

OPERATING MANUAL

SV LIQUID RING VACUUM PUMPS AND COMPRESSORS

Manufactured By:

*SOMARAKIS, INC.
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Parts List SV-586-4 • SV Pumps SV2523 thru SV5372

Parts Drawing SV-686-1 • SV Pumps SV808 thru SV2023

Parts Drawing SV-586PL-4 • SV Pumps SV2523 thru SV5372

Parts Drawing SVG-586PL-1 • SVG Gear Pumps

Installation Drawing • Model No. SV808

Installation Drawing • Model No. SV1211

Installation Drawing • Model No. SV1414

Installation Drawing • Model No. SV1818

Installation Drawing • Model No. SV2023

Installation Drawing • Model No. SV2523

Installation Drawing • Model No. SV3028

Installation Drawing • Model No. SV3633

Installation Drawing • Model No. SV4440

Installation Drawing • Model No. SV5348

Installation Drawing • Model No. SVG5348

Installation Drawing • Model No. SV5372

Vacuum Pump and Compressor Manifolds

Vacuum Pump Inlet Separator

Discharge Separator/Silencer

Performance Curves:

Model No. SV808.1 SV808.2

Model No. SV1211.1 SV1211.2

Model No. SV1414.1 SV1414.2

Model No. SV1818.1 SV1818.2

Model No. SV2023.1 SV2023.2

Model No. SV2523.1 SV2523.2

Model No. SV3028.1 SV3028.2

Model No. SV3633.1 SV3633.2

Model No. SV4440.1 SV4440.2

Model No. SV5348.1 SV5348.2

Model No. SV5372.1 SV5372.2

Brochure: Bulletin SV-489

PREFACE

Information contained in this manual has been prepared to assist in the proper installation, operation and maintenance of equipment manufactured by Somarakis, Inc. If additional information is required it may be obtained from:

*Somarakis, Inc.
P.O. Box 1948
Vancouver, WA 98668*

206-574-6722 or 800-255-7113

Fax: 206-574-0742

A Somarakis field service engineer will be present at the initial equipment start-up. Please notify Somarakis, Inc. approximately two weeks before start-up is anticipated so that provisions can be made to have an engineer available.

(First Tag)

CAUTION: PUMP WILL BE DAMAGED IF RUN DRY

Do not test motor rotation or operate pump until pump is initially primed and connected to supply of clean, fresh water.

CAUTION: USE LINE STRAINERS

To prevent sand and other abrasive and destructive solids from entering the pump with seal liquid.

CAUTION: PUMP WILL BE DAMAGED BY FREEZING

Do not store in below freezing conditions unless vertical air inlets are closed with blind flanges and pump is drained.

(Second Tag)

DO NOT REMOVE THIS TAG UNTIL TEMPORARY INLET SCREENS ARE REMOVED.

Inlet screens are optionally furnished on pump inlets as temporary protection against welding rod, bolts and other plus 1/16" objects. If left in place these screens will gradually plug and affect performance.

CAUTION!

WARRANTY

Products manufactured by Somarakis, Inc. shall be free from defects in material and workmanship, but Somarakis, Inc's liability shall be limited to the replacement, F.O.B. manufacturing shops, of any part found to be defective and as to which Somarakis, Inc. receives written notice of such defect within twenty-four months from date of shipment or longer if requested in writing and properly stored. Decomposition by chemical action and wear caused by the presence of abrasive materials shall not constitute defects.

The foregoing warranty does not apply to motors, electrical accessories or electrical accessory component parts, and Purchaser relies solely upon the warranties of such manufacturers, which are assigned, insofar as possible, to Purchaser.

This obligation does not cover the expense of removal or installation of equipment or parts thereof, or attached piping, supports, drives, accessories or any other related materials.

The Purchaser will furnish and bear cost for all equipment associated labor during the warranty period; this to include routine maintenance, inspections, and modifications to equipment to meet operating conditions.

THIS WARRANTY IS EXPRESSLY MADE AND ACCEPTED IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND ALL OTHER OBLIGATIONS OR LIABILITIES OF SOMARAKIS, INC. NOT SPECIFICALLY SET FORTH HEREIN ARE EXPRESSLY EXCLUDED. SOMARAKIS, INC. SHALL NOT BE LIABLE FOR SPECIAL OR CONSEQUENTIAL DAMAGES NOR DAMAGES RESULTING FROM INSTALLATION, START-UP PROCEDURES, OR OPERATION CONTRARY TO SOMARAKIS, INC. WRITTEN INSTRUCTIONS, UNLESS PERFORMED BY SOMARAKIS, INC.

SV LIQUID RING VACUUM PUMPS AND COMPRESSORS

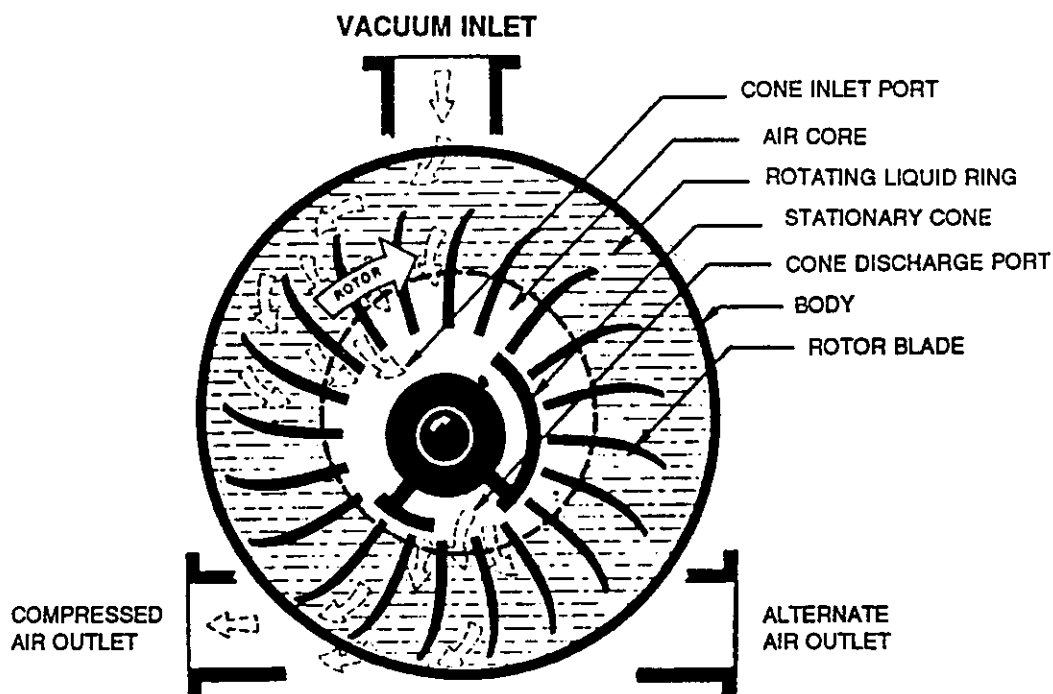
PRINCIPLES OF OPERATION

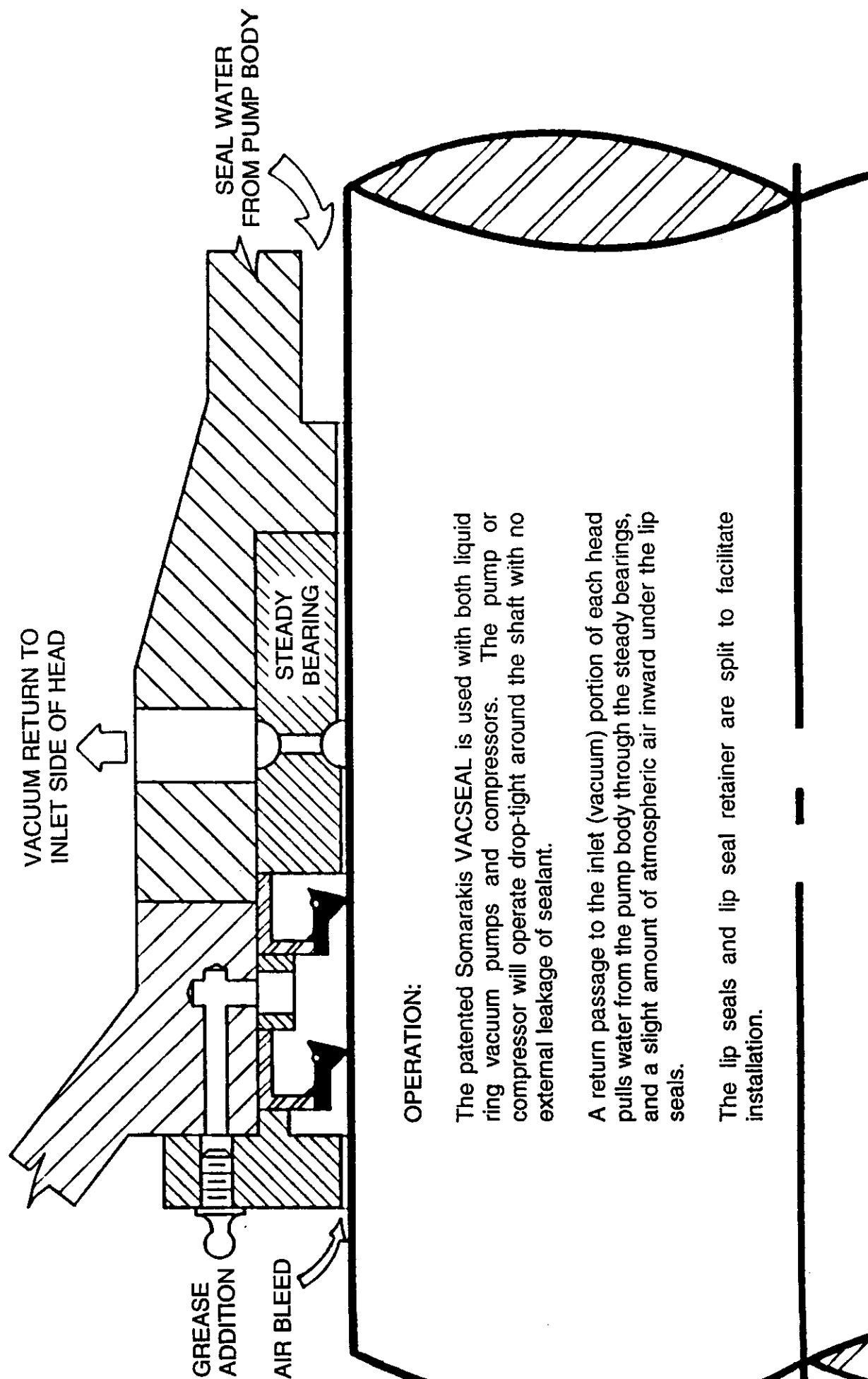
The SV vacuum pump is of typical "liquid ring" design with only one moving part and no metal-to-metal sliding contact. The illustration shows an offset rotor rotating in a clockwise direction in a cylindrical body partially filled with water. The rotor consists of 20 forward curved, shrouded blades forming chambers with hollow centers and air passage to two stationary valves designated as cones.

The water rotates with the rotor and forms an air core at the centerline of the body but offset from the centerline of the rotor. Water volume in the body is maintained to provide a seal at the tips of the rotor blades isolating, individual chambers. Water fills a rotor chamber, recedes as the chamber advances until the chamber is almost empty of water, and fills the chamber again to complete the cycle in one complete revolution of the rotor.

As water recedes from the rotor chamber it is replaced by air entering through the pump inlet and cone inlet port. As water is forced back into the rotor chamber the air exits through the cone discharger port and pump discharge.

The pump inlet can be utilized as a vacuum source or the pump discharge utilized as a source of pressure. Air is the only produce moved through the pump in great volume. Most of the water is trapped within the pump and any loss is gradually replaced by addition of seal water.





OPERATION:

The patented Somarakis VACSEAL is used with both liquid ring vacuum pumps and compressors. The pump or compressor will operate drop-tight around the shaft with no external leakage of sealant.

A return passage to the inlet (vacuum) portion of each head pulls water from the pump body through the steady bearings, and a slight amount of atmospheric air inward under the lip seals.

The lip seals and lip seal retainer are split to facilitate installation.

RECEIVING PUMP

Keys, couplings, V-belts, line strainers, spray nozzles, orifice unions and other miscellaneous parts will be shipped in bags or boxes attached to the shipping skid. Check for these items against the packing slip.

STORAGE OF A NEW PUMP

If the pump will be started up with thirty (30) days, install on the foundation or store in a dry area with all metal or wood blind flanges in place on all inlets and outlets.

If the pump will not be put into use for an extended period, remove two body drain plugs and four head drain plugs to drain any accumulated water. Replace plugs. Leave all blind flanges in place. Rotate the shaft every two weeks. Pumps are flushed with soluble oil prior to shipment from the factory.

INSTALLATION OF PUMP

FOUNDATION:

An SV pump is constructed of rugged castings but can be twisted out of alignment if bolted onto a poorly constructed foundation. The most common mechanical pump problem is bearing failure due to an out of plumb or poorly grouted base, or coupling misalignment.

Foundations should be of concrete with four sole plates having a minimum size of 4"x4"x $\frac{1}{2}$ " set in wet concrete or grout. The pump base, which is heavy walled tubing when furnished by Somarakis, will be set on sole plates and shims leveled to within .003" per foot with no warp. Fully grout under the tubing base members and also fill the interior area of the base with grout.

COUPLING:

The pump motor combination will have been aligned and tested at the factory but these gear drive pumps must be realigned in the field. Dial in both angular and parallel coupling alignment to within .003" TIR.

V-BELTS:

Somarakis furnishes, or recommends the use of 2-belt minimum powerbands for V-belt driven SV pumps. Powerbands cannot roll in the grooves and derail as can single V-belts. It is recommended that matched sets of belts be installed.

CAUTION:

If V-belts or motor-pinion coupling are installed DO NOT check motor rotation unless seal water has been provided for the pump and the pump primed. Operation of a dry pump will seriously damage the cone-rotor fit.

INSTALLATION OF PIPING AND ACCESSORIES

AIR PIPING:

Inlet and discharge air piping must be connected to the pump by use of flexible connections. No rigidly connected air piping is acceptable.

Inlet air piping should contain a Dirt Trap of the same diameter as the air piping. The dirt trap may be installed in a horizontal run or as shown on the installation drawing. Temporary Inlet Screens are shipped with a new pump and must be removed after about two weeks of operation. As the screens form a restriction, even when clean, in the inlet line, they must be removed to allow optimum pump performance.

Inlet air piping should be no smaller than the flanged pump connections. Manifold diameters should have at least the area of connected piping. When inlet piping exceeds 150' in length pipe diameter should be of the next largest size.

Discharge piping should be full size and pitched down to the separator. To avoid overfilling the pump with water the discharge air line must not run above pump centerline. Water must discharge by gravity from the separator with air vent piping from the separator to be full size.

WATER PIPING:

Seal water piping is furnished by the user except that the orifice unions will be provided by Somarakis. It is important that a pressure gauge be installed between the line strainer and the pump seal water inlet to indicate water pressure, 10 PSI minimum, at the inlet.

The user will provide piping to the quench nozzles which are provided by Somarakis.

Standard shaft sealing by Somarakis includes lip seals and a steady bearing. No external water lines, as are required for conventional packing, are required for use with the lip seals.

Relief piping connecting each pump head with discharge piping is used on all pumps excepts those with No. 1 cone ports. Relief piping will be provided and installed by Somarakis.

WATER SUPPLY:

WATER QUALITY:

Seal and quench water should be clean and non-abrasive. Cool water is preferable as it condenses vapor out of saturated process air and therefore reduces the volume of air which is to be handled by the pump. Water discharged by the pump will be 20-30°F warmer than water introduced to the pump. Seal water at 60°F is used as the standard in calculating pump performance. Use of seal and quench water warmer than 60°F will affect pump performance negatively as shown by the chart. (The chart is an example; do not use for calculations).

SEAL WATER TEMP/CAPACITY FACTORS

Table 1.

INLET SEAL WATER TEMP °F	CFM CAPACITY FACTORS AT 60°F PROCESS AIR		
	15" Hg Vacuum Inlet	20" Hg Vacuum Inlet	25" Hg Vacuum Inlet
60	1.00	1.00	1.00
80	.97	.96	.91
100	.94	.91	.76
120	.88	.84	.58

Pumps of cast iron have less corrosion resistance than do pumps of stainless construction. Cast iron pumps with stainless trim can tolerate corrosive conditions longer before performance is affected. The following are the maximum levels of solubles which seal and quench water should contain when pumps are constructed of cast iron, with outgoing seal water at 100°F or less:

<i>Calcium Carbonate</i>	<i>300 ppm</i>
<i>Chlorides</i>	<i>200 ppm</i>
<i>Sulphates</i>	<i>200 ppm</i>
<i>Total Dissolved Solids</i>	<i>1000 ppm</i>

Regardless of materials of construction, hardness of less than 300 ppm calcium carbonate is desirable to prevent excessive build-up of scale.

WATER RATE:

Somarakis provides orifice unions to control rate of seal water flow to the pump. Water

pressure should be controlled at the quench nozzles to 10 PSI. The same incoming waterlines, one required for each end of the pump, is then routed to the pump seal water inlets. Water flows through a line strainer and then through an orifice union. Water pressure before the orifice union should be at 10 PSI, 5 PSI minimum.

The chart indicating flow rates for seal water addition shows total flows, including both ends of the pump, required for pump start-up. With a saturated process air, operating seal water addition can be reduced by as much as 20 percent because of condensate in incoming saturated air. Water can be regulated, with the process operating to produce maximum vacuum with minimum water addition.

SEAL WATER ADDITION - START-UP

Table 2.

PUMP MODEL	VAC "Hg"	GPM	PUMP MODEL	VAC "Hg"	GPM
SV-808.1	15	4	SV-3028.1	15	20
SV-808.2	20	6	SV-3028.2	20	40
SV-808.3	25	7	SV-3028.3	25	45
SV-1211.1	15	6	SV-3633.1	15	25
SV-1211.2	20	12	SV-3633.2	20	30
SV-1211.3	25	12	SV-3633.3	25	60
SV-1414.1	15	10	SV-4440.1	15	40
SV-1414.2	20	12	SV-4440.2	20	60
SV-1414.3	25	18	SV-4440.3	25	95
SV-1818.1	15	9	SV-5348.1	15	75
SV-1818.2	20	12	SV-5348.2	20	80
SV-1818.3	25	18	SV-5348.3	25	130
SV-2023.1	15	11	SV-5372.1	15	90
SV-2023.2	20	16	SV-5372.2	20	100
SV-2023.3	25	25	SV-5372.3	25	160
SV-2525.1	15	12			
SV-2525.2	20	17			
SV-2525.3	25	30			

OPERATION

START-UP OF A NEW PUMP:

To flush out construction slag and scale, remove the two 3/4" inspection plugs at the top of the body and turn on the seal water until water overflows the top of the body. Remove the two body drain plugs and completely drain the body. Remove the four head drain plugs and drain the heads.

Manually rotate the pump shaft; it should turn freely and indicate no obstructions. If an obstruction is felt refill the body with water and flush again.

Replace the body and head drain plugs and the inspection plugs at the top of the body; use pipe tape or thread sealant. Turn on the seal water and prime the pump by filling until water overflows pump by flowing out through the rotor and cone ports and through the pump air outlets.

Make sure that temporary inlet screens are in place and that caution tags are still attached to the screen handles.

Unlock the electrical controls and check motor rotation. CAUTION: Do not check motor rotation when connected to a dry pump.

Turn on seal water again and start pump. Check RPM against name plate specifications. Check amps to determine approximate horsepower draw. Regulate seal water to approximately 10 PSI prior to seal water orifice unions, quench water to 10 PSI at the spray nozzles. Pump should show vacuum at inlet gauges although not as much as nameplate with process equipment not in operation.

Install temperature tape on bearing housings. Bearings are grease lubricated and housing temperature may initially climb to 140°F before dropping to 110°F as excess grease works its way out of bearings. Monitor bearing temperatures closely. Temperatures must not exceed 145°F.

OPERATION OF PUMP WITH PROCESS EQUIPMENT IN OPERATION:

Condensate from incoming air and quench water will supplement seal water. Regulate seal water by gradually reducing flow until pump becomes noisy and indicated vacuum drops off. In no case turn off seal water completely; some water should always flow into seal water inlets. Periodically clean line strainers at seal water inlets.

REMOVE TEMPORARY INLET SCREENS:

After two weeks or at the first scheduled machine shutdown remove the two inlet screens. These extend downward into the pump inlets so manifolding or piping will have to be lifted to remove the screens.

TROUBLE SHOOTING

LOSS OF VACUUM:

Inadequate flow of seal water - The line strainer may be plugged or the orifice nozzle on the seal water line may be plugged.

High temperature of seal water - Remember, pump capacity curves are based on 60°F seal water. If the seal water is appreciably warmer than that specified when your system was engineered, the problem of low vacuum could be due to a high temperature sealing water circuit.

A restriction in the vacuum air line will cause a lack of vacuum at the process equipment but higher than normal vacuum at the pump inlet. Were the temporary inlet screens removed?

Excessive cone-rotor clearance due to corrosion will cause low vacuum. Excessive rotor-body clearance due to corrosion or abrasion will also cause low vacuum. Borescope inspection of the pump will indicate whether these fits are within tolerance.

Belt slippage will cause loss of vacuum. Check actual pump speed to make sure that it corresponds to nameplate speed.

HIGH HORSEPOWER:

Excessive flow of seal water - reduce flow of seal water to minimum while maintaining vacuum.

Back pressure on air discharge piping - is the separator operating correctly? The discharge piping should be full size or to an unobstructed trench. Attempting to start the pump against an obstructed discharge will overload the motor.

Build-up of scale within a pump may cause a gradual increase in horsepower draw. Running high hardness seal water to a pump for extended periods while the pump is not operating may cause accumulation of scale which will not allow the motor to start the pump.

CAVITATION:

High temperature seal water.

Excessive flow of seal water.

Restriction on vacuum side of pump - have the inlet screens been removed? The temporary inlet screens should be removed soon after initial pump start-up.

Restricted discharge air line.

Corrosion and/or erosion of the rotor or pump body will gradually cause a pump to become noisy. Such corrosion will also cause loss of performance.

BEARING FAILURES:

Coupling misalignment should be suspected as it is the primary cause of bearing failure. Has the pump base shifted so that it is out of plumb or twisted? Is air piping isolated from the pump by flexible connectors?

Inadequate coupling end play.

Lack of lubrication or excessive lubrication; use of incorrect grease. (Use an EP-2 type, or equivalent, grease.)

Excessive belt tension.

EXTENDED SHUTDOWN

When a pump will be out of service for more than four weeks prepare for storage as follows:

- 1) Drain all water from the pump by removing two body drain plugs and four head drain plugs.
- 2) Reinstall drain plugs and fill with clean water until relief piping overflows at pump centerline. Add soluble oil through both inspection holes (located at top of body) and run pump for one minute. Drain all the water from the pump and reinstall drain plugs.
- 3) Install blind flanges on pump inlets if pump is not connected to mill piping.
- 4) Spray rust inhibitor into top inlets and turn pump over by hand (not with motor) at fourteen (14) day intervals. Fill pump with R&O inhibitor up to 1/3 body centerline.

SV PUMPS - WEIGHTS

Table 3.

PART DESCRIPTION	WEIGHT - POUNDS										
	SV-808	SV-1211	SV-1414	SV-1818	SV-2023	SV-2523	SV-3028	SV-3633	SV-4440	SV-5348	SV-5372
BODY	67	158	200	307	362	690	1520	2600	3590	5350	9000
HEAD, EA. OF 2	45	125	145	199	356	490	675	1400	2230	2940	3940
CONE, EA. OF 2	3	14	16	24	54	65	110	180	320	520	800
ROTOR	37	72	138	230	478	790	1365	1970	3890	5110	7610
SHAFT	13	35	58	107	186	250	425	650	940	1560	2780
BEARINGS	2	4	6	13	9	10	15	25	45	60	85
BEARING HOUSING	N/A	N/A	N/A	N/A	28	30	40	240	310	310	460
BEARING CAPS	N/A	N/A	N/A	N/A	36	60	70	100	130	160	240
MISC. PARTS, ALL	36	53	41	77	131	210	315	585	795	970	1345
ASSEMBLED PUMP WEIGHT	250	600	765	1180	2050	3150	5320	9330	14800	20440	31000
BASE	125	150	175	200	350	900	+925	+1200	+1600	+2000	+2300
GEARS									+1660	+2045	

MAINTENANCE

LUBRICATION:

Pump bearings are grease lubricated and the bearing housings are provided with grease relief holes so that excess grease can work its way out of the bearing assemblies. Pumps are performance tested at the factory and have been greased adequately for initial mill operation. Do not add grease before start-up of the pumps as excess grease will cause elevated bearing temperatures.

The other lubrication required, for non-gear pumps, is of the lip seals, two on each end of the pump shaft, which seal around the shaft in the "packing" area. Use bearing grease; excess grease will not damage or unseat the seals.

Grease specifications: Premium quality, industrial bearing grease, lithium or lithium base, water resistant; consistency "NLGI #2", viscosity @100 F-500 SSU, viscosity at 210°F - 58 SSU.

Table 4.

DATA FOR		PUMP MODEL				
PUMP MAINTENANCE		SV-808	SV-1211	SV-1414	SV-1818	SV-2023
GASKETS						
ROTOR END TRAVEL		.060", .130"	.060", .130"	.080", .160"	.080", .180"	.080", .180"
INDEX #53, .010" PAPER BODY GASKETS, QUAN.		*IE-6 *DE-5	IE-6 DE-4	IE-7 DE-5	IE-5 DE-3	IE-7 DE-5
INDEX #51 & #52, .010" PAPER CONE GASKETS, QUAN.		IE-1 DE-1	IE-1 DE-1	IE-1 DE-1	IE-1 DE-1	IE-1 DE-1
PACKING						
INDEX #34 LIP SEALS - TOTAL		JM 19238 RUP FOUR	JM R-0225-17628 FOUR	JM R-0262-04268RPD FOUR	JM 10164 LUP FOUR	JM R-0400-09556RPD FOUR
INDEX #35 (ALTERNATE) PACKING - TOTAL/END		1/4" X 15 3/4" FIVE	3/8" X 9 3/4" FIVE	3/8" X 11 1/8" FIVE	1/2" X 12 1/8" SIX	5/8" X 12 9/16" FIVE
BEARINGS AND SEALS						
INDEX #44 BEARINGS ONE REQUIRED FOR IDLE END AND ONE FOR DRIVE END		IE = SKF-6307 DE = SKF-307	IE = SKF-6409 DE = SKF-6409	IE = SKF-6311 DE = SKF-6311	IE = SKF-5315 DE = SKF-315	IE = SKF-21316 DE = SKF-21316
INDEX #23, BRG. OUTER SEAL I.E. AND D.E. - TOTAL		JM 9080-LUP ONE	JM 9636-LUP ONE	JM 10755-LUP ONE	JM 10526-LUP ONE	JM 5104-LUP ONE
INDEX #22, BRG. INNER SEAL I.E. AND D.E. - TOTAL		JM 7073-LUP TWO	JM 10432-LUP TWO	JM 11017-LUP TWO	JM 9042-LUP TWO	JM 9143-LUP TWO
INDEX #45, LOCKNUT		N-07	N-09	N-11	AN-15	AN-16
INDEX #46, LOCKWASHER		W-07	W-09	W-11	W-15	W-16

* DESIGNATES "IDLE END" AND "DRIVE END".

EXTRA GASKETS ARE USED UNDER THE IDLE END HEAD TO ALLOW FOR REMOVAL OF SOME FOR FINAL END TRAVEL ADJUSTMENT.

ADDITIONAL GASKETS MAY BE ADDED UNDER THE CONES IF END TRAVEL ADJUSTMENT REQUIRES (IF MOST OR ALL OF BODY GASKETS HAVE BEEN REMOVED).

EACH .010" OF SHIMMYING UNDER IDLE END CAP, UNDER IDLE END HEAD OR UNDER CONES WILL AFFECT CONE-ROTOR CLEARANCE BY .0014".

Table 5.

DATA FOR	PUMP MODEL					
	SV-2523	SV-3028	SV-3633	SV-4440	SV-5348	SV-5372
PUMP MAINTENANCE						
GASKETS						
ROTOR END TRAVEL	.060"-.090"	.070"-.140"	.080"-.160"	.080"-.190"	.100"-.250"	.225"-.275"
INDEX #53, .010" PAPER BODY GASKETS, QUAN.	*IE-5 *DE-3	IE-8 DE-6	IE-8 DE-6	IE-6 DE-4	IE-7 DE-5	IE-10 DE-10
INDEX #51 & #52, .010" PAPER CONE GASKETS, QUAN.	IE-1 DE-1	IE-1 DE-1	IE-1 DE-1	IE-1 DE-1	IE-1 DE-1	IE-1 DE-1
PACKING						
INDEX #34 LIP SEALS - TOTAL	JM R-0450-05868-RPD FOUR	JM R-0562-04286-RPD FOUR	JM R-0625-05679-RPD FOUR	JM R-0775-08847-RUP FOUR	JM R-0837-04118-RUP FOUR	JM R-1025-03689-RUP FOUR
INDEX #35 (ALTERNATE) PACKING - TOTAL/END	1/2" X 15 3/4" SIX	5/8" X 19 5/8" SIX	3/4" X 23" FIVE	3/4" X 29" SIX	3/4" X 30" SIX	3/4" X 35" SIX
BEARINGS AND SEALS						
INDEX #44 BEARINGS ONE REQUIRED FOR IDLE END AND ONE FOR DRIVE END	SKF 2220-CY	SKF 2222-CJW/33	TIMKEN 1 CUP 74851-D 2 CONES 74550 1 SPACER 74550-9-220	TIMKEN 1 CUP 67720-D 2 CONES 67790 1 SPACER 67790-9-232	TIMKEN 1 CUP 67820-D 2 CONES 67885 1 SPACER 67885-9-241	TIMKEN 1 CUP 244210-D 2 CONES 244249 1 SPACER M244249-9-114
BENCH END PLAY			.016"	.018"	.016"	.016"
INDEX #23, BRG. OUTER SEAL I.E. AND D.E. - TOTAL	JM 11198-LUP ONE	JM 7199-LUP ONE	JM 7042-LUP TWO	GAR. 53X-3917 TWO	JM 12094-LUP TWO	JM 825-16220 LUP TWO
INDEX #22, BRG. INNER SEAL I.E. AND D.E. - TOTAL	JM 4168-LUP TWO	JM 10152-LUP TWO	JM 10439-LUP TWO	JM 9595-LUP TWO	JM 6718-LUP TWO	JM 975-13809 LUP TWO
INDEX #45, LOCKNUT	AN-20	AN-21	AN-28	AN-34	AN-38	AN-44
INDEX #46, LOCKWASHER	W-20	W-21	W-28	W-34	W-38	W-44

* DESIGNATES "IDLE END" AND "DRIVE END.

*EXTRA GASKETS ARE USED UNDER THE IDLE END HEAD TO ALLOW FOR REMOVAL OF SOME FOR FINAL END TRAVEL ADJUSTMENT.

ADDITIONAL GASKETS MAY BE ADDED UNDER THE CONES IF END TRAVEL ADJUSTMENT REQUIRES (IF MOST OR ALL OF BODY GASKETS HAVE BEEN REMOVED). EACH .010" OF SHIMMING UNDER IDLE END CAP, UNDER IDLE END HEAD OR UNDER CONES WILL AFFECT CONE-ROTOR CLEARANCE BY .0014".

The following grease types, or equivalent, are acceptable:

<i>AMOCO</i>	<i>Rykon Premium 2</i>
<i>Atlantic Richfield (ARCO)</i>	<i>ARCO Multipurpose</i>
<i>Chevron Oil</i>	<i>Chevron SRI-2</i>
<i>Exxon</i>	<i>Unirex N2</i>
<i>Gulf Oil</i>	<i>Gulfcrown No. 2</i>
<i>Mobil</i>	<i>Mobilux 2</i>
<i>Shell Oil</i>	<i>Alvania 2 or Dolium R</i>
<i>Texaco</i>	<i>Premium RB 2</i>

SHAFT SEALS:

Pumps and compressors are not packed with conventional packing. Each end of the shaft is sealed with vacuum evacuated, dual lip seals, both of which seal inward, to seal water within the pump and to allow air to enter the pump around the shaft. The seals are separated by a lantern ring through which grease can be introduced to the seal area.

To replace shaft seals (34), remove the split seal retainer (31) and hook out the seals, which are also split for easy installation and removal. After installation of seals, re-grease through the fittings.

SECONDARY BEARINGS:

Secondary bearings are located at both ends of the shaft inboard of the shaft seals. For a limited period of time, in the event of a primary bearing failure, the secondary bearings will prevent cone-rotor contact by providing additional support for the shaft before the rotor comes in contact with the cone.

Secondary bearings (36) are not split; removal and replacement will involve removing the replaceable bearing housings (16). The secondary bearings are provided with puller holes for removal. When installing, notice that the bearing is keyed at the bottom of the housing to prevent rotation of the bearing within the housing.

BORESCOPE INSPECTION OF PUMP INTERNALS:

Two inspection holes are provided at the top of the pump body through which a borescope can be inserted and pump internals inspected. Borescope access is also possible through the two drain holes in the bottom of the pump body.

Obvious wear and damage can be assessed as well as cone-rotor clearance estimated. Body wear can be viewed and the pump taken out of service before leaks occur. The borescope is a useful tool which permits quick appraisal of the life remaining in a pump and estimation of the percentage of efficiency at which the pump is operating. Precise operating efficiency can only be determined by (the more time consuming) orifice testing of the pump in place.

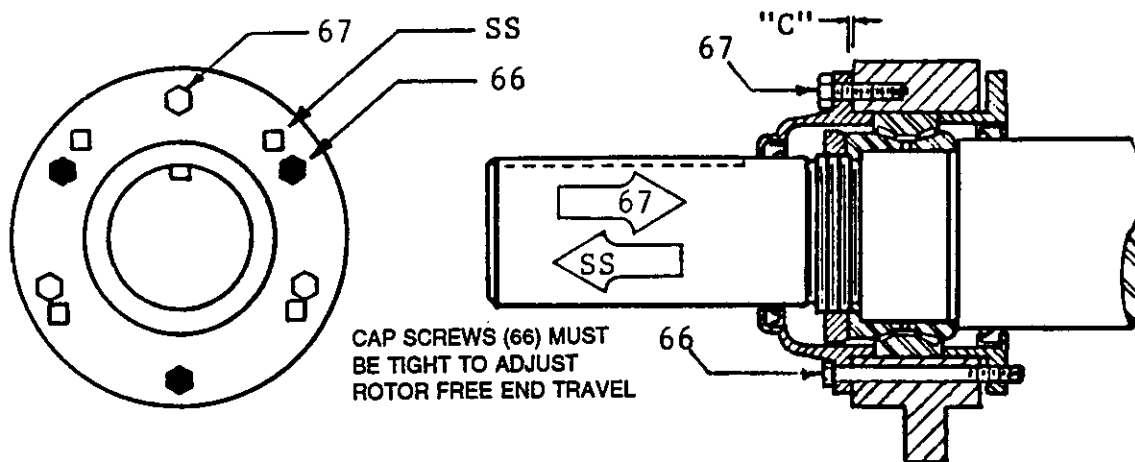
ORIFICE TESTING:

Orifice testing of a pump by a qualified technician permits accurate measurement of actual pump performance. Orifice plates and accurate vacuum gauges are required to perform the test. Call Somarakis, Inc. for orifice testing service or for written instructions of testing procedures.

CHECKING ROTOR FREE END TRAVEL:

Pump efficiency will decrease as the clearance between rotor and cones increases due to corrosion or wear. It is possible to determine rotor free end travel without complete disassembly of the pump. If travel is found to be within .030" of the specifications noted on page 13-2, the pump can be considered to be in good condition. If rotor travel is excessive, and assuming that cone-rotor wear is relatively uniform, the pump can be disassembled to reduce cone-rotor clearance by adding cone gaskets or removing head gaskets.

To check rotor free end travel, remove the idle end bearing cap (19) and adjusting shims (57) leaving the bearing cap gaskets (55) in place. Reinstall the bearing cap using the three thru cap screws (66); tighten. Move the rotor toward the pump drive end by tightening cap screws (67) uniformly. Rotate the shaft by hand and move the rotor until light contact is made between the rotor and drive end cone. Measure the gap "C", between the bearing cap and bearing housing, with a feeler gauge.



Loosen the cap screws and move the rotor toward the idle end by using the four set screws (SS) in the bearing cap. When the rotor touches the idle end cone measure the gap "C" again between the bearing cap and bearing housing. Rotor free end travel is equivalent to the difference between the two measurements.

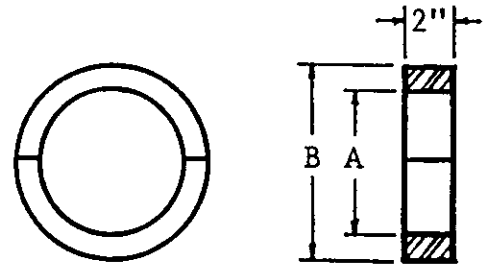
If travel is within .020"-.030" of specifications, and the pump will not be further disassembled, center the rotor by installing shims to the first feeler gauge measurement plus one-half the free end travel.

DISASSEMBLY OF PUMP OR COMPRESSOR:

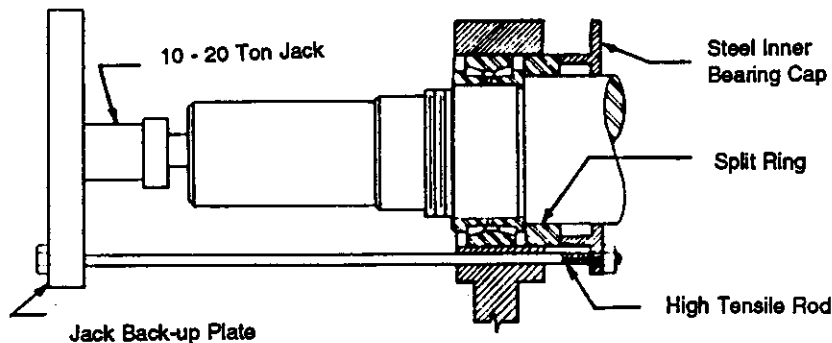
There should be a level floor or base under the pump. Mark all parts while disassembling; this is especially true of head, cone and body relationships. Cones are not interchangeable. Make up a split ring, as illustrated below, for removal of the idle end bearing.

Table 6.

MODEL	$+.005"$ A $-.000"$	$+.005"$ B $-.010"$	ROD "Dia.
SV-808	1.630	3.145	5/16
SV-1211	2.255	4.718	3/8
SV-1414	2.630	4.718	3/8
SV-1818	3.380	6.293	3/8
SV-2023	N/A	N/A	N/A
SV-2523	3.942	7.080	1/2
SV-3028	4.335	7.870	1/2
SV-3633	6.255	8.495	1/2
SV-4440	7.755	9.745	5/8
SV-5348	8.380	10.495	5/8
SV-5372	8.692	12.370	5/8



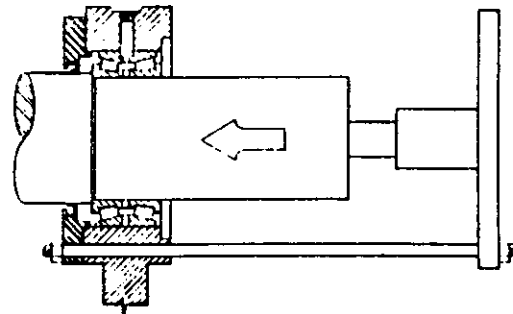
Remove the six cap screws holding the idle end bearing cap (19). Remove cap and adjusting shims (57) and alternating gaskets (55). Remove shaft nut and lock ring (45,46). The steel inner bearing cap (17) will serve as a bearing pusher when set up with the split ring as show below.



It is not necessary to remove the steel bearing housing (16) unless it has been damaged and requires weld repair and machining; leave it fastened to the head. The bearing housing requires no shims if removed and reinstalled.

Block up the pump body (15) and unbolt the idle end head (14). Slide the head off the shaft using lifting eyes in the head inlet flange.

Go to the drive end of the pump and remove the outer bearing cap (21) and the shaft nut and lock ring (45, 46). Using the setup shown, push the shaft out of the bearing housing (16) toward the idle end of the pump; the bearing will stay with the bearing housing. Support the drive



end of the shaft with a sling to get the weight of the rotor off of the bearing. Remove the bearing, which has a "floating" fit in the bearing housing, from the housing and shaft.

Using two slings and a pipe extension, work the shaft and rotor assembly out of the body through the idle end of the pump.

Remove the body from the drive end head. Support the drive end head and cone assembly by the head inlet flange to prevent the head from tipping over when the body is removed.

REPAIR OF CONES AND ROTOR BORE:

If scored or corroded, these 8° tapers can be re-machined and the parts reused. A maximum of .200" of spacers and gaskets can be used in the head-cone rabbet to make up for metal lost in machining. The total amount of material removed from the diameter of cone or rotor tapers must be made up 3.5:1 (gasket dim.: machining dim.") with gaskets under the cones.

ROTOR-SHAFT, TO DISASSEMBLE AND REASSEMBLE:

If the rotor is an alloy other than cast iron, there usually will be a shaft key held in place by set screws located on each side of the hub. Remove the set screws before attempting to press the shaft out of the rotor. The maximum force which should be used when pressing the shaft out cold, is 20 tons for pumps up to size SV-2523, and 50 tons for larger sizes. If this must be exceeded, heat the rotor hub uniformly to 200°F and try again.

Make up a bushing, with a groove so as to miss the shaft key, for pressing against the rotor hub. Do not apply force other than at rotor hub. Do not attempt to remove the key from the shaft. Check dimension "A" before removing shaft:

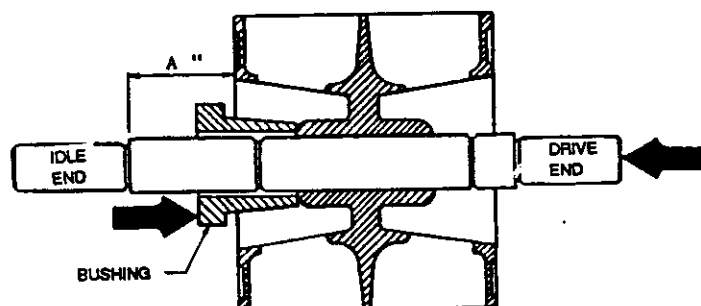


Table 7.

MINIMUM FORCE FOR ASSEMBLY OF ROTOR ON SHAFT - VACUUM PUMP OR COMPRESSOR					
Model	Dim. "A" Inches	Tons	Model	Dim. "A" Inches	Tons
SV-808	5.16	1-1/2	SV-3028	9.44	20
SV-1211	7.31	3	SV-3633	11.12	25
SV-1414	8.19	5	SV-4440	11.12	40
SV-1818	9.03	10	SV-5348	8.94	60
SV-2023	9.22	12	SV-5372	13.21	70
SV-2523	10.03	15			

Use heat on the rotor hub if the shaft and rotor cannot be assembled at the above forces when cold. Use Molykote, or similar product to prevent galling.

HEAD-CONE ASSEMBLY:

The No. 1 cone and No. 1 head must be installed together; The No. 2 cone and No. 2 head must be installed together. Assemble with one 0.010" gasket. Final rotor free end travel will be set by using body-head gaskets to locate the two cones further apart, additional head-cone gaskets to locate the cones closer together.

If there is any play in the head-cone rabbet fit, locate the cone toward the top of the head.

TEMPORARY ASSEMBLY -

DETERMINE GASKETS FOR ROTOR END TRAVEL:

At this point the cones are assembled to the heads; the heads have no secondary bearings or seals installed, the bearing housings have no primary bearings or seals installed. The shaft is installed in the rotor with the shaft ends, threads and fits protected with heavy tape.

Temporarily assemble the two heads and rotor by stacking vertically, or assemble on a flat surface, leaving out the body, pulling the three units together uniformly on both sides with come-alongs. This will force the cones into the rotor tapers, a condition of zero rotor end travel. Measure the distance between the two head fits. Measure the length of the body, which should be (all +.000", -.015").

Temporary Assembly/Determine Gaskets for Rotor End Travel continued.....

Table 8.

SV-808 = 8.875"	SV-2023 = 21.102"	SV-4440 = 44.190"
SV-1211 = 12.937"	SV-2523 = 25.500"	SV-5348 = 50.000"
SV-1414 = 15.625"	SV-3028 = 30.625"	SV-5372 = 73.375"
SV-1818 = 18.280"	SV-3633 = 35.875"	

Determine the specified rotor end travel, and calculate the number of .010" head-body gaskets (53) required to allow proper rotor end travel. Install the required number of head gaskets, half on each end of body, using grease to hold them in place.

FINAL ASSEMBLY OF HEADS TO BODY:

Install the secondary bearing (36) in the drive end head; align the notch in the bottom of the secondary bearing with the pin in the bottom of the housing. If the bearing housing has been removed from the head, reinstall it using no shims but cleaning all surfaces and filing out any nicks.

Assemble the body to the drive end head, on a flat surface, orienting the body rotational arrow to the head rotational arrow. Bolt up tight.

Insert the rotor and drive end of the shaft into the body using a snug pipe extension on the shaft. As the shaft comes through the drive end head slip the following parts over the shaft in sequence: lip seal spacer (331), retainer O-ring (311), retainer (31), slinger and spring (37), inner drive end bearing cap (18) with lip seal (22) installed, and cap gasket (58). Work the shaft on through the bearing housing.

Install the secondary bearing and bearing housing into the idle end head. Install the head on the body making sure, as the shaft comes through the head and before it enters the bearing housing, that the following parts are installed in sequence; lip seal spacer (331), retainer O-ring (311), retainer (31), slinger and spring (37), and bearing cap (17) with lip seal (22) and O-ring (24) installed. Bolt head to body.

EXTREMELY IMPORTANT:

The final loosening of all body-head bolts, and subsequent re-tightening, must be done on a FLAT surface to insure that the heads are in alignment.

ASSEMBLE BEARINGS IN HOUSINGS (Sizes SV-808 to SV-2023):

Push the rotor and shaft toward the drive end until the cone comes firmly in contact with the rotor; this will center the shaft within the bearing housing. The drive end bearing cap should not be bolted to the bearing housing at this time.

Slide drive end ball bearing onto shaft. Select pipe as specified below of suitable length to fit over shaft and bear against inner race of ball bearing. Machine one end of the pipe square and install a pipe cap on the other end.

Table 9.

PUMP	PIPE SIZE-INCHES
SV-808	1½
SV-1211	2
SV-1414	3
SV-1818	3
SV-2023	3" pipe w/3" coupling

Using the above prepared pipe and a mallet, tap ball bearing onto shaft until bearing is seated against shaft shoulder.

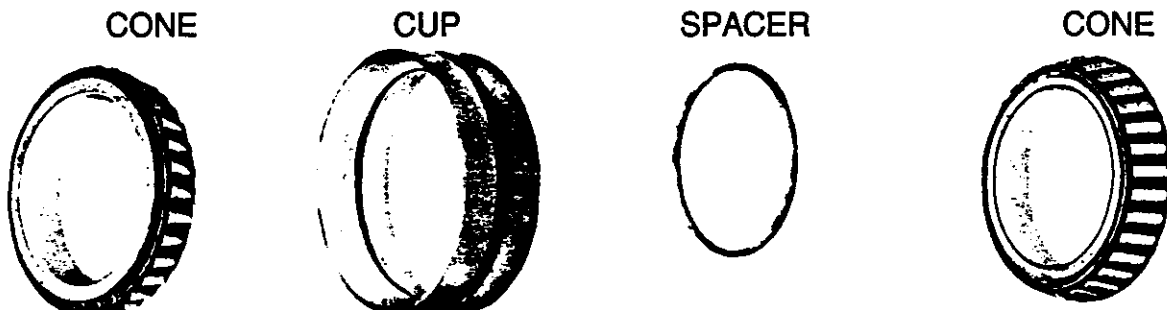
Push the rotor and shaft toward the idle end until the rotor and cone come in contact, centering the shaft within the bearing housing. Install the bearings same as on drive end.

When the bearing is fully seated on the idle end install the lockwasher and locknut and tighten with a spanner wrench. Align notch of locknut with tab on lockwasher after tightening locknut, and bend tab into notch.

ASSEMBLE BEARINGS IN HOUSINGS (Sizes SV-2523 to SV-5372):

(Timken Bearings are to be installed as a set. Do not interchange any bearings parts with other bearings. If installed as a set, it is not possible to accidentally pre-load and damage the bearings.)

BEARING ASSEMBLY



Push the rotor and shaft toward the drive end until the cone comes firmly in contact with the rotor; this will center the shaft within the bearing housing. The drive end bearing cap (18) should not be bolted to the bearing housing at this time. Heat the two bearing tapered cones (not the cup or spacer) to bearing in sequence on the shaft. The tapered cone of the bearing must seat firmly against the shaft shoulder. While the bearing outer cone is still hot install the lockwasher (46) and locknut (45) and tighten with a spanner wrench. When the bearing cools, check bearing roller-cup clearance at the top of the bearing; clearance should be a maximum of .004", preferably .0015" to .002".

Push the rotor and shaft toward the idle end until the rotor and cone come in contact, centering the shaft within the bearing housing. Install the bearings same as on drive end.

COMPLETE THE ASSEMBLY OF BEARINGS (All Pump Sizes):

Finish bearing assembly by installing the drive end outer bearing cap (21) with gasket (59) and lip seal (21) in place. The inner bearing cap (18) with gasket (58) and lip seal (22) in place, will be assembled to housing at this same time.

Finish assembly of the idle end bearing arrangement. Check rotor free end travel and center the rotor as described on page 13-4. Lock rotor in place. GREASE BEARINGS!

INSTALL LIPS SEALS IN PACKING AREA:

Apply light coat of petroleum jelly to outside diameter and sealing lip of lip seals. Install one split lip seal (34) with lip facing toward center of pump. Install second lip seal with lip also facing toward inside of pump. Install retainer (31). Install seals on other end of pump. GREASE!

SOMARAKIS, INC. Standard Terms and Conditions of Sale (Effective 02-01-94)

The following terms and conditions are a part of the foregoing quotation. It is understood that they will constitute a part of any order based on this quotation, placed by the Purchaser and accepted by SOMARAKIS, INC. Any changes, deletions or provisions differing from these conditions, which may be proposed in your order are rejected unless specifically accepted in writing by SOMARAKIS, INC.

WARRANTY: Products manufactured by SOMARAKIS, INC. shall be free from defects in material and workmanship, but SOMARAKIS, INC.'s liability shall be limited to the replacement F.O.B. manufacturing shops of any part found to be defective and as to which SOMARAKIS, INC. receives written notice of such defect twenty-four months from date of shipment or longer if requested in writing and properly stored. Decomposition by chemical action and wear caused by the presence of abrasive materials shall not constitute defects. This obligation does not cover the expense of removal or installation of equipment or parts thereof, or attached piping, supports, drives, accessories or any other related materials. The foregoing warranty does not apply to motors, electrical accessories or electrical accessory component parts, and Purchaser relies solely upon the warranties of such manufacturers, which are assigned insofar as possible, to Purchaser. THIS WARRANTY AND PERFORMANCE GUARANTEE BELOW, IS EXPRESSLY MADE AND ACCEPTED IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND ALL OTHER OBLIGATIONS OR LIABILITIES OF SOMARAKIS, INC. NOT SPECIFICALLY SET FORTH HEREIN ARE EXPRESSLY EXCLUDED. SOMARAKIS, INC. SHALL NOT BE LIABLE FOR SPECIAL OR CONSEQUENTIAL DAMAGES RESULTING FROM INSTALLATION, START-UP PROCEDURES, OR OPERATION CONTRARY TO SOMARAKIS, INC. WRITTEN INSTRUCTION, UNLESS PERFORMED BY SOMARAKIS, INC.

PERFORMANCE GUARANTEE SOMARAKIS, INC. guarantees every SOMARAKIS, INC. product, or system, to do the job for which SOMARAKIS, INC. recommends it (as specified in writing in the foregoing quotation) and, failing in this SOMARAKIS, INC. will either (a) field modify at SOMARAKIS, INC.'s expense so that equipment performs as to meet specifications or (b) refund the purchase price of equipment purchased from SOMARAKIS, INC.. Such refund shall not include installation costs or costs of associated equipment not purchased from SOMARAKIS, INC. or original freight charges. Such refund shall be payable within thirty days following receipt of returned equipment to SOMARAKIS, INC. at a designated facility, when shipped freight collect F.O.B. point of shipment. The choice of (a) or (b) shall be solely ours. The performance guarantee extends to eighteen (18) months following date of shipment from our shops.

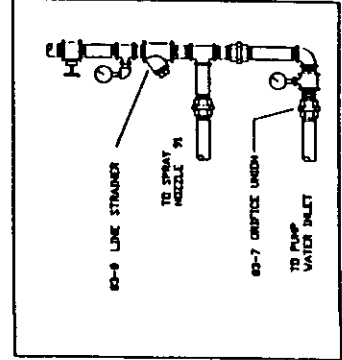
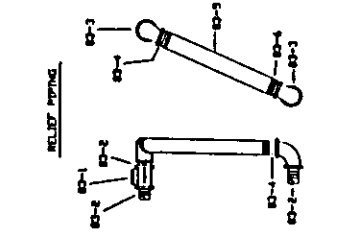
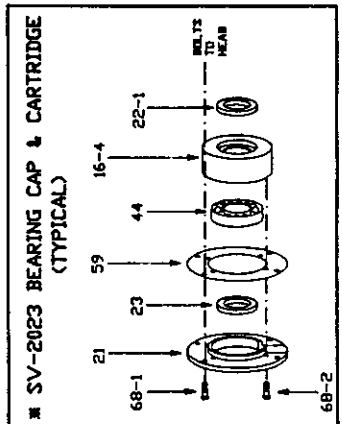
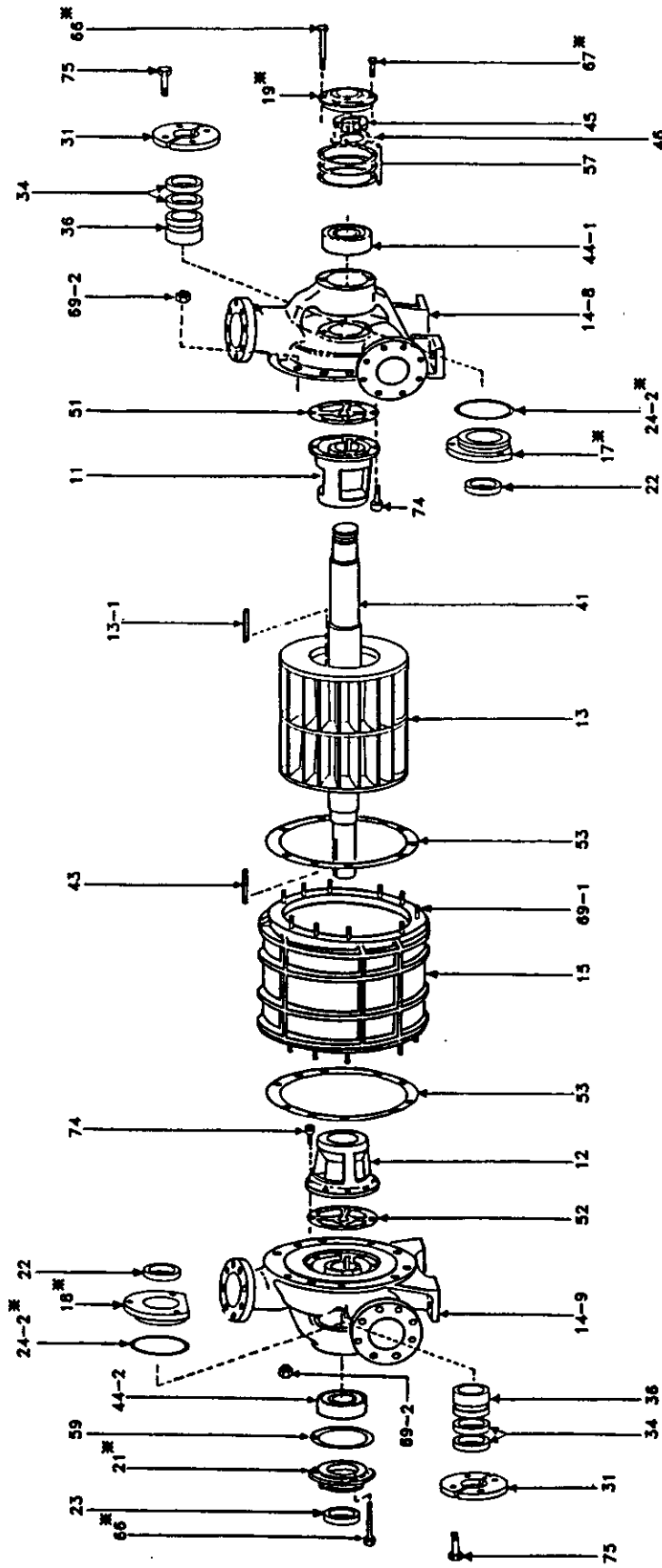
FORCE MAJEURE Shipping schedules noted are approximate and are based upon estimated ship schedules currently in effect. They are subject to timely receipt of all necessary components from SOMARAKIS, INC.'s vendors, all necessary information and data from Purchaser, and other contingencies beyond SOMARAKIS, INC.'S. approximate date specified as may be required by reason of non-availability of components or data, strike, flood, riot, fire, government regulations, or other casualty or cause beyond SOMARAKIS, INC.'s control which cannot be overcome by due diligence, provided SOMARAKIS, INC. shall use its best efforts within a reasonable practicable time after the occurrence of such condition to notify Purchaser of the nature and estimated extent of such condition. Unless otherwise provided in quotation, packing shall be for domestic shipment only. If shipment is postponed at request of Purchaser, payment of the purchase price shall be due on notice from SOMARAKIS, INC. that equipment is ready for shipment. Handling and other charges thereafter incurred by SOMARAKIS, INC. shall be for the account of Purchaser.

TERMS All prices are in U.S. Currency, F.O.B. Manufacturing shops for truck or rail shipment. All quotations expire sixty days after the date thereof unless specifically revoked earlier. SOMARAKIS, INC.'s prices do not include any sales, use, excise, or similar taxes nor any export, import or other duties. Terms of payment are net thirty days from date of invoice, and unless shipment is delayed by causes beyond SOMARAKIS, INC.'s control, equipment will be shipped and invoices rendered on the same date. SOMARAKIS, INC. reserves the right to charge interest on overdue accounts at the rate of 1½ percent per month.

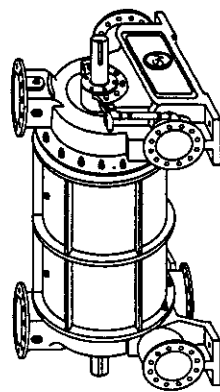
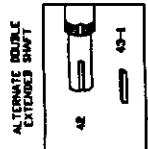
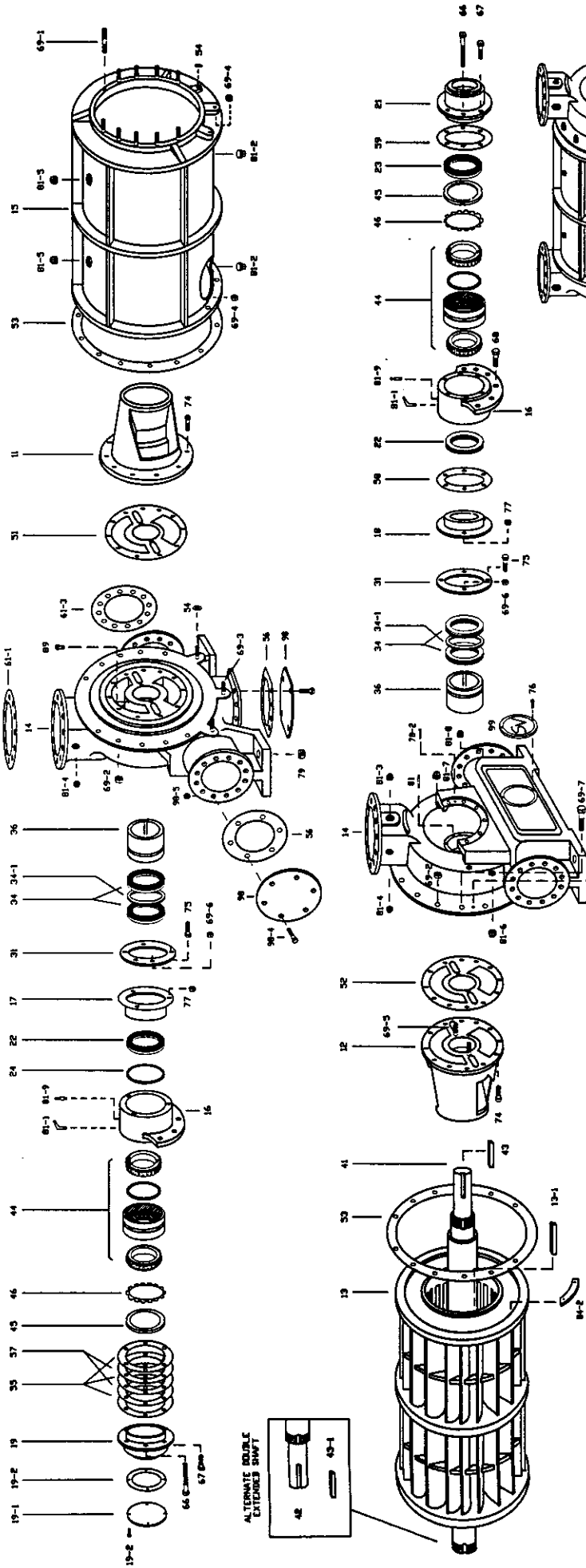
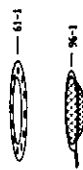
PATENTS SOMARAKIS, INC. agrees to defend any action or suit against Purchaser for infringement of any claim of any United States patent on account of equipment primarily designed by SOMARAKIS, INC. as a result of any contract resulting from the foregoing quotation. Purchaser agrees that Purchaser will notify SOMARAKIS, INC. promptly in writing and give SOMARAKIS, INC. full authority and complete cooperation in the defense of such infringement suit. If equipment supplied under this contract cannot be used by the Purchaser because of an injunction resulting from the infringement suit, SOMARAKIS, INC. will either (a) procure at SOMARAKIS, INC.'s expense for Purchaser the right to continue using the equipment or (b) replace the equipment supplied with non-infringing equipment or (c) refund the purchase price of the equipment and any transportation or installation costs incurred by Purchaser in connection with such equipment. The choice of (a), (b), (c) shall be solely SOMARAKIS, INC.

CODES, SAFETY APPLIANCES, ETC. If local laws or conditions require safety precautions such as guards, code welding, special electrical enclosures, etc. other than those called for by SOMARAKIS, INC.'s drawings and specifications, SOMARAKIS, INC. will satisfy such requirements at Purchaser's written request and expense upon receipt of proper specifications before commencement or manufacture.

ACCEPTANCE Any order placed as a result of this quotation shall not be binding upon SOMARAKIS, INC. until accepted by SOMARAKIS, INC. in writing at Vancouver, Washington, the contract being deemed entered into at that location and to be governed by the laws of the state of Washington.



SOMARAKIS			
SV-808, 1211, 1414, 1818, 2023			
PARTS DRAWING			
TOLERANCES EXCEPT AS NOTED	DRAWN BY	SCALE	MATERIAL
DECIMAL	JTV		
FRACTIONAL			
ANGULAR			
	APPROVED	DATE	DRAWING NUMBER
	JTV	8-21-91	SV-686-1
		REVISED	
		5-21-92	



WHEN ORDERING PARTS SPECIFY PUMP SIZE, SERIAL NUMBER, PART DESCRIPTION, COMPLETE EIGHT DIGIT PART NUMBER, OBIT INDEX NO. AND MATERIAL OF CONSTRUCTION.

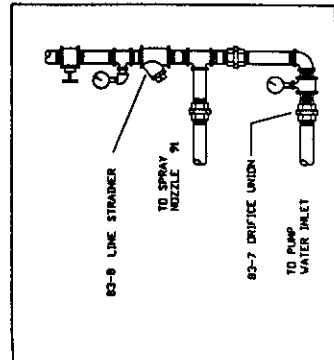
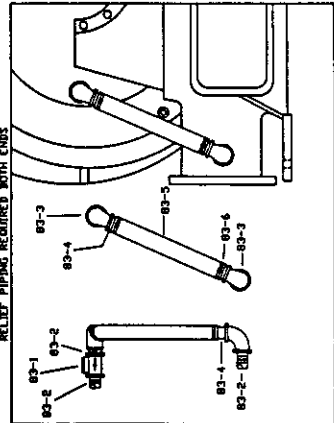
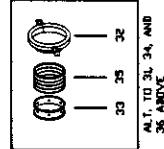
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MAT'L OF CONST. CODE
ADDITIONAL DETAILS
PUMP MODEL NO.
PART INDEX NO.

EXAMPLE:
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SV-3633
SV-3633 - 2
SV-3633 - 3
SV-3633 - 4
SV-3633 - 5
SV-3633 - 6
SV-3633 - 7

PUMP MODEL AND EQUIVALENT CODE NO.

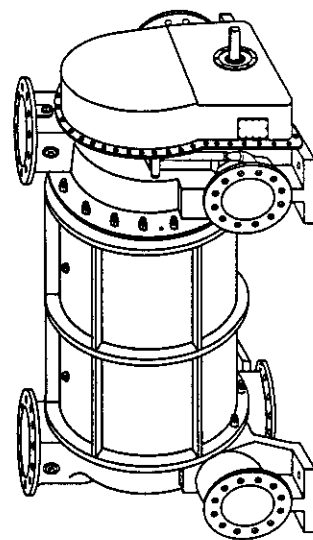
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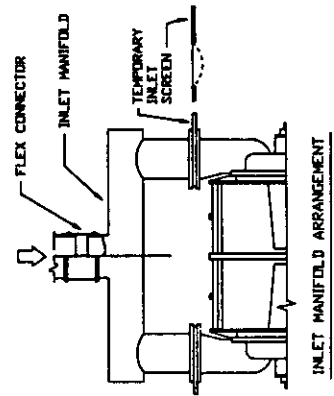
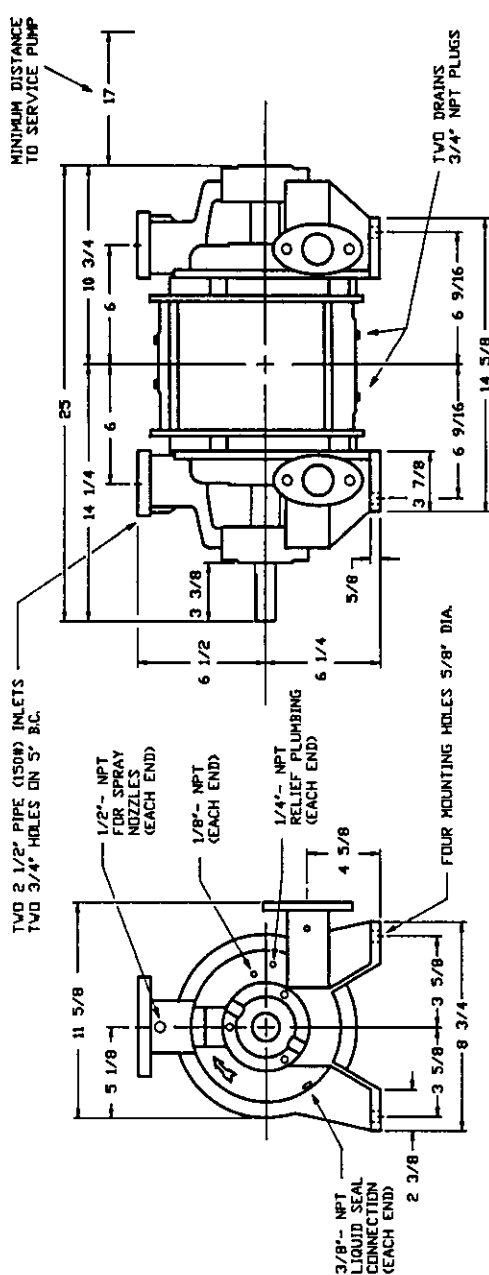
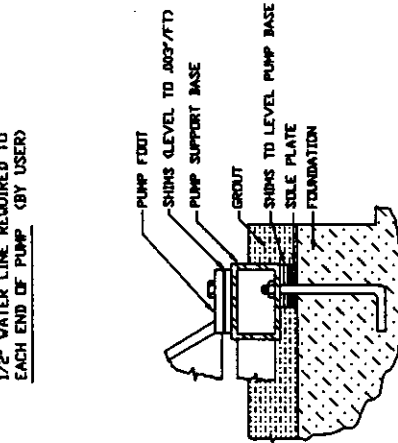
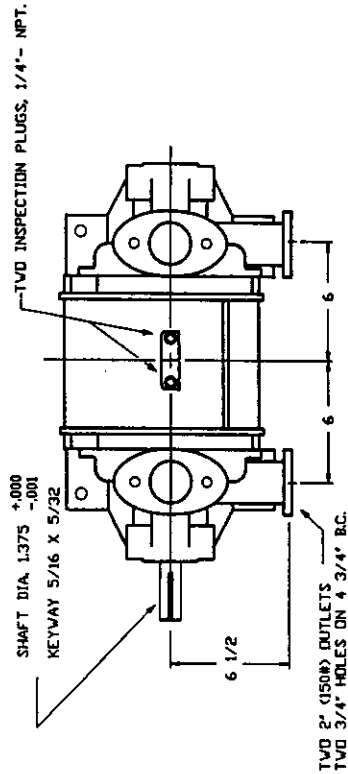
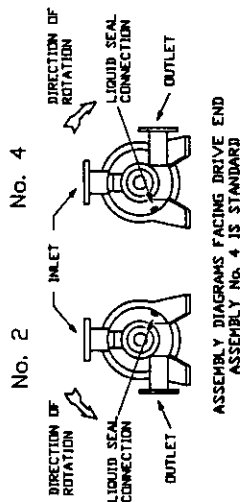
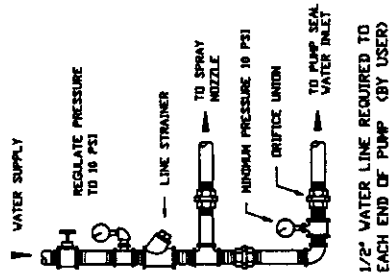
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SV-586PL-4				

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PARTS LIST SVG-586-1**

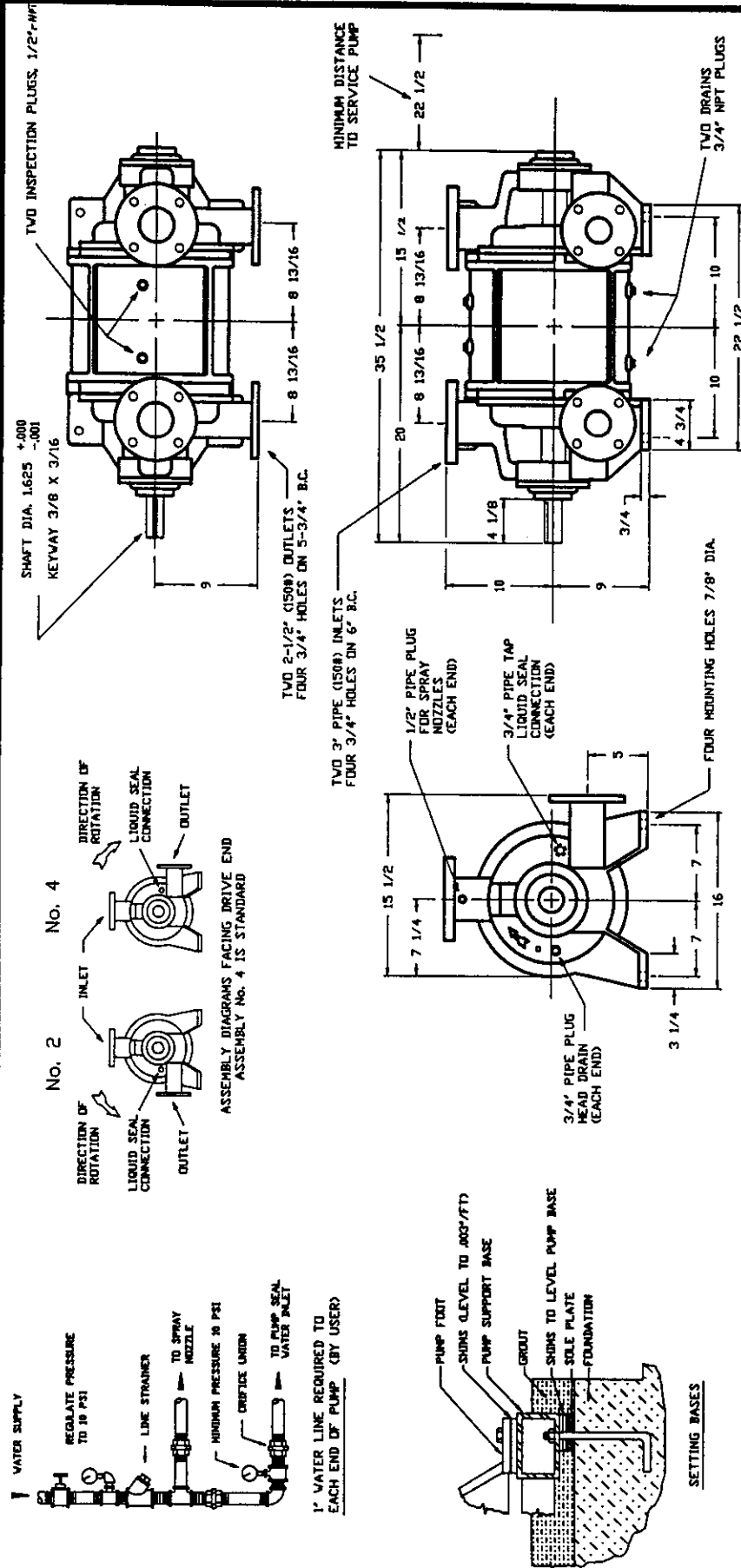
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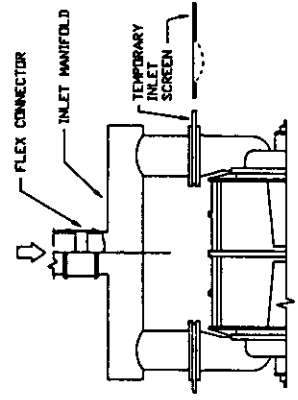
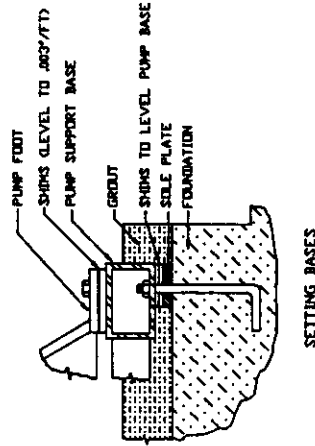
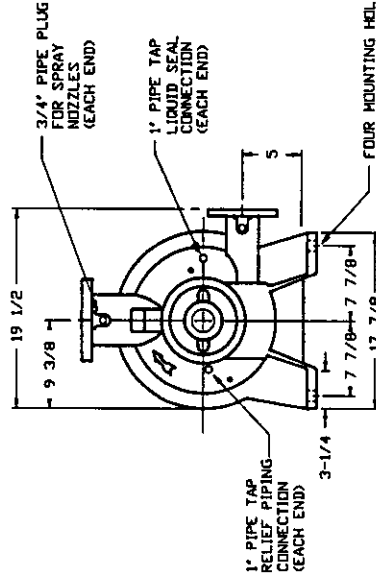
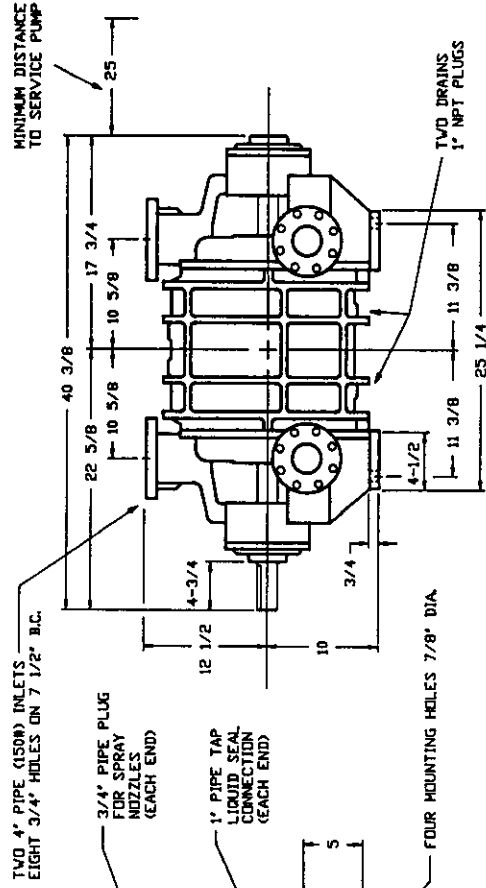
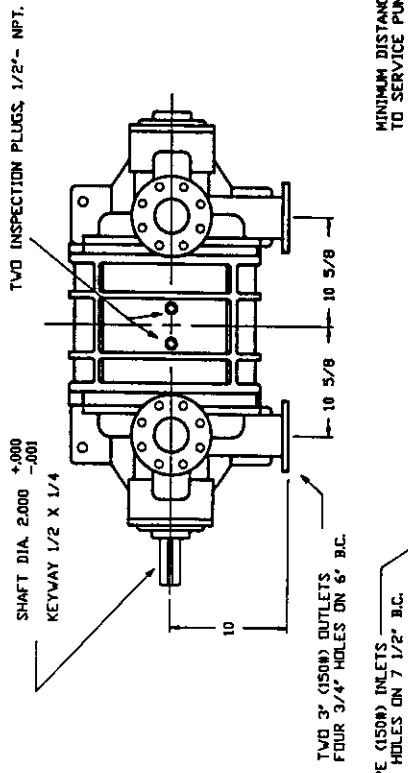
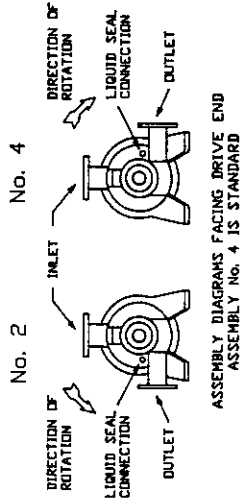
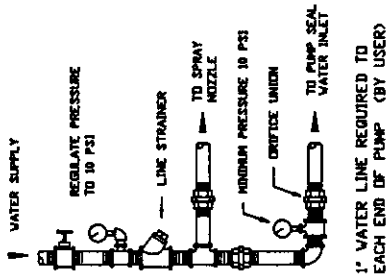
NOCK	PART DESCRIPTION	QTY PER	PART NUMBER
14	HEAD PINION	1	14 -000-
26	KEY, PINION	1	26 -000-26
26-1	SPINNER, OIL	1	26 -100-26
26-2	GEAR	1	26 -200-26
27	GEAR	1	27 -100-16
27-1	BEARING PINION	1	27 -000-11
28	GEAR, RETAINING	1	28 -000-11
28-1	BEARING PINION	1	28 -000-11
29	CASING, GEAR	1	29 -000-44
29-1	PLATE, GEAR, CASING	1	29 -100-26
29-2	COVER, INSPECTION	1	29 -200-26
29-3	COVER, INSPECTION/FILLER	1	29 -300-26
30	SHAFT, SINGLE EXTENDED	1	30 -000-26
30-1	SHAFT, SINGLE EXTENDED	1	30 -000-26
31	SHAFT, DOUBLE EXTENDED	1	31 -000-26
41	KEY, SHAFT	1	41 -000-26
42	KEY, SHAFT	1	42 -000-26
43	BEARING PINION	1	43 -000-26
47	BEARING PINION	1	47 -000-26
47-1	GEAR, RETAINING	2	47 -100-26
47-2	COVER, BEARING	1	47 -200-11
48	CAP, BEARING	1	48 -000-11
48-1	PLATE, BEARING CAP	1	48 -100-26
50	GASKET, HEAD	1	50 -000-26
50-1	GASKET, HEAD	1	50 -000-26
50-2	GASKET, HEAD	1	50 -000-26
50-3	GASKET, HEAD	1	50 -000-26
50-4	GASKET, HEAD	1	50 -000-26
50-5	GASKET, HEAD	1	50 -000-26
50-6	GASKET, HEAD	1	50 -000-26
50-7	GASKET, HEAD	1	50 -000-26
50-8	GASKET, HEAD	1	50 -000-26
50-9	GASKET, HEAD	1	50 -000-26
50-10	GASKET, HEAD	1	50 -000-26
50-11	GASKET, HEAD	1	50 -000-26
50-12	GASKET, HEAD	1	50 -000-26
50-13	GASKET, HEAD	1	50 -000-26
50-14	GASKET, HEAD	1	50 -000-26
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50-63	GASKET, HEAD	1	50 -000-26
50-64	GASKET, HEAD	1	50 -000-26
50-65	GASKET, HEAD	1	50 -000-26
50-66	GASKET, HEAD	1	50 -000-26
50-67	GASKET, HEAD	1	50 -000-26



SOMARAKIS			
TOLERANCES EXCEPT AS NOTED	SV-808	INSTALLATION DRAWING	
DECIMAL	±	DRAWN BY	JTV
FRACTIONAL	±	SCALE	NONE
1/16"	±	DATE	5-5-92
ANGULAR	±	APPROVED	RZU
		REVISION	10E-000-4

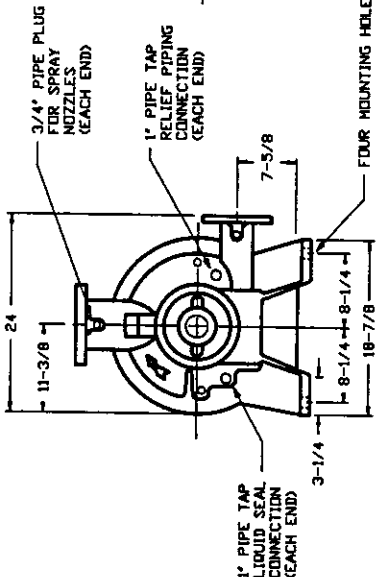
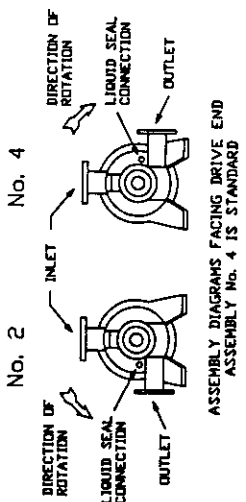
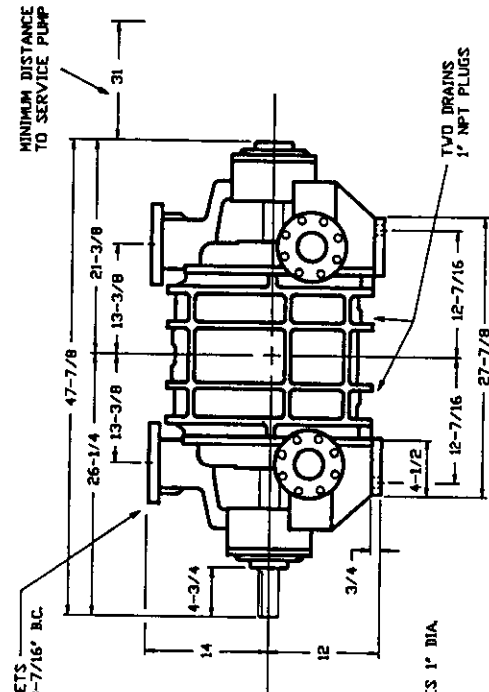
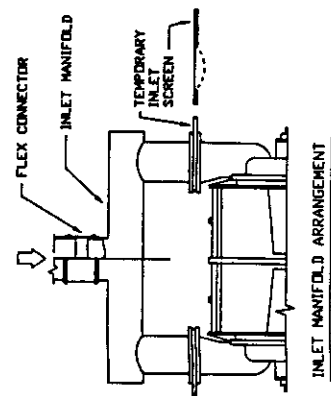


SOMARAKIS				
TOLERANCES EXCEPT AS NOTED	SV-1211	INSTALLATION DRAWING		
DECIMAL	DRAWN BY JTV	SCALE NONE	MATERIAL	
FRACTIONAL	APPROVED S.E. 7-1-91	DATE 7-1-91	DRAWING NUMBER	10F-000-4
ANGULAR		REVISED		



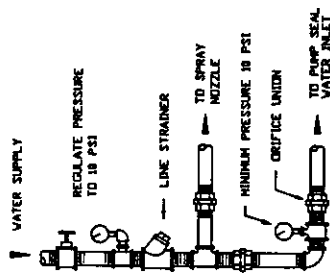
NET WEIGHT - 765 LBS

TOLERANCES UNLESS NOTED		SOMARAKIS			
DECIMAL	FRACTIONAL	ANGULAR	INCHES PER FEET	SV-1414 INSTALLATION DRAWING	MATERIAL
1/16"	1/16"	1/16"	1/16"	DRAWN BY JTV	SCALE NONE
				APPROVED 7/22/92	DATE 5-26-92
				REVISED	DRAWING NUMBER 10K-000-4

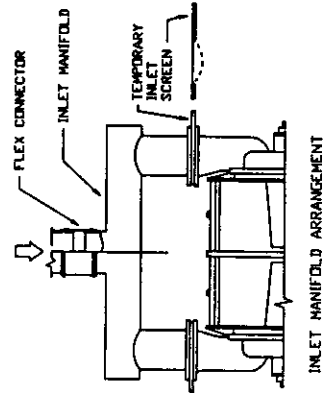
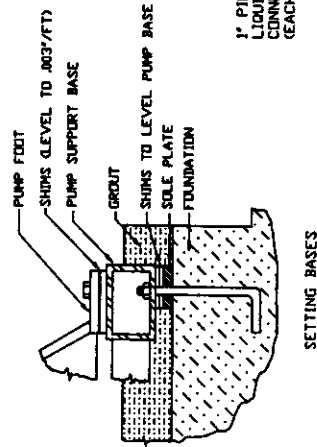
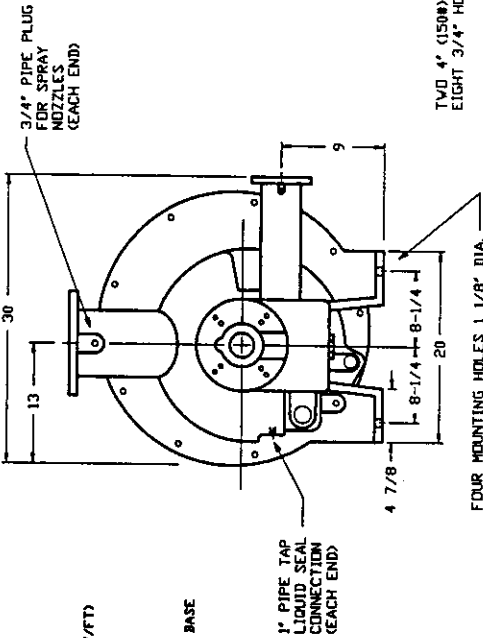
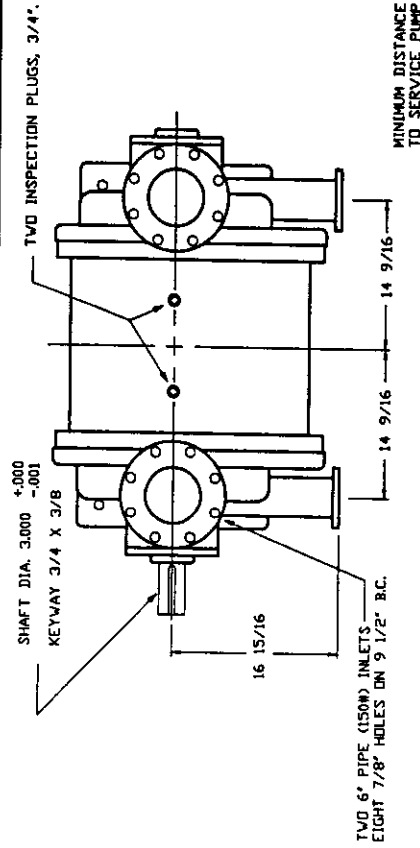
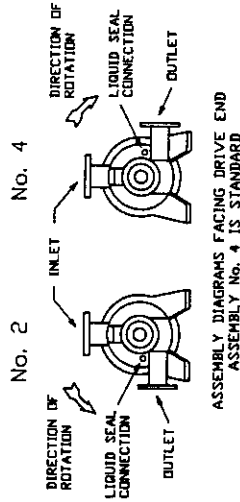


NET WEIGHT - 1300 lbs.
OPERATING WEIGHT - 1450 lbs.

TOLERANCES (EXCEPT AS NOTED)	SOMARAKIS				
DECIMAL	SV-1818				
FRACTIONAL	INSTALLATION DRAWING				
± 1/16"	DRAWN BY JTV	SCALE NONE	DATE 8-1-91	MATERIAL	
ANGULAR	APPROVED JTV	REVISED	DRAWING NUMBER		101-000-4
±					

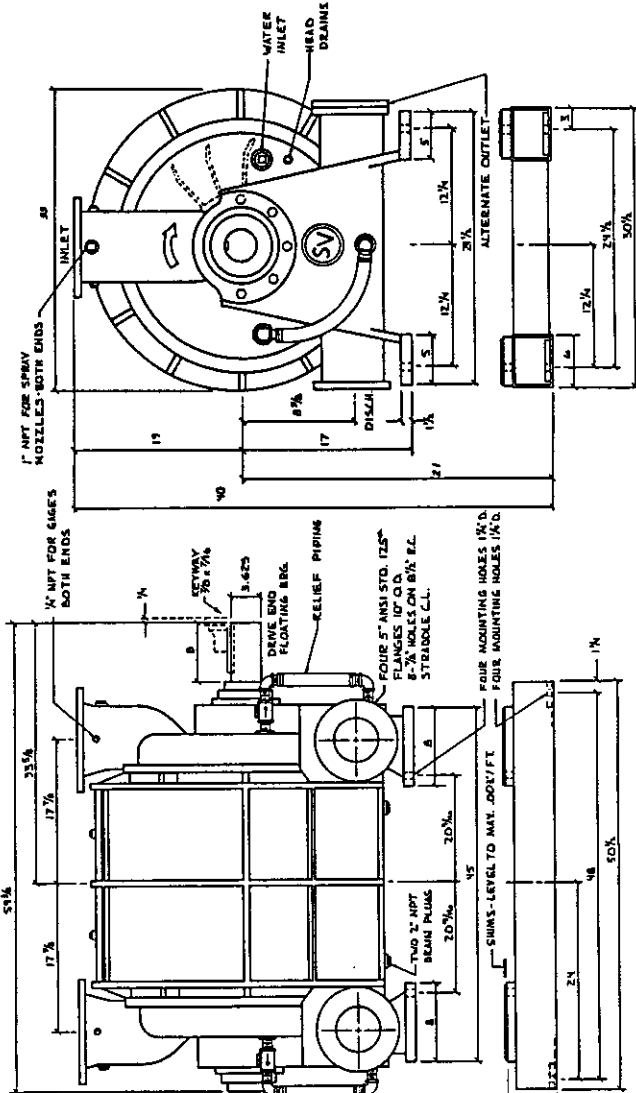
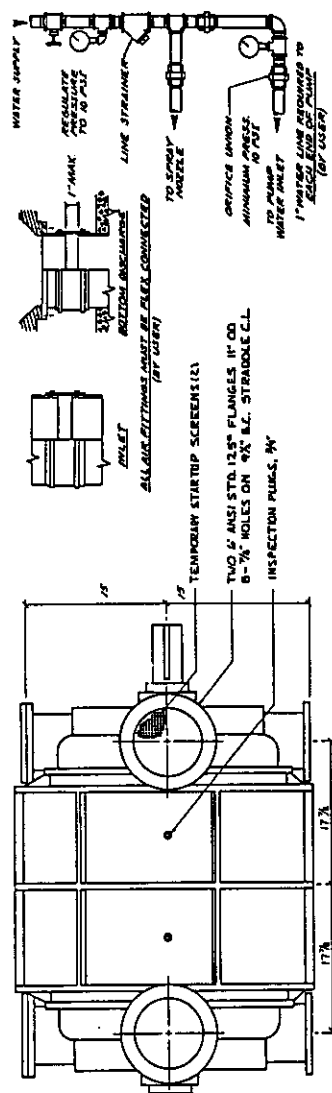


1" WATER LINE REQUIRED TO EACH END OF PUMP (BY USER)



NET WEIGHT - 2012 LBS

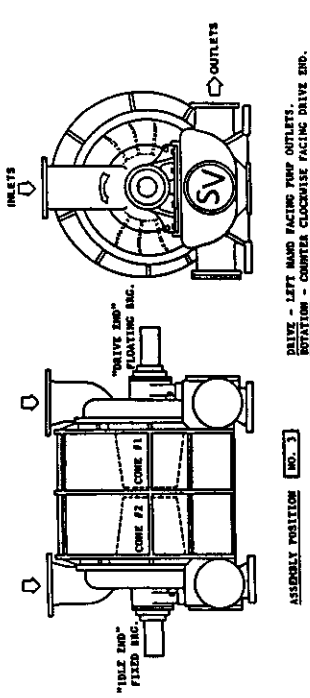
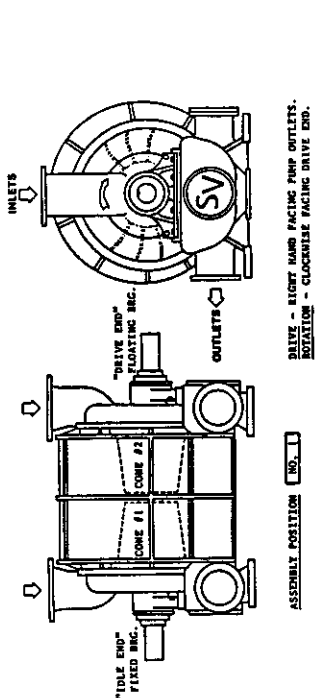
TOLERANCES UNLESS NOTED		SOMARAKIS			
DECIMAL	±	SV-2023			
FRACTIONAL	±	INSTALLATION DRAWING			
ANGULAR	±	DRAWN BY	SCALE	DATE	REVISION
		JTV	NONE	5-12-92	
		APPROVED			
		TCW			
					105-000-4



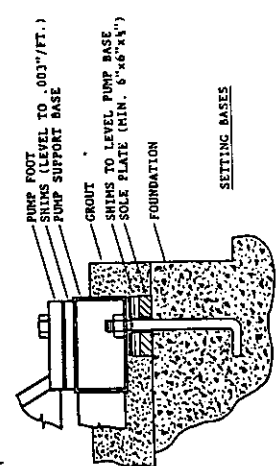
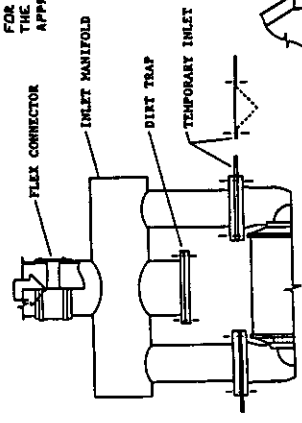
ALL DIMENSIONS ARE IN INCHES
ASSEMBLED PUMP WEIGHT 3150 POUNDS

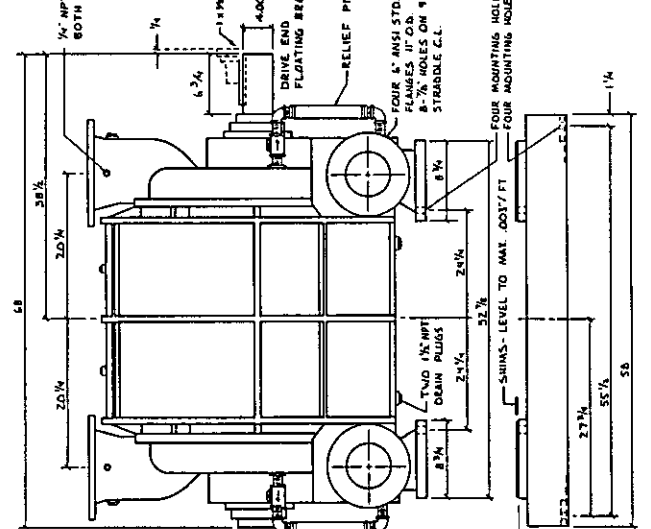
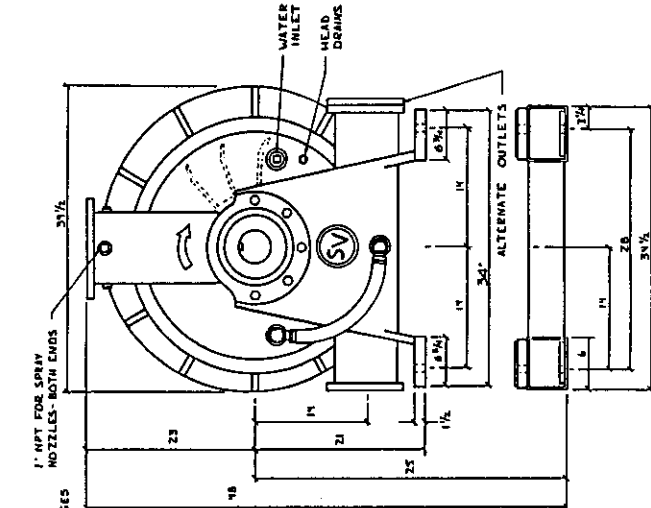
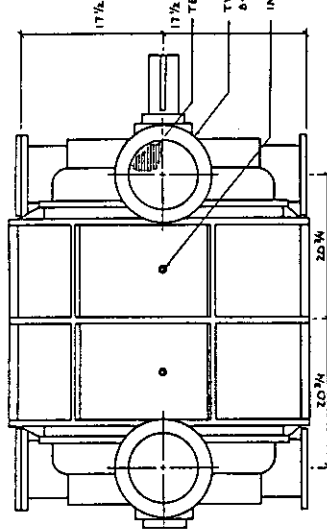
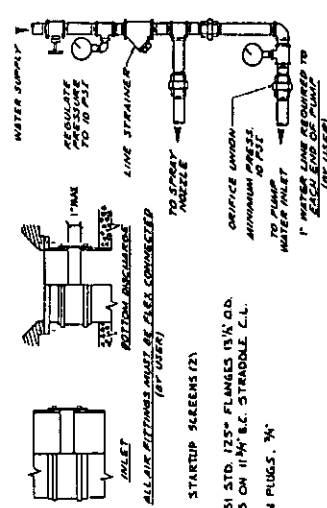
SOMARAKIS

SCALE: NONE	APPROVED BY:	DESIGN BY: AN
DATE: 8-18-88		REVISED: 4-9-91 J.V.
INSTALLATION DRAWING FOR SV VACUUM PUMPS AND COMPRESSORS		
PUMP MODEL SV-2533		
ASSEMBLY POSITION NO. 1		
DRAWING NUMBER		
SV-253310-1		



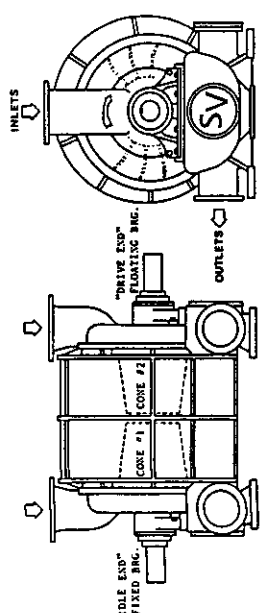
ASSEMBLY POSITION NO. 1 ILLUSTRATED.
FOR POSITION FURNISHED REFERENCE.
THE PUMP SERIAL NUMBER AND
APPROPRIATE ENGINEERING DATA SHEET.



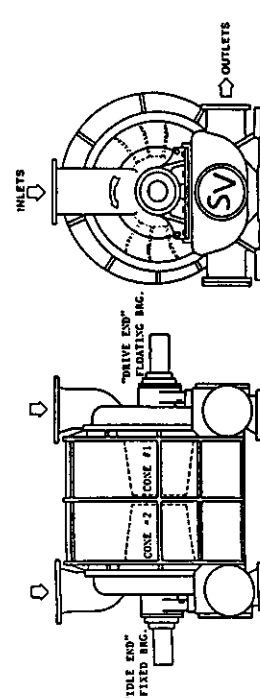


ALL DIMENSIONS ARE IN INCHES
ASSEMBLED PUMP WEIGHT 330 POUNDS

SOMARAKIS		DESIGNED BY	AM
		DATE	9-9-91
REVISION		REVISED	
DATE		9-9-91	
INSTALLATION: DRAWING FOR SV VACUUM PUMPS AND COMPRESSORS			
PUMP MODEL SV-3018			
ASSEMBLY POSITION NO. 1			
DRAWING NUMBER SV-3018D-1			



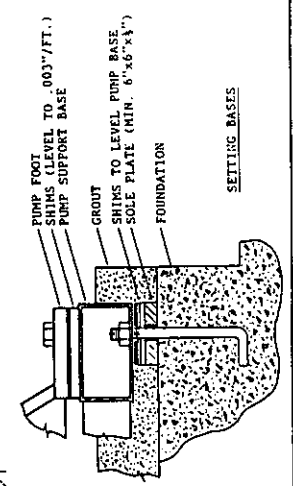
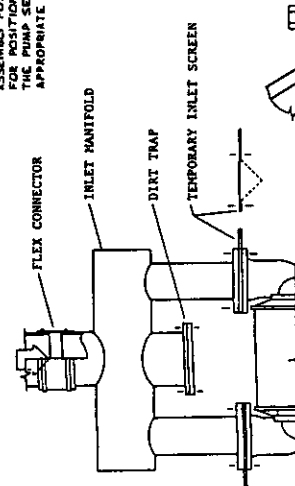
ASSEMBLY POSITION NO. 1



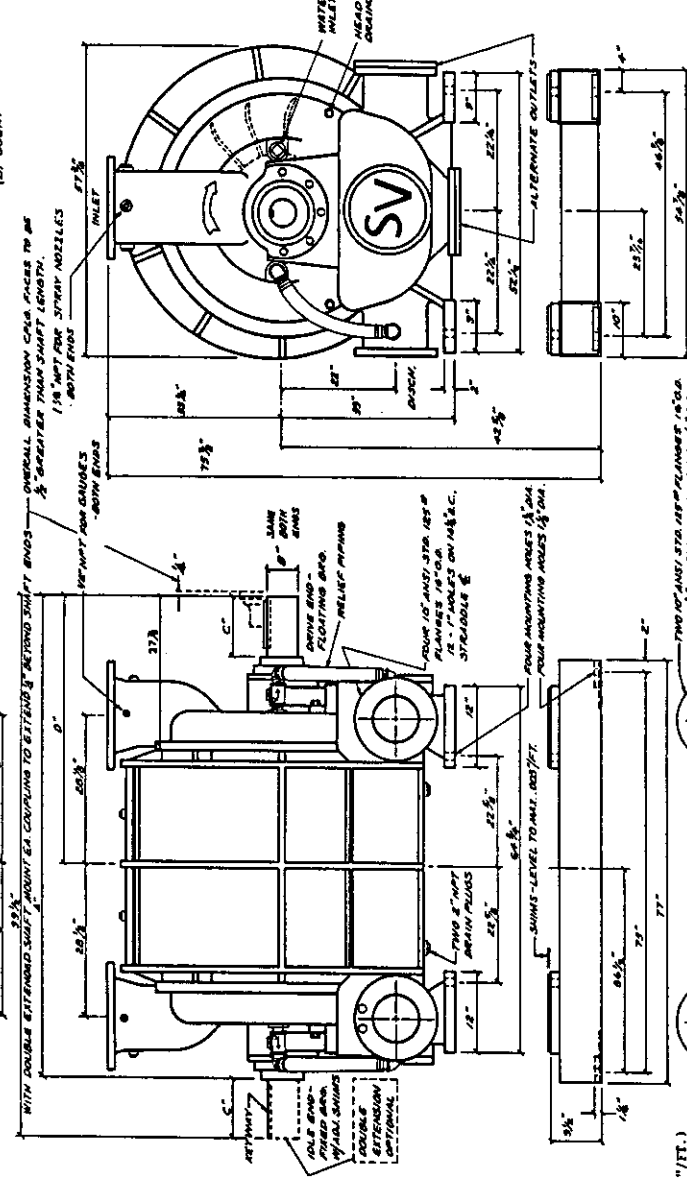
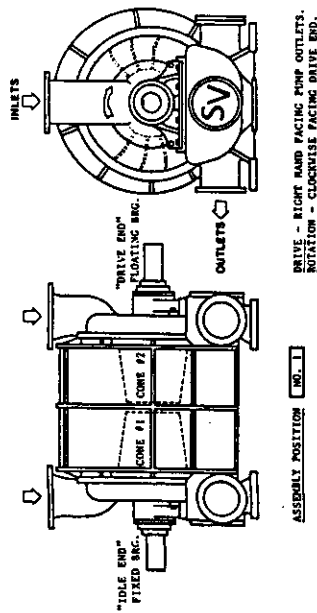
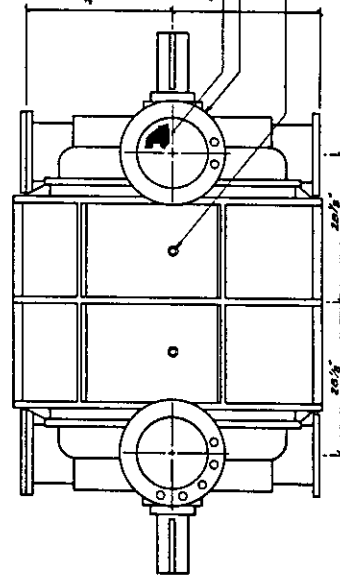
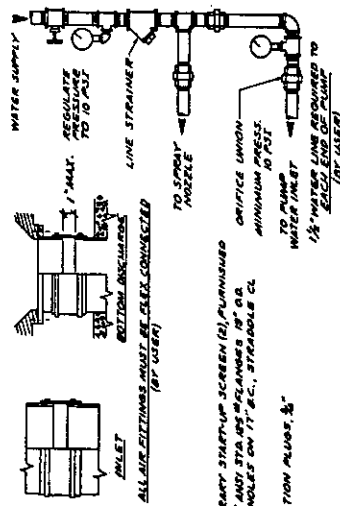
ASSEMBLY POSITION NO. 2

SV PUMP - ASSEMBLY POSITION ALTERNATES

ASSEMBLY POSITION NOT ILLUSTRATED FOR POSITION FURNISHED REFERENCE THE PUMP SERIAL NUMBER AND APPROPRIATE ENGINEERING DATA SHEET



SETTING BASES

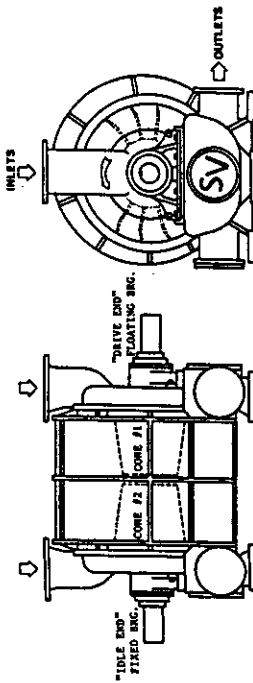


ALL DIMENSIONS ARE IN INCHES
ASSEMBLED PUMP WEIGHT 1400 POUNDS

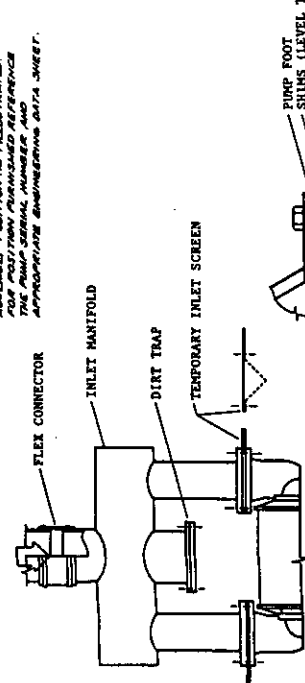
SOMARAKIS

SCALE: NONE	REVISED BY:	DATE: 5-2-85	DESIGNED BY: J. J. J.
INSTALLATION DRAWING FOR SV VACUUM PUMPS AND COMPRESSORS			
PUMP MODEL SV-4400			
ASSEMBLY POSITION NO. 1			
ISSUED FOR: 57-4400D-1			

UNIT	DRIVE	A	B	C	D	ASPT
EXTENSION	DRIVE	8 1/2"	17 1/2"	24"	30"	1 1/2"
SINGLE	DRIVE	8 1/2"	17 1/2"	24"	30"	1 1/2"
SINGLE	DRIVE	8 1/2"	17 1/2"	24"	30"	1 1/2"
DOUBLE	DRIVE	8 1/2"	17 1/2"	24"	30"	1 1/2"



SV PUMP - ASSEMBLY POSITION ALTERNATES
ASSEMBLY POSITION NO. 1 ILLUSTRATED
AND POSITIONING INFORMATION
THE PUMP SERIAL NUMBER AND
APPROPRIATE ENGINEERING DATA SHEET.



PUMP FOOT
SHIMS TO LEVEL TO .003"/FT.
PUMP SUPPORT BASE

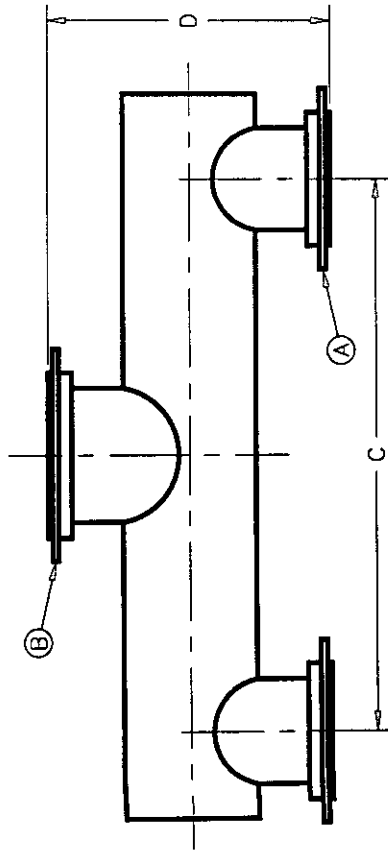
SHIMS TO LEVEL PUMP BASE
SOLE PLATE (MIN. 6" x 6" x 1/4")

FOUNDATION

SETTING BASES



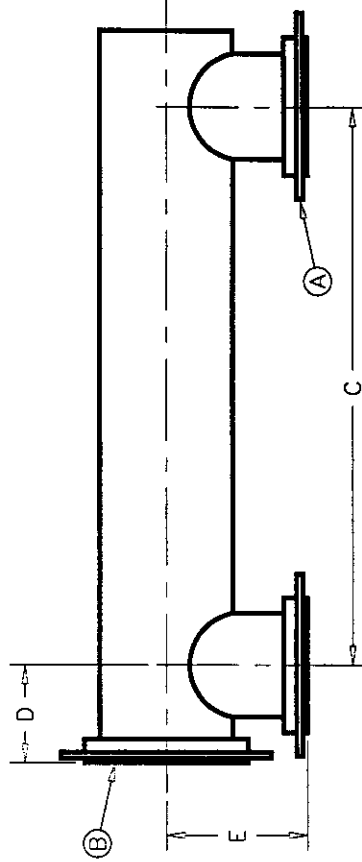
INLET MANIFOLD



MODEL	* FLANGE A	* FLANGE B	C	D
SV-0808	3" x 7½"	4" x 9"	12"	8"
SV-1211	3" x 7½"	4" x 9"	17½"	10"
SV-1414	4" x 9"	6" x 11"	21¼"	13"
SV-1818	5" x 10"	6" x 11"	26¾"	15"
SV-2023	6" x 11"	8" x 13½"	29½"	19"
SV-2523	6" x 11"	8" x 13½"	35¾"	19"
SV-3028	8" x 13½"	10" x 16"	40½"	22"
SV-3633	10" x 16"	12" x 19"	51¼"	24"
SV-4440	12" x 19"	16" x 23½"	56¾"	25"
SV-5348	14" x 21"	18" x 25"	61½"	32"
SV-5372	18" x 25"	24" x 32"	90"	42"

* NOM. x O.D.

DISCHARGE MANIFOLD



MODEL	* FLANGE A	* FLANGE B	C	D	E
SV-0808	2" x 6"	3" x 7½"	12"	5½"	4½"
SV-1211	2½" x 7"	4" x 9"	17½"	4½"	5½"
SV-1414	3" x 7½"	4" x 9"	21¼"	6½"	5½"
SV-1818	4" x 9"	6" x 11"	26¾"	8½"	8"
SV-2023	4" x 9"	6" x 11"	29½"	8"	8"
SV-2523	5" x 10"	6" x 11"	35¾"	8"	8"
SV-3028	6" x 11"	8" x 13½"	41½"	9"	9"
SV-3633	8" x 13½"	10" x 16"	50¼"	11"	11"
SV-4440	10" x 16"	12" x 19"	56¾"	12"	12"
SV-5348	12" x 19"	14" x 21"	61½"	14"	14"
SV-5372	14" x 21"	18" x 25"	90"	18"	18"

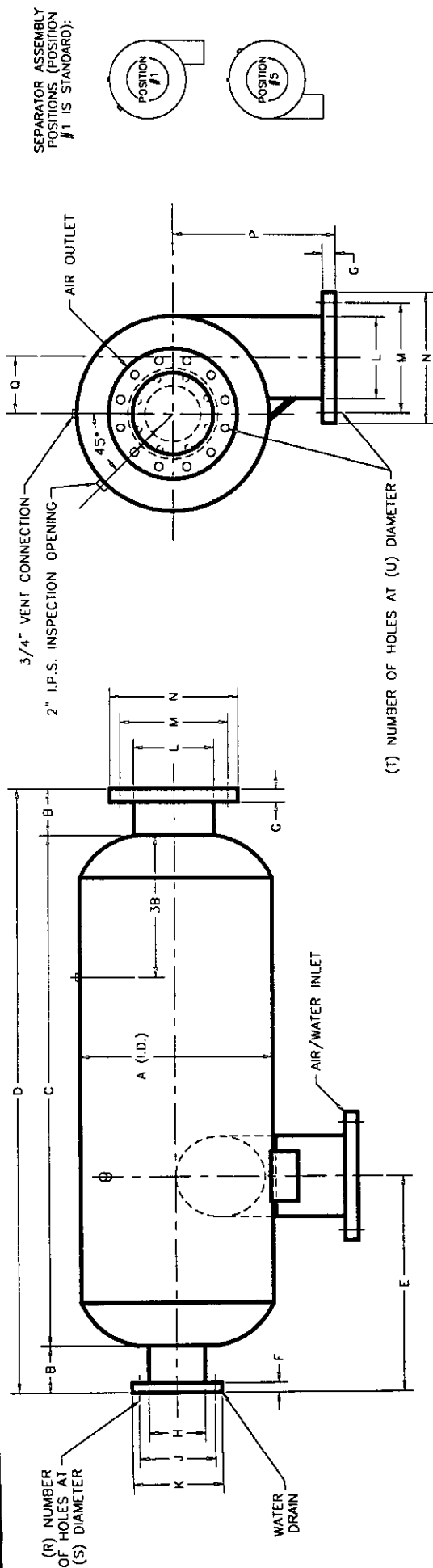
* NOM. x O.D.

SOMARAKIS VANCOUVER,
WA, U.S.A.

TITLE SV VACUUM PUMP AND
COMPRESSOR MANIFOLDS

DRAWN BY	CHECKED BY	DATE	SCALE
MRH	MRH	6/12/95	NONE
SHEET	SIZE	DRAWING NUMBER	REV.
1 OF 1	B	950-305	

NOTE:
ALL FLANGES ARE MADE UP OF STUB END PIPE
WITH STEEL BACKING FLANGES HAVING 150# DRILLING.

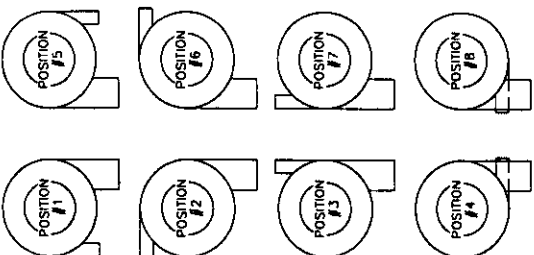
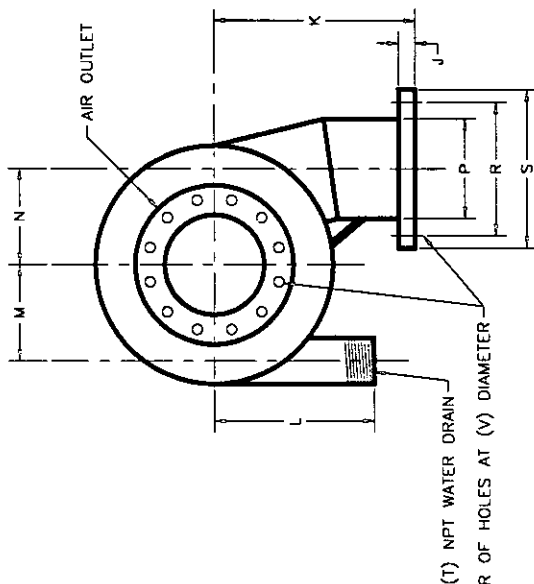
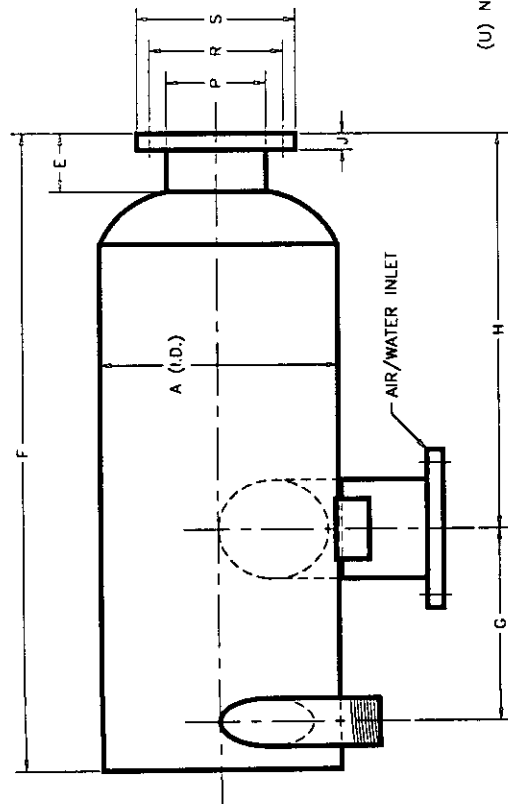


MODEL	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	WEIGHT
5	16.00	3.00	25.00	31.00	13.00	0.63	0.75	2.50	5.50	7.00	5.00	8.50	10.00	14.25	5.18	4	0.75	8	0.88	85
6	18.00	3.00	30.00	36.00	15.00	0.63	0.75	3.00	6.00	7.50	6.00	9.50	11.00	15.50	5.69	4	0.75	8	0.88	115
8	22.00	3.00	40.00	46.00	19.00	0.63	0.75	3.50	7.00	8.50	8.00	11.75	13.50	18.00	6.69	8	0.75	8	0.88	175
10	24.00	4.00	50.00	56.00	24.00	0.63	0.88	4.00	7.50	9.00	10.00	14.25	16.00	23.00	6.63	8	0.75	12	1.00	285
12	30.00	4.00	60.00	68.00	28.00	0.75	0.88	5.00	8.50	10.00	12.00	17.00	19.00	25.50	8.63	8	0.88	12	1.00	440
14	36.00	4.00	70.00	78.00	32.00	0.75	1.00	6.00	9.50	11.00	14.00	18.75	21.00	28.00	11.00	8	0.88	12	1.13	690
16	42.00	4.00	80.00	88.00	36.00	0.75	1.00	6.00	9.50	11.00	16.00	21.25	23.50	28.00	13.00	8	0.88	16	1.13	980
18	42.00	4.00	90.00	98.00	40.00	0.75	1.13	8.00	11.75	13.50	18.00	22.75	25.00	30.50	12.00	8	0.88	16	1.25	1165
20	48.00	4.00	100.00	108.00	44.00	0.75	1.13	8.00	11.75	13.50	20.00	25.00	27.50	33.00	14.00	8	0.88	20	1.25	1455
22	54.00	5.00	110.00	120.00	49.00	0.75	1.13	8.00	11.75	13.50	22.00	27.25	29.50	35.00	16.00	8	0.88	20	1.38	1770
24	60.00	5.00	120.00	130.00	53.00	0.88	1.13	10.00	14.25	16.00	24.00	29.50	32.00	38.00	18.00	12	1.00	20	1.38	2585
26	66.00	5.00	130.00	140.00	57.00	0.88	2.00	10.00	14.25	16.00	26.00	31.75	34.25	42.00	20.00	12	1.00	24	1.38	3025
28	72.00	5.00	140.00	150.00	61.00	0.88	2.00	10.00	14.25	16.00	28.00	34.00	36.50	45.00	22.00	12	1.00	28	1.38	3550
30	78.00	5.00	150.00	160.00	65.00	0.88	2.13	10.00	14.25	16.00	30.00	36.00	38.75	48.00	24.00	12	1.00	28	1.38	4300

SOMARAKIS VANCOUVER, WA, U.S.A.

TITLE				SVI-5 THRU SVI-30 INLET SEPARATORS			
DRAWN BY		CHECKED BY		DATE		SCALE	
MRH		TAS		8/1/93		NONE	
SHEET		SIZE		DRAWING NUMBER		REV.	
1 OF 1		B		950-000			

ALL DIMENSIONS ARE SHOWN IN INCHES.
INSTALL SEPARATOR IN VERTICAL POSITION
ONLY WITH WATER DRAIN POINTING DOWNWARD.



SEPARATOR ASSEMBLY POSITIONS (POSITION #1 IS STANDARD):

MODEL	A	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V	W	WEIGHT
3.5	12.00	2.81	30.00	8.88	18.00	N/A	12.00	7.00	4.75	5.50	3 NPT CONNECTION	7.50	9.00	2-1/2	N/A	N/A	60	
4	12.00	3.00	29.00	8.00	18.50	0.63	13.50	8.00	4.38	5.44	4.00	7.50	9.00	3	8	0.75	85	
5	16.00	3.50	35.00	10.50	21.50	0.75	14.50	9.00	6.38	7.31	5.00	8.50	10.00	3	8	0.88	130	
6	18.00	3.00	42.00	12.00	27.00	0.75	18.00	10.00	7.38	8.19	6.00	9.50	11.00	3	8	0.88	175	
8	22.00	3.50	52.00	17.00	32.00	0.75	21.50	12.00	9.50	9.94	8.00	11.75	13.50	3	8	0.88	285	
10	24.00	3.88	56.00	21.00	32.00	0.88	26.00	13.00	10.50	10.69	10.00	14.25	16.00	3	12	1.00	440	
12	30.00	4.00	69.00	25.00	40.50	0.88	31.50	16.00	13.00	13.44	12.00	17.00	19.00	4	12	1.00	685	
14	36.00	3.94	75.00	28.50	43.00	1.00	36.50	19.00	16.00	16.25	14.00	18.75	21.00	4	12	1.13	1390	
16	42.00	4.19	88.00	32.50	52.00	1.00	41.50	22.00	19.00	18.88	16.00	21.25	23.50	4	16	1.13	1860	
18	48.00	5.00	145.00	51.00	86.00	1.13	43.50	30.00	20.94	21.50	18.00	22.75	25.00	6	16	1.25	3500	
20	48.00	6.00	181.00	63.00	110.00	1.13	45.00	30.00	20.94	22.00	20.00	25.00	27.50	6	20	1.25	3900	
22	60.00	6.00	190.00	76.50	105.50	1.13	60.00	36.00	26.94	27.50	22.00	27.25	29.50	6	20	1.38	4150	
24	66.00	7.00	207.00	76.50	122.50	1.13	65.00	36.00	29.94	30.50	24.00	29.50	32.00	6	20	1.38	4500	

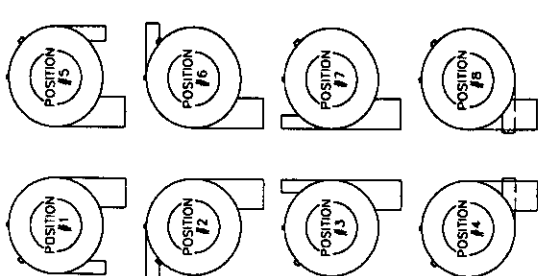
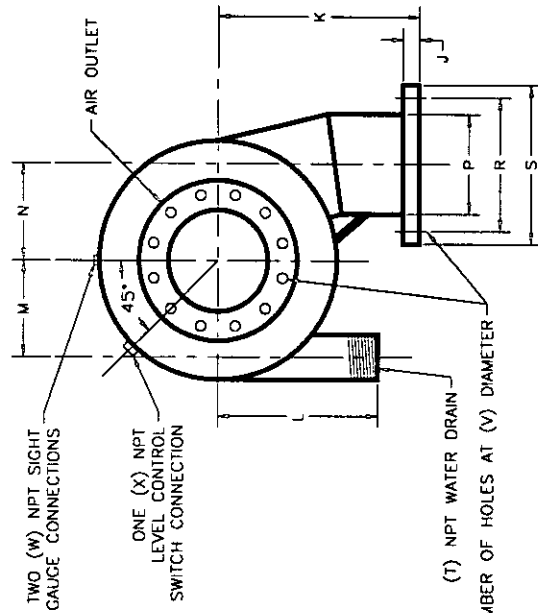
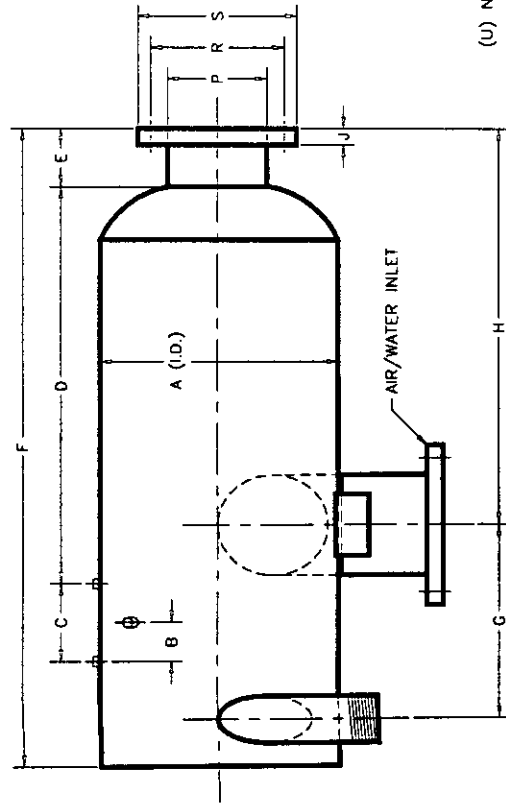
(U) NUMBER OF HOLES AT (V) DIAMETER

SOMARAKIS VANCOUVER, WA, U.S.A.

TITLE SVD-3.5 THRU SVD-24 DISCHARGE SEPARATORS

ALL DIMENSIONS ARE SHOWN IN INCHES.

DRAWN BY	CHECKED BY	DATE	SCALE
MRH	TAS	8/1/93	NONE
SHEET	SIZE	DRAWING NUMBER	REV.
1 OF 1	B	951-000	



SEPARATOR ASSEMBLY POSITIONS (POSITION #1 IS STANDARD):

MODEL	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V	W	X	WEIGHT
3.5	12.00	5.75	11.50	12.50	2.81	30.00	8.88	18.00	N/A	12.00	7.00	4.75	5.50	4.00	7.50	9.00	2-1/2	N/A	N/A	3/8	3/4	60
4	12.00	5.75	11.50	12.00	3.00	29.00	8.00	18.50	0.63	13.50	8.00	4.38	5.44	5.00	8.50	10.00	3	8	0.75	3/8	3/4	85
5	16.00	5.75	11.50	17.00	3.50	35.00	10.50	21.50	0.75	14.50	9.00	5.38	7.31	6.00	9.50	11.00	3	8	0.88	3/8	3/4	130
6	18.00	6.75	13.50	22.50	3.00	42.00	12.00	27.00	0.75	18.00	10.00	7.38	8.19	6.00	9.50	11.00	3	8	0.88	1/2	3/4	175
8	22.00	6.75	13.50	32.00	3.50	52.00	17.00	32.00	0.75	21.50	12.00	9.50	9.94	8.00	11.75	13.50	3	8	0.88	1/2	3/4	285
10	24.00	6.75	13.50	34.00	3.88	58.00	21.00	32.00	0.88	26.00	13.00	10.50	10.68	10.00	14.25	16.00	3	12	1.00	1/2	3/4	440
12	30.00	9.00	18.00	35.00	4.00	69.00	25.00	40.50	0.88	31.50	16.00	13.00	13.44	12.00	17.00	19.00	4	12	1.00	3/4	3/4	685
14	36.00	9.00	18.00	41.00	3.94	75.00	28.50	43.00	1.00	36.50	19.00	16.00	16.25	14.00	18.75	21.00	4	12	1.13	3/4	3/4	1390
16	42.00	9.00	18.00	54.00	4.19	88.00	37.50	52.00	1.00	41.50	22.00	19.00	18.88	16.00	21.25	23.50	4	16	1.13	3/4	3/4	1860
18	48.00	9.00	18.00	104.00	5.00	145.00	51.00	86.00	1.13	43.50	30.00	20.94	21.50	18.00	22.75	25.00	6	16	1.25	3/4	3/4	3500
20	48.00	9.00	18.00	139.00	6.00	181.00	63.00	110.00	1.13	45.00	30.00	20.94	22.00	20.00	25.00	27.50	6	20	1.25	3/4	3/4	3900
22	60.00	9.00	18.00	148.00	6.00	190.00	76.50	105.50	1.13	60.00	36.00	26.94	27.50	22.00	27.25	29.50	6	20	1.38	3/4	3/4	4150
24	66.00	9.00	18.00	164.00	7.00	207.00	76.50	122.50	1.13	65.00	36.00	29.94	30.50	24.00	29.50	32.00	6	20	1.38	3/4	3/4	4500

SOMARAKIS VANCOUVER, WA, U.S.A.

TITLE

SVDC-3.5 THRU SVDC-24 ASME CODE DISCHARGE SEPARATORS

DRAWN BY

MRH

CHECKED BY

TAS

DATE

8/1/93

SCALE

NONE

SHEET

1 OF 1

SIZE

B

DRAWING NUMBER

952-000

REV.

ALL DIMENSIONS ARE SHOWN IN INCHES.

SIGHT GAUGE AND LEVEL CONTROL SWITCH ARE NOT FURNISHED UNLESS SPECIFICALLY NOTED OTHERWISE.

ALL ASME CODE PRESSURE VESSELS (SOMARAKIS MODEL SVDC) ARE RATED AT 50 PSIG AT 250° F. UNLESS NOTED OTHERWISE.

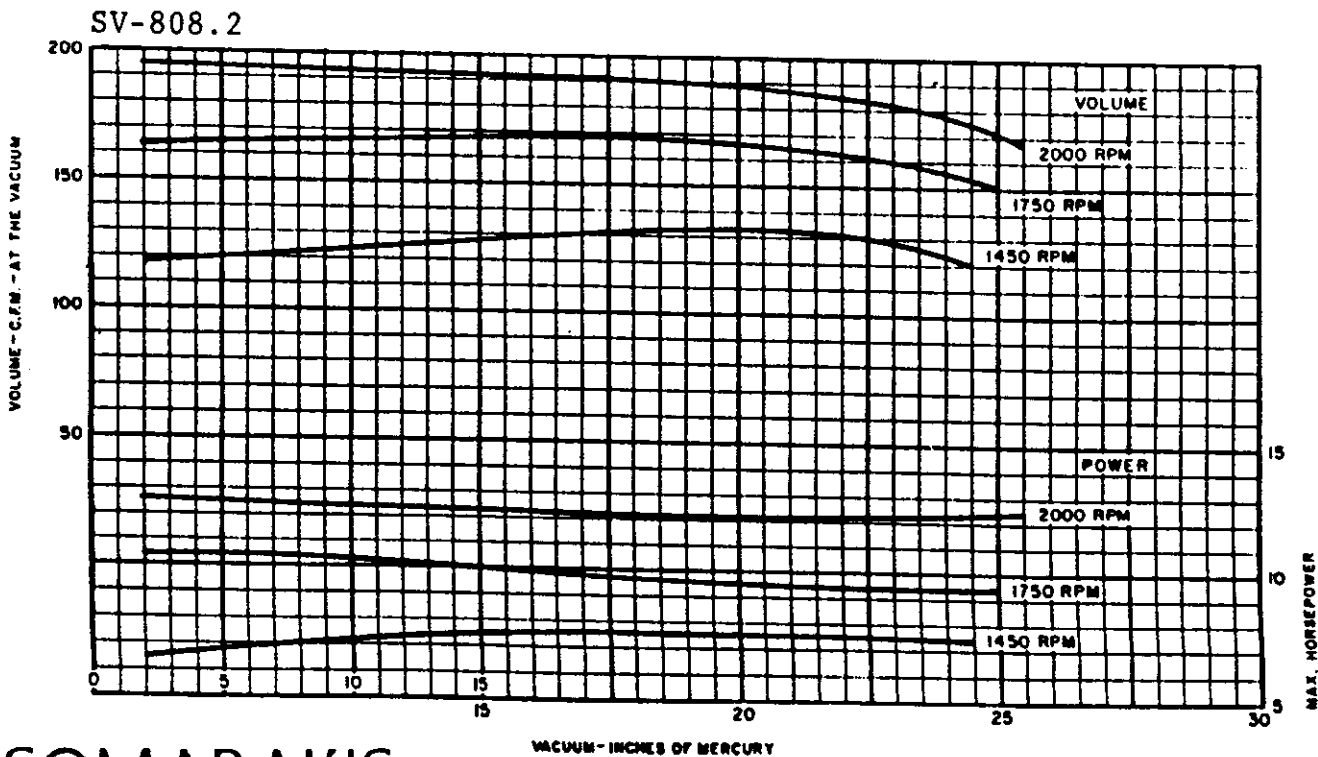
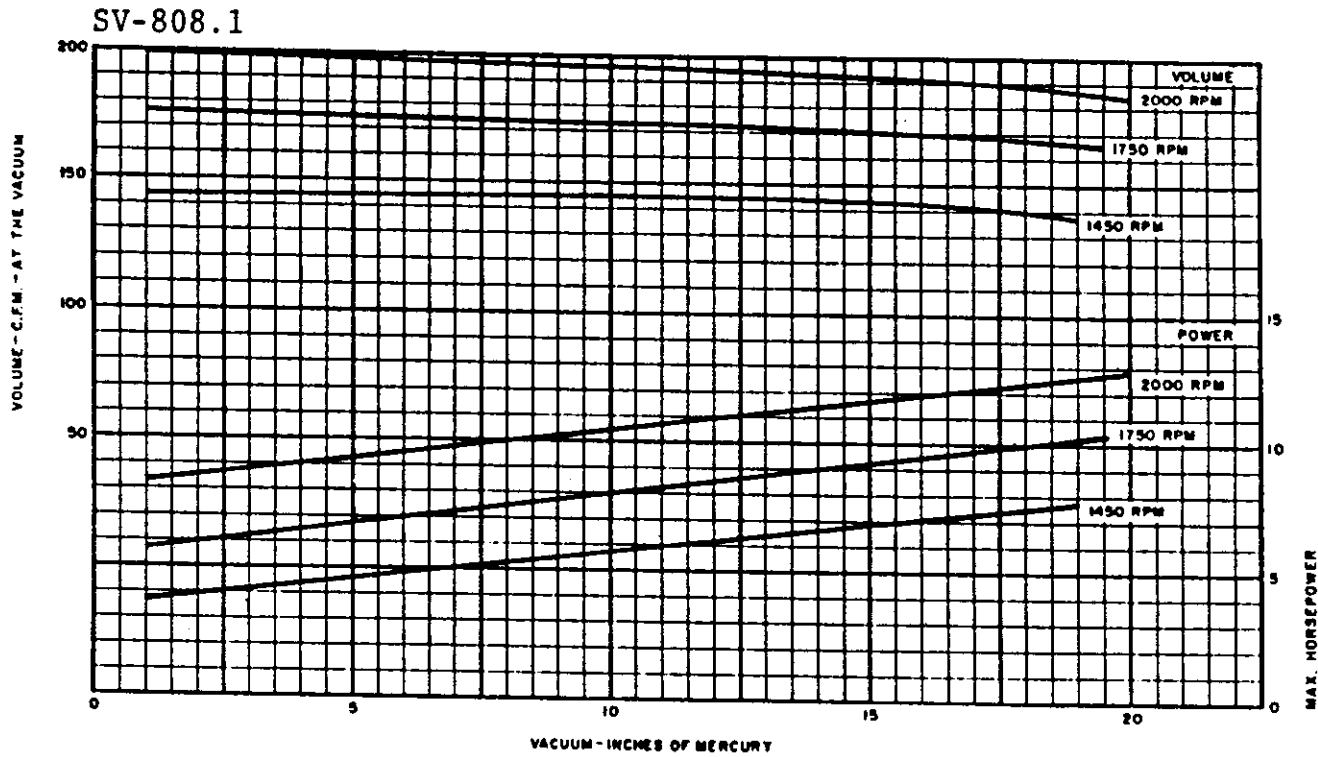
STANDARD PERFORMANCE OF SV VACUUM PUMP: TEST DATES _____

MODEL NO. SV-808.1 SERIAL NOS. _____

30" Hg BAROMETER - 60°F SEAL WATER IN JOB NOS. _____

SEAL WATER REQUIREMENTS						
VACUUM - " Hg	5	10	15	20		
VOLUME - GPM	3	3	4	5		

PUMP NAMEPLATE	
SPEED - RPM	ALL
VACUUM - " Hg	ALL



SOMARAKIS

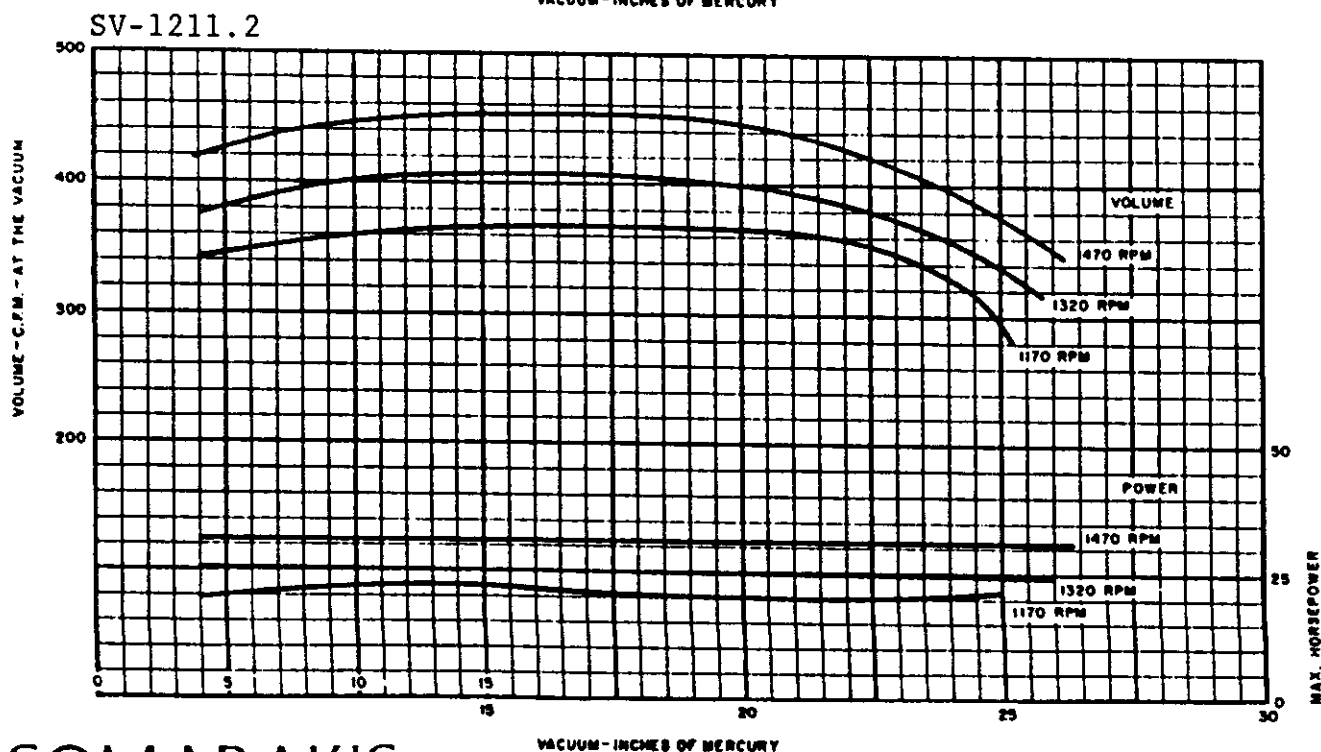
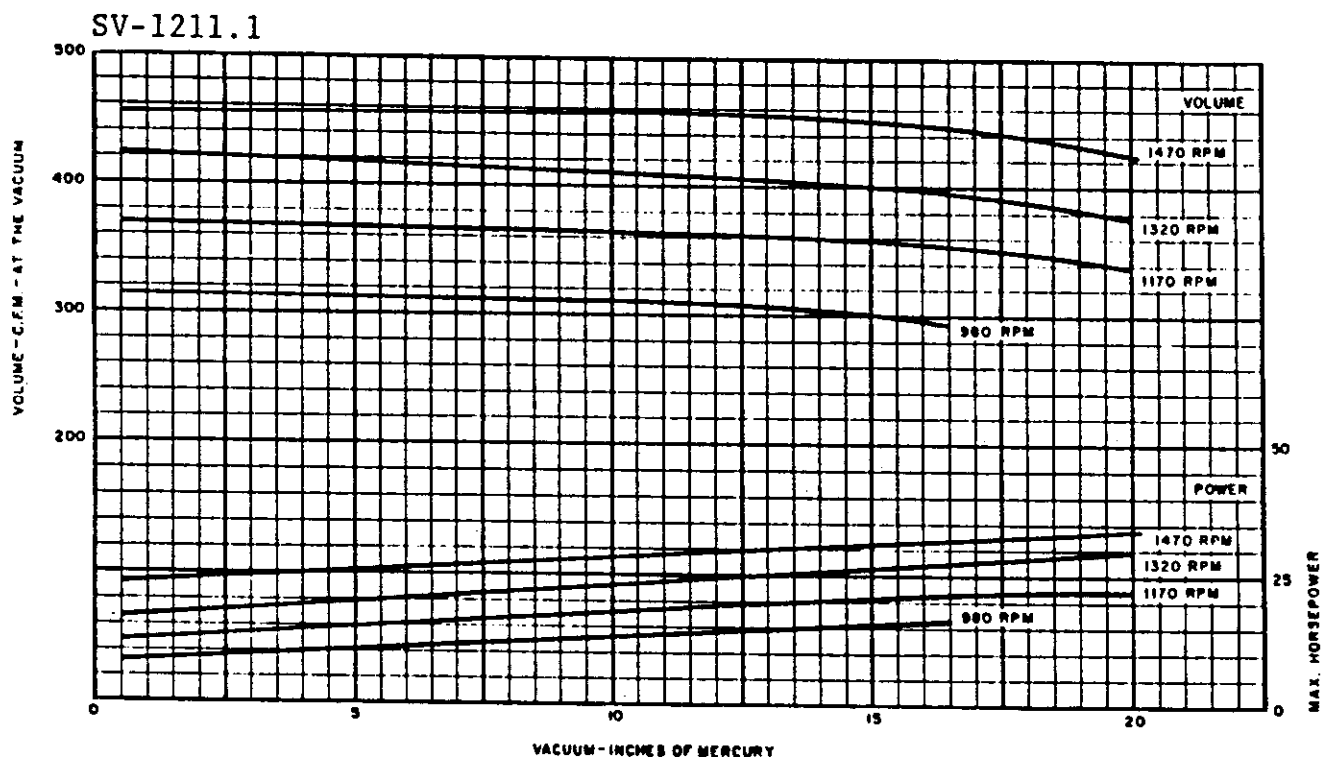
STANDARD PERFORMANCE OF SV VACUUM PUMP: TEST DATES _____

MODEL NO. SV-1211.1 SERIAL NOS. _____

30" Hg BAROMETER - 60°F SEAL WATER IN JOB NOS. _____

SEAL WATER REQUIREMENTS						
VACUUM - " Hg	5	10	15	20		
VOLUME - GPM	4	4	5	8		

PUMP NAMEPLATE	
SPEED - RPM	ALL
VACUUM - " Hg	ALL

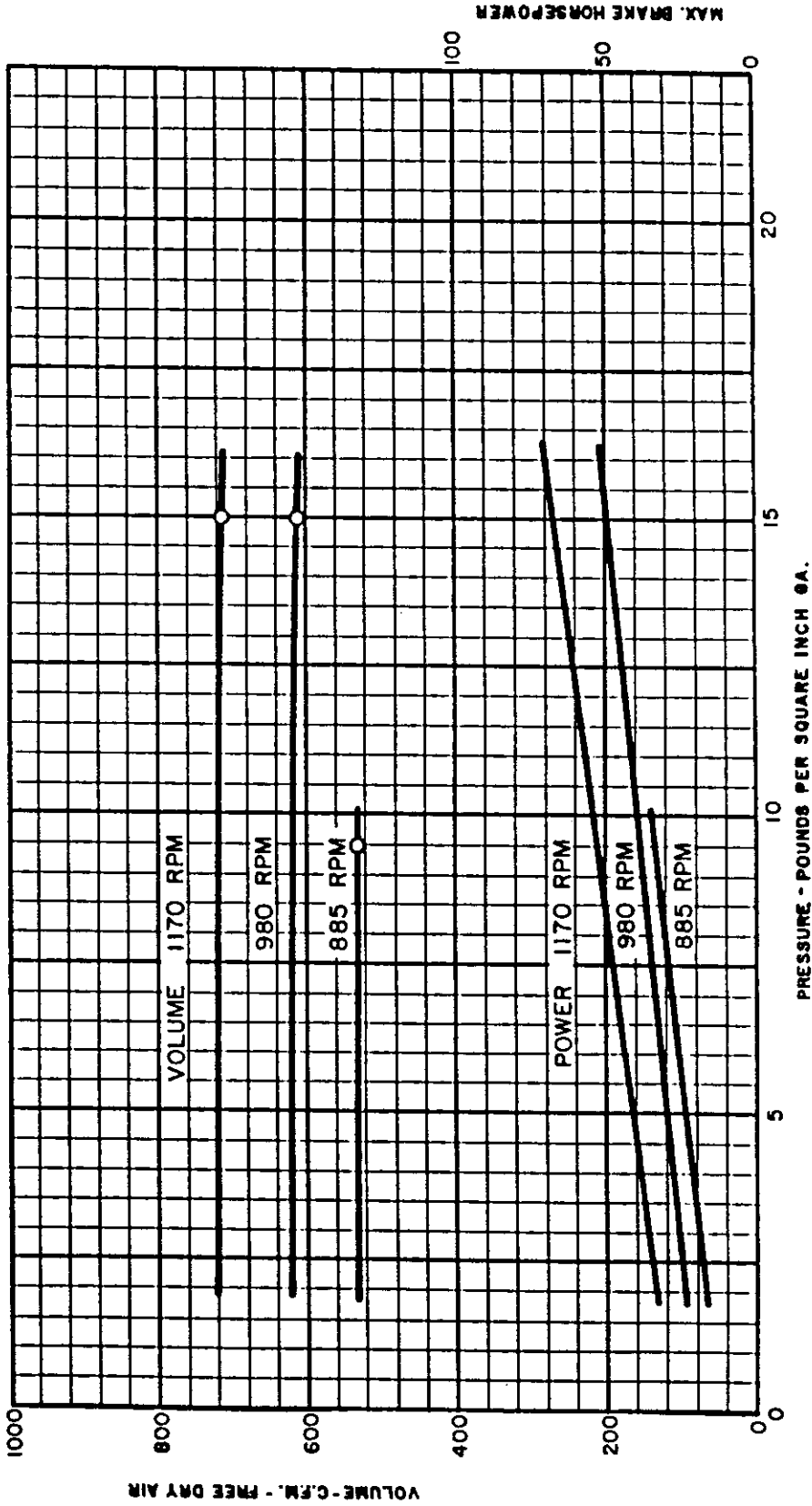


SOMARAKIS

STANDARD PERFORMANCE OF SV COMPRESSOR: TEST DATES _____
 MODEL NO. SV-1414.1 SERIAL NOS. _____
 30" Hg BAROMETER - 60°F SEAL WATER IN JOB NOS. _____

SEAL WATER REQUIREMENTS AT 20 PSIG SUPPLY				
GPM SEAL WATER	10	12	15	17
BHP	40	50	60	70

PUMP NAMEPLATE	
SPEED - RPM	
PRESS. - PSIG	



STANDARD PERFORMANCE OF SV VACUUM PUMP: TEST DATES _____

MODEL NO. SV-1414.2 SERIAL NOS. _____

30" Hg BAROMETER - 60°F SEAL WATER IN JOB NOS. _____

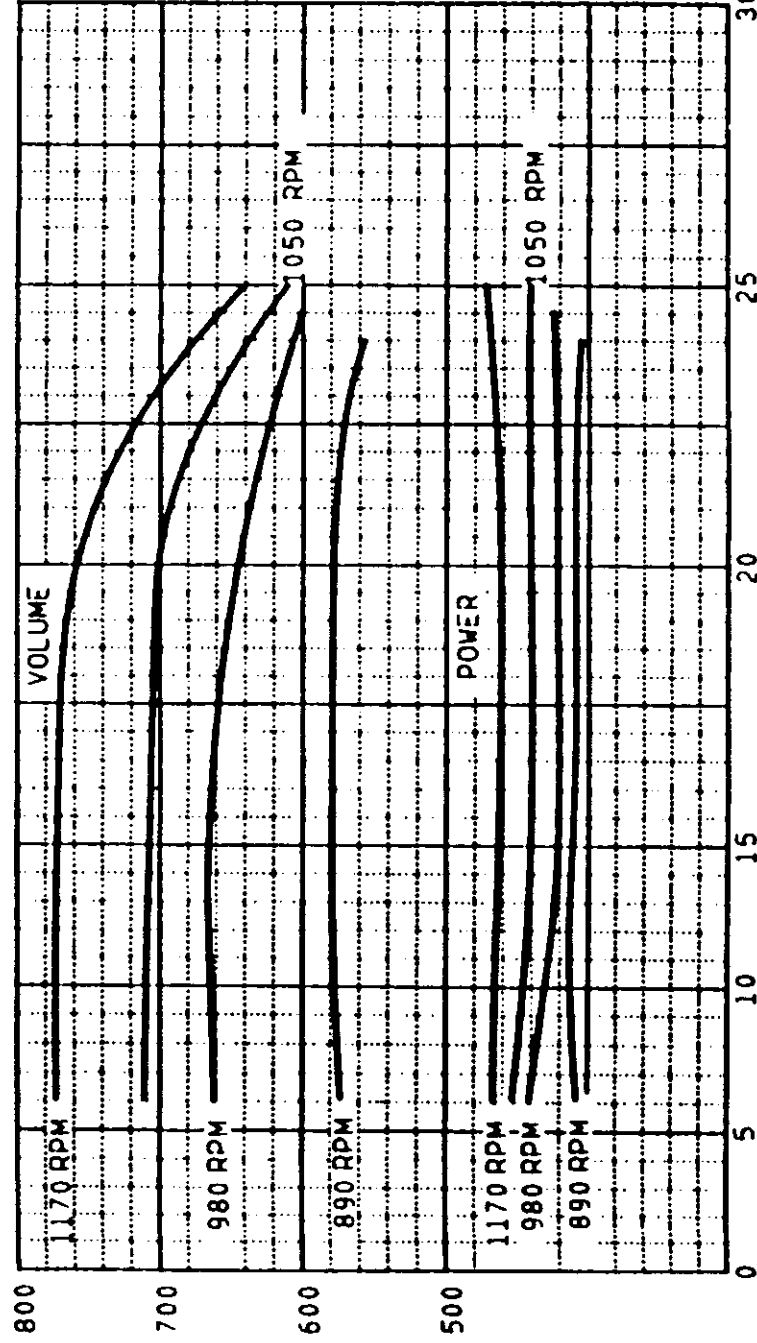
SEAL WATER REQUIREMENTS

VACUUM - " Hg	10	15	20
VOLUME - GPM	8	9	10

PUMP NAMEPLATE

SPEED - RPM
VACUUM - " Hg

VOLUME - C.F.M. AT THE VACUUM



VACUUM - INCHES OF MERCURY

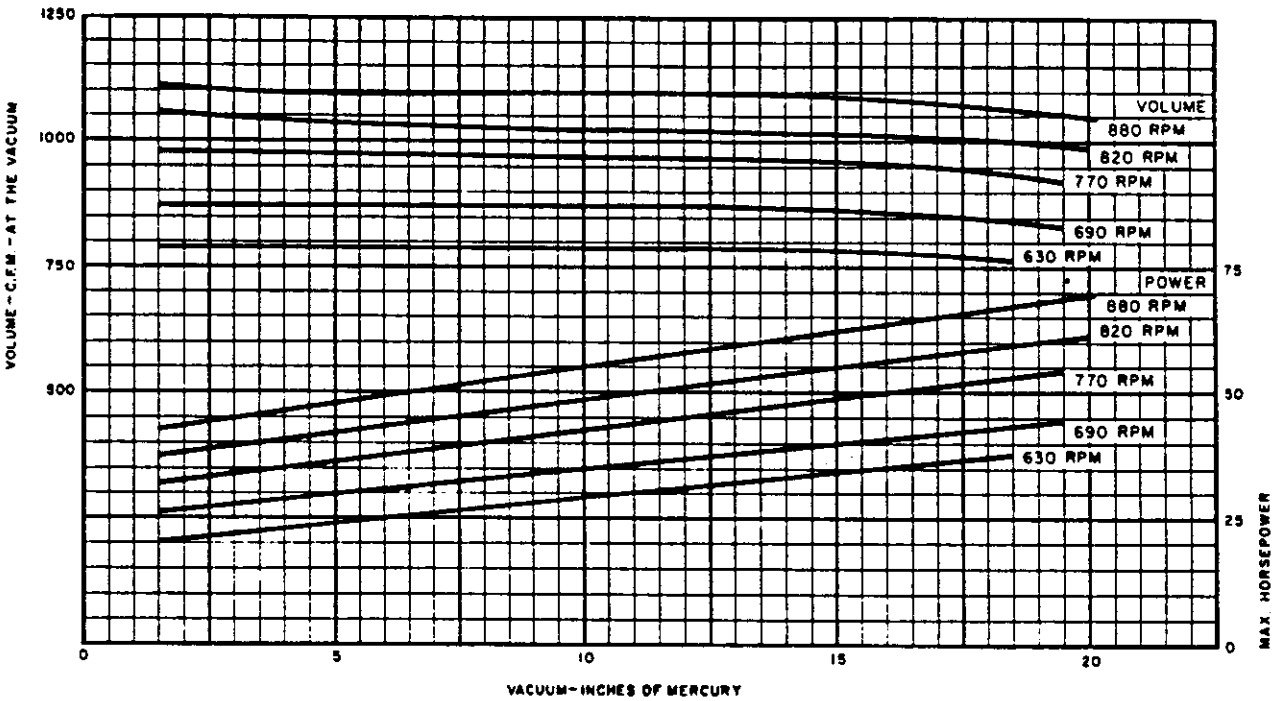
SOMARAKIS

STANDARD PERFORMANCE OF SV VACUUM PUMP: TEST DATES _____	
SV-1818.1	
MODEL NO. <u>SV-1818.2</u>	SERIAL NOS. _____
30" Hg BAROMETER - 60°F SEAL WATER IN JOB NOS. _____	

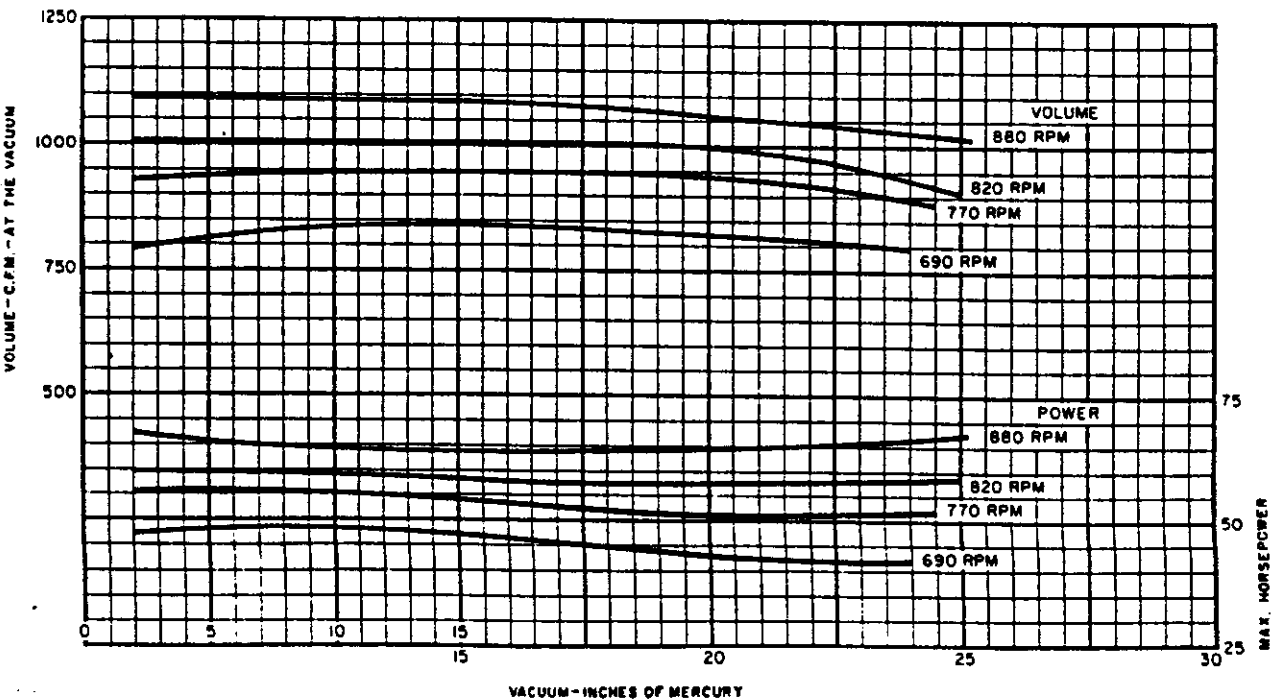
SEAL WATER REQUIREMENTS					
VACUUM - " Hg	5	10	15	20	24
VOLUME - GPM	6	8	10	12	18

PUMP NAMEPLATE	
SPEED - RPM	ALL
VACUUM - " Hg	ALL

SV-1818.1



SV-1818.2



STANDARD PERFORMANCE OF SV VACUUM PUMP: TEST DATES _____

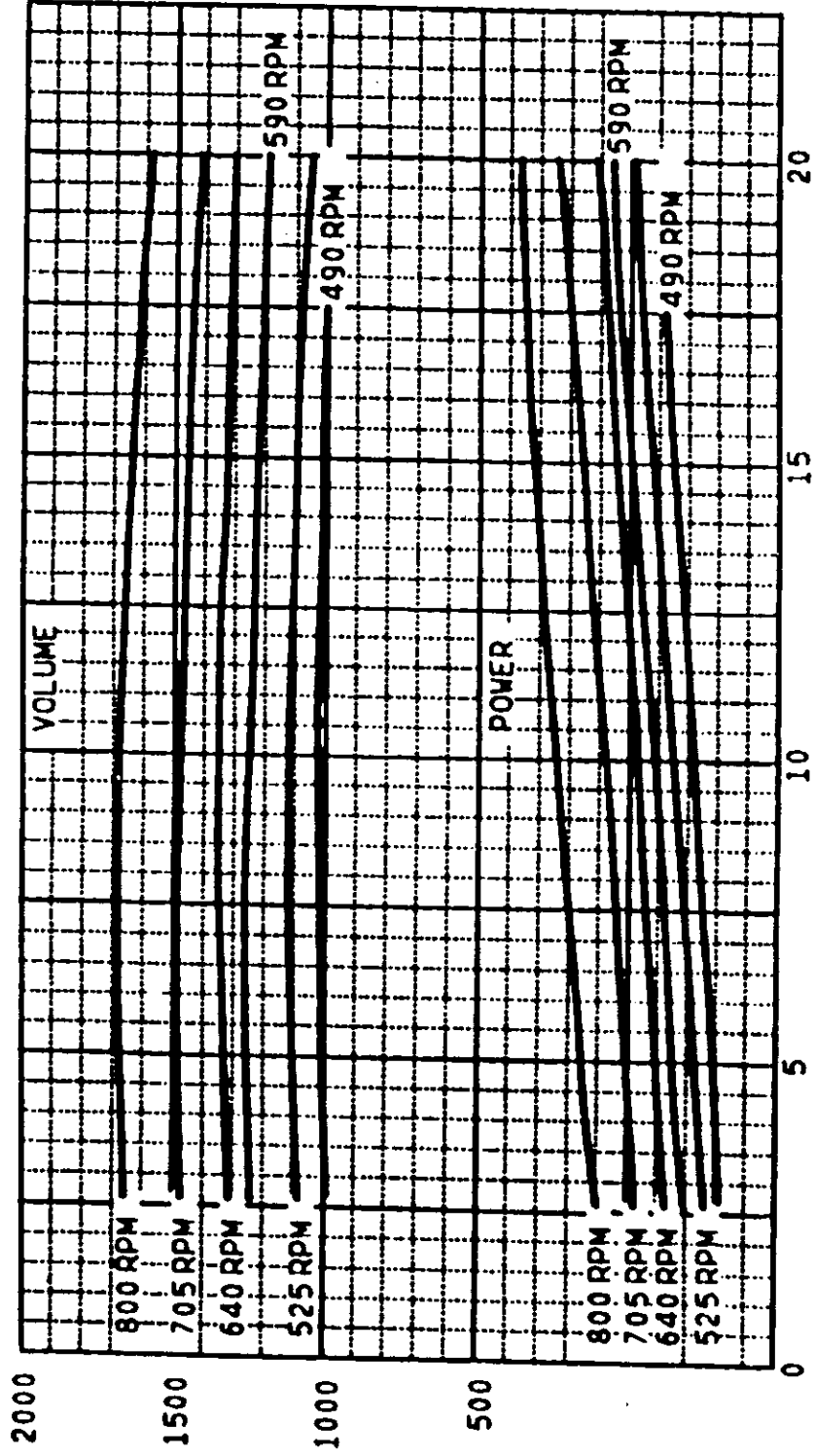
MODEL NO. SV-2023.1 SERIAL NOS. _____

30" Hg BAROMETER - 60°F SEAL WATER IN JOB NOS. _____

SEAL WATER REQUIREMENTS				
VACUUM - " Hg	5	10	15	
VOLUME - GPM	6	8	11	

PUMP NAMEPLATE	
SPEED - RPM	
VACUUM - " Hg	

VOLUME - C.F.M. AT THE VACUUM



HORSEPOWER

100

50

0

20

15

10

5

VACUUM - INCHES OF MERCURY

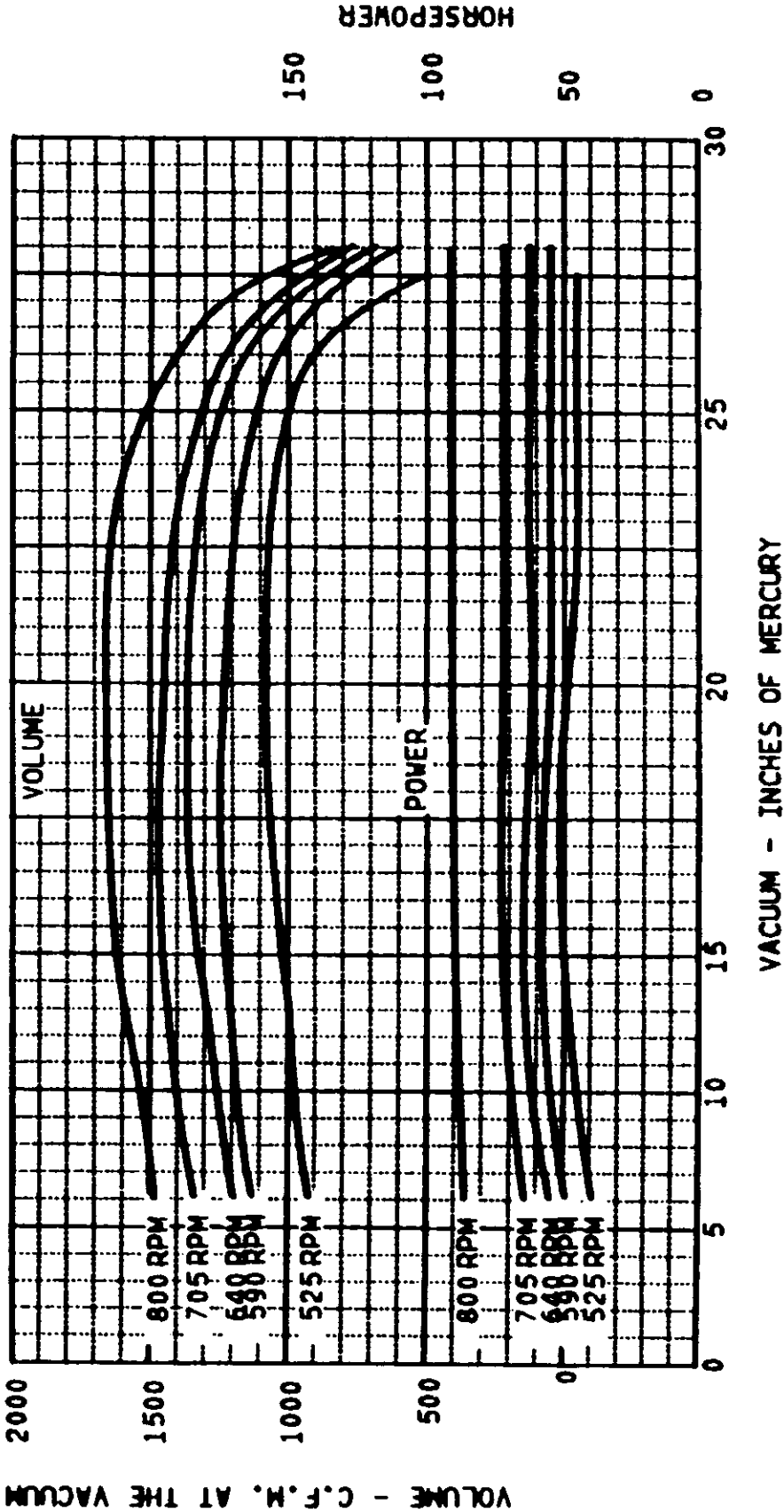
SOMARAKIS

STANDARD PERFORMANCE OF SV VACUUM PUMP: TEST DATES

MODEL NO. SV-2023.2 SERIAL NOS.

30" Hg BAROMETER - 60°F SEAL WATER IN JOB NOS.

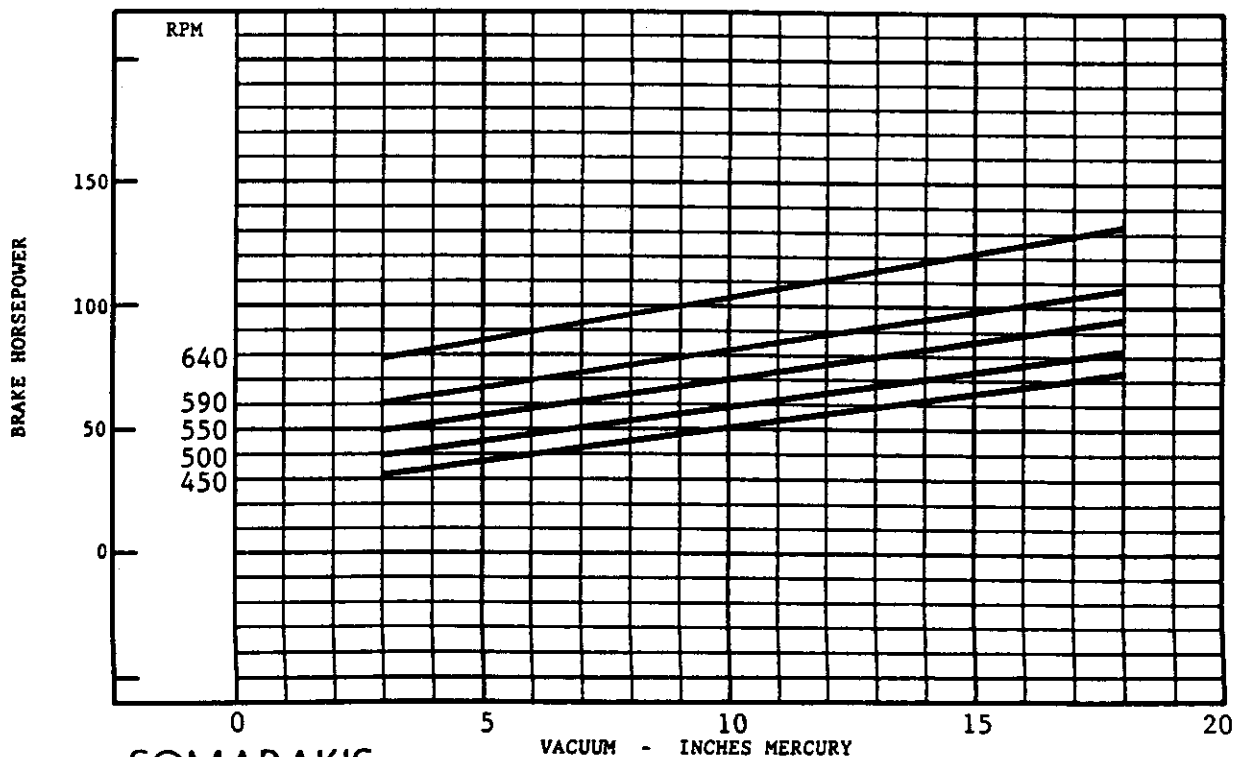
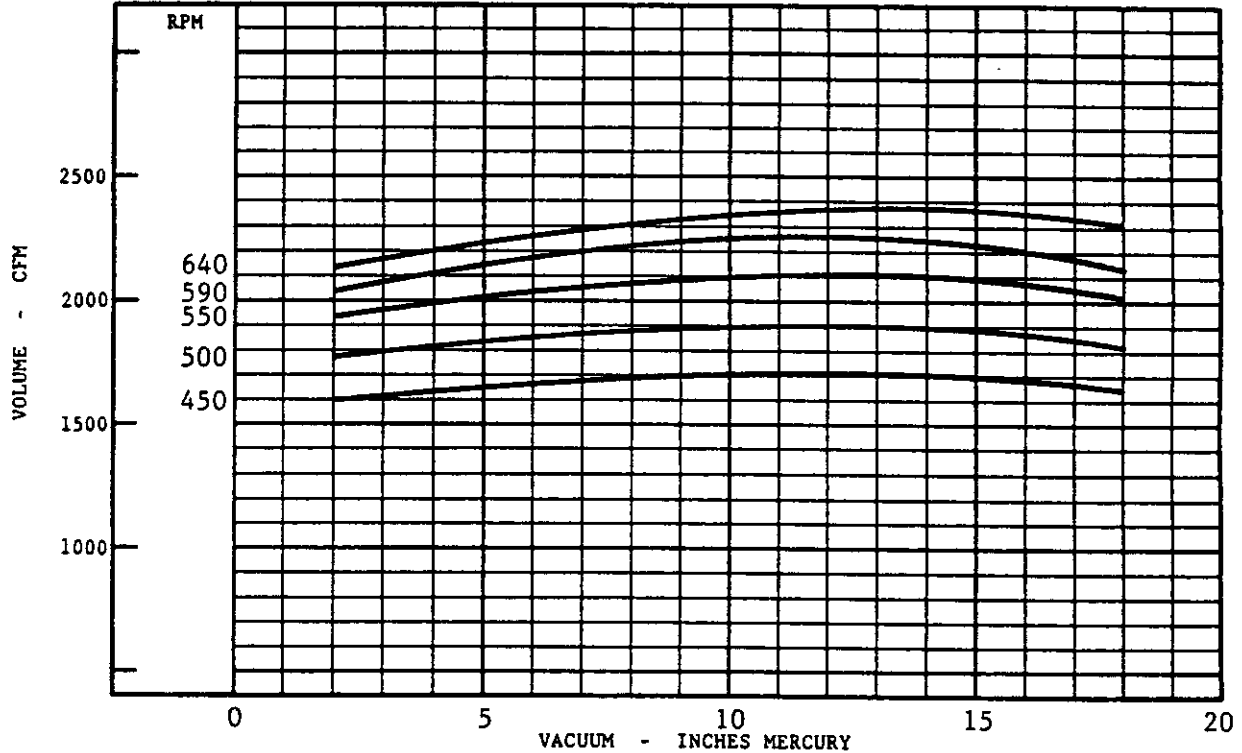
SEAL WATER REQUIREMENTS		PUMP NAMEPLATE	
VACUUM - " Hg	10 15 20	SPEED - RPM	
VOLUME - GPM	10 12 16	VACUUM - " Hg	



STANDARD PERFORMANCE OF Sv VACUUM PUMP: TEST DATES _____
 MODEL NO. SV-2523-1 SERIAL NOS. _____
 30" Hg BAROMETER - 60°F SEAL WATER IN JOB NOS. _____

SEAL WATER REQUIREMENTS						
VACUUM - " Hg	5	10	15			
VOLUME - GPM	10	10	12			

PUMP NAMEPLATE	
SPEED - RPM	
VACUUM - " Hg	



SOMARAKIS

STANDARD PERFORMANCE OF SV VACUUM PUMP: TEST DATES _____

MODEL NO. SV-2523-2 SERIAL NOS. _____

30" Hg BAROMETER - 60°F SEAL WATER IN JOB NOS. _____

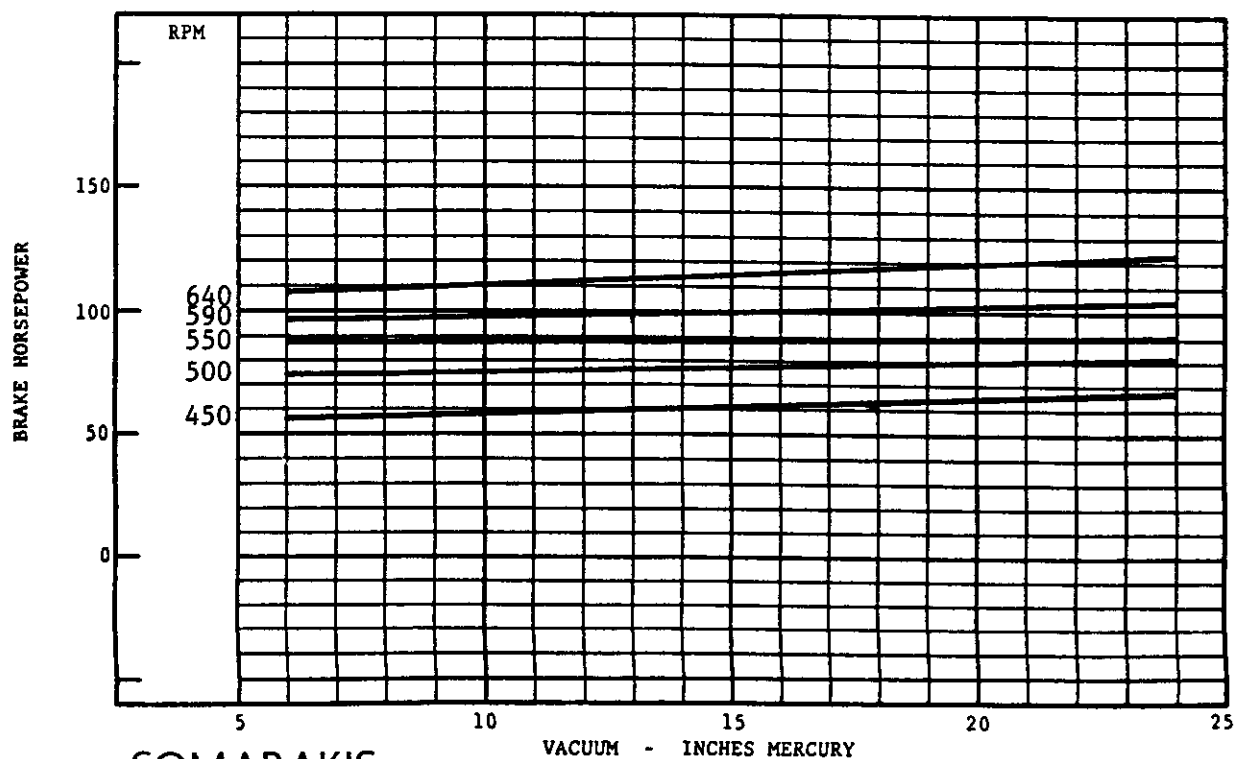
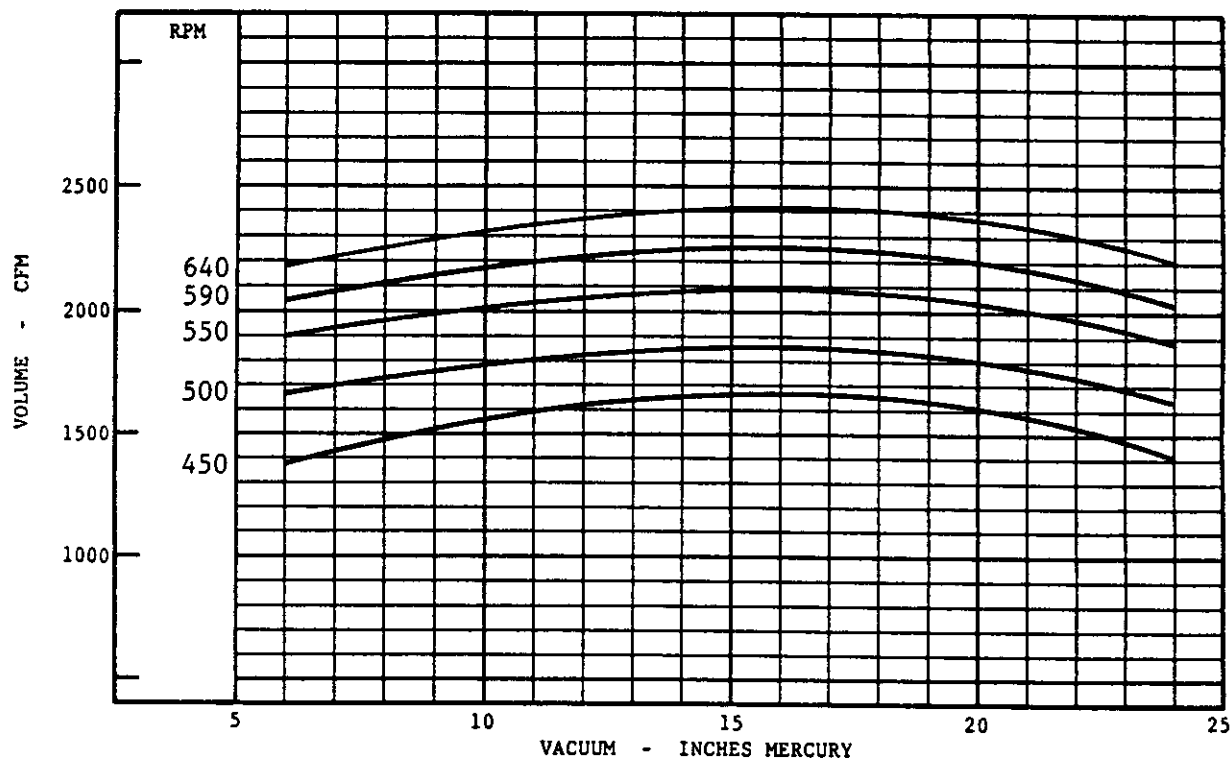
SEAL WATER REQUIREMENTS

VACUUM - " Hg	5	10	15	20		
VOLUME - GPM	10	10	12	17		

PUMP NAMEPLATE

SPEED - RPM

VACUUM - " Hg



SOMARAKIS

STANDARD PERFORMANCE OF Sv VACUUM PUMP: TEST DATES _____

MODEL NO. SV-3028-1 SERIAL NOS. _____

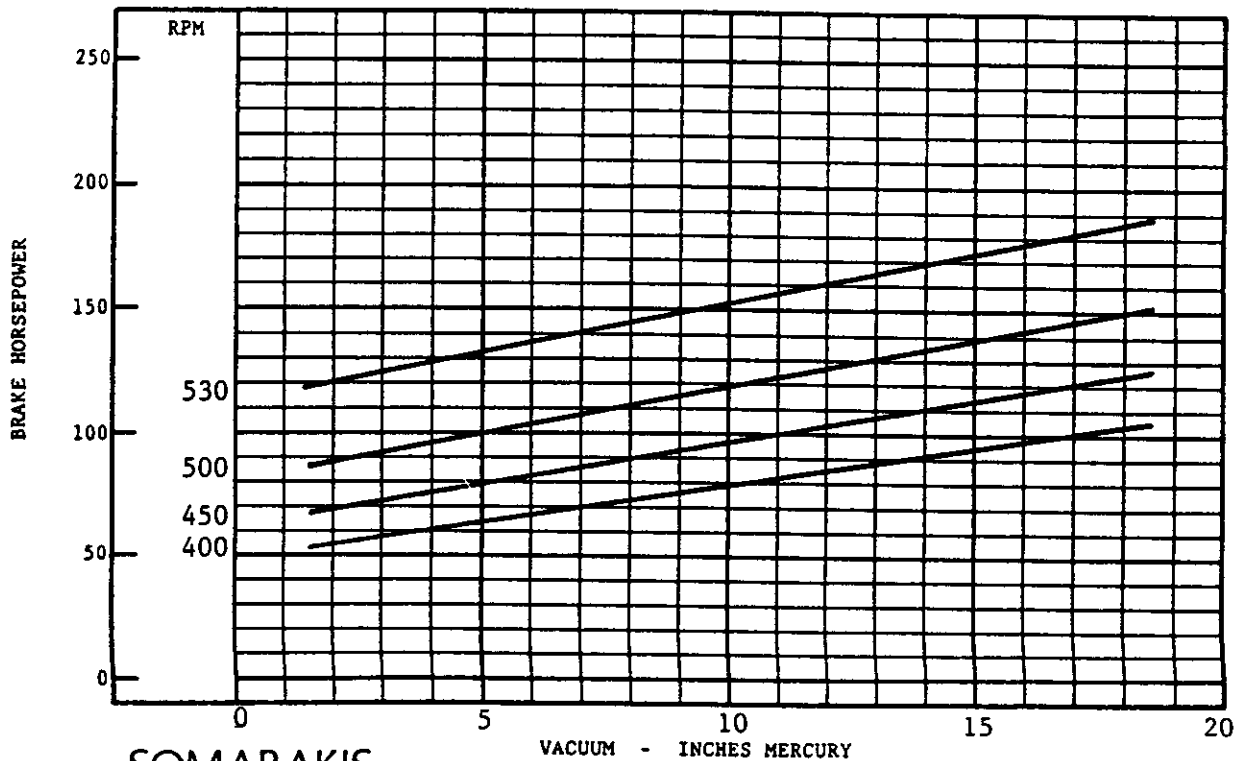
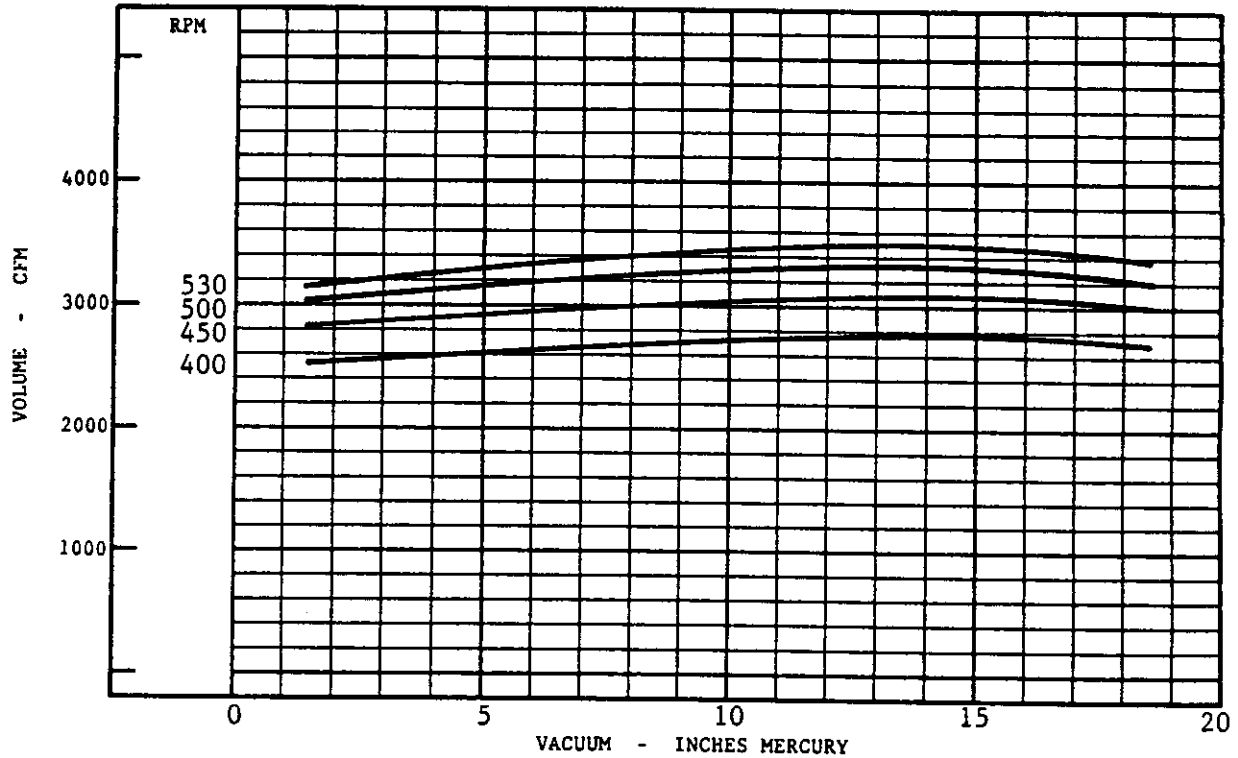
30" Hg BAROMETER - 60°F SEAL WATER IN JOB NOS. _____

SEAL WATER REQUIREMENTS

VACUUM - " Hg	5	10	15			
VOLUME - GPM	15	15	20			

PUMP NAMEPLATE

SPEED - RPM	
VACUUM - " Hg	



SOMARAKIS

STANDARD PERFORMANCE OF S_V VACUUM PUMP: TEST DATES _____

MODEL NO. SV-3028-2 SERIAL NOS. _____

30" Hg BAROMETER - 60°F SEAL WATER IN JOB NOS. _____

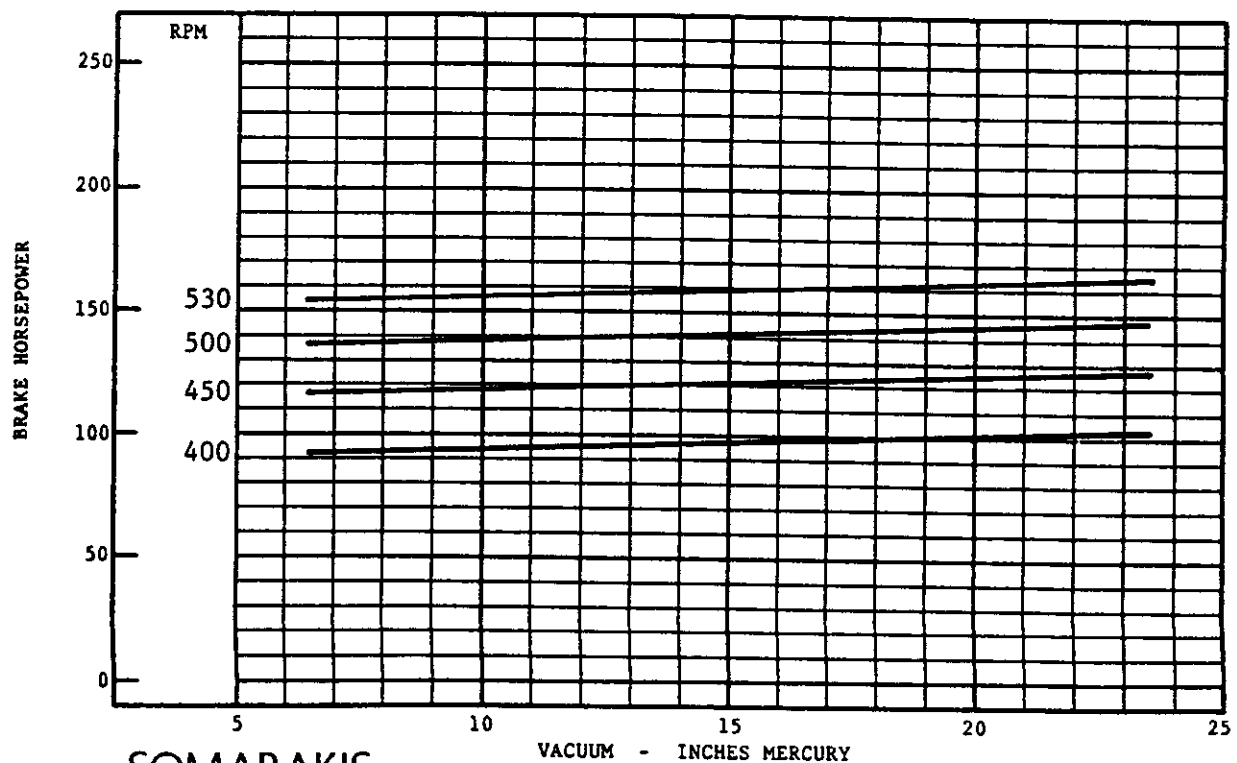
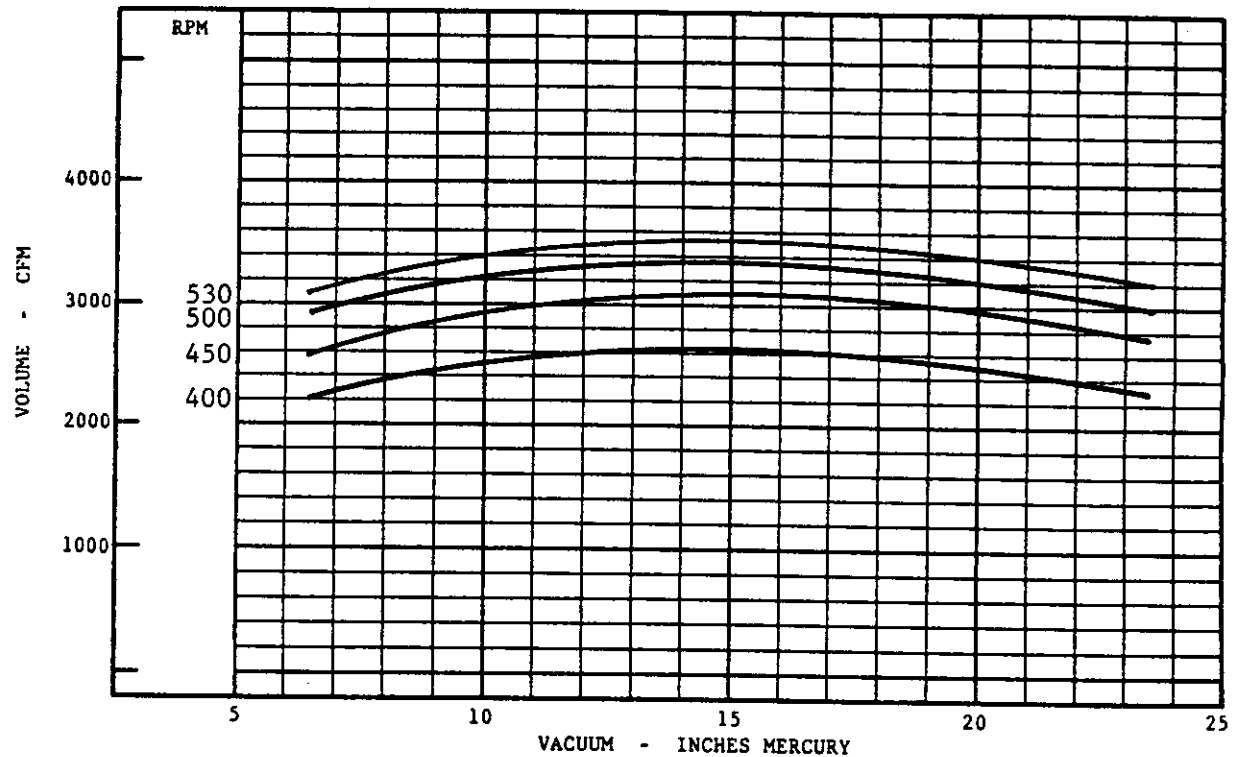
SEAL WATER REQUIREMENTS

VACUUM - " Hg	5	10	15	20		
VOLUME - GPM	25	25	30	40		

PUMP NAMEPLATE

SPEED - RPM

VACUUM - " Hg

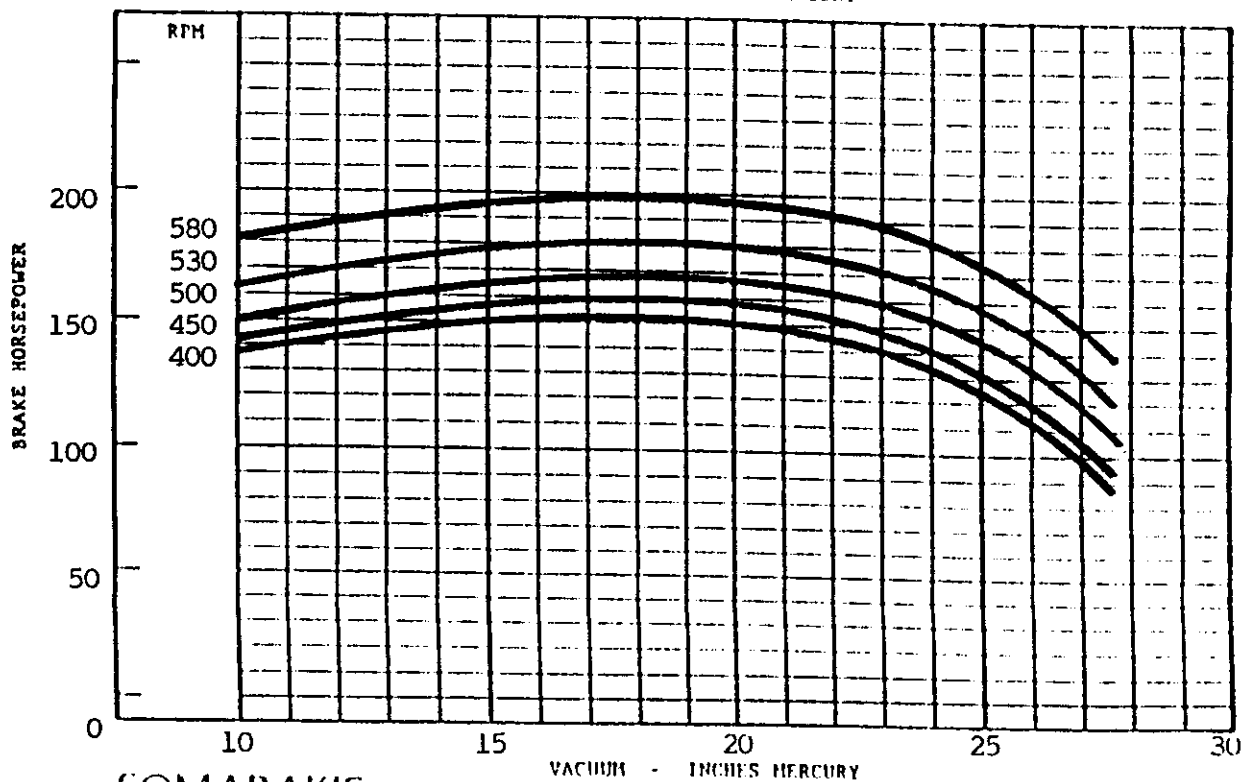
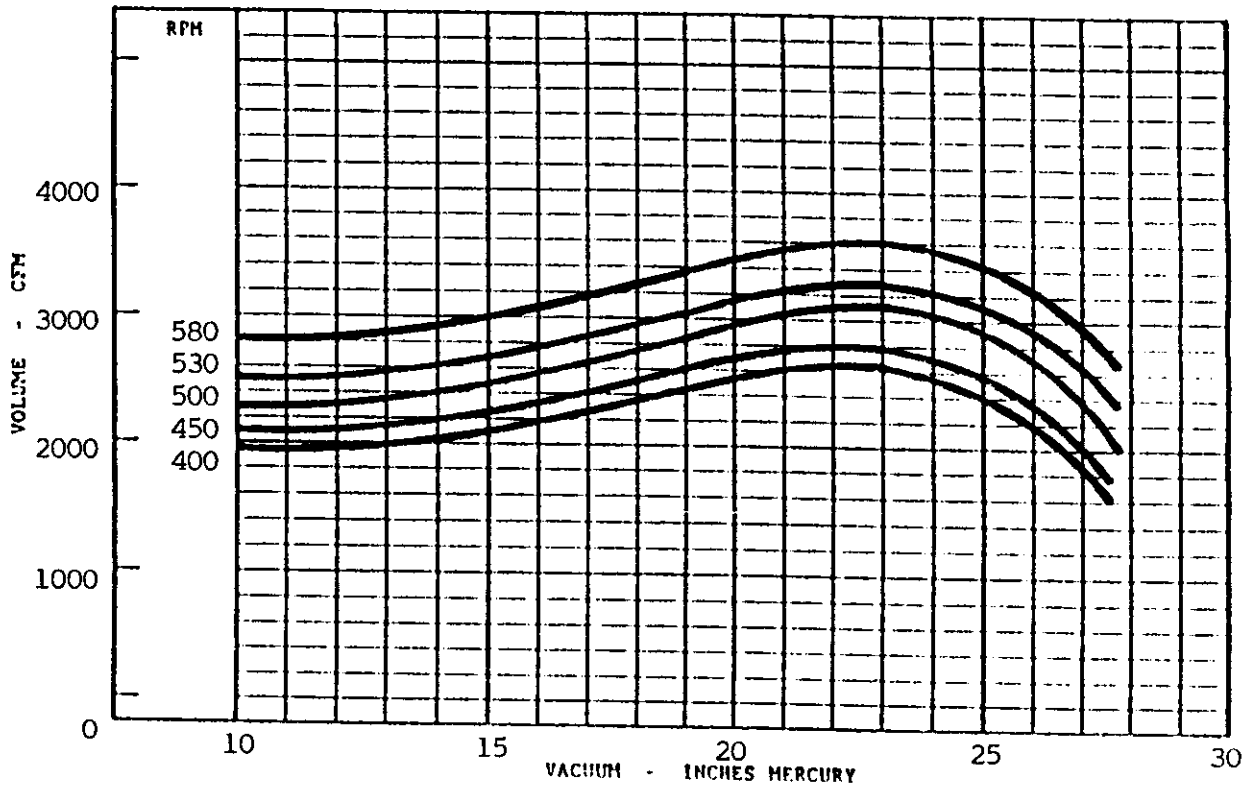


SOMARAKIS

STANDARD PERFORMANCE OF SV VACUUM PUMP: TEST DATES 7-95
 MODEL NO. SV-3028.3 SERIAL NOS. _____
 30" Hg BAROMETER - 60°F SEAL WATER IN JOB NOS. _____

SEAL WATER REQUIREMENTS						
VACUUM - " Hg	15	20	25	26	27	
VOLUME - GPM	20	40	45	47	49	

PUMP NAMEPLATE	
SPEED - RPM	
VACUUM - " Hg	

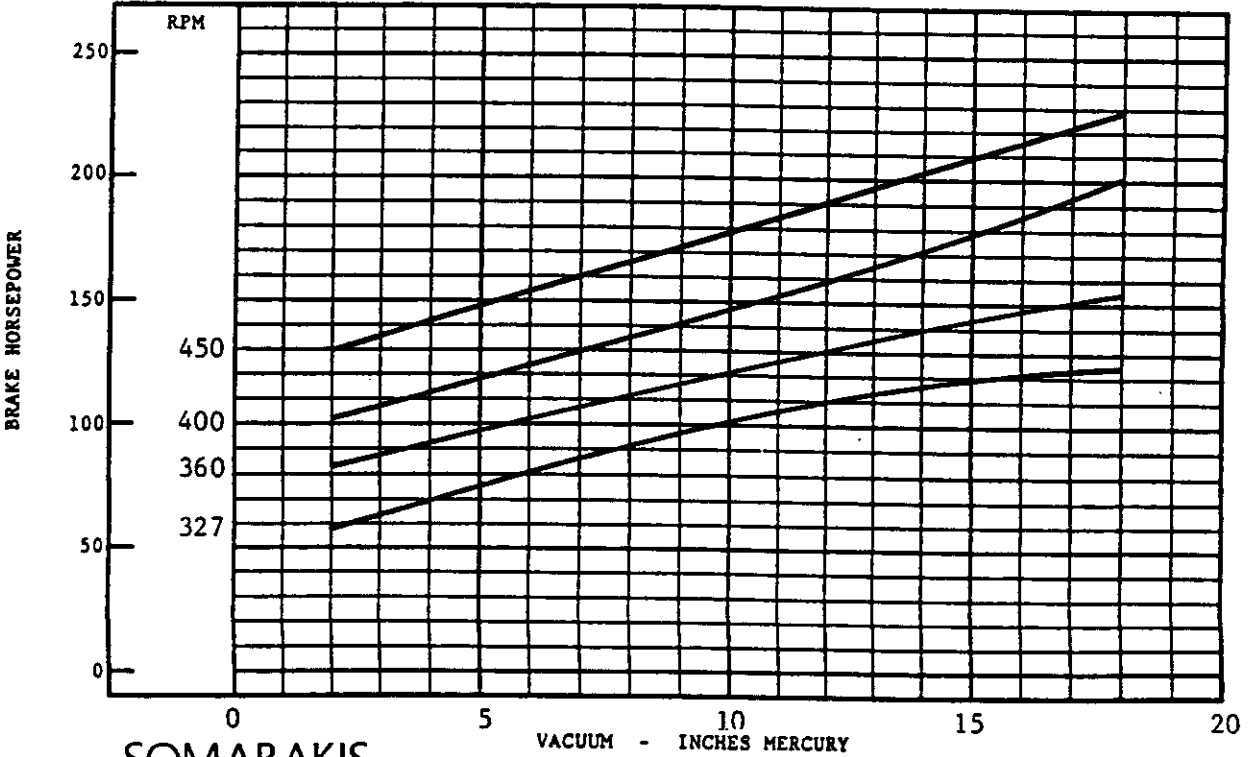
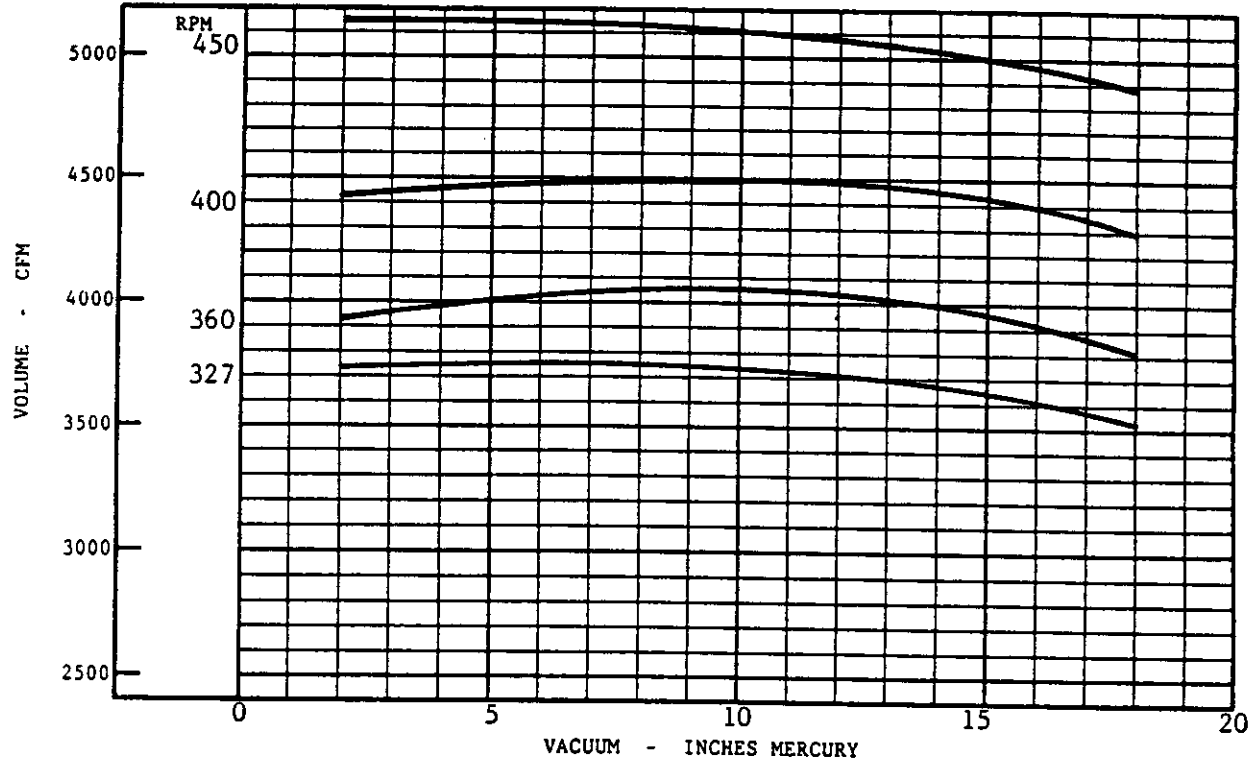


NOTE: 580 RPM is the maximum allowable driven speed for the SV-3028

STANDARD PERFORMANCE OF Sv VACUUM PUMP: TEST DATES _____
MODEL NO. SV-3633-1 SERIAL NOS. _____
30" Hg BAROMETER - 60°F SEAL WATER IN JOB NOS. _____

SEAL WATER REQUIREMENTS						
VACUUM - " Hg	5	10	15			
VOLUME - GPM	20	20	25			

PUMP NAMEPLATE	
SPEED - RPM	
VACUUM - " Hg	



STANDARD PERFORMANCE OF SV VACUUM PUMP: TEST DATES _____

MODEL NO. SV-3633-2 SERIAL NOS. _____

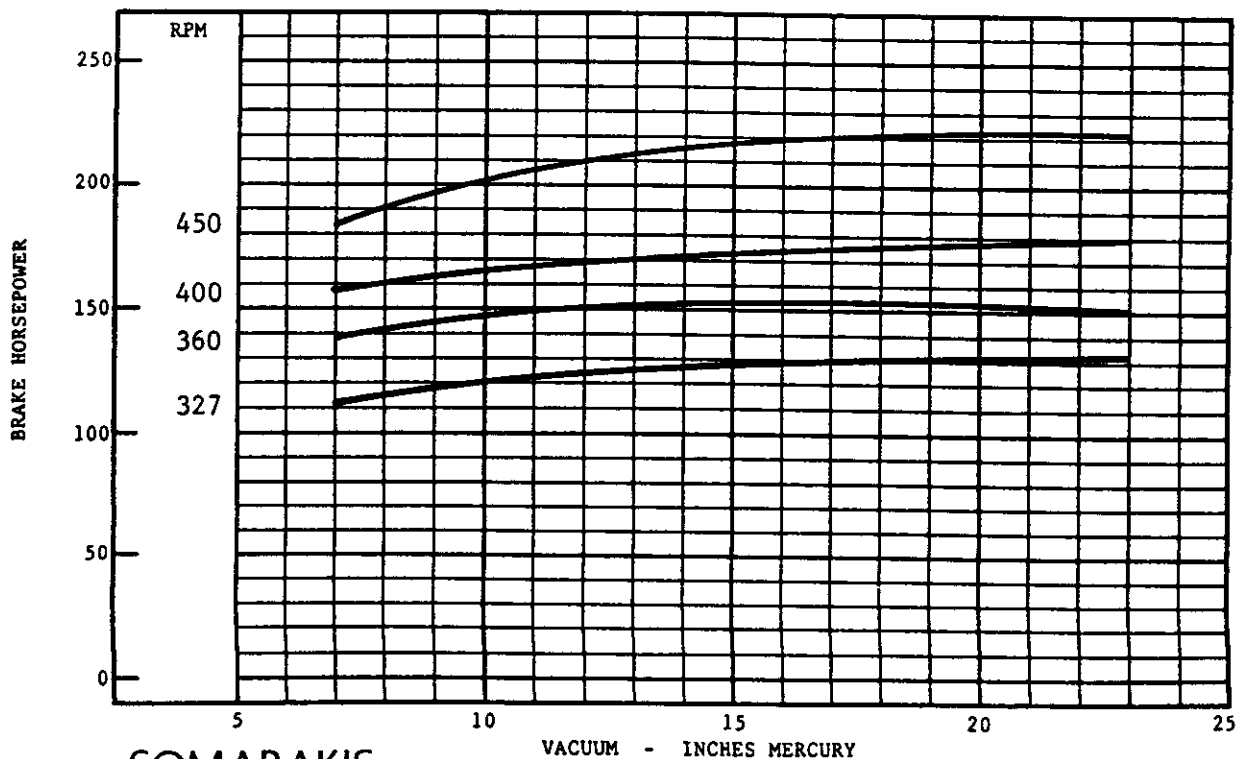
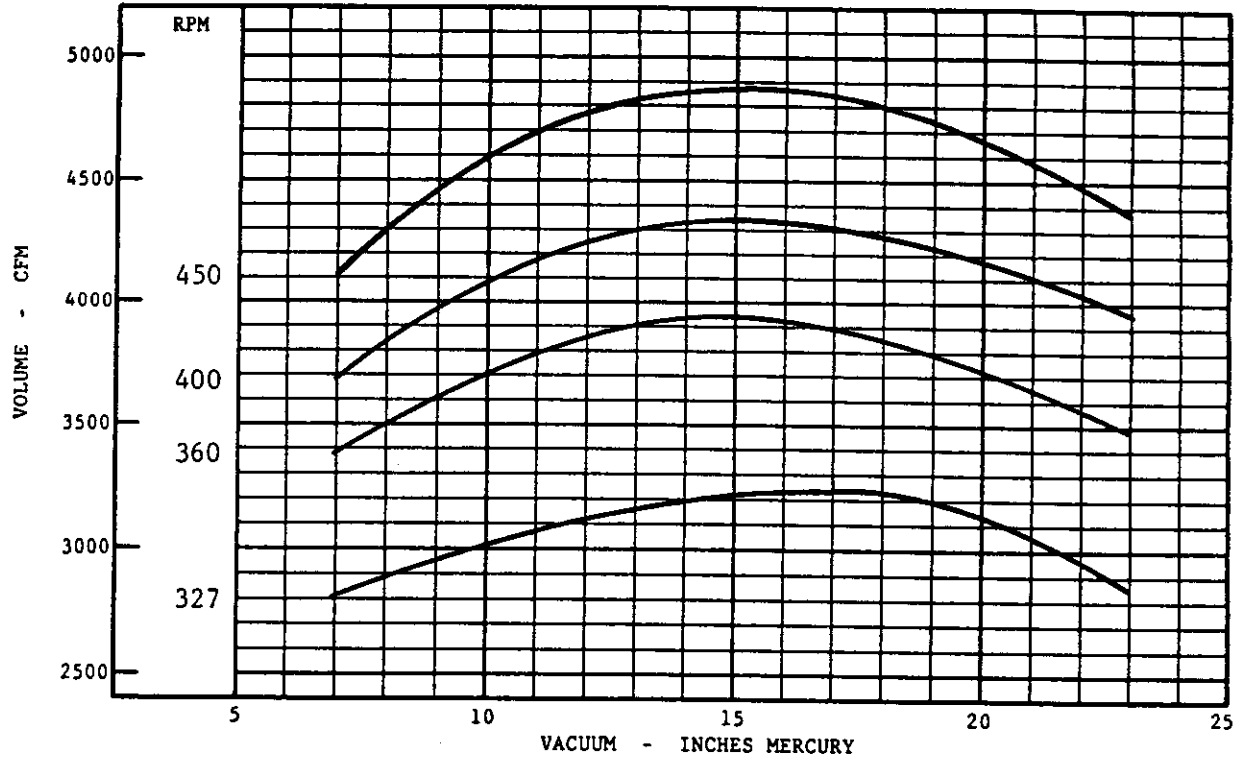
30" Hg BAROMETER - 60°F SEAL WATER IN JOB NOS. _____

SEAL WATER REQUIREMENTS

VACUUM - " Hg	5	10	15	20		
VOLUME - GPM	20	20	25	30		

PUMP NAMEPLATE

SPEED - RPM	
VACUUM - " Hg	



SOMARAKIS

STANDARD PERFORMANCE OF Sv VACUUM PUMP: TEST DATES _____

MODEL NO. SV-4440-1 SERIAL NOS. _____

30" Hg BAROMETER - 60°F SEAL WATER IN JOB NOS. _____

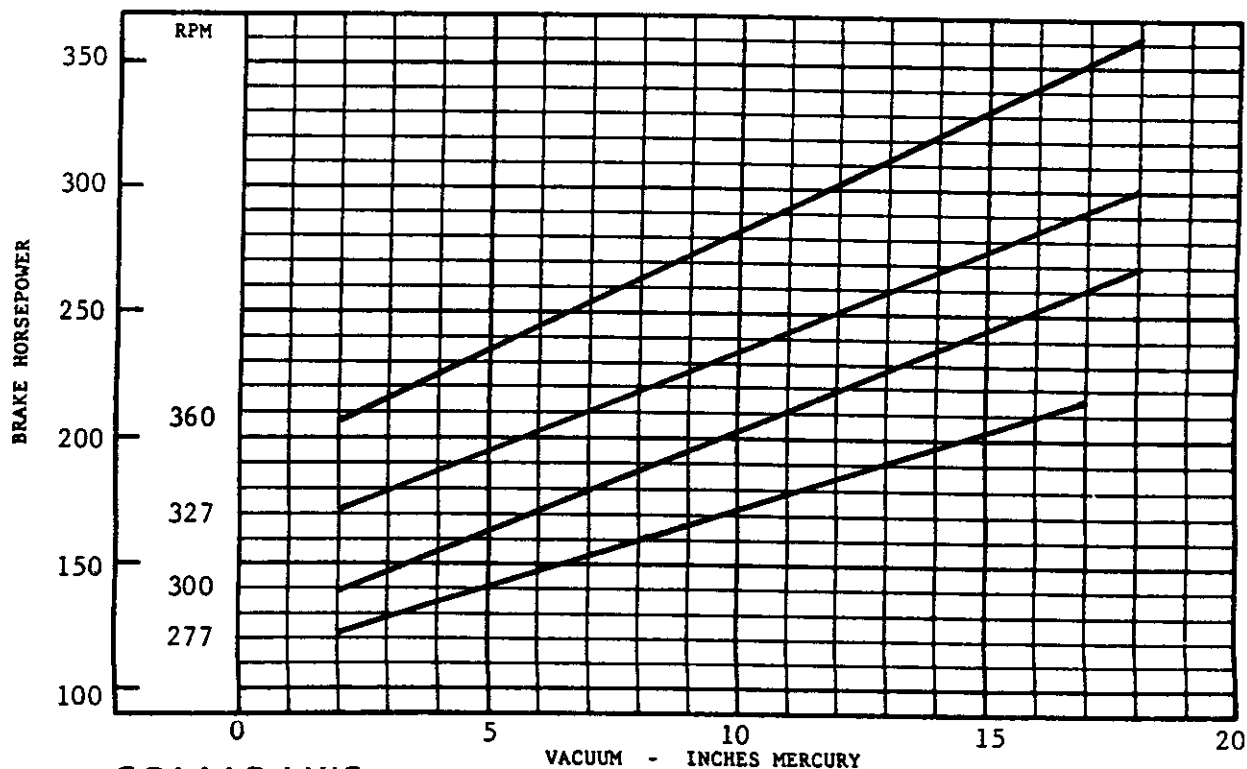
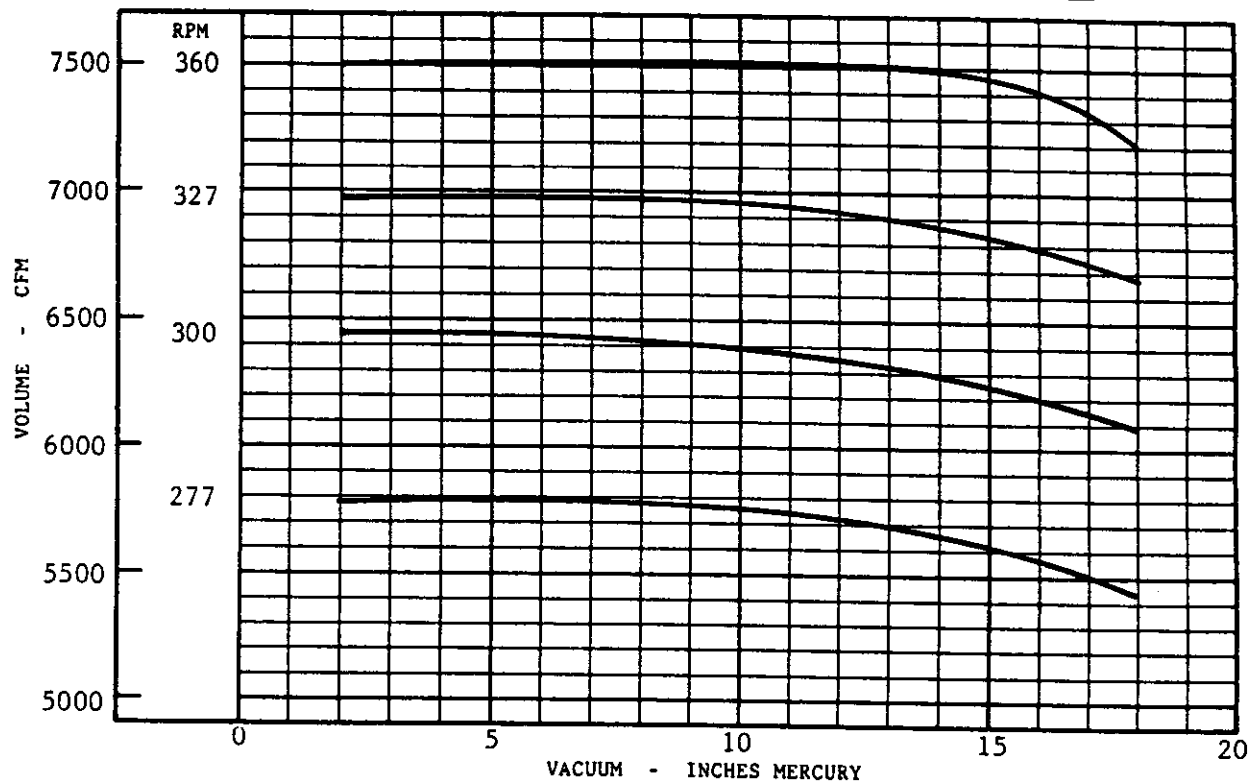
SEAL WATER REQUIREMENTS

VACUUM - " Hg	5	10	15			
VOLUME - GPM	30	30	40			

PUMP NAMEPLATE

SPEED - RPM

VACUUM - " Hg

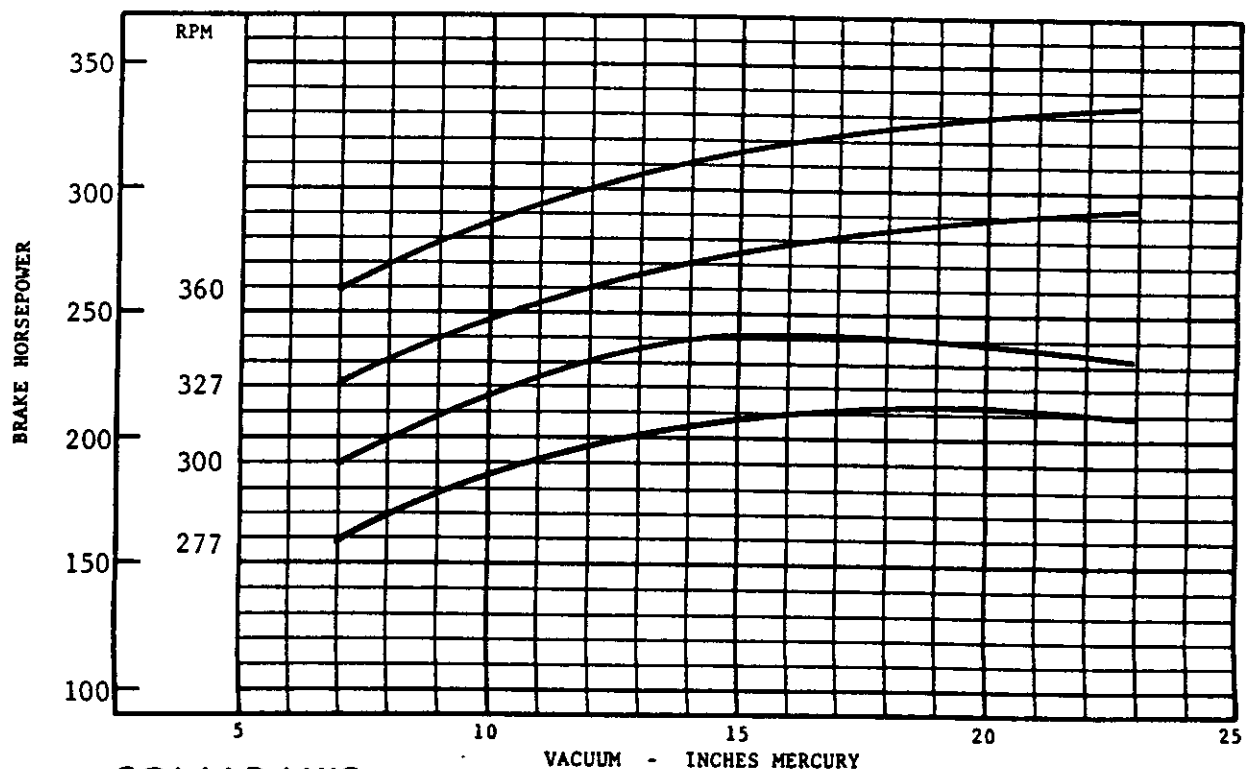
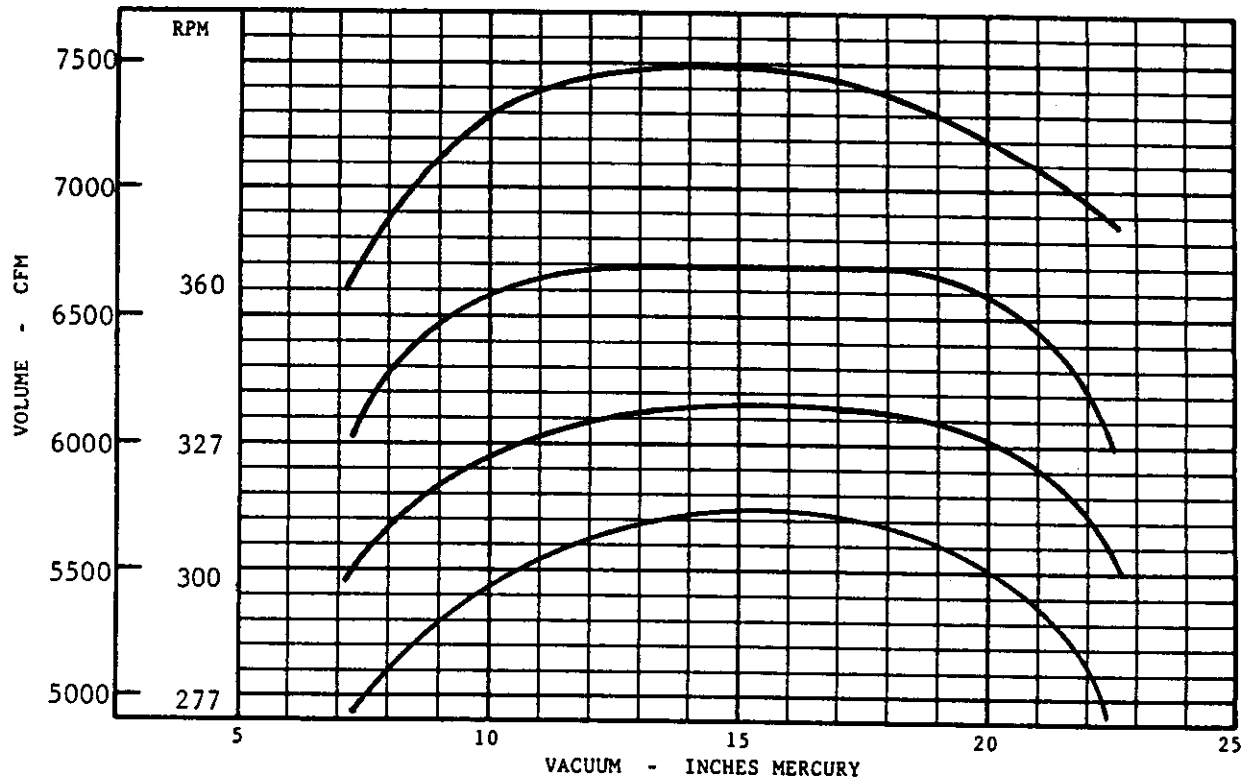


SOMARAKIS

STANDARD PERFORMANCE OF Sv VACUUM PUMP: TEST DATES _____
 MODEL NO. SV-4440-2 SERIAL NOS. _____
 30" Hg BAROMETER - 60°F SEAL WATER IN JOB NOS. _____

SEAL WATER REQUIREMENTS						
VACUUM - " Hg	5	10	15	20		
VOLUME - GPM	30	30	40	60		

PUMP NAMEPLATE	
SPEED - RPM	
VACUUM - " Hg	



SOMARAKIS

STANDARD PERFORMANCE OF S_v VACUUM PUMP: TEST DATES _____

MODEL NO. SV-5348-1 SERIAL NOS. _____

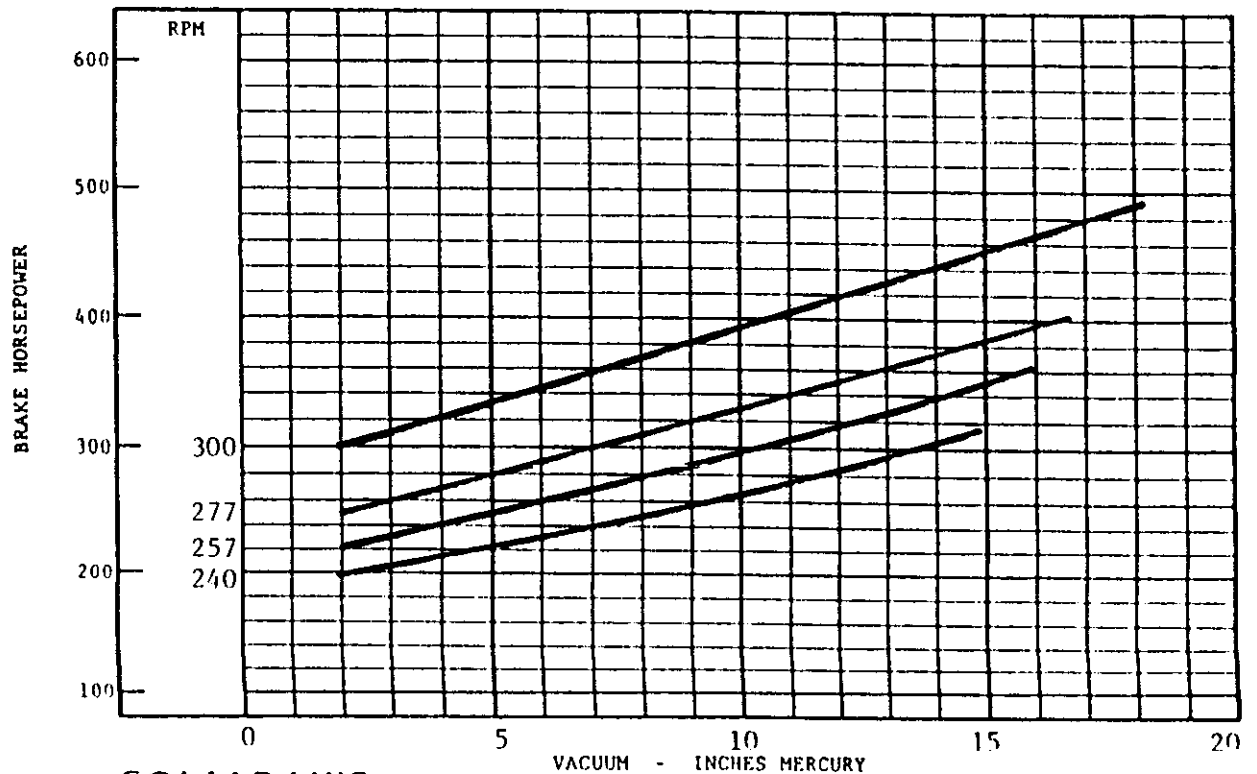
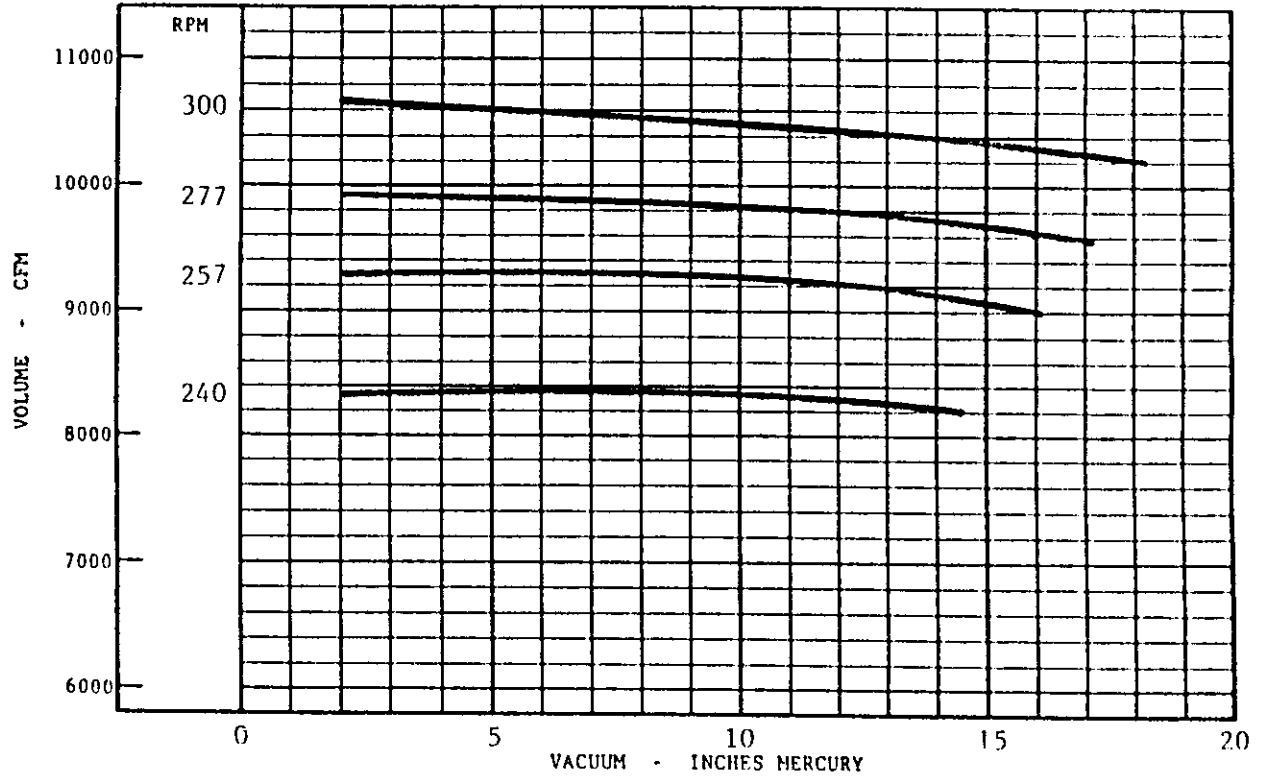
30" Hg BAROMETER - 60°F SEAL WATER IN JOB NOS. _____

SEAL WATER REQUIREMENTS

VACUUM - " Hg	5	10	15			
VOLUME - GPM	60	60	75			

PUMP NAMEPLATE

SPEED - RPM	
VACUUM - " Hg	



SOMARAKIS

STANDARD PERFORMANCE OF S_v VACUUM PUMP: TEST DATES _____

MODEL NO. SV-5348-2 SERIAL NOS. _____

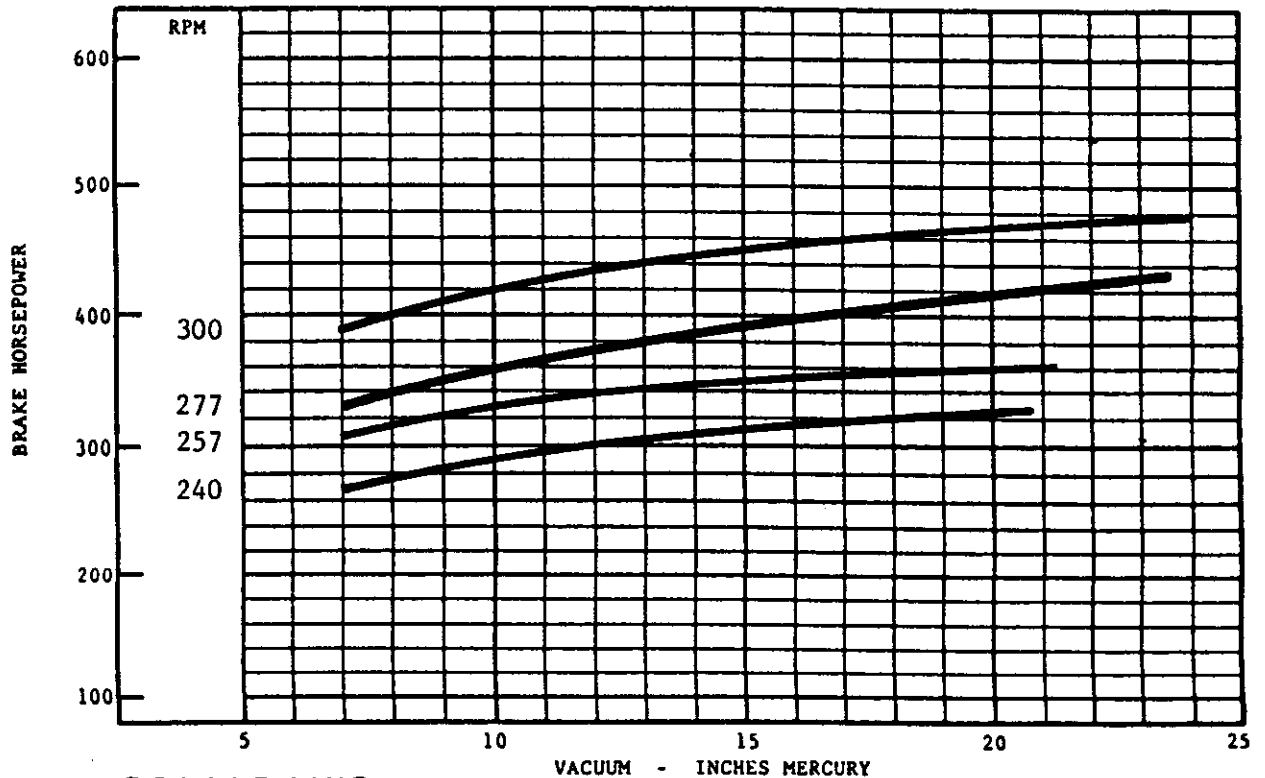
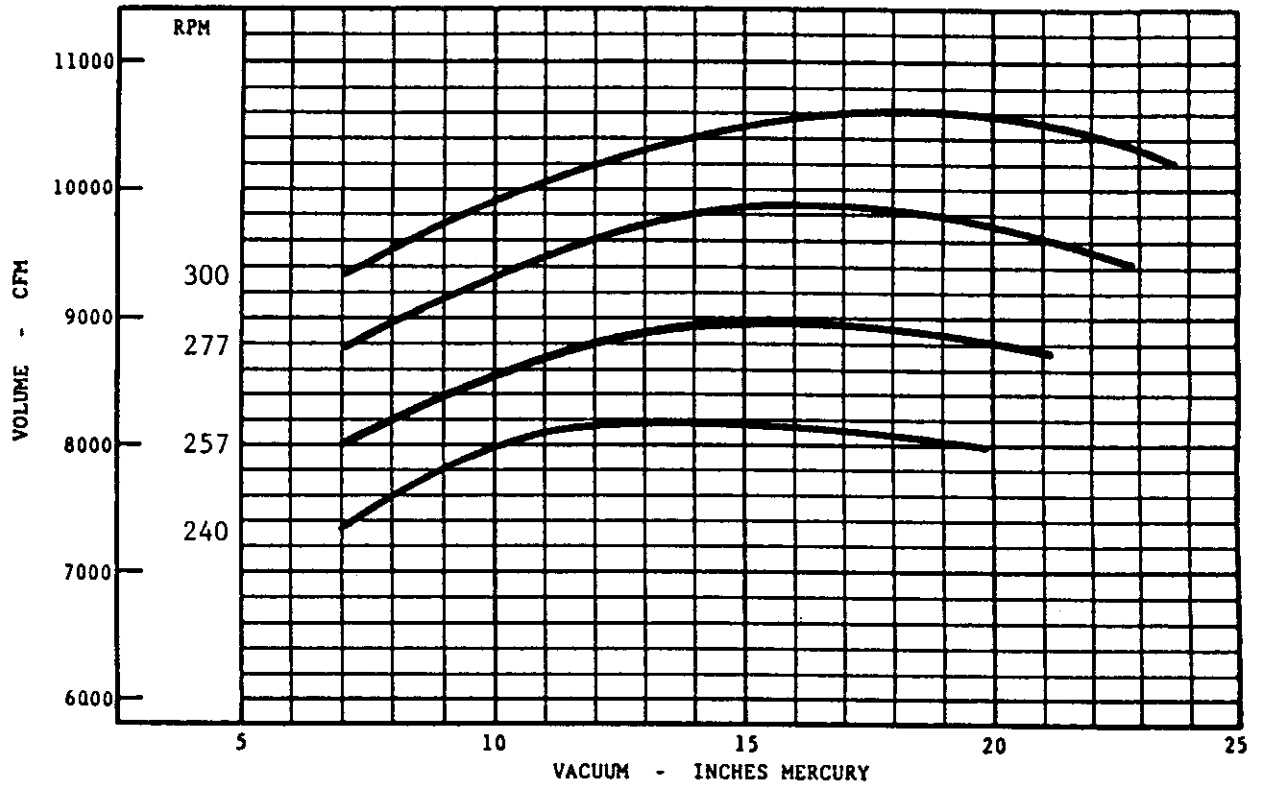
30" Hg BAROMETER - 60°F SEAL WATER IN JOB NOS. _____

SEAL WATER REQUIREMENTS

VACUUM - " Hg	5	10	15	20		
VOLUME - GPM	60	60	75	80		

PUMP NAMEPLATE

SPEED - RPM	
VACUUM - " Hg	



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STANDARD PERFORMANCE OF Sv VACUUM PUMP: TEST DATES 9-88

MODEL NO. SV-5372.1 SERIAL NOS. _____

30" Hg BAROMETER - 60°F SEAL WATER IN JOB NOS. _____

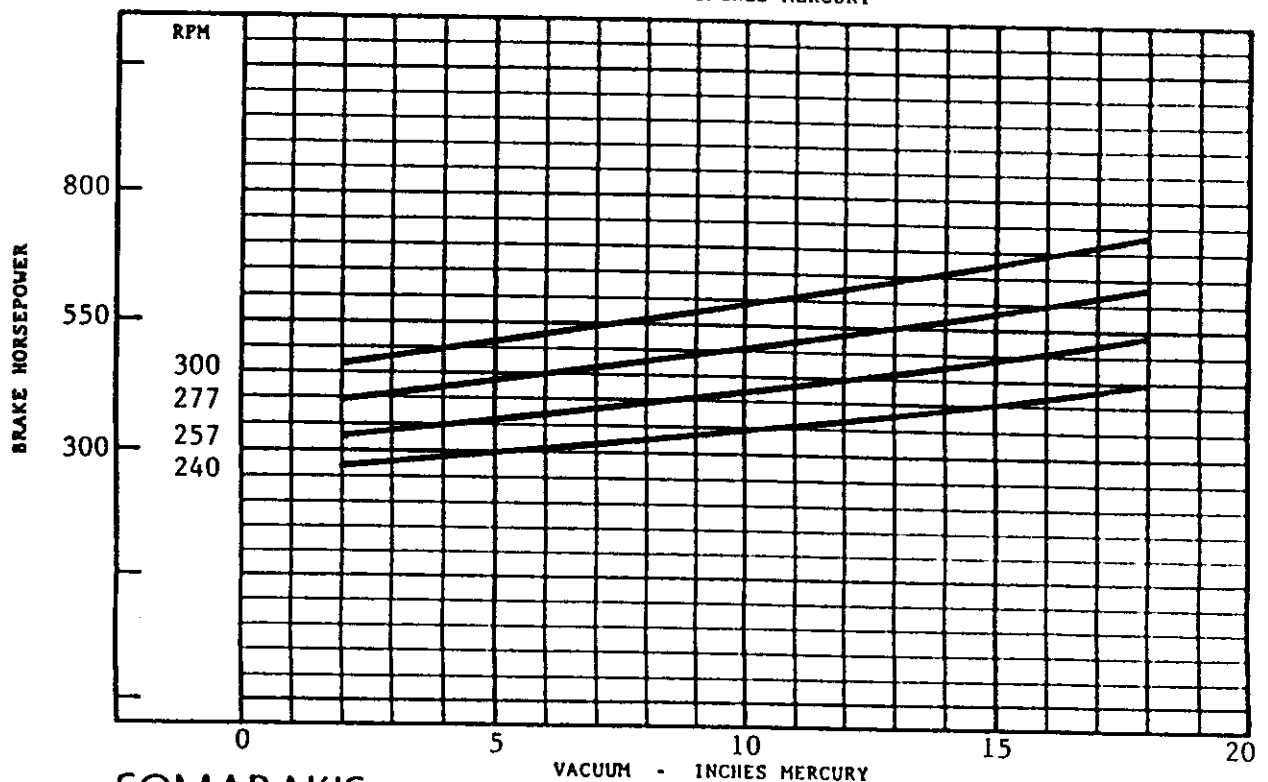
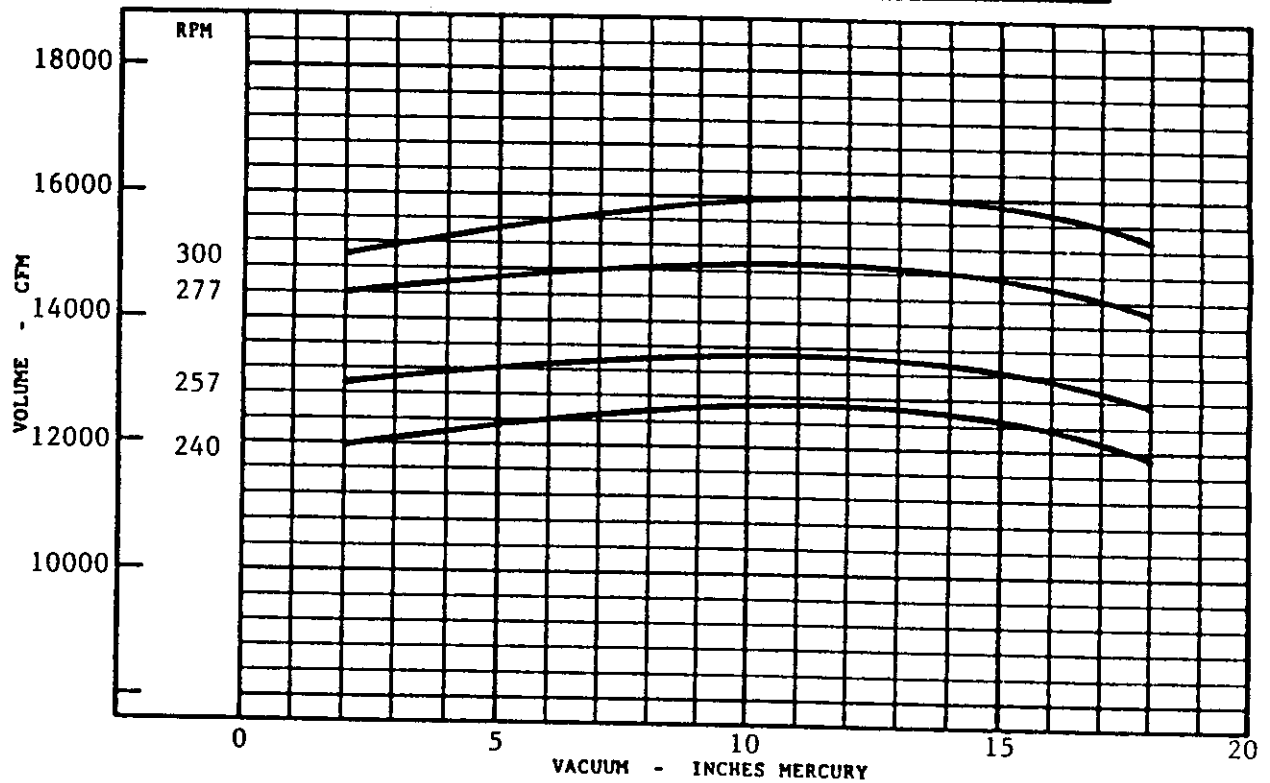
SEAL WATER REQUIREMENTS

VACUUM - " Hg	10	15	20			
VOLUME - GPM	70	90	100			

PUMP NAMEPLATE

SPEED - RPM

VACUUM - " Hg

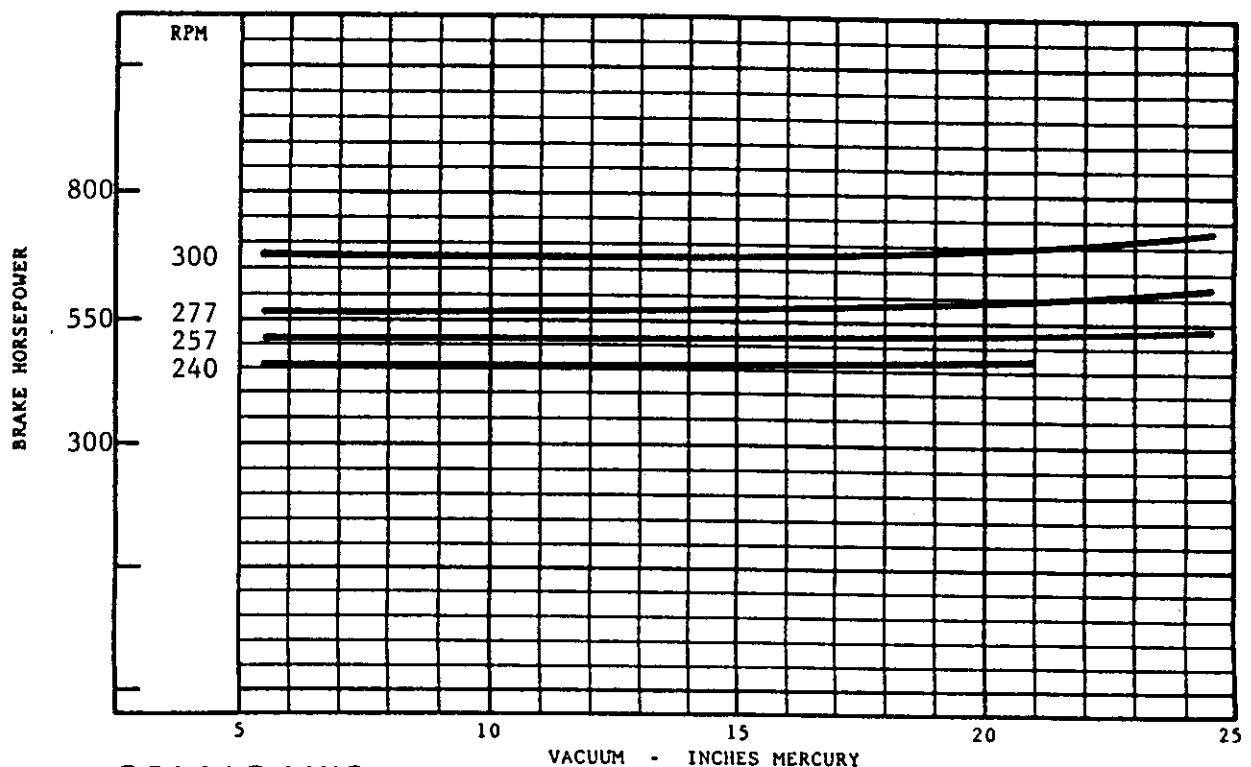
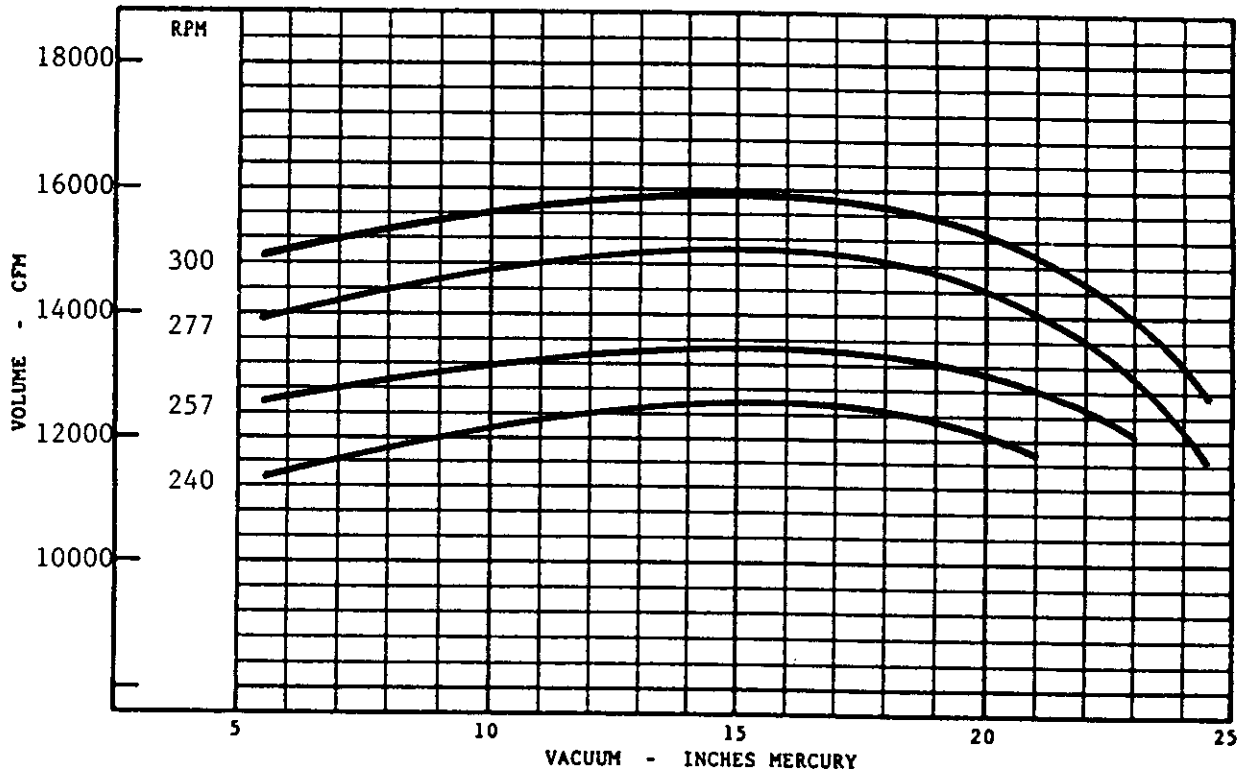


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STANDARD PERFORMANCE OF SV VACUUM PUMP: TEST DATES 9-88
 MODEL NO. SV-5372.2 SERIAL NOS. _____
 30" Hg BAROMETER - 60°F SEAL WATER IN JOB NOS. _____

SEAL WATER REQUIREMENTS						
VACUUM - " Hg	10	15	20	25		
VOLUME - GPM	70	90	100	160		

PUMP NAMEPLATE	
SPEED - RPM	
VACUUM - " Hg	



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