LA Industrial Manhole Rehabilitation

RESULTS

The manholes were put back into service within 24 hours of cleaning and application. A total of over 700 manholes were rehabilitated with additional catch basins repaired as well.



Manhole renewed with GeoSpray geopolymer.



Centrifugal spraying of GeoSpray geopolymer.



Hand spraying of GeoSpray mortar in catch basin.



One of several hundred leaching and deteriorated manholes.



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CASE STUDY: Arlington National Cemetery Manhole Lining

PROJECT OVERVIEW

The US Army Corps of Engineers (USACE) is responsible for the maintenance and operation of utilities at Arlington National Cemetery directly on the banks of the Potomac River in Arlington, VA. USACE is currently engaged in a multiyear, multi-phase project to rehabilitate and upgrade the storm water system that handles water and drainage throughout the solemn national landmark.

The cemetery has been in operation since 1864, and while the plan for land usage at the site today is very detailed and organized, this has not always been the case. Determining the exact location of sewer assets, and evaluating their condition, is a complex process in planning for rehabilitation. Additionally, because there are on average 25 to 30 funerals and interments each day, during which no construction can be conducted, repair efforts are further complicated.

SOLUTION

The USACE had originally specified a spiral wound product for a 300 linear foot section of pipe that on the original drawings was round with few complications. Once the pipe was inspected, it was determined that there were several junction boxes and other concerns that made a spiral wound solution less desirable. After evaluating alternatives, it was determined that lining with a geopolymer was a good option. USACE changed the specification and allowed for the application of GeoSpray geopolymer mortar for the pipes, junction boxes, and 200 vertical feet of manholes and other structures. USACE had already installed the project with good success in other military applications including a project at Fort Bragg in 2015. Inland Pipe Rehab was awarded a subcontract for pipe bursting, geopolymer pipe lining and a portion of new construction work during phase two of the project.

RESULTS

The GeoSpray geopolymer lining was installed at night to avoid any disruption to the public or the operations of the cemetery while also adhering to detailed government regulations. Over a two week period, all of the pipe lining, manholes and junction boxes that were part of the project phase were completed. Further opportunities for use of GeoSpray with USACE are being evaluated for trenchless rehabilitation of military and other government assets.

PROJECT DETAILS

Location: Arlington National Cemetery, Washington, D.C.

Client: Army Corps of Engineers

Installation: May 2016

Installer: Inland Pipe Rehab, LLC



Determining the exact location of sewer assets and evaluating their condition is a complete process in planning for rehabilitation.



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WATER / WASTEWATER

CASE STUDY: Arlington National Cemetery Manhole Lining



Existing cement manhole.



Spin head applying GeoSpray manhole lining.



Completed manhole lining with GeoSpray.



Above ground work on 36" RCP rehabilitation.



Existing RCP pipe with initial patches to stop active infiltration.



Completed RCP rehab with GeoSpray geopolymer lining.



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Geopolymer Mortar



CASE STUDY: Cheektowaga, NY Manhole Rehabilitation

PROJECT OVERVIEW

The town of Cheektowaga began rehabilitating its manholes by trying out an assortment of products in extremely dry conditions. The township found that Ordinary Portland Cement (OPC) and Calcium Aluminate Cement (CAC) liners were prematurely cracking only hours after installing the lining. After testing GeoSpray geopolymer, which did not crack, the town decided to specify GeoSpray mortar on future manhole projects

SOLUTION

GeoTree Solutions reached out to the township's design engineer and suggested using GeoSpray geopolymer, which is less sensitive to cracking in dry manhole conditions. Compared to OPC linings, GeoSpray geopolymer has about double the compressive strength (8000 psi) and about triple the flexural strength (1500 psi). This added strength, coupled with its resistance to sulfuric acid corrosion often found in sanitary sewer systems, gives the geopolymer mortar a 70- to 100-year life cycle.

The town engineer decided to test out a pilot study with a truckload of GeoSpray geopolymer mortar to line about 700 vertical linear feet. MIS provided technical assistance to the township and the installation contractor National Water Main Cleaning Company (NWMCC) powerwashed the manhole, mixed the GeoSpray mortar and pumped it down into the hole to apply it with a handheld spray nozzle.

"GeoSpray geopolymer mortar has a noticeable product consistency and quality that my crew and I appreciated during the project," said Dennis Sullivan, Vice President and General Manager of NWMCC.

RESULTS

GeoSpray mortar went on quickly and easily and did not crack. The township was pleased with the pilot application and specified GeoSpray mortar on a 5000 vertical linear foot manhole 2018 project, which NWMCC will install this summer.

"This product's unique, user-friendly application characteristics lead to efficiency in the field," said Sullivan. "These characteristics make it a preferred product on certain future projects."

PROJECT DETAILS

Location: Cheektowaga, NY

Application: Manhole Rehabilitation

Client: Town of Cheektowaga

Installation: October 2017

Installer: National Water Main Cleaning Company (NWMCC)



Completed manhole rehabilitation.



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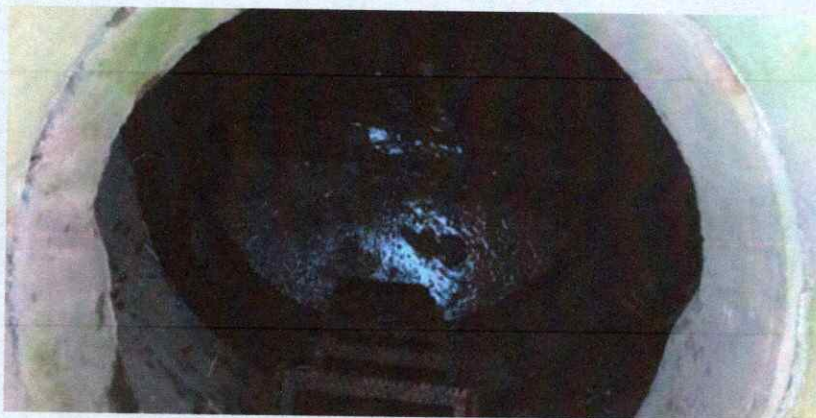
GEOSPRAY[®]

Geopolymer Mortar

WATER / WASTEWATER

CASE STUDY:

Cheektowaga, NY Manhole Rehabilitation



Concrete manhole prior to rehabilitation.



Brick manhole prior to rehabilitation.



Typical manhole application in right-of-way with tripod set up.



GeoSpray mixed and prepared to send for application.



Completed manhole rehabilitation.



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GEOSPRAY®

Geopolymer Mortar



CASE STUDY: Washington, D.C. Manhole Rehabilitation

PROJECT OVERVIEW

DC Water engineering had identified a route along Kingle Road in Washington, D.C., where the sewer pipe was in need of rehabilitation. Though the pipe diameter was below the threshold for standard application parameters for a spray lining, the client specified the use of a geopolymer for the manhole rehabilitation portion.

The 72" (1830mm) diameter manholes to be repaired were brick and had suffered deterioration, resulting in cracked and missing mortar, leaks and water infiltration, and several were in structural distress.

Inland Pipe Rehab was selected as the contractor for the CIPP portion of the pipe repair and applying the GeoSpray geopolymer material.

SOLUTION

The GeoSpray geopolymer was specified for several reasons:

- Superior microbial-induced corrosion resistance experienced in sanitary sewer environments compared to OPC materials
- Proven field performance in manhole rehabilitation without cracking that can be experienced with CAC products
- Superior flexural and tensile properties
- Reduced time for surface preparation and compared to epoxy or polyurethane-based solutions

The GeoSpray mortar was applied using a vertical centrifugal spinning system. Voids in the brick manholes were first repaired with a hydraulic cement. Where necessary, a chemical grout was first injected to stop any running water infiltration through the voids. A 1" (25mm) thick application was applied to create a structural repair.

RESULTS

The project was completed on time and within budget.

PROJECT DETAILS

Location: Washington, D.C., USA

Application: Municipal Pipe and Manhole Rehabilitation

Client: DC Water

Installation: March 2017

Installer: Inland Pipe Rehab, LLC



Like-new manhole and bench after GeoSpray mortar application.



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GEOSPRAY®

Geopolymer Mortar

WATER / WASTEWATER

CASE STUDY: Washington, D.C. Manhole Rehabilitation



Completed manhole.



Manhole prior to spraying.



Start of GeoSpray mortar application.



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GEO SPRAY®

Geopolymer Mortar



CASE STUDY:

Manhole Rehabilitation Inman, SC

PROJECT OVERVIEW

The Dewey Plant has been producing textile chemicals, colorants and other specialty compounds since 1969, and the plant has been expanded several times over that same period. The facility has a series of chemical sewers that collect and direct waste chemical solutions for treatment and processing. In 2000, the plant installed HDPE piping as a repair mechanism for many of these sewer lines.

Unfortunately, the high temperatures (200F+) of the industrial waste that enters these sewers caused the HDPE pipes and manhole liners to expand and contract, causing potential environmental concerns. The plant was looking to repair the system, prevent the HDPE from expanding and ensure ongoing proper environmental controls.

SOLUTION

In 2016, the plant began the combined UV and glass reinforced pipe (GRP) rehab and GeoSpray mortar projects in two phases. In the first stage, two 12 -inch pipes of approximately 300 feet in combined length were lined with a glass reinforced, UV-cured felt liner. Additionally, GeoSpray mortar was applied in one 60" x 96" manhole. The objectives were to place the two rehab materials into hostile operating conditions for a monitoring period and to isolate and prevent expansion of the existing HDPE network. After the UV GRP materials were carefully installed and fully cured, the manhole was steam-cleaned and coated with GeoSpray to effectively seal the system.

Production for Stage 2 began in June 2017. Upon inspection of the UV GRP liners and GeoSpray, it was clear that both solutions had performed very well and the decision was made to completely rehab the existing HDPE waste system. During the next 45 days, more than 1,700 linear feet of 12" - 36" HDPE pipe were lined, and 19 manholes were cleaned and coated with GeoSpray geopolymer.

"Engineered Lining Systems, in cooperation with 3R, did an excellent job and worked well with each other to complete the project on time. I would highly recommend the use of these two companies in any future pipe cleaning, pipe-lining or coating projects at other plants. This team worked together to bring this project in on time and on budget with no safety or environmental issues," said Michael Thomas, Senior Production/Process Improvement Technologist at Milliken Chemical.

PROJECT DETAILS

Location: Inman, SC

Application: Manhole Rehabilitation

Client: Milliken Chemical

Installation: November 2017

Installer: Engineered Lining Systems



Equipment requires minimal space for manhole rehabilitation using GeoSpray mortar.



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Geopolymer Mortar



CASE STUDY:

Manhole Rehabilitation Inman, SC

RESULTS

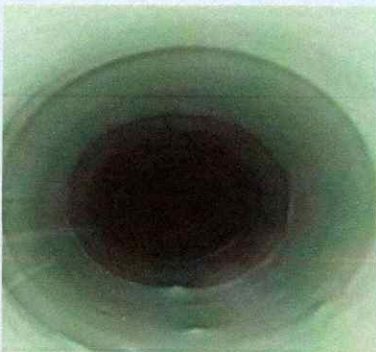
The installation of the UV GRP liners and the coating of all the affected manholes were completed over a 45-day period. The Dewey plant remained open the entire time at full production levels. The facility now has a safety sealed chemical sewer that is resistant to the extreme temperatures often seen during plant operation.



Cleaned 36" pipe.



36" folded liner pulled in place.



Finished 36" UV cured liner.



Equipment set up for manhole repair.



Rehab of manhole.



Completed manhole repair.



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GEOspray[®], GEOspray[®] 61, GEOspray[®] HCE, GEOstrong[™], GEOROC[®] GEOPOLYMER MORTARS

Section 1. Product and Company Identification

Product Name: GeoSpray[®], GeoSpray[®] 61, GeoSpray[®] HCE, GeoStrong[™] & GeoRoc[®] Geopolymer Mortars

Supplier: GeoTree Solutions | 1733 Majestic Rd, Suite 101, Lafayette, CO 80026 | +1 855.655.6750

Emergency Phone Number: 800.424.9300 (CHEMTREC)
+1 703.741.5970 (Outside the US)

Product Description: Geopolymer cements intended for structural rehabilitation of sewers, storm and water piping, concrete and other infrastructure

Product Use: Repairs

Chemical Name or Synonym: N/A

Section 2. Hazards Identification

Classification of the substance or mixture

Skin Corrosion/irritation – Category 2
Sensitization/skin – Category 1B
Eye damage/irritation – Category 1
Carcinogenicity – Category 1
Specific target organ toxicity (single exposure) – Category 3
Specific target organ toxicity (repeated exposure) Category 1

Label Elements:



Hazard Statements:

H315 – Causes skin irritation
H317 – May cause an allergic skin reaction
H318 – Causes serious eye damage
H335 – May cause respiratory irritation (Inhalation)
H350 – May cause cancer (Inhalation)
H372 – Causes damage to organs (lung) through prolonged or repeated exposure (inhalation)

Signal Word: Danger

Precautionary Statements:

P264 – Wash hands and forearms thoroughly after handling
P304+P340 –IF INHALED”” Remove person to fresh air and keep comfortable for breathing.
P302+P352 IF ON SKIN: Wash with plenty water.
P333+P313 If skin irritation or rash occurs: Get medical advice/attention
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308+P313: If exposed or concerned: Get medical advice/attention.



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Section 3. Composition/ Information on Ingredients

Chemical Name	CAS-No	Weight %
Crushed Stone or Gravel	N/A	40-60%
Metal Slag	65996-69-2	<20%
Portland Cement	65997-15-1	<15%
Fly Ash	68131-74-8	<15%
Crystalline Silica	14808-60-7	<20%

Section 4. First Aid Measures

First Aid Measures for Accidental:

Inhalation: If breathing is difficult, give oxygen. Get medical attention if any discomfort continues.

Ingestion: If swallowed, rinse mouth with water (only if the person is conscious). Get medical attention if any discomfort continues.

Eye contact: In the event of contact with the eyes, rinse thoroughly with clean water. Continue to rinse for at least 15 minutes and seek medical attention.

Skin contact: Wash the skin immediately with soap and water. Take off immediately all contaminated clothing. If skin irritation or an allergic skin reaction develops, get medical attention.

Most important symptoms/effects, acute and delayed:

Inhalation: Dust irritates the respiratory system and may cause coughing and difficulties in breathing.

Eye contact: Dust may be irritating to the eyes and respiratory tract and may cause a low-level inflammatory response in the lungs. Not known to cause permanent injury to eye tissue.

Skin Contact: Severely irritating to skin. Frequent or prolonged contact may defat and dry the skin, leading to discomfort and dermatitis. Prolonged or repeated skin contact may cause drying, cracking, or irritation.

Ingestion: Ingestion may cause severe irritation of the mouth, the esophagus and the gastrointestinal tract.

Indication of immediate medical attention and special treatment needed: Treat symptomatically.

Section 5. Fire Fighting Measures

Suitable Extinguishing Media: Water fog. Alcohol resistant foam. Dry chemical. Carbon dioxide or dry powder.

Unsuitable Extinguishing Media: No data available

Special Fire Fighting Procedures: Wear complete firefighting gear and self-contained breathing apparatus to protect against potential harmful and/or irritating fumes. Use water to keep fire exposed containers cool. Do not use high volume water jet on the fire as this may spread the area of the fire.

Special Protective Equipment for Fire-fighters: Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.

Specific Hazards Arising from the substance or mixture: No data available

Section 6. Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures: Wear appropriate personal protective equipment. The risk of inhalation of dust must be minimized as much as possible.

Environmental Precautions: Material should not be released into the environment. Prevent product from entering drains.



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Methods and Materials for Containment and Cleaning Up: Dam and absorb spillages with sand, earth or other non-combustible material. Ensure that waste and contaminated materials are collected and removed from the work area as soon as possible in a suitably labeled container. All waste materials should be packaged, labeled and transported in accordance with all national, state/provincial, and local requirements.

Section 7. Handling and Storage

Precautions for safe handling: No specific hygiene procedures noted, but good personal hygiene practices are always advisable, especially when working with chemicals. Wash promptly with soap and water if skin becomes contaminated. Practice good housekeeping. Avoid conditions which create dust.

Conditions for safe storage including any incompatibilities: Keep containers tightly closed. Store in a cool, dry place with adequate ventilation. Keep away from incompatible materials, open flames, and high temperatures.

Section 8. Exposure Controls / Personal Protection

Control Parameters (Exposure Limits): No Data Available

Appropriate Engineering Control: Ventilation must be adequate for most operations. Protection against nuisance dust must be used when the general level exceeds 10 mg/m³.

Personal Protective Equipment:

Respiratory Protection: Wear dust masks in dusty areas. If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn.

Eye / Face Protection: Wear necessary protective equipment. Avoid contact with eyes and prolonged skin contact.

Skin Protection: Wear suitable protective clothing as protection against splashing or contamination. Wash promptly with soap and water if skin becomes contaminated. Protective gloves should be used if there is a risk of direct contact or splash. Chemical resistant gloves are recommended. If contact with forearms is likely wear gauntlet style gloves. Wear rubber boots. Wear appropriate clothing to prevent repeated or prolonged skin contact.

Hygiene Measures: Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Additional protective measures:

Section 9. Physical and Chemical Properties

Physical State:	Solid, Powder
Colour:	Grey
Odor:	None
Melting Point/ Freezing Point:	No data available
Boiling point:	No data available
Flammability (solid, gas):	No data available
Lower and Upper Explosion limits/	



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Flammability Limits:	No data available
Flash Point:	No data available
Auto-ignition Temperature:	No data available
Decomposition Temperature:	No data available
pH:	10-13 Aqueous suspensions
Kinematic Viscosity:	No data available
Solubility:	No data available
Evaporation rate (ether=1):	No data available
Flammability Limits in Air:	No data available
Solubility in other solvents:	No data available
Partition coefficient (n-octanol/water):	No data available
Vapour Pressure:	No data available
Density and/or Relative Density:	No data available
Relative Vapour Density:	No data available
Specific Gravity:	No data available
Particle Characteristics:	No data available

Section 10. Stability and Reactivity

Reactivity: No dangerous reaction known under conditions of normal use.

Chemical Stability: Stable under normal conditions.

Possibility of Hazardous reactions: Product reacts with water and will generate heat.

Conditions to Avoid: No data available

Incompatible Materials / Chemicals: No data available

Hazardous Decomposition Products: No data available

Section 11. Toxicological Information

Information in the likely route of exposure:

Potential Acute Health Effects:

Skin contact: Irritating to skin.

Eye contact: Irritating to eyes.

Symptoms related to the physical, chemical and toxicological characteristics:

Target organs: No data available

Mutagenicity: No data available

Carcinogenicity: May cause cancer (Inhalation)

Reproductive Toxicity: No data available

Teratogenicity: No data available

Specific Target Organ Toxicity - single exposure (STOT-se): May cause respiratory irritation (Inhalation).

Specific Target Organ Toxicity - repeated exposure (STOT-re): Causes damage to organs (lung) through prolonged or repeated exposure (inhalation).

Over-exposure signs / symptoms: No data available

Delayed and immediate effects and also chronic effects from short and long-term exposure:

Short term exposure: No data available.

Long term exposure: No data available



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Numerical measures of toxicity: No data available

Section 12. Ecological Information

Ecotoxicity: No determined

Persistence and degradability: No determined

Bioaccumulative potential: This substance is not considered to be persistent, bioaccumulating nor toxic (PBT).

Mobility in soil: No determined

Other adverse effects: No determined

Section 13. Disposal Considerations

Waste treatment methods: Dispose of waste at an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Uncleaned packaging: Do not re-use empty containers for food, clothing, or products for human or animal consumption, or where skin contact can occur. Dispose of container and unused contents in accordance with federal, state, and local regulations.

Section 14. Transport Information

ADR: Not dangerous goods

IATA: Not dangerous goods

IMDG: Not dangerous goods

RID: Not dangerous goods

Section 15. Regulatory Information

Safety, health and environmental regulations/legislation specific for the substance or mixture

USDOL-OSHA Hazard Communication Rule, 29 CFR 1910.1200: Ready mix concrete/cement/geopolymer is considered a hazardous chemical and should be part of any hazard communication program.

SARA (Title III), Sections 311 and 312: Ready mix concrete/cement/geopolymer qualifies as a hazardous substance with delayed health effects.

TSCA inventory list: Substances in Ready Mix Concrete/cement/geopolymer are on the TSCA inventory list.

Federal Hazardous Substance Act (USA): Ready mix concrete/cement/geopolymer is considered a hazardous substance under the Federal Hazardous Substance Act.

California Proposition 65: This product contains chemicals (trace metals) known to the State of California to cause cancer, birth defects, or other reproductive harm. California law requires the manufacturer to give the above warning in the absence of definitive testing to prove the defined risks do not exist.

SAFETY DATA SHEET



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Hazardous Products Act: Portland cement is considered to be a hazardous material under the Hazardous Products Act as defined by the Controlled Products Regulations and is therefore subject to the labeling and MSDS requirements of the Workplace Hazardous Materials Information System (WHMIS)

This product has been classified in accordance with the hazard criteria of the CPR and the SDS contains all the information required by the CPR.

Candidate List of Substances of Very High Concern for Authorization: This product does not contain substances of very high concern (Regulation (EC) No 1907/2006 (REACH), Article 57).

Major Accident Hazard: 96/82/EC Update: 2003

Legislation: Directive 96/82/EC does not apply

Notification status:

US. TSCA: On TSCA Inventory

DSL: This product contains the following components listed on the Canadian NDSL list. All other components are on the Canadian DSL list.

AICS: Not in compliance with the inventory

NZIoC: Not in compliance with the inventory

ENCS: On the inventory, or in compliance with the inventory

KECI: Not in compliance with the inventory

PICCS: Not in compliance with the inventory

IECSC: On the inventory, or in compliance with the inventory

Section 16. Other Information

Key Legend Information:

CAS – Chemical Abstracts Service

OSHA – Occupational Safety and Health Administration

NIOSH – National Institute for Occupational Safety and Health

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Supersedes: 1.0

Version: 1.1

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Before using any GeoTree product, the user must review the most recent version of the product's technical data sheet, safety data sheet and other applicable documents, available at www.geotreesolutions.com or by calling +1.855.655.6750



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 Kansas City, KS. 66105
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Raven® 405

Technical Data Sheet

Selection & Specification Data																																													
<p>Description</p> <p>Raven® 405 is a 100% solids, ultra-high build, solvent free epoxy coating formulated with exceptionally high physical properties and chemical resistance. 405 exhibits a superior bond to dry and damp concrete, masonry, steel, ductile iron and fiberglass and is specifically designed as a corrosion protection and structural enhancement lining system which can be used on and in wastewater structures, buried pipelines, tanks, and other corrosive environments.</p> <p>Typical Uses</p> <p>Severe Wastewater Environment—New or existing concrete and steel structures where rehabilitation of an existing structure requires enhancement of the structural integrity and where exposure to concentrated acids and caustics may be expected.</p> <p>Color & Stability (Limitations)</p> <p>The Part A Resin is white; the Part B Curing Agent is blue. When mixed the product is light blue. Limited special colors are available on request. Discolorations and yellowing can and will occur upon exposure to UV (exterior applications). Discoloration or down-glossing does not affect performance.</p> <p>Theoretical Coverage Rates</p> <p>Theoretical coverage is 1604 square feet per gallon at 1 mil DFT. Actual surface coverage will depend on substrate porosity and roughness. A wet film thickness gauge or pump stroke counter may be used to determine actual coating coverage.</p>	<p>Dry Film Thickness</p> <p>Recommended thickness will vary from 30 – 250+ mils per coat based on service conditions.</p> <p>Recommended Dry Film Thickness (Typical)</p> <table> <tr> <td>Concrete, New/Smooth:</td> <td>80-250+ mils DFT.</td> </tr> <tr> <td>Concrete, Rough:</td> <td>100-250+ mils DFT.</td> </tr> <tr> <td>Concrete, Resurfaced:</td> <td>80-250+ mils DFT.</td> </tr> <tr> <td>Masonry/Brick:</td> <td>125-250+ mils DFT.</td> </tr> <tr> <td>Masonry/Brick, Resurfaced:</td> <td>80-250+ mils DFT.</td> </tr> <tr> <td>Steel (Carbon):</td> <td>30-80 mils DFT.</td> </tr> <tr> <td>Non-Ferrous Metals:</td> <td>30-80 mils DFT.</td> </tr> </table> <p>Physical Properties (Typical) Independent Testing</p> <table border="1"> <thead> <tr> <th>Test</th> <th>Method</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Tensile Strength</td> <td>ASTM D638</td> <td>>9,000 psi</td> </tr> <tr> <td>Tensile Elongation</td> <td>ASTM D638</td> <td>>6%</td> </tr> <tr> <td>Compressive Strength</td> <td>ASTM D695</td> <td>>17,500</td> </tr> <tr> <td>Flexural Strength</td> <td>ASTM D790</td> <td>>14,500</td> </tr> <tr> <td>Hardness, Shore D</td> <td>ASTM D2240</td> <td>87</td> </tr> <tr> <td>Taber Abrasion, CS-17 wheel</td> <td>ASTM D4060, 1 kg load/1,000 cycles</td> <td>57</td> </tr> <tr> <td>Adhesion, Steel</td> <td>ASTM D4541</td> <td>>2,500 psi</td> </tr> <tr> <td>Adhesion, Concrete</td> <td>ASTM D7234</td> <td>Substrate Failure</td> </tr> <tr> <td>VOC</td> <td>Calculated</td> <td>0 g/L</td> </tr> </tbody> </table>	Concrete, New/Smooth:	80-250+ mils DFT.	Concrete, Rough:	100-250+ mils DFT.	Concrete, Resurfaced:	80-250+ mils DFT.	Masonry/Brick:	125-250+ mils DFT.	Masonry/Brick, Resurfaced:	80-250+ mils DFT.	Steel (Carbon):	30-80 mils DFT.	Non-Ferrous Metals:	30-80 mils DFT.	Test	Method	Result	Tensile Strength	ASTM D638	>9,000 psi	Tensile Elongation	ASTM D638	>6%	Compressive Strength	ASTM D695	>17,500	Flexural Strength	ASTM D790	>14,500	Hardness, Shore D	ASTM D2240	87	Taber Abrasion, CS-17 wheel	ASTM D4060, 1 kg load/1,000 cycles	57	Adhesion, Steel	ASTM D4541	>2,500 psi	Adhesion, Concrete	ASTM D7234	Substrate Failure	VOC	Calculated	0 g/L
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Surface Preparation							
<p>General</p> <p>Prior to coating, the substrate must be prepared in a manner that provides a uniform, clean, sound, neutralized surface suitable for the specified coating. The substrate must be free of all contaminants, such as oil, grease, rust, scale or deposits. In general, coating performance is proportional to the degree of surface preparation.</p> <p>Steel (Immersion Service)</p> <p>Clean the surface prior to surface preparation in accordance with "Solvent Cleaning" (SSPC SP- 1) to remove oil, grease, and other soluble contaminants. Surfaces to be coated should then be prepared according to SSPC SP-10/ NACE No. 2 <i>Near-White Metal Blast Cleaning</i> for immersion service. The resulting angular anchor profile shall be 3.0-5.0 mils and be relative to the coating thickness specified.</p> <p>Ductile Iron Pipe (Atmospheric and Immersion Service)</p> <p>All oils, small deposits of asphalt paint and grease shall be removed by solvent cleaning (see NAPF 500-03-01). Abrasive blast to accordance with NAPF 500-03-04. More information on cleaning ductile iron pipe can be found at www.napf.com</p>	<p>Steel (Atmospheric/Non-Immersion Service)</p> <p>Visible deposits of oil, grease, or other contaminants shall be removed according to SSPC-SP 1 followed by SSPC SP-6/NACE No. 3 <i>Commercial Blast Cleaning</i>, resulting in a sharp angular anchor profile of 2.5-4.0 mils.</p> <p>Concrete & Masonry</p> <p>Reference SSPC SP-13/NACE No. 6 <i>Surface Preparation of Concrete</i>. Surfaces must be sound and contaminant-free with a surface profile equivalent to a minimum CSP3 to CSP5 in accordance with ICRI Technical Guideline No. 310.2R-2013. This can generally be achieved by abrasive blasting, shot blasting, high-pressure water cleaning, water jetting, or a combination of methods.</p> <p>Primers (Suggested):</p> <table border="0"> <tr> <td>Concrete (optional)</td> <td>Raven 175 Raven 171FS</td> </tr> <tr> <td>Carbon Steel (blast holding)</td> <td>AquataPoxy 190* Raven 490*</td> </tr> <tr> <td>Non-Ferrous Metals</td> <td>AquataPoxy 190</td> </tr> </table> <p>PVC, PE, PP, PS, & HDPE- Contact Raven Tech Service</p> <p>*Do not use this primer if immersion temperatures will exceed 140°F</p>	Concrete (optional)	Raven 175 Raven 171FS	Carbon Steel (blast holding)	AquataPoxy 190* Raven 490*	Non-Ferrous Metals	AquataPoxy 190
Concrete (optional)	Raven 175 Raven 171FS						
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Non-Ferrous Metals	AquataPoxy 190						
Mixing & Thinning							
<p>Components & Mix Ratio</p> <p>Part A Resin: Part B Curing Agent mix ratio is 3:1 by volume.</p> <p>Hand Mixing (touch-up or small repairs)</p> <p>Individually power mix both Part A and Part B containers prior to measuring out 3 parts of Part A to 1 part of Part B by volume into a clean disposable pail. Completely mix combined A & B for a minimum of one minute before transferring contents to a clean pail. Continue mixing at least another minute, scraping the sides and bottom, to obtain a thorough mix before application. Properly mixed material will be a uniform color without light or dark spots.</p>	<p>Thinning</p> <p>Do not thin with solvents. If lower viscosity is needed, heat unmixed material by placing the containers in hot tap water until the desired flow properties are obtained. To heat larger quantities, drum heaters or inline heaters on specialized spray equipment may be used. Unmixed material should not be heated above 150°F (66°C).</p> <p>Pot Life</p> <p>The pot life is ~20 minutes for one gallon at 72°F (22°C). Longer pot life is possible by mixing smaller amounts and/or cooling down the part A & B before mixing.</p>						



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Application & Equipment Guidelines	
<p>Spray Application</p> <p>Optimal proportioning and mixing is achieved with the use of a Raven Lining Systems approved plural-component airless spray system. Raven recommends the use of fixed ratio (3:1), such as, Graco XP 50 or 70 Plural-Component Pump System. Viscon Fluid Heaters and heated hoses are recommended. Carefully monitor, heating devices such as drum blankets or bands to avoid scorching of the material or melting drum liners. Pre-heating containers must not exceed temperatures greater than 150°F.</p> <p>Recommended spray temperatures</p> <p>115-145°F for Part A and 90-125°F for Part B. Temperature is dependent on ambient conditions and hose lengths. To equalize viscosities and reduce operating pressure, Part A should be 20°F warmer than Part B during processing.</p>	<p>Spray Application</p> <p>Heated Hose Temp— 125-145°F</p> <p>Typical Spray Pressure— 1,800-3,000 psi</p> <p>Recommended Tip Sizes— .031-.035</p> <p>Pot life at whip/gun— 1-2 minutes</p> <p>Supply pump pressure— 100 psi</p> <p>Brush/Trowel</p> <p>For touch-up and holiday repair only.</p>
Application & Service Conditions	
<p>Environmental & Substrate Conditions</p> <p>Minimum recommended substrate temperature: 40°F (4°C) Maximum recommended substrate temperature: 120°F (49°C). For best results in limiting outgassing, with a primer or not, apply to prepared concrete when the substrate temperature is stable or falling.</p>	<p>Service Temperatures (Temperature Resistance)</p> <p>Maximum recommended dry temperature: 150°F (66°C). May be post-cured for service up to 200°F (93°C). Wet temperature resistance depends on chemical concentration and exposure time. Contact Raven Technical Service for additional information.</p>
Curing Schedule & Re-Coat Window	
<p>Cure Time</p> <p>The set time varies with substrate temperature and application thickness. Generally, the coating will be tack-free in 3 ½ hours at 72°F (22°C) and dry-hard in about 5 hours.</p> <p>Cure to Service (Municipal wastewater):</p> <p>5 hours at 60°F</p>	<p>Recoat Time</p> <p>This product may be recoated as soon as it becomes tacky but does not transfer to the finger. When applying multiple coats, do not allow more than 12 hours at 72°F (22°C) substrate temperature to pass between coats, higher temperatures will shorten this window. Before recoating; visually inspect, clean and dry surface thoroughly to remove all contamination, including amine blush or condensation. If the recoat time is missed, abrade and clean surfaces prior to recoating.</p>



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Technical Data Sheet

Cleanup & Safety	
<p>Cleanup</p> <p>To clean tools, use acetone, MEK or xylene. To clean skin, wash immediately and thoroughly with soap and water. Refer to the Safety Data Sheet (SDS) for additional information on health and safety.</p>	<p>Safety</p> <p>SDS's are available on the website (www.ravenlining.com) or upon request. All personnel should read and understand the safety recommendations as set forth in the SDS. Keep uncured product away from children at all times.</p>
Packaging, Handling, & Storage	
<p>Packaging</p> <p>Available in 5 gallon (19L) pails as a 20 gallon (76L) kit, 30 gallon (113.5L) drums as a 120 gallon (454L) kit, and 55 gallon (208L) drums as a 220 gallon (832L) kit. Kits are supplied in the correct proportions of A & B; and the two components must be mixed together before use. Raven 405 will only be sold to Raven Certified Applicators.</p>	<p>Shelf Life</p> <p>Product shelf life is 1 year from purchase date in original unopened containers.</p> <p>Storage Temperature & Humidity</p> <p>Store in a sheltered area between 60°F (16°C) and 100°F (38°C).</p>
Warranty	
<p>Warranty and Disclaimer: Raven Lining Systems, Inc. ("Raven") warrants its products to be free of manufacturing defects in accord with applicable Raven quality control procedures and that they meet the formulation standards of Raven. To the best of our knowledge, the technical data contained herein is true and accurate on the date of publication and is subject to change without prior notice. If within one (1) year from purchase, any product is proven defective, Raven, at its sole option, will either replace the defective product or refund the purchase price. This warranty is void if the product is used contrary to Raven's written directions.</p> <p>THE AFORESAID IS THE EXCLUSIVE WARRANTY AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED. THERE IS NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. UNDER NO CIRCUMSTANCES SHALL RAVEN BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES OR FOR LOST PROFITS.</p>	