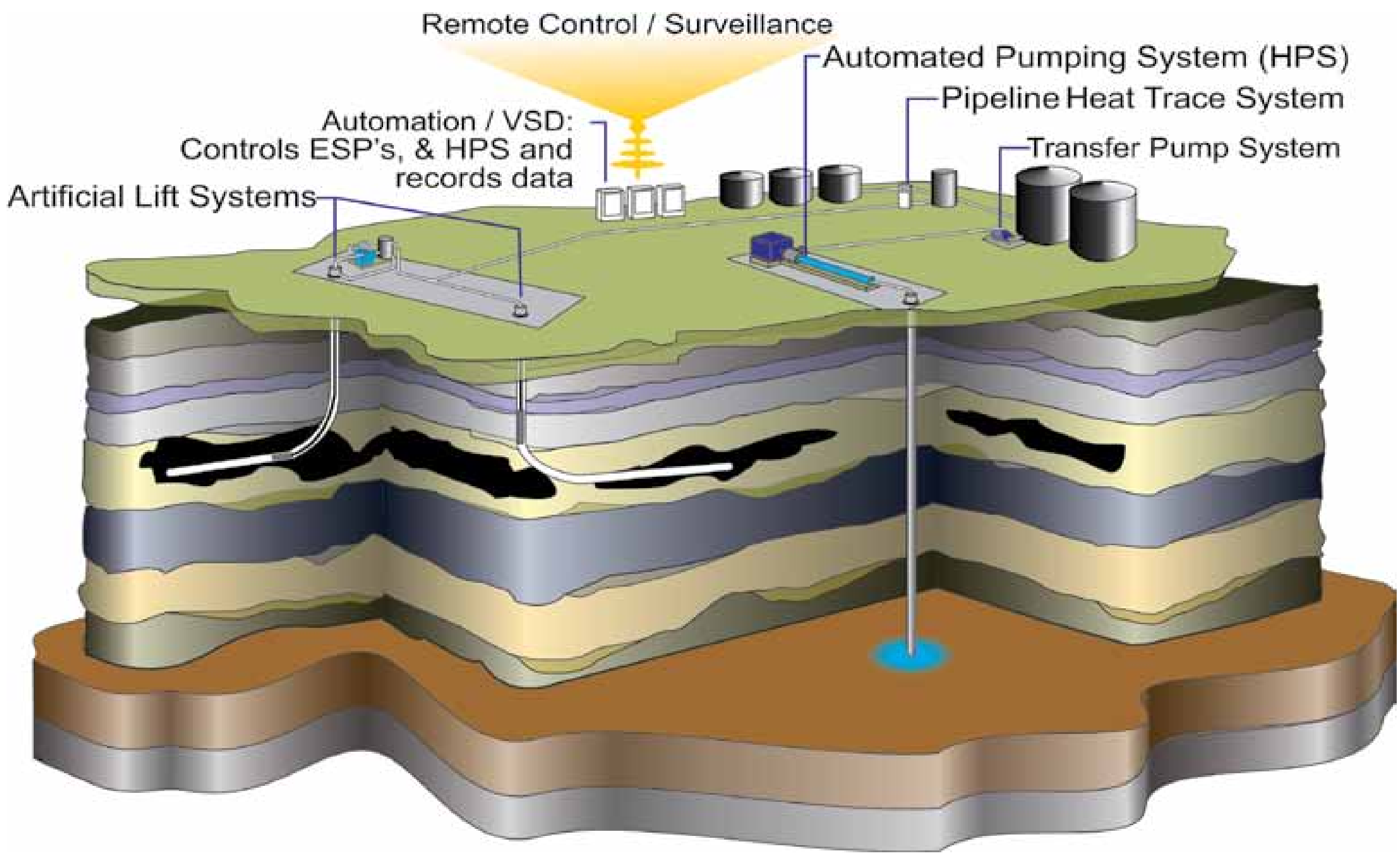
Global Production Solutions
Product Catalog



GPS

Find "SOLUTIONS" with GPS

Table of Contents

Product Catalog

Request for Information

Company Information:

Company: ______________________________ Well Name: ______________________________
Address: ______________________________ Field: ______________________________
______________________________ Country: ______________________________
______________________________ State: ______________________________

Well Data:

Casing Size: ____________________ in.
Tubing Size: ____________________ in.
Pump Set Depth: ____________________ ft.
Tubing Pressure: ____________________ PSI
Casing Pressure: ____________________ PSI
PI: ______________________________
GOR: ______________________________
GIR: ______________________________
Oil Specific Gravity: ____________________ API
Water Specific Gravity: ____________________ API
Pump Intake Pressure: ____________________ PSI
Bottom Hole Temperature: ____________________ °F

Total Well Depth: ____________________ ft.
Measured Depth: ____________________ ft.
True Vertical Depth: ____________________ ft.
Top Perforations: ____________________ ft.
Bottom Perforations: ____________________ ft.
Producing Fluid Level: ____________________ md ft.
Static Fluid Level: ____________________ md ft.
Desired Flow Rate: ____________________ bbl/day
Producing Rate BOPD: ____________________ bbl/day
Producing Rate BWPD: ____________________ bbl/day
Producing Rate Gas: ____________________ MCF/D
Well Survey Available: ______________________________

General Information:

Well has had a history of problems due to the following conditions:

Sand: __________ Parrafin: __________
Severe Corrosion: __________ Other: __________

Power Supply:

Existing __________ Proposed __________
Phase ______ Hz ______ Secondary Voltage ______ Primary Voltage ______ Amperage ______

Proposed Total Dynamic Head Calculation:

Producing Fluid Level: ____________________ md ft.
Wellhead Pressure: ____________________ ft. convert PSI to ft.(PSI x 2.31)
Friction Loss ____________________ ft.

Total Dynamic Head ____________________ ft.

Well information Given by: ____________________
Calculations Completed by: ______________________________
Date: ________________

35431 Hardesty Road - Shawnee, Oklahoma 74801 - Tel: 1.877.574.9292 - Fax: 1.405.214.0592 - email:sales@gps-us.co - www.globalproductionsolutions.com

GPS General Service Agreement

1. **ACCEPTANCE**
   By requesting GPS LLC services, equipment or products, Customer voluntarily elects to enter into and be bound by these General Terms and Conditions.

2. **DEFINITION**
   A. **GPS** – Global Production Solution's LLC., an Oklahoma Corporation.
   B. **Customer** – the person, firm, or other entity to which equipment and/or services are supplied or provided.

3. **TERMS**
   Cash in advance unless GPS has approved Customer's credit prior to the sale. Terms of sale for credit- approved accounts are total invoice amount due on or before the 30th day from the date of invoice. Customer shall pay interest on past due balances at the lesser of 1.5% per month or the maximum allowed by applicable state or federal law. If a customer's account becomes delinquent; GPS shall have the right to revoke any and all previously applied discounts. Upon such revocation, the full invoice price without discount will become immediately due and owing and subject to collection. Customer hereby agrees to pay all fees directly or indirectly incurred in the collection of past due or delinquent accounts.

4. **TAXES**
   Customer shall pay any and all taxes or other levies imposed by any governmental unit or similar authority with respect to the charges made or payments received in connection with GPS' services, equipment or products.

5. **INDEPENDENT CONTRACTOR**
   GPS is and shall be an independent contractor with respect to the performance of the services set forth on the Contract, and neither GPS nor anyone employed by GPS shall be the agent, representative, employee, or servant of Customer in the performance of such services or any part hereof.

6. **INDEMNITIES**
   A. **Personnel**
      a. shall be responsible for and hereby agrees to protect, defend, indemnify, and hold harmless GPS and its insurers against all claims arising out of or in connection with personal injury, illness or death of any member of Customer group or its subcontractors.

   B. **Property**
      Customer assumes all liability for, and hereby agrees to protect, defend, indemnify and hold GPS and their insurers harmless from and against all damage, loss, liability, claims, demands and causes of action of every kind and character (including all costs and expenses thereof and reasonable attorney's fees) arising in connection therewith:
      a. on account of loss of and/or damage to the customer or its contractors' (other than GPS) or subcontractors' property.
      b. on account of loss of or damage to GPS property, equipment, materials or products, including but not limited to, recovery, repair and replacement expenses, when such loss or damage occurs: (i) in the hole (ii) while in transit or being moved on any form of transportation owned or furnished by customer, (iii) while located at the well site when GPS personnel are not present, (iv) as a result of improperly maintained, private access roads to the wellsite, or (v) while being used by or while under the custody or control of any person other than an GPS employee, whether in an emergency or otherwise. The property, equipment, materials and products will be valued at their respective landed replacement cost. With respect to (i) above, rental charges on the equipment lost or damaged in the hole shall continue to be paid up to and including the date on which GPS receives notice in writing of the loss or damage.

   C. **Application of Indemnities**
      The assumption of liability and indemnities in (a) and (b) above shall apply to any loss, damage, expense, injury, illness or death without regard to the cause(s) thereof including, without limitation, strict liability, ultra hazardous activity, breach of express or implied warranty, imperfection of material, defect or failure of equipment, defect or "ruin" or other condition of premises, including any conditions that pre-exist the execution of this agreement, or the sole or concurrent, active or passive, negligence or other fault of the indemnities or its contractors or subcontractors or its or their employees, agents or invitees.

GPS General Service Agreement

7. INCIDENTAL OR CONSEQUENTIAL DAMAGES

It is expressly agreed that GPS shall not be liable to the customer group for any punitive, incidental, consequential, indirect or special damages, including, but not limited to, any loss of profits or business interruption or loss of use, loss of production or loss of rig time.

8. INSURANCE

Each party, as indemnitor, shall support the indemnity obligations it assumes under Paragraph 8, by obtaining at its own cost, adequate insurance for the benefit of the other party as indemnitee, with contractual indemnity endorsements. To the extent each party assumes liability, such insurance shall waive subrogation against and name the indemnitee and its group as additional insured(s) and loss payee, and to the same extent such coverage shall be primary to that carried by the indemnitee's group.

9. LIMITATION OF LIABILITY

GPS' liability, however arising from or in connection with this Contract (whether for breach of contract, negligence, misrepresentation, or otherwise), shall not in any circumstances exceed the full value of the consideration owed to GPS under this contract.

10. FORCE MAJEURE

GPS shall not be liable for any delay or non-performance due to governmental regulation, labor disputes, hostile action, weather, fire, acts of God or any other causes beyond the reasonable control of GPS. This Contract shall be governed by the laws of the state where the services are performed or equipment or products are furnished. Should any clause, sentence, or part of this agreement be held invalid, such holding shall not invalidate the remainder, and the agreement shall be interpreted as if the invalid clause, sentence, or part has been modified or omitted, if necessary, as required to conform to the jurisdiction purporting to limit such provision.

NO FIELD EMPLOYEE OF GPS IS AUTHORIZED OR EMPOWERED TO ALTER THIS GENERAL SERVICE AGREEMENT.

Company Name: ______________________________

Accepted By: _________________________________ Date: ____________________

GPS Standard Terms and Conditions

1. ACCEPTANCE

All sales and transactions with GPS (“Sellers”) are subject to the following standard terms and conditions. Terms and Conditions of buyer’s order which are in any way in conflict or inconsistent with or in addition to these Standard Terms and Conditions shall not be binding on Seller and shall not be considered applicable to any sale unless expressly agreed to in writing by Seller.

2. LIMITED WARRANTY

A. PRODUCTS MANUFACTURED BY SELLER: Seller warrants only products, materials, or supplies (“Products”) manufactured by Seller when properly installed, used and maintained in accordance with manufacturers instructions provided with each sale, shall be free from defects in material and workmanship (“Defects”). SELLER’S OBLIGATION UNDER THIS WARRANTY SHALL BE LIMITED TO REPLACING OR REPAIRING THE PART OR PARTS (“WARRANTY SERVICE”), AT SELLER’S OPTION, WHICH PROVE TO CONTAIN DEFECTS WITHIN ONE YEAR FROM THE DATE OF INSTALLATION OR EIGHTEEN (18) MONTHS FROM THE DATE OF SHIPMENT, WHICHEVER OCCURS FIRST, PROVIDED THAT BUYER GIVES SELLER NOTICE AS HEREINAFTER PROVIDED OF ANY DEFECTS AND SATISFACTORY PROOF THEREOF (“WARRANTY CLAIMS”). Warranty Claims by the Buyer must be submitted to the Seller or Seller’s authorized representative, in writing, within sixty (60) days after the later of the pulling date or failure date of products. Any defective part, or parts, must be returned, freight prepaid by the Buyer, to Seller’s factory or to a service center authorized by Seller for inspection. Seller will deliver replaced or repaired defective part of parts, freight prepaid to the destination provided for in the original order. Parts for which Seller provides replacement under this warranty shall become the property of Seller. Seller; at its discretion, may use reconditioned parts in the manufacture of its product.

This limited warranty does not apply to defects in performance caused by hostile environments such as, but not limited to, abrasive materials, corrosion due to aggressive fluids, lightning, improper voltage supply, mishandling, misapplication or acts of God. Seller’s obligations to perform Warranty Service under this warranty shall not apply to repairs or replacements necessitated by normal wear and tear or necessitated in whole or in part by natural catastrophe or for product operating conditions for which it was not designed or manufactured. Seller will not assume any responsibility or liability for any testing not done in accordance with Seller’s procedures, or for repairs, service, or rebuilding done to products outside Seller’s plants, when performed by Buyer or persons other than by Seller’s authorized representative, and such unauthorized work shall void any and all warranties.

B. PRODUCTS MANUFACTURED BY THIRD PARTIES: WITH RESPECT TO PRODUCTS SOLD BY SELLER, BUT MANUFACTURED BY OTHERS (“THIRD PARTY PRODUCTS”), SELLER MAKES NO WARRANTIES. ALL SUCH WARRANTIES, WHETHER EXPRESS, IMPLIED OR STATUTORY, OF ANY KIND OR NATURE, WHICH MIGHT OTHERWISE EXIST, INCLUDING WITHOUT LIMITATION, ANY WARRANTY OR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED AND WAIVED FOR ALL PURPOSES. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE FACE OF THIS AGREEMENT AND BUYER ACCEPTS THE PRODUCT(S) “AS-IS”. Any claims by Buyer against Third Party Products shall be made directly to the original manufacturer. Seller’s only obligation as to Third Party Products will be to assist Buyer in notifying the original manufacturer of Third Party Product warranty claims. A new warranty period for Products replaced or repaired hereunder shall not be established. Such items shall remain under warranty only for the remainder of the warranty period on the original products furnished under warranty.

C. ALL WARRANTIES: ALL WARRANTIES, EXCEPT AS HEREIN SPECIFICALLY PROVIDED, WHETHER ORAL, WRITTEN, EXPRESS, IMPLIED OR STATUTORY, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF FITNESS AND MECHANTABILITY ARE HEREBY EXPRESSLY DISCLAIMED. SELLER’S WARRANTY OBLIGATIONS AND BUYER’S REMEDIES THEREUNDER (EXCEPT AS TO TITLE) ARE SOLELY AND EXCLUSIVELY AS STATED HEREIN.

GPS Standard Terms and Conditions

3. SHIPMENTS

Promised shipping dates are approximate, and are from point of manufacture. Such dates are estimated from (a) the date of receipt of order with complete manufacturing information at Company's factory, and (b) the date of entry of such order by the Company. Shipping dates are subject to revision at the time of the entry of order and shipping schedule then given is approximate and subject to any action Company must take in connection with priorities or other orders or regulations issued by the United States Government, or any department thereof.

The Company will not be liable for loss, damage, detention, or delay in manufacture or delivery or necessity to substitute materials, resulting from causes beyond its reasonable control, including but not limited to casting failures, war, fire, strikes, lock-outs, or other labor difficulties, civil or military authority, insurrection or riot, embargoes, car or ship shortages, acts of governments, wrecks or delays in transportation, including any delays caused by inability to obtain necessary labor, materials or manufacturing facilities due to such causes, or from action taken by the Company in connection with priorities or preference orders or other production permits issued by the United States Government or any department thereof, or from delay in obtaining or failure to obtain manufacturing, financing, export or other licenses required by the United States Government or any department thereof; or in any event for consequential damages.

Acceptance of material by common carrier constitutes a waiver of any claim against the Company for delay or damage in transit, or for lost goods.

When quotation includes equipment not of Company's manufacture, Company's promise of shipment is based on manufacturer's promise to Company and shipment is contingent on the fulfillment of their promise.

4. TITLE AND RISK OF LOSS

Title and risk of loss to products will pass to Buyer at the time of delivery, except for products leased, rented or any formal transaction which is not a direct sale. Such transaction will have title transfer after completion and final payment has been received by Seller. Buyer will pay, or reimburse Seller for, all freight and in-transit insurance costs as included in purchase price from time of delivery.

5. FORCE MAJEURE

Seller shall not be liable for delay or any failure to deliver goods ordered by Buyer or other failure to perform duties hereunder, where such failure or delay is directly or indirectly the result of any cause or condition beyond Seller's reasonable control, including but not limited to, an act of God, unforeseeable circumstances, government action, war conditions, fires, strikes or other labor disputes.

6. PRICES

No other term herein to the contrary withstanding, Seller reserves the right at any time prior to acceptance of an order for goods, in its sole discretion, to increase the price of said goods. Such increase shall be reflected in the invoice which shall accompany the delivery of the goods and shall be the purchase price of the goods. The indicated prices can be exclusive of freight and transportation costs, packaging costs, insurance, taxes (which shall include any tax or charge imposed by any government body, foreign, national, state, county or municipal, directly or indirectly, upon or imposed in connection with the sale, distribution or use of the goods) and other similar charges, all of which shall be borne by Buyer.

7. TERMS OF PAYMENT

A. Non-Export Sales. Unless Seller requires otherwise in writing, payment shall be due within thirty (30) days from the date of shipment at the office of Seller at the address on the face hereof. Interest shall accrue on all accounts standing after thirty (30) days from the date of shipment at the lesser of (i) 2% per month, compounded monthly or (ii) the maximum legal contract rate.

B. Export Sales. Unless otherwise agreed to in writing, payment shall be made by a Letter of Credit to be established by the Buyer at his expense including any bank confirmation charges. All Letters of Credit shall be in favor of and acceptable to Seller, shall be maintained in sufficient amounts and for the period necessary to meet all payment obligations, shall be irrevocable and issued and confirmed by a bank in the United States of America satisfactory to Seller within thirty (30) days after acceptance of any order.

C. If any amounts due Seller from Buyer are referred to an attorney for collection, or collected through any court, bankruptcy or other legal proceedings, Seller shall be entitled to recover from Buyer its reasonable attorney's fees and court costs plus interest.

8. ORDERS

All iillustrations and specification are descriptive and are not intended as warranties. The acceptance of all orders taken by the Company's sales representatives or branches is subject to approval by Seller's office at Shawnee, Oklahoma, USA.

9. CANCELLATION OF ORDERS

Orders once placed with and accepted by Seller can be cancelled only with Seller's consent and upon terms that will indemnify Seller against loss.

A. Seller may forthwith cancel the order or contract without recourse:
   a. If conditions are such that shipment from Seller's factory may be delayed beyond the date estimated at the time of entry of order or contact;
   b. If the Buyer is in default with the Seller on this or any other order or contract;
   c. If Buyer is or becomes insolvent, or if any time Seller is not fully satisfied with the credit of Buyer, it may at any time after the order has been entered, or during the manufacturing period, or at the time the goods are ready for shipment, require payment in advance of shipping regardless of original terms, or if after shipment has been made and before actual delivery and acceptance at destination, (regardless of F.O.B. point), it may recall the shipment and contracts which may be outstanding, and shall be entitled to receive reimbursement for its reasonable and proper cancellation charges;
   d. If the order or contract is for the direct account of one of its sales representatives, distributors or dealers, and Seller terminates or alters such relationship.

B. The Seller shall have at all times a right of set-off as to any and all accounts between it and Buyer.

10. SALE AND INSTALLATION OF PRODUCTS AND RESPONSIBILITY FOR RESULTANT RISKS OF LOSS

If Seller is requested in writing and agrees to install any product as part of the sale of such product, it shall be mutually agreed and understood by both Seller and Buyer that:

A. Buyer in its capacity as Owner and/or Oil Lease Operator of any oil well(s) shall always be completely responsible for, in charge of all personnel, operations and equipment at the well site and ultimately responsible for all risks of loss including but not by way of limitation:
   a. Third party or owned work over crew, work over rig, and other equipment and vehicles being utilized;
   b. Owner and Oil Lease Operators' employed or contracted field crews responsible for all operations to manage production, maintenance, servicing, etc. and their vehicles and equipment;
   c. other third party servicing contractor and its crews, equipment and/or operations (such as Seller's technician) to repair, replace or conduct any other required services to the well site sub pump.

B. Seller shall not be liable for any direct, consequential, special, incidental or punitive damages, including damages to property including, but not limited to, the well, loss of production or underground resources, loss of well pipe string, fishing operations, equipment or for damages arising out of claims for bodily injury or death of third parties. Buyer agrees, on its behalf, and on behalf of these subcontractors, to hold Seller, its parent and their directors, officers and employees harmless and indemnify them in connection with any claims made against Seller in connection with its work under this agreement.

GPS Standard Terms and Conditions

11. CLAIMS

No claims for allowances will be entertained unless presented immediately on receipt of goods; nor will Seller be held responsible for breakage or shortage after goods are delivered to and accepted by the common carrier.

12. MONTHLY RENTAL/WELL TEST ARTIFICAL LIFT SYSTEMS

A. ESP/Drive Rental – Minimum Rental is 30 days, charged monthly. Customer may cancel in writing at any time, but will be invoiced for the full month. Customer is responsible for removal of down hole equipment from the well. As long as equipment remains in hole; running or not, customer will be invoiced for the equipment. Customer is responsible for testing and repair of all down hole and surface equipment. GPS will inform customer of testing and any repair charges up completion of repairs.

B. Jet Pump Rental – Minimum Rental is 15 days, charged daily; rental may be terminated by customer with 24 hour written notice. Rates do not include freight to or from location, which will be responsibility of customer. GPS reserves the right to give customer 30 days written notice of price increase or removal of equipment from location. Upon acceptance of delivery of the equipment, Customer shall have care, custody and control of the equipment and shall have the responsibility for installation, day-to-day routine inspection. Customer shall be responsible for insuring the equipment from delivery until it is delivered to GPS at the end of the rental term. GPS shall be responsible for all service and repair the equipment. GPS shall furnish all labor, parts and other materials necessary to service and repair the equipment in order to keep it in good repair and condition, except for any labor, parts and other materials furnished by the manufacturers of the components of the equipment in accordance with the manufactures' warranties. In connection with GPS service and repair of the equipment, the equipment shall be serviced by trained and competent personnel at all times, including but not limited to periodic changes of oil and oil filters. All parts and other materials shall conform to the manufactures' specifications. Exception for improper use of equipment is detailed in the Frac Fluid Recovery rental agreement.

13. GOVERNING LAWS AND VENUE

All parties consent to the jurisdiction of the State of Oklahoma. The appropriate state or federal courts located in Pottawatomie County, Oklahoma shall be the exclusive forums in which to adjudicate all causes of action arising hereunder and the Buyer consents to venue in Pottawatomie County, State of Oklahoma, and waives all rights to object to such venue as an inconvenient forum.

14. SUCCESSORS AND ASSIGNS

This agreement shall be binding upon and inure to the benefit of the parties hereto, together with any and all associated persons, entities, heirs, legal and personal representatives, successors, assigns, executors, and administrators, and other related persons or entities.

15. INTEGRATION: WAIVER

This Agreement which includes all the exhibits, schedules and other attachments to it or them and the other agreements, instruments and other documents contemplated by this Agreement supersede all prior negotiations, agreements and understandings between the parties with respect to the subject matter thereof, constitute the entire agreement between the parties with respect to the subject matter thereof, and may not be altered or amended except in writing signed by the Buyer and the Seller. The failure of any party to the Agreement at any time or items to require performance of any provision of this Agreement shall in no manner affect the right to enforce the same; and no waiver by any party to this Agreement of any provision (or of a breach of any provision) of this Agreement, whether by conduct or otherwise, in any on or more instances shall be deemed or construed either as a further or continuing waiver of any such provision or breach or as a waiver of any other provision (or of a breach of any provision) of this Agreement.

16. SEVERABILITY

In the event any court of competent jurisdiction shall determine that any provision of this Agreement is invalid, such determination shall not affect the validity of any other provision of this Agreement, which shall remain in full force and effect and which shall be construed as to be valid under applicable law.

17. ARBITRATION

If irreconcilable differences of opinion arise, as to the interpretation of this Agreement, the differences shall be submitted to arbitration, one arbitrator, to be chosen by each party and a third arbitrator to be chosen by the two arbitrators selected by the parties. The arbitrators shall be disinterested persons experienced in the type of subject matter contained in the Agreement. The decision of a majority of the arbitrators shall be final and binding upon the parties hereto. The arbitration shall be conducted pursuant to the rules of the American Arbitration Association. Each party shall bear the expense of its arbitrator and the parties shall equally divide the expenses of the third arbitrator and of the arbitration. Any arbitration shall take place in a location within Oklahoma chosen by the third arbitrator unless otherwise mutually agreed to in writing. If either party fails to name its arbitrator within thirty (30) days after written request for arbitration as provided such party, the party requesting arbitration shall name both arbitrators and the arbitrators shall select a third arbitrator as stipulated herein, the cost for such arbitration to be borne by the parties as stipulated herein.

18. INDEMNITY

A. Personnel
   a. Customer shall be responsible for and hereby agrees to protect, defend, indemnify, and hold harmless GPS and its insurers against all claims arising out of or in connection with personal injury, illness or death of any member of Customer group or its subcontractors

B. Property- Customer assumes all liability for, and hereby agrees to protect, defend, indemnify and hold GPS and their insurers harmless from and against all damage, loss, liability, claims, demands and causes of action of every kind and character (including all costs and expenses thereof and reasonable attorney's fees) arising in connection therewith:
   a. on account of loss of and/or damage to the customer or its contractors' (other than GPS) or subcontractors' property.
   b. on account of loss of or damage to GPS property, equipment, materials or products, including but not limited to, recovery, repair and replacement expenses, when such loss or damage occurs:
      (i) in the hole,
      (ii) while in transit or being moved on any form of transportation owned or furnished by customer,
      (iii) while located at the well site when GPS personnel are not present, (iv) as a result of improperly maintained, private access roads to the wellsite, or (v) while being used by or while under the custody or control of any person other than an GPS employee, whether in an emergency or otherwise. The property, equipment, materials and products will be valued at their respective landed replacement cost. With respect to (i) above, rental charges on the equipment lost or damaged in the hole shall continue to be paid up to and including the date on which GPS receives notice in writing of the loss or damage.

GPS Standard Terms and Conditions

C. Application of Indemnities - The assumption of liability and indemnities in (a) and (b) above shall apply to any loss, damage, expense, injury, illness or death without regard to the cause(s) thereof including, without limitation, strict liability, ultra hazardous activity, breach of express or implied warranty, imperfection of material, defect or failure of equipment, defect or "ruin" or other condition of premises, including any conditions that pre-exist the execution of this agreement, or the sole or concurrent, active or passive, negligence or other fault of the indemnities or its contractors or subcontractors or its or their employees, agents or invitees.

Company Name: ______________________________

Company Address: ____________________________

City, State: __________________________________

Written Notice to GPS:
Global Production Solutions, Inc
35431 Hardesty Rd
Shawnee, Ok 74801
Fax (405) 214-0592
Office (405) 273-9292
Written notice may be faxed.
Accepted By: _________________________________ Date: ____________________

Informer 2 ESP Sensors

As operators move to deeper more challenging reservoirs the need for real-time downhole operating data has never been more important.

Monitoring downhole conditions of an Electrical Submersible Pumping System (ESP) is critically important in cost effectively producing challenging reservoirs with ESP equipment.

The GPS Downhole Monitoring System (DMS) will help operators realize the full potential of the ESP lift system by improving the ultimate recovery of the reservoir and extending the run life of the ESP systems.

iF2-375S Standard DMS
Parameters:

• Continuous Maximum Well Temperature	257°F
• Short-Duration Absolute Maximum Well Temperature	302°F
• Continuous Maximum Motor Winding Temperature	450°F
• Pressure Range	4000 psi
• Pressure Accuracy	20 psi
• Pressure Resolution	1 psi
• Motor Winding Temperature	
• Motor Oil Temperature	
• Vibration-X, Y, & Z	

The GPS iF2-375E DMS is a higher temperature system that also includes the ability to measure two additional motor winding temperatures, and gives a higher accuracy and improved resolution in all pressure and temperature measurements. Every iF2-400 and iF375E DMS is rated for continuous operation at 320.0 deg. and up to 6,000 psia and is designed and tested to survive short duration heat rise to 350.0 deg. F., also able to monitor Discharge Pressure at .1 pressure resolution, and 5 psi pressure accuracy.

35431 Hardesty Road - Shawnee, Oklahoma 74801 - Tel: 1.877.574.9292 - Fax: 1.405.214.0592 - email:sales@gps-us.co - www.globalproductionsolutions.com

Informer 2 ESP Sensors

Description		iF2-375S	iF2-375E	iF2-400
Continuous Maximum Well Temperature		257°F	320°F	320°F
Short-Duration Absolute Maximum Well Temperature		302°F	350°F	350°F
Continuous Maximum Motor Winding Temperature		450°F	450°F	450°F
Plug 'n' Play with F5 Motor Controllers		Yes	Yes	Yes
Plug ‘n’ Play with GPS Enforcer VFD		Yes	Yes	Yes
Plug ‘n’ Play with Unico VFD		Yes	Yes	Yes
Integration to 3rd Party VFD		* - Yes	* - Yes	* - Yes
Integration to 3rd Party Motor Controller		* - Yes	* - Yes	* - Yes
Sensor OD		3.750"	3.750”	4.375"
Available Sensor Heads	375	Yes	Yes	No
	375 Titan	Yes	Yes	No
	456	Yes	Yes	Yes
	540	Yes	Yes	Yes
	562	Yes	Yes	Yes
Bottom Connection		2 3/8" EUE Box	2 3/8” EUE Box	2 3/8" EUE Box
Metallurgy as standard		Carbon Steel	Stainless Steel	Stainless Steel
Insulation Testable		Yes	Yes	Yes
Pressure Range		4000psi	4000psi	6000psi
Pressure Accuracy		20psi	5psi	5psi
Pressure Resolution		1psi	0.1psi	0.1psi
Well Pressure		Yes	Yes	Yes
Discharge Pressure		No	Yes	Yes
Well Temperature		Yes	Yes	Yes
Motor Winding Temperature		Yes	Dual	Yes
Motor Oil Temperature		Yes	Yes	Yes
Vibration - X		Yes	Yes	Yes
Vibration - Y		Yes	Yes	Yes
Vibration - Z		Yes	Yes	Yes
Motor/Cable Insulation		Yes	Yes	Yes

* - Please contact your GPS representative to confirm compatability.

Informer 2 ESP Sensors

375 Series

Description	Part No
375-S Sensor	PTC-1541
375-E Sensor	PTC-1582
Installation Kit 375-S/E	PTC-1843
Motor Adaptor, Complete Kit 375-S	PTC-1871
Motor Adaptor Kit w/Drain and Fill, Complete Kit 375-E	PTC-1796

375 Titan Series

Description	Part No
375-S Sensor	PTC-1541
375-E Sensor	PTC-1582
Installation Kit 375-S/E	PTC-1843
Motor Adaptor ,Complete Kit 375-S	PTC-1792
Motor Adaptor w/Drain and Fill, Complete Kit 375 E	PTC-1797

456 Series

Description	Part No
375-S Sensor	PTC-1541
375-E Sensor	PTC-1582
Installation Kit 375-S/E	PTC-1843
Motor Adaptor, Complete Kit 375-S	PTC-1793
Motor Adaptor w/Drain and Fill, Complete Kit 375-E	PTC-1798

456 Series - with Discharge Pressure

Description	Part No
400 Sensor w/Discharge Pressure	PTC-1160
Discharge Pressure Installation Kit	PTC-1845
Sensor Installation Kit	PTC-1161
2 7/8 EUE Box-Pin Pressure Take-Off	PTC-1807
3 1/2 EUE Box-Pin Pressure Take-Off	PTC-1806
Motor Adaptor w/Drain and Fill, Comnplete Kit	PTC-1847
GPS 400 Series Pump Discharge Head - Ported	PTC-1808
GPS 513 Series Pump Discharge Head - Ported	PTC-1809
GPS 538 Series Pump Discharge Head - Ported	PTC-1810

Informer 2 ESP Sensors

540 Series

Description	Part No
375-S Sensor	PTC-1541
375-E Sensor	PTC-1582
Installation Kit 375-S/E	PTC-1843
Motor Adaptor, Complete Kit 375-S	PTC-1794
Motor Adaptor w/Drain and Fill, Complete Kit 375-E	PTC-1799

540 Series - with Discharge Pressure

Description	Part No
400 Sensor w/Discharge Pressure	PTC-1160
Discharge Pressure Installation Kit	PTC-1845
Sensor Installation Kit	PTC-1161
2 7/8 EUE Box-Pin Pressure Take-Off	PTC-1807
3 1/2 EUE Box-Pin Pressure Take-Off	PTC-1806
Motor Adaptor w/Drain and Fill, Complete Kit	PTC-1848
GPS 400 Series Pump Discharge Head - Ported	PTC-1808
GPS 513 Series Pump Discharge Head - Ported	PTC-1809
GPS 538 Series Pump Discharge Head - Ported	PTC-1810

Informer 2 ESP Sensors

562 Series

Description	Part No
375-S Sensor	PTC-1541
375-E Sensor	PTC-1582
Installation Kit 375-S/E	PTC-1843
Motor Adaptor, Complete Kit 375-S	PTC-1795
Motor Adaptor w/Drain and Fill, Complete Kit 375-E	PTC-1800

562 Series - with Discharge Pressure

Description	Part No
400 Sensor w/Discharge Pressure	PTC-1160
Discharge Pressure Installation Kit	PTC-1845
Sensor Installation Kit	PTC-1161
2 7/8 EUE Box-Pin Pressure Take-Off	PTC-1807
3 1/2 EUE Box-Pin Pressure Take-Off	PTC-1806
Motor Adaptor w/Drain and Fill, Complete Kit	PTC-1847
GPS 400 Series Pump Discharge Head - Ported	PTC-1808
GPS 513 Series Pump Discharge Head - Ported	PTC-1809
GPS 538 Series Pump Discharge Head - Ported	PTC-1810

Surface Equipment - All Series

Description	Part No
*- 3 Phase Surface Choke w Safety Fuses	PTC-1169
*- Transceiver, Base Model w/LED Icons	PTC-1451
*- F5 Motor Controller Connection Kit	PTC-1769
Entry Level Display	PTC-1768
SCADA+ESP Transceiver w/Color Display and micro SD Logging	PTC-1667
SRO Advanced Display w/ Logging and Control	PTC-1430

*- Required

375 Standard Motors

HP		Volts		Amps	Part No		Length		Weight	
60 Hz	50 Hz	60 Hz	50 Hz		UT	CT	Feet	Meters	Lbs	Kgs
15	12.5	400	333	28	2311002	TBA	11.1	3.4	381	163.8
19.5	16.2	387	322	38	2311006	2321006	13.9	4.2	456	206.8
		630	525	23	2311007	2321007				
22.5	18.7	330	275	51.5	2311008	2321008	15.8	4.8	514	233.2
		440	367	38.5	2311009	2321009				
		730	608	23	2311010	2321010				
25.5	21.2	370	308	51	2311011	2321011	17.7	5.4	660	299.4
		500	417	37	2311012	2321012				
		630	525	30	2311013	2321013				

DESCRIPTION	LENGTH		WEIGHT		STANDARD
	Feet	Meters	Lbs	Kgs	Part No
Motor Head 375 BO Assy	1.1	0.34	26.0	11.79	2375026
U-Base, 375	1.0	0.30	15.0	6.80	2375025
Motor Base 375 Wye-Pt	1.0	0.30	15.0	6.80	2375029

ENGINEERING DATA				
Housing Diameter	3.75 In / 95.25 MM	Shaft Dia		0.984 In / 24.9 MM
Minimum Casing Size	4-1/2 In / 114.3 MM	Shaft Limit	@ 60 Hz	140 HP
Max Operating Temp	Standard 150°C		@ 50 Hz	87 KW

Note: All configurations listed above are Carbon Steel. Stainless Steel configurations are available upon request. High Temperature Insulation configurations are available upon request.

375 Magnum Motors

HP		Volts		Amps	Part No		Length		Weight	
60 Hz	50 Hz	60 Hz	50 Hz		UT	CT	Feet	Meters	Lbs	Kgs
20	16.5	510	425	30	2311014	NA	8.6	2.6	280	127.0
30	25	420	350	54	2311015	NA	11.4	3.5	371	168.3
		535	446	42.5	2311016	NA				
40	33.3	520	433	58.5	2311017	2312020	14.3	4.4	466	211.3
		785	654	37.5	2311018	2312021				
45	37.5	440	367	76.5	2311019	2312029	16.2	4.9	524	237.6
		585	488	57.5	2311020	2312028				
		975	813	45	2311021	2312027				
50	41.7	650	542	57.5	2311022	2312022	18.0	5.5	670	303.9
		835	696	45	2311023	2312023				
60	50	785	654	57.5	2311024	2312024	20.9	6.4	770	349.2
		990	825	45	2311025	2312025				
		1020	850	47.5	2311026	2312026				

DESCRIPTION	LENGTH		WEIGHT		STANDARD
	Feet	Meters	Lbs	Kgs	Part No
Motor Head 375 Magnum BO Assy	1.0	0.30	15.0	6.80	2375024
U-Base, 375 Magnum	0.5	0.15	15.0	6.80	2375031
Motor Base 375 Magnum Wye-Pt	1.5	0.46	35.2	15.96	2375030

ENGINEERING DATA				
Housing Diameter	3.75 In / 95.25 MM	Shaft Dia		0.984 In / 24.9 MM
Minimum Casing Size	4-1/2 In / 114.3 MM	Shaft Limit	@ 60 Hz	180 HP
Max Operating Temp	Standard 180°C		@ 50 Hz	112 KW

Note: All configurations listed above are Carbon Steel. Stainless Steel configurations are available upon request. High Temperature Insulation configurations are available upon request.

456 Standard Motors

HP		Volts		Amps	Part No		Length		Weight	
60 Hz	50 Hz	60 Hz	50 Hz		UT	CT	Feet	Meters	Lbs	Kgs
10	8.7	435	362	15	2411001	TBA	4.10	1.25	200	90.72
15	12.5	435	362	23	2411002	TBA	5.30	1.62	248	112.49
		610	508	16	2411003	TBA				
20	16.5	450	375	28.5	2411004	TBA	6.50	1.98	305	138.35
		750	625	17	2411005	TBA				
25	20.8	410	342	39	2411006	TBA	7.70	2.35	362	164.20
		690	575	22	2411007	TBA				
		810	675	20	2411008	TBA				
30	25	425	354	44.5	2411009	TBA	8.90	2.72	422	191.42
		750	625	25.5	2411010	TBA				
40	33.3	420	350	62	2411014	TBA	11.30	3.44	538	244.03
		770	642	33	2411015	TBA				
		880	733	29	2411016	TBA				
		1295	1079	20	2411017	TBA				
50	41.7	675	562	47	2411018	TBA	13.70	4.18	655	297.10
		815	679	39	2411019	TBA				
		955	796	33	2411020	TBA				
		1210	1008	27	2411021	TBA				
60	50	640	533	59	2411022	TBA	16.50	5.03	660	299.37
		810	675	47	2411023	TBA				
		970	808	39	2411024	TBA				
		1330	1108	29	2411025	TBA				
		1945	1620	20	2411026	TBA				
70	58.3	750	625	60	2411028	TBA	18.40	5.61	846	383.74
		945	787	47	2411029	TBA				
		1135	946	39	2411030	TBA				
		1310	1092	35	2411031	TBA				

456 Standard Motors

HP		Volts		Amps	Part No		Length		Weight	
60 Hz	50 Hz	60 Hz	50 Hz		UT	CT	Feet	Meters	Lbs	Kgs
80	66.7	860	717	60	2411033	2421033	20.80	6.34	955	433.18
		1085	904	46	2411034	2421034				
		1310	1092	39	2411035	2421035				
		2155	1796	24	2411036	2421036				
100	83.5	1075	896	59	2411044	2421044	25.60	7.80	1196	542.50
		1355	1129	46	2411045	2421045				
		2205	1837	28.5	2411046	2421046				
120	100	1125	937	70	2411050	2421050	30.40	9.27	1460	662.24
		1295	1079	59	2411051	2421051				
		1625	1354	46	2411052	2421052				
		2245	1871	35	2411053	2421053				

DESCRIPTION	LENGTH		WEIGHT		STANDARD
	Feet	Meters	Lbs	Kgs	Part No
Motor Head 456 BO Assy	1.30	0.40	32	14.52	2456026
U-Base, 456M	1.00	0.30	21	9.53	2456025
Motor Base 456M Wye-Pt	1.00	0.30	21	9.53	2456029

ENGINEERING DATA					
Housing Diameter		4.56 In / 115.82 MM	Shaft Dia		1.187 In / 29.9 MM
Minimum Casing Size		5-1/2 In / 139.7 MM	Shaft Limit	Standard @ 60 Hz	490 HP
Max Operating Temp	Standard	150°C		@ 50 Hz	304 KW

Note: All configurations listed above are Carbon Steel. Stainless Steel configurations are available upon request. High Temperature Insulation configurations are available upon request.

540 Standard Motors

HP		Volts		Amps	Part No		Length		Weight	
60 Hz	50 Hz	60 Hz	50 Hz		UT	CT	Feet	Meters	Lbs	Kgs
20	16.5	440	367	29	2511001	TBA	4.80	1.46	260	117.93
		755	629	17	2511002	TBA				
		1020	850	12	2511003	TBA				
30	25	435	362	45	2511004	TBA	6.20	1.89	350	158.76
		710	608	28	2511005	TBA				
		1215	1012	16	2511006	TBA				
40	33.3	435	362	60	2511007	TBA	7.70	2.35	443	200.94
		730	608	36	2511008	TBA				
		880	733	30	2511009	TBA				
		1325	1104	20	2511010	TBA				
50	41.7	450	375	72	2511011	TBA	8.90	2.71	535	242.67
		725	604	45	2511012	TBA				
		905	754	35	2511013	TBA				
		1375	1146	22	2511014	TBA				
60	50	870	725	45	2511017	TBA	10.30	3.14	639	289.85
		1085	904	35	2511019	TBA				
		1320	1100	30	2511020	TBA				
70	58.3	755	629	60	2511021	TBA	11.70	3.57	731	331.58
		1015	846	45	2511022	TBA				
		1265	1054	35	2511023	TBA				
80	66.7	865	721	60	2511024	TBA	13.00	3.96	823	373.31
		1160	967	45	2511025	TBA				
		2180	1817	23	2511026	TBA				
100	83.3	835	695	76	TBA	TBA	15.80	4.82	1008	457.22
		1070	892	60	2511029	TBA				
		1255	1046	50	2511030	TBA				
		2170	1808	29	2511031	TBA				

540 Standard Motors

HP 60 Hz	HP 50 Hz	Volts 60 Hz	Volts 50 Hz	Amps	Part No UT	Part No CT	Length Feet	Length Meters	Weight Lbs	Weight Kgs
120	100	855	712	88	2511032	2521032	18.50	5.64	1195	542.04
		1030	858	73	2511033	2521033				
		1295	1079	59	2511034	2521034				
		2165	1804	33	2511035	2521035				
150	125	1075	896	87	2511038	2521038	22.60	6.89	1473	668.14
		1240	1033	76	2511039	2521039				
		2105	1754	44	2511040	2521040				
160	133.3	825	687	122	2511041	2521041	24.00	7.32	1581	717.13
		1115	929	88.5	2511042	2521042				
		2003	1669	50	2511043	2521043				
		2185	1821	46	2511044	2521044				
180	150	945	787	120	2511045	2521045	26.80	8.17	1794	813.74
		1275	1062	89	2511046	2521046				
		1945	1621	59	2511047	2521047				
		2260	1883	50	2511048	2521048				
200	166.7	1100	917	115	2511049	2521049	29.50	8.99	1979	897.66
		1415	1179	89	2511050	2521050				
		2140	1783	54	2511051	2521051				

DESCRIPTION	LENGTH Feet	LENGTH Meters	WEIGHT Lbs	WEIGHT Kgs	STANDARD Part No
Motor Head 540 BO Assy	1.39	0.42	81	36.74	2540026
U-Base, 540M	1.00	0.46	60	27.21	2540025
Motor Base 540M Wye-Pt	1.00	0.30	26	11.80	2540029

ENGINEERING DATA					
Housing Diameter		5.40 In / 137.16 MM	Shaft Dia		1.375 In / 24.9 MM
Minimum Casing Size		6-5/8 In / 168.28 MM	Shaft Limit	Standard @ 60 Hz	775 HP
Max Operating Temp	Standard	150°C		@50 Hz	482 KW

Note: All configurations listed above are Carbon Steel. Stainless Steel configurations are available upon request. High Temperature Insulation configurations are available upon request.

562 Standard Motors

HP		Volts		Amps	Part No		Length		Weight	
60 Hz	50 Hz	60 Hz	50 Hz		UT	CT	Feet	Meters	Lbs	Kgs
60	50	495	413	73.5	2610001	2620001	7.7	2.35	340	154.22
		850	708	43	2610002	TBA				
		1205	1005	30	2610003	2620003				
90	75	850	708	64	2610010	2620010	9.8	2.99	510	231.33
		1170	975	46.5	TBA	TBA				
		1275	1063	43	2610012	TBA				
		1380	1150	39.5	2610013	2620013				
		1490	1242	36.5	TBA	TBA				
		2125	1771	25.5	2610015	TBA				
120	100	990	825	73.5	2620021	TBA	11.9	3.63	680	308.44
		1275	1063	57	2610022	2620022				
		2550	2125	28.5	2610024	TBA				
150	125	1240	1033	73.5	2610031	2620031	14.0	4.27	850	385.55
		1415	1179	64	2610032	TBA				
		2305	1921	39.5	2610033	TBA				
		3190	2658	28.5	2610034	TBA				
180	150	1275	1063	85.5	2610040	2620040	16.1	4.91	1020	462.66
		2550	2125	43	2610041	2620041				
		3190	2658	34	2610042	TBA				
210	175	1240	1033	102.5	2610050	2620050	18.2	5.55	1190	539.77
		2490	2075	51.5	2610051	2620051				
		3720	3100	34	2610052	TBA				
240	200	1415	1179	102.5	2610060	2620060	20.3	6.19	1395	632.76
		2550	2129	57	2610061	2620061				
		4250	3542	34	2610062	TBA				
270	225	1275	1063	128.5	2610065	TBA	22.4	6.82	1570	712.14
		1595	1329	102.5	2610066	2620066				
		2550	2125	64	2610067	2620067				
300	250	1415	1179	128.5	2610071	TBA	24.5	7.47	1600	725.75
		2091	1743	86.5	2610072	2620072				
		2480	2067	73.5	2610073	TBA				

562 Standard Motors

HP		Volts		Amps	Part No		Length		Weight	
60 Hz	50 Hz	60 Hz	50 Hz		UT	CT	Feet	Meters	Lbs	Kgs
330	275	1560	1300	128.5	2610077	2620076	26.5	8.07	1840	834.61
		1950	1625	102.5	2610079	2620079				
		2725	2271	73.5	2610080	2620080				
360	300	2125	1771	102.5	2610086	2620086	28.6	8.71	2005	909.45
		2550	2125	85.5	2610087	TBA				
		3400	2833	64	2610088	2620088				
390	325	2080	1733	114	2610093	TBA	30.7	9.36	2210	1002.44
		2300	1917	102.5	2610094	2620094				
		2765	2304	85.5	2610097	2620097				
		3685	3071	64	2610096	2620096				
420	350	2480	2067	102.5	2610100	2620100	32.8	9.99	2340	1061.41
		2975	3479	85.5	2610101	TBA				
		3470	2892	73.5	2610102	TBA				
450	375	2125	1771	128	2610111	TBA	34.9	10.64	2500	1133.98
		2655	2213	102.5	2610112	TBA				
		4250	3542	64	2610114	2620114				

DESCRIPTION	LENGTH		WEIGHT		STANDARD
	Feet	Meters	Lbs	Kgs	Part No
Motor Head 562 BO Assy	1.5	0.45	88	39.91	2620026
U-Base, 562M	2.1	0.64	65	29.48	2620025
Motor Base 562M Wye-Pt	1.5	0.45	65	29.48	2620029

ENGINEERING DATA					
Housing Diameter		5.62 In / 142.75 MM	Shaft Dia		1.375 In / 24.9 MM
Minimum Casing Size		7 In / 177.80 MM	Shaft Limit	Standard @ 60 Hz	900 HP
Max Operating Temp	Standard	150°C		@50 Hz	559 KW

Note: All configurations listed above are Carbon Steel. Stainless Steel configurations are available upon request. High Temperature Insulation configurations are available upon request.

Application Guidelines - Thrust Bearings

Thrust Bearing Load Calculations for all Floater Pumps

Floater pump thrust curves comes from the pump differential pressure operating on the cross-sectional area of the pump shaft.

Use the following procedure to calculate maximum floater pump thrust.

1.	Locate pump shaft area (A) in sq. inches , located in Engineering data section of Catalog.
2.	Locate shut-in pump head (Hd) in ft./stage at maximum operating frequency, located on pump performance curves in the Pump Curves section of the Product Catalog.
3.	Calculate the maximum pump thrust using: lbf = Ft./stage x .433 x SG x A x N stages where: N stages = number of floater pump stages SG = pumped fluid specific gravity

Thrust Bearing Load Calculations for all Compression Pumps

Compression pump thrust comes from both the discharge pressure operating across the pump shaft area plus the sum of the pressure differential across each pump stage acting across the stage skirt areas minus the fluid momentum imparted on the stage by the moving fluid. The pump thrust is a function of the fluid rate and increases as the flow rate decreases. GPS publishes compression pump thrust at shut-in conditions (the maximum). This published value already includes the pump shaft thrust.

Use the following algorithm to calculate maximum compression pump thrust.

1.	Look in Engineering data section of the Product Catalog and locate the maximum compression pump thrust in lbf/stage for both 60 and 50 Hz operation. (This is at shut-in)
2.	The pump thrust at different operating frequencies can be estimated from: $\text{lbf}(n) = \text{lbf}(60) \times (n/60)^2$
3.	Calculate the maximum pump thrust using: lbf = lbf/stage x N stages where: N stages = number of compression pump stages

Thrust Bearing Load Calculations for all Combination Pumps

When you have a combination of floater pumps and compression pumps, calculate the thrust for each type of pump independently and add the results.

Thrust Bearing Selection

Compare the maximum pump thrust to the thrust bearing thrust limit. (reference Engineering Data section of Product Catalog).
Note:
This is a function of temperature for high load bearings. Choose a thrust bearing that has a higher thrust limit than the thrust generated by the pump.
Note:
Compression pumps will almost always require a high load bearing. Engineering guidelines specify use of a high load bearing when installing compression pumps.

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Protectors

Application Guidelines - Bags

Elastomer Bags are available in three materials; HSN, FKM* and Aflas. The durability of the bag material depends on the temperature and the environment to which it is subjected. The following charts should be followed when selecting the right bag material for your well application. GPS's standard bag material is HSN. More robust materials are also available to meet specific applications.

Material	HSN	FKM*	Aflas
Maximum BHT (applies to Protector Sections only)	175 °F	300 °F	350 °F
Maximum Operating Temperature	275 °F	400°F	450 °F

Chemical	HSN	FKM*	Aflas
Water / Oil	Excellent	Good	Excellent
Carbon Dioxide (CO_2)	Good	Poor	Good
Hydrogen Sulfide (H_2S)	Excellent	Poor	Excellent
Amines	Fair	Poor	Excellent
Aromatic Hydrocarbon (Xylene, Toluene, etc.)	Fair	Good or Fair	Fair
Steam (geothermal applications)	Fair	Fair	Excellent**

*FKM is abbreviation for fluoroelastomers. One common fluoroelastomer is Viton, which is a trade name of DuPont. To call all fluoroelastomers Viton is common, but incorrect and has been addressed legally by DuPont.

** EPDM, perfluoroelastomer, is also excellent in steam applications, depending on the temperature range and chemicals.

Ratings:
Excellent - Long term resistance (very low swell, maintains very high physical properties).
Good - Long term resistance (moderate swell, maintains very high physical properties).
Fair- Depends on exposure time and temperature (Good short term resistance).
Poor- No resistance even in short term.

Note:
An Application Engineer should be consulted on applications where the equipment might be subjected to a fluid with constituents other than listed in table.

Protectors

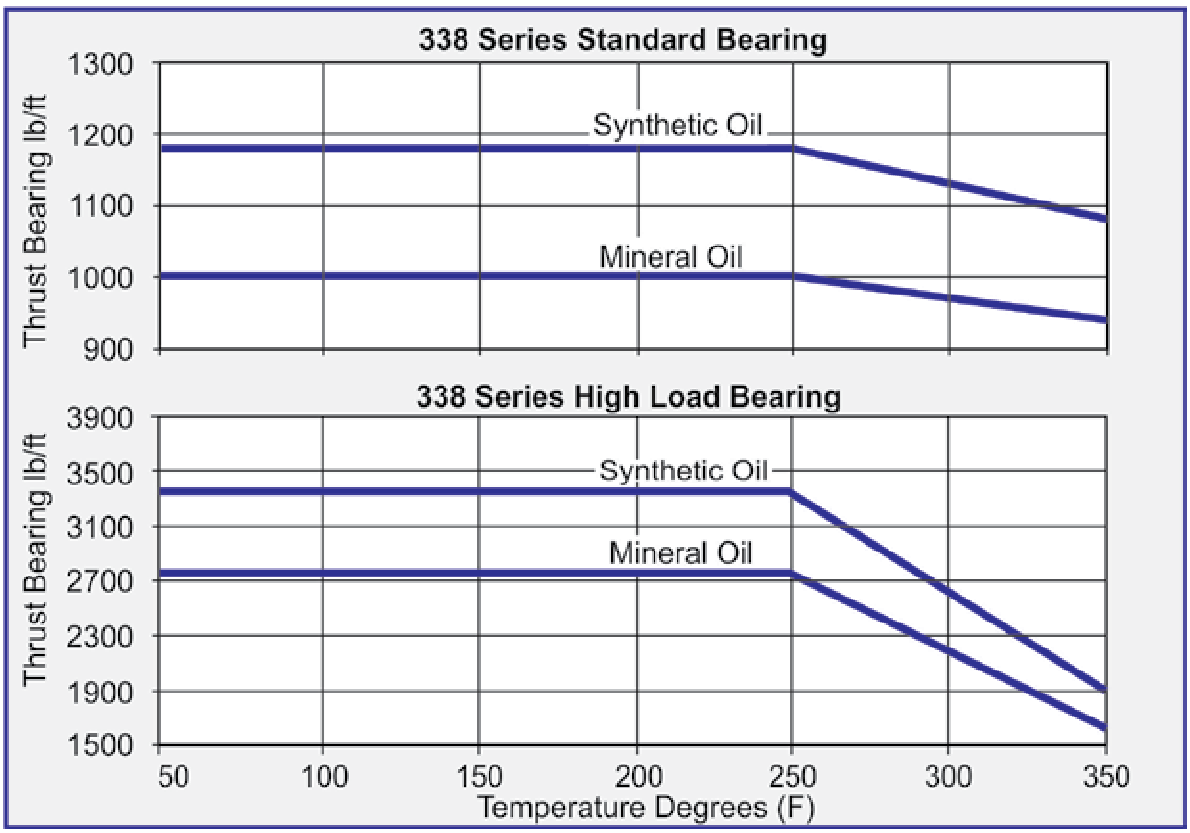
338 /375 Series

Description	Length		Weight		Part No	
	Feet	Meters	Lbs	Kgs	HL	HL-HSS
LSL	5.1	1.6	90	40.8	3323001	NA
PFSB	3.8	1.2	80	36.3	3310001	NA

ENGINEERING DATA				
Housing Diameter	3.75 In / 85.85 MM	Shaft Limit	Standard @ 60 Hz	256 HP
Minimum Casing	4-1/2In / 114.30 MM		@ 50 Hz	159 KW
			HSS @ 60 Hz	410 HP
Shaft Dia	.875 / 22.23 MM		@ 50 Hz	255 KW

Note: All configurations listed are Carbon Steel. Stainless Steel configurations are available upon request.

MAXIMUM LOAD - THRUST BEARING					
338 Standard:	Synthetic	1180	338 HL:	Synthetic	3350
	Mineral	1000		Mineral	2750



Protectors

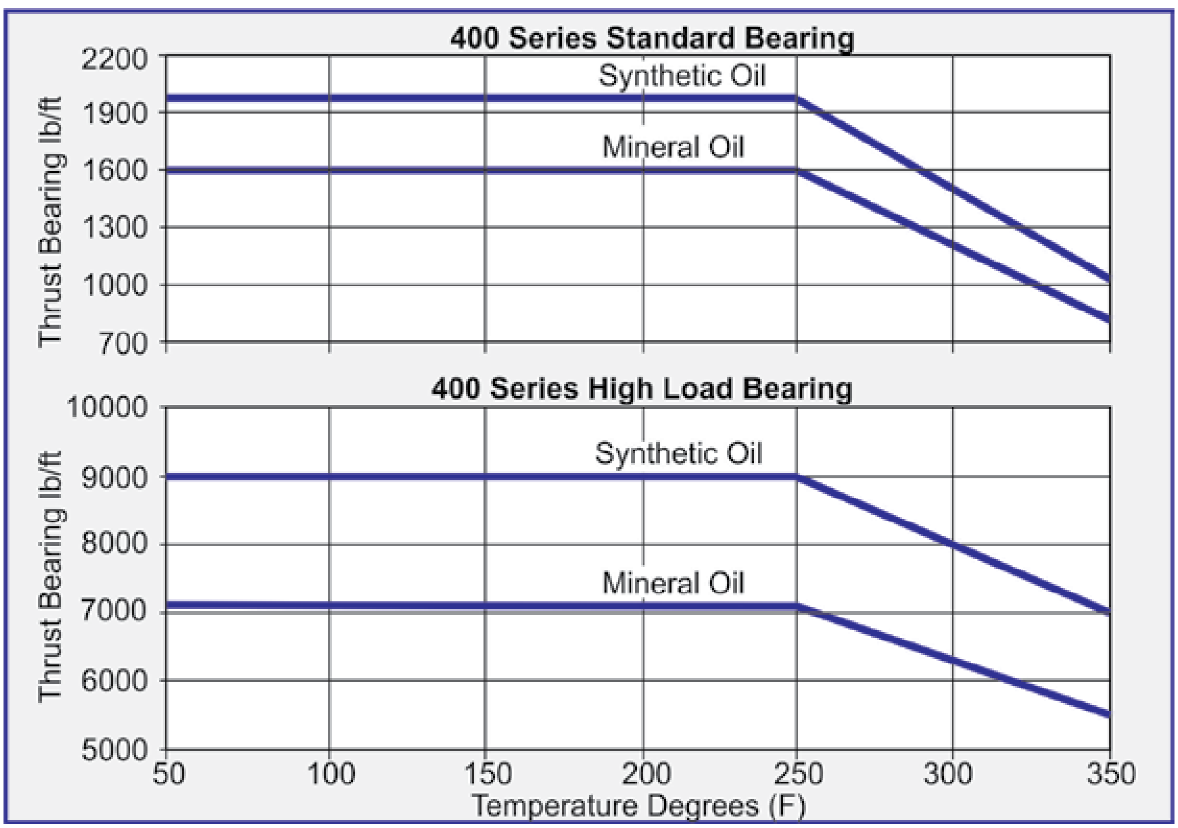
400/456 Series

Description	Length		Weight		Part No	
	Feet	Meters	Lbs	Kgs	HL	HL-HSS
PFSB	3.5	1.1	82	37.2	3450001	3450201
PFDB	5.6	1.7	129	58.5	3451001	3451201
LSL	6.5	2.0	141	64.0	3460001	3460201
BSL	6.5	2.0	145	65.8	3411001	3411201
BPB	6.5	2.0	149	67.6	3480001	3480201
BSB	6.5	2.0	149	67.6	3490001	3490201
LSB	6.5	2.0	145	65.8	3412001	3412201
LSBPB	8.9	2.7	205	93.0	3414001	3414201
BPBSL	8.9	2.7	205	93.0	3470001	3423201
LSLSL	8.9	2.7	205	93.0	3415001	3415201

ENGINEERING DATA				
Housing Diameter	4.00 In / 101.6 MM	Shaft Limit	Standard @ 60 Hz	256 HP
Minimum Casing	5-1/2 In / 139.70 MM		@ 50 Hz	159 KW
			HSS @ 60 Hz	410 HP
Shaft Dia	.875 In / 22.23 MM		@50 Hz	255 KW

Note: All configurations listed are Carbon Steel. Stainless Steel configurations are available upon request.

MAXIMUM LOAD - THRUST BEARING					
400/456 Standard:	Synthetic	1975	400/456 HL:	Synthetic	9000
	Mineral	1600		Mineral	7100



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Protectors

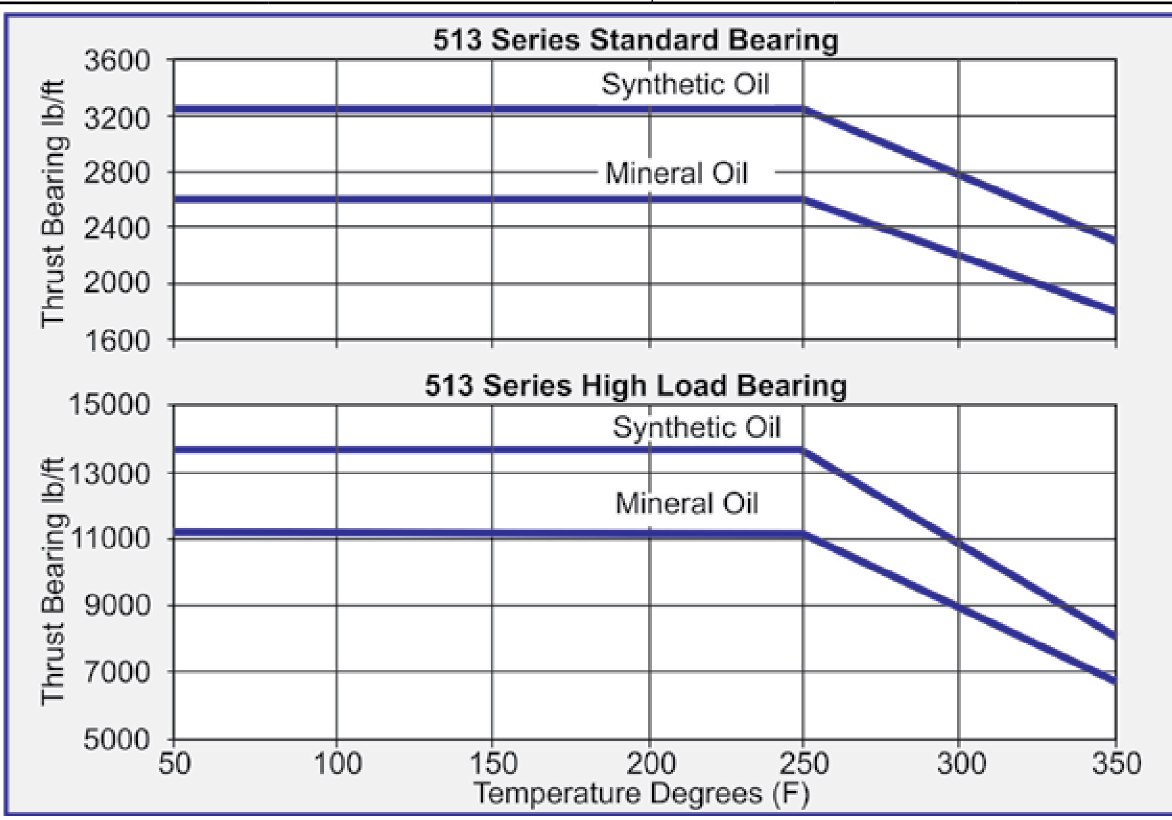
540 Series

Description	Length		Weight		Part No	
	Feet	Meters	Lbs	Kgs	HL	HL-HSS
PFSB	4.1	1.2	131	59.4	3550001	3550201
PFDB	6.3	1.9	256	116.1	3540001	3540201
LSL	6.5	2.0	265	120.2	3560001	3560201
LSB	6.5	2.0	271	122.9	3512001	3512201
BSL	6.5	2.0	271	122.9	3511001	3511201
BPB	6.5	2.0	277	125.6	3580001	3580201
BSB	6.5	2.0	277	125.6	3590001	3590201
LSBPB	8.9	2.7	372	168.7	3514001	3514201
BPBSL	8.9	2.7	372	168.7	3570001	3570201
LSLSL	8.9	2.7	360	163.4	3515001	3515201

ENGINEERING DATA				
Housing Diameter	5.13 In / 136.5 MM	Shaft Limit	Standard @ 60 Hz	637 HP
Minimum Casing	7 In / 177.80 MM		@ 50 Hz	396 KW
			HSS @ 60 Hz	1019 HP
Shaft Dia	1.187 In / 30.20 MM		@ 50 Hz	633 KW

Note: All configurations listed are Carbon Steel. Stainless Steel configurations are available upon request. For configurations not listed, contact your GPS representative.

MAXIMUM LOAD - THRUST BEARING					
540 Standard:	Synthetic	3250	540 HL:	Synthetic	13700
	Mineral	2600		Mineral	11200



Protectors

STANDARD IN ALL SIZES:
High Load Bearings, Monel K-500 Shaft, TC/TC/MNL Mechanical Seals, Aflas Elastomers, TC AR

PROTECTOR NOMENCLATURE:
The description of the protector is read as configured from bottom to top, with the type of chamber (Labyrinth or Bag) listed in order with the type of connection (Series or Parallel) between each chamber.

L = LABYRINTH
PF = PRE-FILLED
SB = SINGLE BAG
DB = DOUBLE BAG
BPB = MODULAR BAG - PARALLEL - BAG
BSB = MODULAR BAG - SERIES - BAG
BSL = MODULAR BAG - SERIES - LABYRINTH
LSB = MODULAR LABYRINTH - SERIES - BAG
LSL = MODULAR LABYRINTH - SERIES - LABYRINTH
BPBSL = MODULAR BAG - PARALLEL - BAG - SERIES - LABYRINTH
LSBPB = MODULAR LABYRINTH - SERIES - BAG - PARALLEL - BAG
LSLSL = MODULAR LABYRINTH - SERIES - LABYRINTH - SERIES - LABYRINTH
HL = HIGH LOAD THRUST BEARING
HSS = HIGH STRENGTH SHAFT

Intake

300 Series

Description	Length		Weight		Part No	
	Feet	Meters	Lbs	Kgs	Standard	HSS
Intake, Bolt On	0.8	0.24	20	44.0	4310001	4320001
Gas Separator, Rotary-2 Brg Std UT	2.4	0.73	45	20.4	4311001	4313001
Gas Separator, Rotary-3 Brg Std LT	2.2	0.67	42	19.0	4312001	4314001

ENGINEERING DATA					
Housing Diameter	3.75 In / 85.85 MM	Shaft Limit	Standard @ 60 Hz	125 HP
Minimum Casing	4-1/2 In / 114.30 MM		@ 50 Hz	78 KW
			HSS @ 60 Hz	200 HP
Shaft Dia	.687 In / 17.44 MM		@ 50 Hz	102 KW

Note: All configurations listed are Carbon Steel. Stainless Steel configurations are available upon request.

400 Series

Description	Length		Weight		Part No	
	Feet	Meters	Lbs	Kgs	Standard	HSS
Intake, Bolt On	1.0	0.31	28	12.7	4410003	4430003
Gas Separator, Rotary-2 Brg Std UT	2.7	0.83	70	31.4	4415903	4413901
Gas Separator, Rotary-3 Brg Std LT	3.0	0.91	75	34.0	4412904	4414904
Gas Handling System	5.4	1.66	140	62.8	8500169	8500169HSS

ENGINEERING DATA				
Housing Diameter	4.00 In / 101.6 MM	Shaft Limit	Standard @ 60 Hz	256 HP
Minimum Casing	5-1/2 In / 139.70 MM		@ 50 Hz	159 KW
			HSS @ 60 Hz	410 HP
Shaft Dia	.875 In / 22.23 MM		@ 50 Hz	255 KW

Note: All configurations listed are Carbon Steel. Stainless Steel configurations are available upon request.

500 Series

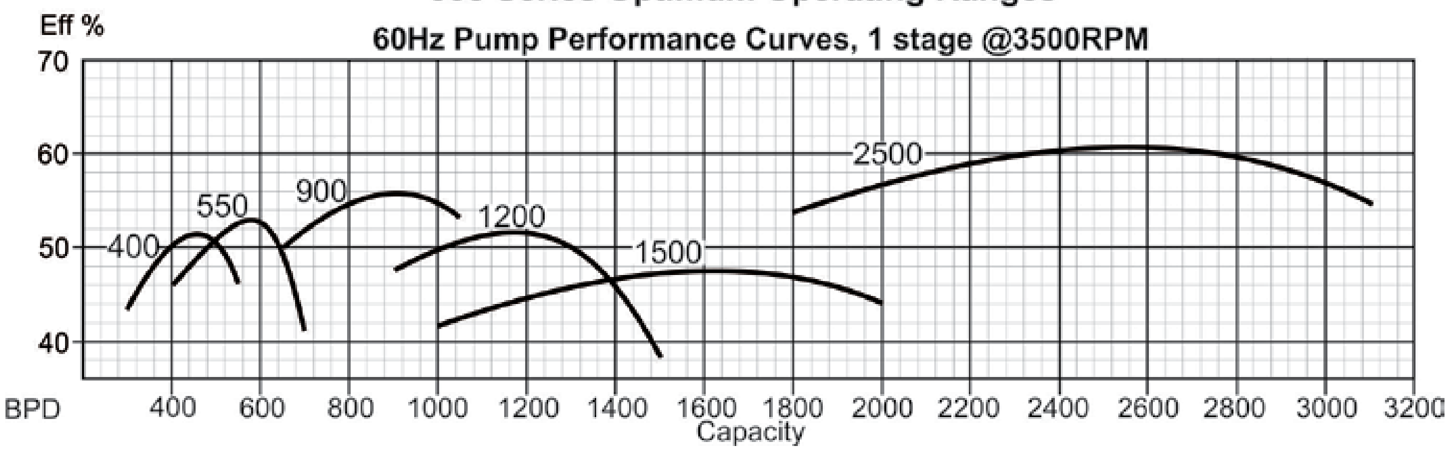
Description	Length		Weight		Part No	
	Feet	Meters	Lbs	Kgs	Standard	HSS
Intake, Bolt On	1.2	0.36	50	22.7	4510001	4530001
Gas Separator, Rotary-2 Brg Std UT	3.5	1.1	155	70.3	4511903	4513001
Gas Separator, Rotary-3 Brg Std LT	3.5	1.1	155	70.3	4512904	4512905

ENGINEERING DATA				
Housing Diameter	5.38 In / 136.65 MM	Shaft Limit	Standard @ 60 Hz	637 HP
Minimum Casing	7In / 177.80 MM		@ 50 Hz	396 KW
			HSS @ 60 Hz	1019 HP
Shaft Dia	1.187 In / 30.20 MM		@ 50 Hz	633 KW

Note: All configurations listed are Carbon Steel. Stainless Steel configurations are available upon request.
For design requirements not listed, consult your GPS-ESP representative.

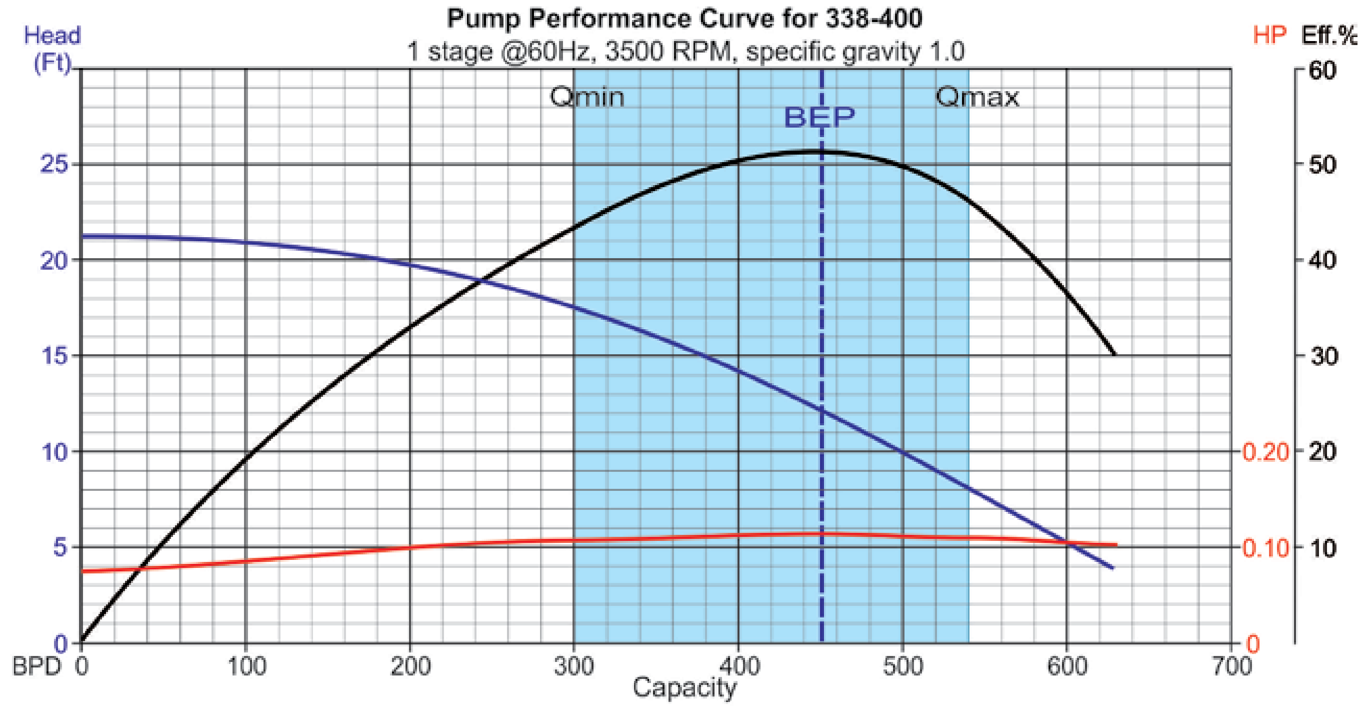
338 Series Pumps

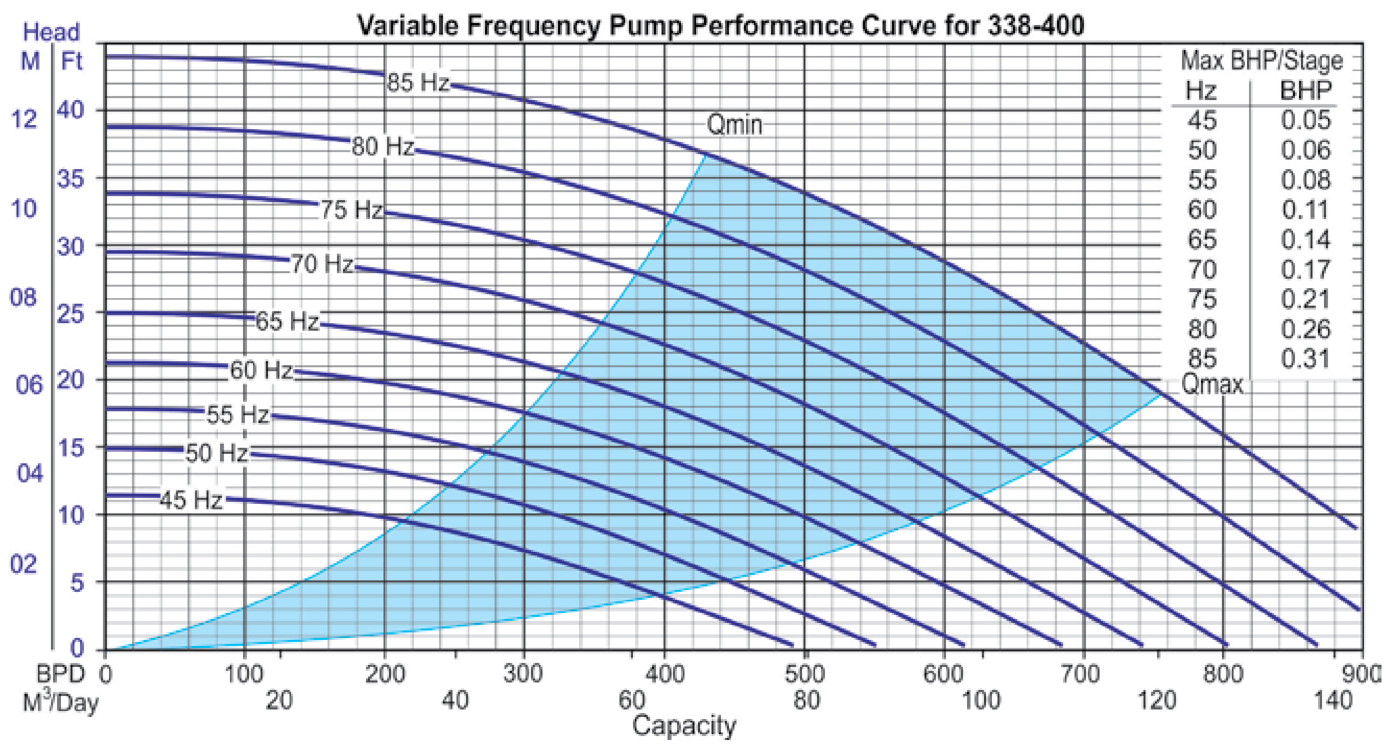
338 Series Optimum Operating Ranges



Model	Hz	Construction		Stage		Optimum Operating Range BPD / M^3/Day		BHP/ Stage	Housing Pressure Limit PSI	
		Fltr	Cmprsn	Radial Flow	Mixed Flow				Std	Hi-Prs
338-400	60	X		X		300	540	0.11	6000	6000
338-400	50	X		X		40	72	0.06	6000	6000
338-550	60	X		X		400	700	0.11	6000	6000
338-550	50	X		X		53	93	0.06	6000	6000
338-900	60	X		X		650	1050	0.15	6000	6000
338-900	50	X		X		87	140	0.09	6000	6000
338-1200	60	X		X		900	1500	0.21	6000	6000
338-1200	50	X		X		119	199	0.12	6000	6000
338-1500	60	X		X		1000	2000	0.29	6000	6000
338-1500	50	X		X		132	265	0.17	6000	6000
338-2500	60	X		X		1800	3100	0.45	6000	6000
338-2500	50	X		X		238	410	0.26	6000	6000

338-400


Pump Performance Curve for 338-400
1 stage @60Hz, 3500 RPM, specific gravity 1.0
Head (Ft)
HP
Eff.%
Qmin
BEP
Qmax
BPD
Capacity
0
5
10
15
20
25
0
100
200
300
400
500
600
700
0
0.10
0.20
10
20
30
40
50
60


Variable Frequency Pump Performance Curve for 338-400
Head
M
Ft
85 Hz
80 Hz
75 Hz
70 Hz
65 Hz
60 Hz
55 Hz
50 Hz
45 Hz
Qmin
Qmax
Max BHP/Stage
Hz BHP
45 0.05
50 0.06
55 0.08
60 0.11
65 0.14
70 0.17
75 0.21
80 0.26
85 0.31
BPD
M3/Day
Capacity

338-400

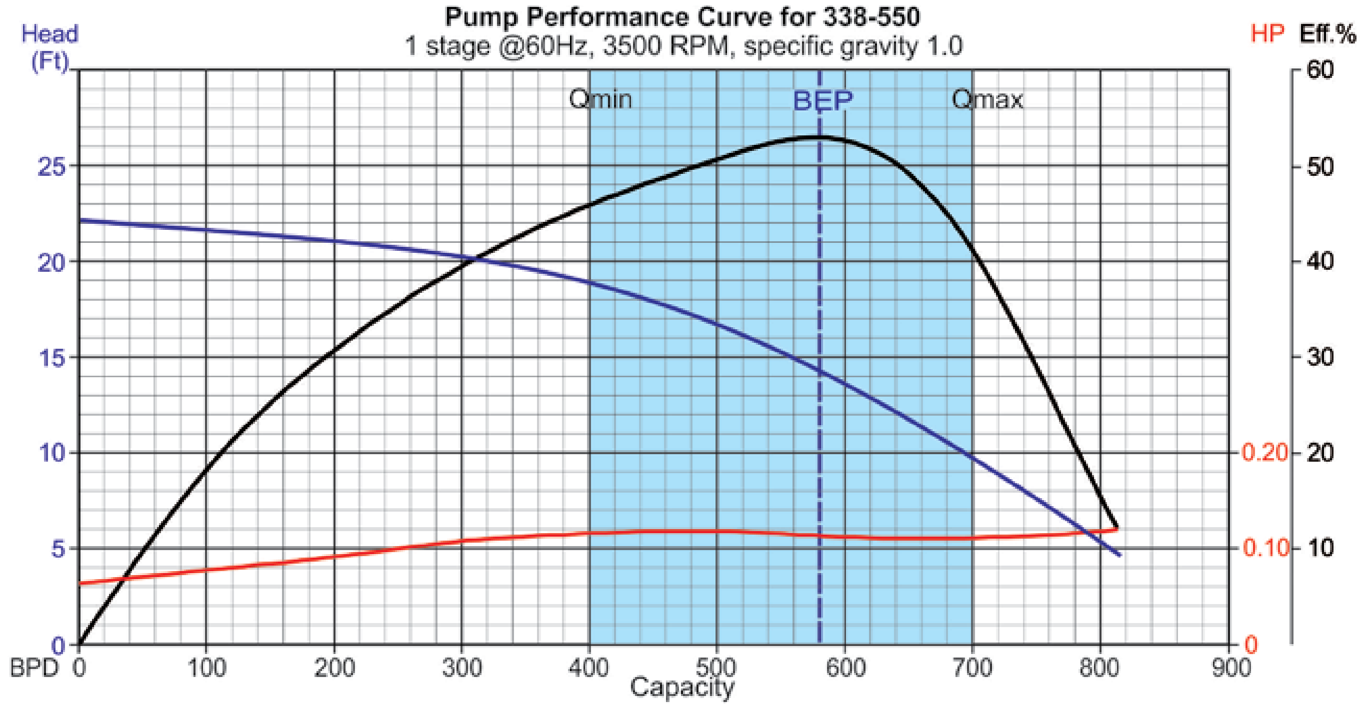
HSG	LENGTH		WEIGHT		STANDARD PUMP				ABRASION RESISTANT PUMP			
					Floater		Compression		Floater		Compression	
	Feet	Meters	Lbs	Kgs	Stgs	Part No	Stgs	Part No	Stgs	Part No	Stgs	Part No
10	2.1	0.64	35	15.9	16	1350001			15	1350001AR		
20	3.5	1.07	55	24.9	35	1350002			33	1350002AR		
30	4.9	1.49	75	34.0	54	1350003			50	1350003AR		
40	6.3	1.92	95	43.1	74	1350004			69	1350004AR		
50	7.8	2.38	118	53.5	93	1350005			86	1350005AR		
60	9.1	2.77	139	63.0	112	1350006			104	1350006AR		
70	10.5	3.20	160	72.6	132	1350007			122	1350007AR		
80	11.9	3.63	180	81.6	151	1350008			139	1350008AR		
90	13.3	4.05	200	90.7	170	1350009			157	1350009AR		
100	14.7	4.48	220	99.8	190	1350010			174	1350010AR		

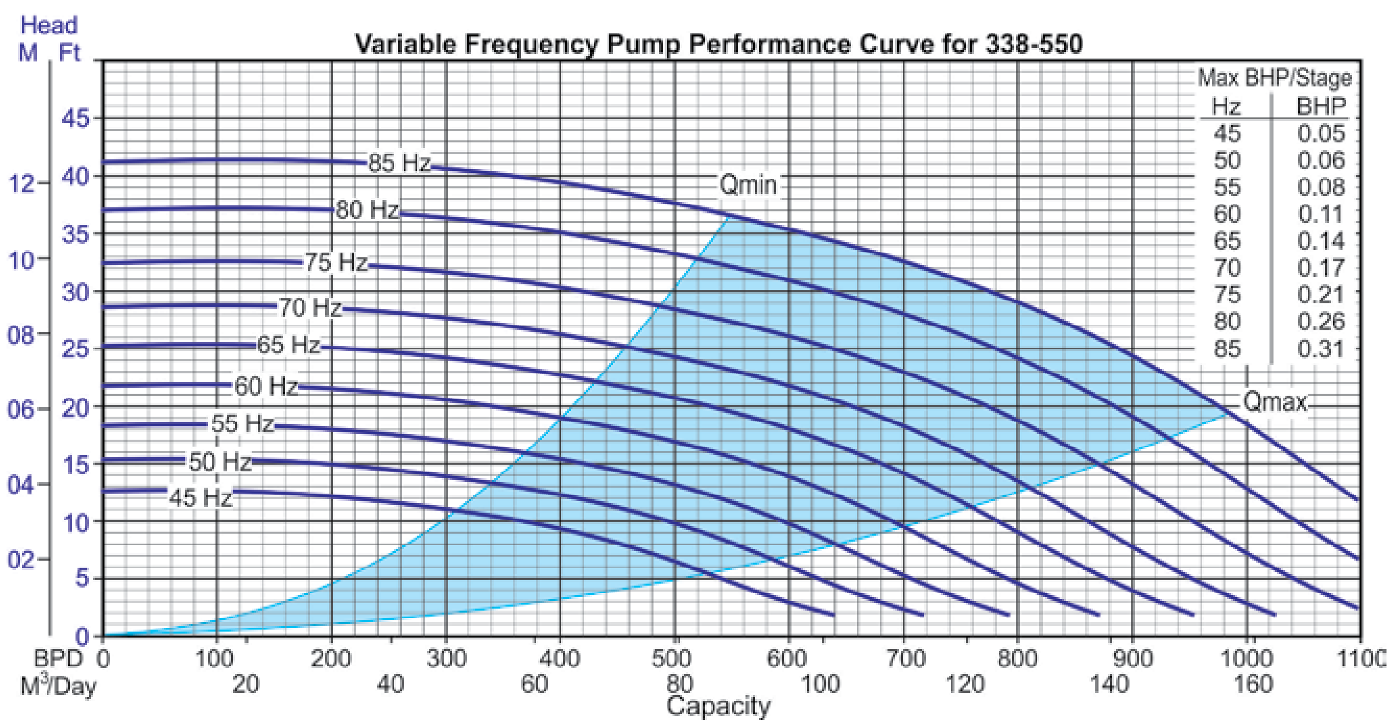
DESCRIPTION	LENGTH		WEIGHT		STANDARD	HIGH STRENGTH
	Feet	Meters	Lbs	Kgs	Part No	Part No
Discharge Head (2-3/8” 8RD EUE)	0.5	0.15	5	2.3	1000100	1300001SST
Bolt On Intake	0.8	0.24	20	9.0	4310001	4320001
Rotary Gas Separator UT	2.4	0.73	45	20.5	4311001	4313001
Rotary Gas Separator LT	2.2	0.67	42	19.0	4312001	4314001

Note: All configurations listed are Carbon Steel. Stainless Steel configurations are available upon request.

ENGINEERING DATA					
Optimum Operating Range	60 Hz	300-540 BPD	Shaft Limit	Standard @ 60Hz	94 HP
	50 Hz	40-72 M^{3}Day		@ 50Hz	58 KW
				High Strength @ 60Hz	150 HP
Housing Diameter		3.38 In / 85.85 MM		@ 50Hz	93 KW
			Max Staging: Shaft		
Minimum Casing Size		4.5 In / 114.3 MM		Standard @ 60Hz	855 Stages
				@ 50Hz	1231 Stages
Shaft Diameter		0.625 In / 15.875 MM		High Strength @ 60Hz	1367 Stages
Area		0.3068 Sq In / 197.93 MM^2		@ 50Hz	1969 Stages
			Max Staging: Thrust Bearing - Floater Pump		
Stage Type		Radial Flow		Std (230ºF BHT Max) @ 60Hz	328 Stages
Rotational Direction		CCW		(110ºC BHT Max) @ 50Hz	413 Stages
Fluid Specific Gravity		1.0		Hi- Ld (250ºF BHT Max) @ 60Hz	902 Stages
Housing Pressure Limit		6000 PSI		(121ºC BHT Max) @ 50Hz	1181 Stages

338-550





These engineering performance curves represent nominal performance based on actual multi-stage testing and certification. All pumps supplied by GPS will be tested and certified to perform within the acceptable limits for head, horsepower and efficiency as defined in the "API RECOMMENDED PRACTICE (11s2) FOR ELECTRIC SUBMERSIBLE PUMP TESTING."

338-550

HSG	LENGTH		WEIGHT		STANDARD PUMP				ABRASION RESISTANT PUMP			
					Floater		Compression		Floater		Compression	
	Feet	Meters	Lbs	Kgs	Stgs	Part No	Stgs	Part No	Stgs	Part No	Stgs	Part No
10	2.1	0.64	38	17.2	16	1310001			15	1310001AR		
20	3.5	1.07	63	28.6	35	1310002			33	1310002AR		
30	4.9	1.49	88	39.9	54	1310003			50	1310003AR		
40	6.3	1.92	107	48.5	74	1310004			69	1310004AR		
50	7.8	2.38	141	63.9	93	1310005			86	1310005AR		
60	9.1	2.77	167	75.7	112	1310006			104	1310006AR		
70	10.5	3.20	193	87.8	132	1310007			122	1310007AR		
80	11.9	3.63	219	99.3	151	1310008			139	1310008AR		
90	13.3	4.05	245	111.1	170	1310009			157	1310009AR		
100	14.8	4.50	271	122.9	190	1310010			174	1310010AR		

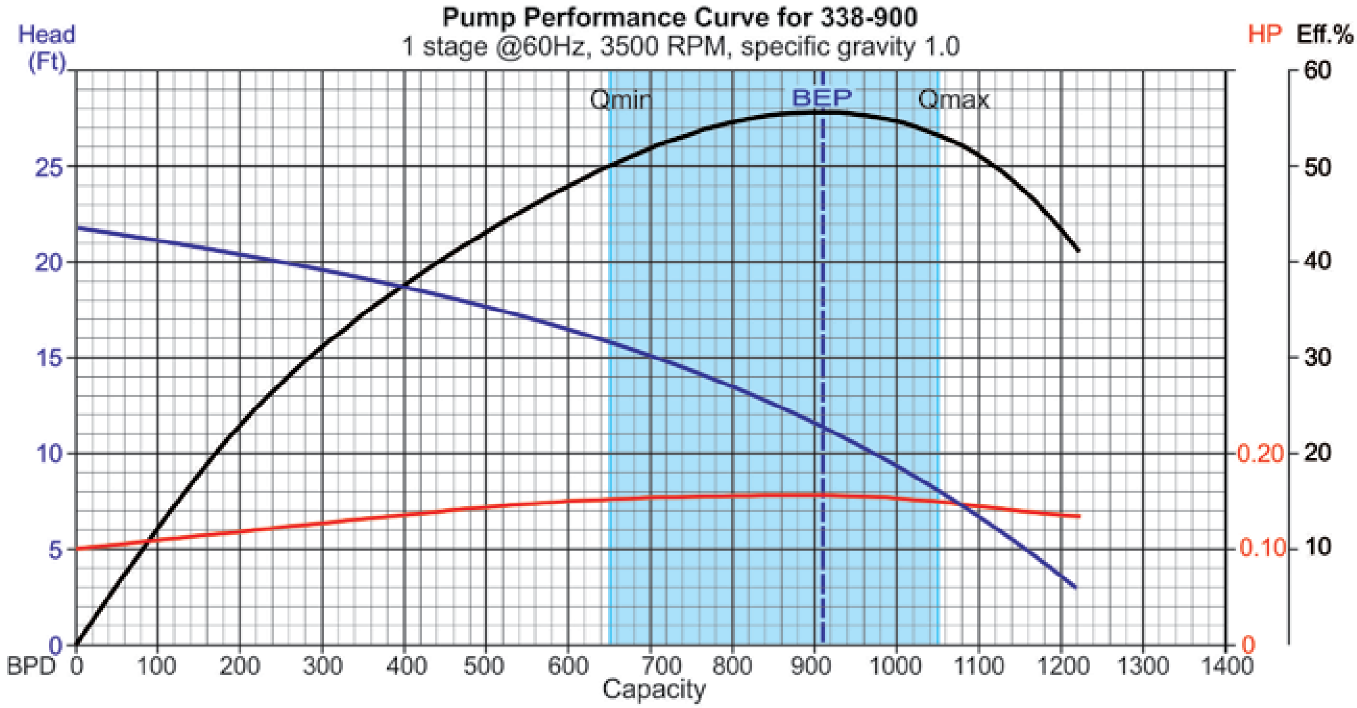
DESCRIPTION	LENGTH		WEIGHT		STANDARD	HIGH STRENGTH
	Feet	Meters	Lbs	Kgs	Part No	Part No
Discharge Head (2-3/8" 8RD EUE)	0.5	0.15	5	2.3	1000100	1300001SST
Bolt On Intake	0.8	0.24	20	9.0	4310001	4320001
Rotary Gas Separator UT	2.4	0.73	45	20.5	4311001	4313001
Rotary Gas Separator LT	2.2	0.67	42	19.0	4312001	4314001

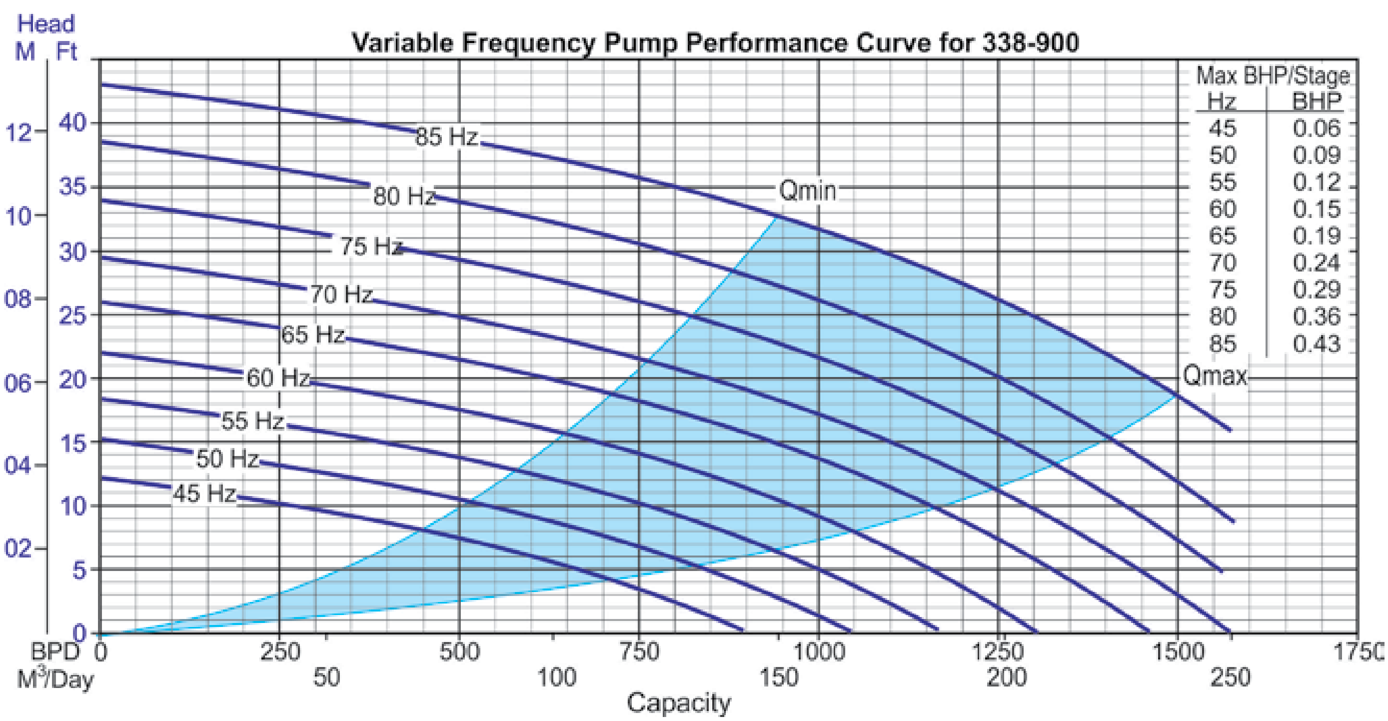
Note: All configurations listed are Carbon Steel. Stainless Steel configurations are available upon request.

ENGINEERING DATA

Optimum Operating Range	60 Hz	400-700 BPD	Shaft Limit	Standard @ 60Hz	94 HP
	50 Hz	53-93 M^3Day		@ 50Hz	58 KW
				High Strength @ 60Hz	150 HP
Housing Diameter		3.38 In / 85.85 MM		@ 50Hz	93 KW
			Max Staging: Shaft		
Minimum Casing Size		4.5 In / 114.3 MM		Standard @ 60Hz	671 Stages
				@ 50Hz	967 Stages
Shaft Diameter		0.625 In / 15.875 MM		High Strength @ 60Hz	1074 Stages
Area		0.3068 Sq In / 197.93 MM^2		@ 50Hz	1969 Stages
			Max Staging: Thrust Bearing - Floater Pump		
Stage Type		Radial Flow		Std (230ºF BHT Max) @ 60Hz	329 Stages
Rotational Direction		CCW		(110ºC BHT Max) @ 50Hz	414 Stages
Fluid Specific Gravity		1.0		Hi- Ld (250ºF BHT Max) @ 60Hz	904 Stages
Housing Pressure Limit		6000 PSI		(121ºC BHT Max) @ 50Hz	1184 Stages

338-900





Hz	BHP
45	0.06
50	0.09
55	0.12
60	0.15
65	0.19
70	0.24
75	0.29
80	0.36
85	0.43

These engineering performance curves represent nominal performance based on actual multi-stage testing and certification. All pumps supplied by GPS will be tested and certified to perform within the acceptable limits for head, horsepower and efficiency as defined in the "API RECOMMENDED PRACTICE (11s2) FOR ELECTRIC SUBMERSIBLE PUMP TESTING."

338-900

HSG	LENGTH		WEIGHT		STANDARD PUMP				ABRASION RESISTANT PUMP			
					Floater		Compression		Floater		Compression	
	Feet	Meters	Lbs	Kgs	Stgs	Part No	Stgs	Part No	Stgs	Part No	Stgs	Part No
10	2.1	0.64	38	17.2	16	1320001			15	1320001AR		
20	3.5	1.07	63	28.6	35	1320002			33	1320002AR		
30	4.9	1.49	88	39.9	54	1320003			50	1320003AR		
40	6.3	1.92	107	48.5	74	1320004			69	1320004AR		
50	7.8	2.38	141	63.9	93	1320005			86	1320005AR		
60	9.1	2.77	167	75.7	112	1320006			104	1320006AR		
70	10.5	3.20	193	87.8	132	1320007			122	1320007AR		
80	11.9	3.63	219	99.3	151	1320008			139	1320008AR		
90	13.3	4.05	245	111.1	170	1320009			157	1320009AR		
100	14.8	4.50	271	122.9	190	1320010			174	1320010AR		

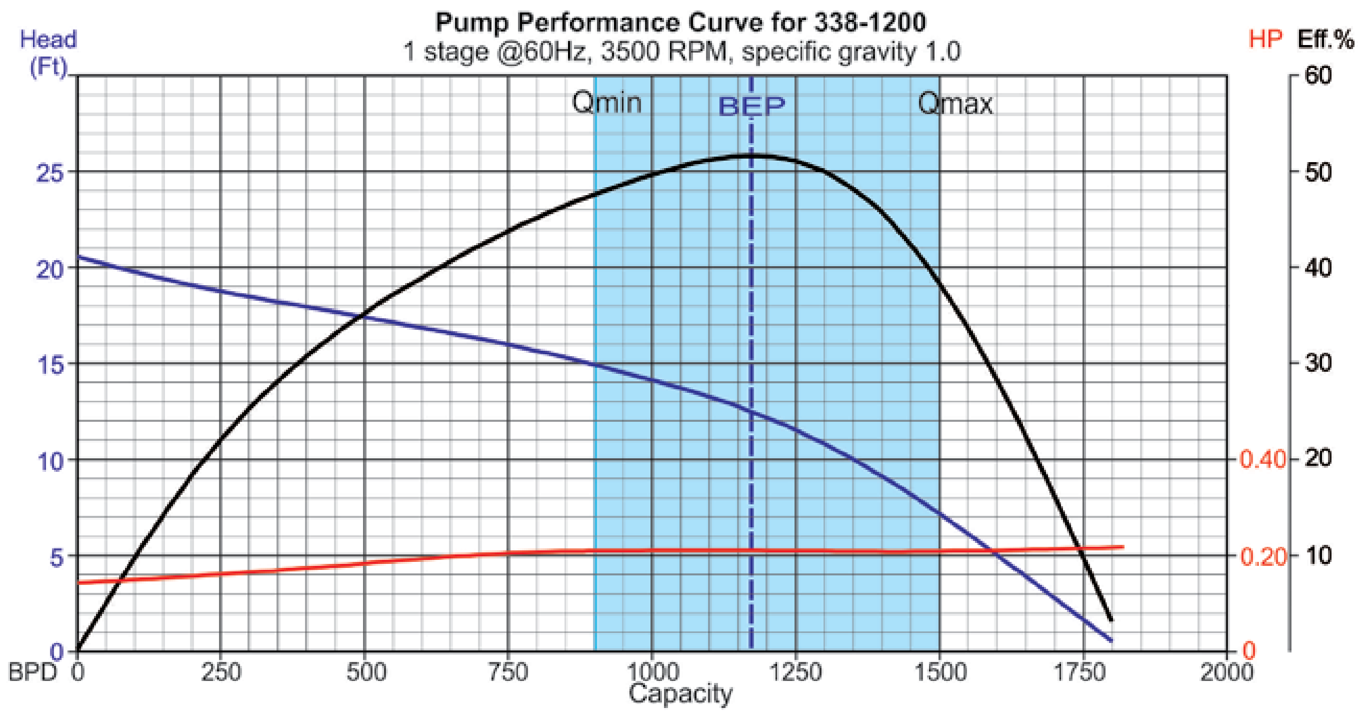
DESCRIPTION	LENGTH		WEIGHT		STANDARD	HIGH STRENGTH
	Feet	Meters	Lbs	Kgs	Part No	Part No
Discharge Head (2-3/8” 8RD EUE)	0.5	0.15	5	2.3	1000100	1300001SST
Bolt On Intake	0.8	0.24	20	9.0	4310001	4320001
Rotary Gas Separator UT	2.4	0.73	45	20.5	4311001	4313001
Rotary Gas Separator LT	2.2	0.67	42	19.0	4312001	4314001

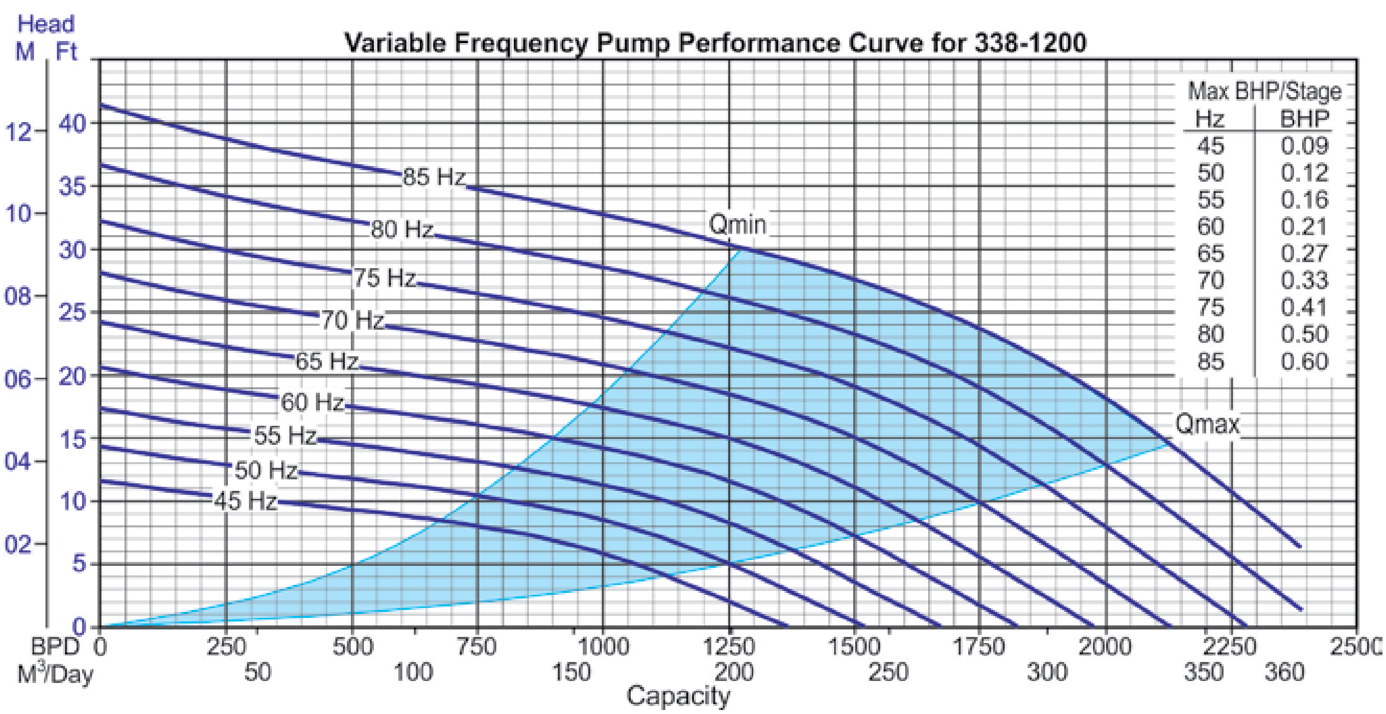
Note: All configurations listed are Carbon Steel. Stainless Steel configurations are available upon request.

ENGINEERING DATA

Optimum Operating Range	60 Hz	650-1050 BPD	Shaft Limit	Standard @ 60Hz	94 HP
	50 Hz	87-140 M^3Day		@ 50Hz	58 KW
				High Strength @ 60Hz	150 HP
Housing Diameter		3.38 In / 85.85 MM		@ 50Hz	93 KW
			Max Staging: Shaft		
Minimum Casing Size		4.5 In / 114.3 MM		Standard @ 60Hz	553 Stages
				@ 50Hz	796 Stages
Shaft Diameter		0.625 In / 15.875 MM		High Strength @ 60Hz	885 Stages
Area		0.3068 Sq In / 197.93 MM^2		@ 50Hz	1274 Stages
			Max Staging: Thrust Bearing - Floater Pump		
Stage Type		Radial Flow		Std (230ºF BHT Max) @ 60Hz	345 Stages
Rotational Direction		CCW		(110ºC BHT Max) @ 50Hz	435 Stages
Fluid Specific Gravity		1.0		Hi- Ld (250ºF BHT Max) @ 60Hz	950 Stages
Housing Pressure Limit		6000 PSI		(121ºC BHT Max) @ 50Hz	1243 Stages

338-1200





These engineering performance curves represent nominal performance based on actual multi-stage testing and certification. All pumps supplied by GPS will be tested and certified to perform within the acceptable limits for head, horsepower and efficiency as defined in the "API RECOMMENDED PRACTICE (11s2) FOR ELECTRIC SUBMERSIBLE PUMP TESTING."

338-1200

HSG	LENGTH		WEIGHT		STANDARD PUMP				ABRASION RESISTANT PUMP			
					Floater		Compression		Floater		Compression	
	Feet	Meters	Lbs	Kgs	Stgs	Part No	Stgs	Part No	Stgs	Part No	Stgs	Part No
10	2.1	0.64	35	15.9	13	1330001			12	1330001AR		
20	3.5	1.07	57	25.9	27	1330002			25	1330002AR		
30	4.9	1.49	81	36.7	45	1330003			42	1330003AR		
40	6.3	1.92	104	47.2	61	1330004			57	1330004AR		
50	7.8	2.38	128	58.0	77	1330005			72	1330005AR		
60	9.1	2.77	152	68.9	93	1330006			86	1330006AR		
70	10.5	3.20	174	78.9	108	1330007			100	1330007AR		
80	11.9	3.63	193	87.5	124	1330008			115	1330008AR		
90	13.3	4.05	221	100.2	140	1330009			130	1330009AR		
100	14.8	4.50	244	110.7	156	1330010			145	1330010AR		

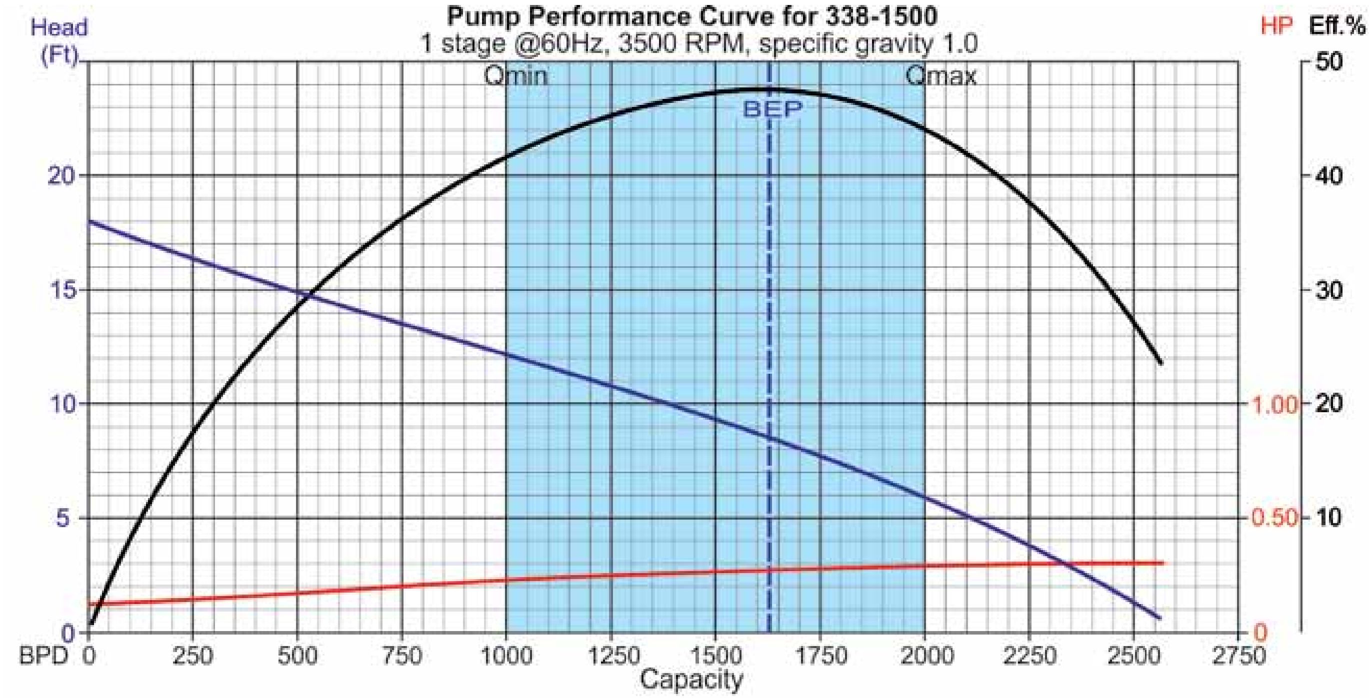
DESCRIPTION	LENGTH		WEIGHT		STANDARD	HIGH STRENGTH
	Feet	Meters	Lbs	Kgs	Part No	Part No
Discharge Head (2-3/8" 8RD EUE)	0.5	0.15	5	2.3	1000100	1300001SST
Bolt On Intake	0.8	0.24	20	9.0	4310001	4320001
Rotary Gas Separator UT	2.4	0.73	45	20.5	4311001	4313001
Rotary Gas Separator LT	2.2	0.67	42	19.0	4312001	4314001

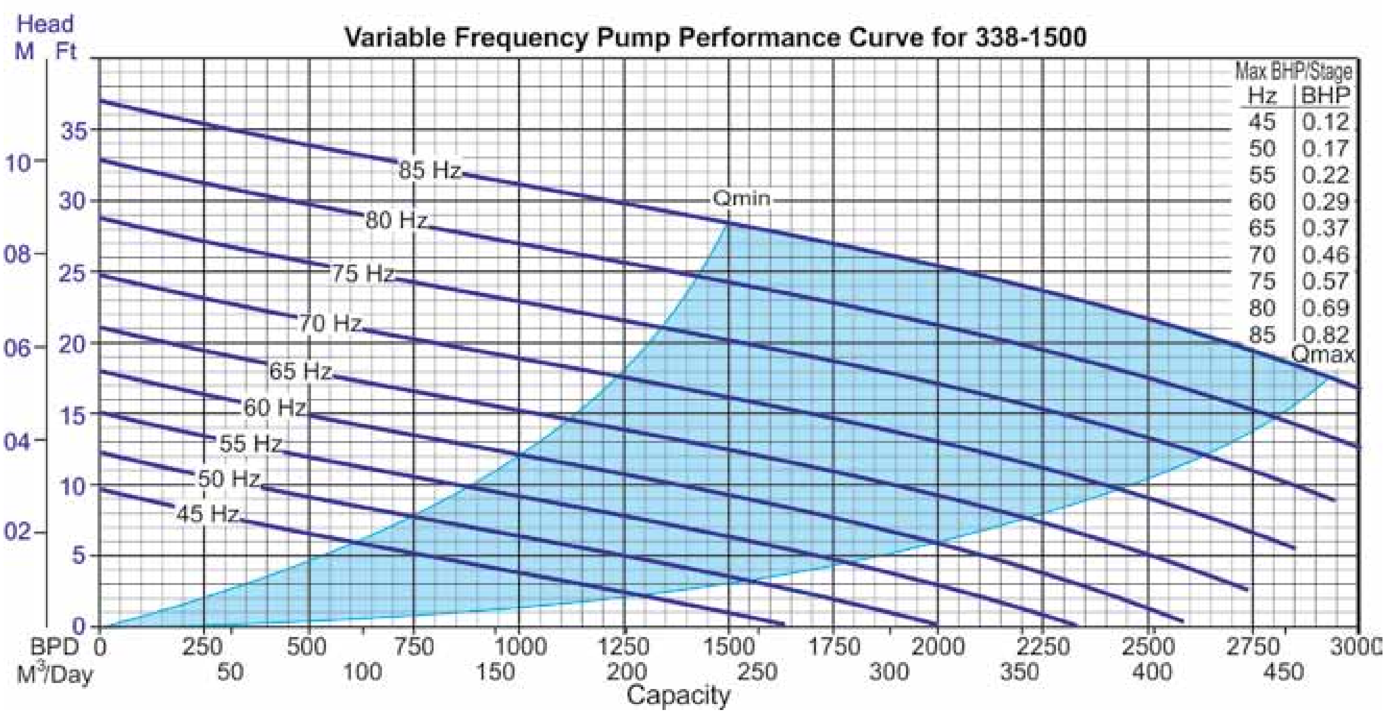
Note: All configurations listed are Carbon Steel. Stainless Steel configurations are available upon request.

ENGINEERING DATA

Optimum Operating Range	60 Hz	900-1500 BPD	Shaft Limit	Standard @ 60Hz	94 HP
	50 Hz	119-199 M^3Day		@ 50Hz	58 KW
				High Strength @ 60Hz	150 HP
Housing Diameter		3.38 In / 85.85 MM		@ 50Hz	93 KW
			Max Staging: Shaft		
Minimum Casing Size		4.5 In / 114.3 MM		Standard @ 60Hz	448 Stages
				@ 50Hz	645 Stages
Shaft Diameter		0.625 In / 15.875 MM		High Strength @ 60Hz	716 Stages
Area		0.3068 Sq In / 197.93 MM^2		@ 50Hz	1031 Stages
			Max Staging: Thrust Bearing - Floater Pump		
Stage Type		Radial Flow		Std (230ºF BHT Max) @ 60Hz	366 Stages
Rotational Direction		CCW		(110ºC BHT Max) @ 50Hz	461 Stages
Fluid Specific Gravity		1.0		Hi- Ld (250ºF BHT Max) @ 60Hz	1005 Stages
Housing Pressure Limit		6000 PSI		(121ºC BHT Max) @ 50Hz	1316 Stages

338-1500





These engineering performance curves represent nominal performance based on actual multi-stage testing and certification. All pumps supplied by GPS will be tested and certified to perform within the acceptable limits for head, horsepower and efficiency as defined in the "API RECOMMENDED PRACTICE (11s2) FOR ELECTRIC SUBMERSIBLE PUMP TESTING."

338-1500

HSG	LENGTH		WEIGHT		STANDARD PUMP				ABRASION RESISTANT PUMP			
					Floater		Compression		Floater		Compression	
	Feet	Meters	Lbs	Kgs	Stgs	Part No	Stgs	Part No	Stgs	Part No	Stgs	Part No
10	2.1	0.64	38	17.2	10	1340001			9	1340001AR		
20	3.5	1.07	65	29.5	23	1340002			21	1340002AR		
30	4.9	1.49	91	41.3	35	1340003			32	1340003AR		
40	6.3	1.92	118	53.5	48	1340004			45	1340004AR		
50	7.8	2.38	145	65.8	60	1340005			56	1340005AR		
60	9.1	2.77	172	78.0	73	1340006			68	1340006AR		
70	10.5	3.20	198	89.8	85	1340007			79	1340007AR		
80	11.9	3.63	226	102.5	96	1340008			91	1340008AR		
90	13.3	4.05	252	114.3	110	1340009			103	1340009AR		
100	14.8	4.50	279	126.5	123	1340010			114	1340010AR		

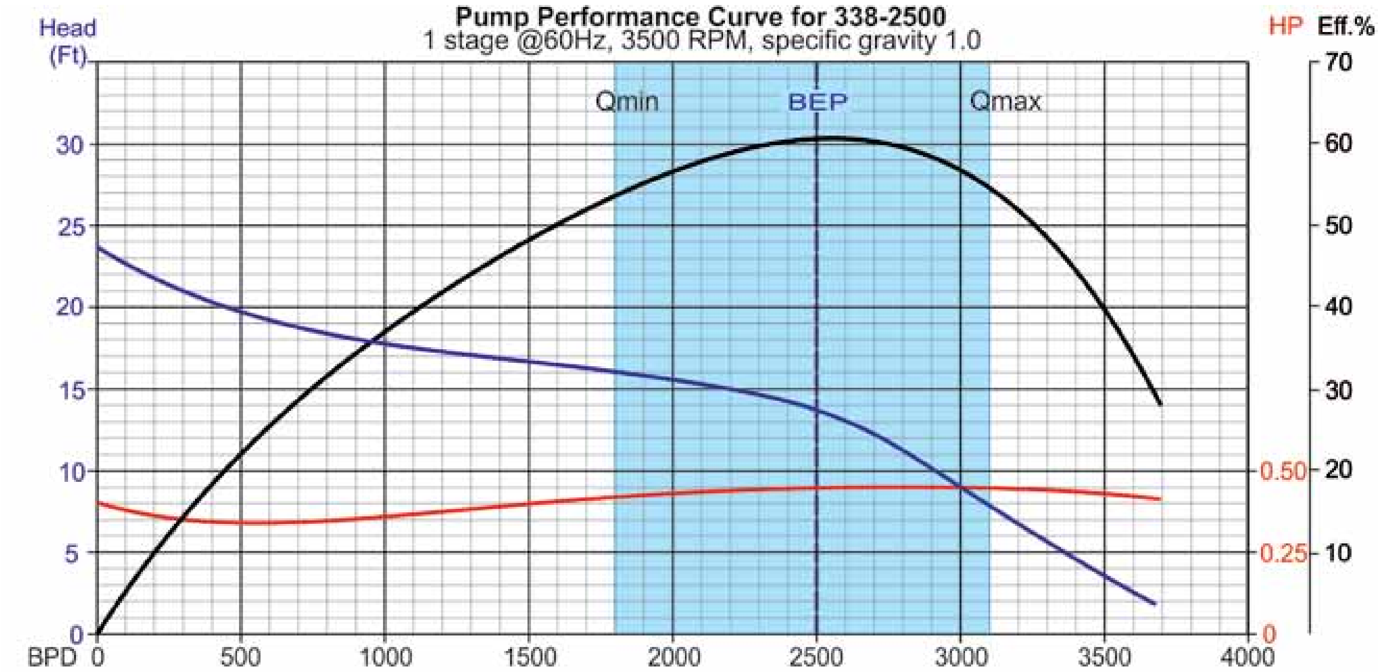
DESCRIPTION	LENGTH		WEIGHT		STANDARD	HIGH STRENGTH
	Feet	Meters	Lbs	Kgs	Part No	Part No
Discharge Head (2-3/8” 8RD EUE)	0.5	0.15	5	2.3	1000100	1300001SST
Bolt On Intake	0.8	0.24	20	9.0	4310001	4320001
Rotary Gas Separator UT	2.4	0.73	45	20.5	4311001	4313001
Rotary Gas Separator LT	2.2	0.67	42	19.0	4312001	4314001

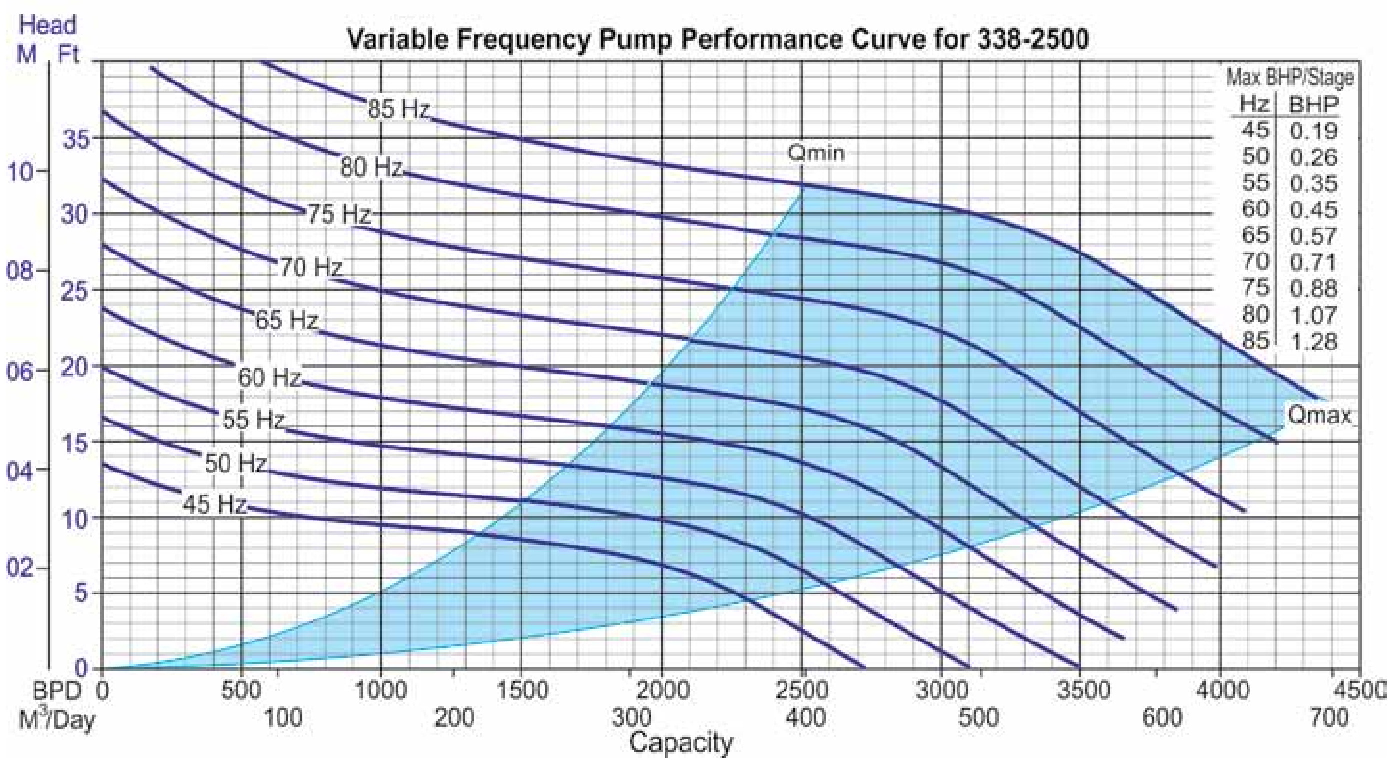
Note: All configurations listed are Carbon Steel. Stainless Steel configurations are available upon request.

ENGINEERING DATA

Optimum Operating Range	60 Hz	1000-2000 BPD	Shaft Limit	Standard @ 60Hz	94 HP
	50 Hz	132-265 M^3Day		@ 50Hz	58 KW
				High Strength @ 60Hz	150 HP
Housing Diameter		3.38 In / 85.85 MM		@ 50Hz	93 KW
			Max Staging: Shaft		
Minimum Casing Size		4.5 In / 114.3 MM		Standard @ 60Hz	276 Stages
				@ 50Hz	390 Stages
Shaft Diameter		0.625 In / 15.875 MM		High Strength @ 60Hz	441 Stages
Area		0.3068 Sq In / 197.93 MM^2		@ 50Hz	625 Stages
			Max Staging: Thrust Bearing - Floater Pump		
Stage Type		Radial Flow		Std (230ºF BHT Max) @ 60Hz	328 Stages
Rotational Direction		CCW		(110ºC BHT Max) @ 50Hz	413 Stages
Fluid Specific Gravity		1.0		Hi- Ld (250ºF BHT Max) @ 60Hz	901 Stages
Housing Pressure Limit		6000 PSI		(121ºC BHT Max) @ 50Hz	1179 Stages

338-2500





These engineering performance curves represent nominal performance based on actual multi-stage testing and certification. All pumps supplied by GPS will be tested and certified to perform within the acceptable limits for head, horsepower and efficiency as defined in the "API RECOMMENDED PRACTICE (11s2) FOR ELECTRIC SUBMERSIBLE PUMP TESTING."

338-2500

HSG	LENGTH		WEIGHT		STANDARD PUMP				ABRASION RESISTANT PUMP			
					Floater		Compression		Floater		Compression	
	Feet	Meters	Lbs	Kgs	Stgs	Part No	Stgs	Part No	Stgs	Part No	Stgs	Part No
10	2.1	0.64	38	17.2	4	1360001			4	1360001AR		
20	3.5	1.07	64	29.0	10	1360002			10	1360002AR		
30	4.9	1.49	89	40.4	15	1360003			15	1360003AR		
40	6.3	1.92	107	48.5	21	1360004			21	1360004AR		
50	7.8	2.38	142	64.4	26	1360005			26	1360005AR		
60	9.1	2.77	167	75.7	31	1360006			31	1360006AR		
70	10.5	3.20	194	88.0	37	1360007			37	1360007AR		
80	11.9	3.63	220	99.8	42	1360008			42	1360008AR		
90	13.3	4.05	245	111.1	48	1360009			48	1360009AR		
100	14.8	4.50	275	124.7	53	1360010			53	1360010AR		

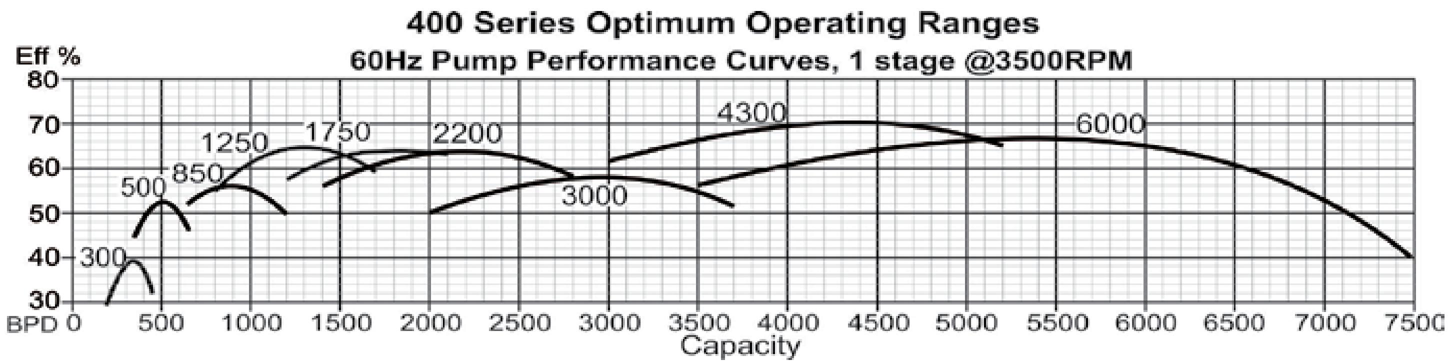
DESCRIPTION	LENGTH		WEIGHT		STANDARD	HIGH STRENGTH
	Feet	Meters	Lbs	Kgs	Part No	Part No
Discharge Head (2-3/8” 8RD EUE)	0.5	0.15	5	2.3	1000100	1300001SST
Bolt On Intake	0.8	0.24	20	9.0	4310001	4320001
Rotary Gas Separator UT	2.4	0.73	45	20.5	4311001	4313001
Rotary Gas Separator LT	2.2	0.67	42	19.0	4312001	4314001

Note: All configurations listed are Carbon Steel. Stainless Steel configurations are available upon request.

ENGINEERING DATA

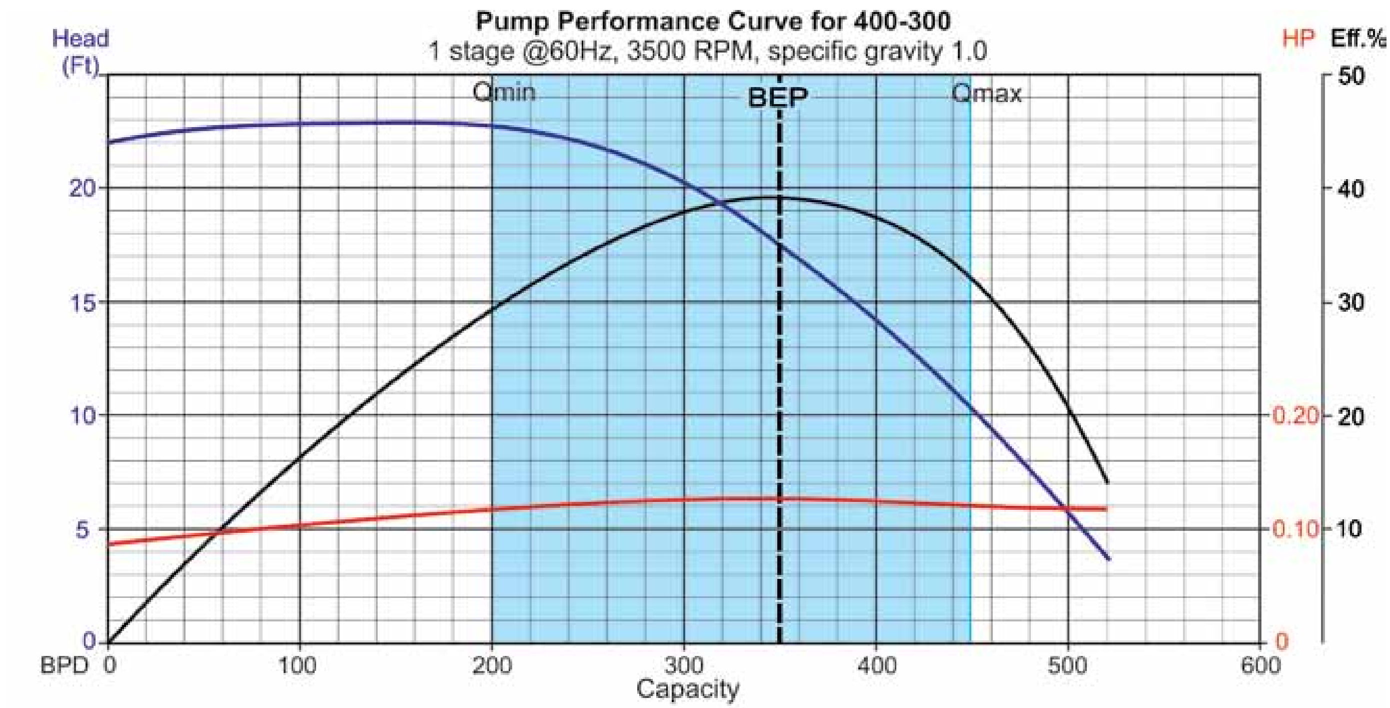
Optimum Operating Range	60 Hz	1800-3100 BPD	Shaft Limit	Standard @ 60Hz	125 HP
	50 Hz	238-410 M^{3}Day		@ 50Hz	78 KW
				High Strength @ 60Hz	200 HP
Housing Diameter		3.38 In / 85.85 MM		@ 50Hz	124 KW
			Max Staging: Shaft		
Minimum Casing Size		4.5 In / 114.3 MM		Standard @ 60Hz	297 Stages
				@ 50Hz	430 Stages
Shaft Diameter		0.687 In / 17.463 MM		High Strength @ 60Hz	476 Stages
Area		0.3712 Sq In / 239.50 MM^2		@ 50Hz	689 Stages
			Max Staging: Thrust Bearing - Floater Pump		
Stage Type		Radial Flow		Std (230ºF BHT Max) @ 60Hz	276 Stages
Rotational Direction		CCW		(110ºC BHT Max) @ 50Hz	332 Stages
Fluid Specific Gravity		1.0		Hi- Ld (250ºF BHT Max) @ 60Hz	794 Stages
Housing Pressure Limit		6000 PSI		(121ºC BHT Max) @ 50Hz	1015 Stages

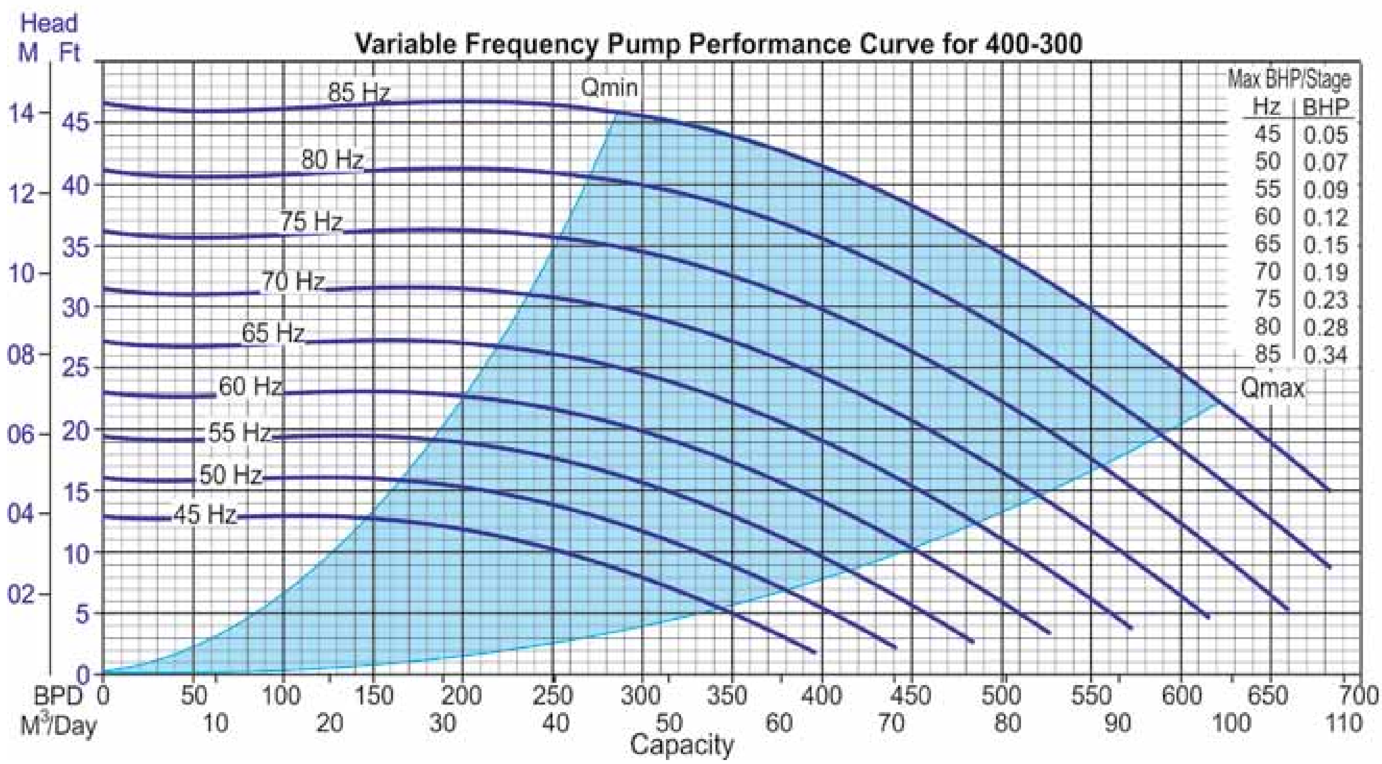
400 Series Pumps



Model	Hz	Construction		Stage		Optimum Operating Range BPD / M^3/Day		BHP/ Stage	Housing Pressure Limit PSI	
		Fltr	Cmprsn	Radial Flow	Mixed Flow				Std	Hi-Prs
400-300	**60**	X	X	X		200	450	0.12	5000	6000
400-300	**50**	X	X	X		26	60	0.07	5000	6000
400-500	**60**	X	X	X		340	660	0.19	5000	6000
400-500	**50**	X	X	X		45	87	0.11	5000	6000
400-850	**60**	X	X	X		640	1200	0.38	5000	6000
400-850	**50**	X	X	X		85	159	0.22	5000	6000
400-1250	**60**	X	X		X	800	1700	0.34	5000	6000
400-1250	**50**	X	X		X	106	225	0.20	5000	6000
400-1750	**60**	X	X		X	1200	2100	0.42	5000	6000
400-1750	**50**	X	X		X	159	275	0.24	5000	6000
400-2200	**60**	X	X		X	1400	2800	0.63	5000	6000
400-2200	**50**	X	X		X	185	371	0.34	5000	6000
400-3000	**60**	X	X		X	2000	3700	0.62	5000	6000
400-3000	**50**	X	X		X	265	490	0.36	5000	6000
400-4300	**60**	X	X		X	3000	5200	1.01	5000	6000
400-4300	**50**	X	X		X	397	689	0.58	5000	6000
400-6000	**60**	X	X		X	3500	7500	1.41	5000	6000
400-6000	**50**	X	X		X	463	993	0.82	5000	6000

400-300





These engineering performance curves represent nominal performance based on actual multi-stage testing and certification. All pumps supplied by GPS will be tested and certified to perform within the acceptable limits for head, horsepower and efficiency as defined in the "API RECOMMENDED PRACTICE (11s2) FOR ELECTRIC SUBMERSIBLE PUMP TESTING."

400-300

HSG	LENGTH		WEIGHT		STANDARD PUMP				ABRASION RESISTANT PUMP			
					Floater		Compression		Floater		Compression	
	Feet	Meters	Lbs	Kgs	Stgs	Part No	Stgs	Part No	Stgs	Part No	Stgs	Part No
10	2.1	0.64	44	19.9	15	1410001	14	1410001C	14	1410001AR	13	1410001ARC
20	3.5	1.06	74	33.5	32	1410002	31	1410002C	31	1410002AR	29	1410002ARC
30	4.9	1.49	105	47.6	49	1410003	48	1410003C	46	1410003AR	45	1410003ARC
40	6.3	1.92	135	61.2	66	1410004	65	1410004C	62	1410004AR	61	1410004ARC
50	7.8	2.37	166	75.3	83	1410005	82	1410005C	77	1410005AR	76	1410005ARC
60	9.2	2.80	196	88.9	100	1410006	98	1410006C	92	1410006AR	91	1410006ARC
70	10.6	3.23	226	102.5	117	1410007			108	1410007AR		
80	12.0	3.66	257	116.5	133	1410008			123	1410008AR		
90	13.4	4.08	287	130.2	150	1410009			139	1410009AR		
100	14.8	4.51	318	144.2	167	1410010			154	1410010AR		
110	16.2	1.94	348	157.8	184	1410011			170	1410011AR		
120	17.6	5.36	378	171.4	201	1410012			186	1410012AR		

DESCRIPTION	LENGTH		WEIGHT		STANDARD	HIGH STRENGTH
	Feet	Meters	Lbs	Kgs	Part No	Part No
Discharge Head (2-3/8" 8RD EUE)	0.5	0.15	5	2.3	1000101	1400016SST
Discharge Head (2-7/8" 8RD EUE)	0.6	0.18	10	4.5	1000102	1400017SST
Bolt On Intake	1.0	0.31	28	12.7	4410003	4430003
Rotary Gas Separator UT	2.7	0.83	70	31.7	4415903	4413901
Rotary Gas Separator LT	3.0	0.91	75	34.0	4412904	4414904

Note: All configurations listed are Carbon Steel. Stainless Steel configurations are available upon request.

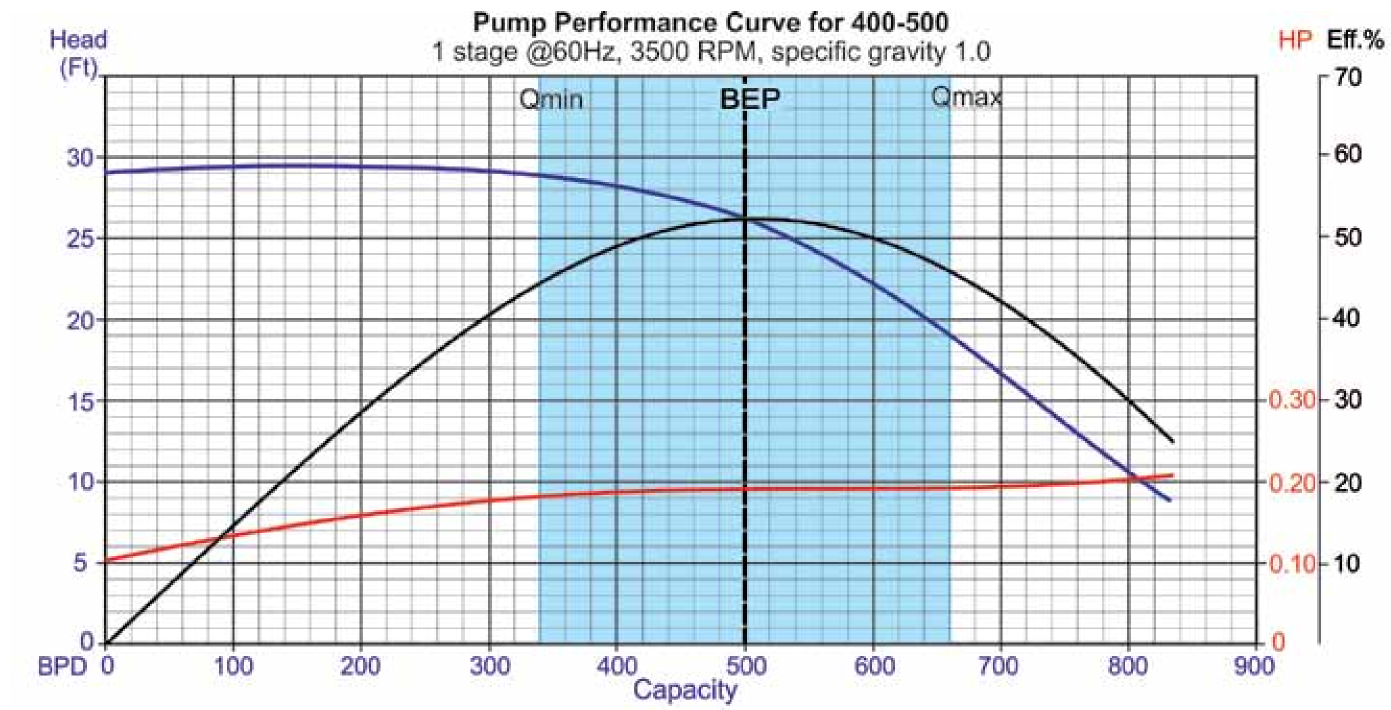
ENGINEERING DATA

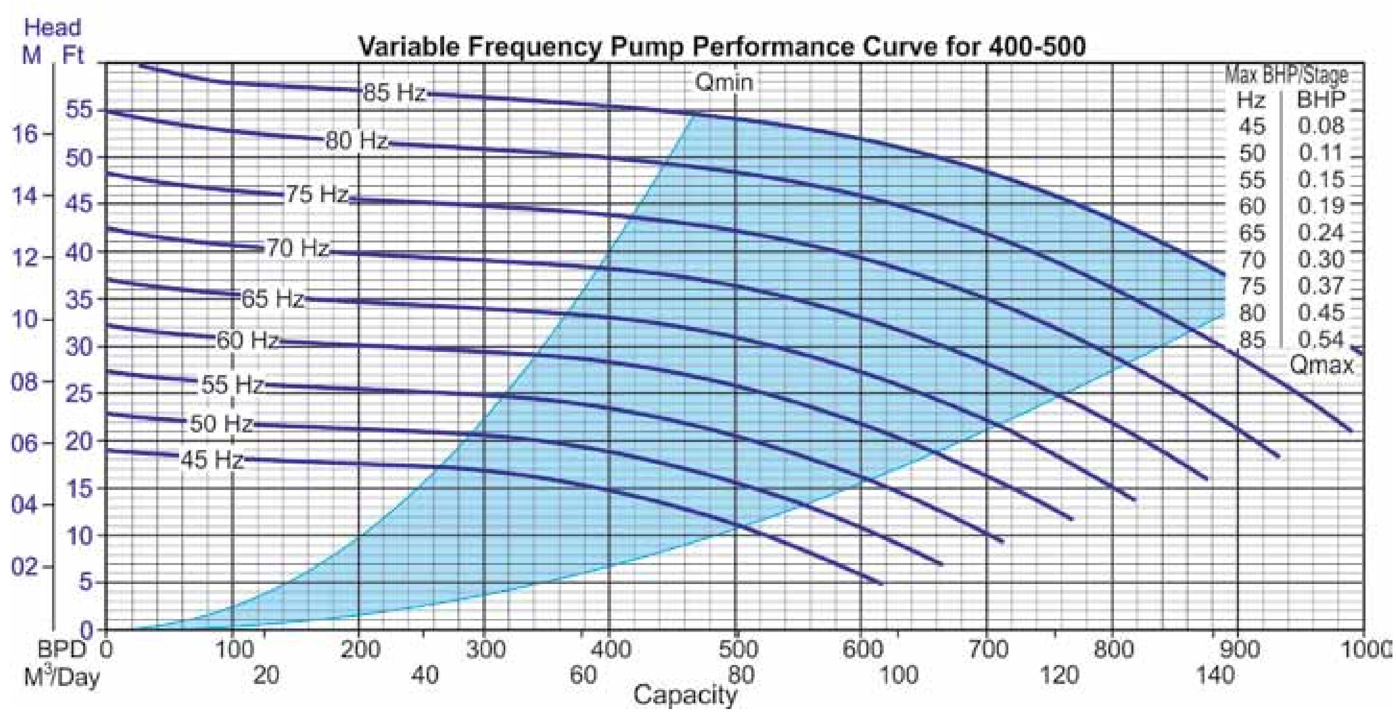
Optimum Operating Range	60 Hz	200-450 BPD
	50 Hz	26-60 M^3Day
Housing Diameter		4.00 In / 101.60 MM
Minimum Casing Size		5.5 In / 139.70 MM
Shaft Diameter		0.625 In / 15.875 MM
Area		0.3068 Sq In / 197.93 MM^2
Stage Type		Radial Flow
Rotational Direction		CCW
Fluid Specific Gravity		1.0
Housing Pressure Limit		5000 PSI

Shaft Limit	Standard @ 60Hz	94 HP
	@ 50Hz	58 KW
	High Strength @ 60Hz	150 HP
	@ 50Hz	93 KW
Max Staging: Shaft		
	Standard @ 60Hz	854 Stages
	@ 50Hz	1231 Stages
	High Strength @ 60Hz	1363 Stages
	@ 50Hz	1961 Stages
Max Staging: Thrust Bearing - Floater Pump		
	Std (230ºF BHT Max) @ 60Hz	386 Stages
	(110ºC BHT Max) @ 50Hz	448 Stages
	Hi- Ld (250ºF BHT Max) @ 60Hz	1775 Stages
	(121ºC BHT Max) @ 50Hz	1182 Stages

* - Thrust bearing staging limits for Compression Pump available upon request

400-500





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400-500

HSG	LENGTH		WEIGHT		STANDARD PUMP				ABRASION RESISTANT PUMP			
					Floater		Compression		Floater		Compression	
	Feet	Meters	Lbs	Kgs	Stgs	Part No	Stgs	Part No	Stgs	Part No	Stgs	Part No
10	2.1	0.64	44	20.0	17	1421001	16	1421001C	16	1421001AR	15	1421001ARC
20	3.5	1.07	73	33.1	36	1421002	35	1421002C	33	1421002AR	32	1421002ARC
30	4.8	1.46	106	48.1	55	1421003	54	1421003C	50	1421003AR	49	1421003ARC
40	6.3	1.92	134	60.8	75	1421004	74	1421004C	68	1421004AR	67	1421004ARC
50	7.8	2.38	165	74.8	94	1421005	93	1421005C	85	1421005AR	84	1421005ARC
60	9.2	2.80	196	88.9	113	1421006	112	1421006C	102	1421006AR	101	1421006ARC
70	10.6	3.23	225	102.0	131	1421007			118	1421007AR		
80	12.0	3.66	258	117.0	151	1421008			136	1421008AR		
90	13.4	4.08	287	130.2	170	1421009			153	1421009AR		
100	14.8	4.51	317	143.8	189	1421010			171	1421010AR		
110	16.2	4.94	348	157.8	208	1421011			188	1421011AR		
120	17.6	5.36	377	171.0	227	1421012			205	1421012AR		

DESCRIPTION	LENGTH		WEIGHT		STANDARD	HIGH STRENGTH
	Feet	Meters	Lbs	Kgs	Part No	Part No
Discharge Head (2-3/8” 8RD EUE)	0.5	0.15	5	2.3	1000101	1400016SST
Discharge Head (2-7/8” 8RD EUE)	0.6	0.18	10	4.5	1000102	1400017SST
Bolt On Intake	1.0	0.31	28	12.7	4410003	4430003
Rotary Gas Separator UT	2.7	0.83	70	31.7	4415903	4413901
Rotary Gas Separator LT	3.0	0.91	75	34.0	4412904	4414904

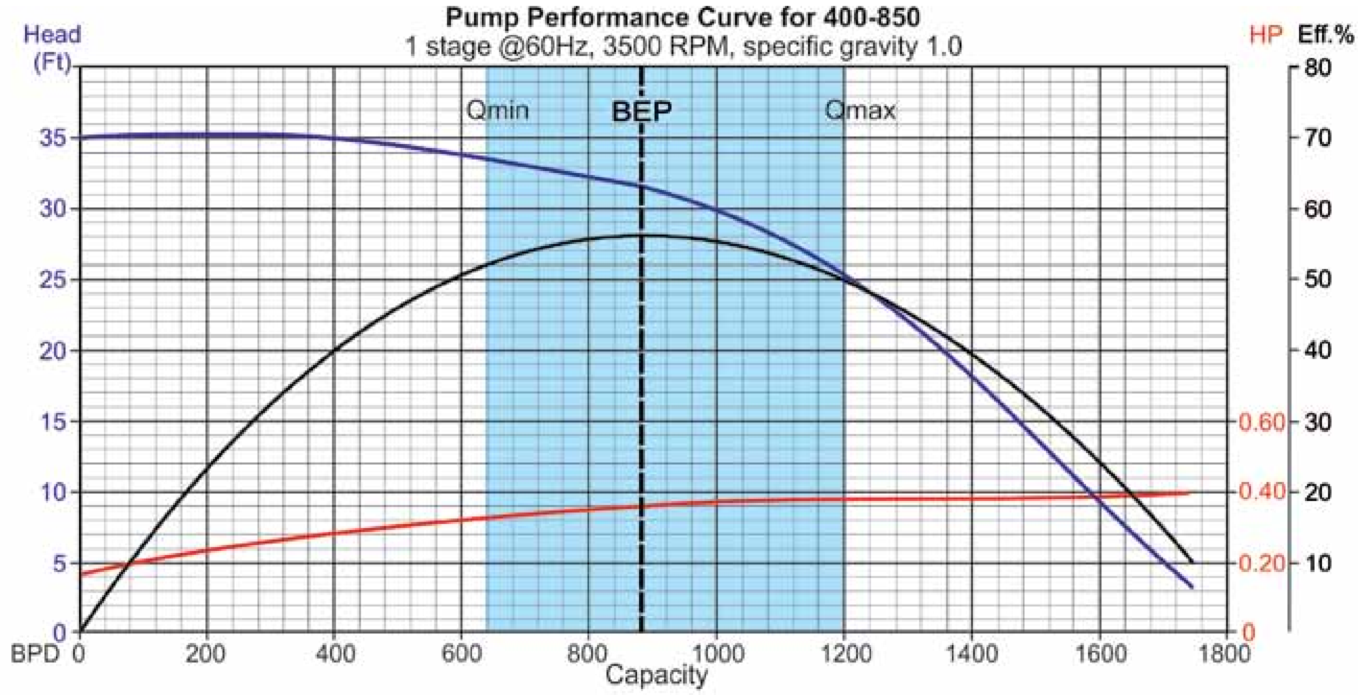
Note: All configurations listed are Carbon Steel. Stainless Steel configurations are available upon request.

ENGINEERING DATA

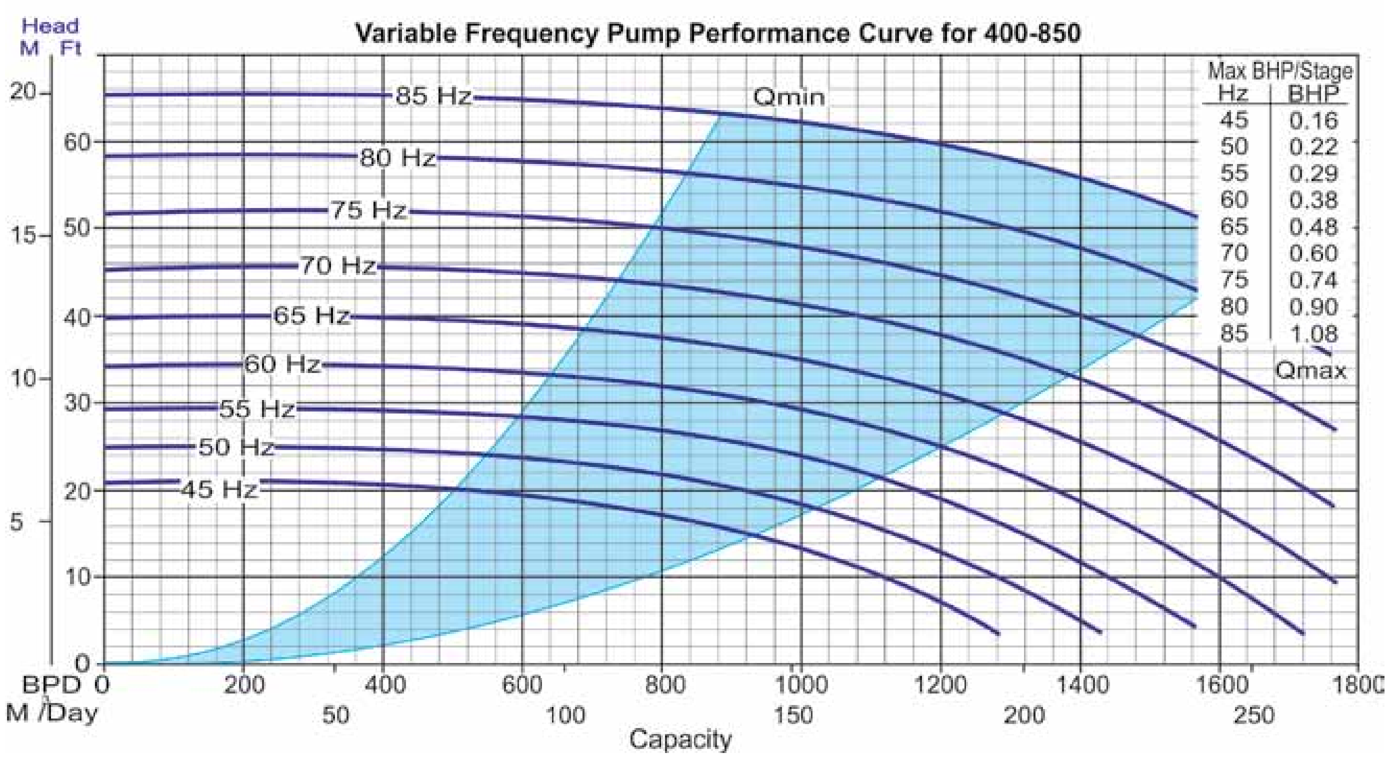
Optimum Operating Range	60 Hz	340-660 BPD	Shaft Limit	Standard @ 60Hz	125 HP
	50 Hz	45-87 M^3Day		@ 50Hz	78 KW
				High Strength @ 60Hz	200 HP
Housing Diameter		4.00 In / 101.60 MM		@ 50Hz	124 KW
			Max Staging: Shaft		
Minimum Casing Size		5.5 In / 139.70 MM		Standard @ 60Hz	595 Stages
				@ 50Hz	945 Stages
Shaft Diameter		0.687 In / 17.463 MM		High Strength @ 60Hz	952 Stages
Area		0.3712 Sq In / 239.50 MM^2		@ 50Hz	1518 Stages
			Max Staging: Thrust Bearing - Floater Pump *		
Stage Type		Radial Flow		Std (230ºF BHT Max) @ 60Hz	236 Stages
Rotational Direction		CCW		(110ºC BHT Max) @ 50Hz	337 Stages
Fluid Specific Gravity		1.0		Hi- Ld (250ºF BHT Max) @ 60Hz	1085 Stages
Housing Pressure Limit		5000 PSI		(121ºC BHT Max) @ 50Hz	1699 Stages

* - Thrust bearing staging limits for Compression Pump available on request

400-850



Pump Performance Curve for 400-850
1 stage @60Hz, 3500 RPM, specific gravity 1.0
Head (Ft)
HP
Eff.%
Qmin
BEP
Qmax
BPD
Capacity



Variable Frequency Pump Performance Curve for 400-850
Head M Ft
85 Hz
80 Hz
75 Hz
70 Hz
65 Hz
60 Hz
55 Hz
50 Hz
45 Hz
Qmin
Qmax
Max BHP/Stage
Hz BHP
45 0.16
50 0.22
55 0.29
60 0.38
65 0.48
70 0.60
75 0.74
80 0.90
85 1.08
BPD
M³/Day
Capacity

400-850

HSG	LENGTH		WEIGHT		STANDARD PUMP				ABRASION RESISTANT PUMP			
					Floater		Compression		Floater		Compression	
	Feet	Meters	Lbs	Kgs	Stgs	Part No	Stgs	Part No	Stgs	Part No	Stgs	Part No
10	2.1	0.64	44	19.9	15	1147001	14	1147001C	14	1147001AR	13	1147001ARC
20	3.5	1.06	74	33.5	32	1147002	31	1147002C	30	1147002AR	29	1147002ARC
30	4.9	1.49	105	47.6	49	1147003	48	1147003C	45	1147003AR	44	1147003ARC
40	6.3	1.92	135	61.2	64	1147004	63	1147004C	59	1147004AR	58	1147004ARC
50	7.8	2.37	166	75.3	82	1147005	81	1147005C	75	1147005AR	74	1147005ARC
60	9.2	2.80	196	88.9	100	1147006	99	1147006C	92	1147006AR	91	1147006ARC
70	10.6	3.23	226	102.5	117	1147007			107	1147007AR		
80	12.0	3.66	257	116.5	133	1147008			122	1147008AR		
90	13.4	4.08	287	130.2	150	1147009			137	1147009AR		
100	14.8	4.51	318	144.2	167	1147010			153	1147010AR		
110	16.2	1.94	348	157.8	184	1147011			168	1147011AR		
120	17.6	5.36	378	171.4	201	1147012			184	1147012AR		

DESCRIPTION	LENGTH		WEIGHT		STANDARD	HIGH STRENGTH
	Feet	Meters	Lbs	Kgs	Part No	Part No
Discharge Head (2-3/8" 8RD EUE)	0.5	0.15	5	2.3	1000101	1400016SST
Discharge Head (2-7/8" 8RD EUE)	0.6	0.18	10	4.5	1000102	1400017SST
Bolt On Intake	1.0	0.31	28	12.7	4410003	4430003
Rotary Gas Separator UT	2.7	0.83	70	31.7	4415903	4413901
Rotary Gas Separator LT	3.0	0.91	75	34.0	4412904	4414904

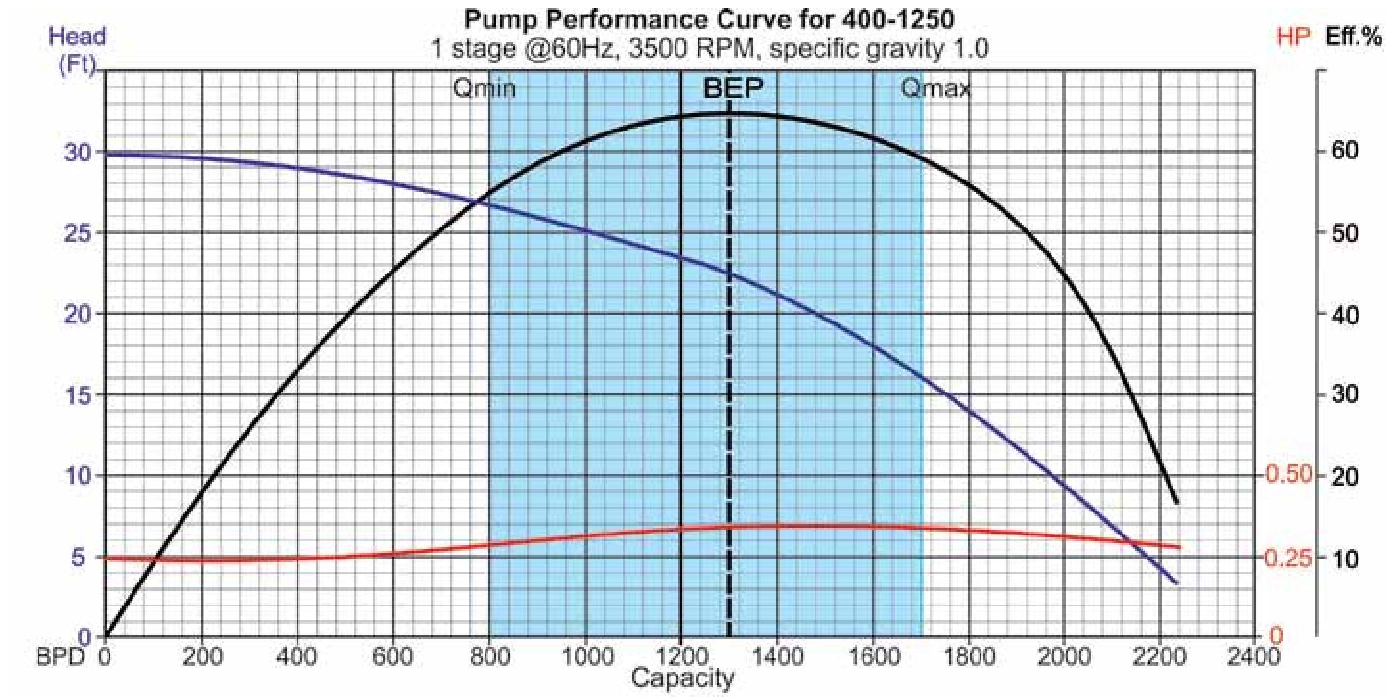
Note: All configurations listed are Carbon Steel. Stainless Steel configurations are available upon request.

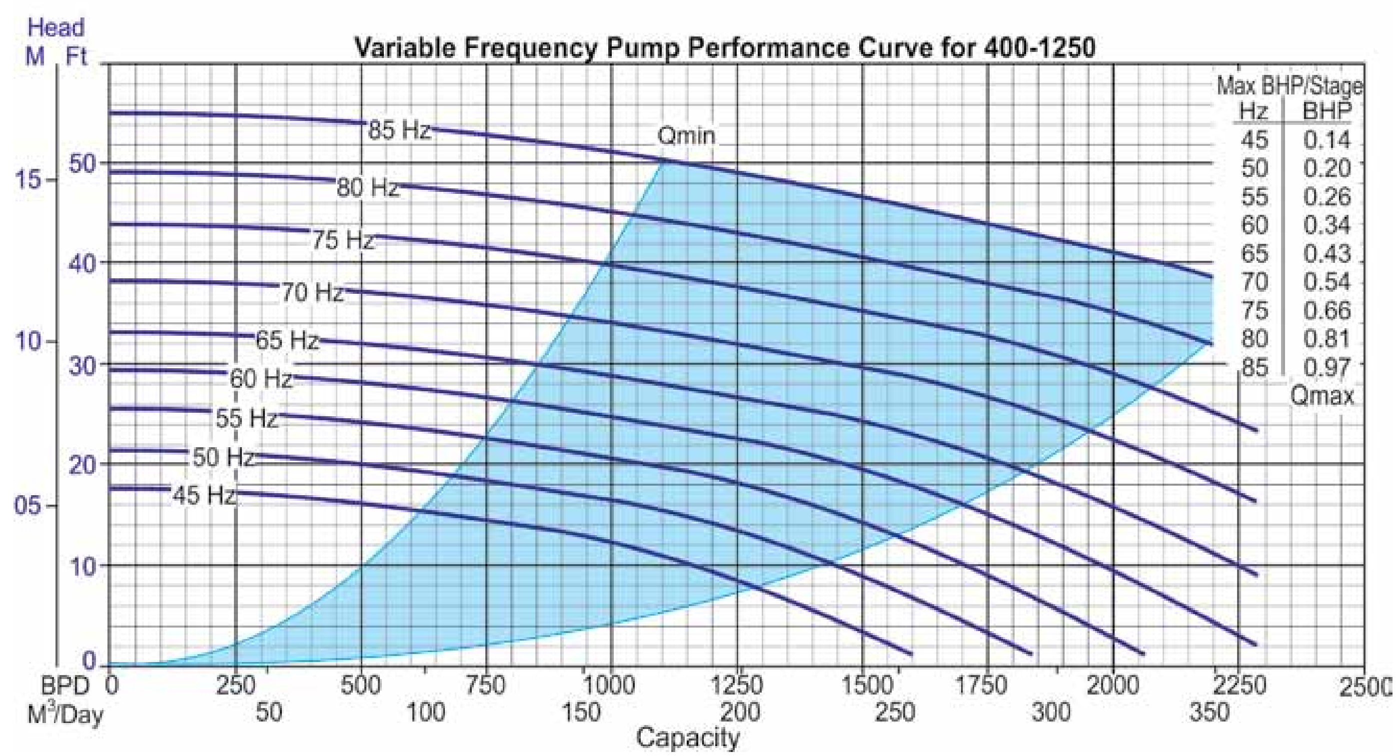
ENGINEERING DATA

Optimum Operating Range	60 Hz	640-1200 BPD	Shaft Limit	Standard @ 60Hz	125 HP
	50 Hz	45-87 M^3Day		@ 50Hz	78 KW
				High Strength @ 60Hz	200 HP
Housing Diameter		4.00 In / 101.60 MM		@ 50Hz	124 KW
			Max Staging: Shaft		
Minimum Casing Size		5.5 In / 139.70 MM		Standard @ 60Hz	305 Stages
				@ 50Hz	577 Stages
Shaft Diameter		0.687 In / 17.463 MM		High Strength @ 60Hz	488 Stages
Area		0.3712 Sq In / 239.50 MM^2		@ 50Hz	927 Stages
			Max Staging: Thrust Bearing - Floater Pump *		
Stage Type		Radial Flow		Std (230ºF BHT Max) @ 60Hz	211 Stages
Rotational Direction		CCW		(110ºC BHT Max) @ 50Hz	321 Stages
Fluid Specific Gravity		1.0		Hi- Ld (250ºF BHT Max) @ 60Hz	970 Stages
Housing Pressure Limit		5000 PSI		(121ºC BHT Max) @ 50Hz	1623 Stages

* - Thrust bearing staging limits for Compression Pump available on request

400-1250





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400-1250

HSG	LENGTH		WEIGHT		STANDARD PUMP				ABRASION RESISTANT PUMP			
					Floater		Compression		Floater		Compression	
	Feet	Meters	Lbs	Kgs	Stgs	Part No	Stgs	Part No	Stgs	Part No	Stgs	Part No
10	2.1	0.64	42	19.1	8	1148001	7	1148001C	8	1148001AR	7	1148001ARC
20	3.5	1.06	70	31.8	16	1148002	15	1148002C	16	1148002AR	15	1148002ARC
30	4.9	1.49	100	45.4	25	1148003	24	1148003C	25	1148003AR	24	1148003ARC
40	6.3	1.92	128	58.1	34	1148004	33	1148004C	34	1148004AR	33	1148004ARC
50	7.8	2.37	158	71.7	43	1148005	42	1148005C	43	1148005AR	42	1148005ARC
60	9.2	2.80	186	74.4	52	1148006	51	1148006C	52	1148006AR	51	1148006ARC
70	10.6	3.23	215	97.5	61	1148007	60	1148007C	61	1148007AR	60	1148007ARC
80	12.0	3.66	244	110.7	70	1148008	69	1148008C	70	1148008AR	69	1148008ARC
90	13.4	4.08	273	123.8	78	1148009	77	1148009C	78	1148009AR	77	1148009ARC
100	14.8	4.51	302	137.0	87	1148010	86	1148010C	87	1148010AR	86	1148010ARC
110	16.2	1.94	331	150.1	96	1148011	95	1148011C	96	1148011AR	95	1148011ARC
120	17.6	5.36	359	162.8	105	1148012	104	1148012C	105	1148012AR	104	1148012ARC
130	19.0	5.79	408	183.6	114	1148013			114	1148013AR		1148013ARC
140	20.4	6.22	438	198.7	123	1148014			123	1148014AR		1148014ARC
150	21.8	6.64	468	210.6	132	1148015			132	1148015AR		1148015ARC

DESCRIPTION	LENGTH		WEIGHT		STANDARD	HIGH STRENGTH
	Feet	Meters	Lbs	Kgs	Part No	Part No
Discharge Head (2-3/8” 8RD EUE)	0.5	0.15	5	2.3	1000101	1400016SST
Discharge Head (2-7/8” 8RD EUE)	0.6	0.18	10	4.5	1000102	1400017SST
Bolt On Intake	1.0	0.31	28	12.7	4410003	4430003
Rotary Gas Separator UT	2.7	0.83	70	31.7	4415903	4413901
Rotary Gas Separator LT	3.0	0.91	75	34.0	4412904	4414904

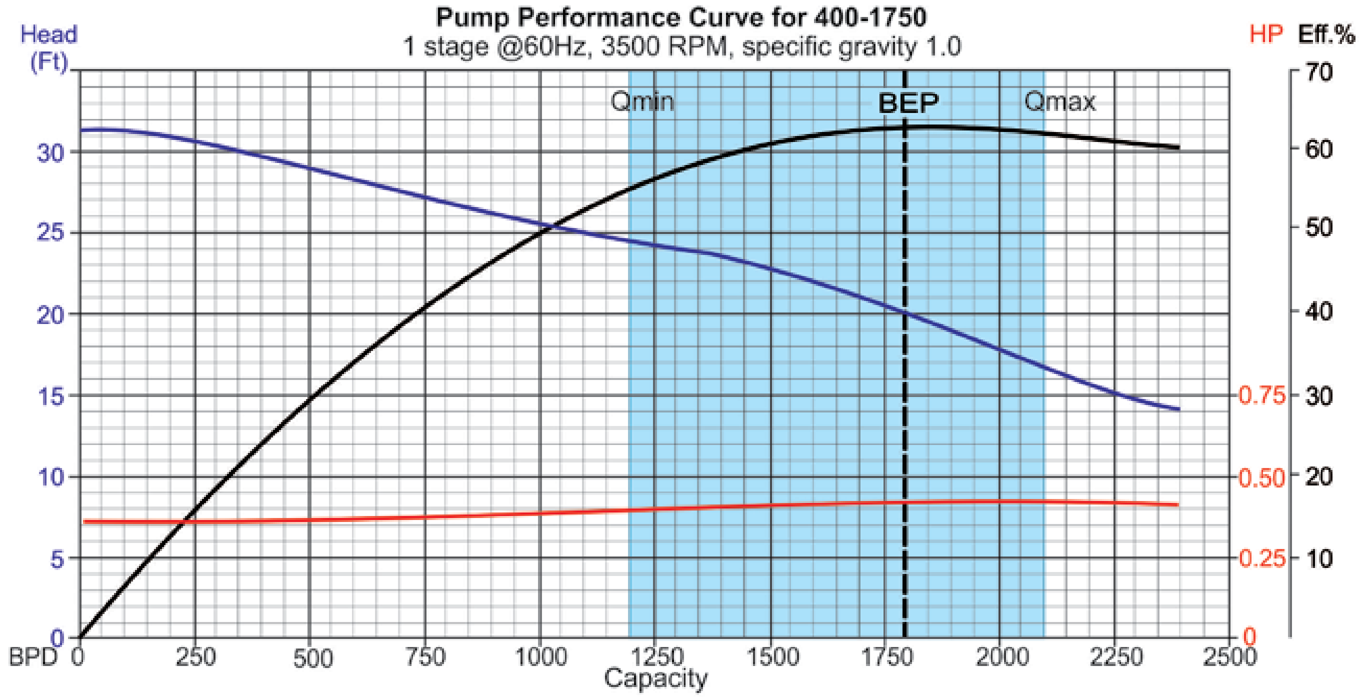
Note: All configurations listed are Carbon Steel. Stainless Steel configurations are available upon request.

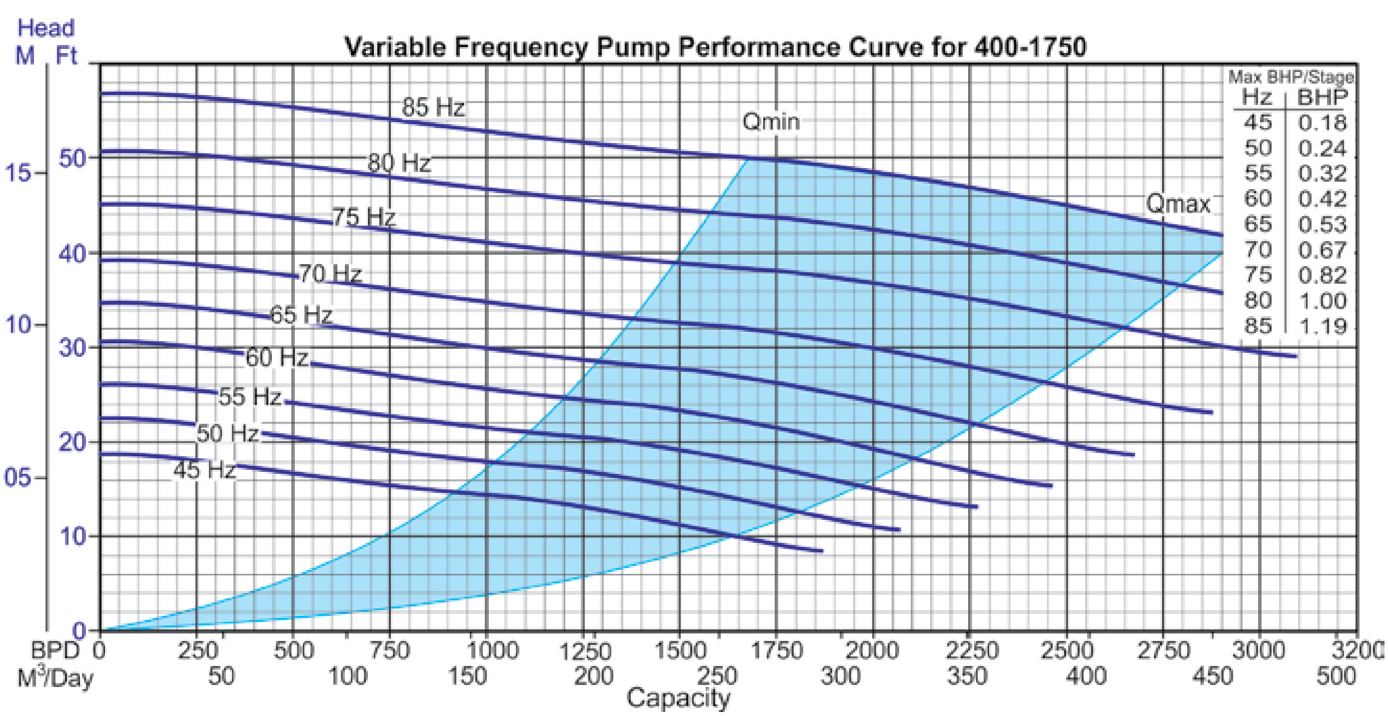
ENGINEERING DATA

Optimum Operating Range	60 Hz	800-1700 BPD	Shaft Limit	Standard @ 60Hz	125 HP
	50 Hz	106-225 M^3Day		@ 50Hz	78 KW
				High Strength @ 60Hz	200 HP
Housing Diameter		4.00 In / 101.60 MM		@ 50Hz	124 KW
			Max Staging: Shaft		
Minimum Casing Size		5.5 In / 139.70 MM		Standard @ 60Hz	347 Stages
				@ 50Hz	503 Stages
Shaft Diameter		0.687 In / 17.463 MM		High Strength @ 60Hz	555 Stages
Area		0.3712 Sq In / 239.50 MM^2		@ 50Hz	806 Stages
			Max Staging: Thrust Bearing - Floater Pump *		
Stage Type		Radial Flow		Std (230ºF BHT Max) @ 60Hz	296 Stages
Rotational Direction		CCW		(110ºC BHT Max) @ 50Hz	321 Stages
Fluid Specific Gravity		1.0		Hi- Ld (250ºF BHT Max) @ 60Hz	970 Stages
Housing Pressure Limit		5000 PSI		(121ºC BHT Max) @ 50Hz	1490 Stages

* - Thrust bearing staging limits for Compression Pump available on request

400-1750





These engineering performance curves represent nominal performance based on actual multi-stage testing and certification. All pumps supplied by GPS will be tested and certified to perform within the acceptable limits for head, horsepower and efficiency as defined in the "API RECOMMENDED PRACTICE (11s2) FOR ELECTRIC SUBMERSIBLE PUMP TESTING."

400-1750

HSG	LENGTH		WEIGHT		STANDARD PUMP				ABRASION RESISTANT PUMP			
					Floater		Compression		Floater		Compression	
	Feet	Meters	Lbs	Kgs	Stgs	Part No	Stgs	Part No	Stgs	Part No	Stgs	Part No
10	2.1	0.64	44	20.0	8	1470001	7	1470001C	8	1470001AR	7	1470001ARC
20	3.5	1.06	74	33.6	16	1470002	15	1470002C	16	1470002AR	15	1470002ARC
30	4.9	1.49	105	17.6	25	1470003	24	1470003C	25	1470003AR	24	1470003ARC
40	6.3	1.92	135	61.2	33	1470004	32	1470004C	33	1470004AR	32	1470004ARC
50	7.8	2.37	166	75.3	41	1470005	41	1470005C	41	1470005AR	41	1470005ARC
60	9.2	2.80	196	88.9	50	1470006	49	1470006C	50	1470006AR	49	1470006ARC
70	10.6	3.23	226	102.5	58	1470007	57	1470007C	58	1470007AR	57	1470007ARC
80	12.0	3.66	257	116.6	67	1470008	66	1470008C	67	1470008AR	66	1470008ARC
90	13.4	4.08	287	130.2	75	1470009	74	1470009C	75	1470009AR	74	1470009ARC
100	14.8	4.51	318	144.2	84	1470010	83	1470010C	84	1470010AR	83	1470010ARC
110	16.2	1.94	348	157.9	92	1470011	91	1470011C	92	1470011AR	91	1470011ARC
120	17.6	5.36	378	171.5	100	1470012	99	1470012C	100	1470012AR	99	1470012ARC
130	19.0	5.79	408	183.6	108	1470013			108	1470013AR		
140	20.4	6.22	438	198.7	116	1470014			116	1470014AR		
150	21.8	6.64	468	210.6	125	1470015			125	1470015AR		

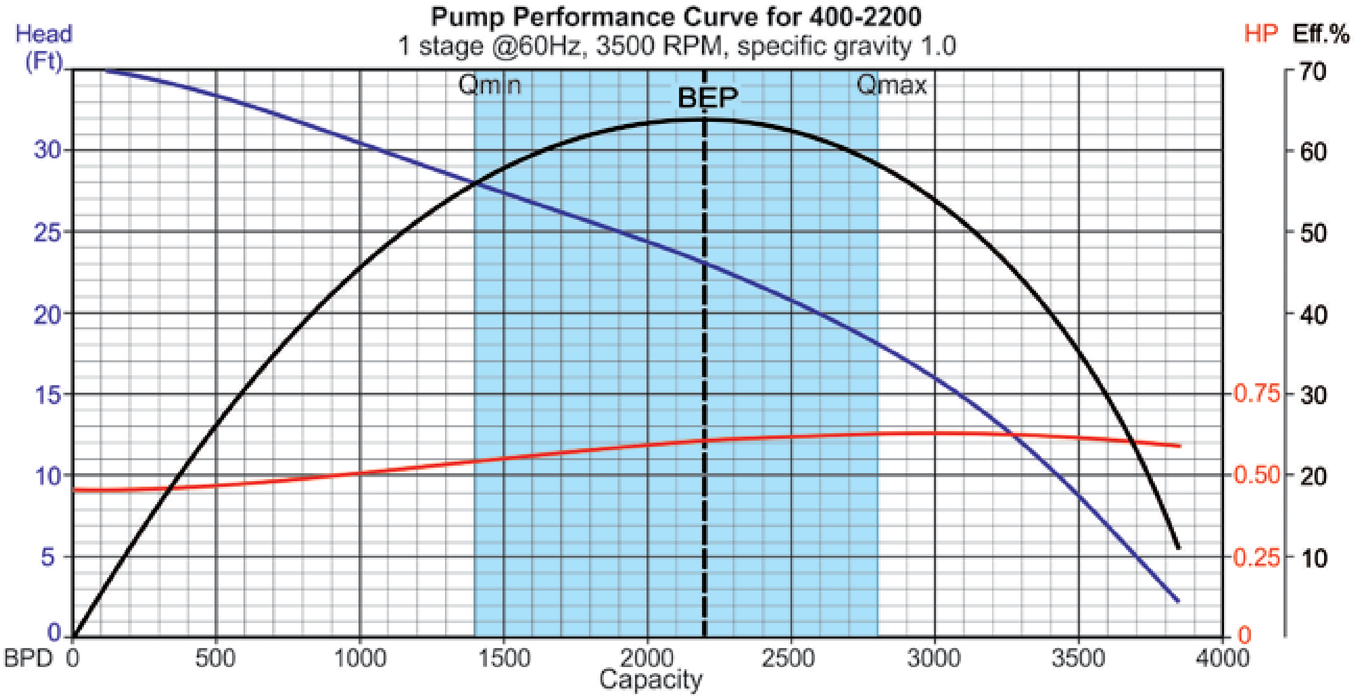
DESCRIPTION	LENGTH		WEIGHT		STANDARD	HIGH STRENGTH
	Feet	Meters	Lbs	Kgs	Part No	Part No
Discharge Head (2-3/8” 8RD EUE)	0.5	0.15	5	2.3	1000101	1400016SST
Discharge Head (2-7/8” 8RD EUE)	0.6	0.18	10	4.5	1000102	1400017SST
Bolt On Intake	1.0	0.31	28	12.7	4410003	4430003
Rotary Gas Separator UT	2.7	0.83	70	31.7	4415903	4413901
Rotary Gas Separator LT	3.0	0.91	75	34.0	4412904	4414904

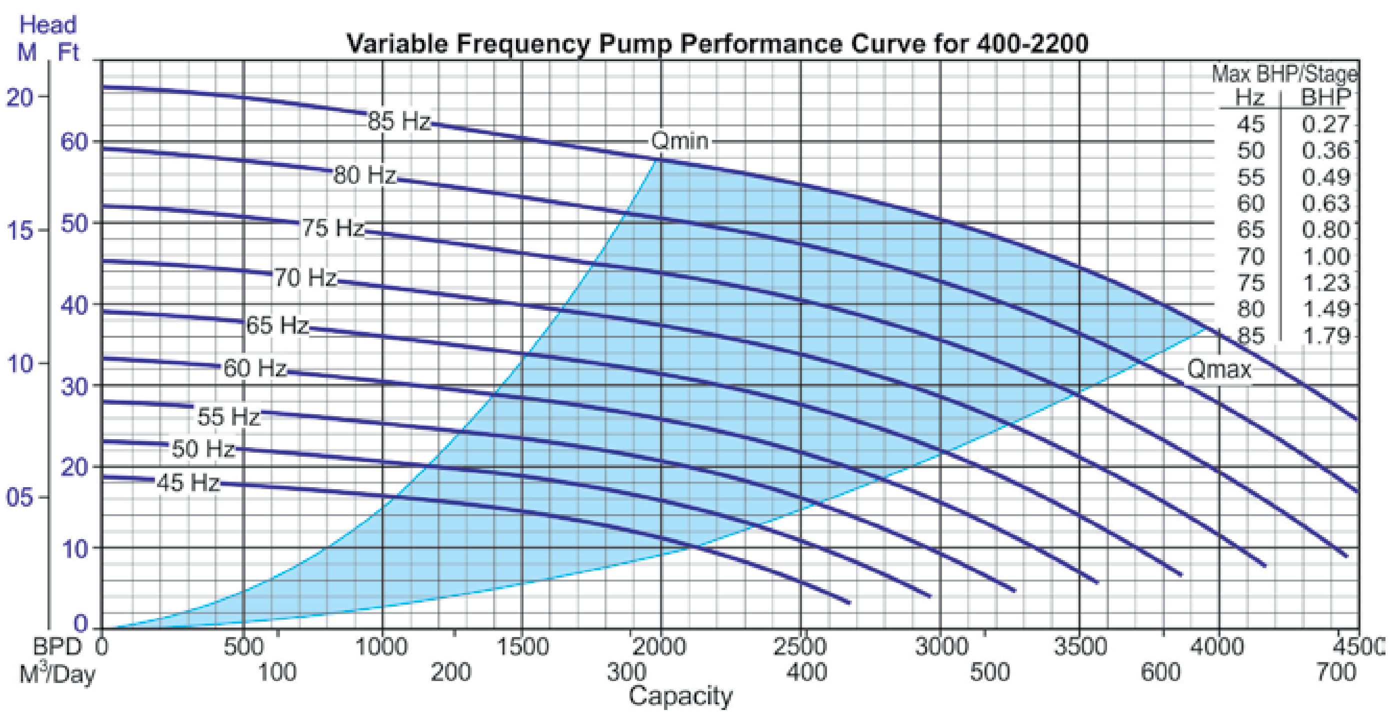
Note: All configurations listed are Carbon Steel. Stainless Steel configurations are available upon request.

ENGINEERING DATA					
Optimum Operating Range	60 Hz	1200-2100 BPD	Shaft Limit	Standard @ 60Hz	125 HP
	50 Hz	159-278 M^3Day		@ 50Hz	78 KW
				High Strength @ 60Hz	200 HP
Housing Diameter		4.00 In / 101.60 MM		@ 50Hz	124 KW
			Max Staging: Shaft		
Minimum Casing Size		5.5 In / 139.70 MM		Standard @ 60Hz	329 Stages
				@ 50Hz	474 Stages
Shaft Diameter		0.687 In / 17.463 MM		High Strength @ 60Hz	526 Stages
Area		0.3712 Sq In / 239.50 MM^2		@ 50Hz	758 Stages
			Max Staging: Thrust Bearing - Floater Pump *		
Stage Type		Radial Flow		Std (230ºF BHT Max) @ 60Hz	253 Stages
Rotational Direction		CCW		(110ºC BHT Max) @ 50Hz	303 Stages
Fluid Specific Gravity		1.0		Hi- Ld (250ºF BHT Max) @ 60Hz	970 Stages
Housing Pressure Limit		5000 PSI		(121ºC BHT Max) @ 50Hz	1682 Stages

* - Thrust bearing staging limits for Compression Pump available on request

400-2200





Max BHP/Stage

Hz	BHP
45	0.27
50	0.36
55	0.49
60	0.63
65	0.80
70	1.00
75	1.23
80	1.49
85	1.79

These engineering performance curves represent nominal performance based on actual multi-stage testing and certification. All pumps supplied by GPS will be tested and certified to perform within the acceptable limits for head, horsepower and efficiency as defined in the "API RECOMMENDED PRACTICE (11s2) FOR ELECTRIC SUBMERSIBLE PUMP TESTING."

400-2200

HSG	LENGTH		WEIGHT		STANDARD PUMP				ABRASION RESISTANT PUMP			
					Floater		Compression		Floater		Compression	
	Feet	Meters	Lbs	Kgs	Stgs	Part No	Stgs	Part No	Stgs	Part No	Stgs	Part No
10	2.1	0.64	44	20.0	8	1142001	7	1142001C	8	1142001AR	7	1142001ARC
20	3.5	1.06	74	33.6	16	1142002	15	1142002C	16	1142002AR	15	1142002ARC
30	4.9	1.49	105	17.6	25	1142003	24	1142003C	25	1142003AR	24	1142003ARC
40	6.3	1.92	135	61.2	33	1142004	32	1142004C	33	1142004AR	32	1142004ARC
50	7.8	2.37	166	75.3	41	1142005	41	1142005C	41	1142005AR	41	1142005ARC
60	9.2	2.80	196	88.9	50	1142006	49	1142006C	50	1142006AR	49	1142006ARC
70	10.6	3.23	226	102.5	58	1142007	57	1142007C	58	1142007AR	57	1142007ARC
80	12.0	3.66	257	116.6	67	1142008	66	1142008C	67	1142008AR	66	1142008ARC
90	13.4	4.08	287	130.2	75	1142009	74	1142009C	75	1142009AR	74	1142009ARC
100	14.8	4.51	318	144.2	84	1142010	83	1142010C	84	1142010AR	83	1142010ARC
110	16.2	1.94	348	157.9	92	1142011	91	1142011C	92	1142011AR	91	1142011ARC
120	17.6	5.36	378	171.5	100	1142012	99	1142012C	100	1142012AR	100	1142012ARC
130	19.0	5.79	408	183.6	108	1142013			108	1142013AR		
140	20.4	6.22	738	198.7	116	1142014			116	1142014AR		
150	21.8	6.64	468	210.6	125	1142015			125	1142015AR		

DESCRIPTION	LENGTH		WEIGHT		STANDARD	HIGH STRENGTH
	Feet	Meters	Lbs	Kgs	Part No	Part No
Discharge Head (2-3/8” 8RD EUE)	0.5	0.15	5	2.3	1000101	1400016SST
Discharge Head (2-7/8” 8RD EUE)	0.6	0.18	10	4.5	1000102	1400017SST
Bolt On Intake	1.0	0.31	28	12.7	4410003	4430003
Rotary Gas Separator UT	2.7	0.83	70	31.7	4415903	4413901
Rotary Gas Separator LT	3.0	0.91	75	34.0	4412904	4414904

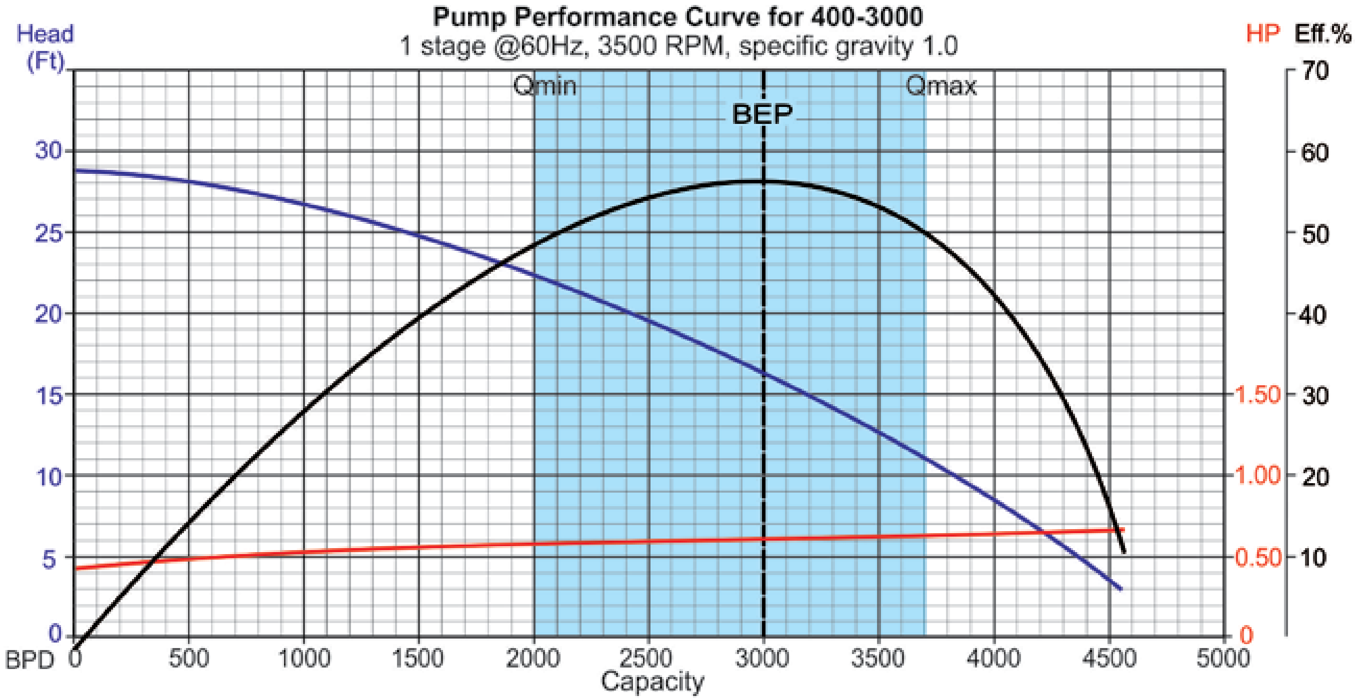
Note: All configurations listed are Carbon Steel. Stainless Steel configurations are available upon request.

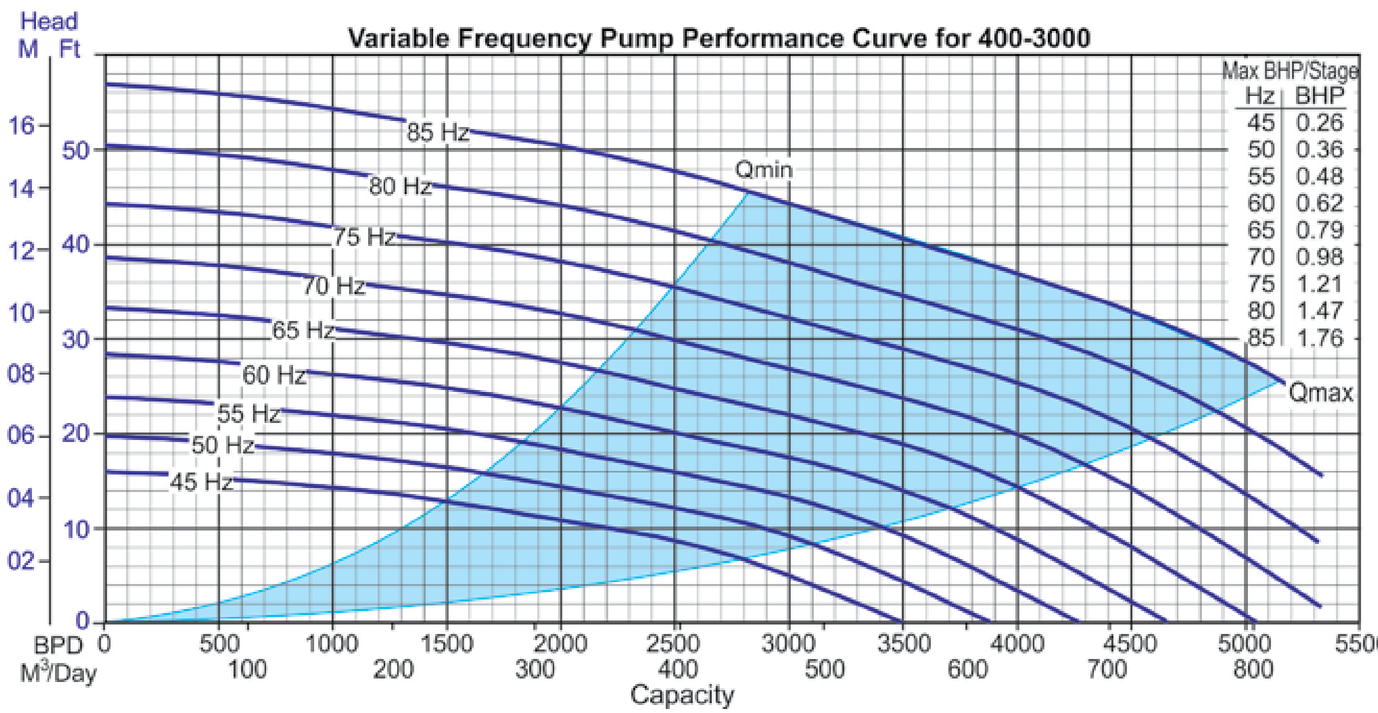
ENGINEERING DATA

Optimum Operating Range	60 Hz	1400-2800 BPD	Shaft Limit	Standard @ 60Hz	125 HP
	50 Hz	185-371 M^3Day		@ 50Hz	78 KW
				High Strength @ 60Hz	200 HP
Housing Diameter		4.00 In / 101.60 MM		@ 50Hz	124 KW
			Max Staging: Shaft		
Minimum Casing Size		5.5 In / 139.70 MM		Standard @ 60Hz	198 Stages
				@ 50Hz	286 Stages
Shaft Diameter		0.687 In / 17.450 MM		High Strength @ 60Hz	317 Stages
Area		0.3712 Sq In / 239.50 MM^2		@ 50Hz	457 Stages
			Max Staging: Thrust Bearing - Floater Pump *		
Stage Type		Radial Flow		Std (230ºF BHT Max) @ 60Hz	224 Stages
Rotational Direction		CCW		(110ºC BHT Max) @ 50Hz	269 Stages
Fluid Specific Gravity		1.0		Hi- Ld (250ºF BHT Max) @ 60Hz	970 Stages
Housing Pressure Limit		5000 PSI		(121ºC BHT Max) @ 50Hz	1489 Stages

* - Thrust bearing staging limits for Compression Pump available on request

400-3000





Max BHP/Stage

Hz	BHP
45	0.26
50	0.36
55	0.48
60	0.62
65	0.79
70	0.98
75	1.21
80	1.47
85	1.76

These engineering performance curves represent nominal performance based on actual multi-stage testing and certification. All pumps supplied by GPS will be tested and certified to perform within the acceptable limits for head, horsepower and efficiency as defined in the "API RECOMMENDED PRACTICE (11s2) FOR ELECTRIC SUBMERSIBLE PUMP TESTING."

400-3000

HSG	LENGTH		WEIGHT		STANDARD PUMP				ABRASION RESISTANT PUMP			
					Floater		Compression		Floater		Compression	
	Feet	Meters	Lbs	Kgs	Stgs	Part No	Stgs	Part No	Stgs	Part No	Stgs	Part No
10	2.1	0.64	44	20.0	6	1490001	6	1490001C	6	1490001AR	6	1490001ARC
20	3.5	1.06	74	33.6	14	1490002	14	1490002C	14	1490002AR	14	1490002ARC
30	4.9	1.49	105	17.6	21	1490003	21	1490003C	21	1490003AR	21	1490003ARC
40	6.3	1.92	135	61.2	29	1490004	29	1490004C	29	1490004AR	29	1490004ARC
50	7.8	2.37	166	75.3	36	1490005	36	1490005C	36	1490005AR	36	1490005ARC
60	9.2	2.80	196	88.9	44	1490006	44	1490006C	44	1490006AR	44	1490006ARC
70	10.6	3.23	226	102.5	51	1490007	51	1490007C	51	1490007AR	51	1490007ARC
80	12.0	3.66	257	116.6	59	1490008	59	1490008C	59	1490008AR	59	1490008ARC
90	13.4	4.08	287	130.2	66	1490009	66	1490009C	66	1490009AR	66	1490009ARC
100	14.8	4.51	318	144.2	74	1490010	74	1490010C	74	1490010AR	74	1490010ARC
110	16.2	1.94	348	157.9	81	1490011	81	1490011C	81	1490011AR	81	1490011ARC
120	17.6	5.36	378	171.5	89	1490012	89	1490012C	89	1490012AR	89	1490012ARC
130	19.0	5.79	408	185.1	96	1490013	96	1490013C	96	1490013AR	96	1490013ARC
140	20.4	6.22	438	198.7	104	1490014	104	1490014C	104	1490014AR	104	1490014ARC
150	21.8	6.64	468	212.3	111	1490015			111	1490015AR		

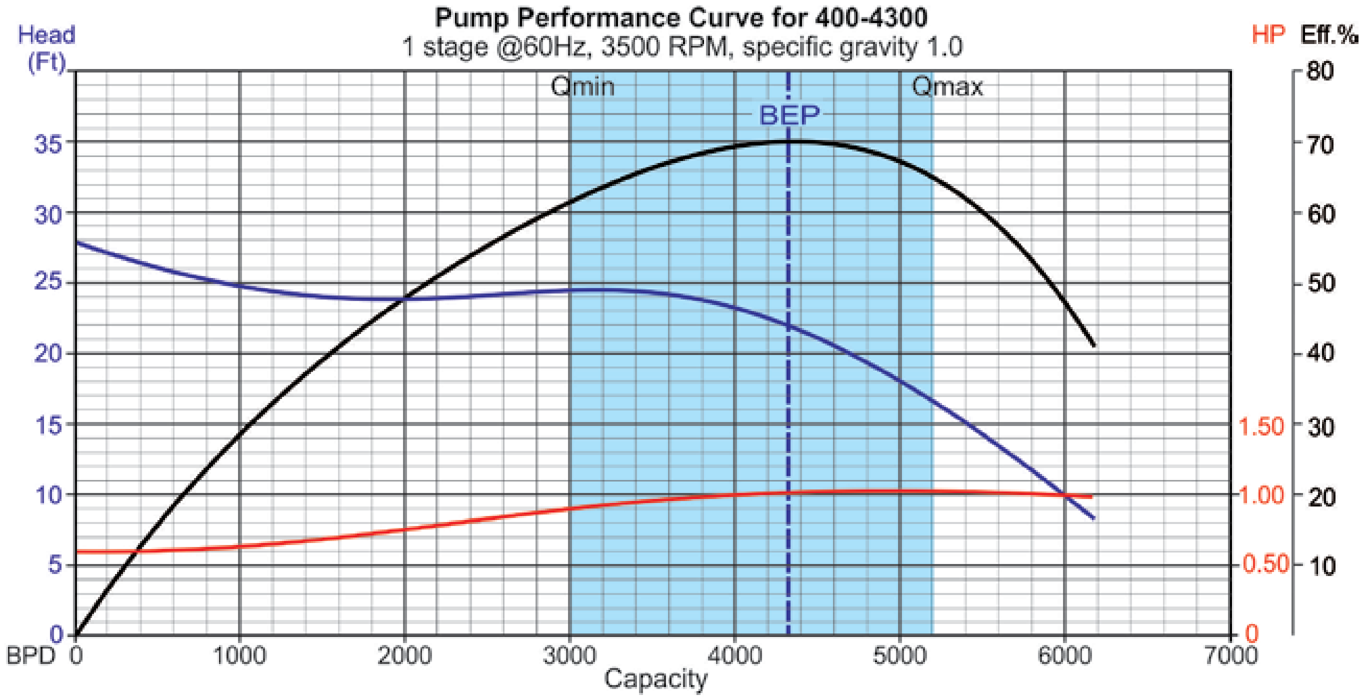
DESCRIPTION	LENGTH		WEIGHT		STANDARD	HIGH STRENGTH
	Feet	Meters	Lbs	Kgs	Part No	Part No
Discharge Head (2-3/8” 8RD EUE)	0.5	0.15	5	2.3	1000101	1400016SST
Discharge Head (2-7/8” 8RD EUE)	0.6	0.18	10	4.5	1000102	1400017SST
Bolt On Intake	1.0	0.31	28	12.7	4410003	4430003
Rotary Gas Separator UT	2.7	0.83	70	31.7	4415903	4413901
Rotary Gas Separator LT	3.0	0.91	75	34.0	4412904	4414904

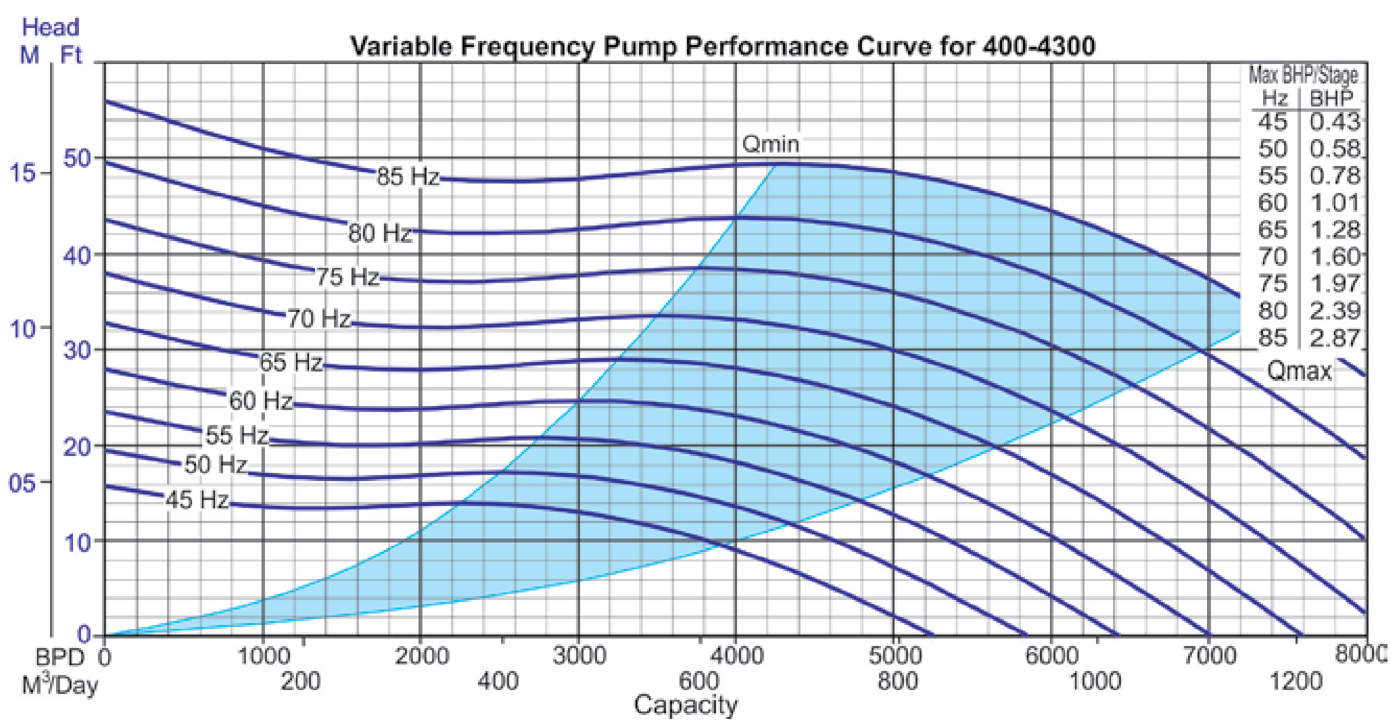
Note: All configurations listed are Carbon Steel. Stainless Steel configurations are available upon request.

ENGINEERING DATA					
Optimum Operating Range	60 Hz	2000-3700 BPD	Shaft Limit	Standard @ 60Hz	256 HP
	50 Hz	265-490 M^{3}Day		@ 50Hz	160 KW
				High Strength @ 60Hz	410 HP
Housing Diameter		4.00 In / 101.60 MM		@ 50Hz	255 KW
			Max Staging: Shaft		
Minimum Casing Size		5.5 In / 139.70 MM		Standard @ 60Hz	400 Stages
				@ 50Hz	576 Stages
Shaft Diameter		0.875 In / 22.225 MM		High Strength @ 60Hz	640 Stages
Area		0.6013 Sq In / 387.95 MM^2		@ 50Hz	922 Stages
			Max Staging: Thrust Bearing - Floater Pump*		
Stage Type		Radial Flow		Std (230ºF BHT Max) @ 60Hz	163 Stages
Rotational Direction		CCW		(110ºC BHT Max) @ 50Hz	196 Stages
Fluid Specific Gravity		1.0		Hi- Ld (250ºF BHT Max) @ 60Hz	823 Stages
Housing Pressure Limit		5000 PSI		(121ºC BHT Max) @ 50Hz	1087 Stages

* - Thrust bearing staging limits for Compression Pump available on request

400-4300





Hz	BHP
45	0.43
50	0.58
55	0.78
60	1.01
65	1.28
70	1.60
75	1.97
80	2.39
85	2.87

These engineering performance curves represent nominal performance based on actual multi-stage testing and certification. All pumps supplied by GPS will be tested and certified to perform within the acceptable limits for head, horsepower and efficiency as defined in the "API RECOMMENDED PRACTICE (11s2) FOR ELECTRIC SUBMERSIBLE PUMP TESTING."

400-4300

HSG	LENGTH		WEIGHT		STANDARD PUMP				ABRASION RESISTANT PUMP			
					Floater		Compression		Floater		Compression	
	Feet	Meters	Lbs	Kgs	Stgs	Part No	Stgs	Part No	Stgs	Part No	Stgs	Part No
10	2.1	0.64	44	20.0	4	1141001	4	1141001C	4	1141001AR	4	1141001ARC
20	3.5	1.06	74	33.6	8	1141002	8	1141002C	8	1141002AR	8	1141002ARC
30	4.9	1.49	105	17.6	13	1141003	13	1141003C	13	1141003AR	13	1141003ARC
40	6.3	1.92	135	61.2	17	1141004	17	1141004C	17	1141004AR	17	1141004ARC
50	7.8	2.37	166	75.3	22	1141005	22	1141005C	22	1141005AR	22	1141005ARC
60	9.2	2.80	196	88.9	27	1141006	27	1141006C	27	1141006AR	27	1141006ARC
70	10.6	3.23	226	102.5	31	1141007	31	1141007C	31	1141007AR	31	1141007ARC
80	12.0	3.66	257	116.6	36	1141008	35	1141008C	36	1141008AR	35	1141008ARC
90	13.4	4.08	287	130.2	40	1141009	40	1141009C	40	1141009AR	40	1141009ARC
100	14.8	4.51	318	144.2	45	1141010	45	1141010C	45	1141010AR	45	1141010ARC
110	16.2	1.94	348	157.9	49	1141011	49	1141011C	49	1141011AR	49	1141011ARC
120	17.6	5.36	378	171.5	54	1141012	54	1141012C	54	1141012AR	54	1141012ARC
130	19.0	5.79	408	185.1	59	1141013	58	1141013C	59	1141013AR	58	1141013ARC
140	20.4	6.22	438	198.7	63	1141014	63	1141014C	63	1141014AR	63	1141014ARC
150	21.8	6.64	468	212.3	68	1141015	68	1141015C	68	1141015AR	68	1141015ARC

DESCRIPTION	LENGTH		WEIGHT		STANDARD	HIGH STRENGTH
	Feet	Meters	Lbs	Kgs	Part No	Part No
Discharge Head (2-3/8” 8RD EUE)	0.5	0.15	5	2.3	1000101	1400016SST
Discharge Head (2-7/8” 8RD EUE)	0.6	0.18	10	4.5	1000102	1400017SST
Bolt On Intake	1.0	0.31	28	12.7	4410003	4430003
Rotary Gas Separator UT	2.7	0.83	70	31.7	4415903	4413901
Rotary Gas Separator LT	3.0	0.91	75	34.0	4412904	4414904

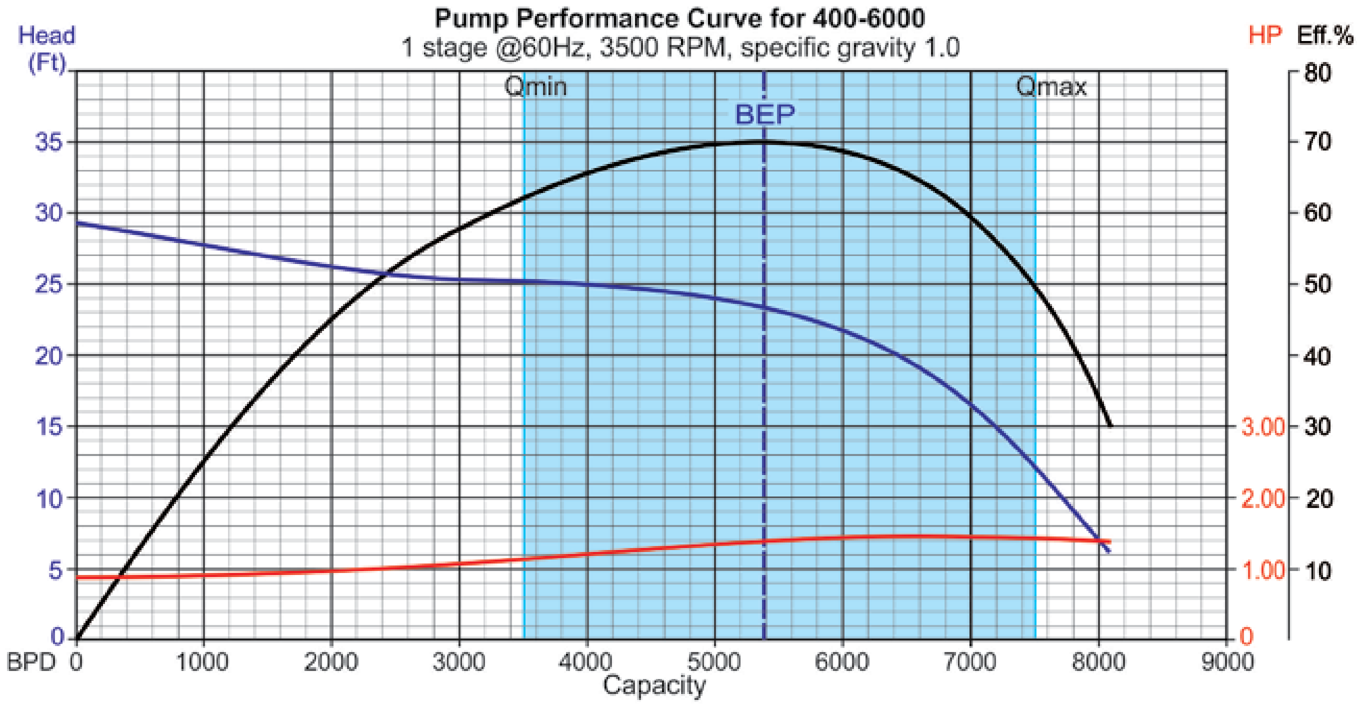
Note: All configurations listed are Carbon Steel. Stainless Steel configurations are available upon request.

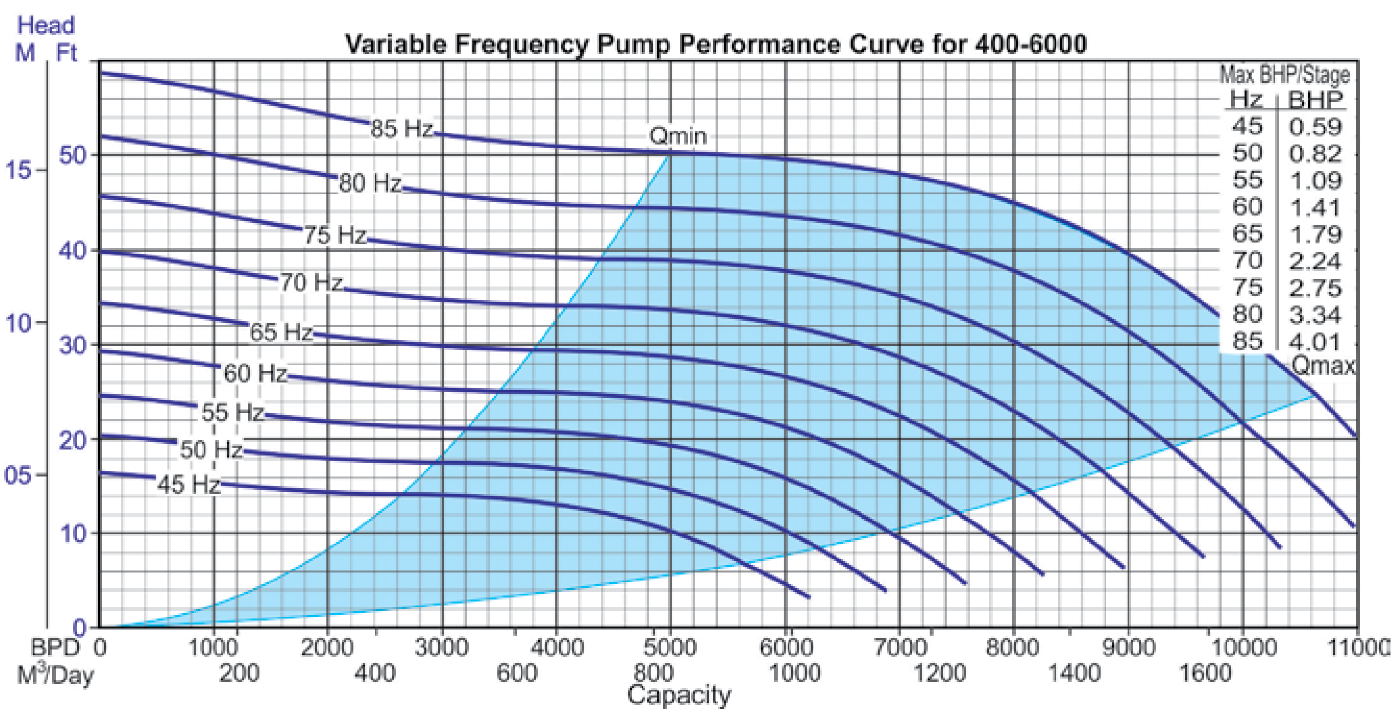
ENGINEERING DATA

Optimum Operating Range	60 Hz	3000-5200 BPD	Shaft Limit	Standard @ 60Hz	256 HP
	50 Hz	397-689 M^3Day		@ 50Hz	160 KW
				High Strength @ 60Hz	410 HP
Housing Diameter		4.00 In / 101.60 MM		@ 50Hz	255 KW
			Max Staging: Shaft		
Minimum Casing Size		5.5 In / 139.70 MM		Standard @ 60Hz	253 Stages
				@ 50Hz	365 Stages
Shaft Diameter		0.875 In / 22.225 MM		High Strength @ 60Hz	406 Stages
Area		0.6013 Sq In / 387.95 MM^2		@ 50Hz	584 Stages
			Max Staging: Thrust Bearing - Floater Pump *		
Stage Type		Radial Flow		Std (230ºF BHT Max) @ 60Hz	146 Stages
Rotational Direction		CCW		(110ºC BHT Max) @ 50Hz	197 Stages
Fluid Specific Gravity		1.0		Hi- Ld (250ºF BHT Max) @ 60Hz	826 Stages
Housing Pressure Limit		5000 PSI		(121ºC BHT Max) @ 50Hz	1091 Stages

* - Thrust bearing staging limits for Compression Pump available on request

400-6000





These engineering performance curves represent nominal performance based on actual multi-stage testing and certification. All pumps supplied by GPS will be tested and certified to perform within the acceptable limits for head, horsepower and efficiency as defined in the "API RECOMMENDED PRACTICE (11s2) FOR ELECTRIC SUBMERSIBLE PUMP TESTING."

400-6000

HSG	LENGTH		WEIGHT		STANDARD PUMP				ABRASION RESISTANT PUMP			
					Floater		Compression		Floater		Compression	
	Feet	Meters	Lbs	Kgs	Stgs	Part No	Stgs	Part No	Stgs	Part No	Stgs	Part No
10	2.1	0.64	44	20.0	4	1145001	4	1145001C	4	1145001AR	4	1145001ARC
20	3.5	1.06	74	33.6	8	1145002	8	1145002C	8	1145002AR	8	1145002ARC
30	4.9	1.49	105	17.6	13	1145003	13	1145003C	13	1145003AR	13	1145003ARC
40	6.3	1.92	135	61.2	17	1145004	17	1145004C	17	1145004AR	17	1145004ARC
50	7.8	2.37	166	75.3	22	1145005	22	1145005C	22	1145005AR	22	1145005ARC
60	9.2	2.80	196	88.9	27	1145006	27	1145006C	27	1145006AR	27	1145006ARC
70	10.6	3.23	226	102.5	31	1145007	31	1145007C	31	1145007AR	31	1145007ARC
80	12.0	3.66	257	116.6	36	1145008	35	1145008C	36	1145008AR	35	1145008ARC
90	13.4	4.08	287	130.2	40	1145009	40	1145009C	40	1145009AR	40	1145009ARC
100	14.8	4.51	318	144.2	45	1145010	45	1145010C	45	1145010AR	45	1145010ARC
110	16.2	1.94	348	157.9	49	1145011	49	1145011C	49	1145011AR	49	1145011ARC
120	17.6	5.36	378	171.5	54	1145012	54	1145012C	54	1145012AR	54	1145012ARC
130	19.0	5.79	408	185.1	59	1145013	58	1145013C	59	1145013AR	58	1145013ARC
140	20.4	6.22	438	198.7	63	1145014	63	1145014C	63	1145014AR	63	1145014ARC
150	21.8	6.64	468	212.3	68	1145015	68	1145015C	68	1145015AR	68	1145015ARC

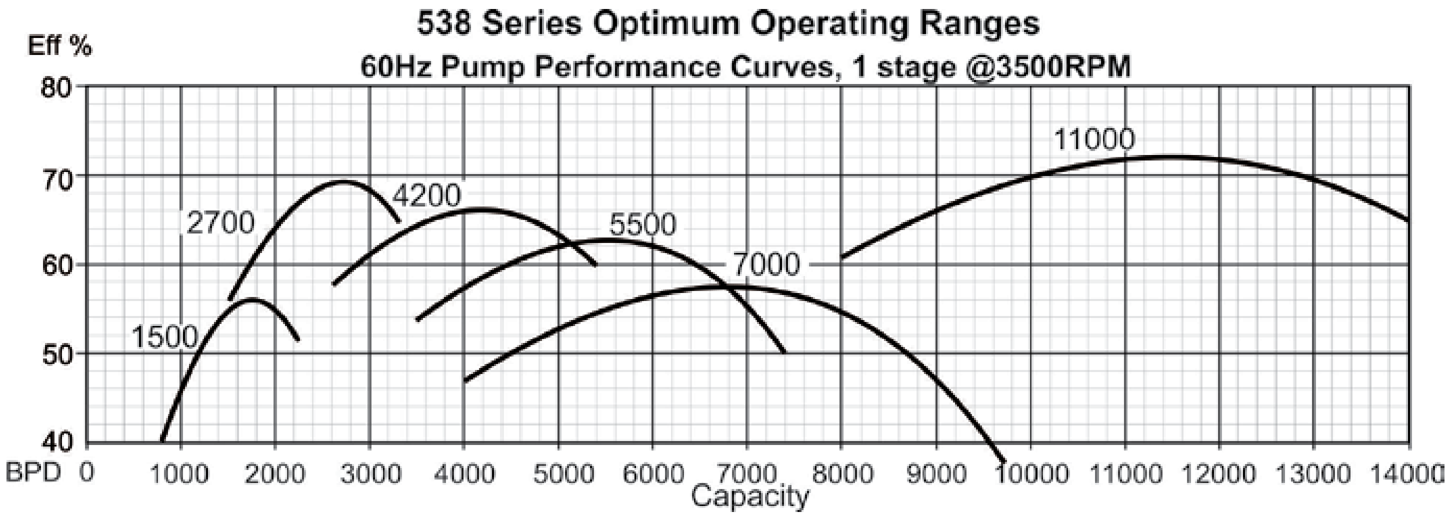
DESCRIPTION	LENGTH		WEIGHT		STANDARD	HIGH STRENGTH
	Feet	Meters	Lbs	Kgs	Part No	Part No
Discharge Head (2-3/8” 8RD EUE)	0.5	0.15	5	2.3	1000101	1400016SST
Discharge Head (2-7/8” 8RD EUE)	0.6	0.18	10	4.5	1000102	1400017SST
Bolt On Intake	1.0	0.31	28	12.7	4410003	4430003
Rotary Gas Separator UT	2.7	0.83	70	31.7	4415903	4413901
Rotary Gas Separator LT	3.0	0.91	75	34.0	4412904	4414904

Note: All configurations listed are Carbon Steel. Stainless Steel configurations are available upon request.

ENGINEERING DATA					
Optimum Operating Range	60 Hz	3500-7500 BPD	Shaft Limit	Standard @ 60Hz	256 HP
	50 Hz	463-993 M^3Day		@ 50Hz	160 KW
				High Strength @ 60Hz	410 HP
Housing Diameter		4.00 In / 101.60 MM		@ 50Hz	255 KW
			Max Staging: Shaft		
Minimum Casing Size		5.5 In / 139.70 MM		Standard @ 60Hz	182 Stages
				@ 50Hz	261 Stages
Shaft Diameter		0.875 In / 22.225 MM		High Strength @ 60Hz	290 Stages
Area		0.6013 Sq In / 387.95 MM^2		@ 50Hz	418 Stages
			Max Staging: Thrust Bearing - Floater Pump		
Stage Type		Radial Flow		Std (230ºF BHT Max) @ 60Hz	157 Stages
Rotational Direction		CCW		(110ºC BHT Max) @ 50Hz	188 Stages
Fluid Specific Gravity		1.0		Hi- Ld (250ºF BHT Max) @ 60Hz	789 Stages
Housing Pressure Limit		5000 PSI		(121ºC BHT Max) @ 50Hz	1042 Stages

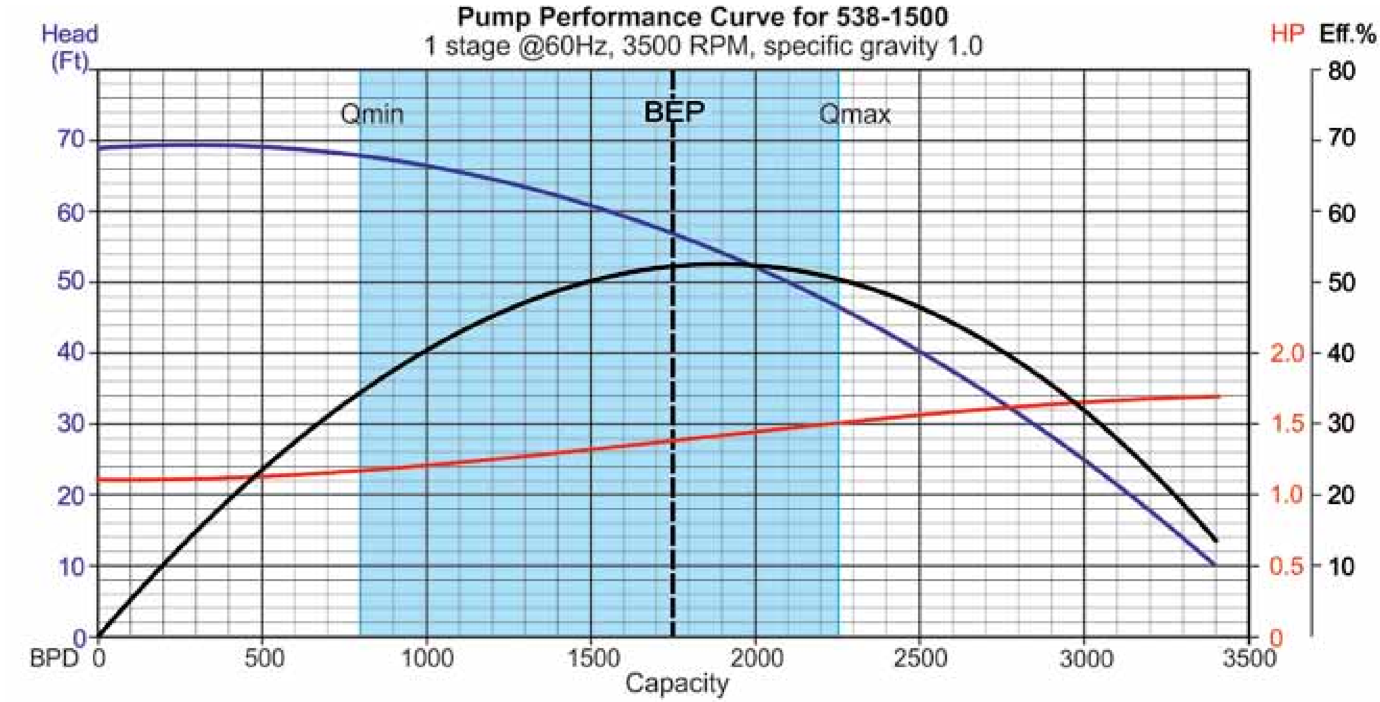
* - Thrust bearing staging limits for Compression Pump available on request

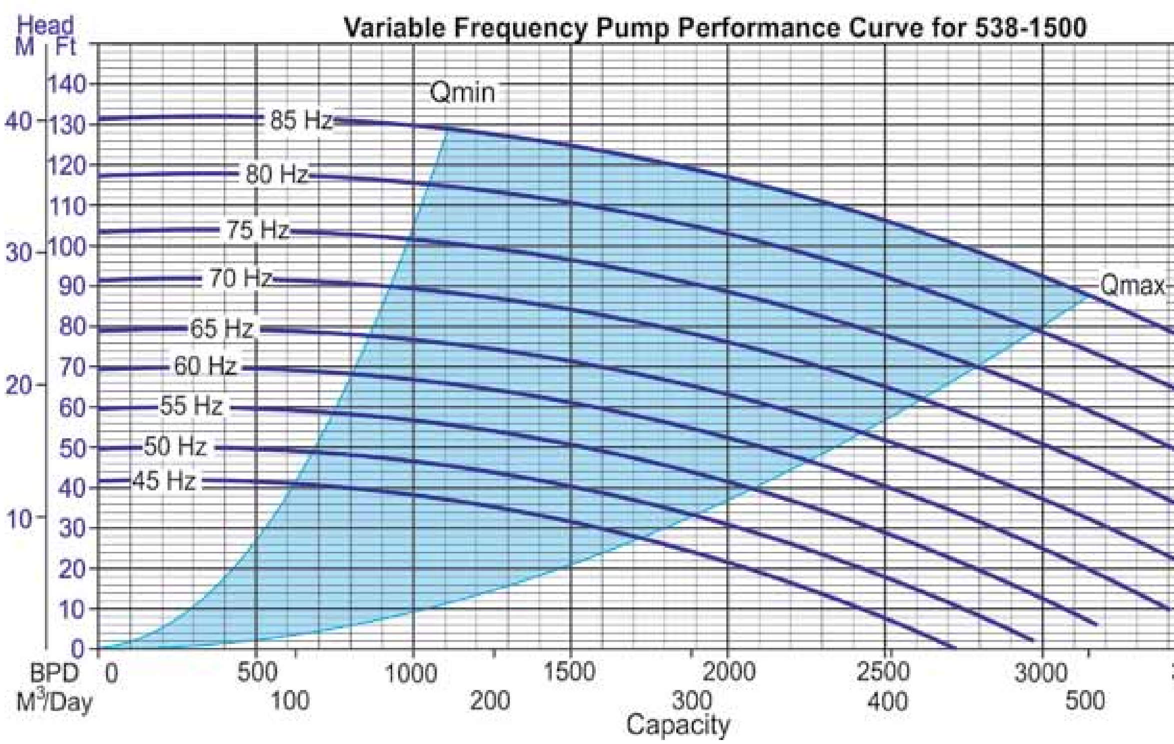
538 Series Pumps



Model	Hz	Construction		Stage		Optimum Operating Range		BHP/ Stage	Housing Pressure Limit PSI	
		Fltr	Cmprsn	Radial Flow	Mixed Flow	BPD	M^3/Day		Std	Hi-Prs
538-1500	60	X	X		X	800	2250	1.53	6000	6000
538-1500	50	X	X		X	106	298	0.89	6000	6000
538-2700	60	X	X		X	1500	3300	1.56	6000	6000
538-2700	50	X	X		X	199	437	0.90	6000	6000
538-4200	60	X	X		X	2600	5400	2.81	6000	6000
538-4200	50	X	X		X	344	715	1.63	6000	6000
538-5500	60	X	X		X	3500	7400	2.76	6000	6000
538-5500	50	X	X		X	464	980	1.60	6000	6000
538-7000	60	X	X		X	4000	9700	3.75	6000	6000
538-7000	50	X	X		X	530	1285	2.17	6000	6000
538-11000	60		X		X	8000	14000	4.41	6000	6000
538-11000	50		X		X	1060	1855	2.55	6000	6000

538-1500





Max BHP/Stage	
Hz	BHP
45	0.65
50	0.89
55	1.18
60	1.53
65	1.95
70	2.43
75	2.99
80	3.63
85	4.35

These engineering performance curves represent nominal performance based on actual multi-stage testing and certification. All pumps supplied by GPS will be tested and certified to perform within the acceptable limits for head, horsepower and efficiency as defined in the "API RECOMMENDED PRACTICE (11s2) FOR ELECTRIC SUBMERSIBLE PUMP TESTING."

538-1500

HSG	LENGTH		WEIGHT		STANDARD PUMP				ABRASION RESISTANT PUMP			
					Floater		Compression		Floater		Compression	
	Feet	Meters	Lbs	Kgs	Stgs	Part No	Stgs	Part No	Stgs	Part No	Stgs	Part No
10	2.5	0.76	117	53.1	7	1532001	7	1532001C	7	1532001AR	7	1532001ARC
20	4.0	1.22	178	80.7	14	1532002	14	1532002C	14	1532002AR	14	1532002ARC
30	5.5	1.52	245	111.1	22	1532003	22	1532003C	22	1532003AR	22	1532003ARC
40	7.0	1.98	311	141.1	30	1532004	30	1532004C	30	1532004AR	30	1532004ARC
50	8.5	2.44	374	169.6	37	1532005	37	1532005C	37	1532005AR	37	1532005ARC
60	10.0	2.90	440	199.6	45	1532006	45	1532006C	45	1532006AR	45	1532006ARC
70	11.5	3.35	502	227.7	52	1532007	52	1532007C	52	1532007AR	52	1532007ARC
80	13.0	3.81	570	258.5	60	1532008	60	1532008C	60	1532008AR	60	1532008ARC
90	14.5	4.11	635	288.0	68	1532009	68	1532009C	68	1532009AR	68	1532009ARC
100	16.0	4.57	698	316.6	75	1532010	75	1532010C	75	1532010AR	75	1532010ARC
110	17.5	5.33	765	347.0	83	1532011	83	1532011C	83	1532011AR	83	1532011ARC
120	19.0	5.49	825	374.2	90	1532012	90	1532012C	90	1532012AR	90	1532012ARC
130	20.5	5.94	892	404.6	98	1532013	98	1532013C	98	1532013AR	98	1532013ARC

DESCRIPTION	LENGTH		WEIGHT		STANDARD	HIGH STRENGTH
	Feet	Meters	Lbs	Kgs	Part No	Part No
Discharge Head (3-1/2" 8RD EUE)	0.8	0.25	23	10.4	1000001	1000103SST
Bolt On Intake	1.2	0.36	50	22.7	4510001	4530001
Rotary Gas Separator UT	3.5	1.1	155	70.3	4511903	4513001
Rotary Gas Separator LT	3.5	1.1	155	70.3	4512904	4512905

Note: All configurations listed are Carbon Steel. Stainless Steel configurations are available upon request.

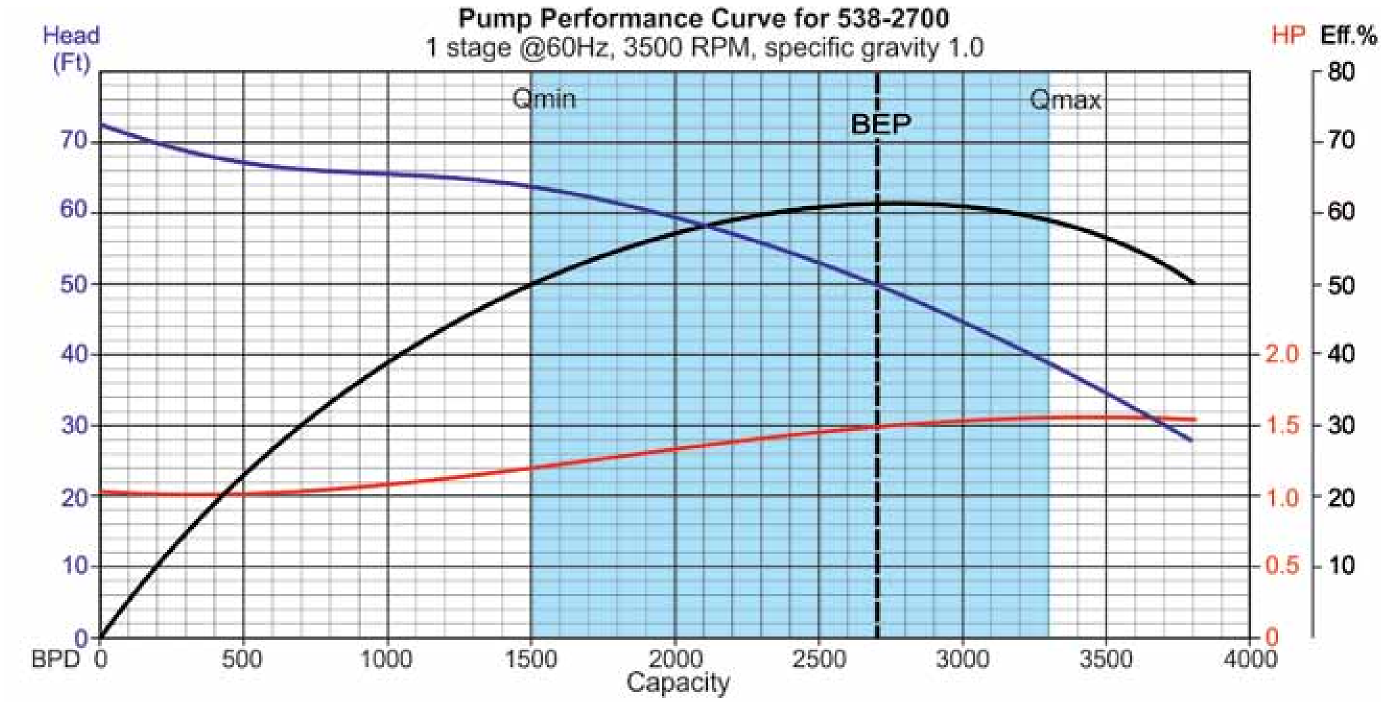
ENGINEERING DATA

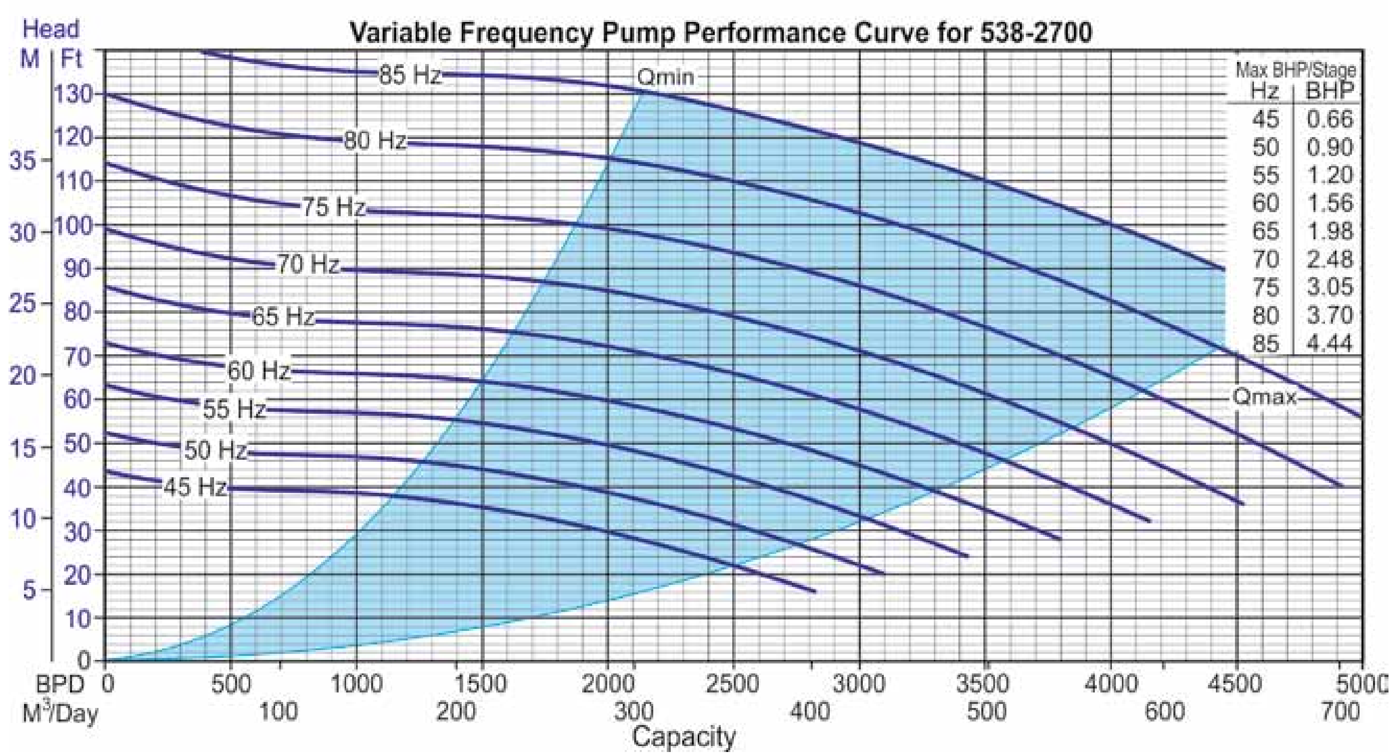
Optimum Operating Range	60 Hz	800-2250 BPD
	50 Hz	106-298 M^3Day
Housing Diameter		5.38 In / 136.65 MM
Minimum Casing Size		7 In / 177.80 MM
Shaft Diameter		0.875 In / 22.225 MM
Area		0.6013 Sq In / 387.93 MM^2
Stage Type		Mixed Flow
Rotational Direction		CCW
Fluid Specific Gravity		1.0
Housing Pressure Limit		6000 PSI

Shaft Limit	Standard @ 60Hz	256 HP
	@ 50Hz	160 KW
	High Strength @ 60Hz	410 HP
	@ 50Hz	255 KW
Max Staging: Shaft		
	Standard @ 60Hz	187 Stages
	@ 50Hz	269 Stages
	High Strength @ 60Hz	299 Stages
	@ 50Hz	431 Stages
Max Staging: Thrust Bearing - Floater Pump *		
	Std (230ºF BHT Max) @ 60Hz	129 Stages
	(110ºC BHT Max) @ 50Hz	154 Stages
	Hi- Ld (250ºF BHT Max) @ 60Hz	587 Stages
	(121ºC BHT Max) @ 50Hz	784 Stages

* - Thrust bearing staging limits for Compression Pump available on request

538-2700


Pump Performance Curve for 538-2700
1 stage @60Hz, 3500 RPM, specific gravity 1.0
Head (Ft)
HP
Eff.%
Qmin
Qmax
BEP
BPD
Capacity
0
500
1000
1500
2000
2500
3000
3500
4000
10
20
30
40
50
60
70
80
0.5
1.0
1.5
2.0


Variable Frequency Pump Performance Curve for 538-2700
Head
M
Ft
85 Hz
80 Hz
75 Hz
70 Hz
65 Hz
60 Hz
55 Hz
50 Hz
45 Hz
Qmin
Qmax
Max BHP/Stage
Hz BHP
45 0.66
50 0.90
55 1.20
60 1.56
65 1.98
70 2.48
75 3.05
80 3.70
85 4.44
BPD
M3/Day
Capacity

538-2700

HSG	LENGTH		WEIGHT		STANDARD PUMP				ABRASION RESISTANT PUMP			
					Floater		Compression		Floater		Compression	
	Feet	Meters	Lbs	Kgs	Stgs	Part No	Stgs	Part No	Stgs	Part No	Stgs	Part No
10	2.5	0.76	117	53.1	7	1537001	7	1537001C	7	1537001AR	7	1537001ARC
20	4.0	1.22	178	80.7	14	1537002	14	1537002C	14	1537002AR	14	1537002ARC
30	5.0	1.52	245	111.1	22	1537003	22	1537003C	22	1537003AR	22	1537003ARC
40	6.5	1.98	311	141.1	30	1537004	30	1537004C	30	1537004AR	30	1537004ARC
50	8.0	2.44	374	169.6	37	1537005	37	1537005C	37	1537005AR	37	1537005ARC
60	9.5	2.90	440	199.6	45	1537006	45	1537006C	45	1537006AR	45	1537006ARC
70	11.0	3.35	502	227.7	52	1537007	52	1537007C	52	1537007AR	52	1537007ARC
80	12.5	3.81	570	258.5	60	1537008	60	1537008C	60	1537008AR	60	1537008ARC
90	13.5	4.11	635	288.0	68	1537009	68	1537009C	68	1537009AR	68	1537009ARC
100	15.0	4.57	698	316.6	75	1537010	75	1537010C	75	1537010AR	75	1537010ARC
110	17.5	5.33	765	347.0	83	1537011	83	1537011C	83	1537011AR	83	1537011ARC
120	18.0	5.49	825	374.2	90	1537012	90	1537012C	90	1537012AR	90	1537012ARC
130	19.5	5.94	892	404.6	98	1537013	98	1537013C	98	1537013AR	98	1537013ARC

DESCRIPTION	LENGTH		WEIGHT		STANDARD	HIGH STRENGTH
	Feet	Meters	Lbs	Kgs	Part No	Part No
Discharge Head (3-1/2” 8RD EUE)	0.8	0.25	23	10.4	1000001	1000103SST
Bolt On Intake	1.2	0.36	50	22.7	4510001	4530001
Rotary Gas Separator UT	3.5	1.1	155	70.3	4511903	4513001
Rotary Gas Separator LT	3.5	1.1	155	70.3	4512904	4512905

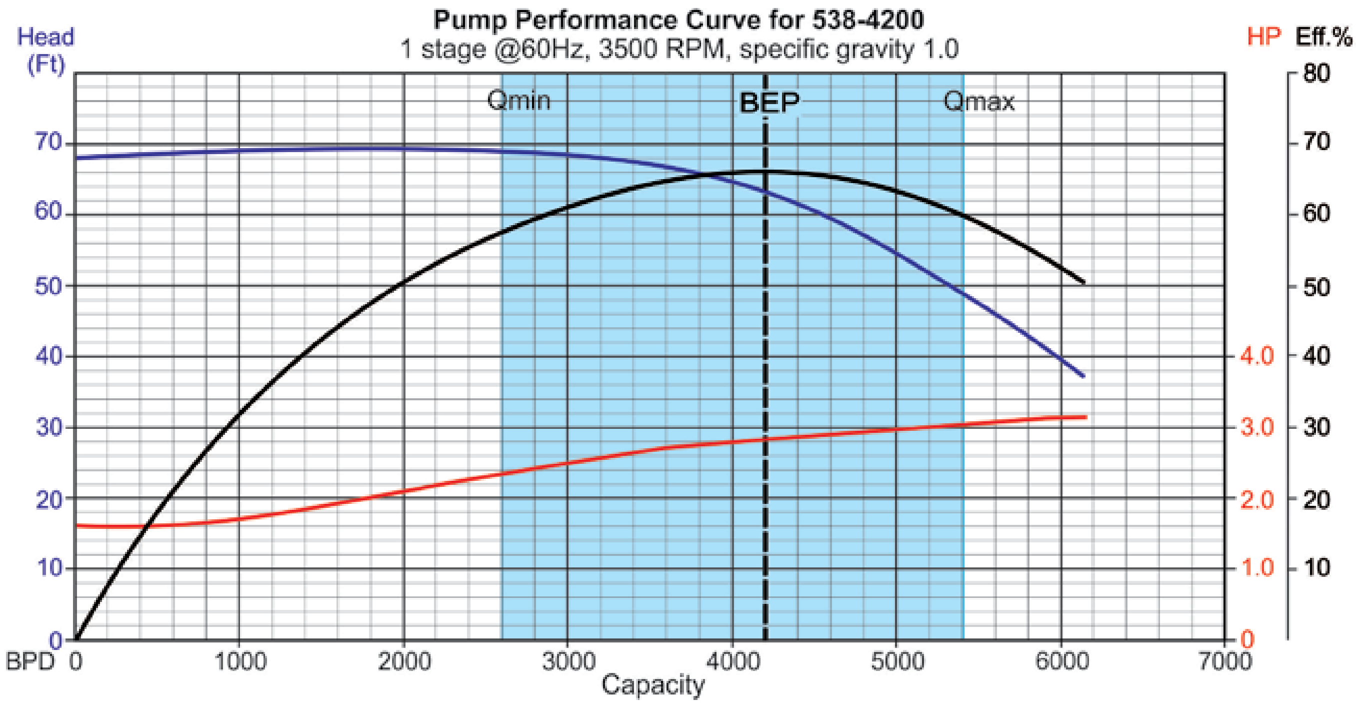
Note: All configurations listed are Carbon Steel. Stainless Steel configurations are available upon request.

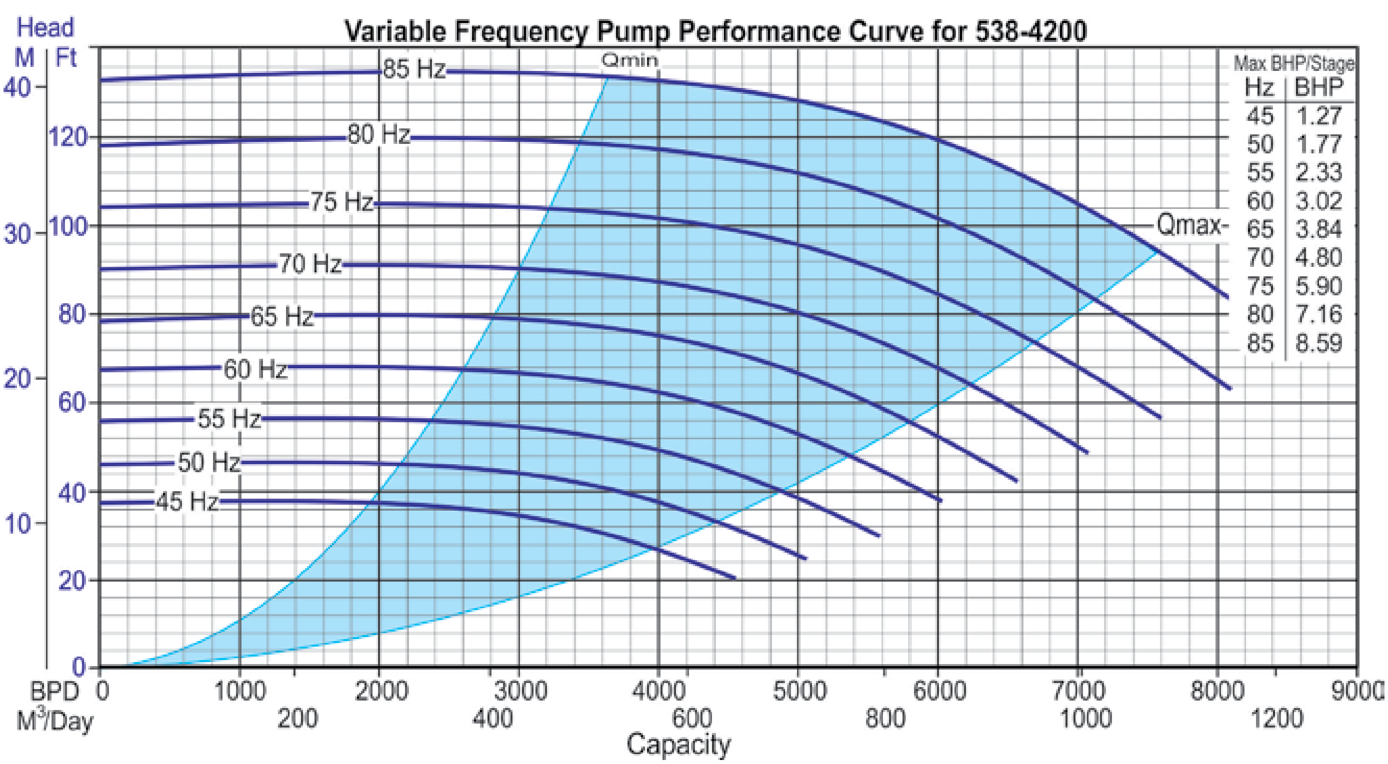
ENGINEERING DATA

Optimum Operating Range	60 Hz	1500-3300 BPD	Shaft Limit	Standard @ 60Hz	256 HP
	50 Hz	199-437 M^3Day		@ 50Hz	160 KW
				High Strength @ 60Hz	410 HP
Housing Diameter		5.38 In / 136.65 MM		@ 50Hz	255 KW
			Max Staging: Shaft		
Minimum Casing Size		7 In / 177.80 MM		Standard @ 60Hz	164 Stages
				@ 50Hz	236 Stages
Shaft Diameter		0.875 In / 22.225 MM		High Strength @ 60Hz	263 Stages
Area		0.6013 Sq In / 387.93 MM^2		@ 50Hz	378 Stages
			Max Staging: Thrust Bearing - Floater Pump *		
Stage Type		Mixed Flow		Std (230ºF BHT Max) @ 60Hz	132 Stages
Rotational Direction		CCW		(110ºC BHT Max) @ 50Hz	159 Stages
Fluid Specific Gravity		1.0		Hi- Ld (250ºF BHT Max) @ 60Hz	604 Stages
Housing Pressure Limit		6000 PSI		(121ºC BHT Max) @ 50Hz	806 Stages

* - Thrust bearing staging limits for Compression Pump available on request

538-4200





These engineering performance curves represent nominal performance based on actual multi-stage testing and certification. All pumps supplied by GPS will be tested and certified to perform within the acceptable limits for head, horsepower and efficiency as defined in the “API RECOMMENDED PRACTICE (11s2) FOR ELECTRIC SUBMERSIBLE PUMP TESTING.”

538-4200

HSG	LENGTH		WEIGHT		STANDARD PUMP				ABRASION RESISTANT PUMP			
					Floater		Compression		Floater		Compression	
	Feet	Meters	Lbs	Kgs	Stgs	Part No	Stgs	Part No	Stgs	Part No	Stgs	Part No
10	2.5	0.76	115	52	5	1539001	5	1539001C	5	1539001AR	5	1539001ARC
20	4.0	1.22	180	82	11	1539002	11	1539002C	11	1539002AR	11	1539002ARC
30	5.0	1.52	245	111	17	1539003	17	1539003C	17	1539003AR	17	1539003ARC
40	6.5	1.98	311	141	23	1539004	23	1539004C	23	1539004AR	23	1539004ARC
50	8.0	2.44	376	171	29	1539005	29	1539005C	29	1539005AR	29	1539005ARC
60	9.5	2.90	441	200	35	1539006	35	1539006C	35	1539006AR	35	1539006ARC
70	11.0	3.35	507	230	41	1539007	41	1539007C	41	1539007AR	41	1539007ARC
80	12.5	3.81	572	259	47	1539008	47	1539008C	47	1539008AR	47	1539008ARC
90	13.5	4.11	637	289	53	1539009	53	1539009C	53	1539009AR	53	1539009ARC
100	15.0	4.57	703	319	59	1539010	59	1539010C	59	1539010AR	59	1539010ARC
110	17.5	5.33	768	348	65	1539011	65	1539011C	65	1539011AR	65	1539011ARC
120	18.0	5.49	833	378	71	1539012	71	1539012C	71	1539012AR	71	1539012ARC
130	19.5	5.94	899	408	77	1539013	77	1539013C	77	1539013AR	77	1539013ARC
140	20.0	6.10	964	437	83	1539014	83	1539014C	83	1539014AR	83	1539014ARC
150	22.0	6.71	1029	467	89	1539015	89	1539015C	89	1539015AR	89	1539015ARC

DESCRIPTION	LENGTH		WEIGHT		STANDARD	HIGH STRENGTH
	Feet	Meters	Lbs	Kgs	Part No	Part No
Discharge Head (3-1/2” 8RD EUE)	0.8	0.25	23	10.4	1000001	1000103SST
Bolt On Intake	1.2	0.36	50	22.7	4510001	4530001
Rotary Gas Separator UT	3.5	1.1	155	70.3	4511903	4513001
Rotary Gas Separator LT	3.5	1.1	155	70.3	4512904	4512905

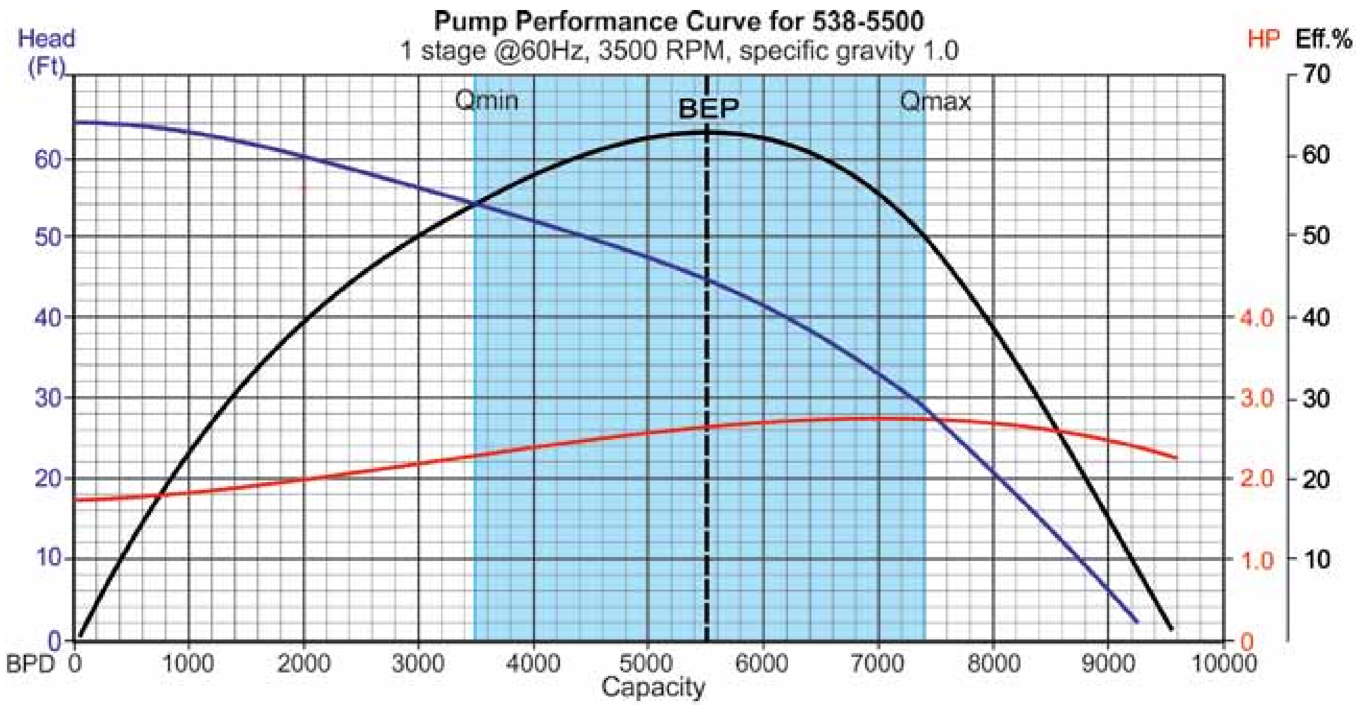
Note: All configurations listed are Carbon Steel. Stainless Steel configurations are available upon request.

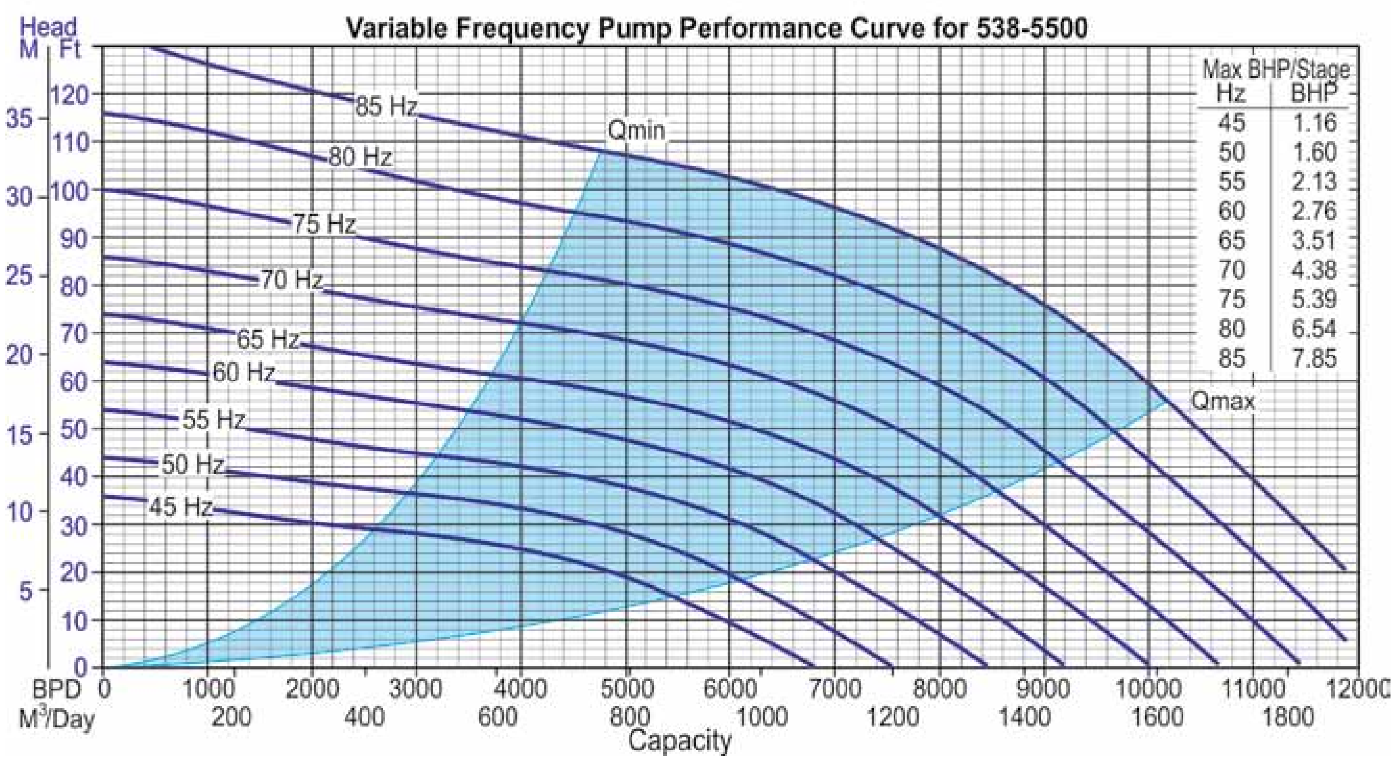
ENGINEERING DATA

Optimum Operating Range	60 Hz	2600-5400 BPD	Shaft Limit	Standard @ 60Hz	375 HP
	50 Hz	344-715 M^3Day		@ 50Hz	142 KW
				High Strength @ 60Hz	600 HP
Housing Diameter		5.38 In / 136.65 MM		@ 50Hz	227 KW
			Max Staging: Shaft		
Minimum Casing Size		7 In / 177.80 MM		Standard @ 60Hz	117 Stages
				@ 50Hz	169 Stages
Shaft Diameter		1.000 In / 25.400 MM		High Strength @ 60Hz	188 Stages
Area		0.7854 Sq In / 506.71 MM^2		@ 50Hz	270 Stages
			Max Staging: Thrust Bearing - Floater Pump *		
Stage Type		Mixed Flow		Std (230ºF BHT Max) @ 60Hz	103 Stages
Rotational Direction		CCW		(110ºC BHT Max) @ 50Hz	124 Stages
Fluid Specific Gravity		1.0		Hi- Ld (250ºF BHT Max) @ 60Hz	520 Stages
Housing Pressure Limit		6000 PSI		(121ºC BHT Max) @ 50Hz	686 Stages

* - Thrust bearing staging limits for Compression Pump available on request

538-5500





These engineering performance curves represent nominal performance based on actual multi-stage testing and certification. All pumps supplied by GPS will be tested and certified to perform within the acceptable limits for head, horsepower and efficiency as defined in the "API RECOMMENDED PRACTICE (11s2) FOR ELECTRIC SUBMERSIBLE PUMP TESTING."

538-5500

HSG	LENGTH		WEIGHT		STANDARD PUMP				ABRASION RESISTANT PUMP			
					Floater		Compression		Floater		Compression	
	Feet	Meters	Lbs	Kgs	Stgs	Part No	Stgs	Part No	Stgs	Part No	Stgs	Part No
10	2.5	0.76	117	53.1	5	1535001	5	1535001C	5	1535001AR	5	1535001ARC
20	4.0	1.22	178	80.7	11	1535002	11	1535002C	11	1535002AR	11	1535002ARC
30	5.0	1.52	245	111.1	17	1535003	17	1535003C	17	1535003AR	17	1535003ARC
40	6.5	1.98	311	141.1	23	1535004	23	1535004C	23	1535004AR	23	1535004ARC
50	8.0	2.44	374	169.6	29	1535005	29	1535005C	29	1535005AR	29	1535005ARC
60	9.5	2.90	440	199.6	35	1535006	35	1535006C	35	1535006AR	35	1535006ARC
70	11.0	3.35	502	227.7	41	1535007	41	1535007C	41	1535007AR	41	1535007ARC
80	12.5	3.81	570	258.5	47	1535008	47	1535008C	47	1535008AR	47	1535008ARC
90	13.5	4.11	635	288.0	53	1535009	53	1535009C	53	1535009AR	53	1535009ARC
100	15.0	4.57	698	316.6	59	1535010	59	1535010C	59	1535010AR	59	1535010ARC
110	17.5	5.33	765	347.0	65	1535011	65	1535011C	65	1535011AR	65	1535011ARC
120	18.0	5.49	825	374.2	71	1535012	71	1535012C	71	1535012AR	71	1535012ARC
130	19.5	5.94	892	404.6	77	1535013	77	1535013C	77	1535013AR	77	1535013ARC
140	20.0	6.10	960	435.4	83	1535014	83	1535014C	83	1535014AR	83	1535014ARC
150	22.0	6.71	1020	462.7	89	1535015	89	1535015C	89	1535015AR	89	1535015ARC

DESCRIPTION	LENGTH		WEIGHT		STANDARD	HIGH STRENGTH
	Feet	Meters	Lbs	Kgs	Part No	Part No
Discharge Head (3-1/2” 8RD EUE)	0.8	0.25	23	10.4	1000001	1000103SST
Bolt On Intake	1.2	0.36	50	22.7	4510001	4530001
Rotary Gas Separator UT	3.5	1.1	155	70.3	4511903	4513001
Rotary Gas Separator LT	3.5	1.1	155	70.3	4512904	4512905

Note: All configurations listed are Carbon Steel. Stainless Steel configurations are available upon request.

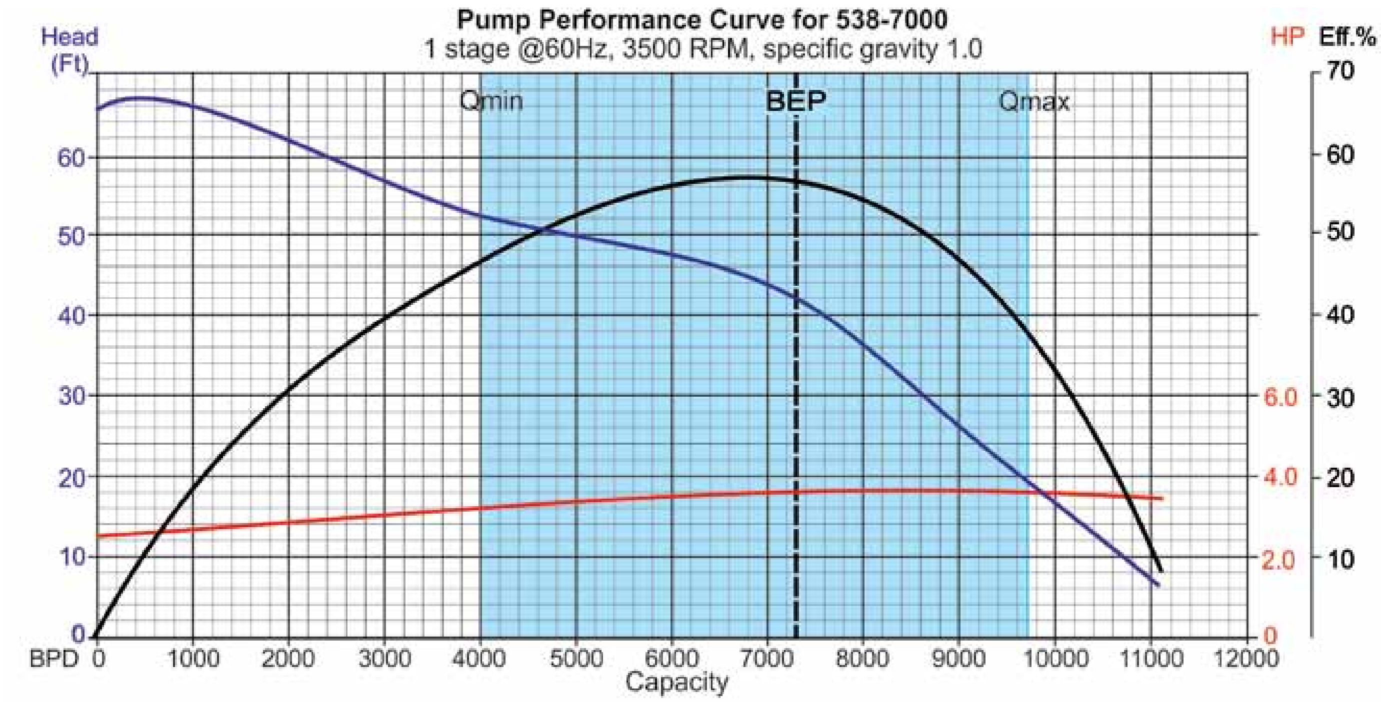
ENGINEERING DATA

Optimum Operating Range	60 Hz	3500-7400 BPD
	50 Hz	464-980 M^{3}Day
Housing Diameter		5.38 In / 136.65 MM
Minimum Casing Size		7 In / 177.80 MM
Shaft Diameter		1.000 In / 25.400 MM
Area		0.7854 Sq In / 506.71 MM^2
Stage Type		Mixed Flow
Rotational Direction		CCW
Fluid Specific Gravity		1.0
Housing Pressure Limit		6000 PSI

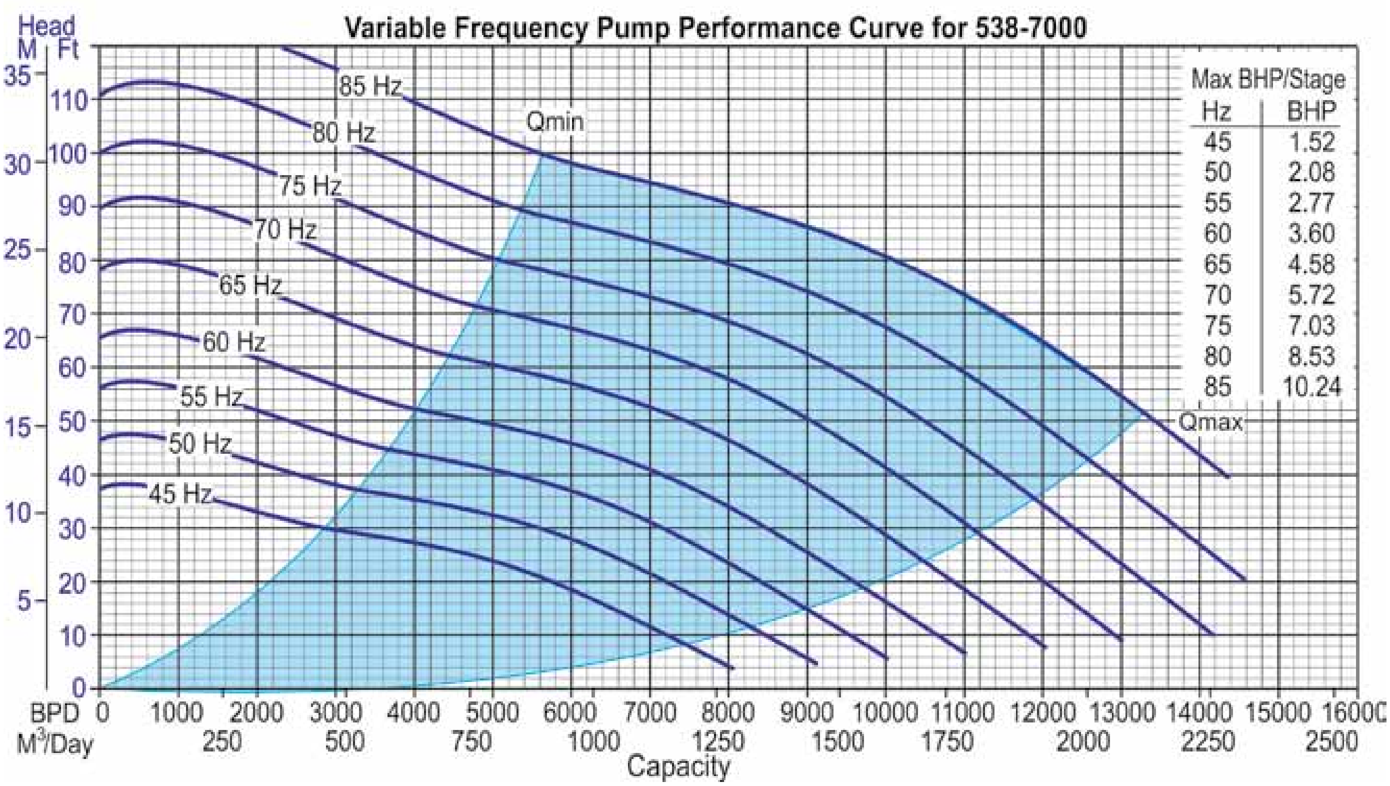
Shaft Limit	Standard @ 60Hz	375 HP
	@ 50Hz	142 KW
	High Strength @ 60Hz	600 HP
	@ 50Hz	227 KW
Max Staging: Shaft		
	Standard @ 60Hz	133 Stages
	@ 50Hz	114 Stages
	High Strength @ 60Hz	213 Stages
	@ 50Hz	522 Stages
Max Staging: Thrust Bearing - Floater Pump *		
	Std (230ºF BHT Max) @ 60Hz	114 Stages
	(110ºC BHT Max) @ 50Hz	137 Stages
	Hi- Ld (250ºF BHT Max) @ 60Hz	522 Stages
	(121ºC BHT Max) @ 50Hz	697 Stages

* - Thrust bearing staging limits for Compression Pump available on request

538-7000



Pump Performance Curve for 538-7000
1 stage @60Hz, 3500 RPM, specific gravity 1.0
Head (Ft)
HP
Eff.%
Qmin
BEP
Qmax
0
10
20
30
40
50
60
70
2.0
4.0
6.0
BPD
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
11000
12000
Capacity



Variable Frequency Pump Performance Curve for 538-7000
Head
M
Ft
85 Hz
80 Hz
75 Hz
70 Hz
65 Hz
60 Hz
55 Hz
50 Hz
45 Hz
Qmin
Qmax
Max BHP/Stage
Hz | BHP
45 | 1.52
50 | 2.08
55 | 2.77
60 | 3.60
65 | 4.58
70 | 5.72
75 | 7.03
80 | 8.53
85 | 10.24
BPD
M3/Day
Capacity

538-7000

HSG	LENGTH		WEIGHT		STANDARD PUMP				ABRASION RESISTANT PUMP			
					Floater		Compression		Floater		Compression	
	Feet	Meters	Lbs	Kgs	Stgs	Part No	Stgs	Part No	Stgs	Part No	Stgs	Part No
10	2.5	0.76	117	53.1	5	1536001	5	1536001C	5	1536001AR	5	1536001ARC
20	4.0	1.22	178	80.7	11	1536002	11	1536002C	11	1536002AR	11	1536002ARC
30	5.0	1.52	245	111.1	17	1536003	17	1536003C	17	1536003AR	17	1536003ARC
40	6.5	1.98	311	141.1	23	1536004	23	1536004C	23	1536004AR	23	1536004ARC
50	8.0	2.44	374	169.6	29	1536005	29	1536005C	29	1536005AR	29	1536005ARC
60	9.5	2.90	440	199.6	35	1536006	35	1536006C	35	1536006AR	35	1536006ARC
70	11.0	3.35	502	227.7	41	1536007	41	1536007C	41	1536007AR	41	1536007ARC
80	12.5	3.81	570	258.5	47	1536008	47	1536008C	47	1536008AR	47	1536008ARC
90	13.5	4.11	635	288.0	53	1536009	53	1536009C	53	1536009AR	53	1536009ARC
100	15.0	4.57	698	316.6	59	1536010	59	1536010C	59	1536010AR	59	1536010ARC
110	17.5	5.33	765	347.0	65	1536011	65	1536011C	65	1536011AR	65	1536011ARC
120	18.0	5.49	825	374.2	71	1536012	71	1536012C	71	1536012AR	71	1536012ARC
130	19.5	5.94	892	404.6	77	1536013	77	1536013C	77	1536013AR	77	1536013ARC
140	20.0	6.10	960	435.4	83	1536014	83	1536014C	83	1536014AR	83	1536014ARC
150	22.0	6.71	1020	462.7	89	1536015	89	1536015C	89	1536015AR	89	1536015ARC

DESCRIPTION	LENGTH		WEIGHT		STANDARD	HIGH STRENGTH
	Feet	Meters	Lbs	Kgs	Part No	Part No
Discharge Head (3-1/2" 8RD EUE)	0.8	0.25	23	10.4	1000001	1000103SST
Bolt On Intake	1.2	0.36	50	22.7	4510001	4530001
Rotary Gas Separator UT	3.5	1.1	155	70.3	4511903	4513001
Rotary Gas Separator LT	3.5	1.1	155	70.3	4512904	4512905

Note: All configurations listed are Carbon Steel. Stainless Steel configurations are available upon request.

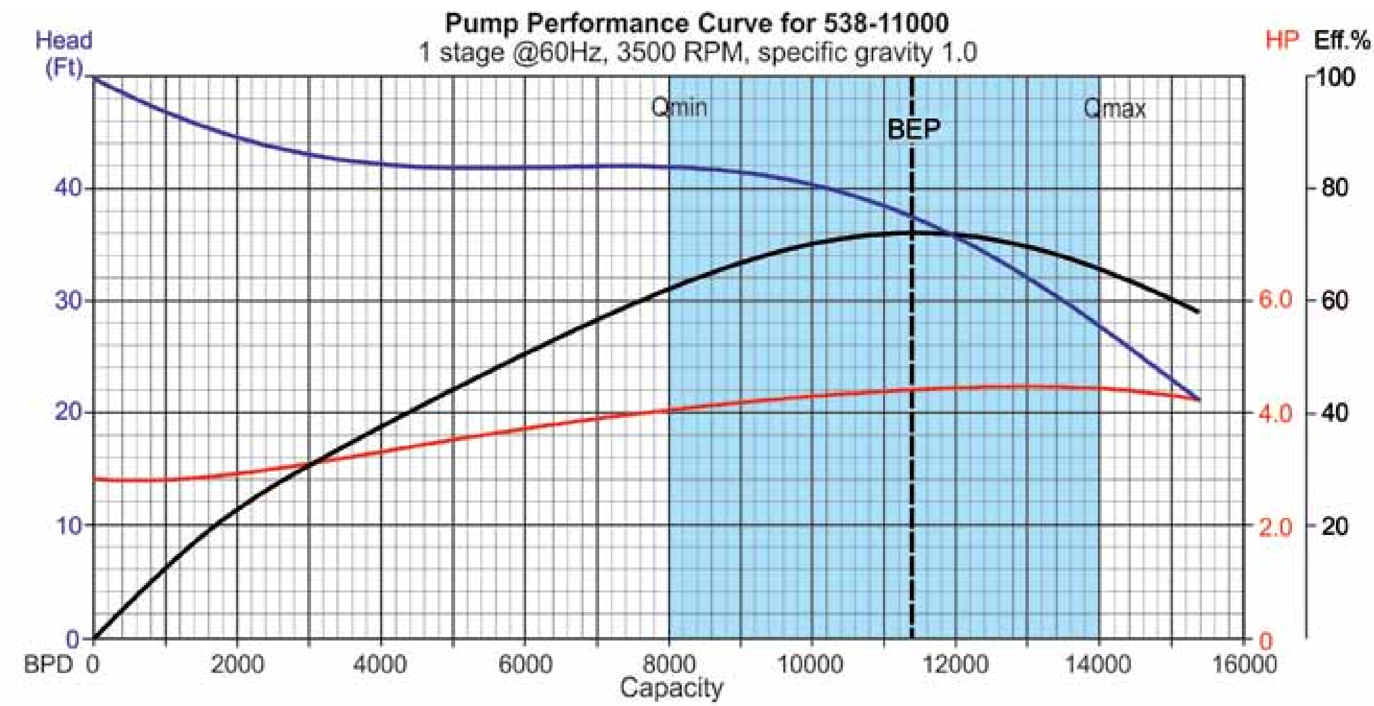
ENGINEERING DATA

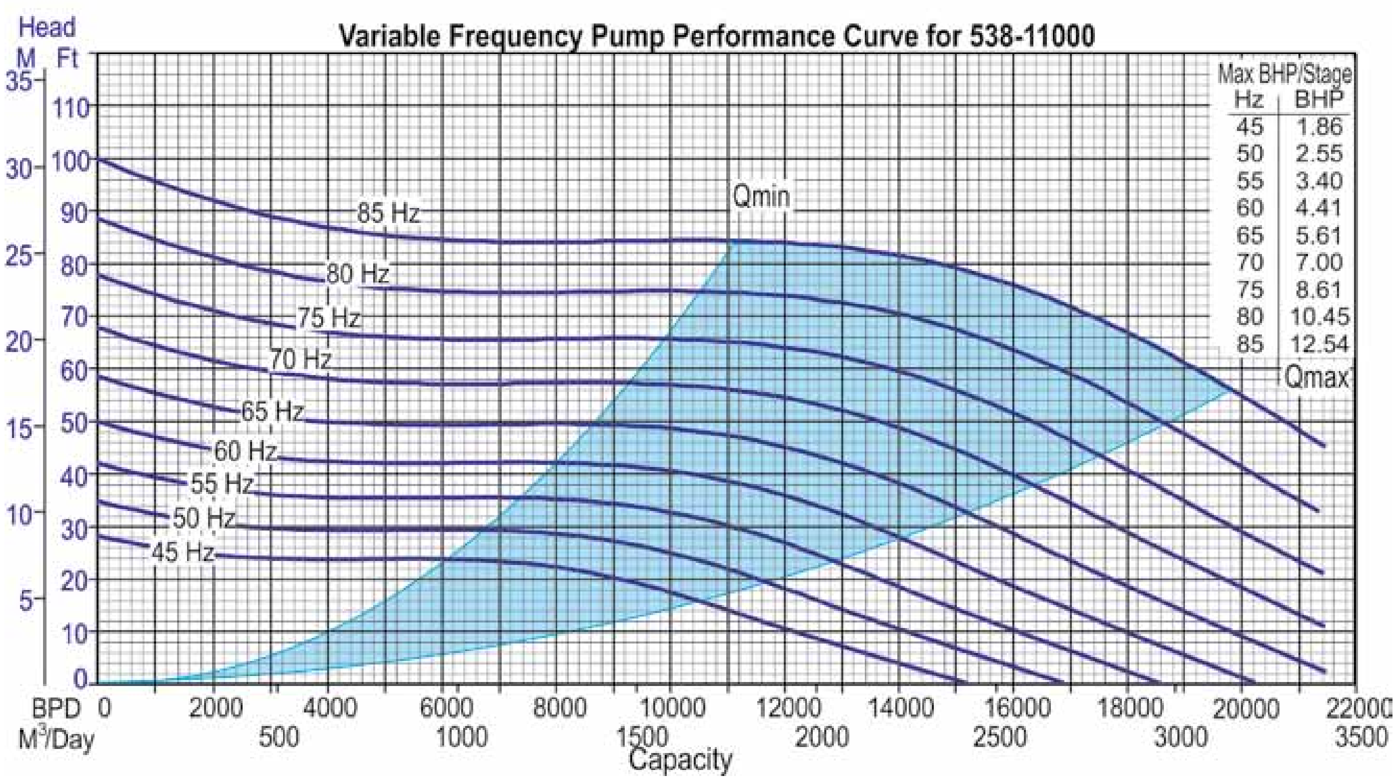
Optimum Operating Range	60 Hz	4000-9700 BPD
	50 Hz	530-1285 M^3Day
Housing Diameter		5.38 In / 136.65 MM
Minimum Casing Size		7 In / 177.80 MM
Shaft Diameter		1.000 In / 25.400 MM
Area		0.7854 Sq In / 506.71 MM^2
Stage Type		Mixed Flow
Rotational Direction		CCW
Fluid Specific Gravity		1.0
Housing Pressure Limit		6000 PSI

Shaft Limit	Standard @ 60Hz	375 HP
	@ 50Hz	142 KW
	High Strength @ 60Hz	600 HP
	@ 50Hz	227 KW
Max Staging: Shaft		
	Standard @ 60Hz	109 Stages
	@ 50Hz	157 Stages
	High Strength @ 60Hz	174 Stages
	@ 50Hz	251 Stages
Max Staging: Thrust Bearing - Floater Pump *		
	Std (230ºF BHT Max) @ 60Hz	111 Stages
	(110ºC BHT Max) @ 50Hz	133 Stages
	Hi- Ld (250ºF BHT Max) @ 60Hz	507 Stages
	(121ºC BHT Max) @ 50Hz	677 Stages

* - Thrust bearing staging limits for Compression Pump available upon request

538-11000


Pump Performance Curve for 538-11000
1 stage @60Hz, 3500 RPM, specific gravity 1.0
Head (Ft)
HP
Eff.%
Qmin
BEP
Qmax
BPD
Capacity


Variable Frequency Pump Performance Curve for 538-11000
Head
M Ft
Max BHP/Stage
Hz BHP
45 1.86
50 2.55
55 3.40
60 4.41
65 5.61
70 7.00
75 8.61
80 10.45
85 12.54
85 Hz
80 Hz
75 Hz
70 Hz
65 Hz
60 Hz
55 Hz
50 Hz
45 Hz
Qmin
Qmax
BPD
M3/Day
Capacity

538-11000

HSG	LENGTH		WEIGHT		STANDARD PUMP				ABRASION RESISTANT PUMP			
					Floater		Compression		Floater		Compression	
	Feet	Meters	Lbs	Kgs	Stgs	Part No	Stgs	Part No	Stgs	Part No	Stgs	Part No
10	2.5	0.76	117	53.1			3	1530801C			3	1530801ARC
20	4.0	1.22	186	84.4			7	1530802C			7	1530802ARC
30	5.0	1.52	245	111.1			10	1530803C			10	1530803ARC
40	6.5	1.98	314	142.4			14	1530804C			14	1530804ARC
50	8.0	2.44	384	174.2			18	1530805C			18	1530805ARC
60	9.5	2.90	453	205.5			22	1530806C			22	1530806ARC
70	11.0	3.35	523	237.2			26	1530807C			26	1530807ARC
80	12.5	3.81	582	264.0			29	1530808C			29	1530808ARC
90	13.5	4.11	652	295.7			33	1530809C			33	1530809ARC
100	15.0	4.57	721	327.0			37	1530810C			37	1530810ARC
110	17.5	5.33	791	358.8			41	1530811C			41	1530811ARC
120	18.0	5.49	850	385.6			44	1530812C			44	1530812ARC
130	19.5	5.94	920	417.3			48	1530813C			48	1530813ARC
140	20.0	6.10	989	448.6			52	1530814C			52	1530814ARC
150	22.0	6.71	1059	480.4			56	1530815C			56	1530815ARC

DESCRIPTION	LENGTH		WEIGHT		STANDARD	HIGH STRENGTH
	Feet	Meters	Lbs	Kgs	Part No	Part No
Discharge Head (3-1/2” 8RD EUE)	0.8	0.25	23	10.4	1000001	1000103SST
Bolt On Intake	1.2	0.36	50	22.7	4510001	4530001
Rotary Gas Separator UT	3.5	1.1	155	70.3	4511903	4513001
Rotary Gas Separator LT	3.5	1.1	155	70.3	4512904	4512905

Note: All configurations listed are Carbon Steel. Stainless Steel configurations are available upon request.

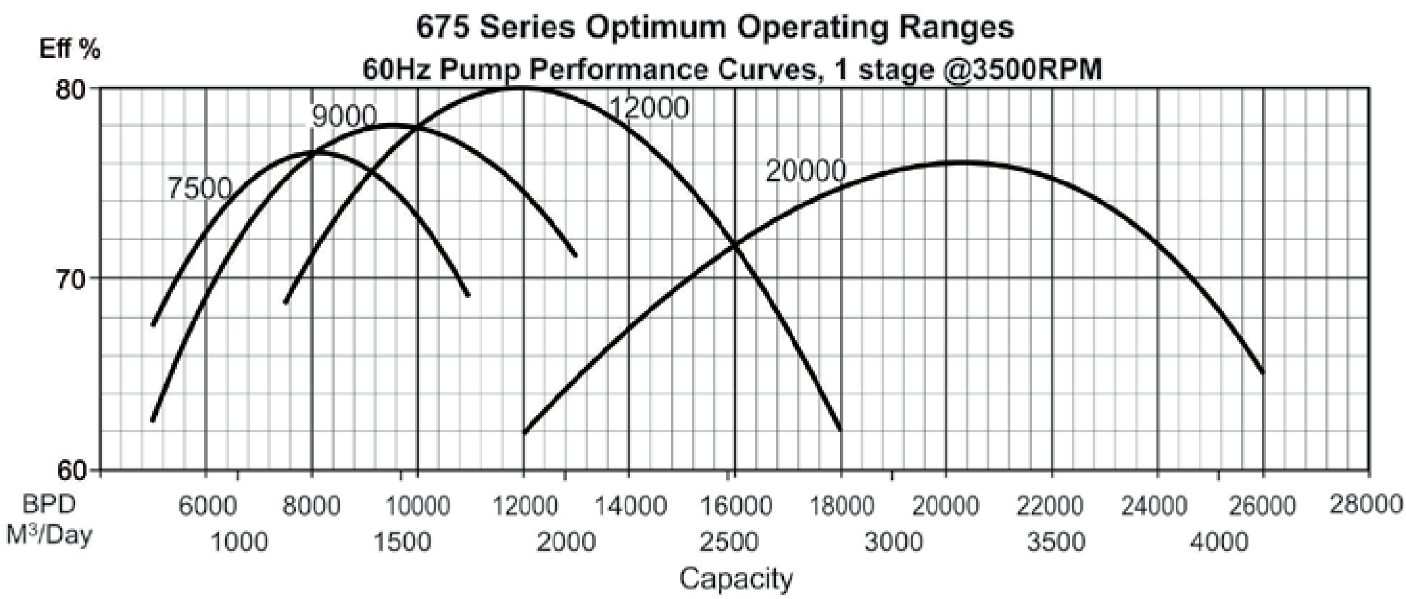
ENGINEERING DATA

Optimum Operating Range	60 Hz	8000-14000 BPD
	50 Hz	1060-1855 M^3Day
Housing Diameter		5.38 In / 136.65 MM
Minimum Casing Size		7 In / 177.80 MM
Shaft Diameter		1.188 In / 30.175 MM
Area		0.7854 Sq In / 506.71 MM^2
Stage Type		Mixed Flow
Rotational Direction		CCW
Fluid Specific Gravity		1.0
Housing Pressure Limit		6000 PSI

Shaft Limit	Standard @ 60Hz	637 HP
	@ 50Hz	241 KW
	High Strength @ 60Hz	1019 HP
	@ 50Hz	385 KW
Max Staging: Shaft		
	Standard @ 60Hz	144 Stages
	@ 50Hz	208 Stages
	High Strength @ 60Hz	231 Stages
	@ 50Hz	333 Stages
Max Staging: Thrust Bearing - Floater Pump *		
	Std (230ºF BHT Max) @ 60Hz	NA
	(110ºC BHT Max) @ 50Hz	NA
	Hi- Ld (250ºF BHT Max) @ 60Hz	155 Stages
	(121ºC BHT Max) @ 50Hz	208 Stages

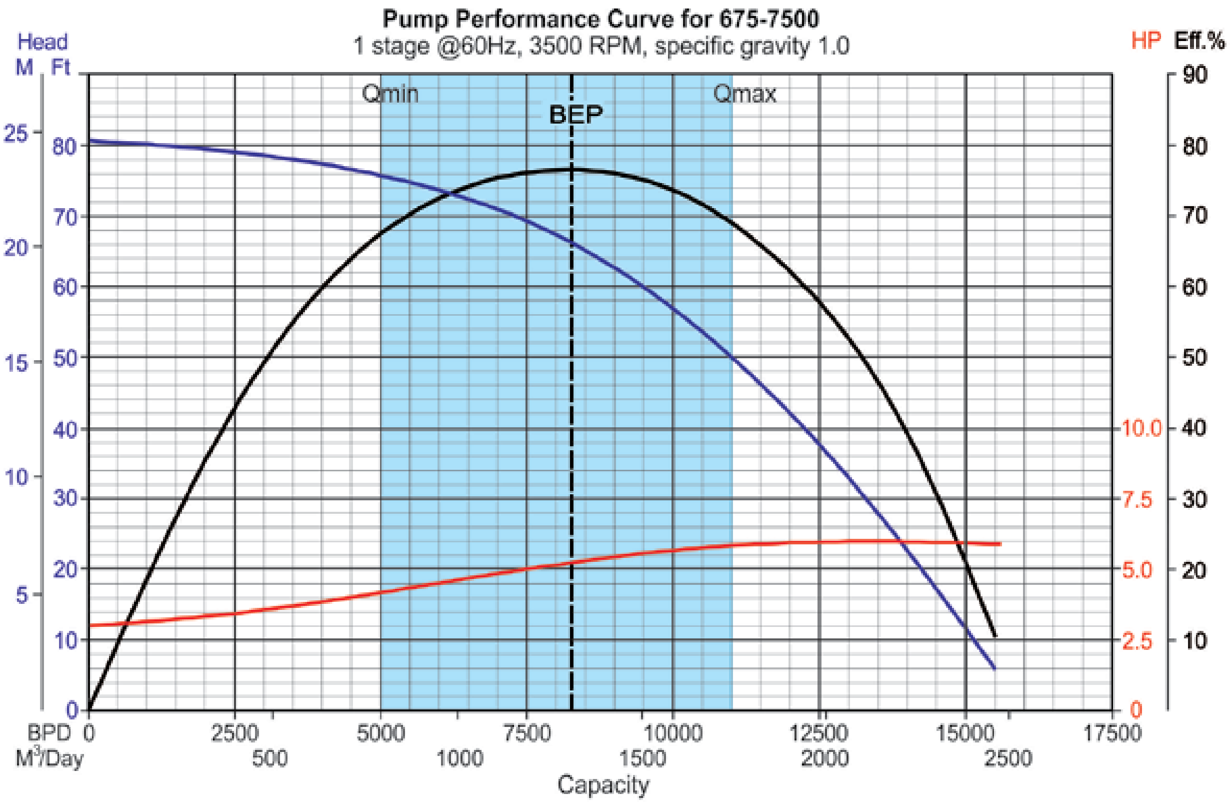
* - Thrust bearing staging limits for Compression Pump available on request

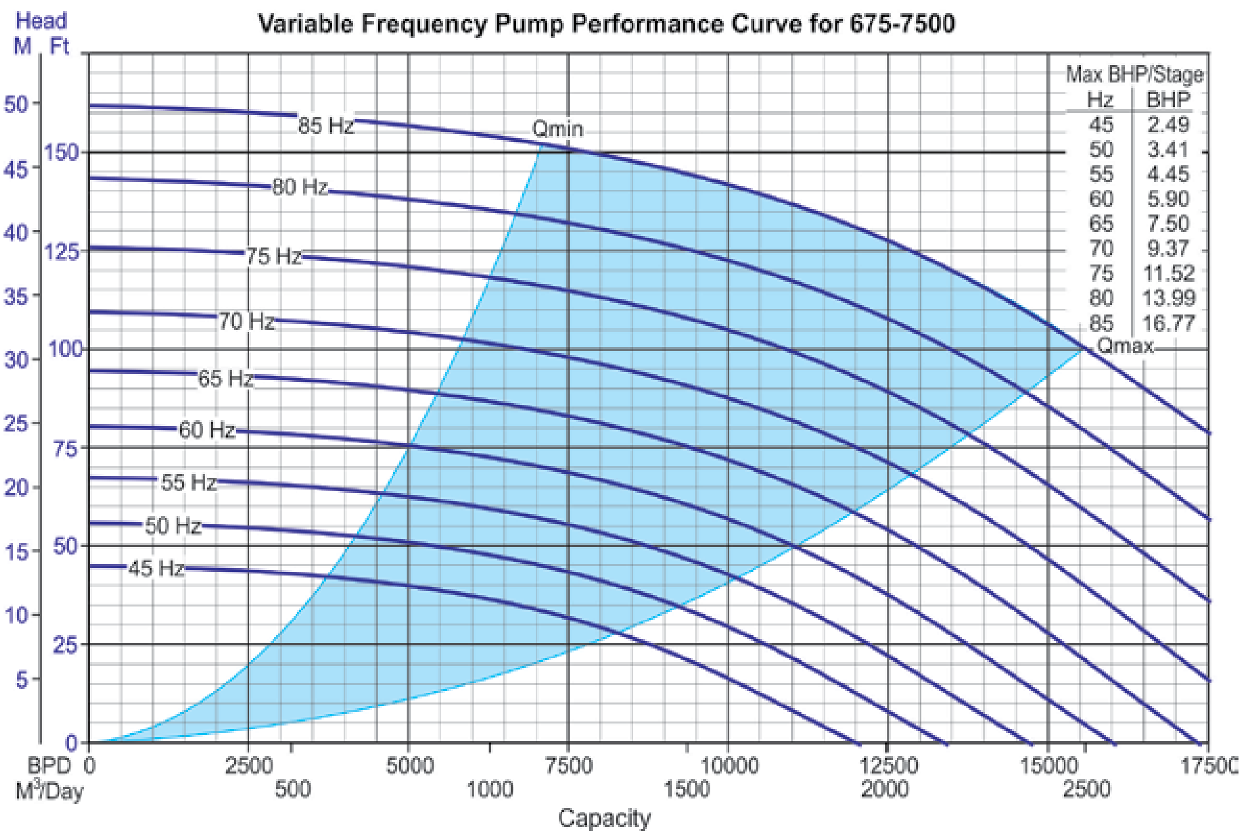
675 Series Pumps



Model	Hz	Construction		Stage		Optimum Operating Range BPD / M^3/Day		BHP/ Stage	Housing Pressure Limit PSI	
		Fltr	Cmprsn	Radial Flow	Mixed Flow				Std	Hi-Prs
675-7500	**60**		X		X	5000	11000	5.90	3000	3600
675-7500	**50**		X		X	662	1457	3.41	3000	3600
675-9000	**60**		X		X	5000	13000	8.80	3000	3600
675-9000	**50**		X		X	662	1722	5.09	3000	3600
675-12000	**60**		X		X	7500	18000	11.40	3000	3600
675-12000	**50**		X		X	994	2385	5.79	3000	3600
675-20000	**60**		X		X	12000	26000	12.63	3000	3600
675-20000	**50**		X		X	1590	3445	7.31	3000	3600

675-7500





Hz	BHP
45	2.49
50	3.41
55	4.45
60	5.90
65	7.50
70	9.37
75	11.52
80	13.99
85	16.77

These engineering performance curves represent nominal performance based on actual multi-stage testing and certification. All pumps supplied by GPS will be tested and certified to perform within the acceptable limits for head, horsepower and efficiency as defined in the "API RECOMMENDED PRACTICE (11s2) FOR ELECTRIC SUBMERSIBLE PUMP TESTING."

675-7500

HSG	LENGTH		WEIGHT		STANDARD PUMP				ABRASION RESISTANT PUMP			
					Floater		Compression		Floater		Compression	
	Feet	Meters	Lbs	Kgs	Stgs	Part No	Stgs	Part No	Stgs	Part No	Stgs	Part No
10	2.5	0.76	98	44.5			2	1675401C			2	1675401ARC
20	4.0	1.22	157	71.2			6	1675402C			6	1675402ARC
30	5.0	1.52	216	98.0			9	1675403C			9	1675403ARC
40	6.5	1.98	275	124.7			12	1675404C			12	1675404ARC
50	8.0	2.44	334	151.5			15	1675405C			15	1675405ARC
60	9.5	2.90	393	178.3			19	1675406C			19	1675406ARC
70	11.0	3.35	451	204.6			22	1675407C			22	1675407ARC
80	12.5	3.81	510	231.3			25	1675408C			25	1675408ARC
90	13.5	4.11	569	258.1			29	1675409C			29	1675409ARC
100	15.0	4.57	628	284.9			32	1675410C			32	1675410ARC
110	17.5	5.33	687	311.6			35	1675411C			35	1675411ARC
120	18.0	5.49	746	338.4			39	1675412C			39	1675412ARC
130	19.5	5.94	805	365.1			42	1675413C			42	1675413ARC
140	20.0	6.10	864	391.9			45	1675414C			45	1675414ARC
150	22.0	6.71	923	418.7			48	1675415C			48	1675415ARC

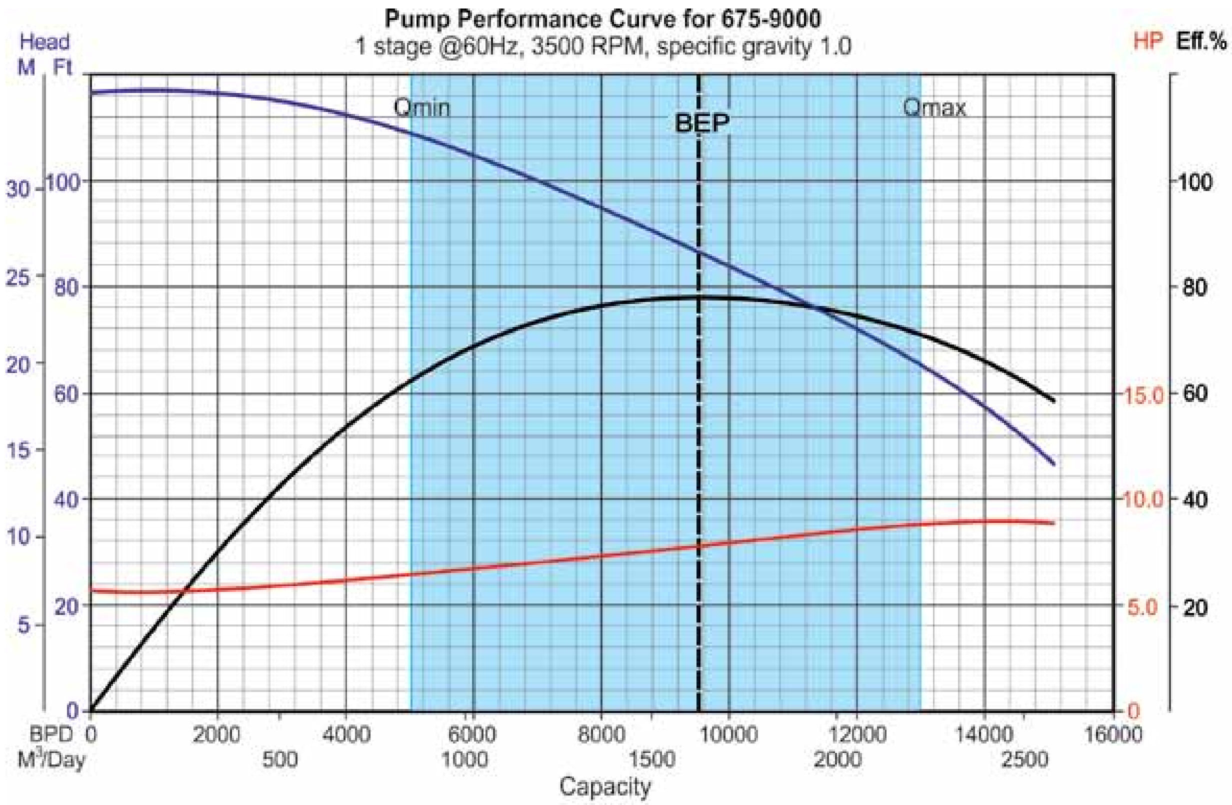
DESCRIPTION	LENGTH		WEIGHT		STANDARD	HIGH STRENGTH
	Feet	Meters	Lbs	Kgs	Part No	Part No
Discharge Head (5-1/2” 8RD LTC)	0.80	0.24	23	10.4	1600000	1600000SST
Bolt On Intake	0.73	0.22	56	25.4	4510001	4530001
Rotary Gas Separator UT	3.50	1.07	190	86.2	4511903	4513001
Rotary Gas Separator LT	3.50	1.07	190	86.2	4512904	4512905

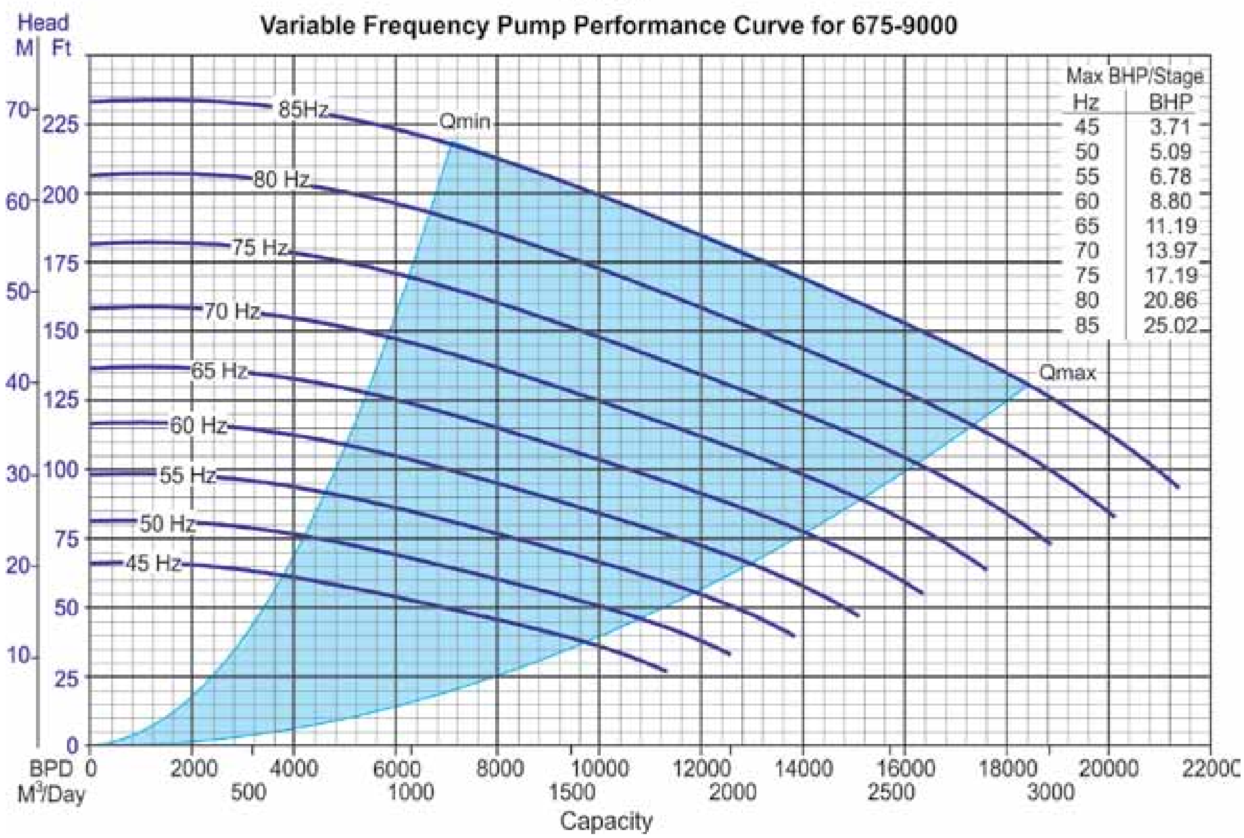
Note: All configurations listed are Carbon Steel. Stainless Steel configurations are available upon request.

ENGINEERING DATA

Optimum Operating Range	60 Hz	5000-11000 BPD	Shaft Limit	Standard @ 60Hz	637 HP
	50 Hz	660-1460 M^3Day		@ 50Hz	396 KW
				High Strength @ 60Hz	1019 HP
Housing Diameter		6.75 In / 171.45 MM		@ 50Hz	633 KW
			Max Staging: Shaft		
Minimum Casing Size		8-5/8 In / 219.10 MM		Standard @ 60Hz	108 Stages
				@ 50Hz	155 Stages
Shaft Diameter		1.187 In / 30.163 MM		High Strength @ 60Hz	173 Stages
Area		1.1075 Sq In / 714.19 MM^2		@ 50Hz	249 Stages
			Max Staging: Thrust Bearing - Compression Pump		
Stage Type		Mixed Flow		Std (230ºF BHT Max) @ 60Hz	NA
Rotational Direction		CCW		(110ºC BHT Max) @ 50Hz	NA
Fluid Specific Gravity		1.0		Hi- Ld (250ºF BHT Max) @ 60Hz	212 Stages
Housing Pressure Limit		3000 PSI		(121ºC BHT Max) @ 50Hz	276 Stages

675-9000





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675-9000

HSG	LENGTH		WEIGHT		STANDARD PUMP				ABRASION RESISTANT PUMP			
					Floater		Compression		Floater		Compression	
	Feet	Meters	Lbs	Kgs	Stgs	Part No	Stgs	Part No	Stgs	Part No	Stgs	Part No
10	2.5	0.76	210	95.3			2	1675601C			2	1675601ARC
20	4.0	1.22	328	148.8			6	1675602C			6	1675602ARC
30	5.0	1.52	421	191.0			9	1675603C			9	1675603ARC
40	6.5	1.98	513	232.7			12	1675604C			12	1675604ARC
50	8.0	2.44	606	274.9			15	1675605C			15	1675605ARC
60	9.5	2.90	718	325.7			19	1675606C			19	1675606ARC
70	11.0	3.35	810	367.4			22	1675607C			22	1675607ARC
80	12.5	3.81	903	409.6			25	1675608C			25	1675608ARC
90	13.5	4.11	1015	460.4			29	1675609C			29	1675609ARC
100	15.0	4.57	1110	503.5			32	1675610C			32	1675610ARC
110	17.5	5.33	1200	544.3			35	1675611C			35	1675611ARC
120	18.0	5.49	1312	595.1			39	1675612C			39	1675612ARC
130	19.5	5.94	1404	636.9			42	1675613C			42	1675613ARC
140	20.0	6.10	1497	679.0			45	1675614C			45	1675614ARC
150	22.0	6.71	1590	721.2			48	1675615C			48	1675615ARC

DESCRIPTION	LENGTH		WEIGHT		STANDARD	HIGH STRENGTH
	Feet	Meters	Lbs	Kgs	Part No	Part No
Discharge Head (5-1/2” 8RD LTC)	0.80	0.24	23	10.4	1600000	1600000SST
Bolt On Intake	0.73	0.22	56	25.4	4510001	4530001
Rotary Gas Separator UT	3.50	1.07	190	86.2	4511903	4513001
Rotary Gas Separator LT	3.50	1.07	190	86.2	4512904	4512905

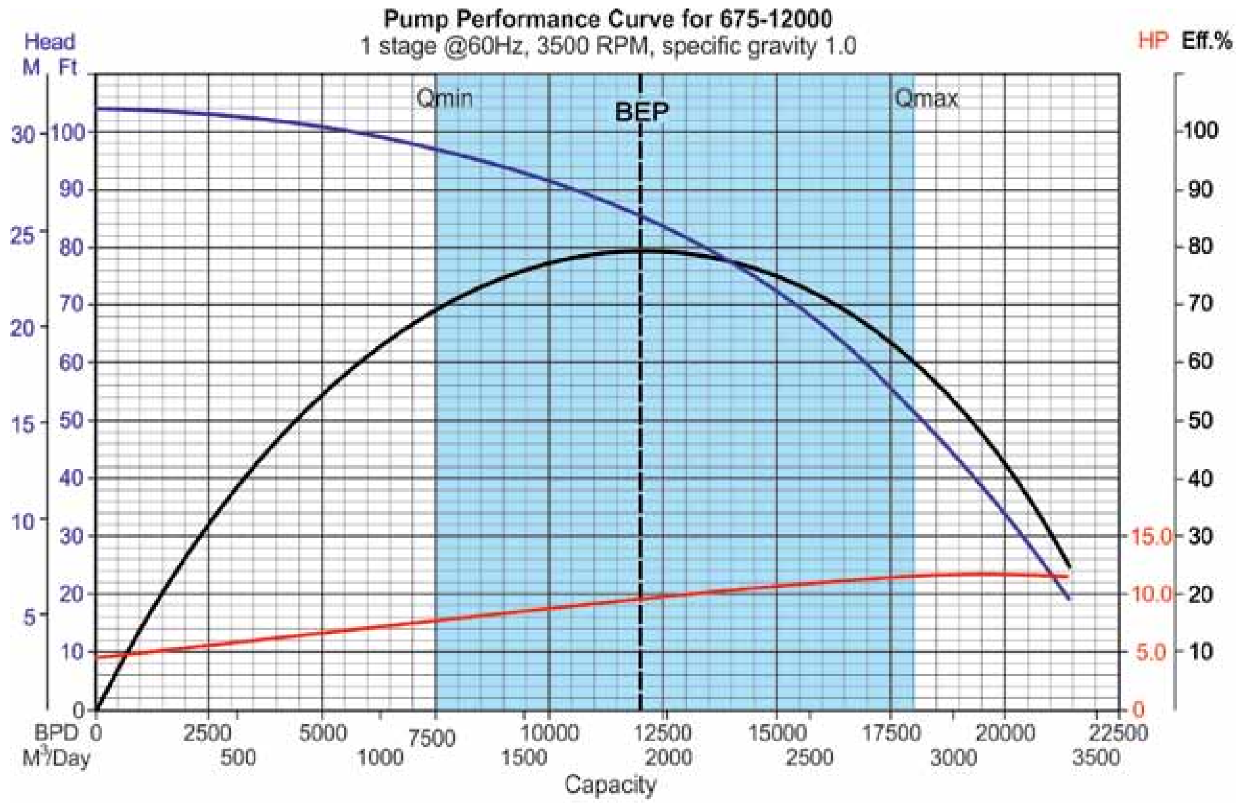
Note: All configurations listed are Carbon Steel. Stainless Steel configurations are available upon request.

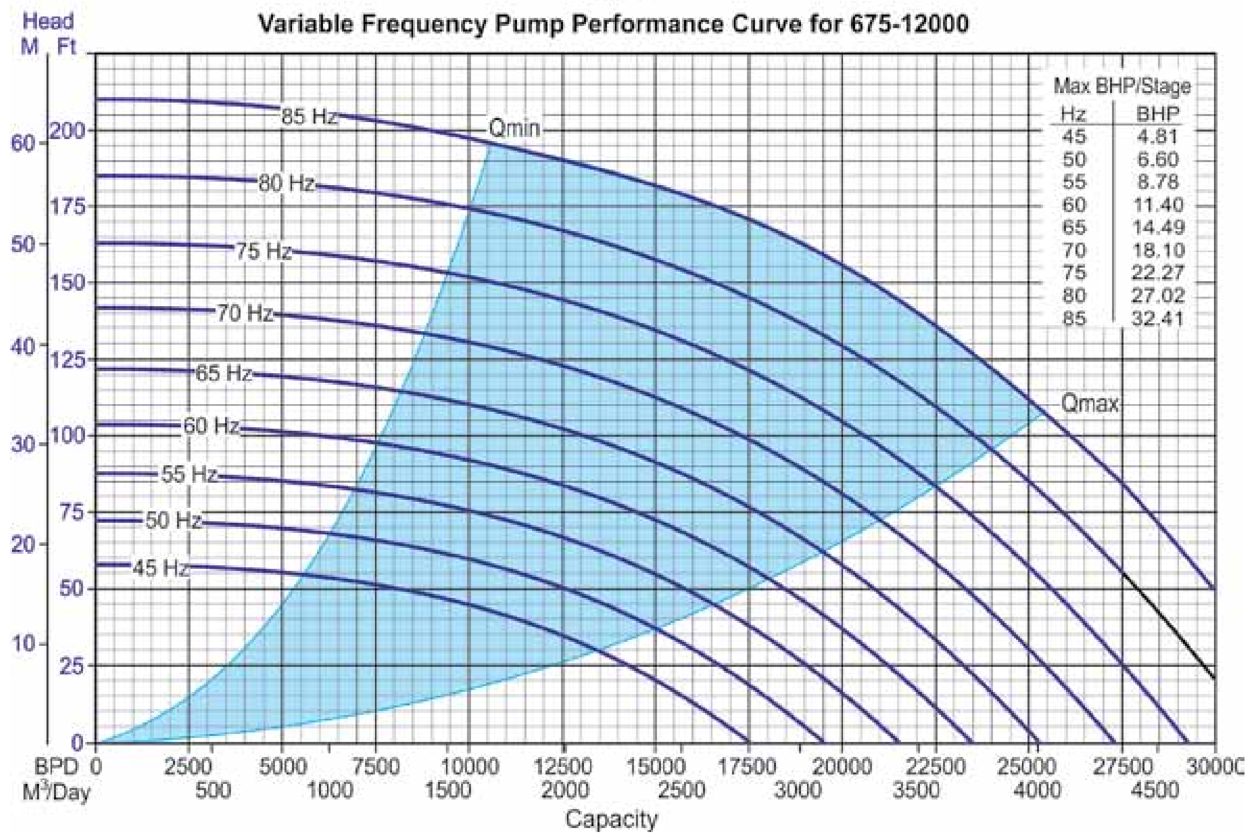
ENGINEERING DATA

Optimum Operating Range	60 Hz	5000-13000 BPD
	50 Hz	662-1722 M^3Day
Housing Diameter		6.75 In / 171.45 MM
Minimum Casing Size		8-5/8 In / 219.10 MM
Shaft Diameter		1.187 In / 30.163 MM
Area		1.1075 Sq In / 714.19 MM^2
Stage Type		Mixed Flow
Rotational Direction		CCW
Fluid Specific Gravity		1.0
Housing Pressure Limit		3000 PSI

Shaft Limit	Standard @ 60Hz	637 HP
	@ 50Hz	396 KW
	High Strength @ 60Hz	1019 HP
	@ 50Hz	633 KW
Max Staging: Shaft		
	Standard @ 60Hz	72 Stages
	@ 50Hz	104 Stages
	High Strength @ 60Hz	116 Stages
	@ 50Hz	167 Stages
Max Staging: Thrust Bearing - Compression Pump		
	Std (230ºF BHT Max) @ 60Hz	NA
	(110ºC BHT Max) @ 50Hz	NA
	Hi- Ld (250ºF BHT Max) @ 60Hz	153 Stages
	(121ºC BHT Max) @ 50Hz	199 Stages

675-12000





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675-12000

HSG	LENGTH		WEIGHT		STANDARD PUMP				ABRASION RESISTANT PUMP			
					Floater		Compression		Floater		Compression	
	Feet	Meters	Lbs	Kgs	Stgs	Part No	Stgs	Part No	Stgs	Part No	Stgs	Part No
10	2.5	0.76	98	44.5			2	1675101C			2	1675101ARC
20	4.0	1.22	157	71.2			5	1675102C			5	1675102ARC
30	5.0	1.52	216	98.0			8	1675103C			8	1675103ARC
40	6.5	1.98	275	124.7			11	1675104C			11	1675104ARC
50	8.0	2.44	334	151.5			14	1675105C			14	1675105ARC
60	9.5	2.90	393	178.3			17	1675106C			17	1675106ARC
70	11.0	3.35	451	204.6			20	1675107C			20	1675107ARC
80	12.5	3.81	510	231.3			23	1675108C			23	1675108ARC
90	13.5	4.11	569	258.1			26	1675109C			26	1675109ARC
100	15.0	4.57	628	284.9			29	1675110C			29	1675110ARC
110	17.5	5.33	687	311.6			32	1675111C			32	1675111ARC
120	18.0	5.49	746	338.4			35	1675112C			35	1675112ARC
130	19.5	5.94	805	365.1			38	1675113C			38	1675113ARC
140	20.0	6.10	864	391.9			41	1675114C			41	1675114ARC
150	22.0	6.71	923	418.7			44	1675115C			44	1675115ARC

DESCRIPTION	LENGTH		WEIGHT		STANDARD	HIGH STRENGTH
	Feet	Meters	Lbs	Kgs	Part No	Part No
Discharge Head (5-1/2" 8RD LTC)	0.80	0.24	23	10.4	1600000	1600000SST
Bolt On Intake	0.73	0.22	56	25.4	4510001	4530001
Rotary Gas Separator UT	3.50	1.07	190	86.2	4511903	4513001
Rotary Gas Separator LT	3.50	1.07	190	86.2	4512904	4512905

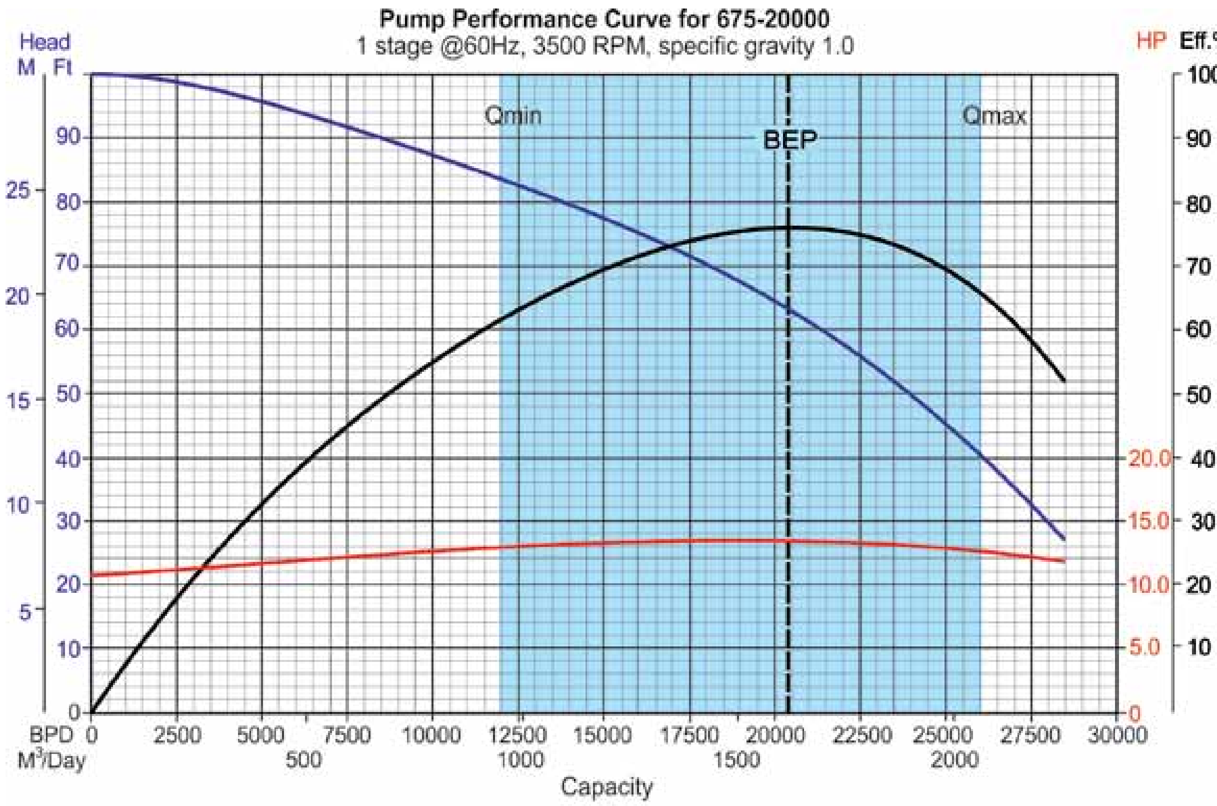
Note: All configurations listed are Carbon Steel. Stainless Steel configurations are available upon request.

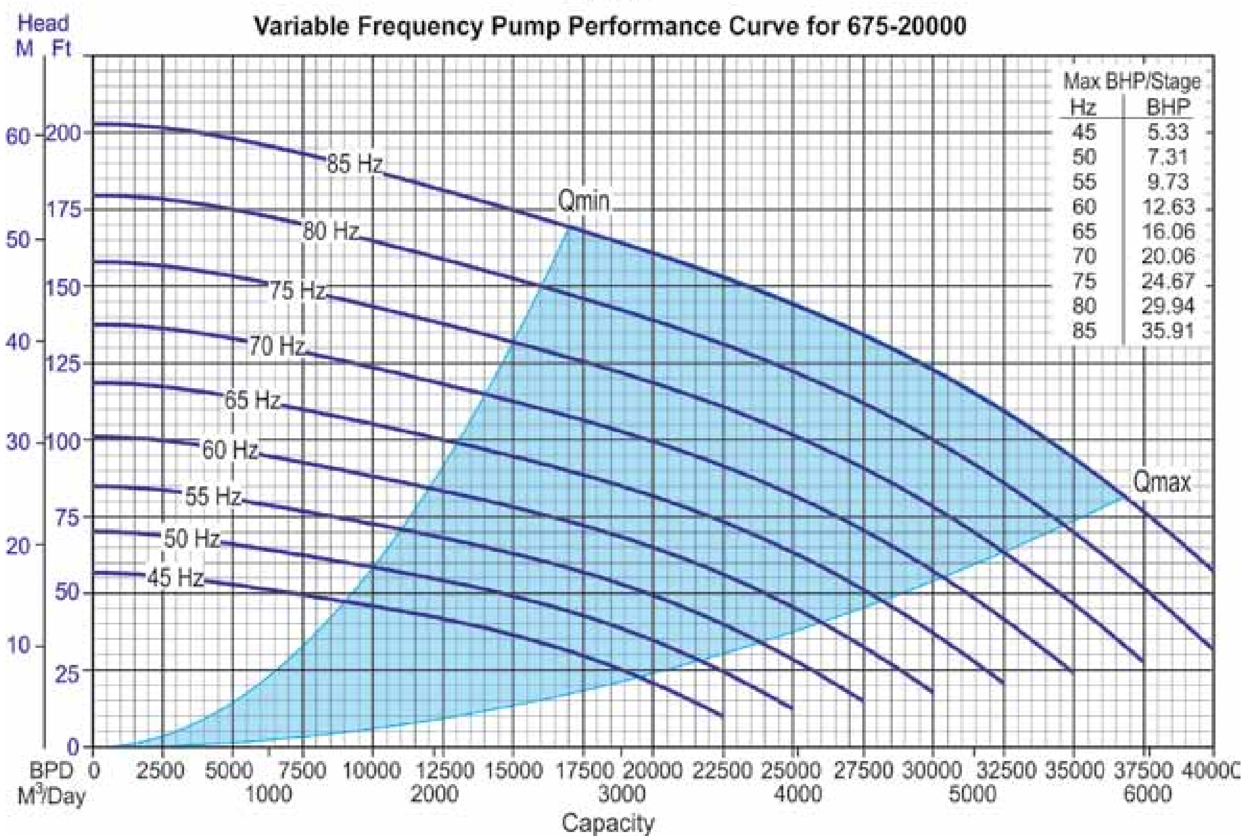
ENGINEERING DATA

Optimum Operating Range	60 Hz	7500-18000 BPD
	50 Hz	994-2385 M^3Day
Housing Diameter		6.75 In / 171.45 MM
Minimum Casing Size		8-5/8 In / 219.10 MM
Shaft Diameter		1.187 In / 30.163 MM
Area		1.1075 Sq In / 714.19 MM^2
Stage Type		Mixed Flow
Rotational Direction		CCW
Fluid Specific Gravity		1.0
Housing Pressure Limit		3000 PSI

Shaft Limit	Standard @ 60Hz	637 HP
	@ 50Hz	396 KW
	High Strength @ 60Hz	1019 HP
	@ 50Hz	633 KW
Max Staging: Shaft		
	Standard @ 60Hz	56 Stages
	@ 50Hz	80 Stages
	High Strength @ 60Hz	89 Stages
	@ 50Hz	129 Stages
Max Staging: Thrust Bearing - Compression Pump		
	Std (230ºF BHT Max) @ 60Hz	NA
	(110ºC BHT Max) @ 50Hz	NA
	Hi- Ld (250ºF BHT Max) @ 60Hz	125 Stages
	(121ºC BHT Max) @ 50Hz	163 Stages

675-20000





Max BHP/Stage

Hz	BHP
45	5.33
50	7.31
55	9.73
60	12.63
65	16.06
70	20.06
75	24.67
80	29.94
85	35.91

These engineering performance curves represent nominal performance based on actual multi-stage testing and certification. All pumps supplied by GPS will be tested and certified to perform within the acceptable limits for head, horsepower and efficiency as defined in the "API RECOMMENDED PRACTICE (11s2) FOR ELECTRIC SUBMERSIBLE PUMP TESTING."

675-20000

HSG	LENGTH		WEIGHT		STANDARD PUMP				ABRASION RESISTANT PUMP			
					Floater		Compression		Floater		Compression	
	Feet	Meters	Lbs	Kgs	Stgs	Part No	Stgs	Part No	Stgs	Part No	Stgs	Part No
10	2.5	0.76	182	82.6			2	1675901C			2	1675901ARC
20	4.0	1.22	263	119.3			5	1675902C			5	1675902ARC
30	5.0	1.52	343	155.6			8	1675903C			8	1675903ARC
40	6.5	1.98	424	192.3			11	1675904C			11	1675904ARC
50	8.0	2.44	504	228.6			14	1675905C			14	1675905ARC
60	9.5	2.90	568	257.6			16	1675906C			16	1675906ARC
70	11.0	3.35	648	293.9			19	1675907C			19	1675907ARC
80	12.5	3.81	729	330.7			22	1675908C			22	1675908ARC
90	13.5	4.11	809	367.0			25	1675909C			25	1675909ARC
100	15.0	4.57	890	403.7			28	1675910C			28	1675910ARC
110	17.5	5.33	970	440.0			31	1675911C			31	1675911ARC
120	18.0	5.49	1050	476.3			34	1675912C			34	1675912ARC
130	19.5	5.94	1131	513.0			37	1675913C			37	1675913ARC
140	20.0	6.10	1194	541.6			39	1675914C			39	1675914ARC
150	22.0	6.71	1275	578.3			42	1675915C			42	1675915ARC

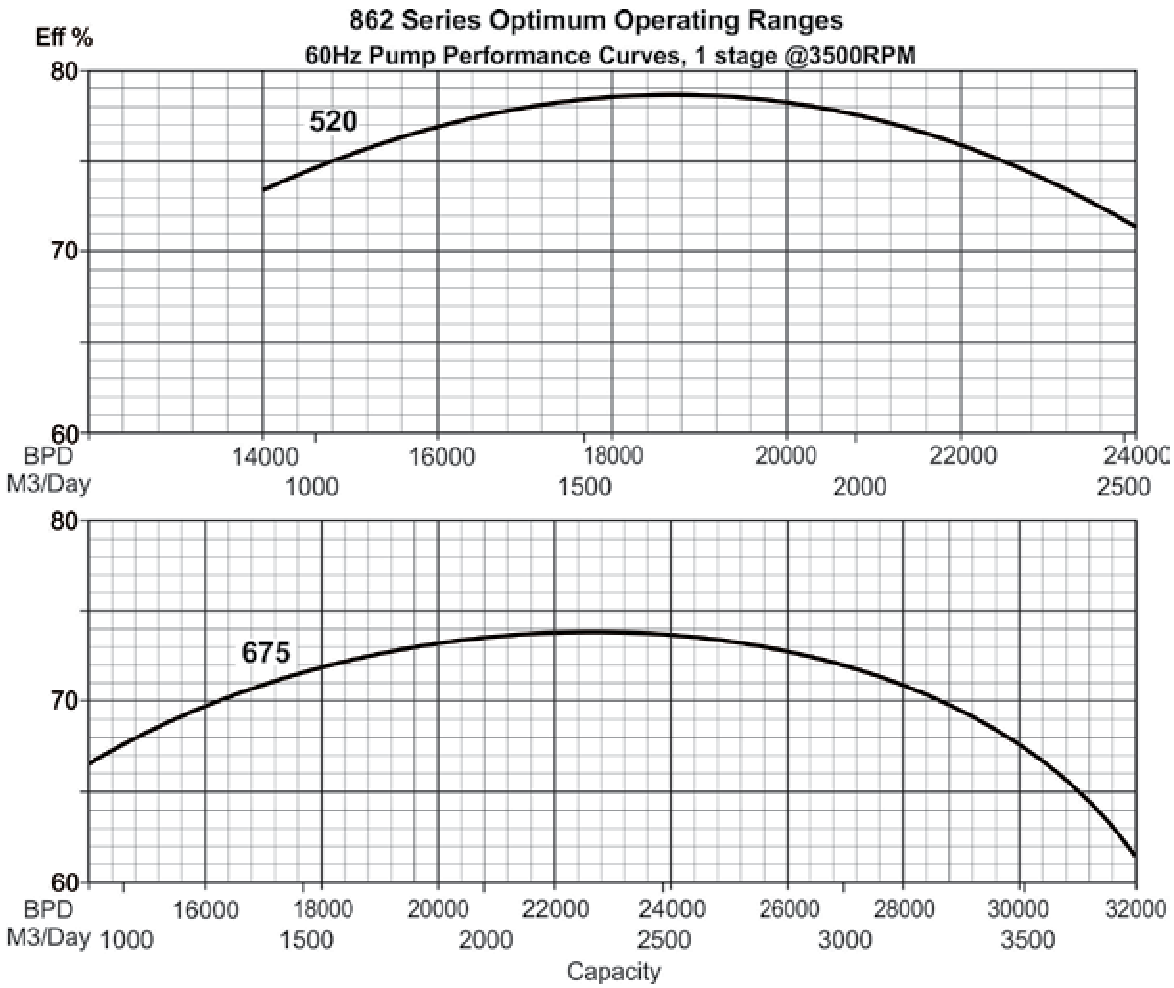
DESCRIPTION	LENGTH		WEIGHT		STANDARD	HIGH STRENGTH
	Feet	Meters	Lbs	Kgs	Part No	Part No
Discharge Head (5-1/2” 8RD LTC)	0.80	0.24	23	10.4	1600000	1600000SST
Bolt On Intake	0.73	0.22	56	25.4	4510001	4530001
Rotary Gas Separator UT	3.50	1.07	190	86.2	4511903	4513001
Rotary Gas Separator LT	3.50	1.07	190	86.2	4512904	4512905

Note: All configurations listed are Carbon Steel. Stainless Steel configurations are available upon request.

ENGINEERING DATA

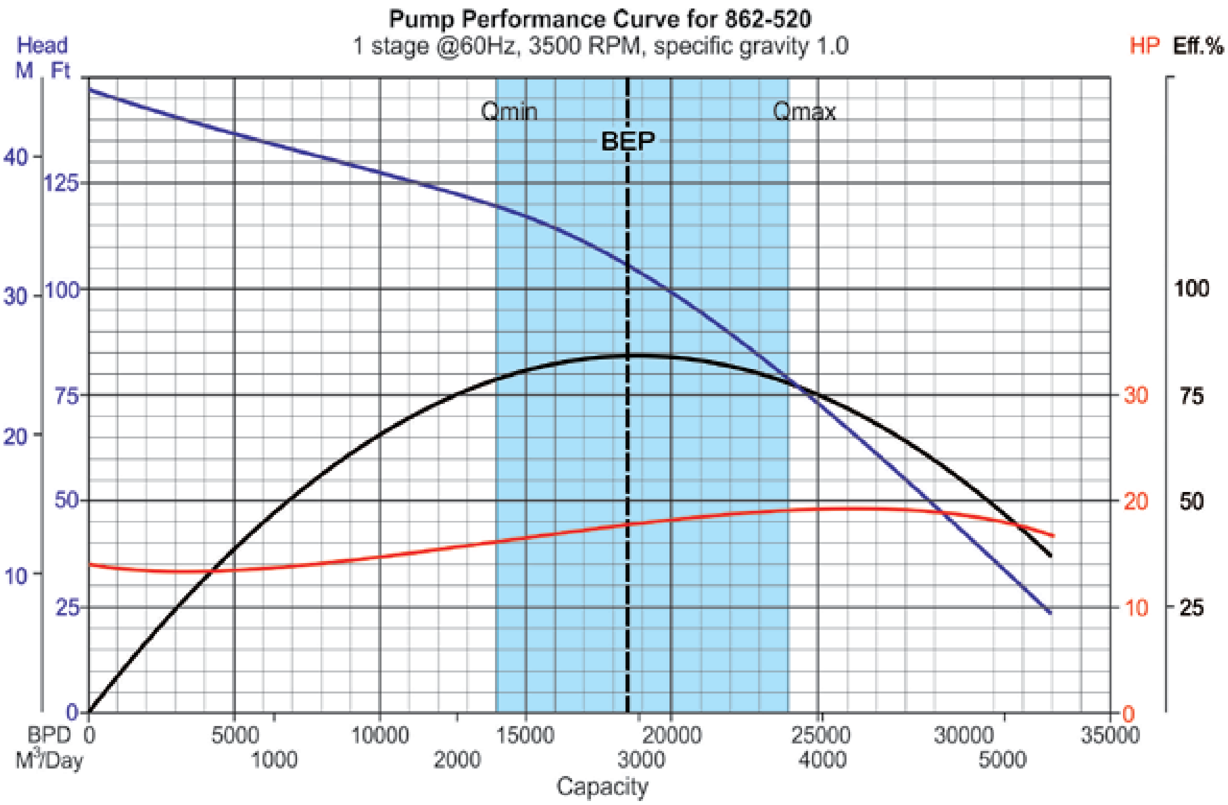
Optimum Operating Range	60 Hz	12000-26000 BPD	Shaft Limit	Standard @ 60Hz	637 HP
	50 Hz	1590-3445 M^3Day		@ 50Hz	396 KW
				High Strength @ 60Hz	1019 HP
Housing Diameter		6.75 Inch / 171.45 MM		@ 50Hz	633 KW
			Max Staging: Shaft		
Minimum Casing Size		8-5/8 Inch / 219.10 MM		Standard @ 60Hz	50 Stages
				@ 50Hz	73 Stages
Shaft Diameter		1.187 Inch / 30.163 MM		High Strength @ 60Hz	81 Stages
Area		1.1075 Sq Inch / 714.19 MM^2		@ 50Hz	116 Stages
			Max Staging: Thrust Bearing - Compression Pump		
Stage Type		Mixed Flow		Std (230ºF BHT Max) @ 60Hz	NA
Rotational Direction		CCW		(110ºC BHT Max) @ 50Hz	NA
Fluid Specific Gravity		1.0		Hi- Ld (250ºF BHT Max) @ 60Hz	95 Stages
Housing Pressure Limit		3000 PSI		(121ºC BHT Max) @ 50Hz	124 Stages

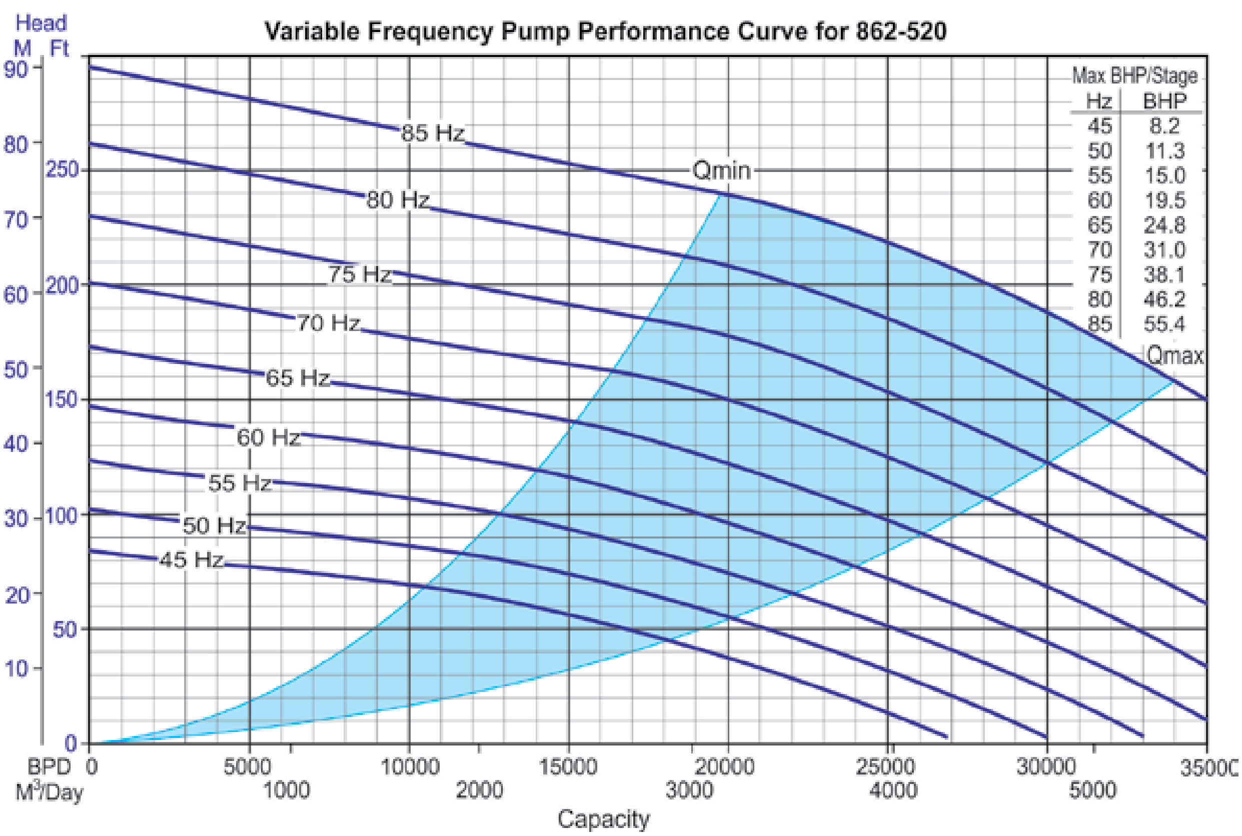
862 Series Pumps



Model	Hz	Construction		Stage		Optimum Operating Range BPD / M3/Day		BHP/ Stage	Housing Pressure Limit PSI	
		Fltr	Cmprsn	Radial Flow	Mixed Flow				Std	Hi-Prs
862-520	**60**		X		X	14000	24000	19.5	2000	2400
862-520	**50**		X		X	1855	3180	11.3	2000	2400
862-675	**60**		X		X	14000	32000	32.0	2000	2400
862-675	**50**		X		X	1855	4239	18.5	2000	2400

862-M520





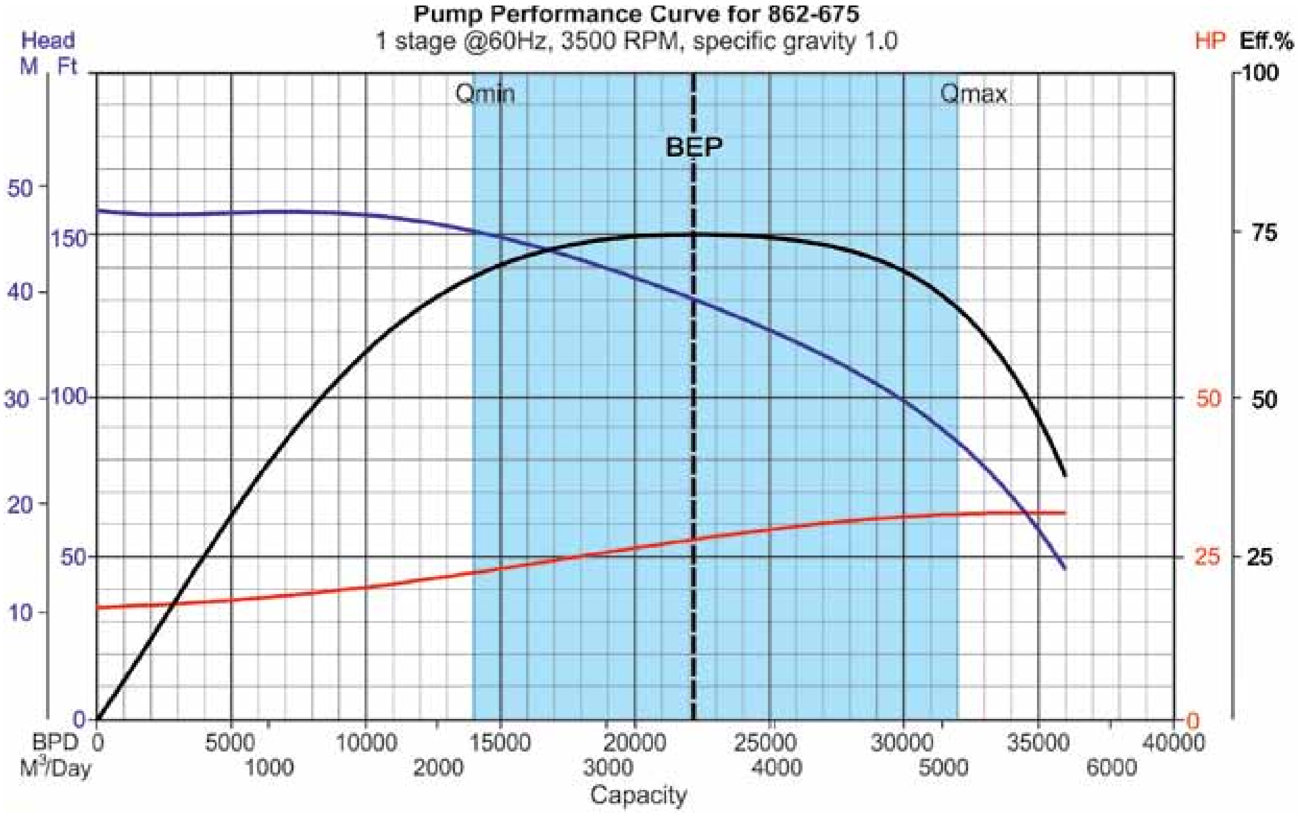
These engineering performance curves represent nominal performance based on actual multi-stage testing and certification. All pumps supplied by GPS will be tested and certified to perform within the acceptable limits for head, horsepower and efficiency as defined in the "API RECOMMENDED PRACTICE (11s2) FOR ELECTRIC SUBMERSIBLE PUMP TESTING."

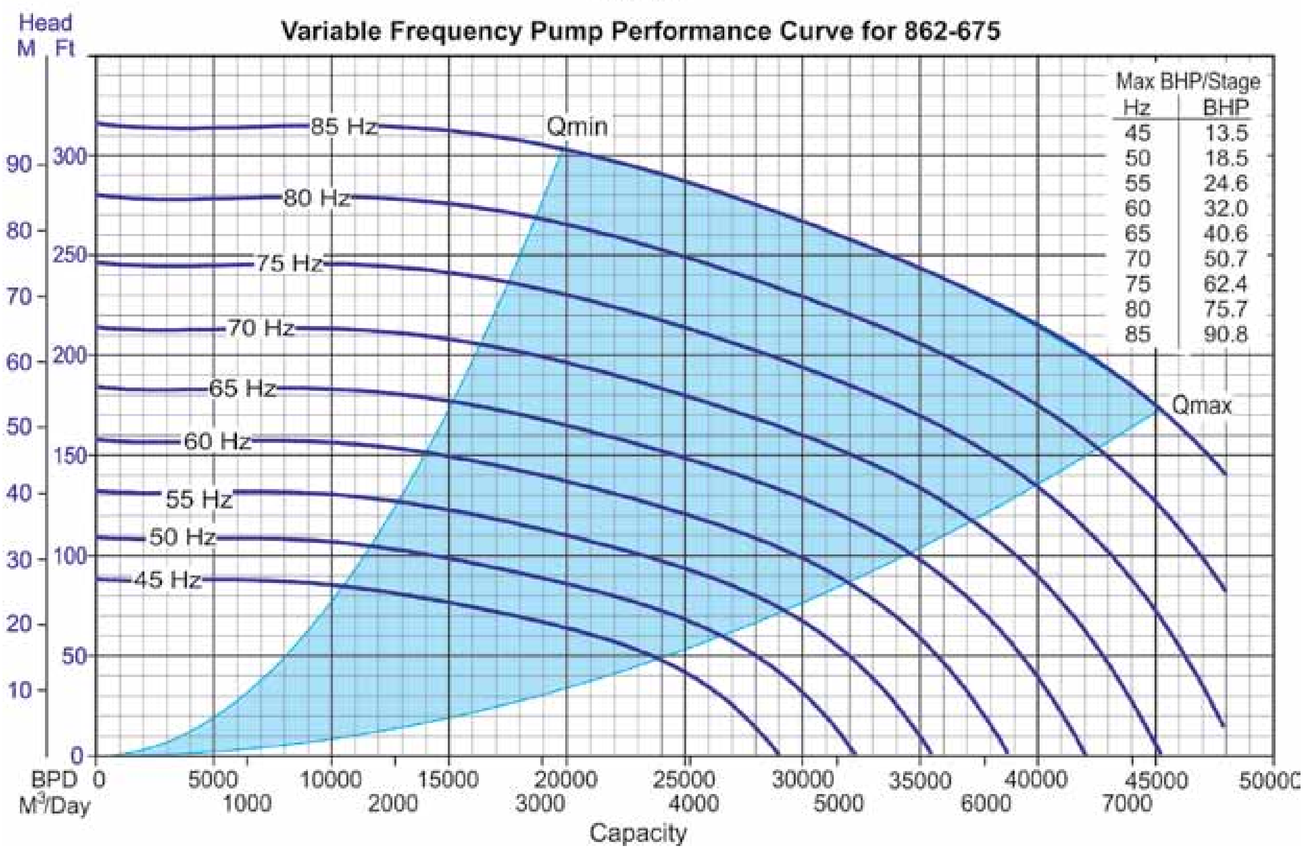
862-M520

HSG	LENGTH		WEIGHT		Stgs	STANDARD PUMP COMPRESSION	ABRASION RESISTANT PUMP COMPRESSION
	Feet	Meters	Lbs	Kgs			
30	3.3	1.01	528	239.4	3	1862202C	1862202ARC
40	3.9	1.19	587	266.2	4	1862203C	1862203ARC
50	4.5	1.37	662	300.2	5	1862204C	1862204ARC
60	5.1	1.55	729	330.6	6	1862205C	1862205ARC
70	5.7	1.74	789	357.8	7	1862206C	1862206ARC
80	6.3	1.92	863	391.4	8	1862207C	1862207ARC
90	6.9	2.10	931	422.2	9	1862208C	1862208ARC
100	7.5	2.29	991	449.4	10	1862209C	1862209ARC
110	8.1	2.47	1058	479.8	11	1862210C	1862210ARC
120	8.7	2.65	1126	510.6	12	1862211C	1862211ARC
130	9.3	2.83	1193	541.0	13	1862212C	1862212ARC
140	9.9	3.02	1260	571.4	14	1862213C	1862213ARC
150	10.6	3.23	1327	601.8	15	1862214C	1862214ARC
160	11.2	3.41	1395	632.6	16	1862215C	1862215ARC
170	11.8	3.60	1466	664.8	17	1862216C	1862216ARC
180	12.4	3.78	1533	695.2	18	1862217C	1862217ARC
190	13.0	3.96	1596	723.8	19	1862218C	1862218ARC
200	13.6	4.15	1664	754.6	20	1862219C	1862219ARC
210	14.2	4.33	1734	786.4	21	1862220C	1862220ARC
220	14.8	4.51	1801	816.8	22	1862221C	1862221ARC
230	15.4	4.69	1866	846.2	23	1862222C	1862222ARC
240	16.0	4.88	1933	876.6	24	1862223C	1862223ARC
250	16.6	5.06	2003	908.4	25	1862224C	1862224ARC
260	17.2	5.24	2071	939.2	26	1862225C	1862225ARC
270	17.8	5.43	2138	969.6	27	1862226C	1862226ARC
280	18.4	5.61	2202	998.6	28	1862227C	1862227ARC
290	19.0	5.79	2272	1030.4	29	1862228C	1862228ARC
300	19.6	5.97	2339	1060.7	30	1862229C	1862229ARC
310	20.2	6.16	2407	1091.6	31	1862230C	1862230ARC
320	20.8	6.34	2474	1122.0	32	1862231C	1862231ARC

Note: All configurations listed are Carbon Steel. Stainless Steel configurations are available upon request.

862 -M675





Max BHP/Stage

Hz	BHP
45	13.5
50	18.5
55	24.6
60	32.0
65	40.6
70	50.7
75	62.4
80	75.7
85	90.8

These engineering performance curves represent nominal performance based on actual multi-stage testing and certification. All pumps supplied by GPS will be tested and certified to perform within the acceptable limits for head, horsepower and efficiency as defined in the "API RECOMMENDED PRACTICE (11s2) FOR ELECTRIC SUBMERSIBLE PUMP TESTING."

862-M675

HSG	LENGTH		WEIGHT		Stgs	STANDARD PUMP COMPRESSION	ABRASION RESISTANT PUMP COMPRESSION
	Feet	Meters	Lbs	Kgs			
30	3.3	1.01	528	239.4	3	1862102C	1862102ARC
40	3.9	1.19	587	266.2	4	1862103C	1862103ARC
50	4.5	1.37	662	300.2	5	1862104C	1862104ARC
60	5.1	1.55	729	330.6	6	1862105C	1862105ARC
70	5.7	1.74	789	357.8	7	1862106C	1862106ARC
80	6.3	1.92	863	391.4	8	1862107C	1862107ARC
90	6.9	2.10	931	422.2	9	1862108C	1862108ARC
100	7.5	2.29	991	449.4	10	1862109C	1862109ARC
110	8.1	2.47	1058	479.8	11	1862110C	1862110ARC
120	8.7	2.65	1126	510.6	12	1862111C	1862111ARC
130	9.3	2.83	1193	541.0	13	1862112C	1862112ARC
140	9.9	3.02	1260	571.4	14	1862113C	1862113ARC
150	10.6	3.23	1327	601.8	15	1862114C	1862114ARC
160	11.2	3.41	1395	632.6	16	1862115C	1862115ARC
170	11.8	3.60	1466	664.8	17	1862116C	1862116ARC
180	12.4	3.78	1533	695.2	18	1862117C	1862117ARC
190	13.0	3.96	1596	723.8	19	1862118C	1862118ARC
200	13.6	4.15	1664	754.6	20	1862119C	1862119ARC
210	14.2	4.33	1734	786.4	21	1862120C	1862120ARC
220	14.8	4.51	1801	816.8	22	1862121C	1862121ARC
230	15.4	4.69	1866	846.2	23	1862122C	1862122ARC
240	16.0	4.88	1933	876.6	24	1862123C	1862123ARC
250	16.6	5.06	2003	908.4	25	1862124C	1862124ARC
260	17.2	5.24	2071	939.2	26	1862125C	1862125ARC
270	17.8	5.43	2138	969.6	27	1862126C	1862126ARC
280	18.4	5.61	2202	998.6	28	1862127C	1862127ARC
290	19.0	5.79	2272	1030.4	29	1862128C	1862128ARC
300	19.6	5.97	2339	1060.7	30	1862129C	1862129ARC
310	20.2	6.16	2407	1091.6	31	1862130C	1862130ARC
320	20.8	6.34	2474	1122.0	32	1862131C	1862131ARC

Note: All configurations listed are Carbon Steel. Stainless Steel configurations are available upon request.

862 Series Pumps

DESCRIPTION	LENGTH		WEIGHT		STANDARD	HIGH STRENGTH
	Feet	Meters	Lbs	Kgs	Part No	Part No
Discharge Head (7” 8RD LTC)	1.0	0.30	62	28.1	1700000	1700000SST
Bolt On Intake	0.73	0.22	56	25.4	4510001	4530001
Rotary Gas Separator UT	3.50	1.07	190	86.2	4511903	4513001
Rotary Gas Separator LT	3.50	1.07	190	86.2	4512904	4512905

Note: All configurations listed are Carbon Steel. Stainless Steel configurations are available upon request.

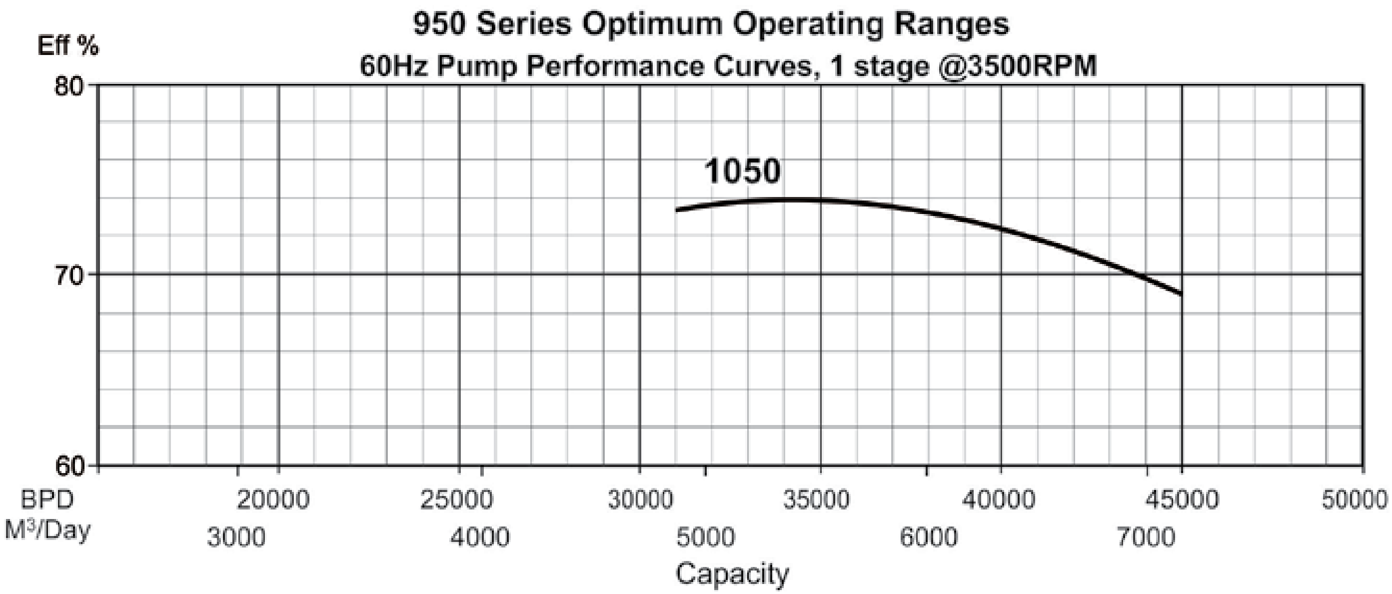
ENGINEERING DATA 862-M520

Optimum Operating Range	60 Hz	14000-24000 BPD	Shaft Limit	Standard @ 60Hz	637 HP
	50 Hz	1855-3180 M^3Day		@ 50Hz	396 KW
				High Strength @ 60Hz	1019 HP
Housing Diameter		8.62 In / 218.95 MM		@ 50Hz	633 KW
			Max Staging: Shaft		
Minimum Casing Size		10-3/4 In / 273.03 MM		Standard @ 60Hz	33 Stages
				@ 50Hz	47 Stages
Shaft Diameter		1.187 In / 30.175 MM		High Strength @ 60Hz	52 Stages
Area		1.107 Sq In / 715.14 MM^2		@ 50Hz	75 Stages
			Max Staging: Thrust Bearing - Compression Pump		
Stage Type		Mixed Flow		Standard @ 60Hz	NA
Rotational Direction		CCW		@ 50Hz	NA
Fluid Specific Gravity		1.0		Hi- Ld (250ºF BHT Max) @ 60Hz	54 Stages
Housing Pressure Limit		2000 PSI		(121ºC BHT Max) @ 50Hz	70 Stages

ENGINEERING DATA 862-M675

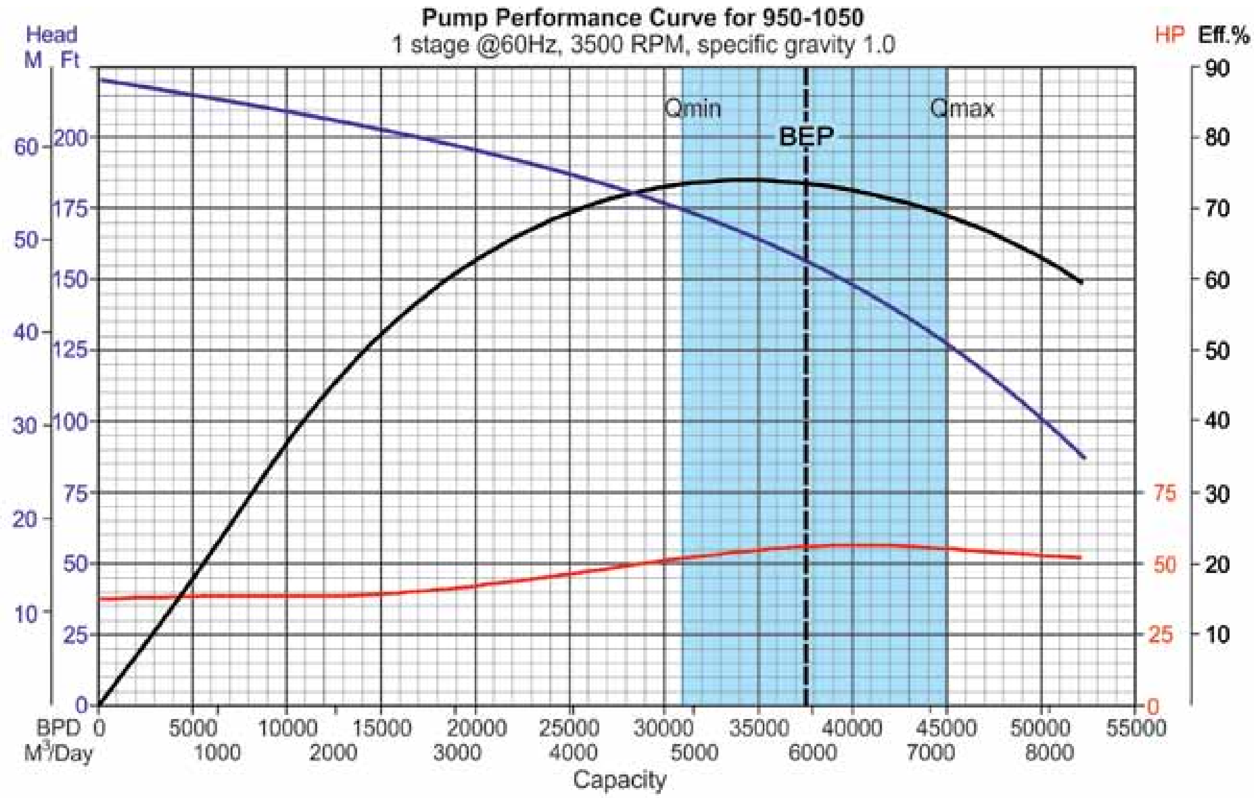
Optimum Operating Range	60 Hz	14000-32000 BPD	Shaft Limit	Standard @ 60Hz	637 HP
	50 Hz	1855-4239 M^3Day		@ 50Hz	396 KW
				High Strength @ 60Hz	1019 HP
Housing Diameter		8.62 In / 218.95 MM		@ 50Hz	633 KW
			Max Staging: Shaft		
Minimum Casing Size		10-3/4 In / 273.03 MM		Standard @ 60Hz	20 Stages
				@ 50Hz	29 Stages
Shaft Diameter		1.187 In / 30.175 MM		High Strength @ 60Hz	32 Stages
Area		1.107 Sq In / 715.14 MM^2		@ 50Hz	47 Stages
			Max Staging: Thrust Bearing - Compression Pump		
Stage Type		Mixed Flow		Standard @ 60Hz	NA
Rotational Direction		CCW		@ 50Hz	NA
Fluid Specific Gravity		1.0		Hi- Ld (250ºF BHT Max) @ 60Hz	55 Stages
Housing Pressure Limit		2000 PSI		(121ºC BHT Max) @ 50Hz	71 Stages

950 Series Pumps

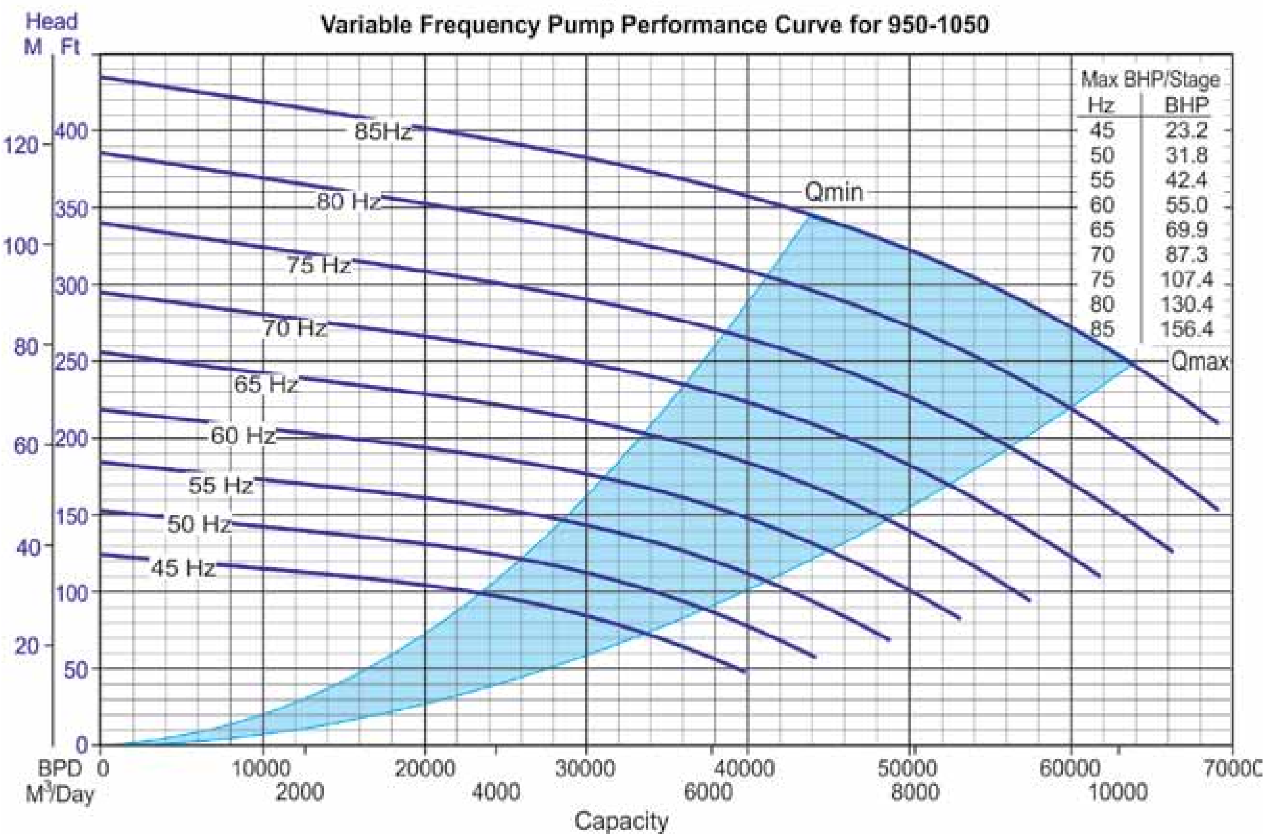


Model	Hz	Construction		Stage		Optimum Operating Range BPD / M3/Day		BHP/ Stage	Housing Pressure Limit PSI	
		Fltr	Cmprsn	Radial Flow	Mixed Flow				Std	Hi-Prs
950-1050	**60**		X		X	31000	45000	55.0	2300	2760
950-1050	**50**		X		X	4107	5962	31.8	2300	2760

950-N1050



Pump Performance Curve for 950-1050
1 stage @60Hz, 3500 RPM, specific gravity 1.0
Head
M
Ft
HP
Eff.%
Qmin
Qmax
BEP
BPD
M^3/Day
Capacity



Variable Frequency Pump Performance Curve for 950-1050
Head
M
Ft
85Hz
80 Hz
75 Hz
70 Hz
65 Hz
60 Hz
55 Hz
50 Hz
45 Hz
Qmin
Qmax
Max BHP/Stage
Hz BHP
45 23.2
50 31.8
55 42.4
60 55.0
65 69.9
70 87.3
75 107.4
80 130.4
85 156.4
BPD
M^3/Day
Capacity

950-N1050

HSG	LENGTH		WEIGHT		Stgs	STANDARD PUMP COMPRESSION	ABRASION RESISTANT PUMP COMPRESSION
	Feet	Meters	Lbs	Kgs			
10	3.1	0.94	326	147.9	3	1950102C	1950202ARC
20	3.7	1.13	402	182.3	4	1950103C	1950203ARC
30	4.3	1.31	477	216.3	5	1950104C	1950204ARC
40	4.9	1.49	554	251.2	6	1950105C	1950205ARC
50	5.4	1.65	627	284.3	7	1950106C	1950206ARC
60	6.0	1.83	703	318.7	8	1950107C	1950207ARC
70	6.6	2.01	779	353.2	9	1950108C	1950208ARC
80	7.2	2.19	854	387.2	10	1950109C	1950209ARC
90	7.8	2.38	930	421.7	11	1950110C	1950210ARC
100	8.4	2.56	1003	454.8	12	1950111C	1950211ARC
110	8.9	2.71	1079	489.2	13	1950112C	1950212ARC
120	9.5	2.90	1155	523.7	14	1950113C	1950213ARC
130	10.1	3.08	1231	558.1	15	1950114C	1950214ARC
140	10.7	3.26	1307	592.6	16	1950115C	1950215ARC
150	11.3	3.44	1382	626.6	17	1950116C	1950216ARC
160	11.9	3.63	1458	661.1	18	1950117C	1950217ARC
170	12.4	3.78	1534	695.5	19	1950118C	1950218ARC
180	13.0	3.96	1611	730.4	20	1950119C	1950219ARC

DESCRIPTION	LENGTH		WEIGHT		STANDARD	HIGH STRENGTH
	Feet	Meters	Lbs	Kgs	Part No	Part No
Discharge Head (7” 8RD LTC)	1.0	0.30	62	28.1	1700000	1700000SST
Bolt On Intake	0.73	0.22	56	25.4	4510001	4530001
Rotary Gas Separator UT	3.50	1.07	190	86.2	4511903	4513001
Rotary Gas Separator LT	3.50	1.07	190	86.2	4512904	4512905

Note: All configurations listed are Carbon Steel. Stainless Steel configurations are available upon request.

ENGINEERING DATA

Optimum Operating Range	60 Hz	31000-45000 BPD
	50 Hz	4107-5962 M^3Day
Housing Diameter		9.50 In / 241.30 MM
Minimum Casing Size		11-3/4 In / 298.45 MM
Shaft Diameter		1.500 In / 38.100 MM
Area		1.767 Sq In /1140.09 MM^2
Stage Type		Mixed Flow
Rotational Direction		CCW
Fluid Specific Gravity		1.0
Housing Pressure Limit		2300 PSI

Shaft Limit	Standard @ 60Hz	1000 HP
	@ 50Hz	621 KW
	High Strength @ 60Hz	1600 HP
	@ 50Hz	994 KW
Max Staging: Shaft		
	Standard @ 60Hz	17 Stages
	@ 50Hz	24 Stages
	High Strength @ 60Hz	27 Stages
	@ 50Hz	39 Stages
Max Staging: Thrust Bearing - Compression Pump		
	Standard @ 60Hz	NA
	@ 50Hz	NA
	Hi- Ld (250ºF BHT Max) @ 60Hz	19 Stages
	(121ºC BHT Max) @ 50Hz	25 Stages

Cables

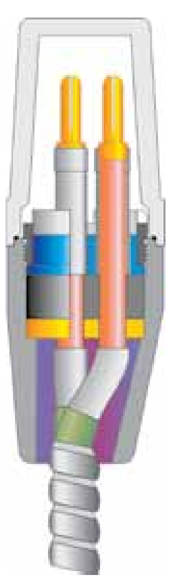
Motor Lead Extensions

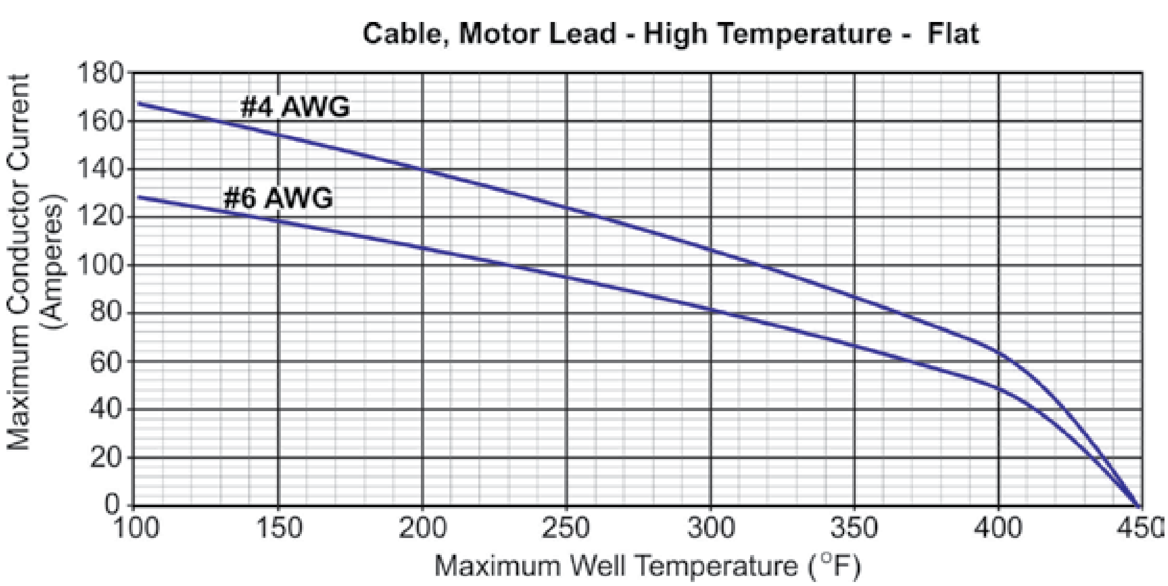
Low Profile Motor Flat Lead Cables are rated 5 kV for operating temperatures up to 450ºF. They provide excellent performance in highly corrosive wells. These cables feature lead sheaths, which provide a superior barrier to the damaging effects of hydrogen sulfide and gas intrusion.

Description	Wire Size	Rating	Length - *		Dimensions		Weight		Part No
			Ft	M	Inch	mm	Lbs	Kgs	
375 Series KELB	#6	5 kV	40	12.19	1.31 x 0.50	33.3 x 12.8	33	15.0	6000004
		5 kV	55	16.76	1.31 x 0.50	33.3 x 12.8	45	20.4	6000003
		5 kV	70	21.34	1.31 x 0.50	33.3 x 12.8	58	26.3	6000015
		5 kV	110	33.53	1.31 x 0.50	33.3 x 12.8	91	41.3	6000008
456 Series KELB	#6	5 kV	40	12.19	1.31 x 0.50	33.3 x 12.8	41	18.6	6000007
		5 kV	45	13.72	1.31 x 0.50	33.3 x 12.8	46	20.9	6000013
		5 kV	50	15.24	1.31 x 0.50	33.3 x 12.8	51	23.1	6000014
		5 kV	55	16.76	1.31 x 0.50	33.3 x 12.8	56	25.4	6000006
		5 kV	70	21.34	1.31 x 0.50	33.3 x 12.8	72	32.7	6000005
		5 kV	90	27.43	1.31 x 0.50	33.3 x 12.8	92	41.7	6000011
		5 kV	100	33.53	1.31 x 0.50	33.3 x 12.8	103	46.7	6000002
		5 kV	120	38.58	1.31 x 0.50	33.3 x 12.8	123	55.8	6000016
540 Series KELB	#4	5 kV	30	9.14	1.44 x 0.54	35.8 x 13.7	38	17.2	6000012
		5 kV	55	16.76	1.44 x 0.54	35.8 x 13.7	70	31.8	6000009
		5 kV	70	21.34	1.44 x 0.54	35.8 x 13.7	89	40.4	6000010
		5 kV	100	33.53	1.44 x 0.54	35.8 x 13.7	127	57.6	6000001
		5 kV	120	38.58	1.44 x 0.54	35.8 x 13.7	152	68.9	6000017

Monel Armor standard - Galvanized Steel Armor and Stainless Steel Armor optional.

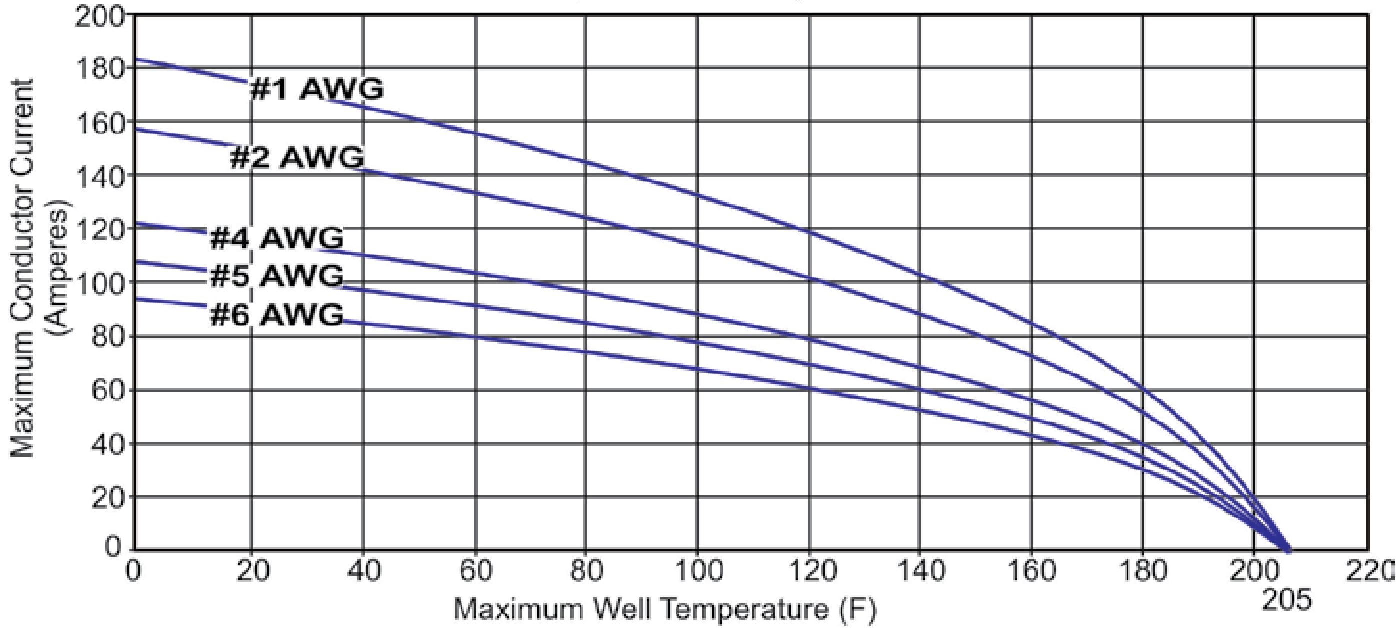
* - longer cables available on request.





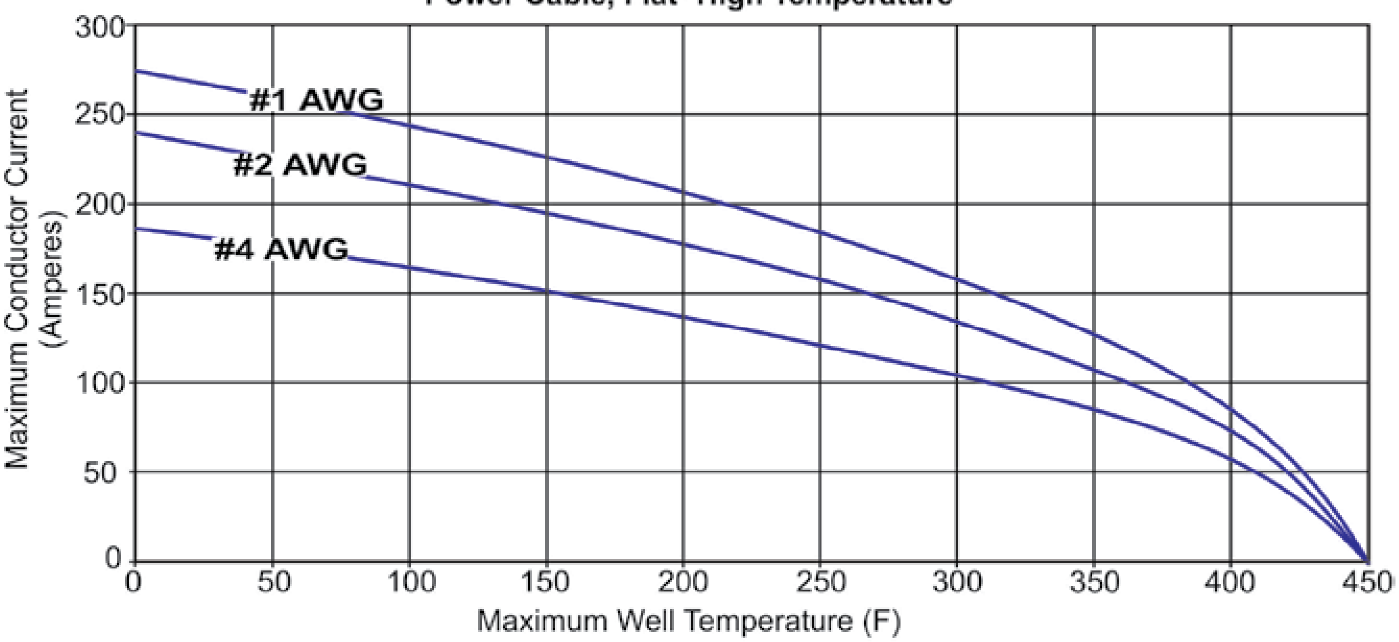
Power Cables

Power Cable, Flat -Low Temperature



Approximate ampacities based on IEEE1018

Power Cable, Flat -High Temperature



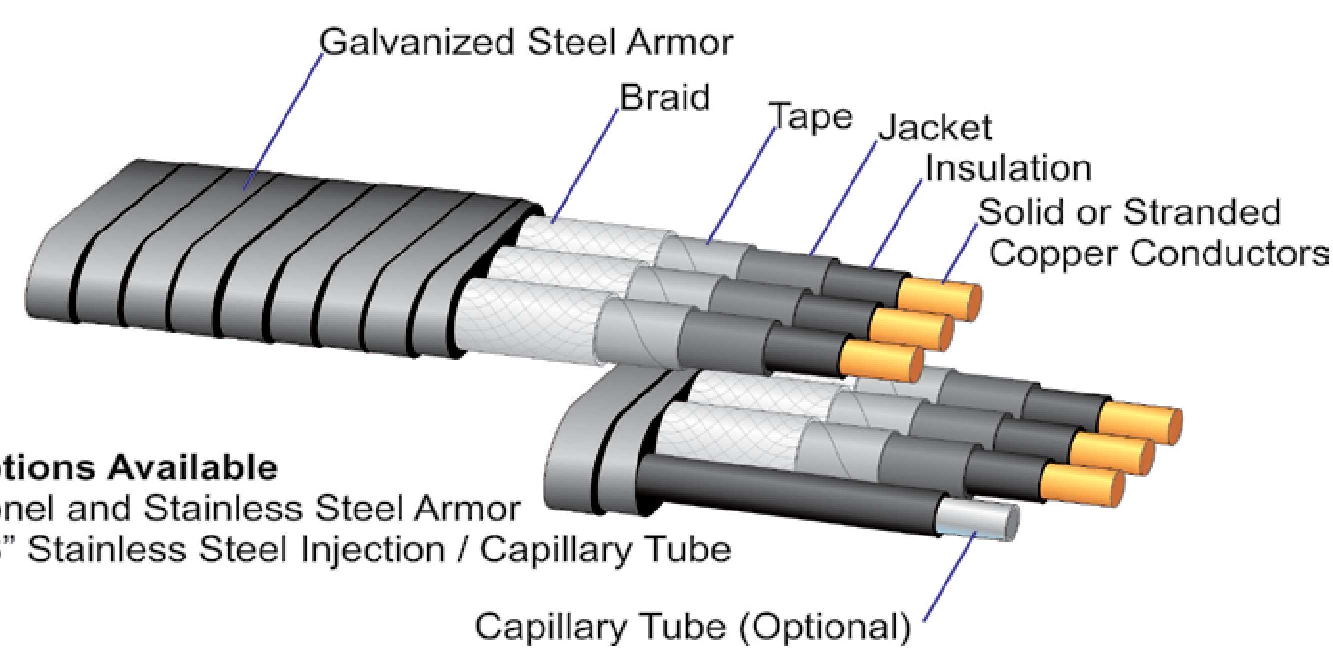
Approximate ampacities based on IEEE1018

Power Cables

Description	Wire Size	Const.	Insulation	Jacket	Armor	Dimensions (inches)	Weight (Lbs/ft)	Part No
5 kV Flat 205ºF	#1	Stranded	Polypropylene	Nitrile	Galv	1.994 x 0.751	1.66	6000023
	#2					1.899 x 0.720	1.45	6000039
	#4	Solid				1.739 x 0.666	1.14	6000025
	#5					1.672 x 0.644	1.03	6000032
	#6					1.612 x 0.624	0.94	6000034
5 kV Flat 450ºF	#1	Stranded	EPDM	Lead	Galv	1.688 x 0.629	2.14	6000027
	#2					1.593 x 0.598	1.89	6000028
	#4	Solid				1.433 x 0.544	1.52	6000029
5 kV Flat 205ºF Cap Tube*	#1	Stranded	Polypropylene	Nitrile	Galv	2.369 x 0.751	1.83	6000037
	#2					2.274 x 0.720	1.62	6000036
	#4	Solid				2.114 x 0.666	1.31	6000035
	#6					1.987 x 0.624	1.11	6000038

A synthetic braid applied with full coverage over the fluropolymer tape provides an additional mechanical reinforcement and hoop strength.

* - Capillary Tube:
  0.375"(9.53 mm) O.D., 0.049" (1.25 mm) Wall, 316L Stainless Steel
  Working Pressure Rated at 4,900 psig (33,786 kPa)



Options Available
Monel and Stainless Steel Armor
3/8" Stainless Steel Injection / Capillary Tube

Cable Miscellaneous

Cable Splice Materials

Tape, 1/2" Thread (Teflon)	9100107
Tape, Fiberglass 1" x 60 Yds	9100145
Tape, Hi-Modules WO/Liner	9100147
Tape, Hi- Modules W/Liner	9100148
Tape, Hi-Temp. 1"x 36 Yds WO/Liner	9100149
Sleeve, Nicropress 1/7str-6sol	9100174
Sleeve, Nicropress 1/7str-4sol	9100173
Sleeve, Nicropress 2/7str-2/7str	9100175
Sleeve, Nicropress 2/7str-6sol	9100169
Sleeve, Nicropress 2/7str-4sol	9100170
Sleeve, Nicropress 2/7str-2sol	9100177
Sleeve, Nicropress 2sol-2sol	9100176
Sleeve, Nicropress 2sol-4sol	9100178
Sleeve, Nicropress 2sol-6sol	9100179
Sleeve, Nicropress 4sol-4sol	9100172
Sleeve, Nicropress 4sol-5sol	9100181
Sleeve, Nicropress 4sol-6sol	9100171
Sleeve, Nicropress 6sol-6sol	9100183

Banding Material

3/4" x 0.02 Stainless Steel	9100193
3/4" x 0.02 Monel	9100194

Calculating Cable Band Length

The following equation can be used to determine the length of bands required for a given tubing size, cable size and type of band (i.e., continuous or individual).

Cable band length Calculation band length = $3.14\,(d_{tubing} + 0.5d_{cable}) + K$	where: d_{tubing} = tubing diameter, inches d_{cable} = cable diameter, inches K = five inches for individual manual bands, two inches for continuous banding material

Determining the Quantity of Cable Bands

The following table shows guidelines for determining the quantity of required cable bands.

75 bands / 1000 ft. of tubing	2 bands / joint of tubing
110 bands / 1000 ft. of tubing	3 bands / joint of tubing (recommended for heavier lead-jacketed cable)

Cable Miscellaneous

Reel Capacity Calculation for Round Cables	

Capacity = N*M*L	where:
	N = # of turns = [(transverse width / major outside dimension of cable) - 1]
	M = # layers = (depth - clearance) / minor outside dimension of cable
	L = length of average turn = (π/12) * (drum diameter + depth - clearance)

Reel Capacity Calculation for Flat Cables	

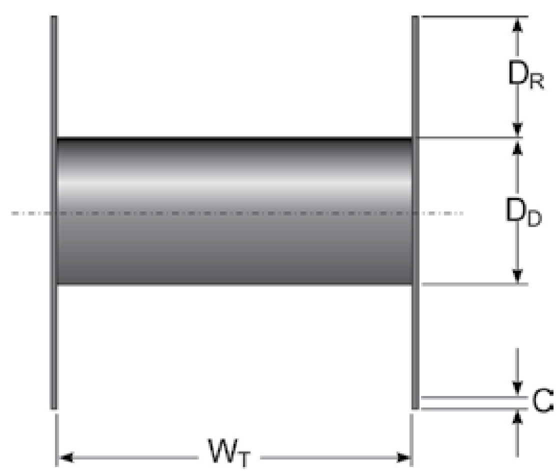
Capacity = N*M*L	where:
	N = # of turns = [(transverse width / outside diameter of cable) - 1]
	M = # layers = (depth - clearance) / outside diameter of cable
	L = length of average turn = (π/12) * (drum diameter + depth - clearance)

CABLE REELS

Nom Size	Flange Diameter (inches)	Drum Diameter (inches)	Transverse Width (inches)	Overall Width (inches)	Depth (inches)	Clearance (inches)	Empty Reel Weight	
							lbs	KG
66	66	33	40	46	16.5	2	441	200
78	78	35	54	60	21.5	2	772	350
78	78-Heavy Duty	42	57	64	18	2	1037	470

REEL CAPACITIES

Cable Description	Wire Size (AWG)	Reel Size			
		66" Max capacity 7600 lbs		78" Max capacity 13000 lbs	
		Ft	M	Ft	M
5 kV Flat 205	#1	3541	1052	6283	1915
	#2	4300	1311	8477	2584
	#4	5300	1615	10972	3344
	#5	6950	2118	11872	3619
	#6	7616	2321	13008	3965
5 kV Flat 450	#1	3000	914	5740	1750
	#2	3400	1036	6492	1979
	#4	4300	1311	8093	2467



W_T = Transverse Width
D_R = Depth
D_D = Drum Diameter
C = Clearance

Note: The limiting factor for a reel is not necessarily the length of cable that can be wound on it, but rather the weight of the cable and reel. This is calculated using the equation: (weight per foot) * (length of cable).

Variable Speed Drives

Enforcer Three Phase Drive Packages with Sinewave Filter							
Model Number	**kVA**	**Drive Amps**	**Output Amps**	**Input Voltage**	**Enclosure Size Dim inches (mm) D x W x H**	**Weight Lb (kg)**	**Part Number**
GPS-10/12	10	12	11.3	480	16x32x79 (406x813x2007)	300 (136)	01-04976
GPS-13/16	13	16	15.2			300 (136)	01-04977
GPS-19/23	19	23	22			300 (136)	01-04978
GPS-25/31	25	31	29.7			300 (136)	01-04979
GPS-31/38	31	38	36.5			300 (136)	01-04980
GPS-38/46	38	46	44			350 (159)	01-04981
GPS-51/61	51	61	59			350 (159)	01-04982
GPS-60/72	60	72	69			385 (175)	01-04983
GPS-72/87	72	87	84			385 (175)	01-04984
GPS-87/105	87	105	102			385 (175)	01-04985
GPS-116/140	116	140	136		20x45x85 (508x1143x2159)	575 (261)	01-04986
GPS-141/170	141	170	165			625 (283)	01-04987
GPS-170/205	170	205	198			625 (283)	01-04988
GPS-217/261	217	261	253		38x60x89 (965x1524x2261)	1500 (680)	01-04989
GPS-249/300	249	300	290			1500 (680)	01-04990
GPS-319/385	319	385	375			2900 (1315)	01-04991
GPS-382/460	382	460	448			3000 (1361)	01-04992
GPS-432/520	432	520	505			3000 (1361)	01-04993
GPS-490/590	490	590	575		38x97x100 (965x2464x2540)	3600 (1633)	01-04994
GPS-540/650	540	650	635			3600 (1633)	01-04995
GPS-606/730	606	730	712			3775 (1712)	01-04996
GPS-680/820	680	820	800			4150 (1882)	01-04997
GPS-763/920	763	920	898			4300 (1950)	01-04998
GPS-855/1030	855	1030	1004			4300 (1950)	01-04999

Standard Package Includes:

SBP Drive with A9 & A2 I/O boards
Nema 3R Enclosure
Padlockable Front Access Door
7” Color Watchdog (behind operator access door)
Anti-Backspin Timer (in software)
Port for SCADA Connection
LAN/TCP connection for VFD-Watchdog connection
Modbus TCP to RS485 converter for DHT translation
Breaker or HMCP (HP dependent)
Rotary Handle Mechanism
Surge Protection
217 kVA and larger have Semi Conductor Protection Fuses
Selector Switch (3 POS) HOA and speed Pot
Sine Wave Output Filter, 140 kVA and above have Sine Wave Monitor
Front Mounted USB and LAN ports under metal cover plate

Variable Speed Drives

Downhole Application VSD's	
Features	**Options**

• Custom Oil & Gas Firmware for Oil & Gas Pumping Application
• Fully Programmable and Expandable Firmware
• Rugged Oil Field Nema 3R Enclosure Standard
• Wide Input Voltage Range Capability
  - *Medium-Voltage Drives Available Upon Request*
• Built in PLC Processor
• Full Parameter Access or Limited Parameter Access via Password Protection
• Full Register List for Remote Communication
• Seamless Downhole Sensor Interface
  - *Common Human Interface Panel for both Sensor and VSD*
• Standard 122°F. (50°C) Ambient Temperature
• Flange Mounted Lockable Disconnect
• TVSS
• Sine Wave Filter Option for Downhole Units
• Communication Options
  Modbus RTU / RS422 Fiber Optic
  Ethernet / Modbus TCP/IP / RS232
  Ethernet IP / RS485 / Device NET
• Input and Output Junction Boxes
• 5 Digital, 3 Analog Input & 2 Analog Output
• Short Circuit and Ground Fault Protection
• Input Circuit Breaker Protection With Back-Up Fuse Protection
• 24 Volt DC or 110 Volt AC Control
• Turn Key Custom VSD Package
	• Custom Programmable Touch
	  - *Screen Panel (HIP) from 6" to 12.5"*
	  - *Displays with High Bright options.*
	• Remote Monitoring and Control
	• CF Card Expansion Port for Date Collection and History Recording
	  - *Information can be viewed on PC via the CF card*
	• Backspin Protection
	• Additional Plug and Play IO Modules
	• RF Scada Options
	• Recording Amp Meter Option Available
	• 12, 18 & 24 Pulse Options
	• AFE Option for IEEE-519 Compliance
	• Filter Board Option for Monitoring Downhole Sine Wave Filter Output
	  - *Protects Downhole Unit in the event of a Sine Wave Filter failure.*
	• Additional I/O available

Switchboards

Volts	**600**	**1500**	**3600**	**5000**
Amps	100	200	200	400
Standard				
Part Number	**01PF-20116**	**01PF-20117**	**01PF-20118**	**01PF-20119**
F-1 Controller	X			
F-3 Controller		X	X	X
HOA Push Button Start Switch		X	X	X
Emergency Stop Switch		X	X	X
Disconnect	X	X	X	X
Vacuum Contactor		X	X	X
Recording ampmeter	X	X	X	X
Fuses	X	X	X	X
Enclosures - Nema 3 rated	X	X	X	X
Indication Lights		X	X	X
0.250 kVA Voltage Sensing PT			X	X
0.500 kVA Voltage Sensing PT	X			
1.000 kVA Voltage Sensing PT		X	X	X
100:5 CT's	X			
200:5 CT's		X		
Multi-tap (75-600:5) CT's			X	X
Options Available				
F-5 Controller	X	X	X	X
* - Data Logger w/software	X	X	X	X
* - Back Spin Module	X	X	X	X
* - Back Spin Probes	X	X	X	X
TVSS	X	X	X	X
Metering Panel	X	X	X	X
JCL Fuses			X	X
Enclosures - Nema 4 rated			X	X
200 Amp Vacuum Contactor		X	X	
400 Amp Vacuum Contactor				X
Built in High Voltage Junction Box			X	X

* - Available with F-5 Controller only.

Switchboard - Fuse Chart

<table>
<tr><th>Recommended Fuse Sizes</th><th>Volt</th><th>Type</th><th>Motor Load</th></tr>
<tr><td rowspan="16">This list is the recommended sizes of fuses to be used. This chart has been compiled by plotting fuse characteristics against overload tripping curves and motor characteristics for each motor.

Note: It is important that the fuse size be checked when re sizing occurs. The fuses are just as important as the current transformer and should be checked to insure they are sized correctly for the new operations.

Note:
JCK (short)-2400 Volt
JCL (long)- 4800 Volt</td><td rowspan="3">1000</td><td>NBE 35</td><td>Up to 25 Amp</td></tr>
<tr><td>NBE 60</td><td>26 to 40 Amp</td></tr>
<tr><td>NBE 80</td><td>41 to 65 Amp</td></tr>
<tr><td rowspan="7">1500</td><td>NBBC 35</td><td>Up to 25 Amp</td></tr>
<tr><td>NBBC 60</td><td>26 to 40 Amp</td></tr>
<tr><td>NBBC 80</td><td>41 to 57 Amp</td></tr>
<tr><td>NBBC 100</td><td>58 to 77 Amp</td></tr>
<tr><td>NBBC 125</td><td>78 to 95 Amp</td></tr>
<tr><td>NBBC 150</td><td>96 to 130 Amp</td></tr>
<tr><td>NBBC 200</td><td>131 to 150 Amp</td></tr>
<tr><td rowspan="6">2400
-
4800</td><td>JCK/JCL 2R (70 amp)</td><td>Up to 50 Amp</td></tr>
<tr><td>JCK/JCL 3R (100 amp)</td><td>51 to 70 Amp</td></tr>
<tr><td>JCK/JCL 4R (130 amp)</td><td>71 to 100 Amp</td></tr>
<tr><td>JCK/JCL 6R (170 amp)</td><td>101 to 135 Amp</td></tr>
<tr><td>JCK/JCL 9R (200 amp)</td><td>136 to 165 Amp</td></tr>
<tr><td>JCK/JCL 12R (230 amp)</td><td>166 to 190 Amp</td></tr>
</table>

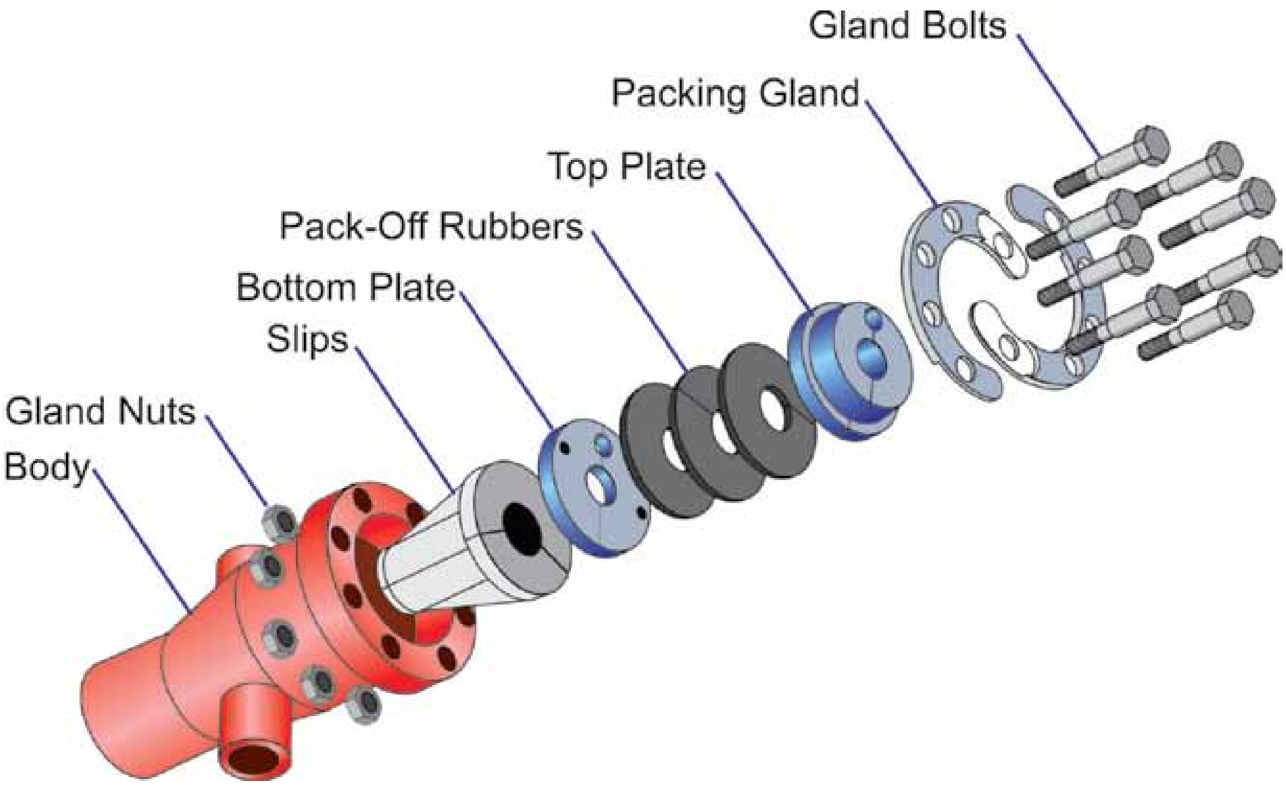
Transformer

Single Phase							
KVA	Primary Volts	Secondary Volts	Weight		Dimensions H x Dia		Part Number
			Lbs	Kgs	In	CM	
37.5			605	275	32 x 26	81 x 66	TBA
50			710	323	43 x 26	109 x 66	TBA
75			890	405	43 x 30	109 x 76	TBA
100	7200 / 12470	456 - 2300	975	443	43 x 33	109 x 84	TBA
125			1405	638	50 x 36	127 x 91	TBA
167			1680	764	50 x 36	127 x 91	TBA
200			1730	786	50 x 45	127 x 114	TBA

Auto 3 Phase- Designed for VSD Applications								
KVA	Primary Amps	Primary Volts	Secondary Volts	Weight		Dimensions H x D x W		Part Number
				Lbs	Kgs	In	CM	
110	120			2565	1163			01-01902
130	156		600-2078	2850	1293	52 x 37 x 48	132 x 94 x 122	01-01903
150	180			2850	1293			01-01904
210	253			3610	1637			01-01905
260	313			4135	1875	53 x 43 x 55	135 x 109 x 140	01-01906
355	427		1100-3811	5300	2404			01-01954
400	481			5485	2488	59 x 46 x 60	150 x 117 x 152	01-01936
520	625.5	480		6815	3091	62 x 46 x 68	157 x 117 x 173	01-01909
520SP	625.5		1400-4850	6800	3084			01-01920
650	782			7875	3572	65 x 54 x 72	165 x 137 x 183	01-01911
650SP	782		1250-4330	7825	3549			01-01955
750	902			8250	3742	66 x 58 x 70	168 x 147 x 178	01-01939
750SP	902			8105	3676			01-01956
875	1052		1400-4850	9005	4084	67 x 59 x 73	170 x 150 x 185	01-01957
1000	1203			10800	4898	65 x 54 x 84	165 x 137 x 213	01-01915

All of the above kVa ratings are at 60 Hz. Multiply by 0.834 to obtain 50 Hz rating. Other Primary and Secondary Voltage ratings available on request.

HHS Wellhead Equipment



Specifications										
Type	Casing Size O.D. Inches	Tubing Size O.D. Inches	Recommended Max Load		Max Casing PSI		Maximum Setting Depth (Safety Factor = 2.0)		Weight	
			Lbs	Kgs	Working	Body Test	Ft	M	Lbs	Kgs
HHS	4-1/2, 5-1/2, 7	2-3/8	80,000	36,000	1,500	3,000	10,000	3,048	144	66
	4-1/2, 5-1/2, 7	2-7/8					7,100	2,165	144	66
	7	3-1/2					4,900	1,495	148	68
	9-5/8	2-3/8 2-7/8 3-1/2	100,000	45,000			4,900	1,495	226	103

HHS Wellhead Equipment

Complete Unit									
Csg O.D.	Tbg EUE	Part Number							
		#1 Flat	#1 Rnd	#2 Flat	#2 Rnd	#4 Flat	#4 Rnd	#6 Flat	#6 Rnd
5-1/2	2-3/8	8000250	8000251	8000252	8000253	8000254	8000255	8000256	8000257
	2-7/8	8000260	8000261	8000262	8000263	8000264	8000265	8000266	8000267
	3-1/2	8000271	8000272	8000273	8000274	8000275	8000276	8000277	8000278
7	2-3/8	8000290	8000291	8000292	8000293	8000294	8000295	8000296	8000297
	2-7/8	8000300	8000301	8000302	8000303	8000304	8000305	8000306	8000307
	3-1/2	8000311	8000312	8000313	8000314	8000315	8000316	8000317	8000318
9-5/8	2-3/8	8000330	8000331	8000332	8000333	8000334	8000335	8000336	8000337
	2-7/8	8000340	8000341	8000342	8000343	8000344	8000345	8000346	8000347
	3-1/2	8000351	8000352	8000353	8000354	8000355	8000356	8000357	8000358

Top Plate								
Tbg EUE	Part Number							
	#1 Flat	#1 Rnd	#2 Flat	#2 Rnd	#4 Flat	#4 Rnd	#6 Flat	#6 Rnd
2-3/8	8000101	8000102	8000103	8000104	8000105	8000106	8000107	8000108
2-7/8	8000131	8000132	8000133	8000134	8000135	8000136	8000137	8000138
3-1/2	8000161	8000162	8000163	8000164	8000165	8000166	8000167	8000168

Bottom Plate								
Tbg EUE	Part Number							
	#1 Flat	#1 Rnd	#2 Flat	#2 Rnd	#4 Flat	#4 Rnd	#6 Flat	#6 Rnd
2-3/8	8000111	8000112	8000113	8000114	8000115	8000116	8000117	8000118
2-7/8	8000141	8000142	8000143	8000144	8000145	8000146	8000147	8000148
3-1/2	8000171	8000172	8000173	8000174	8000175	8000176	8000177	8000178

Body				
Csg. O.D.	Body	Packing Gland	Gland Bolts	Gland Nuts
5-1/2	8000911	8000914	8000915	8000916
7	8000912			
9-5/8	8000913			

Slips		
Tbg EUE	Part Number	
	Short	Long
2-3/8	8000196	8000191
2-7/8	8000197	8000192
3-1/2	8000198	8000193

Packing Rubbers									
Tbg EUE	Part Number								
	#1 Flat	#1 Rnd	#2 Flat	#2 Rnd	#4 Flat	#4 Rnd	#6 Flat	#6 Rnd	Blank
2-3/8	8000121	8000122	8000123	8000124	8000125	8000126	8000127	8000128	8000129
2-7/8	8000151	8000152	8000153	8000154	8000155	8000156	8000157	8000158	8000159
3-1/2	8000181	8000182	8000183	8000184	8000185	8000186	8000187	8000188	8000189

Miscellaneous Equipment

Description	Part Number

Hangers

400 Series Intake Shroud Hangers-SS	8500104
400 Series Intake Shroud Hangers-CS	8500105
400 Series RGS Shroud Hangers-CS	8500106

Motor Oils

Synthetic Motor Oil 15W40	7400011
Synthetic Motor Oil 10W30-Case	7400012
Lubscoat 1300, Oil	9100245

Cable Guard

Cable Guard 8’ Galvanized	9100191

Protectolizer, Cable

2-7/8”, Mid-Joint	TBA
3-1/2”, Mid-Joint	TBA
2-7/8” Cross Coupling	8500002
3-1/2” Cross Coupling	8500003

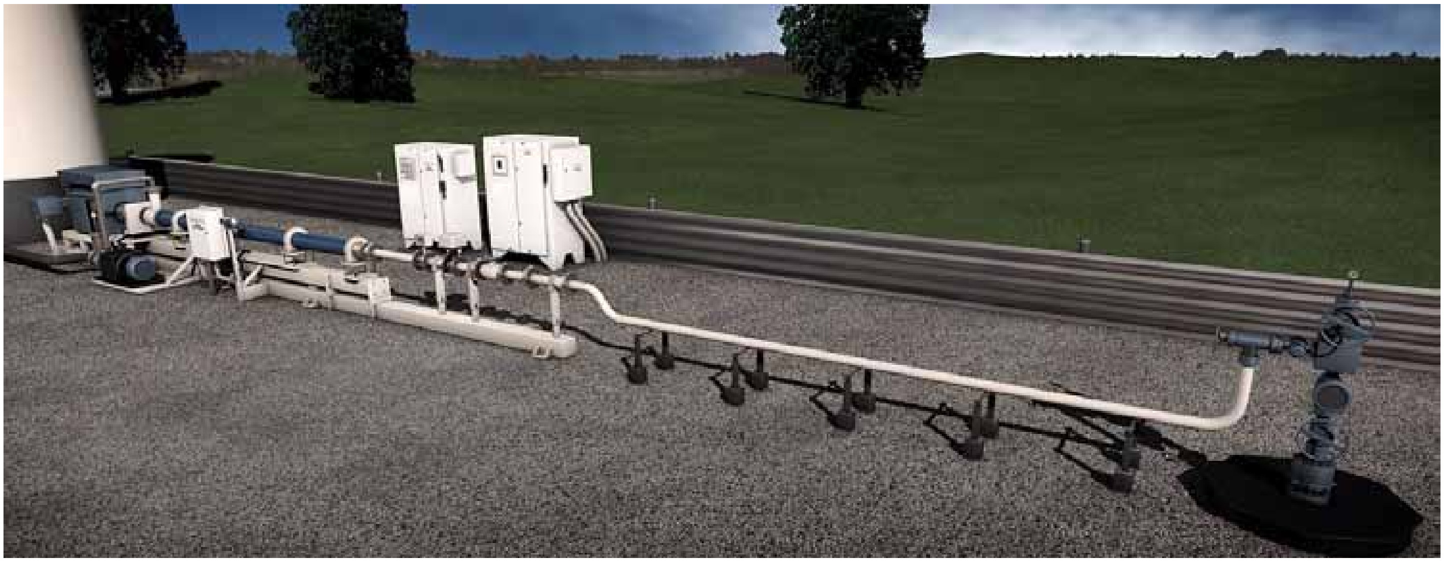
Junction Box

Wellhead Junction Box 5000 V	9000202
Mounting Stand	8500116

Check and Drain Valve

2-3/8”-5000 PSI	Drain Valve	9000171
	Check Valve	9000172
2-7/8”-5000 PSI	Drain Valve	9000173
	Check Valve	9000174
3-1/2”-5000 PSI	Drain Valve	9000175
	Check Valve	9000176

Automated Pumping Systems



NPSH Required

Stage	Cap. BEP BPD	Cap. 50% BPD	Cap. 60% BPD	Cap. 70% BPD	Cap. 80% BPD	Cap. 90% BPD	Cap. 100% BPD	Cap.110% BPD	Cap 120% BPD
338 Series									
338-400	445	223	267	312	356	401	445	490	534
	NPSHR	**4.38**	**4.58**	**4.78**	**5.03**	**5.40**	**5.83**	**6.70**	**8.16**
338-550	580	290	348	406	464	522	580	638	696
	NPSHR	**4.31**	**4.80**	**5.20**	**5.70**	**6.35**	**7.20**	**8.27**	**10.08**
338-900	910	455	546	637	728	819	910	1001	1092
	NPSHR	**4.84**	**4.95**	**5.15**	**5.40**	**5.75**	**6.30**	**7.15**	**8.82**
338-1200	1175	588	705	823	940	1058	1175	1293	1410
	NPSHR	**5.14**	**5.37**	**5.77**	**6.20**	**6.71**	**7.50**	**8.50**	**10.50**
338-1500	1610	805	966	1127	1288	1449	1610	1771	1932
	NPSHR	**5.71**	**6.16**	**6.65**	**7.20**	**7.98**	**9.00**	**10.25**	**12.60**
400 Series									
400-300	350	175	210	245	280	315	350	385	420
	NPSHR	**4.39**	**4.40**	**4.45**	**4.57**	**4.85**	**5.27**	**5.90**	**6.67**
400-500	520	260	312	364	416	468	520	572	624
	NPSHR	**4.62**	**4.79**	**4.96**	**5.23**	**5.59**	**6.10**	**7.35**	**8.15**
400-850	850	425	510	595	680	765	850	935	1020
	NPSHR	**4.93**	**5.29**	**5.76**	**6.37**	**6.97**	**7.75**	**8.90**	**10.82**
400-1250	1300	650	780	910	1040	1170	1300	1320	1440
	NPSHR	**5.42**	**5.91**	**6.47**	**7.17**	**7.92**	**8.94**	**10.25**	**12.12**
400-1750	1700	850	1020	1190	1360	1530	1700	1870	2040
	NPSHR	**5.50**	**5.68**	**5.88**	**6.20**	**6.61**	**7.20**	**8.02**	**9.35**
400-2200	2140	1070	1284	1498	1712	1926	2140	2354	2568
	NPSHR	**5.75**	**5.99**	**6.35**	**6.75**	**7.30**	**8.06**	**9.10**	**10.67**
400-3000	2900	1450	1740	2030	2320	2610	2900	3190	3480
	NPSHR	**7.10**	**7.71**	**8.30**	**9.05**	**9.95**	**11.05**	**12.65**	**15.04**
400-4300	4330	2165	2598	3031	3464	3897	4330	4763	5196
	NPSHR	**7.25**	**7.95**	**8.69**	**9.63**	**10.67**	**12.02**	**14.03**	**16.81**
400-6000	5400	2700	3240	3780	4320	4860	5400	5940	6480
	NPSHR	**7.83**	**8.96**	**10.01**	**11.41**	**12.90**	**14.66**	**17.00**	**20.52**
538 Series									
538-1500	1760	880	1056	1232	1408	1584	1760	1936	2112
	NPSHR	**5.78**	**6.13**	**6.48**	**6.92**	**7.53**	**8.35**	**9.44**	**11.31**
538-2700	2700	1350	1620	1890	2160	2430	2700	2970	3240
	NPSHR	**6.36**	**6.84**	**7.42**	**8.03**	**8.81**	**9.80**	**11.27**	**13.43**
538-4200	4320	2160	2592	3024	3456	3888	4320	4752	5184
	NPSHR	**7.05**	**7.69**	**8.40**	**9.32**	**10.30**	**11.60**	**13.22**	**15.88**

NPSH required is Head feet

NPSH Required

Stage	Cap. BEP BPD	Cap. 50% BPD	Cap. 60% BPD	Cap. 70% BPD	Cap. 80% BPD	Cap. 90% BPD	Cap. 100% BPD	Cap.110% BPD	Cap 120% BPD
538 Series-continued									
538-5500	5700	2850	3420	3990	4560	5130	5700	6270	6840
	NPSHR	**7.89**	**8.79**	**9.81**	**11.05**	**12.41**	**14.05**	**16.25**	**19.40**
538-7000	7500	3750	4500	5250	6000	6750	7500	8250	9000
	NPSHR	**8.40**	**9.46**	**10.70**	**11.95**	**13.60**	**15.30**	**17.85**	**21.06**
538-11000	11400	5700	6840	7980	9120	10260	11400	12540	13680
	NPSHR	**10.67**	**12.65**	**14.85**	**17.00**	**19.50**	**22.46**	**26.00**	**31.44**
675 Series									
675-7500	8300	4150	4980	5810	6640	7470	8300	9130	9960
	NPSHR	**9.07**	**10.20**	**11.50**	**12.91**	**14.65**	**16.59**	**19.15**	**23.23**
675-9000	9500	4750	5700	6650	7600	8550	9500	10450	11400
	NPSHR	**9.80**	**11.35**	**12.96**	**14.79**	**17.09**	**19.84**	**23.00**	**27.78**
675-12000	12700	6350	7620	8890	10160	11430	12700	13970	15240
	NPSHR	**10.64**	**12.28**	**14.05**	**16.15**	**18.50**	**21.52**	**25.10**	**30.13**
675-20000	20200	10100	12120	14140	16160	18180	20200	22220	24240
	NPSHR	**13.33**	**15.53**	**17.91**	**20.96**	**24.55**	**28.44**	**33.20**	**39.82**
862 Series									
862-19000A	18500	9250	11100	12950	14800	16650	18500	20350	22200
	NPSHR	**12.22**	**13.90**	**15.58**	**17.58**	**20.00**	**22.70**	**26.35**	**31.60**
862-19000B	16400	8200	9840	11480	13120	14760	16400	18040	19680
	NPSHR	**11.32**	**12.62**	**14.20**	**15.85**	**17.85**	**20.05**	**23.00**	**27.59**
862-19000C	19000	9500	11400	13300	15200	17100	19000	20900	22800
	NPSHR	**12.48**	**14.24**	**16.00**	**18.04**	**20.20**	**23.24**	**26.95**	**32.54**
862-24000A	22400	11200	13440	15680	17920	20160	22400	24640	26880
	NPSHR	**13.84**	**16.06**	**18.74**	**21.75**	**25.45**	**29.35**	**34.15**	**41.09**
862-24000B	22800	11400	13680	15960	18240	20520	22800	25080	27360
	NPSHR	**14.18**	**16.50**	**19.20**	**22.23**	**25.65**	**29.80**	**34.90**	**41.72**
862-24000C	21800	10900	13080	15260	17440	19620	21800	23980	26160
	NPSHR	**13.66**	**15.62**	**18.08**	**21.07**	**24.49**	**28.20**	**33.00**	**39.23**
950 Series									
950-35000A	34300	17150	20580	24010	27440	30870	34300	37730	41160
	NPSHR	**16.22**	**18.55**	**21.31**	**23.93**	**27.33**	**30.84**	**36.00**	**43.18**
950-35000B	34800	17400	20880	24360	27840	31320	34800	38280	41760
	NPSHR	**16.52**	**18.70**	**21.20**	**24.00**	**27.20**	**31.05**	**36.20**	**44.41**
950-35000C	37200	18600	22320	26040	29760	33480	37200	40920	44640
	NPSHR	**17.17**	**19.78**	**22.65**	**26.03**	**30.00**	**34.74**	**40.70**	**48.64**

NPSH required is Head feet

APS Intake

Intake Chamber Assembly

Intake Dia. Inches	Description	Part No
4.00	4” Intake Chamber - SST	7033041
6.00	6” Intake Chamber - SST	7033035
8.00	8” Intake Chamber - SST	7033048

Intake to Pump Adapter Plate

Pump Series	Description	Part No
400	400 Series Pump Adapter Plate	7033045
538	538 Series Pump Adapter Plate	7033042
675	675 Series Pump Adapter Plate	7033044
862	862 Series Pump Adapter Plate	7033037
950	950 Series Pump Adapter Plate	7033049

Pump Seal Plate

Pump Series	Description	Part No
Common to all Pump Types	Pump Seal Plate	7033036

APS Thrust Chamber

Description	Part No
Thrust Chamber, 2 Bearing, 6000# SST	7030022
Thrust Chamber, 3 Bearing, 8500# SST	7030000
Thrust Chamber, High Thrust, 12,500# SST	7020100
Thrust Chamber, Ultra High Thrust, 40,000# SST	7020110
Thrust Chamber Cooler for Ultra High Thrust	7020150

APS Discharge

400 Series Pump

Size	Flange Class	Working Pressure @100° F	Description	Part No
3" NPS	600	1480	Coated Steel	7034431
	900	2220	Coated Steel	7034442
	1500	3705	Coated Steel	7034443
	600	1440	316 SST	7034444
	900	2160	316 SST	7034445
	1500	3600	316 SST	7034446

538 Series Pump

Size	Flange Class	Working Pressure @100° F	Description	Part No
3" NPS	600	1480	Coated Steel	7034531
	900	2220	Coated Steel	7034532
	1500	3705	Coated Steel	7034533
	600	1440	316 SST	7034534
	900	2160	316 SST	7034535
	1500	3600	316 SST	7034536
4" NPS	600	1480	Coated Steel	7034541
	900	2220	Coated Steel	7034542
	1500	3705	Coated Steel	7034543
	600	1440	316 SST	7034544
	900	2160	316 SST	7034545
	1500	3600	316 SST	7034546

675/862 Series Pump

Size	Flange Class	Working Pressure @100° F	Description	Part No
3" NPS	600	1480	Coated Steel	7034631
	900	2220	Coated Steel	7034632
	1500	3705	Coated Steel	7034633
	600	1440	316 SST	7034634
	900	2160	316 SST	7034635
	1500	3600	316 SST	7034636
4" NPS	600	1480	Coated Steel	7034641
	900	2220	Coated Steel	7034642
	1500	3705	Coated Steel	7034643
	600	1440	316 SST	7034644
	900	2160	316 SST	7034645
	1500	3600	316 SST	7034646
6” NPS	600	1480	Coated Steel	7034661
	900	1480	Coated Steel	7034662
	1500	2220	Coated Steel	7034663
	600	1440	316 SST	7034664
	900	1480	316 SST	7034665
	1500	2220	316 SST	7034666

950 Series Pump

Size	Flange Class	Working Pressure @100° F	Description	Part No
6" NPS	600	1480	Coated Steel	7034961
	900	1480	Coated Steel	7034962
	1500	2220	Coated Steel	7034963
	600	1440	316 SST	7034964
	900	1480	316 SST	7034965
	1500	2220	316 SST	7034966

APS Motor

60 Hz

Size	Enclosure	Frame Size	Description	Part No
100	TEFC	405TS	Siemens Premium Efficiency	7131001
	TEFC	405TS	Toshiba EQPII Premium Efficiency	7131002
	TEFC	405TS	Teco Westinghouse Max E1 Prem. Efficiency	7131003
	TEFC	405TS	WEG Premium Efficiency	7131004
125	TEFC	444TS	Siemens Premium Efficiency	7131251
	TEFC	444TS	Toshiba EQPII Premium Efficiency	7131252
	TEFC	445TS	Teco Westinghouse Max E1 Prem. Efficiency	7131253
	TEFC	445TS	WEG Premium Efficiency	7131254
150	TEFC	445TS	Siemens Premium Efficiency	7131501
	TEFC	445TS	Toshiba EQPII Premium Efficiency	7131502
	TEFC	445TS	Teco Westinghouse Max E1 Prem. Efficiency	7131503
	TEFC	445TS	WEG Premium Efficiency	7131504
200	TEFC	447TS	Siemens Premium Efficiency	7132001
	TEFC	447TS	Toshiba EQPII Premium Efficiency	7132002
300	TEFC	449TS	Siemens Premium Efficiency	7133001
	TEFC	449TS	Toshiba EQPII Premium Efficiency	7133002
	TEFC	449TS	Teco Westinghouse Max E1 Prem. Efficiency	7133003
	TEFC	449TS	WEG Premium Efficiency	7133004
350	TEFC	449TS	Siemens Premium Efficiency	7133501
	TEFC	449TS	Toshiba EQPII Premium Efficiency	7133502
	TEFC	449TS	Teco Westinghouse Max E1 Prem. Efficiency	7133503
	TEFC	449TS	WEG Premium Efficiency	7133504
400	TEFC	5009/5010	Siemens Premium Efficiency	7134001
	TEFC	5009/5010	Toshiba EQPII Premium Efficiency	7134002
	TEFC	5009/5010	Teco Westinghouse Max E1 Prem. Efficiency	7134003
	TEFC	5009/5010	WEG Premium Efficiency	7134004
450	TEFC	5010/5011	Siemens Premium Efficiency	7134501
	TEFC	5010/5011	Toshiba EQPII Premium Efficiency	7134502
	TEFC	5010/5011	Teco Westinghouse Max E1 Prem. Efficiency	7134503
	TEFC	5010/5011	WEG Premium Efficiency	7134504
500	TEFC	5010/5011	Siemens Premium Efficiency	7135001
	TEFC	5010/5011	Toshiba EQPII Premium Efficiency	7135002
	TEFC	5010/5011	Teco Westinghouse Max E1 Prem. Efficiency	7135003
	TEFC	5010/5011	WEG Premium Efficiency	7135004
600	TEFC	5810/5811	Siemens Premium Efficiency	7136001
	TEFC	5810/5811	Toshiba EQPII Premium Efficiency	7136002
	TEFC	5810/5811	Teco Westinghouse Max E1 Prem. Efficiency	7136003
	TEFC	5810/5811	WEG Premium Efficiency	7136004

Options

Description	Part No
Inverter Duty Rated	7130010
Insulated Bearings	7130020
Bearing RTDs	7130030
Phase Winding RTDs	7130035
Space Heater for Windings	7130050

Higher Horse Power Motors are available on request.

APS Skid

Series I: Twin Beam HD, 500 HP and Above
Series II: Twin Beam HD, w/Booster Pump Platform, 500 HP and Above
Series III: Single Beam, Low Profile, 450 HP and Below

Main Frame

Description	Part Number		
	Series I	Series II	Series III
Skid, Main Frame, 14 Ft.	7310114	7311214	7310214
Skid, Main Frame, 18 Ft.	7310118	7311218	7310218
Skid, Main Frame, 22 Ft.	7310122	7311222	7310222
Skid, Main Frame, 23 Ft.	7310123	7311223	7310223
Skid, Main Frame, 26 Ft.	7310126	7311226	7310226
Skid, Main Frame, 30 Ft.	7310130	7311230	7310230
Skid, Main Frame, 34 Ft.	7310134	7311234	7310234
Skid, Main Frame, 38 Ft.	7310138	7311238	7310238

Extension

Description	Part Number
Skid, Extension, 4 Ft.	7310004
Skid, Extension, 8 Ft.	7310008
Skid, Extension, 12 Ft.	7310012
Skid, Extension, 16 Ft.	7310016
Skid, Extension, 20 Ft.	7310020
Skid, Extension, 24 Ft.	7310024
Skid, Extension, 28 Ft.	7310028
Skid, Extension, 32 Ft.	7310032

Series II-A Options

Description	Part Number
Stinger Assembly	7310040
Enclosure Mounting Bracket	7310251
Instrument Stand	7310253
Pre-Intake Filter Assembly 8" 316 SST	7210072
Fabricated Mesh Filter Replacement Screen	7210024
Charge Pump to Intake Piping 316 SST	7210036

Pressure Valve Control Options

Description	Part Number
Automated Pressure Control Valve 3" 300 CL Flanged 316 SST	7211050
Automated Pressure Control Valve 3" 300 CL Wafer 316 SST	7211051
Automated Pressure Control Valve 3" 600 CL Flanged 316 SST	7211052
Automated Pressure Control Valve 3" 600 CL Wafer 316 SST	7211053
Automated Pressure Control Valve 3" 900 CL Flanged 316 SST	7211054
Automated Pressure Control Valve 3" 900 CL Wafer 316 SST	7211055
Automated Pressure Control Valve 3" 1500 CL Flanged 316 SST	7211056
Automated Pressure Control Valve 4" 300 CL Flanged 316 SST	7211004
Automated Pressure Control Valve 4" 300 CL Wafer 316 SST	7211005
Automated Pressure Control Valve 4" 600 CL Flanged 316 SST	7211003
Automated Pressure Control Valve 4" 600 CL Wafer 316 SST	7211002
Automated Pressure Control Valve 4" 900 CL Flanged 316 SST	7211006
Automated Pressure Control Valve 4" 900 CL Wafer 316 SST	7211007
Automated Pressure Control Valve 4" 1500 CL Flanged 316 SST	7211008
Mounting Kit, Back Pressure Actuator	7211009
Back Pressure Valve Actuator 24V DC 4-20 mA	7211010

APS Booster Pump

Pump Flow	Head / Ft	Pump Design	Driver HP	Part No
5000 BPD/145 GPM	115	1 x 1.5-8	10 HP	7500091
10000 BPD/291 GPM	231	3 x 4-8G	30 HP	7500092
20000 BPD/583 GPM	115	3 x 4-10	30 HP	7500093
25000 BPD/730 GPM	115	4 x 6-13	50 HP	7500094
30000 BPD/875 GPM	231	4 x 6-10G	75 HP	7500095

APS Starter Panel

Description	Volts	Amps	Part Number
Starter Panel 600 VAC (Across the Line Starters)	600	200	TBA-APS1
	600	400	TBA-APS2
	600	600	TBA-APS3
	600	800	TBA-APS4
	600	1000	TBA-APS5

Description	Volts	Amps	Part Number
Soft Starter 600 VAC	600	105	TBA-APS6
	600	142	TBA-APS7
	600	170	TBA-APS8
	600	210	TBA-APS9
	600	250	TBA-APS10
	600	300	TBA-APS11
	600	370	TBA-APS12

Technical Data			
Operating Voltage	600 VAC	Rated Frequency - Main Circuit	50/60 Hz
Control Supply Voltage	100 - 250 VAC	Rated Frequency - Control Circuit	50/60 Hz
Control Circuit Voltage	24 VDC		

Variable Frequency Controller

GPS Enforcer Variable Frequency Controller

HP	Drive Amps	Output Amps	Pulse	Voltage	Enclosure	Approx.Weight	Part Number
200	261	253	6	480	Nema 3R	1500	HPS200V4-3-DW-GH
250	300	290	6	480	Nema 3R	1500	HPS250V4-3-DW-GH
300	385	375	6	480	Nema 3R	3200	HPS300V4-3-DW-GH
350	460	448	6	480	Nema 3R	3200	HPS350V4-3-DW-GH
400	520	505	6	480	Nema 3R	3400	HPS400V4-3-DW-GH
500	590	575	6	480	Nema 3R	3600	HPS500V4-3-DW-GH
550	650	635	6	480	Nema 3R	3600	HPS550V4-3-DW-GH
600	730	715	6	480	Nema 3R	3600	HPS600V4-3-DW-GH
650	820	805	6	480	Nema 3R	3600	HPS650V4-3-DW-GH
700	920	905	6	480	Nema 3R	3600	HPS700V4-3-DW-GH
800	1030	1015	6	480	Nema 3R	3600	HPS800V4-3-DW-GH

Larger VFC's available on request

GPS Input Harmonic Filter

Description	Voltage	Amps	Enclosure	Part Number
HMR Series D, 60 Hz.	480	240	Nema 3R	01-00240D
HMR Series D, 60 Hz.	480	320	Nema 3R	01-00320D
HMR Series D, 60 Hz.	480	403	Nema 3R	01-00403D
HMR Series D, 60 Hz.	480	482	Nema 3R	01-00482D
HMR Series D, 60 Hz.	480	636	Nema 3R	01-00636D
HMR Series D, 60 Hz.	480	786	Nema 3R	01-00786D
HMR Series D, 60 Hz.	480	850	Nema 3R	01-00850D
HMR Series D, 60 Hz.	480	970	Nema 3R	01-00970D

Options

Description	Part Number
Recording Amp Meter	TBA-APS13
Surge Suppressor	TBA-APS14

Standard

Input Semi-Conductor Fuses Standard on drives above 200 HP
HOA Selector Switch
APS Touch Screen Operator Interface Controller
Operator Access Door with HOA and APS Controller mounted behind door
IO Count: Analog Inputs - 4 ea., Analog Outputs -1 ea., Digital Inputs - 14 ea., Digital Outputs - 9 ea. Relay Outputs - 2 ea.

PLC Components

Description	Part Number
APS-PLC Interface Panel (ME Version)	01-20111
CE PLC Panel PV700 Micro1100 24 Volt DC/4 AI/4 AI/2 AI-2 AO/4 RTD	01-20124
PLC Panel Power and Upgrade 120 Volt AC 48 Hours	01-20125
12 Pulse VSD Upgrade I/O Expansion Module	01-20126
VSD: 75 HP Transfer VSD 24 Volt PLC	01-20127
VSD: 125 HP Transfer VSD 24 Volt PLC	01-20128
2 Door PLC Panel with 30 HP VSD (APS)	01-20130
APS J Box with terminal strips	01-20152

Sensor

Description				Part Number
Vibration	4-20 mA			01-01200
	Cable			01-01201
Pressure	0-15 PSI	Bullet type		01-01210
	0-30 PSI			01-01211
	0-100 PSI			01-01225
	0-1000 PSI			01-01220
	0-1500 PSI			01-01223
	0-2000 PSI			01-01224
	0-3000 PSI			01-01221
	0-5000 PSI			01-01222
Drop in (0-15) (82° C)				01-01226
Transducer	.15 - 14.5 PSI	Explosion Proof	Stainless	01-01228
	.58 - 58.0 PSI			01-01229
	2.3 - 230 PSI			01-01230
	9.0 - 915 PSI			01-01231
	23 - 2300 PSI			01-01232
	58 - 5800 PSI			01-01233
	.15 - 14.5 PSI		Hasteloy Alloy	01-01234
	.58 - 58.0 PSI			01-01235
	2.3 - 230 PSI			01-01236
	9.0 - 915 PSI			01-01237
	23 - 2300 PSI			01-01238
	58 - 5800 PSI			01-01239

PLC Components

Description	Part Number
Flow Meter Readout Head	01-01262
Pressure Switch	01-01263
Flow Meter Readout Head with Modbus	01-01267
4” 900 Series Flow Meter	01-01268
Pickup Sensor (For SSC-01268)	01-01269
Hardware Kit (For SSC-01268)	01-01270
1” Turbine Flow Meter 9A-100003526	01-01271
4” EZ -In 600 series 9A-100003552	01-01275
4” EZ -In Hardware Kit 9A-100003562 (For SSC-01275)	01-01276
Thrust Chamber RTD	01-01277
VSD: Modbus Card Eaton C/H	01-05000
VSD: I/O Card Eaton C/H	01-05001
VSD: OPTA9 (Slot A)	01-05002
VSD: OPTA2 (Slot B)	01-05003
VSD: OPTA3 relay out card	01-05004
Valve: 1/2" Ball Valve 7250 PSI (Full Port)	01-07411
Valve: 1/2" Ball Valve 1000 PSI (77172)	01-07412
Valve: 1/2" Hex Nipple SST (8-HN)	01-07413
Valve: 1/2" x 3" Nipple SST (59508)	01-07414
Valve: 1/2" x 6" Nipple SST (59514)	01-07415
Valve: 1/2" Union 3000# SST (76253)	01-07416
Valve: 1/2” Ell 90° 3000# Thd SST (46332)	01-07417
Valve: 1/2” Plug 3000# Thd SST (46352)	01-07418
Valve: 1/2" TEE 6000# SST (Special)	01-07419
Valve: 3/8" x 1/2" Male Adapter SST (DCT6-8)	01-07420
Valve: 3/8" x 1/2" 90° Male Adapter SST (DLN6-8)	01-07421
Valve: 3/8” Tube Union DUA 6 SST	01-07422
Valve: 3/8" x 1/2" Female Adapter SST (DSA6-8)	01-07423
Valve: 3/8" x 1/2" 90° Female Adapter SST (DLF6-8)	01-07424
Valve: 3/8" Tubing SST (74315)	01-07425
Valve: Never Seize 1 pt Nickel (3NSBT-16)	01-07426
Valve: Tape 1/2" x 260" Nickel SST	01-07427
Valve : Bleeder Block Valve SST (V2BF8)	01-07428
Valve : 1/2" 4 Way Cross SST (Special Order)	01-07429

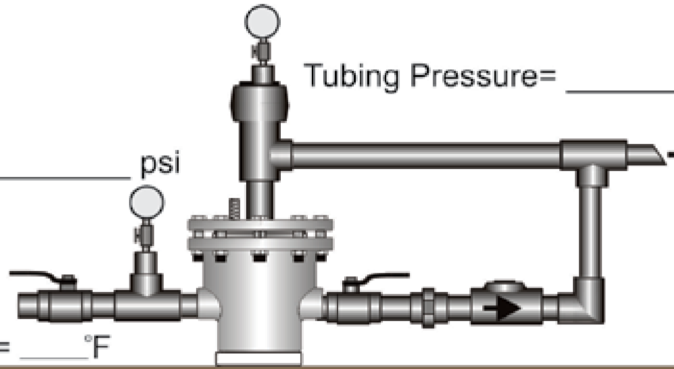
APS Spare Parts

Description	P/N	Description	P/N	Description	P/N
Kit, Hardware, APS SeriesII	7530900	Spool, 22" long 4" 600 CL SST	7210064	Grease, Tube Royal Purple APS	7400008
Kit, Hardware, APS Series II, 16' Ext.	7530916	Spool,24" long 4" to 6" 600 CL	7210073	APS Oil Synfilm 68GT (5 gal)	7400009
Cplg, Flex Assy, Rexnord, 2.625 x 1.625	7022001	Spool, 36" long 4" 600 CL SST	7210069	APS OIL Synfilm 32 GT	7400010
Intake Seal Std. T-2 1500 SC/SC	7033000	Pre Filter Assy 8" 150 CL SST	7210072	Syn. Motor Oil 15W40	7400011
Kit, Series II-A Hardware	7530950	Gasket, 3" 150 Series SST	7210101	Syn. Motor Oil 10W30 - Case	7400012
Kit, Series II O-Ring 675 Tandem	7010206	Gasket, 3" 300 Series SST	7210102	Syn. Motor Oil 5W-30 - Case	7400013
Pre Filter Assembly 8" 150 CL SST	7210072	Gasket, 3" 600 Series SST	7210103	Quart 30 WT Non-Detergent Oil	7400014
Seal, Mech., Booster Pump #651	7500021	Gasket, 3" 900 Series SST	7210104	Oil/Moisture Separators	7400015
Coupling, Booster Pump Assembly #9	7022009	Gasket, 3" 1500 Series SST	7210105	Filter - Diesel Eng. Oil	7400020
Driver, Booster Pump, 30HP TEFC	7030019	Gasket, 4" 150 Series SST	7210111	Filter BRE Caps	7400021
Valve, Ball 3" 1500 CL SST	7770151	Gasket, 4" 300 Series SST	7210112	Filter, Gas Engine 10-48	7400022
Valve, Check 3" 1500 CL SST	7770152	Gasket, 4" 600 Series SST	7210113	Shim 4", .001" SST	7400030
Valve, Pressure Actuator 24 VDC	7211010	Gasket, 4" 900 Series SST	7210114	Shim 4", .002" SST	7400031
Kit, Mounting, Pres Valve Actuator	7211009	Gasket, 4" 1500 Series SST	7210115	Shim 4", .003" SST	7400032
Kit, Gasket, Series II-A Gasket	7231500	Gasket, 5" 150 Series SST	7210121	Shim 4", .004" SST	7400033
Kit, Series II-B Stud Kit	7531500	Gasket, 5" 300 Series SST	7210122	Shim 4", .005" SST	7400034
Oil, Thrust Chmbr, Synfilm 32GT/ Gal.	7400010	Gasket, 5" 600 Series SST	7210123	Shim 4", .010" SST	7400035
Grease, APS, High Temp/ Tube	7400008	Gasket, 5" 900 Series SST	7210124	Shim 4", .015" SST	7400036
APS Stinger Clamp, 4"	7000016	Gasket, 5" 1500 Series SST	7210125	Shim 4", .020" SST	7400037
Thrust Chamber Plate Shim	7000017	Gasket, 6" 150 Series SST	7210131	Shim 4", .025" SST	7400038
Motor Plate Shim	7000018	Gasket, 6" 300 Series SST	7210132	Shim 4", .050" SST	7400039
Pump Clamp, Top 675P	7000019	Gasket, 6" 600 Series SST	7210133	Shim 4", .075" SST	7400040
Pump Clamp, Bottom 675P	7000020	Gasket, 6" 900 Series SST	7210134	Shim 4", .100" SST	7400041
APS Stinger Clamp, 3"	7000021	Gasket, 6" 1500 Series SST	7210135	Shim 4", .125" SST	7400042
APS Instrument Block SST	7000022	Gasket, 8" 150 Series SST	7210141	Shim Kit - Small Shims	7400050
APS Series II Instrument Tree	7000211	Gasket, 8" 300 Series SST	7210142	Shim Kit - Medium Shims	7400051
APS Series II Saddle Assy. 8.6	7000220	Gasket, 8" 600 Series SST	7210143	Shim Kit - Large Shims	7400052
APS Stinger Assembly	7001001	Gasket, 8" 900 Series SST	7210144	Coupling Insert, #6 D Flex	7500006
Skid Base Series I	7010002	Gasket, 8" 1500 Series SST	7210145	Coupling Insert, #7 EM	7500007
Thrust Chamber Angle Plate	7010003	Gasket, 10" 150 Series SST	7210151	Coupling Insert, #8 EM	7500008
APS Pump Clamp, Bottom 862P	7010004	Gasket, 10" 300 Series SST	7210152	Coupling Insert, #9 EM	7500009
APS Pump Clamp, Top 862P	7010005	Gasket, 10" 600 Series SST	7210153	3196 Seal S/S/Kalrez 1.75 #651	7500010
Coupling Safety Cover	7010006	Gasket, 10" 900 Series SST	7210154	Coupling Insert, #11 EM	7500011
APS Series I O-Ring Kit	7010012	Gasket, 10" 1500 Series SST	7210155	Seal 3196 MTX "Big Bore" 401	7500015
Skid Base Series II	7010018	Gasket, 12" 150 Series SST	7210161	Seal 3196 MTX "Sm Bore" 401	7500016
Series II O-Ring Kit 675 Tandem	7010206	Gasket, 12" 300 Series SST	7210162	Seal 3196 C/S/A 2.25" #651	7500017
Thrust Chamber Final Assy 2 Brg.	7020000	Gasket, 12" 600 Series SST	7210163	Seal 3196 MTX BB #651	7500019
Rexnord Thomas Cplg Assy / Comp	7022001	Gasket, 12" 900 Series SST	7210164	Mechanical Seal 3196 STX	7500020
Cplg Hub 2.625" w/ .625" Key	7022002	Gasket, 12" 1500 Series SST	7210165	Seal 3196 MTX "Big Bore" 651	7500021
Cplg Hub 1.625" w/ .500" Key	7022003	BP Valve Flow Disc D9S133P	7211011	Seal 3196 LTX "Big Bore"	7500023
Rexnard 375 Center Spacer 7"	7022004	BP Valve Flow Disc D9S2120P	7211012	Seal 3196 MTX "Sm Bore" 651	7500024
Series 71 300 Borestock Cplg Hub	7022005	BP Valve Wear Sleeve 4"	7211020	Seal 3196 LTX "Sm Bore"	7500025
Series 71 375 Borestock Cplg Hub	7022006	BP Valve Rebuild Seal Kit 4"	7211030	Seal 3196 MTX Sil/Sil Aflas	7500026
Tubing, 4" x 48" SST	7210037	Spool, 3" 1500 CL 12" sch 80	7215012	1.25 type 8B1 Carbon Seal Face	7500027
Gearbox Gasket 8" 3196	7500046	Spool, 3" 1500 CL 24" sch 80	7215024	1 x 1.625" Carbide Seal Seat	7500028
90 Degree Tubing Elbow, 4" SST	7210038	Spool, 3" 1500 CL 36" sch 80	7215036	STX Shaft Sleeve	7500030
Gould 3196 MTX Pump 4x6x10	7210044	Series II-A Piping Gasket Kit	7231500	MTX Shaft Sleeve	7500031
Gould 3196 MTX 3x4x8G	7210045	Series II Enclosure Mtng. Brac.	7310251	LTX Shaft Sleeve	7500032
Pump, 3196 MTX 3x4-10 SST	7210046	Series II Instrument Stand	7310253	3196 Casing Gasket 8"	7500040
Spool 12" long 4" 600 CL SST	7210060	Series 2-A 297 Base	7310297	3196 Casing Gasket 10"	7500041

APS Spare Parts

Description	P/N	Description	P/N	Description	P/N
3196 MTX Casing Gasket 13"	7500043	Washer, Std Flat 3/4", Grd 5	7520240	Bolt, 3/4" x 4.5"-10, Grd 8	7530204
3196 MTX Impeller, 6.0"	7500060	Washer, Low Pro 3/4", Grd 5	7520241	Bolt, 3/4" x 5"-10, Grd 8	7530205
3196 MTX SST Casing 8"	7500065	Washer, Lock 3/4", Grd 5	7520242	Bolt, 3/4" x 5.5"-10, Grd 8	7530206
3196 MTX SST Impeller 8"	7500066	Washer, Std Flat, 3/4", Grd 8	7530240	Bolt, 3/4" x 6"-10, Grd 8	7530207
3196 MTX SST Backplate 8"	7500067	Washer, Low Pro Flat, 3/4", Grd 8	7530241	Bolt, 3/4" x 6.5"-10, Grd 8	7530208
3196 MTX Pmp Frame Adptr 8"	7500068	Washer, Lock, 3/4", Grd 8	7530242	Bolt, 3/4" x 7"-10, Grd 8	7530209
3196 Pmp Frame Adapter 10"	7500069	Washer, Std Flat, 7/8" Grd 5	7520290	Bolt, 3/4" x 7.5"-10, Grd 8	7530210
3196 STX 1x1.5-8 10HP Pmp Pkg	7500076	Washer, Low Pro Flat 7/8" Grd 5	7520291	Bolt, 3/4" x 8"-10, Grd 8	7530211
3196 MTX 1x2-10G 30HP Pmp Pkg	7500081	Washer, Lock 7/8" Grd 5	7520292	Bolt, 3/4" x 1.5”-16, Grd 8	7530225
3196 MTX 4x6-10-30HP Booster	7500084	Washer, Std Flat 7/8", Grd 8	7530290	Bolt, 3/4" x 2”-16, Grd 8	7530226
3196 MTX 4x6-10 Pump Only	7500090	Washer, Low Pro 7/8", Grd 8	7530291	Bolt, 3/4" x 2.5”-16, Grd 8	7530227
3196 MTX 3x4-8G 20HP Pmp Pkg	7500201	Washer, Lock, 7/8", Grd 8	7530292	Bolt, 3/4" x 3”-16, Grd 8	7530228
3196 Pump Cplng Guard Assy	7500225	Washer, Std. Flat 1" Grd 5	7520391	Bolt, 3/4" x 3.5”-16, Grd 8	7530229
Brg Isolator 1.75x2.875x.700	7500050	Bolt, 1/4" x .5"-20, Grd 8	7530001	Bolt, 3/4" x 4”-16, Grd 8	7530230
Brg Isolator, 1.125 x 2 x .700	7500051	Bolt, 1/4" x .75"-20, Grd 8	7530002	Bolt, 3/4" x 4.5”-16, Grd 8	7530231
Seal Face Sil/Sil/A 1.5" x 2"	7500075	Bolt, 1/4" x 1"-20, Grd 8	7530003	Bolt, 3/4" x 5”-16, Grd 8	7530232
Teflon O-Ring, .028	7500100	Bolt, 1/4" x 1.5"-20, Grd 8	7530004	Bolt, 3/4" x 5.5”-16, Grd 8	7530233
Sealed Ball Bearing #6305	7500410	Bolt, 1/4" x 2"-20, Grd 8	7530005	Bolt, 3/4" x 6”-16, Grd 8	7530234
Coupling Hub #9 - 1.125 Bore	7509125	Bolt, 1/4" x 2.5"-20, Grd 8	7530006	Bolt, 3/4" x 6.5”-16, Grd 8	7530235
Bolt On Coupling Flange, #9	7509151	Bolt, 1/4" x 3"-20, Grd 8	7530007	Bolt, 3/4" x 7”-16, Grd 8	7530236
Key, 1/4" x 2" SST	7510001	Bolt, 1/4" x 3.5"-20, Grd 8	7530008	Bolt, 3/4" x 7.5”-16, Grd 8	7530237
Key, 3/8" x 2" SST	7510002	Bolt, 1/4" x 4"-20, Grd 8	7530009	Bolt, 3/4" x 8”-16, Grd 8	7530238
Key, 1/2" x 2" SST	7510003	Bolt, 1/4" x 4.5"-20, Grd 8	7530010	Bolt, 7/8" x 3"-9, Grd 5	7520251
Key, 5/8" x 2" SST	7510004	Bolt, 1/4" x 5"-20, Grd 8	7530011	Bolt, 7/8" x 3.5"-9, Grd 5	7520252
Key, 3/4" x 2" SST	7510005	Bolt, 5/16" x .5"-18, Grd 8	7530025	Bolt, 7/8" x 4"-9, Grd 5	7520253
Key, 1/4" x 3" SST	7510010	Bolt, 5/16" x .75"-18, Grd 8	7530026	Bolt, 7/8" x 4.5"-9, Grd 5	7520254
Key, 3/8" x 3" SST	7510011	Bolt, 5/16" x 1"-18, Grd 8	7530027	Bolt, 7/8" x 5"-9, Grd 5	7520255
Key, 1/2" x 3" SST	7510012	Bolt, 5/16" x 1.5"-18, Grd 8	7530028	Bolt, 7/8" x 5.5"-9, Grd 5	7520256
Key, 5/8" x 3" SST	7510013	Bolt, 5/16" x 2"-18, Grd 8	7530029	Bolt, 7/8" x 6"-9, Grd 5	7520257
Key, 3/4" x 3" SST	7510014	Bolt, 5/16" x 2.5"-18, Grd 8	7530030	Bolt, 7/8" x 6.5"-9, Grd 5	7520258
Socket Plug 1/4" CS	7510020	Bolt, 5/16" x 3"-18, Grd 8	7530031	Bolt, 7/8" x 7"-9, Grd 5	7520259
Socket Plug 3/8" CS	7510021	Bolt, 5/16" x 3.5"-18, Grd 8	7530032	Bolt, 7/8" x 7.5"-9, Grd 5	7520260
Socket Plug 1/2" CS	7510022	Bolt, 5/16" x 4"-18, Grd 8	7530033	Bolt, 7/8" x 8"-9, Grd 5	7520261
Socket Plug 1/4" SST	7510030	Bolt, 5/16" x 4.5"-18, Grd 8	7530034	Bolt, 7/8" X 2"-9, Grd 8	7530251
Socket Plug 3/8" SST	7510031	Bolt, 5/16" x 5"-18, Grd 8	7530035	Bolt, 7/8" X 2.5"-9, Grd 8	7530252
Socket Plug 1/2" SST	7510032	Bolt, 3/8" x .5"-16, Grd 8	7530051	Bolt, 7/8" X 3"-9, Grd 8	7530253
All Thread/Ft, 1/4"- 20, Grd 5	7520001	Bolt, 3/8" x .75"-16, Grd 8	7530052	Bolt, 7/8" X 3.5"-9, Grd 8	7530254
All Thread/Ft, 5/16"-18, Grd 5	7520002	Bolt, 3/8" x 1"-16, Grd 8	7530053	Bolt, 7/8" X 4"-9, Grd 8	7530255
All Thread/Ft, 3/8"-16, Grd 5	7520003	Bolt, 3/8" x 1.5"-16, Grd 8	7530054	Bolt, 7/8" X 4.5"-9, Grd 8	7530256
All Thread/Ft, 7/16"-14, Grd 5	7520004	Bolt, 3/8" x 2"-16, Grd 8	7530055	Bolt, 7/8" X 5"-9, Grd 8	7530257
AllThread/Ft, 1/2"-13, Grd 5	7520005	Bolt, 3/8" x 2.5"-16, Grd 8	7530056	Bolt, 7/8" X 5.5"-9, Grd 8	7530258
All Thread/Ft, 5/8"-11, Grd 5	7520006	Bolt, 3/8" x 3"-16, Grd 8	7530057	Bolt, 7/8" X 6"-9, Grd 8	7530259
All Thread/Ft, 3/4"-10, Grd 5	7520007	Bolt, 3/8" x 3.5"-16, Grd 8	7530058	Bolt, 7/8" X 6.5"-9, Grd 8	7530260
All Thread/Ft, 7/8"-9, Grd 5	7520008	Bolt, 5/8" x 6.5"-11, Grd 8	7530162	Bolt, 7/8" X 7"-9, Grd 8	7530261
All Thread/Ft, 1"- 8, Grd 5	7520009	Bolt, 5/8" x 7"-11, Grd 8	7530163	Bolt, 7/8" X 7.5"-9, Grd 8	7530262
All Thread/Ft, 1 1/8"-7, Grd 5	7520010	Bolt, 5/8" x 7.5"-11, Grd 8	7530164	Bolt, 7/8" X 8"-9, Grd 8	7530263
All Thread, 1" x 72"-14 SST	7520039	Bolt, 5/8" x 8"-11, Grd 8	7530165	Nut, Hex, 5/8"-11, Grd 8	7530194
Washer, Std Flat, 5/8", Grd 8	7530191	Bolt, 3/4" x 3"-10, Grd 8	7530201	Nut, Std.10 Thread, 3/4", Grd 8	7530245
Washer, Low Pro Flat, 5/8", Grd 8	7530192	Bolt, 3/4" x 3.5"-10, Grd 8	7530202	Nut, Hex 3/4"-16, Grd 8	7530249
Washer, Lock, 5/8", Grd 8	7530193	Bolt, 3/4" x 4”-10, Grd 8	7530203	Nut, Hex 7/8" - 9 Grd 8	7530299

Well Schematic

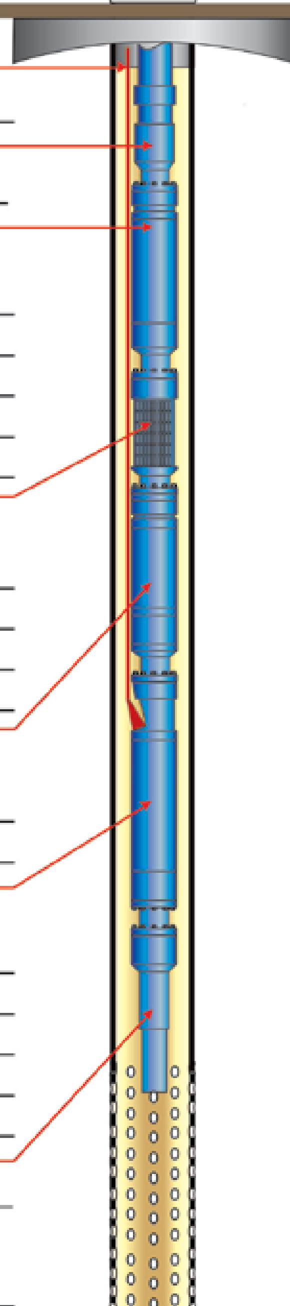


Tubing Pressure= ________ psi

To Production Facilities

Casing Pressure = _________ psi

Surface Temp = _____°F



Cable

Size__________ length__________

Discharge Head

Size__________ length__________

Pump(s)

series / stages / length

#1 ______________________

#2 ______________________

#3 ______________________

#4 ______________________

#5 ______________________

BOI / Gas Separator(s)

series / description / length

#1 ______________________

#2 ______________________

#3 ______________________

#4 ______________________

Protector(s)

series / description / length

#1 ______________________

#2 ______________________

Motor(s)

series / HP / volts / amps / length

#1 ______________________

#2 ______________________

#3 ______________________

#4 ______________________

#5 ______________________

Sensor

description ________ length________

Total Unit Length: __________

Casing

Size__________ weight__________

Production Tubing

Size__________ length__________

Joints__________ Subs__________

Predicted Fluid Level = ________ ft

Static BHP = ________ psi

Flowing BHP = ________ psi

Rate = _______ BFPD

PI = _______

BHT = ________ °F

Pump Set Depth

Measured Depth = ________ ft

True Vertical Depth = ________ ft

Specific Gravity

Oil = ________ API

Water = ________ API

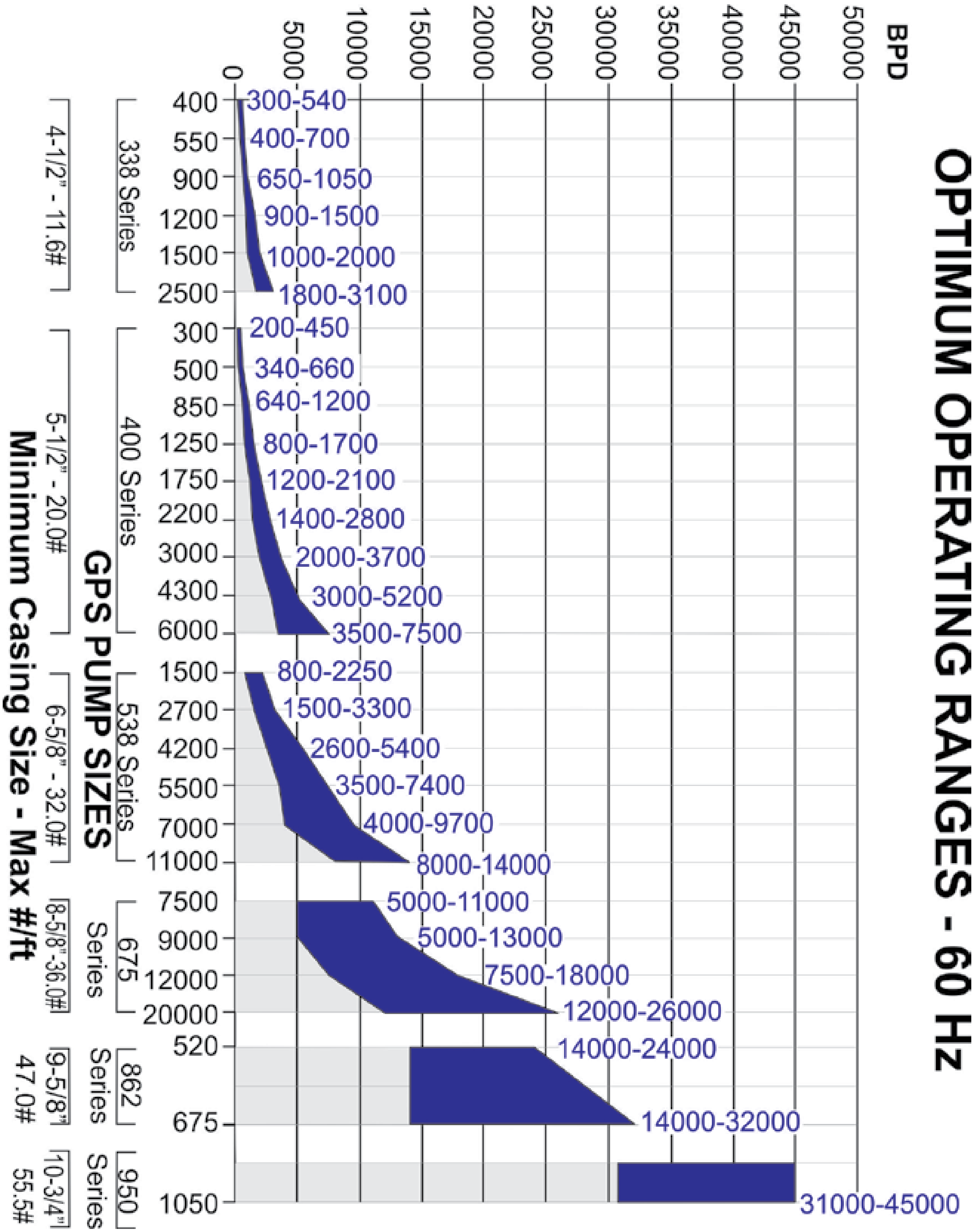
Gas = ________ API

WC = ________ %

Top Perf = ________ ft

Bottom Perf = ________ ft

TD = ________ ft


OPTIMUM OPERATING RANGES - 60 Hz
BPD
0
5000
10000
15000
20000
25000
30000
35000
40000
45000
50000
GPS PUMP SIZES
Minimum Casing Size - Max #/ft
338 Series
4-1/2" - 11.6#
400 300-540
550 400-700
900 650-1050
1200 900-1500
1500 1000-2000
2500 1800-3100
400 Series
5-1/2" - 20.0#
300 200-450
500 340-660
850 640-1200
1250 800-1700
1750 1200-2100
2200 1400-2800
3000 2000-3700
4300 3000-5200
6000 3500-7500
538 Series
6-5/8" - 32.0#
1500 800-2250
2700 1500-3300
4200 2600-5400
5500 3500-7400
7000 4000-9700
11000 8000-14000
675 Series
8-5/8"-36.0#
7500 5000-11000
9000 5000-13000
12000 7500-18000
20000 12000-26000
862 Series
9-5/8" 47.0#
520 14000-24000
675 14000-32000
950 Series
10-3/4" 55.5#
1050 31000-45000

Abbreviations, Electrical Terms and Definitions

Term	Definition
AC	Alternating Current
Amperes (Amp) (A)	Unit of current or rate at flow of electricity.
API	American Petroleum Institute
AR	Abrasion Resistant
ASSY	Assembly
BEP	Best Efficiency Point
BHT	Bottom Hole Temperature
BO	Bolt-On
BPD	Barrels Per Day
Brake Horsepower (BHP)	The net effective power of a prime mover
BRG	Bearing
C_P	Wellhead Casing Pressure
CONST	Construction
CPRSN	Compression
DC	Direct Current
DLS	Dog Leg Severity
Drift	Guaranteed minimum inside diameter of API tubulars
EFF	Efficiency
FLT	Floater
FT	Feet
GLR	Gas / Liquid Ratio
GOR	Gas / Oil Ratio
GPM	Gallons Per Minute
GS	Gas Separator
Horsepower (HP)	A measure of time rate of doing work; equivalent to raising 33,000-lbs one ft. in one minute. 1 hp = 746 watts
HiLd or HL	High Load
HiPr	High Pressure
HSG	Housing
HSS	High Strength Shaft
Hz	Hertz
ID	Inside Diameter
KG	Kilograms
KW	Kilowatts
LBS	Pounds
M	Meters
MCF	Thousand cubic feet
MD	Measured Depth
Megohm	1,000,000 Ohms

Term	Definition
MMSCF	Million cubic feet
NPSH	Net Pressure Suction Head
MTR	Motor
NO	Number
OD	Outside Diameter
Ohm	Unit of resistance
Ohms Law for DC Current Ohms	 Electromotive Force / Resistance Volts / Amperes
P_B	Bubble Point Pressure
PBTD	Plug Back Total Depth
PIP	Pump Intake Pressure
PMP	Pump
Power Factor (PF)	Ratio of true to apparent power
P_R	Reservoir Pressure
PSD	Pump Setting Depth
Pump % Eff	Pump Percent Efficiency
P_{WF}	Producing Bottom Hole Pressure
Q	Volume Flow Rate
Qmin	Minimum volumetric flow rate
Qmax	Maximum volumetric flow rate
SHD or SHRD	Shroud
Sp Gr or SG	Specific Gravity
SST	Stainless Steel
STBPD	Stock Tank Barrels Per Day
STD	Standard
STGS	Stages
STL	Steel
TD	Total Depth
T_F	Tubing Friction Loss
T_P	Wellhead Tubing Pressure
TVD	True Vertical Depth
Volt (s)	Unit of electromotive force Surface Voltage
Volt Amperes	Unit of apparent power
Watt	unit of true power = volt amperes x power factor
Watt-hour	Unit of electrical work; indicates expenditure of electrical power of one watt for one hour.
WC	Water Cut
Y_G (SG_g)	Gas Specific Gravity
Y_O (SG_o)	Oil Specific Gravity
Y_W (SG_W)	Water Specific Gravity

Pumps, 60 Hz 3500 RPM

Series - Model	O.D. Inches	Construction		Stage		Optimum Operating Range BPD		Maximum Downthrust per stage, Cprsn Pump Lbs	BHP per stage	Shut Off Head per stage Ft	Housing Pressure Limit PSI	
		Fltr	Cprsn	Radial Flow	Mixed Flow						Std	Hi-Pr
338-400	3.38	X		X		300	540	NA	0.11	23.0	6000	6000
338-550		X		X		400	700		0.11	22.9		
338-900		X		X		650	1050		0.15	21.8		
338-1200		X		X		900	1500		0.21	20.6		
338-1500		X		X		1000	2000		0.34	19.0		
338-2500		X		X		1800	3100		0.45	23.5		
400-300	4.00	X	X	X		200	450	26.5	0.12	24.0	5000	6000
400-500		X	X	X		340	660	29.1	0.19	31.5		
400-850		X	X	X		640	1200	30.2	0.38	34.0		
400-1250		X	X		X	800	1700	15.7	0.34	30.5		
400-1750		X	X		X	1200	2100	15.8	0.42	29.3		
400-2200		X	X		X	1400	2800	17.9	0.63	33.1		
400-3000		X	X		X	2000	3700	17.2	0.62	28.0		
400-4300		X	X		X	3000	5200	22.5	1.01	27.9		
400-6000		X	X		X	3500	7500	27.0	1.41	29.2		
538-1500	5.38	X	X		X	800	2250	50.0	1.53	72.0	6000	6000
538-2700		X	X		X	1500	3300	53.0	1.56	70.0		
538-4200		X	X		X	2600	5400	58.0	2.81	68.5		
538-5500		X	X		X	3500	7300	51.0	2.76	62.0		
538-7000		X	X		X	4000	9700	37.0	3.75	63.8		
538-11000			X		X	8000	14000	71.0	4.41	50.0		
675-7500	6.75		X		X	5000	11000	85.0	5.90	80.5	3000	3600
675-9000			X		X	5000	13000	118.0	8.80	117.0		
675-12000			X		X	7500	18000	144.0	10.00	104.0		
675-20000			X		X	12000	26000	190.0	12.63	100.0		
862-M520	8.62		X		X	14000	24000	335.0	19.5	147.0	2000	2400
862-M675			X		X	14000	32000	330.0	32.0	157.5		
950-N1050	9.50		X		X	31000	45000	925.0	55.0	215.0	2300	2760

Pumps, 60 Hz 3500 RPM

Model cont.	Shaft Dia. In	Shaft Area In^2	Shaft BHP limit Std	Shaft BHP limit HSS	Thr Brg Load Capacity -lbs Std @230F (Max)	Thr Brg Load Capacity -lbs Hi-Ld @250F (Max)	Maximum Number of stages: Thrust Brg (Prot Sec) Floater Std @230F (Max)	Thrust Brg (Prot Sec) Floater Hi-Ld @250F (Max)	Thrust Brg (Prot Sec) Cprsn Hi-Ld @250F (Max)	Shaft Std	Shaft HSS	Housing Std	Housing HiPr
400	0.625	0.3068	94	150	875	2750	328	902	NA	855	1367	604	604
550							329	904		671	1074	605	605
900							345	950		553	885	636	636
1200							366	1005		448	716	673	673
1500							328	901		276	441	729	729
2500	0.688	0.3712	125	200			276	904		297	476	491	491
300	0.625	0.3068	94	150	1190	6000	373	1882	226	855	1367	481	578
500	0.688	0.3712	125	200			236	1085	206	694	1111	366	440
850							272	1369	199	403	645	399	420
1250							247	1136	382	347	555	386	464
1750							253	1274	380	329	526	394	473
2200							224	1128	335	198	317	349	419
3000	0.875	0.6013	256	410			163	823	349	400	640	413	495
4300							146	826	267	253	406	414	497
6000							157	789	222	182	290	396	475
1500	0.875	0.6013	256	410	2410	11000	129	587	220	187	299	193	193
2700							132	604	208	164	263	198	198
4200	1.000	0.7854	375	600			103	520	209	117	188	202	202
5500							114	522	216	133	213	224	224
7000							111	507	297	109	174	217	217
11000	1.188	1.1085	637	1019			NA	NA	155	144	231	277	277
7500	1.188	1.1085	637	1019	4000	18000	NA	NA	212	108	173	86	103
9000									153	72	116	59	71
12000									125	56	89	67	80
20000									95	50	81	69	82
M520	1.188	1.1085	637	1019	4000	18000	NA	NA	54	33	52	31	38
M675									55	20	32	29	35
N1050	1.500	1.7671	1000	1600	4000	18000	NA	NA	19	17	27	25	30

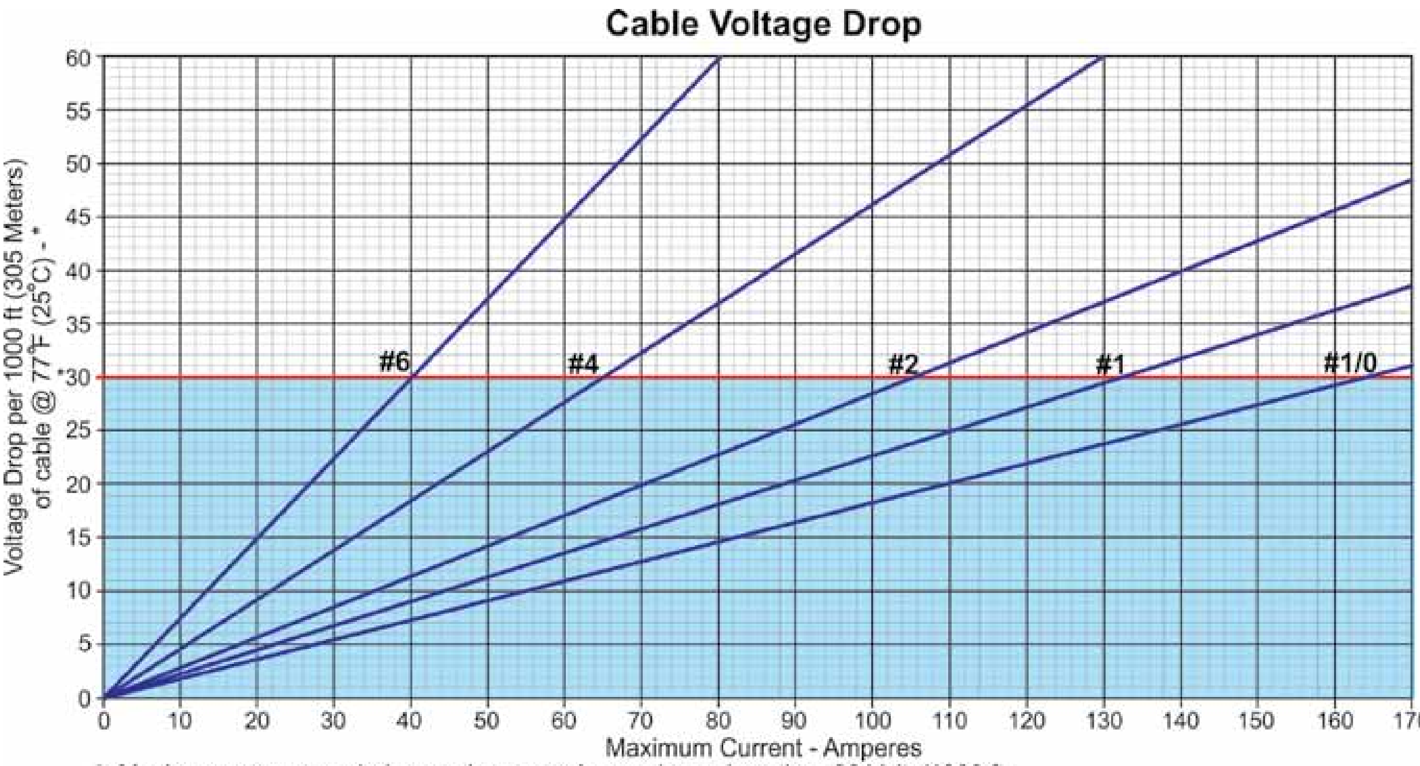
Gravity Correction Table

Degrees API	Specific Gravity	Weight (Density) Gallon	Cu.Ft	Barrell	Fluid Head Pressure / Foot	Height / Lb	Buoyancy Factor
		Pounds			Lbs / Sq In	Feet	Totally Immersed
60.0	0.739	6.16	46.1	259.0	0.320	3.13	0.906
59.0	0.743	6.20	46.4	260.0	0.322	3.11	0.905
58.0	0.747	6.23	46.6	262.0	0.324	3.09	0.905
57.0	0.751	6.26	46.8	263.0	0.325	3.08	0.904
56.0	0.755	6.30	47.1	265.0	0.327	3.06	0.904
55.0	0.759	6.33	47.4	266.0	0.329	3.04	0.903
54.0	0.763	6.36	47.6	267.0	0.330	3.03	0.903
53.0	0.767	6.40	47.9	269.0	0.332	3.01	0.902
52.0	0.771	6.43	48.1	270.0	0.334	2.99	0.902
51.0	0.775	6.46	48.3	271.0	0.336	2.98	0.901
50.0	0.780	6.51	48.7	273.0	0.338	2.96	0.901
49.0	0.784	6.54	48.9	275.0	0.340	2.94	0.900
48.0	0.788	6.57	49.2	276.0	0.341	2.93	0.900
47.0	0.793	6.61	49.5	278.0	0.343	2.92	0.899
46.0	0.797	6.65	49.8	279.0	0.345	2.90	0.898
45.0	0.802	6.69	50.0	281.0	0.348	2.87	0.898
44.0	0.806	6.72	50.3	282.0	0.349	2.87	0.897
43.0	0.811	6.76	50.6	284.0	0.351	2.85	0.897
42.0	0.816	6.81	50.9	286.0	03354	2.82	0.896
41.0	0.820	6.84	51.2	287.0	0.355	2.82	0.896
40.0	0.825	6.88	51.5	289.0	0.357	2.80	0.895
39.0	0.830	6.92	51.8	291.0	0.359	2.79	0.894
38.0	0.835	6.96	52.1	292.0	0.362	2.76	0.894
37.0	0.840	7.01	52.4	294.0	0.364	2.75	0.893
36.0	0.845	7.05	52.7	296.0	0.366	2.73	0.892
35.0	0.850	7.09	53.0	298.0	0.368	2.72	0.892
34.0	0.855	7.13	53.3	299.0	0.370	2.70	0.891
33.0	0.860	7.17	53.6	301.0	0.372	2.69	0.891
32.0	0.865	7.21	53.9	303.0	0.375	2.67	0.890
31.0	0.871	7.26	54.3	305.0	0.377	2.65	0.889
30.0	0.876	7.31	54.7	307.0	0.380	2.63	0.889
29.0	0.882	7.36	55.1	309.0	0.382	2.62	0.887
28.0	0.877	7.40	55.4	311.0	0.384	2.60	0.887
27.0	0.893	7.45	55.7	313.0	0.387	2.58	0.886
26.0	0.898	7.49	56.0	315.0	0.389	2.57	0.885
25.0	0.904	7.54	56.4	317.0	0.392	2.55	0.885
24.0	0.910	7.59	56.8	319.0	0.394	2.54	0.884
23.0	0.916	7.64	57.2	321.0	0.397	2.52	0.883
22.0	0.922	7.69	57.5	323.0	0.399	2.51	0.883
21.0	0.928	7.74	57.9	325.0	0.402	2.49	0.882

Gravity Correction Table

Degrees API	Specific Gravity	Weight (Density)			Fluid Head		Buoyancy Factor
		Gallon	Cu.Ft	Barrell	Pressure / Foot	Height / Lb	Totally Immersed
		Pounds			Lbs / Sq In	Feet	
20.0	0.934	7.79	58.3	327.0	0.405	2.47	0.881
19.0	0.940	7.78	58.7	329.0	0.407	2.46	0.880
18.0	0.946	7.89	59.0	331.0	0.410	2.44	0.879
17.0	0.953	7.95	59.5	334.0	0.413	2.42	0.879
16.0	0.959	8.00	59.8	336.0	0.416	2.40	0.878
15.0	0.966	8.06	60.3	339.0	0.419	2.39	0.877
14.0	0.973	8.11	60.7	342.0	0.421	2.38	0.876
13.0	0.979	8.16	61.0	343.0	0.424	2.36	0.876
12.0	0.986	8.22	61.5	345.0	0.427	2.34	0.874
11.0	0.993	8.28	61.9	348.0	0.430	2.33	0.874
10.0 Degrees API or Pure Water	1.00	8.34	62.4	350.0	0.433	2.31	0.873
	1.01	8.40	62.8	353.0	0.436	2.29	0.872
	1.03	8.60	64.3	361.0	0.447	2.24	0.869
	1.06	8.80	65.8	370.0	0.457	2.19	0.866
	1.08	9.00	67.3	378.0	0.468	2.14	0.862
Salt Water	1.10	9.20	68.8	386.0	0.478	2.09	0.860
	1.13	9.40	70.3	395.0	0.488	2.05	0.856
	1.15	9.60	71.8	403.0	0.499	2.00	0.853
	1.154	9.625	72.0	404.0	0.500	2.00	0.853
	1.18	9.80	73.3	412.0	0.509	1.96	0.850
	1.20	10.0	74.8	420.0	0.519	1.93	0.847
	1.22	10.2	76.3	428.0	0.530	1.89	0.844
	1.25	10.4	77.8	437.0	0.540	1.85	0.841
	1.27	10.6	79.3	445.0	0.551	1.81	0.838
	1.29	10.8	80.8	454.0	0.561	1.78	0.835
	1.32	11.0	82.3	462.0	0.571	1.75	0.832
	1.34	11.2	83.8	470.0	0.582	1.72	0.829
	1.37	11.4	85.3	479.0	0.592	1.69	0.826
	1.39	11.6	86.8	487.0	0.603	1.66	0.823
	1.41	11.8	88.3	496.0	0.613	1.63	0.820
	1.44	12.0	89.8	504.0	0.623	1.61	0.817
	1.46	12.2	91.3	512.0	0.634	1.58	0.814
	1.49	12.4	92.8	521.0	0.644	1.55	0.810
	1.51	12.6	94.3	529.0	0.655	1.53	0.808
	1.53	12.8	95.8	538.0	0.665	1.50	0.804
	1.56	13.0	97.2	546.0	0.675	1.48	0.801
	1.58	13.2	98.7	554.0	0.686	1.46	0.798
	1.61	13.4	100.0	563.0	0.696	1.44	0.795
	1.63	13.6	102.0	571.0	0.706	1.42	0.792
	1.65	13.8	103.0	580.0	0.717	1.39	0.789

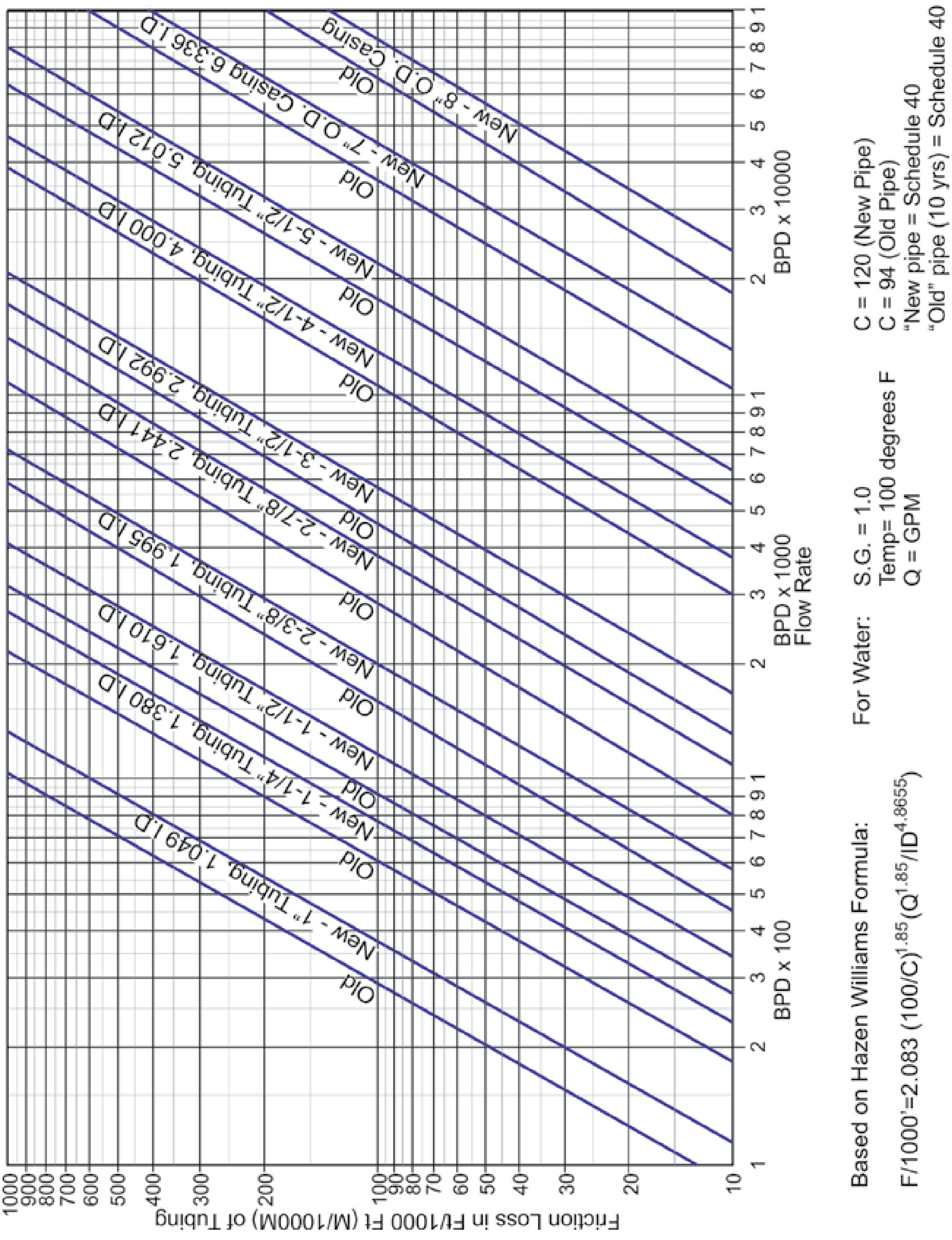
Cable Voltage Drop & Correction



* Maximum recommended operating range is equal to or less than 30 Volts/1000 ft.

Temperature Correction Factors					
For temperatures other than the 77°F (25°C) shown in above chart, multiply graph reading by the appropriate temperature factor below.					
Temp	**Multiplying Factor**	**Temp**	**Multiplying Factor**	**Temp**	**Multiplying Factor**
100°F (38°C)	1.050	170°F (77°C)	1.200	240°F (116°C)	1.345
110°F (43°C)	1.070	180°F (82°C)	1.220	250°F (121°C)	1.365
120°F (49°C)	1.090	190°F (88°C)	1.240	260°F (127°C)	1.385
130°F (54°C)	1.115	200°F (93°C)	1.260	270°F (132°C)	1.405
140°F (60°C)	1.135	210°F (99°C)	1.280	280°F (138°C)	1.430
150°F (66°C)	1.155	220°F (104°C)	1.305	290°F (143°C)	1.450
160°F (71°C)	1.175	230°F (110°C)	1.325	300°F (159°C)	1.485

Loss of Head Due to Friction of Water



API Tubing Regular Casing Data

US Standard

Size (In)	Weight (lb.ft)	I D (in)	Drift (in)	Cplg OD (In)
2 3/8	4.7	1.995	1.90	3.06
	6.0	1.867	1.77	
2 7/8	6.5	2.441	2.35	3.67
	8.8	2.259	2.17	
3 1/2	9.3	2.992	2.87	4.50
	13.0	2.750	2.63	
4	11.0	3.476	3.35	5.00
4 1/2	9.5	4.090	3.97	5.00
	10.5	4.050	3.93	
	11.5	4.000	3.88	
	13.5	3.920	3.80	
5	11.5	4.560	4.44	5.56
	13.0	4.494	4.37	
	15.0	4.408	4.28	
	18.0	4.276	4.15	
	21.4	4.126	4.00	
	23.2	4.044	3.92	
	24.1	4.000	3.88	
5 1/2	14.0	5.012	4.89	6.05
	15.5	4.950	4.83	
	17.0	4.892	4.77	
	20.0	4.778	4.65	
	23.0	4.670	4.55	
6 5/8	20.0	6.049	5.92	7.39
	24.0	5.921	5.80	
	28.0	5.791	5.67	
	32.0	5.675	5.55	
7	17.0	6.538	6.41	7.66
	20.0	6.456	6.33	
	23.0	6.366	6.24	
	26.0	6.276	6.15	
	29.0	6.184	6.06	
	32.0	6.094	5.97	
	35.0	6.004	5.88	
	38.0	5.920	5.80	

Metric

Size (mm)	Weight (mm/kg)	I D (mm)	Drift (mm)	Cplg OD (mm)
60.32	6.99	50.67	48.29	77.80
	8.86	47.42	45.03	
73.03	9.67	62.00	59.56	93.17
	12.95	57.38	54.99	
88.90	13.84	76.00	72.82	114.30
	12.27	69.85	66.68	
101.60	16.37	88.29	85.12	127.00
114.30	14.14	103.89	100.71	127.00
	15.63	102.92	99.75	
	17.26	101.60	98.43	
	20.09	99.57	96.39	
127.00	17.11	115.82	112.65	141.30
	19.35	114.15	110.97	
	22.32	111.96	108.79	
	26.79	108.61	105.44	
	31.85	104.80	101.63	
	34.53	102.72	99.54	
	35.87	101.60	98.43	
139.70	20.84	127.30	124.13	153.67
	23.07	125.73	122.56	
	25.30	124.26	121.08	
	29.76	121.36	118.19	
	34.23	118.62	115.44	
168.28	29.76	153.64	150.47	187.71
	35.72	150.39	147.22	
	41.67	147.09	143.92	
	47.62	144.15	140.97	
177.80	25.30	166.07	162.89	194.46
	29.76	163.98	160.81	
	34.23	161.70	158.52	
	38.69	159.41	156.24	
	43.16	157.07	153.9	
	47.62	154.79	151.61	
	52.09	152.50	149.33	
	56.55	150.37	147.19	

API Tubing Regular Casing Data

US Standard

Size (In)	Weight (lb.ft)	I D (in)	Drift (in)	Cplg OD (In)
7 5/8	24.0	7.025	6.90	8.50
	26.4	6.969	6.84	
	29.7	6.875	6.75	
	33.7	6.765	6.64	
	39.0	6.625	6.50	
	42.8	6.501	6.38	
	45.3	6.435	6.31	
	47.1	6.375	6.25	
8 5/8	24.0	8.097	7.94	9.63
	28.0	8.017	7.89	
	32.0	7.921	7.80	
	36.0	7.825	7.70	
	40.0	7.725	7.60	
	44.0	7.625	7.50	
	49.0	7.511	7.39	
9 5/8	32.3	9.001	8.85	10.63
	36.0	8.921	8.77	
	40.0	8.835	8.68	
	43.5	8.755	8.60	
	47.0	8.681	8.53	
	53.5	8.535	8.38	
	59.4	8.407	8.25	
	64.9	8.281	8.13	
	70.3	8.157	8.00	
	75.6	8.031	7.88	
10 3/4	32.8	10.192	10.04	11.75
	40.5	10.05	9.89	
	45.5	9.950	9.79	
	51.0	9.850	9.69	
	55.5	9.780	9.60	
	60.7	9.660	9.50	
	65.7	9.560	9.40	
	73.2	9.406	9.25	
	79.2	9.282	9.13	
	85.3	9.156	9.00	
11 3/4	42.0	11.084	10.93	12.75
	47.0	11.000	10.84	
	54.0	10.880	10.72	
	60.0	10.772	10.62	
	65.0	10.682	10.53	

Metric

Size (mm)	Weight (mm/kg)	I D (mm)	Drift (mm)	Cplg OD (mm)
193.67	35.72	178.44	175.26	215.90
	39.29	177.01	173.84	
	44.20	174.63	171.45	
	50.15	171.83	168.66	
	58.04	168.28	165.1	
	63.70	165.13	161.95	
	67.42	163.45	160.27	
	70.10	161.93	158.75	
219.08	35.72	205.66	201.70	244.48
	41.67	203.63	200.46	
	47.62	201.19	198.02	
	53.58	198.76	195.58	
	59.53	196.22	193.04	
	65.48	183.68	190.50	
	72.72	190.78	187.60	
244.48	48.07	228.63	224.68	269.88
	53.58	226.59	222.63	
	59.53	224.41	220.45	
	64.74	222.38	218.41	
	69.95	220.5	216.54	
	79.62	216.79	212.83	
	88.40	213.54	209.58	
	96.59	210.34	206.38	
	104.62	207.19	203.23	
	112.51	203.99	200.03	
273.05	48074	258.88	254.91	298.45
	60.27	255.27	251.31	
	67.71	252.73	248.77	
	75.90	250.19	246.23	
	82.60	248.41	243.94	
	90.34	245.36	241.40	
	97.78	242.82	238.86	
	108.94	236.91	234.95	
	117.87	235.76	231.80	
	126.95	232.56	228.60	
298.45	62.51	281.53	277.57	323.85
	69.95	379.40	275.44	
	80.36	276.35	272.39	
	89.29	273.61	269.65	
	96.74	271.32	267.36	

API Tubular Goods

Size-Inches (mm)		Thread	Weight Lb / Ft	Diameter -Inches (mm)			Coupling O D Inches (mm)
Nominal	O D			O D	I D	Drift	
API Line Pipe							
1-1/4 (31.8)		11-1/2 V	2.30	1.660 (42.2)	1.380 (35.1)	NA	2.054 (52.2)
1-1/2 (38.1)		11 to 11-1/2V	2.75	1.900 (48.3)	1.610 (40.1)	NA	2.200 (55.9)
2 (50.8)	2-3/8 (60.3)	11-1/2 V	3.75	2.375 (60.3)	2.067 (52.5)	NA	2.875 (73.0)
3 (76.2)	3-1/2 (88.9)	8 V	7.70	3.500 (88.9)	3.068 (77.9)	NA	4.000 (101.6)
4 (101.6)	4-1/2 (114.3)	8 V	11.00	4.500 (114.3)	4.026 (102.3)	NA	5.200 (132.1)
6 (152.4)	6-5/8 (168.4)	8 V	19.45	6.625 (168.3)	6.065 (167.8)	NA	7.390 (187.7)
8 (203.2)	8-5/8 (219.2)	8 V	25.55	8.625 (219.1)	8.071 (205.0)	NA	9.625 (244.5)
API Tubing (Non Upset)							
1-1/2 (38.1)		10 RD	2.75	1.900 (48.3)	1.610 (40.9)	1.516 (38.5)	2.200 (55.8)
2 (50.8)	2-3/8 (60.3)	10 RD	4.00	2.375 (60.3)	2.041 (51.8)	1.947 (49.5)	2.875 (73.03)
2-1/2 (63.5)	2-7/8 (73.0)	10 RD	6.40	2.875 (73.0)	2.441 (62.0)	2.347 (59.6)	3.500 (88.9)
3 (76.2)	3-1/2 (88.9)	10 RD	7.70	3.500 (88.9)	3.068 (77.9)	2.943 (74.8)	4.250 (108.0)
3-1/2 (88.9)	4 (101.6)	8 RD	9.50	4.000(101.6)	3.548 (90.1)	3.423 (87.0)	4.750 (120.7)
API Tubing (External Upset)							
1-1/2 (38.1)		10 RD	2.90	1.900 (48.3)	1.610 (40.9)	1.516 (38.5)	2.500 (63.5)
2 (50.8)	2-3/8 (60.3)	8 RD	4.70	2.375 (60.3)	1.995 (50.7)	1.901 (48.3)	3.063 (77.8)
2-1/2 (63.5)	2-7/8 (73.0)	8 RD	6.50	2.875 (73.0)	2.441 (62.0)	2.347 (59.61)	3.668 (93.2)
3 (76.2)	3-1/2 (88.9)	8 RD	9.30	3.500 (88.9)	2.992(76.0)	2.867 (72.8)	4.500 (114.3)
3-1/2 (88.9)	4 (101.6)	8 RD	11.00	4.000 (101.6)	3.476 (88.3)	3.351 (85.1)	5.000 (127.0)
4 (101.6)	4-1/2 (114.3)	8 RD	12.75	4.500 (114.3)	3.958 (100.5)	3.833 (97.4)	5.563 (141.3)

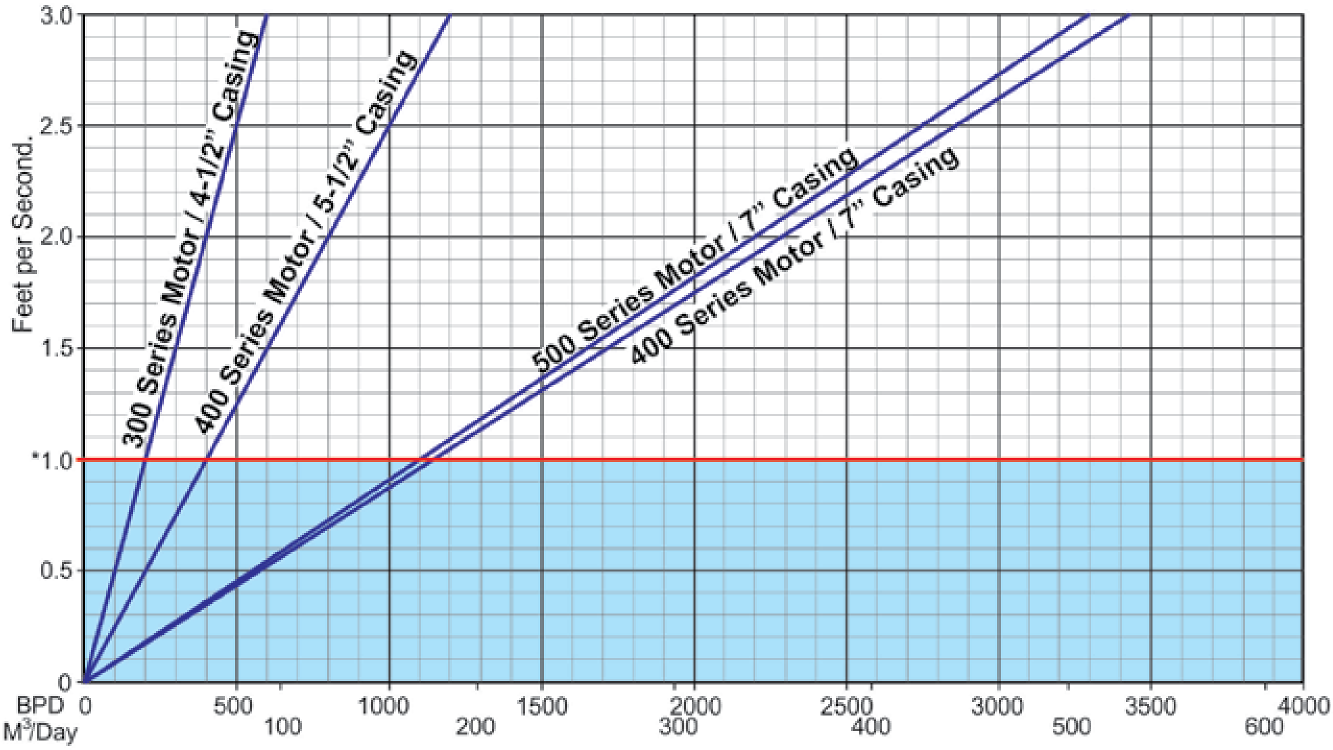
Tubing , Casing and Pipe

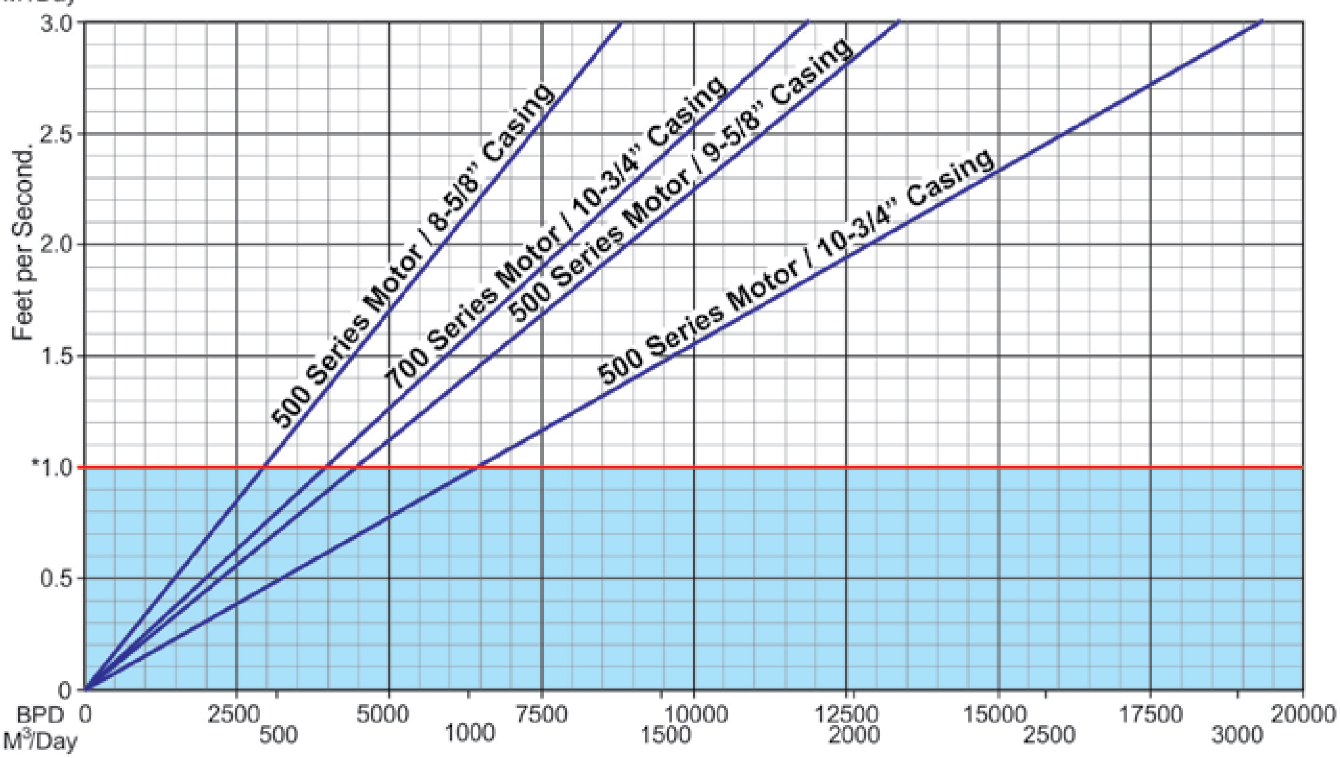
Size Inches	Weight (Lb / Ft)	ID Inches	bbl / ft
Tubing Size and Capacity			
1-29/32	2.90	1.610	0.0025
2-1/16	3.25	1.751	0.0030
2-3/8	4.70	1.995	0.0039
2-7/8	6.50	2.441	0.0058
	8.70	2.259	0.0050
3-1/2	9.30	2.992	0.0087
	10.30	2.922	0.0083
	12.95	2.750	0.0074
4-1/2	12.75	3.958	0.0152
Casing Size and Capacity			
4-1/2	9.50	4.090	0.0162
	10.50	4.052	0.0159
	11.60	4.000	0.0155
	12.60	3.958	0.0152
	13.50	3.920	0.0149
	15.10	3.826	0.0142
5	15.00	4.408	0.0189
	18.00	4.276	0.0178
	21.00	4.154	0.0168
5-1/2	14.00	5.012	0.0244
	15.50	4.960	0.0238
	17.00	4.892	0.0232
	20.00	4.778	0.0222
	23.00	4.670	0.0212
	26.00	4.548	0.0202
7	17.00	6.538	0.0415
	20.00	6.456	0.0405
	23.00	6.366	0.0394
	26.00	6.276	0.0383
	32.00	6.094	0.0361
8-5/8	24.00	8.097	0.0637
	28.00	8.017	0.0624
	32.00	7.921	0.0609
	36.00	7.825	0.0595
9-5/8	43.50	8.755	0.0745
	47.00	8.681	0.0732
	53.00	8.535	0.0708
10-3/4	55.50	9.760	0.0925
11-3/4	47.00	11.000	0.1175

Bouyancy Factor	
8.4	872
8.6	869
8.8	866
9.0	862
9.2	859
9.4	856
9.6	853
9.8	850
10.0	847
10.2	844
10.4	841
10.6	838
10.8	835
11.0	832
11.2	829
11.4	826
11.6	823
11.8	820
12.0	817
12.2	814
12.4	811
12.6	807
12.8	804
13.0	801
13.2	798
13.4	795
13.6	792
13.8	789
14.0	786
14.5	778
15.0	771
15.5	763
16.0	756
16.5	748
17.0	740
17.5	733
18.0	725
18.5	717
19.0	710
20.0	694

Pipe Size Inches	Lb / Ft	Required Pull
Weight to pull above string weight to obtain 3-1/2 inches of stretch per 1000 ft of pipe.		
1 Tubing	1.80	4,000
	2.25	5,000
1-1/4 Tubing	2.40	5,500
1-1/2 Tubing	2.90	6,500
2-1/16 Tubing	3.40	7,500
2-3/8 Tubing	4.70	10,000
	5.30	12,000
	5.95	13,000
2-7/8 Tubing	6.50	14,000
	7.90	17,000
	8.70	19,000
3-1/2 Tubing	9.30	20,000
	10.30	23,000
	12.95	28,000
4 Tubing	11.00	24,000
	13.40	29,000
4-1/2 Tubing	12.75	28,000
	15.50	34,000
	19.50	42,000
2-3/8 Drill Pipe	6.65	15,000
2-7/8 Drill Pipe	10.40	23,000
3-1/2 Drill Pipe	13.30	30,000
4-1/2 Drill Pipe	16.60	36,000
5 Drill Pipe	19.50	43,000
5 Casing	15.00	33,000
5-1/2 Casing	17.00	38,000
6-5/8 Casing	24.00	53,000
7 Casing	35.00	77,000
7-5/8 Casing	29.70	66,000
8-5/8 Casing	40.00	88,000
9-5/8 Casing	43.50	96,000
10-3/4 Casing	45.50	100,000

Fluid Velocity Past the Motor





* 1.0 ft/second is a general guideline for minimum fluid velocity

Required fluid velocity for proper motor cooling is a function of fluid properties.

Formulas

Converting 60 cycle to 50 Cycle - Head Capacity Curve	
60 cycle capacity multiplied by 0.8333 = 50 cycle	60 cycle head multiplied by 0.6944 = 50 cycle

Inflow Performance Relationships for Solution - Gas Drive Wells (Below Bubble Point)

$$\frac{Qo}{Qo\ Max} = 1 - 0.20\left(\frac{Pwf}{Pr}\right) - 0.80\left(\frac{Pwf}{Pr}\right)^2$$

Pr	Static Reservoir Pressure at Producing Zone
Pwf	Flowing Wellbore Pressure at Producing Zone
Qo	Production Rate at Pwf
Qo Max	Production Rate at 100% Drawdown, Pwf = 0

Fluid Temperature Rise	
Fluid temp rise past the motor	dTmotor = 5.1 x PumpBHP x (1 - MotorEff) / (MotorEff x SG x SH x (Q / 32.4))
Fluid temp rise through the motor	dTpump = 5.1 x PumpBHP x (1 - 0.01 * PumpEff) / (SG x SH x (Q / 32.4))

Where:

dTmotor is the fluid temperature rise past the motor (°F)
dTpump is the pumped fluid temperature rise through the pump (°F)
MotorEff is the motor efficiency (fraction)
PumpBHP is pump power consumption (brake horsepower)
PumpEff is the pump efficiency (fraction)
Q is the volumetric flowrate (bpd)
SG is the specific gravity of the fluid being pumped (SG = SGo x (1-WC) + SGw x WC)
SH is the specific heat of the fluid being pumped (SH = SHo x (1-WC) + SHw x WC)
WC is the fluid water cut
SGo and SGw are the specific gravities of the oil, water and phases at pump intake conditions
SHo and SHw are the specific heats of the oil, water and gas phases at pump intake conditions
Typical values are SHo=0.5 and SHw=1.

Electrical Formulas to Determine Kilowatts, KVA, Horsepower and Amperes

Desired Data	Alternating Current	
	Single Phase	Three Phase
Kilowatts	$\frac{\text{Volts x Amps x Pf}}{1000}$	$\frac{\text{1.732 x Volts x Amps x Pf}}{1000}$
Kilovolt – Ampere	$\frac{\text{Volts x Amps}}{1000}$	$\frac{\text{1.732 x Volts x Amps}}{1000}$
Horsepower (Output)	$\frac{\text{Volts x Amps x Eff x Pf}}{\text{746 x 100}}$	$\frac{\text{1.732 x Volts x Amps x Eff x Pf}}{\text{746 x 100}}$
Amperes (When HP is known)	$\frac{\text{HP x 746}}{\text{Volts x Eff x HP}}$	$\frac{\text{HP x 746}}{\text{1.732 x Volts x Eff x HP}}$
Amperes (When Kilowatts are known)	$\frac{\text{Kilowatts x 1000}}{\text{Volts x Pf}}$	$\frac{\text{Kilowatts x 1000}}{\text{1.732 x Volts x Pf}}$

To Find	Formula		To Find	Formula	
Brake HP	$\frac{\text{GPM x Headfeet x SpGr}}{\text{3960 x Pump\%Eff}}$		Brake HP	$\frac{M^3\text{/Hr x HeadMeters x SpGr}}{\text{274 x Pump\%Eff}}$	
	$\frac{\text{BPD x Headfeet x SpGr}}{\text{136,000 x Pump\%Eff}}$			$\frac{M^3\text{/Hr x HeadMeters x SpGr}}{\text{659 x Pump\%Eff}}$	
HP Input (Three Phase)	$\frac{\text{Amps x Volt x 1.732 x Pf}}{746}$		HP Input (Three Phase)	KW x 1.34	
Torque	$T = \frac{\text{HP x 5252}}{N}$	T=Torque (lb.ft) HP=Horsepower N=Speed (RPM)	PI	$\frac{\text{Rate}}{\text{SBHP - PBHP}}$	SBHP = Static Bottom Hole Pressure PBHP = Producing Bottom Hole Pressure

Conversion Factors

Multiply	by	To Obtain
Length		
Feet	0.3048	Meters
Inches	25.4	Millimeters
Area		
Square Inches	6.4516	Square Centimeters
Volume		
Cubic Feet	7.48	Gallons
	0.02832	Cubic Meters
Cubic Inches	16.387	Cubic Centimeters
Barrels (US Pet.)	5.615	Cubic Feet
	42	Gallons (US Liq.)
	0.159	Cubic Meters
Gallons (Imperial)	1.2	Gallons (US Liq.)
Gallons (US Liq.)	231	Cubic Inches
	128	Ounces (US Liq.)
	8	Pints (US Liq.)
	4	Quarts (US Liq.)
Cubic Meters	35.31	Cubic Feet
	6.289	Barrels (US Pet.)
Liters	1000	Cubic Centimeters
	0.001	Cubic Meters
Tons (Metric) 36 Crude	7.452	Barrels (US Pet.)
Volume Ratios		
Cu. Feet / Cu. Foot	5.615	Cu. Feet / Bbl.
Cu. Meters / Cu. Meter	5.615	Cu. Feet / Bbl.
Velocity		
Feet / Second	0.3048	Meters / Second
Feet / Minute	0.00508	Meters / Second
Meters / Second	3.281	Feet / Second
Meters / Minute	0.05468	Feet / Second
Volumetric Flow Rate		
Cubic Feet / Day	5.615	Barrels / Day
	35.31	Cu. Meters / Day
Barrels / Minute	1440	Barrels / Day
	229	Cu. Meters / Day
Barrels / Hour	24	Barrels / Day
	3.816	Cu. Meters / Day
Barrels / Day	0.159	Cu. Meters / Day
Gallons / Minute	34.29	Barrels / Day
	5.451	Cu. Meters / Day
Cu. Meters / Hour	150.9	Barrels / Day
	24	Cu. Meters / Day
Cu. Meters / Day	6.289	Barrels / Day
Temperature		
º Celsius + 17.78	1.8	º Fahrenheit
º Celsius + 273	1	º Kelvin
º Fahrenheit - 32	0.5555	º Celsius
º Fahrenheit + 460	1	º Rankin
Torque		
Foot-Pound	1.356	Newton-Meters
Power		
Horsepower	0.7457	Kilowatts

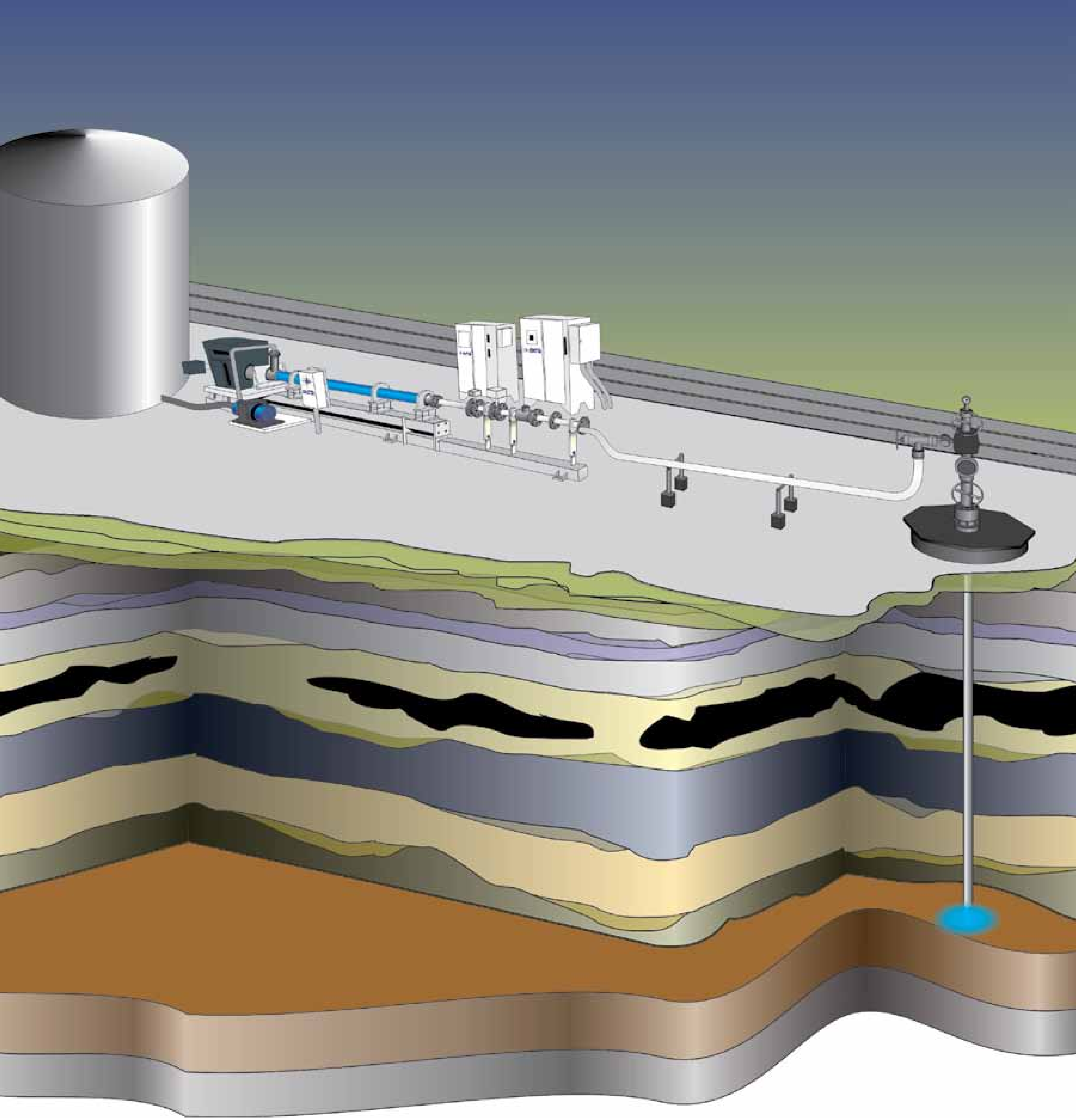
Multiply	by	To Obtain
Weight		
Kilograms	2.205	Pounds (Troy)
Tons (Long)	2240	Pounds (Troy)
Tons (Short)	2000	Pounds (Troy)
Tons (Metric)	1000	Kilograms
Linear Weight		
Kgs. / Meter	0.672	Pounds / Foot
Pounds / Foot	1.488	Kgs. / Meter
Pressure		
Atmospheres	4.7	Pounds / Sq. In.
	101.32	Kilopascals (kPa)
	29.92	Inches of Mercury
	760	Inches of Mercury
Bar	14.5	Pounds / Sq. In.
	100	Kilopascals (kPa)
Kilograms / Sq. Cm.	14.22	Pounds / Sq. In.
	98.1	Kilopascals (kPa)
Kilopascals (kPa)	0.145	Pounds / Sq. In.
Pounds / Sq. In.	6.895	Kilopascals (kPa)
Feet of Water	0.4335	Pounds / Sq. In.
	2.989	Kilopascals (kPa)
Meters of Water	1.422	Pounds / Sq. In.
	9.81	Kilopascals (kPa)
Density		
Pounds / Cu. Ft.	16.02	Kgs. / Cu. Meter
Pounds / Cu. In.	27.68	Grams / Cu. Cm
Pounds / Gallon	7.48	Pounds / Cu. Ft.
Kgs / Cu. Meter	0.06243	Pounds / Cu. Ft.
Cubic Feet of Water	62.43	Pounds of Water
Productivity Index		
Bbls / Day / Atm	0.06805	Bbls / Day / PSI
	0.001569	Cu.Meter / Day / kPa
Bbls / Day / Bar	0.06895	Bbls / Day / PSI
	0.00159	Cu.Meter / Day / kPa
Bbls / Day / Kg / CM^2	0.07031	Bbls / Day / PSI
	0.001621	Cu.Meter / Day / kPa
Bbls / Day / kPa	6.895	Bbls / Day / PSI
	0.159	Cu.Meter / Day / kPa
Bbls / Day / PSI	0.02307	Cu.Meter / Day / kPa
Cu.Meter / Day / Atm	0.4279	Bbls / Day / PSI
	0.00987	Cu.Meter / Day / kPa
Cu.Meter / Day / Bar	0.4336	Bbls / Day / PSI
	0.01	Cu.Meter / Day / kPa
Cu.Meter / Day / PSI	6.289	Bbls / Day / PSI
	0.145	Cu.Meter / Day / kPa
Cu.Meter/Day/Kg/ CM^2	0.4422	Bbls / Day / PSI
	0.01019	Cu.Meter / Day / kPa
Cu.Meter / Day / kPa	43.35	Bbls / Day / PSI
Volume Capacity of Pipe		
Gallons per 1000 ft.	40.8 x (I.D in inches)^2	
Barrels per 1000 ft.	0.9714 x (I.D in inches)^2	

Bolt Flange and Housing Strengths

The following table shows the maximum pull based on bolt pattern and housing capacities for the various series of equipment. The ratings are based on new equipment being pulled evenly and straight.

Series	Bolt Pattern	Maximum Pull (lbf/in^2) [92,000 lbf/in^2 Bolt Stress] Monel	Maximum Pull (lbf/in^2) [Housing Capacity]	
			Vee Thread	Buttress Thread
Pumps				
338	(8) 5/16 Inch	52,700	Not Applicable	42,400
400	(8) 5/16 Inch	52,700	48,100	57,700
538	(11) 7/16 Inch	147,100	Not Applicable	110,000
675	(14) 1/2 Inch	249,900	Not Applicable	93,750
Protectors				
338 / 375	(6) 3/8 Inch	58,500	32,500	Not Applicable
375	(6) 3/8 Inch	58,500	43,750	Not Applicable
400 / 456	(6) 3/8 Inch	58,500	48,100	Not Applicable
456	(6) 7/16 Inch	80,200	66,900	Not Applicable
540	(11) 7/16 Inch	147,100	93,400	Not Applicable
Motors				
375	(6) 3/8 Inch	58,500	43,750	Not Applicable
456	(6) 7/16 inch	80,200	66,900	Not Applicable
540	(11) 7/16 Inch	147,100	93,400	Not Applicable
562	(11) 7/16 Inch	147,100	93,400	Not Applicable
GPS Enforcer / Bolt-On Motor Base				
all series	(6) 7/16 inch	80,200	66,900	Not Applicable

Please be advised that Maximum Pull listed is based on information supplied by material vendors and should be used as guidelines only.



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