CS-19-300

CHANGE ORDER APPROVAL FORM

PROJECT: NAU Lift Stations No. 10 & No. 29 Rehabilitations

CHANGE ORDER NUMBER: 1

DATE: 6/17/20

CONTRACT NUMBER: CM2816

TO CONTRACTOR: Petticoat-Schmitt Civil Contractors, Inc.

Reason for Change Order: Increase of $22,599.80 for labor, equipment and material to switch from Wilo pumps to Flygt pumps. Flygt pumps meet the flow curves and the required specified horsepower ratings to meet the design specifications and size constraints. In addition, a 14 day extension to account for longer lead time of the pumps will be necessary, therefore, replacing the contract end date of 10/29/2020 with 11/12/2020.

Original Contract Sum.....	$	315,900.00
Net Change by Previous Change Order/Supplemental Agreement.	$	0.00
Contract Sum Prior to This Change Order.....	$	315,900.00
Amount of This Change Order (Add).....	$	**22,599.80**
New Contract Sum Including this Change Order.....	$	338,499.80

APPROVED BY: _____ DATE: 6-22-20
Josh Stillwagon, NAU

APPROVED BY: _____ DATE: 6/28/20
Contract Purchasing Manager

APPROVED BY: _____ DATE: 6/28/20
Megan Diehl, Office of Management and Budget

APPROVED BY: _____ DATE: 7/14/20
Michael Mullin, County Manager/County Attorney

APPROVED BY: N/A DATE: _____
Daniel B. Leeper, Chairman

ATTEST: N/A DATE: _____
John A. Crawford, Clerk of Courts

Account No. 71500535-563551-LSSS

PETTICOAT-SCHMITT
CIVIL CONTRACTORS, INC.

To: Nassau Amelia Utilities
5390 1st Coast Hwy.
Fernandina Beach, FL 32034

Date: May 20, 2020

Attn: Becky Bray

Re: NAU LS 10 & 29 – Switch to Flygt Pumps

Change Order Request #1 for JEA Ditch Regrading:

1. Labor, equipment and material to switch from Wilo pumps to Flygt pumps, as agreed to prior to contract execution. Time is also included for the longer lead time of the pumps.

Item Total:	$ 22,599.80
Contract extension:	14 days

Thank you for the opportunity to quote this project.
Please sign and date below for acceptance.

Signed: _____
By: Michael Mullis
Date: 7/14/20

Petticoat-Schmitt Civil Contractors, Inc.

Signed: _____
By: Lauren Bedford, Assistant Project Mgr
Date: 05/20/20

NAU/GAI recommendation of c/o

Sharon Johns

From: Josh Stillwagon
Sent: Thursday, June 18, 2020 8:47 AM
To: Sharon Johns
Cc: John Cox
Subject: Re: Change order #1 -switch to Flygt Pumps

Follow Up Flag: Follow up
Flag Status: Flagged

Good morning Sharon,

The contract allowed the use of an "equal" pump. Wilo submitted a quote and was a cheaper pump but were rejected due to being unable to meet the flow curves and the required specified horsepower ratings. Flygt was able to meet the design specifications and size constraints in lift station # 10. Will you need more information than this?

Thanks,
Josh Stillwagon
Nassau Amelia Utilities
Operations and Maintenance Superintendent
Office (904) 530-6450
Cell (904) 753-6129
Jstillwagon@nassaucountyfl.com

From: Sharon Johns <sjohns@nassaucountyfl.com>
Sent: Wednesday, June 17, 2020 12:33 PM
To: Josh Stillwagon <jstillwagon@nassaucountyfl.com>
Cc: John Cox <jcox@nassaucountyfl.com>
Subject: RE: Change order #1 -switch to Flygt Pumps

Josh,

Please provide an explanation for the switch from Wilo to Flygt pumps to include in the change order. Upon your response, I'll draft a change order immediately and route for execution. Thank you for your assistance and patience.

Thanks,
Sharon A. Johns
Contract Specialist
Nassau County Board of County Commissioners

Contract Management Department
96135 Nassau Place, Suite 2
Yulee, FL 32097
(904) 530-6040

From: Josh Stillwagon <jstillwagon@nassaucountyfl.com>
Sent: Tuesday, June 02, 2020 11:47 AM
To: Grayson Hagins <ghagins@nassaucountyfl.com>
Cc: Sharon Johns <sjohns@nassaucountyfl.com>
Subject: Fw: Change order #1 -switch to Flygt Pumps

Good afternoon Sharon/Grayson,

GAI sent me the below change order for the 10 and 29 project. Anything in particular you need from me in regards to this?

Thanks in advance,

Josh Stillwagon
Nassau Amelia Utilities
Operations and Maintenance Superintendent
Office (904) 530-6450
Cell (904) 753-6129
Jstillwagon@nassaucountyfl.com

From: Rebecca Bray <R.Bray@gaiconsultants.com>
Sent: Tuesday, June 2, 2020 10:36 AM
To: Josh Stillwagon <jstillwagon@nassaucountyfl.com>
Cc: Jay Ameno, Jr. <j.ameno@gaiconsultants.com>; Bingjie Zhao <B.Zhao@gaiconsultants.com>
Subject: FW: Change order #1 -switch to Flygt Pumps

Josh,

The attached change order for switching from Wilo to Flygt pumps is attached. GAI has reviewed the change order and attached email correspondence backup. The amount is the same as the agreed upon cost as detailed in the correspondence. Therefore, GAI recommends approval of the attached Change Order #1.

Thank you,

Becky Bray, P.E.
D 904.903.2848 **M** 904.524.1540

From: Lauren Bedford <lbedford@petticoatschmitt.com>
Sent: Wednesday, May 20, 2020 9:21 AM
To: Rebecca Bray <R.Bray@gaiconsultants.com>; 'Josh Stillwagon' <jstillwagon@nassaucountyfl.com>
Subject: Change order #1 -switch to Flygt Pumps

Good morning,

Attached is the change order to switch from Wilo to Flygt pumps.

Let me know if you have any questions.

Respectfully,

Lauren Bedford
Assistant Project Manager

PETTICOAT-SCHMITT CIVIL CONTRACTORS, INC.
*6380 Philips Hwy. * Jacksonville, FL 32216*
*Direct (904) 365-4330 * Main Line (904) 751-0888 * Fax (904) 751-0988*
www.PetticoatSchmitt.com

GAI Flygt Pump Info

Sharon Johns

From: Jill Grimaldi <J.Grimaldi@gaiconsultants.com>
Sent: Wednesday, January 29, 2020 1:24 PM
To: Josh Stillwagon; Will Fontaine; Ronald Ketteman
Cc: Rebecca Bray; Grayson Hagins; Jay Ameno, Jr.; Bingjie Zhao
Subject: FW: NAU LS No.10 and 29 Pump Selection
Attachments: Nassau Amelia Utilities - PS #10 budget pricing 2019.doc; Nassau Amelia Utilities - PS # 29 budget pricing 2019.doc; LS 10 NP3069-272 3.8HP PS #10 100gpm @ 61'tdh.pdf; 683256 cat.pdf; 682020c cat.pdf; NP3153-462 20HP PS #29 360gpm @ 99'tdh.pdf

Josh, et. al. –

Attached is the pump info for the Flygt pump. I believe this information was provided this morning to Grayson by Jay, but sending to all so you all have the same info.

Grayson – please let us know if you require anything else.

Jill

Jill T. Grimaldi, BCES
Senior Associate
Assistant Environmental Director

M 772.519.0660

GAI Consultants
ENGINEERING, PLANNING, AND ENVIRONMENTAL CONSULTING SINCE 1958

From: Bingjie Zhao <B.Zhao@gaiconsultants.com>
Sent: Wednesday, January 29, 2020 1:19 PM
To: Jay Ameno, Jr. <j.ameno@gaiconsultants.com>
Cc: Jill Grimaldi <J.Grimaldi@gaiconsultants.com>
Subject: NAU LS No.10 and 29 Pump Selection

Good afternoon Jay,

Please see the attachment for the pump selection and price budget from David Williams. Thanks.

Have a nice day,
Bingjie

Bingjie Zhao, PhD, P.E.
Senior Project Engineer

GAI Consultants, 4400 PGA Boulevard, Suite 100, Palm Beach Gardens, FL 33410
T 561.465.8002 **M** 407.341.8269

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GAI Consultants

ENGINEERING, PLANNING, AND ENVIRONMENTAL CONSULTING SINCE 1958

Xylem Water Solutions USA Inc. / Flygt Products
2412 Birds Eye Court Orange Park, FL 32003
Phone: 239-825-8384 • Fax: 407-904-215-4079

To: Bidding Contractors

Date: November 6, 2019

Subject: Nassau Amelia Utilities – PS #29 budget pricing
Quote Number: 2019-APO-XXXX

We are pleased to offer the following equipment:

(2) 4"Flygt NP3153.185/462 submersible wastewater pumps, 20HP, 3/230V, each with 50' of motor cable.
(2) 4" x 4" Flygt discharge connections.
(1) Duplex 20HP/230V control panel, nema 4x stainless steel enclosure, four float DEP control logic.
(2) Flygt minicas pump sensors.
(4) Liquid level sensing floats with cable.
(8) Threaded rod anchor bolts.
(2) 2" upper guide rail brackets, 316 stainless steel.
(1) Cable holder, 316 stainless steel.
(4) 20' lengths of 2" diameter guide rail, 304 stainless steel.
(2) 20' pump lifting chains, 304 stainless steel.
(1) 36" x 48" 300# aluminum access cover.
(1) Startup service by a representative of this company.

Price: $59,000.00

Exclusions: WE DO NOT SUPPLY, PIPING, VALVES, GUIDE BARS, PRESSURE GAUGES, DISCONNECTS, JUNCTION BOXES, KELLUMS GRIPS, SURGE PROTECTION EQUIPMENT, SPARE PARTS, LABOR OR ANY OTHER ITEM NOT SPECIFICALLY LISTED ABOVE.

PLEASE MAKE PURCHASE ORDERS OUT TO: XYLEM WATER SOLUTIONS USA, INC.

Validity: THIS QUOTE IS VALID FOR NINETY (90) DAYS UNLESS LONGER TIME AGREED TO IN WRITING.

Taxes: State, local, and other applicable taxes are not included in this quotation.

Freight Terms: DAP; Jobsite - Full Freight Allowed (per Incoterms 2010)

Shortages: Xylem will not be responsible for apparent shipment shortages or damages incurred in shipment that are not reported within two weeks from delivery to jobsite. Damages should be noted on the receiving slip and the truck driver advised of the damages. Please contact our office as soon as possible to report damages or shortages so that replacement items can be shipped and the appropriate claims made.

Payment Terms: 100% NET 45 DAYS AFTER SHIPMENT DATE.
(Note: Partial billing will be made on partial shipments)

Xylem's payment shall not be dependent upon Purchaser being paid by any third party unless Owner denies payment due to reasons solely attributable to items related to the equipment being provided by FLYGT.

Schedule: Please consult your local Flygt branch for submittals and fabrication lead-times.

Back Charges: Buyer shall not make purchases nor shall Buyer incur any labor that would result in a back charge to Seller without prior written consent of an authorized employee of seller.

Xylem Water Solutions USA Inc. / Flygt Products
2412 Birds Eye Court Orange Park, FL 32003
Phone: 239-825-8384 • Fax: 407-904-215-4079

Terms & Conditions: *This order is subject to the Standard Terms and Conditions of Sale – Xylem Americas effective on the date the order is accepted which terms are available at http://www.xyleminc.com/en-us/Pages/terms-conditions-of-sale.apx and incorporated herein by reference and made part of the agreement between the parties.*

We thank you for your interest in our equipment and look forward to being of service to you in the near future.

IN THE ABSENCE OF A FORMAL ISSUED PURCHASE ORDER, A SIGNED COPY OF THIS PROPOSAL IS ACCEPTABLE AS A BINDING CONTRACT.

Xylem Water Solutions USA, Inc.

David Williams

Dave Williams

Company Name: _____

Address: _____

_____

Accepted By: _____

Print Name: _____

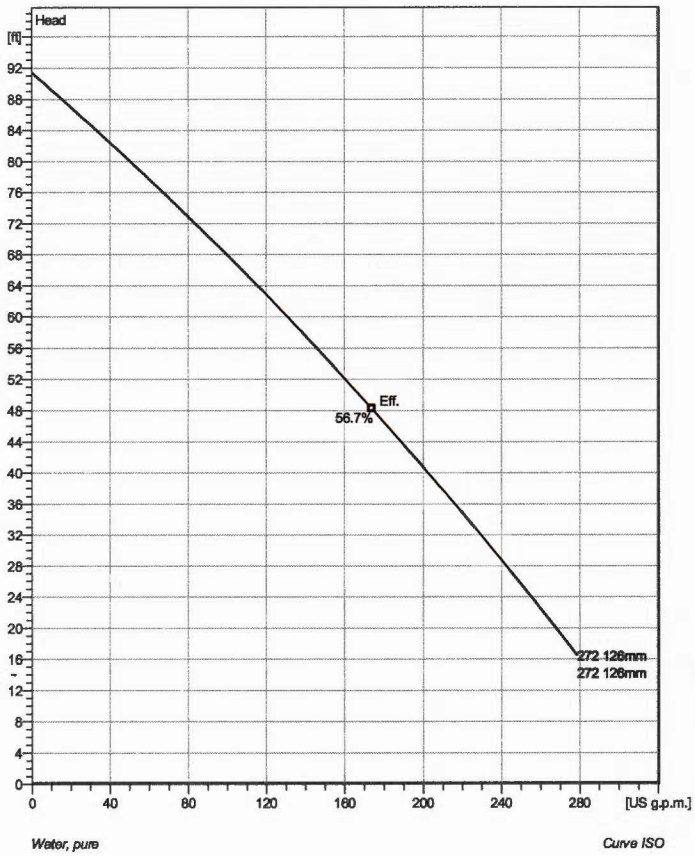
Date: _____

xylem

NP 3069 SH 3~ Adaptive 272

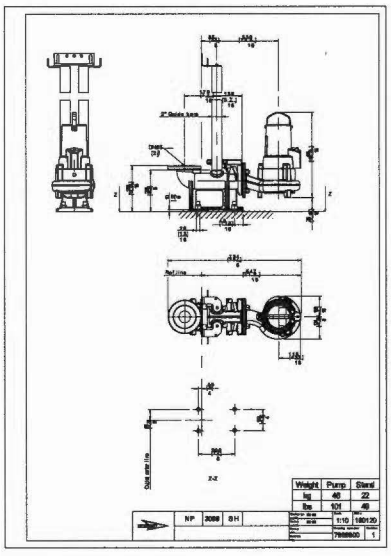
Technical specification

FLYGT



Note: Picture might not correspond to the current configuration.

Installation: P - Semi permanent, Wet



General

Patented self cleaning semi-open channel impeller, ideal for pumping in waste water applications. Possible to be upgraded with Guide-pin® for even better clogging rasistance. Modular based design with high adaptation grade.

Impeller

Impeller material	Hard-Iron ™
Discharge Flange Diameter	2 9/16 inch
Suction Flange Diameter	3 15/16 inch
Impeller diameter	126 mm
Number of blades	2

Motor

Motor #	N3069.060 13-10-2BB-W 3.8hp Standard
Stator variant	8
Frequency	60 Hz
Rated voltage	230 V
Number of poles	2
Phases	3~
Rated power	3.8 hp
Rated current	11 A
Starting current	67 A
Rated speed	3370 rpm
Power factor	
1/1 Load	0.81
3/4 Load	0.74
1/2 Load	0.61
Motor efficiency	
1/1 Load	81.8 %
3/4 Load	83.1 %
1/2 Load	82.3 %

Configuration

Project	Project ID	Created by	Created on	Last update
			4/9/2018	

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NP 3069 SH 3~ Adaptive 272

FLYGT

Performance curve

Pump

Discharge Flange Diameter	2 9/16 inch
Suction Flange Diameter	100 mm
Impeller diameter	$4^{15}/_{16}$"
Number of blades	2

Motor

Motor #	N3069.060 13-10-2BB-W 3.8hp
Stator variant	8
Frequency	60 Hz
Rated voltage	230 V
Number of poles	2
Phases	3~
Rated power	3.8 hp
Rated current	11 A
Starting current	67 A
Rated speed	3370 rpm

Power factor	
1/1 Load	0.81
3/4 Load	0.74
1/2 Load	0.61

Motor efficiency	
1/1 Load	81.8 %
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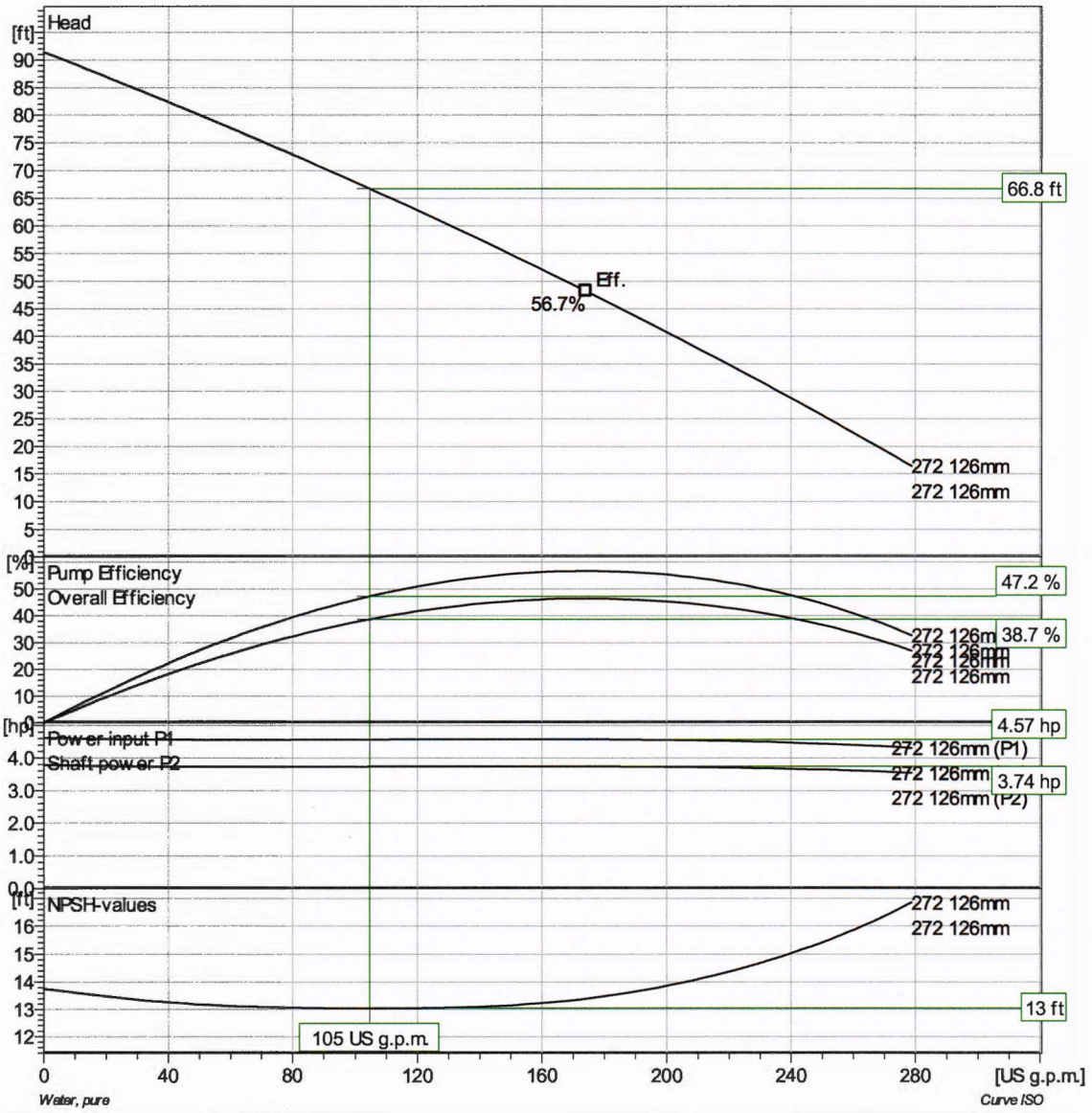
1/2 Load	82.3 %



Duty point		Guarantee
Flow	Head	
100 US g.p.m.	61 ft	No

Project	Project ID	Created by	Created on	Last update
			4/9/2018	

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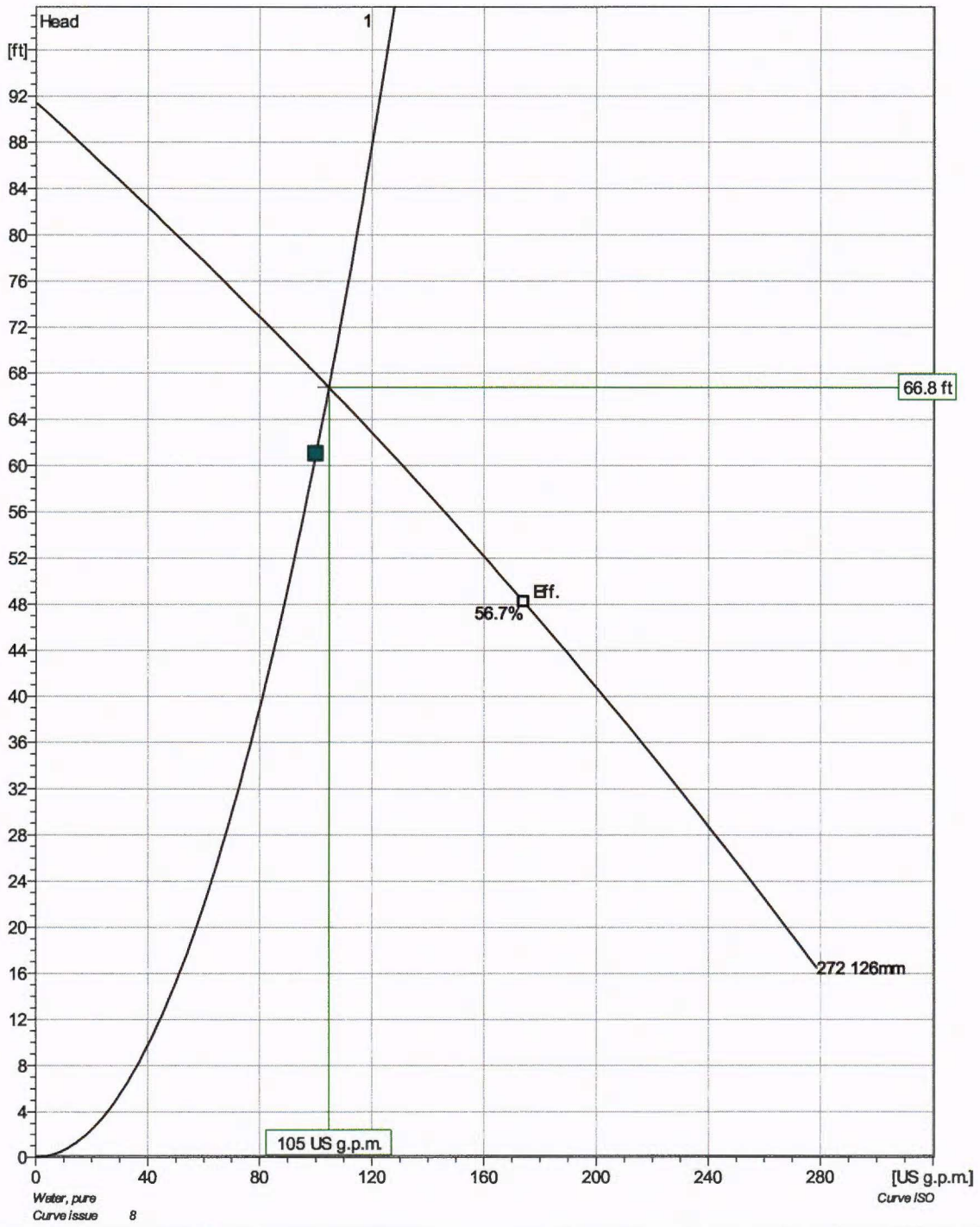
Duty Analysis



Pumps running /System	Individual pump			Total					
	Flow	Head	Shaft power	Flow	Head	Shaft power	Pump eff.	Specific energy	NPSHre
1	105 US g.p.m.	66.8 ft	3.74 hp	105 US g.p.m.	66.8 ft	3.74 hp	47.2 %	543 kWh/US MG	13 ft

Project	Project ID	Created by	Created on	Last update
			4/9/2018	

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NP 3069 SH 3~ Adaptive 272

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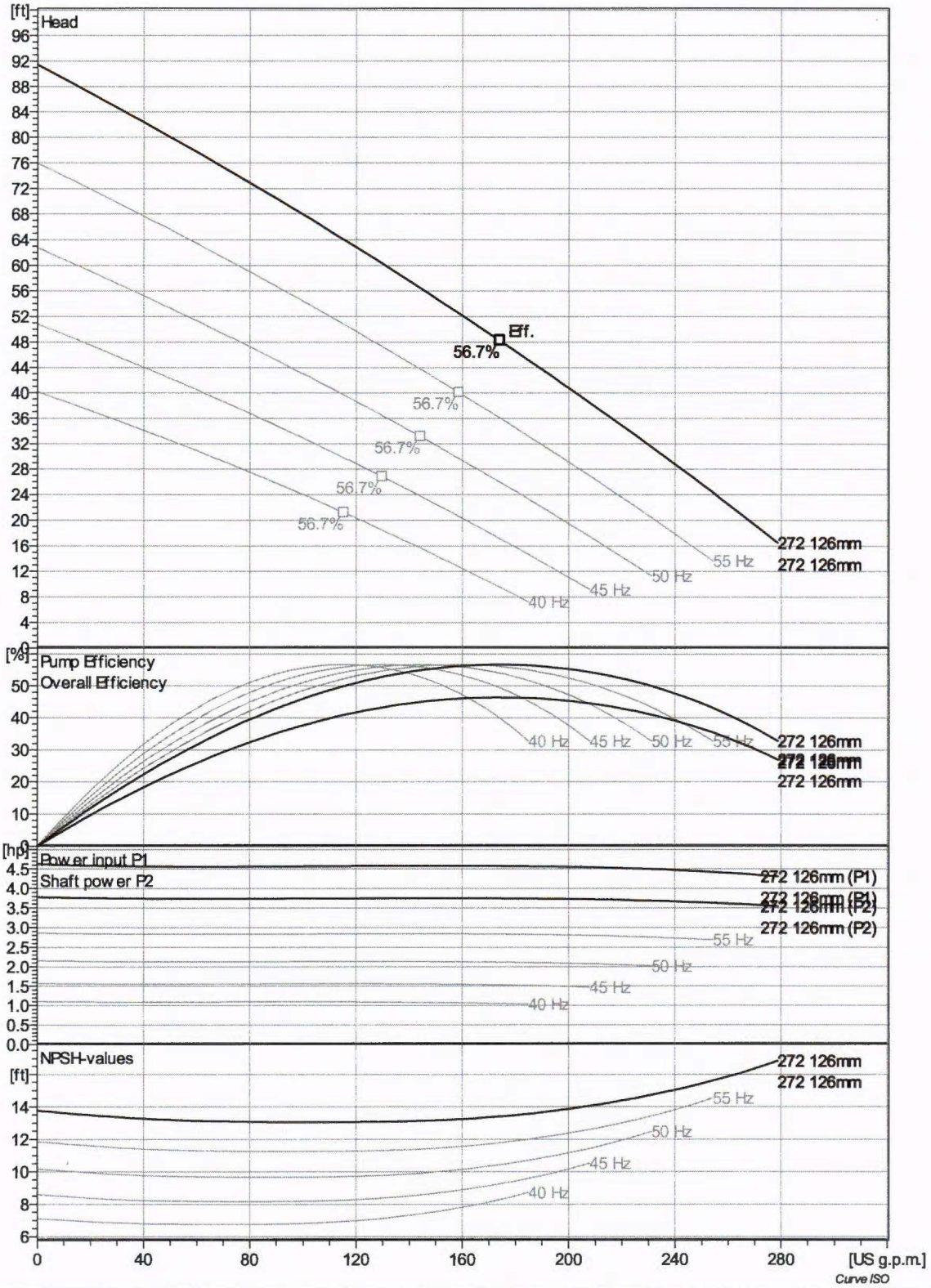
VFD Curve



Project	Project ID	Created by	Created on	Last update
			4/9/2018	

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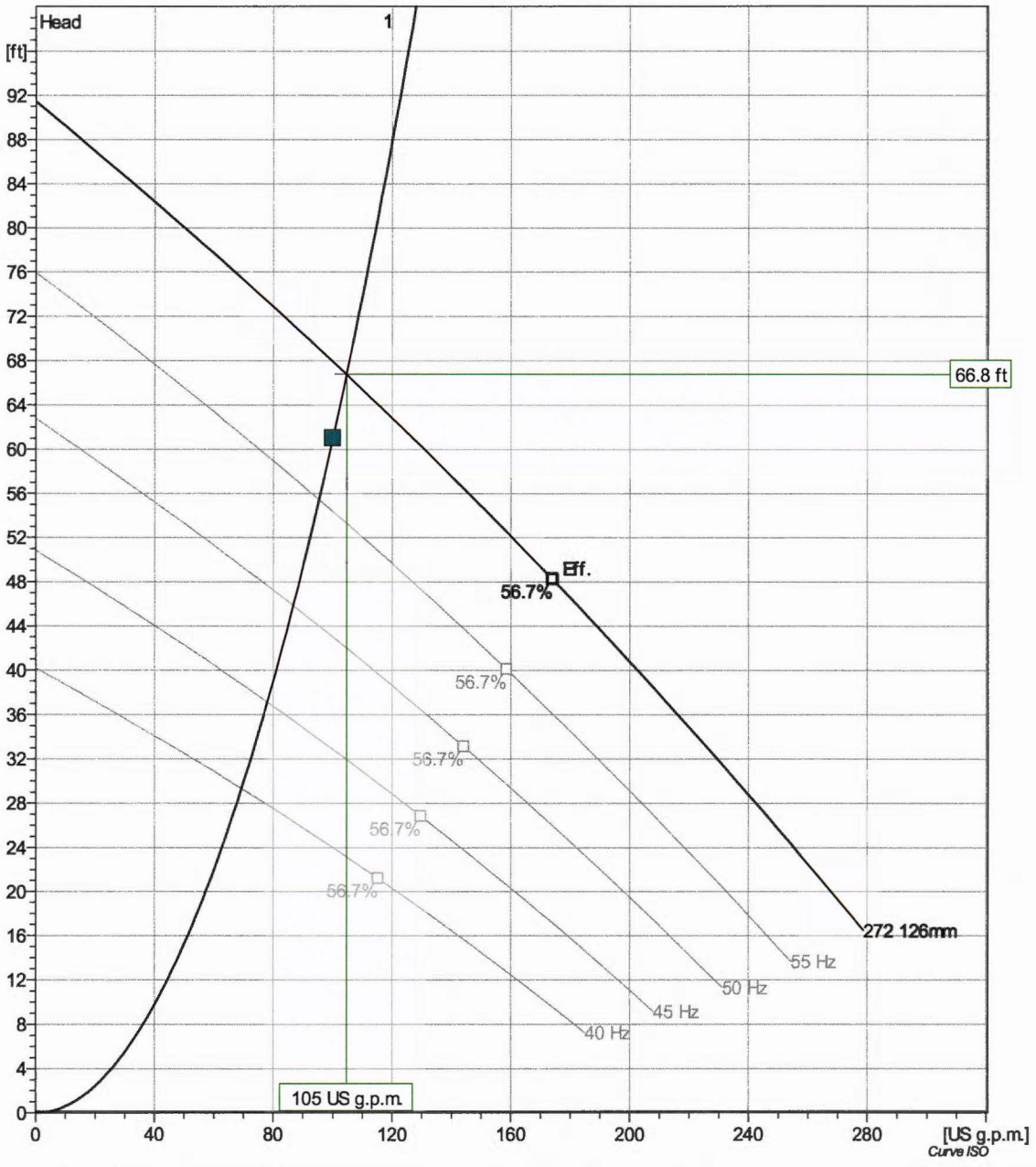
NP 3069 SH 3~ Adaptive 272

FLYGT

VFD Analysis



Pumps running /System	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hyd eff.	Specific energy	NPSHre
1	60 Hz	105 US g.p.m.	66.8 ft	3.74 hp	105 US g.p.m.	66.8 ft	3.74 hp	47.2 %	543 kWh/US MG	13 ft
1	52 Hz	95.4 US g.p.m.	55.5 ft	2.83 hp	95.4 US g.p.m.	55.5 ft	2.83 hp	47.2 %	444 kWh/US MG	11.2 ft
1	47.3 Hz	86.7 US g.p.m.	45.8 ft	2.13 hp	86.7 US g.p.m.	45.8 ft	2.13 hp	47.2 %	372 kWh/US MG	9.66 ft
1	42.6 Hz	78 US g.p.m.	37.1 ft	1.55 hp	78 US g.p.m.	37.1 ft	1.55 hp	47.2 %	311 kWh/US MG	8.16 ft
1	37.6 Hz	69.4 US g.p.m.	29.3 ft	1.09 hp	69.4 US g.p.m.	29.3 ft	1.09 hp	47.2 %	261 kWh/US MG	6.76 ft

Project	Project ID	Created by	Created on	Last update
			4/9/2018	

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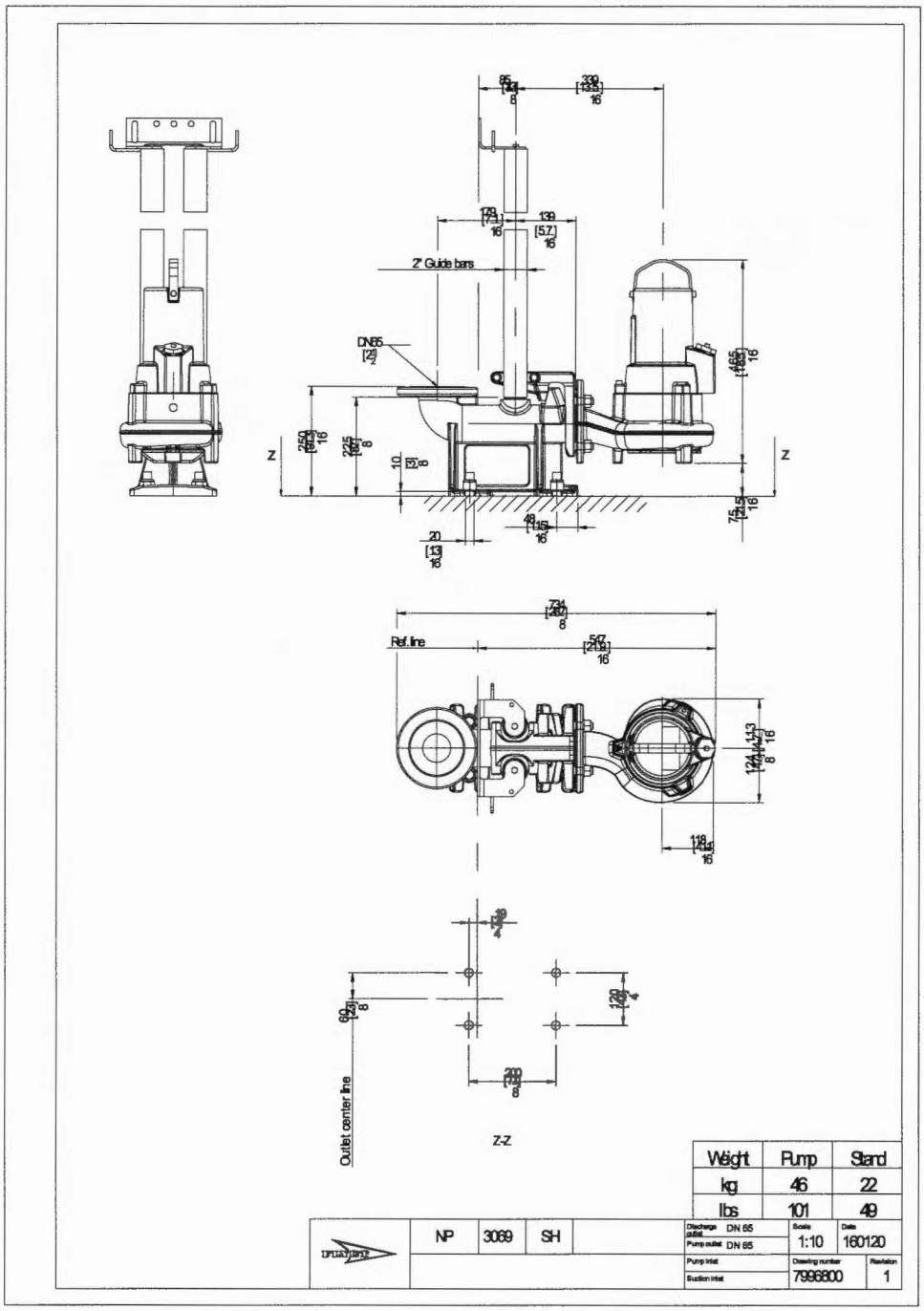
NP 3069 SH 3~ Adaptive 272

Dimensional drawing

FLYGT



Weight	Pump	Stand
kg	46	22
lbs	101	49

NP	3069	SH

Discharge outlet	DN 65
Pump outlet	DN 65
Pump inlet	
Suction inlet	

Scale	Date
1:10	160120

Drawing number	Revision
7996800	1

Project	Project ID	Created by	Created on	Last update
			4/9/2018	

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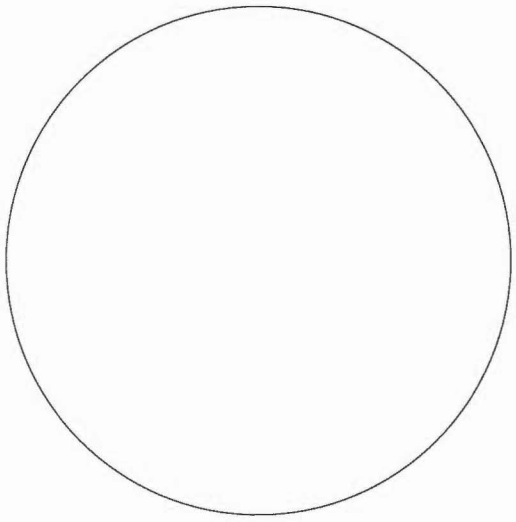
Version 10

NP 3069 SH 3~ Adaptive 272

Life cycle costs (LCC)

Total lifetime	15	Inflation rate (rate of price increases)	2 %
Annual operating time	5600	Interest rate (for investment)	3 %
Energy cost per kWh	0.00 USD		
Power input P1			

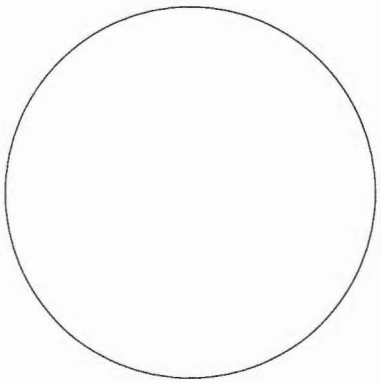
Total costs



0.00
USD

0%	**0.00 USD**	Energy
0%	**0.00 USD**	Investment costs
0%	**0.00 USD**	Installation & commissioning
0%	**0.00 USD**	Operating cost
0%	**0.00 USD**	Maintenance & repair
0%	**0.00 USD**	Downtime
0%	**0.00 USD**	Environmental
0%	**0.00 USD**	Decommissioning

First year costs



0.00
USD

0%	**0.00 USD**	Energy (1st year)
0%	**0.00 USD**	Investment costs (1st year)
0%	**0.00 USD**	Installation & commissioning (1st year)
0%	**0.00 USD**	Operating cost (1st year)
0%	**0.00 USD**	Maintenance & repair (1st year)
0%	**0.00 USD**	Downtime (1st year)
0%	**0.00 USD**	Environmental (1st year)
0%	**0.00 USD**	Decommissioning (1st year)

Project	Project ID	Created by	Created on	Last update
			4/9/2018	

FLYGT
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Issued: Supersedes:

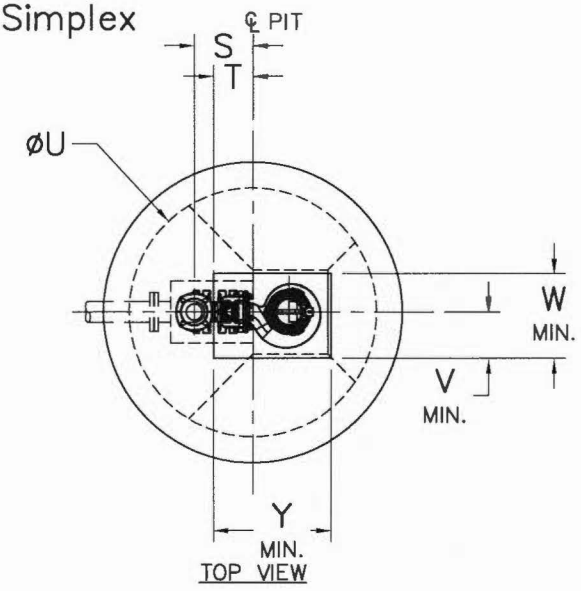
DP,NP 3069

with 1" Guide Rails

NOTES:

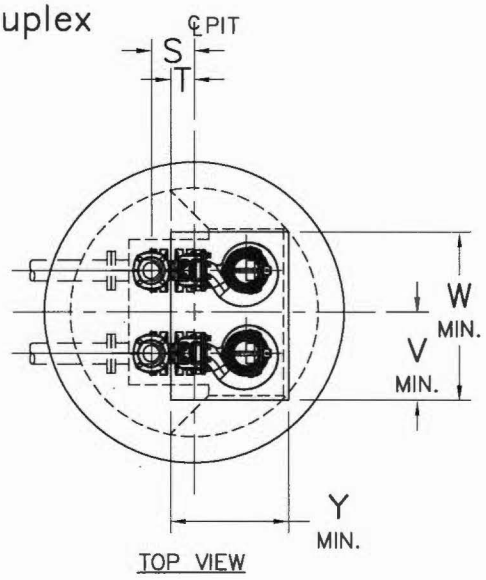
1. CONFIGURATION AND DIMS. SHOWN ARE SUGGESTED REQUIREMENTS ONLY. ALL DETAILS, INCLUDING SIZING OF PIT, TYPE, LOCATION AND ARRANGEMENT OF VALVES AND PIPING, ETC. ARE TO BE SPECIFIED BY THE CONSULTING ENGINEER AND ARE SUBJECT TO THEIR APPROVAL.
2. REFERENCE GENERIC DUPLEX LIFT STATION LAYOUT.
3. LOCATE ANCHOR BOLTS USING CLEAR INSIDE EDGE OF ACCESS FRAME AND PUMP CENTERLINE AS REFERENCE POINT. BOLT LOCATIONS MUST BE HELD TO MAINTAIN EXACT POSITION OF PUMP TO ACCESS FRAME.

Simplex

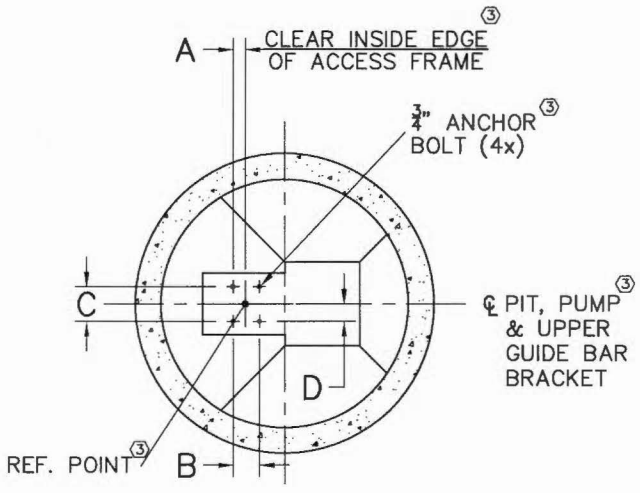


TOP VIEW

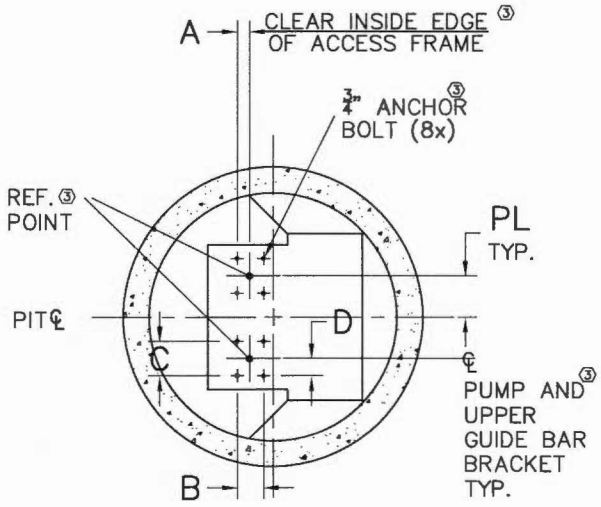
Duplex



TOP VIEW



℄ PIT
BASE SECTION



℄ PIT
BASE SECTION

ALL DIMENSIONS ARE IN INCHES

MODEL	NOM. SIZE	VERSION	SIMPLEX										DUPLEX						
			A	B	C	D	S	T	U	V	W	Y	S	T	U	PL	V	W	Y
DP	2½"	MT,LT	9/16	4¾	4¾	2⅜	12 3/16	8 7/16	48	7⅞	15¾	23¾	9¼	5½	48	8	15 7/8	31¾	23¾
NP	2½"	SH	9/16	4¾	4¾	2⅜	12 3/16	8 7/16	48	6⅞	13¼	23½	9¾	6	48	7	13 7/8	27¼	23½
DP	3"	LT	2⅜	5⅛	6 11/16	3⅜	11⅜	7⅝	48	7⅞	15¾	25	8 5/16	4 9/16	48	8	15 7/8	31¾	25
NP	3"	MT	2⅜	5⅛	6 11/16	3⅜	11⅜	7⅝	48	9	16½	25¾	8 5/16	4 9/16	48	8	17	32½	25¾
NP	3"	SH	2⅜	5⅛	6 11/16	3⅜	11⅜	7⅝	48	6⅞	13¼	23¾	8 13/16	5 1/16	48	7	13 7/8	27¼	23¾
DP	3"	MT,LT	2⅜	5⅛	6 11/16	3⅜	11⅜	7⅝	48	7⅞	15¾	24	8 5/16	4 9/16	48	8	15 7/8	31¾	24

FLYGT
a xylem brand

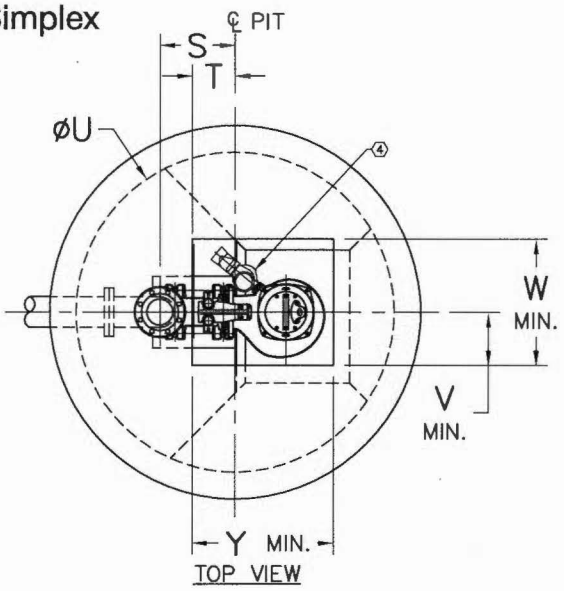
Issued: 11/11 Supersedes: 2/09

FP/NP-3153

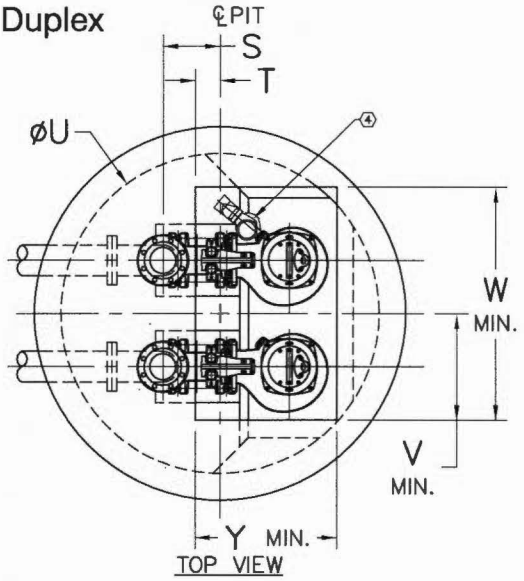
NOTES:

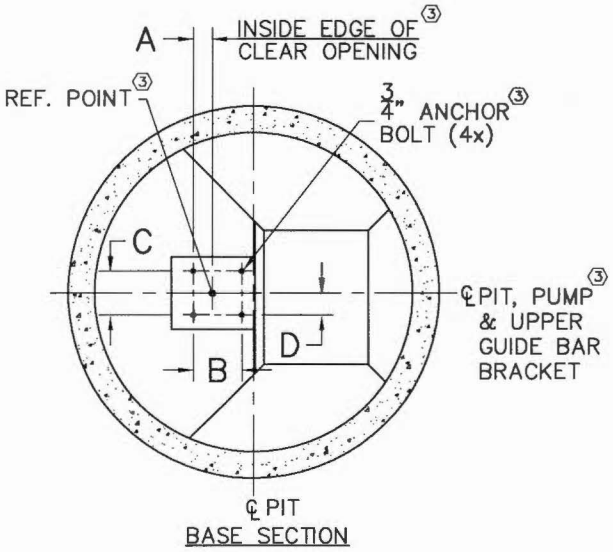
1. CONFIGURATION AND DIMS. SHOWN ARE SUGGESTED REQUIREMENTS ONLY. ALL DETAILS, INCLUDING SIZING OF PIT, TYPE, LOCATION AND ARRANGEMENT OF VALVES AND PIPING, ETC. ARE TO BE SPECIFIED BY THE CONSULTING ENGINEER AND ARE SUBJECT TO THEIR APPROVAL.
2. REFERENCE GENERIC DUPLEX LIFT STATION LAYOUT FOR ELEVATION VIEW.
3. LOCATE ANCHOR BOLTS USING INSIDE EDGE OF CLEAR OPENING AND PUMP CENTERLINE AS REFERENCE POINT. BOLT LOCATIONS MUST BE HELD TO MAINTAIN EXACT POSITION OF PUMP TO CLEAR OPENING.
4. ITT FLYGT MIX-FLUSH VALVE.

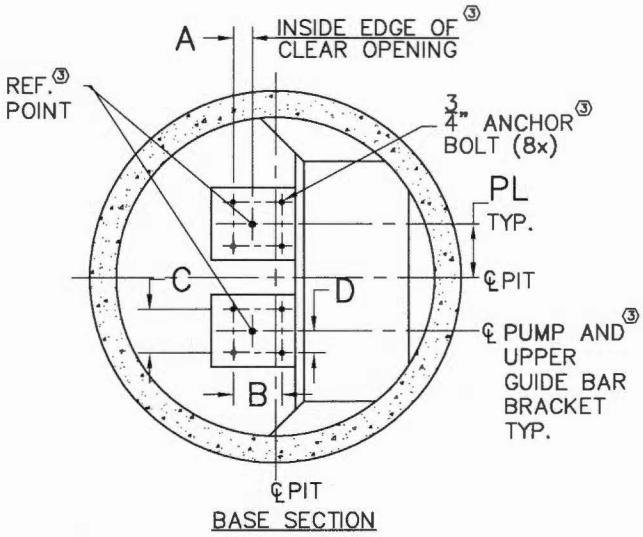
Simplex



Duplex







ALL DIMENSIONS ARE IN INCHES

MODEL	NOM. SIZE	VERSION	SIMPLEX										DUPLEX						
			A	B	C	D	S	T	U	V	W	Y	S	T	U	PL	V	W	Y
FP/NP	3"	SH	2 1/2	9 7/8	8	4	21 1/4	15 1/4	72	9	27	29 1/2	18 3/8	12 3/8	72	11	20	49	29 1/2
FP/NP	4"	SH	2 3/4	9 7/8	8	4	19 3/4	13 1/4	72	9	27	29 1/2	16 1/2	10	72	11	20	49	29 1/2
FP/NP	4"	HT	2 3/4	9 7/8	8	4	19 3/4	13 1/4	72	11	27 1/2	30 1/2	16 1/2	10	72	11	22	49 1/2	30 1/2
FP/NP	6"	MT	4 3/8	11	10	5	17 3/8	9 3/4	72	12	28 1/2	32	12 7/8	5 1/4	72	12	24	52 1/2	32
NP	8"	LT	5 1/2	11	10	5	14 1/4	5 3/8	72	14	30 1/2	35	16 1/2	7 5/8	84	13	27	56 1/2	35
NP	10"	LT	14 1/8	19 3/4	10	5	23 3/4	13	96	16 1/2	35 1/2	40	16 3/4	6	96	18	34 1/2	71 1/2	40

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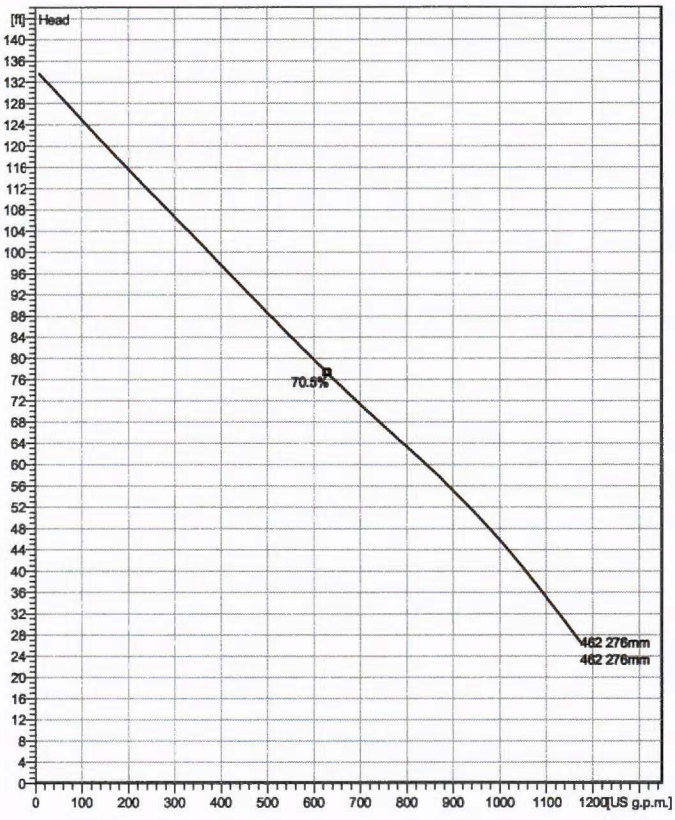
Technical specification

FLYGT



Water, pure *Curve ISO*

Note: Picture might not correspond to the current configuration.

General

Patented self cleaning semi-open channel impeller, ideal for pumping in waste water applications. Possible to be upgraded with Guide-pin® for even better clogging resistance. Modular based design with high adaptation grade.

Impeller

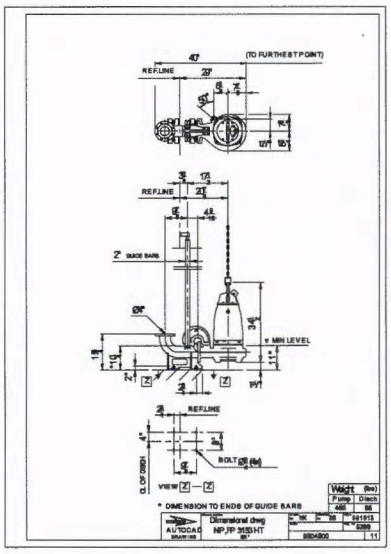
Impeller material	Grey cast iron
Discharge Flange Diameter	3 15/16 inch
Suction Flange Diameter	3 15/16 inch
Impeller diameter	276 mm
Number of blades	2

Motor

Motor #	N3153.181 21-18-4AA-W 20hp Standard
Stator variant	5
Frequency	60 Hz
Rated voltage	230 V
Number of poles	4
Phases	3~
Rated power	20 hp
Rated current	52 A
Starting current	296 A
Rated speed	1755 rpm
Power factor	
1/1 Load	0.83
3/4 Load	0.77
1/2 Load	0.66
Motor efficiency	
1/1 Load	87.5 %
3/4 Load	89.0 %
1/2 Load	89.0 %

Configuration

Installation: P - Semi permanent, Wet



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Performance curve

Pump

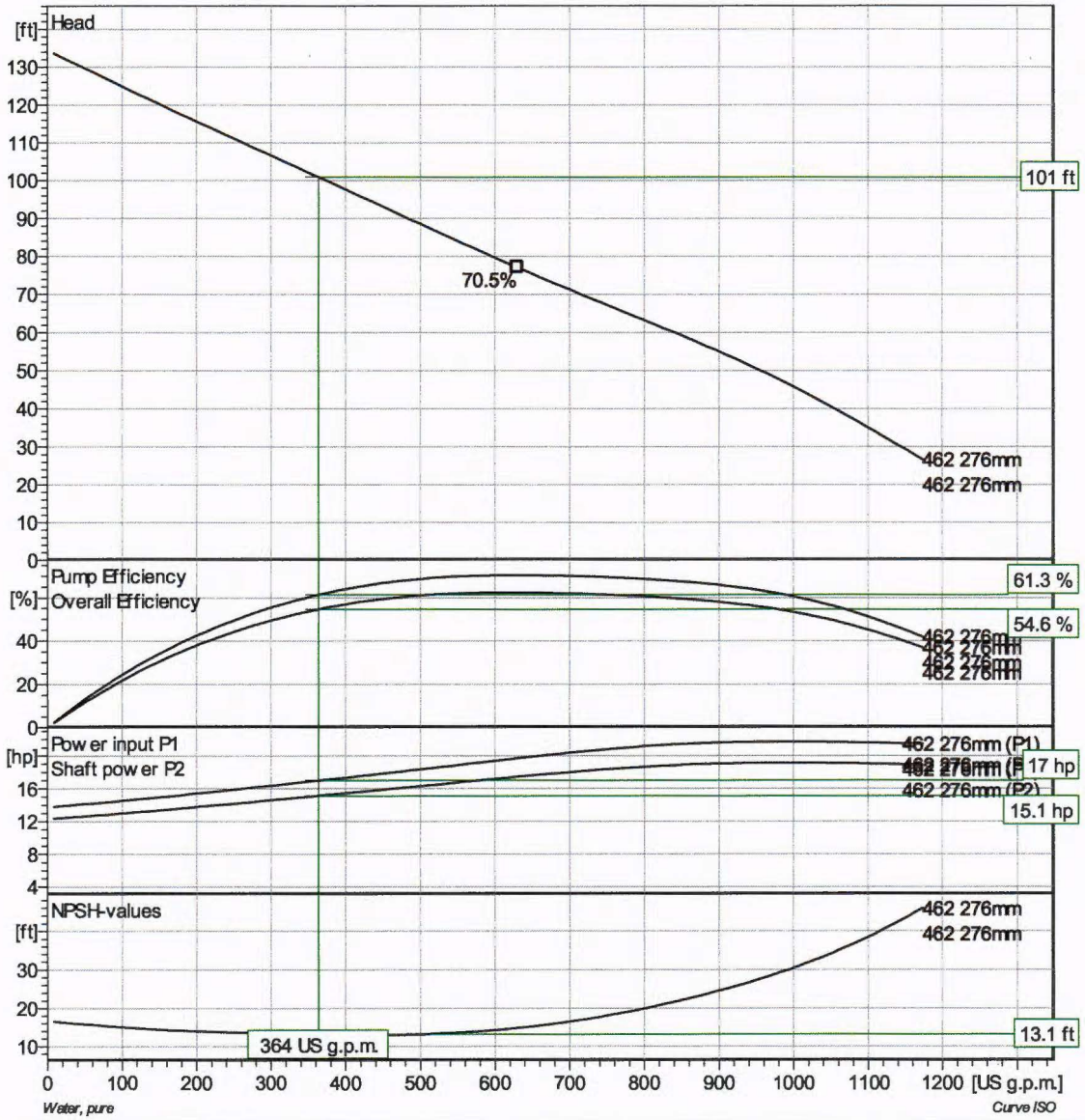
Discharge Flange Diameter	3 15/16 inch
Suction Flange Diameter	100 mm
Impeller diameter	10 7/8"
Number of blades	2

Motor

Motor #	N3153.181 21-18-4AA-W 20hp
Stator variant	5
Frequency	60 Hz
Rated voltage	230 V
Number of poles	4
Phases	3~
Rated power	20 hp
Rated current	52 A
Starting current	296 A
Rated speed	1755 rpm

Power factor	
1/1 Load	0.83
3/4 Load	0.77
1/2 Load	0.66

Motor efficiency	
1/1 Load	87.5 %
3/4 Load	89.0 %
1/2 Load	89.0 %



Duty point		Guarantee
Flow	Head	
360 US g.p.m.	99 ft	No

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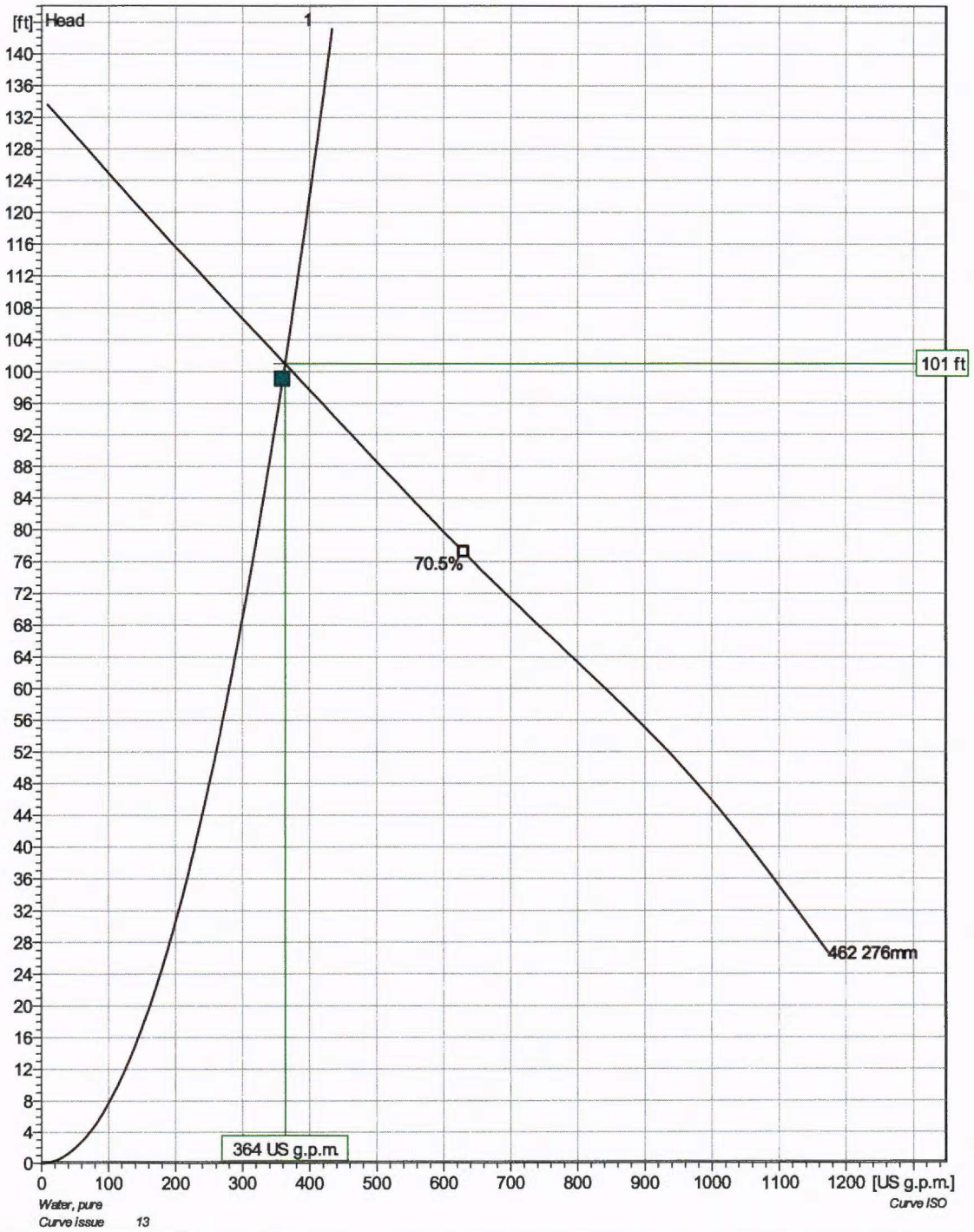
Duty Analysis



Pumps running /System	Individual pump Flow	Head	Shaft power	Total Flow	Head	Shaft power	Pump eff.	Specific energy	NPSHre
1	364 US g.p.m.	101 ft	15.1 hp	364 US g.p.m.	101 ft	15.1 hp	61.3 %	581 kWh/US MG	13.1 ft

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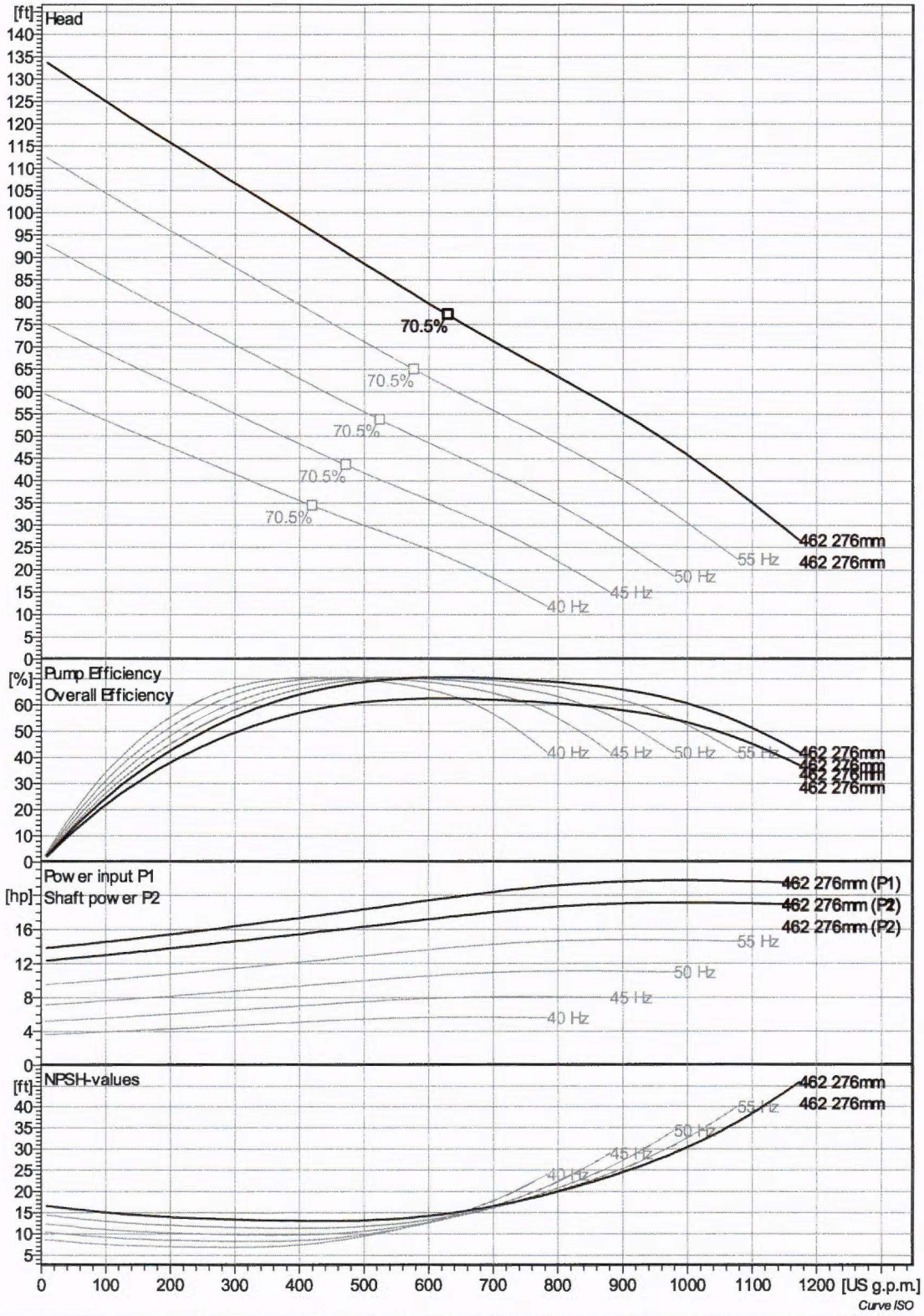
VFD Curve



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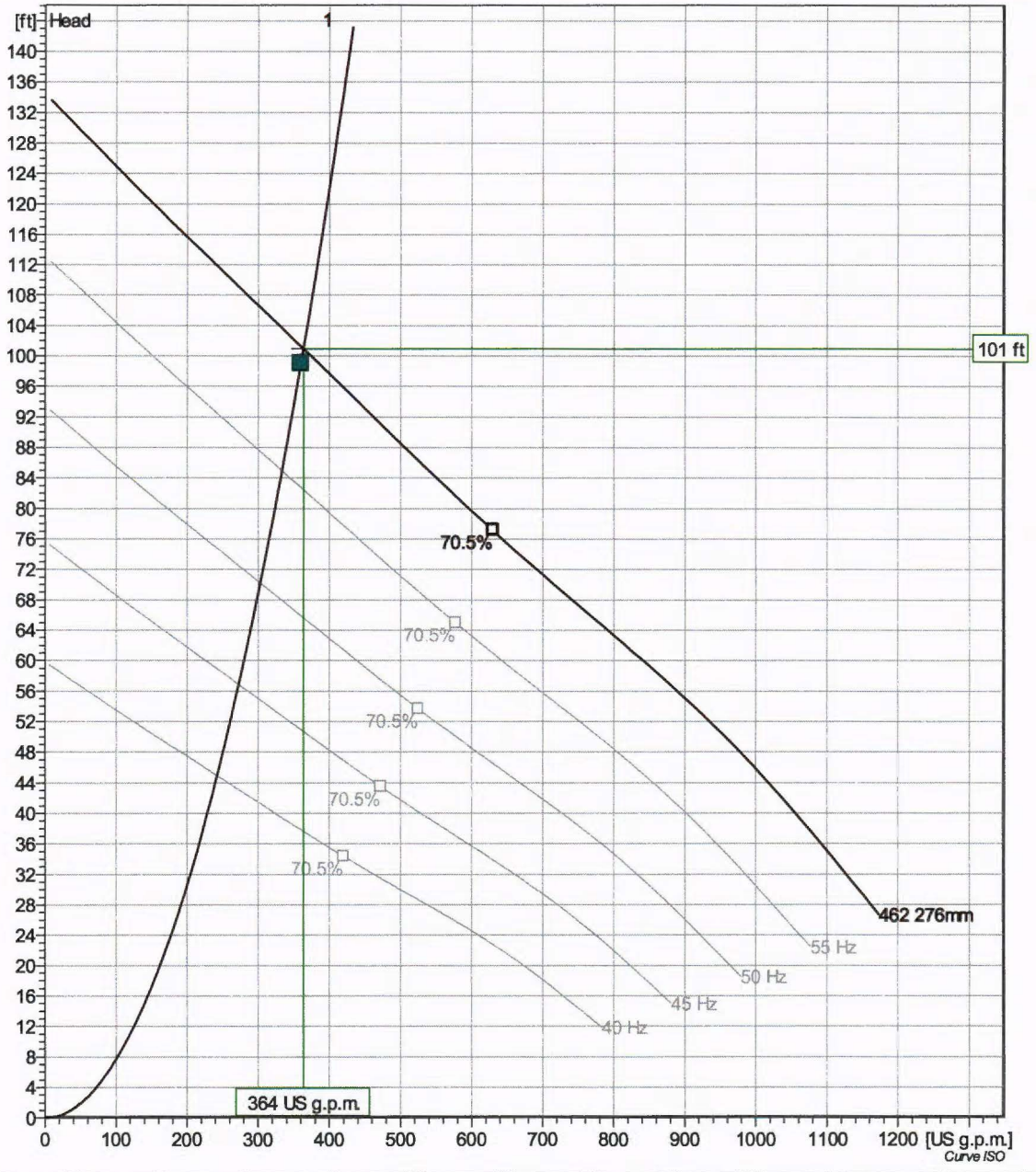
VFD Analysis



Pumps running /System	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hyd eff.	Specific energy	NPSHre
1	60 Hz	364 US g.p.m.	101 ft	15.1 hp	364 US g.p.m.	101 ft	15.1 hp	61.3 %	581 kWh/US MG	13.1 ft
1	54.8 Hz	334 US g.p.m.	85 ft	11.7 hp	334 US g.p.m.	85 ft	11.7 hp	61.3 %	488 kWh/US MG	11.4 ft
1	49.8 Hz	303 US g.p.m.	70.2 ft	8.79 hp	303 US g.p.m.	70.2 ft	8.79 hp	61.3 %	405 kWh/US MG	9.8 ft
1	44.8 Hz	273 US g.p.m.	56.9 ft	6.41 hp	273 US g.p.m.	56.9 ft	6.41 hp	61.3 %	335 kWh/US MG	8.28 ft
1	39.8 Hz	243 US g.p.m.	44.9 ft	4.5 hp	243 US g.p.m.	44.9 ft	4.5 hp	61.3 %	274 kWh/US MG	6.86 ft

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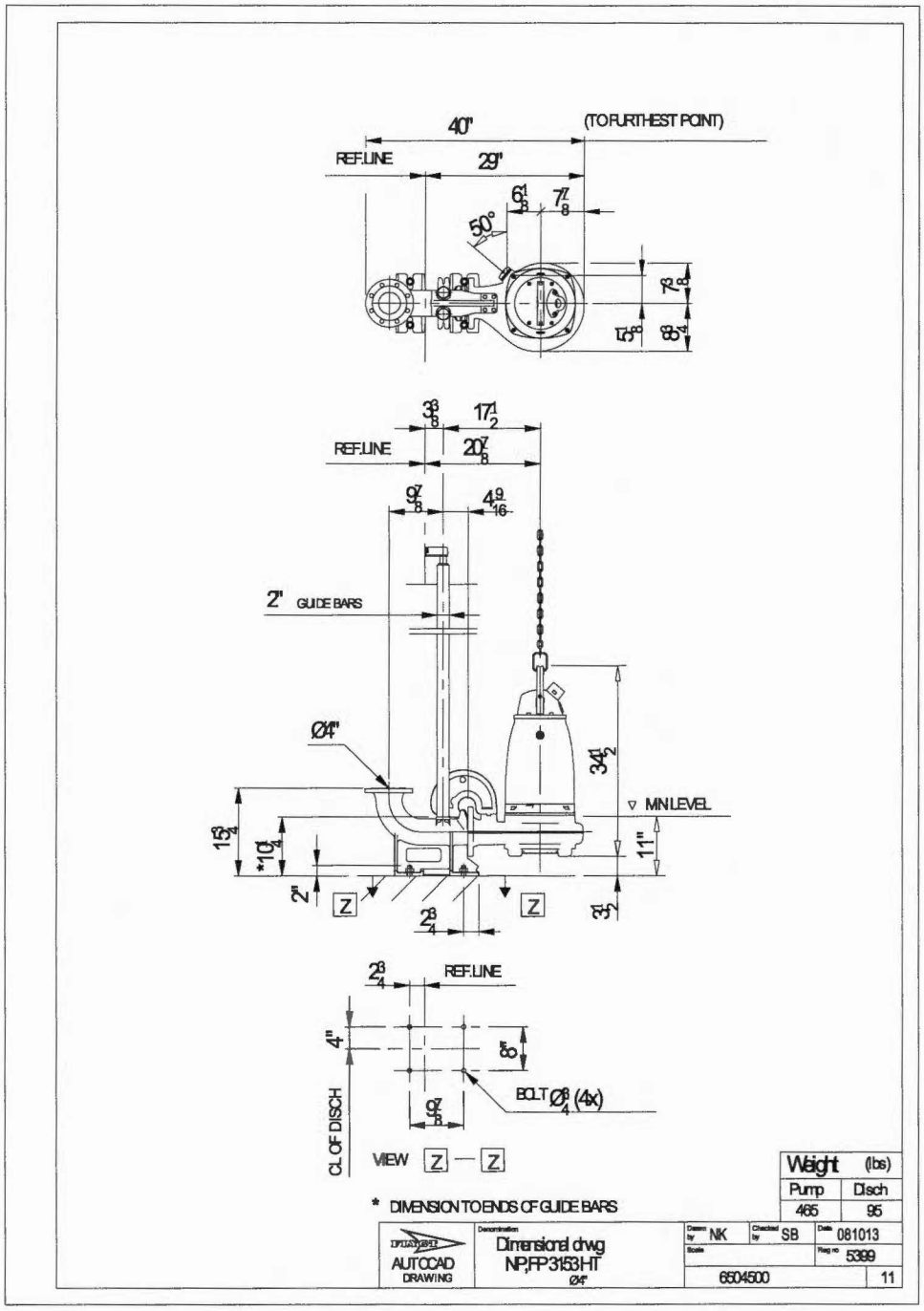
Dimensional drawing

FLYGT



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Version 10

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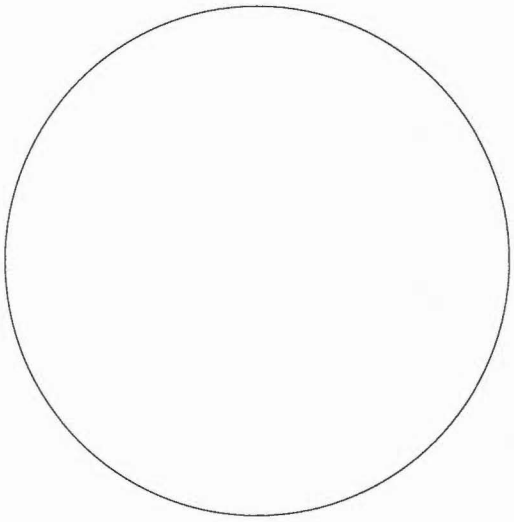
Life cycle costs (LCC)

Total lifetime	15	Inflation rate (rate of price increases)	2 %
Annual operating time	5600	Interest rate (for investment)	3 %
Energy cost per kWh	0.00 USD		
Power input P1			

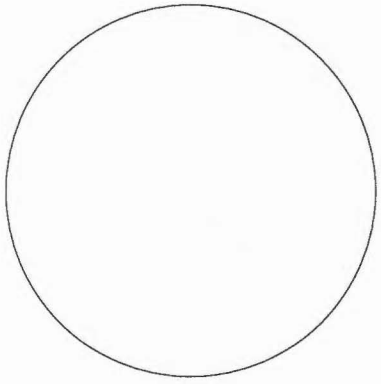
Total costs



0.00
USD

0%	**0.00 USD**	Energy
0%	**0.00 USD**	Investment costs
0%	**0.00 USD**	Installation & commissioning
0%	**0.00 USD**	Operating cost
0%	**0.00 USD**	Maintenance & repair
0%	**0.00 USD**	Downtime
0%	**0.00 USD**	Environmental
0%	**0.00 USD**	Decommissioning

First year costs



0.00
USD

0%	**0.00 USD**	Energy (1st year)
0%	**0.00 USD**	Investment costs (1st year)
0%	**0.00 USD**	Installation & commissioning (1st year)
0%	**0.00 USD**	Operating cost (1st year)
0%	**0.00 USD**	Maintenance & repair (1st year)
0%	**0.00 USD**	Downtime (1st year)
0%	**0.00 USD**	Environmental (1st year)
0%	**0.00 USD**	Decommissioning (1st year)

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			4/9/2018	