WALWORTH®

Since 1842

DUO CHECK VALVE

CATALOG

www.walworthvalves.com

INDEX

INTRODUCTION

VALVES

CE

TÜV CERT

YARMOUTH RESEARCH AND TECHNOLOGY

QMS REGISTERED ISO 9001 Certificate Number: 0038

WALWORTH COMPANY

The WALWORTH Company is one of the world´s most dominant and comprehensive industrial valve manufacturers. Founded in 1842 by James Walworth, the Company has consistently dedicated itself to the design and manufacture of an array of valves exceptionally suited for the world´s fluid control sector. We satisfy all end use industries and comprehensive customer requirements by adhering to the most demanding quality standards.

WALWORTH relies on its broad experience in supplying valves to the petrochemical, oil & gas, petroleum, power generation, pulp and paper, cryogenic and geothermal industries, among others.

Over the years, the Company has produced more than 40,000 different types of products and serves as a global supplier to varied markets utilizing the expertise of over 500 trained employees.

Our manufacturing system includes: utilization of Company directed raw material warehouses; up-to-date specialized machinery; welding processes such as SMAW, GMAW, SAW, PAW; assembly testing for low pressure, high pressure, at low or high temperature; painting processes; crating and shipment.

With Company-directed facilities and stocks in the United States and Mexico, WALWORTH is capable of providing the world´s most comprehensive industrial valve line to the North American, Central American, South American, European and African markets. WALWORTH is proud to meet and satisfy the ultimate demands of our customers throughout the world for quality, cost and service.

WALWORTH VALUES

MISSION
WALWORTH manufactures and supplies world-class valves and components for the flow control industry through exceptional service, competitive pricing, and consistently, on-time delivery.

VISION
To be the world leader of unparalleled valve manufacturing and supply, WALWORTH:

- Sets the standard for product quality in the flow control industry.
- Exceeds the service expectations of our customers.
- Forges enduring relationships with customers, team members, and community.
- Hires, develops, and retains experienced and dedicated team members.

WALWORTH ENGINEERING CONTROL

WALWORTH products are manufactured following the strict international standards recognized all over the world, such as API, ANSI, ASME, ASTM, MSS, NACE, AWWA, BSI, CSA, among others. Our Engineering team consistently monitors updates to these standards and incorporates any applicable changes that affect the design, regulations and/or performance of our products.

Our designs are made using the most advanced technology and equipment, finite elements, and CAD system programs to ensure proper assembly and performance. From conception to calculation to detailed drawings for manufacturers, WALWORTH is a leader in development of new products that meet the needs of the current valve market."

WALWORTH QUALITY SYSTEM

Throughout the years, WALWORTH has developed its Quality System which is an integral part of our manufacturing policy. Our primary goal is to provide products that meet and exceed market standards. In this sense, WALWORTH is an ISO-9001 Audited and Certified Company that has achieved major certifications worldwide. Our system includes the selection of raw materials from approved vendors, and rigorous oversight of our manufacturing process that is vital to quality control. The use of serial numbers allows WALWORTH the ability to not only ensure the quality of components used but to monitor and trace the fabrication process as well.

Certificate of Authority to use the Official API Monogram
License Number: 6D-0097
ORIGINAL
WALWORTH
Avenida de la Industria Lote 16
Fraccionamiento Industrial El Trebol
Tepotzotlan
Mexico
API Spec 6D
The scope of this license includes the following products: Gate Valves, Plug Valves, Ball Valves, Check Valves
QMS Exclusions: No Exclusions Identified as Applicable
American Petroleum Institute
Effective Date: OCTOBER 13, 2011
Expiration Date: NOVEMBER 4, 2014

Certificate API-6D No. 6D-0097 issued by American Petroleum Institute to apply on Gate valves, Plug valves, Ball valves and Check valves manufactured in accordance with API-6D specification.

Certificate of Authority to use the Official API Monogram
License Number: 6A-0234
ORIGINAL
WALWORTH
Avenida de la Industria Lote 16
Fraccionamiento Industrial El Trebol
Tepotzotlan
Mexico
API Spec 6A
The scope of this license includes the following product: Valves at PSL 1 and 2
QMS Exclusions: No Exclusions Identified as Applicable
American Petroleum Institute
Effective Date: OCTOBER 13, 2011
Expiration Date: NOVEMBER 4, 2014

Certificate API-6A No. 6A-0234 from American Petroleum Institute to apply on valves at PSI, 1 through 4.

QMS REGISTERED

Certificate of Registration

APIQR® REGISTRATION NUMBER
0038

This certifies that the quality management system of

WALWORTH
Avenida de la Industria Lote 16
Fraccionamiento Industrial El Trebol
Tepotzotlan
Mexico

has been assessed by the American Petroleum Institute Quality Registrar (APIQR®) and found it to be in conformance with the following standard

ISO 9001:2008

The scope of this registration and the approved quality management system applies to the

Design and Manufacture of Valves

APIQR® approves the organization's justification for excluding:

No Exclusions Identified as Applicable

Effective Date: November 4, 2011
Expiration Date: November 4, 2014
Registered Since: November 4, 2011

W. Dan Whitehurst
Manager of Operations, APIQR

QUALITY REGISTRAR

Certificate ISO-9001 No. 0038 issued by American Petroleum Institute since April 1999.

Certificate

Quality-Assurance System
acc. to Directive 97/23/EC

Certificate no.: 01 202 USA/Q-10 0012

Name and address of the manufacturer: Walworth Industrial de Válvulas, S.A. de C.V.
Av. De la Industria Lote 16,
Fracc. Industrial El Trebol,
Tepotzotlán, Edo. de México,
CP 54600, Mexico

Herewith we certify that the above-mentioned manufacturer operates a quality system according to the European Directive 97/23/EC. The manufacturer has the permission to affix the following CE marking to pressure equipment described and manufactured in accordance to the scope covered by this Quality-Assurance System:

CE 0035

Tested acc. to Directive 97/23/EC: QS-System (Modul H)
(The QS-Modules E1, E, D1, and D are performed by Module H1)

Audit report no.: USA/Q-10 0012

Scope: Design and Manufacturing of industrial valves in accordance with the attached Scope of Validity.

Manufacturing plant/supplier: Av. De la Industria Lote 16,
Fracc. Industrial El Trebol,
Tepotzotlán, Edo. de México,
CP 54600, Mexico

Valid until: April 07, 2013

Cologne, April 08, 2010 Dr.-Ing. Wichert

TÜV Rheinland-Certification Body for Pressure Equipment
TÜV Rheinland Industrie Service GmbH
Notified Body ID-No. 0035
Am Grauen Stein, D-51105 Köln

www.tuv.com

TÜVRheinland®
Precisely Right.

Certificate as per PED 97/23/EC Module H to stamp CE products.

CFE Una empresa de clase mundial

LAPEM

LABORATORIO DE PRUEBAS DE EQUIPOS Y MATERIALES

CONSTANCIA DE CALIFICACIÓN DE PROVEEDOR

NUMERO 082/11

SE HACE CONSTAR QUE LA EMPRESA CUYOS DATOS SE DESCRIBEN A CONTINUACIÓN:

RAZÓN SOCIAL: INDUSTRIAL DE VALVULAS, S. A. DE C.V.
PLANTA O DIVISIÓN: PLANTA INVAL
DOMICILIO: Avenida de la Industria No. 16, Fracc. Industrial El Trebol, TEPOTZOTLAN, EDO.DE MEX, MEXICO

HA SIDO EVALUADA CONFORME A LOS PROCEDIMIENTOS ESTABLECIDOS EN ESTA GERENCIA, HABIENDO SIDO CALIFICADA COMO PROVEEDOR APROBADO PARA EL SUMINISTRO DE LOS BIENES O SERVICIOS INDICADOS AL REVERSO.

LOS RESULTADOS, CONDICIONES, COMPROMISOS Y DETALLES DE LA ACTIVIDAD ESTÁN EXPRESADOS EN EL REPORTE DE REFERENCIA, TENIENDO ESTA CONSTANCIA LA VIGENCIA ESPECIFICADA, RESERVÁNDONOS EL DERECHO DE MODIFICARLA EN CUALQUIER MOMENTO, SI LAS CONDICIONES QUE LE DIERON ORIGEN SON ALTERADAS.

ESTA CONSTANCIA DE CALIFICACION CANCELA CUALQUIER OTRA CONSTANCIA O DOCUMENTO DE CALIFICACION EMITIDO CON ANTERIORIDAD PARA LA EMPRESA ARRIBA SEÑALADA.

FECHA DE EMISIÓN | VIGENCIA 6 Meses a partir de su emisión

REPORTE DE REFERENCIA: SE - 900175 - 24

ING. JORGE THOMAS LOMELI
Jefe Depto. Evaluación y Desarrollo de Proveedores

ING. LUIS JAVIER FREYRE RIZO
Gerente de LAPEM

Certificate of Reliable Supplier No. 082/11 issued by CFE in accordance with ISO-9001 Quality Assurance System.

PETROLEOS MEXICANOS

GRUPO TECNICO DE EVALUACION DE PROVEEDORES E INSPECCION DE BIENES

Nº REPORTE 075-SGC-0172007
NORMAS NMX-CC-9001:2008
ISO – 9001: 2008

CONSTANCIA DE PROVEEDOR CONFIABLE

Nº 0552/2007

INDUSTRIAL DE VALVULAS, S.A. DE C.V. (101-I-439)
AV. INDUSTRIA, LOTE 16
FRACC. INDUSTRIAL EL TREBOL
TEPOTZOTLAN, EDO. DE MEX. C.P. 54600
TEL. 5899 1700

DE ACUERDO CON LA AUDITORIA A SU SISTEMA DE GESTION DE LA CALIDAD EFECTUADA POR PETROLEOS MEXICANOS Y ORGANISMOS SUBSIDIARIOS CONFORME AL PROCEDIMIENTO GTEPB-007/99, SE OTORGA LA PRESENTE CONSTANCIA PARA EL SUMINISTRO DE LOS SIGUIENTES PRODUCTOS:

FABRICANTE DE VALVULAS DE ACERO FUNDIDO COMPUERTA API 6D, GLOBO ASME B16.34, RETENCION, COMPUERTA, BOLA, MACHO API 6D, VALVULAS DE ACERO FORJADO COMPUERTA, GLOBO RETENCION API 602, MARIPOSA AWWA C504, SEGURIDAD Y ALIVIO.

ESTA CONSTANCIA SE EXTIENDE, EN EL ENTENDIDO DE QUE PETROLEOS MEXICANOS EFECTUARA AUDITORIAS DE SEGUIMIENTO A SU SISTEMA DE GESTION DE LA CALIDAD, RESERVANDOSE EL DERECHO DE REVOCAR SU VALIDEZ, DE ACUERDO CON LOS RESULTADOS QUE SE OBTENGAN Y NO EXIME AL PROVEEDOR DE PRESENTAR SUS PRODUCTOS PARA VERIFICACION DE LA CALIDAD, CUANDO ASI SE LE REQUIERA.

FECHA DE EMISION: JUNIO / 2007
FECHA DE EXPIRACION: JUNIO / 2009

LIC. JAIME CONTRERAS ZEPEDA
PRESIDENTE

LUISA MAGDALENA FLORES DELGADO
SECRETARIO EJECUTIVO

ING. JESUS MENDOZA RODRIGUEZ
SECRETARIO TECNICO

Certificate NMX-CC-9001 (Mexican Standards ISO-9001) No. 0552/2007 issued by PEMEX in accordance with ISO-9001 Quality Assurance System.

In addition to the Quality System Certifications, WALWORTH has achieved the following specific product certifications:

TÜVRheinland®
Precisely Right.

CERTIFICATE

Certificate No.: 01 202 USA-TA-09-79768

Concerning the Agreement with the Technical Requirements in:

TA-Luft 2002, VDI 2440 Nov. 2000, Sec. 3.3.1.3

Test report: 209140 Datum: 03 December, 2009

Client: Industrial de Valvulas, S.A. de C.V.

Manufacturer's Address: Av. De la Industria Lote 16 Fracc. Industrial El Trebol, Tepotzotlan, Edo. De Mexico, CP 54600

The stem sealing system and internal flange connection have been successfully tested to meet the tightness criteria of ≤ 10^{-6} mbar x l/(s x m) with a helium mass spectrometer under the following conditions. The BFV Valve with the examined mechanical shaft seals fulfills the requirements of Section 5.2.6.4 of The German Clean Air Act, (TA-Luft), (Leakage Verification) in accordance with Section 3.3.1.3 of VDI 2440 (Rev. 2000).

Kind of Valve:	Walworth API 600 Gate Valve	
Valve Type:	4 Inch, Class 300, Figure 8288F WCB Body / CR 13 Stem & Disc / HF Seat	
Sealing System:	Graphite Seals	
Nominal Size, Nominal Pressure:	4 inch, ANSI 300	
Inspection Media/Pressure:	Helium / 51 Bars	Temperature = Ambient
Switching Cycles: (2/min):	0 Cycles	Total Cycles 500
Leakage Rate : [mbar - l / sec]	8.2e-7 (mbar – l/sec)	3.7e-6 (mbar – l/sec)
Testing Method:	Helium Leak Test – VDI 3440, Appendix A	

Testing Laboratory: Yarmouth Research and Technology
Matthew J Wasielewski, PE
484 Walnut Hill Road, N. Yarmouth, ME USA

TÜV Rheinland North America, Inc.
Industrial Services Division, Newtown, CT., USA
Kasuma J. Santos, Jr. – Examiner

TA Luft Certificate (Fugitive Emission) Approval ISO-5211 Top Flange, Anti-Static Device.

YARMOUTH RESEARCH AND TECHNOLOGY

PROJECT SUMMARY

Project Number: 99069

Customer: The Walworth Company

Contact: David Cornelsen

Date(s) of Test: 12/9/99 – 12/20/99

Product(s) Tested: One 6" Class 300 Gate Valve with Empak-Men EAF-100-001 packing.

Purpose of Test: The test was conducted to evaluate the valve's stem sealing performance at ambient and at 350° F as related to the 1990 Amendments to the Clean Air Act requirements. Leakage measurements were conducted in accordance with 40 CFR Part 60, Appendix A, Method 21.

Conclusion: Three thermal cycles from ambient to 350 deg. F were conducted throughout 3500 open/close cycles with the valve pressurized to 645 psig. The valve was cycled with a 45 RPM gear motor coupled to the handwheel. One packing nut adjustment was required at cycle number 300 to maintain leakage levels below 100 PPMv.

At cycle number 3500, the packing leakage was 25-29 PPMv with the stem static. The packing nuts were tightened from 12/14 ft-lb back to 28 ft-lb and leakage decreased to about 1 PPMv.

See the attached data sheets for more information.

Test Witness:

Matthew J. Wasielewski, P. E., President
YARMOUTH RESEARCH AND TECHNOLOGY

Certificates of Ultra Low Fugitive Emissions No. 20985-3, 8 & 16 in accordance with ISO-15848-1 "Industrial Valves"- Measurement, Test and Qualification Procedures for Fugitive Emissions" "Part 1: Classification System and Qualification Procedures for Type Testing of Valves".

DACOR SERVICES

CONSULTANTS

ENGINEERING • QUALITY ASSURANCE • MANUFACTURING

DAVID J. CORNELSEN, P.E., PRESIDENT

January 22, 2005

Ruben Paredes
Walworth – Inval Facility
Av. De la Industria Lote 16 Fracc. Industrial el Trebol
Tepotzotlan, Edo. De Mexico
CP 54600, Mexico

Reference: Witness Report – API Spec 6FA Fire Test Number 01-1 / 05

This will certify that the following listed valve successfully passed all requirements of API Specification 6FA Fire Test for Valves, Third Edition dated April 1999 and API Standard 607 Fire Test for Soft-Seated Quarter-Turn Valves, Fourth Edition dated May 1993. The tests were made and verified on January 21, 2005.

API 6D Trunnion Mounted Ball Valve, 12-inch Class 150 Figure 8122, Serial Number V05B01.

The successful test of the 12-inch Class 150 API 6D Ball Valve qualifies this design/type of valve as meeting the requirements of API Spec 6FA / API Std 607 for sizes 12-inch through 24-inch in pressure classes 150 and 300.

Sincerely,

David J. Cornelsen P.E.
President

STATE OF TEXAS
DAVID J. CORNELSEN
90169
REGISTERED
PROFESSIONAL ENGINEER

24802 Mathis Drive • Katy, Texas 77494
Telephone (281) 395-5071 • Telefax (281) 395-5073

Fire Test Certificate No. 04/04 in accordance with API-6FA and API Standard API-607 for Trunnion Ball Valves in accordance with API-6D.

FUGITIVE EMISSION TEST CERTIFICATE

Name of Manufacturer: Walworth
Description of Valve: 3 inch Class 300 Gate Valve
52065 with Ultra Low Emissions Packing
Test Specification: ISO 15848-1 (2006) -Industrial valves — Measurement, test and qualification procedures for fugitive Emissions Part 1: Classification system and qualification procedures for type testing of valves
Test Parameters: Endurance Class: CO1 – 500 Cycles; Performance Class: BH
Temperature Classes: Ambient, 200C, 400C, -20C; Pressure Class: ANSI 300
Test Date: August 2009; Certificate Number: 209083-3

RESULTS

The packing qualifies to Class B leakage levels with no readings above 3.9 e-5 atm cc/sec throughout the tests.

This certificate refers to the above mentioned product for the test conducted. This certificate does not imply assessment of the production of the product and future performance.

Laboratory Information
Name: Yarmouth Research and Technology
Address: 434 Walnut Hill Road, North Yarmouth, ME 04097 USA
Tester: Matthew Wasielewski, PE
info@yarmouthresearch.com
www.yarmouthresearch.com
(207) 829-5359

Emissions after 500 cycles at ambient and 350 °F issued by Yarmouth Research and Technology Lab for 3 inch Class 300 Gate Valve After 500 cycles the measurement result was less than 50 ppm.

Certificate of Authority to use the Official API Monogram
License Number: 594-0007

WALWORTH
Avenida de la Industria Lote 16
Fraccionamiento Industrial El Trebol
Tepotzotlan
Mexico

API Spec Q1 and API Spec 594

American Petroleum Institute

Effective Date: OCTOBER 13, 2011
Expiration Date: NOVEMBER 4, 2014

Certificate API-594 No. 594-0007 issued by American Petroleum Institute to apply on Check Valves-Type A; Check Valves Type B manufactured in accordance with API-594 specification.

FUGITIVE EMISSION TEST CERTIFICATE

Name of Manufacturer: Walworth
Description of Valve: 8 inch Class 300 Gate Valve
52065 with Ultra Low Emissions Packing
Test Specification: ISO 15848-1 (2006) -Industrial valves — Measurement, test and qualification procedures for fugitive Emissions Part 1: Classification system and qualification procedures for type testing of valves
Test Parameters: Endurance Class: CO1 – 500 Cycles; Performance Class: BH
Temperature Classes: Ambient, 200C, 400C, -20C; Pressure Class: ANSI 300
Test Date: August 2009; Certificate Number: 209083-8

RESULTS

The packing qualifies to Class B leakage levels with no readings above 6.1 e-5 atm cc/sec throughout the tests.

This certificate refers to the above mentioned product for the test conducted. This certificate does not imply assessment of the production of the product and future performance.

Laboratory Information
Name: Yarmouth Research and Technology
Address: 434 Walnut Hill Road, North Yarmouth, ME 04097 USA
Tester: Matthew Wasielewski, PE
info@yarmouthresearch.com
www.yarmouthresearch.com
(207) 829-5359

Emissions after 500 cycles at ambient and 350 °F issued by Yarmouth Research and Technology Lab for 8 inch Class 300 Gate Valve After 500 cycles the measurement result was less than 50 ppm.

Certificate of Authority to use the Official API Monogram
License Number: 600-0109

WALWORTH
Avenida de la Industria Lote 16
Fraccionamiento Industrial El Trebol
Tepotzotlan
Mexico

API Standard 600

American Petroleum Institute

Effective Date: OCTOBER 13, 2011
Expiration Date: NOVEMBER 4, 2014

API-600 Certificate No. 600-0109 issued by American Petroleum Institute to apply on Bolted Bonnet Steel Gate Valves manufactured in accordance with API-600 specification.

FUGITIVE EMISSION TEST CERTIFICATE

Name of Manufacturer: Walworth
Description of Valve: 16 inch Class 150 Gate Valve
52065 with Ultra Low Emissions Packing
Test Specification: ISO 15848-1 (2006) -Industrial valves — Measurement, test and qualification procedures for fugitive Emissions Part 1: Classification system and qualification procedures for type testing of valves
Test Parameters: Endurance Class: CO1 – 500 Cycles; Performance Class: BH
Temperature Classes: Ambient, 200C, 400C, -20C; Pressure Class: ANSI 150
Test Date: August-September 2009; Certificate Number: 209083-16

RESULTS

The packing qualifies to Class B leakage levels with no readings above 7.8 e-5 atm cc/sec throughout the tests.

This certificate refers to the above mentioned product for the test conducted. This certificate does not imply assessment of the production of the product and future performance.

Laboratory Information
Name: Yarmouth Research and Technology
Address: 434 Walnut Hill Road, North Yarmouth, ME 04097 USA
Tester: Matthew Wasielewski, PE
info@yarmouthresearch.com
www.yarmouthresearch.com
(207) 829-5359

Emissions after 500 cycles at ambient and 350 °F issued by Yarmouth Research and Technology Lab for 16 inch Class 150 Gate Valve After 500 cycles the measurement result was less than 50 ppm.

Certificate of Authority to use the Official API Monogram
License Number: 602-0024

WALWORTH
Avenida de la Industria Lote 16
Fraccionamiento Industrial El Trebol
Tepotzotlan
Mexico

API Standard 602

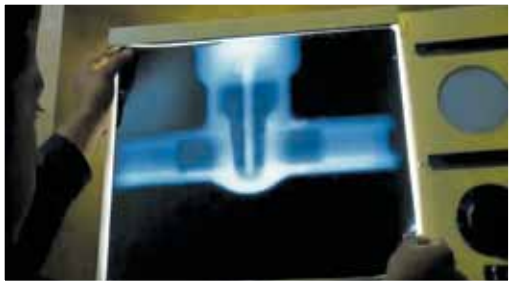
American Petroleum Institute

Effective Date: OCTOBER 13, 2011
Expiration Date: NOVEMBER 4, 2014

API-602 Certificate No. 602-0024 issued by American Petroleum Institute to apply on Compact Steel Gate Valves, Compact Steel Globe Valves, and Compact Steel Check Valves manufactured in accordance with API-602 specification.

QUALITY CONTROL EQUIPMENT

In order to assure that WALWORTH products comply with international quality standards, in-house equipment is kept for monitoring control. Some of this equipment includes:



X-Ray Examination Equipment. WALWORTH has its own Ir-92 source in-house for the radiographic examination (RT) of castings from 0.100" up to 2 1/2" wall thickness to verify the soundness of the casting raw material.

PMI Equipment. A new generation of Positive Material Identification Equipment gives WALWORTH the capability to perform quick chemical analysis on incoming raw materials and on pieces after assembly, to certify that materials used were produced and assembled in accordance with WALWORTH's and our Customer's specifications.

Magnetic Particle Test. On a random basis for standard products or when a Customer requests MT Certification, WALWORTH has Magnetic Particle Test Equipment to perform on ferromagnetic materials.

Penetrant Test Examination. WALWORTH has the personnel and materials to perform PT examination by solvent removable or water washable techniques. NDT personnel are ASNT Certified.

Test Loop. A complete Laboratory Test loop exists for design validation of WALWORTH products. The test is performed at maximum design pressure, advances the valves from 3000 to 5000 cycles, and requires more than four months to complete.

Pressure Gradient Test Loop. This test exposes Plug valves to the extremes of both positive and negative pressure gradients to verify that the plug in a balanced plug design will prevent lock-up in the body.

Metrology Laboratory. WALWORTH developed a calibration and/or verification system in all of the equipment used in its facilities. This ensures our ability to trace measurements, control products, and comply with international standards.

Fire Test Facilities. WALWORTH has the facilities to perform fire tests in accordance with API requirements. The test exposes the valve to a fire flame at 1400 to 1800 °F (761 to 980 °C) to verify proper seal of the valve.

Low Fugitive Emissions Test. This test is performed when a Customer requires low fugitive emissions certification. Our Lab has its own LFE test equipment that is capable of measuring less than 20 ppm in both static and mechanical conditions at either ambient temperature or thermal cycle operations.

Ultrasonic Testing Equipment. Using ultrasonic techniques, we can detect sub surface flaws in materials and evaluate castings and forgings that cannot be radiographed. In addition, we utilize these techniques to measure the wall thickness of castings and forgings.

Tensile Test Equipment. We use this equipment to verify the mechanical properties of materials used for manufacturing. WALWORTH tests samples on a random basis even though we receive MTRs from our suppliers and foundries.

Hardness Test Equipments.- In both lab and shop tests, WALWORTH uses hardness tester equipment, such as Rockwell B, C Brinell or Vickers, to ensure compliance with specifications.

WAFER DUO CHECK VALVE
(IRON AND CAST STEEL)

Advantages of Design

The main purpose of the DUO CHECK valve is to perform the work of almost any conventional valve. However, being smaller makes it lighter and, therefore, is more cost efficient to purchase, install and maintain. It is also a silent check valve; because of it's innovative design, it does not slam upon closing.

The DUO CHECK plate design and flat seat offer many advantages. The flat seat eliminates any possibility of board snaps in the seat, which snaps occur frequently in other valves. When suspended in a vertical pin, the two plates have a reduced weight which eliminates excessive wear on the plate lugs. This wear can cause the plate to collapse on the seat's open surface, causing the valve to subsequently fail.

An important feature of the DUO CHECK valve is that it does not depend on the pressure or flow to center the plates in relation to the sealing surface in order to make the seal.

Single plate conventional designs, even those having centering guides, require a backpressure and backflow to center the plate to the seat in order to get a non leakage adjustment. This feature becomes extremely risky in the event of reduced flow and the handling of gases at low pressure.

Size	Pressure by class according to ASME/ANSI B16.34	Ends
2" a 60"	150, 300, 600, 900, 1500, 2500	RF, RTJ, P

WAFER DUO CHECK VALVE LUG TYPE

Advantages of Design

With the aid of spring DUO CHECK valve LUG type, as Wafer type, gives a maximum resistance with the minimum opening time.

The stop pin avoids the over travel of a disc.

This design is also hermetic, which means there are no drillings in the body, and because there are now pins in a support that is attached to the body, the chance of leakage is greatly reduced.

The DUO CHECK valve LUG type covers the bolt along the entire length of the body.

LUG type valves are supplied in scallop to keep the weight as low as possible, thereby minimizing the cost.

LUG type valves are supplied with straight-through bores according to API-594.

Note:
1. For more information contact the company.

MOST COMMON MATERIAL OF THE BODY

Material suffix	Common designation	Forging specification	Wrought bar specification	Service recommendations (1)
ASTM A216 Grade WCB	Carbon Steel	A105N	A105N	Non-corrosive applications including water, oil and gases at temperatures between -20°F (-30°F) and +800°F (+425°C)
ASTM A216 Grade WCC	Carbon Steel	A105N	A105N	Non-corrosive applications including water, oil and gases at temperatures between -20°F (-30°F)and +800°F (+425°C)
ASTM A217 Grade WC6	1 1/4% Chrome; 1/2% Moly Low Alloy Steel	A182 F11	A182 F11 Class 2	Non-corrosive applications including water, oil and gases at temperatures between -20°F (-30°C) and + 1100°F(+593°C).
ASTM A217 Grade WC9	2 1/4 % Chrome Low Alloy Steel	A182 F22	A182 F11 Class 3	Non-corrosive applications including water, oil and gases at temperatures between -20°F (-30°C) and + 1100°F(+593°C).
ASTM A352 Grade LCB	Low Temp Carbon steel	A350 LF1	A350 LF1	Low temperature applications to -50 °F (-46°C).Not for use above + 650°F(+340°C).
ASTM A352 Grade LCC	Low Temp Carbon steel	A350 LF2	A350 LF2	Low temperature applications to -50 °F (-46°C).Not for use above + 650°F(+340°C).
ASTM A351 Grade CF8	18% Chrome; 8% Nickel; 0.08 % C Stainless Steel	ASTM A182 F304	ASTM A479 304	Corrosive or extremely high temperature non-corrosive services between -450°F (- 268°C) and + 1200°F (+649°C). Above + 800°F (+ 425°C) specify carbon content of 0.04% or greater.
ASTM A351 Grade CF8M	18% Chrome; 12% Nickel; 2 % Mo; 0.08 % C Stainless Steel	ASTM A182 F316	ASTM A479 316	Corrosive or either extremely low or high temperature non-corrosive services between -450°F (-268°C) and +1200°F (+649°C). Above +800°F (+425°C) specify carbon content of 0.04% or greater.
ASTM A351 Grade CF3	18% Chrome; 8% Nickel; 0.03 % C Low Carbon Stainless Steel	ASTM A182 304L	ASTM A479 304L	Brackish water, phosphate solutions, pressurized water @ 570 °F (299 °C), sea water, steam.
ASTM A351 Grade CF3M	18% Chrome; 12% Nickel; 2 % Mo; 0.03 % C Low Carbon Stainless Steel	ASTM A182 F316L	ASTM A479 316L	Acetic acid, calcium carbonate, calcium lactate, potable water, sea water, steam, sulfites.
ASTM A351 Grade CF8C	18% Chrome; 10% Nickel; Cb; 0.08 % C Stainless Steel	ASTM A182 F347	ASTM A479 347	Primarily for high temperature, corrosive applications between -450°F (-268°C) and +1200°F (+649°C). Above +1000°F (+540°C) specify carbon content of 0.04% or greater. Hydrogen service."
ASTM A351 Grade CN7M	19% Chrome; 28% Nickel; Cu-Mo; 0.07 % C Super Stainless Steel	ASTM B462 N08020	ASTM B473 N08020	Acetic acid (hot), brines, caustic solutions, (strong, hot), hydrochloric acid (dilute), hydrofluoric acid and hydrofluosilicic acid (dilute), nitric acid, (strong, hot), nitric-hydrofluoric pickling acids, sulfates and sulfites, sulfuric acid, (all concentrations to 150 °F (65.6 °C), sulfurus acid, phosphoric acid.

(1) The above list of consuming industries and corrosive materials are useful as examples of typical applications where these materials can be used as a guide; however, the responsibility for choosing the proper alloy lies with the Engineering firm or End User.
(*) For other materials, please contact the company.

MOST COMMON TRIMS

Trim No.	Parts and Materials
W1	Discs made from SS A351 Gr. CF8, Pin SS A276 Gr. 410, Stop Pin A276 Gr. 410
W2	Discs made from SS A351 Gr. CF8, Pin SS A276 Gr. F304, Stop Pin A276 Gr. F304
W3	Discs made from SS A351 Gr. CF8M, Pin SS A276 Gr. F316, Stop Pin A276 Gr. F316
W4	Discs made from SS A351 Gr. CF3, Pin SS A276 Gr. F304L, Stop Pin A276 Gr. F304L
W5	Discs made from SS A351 Gr. CF3M, Pin SS A276 Gr. F316L, Stop Pin A276 Gr. F316L
W6	Discs made from Duplex SS A995 Gr. CD3MN, Pin SS A182 Gr. F51, Stop Pin A182 Gr. F51

(*) For other TRIM materials, please contact the company.

CHEMICAL COMPOSITION OF MOST COMMON MATERIALS

Chemical composition and mechanical properties									
Elements and properties	Carbon steel		Low carbon steel		Low alloy steel		Stainless steel		
	ASTM A216		ASTM A352		ASTMA217		ASTMA351		
	WCB	WCC	LCB	LCC	WC6	WC9	CF8	CF8M	CF8C
Carbon	0.30	0.25	0.30	0.25	0.05-0.20	0.05-0.18	0.08	0.08	0.08
Manganese	1	1.2	1	1.2	0.50-0.80	0.40-0.70	1.5	1.5	1.5
Phosphorus	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Sulphur	0.045	0.045	0.045	0.045	0.045	0.045	0.04	0.04	0.04
Silicon	0.6	0.6	0.6	0.6	0.6	0.6	2	1.5	2
Nickel	0.5	0.5	0.5	0.5	-	-	8.00-11.0	9.00-12.0	9.00-12.0
Chromium	0.5	0.5	0.5	0.5	1.00-1.50	2.00-2.75	18.00-21.0	18.00-21.0	18.00-21.0
Molybdenum	0.2	0.2	0.2	0.2	0.45-0.65	0.90-1.20	0.5	2.00-3.00	0.5
Copper	0.3	0.3	0.3	0.3	0.5	0.5	-	-	-
Columbium	-	-	-	-	-	-	-	-	(2)
Vanadium	0.03	0.03	0.03	0.03	-	-	-	-	-
Tensile Strength PSI minimum	70,000-95,000	70,000	65,000	70000-95,000	70,000	70,000	70,000	70,000	70,000
Yield Strength PSI minimum	36,000	40,000	35,000	40,000	40,000	40,000	30,000	30,000	30,000
Elongation In 2"% minimum	22	22	24	22	20	20	35	30	30
Reduction Area "% minimum	35	35	35	35	35	35	-	-	-
Hardness (HB) maximum	185	185	190	200	200	200	-	-	-

Notes:
1. The percentage (%) shown on the elements is the maximum except where ranges are indicated.
2. Steel CF8C should have a Columbium content of not less than 8 times the carbon content, but not exceeding 1%.

SOFT SEATS OPERATING TEMPERATURE

Body Seat	Operating Temperature
Buna - N	-60 a 250 ºF (-5 a 120º C)
Viton	-10 a 400 ºF (-23 a 204º C)
EPDM	0 a 300 ºF (-18 a 149º C)
Neoprene	0 a 212 ºF (-18 a 100º C)
Metal-Metal	In accordance with B16,34

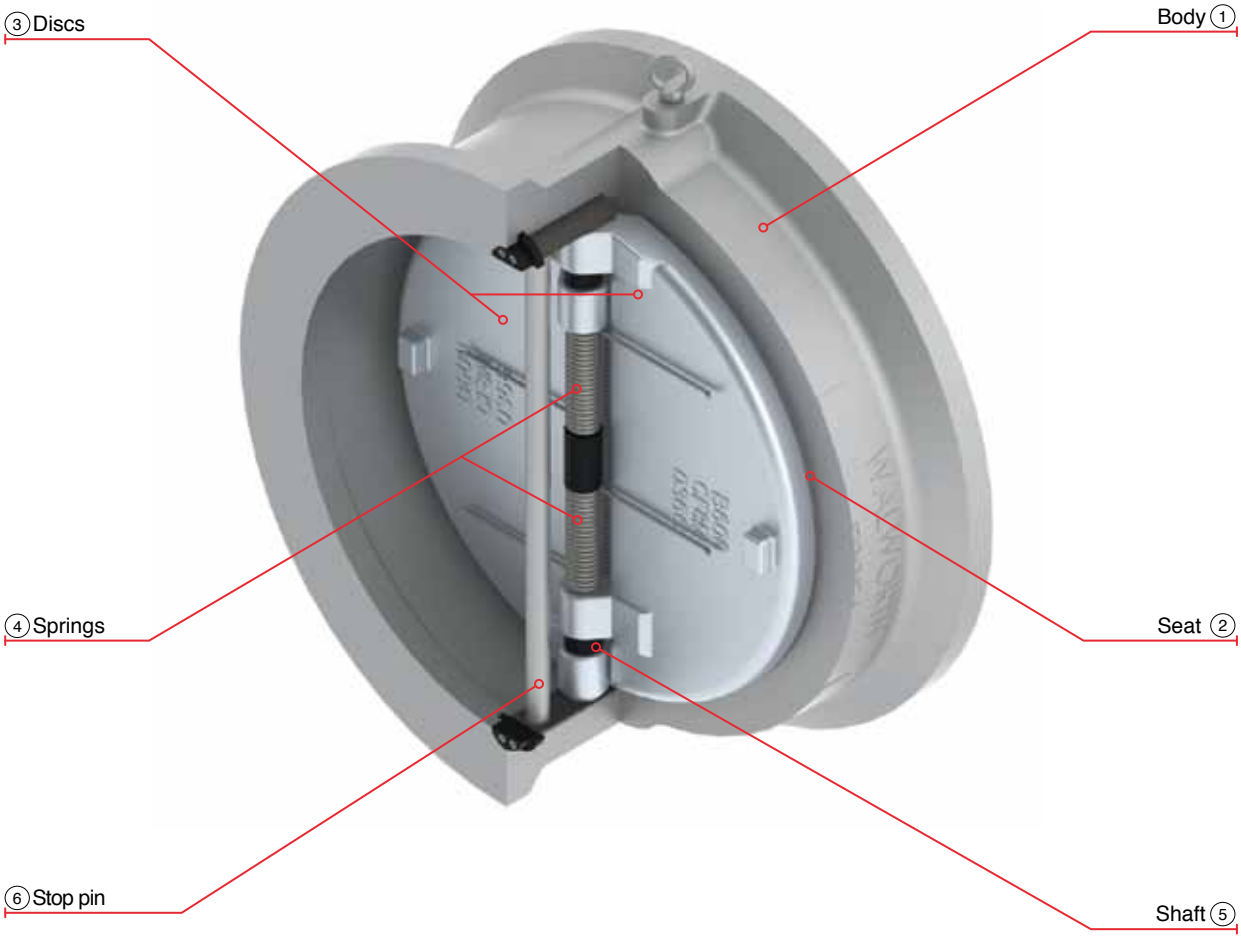
(*) We can supply another kind of seat as per customer request.

WAFER DUO CHECK VALVE

Design Features

- Design in accordance with API 594
- End to end dimension as per API 594
- Flange dimensions in accordance with ASME B16.5, ASME B16.47
- Inspection and Test according to API 598
- NACE MR-0175 Service
- Availability LUG design
- Availability Double Flange from 12”
- Single Spring for 2” to 6”
- Double Spring for 8” and up

① Body. It’s 10% lighter than a conventional flanged check valve.
② Seat. Availability of soft seats and Metal-Metal.
③ Disc in conjunction with springs, offers an airtight seal giving a better performance.
④ Springs give a better reaction to close.
⑤ Shaft keeps discs in the position and avoids vibration.
⑥ Shaft and stop pin are mounted on a support rather than through holes in the body, resulting in a hermetic valve.



WAFER DUO CHECK VALVE CLASS 150

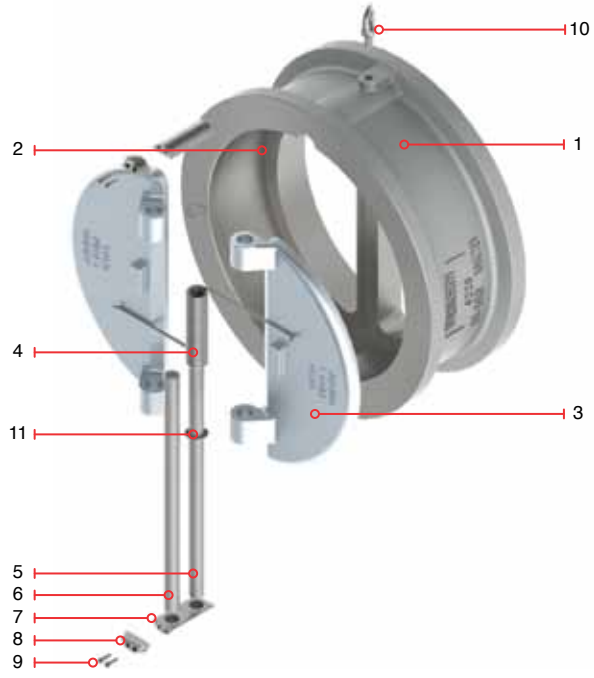
Design Features

- Design in accordance with API 594
- End to end dimension in accordance to API 594
- Flange ends in accordance to ASME B16.5, ASME B16.47
- Inspection and Test according to API 598
- NACE MR-0175 Service
- Lifting Lug for 8” and up
- Single Spring for 2” to 6”
- Double Spring for 8” and up

Material List for Main Parts (Single Spring)

No.	Part Name	ASTM
		Carbon Steel
1	Body	A216 WCB
2	Seat Seal	A216 WCB + SS410 Overlay
3	Disc	A351 CF8
4	Spring	Inconel X-750
5	Shaft	A276 Gr. 410
6	Stop Pin	A276 Gr. 410
7	Shaft Support	A276 Gr. 410
8	Retainer	A276 Gr. 410
9	Bolting	Commercial Steel
10	Lifting Lug	Commercial Steel
11	Bearing	A276 Gr. 410

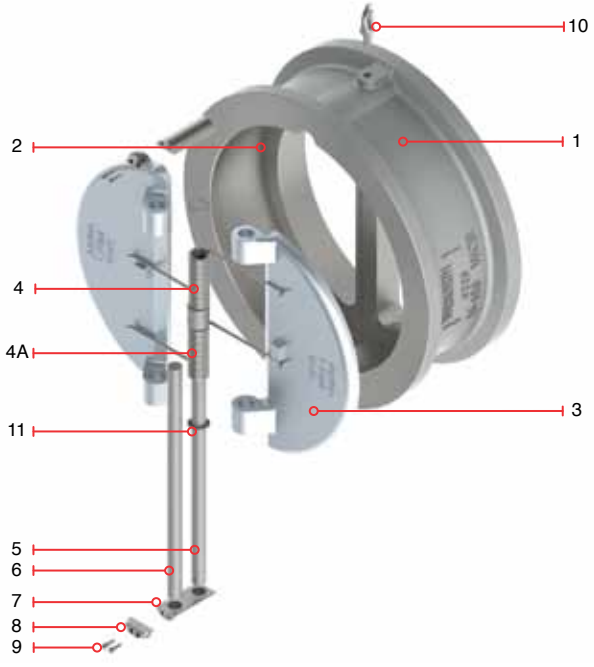
Remark: 1. Select different materials for different working temperature and media.



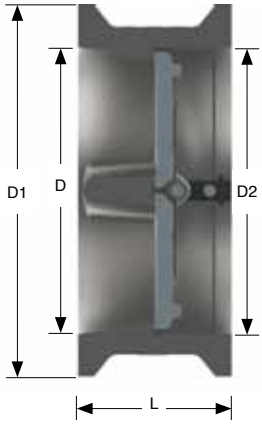
Material List For Main Parts (Double Spring)

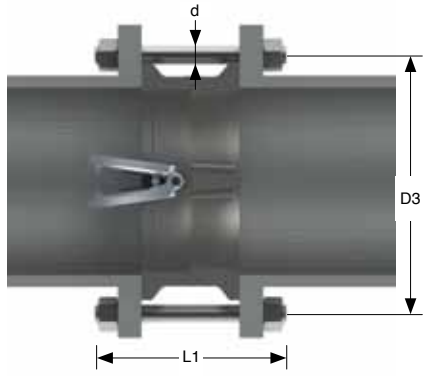
No.	Part Name	ASTM
		Carbon Steel
1	Body	A216 WCB
2	Seat Seal	A216 WCB + SS410 Overlay
3	Disc	A351 CF8
4	Spring	Inconel X-750
4A	Spring	Inconel X-750
5	Shaft	A276 Gr. 410
6	Stop Pin	A276 Gr. 410
7	Shaft Support	A276 Gr. 410
8	Retainer	A276 Gr. 410
9	Bolting	Commercial Steel
10	Lifting Lug	Commercial Steel
11	Bearing	A276 Gr. 410

Remark: 1. Select different materials for different working temperature and media.



WAFER DUO CHECK VALVE
CLASS 150





Dimensions and Weights

Pressure / Flange standard	Nominal pipe size		Dimension				Weight (Kg)	Pipe Flange					
								D3	Bolt No.	Stud Diameter (d)		Stud Length (L1)	
	NPS	CN	L	D1	D2	D				in	mm	RF	RJ
Class 150 PN2,0/ ASME B16.5	2	50	60	103	56	51	2	120.5	4	5/8	M16	140	155
	2 1/2	65	67	122	73	65	3	139.5	4	5/8	M16	150	165
	3	80	73	135	88	80	4	152.5	4	5/8	M16	160	175
	4	100	73	173	108	102	6	190.5	8	5/8	M16	170	185
	5	125	86	195	132	127	8	216	8	3/4	M20	190	205
	6	150	98	220	160	152	13	241.5	8	3/4	M20	205	220
	8	200	127	277	210	203	25	298.5	8	3/4	M20	240	255
	10	250	146	337	266	254	39	362	12	7/8	M24	270	285
	12	300	181	407	310	305	54	432	12	7/8	M24	310	325
	14	350	184	448	355	350	80	476	12	1	M27	325	340
	16	400	191	512	405	400	117	540	16	1	M27	340	355
	18	450	203	547	455	450	138	478	16	1 1/8	M30	365	380
	20	500	219	604	505	500	163	635	20	1 1/8	M30	385	400
	24	600	222	715	605	600	331	749.5	20	1 1/4	M33	405	420
Class 150 PN2,0/ ASME B16.47A o MSS SP-44	26	650	222	770	650	633	380	806.5	24	1 1/4	M33	450	-
	28	700	305	827	700	700	400	863.5	28	1 1/4	M33	535	-
	30	750	305	878	750	746	440	914.5	28	1 1/4	M33	545	-
	32	800	305	935	800	796	580	978	28	1 1/2	M39x3	570	-
	36	900	368	1045	894	874	660	1086	32	1 1/2	M39x3	650	-
	40	1000	432	1167	985	976	890	1200	36	1 1/2	M39x3	710	-
	42	1050	432	1213	1055	1050	980	1257.5	36	1 1/2	M39x3	730	-
	44	1100	432	1274	1070	1070	1150	1314.5	40	1 1/2	M39x3	730	-
	48	1200	524	1397	1205	1166	1450	1422.5	44	1 1/2	M39x3	840	-
	54	1350	591	1545	1315	1312	2300	1594	44	1 3/4	M45x3	950	-
	56	1400	591	1602	1370	1360	2800	1651	48	1 3/4	M45x3	955	-
	60	1500	660	1701	1470	1458	3220	1759	52	1 3/4	M45x3	1040	-

WAFER DUO CHECK VALVE
CLASS 300

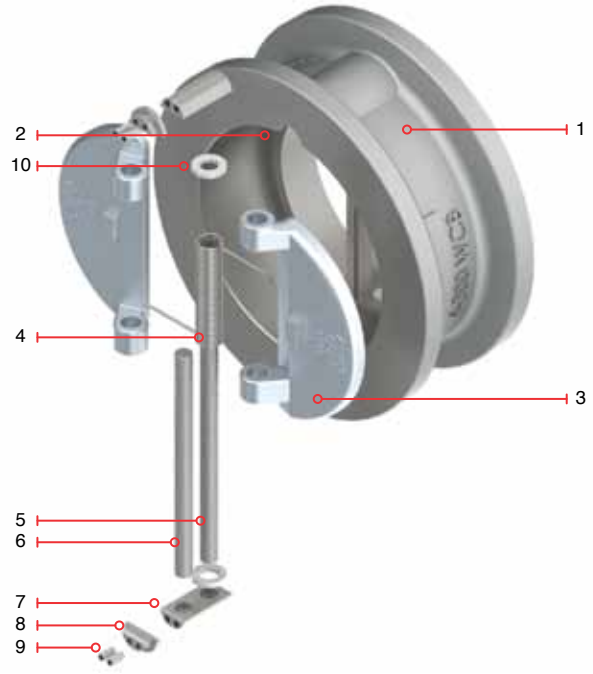
Design Features

- Design in accordance with API 594
- End to end dimension in accordance to API 594
- Flange ends in accordance to ASME B16.5, ASME B16.47
- Inspection and Test according to API 598
- NACE MR-0175 Service
- Lifting Lug for 8" and up
- Single Spring for 2" to 6"
- Double Spring for 8" and up

Material List for Main Parts (Single Spring)

No.	Part Name	ASTM
		Carbon Steel
1	Body	A216 WCB
2	Seat Seal	A216 WCB + SS410 Overlay
3	Disc	A351 CF8
4	Spring	Inconel X-750
5	Shaft	A276 Gr. 410
6	Stop Pin	A276 Gr. 410
7	Shaft Support	A276 Gr. 410
8	Retainer	A276 Gr. 410
9	Bolting	Commercial Steel
10	Lifting Lug	Commercial Steel
11	Bearing	A276 Gr. 410

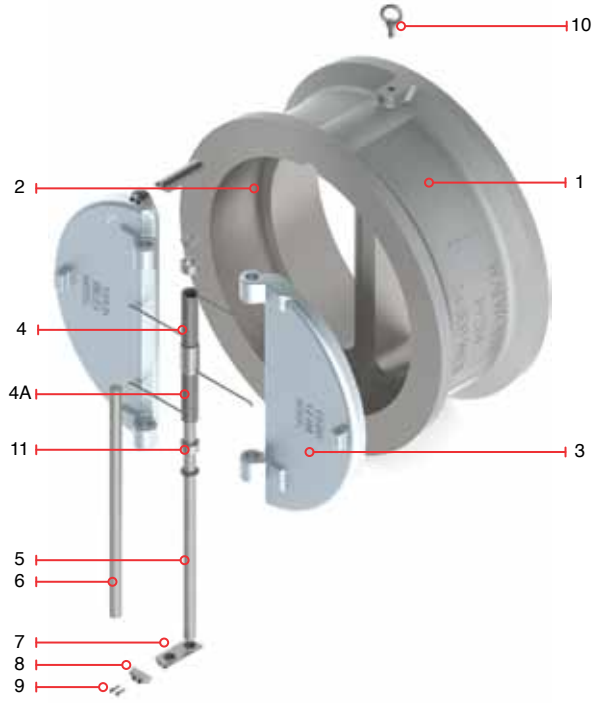
Remark: 1. Select different materials for different working temperature and media.



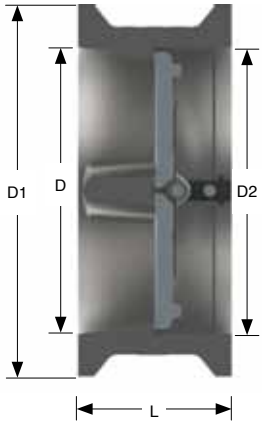
Material List For Main Parts (Double Spring)

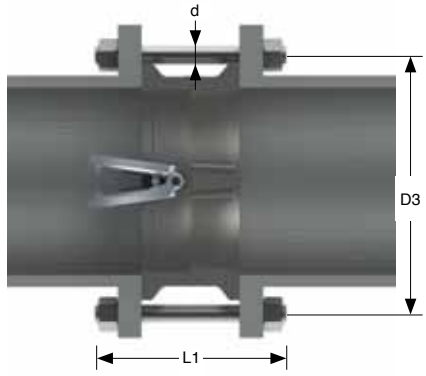
No.	Part Name	ASTM
		Carbon Steel
1	Body	A216 WCB
2	Seat Seal	A216 WCB + SS410 Overlay
3	Disc	A351 CF8
4	Spring	Inconel X-750
4A	Spring	Inconel X-750
5	Shaft	A276 Gr. 410
6	Stop Pin	A276 Gr. 410
7	Shaft Support	A276 Gr. 410
8	Retainer	A276 Gr. 410
9	Bolting	Commercial Steel
10	Lifting Lug	Commercial Steel
11	Bearing	A276 Gr. 410

Remark: 1. Select different materials for different working temperature and media.



WAFER DUO CHECK VALVE
CLASS 300





Dimensions and Weights

Pressure / Flange standard	Nominal pipe size		Dimension				Weight (Kg)	Pipe Flange					
								D3	Bolt No.	Stud Diameter (d)		Stud Length (L1)	
	NPS	CN	L	D1	D2	D				in	mm	RF	RJ
Class 300 PN5,0/ ASME B16.5	2	50	60	110	58	51	3	127	8	5/8	M16	155	175
	2 1/2	65	67	128	73	65	4	149	8	3/4	M20	175	195
	3	80	73	147	88	80	6	168.5	8	3/4	M20	190	210
	4	100	73	179	108	102	8	200	8	3/4	M20	195	215
	5	125	86	214	132	127	15	235	8	3/4	M20	215	235
	6	150	98	249	160	152	18	270	12	3/4	M20	230	250
	8	200	127	305	210	203	31	330	12	7/8	M24	280	300
	10	250	146	359	266	254	51	387.5	16	1	M27	315	335
	12	300	181	420	310	305	77	451	16	1 1/8	M30	365	385
	14	350	222	483	355	350	117	514.5	20	1 1/8	M30	410	430
	16	400	232	537	405	400	190	571.5	20	1 1/4	M33	435	455
	18	450	264	594	455	450	200	628.5	24	1 1/4	M33	475	495
	20	500	292	652	505	500	265	686	24	1 1/4	M33	510	535
	24	600	318	772	608	600	410	813	24	1 1/2	M39x3	560	585
Class 300 PN5,0/ ASME B16.47B o API605	26	650	356	767	640	633	560	803	32	1 1/4	M33	625	-
	28	700	368	821	985	685	580	857	36	1 1/4	M33	635	-
	30	750	368	882	740	735	660	921	36	1 3/8	M36x3	650	-
	32	800	368	936	784	784	970	978	32	1 1/2	M39x3	675	-
	36	900	483	1044	880	873	1010	1089	32	1 5/8	M42x3	800	-
	40	1000	546	1146	985	976	1420	1191	40	1 5/8	M42x3	885	-
	42	1050	568	1196	1045	1035	1540	1244.5	36	1 3/4	M45x3	920	-
	48	1200	629	1365	1190	1166	2250	1416	40	1 7/8	M48x3	1010	-
	54	1350	718	1526	1315	1312	3100	1578	48	1 7/8	M48x3	1140	-
	60	1400	838	1704	1470	1458	4310	1764	40	2 1/4	M56x3	1280	-
Class 300 PN5,0/ ASME B16.47A o MSS SP-44	26	650	356	831	640	633	580	876	28	1 5/8	M42x3	625	-
	28	700	368	895	985	685	600	940	28	1 5/8	M42x3	650	-
	30	750	368	949	740	735	680	997	28	1 3/4	M45x3	665	-
	32	800	368	1003	784	784	990	1054	28	1 7/8	M48x3	685	-
	36	900	483	1113	880	873	1050	1168.5	32	2	M52x3	820	-
	40	1000	546	1110	985	976	1400	1156	32	1 5/8	M42x3	885	-
	42	1050	568	1161	1045	1035	1520	1206.5	32	1 5/8	M42x3	915	-
	48	1200	629	1320	1190	1166	2250	1371.5	32	1 7/8	M48x3	1015	-
	54	1350	718	1489	1315	1312	3050	1594.5	28	2 1/4	M56x3	1160	-
	60	1400	838	1642	1470	1458	4300	1702	32	2 1/4	M56x3	1305	-

WAFER TYPE VALVE DOUBLE DISC CLASS 600

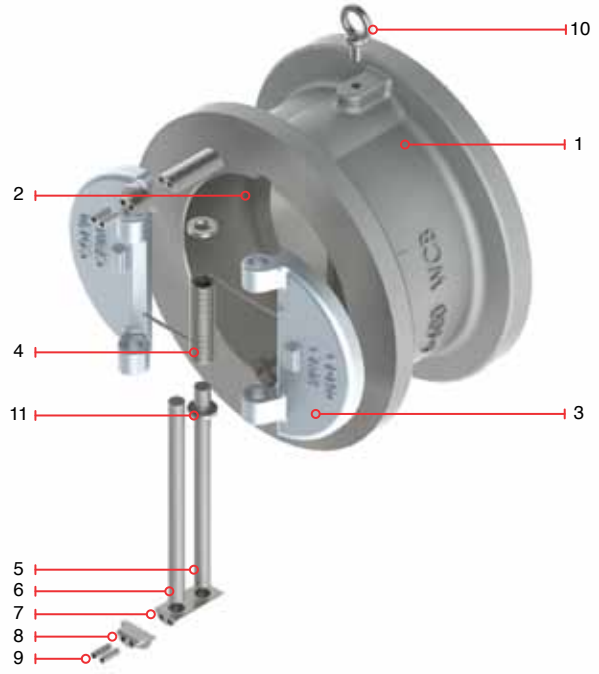
Design Features

- Design in accordance with API 594
- End to end dimension in accordance to API 594
- Flange ends in accordance to ASME B16.5, ASME B16.47
- Inspection and Test according to API 598
- NACE MR-0175 Service
- Lifting Lug for 8” and up
- Single Spring for 2” to 6”
- Double Spring for 8” and up

Material List for Main Parts (Single Spring)

No.	Part Name	ASTM
		Carbon Steel
1	Body	A216 WCB
2	Seat Seal	A216 WCB + SS410 Overlay
3	Disc	A351 CF8
4	Spring	Inconel X-750
5	Shaft	A276 Gr. 410
6	Stop Pin	A276 Gr. 410
7	Shaft Support	A276 Gr. 410
8	Retainer	A276 Gr. 410
9	Bolting	Commercial Steel
10	Lifting Lug	Commercial Steel
11	Bearing	A276 Gr. 410

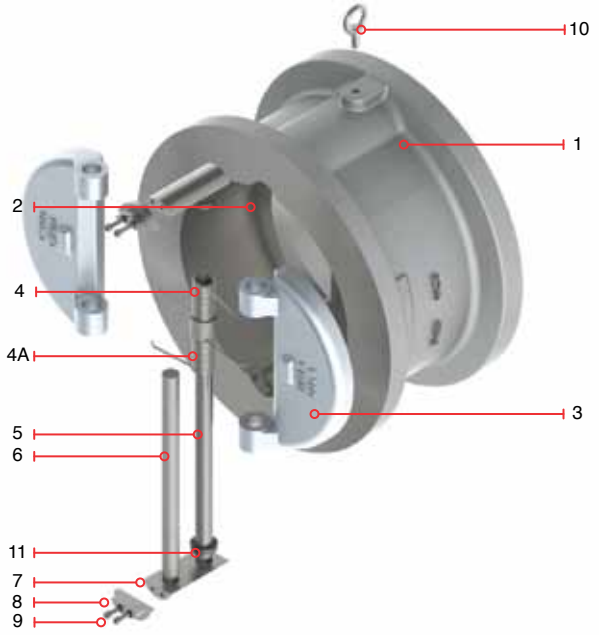
Remark: 1. Select different materials for different working temperature and media.



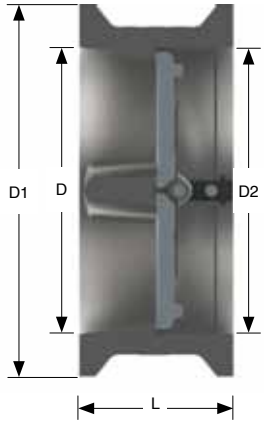
Material List For Main Parts (Double Spring)

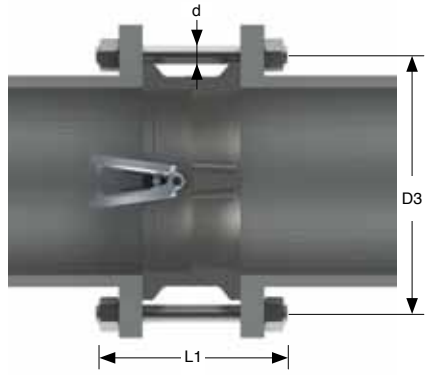
No.	Part Name	ASTM
		Carbon Steel
1	Body	A216 WCB
2	Seat Seal	A216 WCB + SS410 Overlay
3	Disc	A351 CF8
4	Spring	Inconel X-750
4A	Spring	Inconel X-750
5	Shaft	A276 Gr. 410
6	Stop Pin	A276 Gr. 410
7	Shaft Support	A276 Gr. 410
8	Retainer	A276 Gr. 410
9	Bolting	Commercial Steel
10	Lifting Lug	Commercial Steel
11	Bearing	A276 Gr. 410

Remark: 1. Select different materials for different working temperature and media.



WAFER TYPE VALVE DOUBLE DISC
CLASS 600





Dimensions and Weights

Pressure / Flange standard	Nominal pipe size		Dimension				Weight (Kg)	Pipe Flange					
								D3	Bolt No.	Stud Diameter (d)		Stud Length (L1)	
	NPS	CN	L	D1	D2	D				in	mm	RF	RJ
Class 600 PN11,0/ ASME B16.5	2	50	60	110	58	51	4	127	8	5/8	M16	175	180
	2 1/2	65	67	128	73	65	5	149	8	3/4	M20	195	200
	3	80	73	147	88	80	8	168.5	8	3/4	M20	210	215
	4	100	79	191	108	102	11	216	8	7/8	M24	235	240
	5	125	105	139	136	127	20	267	8	1	M27	280	285
	6	150	136	264	162	152	26	292	12	1	M27	320	325
	8	200	165	318	212	200	55	349	12	1 1/8	M30	370	375
	10	250	213	398	266	250	95	432	16	1 1/4	M33	440	445
	12	300	229	455	312	305	140	489	20	1 1/4	M33	460	465
	14	350	273	490	355	337	223	527	20	1 3/8	M36x3	520	525
	16	400	305	562	400	387	360	603	20	1 1/2	M39x3	575	580
	18	450	362	610	450	438	395	654	20	1 5/8	M42x3	650	655
	20	500	368	680	500	489	518	724	24	1 5/8	M42x3	670	680
	24	600	438	786	600	591	836	838	24	1 7/8	M48x3	780	790
Class 600 PN11,0/ ASME B16.47B o API605	26	650	457	761	640	633	950	806.5	28	1 5/8	M42x3	790	805
	28	700	483	815	690	684	1210	863.5	28	1 3/4	M45x3	830	845
	30	750	505	875	740	735	1370	927	28	1 7/8	M48x3	875	890
	32	800	533	928	784	779	1640	984	28	2	M52x3	920	940
	36	900	635	1045	880	874	2120	1105	28	2 1/4	M56x3	1065	1085
Class 600 PN11,0/ ASME B16.47A o MSS SP-44	26	650	457	863	640	633	980	915.5	28	1 7/8	M48x3	795	810
	28	700	483	910	690	684	1250	965	28	2	M52x3	835	850
	30	750	505	967	740	735	1420	1022.5	28	2	M52x3	860	905
	32	800	533	1020	784	779	1700	1079.5	28	2 1/4	M56x3	905	925
	36	900	635	1126	880	874	2200	1194	28	2 1/2	M64x3	1035	1055
	40	1000	660	1153	985	976	2650	1213	32	2 1/4	M56x3	1115	-
	42	1050	701	1215	1030	1020	3120	1283	28	2 1/2	M64x3	1190	-
	48	1200	787	1386	1170	1166	3720	1460.5	32	2	M70x3	1330	-

WAFER DUO CHECK VALVE
CLASS 900

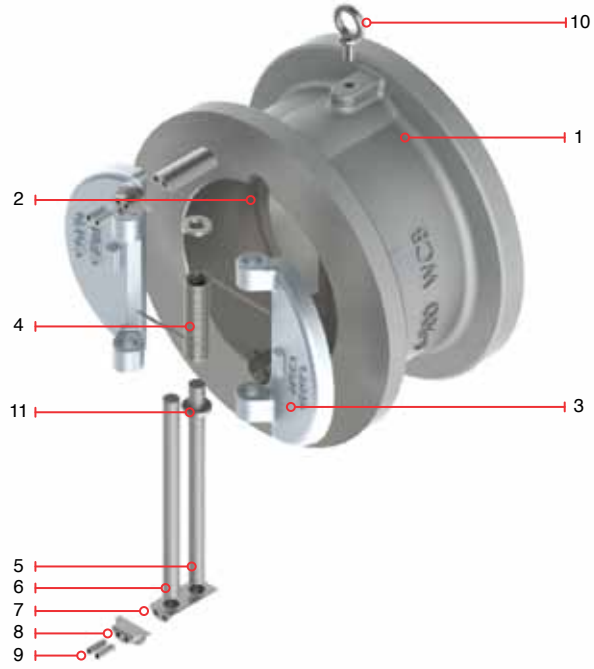
Design Features

- Design in accordance with API 594
- End to end dimension in accordance to API 594
- Flange ends in accordance to ASME B16.5, ASME B16.47
- Inspection and Test according to API 598
- NACE MR-0175 Service
- Lifting Lug for 8” and up
- Single Spring for 2” to 6”
- Double Spring for 8” and up

Material List for Main Parts (Single Spring)

No.	Part Name	ASTM
		Carbon Steel
1	Body	A216 WCB
2	Seat Seal	A216 WCB + SS410 Overlay
3	Disc	A351 CF8
4	Spring	Inconel X-750
5	Shaft	A276 Gr. 410
6	Stop Pin	A276 Gr. 410
7	Shaft Support	A276 Gr. 410
8	Retainer	A276 Gr. 410
9	Bolting	Commercial Steel
10	Lifting Lug	Commercial Steel
11	Bearing	A276 Gr. 410

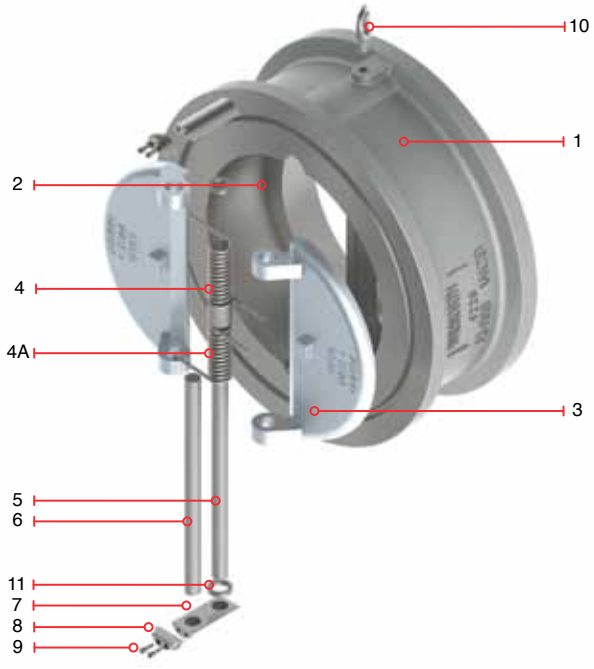
Remark: 1. Select different materials for different working temperature and media.



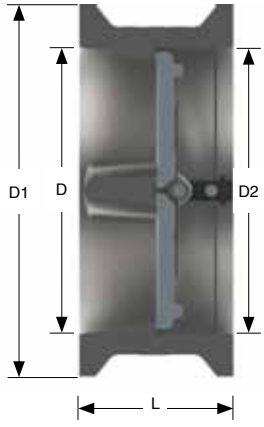
Material List For Main Parts (Double Spring)

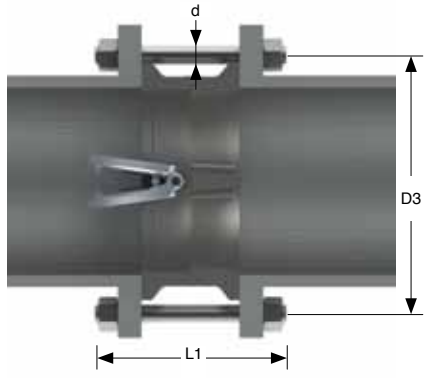
No.	Part Name	ASTM
		Carbon Steel
1	Body	A216 WCB
2	Seat Seal	A216 WCB + SS410 Overlay
3	Disc	A351 CF8
4	Spring	Inconel X-750
4A	Spring	Inconel X-750
5	Shaft	A276 Gr. 410
6	Stop Pin	A276 Gr. 410
7	Shaft Support	A276 Gr. 410
8	Retainer	A276 Gr. 410
9	Bolting	Commercial Steel
10	Lifting Lug	Commercial Steel
11	Bearing	A276 Gr. 410

Remark: 1. Select different materials for different working temperature and media.



WAFER DUO CHECK VALVE
CLASS 900





Dimensions and Weights

Pressure / Flange standard	Nominal pipe size		Dimension				Weight (Kg)	Pipe Flange					
	NPS	CN	L	D1	D2	D		D3	Bolt No.	Stud Diameter (d)		Stud Length (L1)	
										in	mm	RF	RJ
Class 900 PN15,0/ ASME B16.5	2	50	70	140	58	51	8	165	8	7/8	M24	225	230
	2 1/2	65	83	162	73	65	11	190.5	8	1	M27	250	255
	3	80	83	165	90	80	14	190.5	8	7/8	M24	240	245
	4	100	102	204	108	102	20	235	8	1 1/8	M30	285	290
	5	125	110	245	136	127	30	278.5	8	1 1/4	M33	310	315
	6	150	159	286	162	150	42	317.5	12	1 1/8	M30	365	370
	8	200	206	356	212	200	84	393.5	12	1 3/8	M36x3	440	445
	10	250	241	432	266	250	145	470	16	1 3/8	M36x3	490	495
	12	300	292	495	312	305	220	533.5	20	1 3/8	M36x3	560	565
	14	350	356	518	355	337	350	559	20	1 1/2	M39x3	645	655
	16	400	384	572	400	387	470	616	20	1 5/8	M42x3	685	695
	18	450	451	635	450	438	605	686	20	1 7/8	M48x3	790	805
	20	500	451	695	496	487	820	749.5	20	2	M52x3	810	825
	24	600	495	835	600	591	1050	901.5	20	7/8	M64x3	945	965

WAFER DUO CHECK VALVE
CLASS 1500

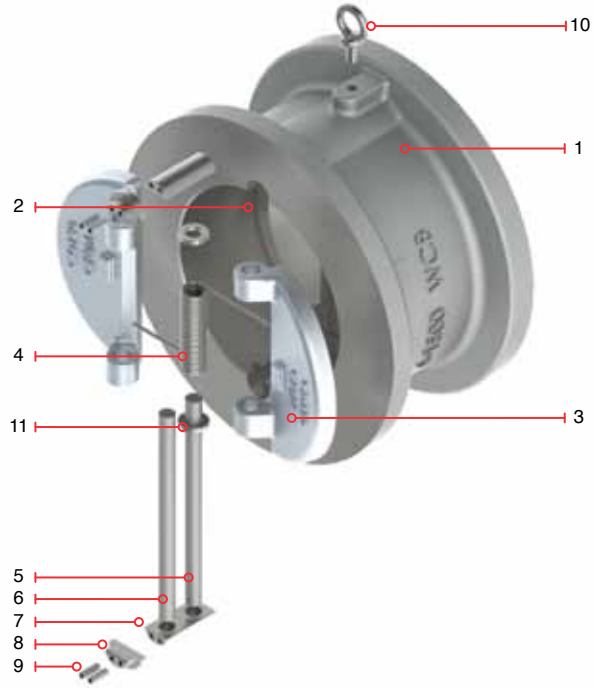
Design Features

- Design in accordance with API 594
- End to end dimension in accordance to API 594
- Flange ends in accordance to ASME B16.5, ASME B16.47
- Inspection and Test according to API 598
- NACE MR-0175 Service
- Lifting Lug for 8” and up
- Single Spring for 2” to 6”
- Double Spring for 8” and up

Material List for Main Parts (Single Spring)

No.	Part Name	ASTM
		Carbon Steel
1	Body	A216 WCB
2	Seat Seal	A216 WCB + SS410 Overlay
3	Disc	A351 CF8
4	Spring	Inconel X-750
5	Shaft	A276 Gr. 410
6	Stop Pin	A276 Gr. 410
7	Shaft Support	A276 Gr. 410
8	Retainer	A276 Gr. 410
9	Bolting	Commercial Steel
10	Lifting Lug	Commercial Steel
11	Bearing	A276 Gr. 410

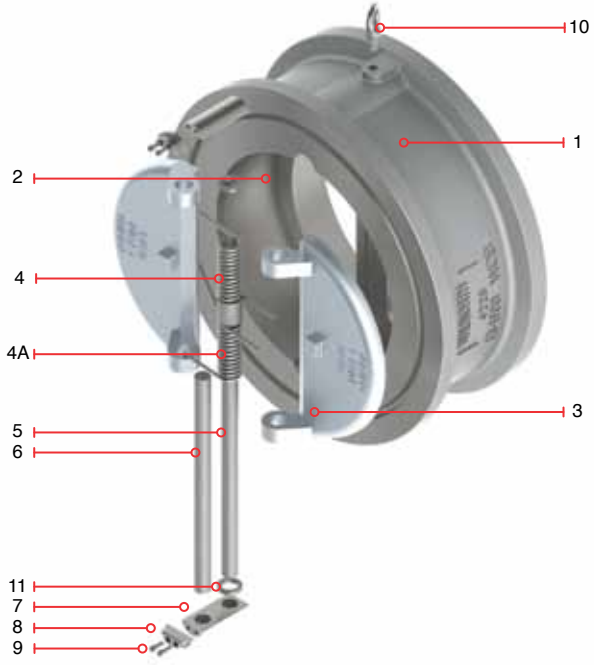
Remark: 1. Select different materials for different working temperature and media.



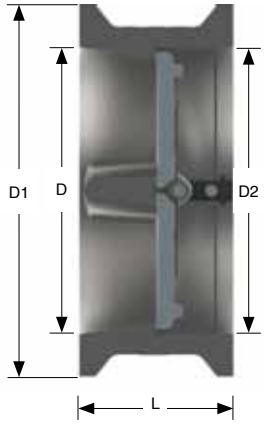
Material List For Main Parts (Double Spring)

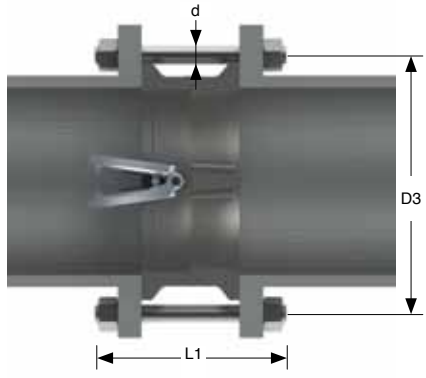
No.	Part Name	ASTM
		Carbon Steel
1	Body	A216 WCB
2	Seat Seal	A216 WCB + SS410 Overlay
3	Disc	A351 CF8
4	Spring	Inconel X-750
4A	Spring	Inconel X-750
5	Shaft	A276 Gr. 410
6	Stop Pin	A276 Gr. 410
7	Shaft Support	A276 Gr. 410
8	Retainer	A276 Gr. 410
9	Bolting	Commercial Steel
10	Lifting Lug	Commercial Steel
11	Bearing	A276 Gr. 410

Remark: 1. Select different materials for different working temperature and media.



WAFER DUO CHECK VALVE
CLASS 1500





Dimensions and Weights

Pressure / Flange standard	Nominal pipe size		Dimension				Weight (Kg)	Pipe Flange					
	NPS	CN	L	D1	D2	D		D3	Bolt No.	Stud Diameter (d)		Stud Length (L1)	
										in	mm	RF	RJ
Class 1500 PN26,0/ ASME B16.5	2	50	70	140	58	51	8	165	8	1	M24	225	230
	2 1/2	65	83	162	73	65	11	190.5	8	1 1/8	M27	250	255
	3	80	83	172	90	80	19	203	8	1 1/4	M30	270	275
	4	100	102	207	108	102	26	241.5	8	1 1/2	M33	310	315
	5	125	110	252	136	127	51	292	8	1 3/8	M39	370	375
	6	150	159	280	162	150	68	317.5	12	1 3/8	M36	430	440
	8	200	206	350	212	200	130	393.5	12	1 5/8	M42	510	520
	10	250	248	433	266	254	210	482.5	12	1 7/8	M48	600	610
	12	300	305	518	312	305	384	517.5	16	2	M52	695	715
	14	350	356	576	355	337	550	635	16	2 1/4	M56	775	800
	16	400	384	639	400	387	635	705	16	2 1/2	M64	950	880

WAFER DUO CHECK VALVE
CLASS 2500

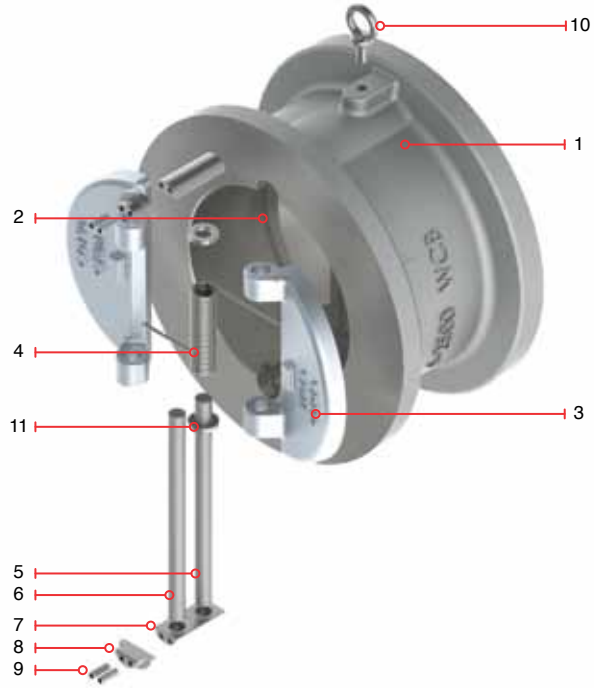
Design Features

- Design in accordance with API 594
- End to end dimension in accordance to API 594
- Flange ends in accordance to ASME B16.5, ASME B16.47
- Inspection and Test according to API 598
- NACE MR-0175 Service
- Lifting Lug for 8" and up
- Single Spring for 2" to 6"
- Double Spring for 8" and up

Material List for Main Parts (Single Spring)

No.	Part Name	ASTM
		Carbon Steel
1	Body	A216 WCB
2	Seat Seal	A216 WCB + SS410 Overlay
3	Disc	A351 CF8
4	Spring	Inconel X-750
5	Shaft	A276 Gr. 410
6	Stop Pin	A276 Gr. 410
7	Shaft Support	A276 Gr. 410
8	Retainer	A276 Gr. 410
9	Bolting	Commercial Steel
10	Lifting Lug	Commercial Steel
11	Bearing	A276 Gr. 410

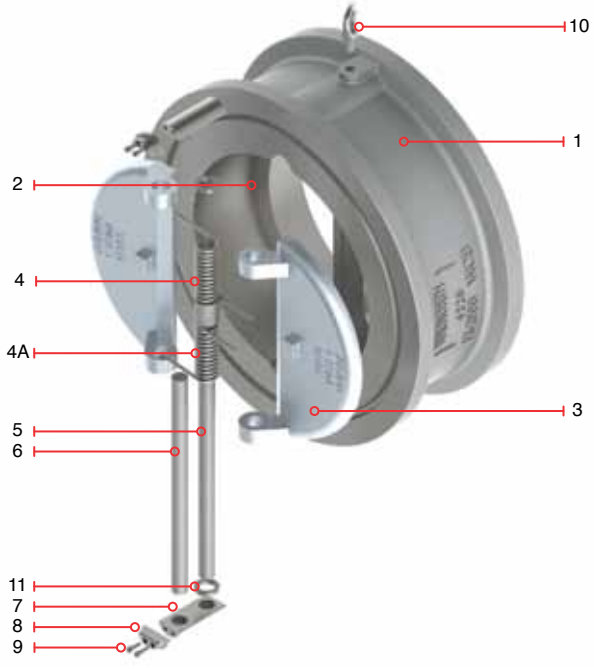
Remark: 1. Select different materials for different working temperature and media.



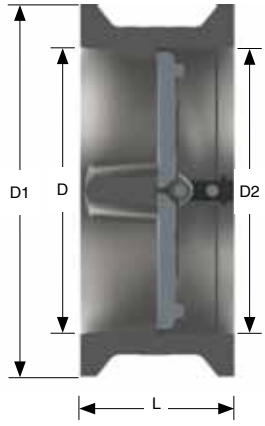
Material List For Main Parts (Double Spring)

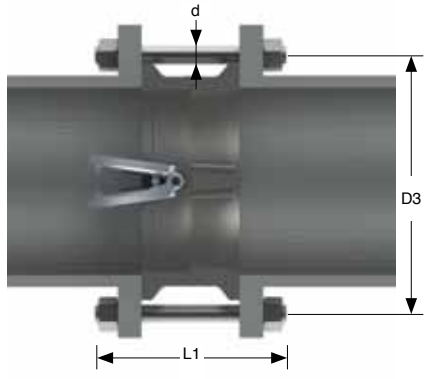
No.	Part Name	ASTM
		Carbon Steel
1	Body	A216 WCB
2	Seat Seal	A216 WCB + SS410 Overlay
3	Disc	A351 CF8
4	Spring	Inconel X-750
4A	Spring	Inconel X-750
5	Shaft	A276 Gr. 410
6	Stop Pin	A276 Gr. 410
7	Shaft Support	A276 Gr. 410
8	Retainer	A276 Gr. 410
9	Bolting	Commercial Steel
10	Lifting Lug	Commercial Steel
11	Bearing	A276 Gr. 410

Remark: 1. Select different materials for different working temperature and media.



WAFER DUO CHECK VALVE
CLASS 2500





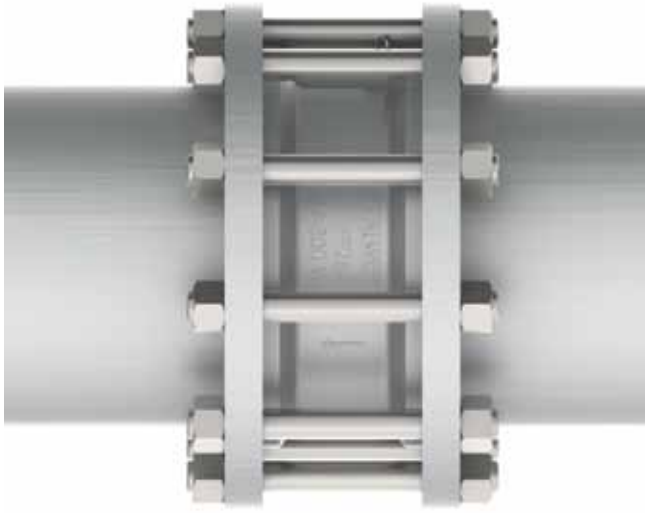
Dimensions and Weights

Pressure / Flange standard	Nominal pipe size		Dimension				Weight (Kg)	Pipe Flange					
	NPS	CN	L	D1	D2	D		D3	Bolt No.	Stud Diameter (d)		Stud Length (L1)	
										in	mm	RF	RJ
Class 2500 PN42,0/ ASME B16.5	2	50	70	143	48	42	10	171.4	8	1	M27	260	260
	2 1/2	65	83	166	58	52	18	196.8	8	1 1/8	M30	290	300
	3	80	86	194	68	62	26	228.6	8	1 1/4	M33	315	325
	4	100	105	232	94	88	40	273	8	1 1/2	M39x3	370	375
	5	125	110	277	106	100	59	323.8	8	1 3/4	M45x3	420	430
	6	150	159	315	162	150	90	368.3	8	2	M52x3	515	525
	8	200	206	385	186	180	150	438.2	12	2	M52x3	600	615
	10	250	254	474	232	225	240	593.8	12	2 1/2	M64x3	760	780
	12	300	305	547	272	266	440	619.1	12	2 3/4	M70x3	860	880

TECHNICAL INFORMATION

Easy Installation

The DUO CHECK valve end to end dimensions allow an easy installation on standard flanges. Only one set of proper length bolts is needed to cover the space of the DUO CHECK valve. Since the valve is more rigid than an equivalent length of heavy wall pipe, supports or special expansion joints are not required for installation.



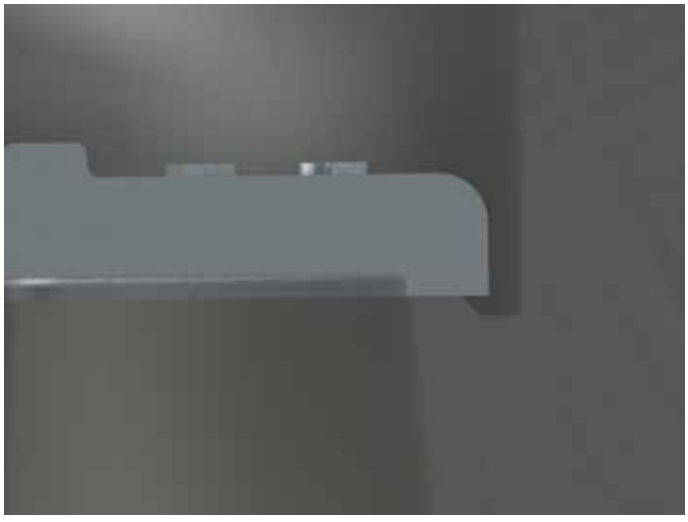
Simplified Pipe Network

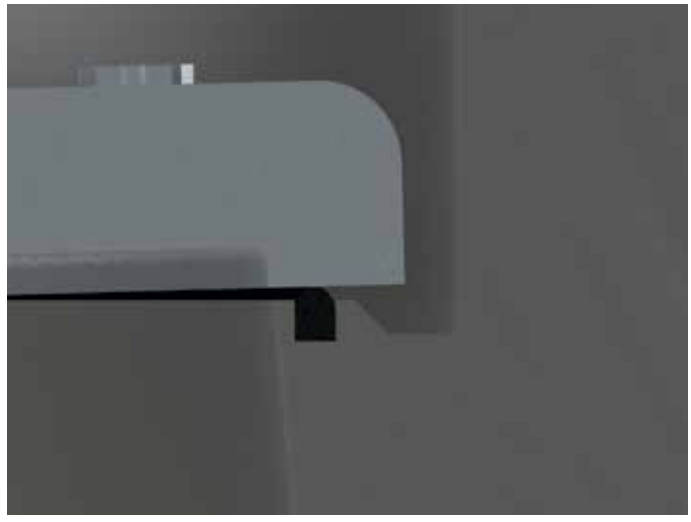
DUO CHECK lightweight plates work in almost any position because of the spring action, allowing a greater versatility and simple installation of the pipe. In some sizes, installation can be done even in vertical lines with flow down.

TECHNICAL INFORMATION

Effective Sealing Action

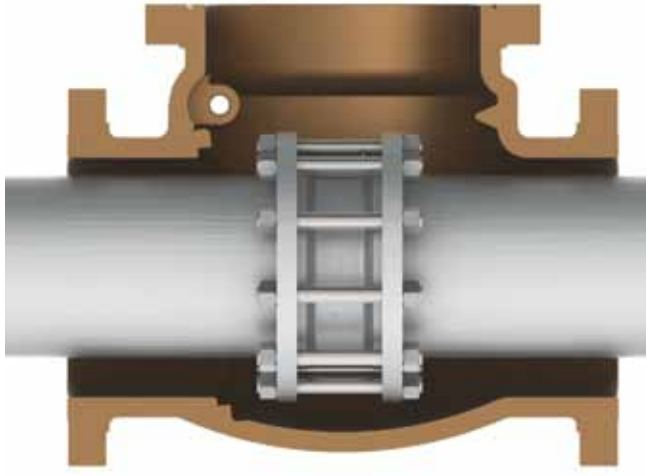
The DUO CHECK valve's resilient seal withstands high pressures without leak, distortion or damage. As shown in the figure below, the sealing element is vulcanized into a slot on the body. This sealing element forms an "O" ring which is distorted due to the pressure until metal to metal contact between the plate and the seal of the body occurs as shown in the figure bellow. The seal is fully guarded to prevent damage under the pressure effect.





No Costly Foundations Required

Since the DUO CHECK valve is placed between the pipe flanges, it does not need its own flanges; hence, the secret of his low weight. For example, a steel valve ANSI 300 series 152.4 mm., (6"), weight is only 18.5 kg (41 lbs.) and can be installed without special tools or equipment. It does not need expensive brackets or bases because the average weight of a DUO CHECK valve is less than 10% of a conventional flanged check valve.



TECHNICAL INFORMATION

Easy Maintenance

The DUO CHECK valve consists of seven assembled parts, without fasteners or joints of any kind. All of these parts are completely floating, without load on the pin, which is also fully floating. The new design eliminates blast-holes and allows total hermeticity; because the pins are located in a support inside the valve, no drilling to the body is necessary.

The DUO CHECK valve is much lighter and stronger than conventional valves.

When the opening is split in two, the thickness of the plates is reduced. The DUO CHECK requires only one-eighth the weight required of a conventional valve to bear an equivalent pressure.

The narrow compact body itself is stronger and more rigid than a short length of heavy wall pipe.

A simple heat-resistant stainless steel spring creates a positive seal, and rapid closure is made possible by lightweight plates. The spring is specially designed for each valve and the low effort that is submitted, give high resistance to fatigue. The fast action of the spring closes the valve before return flow can occur, thereby reducing the possibility of damage to water hammer.

Coefficients

Nominal pipe size		Liquid resistance coefficient of the valves fully open	Water flowing coefficient of the valves fully open under nominal temperature			Flowing direction	
						Vertical ↑	Horizontal →
DN	NPS		Kv(m^3/h)	Cv (U.S)	Cv (U.K)	Opening pressure approximation (Kpa)	
50	2	2.6	63	74	62	2	1
65	2 1/2	2.4	109	128	107	2	1
80	3	2.3	172	201	169	2	1
100	4	2	289	338	283	2	1
125	5	1.8	476	557	466	2	1
150	6	1.5	750	878	735	2	1
200	8	1.3	1432	1675	1403	2	1
250	10	1.2	2330	2726	2283	2	1
300	12	1	3676	4301	3602	2	1
350	14	0.9	5274	6171	5169	2	1
400	16	0.8	7306	8548	7160	3	1
450	18	0.8	9246	10818	9061	3	1
500	20	0.8	11415	13356	11187	3	1
600	24	0.7	17573	20560	17222	3	1
700	28	0.7	23919	27985	23441	4	1
750	30	0.7	27458	32126	26909	4	1
800	32	0.7	31241	36552	30616	4	1
900	36	0.7	39539	46261	37848	4	1
1000	40	0.7	48814	57112	47838	4	1
1050	42	0.7	53817	62966	52741	4	1
1100	44	0.7	—	—	—	4	1
1200	48	0.7	70292	82242	68886	4	1
1350	54	0.7	—	—	—	4	1
1400	56	0.7	—	—	—	4	1
1500	60	0.7	—	—	—	4	1

TECHNICAL INFORMATION

Production Line WAFER DUO CHECK valve

Size		Pressure (CLASS)					
DN	NPS	150	300	600	900	1500	2500
50	2	•	•	•	•	•	•
65	2 1/2	•	•	•	•	•	•
80	3	•	•	•	•	•	•
100	4	•	•	•	•	•	•
125	5	•	•	•	•	•	•
150	6	•	•	•	•	•	•
200	8	•	•	•	•	•	•
250	10	•	•	•	•	•	•
300	12	•	•	•	•	•	•
350	14	•	•	•	•	•	
400	16	•	•	•	•	•	
450	18	•	•	•	•		
500	20	•	•	•	•		
600	24	•	•	•	•		
650	26	•	•	•			
700	28	•	•	•			
750	30	•	•	•			
800	32	•	•	•			
900	36	•	•	•			
1000	40	•	•				
1050	42	•	•				
1100	44	•	•				
1200	48	•	•				
1350	54	•	•				
1400	56	•					
1500	60	•	•				

PRESSURE-TEMPERATURE RATINGS

CAST STEEL ASTM A 216 GR WCB

°F Temperature °C		Maximum allowable non-shock working pressure in PSIG by class					
		150	300	600	900	1500	2500
-20 to 100	-29 to 38	285	740	1480	2220	3705	6170
200	93	260	680	1360	2035	3395	5655
300	149	230	655	1310	1965	3270	5450
400	204	200	635	1265	1900	3170	5280
500	260	170	605	1205	1810	3015	5025
600	316	140	570	1135	1705	2840	4730
650	343	125	550	1100	1650	2745	4575
700	371	110	530	1060	1590	2665	4425
750	399	98	505	1015	1520	2535	4230
800	427	80	410	825	1235	2055	3430
850	454	65	320	640	955	1595	2655
900	482	50	230	460	690	1150	1915
950	510	35	135	275	410	685	1145
1000	538	20	85	170	255	430	715

Note: Upon prolonged exposure to temperatures above 800°F, the carbide phase of steel may be converted to graphite. Permissible, but not recommended for prolonged use above 800°F.

PRESSURE-TEMPERATURE RATINGS

CAST STEEL ASTM A 217 GR WC6

°F Temperature	°C	Maximum allowable non-shock working pressure in PSIG by class					
		150	300	600	900	1500	2500
-20 to 100	-29 to 38	290	750	2600	2250	3750	6250
200	93	260	750	1500	2250	3750	6250
300	149	230	720	1445	2165	3610	6015
400	204	200	695	1385	2080	3465	5775
500	260	170	665	1330	1995	3325	5540
600	316	140	605	1210	1815	3025	5040
650	343	125	590	1175	1765	2940	4905
700	371	110	570	1135	1705	2840	4730
750	399	95	530	1065	1595	2660	4430
800	427	80	510	1015	1525	2540	4230
850	454	65	485	975	1460	2435	4060
900	482	50	450	900	1350	2245	3745
950	510	35	320	640	955	1595	2655
1,000	538	20	215	430	650	1080	1800
1,050	566	20(a)	145	290	430	720	1200
1,100	593	20(a)	95	190	290	480	800
1,150	621	20(a)	65	130	95	325	545
1,200	649	15(a)	40	80	125	205	345

Notes:

- Use normalized and tempered material only.
- Not to be used over 1,100°F.
- The deliberate addition of any element not listed in ASTM A 217, Table 1 is prohibited, except that Ca and Mg may be added for deoxidation.

(a) Flanged-end valve ratings terminate at 1,000°F (538°C).

CAST STEEL ASTM A 217 GR WC9

°F Temperature	°C	Maximum allowable non-shock working pressure in PSIG by class					
		150	300	600	900	1500	2500
-20 to 100	-29 to 38	290	750	1500	2250	3750	6250
200	93	260	750	1500	2250	3750	6250
300	149	230	730	1445	2165	3640	6070
400	204	200	705	1410	2080	3530	5880
500	260	170	665	1330	1995	3325	5540
600	316	140	605	1210	1815	3025	5040
650	343	125	590	1175	1765	2940	4905
700	371	110	570	1135	1705	2840	4730
750	399	95	530	1065	1595	2660	4430
800	427	80	510	1015	1525	2540	4230
850	454	65	485	975	1460	2435	4060
900	482	50	450	900	1350	2245	3745
950	510	35	385	755	1160	1930	3220
1,000	538	20	265	535	800	1335	2230
1,050	566	20(a)	175	350	525	875	1455
1,100	593	20(a)	110	220	330	550	915
1,150	621	20(a)	70	135	205	345	570
1,200	649	15(a)	40	80	125	205	345

Notes:

- Use normalized and tempered material only.
- Not to be used over 1,100°F.
- The deliberate addition of any element not listed in ASTM A 217, Table 1 is prohibited, except that Ca and Mg may be added for deoxidation.

(a) Flanged-end valve ratings terminate at 1,000°F.

CAST STEEL ASTM A 352 GR LCB

°F Temperature	°C	Maximum allowable non-shock working pressure in PSIG by class					
		150	300	600	900	1500	2500
-20 to 100	-29 to 38	265	695	1395	2090	3480	5805
200	93	255	660	1320	1980	3300	5505
300	149	230	640	1275	1915	3190	5315
400	204	200	615	1230	1845	3075	5125
500	260	170	585	1175	1760	2930	4885
600	316	140	550	1105	1655	2755	4595
650	343	125	535	1065	1600	2665	4440
700	371	110	510	1025	1535	2560	4270
750	399	95	475	955	1430	2385	3970
800	427	80	390	780	1175	1955	3255
850	454	65	300	595	895	1490	2485
900	482	50	200	405	605	1010	1685
950	510	35	135	275	410	685	1145
1000	538	20	85	170	255	430	715

Notes:

Not to be used over 650°F.

PRESSURE-TEMPERATURE RATINGS

CAST STEEL ASTM A 351 GR CF8

°F Temperature	°C	Maximum allowable non-shock working pressure in PSIG by class					
		150	300	600	900	1500	2500
-20 to 100	-29 to 38	275	720	1440	2160	3600	6000
200	93	230	600	1200	1800	3000	5000
300	149	205	540	1075	1615	2690	4480
400	204	190	495	995	1490	2485	4140
500	260	170	465	930	1395	2330	3880
600	316	140	440	885	1325	2210	3680
650	343	125	430	865	1295	2160	3600
700	371	110	420	845	1265	2110	3520
750	399	95	415	825	1240	2065	3440
800	427	80	405	710	1215	2030	3380
850	454	65	395	790	1190	1980	3300
900	482	50	390	780	1165	1945	3240
950	510	35	380	765	1145	1910	3180
1000	538	20	355	710	1065	1770	2950
1050	566	20(a)	325	650	975	1630	2715
1100	593	20(a)	255	515	770	1285	2145
1150	621	20(a)	205	410	615	1030	1715
1200	649	20(a)	165	330	495	825	1370
1250	677	20(a)	135	265	400	670	1115
1300	704	20(a)	115	225	340	565	945
1350	732	20(a)	95	185	280	465	770
1400	760	20(a)	75	150	225	380	630
1450	788	20(a)	60	115	175	290	485
1500	816	15(a)	40	85	125	205	345

Notes:
At temperatures over 1,000°F, use only when the carbon content is 0.04% or higher.
(a) Flanged ends ratings terminate at 1000°F (538°C).

CAST STEEL ASTM A 351 GR CF8M

°F Temperature	°C	Maximum allowable non-shock working pressure in PSIG by class					
		150	300	600	900	1500	2500
-20 to 100	-29 to 38	275	720	1440	2160	3600	6000
200	93	235	620	1240	1860	3095	5160
300	149	215	560	1120	1680	2795	4660
400	204	195	515	1025	1540	2570	4280
500	260	170	480	955	1435	2390	3980
600	316	140	450	900	1355	2255	3760
650	343	125	440	885	1325	2210	3680
700	371	110	435	870	1305	2170	3620
750	399	95	425	855	1280	2135	3560
800	427	80	420	745	1265	2110	3520
850	454	65	420	735	1255	2090	3480
900	482	50	415	730	1245	2075	3460
950	510	35	385	775	1160	1930	3220
1000	538	20	365	725	1090	1820	3030
1050	566	20	360	720	1080	1800	3000
1100	593	20(a)	305	610	915	1525	2545
1150	621	20(a)	235	475	710	1185	1970
1200	649	20(a)	185	370	555	925	1545
1250	677	20(a)	145	295	440	735	1230
1300	704	20(a)	115	235	350	585	970
1350	732	20(a)	95	190	290	480	800
1400	760	20(a)	75	150	225	380	630
1450	788	20(a)	60	115	175	290	475
1500	816	15(a)	40	85	125	205	345

Notes:
At temperatures over 1,000°F, use only when the carbon content is 0.04% or higher.
(a) Flanged ends ratings terminate at 1000°F (538°C).

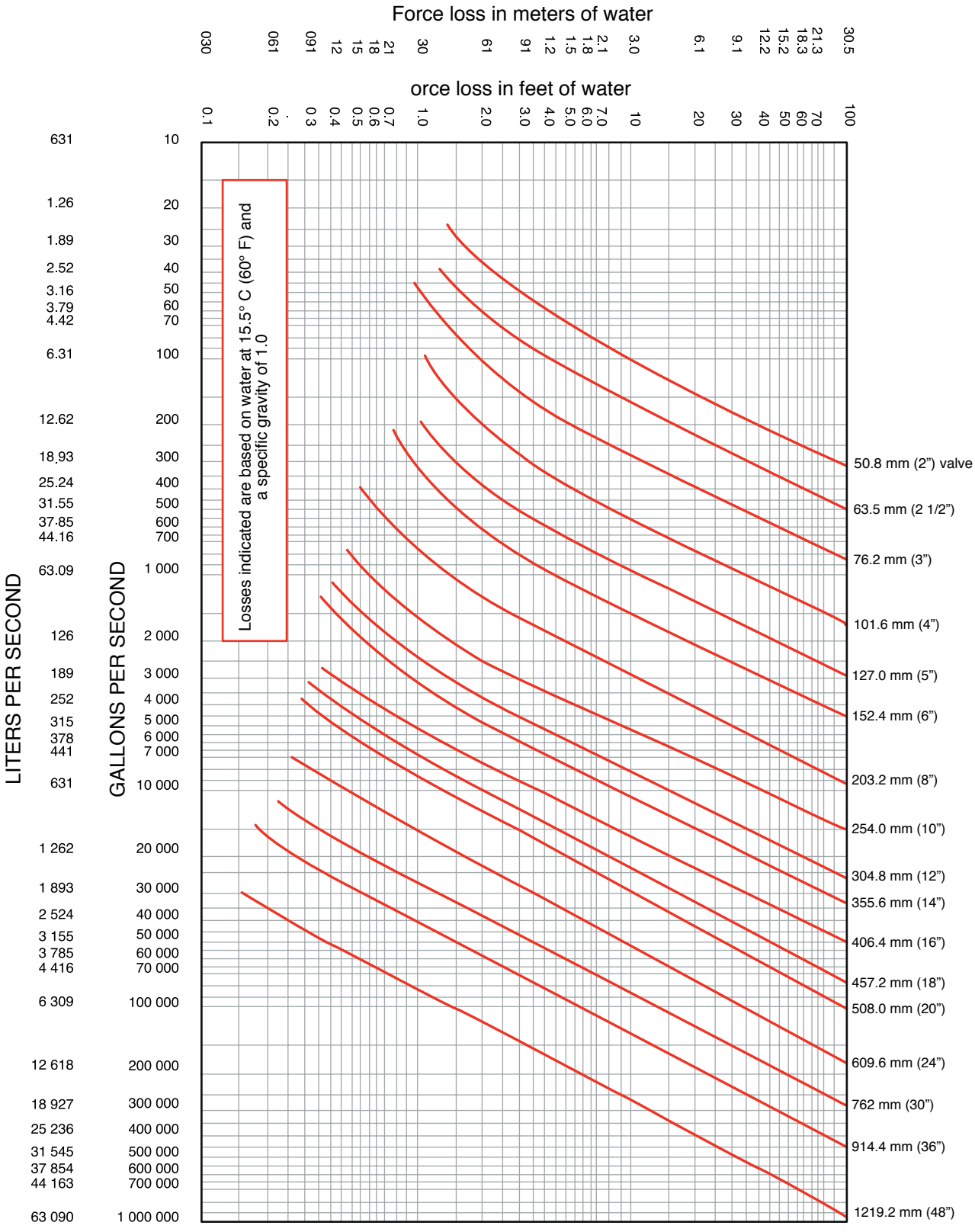
WAFER DUO CHECK VALVE

PRESSURE DROP OR FORCE LOSS THROUGH THE VALVE AT A FLOW RATE OF 3.048 M/SEC (10 FT/SEC) OF WATER AT 155°C (60°F)

Tamaño de la válvula		Gasto		Pérdida de presión		Pérdida de carga		Equivalencia tubería C-100 P	
mm	pulg.	lt/seg	GPM	Kg/cm²	lb/pulg.²	mts	pies	mts	pies
50.8	2	6.50	103	0.320	4.55	3.2	10.5	9.4	31
65	2 1/2	9.40	149	0.246	3.76	2.7	8.7	10.1	33
75	3	14.51	230	0.213	3.03	2.1	7.0	10.7	35
100	4	25.49	404	0.165	2.34	1.6	5.4	11.3	37
125	5	39.31	623	0.134	1.90	1.3	4.4	11.3	37
150	6	56.78	900	0.110	1.56	1.1	3.6	11.6	38
200	8	97.79	1550	0.085	1.21	0.85	2.8	12.5	41
250	10	160.20	2540	0.067	0.95	0.67	2.2	12.8	42
300	12	220.80	3500	0.058	0.825	0.58	1.9	13.7	45
350	14	270.00	4280	0.052	0.740	0.52	1.7	14.3	47
400	16	359.60	5700	0.043	0.611	0.43	1.4	14.3	47
450	18	499.70	7920	0.040	0.569	0.40	1.3	14.6	48
500	20	567.80	9000	0.037	0.526	0.37	1.2	15.2	50
600	24	946.20	15000	0.030	0.424	0.30	0.98	15.8	52
900	36	2000.00	31700	0.020	0.284	0.20	0.65	16.5	54
1200	48	3558.00	56400	0.015	0.216	0.15	0.50	18.3	60

* This table is valid for API and ANSI valves.

WAFER DUO CHECK VALVE
DROP PRESSURE OR FORCE LOSS GRAPHIC



* This table is valid for API and ANSI valves.

DESIGN BASIS

All of WALWORTH's Valve Designs, when applicable, follow one or more of the following standards.

API American Petroleum Institute:
API 594 Check Valves: Flanged, Lug, Wafer and Butt-welding.
API 598 Valve Inspection and Testing.

ASME/ANSI American National Standard Institute:
B16.34 Pressure-Temperature Range.
B16.10 Length of Ferrous Flanged and Welding end valve.
B16.5 Steel pipe Flanges and Flanged Fittings.
B16.47 Large Diameter Steel Flanges.

ASTM American Society for Testing and Materials:
A-216 Standard specification for steel casting, carbon, suitable for fusion welding, for high temperature service.
A-351 Standard specification for casting, austenitic, austenitic-ferritic (duplex), for pressure containing parts.
A-352 Standard specification for steel casting, ferritic and martensitic, for pressure-containing parts, suitable for low temperature service.

NACE National Association of Corrosion Engineers:
MR 0175 Standard material requirements sulfide stress cracking resistant metallic materials for oilfield equipment.

MSS Manufactures Standardization Society of the Valve and Fittings:
SP-25 Standard marking system for valves, fittings, flanges and unions.
SP-44 Steel pipeline flanges.

HOW TO ORDER

The figure of Example 24" H6SPF describes a valve 24" nominal diameter, style H (standard design), ANSI class 600#, with carbon steel body (WCB), metal to metal seal, serrated face, W1 describes discs made of SS Gr. CF8, shaft SS Gr. 410 and stop pin SS Gr. 410.

Base Figure

Model		Class		Body		Body seat		Ends	
D	Double Flange	1	150	B	Al-Bronze	E	EPDM	F	Serrated Face
				C	CF8M/SS316				
H	Wafer Standard Design	3	300	D	CF8/SS304	M	Buna-N	R	Ring Type Joint
				G	LCB				
L	Lug	6	600	I	CF3/SS304L	P	Metal-Metal Seal	P	Plain Face (non serrated)
				J	LC3				
		9	900	K	CF3M/SS316L	V	Viton		
				M	Monel				
		5	1500	N	CD3MN	N	Neoprene		
				S	WCB				
		2	2500						

THE WALWORTH COMPANY GENERAL TERMS AND CONDITIONS

ACCEPTANCE: All quotations are for acceptance within 30 days from date of quotation unless extended in writing. In the event a purchase order is placed after this period of time, the WALWORTH Company reserves the right to requote base prices of all valves offered. All orders and contracts are subject to credit approval and acceptance by the WALWORTH Company.

FREIGHT: When prices are f.o.b. point of shipment - no freight allowance - we will attempt to route shipments in the method which will result in the lowest cost unless otherwise instructed. All shipments will be freight charges collect except when stipulated on the purchase order, in which case you will be invoiced for all transportation charges. Delivery of material to a common carrier shall be considered to be delivery to Buyer and shall be at Buyer's risk thereafter. Claims of loss of or damage to material in transit shall be filed by the Buyer directly with the carrier.

PRICES: There will be added to all prices quoted sales, use, occupation or any other excise or similar tax which Seller may be required to pay or collect on or in connection with the sale. Seller shall be established by Federal, State or other government regulation with respect to the product(s) topped by the order which shall be lower than the price(s) specified in the order.

ESCALATION TERMS: Prices shown in this price schedule reflect the costs in effect at the time of publication. These prices will remain firm on all products with a quoted delivery of twenty–six (26) weeks or less. On products which have a scheduled delivery of more than twenty-six (26) weeks, the goods will be invoiced based on the applicable price sheet in effect at the time of shipment. In no event will the invoiced price be less than the price originally quoted.

PURCHASED COMPONENTS: (i.e. motors, gearing, etc.) Prices are quoted on the supplier's price in effect at the time of quotation. Actual invoice price will be adjusted in accordance with the supplier's escalation policy.

DIFFERED SHIPMENTS: If for any reason the customer desires to delay shipments more than 30 days after manufacturing is complete, or to place a on hold or stop to the order during the manufacturing cycle, The WALWORTH Company reserves the right to consider the order cancelled and to invoke cancellation charges per the schedule bellow.

CANCELLATION: After order acceptance by WALWORTH, items or completed orders may be cancelled and Buyer will be charged for work performed, based on the following schedule:

- Five percent (5%) of prices of stock items.
- Ten percent (10%) of price of stock items ordered in quantities which exceed normal inventory levels.
- Five percent (5%) of prices prior to drawing submittal on made-to-order items.
- 15% after drawing approval, but prior to the start of castings.
- 30% to 50% during casting cycle, depending on the state of completion.
- 55% to 75% during machining and assembly operations, depending on the state of completion.
-100% after final assembly and test.

REMITTANCES: Remittances must be made to the address indicated on the invoice.

CREDIT TERMS: As quoted. Invoices on balances overdue will be subject to a service charge of 1 1/2 % per month on such indebtedness.

DELIVERIES: Shipments and deliveries shall at all times be subject to the approval of Seller's Credit Department. If the Buyer shall fail to make any payments according to the terms of the contract, Seller may, in addition to and not in limitation of its other rights and remedies, at its option, cancel all or any part of Buyer's incomplete contracts with Seller, or may defer shipments of deliveries under Buyer's contracts with Seller except upon receipt of satisfactory security or for cash shipment.

All schedule of shipments are estimated as closely as possible and Seller will use its best efforts to ship within the time scheduled, but does not guarantee to do so. Schedules commence with the date Seller receives authorization to proceed with the order, subject to the provisions of the next sentence. The order will not be released for manufacture until complete specifications and approved drawings (if drawing approval is required) are received at the plant of manufacturer and the estimated schedule of shipment will commence with the date of such receipt.

Seller shall not be liable for any direct, indirect or consequential damage or loss caused by any delay in delivery, regardless of the cause of delay.

Without limiting the generality of the foregoing, Seller assumes no responsibility for delays in delivery resulting from fire, flood, accidents, riots, strikes, transportation delays, labor or material shortages, existing or future laws, acts of any governmental authority, or any other cause beyond Seller's control. Items offered from stock are subject to prior sale.

INSPECTION: Final inspection and acceptance of products must be made at the plant of manufacture, unless otherwise provided in the order and/ or in agreed upon specifications. Prices do not include charges for special tests or inspections performed at the request of the Buyer, unless called for in the order and/or in agreed upon specifications.

RETURNS: Permission in writing and return tagging instructions must be obtained from Seller before any goods returned for credit or adjustment will be accepted. Where returned goods are accepted, a minimum charge of 25% of the invoice price will be made, plus freight from both directions and costs of reconditioning the material for resale as new.

WARRANTY: Seller will replace without charge or refund the purchase price of products manufactured by Seller which prove to be defective in the material or workmanship, provided in each case that the product is properly installed and is used in the service for which Seller recommends it and that a written claim, specifying the alleged defect, is presented to Seller. Seller shall in no event be responsible for (a) claims for labor, expenses or other damages occasioned by defective products or (b) for consequences or secondary damages. THE WARRANTY STATED IN THIS PARAGRAPH IS IN LIEU OF ALL OTHER WARRANTIES, EITHER EXPRESSED OR IMPLIED. WITH RESPECT TO WARRANTIES, THIS PARAGRAPH STATES BUYER'S EXCLUSIVE REMEDY AND SELLER'S EXCLUSIVE LIABILITY.

DESIGN, ETC: Seller reserves the right to change design, materials or specifications without notice. There will be a charge for modifying an order after it has been entered when such change or modification results in additional engineering or clerical work for either The WALWORTH Company or our suppliers.

MINIMUM CHARGE: Orders totaling less than $100.00 net will be billed at a minimum charge of $100.00. Repair parts will be billed at a minimum charge of $50.00.

NOTE: We reserve the right to correct obvious clerical errors in quotations, invoices, and other contracts.

WALWORTH®

Since 1842

Visit our website for more detailed information

www.walworthvalves.com

MEXICO

Industrial de Válvulas, S.A. de C.V.
Av. de la Industria Lote 16
Fracc. Industrial El Trébol, C.P. 54600
Tepotzotlán, Estado de México

Phone: (52 55) 5899 1700
Fax: (52 55) 5876 0156

e-mail: info@walworth.com.mx

USA

TWC The Valve Company
Authorized Distributor
13641 Dublin Court, Stafford, Texas 77477

Phone: (281) 566 1200
Toll Free: (1 800) 697 1842
Fax: (281) 566 1299

e-mail: info@twcousa.com