

Cape May County Municipal Utilities Authority

Submittal No. ≠/

Contract No. OC-EQUIP-23-20

Review is for general compliance with design concept and arrangement of the project. Contractor is responsible for conformity with the contract documents, construction means and methods, quantities, conformation of dimensions and details, coordination with other trades.

No Exceptions Taken

Make Corrections Noted

Amend & Resubmit _____ Copies

Rejected (see remarks)

Date: 11/19/20 By: [Signature]

SUBMITTAL

OWNER: Cape May County MUA
1523 Route 9 North
Cape May Court House, NJ 08210
PO #
Contract #WW-EQUIP-23-20
Furnishing and Delivering Three (3)
Immersible Pumps for 32nd Street Station

OWNER'S CONTACT: Mr. George E. Hann, Jr., P.E.
Cape May County MUA
PO Box 610
Cape May Court House, NJ 08210
Email: hannge@cmcmua.com

EQUIPMENT: Immersible Pumping Units with Motors

PUMP MANUFACTURER: Cornell Pump Company
Clackamas, OR

SUPPLIER: Mid Atlantic Pump & Equip. Co.
228 North Route 73
Berlin, New Jersey
Phone: 856-768-3880

Equipment Includes

<u>Qty.</u>	<u>Description</u>
3	Cornell Model 10NHTB – VC18DB Vertical Coupled Immersible Pumps with modified base support, suction elbow with 10" suction, 12" flanged discharge, vertical bearing assembly with Cycloseal mechanical seal and immersible motors as indicated below.
3	Certified Performance Tests in accordance with HI standards
3	Hydrostatic Tests
3	Vibration Tests
3	125 HP, 1190 RPM immersible TEBC motors, suitable for use with a VFD with a 1.15 service factor on sine wave – 1.0 service factor on VFD operation, 1750 RPM, 460 volt, 3-phase, as manufactured by ABB – Baldor – Reliance. Motors to operate continuously in air or under as much as 30' of submergence of water for a period of two (2) weeks.
3	Lots – Spare Parts (see Spare Parts data sheet)
3 ✓	Model 7814LW2, 14" Val-Matic 7800SER swing check valves with fusion bonded epoxy coatings
3 ✓	12" x 8" J1-W single wide filled arch expansion joints w/316SS rods & rings
3 ✓	14" x 10" Flange Eccentric Reducer, 401 Protecto lined / primed
1 ✓	14" x 8.83" Flange x Flange Fitting, 401 Protecto lined / primed
1 ✓	14" x 2.13" Flanged Filler Piece, 401 Protecto lined / Primed
1	Lot – Start-Up & Training Services

1. 10" x 0.83" Flanged Filler Piece, 401 Protecto lined primed.

**The following spare parts will be supplied for
each pumping unit:**

2✓ Spare Seals

2✓ Sets – Impeller and Volute Wear Rings

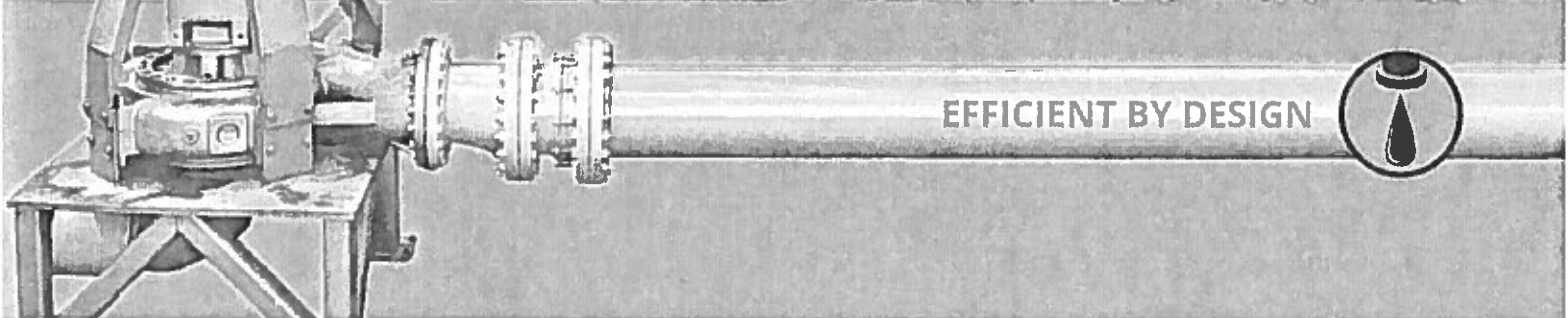
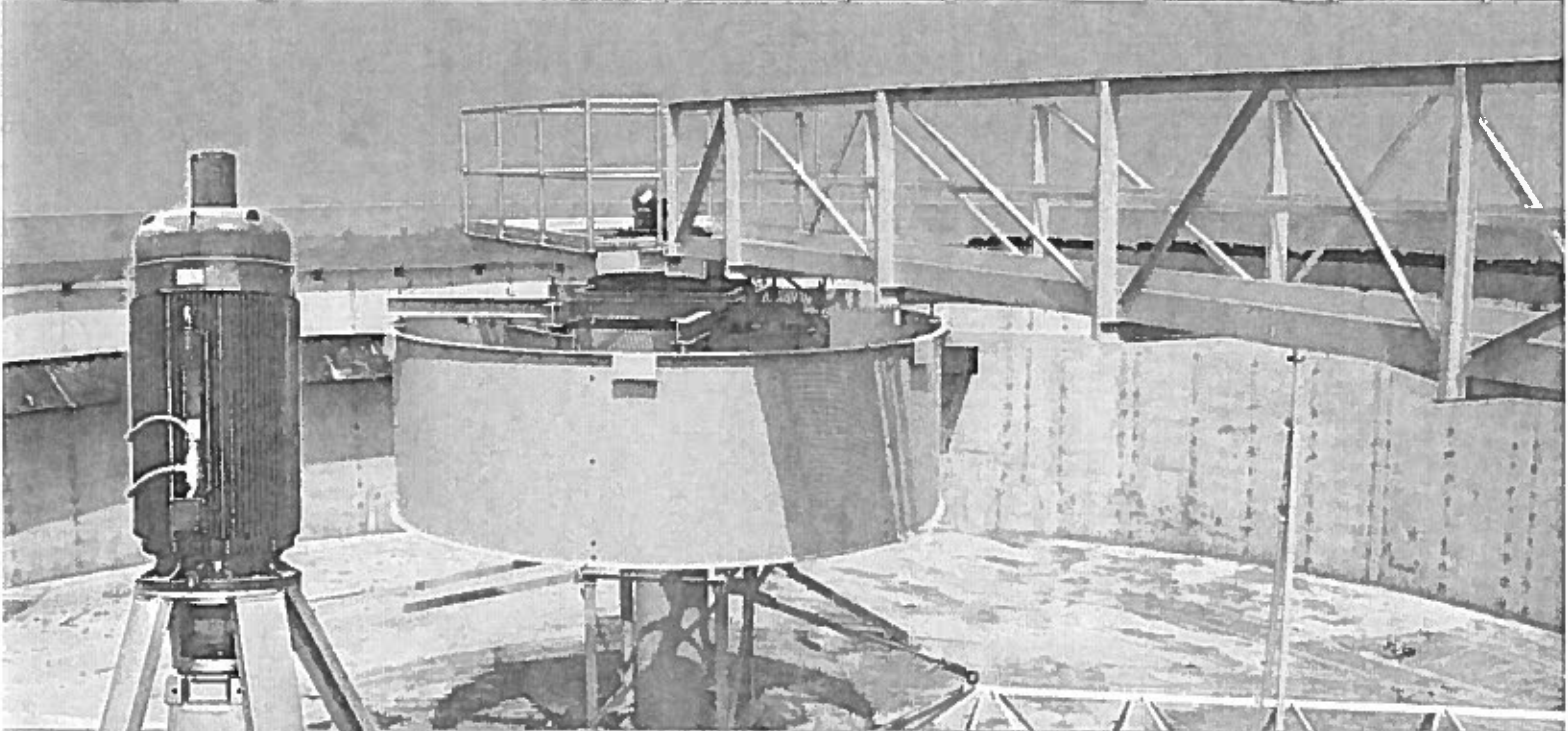
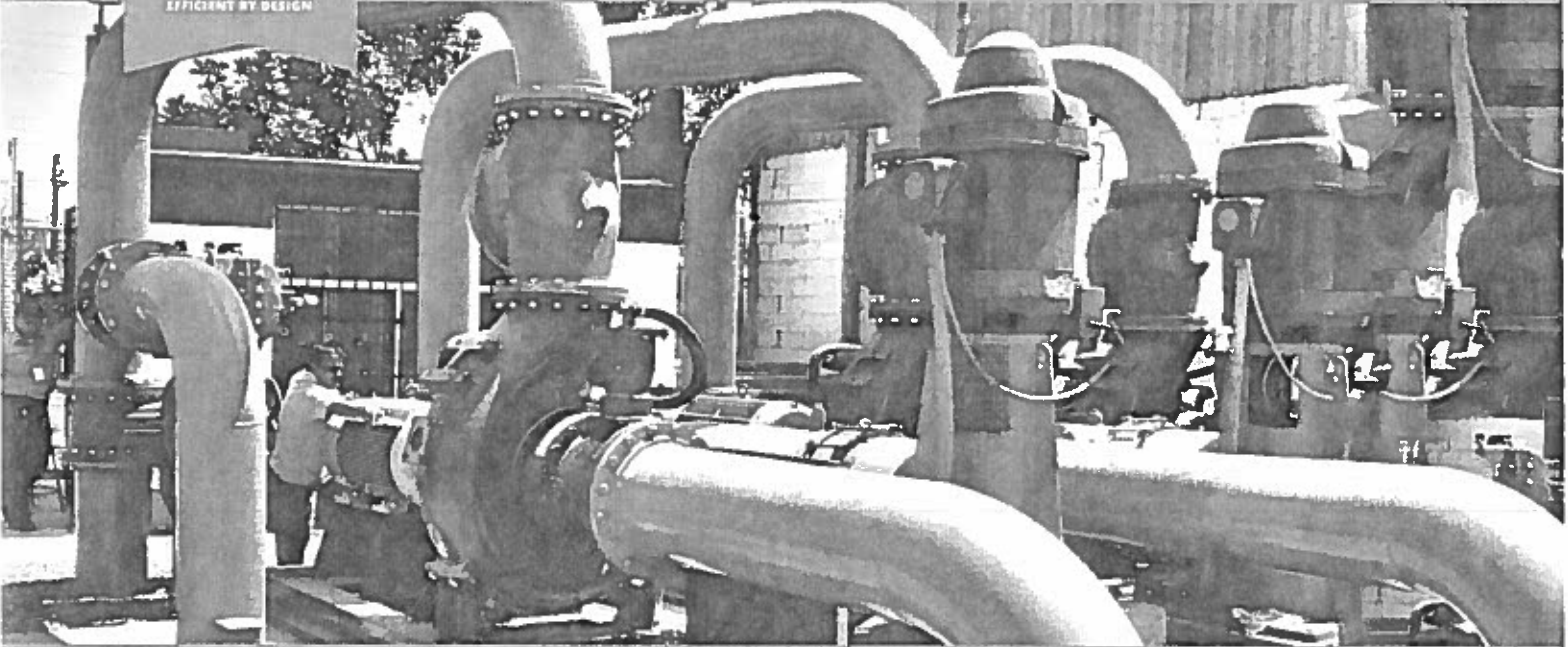
2✓ Sets – Gaskets, o-rings

GENERAL INFORMATION

CORNELL PUMP COMPANY

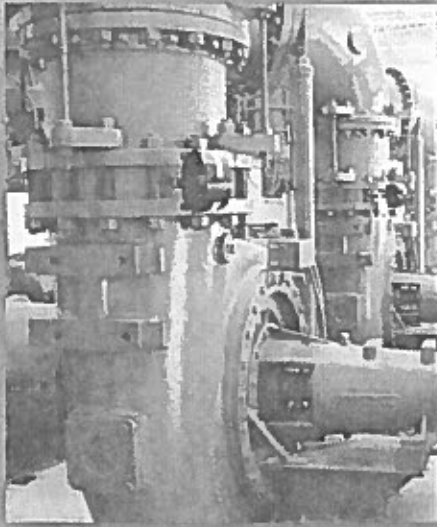


MUNICIPALITIES



EFFICIENT BY DESIGN



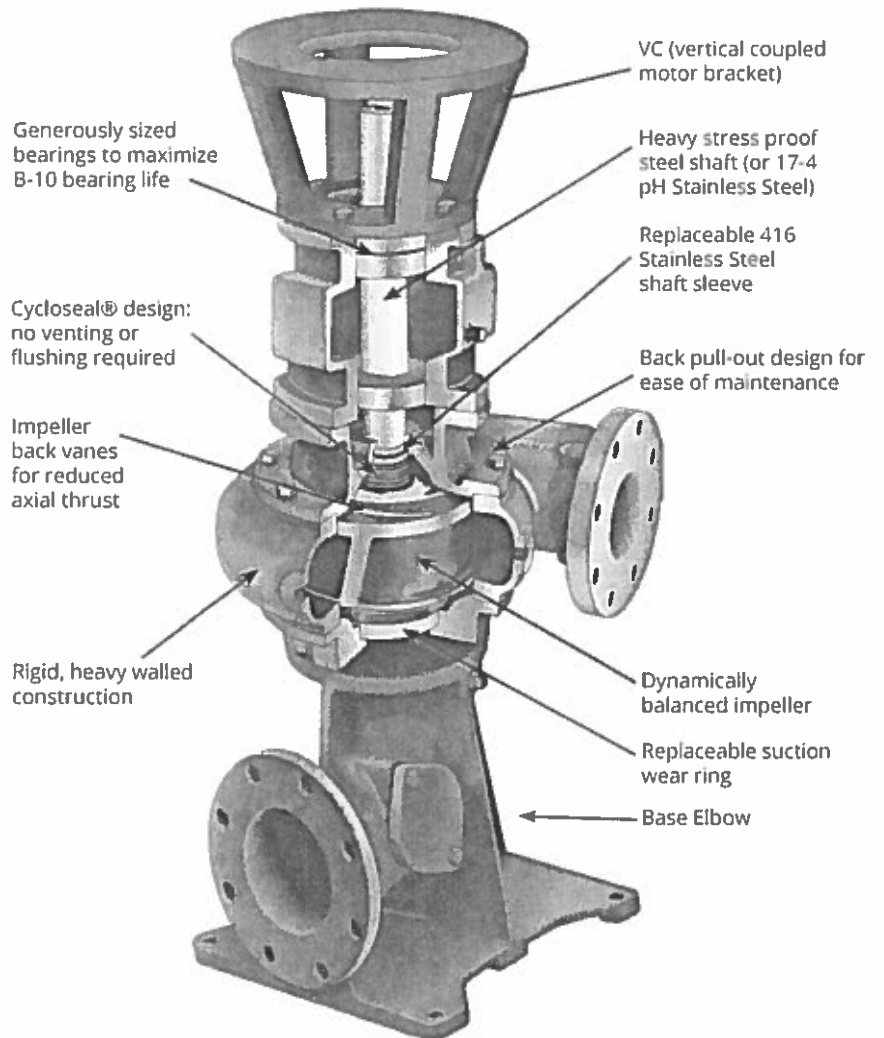
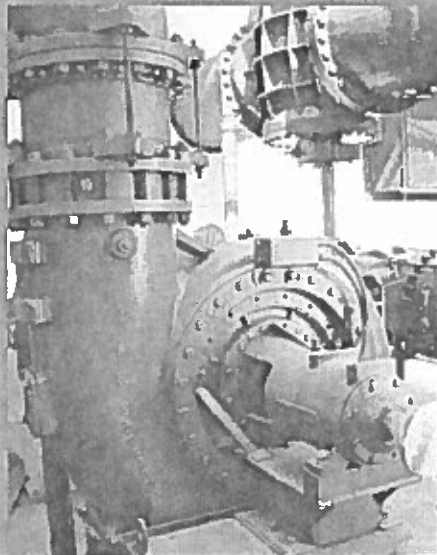


SOLIDS HANDLING

SOLIDS HANDLING

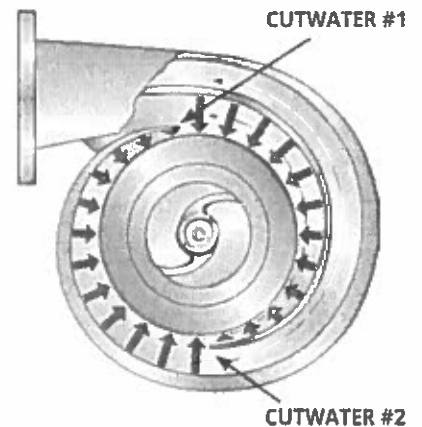
Cornell Solids Handling pumps are used for waste water, sludge, sewer systems, stringy material, de-watering, abrasive transfer, canneries, construction, dredging, lumber mills, slush ice, reclamation plants and foundry or mill slag.

Available with Delta™, Semi-open, Enclosed, and Chopper impellers, Cornell pumps are offered in various discharge sizes ranging from 3 to 30 inches, with heads to 470 feet TDH, and flow rates of up to 38,000 GPM.



DOUBLE VOLUTE DESIGN

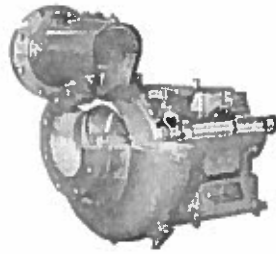
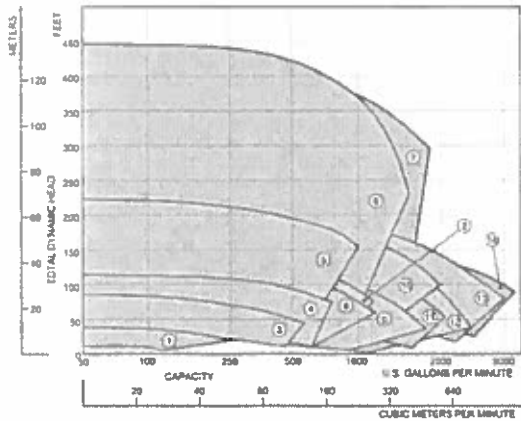
The double volute system enables Cornell single-stage, end-suction centrifugal pumps to easily perform big volume and high pressure jobs. On single volute pumps, the increasing pressure acts against the impeller area and creates unbalanced radial forces. By contrast, the double volute system effectively balances these forces around the impeller to reduce shaft flexure and fatigue for longer seal life, bearing life and shaft life.



"VARIOUS DISCHARGE SIZES RANGING FROM 3 TO 30 INCHES, WITH HEADS TO 470 FEET TDH, AND FLOW RATES OF UP TO 38,000 GPM."

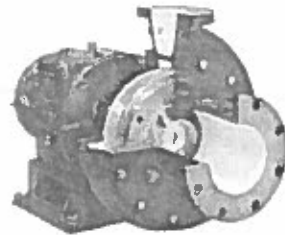
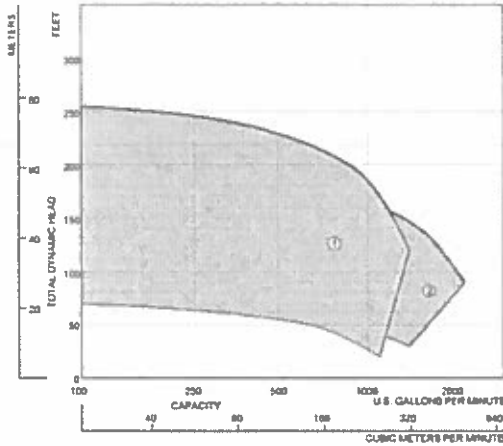
SOLIDS HANDLING

DELTA™ IMPELLER



- | | |
|----------|------------|
| 1. 3NLA | 7. 6NHM |
| 2. 4NLDL | 8. 6NNDH |
| 3. 4NNDH | 9. 8NNDH |
| 4. 4NHHD | 10. 10NNDH |
| 5. 4NHM | |
| 6. 6NHHD | |

CHOPPER IMPELLER



- | | |
|--------|--------|
| 1. 4NC | 2. 6NC |
|--------|--------|

DELTA™ STYLE PUMPS

The trailing edges of Cornell's Delta™ impeller vanes extend continuously across the pump's suction entrance to reduce low pressure areas. Two distinct vortices are created which pass solids through the impeller. The absence of sharp impeller edges prevents hang-up of stringy materials. Many of our enclosed impeller type pumps can be retrofitted with Delta™ style impellers. Delta™ pumps are available in 3 x 3", 4 x 4", 6 x 6", 8 x 8" and 10" x 10" sizes. Capacities range from 50 to 5,000 GPM and heads range from 10 to 450 feet.

CHOPPER PUMPS

Cornell Chopper pumps, constructed of ductile iron with replaceable cutter bars of heat treated T1 tool steel are ideally suited for chopping solids. Back to back angular contact ball thrust bearings and single ball radial bearings make for smooth operation. TDH ranges from 30-200 feet with flows to 1,500 GPM.

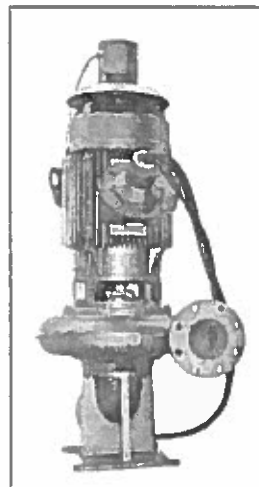
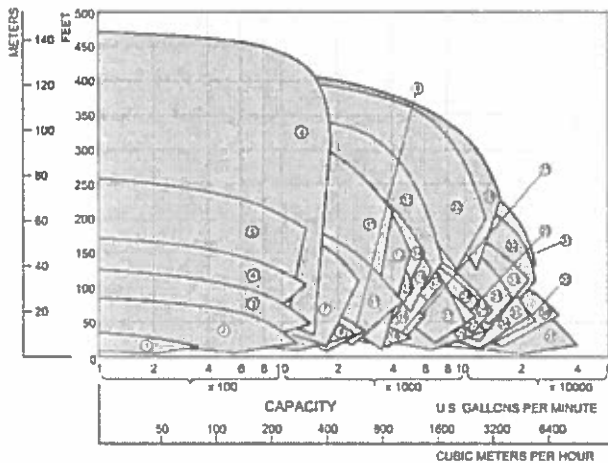
IMMERSIBLES

The basic design of the immersible pump/motor is a premium efficient, inverter duty, P-Base or C-Face; totally enclosed, blower cooled motor. The design prevents water infiltration along the shaft into the motor by utilizing a triple redundant sealing system, including a patented Hydroseal design. The immersible motor can withstand up to 30 feet of submergence depth for a 2 week period.



SCAN THIS QR CODE FOR MORE INFO ON SOLIDS HANDLING

ENCLOSED IMPELLER PUMP CURVES



- | | | | |
|-------------|--------------|-------------|--------------|
| 1. 3NLT | 11. 8NNT | 21. 12NNF | 31. 18NHFL |
| 2. 4NNTL | 12. 8NHHTA | 22. 12NHG28 | 32. 18NHFL34 |
| 3. 4NNT | 13. 8NHHTH | 23. 14NHG | 33. 18NHG34 |
| 4. 4NHHTA | 14. 8NHHTR | 24. 14NHGA | 34. 20NHFL |
| 5. 4414T | 15. 8NHGA | 25. 14NHGH | 35. 20NHFL |
| 6. 4NHHTB | 16. 10NHHTB | 26. 14NHG28 | 36. 24NNG |
| 7. 6NHHTA | 17. 10NHHTBH | 27. 16NHGH | 37. 30NNT |
| 8. 6NNT | 18. 10NHHTA | 28. 16NHG22 | |
| 9. 6NHHT/TH | 19. 12NHHTL | 29. 16NHG32 | |
| 10. 6NHHTB | 20. 12NHHTM | 30. 18NHG | |



CYCLOSEAL® SEALING SYSTEM

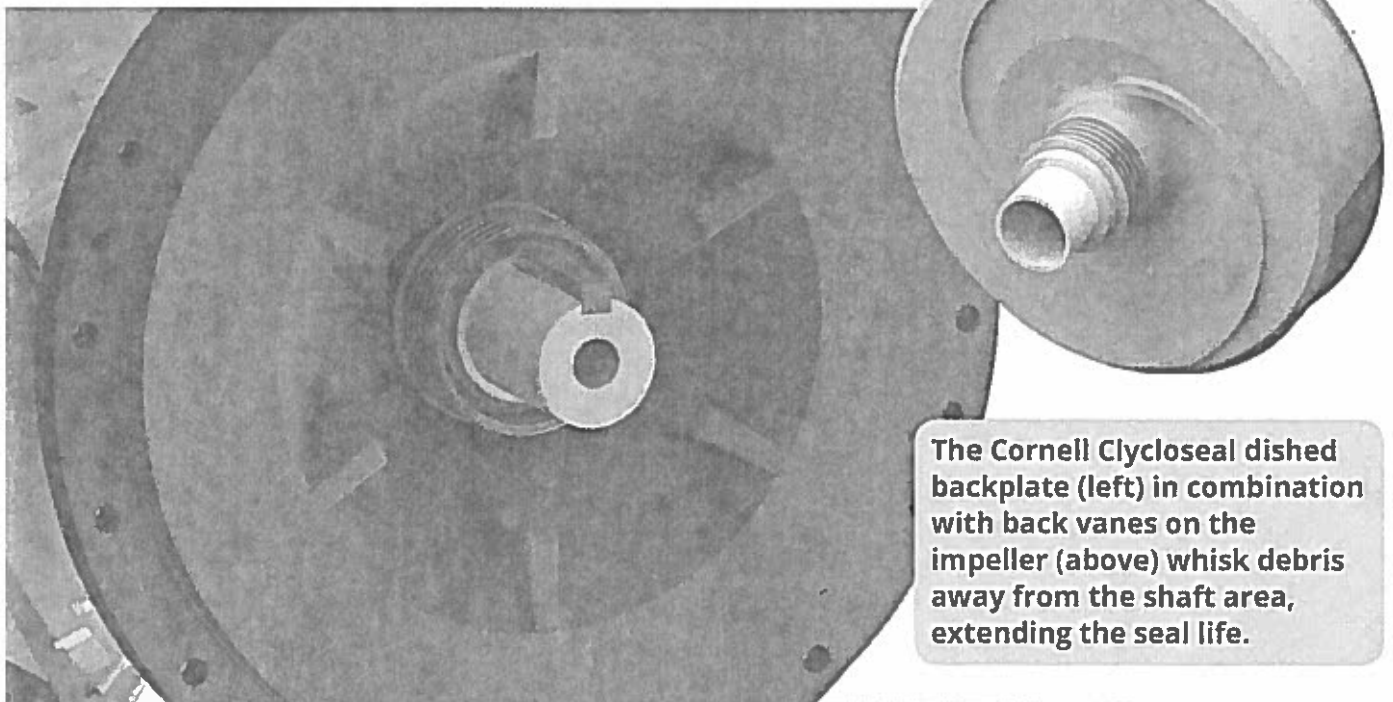
SEAL COMPARISON

Four main types of seals used in centrifugal pumps are compared using relative cost, durability, and leakage.

Seal Type	Packing	Double Mechanical Seal	Cartridge Seals (split seals)	CYCLOSEAL® SYSTEM
Cost	Low cost	Medium cost	High cost	Low cost
Leak Propensity	Copious leaks	Negligible leaks	Small leaks	No/ Negligible leaks
Flush	Flush optional	Flush required	Flush required	No flush required
Durability	Not durable	Somewhat durable	Durable	3 X more durable than double mechanical seal alone

YOU WILL EXPERIENCE THESE BENEFITS EMPLOYING THE CORNELL'S CYCLOSEAL® PATENTED LONG LASTING, LEAK-FREE SEALING SYSTEM:

- ✓ No Flush Water or Packing
- ✓ No Gauging or Instrumentation
- ✓ Extended Seal Life
- ✓ Run-Dry Option
- ✓ System Savings
- ✓ Better for Caustic and Abrasive Applications
- ✓ Greater Reliability
- ✓ Maintenance Savings



The Cornell Cycloseal dished backplate (left) in combination with back vanes on the impeller (above) whisk debris away from the shaft area, extending the seal life.

CYCLOSEAL® SEALING SYSTEM



HOW CYCLOSEAL® WORKS

Cycloseal isn't just a seal, but rather a sealing system. Designed by Cornell engineers in the 1990's, and refined over the years, the elegance of the system is that utilizes a traditional Type I or II Mechanical Seal in such a way that the Cycloseal system provides much longer life than the seal would normally experience.

Through a pressure gradient, Cycloseal system pulls grit and material away from the seal face, leaving it in essentially a clear water environment.

Cycloseal creates this clear water environment with these modifications to standard sealing systems:

Dished Backplate

While most pump manufacturers try to have as small a cavity around the seal as possible, believing the smaller the space the less grit and material can attack the seal, in Cycloseal the area behind the seal is comparatively voluminous. This gives the dirty water enough area to spin/ cyclone debris away from the seal.

Backplate Deflector Vanes

Designed at particular pitches, these back vanes help create the cyclonic action.

Quality Mechanical Seal

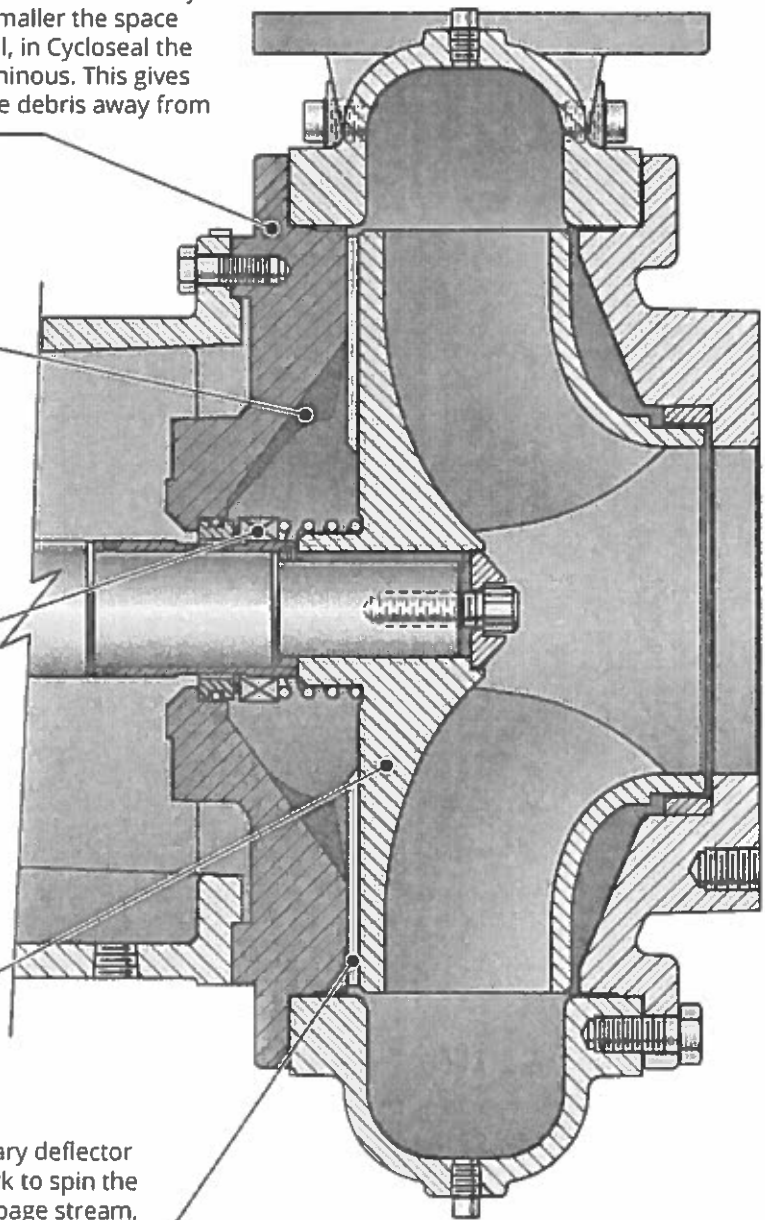
The seal is replaceable with a quality type I or II mechanical seal. Designed with drive bands and drive notches that eliminate overstressing on the bearings, slippage is eliminated, protecting the shaft and sleeve from wear and scoring.

Specifically-Calibrated Impeller

Balanced to precise tolerances, Cornell impellers provide the kinetic energy needed to whisk away the particulates from the seal face.

Impeller Back Vanes

In conjunction with the stationary deflector vanes, these moving vanes work to spin the particulates back into the pumpage stream, and away from seal face.



EFFICIENT BY DESIGN

Cornell's Run-Dry Seal

Cornell Pump Company's solution to protecting mechanical seals from damage caused by operating without pumping fluid present – running dry.

Description

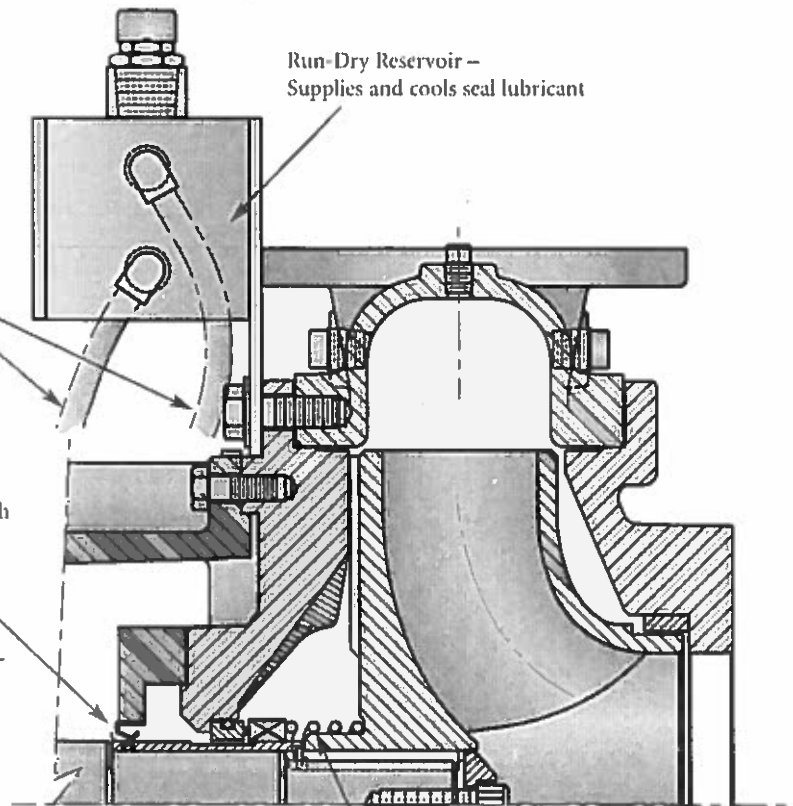
The Cornell Run-Dry system is a unique state of the art solution for providing continual lubrication to mechanical seals. Run-Dry provides a gland on the back side of the mechanical seal through which lubricant can circulate providing lubrication and cooling to the delicate hardened seal faces of the mechanical seal. The result is exceptional seal life regardless of operating conditions from full flow to no flow – Run-Dry.

Applications

Any application where there is a probability, either planned or unplanned, that the pump could be operated in a dry condition. Dry operation could be the result of priming activities, the deliberate operation of the pump in a dry condition, or the accidental loss of prime while pumping.

Lines to and from Gland and Reservoir Entrance and Exit Ports on Gland are tangential so as to take advantage of the pumping action of the shaft

Renewable Lip Seal Sleeve provides ideal surface finish for Lip Seal



Run-Dry Reservoir – Supplies and cools seal lubricant

Seal is Elastomeric or Metal Bellows type, depending on pumpage temperature

Operation

Lubricant leaves the lower portion of the reservoir through a flexible hose and enters the bottom of the Run-Dry gland. The gland is housed within the pump backplate sealed on the drive end by a lip seal operating on a chromed portion of the stainless steel shaft sleeve. The pump end of the gland is sealed by the mechanical seal. Through this relationship with the mechanical seal, lubrication is provided to the seal and seal protection is achieved. The Cornell Run-Dry gland has two ports entering into it. The rotating shaft provides pumping action for continuous flow of the lubricant from the reservoir to the gland and back through the lower and upper ports. With this circulation of lubricant, heat is transferred from the mechanical back to the reservoir. The reservoir provides the opportunity for the lubricant to cool and the capacity to insure that lubricant is always available for the Run-Dry gland.



ISO9001:2000 CERTIFIED

Cornell Pump Company

Portland, Oregon

Phone: (503) 653-0330

Fax: (503) 653-0338

e-mail: info@cornellpump.com

web page: www.cornellpump.com

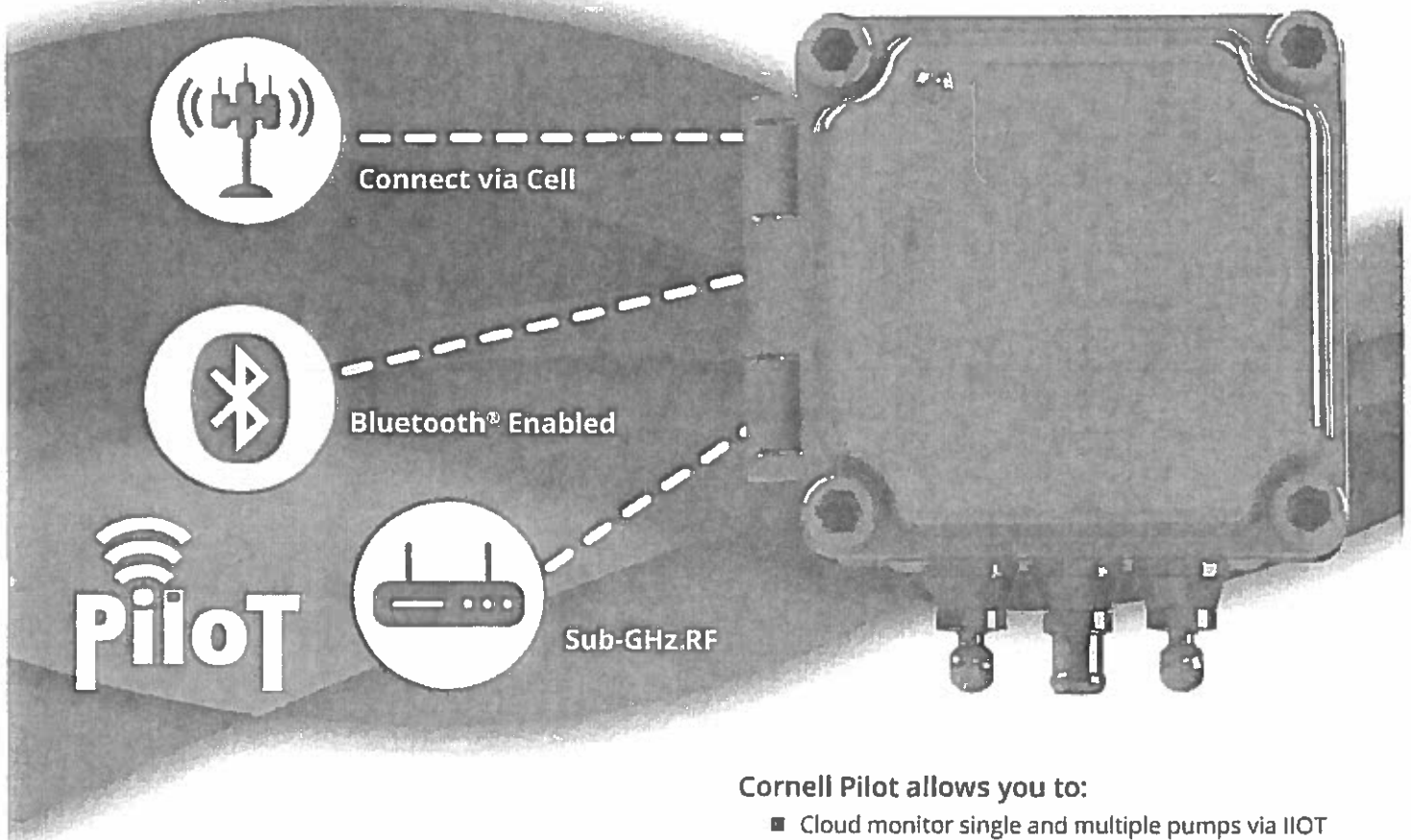


CORNELL PUMP COMPANY

CORNELL Pilot

INDUSTRIAL INTERNET OF THINGS PUMP MONITOR

Cornell Pilot connects to your pump to monitor temperature, vibration remote, and location via battery! Installed on all new frame mount Cornell Pumps in 2019; other models to follow closely.



Use the **Pilot** to:

- Plan maintenance
- Check operation
- Reduce manual inspections
- Track pump location
- Demonstrate run conditions to customers on warranty claims
- Improve run time through maintenance program

Cornell Pilot allows you to:

- Cloud monitor single and multiple pumps via IIOT
- With battery power, monitor temperature, vibration and GPS location
- Through onboard power, additionally monitor flow, start/stop operations and more
- Track data over time via web-based and mobile apps
- Real time pump data for maintenance, wear estimation, and critical conditions
- Receive alerts for preset running conditions

ANOTHER INNOVATION FROM CORNELL PUMP



CORNELL PUMP COMPANY

IMMERSIBLE



THE IMMERSIBLE MOTOR CONCEPT:

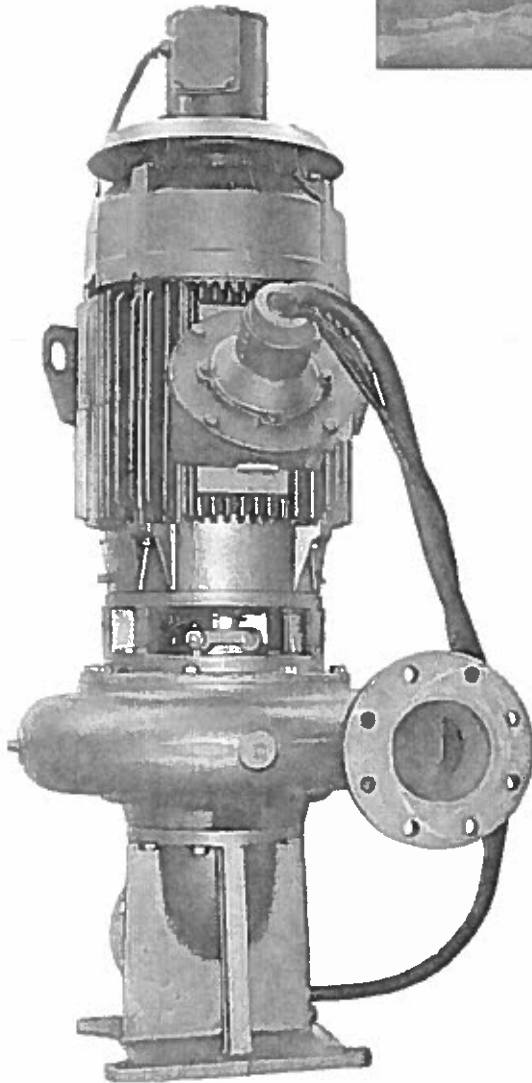
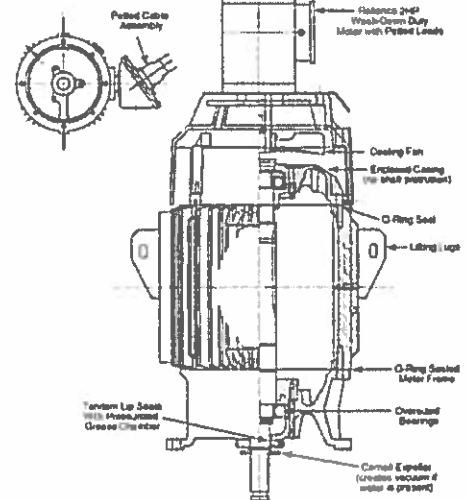
Immersible motors are designed to be used in dry-pit applications where there is a possibility of flooding. Why take a submersible motor that was designed to run submerged 100% of the time and modify it to run in air 99% (or most of the time) and submerged 1% of the time (in case of a flood)? This seems backwards. The correct approach is to take a TEFC motor that is designed to run in air 100% of the time and adapt it to run submerged 1% of the time (in case of a flood).

IMMERSIBLE MOTOR BASIC DESIGN:

The basic design of the immersible pump/motor incorporates a premium efficient, inverter duty, P-Base or C-Face TEFC motor (totally enclosed, blower cooled). The motor, as the name implies, is totally enclosed and cooled by a blower on top of the motor. If the motor becomes submerged, the blower motor fan shuts down without affecting the main motor. While the motor is temporarily submerged, the media cools the motor just like a true submersible. A special conduit box is used to prevent water leakage into the motor. The motor is designed to prevent infiltration of water along the shaft and into the motor by utilizing a triple redundant sealing system, including a patented hydroseal design. The motor-end bell housing incorporates the 'inverted cup' principle, which traps an air bubble under the motor as water rises, thus keeping water away from the shaft seal. The shaft is fitted with a hydroseal, which expells water and further reduces the chance of water reaching the shaft seals.

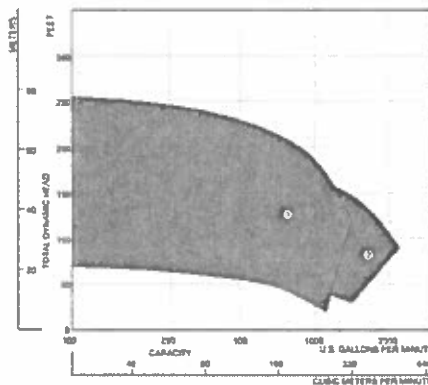
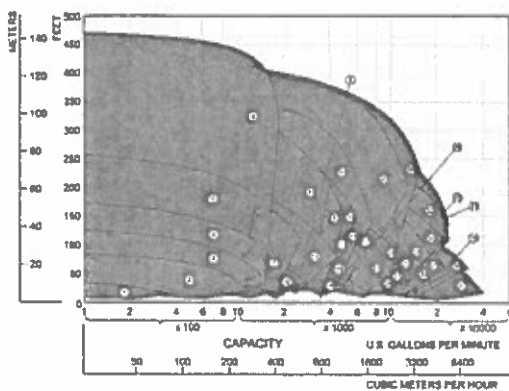
The Immersible motor can withstand up to **30 feet of submergence depth for a two-week period**. This exceeds the requirements of Immersible motors that is described in the industry standard "Index of

Protection" IP67. Competitive designs only allow immersion of the motor for a period of time not exceeding 30 minutes at a submergence level of 3'. Hardly enough time to deal with any kind of flooding emergency!

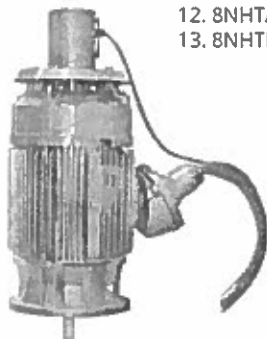
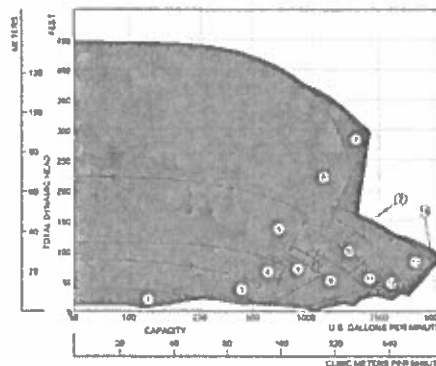


FEATURES AND BENEFITS OF THE IMMERSIBLE MOTOR

- **Ease of maintenance:** With the immersible motor, you can remove the motor and send it to the service shop. Meanwhile, replace it with any brand of motor that has a P-Base flange and you're up and running.
- **Service:** Any motor shop can service the motor while submersibles require a certified submersible motor shop.
- **Lower initial cost:** Immersible motor installations do not require level controls and monitors, clean water, recirculating pump and/or the piping required with other types of dry-pit submersibles.
- **Lower operating cost:** Motor efficiencies are inherently higher in T.E.B.C. motors compared to traditional dry-pit submersible motors.
- **No cooling jackets:** There are no jackets that might clog and need periodic maintenance and inspection.
- **Seal options:** All standard pump sealing options are available.
- **Bearing life:** The pump's bearing frame absorbs the hydraulic loading which results in longer motor bearing life due to lower thrust.
- **Safety:** Use of Immersibles eliminates the health and safety risk concerns (such as the possible presence of pathogens like HIV, Hepatitis B. etc... in sewage fluid) present during routine inspection and maintenance procedures. In comparison, other types require either extensive steam cleaning of the motor's outer shell if it is a wet-pit submersible or of the inside of the jacket in dry-pit submersibles, which constitutes a high-risk health hazard due to the nature of the effluents or sewage conveyed.
- **Retrofit:** Easily retrofit all your existing frame mounted installations with immersible motors without the need to buy new pumps.
- **Unique blower design:** Cornell's Immersible motors do not have the shaft protruding through the top of the motor. The shaft penetrates the bottom only and is sealed using a triple redundant sealing system.
- **A new way of thinking:** Immersible motors are designed to run submerged for a limited period of time. Therefore, even in a flood situation, the pump station will operate as usual.
- **Unique design:** Immersible designs by other manufacturers have a float switch which will shut those motors down until the flood water has been removed.



- | | | |
|------------|-------------|-------------|
| 1. 3NLT | 14. 8NHTR | 27. 16NHG |
| 2. 4NNTL | 15. 8NHGA | 28. 16NHG22 |
| 3. 4NNT | 16. 10NHTB | 29. 16NHG32 |
| 4. 4NHTA | 17. 10NHTBH | 30. 18NHG |
| 5. 4414T | 18. 10NHTA | 31. 18NHFL |
| 6. 4NHTB | 19. 12NHTL | 32. 18NHG34 |
| 7. 6NHTA | 20. 12NHTM | 33. 18NHG34 |
| 8. 6NNT | 21. 12NNF | 34. 20NHFL |
| 9. 6NHT/TH | 22. 12NHG28 | 35. 20NHFL |
| 10. 6NHTB | 23. 14NHG | 36. 24NNG |
| 11. 8NNT | 24. 14NHGA | 37. 30NNT |
| 12. 8NHTA | 25. 14NHGH | |
| 13. 8NHTH | 26. 14NHG28 | |



- | | | |
|----------|----------|------------|
| 1. 3NLA | 5. 4NHM | 9. 8NNDH |
| 2. 4NLDL | 6. 6NHDH | 10. 10NNDH |
| 3. 4NNDH | 7. 6NHM | |
| 4. 4NHHD | 8. 6NNDH | |

PERFORMANCE CURVES

Company: MID ATLANTIC Pump & EQ DENNIS ZEPP
 Name: 32ND ST CAPE MAY
 Date: 10/12/2020



Pump:

Size: 10NHTB
 Type: Encl Solids Handling
 Synch speed: 1200 rpm
 Curve: 10NHTB12
 Specific Speeds:
 Dimensions:

Speed: 1185 rpm
 Dia: 17.125 in
 Impeller:
 Ns: 2300
 Nss: —
 Suction: 12 in
 Discharge: 10 in

Pump Limits:

Temperature: 250 °F
 Pressure: 125 psi g
 Sphere size: 4.75 in

Power: ---
 Eye area: ---

Search Criteria:

Flow: 4600 US gpm ✓ Head: 75.5 ft
 Preferred Operating Region: 70% - 120% BEP
 Secondary Operating Point: 6000 US gpm, 48 ft ✓

Fluid:

Water
 Density: 62.32 lb/ft³
 Viscosity: 0.9946 cP
 NPSHa: —

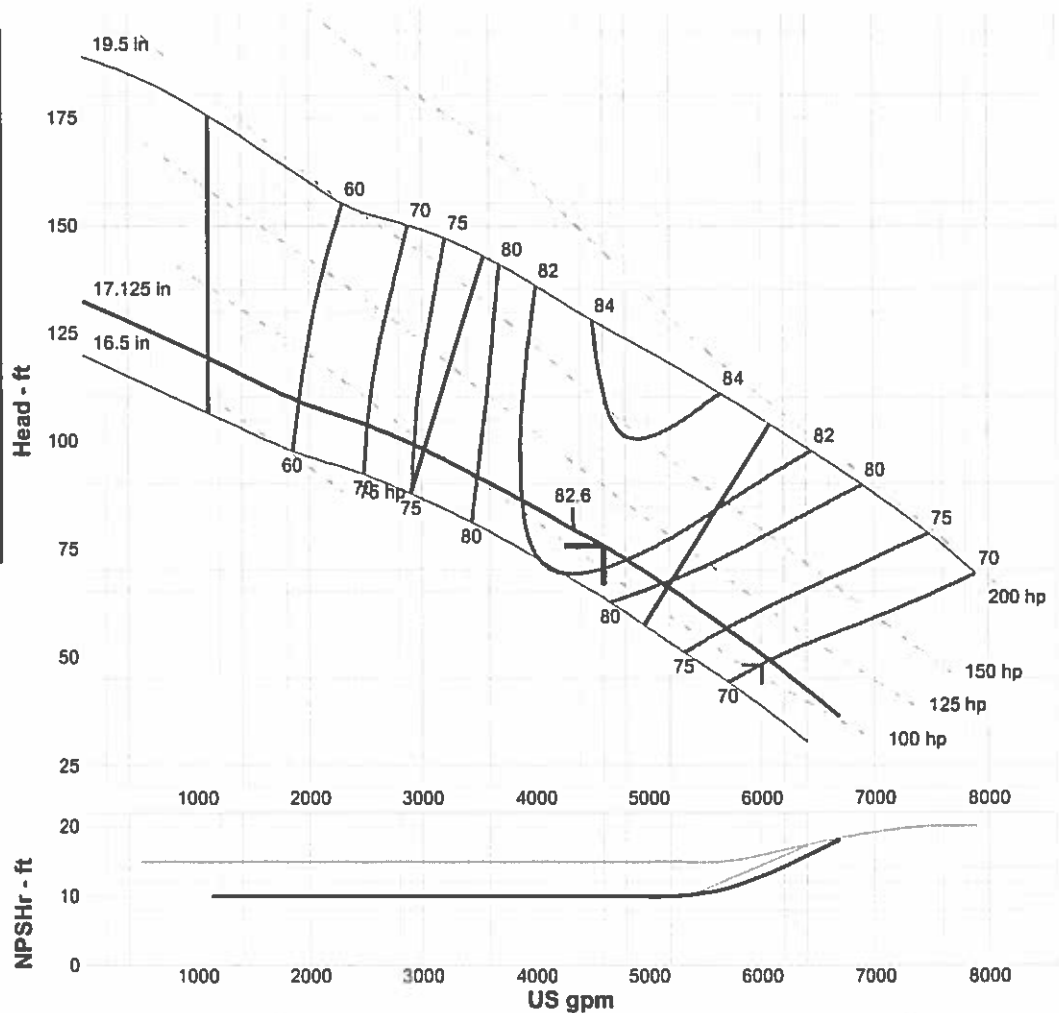
Temperature: 68 °F
 Vapor pressure: 0.3391 psi a
 Atm pressure: 14.7 psi a

Motor:

Standard: NEMA
 Enclosure: TEFC
 Sizing criteria: Max Power on Design Curve

Size: 125 hp ✓
 Speed: 1200 ✓
 Frame: 445T

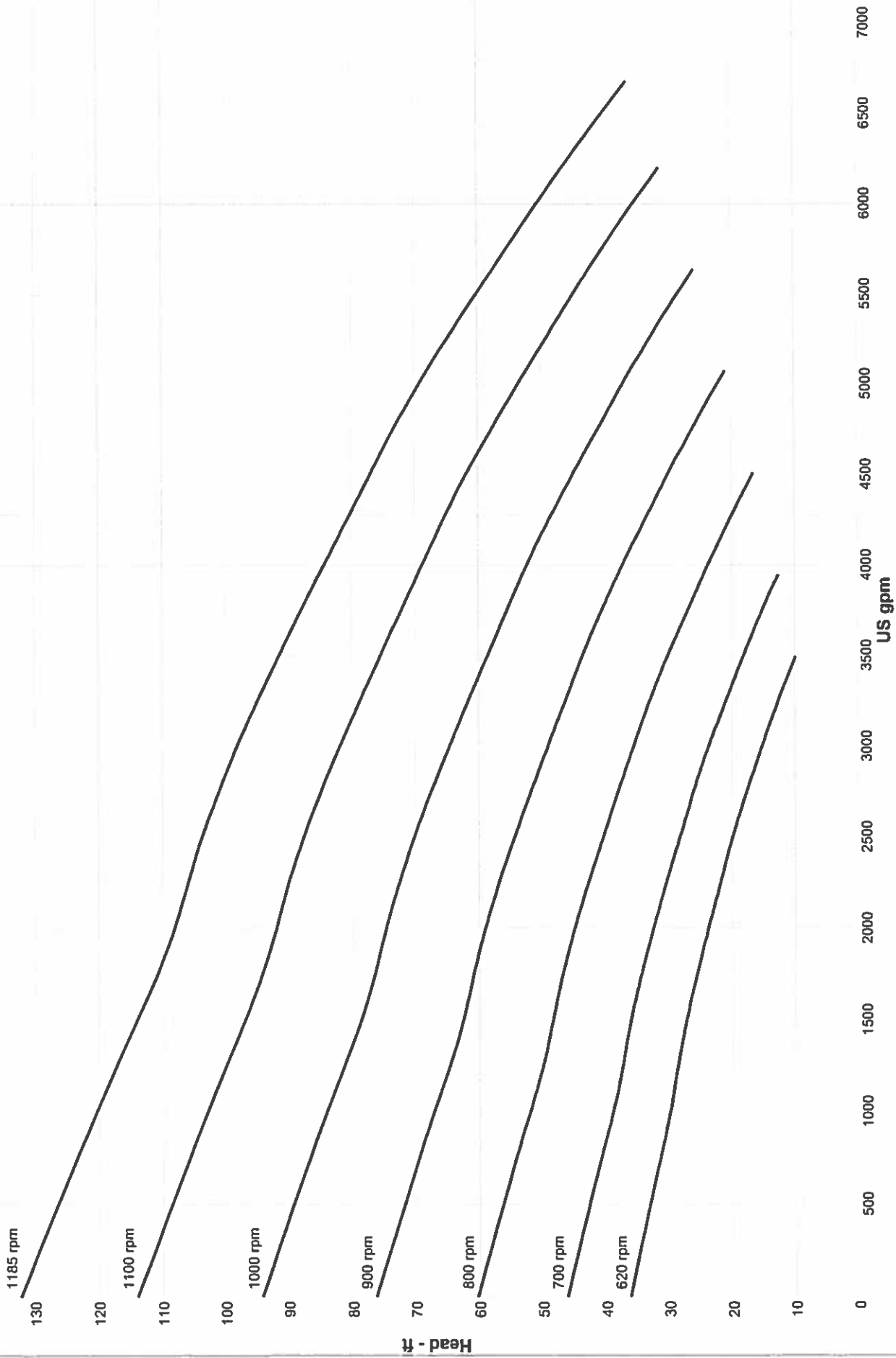
--- Data Point ---	
Flow:	4600 US gpm
Head:	75.5 ft
Eff:	82%
Power:	106 hp
NPSHr:	10 ft
--- Design Curve ---	
Shutoff head:	132 ft
Shutoff dP:	57.3 psi
Min flow:	1100 US gpm
BEP:	83% @ 4335 US gpm
NOL power:	108 hp @ 5126 US gpm
--- Max Curve ---	
Max power:	197 hp @ 7468 US gpm



Min flow line represents the absolute lowest flow pump can operate. Consult with factory if operating below 50% of BEP flow

Performance Evaluation:

Flow US gpm	Speed rpm	Head ft	Efficiency %	Power hp	NPSHr ft
5520	1185	59.7	76	108	10.8
4600	1185	75.5	82	106	10
3680	1185	88.9	81	102	10
2760	1185	101	73	96	10
1840	1185	110	58	87	10



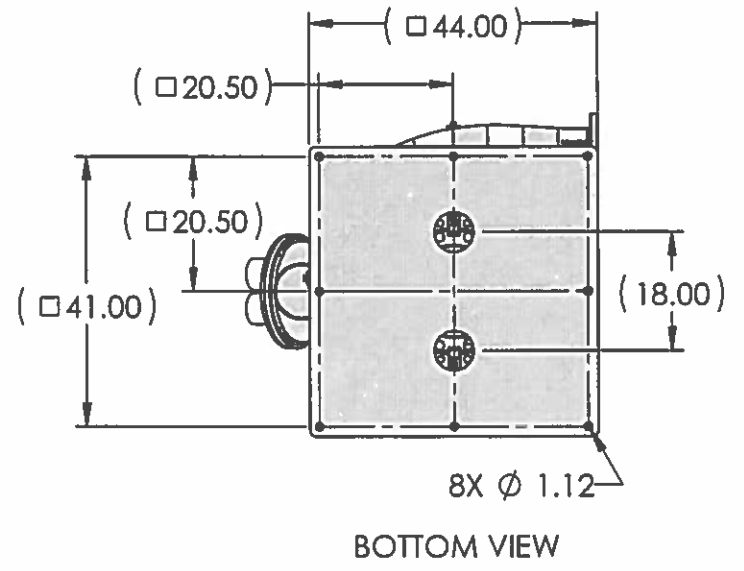
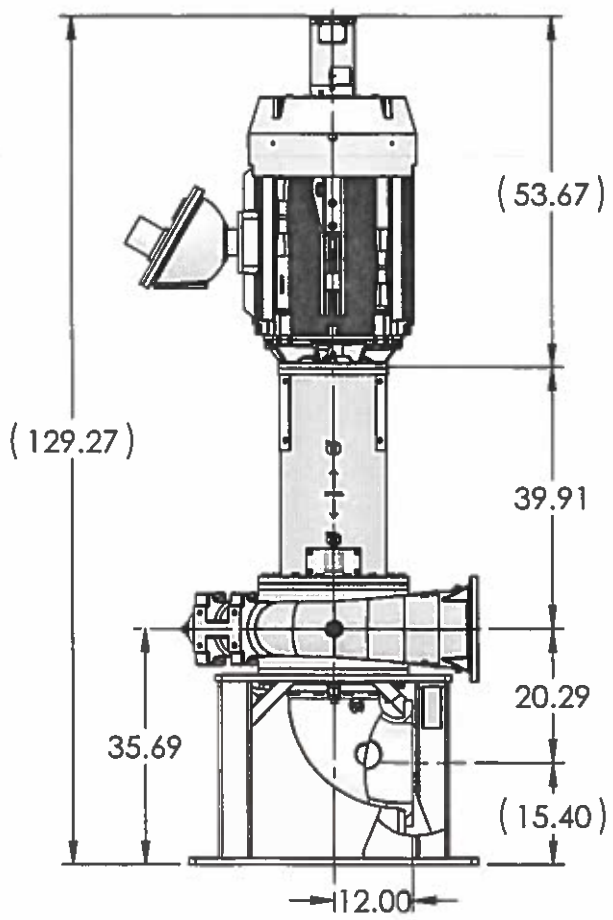
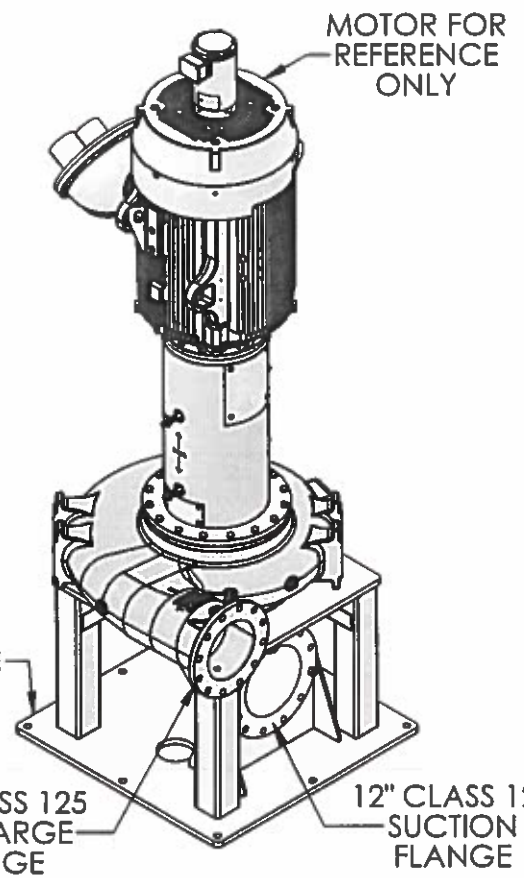
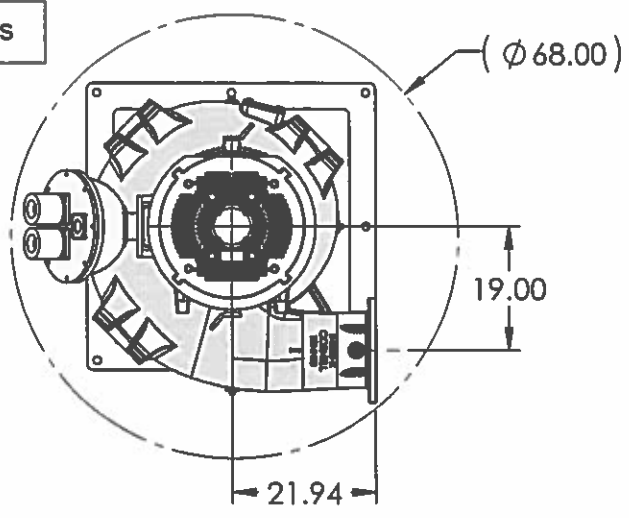
Size: 10NHTB
 Speed: 620 - 1185 rpm
 Dia: 17.125 in
 Curve: 10NHTB12

Cornell
 Catalog: Cornell.60, Vers 3.12.3
 End Solids Handling - 1200

Company: CMC/MUA
 Name: 32nd Street PS
 11/17/2020

**PUMPING UNITS /
MOTORS
DIMENSIONS**

2 Units

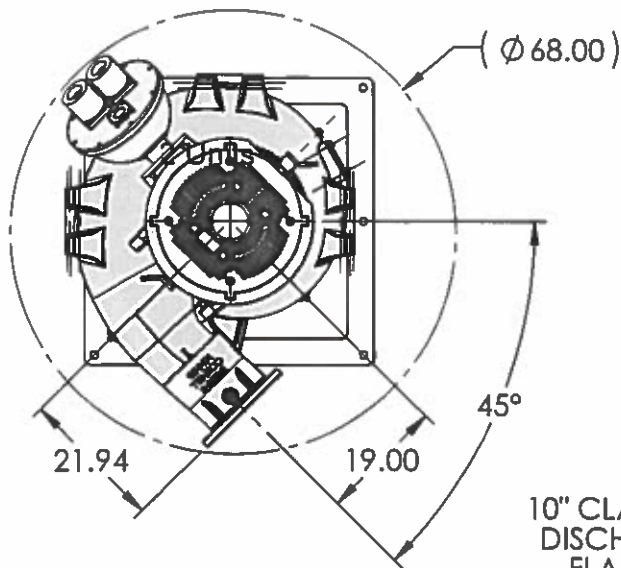


NOTES:
 1. OVERALL DIMENSIONS CAN VARY ±.12 INCH
 2. DO NOT USE FOR CONSTRUCTION UNLESS CERTIFIED
 3. REF: TB14336-PHCS

- 2 units

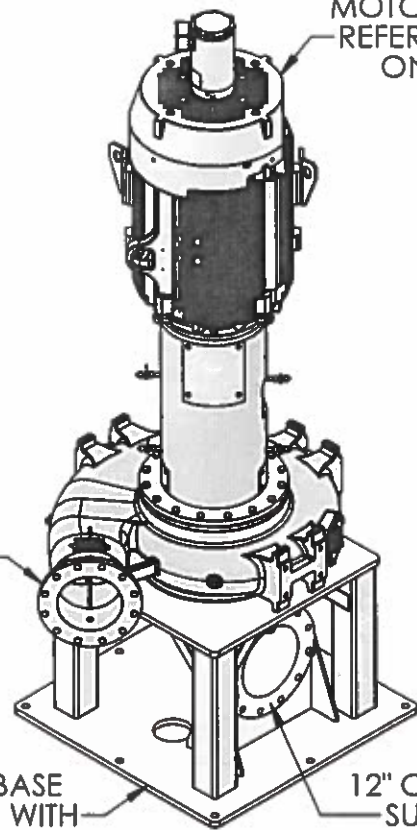
	CUSTOMER: _____	REV. NO	DESCRIPTION		DATE	BY					
	P.O. NO.: _____		10NHTB-VC18DB CYC IMM 12X12		APPROX. WEIGHT (LB)	5690					
	S.O. NO.: _____		TEBC 445HP L180°		JOB NO.						
	PROJECT NAME: _____		DR	AC	CHECKED	CD	DATE	11/11/2020	SCALE	TO SCALE	DWG. NO.
MOTOR MANUF.: RELIANCE HP: 125										F40278	00
FRAME SIZE: 445HP RPM: 1200 MOTOR										SHEET 1 OF 1	
ENCLOSURE: _____										CORNELL PUMP COMPANY PORTLAND, OR	

1 Unit



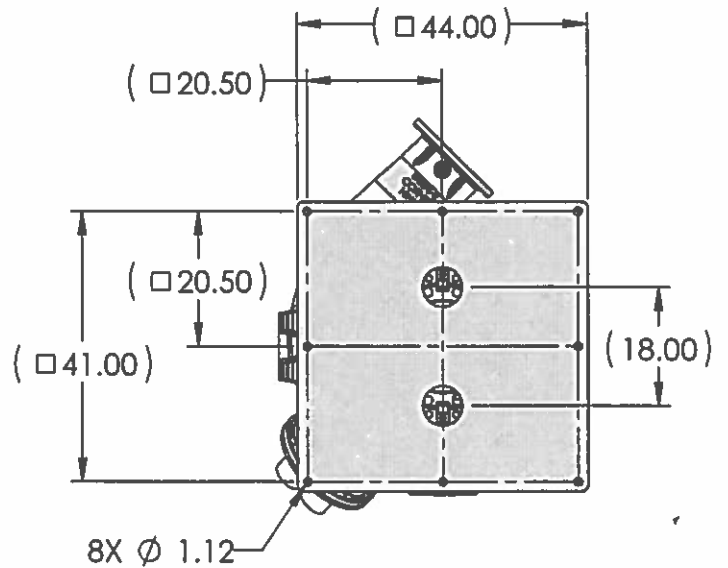
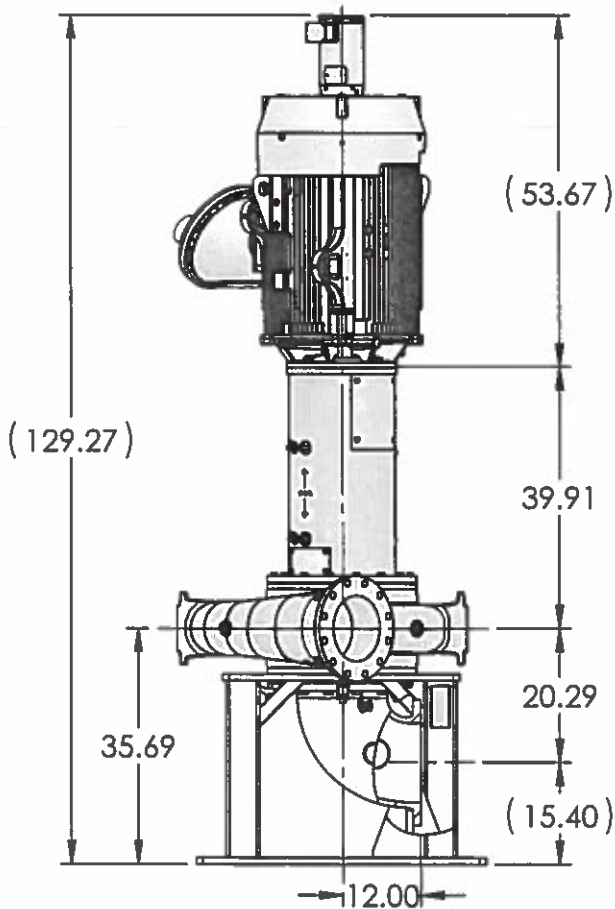
MOTOR FOR REFERENCE ONLY

10" CLASS 125 DISCHARGE FLANGE



12X12 BASE ELBOW WITH CLEANOUT

12" CLASS 125 SUCTION FLANGE



BOTTOM VIEW

1 unit

NOTES:

1. OVERALL DIMENSIONS CAN VARY ±.12 INCH
2. DO NOT USE FOR CONSTRUCTION UNLESS CERTIFIED
3. REF: TB14336-PHCS



CUSTOMER: _____
 P.O. NO.: _____
 S.O. NO.: _____
 PROJECT NAME: _____
 MOTOR MANUF.: RELIANCE HP: 125
 FRAME SIZE: 445HP RPM: 1200 MOTOR
 ENCLOSURE: _____ PUMP

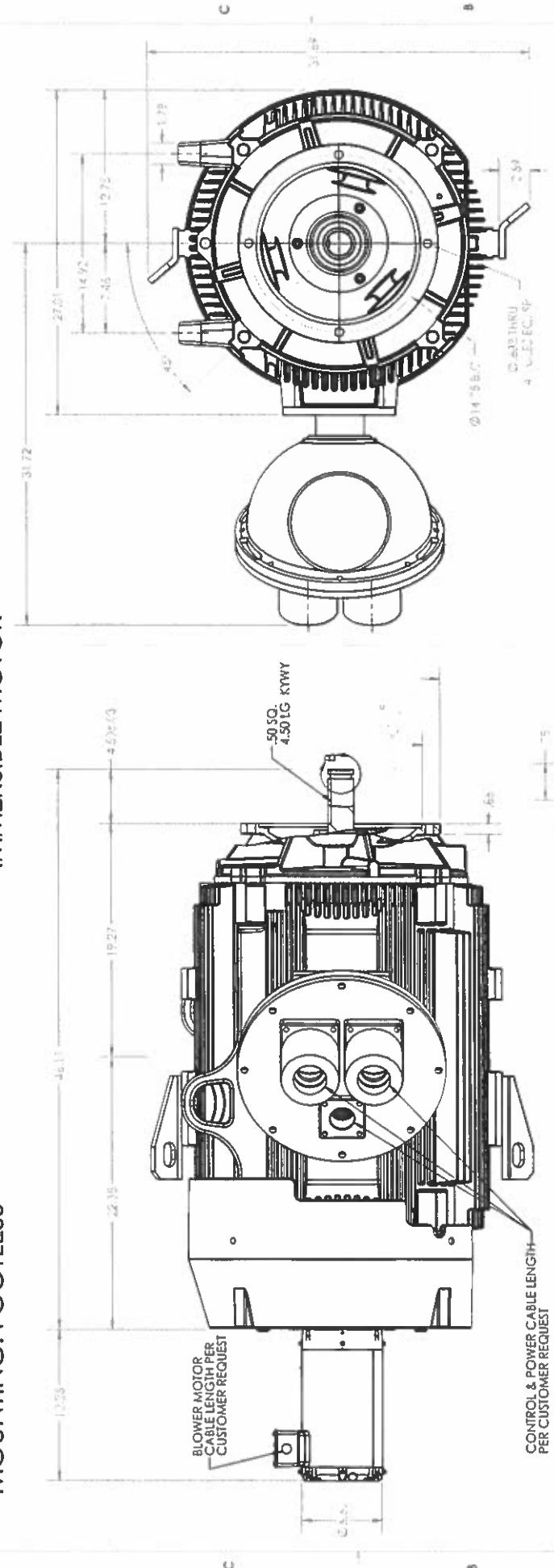
REV. NO	DESCRIPTION	DATE	BY
	10NHTB-VC18DB CYC IMM 12X12 TEBC 445HP L135°		
DR. AC	CHECKED CD	DATE 11/11/2020	SCALE TO SCALE
CORNELL PUMP COMPANY PORTLAND, OR			APPROX. WEIGHT (LB) 5690 JOB NO. DWG. NO. F40266 REV. 00
			SHEET 1 OF 1

DUTY MASTER ALTERNATING CURRENT MOTORS

ENCLOSURE: TOTALLY ENCLOSED
MOUNTING: FOOTLESS

FRAME: G445/447HP
IMMERSIBLE MOTOR

COOLING: BLOWER COOLED



3 units

NOTES:

1. MOTOR WEIGHT MAY VARY ± 15% DEPENDING ON RATING. THE WEIGHT OF THE CABLES ARE NOT INCLUDED IN MOTOR WEIGHT.

DETAIL B
SCALE 1 : 2

REV DESC CHANGED BLOWER MOTOR TO 3 HP
REV A VERSION 01
MODEL NO 617263-090
BY USIAHON

REVISED 03 5916 10/07/2016 TDR 000001000176
REF

CUSTOMER IS RESPONSIBLE FOR DETERMINING THAT BALDOR'S PRODUCT WILL PERFORM SUITABLY IN THE INTENDED APPLICATION


BALDOR

DIM SUIT. 445/447HP IN UNITS: I.E. TERC

617263-090

617263-090

MOTORS

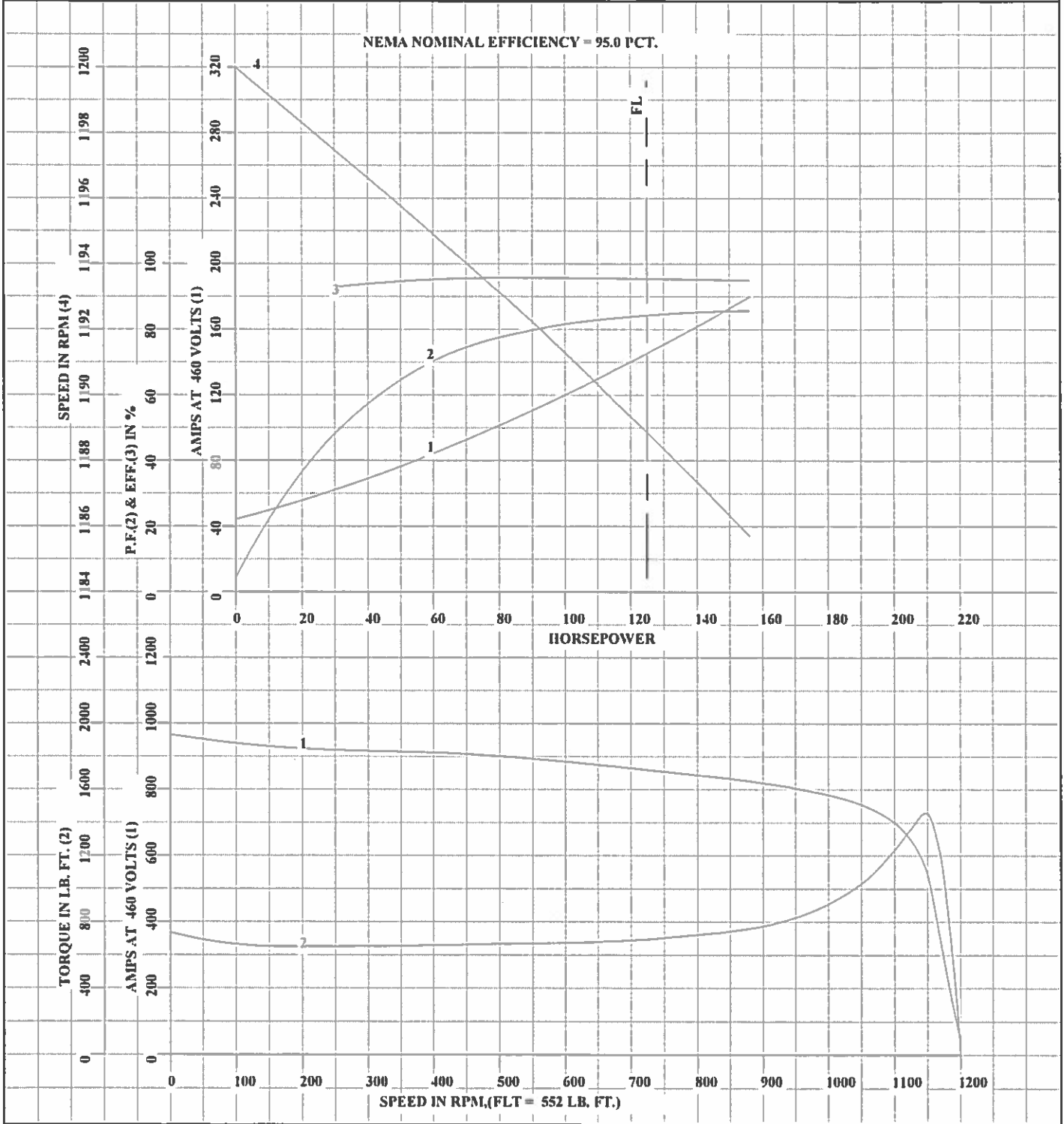
S/O	FRAME	IIP	TYPE	PHASE/ HERTZ	RPM	VOLTS
	445T	125	P	3/60	1190	460
AMPS	DUTY	AMB °C/ INSUL	S.F.	NEMA DESIGN	CODE LETTER	ENCLOSURE
146	CONT	40/F	1.15	B	F	TEBC
E/S	ROTOR	TEST S.O.	TEST DATE	STATOR RES. @25 °C OHMS (BETWEEN LINES)		
498802	418143098ME	—	—	.0377		
PERFORMANCE						
LOAD	HP	AMPERES	RPM	% POWER FACTOR	% EFFICIENCY	
NO LOAD	0	44.1	1200	4.33	0	
1/4	31.3	63.6	1197	49.5	93.0	
2/4	62.5	85.9	1195	71.5	95.3	
3/4	93.7	114	1192	80.5	95.6	
4/4	125	146	1189	84.3	95.4	
5/4	156	180	1186	85.7	94.9	
SPEED TORQUE						
		RPM	TORQUE % FULL LOAD	TORQUE LB.-FT.	AMPERES	
LOCKED ROTOR		0	133	735	965	
PULL UP		168	118	651	927	
BREAKDOWN		1148	264	1460	556	
FULL LOAD		1189	100	552	146	
AMPERES SHOWN FOR 460 VOLT CONNECTION. IF OTHER CONNECTIONS ARE AVAILABLE, THE AMPERES WILL VARY INVERSELY WITH THE RATED VOLTAGE.						
CALCULATED DATA NEMA NOMINAL EFFICIENCY = 95.0 PCT.						
		DRAWN BY: <u>Z.M. WOLFE</u> CHECKED BY: <u>T.S. WILLIAMS</u> APPROVED BY: <u>T.S. WILLIAMS</u> DATE: <u>6/5/18</u>		AC MOTOR PERFORMANCE DATA		W06845-B-E001 DATE ISSUED 6/5/18

REL S.O.
 FRAME 445T
 HP 125
 TYPE P
 PHASE / HERTZ 3/60

RPM 1190
 VOLTS 460
 AMPS 146
 DUTY CONT
 AMB °C / INSUL 40/F

S.F. 1.15
 NEMA DESIGN B
 CODE LETTER F
 ENCLOSURE TEBC
 E/S 498802

ROTOR 418143098ME
 TEST S.O. CALCULATED DATA
 TEST DATE --
 STATOR RES. @ 25°C .0377
 OIIMS (BETWEEN LINES)



AMPERES SHOWN FOR 460 VOLT CONNECTION, IF OTHER VOLTAGE CONNECTIONS ARE AVAILABLE, THE AMPERES WILL VARY INVERSELY WITH THE RATED VOLTAGE.



DRAWN BY: Z.M. WOLFE
 CHECKED BY: T.S. WILLIAMS
 APPROVED BY: T.S. WILLIAMS
 DATE: 6/5/18

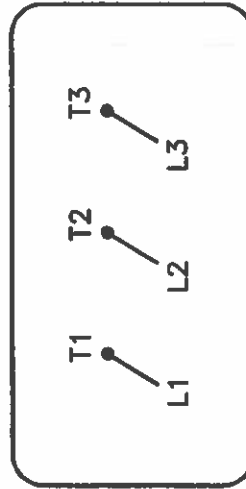
AC MOTOR
 PERFORMANCE
 DATA

W06845-B-E001

ISSUE DATE 6/5/18

MOTOR WIRING DIAGRAM

A-C MOTOR
CONNECTION DIAGRAM
STANDARD 3 LEAD CONNECTED



(N.P. 1575-BA)

REV. DESC: LOADED TO BUS, C/R 335225		TDR: 00000538207	
REV. LTR: -	VERSION: 00	REVISD: 11:54:06 04/30/2010	
FILE: \MGA\00000\682	BY: RAGRA	CONN DIAG - STANDARD 3 LEAD	
MTL: -		SH 1 of 1	

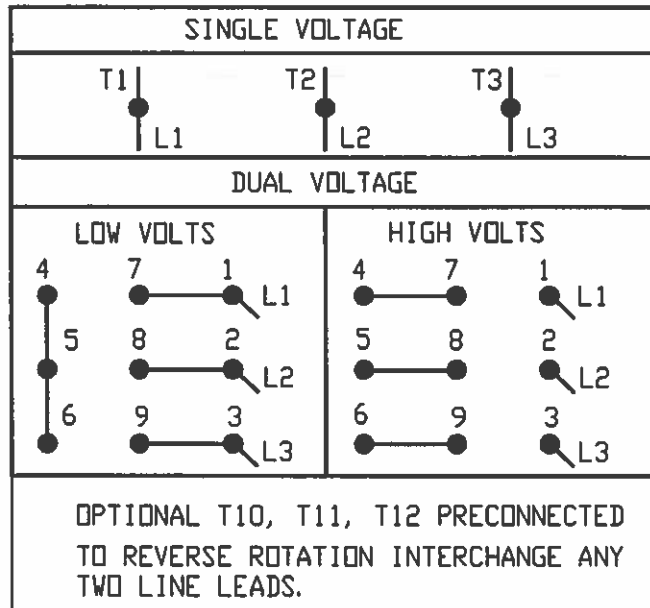
BAIRDOR

BLOWER MOTOR WIRING DIAGRAM

A-C MOTOR CONNECTION DIAGRAM

THREE PHASE

SINGLE AND DUAL VOLTAGE



(P. N. 23P5)
(23P63)

C/R 335225, 367821

CUSTOMER _____ CUSTOMER ORDER NO. _____ RELIANCE S. O. NO. _____



DR. BY E. JAMBOR
CK. BY D. FENNER
APP. BY H. SAJANI
DATE 3-18-91

CONNECTION DIAGRAM 416820-133

ISSUE DATE MARCH 18, 1991

COUPLINGS



Falk Wrapflex Elastomeric Couplings (Inch)



FALK®

Falk Wrapflex Elastomeric Couplings

A Simple Way to Increase Productivity

- 9 sizes
- Torque range: 133,000 lb-in (15,028 Nm)
- Bore capacity: 7¼" (186 mm)
- "Replace in place"
- Non-lubricated/low maintenance

Quick, easy installation and replacement set new standards for reduced downtime. Because motors or drives don't need to be moved, our "replace in place" elements even eliminate the need for time-consuming realignment.

Available in close-coupled and spacer designs, Wrapflex couplings accommodate up to 7¼" (186 mm) shafts and torque loads up to 133,000 lb-in (15,028 Nm).

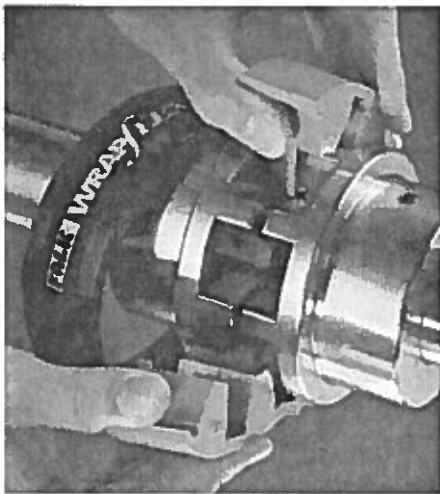
For simplicity and cost-effectiveness over the life of your coupling, it doesn't get any easier than Wrapflex couplings from Rexnord.

Low Initial Cost

- Advanced manufacturing methods and innovative material allow us to offer higher capacity ratings at a more competitive price than ever before possible.

Easy to Install

- The compound root radius in the element teeth (patent #6,342,011) increases flexibility for easier and quicker assembly.
- The coupling can be blind assembled from either direction.



Replace in Place

- Design allows quick and easy element replacement.
- There's no need to remove hubs or realign motors or drives, so downtime is reduced.

No Maintenance Needed

- Non-lubricated design of the tough, flexible polyurethane element lowers periodic maintenance costs.

Protects Equipment

- Compound root radius on inner corners of flex element (patent #6,342,011) acts as a stress relief for longer element life.
- Special hub feature reduces reaction loads transferred to connected equipment (patent #6,648,763).

Tough, Long-Lasting

- Polyurethane element has excellent wear and chemical resistance, and an operating temperature of -40°C (-40°F) to 95°C (200°F).
- Weather-resistant, high-grade nylon cover is standard.
- Optional carbon steel covers with black epoxy coating are suitable for highly-corrosive, severe-duty applications. (Standard for sizes 60-80.)
- Optional stainless steel hubs are available for Type R10 when required in the food industry or corrosive environments.

Safety First

- Two stainless steel button head cap screws, positioned 180° apart, prevent relative motion between cover and element and provide a positive means of retaining the cover to the element.
- Flexible element is retained after failure, helping minimize the potential for damage or personal injury.

Quick and Easy Retrofits

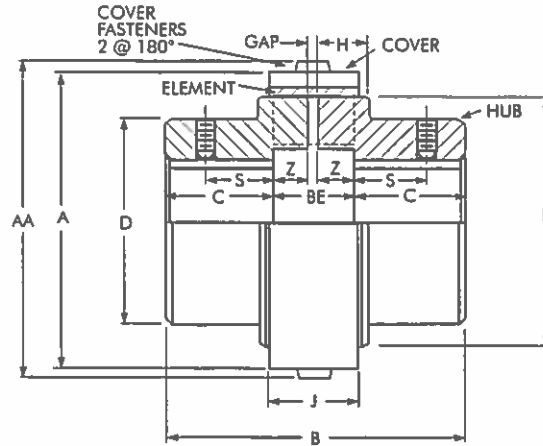
- Compact design eliminates the need for coupling guard redesign on existing applications.
- Stock finished bores in popular sizes. Taper bores for QD and Taper-Lock bushings are available off-the-shelf from our worldwide distribution network.

Falk Wrapflex Coupling Selection

Table 3 — Falk Wrapflex Coupling Quick Selection Chart

Size	5R	10R	20R	30R	40R	50R	60R	70R	80R
Max Bore (in)	1.625	1.875	2.375	2.875	3.375	4.125	5.250	6.125	7.250
Max Speed	4500 RPM	4500 RPM	4500 RPM	4500 RPM	3600 RPM	3000 RPM	2500 RPM	2100 RPM	1800 RPM
Torque (lb-in)	550	1,150	2,800	4,600	9,100	22,200	35,500	70,900	133,000
HP/100 RPM	0.873	1.82	4.44	7.30	14.4	35.2	56.3	112	211
RPM	HP Ratings								
4500	39.3	82.1	200	328	-	-	-	-	-
3600	31.4	65.7	160	263	520	-	-	-	-
3000	26.2	54.7	133	219	433	1057	-	-	-
2500	21.8	45.6	111	182	361	881	1408	-	-
2100	18.3	38.3	93.3	153	303	740	1183	2362	-
1800	15.7	32.8	80.0	131	260	634	1014	2025	3798
1750	15.3	31.9	77.7	128	253	616	986	1969	3693
1450	12.7	26.5	64.4	106	209	511	817	1631	3060
1170	10.2	21.3	52.0	85.4	169	412	659	1316	2469
1000	8.73	18.2	44.4	73.0	144	352	563	1125	2110
870	7.59	15.9	38.7	63.5	126	306	490	979	1836
720	6.28	13.1	32.0	52.6	104	254	406	810	1519
650	5.67	11.9	28.9	47.4	93.9	229	366	731	1372
580	5.06	10.6	25.8	42.3	83.7	204	327	652	1224
520	4.54	9.49	23.1	38.0	75.1	183	293	585	1097
420	3.67	7.66	18.7	30.7	60.6	148	237	472	886
350	3.05	6.39	15.5	25.5	50.5	123	197	394	739
280	2.44	5.11	12.4	20.4	40.4	98.6	158	315	591
230	2.01	4.20	10.2	16.8	33.2	81.0	130	259	485
190	1.66	3.47	8.44	13.9	27.4	66.9	107	214	401
155	1.35	2.83	6.89	11.3	22.4	54.6	87.3	174	327
125	1.09	2.28	5.55	9.12	18.0	44.0	70.4	141	264
100	0.873	1.82	4.44	7.30	14.4	35.2	56.3	112	211
84	0.733	1.53	3.73	6.13	12.1	29.6	47.3	94.5	177
68	0.593	1.24	3.02	4.96	9.82	24.0	38.3	76.5	143
56	0.489	1.02	2.49	4.09	8.09	19.7	31.5	63.0	118
45	0.393	0.821	2.00	3.28	6.50	15.9	25.3	50.6	95.0
37	0.323	0.675	1.64	2.70	5.34	13.0	20.8	41.6	78.1
30	0.262	0.547	1.33	2.19	4.33	10.6	16.9	33.7	63.3
25	0.218	0.456	1.11	1.82	3.61	8.81	14.1	28.1	52.8
20	0.175	0.365	0.889	1.46	2.89	7.04	11.3	22.5	42.2
16.5	0.144	0.301	0.733	1.20	2.38	5.81	9.29	18.6	34.8
13.5	0.118	0.246	0.600	0.985	1.95	4.76	7.60	15.2	28.5
11	0.096	0.201	0.489	0.803	1.59	3.87	6.20	12.4	23.2
9	0.079	0.164	0.400	0.657	1.30	3.17	5.07	10.1	19.0
7.5	0.065	0.137	0.333	0.547	1.08	2.64	4.22	8.44	15.8
5	0.044	0.091	0.222	0.365	0.722	1.76	2.82	5.62	10.6

Close-Coupled Type R10

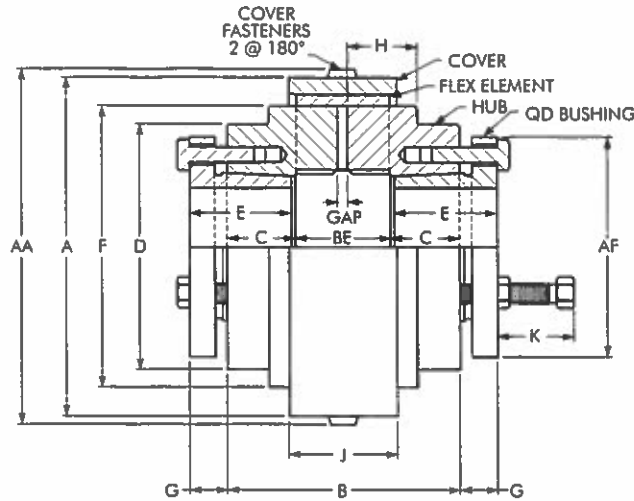


Dimensions (in)

Cplg Size ①	Torque Rating (lb-in)	Allow Speed RPM	Min Bore	Max Bore ②	Cplg Wt (lb) ③		A		AA		B	BE ⑤	C	D	F	H	J	S	Z	GAP ⑥	Cover Fasteners ⑦	
					Nylon Cover	Steel Cover ④	Nylon Cover	Steel Cover ④	Nylon Cover	Steel Cover ④											Size	Allen Wrench
5R	550	4500	0.500	1.625	2.96	3.27	3.01	3.01	3.17	3.17	2.83	0.78	1.02	2.36	2.52	0.59	0.91	0.63	0.35	0.078	M4	M2.5
10R	1,150	4500	0.625	1.875	5.48	5.98	3.56	3.56	3.72	3.72	3.62	0.94	1.34	2.84	2.99	0.75	1.10	0.88	0.43	0.078	M4	M2.5
20R	2,800	4500	0.750	2.375	12.4	13.4	4.96	4.88	5.20	5.12	4.80	1.26	1.77	3.62	4.02	0.98	1.46	1.00	0.59	0.078	M6	M4
30R	4,600	4500	1.000	2.875	20.7	22.1	5.77	5.63	6.01	5.87	5.98	1.42	2.28	4.13	4.65	1.14	1.65	1.25	0.67	0.078	M6	M4
40R	9,100	3600	1.125	3.375	37.6	39.8	7.17	6.97	7.48	7.28	7.13	1.85	2.64	5.12	5.91	1.34	2.15	1.63	0.83	0.197	M8	M5
50R	22,200	3000	1.250	4.125	78.8	82.9	9.09	8.82	9.41	9.13	8.46	2.39	3.03	7.01	7.48	1.81	2.74	1.75	1.10	0.197	M8	M5
60R	35,500	2500	2.000	5.250	-	146	-	10.51	-	10.94	10.84	2.97	3.94	8.25	8.98	2.37	2.64	-	1.39	0.197	M10	M6
70R	70,900	2100	2.750	6.125	-	244	-	12.20	-	12.64	12.76	3.31	4.72	9.88	10.63	2.74	2.95	-	1.56	0.197	M10	M6
80R	133,000	1800	3.375	7.250	-	365	-	14.57	-	15.00	14.84	3.82	5.51	10.63	12.91	3.28	3.35	-	1.79	0.236	M10	M6

- ① Wrapflex is a metric product. Metric to inch conversions may not be direct. Dimensions are for reference only and are subject to change without notice unless certified.
- ② AGMA Class 1 clearance fit bores are standard for Sizes 5R thru 50R, with two setscrews (one over keyway and one at 90°). Interference fit bores and no setscrews are standard for Sizes 60R thru 80R. Long hubs and interference fits are available and recommended when at or near maximum bore and: a) Number of start/stop cycles exceeds 10 per hour; or b) Application service factor = 2.0 or higher.
- ③ Coupling assembly weight is based on "no bore" hubs. For coupling assembly weight and bored hubs, subtract the following value for each hub: $(0.20)(\text{Bore})^2(C)$ lb. Bore in "inches".
- ④ Nylon cover is standard on Sizes 5R thru 50R, with an epoxy-coated steel cover as an option. Epoxy-coated steel cover is standard on Sizes 60R thru 80R, with no option for nylon cover.
- ⑤ "BE" = Standard "Distance Between Shaft Ends" with hubs mounted flush to the shaft ends. "GAP" = Minimum allowable "Distance Between Shaft Ends". Any shaft end spacing between the "GAP" and "BE" dimensions is acceptable. However, if utilizing a shaft end spacing less than the "BE" dimension, the key should not extend beyond the hub face in order to prevent potential interference with the flex element.
- ⑥ Cover fasteners are stainless steel, socket button head cap screws, per ISO 7380-A2. Two cap screws per coupling assembly.

QD Bushings Type R10



Dimensions (in)

Coupling Size	Bushing Size	Torque Rating ① (lb-in)	HP per 100 RPM	Max RPM	Max Bore \varnothing	Min Bore \varnothing	Coupling Weight without Bushing		GAP	BE
							Nylon Cover (lb)	Steel Cover (lb)		
5R	JA	550	0.87	4500	1.250	0.500	2.13	2.43	0.078	0.78
10R	JA	1,150	1.82	4500	1.250	0.500	3.49	3.99	0.078	0.94
20R	SD	2,800	4.44	4500	1.938	0.500	6.73	7.78	0.078	1.26
30R	SD	4,600	7.30	4500	1.938	0.500	10.2	11.6	0.078	1.42
40R	SF	9,100	14.4	3600	2.938	0.500	17.0	19.2	0.197	1.84
50R	E	22,200	35.2	3000	3.500	0.875	38.6	42.7	0.197	2.39
60R	J	35,500	56.3	2500	4.500	1.438	NA	86.3	0.197	2.96
70R	J	70,900	112	2100	4.500	1.438	NA	142	0.197	3.31
80R	M ②	133,000	211	1800	5.500	1.938	NA	254	0.236	3.82

Coupling Size	Cover Fasteners \varnothing		Bushing Fasteners \varnothing Inch Hardware	AA – Nylon Cover	AA – Steel Cover	A – Nylon Cover	A – Steel Cover	AF \varnothing	B
	Size	Hex Tool							
5R	M4	M2.5	#10-24 x 1.00	3.17	3.17	3.01	3.01	2.00	2.83
10R	M4	M2.5	#10-24 x 1.00	3.72	3.72	3.56	3.56	2.00	2.99
20R	M6	M4	1/4-20 x 1.00	5.20	5.12	4.96	4.88	3.19	3.78
30R	M6	M4	1/4-20 x 1.00	6.01	5.87	5.77	5.63	3.19	3.94
40R	M8	M5	3/8-16 x 1.25	7.48	7.28	7.17	6.97	4.63	4.52
50R	M8	M5	1/2-13 x 1.75	9.41	9.13	9.09	8.82	6.00	5.70
60R	M10	M6	5/8-11 x 2.50	-	10.94	-	10.51	7.25	9.34
70R	M10	M6	5/8-11 x 2.50	-	12.64	-	12.20	7.25	9.69
80R	M10	M6	3/4-10 x 3.00	-	15.00	-	14.57	9.13	14.22

Coupling Size	C	D	E \varnothing	F	G \varnothing	H	J – Nylon Cover	J – Steel Cover	K – Clearance
5R	1.02	2.36	1.00	2.520	0.44	0.59	0.91	0.91	1.16
10R	1.02	2.84	1.00	2.992	0.44	0.75	1.10	1.10	1.16
20R	1.26	3.62	1.81	4.016	0.56	0.98	1.46	1.46	1.19
30R	1.26	4.13	1.81	4.646	0.56	1.14	1.65	1.64	1.19
40R	1.34	5.12	2.00	5.906	0.84	1.34	2.15	2.09	1.50
50R	1.65	7.01	2.63	7.480	1.13	1.81	2.74	2.65	2.13
60R	3.19	8.25	4.50	8.976	1.50	2.37	-	2.64	2.94
70R	3.19	9.88	4.50	10.630	1.50	2.74	-	2.95	2.94
80R	5.20	10.63	6.75	12.913	1.66	3.28	-	3.35	3.50

- ① Typical – refer to bushing manufacturer for exceptions and service factor limitations.
- ② 80R requires a special "M" bushing, manufactured for "reverse" mounting. Consult bushing manufacturer.
- ③ Cover fasteners are ISO 7380, stainless steel, socket button head cap screws. Bushing fasteners are SAE Grade 5 (inch) or ISO 8.8 (metric), hex head cap screws.

Bore Specifications and Keyways — All Rexnord Couplings

Recommended Hub Bores for Clearance & Interference Fit on Keyed Shafting (in)

Shaft Dia.	Clearance Fit		Interference Fit		Shaft Dia.	Clearance Fit		Interference Fit		Shaft Dia.	Interference Fit				
	Hub Bore	Clearance	Hub Bore	Interference		Hub Bore	Clearance	Hub Bore	Interference		Hub Bore	Interference			
+0.000	+0.010	.0000	+0.0005	.0000	+0.0000	+0.015	.0000	+0.015	.0000	+0.000	+0.015	.0015			
-0.005	-.0000	.0015	-.0000	.0010	-0.010	-.0000	.0025	-.0000	.0030	-0.010	-.0000	.0040			
0.5000	0.5000	↓	0.4990	↓	3.0625	3.0625	↓	3.0595	↓	6.7500	6.7460	↓			
0.5625	0.5625		6.7000		6.9960										
0.625	0.625		+0.0000		+0.015	.0020									
0.6875	0.6875		-0.010		-.0000	.0050									
0.7500	0.7500		7.250		7.2450	↓									
0.8125	0.8125		7.500		7.4950										
0.8750	0.8750		7.750		7.7450										
0.9375	0.9375		8.000		7.9950	↓									
1.0000	1.0000		8.250		8.2445			.0025							
1.0625	1.0625		8.500		8.4945			.0055							
1.1250	1.1250		8.750		8.7445	↓									
1.1875	1.1875		9.000		8.9945										
1.2500	1.2500		9.250		9.2440			.0030							
1.3125	1.3125		9.500		9.4940	.0060									
1.3750	1.3750		9.750		9.7440	↓									
1.4375	1.4375	10.000	9.9940												
1.5000	1.5000	10.250	10.2435	.0035											
+0.000	+0.010	.0000	+0.010	.0000	-0.010	-.0000	.0025	-.0000	.0035	10.500	10.4935	.0065			
-0.010	-.0000	.0020	-.0000	.0020	4.0625	4.0625	↓	4.0590	↓	10.750	10.7435	↓			
1.5625	1.5625	11.000	10.9935	↓											
1.6250	1.6250	11.250	11.2430		.0040										
1.6875	1.6875	11.500	11.4930		.0070										
1.7500	1.7500	11.750	11.7430	↓											
1.8125	1.8125	12.000	11.9930												
1.8750	1.8750	12.500	12.4925		.0045										
1.9375	1.9375	13.000	12.9925	.0075											
2.0000	2.0000	+0.0000	+0.020	.0050											
+0.000	+0.015	.0000	+0.010	.0000	-0.015	-.0000		.0025		-.0000	.0085	13.500	13.4915	↓	
-0.010	-.0000	.0025	-.0000	.0020	14.000	13.9915		↓		14.500	↓	14.500	14.4910		.0055
2.0625	2.0625	2.0605	2.0605	2.0605	15.000	14.9910				.0090					
2.1250	2.1250	2.1230	2.1230	2.1230	+0.0000	+0.025				.0060					
2.1875	2.1875	2.1855	2.1855	2.1855	-0.015	-.0000				.0100					
2.2500	2.2500	2.2480	2.2480	2.2480	15.500	15.4900				↓					
2.3125	2.3125	2.3105	2.3105	2.3105	16.000	15.9900	.0065								
2.3750	2.3750	2.3730	2.3730	2.3730	16.500	16.4895	.0105								
2.4375	2.4375	2.4355	2.4355	2.4355	17.000	16.9895	.0070								
2.5000	2.5000	2.4980	2.4980	2.4980	17.500	17.4890	.0110								
2.5625	2.5625	2.5605	2.5605	2.5605	18.000	17.9890	↓								
2.6250	2.6250	2.6230	2.6230	2.6230	18.500	18.4890									
2.6875	2.6875	2.6855	2.6855	2.6855	19.000	18.9890			.0080						
2.7500	2.7500	2.7480	2.7480	2.7480	19.500	19.4880	↓								
2.8125	2.8125	2.8105	2.8105	2.8105	20.000	19.9880			.0120						
2.8750	2.8750	2.8730	2.8730	2.8730											
2.9375	2.9375	2.9355	2.9355	2.9355											
3.0000	3.0000	2.9980	2.9980	2.9980											

NOTE: Consult Rexnord for all keyless bore fits.

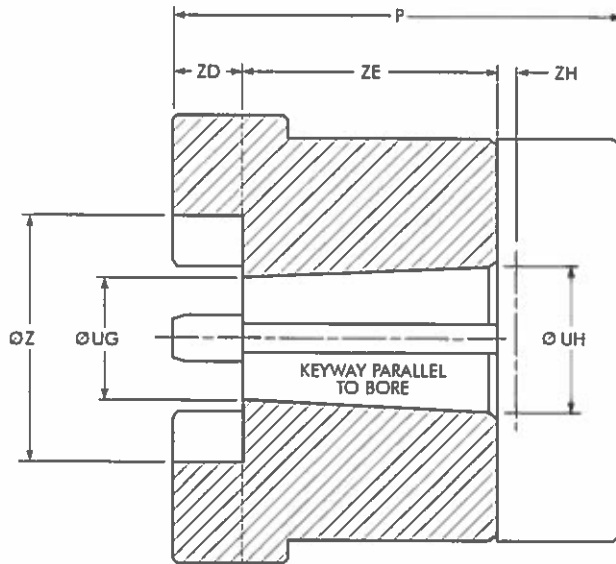
Recommended Keyways for Hubs with One Keyway (in)

Nominal Bore		Keyway Size ⓐ	Width Tolerance ⓑ	Nominal Bore		Keyway Size ⓐ	Width Tolerance ⓑ
Over	Thru			Over	Thru		
0.4375	0.5625	0.125 x 0.062	+0.020 -0.000	3.750	4.500	1.000 x 0.500	+0.030 -0.000
0.5625	0.875	0.1875 x 0.094	+0.020 -0.000	4.500	5.500	1.250 x 0.625	+0.035 -0.000
0.875	1.250	0.250 x 0.125	+0.020 -0.000	5.500	6.500	1.500 x 0.750	+0.035 -0.000
1.250	1.375	0.3125 x 0.156	+0.020 -0.000	6.500	7.500	1.750 x 0.750	+0.040 -0.000
1.375	1.750	0.375 x 0.188	+0.025 -0.000	7.500	9.000	2.000 x 0.750	+0.040 -0.000
1.750	2.250	0.500 x 0.250	+0.025 -0.000	9.000	11.000	2.500 x 0.875	+0.045 -0.000
2.250	2.750	0.625 x 0.312	+0.030 -0.000	11.000	13.000	3.000 x 1.000	+0.045 -0.000
2.750	3.250	0.750 x 0.375	+0.030 -0.000	13.000	15.000	3.500 x 1.250	+0.050 -0.000
3.250	3.750	0.875 x 0.438	+0.030 -0.000	15.000	18.000	4.000 x 1.500	+0.050 -0.000

ⓐ One square key for bore diameters thru 6.500"; one rectangular key for bore diameters over 6.500".

ⓑ Depth tolerance: +.010" to +.020".

Mill Motor Selection



Standard AISE AC & DC Mill Motor Coupling Selections (in)

Motor Frame Sizes			Coupling Size	Torque Rating (lb-in)	Ø UG	Ø UH	Ø Z	Keyway	ZD	ZE	ZH + .000 - .000
602	802 A,B,C	AC 1, 2, 4	40R ①	9,100	1.438	1.750	3.181	0.500 x 0.250	0.83	3.00	0.024
			50R	22,200			4.173	0.500 x 0.250	1.10		
603, 604	803, 804	-	50R	22,200	1.635	2.000	4.173	0.500 x 0.250	1.10	3.50	0.029
			60R	35,500			5.315	0.500 x 0.250	1.39		
606	806	AC 8, 12	50R ①	22,200	2.083	2.500	4.173	0.500 x 0.250	1.10	4.00	0.029
			60R	35,550			5.315	0.500 x 0.250	1.39		
			70R	70,900			6.299	0.500 x 0.250	1.56		
608	808	-	60R	35,550	2.531	3.000	5.315	0.750 x 0.250	1.39	4.50	0.029
			70R	70,900			6.299	0.750 x 0.250	1.56		
			80R	133,000			7.480	0.750 x 0.250	1.79		
610	810	AC 18	70R	70,900	2.781	3.250	6.299	0.750 x 0.250	1.56	4.50	0.034
			80R	133,000			7.480	0.750 x 0.250	1.79		
612	812	AC 25, 30	70R	70,900	3.104	3.625	6.299	0.750 x 0.250	1.56	5.00	0.034
			80R	133,000			7.480	0.750 x 0.250	1.79		
614	814	AC 40, 50	80R	133,000	3.729	4.250	7.480	1.000 x 0.375	1.79	5.00	0.034

Taper & Counter Bore Limitations (in)

Coupling Size	P Max	Ø UG Min	Ø UH Max	Ø Z Max	ZD Max	ZE Min	Keyway ②
5R	2.40	0.500	1.500	1.535	0.362	0.827	0.375 x 0.188
10R	3.11	0.500	1.750	1.811	0.441	1.000	0.375 x 0.188
20R	4.13	0.750	2.250	2.311	0.598	1.063	0.500 x 0.250
30R	5.24	1.000	2.500	2.559	0.677	1.339	0.625 x 0.313
40R	6.10	1.125	3.125	3.181	0.835	1.339	0.750 x 0.375
50R	7.17	1.125	4.125	4.173	1.110	1.811	1.000 x 0.500
60R	7.29	1.250	5.250	5.315	1.394	2.126	1.250 x 0.625
70R	8.65	1.500	6.125	6.299	1.571	2.244	1.500 x 0.750
80R	10.06	1.500	7.250	7.480	1.795	2.618	1.750 x 0.875

- ① Must use "standard" socket on mill motor nut. "Impact" socket will not fit.
- ② Keyway shown is for maximum bore with square key.

Type R10 Mill Motor Hubs

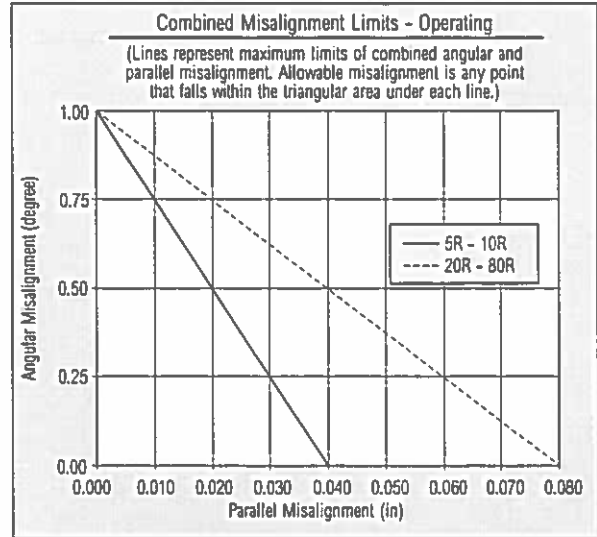
Mill Motor Frame Size	R10 Flex Hubs									
	5R	10R	20R	30R	40R	50R	60R	70R	80R	
602	802 A, B, C	AC 1, 2 & 4	-	-	-	-	X	X	-	-
603	803		-	-	-	-	Consult Rexnord	X	X	-
604	804		-	-	-	-	-	-	X	X
606	806	AC 8 & 12	-	-	-	-	-	X	X	-
608	808		-	-	-	-	-	-	X	X
610	810	AC 18	-	-	-	-	-	-	Consult Rexnord	X
612	812	AC 25 & 50	-	-	-	-	-	-	-	X
614	814	AC 40 & 50	-	-	-	-	-	-	-	X

Misalignment Capacity, Mass & WR²

Installation & Operating Misalignment Capacity

Coupling Size	Installation Limits		Operating Limits	
	Parallel Offset (in)	Angular (degree)	Parallel Offset (in)	Angular (degree)
5R	0.020	0.25	0.040	1.00
10R	0.020	0.25	0.040	1.00
20R	0.040	0.25	0.080	1.00
30R	0.040	0.25	0.080	1.00
40R	0.040	0.25	0.080	1.00
50R	0.040	0.25	0.080	1.00
60R	0.040	0.25	0.080	1.00
70R	0.040	0.25	0.080	1.00
80R	0.040	0.25	0.080	1.00

70D Black Insert		
Used With	Torque	Temp (F)
Nylon Cover	+ 25%	225
Steel Cover	+ 35%	250



Mass & WR²

Coupling Size	R10 Mass					
	Element (lb)	Nylon Cover (lb)	Steel Cover (lb)	R10 Hub (No Bore) (lb)	Total w/Nylon Cover (lb)	Total w/Steel Cover (lb)
5R	0.070	0.068	0.38	1.41	2.96	3.27
10R	0.13	0.11	0.61	2.62	5.48	5.98
20R	0.41	0.28	1.29	5.84	12.4	13.4
30R	0.63	0.37	1.82	9.83	20.7	22.1
40R	1.30	0.86	3.13	17.7	37.6	39.8
50R	2.70	1.70	5.83	37.2	78.8	82.9
60R	4.08	-	7.29	67.1	-	146
70R	6.17	-	10.2	114	-	244
80R	10.2	-	14.6	170	-	365

Coupling Size	R10 WR ²					
	Element (lb-in ²)	Nylon Cover (lb-in ²)	Steel Cover (lb-in ²)	R10 Hub (No Bore) (lb-in ²)	Total w/Nylon Cover (lb-in ²)	Total w/Steel Cover (lb-in ²)
5R	0.090	0.14	0.76	1.05	2.33	2.95
10R	0.23	0.32	1.73	2.80	6.15	7.56
20R	1.35	1.57	7.02	10.5	23.9	29.4
30R	2.75	2.80	13.2	23.2	52.0	62.4
40R	8.84	10.1	35.3	65.6	150	175
50R	30.4	31.8	106	245	552	626
60R	67.8	-	188	621	-	1,498
70R	141	-	358	1,500	-	3,499
80R	334	-	740	2,950	-	6,974

Coupling Size	T31 Shaft Hub	R31/R35 WR ² Values ①							
		Min BE (in)	R31 Assembly ②		WR ² (lb-in ²) per Inch	Min BE (in)	R35 Assembly ③		WR ² (lb-in ²) per Inch
			WR ² at Min BE (lb-in ²)	Steel Cover			WR ² at Min BE (lb-in ²)	Steel Cover	
5R	1020	3.19	7.53	8.15	0.351	1.99	4.93	5.55	0.351
10R	1030	3.50	13.6	15.0	0.413	2.35	9.61	11.0	0.413
20R	1040	3.50	39.1	44.8	1.253	3.01	33.0	38.4	1.253
30R	1050	4.38	72.4	82.3	1.980	3.45	65.9	75.8	1.980
40R	1070	5.00	217	243	4.164	3.49	184	209	4.164
50R	1080	6.50	579	654	10.78	4.45	565	640	10.78
60R	1090	7.87	-	1500	20.35	5.42	-	1500	20.35
70R	1100	8.80	-	2970	40.58	6.06	-	3230	40.58
70R	1110	8.80	-	3620	40.58	6.06	-	3550	40.58
80R	1120	9.78	-	7670	61.97	6.80	-	7210	61.97
80R	1130	10.00	-	9610	144.8	6.91	-	8190	144.8

- ① WR² values are based on hubs with no bore.
- ② For R31 Mass, refer to page 10.
- ③ For R35 Mass, refer to page 11.

BEARING LIFE CALCULATIONS

Prepared For: Rick McGaughey, E1008256

Pump Model: 10NHTB
 Mount: VC18DB
 Horiz/Vert Mount: Vertical
 Seal: Cycloseal
 Shaft Material: FH
 Key Material: KS
 Impeller Material: CI

Yield Strength: 125,000
 Ultimate Strength: 145,000
 50,000
 80,000
 10,000
 31,000

Design Point Inputs:

Impeller Dia: 17.13
 Trim Angle: 0
 RPM: 1160
 TDH (ft): 75.5
 GPM: 4600
 Efficiency (%): 82
 HP: 106.95
 Thrust: 1,021
 Impeller Weight: 111
 Total Thrust: 1,132
 Axial: 192
 Radial: 0

Est B10 Life (hrs)	100,000+
	100,000+

Bearing No. 6316
 Equiv. Load 414
 Pump End 7316-DbI
 Drive End 1179

Shaft Deflection:
 @ Impeller Center Line: 0.0016
 @ Wear Ring: 0.0025

	Axial Stress	Bending Stress	Torsional Stress	Combined Stress	Shaft Fatigue S.F.
@ Impeller hub	209	876	2,618	1,589	26.67
@ Sleeve shoulder	209	1,823	2,618	2,254	16.21

Impeller WR² (lb-in²) (CI matl): 5073
 Full Dia. WR², Design Dia. & Matl. approx. Imp. Weight (lbs): 3915
 Cast Iron (lbm-in²) WR², (lbm-in²) Shaft: 68
 Shaft WR² (lb-in²) (Steel material): 2.43E+06

V-Belt Load From Woods Calculation
 Sheave Width: 0 lbs
 Fully centerline location from end of shaft: 0.000
 0

MATERIALS OF CONSTRUCTION

PAINT SPECIFICATIONS

CERAMIC COATINGS

Materials of Construction

10NHTB-VC18DB

<u>Parts</u>	<u>Material Code</u>
Volute Casing	CP
Impeller Wear Ring	SG
Casing Wear Ring	SG
Impeller	CI
Impeller Washer	ST
Impeller Key	KS
Impeller Screw	SD
Back Plate	CP
Shaft	FH
Shaft Sleeve	SG
Mechanical Seal	CYCLOSEAL, Tungsten vs Silicon
Fasteners	SE
Base Elbow	CI
Stand	Fabricated Steel
Bearing frame	CI

MATERIAL CODE

BA Bronze (SAE 660) ASTM B144-3B C93200	PK Graphited Acrylic	SM SAE Grade 5
BZ Bronze (Sae 40) ASTM B584 C83600	SA Steel AISI 1045	SP Stress Proof Equal MOD. SAE 1144
CA Ductile Iron Nodular NI-QT H.T. to 400-500 BHN	SC Cast Steel AISI 1030, ASTM A216	SS Stainless Steel AISI 416
CI Cast Iron ASTM A48, Class 30	SD Stainless Steel AISI 302, 303, 304	ST Stainless Steel AISI 416 H.T. to 300-325 BHN
CP Ductile Iron ASTM A536-72 GR. 65-45-12 NOD-1B	SE Stainless Steel AISI 316, ASTM A296-CF8M	TE Glass-filled Teflon
CJ Cast Iron ASTM A48, Class 30 With 2%-3% Nickel Added	SG Stainless Steel AISI 420 H.T. to 375-500 BHN (SG double wear rings have Min. 50 BHN difference)	ZK Zamak-3 or equivalent
PB Acrylic Packing	KS Keystock AISI C1018	

SURFACE PREPARATION AND COATINGS

32nd STREET PUMP STATION CAPE MAY COUNTY MUA, NJ

PUMP MODEL: 10NHTB VC/VF18DB

SURFACE PREPARATION:

SSPC-SP6, COMMERCIAL BLAST

**PRIMER COAT:
(BASE AND MOTOR**

**TNEMEC SERIES N69 HI-BUILD EPOXOLINE
1 COAT, 3.0 – 5.0 MDFT (32 DR SLATE GRAY)**

**FINISH COAT:
(BASE AND MOTOR
SUPPORT INCLUDED)**

**TNEMEC SERIES N69 HI-BUILD EPOXOLINE
1 COAT, 3.0 – 5.0 MDFT (32 GR SLATE GRAY)**

**ALL INTERIOR WETTED PARTS:
(SUCTION ELBOW INCLUDED)**

**ENECON METALCLAD CERAMALLOY
CL + AC TWO COMPONENT LIQUID
COMPOSITE ALLOY
UNDERCOAT: GREY (8 – 15 MILS)
OVERCOAT" BLUE (9 – 15 MILS)**

SERIES N69 Hi-Build Epoxoline II

Exterior Coating- Two Coats

TECHNICAL DATA continued

NET WEIGHT PER GALLON*	N69: 13.45 ± 0.25 lbs (6.10 ± .11 kg) (mixed)	V69: 14.01 ± 0.25 lbs (6.36 ± .11 kg) (mixed)
STORAGE TEMPERATURE	Minimum 20°F (-7°C)	Maximum 110°F (43°C)
TEMPERATURE RESISTANCE	(Dry) Continuous 250°F (121°C)	Intermittent 275°F (135°C)
SHELF LIFE	Part A: 24 months; Part B: 12 months at recommended storage temperature.	
FLASH POINT - SETA	N69 & V69 Part A: 82°F (28°C)	N69 Part B: 80°F (26°C) V69 Part B: 86°F (30°C)
HEALTH & SAFETY	Paint products contain chemical ingredients which are considered hazardous. Read container label warning and Material Safety Data Sheet for important health and safety information prior to the use of this product. Keep out of the reach of children.	

APPLICATION

COVERAGE RATES*

	Dry Mil (Microns)	Wet Mil (Microns)	Sq Ft/Gal (m ² /Gal)
Suggested (1)	4.0 (100)	6.0 (150)	277 (25.7)
Minimum	2.0 (50)	3.0 (75)	554 (51.4)
Maximum	6.0 (150)	8.5 (215)	184 (17.1)

(1) Note: Roller or brush application requires two or more coats to obtain recommended film thickness. Also, Series N69 can be spray applied to an optional high-build film thickness range of 8.0 to 10.0 dry mils (205 to 255 dry microns) or 11.5 to 14.5 wet mils (209 to 370 wet microns). Allow for overspray and surface irregularities. Film thickness is rounded to the nearest 0.5 mil or 5 microns. Application of coating below minimum or above maximum recommended dry film thicknesses may adversely affect coating performance.

MIXING

- Start with equal amounts of both Parts A & B.
- Using a power mixer, separately stir Parts A & B.
- (For accelerated version. If not using 44-700, skip to No. 4.)
Add four (4) fluid ounces of 44-700 per gallon of Part A while Part A is under agitation.
- Add Part A to Part B under agitation, stir until thoroughly mixed.
- Both components must be above 50°F (10°C) prior to mixing. For application of the unaccelerated version to surfaces between 50°F to 60°F (10°C to 16°C) or the accelerated version to surfaces between 35°F to 50°F (2°C to 10°C), allow mixed material to stand 30 minutes and restir before using.
- For optimum application properties, the material temperature should be above 60°F (16°C).
Note: The use of more than the recommended amount of 44-700 will adversely affect performance.

POT LIFE

Without 44-700	15 hours at 50°F (10°C)	5 hours at 77°F (25°C)	3 hours at 100°F (38°C)
With 44-700	8 hours at 35°F (2°C)	4 hours at 77°F (25°C)	1 hour at 100°F (38°C)

THINNING

For N69: Use No. 4 Thinner. For air spray, thin up to 10% or ¼ pint (380 mL) per gallon. For airless spray, roller or brush thin up to 5% or ¼ pint (190 mL) per gallon. Note: When using Series V69, a maximum of 2.5% of No. 4 Thinner may be used to comply with VOC regulations.

SURFACE TEMPERATURE

Minimum 50°F (10°C) Maximum 135°F (57°C) The surface should be dry and at least 5°F (3°C) above the dew point. Coating will not cure below minimum surface temperature.

APPLICATION EQUIPMENT

Air Spray †

Gun	Fluid Tip	Air Cap	Air Hose ID	Mat'l Hose ID	Atomizing Pressure	Pot Pressure
DeVilbiss MBC or JGA	E	765 or 78	5/16" or 3/8" (7.9 or 9.5 mm)	3/8" or 1/2" (9.5 or 12.7 mm)	75-100 psi (5.2-6.9 bar)	10-20 psi (0.7-1.4 bar)

Low temperatures or longer hoses require higher pot pressure.

Airless Spray †

Tip Orifice	Atomizing Pressure	Mat'l Hose ID	Manifold Filter
0.015"-0.019" (380-485 microns)	1800-3000 psi (124-207 bar)	1/4" or 3/8" (6.4 or 9.5 mm)	60 mesh (250 microns)

Use appropriate tip/atomizing pressure for equipment, applicator technique and weather conditions.

† Spray application of first coat on CMU should be followed by backrolling.

Note: Application over inorganic zinc-rich primers: Apply a wet mist coat and allow tiny bubbles to form. When bubbles disappear in 1 to 2 minutes, apply a full wet coat at specified mil thickness.

Roller: Use 3/8" or 1/2" (9.5 mm or 12.7 mm) synthetic nap covers.

Brush: Recommended for small areas only. Use high quality natural or synthetic bristle brushes.

CLEANUP

Flush and clean all equipment immediately after use with the recommended thinner or MEK.

*Values may vary with color.

WARRANTY & LIMITATION OF SELLER'S LIABILITY: Tnemec Company, Inc. warrants only that its coatings represented herein meet the formulation standards of Tnemec Company, Inc.

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Interior Coating
(Volute, Impeller, Suction
Cover, All Wetted Parts)
1 Coat Grey-8-15Mils
2nd Coat Blue-8-15 Mils

Revolutionary products . . .

*. . . for rebuilding, resurfacing and protecting all types of
fluid flow machinery, equipment and structures.*

METALCLAD

CeramAlloy™ CL+AC

(Advanced Composite)

Apply by Brush, Roller
or Flexible Applicator

Requires No Heat

Unlimited Shelf Life

100% Solids

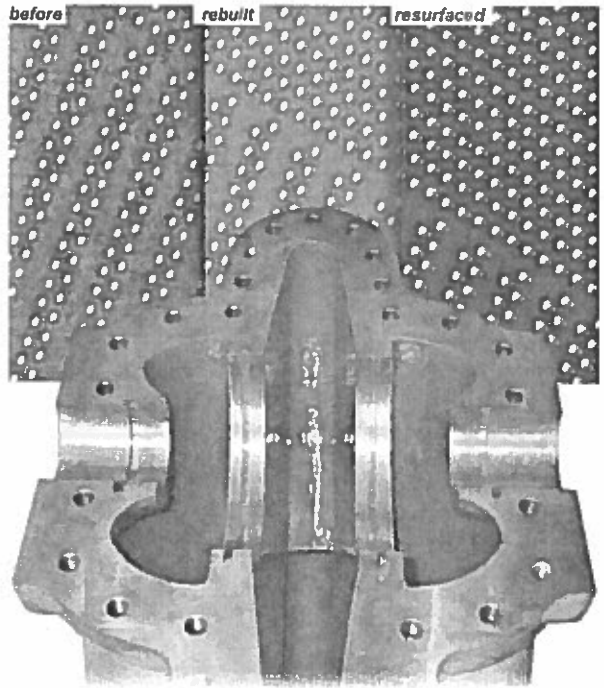
Safe & Simple To Use

High Performance Polymer
Composite for resurfacing
and protecting all types of
fluid flow components from
aggressive erosion and
corrosion damage.

Outstanding erosion/corrosion resistance!

Repairs Damaged Equipment — Protects New Components.

The Most Advanced Polymer Composite Coating System Available!



METALCLAD CeramAlloy™ CL+AC is a 100% solids, two component, liquid polymer composite used for repairing, resurfacing and coating components to provide outstanding fluid flow erosion and corrosion resistance.

When mixed, METALCLAD CeramAlloy™ CL+AC is a viscous liquid. CL+AC cures to a hard, ceramic-like material with an extremely smooth surface finish.

**Heat Exchanger Tube Sheets & Water Boxes, Pumps,
Valves & Pipework, Housings & Tanks, Cooling Towers, etc.**

ENECON Corporation
The Fluid Flow
Systems Specialists

Toll Free: 888-4-ENECON
Tel: 516 349 0022 · Fax: 516 349 5522
Email: info@enecon.com
6 Platinum Court · Medford, NY 11763-2251

www.enecon.com

Technical Data

Volume capacity per kg.	36 in ³ / 592 cc	
Mixed density	0.061 lbs per in ³ / 1.69 gm per cc	
Coverage rate per kg. @ 12 - 15 mils	14 - 16 ft ² / 1.4 m ²	
Shelf life	Indefinite	
Volume solids	100%	
Mixing ratio	Base	Activator
By volume	3.3	1
By weight	6	1

Cure Times

Ambient Temperature	Working Life	Machining Light Load	Full Mechanical	Chemical Immersion
41°F 5°C	4 hrs	48 hrs	96 hrs	10 days
59°F 15°C	2 hrs	24 hrs	48 hrs	5 days
77°F 25°C	1 hr	12 hrs	24 hrs	3 days
86°F 30°C	40 min	8 hrs	20 hrs	2 days

Physical Properties

	Typical Values		Test Method
Compressive strength	13,500 psi	945 kg/cm ²	ASTM D-695
Flexural strength	8,000 psi	560 kg/cm ²	ASTM D-790
Izod impact strength	1.3 ft lbs/in	0.69 J/cm	ASTM D-256
Hardness - Shore D	85		ASTM D-2240

Tensile Shear Adhesion

Steel	4000 psi	280 kg/cm ²	ASTM D-1002
Aluminum	2500 psi	175 kg/cm ²	ASTM D-1002
Copper	3000 psi	210 kg/cm ²	ASTM D-1002
Stainless steel	4100 psi	287 kg/cm ²	ASTM D-1002

Surface resistivity	1 x 10 ¹⁵ ohms	ASTM D-257
Volume resistivity	1 x 10 ¹⁵ ohm/cm	ASTM D-257
Dielectric constant	7.5	ASTM D-150
Dielectric strength	652 volts/mil	ASTM D-115
Breakdown voltage	6.1 Kv	ASTM D-115

Chemical Resistance

Acetic acid (0-10%)	EX	Methyl alcohol	G
Acetic acid (10-20%)	G	Methyl ethyl ketone	G
Acetone	G	Nitric acid (0-10%)	EX
Aviation fuel	EX	Nitric acid (10-20%)	G
Butyl alcohol	EX	Phosphoric acid (0-5%)	EX
Calcium chloride	EX	Phosphoric acid (5-10%)	G
Crude oil	EX	Potassium chloride	EX
Diesel fuel	EX	Propyl alcohol	EX
Ethyl alcohol	G	Sodium chloride	EX
Gasoline	EX	Sodium hydroxide	EX
Heptane	EX	Sulfuric acid (0-10%)	EX
Hydrochloric acid (0-10%)	EX	Sulfuric acid (10-20%)	G
Hydrochloric acid (10-20%)	G	Toluene	G
Kerosene	EX	Xylene	EX

EX - Suitable for most applications including immersion.
G - Suitable for intermittent contact, splashes, etc.

Your Local ENECON® Fluid Flow Systems Specialist

Using CeramAlloy™ CL+AC

Surface Preparation - METALCLAD CeramAlloy™ CL+AC should be applied only to clean, dry and well roughened surfaces.

1. Remove all loose material and surface contamination and clean with a suitable solvent which leaves no residue on the surface after evaporation such as acetone, MEK, isopropyl alcohol, etc.
2. Clean / roughen surface by abrasive blasting.
3. If necessary, apply moderate heat and/or allow the component(s) to "leach" to remove ingrained contaminants.
4. Thoroughly roughen surfaces by abrasive blasting to achieve a "white metal" degree of cleanliness and an anchor pattern of 3 mils.

Note: In situations where adhesion is not desired, such as when making molds and patterns or to ease future disassembly, apply a suitable release agent (mold release compound, paste wax, etc.) to the appropriate surfaces.

Mixing & Application - For your convenience, the METALCLAD CeramAlloy™ CL+AC Base and Activator have been supplied in precisely measured quantities. Simply pour the entire contents of the Activator container into the Base container and, using a spatula, putty knife or other appropriate tool, mix thoroughly until the CeramAlloy™ CL+AC reaches a uniform, streak-free color.

Apply the mixed material to the prepared surface using a stiff-bristled brush, applicator or roller. As a guide, an even thickness of approximately 12-15 mils per coat should be obtained. A minimum two coat application is required.

Overcoating should ideally be performed when the previously applied coat is just surface tacky; and certainly within 8 hours of the previous coat.

Health & Safety - Every effort is made to insure that ENECON® products are as simple and safe to use as possible. Normal industry standards and practices for housekeeping, cleanliness and personal protection should be observed.

Please refer to the detailed MATERIAL SAFETY DATA SHEETS (MSDS) supplied with the material (also available on request) for more information.

Cleaning Equipment - Wipe excess material from tools immediately. Use acetone, MEK, isopropyl alcohol or similar solvent as needed.

Technical Support - The ENECON® engineering team is always available to provide technical support and assistance. For guidance on difficult application procedures or for answers to simple questions, call your local ENECON® Fluid Flow Systems Specialist or the ENECON® Engineering Center.

All information contained herein is based on long term testing in our laboratories as well as practical field experience and is believed to be reliable and accurate. No condition or warranty is given covering the results from use of our products in any particular case, whether the purpose is disclosed or not, and we cannot accept liability if the desired results are not obtained.

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Hi-Build Epoxoline II SERIES N69

Series V69 conforms with air pollution regulations limiting Volatile Organic Compounds (VOC) to a maximum of 250 grams/litre (2.08 lbs/gal)



PRODUCT PROFILE

GENERIC DESCRIPTION	Polyamidoamine Epoxy
COMMON USAGE	An advanced generation epoxy for protection and finishing of steel and concrete. It has excellent resistance to abrasion and is suitable for immersion as well as chemical contact exposure. Contact your local Tnemec representative for a list of chemicals. This product can also be used for lining storage tanks that contain demineralized, deionized or distilled water.
COLORS	Refer to Tnemec Color Guide. Note: Epoxies chalk with extended exposure to sunlight. Lack of ventilation, incomplete mixing, miscatalyzation or the use of heaters that emit carbon dioxide and carbon monoxide during application and initial stages of curing may cause yellowing to occur.
FINISH	Satin
SPECIAL QUALIFICATIONS	A two-coat system at 4.0-6.0 dry mils (100-150 dry microns) per coat passes the performance requirements of MIL-C-4556E for fuel storage.
PERFORMANCE CRITERIA	Extensive test data available. Contact your Tnemec representative for specific test results.

COATING SYSTEM

PRIMERS	<p>Steel: Self-priming or Series 1, 27, 37H, 66, 90, 91-H₂O, 135, 161, 530, 594</p> <p>Galvanized Steel and Non-Ferrous Metal: Self-priming or Series 66, 161</p> <p>Concrete: Self-priming or 54-660, 130, 218, 219</p> <p>CMU: Self-priming or 54-562, 54-660, 130, 216, 218, 219</p>
TOPCOATS	46H-413, 66, N69, 73, 84, 104, 113, 114, 161, 175, 1070, 1071, 1072, 1074, 1075, 1078. Refer to COLORS on applicable topcoat data sheets for additional information. Note: When topcoating with Endura-Shield polyurethane finish, exterior exposed Series N69 has the following maximum time to recoat: Series 175, 1074 or 1075, 60 days; Series 73, 90 days. If these times are exceeded an epoxy intermediate coat or scarification is required before topcoating. Refer to appropriate topcoat data sheet for additional information.

SURFACE PREPARATION

STEEL	<p>Immersion Service: SSPC-SP10 Near-White Blast Cleaning</p> <p>Non-Immersion Service: SSPC-SP6 Commercial Blast Cleaning</p>
PRIMED STEEL	Immersion Service: Scarify the surface before topcoating if the Series 66, N69 or 161 prime coat has been exterior exposed for 60 days or longer.
GALVANIZED STEEL & NON-FERROUS METAL	Surface preparation recommendations will vary depending on substrate and exposure conditions. Contact your Tnemec representative or Tnemec Technical Services.
CAST/DUCTILE IRON	Contact your Tnemec representative or Tnemec Technical Services.
CONCRETE	Allow new concrete to cure 28 days. For optimum results and/or immersion service, abrasive blast referencing SSPC-SP13/NACE 6 Surface Preparation of Concrete and Tnemec's Surface Preparation and Application Guide.
CMU	Allow mortar to cure for 28 days. Level protrusions and mortar spatter.
PAINTED SURFACES	Non-Immersion Service: Ask your Tnemec representative for specific recommendations.
ALL SURFACES	Must be clean, dry and free of oil, grease, chalk and other contaminants.

TECHNICAL DATA

VOLUME SOLIDS*	67.0 ± 2.0% (mixed)																												
RECOMMENDED DFT	2.0 to 10.0 mils (50 to 255 microns) per coat. Note: MIL-C-4556E applications require two coats at 4.0-6.0 mils (100-150 microns) per coat. Otherwise, the number of coats and thickness requirements will vary with substrate, application method and exposure. Contact your Tnemec representative.																												
CURING TIME AT 5 MILS DFT																													
Without 44-700 Accelerator	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="text-align: left;">Temperature</th> <th>To Handle</th> <th>To Recoat</th> <th>Immersion</th> </tr> </thead> <tbody> <tr> <td>75°F (24°C)</td> <td>6 hours</td> <td>9 hours</td> <td>7 days</td> </tr> <tr> <td>75°F (24°C)</td> <td>4 hours</td> <td>5 hours</td> <td>7 days</td> </tr> <tr> <td>65°F (18°C)</td> <td>7-8 hours</td> <td>9-11 hours</td> <td>8 days</td> </tr> <tr> <td>55°F (13°C)</td> <td>12-14 hours</td> <td>16-20 hours</td> <td>9-10 days</td> </tr> <tr> <td>45°F (7°C)</td> <td>18-22 hours</td> <td>28-32 hours</td> <td>12-13 days</td> </tr> <tr> <td>35°F (2°C)</td> <td>28-32 hours</td> <td>46-50 hours</td> <td>16-18 days</td> </tr> </tbody> </table>	Temperature	To Handle	To Recoat	Immersion	75°F (24°C)	6 hours	9 hours	7 days	75°F (24°C)	4 hours	5 hours	7 days	65°F (18°C)	7-8 hours	9-11 hours	8 days	55°F (13°C)	12-14 hours	16-20 hours	9-10 days	45°F (7°C)	18-22 hours	28-32 hours	12-13 days	35°F (2°C)	28-32 hours	46-50 hours	16-18 days
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THEORETICAL COVERAGE*	1,074 mil sq ft/gal (26.4 m ² /L at 25 microns). See APPLICATION for coverage rates.																												
NUMBER OF COMPONENTS	Two: Part A and Part B																												
PACKAGING	5 gallon (18.9L) pails and 1 gallon (3.79L) cans — Order in multiples of 2.																												

Published technical data and instructions are subject to change without notice. The online catalog at www.tnemec.com should be referenced for the most current technical data and instructions or you may contact your Tnemec representative for current technical data and instructions.
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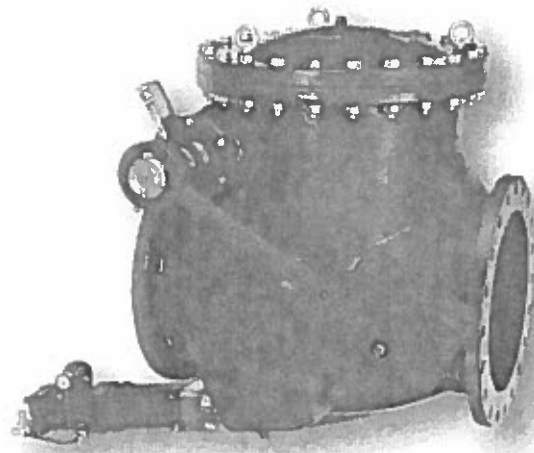
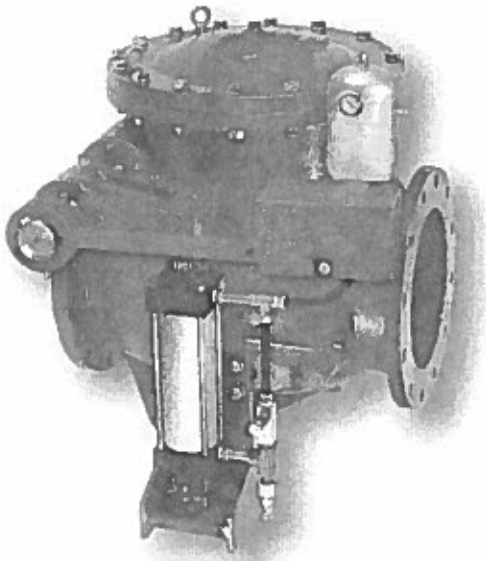
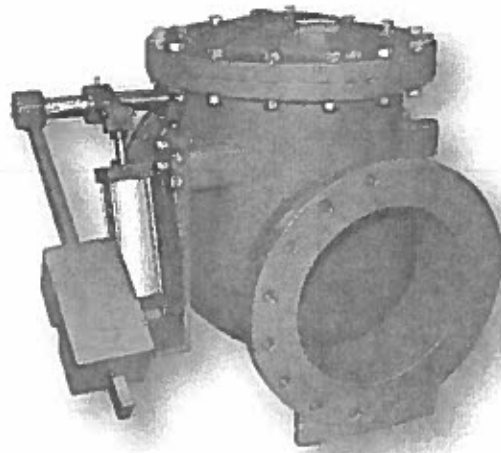
VALVES / FITTINGS

- 3 ✓ Model 7814LW2, 14" Val-Matic 7800SER swing check valves with fusion bonded epoxy coatings
- 3 ✓ 12" x 8" J1-W single wide filled arch expansion joints w/316SS rods & rings
- 3 ✓ 14" x 10" Flange Eccentric Reducer, 401 Protecto lined / primed
- 1 ✓ 14" x 8.8~~3~~" Flange x Flange Fitting, 401 Protecto lined / primed
- 1 ✓ 14" x 2.13" Flanged Filler Piece, 401 Protecto lined / Primed
- 1 ✓ 10" x 0.83 Flanged Filler Piece, 401 Protecto lined / Primed

VALMATIC®



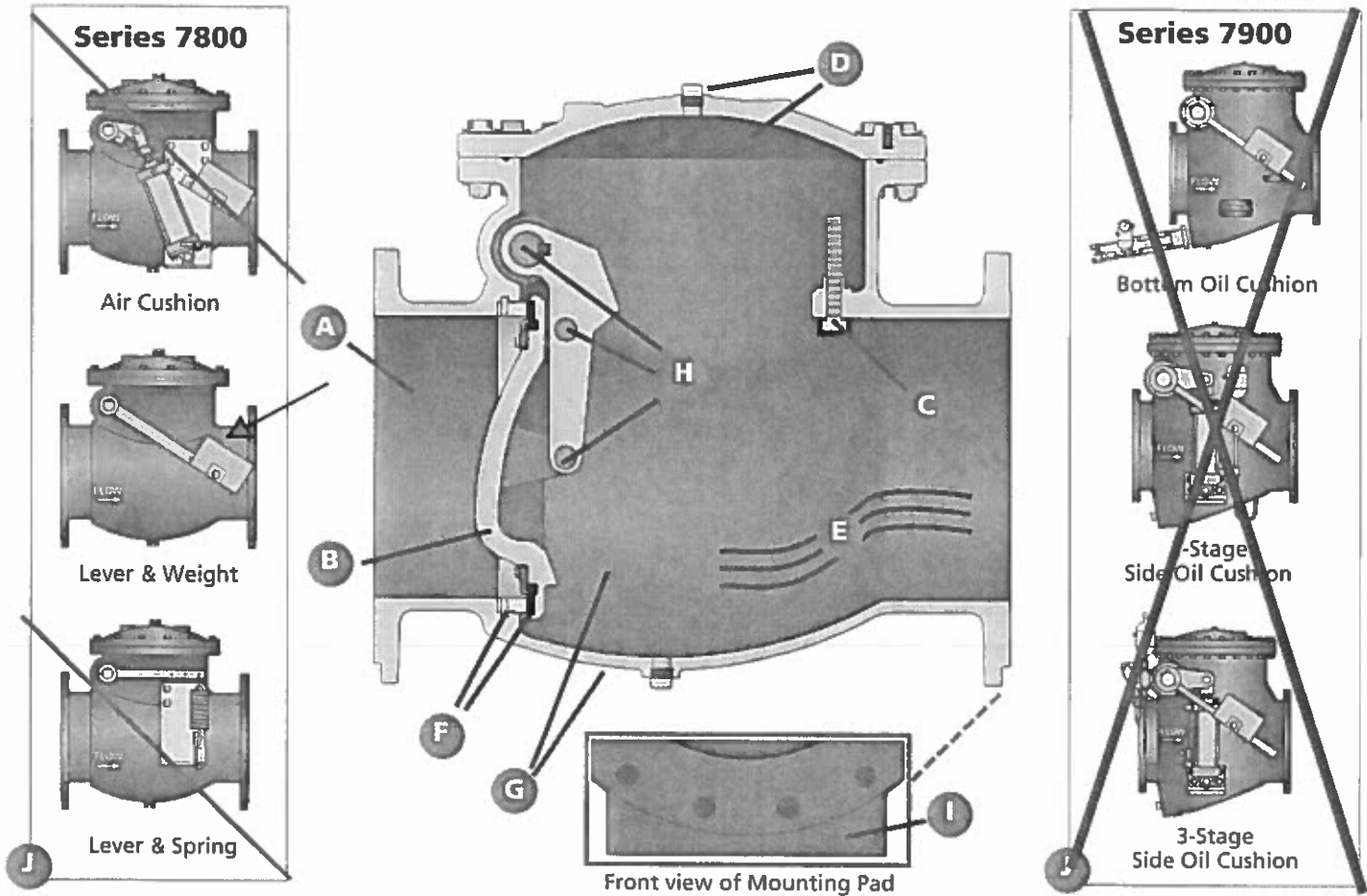
**AWWA
Swing Check
Valve**



www.valmatic.com

NSF/ANSI 61 & 372 Certified

Feature Highlights



A. 100% Flow Area

Energy savings provided with 100% unrestricted flow area.

B. Disc Stabilization

The fluid dynamic convex disc provides for lift, stabilization and strength.

C. Adjustable Stop

Adjustable resilient open stop to prevent disc flutter for applications outside the typical flow ranges.

D. Full Domed Access Cover with Vent Port

Full domed access cover allows for ease of maintenance without removing the valve from the line. The vent port allows the addition of an air release valve or pressure gauge.

E. Non-Clog Design

The unrestricted full flow area combined with smooth streamline

contouring allows for passage of large solids to prevent potential clogging.

F. Seating Options

The field replaceable synthetic seat, with integral O-ring, assures positive seating at high and low pressures. Body seats are stainless steel to extend the life of the valve and are also field replaceable.

When operating conditions require a metal-to-metal seat, the disc is fitted with a precision machined aluminum bronze seating surface. The disc seat seals against the field replaceable aluminum bronze body seat for reliable operation under harsh conditions.

G. Fusion Bonded Epoxy

Fusion Bonded Epoxy (FBE) is provided standard on the interior and exterior of the valve. The FBE is NSF/ANSI 61 certified and complies with AWWA C550.

H. Heavy Duty Disc Connections

Heavy duty shaft and disc retaining pins constructed of high tensile stainless steel for superior strength, wear resistance and extended life.

I. Mounting Pads

Integral mounting pads provide vertical support for ease of installation. The pads are integral to both flanges and are standard on Series 7800 valves. When necessary for installation, mounting pads can be provided on Series 7900 valves.

J. Closure Versatility

The Series 7800 AWWA Swing Check Valve is available with multiple field adjustable closure options: Air Cushion, Lever & Weight and Lever & Spring. The Series 7900 is available with either bottom or side oil cushions.

Feature Benefits

Proven Design

The Val-Matic Swing Check Valve incorporates many design features and characteristics that will provide energy savings, ease of maintenance and extended valve life. The valve is designed for municipal and industrial water and wastewater applications and fully complies with ANSI/AWWA C508 and MSS SP-71/MSS SP-136.

Closure Versatility

7800 Air Cushion, Lever & Weight, Lever & Spring

The Series 7800 Swing Check Valves can be supplied with Air Cushion, Lever & Weight or Lever & Spring for control of the disc closure. The Lever & Weight or Lever & Spring designs are suitable for installation in horizontal or vertical pipelines and are easily adjustable in the field. When rapid flow reversal occurs, the Swing Check Valves can be supplied with dual lever arms, weights and springs. A fully enclosed and adjustable Air Cushion can be added to the standard Lever & Weight to control valve operation and reduce water hammer.

7900 Oil Cushion

The Series 7900 Swing Check Valves include single or dual lever arms with weights and are equipped with either side or bottom oil cushions. The bottom oil cushion provides adjustable control of the final 10% of disc closure. The side oil cushion allows for independent adjustment of closure speeds in either 2- or 3- stages.

Ductile Iron Construction

Val-Matic provides standard Swing Check Valves with ductile iron construction rated to 250 psig Cold Working Pressure (CWP). Ductile iron provides greater strength and toughness than conventional gray iron materials. With ductile iron construction, the body, disc, and disc arm can safely withstand high stresses and shock loads.

Seating System

Val-Matic Swing Check Valves are offered with either drop-tight resilient seating or aluminum bronze metal seating.

Resilient Seating System

For resilient seated valves, the body is fitted with a 300 series stainless steel seat that is raised from the body to assure sealing in applications with high solids. A molded resilient seat mounted on the disc has integral O-ring sealing surfaces for drop tight sealing at high and low pressures. Both seats are secured with stainless steel fasteners and are field replaceable without removing the valve from the line. (See Figure 1)

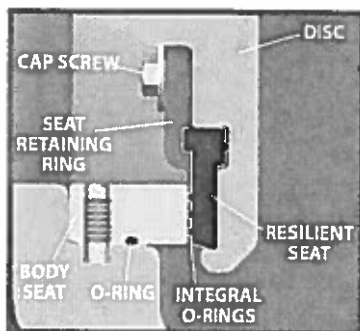


Figure 1 - Resilient Seating System

Metal Seating System

For metal seated valves, the body is fitted with an aluminum bronze seat secured to the body. The body seat mates with a second aluminum bronze seat integral with the disc. (See Figure 2)

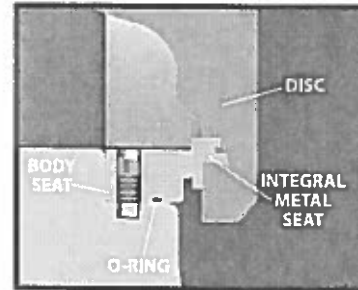


Figure 2 - Metal Seating System

Shaft Seal System

V-Type Packing

The Series 7800 Swing Check Valves are designed with an enhanced V-Type packing system to prevent overload of the packing, the most common reason for packing leakage and failure. To prevent the packing from being over tightened, the shaft seal incorporates POP™ (Packing Overload Protection) Shims with pull tabs. Adjustment is easily accomplished by removing shims as necessary utilizing the pull tab feature. (See Figure 3)

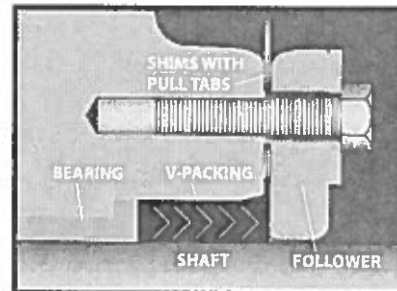


Figure 3 - Series 7800 Shaft Seal System V-Packing

O-ring Cartridge

The Series 7900 Swing Check Valves are designed with dual O-ring seals contained in a corrosion resistant cartridge to provide low torque during operation. (See Figure 4)

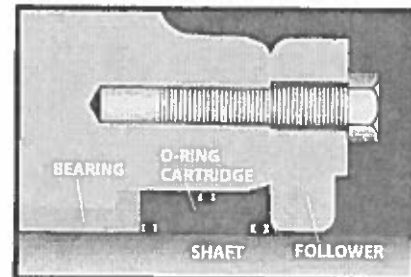


Figure 4 - Series 7900 Shaft Seal System O-ring Cartridge

Corrosion Resistance

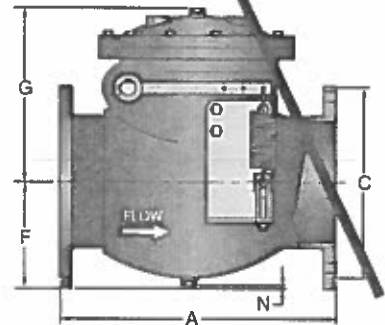
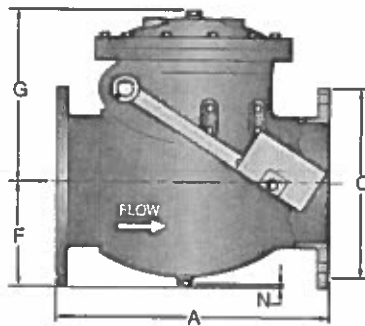
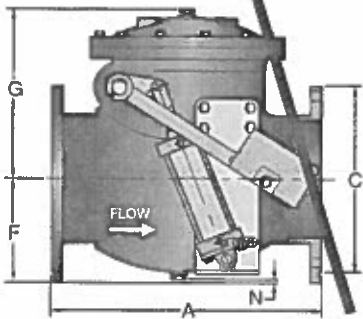
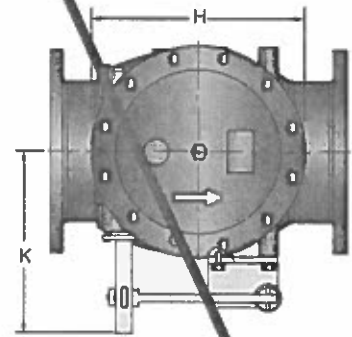
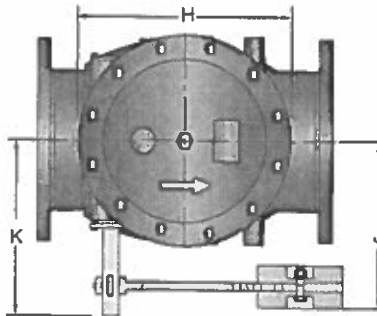
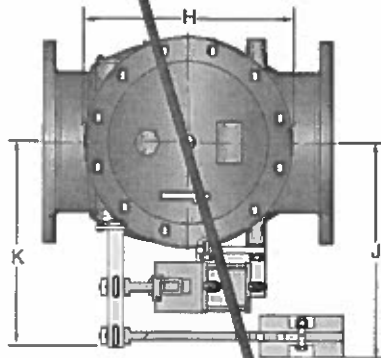
The body and disc are fully encapsulated with NSF/ANSI 61 certified fusion bonded epoxy per AWWA C550 to prevent corrosion and provide extended service life. The shaft, disc pins, and seat hardware are constructed of stainless steel for maximum corrosion resistance even in severe service. Lead-Free Bronze bushings are provided in the body to provide smooth and reliable disc closure.

Installation Dimensions

Series 7800AC
Air Cushion

Series 7800LW
Lever & Weight

Series 7800LS
Lever & Spring



Flanges drilled to ASME B16.1 Class 125 and B16.42 Class 150

Dimensions in inches

Valve Size	CWP (psig)	A	C	F	G	H	J	K	N*	AC Valve Weights (lbs)	LW Valve Weights (lbs)	LS Valve Weights (lbs)
2	250	8.00	6.00	3.00	4.34	5.39	5.25	2.00	0.27	-	28	26
2 1/2	250	8.50	7.00	3.50	4.34	5.78	7.00	2.50	0.62	-	37	34
3	250	9.50	7.50	3.17	6.69	7.01	7.38	6.97	0.46	65	55	51
4	250	11.50	9.00	4.92	7.60	7.87	8.63	8.23	0.43	105	90	79
6	250	14.00	11.00	6.69	10.53	12.60	12.50	12.22	0.59	205	185	169
8	250	19.50	13.50	8.46	12.80	15.75	15.75	15.16	0.97	351	326	286
10	250	24.50	16.00	8.66	14.33	17.52	17.38	16.61	-0.13	519	484	440
12	250	27.50	19.00	10.63	17.32	19.88	17.88	17.32	0.30	763	723	669
14	250	31.00	21.00	12.50	19.96	23.88	23.13	22.63	-0.04	1061	1011	958
16	250	36.00	23.50	13.75	21.22	26.50	25.00	24.25	-0.29	1227	1177	1101
18	250	40.00	25.00	15.00	23.22	27.88	26.38	25.63	-0.16	1571	1521	1431
20	250	40.00	27.50	16.00	24.94	30.44	28.25	27.50	-0.66	1940	1890	1764
24	250	48.00	32.00	18.50	30.34	36.63	32.75	32.13	0.90	3112	3052	2837
30	150	60.00	38.75	22.00	38.47	43.81	40.75	39.81	-0.87	6148	6088	5708
	250											
36	150	63.00	46.00	25.50	43.22	51.41	45.06	43.81	-1.89	8555	8495	8037
	250											
42	150	70.00	53.00	29.25	49.80	59.88	50.00	48.50	-2.38	11460	11380	10680
	250											
48	150	76.00	59.50	32.75	56.38	68.38	55.13	53.00	-2.63	16860	16780	15940
	250											

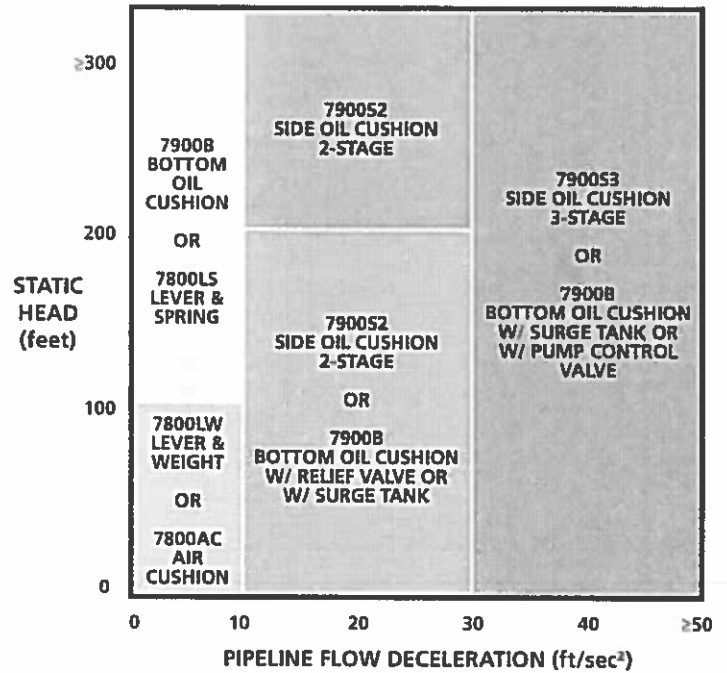
*Dimension "N" with negative numbers extend past bottom of integral mounting pads (flange feet).

Application Chart

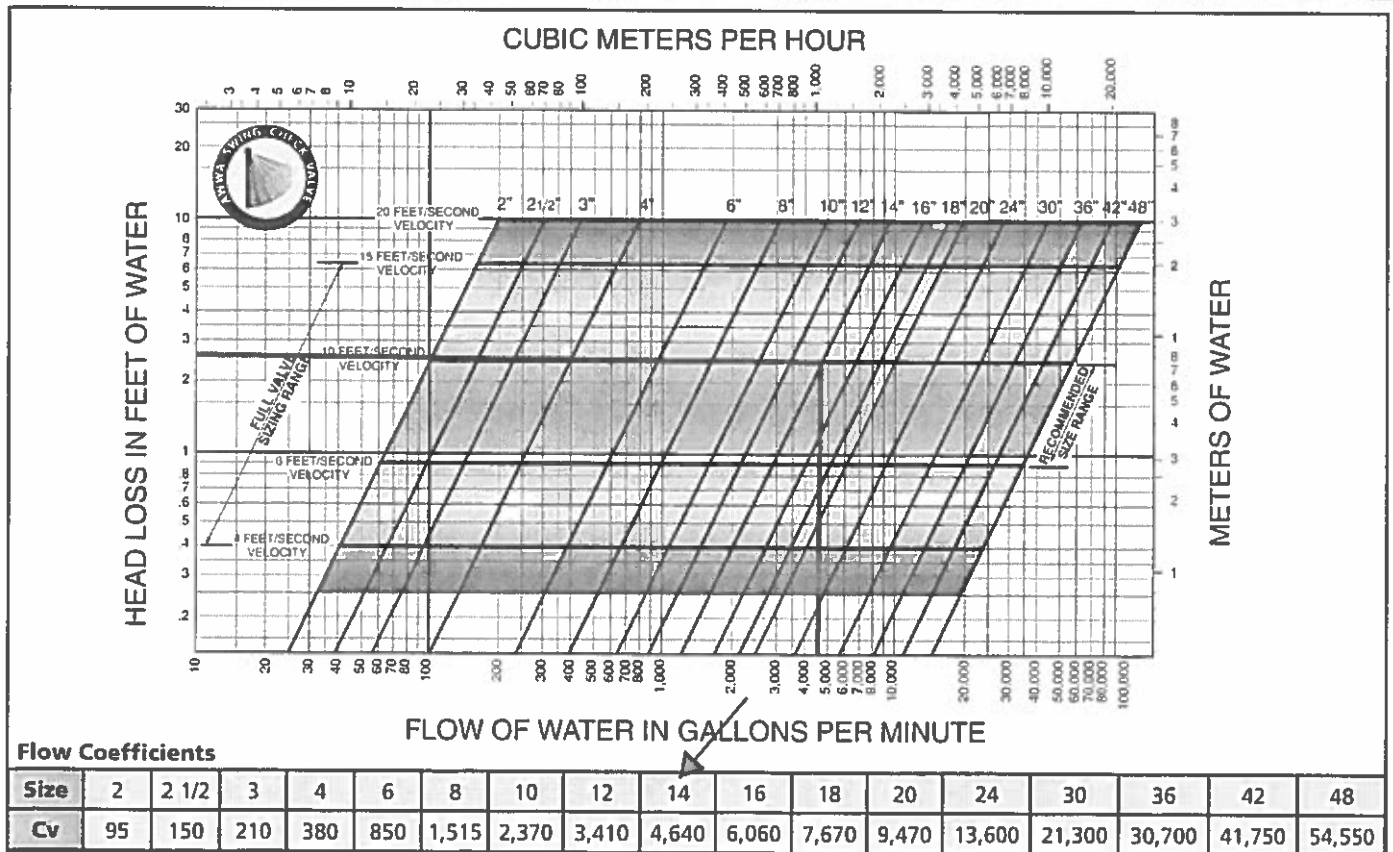
A variety of closure mechanisms allows selection of the correct Swing Check Valve for every application. This application chart illustrates the range of use for the various Swing Check Valve configurations.

Pumping systems with low static head and gradual pipeline flow deceleration may be best served by a conventional lever & weight or air cushion Swing Check. Higher static head applications benefit from a rapid spring assisted closure. When severe deceleration is present in a pumping system, oil cushioned closure provides an economical and reliable means of preventing surges associated with transients while greatly minimizing the potential for check valve slam. The adjustability of closure times on oil cushion Swing Check Valves allows operation to be tailored for each application.

RECOMMENDED VALVE SELECTION



Headloss Chart

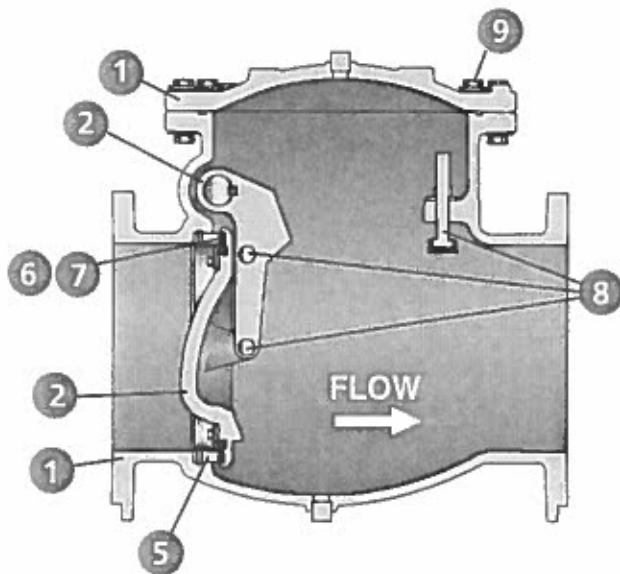
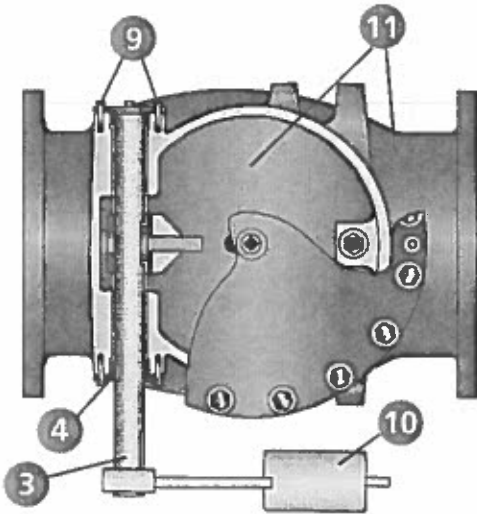


Pressure Ratings

MAXIMUM PRESSURE RATINGS				
SERIES	DESCRIPTION	SIZE RANGE	FLANGE CONNECTION	CWP (psig)
7800AC	Air Cushion	3" - 48"	Class 150 Ductile Iron	250
7800LW	Lever & Weight	2" - 48"		
7800LS	Lever & Spring	2" - 48"		

MAXIMUM PRESSURE RATINGS				
SERIES	DESCRIPTION	SIZE RANGE	FLANGE CONNECTION	CWP (psig)
7900B	Lever & Weight Bottom Oil Cushion	8" - 12"	Class 150 Ductile Iron	200
		14" - 48"		150
7900S	Lever & Weight Side Oil Cushion	8" - 12"	Class 150 Ductile Iron	200
		14" - 24"		150

Materials of Construction



ASSY NO.	COMPONENT	STANDARD	OPTIONAL
1	7800 Body and Cover 2" - 48"	Ductile Iron ASTM A536 Gr 65-45-12	N/A
	7900 Body and Cover 8" - 48"	Ductile Iron ASTM A536 Gr 65-45-12	N/A
2	Disc and Arm	Ductile Iron ASTM A536 Gr 65-45-12	N/A
3	7800 Shaft	T304 Stainless Steel	N/A
	7900 Shaft	T630 Stainless Steel	N/A
4	7800 Shaft Seal	V-Packing Buna-N	N/A
	7900 Shaft Seal	O-ring Buna-N	N/A
5	Removable Body Seat	Stainless Steel ASTM A276 Type 304 or Aluminum Bronze C95400	N/A
6	Molded Resilient Seat	Buna-N	EPDM
7	Metal Integral Seat	Aluminum Bronze C95400	N/A
8	7800 Internal Hardware	T304 Stainless Steel	T316 Stainless Steel
	7900 Internal Hardware	T630 Stainless Steel	T316 Stainless Steel
9	External Hardware 2" - 12"	T304 Stainless Steel	T316 Stainless Steel
	External Hardware 14" - 48"	Alloy Steel, Plated	T316 Stainless Steel
10	External Lever(s)	Ductile Iron ASTM A536 Gr 65-45-12	N/A
11	Internal/External Coating System	Fusion Bonded Epoxy NSF/ANSI 61	N/A

Series 7800 Specification

SCOPE

- 1.1 This specification covers the design, manufacture, and testing of 2 in. (50 mm) through 48 in. (1200 mm) Swing Check Valves suitable for cold working pressures of 250 psig.
- 1.2 The check valve shall be of the full flow body type, with a domed access cover and vent port.
- 1.3 The check valve shall be capable of accepting air cushion, lever and weight or lever and spring.

STANDARDS AND APPROVALS

- 2.1 The valves shall be designed, manufactured and tested in accordance with American Water Works Association Standard ANSI/AWWA C508 and in accordance with Manufacturers Standardization Society Standard Practice MSS SP-71 or MSS SP-136.
- 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 drilled in accordance with ASME B16.1, Class 125 iron flanges or ASME B16.42, Class 150 for ductile iron flanges.

DESIGN

- 4.1 The valve body shall be full flow equal to nominal pipe diameter at all points through the valve and shall be equipped with a threaded adjustable open stop. The body seat shall be O-ring sealed and field replaceable without removing the valve from the line. The end flanges shall contain integrally cast mounting pads.
- 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.
- 4.3 The disc shall be of one-piece construction and connected to the shaft with a disc arm and two pivot pins to provide pivot action to allow self-adjusting seating at all pressures. 14" and larger discs shall be convex shape for lift, stabilization and strength.
- 4.4 When specified, the disc seat shall be resilient with integral O-ring type sealing surface for drop tight shut-off at high and low pressures and for easy replacement in the field without removing the valve from the line.
- 4.5 When specified, metal seated valves shall have aluminum bronze seats.
- 4.6 The shaft seals shall consist of V-type packing in a fixed gland with an adjustable follower designed to prevent over compression of the packing and to meet design parameters of the packing manufacturer. Removable, slotted shims shall be provided under the follower flanges to provide for adjustment and prevent over loading of the packing.

- 4.7 When specified, the valve shall be factory equipped with a lever and weight assembly. The lever shall be equipped with three holes for adjusting the bolted weight assembly. When the valve is closed, the lever and weight shall be located 30 degrees below horizontal.
- 4.8 When specified, the valve shall be factory equipped with a lever and air cushion assembly mounted between the weight assembly and the valve body. The air cushion assembly shall consist of a clevis mounted tie-rod type closed cylinder with speed control valves.
- 4.9 When specified, the valve shall be factory equipped with a lever and spring assembly. The spring shall be mounted to a bracket on the side of the valve body with a bolt assembly to adjust the spring tension.

MATERIALS

- 5.1 The valve body, cover and disc shall be constructed of ASTM A536 Grade 65-45-12 ductile iron.
- 5.2 The exterior and interior of the valve shall be coated with an NSF/ANSI 61 approved fusion bonded epoxy coating.
- 5.3 The removable body seat shall be constructed of ASTM A276, Type 304 stainless steel.
- 5.4 The removable resilient seat shall be precision molded Buna-N (NBR), ASTM D2000-BG. When specified, optional seat material includes EPDM.
- 5.5 The disc, arm, and external levers shall be ductile iron.

OPTIONS

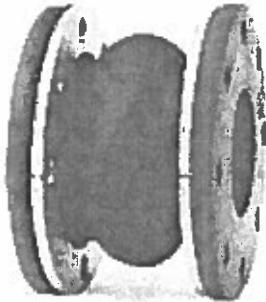
- 6.1 A pre-wired limit switch shall be provided (when specified) to indicate open/closed position to a remote location. The mechanical type limit switch shall be activated by the external arm and rated for NEMA 4, 6, or 6P and shall have U.L. rated 5 amp, 125 or 250 VAC contacts.
- 6.2 When specified, the lever and weight assembly shall be enclosed within a removable safety guard constructed of perforated metal for visibility.

MANUFACTURE

- 7.1 Manufacturer shall demonstrate a minimum of five (5) years' experience in the manufacture of swing check valves.
- 7.2 All valves shall be hydrostatically and seat tested per AWWA C508 to demonstrate leakage criteria and structural integrity. When requested, the manufacturer shall provide test certificates, dimensional drawings, parts list drawings, and operation and maintenance manuals.
- 7.3 Swing Check Valves shall be Series 7800 (resilient seated) or 7800M (metal seated) and equipped with AC (air cushion), LW (lever and weight), or LS (lever and spring) as manufactured by Val-Matic® Valve & Mfg. Corporation, Elmhurst, IL USA or approved equal.

J-1W Wide Arch

- ▶ Same face-to-face as J-1
- ▶ Up to 3x more movement
- ▶ Less force required to move
- ▶ Saves space over multiple arch J-1
- ▶ Multiple wide arch available
- ▶ Made in U.S.A.



Redflex® J-1W Wide Arch Expansion Joints are engineered to permit greater movement capabilities than standard J-1 Expansion Joints. J-1W Expansion Joints can be used to alleviate more extreme expansion and compression stresses, without the need for double or triple arches, since the J-1W has the same face-to-face dimensions as the standard J-1 Single Arch Expansion Joint. The wide arch design also reduces the amount of force required to cause movement in the expansion joint while allowing the J-1W to be used under the same working pressures as the standard J-1. These features and benefits of the J-1W Wide Arch Expansion Joint result in a cost savings for both new installations and for replacement operations.

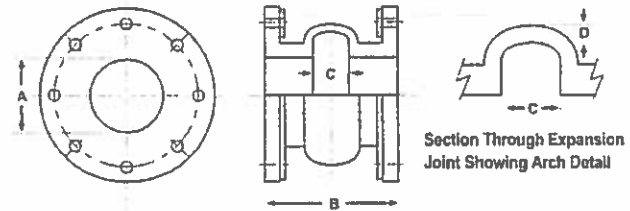
Materials of Construction

▶ ELASTOMERS

Pure Gum Rubber, Neoprene, Hypalon®, Chlorobutyl, Buna-N, EPDM, and Viton®

▶ VACUUM RATING

15 in. Hg. — Full Vacuum Available



Dimensions and Movement J-1W Wide Arch Expansion Joint

Size A	B	C	D	Axial Compress	Force Pounds to Move	Axial Elongation	Force Pounds to Move	Lateral Deflection	Force Pounds to Move	Working Pressure (psi)
*1"	6"	2"	1"	1-3/4"	144	3/4"	106	3/4"	245	165
*1-1/4"	6"	2"	1"	1-3/4"	180	3/4"	134	3/4"	306	165
*1-1/2"	6"	2"	1"	1-3/4"	216	3/4"	161	3/4"	367	165
*2"	6"	2"	1"	1-3/4"	130	3/4"	97	3/4"	245	165
2-1/2"	6"	2"	1"	1-3/4"	162	3/4"	120	3/4"	267	165
3"	6"	2"	1"	1-3/4"	195	3/4"	145	3/4"	288	165
4"	6"	2"	1"	1-3/4"	260	3/4"	193	3/4"	333	165
5"	8"	2"	1"	1-3/4"	324	3/4"	241	3/4"	382	140
6"	6"	2"	1"	1-3/4"	389	3/4"	289	1"	432	140
8"	6"	2"	1"	1-3/4"	777	3/4"	482	1"	527	140
10"	8"	2"	1"	1-3/4"	850	3/4"	603	1"	566	140
12"	8"	2"	1"	1-3/4"	892	3/4"	633	1"	604	140
14"	8"	3"	1-1/4"	2"	1019	7/8"	723	1-1/8"	782	85
16"	8"	3"	1-1/4"	2"	1019	7/8"	723	1-1/8"	900	65
18"	8"	3"	1-1/4"	2"	1147	7/8"	814	1-1/8"	994	65
20"	8"	3"	1-1/4"	2"	1506	7/8"	1054	1-1/8"	1112	65
24"	10"	3"	1-1/4"	2"	1807	1"	1265	1-1/8"	1194	65
26"	10"	3"	1-1/4"	2"	**	1"	**	1-1/8"	**	55
28"	10"	3"	1-1/4"	2"	**	1"	**	1-1/8"	**	55
30"	10"	3"	1-1/4"	2"	**	1"	**	1-1/8"	**	55
36"	10"	3"	1-1/4"	2"	**	1"	**	1-1/8"	**	55
42"	12"	3"	1-1/4"	2"	**	1"	**	1-1/8"	**	55
48"	12"	3"	1-1/4"	2"	**	1"	**	1-1/8"	**	55
54"	12"	3"	1-1/4"	2"	**	1"	**	1-1/8"	**	55

*Filled Arch Only
On larger sizes, consult factory.

Accessories

Anchoring

It is absolutely necessary that rigid metal pipe on both ends of the expansion joint or any flexible connector be properly anchored to eliminate the danger of excessive movement. It cannot be emphasized too strongly that rubber expansion joints and connectors, by virtue of their design and function, are not designed to take end thrusts and in all cases where such forces are likely to occur, proper anchoring is essential. Anchors should always be installed. An expansion joint should never be used to support the piping.

Retaining Rings



Materials of Construction

► Galvanized Steel, 304 SS, or 316 SS

Galvanized 3/8" split steel retaining rings should be installed on rubber-flanged expansion joints to assure a pressure-tight seal. These are placed directly against the inside of the flange to prevent damage to the rubber surface when bolts are tightened, and also to provide equal distribution of bolting stresses. These rings are split and drilled to match the rubber flange holes.

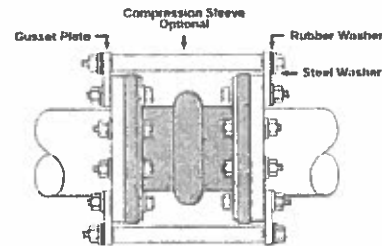
Outside diameter is the same as standard flange, and contains the same number of bolt holes. Those used on joint sizes up to 20" are two-piece, four segments per joint. Four-piece rings, eight segments per joint, are used on all larger sizes.

Dimensions Split Steel Retaining Rings

Joint Size	Number Bolts	Bolt Hole Diameter
1" - 1-1/2"	4	5/8"
2" - 4"	8	3/4"
5" - 8"	8	7/8"
10" - 12"	12	1"
14"	12	1-1/8"
16"	16	1-1/8"
18"	16	1-1/4"
20"	20	1-1/4"
24"	20	1-3/8"
30"	28	1-3/8"
36"	32	1-5/8"
42"	36	1-5/8"
48"	44	1-5/8"
54"	44	2"
60"	52	2"
72"	60	2"

Control Units

Expansion joints, vibration pipe, and reducers installed in piping systems must be rigidly anchored on both sides of the unit to control expansion and contraction. The anchoring must be capable of withstanding the line thrusts generated by the internal pressure or wide temperature fluctuations. In addition, **Control Units are recommended to be installed.** The illustration below exhibits the details of a control unit as presently used.



The table below indicates the number of rods to be used for anchoring purposes by size and working pressure ratings. Now designers can select the proper number of rods required for expansion joints for all pressure ranges. The calculation of the rods is based on an allowable stress of 65% of yield of the rod from ASTM A-307-68 steel.

Maximum Surge or Test Pressure of the System

Test Pressure is defined as 1-1/2 times the working pressure

Size in.	Gusset Plate Thickness in.	Rod Diameter in.	Pressure psig				
			Number of Rods				
			2	3	4	6	8
1"	3/8"	5/8"	949	*	*	*	*
1-1/2"	3/8"	5/8"	510	*	*	*	*
2"	3/8"	5/8"	661	*	*	*	*
2-1/2"	3/8"	5/8"	529	*	*	*	*
3"	3/8"	5/8"	441	*	*	*	*
4"	3/8"	5/8"	311	467	622	*	*
5"	1/2"	5/8"	235	353	470	*	*
6"	1/2"	5/8"	186	278	371	*	*
8"	9/16"	3/4"	163	244	326	*	*
10"	3/4"	1"	163	244	325	488	*
12"	3/4"	1"	160	240	320	481	*
14"	3/4"	1"	112	167	223	335	*
16"	3/4"	1-1/2"	113	170	227	340	453
18"	3/4"	1-1/2"	94	141	187	281	375
20"	3/4"	1-1/8"	79	118	158	236	315
24"	1"	1-1/4"	74	110	147	221	294
30"	1-1/4"	1-1/2"	70	105	141	211	281
36"	1-1/2"	1-5/8"	69	103	138	207	276
42"	1-1/2"	1-5/8"	48	72	96	144	192
48"	1-1/2"	1-5/8"	40	60	81	121	161
54"	1-7/8"	2"	43	64	86	128	171
60"	1-7/8"	2"	35	53	71	106	141
66"	1-7/8"	2"	30	44	59	89	119
72"	1-7/8"	2"	25	38	50	75	101
78"	2"	2-1/4"	28	42	56	84	112
84"	2"	2-1/4"	24	37	49	73	98

*Consult factory for number of rods needed for higher pressure applications.



DUCTILE IRON FLANGED PIPE

GENERAL INFORMATION

DESCRIPTION Flanged Joint Ductile Iron Pipe.

COMMON USAGE Most commonly used in Rigid Pipe Systems in well supported above ground pipe installations. Ductile iron flanged pipe is particularly suited for water filtration plants, sewage disposal plants wastewater treatment plants, pumping and lift stations, and industrial plant applications. The underground use of ductile iron flanged pipe is generally not recommended.

PIPE SPECIFICATIONS

SPECIFICATION Ductile Iron Flanged Pipe is manufactured in accordance with ANSI/AWWA C115/A21.15. See attached TABLE 1 for technical data.

DI PIPE SPEC Ductile iron pipe barrels conform to ANSI/AWWA C151/A21.51. Pipe shall be minimum Class 53. Pipe Class submitted is noted below.
 CL 53 CL54 CL55 CL56

FLANGE SPEC Flanges are made of ductile iron and are drilled in accordance with ANSI B16.1 Class 125. ANSI Class 250 drilled flanges are available upon request. Flanges submitted are noted below.
 CL125 CL250
 See attached TABLE 2 for flange technical data.

WALL COLLAR C&B standard wall collars are made of ductile iron (ASTM A536 - 70:50:05) and are welded continuously on both sides of the collar. See attached TABLE 3 for wall collar technical data.

LINING SYSTEM

STANDARD LINING C&B standard lining is double thickness cement mortar and bituminous seat coat in accordance with ANSI/AWWA C104/A21.4.
 CEMENT MORTAR

SPECIAL LININGS C&B offers special linings for the interior of the pipe. Special linings submitted are marked below
 PROTECTO 401 X GLASS CBGL911

COATING SYSTEM

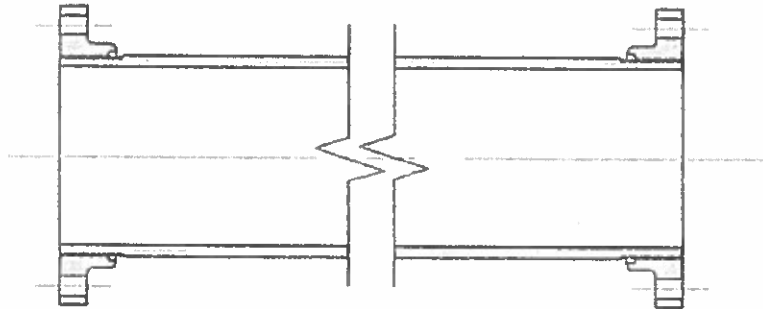
STANDARD COATINGS C&B standard exterior coating is bituminous asphalt in accordance with ANSI/AWWA C151/A21.51. If prime coat is requested, our standard primer is Tnemec 140-1211 epoxy @4-6 mils dft.
 TNEMEC 140-1211 Tech Data Sheet Included

SPECIAL COATINGS C&B offers special coatings upon request. Special coatings submitted are marked below.
 NO SPECIAL COATINGS



DUCTILE IRON FLANGED PIPE

FLANGED PIPE WITH THREADED FLANGES



SIZE (IN.)	PRESSURE RATING PSI	OUTSIDE DIAM (IN.)	THICK (CL53) OF PIPE (IN)	MAX LENGTH (FT-IN)	WEIGHT IN POUNDS		
					FLANGE	PIPE W/O FLANGES PER FOOT	PIPE W/FLANGES PER MAX LENGTH
03"	250	3.96	0.31	17' 6"	7	10.9	205
04"	250 †	4.80	0.32	19' 6"	13	13.8	295
06"	250 †	6.90	0.34	19' 6"	17	21.4	451
08"	250 †	9.05	0.36	19' 6"	28	30.1	643
10"	250 †	11.10	0.38	19' 6"	38	39.2	840
12"	250 †	13.20	4.00	19' 6"	58	49.2	1075
14"	250 †	15.30	0.42	19' 6"	72	60.1	1316
16"	250 †	17.40	0.43	19' 6"	80	70.1	1527
18"	250 †	19.50	0.44	19' 6"	90	80.6	1752
20"	250 †	21.60	0.45	19' 6"	115	91.5	2014
24"	250 †	25.80	0.47	19' 6"	160	114.4	2551
30"	250	32.00	0.51	17' 6"	240	154.4	3182
36"	250	38.30	0.58	17' 6"	350	210.3	4380
42"	250	44.50	0.65	17' 6"	500	274.0	5795
48"	250	50.80	0.72	19' 0"	625	346.6	7835
54"	250	57.56	0.81	19' 0"	670	441.9	9736
60"	250	61.61	0.83 ††	19' 0"	1035	485.0	11285
64"	250	65.67	0.87 ††	19' 0"	1510	542.0	13318

TABLE 1

† This size may be rated at 350 psi if FLANGE-TYTE gaskets are utilized during installation.

†† Wall thickness corresponds to CL350 or 60" and 64" diameters

For bolt hole details, see TABLE 2.



DUCTILE IRON C110 FLANGED FITTINGS

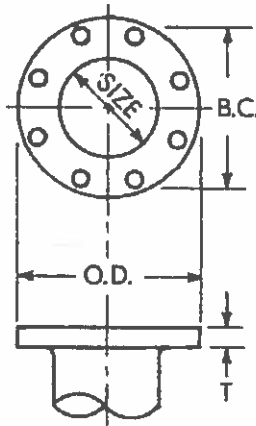
Sizes 3" thru 12" UL Listed for Fire Main Equipment

SAMPLE SPECIFICATION

Flanged Fittings, 2" through 48" shall be manufactured of Ductile Iron in accordance with all applicable terms and provisions of standards ANSI/AWWA C110/A21.10 (current revisions). Flange surface shall be faced and drilled in accordance with ANSI Class 125 B16.1. All Ductile Iron Flanged Fittings shall be rated for water pressure of 250 PSI. Flanged ductile-iron fittings in 24-in. (610 mm) and smaller sizes may be rated for 350 psi (2,413 kPa) with the use of special gaskets. NOTE: Fittings are CEMENT-LINED and seal coated in accordance with ANSI/AWWA C104/A21.4, also available prime coated, bare or epoxy coated. All coated fittings meet requirements of NSF-61. ~~Interiors shall be lined and seal coated in accordance with ANSI/AWWA C104/A21.4, "Cement-mortar Lining for Ductile Iron Pipe and Fittings for Water"~~ unless otherwise specified.

*Hot Lined in
Primer Out
Same as Fab Pipe*

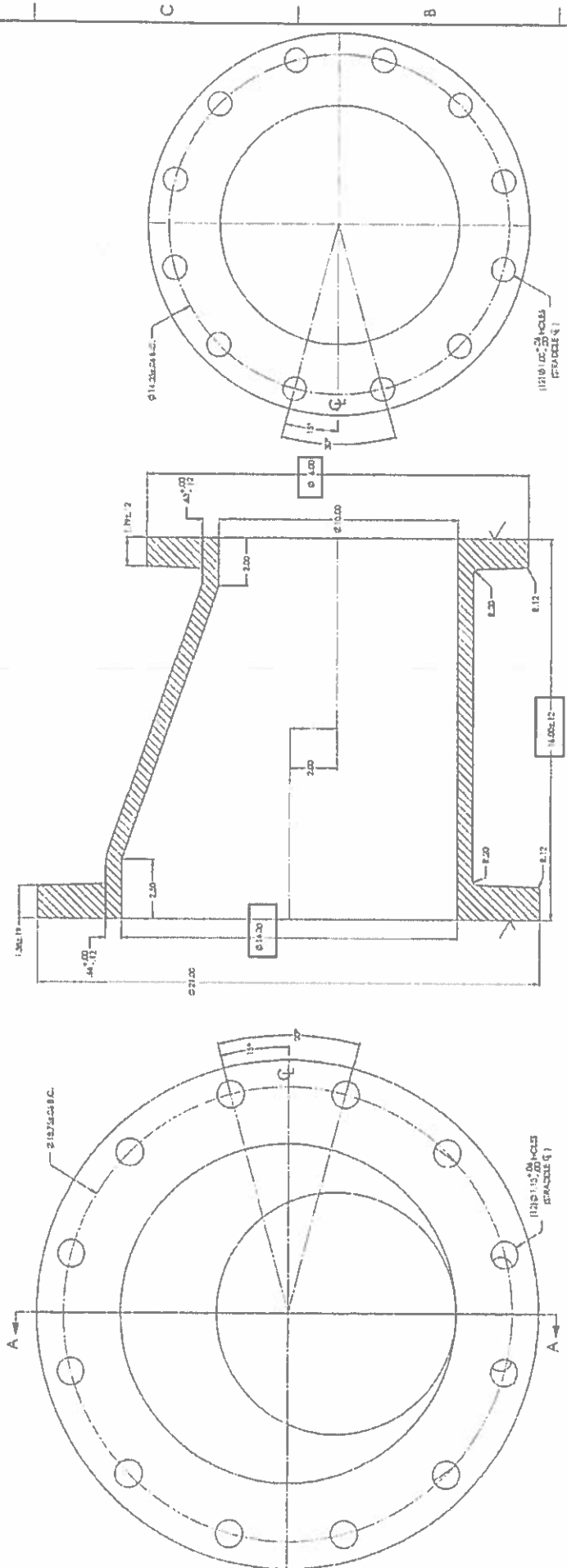
FLANGE DETAILS



NOTE: No flange joint material furnished.

Nominal Pipe Size Inch	Flange O.D.	Dia. of Bolt Circle	Flange Thickness T	Bolt Hole Diameter	Number of Bolts	Bolt Dia. and Lengths
2	6	4.75	.62	.75	4	3/8 x 2 1/4
3	7.5	6	.75	.75	4	3/8 x 2 1/2
4	9	7.5	.94	.75	8	3/8 x 3
6	11	9.5	1.00	.875	8	3/4 x 3 1/2
8	13.5	11.75	1.12	.875	8	3/4 x 3 1/2
10	16	14.25	1.19	1.00	12	7/8 x 4
12	19	17	1.25	1.00	12	7/8 x 4
14	21	18.75	1.38	1.125	12	1 x 4 1/2
16	23.5	21.25	1.44	1.125	16	1 x 4 1/2
18	25	22.75	1.56	1.25	16	1 1/8 x 5
20	27.5	25	1.69	1.25	20	1 1/8 x 5
24	32	29.5	1.88	1.375	20	1 1/4 x 5 1/2
30	38.75	36	2.12	1.375	28	1 1/4 x 6 1/2
36	46	42.75	2.38	1.675	32	1 1/2 x 7
42	53	49.50	2.62	1.625	36	1 1/2 x 7 1/2
48	59.50	56.00	2.75	1.625	44	1 1/2 x 8

NOTE: Drilling templates are in multiples of four, so that fittings may be made to face in any quarter. Bolt holes shall straddle the center line.



SECTION A-A

TYLER UNION <small>Quality Products for Service and Profit</small>	
DESCRIPTION: 14" x 10" T.E. REDUCER-F.C.C., C110/A21.10	
SHEET: 1 of 1	
DATE: 07/23/2020	
SCALE: 1:2	SCALE: 1:2
DESIGNER: MN	DRAWN: MN
CHECKED: ED	BY: MN
PROJECT NUMBER: 2414103600	REVISION: A

Notes:
 1. All Dimensions are in Inches.
 2. Marking: Refer to Drawing E-9866.
 3. Material will be poured with Ductile Iron 70-30-05, 60-42-10, or 65-45-12.
 4. Design for casting as per C110/A21.10.
 5. Pressure rating shall be 250 PSI.
 6. Bolt Holes must be concentric with waterway within 0.031 (0.79mm).
 7. Bolt Holes must be spaced & equally spaced with in 0.031 (0.79mm).
 8. Flange Faces shall be finished with shallow serrations.