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This MANU-SPEC® utilizes the Construction Specifications Institute (CSI) *Manual of Practice*, including *MasterFormat*™, *SectionFormat*™ and *PageFormat*™. A MANU-SPEC is a manufacturer-specific proprietary product specification using the proprietary method of specifying applicable to project specifications and master guide specifications. Optional text is indicated by brackets []; delete optional text in final copy of specification. Specifier Notes typically precede specification text; delete notes in final copy of specification. Trade/brand names with appropriate symbols typically are used in Specifier Notes; symbols are not used in specification text.

This MANU-SPEC specifies steel tension rod systems. These products are manufactured by Halfen Anchoring Systems. DETAN systems are fabricated by Halfen-Deha GmbH in Langenfeld, Germany. Revise MANU-SPEC section number and title below to suit project requirements, specification practices and section content. Refer to CSI *MasterFormat* for other section numbers and titles.

SECTION 05160
METAL FRAMING SYSTEMS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
1. Stainless and carbon steel tension rod systems.
 2. Tension rods.
 3. Couplers.
 4. Anchor discs.
 5. Fork connectors.
 6. Compression rods.

Specifier Note: Revise paragraph below to suit project requirements. Add section numbers and titles per CSI *MasterFormat* and specifier's practice.

- B. Related Sections:
1. Section [01330 - Submittal Procedures] [_____].
 2. Section [01450 - Quality Control] [_____].
 3. Section [01780 - Closeout Submittals] [_____].

Specifier Note: Article below may be omitted when specifying manufacturer's proprietary products and recommended installation. Retain Reference Article when specifying products and installation by an industry reference standard. If retained, list standard(s) referenced in this section. Indicate issuing authority name, acronym, standard designation and title. Establish policy for indicating edition date of standard referenced. Conditions of the Contract or Division 1 References Section may establish the edition date of standards. This article does not require compliance with standard, but is merely a listing of references used. Article below should list only those industry standards referenced in this section. Retain only those reference standards to be used within the text of this Section. Add and delete as required for specific project.

1.02 REFERENCES

A. ASTM International:

1. ASTM A572 Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.

Specifier Note: Article below includes submittal of relevant data to be furnished by Contractor before, during or after construction. Coordinate this article with Architect's and Contractor's duties and responsibilities in Conditions of the Contract and Division 1 Submittal Procedures Section.

1.03 SUBMITTALS

- A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures.
- B. Product Data: Submit manufacturer's product data and installation instructions for DETAN Tension Rod Systems including manufacturer's SPEC-DATA® product sheet.
- C. Shop Drawings:
 1. Submit shop drawings detailing installation procedures, including layout, dimensions and placement of rods, discs, couplers and connection plates.
- D. Quality Assurance:

Specifier Note: Retain or delete paragraph below as applicable to project requirements.

- 1. Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance as stated in product technical catalog.
- 2. Manufacturer's Instructions: Manufacturer's installation instructions.
- E. Closeout Submittals: Submit the following:
 1. Warranty: Warranty documents specified herein.
 2. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products and precautions against cleaning materials and methods detrimental to finishes and performance.

1.04 QUALITY ASSURANCE

- A. Qualifications:
 1. Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.
 2. Manufacturer Qualifications: Manufacturer capable of providing field service representation during installation.
 3. Fabricator Qualifications: Fabrication performed in quality controlled manufacturing environment by experienced fabricators with references indicating multiple satisfactory experiences fabricating carbon steel and stainless steel rods.

Specifier Note: Paragraph below should list obligations for compliance with specific code requirements particular to this section. General statements to comply with a particular code are typically addressed in Conditions of the Contract and Division 1 Regulatory Requirements Section. Repetitive statements should be avoided.

- B. Preinstallation Meetings: Conduct preinstallation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with Division 1 Project Management and Coordination (Project Meetings) Section.

1.05 DELIVERY, STORAGE & HANDLING

- A. General: Comply with Division 1 Product Requirements Section.
- B. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- C. Delivery, Storage and Protection:
 1. Deliver, store and handle in accordance with Section [01610 - Basic Product Requirements] [_____].
 2. Deliver, store and handle materials in accordance with manufacturer's written instructions.
 3. Deliver in original packaging with labels and identification intact.

4. Store in dry area, protected from weather.

D. Waste Management and Disposal:

Specifier Note: Environment: The disposal of packaging waste into landfill site demonstrates an inefficient use of natural resources and consumes valuable landfill space.

1. Separate waste materials for [Reuse] [And] [Recycling] [_____] in accordance with Section [01300 - Administration Requirements, Waste Management and Disposal] [_____].
2. Remove from site and dispose of packaging materials at appropriate recycling facilities.
3. Collect and separate for disposal [Paper] [Plastic] [Polystyrene] [Corrugated cardboard] [_____] packaging material [In appropriate on-site bins] [_____] for recycling.

Specifier Note: Coordinate article below with Conditions of the Contract and with Division 1 Closeout Submittals (Warranty) Section.

1.06 WARRANTY

- A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.
- B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.

PART 2 PRODUCTS

Specifier Note: Retain article below for proprietary method specification. Add product attributes, performance characteristics, material standards, and descriptions as applicable. Use of such phrases as "or equal" or "or approved equal" or similar phrases may cause ambiguity in specifications. Such phrases require verification (procedural, legal and regulatory) and assignment of responsibility for determining "or equal" products.

2.01 DETAN TENSION ROD SYSTEM

- A. Manufacturer: Halfen Anchoring Systems, Meadow Burke Products.
 1. Contact: PO Box 547, Converse, TX 78109; Telephone: (800) 323-6896; (210) 658-4671; Fax: (888) 277-1695; E-mail: halfen@meadowburke.com; website: www.halfenusa.com.
- B. Proprietary Products/Systems: DETAN Tension Rod System.
 1. Stainless Steel System DETAN-E:
 - a. Tension Rods:
 - 1) Stainless steel A4 (316) with 355 MPa (51,500 psi) yield strength, and 600 MPa (87,000 psi) ultimate strength.
 - 2) [Electropolished] [Hand polished].

Specifier Note: System design load capacities vary with the system diameter. Load capacities are available from 6.5 kN - 171.4 kN (1460 - 38,530 lb). Refer to system data sheets for size/capacity relationships.

- 3) Diameter: [6 mm (1/4 inch)] [8 mm (5/16 inch)] [10 mm (3/8 inch)] [12 mm (1/2 inch)] [16 mm (5/8 inch)] [20 mm (3/4 inch)] [24 mm (1 inch)] [27 mm (1 1/8 inches)] [30 mm (1 1/4 inches)] [_____].

Specifier Note: Minimum system lengths are dependent on rod diameter. Maximum one-rod system lengths are also dependent on rod diameter. Refer to system data sheets for minimum and maximum system lengths. The critical length manufacturer requires is called "system length," defined as length from C.L. of left pin to C.L. of right pin.

- 4) Length: [139 mm (5 1/2 inches)] [_____mm (____inches)].
- b. Couplers:
 - 1) Stainless steel with 240 MPa (35,000 psi) minimum yield strength.

Specifier Note: Coupler lengths and diameters are specific to the system rod size. Ensure appropriate coupler size is specified for the system.

- 2) Length: [34 mm (1 1/3 inches)] [____mm (____inches)].
 - 3) Diameter: [12 mm (1/2 inch)] [____mm (____inches)].
- c. Anchor Discs:
- 1) Stainless steel with 240 MPa (35,000 psi) minimum yield strength.
 - 2) Number of Rod Connections: [2] [____] [8] [____].

Specifier Note: Anchor disc diameters are specific to the system rod size. Ensure appropriate diameter is specified for the system.

- 3) Diameter: [73 mm (2 7/8 inches)] [____mm (____inches)]
- d. Fork Connectors:
- 1) Stainless steel A4 S31803 (SAE).

Specifier Note: Connecting plates are not manufactured as part of the DETAN system. They must be fabricated and obtained from other manufacturers in accordance with DETAN catalog dimensions and geometry.

- e. Connecting Plates:
- 1) Stainless steel grade [304] [316] [____] with 205 MPa (30,000 psi) minimum yield strength.
 - 2) [Finned for welding to steelwork] [T-brackets for bolting to structure] [____].

Specifier Note: Plate thickness, pin diameter, edge distance and minimum plate width are specified on the component data sheets and are specific to each system size. Ensure these tolerances are adhered to for connecting plate design.

- 3) [5 mm (3/16 inch)] [____mm (____inches)] thick, [6.5 mm (1/4 inch)] [____mm (____inches)] hole diameter, [9 mm (3/8 inch)] [____mm (____inches)] edge distance, [18 mm (11/16 inch)] [____mm (____inches)] minimum width.
2. Carbon Steel System DETAN-S460:
- a. Tension Rods:

Specifier Note: Tension rods with diameters less than or equal to 12 mm are of S355 carbon steel. All larger sizes will be S460 carbon steel.

- 1) Carbon steel [S355] [S460] [____].
- 2) [Mill finish] [Hot dip galvanized] [____].

Specifier Note: System design load capacities vary with the system diameter. Load capacities are available from 7.5 kN - 2695 kN (1670 - 605,790 lb). Refer to system data sheets for size/capacity relationships.

- 3) Diameter: [6 mm (1/4 inch)] [8 mm (5/16 inch)] [10 mm (3/8 inch)] [12 mm (1/2 inch)] [16 mm (5/8 inch)] [20 mm (3/4 inch)] [24 mm (1 inch)] [27 mm (1 1/8 inches)] [30 mm (1 1/4 inches)] [36 mm (1 3/8 inches)] [42 mm (1 5/8 inches)] [48 mm (2 inches)] [52 mm (2 1/16 inches)] [56 mm (2 1/4 inches)] [60 mm (2 3/8 inches)] [64 mm (2 1/2 inches)] [76 mm (3 inches)] [85 mm (3 3/8 inches)] [95 mm (3 3/4 inches)] [____].

Specifier Note: Minimum system lengths are dependent on rod diameter. Maximum one-rod system lengths are also dependent on rod diameter. Refer to system data sheets for minimum and maximum system lengths. The critical length manufacturer requires is called "system length," defined as length from C.L. of left pin to C.L. of right pin.

- 4) Length: [139 mm (5 1/2 inches)] [____mm (____inches)].
- b. Couplers:
- 1) Dacrometized, carbon steel, Grade S355 with 360 MPa (52,500 psi) minimum yield strength.

Specifier Note: Coupler lengths and diameters are specific to the system rod size. Ensure appropriate coupler size is specified for the system.

- 2) Length: [34 mm (1 1/3 inches)] [____mm (____inches)].

3) Diameter: [12 mm (1/2 inch)] [____mm (____inches)].

c. Anchor Discs:

1) Hot dip galvanized, carbon steel, Grade S355 with 360 MPa (52,500 psi) minimum yield strength.

Specifier Note: Anchor discs may be used to expand the span of the system or as central connection points for structures requiring cross bracing. A maximum of 8 rods may be connected to each anchor disc.

2) Number of Rod Connections: [2] [____] [8] [____].

Specifier Note: Anchor disc diameters are specific to the system rod size. Ensure appropriate diameter is specified for the system.

3) Diameter: [73 mm (2 7/8 inches)] [____mm (____inches)].

d. Fork Connectors:

Specifier Note: The following sentence applies to fork connectors on systems with rod diameters less than or equal to 12 mm (1/2 inch).

1) Dacrometized, forged, S355J2G3 carbon steel.

Specifier Note: The following sentence applies to fork connectors on systems with rod diameters greater than 12 mm (1/2 inch).

2) Dacrometized, cast steel, GS20Mn5QT.

Specifier Note: Connecting plates are not manufactured as part of the DETAN system. They must be fabricated and obtained from other manufacturers in accordance with DETAN catalog dimensions and geometry.

e. Connecting Plates:

1) [ASTM A572 Grade 50] [ASTM A572 Grade 60] [____].

2) [Finned for welding to steelwork] [T-brackets for bolting to structure] [____].

Specifier Note: Plate thickness, pinhole diameter, edge distance and minimum plate width are specified on the component data sheets and are specific to each system size. Ensure these tolerances are adhered to for connecting plate design.

3) [5 mm (3/16 inch)] [____mm (____inch)] thick, [6.5 mm (1/4 inch)] [____mm (____inch)] hole diameter, [9 mm (3/8 inch)] [____mm (____inch)] edge distance, [18 mm (11/16 inch)] [____mm (____inch)] [____] minimum width.

Specifier Note: DETAN compression rods consist of large diameter tubes, reduced at each end for use with standard DETAN fork connectors. These rods are designed to order.

3. DETAN Compression Rods:

a. [Carbon Steel] [Stainless Steel] [____].

b. Diameter: [____mm (____inch)].

Specifier Note: The critical length manufacturer requires is called "system length," defined as length from C.L. of left pin to C.L. of right pin.

c. Rod Length: [____mm (____inch)].

Specifier Note: Edit Paragraph below to suit project requirements. If substitutions are permitted, edit text below. Add text to refer to Division 1 Project Requirements (Product Substitutions Procedures) Section.

2.02 PRODUCT SUBSTITUTIONS

A. Substitutions: No substitutions permitted.

PART 3 EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

Specifier Note: Article below is an addition to the CSI *SectionFormat* and a supplement to MANU-SPEC. Revise article below to suit project requirements and specifier's practice.

- A. Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalog installation instructions, product carton installation instructions and Halfen Anchoring Systems' SPEC-DATA sheet.

3.02 EXAMINATION

A. Site Verification of Conditions:

1. Verify that substrate conditions are acceptable for product installation in accordance with manufacturer's instructions.
2. Examine area to receive bracing for compliance with installation clearances.

3.03 INSTALLATION

A. Assembly:

1. Fully screw DETAN locknut on DETAN tension rod until rod markings are not visible.
2. Screw fork connector on tension rod to required system length.
3. Screw locknut back toward fork connector until locked.
4. Install snap rings with snap ring pliers on each side of pin in fork connector.
5. Position connection plates to not subject tension rod system to bending.
6. Align and position forks in same plane. Ensure maximum misalignment of 0.5 degrees.

3.04 FIELD QUALITY CONTROL

A. Site Tests, Inspection:

1. Inspect completed assembly for proper locknut screw-in depth, after installation and prior to final acceptance. Report component damage to [Supplier] [_____]. Ensure that markings on tension rods are covered by locknut to achieve minimum screw-in depth.

3.05 COMPLETION & CLEANUP

1. Proceed in accordance with Section [01740 - Cleaning] [_____].
2. Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION