

# DIN FLANGED BALL VALVES

**FULL BORE: DN 15 – 150**

**PN 16 – PN 40**

**SERIES 9000 ( 916D, 940D)**

The Jamesbury® polymeric-seated flanged ball valves feature a flexible-lip seat design that provides positive bi-directional shut-off for a variety of applications in industries ranging from chemical and petrochemical to refining, pulp and paper, and power.

Polymeric-seated flanged ball valves are available in sizes (DN 15 – 150) in both full-bore and standard-bore designs that fully conform to ISO 17292 requirements.

A choice of body, trim, and seat materials is available to suit an extensive range of applications. As an option, valves can be prepared for special services, such as chlorine, oxygen, high-vacuum, hydrogen peroxide or NACE.

## Fire-Tite® Valves

Standard body and trim materials for *Fire-Tite* valves are carbon steel with 316 stainless steel trim and all 316 stainless steel. Seat material options include Xtreme® (X) for applications involving chemicals, petrochemicals, acids, caustics, and steam.

## CE Marked

All valves larger than DN25 are CE marked and documented to meet the European Pressure Equipment Directive (PED) 97/23/EC. CE marked products also meet the requirements of BS 5351, including static grounding.

## FEATURES AND BENEFITS

- Xtreme seat provides longer life, expanded performance boundaries, and greater value.
- Polymeric flexible lip-seat design offers tight shut-off in either direction and extended cycle life with minimum maintenance.
- *Fire-Tite* version with non-metallic seats meets API 607 and ISO 10497 requirements.



- Superior control characteristics, coupled with tight shut-off capabilities, make these valves ideal for a variety of on-off and control applications.
- API 608 compliance to serve refineries and related chemical and petrochemical industries.
- NACE MR0103 compliance available.
- Meets 21 standard and 12 optional industry standards and specifications.
- Face to face dimensions according to ISO 5752.

## NEW FEATURES AND BENEFITS For DN 15 through DN150 Series 9000

- New patented stem seal system is live loaded and engineered to assure long sealing life on sizes up to DN40.
- ISO 5211 Bonnet for global conformity on sizes up to DN40.
- New stainless steel linkage for VPVL, V-Series and ADC-Series actuators has a guided coupling to align topworks during assembly and eliminate side load stress on stem seals for long life, clean environment and reduced maintenance.

## Single-Source Responsibility

- Valves, actuators and accessories may be purchased completely mounted from one source.

## SPECIFICATIONS

### Flow Data

The table at right provides flow coefficients for *Jamesbury* valves covered in this bulletin.  $K_v$  values represent the flow of water at 16°C through the valve in cubic meters per hour at a pressure drop of 1 kg/cm<sup>2</sup>. To convert  $K_v$  to  $C_v$ , divide by 0.8569.

Valve Size	$K_v$
DN	Full Bore
15	8
20	43
25	86
40	230
50	420
80	990
100	1885
150	4370

### Valve Body Ratings

These are the maximum working pressure ratings of the valve body only. The seat ratings, shown on the next page, determine the practical pressure limitations according to actual service conditions. Test pressures are recommended pressures for hydrostatic test with ball half open.

Maximum Working Pressure, bar				
Temp °C	PN16		PN40	
	Carbon steel	316 Stainless steel	Carbon steel	316 Stainless steel
-29 to 38	16	14.7	40	36.8
100	16	12.5	40	31.3
150	15.6	11.4	39.1	28.5
200	15.1	10.6	37.9	26.4
250	14.4	9.8	36	24.7
Test Pressure	24	23	60	56

### Valve Seat Ratings

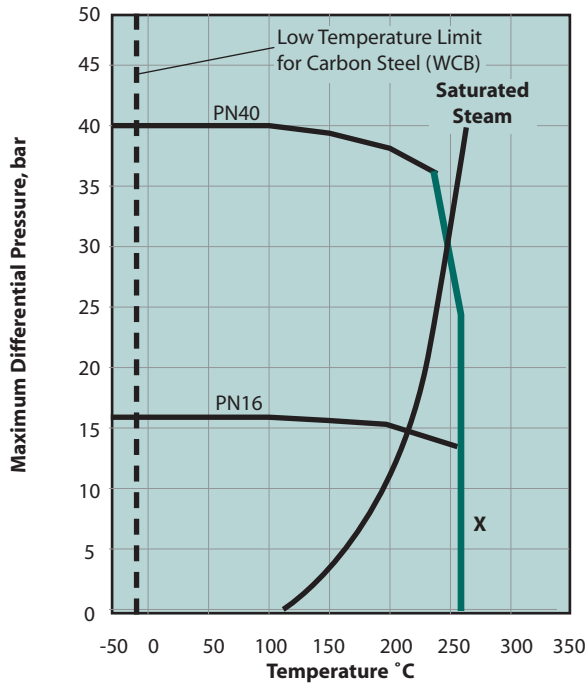
Seat ratings, indicated by solid lines in the charts on the next page, are based on differential pressure with the valve ball in the fully closed position and refer to seats only. The dotted lines indicate maximum working pressures for *WCB carbon steel* valve bodies. (Maximum working pressures of other body materials are shown in the tables above.) The combination of dotted and solid lines indicates the maximum valve rating at specific pressure and temperature conditions. Valves with *Xtreme* seats can be used in service to -51°C provided that the valve body material is suitable for such a temperature. Carbon steel valves are rated to -29°C.

On saturated steam service, stainless steel trim is recommended at all pressures and is required above 14 bar. See Bulletin B150-1. For more application information on seat materials, refer to Bulletin T140-1.

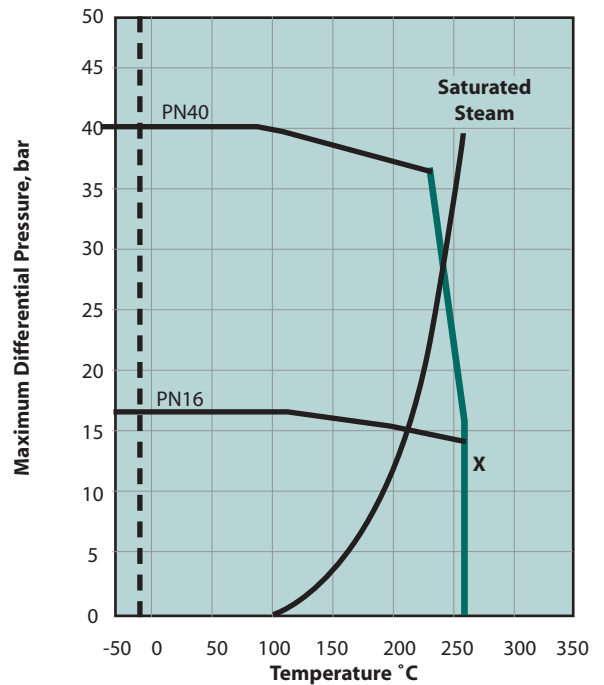
#### ***Xtreme* Performance and Value**

*Xtreme* seats provide longer life, expanded performance boundaries, and the greatest possible value. *Xtreme* is a unique material that resulted from a technological breakthrough in our polymer research lab. The material is a fluoro-polymer-based blend proprietary to *Jamesbury* that provides superior quarter-turn performance.

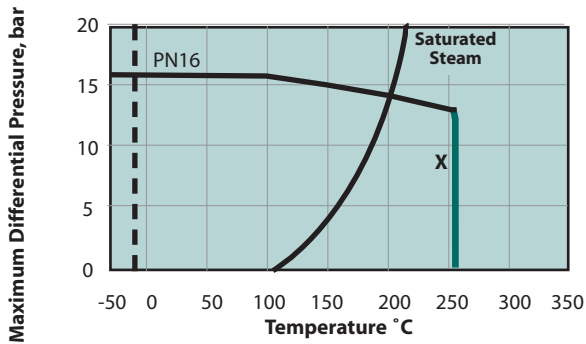
**DN 15 - 40 Full Bore**



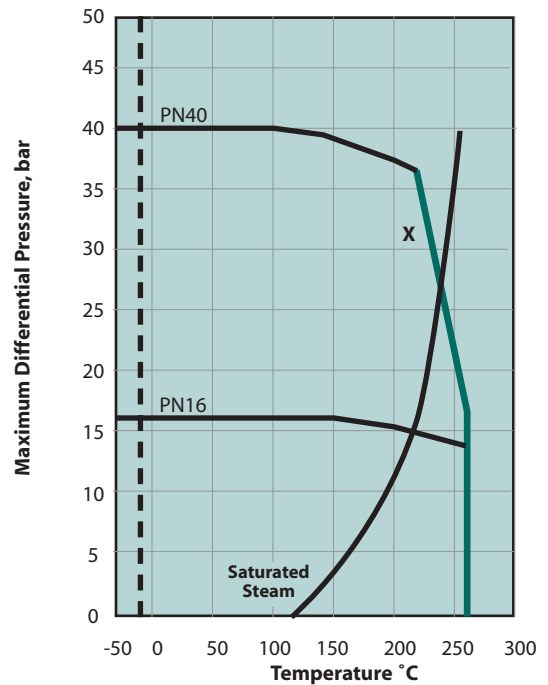
**DN 50 - 100 Full Bore**



**DN 150 - PN16 Full Bore Non-Trunnion**



**Trunnion Valves  
DN 150 - PN40 Full Bore**

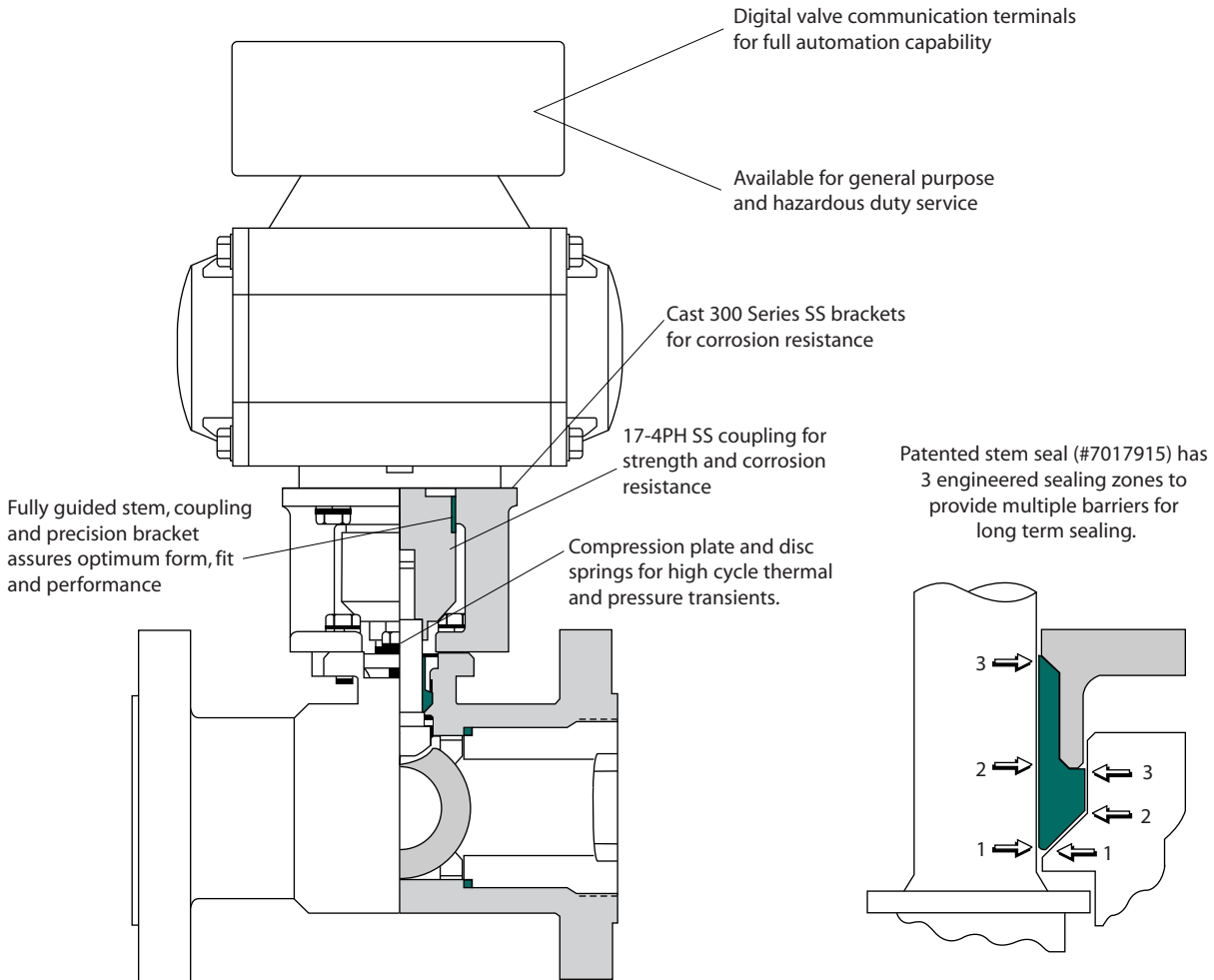


**LEGEND**

X = Xtreme

**Jamesbury 'The Ultimate Process Automation Package'  
for VPVL Pneumatic Actuators, V-Series and ADC-Series Electric Actuators**

**For DN 15 – 40 Full Port Series 9000**

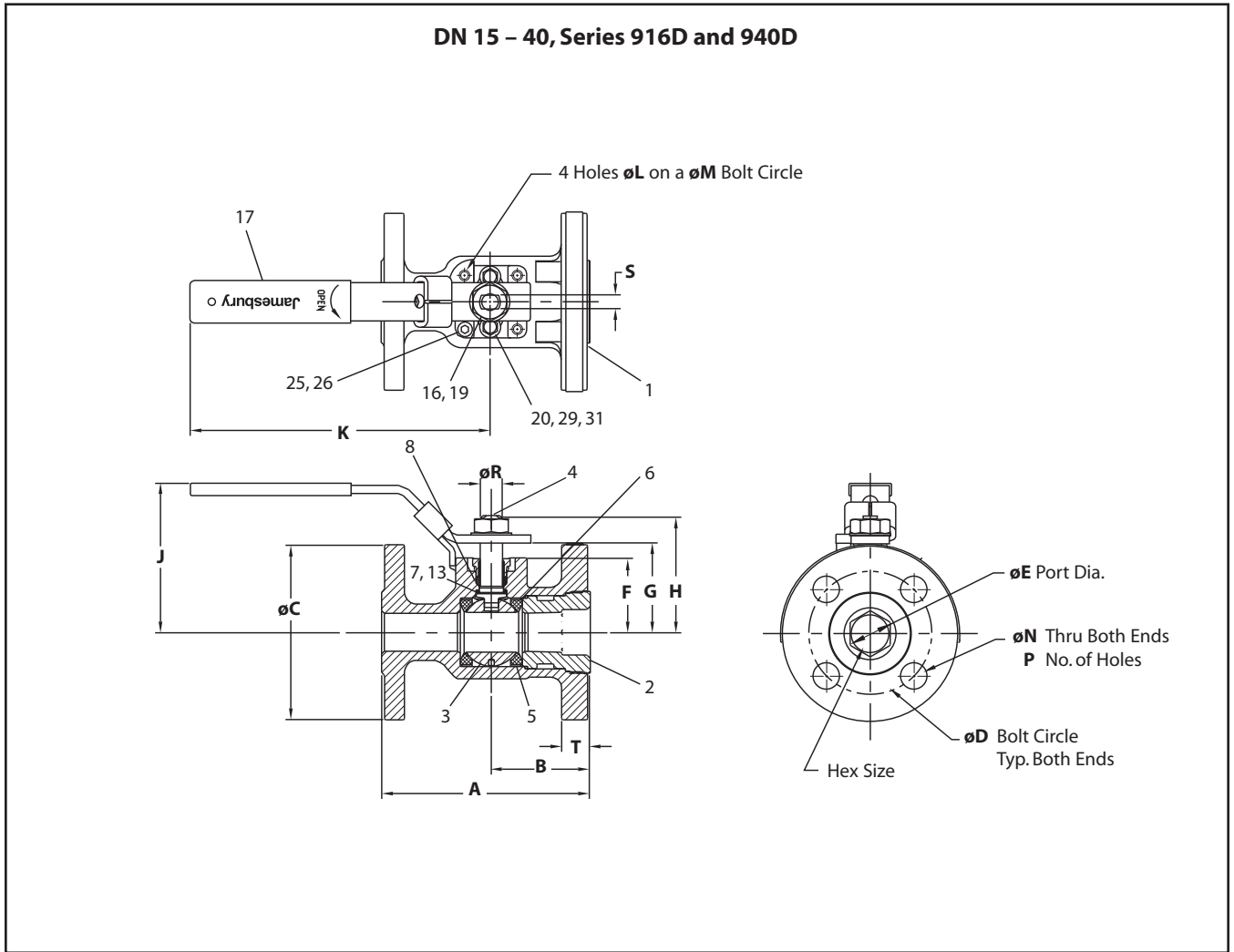


**Automation Performance and Value**

Valves combined with *Jamesbury* actuators offer a total value and performance package. Available with pneumatic Valv-Powr® VPVL actuators, V-Series, ADC-Series, LCU-Series, and LCR-Series electric actuators and with

Stonel® Quartz®, Eclipse®, and Hawkeye® digital monitors or VCTs, the packages have a wide range of applications. Visit our website at: [www.metso.com/automation](http://www.metso.com/automation).

**DIMENSIONS**



Valve Size DN	Series 916D, PN16 Approximate Dimensions - mm																Hex Size	ISO Bonnet	Approx Weight kg	
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S				T
15	115	49	95	65	13	27	34	41	86	127	M5	36	14	4	8	5	16	13	F03	1.9
20	120	56	105	75	22	42	52	66	94	165	M5	42	14	4	8	8	16	22	F04	4.8
25	125	56	115	85	25	45	55	69	100	165	M5	42	14	4	13	8	18	25	F04	6.7
40	140	67	150	110	38	57	71	89	113	203	M6	50	18	4	16	9	18	38	F05	8.3

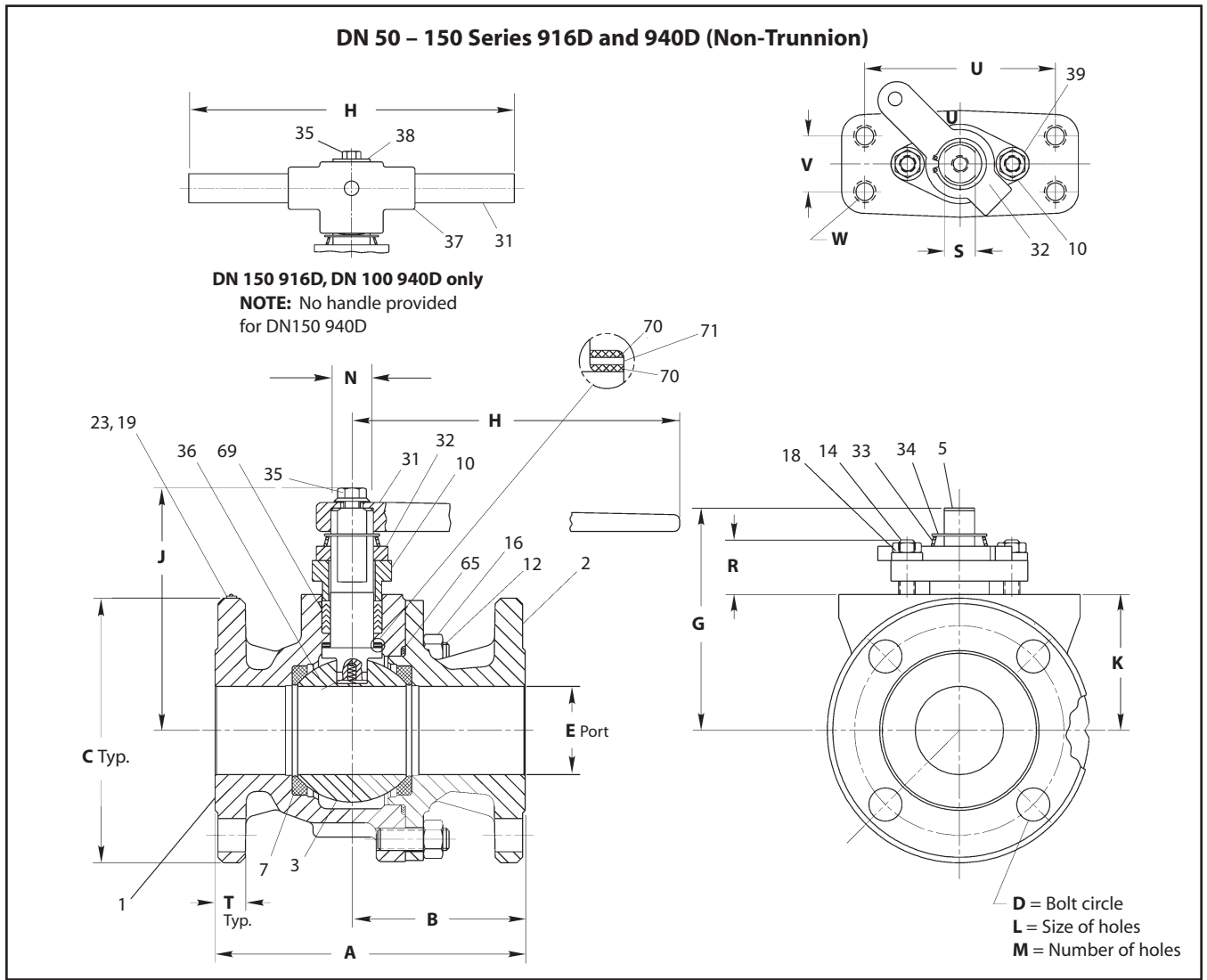
Valve Size DN	Series 940D, PN40 Approximate Dimensions - mm																Hex Size	ISO Bonnet	Approx Weight kg	
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S				T
15	130	49	95	65	13	27	34	41	86	127	M5	36	14	4	8	5	16	13	F03	2.7
20	150	56	105	75	22	42	52	66	94	165	M5	42	14	4	13	8	16	22	F04	5.2
25	160	56	115	85	25	45	55	69	100	165	M5	42	14	4	13	8	18	25	F04	7.2
40	200	67	150	110	38	57	71	89	113	203	M6	50	18	4	16	9	18	38	F05	9.2

<b>BILLS OF MATERIALS AND PARTS LIST</b>			
<b>DN 15 – 40 Full Bore Series 916D and 940D Valves</b>			
<b>Part No.</b>	<b>Part Name</b>	<b>Material</b>	
		<b>Carbon Steel (22)</b>	<b>316 Stainless Steel (36)</b>
1	Body <sup>1</sup>	DIN 1.0619/ASTM A216 Gr. WCB	DIN 1.4408/ASTM A351 Gr. CF8M
2	Insert <sup>1</sup>	DIN 1.0619/ASTM A216 Gr. WCB	DIN 1.4408/ASTM A351 Gr. CF8M
3	Ball	316 Stainless steel	
4	Stem	316 Stainless steel	
5	Seat	<i>Xtreme</i>	
6	Body Seal	TFM	
7	Secondary Stem Seal <sup>2</sup>	Graphite	
8	Primary Stem Seal	TFM	
13	Stem Bearing	Filled PTFE	
16	Hex Nut	Carbon steel (zinc plated)	300 Series Stainless steel
17	Handle	Carbon steel (zinc plated)	300 Series Stainless steel
19	Lockwasher	Carbon steel (zinc plated)	300 Series Stainless steel
20	Compression Plate	316 Stainless steel	
25	Socket Cap Screw	Stainless steel	
26	Handle Stop Spacer	Stainless steel	
29	Hex Cap Screw	ISO 3506, A2	
31	Disc Springs	Inconel	

**Note 1:** When investment castings are used, chemical and physical properties are determined from a master heat in accordance with ANSI B16.34-2004 Sect. 5.1.3.

**Note 2:** *Fire-Tite* construction only.

**DIMENSIONS**



Valve Size DN	Series 916D, PN16 Approximate Dimensions - mm																Weight kg		
	A	B	C	D	E	G	H	J	K	L	M	N	R	S	T	U		V	W
50	230	151	165	125	50	128	356	140	78	18	4	25	31	18	18	110	32	M12	15
80	280	181	200	160	76	149	356	161	99	18	8	25	31	18	20	110	32	M12	24
100	300	185	220	180	102	211	506	223	140	18	8	35	45	25	20	130	32	M12	43
150	350	186	285	240	152	272	762	296	185	22	8	44	45	32	22	160	40	M16	109

Valve Size DN	Series 940D, PN40 Approximate Dimensions - mm																Weight kg		
	A	B	C	D	E	G	H	J	K	L	M	N	R	S	T	U		V	W
50	230	141	165	125	51	128	356	140	78	18	4	25	31	18	20	110	32	M12	26
80	280	161	200	160	76	191	506	202	119	18	8	35	44	25	24	130	32	M12	33
100	300	162	235	190	102	231	762	255	144	22	8	44	44	32	24	160	40	M16	57
150	350	181	300	250	152	307	N/A	—	147	26	8	50	70	35	28	230	90	M24	134

BILLS OF MATERIALS AND PARTS LIST			
DN 50 – 150 Series 916D and 940D Non Trunnion			
Part No.	Part Name	Material	
		Carbon Steel	316 Stainless Steel
1	Body <sup>1</sup>	DIN 1.0619/ASTM A216 Gr. WCB	DIN 1.4408/ASTM A351 Gr. CF8M
2	Body Cap <sup>1</sup>	DIN 1.0619/ASTM A216 Gr. WCB	DIN 1.4408/ASTM A351 Gr. CF8M
3	Ball	+316 Stainless steel	
5	Stem	+316 Stainless steel	
7	Seat	<i>Xtreme</i>	
10	Compression Plate	Stainless steel	
12	Body Stud	EN 10269, 1.7225/ASTM A193, Gr. B7	ISO 3506, A2/ASTM A193, Gr. B8
14	Bonnet Stud	EN 10269, 1.7225/ASTM A193, Gr. B7	ISO 3506, A2/ASTM A193, Gr. B8
16	Body Stud Nut	EN 10269, 1.1191/ASTM A194, Gr. 2H	ISO 3506, A2/ASTM A194, Gr. 8
18	Bonnet Stud Nut	EN 10269, 1.1191/ASTM A194, Gr. 2H	ISO 3506, A2/ASTM A194, Gr. 8
19	Identification Tag	Stainless steel	
23	Rivet	Stainless steel	
31	Handle <sup>2</sup>	Ductile iron or carbon steel <sup>3</sup>	
32	Indicator Stop	Carbon steel	
33	Spring	Stainless steel	
34	Retaining Ring	Stainless steel	
35	Handle Screw	Carbon steel	
36	Grounding Spring	Inconel	
37	"T" Handle Adapter <sup>3</sup>	Ductile iron	
38	Flat Washer <sup>2</sup>	Carbon steel	
39	Stop Bushing	316 Stainless steel	
65	Body Gasket	Spiral wound PTFE/316 Stainless steel	
69	Packing	molecularly enhanced PTFE	
70	Stem Bearing	Filled PTFE	
71	Secondary Stem Seal	Graphite	

**Note 1:** When investment castings are used, chemical and physical properties are determined from a master heat in accordance with ANSI B16.34-2004 Sect. 5.1.3.

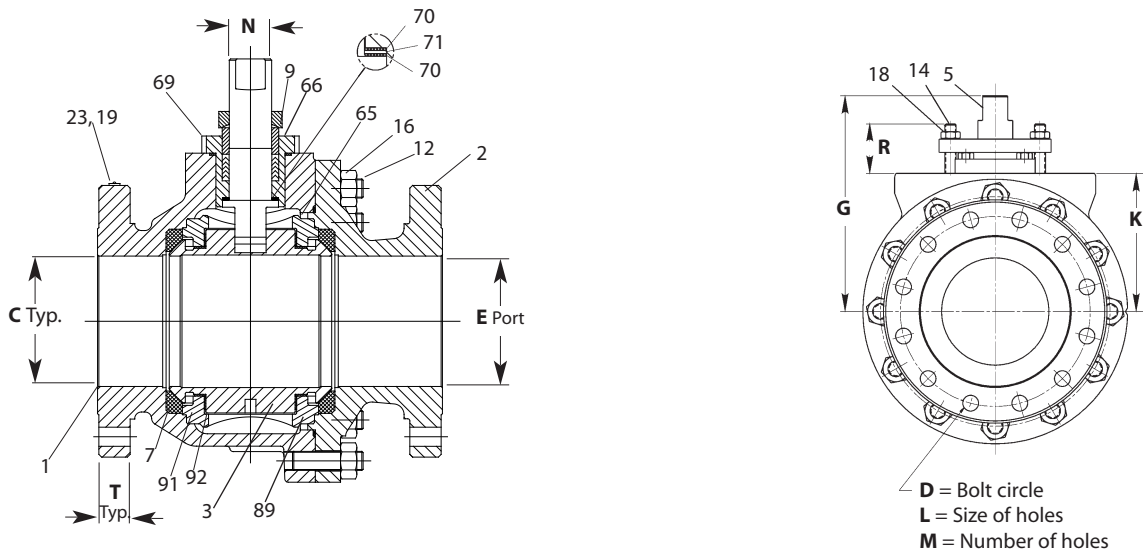
**Note 2:** DN150, 940D provided without handle.

**Note 3:** DN150, 916D and DN100, 940D "T" handle only.



**DIMENSIONS**

**DN 150, Series 940D (Trunnion)**



Valve Size DN	Series 940D, PN40 Approximate Dimensions – mm																Weight kg
	A	B	C	D	E	G	K	L	M	N	R	S	T	U	V	W	
150	350	181	300	250	152	307	197	26	8	50	70	35	28	230	90	M24	141

BILLS OF MATERIALS AND PARTS LIST			
Series 940D, DN 150 (Trunnion)			
Part No.	Part Name	Body Material	
		Carbon Steel (22) All Series	316 Stainless Steel (36) All Series
1	Body <sup>1</sup>	DIN 1.0619/ASTM A216 Gr. WCB	DIN 1.4408/ASTM A351 Gr. CF8M
2	Body Cap <sup>1</sup>	DIN 1.0619/ASTM A216 Gr. WCB	DIN 1.4408/ASTM A351 Gr. CF8M
3	Ball	316 Stainless steel	
5	Stem	316 Stainless steel	
7	Seat	Xtreme - as specified	
8	Stem Retainer	Carbon steel ASTM A216 Gr WCB	Stainless steel ASTM A351 Gr CF8M
9	Gland Follower	Carbon Steel, Stainless steel	
10	Compression Plate	Stainless steel	
12	Body Stud	EN 10269, 1.7225/ASTM A193, Gr. B7	ISO 3506, A2/ASTM A193, Gr. B8
13	Stem Retainer Bolt	EN 10269, 1.7225/ASTM A193, Gr. B7	ISO 3506, A2/ASTM A193, Gr. B8
14	Stud	EN 10269, 1.7225/ASTM A193, Gr. B7	ISO 3506, A2/ASTM A193, Gr. B8
16	Nut	EN 10269, 1.1191/ASTM A194, Gr. 2H	ISO 3506, A2/ASTM A194, Gr. 8
18	Nut	EN 10269, 1.1191/ASTM A194, Gr. 2H	ISO 3506, A2/ASTM A194, Gr. 8
19	Identification Tag	Stainless steel	
23	Rivet	Stainless steel	
36	Grounding Spring	Inconel	
65	Body Gasket	Spiral Wound PTFE / 316 Stainless steel	
66	Stem Retainer Seal	Spiral Wound PTFE / 316 Stainless steel	
69	Packing	molecularly enhanced PTFE	
70	Stem Bearing	Filled PTFE	
71	Secondary Stem Seal	Graphite	
89	Trunnion	Carbon Steel	Stainless steel
91	Bearing Spacer	Filled PTFE	
92	Trunnion Bearing	316 Stainless steel	

**Note 1:** When investment castings are used, chemical and physical properties are determined from a master heat in accordance with ANSI B16.34-2004 Sect. 5.1.3

### ACTUATORS

Metso offers a full line of integrally designed actuators for automated systems or for easier control of inaccessible or remote valves. Pneumatic actuators that include double-acting and spring-return piston, vane, and rack and pinion units, spring-diaphragm types, and electric actuators are available for all valves. Electric actuators are available with both watertight and hazardous location enclosures. For

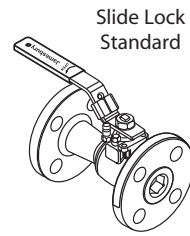
further information on actuators for Series 9000 valves, see the following:

Type	Bulletin
Spring-Diaphragm Actuators	A110-4
VPVL Mod D Actuators	A111-5
V Series electric actuators	A200-1
ADC Series electric actuators	A201-1

## ACCESSORIES

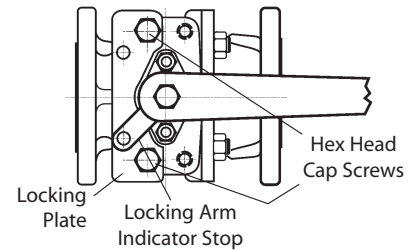
### Locking Devices

When safety measures are necessary, a reliable locking plate is available to allow the valve to be padlocked in either the open or closed position. Proper figure numbers are shown in the Accessory Table below.



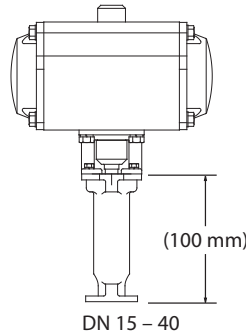
Slide Lock Standard  
DN 15 – 40 Series 9000

DN 50 – 150 Series 916D  
DN 50 – 100 Series 940D  
LD56, 57 & 58

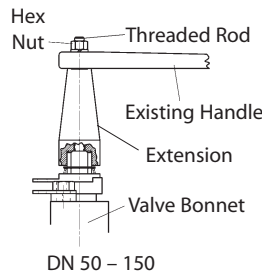


### Bonnet/Stem Extensions SE-096, 097 & 098

100 mm bonnet/stem extensions are available for applications that require insulated pipe, particularly useful for automated products, extensions can also be used to prevent interference between actuators and companion pipelines and equipment. They are ideal as extension that require locking lever or locking oval handle capability. Stainless steel construction offers the option of using the extension to complement the carbon steel stem extension (SE-093, 094 & 095) offering.



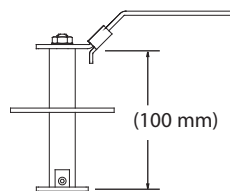
DN 15 – 40



DN 50 – 150

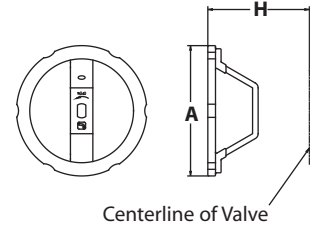
### Stem Extensions SE-093, 094 & 095

A standard 100 mm stem extension is offered for Series 9000 valves DN 15 – 40 for improved accessibility, particularly when used in insulated pipelines. Stem extension kits can be ordered factory-mounted or shipped separately for field mounting



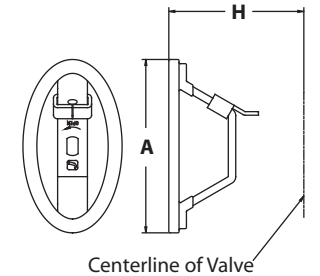
### Round Handles

Series 9000 ball valves have optional round handles available. To order handles separately, specify the part number shown in the accessories table below.



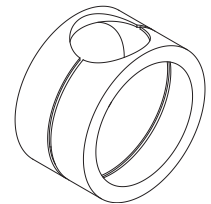
### Oval handles with slide-lock

Optional oval handle saves space and may be padlocked to retain the valve in the open or closed position.



### Cavity Fillers

Cavity fillers are available in 9000 series full bore valves. The fillers are TFE and used for sanitary applications and in processes where cross contamination is a concern. Food processing, pharma-chemicals, cosmetics, paints, solvents, finishes and dyes are typical applications where fillers are employed.



Accessory Table – mm									
Valve Size Full Bore	Locking Device	Stem Ext.	Bonnet/ Stem Ext.	Locking Oval	Round	Round/Oval Handle		Allowable Max. Torque FT•LBS (N•m)	
						Dimension A	Dimension H	Round	Oval
15	Standard Equipment	SE-093	SE-096	112-0108-30	112-0105-30	101.6	75.2	12	12
20		SE-094	SE-097	112-0109-30	112-0106-30	114.3	94.0	24	24
25		SE-094	SE-097	112-0109-30	112-0106-30	114.3	97.3	24	24
30		SE-095	SE-098	112-0110-30	112-0107-30	146.0	120.7	34	34
40		SE-095	SE-098	112-0110-30	112-0107-30	5146.0	4125.5	34	34
50	LD56	SE-60							
80 916D	LD56	SE-60							
80 940D	LD57	SE-61							
100 916D	LD57	SE-61							
100 940D	LD58	SE-62							
150 916D	LD58	SE-62							
						NA			

### VALVE TORQUE DATA

Use these torque charts as a guide for actuator selection. Additional requirements may be imposed by media characteristics, trim, and frequency of valve operation. For clean lubricating fluid service, required torque for *Xtreme* (X) seated valves only may be reduced 20% when the valve is equipped with corrosion resistant trim. For difficult services such as slurries and semi-solids, and for oxygen, increase values by 50%. If in doubt, err on the side of safety by using a larger actuator than would normally be selected.

Valves requiring increased stem seal performance should use E-Pak®. Refer to bulletin B115-4. *E-Pak* valves require an increase in operating torque.

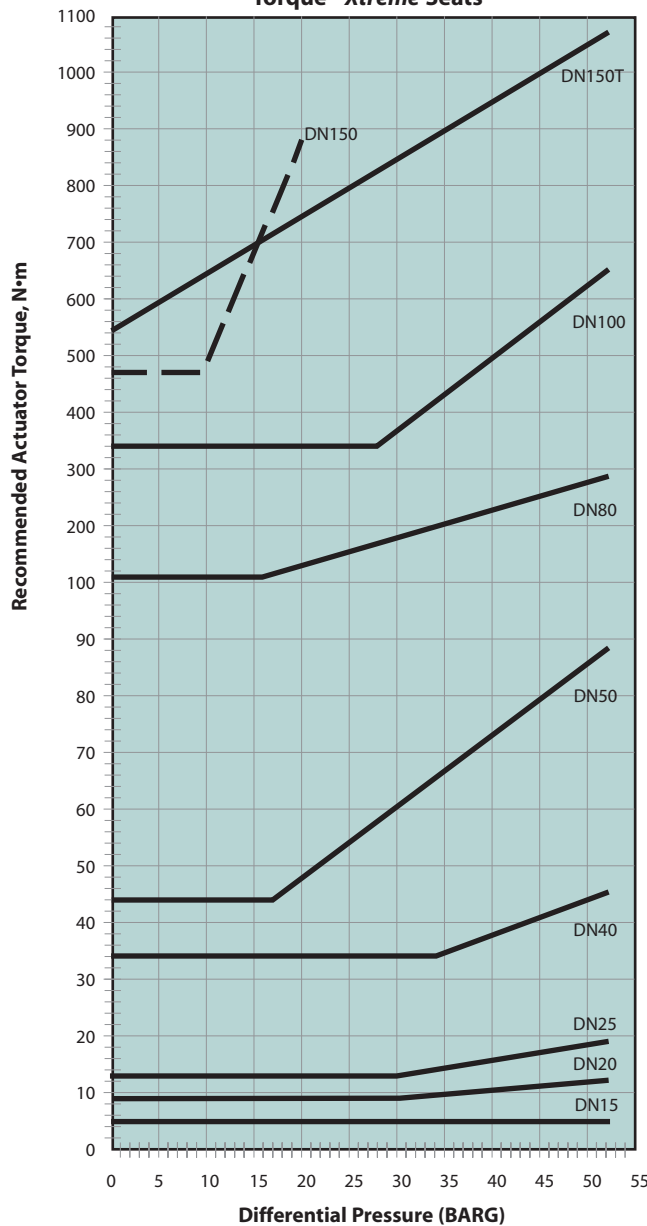
Torque output values and actuator selection tables for the different types of *Jamesbury* actuators are contained in the bulletins listed below.

Manual Gear Actuators	A100-1
B-Series Piston Actuators	6B20
Quadra-Powr® X Spring Diaphragm	
Rotary Actuators	A110-4
<i>Valv-Powr</i> Series VPVL	A111-5
VPVL Stainless Steel	A111-4
V Series Electric Actuators	A200-1
ADC Series Electric Actuators	A201-1
LCU-Series Electric Actuators	A202-1
LCR-Series Electric Actuators	A203-1

#### PN16 AND PN40 Valve Torque Data

#### *Xtreme* (X) Seated Valves DN 15 – 150

##### DIN 9000 Series, FULL BORE Torque - *Xtreme* Seats



## HOW TO ORDER

**EXAMPLE:** A DN50, PN40 valve (940D) in *Fire-Tite* design with raised-face flanges (31), carbon steel body (22), and 316 stainless steel trim (36), with *Xtreme* seats (XTZ) and molecularly enhanced PTFE stem seals is written: 50 940D-31-2236XTZ1.

1	2	3	—	4	—	5	6	7	8
50	940D	—		31		22	36	XTZ	1

1	Size
15	DN 15
20	DN 20
25	DN 25
40	DN 40
50	DN 50
80	DN 80
100	DN 100
150	DN 150

2	Valve Series & Style	Size Range
<b>916D</b>	Full Bore PN16	DN15 - 150
<b>940D</b>	Full Bore PN40	DN15 - 150

3	Special Construction
—	Standard (no entry)
<b>C</b>	Chlorine
<b>N</b>	NACE MR0103
<b>O</b>	Oxygen
<b>Q</b>	TFE Cavity Filler (316SS valves only)

4	End Connection Construction	Size Range
<b>11</b>	Raised Face Non- <i>Fire-Tite</i> Non-Trunnion	DN 15 – 150 Full Bore
<b>31</b>	Raised Face <i>Fire-Tite</i> Non-Trunnion	DN 15 – 150 Full Bore
<b>71</b>	Raised Face <i>Fire-Tite</i> Trunnion	DN 150 – PN40 Full Bore

5	Body Material*	Size Range
<b>22</b>	DIN 1.0619/A216 Gr. WCB	All
<b>36</b>	DIN 1.4408/A351 Gr. CF8M	All

\*Other materials available on application

6	Ball & Stem Materials*	Size Range
<b>36</b>	316 Stainless Steel	All
<b>71</b>	Monel	All
<b>00</b>	Same as body	All (Carbon steel not available)

\*Other materials available on application

7	Seat / Body Seal / Stem Seal Material
<b>XTZ</b>	<i>Xtreme</i> /PTFE*/TFM

\*Note: TFM on sizes DN 40 and smaller

8	Bolts	Nuts	Application
<b>1*</b>	EN 10269, 1.7225/ ASTM A193 Gr B7	EN 10269 Gr 1.1191/ ASTM A194 Gr 2H	Carbon Steel
<b>2</b>	ISO 3506 A2 ASTM A193 Gr B8	ISO 3506 A2 ASTM A194 Gr 8	Stainless Steel

Bolts and nuts for DN40 and smaller valves apply to bonnet hardware only. For DN50 and larger bolts and nuts pertain to bonnet hardware and body and cap fasteners.

\* Stainless bolting standard for DN40 and smaller

**Note 4:** DN 40 and smaller use Monel bonnet hardware for NACE MR0103 compatibility.

## STANDARDS AND SPECIFICATIONS

### The Company

ISO 9001 – 2000 ANSI/150/ASQ Q9001 – 2000  
Pressure Equipment Directive 97/23/EC

### Available Standards

AD2000	Merkblatt
API 598	American Petroleum Institute - Valve Inspection and testing
API 607	American Petroleum Institute - Fire Test for Soft Seated Valves (Division of refining)
API 608	Metal Ball Valves Used in On-Off Service that have Buttwelded or Flanged Ends for Size DN 15 – 40 NPS
ANSI/ASME B16.34	American National Standard - Steel Valves - Flanged and Buttwelded End
ANSI/FCI 70-2-1991	American National Standard - For Control Valve Seat Leakage
ATEX	Atmosphere Explosive
ISO 15848-1	Industrial Valves - Fugitive Emissions - Measurement, Test & Qualification Procedures
ISO 17292	Metal ball valves for petroleum, petrochemical and allied industries
ISO 5211	Industrial Valve — Part turn Actuator attachment
ISO 5752:1982	International Standard for Organization Metal Valves for use in Flanged Piping Systems
ISA 75.02	Valve Sizing Coefficient Cv, Piping Geometry Factor Fp and Pressure Drop Limitation XT
ISA 575.19	Hydrostatic Testing of Control Valves
ISO 5211	Dimensions for Attachment of Actuators/Gear Boxes to Valves (ISO Mounting)
ISO 9000	
MSS-SP-55	Manufacturers Standardization Society - Quality Standards for Steel Castings
MSS-SP-6-1996	Standard Finishes for Contact Faces of Pipe Flanges and Connecting-End Flanges of Valves and Fittings
PED 97/23/EC	Pressure Equipment Directive
97/23/EC	European Pressure Equipment Directive
ISO 5208	Industrial Valves — Pressure Testing of Valves



Subject to change without prior notice.

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