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Iqaluit

REQUEST FOR QUOTATION
FOR THE PROVISION OF

WTP SOUTH CLEARWELL & MIXING CHAMBER ISOLATION VALVE REPLACEMENT

WATER TREATMENT PLANT UPGRADES

BID CALL: June 3, 2022

(Site Visit: June 8, 2022, at 10:00 AM EST)

QUOTATIONS DUE: June 20, 2022

2022-RFQ-134

Receipt Confirmation Schedule

To: City of Iqaluit – Purchasing Department
Attention: Alison Drummond
Title: Senior Director of Corporate Services
Address: 1085 Mivvik Street,
P.O Box 460
Iqaluit, Nunavut, X0A 0H0
Fax: 867-979-5653
Email: a.drummond@iqaluit.ca

Bidders are requested to acknowledge receipt of 2022-RFQ-134 and their intent to submit a Quotation by sending this Receipt Confirmation Schedule by email to the attention of the RFQ Coordinator. Bidders submitting this Receipt Confirmation Schedule will be notified of any addendum issued to this RFQ, which will be forwarded to the person whose name is identified.

I hereby acknowledge receipt of this above-noted RFQ.

(Please check your answer)

I / We DO ☐ NO NOT ☐ Intend to submit a Quotation to this RFQ.

Representative's contact information:

Name	Representative's Signature
Address	Name – Please Print
City, Province/ Territory, Postal Code	Title
Phone	Email
Date	

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PART 1 INTRODUCTION

1.1 Rules of Interpretation

This RFQ shall be interpreted according to the following provisions, unless the context requires a different meaning:

a) Unless the context otherwise requires, wherever used herein the plural includes the singular, the singular includes the plural, and each of the masculine and feminine includes the other gender.

b) Words in the RFQ shall bear their natural meaning unless otherwise expressly defined.

c) In construing the RFQ, general words introduced or followed by the word *other* or *including* or *in particular* shall not be given a restrictive meaning because they are followed or preceded (as the case may be) by particular examples intended to fall within the meaning of the general words.

d) Time periods will be strictly applied.

e) The following terminology applies in the RFQ:

i. Whenever the terms *must* or *shall* are used in relation to the City of Iqaluit or the Bidder, such terms shall be construed and interpreted as synonymous and shall be construed to read *the City of Iqaluit shall* or the *Bidder shall*, as the case may be.

ii. The term “should” relates to a requirement which the City of Iqaluit would like the Bidder to address in its Quotation.

iii. The term *will* describes a procedure that is intended to be followed.

1.2 Role of the City of Iqaluit

This Request for Quotations is issued by the City of Iqaluit Purchasing Department (the “**City of Iqaluit**”) on behalf of the Public Works (Utilidor) Department.

The purchasing organization is the City of Iqaluit. The purchasing organization will administer the RFQ process described in the RFQ for the benefit of the Purchasers.

Once a contract has been established with the successful Bidder, the project will be overseen by the City’s Project Manager. The Project Manager assigned to this project is Rami Rahhal.

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1.3 City of Iqaluit Background

Iqaluit is the capital of the Nunavut Territory and is located at the south end of Baffin Island near the end of Frobisher Bay. Access to Iqaluit is provided by regular scheduled commercial aircraft year-round, snowmobile trails from other Baffin Island communities in the winter, and sealift from the port of Montreal and Valleyfield in the summer.

The City is the newest Capital City in Canada and as a result has experienced a period of rapid development and growth. Iqaluit is the seat of government for the Territory of Nunavut and is the home base of many federal and territorial government departments. The City is rapidly developing into a regional center for the territory with many northern businesses in Inuit organizations making it their base of operations. The current population of Iqaluit is estimated at about 7,000 people with an average annual growth rate between three and four percent.

1.4 Products and Services

This RFQ is issued for the purpose of obtaining Quotations for the dismantling of existing valves, supply and installation of two (2) new valves with accessories at the Water Treatment plant for the City of Iqaluit. The RFQ provides vendors with relevant information pertaining to the services required.

1.5 Objectives

The City of Iqaluit is seeking to satisfy the following objectives in issuing this RFQ:

a) Replacement of valves V2035 (located in the South Clearwell) & 2037 (located in the Mixing Chamber) to restore operators flexibility with respect to isolation of the below ground tanks.

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PART 2 RFQ TERMS AND INSTRUCTIONS

2.1 Submission

Bidders must submit electronic (PDF) copies of their Bid(s). Emails are to be received before June 20, 2022, addressed to:

Alison Drummond
Senior Director of Corporate Services
City of Iqaluit
a.drummond@iqaluit.ca

Emails should be clearly marked in the subject line the "WTP ISOLATION VALVE REPLACEMENT" and the Bidders name. Bidders shall submit a Cost Submission form identifying the corresponding costs.

The total size of email submissions should be less than 5MB in size to facilitate delivery and adequate time must be allowed for delivery. It is the Bidder's responsibility to confirm successful receipt of the email submission prior to the deadline.

The final decision on whether to accept late Quotations is at the City's discretion.

2.2 Inquiries and Amendments

All inquiries concerning this RFQ (up until any contract award notification) are to be directed by email only to:

Rami Rahhal
Project Manager
Colliers Project Leaders
rami.rahhal@colliersprojectleaders.com

and;

Priyanka Varmora
Assistant Project Manager
Colliers Project Leaders
priyanka.varmora@colliersprojectleaders.com

The deadline for submitting inquiries is June 13, 2022.

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To ensure consistency and fairness to all Bidders, all firms who have received the RFQ will receive any information with respect to significant inquiries in the form of written addenda. Verbal explanations or instructions will not be provided.

2.3 Bidder Requirements

The successful Bidder must have a valid City of Iqaluit Business License prior to contract award.

2.4 Solicitation of Council Members, City Staff and City Consultants

Bidders and their agents will not contact any member of the City Council, City Staff or City Consultants with respect to this RFQ, other than the RFQ Coordinator named in Section 2.2, at any time prior to the award of a contract or the cancellation of this RFQ.

2.5 Terms and Conditions

2.5.1 Submission of a Bid constitutes acknowledgement that the Bidder has read and agrees to be bound by all the terms and conditions of this RFQ.

2.5.2 The City will not make any payments for the preparation of a response to this RFQ. All costs incurred by a Bidder will be borne by the Bidder.

2.5.3 This is not an offer. The City does not, by virtue of this Bid call, commit to an award of a Bid, nor does it limit itself to accepting the lowest price or any Bid submitted, but reserves the right to award this Bid in any manner deemed to be in the City's best interest.

2.5.4 The City has the right to cancel this RFQ at any time and to reissue it for any reason whatsoever, without incurring any liability and no Bidder will have any claim against the City as a result of the cancellation or reissuing of the RFQ.

2.5.5 A Bidder may withdraw its Quotation only by providing written notice to the RFQ Coordinator before the RFQ Submission Deadline. A Quotation may not be withdrawn after the RFQ Submission Deadline. The City of Iqaluit has no obligation to return withdrawn Quotations.

2.5.6 A Bidder may amend its Quotation after submission, but only if the Quotation is amended and resubmitted before the RFQ Submission Deadline. The Bidder must provide notice to the RFQ Coordinator in writing and replace its Quotation with a revised Quotation, in accordance with the requirements of this RFQ. The City of Iqaluit has no obligation to return amended Quotations.

2.5.7 The City will not be responsible for any Bid that does not indicate the RFQ reference, and the Bidder's name.

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2.5.8 The City will not be responsible for any Bid that is delivered to any address or in any manner other than that provided in Section 2.1 of this RFQ.

2.5.9 If a contract(s) is to be awarded as a result of this RFQ, it will be awarded to the Bidder whose Bid for each service, in the City's opinion, provides the best potential value to the City and is capable in all respects to perform fully the contract requirements and has the integrity and reliability to assure performance of the contract obligations.

2.5.10 If the City decides to award a contract(s) based on a submission received in response to this RFQ, the Successful Bidder(s) will be notified of the intent to award in writing, and the subsequent execution of a written agreement shall constitute the making of a Contract. Bidders will not acquire any legal or equitable rights or privileges whatsoever until a Contract is signed by both parties.

2.5.11 In the event of any inconsistency between this RFQ, and any ensuing Contract(s), the Contract shall govern.

2.5.12 Any Contract(s) will be in the form of the City's standard "City of Iqaluit Services Agreement" and it will contain the relevant provisions of this RFQ, the accepted Bid as well as such other terms as may be mutually agreed upon, whether arising from the accepted Bid or as a result of any negotiations prior or subsequent thereto. The City reserves the right to negotiate modifications with any Bidder who has submitted a Bid.

A copy of the Services Agreement is included as Appendix A.

2.5.13 Any amendment made by the City to the RFQ will be issued in writing and sent to all who have received the documents via addenda.

2.5.14 An Evaluation Committee will review each Bid. The City reserves the exclusive right to determine the qualitative aspects of all Quotations relative to the evaluation criteria.

2.5.15 Quotations will be evaluated as soon as practicable after the closing time. No detail of any Bid will be made public except the names of all parties submitting Quotations.

2.5.16 Bidders must acknowledge receipt of any addenda issued by the City in their Bid.

2.5.17 Every Bidder shall carefully review the RFQ to ensure that it has no reason to believe there are any uncertainties, inconsistencies, errors, omissions, or ambiguities in any part of the RFQ. Every Bidder is responsible for conducting its own investigations and due diligence necessary for the preparation of its Quotation.

2.5.18 In the event a Bidder has any reason to believe that any of the circumstances listed in Section 2.5.17 exist, the Bidder shall notify the RFQ Coordinator in writing prior to submitting a Quotation. The RFQ Coordinator will then clarify the matter for the benefit of all Bidders.

2.5.19 Bidders shall not:

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a) After submission of a Quotation, claim that there was any misunderstanding or that any of the circumstances set out in 2.5.17 were present with respect to the RFQ; or

b) Claim that the City of Iqaluit is responsible for any of the circumstances listed in Section 2.5.17.

2.5.20 By submitting a Quotation, the Bidder confirms that all of the components required to use and/or manage the Services have been identified in its Quotation or will be provided to the City of Iqaluit at no additional charge. Any requirement that may be identified by the Bidder after the RFQ Submission Deadline or subsequent to signing the Agreement shall be provided at the Bidder's expense.

2.6 Clarification of Bidder's Quotation

The City of Iqaluit shall have the right at any time after the RFQ Submission Deadline to seek clarification from any Bidder in respect of that Bidder's Quotation. The City of Iqaluit shall not be obliged to seek clarification of any aspect of any Quotation.

Any clarification sought shall not be an opportunity for the Bidder to either correct errors or to change the Bidder's Quotation in any substantive manner. Subject to the qualification in this provision, any written information received by the City of Iqaluit from a Bidder in response to a request for clarification from the City of Iqaluit may be considered to form an integral part of the Bidder's Quotation, in the City of Iqaluit's sole discretion.

2.7 Verification of Information

The City of Iqaluit shall have the right, in its sole discretion, to:

a) Verify any Bidder's statement or claim made in the Bidder's Quotation or made subsequently in an interview, site visit, oral presentation, demonstration, or discussion by whatever means the City of Iqaluit may deem appropriate, including contacting persons in addition to those offered as references;

b) reject any Bidder's statement, claim or Quotation, if such statement, claim or Quotation is patently unwarranted or is questionable; or

c) access the Bidder's premises where any part of the work is to be carried out to confirm Quotation information, quality of processes, and to obtain assurances of viability, provided that, prior to providing such access, the Bidder and City of Iqaluit shall agree on reasonable access terms, including pre-notification, extent of access, security, confidentiality and the allocation and amount of any costs incurred in connection with such access.

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The Bidder shall co-operate in the verification of information and is deemed to consent to the City of Iqaluit verifying such information.

2.7 Validity of Offer

Quotations shall remain open for acceptance for a period of not less than sixty calendar (60) days from the closing date of this RFQ.

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PART 3 BID REQUIREMENTS AND EVALUATION

3.1 Quotation Format

3.1.1 General

The Bidder's Quotation should be comprised and formatted as follows:

a) One (1) electronic copy of a fully executed unqualified Cost Submission Form (PDF format), titled "Cost Submission Form – WTP ISOLATION VALVE REPLACEMENT".

3.1.2 Legal Actions

The Bidder shall disclose any pending or threatened legal action against the Bidder or by the Bidder against any third party that may have an impact on the availability of the Services proposed by the Bidder.

3.1.3 Declaration and Certification

The Bidder shall complete the Declaration and Certification Schedule in accordance with the instructions contained in that schedule.

3.1.4 Cost Submission Form

The Bidder shall complete the Cost Submission Form in accordance with the instructions contained in that schedule, provided that the following shall apply:

a) All prices shall be provided in Canadian funds and shall include all applicable customs duties, tariffs, overhead, permits, licenses, labour, carriage insurances, and warranties, and further shall not be subject to adjustment for fluctuation in foreign exchange rates. All prices shall be quoted exclusive of the goods and services taxes (GST);

b) The Quotation submitted for the services requested will be based on a Fixed Fee contract.

c) All prices quoted, unless otherwise instructed in this RFQ, shall remain firm for the period set out in the RFQ;

d) All prices quoted MUST be for units that originate from the Canadian marketplace. No "Grey Market" product pricing will be accepted.

e) Travel and accommodation expenses shall not be included in the rates quoted and shall be billed separately and charged in accordance with the applicable Purchaser's policy, as may be amended from time to time. Original itemized

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receipts are required for reimbursement. Meals, hospitality, and other incidentals shall not be included in eligible expenses;

f) In the event of any discrepancy in the pricing, the lowest unit price submitted shall prevail; and

g) The Bidder is deemed to confirm that it has prepared its Quotation with reference to all of the provisions, and that it has factored all of the provisions of the Agreement into its pricing assumptions, calculations and into its proposed Pricing.

3.2 Evaluation Process

The City will appoint an Evaluation Committee for the purpose of evaluating Quotations. Quotation evaluations will follow a two-step process:

a) Validation of mandatory requirements;

b) Financial evaluation;

Quotations that do not meet the mandatory requirements will not be considered further.

3.3 Mandatory Requirements

Bidders must satisfy the following mandatory requirements in their Quotation in accordance with the requirements of this RFQ. Bidders shall submit the following:

a) Fully executed and unconditional Cost Submission Form.

b) Initials of acknowledgement on all RFQ pages (located on the bottom of each page).

3.4 Financial Evaluation

The Bidder who submits a Quotation with the lowest compliant financial offer will be successful as part of the financial evaluation.

3.5 RFQ Schedule

The following is a summary of the key dates in the RFQ process and the Works:

***Table 1** – RFP Process Schedule*

Milestone	Date
RFQ Issue Date	June 3, 2022

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Site Visit Date and Time	June 8, 2022 at 10:00 a.m. EST
Last Day for Bidder to Submit Questions	June 13, 2022
Last Date for Addenda to be Issued	June 15, 2022
RFP Submission Deadline	June 20, 2022
Anticipated Contract Award Date	June 29, 2022
Anticipated Project Start/ Kick-Off Meeting	July 4, 2022
Substantial Completion	October 30, 2022

3.6 Terms of Payment

The Bidder shall be reimbursed monthly for works completed for each service provided. Invoices are to be submitted on a monthly basis, and shall include:

- the project title.
- the service contract number.
- a description of the work completed.
- billing summary, which includes the tasks as set forth in the costing submission, the proposed costs, cost to date, percentage invoiced to date, and the percentage of work completed to date for each task.
- backup for all disbursements (time sheets may be requested).

The monthly invoice should be reviewed as a draft by the City's Project Manager in order to validate the fee and services being claimed. The Bidder is to update the invoice (as required), as per comments/ feedback received from the City's Project Manager. The City's Project Manager and Bidder are to determine at the Project Kick-Off meeting the date which draft monthly invoices are to be reviewed.

The final invoice is to be submitted to the City's Project Manager for processing with the City. Invoices that are issued directly to the City's Accounts Payable Department will not be processed. Final invoices must be submitted for payment by the 10th of every month, for previous months work (e.g. invoice must be submitted by February 10th for work completed up to January 31st), or on the next corresponding business day if the 10th lies on a holiday or weekend.

No payment will be made for the cost of work incurred to remedy errors or omissions for which the contractor is responsible. No additional invoicing will be accepted above and beyond what the City has agreed to as per the contract. At no time shall the contract upset limit be exceeded without prior written authorization from the City.

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PART 4 SCOPE OF WORK

4.1 Scope of Work

The Bidder will be responsible for all materials labour, and equipment required to execute the scope of work.

The following describes the Scope of Work for the project:

Purpose

Isolation Valve V2035 located in the South Clearwell is to be replaced so as to restore operator flexibility with respect to isolation of the below-ground tanks. The non-functional status of V2035 prevents water from being transferred directly through the interconnecting piping from the Mixing Chamber to the Pumping Chamber. Although V2037 was repaired onsite, it will also be replaced as a preventative measure.

Site Visit

On June 8, 2022, at 10:00am local Iqaluit time, there will be a site visit to view the scope of work for the project with the City Representatives. All Vendors representatives need to arrive 10-15 minutes before the scheduled time to ensure all the vendors walk altogether with the City representative.

Isolation Valve Specifications

The existing isolation valves are a Bray series 31 trim 109 lug style butterfly valve. The new isolation valves are to of Bray series 21 butterfly valve split body lug type.

The specified products are as follows:

- Bare Stem Valve with a bare stem Bray Model: series S21, Part Number 211200-11010024, 12” – 300mm Butterfly valve Lug split body, 316 SS Body, 316 SS Disc material and Stem, EPDM Seat material.

- 13 feet torque tube extension from the top of the valve to the bottom of the gearbox, Part Number 9CTorqueTubeExtension.

- The extension will be made in 2 pieces (approx. 6 feet each) and will be connected to the bare stem by bare couplers after cutting the extensions to suit the distance between the valve and the flooring for the second level above the clear well.

- Bray manual gear operator Part Number 040500-21254003, lubricated by a food-grade grease pack.

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- Adjustable stem guide Part Number 9C-Trumbull adjustable stem guide. The guide is furnished with NSF61 Tnemec 140-1211 primer.

Technical drawings for the locations of V2035 and V2037 in the South Clearwell and Mixing Chamber and the part specifications are given in **Appendix B**. The product specification sheets for the recommended products provided by the supplier are given in **Appendix C**. The quote for the specified parts from the supplier is given in **Appendix D**. The Vendor is to procure the Stainless-Steel body material valve from the selected supplier.

Scope of Work

- All pieces will be fabricated by a Bray subcontractor and Bray should provide a construction drawing before fabrication.
- The contractor may supply this extension and/or stem guide if approved by the City of Iqaluit, Colliers Project Leaders and WSP.
- Coordinate a shutdown period with the City to complete the installation works.
- Ensure system is deenergized, and valves isolating the area of work have been tagged/locked following a lock out/ tag out procedure.
- Dismantle the existing valves and hand them over to the City and install the new valves and its components using SS316 hardware.
- Reinstall all previously connected piping.
- The Contractor shall provide on-site services of qualified technicians to complete and inspect work.
- The Quantities & Material Specifications are to be measured/determined during the site walk.
- The Contractor shall provide a training session with a technician from Bray to train the proper City personnel in the operation, maintenance, repair.
- The valve manufacturer must warrant the valve and its components against any defects in material for a period of 12 months from receiving.
- The contractor must warrant the installation against defects for a period of 12 months from installation.

Overview of relevant facilities

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The Mixing Chamber is a below-ground treated water tank located near the center of the WTP and the South Clearwell is located in the southwest corner of the WTP (Figure 1). The locations of isolation valves V2035 and V2037 (the valves scoped to be replaced) are also shown in the figure below.

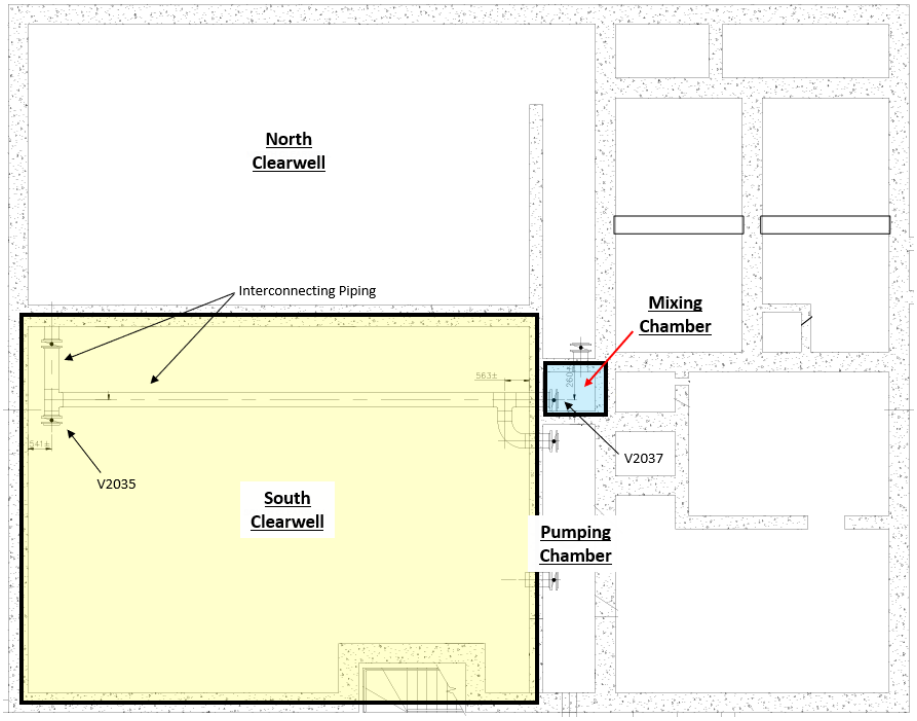

Figure 1: Isolation valves to be closed to isolate the South Clearwell

Isolation valve V2035 is located near the northwest corner of the South Clearwell, and isolation valve V2037 is located in the Mixing Chamber (Figure 2).

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Figure 2: Isolation valves V2035 and 2037 to be replaced

A detailed bypass and SCADA configuration recommendation by the Consultant will be provided to the nominated Contractor that will assist during the execution of works.

COST SUBMISSION FORM

The Bidder should use the following charts to respond to the Part 4 Scope of Work requirements.

Bidder Name _____

No.	Item/ Description	Qty	Unit	Unit Price	Total
1	Mobilization/Demobilization	1	LS		
2	Supply & Installation of Valves	2	each		
3	Supply & Installation of required accessories	1	LS		
4	Testing & Commissioning	1	LS		
				SUBTOTAL (Items 1 to 4):	**$**
				Applicable Taxes (GST):	$
				TOTAL (Incl. GST):	**$**

TBD: The quantities are to be determined during the site visit. It's the Vendors responsibility to carry out the required measurands otherwise, you may provide a Lump Sum (LS) price.

UNFAIR ADVANTAGE AND CONFLICT OF INTEREST STATEMENT SCHEDULE

In the event that the boxes below are left blank, the Bidder shall be deemed to declare that (a) it has had no Unfair Advantage in preparing its Quotation and (b) there is no foreseeable actual or potential Conflict of Interest in performing the contractual obligations contemplated in the RFQ.

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If either or both of the statements below apply, check the appropriate box:

☐ The Bidder declares that there is an actual or potential Unfair Advantage relating to the preparation of

☐ The Bidder declares that there is an actual or potential Conflict of Interest in performing the contractual obligations contemplated in the RFQ.

In the event the Bidder declares an actual or potential Unfair Advantage and/or an actual or potential Conflict of Interest (by marking either of the boxes above), the Bidder shall provide all relevant detailed information below.

_____

_____

_____

_____

_____

The Bidder agrees to provide any additional information which may be requested by the RFQ Coordinator, in the form prescribed by the RFQ Coordinator.

Where, in its sole discretion, the City of Iqaluit concludes that an Unfair Advantage and/or Conflict of Interest arises, it may, in addition to any other remedy available to it at law or in equity, disqualify the Bidder's Quotation, or terminate any Agreement awarded to the Bidder under the RFQ.

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DECLARATION AND CERTIFICATION SCHEDULE

TO: **City of Iqaluit**

RE: In the matter of our Quotation dated [*insert*] to which this Declaration and Certification Schedule is an integral part the Quotation prepared by [*insert*] and submitted in response to a Request for Quotations issued by the City of Brockville dated [Insert] as amended, regarding the selection of a Bidder to execute the Agreement pursuant to the RFQ.

I am duly authorized by the Bidder, including the persons, firms, corporations, and advisors joining in the submission of this Quotation, to execute this Declaration and Certification Schedule. I solemnly declare and certify as follows:

1. Bidder Information

a) The full legal name of the Bidder is:

_____
_____
_____

b) Any other registered business name under which the Bidder carries on business is:

_____
_____
_____

c) The jurisdiction under which the Bidder is formed is:

_____
_____
_____

d) The name, address, telephone number, and email address of the contact person for the Bidder:

_____
_____
_____

2. Offer

The Bidder has carefully examined the RFQ documents and has a clear and comprehensive knowledge of what is required under the RFQ. By submitting its Quotation, the Bidder agrees and consents to the terms, conditions, and provisions of the RFQ, except as otherwise noted, and offers to provide the Services in accordance therewith at the Rates set out in the Cost Submission Form.

3. Pricing

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The Bidder has submitted its Pricing in accordance with the instructions in the RFQ and in the form set out in the Cost Submission Form.

4. Quotation Irrevocable

The Bidder agrees that its Quotation shall be irrevocable for 60 calendar days following the Quotation RFQ Submission Deadline.

5. Disclosure of Information

The Bidder hereby agrees that any information provided in this Quotation, even if it is identified as being supplied in confidence, may be disclosed where required by law or if required by order of a court or tribunal. The Bidder hereby consents to the disclosure, on a confidential basis, of its Quotation to the City of Iqaluit's advisors retained for the purpose of evaluating or participating in the evaluation of this Quotation.

6. Proof of Insurance and Good Standing Under the Workers' Safety Compensation Commission

By signing this Declaration and Certification Schedule, the Bidder agrees, if selected, that it has verified its capability to do so and will provide proof of insurance coverage and a Certificate of Good Standing under the Workers' Safety Compensation Commission (Nunavut).

7. Execution of Agreement

If its Quotation is selected by the City of Iqaluit, the Bidder agrees to finalize and execute the Agreement in accordance with the terms of the RFQ.

Signature of Witness	Signature of Bidder Representative, who has authority to bind the Bidder
Name of Witness	Name and Title of Representative, who has authority to bind the Bidder
	Date

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APPENDIX A – CITY OF IQALUIT SERVICE AGREEMENT

BETWEEN: THE MUNICIPAL CORPORATION OF THE CITY OF IQALUIT

(hereinafter referred to as the "CITY OF IQALUIT")

OF THE FIRST PART

AND: . **<CONTRACTOR NAME>**

(hereinafter referred to as the "Contractor")

OF THE SECOND PART

WHEREAS the CITY OF IQALUIT has requested the Contractor to provide **<description of services>;**

AND WHEREAS the Contractor has agreed to provide such services to the CITY OF IQALUIT in its bid dated **<Bid Submission Date>**;

AND WHEREAS the CITY OF IQALUIT and the Contractor wish to set out the terms and conditions relating to the provision of such services;

THEREFORE, the CITY OF IQALUIT and the Contractor agree as follows:

1. SERVICES AND PAYMENT

1.1 The Contractor agrees to provide to the CITY OF IQALUIT those services set out in the job description and scope of work provided on **<RFT Date>**. A copy of the bid is attached as Appendix "A".

1.2 The CITY OF IQALUIT agrees to pay for the services described above, a total amount not greater than **<Bid Value>,** for the provision of professional services based on the Bid dated **<Bid Submission Date>**.

2. TERM

2.1. This Contract shall commence on the **<Contract Commence Date>** and terminates on the **<Contract Termination Date>** unless otherwise terminated in accordance with the provisions of this Contract.

3. NOTICE AND ADDRESS

3.1 Any notice required to be given herein or any other communication required by this contract shall be in writing and shall be personally delivered, sent by facsimile, or posted by prepaid registered mail and shall be addressed as follows:

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i) If, to the CITY OF IQALUIT:

Amy Elgersma
Chief Administrative Officer
City of Iqaluit
1085 Mivvik Street,
P.O. Box 460
Iqaluit, NU
X0A 0H0
Fax: 979-5922

Reference:

ii) If to the Contractor at:

<Contractor Representative – Name>
<Contractor Organization Name>
<Contractor Address>

3.2 Every such notice and communication, if delivered by hand, shall be deemed to have been received on the date of delivery or if sent by prepaid registered mail shall be deemed to have been received on the seventh day after posting, or if by facsimile, 48 hours after the time of transmission, excluding from the calculation weekends and statutory holidays.

4. COMPLETE AGREEMENT

4.1 This Contract and its attachments constitute the complete Contract between the parties. Except as provided herein, it supersedes and shall take effect in substitution for all previous agreements. It is subject to change only by an instrument executed in writing by the City.

4.2 If this Contract arises from a request for proposals or tender call, the provisions of the request for proposals or tender call and the Contractor's bid or proposal submission are incorporated into this Contract and may be used to clarify, explain or supplement this Contract, but shall not be used to contradict any express terms of this Contract.

4.3 In the event of a conflict between this Contract, the Contractor's bid or proposal submission, and the City's original tender bid instructions or Request for Proposals, the more recently prepared document shall govern to the extent of such inconsistency.

5. GENERAL TERMS

5.1 Any information obtained from or concerning any department of the CITY OF IQALUIT or clients of any department of the CITY OF IQALUIT, by the contractor, its agents or employees in the performance of any contract shall be confidential. The Contractor shall take such steps as are necessary to ensure that any such information is not disclosed to any other person and shall maintain confidential and secure all material and information that is the property of the CITY OF IQALUIT and in the possession of or under the control of the Contractor. This clause survives the termination of this contract.

5.2 Time shall in every respect be of the essence. The Contractor shall deliver the services specified in the contract and according to the project schedule on costs. The CITY OF IQALUIT may grant reasonable extensions to the Contractor for delays, if the Contractor can show those delays were caused by circumstances beyond the control of the Contractor.

5.3 The Contractor is an independent Contractor with the CITY OF IQALUIT and nothing in this contract shall be construed or deemed to create the relationship of employee and employer or of principal and agent between the CITY OF IQALUIT and the Contractor. The Contractor is solely responsible for

INITIALS _____

payments of all statutory deductions or contributions including but not limited to pension plans, unemployment insurance, income tax, workers' compensation and the Nunavut Payroll Tax.

5.4 This contract shall be interpreted and governed in accordance with the laws of Nunavut and the laws of Canada as they apply in Nunavut.

5.5 No waiver by either party of any breach of any term, condition or covenant of this contract shall be effective unless the waiver is in writing and signed by both parties. A waiver, with respect to a specific breach, shall not affect any rights of the parties relating to other or future breaches.

5.6 The failure of either party at any time to require the performance of any provision or requirement of this contract shall not affect the right of that party to require the subsequent performance of that provision or requirement.

5.7 Title to any report, drawing, photograph, plan, specification, model, prototype, pattern, sample, design, logo, technical information, invention, method or process and all other property, work or materials which are produced by the Contractor in performing the contract or conceived, developed or first actually reduced to practice in performing the contract (herein called "the Property") shall vest in the CITY OF IQALUIT and the Contractor hereby absolutely assigns to the CITY OF IQALUIT the copyright in the property for the whole of the term of the copyright. The Contractor shall not be responsible for any loss or damage suffered by the City of Iqaluit or any third parties resulting from any unauthorized use or modification of the property, errors in transmission of the property, changes to the Property by others, the consequences of design defects due to the design of others, or defects in contract documents prepared by others, and the City of Iqaluit agrees to defend, indemnify, and hold the Contractor harmless from and against all claims, demands, losses, damages, liability and costs associated therewith. Subject to the foregoing, the Property may be relied by the City of Iqaluit for design and construction work undertaken by other parties with respect to the Services provided that such parties verify the accuracy and completeness of the Property to their satisfaction.

5.8 It is intended that all provisions of this agreement shall be fully binding and effective between the parties, but in the event that any particular provision or provisions or a part of one is found to be void, voidable or unenforceable for any reason whatever, then the remainder of the agreement shall be interpreted as if such provision, provisions, or part thereof, had not been included.

5.9 This contract may be extended by the written consent of the parties.

5.10 The CITY OF IQALUIT may delegate any of its authority and undertaking pursuant to this contract to any employee or contractor the CITY OF IQALUIT by notice in writing to the Contractor.

5.11 This contract shall enure to the benefit of and be binding on the respective administrators, successors and assignment of each of the parties hereto.

6. CONTRACTOR RESPONSIBILITIES

6.1 The Contractor shall indemnify and hold harmless, the CITY OF IQALUIT, its officers, employees, servants and agents from and against all claims, actions, causes of action, demands, losses, costs, damages, expenses, suits or other proceedings by whomsoever made, brought or prosecuted in any manner based upon or related to the negligent acts, errors, or omissions of the Contractor under this contract.

6.2 The Contractor shall be liable to the CITY OF IQALUIT for any loss or damage to property or equipment that is supplied to or placed in the care, custody or control of the Contractor for use in connection with the contract if such loss or damage is attributable to the negligence or deliberate acts of the Contractor or its employees or agents.

INITIALS _____

6.3 If, in the opinion of the CITY OF IQALUIT acting reasonably, the Contractor is in default in respect of any obligation of the Contractor hereunder, the CITY OF IQALUIT may rectify such default and pursue a claim against the Contractor for any direct costs associated with any such remediation, including a reasonable allowance for the use of the CITY OF IQALUIT's own employees or equipment.

6.4 The Contractor may not assign or delegate work to be done under this contract, or any part thereof, to any other party without the written consent of the CITY OF IQALUIT. In the case of a proposed assignment of monies owing to the Contractor under this contract, the consent in writing of the CITY OF IQALUIT must be obtained.

6.5 The Contractor shall keep proper accounts and records of the services for a period of 3 years after the expiry or termination of this agreement. At any time during the term of this contract or during the three years following the completion or termination of this agreement, the Contractor shall produce copies of such accounts and records upon the written request of the CITY OF IQALUIT.

6.6 The Contractor shall notify the CITY OF IQALUIT immediately of any claim, action, or other proceeding made, brought, prosecuted or threatened in writing to be brought or prosecuted that is based upon, occasioned by or in any way attributable to the performance or non-performance of the services under this contract.

6.7 If at any time the Contractor considers their estimates indicate costs will exceed the project budget they will immediately advise the City of Iqaluit. If in the opinion of the City of Iqaluit, acting reasonably, the excess is due to design, costs factors or matters under the control or reasonably foreseeable by the Contractor, the CITY OF IQALUIT may require the Contractor to do everything by way of revision of the design to bring the cost estimate within the project budget. Costs of completing such revisions shall be based upon a level of compensation reasonably appropriate to the circumstances, including the reason for the revisions.

6.8 Except as required in the performance of services set out in this agreement, the Contractor must maintain as confidential all data and information made available to the Contractor, the CITY OF IQALUIT, or any other parties which is generated by or results from the Contractor's performance of the Services described in this Contract. All such data and information are the property of the City of Iqaluit. This clause shall survive the termination of the Contract.

7. TERMINATION

7.1 The CITY OF IQALUIT may terminate this contract at any time upon giving written notice to this effect to the Contractor if, in the opinion of the CITY OF IQALUIT, the Contractor is unable to deliver the service as required, the Contractor's performance of work is persistently faulty, in the event that the Contractor becomes insolvent or commits an act of bankruptcy, in the event that any actual or potential labor dispute delays or threatens to delay timely performance of the contract or the (Contractor's Sub-Contractor) defaults or fails to observe the terms and conditions of the contract in any material respect.

7.2 This contract shall terminate as of the day for termination set out in the written notice and the Contractor shall forthwith invoice the CITY OF IQALUIT for work performed to the date of termination.

7.3 Any invoice submitted by the Contractor pursuant to clause 7.2 shall be reviewed by the CITY OF IQALUIT to assess the amount which is properly due and owing for work done by the Contractor prior to termination.

8. FINANCIAL

INITIALS _____

a. The CITY OF IQALUIT, having given written notice of a breach, may withhold or hold back in whole or in part any payment due the Contractor without penalty, expense or liability, if in the opinion of the Contracting Authority, the Contractor has failed to comply with or has in any way breached an obligation of the Contractor. Any such hold back shall continue until the breach has been rectified to the satisfaction of the CITY OF IQALUIT.

8.2 The CITY OF IQALUIT may set off any payment due the Contractor against any monies owed by the Contractor to the CITY OF IQALUIT.

8.3 The City of Iqaluit will pay the Goods and Services Tax (GST).

8.4 Provided all terms and conditions on the part of the Contractor have been complied with, each invoice will be paid thirty (30) calendar days after receipt of the invoice, or thirty (30) calendar days after delivery of the services, whichever is later.

8.5 The CITY OF IQALUIT may, in order to discharge lawful obligations or to satisfy lawful claims against the Contractor or a Sub-Contractor arising out of the execution of work, pay any amount, which is due and payable to the Contractor under the contract, if any, directly to the obligee of and the claimants against the Contractor or Sub-Contractor.

9. INSURANCE AND LIABILITY

9.1 The Contractor's liability to the City of Iqaluit for claims arising out of this Agreement, or in any way relating to the Services, will be limited to direct damages and to the re-performance, without additional compensation, of any Services not meeting a normal professional standard of care and such liability will, in the aggregate, not exceed the amount of $1,000,000.00. The limitations of liability will apply, to the extent permitted by law, whether Contractor's liability arises under breach of contract or warranty; tort, including negligence; strict liability; statutory liability; or any other cause of action, and will extend to and include Contractor's directors, officers, employees, insurers, agents and sub-contractor.

9.2 In no event will either party be liable to the other party for indirect or consequential damages including without limitation loss of use or production, loss of profits or business interruption.

9.3 The Contractor shall, without limiting his obligations or liabilities hereto, obtain, maintain and pay for during the period of this agreement, the following insurance with limits not less than those shown:

a) Workers' Compensation insurance covering all employees engaged in the work in accordance with the statutory requirements of the Territory or Province having jurisdiction over such employees. If the Contractor is assessed any additional levy, extra assessment or super-assessment by a Workers' Compensation Board as a result of an accident causing injury or death to an employee of the Contractor or any sub-contractor, or due to unsafe working conditions, then such levy or assessment shall be paid by the Contractor at its sole cost and is not reimbursed by the CITY OF IQALUIT.

b) Employer's liability insurance with limits not less than $500,000 for each accidental injury to or death of the Contractor's employees engaged in the work. If Workers' Compensation insurance exists, then in such event, the aforementioned Employer's Liability insurance shall not be required but the Comprehensive General Liability policy referred to in item (d) herein shall contain an endorsement providing for Contingent Employers' Liability insurance.

c) Motor Vehicle, water craft and snow craft standard liability insurance covering all vehicles and/or craft owned or non-owned, operated and/or licensed by the Contractor and used by the Contractor in the performance of this agreement in an amount not less than one million dollars ($1,000,000.00) per occurrence for bodily injury, death and damage to property; and with respect to busses limits of not less than one million dollars ($1,000,000.00) for vehicle hazards and not

INITIALS _____

less than one million dollars ($1,000,000.00) for Bodily Injury to or death of one or more passengers and loss of or damage to the passengers property in one accident.)

d) Comprehensive General Liability Insurance with limits of not less than $2,000,000.00 (inclusive) per occurrence for bodily injury, death and damage to property including loss of use thereof. Such insurance shall include but not be limited to the following terms and conditions:

- Products & Completed Operations Liability *
- Contractor's Protective Liability
- Blanket Contractual Liability
- Broad Form Property Damage
- Personal Injury Liability
- Cross Liability
- Medical Payments
- Non-owned Automobile Liability *
- Contingent Employers Liability *
- Employees as Additional Insureds *

**WHERE APPLICABLE*

e) Professional Liability Insurance with limits of not less than two hundred fifty thousand dollars ($250,000.00) per claim and five hundred thousand dollars ($500,000.00) in the annual aggregate, to cover claims arising out of the rendering of or failure to render any professional service under this contract or agreement.

All policies shall provide that thirty days written notice be given to the CITY OF IQALUIT prior to any cancellations of any such policies.

The Comprehensive General Liability Insurance policies shall name the CITY OF IQALUIT and any permitted sub-contractor's as additional insureds only with respect to the terms of this contract and shall extend to cover the employees of the insureds hereunder.

The Contractor shall be responsible for any deductibles, exclusions and/or insufficiency of coverage relating to such policies.

The Contractor shall deposit with the CITY OF IQALUIT prior to commencing with the work a certificate of insurance evidencing the insurance(s) required by this clause in a form satisfactory to the CITY OF IQALUIT and with insurance companies satisfactory to the CITY OF IQALUIT.

IN WITNESS WHEREOF the parties hereto have set their hand as of the date and year entered below.

FOR THE CITY OF IQALUIT: FOR THE CONTRACTOR:

INITIALS _____

_____	_____
Name/Title	Name/Title
_____	_____
Signature	Signature
_____	_____
Date	Date
_____	_____
Witness	Witness

END OF APPENDIX A

INITIALS _____

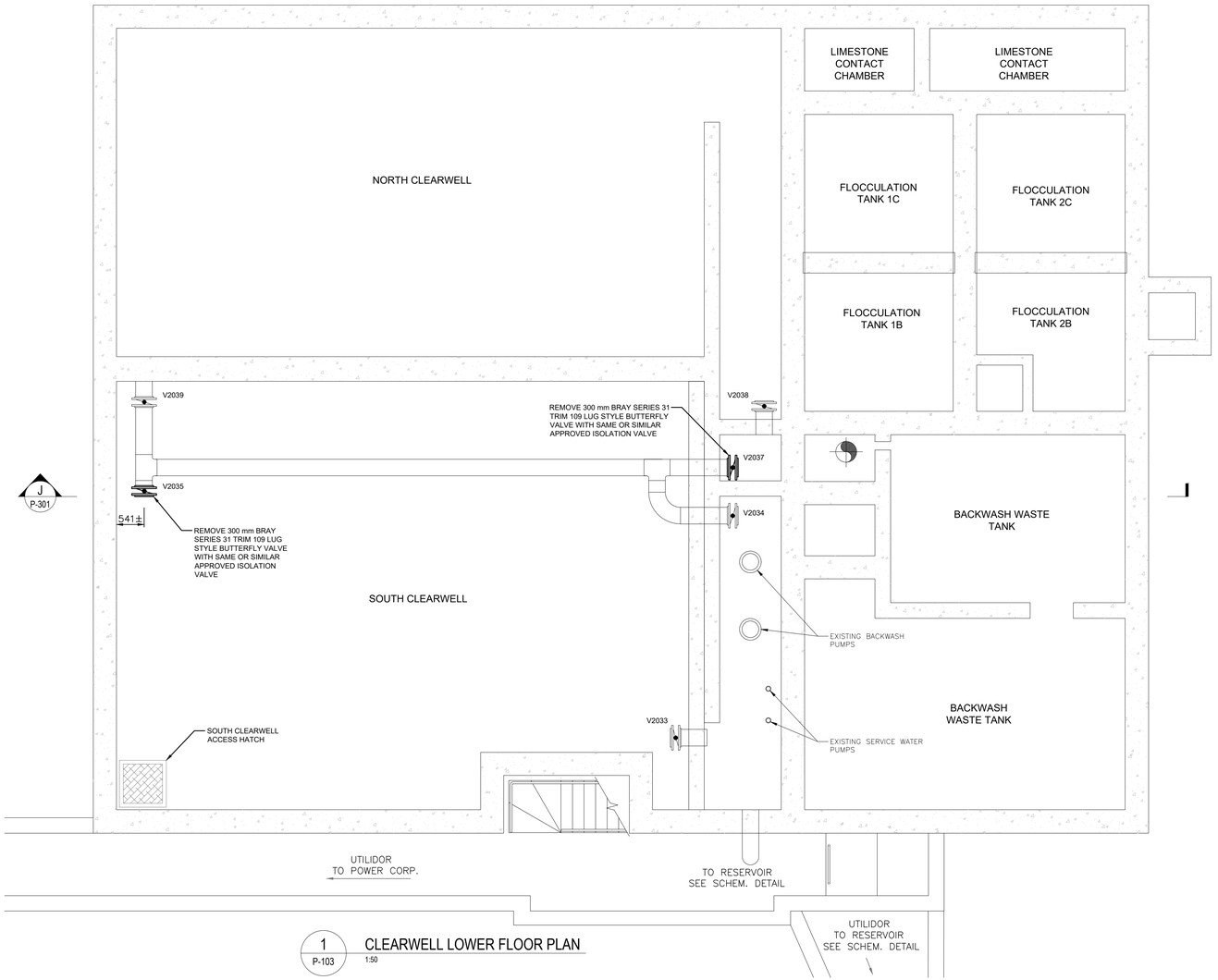
Appendix B - Technical Drawings

INITIALS _____

Appendix B

Technical Drawings

Iqaluit Water Treatment Plant
Project No. 211-12497-00
City of Iqaluit



1 P-103 CLEARWELL LOWER FLOOR PLAN
1:50

NOTES:

1. ALL ELEVATIONS AND DIMENSIONS ARE APPROXIMATE.

IS	RE	DATE	DESCRIPTION
0	-	2022-05-20	ISSUED FOR TENDER

SEAL:

CLIENT: ᐃᖃᓗᐃᑦ Iqaluit CITY OF IQALUIT

CLIENT REF. #:

PROJECT: IQALUIT WATER TREATMENT PLANT

PROJECT NO: 211-12497-00

DATE: 2022/02/23

wsp
1600 BUFFALO PLACE
WINNIPEG, MANITOBA
CANADA R3T 6B8
PHONE: 204-477-6650 FAX : 204-474-2864
WWW.WSP.COM

ORIGINAL SCALE: AS NOTED

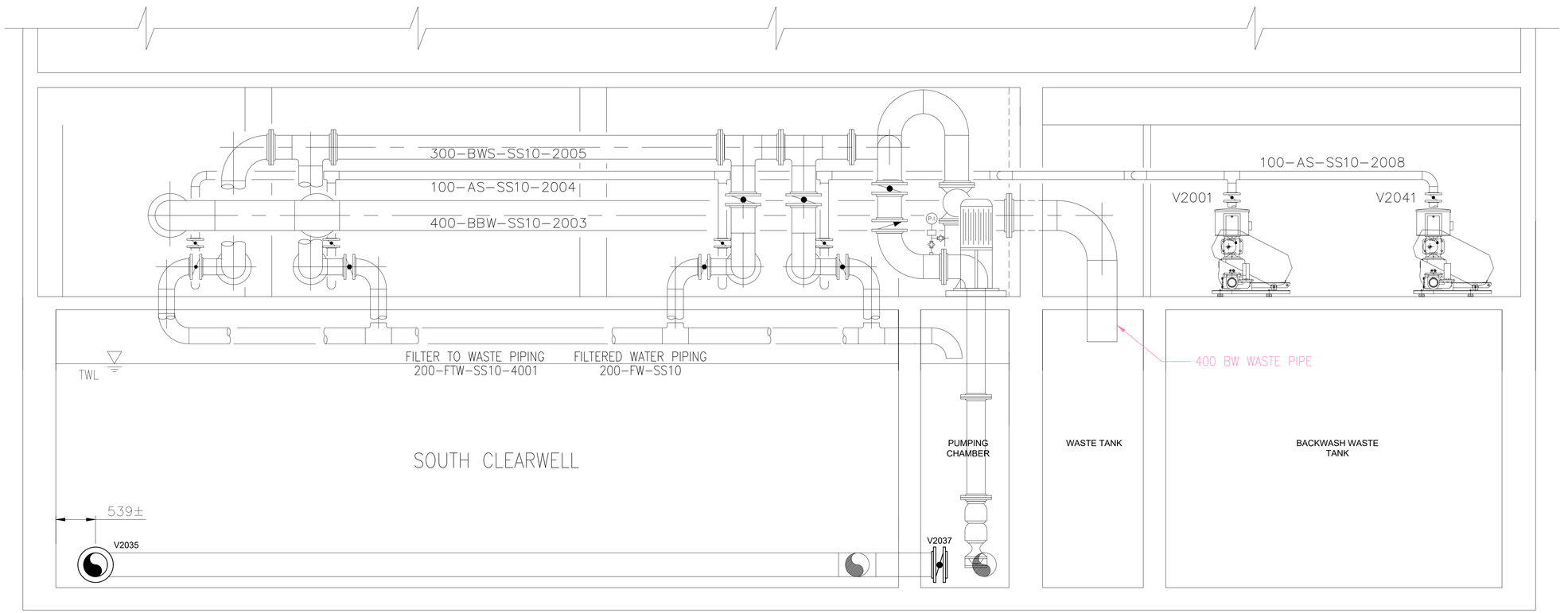
TITLE: CLEARWELL LEVEL LAYOUT

SHEET NUMBER: P-103

DESIGNED BY: IM / CG / JRB
DRAWN BY: IM
CHECKED BY: CG / JRB
DISCIPLINE: PROCESS

ISSUE: ISSUED FOR TENDER 2022/05/20

REV #: -



J / P-301 SECTION
1:30

NOTES:

1. ALL ELEVATIONS AND DIMENSIONS ARE APPROXIMATE.

IS	RE	DATE	DESCRIPTION
0	-	2022-05-20	ISSUED FOR TENDER

SEAL:

CLIENT: Iqaluit / CITY OF IQALUIT

CLIENT REF. #:

PROJECT: IQALUIT WATER TREATMENT PLANT

PROJECT NO: 211-12497-00

DATE: 2022/02/23

WSP
1600 BUFFALO PLACE
WINNIPEG, MANITOBA
CANADA R3T 6B8
PHONE: 204-477-6650 FAX: 204-474-2864
WWW.WSP.COM

ORIGINAL SCALE: AS NOTED

TITLE: FILTER FLOOR SECTION J

SHEET NUMBER: P-303

DESIGNED BY: IM / CG / JRB
DRAWN BY: IM
CHECKED BY: CG / JRB
DISCIPLINE: PROCESS

ISSUE: ISSUED FOR TENDER 2022/05/20

REV #: -

NOTES:

1. MM/VA ARE TAKEN FROM MCC CONTACTOR – NOT MOTOR.
2. LEVEL CONTROL VALVES LOGIC MAX. 50% OPEN.

LCP

MCP

YS 2051 | MM 2051 | UA 2051

YS 2061 | MM 2061 | UA 2061

LALL 2501 | LAL 2501 | LAH 2501 | LI 2501

AI 2501A | AAL 2501A | AAH 2501A

AI 2501B | AAL 2501B | AAH 2501B

AI 2501C | AAL 2501C | AAH 2501C

ZSC 2501 | ZSO 2501 | HSC 2501 | HSO 2501

OPEN/CLOSE: ZSO 2051 (DI) | HS 2051 (DO)

AUTO S/S STATUS FAULT: YS 2051 (DI) | MN 2051 (DO) | MM 2051 (DI) | UA 2051 (DI)

AUTO S/S STATUS FAULT: YS 2061 (DI) | MN 2061 (DO) | MM 2061 (DI) | UA 2061 (DI)

LEVEL: LI 2501 (AI)

CL2: AI 2501A (AI)

pH: AI 2501B (AI)

PHC: AI 2501C (AI)

OPEN CLOSE: HSO 2501 (DO) | HSC 2501 (DO) | ZSO 2501 (DI) | ZSC 2501 (DI)

PID I-107 — 25-OPS-PP-3015
CAUSTIC SODA

PID I-102
UV DISINFECTED WATER FROM WTP BYPASS PIPE

V3054

HS 2051 OCA

HS 2051 HOA MCC

HS 2061 HOA MCC

PI 2061

V2029

V2028

N.O. V2022

V2023

300-BWS-SS10-2005

PID I-103 — 300-BWS-SS10-2005
BACKWASH WATER
TYP. F-211,212,213

PI 2051

V2027

V2026

N.O. V2025

V2024

ZSO 2501 | SV 2501 | SET @ 100 kPag | PRV 2501

300-BWS-SS10-2013

LIT 2501

LE 2501

V2034

V2033

200-FW-SS10-2006

25-FAS-PP-3023

PID I-106
SODIUM HYPOCHLORITE

V2032

V3053

PID I-108 — 25-CLS-PP-3011
CHLORINE SOLUTION
TYP. F-211,212,213

V3050

V3051

V3052

200-BWS-SS10-2014

MANUAL OPERATION TYP. IN CLEARWELL

TWL

BWL

PID I-103 — 200-FW-SS10-2006
FILTERED WATER
TYP. F-211,212,213

V2038

REPLACE VALVE AND STEM

300-BWS-SS10-2016

V2039

V2037

REPLACE VALVE AND STEM

V2033

V2034

V2035

BACKWASH PUMP No. 1
P 205

BACKWASH PUMP No. 2
P 206

PID I-108 — 25-FAS-PP-3023
HYDROFLUOROSILIC ACID
TYP. F-211,212,213

V3052

V3053

NORTH CLEARWELL | MIXING CHAMBER | SOUTH CLEARWELL | PUMPING CHAMBER

AIT 2501

300-TW-PVC-2015

V2036

HS 2501A HOA | HS 2501B O/C

ZSO 2501

ZSC 2501

75-TW-PVC-1013

V2031

V2032

V2040

PID I-111
TREATED WATER TO RESERVOIR

FCV 2501

PI 2045

V2042 | V2040

PID I-107
PRE-RESERVOIR SAMPLE WATER

V2041

V2045

V2044 | V2043

PID I-107
POST-RESERVOIR SAMPLE WATER

AE 2501 CL2 | AE 2502 pH | AE 2503 PHCs

V2046

P 310

FCV 2501
0.0 – 10.0ML/day
ON/OFF CONTROL

V2047

V2048

ID

IS	RE	DATE	DESCRIPTION
0	-	2022-05-20	ISSUED FOR TENDER

SEAL:

CLIENT: Iqaluit — CITY OF IQALUIT

CLIENT REF. #:

PROJECT: IQALUIT WATER TREATMENT PLANT

PROJECT NO: 211-12497-00

DATE: 2022/02/23

wsp
1600 BUFFALO PLACE
WINNIPEG, MANITOBA
CANADA R3T 6B8
PHONE: 204-477-6650 FAX : 204-474-2864
WWW.WSP.COM

ORIGINAL SCALE: N.T.S.

TITLE: PROCESS & INSTRUMENTATION DIAGRAM - BACKWASH SUPPLY

SHEET NUMBER: I-104

DESIGNED BY: IM / CG / JRB
DRAWN BY: IM
CHECKED BY: CG / JRB
DISCIPLINE: INSTRUMENTATION

ISSUE: ISSUED FOR TENDER 2022/05/20

REV #: -

Appendix C – Product Specification Sheets

INITIALS _____

Appendix C

Product Specification Sheets

Series 30/31 Resilient Seated Valve

Valve Type:
Bray Series 30 wafer or Series 31 lug or approved equal.
Body:

- Shall be one-piece wafer or lug design with extended neck to allow for 2” of piping insulation.
- Flange locating holes shall be provided on wafer bodies to allow for quick and precise alignment during valve installation.
- Flange hole drilling per international flange standard as specified.
- A non-corrosive bushing and a self-adjusting stem seal shall be provided. No field adjustment shall be necessary to maintain optimum field performance.

Disc:

- Disc edge and hub on metal discs shall be spherically machined and hand polished for torque and maximum sealing capability.

Stem:

- Shall be one-piece design.
- Disc to stem connection shall be and internal double “D” design with no possible leak paths in the disc-to-stem connection. External disc-to-stem connections such as disc screws or pins are not allowed.
- Stem shall be mechanically retained in the body neck and no part of the stem shall be exposed to the line media.

Seat:

- Shall be tongue-and-groove seat with a primary hub seal and a molded flange O-ring for weld-neck and slip-on flanges.
- The seat shall totally encapsulate the body isolating it from the line media and no flange gaskets shall be required.

Testing:
Valve shall be tested to 110% of the rated pressure.

Pressure Ratings:
Valve shall be rated for bubble-tight shut-off at pressure rating shown below.

Bi-directional Service
(With downstream flanges and disc in closed position):

All Resilient Seated Series 30 and Series 31 Valves (with Standard Disc):

- 2”-12” (50mm-300mm) 175 psi (12.0 Bar)
- 14”-20” (350mm-500mm) 150 psi (10.3 Bar)

Dead-End Service
(No downstream flanges and disc in closed position):

All Series 31 Valves (with Standard Dic):

- 2”-12” (50mm-300mm) 75 psi (5.2 Bar)
- 14”-20” (350mm-500mm) 50 psi (3.4 Bar)

Approvals & Certifications:

- CE/PED Certification
- NSF/ANSI 61-2008 Certification (Potable Water)
- SIL Certification
- ABS Certification
- Bureau Veritas Certification
- DNV

RESILIENT SEATED

BUTTERFLY VALVES

Bray®

BRAY.COM

THE HIGH PERFORMANCE COMPANY

	Body Style	Size Range	Pressure Range	Page
Series 20	Wafer	1"-20" (25mm-500mm)	150 psi (10.3 bar)	**6**
Series 21	Lug	1"-20" (25mm-500mm)	150 psi (10.3 bar)	
Series 22	Wafer	2"-20" (50mm-500mm)	150 psi (10.3 bar)	**8**
Series 23	Lug	2"-20" (50mm-500mm)	150 psi (10.3 bar)	
	Double Flanged	24" (600mm)	150 psi (10.3 bar)	
Series 30	Wafer	2"-12" (50mm-300mm)	175 psi (12 bar)	**10**
		14"-20" (350mm-500mm)	150 psi (10.3 bar)	
Series 31	Lug	2"-12" (50mm-300mm)	175 psi (12 bar)	
		14"-20" (350mm-500mm)	150 psi (10.3 bar)	
Series 31H	Lug	2"-20" (50mm-500mm)	250 psi (17.2 bar)	**11**
Series 31U	Lug	2"-12" (50mm-300mm)	285 psi (20 bar)	**12**
Series 3A	Double Flanged	2"-12" (50mm-300mm)	175 psi (12 bar)	**14**
		14"-20" (350mm-500mm)	150 psi (10.3 bar)	
Series 3AH	Double Flanged	2"-20" (50mm-500mm)	250 psi (17.2 bar)	**15**
Series 32	Wafer	22"-36" (550mm-900mm)	75 psi (5.2 bar)	**18**
Series 33	Wafer	22"-36" (550mm-900mm)	150 psi (10.3 bar)	**18**
Series 35	Double Flanged	22"-120" (550mm-3000mm)	75 psi (5.2 bar)	**20**
Series 36	Double Flanged	22"-120" (550mm-3000mm)	150 psi (10.3 bar)	**20**
Series 35F	Double Flanged	32"-60" (800mm-1500mm)	75 psi (5.2 bar)	**21**
Series 36H	Double Flanged	22"-60" (550mm-1500mm)	232 psi (16 bar)	**21**
Actuators & Accessories				**22**

INTERNATIONAL COMPATIBILITY

Valve mounting top flanges meet ISO 5211 bolt circle standards for direct mounting of manual operators and power actuators. All Bray valves have extended necks which allow for at least 2" piping insulation.

ACTUATOR MOUNTING

All Bray actuators including handles, gear operators, pneumatic and electric actuators mount directly to Bray resilient seated valves. No brackets are required. This allows for simple installation in the field, minimizes possible misalignment and reduces overall height.

ISOLATION FROM LINE MEDIA

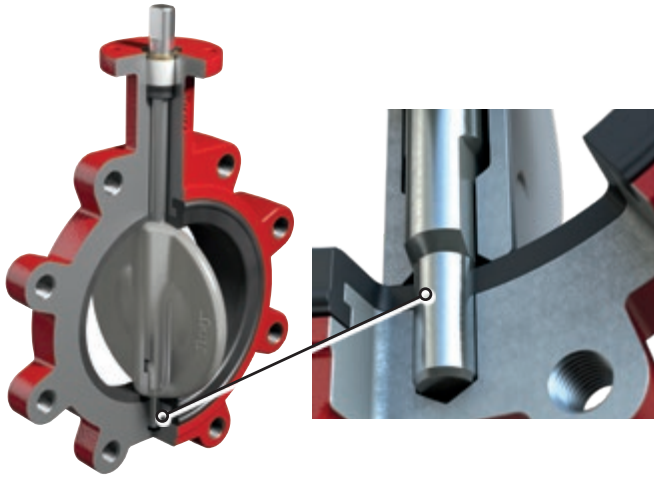
Bray's seat design and internal disc to stem connection isolates the line media from the body and stem.

INTERNAL DISC TO STEM CONNECTION

Series 30/31 Sizes 2"– 20" (50mm–500mm)

Bray offers Double "D" precision machined flats on the stem and in the disc. The Series 30/31 internal, non-wetted connections eliminate exposed external disc to stem connections.

The disc and the stem connection minimizes hysteresis and produces maximum strength engagements. All stem designs incorporate a blowout proof feature.



SEAT DESIGN

The seat is designed to seal with slip-on or weld-neck flanges and the molded o-ring eliminates the need for flange gaskets. The tongue and groove locks the seat in place and makes the valve dead end capable.

Tongue and Groove

POLYESTER COATING

The Bray standard polyester body coating is a hard, gloss red finish. The polyester coating provides excellent corrosion and wear resistance.

Chemical Resistant

Resistant to dilute acids and alkalies, petroleum solvents, alcohols, greases and oils.

Weatherability

Resistant to humidity, water and ultraviolet radiation.

Abrasion and Impact Resistant

NYLON 11 COATING

Nylon 11 has superior corrosion resistance and has been used successfully as a disc coating in many applications

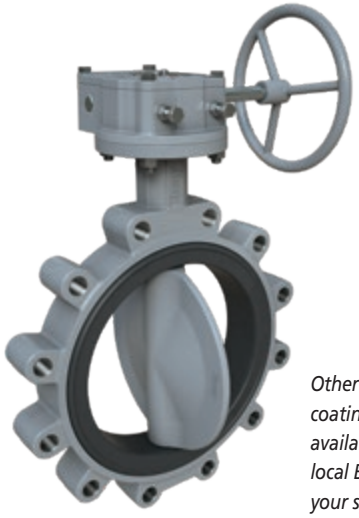
Weatherability

Bray's Nylon 11 coating has been salt spray tested in excess of 2000 hours and used in seawater immersion service for over 30 years without any deterioration of the coating resulting in no corrosion to the coated metal components.

Abrasion and Impact Resistant

SEACORR® COATING

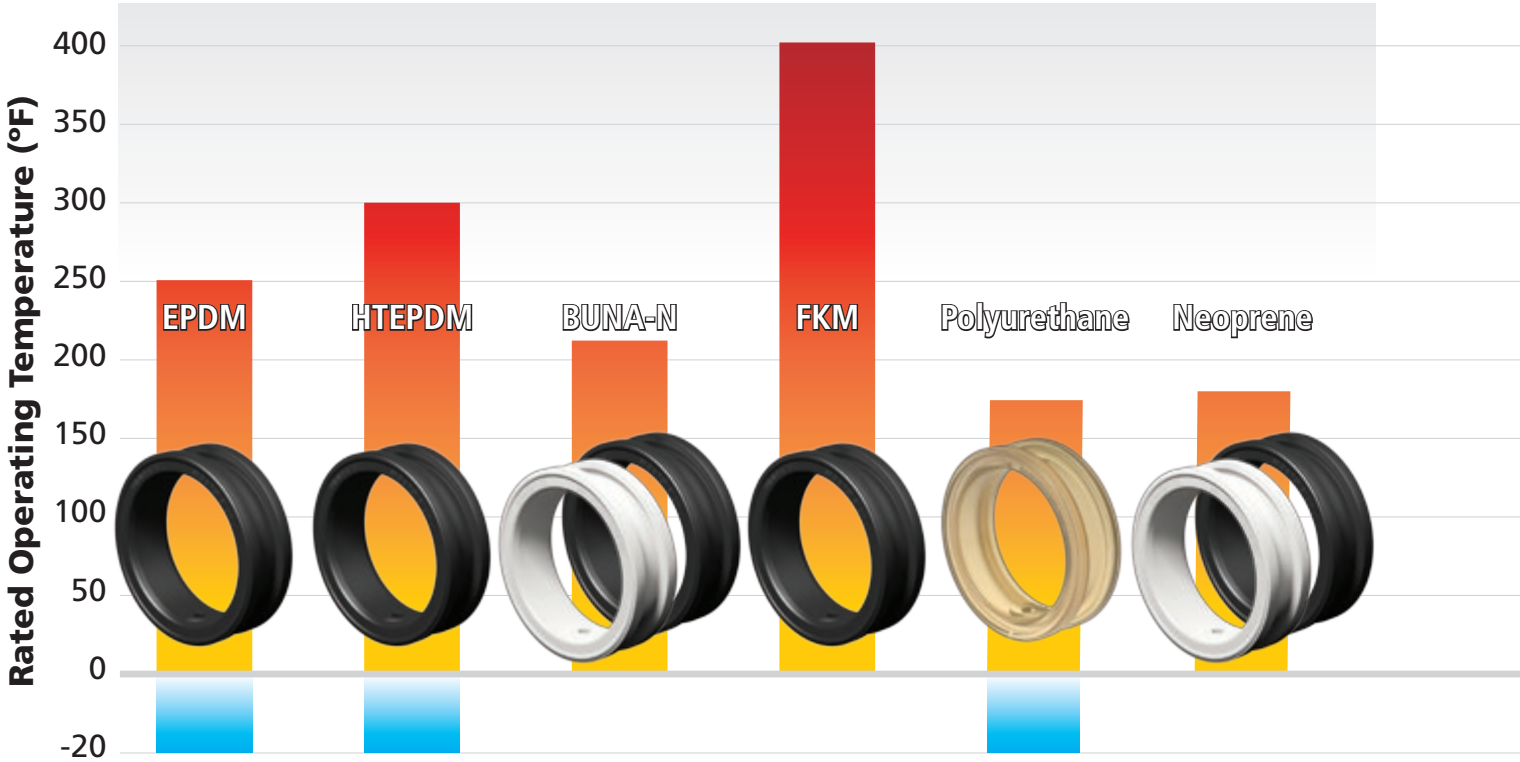
SEACORR coating provides superior protection in corrosive environments. Available as an exterior coating of valves, manual and automated actuators for harsh applications.



Other customer specified coating materials are available. Please consult your local Bray representative for your specific application.

All Bray valves are pressure tested to 110% of rated pressure to assure bubble tight shutoff.

Series 20, 21, 3A, 30, 31, 32, 33, 35, 36



PEROXIDE CURED EPDM

-20°F to 250°F (-29°C to 121°C)

Bray's peroxide cured EPDM (Ethylene Propylene Diene Monomer) seats have a higher resistance to abrasion, lower compression set, and higher temperature capabilities than sulfur cured seats.

As a standard seat offering, Bray's peroxide cured EPDM is the most universal and economical seat material used in our resilient seated butterfly valves. All of Bray's peroxide cured EPDM seats are food grade and can be certified to NSF-61.

HTEPDM

-20°F to 300°F (-29°C to 150°C)

HTEPDM is a proprietary rubber blend offered by Bray to increase the thermal resistance properties of standard EPDM and is formulated to provide long term service at elevated temperatures for hot water. HTEPDM Food Grade seats are suitable for sanitary applications as well as standard industrial uses.

BUNA-N (Black or White)

0°F to 212°F (-18°C to 100°C)

BUNA-N is the commonly used name for Nitrile synthetic rubber. Nitrile is a copolymer of acrylonitrile and butadiene. BUNA-N is sometimes referred to as NBR, Nitrile, or Hycar. BUNA-N is a general purpose seat material particularly suitable for hydrocarbon service. BUNA-N is a standard Bray seat material and food grade is available for sanitary applications.

FKM

0°F to 400°F (-18°C to 204°C)

FKM is the ASTM D1418 designation for Fluorinated Hydrocarbon Elastomers (Fluoroelastomers) such as Viton® (DuPont). FKM has some outstanding characteristics such as improved acid, oil, and temperature resistance over other seat materials.

POLYURETHANE

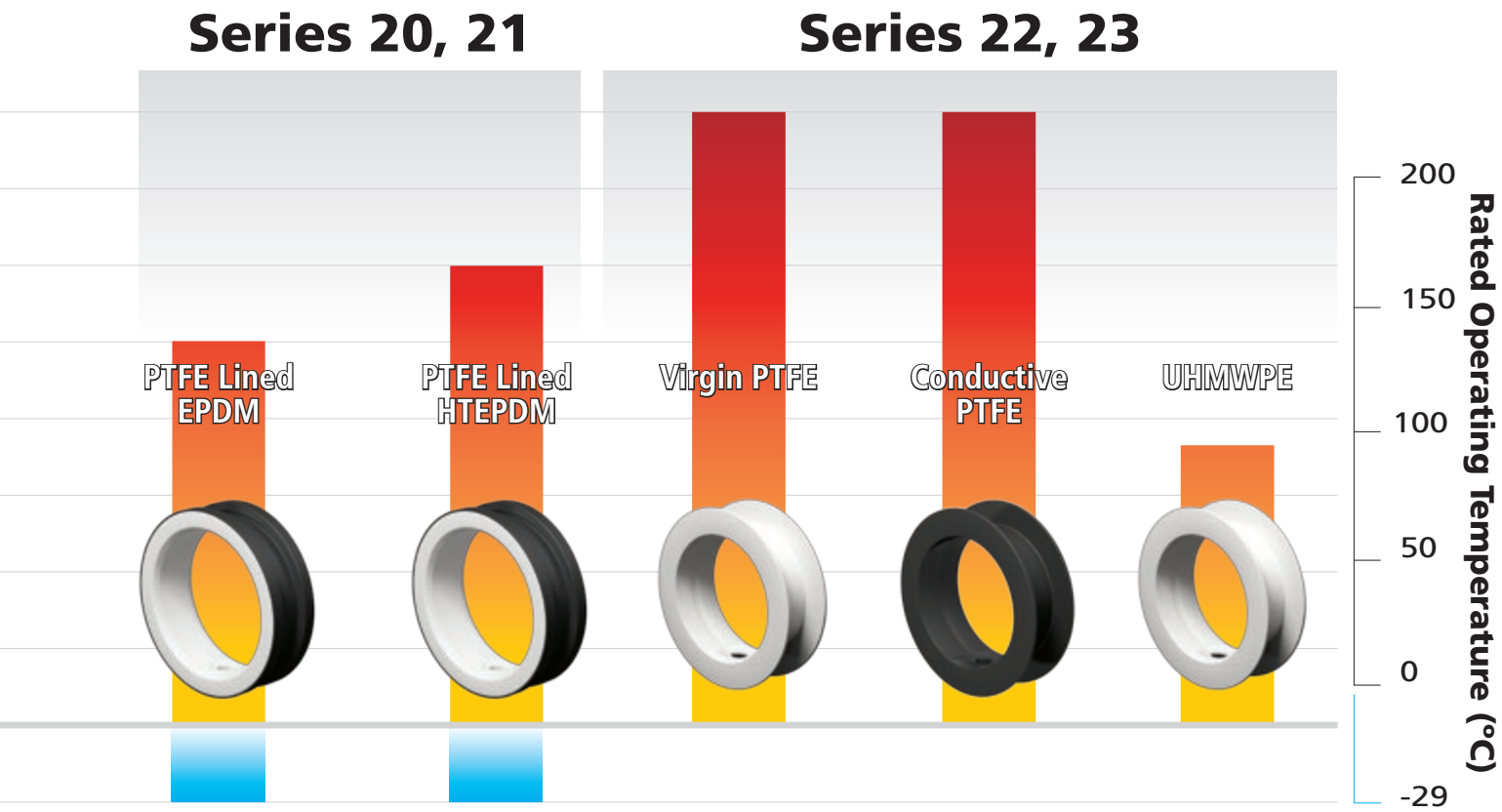
-20°F to 175°F (-29°C to 80°C)

Polyurethane seats are primarily used because of their resistance to abrasive wear. Polyurethane can be used in a reasonably broad range of services and will withstand severe impact, recover its original shape after distortion and resist abrasion better than other elastomers.

NEOPRENE SEAT (Black or White)

0°F to 180°F (-18°C to 82°C)

Neoprene is an all-purpose polymer with desirable characteristics including high resiliency with low compression, resistance to vegetable and animal oil, and flame resistance. This sealing material is excellent for refrigerants, ammonia and Freon, and is principally used in pulp and (non-bleached) paper lines. Neoprene is not recommended for strong oxidizing acids, chlorinated solvents, esters, ketones, aromatic hydrocarbons or hydraulic fluids. White neoprene is generally used in sanitary applications while the black grade provides better abrasion and oil resistance.



PTFE LINED EPDM

-20°F to 250°F (-29°C to 121°C)

PTFE lined EPDM seats consist of a PTFE liner which forms the flange sealing faces and the flow way of the seats which are molded on to EPDM elastomer backings. Only the inert, non-stick PTFE liner surface is exposed to the line media. The EPDM backing acts as a resilient support to the relatively rigid PTFE. These seats are generally used in corrosive services.

PTFE LINED HTEPDM

-20°F to 300°F (-29°C to 150°C)

PTFE lined HTEPDM seats consist of a PTFE liner which forms the flange sealing faces and the flow way of the seats which are molded on to HTEPDM elastomer backings. HTEPDM is a proprietary rubber blend offered by Bray to increase the thermal resistance properties of standard EPDM and is formulated to provide long term service at elevated temperatures.

VIRGIN PTFE

0°F to 400°F (-18°C to 204°C)

All Bray PTFE seats and encapsulated discs are isostatically molded from pure, virgin PTFE material to meet Bray's stringent material requirements. PTFE's inherent molecular bonding strength gives our seats an excellent chemical, high temperature, and tear resistance. Bray's sintered PTFE offers low permeability properties to provide optimum protection against aggressive line medias.

CONDUCTIVE PTFE

0°F to 400°F (-18°C to 204°C)

Bray's conductive PTFE seats and discs are available for installation in areas of the plant where explosion protection is important. This material was designed to prevent harmful electrostatic discharge. Bray has combined electrostatic discharge protection and the excellent chemical resistance properties of PTFE. The seat and the disc have a minimum conductive PTFE thickness of 1/8" (3 mm) which provides optimum protection against permeation of the line media.

UHMWPE

0°F to 185°F (-18°C to 85°C)

UHMWPE seats and discs feature exceptional chemical resistance and are the ideal choice for highly abrasive chemical applications. The natural ability of the UHMWPE's high molecular weight to repel solids prevents in-line particles from damaging the valve's seat surfaces.

Seat material availability depends on valve size and series. Please consult your local Bray representative for your specific application as the pressure and temperature of service also affect seat life and performance.

The Series 20/21 valve surpasses the high standards required in sanitary applications. The disc geometry provides superior inherent flow characteristics and capabilities.

- Sanitary and chemical applications
- One piece disc/stem
- Low pressure drop, High Cv

PRESSURE RATINGS

BIDIRECTIONAL BUBBLE TIGHT SHUT OFF Downstream flanges and disc in closed position			
Resilient Seated	Metal Disc/Stem	1"-20" (25-500mm)	150 psi (10.3 bar)
	Resilient Coated Disc/Stem	2"-20" (50-500mm)	100 psi (7 bar)
PTFE Seated	Metal Disc/Stem	2"-12" (50-300mm)	150 psi (10.3 bar)
	PTFE Coated Disc/Stem	2"-12" (50-300mm)	100 psi (7 bar)
DEAD END SERVICE Lug bodies, no downstream flanges and disc in closed position			
All Valves		2"-12" (50-300mm)	75 psi (5.2 bar)
		14"-20" (350-500mm)	50 psi (3.4 bar)
BODY: 150 psi (10.3 bar)			

VELOCITY LIMITS FOR ON/OFF SERVICES

FLUIDS: 30 ft/sec (9 m/s)	**GASES:** 175 ft/sec (54 m/s)

1 – STEM BUSHING: Non-corrosive, heavy duty acetal bushing absorbs actuator side thrust.

2 – STEM SEAL: Double "U" cup seal design is self-adjusting and gives positive sealing in both directions.

3 – DISC/STEM: One piece design. The disc edge is spherically machined and hand polished to produce a bubble tight shutoff, minimum torque, and longer seat life. For erosion and abrasion resistance, the one piece disc/stem is available encased in either EPDM or BUNA-N.

4 – PRIMARY AND SECONDARY SEALS: These seals prevent line media from coming in contact with the stem or body. Primary seal is achieved by an interference fit of the molded seat flat with the disc hub. Secondary seal is created because the stem diameter is greater than the diameter of the seat stem hole.

5 – SEAT: Bray's tongue and groove seat design provides complete isolation of flowing media from the body. The seat also features a molded o-ring which eliminates the need of flange gaskets.

6 – BODY: Two piece wafer or lug style allows for ease of assembly and maintenance.

7 – BODY COATINGS: For excellent corrosion resistance, Nylon 11 coating is standard for 1"- 8" valves and available on larger sizes upon request. Polyester coating is standard for 10"-20" bodies.

MATERIAL SELECTION OPTIONS

BODY MATERIAL	DISC/STEM MATERIAL	SEAT MATERIAL
Cast Iron✦	316 Stainless Steel✦	EPDM Food Grade✦
Ductile Iron✦	Hastelloy® C-22	BUNA-N Food Grade✦
316 Stainless Steel	PTFE molded over stainless steel	HTEPDM
Aluminum	EPDM molded over stainless steel	White BUNA-N Food Grade
	BUNA-N molded over stainless steel	FKM*
	Halar® coating over stainless steel	PTFE Lined EPDM
		PTFE Lined HTEPDM

✦Standard Option

*FKM is the ASTM D1418 designation for fluorinated hydrocarbon elastomers (also called fluoroelastomers).
Halar® is a registered trademark of Solvay Solexis, Inc.
Hastelloy® is a registered trademark of Haynes International, Inc.

Material availability depends on valve size and series. Other materials are available. Please consult your local Bray representative for your specific application.

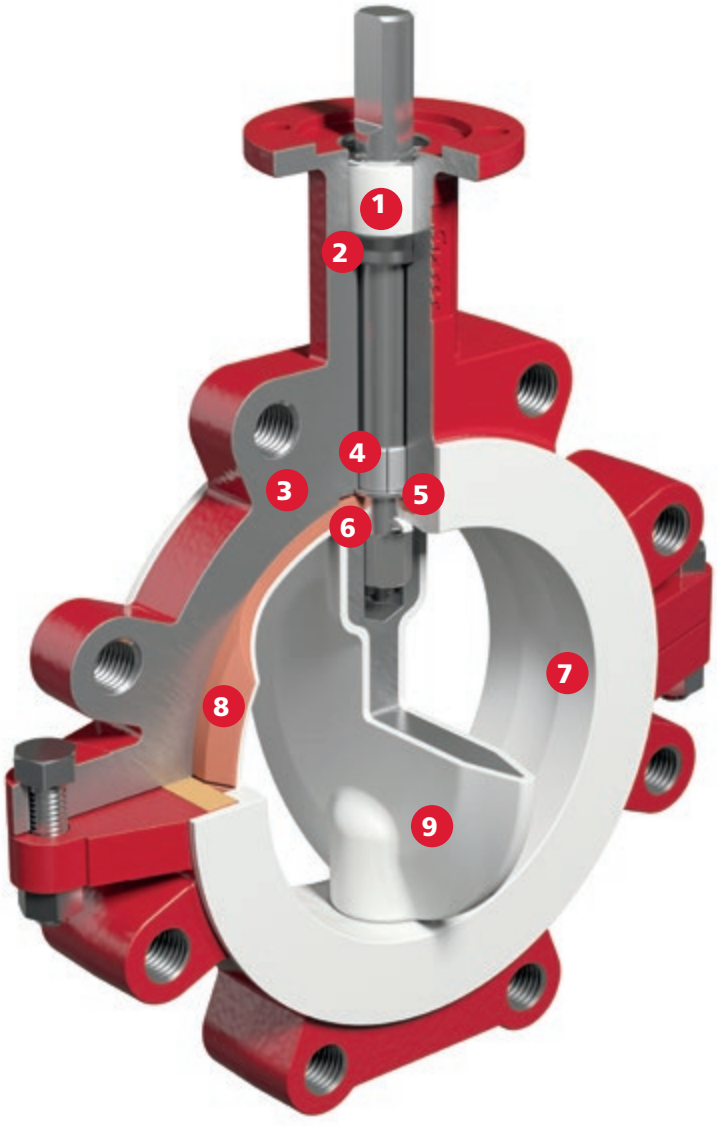
Extensive field research and engineering have developed this design which provides bubble tight shutoff and high Cv values. The Series 22/23 features a stainless steel disc that can be encapsulated in PTFE, PFA, or UHMWPE to fit a wide range of customer applications. The PTFE seat is isostatically molded to provide superior chemical resistance.

PRESSURE RATINGS

BIDIRECTIONAL BUBBLE TIGHT SHUT OFF Downstream flanges and disc in closed position		
All Valves	2"-24" (50-600mm)	150 psi (10.3 bar)
DEAD END SERVICE Lug bodies, no downstream flanges and disc in closed position		
All Valves	2"-12" (50-300mm)	75 psi (5.2 bar)
	14"-24" (350-600mm)	50 psi (3.4 bar)
BODY: 150 psi (10.3 bar)		

VELOCITY LIMITS FOR ON/OFF SERVICES

FLUIDS: 30 ft/sec (9 m/s)	**GASES:** 175 ft/sec (54 m/s)



1 – **UPPER STEM BUSHING:** An upper stem bushing, retained by a stainless steel ring, is provided to absorb actuator side thrusts and is acetal as standard or PTFE as an option.

2 – **UPPER STEM SEAL:** Keeps environmental contaminants from entering the stem bore.

3 – **BODY:** Bodies are two piece wafer or lug style and are polyester coated. All bodies meet full ASME Class 150 OR DIN 3840 flange drilling requirements (24" body is double flanged).

4 – **BEARINGS:** PTFE impregnated steel bearings provided for the precision alignment of the upper and lower stem.

5 – **BLOWOUT PROOF STEM:** A shoulder is machined into the upper stem. The stem and the disc are pressed together during assembly creating a positive stem to disc connection.

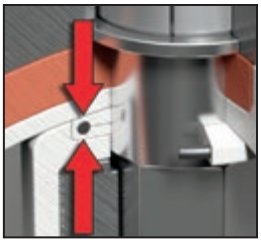
6 – **PRIMARY SEAL:** The primary seal is achieved by an interference fit between the extra wide disc hubs and contoured seat.

7 – **SEAT DESIGN:** The unique seat geometry lowers seating and unseating torque while reducing wear on the contacting parts.

8 – **SEAT ENERGIZER:** A resilient seat energizer extends completely around the seat, including the disc hub providing uniform force sufficient for bubble tight shutoff

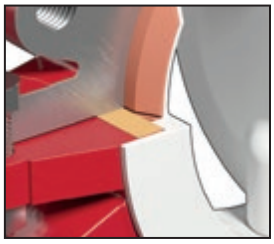
9 – **DISC:** The encapsulated disc has 1/8" (3 mm) minimum thickness of virgin PTFE or PFA lined over stainless steel.

Seal Capsule



The secondary seal is achieved using a seal capsule which fully isolates the valve body and stem from the line media. The seal capsule is made of a virgin PTFE enclosing the internal energizer. The capsule fits into grooves machined in the upper and lower disc hubs. When compressed between the disc and seat during assembly, the capsule becomes energized, exerting both upward and downward pressure on disc and seat surfaces.

Body Seals



Reinforced PTFE gaskets are placed between the body halves. These bidirectional seals eliminate contamination from external environmental conditions and potential leak paths from the line media.

Accessories

Tapped port can be provided in the body neck below the stem seal for fugitive emissions detection.

Grounding cable is offered to protect against static charge build-up. The cable mounts to the valve body.

MATERIAL SELECTION OPTIONS

COMPONENT	MATERIAL	COMPONENT	MATERIAL
Body	Ductile Iron✦ Stainless Steel Carbon Steel	**Bushing**	Acetal✦ PTFE
		Upper Stem Seal	BUNA-N✦ FKM*
Disc	Stainless Steel✦ PTFE molded over stainless steel✦ PFA molded over stainless steel UHMWPE molded over stainless steel Hastelloy® Titanium	**Seal Capsule**	PTFE / FKM
		Bearing	PTFE / Steel
		Seat Energizer	Silicone✦ FKM*
Upper Stem	17-4 PH Stainless Steel	**Body Seal**	Reinforced PTFE
Lower Stem	17-4 PH Stainless Steel		
Seat	PTFE✦ Conductive PTFE UHMWPE		

✦Standard Option
*FKM is the ASTM D1418 designation for fluorinated hydrocarbon elastomers (also called fluoroelastomers).
Hastelloy® is a registered trademark of Haynes International, Inc.

Material availability depends on valve size and series. Other materials are available. Please consult your local Bray representative for your specific application.

The Bray Series 30/31 features a high strength one piece stem design utilizing an efficient internal disc to stem connection. This resilient seated butterfly valve provides a primary and secondary seal between the disc and seat as well as the stem and seat which ensures the total encapsulation of the line media and zero external leakage.

PRESSURE RATINGS

BIDIRECTIONAL BUBBLE TIGHT SHUT OFF – Standard Disc* Downstream flanges and disc in closed position		
Series 30/31 Standard Disc*	2"-12" (50-300mm)	175 psi (12 bar)
	14"-20" (350-500mm)	150 psi (10.3 bar)
DEAD END SERVICE – Lug Bodies and Standard Disc* No downstream flanges and disc in closed position		
Series 31	2"-12" (50-300mm)	75 psi (5.2 bar)
	14"-20" (350-500mm)	50 psi (3.4 bar)
BODY: 250 psi (17.2 bar)		

*For low pressure (50 psi) applications, Bray offers a standard reduced disc diameter to decrease seating torques and extend seat life, thus increasing the valve's performance and reducing actuator costs.

VELOCITY LIMITS FOR ON/OFF SERVICES

FLUIDS: 30 ft/sec (9 m/s)	**GASES:** 175 ft/sec (54 m/s)

1 – **STEM RETAINING ASSEMBLY:** The stem is retained in the body by means of a unique stainless steel Spirolox® retaining ring, a thrust washer and two C-rings, manufactured from brass as standard, stainless steel upon request.

2 – **STEM BUSHING:** Non-corrosive, heavy duty acetal bushing absorbs actuator side thrust.

3 – **STEM SEAL:** Double "U" cup seal design is self-adjusting and gives positive sealing in both directions.

4 – **PRIMARY AND SECONDARY SEALS:** These seals prevent line media from coming in contact with the stem or body. The primary seal is an interference fit of the molded seat flat with the disc hub. The secondary seal is created because the stem diameter is greater than the diameter of the seat stem hole.

5 – **BODY:** One piece wafer or lug style. Polyester coating for excellent corrosion resistance. Nylon 11 coating is available as an option.

6 – **SEAT:** Bray's tongue and groove seat design provides complete isolation of flowing media from the body. The seat also features a molded o-ring which eliminates the use of flange gaskets.

7 – **DISC:** Casting is spherically machined and hand polished to provide a bubble tight shutoff, minimum torque, and longer seat life. Bray's resilient Nylon 11 coating comes as standard.

8 – **STEM:** Precision double "D" disc to stem connection drives the disc without the need for screws or pins. The close tolerance, double "D" connection that drives the valve disc is an exclusive feature of the Bray valve. Disassembly of the Bray stem is just a matter of pulling the stem out of the disc.

MATERIAL SELECTION OPTIONS

BODY	DISC	STEM	SEAT
Cast Iron✦	Nylon 11 Coated Ductile Iron✦	416 Stainless Steel✦	BUNA-N Food Grade✦
Ductile Iron✦	316 Stainless Steel✦	304 Stainless Steel	EPDM Food Grade✦
Carbon Steel	Nickel Aluminum Bronze	316 Stainless Steel	FKM*
Aluminum	Coated Ductile Iron	Monel® K500	White BUNA-N Food Grade
	Halar® Coated Ductile Iron		Bonded EPDM
	304 Stainless Steel		Bonded BUNA-N
	Duplex Stainless Steel		
	Super Duplex Stainless Steel		
	Hastelloy®		

✦Standard Option

*FKM is the ASTM D1418 designation for fluorinated hydrocarbon elastomers (also called fluoroelastomers).

Monel® is a registered trademark of The International Nickel Company, Inc.

Halar® is a registered trademark of Solvay Solexis, Inc.

Hastelloy® is a registered trademark of Haynes International, Inc.

SERIES 31H

2"-20" (50mm-500mm)

Series 31H Lug valves are drilled and tapped to meet ASME Class 125/150 and PN16 flanges. Series 31H valves are designed for manual operation only.

PRESSURE RATINGS

BIDIRECTIONAL BUBBLE TIGHT SHUT OFF AND DEAD END SERVICE	
2"-20" (50-500mm)	250 psi (17.2 bar)
BODY: 250 psi (17.2 bar)	

VELOCITY LIMITS FOR ON/OFF SERVICES

FLUIDS: 30 ft/sec (9 m/s)	**GASES:** 175 ft/sec (54 m/s)

STANDARD MATERIAL SELECTIONS

Body	Cast Iron Ductile Iron
Disc	Nickel Aluminum Bronze Nylon 11 Coated Ductile Iron 316 Stainless Steel
Stem	416 Stainless Steel
Seat	Bonded EPDM Bonded BUNA-N

Material availability depends on valve size and series. Other materials are available. Please consult your local Bray representative for your specific application.

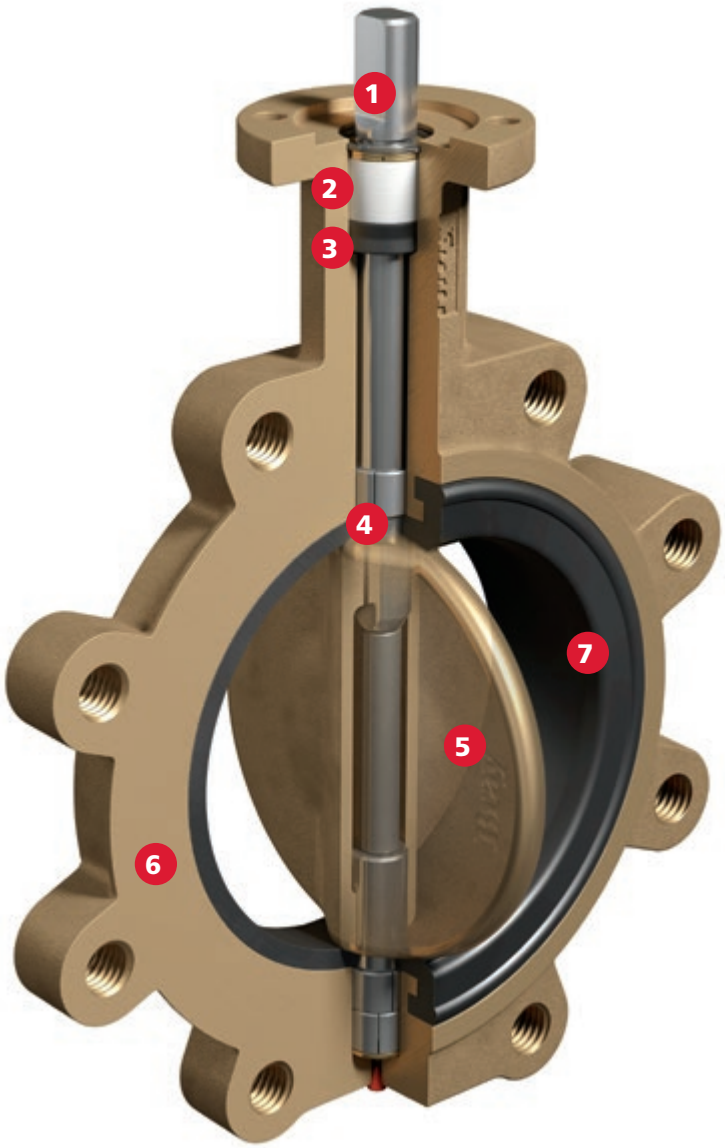
Bray offers this high pressure resilient seated butterfly valve to meet the requirements of today's industrial and marine markets. This valve is specifically designed for onshore and offshore fire protection. The Series 31U is designed to withstand high line velocities and pressure drops through the valve.

PRESSURE RATINGS

BIDIRECTIONAL BUBBLE TIGHT SHUT OFF AND DEAD END SERVICE	
2"-12" (50-300mm)	285 psi (20 bar)
BODY: 285 psi (20 bar)	

VELOCITY LIMITS FOR ON/OFF SERVICES

FLUIDS: 30 ft/sec (9 m/s)	**GASES:** 175 ft/sec (54 m/s)



1 – **STEM:** High strength upper and lower stems incorporate a close tolerance double "D" disk drive connection.

2 – **STEM BUSHING:** Non-corrosive heavy duty acetal bushing absorbs actuator side thrust.

3 – **STEM SEAL:** Patented stem retaining ring and C-rings prevent unintentional removal of the stem during field service.

4 – **PRIMARY AND SECONDARY SEALS:** These seals prevent line media from coming in contact with the stem or body. The primary seal is an interference fit of the molded seat flat with the disc hub. The secondary seal is created because the stem diameter is greater than the diameter of the seat stem hole.

5 – **DISC:** Casting is spherically machined and hand polished to provide bubble tight shut off with minimum torque and an extended seat life.

6 – **BODY:** One piece lugged style flange configuration, with a choice of polyester coated ductile iron, polyester coated carbon steel or uncoated nickel aluminum bronze. All bodies can be drilled to be compatible with ASME 125/150, PN10/16 or other international flange standards.

7 – **SEAT DESIGN:** Bray's bonded tongue and groove resilient seat design offers lower torque than many valves on the market today and provides complete isolation of flowing media from all valve components (excluding the disc) by a totally encasing design. The seat features a molded tangential o-ring eliminating any need for flange gaskets.

MATERIAL SELECTION OPTIONS

Body	Nickel Aluminum Bronze✦ Carbon Steel Ductile Iron
Disc	316 Stainless Steel✦ Monel® K500✦ Nickel Aluminum Bronze✦
Stem	17-4PH Stainless Steel Monel® K500 Stainless Steel
Seat	Bonded BUNA-N

✦Standard Option

Monel® is a registered trademark of The International Nickel Company, Inc.

Material availability depends on valve size and series. Other materials are available. Please consult your local Bray representative for your specific application.

Bray's Series 3A/3AH valve is a double flanged design which can be used for dead end service and as a replacement for a gate valve. A major design advantage of the Series 3A/3AH is international compatibility. The same valve is compatible with most world flange standards:

- ASME Class 125/150
- BS 10 Tables D and E
- BS 4504 NP 10/16
- DIN ND 10/16
- AS 2129 and JIS10.

In addition, the valves are designed to comply with:

- ISO 5752 - Table 1, Series 13 (EN 558 Table 2, Series 13) face-to-face
- ISO 5211 actuator mounting flanges

Therefore, one valve design can be used in many different world markets.

PRESSURE RATINGS

BIDIRECTIONAL AND DEAD END SERVICE BUBBLE TIGHT SHUT OFF Standard Disc*		
Series 3A Standard Disc*	2"-12" (50-300mm)	175 psi (12 bar)
	14"-20" (350-500mm)	150 psi (10.3 bar)
BODY: 250 psi (17.2 bar)		

*For low pressure (50 psi) applications, Bray offers a standard reduced disc diameter to decrease seating torques and extend seat life, thus increasing the valve's performance and reducing actuator costs.

VELOCITY LIMITS FOR ON/OFF SERVICES

FLUIDS: 30 ft/sec (9 m/s)	**GASES:** 175 ft/sec (54 m/s)

1 – **STEM:** Precision double "D" disc to stem connection drives the disc without the need for screws or pins. The close tolerance, double "D" connection that drives the valve disc is an exclusive feature of the Bray valve. Disassembly of the Bray stem is just a matter of pulling the stem out of the disc.

2 – **STEM RETAINING ASSEMBLY:** The stem is retained in the body by means of a unique stainless steel Spirolox® retaining ring, a thrust washer and two C-rings, manufactured from brass as standard, stainless steel upon request.

3 – **STEM BUSHING:** Non-corrosive, heavy duty acetal bushing absorbs actuator side thrusts.

4 – **STEM SEAL:** Double "U" cup seal design is self-adjusting, gives positive sealing in both directions, and prevents external substances from entering the stem bore.

5 – **PRIMARY AND SECONDARY SEALS:** These seals prevent line media from coming in contact with the stem or body. The primary seal is an interference fit of the molded seat flat with the disc hub. The secondary seal is created because the stem diameter is greater than the diameter of the seat stem hole.

6 – **DISC:** Casting is spherically machined and hand polished to provide a bubble tight shutoff, minimum torque, and longer seat life. Bray's resilient Nylon 11 coating comes as standard.

7 – **SEAT:** Bray's bonded seat offers lower torque and provides complete isolation of flowing media from the body. The seat also features a molded O-ring which eliminates the use of flange gaskets.

8 – **BODY:** One piece full flanged style. All bodies are drilled to be compatible with ASME 125/150, PN 10 or other international flange standards.

MATERIAL SELECTION OPTIONS

BODY	STEM	SEAT	DISC	
Cast Iron✦ Ductile Iron✦ Carbon Steel	416 Stainless Steel✦ 304 Stainless Steel 316 Stainless Steel Monel® K500	Bonded EPDM✦ Bonded BUNA-N✦ Bonded FKM*	Nylon 11 Coated Ductile Iron✦ 316 Stainless Steel✦ Nickel Aluminum Bronze Coated Ductile Iron Halar® Coated Ductile Iron	304 Stainless Steel Duplex Stainless Steel Super Duplex Stainless Steel Hastelloy®

✦Standard Option
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Hastelloy® is a registered trademark of Haynes International, Inc.
Monel® is a registered trademark of The International Nickel Company, Inc.

SERIES 3AH

2"-20" (50mm-500mm)

Series 3AH Double Flanged valves are drilled and tapped to meet ASME Class 125/150 and PN16 flanges. Other flange drilling is available. Series 3AH valves are designed for manual operation only.

PRESSURE RATINGS

BIDIRECTIONAL BUBBLE TIGHT SHUT OFF AND DEAD END SERVICE	
2"-20" (50-500mm)	250 psi (17.2 bar)
BODY: 250 psi (17.2 bar)	

VELOCITY LIMITS FOR ON/OFF SERVICES

FLUIDS: 30 ft/sec (9 m/s)	**GASES:** 175 ft/sec (54 m/s)

STANDARD MATERIAL SELECTIONS

BODY	STEM	SEAT	DISC
Ductile Iron	416 Stainless Steel	Bonded EPDM Bonded BUNA-N	Nickel Aluminum Bronze Nylon 11 Coated Ductile Iron 316 Stainless Steel

Material availability depends on valve size and series. Other materials are available. Please consult your local Bray representative for your specific application.

ISOLATION FROM LINE MEDIA

Bray's seat design and internal disc to stem connection isolates the line media from the body and stem.

INTERNAL DISC TO STEM CONNECTION

Bray offers splined and keyed disc to stem connections. These internal, non-wetted connections eliminate external disc to stem connections such as screws or taper pins.

Spline: Male splines on the stem and female in the disc.
Standard Sizes: 22"– 48" (550mm–1200mm)
Selected Sizes: 54"– 120" (1400mm–3000mm)

DOUBLE KEYED

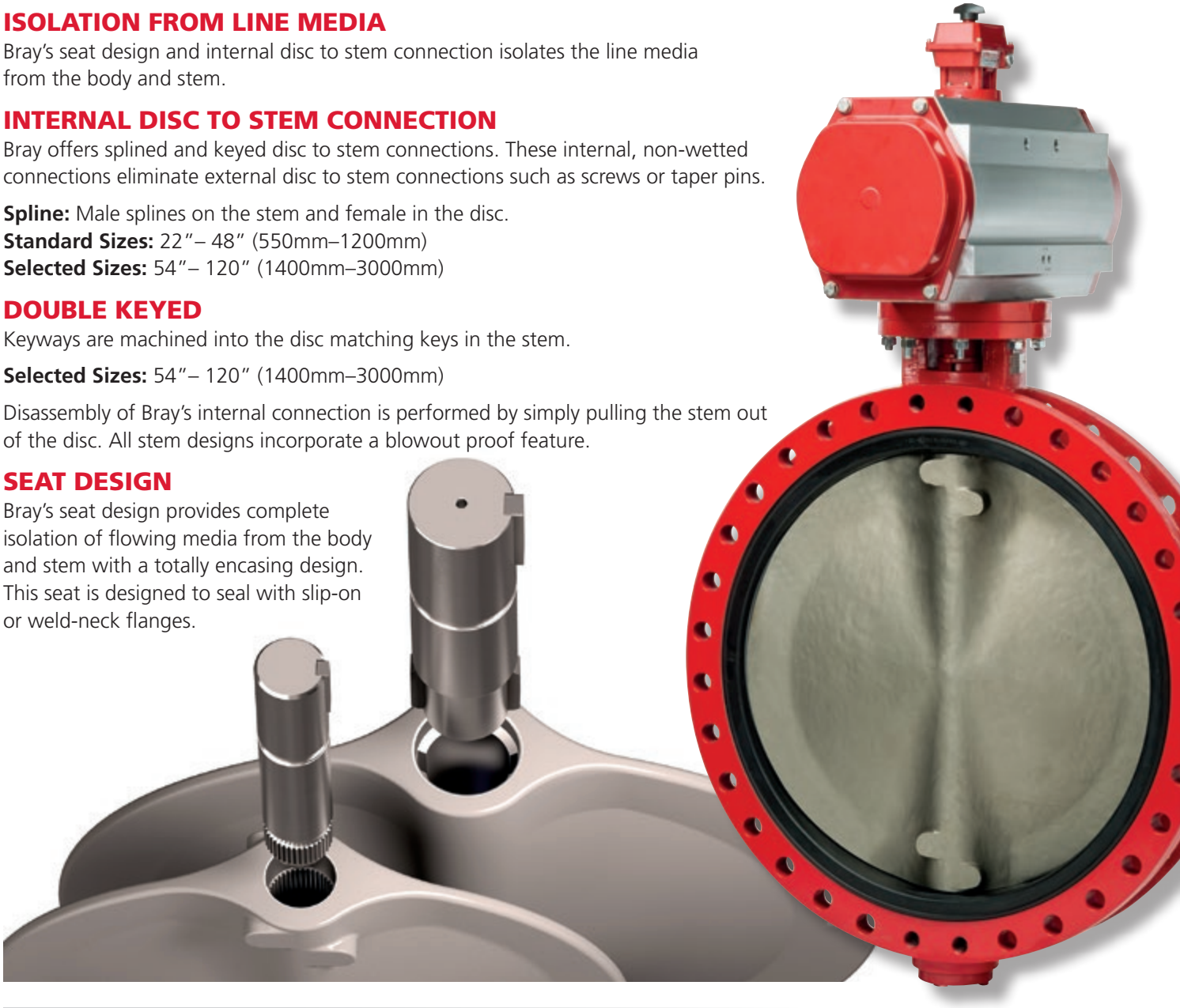
Keyways are machined into the disc matching keys in the stem.

Selected Sizes: 54"– 120" (1400mm–3000mm)

Disassembly of Bray's internal connection is performed by simply pulling the stem out of the disc. All stem designs incorporate a blowout proof feature.

SEAT DESIGN

Bray's seat design provides complete isolation of flowing media from the body and stem with a totally encasing design. This seat is designed to seal with slip-on or weld-neck flanges.

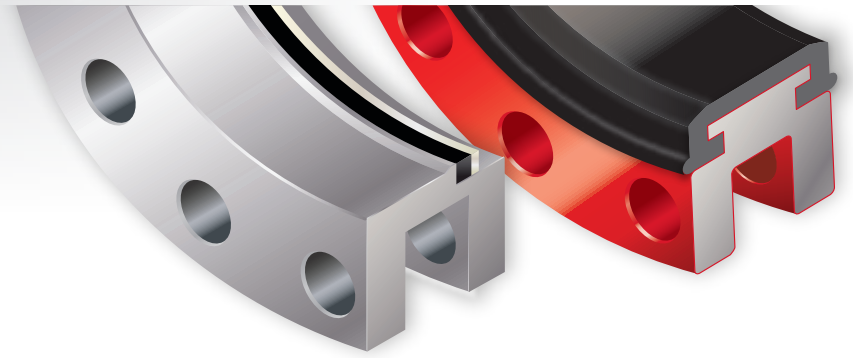


Competitor Strip Seats expose the body, stem and disc stem hole to the line media, thus causing premature failure due to corrosion. Material costs are significantly increased for highly corrosive applications.

Bray Seats isolate the line media from contacting the body and stem, thus increasing service life and therefore lowering costs over the life of the valve.

BRAY TONGUE AND GROOVE SEATS

Competitor Strip Seat **Bray's Seat**



All Bray valves are pressure tested to 110% of rated pressure to assure bubble tight shutoff.

The Series 32/33 has many of the design features and benefits of the smaller Bray valves, such as high C_V ratings, minimum parts exposed to the line media, greater reliability and a proven record of long service life.

PRESSURE RATINGS

BIDIRECTIONAL BUBBLE TIGHT SHUT OFF Downstream flanges and disc in closed position		
Series 32 (Wafer)	22"-36” (550-900mm)	75 psi (5.2 bar)
Series 33 (Wafer)	22"-36” (550-900mm)	150 psi (10.3 bar)
BODY : 150 psi (10.3 bar)		

VELOCITY LIMITS FOR ON/OFF SERVICES

FLUIDS: 30 ft/sec (9 m/s)	**GASES:** 175 ft/sec (54 m/s)

1 – **THRUST BEARING:** Prevents side loading of the stem caused by actuator torque.

2 – **PRIMARY AND SECONDARY SEALS:** These seals prevent line media from coming in contact with the stem or body. The primary seal is an interference fit of the molded seat flat with the disc hub. The secondary seal is created because the stem diameter is greater than the diameter of the seat stem hole.

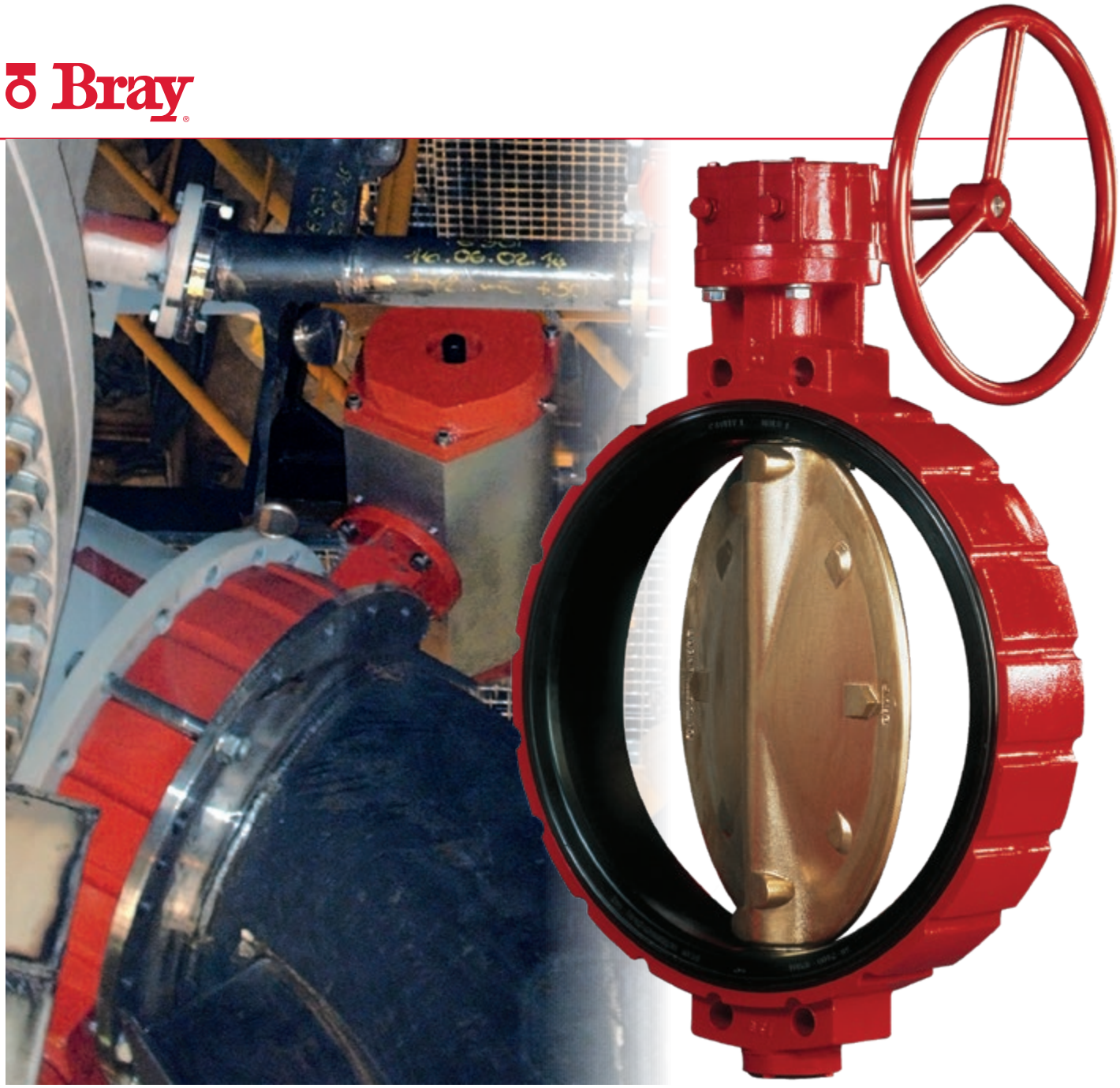
3 – **BODY:** One piece wafer style. All bodies are designed to be compatible with ASME 125/150, PN 10 or other international flange standards.

4 – **DISC:** High strength discs are spherically machined then hand polished and coated with Nylon 11. The symmetrical disc profile increases CV values, reduces turbulence and increases pressure recovery.

5 – **SEAT:** The replaceable tongue and groove seat to body retention method is the most advanced design in the industry. Molded o-ring eliminates the requirement of flange gaskets. The seat isolates the valve body and stem from line media and has been specifically designed to seal with slip-on or weld-neck flanges.

6 – **STEM RETAINER:** The steel stem retainer locks the stem assembly together and assists in aligning the disc during assembly. This feature also makes the stem blow out proof.

7 – **STEM ASSEMBLY:** The upper and lower shafts provide a strong, positive connection to the disc and the tie-rod bolting design allows for better control of the disc to seat hub interferences.



MATERIAL SELECTION OPTIONS

BODY	DISC	STEM	SEAT	PACKING
Cast Iron✦ Ductile Iron✦ Carbon Steel 316 Stainless Steel	Nylon 11 Coated Ductile Iron✦ 316 Stainless Steel✦ 304 Stainless Steel Aluminum Bronze Monel® Hastelloy® Duplex Stainless Steel Super Austenitic Stainless Steel	416 Stainless Steel✦ 304 Stainless Steel 316 Stainless Steel 17-4 PH Stainless Steel Monel® Duplex Stainless Steel Super Austenitic Stainless Steel	EPDM✦ BUNA-N✦ FKM* Valves 54"(1400 mm) and larger are provided with bonded seats	BUNA-N **BEARINGS** Lubricant Impregnated Bronze PTFE encapsulated stainless steel **THRUST BEARING** Brass

✦Standard Option

*FKM is the ASTM D1418 designation for fluorinated hydrocarbon elastomers (also called fluoroelastomers).

Hastelloy® is a registered trademark of Haynes International, Inc.

Monel® is a registered trademark of The International Nickel Company, Inc.

Material availability depends on valve size and series. Other materials are available. Please consult your local Bray representative for your specific application.

The Series 35/36 valves provide the same robust features of the Series 32/33 valves while adding adjustable packing, increasing the maximum valve size offered to 120" (3000mm), and utilizing the flexible design of a fully flanged body. These valves hold to the Bray traditions of reliable performance and providing a long service life.

PRESSURE RATINGS

BIDIRECTIONAL BUBBLE TIGHT SHUT OFF Downstream flanges and disc in closed position		
Series 35 (Full Flanged)	22"-120" (550-3000mm)	75 psi (5.2 bar)
Series 36 (Full Flanged)	22"-120" (550-3000mm)	to 150 psi (10.3 bar)
DEAD END SERVICE No downstream flanges and disc in closed position		
Series 35 (Full Flanged)	22"-120" (550-3000mm)	30 psi (2.1 bar)
Series 36 (Full Flanged)	22"-120" (550-3000mm)	50 psi (3.4 bar)
BODY: Series 35, 36	150 psi (10.3 bar)	

VELOCITY LIMITS FOR ON/OFF SERVICES

FLUIDS: 30 ft/sec (9 m/s)	**GASES:** 175 ft/sec (54 m/s)

1 – **BLOWOUT PROOF STEM:** A retaining ring, installed between the machined stem groove and gland retainer step, provides full retention of the stem in the unlikely event of internal stem failure.

2 – **ADJUSTABLE PACKING SYSTEM:** Design allows for field adjustment of stem packing without removing manual operators or power actuators. The advanced, self-adjusting V-Type stem packing prevents external substances from entering the upper stem bore.

3 – **UPPER AND LOWER STEM BEARINGS:** These PTFE/stainless steel bearings protect the shaft and body from wear during pressurized cycles.

4 – **PRIMARY AND SECONDARY SEALS:** These seals prevent line media from coming in contact with the stem or body. The primary seal is an interference fit of the molded seat flat with the disc hub. The secondary seal is created because the stem diameter is greater than the diameter of the seat stem hole.

5 – **BODY:** One piece full flanged style. All bodies are drilled to be compatible with ASME 125/150, PN 10 or other international flange standards.

6 – **DISC:** High strength discs are spherically machined then hand polished and coated with Nylon 11. The symmetrical disc profile increases CV values, reduces turbulence and increases pressure recovery.

7 – **SEAT:** The replaceable tongue and groove seat to body retention method is the most advanced design in the industry. Molded o-ring eliminates the requirement of flange gaskets. The seat isolates the valve body and stem from line media.

8 – **STEM RETAINER:** The steel stem retainer locks the stem assembly together and assists in aligning the disc during assembly.

9 – **STEM ASSEMBLY:** The upper and lower shafts provide a strong, positive connection to the disc and the tie-rod bolting design allows for better control of the disc to seat hub interferences.

SERIES 35/36 FULL FLANGED MATERIAL SELECTION OPTIONS

BODY	DISC	STEM	SEAT
Cast Iron✦ Ductile Iron✦ Carbon Steel 316 Stainless Steel	Nylon 11 Coated Ductile Iron✦ 316 Stainless Steel 304 Stainless Steel Nickel Aluminum Bronze Monel® Hastelloy® Duplex Stainless Steel Super Austenitic Stainless Steel	416 Stainless Steel✦ 304 Stainless Steel 316 Stainless Steel 17-4 PH Stainless Steel Monel® Duplex Stainless Steel Super Austenitic Stainless Steel	EPDM✦ BUNA-N FKM* Valves 54" (1400mm) and larger are provided with bonded seats

PACKING: BUNA-N
BEARINGS: Lubricant impregnated bronze, PTFE encapsulated stainless steel
THRUST BEARING: Brass

✦Standard Option

SERIES 35F

Bray Series 35F large diameter butterfly valves are designed specifically for high chloride services. Series 35F valves offer rugged reliability in a light weight design.

PRESSURE RATINGS

BIDIRECTIONAL BUBBLE TIGHT SHUT OFF Downstream flanges and disc in closed position	
32"-60" (800-1500mm)	75 psi (5.2 bar)
DEAD END SERVICE No downstream flanges and disc in closed position	
32"-60" (800-1500mm)	30 psi (2.1 bar)
BODY: 150 psi (10.3 bar)	

VELOCITY LIMITS FOR ON/OFF SERVICES

FLUIDS: 30 ft/sec (9 m/s)	**GASES:** 175 ft/sec (54 m/s)

STANDARD MATERIALS SELECTION

Body	Cast Iron, Ductile Iron
Disc	Hastelloy® Duplex Stainless Steel Super Austenitic Stainless Steel
Stem	304 Stainless Steel 316 Stainless Steel
Seat	Bonded EPDM Bonded BUNA-N
Packing	BUNA-N
Bearings and Thrust Bearing	PTFE / Stainless Steel, Brass

SERIES 36H

High pressure manual butterfly valves that meet many of today's requirements in the process industry. Series 36H large diameter, double flanged valves are rated for 232 psi (16 bar) bidirectional bubble-tight service and 150 psi (10.3 bar) bubble-tight with the downstream flange removed. Series 36H double flanged valves are drilled and tapped to meet ASME Class 125/150 and PN10 flanges. Series 36H valves are designed for manual operation only.

PRESSURE RATINGS

BIDIRECTIONAL BUBBLE TIGHT SHUT OFF Downstream flanges and disc in closed position	
22"-60" (550-1500mm)	232 psi (16 bar)
DEAD END SERVICE No downstream flanges and disc in closed position	
22"-60" (550-1500mm)	150 psi (10.3 bar)
BODY: 232 psi (16 bar)	

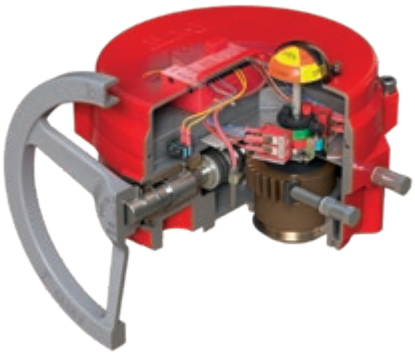
VELOCITY LIMITS FOR ON/OFF SERVICES

FLUIDS: 30 ft/sec (9 m/s)	**GASES:** 175 ft/sec (54 m/s)

STANDARD MATERIALS SELECTION

Body	Ductile Iron
Disc	Nylon 11 Coated, Ductile Iron Nickel Aluminum Bronze 316 Stainless Steel
Stem	17-4 PH Stainless Steel
Seat	Bonded EPDM Bonded BUNA-N
Packing	BUNA-N
Bearings and Thrust Bearing	PTFE / Stainless Steel, Brass

Material availability depends on valve size and series. Other materials are available. Please consult your local Bray representative for your specific application.



SERIES 70 ELECTRIC ACTUATOR

Low profile, compact, high output actuator for quarter turn applications

- On/Off or modulating (Servo NXT)
- Manual declutchable handwheel
- Optional Seacorr® coating for harsh environments
- High visibility dome position indicator
- Network protocols available

Voltages	120, 220, 24VAC 50/60 Hz, 1-phase, 24VDC
Output Torque	300 to 18,000 lb-ins (34 to 2,034 Nm)
Standard Enclosure	NEMA Type 4, 4X
Explosion Proof (Optional)	NEMA Type 4, 4X, 7, 9 Class I, Div 1 & 2, Group C, D Class II, Div 1 & 2, Group E, F, and G

SERIES 92/93 PNEUMATIC ACTUATOR

Rack and pinion actuators available in double acting and spring return

- Standard units have anodized aluminum bodies with polyester coated end caps
- SIL 3 capable
- Optional Seacorr® coating for harsh environments
- Integral porting
- Internal bidirectional travel stops

Extreme High Temperature Actuator

Stainless Steel Actuator

Torque	Double Acting up to: 44,130 lb-in (4,986 Nm) Spring End Torque up to: 14,173 lb-in (1,601 Nm)	
Pressure Range	40 - 140 psi (2.8 - 10 bar)	
Media	Dry Compressed Air/Inert Gas*	
Temperature Range	Standard	-4°F to 200°F (-20°C to 93°C)
	Low	-40°F to 176°F (-40°C to 80°C)
	High	0°F to 300°F (-18°C to 149°C)
	Extreme High Temperature	0°F to 482°F (-18°C to 250°C)

*Contact factory for other media or non-standard temperature range.

Pneumatic Actuator

Hydraulic Actuator

Self-Contained Electro-Hydraulic Actuator

SERIES 98 SCOTCH YOKE ACTUATORS

For quarter turn rotary operation

- Low Pressure Pneumatic Actuator
- High Pressure Hydraulic Actuator
- Optional Self-Contained Integral Hydraulic Power Pack or Centralized Hydraulic Power Unit to power multiple hydraulic actuators.
- Compact design with a high torque to weight ratio
- Modular design offers easy configuration in the field
- Premium epoxy/polyurethane coating as standard
- SIL 3 capable
- Pressure Equipment Directive (PED) 97/23/EC compliant
- Standardized interfaces: ISO 5211, VDI/VDE 3845 for accessories

Optional

- Manual overrides
- Hydraulic dampener for fast acting operation, lockout/pst device
- Lockout/PST device

Torque	Double Acting: Pneumatic or Hydraulic up to: 885,000 lb-in (100,000 Nm)	
	Spring Return (Spring End): Pneumatic or Hydraulic up to 445,261 lb-in (50,306 Nm)	
Pressure Range	Pneumatic: 40 - 150 psi (2.8 - 10.3 bar) Hydraulic: 500 - 3000 psi (35 - 207 bar)	
Media	Pneumatic: Dry compressed air/inert gas Hydraulic: Hydraulic Fluid (Standard Trim) ISO VG 32/46, ISO-L-HV, flash point >157°C	
Temperature Range	Standard	-4°F to 200°F (-20°C to 93°C)
	High Temperature	Up to 300°F (149°C)
	Low Temperature	Down to -50°F (-46°C)

SERIES 6A ELECTRO-PNEUMATIC POSITIONER

> Precision digital control
> Zero bleed design
> Compatible with rotary or linear actuators for single and double acting applications
> Various housing options available
> Precise, microprocessor driven flow control and advanced communication
> Non-contacting position sensor technology
> Integral volume booster
> Connective and preventative maintenance self-diagnostic checks

SERIES 6P PNEUMATIC POSITIONER

> Pneumatic to pneumatic positioner for single and double acting actuators
> Rugged aluminum diecast housing for harsh environments
> Minimal setup time for zero and span adjustment
> Split range capabilities
> High visibility dome position indicator
> Optional 2 x SPDT mechanical switches

SERIES 5A, 5B AND 5C VALVE STATUS MONITORS

> Discrete status monitor for quarter turn rotary actuators
> NEMA 4, 4X and IP66 and IP67 ingress protection
> Intrinsically safe or explosion-proof options for hazardous locations
> High visibility dome position indicator
> Up to 6 SPDT switches or non-contacting proximity switches
> Switches pre-wired to internal terminal block
> Available in die-cast aluminum housing coated with 2-layers of polyester or fiberglass reinforced PBT housing for highly corrosive environments

SERIES 54 VALVE PROXIMITY SENSOR

> Dual proximity sensors for valve position
> NEMA 4, 4X and IP66, IP67, IP69K ingress protection available
> Available solenoid outputs
> 2 or 3 wire DC, AC/DC, intrinsically safe, and AS-i interface
> Pin connector or conduit versions available

SERIES 63 SOLENOID VALVES

> Weatherproof NEMA 4, 4X and explosion proof housings available
> Flying leads or DIN connectors, single or dual coil
> 5/2 or 3/2 operation
> NAMUR mounted
> High flow up to 1.4 Cv
> Intrinsically safe versions available
> Available voltages: 12, 24 VDC; 24, 110, 220 VAC

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Tel: +1.281.894.5454

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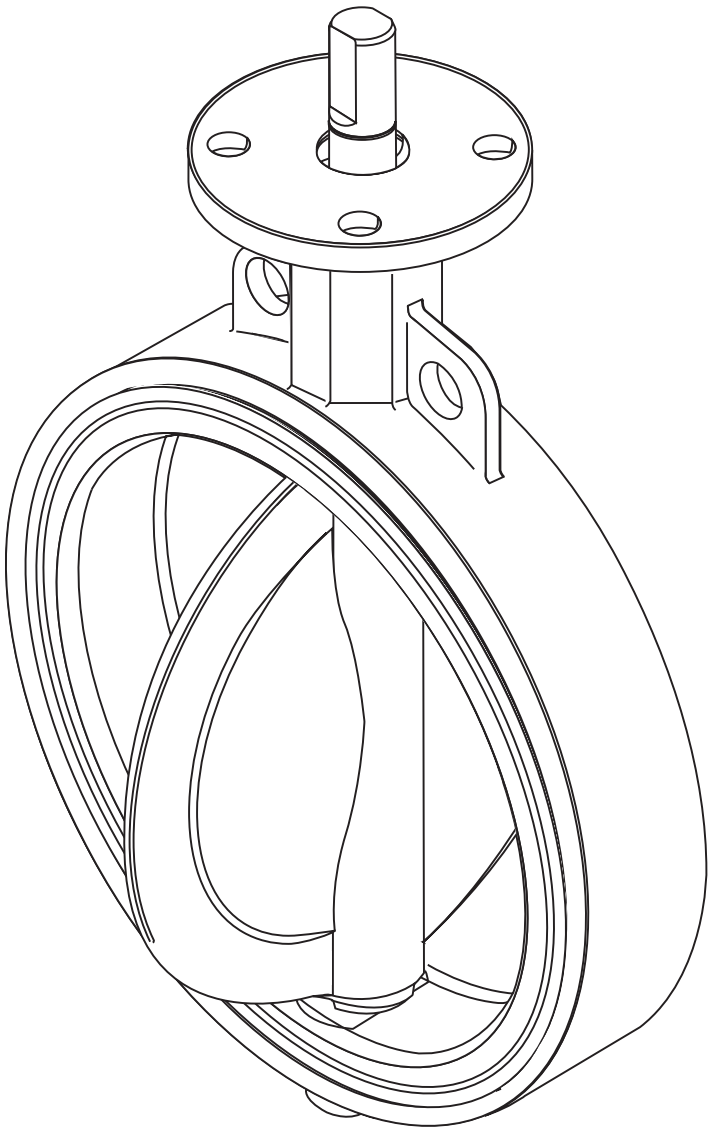
RESILIENT SEATED BUTTERFLY VALVES

Installation, Operation and Maintenance Manual

20/21 | 22/23 | 30/31 | 3A/3AH | 31H | 31U | 32/33 | 35/36 | 36H



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READ AND FOLLOW THESE INSTRUCTIONS CAREFULLY.
SAVE THIS MANUAL FOR LATER USE.

1.0 SAFETY INSTRUCTIONS - DEFINITION OF TERMS

⚠ WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

NOTICE

Used without the safety alert symbol, indicates a potential situation which, if not avoided, may result in an undesirable result or state, including property damage.

2.0 INTRODUCTION

2.1 Historical Experience

2.1.1 Based on over thirty years experience in the butterfly industry, Bray can state without question the majority of all field problems for resilient seated butterfly valves are directly related to poor installation procedures. For this reason, it is very important all distributor salespeople educate their customers regarding proper installation of resilient seated butterfly valves.

2.2 Butterfly Valve Seat / Disc Function

2.2.1 Before reviewing the proper installation, maintenance, and repair procedures for resilient seated butterfly valves, let's discuss the seat-disc function of a butterfly valve. The seat in a resilient seated butterfly valve has molded o-rings on its flange face. As a result, no gaskets are required as these o-rings serve the function of a gasket. The flange face and molded o-rings of the seat extend beyond the body face-to-face to ensure sealing at the flange faces. The seat material, which extends past the face is compressed in installation and flows toward the center of the valve seat I.D.

2.2.2 In essence, the elastomer seat acts as a liquid, and the displaced elastomer moves toward the point of least resistance. The seat I.D. of all resilient seated butterfly valves is smaller than the disc O.D. This difference, the disc-seat interference, plus the increased interference due to the elastomer movement toward the seat center after installation, has been engineered so as to be the basis for pressure rating capability and the related seating/unseating torques. Any change in this interference due to improper installation directly affects the pressure rating and seating/unseating torques.

2.2.3 Finally, unlike many valve types, the resilient seated butterfly valve's disc actually extends beyond the face of the valve body at given angles of opening (say, 30° or more) when installed between flanges.

⚠ CAUTION

It is very important before installation to ensure the critical chordial dimension of the disc at the full open position is less than the adjacent pipe flange I.D.

2.3 Shipmment and Storage

2.3.1 The seat, disc, stem and bushing of the resilient seated butterfly valve should be coated with silicone lubricant unless specified otherwise

2.3.2 The disc should be positioned at 10° open. **Note:** See page 2 for special considerations for valves with spring return actuators.

2.3.3 Valves should be stored indoors with a preferred temperature range from 40°F (4°C) to 85°F (29°C).

2.3.4 While valves are in storage, they should be opened and closed once every 3 months.

2.3.5 Ship and store valves so that no heavy loads are applied to the bodies.

2.3.6 Polymer and elastomer parts should not be stored in the presence of sunlight or artificial light with high ultraviolet content, or any source of radiation as these are primary causes of aging.

2.3.7 If a component is cooled below 59°F (14°C), the entire valve assembly should be allowed to rise above 68°F (20°C) before installing into service.

2.3.8 Valve end protectors should only be removed at the time of valve installation.

3.0 INSTALLATION CONSIDERATIONS - PIPING AND VALVE ORIENTATION AND PLACEMENT

3.1 Piping and Flanged Compatibilities

3.1.1 Piping

3.1.1.1 These valves have been engineered so that the critical disc chord dimension at the full open position will clear the adjacent inside diameter of most types of piping, including Schedule 40, lined pipe, heavy wall, etc.

3.1.2 Metal Flanges

3.1.2.1 Resilient seated butterfly valves have been designed to be suitable for all types of flanges (ASME, DIN, JIS and other international flange standards), whether flat-faced, raised face, slip-on, weld-neck, etc. Proper alignment of any butterfly valve between flanges is critical to good performance of the valve. The flange bolts must also be evenly tightened around the circumference of the valve, providing consistent flange compression of the molded o-ring in the seat face.

3.1.2.2 Since Bray does not recommend the use of gaskets between flanges on resilient seated butterfly valves, a uniform flange face is critical to proper valve sealing. Most weld-neck and slip-on flanges conforming to ASME specifications have an appropriate flange face. Types A and B butt-weld stub-end flanges also provide a suitable mating surface for the molded o-ring.

3.1.2.3 It should be noted that Type C butt-weld stub-end flanges have an “as formed” flange face. The varying surface of this flange face can create sealing problems between any resilient-seated butterfly valve and the flange face. For this reason, Type C flanges are not recommended for use with resilient-seated butterfly valves.

3.1.3 Non-Metallic Flanges

3.1.3.1 When non-metallic flanges, such as plastic or PVC, are used with resilient seated butterfly valves, care must be taken not to over-tighten the flange bolts. The inherent flexibility of these non-metallic flange materials allow them to be over-tightened relatively easily. Flexing caused by this over-tightening can actually reduce the compression of the valve between the flanges, causing leaks between the valve and the flange face. Proper alignment and firm, even, but not excessive tightening of flange bolts are especially important with non-metallic flanges. In some cases, non-metallic flanges of low quality will not mate tightly with butterfly valves regardless of the care taken during installation.

3.2 Valves with Spring Return Actuators

3.2.1 Fail Closed Assemblies

3.2.1.1 If the valve is supplied with an actuator, the butterfly valve is shipped in the full closed position (as no air pressure is present to compress the springs and open the disc).

⚠ CAUTION

Installing the valve with the disc in the full closed position may create a compression set on the seat causing higher than expected torques or premature seat failure. It is recommended to:

> Remove the actuator. Be sure to scribe the valve and actuator to ensure the re-installed actuator is in the exact same quadrant as originally configured

> Install the valve per the attached installation tag instructions

> Re-install the actuator ensuring it is in the proper quadrant

3.2.2 Fail Open Assemblies

3.2.2.1 If the valve is supplied with an actuator, the butterfly valve disc is shipped in the full open position (as no air pressure is present to compress the springs and close the valve disc.) The sealing surface, or disc edge, is therefore exposed. Damage to that surface will cause premature seat failure.

⚠ CAUTION

Use caution installing the valve being careful not to damage the disc edge. It is recommended to:

> Remove the actuator. Be sure to scribe the valve and actuator to ensure the re-installed actuator is in the exact same quadrant as originally configured

> Install the valve per the attached installation tag instructions

> Re-install the actuator ensuring it is in the proper quadrant.

3.2.3 Valve Location

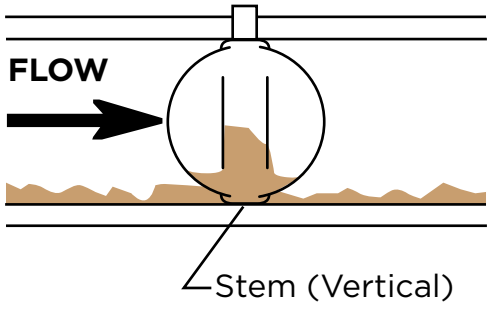
3.2.3.1 Resilient seated butterfly valves should be installed if possible a minimum of 6 pipe diameters from other line elements, i.e., elbows, pumps, valves, etc. of course, 6 pipe diameters are not always practical, but it is important to achieve as much distance as possible.

3.2.3.2 Where the resilient seated butterfly valve is connected to a check valve or pump, use an expansion joint between them to ensure the disc does not interfere with the adjacent equipment.

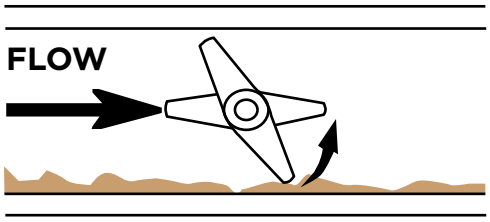
3.2.4 Valve Orientation

3.2.4.1 In general, Bray recommends the resilient seated valve be installed with the stem in the vertical position and the actuator mounted vertically directly above the valve; however, there are those applications as discussed below where the stem should be horizontal. NOTE: Bray does not recommend valves be installed in an upside-down position.

3.2.4.2 For slurries, sludge, mine tailing, pulp stock, dry cement, and any media with sediment or particles, Bray recommends the resilient seated valve be installed with the stem in the horizontal position with the lower disc edge opening in the downstream direction as illustrated below.



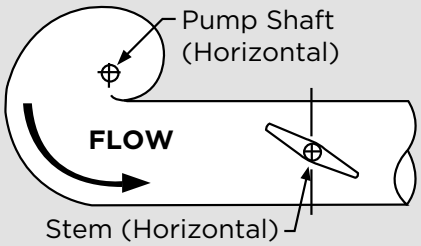
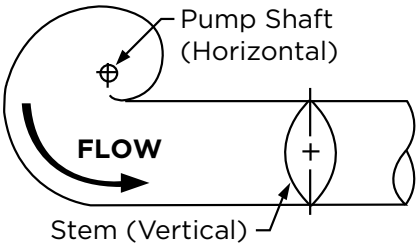
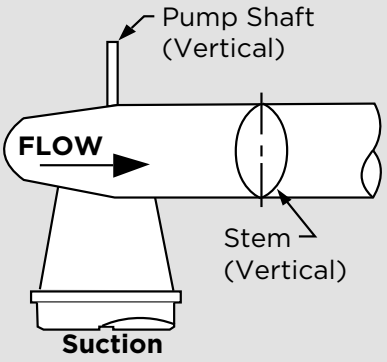
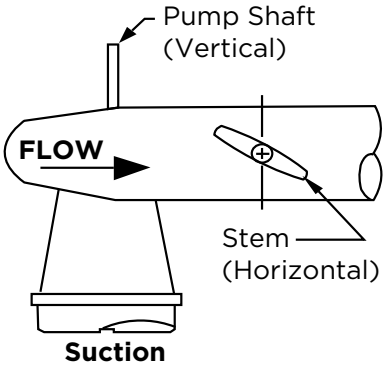
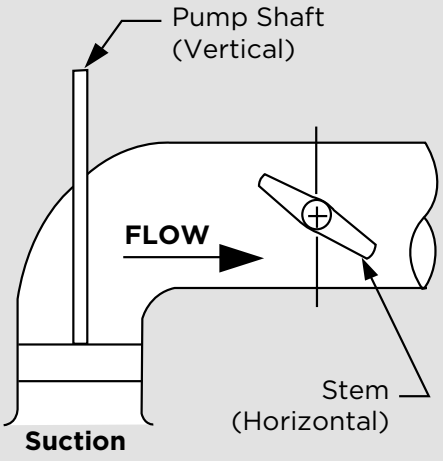
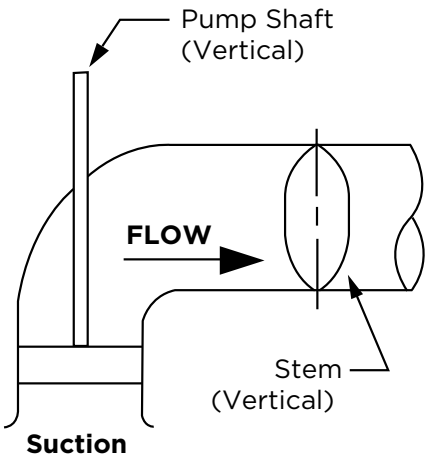
Incorrect Installation
Sludge builds up on the disc



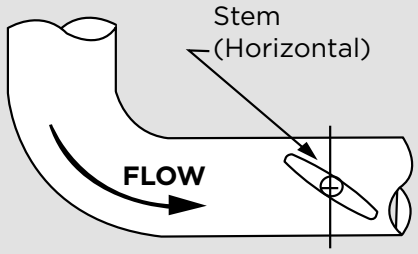
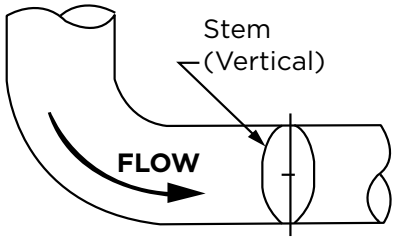
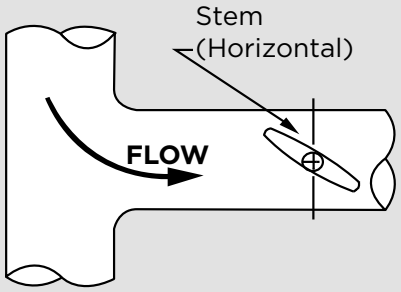
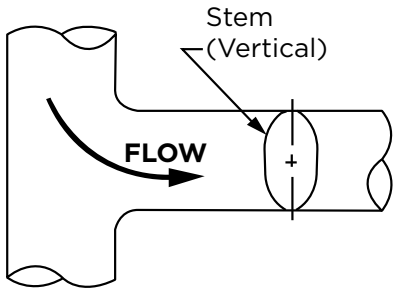
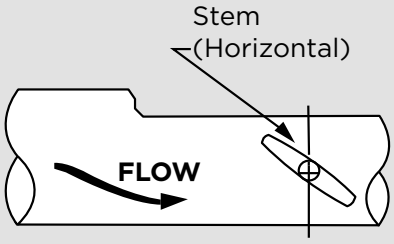
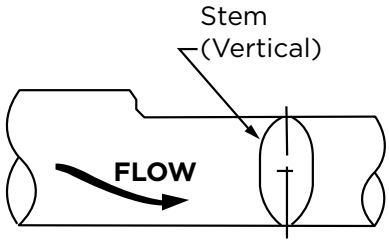
Stem (Horizontal)

Correct Installation
Sludge passes under the disc

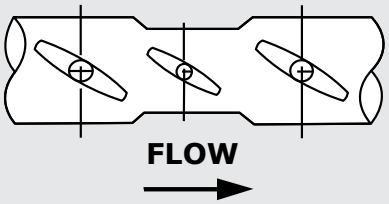
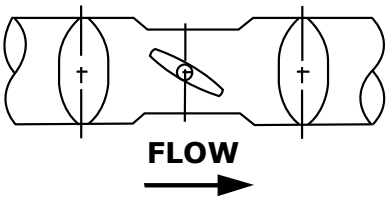
3.2.4.3 Resilient seated butterfly valve located at the discharge of a pump should be oriented as follows:

	INCORRECT INSTALLATION	CORRECT INSTALLATION
1. Centrifugal Pump Pump shaft horizontal and stem vertical		
2. Centrifugal Pump Pump shaft vertical and stem horizontal		
3. Axial Pump Pump shaft vertical and stem vertical		

3.2.4.4 Butterfly valves located downstream of a bend or pipe reducer should be oriented as follows:

	INCORRECT INSTALLATION	CORRECT INSTALLATION
1. Bend		
2. Tee		
3. Pipe Reducer		

3.2.4.5 Butterfly valves in combination for control/isolation applications should be installed as follows:

INCORRECT INSTALLATION	CORRECT INSTALLATION
	
Combination with all valve stems in the same direction accelerates possible noise, vibration, and erosion problems.	Combination with the stem of the control valve at right angle to those of other valves tends to cancel the drift of the fluid, and reduces noises, vibration, and erosion.

4.0 INSTALLATION PROCEDURE

4.1 General Installation

4.1.1 Make sure the pipeline and pipe flange faces are clean. Any foreign material such as pipe scale, metal chips, welding slag, welding rods, etc., can obstruct disc movement or damage the disc or seat.

4.1.2 The Bray elastomer seat has molded o-rings on the face of the seat. **As a result, no gaskets are required as these o-rings serve the function of a gasket.**

4.1.3 Align the piping and then spread the pipe flanges a distance apart so as to permit the valve body to be easily dropped between the flanges without contacting the pipe flanges (see Figure 1 page 11).

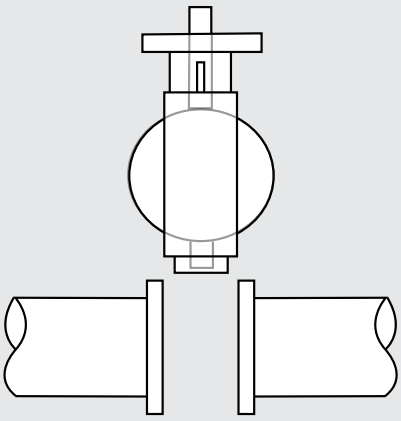
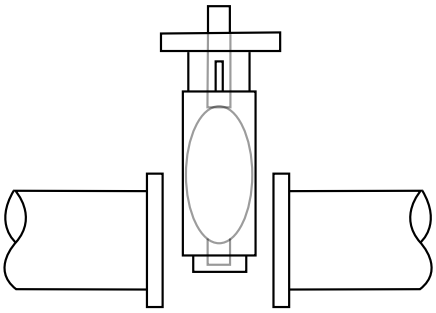
4.1.4 Check to see that the valve disc has been positioned to a partially open position, with the disc edge about 1/2 inch to 3/8 inch inside the face of the seat, (approximately 10° open) **(see Figure 1 page 11) Note: See page 6 for special consideration for valves with spring return actuators.**

4.1.5 Insert the valve between the flanges as shown in Figure 1 of page 11, taking care not to damage the seat faces. Always pick the valve up by the locating holes or by using a nylon sling on the neck of the body.

⚠ WARNING

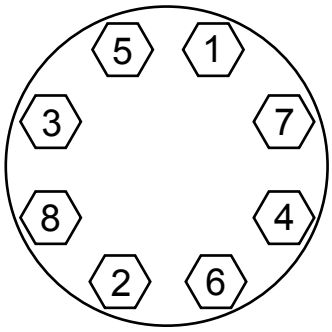
Never pick up the valve by the actuator or operator mounted on top of the valve.

Figure 1 - Insert Resilient Seated Butterfly Valve Between Flanges

INCORRECT INSTALLATION	CORRECT INSTALLATION
	
⚠ CAUTION Pipe not spread, disc opened beyond valve body face; **Results:** Disc edge damaged when it hits pipe flange.	Pipe spread and aligned, disc rotated; **Results:** no undesirable beginning seating/ unseating torque, disc edge protected.

4.1.6 Place the valve between the flanges, center it, and then span the valve body with all flange bolts, but do not tighten the bolts. Carefully open the disc to the full open position, making sure the disc does not hit the adjacent pipe I.D. Now systematically remove jack bolts or other flange spreaders, and hand-tighten the flange bolts as shown in Figure 2 below. Very slowly close the valve disc to ensure disc edge clearance from the adjacent pipe flange I.D. Now open the disc to full open and tighten **all** flange bolts per specification as shown in **Figure 2**. Finally, repeat a full close to full open rotation of the disc to ensure proper clearances (See Figures 3 & 4 page 7).

Figure 2 - Flange Bolt Tightening Pattern



4.1.7 For additional flange bolting information please reference the Resilient Seated Butterfly Valve Technical Manual and "Typical Flange Bolting Guide" found at www.bray.com

Figure 3 - Initial Centering and Flanging of Valve

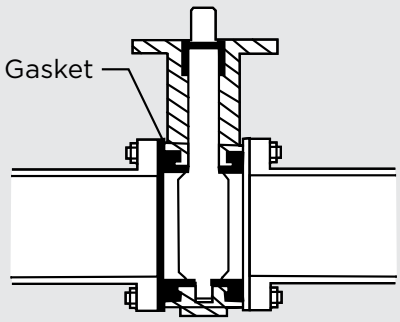
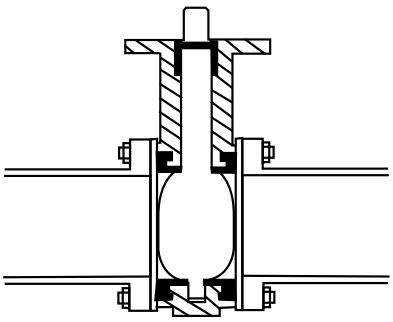
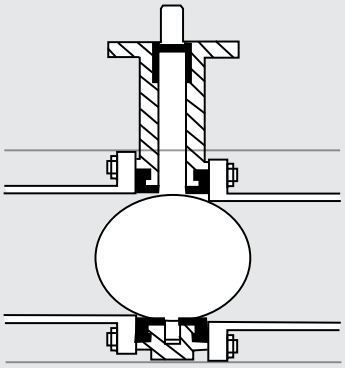
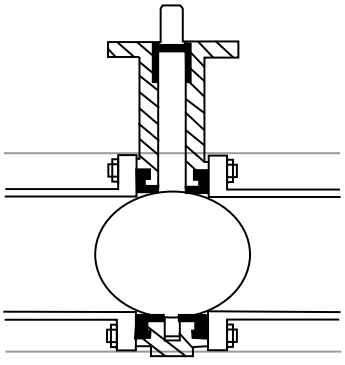
INCORRECT INSTALLATION	CORRECT INSTALLATION
	
Disc in closed position; gaskets used; **Results:** Seat distorted and over-compressed causing high initial unseating torque problems.	Bolts snugged, not torqued tight, disc edge within body face-to-face but not fully closed, no flange gaskets; **Results:** No disc edge damage, proper sealing allowed.

Figure 4 - Final Aligning and Tightening of Flange Bolts

INCORRECT INSTALLATION	CORRECT INSTALLATION
	
Piping misaligned; **Results:** Disc O.D. strikes pipe I.D. causing disc edge damage, increased torque & leakage. Seat face o-rings will not seal properly with incorrectly aligned piping.	Piping aligned properly when bolts tightened, disc in full open position; **Results:** disc clears adjacent pipe I.D., seat face seals properly, no excessive initial torque.

4.1.8 When resilient seated butterfly valves are to be installed between ASME welding type flanges, care should be taken to abide by the following procedure to ensure no damage will occur to the seat:

4.1.8.1 Place the valve between the flanges with the flange bores and valve body aligned properly. The disc should be in the 10° open position.

4.1.8.2 Span the body with the bolts.

4.1.8.3 Take this assembly of flange-body-flange and align it properly to the pipe.

4.1.8.4 Tack weld the flanges to the pipe.

4.1.8.5 When tack welding is complete, remove the bolts and the valve from the pipe flanges and complete the welding of the flanges. Be sure to let the pipe and flanges cool before installing the valve.

⚠ CAUTION

Never complete the welding process (after tacking) with the valve between pipe flanges. This causes severe seat damage due to heat transfer.

4.2 Installation of Bray PTFE Seated Butterfly Valves in Plastic Flanges.

4.2.1 Bray recommends the following guidelines when PTFE Seated Valves are installed between plastic flanges:

4.2.1.1 The valve body should be coated with epoxy, not nylon. The extra thickness of the nylon coating slightly reduces the seat compression, and every advantage to maximize seat compression should be taken with plastic flanges.

4.2.1.2 The plastic flange can be either one piece construction, or two piece construction comprised of a stub end and a backup ring.

4.2.1.3 The plastic flange style can be butt-weld, socket or slip-on, but butt-weld and socket are preferred.

4.2.1.4 The plastic flange face must be flat. Concave and convex flange faces are not acceptable. This includes flange faces that were originally flat but later distorted into a concave shape by over tightening the flange bolts.

4.2.1.5 The plastic flange face surface may have grooves or serrations, provided the grooves do not exceed .100” (2.54 mm) in width or .020” (.508 mm) in depth. If the grooves are less than .100” (2.54 mm) in width, the groove depth must not exceed the width. However, fine conentric or “phonograph record” grooves are acceptable regardless of the groove depth.

4.2.1.6 Flange gaskets must not be used with PTFE seats, since they create an uncontrolled over compression that can buckle the PTFE and damage the seat. If a damaged face, a flange gasket can appear to cure the leak to atmosphere, while simultaneously damaging the PTFE seat and creating a second leak across the disc or up the stem hole. Leaks across the plastic flange must be cured without the use of gaskets, by proper selection and installation of the flange.

4.2.1.7 The bolts holding plastic flanges should be installed in strict conformance to the recommended practices of the plastic flange manufacturer. This usually involves aligning the flanges accurately, using lubricated bolts, and tightening the bolts in the proper sequence and to the specified torque. Uniform stress across the flange prevents leakage.

5.0 MAINTENANCE AND REPAIR

⚠ WARNING

No valve maintenance, including removal of manual or power actuators, should be performed until the piping system is completely depressurized.

5.1 The many Bray features minimize wear and maintenance requirements. No routine lubrication is required. **All components – stem, disc, seat, bushing, stem seal, etc., are field replaceable, no adjustment is required.** If components require replacement, the valve may be removed from the line by placing the disc in the near closed position, then supporting the valve and removing the flange bolts.

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APPENDIX - DISASSEMBLY/ASSEMBLY INSTRUCTIONS

6.0 Appendix A - Series 20/21 Resilient Seated Butterfly Valves

6.1 Disassembly

6.1.1 Remove handle, gear operator or power actuator from actuator mounting flange.

6.1.2 Remove the body bolts and pull the lower body half away from the seat.

6.1.3 Pull the seat and disc stem from the upper body half.

6.1.4 Remove bushing and seal from the upper body.

6.1.5 Push the seat into an oval shape and remove the disc stem by withdrawing the short stem end first.

6.2 Assembly

6.2.1 Push the long stem end of the disc into the seat.

6.2.2 Then push the seat over the disc's short stem.

6.2.3 Place the disc stem and seat into the upper body half.

6.2.4 Align the lower body with the upper body and position lower body in the seat.

NOTICE

The body halves have a matching casting node on one side only to ensure correct assembly of body halves.

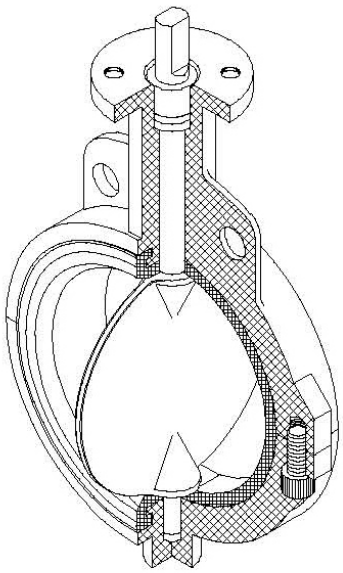
6.2.5 Replace the body bolts and tighten.

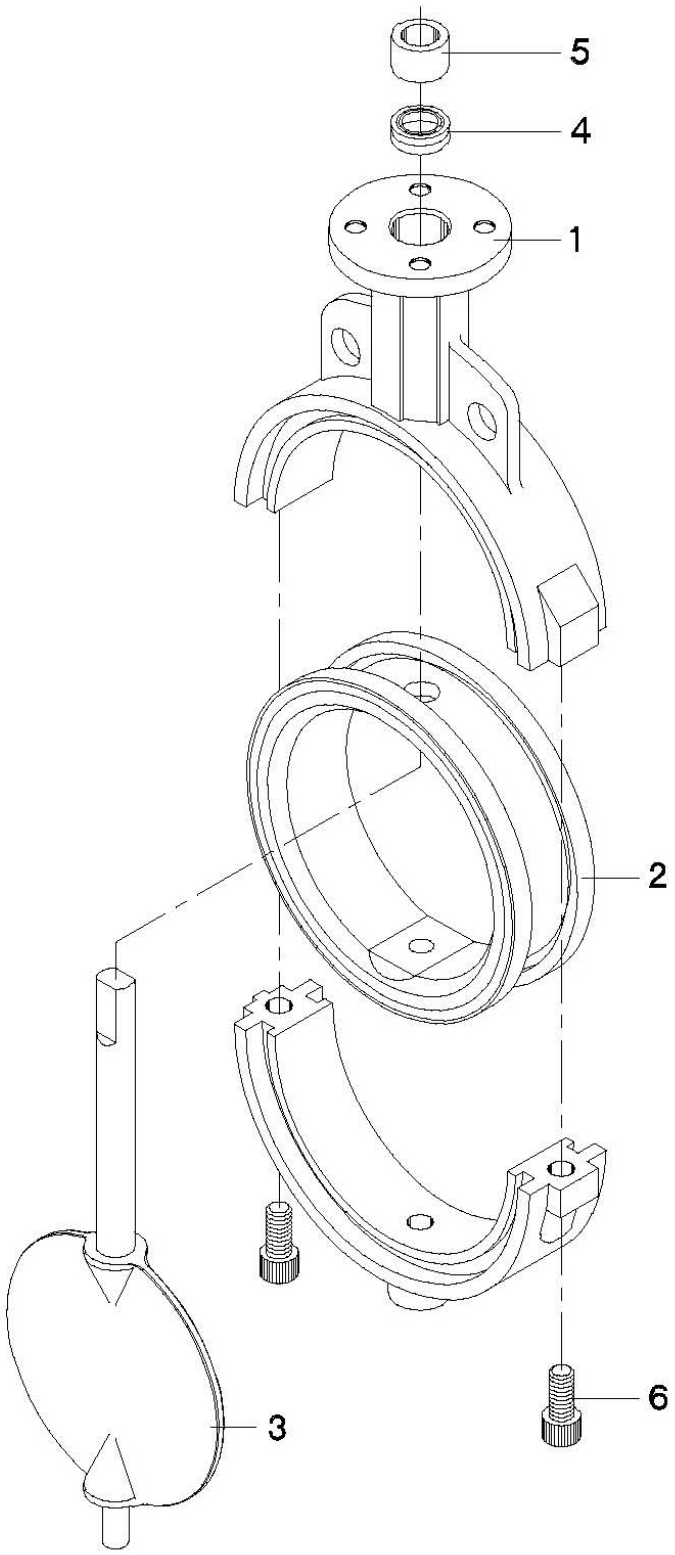
6.2.6 Install the stem seal, then the stem bushing.
Note: It is recommended that the stem bushing be coated with a light amount of silicone grease before installation in the valve body. This coating of silicone grease will assist in keeping the stem bushing in the valve body until an actuator is mounted on the valve.

6.2.7 Replace handle, manual gear operator or power actuator on the actuator mounting flange.

Series 20/21 - Resilient Seated Butterfly Valves

1	Body (S20 Wafer Style Shown)
2	Seat
3	Disc Stem
4	Stem Seal
5	Stem Bushing
6	Body Bolt





7.0 Appendix B - Series 22/23 Resilient Seated Butterfly Valves

7.1 Disassembly

7.1.1 Remove the handle, gear operator, or power actuator from actuator mounting flange.

7.1.2 Remove the "Spirolox"® retaining ring and the two C-ring stem retainers from the stem hole.

7.1.3 Then remove the stem, bushing and seal.

7.1.4 Remove the disc from the seat, protecting the disc edge at all times.

7.1.5 Remove the seat energizer from the stems and seat.

7.1.6 Remove the lower and upper stems from the disc or remove the lower stem if the upper stem is connected to the disc.

7.1.7 Compress the seat just enough to allow the disc to be removed along with the seal capsules.

7.1.8 Remove the retainer bushing and upper stem seal.

7.2 Assembly

7.2.1 Install the stem bearings in upper and lower body halves.

7.2.2 Place the body seal strip on the lower body half, overlapping the body width by approximately 0.19" on both sides.

7.2.3 Press the seat to make the I.D. elliptical, then insert the shaft seals and place the disc into the seat. Rotate the disc hubs into alignment with the seat.

7.2.4 Insert the upper and lower stems.

7.2.5 Slip one seat energizer strip onto the lower portion of the upper shaft.

7.2.6 Insert the upper shaft with the pre-installed seat energizer strip into the disc/seat sub assembly.

7.2.7 Drive the upper shaft into the disc and slip one seat energizer strip onto the lower shaft.

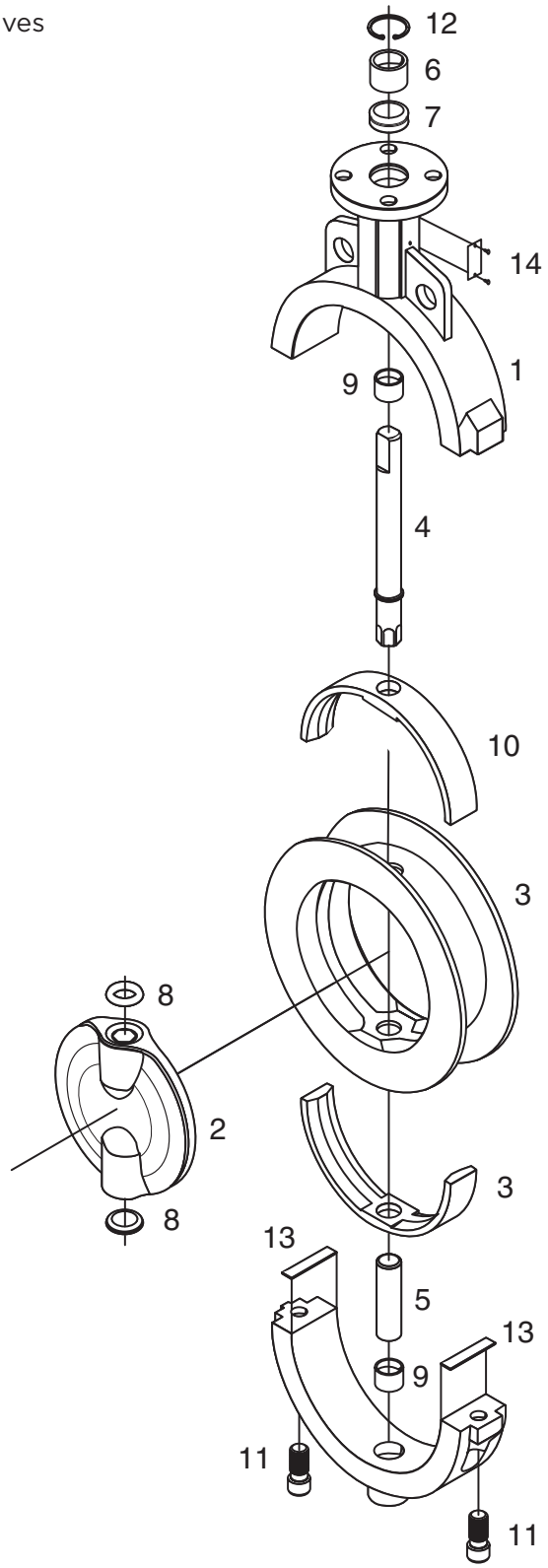
7.2.8 Rotate the disc into the open position and insert the disc/seat/stems/energizer sub assembly into the upper body half.

7.2.9 Place the lower body half over the seat, and ensure that both body halves are properly aligned (identified by cast-on markings.

7.2.10 Attach and tighten the body fasteners.

Series 22/23 - Resilient Seated Butterfly Valves

1	Body
2	Disc
3	Seat
4	Upper Stem
5	Lower Stem
6	Bushing
7	Upper Stem Seal
8	Seal Capsule
9	Bearing
10	Seat Energizer
11	Cap Screw
12	Retainer
13	Body Seal
14	ID Tag



8.0 Appendix C - Series 30/31 Resilient Seated Butterfly Valves

8.1 Disassembly

8.1.1 Remove the handle, gear operator, or power actuator from actuator mounting flange.

8.1.2 Remove the "Spirolox"® retaining ring and the two C-ring stem retainers from the stem hole.

8.1.3 Then remove the stem, bushing and seal.

8.1.4 Remove the disc from the seat, protecting the disc edge at all times.

8.1.5 Push the seat into an oval shape, and then remove the seat from the body.

8.2 Assembly

8.2.1 Push the valve seat into an oval and push it into the body with seat stem holes aligned to body stem holes.

NOTICE

When installing the seat the larger hole should be on top and the smaller hole should be on bottom.

8.2.2 Insert stem seal and bushing.

8.2.3 Push stem into the stem hole of the body until the bottom of the stem is flush with the inner top edge of the seat.

8.2.4 Install a light coating of silicone or grease on the I.D. of seat. Insert the disc into the seat by lining up the disc holes with the stem holes of the seat. **Note: The broached double "D" flats in the disc must be toward the bottom of the valve body.**

8.2.5 With a downward pressure and rotating the stem back and forth, push the stem until the stem touches the bottom of the body stem hole.

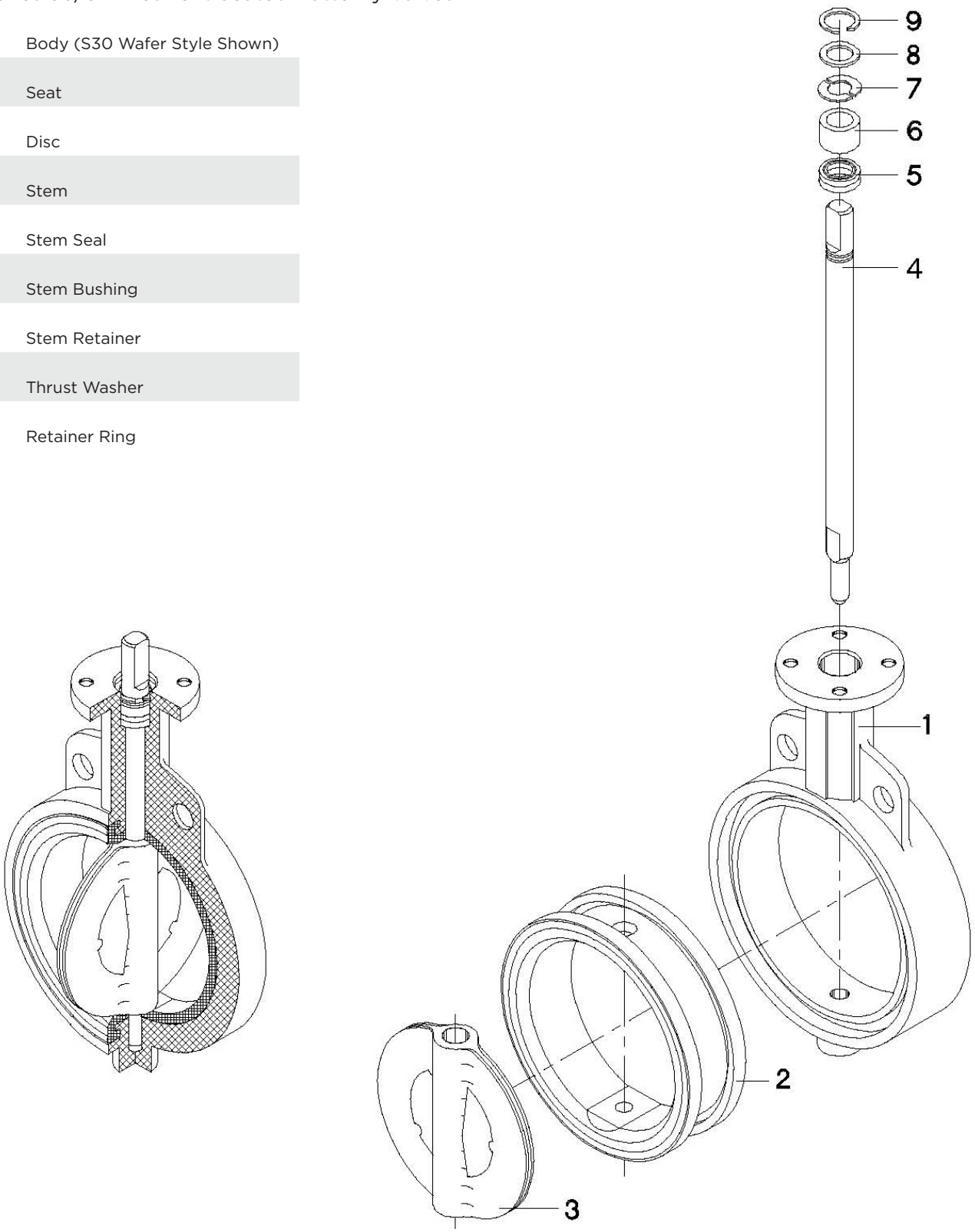
8.2.6 Make certain that when pushing the stem through the disc bottom, the broached flats of stem and disc are aligned.

8.2.7 Replace the stem bushing and two stem retainers, then replace the "Spirolox"® retaining ring back into position.

8.2.8 Replace handle, manual gear operator or power actuator on the actuator mounting flange.

Series 30/31 - Resilient Seated Butterfly Valves

1	Body (S30 Wafer Style Shown)
2	Seat
3	Disc
4	Stem
5	Stem Seal
6	Stem Bushing
7	Stem Retainer
8	Thrust Washer
9	Retainer Ring



9.0 Appendix D - Series 3A/3AH Resilient Seated Butterfly Valves

9.1 Disassembly

9.1.1 Remove the handle, gear operator, or power actuator from actuator mounting flange.

9.1.2 Remove the "Spirolox"® retaining ring and the two C-ring stem retainers from the stem hole.

9.1.3 Then remove the stem, bushing and seal.

9.1.4 Remove the disc from the seat, protecting the disc edge at all times.
Note: The seat is bonded to the body and is not easily field replaceable. Please contact your local Bray representative for seat replacement.

9.2 Assembly

9.2.1 Insert stem seal and bushing.

9.2.2 Push stem into the stem hole of the body until the bottom of the stem is flush with the inner top edge of the seat.

9.2.3 Install a light coating of silicone or grease on the I.D. of seat. Insert the disc into the seat by lining up the disc holes with the stem holes of the seat. Note: The broached double "D" flats in the disc must be toward the bottom of the valve body.

9.2.4 With a downward pressure and rotating the stem back and forth, push the stem until the stem touches the bottom of the body stem hole.

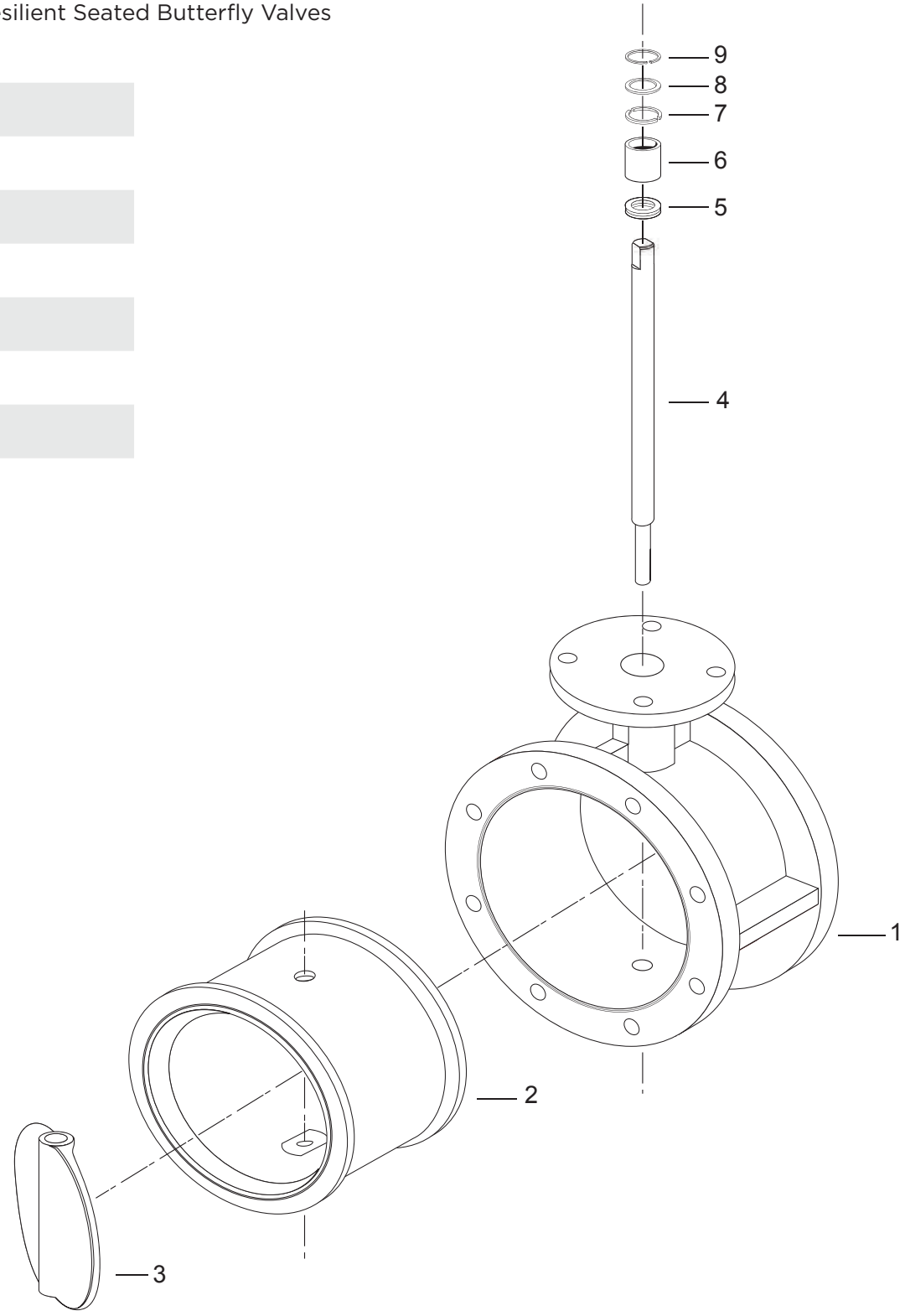
9.2.5 Make certain that when pushing the stem through the disc bottom, the broached flats of stem and disc are aligned.

9.2.6 Replace the stem bushing and two stem retainers, then replace the "Spirolox"® retaining ring back into position.

9.2.7 Replace handle, manual gear operator or power actuator on the actuator mounting flange.

Series 3A/3AH - Resilient Seated Butterfly Valves

1	Body
2	Seat
3	Disc
4	Stem
5	Stem Seal
6	Stem Bushing
7	Stem Retainer
8	Thrust Washer
9	Retaining Ring



10.0 Appendix E - Series 31H Resilient Seated Butterfly Valves

10.1 Disassembly

10.1.1 Remove the handle, gear operator, or power actuator from actuator mounting flange.

10.1.2 Remove the "Spirolox"® retaining ring and the two C-ring stem retainers from the stem hole.

10.1.3 Then remove the stem, bushing and seal.

10.1.4 Remove the disc from the seat, protecting the disc edge at all times.
Note: Valve is provided with the seat bonded to the body and therefore is not easily field replaceable. Please contact your local Bray representative for seat replacement.

10.2 Assembly

10.2.1 Insert stem seal and bushing.

10.2.2 Push stem into the stem hole of the body until the bottom of the stem is flush with the inner top edge of the seat.

10.2.3 Install a light coating of silicone or grease on the I.D. of seat. Insert the disc into the seat by lining up the disc holes with the stem holes of the seat.
Note: The broached double "D" flats in the disc must be toward the bottom of the valve body.

10.2.4 With a downward pressure and rotating the stem back and forth, push the stem until the stem touches the bottom of the body stem hole.

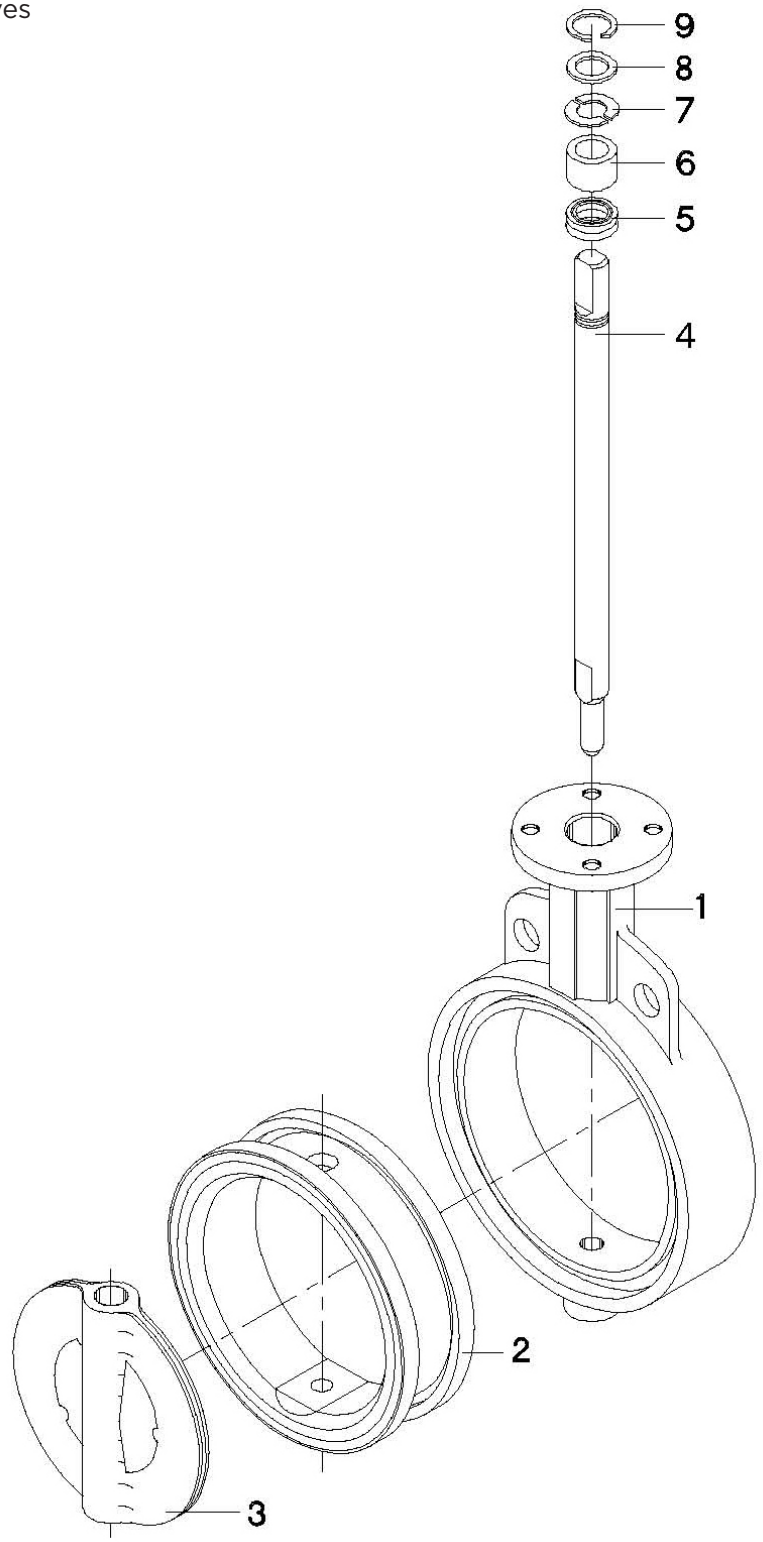
10.2.5 Make certain that when pushing the stem through the disc bottom, the broached flats of stem and disc are aligned.

109.2.6 Replace the stem bushing and two stem retainers, then replace the "Spirolox"® retaining ring back into position.

10.2.7 Replace handle, manual gear operator or power actuator on the actuator mounting flange.

Series 31H - Resilient Seated Butterfly Valves

1	Body S30 Wafer Style Shown)
2	Seat
3	Disc
4	Stem
5	Stem Seal
6	Stem Bushing
7	Stem Retainer
8	Thrust Washer
9	Retaining Ring



11.0 Appendix F - Series 31U Resilient Seated Butterfly Valves

11.1 Disassembly

11.1.1 Remove the handle, gear operator, or power actuator from actuator mounting flange.

11.1.2 Remove the "Spirolox"® retaining ring and the two C-ring stem retainers from the stem hole.

11.1.3 Then remove the top stem bushing and seal, upper stem and retaining rod.

11.1.4 Remove the disc from the seat, protecting the disc edge at all times.

11.1.5 The upper and lower stem bearings will remain in the valve behind the seat.
Note: The seat is bonded to the body and is not easily field replaceable. Please contact your local Bray representative for seat replacement.

11.2 Assembly

11.2.1 Install a light coating of silicone or grease on the I.D. of seat.

11.2.2 Insert the lower stem inside the disc before inserting the disc into the seat.

11.2.3 Insert the disc into the seat by lining up the disc holes with the stem holes of the seat.

11.2.4 Line up the disc using a T-Bar (Allan key style)

11.2.5 With a downward pressure and rotating the T-Bar back and forth, push the lower stem until the lower stem touches the bottom of the body stem hole recess.
Note: The broached double "D" flats in the disc must be toward the bottom of the valve body.

11.2.6 Make certain that when pushing the stem through the disc bottom, the broached flats of stem and disc are aligned.

11.2.7 Insert the spacer bar and upper stem into the disc and valve.

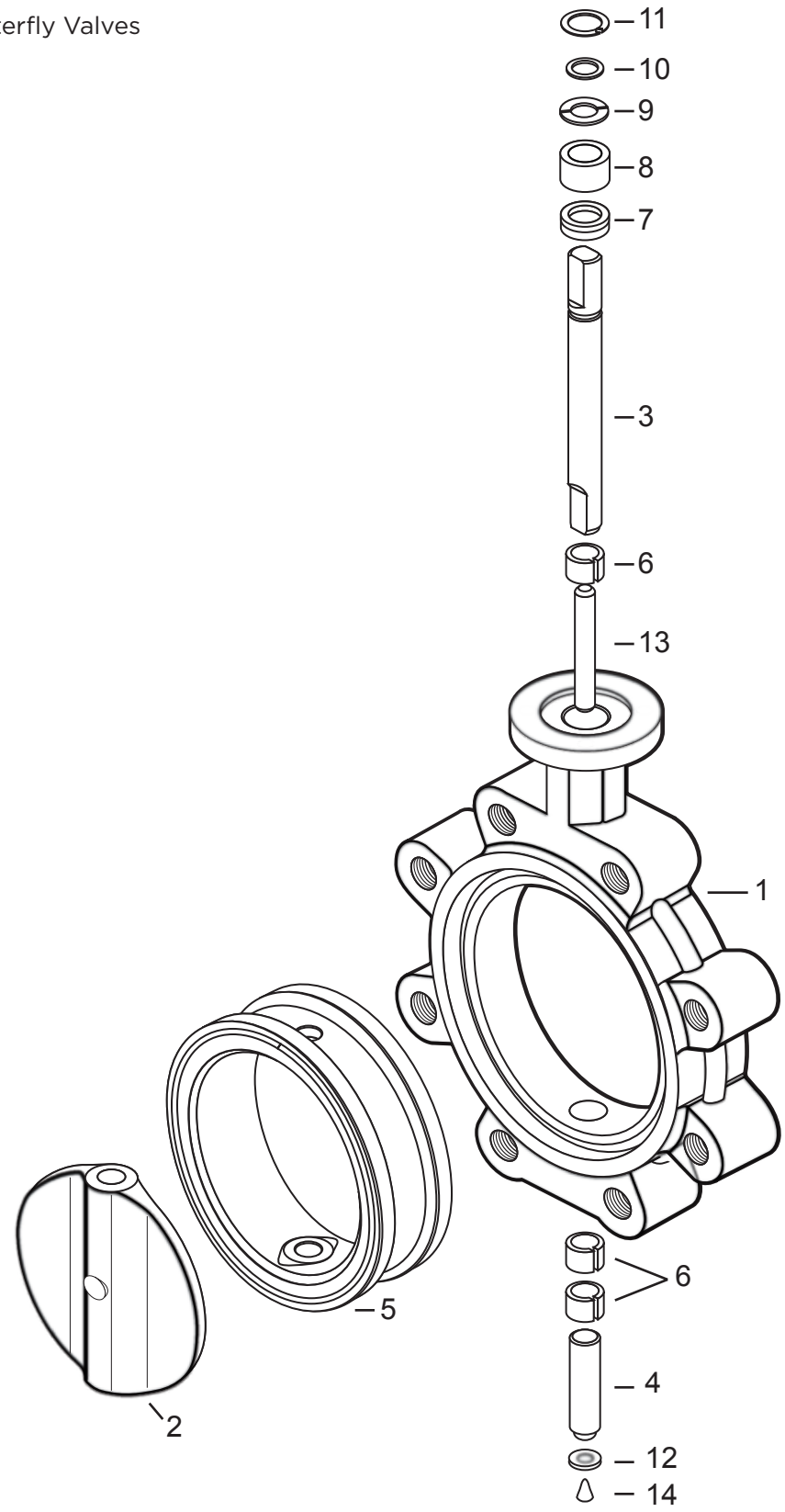
11.2.8 Replace the top stem bushing and seal and two stem retainers.

11.2.9 Then replace the two "C" ring stem retainers and the "Spirolox"® retaining ring back into position in the top stem hole.
Note: It is recommended that a torque and seat test be done to confirm all is in order with the maintenance of the valve.

11.2.10 Replace the handle, manual gear operator or power actuator on the actuator mounting flange.

Series 31U - Resilient Seated Butterfly Valves

1	Body
2	Disc
3	Upper Stem
4	Lower Stem
5	Seat
6	Bearing
7	Stem Seal
8	Stem Bushing
9	Stem Retainer Washers
10	Upper Thrust Washer
11	Retaining ring
12	Lower Thust Washer
13	Spacer
14	Seal Plug



12.0 Appendix G - Series 32/33 Resilient Seated Butterfly Valves

12.1 Disassembly

12.1.1 Remove the gear operator or power actuator from the actuator mounting flange.

12.1.2 Secure the valve in a horizontal position with the taper-pin nuts facing upward.

⚠ CAUTION

Prior to removal of the valve stem the valve disc must be secured and supported to insure it does not drop out of the valve body once the stem is removed. Lay the valve down with two wood blocks located under the disc at the 6 o'clock and 12 o'clock positions making sure the blocks are in close contact with the disc but not supporting the valve.

121.1.4 Remove the packing gland by removing the retaining screws and sliding the gland off the top of the stem.

12.1.5 Remove bottom plate and thrust bearing to expose bottom of stem.

12.1.6 Remove nuts and washers from ends of taper pins and drive taper pins out of the disc. Avoid damaging the disc coating or surface when removing taper-pins.

12.1.7 Once taper-pins are removed, drive the stem, bushing, and packing out of the valve body through the top.

12.1.8 Remove the disc from the seat, protecting disc edge at all times.

12.1.9 Push the seat into an oval shape, and then remove the seat from the body.

12.2 Assembly

12.2.1 Replace bottom thrust bearing and plate.

12.2.2 Push the seat into an oval and push it into the body with seat stem holes aligned to body stem holes.

12.2.3 De-bur taper-pin grooves in the stem.

12.2.4 Push stem into stem hole of body until the bottom of the stem is flush with the inner top edge of the seat.
Note: The end of the stem containing the keyway must be toward the top of the valve body.

12.2.5 Install a light coating of silicone or grease on the I.D. of the seat.

12.2.6 Insert the disc into the seat by lining up the disc hole with the upper stem hole of the seat.

12.2.7 With a downward pressure and rotating the stem back and forth, push the stem until the stem touches the bottom of the body stem hole.
Note: Make certain that when pushing the stem to the bottom of the body, the taper-pin grooves in the stem line up with the holes in the disc face.

12.2.8 Tap the taper-pins into their holes from the large side of the hole, making sure the pins fit tightly in the hole and allow no movement of the stem in the disc.
Note: Ensure that the taper-pin o-rings are in place before completing valve assembly.

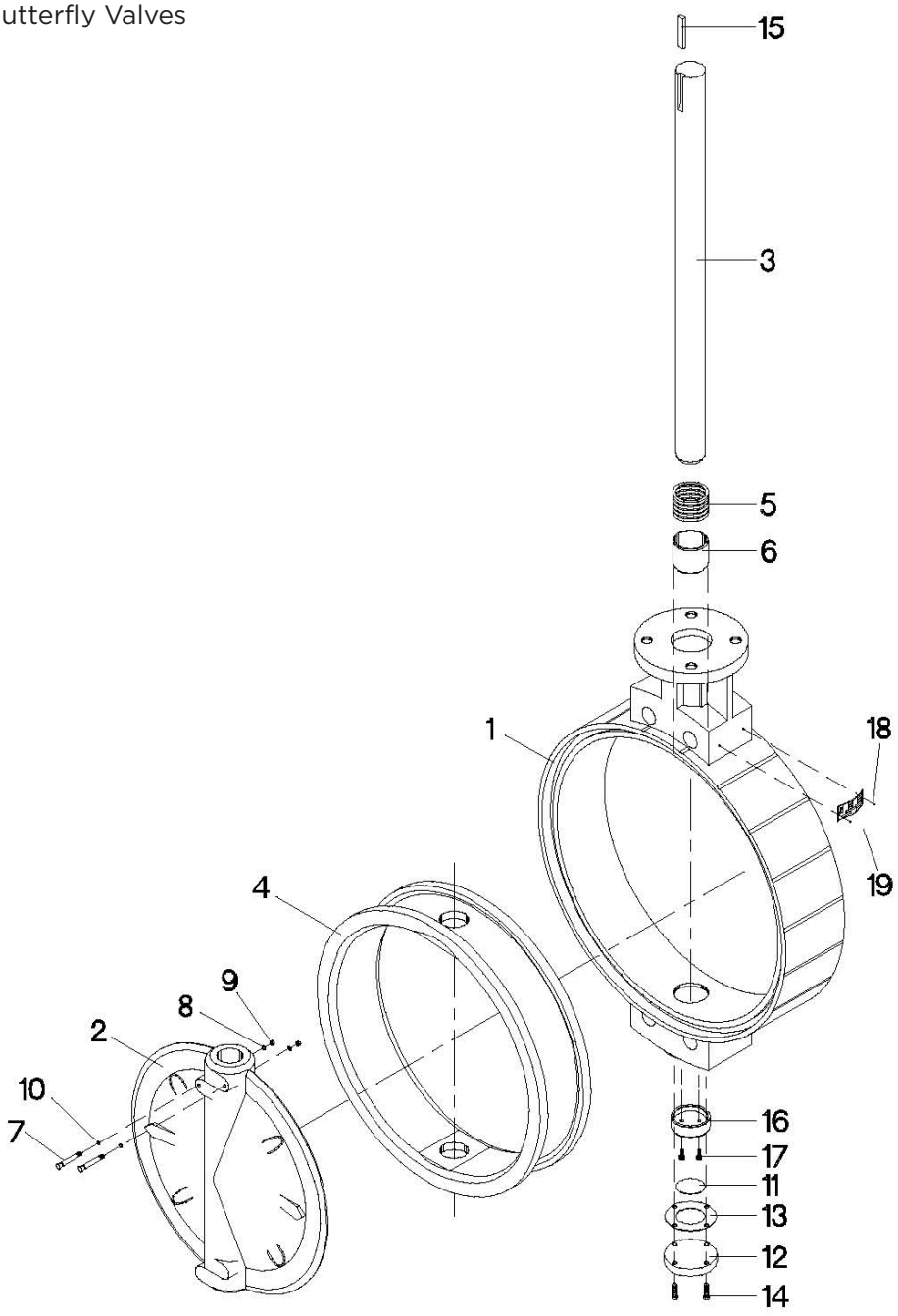
12.2.9 Replace the washers and nuts on the ends of the taper-pins.

12.2.10 Replace bushing, packing, and packing gland, and then tighten the retaining screws snugly.

12.2.11 Replace manual gear operator or power actuator on the actuator mounting flange.

Series 32/33 - Resilient Seated Butterfly Valves

1	Body
2	Disc
3	Stem
4	Seat
5	Stem Packing
6	Stem Bearing
7	Taper Pin
8	Washer
9	Nut
10	O-Ring
11	Thrust Bearing
12	Bottom Plate
13	Bottom Plate Gasket
14	Bolt-Hex Head
15	Key
16	Stem Retainer
17	Ca[Screw
18	ID Tag
19	POP Rivet



13.0 Appendix H - Series 35/36 Resilient Seated Butterfly Valves (Taper Pin Disc/Stem Connection)

13.1 Disassembly

13.1.1 Remove the gear operator or power actuator from the actuator mounting flange.

13.1.2 Secure the valve in a horizontal position with the taper-pin nuts facing upward.

⚠ CAUTION

Prior to removal of the valve stem the valve disc must be secured and supported to insure it does not drop out of the valve body once the stem is removed. Lay the valve down with two wood blocks located under the disc at the 6 o'clock and 12 o'clock positions making sure the blocks are in close contact with the disc but not supporting the valve.

13.1.3 Remove the packing gland by removing the retaining screws and sliding the gland off the top of the stem.

13.1.4 Remove bottom plate and thrust bearing to expose bottom of stem.

13.1.5 Remove nuts and washers from ends of taper pins and drive taper pins out of the disc. Avoid damaging the disc coating or surface when removing taper-pins.

13.1.6 Once taper-pins are removed, drive the stem, bushing, and packing out of the valve body through the top.

13.1.7 Remove the disc from the seat, protecting disc edge at all times.

13.1.8 Push the seat into an oval shape, and then remove the seat from the body.
Note: Valves 54" and larger are provided with the seat bonded to the body and therefore is not easily field replaceable. Please contact your local Bray representative for seat replacement.

132.2 Assembly

13.2.1 Replace bottom thrust bearing and plate.

13.2.2 Push the seat into an oval and push it into the body with seat stem holes aligned to body stem holes.
Note: Valves 54" and larger are provided with the seat bonded to the body and therefore is not easily field replaceable. Please contact your local Bray representative for seat replacement.

13.2.3 De-bur taper-pin grooves in the stem.

13.2.4 Push stem into stem hole of body until the bottom of the stem is flush with the inner top edge of the seat.
Note: The end of the stem containing the keyway must be toward the top of the valve body.

13.2.5 Install a light coating of silicone or grease on the I.D. of the seat.

13.2.6 Insert the disc into the seat by lining up the disc hole with the upper stem hole of the seat.

13.2.7 With a downward pressure and rotating the stem back and forth, push the stem until the stem touches the bottom of the body stem hole.
Note: Make certain that when pushing the stem to the bottom of the body, the taper-pin grooves in the stem line up with the holes in the disc face.

13.2.8 Tap the taper-pins into their holes from the large side of the hole, making sure the pins fit tightly in the hole and allow no movement of the stem in the disc.
Note: Ensure that the taper-pin o-rings are in place before completing valve assembly.

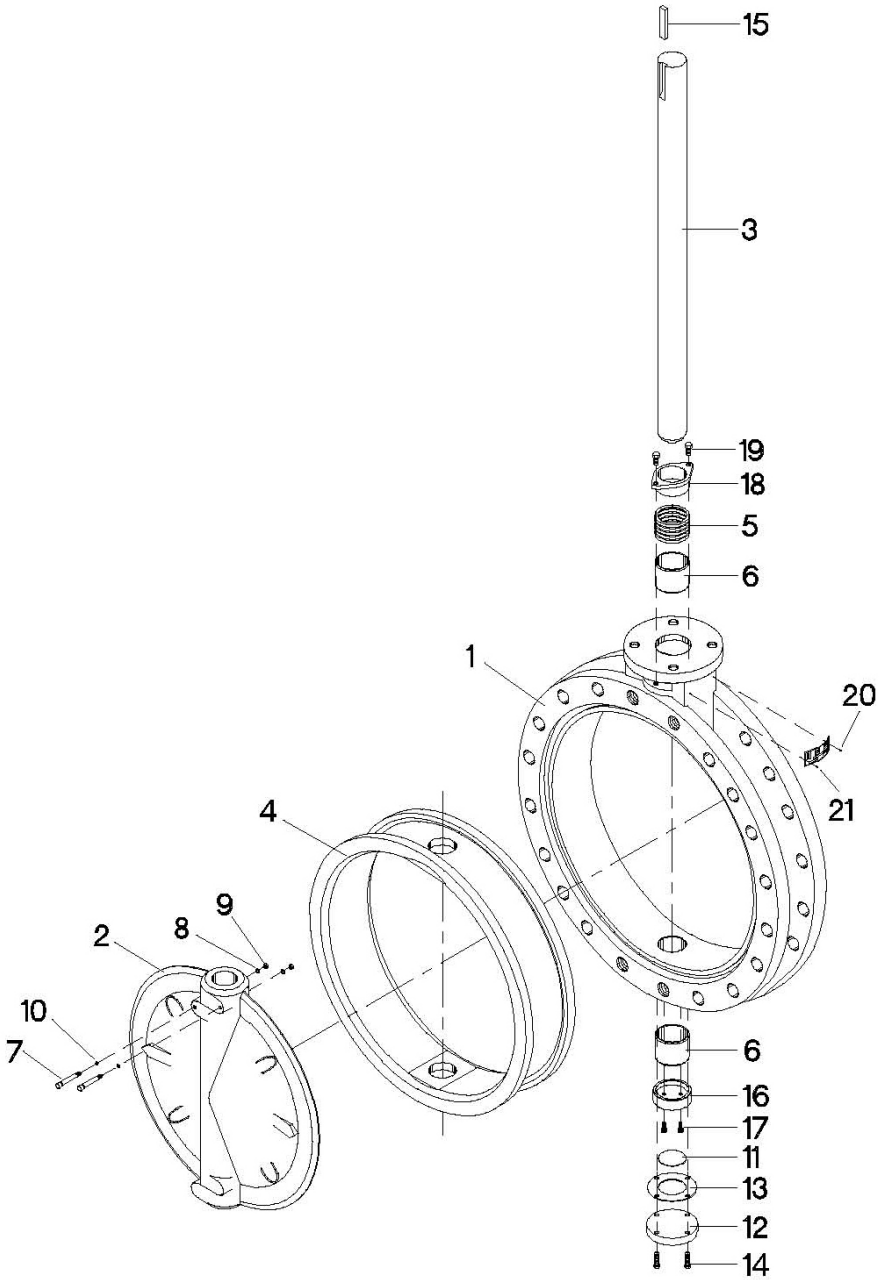
13.2.9 Replace the washers and nuts on the ends of the taper-pins.

13.2.10 Replace bushing, packing, and packing gland, and then tighten the retaining screws snugly.

13.2.11 Replace manual gear operator or power actuator on the actuator mounting flange.

Series 35/36 - Resilient Seated Butterfly Valves (Taper Pin Disc/Stem Connection)

1	Body
2	Disc
3	Stem
4	Seat
5	Stem Packing
6	Stem Bearing
7	Taper Pin
8	Washer
9	Nut
10	O-Ring
11	Thrust Bearing
12	Bottom Plate
13	Bottom Plate Gasket
14	Bolt-Hex Head
15	Key
16	Stem Retainer
17	Cap Screw
18	Packing Gland
19	Bolt-Hex Head
20	ID Tag
21	Pop Rivet



14.0 Appendix I - Series 35/36 Resilient Seated Butterfly Valves (Internal Spiine or Keyed Disc/ Stem Connection)

14.1 Disassembly

14.1.1 Remove the gear operator or power actuator from the actuator mounting flange.

14.1.2 Secure the valve in a horizontal position.

CAUTION

Prior to removal of the valve stems the valve disc must be secured and supported to insure it does not drop out of the valve body once the stems are removed. Lay the valve down with two wood blocks located under the disc at the 6 o'clock and 12 o'clock positions making sure the blocks are in close contact with the disc but not supporting the valve.

14.1.3 Removal of the lower valve stem:
- > Remove the bottom plate screws, bottom plate, bottom plate gasket and thrust bearing.
- > Remove the locking nut from the tie bolt.
- > Remove the stem retainer.
- > Secure a hoist to the lower stem (end is imperial threaded).
- > Then use the hoist to remove the lower stem from the valve body.
- > Remove the stem bearing.

14.1.4 Removal of the upper valve stem:
- > Remove the packing gland by removing the retaining screws and sliding the gland off the top of the stem.
- > Secure a hoist to the upper stem (end is imperial threaded).
- > Then use the hoist to remove the upper stem including the tie bolt from the valve body.

14.1.5 Removal of the valve disc:
- > Remove the wood blocks noted above from below the disc.
- > Using a rubber hammer, pound one area of the disc (ex. 12 o'clock position) repeatedly until the disc clears the face of the valve body.

14.1.6 Removal of packing and bearings:
- > Remove the stem packing.
- > Use a slotted screwdriver to carefully remove the upper and lower stem bearings.

14.1.7 Removal of the valve seat:
Note: Valves 54" and larger are provided with the seat bonded to the body and therefore is not easily field replaceable. Please contact your local Bray representative for seat replacement.

WARNING

Set the valve body in an upright position and secure it in a floor vice capable of handling the weight of the valve body and seat.
Note: Be sure to not clamp the seat in the vice.

14.1.8 Insert a slotted screwdriver into the space between the body and the seat on the face of the valve at the 12 o'clock position.

14.1.9 Carefully leverage the seat away from the body.

14.1.10 Push the seat into an oval shape and remove the seat from the body.

14.0 Appendix I - Series 35/36 Resilient Seated Butterfly Valves (Internal Spiine or Keyed Disc/ Stem Connection)

14.2 Assembly

14.2.1 Installation of the valve seat:

Note: Valves 54" and larger are provided with the seat bonded to the body and therefore is not easily field replaceable. Please contact your local Bray representative for seat replacement.

⚠ WARNING

Set the valve body in an upright position and secure it in a floor vice capable of handling the weight of the valve body and seat.

Note: Be sure to not clamp the seat in the vice.

- Check to assure the interior surface of the valve body is clean.
- Install a light coating of silicone lubricant on the interior surface of the valve body.
- Push the seat into an oval and push it into the body with seat stem holes aligned to the body stem holes.

14.2.2 Installation of the valve disc:

Note: Before installing the disc, check to assure the upper and lower stems are matched to the upper and lower stem holes in the disc.

- With the valve still in the vice in a vertical position, hoist the upper stem with the splined end or the double keyed end pointing upward.
- Push the upper stem into the stem hole of the upper body until the bottom of the stem exceeds the upper stem hole of the seat by 20-50 mm.
- Apply a light coating of silicone or grease on the I.D. of the seat.
- Insert the disc into the seat with the splined end or the double keyed end up.
- Push the disc into the seat while inserting the upper stem into the upper stem hole in the disc.
- Adjust the disc to assure the lower stem hole of the disc is properly aligned with the lower body stem hole.

14.2.3 Installation of the lower stem:

- Close the valve so that the disc is inside the edge of the seat.
- Carefully place the valve in a horizontal position assuring that there is no damage to the body and disc coatings and disc edge.
- Insert the stem bearing into the bottom stem hole of the body.
- Insert the lower stem into the body and disc.

Note: The cone-shaped end of the lower stem should be toward the center of the disc.

14.2.4 Installation of the upper stem:

⚠ CAUTION

Hoist the valve to an angle and secure it (be careful not to go to high so the lower stem does not drop out).

- Remove the upper stem from the valve.
- Screw the tie bolt with lock nut to the splined or the double keyed end of the upper stem, tighten the lock nut and insert the upper stem into the valve with the tie bolt end first.

Note: The tie bolt will go through the disc and reach to the bottom of the valve.

Note: During this step, the keyway of the upper stem should be vertical to the front face of the valve.

14.2.5 Installation of packing and bearings (upper valve stem):

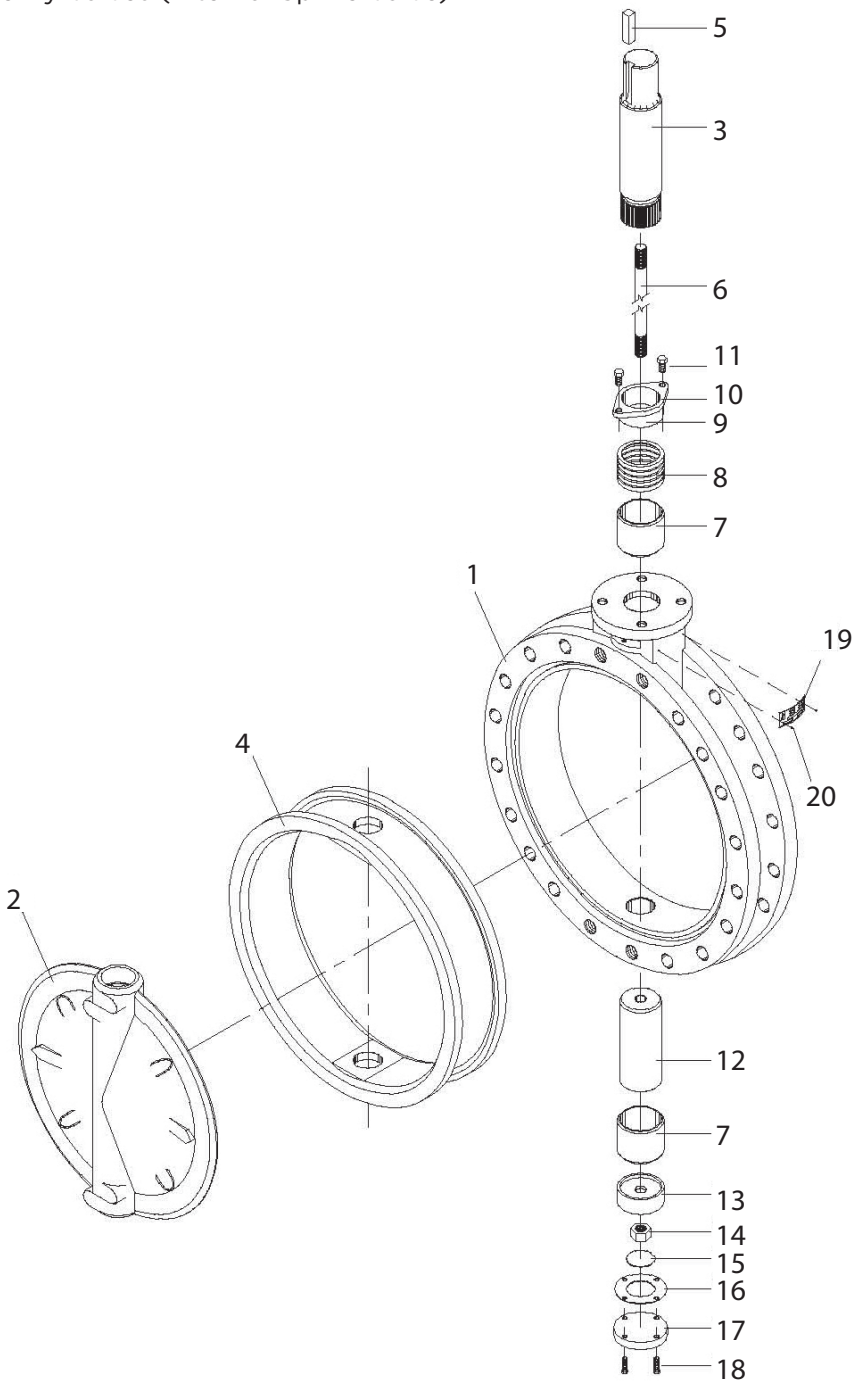
- Insert the stem bearing into the top hole of the body followed by the stem packing and packing gland follower.
- Use two hexagon bolts to fasten the packing gland.

14.2.6 Installation of packing and bearings (lower valve stem):

- Insert the stem retainer into the bottom hole of the body using a nut to fasten it.
- Install the locking nut on the tie bolt.
- Install the thrust bearing, bottom plate gasket and bottom plate follower.
- Use four hexagon bolts to fasten the bottom plate tightly.

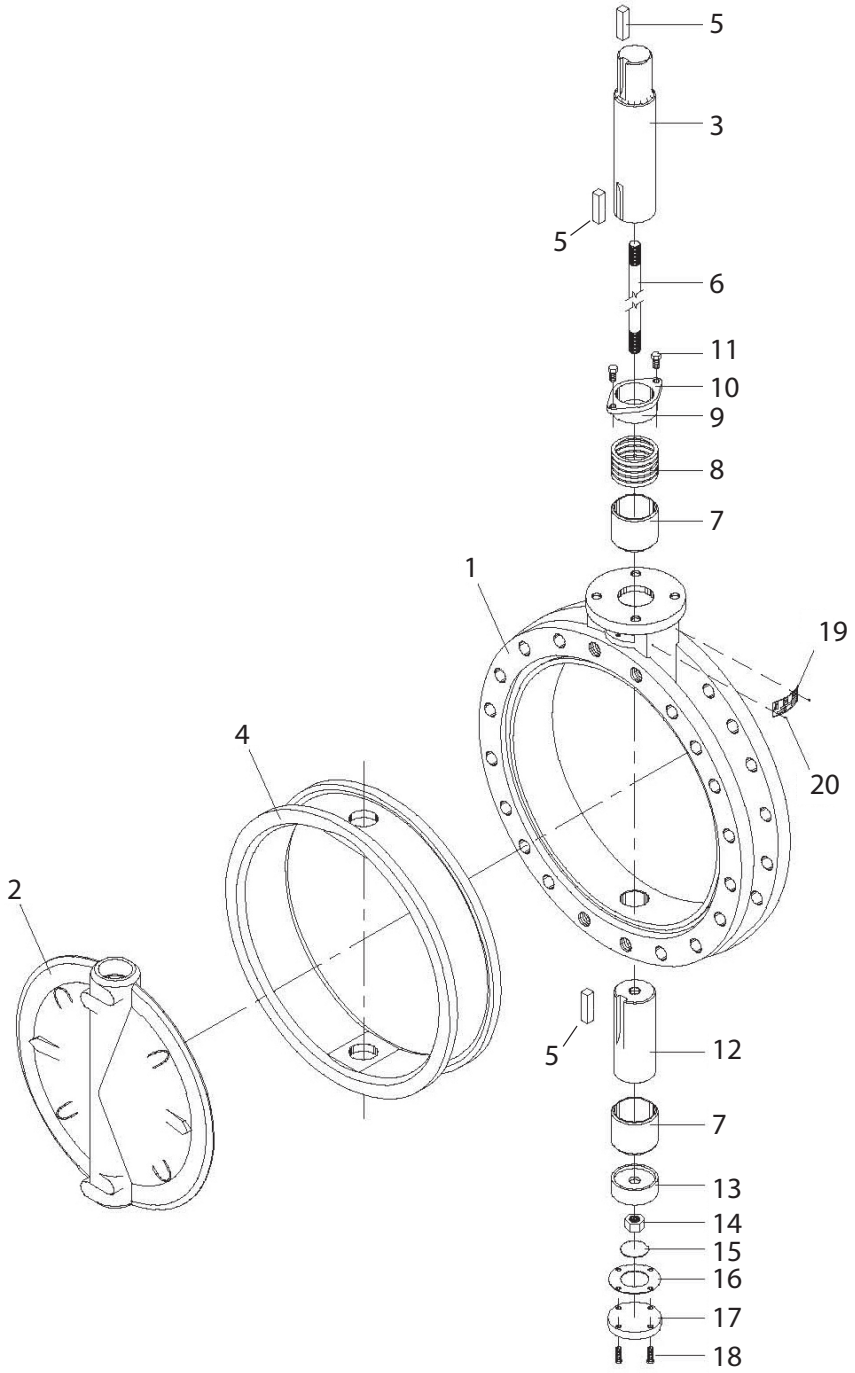
Series 35/36 - Resilient Seated Butterfly Valves (Internal Spline Valve)

1	Body
2	Disc
3	Upper Stem
4	Seat
5	Key
6	Tie Bolt
7	Stem Bearing
8	Stem Packing
9	Packing Gland Follower
10	Packing Gland
11	Bolt-Hex Head
12	Lower Stem
13	Stem Retainer
14	Hex Nut
15	Thrust Bearing
16	Bottom Plate Gasket
17	Bottom Plate
18	Bolt-Hex Head
19	ID Tag
20	Pop Rivet



Series 35/36 - Resilient Seated Butterfly Valves (Internal Keyed Valve)

1	Body
2	Disc
3	Upper Stem
4	Seat
5	Key
6	Tie Bolt
7	Stem Bearing
8	Stem Packing
9	Packing Gland Follower
10	Packing Gland
11	Bolt-Hex Head
12	Lower Stem
13	Stem Retainer
14	Hex Nut
15	Thrust Bearing
16	Bottom Plate Gasket
17	Bottom Plate
18	Bolt-Hex Head
19	ID Tag
20	Pop Rivet



15.0 Appendix J - Series 36H Resilient Seated Butterfly Valves

15.1 Disassembly

15.1.1 Remove the gear operator or power actuator from the actuator mounting flange.

15.1.2 Secure the valve in a horizontal position with the taper-pin nuts facing upward.

⚠ CAUTION

Prior to removal of the valve stem the valve disc must be secured and supported to insure it does not drop out of the valve body once the stem is removed. Lay the valve down with two wood blocks located under the disc at the 6 o'clock and 12 o'clock positions making sure the blocks are in close contact with the disc but not supporting the valve.

15.1.3 Remove the packing gland by removing the retaining screws and sliding the gland off the top of the stem.

15.1.4 Remove bottom plate and thrust bearing to expose bottom of stem.

15.1.5 Remove nuts and washers from ends of taper pins and drive taper pins out of the disc. Avoid damaging the disc coating or surface when removing taper-pins.

15.1.6 Once taper-pins are removed, drive the stem, bushing, and packing out of the valve body through the top.

15.1.7 Remove the disc from the seat, protecting disc edge at all times.
Note: Valve is provided with the seat bonded to the body and therefore is not easily field replaceable. Please contact your local Bray representative for seat replacement.

15.2 Assembly

15.2.1 Replace bottom thrust bearing and plate.

15.2.2 De-bur taper-pin grooves in the stem.

15.2.3 Push stem into stem hole of body until the bottom of the stem is flush with the inner top edge of the seat.
Note: The end of the stem containing the keyway must be toward the top of the valve body.

15.2.4 Install a light coating of silicone or grease on the I.D. of the seat.

15.2.5 Insert the disc into the seat by lining up the disc hole with the upper stem hole of the seat.

15.2.6 With a downward pressure and rotating the stem back and forth, push the stem until the stem touches the bottom of the body stem hole.
Note: Make certain that when pushing the stem to the bottom of the body, the taper-pin grooves in the stem line up with the holes in the disc face.

15.2.7 Tap the taper-pins into their holes from the large side of the hole, making sure the pins fit tightly in the hole and allow no movement of the stem in the disc.
Note: Ensure that the taper-pin o-rings are in place before completing valve assembly.

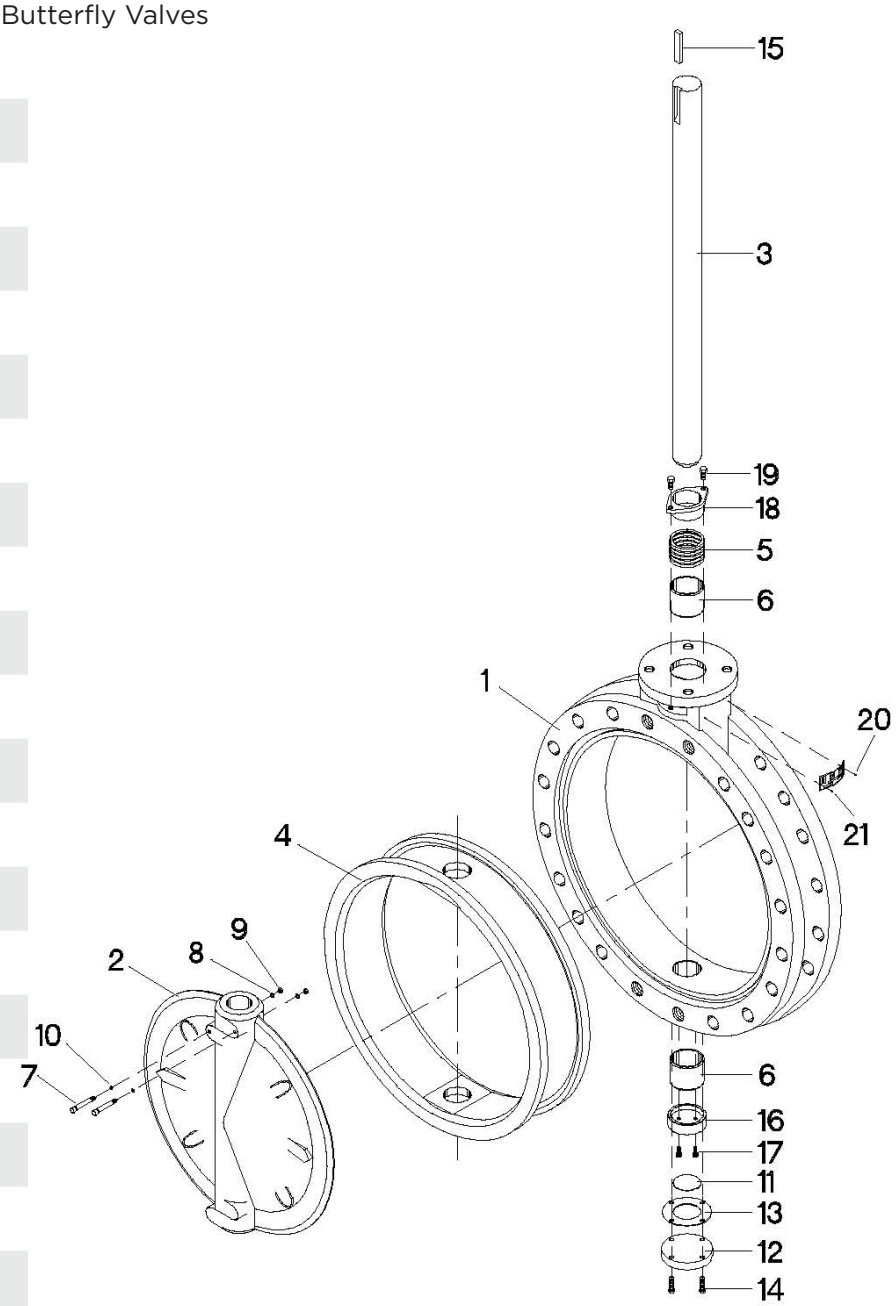
15.2.8 Replace the washers and nuts on the ends of the taper-pins.

15.2.9 Replace bushing, packing, and packing gland, and then tighten the retaining screws snugly.

15.2.10 Replace manual gear operator or power actuator on the actuator mounting flange.

Series 36H - Resilient Seated Butterfly Valves

1	Body
2	Disc
3	Stem
4	Seat
5	Stem Packnig
6	Stem Bearing
7	Taper Pin
8	Washer
9	Nut
10	O-Ring
11	Thrust Bearing
12	Bottom Plaate
13	Bottom Plate Gasket
14	Bolt-Hex Head
15	Key
16	Stem Retainer
17	Cap Screw
18	Packing Gland
19	Bolt-Hex Head
20	ID Tag
21	Pop Rivet



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Bray International, Inc.
13333 Westland East Blvd.
Houston, Texas 77041
Tel: 281.894.5454

CHINA HEADQUARTERS
Bray Controls (ZheJiang) Co. Limited
98 GaoXin # 6 Road
XiaoShan Economic & Development Zone
HangZhou, ZheJiang 311231, P.R. China
Tel: 86 571 8285 2200

EUROPE HEADQUARTERS
Bray Armaturen & Antriebe Europa
Halskestraße 25
47877 Willich
Germany
Tel: +49 2154 8875-0

INDIA HEADQUARTERS
Bray Controls India Pvt. Ltd.
Plot No. H-18 & H-19
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Appendix D – Supplier Quote

INITIALS _____

Appendix D

Supplier Quote

Bray Sales Ontario

Quote QQ-2244741-03
Date 3/28/2022

Company	WSP - Oakville	Sales Rep	Dave Bramston
Name	Hany Abraham	Email	dave.bramston@bray.com
Email	hany.abraham@wsp.com	Phone	+1 905 741-8256
Phone	+1 905 823-8500		
		Prepared By	Ben Koorengevel
Quote Ref	12 BFV's for Nunavut WTP	Email	ben.koorengevel@bray.com
		Phone	+1 514 344 2729,4226

****
DELIVERY QUOTED EXW BRAY CONTROLS CANADA, LACHINE QC - FREIGHT EXTRA
****

IMPORTANT Please note Item 2 is non-cancellable/non-returnable once an order is placed.

Thank you

Line No	Product Details	Qty	Unit Price	Line Total	Delivery
1	Part Number ASSEMBLY *Note: Stem Extension is TBD*	1	$7,571.36	$7,571.36	9-10 Week(s)
1.01	Part Number 211200-11010024 S21 12" 316,316,316,EPDM VALVE TYPE: BUTTERFLY VALVE SPLIT BODY LUG TYPE SIZE: 12" BODY MATERIAL: 316SS DISC: 316 SS STEM: 316SS END CONNECTIONS: LUGGED MANUFACTURER: BRAY MODEL: SERIES S21 SEAT: EPDM ACTUATION: BARE STEM *Note: Stem Extension is TBD*	1			
1.02	Part Number 9C-TorqueTubeExtension Torque Tube Extension 13 feet torque tube extension from top of valve to bottom of gearbox	1			
1.03	Part Number 040500-21254003 S4 10-12" GEAR OPER W/2"SQ NUT Manual Gear Operator	1			
1.04	Part Number FOOD GRADE GREASE GREASE PACK GEAR FOOD GRADE	1			
2	Part Number 9C-Trumbull adjustable stem guide Trumbull adjustable stem guide The DI Stem guide is furnished with Tnemec 140-1211 primer which is NSF61 approved.	1	$1,960.00	$1,960.00	4 Week(s)
	Total Price: (CAD)			$9,531.36	

Options

Line No	Product Details	Qty	Unit Price	Line Total	Delivery
3	Part Number ASSEMBLY	1	$3,544.74	$3,544.74	12-13 Week(s)

3.01	Part Number 311200-11010375 S31 12" DI,316,416,EPDM 12 in. BRAY SERIES 31 BUTTERFLY VALVE LUG TYPE, FULL RATED, DUCTILE IRON BODY, 316 STAINLESS STEEL DISC, 416SS SHAFT, EPDM SEAT, *Note: Stem Extension is TBD*	1
3.02	Part Number 9C-TorqueTubeExtension Torque Tube Extension 13 feet torque tube extension from top of valve to bottom of gearbox	1
3.03	Part Number 040500-21254003 S4 10-12" GEAR OPER W/2"SQ NUT Manual Gear Operator	1
3.04	Part Number FOOD GRADE GREASE GREASE PACK GEAR FOOD GRADE	1

Terms Notes

All deliveries subject to prior sales

This Quotation is an offer to sell, only valid based on the specification and materials described herein, and is expressly conditioned on the Bray International, Inc. Standard Terms and Conditions of Sale, incorporated herein and available at https://www.bray.com/sales-terms-andconditions. Bray objects to any different or additional terms.

• Delivery: Working Weeks after receipt of an order and clear written authorization to proceed, including approved ITP, drawings and test procedures if applicable. Bray must receive approved documentation 3 weeks after submission to avoid delivery delay. Bray will make every effort to hold the quoted lead time, however changes in demand can adversely affect the quoted delivery schedule. Therefore delivery will be confirmed at time of order placement.
• Delivery Point: Ex-Works Bray Controls Canada, Lachine QC
• Warranty: Bray Standard Warranty 36 months from date of shipment
• Packaging: Bray Standard Packing included suitable for Domestic transport
• SS Tags: If required, must be requested at time of order. Charges will apply
• MTRs (Mill Test Reports): If required, must be requested at time of order. Charges will apply
• Documentation, Special testing, NDE: If required, must be requested at time of quote or order. Extra charges will apply

INTERNATIONAL TERMS AND CONDITIONS OF SALE:

FOR BRAY CANADA GROUP OF COMPANIES: BRAY CONTROLS CANADA LTD., BRAY SALES ONTARIO, BRAY SALES QUEBEC, RITE CORPORATION, RITEPRO CORPORATION.

1. **APPLICABILITY**. These terms and conditions of sale (these "**Terms**") are the only terms which govern the sale of the products ("**Products**") by Bray International, Inc. and its subsidiaries, branches and divisions (as applicable, "**Bray**" or "**Seller**") to a purchaser of Products ("**Buyer**") from Bray. Notwithstanding anything herein to the contrary, if a written contract signed by Bray and a Buyer covers the sale of Products covered hereby, the terms and conditions of such contract shall prevail to the extent they are inconsistent with these Terms.

References to (i) "Bray factory" are to the applicable Bray national or regional headquarters of Seller in the country where the order is received and (ii) "dollars" or "$" are to United States dollars unless specified otherwise.

2. **ENTIRE AGREEMENT**. These Terms and the quotation (the "**Quotation**") which they accompany (collectively, the "**Agreement**") comprise the entire agreement between Bray and Buyer relating to the Products that are the subject of such Quotation, and supersede all prior or contemporaneous understandings, agreements, negotiations, representations and warranties and communications, both written and oral. These Terms prevail over any of Buyer's general terms and conditions of purchase regardless of whether or when Buyer submitted its purchase order or such terms. Buyer's acceptance of the Quotation is expressly limited to these Terms, and Bray objects to, and is not bound by, any terms or conditions that differ from, add to, or modify these Terms. Fulfillment of Buyer's order does not constitute acceptance of any of Buyer's terms and conditions and does not serve to modify or amend these Terms. Notwithstanding anything to the contrary in these Terms or any Agreement, Bray shall not be obligated to make, or otherwise fulfill the terms of, any sale of Products to Buyer in an order amount less than Two Hundred and Fifty Dollars ($250).

3. **QUOTATIONS**. Unless stated otherwise in writing by Seller, all Quotations made by Seller are for immediate acceptance. Seller reserves the right to withdraw and/or revise any Quotation at any time prior to final acceptance by Buyer.

4. **PRICE.** Buyer shall purchase the Products from Seller at the prices (the "**Prices**") set forth in Seller's published price list in force as of the date Buyer's order is received by Bray. All Prices (and any applicable discounts) for Products are subject to change without notice. Any order that is delayed for delivery at Buyer's request or is otherwise scheduled to be made in excess of one hundred twenty (120) days from the order date will be invoiced at published list prices and discounts effective at the time of shipment unless otherwise specifically agreed at the time of Seller's order acceptance. Any extra expenses incurred by Seller, such as engineering, tagging, taxes, service calls, export crating or other expenses, will be added to the invoice after notification to Buyer of the extra costs.

5. **TAXES**. Prices are exclusive of all sales, use and excise taxes, and any other similar taxes, duties, fees and charges of any kind imposed by any governmental authority (including those arising from changes in laws or regulations affecting foreign exchange) on any amounts payable by Buyer. Buyer shall be responsible for all such charges, costs and taxes, and if payable or paid by Seller, then added to the Price.

6. **PAYMENT TERMS.**

A. All invoices for domestic (U.S.) Buyers will be due net thirty (30) days from date of invoice unless otherwise stated by Seller. All invoices for international (non-U.S.) Buyers will require confirmed, irrevocable letters of c redit due upon delivery to freight forwarder at its United States port for shipment, unless otherwise agreed by Seller. Seller reserves the right (including if it determines subsequently that Buyer's financial condition becomes unsatisfactory to Seller) to (i) require payment on "cash in advance" basis, (ii) require a confirmed, irrevocable letter of credit or other acceptable security (including preservation of any lien rights) before shipment, or (iii) cancel shipment at any time prior to delivery of the Products (without further obligation or liability on Seller's part). In such cases, an order will be considered valid only upon receipt of any such advance payment or provision of security. Credit terms are provided solely at the discretion of Seller and may be denied for any reason by Seller.

B. Buyer shall pay interest on all late payments at the lesser of: (i) the rate of two percent (2%) per month and (ii) the highest rate permissible under applicable law. Buyer shall reimburse Seller for all costs incurred in collecting any late payments, including, without limitation, attorney fees and court costs. In addition to all other remedies available under these Terms or at law (which are not waived by Seller's exercise of any rights hereunder), Seller shall be entitled to suspend the delivery of any Products if Buyer fails to pay any amounts when due hereunder.

C. Buyer shall not withhold or delay payment of any amounts due and payable by reason of any set-off of any claim, counterclaim, abatement, delay of customer payment or dispute with Seller, whether relating to Seller's breach, bankruptcy or otherwise.

7. **CREDIT. Shipments** and deliveries of Products to Buyer shall remain at all times subject to the approval of Seller's credit department. Seller, in addition to any other rights and remedies, may, at its option, decline to make shipments or deliveries hereunder except upon receipt of payment or satisfactory security or otherwise upon terms and conditions satisfactory to Seller. Should Seller elect to extend credit to Buyer, Seller may limit or deny

further extensions of credit in Seller's sole discretion. Any extension of open payment terms by Seller is dependent on Buyer's ongoing ability to support its working capital requirements for its business.

8. DELIVERY.

A. The Products will be delivered within a reasonable time after the receipt of Buyer's order. Delivery dates are approximate and are dependent upon prompt receipt of all necessary Buyer-furnished information and materials (if applicable). Penalty fees/liquidated damages that may be associated with any late delivery will not apply unless mutually agreed in writing at the time of order acknowledgement.

B. Unless otherwise agreed in writing by the parties, Seller shall make the Products available at the Bray factory (the "**Delivery Point**"). The title to and risk of loss for Products passes to Buyer upon signing of the bill of lading by the transportation company (which signifies the delivery of the Products to the transportation company for shipment to Buyer). Buyer shall be responsible for all loading costs and provide equipment and labor reasonably suited for receipt of the Products at the Delivery Point.

C. All Prices are quoted ExWorks (EXW) Bray factory or such other place that Seller shall designate on the Quotation. Seller does not insure shipments beyond the Delivery Point and, therefore, all claims of lost or damaged Products in transit must be filed directly with the transportation company by Buyer. Seller shall select the method of shipment and the carrier for the Products. Seller may ship via the Buyer's choice if routing is satisfactory and rates equal to or less than Seller's normal choice. In the case of higher than normal special shipping requirements, Seller will ship the Products at Buyer's expense (including a handling fee or collect basis) and Buyer will not receive any credit for freight charges that under normal circumstances would be incurred by Seller. There may be only one destination per order.

D. Bray's standard document package will be provided—please see associated Quotation for details on what is included in document package for associated Product(s); document package will be delivered via electronic delivery (additional charges may apply if hard copy is required).

E. If for any reason Buyer fails to accept delivery of Products on the date fixed pursuant to Seller's notice to Buyer that the Products are being made available for delivery at the Delivery Point: (i) risk of loss to the Products shall pass to Buyer, (ii) the Products shall be deemed to have been delivered and accepted by Buyer and (iii) Seller, at its option, may store the Products until Buyer picks them up, whereupon Buyer shall be liable for all related costs and expenses (including, without limitation, storage and insurance). Any failure of Buyer to provide appropriate instructions, documents, licenses or authorizations in connection with delivery of Products shall be deemed to be a failure of Buyer to accept delivery of Products at such time as such Products are otherwise available for delivery. Any orders held by Seller more than thirty (30) days may be treated as a cancelled and the Products deemed returned.

9. INSPECTION AND REJECTION OF NONCONFORMING PRODUCTS.

A. Buyer shall inspect the Products within ten (10) days of receipt ("**Inspection Period**"). Buyer will be deemed to have accepted the Products unless it notifies Seller in writing of any Nonconforming Products during the Inspection Period and furnishes such written evidence or other documentation as reasonably required by Seller. "**Nonconforming Products**" means that the Products shipped are different than those identified in Buyer's purchase order.

B. If Buyer timely notifies Seller of any Nonconforming Products during the Inspection Period, Seller shall, in its sole discretion, (i) replace such Nonconforming Products with conforming Products, or (ii) credit or refund the Price for such Nonconforming Products, together with any reasonable shipping and handling expenses incurred by Buyer in connection therewith. Buyer shall ship, at its expense and risk of loss, the Nonconforming Products to the Bray factory or such other place that Seller shall designate on the Quotation. Upon Seller's confirmation of the nonconforming nature of the Nonconforming Products, Seller shall credit the Buyer's expense for such shipment against the Buyer's payment obligations to Seller. If Seller exercises its option to replace such Nonconforming Products, Seller shall, after receiving Buyer's shipment of returned Nonconforming Products, ship to Buyer the replaced Products and the terms of Section 8(B) shall apply for such replaced Products, except that Seller shall be responsible for the costs and expenses for such shipment.

C. Buyer acknowledges and agrees that the remedies set forth in Section 9(B) (exercised in accordance with these Terms) are Buyer's exclusive remedies for the delivery of Nonconforming Products.

10. CHANGE ORDER / CANCELLATIONS. Orders received and accepted by Seller may not be changed or cancelled except on terms satisfactory to Seller and which prevent Seller from incurring any loss. Seller will not accept changes or cancellations of Products, whether standard, non-standard or special, without full reimbursement of all related expenses incurred to date. Buyer must request all cancellations and change orders in writing, and must be signed by an authorized representative of Seller to be effective. Any changes or cancellations of Projects will be subject to appropriate changes in discounts, freight costs and other charges to Buyer.

11. LIMITED WARRANTY.

INTERNATIONAL TERMS AND CONDITIONS OF SALE:

FOR BRAY CANADA GROUP OF COMPANIES: BRAY CONTROLS CANADA LTD., BRAY SALES ONTARIO, BRAY SALES QUEBEC, RITE CORPORATION, RITEPRO CORPORATION.

A. Seller warrants to Buyer that, for a period of thirty-six (36) months from the date of Bray's shipment (the "**Warranty Period**") from its manufacturing facility, Products manufactured by Seller will be free from defects in materials and workmanship when used for the purposes for which they were designed and manufactured. Seller does not warrant the Products against chemical or stress corrosion or against any other failure (including normal wear and tear due to operation or the environment) other than from defects in materials or workmanship.

B. **THE EXPRESS WARRANTY SET FORTH IN SECTION 1.11(A) IS EXCLUSIVE AND IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED. NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE IS INTENDED OR GIVEN**.

C. Products manufactured by a third party ("**Third Party Product**") may constitute, contain, be contained in, incorporated into, attached to or packaged together with, the Products. Third Party Products are not covered by the warranty in Section 11(A). For the avoidance of doubt, **SELLER MAKES NO REPRESENTATIONS OR WARRANTIES WITH RESPECT TO ANY THIRD PARTY PRODUCT.**

D. The Seller shall not be liable for a breach of the warranty set forth in Section 11(A) unless:
(i) Buyer gives written notice to Seller of the defect during the Warranty Period and, in any event, within fourteen (14) days of the time when Buyer discovers or ought to have discovered the defect; (ii) Seller is given a reasonable opportunity after receiving the notice to examine such Products and Buyer (if requested to do so by Seller) returns such Products to Bray's factory or such other place that Seller shall designate on the Quotation for the examination to take place there; (iii) Products are stored, maintained and shipped in accordance with Seller's applicable guidelines therefor (available to Buyer in product information available at https://www.bray.com/resources/documents/manuals-guides?page=1, please contact productspec@bray.com with any questions concerning the guidelines) and (iv) Seller reasonably verifies Buyer's claim that the Products are defective. Buyer shall return (freight prepaid) the defective Product to Bray at Bray's factory or such other place that Seller shall designate on the Quotation no later than ninety (90) days of Buyer's initial written notice to Seller of the defect. Upon Seller's confirmation of Products in breach of the warranty provided under Section 11(A), Seller shall credit the Buyer's expense for shipment against the Buyer's payment obligations to Seller and, if Seller exercises its option to replace such defective Products, Seller shall ship to Buyer the replaced Products and the terms of Section 8(B) shall apply for such replaced Products, except that Seller shall be responsible for the costs and expenses for such shipment. Seller shall not be obligated for any on-site costs, including removal and reinstallation of any warranted Products. Upon request, Buyer shall provide Seller reasonable and clear access to the warranted Products.

E. The Seller shall not be liable for a breach of the warranty set forth in Section 11(A) if: (i) Buyer makes any further use of such Products after giving such notice; (ii) the defect arises because Buyer failed to follow Seller's oral or written instructions as to the storage, installation, commissioning, use or maintenance of the Products; or (iii) Buyer alters or repairs such Products without the prior written consent of Seller.

F. Subject to Section 11(D) and Section 11(E) above, with respect to any such Products during the Warranty Period, Seller shall, in its sole discretion, either: (i) repair or replace such Products (or the defective part) or (ii) credit or refund the price of such Products at the pro rata contract rate provided that, if Seller so requests, Buyer shall, at Seller's expense, return such Products to Seller. **THE REMEDIES SET FORTH IN THIS SECTION 11(F) SHALL BE THE BUYER'S SOLE AND EXCLUSIVE REMEDY AND SELLER'S SOLE AND ENTIRE LIABILITY FOR ANY BREACH OF THE LIMITED WARRANTY SET FORTH IN SECTION 11(A).**

12. LIMITATION OF LIABILITY.

A. **IN NO EVENT SHALL SELLER BE LIABLE FOR ANY CONSEQUENTIAL, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY OR PUNITIVE DAMAGES, LOST PROFITS OR REVENUES OR DIMINUTION IN VALUE, ARISING OUT OF OR RELATING TO ANY BREACH OF THESE TERMS, WHETHER OR NOT THE POSSIBILITY OF SUCH DAMAGES HAS BEEN DISCLOSED IN ADVANCE BY BUYER OR COULD HAVE BEEN REASONABLY FORESEEN BY BUYER, REGARDLESS OF THE LEGAL OR EQUITABLE THEORY (CONTRACT, TORT OR OTHERWISE) UPON WHICH THE CLAIM IS BASED, AND NOTWITHSTANDING THE FAILURE OF ANY AGREED OR OTHER REMEDY OF ITS ESSENTIAL PURPOSE.** No action, regardless of form, may be brought by Buyer more than one (1) year after the cause of action has accrued.

B. **IN NO EVENT SHALL SELLER'S AGGREGATE LIABILITY ARISING OUT OF OR RELATED TO ANY PRODUCT, WHETHER ARISING OUT OF OR RELATED TO BREACH OF CONTRACT, TORT (INCLUDING NEGLIGENCE) OR OTHERWISE, EXCEED THE TOTAL OF THE AMOUNTS PAID TO SELLER FOR SUCH PRODUCT.**

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13. **AUTHORIZED RETURNS.** All sales of Products to Buyer are made on a one- way basis and no Products may be returned without prior written approval from Seller. Generally, in addition to the requirement for prior written approval, Bray will accept returns from a Buyer only if the return request is timely made following shipment of the applicable Product(s) to Buyer and the Product(s) are in good, reusable condition and remain standard Bray products (*i.e.*, not custom-made, obsolete or buyout products). In regard to any returns, Seller generally issues credit (from which Seller may deduct shipping, restocking and reconditioning expenses).

14. **INTELLECTUAL PROPERTY RIGHTS.** All copyrights, patents, trademarks, trade secrets, know-how and other intellectual property or proprietary rights pursuant to the laws of any jurisdiction worldwide ("**IP Rights**") associated with or relating to the Products shall belong solely and exclusively to Seller. Seller will retain all IP Rights used to create, embodied in, used in and otherwise relating to the Products and any of their component parts, and Buyer shall not acquire any ownership interest in any of Seller's IP Rights. Buyer shall use Seller's IP Rights only in accordance with these Terms and any instructions of Seller. No license, either express or implied, is granted in any IP Rights of Seller. If Buyer acquires any IP Rights in or relating to any Product by operation of law or otherwise, such rights are deemed and are hereby irrevocably assigned to Seller without further action. Buyer shall, at Seller's expense, execute such documents and do such things as are necessary to enable Seller to protect its IP Rights.

15. **DESIGN CHANGES.** Seller reserves the right to change, discontinue or alter the design and construction of Products without prior notice and without further obligation.

16. **COMPLIANCE WITH LAW**. Buyer shall comply with all applicable laws, regulations and ordinances, and shall maintain in effect all the licenses, permissions, authorizations, consents and permits that it needs to carry out its obligations under the Agreement. Upon Seller request, Buyer agrees to provide Seller with information about the end use (including location of) of any products purchased. In furtherance of the foregoing (and without limitation thereto), please note the following in regards to compliance:

A. *Trade Compliance*. Buyer must comply with all laws governing export/import control and regulation, including, without limitation, laws governing re exporting. If Buyer is obtaining Product(s) for resale, such compliance requires that Buyer know of the end-use, end-user, ultimate destination or other facts relating to such sale of Product(s), and be alerted to "*red flags*" in the circumstances related to such sale. Buyer is obligated to comply with Bray's trade compliance program in regards to any sale and purchase of Product(s). Buyer should contact Bray to confirm compliance with the requirements of this program.

B. *Anti-Corruption Laws*. *Buyer* must comply with all anti-corruption and bribery laws and regulations, including, without limitation the United Kingdom's Bribery Act of 2010 and the United States' Foreign Corrupt Practices Act. Buyer must not pay, offer or promise to pay, directly or indirectly, anything of value for purposes of influencing an official decision or seeking influence in regards to any such decision from a person or organization affiliated with any government body, organization or business entity owned in part or in whole by a government body. Buyer must contact Bray in regards to any transaction in respect of Product(s) provided under this Agreement that could implicate such laws. Bray may immediately terminate, without any liability, any sale, agreement or association with any person violating such laws.

17. **TERMINATION**. In addition to any remedies that may be provided under the Agreement, Seller may terminate the Agreement with immediate effect upon written notice to Buyer, if Buyer: (i) fails to pay any amount when due; (ii) has not otherwise performed or complied with any of the terms of the Agreement, in whole or in part; or (iii) becomes insolvent, files a petition for bankruptcy or commences or has commenced against it proceedings relating to bankruptcy, receivership, reorganization or assignment for the benefit of creditors.

18. **WAIVER**. No waiver by Seller of any of the provisions of these Terms or the Agreement is effective unless explicitly set forth in writing and signed by Seller. No failure to exercise, or delay in exercising, any rights, remedy, power or privilege arising from the Agreement operates or may be construed as a waiver thereof. No single or partial exercise of any right, remedy, power or privilege hereunder precludes any other or further exercise thereof or the exercise of any other right, remedy, power or privilege.

19. **CONFIDENTIAL INFORMATION**. All Confidential Information (as defined below) of Seller disclosed by Seller to Buyer, whether disclosed orally or disclosed or accessed in **written**, electronic or other form or media, and whether or not marked, designated or otherwise identified as "confidential," in connection with these Terms or the Agreement is confidential, solely for the use of performing this Agreement and may not be disclosed or copied unless authorized in advance by Seller in writing. Upon Seller's request, Buyer shall promptly return all Confidential Information received from Seller. Seller shall be entitled to injunctive relief for any violation of this Section. For purposes of this Agreement, "**Confidential Information**" means all non-public, confidential or proprietary information of Seller including, but not limited to, business

affairs, business plans, trade secrets, intellectual property, specifications, samples, patterns, designs, client information, customer information, supplier information, technical data, developments, properties, systems, procedures, services, processes, methods, drawings, know- how, equipment, development plans, documents, manuals, strategies, training materials, costs, pricing, discounts or rebates, inventions, discoveries or any other confidential matters acquired in respect of the Seller or the Products.

20. **FORCE MAJEURE**. Neither Seller nor Buyer shall be in breach of contract nor liable to the other party for any delay or damages if prevented from performance of these Terms and the Agreement (other than the payment of money) by any condition of force majeure which is beyond the control and not caused by the negligence of the party so affected ("**Force Majeure**"). Force Majeure includes, but shall not be limited to, earthquakes, floods, hurricanes, named tropical storms, lightning strikes, ice storms, blizzards, icebergs, pack ice, air and sea disasters, explosions and fire, epidemics, acts of God, acts of public enemy, war, terrorism, national emergency, invasion, insurrection, riot, strike, lockout, blockade or other industrial disputes, any laws, rules, regulations, orders, directives or requirements of or interference by any government or government agency (including any thereof or any affecting foreign exchange or otherwise making the terms of sale materially impractical on the basis of the economics relating to the agreed sale price or of illegality), inability or delay in obtaining supplies of adequate or suitable materials, power outage or other circumstances not within the control of the party and which, by the exercise of reasonable diligence, the party is unable to prevent or remedy, whether similar or dissimilar, foreseen or unforeseen. Seller shall have such additional time as may be reasonably necessary to perform its obligations upon the occurrence of any Force Majeure event.

21. **ASSIGNMENT**. Buyer shall not assign any of its rights or delegate any of its obligations under this Agreement without the prior written consent of Seller. Any purported assignment or delegation in violation of this Section is null and void. No assignment or delegation relieves Buyer of any of its obligations under this Agreement.

22. **AMENDMENT AND MODIFICATION**. These Terms may only be amended or modified in a writing which specifically states that it amends these Terms and is signed by an authorized representative of each of Seller and Buyer.

23. **RELATIONSHIP OF THE PARTIES**. The relationship **between** the parties is that of independent contractors. Nothing contained in these Terms or the Agreement shall be construed as creating any agency, partnership, joint venture or other form of joint enterprise, employment or fiduciary relationship between Seller and Buyer, and neither party shall have authority to contract for or bind the other party in any manner whatsoever.

24. **NO THIRD-PARTY BENEFICIARIES**. These Terms and the Agreement are for the sole benefit of the Seller and Buyer and their respective successors and permitted assigns, and nothing herein, express or implied, is intended to or shall confer upon any other person or entity any legal or equitable right, benefit or remedy of any nature whatsoever under or by reason of these Terms.

25. **GOVERNING LAW / JURISDICTION / JURY WAIVER**. THESE TERMS, THE AGREEMENT AND THE RELATIONS BETWEEN THE PARTIES SHALL BE GOVERNED BY THE PROCEDURAL AND SUBSTANTIVE LAWS OF THE STATE OF TEXAS, EXCLUSIVE OF CONFLICT OF LAWS PRINCIPLES WHICH WOULD DIRECT THE APPLICATION OF THE SUBSTANTIVE OR PROCEDURAL LAW OF ANOTHER JURISDICTION. IN THE EVENT TEXAS LAW IS RULED OR ORDERED TO NOT APPLY TO ANY DISPUTE BETWEEN THE PARTIES, THEN FOR PURPOSES OF THAT DISPUTE THESE TERMS, THE AGREEMENT AND THE RELATIONS BETWEEN THE PARTIES SHALL BE GOVERNED BY THE LAWS OF THE JURISDICTION IN WHICH BRAY'S FACTORY APPLICABLE TO THE SALE IS LOCATED, EXCLUSIVE OF CONFLICT OF LAWS PRINCIPLES WHICH WOULD DIRECT THE APPLICATION OF THE SUBSTANTIVE OR PROCEDUAL LAW OF ANOTHER JURISDICTION.

IF BRAY'S FACTORY APPLICABLE TO THE SALE IS LOCATED IN ANY STATE, TERRITORY, OR DISTRICT OF THE UNITED STATES OF AMERICA, EACH PARTY: (A) IRREVOCABLY SUBMITS TO THE JURISDICTION AND VENUE OF THE COURTS LOCATED IN HARRIS COUNTY, TEXAS FOR THE RESOLUTION OF ANY AND ALL DISPUTES ARISING FROM OR RELATING TO THESE TERMS, THE AGREEMENT AND THE RELATIONS BETWEEN THE PARTIES; **AND (B) KNOWINGLY AND VOLUNTARILY WAIVES ALL RIGHTS TO A JURY TRIAL IN ANY LEGAL PROCEEDING RELATING TO THESE TERMS, THE AGREEMENT AND THE RELATIONS BETWEEN THE PARTIES**.

IF BRAY'S FACTORY APPLICABLE TO THE SALE IS NOT LOCATED IN ANY STATE, TERRITORY, OR DISTRICT OF THE UNITED STATES OF AMERICA, EACH PARTY AGREES ALL DISPUTES ARISING OUT OF OR IN CONNECTION WITH THIS AGREEMENT OR THE ORDER(S) SHALL BE FINALLY SETTLED, SUBJECT TO THE DEFENSES ALLOWED BY APPLICABLE LAW, UNDER THE RULES OF ARBITRATION OF THE INTERNATIONAL CHAMBER OF COMMERCE BY A SINGLE ARBITRATOR APPOINTED IN ACCORDANCE WITH THE SAID RULES. THE ARBITRATION SHALL BE CONDUCTED

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IN ENGLISH WITHIN THE LIMITS OF THE CITY OF HOUSTON, TEXAS. THE ARBITRATOR MUST MEET EACH OF THE FOLLOWING QUALIFICATIONS IN ORDER TO BE APPOINTED: (1) BE A GRADUATE OF A LAW SCHOOL LOCATED IN THE UNITED STATES; (2) HAVE MORE THAN TWENTY YEARS OF EXPERIENCE IN LITIGATING AND/OR ARBITRATING COMPLEX COMMERCIAL DISPUTES; (3) BE LICENSED TO PRACTICE LAW IN THE STATE OF TEXAS; AND (4) BE IMPARTIAL. THE ARBITRATOR WILL HAVE THE AUTHORITY TO APPORTION LIABILITY BETWEEN THE PARTIES, BUT WILL NOT HAVE THE AUTHORITY TO AWARD ANY DAMAGES OR REMEDIES NOT AVAILABLE UNDER, OR IN EXCESS OF, THE EXPRESS TERMS OF THESE TERMS OR THE AGREEMENT. THE ARBITRATION AWARD WILL BE PRESENTED TO THE PARTIES IN WRITING, AND UPON THE REQUEST OF EITHER PARTY, WILL INCLUDE FINDINGS OF FACT AND CONCLUSIONS OF LAW. THE AWARD MAY BE CONFIRMED AND ENFORCED IN ANY COURT OF COMPETENT JURISDICTION. BUYER AND SUPPLIER HEREBY CONSENT AND SUBMIT TO THE AFOREMENTIONED ARBITRATION AND THE JURISDICTION OF ANY LOCAL, STATE OR FEDERAL COURT LOCATED WITHIN HOUSTON, TEXAS, AS JURISDICTION FOR REVIEW OR CHALLENGE OF THE ARBITRATION RESULTS AND WAIVE ANY RIGHT SUCH PARTY MAY HAVE TO TRANSFER THE VENUE TO ANY OTHER JURISDICTION. THE PARTIES EXPRESSLY RESERVE ALL RIGHTS TO PURSUE INJUNCTIVE RELIEF IN ANY COURT LOCATED IN HOUSTON, TEXAS. THE PARTIES ACKNOWLEDGE AND AGREE THAT THIS AGREEMENT INCLUDES ACTIVITIES IN INTERSTATE COMMERCE (AND, ACCORDINGLY, THE FEDERAL ARBITRATION ACT OF THE UNITED STATES SHALL CONTROL AND APPLY TO ALL ARBITRATIONS CONDUCTED HEREUNDER, NOTWITHSTANDING ANY STATE LAW PROVISIONS TO THE CONTRARY).

26. **NOTICES**. All notices, request, consents, claims, demands, waivers and other communications hereunder (each, a "**Notice**") shall be in writing and addressed to the parties at the addresses set forth on the face of the Quotation or to such other address that may be designated by the receiving party in writing. All Notices shall be delivered by personal delivery, nationally recognized overnight courier (with all fees pre-paid), facsimile (with confirmation of transmission), email or certified or registered mail (in each case, return receipt requested, postage prepaid). Except as otherwise provided in the Agreement, a Notice is effective only (i) upon receipt of the receiving party (and confirmation of such receipt in respect of facsimile or email transmissions), and (ii) if the party giving the Notice has complied with the requirements of this Section.

27. **SEVERABILITY**. If any of these Terms or other terms or provision of the Agreement are determined to be invalid, illegal or unenforceable in any jurisdiction, such invalidity, illegality or unenforceability shall not affect any other term or provision or invalidate or render unenforceable such term or provision in any other jurisdiction.

28. **CLERICAL ERRORS**. Seller reserves the right to correct all stenographic or clerical errors or omissions in any documents (whether Quotations, invoices or other documents).

29. **SURVIVAL.** Any provision of the Agreement that by its nature should apply after any termination or expiration of the Agreement, including (but not limited to) the following provisions: Compliance with Laws, Confidentiality, Governing Law / Jurisdiction and Survival, shall survive any such termination or expiration.

30. **PUBLISHED DATA**. All published dimensions, weights, temperatures, pressure ratings and other Product data are approximate.

CANCELLATION, CHANGE ORDERS AND RETURNED GOODS POLICY ADDENDUM

As guidance and further clarification on the applicable terms and conditions relating to change orders or cancellations, Bray will accept changes and cancellations generally subject to Buyer agreement to pay all costs and expenses incurred by Bray for the order, including, without limitation, costs and expenses relating to engineering, financing costs (including those for any performance or warranty obligations), restocking, order administration, supplies, freight, duties and inspection. For standard product, Bray will generally apply a twenty-five percent (25%) cancellation fee unless such amount is not sufficient to recapture Bray's fees and expenses (*e.g.*, financing costs, freight, duties, *etc*.) relating to the order. For non standard products (*i.e*., product with unique feature(s) or specifically designed for the applicable purchase), the cancellation charge will usually be the purchase price of the product(s). For any such agreed cancellation or change, Bray will calculate the specific amount of such costs and expenses incurred to the date of such cancellation or change and advise Buyer of the applicable amount owed. For any standard product returns, exceptional costs such as freight, duties and financing costs will be added to any standard cancellation fee. For any non standard product returns, the cancellation charge will additionally include amounts incurred in connection with the return.

Specific terms and conditions relating to the foregoing and the events and circumstances relating to the novel coronavirus COVID-19: Bray will agree to delay the delivery of orders beyond a previously agreed delivery date as long as the Buyer pays an additional storage fee of five percent (5%) relating to such applicable order(s); *provided*, *however*, that the applicable order(s) must nevertheless be shipped and invoiced by no later than ninety (90) days after the previously agreed delivery date or the applicable order(s) will be deemed canceled and the cancellation charge (as outlined above) therefor shall be charged.

ADDITIONAL TERMS RELATIVE TO SALES:

FOR BRAY CANADA GROUP OF COMPANIES: BRAY CONTROLS CANADA LTD., BRAY SALES ONTARIO, BRAY SALES QUEBEC, RITE CORPORATION, RITEPRO CORPORATION.

Credit Application/First Time Orders:
First time orders require full payment at the time of delivery prior to shipment, unless explicit written consent to the contrary is provided by Bray. For subsequent orders the Buyer shall provide a Credit Application in Bray's format. Credit terms are provided solely at the discretion of Bray and may be denied for any reason by Bray. This process typically takes + 3 working days, so it is encouraged that all clients send this in advance of the purchase order to avoid delays to processing time.

Minimum Order Value:
$200.00 CAD.

Order Acknowledgment Expectations:
Provided purchase order must match last quotation submitted. Any/all order discrepancies will add to delay in processing. Bray Rite will forward the purchase order acknowledgment within 1 week once no discrepancies exist.

Payments:
Buyer's order will be considered valid only upon receipt of relevant milestone deposit payment schedule where dollar value exceeds $250,000.00 CAD. Orders above $ 250,000.00 CAD automatically become defined internally as "project" orders, are subject to separate review and acceptance by Bray's project group, and tie in to a separate set of more stringent commercial standards. Bray's goal is to provide seamless customer service throughout the order cycle. To do so in a world of changing economic markets we need to put in place standard set of progress payments to allow us to serve our clients to a higher standard. All project orders are subject to approval drawings as a key milestone.

Standard Deposit Schedule:

Bray Canada - Deposit Payment Schedule for orders in value of $ 250,000.00 CAD & above.

Standard Deposit Schedule (5 payment system):

DEPOSIT PAYMENT # 1:
10% of total order value to be invoiced (net 30) at time of Purchase Order receipt.

DEPOSIT PAYMENT # 2:
20% of total order value to be invoiced (net 30) at submission of drawings.

DEPOSIT PAYMENT # 3:
30% of total order value to be invoiced (net 30) after receipt of major component (ie. valve body).

DEPOSIT PAYMENT # 4:
30% of total order value to be invoiced (Net 30 **+ Secured Letter of Credit**) after completion of Inspection/Test as applicable.

FINAL PAYMENT # 5 (BALANCE OWING):
10% of total order value to be invoiced (Net 30 **+ Secured Letter of Credit**) after submission of final documentation.

Delays to receive any deposit payments (measured in working days) will impact agreed to final delivery adversely in equal measure.

No order is subject to cancellation unless requested in writing by either party and accepted in writing by the other. For all cancellation terms please reference Bray document "Bray International Terms and Conditions of Sale".

Inspection During Manufacturing:
The quoted Scope of Work is based upon Bray's accredited quality system. The Buyer shall have the right at its own cost to inspect the progress of the Scope of Work. Such inspection including scope, notice of inspection, time and date require Bray's agreement in writing 10 working days in advance of expected inspection.

Shipping:
Bray requires Buyer's appropriate courier, preferred service level, account type (collect, 3rd party, etc.) and relevant Account Number as a prerequisite for any shipment(s) to Buyer or its agents, successors or assigns. Please specify preferred courier details for carton box orders under 70 lbs, as well as alternate LTL pallet/crate orders over 70 lbs in weight. For all non-Canadian orders brokerage information is also required as necessary to clear the goods. Bray may, at its own discretion, require further documentation from Buyer before shipments are initiated. If desired by the Buyer, Bray can ship using 'Bestway/Prepay And Add' methods (i.e. shipment using Bray's shipping account). If such a method is chosen, a courier company will be chosen by Bray and any related charges or fees shall be paid for by Buyer. Bray will not be held responsible for any delay in shipment or delivery caused by or due to war, fire, labour dispute, act of God, or any other cause, accidental or otherwise, over which Bray has no control. In addition, while Bray aims to make all deliveries within the time contracted for, Bray cannot always guarantee to have shipped the products on a certain day, and Bray will assume no liability on account of unavoidable delays in such cases. No claim whatsoever is allowed unless reported within thirty days after receipt of products.