SPEC NO. 15943-22-006
7 September 2022

NOT SENSITIVE
IRA-6459

EQUIPMENT SPECIFICATION

FOR

AUTOMATIC SELF-CLEANING STRAINER

ARNOLD ENGINEERING DEVELOPMENT COMPLEX

ARNOLD AIR FORCE BASE, TN 37389-9998

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1. SCOPE

1.1. Provide three ASME code stamped NPS 16 automatic self-cleaning strainers capable of processing 7000 GPM of raw water. The complete strainers shall be delivered to Arnold AFB, Tennessee. The Government will install the strainer.

2. APPLICABLE DOCUMENTS

2.1. Government Documents: None

2.2. Non-Government Documents:

2.2.1 American Society of Mechanical Engineers:

A.	ASME B16.5-21	Pipe Flanges and Flanged Fittings NPS 1/2 through NPS 24 Metric/Inch Standard.
B.	ASME B16.11-17	Forged Fittings, Socket-Welding and Threaded.
C.	ASME BPVC SEC VIII-1-21	BPVC - Rules for Construction of Pressure Vessels.

2.2.2 ASTM International:

A.	ASTM A304-20	Standard Specification for Carbon and Alloy Steel Bars Subject to End-Quench Hardenability Requirements.
B.	ASTM A316-20	Specification for Low-Alloy Steel Covered Filler Metal Arc-Welding Electrodes.

3. REQUIREMENTS

3.1. General:

3.1.1. The Contractor shall design, fabricate, assemble, test and deliver an automatic self-cleaning strainer in accordance with this Specification and Appendix A. The strainer will be used to prevent foreign object debris (FOD) from entering test cell. Particle size to be filtered is specified in Appendix A.

3.1.2. Service Conditions: The automatic strainer shall be designed to operate Government indoors with environmental temperatures ranging from 0°F to 120°F.

3.1.3. Nozzle size, pressure rating, and type shall be in accordance with Appendix A.

3.1.4. The Contractor shall be registered with the National Board of Boiler and Pressure Vessel Inspectors and possess an active ASME U-Stamp. Submit ASME Stamp to Government for approval. The Contractor shall design and fabricate the automatic self-cleaning strainer in accordance with the requirements of the ASME BPVC SEC VIII-1 including stamping the strainer and registering it with the National Board.

3.1.5. The strainer shall operate automatically with Test Automated Control System (TACS) or automatically control from TACS (lower differential pressure (DP) set point than the strainers default).

A. The strainer shall have a control panel with an appropriate valve to provide control of the backwash flow.

B. The automatic strainer shall have a fail-safe mode to prevent internal damage caused by debris.

C. The strainer shall provide continuous uninterrupted fluid flow during the cleaning operation.

D. The strainer shall have a capability of setting the cleaning cycle for intermittent or continuous backwash.

E. The strainer shall also be designed to manually backflush.

3.1.6. The unit shall be self-supporting with legs provided for mounting to steel flooring. The strainer supports shall be adequate to support the operating and hydrostatic test loads. Submit total weight of strainer and load on each support.

3.1.7. The strainer shall possess lifting lugs for lifting with a crane. Lifting loads (in lbs.) shall be marked on the strainer and lugs. Submit lifting diagram and capacity of lugs.

3.1.8. Fabrication and Finishes:

A. Components requiring adjustment, maintenance and calibration shall be accessible with the automatic self-cleaning strainer in service.

B. All equipment shall be constructed and finished in such a way that no sharp edges, burrs, or physical defects are present.

C. The surfaces shall be free from oxide, slag, loose debris, dirt, rust hydrocarbons and other foreign harmful contaminants.

D. Prime and paint exposed surfaces (excluding stainless steel) in accordance with manufacturer’s standard practice for outdoor service.

E. The carbon steel components shall incorporate a one eighth (0.125) inch minimum additional thickness to provide a 20 year corrosion allowance.

3.2. Nameplates and Markings:

A. Each major component of the strainer assemblies shall mark the manufacturer's name, address, type or style, model or serial number, and pressure class displayed on a plate secured to the component.

B. Flow direction marking shall be prominently and permanently displayed on each strainer indicating flow direction.

C. Strainer have affixed a nameplate including ASME Code Stamp, National Board Registration Number, design conditions, manufacturer, manufacturer's serial number, and year of construction in accordance with ASME BPVC Section VIII Div 1 UG-118.

3.3. Submittals: Submit the following in accordance with Appendix B and Summary Table below.

3.3.1. Engineering Analysis: Perform an engineering analysis to demonstrate that the automatic self-cleaning strainer and related components meet the requirements of this specification. Submit analysis before shipment to Arnold AFB, TN.

3.3.2. Manufacturer's product data: Submit product data to demonstrate all requirements herein are met. General arrangement drawing, equipment manufacturer, publish model number, catalog cutsheets, mounting structures, all piping connections, and datasheet containing all information on Appendix A.

3.3.3. Operations and Maintenance Manuals: spare parts lists, exploded assembly views, troubleshooting guides, and recommended maintenance tasks and intervals.

3.3.4. Manufacturer's Installation Instructions: installation methods and procedures.

3.3.5. Warranty: Submit manufacturer's standard warranty against defects in workmanship and materials, or 1-year warranty against defects in workmanship and materials, whichever is longer.

3.3.6. Submittal Summary Table:

No.	Section Reference	Submittal Description	Due
1	3.1.4	ASME Stamp	Prior to Shipment
2	3.1.6	Weight of strainer and support loads	Prior to Shipment
3	3.17	Lifting diagram and capacity of lugs	Prior to Shipment
4	3.3.1	Engineering Analysis	Prior to shipment
5	3.3.2	Manufacturer's product data	3 weeks after order
6	3.3.3	Operations and Maintenance Manuals	Prior to shipment
7	3.3.4	Manufacturer's installation instructions	Prior to shipment
8	3.3.5	Warranty	At delivery

4. VERIFICATION

4.1 Perform hydrostatic test in accordance with ASME BPVC Section VIII Division 1. Submit Coordinate Testing and Inspections with Government. Government reserves the right to witness.

4.2 ASME Boiler and Pressure Vessel Code Section VIII Division 1 Data Report U-Form.

4.3 Government Acceptance: Government will accept the strainer upon delivery and upon submittal of successful test and analysis reports.

5. PACKAGING

5.1. Preparation for Delivery: Provide all preservation, packaging, and packing to ensure safe delivery of all strainers and related components to Arnold AFB, TN. The strainer shall be packaged and tagged in a manner that will protect the equipment from damage and facilitate the installation in the field. Machined and unpainted parts shall be protected from damage by the elements with the application of a strippable protective coating.

5.2. Cleaning and Drying: Strainers shall be cleaned and dried after testing and all cavities shall be drained of water.

5.3. Post Delivery Storage: All preservation, packaging and packing shall be such that the strainer and related components can be stored on a pallet outdoors and sustain no damage from rain, sleet, snow, and hail. The storage period for the furnished equipment may be up to 12 months. Packaging shall be suitable for the strainer to remain without maintenance in storage for this period.

6. **NOTES**: Not Applicable

APPENDIX A
AUTOMATIC STRAINER DATA SHEET

Physical Characteristics	
Strainer Type Required	Automatic Self Cleaning
Space Dimensions	4’ L x 3’ 6” W x 8’ 6” H
Orientation	Vertical
Pipe Size and Schedule	NPS 16 SCH 40
End Connections	RF Flange, ASME A16.5
Threaded and Socket	Weld Connector, ASME B16.11
Inlet/Outlet Size	16”
Fluid Service	Raw Water
Specific Gravity	1.0
Viscosity	Raw Water
Inlet Pressure (PSIG)	150 Max/80-110 nominal
Temperature	Ambient
Minimum Capacity (GPM)	7000
Pressure Rating	Class 150
Max Allowable Pressure Drop (PSID)	5
Backwash Discharge Pressure	Pressure ≤ Inlet Pressure
Max Strainer Media Size	60 Mesh
Backwash Drive Motor	¼ HP
MATERIAL	
Internal Fasteners	Stainless Steel, A304 or A316
Body	Carbon Steel
Gaskets	By Vendor

Internal Backwash Assembly	Stainless Steel, A304 or A316
CONTROL SYSTEM	
Control panel for Backwash	Yes
Fail Safe Mode	Yes
Provide Continuous Uninterrupted Fluid Flow during the Cleaning Operation	
Setting for Intermittent of Continuous Backwash	
Manually Backwash	Yes

END OF APPENDIX A

PART 1 GENERAL

1.1 DESCRIPTION OF REQUIREMENTS. This section specifies procedural requirements for non-administrative submittals, including but not limited to shop drawings, product data, manufacturer's certificate, design data, calculations, and verifications, manufacturer's instructions, manufacturer's field service reports, samples, operation and maintenance manuals, and other miscellaneous work-related submittals. These submittals are required to amplify, expand, and coordinate other information contained in the contract. This section describes the type and content of submittals that may be required for this work. The required submittals are included in the Specification.

Non-work-related submittals are addressed elsewhere in the contract rather than in the specification and may include items such as: contract progress schedule, permits, payment applications, performance and payment bonds, insurance certificates, and progress reports.

The Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections of the Specification.

1.2 SUBMITTAL PROCEDURE

A. Definition: For the purposes of this section, the term "Contractor" denotes the prime Contractor.

B. Listing: At the end of this section is a summarized listing of item submittals requiring approval for the work. The listing is included for the convenience of users of the contract documents. The listing may not be all inclusive and additional item submittals may be required. Within 14 calendar days after receiving contract award, Contractor shall submit a copy of the summarized submittal listing with calendar dates assigned to each item submittal indicating when submittal will be received by the Government. If contract requires a pre-construction conference, Contractor may submit completed submittal listing at the conference.

C. Risk: Do not proceed with the part of the work covered by an item submittal including purchasing, fabricating, and delivering until approval is received. Machinery, equipment, material, and articles that do not have the required approval shall be installed or used at the risk of subsequent rejection. Any fabrication or other work performed in advance of the receipt of accepted item submittals and approvals shall be entirely at the Contractor's risk and expense.

D. Transmittal Timing: Coordinate the preparation and processing of item submittals with the performance of the work. Prepare and transmit each item submittal to the Contracting Officer sufficiently in advance of the performance of related work and other applicable activities. Transmit related item submittals for the same unit of work so that processing will not be delayed by the Government's need to review submittals concurrently for coordination. No delay damages or time extensions will be allowed for time lost in late submittals.

E. Content: Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with contract requirements. All submittals which are generic and list more information than is specifically required shall be marked to identify required information. Complete a material approval submittal and attach as cover sheet for each submittal. Contractor may include multiple item numbers on a material approval submittal.

F. Language: All item submittals shall be written in English, including documents, notes on drawings, sketches, and/or samples, calculations, manuals, and all other instances of written text and communication.

G. Units: All item submittals shall be marked or show dimensions and values in the same units as specified in the contract documents.

H. Review Time: Allow sufficient time so that contract performance will not be delayed as a result of the time required to properly process submittals, including time for re-submittals, if necessary. Allow 14 calendar days for initial Government processing of each submittal. No extension of time will be authorized because of the Contractor's failure to transmit submittals to the Government sufficiently in advance of the work.

I. Contractor Certification: All submittals shall be carefully reviewed by an authorized representative of the Contractor prior to submission to the Government. Each submittal shall be dated, signed, and certified by the Contractor as being correct and in strict conformance with the contract documents. No consideration for review by the Government of any Contractor’s submittal will be made for any items which have not been so certified by the Contractor. All noncertified submittals will be returned to the Contractor without action taken by the Government, and any delays caused thereby shall be the total responsibility of the Contractor.

J. Deviations: Should any item submittals required by the contract documents show deviations from the contract requirement, the Contractor shall make specific mention of such deviations in the letter of transmittal, including stating cost effects, and product and system limitations which may adversely affect the work, in order that if acceptable, suitable action may be taken for proper adjustment of the contract; otherwise the Contractor will

not be relieved of the responsibility for executing the work in accordance with the contract documents and the approved submittals. Contractor shall clearly mark the proposed variation in all documentation and specifically point out deviations from contract requirements in transmittal letters. Failure to point out deviations may result in the Government requiring rejection and removal of such work at no additional cost to the Government. Deviations from contract requirements require Government approval and will only be considered when advantageous to the Government. When proposing deviations, deliver written request to the Contracting Officer, with documentation of the nature and features of the deviation and why the deviation is desirable and beneficial to the Government. If lower cost is a benefit, include an estimate of the cost savings. In addition to documentation required for deviation, include the submittal information required for the item. Allow an additional 14 calendar days beyond normal submittal review period for consideration by the Government of submittals with deviations.

K. Approved Submittals: The part of the work covered by the approved item submittal may proceed provided it complies with the requirements of the contract documents. Final acceptance will depend upon that compliance. The term “Approved” shall only indicate that there is no exception taken to the submittal. Approval of the item submittal shall not be construed as a complete check, and indicates only that the general method or other information appears to meet the contract requirements. Approval does not relieve the Contractor of the responsibility for any error which may exist. After item submittals have been approved by the Contracting Officer, no resubmittal for the purpose of substituting materials or equipment, or changes to any other information will be considered unless accompanied by an explanation of why a substitution or change is necessary.

L. Disapproved Submittals: Contractor shall correct disapproved item submittals and resubmit for approval within timeframe noted. If no date is given, Contractor shall submit corrected submittal within 14 calendar days. If the Contractor considers any correction or notation on the returned submittal to constitute a change to the Contract Drawings, Specification or Statement of Work the Contractor shall notify the Contracting Officer.

M. Responsibility: The Government’s review of Contractor submittals shall not relieve the Contractor of the entire responsibility for the correctness of details and dimensions and conformance to the specifications. The Contractor shall assume all responsibility and risk for any mistakes and/or costs due to any errors in submittals.

N. Inconsistencies: If a conflict or inconsistency arises between an approved item submittal and the contract documents, the contract documents shall govern.

1.3 SPECIFIC SUBMITTAL DESCRIPTIONS AND REQUIREMENTS: Submittal requirements for individual units of work are specified in the applicable specification section. Except as otherwise indicated in the individual specification sections, comply with the following requirements for each type of submittal.

A. Shop Drawings: These are technical drawings and data specially prepared for this contract including fabrication and installation drawings, setting and seaming diagrams, and coordination drawings (for use on-site). Shop drawings include drawings, diagrams and schedules specifically prepared to illustrate some portion of the work, diagrams and instructions from a manufacturer or fabricator for use in producing the product and as aids to the Contractor for integrating the product or system into the project, or drawings prepared by or for the Contractor to show how multiple systems and interdisciplinary work will be coordinated. Information required on shop drawings includes dimensions, identification of specific products and materials which are included in the work, compliance with specified standards, and notations of coordination requirements with other work. Provide special notations of dimensions that have been established by field measurements. Highlight, encircle, or otherwise indicate deviations from the contract documents on the shop drawings. Furnish one hard copy and one electronic copy in AutoCAD version 2020 or earlier drawing file format (.dwg). The only permissible text font is ROMANS. Custom fonts and shapes are prohibited. The minimum allowable font size shall be 0.125-inch. The maximum allowable font size shall be 0.25-inch.

B. Product Data: This data includes standard printed information on manufactured products that has not been specially prepared for this contract, including manufacturers' product specifications illustrating size, physical appearance and other characteristics of materials, installation instructions, standard color charts, catalog cuts, illustrations, schedules, standard wiring diagrams, standard product operating and maintenance manuals, and samples of warranty language when the contract requires extended product warranties. General information required specifically as product data includes manufacturers' standard printed recommendations for application and use, compliance with recognized standards of trade associations and testing agencies, the application of their labels and seals (if any), special notation of dimensions which have been verified by way of field measurement, and special coordination requirements for interfacing the material, product, or system with other work. Furnish three hard copies and one electronic copy.

C. Samples: These are physical examples of work, including, swatches showing color, texture, and pattern, color-range sets, and units of work to be used for independent inspection and testing. Samples include fabricated or unfabricated physical examples of materials, equipment or workmanship that illustrate functional and aesthetic characteristics of a material or product and establish standards by which the work can be judged, color samples

from the manufacturer's standard line (or custom color samples if specified) to be used in selecting or approving colors for the project, and field samples and mock-ups constructed on the project site to establish standards by which the ensuring work can be judged. This includes assemblies or portions of assemblies which are to be incorporated into the project and those which will be removed at conclusion of the work. Submit samples for the Contracting Officer's visual review of general kind, color, pattern, and texture for a final check of the coordination of these characteristics with other related elements of the work and for quality control comparison of these characteristics between the final sample submittal and the actual work as it is delivered and installed. Submit one each.

D. Design Data: Design data includes design calculations, mix designs, analyses or other data pertaining to a part of work. Refer to individual sections of the Specification or Statement of Work for required quantities, formats, and signatures or certifications required. Furnish three hard copies and one electronic copy.

E. Test Plans and Reports: Test plans shall include planned testing, including a description of the test, equipment and supplies needed, and step-by-step notation of test activities and tasks. Test reports include reports signed by an authorized official of a testing laboratory that a material, product or system identical to the material, product or system to be provided has been tested in accordance with the specified requirements. Testing shall have been within three years of date of contract award for the project. Reports also include findings of tests required to be performed by the Contractor on an actual portion of the work or prototype prepared for the project before shipment to the job site, findings of tests made at the job site or on a sample taken from the job site, investigation reports, daily logs and checklists, and final acceptance test and operational test procedures. Furnish three hard copies and one electronic copy of each such report required.

F. Certificates: These include statements printed on the manufacturer's letterhead and signed by the responsible officials of the manufacturer of a product, system or material attesting that the product, system or material meets specification requirements. Certificates include documentation required of the Contractor, or of a manufacturer, supplier, installer or subcontractor through the Contractor, to further demonstrate the quality of orderly progressions of a portion of the work by documenting procedures, acceptability of methods or personnel qualifications. Examples include confined space entry permits, and text of posted operating instructions. Certificates shall be dated after award of the project contract and clearly name the project. Furnish three hard copies and one electronic copy of each certificate required.

G. Manufacturer's Instructions: Preprinted material describing installation of a product, system or material, including special notices and Material Safety

Data sheets concerning impedances, hazards and safety precautions. Furnish three hard copies and one electronic copy.

H. Manufacturer's Field Reports: Documentation of the testing and verification actions taken by a manufacturer's representative at the job site, in the vicinity of the job site, or on a sample taken from the job site, on a portion of the work, during or after installation, to confirm compliance with the manufacturer's standards or instructions. The documentation shall be signed by an authorized official of a testing laboratory or agency and shall state the test results, and indicate whether the material, product, or system has passed or failed the test. Furnish three hard copies and one electronic copy.

I. Operation and Maintenance Data: Data furnished by the manufacturer, or the system provider, to the equipment operating and maintenance personnel, including manufacturer's help and product line documentation necessary to maintain and install the equipment, and needed by operating and maintenance personnel for the safe and efficient operation, maintenance, and repair of the item. The data is intended to be incorporated in an operations and maintenance manual or control system. Furnish two hard copies and one electronic copy.

J. Final Design Drawings and Documentation: Final design documentation including drawings, specifications, estimates, and other required deliverables. Electronic documentation submitted shall include every associated component file of drawings and other documentation, including raster images, jpeg, tiff, Excel, and any related items required to view, modify, or manipulate the electronic files. Furnish a CD-ROM of all final design documentation, and drawings in AutoCAD 2020 version or earlier drawing file format (.dwg), to the Contracting Officer for approval prior to applying for final payment. The drawings shall be fully editable using AutoCAD software. In addition, drawings shall be delivered to clearly show the location and arrangement of all materials and equipment. The only permissible text font is ROMANS. Custom fonts and shape files are prohibited. The minimum allowable font size shall be 0.125-inch. The maximum allowable font size shall be 0.25-inch.

K. Record (As-Built) Drawings: Record drawings showing final configuration of work accomplished. Show all changes, additions, and deviations from the original contract drawings and documentation. If no changes occur, furnish certification to that effect. Drawings shall be redlined electronic drawings, unless waived by the Government, and shall accurately show as-built conditions during the progress of the job. Furnish drawings on a CD-ROM, in AutoCAD 2020 or earlier version, including every associated component file of the drawings, including raster images, jpeg, tiff, Excel, and any related items required to view, modify, or manipulate the electronic files. Submit to the Contracting Officer for approval prior to applying for final payment.

L. Miscellaneous Submittals: These are work-related, non-administrative submittals that do not fit in the previous categories, including the following:

1. Maintenance agreements. Furnish one hard copy and one electronic copy.
2. Survey data and reports. Furnish one hard copy and one electronic copy.
3. Project photographs. Furnish both hard copies and digital files.
4. Keys and other security protection devices.
5. Maintenance tools, spare parts, and overrun or maintenance stock. Refer to individual sections of the specification for required quantities of spare parts, extra and overrun stock, maintenance tools and devices, keys, and similar physical units to be submitted.
6. Qualification certificates. Furnish one hard copy and one electronic copy.
7. Employee training certificates and documentation showing successful completion of training.
8. Documentation of percentage of recovered material content used during contract.
9. Contractor safety and work plans and schedules.
10. Warranties.

END OF APPENDICES AND SOW