

REQUEST FOR PROPOSALS

RE - ISSUE

City of Rockwood, Michigan

The City of Rockwood (“Rockwood”), Michigan (“MI”), through its City Council (“Council”) is requesting proposals for the removal & replacement of existing components, , and miscellaneous pump, valve, and piping work at the Rockwood Waste Water Treatment Plant, located at 33653 Swallow Drive Rockwood, MI 48173. Work on this Contract shall include the items identified in the Unit Price Table and Task Description Section. Michigan Department of Environment, Great Lakes, and Energy (“EGLE”) Permits will be secured by the City of Rockwood, City Electrical and Plumbing Permits shall be secured by the Contractor through the City of Rockwood Building Department Building.

The Proposer’s shall include detailed information on the components to be installed including manufacturer’s model numbers and specifications for all items being proposed for installation. The proposals should clearly explain and include all work, equipment, materials, and labor required to complete each individual Pay Item listed on the Unit Price Table and a total lump cost for each Pay Item. The selection of a Firm to undertake this project will be based on professional qualifications, experience, and expertise of the personnel, and bid amount. The proposal shall include the necessary information on personnel assigned to the work and a project schedule including the promised and finish deadline dates.

Proposers shall make a mandatory site visit to the Rockwood Waste Water Treatment Plant, as it is the Proposer’s responsibility to familiarize itself with all facilities required to complete this project for Rockwood. The proposer’s failure to familiarize themselves with all aspects of the site along with City, State, and Federal laws or other unseen or latent conditions shall not be cause for the proposer to seek additional funds for this project. This is a contract with Lump Sum Pay Items, and no extras will be allowed.

All proposals shall include, as a minimum, the following provisions and information:

1. All of the significant assumptions on which the pricing is based;
2. A total lump sum cost for each Pay Item;
3. A detailed description of work for all proposed items to be installed and the required work for each Pay Item;
4. A schedule for which details start and completion dates;
5. Sequence of construction to ensure the Treatment Plant remains operational with minimal disruption of normal operations.
6. Furnish General Liability and Umbrella and Products/Completed operation aggregate of \$2,000,000 and excess Liability insurance of not less than \$5,000,000 along with Worker’s compensation insurance and Automobile Liability in the amount of \$1,000,000. Proof of coverage must be provided with Proposal. The engineer; Hubbell, Roth & Clark, Inc., their owners, directors, officers, constituents, agents, and employees are included as Additional insured with respect to the general auto and umbrella liability coverages for the work performed by the named insured for the certificate holder. Insurance is considered primary and non-contributing, and a waiver of subrogation applies.
7. Performance and payment bond for the full amount of the Proposal.

8. Detailed description of what is being proposed product cut sheets, specifications, design calculations, vendor supplies and other miscellaneous items necessary to complete this project must be submitted with the Proposal. Detailed shop drawings of all equipment must be submitted to the engineer. The Contractor shall make any changes or alterations required by the Engineer and re-submit same without delay. The review of the Engineer shall not relieve the Contractor of responsibility for errors, as the Engineer's checking is intended to cover compliance with the drawings and specifications and not to enter into every detail of the shop work. No work shall be undertaken until the Engineer has reviewed the shop drawings. Substitutions and "or-equal" submissions shall be considered if allowable by the Owner. It shall be the Contractor's responsibility to reimburse the Owner for charges by the Engineer for evaluating each proposed substitute.
9. Proposal must include full company name, tax identification number, main office address, telephone number and signed by a corporate officer.
10. Proposal must include a Bid Bond, Certified Check, Cashier's Check, or Money Order, drawn payable to the City of Rockwood in the amount of Five (5) percent of the Proposal Amount submitted. Surety issuing Bid Bond shall be licensed to conduct business in the State of Michigan.
11. Have specific experience in the State of Michigan with similar type projects. Submit three (3) projects with references including contact name, phone number and e-mail address.
12. Identify when the respondent was organized and, if a corporation, where incorporated and how many years engaged in providing this type of service and construction products.
13. Identification of the firms that the respondent intends to subcontract or otherwise use to perform work on this project.
14. Provide specific experience in the type of work proposed.

EVALUATION OF SUBMITTALS

The evaluation of the Proposal and of the respondents presenting them will be carried out by the Council. The Council will make its decision based on information gathered during the procurement process and based upon the recommendation of the City Administrator and/or the City's designated Agent charged with making such recommendation to the City.

The Council regards the submission of the Proposal as the most important factor in the selection of a respondent to provide the services described herein. The City reserves the right to reject any and all of the proposals, to waive any informalities and to award a contract to the proposer whom the Council deems serves the best interest of Rockwood.

The Council shall not be responsible for any costs incurred by responding to this Request for Proposal ("RFP"). Further, Rockwood shall not be responsible for any costs incurred by participating in an oral presentation or costs associated with negotiations.

MISCELLANEOUS INFORMATION

Each respondent must submit three (3) copies of the **Proposal no later than 2:00 P.M. EST on Thursday, February 9, 2023** addressed to: Colleen Oney, Clerk, City of Rockwood, 32409 Fort Street, Rockwood, MI 48173-1190.

The outside shipping label must be clearly marked

"REQUEST FOR PROPOSAL—2023 ROCKWOOD WWTP CIP PROJECT"
ATTN: COLLEEN ONEY, CITY CLERK

Materials must be submitted to and approved by the engineer prior to placement.

The successful Bidder shall be required to furnish separate Performance, Labor and Material, and Payment Bonds, each in the amount of one-hundred percent (100%) of the Contract amount.

A **mandatory** pre-bid conference will be held at City Hall at 10:30 A.M. on Wednesday, January 18, 2023.

Work must be substantially completed on or before Sunday, June 30, 2024, with Final completion on or before Wednesday, November 15, 2024.

Any questions or requests for additional information should be in writing and emailed to jlaub@rockwoodmi.org. The last date for questions is Wednesday, January 27, 2023.

PROJECT SAFETY

CONTRACTOR shall be familiar with and follow applicable OSHA and MiOSHA regulations in the execution of their work. The City of Rockwood and CERCO shall **NOT** be responsible for enforcement of these regulations. It is the responsibility of the Contractor to follow OSHA and MiOSHA standards. Damage caused to existing components in the plant by Contractor's operations shall be repaired by the Contractor, to the satisfaction of the Owner, at no cost to the Owner;

SECTION I / SOUTH PRIMARY CLARIFIER:

1. Removal of existing drive chain and take-up assemblies for the collector drive and helicoid drive units.
2. Install new drive chain stainless steel take-up assemblies and new Brant Manufacturing NH 78 drive chains or approved equal. Brant Manufacturing NH 78 drive chain is molded from POM (Acetal) resin with 7/16” stainless steel pin that locks into both side bars, a tensile strength of 5,000 lbs-f, with a working load of 1,800 lbs-f, and UV resistance. Chain Take-up for Collector drive chain shall include at a minimum installation of one 304 stainless steel tank wall mounting bracket, one 304 stainless steel take-up plate with grease fitting, and lot fasteners. Chain Take-up for Helicoid drive chain shall include at a minimum installation of one 304 stainless steel tank wall mounting bracket, one 304 stainless steel take-up plate with grease fitting, and lot fasteners. See Appendix A
3. Collector drive chain is 45 feet non-metallic polymeric chain.
4. Helicoid drive chain is 50 feet non-metallic polymeric chain.
5. Provide own safety equipment (gas detector-confined space entry)
6. Provide all labor, equipment, materials, mechanical work, delivery/freight charges, and any other items not specifically listed to complete task for a finished product ready for use by owner.

UNIT PRICE TABLE

2023-2024 ROCKWOOD WWTP CIP PROJECT					
SECTION I / SOUTH PRIMARY CLARIFIER					
Item	Description	Unit	Est. Qty.	Unit Price	Estimated Total Amount
1	Remove and Replace South Primary Collector Drive Chain & Take-up assembly	LS	1		
2	Remove and Replace South Primary Helicoid Drive Chain & Take-up assembly	LS	1		

SECTION I TOTAL \$ _____

SECTION II / NORTH & MIDDLE PRIMARY CLARIFIERS:

1. Removal of two existing drive chains and the one take-up assembly for both the North and Middle collector drive unit.
2. Install two new drive chains and one take-up assembly for both drive chains.
3. The drive chain take-up assembly is a single unit for dual side by side drive chains.
4. Middle Primary Clarifier drive chain is 30-foot non-metallic NH 78 drive chain is molded from POM (Acetal) resin with 7/16” stainless steel pin that locks into both side bars, a tensile strength of 5,000 lbs-f, with a working load of 1,800 lbs-f, and UV resistance polymeric chain. The North Primary Clarifier drive chain is a 30-foot 977/477 pin & cotter pintle metal chain. Contractor to verify existing chains for sourcing new chains and assemblies for compatibility.
5. Provide own safety equipment (gas detector-confined space entry)
6. Provide all labor, equipment, materials, mechanical work, delivery/freight charges, and any other items not specifically listed to complete task for a finished product ready for use by owner.

UNIT PRICE TABLE

2023-2024 ROCKWOOD WWTP CIP PROJECT					
SECTION II / NORTH & MIDDLE PRIMARY CLARIFIER					
Item	Description	Unit	Est. Qty.	Unit Price	Estimated Total Amount
1	Remove and Replace North Primary Collector Drive Chain	LS	1		
2	Remove and Replace Middle Primary Collector Drive Chain	LS	1		
3	Remove and Replace North & Middle Primary Collector Dual Side by Side Drive Chain Take-up Assembly	LS	1		

SECTION II TOTAL \$ _____

SECTION III / FILTER PUMP WETWELL & VALVES:

1. Remove and Replace five 8-inch butterfly valves. See Appendix F
2. Remove and Replace one 8-inch float-control recirculation valve. See Appendix F
3. Remove and Replace of two 8-inch swing flex check valves. See Appendix F
4. Remove and Replace Pipe Hangers and Supports.
5. Remove and Replace Piping
6. Provide pump and hose to bypass wet well if needed.
7. Provide own safety equipment (gas detector-confined space entry)
8. Provide all labor, equipment, and mechanical work to complete task.

UNIT PRICE TABLE

2023-2024 ROCKWOOD WWTP CIP PROJECT					
SECTION VI / FILTER PUMP WETWELL & VALVES					
Item	Description	Unit	Est. Qty.	Unit Price	Estimated Total Amount
1	Remove and Replace five 8-inch butterfly valves	LS	1		
2	Remove and Replace 8-inch float-control recirculation valve	LS	1		
3	Remove and Replace of two 8-inch swing flex check valves	LS	1		
4	Provide bypass to wet well	LS	1		
6	Remove and Replace Pipe Hangers and Supports	LS	1		
7	Remove and Replace Piping	LS	1		

SECTION VI TOTAL \$ _____

SECTION IV / PISTON (PLUNGER) PUMP:

1. Remove and Replace existing simplex piston pump with Waste Corp Sludgemaster Plunger Pump Model PE1141SS-III 5hp or approved equal and include all items, fasteners, electrical work and materials, mechanical work, and materials, etc. for a complete installation.
2. Existing pump equipped with 4-inch suction and discharge. See Appendix G
3. Existing pump to be replaced is a Carter Piston Pump 5 HP, 1740 RPM, 3 Phase, 60 HZ, 230 Volts. 125 GPM at 45' TDH. See Appendix G
4. Replacement of 4-inch gate valve on discharge side.
5. Provide all labor, equipment, and materials to complete task.

UNIT PRICE TABLE

2023-2024 ROCKWOOD WWTP CIP PROJECT					
SECTION VII / PISTON (PLUNGER) PUMP					
Item	Description	Unit	Est. Qty.	Unit Price	Estimated Total Amount
1	Remove and Replace Piston (Plunger) Pump	LS	1		
2	Remove and Replace 4-inch gate valve on discharge side.	LS	1		

SECTION VII TOTAL \$ _____

SECTION V / SECONDARY CLAIRIFIER CHECK-VALVE REALIGNMENT & BASE REPLACEMENT:

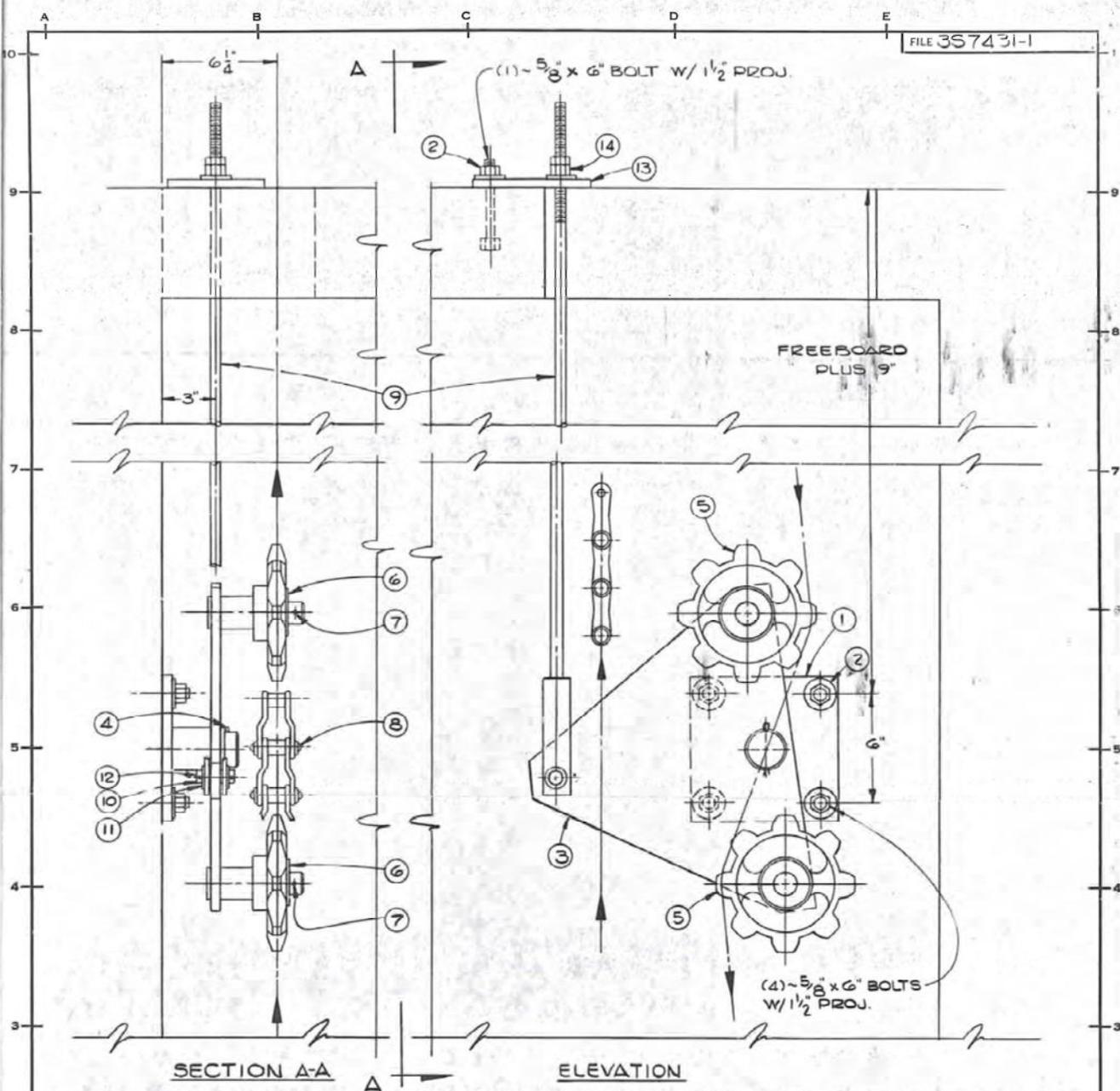
1. Realign existing check valve located in south secondary clarifier sludge pit so bolts heads on the inspection plate are not obstructed by to the two guide rails for the sludge pump.
2. Remove and replace existing Guide Rail System & Bases and install two new Flygt Guide Rail Systems including Bases, Rails, Upper Brackets, and fasteners- one system for each north and south secondary clarifiers. Contractor shall verify existing Flygt Pumps and order compatible Flygt Guide Rail System for installation to insure existing Flygt pumps can ride rails without issue. (See Appendix H)
3. Pump discharge flange is 80 mm (3.14 inches). (See Appendix H)
4. Provide own safety equipment (gas detector-confined space entry)
5. Provide all labor, equipment, materials, and mechanical work to complete task.

UNIT PRICE TABLE

2023-2024 ROCKWOOD WWTP CIP PROJECT					
SECTION VIII / SECONDARY CLAIRIFIER CHECK-VALVE REALIGNMENT & BASE REPLACEMENT					
Item	Description	Unit	Est. Qty.	Unit Price	Estimated Total Amount
1	Realign existing check valve located in south secondary clarifier sludge pit	LS	1		
2	Remove and Replace existing bases including installing new pairs of guide rails for both the north and south secondary clarifiers	LS	1		

SECTION VIII TOTAL \$ _____

APPENDIX A



ASSEMBLY LIST			
NO.	DESCRIPTION	NO.	DESCRIPTION
1.	MOUNTING BRACKET (HOT DIP GALV.)	8.	DRIVE CHAIN
2.	ANCHORAGE BOLTS, NUTS & WASHERS (GALV.)	9.	TAKE-UP ROD (HOT DIP GALV.)
3.	TAKE-UP PLATE (HOT DIP GALV.)	10.	DIN 2/8" (HOT DIP GALV.)
4.	COTTERPIN - 3/8" x 2 1/2" (STN. STL.)	11.	WASHER 3/4" S.A.E. (GALV.)
5.	TAKE-UP SPRKT. ~ W/NEVEROIL BEG. (GREASE & WATER LUB.)	12.	COTTERPIN 3/16" x 1 1/4" (STN. STL.)
6.	WASHER 1 1/8" STD. PLAIN (GALV.)	13.	TAKE-UP ROD SUPPORT (HOT DIP GALV.)
7.	COTTERPINS - 1/4" x 1 3/4" (STN. STL.)	14.	5/8" NUT, JAM NUT & WASHER (GALV.)

SUBSTITUTION OF CINCH ANCHORS, EXPANSION SHIELDS, STUDS SET WITH A STUD DRIVER OR THE LIKE, IN PLACE OF ANCHOR BOLTS PROVIDED BY WALKER PROCESS EQUIPMENT WHICH ARE INTENDED TO BE POURED IN THE CONCRETE, WILL BE DONE AT THE CONTRACTOR'S RISK.

NO.	REVISIONS	DATE
1	REVISED BILL OF MAT'L	7-10-63

THIS DRAWING IS THE PROPERTY OF WALKER PROCESS EQUIPMENT AND IS TO BE USED ONLY IN CONNECTION WITH THE PERFORMANCE OF WORK BY WALKER PROCESS EQUIPMENT.
REPRODUCTION IN WHOLE OR IN PART FOR ANY OTHER PURPOSE IS EXPRESSLY FORBIDDEN.

DATE		BY		WALKER PROCESS EQUIPMENT	
DRAWN	11-19-54	DW		DIVISION OF CHICAGO BRIDGE & IRON CO. AURORA, ILL., U.S.A.	
CHECKED	11-5-55	REE		HELICOID TAKE-UP ASSEMBLY	
APPR.	2-5-55	BW		SIDE WALL MOUNTING	
EXAMINED	1-11-63	WAYNE		FILE 357431-1	
SCALE	3/4" = 1'-0"	CONTRACT			



Drive Chains

CONTACT US ↗

BOTH PRIMARY DRIVE CHAINS

Water Treatment

- Collector Chains
- Drive Chains
- Sprockets & Idlers
- Shear Pins Sprockets & Tensioners
- Shafts & Wall Bearings
- Drive Units
- Fiberglass Flights
- Return Track
- Wear Components
- Aftermarkets & Rebuilds
- DAF's & Scum Scrapers

Drive Chains

Brandt manufactures the broadest range of drive chains attachments and accessories. Every lot is tested during production to guaranty quality. Brandt Drive chains power Clarifiers, Disc Filters, Flocculators, DAF's and Skimmers, Bar Grates and Conveyors.



NH 78

Molded from tough and durable POM (Acetal) resin. Our NH78 chain features a 7/16" stainless steel pin that locks in both side bars for dependable service. With an ultimate tensile strength of 5,000 lbs-f and a working load of 1,800 lbs-f our NH 78 is the strongest available. Stocked in UV resistant Tan and Black colors

NH 45

NH 78's smaller cousin. NH45 chain is a good choice for applications requiring a smaller foot print.

Accessories: attachment links, extended pins



NCS 360S

NCS 360S chain is a 3" pitch chain that uses the same sprockets as 6" pitch NCS 720S chains.

✓ Salt Water Applications

It is an all plastic Design (link and pin) ideal for salt water applications.

✓ High Load Applications

With much larger bearing surfaces and higher





ultimate tensile strength it is used in place of NH 78 or NH 82 in applications requiring 1,800-2,500 lbs-f working load.

✓ **Small Tank Applications**

F2 attachment links are available for skimmer and scraper applications where NCS 720S is too large to use.

	NH 78	NH 45	NCS 360S
Chain Material	POM (Acetal)	POM (Acetal)	POM (Acetal)
Available Chain Color	UV Black, Tan	Tan	UV Black
Pin Material	304 or 316 Stainless Steel	304 Stainless Steel	Glass Reinforced Nylon
Pitch	2.609"	1.630"	3.0"
Width	2.93"	2.18"	4.0"
Height	1.12"	0.87"	2.25"
Working Load	1,800 lbs-f	800 lbs-f	2,500 lbs-f
Accessories	Attachment Links, Extended Pins	Attachment Links, Extended Pins	F2 Attachment Link, Extended Pins
Technical Drawings	BRANDT NH78-attachments.pdf	BRANDT NH45-attachments.pdf	BRANDT NCS360.pdf
Pin Installation Tool			Watch Video
Pin Removal Tool			Watch Video

PRODUCTS

- Water Treatment
- Hydrosieves
- Heavy Duty Polymeric Chains
- Conveyor Chains
- Materials
- Custom Plastic Parts

INDUSTRIES & APPLICATIONS

- Rectangular Clarifiers
- Flocculators & Disc Filters
- Lumber & Plywood
- Dairy Cases
- API Separation

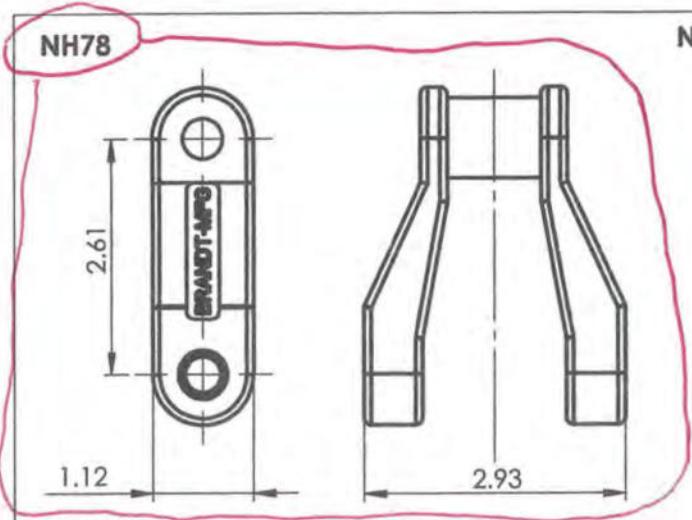
**CONTACT
BRANDT MANUFACTURING**

4974 Bird Drive
Stockbridge, MI 49285

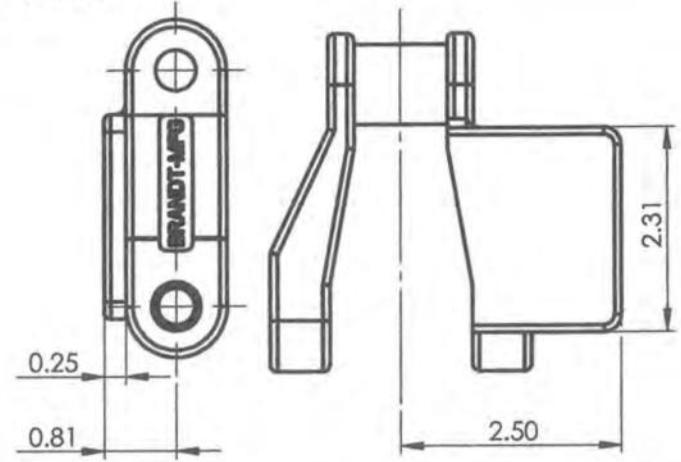
(517) 851-7000

sales@brandt-mfg.com

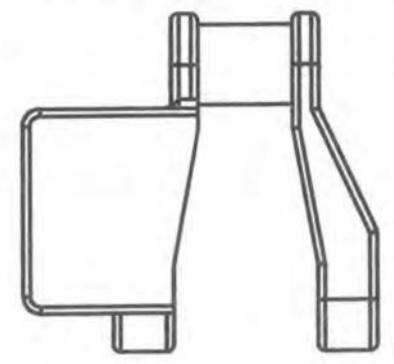
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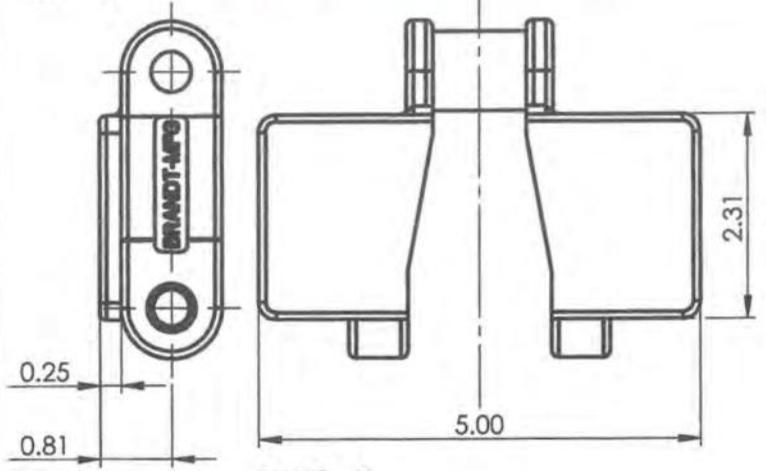
NH78-A0-RH



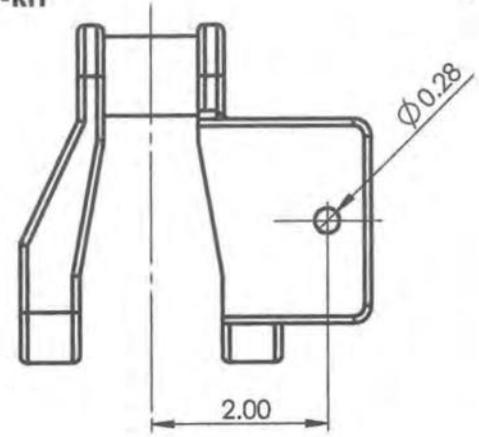
NH78-A0-LH



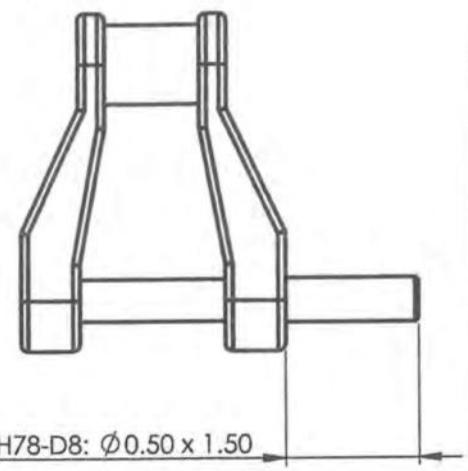
NH78-K0



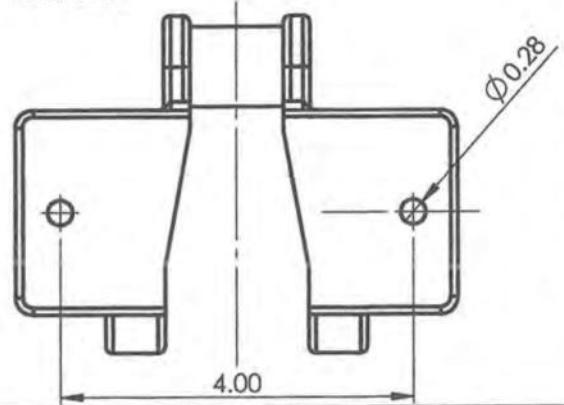
NH78-A1-RH



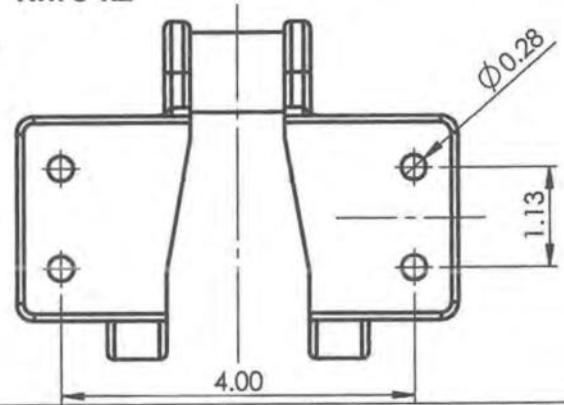
NH78-D8



NH78-K1



NH78-K2



BRANDT Manufacturing		
4974 Bird Drive Stockbridge, MI 49285 P: (517) 851-7000 www.brandt-mfg.com		
Title NH78 Attachments and Ext. pins		
SIZE A	DWG. NO. NH78-xx	REV. 00

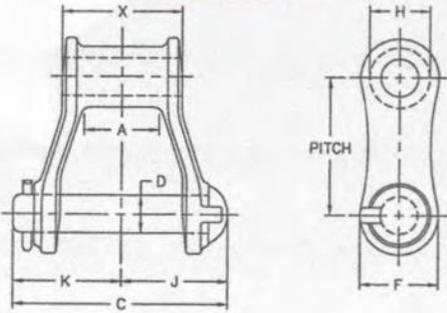
APPENDIX B

400 CLASS PINTLE CHAIN

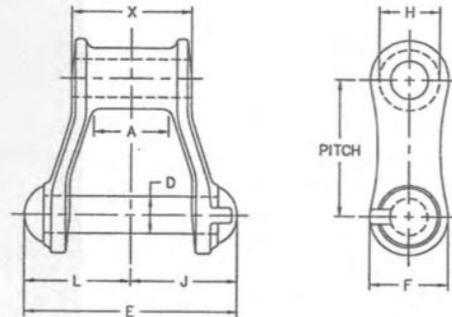
**ALLIED-LOCKE
INDUSTRIES**



Cottered



Riveted



CHAIN - PINTLE
977 / ~~477~~ 477
PIN + COTTER CASE
SPECS

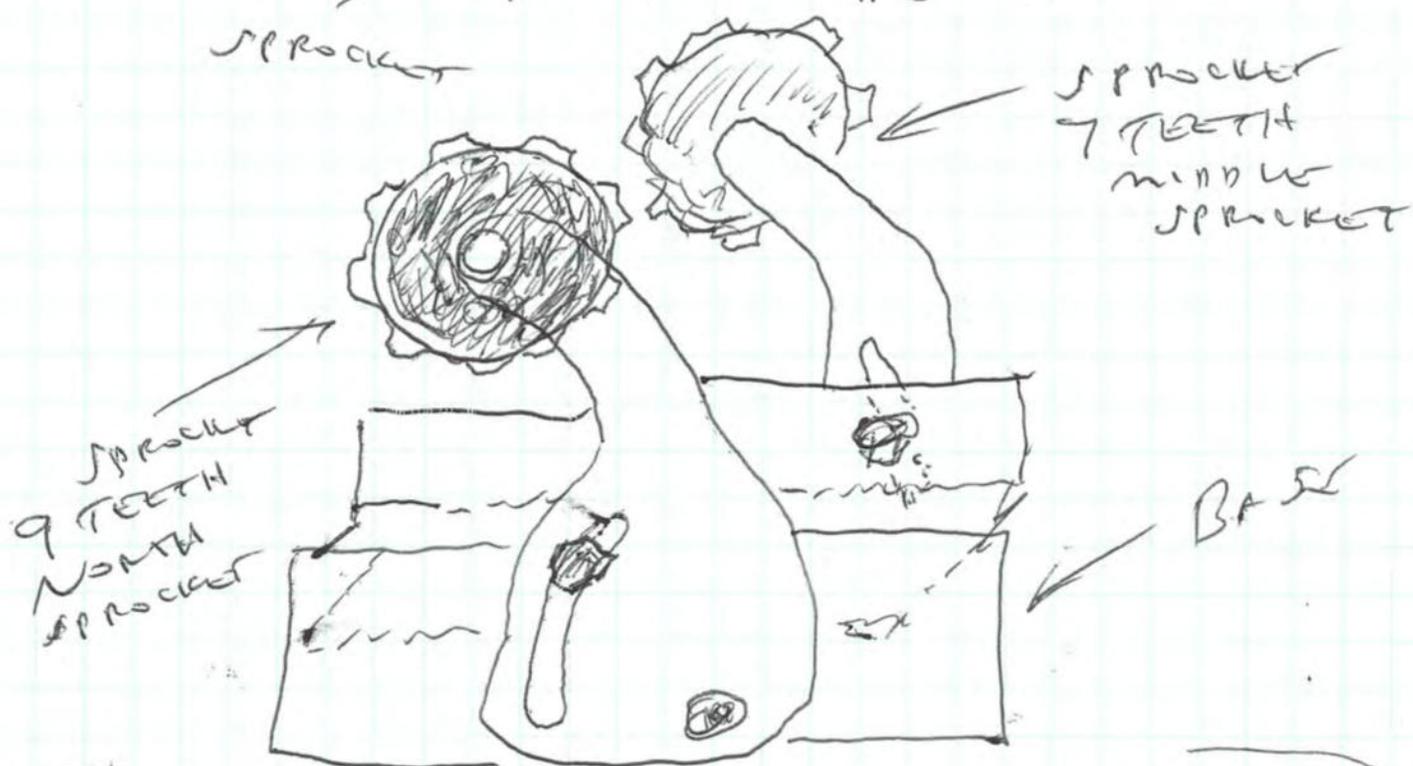
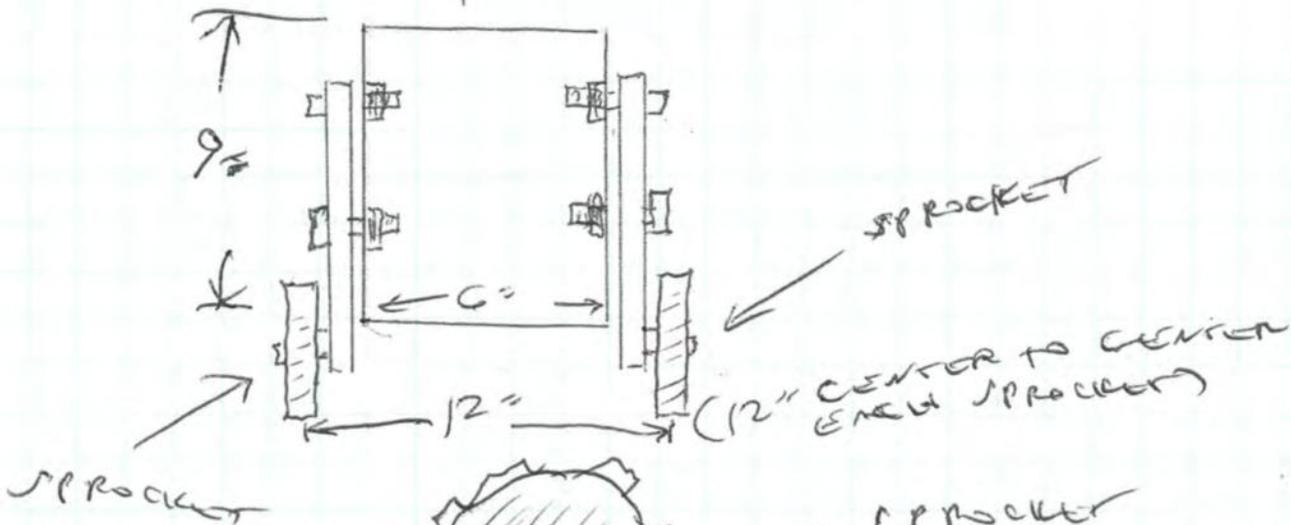
Available in riveted and cottered construction
Cottered furnished unless otherwise specified

DIMENSIONS IN DECIMAL INCHES

MOLINE CHAIN NO.	PITCH	MAXIMUM ALLOWABLE SPROCKET FACE A	OVER-ALL WIDTH— COTTERED C	DIAMETER OF PIN D	OVER-ALL WIDTH— RIVETED E	HEIGHT OF SIDE BARS F	DIAMETER OF BARREL H	HEAD OF PIN TO CENTER LINE J	END OF PIN TO CENTER LINE— COTTERED	END OF PIN TO CENTER LINE— RIVETED	BEARING LENGTH X
									K	L	
442	1.375	0.62	2.03	0.31	1.88	0.75	0.56	0.97	1.06	0.91	1.06
445	1.630	0.69	2.03	0.31	1.88	0.75	0.62	0.97	1.06	0.91	1.06
452	1.506	0.62	2.22	0.38	2.06	0.84	0.69	1.03	1.19	1.03	1.09
455	1.630	0.69	2.22	0.38	2.06	0.84	0.62	1.03	1.19	1.03	1.12
462	1.634	0.88	2.56	0.44	2.38	0.94	0.72	1.25	1.31	1.12	1.44
477	2.308	0.69	2.38	0.44	2.25	1.00	0.72	1.16	1.22	1.09	1.25
488	2.609	0.94	2.94	0.44	2.75	0.94	0.88	1.44	1.50	1.31	1.62
4103	3.075	1.12	3.56	0.75	3.25	1.50	1.25	1.75	1.81	1.50	1.88



TOP VIEW



SIDE VIEW

NORTH
 $2\frac{1}{2}$ " TOOTH
 TO TOOTH
 ON SPROCKET
 CENTER
 TO
 CENTER
 TOOTH
 $\frac{3}{4}$ " WIDE
 AT TIP

M M
 DRIVE CHAIN
 TAKE-UP

MIDDLE
 $2\frac{1}{4}$ " TOOTH
 TO TOOTH
 ON SPROCKET
 CENTER TO
 CENTER
 TOOTH 1"
 WIDE
 AT TIP

STRAIGHTLINE

WELLS-CORRECTION

SEWAGE TREATMENT
PLANT EQUIPMENT

MADE BY

LINK-BELT COMPANY

PHILADELPHIA - CHICAGO

SAN FRANCISCO

THIS EQUIPMENT IS PROTECTED BY ONE OR MORE
OF THE FOLLOWING PATENTS

1392197	1558561	1718087	1645470
1700791	RE-16356	1760233	1760242
1760241	RE-15146	1792915	1799150
1813394	1800300	1832540	RE-25451
1918742	1820158	1939536	1984887
1997161	2024345	2057277	RE-31601
2022655	2005731	2150408	2157421

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APPENDIX C

DeZURIK

DeZURIK CORP., SARTELL, MINNESOTA 56377
DeZURIK OF CANADA, LTD., GALT, ONTARIO

INSTALLATION, OPERATION AND MAINTENANCE OF 2" - 20" BUTTERFLY VALVE WITH KGG HANDWHEEL OR CHAINWHEEL ACTUATOR

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INSTALLATION Page 1

- A. MOUNTING
- B. FLOW
- C. ACTUATOR POSITIONS

MAINTENANCE AND REPAIR Page 2

- A. LUBRICATION
- B. VALVE DISASSEMBLY
- C. VALVE REASSEMBLY
- D. USING THE SECOND SEATING SURFACE

ADJUSTMENTS Page 4

- A. VALVE OPEN
- B. VALVE CLOSE
- C. ADJUSTABLE OPEN POSITION STOP

INSTALLATION

A. MOUNTING

The valve is made to fit between 125# or 150# U.S.A. Standard flanges. It is flangeless. Mount the valve directly between the two mating flanges and do not use gaskets. When installing a 3" - 8" valve in a system using nominal tube size piping, use sufficient gaskets for flange connections to provide adequate clearance for the disc swing.

On the 2" through 18" valve, four of the flange bolts fit notches in the outside diameter of the body. On the 20" valve, four holes are tapped in each flange 1 1/8" - 7NC x 1 1/4" deep. Install these bolts first.

B. FLOW

Flow may be in either direction. Install the valve with the higher pressure against the flat side of the disc when the valve is closed.



C. ACTUATOR POSITIONS

The actuator may be mounted in any of four positions. These positions are in 90° increments around the valve shaft. Mounting position of actuator may be changed as follows:

1. Close the valve.
2. Shut off the flow.
3. Remove the pointer by taking out the two screws fastening it to the gear.
4. Remove the cover by taking out the four screws that hold it to the housing.
5. Loosen the jam nut and back out the closed position stop screw (the one nearest the handwheel) two complete turns.
6. Lift the gear off the shaft.
7. Remove the four screws that hold the housing to the top of the valve.

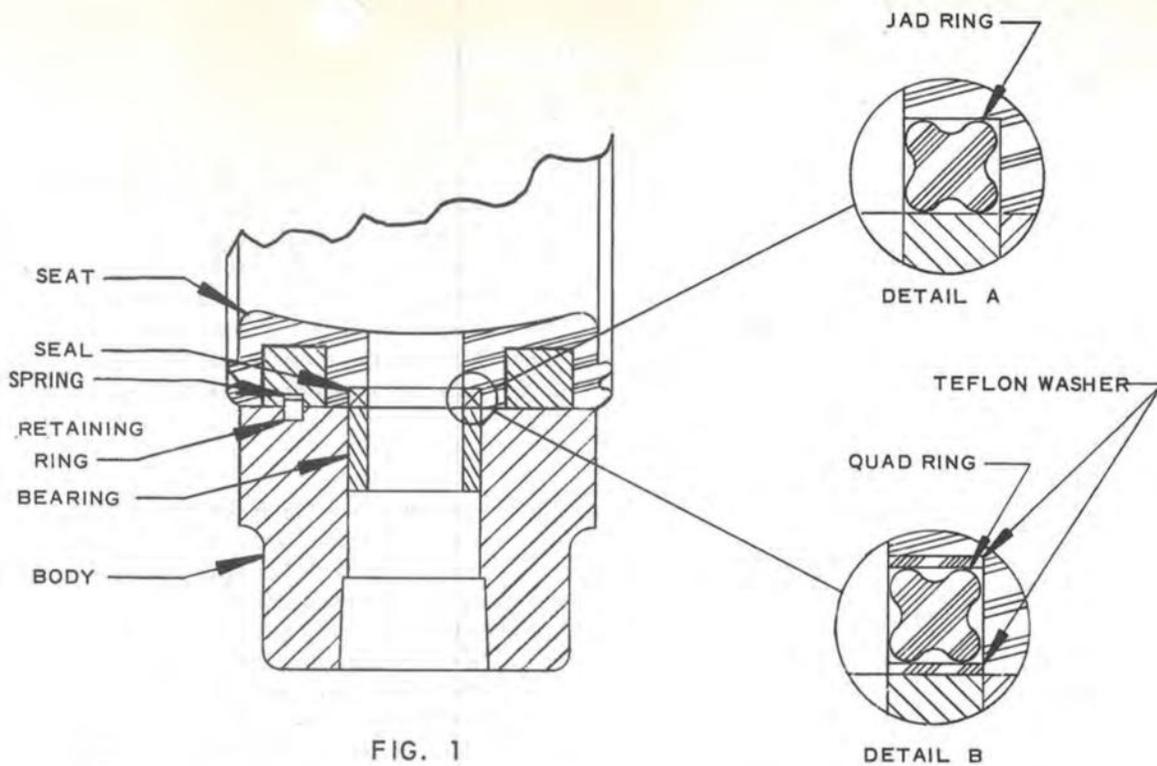


FIG. 1

If the valve has seals as shown in Detail B, place the teflon washers in the seat before installing it. On 6'' and smaller valves also install the quad rings before installing the seat. On larger valves the quad rings may be installed after the seat is in place. Be sure the quad ring is between the two teflon washers.

NOTE—The same quad ring is used in both types of seals.

On the 14'' and larger valves, install the spring and retaining ring in the seat and compress them so they will slide into the body. Make sure the retaining ring springs into the groove in the body and locks in place. (FIG 1)

On the 10'' and larger valves it may be necessary to cool the seat to get it to slide into the body easily.

2. Install the seal at the top of the valve.
3. Place the disc in the valve making sure the top of the disc is up (See FIG. 2).
4. Lightly grease the bottom chamfer of the shaft and the edges of the flat spots for the pins and **INSTALL CAREFULLY WITH A ROTARY MOTION TO PREVENT DAMAGE TO THE SEALS.** Be sure the flat spots or holes of the shaft line up with the holes for the pins in the disc. (See FIG. 2 for Shaft Location).

5. Install the pins. The pins with threaded ends must be installed with the threads to the right (See Fig.2). Tap the pins lightly to seat them before tightening the nuts with the following torque:

VALVE SIZE	TORQUE (Ft. Lbs.)
4	2
5 - 8	6
10 - 14	11
16 - 18	20
20	31

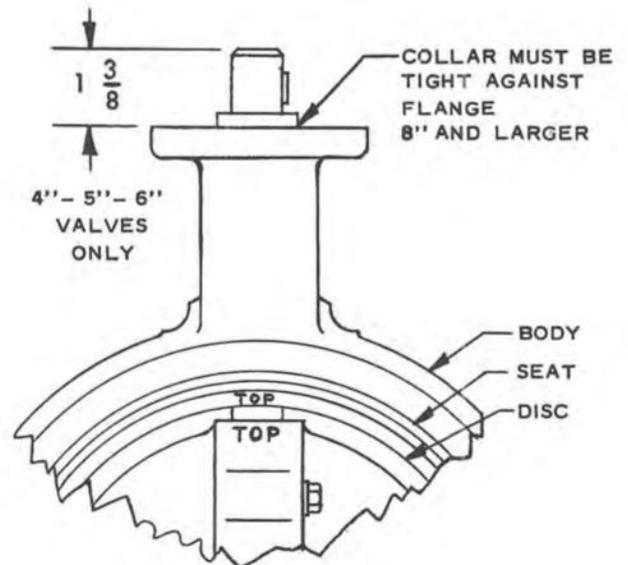


FIG. 2

INSTRUCTIONS FOR
OPERATION AND MAINTENANCE OF
DEZURIK 4" - 12" ECCENTRIC VALVES
WITH LEVER ACTUATORS

I. TYPE OF UNIT

This is a DEZURIK lever actuated eccentric valve.

II. INSTALLATION DATA

See the "INSTALLATION DATA" sheets.

III. ACTUATION

A. Lever, if ordered, for 4" - 8" valves.

B. Two inch square on the actuator for use with wrench for A.W.W.A. standard two inch square nut on 5" - 8".

C. Two inch square adapter, Fig. 309, for 4" valves only.

IV. ADJUSTMENTS

A. VALVE PACKING SPRING ADJUSTMENT

1. STANDARD PACKING, 4" - 12" VALVES

Tighten the valve packing spring nut so the running friction (torque applied to the handle when moving the plug from open to close position) is as listed below.

4" valve	27 ft. lbs.
5" - 6" valve	59 ft. lbs.
8" valve	104 ft. lbs.

On 10" and 12" valves, tighten the valve packing spring so it is 3/4 compressed and after adjusting the seating torque (see TORQUE TABULATION next page), adjust the tension on the friction device to achieve 200'# of torque on the 10" valve and 260'# of torque on the 12" valve.

NOTE: When tightening, DO NOT exceed these torque settings on the 4" - 8" valves as the friction cone* has to be forced back to reduce the friction.

* Friction cone used on 4" - 8" valves only.

2. LOW FRICTION PACKING, 4" - 8" VALVES

Tighten the valve packing spring so it is 3/4 compressed.

NOTE: Friction cones are not used on valves with LOW FRICTION PACKING.

B. CLOSED STOP AN SEATING PRESSURE ADJUSTMENT

This adjustment should be checked periodically for plug wear.

1. Loosen the stop set screw.
2. Use a torque wrench and close the valve with the tabulated torque listed in the chart below.
3. Turn the stop set screw against the stop lug on the bonnet and lock in place.

VALVE SIZE	4"	5" - 6"	8"	10"	12"
TORQUE	75'#	125'#	175'#	95'#	110'#

V. MAINTENANCE AND REPAIR

A. STANDARD VALVE PACKING

1. 4" - 8" valves; remove the flex lock nut, washer, valve spring, handle assembly, gland, cone, and old packing. Install new packing and reassemble. See ADJUSTMENTS, IV.
2. 10" - 12" valves; remove the flex lock nut, washer, valve spring, handle assembly, gland, and old packing. Install new packing and reassemble. See ADJUSTMENTS, IV.

B. LOW FRICTION VALVE PACKING

4" - 8" valves; remove the flex lock nut, washer, valve spring, handle assembly, gland and old packing. Install new packing and reassemble. See ADJUSTMENTS, IV.

C. PLUG REPLACEMENT

1. 4" - 8" valves with standard packing; remove the flex lock nut, washer, valve spring, handle assembly, gland, cone, old packing, bonnet, and plug. Note the position of the plug before removing. Install new plug and replace the bonnet gasket, if damaged, then reassemble. See ADJUSTMENTS, IV.
2. 10" - 12" valves with standard packing; remove the flex lock nut, washer, valve spring, handle assembly, gland, old packing, bonnet, and plug. Note the position of the plug before removing. Install new plug and replace the bonnet gasket, if damaged, then reassemble. See ADJUSTMENTS, IV.
3. 4" - 8" valves with low friction packing; remove the flex lock nut, washer, valve spring, handle assembly, gland, old packing, bonnet, and plug. Note the position of the plug before removing. Install new plug and replace the bonnet gasket, if damaged, then reassemble. See ADJUSTMENTS, IV.

VI. SPARE PARTS

See the "INSTALLATION DATA" sheets.

VII. CORRESPONDENCE

In all correspondence concerning this unit, always refer to the Serial Number and the Assembly Drawing Number. Where applicable, give the Part Number as shown on the Assembly Drawing and the Valve Size.

INSTALLATION DATA
DEZURIK 4" - 12" ECCENTRIC VALVES
WITH LEVER ACTUATORS

I. TYPE OF UNIT

This is a DEZURIK lever actuated eccentric valve.

II. ACTUATION

A. STANDARD

4" valves have 1-5/8" square actuating nut as standard or 2" square when Fig. 309 is ordered.

5" - 8" valves have a 2" square actuating nut.

10" - 12" valves have a pipe lever as shown on the Assembly Drawing.

B. OPTIONAL

- Fig. 145 - Floor Stand
- Fig. 147 - Extension Handle
- Fig. 309 - 2" Square Actuating Nut for 4" Valve Only.
- Fig. 341 - Underground Valve Box
- Fig. 342 - High Head Extension for Valve Box
- Fig. 344 - Actuating Wrench
- Fig. 348 - Floor Box
- Fig. 350 - Folding Lever
- Fig. 602 - Adjustable Open Position Stop
- Fig. 614 - Extension Stem

III. INSTALLATION

A. FLOW

For normal service, installed the valve so that when closed, the higher pressure is against the end of the valve opposite the seat. The seat end is identified on the valve body and is indicated on the Assembly Drawing. Where suspended solids may jam the closing action, install the valve with the seat on the upstream side. Examples of this type of service are:

1. Pulp and paper stock of 2% or greater consistency.
2. Raw sewage sludge.

For specific instructions, contact the factory.

B. MOUNTING

1. ALL VALVES

The overall dimensions of the valve and actuator are given on the Assembly Drawing.

B. Mounting (Continued)

2. VALVES WITH OPTIONAL MANUAL ACTUATORS

a. FIG. 145 FLOOR STAND

The floor stand has six 5/8" diameter mounting holes equally spaced on a 12-3/4" diameter bolt circle. They are located as shown on the Assembly Drawing.

b. FIG. 147 EXTENSION HANDLE

The bearing plate has four 9/16" diameter mounting holes equally spaced on a 6-3/4" diameter bolt circle. They are located as shown on the Assembly Drawing. The bearing plate is 8" in diameter and has a 3/4" flange thickness.

C. INITIAL SERVICING

The unit is completely assembled and adjusted when shipped from the factory. If adjustments should become necessary, see the "INSTRUCTIONS".

IV. VALVE END DATA

A. FLANGE ENDS

1. CARBON STEEL

a. Flanges are 1/16" raised face 150# A.S.A. Standard except for tapped holes listed in chart below.

b. Flange thickness to 150# A.S.A. Standard thru 12" valves.

2. ALL OTHERS

a. All flanges are flat faced.

b. All flanges have diameter and drilling to 125# A.S.A. Standard except for tapped holes listed in chart below.

VALVE SIZE	4"	5"	6"	8"	10"	12"
TAP SIZE	5/8 - 11	3/4 - 10	3/4 - 10	3/4 - 10	7/8 - 9	7/8 - 9
TAP DEPTH	Thru	3/4"	Thru	13/16"	7/8"	15/16"

All 5" and 8" - 12" valves are tapped four holes straddling the principal axis on each flange. 4" and 6" carbon steel valves have only two holes nearest the bonnet on each flange tapped.

B. BELL AND MECHANICAL ENDS

Bell ends are to A.W.W.A. Standard C100-55 Class D.
Mechanical ends are to A.W.W.A. Standard C111-53.

C. SCREWED ENDS

The threads are A.S.A. Standard pipe threads.

D. VICTAULIC ENDS

These ends are sized for use with the Victaulic Company's Style #77 standard coupling.

V. SPARE PARTS

If service conditions necessitate maintaining spare parts, the following are recommended. See the Assembly Drawing.

VALVE PACKING.....1
PLUG (If Rubber Faced).....1

When ordering replacement parts include the Serial Number stamped on the nameplate washer, the Assembly Drawing Number, Part Number as shown on the Assembly Drawing, and the Valve Size.

DeZURIK CORPORATION
SARTELL, MINNESOTA, U.S.A.



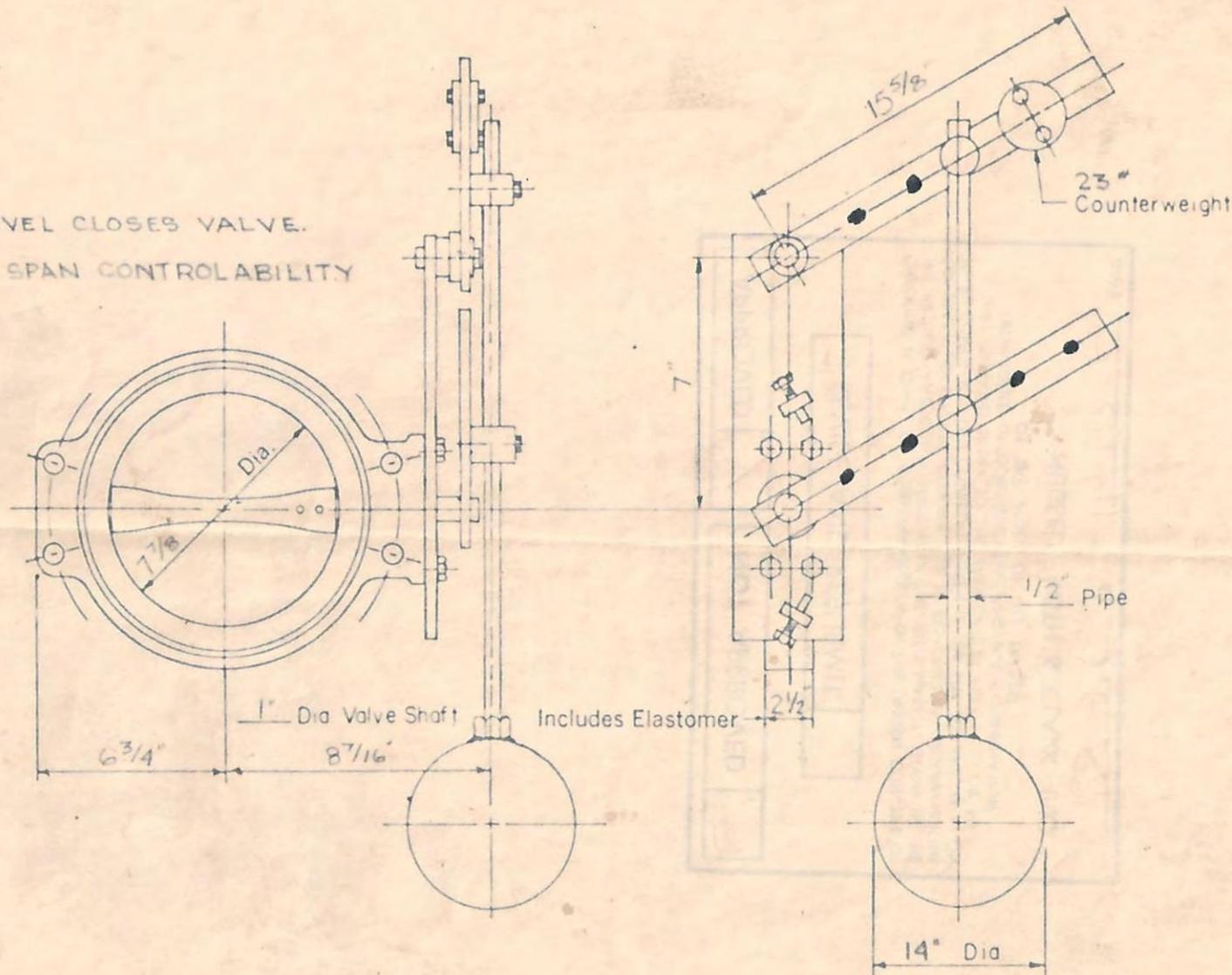
DeZURIK OF CANADA LTD.
GALT, ONTARIO, CANADA

LITHO IN U. S. A.

J-10048

Note:
 4 Flange Bolts Thru
 Body. Others To Clear
 Valve Dia. 8 Bolts
 Of 3/4 Dia On 1 1/4
 Dia Bolt Circle.

NOTE:
 RISING LEVEL CLOSES VALVE.
 24" LEVEL SPAN CONTROLABILITY



DIMENSIONS CERTIFIED CORRECT

125 lb AN.SI. Tag

Serial no BF161512

Redmond & Sons, P.O. #8211, Our P-91752
 Ol, Agent: 11-18554, July 20, 1971

Lloyd D. Baird

B	RJS	1-13-71
REV	BY	DATE

8 9160-5 Double R/L Valve
 Style 5 Float Linkage



CONTINENTAL DIVISION
 FISHER GOVERNOR COMPANY
 Coraopolis, Pennsylvania 15108

DWN S J S	DATE 3-26-70
CKD LDB	4/6/70
LAYOUT NO	SCALE
DWG NO	
P-91752	J-10048

APPROVED

X

NOT APPROVED

REVISE AND RESUBMIT

CHECKING IS ONLY FOR CONFORMANCE WITH THE DESIGN CONCEPT OF THE PROJECT AND COMPLIANCE WITH THE INFORMATION GIVEN IN THE CONTRACT DOCUMENTS. CONTRACTOR IS RESPONSIBLE FOR DIMENSIONS TO BE CONFIRMED AND CORRELATED AT THE JOB SITE FOR INFORMATION THAT PERTAINS SOLELY TO THE FABRICATION PROCESSES OR TO TECHNIQUES OF CONSTRUCTION; AND FOR COORDINATION OF THE WORK OF ALL TRADES.

HUBBELL, ROTH & CLARK, INC.

DATE

7-29-71

BY

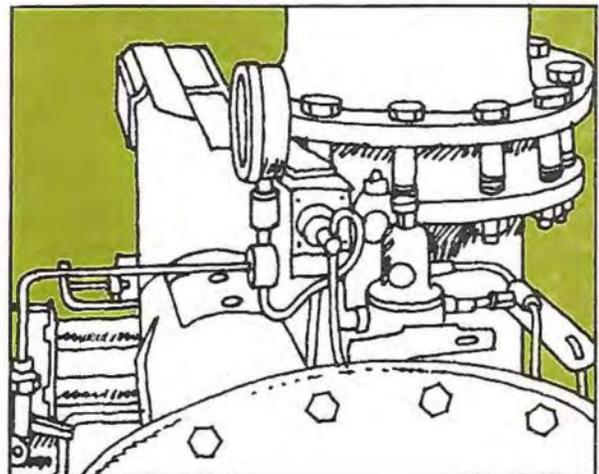
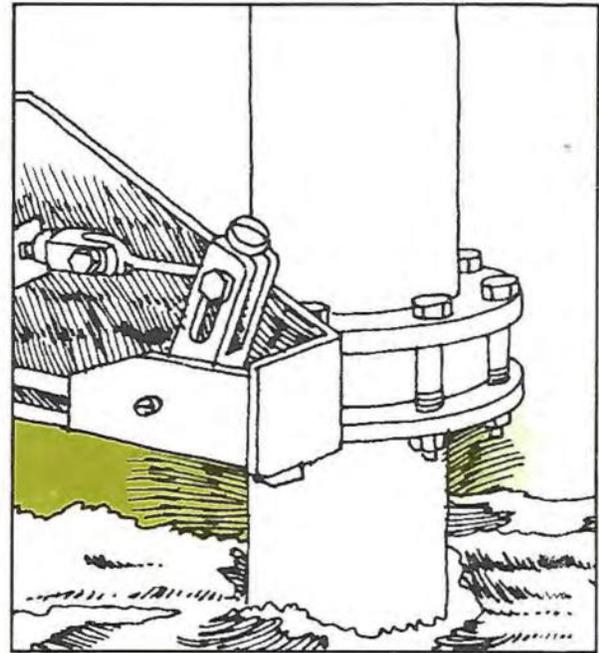
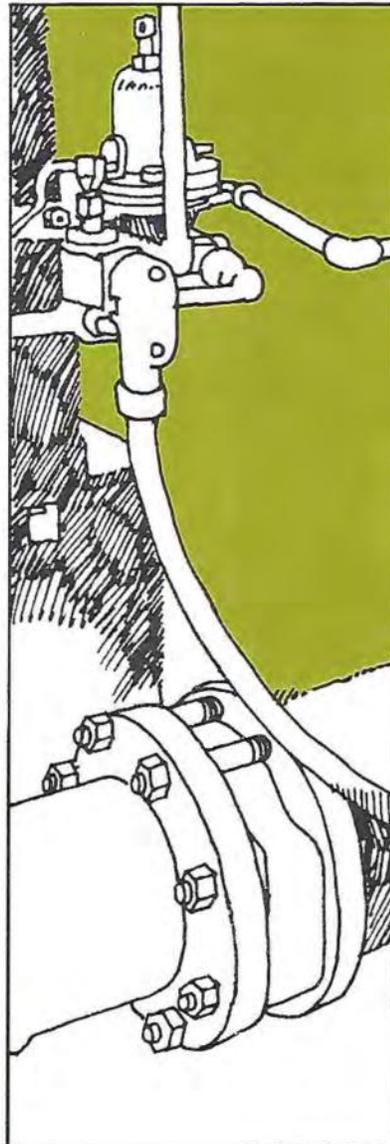
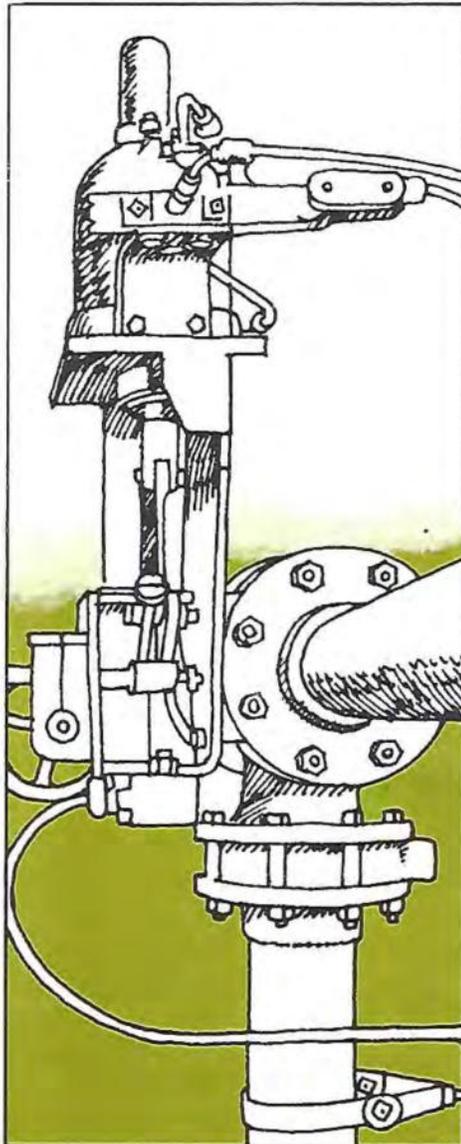
J.C.S.

Double R/L manual and/or power actuated Continental Butterfly Valves for on/off or throttling flow control

High capacity, low pressure drop butterfly valve with replaceable elastomer liner. Designed for bubble-tight shut-off and differential pressures to 150 PSI at temperatures from -60° to $+400^{\circ}$ F. depending on elastomer used. Body types are available in 125 # - 150 # ASA flanges in sizes $1\frac{1}{2}$ " through 20", and 250 # - 300 # ASA flanges in sizes $1\frac{1}{2}$ " through 12". Applicable to fluid control systems in the chemical, gas, power, and many other varied industries.



BULLETIN 9100
OCTOBER, 1970



FISHER CONTROLS COMPANY

MARSHALSTOWN, IOWA 50458

AUTOMATIC CONTROL EQUIPMENT
SINCE 1887

Reply to: JOHN T. HARLEY CO., 13700 Puritan, Detroit, Mich. 48227 (Phone 313-345-6766)
Branch Office: 4225 W. Main, Kalamazoo, Mich. (Phone: 616-381-4550)

July 9 1971 RECEIVED JUL 12 1971

Redmond & Sons
410 E. 5th Street
Royal Oak, Michigan 48067

Attention: Mr. Jerry Chirite

Subject: Rockwood Waste Treatment Plant in Rockwood, Michigan
Our II-18554; Customer Purchase Order #8211

Dear Jerry:

This letter is to confirm our conversation of this date concerning your order for an 8" RR/L butterfly valve with float and linkage. The valve was originally ordered with a 1/8" interference undercut, however, we find from our factory that this type of interference undercut is no longer available. Therefore, with your approval, we will amend the purchase order to read a zero interference undercut. This construction will allow a limited amount of leakage through the valve, less than 2%.

We wish to thank you for your consideration in this matter, and we shall process the order on this basis. If you have any questions concerning the above, please contact us.

Very truly yours,
FISHER CONTROLS COMPANY

Jack H. Udebrock
JOHN T. HARLEY COMPANY
Michigan Representatives

JHU:mea

M.B.A. DISTRIBUTING, INC.

P. O. BOX 823
 JACKSON, MI 49204
 (517) 764-6311 • FAX (517) 764-0394

INVOICE

2420

T.F. PUMPS
 CHECK
 SHIPPED TO
 VALVE
 REPLACEMENT
 DK

Earl Tech
 Box 99-33653 Swallow Dr
 Rockwood, Ms 48173

INVOICE DATE	DATE SHIPPED	OUR ORDER NO.	YOUR ORDER NO.	TERMS	F.O.B.	SALESPERSON	SHIPPED VIA								
6-17-97	5-29-97	1734	19597	Net30			ADR								
QUANTITY	DESCRIPTION					PRICE	AMOUNT								
2	VM 508 8" Swing Flex					847.00	1,694.00								
Batch _____ Gl. Date _____ Vendor Site _____ Amt \$1846.24 Flexfield/Expenditure type _____ XM - pump JUL															
<table border="1"> <tr> <th>Project</th> <th>Task</th> </tr> <tr> <td>19653</td> <td>01</td> </tr> <tr> <td>Client</td> <td>Rockwood</td> </tr> <tr> <td>Approval</td> <td>DK</td> </tr> </table>							Project	Task	19653	01	Client	Rockwood	Approval	DK	
Project	Task														
19653	01														
Client	Rockwood														
Approval	DK														
							10164								
							50.60								
							\$1846.24								

Sales Tax
 Freight
 Total

THANK YOU

APPENDIX D

CARTER PUMP, INC.

326 South Dean Street
Englewood, New Jersey 07631
PHONE: 201 568-9798
FAX: 201 568-1313
E-MAIL: info@carterpump.com

**CARTER
PISTON
PUMP**



TITLE PAGE
CITY OF ROCKWOOD, MICHIGAN WWTP

OPERATIONS & MAINTENANCE MANUAL
CARTER PUMP, INC. JOB # G405123
(1) 801-H SIMPLEX PLUNGER PUMP (DIRECT DRIVE)

DECEMBER 14, 1999

NAME PLATE DATA:

125 GPM AT 45' TDH
S/N 801HS-0368

MANUFACTURER:
CARTER PUMP, INC.
326 S. DEAN ST.
ENGLEWOOD, NJ. 07631
1-800-568-9798

MR. ROBERTO M. LOPEZ, PRODUCT MANAGER
MR. FRANK M. BRIGHT, SALES / APPLICATION ENGINEER

SUPPLIER AND LOCAL SERVICE REPRESENTATIVE:

Kennedy Industries
4975 Technical Drive
Milford, MI 48381
Attn: Steve Sadler
Phone: (248) 684-1200

CONTRACTOR / OWNER:

Waste Water Treatment Plant
City of Rockwood, Michigan

405123TP2. SAM

MANUFACTURERS OF: Plunger Pumps • Contractors Pumps • Pneumatic Ejectors

WWTP, ROCKWOOD, MI.
CPI JOB# 405123
NAME PLATE DATA

One (1) 801H Simplex Plunger Pump Direct Drive

S/N - 801HS-0368
125 GPM 45' TDH
COUPLING: #9 DGH/1090T10

Drive Unit Name Plate Data:

MOTOR:

US ELECTRIC PREMIUM EFFICIENCY MOTOR
5 HP, 3 PHASE INSULATION CLASS F 60 Hz
FRAME 184T 230/460 VOLTS 13.2/6.6 AMPS
TYPE TCEP TE
DESIGN B CODE H SF 1.15
CONT. RATING 40° C AmB RPM 1740
OPT. END BEARING 6205 -2Z-J/C3
ID# C05 610701039757 011F
NEMA NOM EFF 87.5 FLPF-83.5
MAX. KVAR 1.4
CORO DUTY

REDUCER:

US ELECTRIC 35.5 RATIO
SERIES 2000 1750 RPM
OUTPUT TORQUE 100008 IN LBS.
CAT. #CBN2402SB3MC184T5
S #RC08-98116276-6T-01

DIMENSIONS CERTIFIED FOR:

ROCKWOOD WWTP, CITY OF ROCKWOOD, MICHIGAN

(1) CARTER FIG. 801 H SIMPLEX PLUNGER PUMP DIRECT DRIVE

(LEFT HAND) AS ILLUSTRATED

RATED CAPACITY 125 GPM AT 45' TDH

EACH UNIT TO BE SUPPLIED WITH THE FOLLOWING ACCESSORIES:

CHEVRON PACKING

SOLENOID OILER

CROSSHEAD GUIDE

NOTES:

1-UNIT SHOWN IS A LEFT HAND SLUDGE PUMP.

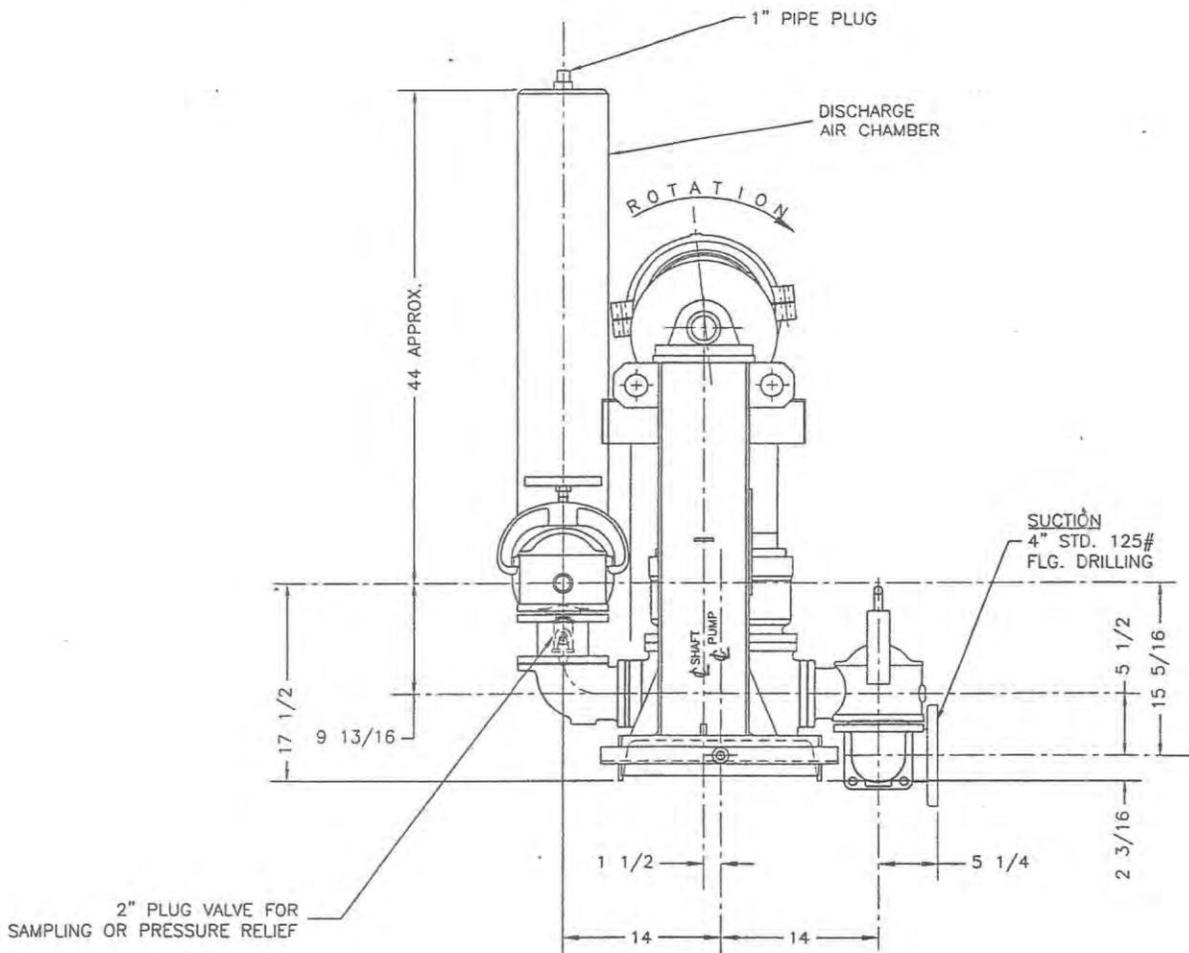
2-UNIT SHOULD BE MOUNTED ON A FIRM CONCRETE FOUNDATION ALLOWING AT LEAST 1/2" FOR GROUTING.

3-THE BALL VALVES ARE 5 1/8" DIA.

4-THE PLUNGER IS 11" DIA.

5-RIGHT HAND FRAME, SHAFT ROTATION, LEFT HAND SLUDGE CONNECTIONS.

CARTER



Carter Pump, Inc. Plunger Pump Test Report

Shop Order # P89550

CUSTOMER (Engr):	JOB NAME: <u>Rockwood, Mi</u>	G#: <u>405123</u>
PUMP SERIAL # (TEST): <u>0368</u>	DATA SUBMITTAL BEFORE SHIPPING (Engr): <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	TEST DATE <u>Oct. 18, 99</u>
	WITNESS TEST REQUIRED (Engr): <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	WITNESSED:
HYDRO TEST PRESSURE (Engr): _____ PSIG, HELD FOR 30 MIN., NO LEAKS VERIFIED BY: _____	Date: _____	WITNESSED:

RATED TEST POINT (Engr): GPM <u>125</u>	TDH (ft) <u>45</u>	SUCTION (HEAD + LIFT) <u>0</u>	RPM <u>51</u>
---	--------------------	--	---------------

(TEST DEPT.)						NOTE: TEST DEPT. TO MEASURE STROKE LENGTH ON TEST.
MODEL # <u>8014</u>	No. OF PLUNGERS <u>1</u>	PLUNGER DIAM. (IN) <u>11</u>	STROKE LENGTH <u>6"</u>			
SUCTION SIZE <u>4"</u>	DISCHARGE SIZE <u>4"</u>	ELEV. PRESSURE GAUGE (FT) <u> datum</u>	PUMP CURVE # _____			

MOTOR DATA (TEST DEPT.)							
H.P. <u>5</u>	R.P.M. <u>1740</u>	PHASE <u>3</u>	HERTZ <u>60</u>	VOLTS <u>230/460</u>	MAX. AMPS <u>13.2/6.6</u>		
FRAME <u>184T</u>	ENCLOSURE <u>TCEP TE</u>	NEMA DESIGN <u>B1</u>	INSULATION CODE <u>H</u>	CONTINUOUS RATING degC RISE <u>40</u>			
MANUFACTURER <u>V.S. MOTORS</u>	SERVICE FACTOR <u>1.15</u>	SUN ID # <u>C05-6107-01039757-011 F</u>					

GEAR BOX DATA (TEST DEPT.)			
RATIO <u>35.5</u>	H.P. RATING <u>10008 ^{in/lb}</u>	SERVICE FACTOR _____	MANUFACTURER <u>V.S. MOTORS</u>
			SIN <u>RC08-98116276-6T 01</u>

WE CERTIFY THESE TEST RESULTS TO BE CORRECT AS CONTAINED IN THE RECORDS OF THIS COMPANY.

TEST DATA TAKEN BY: [Signature]
 APPROVED BY: [Signature]
 CERTIFIED BY: _____
 PE Req'd (Engr): YES NO

Date: 10/18/99
 Date: 10-21-99
 Date: _____

TEST PERFORMANCE AND RATING (ENGR'G AFTER TEST)				
% EFF	GPM	T/H (FT)	BHP	RPM
<u>31</u>	<u>125</u>	<u>45</u>	<u>4.5</u>	<u>51</u>

CARTER PUMP, Inc. TEST DATA SHEET

1	TEST POINT NO.	1	2	3	4			
2	TIME REQ'D AT POINT (MINS)	15	15	15	15			
3	TOTAL HEAD FT	45	45	45	45			
4	DIFF. PRESS. PSI	19.5	19.5	19.5	19.5			
5	SUCTION PSIG (SET)							
6	SUCTION PSIG (ACT)	0	0	0	0			
7	SUCTION GAUGE HEIGHT							
8	SUCTION CORRECTED							
9	DISCH. PRESS (SET) PSIG							
10	DISCH. PRESS (ACT.) PSIG	20	20	20	20			
11	WATER TEMP Deg F	70	←————→		70			
12	TEST CAPACITY (SET) GPM							
13	TEST CAPACITY (ACT.) GPM	123 127	123 127	123 127	123 127	125		
14	PIN POSITION CURVE/ACT.	10	10	10	10			
15	SPECIFIC GRAVITY	1.0	←————→		1.0			
16	TEST SPEED RPM	51	51	51	51			
17	VOLTAGE	455	455	455	455			
18	AMPS MAX / MIN	4.7 7.3	4.7 7.3	4.7 7.3	4.7 7.3			
19	AVERAGE AMPS	6.0	6.0	6.0	6.0			
20	CALC. KW FROM ELECT IN							
21	WATER HP	1.4	1.4	1.4	1.4			
22	HP FROM AVG AMPS	4.5	4.5	4.5	4.5			
23	EFFICIENCY AVG	.31	.31	.31	.31			

JOB NAME: Rockwood, Mo.

G# 405123

S/N 0368

TEST DATE 10/18/99

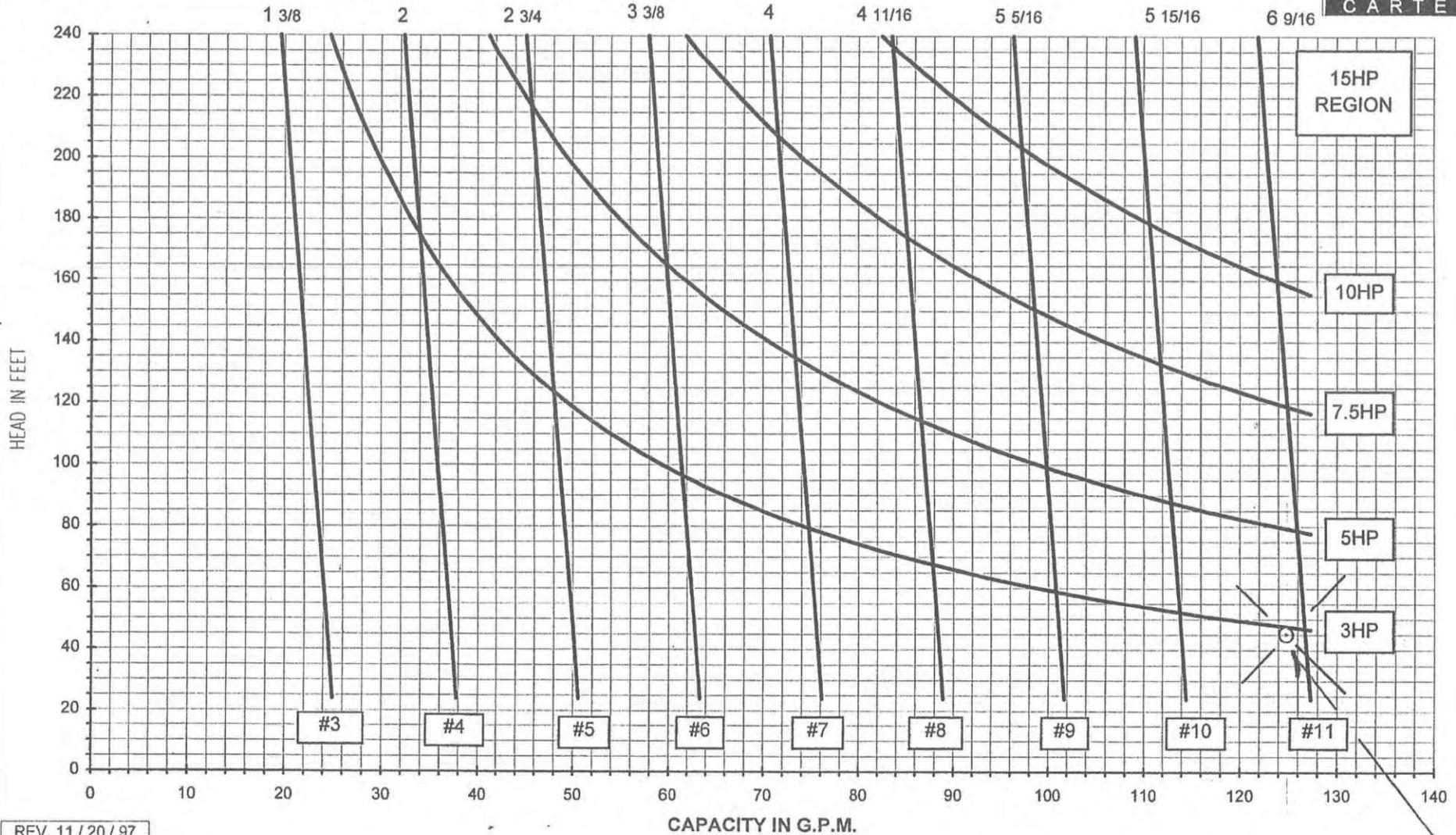
TEST DATA TAKEN BY: John E. Sauer

FILE: CARTTEST.WK4

REV. 8/29/97

SIZE 4" X 4" - FIG. 801 H SIMPLEX
 50 STROKES / MIN
 11" PLUNGER DIAMETER

CARTER PUMP
 ENGLEWOOD, N.J.



REV. 11 / 20 / 97

125 GPM AT 45' TDH

APPENDIX E

FLYGT

Made in Sweden
Xylem Water Solutions
Manufacturing AB

3085.092-1570076

3085.092-1906 466



3-60Hz 1.6kW-2.2hp 1670rpm S1

Max 40°C

YSER460/Y//230V3.3/6.6A

cosφ 0.87

TP111 cl.H IEC60034-1 IP68 $\frac{\nabla}{20m}$ L

66Kg

F

6306800

FLYGT

Made in Sweden
Xylem Water Solutions
Manufacturing AB

3085.092-1570077

3085.092-1906 466



3-60Hz 1.6kW-2.2hp 1670rpm S1

Max 40°C

YSER460/Y//230V3.3/6.6A

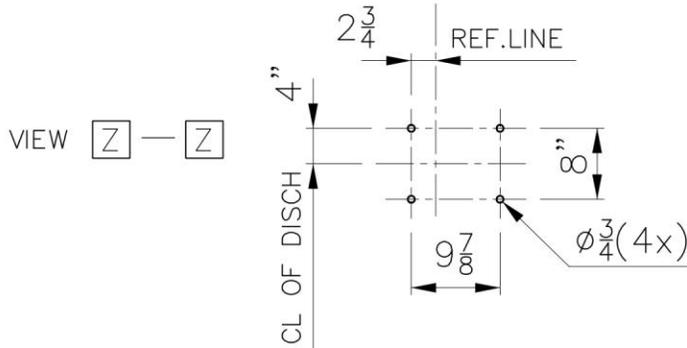
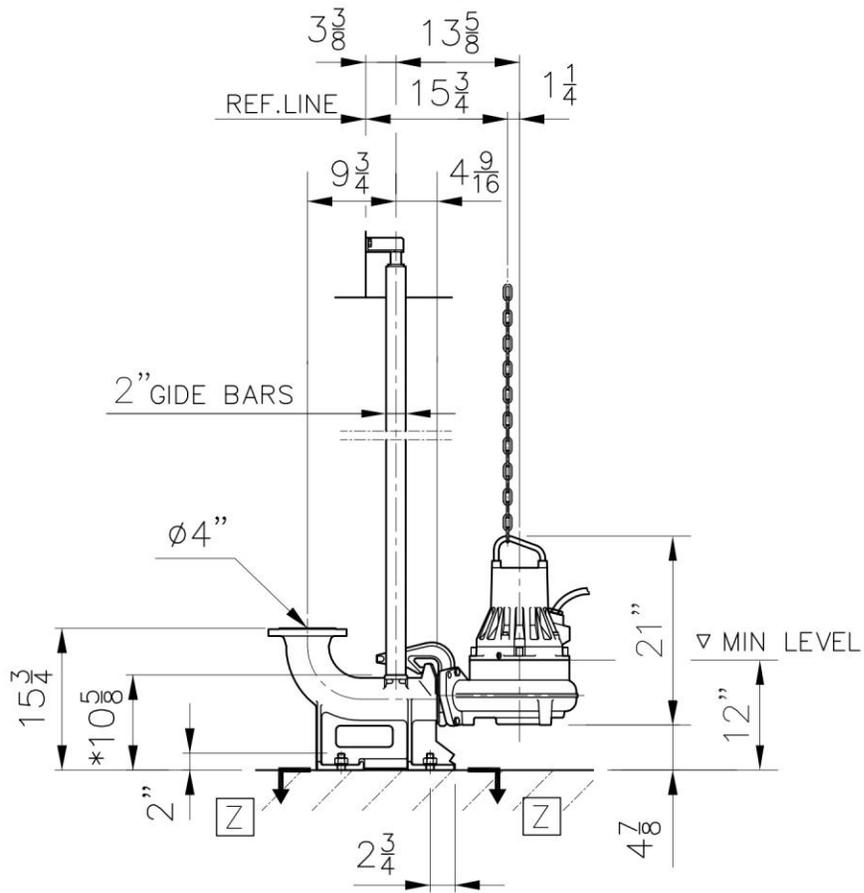
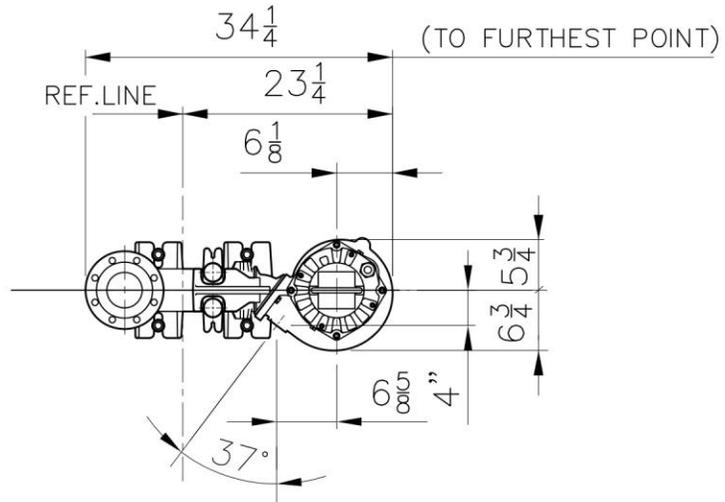
cosφ 0.87

TP111 cl.H IEC60034-1 IP68 $\frac{\nabla}{20m}$ L

66Kg

F

6306800

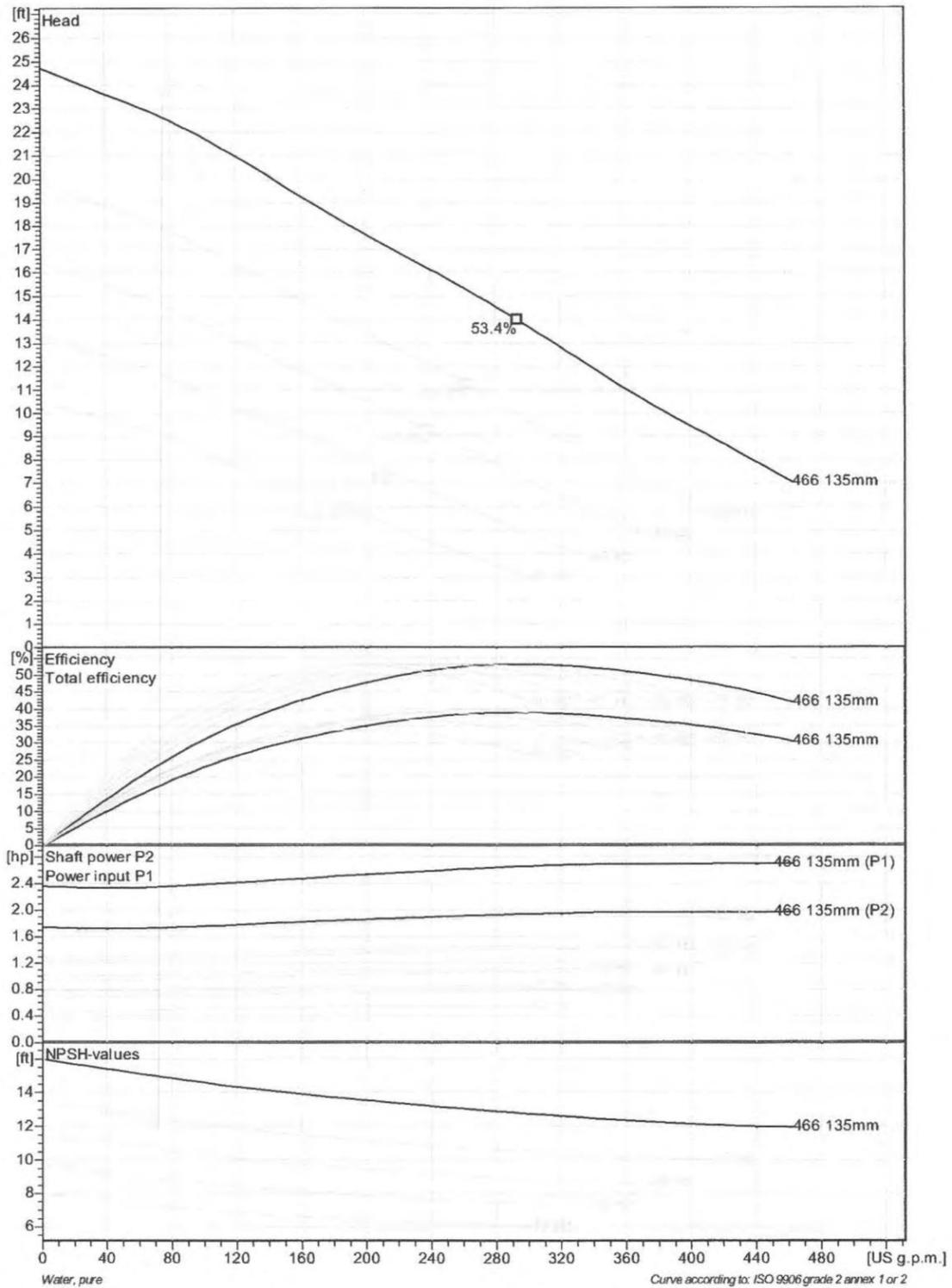


* DIMENSION TO ENDS OF GUIDE BARS

Weight (lbs)	
Pump	Disch
155	80

 AUTOCAD DRAWING	Denomination Dimensional drwg NP 3085 MT $\phi 4"$	Drawn by NK Scale	Checked by RB Date 090515 Reg no 5399
	6601800		3

NP 3085 MT 3~ 466
VFD Curve



Project

Project ID

Created by

Created on

Last update

2015-04-09

NP 3085 MT 3~ 466



Performance curve

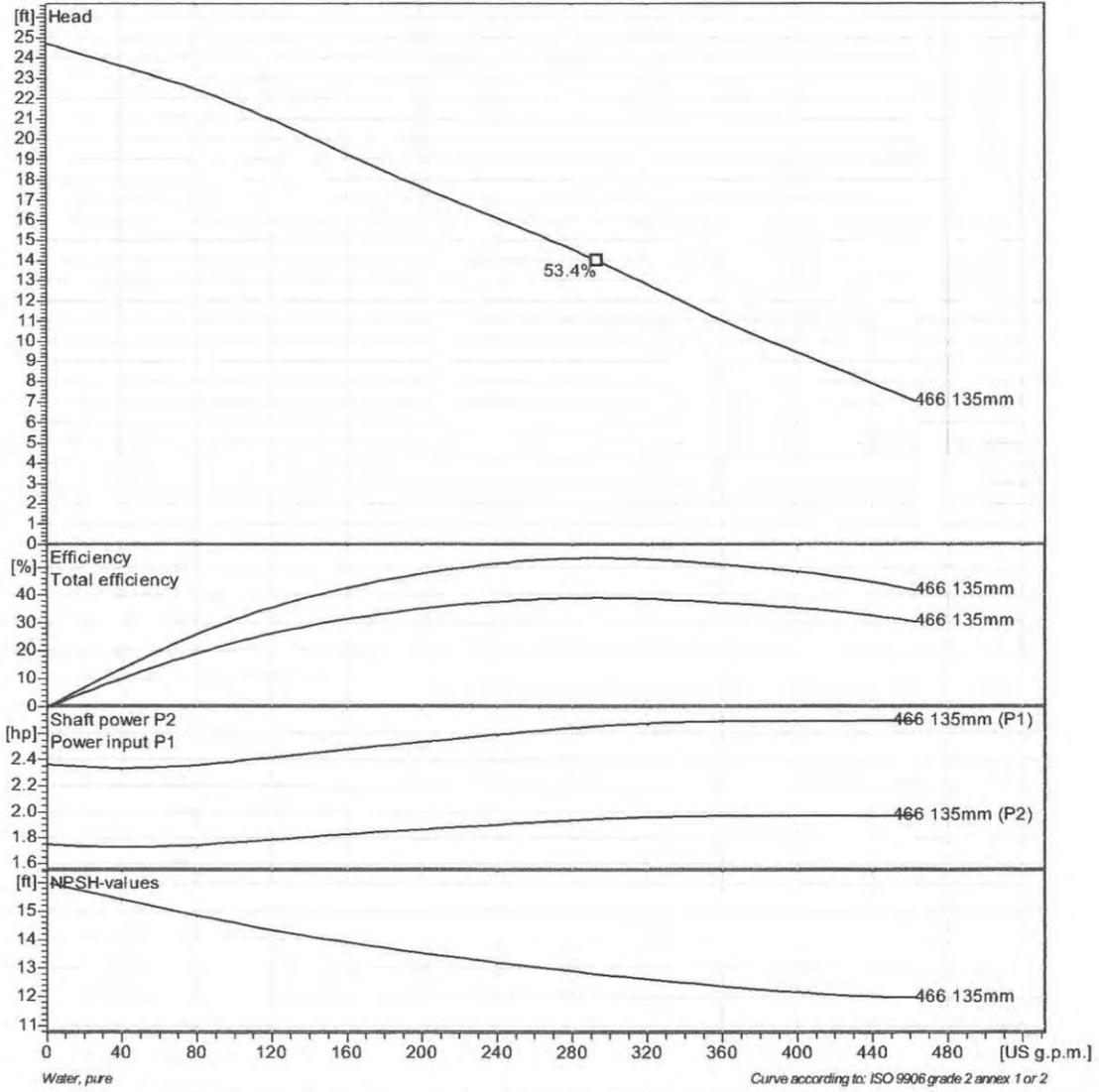
Pump

Discharge Flange Diameter	80 mm
Suction Flange Diameter	80 mm
Impeller diameter	135 mm
Number of blades	2

Motor

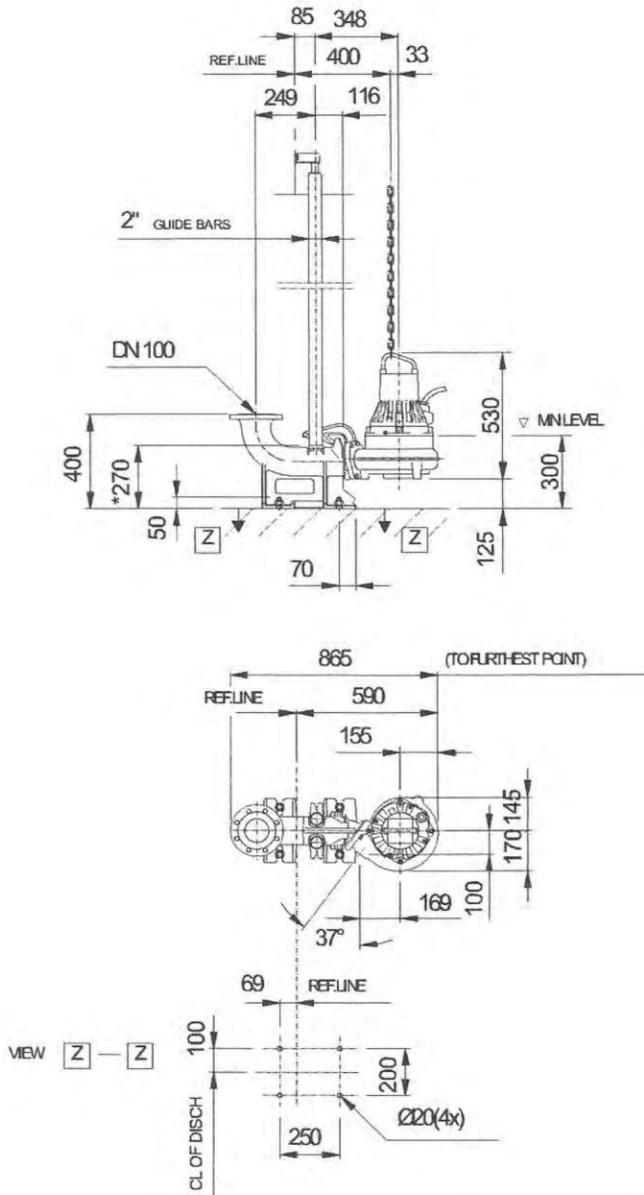
Motor #	N3085.092 15-07-4AL-W 2.2hp
Stator variant	12
Frequency	60 Hz
Rated voltage	230 V
Number of poles	4
Phases	3~
Rated power	2.2 hp
Rated current	6.6 A
Starting current	29 A
Rated speed	1670 1/min

Power factor	
1/1 Load	0.87
3/4 Load	0.83
1/2 Load	0.75
Efficiency	
1/1 Load	71.5 %
3/4 Load	74.0 %
1/2 Load	73.0 %



Project	Project ID	Created by	Created on 2015-04-09	Last update
---------	------------	------------	--------------------------	-------------

NP 3085 MT 3~ 466
Dimensional drawing



* DIMENSION TO ENDS OF GUIDE BARS

Dimensional dvg
NP3085MT

Weight

Project

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