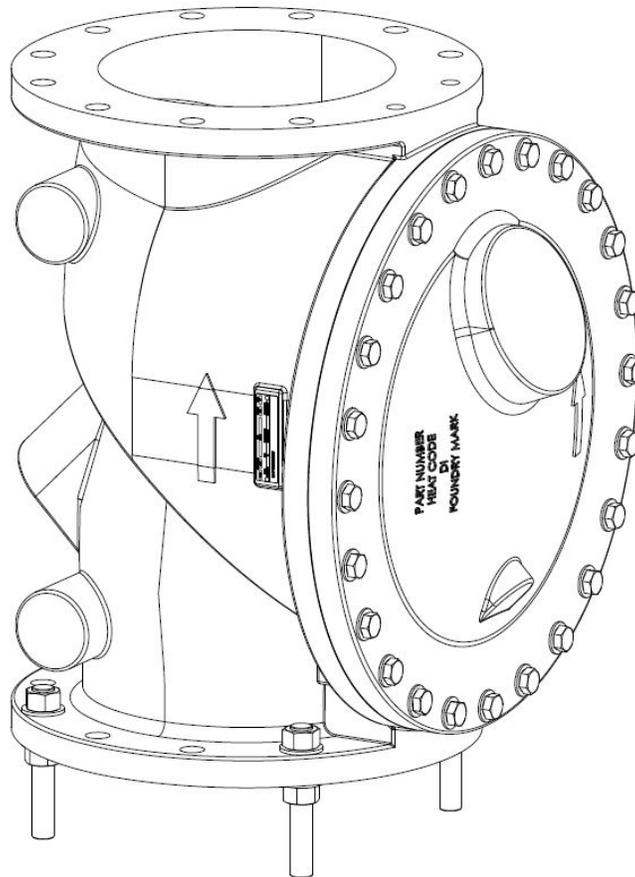


APCO 2-24" FRF-100CF FULL FLOW RUBBER FLAPPER FOOT VALVES



Instruction **D12057**
March 2025

Instructions

These instructions are for use by personnel who are responsible for the installation, operation and maintenance of DeZURIK valves, actuators or accessories.

Safety Messages

All safety messages in the instructions are identified by a general warning sign and the signal word CAUTION, WARNING or DANGER. These messages indicate procedures to avoid injury or death.

Safety label(s) on the product indicate hazards that can cause injury or death. If a safety label becomes difficult to see or read, or if a label has been removed, please contact DeZURIK for replacement label(s).

⚠WARNING

Personnel involved in the installation or maintenance of valves should be constantly alert to potential emission of pipeline material and take appropriate safety precautions. Always wear suitable protection when dealing with hazardous pipeline materials. Handle valves which have been removed from service with suitable protection for any potential pipeline material in the valve.

Inspection

Your DeZURIK product has been packaged to provide protection during shipment; however, items can be damaged in transport. Carefully inspect the unit for damage upon arrival and file a claim with the carrier if damage is apparent.

Parts

Replaceable wear parts are listed on the assembly drawing. These parts can be stocked to minimize downtime. Order parts from your local DeZURIK sales representative or directly from DeZURIK. When ordering parts please provide the following information:

If the valve has a data plate: please include the 7-digit part number with either 4-digit revision number (example: 9999999R000) or 8-digit serial number (example: S1900001) whichever is applicable. The data plate will be attached to the valve assembly. Also, include the part name, the assembly drawing number, the balloon number and the quantity stated on the assembly drawing.

If there isn't any data plate visible on the valve: please include valve model number, part name, and item number from the assembly drawing. You may contact your local DeZURIK Representative to help you identify your valve.

DeZURIK Service

DeZURIK service personnel are available to maintain and repair all DeZURIK products. DeZURIK also offers customized training programs and consultation services. For more information, contact your local DeZURIK sales representative or visit our website at DeZURIK.com.

TABLE OF CONTENTS

Description 4

Handling and Storage..... 4

Installation 4

Fusion Bonded Epoxy Coated Valves..... 4

Operation 4

Maintenance..... 5

 Disassembly Procedure:..... 5

 Assembly Procedure:..... 5

Troubleshooting..... 8

Description

The APCO FRF-100CF Full Flow Rubber Flapper Foot Valve is generally installed on the bottom of a suction line in a wet well. The valve is used primarily to maintain prime on a single centrifugal pump. An FRF-100CF consists of a valve body, cover, a flapper that is secured by the body and cover, and feet that allow the valve to sit off the bottom of the wet well. An optional strainer is available to filter out large debris. The flapper swings away from the valve seat to allow flow in the forward direction and returns to the valve seat when upstream flow is stopped to prevent backflow and maintain a fluid level in the suction line.

Handling and Storage

Lifting the valve improperly may damage it. Do not fasten lifting devices to piping or attached components. Lift the valve with slings, chains or cables fastened around the valve body or fastened to bolts or rods through bolt holes in the flanges.

If installation will be delayed, refer to **Form 1454 – Recommended Long & Short-Term Storage Procedures**.

Installation

The APCO FRF-100CF must be installed in the vertical orientation (with the flow upwards). The embossed flow arrow on the valve body must be pointing in the direction of flow.

1. Before installation, remove foreign material such as weld spatter, oil, grease, and dirt from the pipeline.
2. Prepare pipe ends and install valves in accordance with the pipe manufacturer's instructions for the joint used.

NOTICE

Do not deflect the pipe-valve joint. Minimize bending stresses in the valve end connection with pipe loading.

If excessive seat leakage occurs during startup, check the installation and eliminate any distortion to the valve body.

3. Ensure the valve and pipeline flanges are concentric to ensure proper flange sealing and seat leakage control.
4. Tighten the flange bolts or studs in a crisscross pattern and minimum of four stages.
5. It is recommended to manually fill the suction line with water. This eliminates the risk of damage to the pump from running dry.

Fusion Bonded Epoxy Coated Valves

NOTICE

Valves with fusion bonded epoxy coated exterior require flat washers to be installed under the flange nuts when installing the valve to the pipeline flange. This is to prevent the coating from cracking or chipping.

Operation

The APCO FRF-100CF Full Flow Rubber Flapper Foot Valve is installed at the bottom of a suction line in a wet well. The valve is primarily used to maintain prime on a pump. The FRF operates automatically and opens when the pump turns on. When the pump shuts off, the valve automatically closes and keeps the suction line full.

Maintenance

The FRF-100CF does not require routine maintenance but should be included as part of the normal facility equipment inspections for any malfunction while under normal usage conditions. An inspection can be quickly performed as follows:

Disassembly Procedure:

1. Ensure the pipeline is de-energized.

⚠WARNING

Pipeline pressure can cause injury or death. Relieve pipeline pressure before servicing.

2. Due to the weight of the cover and flapper, it is recommended that 8" and larger valves be removed from the vertical position for maintenance.
3. Loosen each cover Bolt (A04, A05 if applicable) only three full turns.
4. Tap the side of Cover (A02) with a mallet to separate the Cover (A02) from the Body (A01).
5. Remove all cover Bolts (A04, A05 if applicable), Washers (A21) and Nuts (A31 if A05 is used), and lift off Cover (A02).
6. Remove Flapper (A10) from Body (A01) and inspect for cracks or tears. Check for wear on the Body (A01) seat surface.
7. Inspect Spring (A65). Replace it if damaged.

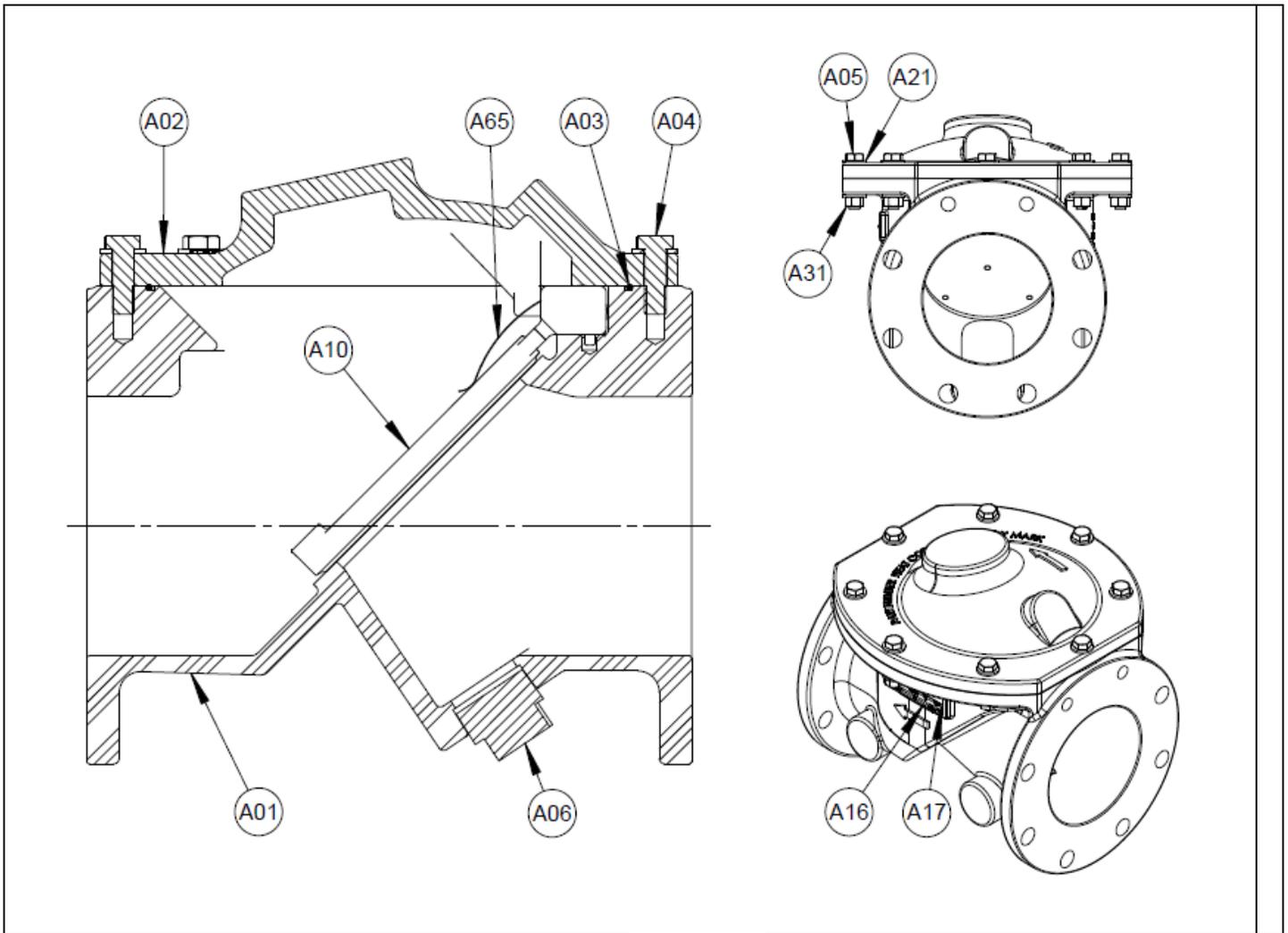
Assembly Procedure:

1. Apply a coating of O-ring and media compatible grease (Molykote 111 or Phoenix 505) to Cover O-ring (A03).
2. Place Flapper (A10) into Body (A01) seat opening. Make sure Flapper (A10) is positioned correctly in the Body (A01) pocket by aligning the rubber pin in the Flapper (A10) with the locating hole in the Body (A01).
3. Push the rubber pin on the Flapper (A10) into the Body (A01) locating hole.
4. Place Spring (A65) on top of the Flapper(A10).
Note: The Spring (A65) should be equally spaced between two flats on the Flapper (A10). The Flapper (A10) should rest flat on the Body (A01) seat as shown in Figure 1.
5. Place O-Ring (A03) into the O-ring groove of the Body (A01).
6. Install Cover (A02) onto Body (A01). Make sure the Cover (A02) properly aligns on the Flapper (A10) hinge pin section.
7. Install Washers (A21), Bolts (A04, A05 if applicable) and Nuts (A31 if A05 is used). Tighten all Bolts (A04, A05 if applicable) in Cover (A02) lightly in a crisscross pattern to prevent tilting the cover.
8. After all Bolts (A04, A05 if applicable) are lightly tightened and Cover (A02) is sitting flat on Body (A01). Torque bolts down.
9. It is recommended to manually fill the suction line with water. This eliminates the risk of damage to the pump from running dry.

Bolt Size	Torque
1/4"-20	62 in-lbs
5/16"-18	128 in-lbs
3/8"-16	19 ft-lbs
7/16"-14	30 ft-lbs
1/2"-13	46 ft-lbs
9/16"-12	67 ft-lbs
5/8"-11	92 ft-lbs
3/4"-10	113 ft-lbs
7/8"-9	182 ft-lbs
1"-8	273 ft-lbs
1-1/4"-7	545 ft-lbs
1-3/8"-6	715 ft-lbs
1-1/2"-6	949 ft-lbs

Table 1: Torque Specifications

APCO 2-24" FRF-100CF Full Flow Rubber Flapper Foot Valves

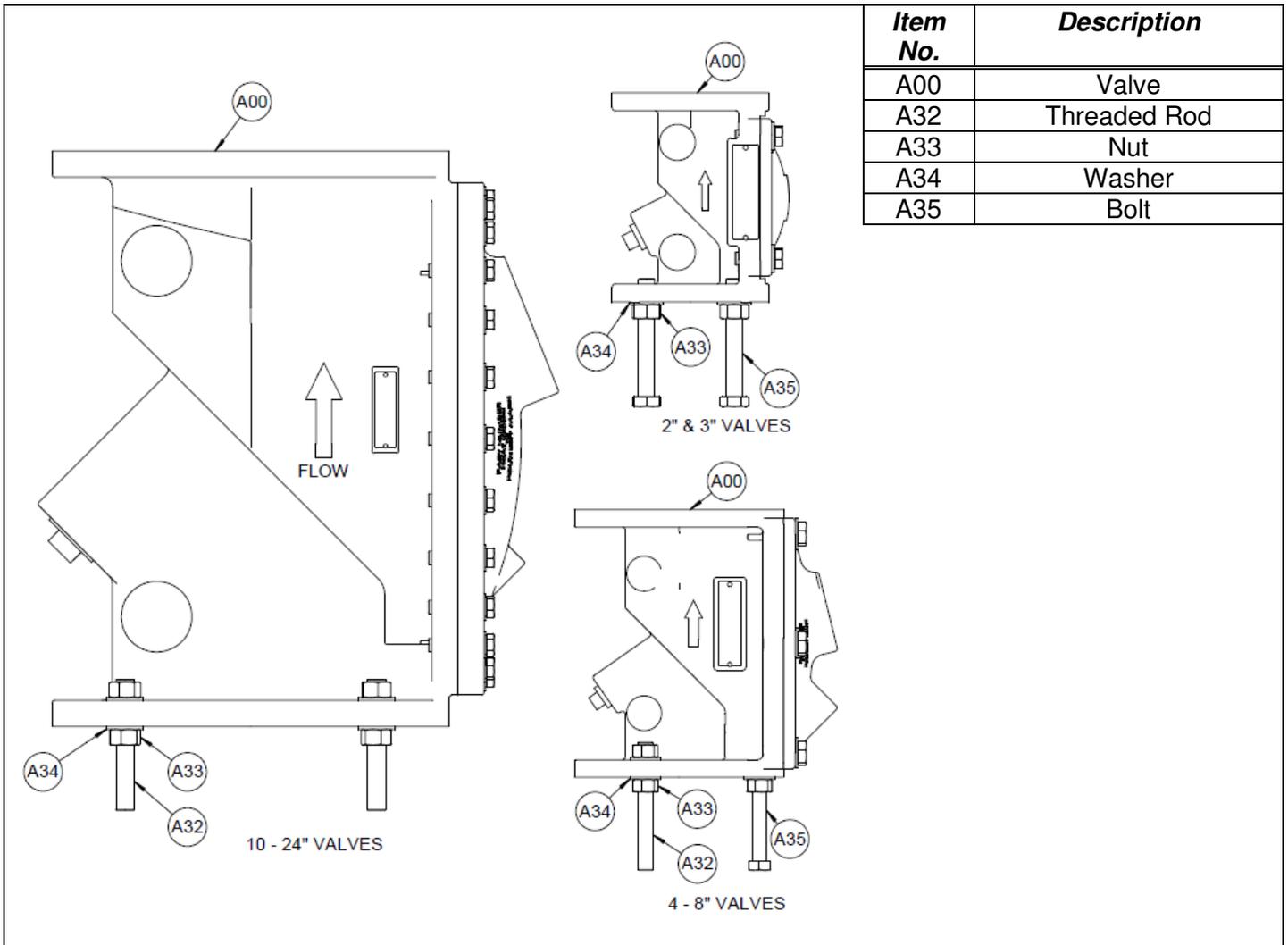


Item No.	Description
A01	Body
A02	Cover
A03	Cover O-Ring
A04	Bolt (Short)
A05	Bolt (Long)
A06	Body Pipe Plug

Item No.	Description
A10	Flapper
A16	Data Plate
A17	Drive Screw
A21	Washer
A31	Nut
A65	Spring

Figure 1: APCO FRF-100CF, Rubber Flapper Swing Check Valve

APCO 2-24" FRF-100CF Full Flow Rubber Flapper Foot Valves



<i>Item No.</i>	<i>Description</i>
A00	Valve
A32	Threaded Rod
A33	Nut
A34	Washer
A35	Bolt

Figure 2: APCO FRF-100CF Rubber Flapper Foot Valve Standoff Assembly

Troubleshooting

<i>Condition</i>	<i>Possible Cause</i>	<i>Corrective Action</i>
Cover leaks.	Cover O-ring is damaged.	Replace cover O-ring.
Valve leaks excessively from one side of the flapper to the other.	Foreign matter caught between flapper and seat.	Fully open valve to remove object.
	Flapper is worn or damaged.	Replace flapper.
Valve leaks at flange joint.	Loose flange bolting.	Tighten flange bolting.
	Blown flange gasket.	Replace flange gasket.
	Misalignment or damage to field piping and supports.	Adjust misalignment or repair piping or supports.
	Damaged flange face/s or improper flange connections.	Repair flange, replace valve body or adjust flange connections.
Valve does not fully close.	Object is wedged between seat and disc.	Fully open valve to remove object.

Limited Warranty

DeZURIK, Inc. ("Seller") manufactured products, auxiliaries and parts thereof that we manufacture for a period of twenty-four (24) months from date of shipment from Seller's factory, are warranted to the original purchaser only against defective workmanship and material, but only if properly stored, installed, operated, and serviced in accordance with Seller's recommendations and instructions.

For items proven to be defective within the warranty period, your exclusive remedy under this limited warranty is repair or replacement of the defective item, at Seller's option, FCA Incoterms 2020 Seller's facility with removal, transportation, and installation at your cost.

Products or parts manufactured by others but furnished by Seller are not covered by this limited warranty. Seller may provide repair or replacement for other's products or parts only to the extent provided in and honored by the original manufacturer's warranty to Seller, in each case subject to the limitations contained in the original manufacturer's warranty.

No claim for transportation, labor, or special or consequential damages or any other loss, cost or damage is being provided in this limited warranty. You shall be solely responsible for determining suitability for use and in no event shall Seller be liable in this respect.

This limited warranty does not warrant that any Seller product or part is resistant to corrosion, erosion, abrasion or other sources of failure, nor does Seller warrant a minimum length of service.

Your failure to give written notice to us of any alleged defect under this warranty within twenty (20) days of its discovery, or attempts by someone other than Seller or its authorized representatives to remedy the alleged defects therein, or failure to return product or parts for repair or replacement as herein provided, or failure to store, install, or operate said products and parts according to the recommendations and instructions furnished by Seller shall be a waiver by you of all rights under this limited warranty.

This limited warranty is voided by any misuse, modification, abuse or alteration of Seller's product or part, accident, fire, flood or other Act of God, or your failure to pay entire contract price when due.

The foregoing limited warranty shall be null and void if, after shipment from our factory, the item is modified in any way or a component of another manufacturer, such as but not limited to; an actuator is attached to the item by anyone other than a Seller factory authorized service personnel.

All orders accepted shall be deemed accepted subject to this limited warranty, which shall be exclusive of any other or previous warranty, and this shall be the only effective guarantee or warranty binding on Seller, despite anything to the contrary contained in the purchase order or represented by any agent or employee of Seller in writing or otherwise, notwithstanding, including but not limited to implied warranties.

THE FOREGOING REPAIR AND REPLACEMENT LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, OBLIGATIONS AND LIABILITIES, INCLUDING, BUT NOT LIMITED TO, ALL WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR OF MERCHANTABILITY OR OTHERWISE, EXPRESSED OR IMPLIED IN FACT OR BY LAW, AND STATE SELLER'S ENTIRE AND EXCLUSIVE LIABILITY AND YOUR EXCLUSIVE REMEDY FOR ANY CLAIM IN CONNECTION WITH THE SALE AND FURNISHING OF SERVICES, GOODS OR PARTS, THEIR DESIGN, SUITABILITY FOR USE, INSTALLATION OR OPERATIONS. NEITHER ANY PERFORMANCE OR OTHER CONDUCT, NOR ANY ORAL OR WRITTEN INFORMATION, STATEMENT, OR ADVICE PREPARED BY SELLER OR ANY OF OUR EMPLOYEES OR AGENTS WILL CREATE A WARRANTY, OR IN ANY WAY INCREASE THE SCOPE OR DURATION OF THE LIMITED WARRANTY.

Disclaimer

Metric fasteners should not be used with ASME Class 150/300 bolt holes and flange bolt patterns. If you use metric fasteners with ASME Class 150/300 bolt holes and flange bolt patterns, it may lead to product failure, injury, and loss of life. DeZURIK Inc. disclaims all liability associated with the use of metric fasteners with ASME Class 150/300 bolt holes and flange patterns, including but not limited to personal injury, loss of life, loss of product, production time, equipment, property damage, lost profits, consequential damages of any kind and environment damage and/or cleanup. Use of metric fasteners with ASME Class 150/300 bolt holes and flange bolt patterns is a misuse that voids all warranties and contractual assurances. If you use metric fasteners with ASME Class 150/300 bolt holes and flange bolt patterns, you do so at your sole risk and any liability associated with such use shall not be the responsibility of DeZURIK, Inc. In addition to the foregoing, DeZURIK's Manufacturer's Conditions apply.

Limitation of Liability

IN NO EVENT SHALL SELLER BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, PUNITIVE, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO; DAMAGE TO OR LOSS OF OTHER PROPERTY OR EQUIPMENT, BUSINESS INTERRUPTION, COST OF SUBSTITUTE PRODUCTS, LOSS OF TIME, LOSS OF PROFITS OR REVENUE, COST OF CAPTIAL, LOSS OF USE, OR DIMINUTION IN VALUE) WHATSOEVER, AND SELLER'S LIABILITY, UNDER NO CIRCUMSTANCES, WILL EXCEED THE CONTRACT PRICE FOR THE GOODS AND/OR SERVICES FOR WHICH LIABILITY IS CLAIMED. ANY ACTION FOR BREACH OF CONTRACT BY YOU, OTHER THAN RIGHTS RESPECTING OUR LIMITED WARRANTY DESCRIBED ABOVE, MUST BE COMMENCED WITHIN 12 MONTHS AFTER THE DATE OF SALE.

Sales and Service

For information about our worldwide locations, approvals, certifications and local representative:

Web site: www.dezurik.com E-Mail: info@dezurik.com



250 Riverside Ave. N., Sartell, MN 56377 • Phone: 320-259-2000 • Fax: 320-259-2227

DeZURIK, Inc. reserves the right to incorporate our latest design and material changes without notice or obligation.

Design features, materials of construction and dimensional data, as described in this manual, are provided for your information only and should not be relied upon unless confirmed in writing by DeZURIK, Inc. Certified drawings are available upon request.