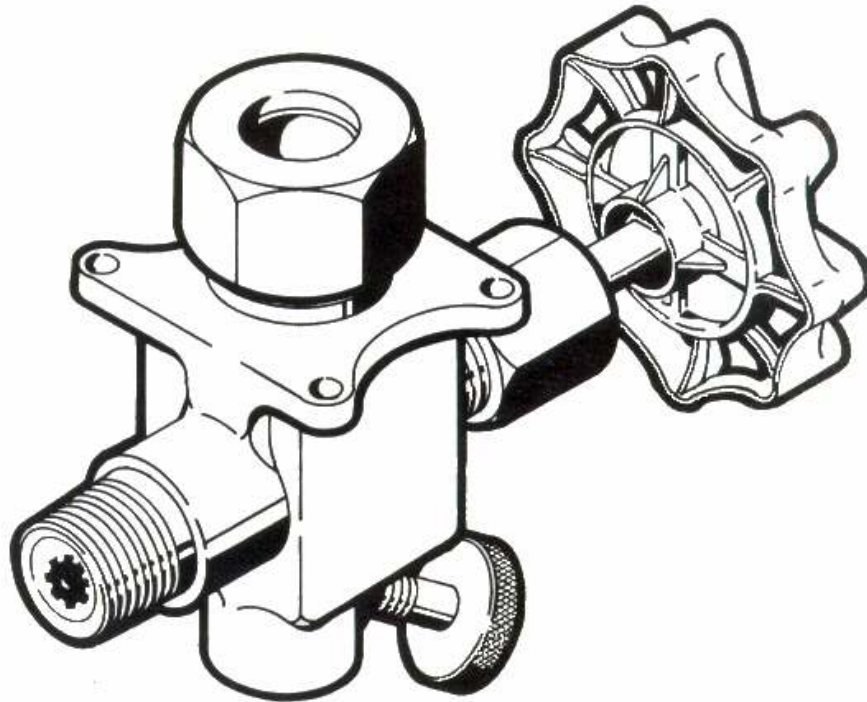


PENBERTHY®

Gagecocks

Series N7



Installation, Operation and Maintenance Instructions

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PENBERTHY PRODUCT WARRANTY

Tyco Valves & Controls, LP warrants its Penberthy products as designed and manufactured by TV&C, LP to be free of defects in the 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. TV&C, LP will, at its option, replace or repair any products which 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 TV&C, LP and obtain written authorization to return the product. Thereafter, the product shall be returned to TV&C, LP in Harlingen, Texas, with freight paid.

This warranty shall not apply if the product has been disassembled, tampered with, repaired or otherwise altered outside of TV&C, LP factory, or if it has been subject to misuse, neglect or accident.

The responsibility of TV&C, LP hereunder is limited to repairing or replacing the product at its expense. TV&C, LP shall not be liable for loss, damage or expenses related directly or indirectly to the installation or use of its products, or from any other cause or for consequential damages. It is expressly understood that TV&C, LP is not responsible for damage or injury caused to other products, buildings, personnel or property, by reason of the installation or use of its products.

THIS IS TV&C, LP'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 TV&C, LP unless made in writing and signed by the General Manager or Director of Engineering of TV&C, LP.

INSTALLATION, OPERATION and MAINTENANCE MANUAL FOR PENBERTHY SERIES N7 GAGECOCKS

1.0 About the Manual

This manual 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.

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



Failure to follow any instruction could possibly result in a malfunction or failure of the gagecock resulting in leakage causing serious personal injury or property damage.

2.0 Introduction

2.1 Features and Specifications

Penberthy Series N7 tubular glass gagecocks are supplied in pairs (upper and lower) and are designed to house each end of a transparent sight glass tube. This gagecock/glass combination forms a gage that accurately indicates liquid level as well as liquid characteristics.

Standard features of N7 gagecocks in non steam-water applications are: a ball check shut-off to stop leakage of contained fluid in case of accidental tubular glass breakage, integral bonnet, integral drain cock and handwheel.

Important: Under most circumstances, Series N7 gagecocks are not recommended without the ball check shut-off. Gagecocks without the ball check shut-off feature will not stop leakage of contained fluid in the event of accidental tubular glass breakage. In circumstances, however, where the fluid being gauged tends to surge in a rapid manner, the ball checks could tend to give false level reading or could accidentally seat.

Series N7 gagecocks are not suitable for steam-water applications unless they are furnished with one of the following optional features:

1. Non-automatic gagecocks – ball checks removed from both upper and lower gagecocks.
2. Automatic gagecocks – vertical rising ball check and ball inspection plug in the lower gagecock in conjunction with a steam cleaner in the lower gagecock stem. The upper gagecock is equipped with a horizontal ball check and a leaky ball seat formed in the body.

Design Ratings

Body Material	Model	Glass Packing	Maximum Allowable Working Pressure	Maximum Steam Pressure
Bronze	N7A	Neoprene® (Standard)	200 psig [1380 kPaG] at -20° F [-29°C] to +100° F [38°C] 165 psig [1140 kPaG] at +300° F [149°C]	125 [860 kPaG]
		Teflon® (Optional)	200 psig [1380 kPaG] at -20° F [-29°C] to +100° F [38°C] 125 psig [860 kPaG] at +400° F [204°C]	125 [860 kPaG]
Bronze	N7B	Neoprene® (Standard)	400 psig [2760 kPaG] at -20° F [-29°C] to + 100° F [38°C] 335 psig [2310 kPaG] at +300° F [149°C]	250 [1720 kPaG]
		Teflon® (Optional)	400 psig [2760 kPaG] at -20° F [-29°C] to + 100° F [38°C] 250 psig [1720 kPaG] at +400° F [204°C]	250 [1720 kPaG]
Iron	N7A	Neoprene® (Standard)	500 psig [3450 kPaG] at -20° F [-29°C] to +100° F [38°C] 375 psig [2590 kPaG] at +300° F [149°C]	350 [2410 kPaG]
		Teflon® (Optional)	500 psig [3450 kPaG] at -20° F [-29°C] to +100° F [38°C] 250 psig [1720 kPaG] at +450° F [232°C]	350 [2410 kPaG]
Iron	N7B	Neoprene® (Standard)	500 psig [3450 kPaG] at -20° F [-29°C] to +100° F [38°C] 375 psig [2590 kPaG] at +300° F [149°C]	350 [2410 kPaG]
		Teflon® (Optional)	500 psig [3450 kPaG] at -20° F [-29°C] to +100° F [38°C] 250 psig [1720 kPaG] at +450° F [232°C]	350 [2410 kPaG]
316 Stainless Steel & Steel	N7A and N7B	Neoprene® (Standard)	500 psig [3450 kPaG] at -20° F [-29°C] to +300° F [149°C]	350 [2410 kPaG]
		Teflon® (Optional)	500 psig [3450 kPaG] at -20° F [-29°C] to +500° F [260°]	350 [2410 kPaG]

Table 1

Pressure/temperature ranges in above table are subject to the limitations of the tubular glass. See chart Figure 2 below.

Tubular Glass – Ratings 5/8” (16 mm) and 3/4” (19 mm) OD

Vessel Tappings Ctr. To Ctr. Distance		Up to 150°F (66°C)			From 150° F (66°C) Thru 425°F (218°C)		
		High Pressure	Heavy Wall	Red Line	High Pressure	Heavy Wall	Red Line
Inches	[mm]	psig [kPaG]	psig [kPaG]	psig [kPaG]	psig [kPaG]	psig [kPaG]	psig [kPaG]
10	[254]	410 [2830]	600 [4140]	340 [2340]	310 [2140]	345 [2380]	275 [1900]
15	[381]	385 [2650]	600 [4140]	310 [2140]	280 [1930]	325 [2240]	265 [1830]
20	[508]	355 [2450]	600 [4140]	285 [1970]	265 [1830]	315 [2170]	260 [1790]
25	[635]	300 [2070]	580 [4000]	260 [1790]	250 [1720]	300 [2070]	250 [1720]
30	[762]	275 [1900]	550 [3790]	230 [1590]			
35	[889]	240 [1650]	500 [3450]	200 [1380]			
40	[1016]	210 [1450]	420 [2900]	180 [1240]			
45	[1143]	200 [1380]	360 [2480]	170 [1170]			
50	[1270]	180 [1240]	340 [2340]	160 [1100]			
55	[1397]	150 [1030]	N/A	140 [970]			
60	[1524]	140 [970]	N/A	120 [830]			
65	[1651]	125 [860]	N/A	100 [690]			
70	[1778]	100 [690]	N/A	90 [620]			

N/A - Not Available

Table 2



WARNING

Under no circumstances should N7 gagecocks be used for steam-water applications unless they are equipped with one of these optional features. Use of standard N7 gagecocks without these features can result in sudden release of pressure causing serious personal injury or property damage.

2.2 Design Ratings at Maximum and Minimum Operating Temperatures

To determine the maximum allowable working pressure for a specific temperature within the design limits stated below, the user must refer to Penberthy dimension sheets, or when provided, the specifically stated design limits on a Penberthy product proposal.

2.3 Application Data

Note: For specific application data, within the above ranges, consult the Penberthy product proposal for the specific model and size gagecock set, or request Penberthy to supply the applicable Technical Data Bulletin.



WARNING

Never exceed these design ratings or application data limits. Exceeding design ratings or application data limits can cause serious personal injury or property damage.

3.0 Inspection & Performance Confirmation

3.1 Receiving Inspection

Upon receipt of gagecock set, check all components carefully for damage incurred in shipping. If damage is evident or suspected, do not attempt installation. Notify carrier immediately and request a damage inspection.

3.2 User's Rating Inspection

The user is to confirm:

1. That the gagecock set model number and pressure/temperature rating stamped on nameplate (163) conforms to the description on the user's purchase order.
2. That the operating conditions described in the purchase order agree with the actual operating conditions at the installation site.
3. That the actual operating conditions at the installation site are within the application data shown on the Penberthy Technical Data Bulletin or product proposal referred to above.
4. That the materials of construction of the gagecocks are compatible with both the contained fluid and surrounding atmosphere in the specific application.

Important: If the size, model, or performance data of the gagecock set 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.

4.0 Installation

Use only qualified experienced personnel who are familiar with this equipment and thoroughly understand all the instructions in this manual for the installation of this equipment.

Refer to Penberthy dimension sheets or Penberthy product proposal to obtain dimensional information for the specific size and model gagecock set.

4.1 Mounting

1. Prior to actual installation, turn handwheel or lever of each gagecock clockwise until the stem closes against the seat.
2. Mount upper and lower gagecocks to vessel using Teflon[®] tape, or equivalent, on all male pipe thread connections as shown in Figure 3.
3. Tighten vessel connections to a pressure tight joint making certain that sight glass connections are aligned vertically and to vessel centers as called for on application specification.

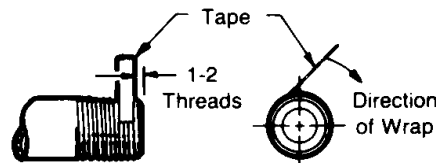


Figure 1

4.2 Sight Glass Installation

1. Turn upper gagecock counterclockwise (approx. 1/8 turn).
2. Loosen glass packing nut to insure there is no compressive force on glass packing.
3. Insert sight glass up into upper gagecock sight glass connection.
4. Tighten upper gagecock to its original position while holding sight glass with upward force to insure its clearing of lower sight glass connection. Check vertical alignment of gagecocks.
5. Loosen glass packing nut on lower gagecock and pull glass down into lower sight glass connection to a positive stop.
6. Tighten upper and lower glass packing nuts.

Note: In some circumstances, it may be necessary to remove glass packing nut, glass packing retainer, and glass packing, and mount them on sight glass prior to insertion of glass into upper and lower gagecock bodies. See Figure 4 for proper assembly sequence.

4.3 Guard Rod Installation

Guard rods (four required) are assembled downward through upper gagecock with swaged portion on rods at the top. Bottom of rods are positioned into respective holes in the lower gagecock.

5.0 Operation

5.1 Pre-Operational Check

1. Check that all installation procedures have been completed.
2. Check to determine that all connections are pressure tight.

5.2 Hydrostatic Test

1. Take all precautions necessary to handle the possibility of leakage.
2. Hydrostatic pressure test installation to at least 100 psig (690 kPaG) or gage limit, and

correct any leakage before proceeding.

5.3 Operating



Gagecock assemblies should be brought into service slowly to avoid excessive shock or stress on the tubular glass. Rapid pressurization of a gagecock assembly can cause glass breakage with resulting sudden release of pressure causing serious personal injury or property damage.

To avoid excessive thermal shock or mechanical stress on the tubular glass, the connecting gagecocks should be opened slightly, and the gage temperature and pressure allowed to slowly equalize with the vessel.

If the gagecocks are furnished with ball checks, 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.

6.0 Maintenance

Use only qualified experienced personnel who are familiar with this equipment and thoroughly understand all the instructions in this manual for all maintenance.

During system shut down, the gage gagecocks should be left open to permit the gage to lose pressure and cool with the rest of the system.

Failure to leave the gagecocks open during system shut down will trap high pressure fluid in the gage.



Do not proceed with any maintenance unless the gagecock 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 do so can cause serious personal injury or property damage.

6.1 Preventative Maintenance

Create maintenance schedules, safety manuals and inspection details for each specific installation of a gagecock set.

For maintenance purposes on all installations, regularly check gagecocks for signs of:

1. leakage around stem area.
2. an internal stem leak.
3. leakage around stuffing box connections.
4. internal or external corrosion.

Determine upon evaluation of your own operating experience an appropriate maintenance schedule necessary for the specific application. Realistic maintenance schedules can only be determined with full knowledge of the services and application situation involved.

6.2 Maintenance Procedures

1. Stem packing leakage can often be stopped by tightening the stem packing nut. If leak persists, the stem packing should be replaced by following steps a through f of Disassembly and steps a through f of Reassembly.
2. Signs of internal stem leak is an indication of a worn or damaged stem or seat.
 - A. To replace stem, follow Disassembly steps a through f and Reassembly steps a through f.
 - B. To renew seat surface, follow Disassembly steps a through f. Renew seat by using a fine lapping compound and a mandrel with the same size, shape, and seat angle as the stem. Flush gagecock body clean and reassemble by following steps a through f of Reassembly.

Note: Series N7 gagecocks have an integral seat. Gagecock body must be replaced when seat becomes worn or damaged beyond repair.

3. Signs of leakage around the stuffing box indicates worn out glass packing or improper compression of glass packing. To replace glass packing, follow Disassembly steps a, b and g through l and Reassembly steps a, b and g through n. In the event of improper packing compression, leakage can be stopped by tightening glass packing nut.
4. It is the user's responsibility to choose a material of construction compatible with both the contained fluid and surrounding atmosphere in the user's specific application. If internal or external corrosion are present, an investigation must immediately be carried out by the user as to the cause of the problem, including consulting with an authorized Penberthy distributor.
5. For broken sight glass replacement, follow Disassembly steps a, b and g through l, and Reassembly steps a, b and g through n.

Important: New glass packing must be used when replacing glass.

6.3 Removal – Disassembly - Reassembly



Do not proceed with the disassembly of a gagecock unless the gagecock 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 comply can cause serious personal injury or property damage.

1. Disassembly
 - a. Close upper and lower gagecocks.
 - b. Open drain cock and allow gagecocks to drain.
 - c. Remove handwheel screw, nameplate, and handwheel or lever from stem.
 - d. Loosen and remove stem packing nut.
 - e. Remove stem by turning counterclockwise, along with stem packing and stem packing retainer.
 - f. Slip stem packing and stem packing retainer off the stem
 - g. Remove guard rods if present.
 - h. Loosen glass packing nuts on both upper and lower gagecocks.

- i. Slide sight glass upward into upper gagecock until bottom of tubular glass clears the stuffing box connection on the lower gagecock.
- j. While holding tubular glass in this upward position, rotate upper gagecock counterclockwise (approx. 1/8 turn) to allow clearance to remove sight glass from upper gagecock.
- k. Remove sight glass from upper gagecock.
- l. Remove glass packing nuts, glass packing glands, glass packing and glass packing retainers from both upper and lower gagecocks.

2. Reassembly

- a. Refer to exploded view Figure 4.
- b. Prepare for installation of new packing by cleaning all packing chambers and glands of upper and lower gagecocks.
- c. Slip stem packing retainer (18) on stem (17) and install new stem packing (25).
- d. Thread stem assembly into gagecock by turning clockwise until stem seats and then back off one turn.
- e. Assemble stem packing nut (26) and tighten in place.
- f. Assemble handwheel (28) or lever (261), nameplate (163) and handwheel screw (100) on stem and tighten securely into place.
- g. Replace glass packing nut (37), glass packing gland (36), new glass packing (34) and glass packing retainers (35) on each end of tubular glass (48).
- h. Insert glass packing retainer (35A) into stuffing box of lower gagecock.
- i. With upper gagecock turned 1/8 turn counterclockwise from vertical, insert one end of sight glass into stuffing box connection in upper gagecock to sufficient depth to insure clearance of lower glass packing nut.
- j. Tighten upper gagecock to original position while holding sight glass in place with upward force to insure its clearing lower sight glass connection. Check vertical alignment of gagecocks.
- k. Slide sight glass down into lower gagecock sight glass connection to a positive stop.
- l. Tighten glass packing nuts.
- m. Close both gagecocks by turning handwheel or lever clockwise until stem seats.
- n. Replace guard rods (40).

- 3. Refer to Section 4.0 Installation and Section 5.0 Operation of gagecock when returning to service.

7.0 Disposal at End of Useful Life

Penberthy Series N7 gagecocks 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 N7 gagecocks must incur before their disposal. A Material Safety Data Sheet (MSDS) may be required before disposal services accept certain components.

Metal, glass and polymers should be recycled whenever possible. Refer to order and TV&C, LP Material Specification sheets for materials of construction.

8.0 Telephone Assistance

If you are having difficulty with your Series N7 gagecocks, contact your local Penberthy distributor. You may also contact the factory direct at (309) 946-5205 and ask for an applications specialist. So that we may assist you more effectively, please have as much of the following information available as possible when you call:

- Model #
- Name of the company from whom you purchased the N7 gagecocks
- Invoice # and date
- Process conditions (pressure, flow rates, tank shape, etc)
- A brief description of the problem
- Trouble shooting procedures that failed

If attempts to solve your problem fail, you may request to return your N7 gagecocks to the factory for intensive testing. You must obtain a Return Authorization (R.A.) number from TV&C, LP before returning anything. Failure to do so will result in the unit being returned to you without being tested, freight collect. To obtain an R.A. number, 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 for evaluation of non-warranty units. You will be contacted before any repairs are initiated should the cost exceed the minimum charge. If you return a unit under warranty, but is not defective, the minimum charge will apply.

9.0 Exploded Parts Drawing

RECOMMENDED SPARE PARTS

REF. NO.	ITEM	MIN. QTY.
18	Retainer, Stem Packing	2
25	Packing, Stem	4
26	Nut, Stem Packing	1
34	Packing, Glass	2
35	Retainer, Glass Packing	2
35A	Retainer, Glass Packing	1
37	Nut, Glass Packing	1
48	Glass	1

RECOMMENDED MAXIMUM QUANTITIES SHOULD PROVIDE SPARE PARTS FOR 10% OF THE GAGECOCKS IN SERVICE

11 Body
 14 Retainer, Ball
 15 Ball
 17 Stem
 18 Retainer, Stem Packing
 25 Packing, Stem
 26 Nut, Stem Packing
 28 Handwheel
 34 Packing, Glass
 35 Retainer, Glass Packing
 35A Retainer, Glass Packing
 36 Gland, Glass Packing
 37 Nut, Glass Packing
 40 Rod
 47 Stem, Drain
 48 Glass
 100 Screw
 163 Nameplate
 261 Lever

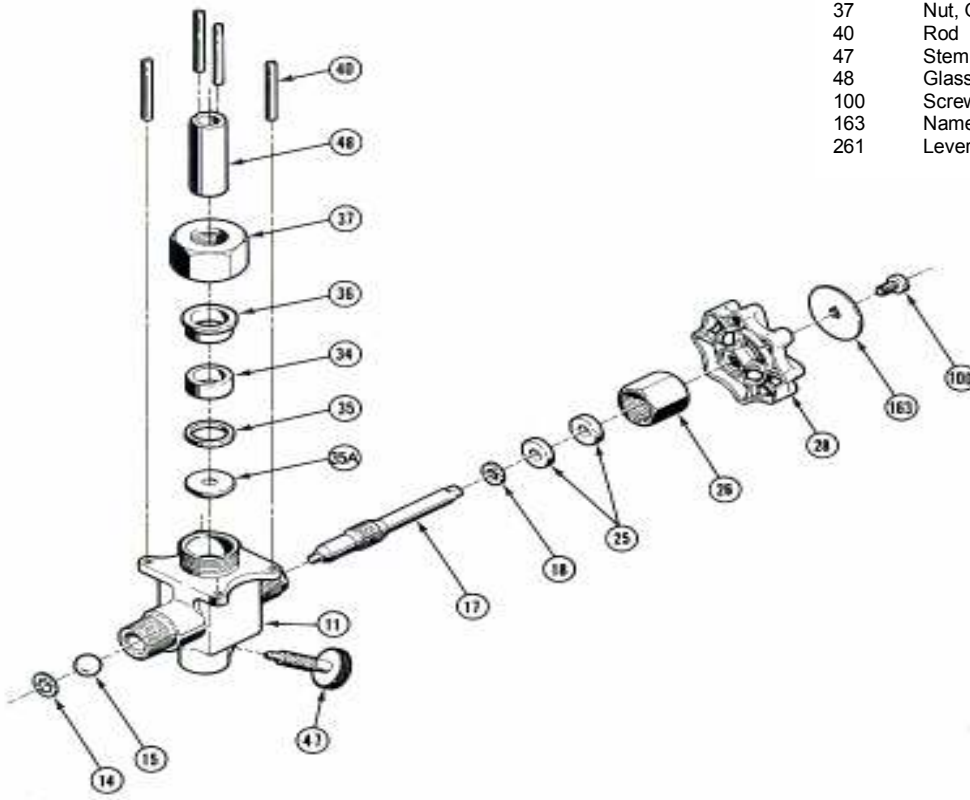


Figure 2

Note: Part No. 35A Retainer, Glass Packing, on lower gagecock only.

PENBERTHY

DECLARATION of CONFORMITY

Application of EU Council Directives:

92/59/EEC; 87/404/EEC; 89/392/EEC

Standards to which conformity is declared:

EN 10213-1:4; ISO 7-1; BS 10; BS 21; BS 759;
BS 1502; BS 1506; BS 1560; BS 1965; BS 3076;
BS 3463; BS 3605; BS 3643; BS 3799; BS 4504;
ASME B&PV Code, Section VIII;
ANSI/ASME B1.1; ANSI/ASME B1.20.1;
ANSI/ASME B16.5; ANSI/ASME B18.2.1;
ANSI/ASME B18.2.2; ANSI/ASME B18.3;
ANSI/ASME B31.3

Manufacturer's Name: Tyco Valves & Controls, LP

Manufacturer's Address: 5801 East Harrison
Harlingen, TX 78550 U.S.A.

Type of Equipment: Pressure Vessel - Armored and Tubular Gage Glass
Gagecocks

Equipment Class: Industrial Instrumentation - Hazardous Area

Model Designations: 100, 200, 300, 400, 500, 600, 700 series
N2, K2, N6, N7, A5

*I, the undersigned, hereby declare that the equipment specified above
conforms to the above Directive(s) and Standard(s).*

Date: 01 August 2010

Signature: _____

Name: Nicholas J. Velk, M.E.

Position: Quality & Operational Excellence Manager

Technical Construction File is available at stated address. Signatory is contact person.

NOTES

NOTES



Tyco Valves & Controls, LP
5801 East Harrison, Harlingen, Texas 78550
Phone: 309-946-5205
FAX: 309-946-5206
Printed in USA
Form No. 14911-009

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