

CITY OF SAN CLEMENTE
CONSTRUCTION CONTRACT

NECR ALLEY SANITARY SEWER LINE SSGM-11917 REHABILITATION (CIPP), PN 24200

1. PARTIES AND DATE.

This Contract is made and entered into this 14 day of September, 2022 by and between the City of San Clemente, a public agency of the State of California ("City") and Sancon Technologies, Inc. ("Contractor"). City and Contractor are sometimes individually referred to as "Party" and collectively as "Parties" in this Contract.

2. RECITALS.

2.1 City. City is a public agency organized under the laws of the State of California, with power to contract for services necessary to achieve its purpose.

2.2 Contractor. Contractor desires to perform and assume responsibility for the provision of certain construction services required by the City on the terms and conditions set forth in this Contract. Contractor represents that it is duly licensed and experienced in providing NECR Alley Sanitary Sewer Line SSGM-11917 Rehabilitation (CIPP), PN 24200, related construction services to public clients, that it and its employees or subcontractors have all necessary licenses and permits to perform the services in the State of California, and that it is familiar with the plans of City. The following license classifications are required for this Project: Class "A", California State Contracting License.

2.3 Project. City desires to engage Contractor to render such services for the 502 Avenida La Costa Sewer Line Rehabilitation (CIPP) and Sewer Manhole Repair ("Project") as set forth in this Contract.

2.4 Project Documents & Certifications. Contractor has obtained, and delivers concurrently herewith, a performance bond, a payment bond, and all insurance documentation, as required by the Contract.

3. TERMS

3.1 Incorporation of Documents. This Contract includes and hereby incorporates in full by reference the following documents, including all exhibits, drawings, specifications and documents therein, and attachments and addenda thereto:

- Services/Schedule (Exhibit "A")
- Plans and Specifications (Exhibit "B")
- Special Conditions (Exhibit "C")
- Contractor's Certificate Regarding Workers' Compensation (Exhibit "D")
- Public Works Contractor Registration Certification (Exhibit "E")
- Payment and Performance Bonds (Exhibit "F")
- Federal Requirements (Exhibit "G")
- Insurance Requirements (Exhibit "H")
- Addenda
- Change Orders executed by the City

- 2021 Edition of the Standard Specifications for Public Works Construction (The Greenbook), Excluding Sections 1-8
- Notice Inviting Bids, if any
- Instructions to Bidders, if any
- Contractor's Bid

3.2 Contractor's Basic Obligation; Scope of Work. Contractor promises and agrees, at its own cost and expense, to furnish to the City all labor, materials, tools, equipment, services, and incidental and customary work necessary to fully and adequately complete the Project, including all structures and facilities necessary for the Project or described in the Contract (hereinafter sometimes referred to as the "Work"), for a Total Contract Price as specified pursuant to this Contract. All Work shall be subject to, and performed in accordance with the above referenced documents, as well as the exhibits attached hereto and incorporated herein by reference. The plans and specifications for the Work are further described in Exhibit "B" attached hereto and incorporated herein by this reference. Special Conditions, if any, relating to the Work are described in Exhibit "C" attached hereto and incorporated herein by this reference.

3.2.1 Change in Scope of Work. Any change in the scope of the Work, method of performance, nature of materials or price thereof, or any other matter materially affecting the performance or nature of the Work shall not be paid for or accepted unless such change, addition or deletion is approved in writing by a valid change order executed by the City. Should Contractor request a change order due to unforeseen circumstances affecting the performance of the Work, such request shall be made within five (5) business days of the date such circumstances are discovered or shall waive its right to request a change order due to such circumstances. If the Parties cannot agree on any change in price required by such change in the Work, the City may direct the Contractor to proceed with the performance of the change on a time and materials basis.

3.2.2 Substitutions/"Or Equal". Pursuant to Public Contract Code Section 3400(b), the City may make a finding that designates certain products, things, or services by specific brand or trade name. Unless specifically designated in this Contract, whenever any material, process, or article is indicated or specified by grade, patent, or proprietary name or by name of manufacturer, such Specifications shall be deemed to be used for the purpose of facilitating the description of the material, process or article desired and shall be deemed to be followed by the words "or equal."

Contractor may, unless otherwise stated, offer for substitution any material, process or article which shall be substantially equal or better in every respect to that so indicated or specified in this Contract. However, the City may have adopted certain uniform standards for certain materials, processes and articles. Contractor shall submit requests, together with substantiating data, for substitution of any "or equal" material, process or article no later than thirty-five (35) days after award of the Contract. To facilitate the construction schedule and sequencing, some requests may need to be submitted before thirty-five (35) days after award of Contract. Provisions regarding submission of "or equal" requests shall not in any way authorize an extension of time for performance of this Contract. If a proposed "or equal" substitution request is rejected, Contractor shall be responsible for providing the specified material, process or article. The burden of proof as to the equality of any material, process or article shall rest with Contractor.

The City has the complete and sole discretion to determine if a material, process or article is an "or equal" material, process or article that may be substituted. Data required to substantiate requests for substitutions of an "or equal" material, process or article data shall

include a signed affidavit from Contractor stating that, and describing how, the substituted "or equal" material, process or article is equivalent to that specified in every way except as listed on the affidavit. Substantiating data shall include any and all illustrations, specifications, and other relevant data including catalog information which describes the requested substituted "or equal" material, process or article, and substantiates that it is an "or equal" to the material, process or article. The substantiating data must also include information regarding the durability and lifecycle cost of the requested substituted "or equal" material, process or article. Failure to submit all the required substantiating data, including the signed affidavit, to the City in a timely fashion will result in the rejection of the proposed substitution.

Contractor shall bear all of the City's costs associated with the review of substitution requests. Contractor shall be responsible for all costs related to a substituted "or equal" material, process or article. Contractor is directed to the Special Conditions (if any) to review any findings made pursuant to Public Contract Code section 3400.

3.3 Period of Performance.

3.3.1 Contract Time. Contractor shall perform and complete all Work under this Contract within thirty (30) working days, beginning the effective date of the Notice to Proceed ("Contract Time"). Contractor shall perform its Work in strict accordance with any completion schedule, construction schedule or project milestones developed by the City. Such schedules or milestones may be included as part of Exhibits "A" or "B" attached hereto, or may be provided separately in writing to Contractor. Contractor agrees that if such Work is not completed within the aforementioned Contract Time and/or pursuant to any such completion schedule, construction schedule or project milestones developed pursuant to provisions of the Contract, it is understood, acknowledged and agreed that the City will suffer damage.

3.3.2 Force Majeure. Neither City nor Contractor shall be considered in default of this Contract for delays in performance caused by circumstances beyond the reasonable control of the non-performing party. For purposes of this Contract, such circumstances include but are not limited to, abnormal weather conditions; floods; earthquakes; fire; pandemics or epidemics; war; riots and other civil disturbances; strikes, lockouts, work slowdowns, and other labor disturbances; sabotage or judicial restraint. Should such circumstances occur, the non-performing party shall, within a reasonable time of being prevented from performing, give written notice to the other party describing the circumstances preventing continued performance and the efforts being made to resume performance of this Contract. Contractor's exclusive remedy in the event of delay covered under this section shall be a non-compensable extension of the Contract Time.

3.3.3 Liquidated Damages. Pursuant to Government Code Section 53069.85, Contractor shall pay to the City as fixed and liquidated damages the sum of eight hundred dollars (\$800.00) per day for each and every calendar day of delay beyond the Contract Time or beyond any completion schedule, construction schedule or Project milestones established pursuant to the Contract.

3.4 Standard of Performance; Performance of Employees. Contractor shall perform all Work under this Contract in a skillful and workmanlike manner, and consistent with the standards generally recognized as being employed by professionals in the same discipline in the State of California. Contractor represents and maintains that it is skilled in the professional calling necessary to perform the Work. Contractor warrants that all employees and subcontractors shall have sufficient skill and experience to perform the Work assigned to them. Finally, Contractor

represents that it, its employees and subcontractors have all licenses, permits, qualifications and approvals of whatever nature that are legally required to perform the Work, including any required business license, and that such licenses and approvals shall be maintained throughout the term of this Contract. As provided for in the indemnification provisions of this Contract, Contractor shall perform, at its own cost and expense and without reimbursement from the City, any work necessary to correct errors or omissions which are caused by Contractor's failure to comply with the standard of care provided for herein. Any employee who is determined by the City to be uncooperative, incompetent, a threat to the safety of persons or the Work, or any employee who fails or refuses to perform the Work in a manner acceptable to the City, shall be promptly removed from the Project by Contractor and shall not be re-employed on the Work.

3.5 Control and Payment of Subordinates; Contractual Relationship. City retains Contractor on an independent contractor basis and Contractor is not an employee of City. Any additional personnel performing the work governed by this Contract on behalf of Contractor shall at all times be under Contractor's exclusive direction and control. Contractor shall pay all wages, salaries, and other amounts due such personnel in connection with their performance under this Contract and as required by law. Contractor shall be responsible for all reports and obligations respecting such additional personnel, including, but not limited to: social security taxes, income tax withholding, unemployment insurance, and workers' compensation insurance.

3.6 City's Basic Obligation. City agrees to engage and does hereby engage Contractor as an independent contractor to furnish all materials and to perform all Work according to the terms and conditions herein contained for the sum set forth above. Except as otherwise provided in the Contract, the City shall pay to Contractor, as full consideration for the satisfactory performance by Contractor of the services and obligations required by this Contract, the below-referenced compensation in accordance with compensation provisions set forth in the Contract.

3.7 Compensation and Payment.

3.7.1 Amount of Compensation. As consideration for performance of the Work required herein, City agrees to pay Contractor the Total Contract Price of Twenty Seven Thousand Eight Hundred Forty Dollars (\$27,840.00) ("Total Contract Price") provided that such amount shall be subject to adjustment pursuant to the applicable terms of this Contract or written change orders approved and signed in advance by the City.

3.7.2 Payment of Compensation. If the Work is scheduled for completion in thirty (30) or less calendar days, City will arrange for payment of the Total Contract Price upon completion and approval by City of the Work. If the Work is scheduled for completion in more than thirty (30) calendar days, City will pay Contractor on a monthly basis as provided for herein. On or before the fifth (5th) day of each month, Contractor shall submit to the City an itemized application for payment in the format supplied by the City indicating the amount of Work completed since commencement of the Work or since the last progress payment. These applications shall be supported by evidence which is required by this Contract and such other documentation as the City may require. The Contractor shall certify that the Work for which payment is requested has been done and that the materials listed are stored where indicated. Contractor may be required to furnish a detailed schedule of values upon request of the City and in such detail and form as the City shall request, showing the quantities, unit prices, overhead, profit, and all other expenses involved in order to provide a basis for determining the amount of progress payments.

3.7.3 Prompt Payment. City shall review and pay all progress payment requests in accordance with the provisions set forth in Section 20104.50 of the California Public Contract

Code. However, no progress payments will be made for Work not completed in accordance with this Contract. Contractor shall comply with all applicable laws, rules and regulations relating to the proper payment of its employees, subcontractors, suppliers or others.

3.7.4 Contract Retentions. From each approved progress estimate, five percent (5%) will be deducted and retained by the City, and the remainder will be paid to Contractor. All Contract retention shall be released and paid to Contractor and subcontractors pursuant to California Public Contract Code Section 7107.

3.7.5 Other Retentions. In addition to Contract retentions, the City may deduct from each progress payment an amount necessary to protect City from loss because of: (1) liquidated damages which have accrued as of the date of the application for payment; (2) any sums expended by the City in performing any of Contractor's obligations under the Contract which Contractor has failed to perform or has performed inadequately; (3) defective Work not remedied; (4) stop notices as allowed by state law; (5) reasonable doubt that the Work can be completed for the unpaid balance of the Total Contract Price or within the scheduled completion date; (6) unsatisfactory prosecution of the Work by Contractor; (7) unauthorized deviations from the Contract; (8) failure of Contractor to maintain or submit on a timely basis proper and sufficient documentation as required by the Contract or by City during the prosecution of the Work; (9) erroneous or false estimates by Contractor of the value of the Work performed; (10) any sums representing expenses, losses, or damages as determined by the City, incurred by the City for which Contractor is liable under the Contract; and (11) any other sums which the City is entitled to recover from Contractor under the terms of the Contract or pursuant to state law, including Section 1727 of the California Labor Code. The failure by the City to deduct any of these sums from a progress payment shall not constitute a waiver of the City's right to such sums.

3.7.6 Substitutions for Contract Retentions. In accordance with California Public Contract Code Section 22300, the City will permit the substitution of securities for any monies withheld by the City to ensure performance under the Contract. At the request and expense of Contractor, securities equivalent to the amount withheld shall be deposited with the City, or with a state or federally chartered bank in California as the escrow agent, and thereafter the City shall then pay such monies to Contractor as they come due. Upon satisfactory completion of the Contract, the securities shall be returned to Contractor. For purposes of this Section and Section 22300 of the Public Contract Code, the term "satisfactory completion of the contract" shall mean the time the City has issued written final acceptance of the Work and filed a Notice of Completion as required by law and provisions of this Contract. Contractor shall be the beneficial owner of any securities substituted for monies withheld and shall receive any interest thereon. The escrow agreement used for the purposes of this Section shall be in the form provided by the City.

3.7.7 Title to Work. As security for partial, progress, or other payments, title to Work for which such payments are made shall pass to the City at the time of payment. To the extent that title has not previously been vested in the City by reason of payments, full title shall pass to the City at delivery of the Work at the destination and time specified in this Contract. Such transferred title shall in each case be good, free and clear from any and all security interests, liens, or other encumbrances. Contractor promises and agrees that it will not pledge, hypothecate, or otherwise encumber the items in any manner that would result in any lien, security interest, charge, or claim upon or against said items. Such transfer of title shall not imply acceptance by the City, nor relieve Contractor from the responsibility to strictly comply with the Contract, and shall not relieve Contractor of responsibility for any loss of or damage to items.

3.7.8 Labor and Material Releases. Contractor shall furnish City with labor and material releases from all subcontractors performing work on, or furnishing materials for, the Work governed by this Contract prior to final payment by City.

3.7.9 Prevailing Wages. Contractor is aware of the requirements of California Labor Code Section 1720 et seq., and 1770 et seq., as well as California Code of Regulations, Title 8, Section 16000 et seq., ("Prevailing Wage Laws"), which require the payment of prevailing wage rates and the performance of other requirements on "public works" and "maintenance" projects. Since the Services are being performed as part of an applicable "public works" or "maintenance" project, as defined by the Prevailing Wage Laws, and since the total compensation is \$1,000 or more, Contractor agrees to fully comply with such Prevailing Wage Laws. City shall provide Contractor with a copy of the prevailing rates of per diem wages in effect at the commencement of this Contract upon request. Contractor shall make copies of the prevailing rates of per diem wages for each craft, classification or type of worker needed to execute the Services available to interested parties upon request, and shall post copies at Contractor's principal place of business and at the project site. Contractor shall defend, indemnify and hold the City, its officials, officers, employees and agents free and harmless from any claim or liability arising out of any failure or alleged failure to comply with the Prevailing Wage Laws. Contractor and any subcontractor shall forfeit a penalty of up to \$200 per calendar day or portion thereof for each worker paid less than the prevailing wage rates.

3.7.10 Apprenticeable Crafts. When Contractor employs workmen in an apprenticeable craft or trade, Contractor shall comply with the provisions of Section 1777.5 of the California Labor Code with respect to the employment of properly registered apprentices upon public works. The primary responsibility for compliance with said section for all apprenticeable occupations shall be with Contractor. The Contractor or any subcontractor that is determined by the Labor Commissioner to have knowingly violated Section 1777.5 shall forfeit as a civil penalty an amount not exceeding \$100 for each full calendar day of noncompliance, or such greater amount as provided by law.

3.7.11 Hours of Work. Contractor is advised that eight (8) hours labor constitutes a legal day's work. Pursuant to Section 1813 of the California Labor Code, Contractor shall forfeit a penalty of \$25.00 per worker for each day that each worker is permitted to work more than eight (8) hours in any one calendar day and forty (40) hours in any one calendar week, except when payment for overtime is made at not less than one and one-half (1-1/2) times the basic rate for that worker.

3.7.12 Payroll Records. Contractor and each subcontractor shall keep an accurate payroll record, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by him or her in connection with the public work. The payroll records shall be certified and shall be available for inspection at all reasonable hours at the principal office of Contractor in the manner provided in Labor Code section 1776. In the event of noncompliance with the requirements of this section, Contractor shall have 10 days in which to comply subsequent to receipt of written notice specifying in what respects such Contractor must comply with this section. Should noncompliance still be evident after such 10-day period, Contractor shall, as a penalty to City, forfeit not more than \$100.00 for each calendar day or portion thereof, for each worker, until strict compliance is effectuated. The amount of the forfeiture is to be determined by the Labor Commissioner. A contractor who is found to have violated the provisions of law regarding wages on Public Works with the intent to defraud shall be ineligible to bid on Public Works contracts for a period of one to three years as

determined by the Labor Commissioner. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, such penalties shall be withheld from progress payments then due. The responsibility for compliance with this section is on Contractor. The requirement to submit certified payroll records directly to the Labor Commissioner under Labor Code section 1771.4 shall not apply to work performed on a public works project that is exempt pursuant to the small project exemption specified in Labor Code Section 1771.4.

3.7.13 Contractor and Subcontractor Registration. Pursuant to Labor Code sections 1725.5 and 1771.1, all contractors and subcontractors that wish to bid on, be listed in a bid proposal, or enter into a contract to perform public work must be registered with the Department of Industrial Relations. No bid will be accepted nor any contract entered into without proof of the contractor's and subcontractors' current registration with the Department of Industrial Relations to perform public work. Contractor is directed to review, fill out and execute the Public Works Contractor Registration Certification attached hereto as Exhibit "E" prior to contract execution. Notwithstanding the foregoing, the contractor registration requirements mandated by Labor Code Sections 1725.5 and 1771.1 shall not apply to work performed on a public works project that is exempt pursuant to the small project exemption specified in Labor Code Sections 1725.5 and 1771.1.

3.7.14 Labor Compliance; Stop Orders. This Project is subject to compliance monitoring and enforcement by the Department of Industrial Relations. It shall be the Contractor's sole responsibility to evaluate and pay the cost of complying with all labor compliance requirements under this Contract and applicable law. Any stop orders issued by the Department of Industrial Relations against Contractor or any subcontractor that affect Contractor's performance of Work, including any delay, shall be Contractor's sole responsibility. Any delay arising out of or resulting from such stop orders shall be considered Contractor caused delay subject to any applicable liquidated damages and shall not be compensable by the City. Contractor shall defend, indemnify and hold the City, its officials, officers, employees and agents free and harmless from any claim or liability arising out of stop orders issued by the Department of Industrial Relations against Contractor or any subcontractor.

3.8 Performance of Work; Jobsite Obligations.

3.8.1 Water Quality Management and Compliance.

3.8.1.1 Water Quality Management and Compliance. Contractor shall keep itself and all subcontractors, staff, and employees fully informed of and in compliance with all local, state and federal laws, rules and regulations that may impact, or be implicated by the performance of the Work including, without limitation, all applicable provisions of the Federal Water Pollution Control Act (33 U.S.C. §§ 1300); the California Porter-Cologne Water Quality Control Act (Cal Water Code §§ 13000-14950); local ordinances regulating discharges of storm water; and any and all regulations, policies, or permits issued pursuant to any such authority regulating the discharge of pollutants, as that term is used in the Porter-Cologne Water Quality Control Act, to any ground or surface water in the State.

3.8.1.2 Compliance with the Statewide Construction General Permit. Contractor shall comply with all conditions of the most recent iteration of the National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activity, issued by the California State Water Resources Control Board ("Permit"). It shall be Contractor's sole responsibility to file a Notice of Intent and procure coverage under the Permit for all construction activity which results in the disturbance of more than one

acre of total land area or which is part of a larger common area of development or sale. Prior to initiating work, Contractor shall be solely responsible for preparing and implementing a Storm Water Pollution Prevention Plan (SWPPP) as required by the Permit. Contractor shall be responsible for procuring, implementing and complying with the provisions of the Permit and the SWPPP, including the standard provisions, and monitoring and reporting requirements as required by the Permit. The Permit requires the SWPPP to be a "living document" that changes as necessary to meet the conditions and requirements of the job site as it progresses through different phases of construction and is subject to different weather conditions. It shall be Contractor's sole responsibility to update the SWPPP as necessary to address conditions at the project site.

3.8.1.3 Other Water Quality Rules Regulations and Policies. Contractor shall comply with the lawful requirements of any applicable municipality, drainage City, or local agency regarding discharges of storm water to separate storm drain systems or other watercourses under their jurisdiction, including applicable requirements in municipal storm water management programs.

3.8.1.4 Cost of Compliance. Storm, surface, nuisance, or other waters may be encountered at various times during construction of The Work. Therefore, the Contractor, by submitting a Bid, hereby acknowledges that it has investigated the risk arising from such waters, has prepared its Bid accordingly, and assumes any and all risks and liabilities arising therefrom.

3.8.1.5 Liability for Non-Compliance. Failure to comply with the Permit is a violation of federal and state law. Pursuant to the indemnification provisions of this Contract, Contractor hereby agrees to defend, indemnify and hold harmless the City and its officials, officers, employees, volunteers and agents for any alleged violations. In addition, City may seek damages from Contractor for any delay in completing the Work in accordance with the Contract, if such delay is caused by or related to Contractor's failure to comply with the Permit.

3.8.1.6 Reservation of Right to Defend. City reserves the right to defend any enforcement action brought against the City for Contractor's failure to comply with the Permit or any other relevant water quality law, regulation, or policy. Pursuant to the indemnification provisions of this Contract, Contractor hereby agrees to be bound by, and to reimburse the City for the costs (including the City's attorney's fees) associated with, any settlement reached between the City and the relevant enforcement entity.

3.8.1.7 Training. In addition to the standard of performance requirements set forth in paragraph 3.4, Contractor warrants that all employees and subcontractors shall have sufficient skill and experience to perform the Work assigned to them without impacting water quality in violation of the laws, regulations and policies described in paragraph 3.8.1. Contractor further warrants that it, its employees and subcontractors will receive adequate training, as determined by City, regarding the requirements of the laws, regulations and policies described in paragraph 3.8.1 as they may relate to the Work provided under this Agreement. Upon request, City will provide the Contractor with a list of training programs that meet the requirements of this paragraph.

3.8.2 Safety. Contractor shall execute and maintain its work so as to avoid injury or damage to any person or property. Contractor shall comply with the requirements of the specifications relating to safety measures applicable in particular operations or kinds of work. In carrying out its Work, Contractor shall at all times be in compliance with all applicable local, state

and federal laws, rules and regulations, and shall exercise all necessary precautions for the safety of employees appropriate to the nature of the Work and the conditions under which the Work is to be performed. Safety precautions as applicable shall include, but shall not be limited to, adequate life protection and lifesaving equipment; adequate illumination for underground and night operations; instructions in accident prevention for all employees, such as machinery guards, safe walkways, scaffolds, ladders, bridges, gang planks, confined space procedures, trenching and shoring, fall protection and other safety devices, equipment and wearing apparel as are necessary or lawfully required to prevent accidents or injuries; and adequate facilities for the proper inspection and maintenance of all safety measures. Furthermore, Contractor shall prominently display the names and telephone numbers of at least two medical doctors practicing in the vicinity of the Project, as well as the telephone number of the local ambulance service, adjacent to all telephones at the Project site.

3.8.3 Laws and Regulations. Contractor shall keep itself fully informed of and in compliance with all local, state and federal laws, rules and regulations in any manner affecting the performance of the Contract or the Work, including all Cal/OSHA requirements, and shall give all notices required by law. Contractor shall be liable for all violations of such laws and regulations in connection with Work. If Contractor observes that the drawings or specifications are at variance with any law, rule or regulation, it shall promptly notify the City in writing. Any necessary changes shall be made by written change order. If Contractor performs any work knowing it to be contrary to such laws, rules and regulations and without giving written notice to the City, Contractor shall be solely responsible for all costs arising therefrom. City is a public entity of the State of California subject to certain provisions of the Health & Safety Code, Government Code, Public Contract Code, and Labor Code of the State. It is stipulated and agreed that all provisions of the law applicable to the public contracts of a municipality are a part of this Contract to the same extent as though set forth herein and will be complied with. Contractor shall defend, indemnify and hold City, its officials, officers, employees and agents free and harmless, pursuant to the indemnification provisions of this Contract, from any claim or liability arising out of any failure or alleged failure to comply with such laws, rules or regulations.

3.8.4 Permits and Licenses. Contractor shall be responsible for securing City permits and licenses necessary to perform the Work described herein, including, but not limited to, any required business license. While Contractor will not be charged a fee for any City permits, Contractor shall pay the City's business license fee, if any. Any ineligible contractor or subcontractor pursuant to Labor Code Sections 1777.1 and 1777.7 may not perform work on this Project.

3.8.5 Trenching Work. If the Total Contract Price exceeds \$25,000 and if the Work governed by this Contract entails excavation of any trench or trenches five (5) feet or more in depth, Contractor shall comply with all applicable provisions of the California Labor Code, including Section 6705. To this end, Contractor shall submit for City's review and approval a detailed plan showing the design of shoring, bracing, sloping, or other provisions to be made for worker protection from the hazard of caving ground during the excavation of such trench or trenches. If such plan varies from the shoring system standards, the plan shall be prepared by a registered civil or structural engineer.

3.8.6 Hazardous Materials and Differing Conditions. As required by California Public Contract Code Section 7104, if this Contract involves digging trenches or other excavations that extend deeper than four (4) feet below the surface, Contractor shall promptly, and prior to disturbance of any conditions, notify City of: (1) any material discovered in excavation that Contractor believes to be a hazardous waste that is required to be removed to a Class I, Class II

or Class III disposal site; (2) subsurface or latent physical conditions at the site differing from those indicated by City; and (3) unknown physical conditions of an unusual nature at the site, significantly different from those ordinarily encountered in such contract work. Upon notification, City shall promptly investigate the conditions to determine whether a change order is appropriate. In the event of a dispute, Contractor shall not be excused from any scheduled completion date and shall proceed with all Work to be performed under the Contract, but shall retain all rights provided by the Contract or by law for making protests and resolving the dispute.

3.8.7 Underground Utility Facilities. To the extent required by Section 4215 of the California Government Code, City shall compensate Contractor for the costs of: (1) locating and repairing damage to underground utility facilities not caused by the failure of Contractor to exercise reasonable care; (2) removing or relocating underground utility facilities not indicated in the construction drawings; and (3) equipment necessarily idled during such work. Contractor shall not be assessed liquidated damages for delay caused by failure of City to provide for removal or relocation of such utility facilities.

3.8.8 Air Quality. Contractor must fully comply with all applicable laws, rules and regulations in furnishing or using equipment and/or providing services, including, but not limited to, emissions limits and permitting requirements imposed by the California Air Resources Board (CARB). Although CARB limits and requirements are more broad, Contractor shall specifically be aware of their application to "portable equipment", which definition is considered by CARB to include any item of equipment with a fuel-powered engine. Contractor shall indemnify City against any fines or penalties imposed by CARB, or any other governmental or regulatory agency for violations of applicable laws, rules and/or regulations by Contractor, its subcontractors, or others for whom Contractor is responsible under its indemnity obligations provided for in this Agreement.

3.8.9 State Recycling Mandates. Contractor shall comply with State Recycling Mandates. Any recyclable materials/debris collected by the contractor that can be feasibly diverted via reuse or recycling must be hauled by the appropriate handler for reuse or recycling.

3.9 Completion of Work. When Contractor determines that it has completed the Work required herein, Contractor shall so notify City in writing and shall furnish all labor and material releases required by this Contract. City shall thereupon inspect the Work. If the Work is not acceptable to the City, the City shall indicate to Contractor in writing the specific portions or items of Work which are unsatisfactory or incomplete. Once Contractor determines that it has completed the incomplete or unsatisfactory Work, Contractor may request a reinspection by the City. Once the Work is acceptable to City, City shall pay to Contractor the Total Contract Price remaining to be paid, less any amount which City may be authorized or directed by law to retain. Payment of retention proceeds due to Contractor shall be made in accordance with Section 7107 of the California Public Contract Code.

3.10 Claims; Government Code Claim Compliance.

3.10.1 Intent. Effective January 1, 1991, Section 20104 et seq., of the California Public Contract Code prescribes a process utilizing informal conferences, non-binding judicial supervised mediation, and judicial arbitration to resolve disputes on construction claims of \$375,000 or less. Effective January 1, 2017, Section 9204 of the Public Contract Code prescribes a process for negotiation and mediation to resolve disputes on construction claims. The intent of this Section is to implement Sections 20104 et seq. and Section 9204 of the California Public Contract Code. This Section shall be construed to be consistent with said statutes.

3.10.2 Claims. For purposes of this Section, "Claim" means a separate demand by the Contractor, after a change order duly requested in accordance with the terms of this Contract has been denied by the City, for (A) a time extension, (B) payment of money or damages arising from Work done by or on behalf of the Contractor pursuant to the Contract, or (C) an amount the payment of which is disputed by the City. A "Claim" does not include any demand for payment for which the Contractor has failed to provide notice, request a change order, or otherwise failed to follow any procedures contained in the Contract Documents. Claims governed by this Section may not be filed unless and until the Contractor completes all procedures for giving notice of delay or change and for the requesting of a time extension or change order, including but not necessarily limited to the change order procedures contained herein, and Contractor's request for a change has been denied in whole or in part. Claims governed by this Section must be filed no later than fourteen (14) days after a request for change has been denied in whole or in part or after any other event giving rise to the Claim. The Claim shall be submitted in writing to the City and shall include on its first page the following in 16 point capital font: "THIS IS A CLAIM." Furthermore, the claim shall include the documents necessary to substantiate the claim. Nothing in this Section is intended to extend the time limit or supersede notice requirements otherwise provided by contract for the filing of claims, including all requirements pertaining to compensation or payment for extra Work, disputed Work, and/or changed conditions. Failure to follow such contractual requirements shall bar any claims or subsequent lawsuits for compensation or payment thereon.

3.10.3 Supporting Documentation. The Contractor shall submit all claims in the following format:

3.10.3.1 Summary of claim merit and price, reference Contract Document provisions pursuant to which the claim is made

3.10.3.2 List of documents relating to claim:

- (A) Specifications
- (B) Drawings
- (C) Clarifications (Requests for Information)
- (D) Schedules
- (E) Other

3.10.3.3 Chronology of events and correspondence

3.10.3.4 Analysis of claim merit

3.10.3.5 Analysis of claim cost

3.10.3.6 Time impact analysis in CPM format

3.10.3.7 If Contractor's claim is based in whole or in part on an allegation of errors or omissions in the Drawings or Specifications for the Project, Contractor shall provide a summary of the percentage of the claim subject to design errors or omissions and shall obtain a certificate of merit in support of the claim of design errors and omissions.

3.10.3.8 Cover letter and certification of validity of the claim, including any claims from subcontractors of any tier, in accordance with Government Code section 12650 *et seq.*

3.10.4 City's Response. Upon receipt of a claim pursuant to this Section, City shall conduct a reasonable review of the claim and, within a period not to exceed 45 days, shall provide the Contractor a written statement identifying what portion of the claim is disputed and what portion is undisputed. Any payment due on an undisputed portion of the claim will be processed and made within 60 days after the public entity issues its written statement.

3.10.4.1 If City needs approval from its governing body to provide the Contractor a written statement identifying the disputed portion and the undisputed portion of the claim, and the governing body does not meet within the 45 days or within the mutually agreed to extension of time following receipt of a claim sent by registered mail or certified mail, return receipt requested, City shall have up to three days following the next duly publicly noticed meeting of the governing body after the 45-day period, or extension, expires to provide the Contractor a written statement identifying the disputed portion and the undisputed portion.

3.10.4.2 Within 30 days of receipt of a claim, City may request in writing additional documentation supporting the claim or relating to defenses or claims City may have against the Contractor. If additional information is thereafter required, it shall be requested and provided pursuant to this subdivision, upon mutual agreement of City and the Contractor.

3.10.4.3 City's written response to the claim, as further documented, shall be submitted to the Contractor within 30 days (if the claim is less than \$50,000, within 15 days) after receipt of the further documentation, or within a period of time no greater than that taken by the Contractor in producing the additional information or requested documentation, whichever is greater.

3.10.5 Meet and Confer. If the Contractor disputes City's written response, or City fails to respond within the time prescribed, the Contractor may so notify City, in writing, either within 15 days of receipt of City's response or within 15 days of City's failure to respond within the time prescribed, respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon receipt of a demand, City shall schedule a meet and confer conference within 30 days for settlement of the dispute.

3.10.6 Mediation. Within 10 business days following the conclusion of the meet and confer conference, if the claim or any portion of the claim remains in dispute, City shall provide the Contractor a written statement identifying the portion of the claim that remains in dispute and the portion that is undisputed. Any payment due on an undisputed portion of the claim shall be processed and made within 60 days after City issues its written statement. Any disputed portion of the claim, as identified by the Contractor in writing, shall be submitted to nonbinding mediation, with City and the Contractor sharing the associated costs equally. City and Contractor shall mutually agree to a mediator within 10 business days after the disputed portion of the claim has been identified in writing, unless the parties agree to select a mediator at a later time.

3.10.6.1 If the Parties cannot agree upon a mediator, each Party shall select a mediator and those mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the claim. Each Party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator.

3.10.6.2 For purposes of this section, mediation includes any nonbinding process, including, but not limited to, neutral evaluation or a dispute review board, in which an independent third party or board assists the Parties in dispute resolution through negotiation or by issuance of an evaluation. Any mediation utilized shall conform to the timeframes in this section.

3.10.6.3 Unless otherwise agreed to by City and the Contractor in writing, the mediation conducted pursuant to this section shall excuse any further obligation under Section 20104.4 to mediate after litigation has been commenced.

3.10.6.4 The mediation shall be held no earlier than the date the Contractor completes the Work or the date that the Contractor last performs Work, whichever is earlier. All unresolved claims shall be considered jointly in a single mediation, unless a new unrelated claim arises after mediation is completed.

3.10.7 Procedures After Mediation. If following the mediation, the claim or any portion remains in dispute, the Contractor must file a claim pursuant to Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code. For purposes of those provisions, the running of the period of time within which a claim must be filed shall be tolled from the time the Contractor submits his or her written claim pursuant to subdivision (a) until the time the claim is denied, including any period of time utilized by the meet and confer conference or mediation.

3.10.8 Civil Actions. The following procedures are established for all civil actions filed to resolve claims subject to this Section:

3.10.8.1 Within 60 days, but no earlier than 30 days, following the filing or responsive pleadings, the court shall submit the matter to non-binding mediation unless waived by mutual stipulation of both parties or unless mediation was held prior to commencement of the action in accordance with Public Contract Code section 9204 and the terms of these procedures.. The mediation process shall provide for the selection within 15 days by both parties of a disinterested third person as mediator, shall be commenced within 30 days of the submittal, and shall be concluded within 15 days from the commencement of the mediation unless a time requirement is extended upon a good cause showing to the court.

3.10.8.2 If the matter remains in dispute, the case shall be submitted to judicial arbitration pursuant to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, notwithstanding Section 1114.11 of that code. The Civil Discovery Act of 1986 (Article 3 (commencing with Section 2016) of Chapter 3 of Title 3 of Part 4 of the Code of Civil Procedure) shall apply to any proceeding brought under this subdivision consistent with the rules pertaining to judicial arbitration.

3.10.8.3 In addition to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, (A) arbitrators shall, when possible, be experienced in construction law, and (B) any party appealing an arbitration award who does not obtain a more favorable judgment shall, in addition to payment of costs and fees under that chapter, also pay the attorney's fees on appeal of the other party.

3.10.9 Government Code Claims. In addition to any and all contract requirements pertaining to notices of and requests for compensation or payment for extra work, disputed work, claims and/or changed conditions, Contractor must comply with the claim procedures set forth in Government Code sections 900 et seq. prior to filing any lawsuit against the City. Such

Government Code claims and any subsequent lawsuit based upon the Government Code claims shall be limited to those matters that remain unresolved after all procedures pertaining to extra work, disputed work, claims, and/or changed conditions have been followed by Contractor. If no such Government Code claim is submitted, or if any prerequisite contractual requirements are not otherwise satisfied as specified herein, Contractor shall be barred from bringing and maintaining a valid lawsuit against the City. A Government Code claim must be filed no earlier than the date the work is completed or the date the Contractor last performs work on the Project, whichever occurs first. A Government Code claim shall be inclusive of all unresolved claims unless a new unrelated claim arises after the Government Code claim is submitted.

3.10.10 Non-Waiver. City's failure to respond to a claim from the Contractor within the time periods described in this Section or to otherwise meet the time requirements of this Section shall result in the claim being deemed rejected in its entirety. City's failure to respond shall not waive City's rights to any subsequent procedures for the resolution of disputed claims.

3.11 Loss and Damage. Except as may otherwise be limited by law, Contractor shall be responsible for all loss and damage which may arise out of the nature of the Work agreed to herein, or from the action of the elements, or from any unforeseen difficulties which may arise or be encountered in the prosecution of the Work until the same is fully completed and accepted by City. In the event of damage proximately caused by an Act of God, as defined by Section 7105 of the Public Contract Code, the City may terminate this Contract pursuant to Section 3.17.3; provided, however, that the City needs to provide Contractor with only one (1) day advanced written notice.

3.12 Indemnification.

3.12.1 Scope of Indemnity. To the fullest extent permitted by law, Contractor shall defend (with counsel reasonably approved by City), indemnify and hold the City, its officials, employees, agents and authorized volunteers free and harmless from any and all claims, demands, causes of action, suits, actions, proceedings, costs, expenses, liability, judgments, awards, decrees, settlements, loss, damage or injury of any kind, in law or equity, to property or persons, including wrongful death, (collectively, "Claims") in any manner arising out of, pertaining to, or incident to any alleged acts, errors or omissions, or willful misconduct of Contractor, its officials, officers, employees, subcontractors, consultants or agents in connection with the performance of the Contractor's services, the Project or this Agreement, including without limitation the payment of all consequential damages, expert witness fees and attorneys' fees and other related costs and expenses. Notwithstanding the foregoing, to the extent required by Civil Code section 2782, Contractor's indemnity obligation shall not apply to liability for damages for death or bodily injury to persons, injury to property, or any other loss, damage or expense arising from the sole or active negligence or willful misconduct of the City or the City's agents, servants, or independent contractors who are directly responsible to the City, or for defects in design furnished by those persons.

3.12.2 Additional Indemnity Obligations. In addition, Contractor shall pay and satisfy any judgment, award or decree that may be rendered against City or its officials, employees, agents and authorized volunteers as part of any such claim, suit, action or other proceeding. Contractor shall also reimburse City for the cost of any settlement paid by City or its officials, employees, agents and authorized volunteers as part of any such claim, suit, action or other proceeding. Such reimbursement shall include payment for City's attorney's fees and costs, including expert witness fees. Contractor shall reimburse City and its officials, employees, agents and authorized volunteers, for any and all legal expenses and costs incurred by each of them in

connection therewith or in enforcing the indemnity herein provided. Contractor's obligation to indemnify shall not be restricted to insurance proceeds, if any, received by the City, its officials, employees, agents and authorized volunteers.

3.13 Insurance. Contractor agrees to procure and maintain, at Contractor's expense all insurance specified in Exhibit "H" attached hereto and by this reference incorporated herein. Contractor shall require all subcontractors to carry the same policies and limits of insurance that the Contractor is required to maintain, unless otherwise approved in writing by the City.

3.13.1

3.14 Bond Requirements.

3.14.1 Payment Bond. If required by law or otherwise specifically requested by City in Exhibit "C" attached hereto and incorporated herein by reference, Contractor shall execute and provide to City concurrently with this Contract a Payment Bond in an amount required by the City and in a form provided or approved by the City. If such bond is required, no payment will be made to Contractor until the bond has been received and approved by the City.

3.14.2 Performance Bond. If specifically requested by City in Exhibit "C" attached hereto and incorporated herein by reference, Contractor shall execute and provide to City concurrently with this Contract a Performance Bond in an amount required by the City and in a form provided or approved by the City. If such bond is required, no payment will be made to Contractor until the bond has been received and approved by the City.

3.14.3 Bond Provisions. Should, in City's sole opinion, any bond become insufficient or any surety be found to be unsatisfactory, Contractor shall renew or replace the effected bond within (ten) 10 days of receiving notice from City. In the event the surety or Contractor intends to reduce or cancel any required bond, at least thirty (30) days prior written notice shall be given to the City, and Contractor shall post acceptable replacement bonds at least ten (10) days prior to expiration of the original bonds. No further payments shall be deemed due or will be made under this Contract until any replacement bonds required by this Section are accepted by the City. To the extent, if any, that the Total Contract Price is increased in accordance with the Contract, Contractor shall, upon request of the City, cause the amount of the bond to be increased accordingly and shall promptly deliver satisfactory evidence of such increase to the City. If Contractor fails to furnish any required bond, the City may terminate the Contract for cause.

3.14.4 Surety Qualifications. Only bonds executed by an admitted surety insurer, as defined in California Code of Civil Procedure Section 995.120, shall be accepted. If a California-admitted surety insurer issuing bonds does not meet these requirements, the insurer will be considered qualified if it is in conformance with Section 995.660 of the California Code of Civil Procedure, and proof of such is provided to the City.

3.15 Warranty. Contractor warrants all Work under the Contract (which for purposes of this Section shall be deemed to include unauthorized work which has not been removed and any non-conforming materials incorporated into the Work) to be of good quality and free from any defective or faulty material and workmanship. Contractor agrees that for a period of one year (or the period of time specified elsewhere in the Contract or in any guarantee or warranty provided by any manufacturer or supplier of equipment or materials incorporated into the Work, whichever is later) after the date of final acceptance, Contractor shall within ten (10) days after being notified

in writing by the City of any defect in the Work or non-conformance of the Work to the Contract, commence and prosecute with due diligence all Work necessary to fulfill the terms of the warranty at its sole cost and expense. Contractor shall act sooner as requested by the City in response to an emergency. In addition, Contractor shall, at its sole cost and expense, repair and replace any portions of the Work (or work of other contractors) damaged by its defective Work or which becomes damaged in the course of repairing or replacing defective Work. For any Work so corrected, Contractor's obligation hereunder to correct defective Work shall be reinstated for an additional one year period, commencing with the date of acceptance of such corrected Work. Contractor shall perform such tests as the City may require to verify that any corrective actions, including, without limitation, redesign, repairs, and replacements comply with the requirements of the Contract. All costs associated with such corrective actions and testing, including the removal, replacement, and reinstatement of equipment and materials necessary to gain access, shall be the sole responsibility of Contractor. All warranties and guarantees of subcontractors, suppliers and manufacturers with respect to any portion of the Work, whether express or implied, are deemed to be obtained by Contractor for the benefit of the City, regardless of whether or not such warranties and guarantees have been transferred or assigned to the City by separate agreement and Contractor agrees to enforce such warranties and guarantees, if necessary, on behalf of the City. In the event that Contractor fails to perform its obligations under this Section, or under any other warranty or guaranty under this Contract, to the reasonable satisfaction of the City, the City shall have the right to correct and replace any defective or non-conforming Work and any work damaged by such work or the replacement or correction thereof at Contractor's sole expense. Contractor shall be obligated to fully reimburse the City for any expenses incurred hereunder upon demand.

3.16 Employee/Labor Certifications.

3.16.1 Contractor's Labor Certification. By its signature hereunder, Contractor certifies that he is aware of the provisions of Section 3700 of the California Labor Code which require every employer to be insured against liability for Worker's Compensation or to undertake self-insurance in accordance with the provisions of that Code, and agrees to comply with such provisions before commencing the performance of the Work. A certification form for this purpose, which is attached to this Contract as Exhibit "D" and incorporated herein by reference, shall be executed simultaneously with this Contract.

3.16.2 Equal Opportunity Employment. Contractor represents that it is an equal opportunity employer and that it shall not discriminate against any employee or applicant for employment because of race, religion, color, national origin, ancestry, sex, age or other interests protected by the State or Federal Constitutions. Such non-discrimination shall include, but not be limited to, all activities related to initial employment, upgrading, demotion, transfer, recruitment or recruitment advertising, layoff or termination.

3.16.3 Verification of Employment Eligibility. By executing this Contract, Contractor verifies that it fully complies with all requirements and restrictions of state and federal law respecting the employment of undocumented aliens, including, but not limited to, the Immigration Reform and Control Act of 1986, as may be amended from time to time, and shall require all subcontractors and sub-subcontractors to comply with the same.

3.17 General Provisions.

3.17.1 City's Representative. The City hereby designates the General Manager, or his or her designee, to act as its representative for the performance of this Contract ("City's

Representative"). City's Representative shall have the power to act on behalf of the City for all purposes under this Contract. Contractor shall not accept direction or orders from any person other than the City's Representative or his or her designee.

3.17.2 Contractor's Representative. Before starting the Work, Contractor shall submit in writing the name, qualifications and experience of its proposed representative who shall be subject to the review and approval of the City ("Contractor's Representative"). Following approval by the City, Contractor's Representative shall have full authority to represent and act on behalf of Contractor for all purposes under this Contract. Contractor's Representative shall supervise and direct the Work, using his best skill and attention, and shall be responsible for all construction means, methods, techniques, sequences and procedures and for the satisfactory coordination of all portions of the Work under this Contract. Contractor's Representative shall devote full time to the Project and either he or his designee, who shall be acceptable to the City, shall be present at the Work site at all times that any Work is in progress and at any time that any employee or subcontractor of Contractor is present at the Work site. Arrangements for responsible supervision, acceptable to the City, shall be made for emergency Work which may be required. Should Contractor desire to change its Contractor's Representative, Contractor shall provide the information specified above and obtain the City's written approval.

3.17.3 Termination. This Contract may be terminated by City at any time, either with or without cause, by giving Contractor three (3) days advance written notice. In the event of termination by City for any reason other than the fault of Contractor, City shall pay Contractor for all Work performed up to that time as provided herein. In the event of breach of the Contract by Contractor, City may terminate the Contract immediately without notice, may reduce payment to Contractor in the amount necessary to offset City's resulting damages, and may pursue any other available recourse against Contractor. Contractor may not terminate this Contract except for cause. In the event this Contract is terminated in whole or in part as provided, City may procure, upon such terms and in such manner as it may determine appropriate, services similar to those terminated. Further, if this Contract is terminated as provided, City may require Contractor to provide all finished or unfinished documents, data, diagrams, drawings, materials or other matter prepared or built by Contractor in connection with its performance of this Contract.

3.17.4 Contract Interpretation. Should any question arise regarding the meaning or import of any of the provisions of this Contract or written or oral instructions from City, the matter shall be referred to City's Representative, whose decision shall be binding upon Contractor.

3.17.5 Anti-Trust Claims. This provision shall be operative if this Contract is applicable to California Public Contract Code Section 7103.5. In entering into this Contract to supply goods, services or materials, Contractor hereby offers and agrees to assign to the City all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Section 15) or under the Cartwright Act (Chapter 2, commencing with Section 16700, of Part 2 of Division 7 of the Business and Professions Code) arising from purchases of goods, services, or materials pursuant to the Contract. This assignment shall be made and become effective at the time the City tender final payment to Contractor, without further acknowledgment by the Parties.

3.17.6 Notices. All notices hereunder and communications regarding interpretation of the terms of the Contract or changes thereto shall be provided by the mailing thereof by registered or certified mail, return receipt requested, postage prepaid and addressed as follows:

CONTRACTOR: Sancon Technologies, Inc.
5841 Engineer Drive
Huntington Beach, CA 92649
Attn: Chuck Parsons, President

CITY: City of San Clemente
910 Calle Negocio
San Clemente, CA 92673
Attn: Amir Ilkhanipour, Principal Engineer

Any notice so given shall be considered received by the other Party three (3) days after deposit in the U.S. Mail as stated above and addressed to the Party at the above address. Actual notice shall be deemed adequate notice on the date actual notice occurred, regardless of the method of service.

3.17.7 Time of Essence. Time is of the essence in the performance of this Contract.

3.17.8 Assignment Forbidden. Contractor shall not, either voluntarily or by action of law, assign or transfer this Contract or any obligation, right, title or interest assumed by Contractor herein without the prior written consent of City. If Contractor attempts an assignment or transfer of this Contract or any obligation, right, title or interest herein, City may, at its option, terminate and revoke the Contract and shall thereupon be relieved from any and all obligations to Contractor or its assignee or transferee.

3.17.9 No Third Party Beneficiaries. There are no intended third party beneficiaries of any right or obligation assumed by the Parties.

3.17.10 Laws, Venue, and Attorneys' Fees. This Agreement shall be interpreted in accordance with the laws of the State of California. If any action is brought to interpret or enforce any term of this Agreement, the action shall be brought in a state or federal court situated in the County of Orange, State of California.

3.17.11 Counterparts. This Contract may be executed in counterparts, each of which shall constitute an original.

3.17.12 Successors. The Parties do for themselves, their heirs, executors, administrators, successors, and assigns agree to the full performance of all of the provisions contained in this Contract.

3.17.13 [Reserved]

3.17.14 Solicitation. Contractor maintains and warrants that it has not employed nor retained any company or person, other than a bona fide employee working solely for Contractor, to solicit or secure this Contract. Further, Contractor warrants that it has not paid nor has it agreed to pay any company or person, other than a bona fide employee working solely for Contractor, any fee, commission, percentage, brokerage fee, gift or other consideration contingent upon or resulting from the award or making of this Contract. For breach or violation of this warranty, City shall have the right to terminate this Contract without liability.

3.17.15 Conflict of Interest. Contractor maintains and warrants that it has not employed nor retained any company or person, other than a bona fide employee working

solely for Contractor, to solicit or secure this Agreement. Further, Contractor warrants that it has not paid nor has it agreed to pay any company or person, other than a bona fide employee working solely for Contractor, any fee, commission, percentage, brokerage fee, gift or other consideration contingent upon or resulting from the award or making of this Agreement. For breach or violation of this warranty, City shall have the right to rescind this Agreement without liability. For the term of this Contract, no official, officer or employee of City, during the term of his or her service with City, shall have any direct interest in this Contract, or obtain any present or anticipated material benefit arising therefrom. In addition, Contractor agrees to file, or to cause its employees or subcontractors to file, a Statement of Economic Interest with the City's Filing Officer as required under state law in the performance of the Work.

3.17.16 Certification of License.

3.17.16.1 Contractor certifies that as of the date of execution of this Contract, Contractor has a current contractor's license of the classification indicated below under Contractor's signature.

3.17.16.2 Contractors are required by law to be licensed and regulated by the Contractors' State License Board which has jurisdiction to investigate complaints against contractors if a complaint regarding a patent act or omission is filed within four (4) years of the date of the alleged violation. A complaint regarding a latent act or omission pertaining to structural defects must be filed within ten (10) years of the date of the alleged violation. Any questions concerning a contractor may be referred to the Registrar, Contractors' State License Board, P.O. Box 26000, Sacramento, California 95826.

3.17.17 Authority to Enter Contract. Each Party warrants that the individuals who have signed this Contract have the legal power, right and authority to make this Contract and bind each respective Party.

3.17.18 Entire Contract, Modification. This Contract contains the entire agreement of the Parties with respect to the subject matter hereof, and supersedes all prior negotiations, understandings or agreements. This Contract may only be modified by a writing signed by both Parties.

3.17.19 Non-Waiver. None of the provisions of this Agreement shall be considered waived by either party, unless such waiver is specifically specified in writing.

3.17.20 City's Right to Employ Other Contractors. City reserves right to employ other contractors in connection with this Project or other projects.

3.17.21 Federal Provisions. NOT APPLICABLE

[SIGNATURES ON NEXT PAGE]

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be duly executed on the respective dates set forth opposite of their signatures.

CITY OF SAN CLEMENTE

By: Alan Joyce

Its: Interim City Manager

Dated: 9-14, 2022

ATTEST:

Paul Cary / Legislative Administrator
CITY CLERK of the City of
San Clemente, California

APPROVED AS TO FORM:
BEST BEST & KRIEGER

[Signature]
City Attorney

APPROVED AS TO AVAILABILITY
OF FUNDING:

[Signature]
Finance Authorization

SARON TECHNOLOGIES, INC.
("CONTRACTOR")

By: [Signature], Chuck Parsons

Its: PRESIDENT

Dated: SEPTEMBER 6, 2022

EXHIBIT "A"
SERVICES / BID SCHEDULE

BID SCHEDULE

NECR Alley SSGM-11917 Sewer Line Rehabilitation (CIPP) PROJECT NO. 24200

Item No.	Description	Unit of Measure	Estimated Quantity	Unit Price	Total Item Cost
1	Mobilization and Demobilization.	L.S.	1	\$6,500	\$6,500
2	Traffic Control per WATCH.	L.S.	1	\$1,500	\$1,500
3 (*)(**)	8" SS Line Rehabilitation (CIPP).	L.F.	266	\$65	\$17,290
4	Re-establish SS Service Laterals.	EA.	11	\$50	\$550
5	Pre and post rehab/repair CCTV inspection.	L.S.	1	\$2,000	\$2,000
GRAND TOTAL BID					\$27,840

GRAND TOTAL BID (Twenty-Seven Thousand Eight Hundred Forty Dollars) (In Words)

(*) Pipe cleaning, root removal, video inspection and rehabilitation of existing sewer by installation of liner, including cutting out lateral connections and bypass pumping. A completed "Pipe Thickness Form" for the host pipe diameter size utilizing the design parameters, physical properties and test data as provided for in the Special Provisions. Failure to specify a rehabilitation method and a completed "Pipe Thickness Form" shall render the bid non-responsive.

(**) Scope of work stated summarized. For specific scope of work for this bid item see Specifications (Exhibit B), "Special Provisions, Section 500 - Pipeline System Rehabilitation". **In order to minimize inconvenience to local businesses and residents this work shall be performed during night hours and requires coordination with the City. The time window for this work night hours is from 9:00 PM to 6:00 AM.**

All quantities shown are estimates for bidding purposes only. The City reserves the right to delete any or all of the bid items from the Bid Schedule. The Contract will be awarded to the lowest responsive and responsible bidder based on the Lowest Grand Total Bid Proposal which is the sum of the total prices from Items 1 through 5.

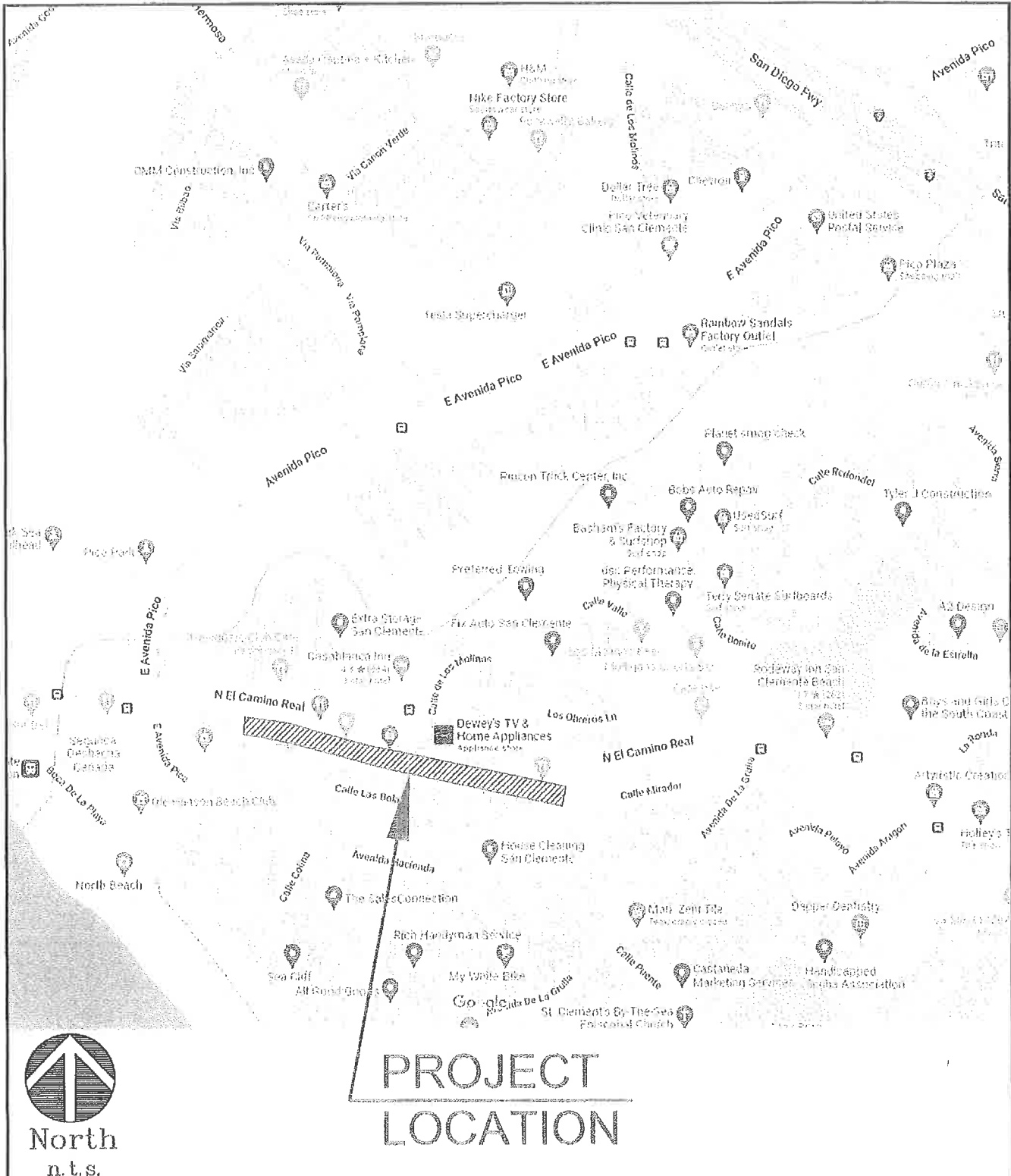
BIDDER: SANCON TECHNOLOGIES, INC.

ADDRESS: 5841 ENGINEER DRIVE, HUNTINGTON BEACH, CA 92649

TELEPHONE: (714) 891-2323 E-mail: BIDS@SANCON.COM

EXHIBIT "B"
PLANS AND SPECIFICATIONS

S:\cd\Engineering\secure\PROJECTS\PN 24200 - NECR Alley SSGM 11917 Rehab\09-Plans & Specs\EXHIBITS.dwg Thursday, July 14, 2022 4:28:51 PM



North
n. t. s.

**PROJECT
LOCATION**

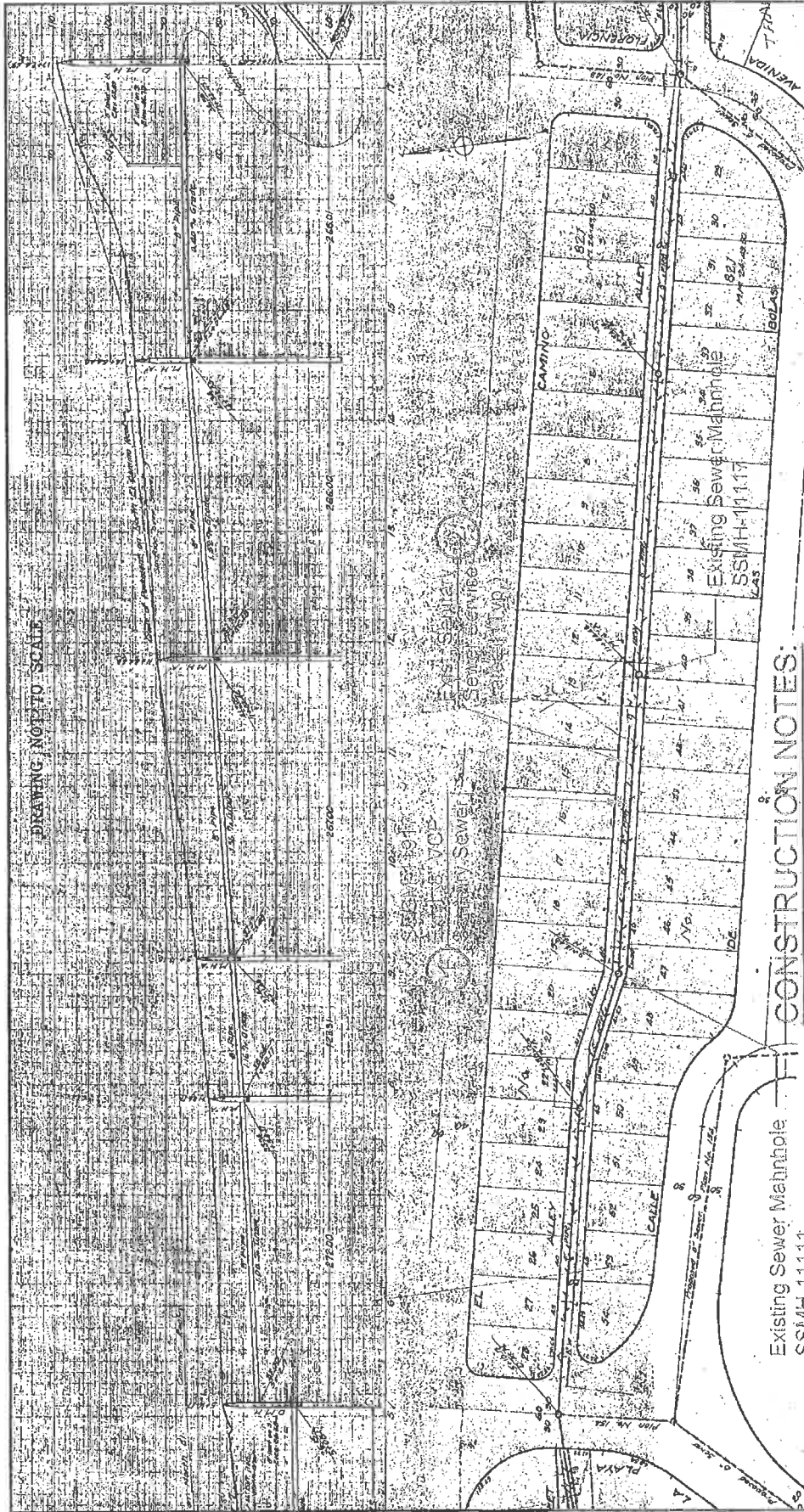


City of San Clemente

910 Calle Negocio, Suite 100
San Clemente, CA 92673
Tel (949) 361-6100
Fax (949) 361-8316

LOCATION MAP

**NECR ALLEY SANITARY SEWER LINE
SSGM-11917 REHABILITATION (CIPP)
P.N. 24200**



DRAWING NOTE TO SCALE

CONSTRUCTION NOTES:

- 1 REHABILITATE (CIPP) EXISTING 8" V.C.P. SANITARY SEWER LINE (SSGM-11917) FROM SSMH-11111 TO SSMH-11117 PER PROJECT SPECIFICATIONS.
- 2 RE-ESTABLISH SANITARY SEWER SERVICE LATERALS.

Existing Sewer Mainhole
SSMH-11117



City of San Clemente

910 Calle Negocio, Suite 100
San Clemente, CA 92873
Tel (949) 361-6100
Fax (949) 361-8316

PLAN AND PROFILE

NECR ALLEY SANITARY SEWER LINE
SSGM-11917 REHABILITATION (CIPP)
P.N. 24200

S P E C I F I C A T I O N S

FOR

N.E.C.R. ALLEY SANITARY SEWER LINE
SSGM-11917 REHABILITATION (CIPP)
PN 24200

**N.E.C.R. ALLEY SANITARY SEWER LINE SSGM-11917
REHABILITATION (CIPP)
Project No. 24200**

TABLE OF CONTENTS

INFORMATION FOR BIDDERS	1
LIST OF SUBCONTRACTORS	3
EXPERIENCE.....	4
PIPE THICKNESS FORM	5
PIPE FOREMAN QUALIFICATION FORM.....	7
MANHOLE FOREMAN QUALIFICATION FORM.....	8
GENERAL PROVISIONS	9
SPECIAL PROVISIONS.....	16
A. GENERAL	16
B. SECTION 500 - PIPELINE SYSTEM REHABILITATION.....	19

INFORMATION FOR BIDDERS

All improvement work required to be performed and materials furnished shall be performed and furnished in strict accordance with the applicable portions of: (1) the Plans and Specifications for N.E.C.R. Sewer Line SSGM-11917 Rehabilitation (CIPP), Project No. 24200; (2) "Standard Specifications for Public Works Construction", 2021 edition, by the American Public Works Association (Green Book); (3) Orange County Public Works Department Standard Plans, 2018 edition; (4) "Standard Plans for Public Works Construction", 2021 edition, by the American Public Works Association; (5) "California Building Code", 2021 edition; (6) "California Plumbing Code", 2021 edition; (7) "California Mechanical Code", 2021 edition; (8) "California Electric Code", 2021 edition; "California Fire Code", 2019 edition; (9) "American with Disabilities Act (ADA) Handbook", latest edition; (10) latest editions of the American Water Works Association (AWWA), and City of San Clemente Sewer, Water and Engineering Division Technical Standards and Grading Manual: all as included herein, except for the Green Book which shall apply in general.

All traffic related improvements shall comply with the applicable portions of: (1) "Standard Plans", State of California, Department of Transportation, latest edition; (2) "The Work Area Traffic Control Handbook" W.A.T.C.H. Manual, latest edition; (3) "Standard Specifications", State of California, Department of Transportation, latest edition; (4) State of California Manual of Traffic Controls for Construction and Maintenance Work Zones, latest edition; and (5) California MUTCD 2014 and its revisions.

Project Scope / Contract Intent

Work includes but is not limited to traffic control, pipe cleaning, root removal, sewer line and sewer manhole video inspection (pre and post installation/repair), bypass pumping and rehabilitation of existing sewer line by installation of liner, including reestablishment of impacted lateral connections, sewer manhole repair and sewer line point repair.

The Contractor must submit a completed "Pipe Thickness Form" (see Bid Form) for each host pipe diameter size utilizing the design parameters, physical properties and test data as provided for in the Special Provisions. A new form shall be submitted prior to the start of the each project.

Bidder's Qualifications

Bidder shall possess a Class "A", California State Contracting License in good standing, and shall have successfully completed two projects of similar scope for a public agency. The Contractor and all subcontractors (or concessionaires) must obtain and maintain in effect a valid City of San Clemente Business License prior to commencement of work, and during the entire time that work is being performed under the contract.

The Bidder shall have successfully installed the proposed lining method, a minimum of 5,000 lineal feet of pipe sizes greater than or equal to 6 inches in diameter in the United

States, and also have at least 3 years of qualified experience installing the proposed lining system in the United States, similar to those required for this project. The Contractor shall have performed at least 80% of the contracted work with his own in-house forces. The Contractor shall provide a statement certifying compliance with the experience requirement and information below at the time of the bid submittal. **Failure to provide the listed information with the Bid will cause the City to deem the Bid non-responsive:**

- a. Name of the owner/agency.
- b. Name and telephone number of a contact person with the owner/agency.
- c. Diameter and length of pipe installed.
- d. Project completion date.
- e. A valid California "Confined Space Rescue Training Certification";
- f. Statement indicating whether or not they have had any claims against their bond for completion of work. If so please explain why in detail;
- g. A completed "List of Subcontractors" form.
- h. A completed "Experience" form.
- i. A completed "Pipe Thickness Form.
- j. Proof of meeting lining material chemical resistance requirements per the Standards Specifications. Only this material shall be used during the term of the contract unless approved by the City of San Clemente.
- k. A completed "Pipe Foreman Qualification Form".
- l. A completed "Manhole Foreman Qualification Form".
- m. Provide their Experience Modifications Rate (EMR) for previous three (3) years

The Contractor must also submit a completed "Pipe Foreman and Manhole Foreman Qualification Form" at the time of the bid submittal indicating the name and qualifications of each foreman scheduled to work on the project. The Contractor is required to have at least one qualified foreman on the job at all times during construction. Qualified foreman must have a minimum of 1 year of supervisory field experience on at least 3 successfully completed lining method projects totaling a minimum of 2,000 lineal feet of 6 inch or larger diameter pipe, 1 year of supervisory field experience in Sewer Manhole Repair, and 1 year of supervisory field experience in flow diversion.

EXPERIENCE

Submit a brief description of the character of work previously executed, giving the location, the year in which it was done, the agency or owner, and such other information as will tend to show ability to prosecute the work required by this Specification. List minimum of five (5) trenchless sewer rehabilitation projects successfully completed within the last three (3) years. For each project, provide the name and address of the agency, the contact person and his telephone number, the start and completion dates, and the original bid price and final amount paid.

SEE ATTACHED

MORE REFERENCES CAN BE PROVIDED UPON REQUEST

SANCON TECHNOLOGIES, INC.

GENERAL ENGINEERING CONTRACTOR
STATE CONTRACTORS LICENSE #774055
DIR REGISTRATION #1000008879

Tel: (714) 891-2323
Fax: (714) 891-2524

July 13, 2022

To: A. Cesar Chamorro

RE: Certification of Pipelining Experience

This is to certify that Sancon is the manufacturer/owner of the Sancon CIPP process, as manufactured from commercially available CIPP resin and felt tube supplied products, which meets or exceeds the technical specifications for this particular project and is also in compliance with the provisions of the referenced standards for this project. Sancon's CIPP crews have experience exceeding the requirements in the project.

Sancon is also the manufacturer/owner of Sancon 100 polyurethane protective coating, which is Greenbook approved and meets or exceeds the technical specifications for this particular project. Sancon's Manhole Rehabilitation crews are certified applications of Sancon 100 polyurethane and have experience exceeding the requirements of this project.

Sancon has not had any claims against our bond for completion of work.

Sancon's EMR for the previous (3) years are as follows: 2021: 1.15, 2020: 1.39, 2019: 1.31.

We finally attest to our employee's cognizance and ability to comply with Sancon's IIPP program as well as all Federal and State OSHA regulations regarding confined space entry. All Sancon field employees possess valid California confined space rescue training certification.

Sincerely,

Sancon Technologies, Inc.



Chuck Parsons
President

Sancon Technologies, Inc.

CIPP Completed Projects

1. City of Cypress – Project 265
Paul Tran
Phone: 714-229-6700
Contract Amount: \$115,400
Work Completed In 2021
2. South Coast Water District- Full-Length Lining Repairs
South Coast Water District
Phone: 714-562-3687
Contract Amount: \$195,434
Work Completed In 2020
3. Long Beach Water Department – SSRRP-4 P.O. 21906968
Carolina Avendano
Phone: 562-570-2300
Contract Amount: \$455,443
Work Completed In 2020
4. City of Newport Beach – Sewer and Storm Drain Systems Rehabilitation
Patrick Aciniega
Phone: 949-644-3311
Contract Amount: \$2,553,685
Work Completed in 2020
5. Mammoth Community Service Districts- CIPP Lining 2018
Jerry Baker
Phone: 760-934-2596
Contract Amount: \$250,254
Work Completed in 2018
6. City of San Juan Capistrano – Annual Sewer Rehabilitation Program, CIP 18701
Garrett White
Phone: (760) 445-0220
Contract Amount: \$980,740
Work Completed In 2019

Sancon Technologies Inc.

Sancon 100 Past Project References:

1. Town of Apple Valley
Jabez Vargas
Manhole Rehabilitation Project Phase 3
Rehabilitate (18) Manholes
Contract Value: \$50,000
Phone: 760-240-7000
2. Long Beach Water Department
Valeri Karakanov
FY 14-15 Sanitary Sewer Manhole Rehabilitation Project
Rehabilitate (29) Manholes
Contract Value: \$91,935
Phone: 562-570-2331
3. Ojai Valley Sanitary District
Jim Stallings
Ojai Valley Trail Manhole Rehabilitation Project
Rehabilitate (14) Manholes
Contract Value: \$35,280
Phone: 805-207-9501
4. Town of Apple Valley
Jabez Vargas
Manhole Rehabilitation Project Phase 1
Rehabilitate (12) Manholes
Contract Value: \$40,800
Phone: 760-240-7000
5. University of California, Santa Barbara
Bill @ Tierra Contracting
Infrastructure Renewal project
Coat (19) Manholes
Contract Value: \$35,500
6. Town of Apple Valley
Jabez Vargas
Manhole Rehabilitation Project Phase 2
Rehabilitate (8) Manholes
Contract Value: \$33,704
Phone: 760-240-7000

PIPE THICKNESS FORM

**N.E.C.R. SEWER LINE SSGM-1197 REHABILITATION (CIPP)
PROJECT NO. 24200**

Provide the following information regarding wall thickness.

CONTRACTOR: _____

TEST DATA

FLEXURAL MODULUS

Initial Flexural Modulus (E_i) = _____ psi (Attach ASTM D-790 Test Data)

Long-Term Flexural Modulus (E_L) = _____ psi (Attach Third Party 10,000 Hour Test Data)

FLEXURAL STRENGTH

Initial Flexural Strength (σ_i) = _____ psi

Long Term Flexural Strength (σ_L) = _____ psi

Note: If approved third party 10,000 hour test data is not available, the following long-term data shall be used to determine wall thickness:

$$(E_L) = (0.25) \times (E_i) = \text{_____} \text{ psi}$$

$$(\sigma_L) = (0.25) \times (\sigma_i) = \text{_____} \text{ psi}$$

THICKNESS CALCULATIONS per ASTM F 1216-21 for fully deteriorated gravity pipe

Complete AWWA C950 buckling formula. Bidder shall provide E_L and complete the formula as required.

(Attach calculation sheets)

Calculate required Dimension Ratio (DR):

DR (liner pipe) = Liner Pipe Outside Diameter (O.D) ÷ Min. Wall Thickness

Host pipe diameter = Liner Pipe O.D. ÷ Min. Wall Thickness = Minimum DR

_____ " = _____ " ÷ _____ " = _____

List SDR's available () 18 () 21 () 26 () 32.5 () 35 () 41

() 50 () others _____

List product manufacturer Company: _____

Address: _____

City: _____ State _____ Zip _____

Phone: _____ Fax: _____ E-mail: _____

Method of installing liner () pull-in () inversion () other

Professional Engineer's Certification

Signed by: _____
(Signature)

(Engineer's Seal)

Professional Engineer No: _____

Expiration Date: _____

PIPE THICKNESS FORM

**N.E.C.R. SEWER LINE SSGM-1197 REHABILITATION (CIPP)
PROJECT NO. 24200**

Provide the following information regarding wall thickness.

CONTRACTOR: Saviora Technologies, Inc.

TEST DATA

FLEXURAL MODULUS

Initial Flexural Modulus (E_i) = 300,000 psi (Attach ASTM D-790 Test Data)

Long-Term Flexural Modulus (E_L) = 150,000 psi (Attach Third Party 10,000 Hour Test Data)

FLEXURAL STRENGTH

Initial Flexural Strength (σ_i) = 5,000 psi

Long Term Flexural Strength (σ_L) = 2,500 psi

Note: If approved third party 10,000 hour test data is not available, the following long-term data shall be used to determine wall thickness:

$$(E_L) = (0.25) \times (E_i) = \underline{500 \text{ ATTACHED}} \text{ psi}$$

$$(\sigma_L) = (0.25) \times (\sigma_i) = \underline{500 \text{ ATTACHED}} \text{ psi}$$

THICKNESS CALCULATIONS per ASTM F 1216-21 for fully deteriorated gravity pipe

Complete AWWA C950 buckling formula. Bidder shall provide E_L and complete the formula as required.

(Attach calculation sheets)

Calculate required Dimension Ratio (DR):

DR (liner pipe) = Liner Pipe Outside Diameter (O.D) ÷ Min. Wall Thickness

Host pipe diameter = Liner Pipe O.D. ÷ Min. Wall Thickness = Minimum DR

$$\underline{8} \text{ " } = \underline{8} \text{ " } \div \underline{.13} \text{ " } = \underline{61.54}$$

List SDR's available () 18 () 21 () 26 () 32.5 () 35 () 41

() 50 () others _____

List product manufacturer Company: SANCON CIPP

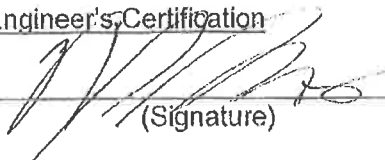
Address: 5841 ENGINEER DRIVE

City: HUNTINGTON BEACH State CA Zip 92649

Phone: 714-891-2323 Fax: 714-891-2524 E-mail: WWW@SANCON.COM

Method of installing liner () pull-in () inversion () other

Professional Engineer's Certification

Signed by: 
(Signature)

(Engineer's Seal)



Professional Engineer No: 26173

Expiration Date: 3/31/23

PIPE FOREMAN QUALIFICATION FORM

Provide the following information for each construction foreman who will work on the project above. Qualified foreman shall have a minimum of 1 year of supervisory field experience on at least three successfully completed pipe rehabilitation methods on projects totaling a minimum of 2,000 LF of 6-inch or larger diameter pipe, and 1 year of supervisory field experience in flow diversion.

CONTRACTOR: _____

FOREMAN: _____

SUPERVISORY FIELD EXPERIENCE – PIPE REHABILITATION:

REHABILITATION METHOD: _____

SUPERVISORY FIELD EXPERIENCE – FLOW DIVERSION:

PROJECT: _____ DATE COMPLETED: _____

NAME OF OWNER: _____

CONTACT PERSON: _____ PHONE NO: _____

PIPE SIZE: _____ LINEAR FEET: _____

PROJECT: _____ DATE COMPLETED: _____

NAME OF OWNER: _____

CONTACT PERSON: _____ PHONE NO: _____

PIPE SIZE: _____ LINEAR FEET: _____

PROJECT: _____ DATE COMPLETED: _____

NAME OF OWNER: _____

CONTACT PERSON: _____ PHONE NO: _____

PIPE SIZE: _____ LINEAR FEET: _____

PIPE FOREMAN QUALIFICATION FORM

Provide the following information for each construction foreman who will work on the project above. Qualified foreman shall have a minimum of 1 year of supervisory field experience on at least three successfully completed pipe rehabilitation methods on projects totaling a minimum of 2,000 LF of 6-inch or larger diameter pipe, and 1 year of supervisory field experience in flow diversion.

CONTRACTOR: SANWEN TECHNOLOGIES, INC.

FOREMAN: NOE GILMARDOS

SUPERVISORY FIELD EXPERIENCE – PIPE REHABILITATION:
SEE ATTACHED

REHABILITATION METHOD: _____

SUPERVISORY FIELD EXPERIENCE – FLOW DIVERSION:

PROJECT: _____ DATE COMPLETED: _____

NAME OF OWNER: _____

CONTACT PERSON: _____ PHONE NO: _____

PIPE SIZE: _____ LINEAR FEET: _____

PROJECT: _____ DATE COMPLETED: _____

NAME OF OWNER: _____

CONTACT PERSON: _____ PHONE NO: _____

PIPE SIZE: _____ LINEAR FEET: _____

PROJECT: _____ DATE COMPLETED: _____

NAME OF OWNER: _____

CONTACT PERSON: _____ PHONE NO: _____

PIPE SIZE: _____ LINEAR FEET: _____

SANCON TECHNOLOGIES, INC.

GENERAL ENGINEERING CONTRACTOR
STATE CONTRACTORS LICENSE #774055 Class "A"

Tel: (714) 891-2323
Fax: (714) 891-2524

Foreman Professional Experience Resume

Noe Granados
Sancon, Inc.
5841 Engineer Dr.
Huntington Beach, CA 92649

Mr. Granados has been employed by Sancon since 1996. He has had increasing responsibilities since his hire date and has been a job foreman on countless pipe lining projects since Sancon began liner installations in 1996 and CIPP installations since 2000. Several large projects that Mr. Granados has completed similar in nature to this project include:

Sewer Rehabilitation Project
City of Huntington Beach
30,000+ LF of pipe lining utilizing CIPP Liners
Project Value: \$1,310,000
Contact: Mark Birchfield 714-375-5041
Email: mbirchfield@surfcity-hb.org

Sewer Rehabilitation Project
City of Costa Mesa
20,000+LF of pipe lining utilizing CIPP Liners
Project Value: \$650,000
Contact: Rob Hamers 949-631-1731
Email: robh2@cox.net

Santa Monica Blvd. Streetscape Project
City of West Hollywood
15,000 LF of pipe lining including Fold & Form PVC + CIPP Liners
Project Value: \$608,000

Mr. Granados's knowledge and experience have proven to be invaluable in our pipe lining projects, including many of our larger and/or more complex pipe lining projects. His supervisory experience encompasses well over one million linear feet of trenchless liners installed successfully and on schedule.

Certifications / Specific Training:
Class A driver
PACP

5841 Engineer Drive
Huntington Beach, CA 92649

MANHOLE FOREMAN QUALIFICATION FORM

Provide the following information for each construction foreman who will work on the project above. Qualified foreman shall have a minimum of 1 year of supervisory field experience on at least three successfully completed sewer manhole repair projects.

CONTRACTOR: _____

FOREMAN: _____

SUPERVISORY FIELD EXPERIENCE – MANHOLE REPAIR:

REPAIR METHOD: _____

PROJECT: _____ DATE COMPLETED: _____

NAME OF OWNER: _____

CONTACT PERSON: _____ PHONE NO: _____

NO. OF MANHOLES REPAIRED _____

PROJECT: _____ DATE COMPLETED: _____

NAME OF OWNER: _____

CONTACT PERSON: _____ PHONE NO: _____

NO. OF MANHOLES REPAIRED _____

PROJECT: _____ DATE COMPLETED: _____

NAME OF OWNER: _____

CONTACT PERSON: _____ PHONE NO: _____

NO. OF MANHOLES REPAIRED _____

MANHOLE FOREMAN QUALIFICATION FORM

Provide the following information for each construction foreman who will work on the project above. Qualified foreman shall have a minimum of 1 year of supervisory field experience on at least three successfully completed sewer manhole repair projects.

CONTRACTOR: SANWON TECHNOLOGIES, INC.

FOREMAN: MIGUEL MENDOZA

SUPERVISORY FIELD EXPERIENCE - MANHOLE REPAIR:

SEE ATTACHED

REPAIR METHOD: _____

PROJECT: _____ DATE COMPLETED: _____

NAME OF OWNER: _____

CONTACT PERSON: _____ PHONE NO: _____

NO. OF MANHOLES REPAIRED _____

PROJECT: _____ DATE COMPLETED: _____

NAME OF OWNER: _____

CONTACT PERSON: _____ PHONE NO: _____

NO. OF MANHOLES REPAIRED _____

PROJECT: _____ DATE COMPLETED: _____

NAME OF OWNER: _____

CONTACT PERSON: _____ PHONE NO: _____

NO. OF MANHOLES REPAIRED _____

SANCON TECHNOLOGIES, INC
MIGUEL MENDOZA, FOREMAN

PROFESSIONAL EXPERIENCE:

Miguel has been employed at Sancon since 2002. He began work at Sancon as a laborer and has progressed through the ranks to his current position as coating foreman. During his tenure at Sancon he has been integral in the success of many projects some of which are listed below:

Kern Generating Station Tunnel Repairs (SCE)

Lined and repaired 2,000 lineal feet of 84" and 102" concrete tunnel

Mohave Generating Station (SCE)

- Unit 1 and Unit 2 Circulation Tunnels (annual inspection and repair)
- Cooling tower basin rehabilitation (7 towers over 7 years)

Calpine Generating Station (Bullhead City, AZ)

Circulation Tunnel Repairs including repair of tunnel joints and stabilization of the tunnel.

Long Beach Generating Station (NRG)

Installed internal joint seals in 72" diameter tunnel and provide injection grouting operations to prevent infiltration and exfiltration

Headworks "C" (OCSD)

Installed internal joint seals in 42" trunk sewer terminating at the OCSD Plant 2 Headworks under live flow conditions and supervised 20 MGD bypass during the course of the project.

South Metro Interceptor Tunnel Sewer Rehabilitation - City of San Diego

Repair of more than 300 locations of failed PVC liner in a live 84" diameter tunnel sewer.

Sunflower Trunk Sewer Manhole Rehabilitation - OCSD

Rehabilitate (31) 84" diameter manholes and repair internal PVC pipeliner in live 60" 72" & 84" trunk sewer. This project was very complex and required flow diversions in 5 cities during low flow periods to allow for a minimum safe working environment within the Sunflower Trunk Sewer.

Beverly Hills Manhole Rehabilitation - Beverly Hills

Rehabilitation of (550) sewer manholes using the Sancon 100 Polyurethane manhole rehabilitation system.

SPECIAL TRAINING/ CONTINUING EDUCATION AND CERTIFICATIONS:

Ameron Certified Welder
Confined Space Entry Supervisor, Current
WACO Scaffolding Certified Competent Person
CPR/First Aid, Current



(714) 891-2323
FAX (714) 891-2524

Manhole and Structure Rehabilitation References

1. Ojai Valley Sanitation District
OVSD Manhole Rehabilitation 2021
Reference: Travis Fisher 805-207-9499
Scope: Rehabilitate 55 manholes with Sancon 100 (7,000 SF)
Foreman: Miguel Mendoza

2. Yorba Linda Water District
FY21 Sewer Rehabilitation
Reference: Jeannette Guereca 714-701-3000
Scope: Rehabilitate 28 manholes with Sancon 100 (3,000+ SF)
Foreman: Miguel Mendoza and Gilbert Medrano

3. Costa Mesa Sanitary District
Steve Cano
234 East 17th Street, Suite 205
Costa Mesa, CA 92627
Phone: (949) 645-8400
Rehabilitate (27) Manholes and (3) Wet Wells using Sancon 100
Project Name: 324
Foreman: Miguel Mendoza

4. South Coast Water District
Joe McDivitt
31592 West Street
Laguna Beach, CA 92651
Phone: 949-499-4555
Rehab (22) Manholes Avg. 10' deep in Capistrano/Dana Point using Sancon 100
Project Name: Manhole Rehab 15-01-03
Foreman: Miguel Mendoza

5. City of Santa Maria
Russ Newman
810 W Church St
Santa Maria, CA 93458
Phone: 805-925-0951
Rehabilitate (22) Manholes using Sancon 100
Foreman: Miguel Mendoza

GENERAL PROVISIONS

N.E.C.R. SEWER LINE SSGM-11917 REHABILITATION (CIPP) PROJECT NO. 24200

Reference is hereby made to "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION", latest edition, including all supplements thereto, for General Provisions, and same are by such reference incorporated herein and made a part of the Specifications the same as though fully set forth hereunder.

Water

The Contractor will be responsible for all costs, permits and fees for providing water for the construction of this project. Hydrant meter installation can be arranged by contacting the City's Water Division, 380 Avenida Pico, San Clemente, (949) 361-6149.

The City encourages the Contractor to make arrangements to purchase recycled water from independent sources and/or reclaimed water from the City.

Street Cleaning, Cleanup & Dust Control

All surplus materials shall be removed from the site of the work immediately after completion of the work.

Failure of the Contractor to comply with the Engineer's dust control orders may result in an order to suspend work until the condition is corrected and, after giving notice to the Contractor, the Engineer may order the condition corrected by others. All costs thus incurred shall be deducted from the amount to be paid to the Contractor. No additional compensation will be allowed as a result of such suspension.

No separate payment will be made for any work performed nor material used to control dust resulting from the Contractor's performance of the work or from public traffic, either inside or outside right-of-way. Full compensation for such dust control will be considered to be included in the prices paid for the various items of work involved.

Project Schedule & Commencement of Work

If applicable, prior to commencement of construction, meeting arrangements will be made between Contractor, Engineer, and utility companies' representatives. The purpose of this meeting is to organize the activities of the Contractor within the limits of this contract, review scheduling, discuss construction methods and clarify inspection procedures. The Contractor will be required to submit for approval by the Engineer a plan with complete detailed construction schedule showing the number or working days required on a project by project basis.

Traffic Control

For the protection of traffic in public or private streets and ways, the Contractor shall provide, place and maintain all necessary barricades, traffic cones, delineators, warning signs, lights and other safety devices in accordance with the requirements of the "Manual of Warning Signs, Lights and Devices for Use in Performance of Work Upon Highways", as issued by the State of California, Department of Public Works, Division of Highways and "Work Area Traffic Control Handbook", latest edition, as issued by American Public Works Association. The Contractor shall take all necessary precautions for the protection of the work and the safety of the public. All barricades and obstructions shall be illuminated at night, and all lights shall be kept burning from sunset until sunrise. White reflective bands shall be placed on all cones and delineators at night. The Contractor shall station such guards or flagmen and shall conform to such special safety regulations relating to traffic control as may be required by the public authorities within their respective jurisdictions. All signs, signals and barricades shall conform to the requirements of 29 CFR Part 1926 Subpart G of OSHA Safety and Health Standards for Construction.

It is the City's requirement that through traffic shall be maintained at all times. Each travel lane shall be a minimum 12' wide. Access to driveways shall be required at all times. The Contractor shall provide qualified flagmen with appropriate equipment and signs to direct traffic as needed to the satisfaction of the City Inspector. If flag men are required to direct traffic, communication devices such as radios, CB, etc. shall be provided to them by contractor. Temporary crosswalks shall be provided per the WATCH manual. However, if the City Engineer, or his designee, determines that it is necessary to close and detour traffic around the site, the Contractor shall provide all necessary requirements for traffic control, including signs, barricades and flashers necessary to close/detour traffic around site as directed by the City Traffic Engineer.

At least 48-hours prior to construction within the street right-of-way, the Contractor shall post signs at construction limits affected by the project. The signs shall be readable to traffic from a minimum distance of 75 feet. All the signs shall be removed from the site after completion of construction activities.

The Contractor shall maintain a 24-hour emergency service to remove, install, relocate, and maintain warning devices and shall furnish to the authority, names and telephone numbers of three persons responsible for this emergency service. In the event these persons do not promptly respond when notified, or it becomes necessary to call other forces to accomplish emergency service, the Contractor will be held liable for any costs incurred. These costs will be deducted from the moneys due to the Contractor.

All existing permanent traffic control signs, barricades and devices shall remain in effective operation unless a substitute operation is arranged for and approved as a portion of vehicular traffic control above. Prior to the start of each work day, the Contractor shall perform all necessary work incidental to and commensurate with the proper signing, detouring, barricading, etc., heretofore and hereinafter specified that is required for that particular day's schedule of operations. No construction shall be permitted until such signing and detouring operations have been completed.

The Contractor, at his or her expense, shall submit a detailed traffic control plan to the City Traffic Engineer for approval within three (3) working days after receipt of Notice to Proceed. The plan shall show the proposed section phasing and traffic control for each phase. Locations of detour signing on all intersections and adjacent streets along the detour route shall be shown. The City will approve or comment and return the traffic control plan to the Contractor for revisions within three (3) working days after each receipt. The Contractor shall respond to the City's comments within three (3) working days by resubmitting revised traffic control plans. The revised control plan shall comply with all City comments without exceptions. The Contractor shall notify and furnish copy of the approved traffic control plan to the Public Works, Fire and Police Departments.

Contractor shall use illuminated or reflective warning/construction signs at appropriate locations for the project and/or as directed by the Engineer. Contractor shall also use flashing arrow boards at lane closure tapers in addition to other delineation.

Should the Contractor not furnish and maintain warning and protective measures as stated above, the Engineer will direct attention to the existence of a hazard, and necessary warning and protective measures shall be furnished, installed and maintained by the Contractor immediately. Continued failure to furnish and maintain warning and protective measures by the Contractor will result in the discontinuance of all work until such time as the Engineer deems that appropriate steps have been taken by the Contractor to correct the situation. Should the Engineer fail to point out the inadequacy of warning and protective measures, such action on the part of the Engineer shall not relieve the Contractor from the responsibility for public safety or abrogate his obligation to furnish and pay for these devices.

Contractor shall at all times provide sufficient safety traffic devices. At the end of each work day normal vehicular traffic shall be restored. When applicable, and at the discretion of the City Engineer, any open excavation shall be completely covered with plywood and enclosed with approved six (6) foot fence or covered and bridged with steel plates. Non-skid, welded haring-bone pattern steel plates shall be secured by pinning and surrounded with temporary AC pavement.

The Contractor shall coordinate efforts and cooperate with the Orange County Transit District as needed to maintain bus schedules and service.

The Contractor shall notify the trash pick-up company, CR&R, of the schedule of work and the limitation of access.

Payment for all of the preceding shall be included in the lump sum contract unit price bid for "Traffic/Pedestrian Control", and no additional compensation will be allowed.

Contractor shall place and relocate, as required, signage, barricades, markers, or other methods to designate and control construction traffic.

Site Maintenance

The Contractor shall maintain the site in a clean, safe and adequate condition for pedestrian and vehicular traffic. The Contractor shall provide a 24 hour per day, 7 days a week emergency number for the City to call to report neglect of the aforementioned requirements. If the City is unable to reach the Contractor, if the Contractor does not respond, or if the City Inspector considers the response time too long given the nature of the problem, the City shall reserve the right to call in another Contractor or City crew to correct the problem. The Contractor shall be billed for the corrections at cost plus 15% for private services. The City's expense will be billed at cost. The need for corrective action shall be at the discretion of the City. This includes off hour emergency repairs to any temporary highline in place.

When applicable, and at the discretion of the City Engineer, any open excavation shall be completely covered with plywood and enclosed with an approved six (6) foot chain link fence or covered and bridged with **recessed** steel plates. Non-skid, welded herring-bone pattern steel plates shall be secured by pinning and surrounding with temporary A.C. pavement.

Plans & Specifications

If, after the contract is awarded, it appears that the work to be done or matter relative thereto is not sufficiently detailed or explained in the specifications and plans, the Contractor shall apply to the Engineer for such further explanations as may be necessary and shall conform to such explanation or interpretation as part of the contract.

All scaled dimensions are approximate. Before proceeding with any work, the Contractor shall carefully check and verify all dimensions and quantities and shall immediately inform the Engineer or his representative of any discrepancies.

Utilities - Location

Locations of utilities shown on plans are approximate only and are based on a search of available records. Prior to commencing any other work, the Contractor shall carefully excavate and determine precise locations and depths of all utilities, including service connections and any abandoned lines, which may or may not be shown on the plans and marked in the field, which may affect or be affected by the Contractor's operations. This work shall be done in accordance with Section 5-1 of the Standard Specifications. It is the Contractor's responsibility to verify whether or not any existing utilities shown per plan or not shown will conflict with the proposed improvement prior to constructing any part of it. The Contractor shall not be compensated for any delays or extra work brought about by his failure to perform the above-mentioned work. The Contractor shall be responsible for any damage to existing utilities shown on the plan. The Contractor shall be responsible for locating and working around any abandoned facilities which may be encountered.

Maintaining Utility Service

The Contractor shall coordinate with the residents any necessary temporary disconnection of utility services. The City shall be notified of any said temporary disconnection of utility services. All tools, equipment, personnel and materials shall be on hand to make new connections before disconnecting existing services. The connection shall be performed in a timely manner such that disruption of service is minimal.

Survey Service

Unless otherwise provided in the Special Provisions, lines and grades for construction shall be the responsibility of the Contractor, with the following provisions:

All work under this contract shall be built in accordance with the lines and grades shown on the plans. Field survey for establishing these and for the control of construction staking, shall be under the supervision of a California-licensed Land Surveyor or by a California-licensed Civil Engineer allowed by law. Staking shall be performed on all items ordinarily requiring grade and alignment, at intervals normally accepted by the agencies and trade involved.

Unless a separate bid item is provided, the payment for surveying, construction staking, professional services, office calculations furnishing all labor, materials, equipment, tools and incidentals, and for doing all work involved shall be considered as included in the various items of work, and no additional compensation will be allowed.

Permanent Survey Markers

Any ties, monuments and bench marks which are distorted or destroyed without the City's permission shall be reestablished and replaced after construction at the Contractor's expense. The Contractor and his sureties shall be liable, at Contractor's expense, for any resurvey required due to his negligence in protecting existing ties, monuments, bench marks or any such horizontal and vertical controls.

Mobilization

See 'Mobilization' of the Special Provisions. Mobilization shall consist of preparatory work and operations including, but not limited to, those necessary for the sequencing of the work, movement of personnel, equipment, materials and incidentals to the project site necessary for work on the project and for all other work and operations which must be performed or costs incurred, including bonds, obtaining city business licenses as required, insurance and financing, prior to beginning work on the various contract items on the project site. Mobilization shall also include the time and labor to move the necessary construction equipment to and from the job site, supervisory time on the job by the Contractor's personnel to keep the construction site in a safe condition and of all other related work as required for non-working days during construction. The Contractor is responsible for securing an adequate storage site for equipment and materials.

The Contractor shall have on the work site at all times, as his agent, a competent English-speaking superintendent capable of reading and thoroughly understanding the plans and specifications and other related documents.

Working Hours

The Contractor shall perform all work required, **except as noted on the Bid Schedule**, between the hours of 8:00 a.m. and 4:30 p.m., Monday through Friday, excluding City Holidays, unless approved in advance, in writing, by the City. Request for overtime work shall be submitted to the City, 24 hours in advance. The Contractor shall reimburse the City for all costs incurred for overtime work (work exceeding 8 hours per day). The overtime work costs will be deducted from the moneys due to the Contractor.

Construction Limits and Access

The Contractor shall confine his work to the street right-of-way and easements unless indicated otherwise on the construction plans or as directed by the Engineer.

Permits and Inspection Costs

The Contractor may be required to obtain such permits as may be required by ordinances and regulations of the public agencies having jurisdiction over the areas in which the work is located, and shall comply with all the terms and conditions thereof and with all lawful orders and regulations of each such public agency relating to construction operations under the jurisdiction of such agency, and no additional compensation will be allowed therefore.

Where the property of the Federal Government, the State of California, the County of Orange, the City of San Clemente, local utilities, or any other agency is affected by the work included in this contract, the Contractor shall be responsible for obtaining all necessary permits lawfully exacted by said Government, State, County, City, District, Department, or other agency during the time of performing the work affecting said property. The City will reimburse the Contractor for the actual permit costs plus 15% overhead. The Contractor shall bear all costs of traffic regulation and traffic control devices lawfully exacted by said State, County, City, or other agency during the time of performing the work affecting said property.

The Contractor will not be required to pay for inspection provided by the City except for overtime as noted under "Working Hours" herein. The City will provide inspection for all work to be performed under the contract. All materials and work shall be performed only in the presence of the Engineer or his authorized inspector, and any work performed in the absence of said Engineer or authorized inspector shall be subject to rejection.

Where required under the terms of the permits, the Contractor shall obtain liability insurance acceptable to and in an amount required by the public agency having jurisdiction. The policy shall insure said agency against all claims arising out of or in

connection with the work to be performed and shall remain in full force and effect until the work is accepted by the City. The Contractor shall furnish to each such agency a certificate of protective liability insurance showing the protection afforded and the amount thereof.

Neither the terms thereof nor anything shown on the drawings in connection with rights-of-way, shall be in violation of existing regulations restricting interference with watercourses and drainage channels. The Contractor shall take adequate precautions against obstructing storm water flow in any affected materials in any area where they might interfere with or be subject to erosion from such flow.

SPECIAL PROVISIONS

N.E.C.R. SEWER LINE SSGM-11917 REHABILITATION (CIPP) PROJECT NO. 28206

Reference is hereby made to "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION", 2021 edition, including all supplements thereto, are incorporated herein and made a part of the Specifications the same as though fully set forth hereunder. The following are additions and exceptions to the said Standard Specifications and all other provisions of the said Standard Specifications are to remain in effect.

A. GENERAL

COMPLETION, ACCEPTANCE, AND WARRANTY

Section 3-13 of Standard Specifications (add the following subsection)

Acceptance

Prior to acceptance of the work, the Engineer shall review the post-installation video inspection and determine whether and where portions of the work are not in conformance with ASTM F 1216-21, and these special provisions. The Contractor shall correct all such portions by means as approved by the Engineer.

Warranty

During the 1-year warranty period, the Contractor, at no expense to the City, shall repair or replace the liner using methods as approved by the Engineer for any of the following reasons:

- a. Leakage through the liner or between the liner and host pipe.
- b. A reduction of the liner thickness of more than ten percent (10%) caused by corrosion or abrasion.
- c. Separation of the liner from the host pipe.
- d. Any other failure due as a result of faulty material and/or improper installation, including wrinkles or folding of the liner.

The Contractor shall submit detailed procedures for repairing the work prior to making such repairs.

Prior to the end of the 1-year warranty period (approximately 1 month prior), the City will conduct a closed circuit television inspection of the lined pipes. The Engineer will review the video recording and determine whether and where portions of the work contain defects resulting from faulty material and/or improper installation. The Contractor shall correct all such portions including lateral openings, in accordance with

the original contract documents and at no expense to the City, by means as approved by the Engineer.

WORK SITE MAINTENANCE

Section 3-12 of Standard Specifications (add the following subsection)

Erosion Control and BMP's

The Contractor shall maintain the site in a clean, safe and adequate condition for Best Management Practices (BMP's), erosion control, pedestrian and vehicular traffic. The Contractor shall provide a 24 hour per day, 7 days a week emergency number for the City to call to report neglect of the aforementioned requirements. If the City is unable to reach the Contractor, if the Contractor does not respond, or if the City Inspector considers the response time too long given the nature of the problem, the City shall reserve the right to call in another Contractor or City crew to correct the problem. The Contractor shall be billed for the corrections at cost plus 15% for private services. The City's expense will be billed at cost. The need for corrective action shall be at the discretion of the City.

Substance Control

Disposal of all refuse, excess materials and all other substances, shall be in compliance with all City, County, State and Federal rules, regulations and laws.

Under no circumstances will construction water be permitted to enter into the storm drain system. Construction water entering the existing gutters shall be retained and trapped by the placement of sandbags or berms. Such trapped water shall be collected and removed from the gutters at the end of each workday.

Under no circumstances will the dumping of raw sewage on private property or in City streets or storm drains be allowed. Should the Contractor disrupt existing sewer facilities, sewage shall be conveyed in closed conduits and disposed of in a sanitary sewer system. Sewage shall not be permitted to flow in trenches or be covered by backfill.

Any sewage spilled by the Contractor during the project shall be the responsibility of the Contractor. Any Federal, State, or local fines shall be paid by the Contractor. Fines may consist of \$10,000 per occurrence and \$10.00 per gallon.

A clean portable sanitation facility shall be provided for use by the Contractor's crews and the City staff.

Full compensation for Project Site Maintenance shall be included in unit prices bid for various items of work involved.

PROTECTION AND RESTORATION OF EXISTING IMPROVEMENTS

Section 4-2 of Standard Specifications (add the following subsection)

Restoration of Private Property

The Contractor shall repair and restore all improvements, structures, property, vegetation, utilities and facilities disturbed, disconnected or damaged as a result or consequence of the Contractor's work or the operations of those for whom the Contractor is responsible or liable, including that caused by trespass with or without the Contractor's knowledge or consent, or by the transporting of workers, materials or equipment to or from the work site.

Damage caused by trespass or the transport of workers, materials, or equipment shall be repaired immediately by means and methods as approved by the Engineer.

Damage resulting from the Contractor's work shall be repaired immediately upon completion of said work. The Contractor shall submit construction details to the Engineer for approval prior to commencing any restoration necessitated by the Contractor's work.

All restoration work shall be completed to the satisfaction of the Engineer and the appropriate property owners.

Full compensation for Protection and Restoration of Existing Improvements shall be included in unit prices bid for various items of work involved.

PUBLIC CONVENIENCE AND SAFETY

Section 3-12.4 of Standard Specifications (add the following subsection)

Staging and storage areas shall be located within the limits of construction.

Section 5.7.1 of Standard Specifications (add the following subsection)

Safety

The Contractor shall carry out his operations in strict accordance with all applicable safety regulations and standards. Particular attention is directed to those safety requirements involving open trench, scaffolding and entering of confined spaces. The Contractor's personnel shall be certified for confined space entry.

Payment

Public Convenience and Safety shall be included in the lump sum unit price bid for Traffic Control.

MOBILIZATION

Section 7-3.4 of Standard Specifications (add the following subsection)

Mobilization shall conform to the provisions stated in the General Provisions and herein.

The Contractor shall provide at own expense a mobile cellular telephone for use of Contractor and Sub-Contractors, and for use of the City representatives, limited to local calls at Contractor's expense.

Payment

Payment shall be per the agreed price on the bid form for "Mobilization" and shall be considered full compensation for furnishing all labor, materials, equipment and incidentals necessary to perform the items of work. Progress payments for this item shall be paid in accordance with the completion percentage of the project to the Contractor, and shall include the cost of such mobilization and administration for the entire contract period. No additional compensation will be allowed for furnishing labor, materials, equipment, rental of necessary storage sites for storage of equipment, obtaining all City business licenses as required, and incidentals necessary to perform the items of work.

B. SECTION 500 - PIPELINE SYSTEM REHABILITATION

GENERAL

Section 500-1 of Standard Specifications (add the following subsection)

STORAGE AND HANDLING

Storage area and handling of liner pipes and rehabilitation material shall be the responsibility of the Contractor.

The liner pipes to be impregnated with thermosetting resin shall be done in accordance with the Standard Specifications and these Special Provisions at an off-site facility approved by the Engineer. The Contractor shall designate the facility location and wet out schedule and shall allow the Engineer to inspect all materials and procedures. No wet out activities shall occur at the project site. The resin impregnated fabric tubes shall be stored and delivered to the site in accordance with the manufacturer requirements or recommendations.

The manufacturer shall exercise extreme care during transportation, handling, storing, and installation of the liner to ensure that the material is not torn, cut, or otherwise damaged. If any part or parts of the liner material becomes torn, cut, or otherwise damaged before or during installation, it shall be repaired or replaced before proceeding with further installation, and at no additional cost to the City. The Contractor shall handle and store the liner as recommended by the manufacturer to ensure installation in a sound, undamaged condition. The Contractor shall follow the resin manufacturer's requirements for handling and storage of the resin prior to, during, and following impregnation of the tube.

Full compensation for Storage and Handling shall be included in unit prices bid for various items of work involved.

Other Requirements

It will be the responsibility of the Contractor to notify local residents before and after liner installation, providing traffic control, locating manholes, excavating pits where allowed to access existing sewer and storm drain lines, constructing temporary fencing to maintain the integrity of existing walls and fences on private property, cleaning existing pipe, CCTV inspection as required, making preparatory spot repairs to existing pipe, bypassing sewage and storm drain flows during installation, inserting liner, curing liner, testing for water tightness, locating, re-establishing and reconnecting all active sewer laterals, and post lining testing.

The Contractor shall carry out his operations in strict accordance with all applicable regulations and standards. Particular attention is directed to those safety requirements involving working with scaffolding and entering confined spaces. The Contractor's personnel shall be certified for confined space entry.

It will be assumed that the Contractor has examined the site of the work, record drawings, aerial photographs, video recordings and logs, the proposal and these special provisions, and is satisfied as to the conditions to be encountered, the character, quality, and quantities of work to be performed and materials to be furnished, and as to the requirements of the specifications, the special provisions, and the contract. It is mutually agreed that the submission of a proposal shall be considered prima facie evidence that the bidder has made such examination.

Full compensation for General shall be included in unit prices bid for various items of work involved.

SUBMITTALS

Section 500-2 of Standard Specifications (add the following subsection)

The Contractor shall submit Material Safety Data Sheets prior to the start of each job on a location by location basis. The Contractor shall certify that all operations shall be in accordance with all Federal, State, and Local environmental, health, and safety standards.

The Contractor is required to submit pipe design calculations prior to the start of each project on a location by location basis; pipe shall be designed per the fully deteriorated gravity pipe condition. Calculations shall be signed and stamped by a registered engineer.

All working drawings, data and samples shall be subject to review by the Engineer for conformity with the plans and specifications.

The Contractor shall provide procedural criteria and its processes by indicating all necessary steps to ensure adequate venting and/or exhausting of all noxious fumes or odors generated during and remaining after the curing process is completed. This process will remain in place at all manholes, laterals, etc. until all noxious odors have dissipated to and acceptable level in accordance with CAL OSHA requirements for the materials used and there is no more air pollution or potential health hazard left to the general public or the construction workers.

BYPASSING

Bypassing shall be the responsibility of the Contractor. The Contractor shall submit to the Engineer for approval the method of bypassing existing flows in the pipe during the installation and/or curing processes. Any damage to private property or within the City right-of-way, to landscaping, irrigation, structures, or any other appurtenances will be repaired or replaced by the Contractor to the satisfaction of the City Engineer or designee.

Additional requirements include the following:

- Ensuring a pumping capacity that meets the maximum flow as shown on the plans. Sewer flow estimated on the plans may vary from 0 gpm to the maximum shown on plans.
- Ensuring that 100% back-up pump and power is provided.

Prior to the start of each project on a location by location basis, the Contractor shall prepare and submit to the Engineer for approval, a comprehensive Bypass Plan detailing the exact methods and procedures to be used for full flow diversion during installation of the liner.

The Bypass Plan shall minimally include the following elements and stipulations:

- Written procedures for bypass operations.
- Specific location and configuration of pumping equipment for each bypass.
- Pipe alignment for each bypass including vehicle access provisions.
- Full pumping system redundancy is required. Primary pump(s) at 120% of peak flow.
- Minimum 8-hr. emergency fuel storage on-site is required.
- Pumping system shall be continuously manned while operating.
- Technical shop drawings for bypass pump(s) indicating peak bypass capacity.
- Spill response and notification procedures including emergency phone numbers.

All shop drawings and bypass pumping plans shall be submitted directly to the Engineer. The shop drawings shall be submitted for review whether the products and construction methods are furnished per the Plans & Specifications and all equipment shall be submitted for review. The Contractor shall furnish to the Engineer such working drawings, data on materials, flow calculations, design calculations, corrosion testing, flexural modulus testing, long-term creep testing, equipment and samples as are required for the proper control of the work including, but not limited to written description of the construction methods and equipment to be used for storage, handling,

installation, curing, control, cool-down, finish of the liner and equipment layout, as well as proposed access locations.

Full compensation for Submittals shall be included in unit prices bid for various items of work involved.

Full compensation for Storage and Handling shall be included in unit prices bid for various items of work involved.

CLEANING AND PRELIMINARY INSPECTION

Section 500-3 of Standard Specifications (add the following subsection)

The Contractor shall provide the Engineer with 48 hours notice before commencing preliminary pipe cleaning operations. Cleaning shall be completed as required for successful rehabilitation of the pipeline. During the cleaning operation, all roots shall be trapped and captured. Roots will not be allowed to be flushed downstream. All materials shall be removed and disposed of at the Contractor's expense.

Preparatory spot and point repairs may be required. Repair work shall be performed from the inside of the existing pipe using methods approved by the Engineer. Repair work requiring excavation shall be allowed only when approved by the Engineer.

Full compensation for Cleaning and Preliminary Inspection shall be included in unit prices bid for various items of work involved.

EQUIPMENT

Section 500-3.2.1.3 of Standard Specification (add the following subsection)

Equipment shall conform to the provisions stated in the General Provisions and herein.

High-Velocity Jet (Hydrocleaning) Equipment: All high velocity sewer cleaning equipment shall be constructed for ease and safety of operation. The equipment shall have a selection of two or more nozzles. The nozzles shall be capable of producing a scouring action from 15 to 45 degrees in all size lines designated to be cleaned. The equipment will have a minimum working pressure of 2,000 psi at a 60 gpm rate. Equipment shall also include a high-velocity gun for washing and scouring manhole walls and floor. The gun shall be capable of producing flows from a fine spray to a solid stream. The equipment shall carry a nominal 800-gallon minimum water tank, auxiliary engines, pumps, and a minimum of 650 feet of high-pressure hose on a hose reel.

Section 500-3.2.2 (CCTV) System Equipment of Standard Specifications

CCTV system equipment shall include television cameras, a television monitor, cables power sources, and other equipment. The focal distance shall be adjustable through a range from 6 inches (150 mm) to infinity. The remote-reading footage counter

shall be accurate to less than 1 percent error over the length of the particular section of pipeline being inspected. This distance shall be measured from the centerline of the manhole to the centerline of the next manhole. The camera and television monitor shall produce a minimum 350 lines per inch (14 lines/mm) resolution. Telephones, radios, or other suitable means of communication shall be set up to ensure that adequate communication exists between members of the crew.

The CCTV inspection camera utilized shall be specifically designed and constructed for sewer and or storm drain inspection. The CCTV inspection camera shall be operative in 100 percent humidity conditions. Lighting for the camera shall minimize reflective glare. Lighting and picture quality shall be suitable to provide a clear, in-focus picture of the entire periphery of the pipeline for all conditions encountered during the work.

The CCTV inspection camera shall be mounted on a skid, floatable raft system, or transporter based on the conditions of the pipeline to be televised.

The CCTV inspection system to be utilized shall be approved by the engineer prior to the work being performed.

Section 500-3.3 Pipeline Cleaning of Standard Specifications

When utilizing high-velocity hydraulic cleaning equipment independently or in combination with other cleaning methods, a minimum of 2 passes with the hydraulic nozzle shall be done unless otherwise approved by the Engineer.

If cleaning cannot be completed from one manhole, the equipment shall be moved and set up on the other manhole and cleaning shall be re-attempted. If successful cleaning still cannot be performed or the equipment fails to traverse the entire pipeline section, it shall be assumed that a major blockage exists. Efforts to clean the lines shall be temporarily suspended and the Contractor shall notify the Engineer. Upon removal of the obstruction, the Contractor shall complete the cleaning operation.

Contractor shall dispose of all debris removed from the pipeline in accordance with Federal, State, and local laws and regulations.

Section 500-3.4 of Standard Specifications (add the following subsection)

The Contractor shall use color video equipment and a rotating-lens or pan and tilt camera. The video recording shall indicate the date, time, and location of each inspection and a running total of pipeline footage. Video recordings of low quality such as poor lighting and technical irregularities will be rejected. Video counters for measuring exact lineal footage shall be calibrated daily with the inspector present.

Television inspection will be required at the following stages of construction:

1. Prior to cleaning of host pipe and or insertion of a pipe liner;

2. After cleaning or;
3. After insertion of pipe liner and re-establishment of sewer lateral connections

All stages of video inspection shall be reviewed and approved by the Engineer. The Contractor shall provide a copy of the video inspections (DVD format) to the City, which shall become the property of the City. During the inspection, the Contractor shall keep a log suitable for future reference which documents existing conditions on the interior of the pipe. Both the original log and the original video recording shall become the property of the City. If the Contractor desires to have an original copy of the video recording, then the Contractor shall record two videos simultaneously during the video inspection. One video recording shall become the property of the City and the second shall be the property of the Contractor. Video recordings of low quality such as poor lighting and technical irregularities will be rejected.

The Engineer will review the recording of the preliminary video inspection and determine whether and where preparatory repairs are needed. Preparatory repairs shall be made by the Contractor prior to the insertion of the liner. Possible preparatory repairs that may be required on this project include, but are not limited to, removing protruding laterals, roots and built-up deposits including concrete on the inside of the host pipe, and performing point and spot repairs. All preparatory repairs shall be performed from the inside of the existing pipe using methods as approved by the Engineer. Repair work requiring excavation shall be allowed only when approved by the Engineer.

Full compensation for CCTV Inspection shall be included in unit price bid for sewer and manhole rehabilitation.

VIDEO INSPECTION REPORT REQUIREMENTS

Upon Completion of the video inspection, the service provider shall provide the agency with an Inspection Report that includes the following.

1. Brief Summary of work performed;
2. Summary list of all pipeline segments inspected (i.e. structure to structure);
3. Inspection reports (log sheets) of each segments;
4. All original recordings (via external drive or thumb drive);
5. Summary list of recorded observations and defects;
6. Photo's of major defects for each pipeline segment (in JPEG format).

The Contractor shall use the National Association of Sewer Service Companies (NASSCO) PACP defect coding and rating system on the Inspection Report and also the Summary List of Recorded Defects.

Each pipe segment (structure to Structure) shall be identified with an initial screen text and shall include the following:

1. Agency project or contract number
2. Video date

3. Weather history
4. Contractors name
5. Contractor operator(s) name (s)
6. Street location name
7. Structure ID upstream
8. Structure ID downstream
9. Pipeline segment ID
10. Direction of Camera – with or against flow
11. Pipe Material(s)
12. Pipe length
13. Pipe size

Running Screen Text – During the CCTV inspection, the running screen shall show the running footage (distance traveled) and the following text information at the bottom of the screen:

1. Street Intersection – upstream
2. Structure number – upstream
3. Structure number – downstream
4. Pipe size
5. Pipe length
6. Date
7. Time of day

Ending Screen Text – At the end of each pipe segment, and ending screen text shall include the following:

1. “End of Segment Inspection”
2. Condition that prevented a complete inspection, if applicable.

Cured-In-Place Pipe (CIPP) Liner, Felt or Fiberglass Liner. Section 500-5.5 of the Standard Specifications.

Section 500-5.5.2 of Standard Specifications (add the following subsection) The required wall thickness of CIPP liner shall be in accordance with the design formulae in ASTM F1216-21 for “Fully Deteriorated” (structural) gravity pipe per ASTM F-1216 using the design parameters and physical properties listed below:

Design Formula Values:

Flexural Modulus of Elasticity (E _i)	300,000 psi
Flexural Strength (a)	5,000 psi
Mean Diameter (D)	8.00 – 24.00 inches
Ovality (q)	2.00 %
Max. External Water Pressure to Flowline	4.00 feet above top of pipe
Depth at top of Conduit	2 feet to 12.5 feet
Soil Density	120 pcf
Soil Modulus	1000 psi

Safety Factor for External Loads (N)	2
Total Earth Loading	16,000 lbs

The minimum liner wall thickness allowable shall be as determined by the design formulas and as tested per ASTM D 790. The Flexural Modulus of Elasticity (E_i) for the liner shall be a minimum of 300,000 psi as determined by ASTM D-790. The long-term Flexural Modulus of Elasticity (E_L) shall be a minimum 50% reduction of E_i or more as specified herein. The liner shall satisfy the minimum wall thickness, minimum Flexural Modulus of Elasticity and minimum Flexural Strength requirements as specified herein. The Contractor shall submit a completed "Pipe Thickness Form" with the following test data at the time of bid submittal:

- a. Flexural Modulus of Elasticity (E_i) and Flexural Strength test data in accordance with ASTM D-790.
- b. 10,000-hour third-party long-term Flexural Modulus of Elasticity (E_L) and Flexural Strength (σ_L) test data in accordance with ASTM D-2990 at 10,000 hours, or equal 10,000-hour test, as approved by the Engineer.

If approved 10,000-hour test results are not available, the Contractor shall use a minimum 75% reduction (25% retention) of E_i for the liner wall thickness calculations. Contractor shall submit the "Pipe Thickness" form signed and sealed by a registered civil engineer including supporting test data with the bid proposal. If the Contractor does not submit a completed "Pipe Thickness Form" and the required test data, the bid shall be non-responsive. Payment for all submittals shall be included in the bid price per foot for the liner.

The Contractor shall provide design cut sheets per the shop drawing section in special provisions in these specifications. Design shall be per the fully deteriorated condition when applicable to calculating pipe design or minimum thickness.

Chemical Resistance Testing

Section 500-5.5-4 of Standard Specifications (add the following subsection)
Contractor must submit with the Bid Proposal proof of meeting lining material chemical resistance requirements per the Standards Specifications.

Payment

Sampling, Testing and Installation shall be per the unit price bid per lineal foot as **measured edge of liner to edge of liner** and shall be full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in cleaning, root removal, video recording and inspecting the pipe, in the various stages as specified, liner installation, including notifying local residents, providing traffic control, locating manholes, making preparatory spot repairs to existing pipe as required, locating all active laterals and chimneys, bypassing sewage and storm drain flows as required, inserting liner, curing liner, testing for water tightness, sealing liner at the end of runs.

Sealing at Manholes, Structures and Ends of Pipe

Section 500-6 of Standard Specifications (add the following subsection)

In the event the liner fails to make a watertight seal the following shall apply:

- For sewer systems the manhole base and wall around the liner shall be cleaned of loose debris by brushing and/or use of a low pressure washer.
- Apply low shrink epoxy for use in bonding to Portland cement concrete to form a watertight seal at the edge of the interface of pipe and liner where the liner joins the inlet and outlet of all manholes.

Use of AV-118 chemical grout will not be allowed.

Full compensation Miscellaneous shall be included in unit prices bid for various items of work involved.

Payment

Sealing Connections shall be included in the unit price bid per lineal foot **as measured edge of liner to edge of liner** and shall be full compensation for furnishing all labor, materials, tools, equipment and incidentals.

Service Connection Re-Establishment

Section 500-8 of Standard Specifications (add the following subsection)

The Contractor shall provide advance written notice to all affected parties, once at 48-hours and again at 24-hours, prior to taking sewer laterals out of commission. Said notice shall specify the time frame laterals will be out of service and shall advise parties against water usage during such time (e.g., running water, washing laundry, flushing toilets, etc.) The notices will be reviewed and approved by the City Engineer prior to distribution. Immediately after sewer lateral connections are re-established, the Contractor shall notify all affected parties that their sewer service has been reactivated and is fully operational. **All sewer lateral connections must be re-established at the end of each working day.**

The City relied upon record drawings and video recording inspections of the existing sewer and storm drain pipes to determine the number of active laterals and chimneys for this project. These pipelines may have additional side connections that were not visible on the video tapes or locatable from the record drawings. To ensure that all laterals and chimneys are located and connections are properly re-established, the Contractor during the pre-installation CCTV inspection shall utilize a metal tape measuring device attached to the camera to locate and identify service lateral connections for re-establishment. Lateral connections that have been identified as inactive or capped may require re-establishment as directed by the Engineer.

Directly after liner installation, the Contractor shall immediately re-establish all active lateral connections. All material cut from the liner to reconnect laterals, and any miscellaneous material resulting from the cutting operations, shall be removed from the pipe by means as approved by the Engineer. A temporary P-trap shall be placed at downstream manholes and outlets to trap all construction materials and debris. Contractor shall have the sole responsibility to insure that removal of these materials and debris does occur at his own expense.

Payment

Re-establish Sewer Lateral Connections shall be per the unit price bid each for Re-establish Lateral Connection and shall be full compensation for furnishing all labor, materials, tools, equipment and for doing all the work involved in reconnecting laterals and cleanouts. No additional compensation will be allowed.

MISCELLANEOUS

Water Discharge

It is the sole responsibility of the Contractor to contain all discharging of water produced from its operations. At no time will discharging of water or any construction water be allowed to be dispersed on existing ground and surface improvements or enter into the existing storm drain system. However, discharging of such water can be accepted into the sewer system with permission from the City's Utility Supervisor.

EXHIBIT "C"

SPECIAL CONDITIONS

ARTICLE 1. BONDS

Within ten (10) calendar days from the date the Contractor is notified of award of the Contract, the Contractor shall deliver to the City four identical counterparts of the Performance Bond and Payment Bond on the forms supplied by the City and included as Exhibit "F" to the Contract. Failure to do so may, in the sole discretion of City, result in the forfeiture of Contractor's bid security. The surety supplying the bond must be an admitted surety insurer, as defined in Code of Civil Procedure Section 995.120, authorized to do business as such in the State of California and satisfactory to the City. The Performance Bond and the Payment Bond shall be for one hundred percent (100%) of the Total Contract Price.

EXHIBIT "D"

WORKERS COMPENSATION INSURANCE CERTIFICATION

WORKERS' COMPENSATION DECLARATION

I hereby affirm under penalty of perjury one of the following declarations:

(ONE OF THE BOXES BELOW MUST BE CHECKED)



I have and will maintain a certificate of consent from the California Labor Commission to self-insure for workers' compensation, as provided for by Section 3700 of the Labor Code, for the performance of the work to be performed under this contract.



I have and will maintain workers' compensation insurance, as required by Section 3700 of the Labor Code, for the performance of the work to be performed under this contract. My workers' compensation insurance carrier and policy number are:

Carrier MIDWEST EMPLOYERS CASUALTY COMPANY

Policy Number BNVWC0152392



I certify that, in the performance of the work under this Agreement, I shall not employ any person in any manner so as to become subject to the workers' compensation laws of California, and I hereby agree to indemnify, defend, and hold harmless the City of San Clemente and all of its officials, employees, and agents from and against any and all claims, liabilities, and losses relating to personal injury or death, economic losses, and property damage arising out of my failure to provide such worker's compensation insurance. I further agree that, if I should become subject to the workers' compensation provisions of Section 3700 of the Labor Code, I shall forthwith comply with those provisions.

WARNING: FAILURE TO SECURE WORKERS' COMPENSATION COVERAGE IS UNLAWFUL, AND SHALL SUBJECT AN EMPLOYER TO CRIMINAL PENALTIES AND CIVIL FINES UP TO ONE HUNDRED THOUSAND DOLLARS (\$100,000), IN ADDITION TO THE COST OF COMPENSATION, DAMAGES AS PROVIDED FOR IN SECTION 3706 OF THE LABOR CODE, INTEREST, AND ATTORNEY'S FEES.

Dated: SEPTEMBER 6TH, 2022

SARCON TECHNOLOGIES, INC.
Consultant

By: , CHUCK PARSONS

PRESIDENT
Title

5841 ENGINEER DRIVE
Address

HUNTINGTON BEACH, CA 92649

EXHIBIT "E"

PUBLIC WORKS CONTRACTOR REGISTRATION CERTIFICATION

Pursuant to Labor Code sections 1725.5 and 1771.1, all contractors and subcontractors that wish to bid on, be listed in a bid proposal, or enter into a contract to perform public work must be registered with the Department of Industrial Relations. See <http://www.dir.ca.gov/Public-Works/PublicWorks.html> for additional information.

No bid will be accepted nor any contract entered into without proof of the contractor's and subcontractors' current registration with the Department of Industrial Relations to perform public work.

Contractor hereby certifies that it is aware of the registration requirements set forth in Labor Code sections 1725.5 and 1771.1 and is currently registered as a contractor with the Department of Industrial Relations.¹

Name of Contractor: SANCON TECHNOLOGIES, INC.

DIR Registration Number: 1000008879

DIR Registration Expiration: 6/30/2023

Small Project Exemption: Yes or No

Unless Contractor is exempt pursuant to the small project exemption, Contractor further acknowledges:

- Contractor shall maintain a current DIR registration for the duration of the project.
- Contractor shall include the requirements of Labor Code sections 1725.5 and 1771.1 in its contract with subcontractors and ensure that all subcontractors are registered at the time of bid opening and maintain registration status for the duration of the project.
- Failure to submit this form or comply with any of the above requirements may result in a finding that the bid is non-responsive.

Name of Contractor SANCON TECHNOLOGIES, INC.

Signature 

Name and Title CHUCK PARSONS, PRESIDENT

Dated 9/6/2022

¹ If the Project is exempt from the contractor registration requirements pursuant to the small project exemption under Labor Code Sections 1725.5 and 1771.1, please mark "Yes" in response to "Small Project Exemption."

EXHIBIT "F"
PAYMENT AND PERFORMANCE BONDS

PERFORMANCE BOND

KNOW ALL PERSONS BY THESE PRESENTS:

THAT WHEREAS, the City of San Clemente (hereinafter referred to as "City") has awarded to Sancon Technologies, Inc., (hereinafter referred to as the "Contractor") an agreement for NECR Alley Sanitary Sewer Line SSGM-11917 Rehabilitation (CIPP), PN 24200 (hereinafter referred to as the "Project").

WHEREAS, the work to be performed by the Contractor is more particularly set forth in the Contract Documents for the Project dated September 14, 2022, (hereinafter referred to as "Contract Documents"), the terms and conditions of which are expressly incorporated herein by reference; and

WHEREAS, the Contractor is required by said Contract Documents to perform the terms thereof and to furnish a bond for the faithful performance of said Contract Documents.

Sancon
NOW, THEREFORE, we, Technologies, Inc., the undersigned Contractor and Old Republic Surety Company as Surety, a corporation organized and duly authorized to transact business under the laws of the State of California, are held and firmly bound unto the City in the sum of Twenty Seven Thousand Eight Hundred Forty DOLLARS, (\$ 27,840.00), said sum being not less than one hundred percent (100%) of the total amount of the Contract, for which amount well and truly to be made, we bind ourselves, our heirs, executors and administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that, if the Contractor, his or its heirs, executors, administrators, successors or assigns, shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions and agreements in the Contract Documents and any alteration thereof made as therein provided, on its part, to be kept and performed at the time and in the manner therein specified, and in all respects according to their intent and meaning; and shall faithfully fulfill all obligations including the one-year guarantee of all materials and workmanship; and shall indemnify and save harmless the City, its officers and agents, as stipulated in said Contract Documents, then this obligation shall become null and void; otherwise it shall be and remain in full force and effect.

As a condition precedent to the satisfactory completion of the Contract Documents, unless otherwise provided for in the Contract Documents, the above obligation shall hold good for a period of one (1) year after the acceptance of the work by City, during which time if Contractor shall fail to make full, complete, and satisfactory repair and replacements and totally protect the City from loss or damage resulting from or caused by defective materials or faulty workmanship, Surety shall undertake and faithfully fulfill all such obligations. The obligations of Surety hereunder shall continue so long as any obligation of Contractor remains. Nothing herein shall limit the City's rights or the Contractor or Surety's obligations under the Contract, law or equity, including, but not limited to, California Code of Civil Procedure section 337.15.

Whenever Contractor shall be, and is declared by the City to be, in default under the Contract Documents, the Surety shall remedy the default pursuant to the Contract Documents, or shall promptly, at the City's option:

- (1) Take over and complete the Project in accordance with all terms and conditions in the Contract Documents; or
- (2) Obtain a bid or bids for completing the Project in accordance with all terms and conditions in the Contract Documents and upon determination by Surety of the lowest responsive and responsible bidder, arrange for a Contract between such bidder, the Surety and the City, and make available as work progresses sufficient funds to pay the cost of completion of the Project, less the balance of the contract price, including other costs and damages for which Surety may be liable. The term "balance of the contract price" as used in this paragraph shall mean the total amount payable to Contractor by the City under the Contract and any modification thereto, less any amount previously paid by the City to the Contractor and any other set offs pursuant to the Contract Documents.
- (3) Permit the City to complete the Project in any manner consistent with local, California and federal law and make available as work progresses sufficient funds to pay the cost of completion of the Project, less the balance of the contract price, including other costs and damages for which Surety may be liable. The term "balance of the contract price" as used in this paragraph shall mean the total amount payable to Contractor by the City under the Contract and any modification thereto, less any amount previously paid by the City to the Contractor and any other set offs pursuant to the Contract Documents.

Surety expressly agrees that the City may reject any contractor or subcontractor which may be proposed by Surety in fulfillment of its obligations in the event of default by the Contractor.

Surety shall not utilize Contractor in completing the Project nor shall Surety accept a bid from Contractor for completion of the Project if the City, when declaring the Contractor in default, notifies Surety of the City's objection to Contractor's further participation in the completion of the Project.

The Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract Documents or to the Project to be performed thereunder shall in any way affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract Documents or to the Project, including but not limited to the provisions of sections 2819 and 2845 of the California Civil Code.

IN WITNESS WHEREOF, we have hereunto set our hands and seals this 7th day of September, 2022).

(Corporate Seal)

Sancon Technologies, Inc.
Contractor/ Principal

By *Garry Drew*, Garry Drew

Title SECRETARY

(Corporate Seal)

Old Republic Surety Company

Surety

By

Scott Salandi Attorney-in-Fact

Signatures of those signing for the Contractor and Surety must be notarized and evidence of corporate authority attached.

(Attach Attorney-in-Fact Certificate)

Title _____

The rate of premium on this bond is N/A per thousand. The total amount of premium charges, \$ N/A.

(The above must be filled in by corporate attorney.)

THIS IS A REQUIRED FORM

Any claims under this bond may be addressed to:

(Name and Address of Surety)

Old Republic Surety Company
14728 Pipeline Ave., Suite E
Chino Hills, CA 91709

(Name and Address of Agent or Representative for service of process in California, if different from above)

Patriot Risk & Insurance Services LLC
2415 Campus Dr., Suite 200
Irvine, CA 92612

(Telephone number of Surety and Agent or Representative for service of process in California)

Surety 909-367-2015
Agent 949-486-7917

NOTE: A copy of the Power-of-Attorney authorizing the person signing on behalf of the Surety to do so must be attached hereto.

ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of Orange)

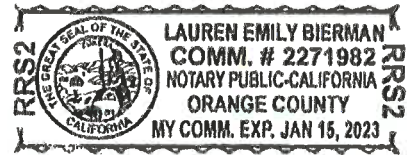
On September 7, 2022 before me, Lauren Emily Bierman
(insert name and title of the officer)

personally appeared Scott Salandi
who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/~~are~~ subscribed to the within instrument and acknowledged to me that he/~~she/they~~ executed the same in his/~~her/their~~ authorized capacity(ies), and that by his/~~her/their~~ signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature Lauren Emily Bierman (Seal)



PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS That

WHEREAS, the City of San Clemente (hereinafter designated as the "City"), by action taken or a resolution passed September 14, 2022 has awarded to Sancon Technologies, Inc. hereinafter designated as the "Principal," a contract for the work described as follows:

NECR Alley Sanitary Sewer Line SSGM-11917 Rehabilitation (CIPP), PN 24200 (the "Project"); and

WHEREAS, the work to be performed by the Principal is more particularly set forth in the Contract Documents for the Project dated September 14, 2022 ("Contract Documents"), the terms and conditions of which are expressly incorporated by reference; and

WHEREAS, said Principal is required to furnish a bond in connection with said contract; providing that if said Principal or any of its Subcontractors shall fail to pay for any materials, provisions, provender, equipment, or other supplies used in, upon, for or about the performance of the work contracted to be done, or for any work or labor done thereon of any kind, or for amounts due under the Unemployment Insurance Code or for any amounts required to be deducted, withheld, and paid over to the Employment Development Department from the wages of employees of said Principal and its Subcontractors with respect to such work or labor the Surety on this bond will pay for the same to the extent hereinafter set forth.

NOW THEREFORE, we, the Principal and Old Republic Surety Company as Surety, are held and firmly bound unto the City in the penal sum of twenty seven thousand eight hundred forty Dollars (\$ 27,840.00) lawful money of the United States of America, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that if said Principal, his or its subcontractors, heirs, executors, administrators, successors or assigns, shall fail to pay any of the persons named in Section 9100 of the Civil Code, fail to pay for any materials, provisions or other supplies, used in, upon, for or about the performance of the work contracted to be done, or for any work or labor thereon of any kind, or amounts due under the Unemployment Insurance Code with respect to work or labor performed under the contract, or for any amounts required to be deducted, withheld, and paid over to the Employment Development Department or Franchise Tax Board from the wages of employees of the contractor and his subcontractors pursuant to Section 18663 of the Revenue and Taxation Code, with respect to such work and labor the Surety or Sureties will pay for the same, in an amount not exceeding the sum herein above specified.


This bond shall inure to the benefit of any of the persons named in Section 9100 of the Civil Code so as to give a right of action to such persons or their assigns in any suit brought upon this bond.

It is further stipulated and agreed that the Surety on this bond shall not be exonerated or released from the obligation of this bond by any change, extension of time for performance, addition, alteration or modification in, to, or of any contract, plans, specifications, or agreement pertaining or relating to any scheme or work of improvement herein above described, or pertaining or relating to the furnishing of labor, materials, or equipment therefore, nor by any change or modification of any terms of payment or extension of the time for any payment pertaining or relating to any scheme or work of improvement herein above described, nor by any rescission or


attempted rescission of the contract, agreement or bond, nor by any conditions precedent or subsequent in the bond attempting to limit the right of recovery of claimants otherwise entitled to recover under any such contract or agreement or under the bond, nor by any fraud practiced by any person other than the claimant seeking to recover on the bond and that this bond be construed most strongly against the Surety and in favor of all persons for whose benefit such bond is given, and under no circumstances shall Surety be released from liability to those for whose benefit such bond has been given, by reason of any breach of contract between the owner or City and original contractor or on the part of any obligee named in such bond, but the sole conditions of recovery shall be that claimant is a person described in Section 9100 of the Civil Code, and has not been paid the full amount of his claim and that Surety does hereby waive notice of any such change, extension of time, addition, alteration or modification herein mentioned and the provisions of sections 2819 and 2845 of the California Civil Code.

IN WITNESS WHEREOF, we have hereunto set our hands and seals this 7th day of September, 2022

(Corporate Seal)

Sancon Technologies, Inc.
Contractor/ Principal
By 
Title SECRETARY

(Corporate Seal)

Old Republic Surety Company
Surety
By 
Scott Salandi Attorney-in-Fact
Title _____

Signatures of those signing for the Contractor and Surety must be notarized and evidence of corporate authority attached. A Power-of-Attorney authorizing the person signing on behalf of the Surety to do so must be attached hereto.

NOTE: A copy of the Power-of-Attorney authorizing the person signing on behalf of the Surety to do so must be attached hereto.

ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of Orange)

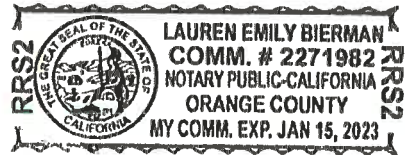
On September 7, 2022 before me, Lauren Emily Bierman
(insert name and title of the officer)

personally appeared Scott Salandi
who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/~~are~~
subscribed to the within instrument and acknowledged to me that he/~~she/they~~ executed the same in
his/~~her/their~~ authorized capacity(~~ies~~), and that by his/~~her/their~~ signature(s) on the instrument the
person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature Lauren Emily Bierman (Seal)



Notary Acknowledgment

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

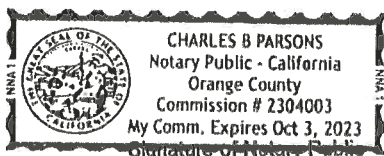
STATE OF CALIFORNIA

COUNTY OF ORANGE

On 4/9/22, 20 , before me, CHARLES PARSONS, Notary Public, personally appeared GARY DREW,

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.



WITNESS my hand and official seal.

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

CAPACITY CLAIMED BY SIGNER

DESCRIPTION OF ATTACHED DOCUMENT

- Individual
- Corporate Officer

- Partner(s)
 - Limited
 - General
- Attorney-In-Fact
- Trustee(s)
- Guardian/Conservator
- Other:

Signer is representing:
Name Of Person(s) Or Entity(ies)

Title(s)

Title or Type of Document

Number of Pages

Date of Document

Signer(s) Other Than Named Above



OLD REPUBLIC SURETY COMPANY

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That OLD REPUBLIC SURETY COMPANY, a Wisconsin stock insurance corporation, does make, constitute and appoint:

Scott Safandi, David Jacobson of Irvine, CA

its true and lawful Attorney(s)-in-Fact, with full power and authority for and on behalf of the company as surety, to execute and deliver and affix the seal of the company thereto (if a seal is required), bonds, undertakings, recognizances or other written obligations in the nature thereof, (other than bail bonds, bank depository bonds, mortgage deficiency bonds, mortgage guaranty bonds, guarantees of installment paper and note guaranty bonds, self-insurance workers compensation bonds guaranteeing payment of benefits, or black lung bonds), as follows:

ALL WRITTEN INSTRUMENTS

and to bind OLD REPUBLIC SURETY COMPANY thereby, and all of the acts of said Attorneys-in-Fact, pursuant to these presents, are ratified and confirmed. This appointment is made under and by authority of the board of directors at a special meeting held on February 18, 1982.

This Power of Attorney is signed and sealed by facsimile under and by the authority of the following resolutions adopted by the board of directors of the OLD REPUBLIC SURETY COMPANY on February 18, 1982.

RESOLVED that, the president, any vice-president or assistant vice president, in conjunction with the secretary or any assistant secretary, may appoint attorneys-in-fact or agents with authority as defined or limited in the instrument evidencing the appointment in each case, for and on behalf of the company to execute and deliver and affix the seal of the company to bonds, undertakings, recognizances, and suretyship obligations of all kinds; and said officers may remove any such attorney-in-fact or agent and revoke any Power of Attorney previously granted to such person.

RESOLVED FURTHER, that any bond, undertaking, recognizance, or suretyship obligation shall be valid and binding upon the Company

- (i) when signed by the president, any vice president or assistant vice president, and attested and sealed (if a seal be required) by any secretary or assistant secretary; or
- (ii) when signed by the president, any vice president or assistant vice president, secretary or assistant secretary, and countersigned and sealed (if a seal be required) by a duly authorized attorney-in-fact or agent; or
- (iii) when duly executed and sealed (if a seal be required) by one or more attorneys-in-fact or agents pursuant to and within the limits of the authority evidenced by the Power of Attorney issued by the company to such person or persons.

RESOLVED FURTHER that the signature of any authorized officer and the seal of the company may be affixed by facsimile to any Power of Attorney or certification thereof authorizing the execution and delivery of any bond, undertaking, recognizance, or other suretyship obligations of the company; and such signature and seal when so used shall have the same force and effect as though manually affixed.

IN WITNESS WHEREOF, OLD REPUBLIC SURETY COMPANY has caused these presents to be signed by its proper officer, and its corporate seal to be affixed this 16th day of March, 2022.

Karen J. Haffner
Assistant Secretary



OLD REPUBLIC SURETY COMPANY

Alan Pavlic
President

STATE OF WISCONSIN, COUNTY OF WAUKESHA - SS

On this 16th day of March, 2022, personally came before me, Alan Pavlic and Karen J Haffner, to me known to be the individuals and officers of the OLD REPUBLIC SURETY COMPANY who executed the above instrument, and they each acknowledged the execution of the same, and being by me duly sworn, did severally depose and say: that they are the said officers of the corporation aforesaid, and that the seal affixed to the above instrument is the seal of the corporation, and that said corporate seal and their signatures as such officers were duly affixed and subscribed to the said instrument by the authority of the board of directors of said corporation.



Kathryn R. Pearson
Notary Public

My Commission Expires: September 28, 2022
(Expiration of notary's commission does not invalidate this instrument)

CERTIFICATE

I, the undersigned, assistant secretary of the OLD REPUBLIC SURETY COMPANY, a Wisconsin corporation, CERTIFY that the foregoing and attached Power of Attorney remains in full force and has not been revoked; and furthermore, that the Resolutions of the board of directors set forth in the Power of Attorney, are now in force.

74 0043



Signed and sealed at the City of Brookfield, WI this 7th day of September, 2022
Karen J. Haffner
Assistant Secretary

ORSC 22282 (3-06)

Patriot Risk & Ins Services LLC

EXHIBIT "G"
FEDERAL REQUIREMENTS
NOT APPLICABLE

EXHIBIT "H"

INSURANCE REQUIREMENTS

3.13 Insurance.

3.13.1 Time for Compliance. Contractor shall not commence work under this Contract until it has provided evidence satisfactory to the City that it has secured all insurance required under this section. In addition, Contractor shall not allow any subcontractor to commence work on any subcontract as required in section 1.1.12 of this agreement.

3.13.2 Types of Insurance Required. As a condition precedent to the effectiveness of this Contract for work to be performed hereunder, and without limiting the indemnity provisions of the Contract, the Contractor, in partial performance of its obligations under such Contract, shall procure and maintain in full force and effect during the term of the Contract the following policies of insurance. If the existing policies do not meet the insurance requirements set forth herein, Contractor agrees to amend, supplement or endorse the policies to do so.

(A) Commercial General Liability: Commercial General Liability Insurance which affords coverage at least as broad as Insurance Services Office "occurrence" form CG 0001, or the exact equivalent, and shall be no less than \$1,000,000 per occurrence and no less than \$2,000,000 in the general aggregate. Defense costs shall be paid in addition to the limits. The policy shall contain no endorsements or provisions limiting coverage for (1) contractual liability; (2) cross liability exclusion for claims or suits by one insured against another; or (3) contain any other exclusion contrary to the Contract.

(B) Automobile Liability Insurance: Automobile Liability Insurance with coverage at least as broad as Insurance Services Office Form CA 0001 covering "Any Auto" (Symbol 1), or the exact equivalent, covering bodily injury and property damage for all activities shall be in an amount of not less than \$1,000,000 combined limit for each occurrence.

(C) Workers' Compensation: Workers' Compensation Insurance, as required by the State of California and Employer's Liability Insurance with a limit of not less than \$1,000,000 per accident for bodily injury and disease.

(D) Builder's Risk Insurance ["All Risk"]: NOT REQUIRED.

3.13.3 Endorsements. Required insurance policies shall contain the following provisions, or Contractor shall provide endorsements on forms approved by the City to add the following provisions to the insurance policies:

(A) Commercial General Liability:

(1) Additional Insured: The City, its officials, officers, employees, agents, and volunteers shall be additional insureds with regard to liability and defense of suits or claims arising out of the performance of the Contract.

Additional Insured Endorsements shall not (1) be restricted to "ongoing operations"; (2) exclude "contractual liability"; (3) restrict coverage to "sole" liability of Contractor; or (4) contain any other exclusions contrary to the terms of purposes of this Contract.

For all policies of Commercial General Liability insurance, Contractor shall provide endorsements in the form of ISO CG 20 10 10 01 and 20 37 10 01 (or endorsements providing the exact same coverage) to effectuate this requirement.

(2) Cancellation: Required insurance policies shall not be canceled or the coverage reduced until a thirty (30) day written notice of cancellation has been served upon the City except ten (10) days shall be allowed for non-payment of premium.

(B) Automobile Liability:

(1) Cancellation: Required insurance policies shall not be canceled or the coverage reduced until a thirty (30) day written notice of cancellation has been served upon the City except ten (10) days shall be allowed for non-payment of premium.

(C) Workers' Compensation:

(1) Waiver of Subrogation: NOT APPLICABLE

(2) Cancellation: Required insurance policies shall not be canceled or the coverage reduced until a thirty (30) day written notice of cancellation has been served upon the City except ten (10) days shall be allowed for non-payment of premium.

3.13.4 Primary and Non-Contributing Insurance. All policies of Commercial General Liability, Automobile Liability insurance (if required) shall be primary and any other insurance, deductible, or self-insurance maintained by the City, its officials, officers, employees agents or volunteers shall not contribute with this primary insurance. Policies shall contain or be endorsed to contain such provisions.

3.13.5 Waiver of Subrogation. NOT APPLICABLE

3.13.6 Deductibles and Self-Insured Retentions. Any deductible or self-insured retention in excess of \$5,000 must be approved in writing by the City and shall protect the City, its officials, officers, employees, agents and volunteers in the same manner and to the same extent as they would have been protected had the policy or policies not contained a deductible or self-insured retention.

3.13.7 Evidence of Insurance. The Contractor, concurrently with the execution of the Contract, and as a condition precedent to the effectiveness thereof, shall deliver either certified copies of the required policies, or original certificates on forms approved by the City, together with all endorsements affecting each policy. Required insurance policies shall not be in compliance if they include any limiting provision or endorsement that has not been submitted to the City for approval. The certificates and endorsements for each insurance policy shall be signed by a person authorized by that insurer to bind coverage on its behalf. At least fifteen (15 days) prior to the expiration of any such policy, evidence of insurance showing that such insurance coverage has been renewed or extended shall be filed with the City. If such coverage is cancelled or reduced, and not replaced immediately so as to avoid a lapse in the required coverage, Contractor shall, within ten (10) days after receipt of written notice of such cancellation or reduction of coverage, file with the City evidence of insurance showing that the required insurance has been reinstated or has been provided through another insurance company or companies.

3.13.8 Failure to Maintain Coverage. In the event any policy of insurance required under this Contract does not comply with these specifications or is canceled and not replaced immediately so as to avoid a lapse in the required coverage, City has the right but not the duty to obtain the insurance it deems necessary and any premium paid by City will be promptly reimbursed by Contractor or City will withhold amounts sufficient to pay premium from Contractor payments. In the alternative, City may cancel this Contract, effective upon notice.

3.13.9 Acceptability of Insurers. Each such policy shall be from a company or companies with a current A.M. Best's rating of no less than A- VII and authorized to transact business of insurance in the State of California, or otherwise allowed to place insurance through surplus line brokers under applicable provisions of the California Insurance Code or any federal law.

3.13.10 Enforcement of Contract Provisions (non estoppel). Contractor acknowledges and agrees that actual or alleged failure on the part of the City to inform Contractor of non-compliance with any requirement imposes no additional obligation on the City nor does it waive any rights hereunder.

3.13.11 Requirements Not Limiting. Requirement of specific coverage or minimum limits contained in this Appendix are not intended as a limitation on coverage, limits, or other requirement, or a waiver of any coverage normally provided by any insurance.

3.13.12 Insurance for Subcontractors. Contractor shall include all Subcontractors as additional insureds under the Contractor's policies, or the Contractor shall be responsible for causing Subcontractors to purchase the appropriate insurance in compliance with the terms of these Insurance Requirements, including adding the City, its officials, officers, employees, agents and volunteers as additional insureds to the Subcontractor's policies. All policies of Commercial General Liability insurance provided by Subcontractors shall be endorsed to name the City, its officials, officers, employees, agents and volunteers as additional insureds using endorsement form ISO CG 20 38 04 13. Contractor shall not allow any Subcontractor to commence work until it has received satisfactory evidence of Subcontractor's compliance with all insurance requirements under this Contract, to the extent applicable. The Contractor shall provide satisfactory evidence of compliance with this section upon request of the City.



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

09/09/2022

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Poms & Associates Insurance Brokers CA License #0811733 5700 Canoga Ave. #400 Woodland Hills CA 91367		CONTACT NAME: Pamela Paulino PHONE (A/C, No, Ext): (800) 578-8802 FAX (A/C, No): (818) 449-9321 E-MAIL ADDRESS: ppaulino@pomsassoc.com													
INSURED Sancon Technologies, Inc. 5841 Engineer Drive Huntington Beach CA 92649		INSURER(S) AFFORDING COVERAGE <table border="1"> <tr> <td>INSURER A: Admiral Insurance</td> <td>NAIC # 24856</td> </tr> <tr> <td>INSURER B: West American Insurance Company</td> <td>44393</td> </tr> <tr> <td>INSURER C: Midwest Employers Casualty Company</td> <td>23612</td> </tr> <tr> <td>INSURER D:</td> <td></td> </tr> <tr> <td>INSURER E:</td> <td></td> </tr> <tr> <td>INSURER F:</td> <td></td> </tr> </table>		INSURER A: Admiral Insurance	NAIC # 24856	INSURER B: West American Insurance Company	44393	INSURER C: Midwest Employers Casualty Company	23612	INSURER D:		INSURER E:		INSURER F:	
INSURER A: Admiral Insurance	NAIC # 24856														
INSURER B: West American Insurance Company	44393														
INSURER C: Midwest Employers Casualty Company	23612														
INSURER D:															
INSURER E:															
INSURER F:															

COVERAGES

CERTIFICATE NUMBER: 21-22 GL/AU/UMB/WC

REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.


INSR LTR	TYPE OF INSURANCE	ADDSUBR INSD WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	<input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input checked="" type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC <input type="checkbox"/> OTHER:	Y	FEIECC2281005	10/01/2021	10/01/2022	EACH OCCURRENCE \$ 1,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 100,000 MED EXP (Any one person) \$ 10,000 PERSONAL & ADV INJURY \$ 1,000,000 GENERAL AGGREGATE \$ 2,000,000 PRODUCTS - COMP/OP AGG \$ 2,000,000 \$	
B	AUTOMOBILE LIABILITY <input checked="" type="checkbox"/> ANY AUTO <input type="checkbox"/> OWNED AUTOS ONLY <input type="checkbox"/> SCHEDULED AUTOS <input checked="" type="checkbox"/> HIRED AUTOS ONLY <input checked="" type="checkbox"/> NON-OWNED AUTOS ONLY		BAW2256177090	10/01/2021	10/01/2022	COMBINED SINGLE LIMIT (Ea accident) \$ 1,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$ \$	
A	<input type="checkbox"/> UMBRELLA LIAB <input checked="" type="checkbox"/> OCCUR <input checked="" type="checkbox"/> EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE DED RETENTION \$		FEIEXS2281105	10/01/2021	10/01/2022	EACH OCCURRENCE \$ 10,000,000 AGGREGATE \$ 10,000,000 \$	
C	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	Y/N Y	N/A	BNUWC0152392	10/01/2021	10/01/2022	<input checked="" type="checkbox"/> PER STATUTE <input type="checkbox"/> OTH-ER E.L. EACH ACCIDENT \$ 1,000,000 E.L. DISEASE - EA EMPLOYEE \$ 1,000,000 E.L. DISEASE - POLICY LIMIT \$ 1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

RE: NECR Alley Sanitary Sewer Line SSGM-11917 Rehabilitation (CIPP), PN 24200

The City of San Clemente, its officials, officers, employees, agents, and volunteers shall be named as additional insureds with regard to liability and defense of suits or claims arising out of the performance of the Contract. Policy is on a primary and non-contributory basis. 30-Day notice of cancellation applies per the attached endorsement.

CERTIFICATE HOLDER**CANCELLATION**

City of San Clemente Attn: Amir Ilkhanipour, Sr. 910 Calle Negocio San Clemente CA 92673	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS. AUTHORIZED REPRESENTATIVE 
---	--

© 1988-2015 ACORD CORPORATION. All rights reserved.



Additional Insured – Owners, Lessees or Contractors – Completed Operations

This endorsement, effective 10/01/2021 attaches to and forms a part of Policy Number FEI-ECC-22810-05. This endorsement changes the Policy. Please read it carefully.

In consideration of an additional premium of \$Applied, this endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART

SCHEDULE

Name Of Additional Insured Person(s) Or Organization(s):	Location And Description Of Completed Operations
Any person(s) or organization(s) whom the Named Insured agrees, in a written contract, to name as an additional insured. However, this status exists only for the project specified in that contract.	Those project locations where this endorsement is required by contract.
Information required to complete this Schedule, if not shown above, will be shown in the Declarations.	

- A. Section II - Who Is An Insured is amended to include as an additional insured the person(s) or organization(s) shown in the Schedule, but only with respect to liability for "bodily injury" or "property damage" caused, in whole or in part, by "your work" at the location designated and described in the Schedule of this endorsement performed for that additional insured and included in the "products-completed operations hazard".

However:

1. The insurance afforded to such additional insured only applies to the extent permitted by law; and
2. If coverage provided to the additional insured is required by a contract or agreement, the insurance afforded to such additional insured will not be broader than that which you are required by the contract or agreement to provide for such additional insured.



B. With respect to the insurance afforded to these additional insureds, the following is added to Section III - Limits Of Insurance:

If coverage provided to the additional insured is required by a contract or agreement, the most we will pay on behalf of the additional insured is the amount of insurance:

1. Required by the contract or agreement; or
 2. Available under the applicable Limits of Insurance shown in the Declarations;
- whichever is less.

This endorsement shall not increase the applicable Limits of Insurance shown in the Declarations.



Automatic Additional Insured – Owners, Lessees or Contractors

This endorsement, effective 10/01/2021 attaches to and forms a part of Policy Number FEI-ECC-22810-05. This endorsement changes the Policy. Please read it carefully.

In consideration of an additional premium of \$Applied, this endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART CONTRACTORS POLLUTION LIABILITY COVERAGE PART

SCHEDULE

Name of Person or Organization:

Any person(s) or organization(s) whom the *Named Insured* agrees, in a written contract, to name as an additional insured. However, this status exists only for the project specified in that contract.

The person or organization shown in this Schedule is included as an insured, but only with respect to that person's or organization's vicarious liability arising out of your ongoing operations performed for that insured.



Designated Construction Project(s) General Aggregate Limit

This endorsement, effective 10/1/2021 attaches to and forms a part of Policy Number FEI-ECC-22810-05. This endorsement changes the Policy. Please read it carefully.

In consideration of an additional premium of \$Applied, this endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART

SCHEDULE

Designated Construction Projects:

Those construction projects of the Named Insured when agreed to and required under written contract. However, this coverage only applies for the project specified in that contract.

(If no entry appears above, information required to complete this endorsement will be shown in the Declarations as applicable to this endorsement.)

- A. For all sums which the insured becomes legally obligated to pay as damages caused by "occurrences" under COVERAGE A (SECTION I), and for all medical expenses caused by accidents under COVERAGE C (SECTION I), which can be attributed only to operations at a single designated "location" shown in the Schedule above:
1. A separate Designated Construction Project General Aggregate Limit applies to each designated construction project, and that limit is equal to the amount of the General Aggregate Limit shown in the Declarations.
 2. The Designated Construction Project General Aggregate Limit is the most we will pay for the sum of all damages under COVERAGE A, except damages because of "bodily injury" or "property damage" included in the "products-completed operations hazard", and for medical expenses under COVERAGE C regardless of the number of:
 - a. Insureds;
 - b. Claims made or "suits" brought; or
 - c. Persons or organizations making claims or bringing "suits".



3. Any payments made under COVERAGE A for damages or under COVERAGE C for medical expenses shall reduce the Designated Construction Project General Aggregate Limit for that designated construction project. Such payments shall not reduce the General Aggregate Limit shown in the Declarations nor shall they reduce any other Designated Construction Project General Aggregate Limit for any other designated construction project shown in the Schedule above.
 4. The limits shown in the Declarations for Each Occurrence, Fire Damage and Medical Expense continue to apply. However, instead of being subject to the General Aggregate Limit shown in the Declarations, such limits will be subject to the applicable Designated Construction Project General Aggregate Limit.
- B. For all sums which the insured becomes legally obligated to pay as damages caused by "occurrences" under COVERED A (SECTION I), and for all medical expenses caused by accidents under COVERAGE C (SECTION I), which cannot be attributed only to operations at a single designated construction project shown in the Schedule above:
1. Any payments made under COVERAGE A for the damages or under COVERAGE C for medical expenses shall reduce the amount available under the General Aggregate Limit or the Products-Completed Operations Aggregate Limit, whichever is applicable; and
 2. Such payments shall not reduce any Designated Construction Project General Aggregate Limit.
- C. When coverage for liability arising out of the "products-completed operations hazard" is provided, any payments for damages because of "bodily injury" or "property damage" included in the "products-completed operations hazard" will reduce the Products-Completed Operation Aggregate Limit, and not reduce the General Aggregate Limit nor the Designated Construction Project General Aggregate Limit.
- D. If the applicable designated construction project has been abandoned, delayed, or abandoned and then restarted, or if the authorized contracting parties deviate from plans, blueprints, designs, specifications or timetables, the project will still be deemed to be the same construction project.
- E. The provisions of Limits Of Insurance (SECTION III) not otherwise modified by this endorsement shall continue to apply as stipulated.



Designated Construction Project(s) General Aggregate Limit

This endorsement, effective 10/1/2021 attaches to and forms a part of Policy Number FEI-ECC-22810-05. This endorsement changes the Policy. Please read it carefully.

In consideration of an additional premium of \$Applied, this endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART

SCHEDULE

Designated Construction Projects:

Those construction projects of the Named Insured when agreed to and required under written contract. However, this coverage only applies for the project specified in that contract.

(If no entry appears above, information required to complete this endorsement will be shown in the Declarations as applicable to this endorsement.)

- A. For all sums which the insured becomes legally obligated to pay as damages caused by "occurrences" under COVERAGE A (SECTION I), and for all medical expenses caused by accidents under COVERAGE C (SECTION I), which can be attributed only to operations at a single designated "location" shown in the Schedule above:
1. A separate Designated Construction Project General Aggregate Limit applies to each designated construction project, and that limit is equal to the amount of the General Aggregate Limit shown in the Declarations.
 2. The Designated Construction Project General Aggregate Limit is the most we will pay for the sum of all damages under COVERAGE A, except damages because of "bodily injury" or "property damage" included in the "products-completed operations hazard", and for medical expenses under COVERAGE C regardless of the number of:
 - a. Insureds;
 - b. Claims made or "suits" brought; or
 - c. Persons or organizations making claims or bringing "suits".



3. Any payments made under COVERAGE A for damages or under COVERAGE C for medical expenses shall reduce the Designated Construction Project General Aggregate Limit for that designated construction project. Such payments shall not reduce the General Aggregate Limit shown in the Declarations nor shall they reduce any other Designated Construction Project General Aggregate Limit for any other designated construction project shown in the Schedule above.
 4. The limits shown in the Declarations for Each Occurrence, Fire Damage and Medical Expense continue to apply. However, instead of being subject to the General Aggregate Limit shown in the Declarations, such limits will be subject to the applicable Designated Construction Project General Aggregate Limit.
- B. For all sums which the insured becomes legally obligated to pay as damages caused by "occurrences" under COVERED A (SECTION I), and for all medical expenses caused by accidents under COVERAGE C (SECTION I), which cannot be attributed only to operations at a single designated construction project shown in the Schedule above:
1. Any payments made under COVERAGE A for the damages or under COVERAGE C for medical expenses shall reduce the amount available under the General Aggregate Limit or the Products-Completed Operations Aggregate Limit, whichever is applicable; and
 2. Such payments shall not reduce any Designated Construction Project General Aggregate Limit.
- C. When coverage for liability arising out of the "products-completed operations hazard" is provided, any payments for damages because of "bodily injury" or "property damage" included in the "products-completed operations hazard" will reduce the Products-Completed Operation Aggregate Limit, and not reduce the General Aggregate Limit nor the Designated Construction Project General Aggregate Limit.
- D. If the applicable designated construction project has been abandoned, delayed, or abandoned and then restarted, or if the authorized contracting parties deviate from plans, blueprints, designs, specifications or timetables, the project will still be deemed to be the same construction project.
- E. The provisions of Limits Of Insurance (SECTION III) not otherwise modified by this endorsement shall continue to apply as stipulated.

EXHIBIT "I"
SUBMITTALS



SANCON 100[®]

Epoxy Urethane Coating System

Designed for Sanitation Systems - High Build, Flexible, Non-Shrinking - Bonds to Damp Concrete
"Greenbook" Section 500-2.1

Product Description

Sancon 100 is a two coat protective coating system for concrete that uses a high adhesion and moisture tolerant epoxy base coat and a high build polyurethane elastomer top coat. The resulting system provides the adhesion of epoxy and the flexibility of polyurethane.

Recommended Uses

Sancon 100 was specifically developed for protecting concrete and steel surfaces exposed to the corrosive and abrasive environment of sanitary systems. The typical application involves coating below grade concrete in a live sewer condition.

Characteristics

The Sancon 100 system is a fast drying and fast curing protective lining which develops high bond strengths to both dry and damp concrete. It contains no solvents to evaporate; therefore, no drying shrinkage occurs.

Sancon 100 polyurethane remains flexible throughout its life, yet it is highly resistant to abrasion and impact.

Surface Preparation

Concrete: No surface preparation is required on clean concrete surfaces free from curing compounds, oils, existing coatings, or other foreign materials. Grit blasting is required where the coating is subject to immersion service.

Newly placed concrete or gunned mortar may be coated as soon as the initial set. Deteriorated concrete surfaces must be cleaned by high pressure water to sound concrete. The surface must be free of oil, grease, soft concrete or existing coatings.

Steel: Steel surfaces require grit blast to near white metal. (SSPC SP-10) Primer must be applied to a dust free surface prior to surface rust appearing.

Application

Concrete: Epoxy and polyurethane are applied through plural component equipment which mixes both components before the spray gun. Both materials are applied in one continuous coat until the desired thickness is reached. Recommended thickness for the epoxy coat is between 1 to 2 mils. Recommended thickness for the polyurethane is between 60 and 125 mils depending on the particular service requirements and the surface profile.

Application of the polyurethane must take place prior to the epoxy becoming tack free. Where the coating application cannot be completed in one continuous operation, or where a second coat of polyurethane is needed, a 1 to 2 mil thick prime coat of epoxy must be used for the adhesion of the polyurethane to the cured polyurethane.

Steel: Steel surfaces require polyurethane primer in lieu of epoxy. Primer thickness should be 1 to 2 mils. Recommended thickness on steel is between 40 to 60 mils.

Chemical Resistance @ 70°F

ACIDS

50% Sulfuric	I
43% Phosphoric	I
37% Hydrochloric	FC
50% Acetic	I
15% Chromic	FC
14% Nitric	FC

BASES

25% Sodium Hydroxide	I
20% Potassium Hydroxide	I
29% Ammonium Hydroxide	I

SALTS

20% Sodium Chloride	I
1% Ferric Chloride	I

HYDROCARBONS

Soaps and Detergents	I
Petroleum Oils	I
Vegetable Oils	I

Solvents	Not Recommended
Weathering	Discoloration, No Physical Degradation
I - Immersion	FC - Frequent Contact



SANCON 100®

PHYSICAL PROPERTIES

Warranty

The technical data contained herein is accurate to the best of our knowledge. Sancon Engineering, Inc. warrants coatings that are presented herein meet their formulation standards. No other warranty is expressed or implied, including warranties of merchantability, fitness, and coverage for a particular purpose. Published technical data and instructions are subject to change without notice. Contact Sancon Engineering for current technical data, instructions, and chemical resistance.

	Epoxy	Polyurethane
Type	Modified Amine	Aromatic
Components	2	2
Color	Purple	Tan
Application	Plural Spray	Plural Spray
Mixing Ratio	2:1	3:1
Pot Life, Mass	15 Minutes	0.5 Minutes
Standard Thickness	2-5 Mils	60-125 Mils
Cure To Tack Free	2 Hours @ 70°F	30 Min. @ 70°F
Minimum Cure Time for Submersion	4 Hours @ 70°F	4 Hours @ 70°F
Recoating Time	2 Hours @ 70°F	30 Min. @ 70°F
Application Surface Temperatures	50°F - 150°F	32°F - 150°F
Maximum Service Temperature	250°F Dry 140°F Wet	250°F Dry 140°F Wet
Typical Coverage on New Concrete	200 s.f./gal. @ 5 mils	1200 s.f./gal./mil
Combined Weight	9.6 lb./gal.	10.8 lb./gal.
Flash Point	> 400°F	> 400°F
Thinning	None	None
Shelf Life	1 Year	1 Year
Transport Index	Non-Hazardous	Non-Hazardous

E: bids@sancon.com
P: 714.891.2323
F: 714.891.2524

<https://www.sancon.com>

5841 Engineer Dr.
Huntington Beach, CA 92649 USA



CIPP Corporation

Pipe Wall Thickness Design
 ASTM F1216-16 - Fully Deteriorated Gravity Pipe Conditions
 with Partially Deteriorated Check

Copyright October 3, 2001, PEG Inc., Helena, Montana
 Updated 05-28-2020 RJP and LJB

PROJECT: **San Clemente**
 SEGMENT ID: **8"**

<p>Existing Pipe Parameters:</p> <p>D = Mean Inside Diameter of Original Pipe (in) = 8.0</p> <p>H = Height of Soil Above Top of Pipe (ft) = 12.6</p> <p>W = Soil Density (lb/ft³) = 120</p> <p>H_w = Height of Water Table Above Top of Pipe (ft) = 4.0</p> <p>Δ = Percent Ovality of Original Pipe = 2.00%</p> <p>Live Load Description = H-20</p>	<p>Diagram for a Fully Deteriorated Design</p>																																																																																											
<p>CIPP Linear Parameters:</p> <p>E_s = Short Term Modulus of Elasticity (psi) = 300,000</p> <p>σ_s = Short Term Flexural Strength (psi) = 5,000</p> <p>E_s' = Modulus of Soil Reaction (psi) = 1000</p> <p>N = Safety Factor = 2.0</p> <p>ν = Poisson's Ratio = 0.3</p> <p>K = Enhancement Factor = 7.0</p> <p>Long Term Retention (%) = 60%</p>	<p>Notes:</p> <p>1) Pipelines and conduits must have a diameter between 2 and 100 inches.</p> <p>2) The long term flexural strength and modulus are equal to the respective short term multiplied by the long term retention.</p> <p>3) The Poisson's Ratio is an average 0.3, the enhancement factor is 7, and the safety factor is 2.</p> <p>4) The water buoyancy factor must be at least 0.07 and it is calculated by the following formula:</p> $R_w = 1 - 0.33 \left(\frac{H_w}{H} \right)$ <p>5) The ovality reduction factor is calculated by the following formula:</p> $c = \left(\frac{1 - \frac{\Delta}{100}}{1 + \frac{\Delta}{100}} \right)^3$																																																																																											
<p>Results for the Minimum Pipe Wall Thickness Requirements:</p> <p>Table 2: The Minimum Pipe Wall Thickness</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>t_{min} (in)</th> <th>t_{min} (mm)</th> </tr> </thead> <tbody> <tr> <td>t_{min, full}</td> <td>0.79</td> <td>20.1</td> </tr> <tr> <td>t_{min, 60/37%}</td> <td>0.70</td> <td>17.8</td> </tr> <tr> <td>t_{min, 60/20%}</td> <td>0.65</td> <td>16.5</td> </tr> </tbody> </table> <p>Recommended Stock Size Wall Thickness</p> <p>t_{recommended} = 0.18 in OR 4.6 mm</p>		t _{min} (in)	t _{min} (mm)	t _{min, full}	0.79	20.1	t _{min, 60/37%}	0.70	17.8	t _{min, 60/20%}	0.65	16.5	<p>Factor Summary:</p> <p>E_L = Long Term Modulus of Elasticity (psi) = 150,000</p> <p>σ_L = Long Term Flexural Strength (psi) = 2500</p> <p>R_w = Water Buoyancy Factor = 0.9944</p> <p>C = Ovality Reduction Factor = 0.936</p>																																																																															
	t _{min} (in)	t _{min} (mm)																																																																																										
t _{min, full}	0.79	20.1																																																																																										
t _{min, 60/37%}	0.70	17.8																																																																																										
t _{min, 60/20%}	0.65	16.5																																																																																										
<p>Load Calculations:</p> <p>W_d = Dead Load (psi) = 9.32</p> $W_d = \frac{WHH_w}{144 \frac{in^2}{ft^2}}$ <p>P = Groundwater Load (psi) = 1.73</p> $P = \frac{(62.4 \frac{lb}{ft^3}) H_w}{144 \frac{in^2}{ft^2}} = (0.433 \frac{lb}{ft^2}) H_w$ <p>W_L = Live Load (psi) = 2 col</p> <p>Determine if the piping goes under a highway, railroad, or airport and insert the proper column (HWY = col 2, RR = col 3, AIRPT = col 4). If none enter zero.</p> <p>q_e = Total External Pressure on the Pipe (psi) = 11.05</p> $q_e = W_d + P + W_L$	<p>Live Loads on Pipes (PSI)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">H (ft)</th> <th colspan="3">Live Load Transferred to Pipe (lb/ft²)</th> </tr> <tr> <th>Highway¹</th> <th>Railway²</th> <th>Airport³</th> </tr> </thead> <tbody> <tr><td>1</td><td>12.60</td><td></td><td></td></tr> <tr><td>2</td><td>5.60</td><td>20.39</td><td>13.14</td></tr> <tr><td>3</td><td>4.17</td><td>23.01</td><td>12.20</td></tr> <tr><td>4</td><td>2.78</td><td>19.40</td><td>11.27</td></tr> <tr><td>5</td><td>1.74</td><td>16.07</td><td>10.00</td></tr> <tr><td>6</td><td>1.39</td><td>16.03</td><td>0.79</td></tr> <tr><td>7</td><td>1.22</td><td>12.16</td><td>7.06</td></tr> <tr><td>8</td><td>0.80</td><td>11.11</td><td>0.93</td></tr> <tr><td>10</td><td>0</td><td>7.84</td><td>0.99</td></tr> <tr><td>12</td><td>0</td><td>5.60</td><td>4.78</td></tr> <tr><td>14</td><td>0</td><td>4.17</td><td>3.08</td></tr> <tr><td>16</td><td>0</td><td>3.47</td><td>2.29</td></tr> <tr><td>18</td><td>0</td><td>2.78</td><td>1.91</td></tr> <tr><td>20</td><td>0</td><td>2.00</td><td>1.53</td></tr> <tr><td>22</td><td>0</td><td>1.81</td><td>1.14</td></tr> <tr><td>24</td><td>0</td><td>1.74</td><td>1.05</td></tr> <tr><td>26</td><td>0</td><td>1.39</td><td>0</td></tr> <tr><td>28</td><td>0</td><td>1.04</td><td>0</td></tr> <tr><td>30</td><td>0</td><td>0.80</td><td>0</td></tr> <tr><td>35</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>40</td><td>0</td><td>0</td><td>0</td></tr> </tbody> </table> <p>Note: Table is from ASTM 790.</p>	H (ft)	Live Load Transferred to Pipe (lb/ft ²)			Highway ¹	Railway ²	Airport ³	1	12.60			2	5.60	20.39	13.14	3	4.17	23.01	12.20	4	2.78	19.40	11.27	5	1.74	16.07	10.00	6	1.39	16.03	0.79	7	1.22	12.16	7.06	8	0.80	11.11	0.93	10	0	7.84	0.99	12	0	5.60	4.78	14	0	4.17	3.08	16	0	3.47	2.29	18	0	2.78	1.91	20	0	2.00	1.53	22	0	1.81	1.14	24	0	1.74	1.05	26	0	1.39	0	28	0	1.04	0	30	0	0.80	0	35	0	0	0	40	0	0	0
H (ft)	Live Load Transferred to Pipe (lb/ft ²)																																																																																											
	Highway ¹	Railway ²	Airport ³																																																																																									
1	12.60																																																																																											
2	5.60	20.39	13.14																																																																																									
3	4.17	23.01	12.20																																																																																									
4	2.78	19.40	11.27																																																																																									
5	1.74	16.07	10.00																																																																																									
6	1.39	16.03	0.79																																																																																									
7	1.22	12.16	7.06																																																																																									
8	0.80	11.11	0.93																																																																																									
10	0	7.84	0.99																																																																																									
12	0	5.60	4.78																																																																																									
14	0	4.17	3.08																																																																																									
16	0	3.47	2.29																																																																																									
18	0	2.78	1.91																																																																																									
20	0	2.00	1.53																																																																																									
22	0	1.81	1.14																																																																																									
24	0	1.74	1.05																																																																																									
26	0	1.39	0																																																																																									
28	0	1.04	0																																																																																									
30	0	0.80	0																																																																																									
35	0	0	0																																																																																									
40	0	0	0																																																																																									

Minimum Wall Thickness Required for Buckling Pressure: ASTM 1216-16 EQ X1.3		Given Equations
Calculated Values: $q_t =$ Total External Pressure on the Pipe (psi) 11.05 psi $q_t = \left(\frac{1}{N}\right) \left(32R_w H' R' C' \left(\frac{H' L'}{D}\right)^{0.5}\right)$ $E' =$ Coefficient of Elastic Support (in lb) $H' = \frac{1}{1 + 4e^{-0.0055H}}$		$I =$ Moment of Inertia for CIP (in ⁴) $I = \frac{t^3}{12}$ $t =$ Pipe Wall Thickness (in) $t = \left(\frac{12q_t H' R' D^3}{32R_w H' R' C' E'}\right)^{1/3}$ $E =$ Initial Modulus of Elasticity $E = 2H_t$ $DR =$ Dimension Ratio $DR = \frac{D}{t}$ Constraint for Minimum Thickness $\frac{E}{12(DR)^3} \geq 0.073 \text{ in} \cdot \text{lb}^2$
Results: Minimum Wall Thickness ($t_{min, buckling}$) = 0.13 in OR 3.4 mm		
Check with ASTM 1216-16 EQ X1.4: $E =$ Initial Modulus of Elasticity (psi) 300,000 psi $DR =$ Dimension Ratio 60.4 Does the value meet the constraint? 0.11 in/lb		
<div style="border: 1px solid black; padding: 5px; display: inline-block;">PASS</div>		
Minimum Wall Thickness Required for Partially Deteriorated Pipe Conditions: ASTM 1216-16 EQ X1.1		Given Equations
Calculated Values: $P_w =$ Ground Water Load (psi) 2.02 psi $P_w = \frac{2K R_w C}{N(1-v^2)(DR-1)} = \frac{62.4}{144} \left(H_w + \frac{D}{12}\right)$ $DR =$ Dimension Ratio 70.1		$DR =$ Dimension Ratio $DR = \left(\frac{2K R_w C}{PN(1-v^2)}\right)^{1/3} + 1$ $t =$ Pipe Wall Thickness (in) $t = \frac{D}{DR}$
Results: Minimum Wall Thickness ($t_{min, 1216-16}$) = 0.10 in OR 2.6 mm		
Minimum Wall Thickness Required for Ovality: ASTM 1216-16 EQ X1.2		Given Equations
Calculated Values: $a =$ Constant Multiplier for the Squared Variable 0.0308 $a = 0.015A \left(1 + \frac{A}{100}\right)$ $b =$ Constant Multiplier for the Variable to the First Power -0.6100 $b = -0.5 \left(1 + \frac{A}{100}\right)$ $c =$ Constant Term 616.1 $c = -\frac{\sigma_c}{PN}$ $DR =$ Dimension Ratio 150.7		Quadratic Version of EQ 1.2 $0.015A(DR^2) \left(1 + \frac{A}{100}\right) - 0.5DR \left(1 + \frac{A}{100}\right) - \frac{\sigma_c}{PN} = 0$ Solution to the Quadratic Equation $ax^2 + bx + c = 0$ $x = DR = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ Note: Only the adding solution to the quadratic equation will be used because it produces the larger dimension ratio which in turn produces the minimum wall thickness required.
Results: Minimum Wall Thickness ($t_{min, ovality}$) = 0.053 in OR 1.3 mm		$t =$ Pipe Wall Thickness (inches) $t = \frac{D}{DR}$

SANCON TECHNOLOGIES, INC.

GENERAL ENGINEERING CONTRACTOR
STATE CONTRACTORS LICENSE #774055, CLASS 'A'

Tel: (714) 891-2323
Fax: (714) 891-2524

Sancon CIPP Cured-in-Place-Pipe (CIPP)

Sancon CIPP is a resin impregnated composite felt tube, which can be cured in place by hot water, steam or ambient conditions after water inversion (ASTM F-1216) or pull-in installation (ASTM F-1743) inside of an existing host pipe (sewer, storm drain, etc.). Once fully cured, it provides a jointless, seamless, continuous structural pipe within a pipe that covers holes, voids or cracks in the existing pipe while effectively preventing root intrusion, ground water infiltration & any possible ex-filtration to the surrounding soil while increasing the overall pipe flow capacity. When analyzed for a fully deteriorated host pipe condition, it effectively creates a new 50-year design life pipe within the existing host pipe with structural capabilities that exceed the original host pipe.

Sancon CIPP can be installed in accordance with ASTM F-1216 or ASTM F-1743 as specified by a particular project and/or as recommended by the manufacturer/installer.

Sancon CIPP is a custom designed pipe liner that is available for pipes sizes 4" through 48" and is installed in custom lengths up to 2500' long.

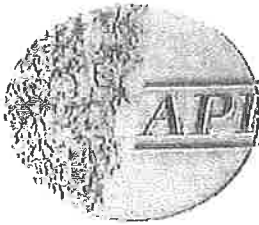
Please refer to ASTM F1216 or ASTM F1743 for installation and design details for this product.

Sancon CIPP is custom designed to specific site conditions and built to exact specifications for each job. It is assembled and QC'd locally in our Huntington Beach Facility.

Minimum Physical Properties

Property	ASTM Method	Value
Flexural Strength	D790	5,000 psi
Flexural Modulus	D790	300,000 psi
Tensile Strength	D638	4,000 psi
Tensile Modulus	D638	300,000 psi
Specific Gravity	D792	1.07
Tensile Elongation	D638	3.0%

5841 Engineer Drive
Huntington Beach, CA 92649



APPLIED FELTS

Applied Felts, Inc. 450 College Drive, Martinsville, Virginia 24112
 Telephone (276) 656 1901 Fax (276) 656 1909
 office@appliedfelts.com

TECHNICAL INFORMATION

Product: Inversion Liner for Hot Water/Steam Cure Installation (PROCESS QUALITY CONTROL)

1. Raw Materials

Each Supplier is assessed against Quality Assurance criteria. If the supplier meets the criteria set out, then they may be included in our "Approved Suppliers List". Periodic reviews take place of all of our approved suppliers to ensure that they continue to meet our criteria.

Inspection and test of raw materials, when received also enables us to assess the supplier as well as each batch of delivered raw material. Details are shown in Table 1.1.

Table 1.1

<u>Raw Material</u>	<u>Characteristic Tested</u>
Polycoster fiber (Several Specifications)	Staple length Crimp level Denier Shade Supplier Certification
Stitchbonded Fiberglass Fabric	Supplier Certification
Polyurethane (PU) pellets or Thermoplastic Olefin (TPO) pellets (Several Specifications)	Granularity Blocking Yellowness Supplier Certification
Tetrahydrofuran	Supplier Certification
Polyurethane (PU) or Polyolefin (TPO) film, sealing tape	Gauge Density Strength of weld – Heat Strength of weld – Chemical Opacity

2. Production of Felt (Nonwoven)

The sole raw material used in the production of felt is polyester staple fiber. The most suitable fiber specification for the customer's particular end-use is selected (on basis of resin type, impregnation equipment, installation conditions, and cure regime).

The process utilizes state of the art equipment and technology to ensure that the Nonwoven Product is fully suited to the customer's requirements.

Continual operator inspection at each stage of the process and product, combined with the use of standard machine parameters and computerized machine monitoring ensures that the process is repeatable and consistent.

Each product is tailored to the specific customer's requirements, and a production specification is produced by the Technical Department. The felt produced is tested against the requirements of this document to concur suitable.

Process controls are described in Table 2.1.

Table 2.1

<u>Process</u>	<u>Control</u>	<u>Characteristic</u>
Opening Fiber	Operator inspection, set parameters	Even density and thickness
Carding	Operator inspection, set parameters, computer feedback	Even fiber distribution
Tacker needling	Operator inspection, set parameters, computer feedback, orientation of fibers	Permits controlled
Reorientation of fibers	Operator inspections, set parameters, computer feedback	Controls relative elongation moduli in length and cross directions
Needling	Operator inspections, set parameters, computer feedback	Density, strength, ability to weld

3. Production of Fiberglass Reinforced Felt

Polyester felt stock and stitchbonded fiberglass fabric stock is selected and bonded together using a Needle Loom. This process yields a single, homogenous felt/fiberglass composite.

Table 3.1

<u>Process</u>	<u>Control</u>	<u>Characteristics</u>
Needling	Operator inspections, set parameters	Density, strength, ability to weld, delamination

4. Polyurethane and TPO Coating of Felt

Polyurethane and TPO granular pellets are selected to ensure that the coating has the correct properties to meet the requirements of the customer.

Process controls are described in Table 3.1.

Table 4.1

<u>Process</u>	<u>Control</u>	<u>Characteristics</u>
Extrusion of polymer into Flat Die	Fully automatic temperature, pressure control	Homogeneity of extrudate
Formation of molten polymer film	Operator control of machine temperatures, pressures, speeds	Coating uniformity
Transfer of molten film onto felt	Operator control of machine temperatures, pressures, speeds. Continual monitoring of coating thickness	Coating mass per unit area Weight distribution over entire roll area

5. Testing of Plain and Coated Felts

Each roll of plain felt, fiberglass reinforced felt, and felt for coating is sampled and destructively tested against the requirements of the Production Specification as shown in Table 4.1. Each coated roll undergoes testing as shown in Table 4.2.

Table 5.1

<u>Characteristic</u>	<u>Test</u>
Density and density distribution at various applied pressures	Compression measurement at increasing pressure
Load at break in machine and cross directions	Tensile Testing -- Maximum Resistive Force.
Secant Modulus in machine and cross directions (resistance to stretch)	Tensile Testing -- Maximum Resistive Force vs. Elongation %

Table 5.2

<u>Characteristic</u>	<u>Test</u>
Density and density distribution at various applied pressures	Compression measurement at increasing pressure
Load at break in machine and cross directions	Tensile Testing -- Maximum Resistive Force.
Secant Modulus in machine and cross directions (resistance to stretch)	Tensile Testing -- Maximum Resistive Force vs. Elongation %
Coating Weight and Distribution	Samples weighed to determine distribution of coating in cross direction of roll.
Coating adhesion and ability to weld	Peel strength of welded tape (Standard Specification)
Coating Surface Finish	Visual inspection.

6. Production of Liners

Liner requirements are collected by way of the Customer Order and customer liaison, and are confirmed to the customer on our Order Acknowledgement form.

Once all of the requirements are known, a liner is designed, which will fulfill all of the requirements.

The design is detailed to the Production Department as a Manufacturing Specification. This is then entered onto the Production Schedule.

The liner may be produced by one of a number of production techniques, depending on the requirements.

7. Testing the Finished Liner

The control and test of the liner properties are detailed in Table 6.1.

From each liner produced, a sample is cut from one end for QC inspection and test. This sample is destructively tested to ensure that all of the liner properties are within the Manufacturing Specification.

Table 7.1

<u>Property</u>	<u>Control</u>	<u>Test</u>
Circumference of liner	Monitored at each production stage against the Manufacturing Specification	Destructive test of sample. All layers are measured.
Density, Gauge of Liner under various applied pressures	Selection of felt layers in order that finished density and gauge are within Manufacturing Specification	Compression test of sample of all layers.
Length of Liner	Monitored at each production stage against Manufacturing Specifications	Inspection regime includes measurement of a sample of liners against Manufacturing Specifications.
Coating Integrity	Continually monitored by state-of-the-art gauge.	Inspected after coating. Monitored throughout liner manufacture
Metal Free	Needling process is continually monitored for alignment to prevent needle damage	Each roll passes through Metal Detection equipment.
Felt Weld Strengths	All welding equipment operates to set parameters. Overlapped thermal welded.	Each weld is sampled and destructively tested. Results are compared to the Manufacturing Specification.
PU / TPO Sewn Seam Strength	All sewing equipment operates to set parameters.	Each sewn seam is sampled and destructively tested. Results are compared to the Manufacturing Specification.
Sealing Tape Weld Strengths	All welding equipment operates to set parameters, chemically bonded seal.	Each weld is sampled, specially conditioned, and destructively tested under conditions that simulate the "worst case" for that liner.

TECHNICAL INFORMATION

Product: Inversion Liner for Hot Water/Steam Cure Installation

Specification

Felt:

The fiber is PET Polyester staple fiber.

The denier of the fiber for a standard hot cure eversion liner for vacuum impregnation with a polyester resin is usually selected as nominally 6 denier (+10%) (dependent on specific liner and installation details).

The felt is manufactured to a thickness specification of $\pm 3\%$ when measured at a compressive pressure of 0.5 bar (7.4 psi) (16 ft. of water head). Standard thicknesses of 1.5mm, 3mm, 4mm, 4.5mm, and 6mm exist.

Fiberglass Reinforced Felt:

The fiberglass reinforced felt product is assembled from rolls of polyester needled felt and rolls of stitchbonded fiberglass fabric.

Coating:

The coating is thermoplastic polyester polyurethane (PU) or thermoplastic polyolefin (TPO). The nominal weight may be 400 – 500, 500 – 600, and 600 – 700 grams per square meter. It is usual for the 400 – 500 gsm specification to be used. This affords an average coating thickness of 0.33mm for 400gsm-PU, 0.41mm for 500gsm-PU, 0.56 for 500gsm-TPO, and 0.79 for 700gsm-TPO.

Liner:

The liner is assembled from layers of plain felt, fiberglass reinforced plain felt, and an outer layer of coated felt or fiberglass reinforced coated felt. Each inner plain layer is overlapped approximately 50mm (2") at each joint and welded by hot fusion techniques to give the requisite weld strength to support the installation pressure (with a safety factor included). The safety factor is in excess of 2.

The outer coated layer has a high strength felt strip fusion welded across the inside of the joint and a sealing tape of polyurethane (PU) or polyolefin (TPO) welded over the coating to give a seal and a barrier of comparable thickness to the coating.

The finished liner thickness is measured at the installation head and is tolerance at $-0 + 5\%$ on nominal ordered thickness.

CERTIFICATION

This certifies that Applied Felts manufactured tubes meet the material requirements of ASTM F1216-09. In support of ASTM D5035-11, specifically as it relates to tensile strengths, our liner tensile properties average 1100 psi. The minimum tensile strength is 750 psi as per ASTM D5813-04 item 6.1 *Fabric Tube Strength* (see Page 9). All our materials are tested to ensure suitability to the application. Each liner is typically tested in 28 different ways and traceable test data is available for any particular liner.

Recommendations for minimum, maximum, and ideal pressures are provided for each and every liner that Applied Felts manufactures. This ensures that the installer understands the requirements for holding the tube against the existing conduit and the maximum allowable pressure so as not to damage the tube. A head pressure chart is attached as examples for various tube sizes.

Applied Felts has provided polymer coated felt tubes for use in Cured in Place Pipe (CIPP) lining for more than fifteen years, and supplied materials for the CIPP industry for more than twenty years. Over 80 million feet of our liner has been successfully installed worldwide, of which 65 million feet has been installed in the United States. Our liners are assembled in Martinsville, VA, using only components made in the USA.

Applied Felts also certifies that all liners manufactured will meet the minimum requested finished thickness (or greater) as ordered by its customers.

Applied Felts is a registered ISO 9001:2008 company.

Sincerely,

W. Mark Sanders
General Manager
Applied Felts, Inc.

FABRIC TUBE STRENGTH

Roll Number	TWF 6.0P		09/14/14	
	Warp Break	Warp Modulus	Wef Break	Wef Modulus
6167/01	2010	9.80	2870	7.11
6167/02	2090	9.64	2850	6.00
6167/03	2270	9.95	2790	6.16
6167/04	2070	9.26	2980	6.57
6167/05	2120	9.42	2750	6.12
6167/06	2160	10.02	2870	7.28
6167/07	2380	10.41	2880	6.59
6167/08	2440	10.42	2730	6.56
6167/09	2370	10.90	2820	6.62
6167/10	2450	11.86	3020	5.84
6167/11	2280	10.21	2880	6.30
6167/12	2160	9.52	2890	5.61
6167/13	2220	9.75	2780	6.48
6167/14	2270	9.86	2670	5.82
6167/15	2240	10.22	2770	5.64
6167/16	2230	10.09	2920	6.47
6167/17	2240	10.58	2640	6.34
6167/18	2060	7.90	2620	6.04

Average 2226 10.00 6.31

1076 psl

RECOMMENDED HANDLING AND STORAGE FOR LINERS

1. Avoid extremes of temperature.

Freezing may cause the coating structure to degrade locally, especially areas where the coating is in tension or compression, at bends, edges, and immediately adjacent to seam welds.

Recommended storage temperature 5 to 35 Degrees C.

Shelf life at this temperature: in excess of 1 year.

2. Avoid extremes of humidity.

Very high relative humidity (especially at high temperature such as tropical countries) will accelerate the hydrolysis of the polyurethane coating (PU), consequently reducing the shelf life.

Recommended storage humidity 25% rh to 65% rh.

Shelf life at 65% rh, 35 Degrees C: 1 year.

3. Avoid prolonged wet storage.

As with high humidity, the coating is more susceptible to degradation at higher temperatures, and even further susceptible if pH of liquid in contact is below 7.

Wet storage is not recommended.

4. Avoid direct sunlight of incident UV radiation.

Prolonged exposure to ultra violet light will accelerate the degradation of the polyurethane (PU) or polyolefin (TPO).

It is recommended that liners remain in the original packaging until they are required for use. Failing this, the liner should be covered to prevent exposure.

Storage and Handling con't.

5. Mechanical damage should be avoided.

In order to ensure that the liner is not damaged, the following recommendations should be followed:

- a. Ensure that the liner is not placed directly onto dirt or gravel floor. Sweep and cover floor first.
- b. Ensure personnel are instructed not to walk on liner.
- c. Handle liner with care.
- d. Ensure nip rollers are clean, and liner is not in contact with any sharp edges or snags anywhere during impregnation and installation.
- e. Large liners will require special handling considerations (especially when wet-out), as their weight will preclude manual handling. Cranes or conveyors may be required. If a liner is to be lifted with a crane sling, it is important that the sling should be sufficiently wide to prevent it from "biting" into the liner. It should be set up in such a way that the sling does not grip the liner (ie. Both loops on the sling onto the crane hook).

6. Styrene and Chemical Attack.

Avoid prolonged contact with solvents and chemicals.

On impregnation with styrene-based resin, the solvent/monomer may start to swell the coating, giving an orange peel appearance. In time, this effect will increase to severe wrinkling (stretch by 60%)

If the contact time is sufficient, the coating will feel tacky. At this stage, the product should not be used.

Recommended shelf life after impregnation will vary dependent on the proportion of styrene in the resin, the nature and proportion of thixotropes, inhibitors, accelerators and catalysts, and the storage temperature.

As a general rule, the impregnated liner should be stored below 10 degrees C. The typical shelf life at this temperature, with a polyester resin system, is a maximum of 7 days. With some resin systems, this shelf life is reduced to less than 24 hours. If using an unfamiliar system, it is recommended that a section of coated felt is soaked in resin and assessed periodically to determine shelf life. With experience, this may be judged visually by the degree of wrinkling.



INTERPLASTIC CORPORATION

2015 Broadway Street Northeast
Minneapolis, MN 55413-1714
651.481.6860 Fax 612.331.4634

COR72-AT-470HT Cured-in-Place Pipe Resin

This packet contains information typically required when submitting a resin designed for the CIPP process to a municipality. Included is the following information for COR72-AT-470HT:

- **Technical Data Sheet**
 - Includes product specifications
 - Includes typical physical properties of the resin
 - Includes typical physical properties of a felt impregnated composite
- **Fourier Transform Infrared (FTIR) Spectrum on the Liquid Resin**
- **Safety Data Sheet (SDS)**
- **Corrosion Test Data**
 - A summary of the data as it relates to ASTMs D543, D5813, F1216, and F1743
 - Raw data for 1 month and 12 month testing performed by a third party test laboratory
- **ASTM D2990 Flexural Creep Modulus Data**

If additional information is required, or for any specific questions regarding this resin, please contact one of the following individuals:

Jason Schiro
CIPP Product Manager
651.757.3961 (office)
612.356.3343 (cell)
jschiro@interplastic.com

OR

Kateel Rahaim
Business Manager-Remediation Polymers
281.687.8617 (cell)
krahaim@interplastic.com

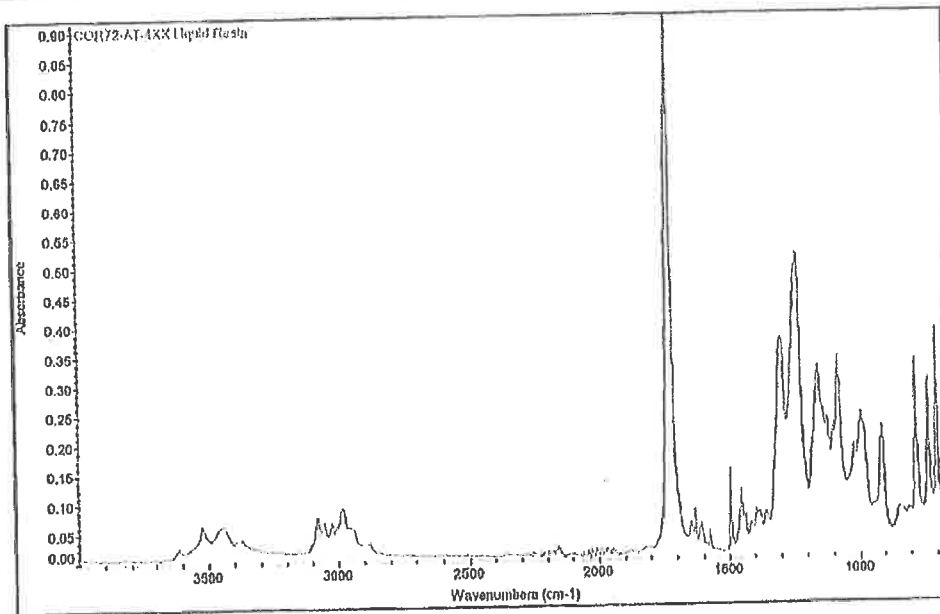
All specifications and properties specified above are approximate. Specifications and properties of material delivered may vary slightly from those given above. Interplastic Corporation makes no representations of fact regarding the material except those specified above. No person has any authority to bind Interplastic Corporation to any representation except those specified above. Final determination of the suitability of the material for the use contemplated is the sole responsibility of the Buyer. The Thermoset Resin Division's technical sales representatives will assist in developing procedures to fit individual requirements.



INTERPLASTIC CORPORATION

2016 Northeast Broadway Street
Minneapolis, Minnesota 55413-1776
(651) 401-0000 Fax (612) 331-4235

COR72-AT-4XX Type Liquid Resin Sample



All specifications and properties specified above are appropriate. Specifications and properties of material delivered may vary slightly from those given above. Interplastic Corporation makes no representations of fact regarding the material except those specified above. No person has any authority to bind Interplastic Corporation to any representation except those specified above. Final determination of the suitability of the material for the use contemplated is the sole responsibility of the Buyer. Interplastic Corporation's sales representatives are available to assist in developing procedures to fit individual requirements.

SAFETY DATA SHEET

CIPP ISO RESIN



Section 1. Identification

GHS product identifier : CIPP ISO RESIN
Product code : COR72-AT-470HT
Other means of identification : Unsaturated Polyester Resin
Product type : Liquid.

Material uses

Product use : Industrial applications.

Supplier's details : INTERPLASTIC CORPORATION
1225 Willow Lake Boulevard
St. Paul, MN 55110-5145
651.481.6860

Emergency telephone number (with hours of operation) : CHEMTREC 24-Hour Emergency Telephone 800.424.9300

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Classification of the substance or mixture : FLAMMABLE LIQUIDS - Category 3
ACUTE TOXICITY (Inhalation) - Category 4
SKIN IRRITATION - Category 2
EYE IRRITATION - Category 2A
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract Irritation) - Category 3
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (hearing organs) - Category 1

GHS label elements

Hazard pictograms :



Signal word : Danger

Hazard statements : Flammable liquid and vapor.
Harmful if inhaled.
Causes serious eye irritation.
Causes skin irritation.
May cause respiratory irritation.
Causes damage to organs through prolonged or repeated exposure. (hearing organs)

Precautionary statements

Date of Issue/Date of revision

: 6/22/2017

Date of previous Issue

: 6/17/2017

Version : 7.01

1/14

Section 2. Hazards identification

- Prevention** : Wear protective gloves. Wear eye or face protection. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use explosion-proof electrical, ventilating, lighting and all material-handling equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Keep container tightly closed. Use only outdoors or in a well-ventilated area. Do not breathe vapor. Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling.
- Response** : Get medical attention if you feel unwell. **IF INHALED:** Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or physician if you feel unwell. **IF ON SKIN (or hair):** Take off immediately all contaminated clothing. Rinse skin with water or shower. **IF ON SKIN:** Wash with plenty of soap and water. Take off contaminated clothing and wash it before reuse. If skin irritation occurs: Get medical attention. **IF IN EYES:** Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention.
- Storage** : Store locked up. Store in a well-ventilated place. Keep cool.
- Disposal** : Dispose of contents and container in accordance with all local, regional, national and international regulations. Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.
- Hazards not otherwise classified** : None known.

Section 3. Composition/information on ingredients

- Substance/mixture** : Mixture
- Other means of identification** : Unsaturated Polyester Resin

CAS number/other identifiers

- CAS number** : Not applicable.
- Product code** : COR72-AT-470HT

Ingredient name	%	CAS number
styrene	<= 33.0	100-42-5

Any concentration shown as a range is to protect confidentiality or is due to batch variation. Any concentration shown as exact is based on formula.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.
See Section 9 for VOC content. See Section 15 for HAP information.

Section 4. First aid measures

Description of necessary first aid measures

- Eye contact** : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

Section 4. First aid measures

- Inhalation** : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
- Skin contact** : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Continue to rinse for at least 10 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.
- Ingestion** : Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention following exposure or if feeling unwell. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Potential acute health effects

- Eye contact** : Causes serious eye irritation.
- Inhalation** : Harmful if inhaled. May cause respiratory irritation.
- Skin contact** : Causes skin irritation.
- Ingestion** : No known significant effects or critical hazards.

Over-exposure signs/symptoms

- Eye contact** : Adverse symptoms may include the following:
pain or irritation
watering
redness
- Inhalation** : Adverse symptoms may include the following:
respiratory tract irritation
coughing
- Skin contact** : Adverse symptoms may include the following:
irritation
redness
- Ingestion** : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

- Notes to physician** : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
- Specific treatments** : No specific treatment.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use dry chemical, CO₂, water spray (fog) or foam.

Unsuitable extinguishing media : Do not use water jet.

Specific hazards arising from the chemical : Flammable liquid and vapor. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapor/gas is heavier than air and will spread along the ground. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Runoff to sewer may create fire or explosion hazard.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
metal oxide/oxides

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flames, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Section 6. Accidental release measures

- Large spill** : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

- Protective measures** : Put on appropriate personal protective equipment (see Section 8). Do not breathe vapor or mist. Do not ingest. Avoid contact with eyes, skin and clothing. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Take precautionary measures against electrostatic discharges. Empty containers retain product residue and can be hazardous. Do not reuse container.
- Advice on general occupational hygiene** : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.
- Conditions for safe storage, including any incompatibilities** : Do not store above the following temperature: 38°C (100.4°F). Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
styrene	ACGIH TLV (United States, 3/2016). TWA: 20 ppm 8 hours. TWA: 85 mg/m ³ 8 hours. STEL: 40 ppm 15 minutes. STEL: 170 mg/m ³ 15 minutes. OSHA PEL 1989 (United States, 3/1989). TWA: 50 ppm 8 hours. TWA: 215 mg/m ³ 8 hours. STEL: 100 ppm 15 minutes. STEL: 425 mg/m ³ 15 minutes. OSHA PEL Z2 (United States, 2/2013).

Section 8. Exposure controls/personal protection

TWA: 100 ppm 8 hours.
 CEIL: 200 ppm
 AMP: 600 ppm 5 minutes.
 NIOSH REL (United States, 10/2016).
 TWA: 50 ppm 10 hours.
 TWA: 215 mg/m³ 10 hours.
 STEL: 100 ppm 15 minutes.
 STEL: 425 mg/m³ 15 minutes.

- Appropriate engineering controls** : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.
- Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

- 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. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
- Eye/face protection** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.
- Skin protection**
- Hand protection** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
- Body protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.
- Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory protection** : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

Section 9. Physical and chemical properties

Appearance

Physical state	: Liquid.
Color	: Various
Odor	: Aromatic, Sweetish.
Odor threshold	: 0.1 ppm
pH	: Not applicable.
Melting point	: Not available.
Boiling point	: 145°C (293°F)
Flash point	: Closed cup: 31°C (87.8°F)
Evaporation rate	: <1 (butyl acetate = 1)
Lower and upper explosive (flammable) limits	: Lower: 0.9% Upper: 6.8%
Vapor pressure	: 0.67 kPa (5 mm Hg) [room temperature]
Vapor density	: 3.6 [Air = 1]
Relative density	: 1.24 to 1.27
Solubility in water	: Not applicable.
Partition coefficient: n-octanol/water	: Not available.
Auto-ignition temperature	: Not available.
Decomposition temperature	: Not available.
Viscosity	: Not available.
VOC content (industrial use)	: 32.6 % (w/w) As shipped. Including monomer.

Section 10. Stability and reactivity

Reactivity	: No specific test data related to reactivity available for this product or its ingredients.
Chemical stability	: The product is stable.
Possibility of hazardous reactions	: Hazardous reactions or instability may occur under certain conditions of storage or use.
Conditions to avoid	: Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapor to accumulate in low or confined areas. Hazardous polymerization may occur under certain conditions of storage or use. Keep away from heat and direct sunlight. Keep away from heat and flames. Keep away from oxidizing agents.
Incompatible materials	: Reactive or incompatible with the following materials: oxidizing materials Reactive or incompatible with the following materials; metals, acids and alkalis. Incompatible with alkali metals. Incompatible with some alkalis. Incompatible with some strong acids. Incompatible with copper alloys, brass.
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
styrene	LC50 Inhalation Gas.	Rat	2770 ppm	4 hours
	LC50 Inhalation Vapor	Rat	11800 mg/m ³	4 hours
	LD50 Oral	Rat	2650 mg/kg	-

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
styrene	Eyes - Mild Irritant	Human	-	50 parts per million	-
	Eyes - Moderate Irritant	Rabbit	-	24 hours 100 milligrams	-
	Eyes - Severe Irritant	Rabbit	-	100 milligrams	-
	Skin - Mild Irritant	Rabbit	-	500 milligrams	-
	Skin - Moderate Irritant	Rabbit	-	100 Percent	-

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Conclusion/Summary : Styrene manufacturers have determined that the weight of evidence for the carcinogenicity of this substance does not meet the criteria for classification.

Styrene is listed by IARC as a possible carcinogen to humans (Group 2B) based on "limited evidence" in humans, "limited evidence" in animals and "other relevant data". The United States NTP listed styrene as reasonably anticipated to be a human carcinogen based on "limited evidence" from studies in humans, "sufficient evidence" from studies in experimental animals, and supporting data on mechanisms of carcinogenesis. The significance of these results for humans has not been established through risk assessment.

Classification

Product/ingredient name	OSHA	IARC	NTP
styrene	-	2B	Reasonably anticipated to be a human carcinogen.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Section 11. Toxicological information

Name	Category	Route of exposure	Target organs
styrene	Category 3	Not applicable.	Respiratory tract Irritation

Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs
styrene	Category 1	Inhalation	hearing organs

Aspiration hazard

Name	Result
styrene	ASPIRATION HAZARD - Category 1

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : Causes serious eye irritation.
 Inhalation : Harmful if inhaled. May cause respiratory irritation.
 Skin contact : Causes skin irritation.
 Ingestion : No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : Adverse symptoms may include the following:
 pain or Irritation
 watering
 redness
 Inhalation : Adverse symptoms may include the following:
 respiratory tract Irritation
 coughing
 Skin contact : Adverse symptoms may include the following:
 Irritation
 redness
 Ingestion : No specific data.

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

Short term exposure

Potential immediate effects : Not available.
 Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.
 Potential delayed effects : Not available.

Potential chronic health effects

Not available.

Section 11. Toxicological information

General	: Causes damage to organs through prolonged or repeated exposure.
Carcinogenicity	: No known significant effects or critical hazards.
Mutagenicity	: No known significant effects or critical hazards.
Teratogenicity	: No known significant effects or critical hazards.
Developmental effects	: No known significant effects or critical hazards.
Fertility effects	: No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Route	ATE value
Oral	3912.1 mg/kg
Inhalation (gases)	8528 ppm
Inhalation (vapors)	36,33 mg/l

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
styrene	Acute EC50 1400 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	72 hours
	Acute EC50 720 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	96 hours
	Acute EC50 4700 µg/l Fresh water	Daphnia - Daphnia magna	48 hours
	Acute LC50 52 mg/l Marine water	Crustaceans - Artemia salina	48 hours
	Acute LC50 4020 µg/l Fresh water	Fish - Pimephales promelas	96 hours
	Chronic NOEC 63 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	96 hours

Persistence and degradability

Product/ingredient name	Test	Result	Dose	Inoculum
styrene	OECD	70 % - Readily - 28 days	-	-
Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability	
styrene	-	-	Readily	

Bioaccumulative potential

Product/ingredient name	LogP _{ow}	BCF	Potential
styrene	0,35	13,49	low

Mobility in soil

Soil/water partition coefficient (K_{oc}) : Not available.





Other adverse effects : No known significant effects or critical hazards.

Date of Issue/Date of revision	: 6/22/2017	Date of previous Issue	: 5/17/2017	Version	: 7.01	10/14
--------------------------------	-------------	------------------------	-------------	---------	--------	-------

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	DOT Classification	Mexico Classification	IMDG	IATA
UN number	UN1866	UN1866	UN1866	UN1866
UN proper shipping name	RESIN SOLUTION	RESIN SOLUTION	RESIN SOLUTION	RESIN SOLUTION
Transport hazard class(es)	3 	3 	3 	3 
Packing group	III	III	III	III
Environmental hazards	No.	No.	No.	No.
Additional information	<u>Reportable quantity</u> 3078.7 lbs / 1397.7 kg [294, 22 gal / 1113.7 L] Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.			

Section 14. Transport Information

Special precautions for user : Transport within user's premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL and the IBC Code : Not available.

Section 15. Regulatory Information

U.S. Federal regulations : TSCA 8(a) PAIR: 4-tert-butylpyrocatechol
TSCA 8(a) CDR Exempt/Partial exemption: Not determined
United States Inventory (TSCA 8b): All components are listed or exempted.
Clean Water Act (CWA) 307: Naphthenic acids, copper salts
Clean Water Act (CWA) 311: styrene

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : styrene
cobalt bis(2-ethylhexanoate)

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Fire hazard
Immediate (acute) health hazard
Delayed (chronic) health hazard

SARA 313

	Product name	CAS number	%
Form R - Reporting requirements	styrene	100-42-5	<= 33.0
Supplier notification	styrene	100-42-5	32.48

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

State regulations

Massachusetts : The following components are listed: STYRENE; PHENYLETHYLENE
New York : The following components are listed: Styrene
New Jersey : The following components are listed: STYRENE MONOMER; BENZENE, ETHENYL-
Pennsylvania : The following components are listed: BENZENE, ETHENYL-

California Prop. 65

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

Section 15. Regulatory information

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
styrene	Yes.	No.	No.	No.

International regulations

International lists

- : Australia Inventory (AICS): All components are listed or exempted.
- : China Inventory (IECSG): All components are listed or exempted.
- : Japan Inventory (ENCS): Not determined.
- : Japan Inventory (ISHL): Not determined.
- : Korea Inventory: All components are listed or exempted.
- : Malaysia Inventory (EHS Register): Not determined.
- : New Zealand Inventory of Chemicals (NZIoC): All components are listed or exempted.
- : Philippines Inventory (PICCS): Not determined.
- : Taiwan Chemical Substances Inventory (TCSI): All components are listed or exempted.
- : Turkey Inventory: Not determined.

Canada Inventory

- : All components are listed or exempted.

Section 16. Other information

Hazardous Material Information System (U.S.A.)

Health	2
Flammability	3
Physical hazards	1

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on SDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)



Reprinted with permission from NFPA 704-2001, Identification of the Hazards of Materials for Emergency Response Copyright ©1997, National Fire Protection Association, Quincy, MA 02269. This reprinted material is not the complete and official position of the National Fire Protection Association, on the referenced subject which is represented only by the standard in its entirety.

Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

History

Date of printing : 5/22/2017

Section 16. Other information

Date of issue/Date of revision	: 5/22/2017
Date of previous issue	: 5/17/2017
Version	: 7.01
Prepared by	Health, Safety and Environmental Department
Email	: For questions regarding the SDS contact: lasafety@lp-corporation.com
Key to abbreviations	: ATE = Acute Toxicity Estimate BCF = Bioconcentration Factor GHS = Globally Harmonized System of Classification and Labelling of Chemicals IATA = International Air Transport Association IBC = Intermediate Bulk Container IMDG = International Maritime Dangerous Goods LogPow = logarithm of the octanol/water partition coefficient MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution) UN = United Nations
References	: OSHA Hazard Communication Standard, March 2012 (29 CFR 1910.1200)
<input checked="" type="checkbox"/>	Indicates information that has changed from previously issued version.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.



INTERPLASTIC CORPORATION

2015 Broadway Street Northeast
 Minneapolis, MN 55413-1714
 651.481.6860 Fax 612.331.4634

COR72-AT-4XX Series Corrosion Summary

ASTM F1216 & D543 (CIPP) Corrosion Data @ 73.4 +/- 3.6°F (23 +/- 2°C)

Immersion Media	Flexural Strength Retention, % Months		Flexural Modulus Retention, % Months	
	1	12	1	12
100% Tap Water (pH 6-9)	97	89	96	97
5% Nitric Acid	97	85	99	90
10% Phosphoric Acid	98	90	96	98
10% Sulfuric Acid	95	98	97	97
100% Gasoline	98	92	100	98
0.1% Detergent	100	96	99	97
0.1% Soap Solution	100	99	98	99
100% Vegetable Oil	94	98	100	100

ASTM D5813, F1743, & D543 (CIPP) Corrosion Data @ 73.4 +/- 3.6°F (23 +/- 2°C)

Immersion Media	Flexural Strength Retention, % Months		Flexural Modulus Retention, % Months	
	1	12	1	12
1% Nitric Acid	100	98	100	96
5% Sulfuric Acid	100	96	97	95
100% Gasoline	98	92	100	98
0.1% Detergent	100	96	99	97
0.1% Soap Solution	100	99	98	99
100% Vegetable Oil	94	98	100	100

Note: Non-shaded regions are the applicable test durations as they relate to achievement of the minimum acceptable retentions.

**All testing was conducted by HTS Pipe Consultants, Inc.

All specifications and properties specified above are approximate. Specifications and properties of material delivered may vary slightly from those given above. Interplastic Corporation makes no representations of fact regarding the material except those specified above. No person has any authority to bind Interplastic Corporation to any representation except those specified above. Final determination of the suitability of the material for the use contemplated is the sole responsibility of the Buyer. The Thermoset Resin Division's technical sales representatives will assist in developing procedures to fit individual requirements.

**SUMMARY OF TEST DATA
RESISTANCE OF CIPP TO CHEMICAL REAGENTS**

SAMPLE ID: COR72-AT Duration: 30 Days Date Tested: 11/13/2008

Chemical Reagent (Concentration)	Mechanical Property	Test Method ASTM D	Unit	Control Sample	30 Days	
					Value	% Change
Tap water (100%)	Observation	543		N/A	No Change	pH 7.6
	Weight	543	g	143.2	143.4	0.14
	Hardness	2583		90.6	90.6	0.00
	Thickness	2122	in.	0.276	0.276	0.00
			mm.	7.0	7.0	0.00
	Max. Flexural Modulus	790	psi	9520.2	9234.8	-3.00
psi			679880	660263	-4.36	
Nitric Acid (5%)	Observation	543		N/A	Spot of cloud	pH 0.6
	Weight	543	g	132.3	132.6	0.23
	Hardness	2583		90.6	90.6	0.00
	Thickness	2122	in.	0.262	0.262	0.00
			mm.	6.7	6.7	0.00
	Max. Flexural Modulus	790	psi	9520.2	9187.8	-3.39
psi			679890	671493	-1.24	
Phosphoric Acid (10%)	Observation	543		N/A	Spot of cloud	pH 1.0
	Weight	543	g	143.7	143.8	0.07
	Hardness	2583		90.6	90.6	0.00
	Thickness	2122	in.	0.281	0.281	0.00
			mm.	7.1	7.1	0.00
	Max. Flexural Modulus	790	psi	9520.2	9313.3	-2.17
psi			679890	652410	-4.04	
Sulfuric Acid (10%)	Observation	543		N/A	Spot of cloud	pH 0.2
	Weight	543	g	137.4	137.5	0.07
	Hardness	2583		90.4	90.4	0.00
	Thickness	2122	in.	0.266	0.266	0.00
			mm.	6.8	6.8	0.00
	Max. Flexural Modulus	790	psi	9520.2	9024	-5.21
psi			679880	656742	-3.40	



**SUMMARY OF TEST DATA
RESISTANCE OF CIPP TO CHEMICAL REAGENTS**

SAMPLE ID: **QOR72-AT** Duration: **30 Days** Date Tested: **11/13/2008**

Chemical Reagent (Concentration)	Mechanical Property	Test Method ASTM D	Unit	Control Sample	30 Days	
					Value	% Change
Gasoline (100%)	Observation	543		N/A	No Change	pH-NA
	Weight	543	g	134.4	134.5	0.07
	Hardness	2503		90.6	90.6	0.00
	Thickness	2122	in.	0.266	0.260	0.00
				mm.	6.8	6.8
	Max. Flexural Modulus	790	psi	9520.2	9321	-2.09
psi				679890	661694	0.29
Vegetable Oil (100%)	Observation	543		N/A	No Change	pH-NA
	Weight	543	g	130.2	130.3	0.08
	Hardness	2503		90.4	90.4	0.00
	Thickness	2122	in.	0.263	0.263	0.00
				mm.	6.7	6.7
	Max. Flexural Modulus	790	psi	9520.2	8951.0	-5.87
psi				679890	688215	1.22
Detergent (0.1%)	Observation	543		N/A	No Change	pH 5.8
	Weight	543	g	124.4	124.8	0.32
	Hardness	2503		90.4	90.4	0.00
	Thickness	2122	in.	0.256	0.256	0.00
				mm.	6.5	6.5
	Max. Flexural Modulus	790	psi	9520.2	10051.0	5.58
psi				679890	669962	-1.46
Soap (0.1%)	Observation	543		N/A	No Change	pH 5.4
	Weight	543	g	136.0	136.4	0.29
	Hardness	2503		90.8	90.8	0.00
	Thickness	2122	in.	0.262	0.262	0.00
				mm.	6.7	6.7
	Max. Flexural Modulus	790	psi	9520.2	9508.3	-0.12
psi				679890	669661	-1.52

**SUMMARY OF TEST DATA
RESISTANCE OF CIPP TO CHEMICAL REAGENTS**

SAMPLE ID: **COR72-AT** Duration: **30 Days** Date Tested: **11/13/2008**

Chemical Reagent (Concentration)	Mechanical Property	Test Method ASTM D	Unit	Control Sample	30 Days	
					Value	% Change
Nitric Acid (1%)	Observation	543		N/A	No Change	pH 1.2
	Weight	543	g	134.9	135.3	0.30
	Hardness	2583		90.6	90.6	0.00
	Thickness	2122	in.	0.268	0.268	0.00
				mm.	6.8	6.8
	Max. Flexural Modulus	790	psi	9520.2	9554.8	0.36
679890				680468	0.09	
Sulfuric Acid (5%)	Observation	543		N/A	Spot of cloud	pH 0.5
	Weight	543	g	129.7	129.9	0.16
	Hardness	2583		91.0	91.0	0.00
	Thickness	2122	in.	0.259	0.259	0.00
				mm.	6.6	6.6
	Max. Flexural Modulus	790	psi	9520.2	9988.7	4.92
679890				662814	-2.51	



HTS, Inc. Consultants
 418 Pickering Street, Houston, TX 77091
 www.htshouston.com

Phone 713-692-8373
 Fax 713-692-8502
 Toll Free 1-800-692-TEST



Excellence in Engineering, Consulting, Testing and Inspection

FLEXURAL PROPERTIES OF PLASTICS (ASTM D790)

SUPPORT SPAN = 4"

Flexural 3 point bend

Operator Name: D. CARROLL

Sample Identification: 8955-4CC
 Interface Type: 12/13/1400 Series
 Machine Parameters of Test:

Sample Rate (pcs/sec): 10.000
 Crosshead Speed (in/min): .1100

Instron Corporation
 Series IX Automated Materials Testing System 6.05
 Test Date: 13 Nov 2008

Sample Type: ASTM

Humidity (%): 50
 Temperature (deg. F): 71

Dimensions:

	Spec. 1	Spec. 2	Spec. 3	Spec. 4	Spec. 5
Width (in)	.95700	.55700	.55500	.55200	.57500
Depth (in)	.29400	.24800	.25000	.27700	.27600
Span (in)	4.0000	4.0000	4.0000	4.0000	4.0000

Out of 5 specimens, 0 excluded.

Sample comments: COR72-AT, CONTROL

Specimen Number	Displacement	Strain	Load	Stress	Modulus
	at Yield (in)	at Yield (in/in)	at Yield (lbs)	at Yield (psi)	of Elasticity (psi)
1	.8776	.0507	51.4	10119.6	662176
2	.5294	.0492	58.1	10174.1	653016
3	.3701	.0358	56.4	9156.8	686340
4	.3424	.0356	63.3	8971.4	688242
5	.4790	.0492	57.0	9179.2	708782
Mean:	.4399	.0422	59.3	9620.2	679890
Standard Deviation:	.1060	.0072	6.1	578.0	22032
Minimum:	.3424	.0356	51.4	8971.4	653016
Maximum:	.8776	.0507	67.0	10174.1	708782

• Geotechnical Engineering • Materials Testing and Inspection • Environmental Site Assessments • Geosynthetics and Construction QA/QC

Serving the Construction, Petroleum and Waste Industries

HTS, Inc. Consultants
 416 Plokerling Street, Houston, TX 77091
 www.htshouston.com

Phone 713-682-8373
 Fax 713-682-8602
 Toll Free 1-800-002-TEST



Excellence in Engineering, Consulting, Testing and Inspection

FLEXURAL PROPERTIES OF PLASTICS (ASTM D790)

SUPPORT SPAN = 4"

Flexural 3 point bend

Operator name: K. PHOUANGSVANH

Sample Identification: 0F55-4-1
 Interface Type: 42/43/4400 Series
 Machine Parameters of test:

Sample Rate (pts/sec): 10.000
 Crosshead Speed (in/min): .1100

Instron Corporation
 Series IX Automated Materials Testing System 6.05
 Test Date: 17 Nov 2009

Sample Type: ASTM

Humidity (%): 50
 Temperature (deg. F): 71

Dimensions:

	Spec. 1	Spec. 2	Spec. 3	Spec. 4	Spec. 5
Width (in)	.56500	.58000	.56100	.55400	.55400
Depth (in)	.26100	.27000	.27600	.27900	.28700
Span (in)	4.0000	4.0000	4.0000	4.0000	4.0000

Out of 9 specimens, 0 excluded.

Sample comments: COR72-ZT, SAMPLE SOAKED IN TAP WATER pH6-9 (100%) FOR 30 DAYS

Specimen Number	Displacement	Strain	Load	Stress	Modulus
	at Yield (in)	at Yield (in/in)	at Yield (lbf)	at Yield (psi)	of Elasticity (psi)
1	.5078	.0497	69.8	9479.7	623467
2	.4462	.0452	69.2	9567.0	603438
3	.3859	.0399	66.6	9447.9	675286
4	.4253	.0445	65.6	9132.8	684403
5	.2988	.0322	65.6	8626.0	664732
Mean:	.4120	.0423	64.8	9234.0	660269
Standard Deviation:	.0776	.0066	2.3	379.8	36045
Minimum:	.2988	.0222	60.8	8626.0	603428
Maximum:	.5078	.0497	66.6	9507.0	684403

• Geotechnical Engineering • Materials Testing and Inspection • Environmental Site Assessments • Geosynthetics and Construction QA/QC

Serving the Construction, Petroleum and Waste Industries

HTS, Inc. Consultants
 418 Pickering Street, Houston, TX 77001
 www.htshouston.com

Phone 713-692-8373
 Fax 713-692-8502
 Toll Free 1-800-692-TEST



Excellence In Engineering, Consulting, Testing and Inspection

FLEXURAL PROPERTIES OF PLASTICS (ASTM D790)

SUPPORT SPAN - 4"

Flexural 3 point bend

Operator name: E. CARRILLO

Sample Identification: 0555-4-2
 Interface Type: 42/43/4400 Series
 Machine Parameters of test:

Sample Rate (pts/sec): 10.000
 Crosshead Speed (in/min): .1100

Instron Corporation
 Series XX Automated Materials Testing System 6.05
 Test Date: 13 Nov 2008

Sample Type: ASTM

Humidity (%): 50
 Temperature (deg. F): 71

Dimensions:

	Spec. 1	Spec. 2	Spec. 3	Spec. 4	Spec. 5
Width (in)	.56200	.56700	.56400	.56600	.55200
Depth (in)	.24700	.25700	.26400	.27100	.22500
Span (in)	4.0000	4.0000	4.0000	4.0000	4.0000

Out of 5 specimens, 0 excluded.

Sample comment: COR72-AF, SAMPLE SOAKED IN NITRIC ACID (6%) FOR 30 DAYS

Specimen Number	Displacement	Strain	Load	Stress	Modulus
	at Yield (in)	at Yield (in/in)	at Yield (lbs)	at Yield (psi)	of Elasticity (psi)
1	.4456	.0413	54.0	9439.8	664801
2	.3730	.0389	50.1	9303.7	683507
3	.3146	.0321	50.5	9231.6	676030
4	.3433	.0349	62.3	8989.7	690621
5	.5750	.0507	49.0	9024.3	642586
Mean:	.4109	.0388	56.1	9197.8	671493.
Standard Deviation:	.1045	.0076	6.6	189.9	18814.
Minimum:	.3146	.0311	49.0	8989.7	642586.
Maximum:	.5750	.0507	62.3	9439.8	690621.

• Geotechnical Engineering • Materials Testing and Inspection • Environmental Site Assessments • Geosynthetics and Construction QA/QC

Serving the Construction, Petroleum and Waste Industries

HTS, Inc. Consultants
 416 Pickering Street, Houston, TX 77091
 www.htshouston.com

Phone 713-692-8373
 Fax 713-692-8502
 Toll Free 1-800-692-TEST



Excellence in Engineering, Consulting, Testing and Inspection

FLEXURAL PROPERTIES OF PLASTICS (ASTM D190)

SUPPORT SPAN = 4"

Flexural 3 point bend

Operator name: K. PICHUANGSAVAM!

Sample Identification: 0F55-4-3
 Interface Type: 02/43/4400 Series
 Machine Parameters of test:

Sample Rate (pts/sec): 10.000
 Crosshead Speed (in/min): .1100

Instron Corporation
 Series IX Automated Materials Testing System 6.05
 Test Date: 13 Nov 2000

Sample Type: ASTM

Humidity (%): 50
 Temperature (deg. F): 71

Dimensions:

	Spec. 1	Spec. 2	Spec. 3	Spec. 4	Spec. 5
Width (in)	.56600	.56300	.57000	.55500	.56900
Depth (in)	.27200	.29200	.28400	.28900	.29200
Span (in)	4.0000	4.0000	4.0000	4.0000	4.0000

Out of 5 specimens, 0 excluded.

Sample comments: COR72-AT, SAMPLE SOAKED IN PHOSPHORIC ACID (10%) FOR 30 DAYS

Specimen Number	Displacement	Strain	Load	Stress	Modulus
	at Yield (in)	at Yield (in/in)	at Yield (lbs)	at Yield (psi)	or Elasticity (psi)
1	.4784	.0508	67.7	9780.3	659947
2	.3990	.0422	60.1	9127.6	644073
3	.3767	.0401	67.4	8801.5	658320
4	.4319	.0468	70.9	9273.3	637340
5	.4607	.0508	78.9	9763.9	664860
Mean:	.4233	.0461	70.6	9313.3	652410.
Standard Deviation:	.0404	.0040	4.9	408.9	11142.
Minimum:	.3767	.0401	67.4	8801.5	637340.
Maximum:	.4904	.0508	78.9	9763.9	664560.

• Geotechnical Engineering • Materials Testing and Inspection • Environmental Site Assessments • Geosynthetics and Construction QA/QC

Serving the Construction, Petroleum and Waste Industries

HTS, Inc. Consultants
 410 Pickering Street, Houston, TX 77091
 www.htshouston.com

Phone 713-692-8373
 Fax 713-692-8802
 Toll Free 1-800-692-TEST



Excellence in Engineering, Consulting, Testing and Inspection

FLEXURAL PROPERTIES OF PLASTICS (ASTM D790)

SUPPORT SPAN = 4"

Flexural 3 point bend

Operator name: K. PHOUANGSAVANH

Sample Identification: SF55-4-4
 Interface Type: 42/43/4400 Series
 Machine Parameters of Test:

Sample Rate (pts/sec): 10.000
 Crosshead Speed (in/min): .1100

Instron Corporation
 Series IX Automated Materials Testing System 6.05
 Test Date: 13 Nov 2008

Sample Type: ASTM

Humidity (%): 50
 Temperature (deg. F): 71

Dimensions:

	Spec. 1	Spec. 2	Spec. 3	Spec. 4	Spec. 5
Width (in)	.56800	.55600	.57000	.57000	.56200
Depth (in)	.24600	.25700	.26800	.27600	.28400
Span (in)	4.0000	4.0000	4.0000	4.0000	4.0000

Out of 5 specimens, 0 excluded.

Sample comments: COR72-AT, SAMPLE SOAKED IN SULFURIC ACID (10%) FOR 30 DAYS

Specimen Number	Displacement	Strain	Load	Stress	Modulus
	at Yield (in)	at Yield (in/in)	at Yield (lbs)	at Yield (psi)	of Elasticity (psi)
1	.6512	.0806	54.7	9633.3	638948
2	.3689	.0255	54.1	8837.6	630719
3	.3332	.0236	63.3	9281.5	673725
4	.3562	.0369	66.4	9101.0	676968
5	.4084	.0435	61.8	8186.9	663388
Mean:	.4036	.0440	60.1	9024.0	656742.
Standard Deviation:	.0869	.0070	5.4	547.2	20827.
Minimum:	.3332	.0225	54.1	6186.9	630719.
Maximum:	.6512	.0506	66.4	9633.3	676968.

• Geotechnical Engineering • Materials Testing and Inspection • Environmental Site Assessments • Geosynthetics and Construction QA/QC

Serving the Construction, Petroleum and Waste Industries

HTS, Inc. Consultants
 4115 Pickering Street, Houston, TX 77091
 www.htshouston.com

Phone 713-682-8373
 Fax 713-682-8502
 Toll Free 1-800-882-TEST



Excellence in Engineering, Consulting, Testing and Inspection

MECHANICAL PROPERTIES OF PLASTICS (ASTM D790)

SUPPORT SPAN = 4^h

Flexural 3 point bend

Operator name: K. DHOUANGSAVANK

Sample Identification: SF58-4-5
 Interface Type: 42/43/4400 Series
 Machine Parameters of Test:

Sample Rate (pts/sec): 10.000
 Crosshead Speed (in/min): .1100

Instron Corporation
 Series IX Automated Materials Testing System 6.08
 Test Date: 13 Nov 2008

Sample Type: ASTM

Humidity (%): 50
 Temperature (deg. F): 71

Dimensions:

Spec. 1 Spec. 2 Spec. 3 Spec. 4 Spec. 5

Width (in)	.56000	.56000	.87200	.56400	.56200
Depth (in)	.23200	.26600	.27300	.28000	.20400
Span (in)	4.0000	4.0000	4.0000	4.0000	4.0000

Out of 5 specimens, 0 excluded.

Sample comments: CUR72-AF, SAMPLE SOAKED IN GASOLINE (100%) FOR 30 DAYS

Specimen Number	Displacement at Yield (in)	Strain at Yield (in/in)	Load at Yield (lbs)	Stress at Yield (psi)	Modulus of Elasticity (psi)
1	.4784	.0482	50.8	9940.6	675869
2	.4229	.0422	64.4	9611.5	651738
3	.3910	.0404	69.3	9610.0	689896
4	.3676	.0386	67.9	9212.2	700232
5	.2959	.0316	62.9	8230.0	691738
Mean:	.3912	.0396	64.9	9121.0	661894
Standard Deviation:	.0676	.0051	3.8	662.3	18991
Minimum:	.2959	.0316	59.8	8230.0	651738
Maximum:	.4784	.0482	69.3	9940.6	700232

• Geotechnical Engineering • Materials Testing and Inspection • Environmental Site Assessments • Geosynthetics and Construction QM/QC

Serving the Construction, Petroleum and Waste Industries

HTS, Inc. Consultants
 416 Plokerling Street, Houston, TX 77091
 www.htshouston.com

Phone 713-692-8373
 Fax 713-692-8602
 Toll Free 1-800-692-TEST



Excellence in Engineering, Consulting, Testing and Inspection

FLEXURAL PROPERTIES OF PLASTICS (ASTM D790)

SUPPORT SPAN = 4"

Flexural 3 point bend

Operator name: K. PHOUANGSAVANH

Sample Identification: RP55-4-6
 Interface Type: 42/43/4400 Series
 Machine Parameters of test:

Sample Rate (pts/sec): 10.000
 Crosshead Speed (in/min): .1200

Instron Configuration
 Series IX Automated Materials Testing System 6.05
 Test Date: 13 Nov 2008

Sample Type: ASTM

Humidity (%): 60
 Temperature (deg. F): 71

Dimensions:

	Spec. 1	Spec. 2	Spec. 3	Spec. 4	Spec. 5
Width (in)	.56800	.57000	.56900	.57200	.55700
Depth (in)	.25500	.26400	.27200	.27900	.27700
Span (in)	4.0000	4.0000	4.0000	4.0000	4.0000

Out of 5 specimens, 0 excluded.

Sample comment: CORTZ-AT, SAMPLES SOAKED IN VEGETABLE OIL (100%) FOR 30 DAYS

Specimen Number	Displacement	Strain	Load	Stress	Modulus
	at Yield (in)	at Yield (in/in)	at Yield (lbs)	at Yield (psi)	of Elasticity (psi)
1	.4668	.0448	62.2	10026.7	691028
2	.4365	.0432	60.5	9131.4	695875
3	.3487	.0385	56.9	8104.2	665546
4	.2952	.0309	60.7	8102.4	665598
5	.4056	.0504	66.7	9367.2	703026
Mean:	.4006	.0404	61.4	8961.0	688215.
Standard Deviation:	.0876	.0084	3.6	818.0	14183.
Minimum:	.2983	.0309	56.9	8104.2	665598.
Maximum:	.4856	.0504	66.7	10026.7	703026.

• Geotechnical Engineering • Materials Testing and Inspection • Environmental Site Assessments • Geosynthetics and Construction QA/QC

Serving the Construction, Petroleum and Waste Industries

HTS, Inc. Consultants
 416 Pickering Street, Houston, TX 77001
 www.hishouston.com

Phone 713-692-8879
 Fax 713-692-8502
 Toll Free 1-800-882-TEST



Excellence in Engineering, Consulting, Testing and Inspection

FLEXURAL PROPERTIES OF PLASTICS (ASTM D790)

SUPPORT SPAN = 4"

Flexural 3 point bend

Operator name: K. PHOUANGSAVANH

Sample Identification: BP35-4-7
 Interface Type: 42/43/4400 Series
 Machine Parameters of test:

Sample Rate (pts/sec): 10.000
 Crosshead speed (in/min): .1100

Instron Corporation
 Series IX Automated Materials Testing System 6.05
 Test Date: 13 Nov 2008

Sample Type: ASTM

Humidity (%): 50
 Temperature (deg. F): 71

Dimensions:

	Spec. 1	Spec. 2	Spec. 3	Spec. 4	Spec. 5
Width (in)	.56200	.56900	.57100	.57400	.57000
Depth (in)	.23800	.24900	.25900	.26700	.27100
Span (in)	4.0000	4.0000	4.0000	4.0000	4.0000

Out of 5 specimens, 0 excluded.

Sample comments: COL72-AT, SAMPLE SOAKED IN DEFORMANT (0.1%) FOR 30 DAYS

Specimen Number	Displacement	Strain	Load	Stress	Modulus
	at Yield (in)	at Yield (in/in)	at Yield (lbs)	at Yield (psi)	of Elasticity (psi)
1	.5408	.0483	52.6	9917.7	674132
2	.5336	.0498	59.5	10117.8	660040
3	.4936	.0479	54.2	10062.8	650072
4	.5085	.0509	68.2	10001.5	671442
5	.4826	.0492	70.0	10155.0	693313
Mean:	.5121	.0492	63.1	10051.0	669962.
Standard Deviation:	.0247	.0012	7.3	94.4	16029.
Minimum:	.4826	.0479	52.6	9917.7	650072.
Maximum:	.5408	.0509	70.0	10155.0	693313.

• Geotechnical Engineering • Materials Testing and Inspection • Environmental Site Assessments • Geosynthetics and Construction QA/QC

Serving the Construction, Petroleum and Waste Industries

HTS, Inc. Consultants
 416 Pickering Street, Houston, TX 77001
 www.htshouston.com

Phone 713-692-9373
 Fax 713-692-8502
 Toll Free 1-800-692-TEST



Excellence in Engineering, Consulting, Testing and Inspection

FLEXURAL PROPERTIES OF PLASTICS (ASTM D790)

SUPPORT SPAN = 4".

Flexural 3 point bend

Operator name: K. PHOUANGSAVANH

Sample Identification: 0P55-4-J
 Interface Type: 42/43/4400 Series
 Machine Parameters of test:

Sample Rate (pts/sec): 10.000
 Crosshead Speed (in/min): .1100

Instron Corporation
 Series IX Automated Materials Testing System 6.08
 Test Date: 13 Nov 2008

Sample Type: ASTM

Humidity (%): 50
 Temperature (deg. F): 71

Dimensions:

	Spec. 1	Spec. 2	Spec. 3	Spec. 4	Spec. 5
Width (in)	.56600	.56300	.57600	.56600	.56600
Depth (in)	.24600	.25600	.26600	.27200	.27900
Span (in)	4.0000	4.0000	4.0000	4.0000	4.0000

Out of 5 specimens, 0 excluded.

Sample comments: COK72-A1, SAMPLE SOAKED IN SOAP (.1%) FOR 30 DAYS

Specimen Number	Displacement	Strain	Load	Stress	Modulus
	at Yield (in)	at Yield (in/in)	at Yield (lbs)	at Yield (psi)	Of Elasticity (psi)
1	.3549	.0512	58.3	9862.2	646741
2	.3228	.0502	58.8	9369.9	666470
3	.4170	.0414	63.6	9417.6	678530
4	.4050	.0413	64.7	9270.5	690133
5	.4069	.0426	69.3	9421.3	665953
Mean:	.4013	.0453	62.6	9504.3	669061.
Standard Deviation:	.0728	.0049	5.1	224.4	16174.
Minimum:	.4050	.0413	56.3	9270.5	646741.
Maximum:	.5549	.0512	69.2	9862.2	690133.

• Geotechnical Engineering • Materials Testing and Inspection • Environmental Site Assessments • Geosynthetic and Construction QA/QC

Serving the Construction, Petroleum and Waste Industries

HTS, Inc. Consultants
 416 Pickering Street, Houston, TX 77091
 www.htshouston.com

Phone 713-892-8373
 Fax 713-892-8502
 Toll Free 1-800-892-TEST



Excellence In Engineering, Consulting, Training and Inspection

FLEXURAL PROPERTIES OF PLASTICS (ASTM D790)

SUPPORT SPAN = 4".

Flexural 3 point bend

Operator name: K. PHOUANGSAVANH

Sample Identification: 8F55-4-9
 Interface Type: 42/43/4400 Series
 Machine Parameters of Test:

Sample Rate (pts/sec): 10.000
 Crosshead Speed (in/min): 11.000

Instron Corporation
 Series IX Automated Materials Testing System 6.05
 Test Date: 13 Nov 2008

Sample Type: ASTM

Humidity (%): 50
 Temperature (deg. F): 71

Dimensions:

	Spec. 1	Spec. 2	Spec. 3	Spec. 4	Spec. 5
Width (in)	.57000	.57200	.56900	.56200	.56200
Depth (in)	.25300	.26300	.27200	.27700	.28000
Span (in)	4.0000	4.0000	4.0000	4.0000	4.0000

Out of 5 specimens, 0 excluded.

Sample comments: COR72-AT, SAMPLE SOAKED IN NITRIC ACID (1%) FOR 30 DAYS

Specimen Number	Displacement	Strain	Load	Stress	Modulus
	at Yield (in)	at Yield (in/in)	at Yield (lbs)	at Yield (psi)	of Elasticity (psi)
1	.5339	.0807	61.4	10100.5	670889
2	.5158	.0809	63.1	9875.2	682443
3	.4845	.0466	66.2	9428.2	606689
4	.3814	.0396	64.0	8905.0	674803
5	.4332	.0485	71.7	9763.0	688718
Mean:	.4630	.0466	65.3	9554.6	680458
Standard Deviation:	.0621	.0046	4.0	441.6	7906
Minimum:	.3814	.0396	61.4	8905.0	670889
Maximum:	.5339	.0809	71.7	10100.5	688718

HTS, Inc. Consultants
 418 Pickering Street, Houston, TX 77001
 www.htshouston.com

Phone 713-692-8373
 Fax 713-692-8502
 Toll Free 1-800-892-TEST



Excellence in Engineering, Consulting, Testing and Inspection

FLEXURAL PROPERTIES OF ELASTICS (ASTM D790)

SUPPORT SPAN = 4".

Flexural 3 point bend

Operator name: K. PHOURNGSAVANH

Sample Identification: 0855-410
 Interface Type: 42/43/4400 Series
 Machine Parameters of test:

Sample Rate (pts/sec): 10.000
 Crosshead Speed (in/min): .1100

Instron Corporation
 Series XX Automated Materials Testing System 6.05
 Test Date: 13 Nov 2008

Sample Type: ASTM

Humidity (%): 50
 Temperature (deg. F): 71

Dimensions:

	Spec. 1	Spec. 2	Spec. 3	Spec. 4	Spec. 5
Width (in)	.54600	.56600	.56400	.57000	.56900
Depth (in)	.23800	.25100	.26000	.26900	.27300
Span (in)	4.0000	4.0000	4.0000	4.0000	4.0000

Out of 5 specimens, 0 excluded.

Sample comments: COR72-RT, SAMPLE SOAKED IN SULFURIC ACID (5%) FOR 30 DAYS

Specimen Number	Displacement	Strain	Load	Stress	Modulus
	at Yield (in)	at Yield (in/in)	at Yield (lbs)	at Yield (psi)	of Elasticity (psi)
1	.4782	.0427	53.3	10344.1	666930
2	.5415	.0510	50.5	9851.0	649140
3	.5065	.0493	69.5	10307.0	670155
4	.5070	.0511	65.9	9739.2	644336
5	.4193	.0427	68.1	9700.6	684105
Mean:	.4903	.0474	62.3	9988.7	662814.
Standard Deviation:	.0456	.0043	6.3	313.1	16186.
Minimum:	.4193	.0427	53.3	9700.6	644336.
Maximum:	.5415	.0511	69.5	10344.1	684105.

• Geotechnical Engineering • Materials Testing and Inspection • Environmental Site Assessments • Geosynthetics and Construction QA/QC

Serving the Construction, Petroleum and Waste Industries

**SUMMARY OF TEST DATA
RESISTANCE OF CIPP TO CHEMICAL REAGENTS**

SAMPLE ID: **GOR72-AT** Duration: **1 Year** Date Tested: **10/14/2009**

Chemical Reagent (Concentration)	Mechanical Property	Test Method ASTM D	Unit	Control Sample	1 Year	
					Value	% Change
Tap water (100%)	Observation	543		N/A	No Change	pH 7.7
	Weight	543	g	131.0	131.7	0.53
	Hardness	2583		91	91	0.00
	Thickness	2122	in.	0.264	0.264	0.00
				mm.	6.4	6.4
Max. Flexural Modulus	790	psi	9520.2	9497.0	-10.76	
			psi	679990	661298	-2.73
Nitric Acid (5%)	Observation	543		N/A	Spot of cloud	pH 0.4
	Weight	543	g	132.7	133.0	0.23
	Hardness	2583		90	90	0.00
	Thickness	2122	in.	0.262	0.262	0.00
				mm.	6.7	6.7
Max. Flexural Modulus	790	psi	9520.2	8090.5	-14.93	
			psi	679990	615084	-9.53
Phosphoric Acid (10%)	Observation	543		N/A	Spot of cloud	pH 0.4
	Weight	543	g	134.8	135.0	0.15
	Hardness	2583		90	90	0.00
	Thickness	2122	in.	0.262	0.262	0.00
				mm.	6.7	6.7
Max. Flexural Modulus	790	psi	9520.2	8582.4	-9.86	
			psi	679990	665352	-2.14
Sulfuric Acid (10%)	Observation	543		N/A	Spot of cloud	pH 0.4
	Weight	543	g	135.5	135.7	0.15
	Hardness	2583		91	91	0.00
	Thickness	2122	in.	0.267	0.267	0.00
				mm.	6.8	6.8
Max. Flexural Modulus	790	psi	9520.2	9323.9	-2.08	
			psi	679990	661643	-2.85



**SUMMARY OF TEST DATA
RESISTANCE OF CIPP TO CHEMICAL REAGENTS**

SAMPLE ID: **GOR72-AT** Duration: **1 Year** Date Tested: **10/14/2009**

Chemical Reagent (Concentration)	Mechanical Property	Test Method ASTM D	Unit	Control Sample	1 Year	
					Value	% Change
Gasoline (100%)	Observation	543		N/A	No Change	pH-NA
	Weight	543	g	131.6	132.2	0.46
	Hardness	2583		91	91	0.00
	Thickness	2122	in.	0.268	0.268	0.00
				mm.	6.8	6.8
	Max. Flexural Modulus	790	psi	9520.2	8738.5	-8.21
psi				679890	663847	-2.34
Vegetable Oil (100%)	Observation	543		N/A	No Change	pH-NA
	Weight	543	g	133.5	133.6	0.07
	Hardness	2583		90	90	0.00
	Thickness	2122	in.	0.262	0.262	0.00
				mm.	6.7	6.7
	Max. Flexural Modulus	790	psi	9520.2	9302.7	-2.25
psi				679890	710166	4.45
Detergent (0.1%)	Observation	543		N/A	No Change	pH 6.0
	Weight	543	g	125.6	126.4	0.62
	Hardness	2583		90	90	0.00
	Thickness	2122	in.	0.255	0.255	0.00
				mm.	6.5	6.5
	Max. Flexural Modulus	790	psi	9520.2	9120.6	-4.20
psi				679890	661203	-2.74
Soap (0.1%)	Observation	543		N/A	No Change	pH 4.6
	Weight	543	g	127.9	128.6	0.55
	Hardness	2583		91	91	0.00
	Thickness	2122	in.	0.266	0.265	0.00
				mm.	6.8	6.8
	Max. Flexural Modulus	790	psi	9520.2	8415.1	-1.10
psi				679890	672379	-1.10



**SUMMARY OF TEST DATA
RESISTANCE OF CIPP TO CHEMICAL REAGENTS**

SAMPLE ID: COR72-AT Duration: 1 Year Date Tested: 10/14/2009

Chemical Reagent (Concentration)	Mechanical Property	Test Method ASTM D	Unit	Control Sample	1 Year	
					Value	% Change
Nitric Acid (1%)	Observation	843		N/A	Spot of cloud	pH 1.0
	Weight	843	g	142.8	143.0	0.28
	Hardness	2883		90	90	0.00
	Thickness	2122	in.	0.266	0.266	0.00
				6.8	6.8	0.00
	Max. Flexural Modulus	780	psi	8520.2	8161.3	-3.87
679890				649823	-4.42	
Sulfuric Acid (6%)	Observation	843		N/A	Spot of cloud	pH 0.4
	Weight	843	g	127.9	128.0	0.08
	Hardness	2883		90	90	0.00
	Thickness	2122	in.	0.266	0.266	0.00
				6.6	6.6	0.00
	Max. Flexural Modulus	780	psi	8520.2	8179.4	-3.56
679890				648949	-4.99	



HTS, Inc. Consultants
 418 Ploquing Street, Houston, TX 77001
 www.htshouston.com

Phone 713-892-8373
 Fax 713-892-0502
 Toll Free 1-800-892-TEST



Excellence in Engineering, Consulting, Testing and Inspection

FLSURAL PROPERTIES OF PLASTIC (ASTM D790)

SUPPORT BEAM - 4"

Flexural 3 point bend

Operator name: K. BHUVANESHWARI

Sample Identification: 9865Y-41
 Indenture Type: 42/43/4400 Series
 Machine Parameters of test:

Sample Rate (pts/sec): 10.000
 Crosshead Speed (in/min): .1100

Instron Corporation
 Series IX Automated Materials Testing System 6.05
 Test Date: 14 Oct 2009

Sample Type: ASTM

Humidity (%): 50
 Temperature (deg. F): 71

Dimensions:

Spec. 1 Spec. 2 Spec. 3 Spec. 4 Spec. 5

	Spec. 1	Spec. 2	Spec. 3	Spec. 4	Spec. 5
Width (in)	.56500	.56300	.56300	.55800	.56000
Depth (in)	.24000	.26200	.26200	.27000	.27600
Span (in)	4.0000	4.0000	4.0000	4.0000	4.0000

Out of 5 specimens, 0 excluded.

Sample comments: CORRODED, SAMPLE SOAKED IN WATER-pH-9 (100%) FOR 1 YEAR

specimen Number	Displacement	Strain	Load	Stress	Modulus
	at Yield (in)	at Yield (in/in)	at Yield (lbs)	at Yield (psi)	of Elasticity (psi)
1	.5222	.0470	40.9	9023.6	642717
2	.4766	.0480	54.0	9060.6	640934
3	.3440	.0338	62.7	8310.0	648526
4	.3277	.0332	54.9	8137.0	676203
5	.3199	.0330	56.3	7963.6	607910
Mean:	.3961	.0384	53.3	8487.0	661296.
Standard Deviation:	.0943	.0070	2.8	600.3	19646.
Minimum:	.3199	.0330	46.9	7963.6	642717.
Maximum:	.5222	.0470	56.2	9060.6	687810.

• Geotechnical Engineering • Materials Testing and Inspection • Environmental Site Assessments • Geosynthetics and Construction QA/QC

Serving the Construction, Petroleum and Waste Industries

HTS, Inc. Consultants
 416 Plokering Street, Houston, TX 77001
 www.htshouston.com

Phone 713-692-0373
 Fax 713-692-8302
 Toll Free 1-800-692-YEST



Excellence in Engineering, Consulting, Testing and Inspection

MECHANICAL PROPERTIES OF PLASTICS (ASTM D790)

SUPPORT SPAN = 4"

Plexural 3 point bend

Operator name: K. PUGHANSAVANNH

Sample Identification: 9F55Y3-2
 Intarkhos Type: 42/43/4400 series
 Machine Parameters of Test:

Sample Rate (ptn/sec): 10.000
 Crosshead Speed (in/min): .1100

Instron Corporation
 Series IX Automated Materials Testing System 6.05
 Test Date: 14 Oct 2009

Sample Type: ASTM

Humidity (%): 50
 Temperature (deg. F): 71

Dimensions:

Spec. 1 Spec. 2 Spec. 3 Spec. 4 Spec. 5

	Spec. 1	Spec. 2	Spec. 3	Spec. 4	Spec. 5
Width (in)	.55500	.56300	.56300	.55400	.57600
Depth (in)	.24800	.26000	.27000	.27800	.28100
Span (in)	4.0000	4.0000	4.0000	4.0000	4.0000

Out of 5 specimens, 0 excluded.

Sample comments: CORVA-NT, SAMPLE SOAKED IN NITRIC ACID (6%) FOR 1 YEAR

Specimen Number	Displacement	Strain	Load	Stress	Modulus
	at Yield (in)	at Yield (in/in)	at Yield (lbs)	at Yield (psi)	at Yield (psi)
1	.4322	.0402	50.5	8880.1	627168
2	.2357	.0230	50.1	7906.2	621782
3	.2351	.0230	55.4	8184.7	618555
4	.2362	.0235	58.0	8129.3	608593
5	.2147	.0226	56.6	7472.0	607222
Mean:	.2690	.0266	54.7	8098.5	615084
Standard Deviation:	.0917	.0076	3.6	510.3	8866
Minimum:	.2147	.0226	50.1	7472.0	607222
Maximum:	.4322	.0402	60.6	8880.1	627168

• Geotechnical Engineering • Materials Testing and Inspection • Environmental Site Assessments • Geosynthetics and Construction QA/QC

Serving the Construction, Petroleum and Waste Industries

HTS, Inc. Consultants
 416 Plunking Street, Houston, TX 77091
 www.htshouston.com

Phone 713-892-8378
 Fax 713-892-0602
 Toll Free 1-800-692-TEST



Excellence in Engineering, Consulting, Testing and Inspection

MECHANICAL PROPERTIES OF PLASTICS (ASTM D790)

SUPPORT SPAN = 4".

Flexural 3 point bend

Operator name: K. PICHAIKOVANHI

Sample Identification: 9F55X-43
 Interface Type: 42/43/4400 Series
 Machine PARAMETERS OF TEST:

Sample Rate (in/min): 20.000
 Crosshead Speed (in/min): 12.000

Instron Corporation
 Series IX Automated Materials Testing System 5.05
 Test Date: 14 Oct 2009

Sample Type: A9TH

Humidity (%): 50
 Temperature (deg. F): 71

Dimensions:

Spec. 1 Spec. 2 Spec. 3 Spec. 4 Spec. 5

	Spec. 1	Spec. 2	Spec. 3	Spec. 4	Spec. 5
Width (in)	.56700	.56600	.56000	.56500	.56300
Depth (in)	.23400	.24900	.26100	.27200	.27800
Span (in)	4.0000	4.0000	4.0000	4.0000	4.0000

Out of 5 specimens, 0 excluded.

Sample comments: COR72-AT, SAMPLE SOAKED IN PHOSPHORIC ACID (10%) FOR 1 YEAR

Specimen Number	Displacement	Strain	Load	Stress	Modulus
	at Yield (in)	at Yield (in/in)	at Yield (lbs)	at Yield (psi)	at Yield (psi)
1	.2776	.0507	49.6	8577.0	603629
2	.4472	.0418	61.9	8077.1	690564
3	.3049	.0347	53.8	8457.1	662209
4	.3621	.0368	57.0	8240.7	639456
5	.2151	.0224	56.3	7759.4	630971
Mean:	.3916	.0372	53.7	8002.4	665362.
Standard Deviation:	.1333	.0103	3.1	606.9	23434.
Minimum:	.2151	.0224	49.6	7759.4	630971.
Maximum:	.5776	.0507	61.9	8577.0	690564.

• Geotechnical Engineering • Materials Testing and Inspection • Environmental Site Assessments • Geosynthetics and Construction QA/QC

Serving the Construction, Petroleum and Waste Industries

HTS, Inc. Consultants
 418 Pickering Street, Houston, TX 77091
 www.htshouston.com

Phone 713-892-8373
 Fax 713-892-8502
 Toll Free 1-800-892-1187



Excellence in Engineering, Consulting, Testing and Inspection

FLEXURAL PROPERTIES OF PLASTICS (ASTM D790)

SUPPORT SPAN = 4"

Flexural 3 point bend

Operator name: K. VIKRANDESHVARI

Instron Corporation
 Series IX Automated Materials Testing System 5.05
 Test Date: 14 Oct 2009

Sample Identification: 0P55X4-4
 Interface Type: 42/43/4400 Series
 Machine Parameters of Test:

Sample Type: ASTM

Sample Rate (IPS/SEC): 10.000
 Crosshead Speed (in/min): .1100

Humidity (%): 50
 Temperature (deg. F): 71

Dimensions:

Spec. 1 Spec. 2 Spec. 3 Spec. 4 Spec. 5

	Spec. 1	Spec. 2	Spec. 3	Spec. 4	Spec. 5
Width (in)	.56600	.55000	.55200	.56000	.55800
Depth (in)	.24100	.25500	.26700	.27800	.20400
Span (in)	4.0000	4.0000	4.0000	4.0000	4.0000

Out of 5 specimens, 0 excluded.

Sample Description: COR72-AT, SAMPLE SOAKED IN SULFURIC ACID (10%) FOR 1 YEAR

Specimen Number	Displacement	Strain	Load	Stress	Modulus
	at Yield (in)	at Yield (in/in)	at Yield (lbs)	at Yield (psi)	of Elasticity (psi)
1	.5594	.0506	52.7	9622.2	699608
2	.4676	.0467	56.7	9210.7	673400
3	.4602	.0469	63.0	9602.7	691397
4	.4639	.0473	67.1	9300.0	668623
5	.3553	.0378	66.6	8076.1	648093
Mean:	.4609	.0466	61.0	9323.9	661643.
Standard Deviation:	.0726	.0047	6.6	309.3	20904.
Minimum:	.3553	.0378	52.7	8076.1	639608.
Maximum:	.5594	.0506	67.1	9622.2	691397.

• Geotechnical Engineering • Materials Testing and Inspection • Environmental Site Assessments • Geosynthetics and Construction QA/QC

Serving the Construction, Petroleum and Waste Industries

HTS, Inc. Consultants
 416 Pickering Street, Houston, TX 77001
 www.htshouston.com

Phone 713-692-0373
 Fax 713-692-0692
 Toll Free 1-800-602-TEST



Excellence in Engineering, Consulting, Testing and Inspection

FLEXURAL PROPERTIES OF PLASTICS (ASTM D790)

SUPPORT SPAN = 4";

Flexural 3 point bend

Operator name: K. PHOURNOSIVANN

Sample Identification: 9P26Y4-6
 Interface Type: 42/43/4400 Series
 Machine Parameters of Test:

Sample Rate (pts/sec): 10.000
 Crosshead Speed (in/min): .1300

Instron Corporation
 Series IX Automated Materials Testing System 5.05
 Test Date: 14 Oct 2009

Sample Type: ASTM

Humidity (%): 50
 Temperature (deg. F): 71

Dimensions:

	Spec. 1	Spec. 2	Spec. 3	Spec. 4	Spec. 5
Width (in)	.55800	.56100	.55700	.56200	.56100
Depth (in)	.26200	.26400	.27600	.28200	.28700
Span (in)	4.0000	4.0000	4.0000	4.0000	4.0000

Out of 5 specimens, 0 excluded.

Sample comments: COR72-AR, SAMPLE SOAKED IN GASELOXENE (100%) FOR 1 YEAR

Specimen Number	Displacement	Strain	Load	Area	Modulus
	at Yield (in)	at Yield (in/in)	at Yield (lbs)	at Yield (psi)	of Stiffness (psi)
1	.3931	.0372	56.1	9331.4	647403
2	.3786	.0376	58.2	9331.1	667013
3	.1319	.0137	59.6	8423.8	666201
4	.1214	.0128	61.4	8249.7	682524
5	.1289	.0130	67.4	9766.2	677627
Mean:	.2307	.0230	60.4	9738.6	663947
Standard Deviation:	.1418	.0131	4.6	426.3	18246
Minimum:	.1214	.0128	56.1	8249.7	647403
Maximum:	.3931	.0378	67.4	9331.4	682524

• Geotechnical Engineering • Materials Testing and Inspection • Environmental Site Assessments • Geosynthetics and Construction QA/QC

Solving the Construction, Petroleum and Waste Industries

HTS, Inc. Consultants
 416 Ploking Street, Houston, TX 77001
 www.htshouston.com

Phone 713-692-8373
 Fax 713-692-8502
 Toll Free 1-800-692-TEST



Excellence in Engineering, Consulting, Testing and Inspection

FLEXURAL PROPERTIES OF PLASTIC (ASTM D790)

SUPPORT SPAN = 4".

Flexural 3 point bend

Operator name: K. THOUANOSHYANN

Sample Identification: 9P55Y4-6
 Interface Type: 42/43/4400 Series
 Machine Parameters of test:

Sample Rate (pts/sec): 10.000
 Crosshead Speed (in/min): .1100

Instron Corporation
 Model IX Automated Materials Testing System 6.05
 Test Date: 14 Dec 2009

Sample Type: ASTM

Humidity (%): 60
 Temperature (deg. F): 71

Dimensions:

Spec. 1 Spec. 2 Spec. 3 Spec. 4 Spec. 5

	Spec. 1	Spec. 2	Spec. 3	Spec. 4	Spec. 5
Width (in)	.56100	.55900	.56500	.56500	.57400
Depth (in)	.26300	.26200	.26900	.27400	.27400
Span (in)	4.0000	4.0000	4.0000	4.0000	4.0000

Out of 5 specimens, 0 excluded.

Sample comment: COR72-AT, SAMPLE SOAKED IN VEGETABLE OIL (100%) FOR 1 YEAR

Specimen Number	Displacement	Strain	Load	Stress	Modulus
	at Yield	at Yield	at Yield	at Yield	of Elasticity
	(in)	(in/in)	(lbs)	(psi)	(psi)
1	.4269	.0406	66.7	9479.3	712766
2	.3003	.0302	89.9	9389.3	696740
3	.4512	.0455	66.3	9733.4	700871
4	.3178	.0327	66.4	9390.0	720676
5	.3371	.0346	61.4	9544.7	720079
Mean:	.3843	.0383	62.1	9302.7	710166.
Standard Deviation:	.0669	.0051	4.2	447.6	11043.
Minimum:	.3178	.0327	66.7	8844.7	696740.
Maximum:	.4512	.0455	66.4	9733.4	720676.

• Geotechnical Engineering • Materials Testing and Inspection • Environmental Site Assessments • Geosynthetics and Construction QA/QC

Serving the Construction, Petroleum and Waste Industries

HTS, Inc. Consultants
 418 Ploeking Blvd, Houston, TX 77091
 www.htshouston.com

Phone 713-692-8370
 Fax 713-692-8502
 Toll Free 1-800-692-1181



Excellence in Engineering, Consulting, Testing and Inspection

MECHANICAL PROPERTIES OF PLASTICS (ASTM D790)

SUPPORT SPAN = 4"

Flexural 3 point bend

Operator name: K. PRAJANGSUVANNI

Sample Identification: 9F55Y4-7
 Instron Type: 42/41/4400 Series
 Machine Parameters of Test:

Sample Rate (rpm/Sec): 10.000
 Crosshead Speed (in/min): .1100

Metron Corporation
 Series IX Automated Materials Testing System 6.05
 Test Date: 14 Oct 2009

Sample Type: 86TH

Humidity (%): 50
 Temperature (deg. F): 71

Dimensions:

Spec. 1 Spec. 2 Spec. 3 Spec. 4 Spec. 5

	Spec. 1	Spec. 2	Spec. 3	Spec. 4	Spec. 5
Width (in)	.57800	.56500	.56600	.56900	.56600
Depth (in)	.22600	.24100	.23200	.26100	.26900
Span (in)	4.0000	4.0000	4.0000	4.0000	4.0000

Out of 5 specimens, 0 excluded.

Sample comment: COR72-AT, SAMPLE SOAKED IN DEFERENT (0.1%) FOR 1 YEAR

Specimen Number	Displacement	Strain	Load	Stress	Modulus
	at Yield (in)	at Yield (in/in)	at Yield (lbs)	at Yield (psi)	of Elasticity (psi)
1	.6090	.0400	44.0	9094.9	641697
2	.3406	.0496	51.0	9321.1	662032
3	.4425	.0418	56.5	9257.9	679547
4	.4951	.0489	59.0	8991.5	679759
5	.4988	.0503	60.9	8927.6	647501
Mean:	.5171	.0480	64.2	9120.6	662203
Standard Deviation:	.0505	.0037	6.8	170.7	16363
Minimum:	.4425	.0418	44.0	8927.6	641697
Maximum:	.5998	.0509	60.9	9321.1	679759

• Geotechnical Engineering • Materials Testing and Inspection • Environmental Site Assessments • Geosynthetics and Construction QA/QC

Serving the Construction, Petroleum and Waste Industries

HTS, Inc. Consultants
 416 Ploking Street, Houston, TX 77001
 www.htshouston.com

Phone 713-602-8373
 Fax 713-602-8502
 Toll Free 1-800-602-7687



Excellence in Engineering, Consulting, Testing and Inspection

MECHANICAL PROPERTIES OF PLASTICS (ASTM D790)

SUPPORT SPAN = 4".

Flexural 3 point bend

Indenter Configuration

Series IK Automated Materials Testing System 6.05

Operator name: K. PICHANONSAVANNI

Test Date: 14 Oct 2009

Sample Identification: 9P56Y4-0
 Interface Type: 42/43/4400 Series
 Machine Parameters of Test:

Sample Type: ASTM

Sample Rate (lbs/sec): 10.000
 Crosshead Speed (in/min): .1100

Humidity (%): 50
 Temperature (deg. F): 71

Dimensions:

Spec. 1 Span, 2 Spec. 3 Spec. 4 Spec. 5

	Spec. 1	Spec. 2	Spec. 3	Spec. 4	Spec. 5
Width (in)	.56700	.57100	.56500	.56600	.57000
Depth (in)	.24600	.25500	.24300	.26000	.27000
Span (in)	4.0000	4.0000	4.0000	4.0000	4.0000

Out of 5 specimens, 0 excluded,

Sample comments: COR72-AT, SAMPLE SOAKED IN SOAP (0.1%) FOR 1 YEAR

Specimen Number	Displacement at Yield (in)	Strain at Yield (in/in)	Load at Yield (lbs)	Stress at Yield (psi)	Modulus of Elasticity (psi)
1	.6406	.0906	54.3	9406.3	674630
2	.8293	.0806	59.1	9544.0	673210
3	.8135	.0806	59.0	9171.0	661660
4	.4743	.0477	65.6	9600.0	661391
5	.4071	.0493	63.6	9106.3	690800
Mean:	.5106	.0490	60.6	9416.1	672370
Standard Deviation:	.1503	.0013	4.1	808.1	32016
Minimum:	.4743	.0477	54.3	9171.0	661661
Maximum:	.8296	.0806	65.6	9600.0	690800

• Geotechnical Engineering • Materials Testing and Inspection • Environmental Site Assessments • Geosynthetics and Construction QA/QC

Serving the Construction, Petroleum and Waste Industries

HTS, Inc. Consultants
 418 Pickering Street, Houston, TX 77001
 www.htshouston.com

Phone 713-602-0370
 Fax 713-602-0302
 Toll Free 1-800-892-7267



Excellence in Engineering, Consulting, Testing and Inspection

MECHANICAL PROPERTIES OF PLASTICS (ASTM D790)

SUPPORT BEAM = 4".

Flexural 3 point bend

Operator Name: K. POUNDURISHVAMIN

Intron Corporation
 Series IX Automated Materials Testing System 6.06
 Test Date: 14 Oct 2009

Sample Identification: SP55Y4-9
 Interface Type: 12/43/4400 Series

Sample Type: ASTM

Machining Parameters of test:

Sample Rate (psi/sec): 10.000
 Crosshead Speed (in/min): .1100

Humidity (%): 50
 Temperature (deg, F): 71

Dimensions:

Spec. 1 Spec. 2 Spec. 3 Spec. 4 Spec. 5

	Spec. 1	Spec. 2	Spec. 3	Spec. 4	Spec. 5
Width (in)	.56900	.65900	.56700	.56400	.65800
Depth (in)	.28600	.26500	.27300	.28200	.28600
Span (in)	4.0000	4.0000	4.0000	4.0000	4.0000

Out of 5 specimens, 0 excluded,

Sample comments: COR72-KT, SAMPLE SOAKED IN NITRIC ACID (1%) FOR 1 YEAR

Specimen Number	Displacement	Strain	Load	Stress	Modulus
	at Yield (in)	at Yield (in/in)	at Yield (lbs)	at Yield (psi)	of Elasticity (psi)
1	.4991	.0477	87.0	9230.6	632265
2	.5015	.0490	82.8	9618.5	650446
3	.4124	.0423	63.2	8972.0	651811
4	.4387	.0464	60.3	9139.5	657430
5	.3181	.0359	66.0	8787.9	667464
Mean:	.4375	.0444	63.7	9161.3	649023.
Standard Deviation:	.0608	.0055	4.4	322.3	10341.
Minimum:	.3051	.0309	67.0	8787.9	632265.
Maximum:	.5015	.0490	60.3	9618.5	657464.

• Geotechnical Engineering • Materials Testing and Inspection • Environmental Site Assessments • Geosynthetics and Construction QA/QC

Serving the Construction, Petroleum and Waste Industries

HTS, Inc. Consultants
 410 Ploeking Street, Houston, TX 77001
 www.htshouston.com

Phone 713-862-0378
 Fax 713-862-8502
 Toll Free 1-800-862-TEST



Excellence in Engineering, Consulting, Testing and Inspection

PLASTIC PROPERTIES OF PLASTIC (ASTM D790)

SUPPORT SPAN = 4"

Flexural 3 point bend

Operator name: K. MOUKARAVAN

Instron Corporation
 Series IX Automated Materials Testing System 4.08
 Test Date: 14 Oct 2009

Sample Identification: 9P66Y10
 Interface Type: 4243/4400 Series
 Machine Parameters of test:

Sample Type: ASTM

Sample Rate (ips/sec): 3.0000
 Crosshead Speed (in/min): 11.00

Humidity (%): 60
 Temperature (deg. F): 71

Dimensions:

0 Spec, 1 Spec, 2 Spec, 3 Spec, 4 Spec, 5

	0 Spec	1 Spec	2 Spec	3 Spec	4 Spec	5
Width (in)	.87200	.87100	.86400	.86800	.86200	
Depth (in)	.23800	.24700	.26500	.26200	.26700	
Span (in)	4.0000	4.0000	4.0000	4.0000	4.0000	

Out of 5 specimens, 0 excluded.

Sample comments: CART2-AT, SAMPLE SOAKED IN SULFURIC (5%) FOR 1 YEAR

Specimen Number	Displacement	Strain	Load	Stress	Modulus
	at Yield (in)	at Yield (in/in)	at Yield (lbs)	at Yield (psi)	of Elasticity (psi)
1	.4165	.0390	80.1	9397.6	652530
2	.4725	.0438	85.5	9733.0	650343
3	.6279	.0507	89.4	9638.8	650771
4	.4196	.0417	86.6	9739.2	639163
5	.4129	.0413	86.7	9491.3	628942
Mean	.4539	.0438	85.9	9179.4	646949.
Standard Deviation:	.0474	.0045	3.4	546.0	11056.
Minimum:	.4129	.0390	80.1	9491.3	620942.
Maximum:	.6279	.0507	89.4	9733.0	660771.

• Geotechnical Engineering • Materials Testing and Inspection • Environmental Site Assessments • Geosynthetics and Construction QA/QC

Serving the Construction, Petroleum and Waste Industries



INTERPLASTIC CORPORATION

2015 Broadway Street Northeast
Minneapolis, MN 55413-1714
651.481.6860 Fax 612.331.4634

COR72-AT-4XX Series
ASTM D-2990 10,000-Hour Flexural Modulus Creep Data
(260 psi Stress Load)

<u>Test Time, hours</u>	<u>Flexural Modulus, psi</u>
0.017	467,106
0.1	460,029
0.2	456,570
0.5	454,860
1	449,806
2	446,499
5	435,296
20	424,642
50	405,908
100	399,499
200	375,999
500	343,073
700	330,021
1,000	327,352
6,200	277,278
10,000	257,369
438,000	236,406

Note: The results in bold were calculated from the equation obtained from the trendline from the graphs.

All specifications and properties specified above are approximate. Specifications and properties of material delivered may vary slightly from those given above. Interplastic Corporation makes no representations of fact regarding the material except those specified above. No person has any authority to bind Interplastic Corporation to any representation except those specified above. Final determination of the suitability of the material for the use contemplated is the sole responsibility of the Buyer. The Thermoset Resin Division's technical sales representatives will assist in developing procedures to fit individual requirements.