

# Procurement Specification for Butterfly Valves in 241-A and 241-AX Tank Farm Ventilation

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Abstract: This document provides the procurement requirements of the butterfly valves used in the ventilation system of the 241A and 241-AX tank farm.

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## LIST OF TERMS

### Abbreviations and Acronyms

ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing and Materials
BTR	Buyers Technical Representative
COC	Certificate of Conformance
FTP	File Transfer Protocol
ISO	International Standards Organization
MSR	Master Submittal Register
TOC	Tank Farm Operating Contractor

### Units

%	percent
°F	degrees Fahrenheit
acfm	actual cubic feet per minute
ft	foot
in	inch
psig	pounds per square inch gauge
VAC	volts alternating current
W.C.	water column
wg	water gauge

## 1.0 SCOPE

This specification provides the procurement requirements for manually operated butterfly valve assemblies to be used as isolation valves in toxic and radioactive air/vapor exhaust pipe/ducting in the 241-A and 241-AX Tank Farm Ventilation System/s. Special valve requirements / specifications as stated on engineering documents take precedence over this specification.

Work included: Fabrication, Inspection, Testing, Documentation, Packaging, and Shipping.

Work not included: Site services.

## 2.0 APPLICABLE DOCUMENTS

The following documents, of the exact issue shown, form a part of the basis of design to the extent specified in the applicable sections of this document and establish the Code of Record. In the event of a conflict between documents referenced herein and the requirements of this specification, the requirements of this specification shall take precedence.

### 2.1 GOVERNMENT DOCUMENTS

None.

### 2.2 NON-GOVERNMENT DOCUMENTS

ASME B16.34, 2013, *Valves-Flanged, Threaded, and Welding End*, American Society of Mechanical Engineers, New York, New York.

ASME B31.1-2012, *Power Piping*, American Society of Mechanical Engineers, New York, New York.

ASME B31.3, 2012, *Process Piping*, American Society of Mechanical Engineers, New York, New York.

ASTM A 351/A - ASTM A 351/M, 2013, *Standard Specification for Casting, Austenitic, Austenitic-Ferritic (Duplex), for Pressure-Containing Parts*, American Society for Testing and Materials, West Conshohocken, Pennsylvania.

ASTM A 380, 2013, *Standard Practice for cleaning, Descaling and Passivation of Stainless Steel Parts, Equipment, and Systems*, American Society for Testing and Materials, West Conshohocken, Pennsylvania.

ISO 9001, 2008, *Quality Systems- Model for Quality assurance in Design, Development, Production, Installation and Services*, International Organization for Standardization, Geneva, Switzerland.

ASME NQA-1 2008, *Quality Assurance Program Requirements*, American Society of Mechanical Engineers, New York, New York.

### 2.3 NON-CODE OF RECORD DOCUMENTS

The most current revisions of the following Non Code of Record documents shall be used.

RPP-RPT-28513, *Technical Basis Document for TFC-ENG-STD-02, Environmental/Seasonal Requirements for TOC Systems Structures and Components*, Washington River Protection Solutions, LLC, Richland, Washington.

RPP-RPT-29780, *Report FGEAB-06-001, Re: EPDM Valve Seat Usage*, Washington River Protection Solutions, LLC, Richland, Washington.

RPP-SPEC-57420, *241-A and 241-AX Tank Farm Ventilation System Level 2 Specification*, Washington River Protection Solutions, LLC, Richland, Washington.

TFC-BSM-IRM\_DC-C-07, *Vendor Process*, Washington River Protection Solutions, LLC, Richland, Washington.

TFC-ENG-STD-02, *Environmental/Seasonal Requirements for TOC Systems, Structures, and Components*, Washington River Protection Solutions, LLC, Richland, Washington.

TFC-ENG-STD-07, *Ventilation System Design Standard*, Washington River Protection Solutions, LLC, Richland, Washington.

## 3.0 REQUIREMENTS

### 3.1 ITEM DEFINITION

Butterfly valves shall comply with ASME B31.3 and ASME B16.34. The butterfly valves shall be stainless steel material that is compatible with waste tank vapors and be accessible for operation and repair. Handles and operators shall be installed to allow removal as necessary, easy access for operation of the valve, and allow clear visibility of the valve position indicator.

#### 3.1.1 Interface Definition

The butterfly valves shall interface with 6-, 8-, 10-, 12-, or 14-inch nominal pipe Class 150 flanges. Interfacing flanges may be either raised face or flat face.

#### 3.1.2 Pollution Prevention and Waste Minimization

The butterfly valves shall be designed to minimize the escape and spread of particulate and gaseous contamination.

### 3.2 CHARACTERISTICS

#### 3.2.1 Functional Characteristics

Butterfly valves shall provide for equipment isolation on the General Service ventilation equipment/system.

### 3.2.2 Physical Characteristics

Butterfly valves shall be 6-, 8-, 10-, 12-, or 14-inch nominal pipe size with lockable manual operator, to be used for equipment isolation in service category I toxic and radioactive air/water vapor at slight negative pressure.

### 3.2.3 Reliability

The design life of the butterfly valves shall be 40 years per RPP-SPEC-57420, with the exception of consumables (e.g. 3.2.6). The Seller shall furnish reliability data (as available) for the valve design.

### 3.2.4 Maintainability

The valve assembly shall allow for routine maintenance, repair or replacement-in-kind of all parts subject to failure. The Seller shall furnish spare parts list and operations and maintenance (O&M) manual.

### 3.2.5 Environment

1. The internal surfaces of butterfly valves shall withstand without failure exposure to process fluids with the following properties:
  - Fluid: Air
  - Maximum Temperature: <195 °F
  - Moisture Content: 100% Humidity
  - Air Flow: A maximum of 3000 SCFM
  - Chemical Composition: pH range from 7 to 14; may include hydrogen, organics, and ammonia; the latest qualitative and quantitative data can be found in TFC-ENG-STD-07
  - Operating Pressure: -30 to 10 in. W.C.
2. Butterfly valves shall withstand without failure exposure to the following ambient, environmental conditions (TFC-ENG-STD-02):
  - Air Temperature Range: -20 to 115 °F with a daily temperature range of 50 °F (See RPP-RPT-28513)
  - Relative Humidity 0 to 100%
  - Outdoors Blowing sand, sun, snow, freezing temperatures.

### 3.2.6 Transportability and Storage

Factory assembled systems or subsystems shall be designed to withstand the shock and vibration of normal transportation. The Seller shall identify storage life of any age sensitive material.

### **3.3 DESIGN AND CONSTRUCTION**

#### **3.3.1 Parts / Materials / Processes**

1. The butterfly valve shall be in furnished in accordance with ASME B16.34, with lugged or wafer style ASME Standard Class 150 body. Interfacing flanges may be either raised face or flat face.
2. The valve body shall be 316 stainless steel per ASTM A351, Type CF8M, lugged or approved equal.
3. The seat shall be EPDM (ethylene propylene diene monomer) designed for tight shutoff through full interference of the disc edge to the seat with integral face seal to prevent contact of service fluid with body (RPP-RPT-29780). Verify shutoff performance in accordance with an ASME B16.34 shell and closure test.
4. The valve disc shall be stainless steel, spherically machined and polished to give bubble tight performance.
5. Tapered stainless pins may be used to attach the disc to the stem.
6. The valve stem shall be stainless steel (one or two piece) and shall pass through the valve disc. Stem bearings shall be non-combustible and shall be provided with positive seals to prevent foreign materials from entering the stem bore. The stem shall be retained by means other than the seal retainer.
7. Operators for butterfly valves shall be gear driven manual operators. The manual operator shall be permanently lubricated, with corrosion protected or stainless steel hand wheel which is capable of being locked in both open and closed position. The operator shall mount directly to valve without the use of external linkage.
8. Mechanical travel stops shall stop the valve at the fully open and fully closed positions without binding or over-travel.
9. Valve position (status) shall be visually displayed locally at all times.

#### **3.3.2 Industry and Government Standards**

Fabricate and assemble butterfly valve assembly in accordance with ASME B16.34.

#### **3.3.3 Radiation**

- a. The design of the butterfly valve system shall be commensurate with the characteristics of the radioactive material in the air stream and the risk associated with its release as an effluent.

#### **3.3.4 Cleanliness and Foreign Material Exclusion**

1. Clean internal and external valve surfaces in accordance with ASTM A380.
2. Inspect the final surface to ensure it meets the requirements of ASTM A380, Paragraph 7.2.1.
3. Submit alternative cleaning procedures to the Buyer for approval.

### **3.3.5 Corrosion of Parts**

1. Do not paint corrosion-resistant steel surfaces. Exception: hand wheels which may be coated with corrosion resistant paint.
2. Galvanized surface finishes are unacceptable.

### **3.3.6 Protective Coatings**

See Section 3.3.5.

### **3.3.7 Interchangeability**

The butterfly valve system shall standardize the components used in the design to the maximum extent practicable.

### **3.3.8 Identification and Markings**

Mark valve in accordance with ASME B16.34.

### **3.3.9 Nameplate**

See Section 3.3.8.

### **3.3.10 Qualification**

Work performed to this document shall be done in accordance with a quality assurance program meeting the basic requirements of ASME NQA-1, and any specific supplemental requirements as may be specified by contract.

### **3.3.11 Document Submittal (Vendor Information)**

Required submittals are identified and listed on the Master Submittal Register (MSR), Appendix A. The attached MSR identifies the minimum submittals required by this specification and identifies when the submittals are required to be submitted in the procurement process. An MSR specific to each order will be prepared at the time of purchase order preparation and may contain additional submittal requirements or exclude submittals identified by the MSR included in Appendix A. The MSR included with the purchase order will constitute the governing MSR.

Submittals shall be provided using the Tank Farm Operating Contractor (TOC) Incoming Letter of Transmittal (form A-6005-315). All transmittal subject headings shall contain, at a minimum, the subcontract number, submittal number identified by the MSR, and submittal description.

Submittals shall be provided in electronic format unless available only as a hard copy. Electronic submittals may be sent to [TOCVND@rl.gov](mailto:TOCVND@rl.gov) or delivered via a WRPS designated File Transfer Protocol (FTP) site. Electronic formats must be non-password protected in one of the following formats:

- Microsoft® Office Compatible
- Portable Document Format (PDF)
- Tagged Image File Format (TIFF)
- Graphics Interchange Format (GIF)
- Moving Picture Expert Group (MPEG)
- Extensible Markup Language (XML)
- HyperText Markup Language (HTML)
- Comma Separated Values (CSV)

- Joint Photographic Experts Group (JPEG)
- Text (TXT)
- Windows Media Video (WMV)

All deliverable documentation shall be complete, accurate, legible, and reproducible. Before delivery, design media and documents shall be reviewed by qualified Subcontractor personnel for technical adequacy and appropriate content in accordance with the Subcontractor's Quality Assurance procedures. The Subcontractor shall attest, in writing, to the accuracy and completeness of the information contained in the final deliverables.

Deliverables shall be subject to approval by the Buyers Technical Representative (BTR). Deliverables shall comply with this specification and technical basis documents and other requirements identified herein.

### **3.3.12 Approval of Submittals**

All Submittals transmitted shall include the designation in the Master Submittal Register (MSR) per TOC Vendor Processes stated in TFC-BSM-IRM\_DC-C-07. Submittals are divided into two types: (1) those requiring "approval" (e.g., approval data or pre-purchase evaluation data); and (2) those "not requiring approval" (e.g., vendor information data). Submittals "not requiring approval" will be reviewed to verify completeness and adequacy for their intended purposes. A submittal requiring approval that is not approved is identified as: (1) "Not Approved Revise and Resubmit." The submittal is considered technically deficient, or incomplete, and therefore unacceptable. Resubmittal is required, hence the fabrication, procurement, or performance of procedures shall not proceed; or (2) "Approved with Exception." Fabrication, procurement, and performance may proceed, and resubmittal is required to verify incorporation of the exception. Submittals "not requiring approval" that are determined to be incomplete or inadequate will be marked "Resubmit." An explanation of the deficiencies will be included for corrective action by the Seller.

Approval by the Buyer does not relieve the Seller of responsibility for accuracy or adequacy of design under this specification.

If any revision has been made to previously submitted items, the Seller shall resubmit updated versions of said items for approval, in addition to the items listed above.

Certified data shall be defined to mean that the design adequacy of a given item (document, drawing, calculation, etc.) be verified by persons other than those who prepared the item. Each deliverable (drawing, calculation, etc.) shall have at least an originator's/preparer's signature and a checked-by or approved-by signature

## **4.0 QUALITY ASSURANCE REQUIREMENTS**

1. The Seller shall have a quality assurance program that complies with the quality control requirements of ASME NQA-1.
2. The Certificate of Registration shall be submitted with bid.
3. Additional quality clauses as stated on the procurement documents shall be met.

#### **4.1 ACCEPTANCE CRITERIA**

1. Valves stem and seals shall have no visible detectable leakage up to 285 psig per ASME 16.34.
2. Shell and closure test documentation shall be traceable to each individual valve. Testing by lot number is not allowed unless there is documented traceability to each valve in the lot.
3. Materials of construction shall comply with the requirements of Section 3.3.1

#### **4.2 VERIFICATION**

##### **4.2.1 Responsibility for Verification**

The subcontractor shall be responsible for the performance of all inspections for each system developed in accordance with this specification. Inspections shall be conducted at the contractor facilities or the facilities of their choice with the approval of the buyer. The procuring authority reserves the right to witness or perform the specified inspections.

##### **4.2.2 Verification Methods**

Verification of the quality assurance requirements and acceptance criteria shall be by examination, demonstration, or testing.

#### **4.3 INSPECTIONS AND TESTS**

1. Closure leak tests on the valves shall be completed per ASME B16.34 with air or other gas test fluid at 150 +15/-0 psig.
2. Shell leak tests on the valves shall be completed per ASME B16.34 with water at 450 +25/-0 psig. The shell shall show no signs of visible leakage for the duration of the test.

### **5.0 PREPARATION FOR DELIVERY**

#### **5.1 GENERAL**

The Seller shall package and handle the butterfly valve(s) to prevent damage under conditions normally incident to transport.

#### **5.2 PRESERVATION AND PACKAGING**

Item shall be protected from dirt, soil, and moisture.

#### **5.3 PACKING**

1. The item shall be boxed or crated in a manner to prevent damage during shipping.
2. All removable and loose components shall be securely blocked and fastened in place.

**5.4 MARKING**

All packages shall be suitably marked on the outside to facilitate identification of the purchase order, the package content, and any special handling instruction.

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**APPENDIX A**

**MASTER SUBMITTAL REGISTER**

