

**APPENDIX D - SHOP DRAWINGS OF CITY SUPPLIED VALVES**



**Submittal Data Sheet**

Page 1 of 4

Date: 4/7/2010

City of Winnipeg c/o Flo-Crest Equipment  
 52-A Caithness Street  
 Winnipeg, Manitoba

Cust. P.O. #: NA  
 Fact Order #: TBD  
 Fact SO #: TBD  
 Rev. #: 0

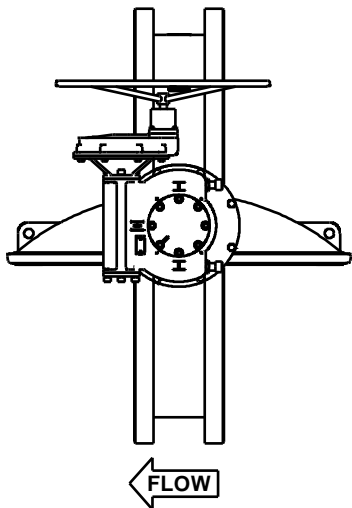
Factory Item	Cust. Item	Qty	Description	Part No.
1	1	1	Crispin/K-Flo 60" AWWA C504 Butterfly Valve w/ Worm Gear Manual Actuator and Hand Wheel	KK6032
Style:	473		AWWA Butterfly Valve 24"-168" - Flanged - 150B	
Size:	60		60 Inch	
End Connection:	Flg - 150		Flanged Drilling; ANSI 125/150	
Body Material:	CI		Cast Iron, ASTM A126 ClassB	
Packing:	Packing		PTFE; Self Adjusting	
Seat Material:	Buna		BUNA - N (nitrile), D2000	
Service Class:	150B		AWWA Class 150B	
Disc:	DI		Ductile Iron with 316 Stainless Steel Edge	
Shaft:	304		Type 304 Stainless Steel, ASTM A276	
Paint:	47		12 mils minimum of Crispin Blue Epoxy Tnemec Series 141 "pota-pox" (NSF Std. 61) on Interior and Exterior	
Act Type:	RTG-IW8R-HW		Rorork Gear IW8R w/ Handwheel	

**SPECIAL FEATURES**

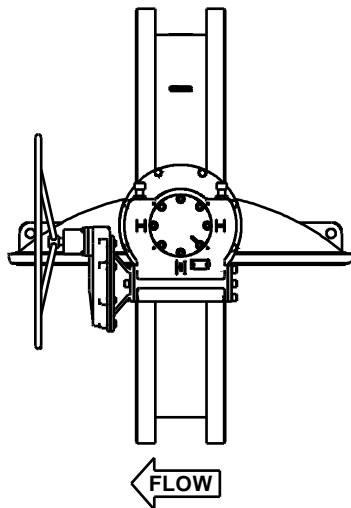
*Flange Bolt Holes to be Spot Faced for Nuts  
 Interior and Exterior to be Holiday Free (low voltage)  
 Seat Test to be performed in Vertical Position  
 City of Winniped to be given 2 week notice prior to testing*

**RELATED DOCUMENTS**

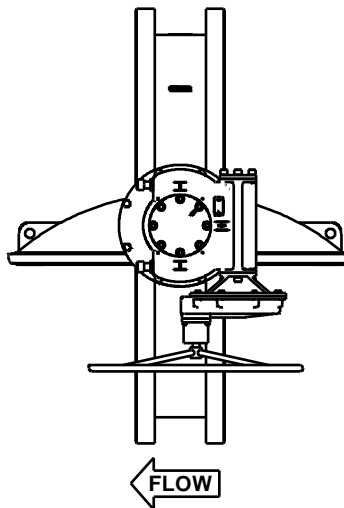
NSF 61 UL Certification  
 Tnemec Series 141 Pota-Pox Specification Data Sheets  
 Crispin/K-Flo Standard Terms and Warranty  
 Letter of Compliance with AWWA C504



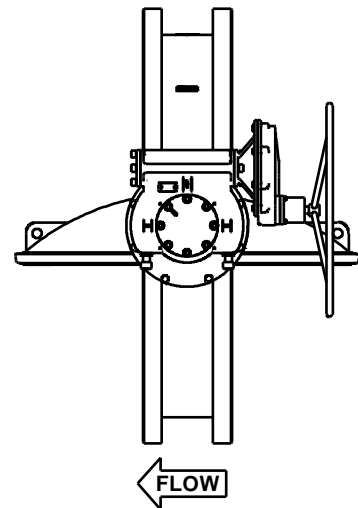
ASS'Y "B1" (STD. MOUNTING)



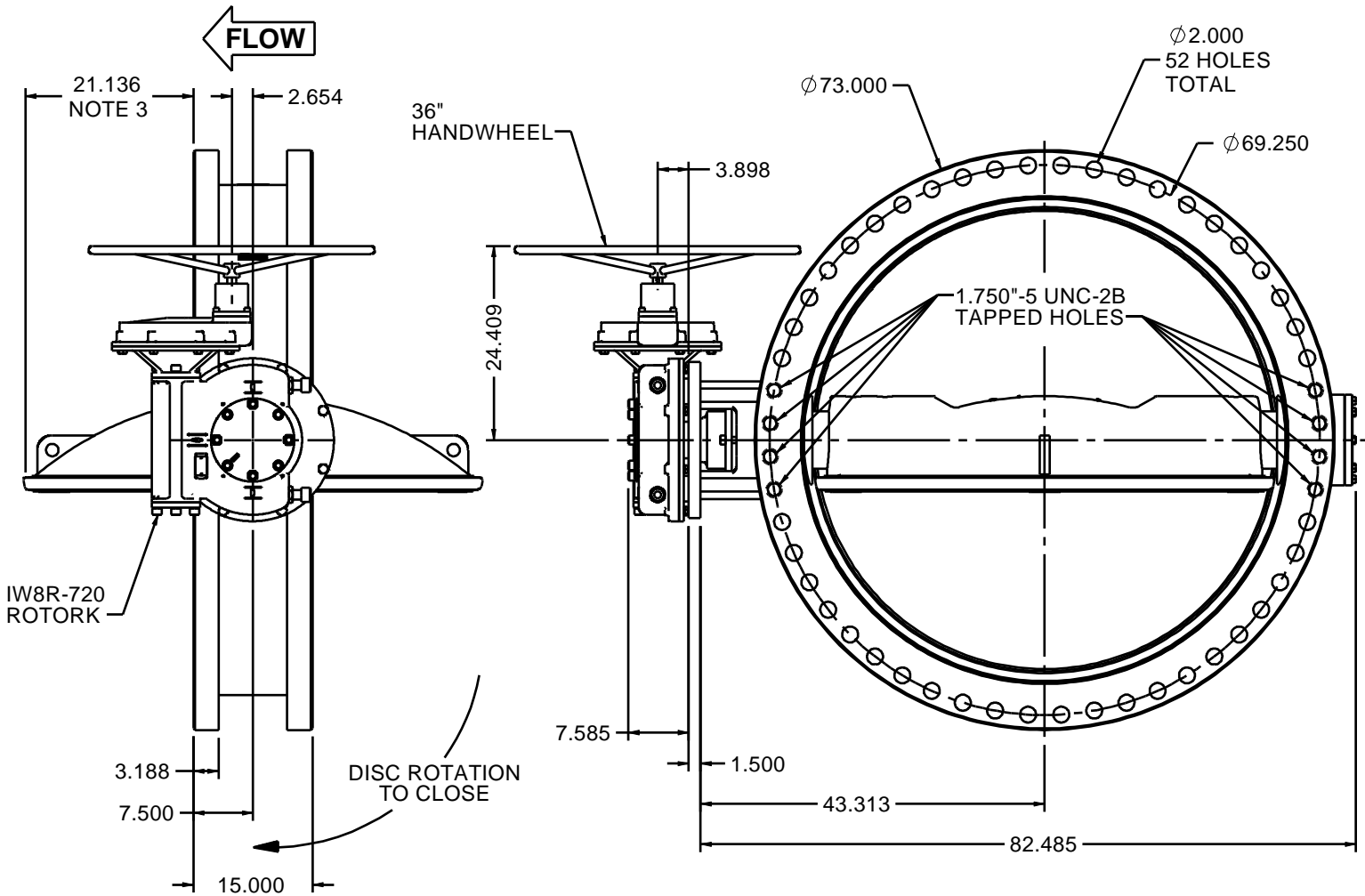
ASS'Y "B2"



ASS'Y "B3"



ASS'Y "B4"

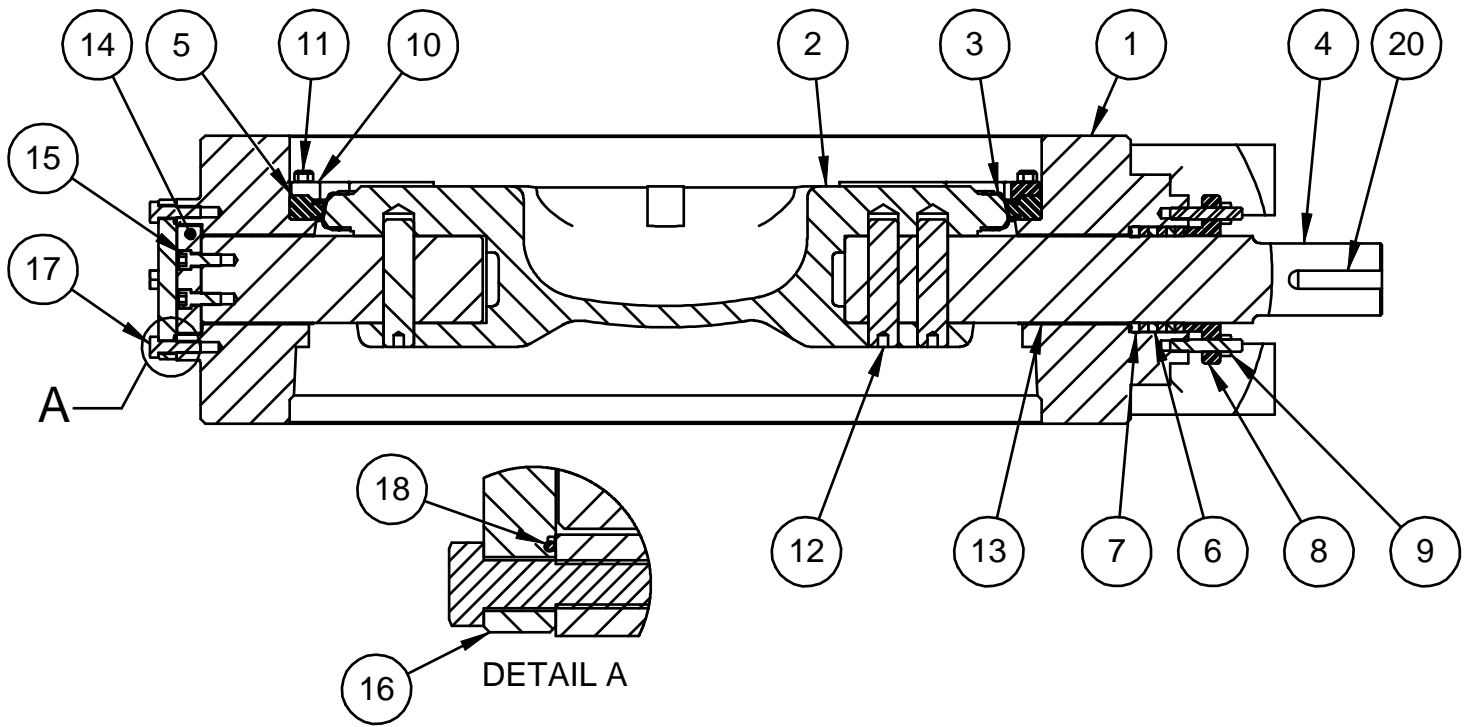


NOTES:

1. 150 PSIG MAXIMUM WORKING PRESSURE.
2. THIS VALVE CONFORMS TO AWWA C504.
3. "Q" IS THE MINIMUM ALLOWABLE PIPE OR FLANGE INSIDE DIAMETER AT THE CENTERED BODY FACE TO PROTECT THE DISC SEALING EDGE FROM DAMAGE WHEN OPENING THE VALVE.
4. FLOW RECOMMENDED IN DIRECTION SHOWN.
5. VALVE MAY BE INSTALLED WITH SHAFT IN EITHER HORIZONTAL OR VERTICAL POSITION.
6. ROTATE HANDWHEEL CLOCKWISE TO CLOSE VALVE.
7. ALL DIMENSIONS ARE IN INCHES.

REDRAWN:		SIZE	DWG. NO.	REV
CHECKED:		C	60-150B IW8 HW	0
DRAWN: C. GEARY	10/23/06			

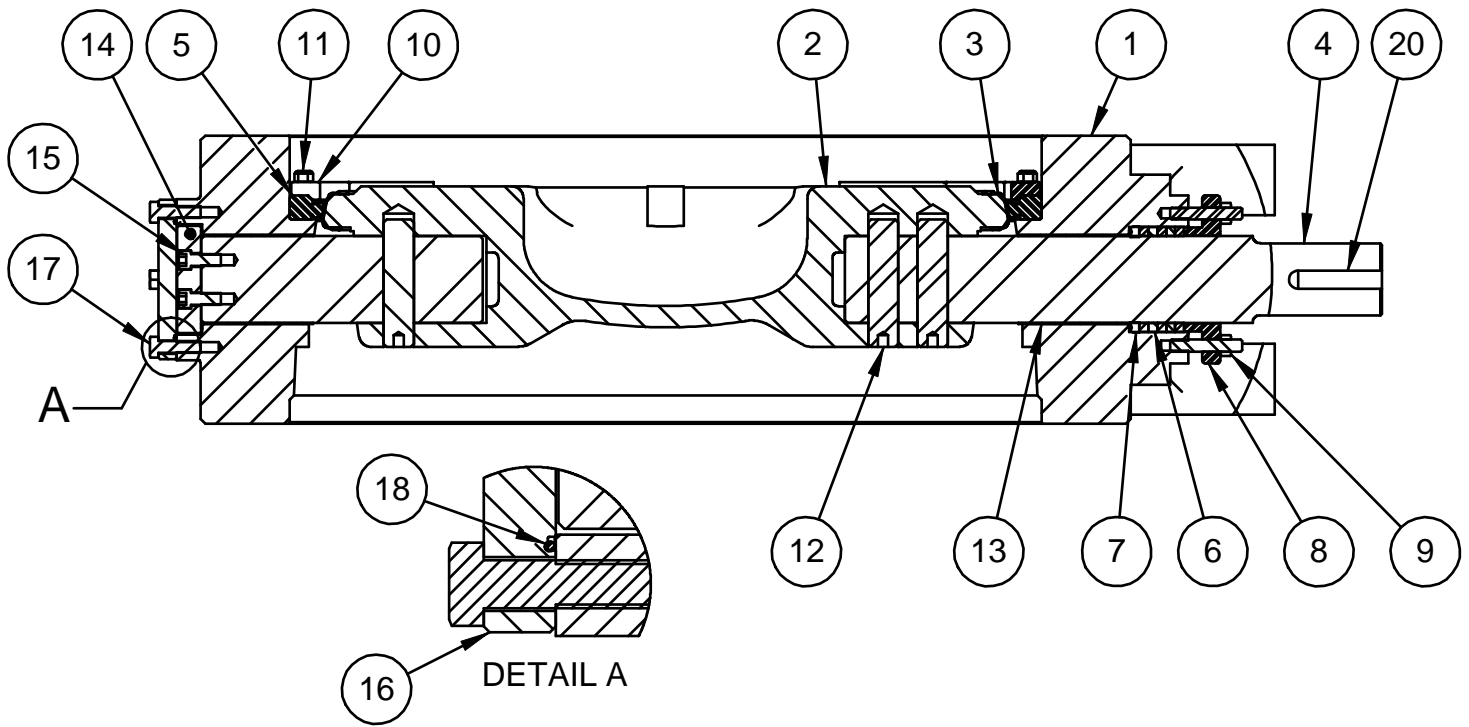
**K-FLO**  
 BUTTERFLY VALVES  
 BY  
 CRISPIN VALVES  
 800-247-VALVE  
 WWW.CRISPINVALVE.COM  
 60"-150B FLANGED  
 BUTTERFLY VALVE WITH  
 ROTORK IW8R-720  
 AND 36" HANDWHEEL




ITEM	DESCRIPTION	MATERIAL	REMARKS
1	BODY	CAST IRON	ASTM A126 CLASS B
2	DISC	DUCTILE IRON	ASTM A536 GR. 65-45-12
3	DISC EDGE	316 STAINLESS STEEL	ASTM A240 TYPE 316
4	UPPER & LOWER SHAFT	304 STAINLESS STEEL	ASTM A276 TYPE 304
5	SEAT	BUNA-N	ASTM D2000
6	PACKING	TEFLON COMPOSITE FIBER	PALMETTO NO. 1392-H OR EQUIV.
7	V-TYPE COMPRESS PACKING	BUNA-N	ASTM D2000
8	GLAND PLATE	RED BRASS	ASTM B62 UNS C83600
9	STUDS & NUTS (GLAND)	304 STAINLESS STEEL	ASTM A276 TYPE 304
10	RETAINING RING SEGMENTS	316 STAINLESS STEEL	ASTM A743 GRADE CF8M
11	STUDS & NUTS (RING)	304 STAINLESS STEEL	ASTM A276 TYPE 304
12	SHAFT PIN	410 STAINLESS STEEL	ASTM A276 TYPE 410
13	BEARING	TFE - 316 STAINLESS STEEL BACKING	TFE/ASTM A240 TYPE 316
14	THRUST COLLAR	304 STAINLESS STEEL	ASTM A240 TYPE 304
15	SCREWS (THRUST COLLAR)	304 STAINLESS STEEL	ASTM F594 GRADE 1
16	COVER PLATE (BOTTOM)	410 STAINLESS STEEL	ASTM A240 TYPE 410
17	SCREW (COVER PLATE)	304 STAINLESS STEEL	ASTM A193 GRADE B8
18	SEAL O-RING	BUNA-N	ASTM D2000
20	KEY	CARBON STEEL	ASTM A108 UNS G10180

<b>K-FLO AWWA BUTTERFLY VALVES FROM CRISPIN VALVES</b>		<b>TITLE: CROSS-SECTION &amp; MATERIAL LIST FOR 24" TO 72", FLANGED BUTTERFLY VALVE FIGURE 473</b>	
DWN. BY: BJL	DATE: 2005 8-11		DWG. NO. <b>101473-ML</b>
DATE:	APPD. BY:		REV. <b>1</b>
		SIZE: <b>A</b>	SHEET <b>1</b> OF <b>1</b>

1	2009 06-18	CTG		REVISED PARTS LIST AND MATERIALS
REV.	DATE	BY	APPD	REVISION



ITEM	DESCRIPTION	MATERIAL	REMARKS
1	BODY	CAST IRON	ASTM A126 CLASS B
2	DISC	DUCTILE IRON	ASTM A536 GR. 65-45-12
3	DISC EDGE	316 STAINLESS STEEL	ASTM A240 TYPE 316
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5	SEAT	BUNA-N	ASTM D2000
6	PACKING	TEFLON COMPOSITE FIBER	PALMETTO NO. 1392-H OR EQUIV.
7	V-TYPE COMPRESS PACKING	BUNA-N	ASTM D2000
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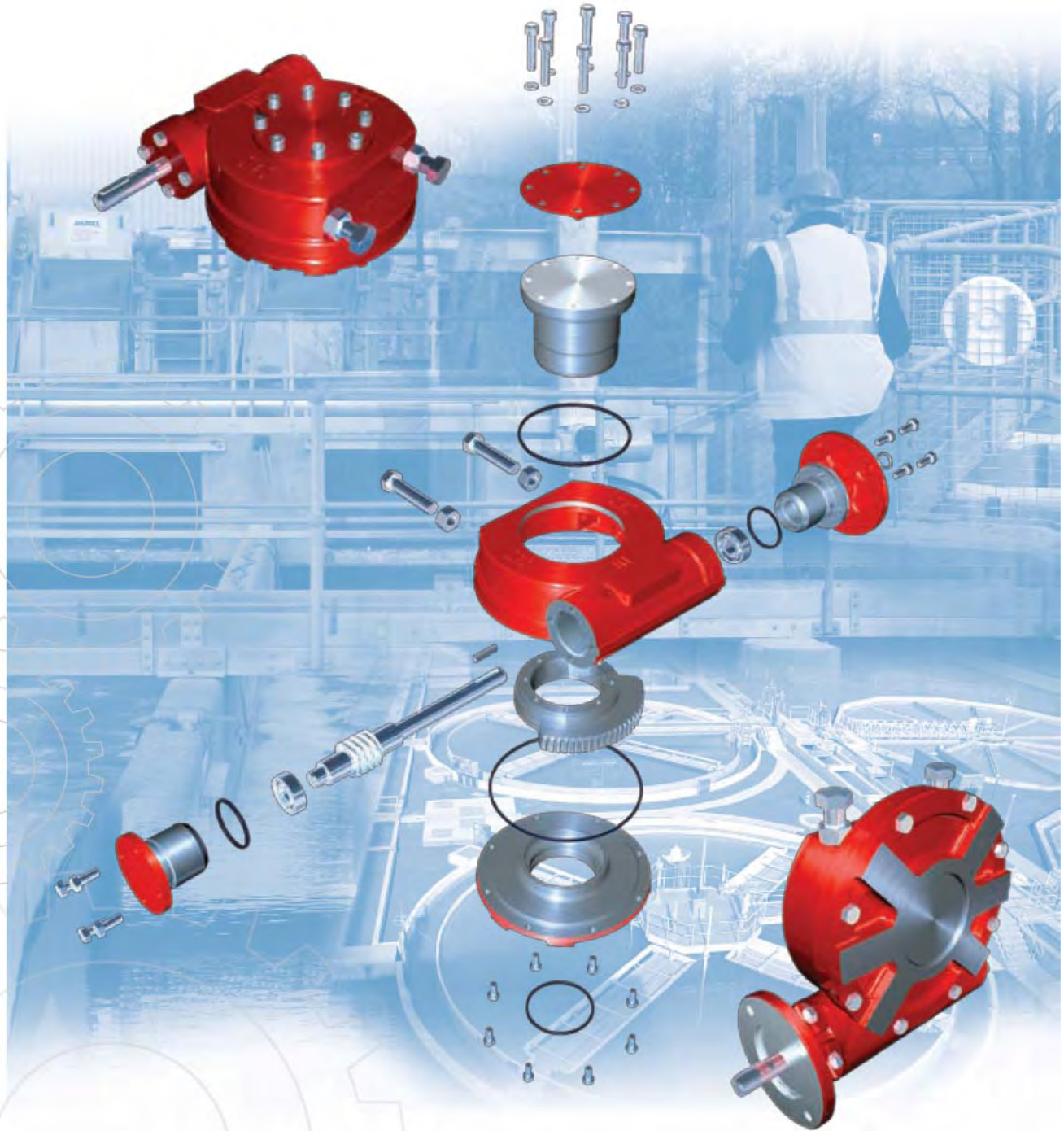
<b>K-FLO AWWA BUTTERFLY VALVES FROM CRISPIN VALVES</b>		<b>TITLE: CROSS-SECTION &amp; MATERIAL LIST FOR 24" TO 72", FLANGED BUTTERFLY VALVE FIGURE 473</b>	
DWN. BY: BJL	DATE: 2005 8-11		DWG. NO. <b>101473-ML</b>
DATE:	APPD. BY:		REV. <b>1</b>
SIZE: A		SHEET 1 OF 1	

1	2009 06-18	CTG		REVISED PARTS LIST AND MATERIALS
REV.	DATE	BY	APPD	REVISION

# IW Quarter-turn

## Gearbox Series

**rotork**<sup>®</sup>  
Gears



Cast Iron Housing Gearboxes - IW Quarter-turn Gear Series

# IW Gearbox Series

## IW Quarter-turn Gearbox Series

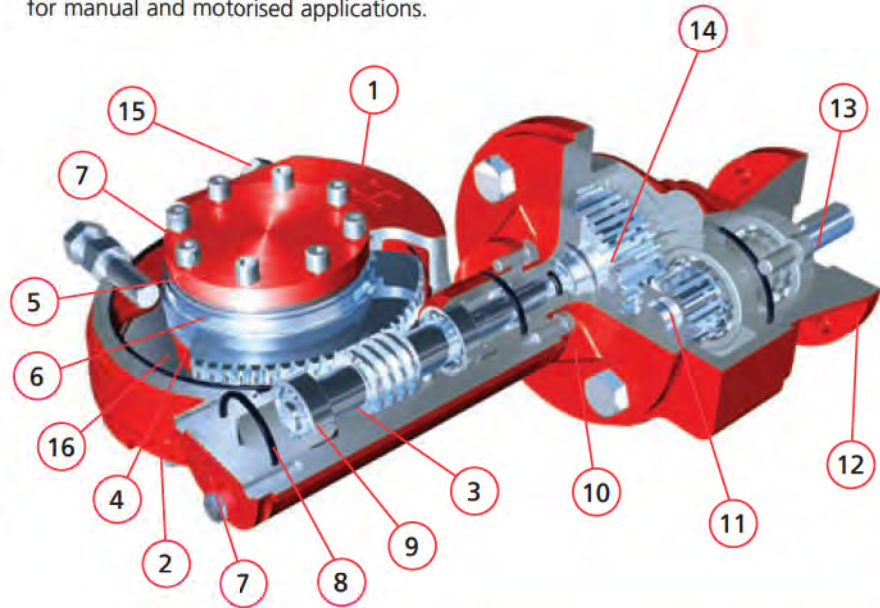
### Description

The IW series of quadrant worm operators has been designed with customer stocking in mind, and features a removable steel output sleeve to facilitate bore and keyway machining. This separate output sleeve can be positioned through 90° steps on the IW3 & through 45° steps on the IW4 to IW11. The baseplate can be positioned through 45° steps on the IW3 to IW5 and through 22.5° steps on the IW6 to IW12. This facility allows for on or off centre mounting on the valve stool without special machining.

Operating temperature normally ranges from -40 °F to +250 °F, although other temperature ranges are available on request. Standard input (for actuation purposes) and output flanges are to MSS standard. However, equivalent standards such as ISO & DIN can be supplied.

### Application

Rotork Gears IW series operators are quarter-turn devices intended for the operation of ball, plug and butterfly valves as well as power and process dampers. The gearboxes are suitable for manual and motorised applications.



### Features

- Totally enclosed gearing
- Grease filled for life & fully sealed
- Comprehensive gear ratios combined with a selection of auxiliary input spur gear reducers
- Angular contact bearings supporting worm shaft
- Removable output sleeve
- Repositionable baseplate facility
- Adjustable mechanical stops (at 0° and 90° ±5°)

### Environmental specification

- Enclosure: IP67 standard
- Temperature: -40 °F to +250 °F (-40 °C to +120 °C)

### Options

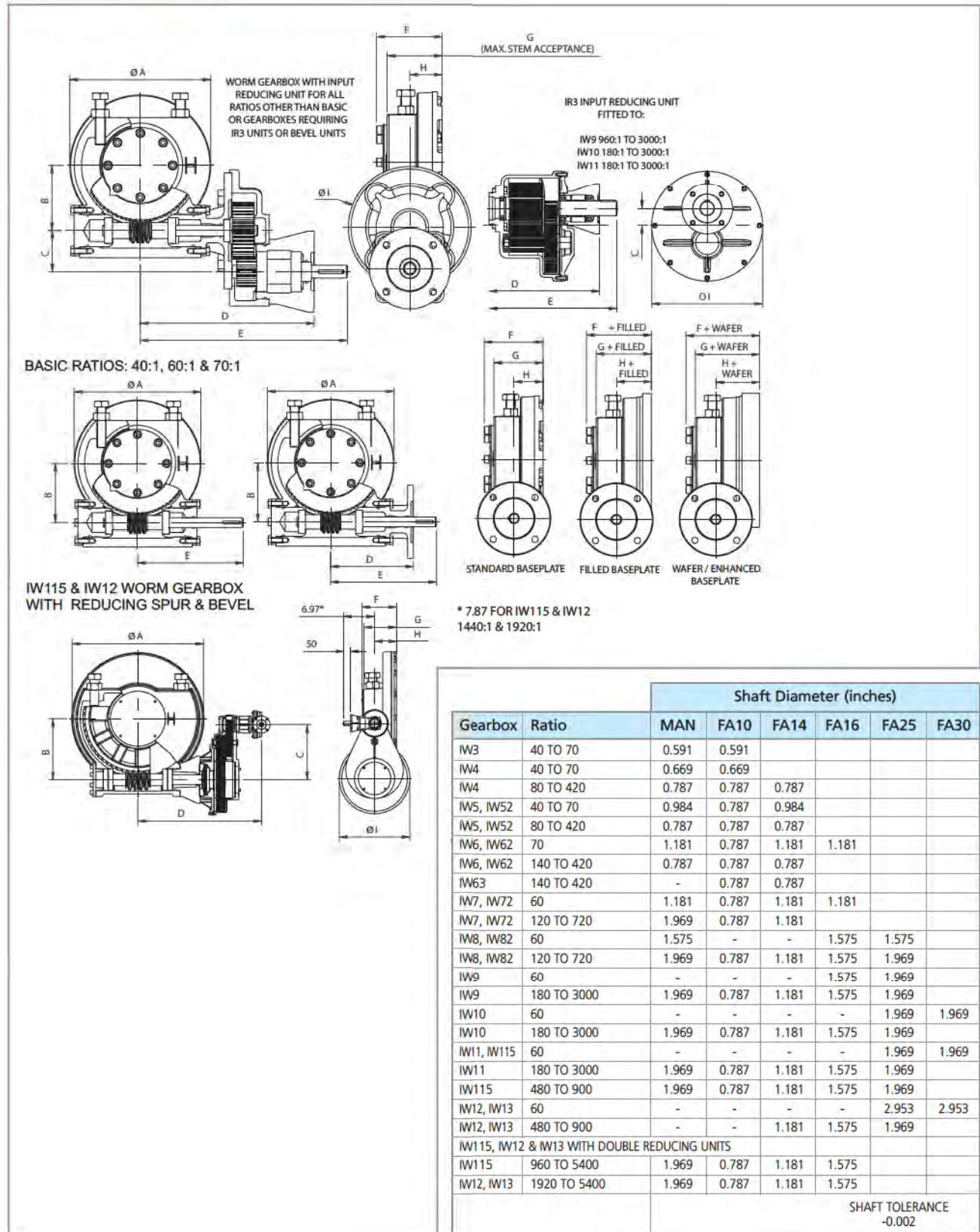
- Ductile Iron
- IP68
- AWWA
- ATEX
- Nuclear
- All types of environment
- High & low temperatures
- Padlockable handwheels
- Limit switches
- Lever arms
- Travelling nut for applications requiring less than 90° travel and more than 90°
- Modulating & multi-turn
- Input flanges for motorisation

No.	Description	Material	UK Standard	USA Standard	DIN Standard
1	Gearcase (IW3 to IW8)	Cast Iron	BS1561 EN-GJL-250	ASTM A48 35B/40B	GG25
	Gearcase (IW9 to IW12)	SG Iron	BS1563 EN-GJS-450-10	ASTM A536 65-45-12	GGG40
2	Baseplate	Cast Iron	BS1561 EN-GJL-250	ASTM A48 35B/40B	GG25
3	Worm Shaft	Steel	BS970 045M10 or 60S36T	AISI/SAE 1010 or 4340	C 10 or 42 MnMo 7
4	Quadrant	SG Iron	BS1563 EN-GJS-700-2	ASTM A536 100-70-03	GGG70
5	Position Indicator	Steel	BS970 070M20	AISI/SAE 1023	C 22
6	Output Sleeve	Steel	BS970 070M20 or BS970 080M40 or BS970 070M55 or	AISI/SAE 1023 or AISI/SAE 1040 or AISI/SAE 1055 or	C 22 C 40 C 55
7	Drive Screws	Carbon Steel	BS4168		
8	Seal	Nitrile Rubber			
9	Bearing	Angular Contact Ball Bearings			
10	Adaptor	Cast Iron	BS1561 EN-GJL-250	ASTM A48 35B/40B	GG25
11	Reducer Gearcase	Cast Iron	BS1561 EN-GJL-250	ASTM A48 35B/40B	GG25
12	Input Housing	Cast Iron	BS1561 EN-GJL-250	ASTM A48 35B/40B	GG25
13	Input Shaft	Steel	BS970 60S36T	AISI/SAE 4340	42 MnMo 7
14	Spur Gear	Steel	BS970 817M40T	AISI/SAE 4340	40 NiCrMo 8 - 4
15	Fasteners	Steel	BS3692		
16	Grease	Renolit CLX2			

Note: Because of the company's policy of continuous improvement, Rotork Gears reserves the right to change specification details without prior notice.

**Established Leaders in Actuation Technology**

# Gearbox IW Series





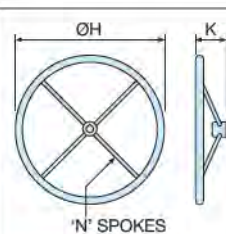
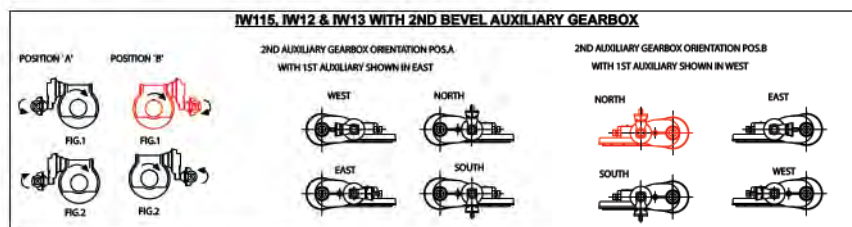
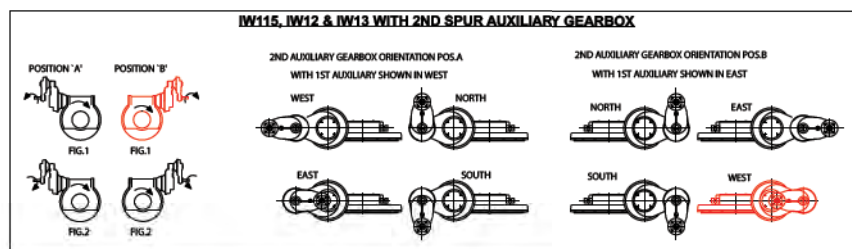
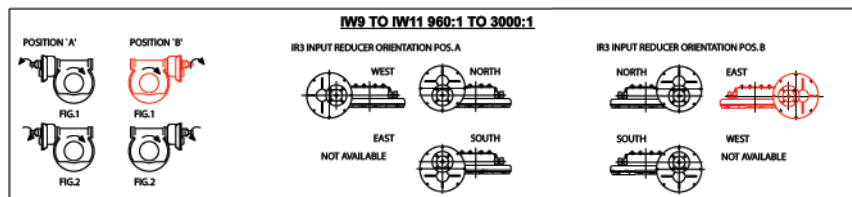
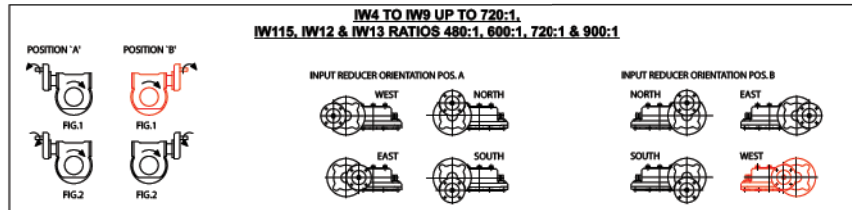
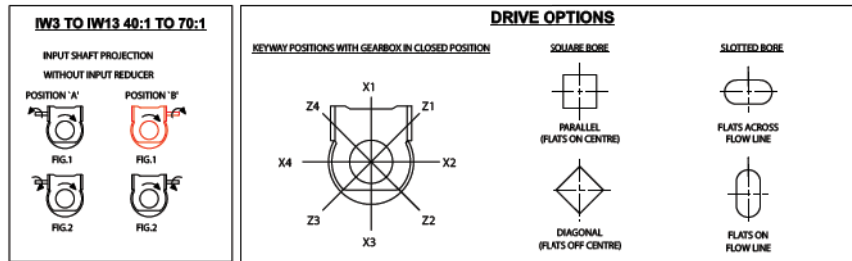
### Dimensions and Weights

Gearbox	Ratio	ØA	B	C	D	E	F	G	H	ØI	Weight (lb)
IW3	40, 70	6.69	2.99		4.65	6.22	3.19	2.56	1.77		24
IW4	40, 70	8.58	4.02		5.59	7.17	4.02	3.35	1.97		49
IW4	80, 120, 140, 160, 210, 280	8.58	4.02	2.52	10.59	12.60	4.02	3.35	1.97	7.48	66
IW4	200, 240, 350, 420	8.58	4.02	3.78	11.46	13.46	4.02	3.35	1.97	9.76	77
IW5, IW52	40, 70	11.22	5.35		7.32	9.29	4.96	4.33	2.56		99
IW5, IW52	80, 120, 140, 160, 210, 280	11.22	5.35	2.52	12.32	14.33	4.96	4.33	2.56	7.48	117
IW5, IW52	200, 240, 350, 420	11.22	5.35	3.78	13.19	15.20	4.96	4.33	2.56	9.76	128
IW6, IW62, IW63	70	14.76	7.01		7.32	9.29	5.20	4.33	2.76		150
					7.72 for IW6 F10, FA10						
IW6, IW62, IW63	140 - 280	14.76	7.01	2.52	12.32	14.33	5.20	4.33	2.76	7.48	174
IW6, IW62, IW63	350 - 420	14.76	7.01	3.78	13.46	15.47	5.20	4.33	2.76	9.76	185
IW7, IW72	60	17.72	8.27		10.63	12.95	6.65	5.51	3.43		265
IW7, IW72	120 - 360	17.72	8.27	4.69	18.11	20.51	6.65	5.51	3.43	11.42	335
IW7, IW72	480 - 720	17.72	8.27	7.05	18.46	20.87	6.65	5.51	3.43	16.06	357
IW8, IW82	60	20.47	9.69		12.05	14.37	7.28	6.10	3.74		397
IW8, IW82	120 - 360	20.47	9.69	4.69	19.53	21.93	7.28	6.10	3.74	11.42	467
IW8, IW82	480 - 720	20.47	9.69	7.05	19.88	22.28	7.28	6.10	3.74	16.06	489
IW9	60	23.46	10.98		14.61	18.94	7.80	6.50	3.94		485
IW9	180 - 720	23.46	10.98	7.05	22.36	24.84	7.80	6.50	3.94	16.06	578
IW9	960 - 3000	23.46	10.98	2.32	23.82	26.22	7.80	6.50	3.94	15.04	639
IW10	60	28.94	13.50		15.63	19.96	8.27	7.09	4.33		728
IW10	180 - 3000	28.94	13.50	2.32	24.84	27.24	8.27	7.09	4.33	15.04	899
IW11	60	31.30	15.00		16.30	20.63	9.65	7.87	4.72		1146
IW11	180 - 3000	31.30	15.00	2.32	25.51	27.91	9.65	7.87	4.72	15.04	1257
IW115	60	31.30	15.00		16.30	20.63	9.65	7.87	4.72		1060
IW115	480, 600, 720 & 900	31.30	15.00	16.02	31.14	33.50	9.65	7.87	4.72	20.47	1698
IW115 WITH SPUR & BEVEL REDUCING UNIT	1440, 1800, 1920, 2160, 2400, 2700, 2880, 3600, 4320 & 5400	31.30	15.00	16.02	34.06	-	9.65	7.87	4.72	20.47	1742
					35.16 for IW115 1440:1 & 1920:1						
IW12, IW13	60	38.27	17.72		18.11	24.02	10.24	9.88	6.54		2205
IW12, IW13	480, 600, 720 & 900	38.27	17.72	16.02	32.95	35.28	10.24	9.88	6.54	20.47	2646
IW12 WITH SPUR & BEVEL REDUCING UNIT	1440, 1800, 1920, 2160, 2400, 2700, 2880, 3600, 4320 & 5400	38.27	17.72	16.02	35.87	-	10.24	9.88	6.54	20.47	2690
					36.97 for IW12 1440:1 & 1920:1						
IW13 WITH SPUR & BEVEL REDUCING UNIT	1440, 1800, 1920, 2160, 2400, 2700, 2880, 3600, 4320 & 5400	38.27	17.72	16.02	36.97	-	10.24	9.88	6.54	20.47	2690

All dimensions in inches.

### Mounting Options

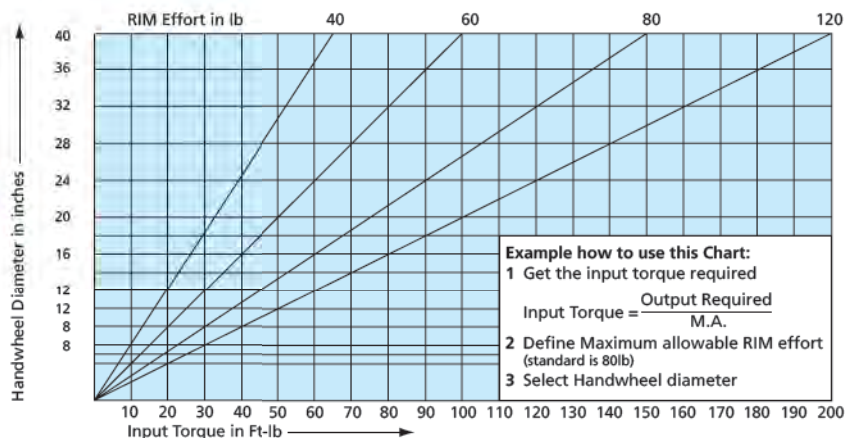
Gearbox	Max Bore ANSI B17.1 Key		Max Square Bore AF	MSS Flange Standard Baseplate	MSS Flange Filled Baseplate	MSS Flange Wafer Baseplate	Filled Baseplate Thickness	Wafer Baseplate Thickness
	Square	Rectangular						
IW3	1.75	1.75	1.375	FA10 - FA12	FA14	FA16	0.47	1.02
IW4	2.25	2.5	2	FA12 - FA14	---	FA16	---	0.98
IW5, IW52	2.75	3	2.375	FA14 - FA16	FA25	FA25	0.39	1.42
IW6, IW62, IW63	3.75	3.875	3.25	FA16 - FA25	FA30	FA30	0	0.91
IW7, IW72	4.875	5.25	4.25	FA25 - FA30	FA25 - FA30	FA35	0.39	1.22
IW8, IW82	5.625	6	4.75	FA25 - FA35	---	FA40 - FA48	---	1.65
IW9	6.5	6.5	5.125	FA30 - FA35 - FA40	FA30 - FA35 - FA40	FA48	0	1.06
IW10	7.375	7.625	6	FA35 - FA40	FA35 - FA40 - FA48	FA60	0	1.26
IW11, IW115	7.375	7.625	5.5	FA35 - FA40 - FA48	FA60	---	0	---
IW12, IW13	9.5	10.25	7	FA40	---	---	---	---
IW12, IW13	11.75	12	9	FA48 - FA60	---	---	---	---



'F' Type handwheel

**Dimensions**

Type	ØH	K	N
F200	8	2.97	3
F300	12	3.96	3
F400	16	3.96	4
F500	20	3.96	4
F600	24	3.96	4
F700	28	3.96	6
F800	32	3.96	6
F900	36	3.96	6
F1000	40	3.96	6
F1100	44	3.96	6
F1200	48	3.96	8







**Submittal Data Sheet**

Date: 12/05/11

POWER & MINE SUPPLY CO LTD

P.O. PO80026

4-75 MERIDIAN DRIVE

FACTORY ORDER NO 111264

FACTORY SALES ORDER NO 320335

REV 0

WINNIPEG, MB  
R2R 2V9

PROJ. NAME City of Winnipeg Bld Opportunity  
880-2011 PO80026

Fact. ITEM	Cust. ITEM	QTY	DESCRIPTION	PART NO. 9618669
1	1	1	BAW,84,F1,CI,NBRN-NBR,150B,DI-S1,1221D2*X*FPZ044	

<b>Style</b>	BAW	DeZURIK AWWA C516 Rubber-Seated Butterfly Valve
<b>Size</b>	84	84 Inch
<b>End Connection</b>	F1	Flanged, Drilled to ANSI B16.1 Class 125/150
<b>Body Material</b>	CI	Cast Iron, ASTM A126 Class B
<b>Packing</b>	NBRN	NBR (Acrylonitrile-Butadiene), Self-Adjusting Multiple V-Ring; -20 to 180°F (-29 to 82°C)
<b>Seat Material</b>	NBR	NBR (Acrylonitrile-Butadiene); -20 to 180°F (-29 to 82°C)
<b>Service Class</b>	150B	AWWA Class 150B
<b>Disc</b>	DI	Ductile Iron, ASTM A536 Grade 65-45-12 Type 316 Stainless Steel Seating Edge (3" - 20" =ASTM A276, 24" and larger - ASTM A240)
<b>Shaft</b>	S1	304 Stainless Steel, ASTM A276
<b>Option</b>	1221D2	Selection Not Valid
<b>Act Type</b>	X	Specified in Modifier Below
<b>Modifier</b>	FPZ044	BACK SIDE OF FLANGE SPOT FACED. ROTORK GEARS MODEL IW12R (2400:1) AWWA C504 WORM GEAR ACTUATOR WITH 2" SQUARE NUT, 24" HW, AUNSPACH MODEL D82, H.W. SPINNER. ACTUATOR RATED IP68 TO A DEPTH OF 50' FOR 72 HRS. STANDARD TEST CERTIFICATION EXCEPT VALVE TESTED WITH FLANGES VERTICAL AND SHAFT HORIZONTAL. CERTIFIED PHYSICAL AND CHEMICAL TEST REPORTS PER SPEC QY00064 ✓ CERTIFIED HOLIDAY SPARK TEST ON INTERIOR & EXTERIOR ✓ CERTIFICATION OF PAINT AS TO TYPE AND THICKNESS EPOXY RETAINED SEAT

**RELATED DOCUMENTS**

J58263	DWG INST F1 ROTORK IW12R(2400)
J50122	DWG INST VALVE BAW F1 78-144"

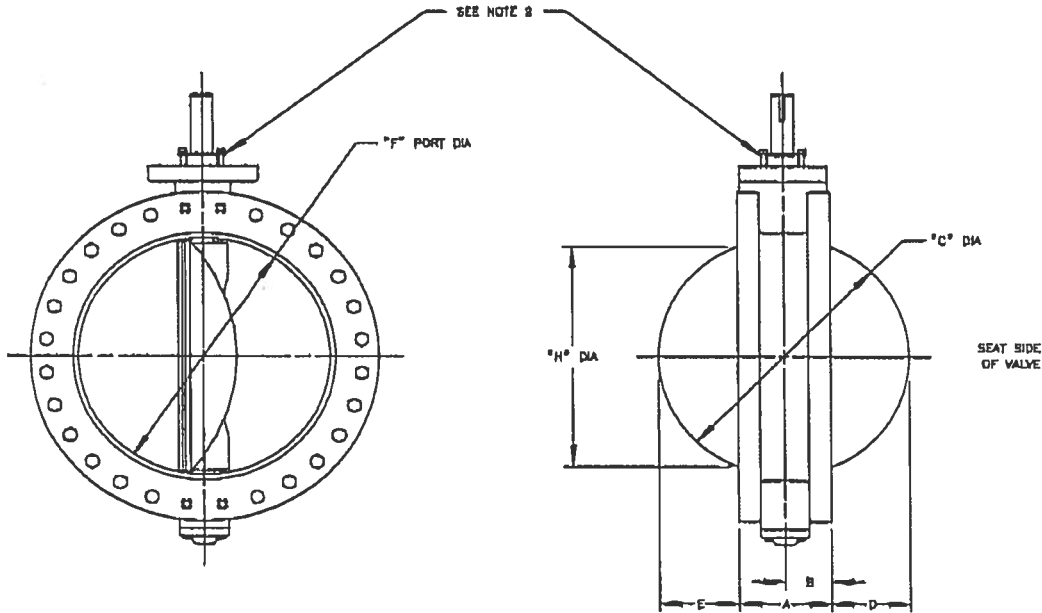
**FEATURES**

CW CERTIFICATE OF DEZURIK STANDARD SEAT AND SHELL HYDRO TEST, MTR'S  
 CUSTOMER INSPECTION OF HYDROSTATIC SHELL AND SEAT LEAK TEST  
 CUSTOMER INSPECTION OF HOLIDAY SPARK TEST

VALVE SIZE	DIMENSIONS IN INCHES							SIZE	VALVE WEIGHT								
	A	B	C	D	E	F	H		G								
								78	84	90	96	102	108	114	120	144	
78	20.00 508	10.00 254	77.40 1966	28.70 729	28.70 729	76.60 1951											
84	24.00 610	12.00 305	83.00 2083	29.00 737	29.00 737	82.25 2089	78.82 1994										72000
90	24.00 610	12.00 305	88.00 2261	32.50 828	32.50 828	89.25 2267			23800				36800				
96	26.00 660	13.00 330	94.00 2388	34.00 864	34.00 864	90.25 2319					36000	31000			48000		
102	28.00 711	14.00 356	102.25 2607	37.12 943	37.12 943	102.25 2597											
108	28.00 711	14.00 356	108.75 2711	39.38 1000	39.38 1000	108.75 2711											
114																	
120	30.00 762	15.00 381	118.84 3021	44.78 1137	44.78 1137	118.75 3018	117.28 2978										
144	38.00 914	18.00 457	142.94 3631	53.75 1365	53.75 1365	142.75 3628	140.78 3578										

NOTE:

- "D" IS APPROXIMATE BARE SHAFTED VALVE WEIGHT (LBS).
- VALVE IS SHOWN WITH PACKING GLAND. 78 - 144 SIZES (STANDARD).



1	DESIGNED BY	1	DESIGNED BY
2	DRAWN BY	2	DRAWN BY
3	CHECKED BY	3	CHECKED BY
4	APPROVED BY	4	APPROVED BY
5	DATE	5	DATE

**DeZURIK**  
Sartell, MN USA 56377  
www.dezurik.com

78 - 144 BAN FLANGED ANNA BUTTERFLY VALVES  
SHOWING DISC CLEARANCE IN FULL OPEN POSITION,  
VALVE WEIGHTS AND PORT DIAMETERS

QUEST. CODE	GRAM	APR	APPROVED	DK
C1	CHECKED	DATE	2-8-94	

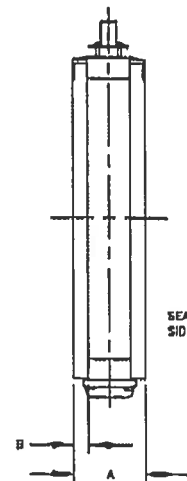
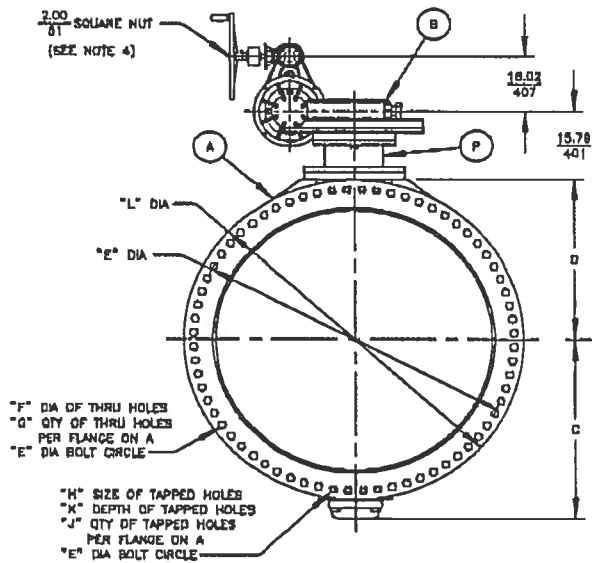
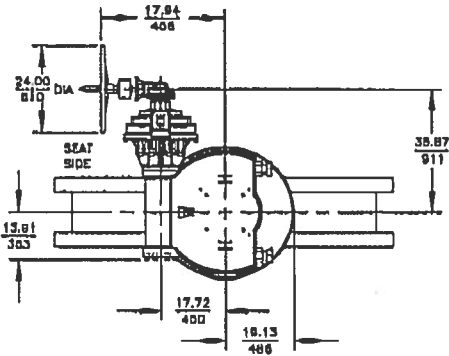
J50122

VALVE SIZE	DIMENSIONS										
	A	B	C	D	E	F	G	H	J	K	L
84	24.00 810	4.00 102	80.25 1530	58.00 1422	95.50 2420	2.25 57	58	2 - 4-1/2 UNC	8	3.85 99	89.78 2234
96	28.00 880	4.25 108	88.25 1883	83.50 1813	108.50 2756	2.50 64	60	2-1/4 - 4-1/2 UNC	8	4.38 111	113.25 2877

A	VALVE
B	ACTUATOR
P	CONNECTING PARTS

NOTE:

1. FLANGES ARE FLAT FACED WITH THRU HOLE DRILLING PER ANSA C207, EXCEPT FOR TAPPED HOLES AS INDICATED.
2. FLOW MAY BE IN EITHER DIRECTION. FOR MAINTENANCE PURPOSES THE SEAT SIDE SHOULD BE ACCESSIBLE.
3. 600 TURNS OF HANDWHEEL ARE REQUIRED TO OPEN VALVE.
4. HANDWHEEL MUST BE REMOVED TO OPERATE 2" SQUARE NUT.



ACTUATOR MOUNTING POSITIONS



STANDARD POSITION SHOWN ON THIS DRAWING

90° POSITION

180° POSITION

270° POSITION



**DeZURIK**  
Sartell, MN USA 56377  
www.dezurik.com

8AW BUTTERFLY VALVES 84 & 96 FLANGED ROTARY (2:1 RATIO) HR. HANDWHEEL ACTUATOR AND TORQUE LIMITING DEVICE WITH 2" SQUARE NUT			
DESIGN CODE	DRAWN	BY	CHECKED
C1	CHICAGO	CAP	DATE 11/15/11
			J58263

## DeZURIK BAW BUTTERFLY VALVES - Manual Actuator Sizing

12/6/2011

Valve Description: 84 Inch BAW Valve W.O. 881335  
 Actuator: Rotork Gears IW12R with HW Item 1

<u>BAW Valve Application Parameters</u>	
Valve Size (inches):	<u>84</u> inch
or Valve Size (mm):	_____ mm
Maximum Pressure: (P)	<u>100</u> psi
Seat Upstream	<input checked="" type="checkbox"/>
Seat Downstream	<input type="checkbox"/>
Flow Velocity: (V)	<u>16</u> ft/sec
Stem Diameter: (d)	<u>11</u> Inch
Bearing Coefficient of Friction: (f)	<u>0.10</u>
Design Safety Factor: (S)	<u>1.25</u>
Pressure Class: 250B	<input type="checkbox"/>
150B	<input checked="" type="checkbox"/>
75B	<input type="checkbox"/>
25A	<input type="checkbox"/>
<u>Actuator Parameters (from supplier)</u>	
Actuator Rated Output Torque: (Ta)	<u>122,240</u> ft-lbs
Actuator Mechanical Advantage: (M)	<u>764</u>
Actuator Handwheel Diameter: (H)	<u>24</u> in

<u>Calculated Valve Torque</u>		
Valve Body Size:	<b>84 Inch</b>	$D = 84$
Pressure Class:	<b>150B</b>	$C = 11.0$
Bearing Torque	<b>25,400 ft-lbs</b>	$T_b = P \cdot D^2 \cdot \pi \cdot f / 8 / 12$
Seating Torque	<b>6,468 ft-lbs</b>	$T_s = D^2 \cdot C$
Hydrostatic Torque:	<b>7,347 ft-lbs</b>	$T_h = 3.06 \cdot (D/12)^4$
<b>Valve Operating Torque:</b>	<b>39,215 ft-lbs</b>	$T_v = T_b + T_s + T_h$
<b>Maximum Dynamic Torque:</b>	<b>38,425 ft-lbs</b>	$T_d = \text{dynamic torque}$
<b>Operating Torque with Safety Factor:</b>	<b>49,019 ft-lbs</b>	$T_f = T_v \cdot S$
<u>Calculated Actuator Torque Data</u>		
Actuator Rated Output Torque:	<b>122,240 ft-lbs</b>	$T_a = (\text{from supplier})$
Calculated Actuator Safety Factor:	<b>3.12</b>	$S_a = T_a / T_v$
Calculated Handwheel Rim Pull:	<b>51.3 lbs</b>	$F_r = T_v / M / H \cdot 24$

**DeZURIK BAW BUTTERFLY VALVES - Manual Actuator Sizing**

12/6/2011

Valve Description: 84 Inch BAW Valve W.O. 881335  
 Actuator: 2 Inch Nut Item 1

**BAW Valve Application Parameters**

Valve Size (inches): 84 Inch  
 or Valve Size (mm): \_\_\_\_\_ mm  
 Maximum Pressure: (P) 100 psi  
 Seat Upstream   
 Seat Downstream   
 Flow Velocity: (V) 16 ft/sec  
 Stem Diameter: (d) 11 inch  
 Bearing Coefficient of Friction: (f) 0.10  
 Design Safety Factor: (S) 1.25  
 Pressure Class: 250B   
 150B   
 75B   
 25A

**Actuator Parameters (from supplier)**

Actuator Rated Output Torque: (Ta) 122,240 ft-lbs  
 Actuator Mechanical Advantage: (M) 764

**Calculated Valve Torque**

Valve Body Size:	<b>84 inch</b>	$D = 84$
Pressure Class:	<b>150B</b>	$C = 11.0$
Bearing Torque	<b>25,400 ft-lbs</b>	$T_b = P \cdot D^2 \cdot \pi \cdot d \cdot f / 8 / 12$
Seating Torque	<b>6,468 ft-lbs</b>	$T_s = D^2 \cdot C$
Hydrostatic Torque:	<b>7,347 ft-lbs</b>	$T_h = 3.06 \cdot (D/12)^4$
Valve Operating Torque:	<b>39,215 ft-lbs</b>	$T_v = T_b + T_s + T_h$
Maximum Dynamic Torque:	<b>38,431 ft-lbs</b>	$T_d = \text{dynamic torque}$
Operating Torque with Safety Factor:	<b>49,019 ft-lbs</b>	$T_r = T_v \cdot S$

**Calculated Actuator Torque Data**

Actuator Rated Output Torque:	<b>122,240 ft-lbs</b>	$T_a = (\text{from supplier})$
Calculated Actuator Safety Factor:	<b>3.12</b>	$S_s = T_s / T_v$
Actuator Input Torque:	<b>51 ft-lbs</b>	$T_i = T_v / M$