Weaver
CONSTRUCTION MANAGEMENT
3679 S Huron Street, Suite 404 Englewood, Colorado 80110
Phone: (303) 789-4111 FAX: (303) 789-4310

SUBMITTAL TRANSMITAL

August 13, 2012
Submittal No: 11316-001

PROJECT: **Harold Thompson Regional WRF**
Birdsall Rd.
Fountain, CO 80817
Job No. 2908

ENGINEER: **GMS, Inc.**
611 No. Weber St., #300
Colorado Springs, CO 80903
719-475-2935 Roger Sams

OWNER: **Lower Fountain Metropolitan Sewage Disposal District**
901 S. Santa Fe Ave.
Fountain, CO 80817
719-382-5303 James Heckman

CONTRACTOR: **Ambiente H2O Inc. (USEMCO)**
1500 W Hampden Ave., STE 5D
Sheridan, CO 80110
303-433-0364 Jane Harlow/ Bill Pinkston

SUBJECT: Submersible Pumps by Fairbanks Morse TAG: DP-1 & DP-2

SPEC SECTION: 11316 – Submersible Pumps

PREVIOUS SUBMISSION DATES:

DEVIATIONS FROM SPEC: ___ YES _X_ NO

CONTRACTOR'S STAMP: This submittal has been reviewed by Weaver Construction Management and, unless indicated otherwise, has been found to be in conformance with the intent of the contract documents.

Contractor's Stamp:	Engineer's Stamp:
Date: 9/13/12 Reviewed by: John Jacob ( ) Reviewed Without Comments (X) Reviewed With Comments	

ENGINEER'S
COMMENTS:_____
_____

Project: HDTWRF Project

Location: Fountain, CO

Supplier: Ambiente Water

Date: 8/13/12

Submittal 11316 Submersible Pumps by Fairbanks Morse DP-1 and DP-2.

Additional Submittal Review Comments:

1. **General Clarifications sheets states that start up is excluded from the work. Section 11316-3.2 requires manufactures services which includes start up.**
2. **Pump discharge size is listed as 5". WCM will provide a 5 x 6 eccentric reducer to accommodate the 6" discharge piping shown on Sheet PD-16.**
3. **The submittal does not include information or a listing for the SS rail listed in 11316-2.3.B. Ambiente Water to provide this rail.**
4. **Ambiente shall confirm that the pump is rated for 5,380 feet above sea level per 11316-1.4.A.**
5. **Ambiente providing a shop paint system by Carboline Bitumastic 300 as an equal. GMS to verify.**
6. **Access covers 11316-2.3.C. have been supplied and installed by WCM.**

End of Review by WCM.

Fairbanks Morse®
Pentair Water

August 8, 2012

Ambiente H2O Inc.
1500 W. Hampden Ave. Ste. 5D
Sheridan, CO 80110

Attn: Jane Harlow

Subject:	Purchase Order Number:	P120165
	Factory Order Number:	095649
	Project:	Harold D. Thompson Water Reclamation Facility

Jane:

Submittal data for the above order is attached. This submittal is for your review and approval prior to release for manufacturing.

We require submittal return with your review comments and/or approval to release within 35 days for production scheduling purposes. At time of release, please advise firm “on-site” requirement dates for this equipment.

Very Truly Yours,

Specifications Department
Pentair Pump Group

Return Submittal to: **Carolyn Crews**
Manager, Order Administration

Enclosures: (1) sets electronic submittal

3601 Fairbanks Ave. • P.O. Box 6999 • Kansas City, Kansas 66106-0999
913-371-5000 • Fax: 913-748-4025

Pentair Pump Group
General Clarifications

1. The supply and installation of the following items are by others unless otherwise indicated in this submittal.
   - Anchor Bolts, nuts and washers
   - Gauges, valves, miscellaneous fittings and adapters
   - Connecting piping and/or supports
   - Maintenance lubrication, lubrication piping and related equipment
   - System controls or electrical work
   - Maintenance tools and/or storage boxes
   - Equipment Tags
   - Installation, start-up or field performance testing

Fairbanks Morse Pump
Submittal Data
For
Harold D. Thompson Water Reclamation Facility
El Paso County, CO

Supplier:	Ambiente H2O, Inc.
Manufacturer:	
Pump & Motor	Fairbanks Morse Pump 3601 Fairbanks Ave. Kansas City, Kansas 66106-0906 Phone: (913) 371-5000 Fax: (913) 748-4025
Fairbanks Morse Project Number:	095649
Fairbanks Morse Sales Order No:	2529536
Tag:	DP-1, DP-2
Quantity:	2
Pump Size & Model:	5” D5433MV Submersible

Fairbanks Morse Pump
Submittal Table of Contents

Fairbanks Morse Pump
Included Features

- Fairbanks Morse Submersible Motor
- U L Listed, Explosion Proof, Class 1, Division 1, Groups C & D
- Characteristics
  HP 9.7
  RPM 856
  Ph/Hz/Volt 3/60/460
- Mechanical Seal
  Outer Seal:
  Silicon Carbide Vs Tungsten Carbide
  Inner Seal:
  Ceramic vs. Carbon
- Winding Thermostats
- Moisture Detectors
- Stainless Steel Bolting
- Power Cable Length, 40 Ft
- Continuous Duty In Air
- Lifting Bail
- 25 Ft. Stainless Steel Lifting Chain
- Dynamically Balanced Cast Iron Impellers
- Stainless Steel Impeller Fasteners
- 5 x 6 Pull Up Elbow
- Stainless Steel Top Guide Bracket
- Stainless Steel Intermediate Guide Bracket
- 6” Riser
- Certified Non-Witness Performance Test, 1 Pump
- Certified Non-Witness Hydrostatic Test per H-I Standards, 2 Pumps
- A Lot of Spare Parts
  1 Set Mechanical Seals, Inner and Outer
  1 Set Bearings

1. Submersible motors are supplied with moisture detectors as standard equipment. A compatible controller is supplied and must be connected to properly protect the motor. If the controller is not connected, the manufacturer's warranty is invalid.

Fairbanks Morse
Pentair Water

CURVE NO.:	095649	REV.:	0

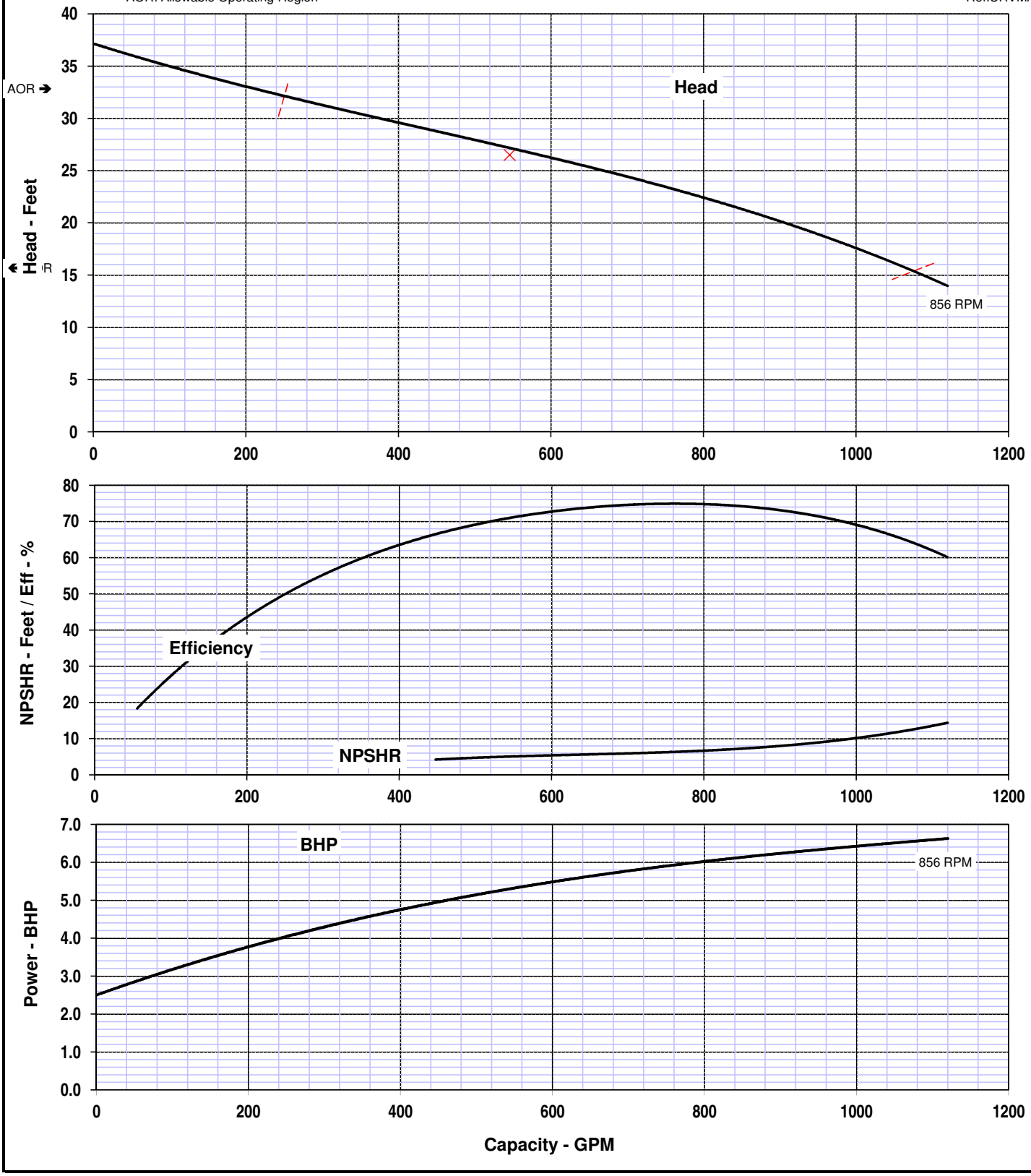
5" D5433MV SUBMITTAL CURVE

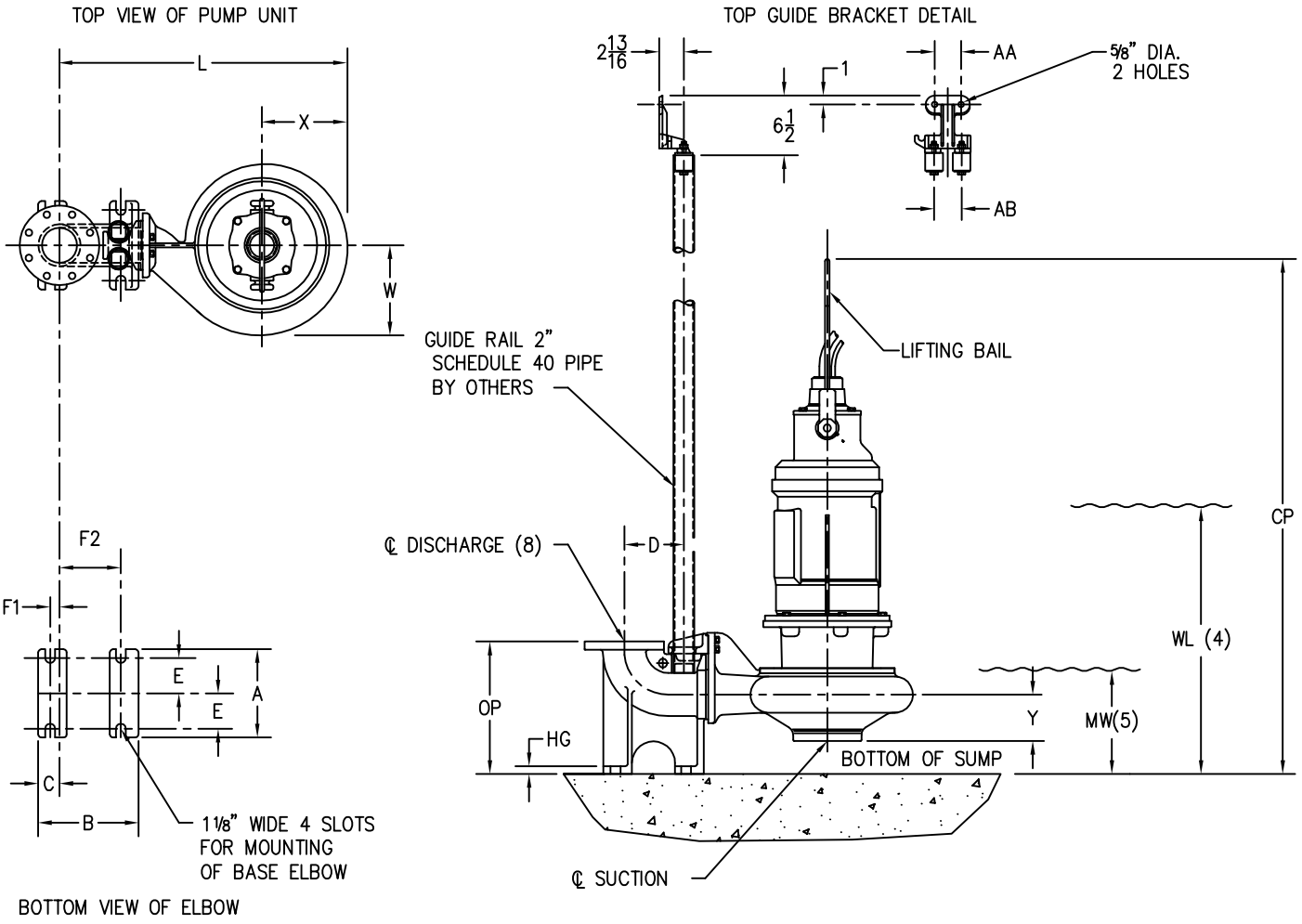
SPEED	IMPELLER	DIAMETER	STAGE	GUARANTEED VALUES			
856	T5C1A	11.90	1	FLOW	HEAD	% EFF	BHP
SPHERE	DRIVER	DATE	BY	546	26.5		
3"	9.7 HP	8/6/2012	DF				

THIS CURVE IS BASED ON THE ACTUAL TEST PERFORMANCE OF A SIMILAR PUMP. ONLY THE INDICATED POINT(S) IS GUARANTEED.

AOR: Allowable Operating Region

Ref:CRVMAC





PUMP	MOTOR FRAME	DISCH	A	B	C	D	E	F1	F2	L	W	X	Y	AA	AB	CP	HG	MW	OP	WL
5" D5433MV	210T	6	16	17 1/2	4 1/2	9 1/4	7	2 7/8	10 1/8	42 5/8	11 7/8	11 1/4	6 3/4	3	3 1/8	59 1/2	1 1/4	17 3/4	21 1/2	36

NOTES:

(1) DISCHARGE FLANGE IS 125# ANSI DRILLING UNLESS NOTED.
(2) ALL DIMENSIONS ARE IN INCHES UNLESS NOTED.
(3) 5400'S AND 5400K'S ARE DIMENSIONALLY IDENTICAL.
(4) RECOMMENDED LOW WATER LEVEL FOR CONTINUOUS OPERATION. 210 FRAME AND WATER JACKETED 250 THRU 440 FRAME UNITS CAN OPERATE CONTINUOUSLY AT "MW" WATER LEVEL.
(5) WATER LEVEL MAY BE DRAWN DOWN TO THIS LEVEL FOR SHORT TIME DUTY IN AIR MOTOR RATINGS. DRAW DOWN CAN OCCUR OVER A PERIOD OF 15 MINUTES.
(6) BASES ARE DESIGNED TO HAVE FULL CONTACT WITH GROUT OR A SOLE PLATE GROUTED IN PLACE.
(7) NOT FOR CONSTRUCTION, INSTALLATION, OR APPLICATION PURPOSES UNLESS CERTIFIED. DIMENSIONS SHOWN MAY VARY DUE TO NORMAL MANUFACTURING TOLERANCES.
(8) IF RISER PIPE IS NOT SAME SIZE AS THE DISCHARGE ELBOW, AN ECCENTRIC INCREASER MUST BE USED LIMITED TO TWO SIZES LARGER MAXIMUM.

UL LISTED
ISO-9001 CERTIFIED
CSA CERTIFIED (THRU 365 FRAME)

CUSTOMER: AMBIENTE H2O INC.					P.O. NO.: P120165	
JOB NAME: HAROLD D. THOMPSON WATER RECLAMATION FACILITY					TAG NAME: DP-1, DP-2	
PUMP SIZE AND MODEL: 5" D5433MV SUBMERSIBLE		GPM: 546	TDH: 26.5	RPM: 856	ROTATION: CW	
MOTOR: FAIRBANKS	HP: 9.7	FRAME: 210T	PHASE: 3	HERTZ: 60	VOLTS: 460	ENCLOSURE: SUBM
CERTIFIED FOR: PROJECT NO. 095649			CERTIFIED BY: KLB		DATE: 8/8/2012	

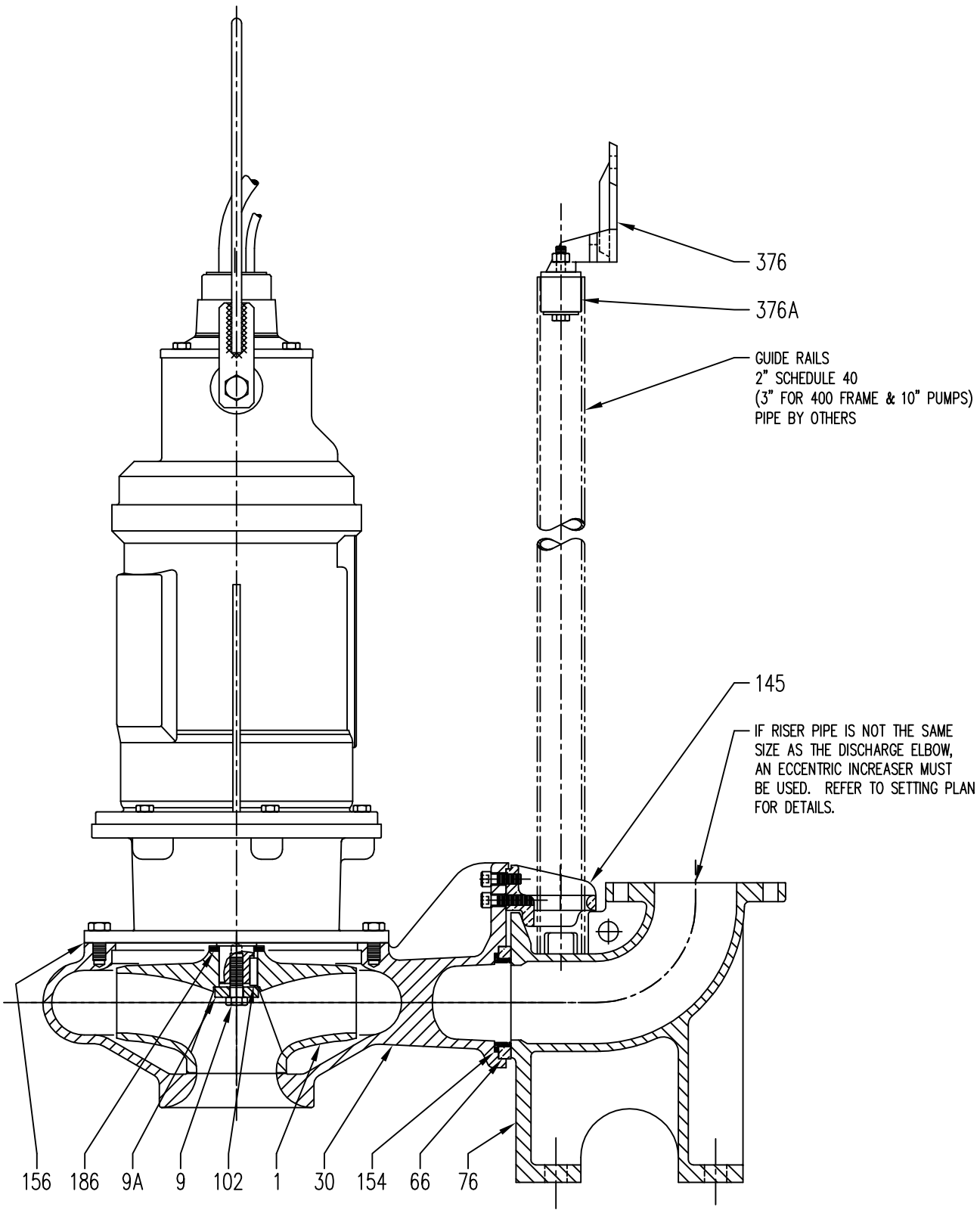
Fairbanks Morse®
Pentair Water

BASIC PUMP
5" D5433MV
PULL-UP SUBMERSIBLE
FAIRBANKS MORSE MTR

DWG NO 095649SP REV NO 0

Fairbanks Morse Pump
Material List

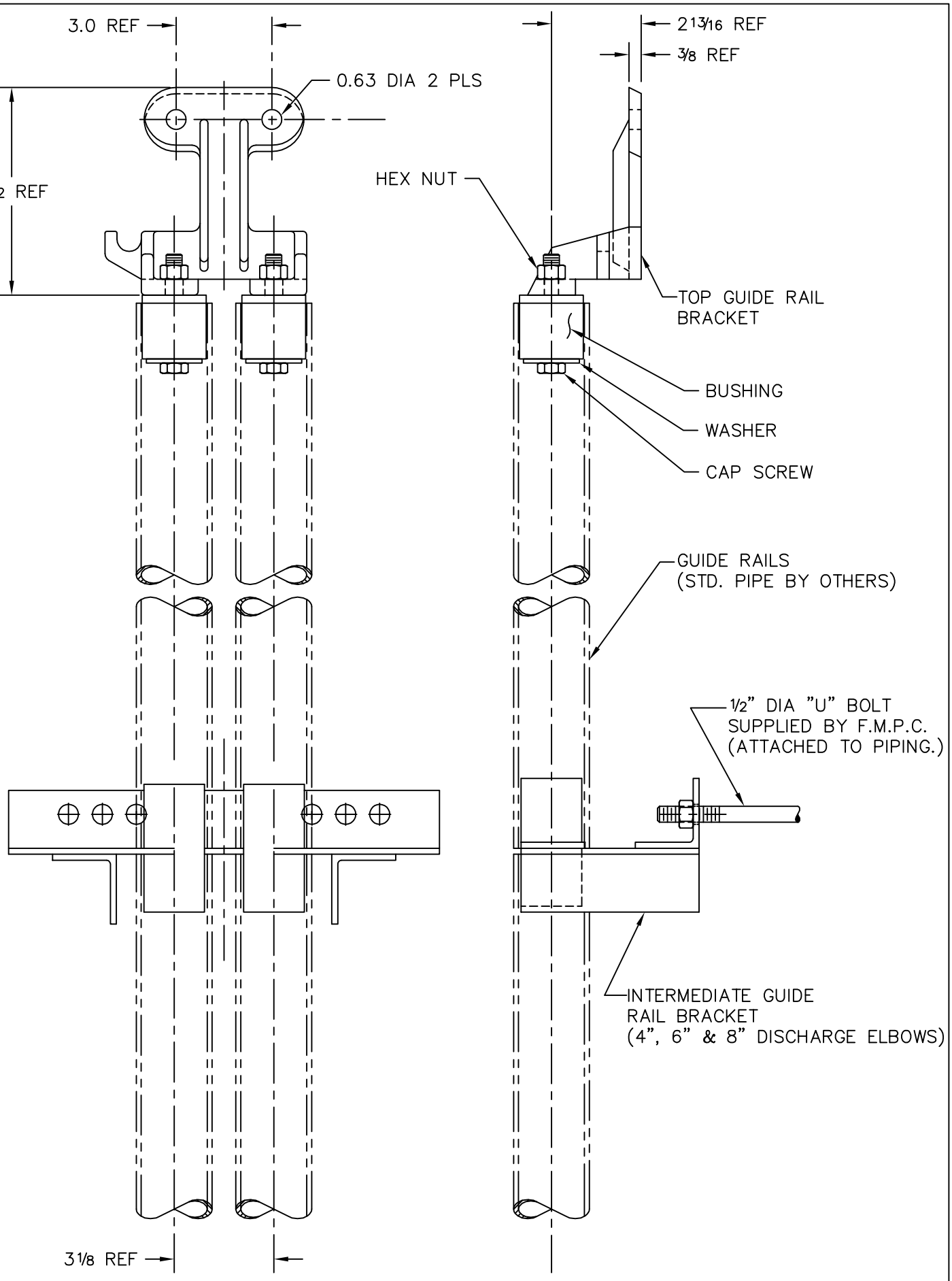
Item	Description	Material	Specification
1	Impeller	Cast Iron	A48 Class 30
9	Capscrew, Impeller	Steel	SAE Bolt Steel
9A	Washer, Impeller	Steel	AISI 1215
30	Volute	Cast Iron	A48 Class 30
66	Ring, Flange	Brass	B505 AL932
76	Discharge Elbow	Cast Iron	A48 Class 30
102	Key, Impeller	Stainless Steel	A582 S41600
145	Bracket, Guide	Stainless Steel	A743 GR CF-8M
154	Seal, Flange	Rubber	BUNA-N
156	Gasket, Volute	Tag Board	F104
186	Impeller Shim	Stainless Steel	A582-303
376	Upper Guide Bracket	Stainless Steel	A743 GR CF-8M
376A	Bushing, Upper Guide	Rubber	Commercial
---	Bolting	Stainless Steel	Commercial



ASSEMBLY, D5433MV, PULL-UP SUBMERSIBLE
210T FRAME FAIRBANKS MORSE MOTOR

Fairbanks Morse®
Pentair Water

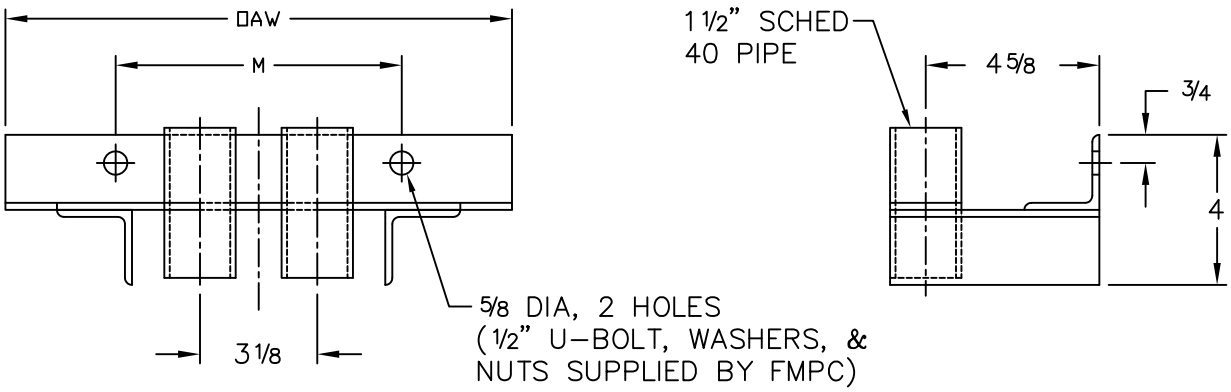
DWG NO	543MA005	REV NO	3



ASSEMBLY, TOP AND INTERMEDIATE GUIDE BRACKET 4", 6", 8" 543XMV PULL UP

Fairbanks Morse® Pentair Water

DWG NO	IGB–468	REV NO	0



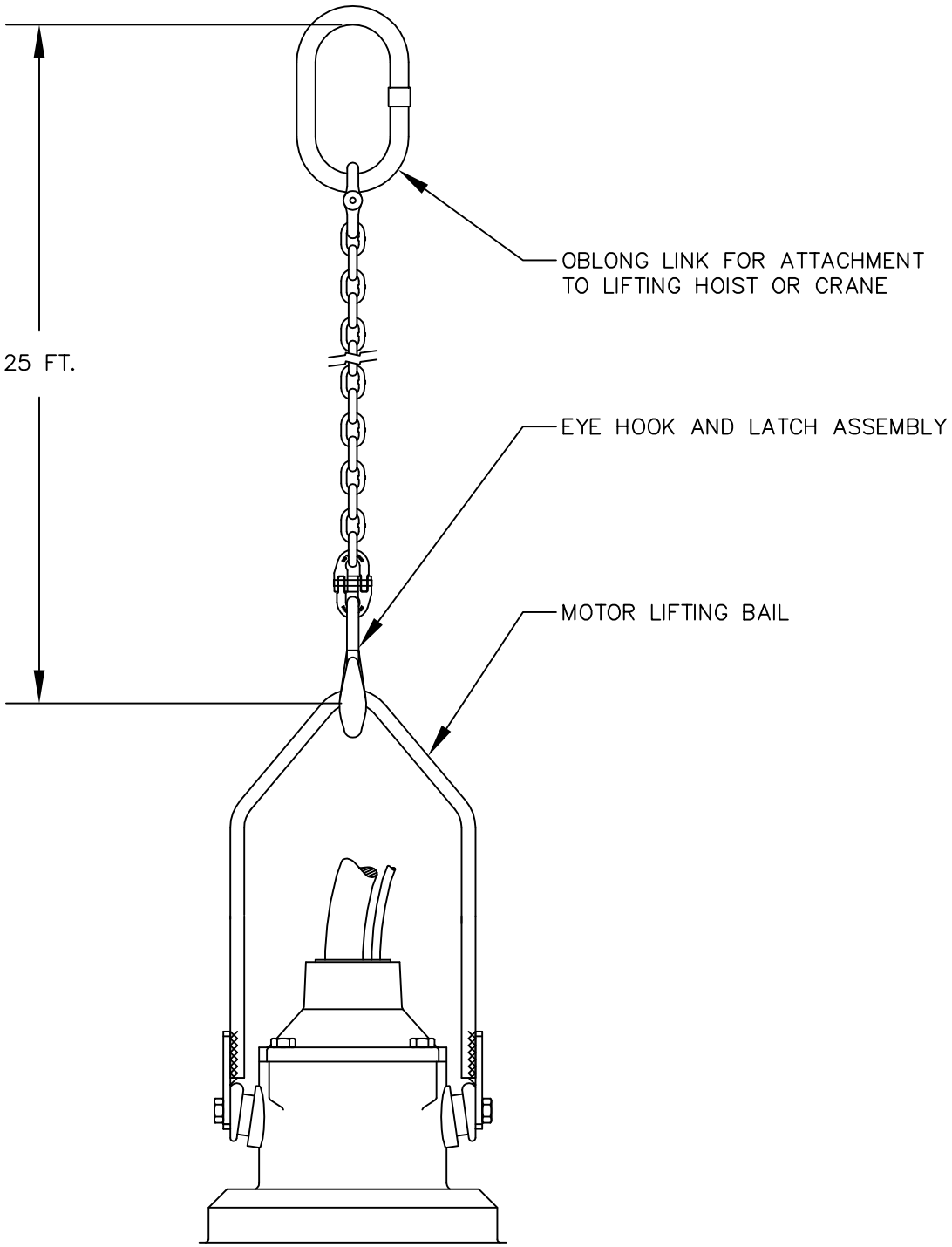
PUMP SIZE	DISCHARGE PIPE SIZE	OAW	M
2", 3", & 4"	4"	13 1/2"	5 1/2"
2", 3", 4", 5", & 6"	6"	13 1/2"	7 5/8"
3", 4", 5", 6", & 8"	8"	13 1/2"	9 3/4"
6" & 8"	10"	16 1/4"	11 3/4"
8"	12"	16 1/4"	14"

365T & Smaller Frame Motors

SUBMERSIBLE PULL-UP INTERMEDIATE GUIDE BRACKET DETAILS, CENTERLINE VOLUTE PUMPS

Fairbanks Morse®
Pentair Water

DWG NO	IGB-54MV	REV NO	0



FAIRBANKS MORSE MOTOR BAIL & LIFTING CHAIN DETAIL

Fairbanks Morse®
Pentair Water

DWG NO	095649LC	REV NO	0

Fairbanks Morse Pump
Technical Data

Size	5
Nominal Wear Ring Clearance	0.020
Impeller Fastener	
Tightening Torque (Lb.-Ft)	120
Impeller	
Weight (Lbs)	70
Inlet Area (In-Sq.)	46.43
Sphere Size	3
Max. Hydrostatic Test (PSI)	125
Max. Casing Working (PSI)	85
Nominal Casing Thickness	1/2
Max. Operation Temp.	104^0F
Weight (Lbs.)	
Pump & Motor	880
Elbow	150

Fairbanks Morse Pump
Spare Parts List

Ref. No.	Description	Quantity
---	Mechanical Seal, Set	1
---	Bearings, Set	1

Fairbanks Morse Pump
Paint Specifications

- Coating Manufacturer:
  Carboline
- Surface Preparation
  SSPC-SP10
- Prime Coat: Bitumastic 300 M
  Number of Coats: 1
  Color: Black
  Dry Film Thickness: 8 Mils
- Finish Coat: Bitumastic 300 M
  Number of Coats: 1
  Color: Black
  Dry Film Thickness: 8 Mils
- Surfaces to be Coated:
  Exterior of Pump and Motor & Elbow

product data

carboline®

Bitumastic®300 M

Selection & Specification Data

Generic Type Coal Tar Epoxy

Description Renowned high build coal tar epoxy for protection of steel and concrete in single or two-coat applications in a broad variety of aggressive industrial applications.

Features

- Excellent chemical, corrosion and abrasion resistance
- High-build up to 24 mils (610 microns) in a single coat
- Compatible with controlled cathodic protection
- Meets or exceeds all requirements of:
  - **Corp of Engineers C-200, C200a**
  - **AWWA C-210-92 for exterior**
  - **SSPC-Paint 16**
  - **Steel Tank Institute Corrosion Control System STI-P_3**

Color Black (0900)

Finish Gloss. Will discolor, chalk and lose gloss in sunlight exposure.

Primers Self-priming, Carboguard 888 or others as recommended.

Topcoats Not recommended

Dry Film Thickness 16.0 mils (400 microns) in one or two coats. Total dry film thickness less than 8 mils (200 microns) or in excess of 24 mils (610 microns) not recommended.

Solids Content By Volume: 74% ± 2%

Theoretical Coverage Rate 1187 mil ft^2 (29.1 m^2/l at 25 microns)
Allow for loss in mixing and application

VOC Values
As supplied: 1.85 lbs/gal (222 g/l)
Thinned:
20 oz/gal w/ #10:* 2.6 lbs/gal (309 g/l)
25 oz/gal w/ #10: 2.7 lbs/gal (327 g/l)
These are nominal values.
*Maximum thinning for 250 g/l restricted areas is 6 oz/gal.

Dry Temp. Resistance
Continuous: 350°F (177°C)
Non-Continuous: 370°F (190°C)

Wet Temp. Resistance Immersion temperature should not exceed 120°F (49°C).

Limitations Do not use for potable water requirements

Substrates & Surface Preparation

General Surfaces must be clean and dry. Employ adequate methods to remove dirt, dust, oil and all other contaminants that could interfere with adhesion of the coating.

Steel
Immersion: SSPC-SP10
Non-Immersion: SSPC-SP6. SSPC-SP2 or SP3 as minimum requirement imparting proper profile.
Surface Profile: 2.0-3.0 mils (50-75 micron)

Concrete Concrete must be cured 28 days at 75°F (24°C) and 50% relative humidity or equivalent. Prepare surfaces in accordance with ASTM D4258 Surface Cleaning of Concrete and ASTM D4259 Abrading Concrete. Voids in concrete may require surfacing.

Performance Data

Test Method	System	Results	Report #
ASTM D4060 Abrasion	Blasted Steel 2 cts. 300M	130 mg. loss after 1000 cycles. CS17 wheel, 1000 gm load.	02877
ASTM D4541 Adhesion	Blasted Steel 2 cts. 300M	1443 psi (Pneumatic)	02877
ASTM D2794 Impact	Blasted Steel 2 cts. 300M	Impact site diameter. Inches: 3/8, 3/8, ½ 100 in/lbs Gardner Impactor at ½ in. diam.	02877
ASTM B117 Salt Fog	Blasted Steel 2 cts. 300M	No blistering, rusting or delamination. No measurable undercutting at scribe after 2000 hrs.	02938

Test reports and additional data available upon written request.

March 2003 replaces June 2002

0165

Bitumastic® 300M

Application Equipment

Listed below are general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results.

General Guidelines:

Spray Application (General) This is a high solids coating and may require adjustments in spray techniques. Wet film thickness is easily and quickly achieved. The following spray equipment has been found suitable and is available from manufacturers such as Binks, DeVilbiss and Graco.

Conventional Spray Pressure pot equipped with dual regulators, 3/8" I.D. minimum material hose, with 50' maximum material hose .086" I.D. fluid tip and appropriate air cap.

Airless Spray

Pump Ratio:	30:1 (min.)*
GPM Output:	3.0 (min.)
Material Hose:	½" I.D. (min.)
Tip Size:	.023-.035"
Output PSI:	2100-2500
Filter Size:	30 mesh

*Teflon packings are recommended and available from the pump manufacturer.

Brush & Roller (General) Recommended for touch up, striping of weld seams and hard-to-coat areas only. Avoid excessive re-brushing or re-rolling.

Brush Use a medium bristle brush.

Roller Use a short-nap synthetic roller cover with phenolic core.

Mixing & Thinning

Mixing Power mix separately, then combine and power mix for a minimum of two minutes. DO NOT MIX PARTIAL KITS.

Ratio 4:1 Ratio (A to B)

Thinning Up to 20 oz/gal (16%) w/ #10
Up to 25 oz/gal (20%) w/ #10 for the first coat application to concrete. Use of thinners other than those supplied or recommended by Carboline may adversely affect product performance and void product warranty, whether expressed or implied.

Pot Life

75°F (24°C)	2 Hours
90°F (32°C)	1 Hour

Pot life ends when coating loses body and begins to sag.

Cleanup & Safety

Cleanup Use Thinner #2 or Acetone. In case of spillage, absorb and dispose of in accordance with local applicable regulations.

Safety Read and follow all caution statements on this product data sheet and on the MSDS for this product. Employ normal workmanlike safety precautions. Hypersensitive persons should wear protective clothing, gloves and use protective cream on face, hands and all exposed areas.

Caution This product contains flammable solvents. Keep away from sparks and open flames. All electrical equipment and installations should be made and grounded in accordance with the National Electric Code. In areas where explosion hazards exist, workmen should be required to use non-ferrous tools and wear conductive and non-sparking shoes.

Application Conditions

Condition	Material	Surface	Ambient	Humidity
Normal	60-85°F (16-29°C)	60-85°F (16-29°C)	60-85°F (16-29°C)	0-80%
Minimum	50°F (10°C)	50°F (10°C)	50°F (10°C)	0%
Maximum	90°F (32°C)	125°F (52°C)	110°F (43°C)	90%

Condensation due to substrate temperatures below the dew point can cause flash rusting on prepared steel and interfere with proper adhesion to the substrate. Special application techniques may be required above or below normal application conditions.

Curing Schedule

Surface Temp. & 50% Relative Humidity	Dry to Touch	Minimum Recoat Time	Maximum Recoat Time	Cure for Immersion
50°F (10°C)	8 Hours	10 Hours	24 Hours	14 Days
75°F (24°C)	4 Hours	6 Hours	24 Hours	7 Days
90°F (32°C)	2 Hours	3 Hours	24 Hours	5 Days

These times are based on a 16.0 mil (400 micron) dry film thickness. Higher film thickness, insufficient ventilation, high humidity or cooler temperatures will require longer cure times. Excessive humidity or condensation on the surface during curing can interfere with the cure, can cause discoloration and may result in a surface haze. Any haze or blush must be removed by water washing before recoating. If the **maximum recoat time** is exceeded, the surface must be abraded by sweep blasting prior to the application of additional coats. **Holiday Detection** (if required): Wet sponge types may be used if the dry film thickness is below 20 mils (500 microns). High voltage spark testing should be used when the dry film thickness exceeds 20 mils (500 microns). Refer to NACE RP0188-90 for specific procedures.

Packaging, Handling & Storage

	1.25 Gallon Kit	5 Gallon Kit
Shipping Weight (Approximate)	12 lbs (6 kg)	50 lbs (26 kg)

Flash Point (Setaflash) 75°F (24°C) for Part A
>200°F (93°C) for Part B

Storage (General) Store Indoors.

Storage Temperature & Humidity 40° -110°F (4°-43°C)
0-100% Relative Humidity

Shelf Life Part A: Min. 12 months at 75°F (24°C)
Part B: Min. 24 months at 75°F (24°C)

***Shelf Life: (actual stated shelf life) when kept at recommended storage conditions and in original unopened containers.**

carboline®

350 Hanley Industrial Court, St. Louis, MO 63144-1599
314/644-1000 314/644-4617 (fax) www.carboline.com

An RPM Company

March 2003 replaces June 2002

MODEL: 10

FRAME	HP	TYPE	PHASE	HERTZ	RPM	VOLTS	F/L AMPS[1]
210	9.7	LK	3	60	856	230/460	31.8/15.9

DUTY	AMB °C	INSUL.	S. F.	NEMA DESIGN	CODE LETTER	STATOR RES. OHMS AT 25°C
Continuous Duty in Air	40	F	1.15 1.0 (VFD)[3]	B	G	1.3617

PERFORMANCE[2]

LOAD	HP	AMPERES	RPM	POWER FACTOR %	EFF. %
2/4	4.9	11.4	882	50.7	78.8
3/4	7.3	13.4	871	62.8	81.0
4/4	9.7	15.9	856	70.7	80.8
S. F.	11.2	17.7	845	73.8	80.0
Locked Rotor	-				

[1] MAXIMUM EXPECTED VALUE (NAMEPLATE AMPS).
WHEN OPERATING WITH A PWM-TYPE VARIABLE SPEED DRIVE, IT IS OUR RECOMMENDATION THAT THE VFD BE SIZED AT A MINIMUM OF 105% OF THE RATED FULL-LOAD AMPS.

[2] INFORMATION IS BASED ON 460 VOLT POWER

[3] SERVICE FACTOR SHALL BE 1.15 ON SINE WAVE POWER ADN 1.0 FOR VARIABLE FREQUENCY POWER INPUT.
IN ORDER TO MEET NEMA MG1 PART 31 AN INVERTER DUTY MOTOR MUST BE PURCHASED.

DWN. BY KWS	CKD. BY MB	DATE 2/13/2012	RELEASE 1
DATA SHEET NUMBER: GMD21UB17		APP BY BGJ	ISSUED 2/13/2012

Fairbanks Morse
Pentair Water

PERFORMANCE DATA
GUARANTEED
SUBMERSIBLE MOTOR

UL Listed

Power Cable

Continuous Duty in Air

HP	RPM	460V		
		Dia.	AWG Wire Size 4 Wire	Number Cables
9.7	856	.675	12	1

Control Cable

The control cable has an outside diameter of 0.482 inches and includes five #18 wires; two for thermostats, two for moisture detectors and one ground.

Units are UL Listed, explosion–proof, for Class 1, Division 1, Groups C & D and manufactured by Fairbanks Morse in our dedicated Kansas City, Kansas manufacturing facility ensuring compatibility, quality assurance, and reliability of the complete unit.

Heavy cast iron motor housing, silicon steel laminations, centrifugally die–cast rotor matched to the stator for high efficiency. Constructed with Class "F" insulation and rated with a 1.15 service factor and continuous duty at 40 degree C ambient temperatures. 210 frame, oil filled.

High motor and hydraulic (wire–to–water) efficiencies ensure low operating costs.

CABLE

Power and control cable are UL listed and MSA approved.

ELECTRICAL CONNECTION

Double–seal system with strain relief, consisting of rubber grommet followed by epoxy. Individual wires have insulation removed and epoxy potted to prevent wicking into the motor.

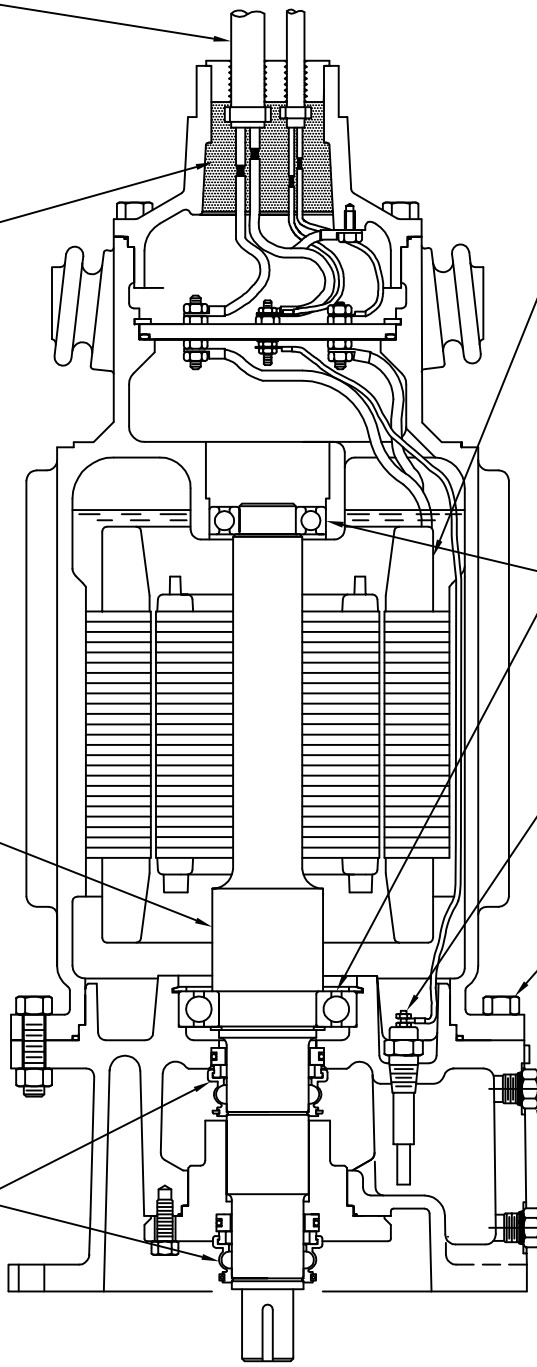
Wires are terminated with connectors secured to bronze lugs on the O–ring sealed terminal board. Stator and control leads from the motor are attached to the underside of the lugs.

SHAFT

Large diameter one–piece 416 stainless steel, precision machined over its entire length to ensure a tight fit of the impeller and rotor to the shaft.

MECHANICAL SEALS

Two separate seals, tandem mounted to protect the motor from the pumped liquid. Upper seal uses carbon against ceramic faces and the lower seal uses silicon carbide against tungsten carbide faces as standard.



THERMOSTATS

Imbedded in the motor windings to protect from overheating. These devices are reset automatically. Excessive heat will cause the normally closed contact to open, stopping the motor.

BEARING LIFE

Oil lubricated thrust bearing and radial bearing with an L10 bearing life of 50,000 hours at BEP. For higher bearing load applications, optional bearing construction is available.

TWO MOISTURE DETECTORS

Detect moisture entering the oil cavity or stator housing and send a signal to a compatible controller.

STAINLESS STEEL BOLTING

External bolting is stainless steel as standard for ease of maintenance

OIL INSPECTION PLUGS

Convenient, removeable O–ring sealed plugs for inspection and ease of changing oil in the mechanical seal chamber.

210 & 220 FRAME SUBMERSIBLE MOTOR

Fairbanks Morse®
Pentair Water

DWG NO	DSUBM011A	REV NO	1

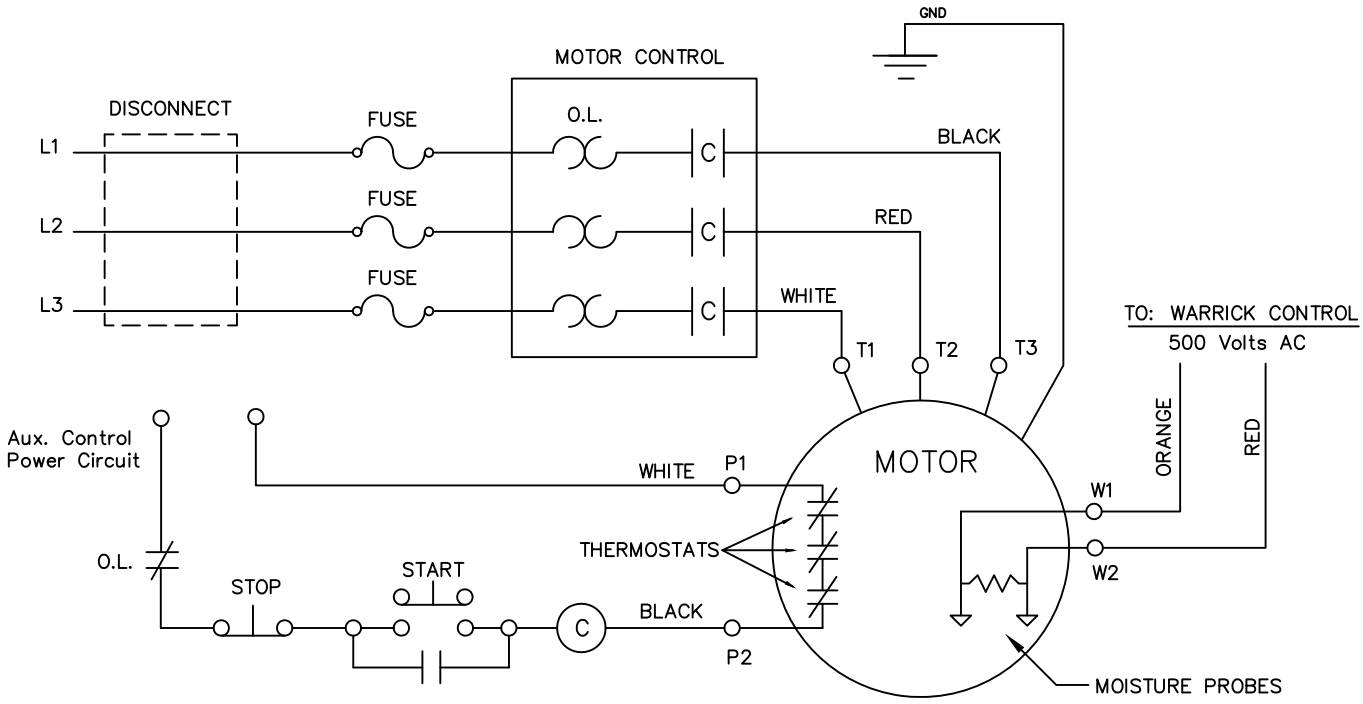
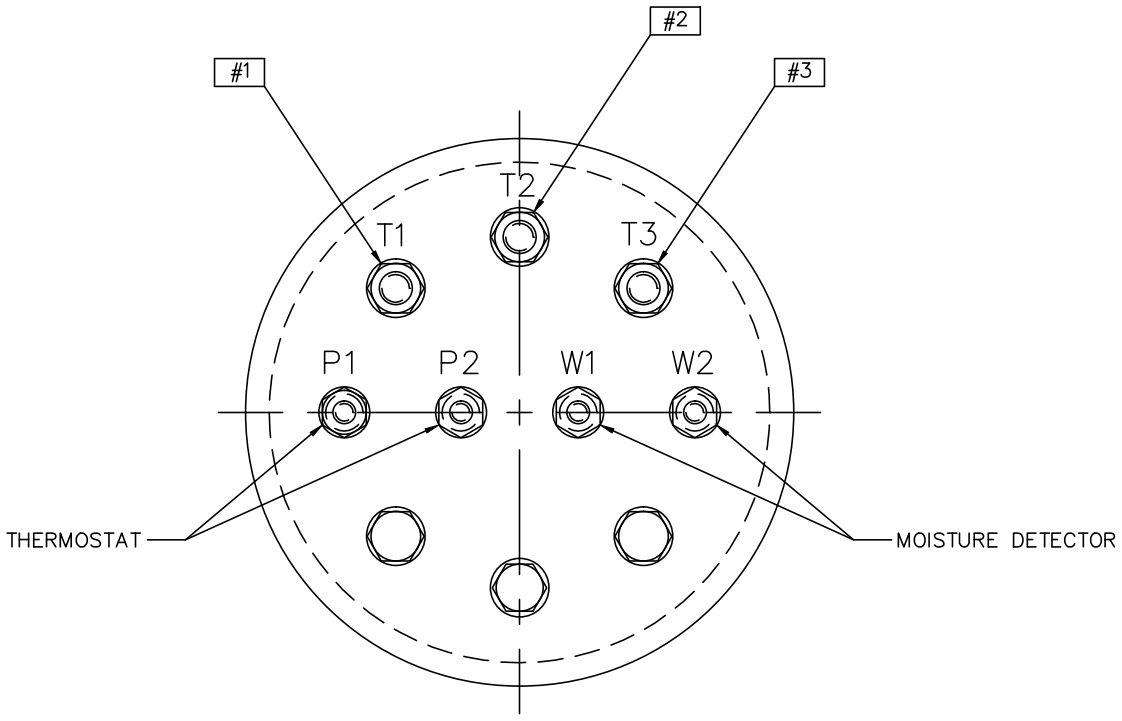


Figure 3

FAIRBANKS MORSE PUMP
SUBMERSIBLE MOTOR WIRING DIAGRAM
210T, 220T FRAME MOTORS

Fairbanks Morse®
Pentair Water

DWG NO	543MM001	REV NO	1



CABLE LEAD SIDE
CONNECTIONS
FIGURE #8

TERMINAL BOARD CONNECTIONS
210T – 320T FRAME SINGLE VOLTAGE MOTORS

Fairbanks Morse
Pentair Water

DWG NO 543MM015–4 | REV NO 1

CUSTOM ENTERPRISES MOISTURE DETECTION

INSTALLATION AND OPERATING INSTRUCTIONS

GENERAL DESCRIPTION:
The CE2800/CE2810 is a conductance-actuated control for detection of moisture in the oil chamber of a submersible pump motor. It is used as a warning devise to indicate a seal leakage and to signal the need for preventative maintenance.

INSTALLATION:
Mount the control box vertically on a wall or other solid structure. The CE2800/CE2810 is to be wired as indicated on drawing no.CE2800/CE2810. Terminals on the control relay are numbered and are in the same relative position as shown on the wiring diagram. Terminals 3 and 4 must be continuously energized from an AC power source with the proper line voltage.(See the appropriate Catalog Numbering System for the line voltage options). Contacts 1-2, 5-6, and 9-10 are available for load duty. The contacts are rated at 25 amp Resistive at 120, 240, or 480VAC. Terminals 7 and 8 are connected to the moisture sensing probes in the motor. CAUTION: the probe sensing circuit, terminals 7 and 8 have 480 volts AC. This high voltage has minimal amperage but can cause significant shocking.

OPERATION:
Normally the oil surrounding the probes is non-conductive and the control will be de-energized. An influx of moisture past the outer seal and into the oil reservoir will change the conductivity of the oil and cause the relay to energize. Note that the moisture may not cause this change in conductivity until motor is running and moisture becomes emulsified with the oil. Load contacts 1-2, 5-6, and 9-10 will change from their normally open or normally closed position when the control energizes.
The CE2810 has a red "Seal Leak" indicating light to indicate moisture in the oil chamber.

TEST PROCEDURE:
A normally closed "Test" push button and a yellow neon "Operational" indicator lamp are provided as part of the control relay for testing the moisture sensing components. The motor manufacturer has provided a 333,000 ohm resistor across the probes inside the motor to complete the test. When the "Test" pushbutton is depressed, the neon "Operational" indicator lamp will be illuminated to indicate:

- **A: Power is supplied to the control**
- **B: The control is operational**
- **C: The wiring to the motor sensing probes is intact**

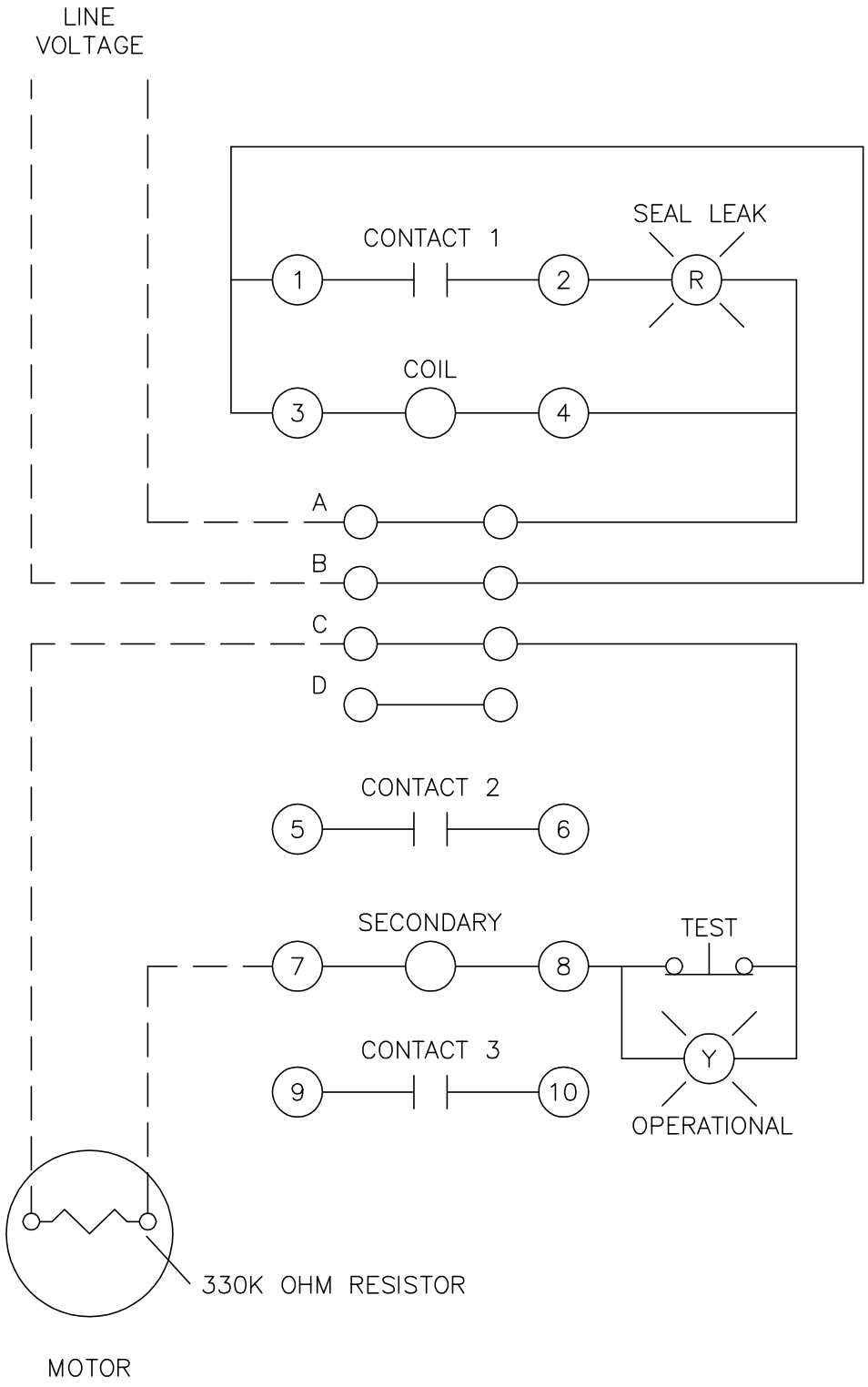
CE2810 CATALOG NUMBERING SYSTEM

CE2810 --- --- ---

Enclosure Style
1 = NEMA 1
→ 4 = NEMA 4

Contact Configuration
→ D = 1 normally open
E = 1 normally closed
G = 2 normally open
H = 1 normally closed, 1 normally open
J = 2 normally closed

Line Voltage
→ 1 = 115 VAC
2 = 230 VAC
3 = 460 VAC



CONTACT CONFIGURATION

"D"
CONTACT 3 NORMALLY OPEN

"E"
CONTACT 3 NORMALLY CLOSED

"G"
CONTACT 2 NORMALLY OPEN
CONTACT 3 NORMALLY OPEN

"H"
CONTACT 2 NORMALLY CLOSED
CONTACT 3 NORMALLY OPEN

"J"
CONTACT 2 NORMALLY CLOSED
CONTACT 3 NORMALLY CLOSED

NOTE: CONTACTS ARE FIELD CONVERTIBLE

— — — INDICATES FIELD WIRING

CE2810