Fields of Opportunities

STATE OF IOWA

TERRY E. BRANSTAD, GOVERNOR
KIM REYNOLDS, LT. GOVERNOR

DEPARTMENT OF NATURAL RESOURCES
CHUCK GIPP, DIRECTOR

April 11, 2016

City of Waukee, Iowa
Attn: John Gibson, Public Works Director
230 West Hickman Road
Waukee, IA 50263

RE: Bluestem Lift Station #14 Improvements
Waukee, Iowa
DNR Project No. S2015-0425

Subject: Variance Request from Iowa Wastewater Facilities Design Standards Section 13.4.3

Dear Mr. Gibson:

After careful and thorough consideration, the Department has ***approved*** your February 17, 2016 (as amended April 5, 2016) request for a variance from Iowa Administrative Code Subrule lAC 64.2(9a) and Chapter 13, 13.4.3 of the Iowa Wastewater Facilities Design Standards, which requires that lift station pumps, other than grinder pumps, have the capability to pass a 3-inch spherical solid.

Based on the documentation presented by your Engineer, it is the determination of this Department that satisfactory justification has been presented to warrant the granting of a variance for the installation of a lift station pump that has the capacity to pass a 1.4-inch spherical solid installed with a trash basket with 1.4-inch or smaller openings. The requested variance is deemed to be reasonable and necessary pursuant to the Iowa Code section 455B.181.

The facts presented for the project present unique circumstances and the variance is therefore justified to provide the narrowest exception possible to the provisions of the rule in accordance with Rule 561 IAC 10.5. Since the project planning and construction may last more than one year, the variance is considered to be of a permanent nature. The validity of this variance approval shall last for a period of one year from the date of the construction permit in accordance with Rule 561 IAC 10.5.

This decision is based on our review of justification presented to support the request. Our concurrence with the request is based on the Department's finding that the resulting project will provide substantially equivalent effectiveness as would be provided by technical compliance with the design standard on this issue.

Please contact Marty Jacobs at 515-725-8419 or email martin.jacobs@dnr.iowa.gov if you have any questions.

Sincerely,

Jon Tack
Water Quality Bureau Chief

Cc: Curtis J. Kampman, P.E., McClure Engineering Company
DNR FO 5
DNR Sewage File 6-25-73-0-01

VARIANCE REQUEST
Iowa Department of Natural Resources

1.	Date:	April 8, 2016	14a.	Decision:	Approved
2.	Reviewer/Engr.:	Marty Jacobs		Date:	4/11/16
				Expiration Date	
3.	Date Received:	April 8, 2016	14b.	(if any):	
4.	Facility Name:	City of Waukee			
5.	Facility Number:	6-25-73-0-01			
6.	County Number:	25 (Dallas)	15.	Appealed:	
7.	Program Area:	CP (Wastewater)		Date:	
8.	Facility Type:	C01 (Collection/Transport)			
9.	Subject Area:	344 (Pump Clogging Protection)			
10.	Rule Reference:	567-64.2(9)a			
11.	Design Std. Ref.:	13.4.3			
12.	Consulting Engr.:	McClure			
13.	Variance Rule:	567-64.2(9)c			

16. Description of Variance Request:
The City of Waukee is requesting variance from the Iowa Wastewater Facilities Design Standards Chapter 13.4.3 – Wastewater Pumping Stations and Force Mains – 13.4.3 (Pump Openings) for installing a submersible lift station pump that does not pass a 3-inch spherical solid.

17. Applicant's/Consulting Engineer's Justification:
To offer an additional layer of protection, as well as conform to current design standards, a trash basket will be installed on the influent line entering the wet well of the Lift Station. The originally specified trash basket for the Lift Station had a maximum clear opening of 1.5-inches. However, given the clear opening of the proposed pump is 1.4-inches, the City will specify a new trash basket with a maximum clear opening equivalent to or less than 1.4-inches. As a result, objects larger than 1.4-inches should be collected in the trash basket, reducing the potential for clogging from such objects.
The City of Waukee actively inspects and maintains the trash baskets of its lift stations as part of a regular maintenance program to remove any built up deposition and ensure the condition of the trash basket is adequate in order to perform its intended function.
City of Waukee has multiple similar combinations of Flygt N-series impeller pumps with trash baskets with similar clear openings in sanitary lift stations throughout the community. With 12 years of operating experience with this combination, the City can attest that they have experienced no reduction in pumping capacity, ability, or flexibility.

18. Department's Justification:
Recommend variance approval.
The proposed pump is able to pass a 1.4-inch solid (confirmed with product data from Flygt). As discussed among DNR staff, a trash basket with an opening of 1.4-inches or less is expected to provide an approvable level of protection for the proposed pump. The variance request includes assurances from the City of Waukee for appropriate inspection and maintenance of the trash basket. This is expected to provide equivalent effectiveness to an installation meeting the requirements of 13.4.3.

19. Precedents Used:
Tripoli - 6/13/00

20. Staff Reviewer:	[signature]	Date: 4-8-16	LWB 4/8/16
21. Supervisor:	Satya Chennupati	Date: 4/11/16	
22. Authorized by:	[signature]	Date: 4/11/16	

S2015-0425

McCLURE™
ENGINEERING CO.

1740 Lininger Lane
North Liberty, IA 52317
P 319.626.9090
F 319.626.9095

www.mecresults.com

April 5, 2016

Mr. Charles Gipp, Director of the Iowa DNR
c/o Mr. Marty Jacobs, P.E., Environmental Engineer
Iowa Department of Natural Resources – Wastewater Engineering Section
Wallace Building
502 E. 9th Street
Des Moines, IA 50319-0034

RE: Waukee Bluestem Lift Station #14 Improvements, Waukee, Iowa
MEC 2214027-00
IDNR #S2015-0425

Dear Mr. Gipp and Mr. Jacobs:

Enclosed please find one (1) copy of the City of Waukee's amendment number 2 to the variance request for the job referenced above regarding Iowa Wastewater Facilities Design Standard 13.4.3, which states "unless grinder pumps are used, pumps shall be capable of passing spheres at least 3 inches in diameter."

If you have any questions, please call me at (515) 964-1229.

Very truly yours,

McCLURE ENGINEERING COMPANY

Curtis Kampman, P.E.

Enclosures

cc: Mr. John Gibson, City of Waukee
File.

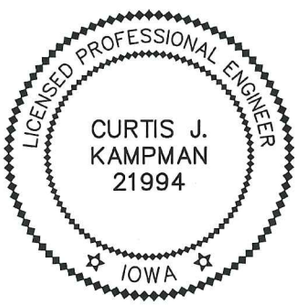
S2015-0425

CERTIFICATION FOR PETITION FOR VARIANCE

BLUESTEM LIFT STATION #14 IMPROVEMENTS
WAUKEE, IOWA

MEC PROJECT NO. 2214027-00

FEBRUARY 2016



I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Curtis Kampman 2-25-16

Curtis J. Kampman, P.E., Reg. No. 21994 (Date)

My license renewal date is December 31, 2017.

Pages or sheets covered by this Seal:
Petition for Variance, Bluestem Lift Station #14 Improvements, Waukee, IA, February, 2016.

BEFORE THE IOWA DEPARTMENT OF NATURAL RESOURCES
DES MOINES, IOWA

CITY OF WAUKEE, IOWA 230 WEST HICKMAN RD. WAUKEE, IA 50263 (515) 978-7900	PETITION FOR VARIANCE

The Petitioner, pursuant to Iowa Code Section 17A.9A and Iowa Administrative Code 561 Chapter 10, requests a Variance from Iowa Wastewater Facilities Design Standard 13.4.3. Petitioner provides the following information pursuant to Iowa Administrative Code 561 Chapter 10.9(1) through 561 Chapter 10.9(10):

10.9 (1) The name, address, and telephone number of the entity or person for whom a waiver or variance is requested.

City of Waukee, Iowa
230 West Hickman Road
Waukee, IA 50263
Telephone: (515) 978-7900

10.9 (2) A description and citation of the specific rule from which a waiver or variance is requested.

Iowa Wastewater Facilities Design Standard 13.4.3 (Pump Openings) as follows:

"Unless grinder pumps are used, pumps shall be capable of passing spheres at least 3 inches in diameter."

10.9 (3) The specific waiver or variance requested, including the precise scope and operative period that the waiver or variance will extend.

The petitioner requests a variance from the requirement that "pumps shall be capable of passing spheres at least 3 inches in diameter" as required by Iowa Wastewater Facilities Design Standard 13.4.3 (Pump Openings). The units of operation in question are the pumps used to convey raw wastewater at the Bluestem Lift Station #14 in Waukee, Iowa.

Two (2) pumps are scheduled to be installed in the Lift Station. Each pump is sized to individually convey flows of up to 0.619 million gallons per day (MGD), or 430 gallons per minute (GPM). The pumps are to remain in service indefinitely, until such time as the Lift Station is decommissioned or increased flows require larger pumps to be installed.

The pumps specified for installation in the Lift Station are Flygt NP 3153 HT3~464.

10.9 (4) The relevant facts that the petitioner believes would justify a waiver or variance. The factual statement is to include a signed statement from the petitioner attesting to the accuracy of the facts provided in the petition and a statement of reasons that the petitioner believes will justify a waiver or variance.

Background
The Flygt NP 3153 HT3~464 pump incorporates a specially designed semi-open channel impeller, which has been designated the "N-technology" impeller by the manufacturer. The N-technology impeller is utilized on an entire line of Flygt wastewater pump products from 0.1 to 23 MGD and is promoted by the manufacturer as being "self-cleaning." Per the manufacturer, the self-cleaning impeller design enables Flygt N-series pumps to sustain higher levels of efficiency throughout the life of the pump due to the absence of build-up on the impeller itself.

The Flygt NP 3153 HT3~464 pumps specified for installation in the Lift Station include the N-series impeller, which does not allow passage of a 3-inch sphere. However, the pumps specified do include an optional chopper ring insert for cutting long fibers or solids in raw wastewater.

City of Waukee Experience

The City of Waukee has substantial experience with Flygt N-series pumps in their sanitary lift stations. In the past 12 years, the City has installed at least twenty-four Flygt N-series pumps. In the course of operating these lift stations over the past 12 years, the City has been pleased with their performance and found the N-series impeller to demonstrate minimal issues with clogging. As will be discussed later, the level of satisfaction with the operation with the pumps has led the City to consolidate all lift stations to utilizing the N-series impeller.

Experience Across the State of Iowa

Additionally, across the state of Iowa, at least 1,187 Flygt N-series pumps have been installed in the past 15 years based on records obtained from Electric Pump of Des Moines, Iowa, who serves as manufacturer's representative for Flygt in the State of Iowa. The full list of installations is available upon request.

In discussions with wastewater operators across the state, McClure Engineering Company has found the N-series impeller has developed a very positive reputation for its non-clog performance despite not having a free passage of 3-inches. In some cases, a Flygt N-series pump was specifically installed in locations where other pumps had a history of clogging.

Conference presentations, industry seminars, and discussions with wastewater operators have indicated that long fibrous materials and "flushable" products have become a primary threat for pump down-time and clogging in recent years.

Consolidation of Spare Parts & Training

As a result of their own operating experience, as well as the reputation of the N-series impeller, the City of Waukee is in the process of standardizing its fleet of sanitary lift station pumps around Flygt N-series pumps due to their performance, efficiency, and non-clogging characteristics. By consolidating around a single manufacturer, the City is able to minimize the number of spare parts the City must maintain. Additionally, this also allows the City to standardize its pump maintenance training for operators, further reducing costs and operational challenges.

Trash Basket Provision

To offer an additional layer of protection, as well as conform to current design standards, a trash basket will be installed on the only influent line entering the wet well of the Lift Station. The specified trash basket for the Lift Station has a maximum clear opening of 1.5-inches. As a result, all solid objects larger than 3 inches should be collected in the trash basket, further reducing the potential for clogging from such objects.

Preferred Operating Range Evaluation

It is an industry standard recommendation for pump operation to be kept within the preferred operating range of 70% to 120% of the best efficiency pump discharge point (Q_{BEP}). Review of Table 1 indicates the specified pump has the highest Q/Q_{BEP} ratio among the pumps evaluated other than the Yeoman 9100-4103S. The remaining pumps evaluated from ABS Sulzer, Grundfos, and KSB all have Q/Q_{BEP} ratios less than or significantly less than the 70% minimum. Operating outside or along the edges of the preferred operating range can increase radial thrust, vibration, suction recirculation, and inlet surging, which can cause premature wear on pump components such as seals and bearings and increase maintenance costs.

Table 1 – Selected Characteristics of Investigated Pumps

Pump	Q (GPM)	TDH (FT)	Hydraulic Efficiency (%)	Total Efficiency	Est. Q_{BEP} (GPM)	$Q : Q_{BEP}$
Flygt NP3153 HT3 ~464	432	75.2	67.5%	59.6%	585	74%
ABS Sulzer XFP100G	438	75.9	60.8%	55.9%	675	65%
Grundfos SE1.30.A60	431	74.8	65.7%	58.2%	725	59%
KSB KRTE 100-251	455	79.2	68.3%	58.9%	790	58%
KSB KRTK 100-251	430	74.5	61.7%	53.7%	930	46%
Yeomans 9100-4103S	435	79.9	59.8%	52.6%	520	84%

Efficiency Evaluation

Review of the remaining available pumps (Flygt & Yeomans) with an acceptable Q/Q_{BEP} ratio indicate the specified pump is the most efficient of the possible selections, both in terms of hydraulic efficiency of the pump, as well as total efficiency. The total efficiency advantage of the specified Flygt pump is 7.0% . Further detail on the investigated pumps is included in Appendix A.

The criteria for a waiver or variance of a rule are contained in Iowa Administrative Code 561 Chapter 10.4:

"Upon petition of any person and at the sole discretion of the department, the department may issue a waiver or variance from the requirements of a rule is the director or the department in a contested case proceeding finds, based on clear and convincing evidence, all of the following:

10.4(1) The application of the rule would pose an undue hardship on the person for the waiver or variance is requested.

As stated previously, the installation of pumps with the ability to pass a 3-inch sphere was evaluated and deemed undesirable to install based on their lower efficiency and/or due to their respective operating points being outside of the preferred operating range.

Additionally, the City's own operating experience with the non-clogging performance of the N-series impeller, along with the City's standardization to Flygt N-series pumps have allowed the City to reduce operating expenses, spare parts, and training requirements. Forcing the City to move away from the Flygt N-series pumps to meet the regulatory requirements of the Iowa Wastewater Facilities Design Standard 13.4.3 would begin to unravel the efficiencies the City has worked to obtain in its operation and maintenance of the City's lift stations.

10.4(2) The waiver or variance from the requirements of a rule in the specific case would not prejudice the substantial legal rights of any person.

The proposed variance has no impact or prejudice to the substantial legal rights of any person.

10.4(3) The provisions of a rule subject to a petition for a waiver or variance are not specifically mandated by statue or another provision of law.

The provision required for "Unless grinder pumps are used, pumps shall be capable of passing spheres at least 3 inches in diameter" is only found in Iowa Wastewater Facilities Design Standard 13.4.3 (Pump Openings).

10.4(4) Substantially equal protection of public health, safety, and welfare will be afforded by a means other than that prescribed in the particular rule for which the waiver or variance is requested.

As described previously, the proposed pump provides conveyance of wastewater following passage through a trash basket with a 1.5 inch clear opening which meets the intent of Design Standard 13.4.3. Additionally, the City's own operating experience indicates no reduction in pumping capacity, ability, or flexibility would occur with the approval of the variance.

10.9 (5) A history and any prior contacts between the department and the petitioner for the past five years, including a description of each affected permit held by the petitioner, and any notices of violation, Administrative Orders, contested case proceedings, and lawsuits involving the Department and the petitioner.

The City is under a compliance schedule as listed in Iowa NPDES Permit #2573001, issued August 1, 2014 and expiring July 31, 2019 for achieving compliance with E.coli effluent limits at the WWTP, as well as the Nutrient Reduction Strategy, by connecting to the Des Moines Metropolitan Wastewater Reclamation Authority (WRA) by January 1, 2019.

This variance request will have no impact on the above compliance schedule.

10.9 (6) Any information known to the petitioner regarding the Department's treatment of similar cases.

While the exact circumstances regarding the installation of other Flygt N-series pumps is not known, it is noted that over 1,187 Flygt N-series impeller pumps have been installed across the State of Iowa in the past 15 years per records obtained from Electric Pump of Des Moines, Iowa, who serves as a manufacturer's representative for Flygt. The full list of installations is available upon request.

10.9 (7) **The name, address, and telephone number of any public agency or political subdivision of the state or federal government which also regulates the activity in question, or which might be affected by the granting of a waiver or variance.**

The petitioner states that no public agency or political subdivision of the state or federal government would be affected by granting a waiver or variance.

10.9 (8) **The name, address, and telephone number of any person or entity that would be adversely affected by the granting of a petition.**

The petitioner states that no person or entity would be adversely affected by the granting of the petition.

10.9 (9) **The name, address, and telephone number of any person with knowledge of relevant facts relating to the proposed waiver or variance.**

Mr. Curtis Kampman, P.E.
McClure Engineering Company
1360 NW 121st Street, Suite A
Clive, Iowa 50325
(515) 964-1229

Mr. John Gibson
City of Waukee
230 West Hickman Road
Waukee, IA 50263
(515) 978-7900

Mr. Marty Jacobs, P.E.
IDNR Wastewater Engineering Section
502 East 9th Street
Des Moines, IA 50319-0034
(515) 725-8419

10.9 (10) **Signed releases authorizing persons with factual knowledge concerning the request to furnish the Department with information relevant to the waiver or variance. (Variances must be signed by the petitioner or authorized representative and a professional engineer licensed in Iowa preparing the engineering and technical justification of the petition.)**

See verification below,

WHEREFORE, the Petitioner respectfully requests the department grant it a variance of "Unless grinder pumps are used, pumps shall be capable of passing spheres at least 3 inches in diameter" required by Iowa Wastewater Facilities Design Standards section 13.4.3 (Pump Openings) so that the department may issue the construction permit, the application for which was submitted on October 22, 2015.

Dated this 25th day of February, 2016.

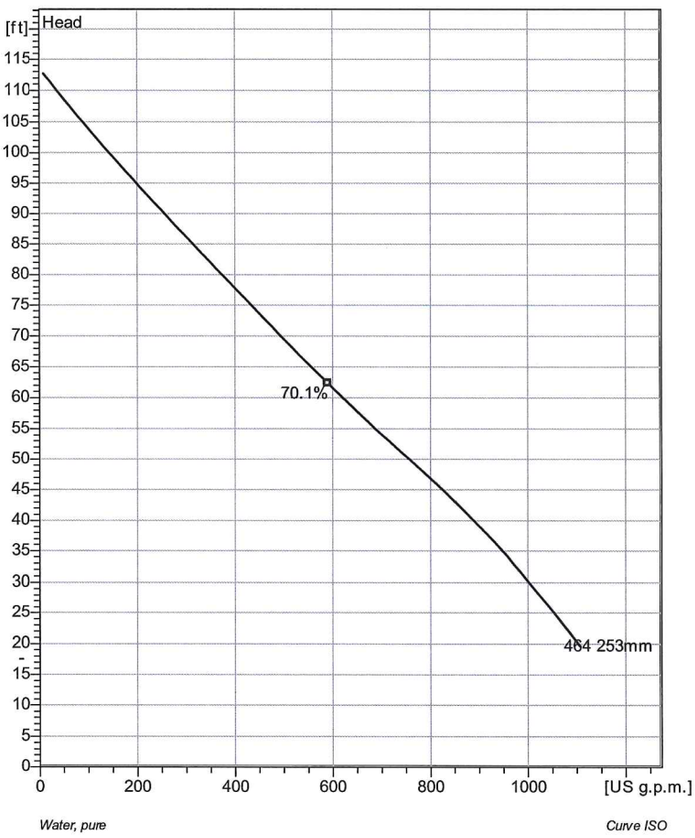
Curtis J. Kampman, P.E.
(P.E. No. 21994)
McClure Engineering Company
50325
ckampman@mecresults.com

John Gibson
Public Works Directory
City of Waukee, Clive, Iowa

APPENDIX A

NP 3153 HT 3~ 464

Technical specification



Water, pure *Curve ISO*

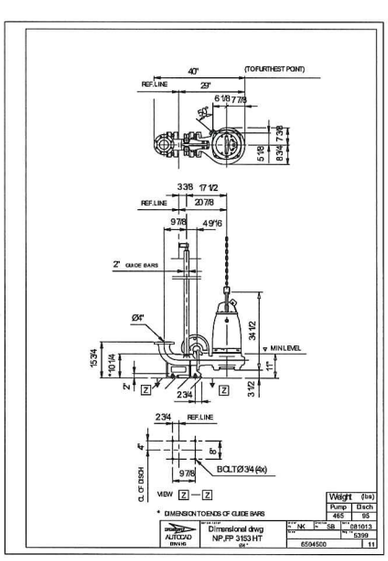
Note: Picture might not correspond to the current configuration.

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
Inlet diameter	3 15/16 inch
Impeller diameter	253 mm
Number of blades	2

Installation: P - Semi permanent, Wet



Motor

Motor #	N3153.181 21-15-4AA-W 15hp
Stator variant	1
Frequency	60 Hz
Rated voltage	460 V
Number of poles	4
Phases	3~
Rated power	15 hp
Rated current	19 A
Starting current	112 A
Rated speed	1755 rpm
Power factor	
1/1 Load	0.84
3/4 Load	0.78
1/2 Load	0.67
Efficiency	
1/1 Load	87.0 %
3/4 Load	88.5 %
1/2 Load	88.0 %

Configuration

Project	Project ID	Created by	Created on	Last update
			2015-10-17	

xylem
Let's Solve Water

NP 3153 HT 3~ 464

FLYGT

Performance curve

Pump

Discharge Flange Diameter	3 15/16 inch
Inlet diameter	100 mm
Impeller diameter	$9^{15}/_{16}$"
Number of blades	2

Motor

Motor #	N3153.181 21-15-4AA-W 15hp
Stator variant	1
Frequency	60 Hz
Rated voltage	460 V
Number of poles	4
Phases	3~
Rated power	15 hp
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Starting current	112 A
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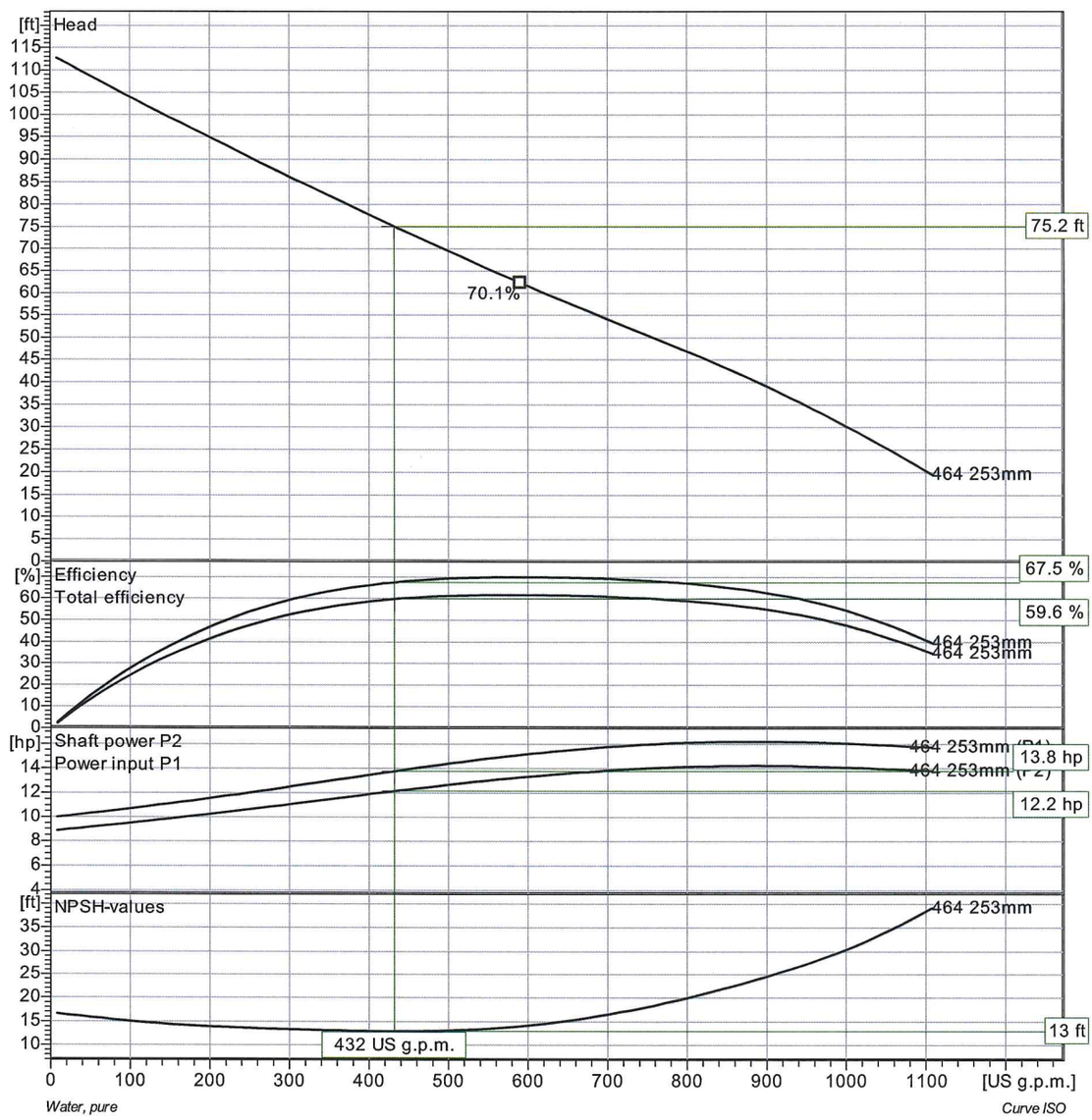
Power factor	
1/1 Load	0.84
3/4 Load	0.78
1/2 Load	0.67

Efficiency	
1/1 Load	87.0 %
3/4 Load	88.5 %
1/2 Load	88.0 %



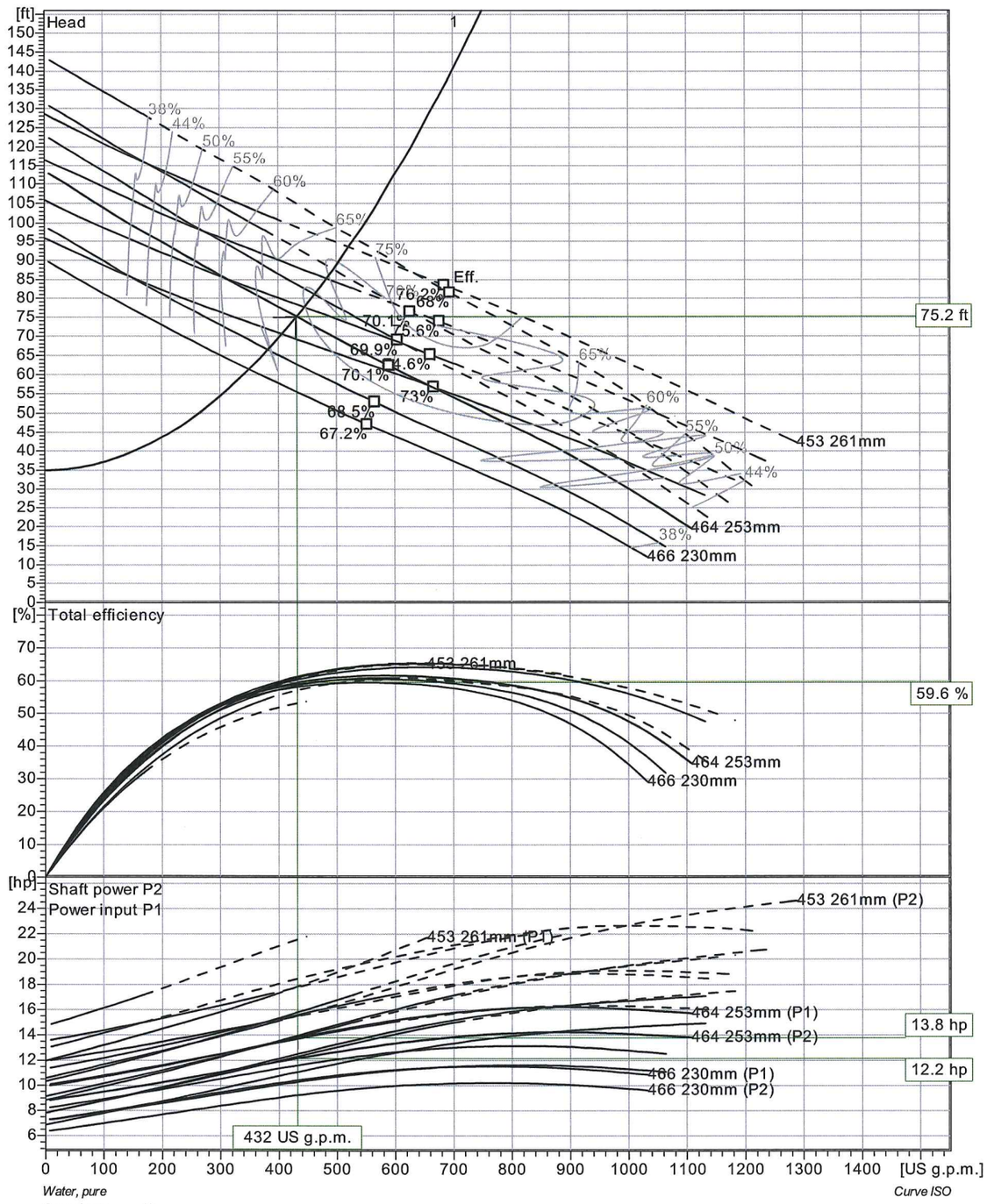
Project	Project ID	Created by	Created on	Last update
			2015-10-17	

xylem
Let's Solve Water

NP 3153 HT 3~ 464

FLYGT

Duty Analysis



Pumps running /System	Individual pump Flow	Head	Shaft power	Total Flow	Head	Shaft power	Pump eff.	Specific energy	NPSHre
1	432 US g.p.m.	75.2 ft	12.2 hp	432 US g.p.m.	75.2 ft	12.2 hp	67.5 %	396 kWh/US MG	13 ft

Project	Project ID	Created by	Created on	Last update
			2015-10-17	

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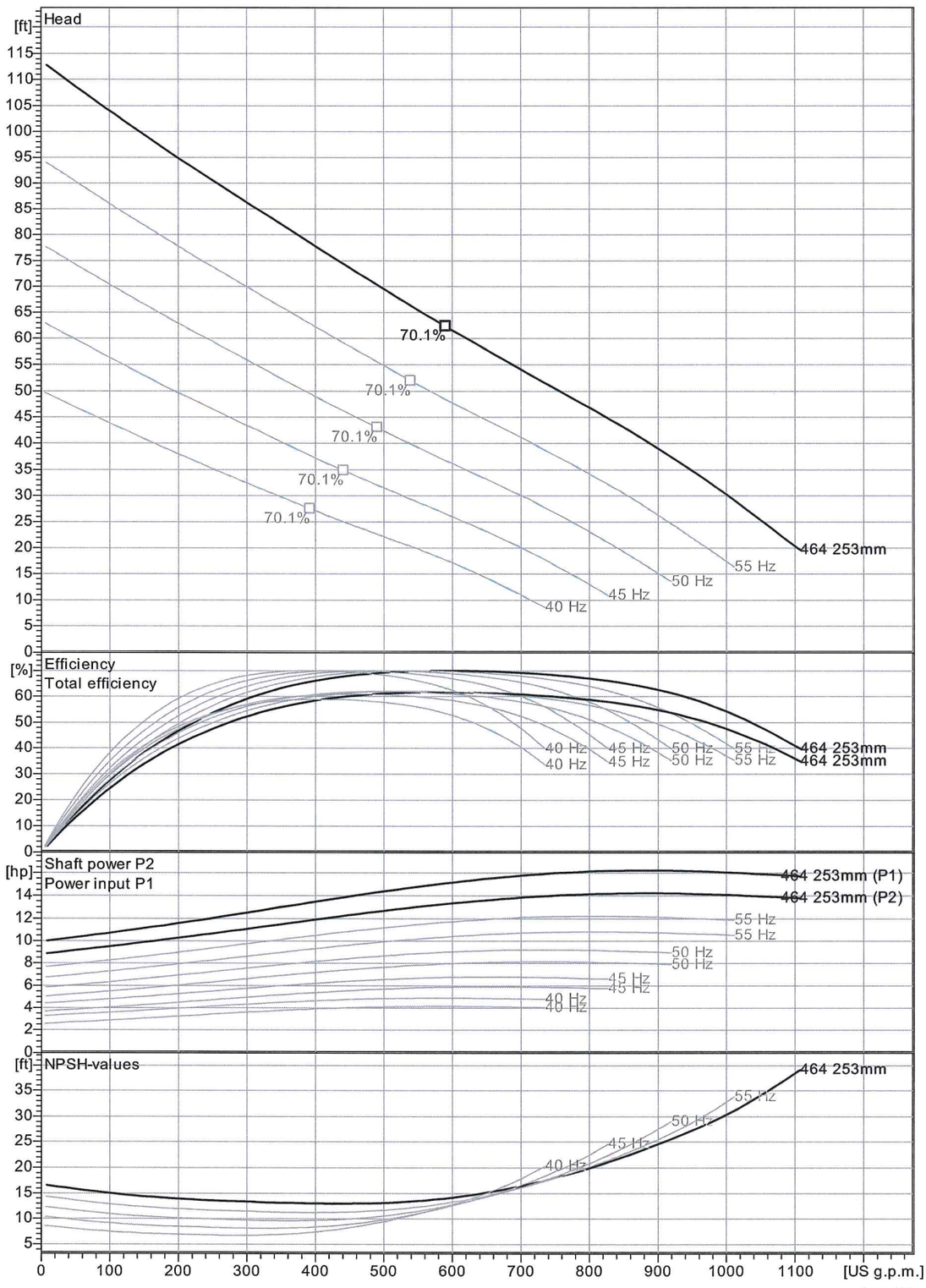
NP 3153 HT 3~ 464

VFD Curve

FLYGT



Curve ISO

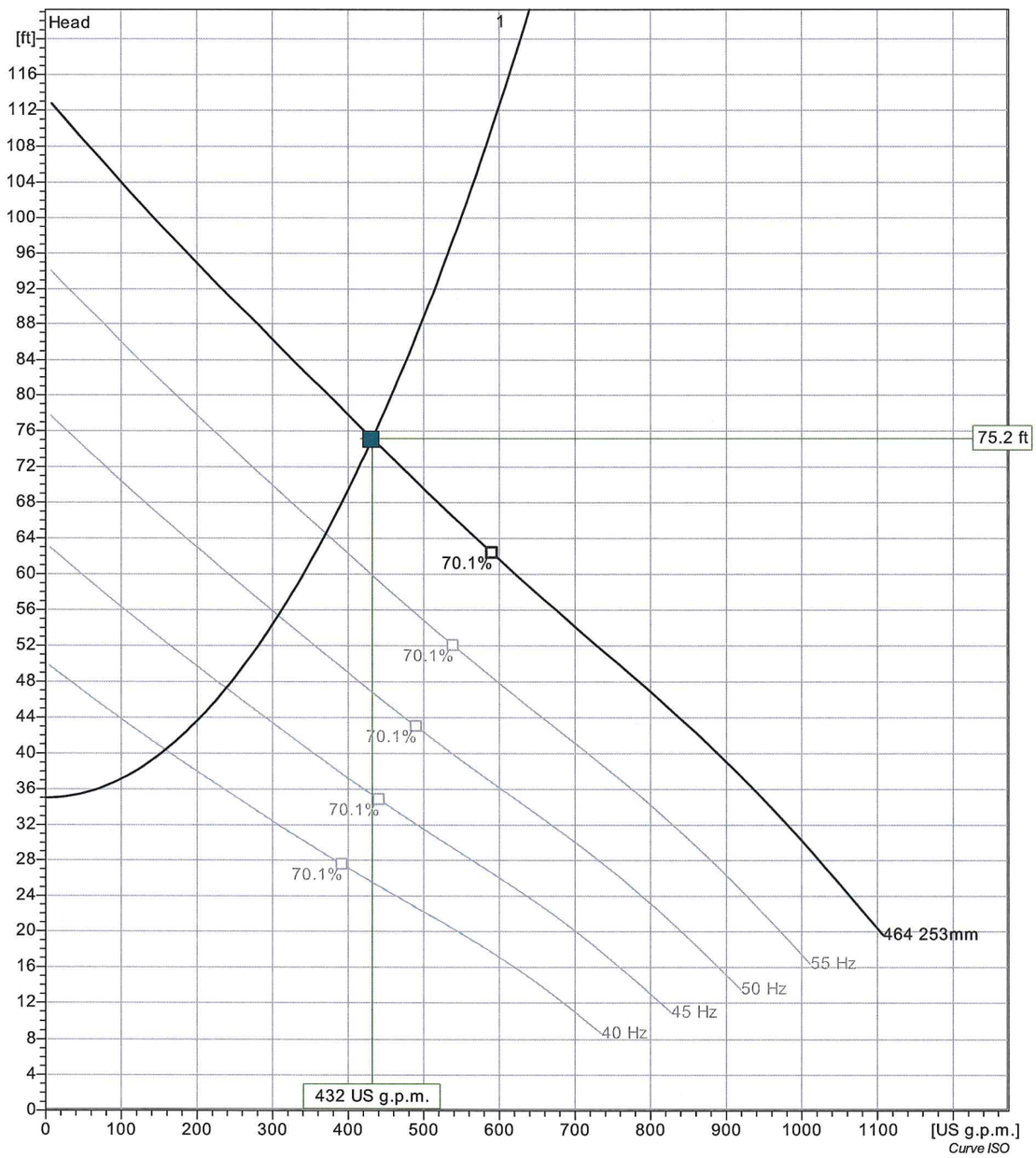
Project	Project ID	Created by	Created on	Last update
			2015-10-17	

xylem
Let's Solve Water

NP 3153 HT 3~ 464

FLYGT

VFD Analysis



Pumps running /System	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hyd eff.	Specific energy	NPSHre
1	60 Hz	432 US g.p.m.	75.2 ft	12.2 hp	432 US g.p.m.	75.2 ft	12.2 hp	67.5 %	396 kWh/US MG	13 ft
1	55 Hz	370 US g.p.m.	64.5 ft	9.11 hp	370 US g.p.m.	64.5 ft	9.11 hp	66.4 %	345 kWh/US MG	11.3 ft
1	50 Hz	308 US g.p.m.	55.4 ft	6.68 hp	308 US g.p.m.	55.4 ft	6.68 hp	64.5 %	307 kWh/US MG	9.72 ft
1	45 Hz	239 US g.p.m.	47.3 ft	4.69 hp	239 US g.p.m.	47.3 ft	4.69 hp	60.8 %	285 kWh/US MG	8.33 ft
1	40 Hz	158 US g.p.m.	40.4 ft	3.1 hp	158 US g.p.m.	40.4 ft	3.1 hp	52.3 %	299 kWh/US MG	7.12 ft

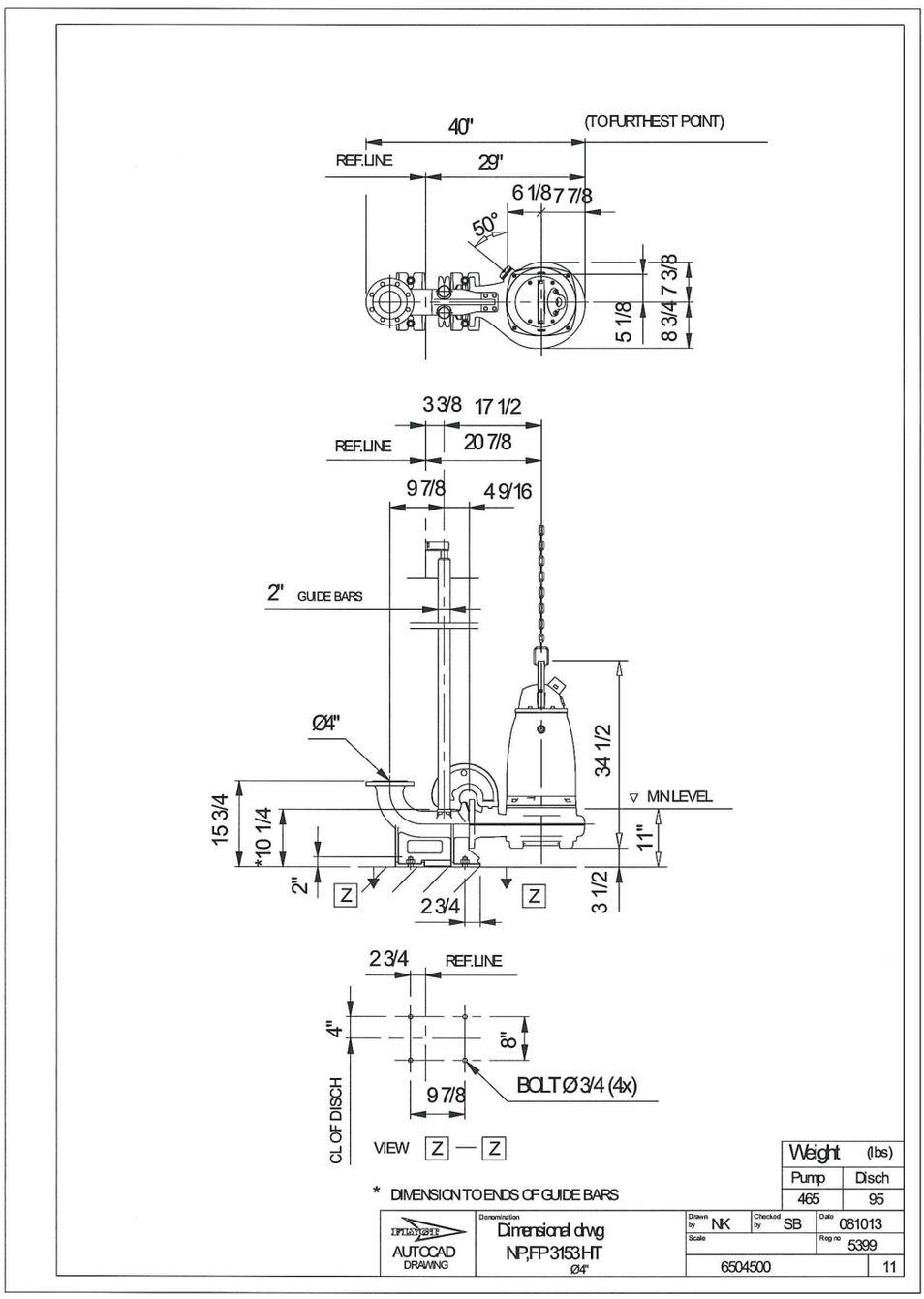
Project	Project ID	Created by	Created on	Last update
			2015-10-17	

xylem
Let's Solve Water

NP 3153 HT 3~ 464

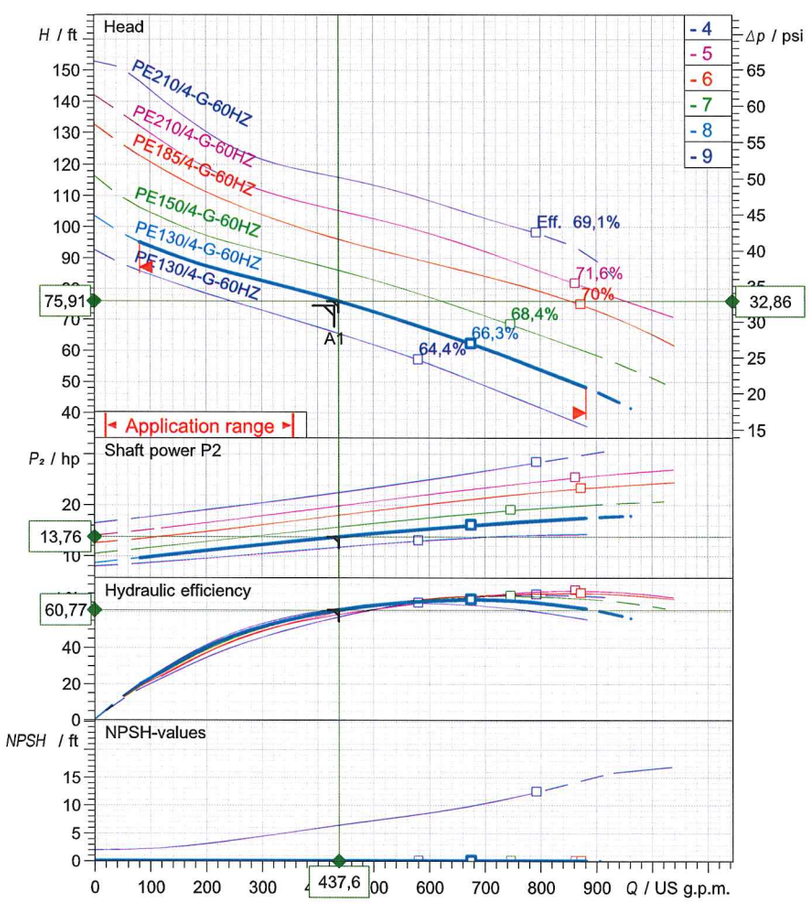
Dimensional drawing

FLYGT



Project	Project ID	Created by	Created on	Last update
			2015-10-17	

XFP100G CB1 60HZ



Testnorm
ISO 9906: 2012, HI 11.6/14.6 Gr 2B

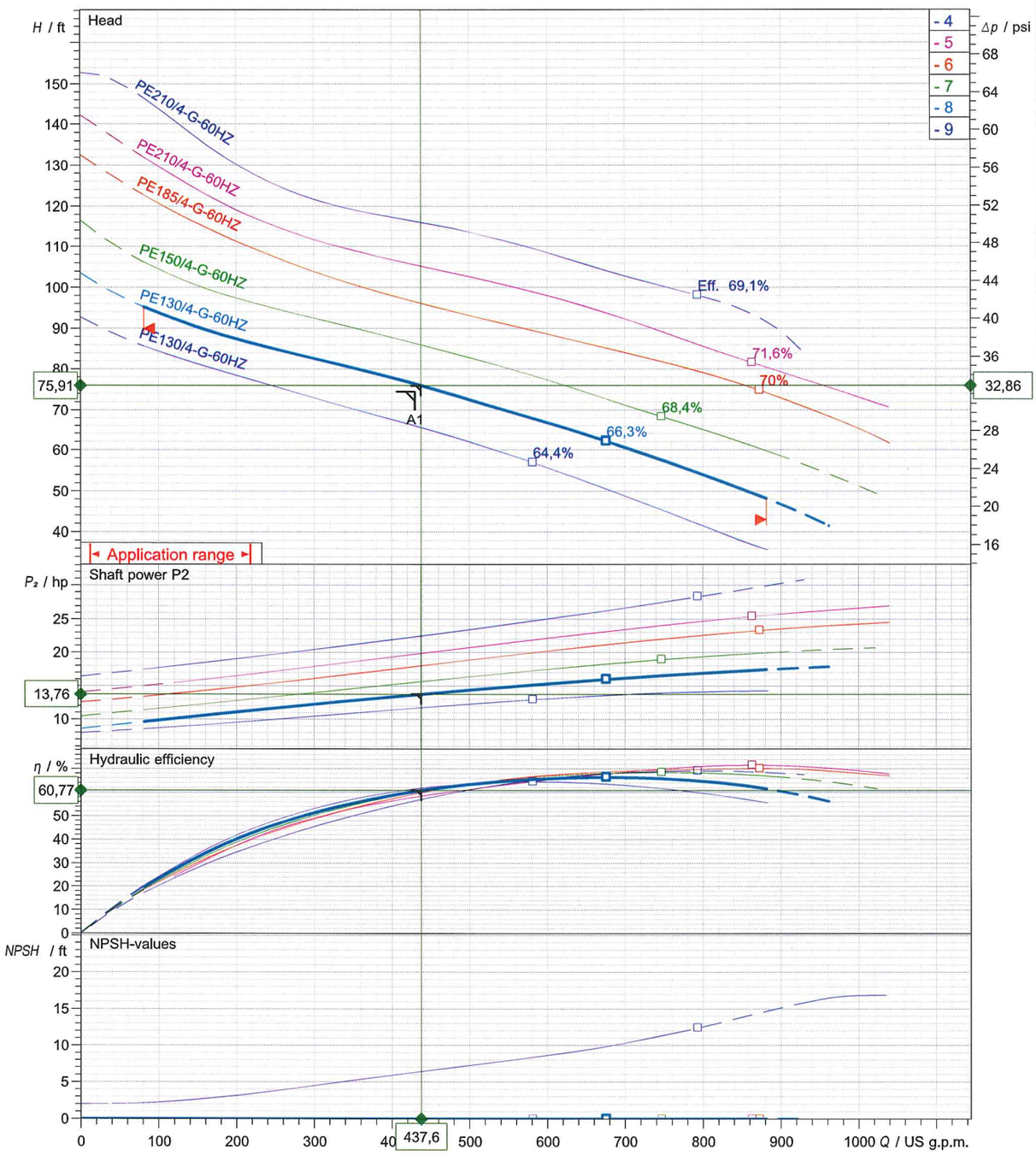
19.02.2016

Operating data specification			
Flow	438 US g.p.m.	Head	75,9 ft
Efficiency	60,8 %	Shaft power	13,8 hp
NPSH	0 ft	Fluid	Wastewater
Temperature	68 °F	Nature of system	Single head pump
No. of pumps	1		
Pump data			
Type	XFP100G CB1 60HZ	Make	SULZER
Series	XFP PE1-PE3	Impeller	Contrablock Plus impeller, 1 vane
N° of vanes	1	Impeller size	9,45 inch
Free passage	3,94 inch	Suction port	DN100
Discharge port	DN100		
Motor data			
Rated voltage	460 V	Frequency	60,0 Hz
Rated power P2	17,4 hp	Nominal Speed	1780 rpm
Number of poles	4	Efficiency	93 %
Power factor	0,757	Rated current	23,2 A
Starting current	269 A	Rated torque	51,4 lbf ft
Starting torque	287 lbf ft	Degree of protection	IP 68
Insulation class	H	No. starts per hour	15

Version 2015/11/27
Data version Sep-2015

Curve number	Pump performance curves	SULZER
Reference curve XFP100G CB1 60HZ	**XFP100G CB1 60HZ**	

			Discharge DN100	Frequency 60 Hz
Density 62,31 lb/ft³	Viscosity 1,077E-5 ft²/s	Testnorm ISO 9906: 2012, HI 11.6/14.6 Gr 2B	Rated speed 1785 rpm	Date 19.02.2016
Flow 438 US g.p.m.	Head 75,9 ft	Rated power 13,8 hp	Hydraulic efficiency 60,8 %	NPSH 0 ft

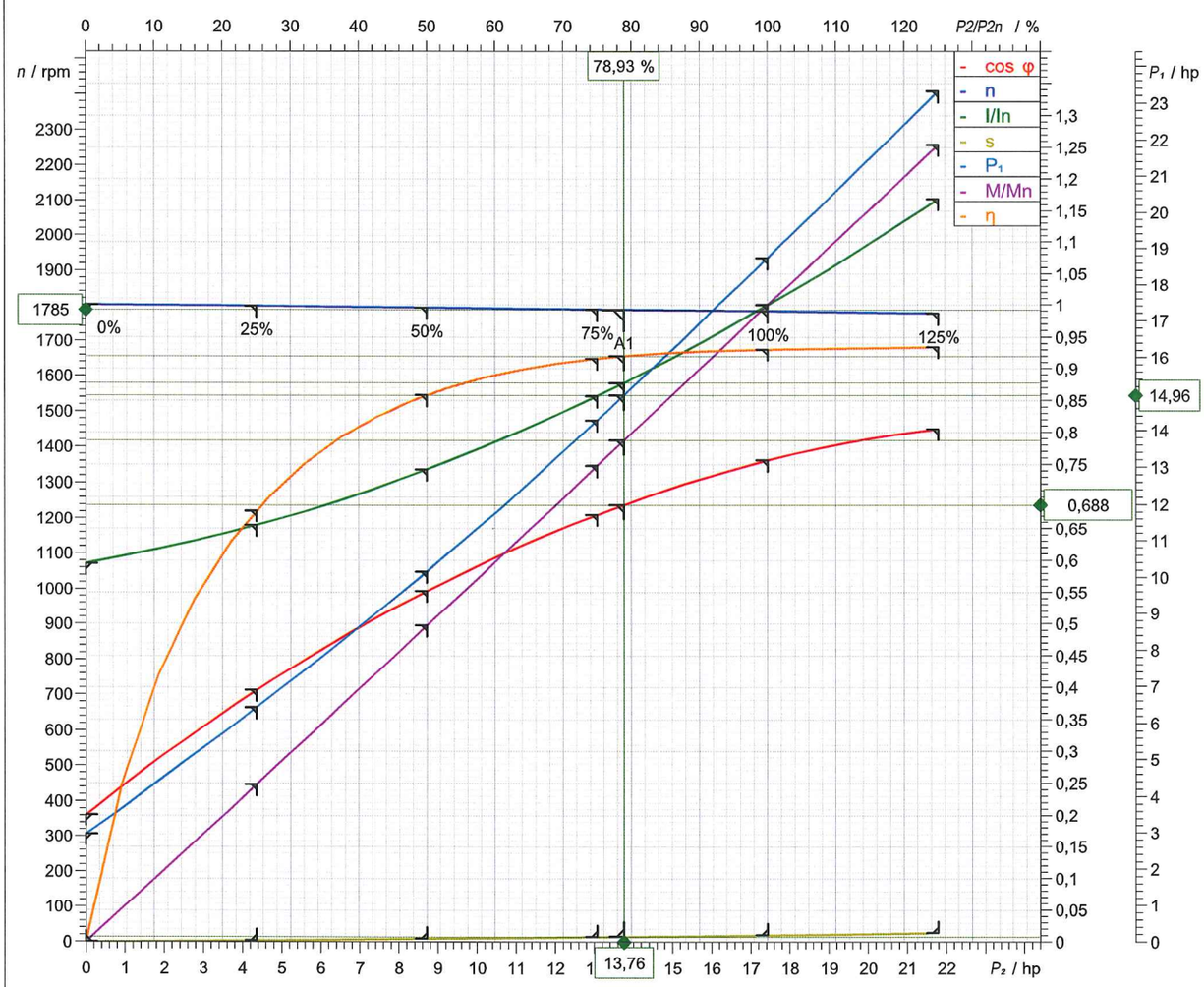


Impeller size	N° of vanes	Impeller	Solid size	Revision
9,45 inch	1	Contrablock Plus impeller, 1 vane	3,94 inch	

Version 2015/11/27
Data version Sep-2015

Frequency	Motor performance curve	SULZER
60 Hz	PE130/4-G-60HZ	

Rated power	Service factor	Nominal Speed	Number of poles	Rated voltage	Date
17,4 hp	1,3	1780 rpm	4	460 V	19.02.2016



Symbol	No load	25 %	50 %	75 %	100 %	125 %
P_2 / hp	0	4,358	8,717	13,07	17,43	21,79
P_1 / hp	2,964	6,423	10,16	14,27	18,74	23,32
η / %	0	67,85	85,83	91,6	93,05	93,44
n / rpm	1800	1796	1791	1786	1781	1775
cos φ	0,2009	0,3955	0,552	0,672	0,7565	0,8051
I / A	13,81	15,2	17,22	19,88	23,18	27,11
s / %	0	0,2222	0,5	0,7778	1,056	1,389
M / lbf ft	0	12,75	25,56	38,45	51,41	64,48

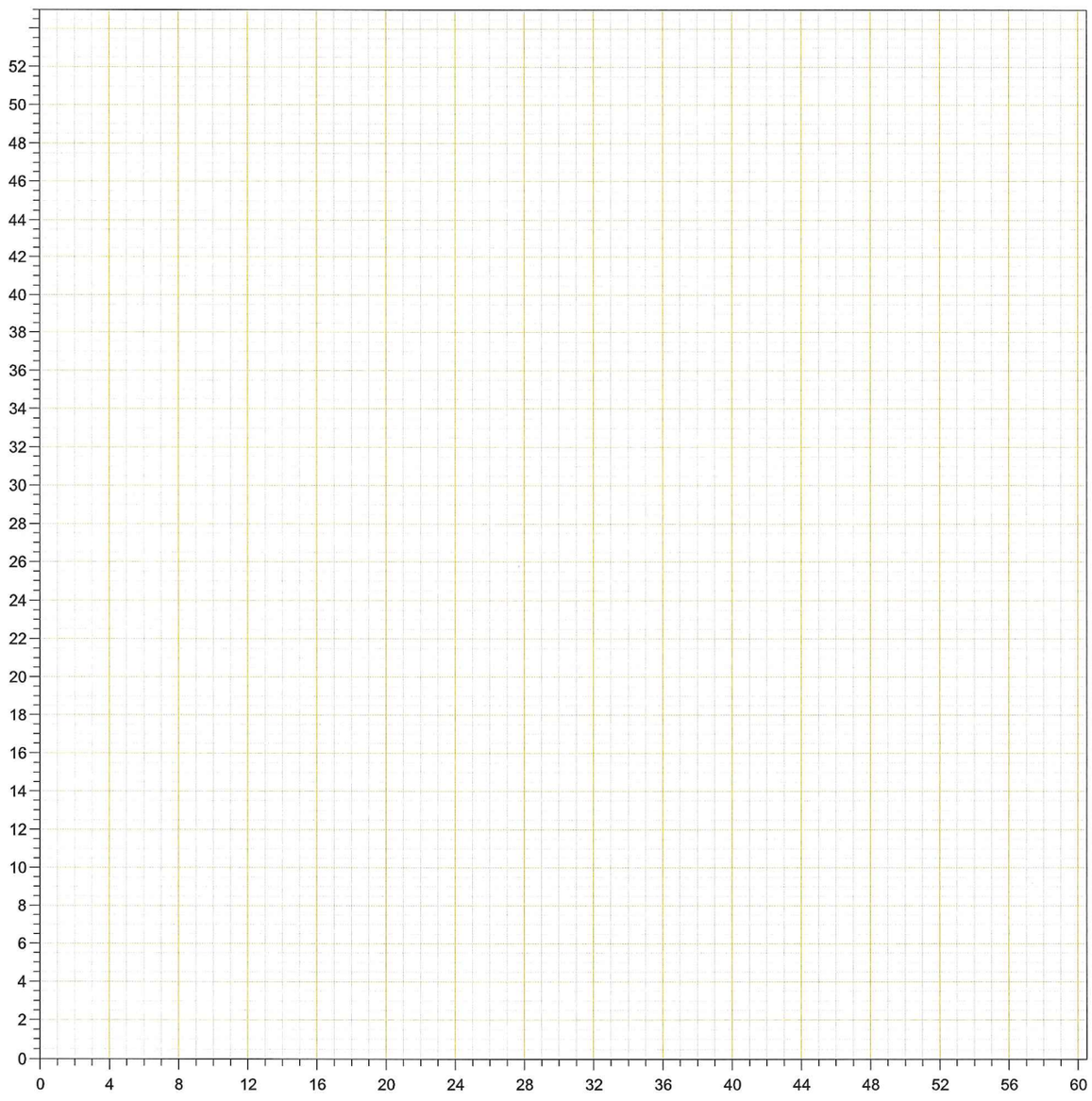
Tolerance according to VDE 0530 T1 12.84 for rated power

Starting current	Starting torque	Moment of inertia	No. starts per hour
269 A	287 lbf ft	4,14 lb ft²	15

Version 2015/11/27
Data version Sep-2015

Frequency	Specific energy	
60 Hz	XFP100G CB1 60HZ	SULZER

Frequency controller	Rated speed	Operating speed	Power input P1	Date
	1780 rpm	1785 rpm	15 hp	19.02.2016



Hydraulic efficiency	Motor efficiency	VFD efficiency	Total efficiency	Spec. Energy
60,8 %	92 %	100 %	55,9 %	425 kWh/MG

Version 2015/11/27
Data version Sep-2015

XFP100G CB1 60HZ

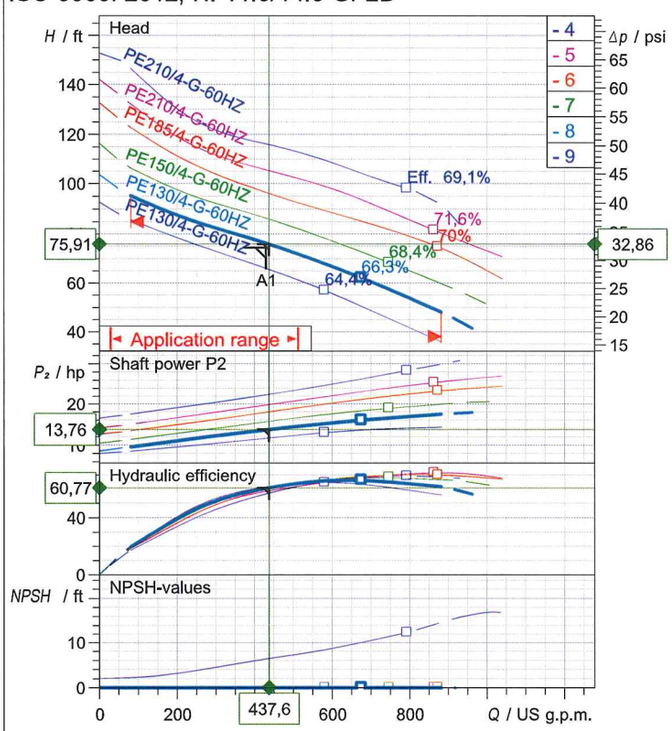
Operating data specification	
Flow	437,6 US g.p.m.
Head	75,9 ft
Efficiency	60,8 %
Shaft power	13,8 hp
Fluid	Wastewater
Temperature	68,0 °F
Nature of system	
No. of pumps	1

Pump data	
Type	
Make	
Series	
Impeller	Contrablock Plus impeller, 1 vane
N° of vanes	1
Impeller size	9,4 inch
Free passage	
Suction port	DN100
Discharge port	DN100

Motor data	
Rated voltage	460,0 V
Frequency	60,0 Hz
Rated power P2	17,4 hp
Nominal Speed	1781,0 rpm
Number of poles	4
Efficiency	93,0 %
Power factor	0,757
Rated current	51 lbf ft
Starting current	269,1 A
Rated torque	51,41 lbf ft
Starting torque	286,9 lbf ft
Degree of protection	IP 68
Insulation class	H

Testnorm

ISO 9906: 2012, HI 11.6/14.6 Gr 2B



19.02.2016

Wet Well installation with pedestal

Dimensions [inch]

Version 2015/11/27

GRUNDFOS

Submittal Data

PROJECT:		UNIT TAG:		QUANTITY:	
		TYPE OF SERVICE:			
REPRESENTATIVE:		SUBMITTED BY:		DATE:	
ENGINEER:		APPROVED BY:		DATE:	
CONTRACTOR:		ORDER NO.:		DATE:	

Product photo could vary from the actual product

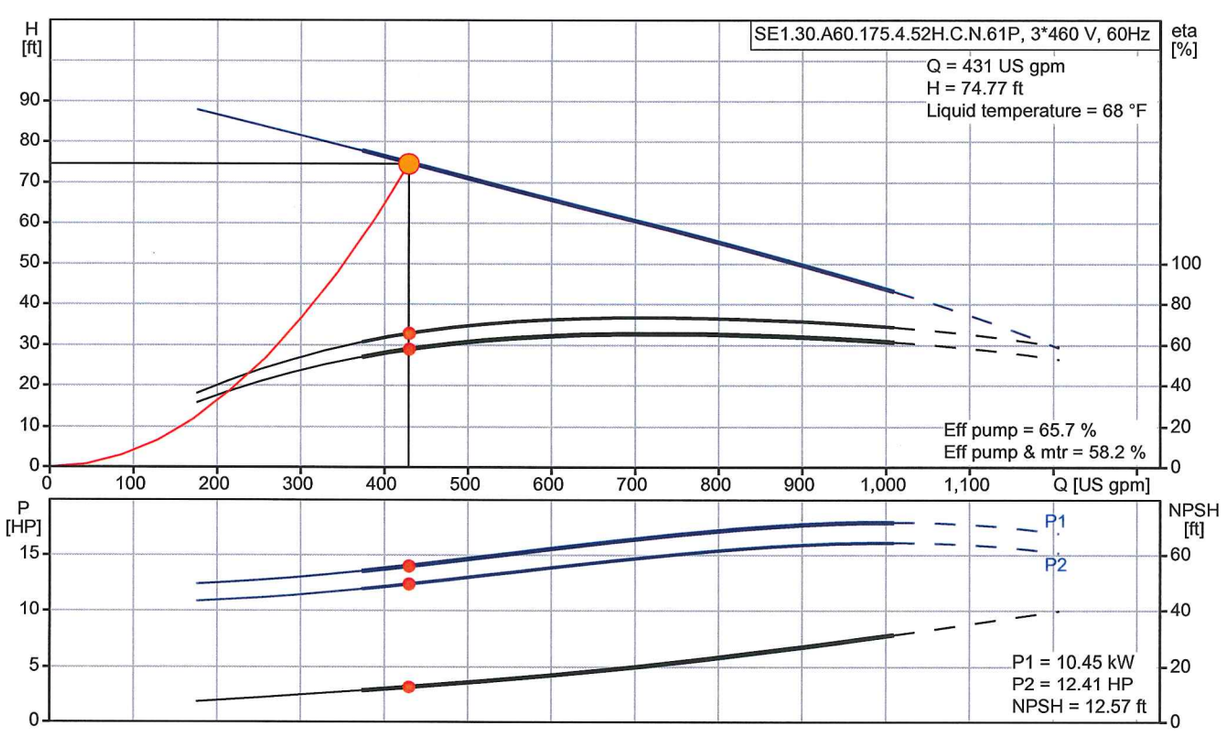
SE1.30.A60.175.4.52H.C.N.61P

Sewage pumps

Conditions of Service	
Flow:	431 US gpm
Head:	74.77 ft
Efficiency:	58.2 %
Liquid:	any viscous fluid
Temperature:	68 °F
NPSH required:	12.57 ft
Viscosity:	1 cSt
Specific Gravity:	1.002

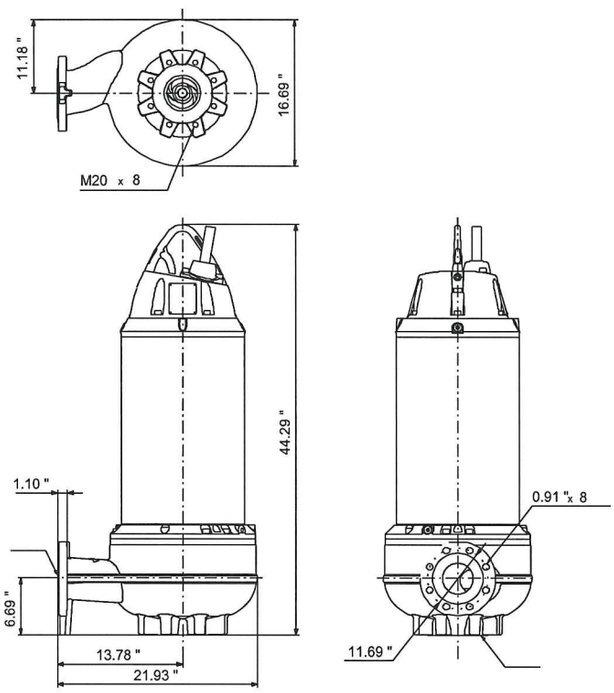
Pump Data	
Liquid temperature range:	32 .. 104 °F
Maximum ambient temperature:	104 °F
Flange standard:	ANSI
Product number:	98735238

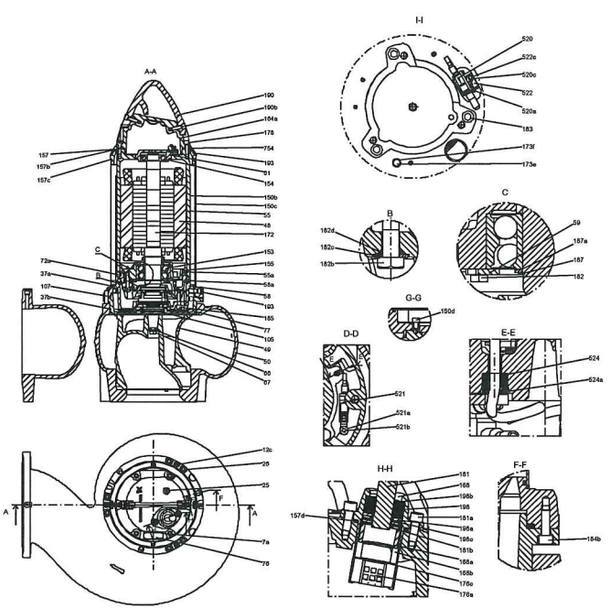
Motor Data	
Rated voltage:	208-230/440-480 V
Main frequency:	60 Hz
Number of poles:	4
Enclosure class:	IP68
Insulation class:	H
Motor protection:	KLIXON
Motor_efficiency:	90 %



GRUNDFOS

Submittal Data





Materials:

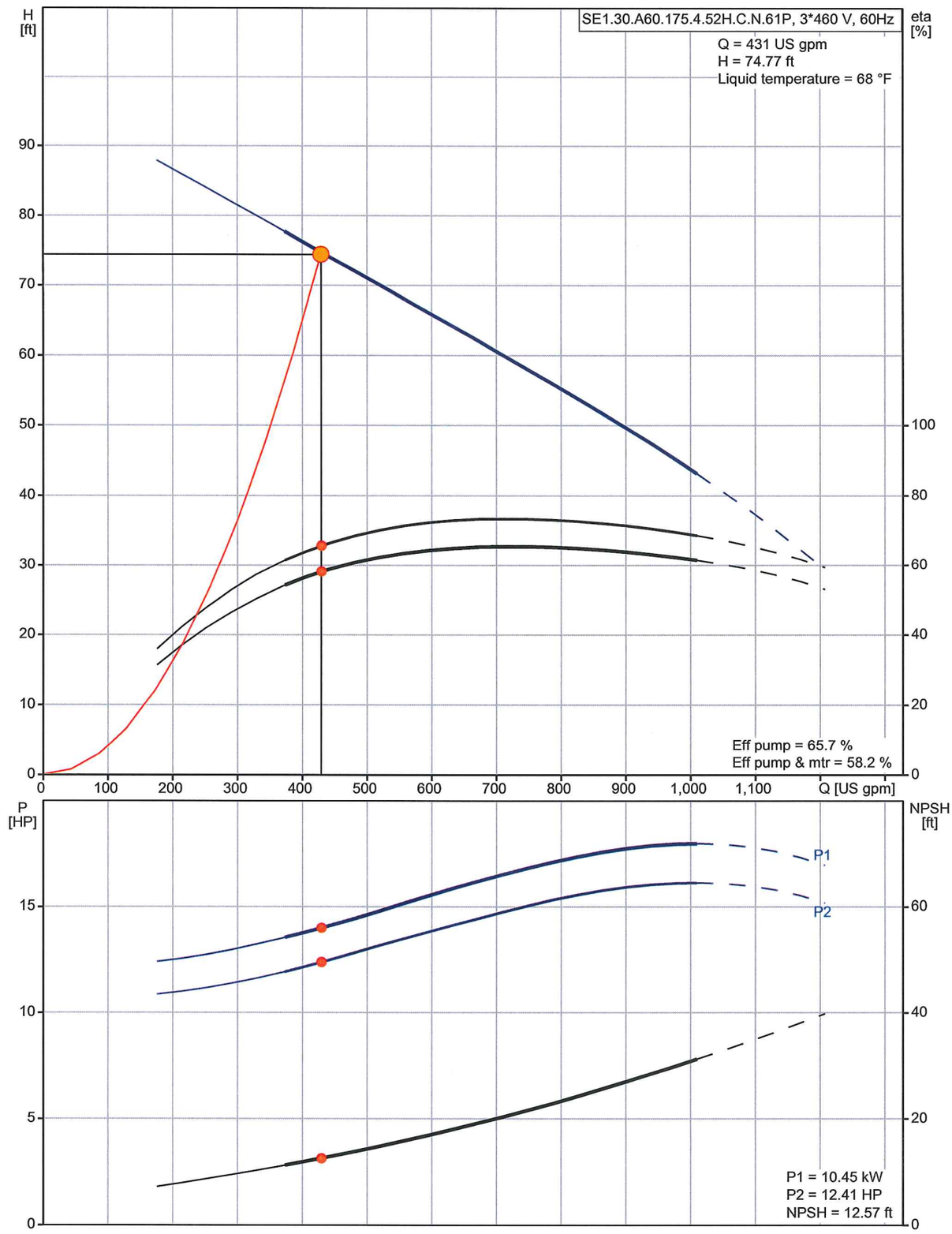
Pump housing:	Cast iron EN-GJL250
Impeller:	Cast iron EN-GJL250
Material:	Whole pump in cast iron
Motor:	Cast iron EN-GJL250

GRUNDFOS

Company name:
Created by:
Phone:

Date: 2/19/2016

98735238 SE1.30.A60.175.4.52H.C.N.61P 60 Hz

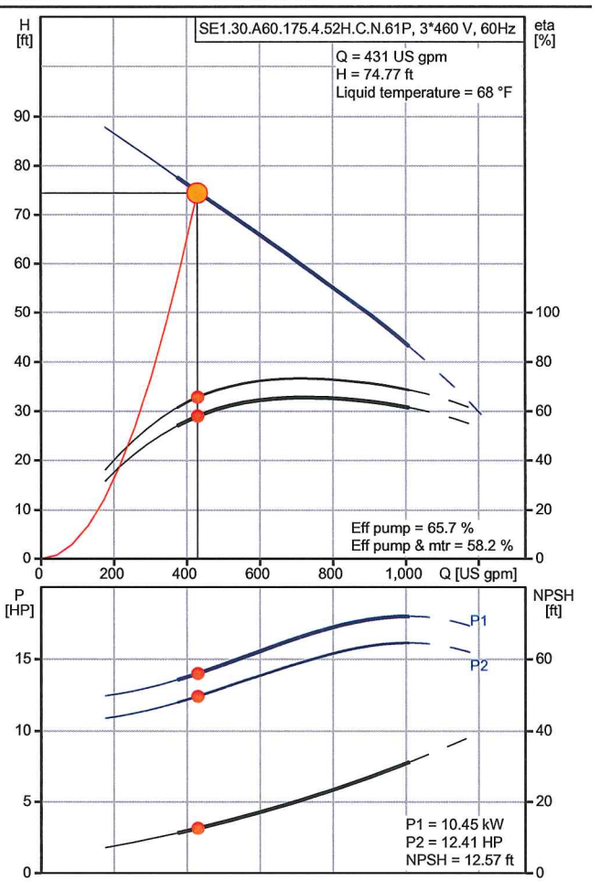


GRUNDFOS

Company name:
Created by:
Phone:

Date: 2/19/2016

Description	Value
General information:	
Product name:	SE1.30.A60.175.4.52H.C.N.61P
Product No.:	98735238
EAN:	5712600684218
Technical:	
Actual calculated flow:	431 US gpm
Max flow:	1010 US gpm
Resulting head of the pump:	74.77 ft
Head max:	78.74 ft
Type of impeller:	S-TUBE
Maximum particle size:	3.35 in
Primary shaft seal:	SIC-SIC
Secondary shaft seal:	SIC-CARBON
Curve tolerance:	ANSI/HI11.6:2012 3B
Cooling jacket:	with cooling jacket
Materials:	
Pump housing:	Cast iron
	EN-GJL250
Impeller:	Cast iron
	EN-GJL250
Material:	Whole pump in cast iron
Motor:	Cast iron
	EN-GJL250
Installation:	
Maximum ambient temperature:	104 °F
Flange standard:	ANSI
Pump inlet:	DN150
Pump outlet:	DN150
Maximum installation depth:	65.62 ft
Installation:	C
Inst dry/wet:	D/S
Installation:	vertical
Auto-coupling:	97699099
Inst vertical:	96308238
Base stand:	97632372
Frame range:	52
Liquid:	
Pumped liquid:	any viscous fluid
Liquid temperature range:	32 .. 104 °F
Liquid temp:	68 °F
Density:	62.4 lb/ft³
Kinematic viscosity:	1 cSt
Electrical data:	
Number of poles:	4
Power input - P1:	14 kW
Rated power - P2:	17.5 HP
Main frequency:	60 Hz
Rated voltage:	3 x 208-230/440-480 V
Voltage tolerance:	+10/-10 %
Start. method:	star/delta
Max starts per. hour:	20
Rated current:	50-45/24-22 A
Maximum current consumption:	45 A
Starting current:	478 A



GRUNDFOS

Company name:
Created by:
Phone:

Date: 2/19/2016

Description	Value
Rated current at no load:	22.2 A
Rated speed:	1785 rpm
Motor efficiency at full load:	90 %
Motor efficiency at 3/4 load:	89 %
Motor efficiency at 1/2 load:	86 %
Enclosure class (IEC 34-5):	IP68
Insulation class (IEC 85):	H
Explosion proof:	no
Motor protection:	KLIXON
Length of cable:	49.22 ft
Cable type:	S1BN8-F
Cable size:	7X4+ 5X1,5
Cable resist.:	4,95 mOhm/m
Winding resistance	0,123 Ohm
Cos phi 1/1:	0,81
Cos phi 1/2:	0,64
Cos phi 3/4:	0,75
Controls:	
Moisture sensor:	with moisture sensors
Water-in-air_sensor:	N
Others:	
Net weight:	778 lb
Sales region:	Namreg

Data sheet

Customer item no.:
Communication dated:
Doc. no.:
Quantity: 1

Number: ES 4167306
Item no.: 100
Date: 25/02/2016

KRTE 100-251/164UG-S

Version no.: 1

Operating data

Requested flow rate	430.00 US GPM	Actual flow rate	454.74 US GPM
Requested developed head	74.50 ft	Actual developed head	79.24 ft
Pumped medium	Wastewater, municipal untreated Not containing chemical and mechanical substances which affect the materials	Efficiency	68.3 %
		Power absorbed	13.74 HP
		Pump speed of rotation	1768 rpm
		Max. power on curve	18.49 HP
		Shutoff head	105.48 ft
Ambient air temperature	68.0 °F	Design	Single system 1 x 100 %
Fluid temperature	68.0 °F		
Fluid density	64.300840 lb/ft³		
Fluid viscosity	0.0015 in²/s	Performance test	No Tolerances to ISO 9906 Class 3B; below 10 kW acc. to paragraph 4.4.2
Static head	34.50 ft		

Design

Design	Close-coupled submersible	Material code	SIC/SIC/NBR
Orientation	Vertical	Impeller type	Single vane, radial flow (E)
Suction flange pump according to(DN1)	unmachined	Wear ring	Casing wear ring
		Impeller diameter	9.65 in
Discharge flange pump according to(DN2)	EN 1092-2 / DN 100 / PN 16	Free passage size	3.54 in
		Direction of rotation from drive	Clockwise
Shaft seal	2 mech. seals in tandem arrangement with oil reservoir	Color	Ultramarine blue (RAL 5002) KSB-blue
Manufacturer	KSB		
Type	MG		

Driver, accessories

Driver type	Electric motor	Temperature sensor	Bimetal switch 2x
Model (make)	KSB	Motor winding	460 V
Motor const. type	KSB Sub. motor	Number of poles	4
NEMA code letter	K	Starting mode	Direct-on-line starting
Frequency	60 Hz	Connection mode	Delta
Rated voltage	460 V	Motor cooling method	Surface cooling
Rated power P2	19.99 HP	Motor version	U
Available reserve	45.50 %	Cable design	Rubber hose
Rated current	29.0 A	Cable entry	Sealed along entire length
Starting current ratio	7.6	Power cable	AWG 11-7+15-5
Insulation class	F to IEC 34-1	Number of power cables	1
Motor enclosure	IP68	Moisture sensor	With
Cos phi at 4/4 load	0.73	Cable length	32.81 ft
Motor efficiency at 4/4 load	88.0 %		
Motor service factor	1.15		

Materials G

Pump casing (101)	Cast iron A 48 Class 35 B	Casing wear ring (502.1)	Cast iron A 48 Class 35 B
Discharge cover (163)	Cast iron A 48 Class 35 B	Motor housing (811)	Cast iron A 48 Class 35 B
Shaft (210)	Chrome steel A 276 Type 410 T	Motor cable (824)	Chloroprene rubber
		Screw (900)	Stainless steel A 193 B8M
Impeller (230)	Cast iron A 48 Class 35 B		
O-Ring (412)	Nitrile rubber NBR		

Data sheet

Customer item no.:
Communication dated:
Doc. no.:
Quantity: 1

Number: ES 4167306
Item no.: 100
Date: 25/02/2016

KRTE 100-251/164UG-S

Version no.: 1

Nameplates

Nameplates language	International	Duplicate nameplate	With

Installation parts

Installation type	Stationary with guide wire	Type	Chain
Scope of supply	Pump with installation parts	Material	CrNiMo steel 1.4404
Installation depth	14.76 ft	Length	16.40 ft
Material concept	G	Max. load	882 lbm

Duckfoot bend

Size	DN 100
Flange design	ASME
Duckfoot bend size (DN2 / DN3)	DN 100 Drilled according to ASME
Material	Cast iron A 48 Class 35 B
Mounting type	Composite anchor bolts
Foundation rail	Without

Claw

Design	straight
Size	DN 100

Lifting chain / -rope

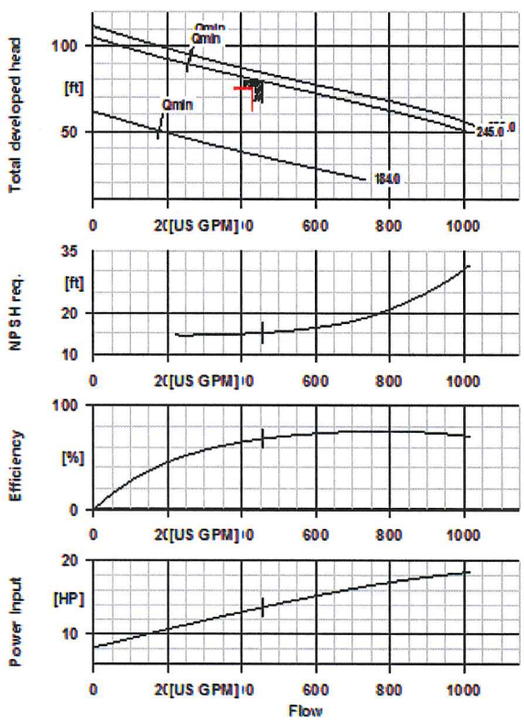
Compact data sheet

Customer item no.:
Communication dated:
Doc. no.:
Quantity: 1

Number: ES 4167306
Item no.:100
Date: 25/02/2016

KRTE 100-251/164UG-S

Version no.: 1



Design

Design	Close-coupled submersible
Orientation	Vertical
Suction flange pump according to(DN1)	unmachined
Discharge flange pump according to(DN2)	EN 1092-2 / DN 100 / PN 16
Shaft seal	2 mech. seals in tandem arrangement with oil reservoir
Type	MG
Material code	SIC/SIC/NBR
Impeller type	Single vane, radial flow (E)
Impeller diameter	9.65 in
Free passage size	3.54 in
Direction of rotation from drive	Clockwise

Materials G

Pump casing (101)	Cast iron A 48 Class 35 B
Discharge cover (163)	Cast iron A 48 Class 35 B
Shaft (210)	Chrome steel A 276 Type 410 T
Impeller (230)	Cast iron A 48 Class 35 B

Operating data

Pumped medium	Wastewater, municipal untreated Not containing chemical and mechanical substances which affect the materials
Ambient air temperature	68.0 °F
Fluid temperature	68.0 °F
Actual flow rate	454.74 US GPM
Actual developed head	79.24 ft
Efficiency	68.3 %
Power absorbed	13.74 HP
Pump speed of rotation	1768 rpm
Static head	34.50 ft
Design	Single system 1 x 100 %

Driver, accessories

Driver type	Electric motor
NEMA code letter	K
Frequency	60 Hz
Rated voltage	460 V
Rated power P2	19.99 HP
Available reserve	45.50 %
Rated current	29.0 A
Starting current ratio	7.6
Insulation class	F to IEC 34-1
Motor enclosure	IP68
Temperature sensor	Bimetal switch 2x
Motor winding	460 V
Starting mode	Direct-on-line starting
Cable design	Rubber hose
Cable length	32.81 ft

Installation parts

Installation type	Stationary with guide wire
Scope of supply	Pump with installation parts
Installation depth	14.76 ft
Material concept	G
Duckfoot bend	
Duckfoot bend size (DN2 / DN3)	DN 100 Drilled according to ASME
Size / Material	DN 100/Cast iron A 48 Class 35 B
Mounting type	Composite anchor bolts
Claw	straight
Claw	
Size	DN 100

Compact data sheet

Customer item no.:
Communication dated:
Doc. no.:
Quantity: 1

Number: ES 4167306
Item no.:100
Date: 25/02/2016

KRTE 100-251/164UG-S

Version no.: 1

	Lifting chain / -rope	Chain
	Material	CrNiMo steel 1.4404
	Length / Max. load	16.40 ft / 882 lbm

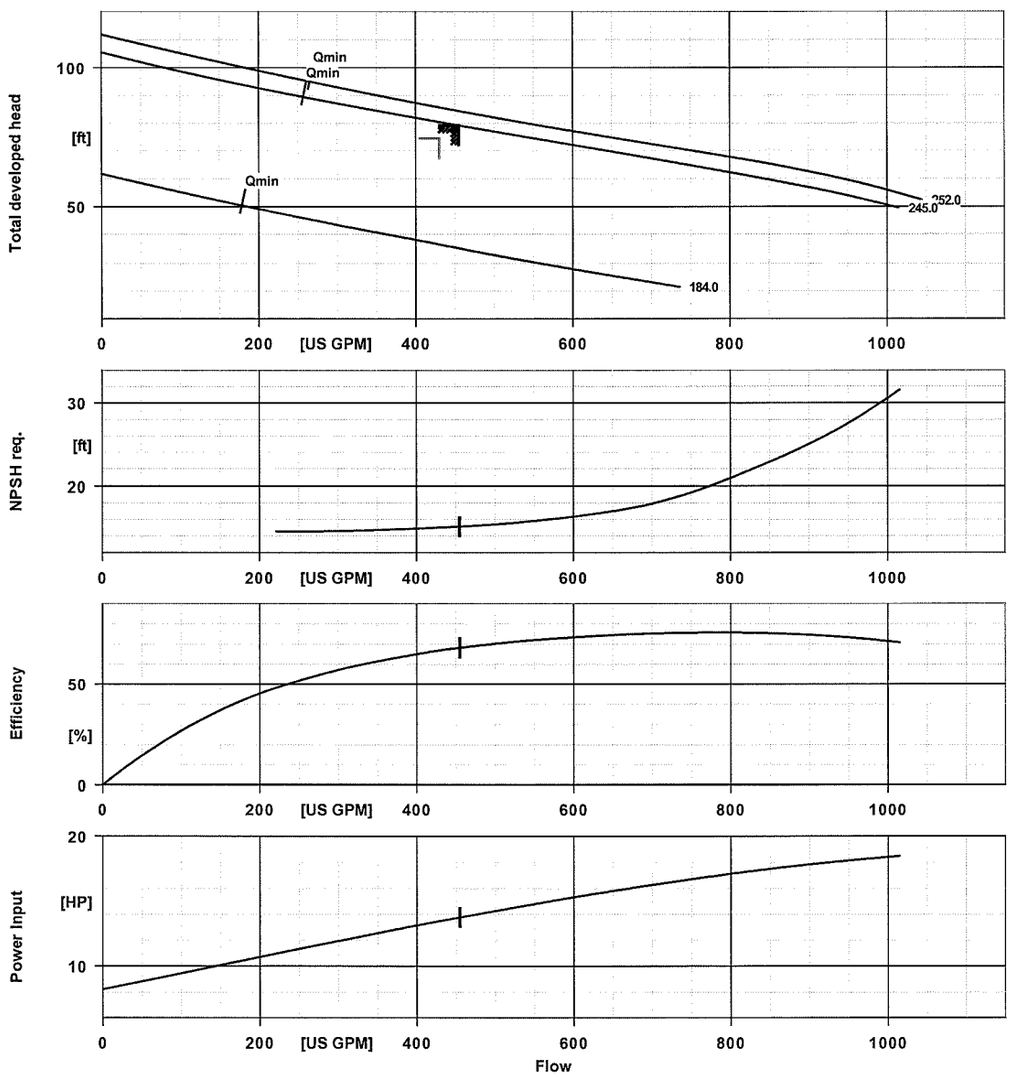
Performance curve

Customer item no.:
Communication dated:
Doc. no.:
Quantity: 1

Number: ES 4167306
Item no.:100
Date: 25/02/2016

KRTE 100-251/164UG-S

Version no.: 1



Curve data

Speed of rotation	1768 rpm	Efficiency	68.3 %
Fluid density	64.300840 lb/ft³	Power absorbed	13.74 HP
Viscosity	0.0015 in²/s	NPSH required	15.16 ft
Flow rate	454.74 US GPM	Curve number	K42580s
Requested flow rate	430.00 US GPM	Effective impeller diameter	9.65 in
Total developed head	79.24 ft	Acceptance standard	Tolerances to ISO 9906 Class 3B; below 10 kW acc. to paragraph 4.4.2
Requested developed head	74.50 ft		

Motor data sheet

Customer item no.:
Communication dated:
Doc. no.:
Quantity: 1

Number: ES 4167306
Item no.:100
Date: 25/02/2016

KRTE 100-251/164UG-S

Version no.: 1

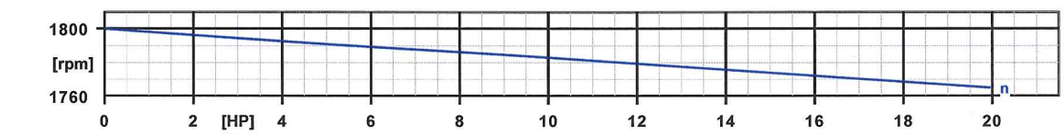
Motor data

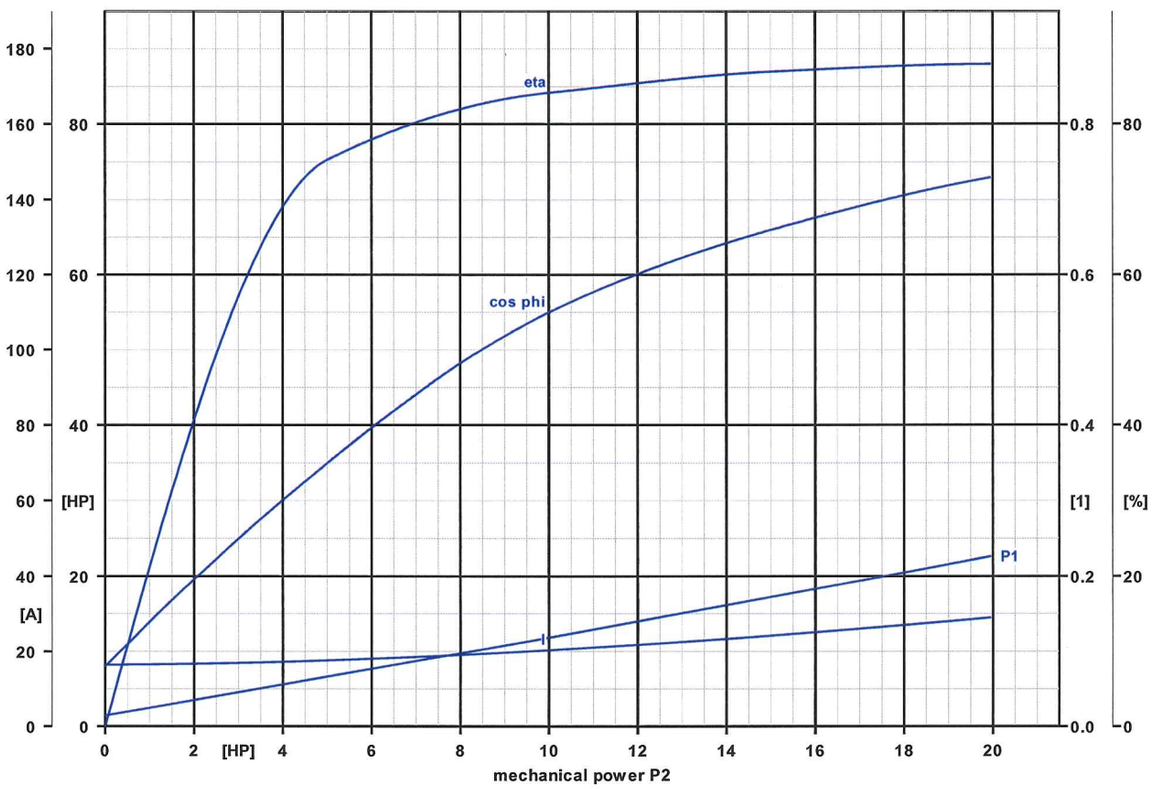
Motor manufacturer	KSB	Rated speed	1765 rpm
Motor size	16	Starting current ratio	7.6
Motor construction type	KSB Sub. motor	Starting mode	Direct-on-line starting
Motor material	Grey cast iron EN-GJL-250	Power cable	AWG 11-7+15-5
Efficiency class	not classified	Number of power cables	1
Rated voltage	460 V	Power cable Ø min.	0.83 in
Frequency	60 Hz	Power cable Ø max.	0.91 in
Motor power	19.99 HP	Cable standard	NEC
Rated current	29.0 A	Switching frequency	10.00 1/h

Curve data

The no-load point is not a guarantee point within the meaning of IEC 60034

Load	0.0 %	25.0 %	50.0 %	75.1 %	100.0 %
P2	0.00 HP	5.00 HP	10.00 HP	15.01 HP	19.99 HP
n	1800 rpm	1791 rpm	1783 rpm	1774 rpm	1765 rpm
P1	1.48 HP	6.64 HP	11.88 HP	17.23 HP	22.73 HP
I	16.4 A	17.6 A	20.4 A	24.3 A	29.0 A
Eta	0.0 %	75.3 %	84.2 %	87.0 %	88.0 %
cos phi	0.08	0.35	0.55	0.66	0.73





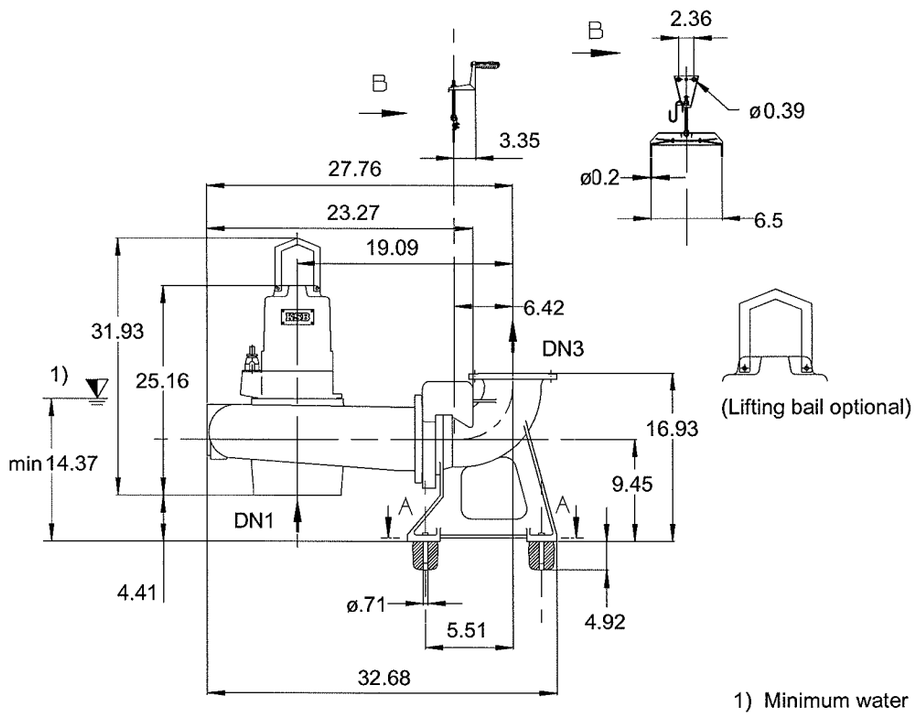
Installation plan

Customer item no.:
Communication dated:
Doc. no.:
Quantity: 1

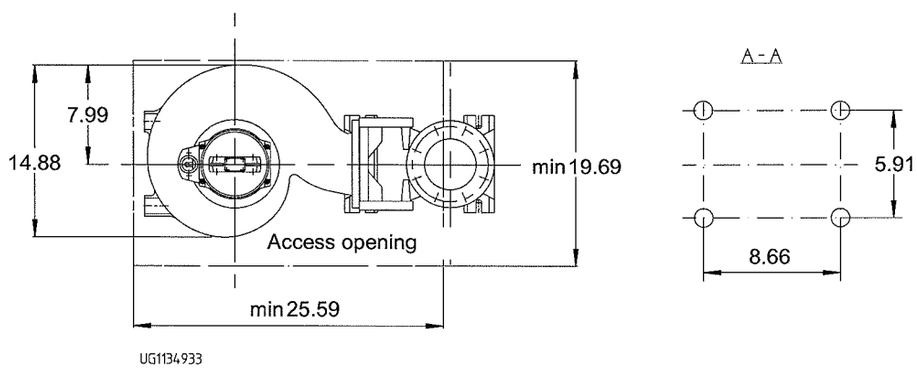
Number: ES 4167306
Item no.:100
Date: 25/02/2016

KRTE 100-251/164UG-S

Version no.: 1



1) Minimum water level t1



Drawing is not to scale

Dimensions in in

Installation plan

Customer item no.:
Communication dated:
Doc. no.:
Quantity: 1

Number: ES 4167306
Item no.:100
Date: 25/02/2016

KRTE 100-251/164UG-S

Version no.: 1

Motor

Motor manufacturer	KSB
Motor size	16
Motor power	19.99 HP
Number of poles	4
Speed of rotation	1765 rpm

Connections

Suction flange pump according to(DN1)	unmachined
Duckfoot bend size (DN2 / DN3)	DN 100 Drilled according to ASME

Weight net

Pump, Motor, Cable	417 lbm
Claw / Foot	32 lbm
Total	449 lbm

Connect pipes without stress or strain!

Dimensional tolerances for shaft axis height:	DIN 747
Dimensions without tolerances, middle tolerances to:	ISO 2768-m
Connection dimensions for pumps:	EN735
Dimensions without tolerances - welded parts:	ISO 13920-B
Dimensions without tolerances - gray cast iron parts:	ISO 8062-CT9

For auxiliary connections see separate drawing.

Data sheet

Customer item no.:
Communication dated:
Doc. no.:
Quantity: 1

Number: ES 4167306
Item no.: 200
Date: 25/02/2016

KRTK 100-251/114UG-S

Version no.: 1

Operating data

Requested flow rate	430.00 US GPM	Actual flow rate	430.00 US GPM
Requested developed head	74.50 ft	Actual developed head	74.50 ft
Pumped medium	Wastewater, municipal untreated Not containing chemical and mechanical substances which affect the materials	Efficiency Power absorbed Pump speed of rotation Max. power on curve Shutoff head Design	61.7 % 13.54 HP 1768 rpm 22.51 HP 97.13 ft Single system 1 x 100 %
Ambient air temperature	68.0 °F		
Fluid temperature	68.0 °F		
Fluid density	64.300840 lb/ft³		
Fluid viscosity	0.0015 in²/s	Performance test	No Tolerances to ISO 9906 Class 3B; below 10 kW acc. to paragraph 4.4.2
Static head	34.50 ft		

Design

Design	Close-coupled submersible	Material code	SIC/SIC/NBR
Orientation	Vertical	Impeller type	Multivane radial flow impeller (K)
Suction flange pump according to(DN1)	unmachined	Wear ring	Casing wear ring
Discharge flange pump according to(DN2)	EN 1092-2 / DN 100 / PN 16	Impeller diameter	9.29 in
Shaft seal	2 mech. seals in tandem arrangement with oil reservoir	Free passage size Direction of rotation from drive Color	2.99 in Clockwise Ultramarine blue (RAL 5002) KSB-blue
Manufacturer	KSB		
Type	MG		

Driver, accessories

Driver type	Electric motor	Temperature sensor	Bimetal switch 2x
Model (make)	KSB	Motor winding	460 V
Motor const. type	KSB Sub. motor	Number of poles	4
NEMA code letter	K	Starting mode	Direct-on-line starting
Frequency	60 Hz	Connection mode	Delta
Rated voltage	460 V	Motor cooling method	Surface cooling
Rated power P2	15.01 HP	Motor version	U
Available reserve	10.80 %	Cable design	Rubber hose
Rated current	22.0 A	Cable entry	Sealed along entire length
Starting current ratio	7	Power cable	AWG 13-12
Insulation class	F to IEC 34-1	Number of power cables	1
Motor enclosure	IP68	Moisture sensor	With
Cos phi at 4/4 load	0.73	Cable length	32.81 ft
Motor efficiency at 4/4 load	87.7 %		
Motor service factor	1.15		

Materials G

Pump casing (101)	Cast iron A 48 Class 35 B	Casing wear ring (502.1)	Cast iron A 48 Class 35 B
Discharge cover (163)	Cast iron A 48 Class 35 B	Motor housing (811)	Cast iron A 48 Class 35 B
Shaft (210)	Chrome steel A 276 Type 410 T	Motor cable (824)	Chloroprene rubber
		Screw (900)	Stainless steel A 193 B8M
Impeller (230)	Cast iron A 48 Class 35 B		
O-Ring (412)	Nitrile rubber NBR		

Data sheet

Customer item no.:
Communication dated:
Doc. no.:
Quantity: 1

Number: ES 4167306
Item no.: 200
Date: 25/02/2016

KRTK 100-251/114UG-S

Version no.: 1

Nameplates

Nameplates language	International	Duplicate nameplate	With

Installation parts

Installation type	Stationary with guide wire	Type	Chain
Scope of supply	Pump with installation parts	Material	CrNiMo steel 1.4404
Installation depth	14.76 ft	Length	16.40 ft
Material concept	G	Max. load	441 lbm

Duckfoot bend

Size	DN 100
Flange design	ASME
Duckfoot bend size (DN2 / DN3)	DN 100 Drilled according to ASME
Material	Cast iron A 48 Class 35 B
Mounting type	Composite anchor bolts
Foundation rail	Without

Claw

Design	straight
Size	DN 100

Lifting chain / -rope

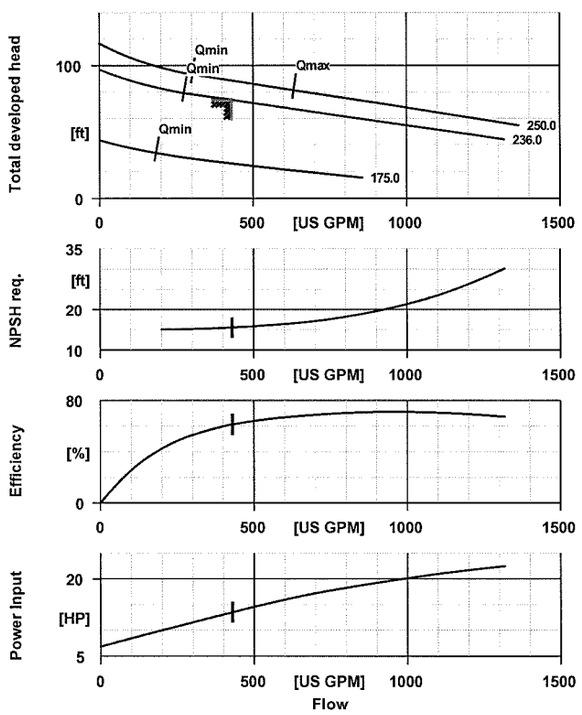
Compact data sheet

Customer item no.:
Communication dated:
Doc. no.:
Quantity: 1

Number: ES 4167306
Item no.:200
Date: 25/02/2016

KRTK 100-251/114UG-S

Version no.: 1



Design

Design	Close-coupled submersible
Orientation	Vertical
Suction flange pump according to(DN1)	unmachined
Discharge flange pump according to(DN2)	EN 1092-2 / DN 100 / PN 16
Shaft seal	2 mech. seals in tandem arrangement with oil reservoir
Type	MG
Material code	SIC/SIC/NBR
Impeller type	Multivane radial flow impeller (K)
Impeller diameter	9.29 in
Free passage size	2.99 in
Direction of rotation from drive	Clockwise

Materials G

Pump casing (101)	Cast iron A 48 Class 35 B
Discharge cover (163)	Cast iron A 48 Class 35 B
Shaft (210)	Chrome steel A 276 Type 410 T
Impeller (230)	Cast iron A 48 Class 35 B

Operating data

Pumped medium	Wastewater, municipal untreated Not containing chemical and mechanical substances which affect the materials
Ambient air temperature	68.0 °F
Fluid temperature	68.0 °F
Actual flow rate	430.00 US GPM
Actual developed head	74.50 ft
Efficiency	61.7 %
Power absorbed	13.54 HP
Pump speed of rotation	1768 rpm
Static head	34.50 ft
Design	Single system 1 x 100 %

Driver, accessories

Driver type	Electric motor
NEMA code letter	K
Frequency	60 Hz
Rated voltage	460 V
Rated power P2	15.01 HP
Available reserve	10.80 %
Rated current	22.0 A
Starting current ratio	7
Insulation class	F to IEC 34-1
Motor enclosure	IP68
Temperature sensor	Bimetal switch 2x
Motor winding	460 V
Starting mode	Direct-on-line starting
Cable design	Rubber hose
Cable length	32.81 ft

Installation parts

Installation type	Stationary with guide wire
Scope of supply	Pump with installation parts
Installation depth	14.76 ft
Material concept	G
Duckfoot bend	
Duckfoot bend size (DN2 / DN3)	DN 100 Drilled according to ASME
Size / Material	DN 100/Cast iron A 48 Class 35 B
Mounting type	Composite anchor bolts
Claw	straight
Claw	
Size	DN 100

Compact data sheet

Customer item no.:
Communication dated:
Doc. no.:
Quantity: 1

Number: ES 4167306
Item no.:200
Date: 25/02/2016

KRTK 100-251/114UG-S

Version no.: 1

	Lifting chain / -rope	Chain
	Material	CrNiMo steel 1.4404
	Length / Max. load	16.40 ft / 441 lbm

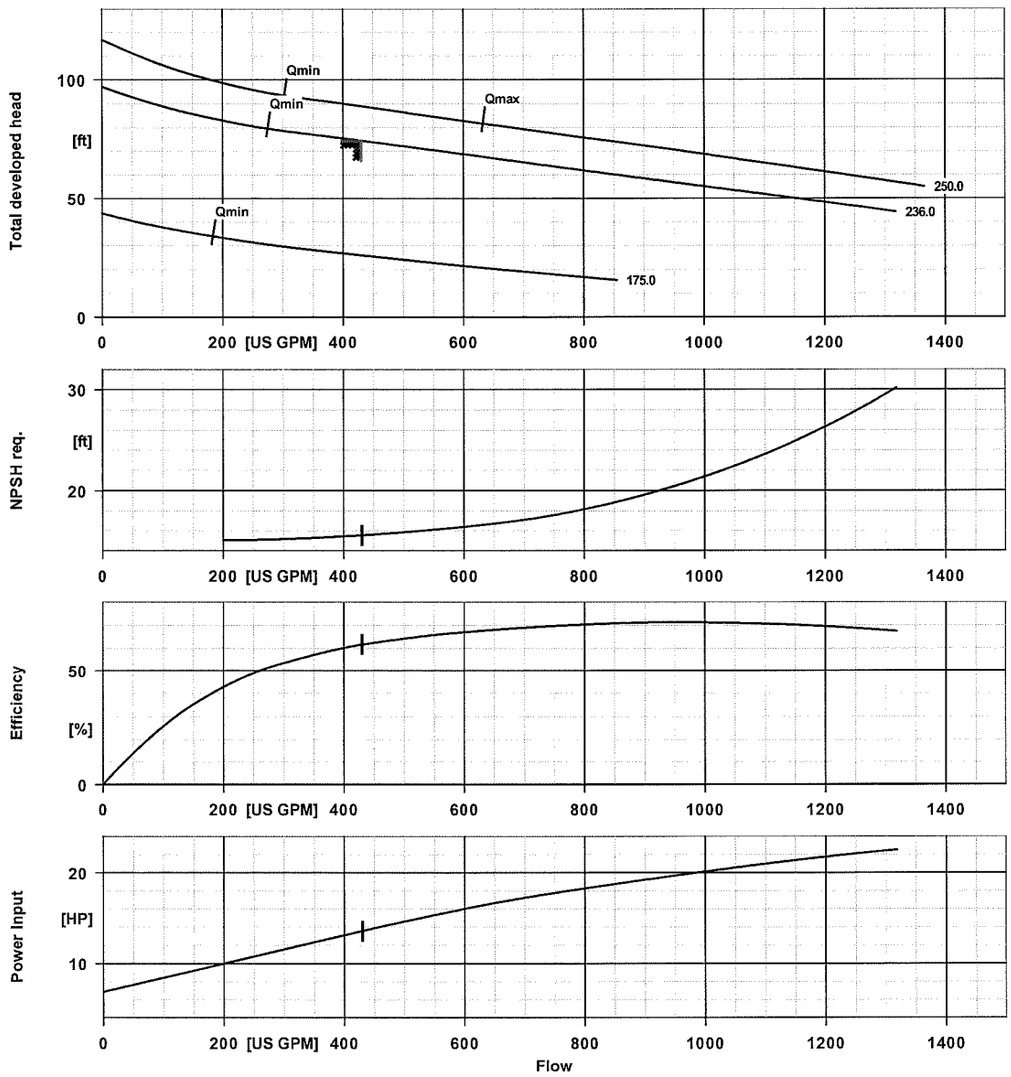
Performance curve

Customer item no.:
Communication dated:
Doc. no.:
Quantity: 1

Number: ES 4167306
Item no.:200
Date: 25/02/2016

KRTK 100-251/114UG-S

Version no.: 1



Curve data

Speed of rotation	1768 rpm	Efficiency	61.7 %
Fluid density	64.300840 lb/ft³	Power absorbed	13.54 HP
Viscosity	0.0015 in²/s	NPSH required	15.55 ft
Flow rate	430.00 US GPM	Curve number	K42595s
Requested flow rate	430.00 US GPM	Effective impeller diameter	9.29 in
Total developed head	74.50 ft	Acceptance standard	Tolerances to ISO 9906 Class 3B; below 10 kW acc. to paragraph 4.4.2
Requested developed head	74.50 ft		

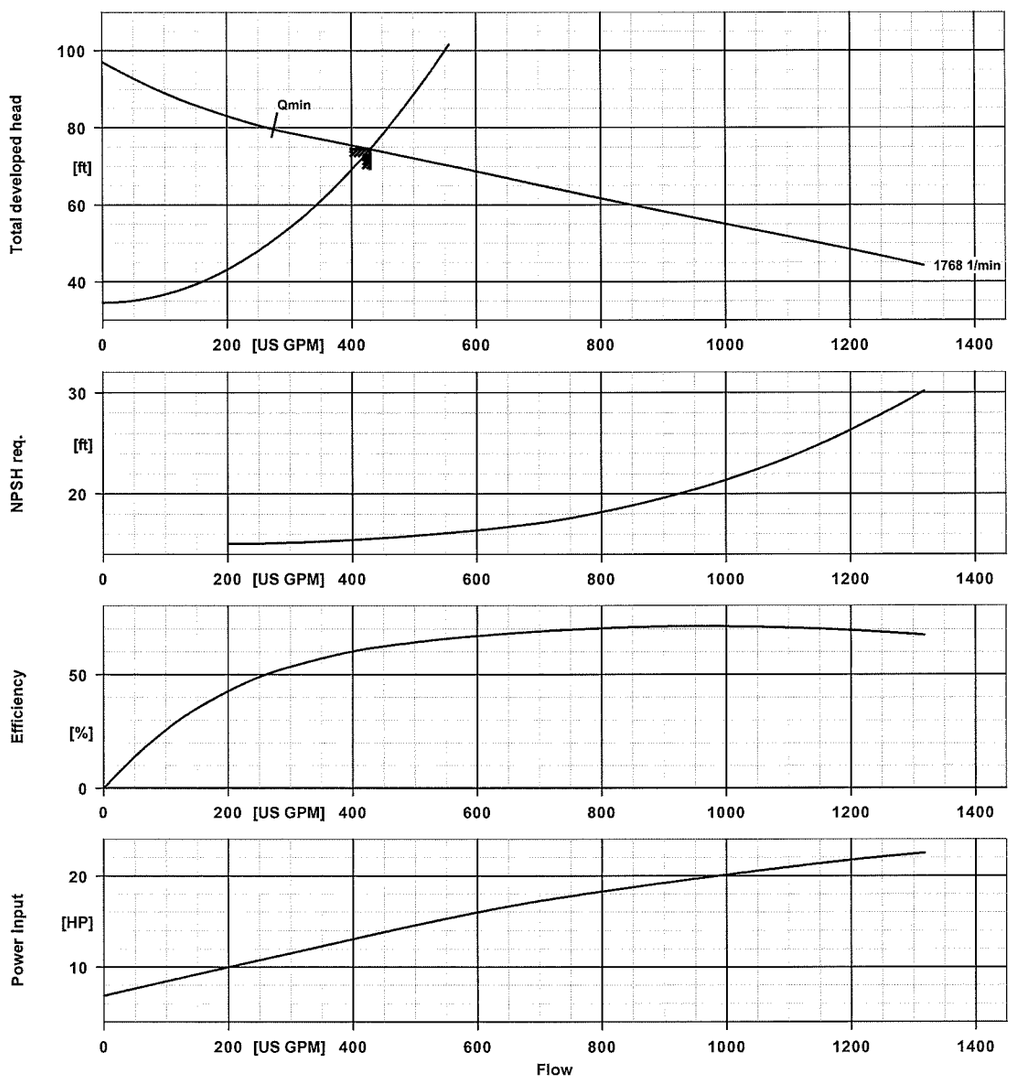
Speed curve

Customer item no.:
Communication dated:
Doc. no.:
Quantity: 1

Number: ES 4167306
Item no.:200
Date: 25/02/2016
Page: 6 / 9

KRTK 100-251/114UG-S

Version no.: 1



Curve data

Fluid density	64.300840 lb/ft³	Total developed head	74.50 ft
Viscosity	0.0015 in²/s	Requested developed head	74.50 ft
Flow rate	430.00 US GPM	Effective impeller diameter	9.29 in
Requested flow rate	430.00 US GPM		

Motor data sheet

Customer item no.:
Communication dated:
Doc. no.:
Quantity: 1

Number: ES 4167306
Item no.:200
Date: 25/02/2016

KRTK 100-251/114UG-S

Version no.: 1

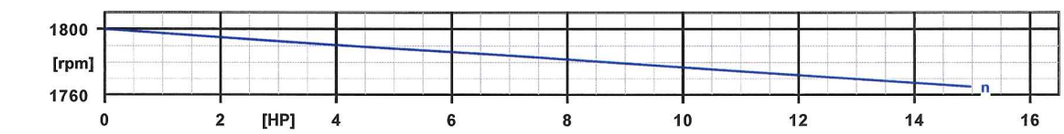
Motor data

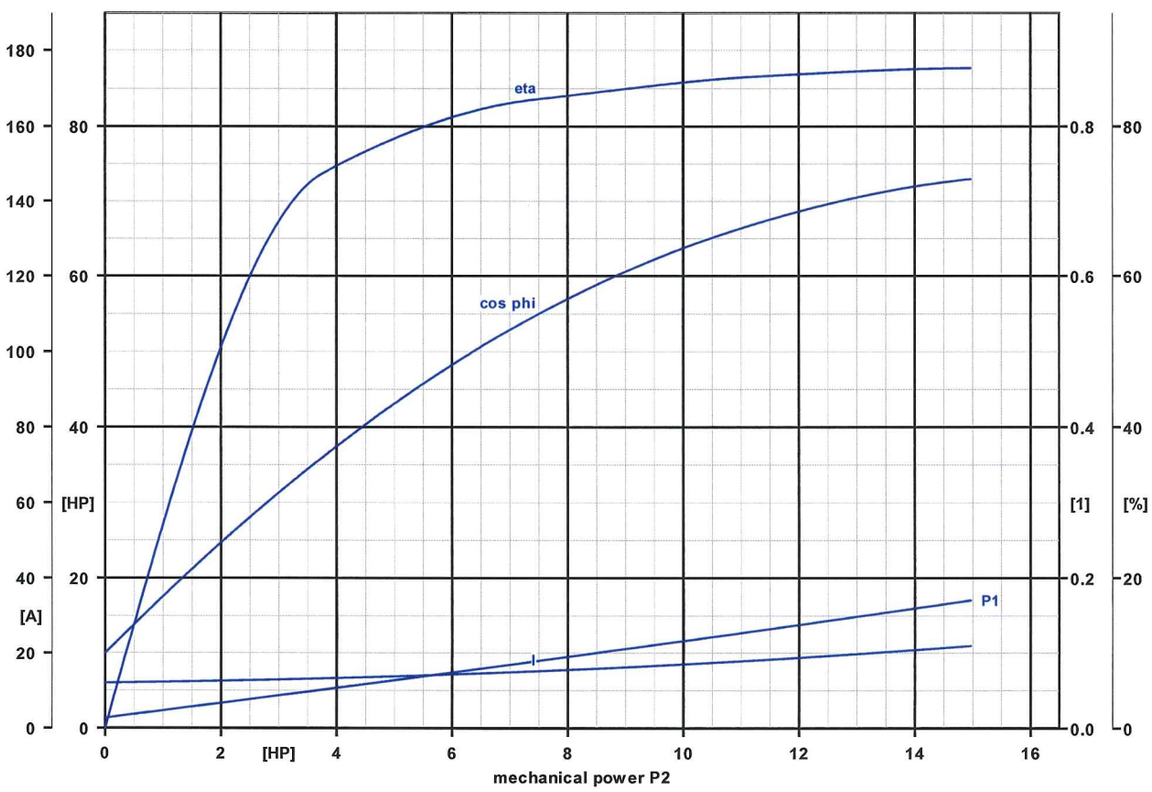
Motor manufacturer	KSB	Rated speed	1765 rpm
Motor size	11	Starting current ratio	7
Motor construction type	KSB Sub. motor	Starting mode	Direct-on-line starting
Motor material	Grey cast iron EN-GJL-250	Power cable	AWG 13-12
Efficiency class	not classified	Number of power cables	1
Rated voltage	460 V	Power cable Ø min.	0.73 in
Frequency	60 Hz	Power cable Ø max.	0.77 in
Motor power	15.01 HP	Cable standard	NEC
Rated current	22.0 A	Switching frequency	10.00 1/h

Curve data

The no-load point is not a guarantee point within the meaning of IEC 60034

Load	0.0 %	25.0 %	50.0 %	75.0 %	100.0 %
P2	0.00 HP	3.75 HP	7.50 HP	11.25 HP	15.01 HP
n	1800 rpm	1791 rpm	1783 rpm	1774 rpm	1765 rpm
P1	1.34 HP	5.09 HP	8.97 HP	12.99 HP	17.11 HP
I	12.0 A	13.2 A	15.2 A	18.1 A	22.0 A
Eta	0.0 %	73.7 %	83.6 %	86.6 %	87.7 %
cos phi	0.10	0.36	0.55	0.67	0.73





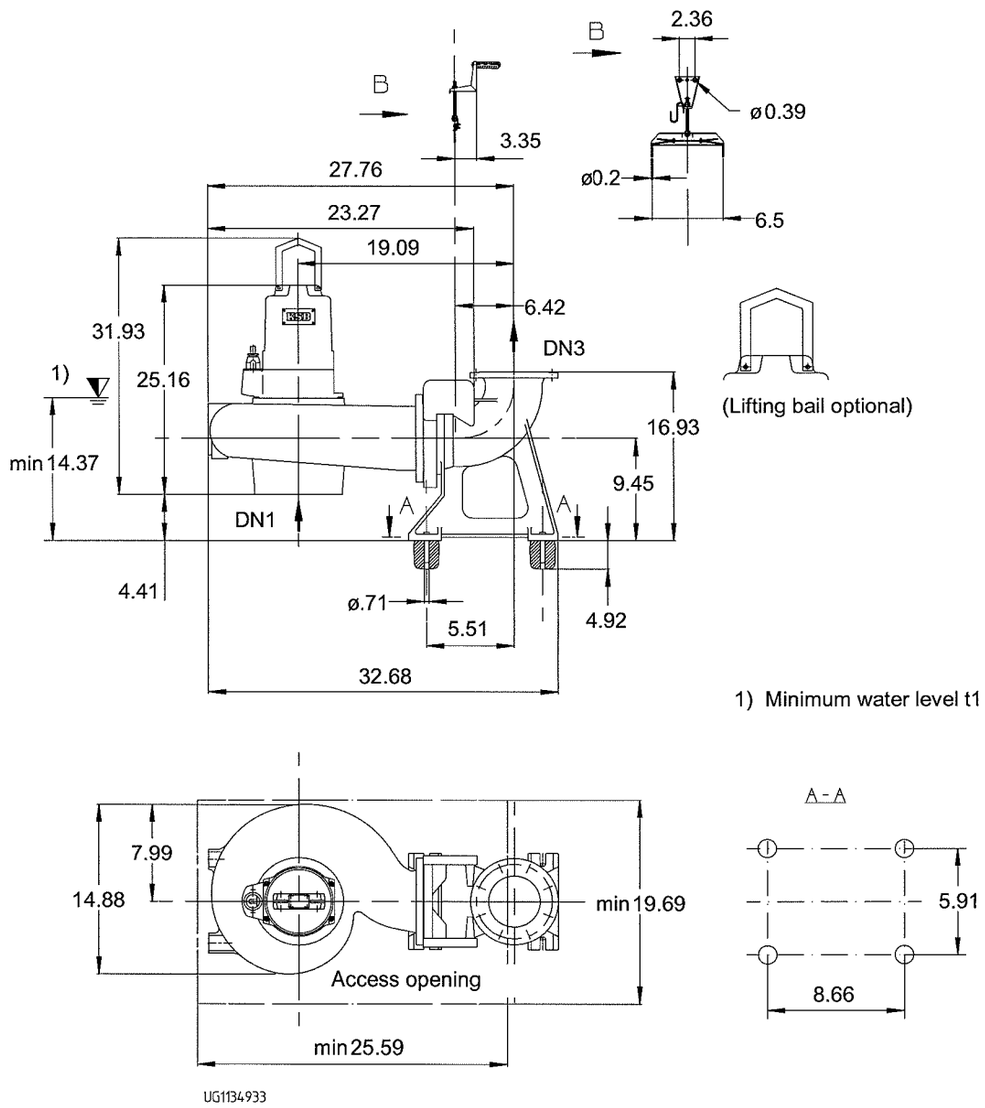
Installation plan

Customer item no.:
Communication dated:
Doc. no.:
Quantity: 1

Number: ES 4167306
Item no.:200
Date: 25/02/2016

Version no.: 1

KRTK 100-251/114UG-S



Drawing is not to scale

Dimensions in in

Installation plan

Customer item no.:
Communication dated:
Doc. no.:
Quantity: 1

Number: ES 4167306
Item no.:200
Date: 25/02/2016

KRTK 100-251/114UG-S

Version no.: 1

Motor

Motor manufacturer	KSB
Motor size	11
Motor power	15.01 HP
Number of poles	4
Speed of rotation	1765 rpm

Connections

Suction flange pump according to(DN1)	unmachined
Duckfoot bend size (DN2 / DN3)	DN 100 Drilled according to ASME

Weight net

Pump, Motor, Cable	392 lbm
Claw / Foot	32 lbm
Total	424 lbm

Connect pipes without stress or strain!

Dimensional tolerances for shaft axis height:	DIN 747
Dimensions without tolerances, middle tolerances to:	ISO 2768-m
Connection dimensions for pumps:	EN735
Dimensions without tolerances - welded parts:	ISO 13920-B
Dimensions without tolerances - gray cast iron parts:	ISO 8062-CT9

For auxiliary connections see separate drawing.

Pump Data Sheet - Yeomans Pump, Aurora, IL

Company:
Name:
Date: 2/25/2016

Customer:
Project:
Location:
Quote #:
Item ID / Tag #:
Qty. of Pumps:

Pump:

Model: 4103S

Type: 9100
Synch speed: 1800 rpm

Speed: 1750 rpm
Dia: 9.625 in

Curve ID No.: 3501

Impeller ID No.: Y-4627

Specific Speeds:

Ns: ---
Nss: ---

Dimensions:

Suction: ---
Discharge: 4 in

Pump Limits:

Temperature: 104 °F
Pressure: 150 psi g
Sphere size: 3 in

Power: ---
Eye area: ---

Search Criteria:

Flow: 430 US gpm

Head: 74.5 ft

Fluid:

Water
SG: 1
Viscosity: 1.105 cP

Temperature: 60 °F
Vapor pressure: 0.2563 psi a
Atm pressure: 14.7 psi a

NPSHa: ---

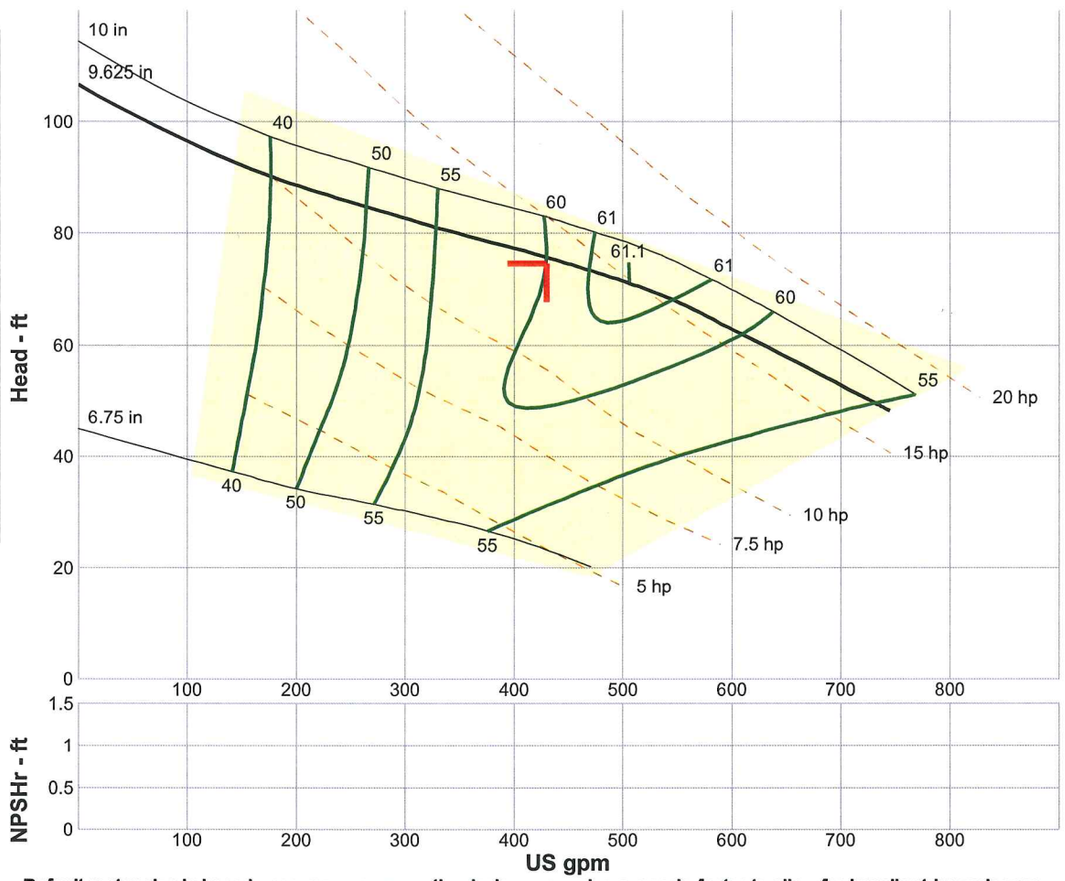
Motor:

Standard: YCC
Enclosure: TENV

Size: 20 hp
Speed: 1800
Frame: 210

Sizing criteria: Max Power on Design Curve

---- Data Point ----	
Flow:	430 US gpm
Head:	75.7 ft
Eff:	60%
Power:	13.7 hp
NPSHr:	---
---- Design Curve ----	
Shutoff head:	107 ft
Shutoff dP:	46.2 psi
Min flow:	---
BEP:	61.1% @ 506 US gpm
NOL power:	16.7 hp @ 744 US gpm
-- Max Curve --	
Max power:	18.1 hp @ 768 US gpm



Default motor size is based upon max. power on the design curve plus a margin factor to allow for impeller trim variances that may occur to meet H.I. TDH requirements. Efficiencies and data are typical. Please contact the factory for guaranteed values. FOR TEMP. ABOVE 104 DEG. F (40 DEG C) REFER TO FACTORY FOR ASSISTANCE.

Performance Evaluation:

Flow US gpm	Speed rpm	Head ft	Efficiency %	Power hp	NPSHr ft
516	1750	70.2	61	15	---
430	1750	75.7	60	13.7	---
344	1750	80.2	55.8	12.4	---
258	1750	85.1	49.3	11.2	---
172	1750	90.6	39.5	9.98	---

Selected from catalog: YP_9100.60 Vers: 1

YEOMANS

Series 9100
Motor Data
1750 RPM – 3 Phase

Totally enclosed, non-ventilated, hermetically sealed submersible type. Features include 416 stainless steel shaft, tandem mechanical seals (one inside an oil chamber and one outside); automatic reset N.C. series connected thermal overload protection, two moisture sensing probes, pre-lubricated shaft bearings class H insulation (Class F on 140 frame). *Efficiencies include all mechanical losses including mechanical seals.

H.P.	Full Load RPM	Frame Size	Nominal Eff % @ *			Nominal Power Factor % @			Amps @ 460V		KVA Code Letter	Full Load Torque (Ft-Lbs)	% Full Load Torque		Power Cable		Control Cable	
			Full Load	3/4 Load	1/2 Load	Full Load	3/4 Load	1/2 Load	Full Load	Locked Rotor			Locked Rotor	Break-down	AWG Size	O.D. ** (in.)	AWG Size	O.D. ** (in.)
0.5	1732	140	55.7	50.1	41.1	75.6	69.3	61.2	1.1	6.1	L	1.5	313	368	#16	0.57	Not Applicable - Single Cable Used	
0.75	1733	140	63.9	58.9	50.3	76.8	70.4	61.8	1.4	8.5	K	2.3	302	356	#16	0.57		
1	1739	140	68.3	63.7	55.4	75.6	68.8	59.5	1.8	11.5	L	3.0	308	371	#16	0.57		
1.5	1737	140	72.3	68.5	61.1	76.7	69.8	58.9	2.5	15.4	K	4.5	268	332	#16	0.57		
2	1744	140	74.9	72.7	66.6	75.7	67.4	55.2	3.3	19.8	J	6.0	267	319	#12	0.65	#18	0.45
3	1733	140	77.7	76.2	71.0	79.9	73.1	61.6	4.5	26.8	J	9.0	199	288	#12	0.65	#18	0.45
5	1733	140	80.6	79.4	74.6	81.1	74.7	63.6	7.1	45.1	J	15.0	244	301	#12	0.65	#18	0.45
7.5	1737	180	85.9	87.4	87.0	83.7	78.0	67.1	9.8	64.3	H	22.7	232	310	*See Power Cable Size Chart*		#14	0.59
10	1735	180	84.0	86.7	86.1	80.6	73.3	60.4	13.8	84.0	H	30.3	238	313			#14	0.59
15	1747	210	86.7	88.6	88.6	81.4	76.4	66.1	19.9	104.8	F	45.1	192	239			#14	0.59
20	1741	210	86.4	88.9	89.6	82.4	78.6	69.6	26.3	131.1	F	60.3	183	223			#14	0.59
25	1761	250	88.8	90.3	90.2	83.8	80.6	72.2	31.4	172.1	F	74.6	192	236			#14	0.59
30	1765	250	90.2	91.6	91.3	85.2	82.3	74.4	37.0	218.0	G	89.4	210	263			#14	0.59
40	1760	250	89.5	91.0	91.0	84.8	81.2	72.3	49.0	298.0	G	119.3	212	265			#14	0.59
50	1771	320	89.3	89.4	87.6	82.1	77.6	67.7	64.0	345.0	F	148.3	175	252			#14	0.59
60	1767	320	90.3	90.9	90.0	87.9	86.8	82.1	71.0	378.0	F	178.3	167	229			#14	0.59
75	1770	320	93.0	93.7	93.3	87.8	85.8	79.7	86.0	560.0	G	222.2	208	266			#14	0.59
100	1785	360	92.4	92.6	91.0	86.9	85.2	79.5	117.0	777.2	G	294.4	197	238			#14	0.59
125	1782	360	93.2	93.2	92.0	86.9	85.4	80.1	145.0	901.0	G	368.5	178	263			#14	0.59
150	1782	360	93.6	93.8	92.8	88.5	87.2	83.0	169.0	1108.0	G	442.1	186	268			#14	0.59
200	1780	L360	94.6	95.1	94.8	88.1	88.7	86.8	225.0	1297.0	F	590.0	165	234			#14	0.59

Typical motor data for Submersible 3 phase, 60 hertz, NEMA design B, 40 °C ambient, normal torque motors. Amperes shown for 460 volt connection. If other connections are available, the amperes will vary inversely with rated voltage. All values nominal. All motors have 1.15 S.F. at 40 °C ambient temperature.
** Above cable data for standard motors only, with cable length of 30'. Data is applicable through lengths of 100'. 140 frame motors with #16 AWG cord utilize single cable, (8) conductor, with power and control leads.
Control cables must be run in a separate conduit. Not certified for construction. Cable size and dimensions may vary. Confirm with factory before final design or construction.

YEOMANS

SERIES 9100

SOLIDS-HANDLING SUBMERSIBLE WASTEWATER BARE PUMP

Submersible Wastewater Pump Association SWPA MEMBER

OUTLINE DWG #	111679A	
S.O.		
JOB:		
ISSUE	REVISION	DATE

LIST OF EQUIPMENT FURNISHED:

__ Model _____ Pump
Rated for_____ GPM at_____ Ft.TDH.
__ _____HP,_____RPM, _____Volts
____Phase, _____ Hz _____ Motor Frame
Totally Enclosed Non-Ventilated w/
Thermal Protection & Moisture Detection

DIMENSION CHART

√	PUMP MODEL	A	C	D	E	G	H	J	K	P	√	MOTOR FRAME	M	N MAX	APPROX. UNIT WT.#
	3062	15	9	12 1/4	6 1/2	5 5/8	2 3/8	3	2 1/8	3 1/4		140	21 3/8	37	220
												180	22 3/8	38 5/8	405
	4072 (1)	15 1/4	9 1/2	10 7/8	5 3/4	(1)	(1)	4	2 1/2	2 11/16		140	24 1/4	29 3/4	250
	4072.5	15 1/2	9 1/2	11 3/4	6 1/4	6	3	4	3	3		140	22 3/8	37 5/8	250
	4073											180	24 1/4	40 3/8	475
	4083 (1)	19 3/16	12	14 3/4	7 7/8	(1)	(1)	4	4	3 7/8		140	23	29 3/4	287
												180	24	31 1/4	390
												210	30	38	537
	4092.5	17	10 1/2	13 1/2	7 1/4	6 1/2	2 1/2	4	3	4		140	23 3/8	38 5/8	280
												180	24 1/2	40 5/8	400
												210	29 3/4	51 1/4	450
	4103S	21	13	16 1/4	8 3/4	7 1/4	3	4	4	4 1/4		140	23 7/8	39 1/8	280
												180	25	41 1/8	465
	4103L											210	29	50 1/2	515
												250	33 1/2	57	865
	4103SV	21	13	16 1/4	8 3/4	7 1/4	3	4	4	4 1/4		210	29	50 1/2	515
	4113SV														
	4123SV (2)					(2)	(2)					250	33 1/2	57	865
	4133SV (2)														
	4123	23	13 1/2	19 1/2	10 1/2	7 1/4	3	4	4	4 1/4		180	24 1/4	39 3/8	470
												210	29	50 1/2	520
												250	33 1/2	57	870
												320	35 1/2	61	1345
	412.53SV (3)	21 1/4	12 1/2	17 3/4	9 1/16	4 1/2	1/8	4	4	4 3/8		180	25	45 3/4	465
												210	29 3/4	50 1/2	515
												250	34 1/4	55	865
	4153	29 1/8	17 3/4	22 3/4	11 3/4	7 3/4	3	4	4	4 3/4		210	34 1/2	56	720
												250	37 5/8	61 1/8	1070
												320	39 5/8	64 5/8	1545
												360	46 1/2	73 5/8	2035
	4153L (1)	28 3/4	18	22 1/4	12	(1)	(1)	4	6	5 1/4		250	34	44 1/4	1070
												320	36	48 1/4	1545
												360	42 3/4	53 3/4	2035
	6123	28 5/8	17 3/4	21 3/4	12	8	3	6	6	5		180	27 1/8	43 1/4	640
												210	31 7/8	53 3/8	690
												250	35	58 1/2	1040
												320	37	62	1515

(1) THESE MODELS AVAILABLE WITH "EL" TYPE VOLUTE ONLY AND DO NOT HAVE SUPPORT FEET. THEY ARE NOT FREE STANDING OR SUITABLE FOR PORTABLE USE WITHOUT OPTIONAL SUPPORT PEDESTAL AND DISCHARGE FLANGE ADAPTER. REFER TO FACTORY FOR ADDITIONAL INFORMATION.

(2) THESE MODELS DO NOT HAVE SUPPORT FEET. THEY ARE NOT FREE STANDING OR SUITABLE FOR PORTABLE USE WITHOUT OPTIONAL SUPPORT PEDESTAL. REFER TO FACTORY FOR ADDITIONAL INFORMATION.

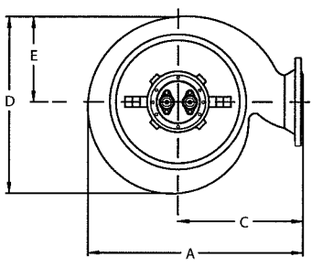
(3) SUITABLE FOR PORTABLE USE WITH OPTIONAL SUPPORT PEDESTAL. REFER TO FACTORY FOR ADDITIONAL INFORMATION. ADD 5" TO G & H DIMS. WHEN SUPPLIED WITH OPTIONAL SUPPORT PEDESTAL.

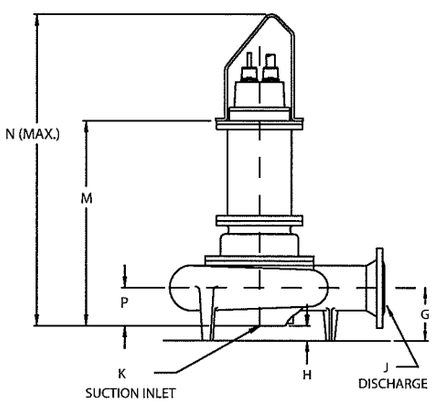
FREE STANDING INSTALLATION DRAWING ON PAGE 9182

NOT CERTIFIED FOR CONSTRUCTION PURPOSES. REFER TO FACTORY FOR CERTIFIED INSTALLATION DRAWINGS

MOTOR FRAME CHART

MOTOR HP	THREE PHASE 60 HERTZ			SINGLE PHASE 60 HERTZ	
	1750	1160	875	1750	1160
1 1 1/2 2 3	140	140	140 180	140	140
5 7 1/2	180	180	210		
10 15		210	250		
20 25	210	250	320		
30 40	250	320			
50 60	320		360		
75 100	360	360			
125 150		360L			
200	360L				





M = RECOMMENDED SUBMERGENCE
ALL DIMENSIONS IN INCHES +/- 1/8

S2015-0425

McCLURE™
ENGINEERING CO.

1740 Lininger Lane
North Liberty, IA 52317
P 319.626.9090
F 319.626.9095

www.mecresults.com

February 26, 2016

Mr. Charles Gipp, Director of the Iowa DNR
c/o Mr. Marty Jacobs, P.E., Environmental Engineer
Iowa Department of Natural Resources – Wastewater Engineering Section
Wallace Building
502 E. 9th Street
Des Moines, IA 50319-0034

RE: Waukee Bluestem Lift Station #14 Improvements, Waukee, Iowa
MEC 2214027-00
IDNR #S2015-0425

Dear Mr. Gipp and Mr. Jacobs:

Enclosed please find one (1) copy of the City of Waukee's variance request for the job referenced above regarding Iowa Wastewater Facilities Design Standard 13.4.3, which states "unless grinder pumps are used, pumps shall be capable of passing spheres at least 3 inches in diameter."

If you have any questions, please call me at (515) 964-1229.

Very truly yours,

McCLURE ENGINEERING COMPANY

Curtis Kampman, P.E.

Enclosures

cc: Mr. John Gibson, City of Waukee
File.

S2015-0425

McCLURE™
ENGINEERING Co.

705 First Avenue North
Fort Dodge, IA 50501
P 515.576.7155
F 515.576.4235

www.mecresults.com

February 17, 2016

Mr. Marty Jacobs, P.E.
Iowa Department of Natural Resources – Wastewater Engineering Section
Wallace Building
502 E. 9th Street
Des Moines, IA 50319-0034

RE: Waukee Bluestem Lift Station #14 Improvements, Waukee, Iowa
MEC 2214027-00
IDNR #S2015-0425

Dear Marty,

The City of Waukee is requesting a variance for the above referenced project on the 3-inch sphere requirement as specified in the State of Iowa's Wastewater Design Standards chapter 13.4.3, which states "pumps shall be capable of passing spheres at least 3 inches in diameter."

The pumps specified as the basis of design in the proposed project (Flygt NP 3153 submersible pumps) contain an impeller which does not meet the regulatory requirement of being able to pass a 3-inch sphere.

The City of Waukee is aware Flygt's N-series impeller does not meet this regulatory requirement. However, the City has multiple N-series impellers installed throughout their existing sanitary collection system and is satisfied with their performance. Additionally, per discussions with the local manufacturer's representative, Electric Pump of Des Moines, Iowa, there are currently over 800 N-series impellers installed across the state of Iowa.

Please find enclosed a revised Schedule E denoting the inability of the proposed pumps to pass a 3-inch solid. If any additional information is required prior to granting the requested variance, please let me know.

Sincerely,

McCLURE ENGINEERING COMPANY

Curtis J. Kampman, PE
Project Engineer

Enclosures

cc: Mr. John Gibson, City of Waukee
File

S2015-0425

Iowa Department of Natural Resources
Wastewater Section
Construction Permit Application
SCHEDULE E, Wastewater Pump Station

DATE PREPARED	PROJECT IDENTITY	DNR USE
10-20-15	Waukee Bluestem Lift Station #14 Improvements	PROJECT NO.
DATE REVISED	Waukee, Iowa	
2-17-16		PERMIT NO.

1.

Design Basis	Initial	Design Year (2035)
Residential Area, Acres	0 -> 16	72
Population, Persons	0 -> 160	720
PHDW Flow, MGD	0 -> 0.024	0.108
Industrial Area, Acres	0 -> 0	0
PHDW Flow, MGD	0 -> 0	0
Other School / Commercial , Acres	0 -> 37 / 0	37 / 9
PHDW Flow, MGD	0 -> 0.029 / 0	0.058 / 0.067
Peak Hourly Infiltration, MGD	0 ->	0
Peak Hourly Inflow, MGD	0 -> 0.083	0.275
Total PHDW Flow, MGD	0 -> 0.053	0.233
Total PHWW Flow, MGD	0 -> 0.136	0.508

2. Provide pump information

Pump No.	Type	Opening (in)	HP	Capacity GPM	TDH (ft.) Computed	TDH (ft.) Rated	Operating Level On	Operating Level Off
1	Flygt NP 3153	4	15	430	75	75	985.92	985.00
2	Flygt NP 3153	4	15	430	75	75	986.92	985.00
3								
4								
5								
Sump								

Are pumps specified as being capable of passing three-inch diameter spheres? Yes ☐ No ☒ <- Flygt N-Series Pump
Can remaining pumps handle PHWW flow with largest pump out of service? Yes ☒ No ☐

3. Wet-well effective volume 538 gallons. Maximum retention time: Initial flow 28 minutes.
Design flow 9 minutes.

4. Is forced air ventilation provided? No
Continuous: wet-well - dry-well - Intermittent: wet-well - dry-well -
dry-well - air changes/hour dry-well - air changes/hour
Are spark-proof materials specified? Yes ☒ No ☐

5. Force main: Is profile of force main provided? Yes ☒ No ☐
Size 6.0 in. Length 2,433 ft. Detention time at ADW design flow 0.6 hours.
Pipe material PVC (AWWA C900 DR-18) Joint Internal joint restraint or Push-on w/gaskets
Minimum cover 5.0 ft. Minimum velocity 4.55 fps
Number of high points 1.0 Are air relief valves provided? Yes ☐ No ☒
Number of thrust blocks provided? 6.0 At location(s) At Bends
Is pressure test specified? Yes ☒ No ☐ Does installation conform to AWWA C600? Yes ☒ No ☐
If no, explain N/A

6. Are valves provided on the suction & discharge lines? Yes ☒ No ☐
Type: Discharge 6" Plug Valve; 6" Check Valve Suction Submersible pump; None

7. Is an alarm system provided? Yes ☒ No ☐ Type High & low level float alarms; Crystal Ball system
Indicate where audio/visual warning signals will be located City SCADA system, Cellular service

8. Method of pump control Multitrode level sensor monitor wet-well level; Backup floats

9. Are the pumps protected from clogging? Yes ☒ No ☐
Method of cleaning Trash basket in wet-well; Pumps cleaned by removal from wet-well with onsite water
Method of pump removal Portable truck hoist Are lifting hook/arms provided? Yes

10. Are permanent emergency piping bypass connections provided? Yes
Is an emergency power supply available? Yes
Describe station operation in an emergency (equipment, piping, bypass, etc.) Standby diesel generator

11. Is the wastewater pump station located in a floodplain? Yes ☐ No ☒
Elevation of 100 year flood (MSL) N/A Elevation of 25 year flood (MSL) N/A

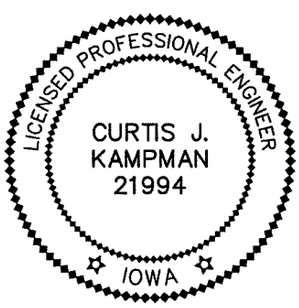
S2015-0425

CERTIFICATION FOR AMENDMENT NO. 2 FOR PETITION FOR VARIANCE

BLUESTEM LIFT STATION #14 IMPROVEMENTS
WAUKEE, IOWA

MEC PROJECT NO. 2214027-00
IDNR S2015-0425

APRIL 2016



I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Curtis J. Kampman, P.E. Reg. No. 21994 4-5-16 (Date)

My license renewal date is December 31, 2017.

Pages or sheets covered by this Seal:
Amendment No. 2 for Petition for Variance, Bluestem Lift Station #14 Improvements, Waukee, IA, April, 2016.

RECEIVED APR - 8 2016

BEFORE THE IOWA DEPARTMENT OF NATURAL RESOURCES
DES MOINES, IOWA

CITY OF WAUKEE, IOWA 230 WEST HICKMAN RD. WAUKEE, IA 50263 (515) 978-7900	AMENDMENT No. 2 for PETITION FOR VARIANCE

The Petitioner, pursuant to Iowa Code Section 17A.9A and Iowa Administrative Code 561 Chapter 10, requests a Variance from Iowa Wastewater Facilities Design Standard 13.4.3. Petitioner provides the following information pursuant to Iowa Administrative Code 561 Chapter 10.9(1) through 561 Chapter 10.9(10):

This Amendment No. 2 shall be attached to and become part of the Petition for Variance for the "BLUESTEM LIFT STATION #14 IMPROVEMENTS" project. The Petition for Variance shall be modified as follows:

Change #1

10.9 (4) The relevant facts that the petitioner believes would justify a waiver or variance. The factual statement is to include a signed statement from the petitioner attesting to the accuracy of the facts provided in the petition and a statement of reasons that the petitioner believes will justify a waiver or variance.

Please DELETE the fifth response subsection entitled "Trash Basket Provision" of this section in its entirety and insert the following:

"Trash Basket Provision
To offer an additional layer of protection, as well as conform to current design standards, a trash basket will be installed on the only influent line entering the wet well of the Lift Station. The originally specified trash basket for the Lift Station had a maximum clear opening of 1.5-inches. However, given the clear opening of the proposed pump is 1.4-inches, the City will specify a new trash basket with a maximum clear opening equivalent to or less than 1.4-inches. As a result, objects larger than 1.4-inches should be collected in the trash basket, reducing the potential for clogging from such objects.

The City of Waukee actively inspects and maintains the trash baskets of its lift stations as part of a regular maintenance program to remove any built up deposition and ensure the condition of the trash basket is adequate in order to perform its intended function. Additional discussion on this topic is available in Section 10.4 (4) of this Petition for Variance."

Change #2

10.4 (4) Substantially equal protection of public health, safety, and welfare will be afforded by a means other than that prescribed in the particular rule for which the waiver or variance is requested.

Please DELETE the response for this section in its entirety and insert the following:

"Per the pump manufacturer's representative, Electric Pump of Des Moines, Iowa, the minimum free passage inside the proposed Flygt NP 3153 HT3~464 pump is 1.4 inches.

As described previously, the originally specified trash basket for the Lift Station has a maximum clear opening of 1.5-inches. Given the clear opening of the proposed pump is 1.4-inches, the City will specify a new trash basket with a clear opening equivalent to or less than 1.4-inches. With the maximum clear opening of the trash basket equivalent to or less than the minimum free passage of the proposed pump, any objects which could potentially clog the pump due to the object's size being greater than the free passage of the pump should be captured by the trash basket. As a result, the provided trash basket should effectively provide a substantially equivalent level of protection against clogging for debris between the pump's free passage size through and beyond 3.0 inches as is intended in the Iowa Wastewater Facilities Design Standard 13.4.3, which requires that "pump shall be capable of passing spheres at least 3 inches in diameter."

Additionally, the City of Waukee has multiple similar combinations of Flygt N-series impeller pumps with trash baskets with similar clear openings in sanitary lift stations throughout the community. With 12 years of operating experience with this combination, the City can attest that they have experienced no reduction in pumping capacity, ability, or flexibility."

Signed releases authorizing persons with factual knowledge concerning the request to furnish the Department with information relevant to the waiver or variance. (Variances must be signed by the petitioner or authorized representative and a professional engineer licensed in Iowa preparing the engineering and technical justification of the petition.)

See verification below,

WHEREFORE, the Petitioner respectfully requests the department grant it a variance of "Unless grinder pumps are used, pumps shall be capable of passing spheres at least 3 inches in diameter" required by Iowa Wastewater Facilities Design Standards section 13.4.3 (Pump Openings) so that the department may issue the construction permit, the application for which was submitted on October 22, 2015.

Dated this 5 day of April, 2016.

Curtis J. Kampman, P.E.
(P.E. No. 21994)
McClure Engineering Company

John Gibson
Public Works Director
City of Waukee, Clive, Iowa

S2015-0425

McCLURE™
ENGINEERING CO.

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www.mecresults.com

March 22, 2016

Mr. Charles Gipp, Director of the Iowa DNR
c/o Mr. Marty Jacobs, P.E., Environmental Engineer
Iowa Department of Natural Resources – Wastewater Engineering Section
Wallace Building
502 E. 9th Street
Des Moines, IA 50319-0034

RE: Waukee Bluestem Lift Station #14 Improvements, Waukee, Iowa
MEC 2214027-00
IDNR #S2015-0425

Dear Mr. Gipp and Mr. Jacobs:

Enclosed please find one (1) copy of the City of Waukee's amendment number 1 to the variance request for the job referenced above regarding Iowa Wastewater Facilities Design Standard 13.4.3, which states "unless grinder pumps are used, pumps shall be capable of passing spheres at least 3 inches in diameter."

If you have any questions, please call me at (515) 964-1229.

Very truly yours,

McCLURE ENGINEERING COMPANY

Curtis Kampman, P.E.

Enclosures

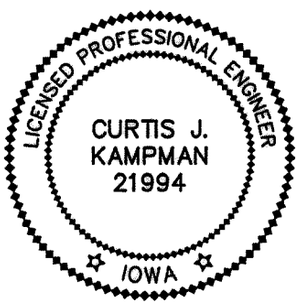
cc: Mr. John Gibson, City of Waukee
File.

CERTIFICATION FOR AMENDMENT NO. 1 FOR PETITION FOR VARIANCE

BLUESTEM LIFT STATION #14 IMPROVEMENTS
WAUKEE, IOWA

MEC PROJECT NO. 2214027-00
IDNR S2015-0425

MARCH 2016



I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Curtis J. Kampman, P.E., Reg. No. 21994 3-22-16 (Date)

My license renewal date is December 31, 2017.

Pages or sheets covered by this Seal:
Amendment No. 1 for Petition for Variance, Bluestem Lift Station #14 Improvements, Waukee, IA, March, 2016.

BEFORE THE IOWA DEPARTMENT OF NATURAL RESOURCES
DES MOINES, IOWA

CITY OF WAUKEE, IOWA 230 WEST HICKMAN RD. WAUKEE, IA 50263 (515) 978-7900	AMENDMENT No. 1 for PETITION FOR VARIANCE

The Petitioner, pursuant to Iowa Code Section 17A.9A and Iowa Administrative Code 561 Chapter 10, requests a Variance from Iowa Wastewater Facilities Design Standard 13.4.3. Petitioner provides the following information pursuant to Iowa Administrative Code 561 Chapter 10.9(1) through 561 Chapter 10.9(10):

This Amendment No. 1 shall be attached to and become part of the Petition for Variance for the "BLUESTEM LIFT STATION #14 IMPROVEMENTS" project. The Petition for Variance shall be modified as follows:

Change #1

10.9 (4) The relevant facts that the petitioner believes would justify a waiver or variance. The factual statement is to include a signed statement from the petitioner attesting to the accuracy of the facts provided in the petition and a statement of reasons that the petitioner believes will justify a waiver or variance.

Please DELETE the fifth response subsection entitled "Trash Basket Provision" of this section in its entirety and insert the following:

"Trash Basket Provision
To offer an additional layer of protection, as well as conform to current design standards, a trash basket will be installed on the only influent line entering the wet well of the Lift Station. The specified trash basket for the Lift Station has a maximum clear opening of 1.5-inches. As a result, objects larger than 1.5-inches should be collected in the trash basket, reducing the potential for clogging from such objects.

The City of Waukee actively inspects and maintains the trash baskets of its lift stations as part of a regular maintenance program to remove any built up deposition and ensure the condition of the trash basket is adequate in order to perform its intended function. Additional discussion on this topic is available in Section 10.4 (4) of this Petition for Variance."

Change #2

10.4 (4) Substantially equal protection of public health, safety, and welfare will be afforded by a means other than that prescribed in the particular rule for which the waiver or variance is requested.

Please DELETE the response for this section in its entirety and insert the following:

"Per the pump manufacturer's representative, Electric Pump of Des Moines, Iowa, the minimum free passage inside the proposed Flygt NP 3153 HT3~464 pump is 1.4 inches.

As described previously, the trash basket for the Lift Station has a maximum clear opening of 1.5-inches. Given the maximum clear opening of the trash basket is effectively equivalent to the minimum free passage of the proposed pump, virtually any objects which could potentially clog the pump due to the object's size being greater than the free passage of the pump should be captured by the trash basket. As a result, the provided trash basket should effectively provide a substantially equivalent level of protection against clogging for debris between the pump's free passage size through and beyond 3.0 inches as is intended in the Iowa Wastewater Facilities Design Standard 13.4.3, which requires that "pump shall be capable of passing spheres at least 3 inches in diameter."

As evidence to the above, the City of Waukee as multiple similar combinations of Flygt N-series impeller pumps with trash baskets with similar clear openings (1.5 inches or greater) in sanitary lift stations throughout the community. With 12 years of operating experience with this combination, the City can attest that they have experienced no reduction in pumping capacity, ability, or flexibility."

Signed releases authorizing persons with factual knowledge concerning the request to furnish the Department with information relevant to the waiver or variance. (Variances must be signed by the petitioner or authorized representative and a professional engineer licensed in Iowa preparing the engineering and technical justification of the petition.)

See verification below,

WHEREFORE, the Petitioner respectfully requests the department grant it a variance of "Unless grinder pumps are used, pumps shall be capable of passing spheres at least 3 inches in diameter" required by Iowa Wastewater Facilities Design Standards section 13.4.3 (Pump Openings) so that the department may issue the construction permit, the application for which was submitted on October 22, 2015.

Dated this 22 day of March, 2016.

Curtis J. Kampman, P.E.
(P.E. No. 21994)
McClure Engineering Company

John Gibson
Public Works Director
City of Waukee, Clive, Iowa