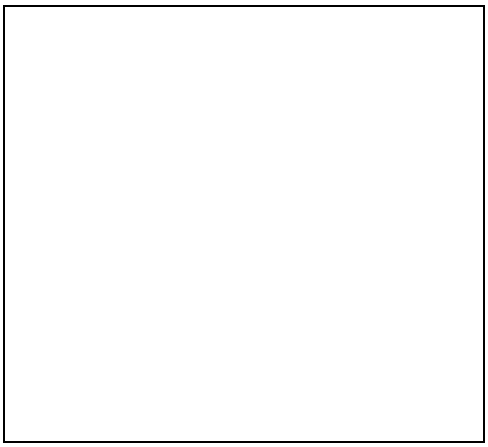
Water and Sewer Engineer's Report
for
River Ridge

Prepared for:
River Ridge Views, LLC
445 Main Street
Beacon, NY 12508

January 30, 2018



HUDSON
LAND DESIGN

Prepared by:
Hudson Land Design Professional Engineering, P.C.
174 Main Street
Beacon, NY 12508

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1.0 PROJECT LOCATION

The River Ridge project is located at 12 Ferry Street and sits on approximately 2.98 acres of land with frontage on Wolcott Avenue (NYS Route 9D) and Beekman Street in the City of Beacon, Dutchess County, New York. The property is comprised of three parcels identified as parcel numbers 5954-34-630770, 5954-26-637879, and 5954-26-649885 on the City of Beacon Tax Maps.

2.0 PROJECT DESCRIPTION

The project consists of combining the three parcels to allow for a proposed 18-unit Townhouse Project with internal travel-ways, parking areas, site infrastructure and landscaped areas. A new water meter pit and water main will be installed and be privately owned by a property owner's association. New private sewer lines will also be constructed to convey sewage to the City of Beacon sewer system.

Water for the project will be obtained by making a connection to the existing City of Beacon water supply system. Wastewater generated by the project will be disposed of by means of a new sewer main that will convey wastewater flows to the existing City of Beacon sewer collection system.

This report summarizes all data and information necessary for the design of the water and sewer infrastructure that will serve the project.

The project has been designed in accordance with the following:

- New York State Department of Health (NYSDOH) Standards for Individual Water Supply and Individual Sewage Treatment Systems Appendix 75-A
- Dutchess County Department of Health (DCDOH) Water and Wastewater Systems Design and Construction Standards
- New York State Department of Environmental Conservation (NYSDEC) "Design Standards for Wastewater Treatment Works" for Intermediate Sized Sewage Facilities.
- Recommended Standards For Wastewater Facilities (Ten States Standards)

3.0 ESTIMATED WATER & WASTEWATER QUANTITIES

At full build-out, the project is expected to generate 5,720 gallons of wastewater per day. Based on previous conversations with the City of Beacon Sewer Superintendent, the City's existing sewer infrastructure and sewer treatment plant have sufficient capacity to handle the anticipated increase in daily sewage load. The following table provides estimated water usage/wastewater generation at full buildout of the project, according to the NYSDEC Design Standards for Wastewater Treatment Works, 2014.

Water and wastewater quantities for the project are based on the following:

Flow Component	# of Units	Flow Rate per Unit - gallons per day (gpd)	Total Component Flow (gpd)
Residential	*52 bedrooms	110	5,720

*The current bedroom breakdown is as follows: 2 two-bedroom and 16 three-bedroom townhouses.

Total Flow: 5,720 gpd

4.0 WATER SUPPLY

At full build-out, the project is expected to require 5,720 gallons of water per day. Based on previous conversations with the City of Beacon Water and Sewer Superintendent, the anticipated increase in daily water demand is readily available for this project. There is an 8" ductile iron pipe (DIP) that runs between Ferry Street and Wolcott Avenue. A reputed 8" DIP spur runs into the site from the water main approximately 40 feet east of Ferry Street. It is proposed to connect to the 8" DIP spur with 8" ductile iron pipe (DIP), and then reduce the pipe diameter to 6" through the proposed meter pit. The 6" DIP will be brought through the site to a point just past the proposed access drive from Wolcott Avenue, at which point it will again be reduced to a 4" DIP. Two hydrants will be installed along the 6" line, one near the intersection of the access drive and Wolcott Avenue, and the other internal to the site. In addition, and flushing hydrant will be installed at the end of the 4" portion of the line. The overall system will provide water to the new buildings via individual ¾" K-copper service connections.

Approximately 404 lf of 6" and 356 lf of 4" diameter class 52 ductile iron water main will be installed to serve the project. In addition to the hydrants noted above, the new water main shall have valves and other fittings as shown on the plan set.

Static pressure readings were taken on two existing hydrants in the vicinity of the project. The first hydrant located at the end of Ferry Street at an elevation of approximately 77 had a static pressure reading of 114 psi. The second hydrant located adjacent to Wolcott Avenue at an

elevation of approximately 118 had a static pressure reading of 97 psi. Using this data, the static pressure at the proposed point of connection (approximate elevation of 90) can reasonably be assumed to be approximately 108 psi. Assuming an active flow condition of 500 gallons per minute (gpm) from the proposed internal hydrant, and using a conservative peak flow of 50 gpm from the proposed units, the pressure within the 4" portion of the main at the highest point within the property (adjacent to Unit 13, approximate elevation of 140) would still be approximately 67 psi, so the existing and proposed infrastructure provide adequate pressure to service the project. Preliminary hydraulic calculations using an on-line head loss spread sheet are attached in Appendix A.

All minimum separation distance requirements from the water main and individual service connections shall be maintained. A minimum of 10 feet of separation is required between water and sewer lines that are running parallel. If a water line and a sewer line must cross, they shall do so perpendicular to each other. A minimum of 18" shall be provided from the crown of the sewer pipe to the bottom of the water pipe or the crown of the water pipe to the bottom of the sewer pipe.

4.1 WATER METER

The proposed water meter is a 6-inch Sensus OMNI F2 Fire Service Meter, which is proposed to be installed within the new meter pit. Cut sheets of the proposed meter are attached to this report in Appendix B.

4.2 CROSS CONNECTION CONTROL

An 8" double check valve assembly is proposed as the means to provide cross connection control. The proposed double check valve assembly is a Watts Series LF709 backflow preventer, which will be located in the meter pit (downstream of the meter) as shown on the attached plan.

5.0 SEWAGE CONVEYANCE

The project is expected to generate 5,720 gallons of wastewater per day. Per conversations with the City of Beacon Sewer Superintendent, the City's existing sewer infrastructure and sewer treatment plant have sufficient capacity to handle the anticipated increase in daily sewage load. Approximately 470 lf of 8" SDR 35 PVC sewer main will be installed on site to convey the sewage to the City's municipal main, which is stubbed into the property adjacent to Ferry Street. Each townhouse will be provided with a new 4" SDR 35 PVC sewer service connection to the new sewer main. Minimum pitch on the individual sewer laterals shall be 2% slope.

Five (5) sanitary manholes are proposed at key locations within the property, including changes of direction and pipe slope. The new sewer main will connect to an existing doghouse manhole located along the aforementioned 8" main. The existing 10" sewer stub into the site is to be removed, and the new 8" main will discharge to the manhole in its place. The minimum slope on the 8-inch sewer main shall be 0.40%. Sewer mains shall be laid in straight alignment. The

sewer main shall be tested for alignment and exfiltration and the sanitary manholes shall be hydrostatically tested in accordance with the requirements on the subdivision plan set.

APPENDIX A

Hydraulic Calculations

Simple Pipe & Fitting Calculations

Pipe Calcs

Enter the required data in the yellow cells

Pipe Segment 1

Flow Rate (GPM)	550
Pipe ID (Inches)	6
Pipe Length (Feet)	380
Hazen & Williams C Value	140

Calculated Results

Velocity in Ft/sec	6.2
Velocity Head in Ft	0.6
Friction / 100 Feet of Pipe	2.2
Total Pipe Friction	8.3
Fitting Equivalent Length	86.0
Total Fitting Friction	1.9
Total Friction Losses Segment 1	10.1

Pipe Segment 2

Flow Rate (GPM)	50
Pipe ID (Inches)	6
Pipe Length (Feet)	24
Hazen & Williams C Value	140

Calculated Results

Velocity in Ft/sec	0.6
Velocity Head in Ft	0.0
Friction / 100 Feet of Pipe	0.0
Total Pipe Friction	0.0
Fitting Equivalent Length	24.2
Total Fitting Friction	0.0
Total Friction Losses Segment 2	0.0
Total Friction Losses 1 & 2	10.1

Pipe Segment 3

Flow Rate (GPM)	50
Pipe ID (Inches)	4
Pipe Length (Feet)	356
Hazen & Williams C Value	140

Calculated Results

Velocity in Ft/sec	1.3
Velocity Head in Ft	0.0
Friction / 100 Feet of Pipe	0.2
Total Pipe Friction	0.7
Fitting Equivalent Length	17.5
Total Fitting Friction	0.0
Total Friction Losses Segment 3	0.7
Total Friction Losses 1, 2 & 3	10.8

Static Pressure leaving meter pit ±100 psi
Friction Losses at 550 gpm ±11 psi
Elevation Loss at high point ±22 psi
Static Pressure at high point ±67 psi

Pipe Type	C Range	C Average	Commonly Used
Cast / Ductile Iron - New	150 - 80	130	100
Cast Iron 10 years old	113 - 107		
Cast Iron 20 years old	100 - 89		
Cast Iron 30 years old	75 - 90		
Cast Iron 40 years old	83 - 64		
Tar Coated Cast Iron	145 - 50	130	100
Steel - New	150 - 80	130	100
Corrugated Steel		60	60
Cement Lined Iron / Steel	160 - 130	148	140
Asphalt Lined Iron / Steel	140 - 130		
Copper, Brass, Lead, Glass	150 - 120	140	130
Aluminum	150 - 130		
Concrete	152 - 85	120	100
Asbestos Cement	140		
PVC	160 - 150	155	150
PE	140		

Instructions

This spreadsheet is designed to calculate pipe and fitting friction for one to three pipe segments. The Hazen & Williams equation and C values are used for all friction calculations. This provides flexibility when working with both new and old piping systems.

Enter the required data in the four yellow cells for one, two or three pipe segments. The calculated results will appear below. Click on the Fitting Calcs tab to enter the fitting data. Click on the box that corresponds to a desired fitting and its size. Enter the number of fittings used in that pipe pipe section. Enter the quantities of any other fittings in the appropriate box. Note that each pipe section has its own fitting selector. If a particular fitting is not shown, you may enter it manually in one of the bottom lines. You will have to look up the "equivalent pipe length" and enter it in Column Q. The value should be the total equivalent length for the number of fittings you entered. Fitting equivalent length and total fitting friction will be displayed in the calculated results for each pipe section.

Simple Pipe & Fitting Calculations

Fitting Calcs

Enter the number of fittings in the yellow cells that correspond to the pipe diameter. All others must remain blank.

Pipe Segment 1

Fittings	2"	2.5"	3"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	24"	
90 Standard Elbow						1									15.2
90 Long Radius Elbow															0.0
45 Standard Elbow						4									32.4
Standard Tee (Branch Flow)						1									30.3
Standard Tee (Thru Flow)															0.0
Gate Valve						2									8.1
Globe Valve															0.0
Butterfly Valve															0.0
180 Return Bend															0.0
Swing Check Valve															0.0
															86.0 Total Losses In Equivalent Feet of Pipe

Pipe Segment 2

Fittings	2"	2.5"	3"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	24"	
90 Standard Elbow															0.0
90 Long Radius Elbow															0.0
45 Standard Elbow															0.0
Standard Tee (Branch Flow)															0.0
Standard Tee (Thru Flow)						1									10.1
Gate Valve						1									4.0
Globe Valve															0.0
Butterfly Valve															0.0
180 Return Bend															0.0
Swing Check Valve															0.0
Reducer (6" to 4")															10.1
															24.2 Total Losses In Equivalent Feet of Pipe

Pipe Segment 3

Fittings	2"	2.5"	3"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	24"	
90 Standard Elbow															0.0
90 Long Radius Elbow															0.0
45 Standard Elbow				2											10.7
Standard Tee (Branch Flow)															0.0
Standard Tee (Thru Flow)				1											6.7
Gate Valve															0.0
Globe Valve															0.0
Butterfly Valve															0.0
180 Return Bend															0.0
Swing Check Valve															0.0
															17.5 Total Losses In Equivalent Feet of Pipe

APPENDIX B

Product Cut Sheets

OMNI™ F²

4”, 6”, 8” and 10” OMNI F² Meter

Description

4”, 6”, 8” and 10” Sizes

The OMNI F² meter operation is based on advanced Floating Ball Technology (FBT).

AMR/AMI Mode | Totalization Mode | Resettable Test Mode

Features

CONFORMANCE TO STANDARDS

The OMNI F² meter meets and far exceeds the most recent revision of AWWA Standard C703 class II. Additionally, the meter does not require a valve to meet these standards. Each meter is performance tested to ensure compliance. All OMNI meters are NSF/ANSI Standard 61, Annex F and G approved. The OMNI F² meter is UL (Underwriters Laboratories) Listed and FM (Factory Mutual) approved for use on fire protection and domestic water applications.

PERFORMANCE

The patented measurement principles of the OMNI F² meter assure enhanced accuracy ranges, an overall greater accuracy, and a longer service life than any other comparable class meter produced. The F² meter has no restrictions as to sustained flow rates within its continuous operating range. The floating ball measurement technology allows for flows up to its rated maximum capacity without undue wear or accuracy degradation.

CONSTRUCTION

The OMNI F² meter consists of two basic assemblies; the maincase and the measuring chamber. The measuring chamber assembly includes the “floating ball” impeller with a coated titanium shaft, hybrid axial bearings, integral flow straightener and an all electronic programmable register with protective bonnet. The maincase is made from industry proven Ductile Iron with an approved NSF epoxy coating. Maincase features are; easily removable measuring chamber, unique chamber seal to the maincase using a high pressure o-ring, testing port and a convenient integral strainer with optional drain/debris-flushing ports.

OMNI ELECTRONIC REGISTER

The OMNI F² electronic register is hermetically sealed with electronic pickup containing no mechanical gearing. The large character LCD displays AMR, Totalization and a Resettable Test Totalizer. OMNI register features; AMR resolution units that are fully programmable, Pulse output frequency that are fully programmable, Integral customer data logging capability, Integral resettable accuracy testing feature compatible with the UniPro Testing Assistant Program, Large, easy-to-read LCD also displays both forward and reverse flow directions and all with a 10-year battery life guarantee.

MAGNETIC DRIVE

Meter registration is achieved by utilizing a fully magnetic pickup system. This is accomplished by the magnetic actions of the embedded rotor magnets and the ultra sensitive register pickup probe. The only moving component in water is the “floating ball” impeller.

MEASURING ELEMENT

The revolutionary thermoplastic, hydro dynamically balanced impeller floats between the bearings. The Floating Ball Technology (FBT) allows the measuring element to operate virtually without friction or wear, thus creating the extended upper and lower flow ranges capable on only the OMNI F² meter.

STRAINER

The OMNI F² meter includes the Sensus designed “V” shaped UL Listed/FM approved strainer which utilizes a stainless steel screen along with Floating Ball Technology (FBT) to create a design that gives far improved accuracy even in those once thought questionable settings. A removable strainer cover permits easy access to the screen for routine maintenance. Optional drain ports, located at the back lower corners of the strainer body, allow for easy discharging of debris without the need to remove the cover.

MAINTENANCE

The OMNI F² meter is designed for easy maintenance. Should any maintenance be required, the measuring chamber and/or strainer cover can be removed independently. Parts and or a replacement measuring chamber may be utilized in the event repairs are needed. Replacement Measuring Chambers are available for the OMNI F² meters.

AMR / AMI SYSTEMS

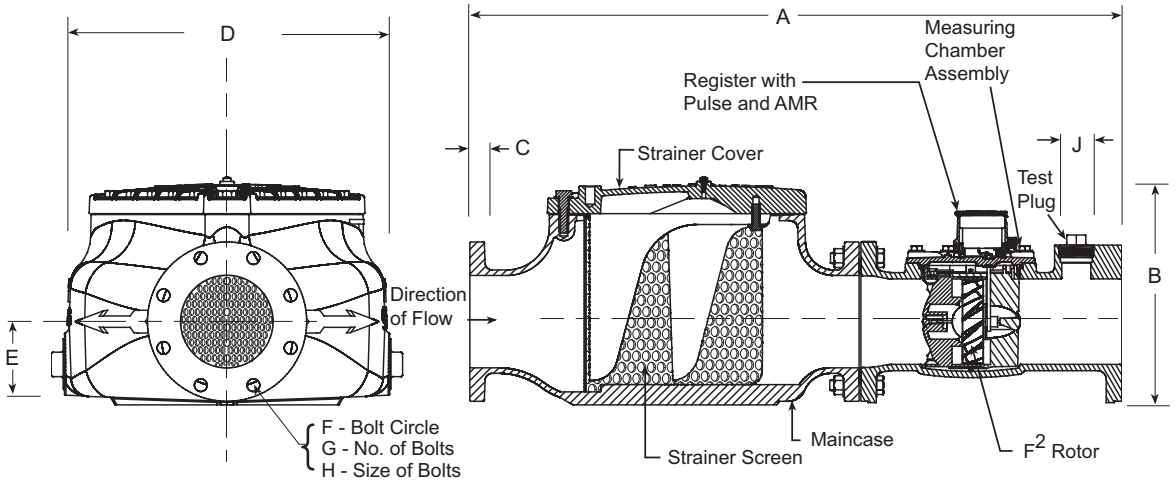
Meters and encoders are compatible with current Sensus AMR/AMI systems.

GUARANTEE

Sensus OMNI F² Meters are backed by “The Sensus Guarantee.” Ask your Sensus representative for details or see Bulletin G-500.

sensus

OMNI F²: 4", 6", 8" and 10"



DIMENSIONS AND NET WEIGHTS

Meter and Pipe Size	Normal Operating Range		Connections	A	B	C	D	E	F	G	H	J	Net Weight	Shipping Weight	Standard Fireline
4" DN 100mm	1.5 gpm .34 m³/hr	1000 gpm 227 m³/hr	Flanged	33" 838mm	13-11/16" 348mm	15/16" 24mm	17-1/2" 446mm	4-3/4" 121mm	7-1/2" 191mm	8	5/8" 16mm	2" 50mm	212 lbs. 96 kg.	252 lbs. 115 kg.	51-7/8" (1317mm)
6" DN 150mm	3.0 gpm .681 m³/hr	2000 gpm 454 m³/hr	Flanged	45" 1143mm	15-3/4" 400mm	15/16" 24mm	22-3/8" 569mm	5-3/4" 146mm	9-1/2" 242mm	8	3/4" 19mm	2" 50mm	394 lbs. 179 kg.	449 lbs. 204 kg.	67-5/8" (1717mm)
8" DN 200mm	4 gpm .91 m³/hr	3500 gpm 795 m³/hr	Flanged	53" 1346mm	18-1/2" 470mm	11/16" 17mm	31" 787mm	6-3/4" 172mm	11-3/4" 298mm	8	3/4" 19mm	2" NPT	736 lbs. 334 kg.	786 lbs. 357 kg.	77" (1956mm)
10" DN 250mm	5 gpm 1.1 m³/hr	5500 gpm 1249 m³/hr	Flanged	68" 1727mm	22-1/4" 565mm	11/16" 17mm	37-1/3" 947mm	8-1/2" 216mm	14-1/4" 362mm	12	7/8 22mm	2" NPT	1155 lbs. 524 kg.	1215 lbs. 551 kg.	90" (2286mm)

[1] **Standard Fireline lay length with optional spool piece added.**

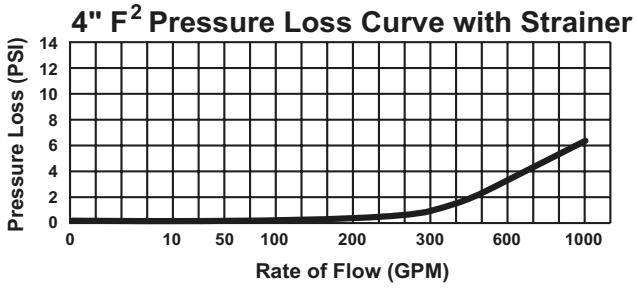
SPECIFICATIONS

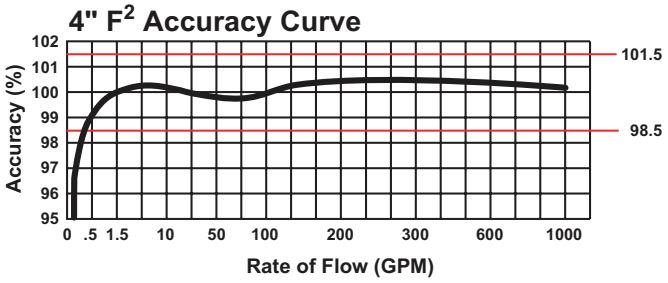
SERVICE	Measurement of potable and reclaim water. Operating temperature range of 33 ºF (56 ºC) - 150 ºF (65.6 ºC)
OPERATING RANGE (100% ± 1.5%)	4": 1.5 – 1000 GPM (.34 - 227 m³/hr) 6": 3.0 – 2000 GPM (.34 - 227 m³/hr) 8": 4– 3500 GPM (0.91-795 m³/hr) 10": 5– 5500 GPM (1.1-1249 m³/hr)
LOW FLOW (95% – 101.5%)	4": .75 GPM (.06 m³/hr) 6": 1.5 GPM (.06 m³/hr) 8": 2.5 GPM (0.57 m³/hr) 10": 3.5 GPM (0.8 m³/hr)
UL MINIMUM FLOW	8": 97% @ 3 GPM (0.68 m³/hr) 10": 97% @ 4 GPM (0.9 m³/hr)
MAXIMUM CONTINUOUS OPERATION	4": 1000 GPM (227 m³/hr) 6": 2000 GPM (454 m³/hr) 8": 3500 GPM (795 m³/hr) 10": 5500 GPM (1249 m³/hr)
MAXIMUM INTERMITTENT OPERATION	4": 1250 GPM (284 m³/hr) 6": 2500 GPM (568 m³/hr) 8": 4700 GPM (1067 m³/hr) 10": 7000 GPM (1590 m³/hr)

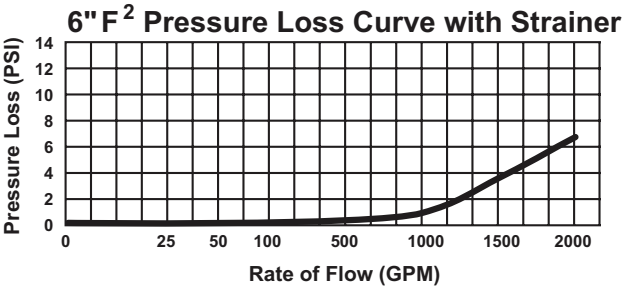
PRESSURE LOSS	4": 6.4 psi @ 1000 GPM (.60 bar @ 227 m³/hr) 6": 6.7 psi @ 2000 GPM (.56 bar @ 454 m³/hr) 8": 5 psi @ 3500 GPM (.34 bar @ 795 m³/hr) 10": 7 psi @ 5500 GPM (.48 bar @ 1249 m³/hr)
MAXIMUM OPERATING PRESSURE	175 PSI (12 bar)
FLANGE CONNECTIONS	U.S. ANSI B16.1 / AWWA Class 125
REGISTER	Fully electronic sealed register with programmable registration (Gal. /Cu.Ft./ Cu. Mtr. / Imp.Gal / Acre Ft.) Programmable AMR/AMI reading and pulse outputs Guaranteed 10 year battery life
NSF APPROVED MATERIALS	**Maincase:** Coated Ductile Iron **Measuring Chamber:** Thermoplastic **Rotor "Floating Ball":** Thermoplastic **Radial Bearings:** Hybrid Thermoplastic **Thrust Bearings:** Sapphire/Ceramic Jewel **Magnets:** Ceramic Magnet **Strainer Screen:** Stainless Steel **Strainer Cover:** Coated Ductile Iron **Test Plug:** Coated Ductile Iron

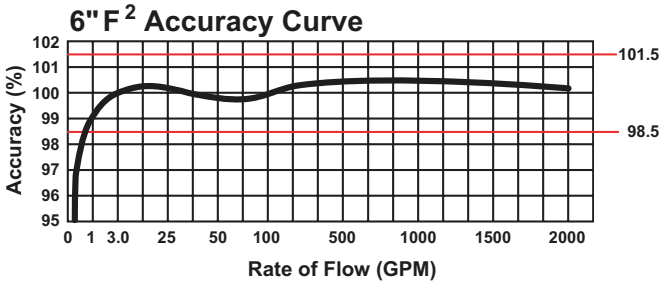
OMNI F²: 4”, 6”, 8” and 10”

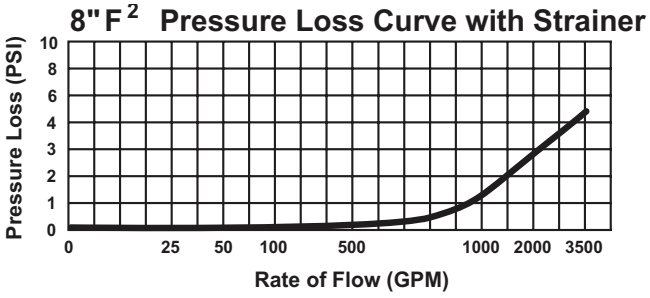
Headloss Curves

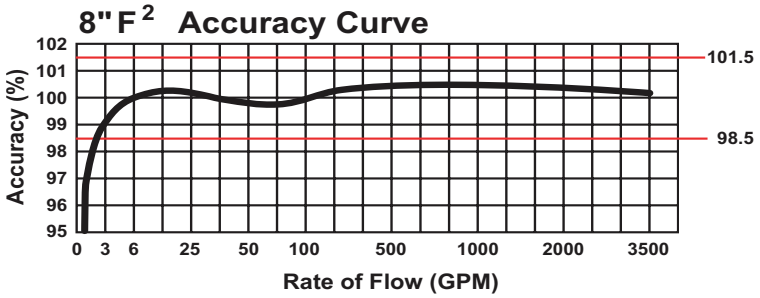


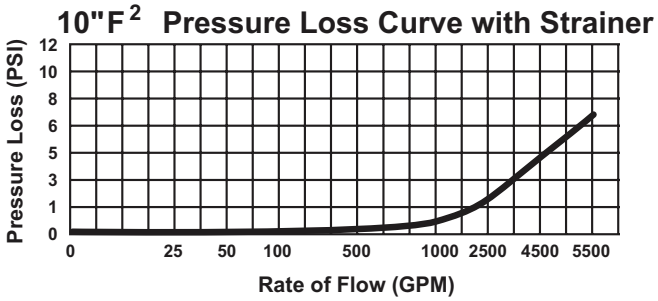


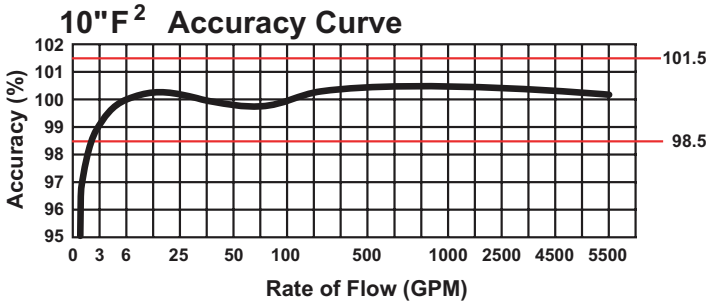












8601 Six Forks Road, Suite 700
Raleigh, NC 27615
1-800-638-3748
www.sensus.com/water

For Non-Health Hazard Applications

Job Name _____ Contractor _____

Job Location _____ Approval _____

Engineer _____ Contractor's P.O. No. _____

Approval _____ Representative _____

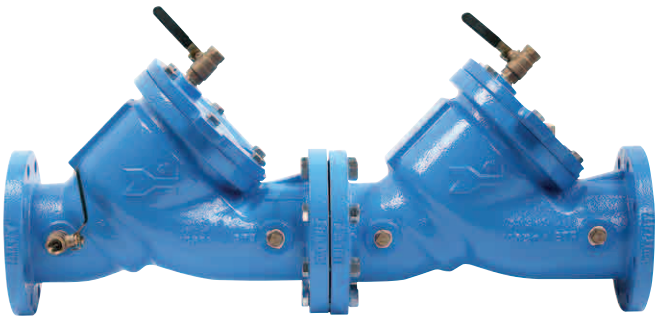
LEAD FREE*

Series LF709

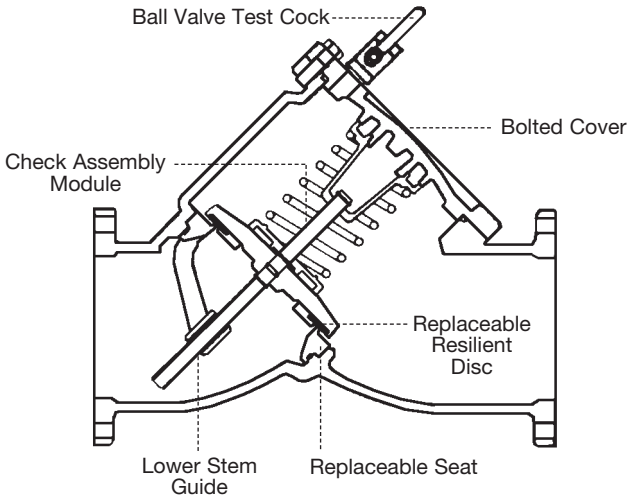
Double Check Valve Assemblies

Sizes: 2½" – 10" (65 – 250mm)

Series LF709 Double Check Valve Assemblies are designed to prevent the reverse flow of polluted water from entering into the potable water system. This series can be applied, where approved by the local authority having jurisdiction, on non-health hazard installations. Series LF709 features a modular check design concept to facilitate easy maintenance. Check with local jurisdictional authority as to installation requirements. The LF709 features Lead Free* construction to comply with Lead Free* installation requirements.



LF709 LF



Features

- Replaceable stainless steel seats
- Maximum flow at low pressure drop
- Design simplicity for easy maintenance
- No special tools required for servicing
- Captured spring assemblies for safety
- Approved for vertical flow up installation

Models

Suffix:

NRS – non-rising stem resilient seated gate valves

OSY – UL/FM outside stem and yoke resilient seated gate valves

S-FDA – FDA epoxy coated strainer

QT-FDA – FDA epoxy coated ball valve shutoffs

LF – without shutoff valves

Specifications

A Double Check Valve Assembly shall be installed at referenced cross-connections to prevent the backflow of polluted water into the potable water supply. The cross-connections shall be determined by local inspection authority for use where a high hazard situation does not exist. Valve shall feature modular check assemblies with center stem guiding. Each check module shall have a captured spring and be accessible through a bolted cover plate. Seats shall be replaceable without special tools. It shall be a complete assembly including tight-closing resilient seated shutoff valves, test cocks, and a strainer is recommended. The Lead Free* Double Check Assemblies shall comply with state codes and standards, where applicable, requiring reduced lead content. The assembly shall meet the requirements of ASSE No. 1015; AWWA C510-92; CSA B64.5 and UL Classified File No. EX3185. Approved by the Foundation for Cross-Connection Control and Hydraulic Research at the University of Southern California. Assembly shall be a Watts Series LF709.

Check Assembly Module

Series LF709 features a modular design concept which facilitates complete maintenance and assembly by retaining the spring load. Also, the first and second check module are identical and can be interchanged.

Now Available

WattsBox Insulated Enclosures.

For more information, refer to literature ES-WB.

NOTICE

Inquire with governing authorities for local installation requirements

***The wetted surface of this product contacted by consumable water contains less than 0.25% of lead by weight.**

WATTS®

Materials

Check Valve Bodies: Epoxy coated cast iron
Seats: Stainless Steel

Pressure — Temperature

Temperatures Range: 33°F – 110°F (0.5°C – 43°C) continuous, 140°F (60°C) intermittent
Maximum Working Pressure: 175psi (12.1 bar)

Standards

AWWA C510-92
IAPMO PA 31
USC Manual for Cross-Connection Control, 8th Edition

Approvals

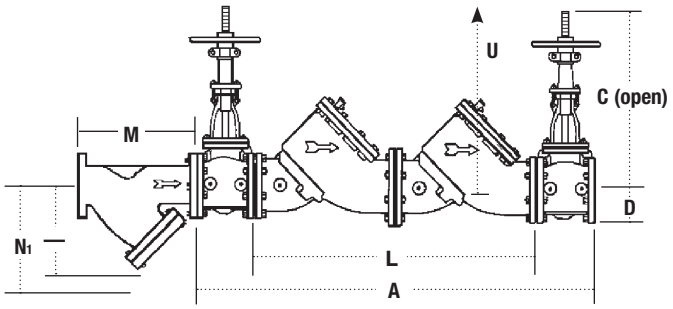
1015 B64.5

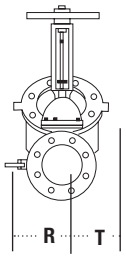
Approved by the Foundation for Cross-Connection Control and Hydraulic Research at the University of Southern California. Sizes 4" – 10" (100 – 250mm) approved horizontal and vertical “flow up". Size 2½" and 3" (65 – 80mm) approved horizontal only.

Factory Mutual approved 4" – 10" (80 – 250mm) vertical “flow up" with OSY gate valves only.

Note: Model “S" not listed

Dimensions — Weights





SIZE (DN)		DIMENSIONS															
		A		C (OSY)		C (NRS)		D		L		U††		M		N	
in.	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*
2½	65	39⅜	1000	16⅜	416	9⅜	238	3½	89	24⅛	613	11	279	10	254	6½	165
3	80	40⅜	1025	18⅞	479	10¼	260	3¾	95	24⅛	613	14	356	10⅛	257	7	178
4	100	52⅜	1330	22¾	578	12³⁄₁₆	310	4½	114	34⅛	867	14	356	12⅛	308	8¼	210
6	150	62⅞	1597	30⅛	765	16	406	5½	140	41⅛	1057	16	406	18½	470	13½	343
8	200	75	1905	37¾	959	19¹⁵⁄₁₆	506	6½	165	52	1321	21	533	21⅝	549	15½	394
10	250	90	2286	45¾	1162	23¹³⁄₁₆	605	8	203	64	1626	25	635	26	660	18½	470

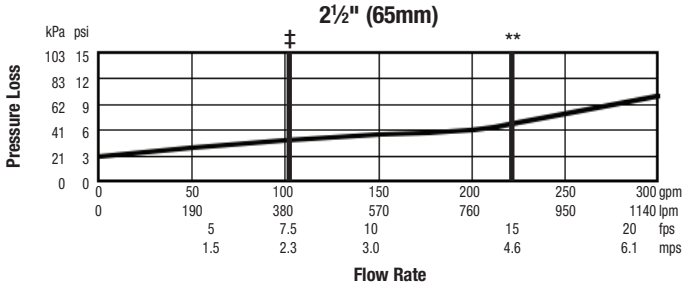
SIZE (DN)		DIMENSIONS								WEIGHT						STRAINER	
		N1†		R		R❖		T		NRS		OSY		QT		Weight	
in.	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*lbs.*	*kgs.*	*lbs.*	*kgs.*	*lbs.*	*kgs.*	*lbs.*	*kgs.*
2½	65	10	254	4	102	16	406	3	76	167	76	170	77	154	70	28	13
3	80	10	254	5	127	16	406	3	76	167	76	170	77	162	73	34	15
4	100	12	305	6	152	19¾	502	6	152	368	167	383	174	275	125	60	27
6	150	20	508	11	279	26	660	7½	191	627	284	707	321	611	277	122	55
8	200	22¾	578	11¼	286	11¼	286	9	229	1201	545	1307	593	1419	644	247	112
10	250	28	711	12½	318	12½	318	10¼	260	2003	909	2073	940	2466	1119	370	168

†Dimension required for screen removal. ❖Quarter-turn (QT) valve dimensions.
††Service clearance for check assembly from center.

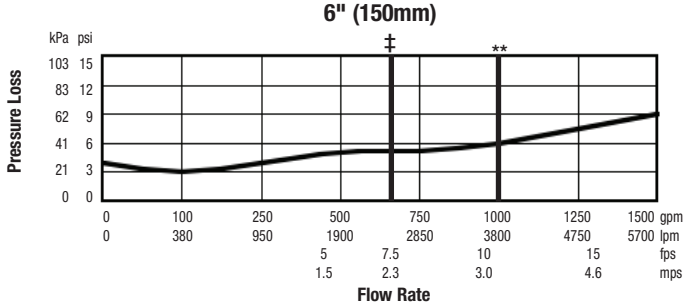
Capacity

‡Typical maximum system flow rate (7.5 feet/sec.)
**UL rated flow

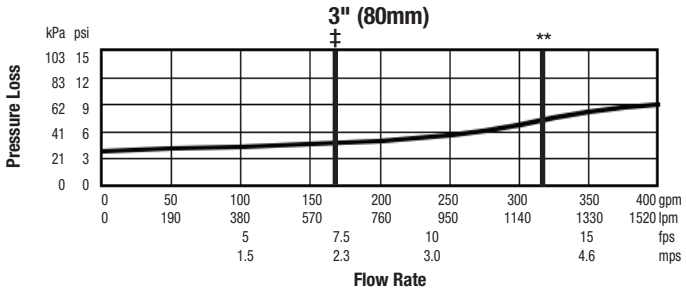
2½" (65mm)



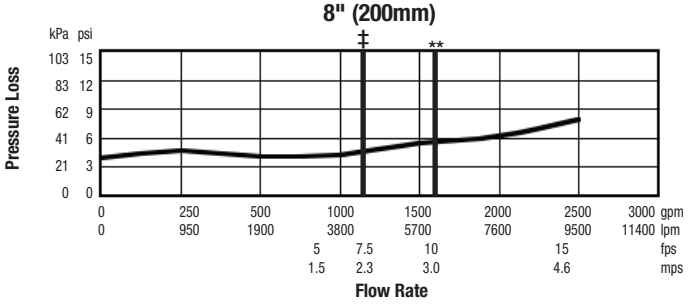
6" (150mm)



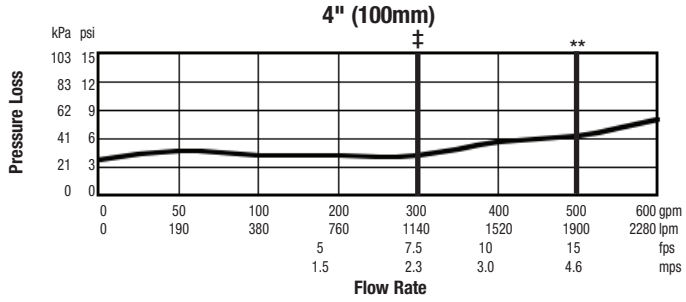
3" (80mm)



8" (200mm)



4" (100mm)



10" (250mm)