

INSTALLATION, OPERATION and MAINTENANCE FOR TRANSPARENT ALUMINOSILICATE REPLACEMENT GLASS

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

SAFETY INSTRUCTIONS

Penberthy does not have control over the manner in which its gage glass is handled, installed, or used and Penberthy cannot and does not warrant or guarantee that the gage glass is suitable or compatible with the user's specific application.



WARNING

Safety glasses should be worn when removing old glass or when installing replacement gage glass. Failure to follow any instruction could possibly result in glass breakage resulting in severe physical injury or property damage.

I. INTRODUCTION:

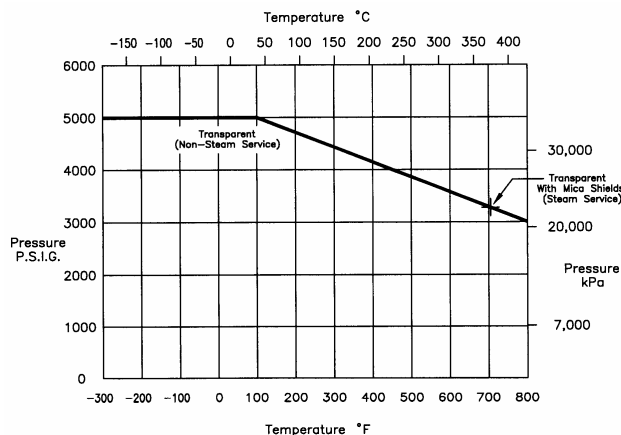
A. Features and Specifications

Penberthy aluminosilicate gage glass is available in transparent glass for use in through vision type liquid level gages only.



WARNING

Under no circumstances should these glass ratings or ratings of the liquid level gage manufacturer be exceeded. Exceeding these ratings may cause severe physical injury or property damage.



DIMENSIONS

| Length in inches & (mm) $\pm .00/- .039$ (0.99) | | | | | |
|--|----------------|-----------------|-----------------|-----------------|----------------|
| Width: 1.339/1.299 in (34.01/32.99 mm) Thickness: .687/.656 in (17.45/16.66 mm) Flatness: .005 in (0.13 mm) | Size | | | | |
| | 1 | 2 | 3 | 4 | 5 |
| | 4.528 (115) | 5.512 (140) | 6.496 (165) | 7.480 (190) | 8.661 (220) |
| | 6 | 7 | 8 | 9 | |
| | 9.843 (250) | 11.024 (280) | 12.598 (320) | 13.386 (340) | |

II. INSPECTION AND PERFORMANCE CONFIRMATION:

A. Receiving Inspection

Upon receipt of glass, inspect each piece individually for shipping damage. During inspection and during any subsequent handling of glass, care must be exercised to keep glass pieces from contacting each other or any other surface including tabletops. If shipping damage is evident or suspected, notify carrier immediately and request damage inspection. Glass should be kept within original box until ready to use.

B. User's Rating Inspection

The user should confirm that the gage glass style, size, rating, and quantity meet the requirements of the specific application.

SAFETY INSTRUCTIONS

If the style, size, or performance data of the gage glass as received does not conform with any of the criteria above, do not proceed with installation. Contact an authorized Penberthy distributor for direction on what to do.

III. INSTALLATION:

Installation should only be undertaken by qualified experienced personnel who are familiar with this equipment and have read and understood all the instructions in this manual.



CAUTION

Do not proceed with installation of replacement gage glass until the liquid level gage has been relieved of all pressure or vacuum, has been allowed to reach ambient temperature and has been drained or purged of all fluids. Failure to follow these instructions may cause personal injury or property damage.

Refer to the manufacturer's installation instructions for the specific model liquid level gage for required installation procedures.

Before installing replacement glass, all old glass, gaskets, cushions and shields (if used) must be destroyed and disposed of and under no circumstances should be re-used.



WARNING

Cushions, gaskets and shields are permanently deformed by compression and if re-used, may cause leaks and high stress points resulting in glass breakage. Glass may contain hidden damage and internal stresses caused by previous pressure and temperature usage. If re-used, the glass may break under pressure causing severe physical injury or property damage.

A. Inspection of Glass Seating Surfaces

- Clean the glass seating surfaces on the liquid chamber and cover with a soft metal scraper (preferably brass). Make sure that all burrs, rust, and bits of old gasket are removed.



CAUTION

Extreme care must be taken to avoid gouging or scarring seating surfaces. Failure to properly clean gasket surfaces may result in gasket leaks and high stress points which may cause glass breakage.

- Check flatness of each glass seating surface on liquid chamber and cover, using a known flat piece the same size as the glass, and a thickness gage. Surface must be flat within .002 inch (.05 mm).
- If any one surface is found to be beyond a tolerance of .002 inches (.05 mm), the entire gage must be disposed of and replaced.
- If all glass seating surfaces are found to be within the .002 inch (.05 mm) tolerance as described above, proceed to reassemble liquid level gage by following the specific reassembly instructions in the manufacturer's liquid level gage instruction manual.

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WARNING

Flatness of glass seating surfaces outside the .002 inch (.05 mm) tolerance specified above is an indication of the gage having been overstressed through repeated exposure to mechanical, thermal, or hydraulic shock during its previous service. Operation of a liquid level gage which has been overstressed will result in abnormal stresses on glass which may cause glass to break with resulting sudden release of pressure, leakage of contained fluid, severe physical injury or property damage.

B. Mirror Viewing

For added safety, a system of indirect viewing by means of mirrors should be installed to protect personnel from the hazards of possible gage failure.

IV. OPERATION:

A. Pre-Operational Check

1. Assure that all installation procedures have been completed.
2. Check to determine that all connections are pressure tight.
3. Assure that nuts have been retorqued to their proper values.

B. Hydrostatic Test

1. Take all precautions necessary to handle the possibility of leakage during the test.
2. Hydrostatically pressure test all installations to 100 psig (690 kPaG), and correct any leakage before proceeding.

C. Operating

Gages should be brought into service slowly. The glass is tempered and can stand minimal thermal shock or mechanical stress. The connecting gagecocks should be opened slightly, and the gage temperature and pressure allowed to slowly equalize with the vessel. If the gage is equipped with gagecocks which have a ball check, the gagecocks must be opened all the way after the pressure and temperature have equalized to permit operation of the automatic ball check in the event of gage failure.

V. MAINTENANCE:

Maintenance should only be undertaken by qualified, experienced personnel who are familiar with this equipment and have read and understood all the instructions in this manual.



CAUTION

Do not proceed with any maintenance unless the liquid level gage has been relieved of all pressure or vacuum, has been allowed to reach ambient temperature and has been drained or purged of all fluids. Failure to follow these instructions may cause personal injury or property damage.

A. Preventative Maintenance

The user must create maintenance schedules, safety manuals and inspection details for each specific installation of a liquid level gage.

On all installations, the gage should be regularly evaluated by the user for purposes of maintenance for cleanliness and signs of damage or wear.

The user must determine upon evaluation of his or her own operating experience an appropriate maintenance schedule necessary for his or her specific application. Realistic maintenance schedules can only be determined with full knowledge of the services and application situation involved.

B. Maintenance Procedures

Regular and careful attention must be given to the cleaning and inspection of glass. *Glass that is etched or even slightly scratched is weakened and may break under pressure. Glass ratings listed under Section I above are no longer valid for gages that contain scratched, worn, or otherwise damaged glass, and such glass must be immediately replaced.*

a. Cleaning of glass

Keep glass clean using a commercial glass cleaner and a soft cloth. DO NOT use wire brushes, metal scrapers, or any device which could scratch the glass.

b. Inspection of the glass

Inspect the surface of the glass for any signs of clouding, etching, scratching or physical damage such as bruises, checks, or corrosion. Shining a light at approximately a 45° angle will aid in detecting some of these conditions which will glisten more brightly than the surrounding glass when reflecting light. Detection of any such problem areas or any surface wear is sufficient evidence of damage. Immediately take liquid level gage out of service. Do not proceed with operation of liquid level gage until glass has been replaced by following the disassembly-reassembly instructions under Section V, Paragraph D below.

| Problem | Cause | Cure |
|--|---|---|
| Glass or shields become etched or clouded in service | Fluid being gaged is not compatible with glass or shield material | Install shields which will not be affected by contained fluid. Observe Caution in Section III on previous page and consult with the liquid level gage manufacturer |
| Glass repeatedly breaks in service despite careful attention to maintenance procedures | Thermal shock, hydraulic shock, mechanical loads, exceeding manufacturer's ratings or a combination of these things | Check entire system to determine possible sources of loads. Check application to determine actual operating conditions and contact the liquid level gage manufacturer for direction on how to proceed |

D. Removal-Disassembly-Reassembly



CAUTION

Do not proceed with removal of liquid level gage unless the gage has been relieved of all pressure or vacuum, has been allowed to reach ambient temperature and has been drained or purged of all fluids. Failure to follow these instructions may cause personal injury or property damage.

Refer to the manufacturer's installation instruction manual for the specific liquid level gage for Removal-Disassembly-Reassembly instructions.

VI. Disposal at End of Useful Life

Penberthy gages are used in a variety of fluid applications. By following the appropriate federal and industry regulations, the user must determine the extent of preparation and treatment the glass must incur before its disposal. A Material Safety Data Sheet (MSDS) may be required before disposal services accept the glass.