

VARIANCE REQUEST

Iowa Department of Natural Resources

1. Date: November 17, 2003
2. Review Engineer: James A. Hallmark
3. Date Received: November 14, 2003
4. Facility Name: City of DeSoto
5. County Number: Dallas (25)
6. Program Area: CP (Wastewater Construction)
7. Facility Type : C02 (Pumping)
8. Subject Area : 314
9. Rule Reference: 567-64.2(9)a
10. Design Std Ref: 13.5.2
11. Consulting Engr: Vance & Hochstetler, P.C.
12. Variance Rule: 567-64.2(9)c

13. Decision:

Date:

approved
11/18/03

14. Appeal:

Date:

15. Description of Variance Request: A request was received from Vance & Hochstetler Engineers to locate the check valves in the discharge piping in the vertical position rather than the horizontal position as required by Iowa Wastewater Facilities Design Standards Chapter 13.5.2

16. Consulting Engineer's Justifications

- The vertical design has been used for many years and has not been a source of plugging.
- Similar designs have been approved by IDNR for package lift stations.
- This type of design minimizes the number of elbows, and space required.
- Elimination of fittings will reduce the required head on the pumps.
- Manufacturer states that valves can be installed in either the horizontal or vertical position.

17. Department's Justifications

- Not aware of any significant problems with this design.
- Concurrence with Engineers Justification.

18. Precedents Used

Oskaloosa (1982), Carlisle (1985), Perry (1988), Kellogg (1988), Fort Dodge (1991), Van Meter (1991), Alden (1996), and North Liberty (1998)

19. Staff Reviewer:

Date:

James A. Hallmark

11/17/03

20. Supervisor:

Date:

William J. Janssen

21. Authorized by:

Date:

11/18/03

Vance & Hochstetler P.C.

Consulting Engineers

71 Jefferson, Winterset, Iowa 50273

C.T. Vance, P.E. & L.S.
J.M. Hochstetler, P.E. & L.S.

Office Telephone [515] 462-3995

Mr. Gary Witkovski
Iowa Department of Natural Resources
Wallace State Office Building
Des Moines, Iowa 50319

December 31, 1990

Re: Request for Variance for Van Meter, Iowa
Wastewater Pumping Stations

Dear Gary:

The following comments apply to both lift stations in our previously submitted plans for Wastewater Treatment Facilities in Van Meter, Iowa.

The packaged lift stations incorporate a feature which is in variance with the Iowa Wastewater Facilities Design Standards, Chapter 13. The manufacturer's design places a full flow type swing check valve on the vertical run of each discharge line. The standards require all check valves, except ball checks to be placed on the horizontal. Discussions with the manufacturer indicates that the vertical design has been used for many years and has not been a source of plugging. Similar designs have been approved by IDNR for package lift stations at Carlisle, Perry and Kellogg.

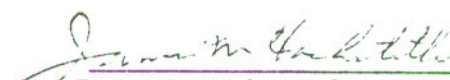
The package stations are designed and assembled with the check valves in the vertical piping to minimize the number of elbows, valves and space required. This minimizes the amount of piping which must be supported by the pumps and pipe supports in the station. It also reduces the discharge pumping head by eliminating an elbow and one gate valve.

As was stated in the letters from Gorman-Rupp Company and M & H Valve Company, copies of which are attached, the check valves are suitable for operation in the vertical or horizontal position and have been used in the vertical position by Gorman - Rupp Company since 1967. In addition Mueller and Clow literature indicate that their check valves can be used in the vertical position and I have a number of package pumping station catalogs showing the check valves in the vertical position.

It is my professional opinion that the pumping stations with the check valves installed in the vertical piping are equal to those placed in horizontal piping and I respectfully request that a variance be granted.

Respectfully submitted,

VANCE & HOCHSTETLER, P.C.
Consulting Engineers


James M Hochstetler

Encl.

December 10, 1990

Mr. Gary Witkovski
Iowa Dept. of Natural Resources
Wallace State Office Bldg.
5th Floor
Des Moines, Ia. 50319

Subject: Vertical Installation of Check Valves
in Gorman-Rupp Pump Stations

Dear Gary:

This letter is to confirm recent discussions you have had with Vance & Hochstetler Engineers concerning the above subject.

Gorman-Rupp's engineering department has been in contact with M&H Check Valve Co. (M&H being the check valves we provide in the station proposed for the Van Meter lift stations). Enclosed is a copy of a letter from M&H as to the suitability of their check valve for vertical application. Gorman-Rupp uses the lever and spring type with the proper lever arm alignment. Also enclosed is a copy of the M&H check valve specifications that clearly show the valves being suitable for use in both the vertical and horizontal positions.

Gorman-Rupp has been using the vertical configuration in our packaged lift stations since 1967 in well over 3,000 sewage applications with virtually no known problems.

I trust this will answer any questions you may have; however, if we can be of any further assistance, please feel free to call.

Very truly yours,
THE GORMAN-RUPP COMPANY



Dave Oswalt, Manager
Water/Wastewater Equipment Sales

DO:ch

cc - Mr. James Hochstetler
Vance & Hochstetler Consulting Engineers



M & H VALVE COMPANY

P.O. BOX 2088, ANNISTON, ALABAMA 36202 • (205) 237-3521

July 10, 1987



Carolyn Price
Gorman Rupp
P. O. Box 1217
Mansfield, Ohio 44901

Re M & H Check Valves

TO WHOM IT MAY CONCERN:

This is to advise that M & H check valves, in either lever and weight (159-02) or lever and spring (259-02), are suitable for installation in vertical pipe lines (position). Vertical installation requires the lever arm to be parallel to the valve seat, extending toward the bottom of valve body.

Regards,

M & H VALVE COMPANY


Terry Christjohn
Assistant Sales Manager

cc B. Dowds

M&H AWWA C508 Check Valves

■ Styles 59, 159 & 259

■ Iron Body, Bronze Mounted, Full Opening

M&H Swing Check Valves are widely specified by engineers and operating personnel. They are well proportioned and sturdily constructed—provide the ideal answer wherever check valves are needed in water and waste treatment plants.

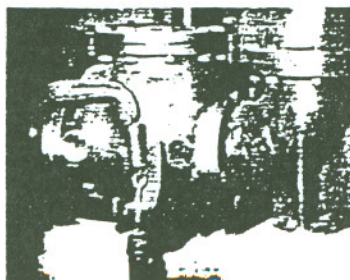
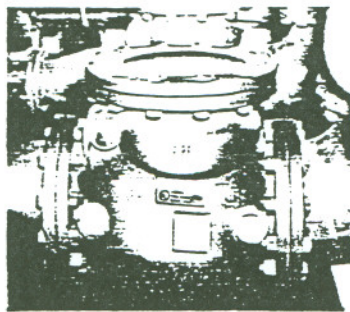
The valve clapper swings completely clear of the waterway when the valve is full open, permitting a "full flow" through the valve equal to the nominal diameter of the pipe. The clapper operates freely and opens or closes in accordance with the direction of flow. Clappers for valves 4" and smaller are all bronze. Clappers for valves 6" and larger are cast-iron, bronze-faced. If desired, sizes 2½" through 30" are available with rubber-faced clappers.

Three types of M&H Check Valves are manufactured. First, the plain swing check valve which opens by line pressure and flow, and closes by gravity under a no-flow condition; the clapper is lowered when the flow drops or reverses direction. The second type is outside lever-and-weight and the third type is outside lever-and-spring. These refinements are desirable to accomplish quicker closing and to minimize slamming where conditions of rapid flow reversal are encountered.

Either lever-and-weight or outside lever-and-spring designs should be used for vertical installation. Lever-and-weight type check valves for horizontal installation require the lever arm close to parallel to the run of the pipe and the weight on the downstream side of the clapper for quick closing. For vertical installation of lever-and-weight valves, the lever arm is moved to a position parallel to the clapper seat and extending towards the bottom of the body, to assist in closing.

NOTE:

When lever and weight or lever and spring check valves are to be specified or used, we strongly recommend lever and spring over lever and weight, for all 14" and larger. In addition rubber faced clappers should be used. As states in AWWA C508 "Conditions of water hammer, hydraulic pulsation, and excessive operating noise are results of system design rather than valve design and are beyond the scope of this standard and require special design and construction considerations."



Either lever-and-weight or lever-and-spring check valves are adjustable. Both types require field adjustment to best meet particular operating conditions. Unless otherwise ordered, the lever-and-weight or the lever-and-spring is placed on the right hand side when facing the valve inlet. Under conditions of extreme rapid flow reversal, check valves with dual lever arms can be supplied.

Stainless steel hinge pins are featured in all sizes. O-ring packed gland is standard in 3" thru 12" sizes. Lever-and-weight or lever-and-spring type check valves sizes 14" and larger using packing are regularly supplied with hinge pin extended through bronze bushings and with outside glands and rubber faced clappers. Alemite fittings for lubrication of bronze bushings can be supplied in either design when specified.

Built up by-passes can be furnished on check valves, sizes 14" and smaller. Larger sizes can be supplied with flange type by-passes. All check valves have bosses on sides and bottom which may be tapped for draining or used for by-pass. When tapping is required, boss designation and size of tap should be stated.

All check valves are available in 250 WWP and M.J. ends as option.

Also available are increasing type check valves in the same configurations. These valves provide size reduction within the valve body for elimination of special adaptors and fittings. The use of increasing check valves are popular in manifolded systems and package treatment systems.



M&H Valve Co.
ANNISTON, ALABAMA

SUGGESTED SPECIFICATIONS FOR

M&H AWWA Swing Check Valves

- Styles 59-Plain; 259-Lever/Spring
- Sizes 2" Through 30"
- Water/Sewage Service

GENERAL

Check valves shall be of the iron body, bronze mounted, full opening swing type. Valve clapper shall swing completely clear of the waterway when valve is full open, permitting a "full flow" thru the valve equal to the nominal pipe diameter. They shall comply with AWWA Standard C-508 latest revision.

RATING

Check Valves shall be rated for 175 psi water working pressure, 350 psi hydrostatic test for structural soundness (2" through 12") and 150 psi water working pressure, 300 psi hydrostatic test (sizes 14" through 30") (when specified all sizes for 250 psi W.W.P.). Seat tightness at rated working pressure shall be in accordance with values shown in AWWA Standard C-500 for gate valves and fully conform to AWWA C508-76.

END CONFIGURATIONS

Check valves shall be furnished with type of end connection as follows: 125# ANSI flanged ends, mechanical joint per AWWA C-111 with (without) accessories, or screwed end 2" through 6"

MATERIALS

All cast iron shall conform to ASTM-A-126 Class B. Castings shall be clean and sound without defects that will impair their service. No plugging or welding of such defects will be allowed.

Clappers shall be all bronze for sizes through 4" and cast iron, bronze faced for sizes 6" and larger. When specified, neoprene rubber facing shall be furnished in place of bronze facing.

Hinge pins shall be 18-8 Stainless Steel rotating in bronze plugs.

Bolts shall be electro-zinc plated steel with hex heads and hex nuts in accordance with ASTM A-307.

DESIGN

Check valves shall be constructed to permit top entry for complete removal of internal components without removing the valve from the line.

Glands shall be O-ring—2"-12" sizes and conventional in 14"-30" sizes.

When specified, for application conditions of rapid flow reversal or vertical installation, check valves shall be equipped with adjustable outside lever & spring to accomplish faster closing and to minimize slamming effect.

Bosses shall be provided on check valves which may be tapped for draining or used for by-pass. When tapping is required, boss designation and size of tap should be stated.

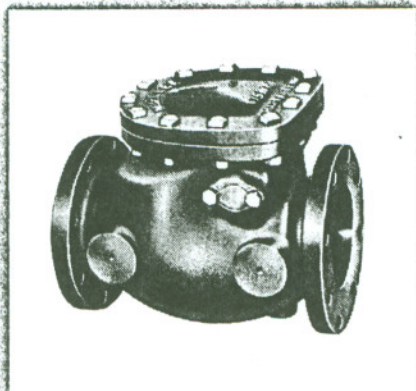
All valves 14" and larger shall have extended hinge pins for future addition of levers and springs if required. Valves shall be suitable for installation in either horizontal or vertical position. Increasing check valves shall be available in accordance with the provisions of this specification.

PAINTING

The inside and outside of all valves, together with the working parts except bronze and machined surfaces, shall be coated in accordance with AWWA standards and Federal Spec TT-C-494A or equal.

MARKING

Marking shall be in accordance with AWWA C-508 and shall include size, working pressure, and cast arrow to indicate direction of flow, name of manufacturer, and year of manufacture.



MUELLER SWING-TRIP CHECK VALVE

Heavier duty to survive repetitive cycling

For water filtration, sewage treatment, power and pumping plants . . . drainage, irrigation and flood control projects . . . and similar applications where dependability and long life are important.

Many types of valves are rarely operated — sometimes only once or twice in their lifetime. But a check valve is often called on to cycle thousands, even millions of times. Heavy-duty design has to be standard with any check valve.

Mueller® Check Valves are more than that. They're heavy duty with extra features to give reliable, minimum-maintenance service over a period of years.

The basic design features a heavy cast iron body, fully bronze mounted with bronze (or rubber faced bronze) clapper disc accurately seated by a bronze clapper arm against a bronze seat ring. The design minimizes chatter and vibration.

The clapper of the gravity operated type swings from large diameter stainless steel hinge pins held in position by plugs. The clapper of the lever operated type is secured to a large diameter stainless steel shaft which turns in bronze bushings. The plugs or bushings are securely held in the valve body by cap screws — rather than screwed directly into the body — to prevent backing-out.

Plugs and bushings are sealed by O-rings, for more reliable sealing than with conventional packing. The O-rings that seal the shaft of the lever operated type are further protected by integral dirt seals.

Mueller Check Valves are available with standard mechanical joint ends in 3"-12" sizes or with flanged ends in 2-1/2"-24" sizes. Any model may be installed horizontally or vertically.

Gravity-operated check valves recommended for lines without sudden flow stoppages

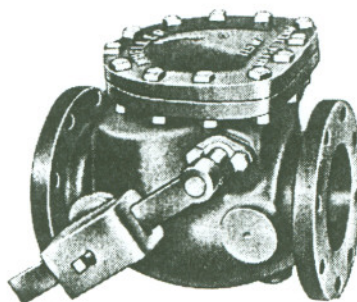
Lever and spring operated check valves recommended for lines having sudden flow stoppages

Lever and weight operated check valves recommended for lines having sudden flow stoppages

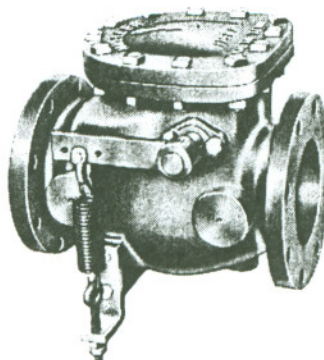
2-1/2"-12" — 175 psi (1207 kPa) working pressure, 350 psi (2413 kPa) test pressure

14"-24" — 150 psi (1034 kPa) working pressure, 300 psi (2068 kPa) test pressure

. . . for horizontal or vertical installation in cast iron and ductile iron pipe or class 200 cast iron O.D. PVC plastic pipe



On lever and weight operated valves, the speed of closure can be altered by moving the weight along the lever. The lever can be installed on either side of the valve.



On lever and spring operated valves, the speed of closure can be selected, first by attaching the spring to any of the three holes in the lever arm, then "fine tuned" by tightening or loosening the bolt at the spring bracket. The lever and bracket can be installed on either side of the valve.

SECTION NUMBER	11200	RECOMMENDED SPECIFICATIONS FOR CLOW IRON BODY, BRONZE MOUNTED SWING CHECK VALVES
PRODUCT SPECIFICATIONS		
CLOW VALVE DIVISION - OSKALOOSA, IOWA		

NOVEMBER, 1984
PAGE 1.1

- Check valves shall be of swing type and shall meet the material requirements of AWWA specification C508. The valve shall be iron body, bronze mounted, single gate for non-shock working pressure 175 psi 2"-12", 150 psi 14"-24" and hydrostatically tested at double the working pressure. Ends shall be flanged or mechanical joint.
- When there is no flow through the line the gate shall hang lightly against the seat.
- The valve shall be so constructed that by simply unbolting and lifting off the cover, the internal working parts may easily be removed and replaced without removing the valve from the line. The valve shall be furnished plain or with outside lever and spring or outside lever and weight.
- • Check valves shall be suitable for mounting in horizontal lines or vertical lines when water flow is up.
- Check valves shall have stainless steel hinge pin.
- Hinge pin shall operate in bronze support bearings (2"-12") or babitte support bearings (14"-24").

Check Valve Ordering Information

Please furnish all the information requested below:

- Quantity
- Size: Available in 2" through 24".
- Type: Whether plain, outside lever and weight, outside lever and spring.
- End types: Whether flanged or mechanical joint.
- Special features: Rubber faces or bronze gates.