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Bolt-on Circular Sight Glass

Model: **KBRFNL**



Installation / Operation / Maintenance Instruction

Instruction No.:

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Approved:

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PRODUCT WARRANTY

ARCHON Industries Inc., warrants its products as designed and manufactured by

ARCHON to be free of defects in material and workmanship for a period of one year after the date of installation or eighteen months after the date of manufacture, whichever is earliest. ARCHON will, at its option, replace or repair any products that fail during the warranty period due to defective material or workmanship.

Prior to submitting any claim for warranty service, the owner must submit proof of purchase to ARCHON and obtain written authorization to return the product. Thereafter, the product shall be returned to ARCHON in Suffern, New York, with freight prepaid.

This warranty shall not apply if the product has been disassembled, tampered with, repaired or altered outside of the ARCHON factory, or if it has been subjected to misuse, neglect or accident.

ARCHON's responsibility hereunder is limited to repairing or replacing the product at its expense. ARCHON shall not be liable for loss, damage, or expenses directly or indirectly related to the installation or use of its products, or from any other cause or for consequential damages. It is expressly understood that ARCHON is not responsible for damage or injury caused to other products, building, property or persons, by reason of the installation or use of its products.

THIS IS ARCHON'S SOLE WARRANTY AND IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED WHICH ARE HEREBY EXCLUDED, INCLUDING IN PARTICULAR ALL WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

This document and the warranty contained herein may not be modified and no other warranty, expressed or implied, shall be made by or on behalf of ARCHON unless modified or made in writing and signed by the President or a Vice President of ARCHON.

1.0 About the Manual

This manual has been prepared as an aid and guide for personnel involved in installation and maintenance. All instructions must be read and understood thoroughly before attempting any installation, operation or maintenance.

WARNING

Failure to follow instructions could result in breakage of the sight glass lens, resulting in fluid escaping from the vessel and fragmenting glass. Always wear safety glasses when installing, servicing or operating a sight glass. Failure to follow precautions can result in personal injury and property damage.

2.0 Introduction

ARCHON Industries, Inc.'s circular sight glasses are designed for observation of fluid flow in process lines or for observation of the level of the contents in a vessel or tank. These sight glasses are available in a variety of sizes, styles and connection methods. The user should refer to ARCHON literature to identify the specific sizes, models and connection types available.

A circular sight glass permits the convenient monitoring of:

- fluid presence - change in level or volume of liquid in the viewing area
- fluid color - change in tint or hue
- fluid clarity - change in opacity, brightness or purity

The glass assists the observer by creating a monitoring port for process fluid volumes, directions, and reactions without exposing the fluid to the external environment.

2.1 Description

The ARCHON model KBRFNL Circular sight glass consists of four basic components. Each component may vary slightly, depending on the desired physical and mechanical properties for the indicator. Refer to the exploded parts view in Section 9.

Cover - the cover provides a machined surface in which the glass and cushion are protectively seated. The cover provides an effective means of compressing the gasket between the glass and the lower pad using threaded fasteners.

Lens - provides a window for vessel fluid observation.

Gaskets - when the nuts are torque to their proper values, the gaskets are compressed between the lens and the upper cover and weld pad to tightly seal the gap and prevent leaking.

Bolts/Nuts – to mechanically attach the sight glass to the customer’s supplied value.

3.0 Model

Model KB-RF-NL – Flanged type

Cover bolted to ANSI flanged nozzle or vessel studing outlet – lower pad not used.

Standard materials of construction for the upper cover are forged SA105 Steel, SA182F 304L and 316L stainless steel. Standard glass is tempered borosilicate with non-asbestos (NA) compressed fiber gasketing.

Alternate lens materials such as tempered soda lime are available. Alternate available gasketing materials are Buna N, Neoprene, Viton, Grafoil and Teflon® PTFE and others.

4.0 Installation

Upon receipt of the ARCHON Circular sight glass, check all components carefully for damage which may have been incurred during shipping. *IMPORTANT: If damage is evident or suspected, do not attempt installation. Notify your carrier immediately and request a damage inspection.*

Confirm that the information on the identification tag conforms to the size, model, and performance data on the purchase order and the actual operating conditions at the installation site.

DANGER

Exceeding the design ratings or application's data limits can cause the glass to break, the unit to leak or sudden release of pressure. Do not exceed the design ratings for each particular unit. Failure to keep operating conditions below design ratings may result in severe personal injury and property damage.

CAUTION

Only qualified, experienced personnel who are familiar with sight glass equipment and thoroughly understand the implications of the tables and all the instructions should install the Circular sight glass. Failure to read and comply with the following instructions could result in personal injury or property damage.

Inspection:

- 1) Examine the glass to see that it is free of scratches, chips or other imperfections.
- 2) Ensure that the lower pad and cover have been cleaned and are free of any foreign material.
- 3) Ensure that the vessel connection area has been cleaned and is free of any foreign material.

Location Precautions:

Locate the Circular sight glass:

- 1) where it can be easily seen;
- 2) away from areas where objects may be dropped thrown or generally allowed to contact the glass;
- 3) protected from dust, grit or other objects that could damage the glass;
- 4) protected from external thermal shock, such as a high temperature application being exposed to a cold air blast or cold water wash.

DANGER

Extreme care should be used when disassembling the circular sight glass to avoid damaging the cushions, glass, shields, or gaskets. Damaging any of these components could result in glass breakage with sudden release of pressure and contained fluid, causing severe personal and property damage.

4.1 Assembling / Re-assembling

Refer to the exploded view in Section 9 for component identification assistance and position.

- 1) Carefully remove the glass plate from the shipping package and place in a safe area.
- 2) Clean any material from gasket seating areas.
- 3) Place and align the full face gasket over the raised face flange on the vessel.
- 4) Apply oil or anti-seize to threads of the studs.

- 5) Place a rubber band around the circumference of the glass to properly center the glass.
- 6) Carefully place shield (if any) and glass plate on the gasket until they rest level on the gasket. Position shield between glass and gasket.
- 7) Place cushion on top of the glass so that it lines up with the edges of the glass plate.
- 8) Carefully place the cover over the cushion gasket avoiding direct contact with the glass lens.
- 9) Place the bolts and tighten nuts with fingers.
- 10) Using a torque wrench, tighten the bolts to the proper value in a sequence as shown in the figure below. Tighten bolts in increments of 5 ft/lb. or 50% of torque value, whichever is smaller.

TYPICAL TORQUING SEQUENCE

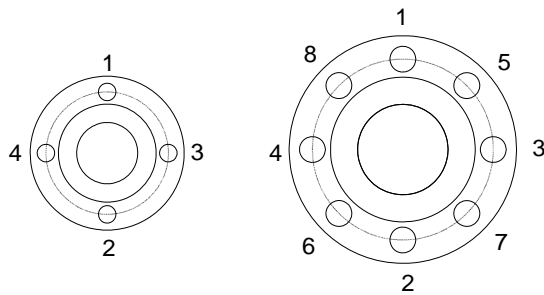


FIGURE 1

DANGER

Torquing under pressure yields incorrect torque and increases the likelihood of the glass plate breaking and contents spraying out of the vessel. The sight glass must be relieved of all pressure or vacuum, and allowed to reach ambient temperature. The vessel must be drained or purged of all fluids before torquing. Failure to follow this procedure could result in severe personal injury and property damage.

BOLT TORQUE CHECK:

Bolt torque is vital to the proper operation of the circular sight glass. Bolt torque should be checked after initial installation, and periodically thereafter, to ensure that the unit is in compliance with the torque values shown in Table 1 (tighten in the proper sequence - see Figure 1).

5.0 Operation

Before initializing sight glass operation, check that all installation procedures have been completed. Use only qualified experienced personnel who are familiar with sight glass equipment and thoroughly understand the implications of the tables and all the instructions. Check that the bolts have been torqued to their proper limits as stated in Section 4. Check that all connections are pressure tight and the glass is clean and free of any damage.

DANGER

Sight glasses should be brought into service slowly to avoid excessive shock or stress on the glass. Rapid pressurization of a sight glass can cause glass breakage/fragmentation and fluid leakage. Failure to take proper precautions could result in severe personal or property damage.

6.0 Maintenance

Use only qualified experienced personnel who are familiar with sight glass equipment and thoroughly understand the implications of the tables and all the instructions.

Create a maintenance schedule for each specific installation of a Sight Glass. On all inspections, regularly check the following items:

- 1) glass for cleanliness and signs of damage or wear,
- 2) sight glass for signs of leakage at gaskets,
- 3) sight glass for signs of internal or external corrosion, and
- 4) bolt torque values (see Section 4 and Table 1).

Use only qualified experienced personnel who are familiar with sight glass equipment and thoroughly understand the implications of the tables and all the instructions.

DANGER

DO NOT proceed with any maintenance while the sight glass is in operation. Pressure increases the likelihood of the glass plate breaking and contents spraying out of the vessel. A sight glass in service must be relieved of all pressure or vacuum, allowed to reach ambient temperature and the vessel drained or purged of all fluids before conducting maintenance. Failure to follow this procedure could result in severe personal injury and property damage.

6.1 Maintenance Procedures

GLASS should be given regular and careful attention. Keep glass clean using a commercial glass cleaner and a soft cloth. Inspect the surface of the glass for any clouding, etching or scratching or physical damage such as chips or corrosion. Glass that is damaged is weakened and may break under pressure. Shining a light at approximately a 45° angle will aid in detecting some of these conditions. Typical damaged areas will glisten more brightly than the surrounding glass because the light is reflected.

Detection of any damage, problem areas or surface wear is sufficient evidence to take the sight glass out of service. DO NOT proceed with operations until the glass has been replaced with a glass replacement kit following the assembly instructions in Section 4.

SHIELDS showing any sign of clouding, wear, or deterioration is an indication that the sight glass has been or could soon become exposed to the contained fluid. Immediately take the sight glass out of service and replace the shield, glass, and gasket following the assembly instructions in Section 4.

GASKET LEAKS must be repaired immediately. DO NOT proceed with operations until gaskets have been replaced by following the assembly instructions in Section 4.

CORROSION may occur if the user has selected an improper material for the Circular Sight Glass application. It is the responsibility of the user to choose a material of construction compatible with both the contained fluid and the surrounding environment. If internal or external corrosion is present, the user must immediately perform an investigation. It may be necessary to contact an authorized ARCHON distributor to better determine the origin of the corrosion.

6.2 Troubleshooting

Problem: glass or shield becomes etched or clouded in service

Cause: fluid being handled is not compatible with the glass or shield material

Solution: replace the glass and/or shield

Problem: glass continually breaks in service

Cause: warped body as a result of mechanical or thermal stresses

Solution: reduce the stress and replace sight glass

7.0 Removal/Disassembly/Reassemble

DANGER

DO NOT proceed with any removal or disassembly while the sight glass is in operation. Pressure increases the likelihood of the glass plate breaking and contents spraying out of the vessel. A sight glass in service must be freed of all pressure or vacuum, allowed to reach ambient temperature and the vessel drained or purged of all fluids before proceeding. Failure to follow this procedure could result in severe personal injury and property damage.

7.1 Disassembly

The Circular sight glass should be disassembled by loosening the nuts in the sequence denoted in Section 4. Remove the cover, cushion, glass, and gaskets using the appropriate safety precautions. Once a sight glass has been disassembled, all glass must be disposed of because of wear; and all gaskets and cushions must be disposed of since they are permanently deformed by compression during service.

DANGER

DO NOT under any circumstances reuse glass or gasketing items previously in service, since they can cause leaks or high stress points resulting in glass breakage and severe personal and property damage. Glass that is broken is dangerous and should be disposed of in a safe manner determined by the user.

7.2 Reassembly

To prepare for installation of new glass, clean the gasket seating surfaces on the welding pad and cover. This should be done using a soft metal scraper (preferably brass) to remove all burrs, rust and remnants of the previous gasket. Exercise extreme care to avoid gouging or scarring gasket seating surfaces. Failure to prepare the gasket surfaces will result in leaks and/or glass breakage.

Check flatness of each glass seating surface of the sight glass by using a known flat piece of the same size glass and a thickness gauge. Surfaces must be flat within 0.005 inch. If the glass seating surfaces cannot be restored to this tolerance, the entire sight glass must be disposed of and replaced. If tolerances are met, proceed with re-assembly of the sight glass.

Before installation, inspect the replacement glass for imperfections. During inspection, and during any subsequent handling of the glass, keep the glass from contacting other surfaces. Bumping or sliding of glass against other surfaces can result in glass breaking, scratching or chipping. Install the new glass by following the procedure in Section 4.

8.0 Telephone Assistance & Equipment Return

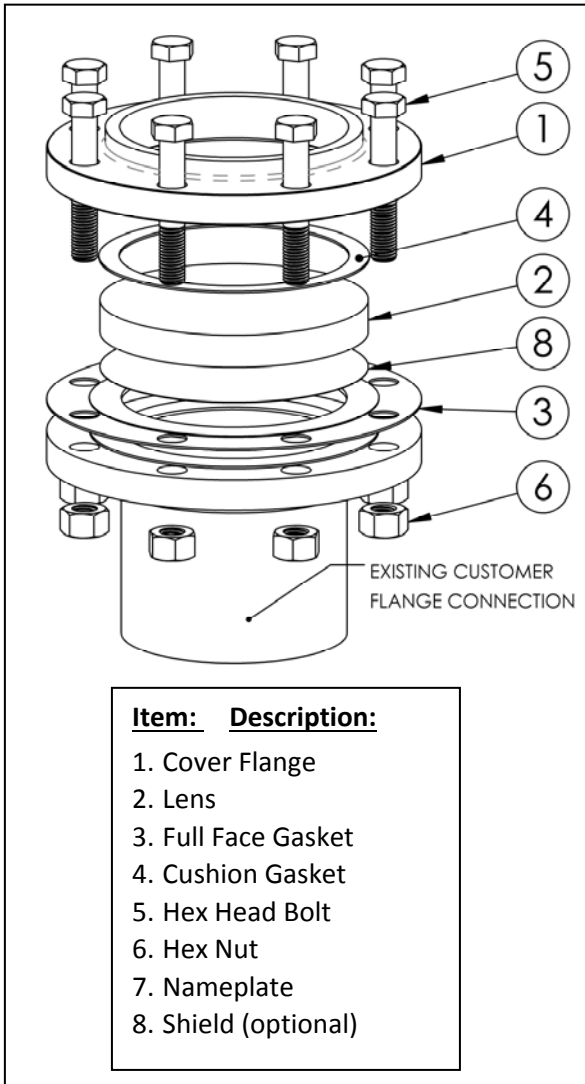
If you are having difficulty with your Sight Glass, notify your local ARCHON distributor, or call the factory direct **(845) 368-3600** and ask for the Sight Glass product manager. To help us assist you more effectively, please have as much of the following information as possible when you call:

- Model #
- Name of the company from whom you purchased the Circular Sight Glass
- Invoice # and date
- Process media
- Operating temperature
- Operating pressure
- Brief description of the problem
- Troubleshooting procedures that failed

You must obtain a Return Authorization (RA) number from ARCHON before returning anything. Failure to do so will result in the unit being returned to you, without being tested, freight collect. To obtain a RA #, the following information (in addition to that above) is needed:

- Reason for Return
- Person to contact at your company
- "Ship-To" address

There is a minimum charge of \$50.00 for evaluation of non-warranty units. You will be contacted before we repair the unit if there will be any additional charges. If you return a unit that is covered by the warranty, but is not defective, the minimum charge will apply.



ARCHON Model	Pressure Rating	Torque value by gasket material (ft-lb)	
		Elastomers: EPDM, Buna, Silicone, Viton	Rigid: Non-Asbestos PTFE Grafoil
KBRFNL-1"	150	4	12
KBRFNL-1.5"	150	7	22
KBRFNL-2"	150	10	28
KBRFNL-2.5"	150	12	36
KBRFNL-3"	150	20	58
KBRFNL-4"	150	12	35
KBRFNL-5"	150	15	44
KBRFNL-6"	150	18	50
KBRFNL-8"	150	25	72
KBRFNL-10"	75	24	70

Table 1

Figure 2