

USU WATER RESEACH LABORATORY BRIDGE REHABILITATION SPECIFICATIONS

April 5, 2022

UDOT 2022 STANDARD SPECIFICATIONS

<https://www.udot.utah.gov/connect/business/standards/>

USU Exterior Concrete Specification

https://www.usu.edu/facilities/files/planning-design-and-construction/USU-AE-Manual-Div-03-Exterior-Concrete-Version-4_0.pdf

Special Provisions

01355S Environmental Compliance

02056M Embankment, Borrow and Backfill

03211S Reinforcing Steel and Welded Wire.

05120S Structural Steel

05130S Temporary Pedestrian Bridge

05140S Temporary Falsework

05831S Compression Joint Seal

08010S Pipe Insulation and Jacket

SPECIAL PROVISION

SECTION 01355S

ENVIRONMENTAL COMPLIANCE

PART 1 GENERAL

Add part 1.15 in its entirety with the following:

1.15 MIGRATORY BIRD TREATY ACT

- A. To comply with the MBTA, the following mitigation measures should be implemented during construction in the survey area:
1. Require that no nesting vegetation (which can include trees, shrubs, and herbaceous vegetation such as grasses and forbs) clearing occur during the typical nesting/brood rearing period from April 1st through August 30th.
 2. Have a qualified wildlife biologist perform a nest clearance survey immediately prior (within three days) to construction activities if any vegetation clearing is required during the nesting/brood rearing period.
 3. If actively nesting and/or brood rearing birds are found within or reasonably near (≤ 200 feet) the vegetation clearance area, clearance and construction should be postponed until breeding activity is completed (as assessed by a qualified wildlife biologist).

END OF SECTION

SPECIAL PROVISION

SECTION 02056M

EMBANKMENT, BORROW, AND BACKFILL

Add Article 1.2 Paragraph B

- B. Section 02721: Untreated Base Course (UTBC)

Delete Article 1.5 Paragraph B and replace with the following:

- B. Engineering proposal for alternate materials or trench configurations for drainage pipe bedding and pipe backfill as outlined in this Section, Article 2.4 B.

Delete Article 2.2 Paragraph B and replace with the following:

- B. Granular Borrow
 - 1. Classification A-1-a. Refer to AASHTO M 145
 - 2. Non-plastic.
 - 3. Meet gradation requirements in Table 1.

Table 1

| Granular Borrow Gradation Option 1 | |
|---|------------------------|
| Sieve Size | Percent Passing |
| 3 inch | 90 - 100 |
| 1 inch | 60 - 100 |
| 1/2 inch | 30 - 80 |
| No. 4 | 25 - 65 |
| No. 10 | 0 - 50 |
| No. 40 | 0 - 30 |
| No. 200 | 0 - 15 |

- 4. UTBC meeting the requirements of Section 02721 may be used upon approval of the Engineer.

Delete Article 2.2 Paragraph D and replace with the following:

- D. Free-Draining Granular Backfill
 - 1. Meet the following gradation:

Table 2

| Free Draining Granular Backfill Gradation | |
|--|------------------------|
| Sieve Size | Percent Passing |
| 1½ inch | 90-100 |
| 1 inch | 20-55 |
| ¾ inch | 0-15 |
| ⅜ inch | 0-5 |

SPECIAL PROVISION

SECTION 03211S

REINFORCING STEEL AND WELDED WIRE

PART 1 GENERAL

Replace part 1.5 in its entirety and replace with the following:

1.5 SUBMITTALS

- A. Working Drawings
 - 1. Detailed shop drawings for review of the following:
 - a. Field bending procedure if required. Provide the seal of a Professional Engineer (PE) or Professional Structure Engineer (SE) licensed in the State of Utah.
 - b. Mechanical butt splice shop drawings when proposed details differ from the plans and specifications.
 - 1) Show number and location of mechanical butt splices.
 - 2) Provide two samples of mechanical butt splices and test to destruction in the presence of the Engineer.
 - c. Provide reinforcing shop drawings to the Engineer for review.

END OF SECTION

SPECIAL PROVISION

SECTION 05120S

STRUCTURAL STEEL

PART 1 GENERAL

Add the following to part 1.1 References:

1.1 REFERENCES

- Q. ASTM A 847: Standard Specification for Cold-Formed Welded and Seamless High-Strength, Low-Alloy Structural Tubing with Improved Atmospheric Corrosion Resistance.

Add the following to part 1.5 Submittals:

1.5 SUBMITTALS

- F. Working drawing submittals shall include steel bridge railing.

Replace part 3.4 in its entirety and replace with the following:

PART 3 EXECUTION

3.4 UNPAINTED WEATHERING STEEL

- A. Clean girders of debris after deck concrete is placed.
 - 1. Redevelop patina as needed.
- B. Clean steel railing of debris after installation.
 - 1. Redevelop patina as needed.

END OF SECTION

SPECIAL PROVISION

SECTION 05130S

TEMPORARY PEDESTRIAN BRIDGE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Design and construction of a fully engineered clear span temporary bridge for pedestrian crossing during construction. Design of bridge shall include bridge bearings, decking, railing, anchorages, and footings or foundations.

1.2 RELATED SECTIONS

- A. Section 03055: Portland Cement Concrete
- B. Section 03211: Reinforcing Steel and Welded Wire
- C. Section 05120: Structural Steel
- D. Section 05822: Bearings
- E. Section 06055: Timber and Timber Treatment

1.3 REFERENCES

- A. AASHTO M 270: Structural Steel for Bridges
- B. AASHTO LRFD Bridge Design Specifications
- C. AASHTO LRFD Guide Specifications for the Design of Pedestrian Bridges
- D. AWS D1.1 Structural Welding Code
- E. American Institute of Steel Construction (AISC)

1.4 DEFINITIONS **Not Used**

1.5 SUBMITTALS

A. Working Drawings

1. The Contractor shall submit drawings and copies of supporting design calculations for the temporary bridge for approval in accordance with UDOT Standard Specifications Section 01450. The following documentation shall be submitted as part of the working drawings:
 - a. Product Literature
 - b. Design Calculations
 - c. Design Drawings
 - d. Erection and Removal Procedures
 - e. Inspection and maintenance procedures
 - f. AISC Shop Certifications
 - g. Welder Qualifications
 - h. Shipping requirements
2. Temporary Bridge engineer shall submit a Design Summary to accompany the working drawings and calculations. The Design Summary shall contain the following at a minimum:
 - a. Assumed dead and live loads;
 - b. Allowable and design stresses;
 - c. Allowable and calculated deflections;
 - d. Design references and derivations for design formulas;
 - e. Documentation for computer generated calculations;
 - f. Any other pertinent information required for design.
3. Detailed Shop Drawings of temporary bridge shall include:
 - a. Include geometry verification stating that the dimensions, elevations, and layout of the temporary bridge are consistent with the plans shown and provide pedestrian crossing during construction.
 - b. Include design calculations for temporary bridge, foundation, anchor bolts, or any other pertinent design needed to install bridge.
 - c. Erection, excavation, and removal sequence of the temporary bridge.
 - d. The seal of a Professional Engineer (PE) or Professional Structural Engineer (SE) licensed in the State of Utah is required on shop drawings and calculations.

B. Documentation for AISC Certification for information.

1.6 MANUFACTURER EXPERIENCE

- A. Supplies shall have a minimum of five years' experience designing and manufacturing these types of temporary bridges for pedestrian loads. Supplier shall show a minimum of five (5) successful bridge projects of similar construction, within the last five (5) years. List the location, bridge size, owner, and a contact for reference for each project.
- B. AISC Certified Bridge Fabricator – Intermediate Certification (IBR).

PART 2 PRODUCTS

2.1 STRUCTURAL STEEL

- A. Refer to Section 05120.
 - 1. Stock steel purchased from a warehouse can be used in the fabrication of temporary pedestrian bridges.

2.2 HIGH TENSILE STRENGTH BOLTS, NUTS, AND WASHERS

- A. Refer to Section 05120.

2.3 ELASTOMERIC BEARINGS AND ANCHORAGES

- A. Refer to Section 05822.

2.4 TIMBER DECKING

- A. Treated, Structural Timber and Lumber. Refer to Section 06055.
- B. S4S, Heart Center (HC), Douglas Fir, Grade No. 2 or better.

2.5 CONCRETE

- A. Class AA (AE). Refer to Section 03055.

2.6 REINFORCING STEEL AND WELDED WIRE

- A. Use coated reinforcing steel. Refer to Section 03211.

2.7 DESIGN

- A. Design temporary bridge according to current editions of the AASHTO LRFD Bridge Design Specifications, the AASHTO LRFD Guide Specifications for the Design of Pedestrian Bridges, the AASHTO Guide Specifications for LRFD Seismic Bridge Design.
 - 1. Design and detail the bridge to accommodate a ‘Cold Climate’ temperature differential.
 - 2. Provide a timber or non-slip or non-skip resistant deck.
- B. Temporary bridge shall meet ADA requirements for access.
- C. Span: Bridge span shall be as shown on the plans and shall be measured from each end of the bridge structure. Ensure that temporary structure spans the stream and has dimensions sufficient to not constrict stream flow.
- D. Width: Bridge width shall be a minimum of 6'-00" and shall be measure from the inside face of structural elements at deck level.
- E. Elevations and geometry: As shown on plans. Ensure that structure has a minimum of two feet of freeboard over the stream to the low superstructure elevation and an open waterway. Refer to current ADA standards for Accessible Design for maximum grade allowed on pedestrian structures.
- F. Truss Bridge: A temporary truss bridge shall have the following requirements:
 - 1. Use two parallel trusses with at least one diagonal in each panel consistent with the layout, clear width, and span shown.
 - 2. The trusses must be main load-carrying members of the bridge.
 - 3. Orient vertical truss members so they appear perpendicular to the bridge profile grade after the bridge is erected and dead loads are applied.
 - 4. Use square and rectangular structural tubing for the members of each truss (upper and lower chords, diagonals, end posts, and vertical posts).
- G. RAILINGS
 - 1. The minimum rail height shall be 42" The safety system shall be vertical pickets and shall prevent a sphere with a diameter of 4" from passing through. Safety systems shall be placed on the inside of the bridge and shall be designed to carry a horizontal or vertical 200 lbs point load each.

2. Bridges designated for use by pedestrians and bicycles shall be equipped with 4" minimum steel toe rails, located no more than 2" clear above the bridge deck. Toe rails shall be designed as horizontal rails.
3. Rub rails shall be steel. The rub rail shall be 6" minimum nominal height, centered at 32" plus or minus 2" above the initial and future deck surface. Rub rails shall be designed per as horizontal rails.
4. When the bottom of the top chord is higher than 42" and there is no rub rail or handrail, a rail designed as a horizontal rail shall be provided no higher than 42".
5. All rails shall be of a smooth, continuous nature that prevents snagging and scraping.

2.8 FABRICATION

- A. The following supplements the requirements in Section 05120:
 1. Fabricate welded tubular connections according to AWS D1.1.
 - a. Meet the AASHTO M 270 zone 2 Charpy V-notch requirements for fracture critical members for main tension members.
 2. Timber Decking
 - a. Pre-drill timber deck for connections to floor beams.
 - b. Smooth exposed edges with 1/8 inch radius.

PART 3 EXECUTION

3.1 INSTALLATION AND REMOVAL

- A. All temporary bridge work shall in be conformance with the Stream Alteration permit and environmental requirements and pertinent specifications.
- B. Temporary bridge shall be installed at location as shown on drawings.
- C. Contractor shall be responsible for all survey, construction staking and layout.
- D. All construction shall be closely coordinated with the Engineer so that the quality of work can be checked for approval.
- E. Temporary bridge shall be supported on foundation designed and provided Contractor.

- F. Provide landings at each end of the bridge that meet ADA requirements. Landings shall be level and the full width of the bridge.
- G. Construction of temporary bridge and footings shall be above ordinary waterline. Temporary shoring or falsework is not allowed in the stream channel.
- H. Temporary bridge, landings, and footings shall be removed after completion of construction work.
- I. Disturbed areas shall be regraded to match existing slope and elevation.
- J. Disturbed areas shall be reseeded. Contractor shall coordinate with representatives for USU Landscape Operation and Maintenance (LOAM) for seeding requirements.

END OF SECTION

SPECIAL PROVISION

SECTION 05140S

TEMPORARY FALSEWORK

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Design and construction of temporary falsework as required for the support of the existing bridge during construction.

1.2 RELATED SECTIONS

- A. Section 01450: Submittals
- B. Section 02455: Driven Piles
- C. Section 02456: Dynamic Testing and Analysis of Driven Piles
- D. Section 03310: Structural Concrete
- E. Section 05120: Structural Steel

1.3 REFERENCES

- A. AASHTO M 270: Structural Steel for Bridges
- B. AASHTO LRFD Bridge Design Specifications
- C. AASHTO LRFD Bridge Construction Specifications Section 3 (Temporary Works)
- D. AWS D1.1 Structural Welding Code
- E. American Institute of Steel Construction (AISC)

1.4 DEFINITIONS **Not Used**

1.5 SUBMITTALS

A. Working Drawings

1. The Contractor shall submit drawings and copies of supporting design calculations for the temporary bridge for approval in accordance with UDOT Standard Specifications Section 01450. The following documentation shall be submitted as part of the working drawings:
 - a. Product Literature
 - b. Design Calculations
 - c. Design Drawings
 - d. Erection and Removal Procedures
 - e. Inspection and maintenance procedures
 - f. AISC Shop Certifications
 - g. Welder Qualifications

2. Falsework engineer shall submit a Falsework Design Summary to accompany the working drawings and calculations. The falsework Design Summary shall contain the following at a minimum for each falsework member:
 - a. Assumed dead and live loads.
 - b. Allowable and design stresses.
 - c. Allowable and calculated deflections.
 - d. Design references and derivations for design formulas.
 - e. Documentation for computer generated calculations.
 - f. Any other pertinent information required for design.

3. Detailed Shop Drawings of temporary falsework shall include:
 - a. Location and limits of the temporary falsework with respect to existing bridge and stream channel.
 - b. Plan, elevation, and section views including necessary dimensions and elevations.
 - c. Excavation limits of falsework in channel shall in be conformance with the Stream Alteration permit and environmental requirements.
 - d. Cofferdam limits and location in channel shall in be conformance with the Stream Alteration permit and environmental requirements.
 - e. Type and size of materials and falsework components being used.
 - f. Erection, excavation, and removal sequence of the temporary falsework.
 - g. Design notes including design criteria, loads, material specifications, and inspection, testing, and/or

- h. monitoring requirements.
Show temporary falsework installed in stages, if necessary, to accommodate other work activities.
- i. The seal of a Professional Engineer (PE) or Professional Structural Engineer (SE) licensed in the state of Utah is required on shop drawings and calculations.

PART 2 PRODUCTS

2.1 STRUCTURAL STEEL

- A. Refer to Section 05120.

2.2 HIGH TENSILE STRENGTH BOLTS, NUTS, AND WASHERS

- A. Refer to Section 05120.

2.3 DESIGN

- A. Design temporary falsework according to current editions of the AASHTO LRFD Bridge Construction Specifications, Section 3 (Temporary Works).

The falsework shall be designed and constructed to support the total applied loads and provide enough redundancy in the design to prevent a failure of the entire system. The Contractor and Falsework Design Engineer shall ensure that the design loads used are the maximum loadings, ensure that the deflections used on manufactured devices and assemblies do not exceed the manufacturer's recommendations, and provide catalog data that lists the manufacturer's recommendations.

Supports for deck falsework, forming, or screed supports shall not be welded to steel girders, shear connectors.

The Falsework Design Engineer of Record shall ensure that falsework is constructed according to the falsework design and on soils equal to or exceeding design assumptions. The Contractor shall not start construction until the Falsework Design Engineer of Record field inspects the falsework proposed for use. The Contractor shall not start construction until all construction concerns have been addressed and the Falsework Design Engineer of Record furnishes the Engineer a stamped letter stating that the falsework has been constructed in accordance with the approved falsework working drawings and will serve the intended use.

- B. Temporary falsework shall support existing steel bridge girders and utilities to the proper line and grade as shown on the plans.

- C. Deflection of steel girders and 48" irrigation pipe shall not exceed ¼ - inch. Existing 48" irrigation pipe is full, and flow shall be maintained throughout the duration of the project.
- D. All other utility lines shall be maintained and supported throughout the duration of the project.
- E. All welds must comply with AWS. Certified welder is required.

PART 3 EXECUTION

3.1 INSTALLATION AND REMOVAL

- A. All temporary falsework shall in be conformance with the Stream Alteration permit and environmental requirements.
- B. Temporary falsework shall be supported on foundation designed and provided Contractor.
- C. Erection and removal plans must be shown on the shop drawings.
- D. Temporary falsework is allowed in the stream channel.
- E. Temporary falsework shall be removed after completion of construction work. No debris or falsework material shall be allowed to remain in the stream channel.
- F. Disturbed areas shall be regraded to match existing slope and elevation.
- G. Falsework, excluding cantilevered bridge deck overhangs shall not be removed until all construction has been completed and a minimum deck concrete strength of 4000 psi has been achieved.
- H. Inspect falsework at daily during construction and at frequent intervals during concrete placement. Look for the following indicators of incipient failure:
 - 1. Excessive compression at the tops and bottoms of posts and under the ends of stringers.
 - 2. Crushing of wedges.
 - 3. Settlement of sand jacks
 - 4. Movement or deflection of diagonal bracing. Distortion at connections Pulling of nails
 - 5. Tilting or rotation of joists or stringers.
 - 6. Excessive deflection of any horizontal member
 - 7. Posts or towers that are bowing or moving out of plumb
 - 8. Excessive settlement as indicated by telltales

9. The sound of falling concrete or breaking timbers. Any unusual sound
10. Settlement must not deviate more than $\pm 3/8$ -inch from the anticipated settlement on the shop drawings

END OF SECTION

SPECIAL PROVISION

SECTION 05831S

COMPRESSION JOINT SEAL

Delete Section 05831 in its entirety and replace with the following:

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Compression joint seal for bridge decks and approach slabs.
- B. Replacement of existing joint seal from bridge deck and approach slabs.

1.2 RELATED SECTIONS Not Used

1.3 REFERENCES

- A. ASTM C 307: Tensile Strength of Chemical-Resistant Mortar, Grouts, and Monolithic Surfacing
- B. ASTM C 579: Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes
- C. ASTM C 661: Indentation Hardness of Elastomeric – Type Sealants by Means of a Durometer
- D. ASTM C 711: Low-Temperature Flexibility and Tenacity of One-Part, Elastomeric, Solvent-Release Type Sealants
- E. ASTM C 719: Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle)
- F. ASTM D 412: Vulcanized Rubber and Thermoplastic Elastomers - Tension
- G. ASTM D 545: Preformed Expansion Joint Fillers for Concrete Construction (Nonextruding and Resilient Types)

- H. ASTM D 3542: Preformed Polychloroprene Elastomeric Joint Seals for Bridges
- I. ASTM D 3574: Flexible Cellular Materials – Slab, Bonded, and Molded Urethane Foams
- J. ASTM D 4070: Adhesive Lubricant for Installation of Preformed Elastomeric Bridge Compression Seals in Concrete Structures
- K. ASTM D 4285: Indicating Oil or Water in Compressed Air

1.4 DEFINITIONS

- A. Compression Joint Seal – A watertight joint seal placed in compression before installation and kept in compression during its life.

1.5 SUBMITTALS

- A. Manufacturer's product data sheet and installation instructions for review.
- B. Removal Plan for review when required.
 - 1. Include method of removal and preparation of existing surface.
 - 2. Equipment to be used.
- C. Fit of the joint seal for information.
 - 1. Include length of joint opening per plan and length of compression joint seal to be provided
 - a. Do not include turned ends in the length of the joint opening or joint seal.
 - b. Provide joint seal which fits joint opening without any required joint stretching.
- D. Repair procedure for review when required.
 - 1. Refer to this Section, Article 3.3 C1.

PART 2 PRODUCTS

2.1 COMPRESSION JOINT SEAL TYPE A

- A. General
 - 1. Provide system including foam, surface coating, sealing bands, and epoxy adhesive from the same supplier.
 - 2. Provide movement rating as shown.
 - 3. Provide joint seal capable of movements of plus or minus 60 percent of nominal material size.

4. Provide factory fabricated transitions at corners.

B. Materials

1. Polyurethane open cell foam
 - a. Use 100 percent acrylic, water based, impregnation
 - b. Meet the requirements of Table 1.

Table 1

| Physical Properties | Requirement | Test Method |
|----------------------------|---------------------------|--------------------|
| Temperature Service Range | -40°F to 185°F | ASTM C 711 |
| Density | 6 lb/ft ³ min. | ASTM D 545 |
| Elongation | 150% min. | ASTM D 3574 |

2. Surface Coating and Sealant Bands

- a. Use highway-grade, UV resistant, and fuel resistant silicone.
- b. Meet the requirements of Table 2.

Table 2

| Physical Properties | Requirement | Test Method |
|----------------------------|--------------------|--------------------|
| Tensile Strength | 175 psi min. | ASTM D 412 |
| Elongation at break | >600% min. | ASTM D 412 |
| Movement Capability | ±50% | ASTM C 719 |
| Hardness (Shore A) | 20-30 | ASTM C 661 |

2.2 COMPRESSION JOINT SEAL TYPE B

A. Provide movement rating shown.

B. Materials

1. Preformed Elastomeric Joint Seal
 - a. Provide seal height at least 90 percent of the nominal width.
 - b. Meet the physical properties of ASTM D 3542.
2. Adhesive lubricant according to ASTM D 4070.
 - a. Capable of bonding to concrete or steel surfaces

2.3 EPOXY GROUT

A. Use a non-shrink epoxy grout patching material.

B. Provide a minimum compressive strength of 3,000 psi in 1 day and 5,000 psi in 28 days according to ASTM C 579.

- C. Provide a minimum tensile strength of 2,000 psi according to ASTM C 307.

PART 3 EXECUTION

3.1 GENERAL

- A. Follow manufacturer's recommendations and installation instructions.
- B. Store Compression Joint Seal Type A indoors at room temperature until needed at time of installation.

3.2 PREPARATION

- A. Remove existing joint system according to the authorized Removal Plan when performing a joint replacement.
 - 1. Avoid damaging existing concrete.
- B. Concrete contact surfaces
 - 1. Compression Joint Seal Type A
 - a. Remove loose particles and weak concrete.
 - b. Prepare concrete joint surfaces by sandblasting.
 - 1) Verify no oil or water contamination according to ASTM D 4285.
 - 2) Remove unsound materials, adhesive, and contaminants.
 - 2. Compression Joint Seal Type B
 - a. Provide joint openings that are smooth, true and vertical.
 - 1) Provide a blockout width for the joint within $\frac{1}{8}$ inch for joints less than or equal to $2\frac{1}{2}$ inch and $\frac{1}{4}$ inch for joints greater than $2\frac{1}{2}$ inch of the width shown.
 - a) The blockout width corresponds to the appropriate ambient temperature at the time of concrete placement.
 - 2) Saw cut the vertical joint opening in concrete surfaces as required, to achieve the appropriate width and depth as shown.
 - 3) Verify joint opening faces are parallel and the width does not vary by more than $\frac{1}{8}$ inch over 10 ft along the length of the joint.
 - 4) Repair vertical surface imperfections, including saw blade gouges, greater than $\frac{1}{16}$ inch with epoxy grout.
 - b. Prepare finished concrete joint surfaces by sandblasting.

- 1) Verify no oil or water in compressed air according to ASTM D 4285.
 - 2) Remove unsound materials, adhesive, and contaminants.
- C. Metal contact surfaces
1. Prepare metal contact surfaces by sandblasting to rough white metal.
 - a. Verify no oil or water in compressed air according to ASTM D 4285.
 2. Solvent-wipe immediately before applying epoxy adhesive primer.

3.3 SEAL INSTALLATION

- A. Verify the joint seal size based on the prepared surface and installation temperature.
- B. Compression Joint Seal Type A
1. Install the joint seal according to manufacturer's specifications.
 2. Apply epoxy adhesive to the substrate.
 - a. Prepare the joint again according to this Section, Article 3.2 and manufacturer's recommendations if the epoxy cures before placement of seal.
 3. Install joint seal at least $\frac{1}{2}$ inch below the traffic surface, as shown, or according to manufacturer's installation instructions, whichever is larger.
 4. Clean silicone coating at joint edges and apply sealant bands according to the manufacturer's installation instructions.
 5. Coat exposed foam ends with a light coating of silicone.
- C. Compression Joint Seal Type B
1. Supply the longest continuous length of compression seal possible.
 - a. Field splices are allowed, when required by phasing.
 - b. Field splice according to manufacturer's requirements.
 2. Install compression joint seal according to the manufacturer's installation instructions.
 - a. Cut the compression joint seal length to the exact width of the pavement.
 - b. Cut upturn and downturn bends according to manufacturer's installation instructions.
 3. Install compression joint seal so the top of the seal is $\frac{1}{4}$ inch \pm $\frac{1}{16}$ inch below the traffic surface, as shown, or according to the manufacturer's installation instructions, whichever is larger.
- D. Insert compression joint seal into the joint blockout with tools that will not damage the seal.

- E. Install the compression seal without stretching more than 4 percent.
 - 1. Calculate stretch by dividing the installed length by the original length.
 - a. Stretch greater than 4 percent is unacceptable and requires that the seal be replaced.
 - 2. Provide the Engineer the calculated stretch.

3.4 WATERTIGHT INTEGRITY TEST

- A. Perform a watertight integrity test on the joint system at least five calendar days after the joint has been installed.
 - 1. Test full width or staged width of the joint system as shown.
 - 2. Perform the watertight integrity test in the presence of the Engineer.
- B. Pond at least 2 inch of water over the joint for 15 minutes where:
 - 1. Joints are over steel or concrete surfaces that can be inspected.
 - a. Inspect the steel and concrete surfaces for evidence of dripping water or moisture for the initial 15 minutes and for 45 minutes after the ponded water has been released.
 - 2. Joints are over steel or concrete surfaces that cannot be inspected.
 - a. Measure and record the initial depth of the ponded water.
 - b. Measure and record the depth of the ponded water after 15 minutes.
 - c. The test can be stopped if depth of ponded water has not changed $\frac{1}{8}$ inch or more.
 - d. Continue the test for an additional 15 minutes if depth of water has changed more than $\frac{1}{8}$ inch.
 - 1) Measure and record the depth of the ponded water.
 - 2) The test is considered a failure if the water level has changed by an additional $\frac{1}{8}$ inch or more.
- C. Locate the places in the joint system where leakage is occurring and take measures necessary to stop the leakage.
 - 1. Submit a repair procedure recommended by the manufacturer.
 - 2. Repair joint system according to the authorized manufacturer's recommended repair procedure.
 - 3. Repeat watertight integrity test.

END OF SECTION

SPECIAL PROVISION

SECTION 08010S

Pipe Insulation and Jacket

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Pipe insulation for utilities under bridge deck.
- B. Stainless steel jackets for utilities under bridge deck.

1.2 RELATED SECTIONS Not Used

1.3 REFERENCES

- A. ASTM A 240: Specification for Stainless-Steel Plates, Sheet and Strips.
- B. ASTM C 612: Standard Specification for Mineral Fiber Block and Thermal Insulation.
- C. ASTM C 795: Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.

1.4 DEFINITIONS Not used

1.5 SUBMITTALS

- A. Manufacturer's product data sheet and installation instructions for review.

PART 2 PRODUCTS

2.1 PIPE INSULATION

- A. General
 - 1. Provide 1" fiberglass insulation for 48" water line and 8" culinary water line.
 - 2. The Contractor shall furnish the insulation manufacturer with the exact dimensions of the pipe to be insulated, together with the type of couplings and specials to be used.
- B. Materials
 - 1. Fiberglass Insulation
 - a. Meet the requirements of Table 1.

| Physical Properties | Requirement |
|---|--|
| Temperature Service Range | -60°F to 650°F |
| Density | 4.5 lb/ft ³ min. |
| Compression strength | Not less than 125 PSF at 10% deformation |
| Thermal Conductivity at 75 F mean temperature | 0.27 |
| Facing | ASJ, FSK OR Glass Mat |

2.2 STAINLESS STEEL JACKET

- A. Provide for 48" water line and 8" culinary water line.
- B. Materials
 - 1. T-304 Stainless Steel with 3/16" corrugations or (smooth option) in .010" and .016" thickness.
 - 2. Meet the physical properties of ASTM A 240.
 - 3. All jacketing shall have an integrally bonded moisture retarder over the surface in contact with the insulation.
 - 4. Moisture Retarder consists of a 3-mil thickness of a coextrusion of polyethylene and DuPont's Surlyn which is heat laminated to the metal jacketing.

PART 3 EXECUTION

3.1 GENERAL

- A. Follow manufacturer's recommendations and installation instructions.

- B. Store pipe insulation and stainless jackets until needed at time of installation.

3.2 PREPARATION

- A. Remove existing jacket and insulation as shown on the plans.
 - 1. Avoid damaging pipe and instrumentation.
 - 2. Dispose of insulation.
- B. Pipe insulation and jackets are to be compatible with the pipe hangers and brackets.

3.3 PIPE INSULATION INSTALLATION

- A. Install pipe insulation with tape or mechanical fasteners as recommend by manufacturer.
- B. Protect insulation until metal jacketing is installed.

3.4 STAINLESS STEEL JACKET INSTALLATION

- A. Install stainless steel jacket by mechanical fasteners and banding as recommended by the manufacturer.

END OF SECTION