



TECHNOLOGIES, INC.

— THE ART & SCIENCE OF WASTEWATER TREATMENT —

Hydro-Flo Technologies Engineering Specifications

Common Data Applicable to all Equipment

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1. FABRICATION SPECIFICATIONS

1.1. Structural Steel Fabrication and Assembly Specifications

- 1.1.1. All structural and tank steel stresses shall be within the allowable limits shown in the current edition of the Steel Construction Manual of the American Institute of Steel Construction
- 1.1.2. The unit to be structurally designed for installation in Seismic Zone **????** in accordance with the current Uniform Building Code.
- 1.1.3. All materials used in construction, fabrication and assembly shall conform to all applicable ANSI and ASTM listed publications.
- 1.1.4. All welds must conform to the applicable listed AWS publications
- 1.1.5. All tank connections to conform to ANSI B16.1.

1.2. Surface Preparation and Coating

- 1.2.1. Exterior Surfaces
- 1.2.2. Surface Preparation:
The steel surfaces must be dry and clean in accordance with the following requirements. Remove all grease, oils and contaminants as outlined in SSPC SP1. Remove all weld splatter and grind burrs on cut edges and rough welds smooth. Blast clean all surfaces after fabrication in accordance with SSPC SP6. Apply first coat within 24 hours after completion of surface prep.
- 1.2.3. Shop First Coat:
Apply one coat of a high-build catalyzed epoxy. Apply to all steel surfaces except the areas within 2 inches adjacent to field welds. All coatings are to be applied as per the manufacturer's specifications for exterior applications.
- 1.2.4. The dry film thickness of the first coat shall be a minimum of **????** mils, and a maximum of **????** mils.
- 1.2.5. Caulking:
All exterior non-seal welding joints shall be filled with caulk after the first coat and before the finish coat. Allow sufficient time for the caulking to dry before applying the finish coat.
- 1.2.6. Shop Finish Coat:
Apply one coat of a high-build catalyzed epoxy. Apply to all steel surfaces except the areas within 2 inches adjacent to field welds. All coatings are to be applied as per the manufacturer's specifications for exterior applications.
- 1.2.7. The dry film thickness of the finish coat shall be a minimum of **????** mils, and a maximum of **????** mils.
- 1.2.8. Field touch-up of damaged and unpainted areas shall be the same as specified first and second coats at the same film thickness.
- 1.2.9. The total dry film thickness shall be an average of **????** mils.
- 1.2.10. Interior Surfaces:
- 1.2.11. Surface Preparation:
The steel surfaces must be dry and clean in accordance with the following requirements. Remove all grease, oils and contaminants as outlined in SSPC SP1. Remove all weld splatter and grind burrs on cut edges and rough welds smooth.

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Blast clean all surfaces after fabrication in accordance with SSPC SP10. Apply first coat within 24 hours after completion of surface prep.

- 1.2.12. Shop First Coat:
Apply one coat of a high-build catalyzed epoxy. Apply to all steel surfaces except the areas within 2 inches adjacent to field welds. All coatings are to be applied as per the manufacturer's specifications for exterior applications.
- 1.2.13. The dry film thickness of the first coat shall be a minimum of **????** mils, and a maximum of **????** mils.
- 1.2.14. Shop Finish Coat:
Apply one coat of a high-build catalyzed epoxy. Apply to all steel surfaces except the areas within 2 inches adjacent to field welds. All coatings are to be applied as per the manufacturer's specifications for exterior applications.
- 1.2.15. The dry film thickness of the finish coat shall be a minimum of **????** mils, and a maximum of **????** mils.
- 1.2.16. Field touch-up of damaged and unpainted areas shall be the same as specified first and second coats at the same film thickness. (Liquid Contact).
- 1.2.17. The total dry film thickness shall be an average of **????** mils.

1.3. Testing

- 1.3.1. All seal welds shall be visually checked for continuity, pinholes, and voids.
- 1.3.2. The entire unit shall be shop-hydrostatically tested. Documentation of hydrostatic test shall be provided.

2. SUBMITTALS

- 2.1.1. Contracting officer will review and approve all submittals.

2.2. Submit the Following Before Fabrication

- 2.2.1. Shop drawings for all supplied equipment and accessory equipment including principle dimensions and location of fittings. Data shall include weight and distribution of weight with the unit empty and filled with water.

2.3. Submit the Following After Fabrication:

- 2.3.1. Verification:
- 2.3.2. Written verification on the fabricator's letterhead that surface preparation and coating application were performed in accordance with the specification and coating specification and system manufacturer's printed recommendations.
- 2.3.3. Written verification on the fabricator's letterhead that the equipment was hydraulically leak tested for a period of at least 4 hours before further surface preparation and coating.
- 2.3.4. Written verification on the fabricator's letterhead that the surface preparation and coating process was performed per the manufacturers specifications.

3. MANUFACTURER'S SERVICE REPRESENTATIVE'S REPORT AND CERTIFICATE

- 3.1.1. Submit service representative's complete signed report of results of the inspection, operation, adjustment, and tests. Report shall include detailed descriptions of points inspected, tests and adjustments made, quantitative results obtained if such are specified, and suggestions for precautions to be taken to ensure proper maintenance. Include the manufacturer's certificate that equipment conforms to specified requirements and is ready for permanent operation and that nothing in installation will render manufacturer's warranty null and void.

4. WELDER QUALIFICATIONS

- 4.1.1. Welders shall be previously qualified by passing the tests prescribed in the AWS Standard Qualification Procedure, or by passing such other tests as the Engineer may accept.
- 4.1.2. Welders shall have been tested within the past twenty four months and their qualifications shall be considered as remaining in effect unless the welder is not engaged in a given process of welding for a period exceeding six months.

5. INSPECTION

- 5.1.1. Examine each component of supplied equipment for compliance with requirements specified. Redesign or modification of equipment to comply with specified requirements, or necessary redesign or modification following failure to meet specified requirements, shall receive particular attention for adequacy and suitability. This element of inspection shall encompass visual examinations and dimensional measurements. Noncompliance with specified requirements, or presence of one or more defects preventing or lessening maximum efficiency of equipments operation, shall constitute cause for rejection.

6. DELIVERY, STORAGE AND HANDLING MATERIALS

- 6.1.1. Inspect materials delivered to site for damage; unload and store with minimum handling. Store materials on-site in enclosures or under protective coverings. Protect materials not suitable for outdoor storage to prevent damage during periods of inclement weather, including subfreezing temperatures, precipitation and high winds. Store material susceptible to deterioration by direct sunlight under cover and avoid damage due to high temperatures. Do not store materials directly on ground. If special precautions are required, prominently and legibly stencil instruction for such precautions on outside of equipment or its crating. Store and protect materials according to manufacturer's recommendations.
- 6.1.2. Handle all equipment in such a manner as to ensure delivery to final location in sound, undamaged condition. Take special care not to damage interior and exterior surfaces of sludge thickener tank and associated supports and pipe coatings or

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linings. Make satisfactory repairs to damaged material(s) at no cost. Carry and do not drag materials. Handle all equipment according to manufacturer's information.

7. INSTALLATION

- 7.1.1. All equipment to be installed as indicated and as recommended by the manufacturer. Equipment delivered to the site in advance of installation to be stored per the manufacturer's requirements. Make all connections as required to make supplied equipment fully operational. Do not weld tank surfaces, interior or exterior, it will permanently damage the interior lining. If welding has inadvertently occurred, the interior surface affected shall be abrasively ground to white metal and the specified coatings to be re-applied per manufacturer's specifications.

8. WARRANTY

- 8.1.1. The manufacturer shall warrant its products to be free of defects in materials and workmanship. The warranty period will last for one year from date of shipment.

9. PROJECT DOCUMENTATION WEBSITE

- 9.1.1. The manufacturer shall create a custom web site where all the project files are to be stored. As a minimum, the files to be stored on this site to be:
- 9.1.2. Copies of all bid documents
Including all notices, revisions and appendixes as well as all published engineering specifications.
- 9.1.3. Copies of manufacturers proposal
This includes the original proposal and all subsequent revisions
- 9.1.4. Copies of the component spec sheets. Each supplied component shall have its own spec sheet detailing all pertinent information regarding that component. As a minimum the sheet shall list...
- 9.1.5. Customer P.O. Number, Project Name, Project Number, Manufacturers Proposal Reference Number and Manufacturers Job Number
- 9.1.6. Site Specific Area Classifications, NEMA ratings, Electrical Power Supplies and Process Flow Rate
- 9.1.7. Tag Numbers (must correspond to listings on the P&ID)
- 9.1.8. Brand & Model Numbers
- 9.1.9. Materials of construction
- 9.1.10. Component Power Rating (Voltage, HP, Motor Type, RPM, Etc...)
- 9.1.11. Copies of the component data (cut) sheets.
- 9.1.12. Copies of the component "Installation, Operation and Maintenance Manuals".
- 9.1.13. Copies of all drawings including P&ID (for all packaged systems), General Arrangement and Electrical. All revision levels are to be maintained on the site.
- 9.1.14. The site will have a "Project Status" section where all project milestones will be listed along with there current status.

10. "ON SITE" SERVICES

10.1. Inspection

- 10.1.1. Manufacturer's field representative shall inspect the installed equipment and certify that the installation has been performed in accordance with manufacturer's recommendations. The factory representative shall consider, but not be limited to, the following:
- 10.1.2. Soundness (without cracked or otherwise damaged parts).
- 10.1.3. Completeness in all details, as specified.
- 10.1.4. Correctness of installation, set points and relative arrangement of each component.
- 10.1.5. Confirm that the equipment is set properly and is level within acceptable tolerances side to side and end to end.
- 10.1.6. Inspect unit for leakage and that all supplied equipment is operating as specified.
- 10.1.7. Inspect coating integrity to insure installation contractor has applied touch-up paint to all scratches, blemishes and/or coating discontinuity that occurred during shipping and installation.

10.2. Operator Training

- 10.2.1. Manufacturer's field representative shall meet with the equipment operators and review the supplied manuals and run the operator through the overall operation of the equipment, systems and sub systems. The factory representative shall consider, but not be limited to, the following:
- 10.2.2. Review the calibration and set up of all operator adjustable components and systems,
- 10.2.3. Run through the overall operation of the system.
- 10.2.4. Answer any questions in regard to operation and maintenance of the equipment

10.3. Start-Up

- 10.3.1. Manufacturer's field representative shall test all equipment and certify that the installation is ready for operation by others. The factory representative shall consider, but not be limited to, the following:
- 10.3.2. Meet with customer's direct employees, sub contractors and suppliers. Make sure that everything is ready for system operation.
- 10.3.3. Operate all system components on clean water. Make sure that all systems are functioning as specified

11. MANUFACTURERS QUALIFICATIONS

- 11.1.1. The manufacturer of the equipment and related components shall have been manufacturing equipment of the following specified design for a minimum of five years. The manufacturer shall maintain a quality control staff to perform quality assurance checks during fabrication and assembly.

12. RECOMMENDED MANUFACTURER

12.1.1. Hydro-Flo Technologies, Inc.
3985 Commerce Drive
St Charles, Illinois 60174

630-762-0380 phone / 630-762-0390 fax
e-mail: <mailto:contact@hydroflotech.com>

13. APPLICABLE PUBLICATIONS

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

13.1. American National Standards Institute (ANSI) Publications:

13.1.1. ASME/ANSI B16.1 - 2005 - Cast Iron Pipe Flanges and Flanged Fittings, Classes 25, 125, 250 and 800:
Covers: (a) pressure-temperature ratings; (b) sizes and methods of designating openings of reducing fittings; (c) marking; (d) minimum requirements for materials; (e) dimensions and tolerances; (f) bolt, nut, and gasket dimensions; and (g) tests..

13.2. American Society for Testing and Materials (ASTM) Publications:

- 13.2.1. 5B Specification for Threading, Gauging, and Thread Inspection of Casing, Tubing, and Line Pipe Threads
- 13.2.2. A6/A6M Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling
- 13.2.3. A27/A27M Specification for Steel Castings, Carbon, for General Application
- 13.2.4. A36 / A36M - 08 Standard Specification for Carbon Structural Steel
- 13.2.5. A53 / A53M - 07 Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
- 13.2.6. A90/A90M Test Method for Weight [Mass] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings
- 13.2.7. A307 Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength
- 13.2.8. A283 / A283M - 03(2007) Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
- 13.2.9. A325 Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
- 13.2.10. A325M Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength (Metric)
- 13.2.11. 4A370 Test Methods and Definitions for Mechanical Testing of Steel Products
- 13.2.12. A501 Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
- 13.2.13. A502 Specification for Rivets, Steel, Structural

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- 13.2.14. A530/A530M Specification for General Requirements for Specialized Carbon and Alloy Steel Pipe
- 13.2.15. A563 Specification for Carbon and Alloy Steel Nuts
- 13.2.16. A563M Specification for Carbon and Alloy Steel Nuts (Metric)
- 13.2.17. A668/A668M Specification for Steel Forgings, Carbon and Alloy, for General Industrial Use
- 13.2.18. A700 Practices for Packaging, Marking, and Loading Methods for Steel Products for Shipment
- 13.2.19. A751 Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products
- 13.2.20. A1011/A1011M Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength
- 13.2.21. A1018/A1018M Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Hot-Rolled, Carbon, Commercial, Drawing, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength
- 13.2.22. B1.20.1 Pipe Threads, General Purpose
- 13.2.23. B6 Specification for Zinc
- 13.2.24. B36.10M Welded and Seamless Wrought Steel Pipe
- 13.2.25. E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications
- 13.2.26. E213 Practice for Ultrasonic Testing of Metal Pipe and Tubing
- 13.2.27. E273 Practice for Ultrasonic Examination of the Weld Zone of Welded Pipe and Tubing
- 13.2.28. E309 Practice for Eddy-Current Examination of Steel Tubular Products Using Magnetic Saturation
- 13.2.29. E570 Practice for Flux Leakage Examination of Ferromagnetic Steel Tubular Products
- 13.2.30. E1806 Practice for Sampling Steel and Iron for Determination of Chemical Composition
- 13.2.31. F568M Specification for Carbon and Alloy Steel Externally Threaded Metric Fasteners (Metric)
- 13.2.32. F1554 Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength
- 13.2.33. MIL-STD-163 Steel Mill Products Preparation for Shipment and Storage Federal Standards
- 13.2.34. MIL-STD-183 Continuous Identification Marking of Iron and Steel Products API Standard

13.3. American Welding Society (AWS) Publications:

- 13.3.1. D1.3 - Structural Welding Code-Sheet Steel
- 13.3.2. A3.0 - Standard Welding Terms and Definitions
- 13.3.3. A2.4 - Symbols for Welding, Brazing, and Nondestructive Examination
- 13.3.4. Z49.1 - Safety in Welding, Cutting, and Allied Processes

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- 13.3.5. A5.25/A5.25M - Specification for Carbon and Low Alloy Steel Electrodes and Fluxes for Electroslag Welding
- 13.3.6. A5.26/A5.26M - Specification for Carbon and Low Alloy Steel Electrodes for Electrode Gas Welding
- 13.3.7. A5.1/A5.1M - Specification for Carbon Steel Electrodes for Shielded Metal Arc Welding
- 13.3.8. A5.5 - Specification for Low-Alloy Steel Electrodes for Shielded Metal Arc Welding
- 13.3.9. A5.17/A5.17M - Specification for Carbon Steel Electrodes and Fluxes for Submerged Arc Welding
- 13.3.10. A5.23/A5.23M - Specification for Low Alloy Steel Electrodes and Fluxes for Submerged Arc Welding
- 13.3.11. A5.18/A5.18M - Specification for Carbon Steel Electrodes and Rods for Gas Shielded Arc Welding
- 13.3.12. A5.20 - Specification for Carbon Steel Electrodes for Flux Cored Arc Welding
- 13.3.13. A5.28 - Specification for Low Alloy Steel Filler Metals for Gas Shielded Arc Welding
- 13.3.14. A5.29 - Specification for Low Alloy Steel Electrodes for Flux Cored Arc Welding
- 13.3.15. A5.12/A5.12M - Specification for Tungsten and Tungsten Alloy Electrodes for Arc Welding and Cutting
- 13.3.16. A5.30 - Specification for Consumables Inserts
- 13.3.17. C4.1G - Surface Roughness Guide for Oxygen
- 13.3.18. QC1 - Standard and Guide for Qualification and Certification of Welding Inspectors
- 13.3.19. B1.10 - Guide for Nondestructive Examination of Welds
- 13.3.20. C5.4 - Recommended Practices for Stud Welding
- 13.3.21. D1.6 - Structural Welding Code-Stainless Steel

13.4. Steel Structures Painting Council (SSPC) Publications:

- 13.4.1. SSPC-SP-6 Commercial Blast Cleaning
- 13.4.2. SSPC-SP-10 Near White Blast Cleaning

13.5. American Institute of Steel Construction (AISC) Publications:

- 13.5.1. Detailing for Steel Construction, 3rd Edition
- 13.5.2. Steel Construction Manual, Thirteenth Edition
- 13.5.3. AISC Seismic Design Manual