

MANUFACTURER'S CONTACT INFORMATION



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MANUFACTURER: Pioneer Pump, Inc.

MAILING AND BILLING ADDRESS: 310 S. Sequoia Pkwy.
Canby, OR 97013

TELEPHONE: 503-266-4115

FAX: 503-266-4116

CONTACT: TJ Walstrom

TITLE: Project Sales Engineer

DID TELEPHONE: 888-299-2466

E-MAIL: tj.walstrom@fele.com

WEBSITE: www.pioneerpump.com

MANUFACTURER'S REPRESENTATIVE'S CONTACT INFORMATION



**MANUFACTURER'S
REPRESENTATIVE'S
CONTACT INFORMATION**

REPRESENTATIVE: Wholesale Pump & Supply

**MAILING AND BILLING
ADDRESS:** 1284 North Market Street
Shreveport, LA 71107

TELEPHONE: 985.542.1527

CONTACT: Gregory Roch

Title: Municipal/ Commercial Sales

E-MAIL: Greg.roch@wpspump.com



PROPOSAL

#1764272



Franklin Electric Co., Inc.
9255 Coverdale Road
Fort Wayne, IN 46809

Quote

Page No 1
Date 2020-May-07
Customer 662902
Branch/Plant 9000
Related PO/SO/WO Number
Order Number 1764272 SQ
Date 2020-May-07

Sold To

WHOLESALE PUMP & SUPPLY INC
P O BOX 1079
SHREVEPORT LA 71162
United States

Ship To

WHOLESALE PUMP & SUPPLY INC
P O BOX 1079
SHREVEPORT LA 71162
United States

Carrier: -

Requested	Customer PO	Freight	Delivery Instructions
2020-May-06	Jefferson Parish	.	

Line Number	Description	Item Number	UM	S/B	Quantity	Unit Price	Extended Price	Tax
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1.000	GT6O13L72-TD2.9 GL2 TRLR -S	PPTPGT6-GL000	EA	S	1.00			Y
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Pump Specifications

- Pump Model: GT6
- Pump Type: Pioneer Prime
- Volute discharge orientation: Top Horizontal (TH)
- Impeller Trim: 12.5"
- Seal Type: Mechanical Seal
- Bearing Frame: SAE - No Preference (Std for Diesel Pkgs) - No Preference (Std for Diesel Packages) Drive Coupling
- Materials of Construction: 72 - "Ductile Iron Standard"
- Paint Color: Pioneer Green Standard

Package Specifications

- Platform: GL2
- Fuel Capacity: 75 US Gallons
- Package Type: Enclosed DOT Trailer w/ Electric Brakes
- Engine Make/Model/HP/Tier: Deutz / TD2.9L4A / 58 HP / FT4
- Control Panel: Murphy MPC-10 L1 (Standard)
- Other Specifications:
- See attached specification sheet for complete details
- Entire package completely assembled, primed, and painted prior to shipment

Exceptions

- Our packages tend to align pretty closely with the relevant CPB specifications, but we do not specifically design around them nor can we ensure total compliance.
- No Shaft Sleeve Required in Our Design
- Shaft Material is 17-4 Stainless Steel

Clarifications

- Seal chamber designed for easy cleanout.

Total Order # 1764272 SQ

Due Date	2020-Jun-06	Tax Rate 1	0 %
Payment Terms	Net 30 Days		

ACH Payment Option:
ACH ABA #: 071000039
Account Number 8666053939

Bank of America
New York, NY

PLEASE PAY FROM THIS INVOICE NO.
MONTHLY STATEMENT WILL BE
SENT UNLESS YOU REQUEST IT

PLEASE REMIT TO: Franklin Electric Co., Inc.
21054 Network Place
Chicago, Il. 60673-1210

PUMP SPECIFICATION SHEET

GT SERIES

Wet Prime Centrifugal Pump

GT6013

The Pioneer Pump® GT Series is a robust pumping solution for nearly any food processing, wastewater treatment, waste handling, chemical processing, or industrial application with high performance demands. Now available in 3x3 and 4x4 sizes in addition to the 6x6 sizes, this product family features a robust shaft design that permits maximum flow rates up to 2250 gpm at a maximum head of 250 feet with a solids handling capability of up to three inches. The case inlet diameter is uniquely designed to alleviate abrasive wear on the pump and a unique cover design combines both the fill and flapper valve access cover into one part to improve ease of use – making these pumps ideal for the toughest tasks, all within a standard footprint.



PERFORMANCE

Size	6" x 6" (150 x 150 mm)
Max Flow	2,250 gpm (511 m ³ /h)
Max Head	250 feet (76 meters)
Max Speed	2,200 rpm
Max Efficiency	62%
Flow at BEP	1,700 gpm (386 m ³ /h)
Max Solids Handling	3" (7 mm)
Bearing Lubrication	Standard Oil
Fasteners	English

FEATURES

- Rugged cast iron casing and ductile-iron impellers for added strength and dependability
- Highly reliable and corrosion-resistant 17-4 stainless steel shaft
- Double-lip seal with atmospheric drain for additional bearing protection within the rotating assembly
- Cartridge-type SC/TC (silicone carbide/tungsten carbide) mechanical seal for simple installation and ease of maintenance

APPLICATIONS

Industrial	Oil Field
Municipal	Agriculture
Construction	Food Processing
Wastewater	Mining
Petrochemical	

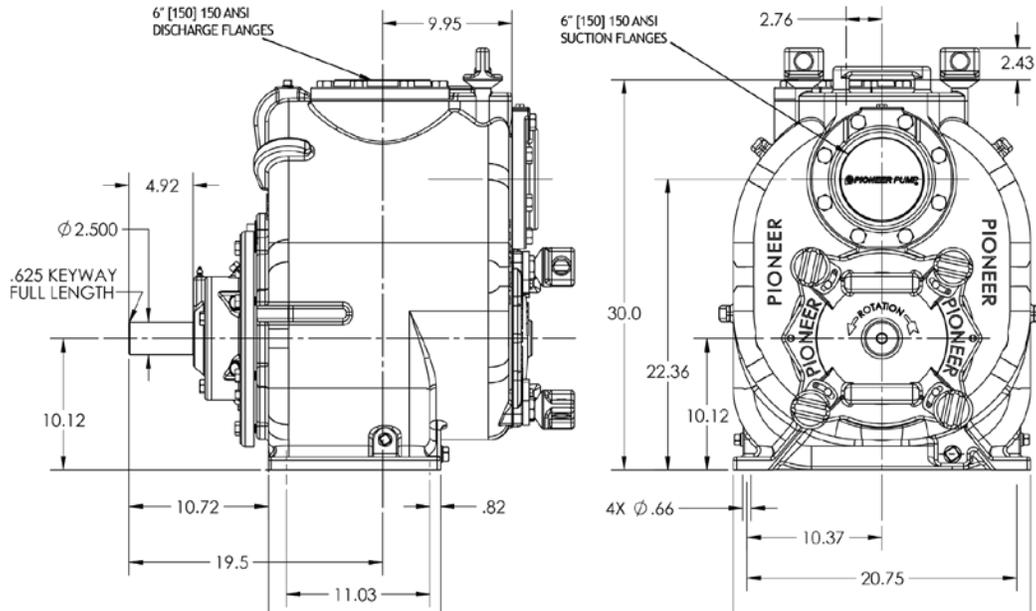
MATERIALS OF CONSTRUCTION

	Standard Materials	CD4MCu Duplex Stainless
Impeller	ASTM A536 Ductile Iron 65-45-12	ASTM A744 CD4MCu
Volute	ASTM A536 Ductile Iron 65-45-12	ASTM A744 CD4MCu
Inspection Cover	ASTM A48 Class 30 Gray Iron	ASTM A744 CD4MCu
Wear Plate	1018 Steel	ASTM A744 CD4MCu
Seal Plate	ASTM A48 Class 30 Gray Iron	ASTM A744 CD4MCu
Bearing Housing	ASTM A48 Class 30 Gray Iron	ASTM A744 CD4MCu

DRIVE OPTIONS

Bareshaft Pump End	Electric Driven Trailer
Overhead Belt Drive	Diesel Driven Trailer
Electric Direct Drive w/ Guard	

MECHANICAL DIMENSIONS



PERFORMANCE CURVE

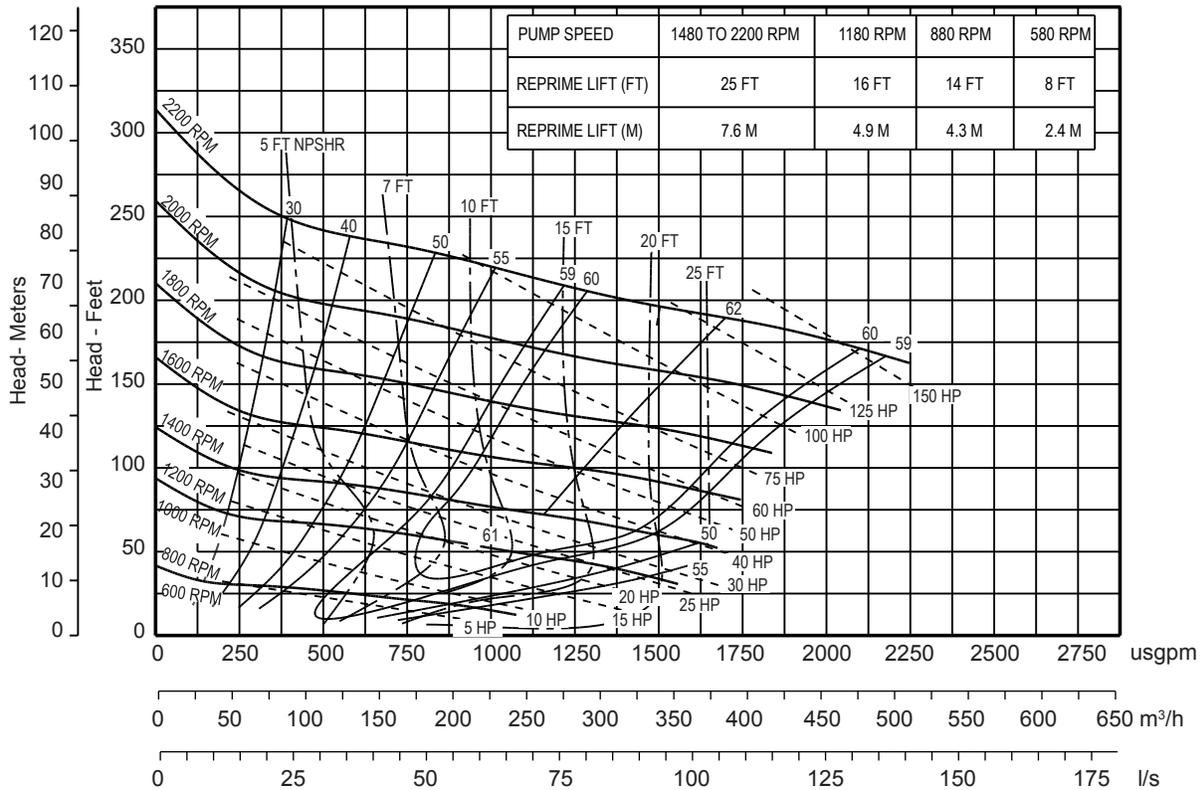
Model: GT6013

Impeller Dia: 13"

Speed: Variable

Solids Size: 3"

Curve #15848HQ



MECHANICAL SEAL DATA



The Type 31 hard-faced seal is a heavy duty seal for your most demanding applications.

The Type 31 features mechanically crimped components, eliminating the use of adhesives. The crimped head feature prevents solids from entering the head between the shell and the face, which is a cause of pre-mature failure in non-crimped designs.

Our unique Hexagonal Torque Drive (Hex Drive) reduces elastomer stress by distributing torque forces over the greatest possible area.

The elastomer bellows will accommodate variations in seal cavity length and pump misalignment.

Our standard design features an o-ring mounted stationary seat for better thermal transfer and easier installation. Cup seats are available.

Applications:

Agriculture, Construction, Sewage/Waste Water, Oilfield, Trash Pumps, Drainage Pumps, Coolant Pumps, Mining, Horizontal Drilling, Food Processing, Cryogenics

Fluid Media:

Abrasive Fluids, Slurries, Oils, Aggressive Chemicals, Thermal Transfer Fluids, De-Ionized Water and other demanding applications.

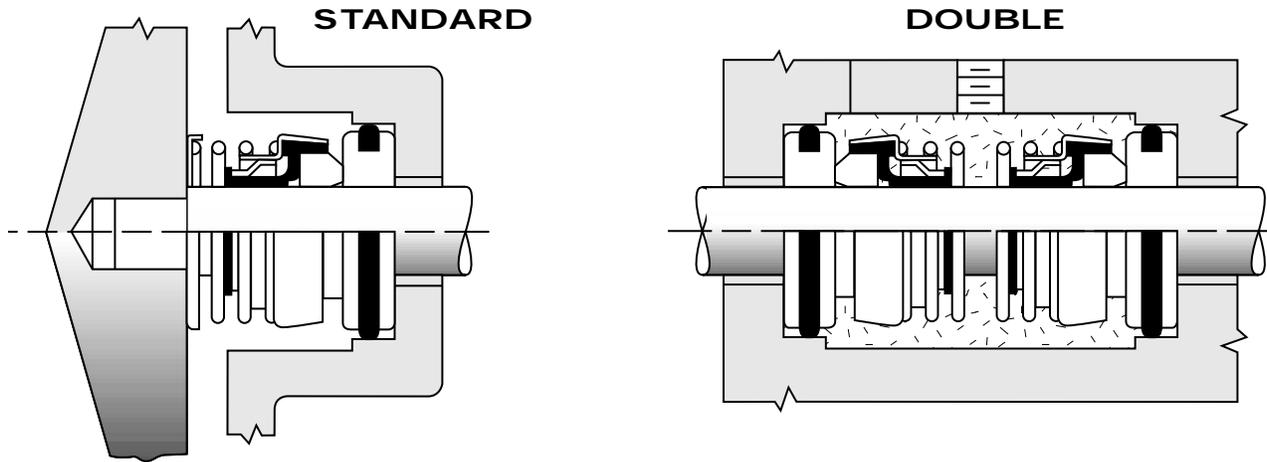
Operating Limits:

Pressure = 650 psi Balanced
= 250 psi Unbalanced
Speed = 5,000 ft./min.
Temperature = -55 to 400°F

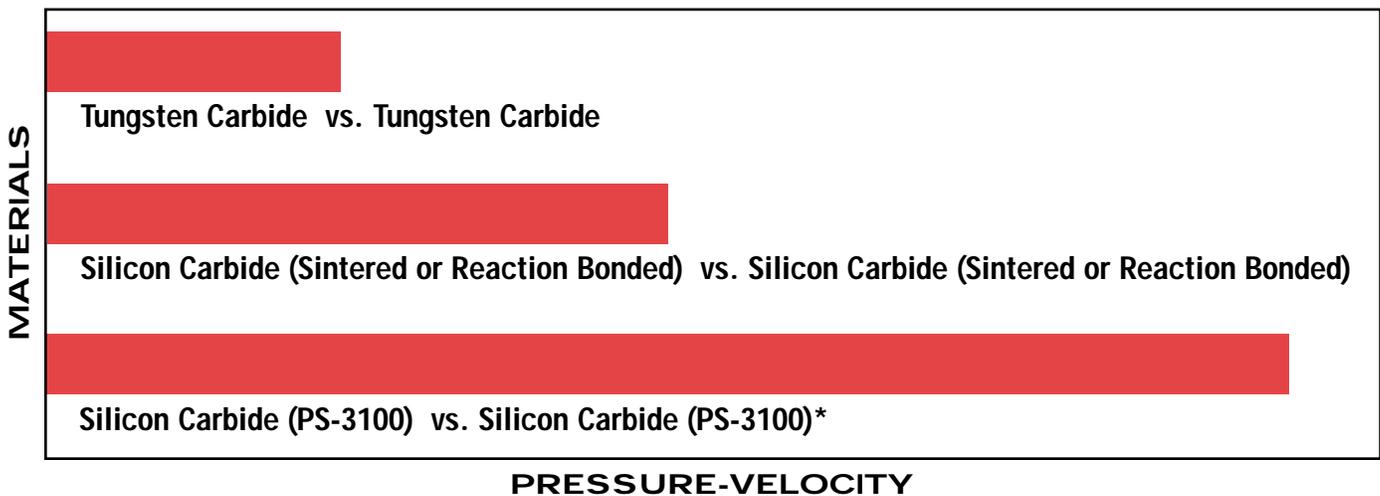
Replaces:

JOHN CRANE Type 21 / Type 2
SEALOL Type 43
US SEAL Type C

TYPICAL INSTALLATIONS



RELATIVE PRESSURE-VELOCITY CAPABILITY FOR HARD-FACE SEALS

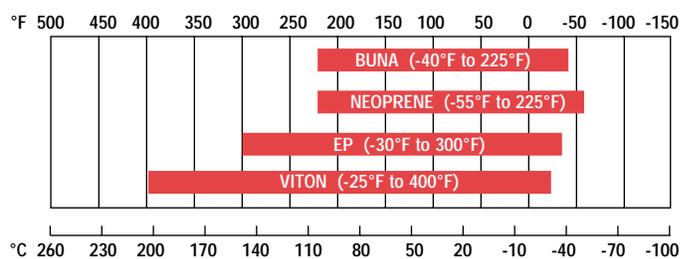


*PS-3100 is the advanced graphite-loaded sintered Silicon Carbide selected as the standard grade in Pac-Seal Type 31 Seals

AVAILABLE MATERIALS

Seal Ring	Mating Ring Seat	Elastomer	Metal Components
Silicon Carbide	Silicon Carbide	Viton	302/304 Stainless
Tungsten Carbide	Tungsten Carbide	Buna (FDA & U.L.)	316 Stainless
Carbon		EP	Monel
		Neoprene	
		Aflas	

TEMPERATURE LIMITS FOR ELASTOMERS





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Fluid Media:

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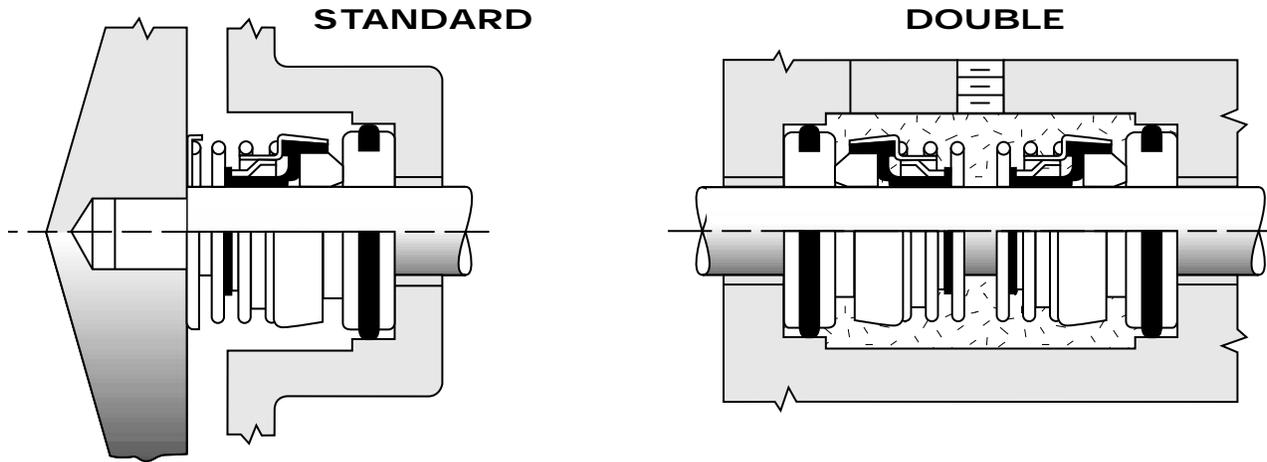
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= 250 psi Unbalanced
Speed = 5,000 ft./min.
Temperature = -55 to 400°F

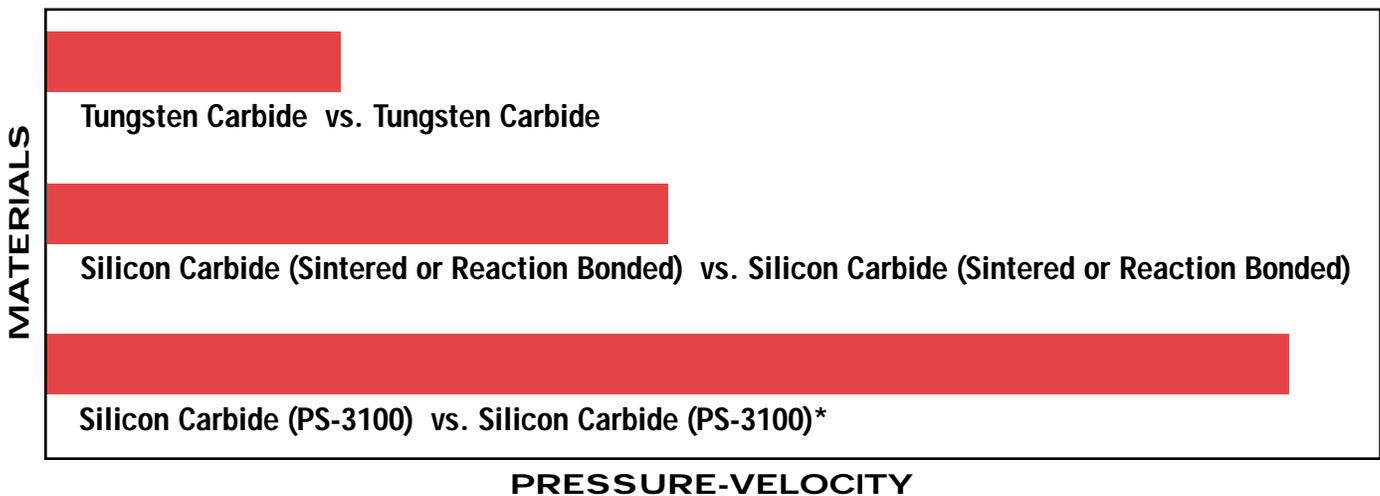
Replaces:

JOHN CRANE Type 21 / Type 2
SEALOL Type 43
US SEAL Type C

TYPICAL INSTALLATIONS



RELATIVE PRESSURE-VELOCITY CAPABILITY FOR HARD-FACE SEALS

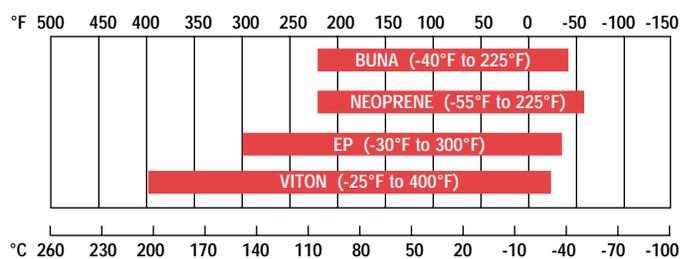


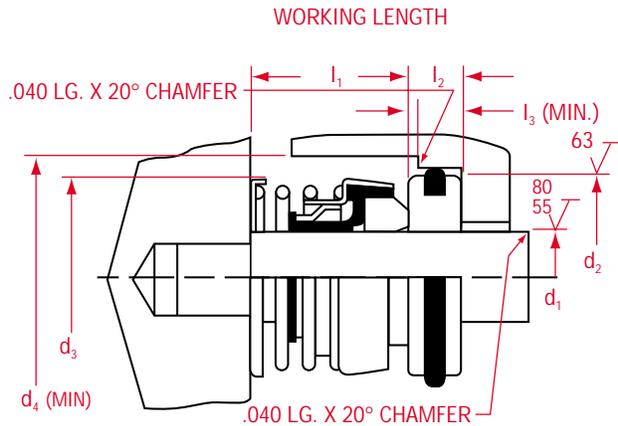
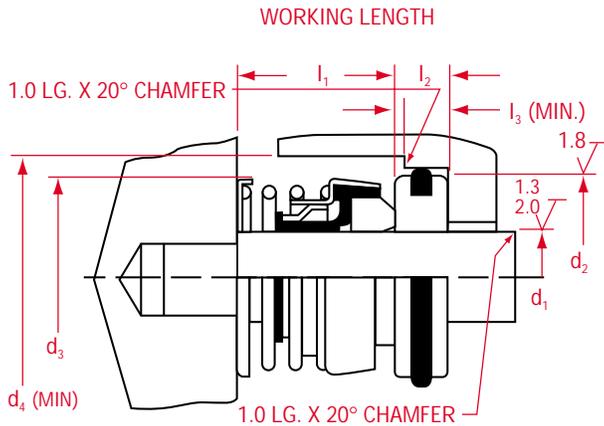
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Tungsten Carbide	Tungsten Carbide	Buna (FDA & U.L.)	316 Stainless
Carbon		EP	Monel
		Neoprene	
		Aflas	

TEMPERATURE LIMITS FOR ELASTOMERS





Dimensions in Millimeters

Dimensions in Inches

STYLE: 31-800002 UK

Replaces: JOHN CRANE Type 21 & Type 2
SEALOL Type 43
US SEAL TYPE C

STYLE: 31-800003 UK

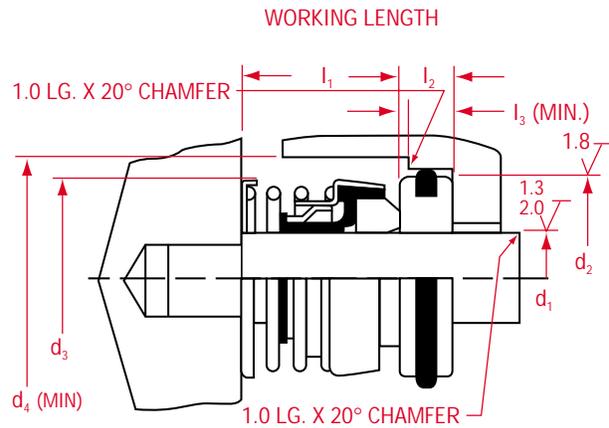
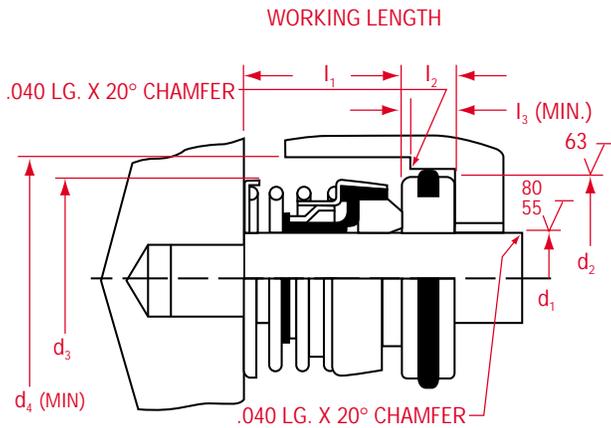
Replaces: JOHN CRANE Type 21 & Type 2
SEALOL Type 43
US SEAL TYPE C

d1	d2	d3	d4*	I1	I2	I3*
All Dimensions in Millimeters						
8	24.6	23.3	27	25.4	8.7	7.5
10	24.6	23.3	31	25.4	8.7	7.5
12	27.8	23.3	31	25.4	8.7	7.5
14	30.95	30.1	34	25.4	10.3	9.0
16	30.95	30.1	34	25.4	10.3	9.0
18	34.15	33.1	38	25.4	10.3	9.0
20	35.7	36.3	41	25.4	10.3	9.0
22	37.3	36.3	41	25.4	10.3	9.0
24	40.5	39.4	44	25.4	10.3	9.0
25	40.5	39.4	44	25.4	10.3	9.0
28	47.65	44.4	51	33.3	11.9	10.5
30	50.8	47.6	54	33.3	11.9	10.5
32	50.8	47.6	54	33.3	11.9	10.5
33	54.0	50.8	57	33.3	11.9	10.5
35	54.0	50.8	57	33.3	11.9	10.5
38	57.15	54.0	61	33.3	11.9	10.5
39	60.35	54.0	61	33.3	11.9	10.5
40	60.35	60.3	64	33.3	11.9	10.5
43	63.5	60.3	64	40.5	11.9	10.5
45	63.5	66.7	73	40.5	11.9	10.5
48	66.7	66.7	73	40.5	11.9	10.5
50	69.85	66.7	73	40.5	13.5	12.0
53	73.05	74.6	80	40.5	13.5	12.0
55	76.2	74.6	80	40.5	13.5	12.0
58	79.4	82.0	86	40.5	13.5	12.0
60	79.4	82.0	86	40.5	13.5	12.0
63	82.55	86.1	96	40.5	13.5	12.0
65	92.1	86.1	96	49.0	15.9	14.5
68	95.25	88.9	99	49.0	15.9	14.5
70	95.25	88.9	99	49.0	15.9	14.5
75	101.6	96.5	105	52.0	15.9	14.5

d1	d2	d3	d4*	I1	I2	I3*
All Dimensions in Inches						
.375	.968	.917	1.250	1.000	.344	.294
.500	1.094	.917	1.250	1.000	.344	.294
.625	1.218	1.185	1.375	1.000	.406	.353
.750	1.344	1.302	1.500	1.000	.406	.353
.875	1.468	1.429	1.625	1.000	.406	.353
1.000	1.594	1.552	1.750	1.000	.406	.353
1.125	1.875	1.750	2.000	1.299	.469	.412
1.250	2.000	1.875	2.125	1.299	.469	.412
1.375	2.125	2.000	2.250	1.299	.469	.412
1.500	2.250	2.125	2.375	1.299	.469	.412
1.625	2.375	2.375	2.625	1.299	.469	.412
1.750	2.500	2.375	2.625	1.615	.469	.412
1.875	2.625	2.515	2.750	1.615	.469	.412
2.000	2.750	2.625	2.875	1.615	.531	.471
2.125	2.875	2.938	3.125	1.615	.531	.471
2.250	3.000	2.938	3.125	1.615	.531	.471
2.375	3.125	3.230	3.375	1.615	.531	.471
2.500	3.250	3.390	3.750	1.615	.531	.471
2.625	3.625	3.390	3.750	1.937	.625	.562
2.750	3.750	3.500	3.875	1.937	.625	.562
2.875	3.875	3.800	4.125	2.062	.625	.562
3.000	4.000	3.800	4.125	2.062	.625	.562

*Minimum

*Minimum



Dimensions in Inches

STYLE: 31-800004 US
 Replaces: JOHN CRANE Type 21 & Type 2
 SEALOL Type 43
 US SEAL TYPE C

d1	d2	d3	d4*	I1	I2	I3*
All Dimensions in Inches						
.250	.750	.687	.875	.562	.250	.218
.375	.875	.917	1.125	.812	.284	.250
.437	1.000	.917	1.125	.812	.312	.281
.500	1.000	.917	1.125	.812	.312	.281
.562	1.250	1.110	1.375	.875	.406	.344
.625	1.250	1.185	1.375	.875	.406	.344
.750	1.375	1.302	1.500	.875	.406	.344
.875	1.500	1.429	1.625	.937	.406	.344
1.000	1.625	1.552	1.750	1.000	.437	.375
1.125	1.750	1.750	1.875	1.062	.437	.375
1.250	1.875	1.875	2.000	1.062	.437	.375
1.375	2.000	2.000	2.125	1.125	.437	.375
1.437	2.125	2.125	2.250	1.125	.437	.375
1.500	2.125	2.125	2.250	1.125	.437	.375
1.625	2.375	2.375	2.625	1.375	.500	.437
1.750	2.500	2.375	2.625	1.375	.500	.437
1.875	2.625	2.625	2.750	1.500	.500	.437
2.000	2.750	2.625	2.875	1.500	.500	.437
2.125	3.000	2.938	3.250	1.687	.562	.500
2.250	3.125	2.938	3.250	1.687	.562	.500
2.375	3.250	3.230	3.375	1.812	.562	.500
2.437	3.250	3.230	3.375	1.812	.562	.500
2.500	3.375	3.390	3.500	1.812	.562	.500
2.625	3.375	3.390	3.500	1.937	.625	.562
2.750	3.500	3.500	3.625	1.937	.625	.562
2.875	3.750	3.800	4.000	2.062	.625	.562
3.000	3.875	3.800	4.000	2.062	.625	.562

*Minimum

Dimensions in Millimeters

STYLE: 31-800006 US
 Replaces: JOHN CRANE Type 21 & Type 2
 SEALOL Type 43
 US SEAL TYPE C

d1	d2	d3	d4*	I1	I2	I3*
All Dimensions in Millimeters						
8	25.4	23.3	25.4	19.0	7.9	7.1
10	25.4	23.3	25.4	19.0	7.9	7.1
12	25.4	23.3	25.4	19.0	7.9	7.1
14	31.75	30.1	32.0	22.5	10.3	8.7
16	31.75	30.1	32.0	22.5	10.3	8.7
18	34.92	33.1	35.0	22.5	10.3	8.7
20	38.1	36.3	38.5	24.0	10.3	8.7
22	38.1	36.3	38.5	24.0	10.3	8.7
24	41.27	39.4	41.5	25.4	11.1	9.5
25	41.27	39.4	41.5	25.4	11.1	9.5
28	44.45	44.45	46.0	27.0	11.1	9.5
30	47.62	47.62	49.5	27.0	11.1	9.5
32	47.62	47.62	49.5	27.0	11.1	9.5
33	50.8	50.8	52.5	28.5	11.1	9.5
35	50.8	50.8	52.5	28.5	11.1	9.5
38	53.98	53.98	55.5	28.5	11.1	9.5
39	60.32	60.32	62.0	35.0	12.7	11.1
40	60.32	60.32	62.0	35.0	12.7	11.1
43	63.5	60.32	65.0	35.0	12.7	11.1
45	66.68	69.19	68.5	38.0	12.7	11.1
48	69.85	69.19	71.5	38.0	12.7	11.1
50	69.85	69.19	71.5	38.0	12.7	11.1
53	76.2	74.6	78.0	43.0	14.3	12.7
55	79.38	74.6	81.0	43.0	14.3	12.7
58	82.55	82.0	84.5	46.0	14.3	12.7
60	82.55	82.0	84.5	46.0	14.3	12.7
63	85.72	86.1	89.0	46.0	14.3	12.7
65	85.72	86.1	89.0	49.0	15.9	14.3
68	88.9	88.9	92.0	49.0	15.9	14.3
70	88.9	88.9	92.0	49.0	15.9	14.3
73	95.25	96.52	100.0	52.5	15.9	14.3
75	98.42	96.52	102.0	52.5	15.9	14.3

*Minimum

COATINGS



Quick Drying Equipment Enamel 758001

PRODUCT DATA SHEET

PRODUCTS

758001x White Base
758002x Midtone Base
758003x Deeptone Base
758004x Neutral Base

PRODUCT DESCRIPTION

Air Drying, Pigmented, Acrylic-Modified Alkyd Resin Coating.

Basic Use	FOR INDUSTRIAL USE ONLY. Provides outstanding protection when used on properly primed or prepared metal. Excellent performance and durability on industrial, agricultural, oil field, construction, highway equipment, and machinery. Ideal for use on industrial buildings interior or exterior.
Packaging	Stocked in single and five gallon containers. Other sizes available upon request.
Finish	A high gloss, durable, flexible, gasoline and oil resistant finish.
Thinning	As necessary with 799260x Synthetic Reducer.
Cleanup	As necessary with 799260x Synthetic Reducer
Spreading Rate	300 square feet per gallon, will result in a dry film thickness of 1.5 mils (allows 20% for loss)

PHYSICAL PROPERTIES

Dry Film Thickness	1.5 to 2mils
Viscosity Range	63 to 67 Krebs Units
Odor	Mixed aliphatic / aromatic odor
Toxic Properties	See label for lead containing colors
Resistance	Excellent
Weight	9.4 ± 1 lbs. per gallon
Solids Weight	53 ± 2%
Solids Volume	35 ± 2%
Theoretical VOC	4.43 lbs. per gallon, 531 grams per liter

SURFACE PREPARATION

Metal Preparation	New metal should be thoroughly cleaned and properly primed with 7082xxx Barrier III High Solids Metal Primer before coating. Recoated surfaces must be thoroughly clean. All loose rust, mill scale, grease, cutting oil, etc., must be cleaned to bare, clean surface before coating.
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APPLICATION

Application Method	Spray painting preferred. Small items may be dipped or brushed
Airless Sprayer Application	Recommend pressure 2000 to 2500 psi, using .013 to .016 tip orifice.
Conventional Sprayer Application	Recommend air pressure 40 - 60 psi; fluid pressure 20 psi; JGA 510 gun, FX tip, 705 air cap.

DRY TIME

Dry time to touch	10 to 20 minutes
Dry time to re-coat	To avoid wrinkling of previous coat, recoat before four hours or after 24 hours, depending on film thickness.
Dry time to handle	4 hours
Dry time until tack free	1½ hours
Dry time until hard	6 hours

Disclaimer - All technical advice, recommendations and services regarding this product are rendered by the Seller gratis. They are based on technical data which the Seller believes to be reliable and are intended for use by persons having skill and know-how, at their discretion and risk. Seller assumes no responsibility for results obtained or damages incurred from this product use by Buyer whether as recommended herein or otherwise. Such recommendations, technical advice or services are not to be taken as a license to operate under or suggest infringement of any patent.

Last modification made on: 7/7/2003 10:03:28 AM

Rodda Paint Co.
Corporate Office: 12000 SW Garden Place, Portland, Oregon 97223
Regional: 3838 4th Avenue So., Seattle, Washington 98134



Synthetic Reducer
799260

P R O D U C T D A T A S H E E T

PRODUCTS

799260x

PRODUCT DESCRIPTION

Basic Use

The primary use of Synthetic Reducer is used to thin Rodda Products and also used for cleaning up. Always use this product with adequate ventilation. For more information regarding this product call a Rodda Paint Sales Representative.

PHYSICAL PROPERTIES

SURFACE PREPARATION

APPLICATION

DRY TIME

Disclaimer - All technical advice, recommendations and services regarding this product are rendered by the Seller gratis. They are based on technical data which the Seller believes to be reliable and are intended for use by persons having skill and know-how, at their discretion and risk. Seller assumes no responsibility for results obtained or damages incurred from this product use by Buyer whether as recommended herein or otherwise. Such recommendations, technical advice or services are not to be taken as a license to operate under or suggest infringement of any patent.

Last modification made on: 10/10/2003 11:49:15 AM

Rodda Paint Co.

Corporate Office: 12000 SW Garden Place, Portland, Oregon 97223
Regional: 3838 4th Avenue So., Seattle, Washington 98134

DISCHARGE CHECK VALVE

VAL-MATIC®

Proven Design

Preferred Features

Advanced Technology



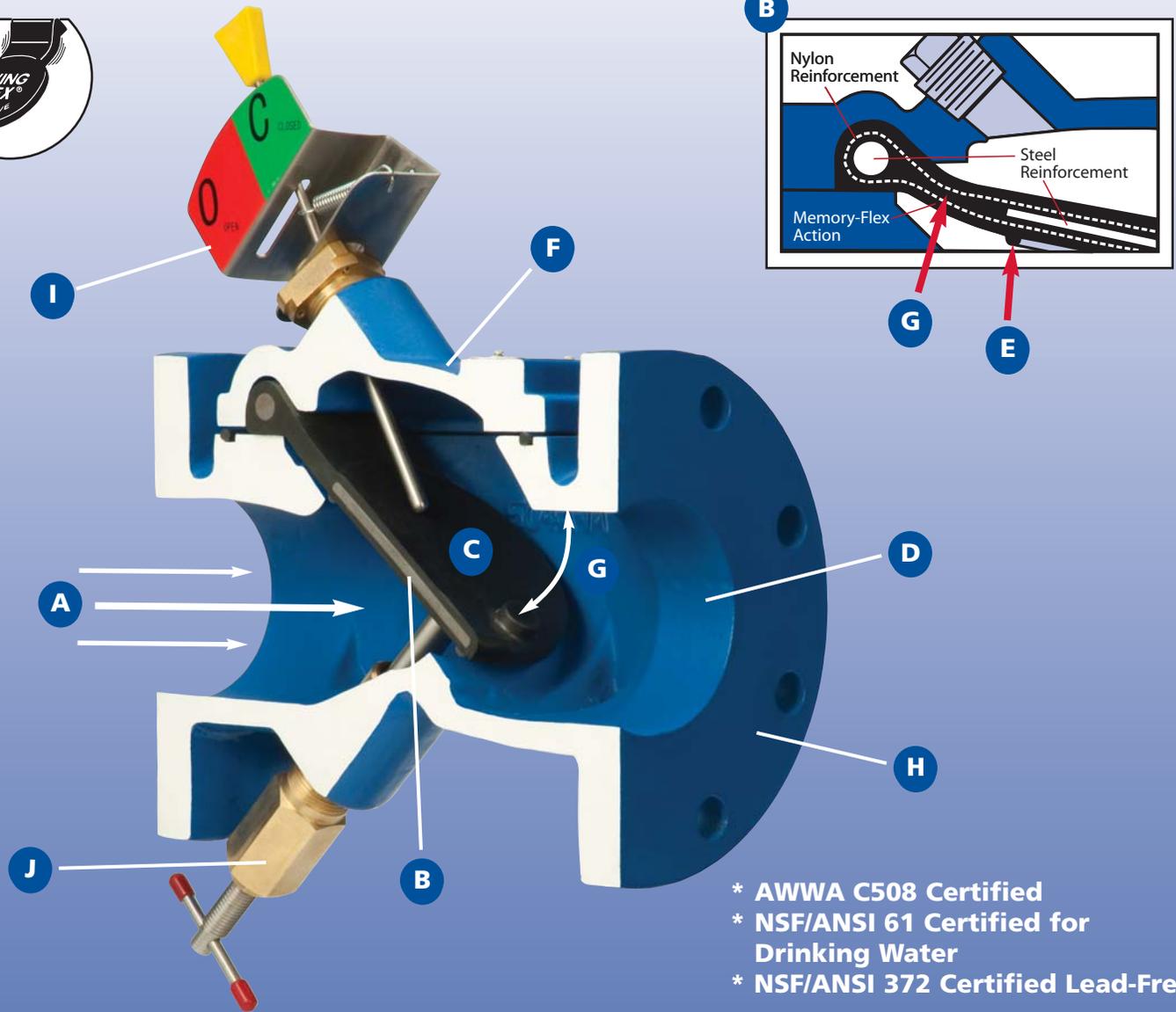
Swing-Flex® Check Valves



www.valmatic.com

AWWA C508 Certified
NSF/ANSI 61 Certified for Drinking Water
NSF/ANSI 372 Certified Lead-Free

Feature Highlights



A. Non-Clog Design

100% flow area for improved flow characteristics and lower headloss. Unrestricted flow area combined with smooth streamlined contouring allows passage of large solids minimizing the potential for clogging.

B. Reinforced Disc

The one piece precision molded disc is steel and nylon reinforced to provide years of trouble free performance. It is backed by a 25 year warranty for the flex portion of the disc.

C. One Moving Part

The Memory-Flex™ disc, the only moving part, assures long life with minimal maintenance. No packing, mechanical hinges, pivot pins or bearings to wear out.

D. Body

Ductile Iron Body for 250 PSI rating.

E. Drop Tight Seating

The synthetic reinforced disc, with its integral O-ring type seal design assures positive seating at high and low pressures.

F. Domed Access Port

Full size top access port allows removal of disc without removing the valve from the line and provides flushing action over the valve disc for clog free performance. Access cover includes a drilled and tapped port for installation of optional Disc Position Indicator.

G. Non-Slam Closure

"Short Disc Stroke" combined with Memory-Flex™ Disc Action reduces potentially destructive water hammer.

- * AWWA C508 Certified
- * NSF/ANSI 61 Certified for Drinking Water
- * NSF/ANSI 372 Certified Lead-Free

H. Fusion Bonded Epoxy

Fusion Bonded Epoxy (FBE) is the standard on the interior and exterior of the valve. The FBE is NSF/ANSI 61 certified.

I. Mechanical Disc Position Indicator

Provides clear indication of the valve's disc position. Can also be provided with a SCADA compatible limit switch for off site monitoring. (Optional)

J. Backflow Actuator

Body is drilled and tapped for installation of optional backflow actuator. Available for use when manual backflow operation is required. Most commonly used for priming pumps, back flushing, draining lines and system testing.

Proven Design

Efficiency and reliability through simplicity of design is the key to the superior performance and long life of the Val-Matic Swing-Flex® Check Valve. The streamlined contour of the Swing-Flex® body provides 100% flow area with no restrictions at any point through the valve (Figure 1). Flow tests performed by the Utah State Water Research Laboratory have shown that this unique body design produces minimal headloss through the valve. Flow and headloss charts, developed from the test data, are shown on Page 4.

In the full open position, the disc is stabilized by using smooth streamlined body contouring to direct the flow towards the disc preventing disc flutter and assuring long disc life (Figure 1). Clog resistant performance is achieved by maintaining an unobstructed 100% flow area and the use of a smooth fusion bonded epoxy coating. The entrapment or collection of solids and stringy materials is minimized by the elimination of hinge mechanisms in the valve design. The standard 4" Swing-Flex® is designed to pass a 3" solid.

Preferred Features

The Swing-Flex® Check Valve non-slam closing characteristic is achieved by utilizing a "Short Disc Stroke" in conjunction with the unique "Memory-Flex™ action" of the valve's disc. The 35° stroke, a result of the angled seat, is less than half the typical 80° to 90° stroke of a conventional swing check valve. (Figures 1 & 2)

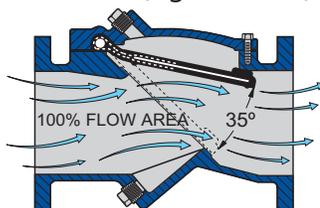


Figure 1. Swing-Flex Geometry

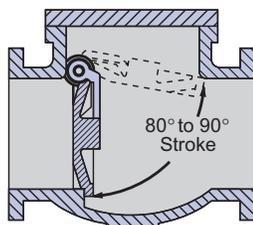


Figure 2. Conventional Geometry

The short disc stroke and "Memory-Flex™ action" (Figure 1) serve to reduce the closing time of the valve

minimizing flow reversal and the resultant water hammer normally associated with the sudden stoppage of reverse flow.

Operational reliability is achieved by utilizing just one moving part, the Memory-Flex™ disc. The steel and nylon reinforcements are precision molded into the disc, providing a tough, durable disc with a 25-year warranty on the flex portion of the disc (Figure 3). Unlike conventional swing check valves, the Swing-Flex® has no packing, mechanical hinges, shafts, pivot pins, or bearings to wear out (Figure 3). The Memory-Flex™ disc with its integral O-ring type seal design assures drop tight seating at both high and low working pressures. Upon conclusion of a 1,000,000 (one million) cycle test, an independent testing laboratory reported that the valve had no visible signs of wear and remained drop tight.

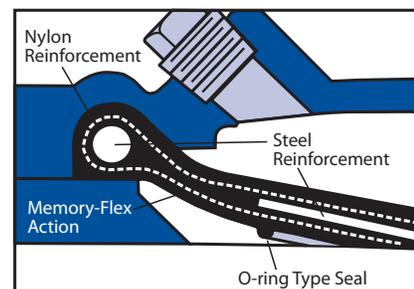


Figure 3.

Advanced Technology

Incorporating the latest in valve technology assures a high-quality valve that will provide long service. The design process utilized solid Modeling and Finite Element Analysis (FEA) of the key structural components. Flow and headloss data was derived from flow tests, mathematical models and Computational Fluid Dynamics (CFD). Manufacturing technology uses automated process control in the foundry and ISO 9001 controlled manufacturing processes.

Product Certifications

Val-Matic Swing-Flex® check valves are certified for use in drinking water in accordance with NSF/ANSI 61 and are Certified Lead-Free per NSF/ANSI 372. Every valve is tested in accordance with and is certified to AWWA C508. All valves are tested on automated hydraulic test rigs with gauges calibrated per ISO standards. All Val-Matic Valves are manufactured under a certified ISO 9001 quality management system.

Ratings/Construction

PRESSURE RATINGS

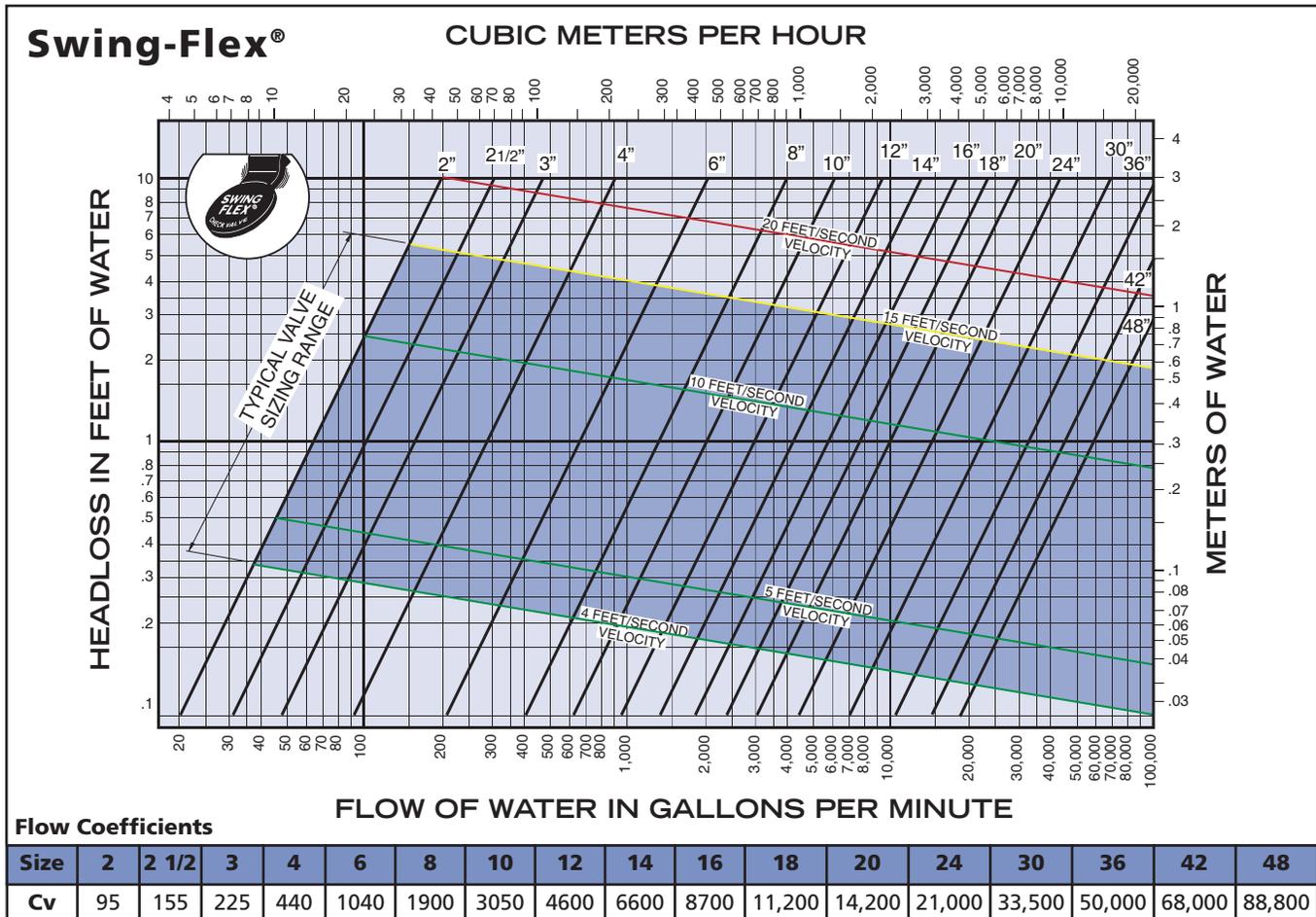
MAXIMUM PRESSURE RATINGS*		
SIZE RANGE in (mm)	CONNECTION	CWP psig (Bar)
2" - 24" (50-600 mm)	ANSI Class 125 Ductile Iron	250 (17.2)
30" - 48" (800-1200 mm)	ANSI Class 125 Cast Iron	150 (10.3)
30" - 48" (800-1200 mm)	ANSI Class 125 Ductile Iron	250 (17.2)

*For Critical Low Pressure Applications, such as gravity flow and digester gas, low-durometer (soft rubber) discs are available. Consult Factory.

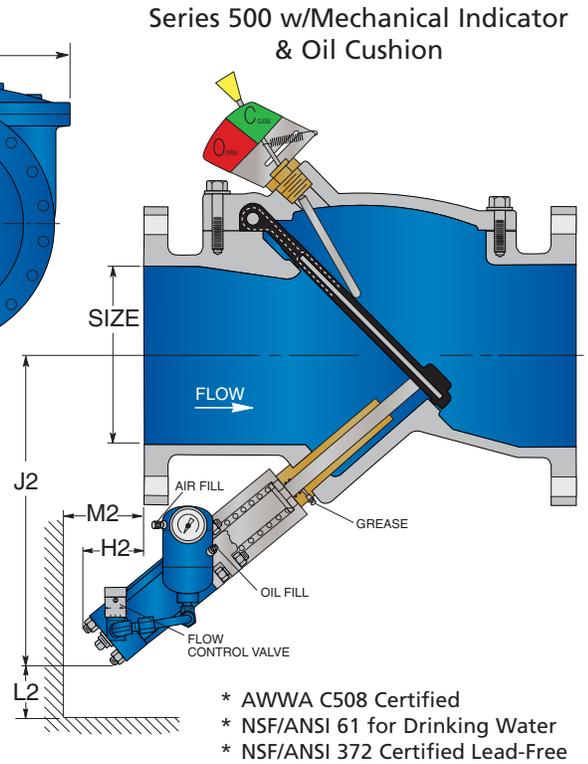
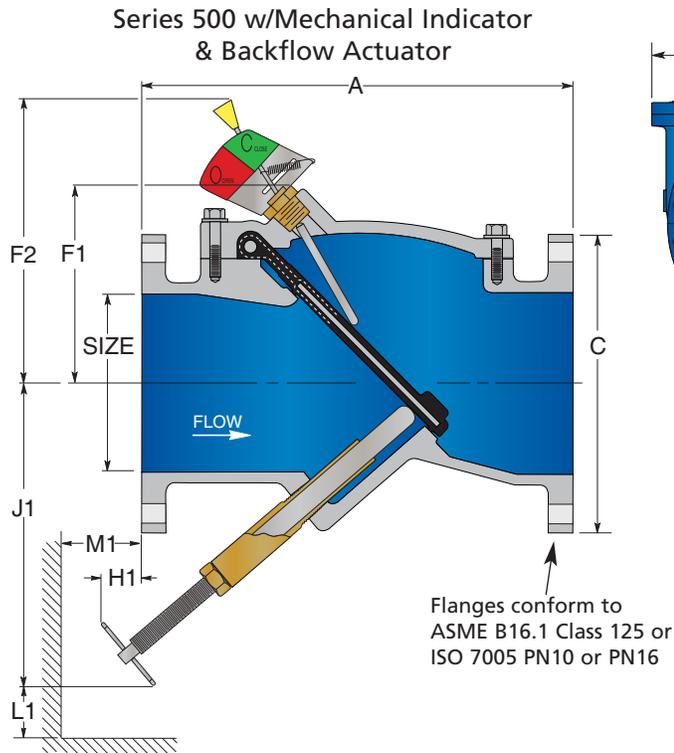
MATERIALS OF CONSTRUCTION

COMPONENT	STANDARD	OPTIONAL
Body 2" - 24" (50-600 mm)	Ductile Iron ASTM A536, Grade 65-45-12	ASTM A351, CF8M 316 SS 3"-12" (80-300 mm)
Body 30" - 48" (800-1200 mm)	Cast Iron ASTM A126, Class B	Ductile Iron ASTM A536, Grade 65-45-12
Disc	Buna-N w/Alloy Steel & Nylon Reinforcement	EPDM, Hypalon, Viton
Coatings	Fusion Bonded Epoxy (Int/Ext)	Rubber Lining, Glass Lining
Mechanical Indicator (Optional)	17-4 Stainless Steel, Lead-Free Bronze	-
Backflow Actuator (Optional)	T304 Stainless Steel, Lead-Free Bronze	-
Oil Cushion (Optional)	17-4 Stainless Steel, Lead-Free Bronze	-

Headloss Chart



Installation Dimensions



Dimensions in Inches

Valve Size (in)	Valve Size (mm)	CWP (PSI)	Base Valve					with Indicator	with Backflow Actuator				with Oil Cushion			
			Model No.	A	C	F1	K		F2	H1	J1	L1	M1	H2	J2	L2
2	50	250	502A	8.00	6.00	3.38	5.18	-	-0.50	6.75	1.50	1.50	-	-	-	-
2 1/2	60	250	525A	8.50	7.00	3.38	5.18	-	-0.50	7.00	1.50	1.50	-	-	-	-
3	80	250	503A	9.50	7.50	5.13	7.50	8.69	-0.38	7.50	1.50	1.50	-	-	-	-
4	100	250	504A	11.50	9.00	5.75	8.25	10.63	3.38	10.75	2.50	2.50	-	-	-	-
6	150	250	506C	14.00	11.00	6.88	11.12	11.69	1.38	11.38	3.00	3.00	5.00	16.00	4.25	9.25
8	200	250	508A	19.50	13.50	8.38	16.00	13.25	2.00	15.75	5.75	5.75	3.25	17.00	5.25	8.50
10	250	250	510A	24.50	16.00	10.75	21.00	15.63	0.50	17.00	5.75	5.75	1.25	18.00	6.25	7.25
12	300	250	512A	27.50	19.00	12.50	24.00	17.19	3.50	22.50	6.50	6.50	2.00	20.75	7.25	9.50
14	350	250	514A	31.00	21.00	13.00	23.25	18.81	4.00	26.25	6.50	6.50	0.00	22.75	7.25	7.50
16	400	250	516C	36.00	23.50	14.25	25.25	19.06	4.63	30.00	6.50	6.50	-1.00	24.25	9.00	10.25
18	450	250	518C	40.00	25.00	15.25	28.25	20.25	5.25	33.75	6.50	6.50	-1.25	25.25	8.75	7.50
20	500	250	520A	40.00	27.50	16.88	30.63	21.69	5.88	37.50	8.00	8.00	-2.75	27.00	9.50	5.25
24	600	250	524A	48.00	32.00	19.25	36.00	24.50	1.81	45.00	8.00	8.00	-9.00	27.63	9.75	0.75
30	800	150	530	56.00	38.75	23.00	45.88	27.81	-0.63	41.25	8.00	8.00	-9.50	33.63	11.25	3.00
	800	250	530A													
36	900	150	536	63.00	46.00	27.38	55.00	32.63	-0.38	49.00	9.75	9.75	-8.25	33.75	15.25	3.00
	900	250	536A													
42	1000	150	542	70.00	53.00	36.88	60.18	39.63	-5.50	53.50	9.75	9.75	-14.00	46.00	14.25	1.50
	1000	250	542A													
48	1200	150	548	76.00	59.50	40.66	68.00	43.41	-2.90	41.98	10.00	10.00	-	-	-	-
	1200	250	548A													

- Notes:
1. Available with ISO/PN drilling.
 2. Add a BF suffix to model number to indicate backflow actuator (i.e. 503ABF).
 3. Add a MI suffix to model number to include a mechanical indicator (i.e. 503AMI).
 4. Add a BFMI suffix to model number to indicate a backflow actuator and mechanical indicator (i.e. 503ABFMI).
 5. Add a B suffix to model number to indicate oil cushion (i.e. 508AB).

Installations



Swing-Flex® Check Valve installed in a Valve Vault



Swing-Flex® Check Valve with Mechanical Indicator installed in a Pump Station



Swing-Flex® Check Valve with Limit Switch installed in a Vertical Flow Up Application

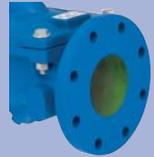


Swing-Flex® Check Valve with Backflow Actuator and Air Valve for Pump Discharge



Swing-Flex® Check Valve with Oil Cushion for Pump Discharge

Options/Accessories

Mechanical Disc Position Indicator	Limit Switch	Check Light	Backflow Actuator	Oil Cushion	Welded Nickel Seat	Tapped Ports	Rubber Lining	Glass Lining
Provides clear indication of the valve's disc position.	Used when applications require remote indication of valve's open/close position.	Provides remote indication from the limit switch.	Available for use when manual backflow operation is required.	Hydraulically controls the last 10% of valve closure in 1-5 seconds to reduce water hammer.	For severe and abrasive service.	Top and bottom NPT Ports for sampling, pressure testing, and removing sediment.	Interior lining suited for systems containing abrasive or corrosive fluids.	Interior lining provides a smooth, non-stick surface.
								

SCOPE

- 1.1 This specification covers the design, manufacture, and testing of 2 in. (50 mm) through 48 in. (1200 mm) Swing-Flex® Check Valves suitable for cold working pressures up to 250 psig (1725 kPa), in water, wastewater, abrasive, and slurry service.
- 1.2 The check valve shall be of the full flow body type, with a domed access cover and only one moving part, the flexible disc.

STANDARDS AND APPROVALS

- 2.1 The valves shall be designed, manufactured, tested and certified to American Water Works Association Standard ANSI/AWWA C508.
- 2.2 The valves used in potable water service shall be certified to NSF/ANSI 61 Drinking Water System Components – Health Effects, and certified to be Lead-Free in accordance with NSF/ANSI 372.
- 2.3 Manufacturer shall have a quality management system that is certified to ISO 9001 by an accredited, certifying body.

CONNECTIONS

- 3.1 The Valves shall be provided with flanges in accordance with ANSI B16.1, Class 125.

DESIGN

- 4.1 The valve body shall be full flow equal to nominal pipe diameter at all points through the valve. The 4 in. (100mm) valve shall be capable of passing a 3 in. (75mm) solid. The seating surface shall be on a 45 degree angle to minimize disc travel. A threaded port with pipe plug shall be provided on the bottom of the valve to allow for field installation of a backflow actuator or oil cushion device without special tools or removing the valve from the line.
- 4.2 The top access port shall be full size, allowing removal of the disc without removing the valve from the line. The access cover shall be domed in shape to provide flushing action over the disc for operating in lines containing high solids content. A threaded port with pipe plug shall be provided in the access cover to allow for field installation of a mechanical, disc position indicator.
- 4.3 The disc shall be of one-piece construction, precision molded with an integral O-ring type sealing surface and reinforced with alloy steel. The flex portion of the disc contains nylon reinforcement and shall be warranted for twenty-five years. Non-Slam closing characteristics shall be provided through a short 35 degree disc stroke and a memory disc return action to provide a cracking pressure of 0.25 psig.
- 4.4 The valve disc shall be cycle tested 1,000,000 times in accordance with ANSI/AWWA C508 and show no signs of wear, cracking, or distortion to the valve disc or seat and shall remain drop tight at both high and low pressures.

MATERIALS

- 5.1 The valve body and cover shall be constructed of ASTM A536 Grade 65-45-12 ductile iron or ASTM A126 class B gray iron for 30 in. (800mm) and larger. Optional body materials include ASTM A-351 Grade CF8M, stainless steel for sizes 3" (80 mm) through 12" (300 mm).

- 5.2 The disc shall be precision molded Buna-N (NBR), ASTM D2000-BG. Optional disc material includes Viton, EPDM, Hypalon.

OPTIONS

- 6.1 A screw-type backflow actuator shall be provided (when specified) to allow opening of the valve during no-flow conditions. Buna-N seals shall be used to seal the stainless steel stem in a Lead-Free bronze bushing. The backflow device shall be of the rising-stem type to indicate position. A stainless steel T-handle shall be provided for ease of operation.
- 6.2 A mechanical indicator shall be provided (when specified) to provide disc position indication on valves 3" (80 mm) and larger. The indicator shall have continuous contact with the disc under all operating conditions to assure accurate disc position indication.
- 6.3 A pre-wired limit switch will be provided (when specified) to indicate open/closed position to a remote location. The mechanical type limit switch shall be activated by the mechanical indicator. The switch shall be rated for NEMA 4, 6, or 6P and shall have U.L. rated 5 amp, 125 or 250 VAC contacts.
- 6.4 An oil cushion device shall be provided when specified to provide hydraulic control of the final 10% of valve closure and reduce valve slam and water hammer normally associated with rapid flow reversal conditions on pump shut down. The oil cushion device shall consist of a high pressure hydraulic cylinder, adjustable external flow control valve, oil reservoir, pressure gauge, stainless steel air inlet valve, and piping designed to control the closing speed of the last 10% of travel in 1-5 seconds. A threaded lead-free bronze dashpot bushing unit with a grease fitting for lubrication shall connect the cylinder to the valve and shall have an air gap to prevent hydraulic fluid from entering the valve and contaminating the water system. A snubber rod fitted with O-ring seals and rod wiper scrapers shall make contact with the lower portion of the disc's stainless steel strike plate.
- 6.5 Available linings include rubber for abrasive or corrosive fluids and glass for a smooth, non-stick surface.
- 6.6 A welded nickel seat is available for severe or abrasive service.

MANUFACTURE

- 7.1 Manufacturer shall demonstrate a minimum of five (5) years' experience in the manufacture of resilient, flexible disc check valves with hydraulic cushions.
- 7.2 All valves shall be hydrostatically tested and seat tested to demonstrate zero leakage. When requested, the manufacturer shall provide test certificates, dimensional drawings, parts list drawings, and operation and maintenance manuals.
- 7.3 The exterior and interior of the valve shall be coated with an NSF/ANSI 61 approved fusion bonded epoxy coating.
- 7.4 Swing-Flex® Check Valves shall be Series #500 as manufactured by Val-Matic® Valve & Mfg. Corporation, Elmhurst, IL. USA or approved equal.

VAL-MATIC®

Val-Matic's quality of design and meticulous workmanship has set the standards by which all others are measured. Quality design features such as the AWWA **Ener•G® Ball Valve** with its energy efficient design, fusion bonded epoxy and adjustable resilient seating....**Cam-Centric® Plug Valves** have more requested features than any other eccentric plug valve....**American-BFV® Butterfly Valves** include a field replaceable seat without the need for special tools....**Tilted Disc® Check Valves** with high strength and wear resistant aluminum bronze trim as standard....**Silent Check Valves** featuring combined resilient/metal-to-metal seating and are **NSF/ANSI 61 & 372 Certified**....**Sure Seal Foot Valves** provided with a heavy duty stainless steel screened inlet....**Swing-Flex® and Surgebuster® Check Valves** designed with an unrestricted full flow area....**Swing Check Valves** with field adjustable closure versatility....**Dual Disc® Check Valves** utilize stabilizing components to provide extended life....**Air Release, Air/Vacuum and Combination Air Valves** provided standard with Type 316 stainless steel trim....**VaultSafe®** family of products includes the **FloodSafe® Inflow Preventer**, **FrostSafe®** two-way damper and the **VentSafe®** vent pipe security cage. These features coupled with our attention to detail put Val-Matic Valves in a class by themselves. All products are WQA certified Lead-Free in accordance with NSF/ANSI 372.

Val-Matic is totally committed to providing the highest quality valves and outstanding service to our customers. Complete customer satisfaction is our goal.

Make the Change
to Quality!

Specify

VAL-MATIC®

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Phone: 630-941-7600 Fax: 630-941-8042
www.valmatic.com
valves@valmatic.com

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ISO 9001 Certified Company

ISO 9001 Certification



Orion Registrar, Inc.
Thorough and Fair Auditing

Certificate of Certification

This is to certify the Quality Management System of:

Pioneer Pump Inc.
310 South Sequoia Parkway
Canby, OR 97013 USA

Has been assessed by Orion Registrar and found to be in compliance with the following Quality Standard:

ISO 9001:2015

The Quality Management System is applicable to:

The Design, Manufacture and Assembly of Hydraulic Pumps and Pump Drivers, Mountings and Enclosures.

The Certification period is from

May 11, 2018 to June 19, 2020

This certification is subject to the company maintaining its system to the required standard, and applicable exceptions, which will be monitored by Orion.

Client ID: 2156

Certificate ID: 1014210




Paul M. Burck, President *May 29, 2018*
Date





PUMP WARRANTY

THIS DOCUMENT CONTAINS PIONEER PUMP, LLC AND ALL OF ITS SUBSIDIARIES' (COLLECTIVELY REFERRED TO AS "PIONEER") STANDARD LIMITED WARRANTY, GENERAL SALES POLICIES AND CONTROLLING TERMS AND CONDITIONS. THIS STANDARD LIMITED WARRANTY, GENERAL SALES POLICIES AND CONTROLLING TERMS AND CONDITIONS SHALL NOT BE ALTERED OR AMENDED EXCEPT PURSUANT TO AN AUTHORIZED PIONEER EXTENDED WARRANTY.

PIONEER Standard Terms & Conditions are subject to change at any time. The latest version is available at pioneerpump.com

A. EFFECTIVE DATE AND NO AGREEMENT OR AMENDMENTS

This document and its provisions are effective as of 9/11/2019 and valid until updated by PIONEER. This document and its provisions shall supersede any and all pre-existing sales policies, terms and conditions, and standard limited warranties issued by PIONEER, whether in writing or orally. This document does not reflect an offer or an agreement to sell PIONEER products to any person or entity and should not be construed as such.

B. GENERAL SALES POLICIES AND CONTROLLING TERMS AND CONDITIONS

PIONEER OBJECTS TO, AND SHALL NOT BE BOUND BY, ANY ADDITIONAL OR DIFFERENT TERMS OR CONDITIONS, WHETHER PRINTED OR OTHERWISE AND REGARDLESS OF WHETHER SUCH ADDITIONAL TERMS OR CONDITIONS ARE IN PURCHASER'S PURCHASE ORDER OR IN ANY OTHER COMMUNICATION FROM PURCHASER TO PIONEER. The terms and conditions appearing in this agreement together with PIONEER's standard or custom product specifications (if applicable), constitute the entire agreement between PIONEER and Purchaser. Prior courses of dealing, trade usage and verbal agreements not reduced to a writing signed by PIONEER to the extent they differ from, modify, add to or detract from this agreement shall not be binding upon PIONEER. There are no other agreements, promises or understandings, either verbal or written, which are not fully expressed in this agreement. No statements, recommendations or assistance by either party have been relied upon by either party or shall constitute a waiver by either party of any of the provisions hereof. This agreement may be amended or altered only if agreed to in writing, signed by the party against which any such amendment or alteration is asserted.

a. Acceptance and Payment

PIONEER reserves the right to reject and refuse to process a purchase order for any reason whatsoever. If a Purchase Order (PO) or a line item contained in a PO is cancelled by the Purchaser after PO acceptance by PIONEER, PIONEER reserves the right to apply cancellation charges of up to fifty percent (50%) of the PO price of the cancelled item(s).

The due date of payment shall be measured from the invoice date. Terms are net thirty (30) days from date of invoice of each shipment, unless otherwise stated. Any portion of the purchase price which is not paid in accordance with applicable payment terms shall accrue interest at a rate equal to one and one-half percent (1 ½%) per month or the highest rate allowed by law, plus any attorney fees and other costs associated with collections. PIONEER shall apply payments received against outstanding invoices and/or interest charges at its discretion.

b. Prices and Taxes

All prices and discounts are subject to change by PIONEER, with or without prior notice. Prices and discounts applicable to unshipped quantities of existing purchase orders, as well as to new purchase orders, shall be those in effect at the time of shipment.

A representation by Purchaser of facts, upon which PIONEER relies in basing applicable discount or term of sale, shall be taken as a representation that such facts are true; and PIONEER shall have the right to revise any price or discount, including products already shipped, invoiced, or paid, should such representations be untrue.

All prices are net of, and do not include, any federal, state, or local income, property, sales, use, excise, value-added, or other taxes, all of which shall be the responsibility of, and paid by, Purchaser.

c. Quotations

No price quotations for PIONEER products shall be binding on PIONEER unless confirmed in writing by PIONEER. Prices so quoted will be binding on PIONEER for ninety (90) days from the date of the price quotation unless noted in the quotation by PIONEER. Price quotations do not include accessories or components not supplied by PIONEER. Clerical errors on any price quotations are subject to correction by PIONEER. Quotations are subject to change by PIONEER with notice to Purchaser.

d. Delivery

Shipments may be made by common carrier, unless otherwise specified. Special arrangements, such as air freight, parcel shipment, overnight delivery and special packaging requirements must be specifically requested by Purchaser and, unless agreed to in writing by PIONEER, will be at Purchaser's expense.

Any dates or schedules specified for the delivery of goods covered hereby are approximate only and are based upon then existing conditions and/or conditions reasonably anticipated through each shipping date. In addition to the limitation on damages described herein, PIONEER shall not, under any circumstances be liable for any loss, cost, expense, delay, damage, inconvenience, or consequential damages for failure (however caused) to meet a specific shipping date, or for any delay, loss, or damage in transit, or due to the unavailability of sufficient products to fill a purchase order. PIONEER reserves the right to allocate available inventories among its customers, including Purchaser, in the event that such inventories are inadequate to meet demand.

Pioneer will deliver product in accordance with the terms and requirements of Incoterms 2010 FCA shipping point unless alternative terms are agreed to in writing. Title to the product shipped shall pass to Purchaser when PIONEER delivers such goods (i) to the carrier for delivery to Purchaser or (ii) to the dock for export shipments to Purchaser, and all risks of damage, loss, or delay shall thereupon pass to Purchaser. PIONEER shall promptly, after shipment, notify Purchaser that the goods have been delivered to the carrier or to the dock and shall furnish Purchaser with all documents, if any that are required to enable Purchaser to obtain possession of the product.

C. STANDARD LIMITED WARRANTY

LIMITED WARRANTY: Except as set forth in an Extended Warranty, Pioneer warrants to the purchaser of Pioneer's manufactured products that, for the applicable warranty period identified on the Warranty Schedule attached hereto as Exhibit A and incorporated herein by reference, the products purchased will (i) be free from defects in workmanship and material at the time of shipment, (ii) conform to the specifications published or unless agreed to in writing between the purchaser and Pioneer. This limited warranty extends only to products purchased directly from Pioneer.

If a failure to conform to purchaser's specifications or a defect in materials or workmanship is discovered during the warranty period, Pioneer must be notified in writing within thirty (30) days of such discovery.

- a.** THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, WRITTEN OR ORAL, STATUTORY, EXPRESS, OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. PURCHASER'S SOLE AND EXCLUSIVE REMEDY FOR PIONEER'S BREACH OF ITS OBLIGATIONS HEREUNDER, INCLUDING BREACH OF ANY EXPRESS OR IMPLIED WARRANTY OR OTHERWISE, UNLESS PROVIDED ON THE FACE HEREOF OR IN A WRITTEN INSTRUMENT MADE PART OF THIS LIMITED WARRANTY, SHALL BE FOR THE PURCHASE PRICE PAID TO PIONEER FOR THE NONCONFORMING OR DEFECTIVE PRODUCT OR FOR THE REPAIR OR REPLACEMENT OF NONCONFORMING OR DEFECTIVE PRODUCT, AT PIONEER'S ELECTION. ANY PIONEER PRODUCT WHICH PIONEER DETERMINES TO BE DEFECTIVE WITHIN THE WARRANTY PERIOD SHALL BE, AT PIONEER'S SOLE OPTION, REPAIRED, REPLACED, OR A REFUND OF THE PURCHASE PRICE PAID. Some states do not allow limitations on how long an implied warranty lasts, therefore, the limitations and exclusions relating to the products may not apply.
- b.** WITHOUT LIMITING THE GENERALITY OF THE EXCLUSIONS OF THIS LIMITED WARRANTY, PIONEER SHALL NOT BE LIABLE TO THE PURCHASER OR ANY THIRD PARTY FOR ANY AND ALL (i) INCIDENTAL EXPENSES OR OTHER CHARGES, COSTS, EXPENSES (INCLUDING COSTS OF INSPECTION, TESTING, STORAGE, OR TRANSPORTATION) OR (ii) DAMAGES, INCLUDING CONSEQUENTIAL, SPECIAL DAMAGES, PUNITIVE OR INDIRECT DAMAGES, INCLUDING, WITHOUT LIMITATION, LOST PROFITS, LOST TIME AND LOST BUSINESS OPPORTUNITIES, REGARDLESS OF WHETHER PIONEER IS OR IS SHOWN TO BE AT FAULT, AND REGARDLESS OF WHETHER THERE IS OR THERE IS SHOWN TO HAVE BEEN A DEFECT IN MATERIALS OR WORKMANSHIP, NEGLIGENCE IN MANUFACTURE OR DESIGN, OR A FAILURE TO WARN.
- c.** Pioneer's liability arising out of the sale or delivery of its products, or their use, whether based upon warranty contract, negligence, or otherwise, shall not in any case exceed the cost of repair or replacement of the product and, upon expiration of any applicable warranty period, any and all such liability shall terminate.
- d.** Without limiting the generality of the exclusions of this limited warranty, PIONEER does not warrant the adequacy of any specifications provided directly or indirectly by a purchaser or that PIONEER's products will perform in accordance with such specifications. This limited warranty does not apply to any products that have been subject to misuse (including use in a manner inconsistent with the design of the product), abuse, neglect, accident or improper installation or maintenance, or to products that have been altered or repaired by any person or entity other than Pioneer or its authorized representatives.

- e. This limited warranty does not cover parts that by nature of their function require replacement as the result of normal wear and tear, including but not limited to, seals, wear rings, wear plates, or other parts subjected to abrasion, cavitation, or corrosion, unless a defect in materials or workmanship can be determined by Pioneer.
- g. With respect to all products manufactured by Pioneer, the following conditions automatically void this limited warranty:
 - 1. Corrosion due to aggressive pumping conditions.
 - 2. Improper voltage supply.
 - 3. Physical damage that is the result of misuse, mishandling, or freight or shipping damage.
 - 2. Damage caused by disasters such as fire, flood, wind, or lightning.
 - 3. Damage caused by unauthorized modifications or attachments.
 - 4. Corrosive or abrasive wear outside the normal use of the product.
 - 5. Lightning damage (often referred to as high voltage surge damage).
 - 6. Electrical failures due to the use of non-approved overload protection.
 - 7. Unauthorized disassembly.
 - 8. Improper flange loading.
 - 9. Cavitation.

Prior authorization must be received from Pioneer prior to any service work on any product by third parties. Failure to obtain prior authorization shall void this warranty.

Third Party Field Service. No statements regarding warranty coverage made by any third party shall be binding on Pioneer.

D. MISCELLANEOUS

a. Compliance with Laws, Ordinances and Regulations

PIONEER shall use reasonable efforts to cause the products to comply with federal safety, health and environmental regulations and insurance codes. However, PIONEER shall not be responsible for compliance of the products with local interpretations of such federal regulations or insurance codes, nor with any local laws, ordinances, codes and/or regulations which may at any time be in effect at any location where the products are to be used, unless such responsibility shall be expressly assumed by PIONEER in writing.

b. Change of Design

PIONEER shall be entitled to make any and all changes in details of design, construction or arrangement of the product as PIONEER in its sole discretion determines will constitute an improvement upon the product or any specifications or designs previously furnished to the Purchaser.

c. PIONEER Remedies

In addition to and notwithstanding any other remedy to which PIONEER may be entitled by law, in the event of Purchaser's breach of its obligations hereunder, or if Purchaser should cancel a purchase order, in whole or in part, or refuse to accept the products shipped hereunder, or wrongfully rejects or revokes its acceptance of products shipped that conform to a purchase order, Purchaser shall pay for, and PIONEER shall be entitled to recover from Purchaser, all special engineering, design, tooling, manufacturing, storage, or transportation costs incurred in connection with PIONEER's performance of the purchase order.

d. Infringement

With respect to PIONEER's own standard designs and specifications, or specialty products which PIONEER has engineered and designed, PIONEER shall defend, indemnify and hold Purchaser harmless from and against any loss, damage, cost or expense arising out of any third-party claims for patent or trademark infringement relating to such products, so long as Purchaser promptly notifies PIONEER in writing of any such claim and gives PIONEER such authority, information and assistance as PIONEER may request in connection with the defense thereof.

Purchaser shall defend, indemnify and hold PIONEER harmless from and against any loss, damage, costs or expenses arising out of any claims of patent or trademark infringement relating to products manufactured by PIONEER in accordance with any designs or specifications furnished by Purchaser.

e. Special Tooling

Any special tools, dies, jigs, molds, or other equipment manufactured or purchased by PIONEER, regardless of whether included as part of PIONEER’s pricing, shall remain PIONEER’s exclusive property.

f. Confidentiality

All commercial, financial or technical information furnished by PIONEER shall be considered confidential and Purchaser shall not disclose any such information to any other person or use such information itself for any purpose other than the re-sale or the intended use of the products. This Section shall apply to drawings, specifications or other documents prepared by us. Unless otherwise agreed in writing, no information disclosed in any manner or at any time by Purchaser to PIONEER shall be deemed secret or confidential, and Purchaser shall have no rights against PIONEER with respect thereto, except such rights as may exist under applicable patent laws.

g. Independent Contractors

PIONEER and Purchaser are independent contractors and neither has the authority to assume or to create any obligation on behalf of or in the name of the other.

h. Set Off

PIONEER shall be entitled to set off any amount or apply any sum due from Purchaser to PIONEER or any other affiliated company of PIONEER.

i. Force Majeure

PIONEER shall not be responsible or liable for any delays or failures in manufacture or delivery due to any cause or condition beyond the reasonable control of PIONEER. PIONEER shall not be responsible or liable for any delays or failures to deliver or to perform its contractual responsibilities if due to causes beyond its reasonable control or the reasonable control of its suppliers, or due to acts of God, acts of civil or military authority, judicial action, fires, strikes, floods, wars, transportation delays, or inability due to causes beyond its reasonable control to obtain necessary labor, materials or manufacturing facilities. In the event of such a condition or circumstance, PIONEER shall have the right, at its option, to cancel any purchase orders or any part thereof without any resulting liability.

j. Applicable Law

The terms and conditions expressed herein shall be construed and its performance governed by the internal laws (as opposed to conflicts of law provisions) of the State of Texas.

k. Headings

All headings or captions used herein are for convenience of reference only and shall not limit or define these terms and conditions.

l. Interpretation

Whenever the term “include” or “including” is used in this document or any document referenced in this document, it shall mean “including, without limitation,” (whether or not such language is specifically set forth) and shall not be deemed to limit the range of possibilities to those items specifically enumerated. The words “hereof”, “herein” and “hereunder” and words of similar import refer to this document and any document referenced in this document as a whole and not to any particular provision. Terms defined in the singular have a comparable meaning when used in the plural and vice versa.

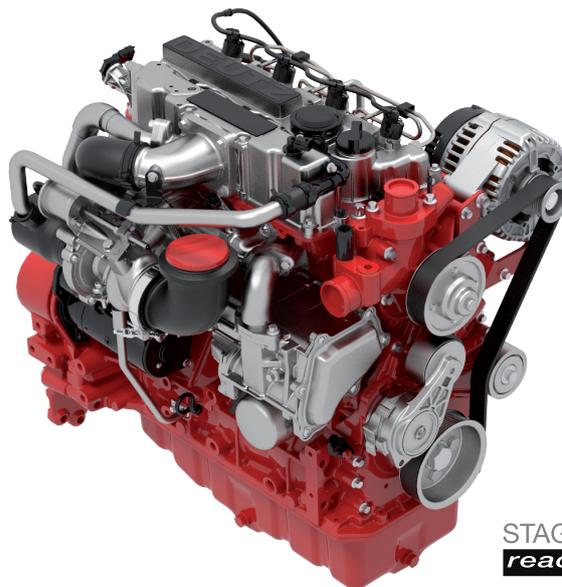
Exhibit A	Product	0–12 Months	13–24 Months	25–60 Months
Pumps	Solids Handling	•	•	
	Clear Liquids	•	•	
	Vortex Series	•	•	
	HWR Series	•	•	
	GS Series	•	•	•
	GT Series	•	•	•
	P_B Series	•	•	•
	PE_B Series	•	•	•
Packages	Engine Driven	•	•	
	Electric motor driven	•	•	
	Other	•	•	
Other	Parts	•		

ENGINE DATA

DEUTZ TCD 2.9

For mobile machinery ■ 30-75 kW / 40-100 hp at 2200-2600 min⁻¹/rpm ■ EU Stage IIIB and V / US EPA Tier 4

- Water-cooled 4-cylinder inline engine with cooled, external exhaust gas recirculation with and without turbocharging and optionally with and without charge air cooling.
- The powerful Common Rail injection system and highly-efficient combustion process with cooled external exhaust gas recirculation ensure optimum engine performance at low fuel consumption and exhaust emissions.
- The DVERT[®] oxidation catalyst for EU Stage IIIB and US EPA Tier 4 enables maintenance-free operation under all application and ambient conditions. A DVERT[®] particulate filter (DPF) is available as an option. With the introduction of EU Stage V, DPF will be available for all engine types. Through the use of the diesel particulate filter, the engines already comply with the EU Stage V emissions standard expected from 2019*.
- For ease of machine installation engine foot print and all major installation interfaces will stay unchanged for Stage V.
- Up to 1000 h oil change intervals and a maintenance-free valve train result in low maintenance costs and increased machine availability.
- The extremely compact engine design and customer friendly accessories reduce the installation costs and increase the number of applications.
- 100% power take-off at flywheel and front end and additional side PTO drive with up to 120 Nm for the mounting of up to two hydraulic pumps.
- A variant without EAT is optionally available for EU Stage III A, US EPA Tier 4i and for less regulated markets.
- New High Power engine version to extend the 2.9 platform to 100 hp.
- New High Torque engine version for extraordinary strong performance below 56 kW.



STAGE
ready **V**

TECHNICAL DATA

Engine type		D 2.9 L4	TD 2.9 L4	TCD 2.9 L4	TCD 2.9 L4 HT ^{*)}	TCD 2.9 L4 HP ^{**)}
No. of cylinders		4	4	4	4	4
Bore/stroke	mm in	92/110 3,6/4,3	92/110 3,6/4,3	92/110 3,6/4,3	92/110 3,6/4,3	92/110 3,6/4,3
Displacement	l cu in	2,9 177	2,9 177	2,9 177	2,9 177	2,9 177
Max. nominal speed	min ⁻¹ rpm	2600	2600	2600	2600	2300

Engine type		D 2.9 L4	TD 2.9 L4	TCD 2.9 L4	TCD 2.9 L4 HT ^{*)}	TCD 2.9 L4 HP ^{**)}
Power output as per ISO 14396 ¹⁾	kW hp	36,4 50	55,4 75	55,4 75	55,4 75	75 100
at speed	min ⁻¹ rpm	2600	2600	2600	2600	2300
Max. torque	Nm lb/ft	147 108	260 192	300 221	375 277	400 295
at speed	min ⁻¹ rpm	1600	1600-1800	1600	1600	1600
Minimum idling speed	min ⁻¹ rpm	900	900	900	900	900
Specific fuel consumption ²⁾	g/kWh lb/hph	225 0,37	225 0,37	210 0,35	210 0,35	210 0,35
Weight as per DIN 70020 Part 7A ³⁾	kg lb	220 485	237 522	237 522	237 522	237 522

* Based on the proposal by the EU Commission COM (2014) 581 final from 25.09.2014

1) Power data without deduction of fan power

2) Best point consumption refers to diesel with a density of 0.835 kg/dm³ at 15°C.

3) Without starter/alternator, cooler and fluids but with flywheel and flywheel housing

^{*)} HT = High Torque
^{**)} HP = High Power

The engine company.

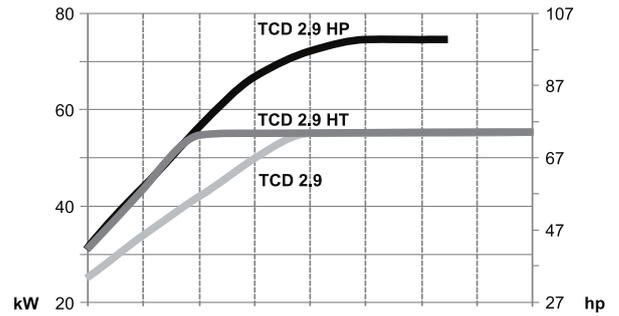
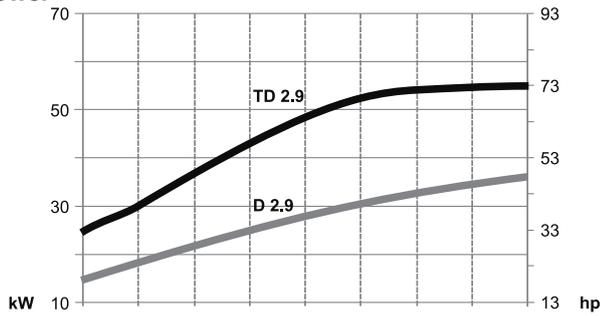


CHARACTERISTIC CURVES

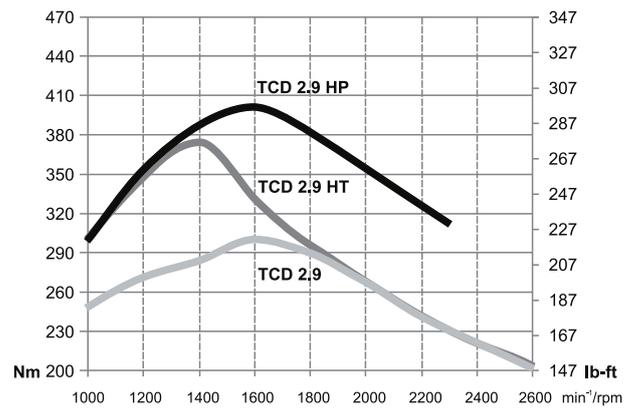
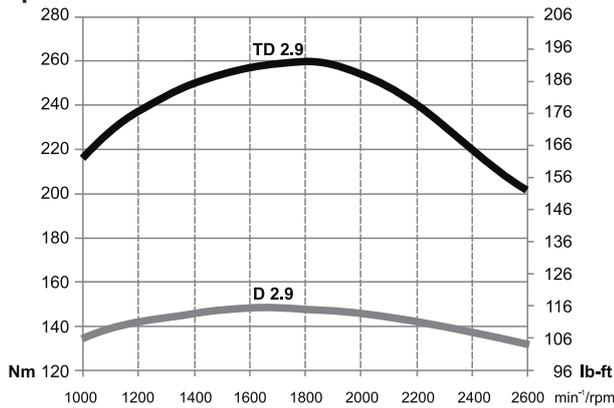
D 2.9 / TD 2.9 L4

TCD 2.9 L4 - Standard, HT and HP

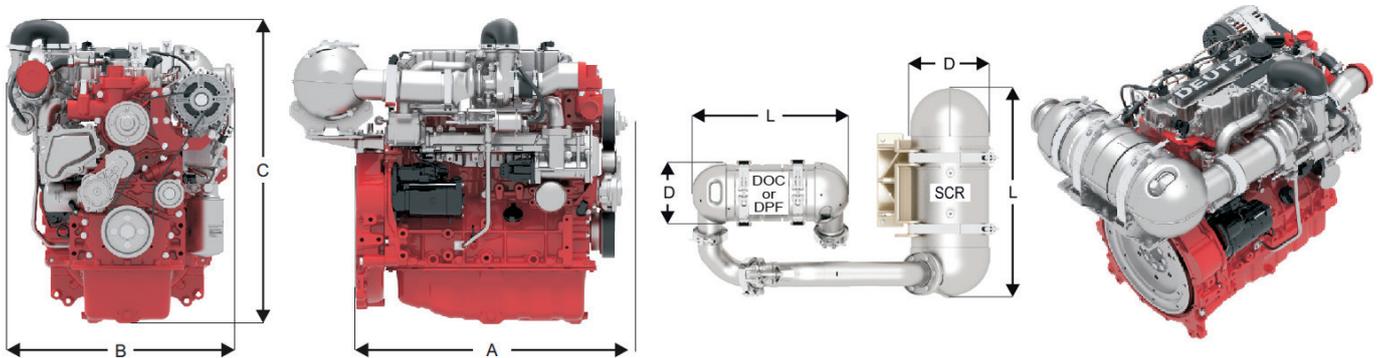
Power



Torque



DIMENSIONS



Engine type	A			B		C		DOC		SCR		DPF		DVERT® EAT							
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	DOC	SCR	DPF						
D 2.9	< 37 kW		678	26,7	483	19,0	685	27,8	199	7,8	380	15,0	-	-	-	■	-	●			
TD 2.9	< 56 kW		678	26,7	560	22,0	685	27,8	199	7,8	523	20,6	-	-	-	■	-	●			
TCD 2.9	< 56 kW		678	26,7	560	22,0	685	27,8	199	7,8	380	15,0	-	-	199	7,8	613	24,1	■	-	●
TCD 2.9 / HT	< 56 kW		678	26,7	560	22,0	685	27,8	199	7,8	380	15,0	-	-	199	7,8	613	24,1	■	-	●
TCD 2.9 / HP	> 56 kW		678	26,7	560	22,0	685	27,8	-	-	246	9,7	659	25,9	199	7,8	613	24,1	■	●	●

- Standard for Stage IIIB / T4
- Optional for Stage IIIB / T4, but DPF and SCR standard for Stage V

For EU Step IV / EPA Tier 4 or standard for EU Step V. The DVERT® oxidation catalyst (DOC) does not satisfy the regulations of certain markets that have specified additional limit values for the number of particles (e.g. Switzerland). DEUTZ offers the DVERT® wallflow particulate filter as an option for these markets.

All connection variants are available either in 0° or 90° positions for inlet and outlet flanges. Note: The engine dimensions and weights vary depending on the scope of delivery.

For more information please contact the DEUTZ AG or the responsible sales partner.

DEUTZ AG
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 51149 Cologne, Germany
 Phone: +49 (0) 221 822-0
 Telefax: +49 (0) 221 822-3525
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 www.deutz.com

The engine company. **DEUTZ**



ENGINE EPA CERTIFICATE

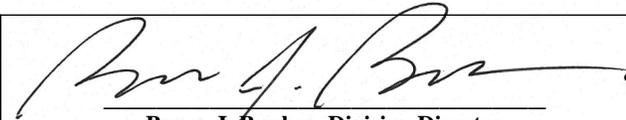


UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2019 MODEL YEAR
CERTIFICATE OF CONFORMITY
WITH THE CLEAN AIR ACT

OFFICE OF TRANSPORTATION
AND AIR QUALITY
ANN ARBOR, MICHIGAN 48105

Certificate Issued To: Deutz AG
(U.S. Manufacturer or Importer)
Certificate Number: KDZXL02.9020-025

Effective Date:
11/27/2018
Expiration Date:
12/31/2019


Byron J. Bunker, Division Director
Compliance Division

Issue Date:
11/27/2018
Revision Date:
N/A

Model Year: 2019
Manufacturer Type: Original Engine Manufacturer
Engine Family: KDZXL02.9020

Mobile/Stationary Indicator: Both
Emissions Power Category: 37<=kW<56
Fuel Type: Diesel
After Treatment Devices: Diesel Oxidation Catalyst
Non-after Treatment Devices: Electronic Control, Electronic/Electric EGR - Cooled

Pursuant to Section 111 and Section 213 of the Clean Air Act (42 U.S.C. sections 7411 and 7547) and 40 CFR Parts 60 and 1039, and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following engines, by engine family, more fully described in the documentation required by 40 CFR Parts 60 and 1039 and produced in the stated model year.

This certificate of conformity covers only those new compression-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Parts 60 and 1039 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Parts 60 and 1039.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Parts 60 and 1039. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Parts 60 and 1039.

This certificate does not cover engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

ENGINE CARB CERTIFICATE

Pursuant to the authority vested in California Air Resources Board by Sections 43013, 43018, 43101, 43102, 43104 and 43105 of the Health and Safety Code; and

Pursuant to the authority vested in the undersigned by Sections 39515 and 39516 of the Health and Safety Code and Executive Order G-14-012;

IT IS ORDERED AND RESOLVED: That the following compression-ignition engines and emission control systems produced by the manufacturer are certified as described below for use in off-road equipment. Production engines shall be in all material respects the same as those for which certification is granted.

MODEL YEAR	ENGINE FAMILY	DISPLACEMENT (liters)	FUEL TYPE	USEFUL LIFE (hours)
2019	KDZXL02.9020	2.925	Diesel	8000
SPECIAL FEATURES & EMISSION CONTROL SYSTEMS			TYPICAL EQUIPMENT APPLICATION	
Common Rail Direct Injection, Turbocharger, Exhaust Gas Recirculation, Electronic Control Module, Diesel Oxidation Catalyst			Loader, Tractor, Dozer	

The engine models and codes are attached.

The following are the exhaust certification standards (STD) and certification levels (CERT) for non-methane hydrocarbon (NMHC), oxides of nitrogen (NOx), or non-methane hydrocarbon plus oxides of nitrogen (NMHC+NOx), carbon monoxide (CO), and particulate matter (PM) in grams per kilowatt-hour (g/kW-hr), and the opacity-of-smoke certification standards and certification levels in percent (%) during acceleration (Accel), lugging (Lug), and the peak value from either mode (Peak) for this engine family (Title 13, California Code of Regulations, (13 CCR) Section 2423):

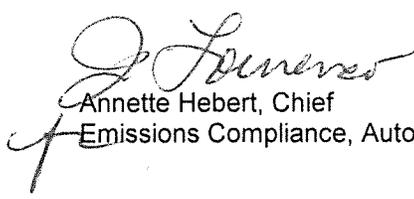
RATED POWER CLASS	EMISSION STANDARD CATEGORY	STD	EXHAUST (g/kW-hr)					OPACITY (%)		
			NMHC	NOx	NMHC+NOx	CO	PM	ACCEL	LUG	PEAK
37 ≤ kW < 56	Tier 4 Final	STD	N/A	N/A	4.7	5.0	0.03	N/A	N/A	N/A
		CERT	--	--	3.7	0.02	0.03	--	--	--

BE IT FURTHER RESOLVED: That for the listed engine models, the manufacturer has submitted the information and materials to demonstrate certification compliance with 13 CCR Section 2424 (emission control labels), and 13 CCR Sections 2425 and 2426 (emission control system warranty).

Engines certified under this Executive Order must conform to all applicable California emission regulations.

This Executive Order is only granted to the engine family and model-year listed above. Engines in this family that are produced for any other model-year are not covered by this Executive Order.

Executed at El Monte, California on this 27th day of September 2018.


 Annette Hebert, Chief
 Emissions Compliance, Automotive Regulations and Science Division

EO # U-R-013-0513
Date: 8/24/2018

Attachment page 1 of 2

Engine Model Summary Template

Deutz AG
Nonroad CI

Engine Family	1.Engine Code	2.Engine Model	3.BHP@RPM (SAE Gross)	4.Fuel Rate: mm/stroke @ peak HP (for diesel only)	5.Fuel Rate: (lbs/hr) @ peak HP (for diesels only)	6.Torque @ RPM (SEA Gross)	7.Fuel Rate: mm/stroke@pe ak torque	8.Fuel Rate: (lbs/hr)@peak torque	9.Emission Control Device Per SAE J1930
KDZXL02.9020	C4DI55C	TD2.9L4	74.2@2300	58.3	29.7	191.7@1800	62.5	25.0	DDI, TC, EGR, ECM, DOC
KDZXL02.9020	C4DI55.4	TD2.9L4	74.2@2600	56.1	32.4	191.7@1800	62.5	24.9	DDI, TC, EGR, ECM, DOC
KDZXL02.9020	C4DI55A	TD2.9L4	74.2@2500	56.5	31.4	191.7@1800	62.5	24.9	DDI, TC, EGR, ECM, DOC
KDZXL02.9020	C4DI55B	TD2.9L4	74.2@2400	57.0	30.3	191.7@1800	62.5	24.9	DDI, TC, EGR, ECM, DOC
KDZXL02.9020	C4DI54	TD2.9L4	72.4@2200	58.0	28.3	191.7@1800	62.5	24.9	DDI, TC, EGR, ECM, DOC
KDZXL02.9020	C4DI50	TD2.9L4	67.0@2600	53.5	30.9	172.5@1800	56.2	22.4	DDI, TC, EGR, ECM, DOC
KDZXL02.9020	C4DI50A	TD2.9L4	67.0@2500	52.0	28.8	172.5@1800	56.2	22.4	DDI, TC, EGR, ECM, DOC
KDZXL02.9020	C4DI50C	TD2.9L4	67.0@2300	53.9	27.5	172.5@1800	56.2	22.4	DDI, TC, EGR, ECM, DOC
KDZXL02.9020	C4DI49	TD2.9L4	65.7@2200	53.9	26.3	172.5@1800	56.2	22.4	DDI, TC, EGR, ECM, DOC
KDZXL02.9020	C4DI45	TD2.9L4	60.3@2600	51.0	29.4	172.5@1800	56.2	22.4	DDI, TC, EGR, ECM, DOC
KDZXL02.9020	C4DI45A	TD2.9L4	60.3@2500	48.0	26.6	172.5@1800	56.2	22.4	DDI, TC, EGR, ECM, DOC
KDZXL02.9020	C4DI45B	TD2.9L4	60.3@2200	50.7	24.7	172.5@1800	56.2	22.4	DDI, TC, EGR, ECM, DOC
KDZXL02.9020	C4DT54	TD2.9L4	72.4@2200	58.5	28.5	191.7@1600	61.0	21.6	DDI, TC, EGR, ECM, DOC
KDZXL02.9020	C4DT50	TD2.9L4	67.0@2200	54.5	26.6	191.7@1600	60.5	21.5	DDI, TC, EGR, ECM, DOC
KDZXL02.9020	C4DT45	TD2.9L4	60.3@2200	49.5	24.1	179.9@1800	57.0	22.2	DDI, TC, EGR, ECM, DOC
KDZXL02.9020	C4DI45F	TD2.9L4	60.3@2200	50.7	24.7	172.5@1800	56.2	22.4	DDI, TC, EGR, ECM, DOC
KDZXL02.9020	C4DI45E	TD2.9L4	60.3@2500	48.0	26.6	172.5@1800	56.2	22.4	DDI, TC, EGR, ECM, DOC
KDZXL02.9020	C4DI45D	TD2.9L4	60.3@2600	51.0	29.4	172.5@1800	56.2	22.4	DDI, TC, EGR, ECM, DOC
KDZXL02.9020	C4DI49A	TD2.9L4	65.7@2200	53.9	26.3	172.5@1800	56.2	22.4	DDI, TC, EGR, ECM, DOC
KDZXL02.9020	C4DI50G	TD2.9L4	67.0@2300	53.9	27.5	172.5@1800	56.2	22.4	DDI, TC, EGR, ECM, DOC
KDZXL02.9020	C4DI50E	TD2.9L4	67.0@2500	52.0	28.8	172.5@1800	56.2	22.4	DDI, TC, EGR, ECM, DOC
KDZXL02.9020	C4DI50D	TD2.9L4	67.0@2600	53.5	30.9	172.5@1800	56.2	22.4	DDI, TC, EGR, ECM, DOC
KDZXL02.9020	C4DI54A	TD2.9L4	72.4@2200	58.0	28.3	191.7@1800	62.5	24.9	DDI, TC, EGR, ECM, DOC
KDZXL02.9020	C4DI55G	TD2.9L4	74.2@2300	58.3	29.7	191.7@1800	62.5	25.0	DDI, TC, EGR, ECM, DOC
KDZXL02.9020	C4DI55F	TD2.9L4	74.2@2400	57.0	30.3	191.7@1800	62.5	24.9	DDI, TC, EGR, ECM, DOC
KDZXL02.9020	C4DI55E	TD2.9L4	74.2@2500	56.5	31.4	191.7@1800	62.5	24.9	DDI, TC, EGR, ECM, DOC
KDZXL02.9020	C4DI55D	TD2.9L4	74.2@2600	56.1	32.4	191.7@1800	62.5	24.9	DDI, TC, EGR, ECM, DOC

Deutz AG

Nonroad CI

Attachment page 2 of 2

EO# U-R-013-0573

Date: 8/24/2018

Engine Model Summary Template

Engine Family	1.Engine Code	2.Engine Model	3.BHP@RPM (SAE Gross)	4.Fuel Rate: mm/stroke @ peak HP (for diesel only)	5.Fuel Rate: (lbs/hr) @ peak HP (for diesels only)	6.Torque @ RPM (SEA Gross)	7.Fuel Rate: mm/stroke@pe ak torque	8.Fuel Rate: (lbs/hr)@peak torque	9.Emission Control Device Per SAE J1930
KDZXL02.9020	C4DI55K	TD2.9L4	74.2@2600	56.1	32.4	191.7@1800	62.5	24.9	DDI, TC, EGR, ECM, DOC
KDZXL02.9020	C4DI36EU	TD2.9L4	48.8@2200	42.0	20.5	183.6@1350	61.5	18.4	DDI, TC, EGR, ECM, DOC



ENGINE LIMITED WARRANTY



DEUTZ Limited Warranty Statement

DEUTZ ENGINE, DEUTZ **XCHANGE** ENGINE,
GENUINE DEUTZ PART OR GENUINE DEUTZ **XCHANGE** PART

1. DEUTZ Corporation (“DC”) warrants to the original retail customer that each new DEUTZ engine or genuine DEUTZ **XCHANGE** engine (“Engine”) or genuine new DEUTZ spare or replacement part or DEUTZ **XCHANGE** part (“Part”) supplied by DC or an authorized distributor of DC, purchased by the original retail customer and properly installed in an application, will be free from defects in material and workmanship under normal use and service. If, during the warranty period following the delivery of the Engine or Part, it is shown there is a defect in material or workmanship caused solely by failure of DC’s manufacturer (DEUTZ AG) to meet such standards, and customer has notified DC in writing of such defect within that period, DC shall repair or replace, at DC’s cost and option, such defective Engine or Part. Such repair or replacement will be made without charge to the customer at customer’s premises or, at the option of DC, at such other location as DC may designate. Any Engine or Part that is replaced shall become the property of DC. Any repaired or replaced Engine or Part shall be warranted until the expiration of the original warranty period. DC’s warranty obligation is expressly conditioned upon the customer fulfilling all obligations pursuant to customer’s purchase order, including, without limitation, all payment obligations.

2. ENGINES (NEW OR DEUTZ **XCHANGE):**

Warranty coverage is provided for the DEUTZ engine series listed below:

Warranty Period	Operating Hours	Warranty Coverage	
12 months	Unlimited	All components	
24 months	511, 909, 1011,1011F, 2010, 2011 2008, 2009, 2.9, 3.6 1012, 2012, 1013, 2013 910, 912, 913, 914, 4.1, 6.1, 7.8 913 and 914 gas engines 413, 513, 1015, 2015, 2015 gas engine 12.0, 16.0	2000h 2000h 3000h 3000h 4000h 5000h 5000h	All components of the engine
36 months	511, 909, 1011, 1011F, 2010, 2011 2008, 2009, 2.9, 3.6 1012, 2012, 1013, 2013 910, 912, 913, 914, 4.1, 6.1, 7.8 913 and 914 gas engines 413, 513, 1015, 2015, 2015 gas engine 12.0, 16.0	3000h 3000h 4500h 4500h 4500h 7500h 7500h	Main engine components, Crankcase, Crankshaft, Camshaft, Connecting Rods, Cylinder Head Casting

The Engine warranty will commence at the date of sale to the original retail customer, or one year from the date of manufacture, whichever occurs first.

3. **PARTS:** Warranty coverage is provided for each new genuine DEUTZ Part or DEUTZ **XCHANGE** Part for a period of 12 months from the date of sale to the original retail customer.

4. This warranty does not cover the following: (i) wear and tear or contaminants; (ii) exposure, corrosion or prolonged or improper storage; (iii) normal maintenance service or the replacement or repair of parts required to be replaced or repaired in the course of normal maintenance service; (iv) improper installation, use, fuels, lubricants, operation, maintenance, transportation or packing; (v) misuse, alteration, negligence and accidents; (vi) chemical or electrical action; and (vii) unauthorized repairs.

5. This warranty does not cover any components supplied by DC manufactured by someone other than DEUTZ AG, such as components obtained by DC from its suppliers (other than DEUTZ AG), and DC makes no warranty whatsoever with respect to such components. Such components will be covered only by the warranties, if any, as may be issued by such suppliers themselves, which warranties will be made available to customer upon request. This warranty does not cover any components added by DC’s customers before reselling it to the end-customer, and DC makes no warranty whatsoever with respect to such components.

6. The warranties, obligations, liabilities and remedies of the parties, as provided herein, are exclusive and in lieu of any others available at law or in equity. DC’s total aggregate liability with respect to any defective Engine or Part shall not exceed the amount paid by the customer for such Engine or Part and customer agrees to release, defend, indemnify and hold DC harmless from and against any and all further liability in excess thereof arising in any manner from any alleged defective Engine or Part. To the fullest extent allowed by law, releases from, and limitations of liability shall apply notwithstanding breach of contract, tort (including negligence), strict liability or other theory of legal liability of the party released or whose liability is limited. The laws of the State of Georgia shall govern this warranty.

7. UNDER NO CIRCUMSTANCES WILL THE CUSTOMER BE ENTITLED TO RECISSION OR TO A REDUCTION IN THE PURCHASE PRICE. CUSTOMER WAIVES ANY AND ALL CLAIM FOR LOSS OF TIME, REPLACEMENT POWER, INCREASED COST, INCONVENIENCE, LOSS OF USE OR PROFIT, LOSS OF GOODWILL, COST OF CAPITAL, COST OF RENTALS OR ANY OTHER DIRECT, INDIRECT, PUNITIVE, SPECIAL, EXEMPLARY, INCIDENTAL OR CONSEQUENTIAL DAMAGES WHATSOEVER.

8. THIS WARRANTY AND THE DEUTZ EMISSION WARRANTIES FOR EPA-APPROVED DEUTZ ENGINES AND GENUINE DEUTZ PARTS INSTALLED IN SUCH ENGINES ARE IN LIEU OF ALL OTHER EXPRESS OR IMPLIED WARRANTIES OF DC AND DEUTZ AG WITH RESPECT TO DEUTZ ENGINES AND GENUINE DEUTZ PARTS, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. NEITHER DC NOR DEUTZ AG ASSUME, NOR AUTHORIZE ANY DISTRIBUTOR OR OTHER PERSON TO ASSUME, ON THEIR BEHALF, ANY OTHER OBLIGATION OR LIABILITY.

9. For details of the DEUTZ warranty contact:
DEUTZ Corporation
Warranty Department
3883 Steve Reynolds Blvd
Norcross GA 30093 USA
Phone: 770-564-7100
www.deutzamericas.com

ENGINE CONTROLLER DATA

PowerCore™ MPC-10

The Murphy PowerCore MPC-10 Controller is a general, all-purpose manual/auto start and manual/auto throttling engine controller designed with rental applications in mind. The controller is purposed primarily for applications where a wide array of inputs and outputs are not required. This is a powerful and rugged controller that supports J1939 CAN protocols for electronically governed engines as well as analog sensors on mechanical engines for fault and safety shutdowns.

While reprogrammable, the MPC-10 follows a standard operating sequence. This operating sequence is a set of 22 machine states that happen in a predetermined order. Machine states can be set to zero if not needed or adjusted to fit the application. The menu structure is incredibly versatile, with the ability to change many parameters and settings from the face without the need of a PC tool, if desired.

The MPC-10 is flexible in many aspects, with the ability to:

- use the same controller on 12VDC or 24VDC systems;
- assign multiple levels of passcode protection to the menu using the free of charge PC Configuration Tool;
- change the input sensor type for the analog inputs;
- use analog inputs as digital ground inputs;
- be mounted in all-weather environments;
- be customer mounted in panel of choice.

Specifications

Power Input: 8-32 VDC, reverse polarity and load dump protection

Cranking Power Holdup: 0 VDC up to 50mS (also good for brownout/blackout instances)

Total Current Consumption: Power on in stopped state; 117 mA at 12 VDC. Power on in standby mode; 52 mA at 12 VDC.

Display: 2.7" WQVGA Monochrome HR-TFT 400x240

Keypad: 11 Tactile Feedback Buttons

LEDs: (1) Red, Shutdown, (1) Amber, Warning, (1) Green, Auto Mode or Running Loaded State

Outputs:

- (3) Relays: 10A, SPDT, Form C (30 VDC @ 10A max.), 30A max aggregate @ 85C
- (2) Low-side (1A)
- (2) High-side (1A)
- (1) Dedicated Alternator Excite (provides Charge Fail Fault if unable to excite alternator)

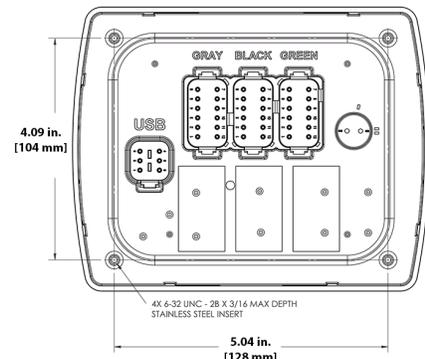
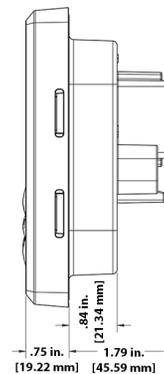
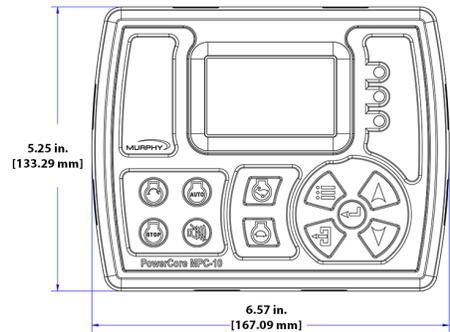
Inputs:

- (5) Digital, configurable (high/low)
- (3) Analog, configurable (4-20mA, 0-5V, resistive)
- (1) Frequency, supporting Magnetic pickup (30Hz - 10kHz, 2.0VAC-120VAC) and Engine Alternator (30Hz - 10kHz, 4.5 VRMS - 90 VRMS)



*Approved by CSA for non-hazardous locations (Group Safety Publication IEC 61010-1 Third Edition).
Products covered in this document comply with European Union electromagnetic compatibility directive 2004/108/EC and electrical safety directive 2006/95/EC.

Dimensions



Specifications (continued)

Communications:

- (1) CAN J1939
- (1) RS485, MODBUS RTU
- (1) USB 2.0B for Programming

Dimensions:

Width: 6.57 in. (167.09 mm)
 Height: 5.24 in. (133.29 mm)
 Depth: 2.55 in. (64.81 mm)

Mass: 1lb. 1oz. (0.5 kg)

Operating Temperature: -40°F to 185°F (-40°C to 85°C)

Storage Temperature: -40°F to 185°F (-40°F to 85°C)

EMI/EMC: SAE J1113, 2004/108/EC

Shock: ± 50G in axes

Vibration: Random, 7.86 Grms (5-2000Hz), 3 axes

Sealing: IP67 front and back, IP66 Panel Seal with Gasket

Case: Polycarbonate/ABS

Mating Connector: Deutsch Wedge Lock W12S-P012:

Gray DT06-12SA-P012

Black DT06-12SB-P012

Green DT06-12SC-P012

USB 6 pin

Shipping Weight: 2lbs. 7.1 oz. (1.11 kg)

Shipping Dimensions:

8 x 8 x 5-11/16 in. (204 x 204 x 127mm) (WxHxD)

Languages: English, Spanish, German, French, Italian

Connectors

Deutsch 12 pin Connector Gray		Deutsch 12 pin Connector Black		Deutsch 12 pin Connector Green		Deutsch 6 pin Connector USB	
PIN	Function	PIN	Function	PIN	Function	PIN	Function
1	Battery (+)	1	Battery (+)	1	Battery (-)	1	USB1_VBUS
2	RS485 (H)	2	Not Used	2	Battery (+)	2	USB_DP_OUT
3	RS485 (L)	3	Digital Out 2 HS 1A	3	Battery (+) Switched	3	USB_DM_OUT
4	Relay 3 NC	4	Digital Out 1 HS 1A	4	Alt Excite	4	USB_ID_OUT
5	Relay 3 COM	5	Digital Out 2 LS 1A	5	CAN (H)	5	USB_SHLD
6	Relay 3 NO	6	Digital Out 1 LS 1A	6	CAN (L)	6	USB_GND
7	Analog In 3	7	Analog In 1	7	Relay 1 NO		
8	Digital In 3	8	Analog In 2	8	Relay 1 COM		
9	Digital In 4	9	Digital In 1	9	Relay 1 NC		
10	Digital In 5	10	Digital In 2	10	Relay 2 NO		
11	Not Used	11	Frequency In	11	Relay 2 COM		
12	Battery (-)	12	Battery (-)	12	Relay 2 NC		

How to Order

Part Number	Model/Description
40700494	MPC-10 Controller
40051142	Panel Gasket, IP66, MPC-10
40700506	PowerCore 3X12 Position Connector Kit
40000598	PowerCore 3X12 Position 3' Conn Whip Harness (1m approx.)
78000668	USB Programming Harness