

## SERIES K815, K830 AND K860 CRYOGENIC JAMESBURY™ WAFER-SPHERE™ BUTTERFLY VALVES



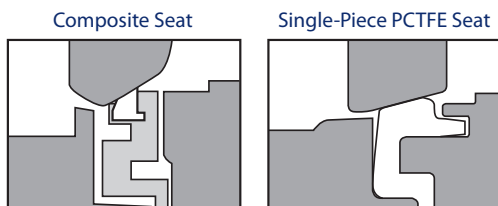
Series K815 ASME Class 150, K830 ASME Class 300, and K860 ASME Class 600 *Wafer-Sphere* high-performance butterfly valves are designed to meet the severe conditions of cryogenic services such as air separation and LNG. They have been proven to provide superior performance and reliability in a wide range of applications, and offer a low cost of ownership. Cryogenic *Wafer-Sphere* valves are suitable for temperatures as low as -320°F (-196°C). Also available are valves prepared for oxygen service. The following standard sizes are available:

K815W (Class 150 Wafer-Body Design)	3"–30" (DN 80–750)
K815L (Class 150 Single-Flange Design)	3"–30" (DN 80–750)
K818W (CE Marked Class 150 Wafer-Body Design)	3"–30" (DN 80–750)
K818L (CE Marked Class 150 Single Flange Design)	3"–30" (DN 80–750)
K830W (Class 300 Wafer-Body Design)	3"–24" (DN 80–600)
K830L (Class 300 Single-Flange Design)	3"–24" (DN 80–600)
K838W (CE Marked Class 300 Wafer-Body Design)	3"–24" (DN 80–600)
K838L (CE Marked Class 300 Single Flange Design)	3"–24" (DN 80–600)
K860W (Class 600 Wafer-Body Design)	3"–12" (DN 80–300)
K860L (Class 600 Single Flange Design)	3"–12" (DN 80–300)
K868W (CE Marked Class 600 Wafer-Body Design)	3"–12" (DN 80–300)
K868L (CE Marked Class 600 Single Flange Design)	3"–12" (DN 80–300)

### FEATURES

#### Field-proven Flexible-Lip Seat Design

- Tight shut-off in either direction. Contact Neles for shut-off performance details.
- Composite seat in 3" – 12" (DN 80 – 300), K815, K830 and all K860 valves with metal carrier and PTFE or PCTFE insert, assures tight sealing over a wide range of pressures and temperatures.



- Single-Piece PCTFE seat in 14" (DN 350) and larger K815 and K830 valves is designed with a unique flexible lip for positive, long-lasting shutoff.

#### Variety of Extension Lengths Available

- Bonnet extensions available in varied lengths to suit specific service requirements.

#### Compact Body Design

- Allows rapid cooling to cryogenic temperatures.

#### Eccentric Disc and Offset Shaft

- No seat/disc contact in the open or intermediate position.
- Eliminates wear points at top and bottom of seats for higher cycle life.
- Reduces torque requirements, allowing for smaller operators.

#### Easy Maintenance

- Simply remove body insert and replace seat – disassembly of disc and shaft is not required.

#### Single Source Responsibility

- Valves, actuators, and accessories from one source with accessories fully mounted.
- Available with electric, manual gear, and pneumatic double-acting or spring-return actuators and a variety of accessories including limit switches and solenoids.

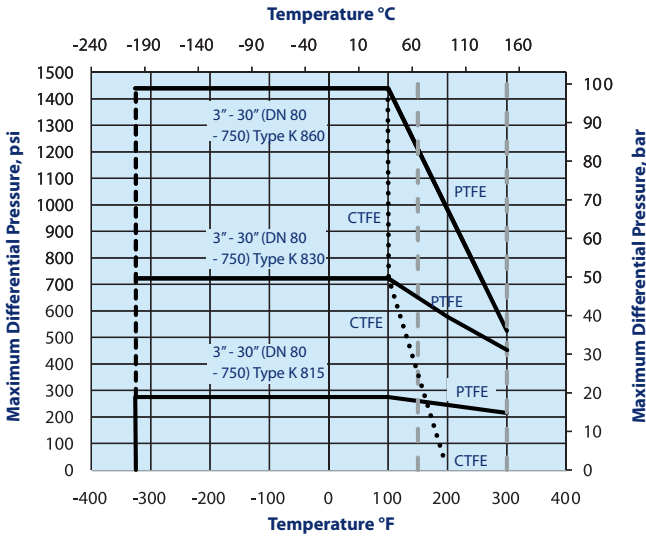
#### CE Marked Versions Available

- CE marked and documented valves that conform to the European Pressure Equipment Directive (PED) 97/23/EC are available in ASME Class 150/300/600. Operating torques, construction options and valve dimensions are exactly the same as the standard ASME 150/300/600 offering. The applicable sizes for CE marked valves are shown in table to left.

**SPECIFICATIONS**

**Seat Ratings**

Seat ratings are based on the differential pressure with the disc in the fully closed position. Up to +100°F (38°C) the ratings for the seats are the same as the body ratings. Above 100°F, the seat ratings drop lower than the body ratings and are limited by temperature. (See graph below). Consult the factory if applications exceed these temperatures.



**Flow Data**

The table below provides information on flow capacity for the *Wafer-Sphere* cryogenic valves covered in this bulletin. The  $C_v$  values represent the flow of water at 60°F through the valve in U.S. gallons per minute at a pressure drop of 1 psi. The metric equivalent,  $K_v$ , is the flow of water at 16°C through the valve in  $m^3/hr$  at a pressure drop of 1  $kg/cm^2$ . To convert  $C_v$  to  $K_v$ , multiply by 0.8569.

Valve Size		Series $C_v$		
Inches	DN	K815W and K815L	K830W and K830L	K860W and K860L
3	80	165	165	155
4	100	400	400	260
6	150	1050	1050	750
8	200	2200	1800	1350
10	250	3300	3150	2100
12	300	5100	4750	2900
14	350	5800	5200	—
16	400	8000	6900	—
18	450	10500	9300	—
20	500	14000	11300	—
24	600	21600	18500	—
30	750	34000	—	—

**Body Ratings**

These are maximum working-pressure ratings of the valve body only. The seat ratings shown in the table to the left determine the practical pressure limitations according to actual service conditions. Test pressures are for hydrostatic test with disc open.

Temperature	316 Stainless Steel Maximum Working Pressure, psi		
°F	K815	K830	K860
-320 to +100	275	720	1440
Test Pressure	425	1100	2200

Temperature	316 Stainless Steel Maximum Working Pressure, bar		
°C	K815	K830	K860
-198 to +38	19.0	49.6	99.3
Test Pressure	29	75	150

Ratings above correspond to those of ASME B16.34 for material grade of valve body.

**OTHER HIGH-PERFORMANCE BUTTERFLY VALVES**

Neles manufactures a variety of high-performance butterfly valves to cover a wide range of pressures, temperatures, and services. Standard *Wafer-Sphere* soft-seated butterfly valves are available in ASME Class 150, 300, and 600 designs to handle temperatures from -50°F to 500°F (-45.5°C to 260°C).

Refer to the following bulletins for complete details:

**Wafer-Sphere Polymer (soft) Seated Butterfly Valves**

- ASME Class 150 and 300
- ASME Class 600
- ASME Class (Process-Rated)
- Steam Service
- Chlorine Service
- Oxygen Service
- Vacuum Service
- Jacketed Valves

**Bulletin**

- W101-6
- W104-1
- W105-1
- W150-1
- W150-2
- W150-3
- W150-4
- W151-3

### BONNET EXTENSIONS

Cryogenic valves are made from standard stocked components with extension lengths available, in 2-inch increments, within the ranges shown in the dimensional tables on pages 4 – 13 (see dimensions K1 and K2). The K2 lengths require larger shafts as shown in the dimension tables. Other lengths are available on application.

Under the specified operating limits of the valve, all bonnet extensions are structurally capable of supporting the weight of the actuator in all possible installation orientations.

### OPERATING HANDLES AND ACTUATORS

As an option, handles are available for small-size cryogenic *Wafer-Sphere* high-performance butterfly valves. High line pressure may create high enough forces to pull

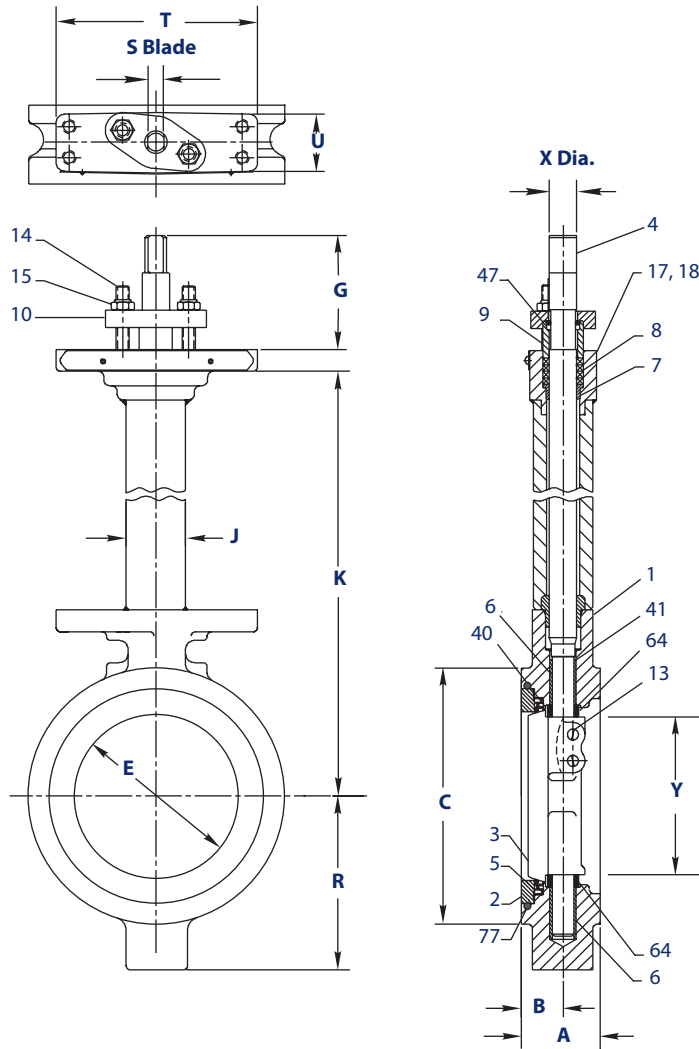
a manual handle out of an operator’s hand. Therefore, it is recommended that manual gear, pneumatic, or electric actuators be used for valves larger than tabulated below.

Operating Handles and Actuators										
Valve Size		Valve Type	Max. Diff Pressure		Extension Lengths	Handle Length		Handle Weight		Handle Code*
			psi	bar		inches	mm	lb	kg	
Inches	DN	Series K815								
3, 4	80, 100	K815	275	19.0	K1	22	559	15	6.8	WSH-23
6	150	K815	275	19.0						WSH-23
8	200	K815	100	6.9						WSH-24
3, 4	80, 100	K815	275	19.0	K2	22	559	15	6.8	WSH-23
6	150	K815	275	19.0						WSH-24
8	200	K815	100	6.9						WSH-25
Inches	DN	Series K830								
3, 4	80, 100	K830	300	20.7	K1	22	559	15	6.8	WSH-23
6	150	K830	300	20.7						WSH-24
8	200	K830	100	6.9						WSH-25
3	80	K830	300	20.7	K2	22	559	15	6.8	WSH-23
4	100	K830	300	20.7						WSH-24
6	150	K830	300	20.7						WSH-25

\* Refer to Jamesbury bulletin W101-6, page 5 for additional handle information.

**DIMENSIONS**

**3" – 12" (DN 80 – 300) Type K815W Wafer-Sphere Valves ASME Class 150 Wafer Design**



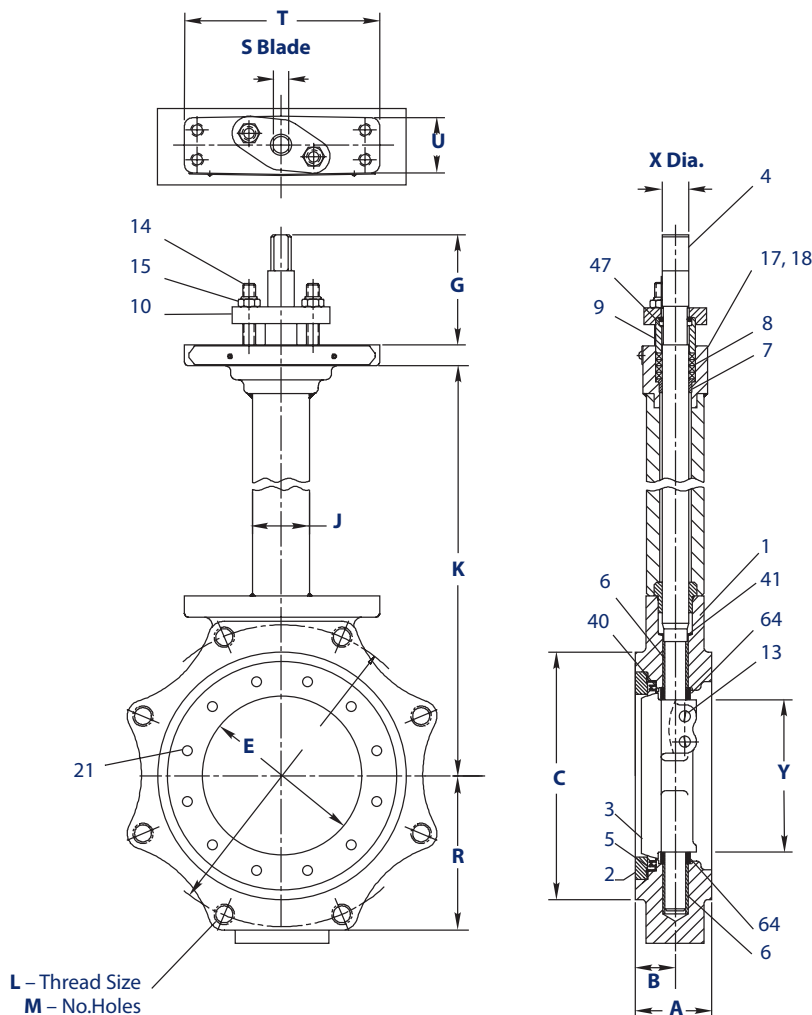
Valve Size Inches	Approximate Dimensions – inches																			
	A	B	C	E	G1 <sup>1</sup>	G2 <sup>2</sup>	J1 <sup>1</sup>	J2 <sup>2</sup>	K1 <sup>1</sup>	K2 <sup>2</sup>	R	S1 <sup>1</sup>	S2 <sup>2</sup>	T1 <sup>1</sup>	T2 <sup>2</sup>	U1 <sup>1</sup>	U2 <sup>2</sup>	X1 <sup>1</sup>	X2 <sup>2</sup>	Y <sup>3</sup>
3	1.94	1.06	5.19	2.88	3.25	3.25	1.66	1.66	8-26	28-36	4.44	0.63	0.63	6.25	6.25	2.00	2.00	0.88	0.88	2.91
4	2.13	1.19	6.19	3.75	3.25	3.25	1.66	1.66	10-26	28-36	4.94	0.63	0.63	6.25	6.25	2.00	2.00	0.88	0.88	3.81
6	2.25	1.31	8.50	5.59	3.25	3.69	1.90	1.90	10-26	28-36	5.88	0.63	0.81	6.25	7.00	2.00	3.00	0.88	1.13	5.75
8	2.50	1.41	10.63	7.41	3.69	3.88	2.38	2.38	12-32	34-42	7.63	0.81	0.94	7.00	7.00	3.00	3.00	1.13	1.38	7.63
10	2.81	1.63	12.75	9.28	3.88	4.19	2.38	2.88	12-40	42-50	9.25	0.94	1.13	7.00	7.00	3.00	3.00	1.38	1.63	9.56
12	3.19	1.88	15.00	11.09	4.19	3.50	2.88	2.88	14-40	42-50	10.75	1.13	1.63sq	7.00	9.38	3.00	4.50	1.63	1.88	11.38

Valve Size DN	Approximate Dimensions – mm <sup>4</sup>																			
	A	B	C	E	G1 <sup>1</sup>	G2 <sup>2</sup>	J1 <sup>1</sup>	J2 <sup>2</sup>	K1 <sup>1</sup>	K2 <sup>2</sup>	R	S1 <sup>1</sup>	S2 <sup>2</sup>	T1 <sup>1</sup>	T2 <sup>2</sup>	U1 <sup>1</sup>	U2 <sup>2</sup>	X1 <sup>1</sup>	X2 <sup>2</sup>	Y <sup>3</sup>
80	49	27	132	73	83	83	42	42	8-26	28-36	113	16	16	159	159	51	51	22	22	74
100	54	30	157	95	83	83	42	42	10-26	28-36	125	16	16	159	159	51	51	22	22	97
150	57	33	216	142	83	944	48	48	10-26	28-36	149	16	21	159	178	51	76	22	29	146
200	64	36	270	188	94	99	60	60	12-32	34-42	194	21	24	178	178	76	76	29	35	194
250	71	41	324	236	99	106	60	73	12-40	42-50	235	24	29	178	178	76	76	35	41	243
300	81	48	381	282	106	89	73	73	14-40	42-50	273	29	41sq	178	238	76	114	41	48	289

- 1 Use G1, J1, S1, T1, U1, and X1 for extension lengths (K1).
- 2 Use G2, J2, S2, T2, U2, and X2 for extension lengths (K2).
- 3 Conforms to API 609 and MSS-SP 68 requirements for minimum clearances of pipe inside diameters for Schedule 80 pipe.
- 4 K1 and K2 dimensions are inches.

**DIMENSIONS**

**3" – 12" (DN 80 – 300) Type K815L Wafer-Sphere Valves ASME Class 150 Single-Flange Lugged Design**



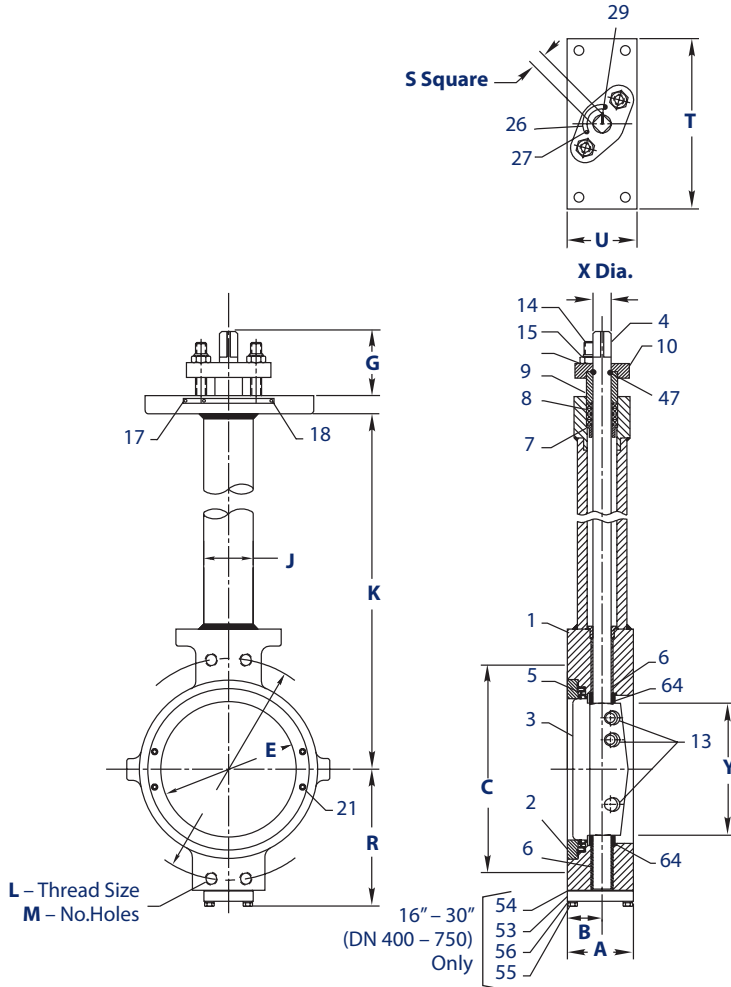
Valve Size Inches	Approximate Dimensions – inches																						
	A	B	C	D	E	G1 <sup>1</sup>	G2 <sup>2</sup>	J1 <sup>1</sup>	J2 <sup>2</sup>	K1 <sup>1</sup>	K2 <sup>2</sup>	L	M	R	S1 <sup>1</sup>	S2 <sup>2</sup>	T1 <sup>1</sup>	T2 <sup>2</sup>	U1 <sup>1</sup>	U2 <sup>2</sup>	X1 <sup>1</sup>	X2 <sup>2</sup>	Y <sup>3</sup>
3	1.94	1.06	5.19	6.00	2.88	3.25	3.25	1.66	1.66	8-26	28-36	5/8-11	4	4.44	0.63	0.63	6.25	6.25	2.00	2.00	0.88	0.88	2.91
4	2.13	1.19	6.19	7.50	3.75	3.25	3.25	1.66	1.66	10-26	28-36	5/8-11	8	4.94	0.63	0.63	6.25	6.25	2.00	2.00	0.88	0.88	3.81
6	2.25	1.31	8.50	9.50	5.59	3.25	3.69	1.90	1.90	10-26	28-36	3/4-10	8	5.88	0.63	0.81	6.25	7.00	2.00	3.00	0.88	1.13	5.75
8	2.50	1.41	10.63	11.75	7.41	3.69	3.88	2.38	2.38	12-32	34-42	3/4-10	8	7.63	0.81	0.94	7.00	7.00	3.00	3.00	1.13	1.38	7.63
10	2.81	1.63	12.75	14.25	9.28	3.88	4.19	2.38	2.88	12-40	42-50	7/8-9	12	9.25	0.94	1.13	7.00	7.00	3.00	3.00	1.38	1.63	9.56
12	3.19	1.88	15.00	17.00	11.09	4.19	3.50	2.88	2.88	14-40	42-50	7/8-9	12	10.75	1.13	1.63sq	7.00	9.38	3.00	4.50	1.63	1.88	11.38

Valve Size DN	Approximate Dimensions – mm <sup>3</sup>																						
	A	B	C	E	G1 <sup>1</sup>	G2 <sup>2</sup>	J1 <sup>1</sup>	J2 <sup>2</sup>	K1 <sup>1</sup>	K2 <sup>2</sup>	L	M	R	S1 <sup>1</sup>	S2 <sup>2</sup>	T1 <sup>1</sup>	T2 <sup>2</sup>	U1 <sup>1</sup>	U2 <sup>2</sup>	X1 <sup>1</sup>	X2 <sup>2</sup>	Y <sup>3</sup>	
80	49	27	132	73	83	83	42	42	8-26	28-36	5/8-11	4	113	16	16	159	159	51	51	22	22	74	
100	54	30	157	95	83	83	42	42	10-26	28-36	5/8-11	8	125	16	16	159	159	51	51	22	22	97	
150	57	33	216	142	83	94	48	48	10-26	28-36	3/4-10	8	149	16	21	159	178	51	76	22	29	146	
200	64	36	270	188	94	99	60	60	12-32	34-42	3/4-10	8	194	21	24	178	178	76	76	29	35	194	
250	71	41	324	236	99	106	60	73	12-40	42-50	7/8-9	12	235	24	29	178	178	76	76	35	41	243	
300	81	48	381	282	106	89	73	73	14-40	42-50	7/8-9	12	273	29	41sq	178	238	76	114	41	48	289	

- 1 Use G1, J1, S1, T1, U1, and X1 for extension lengths (K1).
- 2 Use G2, J2, S2, T2, U2, and X2 for extension lengths (K2).
- 3 Conforms to API 609 and MSS-SP 68 requirements for minimum clearances of pipe inside diameters for Schedule 80 pipe.
- 4 K1, K2 and L dimensions are inches.

**DIMENSIONS**

**14" – 30" (DN 350 – 750) Type K815W Wafer-Sphere Valves ASME Class 150 Wafer Design**



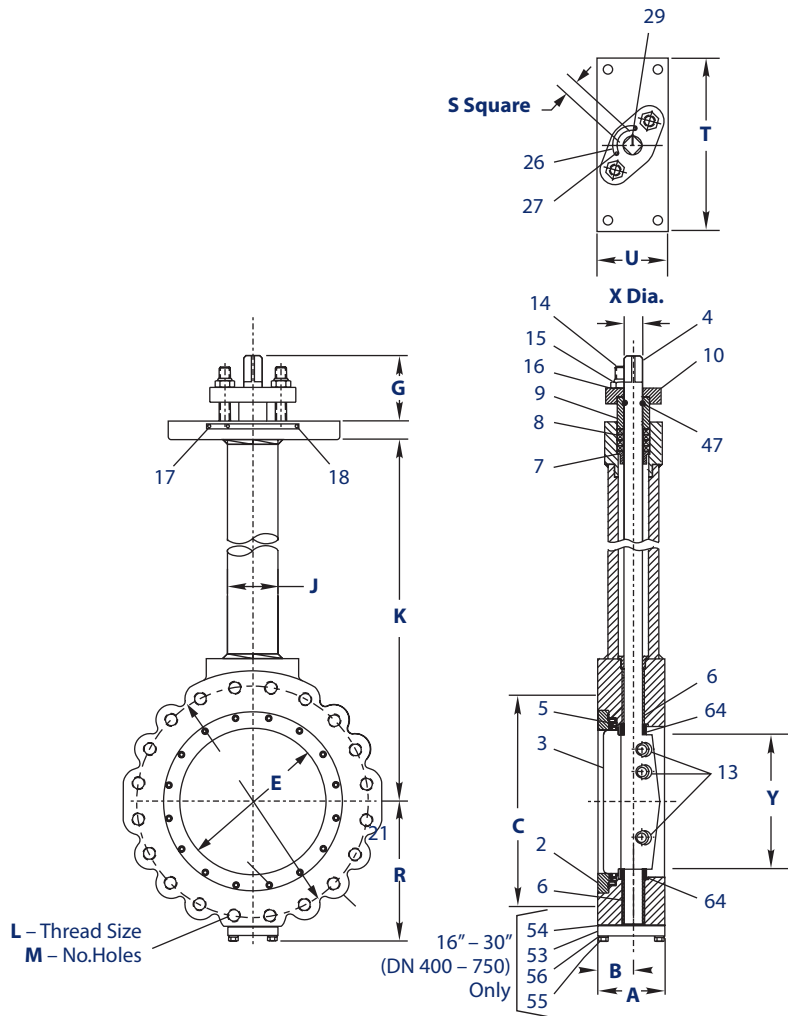
Valve Size Inches	Approximate Dimensions – inches															
	A	B	C	D	E	G	J	K <sup>1</sup>	L	M	R	S	T	U	X	Y <sup>2</sup>
14	3.63	2.06	16.25	18.75	12.38	3.37	3.50	16-50	1-1/8 <sup>4</sup>	4	12.22	1.63	9.38	4.50	1.88	12.50
16	4.00	2.22	18.50	21.25	14.28	3.50	3.50	16-60	1-1/16 <sup>4</sup>	4	12.66	1.63	9.38	4.50	1.88	14.38
18	4.50	2.63	21.00	22.75	16.28	3.63	3.50	18-60	1-3/16 <sup>4</sup>	4	13.90	1.63	9.38	4.50	2.13	16.38
20	5.00	2.63	23.00	25.00	17.94	3.50	4.50	18-60	1-1/8-8 <sup>5</sup>	4	14.75	1.63	10.00	6.00	2.38	17.88
24	6.06	3.00	27.25	29.50	21.63	4.63	4.50	24-60	1-1/4-8 <sup>5</sup>	4	21.78	2.00	12.00	6.00	2.75	21.34
30	6.56	3.44	33.75	36.00	27.63	5.00	6.63	26-72	1-1/4-8	4	24.00	2.00	14.00	8.00	3.50	28.00

Valve Size DN	Approximate Dimensions – mm <sup>3</sup>															
	A	B	C	D	E	G	J	K <sup>1</sup>	L	M	R	S	T	U	X	Y <sup>2</sup>
350	92	52	413	476	314	86	89	16-50	1-1/8 <sup>4</sup>	4	310	41	238	114	48	318
400	102	56	470	540	363	89	89	16-60	1-1/16 <sup>4</sup>	4	322	41	238	114	48	365
450	114	67	533	578	414	92	89	18-60	1-3/16 <sup>4</sup>	4	353	41	238	114	54	416
500	127	67	584	635	456	89	114	18-60	1-1/8-8 <sup>5</sup>	4	375	41	254	152	60	454
600	154	76	692	749	549	118	114	24-60	1-1/4-8 <sup>5</sup>	4	553	51	305	152	70	542
750	167	87	857	914	702	127	168	26-72	1-1/4-8	4	609	51	356	203	89	711

- Standard bonnet extensions are available in 2-inch increments as shown under dimension K; special lengths are available on application.
- Conforms to API 609 and MSS-SP 68 requirements for minimum clearances of pipe inside diameters for Schedule 80 pipe.
- K and L dimensions are inches.
- Through holes, not tapped.
- ASME B16.5 requires all bolts 1-1/8 and larger have an 8-UN thread series.

**DIMENSIONS**

**14" – 30" (DN 350 – 750) Type K815L Wafer-Sphere Valves ASME Class 150 Single-Flange Lugged Design**



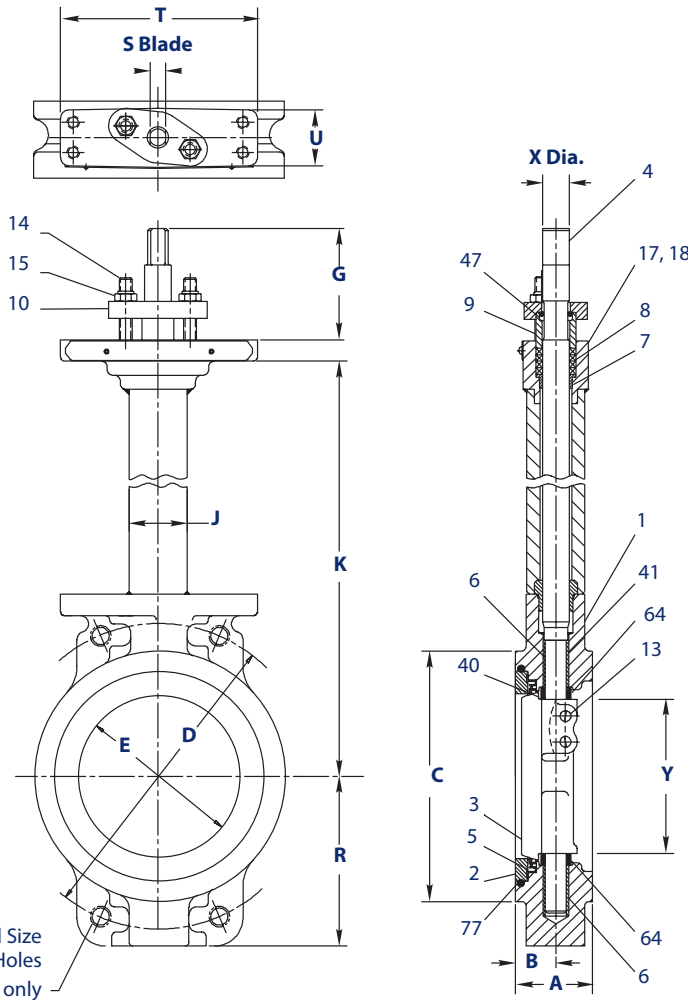
Valve Size Inches	Approximate Dimensions – inches															
	A	B	C	D	E	G	J	K <sup>1</sup>	L	M	R	S	T	U	X	Y <sup>2</sup>
14	3.63	2.06	16.25	18.75	12.38	3.37	3.50	16-50	1-8	12	12.22	1.63	9.38	4.50	1.88	12.50
16	4.00	2.22	18.50	21.25	14.28	3.50	3.50	16-60	1-8	16	12.66	1.63	9.38	4.50	1.88	14.38
18	4.50	2.63	21.00	22.75	16.28	3.63	3.50	18-60	1-1/8 – 8 <sup>4</sup>	16	13.90	1.63	9.38	4.50	2.13	16.38
20	5.00	2.63	23.00	25.00	17.94	3.50	4.50	18-60	1-1/8 – 8 <sup>4</sup>	20	14.75	1.63	10.00	6.00	2.38	17.88
24	6.06	3.00	27.25	29.50	21.63	4.63	4.50	24-60	1-1/4 – 8 <sup>4</sup>	20	21.78	2.00	12.00	6.00	2.75	21.34
30	6.56	3.44	33.75	36.00	27.63	5.00	6.63	26-72	1-1/4 – 8 <sup>4</sup>	28	24.00	2.00	14.00	8.00	3.50	28.00

Valve Size DN	Approximate Dimensions – mm <sup>3</sup>															
	A	B	C	D	E	G	J	K <sup>1</sup>	L	M	R	S	T	U	X	Y <sup>2</sup>
350	92	52	413	476	314	86	89	16-50	1-8	12	310	41	238	114	48	318
400	102	56	470	540	363	89	89	16-60	1-8	16	322	41	238	114	48	365
450	114	67	533	578	414	92	89	18-60	1-1/8 – 8 <sup>4</sup>	16	353	41	238	114	54	416
500	127	67	584	635	456	89	114	18-60	1-1/8 – 8 <sup>4</sup>	20	375	41	254	152	60	454
600	154	76	692	749	549	118	114	24-60	1-1/4 – 8 <sup>4</sup>	20	553	51	305	152	70	542
750	167	87	857	914	702	127	168	26-72	1-1/4 – 8 <sup>4</sup>	28	609	51	356	203	89	711

- 1 Standard bonnet extensions are available in 2-inch increments as shown under dimension K; special lengths are available on application.
- 2 Conforms to API 609 and MSS-SP 68 requirements for minimum clearances of pipe inside diameters for Schedule 80 pipe.
- 3 K and L dimensions are inches.
- 4 ASME B16.5 requires all bolts 1-1/8 and larger have an 8-UN thread series.

**DIMENSIONS**

**3" – 12" (DN 80 – 300) Type K830W Wafer-Sphere Valves ASME Class 300 Wafer Design**



Valve Size Inches	Approximate Dimensions – inches																						
	A	B	C	D	E	G1 <sup>1</sup>	G2 <sup>3</sup>	J1 <sup>1</sup>	J2 <sup>3</sup>	K1 <sup>1</sup>	K2 <sup>3</sup>	L	M	R	S1 <sup>1</sup>	S2 <sup>3</sup>	T1 <sup>1</sup>	T2 <sup>3</sup>	U1 <sup>1</sup>	U2 <sup>3</sup>	X1 <sup>1</sup>	X2 <sup>3</sup>	Y <sup>4</sup>
3	1.94	1.06	5.19	—	2.88	3.25	3.25	1.66	1.66	8-26	28-36	—	—	4.44	0.63	0.63	6.25	6.25	2.00	2.00	0.88	0.88	2.91
4	2.13	1.19	6.19	—	3.75	3.25	3.69	1.66	1.90	10-26	28-36	—	—	4.94	0.63	0.81	6.25	7.00	2.00	3.00	0.88	1.13	3.41
6	2.31	1.34	8.50	—	5.59	3.69	3.88	1.90	2.38	10-26	28-36	—	—	6.13	0.81	0.94	7.00	7.00	3.00	3.00	1.13	1.38	5.75
8	2.88	1.56	10.63	—	7.41	3.88	4.19	2.38	2.88	12-32	34-42	—	—	7.75	0.94	1.13	7.00	7.00	3.00	3.00	1.38	1.63	7.63
10	3.25	1.75	12.75	15.25	9.28	4.19	3.50	2.88	3.50	14-40	42-50	1-8	4	9.50	1.13	1.63sq	7.00	9.38	3.00	4.50	1.63	1.88	9.56
12	3.63	1.97	15.00	17.75	11.09	3.50	3.50	3.50	3.50	14-40	42-50	1-1/8-8 <sup>2</sup>	4	11.25	1.63sq	1.63sq	9.38	9.38	4.50	4.50	1.88	2.13	11.38

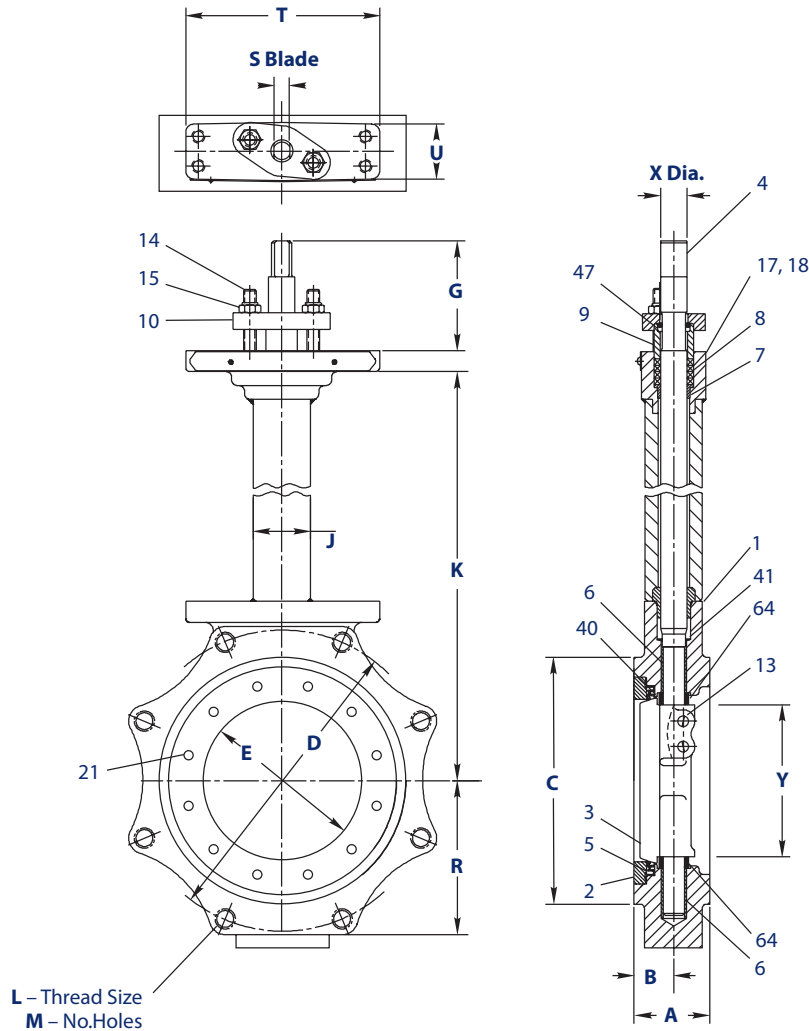
Valve Size DN	Approximate Dimensions – mm <sup>5</sup>																						
	A	B	C	D	E	G1 <sup>1</sup>	G2 <sup>3</sup>	J1 <sup>1</sup>	J2 <sup>3</sup>	K1 <sup>1</sup>	K2 <sup>3</sup>	L	M	R	S1 <sup>1</sup>	S2 <sup>3</sup>	T1 <sup>1</sup>	T2 <sup>3</sup>	U1 <sup>1</sup>	U2 <sup>3</sup>	X1 <sup>1</sup>	X2 <sup>3</sup>	Y <sup>4</sup>
80	27	27	132	—	73	83	83	42	42	8-26	28-36	—	—	113	16	16	159	159	51	51	22	22	74
100	54	30	157	—	95	83	94	42	48	10-26	28-36	—	—	125	16	21	159	178	51	76	22	29	87
150	59	34	216	—	142	94	99	48	60	10-26	28-36	—	—	156	21	24	178	178	76	76	29	35	146
200	73	40	270	—	188	99	106	60	73	12-32	34-42	—	—	197	24	29	178	178	76	76	35	41	194
250	83	44	324	387	236	106	89	73	89	14-40	42-50	1-8	4	241	29	41sq	178	238	76	114	41	48	243
300	92	50	381	451	282	89	89	89	89	14-40	42-50	1-1/8-8 <sup>2</sup>	4	286	41sq	41sq	238	238	114	114	48	54	289

- 1 Use G1, J1, S1, T1, U1, and X1 for extension lengths (K1).
- 2 ASME B16.5 requires all bolts 1-1/8 and larger have an 8-UN thread series.
- 3 Use G2, J2, S2, T2, U2, and X2 for extension lengths (K2).
- 4 Conforms to API 609 and MSS-SP 68 requirements for minimum clearances of pipe inside diameters for Schedule 80 pipe.
- 5 K1, K2 and L dimensions are inches.



**DIMENSIONS**

**3" – 12" (DN 80 – 300) Type K830L Wafer-Sphere Valves ASME Class 300 Single-Flange Lugged Design**



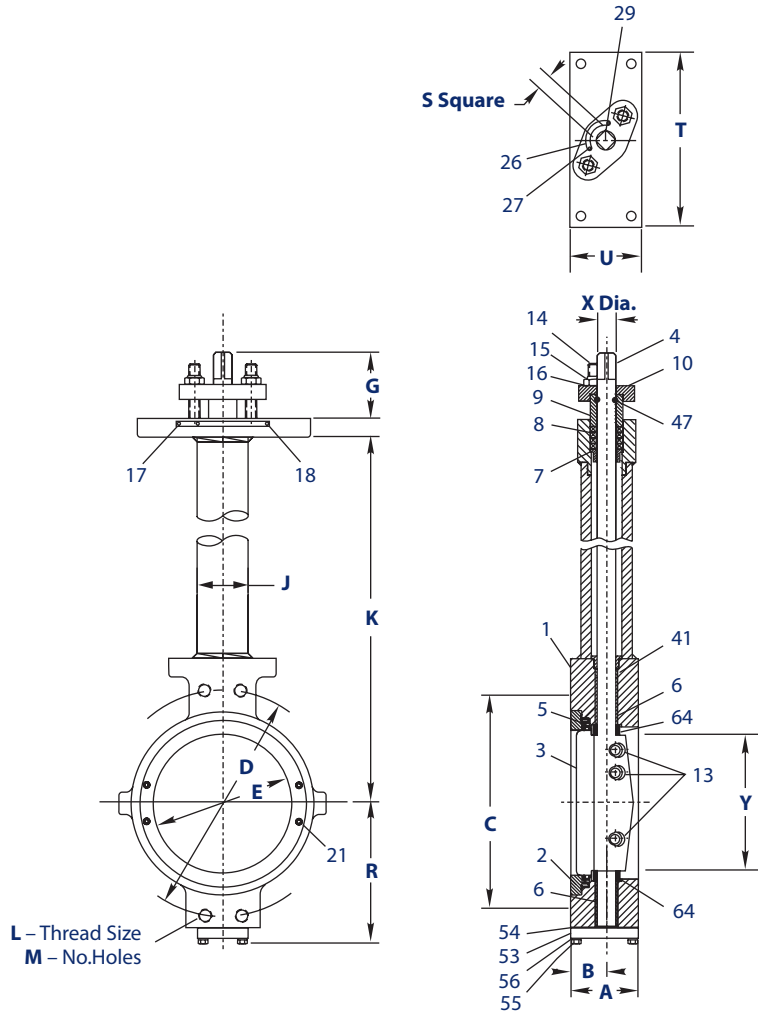
Valve Size Inches	Approximate Dimensions – inches																							
	A	B	C	D	E	G1 <sup>1</sup>	G2 <sup>3</sup>	J1 <sup>1</sup>	J2 <sup>3</sup>	K1 <sup>1</sup>	K2 <sup>3</sup>	L	M	R	S1 <sup>1</sup>	S2 <sup>3</sup>	T1 <sup>1</sup>	T2 <sup>3</sup>	U1 <sup>1</sup>	U2 <sup>3</sup>	X1 <sup>1</sup>	X2 <sup>3</sup>	Y <sup>4</sup>	
3	1.94	1.06	5.19	6.63	2.88	3.25	3.25	1.66	1.66	8-26	28-36	3/4-10	8	4.44	0.63	0.63	6.25	6.25	2.00	2.00	0.88	0.88	2.91	
4	2.13	1.19	6.19	7.88	3.75	3.25	3.69	1.66	1.90	10-26	28-36	3/4-10	8	4.94	0.63	0.81	6.25	7.00	2.00	3.00	0.88	1.13	3.41	
6	2.31	1.34	8.50	10.63	5.59	3.69	3.88	1.90	2.38	10-26	28-36	3/4-10	12	6.13	0.81	0.94	7.00	7.00	3.00	3.00	1.13	1.38	5.75	
8	2.88	1.56	10.63	13.00	7.41	3.88	4.19	2.38	2.88	12-32	34-42	7/8-9	12	7.75	0.94	1.13	7.00	7.00	3.00	3.00	1.38	1.63	7.63	
10	3.25	1.75	12.75	15.25	9.28	4.19	3.50	2.88	3.50	14-40	42-50	1-8	16	9.50	1.13	1.63sq	7.00	9.38	3.00	4.50	1.63	1.88	9.56	
12	3.63	1.97	15.00	17.75	11.09	3.50	3.50	3.50	3.50	14-40	42-50	1-1/8-8 <sup>2</sup>	16	11.25	1.63sq	1.63sq	9.38	9.38	4.50	4.50	1.88	2.13	11.38	

Valve Size DN	Approximate Dimensions – mm <sup>5</sup>																							
	A	B	C	D	E	G1 <sup>1</sup>	G2 <sup>3</sup>	J1 <sup>1</sup>	J2 <sup>3</sup>	K1 <sup>1</sup>	K2 <sup>3</sup>	L	M	R	S1 <sup>1</sup>	S2 <sup>3</sup>	T1 <sup>1</sup>	T2 <sup>3</sup>	U1 <sup>1</sup>	U2 <sup>3</sup>	X1 <sup>1</sup>	X2 <sup>3</sup>	Y <sup>4</sup>	
80	49	27	132	168	73	83	83	42	42	8-26	28-36	3/4-10	8	113	16	16	159	159	51	51	22	22	74	
100	54	30	157	200	95	83	94	42	48	10-26	28-36	3/4-10	8	125	16	21	159	178	51	76	22	29	87	
150	59	34	216	270	142	94	99	48	60	10-26	28-36	3/4-10	12	156	21	24	178	178	76	76	29	35	146	
200	73	40	270	330	188	99	106	60	73	12-32	34-42	7/8-9	12	197	24	29	178	178	76	76	35	41	194	
250	83	44	324	387	236	106	89	73	89	14-40	42-50	1-8	16	241	29	41sq	178	238	76	114	41	48	243	
300	92	50	381	451	282	89	89	89	89	14-40	42-50	1-1/8-8 <sup>2</sup>	16	286	41sq	41sq	238	238	114	114	48	54	289	

- 1 Use G1, J1, S1, T1, U1, and X1 for extension lengths (K1).
- 2 ASME B16.5 requires all bolts 1-1/8 and larger have an 8-UN thread series.
- 3 Use G2, J2, S2, T2, U2, and X2 for extension lengths (K2).
- 4 Conforms to API 609 and MSS-SP 68 requirements for minimum clearances of pipe inside diameters for Schedule 80 pipe.
- 5 K1, K2 and L dimensions are inches.

**DIMENSIONS**

**14" – 24" (DN 350 – 600) Type K830W Wafer-Sphere Valves ASME Class 300 Wafer Design**



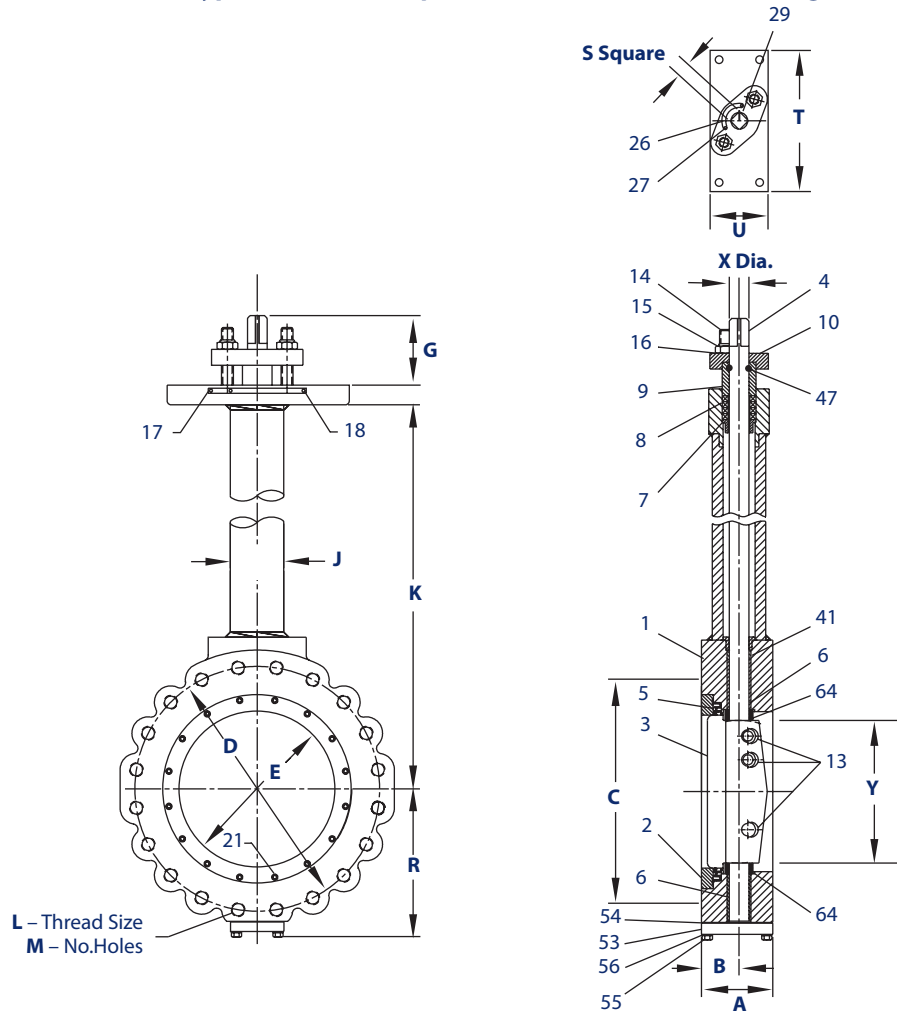
Valve Size Inches	Approximate Dimensions – inches															
	A	B	C	D	E	G	J	K <sup>1</sup>	L <sup>4</sup>	M	R	S	T	U	X	Y <sup>2</sup>
14	4.63	2.31	16.25	20.25	12.38	3.50	3.50	16-50	1-1/8-8	4	12.50	1.63	9.38	4.50	2.13	11.75
16	5.25	2.44	18.50	22.50	14.31	3.50	4.50	18-60	1-1/4-8	4	13.69	1.63	9.38	5.75	2.38	13.63
18	5.88	2.94	21.00	24.75	16.28	4.62	4.50	20-60	1-1/4-8	4	18.97	2.00	12.00	6.00	2.75	15.44
20	6.38	3.19	23.00	27.00	17.91	5.00	6.63	22-72	1-1/4-8	4	19.87	2.00	14.00	8.00	3.50	17.06
24 <sup>5</sup>	7.25	3.63	27.25	32.00	21.63	5.00	6.63	24-72	1-1/2-8	4	22.63	4.00 <sup>5</sup>	18.00	10.00	4.00	20.63

Valve Size DN	Approximate Dimensions – mm <sup>3</sup>															
	A	B	C	D	E	G	J	K <sup>1</sup>	L <sup>4</sup>	M	R	S	T	U	X	Y <sup>2</sup>
350	118	59	413	514	314	89	89	16-50	1-1/8-8	4	318	41	238	114	54	298
400	133	62	470	572	363	89	114	18-60	1-1/4-8	4	348	41	238	146	60	346
450	149	75	533	629	414	117	114	20-60	1-1/4-8	4	482	51	305	152	70	392
500	162	81	584	686	455	127	168	22-72	1-1/4-8	4	505	51	356	203	89	433
600 <sup>5</sup>	184	92	692	813	549	127	168	24-72	1-1/2-8	4	575	102 <sup>5</sup>	457	254	102	524

- 1 Standard bonnet extensions are available in 2-inch increments as shown under dimension K; special lengths are available on application.
- 2 Conforms to API 609 and MSS-SP 68 requirements for minimum clearances of pipe inside diameters for Schedule 80 pipe.
- 3 K and L dimensions are inches.
- 4 ASME B16.5 requires all bolts 1-1/8 and larger have an 8-UN thread series.
- 5 24" (DN600) K830W has keyed shaft.

**DIMENSIONS**

**14" – 24" (DN 350 – 600) Type K830L Wafer-Sphere Valves ASME Class 300 Single-Flange Lugged Design**



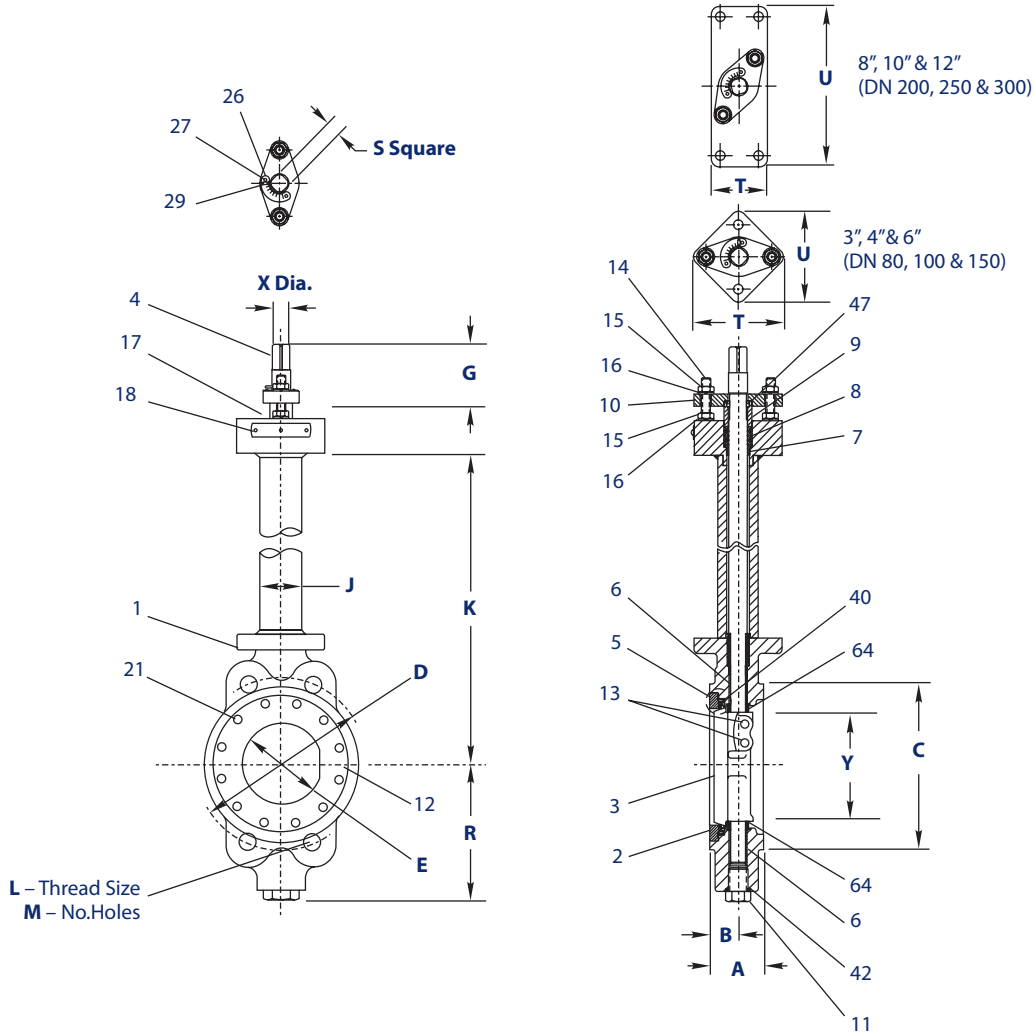
Valve Size Inches	Approximate Dimensions – inches															
	A	B	C	D	E	G	J	K <sup>1</sup>	L <sup>4</sup>	M	R	S	T	U	X	Y <sup>2</sup>
14	4.63	2.31	16.25	20.25	12.38	3.50	3.50	16-50	1-1/8-8	20	12.50	1.63	9.38	4.50	2.13	11.75
16	5.25	2.44	18.50	22.50	14.31	3.50	4.50	18-60	1-1/4-8	20	13.69	1.63	9.38	5.75	2.38	13.63
18	5.88	2.94	21.00	24.75	16.28	4.62	4.50	20-60	1-1/4-8	24	18.97	2.00	12.00	6.00	2.75	15.44
20	6.38	3.19	23.00	27.00	17.91	5.00	6.63	22-72	1-1/4-8	24	19.87	2.00	14.00	8.00	3.50	17.06
24 <sup>5</sup>	7.25	3.63	27.25	32.00	21.63	5.00	6.63	24-72	1-1/2-8	24	22.63	4.00 <sup>5</sup>	18.00	10.00	4.00	20.63

Valve Size DN	Approximate Dimensions – mm <sup>3</sup>															
	A	B	C	D	E	G	J	K <sup>1</sup>	L <sup>4</sup>	M	R	S	T	U	X	Y <sup>2</sup>
350	118	59	413	514	314	89	89	16-50	1-1/8-8	20	318	41	238	114	54	298
400	133	62	470	572	363	89	114	18-60	1-1/4-8	20	348	41	238	146	60	346
450	149	75	533	629	414	117	114	20-60	1-1/4-8	24	482	51	305	152	70	392
500	162	81	584	686	455	127	168	22-72	1-1/4-8	24	505	51	356	203	89	433
600 <sup>5</sup>	184	92	692	813	549	127	168	24-72	1-1/2-8	24	575	102 <sup>5</sup>	457	254	102	524

- 1 Standard bonnet extensions are available in 2-inch increments as shown under dimension K; special lengths are available on application.
- 2 Conforms to API 609 and MSS-SP 68 requirements for minimum clearances of pipe inside diameters for Schedule 80 pipe.
- 3 K and L dimensions are inches.
- 4 ASME B16.5 requires all bolts 1-1/8 and larger have an 8-UN thread series.
- 5 24" (DN600) K830L has keyed shaft.

**DIMENSIONS**

**3" – 12" (DN 80 – 300) Type K860W Wafer-Sphere Valves ASME Class 600 Wafer Design**



Valve Size Inches	Approximate Dimensions – inches															
	A	B	C	D	E	G	J	K	L	M	R	S	T	U	X	Y
3	2.37	1.25	5.00	—	2.94	3.26	2.38	8-36	—	—	5.25	0.87	5.25	5.25	1.13	2.75
4	2.87	1.44	6.19	—	3.94	3.26	2.38	10-48	—	—	6.87	0.87	5.25	5.25	1.13	3.56
6	3.00	1.62	8.50	11.50	5.50	3.26	2.88	10-36	1.12 <sup>2</sup>	4	8.81	0.87	5.25	5.25	1.13	5.50
8	4.00	2.00	10.62	13.75	7.81	4.00	3.50	12-42	1.25 <sup>2</sup>	4	10.69	1.31	10.00	5.00	1.75	7.19
10	4.75	2.37	12.75	17.00	9.34	4.00	3.50	12-50	1-1/4-8 <sup>1</sup>	4	13.06	1.31	10.00	5.00	1.75	8.94
12	5.75	2.87	15.00	19.25	11.00	4.00	3.50	14-72	1-1/4-8 <sup>1</sup>	4	15.94	1.62	9.38	4.50	2.13	10.62

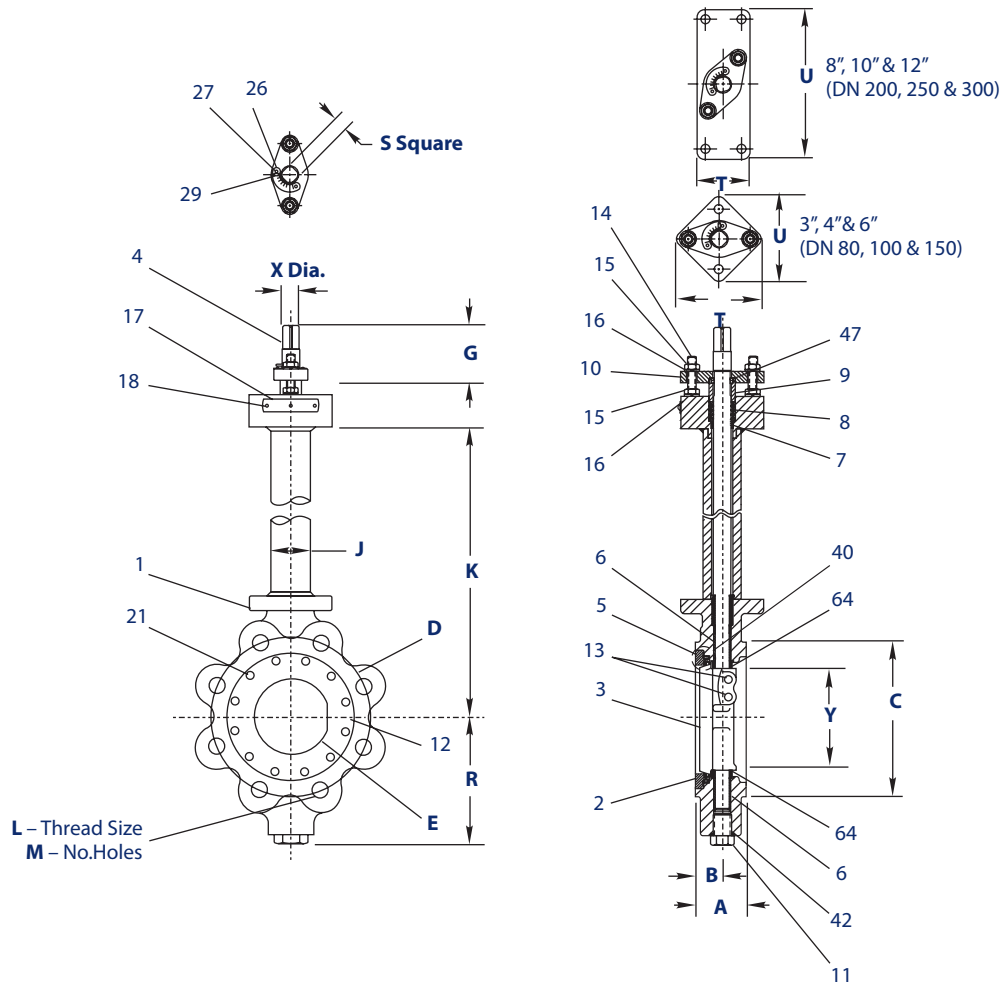
Valve Size DN	Approximate Dimensions – mm <sup>3</sup>															
	A	B	C	D	E	G	J	K	L	M	R	S	T	U	X	Y
80	60	32	127	—	75	83	60	8-36	—	—	133	22	133	133	28	70
100	73	37	157	—	100	83	60	10-48	—	—	174	22	133	133	28	90
150	76	41	216	292	140	83	73	10-36	1.12 <sup>2</sup>	4	224	22	133	133	28	140
200	102	51	270	349	198	102	89	12-42	1.25 <sup>2</sup>	4	272	33	254	127	44	183
250	121	60	324	432	237	102	89	12-50	1-1/4-8 <sup>1</sup>	4	332	33	254	127	44	227
300	146	73	381	489	279	102	89	14-72	1-1/4-8 <sup>1</sup>	4	405	41	238	114	54	270

**Consult factory for 14" – 20" (DN 350 – 500) K860W.**

- 1 ASME B16.5 requires all bolts 1-1/8 and larger to have an 8-UN thread series.
- 2 Through holes not tapped.
- 3 K and L dimensions are inches.

**DIMENSIONS**

**3" – 12" (DN 80 – 300) Type K860L Wafer-Sphere Valves ASME Class 600 Single-Flange Lugged Design**



Valve Size Inches	Approximate Dimensions – inches															
	A	B	C	D	E	G	J	K	L	M	R	S	T	U	X	Y
3	2.37	1.25	5.00	6.62	2.94	3.26	2.38	8-36	3/4-10	8	5.25	0.87	5.25	5.25	1.13	2.75
4	2.87	1.44	6.19	8.50	3.94	3.26	2.38	10-48	7/8-9	8	6.87	0.87	5.25	5.25	1.13	3.56
6	3.00	1.62	8.50	11.50	5.50	3.26	2.88	10-36	1-8	12	8.81	0.87	5.25	5.25	1.13	5.50
8	4.00	2.00	10.62	13.75	7.81	4.00	3.50	12-42	1-1/8-8 <sup>1</sup>	12	10.69	1.31	10.00	5.00	1.75	7.19
10	4.75	2.37	12.75	17.00	9.34	4.00	3.50	12-50	1-1/4-8 <sup>1</sup>	16	13.06	1.31	10.00	5.00	1.75	8.94
12	5.75	2.87	15.00	19.25	11.00	4.00	3.50	14-72	1-1/4-8 <sup>1</sup>	20	15.94	1.62	9.38	4.50	2.13	10.62

Valve Size DN	Approximate Dimensions – mm <sup>2</sup>															
	A	B	C	D	E	G	J	K	L	M	R	S	T	U	X	Y
80	60	32	127	168	75	83	60	8-36	3/4-10	8	133	22	133	133	28	70
100	73	37	157	216	100	83	60	10-48	7/8-9	8	174	22	133	133	28	90
150	76	41	216	292	140	83	73	10-36	1-8	12	224	22	133	133	28	140
200	102	51	270	349	198	102	89	12-42	1-1/8-8 <sup>1</sup>	12	272	33	254	127	44	183
250	121	60	324	432	237	102	89	12-50	1-1/4-8 <sup>1</sup>	16	332	33	254	127	44	227
300	146	73	381	489	279	102	89	14-72	1-1/4-8 <sup>1</sup>	20	405	41	238	114	54	270

**Consult factory for 14" – 20" (DN 350 – 500) K860L.**

- 1 ASME B16.5 requires all bolts 1-1/8 and larger to have an 8-UN thread series
- 2 K and L dimensions are inches.

BILL OF MATERIAL AND PARTS LIST			
Part No.	Part Name		Type K815-36HB, K830-36HB, K860-36HB
1	Body		316 Stainless steel
2	Insert		316 Stainless steel
3	Disc		316 Stainless steel
4	Shaft		17-4PH Stainless steel
5	Seat		PTFE/316 Stainless steel or PCTFE (14" [DN 350] and larger K815 & K830)
6	Shaft Bearing		316 Stainless steel backed PTFE
7	Flange Bearing		Bronze
8	Shaft Seal		PTFE
9	Compression Ring		316 Stainless steel
10	Compression Plate		316 Stainless steel
11	Pressure Plug (3" – 12" [DN 80 – 300] K860 only)		316 Stainless steel
12	Insert Pin (K860 valves only)		Stainless steel
13	Disc Pin		17-4PH Stainless steel
14	Stud		Stainless steel
15	Nut		Stainless steel
16	Lock Washer	(14" – 30" [DN 350 – 750] K815 valves)	Stainless steel
		(14" – 24" [DN 350 – 600] K830 valves)	
		(3" – 12" [DN 80 – 300] K860 valves)	
17	Name Plate		Stainless steel
18	Drive Screw		Stainless steel
21	Cap Screw (except 3" – 12" [DN 80 – 300] K815 & K830)		Stainless steel
26	Indicator Plate	(30" [DN 750] K815 valves)	Stainless steel
		(20" – 24" [DN 500 – 600] K830 valves)	
		(3" – 10" [DN 80 – 250] K860 valves)	
27	Drive Screw	(30" [DN 750] K815 valves)	Stainless steel
		(20" – 24" [DN 500 – 600] K830 valves)	
		(3" – 10" [DN 80 – 250] K860 valves)	
29	Indicator Pointer (except 3" – 12" [DN 80 – 300] K815 & K830)		Carbon steel
40	Body Seal (3" – 12" [DN 80 – 300] K815, K830 & K860)		Graphite
41	Top Bearing Spacer	(except 12" [DN 300] K815 & K830)	PTFE
		except 3" – 12" [DN 80 – 300] K860)	
42	Plug Seal (3" – 12" [DN 80 - 300] K860)		PTFE
47	Retaining Ring (except 8" – 12" [DN 200 – 300] K860)		Inconel®
53	Cover Plate	(16" – 30" [DN 400 – 750] K815)	316 Stainless steel
		(14" – 24" [DN 350 – 600] K830)	
54	Gasket	(16" – 30" [DN 400 – 750] K815)	PTFE
		(14" – 24" [DN 350 – 600] K830)	
55	Cap Screw	(16" – 30" [DN 400 – 750] K815)	Stainless steel
		(14" – 24" [DN 350 – 600] K830)	
56	Lock Washer	(16" – 30" [DN 400 – 750] K815)	Stainless steel
		(14" – 24" [DN 350 – 600] K830)	
64	Thrust Bearing		316 Stainless steel, Chrome plated
77	Insert Spring (3" – 12" [DN 80 – 300] K815W & K830W)		Inconel

**Note 1:** Bonnet extension portion of body is 316 stainless steel.

**Note 2:** Monel® valves are available on application.

**VALVE TORQUE DATA**

The torque required to open or close the Series K815, K830, or K860 valves can easily be calculated using the equation on the following page. However, for your convenience, the following tables can be used as a quick guide for actuator selection. If the valve's torque is not listed in the tables,

**use the equation to calculate the torque.** Refer to Neles bulletins for pneumatic and electric actuators. Select an actuator that provides the same or greater torque output. **If in doubt, select the next larger actuator.**

Valve Size		Torque Required at Specified Shutoff Differential Pressure for Series K815W and K815L Valves, Shaft Upstream or Downstream					
inches	DN	FT•LBS @ 100 psi N	N•m @ 6.9 bar	FT•LBS @ 200 psi	N•m @ 13.8 bar	FT•LBS @ 275 psi	N•m @ 19 bar
3	80	40	54	45	61	49	66
4	100	55	75	65	88	73	98
6	150	115	156	140	190	159	215
8	200	195	264	235	319	265	359
10	250	272	369	334	453	387	524
12	300	425	576	530	719	609	825
14	350	990	1342	1380	1871	1673	2268
16	400	1290	1749	1780	2414	2148	2912
18	450	1700	2305	2350	3187	2838	3848
20	500	2110	2861	2920	3960	3528	4783
24	600	3400	4610	4800	6509	5650	7933
30	750	6130	8312	8460	11472	10208	13841

Valve Size		Torque Required at Specified Shutoff Differential Pressure for Series K830W and K830L Valves, Shaft Upstream or Downstream											
inches	DN	FT•LBS @ 300 psi	N•m @ 20.7 bar	FT•LBS @ 400 psi	N•m @ 27.6 bar	FT•LBS @ 500 psi	N•m @ 34.5 bar	FT•LBS @ 600 psi	N•m @ 41.4 bar	FT•LBS @ 700 psi	N•m @ 48.3 bar	FT•LBS @ 720 psi	N•m @ 49.6 bar
3	80	50	68	55	75	60	81	65	88	70	95	71	96
4	100	75	102	85	115	95	129	105	142	115	156	117	159
6	150	173	235	199	270	225	305	251	340	277	376	282	383
8	200	280	380	320	434	360	488	400	542	440	597	448	607
10	250	421	571	488	662	555	753	622	843	689	934	702	952
12	300	773	1048	914	1239	1055	1431	1196	1622	1337	1813	1365	1851
14	350	1770	2400	2160	2929	2550	3458	2940	3987	3330	4515	3408	4621
16	400	2270	3078	2760	3743	3250	4407	3740	5071	4230	5736	4328	5869
18	450	3000	4068	3650	4949	4300	5831	4950	6712	5600	7594	5730	7770
20	500	3730	5058	4540	6156	5350	7255	6160	8353	6970	9451	7132	9671
24	600	6230	8448	7640	10360	9050	12272	10460	14184	11870	16096	12152	16478

Valve Size		Torque Required at Specified Shutoff Differential Pressure for Series K860W and K860L Valves, Shaft Upstream or Downstream											
inches	DN	FT•LBS @ 600 psi	N•m @ 41 bar	FT•LBS @ 800 psi	N•m @ 55.2 bar	FT•LBS @ 1000 psi	N•m @ 69.0 bar	FT•LBS @ 1200 psi	N•m @ 82.8 bar	FT•LBS @ 1400 psi	N•m @ 96.6 bar	FT•LBS @ 1440 psi	N•m @ 99.3 bar
3	80	65	88	75	102	85	115	95	129	105	142	107	145
4	100	116	157	138	187	160	217	182	247	204	277	208	283
6	150	285	386	345	468	405	549	465	631	525	712	537	728
8	200	548	743	674	914	800	1085	926	1256	1052	1427	1077	1461
10	250	872	1182	1086	1473	1300	1763	1514	2053	1728	2343	1771	2401
12	300	1350	1831	1680	2278	2010	2726	2340	3173	2670	3621	2736	3710

**VALVE TORQUE EQUATION**

Use the following equation to calculate the torque required to open and close the Series K815, K830, or K860 valves.

**Torque required (FT•LBS) = (Kt multiplied by the differential shutoff pressure in psi) + Ts**

**Example:** 6"(DN 150) K815L-18-36HBAS at 230 psi (15.9 bar) differential pressure, installed shaft downstream = (0.25 X 230) + 90 = 148 FT•LBS.

(To convert FT•LBS to N•m, multiply by 1.356.)

Valve Size		Shaft Upstream or Downstream					
inches	DN	Class 150 Series K815		Class 300 Series K830		Class 600 Series K860	
		Kt	Ts	Kt	Ts	Kt	Ts
3	80	0.05	35	0.05	35	0.05	35
4	100	0.10	45	0.10	45	0.11	50
6	150	0.25	90	0.26	95	0.30	105
8	200	0.40	155	0.40	160	0.63	170
10	250	0.62	210	0.67	220	1.07	230
12	300	1.05	320	1.41	350	1.65	360
14	350	3.9	600	3.9	600	2.7	400
16	400	4.9	800	4.9	800	4.0	470
18	450	6.5	1050	6.5	1050	5.4	650
20	500	8.1	1300	8.1	1300	7.2	780
24	600	14.0	2000	14.1	2000	9.1	880
30	750	23.3	3800	—	—	—	—

Refer to any of the following *Jamesbury* bulletins for selection of pneumatic or electric actuators:

	Bulletin		Bulletin
Manual Gear Actuators	A100-1	Valv-Powr® Series VPVL Mod D	
B-Series Pneumatic Actuators	6B20	Pneumatic Actuators	A111-5
Quadra-Powr® X		V-Series Electric Actuators	V200-1
Spring-Diaphragm Actuators	A110-4	ADC-Series Electric Actuators	V201-1

**WARNING:**

As the use of the valve is application specific, a number of factors should be taken into account when selecting a valve for a given application. Therefore, some of the situations in which the valves are used are outside the scope of this manual. If you have any questions concerning the use, application or compatibility of the valve with the intended service, contact Neles for more information.

**HOW TO ORDER JAMESBURY BRAND CRYOGENIC WAFER-SPHERE VALVES**

These *Wafer-Sphere* valves are described by a code that precisely defines body configuration, body, disc, shaft, seat, and seal materials, with one optional character to denote special services. Explanation of the code for valves in this bulletin is as follows:

1	2	3	4	—	5	—	6	7	8
8"	K815	W			20		36	HB	AS

**Example:** The above figure designation is for an 8" (DN 200) ASME Class 150 wafer design cryogenic butterfly valve having a 20" (508 mm) bonnet extension with 316 stainless steel body, 316 stainless steel disc and 17-4PH shaft, PTFE/316 stainless steel composite seat, and PTFE shaft seal.

1	Size											
inches	3	4	6	8	10	12	14	16	18	24	30	
DN	80	100	150	200	250	300	350	400	450	600	750	
2	Pressure Class											
<b>K815</b>	ASME Class 150 (3" – 30" [DN 80 – 750])											
<b>K818</b>	ASME Class 150 (3" – 30" [DN 80 – 750])											
<b>K830</b>	ASME Class 300 (3" – 24" [DN 80 – 600])											
<b>K838</b>	ASME Class 300 (3" – 24" [DN 80 – 600])											
<b>K860</b>	ASME Class 600 (3" – 12" [DN 80 – 300])											
<b>K868</b>	ASME Class 600 (3" – 12" [DN 80 – 300])											
3	Body Style											
W	Wafer											
L	Single-Flange Lugged											
4	Special Services											
—	Standard (no entry)											
O	Oxygen											

5	Bonnet Extension Lengths	
8-72	Bonnet extension lengths are described on the top of 8-72 page 4. Specific ranges of available lengths in 2-inch increments, are shown in the dimension tables on pages 4 – 13 (see dimension K1 or K2)	
6	Body Material	
36	316 Stainless steel	
71	Monel	
7	Disc & Shaft Material	
HB	316 Stainless disc, 17-4PH Stainless shaft	
71**	Monel disc with K-Monel shaft	

\*\* Use code 00 when body material is Monel

8	Seat & Seal Material	
	Seat	Seal
<b>AS</b>	PTFE/316 Stainless steel	PTFE***
<b>KT</b>	PCTFE (standard for 14" [DN 350] and larger K815 & K830)	PTFE
<b>AP</b>	PTFE/Monel	PTFE***
<b>AJ</b>	PCTFE/316 Stainless steel	PTFE***

\*\*\* Body Seal of 3" – 12" (DN 80 – 300) is graphite.

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