Flowserve Flow Solutions Group

Flowserve Pump Division, 3900 Cook Boulevard, Chesapeake, VA 23323, USA
Phone: (+1) 757 485-8000
chpdoc@flowserve.com

Customer Document title:

General Arrangement Drawing

Flowserve Document title:	**General Arrangement Drawing**
Flowserve Document No.:	**1408912-003-2500-01**
Document Revision No.:	**B**
Flowserve Order No.:	**1408912**
Flowserve Serial No.:	**1408912CHP003A/B**
Pump Type/Size:	**MARK 3 STANDARD / 2K3X2-13RV**
Quantity:	**2**
Customer Name:	**World Energy Paramount**
Customer Tag No:	**18P1879 A/B**
Customer PO No.:	**4505555756**
End User:	**AIR PRODUCTS LLC**

Please complete and return:			
Document Reviewed by:		**Document Reviewed date:**	

☐ **APPROVED**. NO ACTION REQUIRED
☐ **APPROVED**. **RE-SUBMIT AS FINAL.**
☐ **APPROVED WITH COMMENTS**. DOCUMENT WILL BE MODIFIED AND RESUBMITTED AS FINAL.
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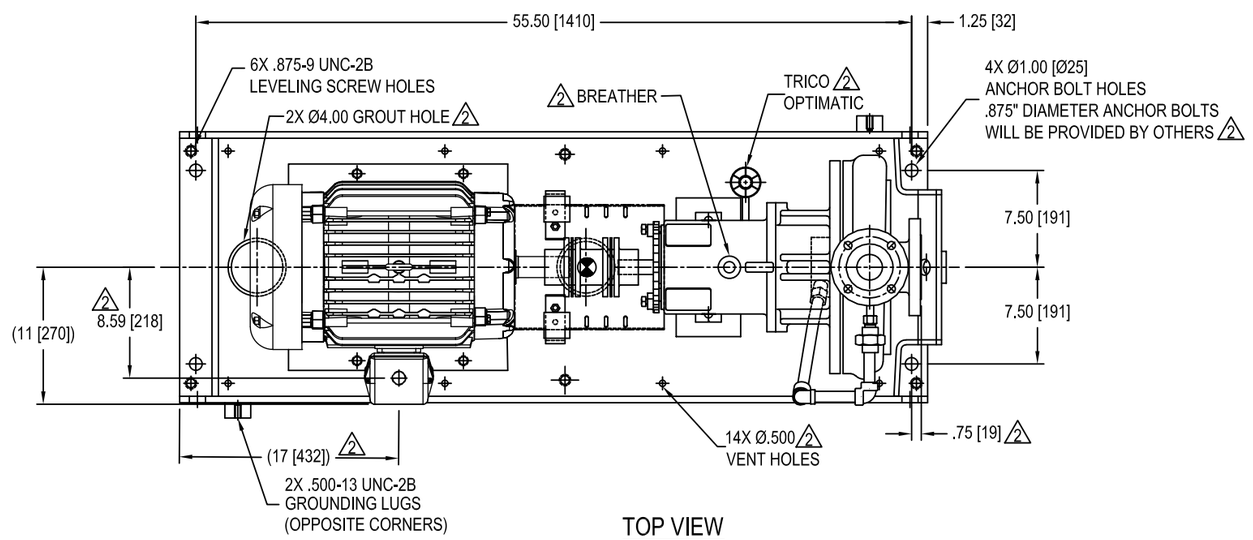
Rev	Revision Description	Released	Release Date
B	Information Only	Lakshmikantha, Gowda	09-Nov-22



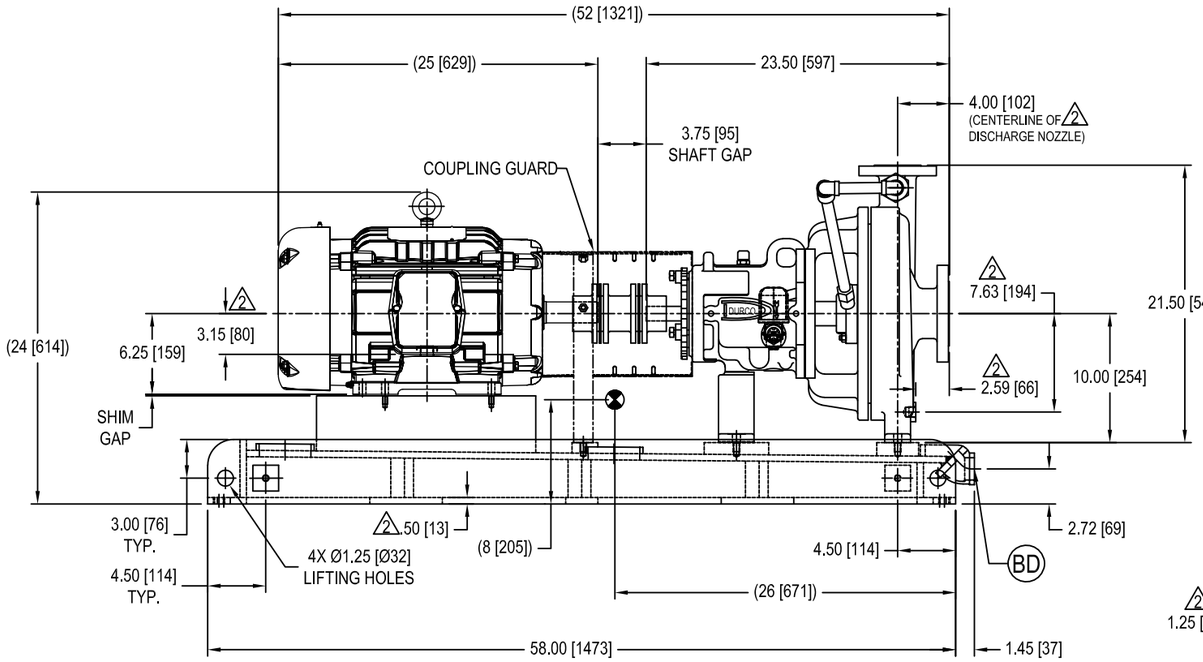
TOP VIEW

NORTH 2

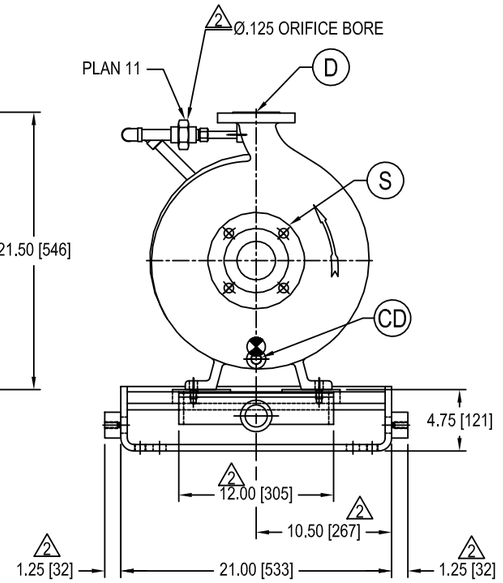
GENERAL NOTES:

1. CONSULT INSTRUCTION BOOK BEFORE INSTALLING PUMP.
2. ALL DIMENSIONS GIVEN IN INCHES [mm] AND WEIGHTS IN POUNDS [Kg].
3. ALL PIPE TAPS ARE STANDARD N.P.T. THREADS.
4. ALL HOLES IN FLANGES STRADDLE CENTERLINES.
5. ALLOW .25" [6 mm] FOR VARIATION OF FOUNDATION BOLT HOLES.
6. STANDARD TOLERANCE FOR CUSTOMERS PIPE CONNECTIONS ARE AS FOLLOWS:
   A. ±.25" [±6 mm] ON ALL (2) PLACE DECIMAL DIMENSIONS
   B. ±1.00" [±25 mm] ON ANY FLUSH, DRAIN OR COOLING PIPING FLANGE LOCATION DIMENSIONS AND ANY ELECTRICAL CONNECTIONS.
   C. OR AS SPECIFIED FOR SPECIFIC DIMENSIONS ON THE GENERAL ARRANGEMENT.
7. FOUNDATION BOLTS AND PIPING SHOULD NOT BE SET RIGIDLY UNTIL RECEIPT OF EQUIPMENT.
8. ALLOW .75" [19 mm] MINIMUM UNDER BASEPLATE FOR GROUTING.
9. RECHECK ALIGNMENT AFTER UNIT REACHES OPERATING CONDITIONS.
10. THE DESIGN OF PIPING SYSTEM, FOUNDATIONS, AND OTHER AREAS OF SYSTEM DESIGN IS THE RESPONSIBILTY OF OTHERS. FLOWSERVE CORPORATION DATA AND COMMENTS ARE OFFERED AS AN AID, BUT FPD CANNOT ASSUME RESPONSIBILITY FOR THE DESIGN AND OPERATION. WE RECOMMEND THAT THE CUSTOMER CONSULT A SPECIALIST SKILLED IN THE DESIGN OF FOUNDATIONS, PIPING, SUMPS AND RELATED SYSTEMS SO AS TO SUPPLEMENT AND INTERPRET FLOWSERVE CORPORATION INDUSTRIAL PUMP DIVISION INFORMATION AND ENSURE A SUCCESSFUL INSTALLATION.
11. DRIVER DIMENSIONS ARE APPROXIMATE. REFER TO CERTIFIED DRIVER DIMENSIONS DRAWING FOR EXACT DIMENSIONS, IF NEEDED.
12. USE ONLY SIGNED CERTIFIED PRINTS FOR CONSTRUCTION.

⊗ = ESTIMATED CENTER OF GRAVITY



FRONT VIEW



SIDE VIEW

BD	BASEPLATE DRAIN	1.50" NPT
CD	PUMP CASING DRAIN	1/2" NPT (PLUGGED)
D	PUMP DISCHARGE	2.00"-150# ANSI R.F. FLANGE
S	PUMP SUCTION	3.00"-150# ANSI R.F. FLANGE
LABEL	DESCRIPTION	CONNECTION TYPE

CUSTOMER CONNECTIONS	
P.O. No.: 4505555756	TAG No.: 18-P-1879A/B
CUSTOMER: WORLD ENERGY PARAMOUNT	SERVICE: STORM WATER TANK PUMP 2
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC	ITEM: 003
WBS NUMBER: 1860, UTILITES & OFFSITES	SERIAL No.: 1408912CHP003A/B

CUSTOMER INFORMATION

WEIGHT (APPROX)	
	lb [kg]
PUMP	258 [116]
DRIVER	322 [146]
BASE	429 [195]
COUPLING	8 [4] 1
CPL. GRD.	10 [5]
TOTAL	1027 [466]

1

COUPLING	
TYPE	THOMAS
MODEL	DBZ-C
SIZE	163

SHAFT GAP
3.75 [95]

DRIVER DATA		
MFR.	ABB/BALDOR	
ENCLOSURE	TEFC	
FRAME	254T	
HP [kW]	15 [11.2]	RPM 1800
CHARACTERISTIC	3/60/460	
SHAFT DIAMETER		KEYWAY
1.625 [41.275]	1.624 [41.250]	.38 [10] X .19 [5]

ALL DIMENSIONS ARE REFERENCES UNLESS OTHERWISE SPECIFIED

REV.	CHG NO.	DATE	REVD	CHKD	APVD
---	---	---	---	---	---
	DESC: —				
1	00085835	07-Mar-2022	MaHa	MaM	GoLa
	DESC: Updated Coupling To Thomas Series DBZ-C 163				
2	00100021	08-Nov-2022	ThMu	NaVi	GoLa
	DESC: Customer comments updated				

STATUS: CERTIFIED

CERTIFIED BY: 1

JOB NUMBER	1408912
DRWN: MaHa	DATE: 19-Dec-2021
CHKD: MaM	DATE: 20-Dec-2021
APVD: GoLa	DATE: 20-Dec-2021
3D MODEL NO. / REV.	---- / ---
APPROX. WEIGHT	---- (----)

FLOWSERVE Chesapeake, VA USA Operations

DRAWING TITLE

GENERAL ARRANGEMENT
2K 3X2-13RV W/ 254T FR.
MARK 3 STANDARD - ----

3rd ANGLE | SIZE A2 | DRAWING NUMBER F000225461 | REV. 2

SCALE: NTS | DIM. UNITS: inch[mm] | SHEET: 1 OF: 1

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Flowserve Pump Division, 3900 Cook Boulevard, Chesapeake, VA 23323, USA
Phone: (+1) 757 485-8000
chpdoc@flowserve.com

Customer Document title:

2.2 Material Certificate of Compliance

Flowserve Document title:	**2.2 Material Certificate of Compliance**
Flowserve Document No.:	**1408912-003-1002-01**
Document Revision No.:	**0**
Flowserve Order No.:	**1408912**
Flowserve Serial No.:	**1408912CHP003A/B**
Pump Type/Size:	**MARK 3 STANDARD / 2K3X2-13RV**
Quantity:	**2**
Customer Name:	**World Energy Paramount**
Customer Tag No:	**18P1879 A/B**
Customer PO No.:	**4505555756**
End User:	**AIR PRODUCTS LLC**

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Rev	Revision Description	Released	Release Date
	Final	Shaw, Amie	28-Feb-23

Pump Division
Chesapeake Virginia
Quality Assurance Department
Internet: TMomtsios@flowserve.com ***phone: 757-485-8052 fax: 757-485-8191***

COMPONENT: **SHAFT**

2.2 Certificate of Compliance
European Standard EN 10204

Material: ASTM A276 Type 316/316L Stainless Steel

Flowserve certifies that the 316/316L SS parts supplied meet the requirements of ASTM A276. Below are typical properties based on historical test data for the material:

Composition in Wt %

Cr	**16.13**
Ni	**10.13**
Mo	**2.022**
Si	**.564**
Cu	**.310**
Mn	**.1660**
S	**.024**
Co	**.092**
P	**.028**
N	**.065**
C	**.015**
Fe	**bal**

Yield strength	**42,700 psi**
Tensile strength	**91,300 psi**
Elongation	**52.4 %**
RA	**75.5%**

Tom Momtsios
Quality Assurance, Chesapeake Operations

Pump Division
Chesapeake Virginia
Quality Assurance Department
Internet: TMomtsios@flowserve.com ***phone: 757-485-8052 fax: 757-485-8191***

COMPONENT: IMPELLER,COVER

2.2 Certificate of Compliance
European Standard EN 10204

Material: ASTM A744 CF-8M Stainless Steel

Flowserve certifies that the cast steel parts supplied meet the requirements of ASTM A744. Below are typical properties based on historical test data for the material:

Composition in Wt %

Cr	**18.74**
Ni	**9.18**
Mo	**2.12**
Si	**1.37**
Cu	**.30**
Mn	**.79**
S	**.002**
P	**.024**
C	**.044**
Fe	**Bal**

Yield strength	**43,200 psi**
Tensile strength	**90,900 psi**
Elongation	**46 %**

Tom Momtsios
Quality Assurance, Chesapeake Operations

Pump Division
Chesapeake Virginia
Quality Assurance Department
Internet: tmomtsios@flowserve.com ***phone: 757-485-8000 fax: 757-485-8194***

COMPONENT: CASING

2.2 Certificate of Compliance
European Standard EN 10204

Material : ASTM A395 Ductile Cast Iron

Flowserve certifies that the ductile cast iron parts supplied meet the requirements of ASTM A395 60-40-18.

Below are actual typical properties for the material based on melt number D8045-65 which was poured on Feb. 14, 2008:

Carbon	**3.92 %**
Silicon	**2.75 %**
Phosphorus	**0.036 %**
Sulfur	**0.008 %**
Fe	**BAL**

Yield strength	**46,298 psi**
Tensile strength	**66,277 psi**
Elongation	**21.0 %**
Hardness	**154 HB**

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Quality Assurance, Chesapeake Operations

Flowserve Flow Solutions Group

Flowserve Pump Division, 3900 Cook Boulevard, Chesapeake, VA 23323, USA
Phone: (+1) 757 485-8000
chpdoc@flowserve.com

Customer Document title:

Certificate of Conformance

Flowserve Document title:	**Certificate of Conformance**
Flowserve Document No.:	**1408912-003-1008-01**
Document Revision No.:	**0**
Flowserve Order No.:	**1408912**
Flowserve Serial No.:	**1408912CHP003A/B**
Pump Type/Size:	**MARK 3 STANDARD / 2K3X2-13RV**
Quantity:	**2**
Customer Name:	**World Energy Paramount**
Customer Tag No:	**18P1879 A/B**
Customer PO No.:	**4505555756**
End User:	**AIR PRODUCTS LLC**

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Rev	Revision Description	Released	Release Date
	Final	Shaw, Amie	28-Feb-23

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ccontracts@flowserve.com

Certificate of Conformance

Customer Name:	**World Energy Paramount**
Customer PO No.:	**4505555756**
Customer Tag No:	**18P1879 A/B**
Flowserve Order:	**1408912**
Pump Type/Size:	**MARK 3 STANDARD / 2K3X2-13RV**
Flowserve Serial: No.:	**1408912CHP003A/B**
Quantity:	**2**

This is to certify that the equipment, component parts, etc., on subject order or contract have been manufactured by Flowserve or manufactured in whole or in part by contractors under the supervision of Flowserve, and comply with all requirements specified by order or contract referenced above.

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Quality Assurance, Chesapeake Operations

Flowserve Flow Solutions Group

Flowserve Pump Division, 3900 Cook Boulevard, Chesapeake, VA 23323, USA
Phone: (+1) 757 485-8000
chpdoc@flowserve.com

Customer Document title:

Certificate of Hydrostatic Test

Flowserve Document title:	**Certificate of Hydrostatic Test**
Flowserve Document No.:	**1408912-003-1010-01**
Document Revision No.:	**0**
Flowserve Order No.:	**1408912**
Flowserve Serial No.:	**1408912CHP003A/B**
Pump Type/Size:	**MARK 3 STANDARD / 2K3X2-13RV**
Quantity:	**2**
Customer Name:	**World Energy Paramount**
Customer Tag No:	**18P1879 A/B**
Customer PO No.:	**4505555756**
End User:	**AIR PRODUCTS LLC**

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	Information Only	Shaw, Amie	28-Feb-23

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ccontracts@flowserve.com

Certificate of Hydrostatic Test

Customer Name:	**World Energy Paramount**
Customer PO No.:	**4505555756**
Customer Tag No:	**18P1879 A/B**
Flowserve Order:	**1408912**
Pump Type/Size:	**MARK 3 STANDARD / 2K3X2-13RV**
Flowserve Serial: No.:	**1408912CHP003A/B**
Quantity:	**2**

This is to certify that the following units have been successfully hydrostatic tested to pressures quoted and found to be satisfactorily sound.

Part Type	Part Number	Material	Hold Time	PSI #
CASING	BY40035N	ASTM A395	10 MIN	375
COVER	SM-DY52028A-D4-XXGXX	ASTM A744 CF8M	10 MIN	675

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Quality Assurance, Chesapeake Operations

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Phone: (+1) 757 485-8000
chpdoc@flowserve.com

Customer Document title:

Certificate of Impeller Balance

Flowserve Document title:	**Certificate of Impeller Balance**
Flowserve Document No.:	**1408912-003-1012-01**
Document Revision No.:	**0**
Flowserve Order No.:	**1408912**
Flowserve Serial No.:	**1408912CHP003A/B**
Pump Type/Size:	**MARK 3 STANDARD / 2K3X2-13RV**
Quantity:	**2**
Customer Name:	**World Energy Paramount**
Customer Tag No:	**18P1879 A/B**
Customer PO No.:	**4505555756**
End User:	**AIR PRODUCTS LLC**

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Flowserve Flow Solutions Group

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Phone: (+1) 757 485-8000
ccontracts@flowserve.com

Certificate of Impeller Balance – 6.3

Customer Name:	**World Energy Paramount**
Customer PO No.:	**4505555756**
Customer Tag No:	**18P1879 A/B**
Flowserve Order:	**1408912**
Pump Type/Size:	**MARK 3 STANDARD / 2K3X2-13RV**
Flowserve Serial: No.:	**1408912CHP003A/B**
Quantity:	**2**
Equipment Service:	**water pump**

It is hereby certified that balance to ISO – 1940-11 G 6.3 was performed on the impellers for the units described.

Part Type	Part Number	Material Spec.	Balance Grade
Impeller	SM-MY49112A130-D4-XXGXX	ASTM A744 CF8M	6.3

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Quality Assurance, Chesapeake Operations

Flowserve Flow Solutions Group

Flowserve Pump Division, 3900 Cook Boulevard, Chesapeake, VA 23323, USA
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chpdoc@flowserve.com

Customer Document title:

Certificate of Noise Compliance

Flowserve Document title:	**Certificate of Noise Compliance**
Flowserve Document No.:	**1408912-003-1014-01**
Document Revision No.:	**0**
Flowserve Order No.:	**1408912**
Flowserve Serial No.:	**1408912CHP003A/B**
Pump Type/Size:	**MARK 3 STANDARD / 2K3X2-13RV**
Quantity:	**2**
Customer Name:	**World Energy Paramount**
Customer Tag No:	**18P1879 A/B**
Customer PO No.:	**4505555756**
End User:	**AIR PRODUCTS LLC**

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Certificate of Noise Compliance

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Customer PO No.:	**4505555756**
Flowserve Order:	**1408912**
Pump Type/Size:	**MARK 3 STANDARD / 2K3X2-13RV**
Flowserve Serial: No.:	**1408912CHP003A/B**
Quantity:	**2**

This is to certify that the noise level for pump and driver will not exceed 85 dBa free field when measured 3 ft. away from any surface of the equipment.

Logan Coard

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Quality Assurance, Chesapeake Operations

Flowserve Flow Solutions Group

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Customer Document title:

Cross Section

Flowserve Document title:	**Cross Section**
Flowserve Document No.:	**1408912-003-1016-01**
Document Revision No.:	**B**
Flowserve Order No.:	**1408912**
Flowserve Serial No.:	**1408912CHP003A/B**
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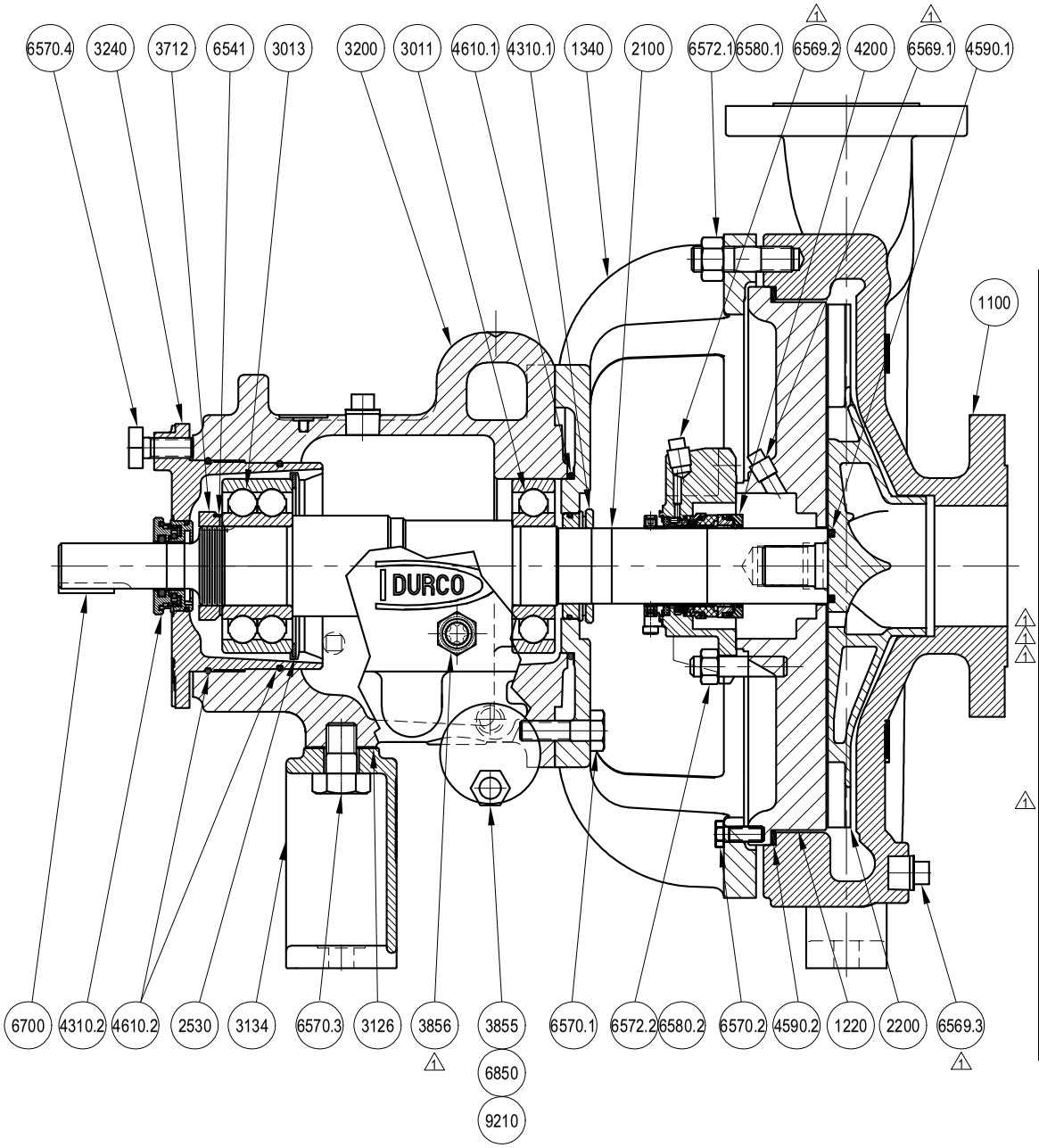
Rev	Revision Description	Released	Release Date
	For Review	Lakshmikantha, Gowda	06-Mar-23



REF NUM	PART NO	DESCRIPTION	QTY	MATERIAL
NS	74948233	NAMEPLATE, ADDITIONAL INFORMATION	2	AISI 302 303 304 305 384
NS	AY51851A-304	PLATE, NAME, PUMP, STANDARD, ASTM A240 Type 304 UNS S30400	1	ASTM A276 AISI 304
NS	95330452	SCREW, SELF-TAPPING, DRIVE, TYPE U #2 X 0.25, STAINLESS STEEL	4	STAINLESS STEEL NOT A DURIRON ALLOY
NS	95243366	NIPPLE 1/4 X 2-1/2 SCH80 316SS	1	316SS
NS	AY50972D-304	OILER TRICO 4 OZ. GLASS(CLOSED SYSTEM) W/WIRE GUARD P/N: 40101	1	ASTM A276 AISI 304
NS	95031423	ELBOW 90DEG MALE CONN .25T X .125NPT SS	1	STAINLESS STEEL NOT A DURIRON ALLOY
NS	75555078	TUBING 1/4OD X .035WALL AISI316L	18"	AISI316L
NS	95031431	ELBOW 90DEG MALE CONN .25T X .25NPT SS	1	STAINLESS STEEL NOT A DURIRON ALLOY
NS	95388369	BUSHING .50NPT X .25NPT 316SS	2	ASTM A276 AISI 316
NS	AY54506B-SR	PLUG PIPE 1/4"NPT - MAGNETIC	1	COMMERCIAL GR QLTY STEEL
9210	95272233	NIPPLE 1/4 X 1-1/2 SCH80 CARB.STL	1	ASTM A179 CARBON STEEL
6850	95061255	COUPLING CAST 150# .250	1	CARBON STEEL
6700	95094454	KEY .25 X .25 X 1.38	1	ASTM A108 GR 1018
6580.2	AY54058K-E8	XN 1/2-13	4	ASTM A194 GR 8 FINISHED
6580.1	AY54058M-SR2H	XN 5/8-11	8	ASTM A194 GR 2H
6572.2	AY54675D-B8C1	STUD 1/2-13X2-1/2	4	ASTM A193 GRADE B8 CLASS 1
6572.1	AY38338N-B7	STUD 5/8-11X2-1/2	8	ASTM A193 GR B7
6570.4	95075461	SCREW SET SQ HD CUP PT .50-13X1.25	3	GENERAL PURPOSE ALLOY STEEL
6570.3	95054318	SCREW HEX HD .75-10 X 1.25 CARB.STL	1	ASTM A307 GR B
6570.2	95043766	SCREW HEX HD .38-16 X 1.25(CARBON STEEL)	2	ASTM A307 GR B
6570.1	95043741	SCREW HEX HD .50-13 X 1.75 CARB.STL	4	ASTM A307 GR B
6569.3	95272555	PLUG SQ HD .50 ALLOY STEEL	1	ASTM A234 Gr. WP9
6569.2	95249744	PLUG SQ HD .375 AISI316	1	ASTM A276 Type 316
6569.1	95249736	PLUG SQ HD .25 AISI316	3	ASTM A276 Type 316
6541	95201018	LOCKWASHER BRG 10	1	COMMERCIAL GR QLTY STEEL
4610.2	95086419	O RING -158, SIZE : OD 4.94"X ID 4.75" X 0.103" THKS, MOC : NBR	2	BUNA N
4610.1	95087151	O-RING -347	1	BUNA N
4590.2	Y22774A-TM	GASKET REAR COVER GP2 13 & 13 LF (FOR GP2-13" LF IN MATL. "GHP" USE P/N: Y22774N-GHP)	1	TFM FLUOROPOLYMER GR1701
4590.1	SA3210AA00-TFR	GASKET IMPELLER GP2 STD, (OD 46.33 X ID 38.97 X 4.06 THK. MOC :TEFL + SI	1	FLUOROPOLYMER ENVELOPE/RUBBER O-RING
4310.2	AY58295A-BZV	ISOLATOR BRG VBXXD OB GP2 GP2K GP2 POLY-S	1	BZV
4310.1	AY58296A-BZV	ISOLATOR BRG VBXXD IB GP2 2K GP2 POLY-S	1	BZV
4200	74916321	SEAL ISC2PX LG. GLD 1.875 (EAXV)	1	316SS / SILCARSILCAR / VITON
3856	75302364	GAUGE SIGHT 3D-PLASTIC 1"NPT TRICO	2	PLASTIC
3855	75692858	GAUGE 3 OZ OILER/SIGHTGLASS 1/4"NPT NIPPLE HORIZONTAL - ESCO P/N DC-OSG3X250HZ	1	CARBON STEEL-PLATED
3712	95200911	LOCKNUT (PREVIOUSLY P/N Y20A-SR)	1	COMMERCIAL GR QLTY STEEL
3240	CY61530A-CI	CARRIER BRG GP2K MK3A (LFP)	1	ASTM A48 30B OR 30C
3200	BY55979A-CI	HOUSING BRG GP2 3A SGT/OLOPP	1	ASTM A48 30B OR 30C
3134	CY55737A-CI	FOOT BHSG GP2 10 CL MK3A	1	ASTM A48 30B OR 30C
3126	BY55760D-304	SHIM FOOT GP2 MK3A .030	1	ASTM A276 AISI 304
3013	AY58150A-SR	BEARING OB OIL GP2 MK3 STYLE	1	COMMERCIAL GR QLTY STEEL
3011	Y21963A-SR	BEARING OB/IB GP2/2K/2V OIL	1	COMMERCIAL GR QLTY STEEL
2530	AY51567A-SR	RING RTNG BCARR 2K	1	COMMERCIAL GR QLTY STEEL
2200	SM-MY49112A130-D4-XXGXX	IMPELLER 3X2-13 RV	1	ASTM A744 GR CF8M
2100	SM-CY21361AB-316-XXGXX	SHAFT GP2 ONE PIECE	1	ASTM A276 AISI 316
1340	DY21857AB-DCI2	ADAPTER BRG HSG GP2 13 MK3A	1	ASTM A536 GR 65-45-12
1220	SM-DY52028A-D4-XXGXX	COVER CBL GP2-13 OVZ STPD	1	ASTM A744 GR CF8M
1100	BY40035N-DACA-DCI	CASING 3X2-13 150#RF TAP I 1/2 NPT	1	ASTM A395 GR 60-40-18

REV.	CHG NO.	DATE	REVD	CHKD	APVD
1	00107231	06-Mar-2023	ThMu	NaVi	GoLa
	DESC: 1" Bullseye Gauge added				

STATUS: CERTIFIED

CERTIFIED BY: _____

PUMP TAG NO: 18-P-1879 A/B

ALL DIMENSIONS ARE REFERENCES UNLESS OTHERWISE SPECIFIED

JOB NUMBER: 1408912

DRWN: SuA
DATE: 23-Jan-2023
CHKD: MaM
DATE: 23-Jan-2023
APVD: GoLa
DATE: 23-Jan-2023
3D MODEL NO. / REV.: --- / ----
≈ WEIGHT (---): ----

FLOWSERVE Chesapeake, VA USA Operations

DRAWING TITLE
SECTIONAL ASSEMBLY
2K 3X2-13RV BARE PUMP
MARK 3 STANDARD - ----

3rd ANGLE

SIZE: A2

DRAWING NUMBER: F000630670

REV.: 1

SCALE: NTS

DIM. UNITS: inch

SHEET: 1 OF: 1

Flowserve Flow Solutions Group

Flowserve Pump Division, 3900 Cook Boulevard, Chesapeake, VA 23323, USA
Phone: (+1) 757 485-8000
chpdoc@flowserve.com

Customer Document title:

Nozzle Loads

Flowserve Document title:	**Nozzle Loads**
Flowserve Document No.:	**1408912-003-1044-01**
Document Revision No.:	**0**
Flowserve Order No.:	**1408912**
Flowserve Serial No.:	**1408912CHP003A/B**
Pump Type/Size:	**MARK 3 STANDARD / 2K3X2-13RV**
Quantity:	**2**
Customer Name:	**World Energy Paramount**
Customer Tag No:	**18P1879 A/B**
Customer PO No.:	**4505555756**
End User:	**AIR PRODUCTS LLC**

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Rev	Revision Description	Released	Release Date
	Final	Morris, Tamika	27-Jan-22

a) Determine the appropriate casing "Material Group No." from figure 3-2.
b) Find the "Casing material correction factor" in Figure 4-14 based upon the "Material Group No." and operating temperature. Interpolation may be used to determine the correction factor for a specific temperature.
c) Find the "Baseplate correction factor" in Figure 4-15. The correction factor depends upon how the baseplate is to be installed.
d) Locate the pump model being evaluated in Figure 4-19 and multiply each load rating by the casing correction factor. Record the "adjusted Figure 4-19loads".
e) Locate the pump model being evaluated in Figures 4-20 and 4-21 and multiply each load rating by the baseplate correction factor. Record the adjusted Figure 4-20 and 4-21 loads.
f) Compare the "adjusted Figure 4-19 loads" to the values shown in figure 4-18. The lower of these two values should be used as the adjusted figure 4-18values. *(The HI standard also asks that figure 4-18 loads be reduced if figure 4-20 or 4-21 values are lower. Flowserve does not follow this step.)*
g) Calculate the applied loads at the casing flanges according to the coordinate system found in figure 4-16. The 12 forces and moments possible are Fxs, Fys, Fzs, Mxs, Mys, Mzs, Fxd, Fyd, Fzd, Mxd, Myd and Mzd. For example, Fxd designates Force in the "x" direction on the discharge flange. Mys designates the Moment about the "y"-axis on the suction flange.
h) Figure 4-17 gives the acceptance criteria equations. For long coupled pumps, equation sets 1 through 5 must be satisfied. For close coupled and C-face pumps, only equation sets 1 and 2 must be satisfied.
i) Equation set 1. Each applied load is divided by the corresponding adjusted figure 4-18 value. The absolute value of each ratio must be less than or equal to one.
j) Equation set 2. The summation of the absolute values of each ratio must be less than or equal to two. The ratios are the applied load divided by the adjusted figure 4-19 values.
k) Equation sets 3 and 4. These equations are checking for coupling misalignment due to nozzle loading in each axis. Each applied load is divided by the corresponding adjusted load from figure 4-20 and 4-21. The result of each equation must be between one and negative one.
l) Equation set 5. This equation calculates the total shaft movement from the results of equations 3 and 4. The result must be less than or equal to one.

4.6.4 Allowable nozzle loads

Flowserve chemical process pumps meet or exceed the allowable nozzle loads given by ANSI/HI 9.6.2. The following paragraphs describe how to calculate the allowable loads for each pump type and how to determine if the applied loads are acceptable. The first configuration covered is ASME B73.1M pumps, including the Mark 3 Standard, Sealmatic, Lo-Flo, Recessed Impeller, and Unitized Self-Priming pumps. The second configuration covered is the ASME B73.2M vertical, Mark 3 In-Line pump.

4.6.4.1 Mark 3 horizontal pumps (ASME B73.1M)

The following steps are based upon ANSI/HI 9.6.2. All information necessary to complete the evaluation is given below. For complete details please review the standard.

Figure 4-14: Casing Material Correction Factors

		Material Group No.													
		1.0	1.1	2.1	2.2	2.4	2.8	3.2	3.4	3.5	3.7	3.8	3.17	Ti	Cr
				Austenitic Steels				Nickel and Nickel Alloys							
Temp °C	Temp °F	DCI	Carbon Steel	Type 304 and 304L	Type 316 and 316L	Type 321	CD-4MCu	Nickel	Monel	Inconel	Hast B.	Hast C.	Alloy 20	Ti, Ti-Pd, Zr	High Chrome -18 to 171°C (0 to 340°F)
-129	-200			1.00	1.00	1.00		0.50					0.83		
-73	-100			1.00	1.00	1.00	1.00	0.50	0.83	0.93	1.00	1.00	0.83	0.89	
-29	-20	0.89	1.00	1.00	1.00	1.00	1.00	0.50	0.83	0.93	1.00	1.00	0.83	0.89	0.65
38	100	0.89	1.00	1.00	1.00	1.00	1.00	0.50	0.83	0.93	1.00	1.00	0.83	0.89	0.65
93	200	0.83	0.94	0.83	0.86	0.93	1.00	0.50	0.74	0.88	1.00	1.00	0.72	0.86	0.65
150	300	0.78	0.91	0.75	0.78	0.83	0.92	0.50	0.69	0.82	1.00	1.00	0.65	0.81	0.65
205	400	0.73	0.88	0.69	0.72	0.69	0.85	0.50	0.67	0.77	0.98	0.98	0.58	0.69	0.65
260	500	0.69	0.83	0.63	0.67	0.64	0.80	0.50	0.66	0.74	0.92	0.92	0.54	0.57	
315	600	0.65	0.76	0.60	0.63	0.60	0.77	0.50	0.66	0.74	0.84	0.84	0.50	0.45	
344	650	0.63	0.74	0.60	0.62	0.60			0.66	0.73	0.82	0.82		0.39	
370	700		0.74	0.59	0.60	0.58			0.66	0.73	0.79	0.79		0.33	

Figure 4-15: Baseplate correction factors

Base Type	Grouted	Bolted	Stilt Mounted
Type A	1.0	0.7	0.65
Type B - Polybase	1.0	n/a	0.95
Type C	n/a	1.0	1.0
Type D	1.0	0.8	0.75
Type E - PIP	1.0	0.95	n/a
Type T5000	1.0	n/a	n/a
Polyshield - baseplate/foundation	1.0	n/a	n/a

Figure 4-16: Coordinate system

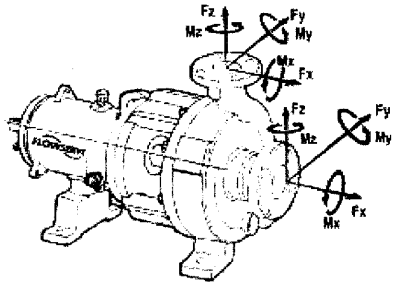

Figure 4-17: Acceptance criteria equations

Set	Equations	Figure	Remarks
1	$\left\lvert\frac{F_{xs}}{F_{xs\_adj}}\right\rvert \le 1.0,\ \left\lvert\frac{F_{ys}}{F_{ys\_adj}}\right\rvert \le 1.0,\ \left\lvert\frac{F_{zs}}{F_{zs\_adj}}\right\rvert \le 1.0,\ \left\lvert\frac{M_{xs}}{M_{xs\_adj}}\right\rvert \le 1.0,\ \left\lvert\frac{M_{ys}}{M_{ys\_adj}}\right\rvert \le 1.0,\ \left\lvert\frac{M_{zs}}{M_{zs\_adj}}\right\rvert \le 1.0,$ $\left\lvert\frac{F_{xd}}{F_{xd\_adj}}\right\rvert \le 1.0,\ \left\lvert\frac{F_{yd}}{F_{yd\_adj}}\right\rvert \le 1.0,\ \left\lvert\frac{F_{zd}}{F_{zd\_adj}}\right\rvert \le 1.0,\ \left\lvert\frac{M_{xd}}{M_{xd\_adj}}\right\rvert \le 1.0,\ \left\lvert\frac{M_{yd}}{M_{yd\_adj}}\right\rvert \le 1.0,\ \left\lvert\frac{M_{zd}}{M_{zd\_adj}}\right\rvert \le 1.0$	Adjusted 4-18	Maximum individual loading
2	$\left\lvert\frac{F_{xs}}{F_{xs\_adj}}\right\rvert + \left\lvert\frac{F_{ys}}{F_{ys\_adj}}\right\rvert + \left\lvert\frac{F_{zs}}{F_{zs\_adj}}\right\rvert + \left\lvert\frac{M_{xs}}{M_{xs\_adj}}\right\rvert + \left\lvert\frac{M_{ys}}{M_{ys\_adj}}\right\rvert + \left\lvert\frac{M_{zs}}{M_{zs\_adj}}\right\rvert +$ $\left\lvert\frac{F_{xd}}{F_{xd\_adj}}\right\rvert + \left\lvert\frac{F_{yd}}{F_{yd\_adj}}\right\rvert + \left\lvert\frac{F_{zd}}{F_{zd\_adj}}\right\rvert + \left\lvert\frac{M_{xd}}{M_{xd\_adj}}\right\rvert + \left\lvert\frac{M_{yd}}{M_{yd\_adj}}\right\rvert + \left\lvert\frac{M_{zd}}{M_{zd\_adj}}\right\rvert \le 2.0$	Adjusted 4-19	Nozzle stress, bolt stress, pump slippage
3	$A = \frac{F_{ys}}{F_{ys\_adj}} + \frac{M_{xs}}{M_{xs\_adj}} + \frac{M_{ys}}{M_{ys\_adj}} + \frac{M_{zs}}{M_{zs\_adj}} +$ $\frac{F_{yd}}{F_{yd\_adj}} + \frac{M_{xd}}{M_{xd\_adj}} + \frac{M_{yd}}{M_{yd\_adj}} + \frac{M_{zd}}{M_{zd\_adj}}$ $-1.0 \le A \le 1.0$	Adjusted 4-20	y-axis movement
4	$B = \frac{F_{xs}}{F_{xs\_adj}} + \frac{F_{zs}}{F_{zs\_adj}} + \frac{M_{xs}}{M_{xs\_adj}} + \frac{M_{ys}}{M_{ys\_adj}} + \frac{M_{zs}}{M_{zs\_adj}} +$ $\frac{F_{xd}}{F_{xd\_adj}} + \frac{F_{yd}}{F_{yd\_adj}} + \frac{F_{zd}}{F_{zd\_adj}} + \frac{M_{xd}}{M_{xd\_adj}} + \frac{M_{yd}}{M_{yd\_adj}} + \frac{M_{zd}}{M_{zd\_adj}}$ $-1.0 \le B \le 1.0$	Adjusted 4-21	z-axis movement
5	$\sqrt{A^2 + B^2} \le 1.0$	-	Combined axis

Figure 4-18: Maximum individual loading

Pump size	Suction Flange						Discharge Flange					
	Forces N (lbf)			Moments Nm (lbf•ft)			Forces N (lbf)			Moments Nm (lbf•ft)		
	Fxs	Fys	Fzs	Mxs	Mys	Mzs	Fxd	Fyd	Fzd	Mxd	Myd	Mzd
1K 1.5x1-LF4	4 670 (1 050)	3 336 (750)	3 336 (750)	976 (720)	231 (170)	231 (170)	3 558 (800)	6 005 (1350)	13 344 (3 000)	556 (410)	556 (410)	556 (410)
1K 1.5x1-6	4 670 (1 050)	3 336 (750)	3 336 (750)	976 (720)	231 (170)	231 (170)	3 558 (800)	6 005 (1350)	13 344 (3 000)	556 (410)	556 (410)	556 (410)
1K 3x1.5-6	4 670 (1 050)	5 516 (1 240)	5 560 (1 250)	1 220 (900)	664 (490)	664 (490)	3 558 (800)	6 005 (1 350)	13 344 (3 000)	678 (500)	746 (550)	692 (510)
1K 3x2-6 and US-6	4 670 (1 050)	4 670 (1 050)	4 670 (1 050)	1 220 (900)	298 (220)	298 (220)	3 558 (800)	6 005 (1 350)	13 344 (3 000)	678 (500)	1 356 (1 000)	692 (510)
1K 1.5x1-8 and LF8	4 670 (1 050)	5 382 (1 210)	5 382 (1 210)	976 (720)	258 (190)	258 (190)	3 558 (800)	6 005 (1 350)	13 344 (3 000)	488 (360)	488 (360)	488 (360)
1K 1.5x1.5US-8	4 670 (1 050)	5 382 (1 210)	5 382 (1 210)	976 (720)	258 (190)	258 (190)	3 558 (800)	6 005 (1 350)	13 344 (3 000)	488 (360)	488 (360)	488 (360)
1K 3x1.5-8	4 670 (1 050)	5 516 (1 240)	5 560 (1 250)	1 220 (900)	664 (490)	664 (490)	3 558 (800)	6 005 (1 350)	13 344 (3 000)	597 (440)	597 (440)	597 (440)
2K 3x2-8 and US-8	12 010 (2 700)	6 005 (1 350)	6 672 (1 500)	1 763 (1 300)	814 (600)	814 (600)	6 227 (1 400)	6 005 (1 350)	14 456 (3 250)	895 (660)	895 (660)	895 (660)
2K 4x3-8 and US-8	12 010 (2 700)	6 005 (1 350)	6 672 (1 500)	1 763 (1 300)	475 (350)	475 (350)	6 227 (1 400)	6 005 (1 350)	14 456 (3 250)	1 627 (1 200)	1 980 (1 460)	936 (690)
2K 2x1-10A and LF10	10 408 (2 340)	4 270 (960)	4 270 (960)	1 722 (1 270)	298 (220)	298 (220)	6 227 (1 400)	6 005 (1 350)	14 456 (3 250)	895 (660)	895 (660)	895 (660)
2K 2x1.5US-10A	10 408 (2 340)	4 270 (960)	4 270 (960)	1 722 (1 270)	298 (220)	298 (220)	6 227 (1 400)	6 005 (1 350)	14 456 (3 250)	895 (660)	895 (660)	895 (660)
2K 2x2R-10	10 408 (2 340)	4 270 (960)	4 270 (960)	1 722 (1 270)	298 (220)	298 (220)	6 227 (1 400)	6 005 (1 350)	14 456 (3 250)	895 (660)	895 (660)	895 (660)
2K 3x1.5-10A	12 010 (2 700)	6 005 (1 350)	6 672 (1 500)	1 763 (1 300)	570 (420)	570 (420)	6 227 (1 400)	6 005 (1 350)	14 456 (3 250)	502 (370)	502 (370)	502 (370)
2K 3x2-10A	12 010 (2 700)	6 005 (1 350)	6 583 (1 480)	1 763 (1 300)	420 (310)	420 (310)	6 227 (1 400)	6 005 (1 350)	14 456 (3 250)	759 (560)	759 (560)	759 (560)
2K 3x2US-10	12 010 (2 700)	6 005 (1 350)	6 583 (1 480)	1 763 (1 300)	420 (310)	420 (310)	6 227 (1 400)	6 005 (1 350)	14 456 (3 250)	759 (560)	759 (560)	759 (560)
2K 3x3R-10	12 010 (2 700)	6 005 (1 350)	6 583 (1 480)	1 763 (1 300)	420 (310)	420 (310)	6 227 (1 400)	6 005 (1 350)	14 456 (3 250)	759 (560)	759 (560)	759 (560)
2K 4x3-10 and 10H	10 230 (2 300)	6 005 (1 350)	6 672 (1 500)	1 763 (1 300)	420 (310)	420 (310)	6 227 (1 400)	6 005 (1 350)	14 456 (3 250)	1 627 (1 200)	1 980 (1 460)	936 (690)
2K 4x3US-10H	10 230 (2 300)	6 005 (1 350)	6 672 (1 500)	1 763 (1 300)	420 (310)	420 (310)	6 227 (1 400)	6 005 (1 350)	14 456 (3 250)	1 627 (1 200)	1 980 (1 460)	936 (690)
2K 6x4-10 and 10H	12 010 (2 700)	6 005 (1 350)	6 672 (1 500)	1 763 (1 300)	1 492 (1 100)	1 492 (1 100)	6 227 (1 400)	6 005 (1 350)	14 456 (3 250)	1 627 (1 200)	2 034 (1 500)	936 (690)
2K 3x1.5-13 and LF13	12 010 (2 700)	6 005 (1 350)	6 672 (1 500)	1 763 (1 300)	909 (670)	909 (670)	6 227 (1 400)	6 005 (1 350)	14 456 (3 250)	719 (530)	719 (530)	719 (530)
2K 3x2-13	8 540 (1 920)	5 471 (1 230)	5 471 (1 230)	1 763 (1 300)	475 (350)	475 (350)	6 227 (1 400)	6 005 (1 350)	14 456 (3 250)	1 627 (1 200)	1 722 (1 270)	936 (690)
2K 3x2US-13	8 540 (1 920)	5 471 (1 230)	5 471 (1 230)	1 763 (1 300)	475 (350)	475 (350)	6 227 (1 400)	6 005 (1 350)	14 456 (3 250)	1 627 (1 200)	1 722 (1 270)	936 (690)
2K 4x3-13 and 13HH	12 010 (2 700)	6 005 (1 350)	6 672 (1 500)	1 763 (1 300)	542 (400)	542 (400)	6 227 (1 400)	6 005 (1 350)	14 456 (3 250)	1 627 (1 200)	2 034 (1 500)	936 (690)
2K 4x3US-13	12 010 (2 700)	6 005 (1 350)	6 672 (1 500)	1 763 (1 300)	542 (400)	542 (400)	6 227 (1 400)	6 005 (1 350)	14 456 (3 250)	1 627 (1 200)	2 034 (1 500)	936 (690)
2K 4x3R-13	12 010 (2 700)	6 005 (1 350)	6 672 (1 500)	1 763 (1 300)	542 (400)	542 (400)	6 227 (1 400)	6 005 (1 350)	14 456 (3 250)	1 627 (1 200)	2 034 (1 500)	936 (690)
2K 6x4-13A	12 010 (2 700)	6 005 (1 350)	6 672 (1 500)	1 763 (1 300)	1 763 (1 300)	1 492 (1 100)	6 227 (1 400)	6 005 (1 350)	14 456 (3 250)	1 627 (1 200)	2 034 (1 500)	936 (690)
2K 6x4US-13A	12 010 (2 700)	6 005 (1 350)	6 672 (1 500)	1 763 (1 300)	1 763 (1 300)	1 492 (1 100)	6 227 (1 400)	6 005 (1 350)	14 456 (3 250)	1 627 (1 200)	2 034 (1 500)	936 (690)
2K 6x4R-13	12 010 (2 700)	6 005 (1 350)	6 672 (1 500)	1 763 (1 300)	1 763 (1 300)	1 492 (1 100)	6 227 (1 400)	6 005 (1 350)	14 456 (3 250)	1 627 (1 200)	2 034 (1 500)	936 (690)
3K 8x6-14A	15 568 (3 500)	14 145 (3 180)	8 896 (2 000)	2 034 (1 500)	1 587 (1 170)	1 587 (1 170)	6 672 (1 500)	13 344 (3 000)	15 568 (3 500)	1 695 (1 250)	3 851 (2 840)	3 851 (2 840)
3K 10x8-14	15 568 (3 500)	14 145 (3 180)	8 896 (2 000)	2 034 (1 500)	2 712 (2 000)	2 915 (2 150)	6 672 (1 500)	13 344 (3 000)	15 568 (3 500)	1 695 (1 250)	3 851 (2 840)	3 851 (2 840)
3K 6x4-16	15 568 (3 500)	12 721 (2 860)	8 006 (1 800)	1 831 (1 350)	1 431 (1 055)	1 431 (1 055)	6 005 (1 350)	12 010 (2 700)	14 011 (3 150)	1 526 (1 125)	3 465 (2 555)	3 465 (2 555)
3K 8x6-16A	15 568 (3 500)	14 145 (3 180)	8 896 (2 000)	2 034 (1 500)	2 007 (1 480)	2 007 (1 480)	6 672 (1 500)	13 344 (3 000)	15 568 (3 500)	1 695 (1 250)	3 851 (2 840)	3 851 (2 840)
3K 10x8-16 and 16H	15 568 (3 500)	14 145 (3 180)	8 896 (2 000)	2 034 (1 500)	1 532 (1 130)	1 532 (1 130)	6 672 (1 500)	13 344 (3 000)	15 568 (3 500)	1 695 (1 250)	3 851 (2 840)	3 851 (2 840)
3K 10x8-17	15 568 (3 500)	14 145 (3 180)	8 896 (2 000)	2 034 (1 500)	1 532 (1 130)	1 532 (1 130)	6 672 (1 500)	13 344 (3 000)	15 568 (3 500)	1 695 (1 250)	3 851 (2 840)	3 851 (2 840)
3K 12x10-18HD	8000 (1800)	5340 (1200)	6670 (1500)	6100 (4500)	4610 (3400)	2980 (2200)	5340 (1200)	6670 (1500)	4450 (1000)	5020 (3700)	3800 (2800)	2440 (1800)

Figure 4-19: Maximum combined loading

Pump size	Suction Flange						Discharge Flange					
	Forces N (lbf)			Moments Nm (lbf•ft)			Forces N (lbf)			Moments Nm (lbf•ft)		
	Fxs	Fys	Fzs	Mxs	Mys	Mzs	Fxd	Fyd	Fzd	Mxd	Myd	Mzd
1K 1.5x1-LF4	8 985 (2 020)	3 336 (750)	3 336 (750)	2 481 (1 830)	231 (170)	231 (170)	8 985 (2 020)	6 005 (1 350)	27 756 (6 240)	556 (410)	556 (410)	556 (410)
1K 1.5x1-6	8 985 (2 020)	3 336 (750)	3 336 (750)	2 481 (1 830)	231 (170)	231 (170)	8 985 (2 020)	6 005 (1 350)	27 756 (6 240)	556 (410)	556 (410)	556 (410)
1K 3x1.5-6	8 985 (2 020)	5 516 (1 240)	9 385 (2 110)	3 105 (2 290)	664 (490)	664 (490)	8 985 (2 020)	6 005 (1 350)	27 756 (6 240)	746 (550)	746 (550)	692 (510)
1K 3x2-6 and US-6	8 985 (2 020)	4 670 (1 050)	4 670 (1 050)	3 105 (2 290)	298 (220)	298 (220)	8 985 (2 020)	6 005 (1 350)	27 756 (6 240)	1 397 (1 030)	1 397 (1 030)	692 (510)
1K 1.5x1-8 and LF8	8 985 (2 020)	5 382 (1 210)	5 382 (1 210)	2 481 (1 830)	258 (190)	258 (190)	8 985 (2 020)	6 005 (1 350)	27 756 (6 240)	488 (360)	488 (360)	488 (360)
1K 1.5x1.5US-8	8 985 (2 020)	5 382 (1 210)	5 382 (1 210)	2 481 (1 830)	258 (190)	258 (190)	8 985 (2 020)	6 005 (1 350)	27 756 (6 240)	488 (360)	488 (360)	488 (360)
1K 3x1.5-8	8 985 (2 020)	5 516 (1 240)	7 295 (1 640)	3 105 (2 290)	664 (490)	664 (490)	8 985 (2 020)	6 005 (1 350)	27 756 (6 240)	597 (440)	597 (440)	597 (440)
2K 3x2-8 and US-8	12 010 (2 700)	6 005 (1 350)	11 076 (2 490)	5 058 (3 730)	814 (600)	814 (600)	8 763 (1 970)	6 005 (1 350)	27 756 (6 240)	895 (660)	895 (660)	895 (660)
2K 4x3-8 and US-8	12 010 (2 700)	6 005 (1 350)	8 184 (1 840)	5 058 (3 730)	475 (350)	475 (350)	8 985 (2 020)	6 005 (1 350)	27 756 (6 240)	1 980 (1 460)	1 980 (1 460)	936 (690)
2K 2x1-10A and LF10	10 408 (2 340)	4 270 (960)	4 270 (960)	4 936 (3 640)	298 (220)	298 (220)	8 985 (2 020)	6 005 (1 350)	27 756 (6 240)	895 (660)	895 (660)	895 (660)
2K 2x1.5US-10A	10 408 (2 340)	4 270 (960)	4 270 (960)	4 936 (3 640)	298 (220)	298 (220)	8 985 (2 020)	6 005 (1 350)	27 756 (6 240)	895 (660)	895 (660)	895 (660)
2K 2x2R-10	10 408 (2 340)	4 270 (960)	4 270 (960)	4 936 (3 640)	298 (220)	298 (220)	8 985 (2 020)	6 005 (1 350)	27 756 (6 240)	895 (660)	895 (660)	895 (660)
2K 3x1.5-10A	12 010 (2 700)	6 005 (1 350)	8 496 (1 910)	5 058 (3 730)	570 (420)	570 (420)	8 629 (1 940)	6 005 (1 350)	27 756 (6 240)	502 (370)	502 (370)	502 (370)
2K 3x2-10A	12 010 (2 700)	6 005 (1 350)	6 583 (1 480)	5 058 (3 730)	420 (310)	420 (310)	8 985 (2 020)	6 005 (1 350)	27 756 (6 240)	759 (560)	759 (560)	759 (560)
2K 3x2US-10	12 010 (2 700)	6 005 (1 350)	6 583 (1 480)	5 058 (3 730)	420 (310)	420 (310)	8 985 (2 020)	6 005 (1 350)	27 756 (6 240)	759 (560)	759 (560)	759 (560)
2K 3x3R-10	12 010 (2 700)	6 005 (1 350)	6 583 (1 480)	5 058 (3 730)	420 (310)	420 (310)	8 985 (2 020)	6 005 (1 350)	27 756 (6 240)	759 (560)	759 (560)	759 (560)
2K 4x3-10 and 10H	10 230 (2 300)	6 005 (1 350)	7 295 (1 640)	5 058 (3 730)	420 (310)	420 (310)	8 985 (2 020)	6 005 (1 350)	27 756 (6 240)	1 980 (1 460)	1 980 (1 460)	936 (690)
2K 4x3US-10H	10 230 (2 300)	6 005 (1 350)	7 295 (1 640)	5 058 (3 730)	420 (310)	420 (310)	8 985 (2 020)	6 005 (1 350)	27 756 (6 240)	1 980 (1 460)	1 980 (1 460)	936 (690)
2K 6x4-10 and 10H	12 010 (2 700)	6 005 (1 350)	27 756 (6 240)	5 058 (3 730)	1 492 (1 100)	1 492 (1 100)	8 985 (2 020)	6 005 (1 350)	27 756 (6 240)	4 204 (3 100)	4 204 (3 100)	936 (690)
2K 3x1.5-13 and LF13	12 010 (2 700)	6 005 (1 350)	13 611 (3 060)	5 058 (3 730)	909 (670)	909 (670)	8 985 (2 020)	6 005 (1 350)	27 756 (6 240)	719 (530)	719 (530)	719 (530)
2K 3x2-13	8 540 (1 920)	5 471 (1 230)	5 471 (1 230)	5 058 (3 730)	475 (350)	475 (350)	8 985 (2 020)	6 005 (1 350)	27 756 (6 240)	1 980 (1 460)	1 980 (1 460)	936 (690)
2K 3x2US-13	8 540 (1 920)	5 471 (1 230)	5 471 (1 230)	5 058 (3 730)	475 (350)	475 (350)	8 985 (2 020)	6 005 (1 350)	27 756 (6 240)	1 980 (1 460)	1 980 (1 460)	936 (690)
2K 4x3-13 and 13HH	12 010 (2 700)	6 005 (1 350)	10 631 (2 390)	5 058 (3 730)	542 (400)	542 (400)	8 985 (2 020)	6 005 (1 350)	27 756 (6 240)	2 346 (1 730)	2 346 (1 730)	936 (690)
2K 4x3US-13	12 010 (2 700)	6 005 (1 350)	10 631 (2 390)	5 058 (3 730)	542 (400)	542 (400)	8 985 (2 020)	6 005 (1 350)	27 756 (6 240)	2 346 (1 730)	2 346 (1 730)	936 (690)
2K 4x3R-13	12 010 (2 700)	6 005 (1 350)	10 631 (2 390)	5 058 (3 730)	542 (400)	542 (400)	8 985 (2 020)	6 005 (1 350)	27 756 (6 240)	2 346 (1 730)	2 346 (1 730)	936 (690)
2K 6x4-13A	12 010 (2 700)	6 005 (1 350)	27 756 (6 240)	5 058 (3 730)	6 753 (4 980)	1 492 (1 100)	8 985 (2 020)	6 005 (1 350)	27 756 (6 240)	2 915 (2 150)	2 915 (2 150)	936 (690)
2K 6x4US-13A	12 010 (2 700)	6 005 (1 350)	27 756 (6 240)	5 058 (3 730)	6 753 (4 980)	1 492 (1 100)	8 985 (2 020)	6 005 (1 350)	27 756 (6 240)	2 915 (2 150)	2 915 (2 150)	936 (690)
2K 6x4R-13	12 010 (2 700)	6 005 (1 350)	27 756 (6 240)	5 058 (3 730)	6 753 (4 980)	1 492 (1 100)	8 985 (2 020)	6 005 (1 350)	27 756 (6 240)	2 915 (2 150)	2 915 (2 150)	936 (690)
3K 8x6-14A	28 289 (6 360)	14 145 (3 180)	22 596 (5 080)	12 163 (8 970)	1 587 (1 170)	1 587 (1 170)	28 289 (6 360)	14 145 (3 180)	59 870 (13 460)	9 194 (6 780)	5 221 (3 850)	3 851 (2 840)
3K 10x8-14	28 289 (6 360)	14 145 (3 180)	59 870 (13 460)	12 163 (8 970)	3 322 (2 450)	2 915 (2 150)	28 289 (6 360)	14 145 (3 180)	59 870 (13 460)	12 163 (8 970)	9 790 (7 220)	3 851 (2 840)
3K 6x4-16	28 289 (6 360)	14 145 (3 180)	20 327 (4 570)	12 163 (8 970)	1 431 (1 055)	1 431 (1 055)	25 465 (5 725)	12 720 (2 860)	53 888 (12 115)	8 272 (6 100)	4 699 (3 465)	3 465 (2 555)
3K 8x6-16A	28 289 (6 360)	14 145 (3 180)	29 713 (6 680)	12 163 (8 970)	2 007 (1 480)	2 007 (1 480)	28 289 (6 360)	14 145 (3 180)	59 870 (13 460)	8 895 (6 560)	5 044 (3 720)	3 851 (2 840)
3K 10x8-16 & 16HH	28 289 (6 360)	14 145 (3 180)	22 818 (5 130)	12 163 (8 970)	1 532 (1 130)	1 532 (1 130)	28 289 (6 360)	14 145 (3 180)	59 870 (13 460)	12 163 (8 970)	12 285 (9 060)	3 851 (2 840)
3K 10x8-17	28 289 (6 360)	14 145 (3 180)	22 818 (5 130)	12 163 (8 970)	1 532 (1 130)	1 532 (1 130)	28 289 (6 360)	14 145 (3 180)	59 870 (13 460)	12 163 (8 970)	12 285 (9 060)	3 851 (2 840)
3K 12x10-18HD	8000 (1800)	5340 (1200)	6670 (1500)	6100 (4500)	4610 (3400)	2980 (2200)	5340 (1200)	6670 (1500)	4450 (1000)	5020 (3700)	3800 (2800)	2440 (1800)

Figure 4-20: Maximum Y-axis loading for shaft deflection

Pump size	Suction Flange						Discharge Flange					
	Forces N (lbf)			Moments Nm (lbf•ft)			Forces N (lbf)			Moments Nm (lbf•ft)		
	Fxs	Fys	Fzs	Mxs	Mys	Mzs	Fxd	Fyd	Fzd	Mxd	Myd	Mzd
Group 1		-8 896 (-2 000)		1 220.4 (900)	1 627.2 (1 200)	1 695 (1 250)		6 672 (1 500)		-678 (-500)	2 034 (1 500)	1 695 (1 250)
Group 2		-15 568 (-3 500)		1 762.8 (1 300)	1 762.8 (1 300)	4 068 (3 000)		11 120 (2 500)		-1 627 (-1 200)	2 034 (1 500)	4 068 (3 000)
Group 3		-22 240 (-5 000)		2 034 (1 500)	2 712 (2 000)	5 424 (4 000)		13 344 (3 000)		-1 695 (-1 250)	6 780 (5 000)	5 424 (4 000)

Figure 4-21: Maximum Z-axis loading for shaft deflection

Pump size	Suction Flange						Discharge Flange					
	Forces N (lbf)			Moments Nm (lbf*ft)			Forces N (lbf•ft)			Moments Nm (lbf•ft)		
	Fxs	Fys	Fzs	Mxs	Mys	Mzs	Fxd	Fyd	Fzd	Mxd	Myd	Mzd
Group 1	4 670 (1 050)		-5 560 (-1 250)	2 034 (1 500)	1 627 (1 200)	-3 390 (-2 500)	3 558 (800)	8 896 (2 000)	-13 344 (-3 000)	-2 034 (-1 500)	1 356 (1 000)	-3 390 (-2 500)
Group 2	15 568 (3 500)		-6 672 (-1 500)	2 034 (1 500)	1 763 (1 300)	-4 746 (-3 500)	6 227 (1 400)	11 120 (2 500)	-14 456 (-3 250)	-2 034 (-1 500)	2 915 (2 150)	-4 746 (-3 500)
Group 3	15 568 (3 500)		-8 896 (-2 000)	2 034 (1 500)	5 560 (4 100)	-5 424 (-4 000)	6 672 (1 500)	17 792 (4 000)	-15 568 (-3 500)	-2 034 (-1 500)	6 780 (5 000)	-5 424 (-4 000)

Flowserve Flow Solutions Group

Flowserve Pump Division, 3900 Cook Boulevard, Chesapeake, VA 23323, USA
Phone: (+1) 757 485-8000
chpdoc@flowserve.com

Customer Document title:

Standard Performance Curve

Flowserve Document title:	**Standard Performance Curve**
Flowserve Document No.:	**1408912-003-1060-01**
Document Revision No.:	**A**
Flowserve Order No.:	**1408912**
Flowserve Serial No.:	**1408912CHP003A/B**
Pump Type/Size:	**MARK 3 STANDARD / 2K3X2-13RV**
Quantity:	**2**
Customer Name:	**World Energy Paramount**
Customer Tag No:	**18P1879 A/B**
Customer PO No.:	**4505555756**
End User:	**AIR PRODUCTS LLC**

Please complete and return:			
Document Reviewed by:		**Document Reviewed date:**	

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Rev	Revision Description	Released	Release Date
A	For Review	Shaw, Amie	22-May-23

Customer	: AIR PRODUCTS & CHEMICALS INC	Capacity	: 250.0 USgpm
Item number	: 18-P-1879A/B	Head	: 109.30 ft
Service	: Storm Water Tank Pump	Density / Specific gravity	: - / 1.000
Flowserve reference	: 3425718151	Pump speed	: 1,750 rpm
Pump size & type / Stages	: 2K3x2-13RV M3 ST / 1	Ns / Nss	: 707 / 7,890 (US units)
Based on curve no.	: MIII7400DV	Test tolerance	: ANSI/HI 14.6 Grade 2B
Impeller diameter	: 11.00 in	Date	: December 3, 2021

CURVES ARE APPROXIMATE, PUMP IS GUARANTEED FOR ONE SET OF CONDITIONS; CAPACITY, HEAD, AND EFFICIENCY.
MCSF PROVIDES MECHANICAL PROTECTION ONLY. MINIMUM THERMAL FLOW MUST BE CALCULATED FOR THE SPECIFIC FLUID AND OPERATING CONDITIONS.

Flowserve Flow Solutions Group

Flowserve Pump Division, 3900 Cook Boulevard, Chesapeake, VA 23323, USA
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chpdoc@flowserve.com

Customer Document title:

Flowserve Hydraulic Data Sheet

Flowserve Document title:	**Flowserve Hydraulic Data Sheet**
Flowserve Document No.:	**1408912-003-5008-01**
Document Revision No.:	**A**
Flowserve Order No.:	**1408912**
Flowserve Serial No.:	**1408912CHP003A/B**
Pump Type/Size:	**MARK 3 STANDARD / 2K3X2-13RV**
Quantity:	**2**
Customer Name:	**World Energy Paramount**
Customer Tag No:	**18P1879 A/B**
Customer PO No.:	**4505555756**
End User:	**AIR PRODUCTS LLC**

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Rev	Revision Description	Released	Release Date
A	For Review		23-Jan-23

Customer	: AIR PRODUCTS & CHEMICALS INC	Pump / Stages	: 2K3x2-13RV M3 ST / 1
Customer reference	: WEP RFQ A8KM-4-602A-RQ	Based on curve no.	: MIII7400DV
Item number	: 18-P-1879A/B	Flowserve reference	: 3425718151
Service	: Storm Water Tank Pump	Date	: December 3, 2021

Operating Conditions

Capacity (rated/normal)	: 250.0 USgpm / -
Water capacity (CQ=1.00)	: -
Total developed head	: 109.30 ft
Water head (CH=1.00)	: -
NPSHa/NPSHa less margin	: 32.2 ft / -
Maximum suction pressure	: 15.0 psig

Liquid

Liquid type	: Other
Liquid description	: Storm Water
Temperature	: 80 °F
Density / Specific gravity	: - / 1.000
Solid Size - Actual / Limit	: - / 0.4060 in
Viscosity / Vapor pressure	: 1.00 cP / 0.40 psia

Materials / Specification

Material column code	: DCI
Pump specification	: ANSI B73.1

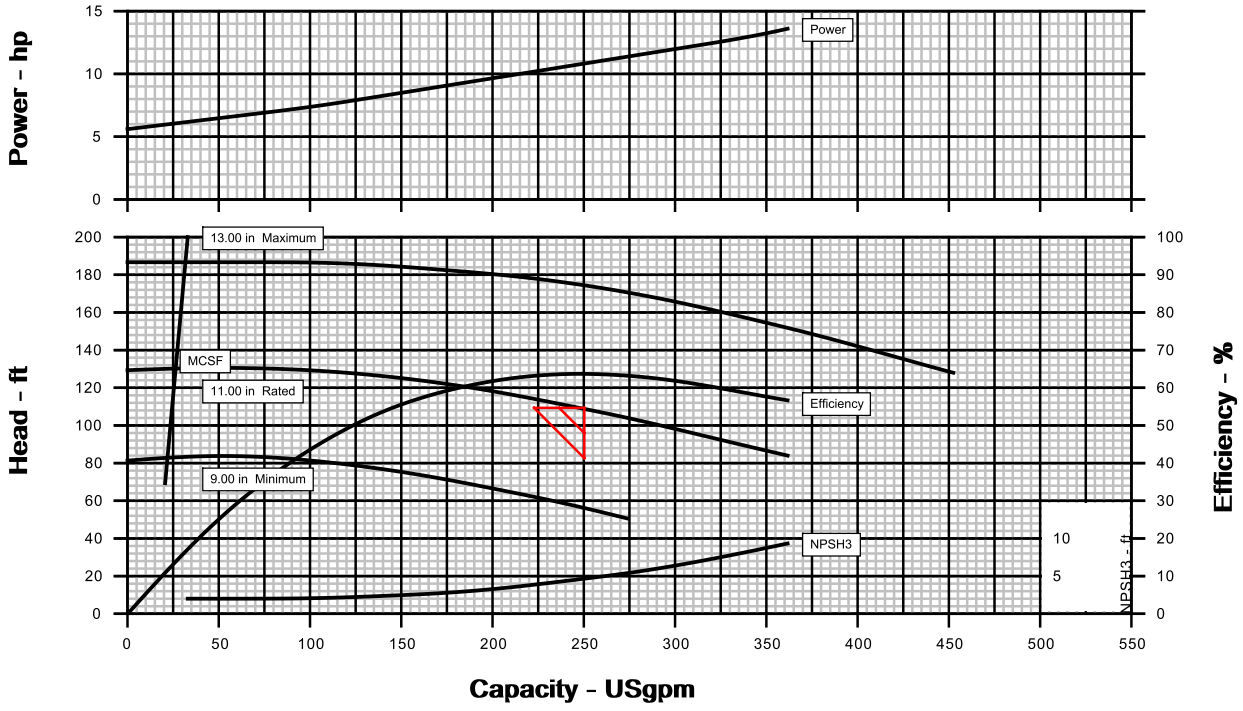
Other Requirements

Hydraulic selection : No specification
Construction : No specification
Test tolerance : ANSI/HI 14.6 Grade 2B
Driver Sizing : Max Power(MCSF to EOC) not using SF
Seal configuration : Single Seal

Performance

Hydraulic power	: 6.90 hp	Impeller diameter	
Pump speed	: 1,750 rpm	Rated	: 11.00 in
Pump overall efficiency (CE=1.00)	: 64.1 %	Maximum	: 13.00 in
NPSH required (NPSH3)	: 4.7 ft	Minimum	: 9.00 in
Rated brake power	: 10.8 hp	Ns / Nss	: 707 / 7,890 (US units)
		Minimum continuous flow	: 27.2 USgpm
Maximum brake power	: 13.6 hp	Maximum head at rated diameter	: 129.47 ft
Driver power rating	: 15.0 hp / 11.2 kW	Flow at BEP	: 247.7 USgpm
Casing working pressure	: 71.0 psig	Flow as % of BEP	: 100.9 %
(based on shut off @ cut dia/rated SG)		Efficiency at normal flow	: -
Maximum allowable	: 250.0 psig	Impeller diameter ratio (rated/max)	: 84.6 %
Hydrostatic test pressure	: 375.0 psig	Head rise to shut off	: 18.4 %
Estimated rated seal chamber pressure	: 4.0 psig	Total head ratio (rated / max) / (max / rated)	: 62.7 % / 159.4 %

CURVES ARE APPROXIMATE, PUMP IS GUARANTEED FOR ONE SET OF CONDITIONS; CAPACITY, HEAD, AND EFFICIENCY.
MCSF PROVIDES MECHANICAL PROTECTION ONLY. MINIMUM THERMAL FLOW MUST BE CALCULATED FOR THE SPECIFIC FLUID AND OPERATING CONDITIONS.



Flowserve Flow Solutions Group

Flowserve Pump Division, 3900 Cook Boulevard, Chesapeake, VA 23323, USA
Phone: (+1) 757 485-8000
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Customer Document title:

PMI Test Report

Flowserve Document title:	**PMI Test Report**
Flowserve Document No.:	**1408912-003-3020-01**
Document Revision No.:	**0**
Flowserve Order No.:	**1408912**
Flowserve Serial No.:	**1408912CHP003A/B**
Pump Type/Size:	**MARK 3 STANDARD / 2K3X2-13RV**
Quantity:	**2**
Customer Name:	**World Energy Paramount**
Customer Tag No:	**18P1879 A/B**
Customer PO No.:	**4505555756**
End User:	**AIR PRODUCTS LLC**

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Rev	Revision Description	Released	Release Date
	Final	Shaw, Amie	28-Feb-23

POSITIVE MATERIAL IDENTIFICATION (PMI) REPORT

Project No./Order : 3206805
Customer : AIR PRODUCTS LLC
Customer PO/Order No. : 4505555756
Job No. :
Customer Tag No. : 18-P-1879A/B

Source : Olympus XRF S/N 501048

Part No.	Part Name	Material	Heat No.	Qty.	ID
SM-MY49112A130-D4-XXGXX	IMPELLER	D4	N/A	1	B

Cr	Ni	Mo	Cu	W	Fe	Mn	Al	Ti
19.04	9.83	2.27						

Result	Inspector	TestDate
PASS	LM	7/11/2022

Part No.	Part Name	Material	Heat No.	Qty.	ID
SM-MY49112A130-D4-XXGXX	IMPELLER	D4	N/A	1	A

Cr	Ni	Mo	Cu	W	Fe	Mn	Al	Ti
18.85	9.58	2.17						

Result	Inspector	TestDate
PASS	LM	7/11/2022

Comments:

Signature: 

Date: 2/24/2023

POSITIVE MATERIAL IDENTIFICATION (PMI) REPORT

Project No./Order : 3203260
Customer : AIR PRODUCTS LLC
Customer PO/Order No. : 4505555756
Job No. :
Customer Tag No. : 18-P-1879A/B

Source : Olympus XRF S/N 501048

Part No.	Part Name	Material	Heat No.	Qty.	ID
SM-CY21361AB-316-XXGXX	SHAFT	316SS	N/A	1	A

Cr	Ni	Mo	Cu	W	Fe	Mn	Al	Ti
16.16	9.94	2.1						

Result	Inspector	TestDate
PASS	LM	8/29/2022

Comments:

Signature: _____ Date: 2/24/2023

POSITIVE MATERIAL IDENTIFICATION (PMI) REPORT

Project No./Order : 3203259
Customer : AIR PRODUCTS LLC
Customer PO/Order No. : 4505555756
Job No. :
Customer Tag No. : 18-P-1879A/B

Source : Olympus XRF S/N 501048

Part No.	Part Name	Material	Heat No.	Qty.	ID
SM-CY21361AB-316-XXGXX	SHAFT	316SS	N/A	1	A

Cr	Ni	Mo	Cu	W	Fe	Mn	Al	Ti
16.05	10.35	2.08						

Result	Inspector	TestDate
PASS	LM	8/29/2022

Comments:

Signature: 

Date: 2/24/2023

POSITIVE MATERIAL IDENTIFICATION (PMI) REPORT

Project No./Order : 3206804
Customer : AIR PRODUCTS LLC
Customer PO/Order No. : 4505555756
Job No. :
Customer Tag No. : 18-P-1879A/B

Source : Olympus XRF S/N 501048

Part No.	Part Name	Material	Heat No.	Qty.	ID
SM-DY52028A-D4-XXGXX	COVER	D4	N/A	1	B

Cr	Ni	Mo	Cu	W	Fe	Mn	Al	Ti
18.77	9.63	2.07						

Result	Inspector	TestDate
PASS	LM	7/11/2022

Part No.	Part Name	Material	Heat No.	Qty.	ID
SM-DY52028A-D4-XXGXX	COVER	D4	N/A	1	A

Cr	Ni	Mo	Cu	W	Fe	Mn	Al	Ti
18.69	9.79	2.26						

Result	Inspector	TestDate
PASS	LM	7/11/2022

Comments:

Signature: 

Date: 2/24/2023

Flowserve Flow Solutions Group

Flowserve Pump Division, 3900 Cook Boulevard, Chesapeake, VA 23323, USA
Phone: (+1) 757 485-8000
chpdoc@flowserve.com

Customer Document title:

Performance Test Report

Flowserve Document title:	**Performance Test Report**
Flowserve Document No.:	**1408912-003-4006-01**
Document Revision No.:	**0**
Flowserve Order No.:	**1408912**
Flowserve Serial No.:	**1408912CHP003A/B**
Pump Type/Size:	**MARK 3 STANDARD / 2K3X2-13RV**
Quantity:	**2**
Customer Name:	**World Energy Paramount**
Customer Tag No:	**18P1879 A/B**
Customer PO No.:	**4505555756**
End User:	**AIR PRODUCTS LLC**

Please complete and return:			
Document Reviewed by:		**Document Reviewed date:**	

☐ **APPROVED**. NO ACTION REQUIRED
☐ **APPROVED**. **RE-SUBMIT AS FINAL.**
☐ **APPROVED WITH COMMENTS**. DOCUMENT WILL BE MODIFIED AND RESUBMITTED AS FINAL.
☐ **REJECTED**. CORRECT AND RE-SUBMIT FOR APPROVAL.
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☐ **AS-BUILT**

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Rev	Revision Description	Released	Release Date
	Final	Shaw, Amie	28-Feb-23

FLOWSERVE

3900 Cook Boulevard, Chesapeake, VA 23323

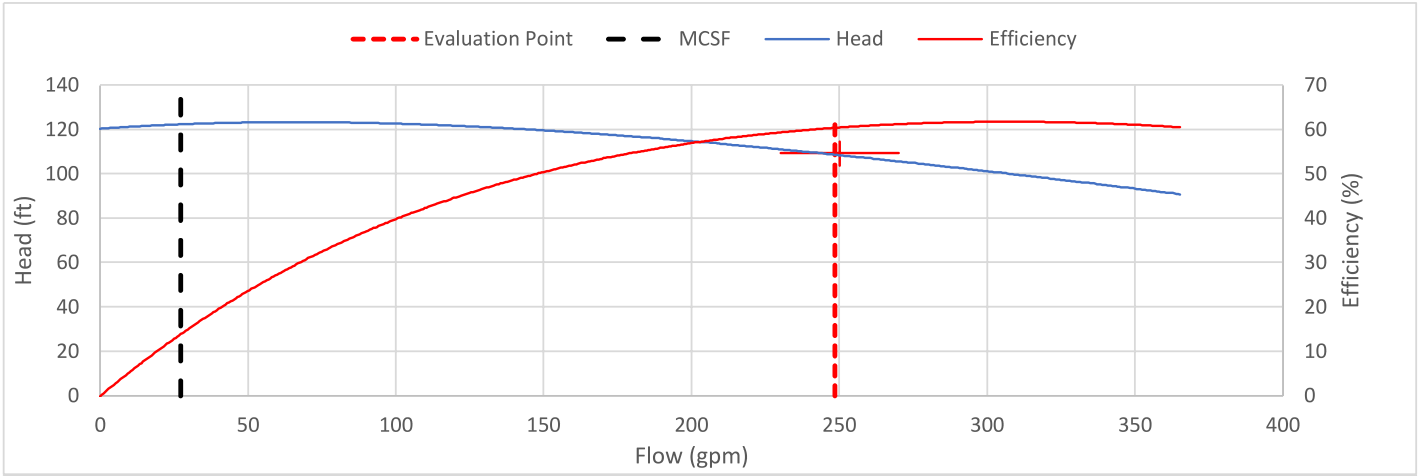
Performance Report **Curve No.** 00037114

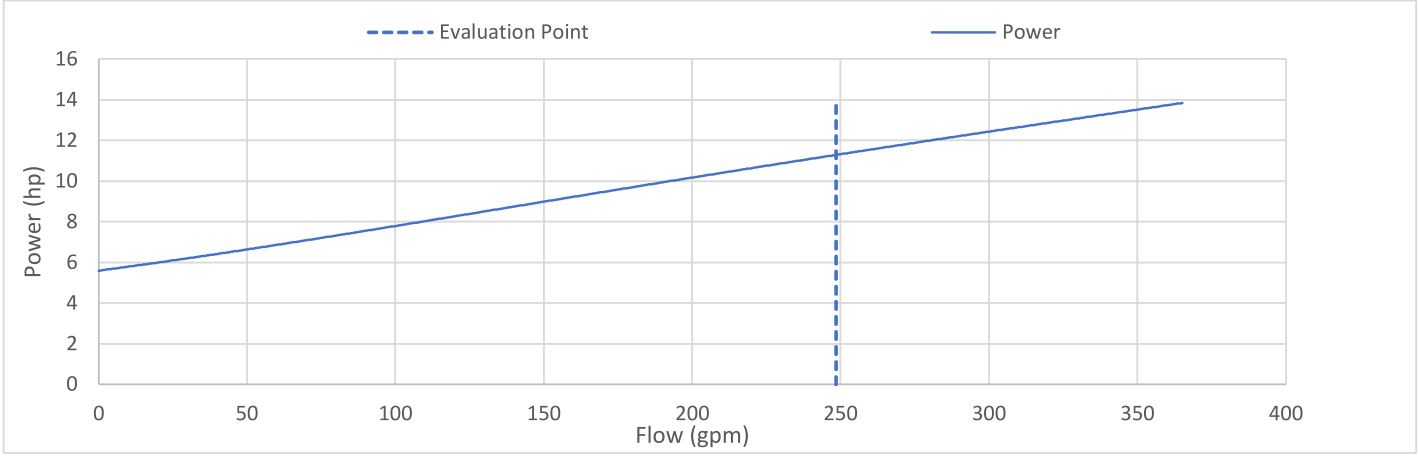
Test Date	Tested By	Certified
11/16/2022	SWEBSTER 10157338	

Digitally signed by 10157338
DN: cn=10157338, ou=CHP
Date: 2022.11.21 08:15:29 -05'00'

					Rated Values
Customer:	AIR PRODUCTS LLC	Speed Ratio:		Flow (gpm):	250
PO #:	4505555756	Impeller Type:	RV	Head (ft):	109.3
Customer Tag:	18-P-1879 A	Imp. Dia. (in):	11	Eff. (%):	64.1
Order #:	1408912	Impeller Mat.:	D4	Power (hp):	10.78
Line Item #:	3	Casing Mat.:	DCI	RPM:	1750
Job #:	3206764	Test Media:	Water	NPSHR (ft):	4.7
Serial #:	1408912CHP003A	Test Driver #:	M140	Specific Gravity:	1.000
Pump Line:	MK3	Test Driver (hp):	20	Viscosity:	1.000
Pump Size:	2K3X2-13RV	Test Driver Speed (RPM):	1765	Customer Driver:	15 HP
		Vibration:	Unfiltered RMS	Criteria:	2B

	Flow (gpm)	Head (ft)	Power (hp)	Eff. (%)	IN Horiz.	IN Vert.	IN Axial	OUT Horiz.	OUT Vert.	OUT Axial
Point 1	0.0	120.7	5.6	0.0						
Point 2	27.2	121.8	6.1	13.6	0.02	0.03	0.02	0.02	0.03	
Point 3	83.6	123.2	7.4	35.0	0.03	0.02	0.02	0.03	0.02	
Point 4	139.9	121.1	8.7	49.1	0.02	0.03	0.03	0.04	0.03	
Point 5	195.4	114.7	10.1	56.0	0.03	0.03	0.02	0.03	0.02	
Point 6	250.5	108.1	11.3	60.6	0.03	0.02	0.02	0.04	0.02	
Point 7	308.4	100.3	12.6	61.8	0.03	0.03	0.02	0.04	0.03	
Point 8	365.1	90.8	13.8	60.5	0.04	0.03	0.03	0.04	0.04	





Notes:	Noise: 79dB 6'; 80db. 3' from pump

FLOWSERVE

3900 Cook Boulevard, Chesapeake, VA 23323

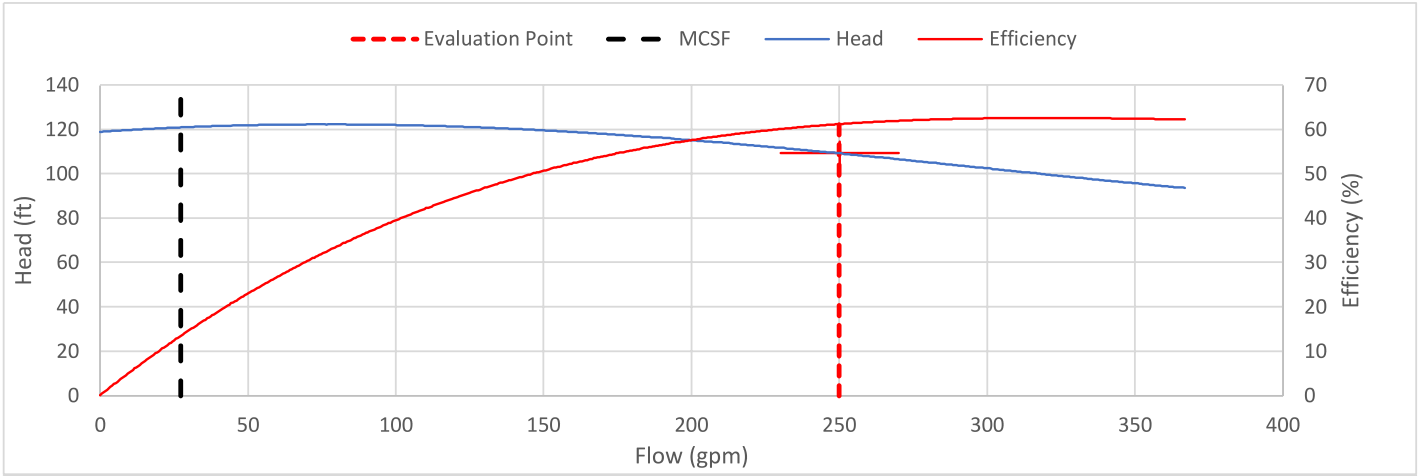
Performance Report **Curve No.** 00037116

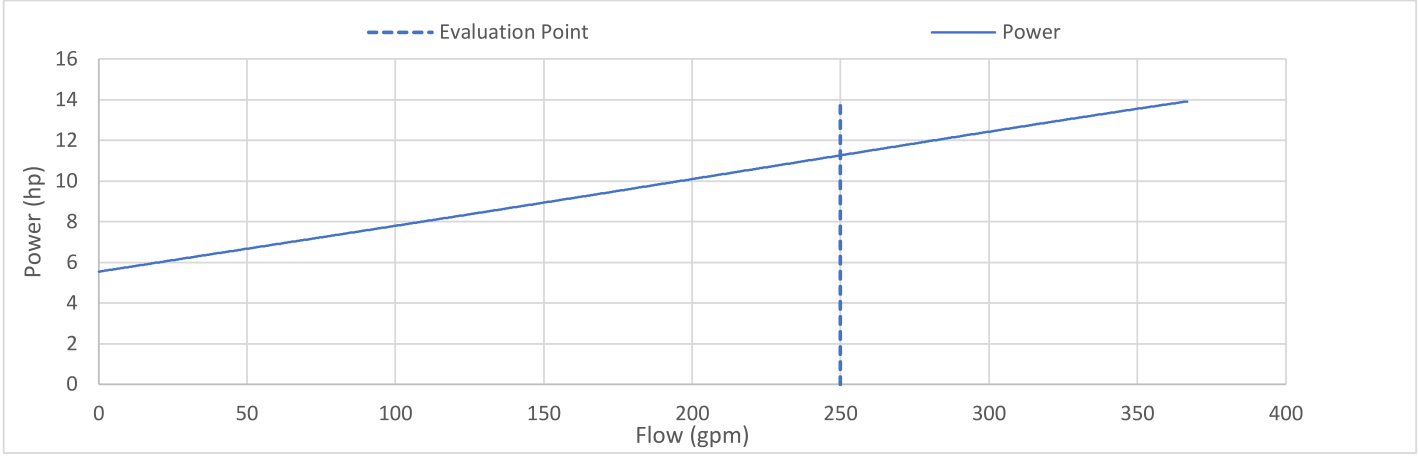
Test Date	Tested By	Certified
11/16/2022	SWEBSTER 10157338	

Digitally signed by 10157338
DN: cn=10157338, ou=CHP
Date: 2022.11.21 08:16:20 -05'00'

Customer:	AIR PRODUCTS LLC	Speed Ratio:		Rated Values	
PO #:	4505555756	Impeller Type:	RV	Flow (gpm):	250
Customer Tag:	18-P-1879 B	Imp. Dia. (in):	11	Head (ft):	109.3
Order #:	1408912	Impeller Mat.:	D4	Eff. (%):	64.1
Line Item #:	3	Casing Mat.:	DCI	Power (hp):	10.78
Job #:	3206764	Test Media:	Water	RPM:	1750
Serial #:	1408912CHP003B	Test Driver #:	M140	NPSHR (ft):	4.7
Pump Line:	MK3	Test Driver (hp):	20	Specific Gravity:	1.000
Pump Size:	2K3X2-13RV	Test Driver Speed (RPM):	1765	Viscosity:	1.000
		Vibration:	Unfiltered RMS	Customer Driver:	15 HP
				Criteria:	2B

	Flow (gpm)	Head (ft)	Power (hp)	Eff. (%)	IN Horiz.	IN Vert.	IN Axial	OUT Horiz.	OUT Vert.	OUT Axial
Point 1	0.0	119.3	5.6	0.0						
Point 2	27.2	120.5	6.1	13.6	0.02	0.03	0.03	0.02	0.03	
Point 3	83.5	122.5	7.4	34.7	0.03	0.02	0.02	0.02	0.03	
Point 4	139.9	120.5	8.7	48.7	0.03	0.03	0.02	0.03	0.03	
Point 5	194.4	115.5	10.0	56.9	0.04	0.03	0.02	0.02	0.03	
Point 6	250.6	109.1	11.2	61.7	0.03	0.02	0.02	0.03	0.02	
Point 7	308.3	101.5	12.7	62.3	0.02	0.03	0.02	0.03	0.03	
Point 8	366.7	93.6	13.9	62.3	0.04	0.03	0.02	0.04	0.03	





Notes:	Noise: 79db 6'; 80db. 3' from pump

Flowserve Flow Solutions Group

Flowserve Pump Division, 3900 Cook Boulevard, Chesapeake, VA 23323, USA
Phone: (+1) 757 485-8000
chpdoc@flowserve.com

Customer Document title:

Coupling Drawing

Flowserve Document title:	**Coupling Drawing**
Flowserve Document No.:	**1408912-003-5700-01**
Document Revision No.:	**C**
Flowserve Order No.:	**1408912**
Flowserve Serial No.:	**1408912CHP003A/B**
Pump Type/Size:	**MARK 3 STANDARD / 2K3X2-13RV**
Quantity:	**2**
Customer Name:	**World Energy Paramount**
Customer Tag No:	**18P1879 A/B**
Customer PO No.:	**4505555756**
End User:	**AIR PRODUCTS LLC**

Please complete and return:			
Document Reviewed by:		**Document Reviewed date:**	

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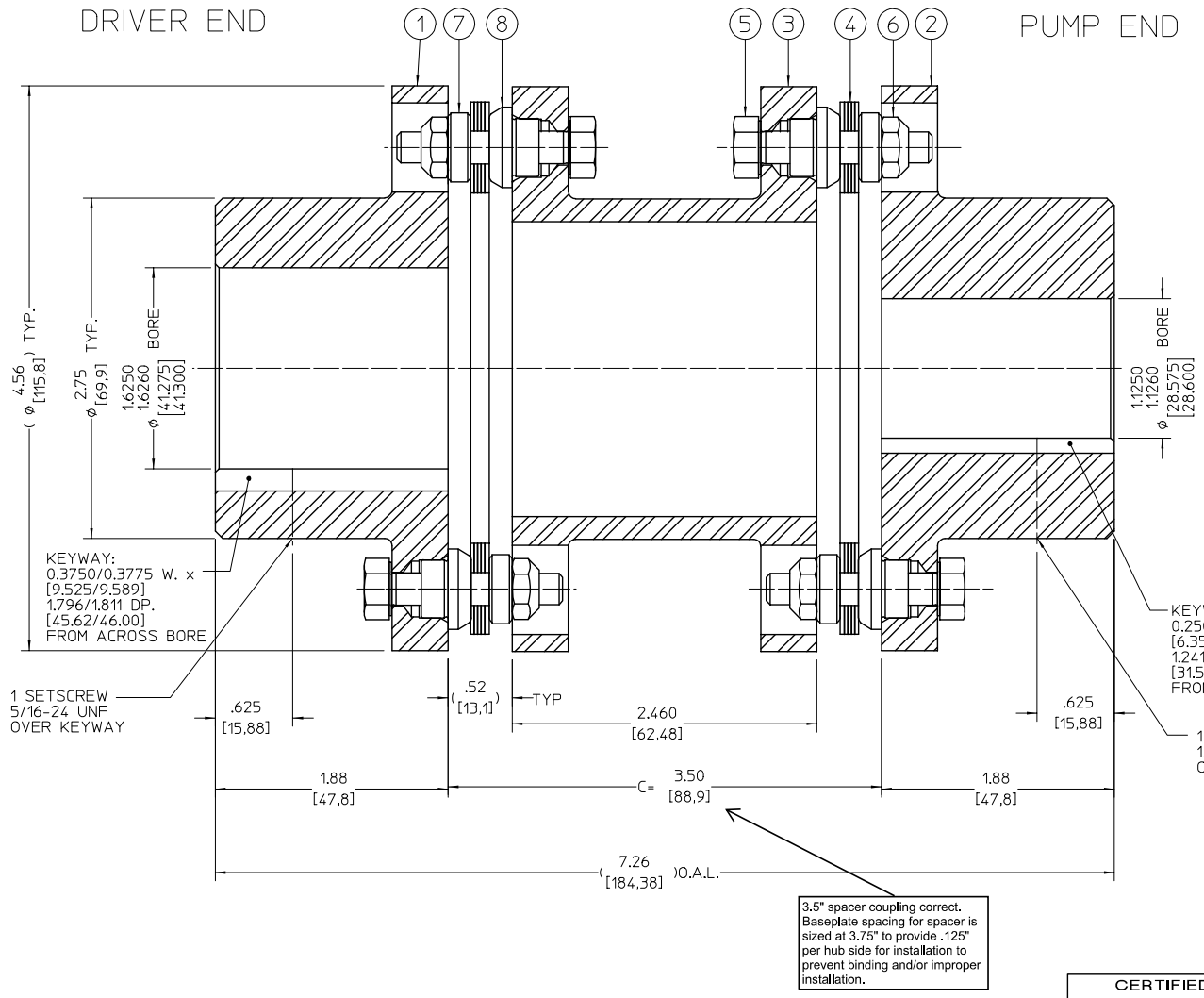
Rev	Revision Description	Released	Release Date
C	For Information		23-May-23

REVISIONS		



A. TORSIONAL DATA (CALC.)

WT = 12.10 lbs [5.50 kg]
WR^2 = 28 lbs-in² [81939.2 kg-mm²]
Kt = 7.103E^5 In-lbs/rad [8.028E^4 Nm/rad]
(BASED ON 1/3 SHAFT PENETRATION
FACTOR IN BOTH HUBS)

B. CUSTOMER DATA:

P.O. NO.: 347960
LINE ITEM NO.: 4
CUSTOMER NAME.: FLOWSERVE CORP. CHESAPEAKE

C. CUSTOMER NOTES

FLOWSERVE DOCUMENT TITLE: COUPLING DWG
FLOWSERVE DOCUMENT NO.: 1408912-003-5700-01
DOCUMENT REVISION NO.: 0
FLOWSERVE ORDER NO.: 1408912
FLOWSERVE SERIAL NO.: 1408912CHP002A/B
PUMP TYPE/SIZE: MARK 3 GRP 2 / 2K3X2-13RV
CUSTOMER: WORLD ENERGY PARAMOUNT
CUSTOMER TAG NO.: 18-P-1879A/B
CUSTOMER PO NO.: 4505555756
EQUIPMENT OWNER: AIR PRODUCTS LLC
CUSTOMER MATERIAL NO.: 74800236

D. N

COUPLING FURNISHED WITH TOMALOY DISCPACKS

ITEM NO. 4: LAMINATION THK.: 0.140/0.157 [3,56/3,99]

ITEM NO.	DESCRIPTION	QTY.	DWG. NO.	MATERIALS OF CONSTRUCTION
8	BUSHINGS	16	10999	POWDER METAL (F-0008-30)
7	WASHERS	16	10731	POWDER METAL (FC-0208-80 HT)
6	LOCKNUTS	16	16504	IFI GRADE C
5	BOLTS	16	10728	SAE GRADE 8
4	DISC PACKS	2	10954	TOMALOY
3	CENTER MEMBER	1	23947	CARBON STEEL
2	HUB	1	26492	CARBON STEEL
1	HUB	1	26492	CARBON STEEL

BILL OF MATERIAL

CERTIFIED DRAWING

CUSTOMER P.O. #: 347960
REXNORD ORDER #: 2009965-50
SAP MTL.# 10110036
REV. #: -
PER: SWD DATE: JAN-30-2023

Rexnord
COUPLING GROUP
WWW.REXNORD.COM
Thomas
Flexible Couplings

FLOWSERVE CORP. CHESAPEAKE

inch [mm] OR [mm]	DR. SWD 01-30-2023	SECTIONAL ASSEMBLY STANDARD 163 DBZ-C COUPLING	DRAWING NO. C007412
	DSGN.		PROPOSAL NO. N/A
	CHK. SWD 01-30-2023		ORDER NO. 2009965-50
	SCALE 1.5 : 1		

Flowserve Flow Solutions Group

Flowserve Pump Division, 3900 Cook Boulevard, Chesapeake, VA 23323, USA
Phone: (+1) 757 485-8000
chpdoc@flowserve.com

Customer Document title:

Mechanical Seal Drawing

Flowserve Document title:	**Mechanical Seal Drawing**
Flowserve Document No.:	**1408912-003-5800-01**
Document Revision No.:	**A**
Flowserve Order No.:	**1408912**
Flowserve Serial No.:	**1408912CHP003A/B**
Pump Type/Size:	**MARK 3 STANDARD / 2K3X2-13RV**
Quantity:	**2**
Customer Name:	**World Energy Paramount**
Customer Tag No:	**18P1879 A/B**
Customer PO No.:	**4505555756**
End User:	**AIR PRODUCTS LLC**

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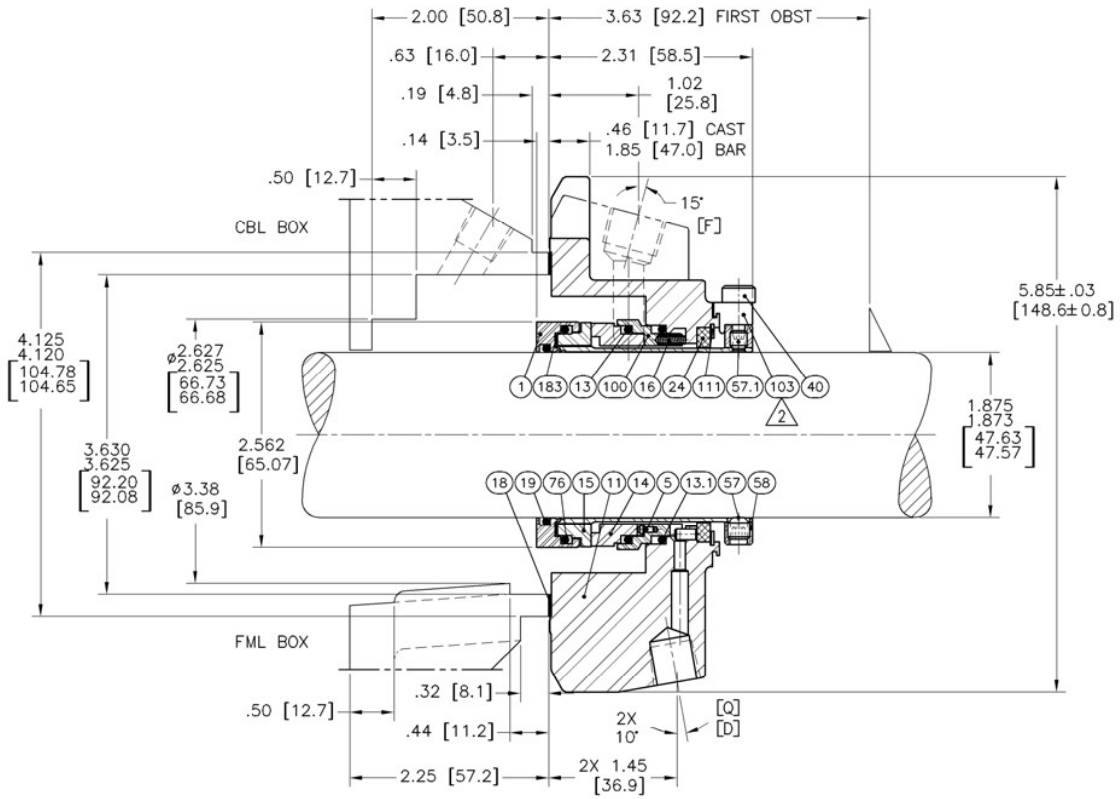
Rev	Revision Description	Released	Release Date
A	Information Only	Shaw, Amie	23-Jan-23

D0112258 1 (Both) Rev: - KAL Eng Puzin, Dan (Dpuzin) Mar-24-2015 10:05:55

NO: D0112258 | REV: –



[F] FLUSH 3/8 NPT
[Q] QUENCH 1/4 NPT
[D] DRAIN 1/4 NPT

NOTES:

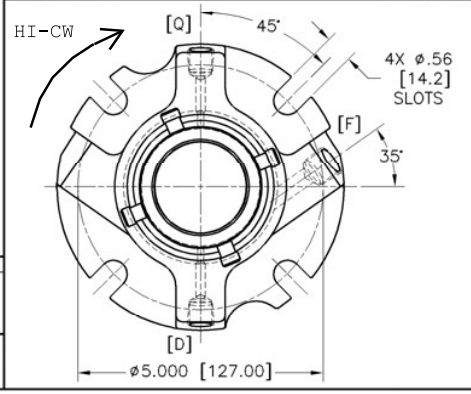
1. FOR INSTALLATION AND OPERATING INSTRUCTIONS SEE FIS190.
2. DISENGAGE SETTING DEVICES BEFORE START-UP.
3. END VIEW IS FOR REFERENCE ONLY. FEATURES AND FEATURE LOCATIONS MAY VARY BY METHOD OF MANUFACTURE.
4. PATENT PENDING.

REVISION: –	DATE: 21-JAN-2012	BY: MRAMASAMY	CHKD: MRAMASAMY	ECN NO:

REVISION NOTE: RELEASE TO MANUFACTURE.

DIM'S ARE REF UNLESS SPECIFIED OTHERWISE. | DIM'S IN: INCHES [MM] | C/A2 JULY 2009

THIRD ANGLE | END VIEW REDUCED SCALE: | ROTATION



BILL OF MATERIAL NO: C2CPX1875EAXVB — 1 SUGGESTED SPARE PARTS, 2 CODE/BSC[X]/OFF.STD[W]

NO	PARTCODE	QTY	DESCRIPTION	MATERIAL	1	2
1	C0011866DB	1	SLEEVE ASSEMBLY	316		X
5	C0012107NL	3	PIN SQ. HEAD	ALLOY C-276	*	X
11	C0011308DB	1	GLAND SINGLE-CW	316		X
13	568141GU	1	SEAT GASKET	FLUOROELASTOMER	*	X
13.1	568141GU	1	SEAT GASKET	FLUOROELASTOMER	*	X
14	C0011928YO	1	STATIONARY FACE	SILICON CARBIDE	*	X
15	K23C1875C33	1	ROTATING FACE	SILICON CARBIDE	*	X
16	MIAX88403CM	14	COIL SPRING	ALLOY C-276	*	X
18	MYCG4110AAC	1	GLAND GASKET	PTFE, BaSO4 FILLED (FDA GRADE)	*	X
19	568134GU	1	SLEEVE GASKET	FLUOROELASTOMER	*	X
24	C0010316KR3	1	GLAND BUSHING	CARBON (FDA GRADE)	*	X
40	C0012104CK	4	SHCS #10-24 X 3/8	18-8	*	X
57	4R0426X902	4	SSCP 1/4-20 X 1/4	17-4 H900	*	X
57.1	MLA36788233	2	SSQDP #10-24 X 7/32	ALLOY C-276	*	X
58	C0010378DB	1	DRIVE COLLAR	316		X
76	568141GU	1	ROT. FACE GASKET	FLUOROELASTOMER	*	X
100	C0011990DB	1	STATIONARY FACE SUPPORT	316	*	X
103	C0012106CK	4	SETTING DEVICE	18-8	*	X
111	UR243CK	1	SNAP RING	18-8	*	X
183	C0012052QF	1	VIBRATION DAMPER	FLEXIBLE GRAPHITE	*	X

Pump Tag: 18-P-1879 A/B

Site Location: World Energy, Paramount, CA USA

SEAL TYPE: ISC2-PX	SEAL SIZE: 1.875
SEAL CONFIG: SINGLE INSIDE-CARTRIDGE	
MATL CODE: 5Z4Z	
EQUIP MFR: FLOWSERVE	INSTR: FIS190
EQUIP MODEL: MK III GR 1K CBL/FML	
EQUIP DWG:	

FLOWSERVE Flow Solutions Group

SCALE: TO SCALE	PARTS LIST NO: L0000060	
DRAWN: MRAMASAMY	REF DWG: D0106758	
DATE: 21-JAN-2012	FORM DWG: F0012781	
CHKD: MRAMASAMY	DRAWING NO: D0112258 SHEET: 1 OF: 1	REV: –
APPVD:		
JOB NO: 12KAL0702		