



Highly Evolved...



Total Performance
Fire Pump Packages

SPP

PUMPS



...throughout the

A Global Presence

SPP Pumps has been working with consultants, contractors, installers and end-users for more than a century to achieve the most cost effective Fire System pumping solutions.

It is no wonder that since SPP Pumps was formed in 1875, it has built a reputation for quality and value that has made it unquestionably the leading supplier of Approved Fire Protection Pumping Packages throughout the World.

Our newest facility in Atlanta GA offers the same attention to quality and value that has made SPP Pumps a market leader for over 100 years.





World

Setting the Standards

SPP Pumps Fire Products comply with the demanding requirements of the UL and FM approval standards, and meets all the requirements of NFPAZO.

You will find our products in many major airports, oil & gas installations, in many of the tallest and most prestigious buildings around the world and in the channel tunnel between the UK and France. In fact you will find SPP Fire Pump Products wherever people and property need to be protected from the devastation of fire.

If you need secure and affordable fire protection pump packages then contact SPP Pumps Inc.

Born Out of Experience

Originally called Pulsometer Pumps, SPP has more than a century of experience in Fire protection although capability has changed :

c.1875

today and tomorrow



As the first pump manufacturer in Europe to achieve FM approval, SPP has one of the widest range of approved and listed equipment in the world.



Certificate No. 111b



UL Listings & FM Approvals



**SPP Fire Pump Listings
UL Listed and FM Approved
Single Stage Horizontal Split Case**



Capacity GPM	Size Inches	Model Designation	Rated Pressure psi	Approximate Speed RPM	Maximum Working Pressure psi
200	3	TB08D	96-149	3550	225
200	4	TD10E	98-169	2950	225
200	4	TD10E	109-187	3100	225
200	4	TD10E	140-210	3550	225
250	3	TB08D	94-147	3550	225
250	4	TD10E	97-168	2950	225
250	4	TD10E	108-186	3100	225
250	4	TD10E	139-209	3550	225
300	3	TB08D	93-145	3550	225
300	4	TD10E	96-167	2950	225
300	4	TD10E	106-185	3100	225
300	4	TD10E	138-207	3550	225
400	3	TB08D	87-139	3550	225
400	4	TB10D	105-144	3550	225
400	4	TD10E	134-205	3550	225
400	4	TD10E	92-164	2950	225
400	4	TD10E	102-182	3100	225
500	3	TB08D	81-133	3550	225
500	4	TB10D	102-139	3550	225
500	5	TB12D	112-148	3550	225
500	5	TC12F	118-208	3550	225
500	5	TC12G	138-193	3550	225
500	4	TD10E	86-158	2950	225
500	4	TD10E	97-176	3100	225
500	4	TD10E	129-200	3550	225
500	4	TE10D	141-264	3000	362.5
500	4	TE10D	135-255	2950	362.5
500	4	TE10D	131-247	2900	362.5
500	4	TE10D	121-229	2800	362.5
500	4	TE10D	104-193	2600	362.5
500	4	TE10D	96-176	2500	362.5
500	5	TE12E	104-187	2500	362.5
500	4	TE10D	87-162	2400	362.5
500	5	TE12E	97-171	2400	362.5
500	4	TE10D	81-150	2300	362.5
500	5	TE12E	87-158	2300	362.5
500	4	TE10D	72-137	2200	362.5
500	5	TE12E	80-143	2200	362.5
500	4	TE10D	65-122	2100	362.5
500	5	TE12E	72-131	2100	362.5
500	3	TE08D	128-195	2600	362.5
500	3	TE08D	152-229	2800	362.5
500	3	TE08D	133-257	2950	362.5
500	3	TE08D	139-268	3000	362.5
750	4	TB10D	95-129	3550	225
750	5	TB12D	106-144	3550	225
750	5	TC12F	74-134	2950	225
750	5	TC12F	111-199	3550	225
750	5	TC12G	111-142	2950	225
750	5	TC12G	130-185	3550	225
750	5	TD12F	95-165	2950	225
750	5	TD12F	141-208	3550	225
750	4	TE10D	131-252	3000	362.5



SPP Fire Pump Listings
UL Listed and FM Approved
Single Stage Horizontal Split Case



Capacity GPM	Size Inches	Model Designation	Rated Pressure psi	Approximate Speed RPM	Maximum Working Pressure psi
750	5	TE12E	146-264	3000	362.5
750	4	TE10D	124-243	2950	362.5
750	5	TE12E	141-255	2950	362.5
750	4	TE10D	121-233	2900	362.5
750	5	TE12E	136-245	2900	362.5
750	4	TE10D	112-216	2800	362.5
750	5	TE12E	124-227	2800	362.5
750	4	TE10D	94-179	2600	362.5
750	5	TE12E	105-193	2600	362.5
750	4	TE10D	85-164	2500	362.5
750	5	TE12E	97-178	2500	362.5
750	4	TE10D	77-149	2400	362.5
750	5	TE12E	88-162	2400	362.5
750	4	TE10D	69-137	2300	362.5
750	5	TE12E	78-148	2300	362.5
750	4	TE10D	62-122	2200	362.5
750	5	TE12E	70-134	2200	362.5
750	4	TE10D	82-108	2100	362.5
750	5	TE12E	90-121	2100	362.5
1000	5	TB12D	99-137	3550	225
1000	5	TC12G	100-131	2950	225
1000	5	TC12G	119-175	3550	225
1000	5	TD12F	89-159	2950	225
1000	5	TD12F	134-199	3550	225
1000	6	TD15F	74-128	2600	225
1000	6	TD15F	90-157	2800	225
1000	6	TD15F	97-171	2950	225
1000	5	TE12E	134-250	3000	362.5
1000	5	TE12E	128-240	2950	362.5
1000	5	TE12E	123-232	2900	362.5
1000	5	TE12E	159-213	2800	362.5
1000	5	TE12E	132-181	2600	362.5
1000	6	TF15E	85-145	1760	362.5
1000	6	TF15E	101-171	1900	362.5
1000	6	TF15E	126-208	2100	362.5
1000	6	TF15E	139-228	2200	362.5
1000	6	TF15E	152-251	2300	362.5
1000	6	TF15E	160-251	2350	362.5
1250	5	TD12F	82-148	2950	225
1250	5	TD12F	125-191	3550	225
1250	6	TD15F	70-123	2600	225
1250	6	TD15F	84-150	2800	225
1250	6	TD15F	93-164	2950	225
1250	6	TD15F	137-191	3550	225
1250	8	TD20E	96-174	2800	225
1250	8	TD20E	108-196	2950	225
1250	6	TF15E	81-142	1760	362.5
1250	6	TF15E	97-166	1900	362.5
1250	6	TF15E	122-203	2100	362.5
1250	6	TF15E	134-225	2200	362.5
1250	6	TF15E	148-246	2300	362.5
1250	6	TF15E	155-246	2350	362.5
1500	6	TD15F	64-116	2600	225



SPP Fire Pump Listings
UL Listed and FM Approved
Single Stage Horizontal Split Case



Capacity GPM	Size Inches	Model Designation	Rated Pressure psi	Approximate Speed RPM	Maximum Working Pressure psi
1500	6	TD15F	78-144	2800	225
1500	6	TD15F	88-157	2950	225
1500	6	TD15F	133-187	3550	225
1500	8	TD20E	91-169	2800	225
1500	8	TD20E	105-190	2950	225
1500	8	TD20E	154-202	3550	225
1500	8	TD20D	110-179	2800	305
1500	6	TF15E	108-136	1760	362.5
1500	6	TF15E	115-162	1900	362.5
1500	6	TF15E	116-199	2100	362.5
1500	6	TF15E	128-220	2200	362.5
1500	6	TF15E	143-241	2300	362.5
1500	6	TF15E	151-243	2350	362.5
2000	8	TD20E	84-159	2800	225
2000	8	TD20E	95-179	2950	225
2000	8	TD20E	147-196	3550	225
2000	8	TD20D	104-174	2800	305
2000	8	TD20D	97-197	2960	305
2000	8	BS08B	100-148	1475	330
2000	8	BS08B	143-210	1750	330
2500	8	TD20D	95-164	2800	305
2500	8	TD20D	102-188	2960	305
2500	10x8	BS08A	131	1480	270
2500	8	BS08B	137-205	1750	330
2500	8	BS08C	138 -167	1475	270
3000	8	BS08C	130-162	1475	270
3000	16x12	BR12D	108-165	1780	273
3500	16 x 12	BS12A	135-202	1490	290
3500	16x12	BR12D	108-163	1780	273
4000	16 x 12	BS12A	131-199	1490	290
4000	16x12	BR12D	102-161	1780	273
4500	16 x 12	BS12A	126-196	1490	290
4500	16x12	BR12D	99-158	1780	273
5000	16 x 12	BS12A	122-193	1490	290
5000	16x12	BR12D	95-154	1780	273



SPP Fire Pump Listings
UL Listed and FM Approved
Single Stage Horizontal Split Case



Capacity GPM	Size Inches	Model Designation	Rated Pressure psi	Approximate Speed RPM	Maximum Working Pressure psi
250	2	PB02B	41-100	3530	275
500	3	PC03A	95-130	3525	425
500	3	PC03B	125-145	3525	425
500	4	PC04E	104-173	2950	510
500	4	PC04E	112-181	3000	510
500	4	PC04E	138-220	3300	510
500	4	PC04E	160-264	3550	510
500	5	PC05H	37-66	1460	250
500	4	PC04C	45-60	1760	250
500	5	PC05K	50-80	1760	250
500	4	PC04D	40-50	1760	250
500	4	PC04A	80-90	2600	450
500	4	PC04A	93-105	2800	450
500	4	PC04A	93-116	2950	450
500	4	PC04A	97-121	3000	450
500	4	PC04A	93-148	3300	450
500	4	PC04A	96-172	3550	450
500	4	PC04B	47-81	2950	450
500	4	PC04B	49-84	3000	450
500	4	PC04B	55-120	3525	450
500	4	PC04E	50-86	2100	510
500	4	PC04E	65-110	2350	510
500	5	PC05C	54-93	3525	375
500	6	PC06C	50-70	1760	500
750	4	PC04A	72-80	2600	450
750	4	PC04A	83-93	2800	450
750	4	PC04A	83-107	2950	450
750	4	PC04A	86-110	3000	450
750	4	PC04A	82-139	3300	450
750	4	PC04A	80-159	3500	450
750	4	PC04A	84-164	3550	450
750	4	PC04C	40-56	1760	250
750	4	PC04E	121-207	3300	510
750	4	PC04E	147-260	3550	510
750	4	PC04E	95-160	2950	510
750	4	PC04E	95-170	3000	510
750	5	PC05G	136-180	2950	510
750	5	PC05G	184-268	3550	510
750	5	PC05G	156-234	3300	510
750	5	PC05G	141-186	3000	510
Note: Fire pumps, multistage.					
750	5	PC05H	100-173	2350	250
750	5	PC05H	75-138	2100	250
750	5	PC05H	105-180	2400	250
750	5	PC05H	93-160	2300	250
750	5	PC05H	50-94	1760	250
750	5	PC05E	58-106	2600	510
750	5	PC05E	69-123	2800	510
750	5	PC05A	50-75	2950	375
750	5	PC05A	56-78	3000	375
750	5	PC05A	70-96	3300	375
750	5	PC05A	60-106	3500	375
750	5	PC05A	62-111	3550	375



SPP Fire Pump Listings
UL Listed and FM Approved
Single Stage Horizontal Split Case



Capacity GPM	Size Inches	Model Designation	Rated Pressure psi	Approximate Speed RPM	Maximum Working Pressure psi
750	6	PC06C	47-71	1760	500
1000	5	PC05A	90-105	3550	375
1000	5	PC05A	87-102	3500	375
1000	5	PC05E	76-136	3000	510
1000	5	PC05E	95-167	3300	510
1000	5	PC05F	84-166	3300	510
1000	5	PC05F	97-189	3500	510
1000	5	PC05F	100-194	3550	510
1000	5	PC05G	145-222	3300	510
1000	5	PC05G	170-255	3500	510
1000	5	PC05G	128-175	2950	510
1000	5	PC05C	60-106	3550	375
1000	5	PC05G	173-262	3550	510
1000	5	PC05E	74-131	2950	510
1000	5	PC05G	132-181	3000	510
1000	6	PC06L	171-205	2100	300
1000	6	PC06L	119-145	1770	300
1000	6	PC06G	57-87	1460	250
1000	5	PC05H	95-167	2350	250
1000	5	PC05H	100-176	2400	250
1000	6	PC06A	70-108	2800	300
1000	6	PC06A	77-114	2950	300
1000	6	PC06A	82-121	3000	300
1000	6	PC06A	101-147	3300	300
1000	6	PC06A	103-169	3550	300
1000	6	PC06J	75-110	1780	250
1000	6	PC06D	44-85	1760	250
1250	6	PC06A	66-103	2800	300
1250	6	PC06A	74-110	2950	300
1250	6	PC06A	76-116	3000	300
1250	6	PC06A	97-142	3300	300
1250	6	PC06A	97-164	3550	300
1250	6	PC06C	76-146	2600	500
1250	6	PC06C	90-169	2800	500
1250	6	PC06C	100-181	2950	500
1250	6	PC06C	104-186	3000	500
1250	6	PC06C	125-229	3300	500
1250	6	PC06C	150-270	3550	500
1250	6	PC06G	58-82	1460	250
1250	6	PC06G	60-127	1780	250
1250	6	PC06L	114-145	1770	300
1250	6	PC06L	167-205	2100	300
1250	6	PC06D	40-82	1760	250
1500	6	PC06E	45-86	1760	250
1500	6	PC06C	108-180	2950	500
1500	6	PC06C	112-180	3000	500
1500	6	PC06C	121-220	3300	500
1500	6	PC06C	145-265	3550	500
1500	6	PC06A	100-136	3300	300
1500	6	PC06A	97-160	3550	300
1500	6	PC06C	97-134	2600	500
1500	6	PC06C	120-160	2800	500
1500	6	PC06G	87-122	1780	250



**SPP Fire Pump Listings
UL Listed and FM Approved
Single Stage Horizontal Split Case**



Capacity GPM	Size Inches	Model Designation	Rated Pressure psi	Approximate Speed RPM	Maximum Working Pressure psi
1500	6	PC06L	108-140	1770	300
1500	6	PC06L	160-202	2100	300
1500	8	PC08B	40-77	1760	250
1500	8	PC08E	40-63	1470	250
1500	8	PC08J	73-105	1470	300
2000	6	PC06F	85-140	2100	250
2000	8	PC08B	63-74	1760	225
2000	8	PC08E	48-89	1780	250
2000	8	PC08E	69-130	2100	250
2000	8	PC08G	55-85	1470	262
2000	8	PC08F	54-94	1460	262
2000	8	PC08H	90-118	1780	262
2000	8	PC08H	110-169	2100	262
2000	8	PC08J	103-156	1780	300
2000	8	PC08J	150-212	2100	300
2000	8	PC08K	72-119	1470	300
2000	8	PC08K	110-175	1780	300
2500	8	PC08D	105-155	2100	250
2500	8	PC08C	51-98	1760	250
2500	8	PC08G	115-150	2100	262
2500	8	PC08G	80-125	1780	262
2500	8	PC08F	66-90	1460	262
2500	8	PC08F	80-137	1780	262
2500	8	PC08K	104-172	1780	300
2500	8	PC08K	154-202	2100	300
2500	10	PC10E	85-127	1470	250
3000	8	PC08D	100-151	2100	250
3000	10	PC10D	75-123	1760	250
3000	10	PC10E	118	1470	250
3000	10	PC10E	85-188	1780	250
3000	10	PC10E	102-210	1900	250
3000	10	PC10D	92-144	1900	250
3000	12	PA12F	118-164	1760	253
3000	12	PA12F	82-117	1480	253
3500	10	PC10D	73-120	1760	250
3500	10	PC10D	89-142	1900	250
3500	10	PC10E	120-182	1780	250
3500	10	PC10E	95-206	1900	250
3500	12	PA12F	80-117	1480	253
3500	12	PA12F	115-162	1760	253
4000	10	PC10D	100-117	1760	250
4000	10	PC10D	84-139	1900	250
4000	12	PA12F	78-112	1480	253
4000	12	PA12F	112-161	1760	253
4500	10	PC10D	93-114	1760	250
4500	10	PC10D	80-135	1900	250
4500	12	PA12F	76-109	1480	253
4500	12	PA12F	109-160	1760	253
5000	12	PA12F	106-157	1760	253



**SPP Fire Pump Listings
UL Listed and FM Approved
Vertical Turbine Fire Pump**



Capacity GPM	Model Designation	Rated Pressure psi	Approximate Speed RPM
250	PE08A	40-140	1760
500	PE10D	50-308	1760
500	PE12F	42-215	1460
750	+PE12C	100-510	1760
750	PE12F	40-280	1760
750	PE12G	40-291	1460
1000	PE12G	51-368	1760
1000	PE14D	40-280	1460
1500	PE14D	100-270	1760
1500	PE14G	65-291	1760
1500	PE16B	129	1470
2000	PE14G	60-270	1760
2000	++PE14G	105	1760
2000	PE16B	104-262	1760
2000	PE18E	65-230	1460
2500	PE16E	103-280	1760
2500	PE18E	143	1460
2500	PE18E	61-221	1460
3000	PE16E	155	1760
3000	PE16E	165	1760
3000	PE16E	225	1770
3000	PE18E	58-208	1460
3000	PE20K	117-151	1760
3500	PE18E	107-182	1760
3500	PE20K	112-147	1760
4000	PE20K	108-142	1760
4500	PE20K	104-138	1760
4500	PE20K	165	1770
5000	PE20K	134	1760



SPP Fire Pump Listings
UL Listed and FM Approved
Multi-Stage Horizontal Split Case



Capacity GPM	Size Inches	Model Designation	Stages	Rated Pressure psi	Approximate Speed RPM	Maximum Working Pressure psi
500	4	PD04A	2	100-175	1800	428
500	4	PD04K	2	158-269	2800	550
500	4	PD04K	2	170-300	2950	550
500	4	PD04K	2	183-312	3000	550
500	4	PD04K	2	229-384	3300	550
500	4	PD04K	2	272-446	3550	550
500	4	PD04Y	3	176-250	1800	428
500	5	PD05C	2	196-372	2800	600
500	5	PD05C	2	226-414	2950	600
500	5	PD05C	2	234-429	3000	600
500	5	PD05C	2	302-557	3300	600
500	5	PD05C	2	351-646	3550	600
500	5	PD05A	2	132-197	1760	420
500	5	PD05A	2	173-275	2100	420
500	6	BM05J	2	117	1450	205
500	5	TY12D	2	145-191	1760	450
500	5	TY12D	2	173-223	1900	450
500	5	TY12D	2	214-276	2100	450
500	5	TY12D	2	260-334	2300	450
500	5	TY12D	2	273-350	2350	450
500	5	TX12D	2	256-330	2950	450
500	6	TX15E	2	277-370	2950	478
500	6	TY15E	2	300-375	2350	478
500	6	TY15E	2	288-360	2300	478
500	6	TY15E	2	240-298	2100	478
500	6	TY15E	2	195-242	1900	478
500	6	TY15E	2	171-210	1760	478
500	6	TX15F	2	283-378	2950	478
750	4	PD04K	2	199-240	2800	550
750	4	PD04K	2	227-272	2950	550
750	4	PD04K	2	234-286	3000	550
750	4	PD04K	2	295-352	3300	550
750	4	PD04K	2	235-417	3550	550
750	5	PD05A	2	100-180	1800	420
750	5	PD05A	2	165-265	2100	420
750	5	PD05L	3	181-390	1775	510
750	5	PD05C	2	188-364	2800	600
750	5	PD05C	2	212-407	2950	600
750	5	PD05C	2	220-421	3000	600
750	5	PD05C	2	289-547	3300	600
750	5	PD05C	2	337-636	3550	600
750	5	TY12D	2	163-200	1900	450
750	5	TY12D	2	190-250	2100	450
750	5	TY12D	2	240-312	2300	450
750	5	TY12D	2	250-328	2350	450
750	5	TX12D	2	230-300	2950	450
750	6	TX15E	2	268-360	2950	478
750	6	TY15E	2	296-370	2350	478
750	6	TY15E	2	284-353	2300	478
750	6	TY15E	2	235-294	2100	478
750	6	TY15E	2	190-237	1900	478
750	6	TY15E	2	166-205	1760	478



SPP Fire Pump Listings
UL Listed and FM Approved
Multi-Stage Horizontal Split Case



Capacity GPM	Size Inches	Model Designation	Stages	Rated Pressure psi	Approximate Speed RPM	Maximum Working Pressure psi
750	6	TX15F	2	276-370	2950	478
1000	6	PD06A	2	100-210	1800	500
1000	6	TX15E	2	254-346	2950	478
1000	6	TY15E	2	291-361	2350	478
1000	6	TY15E	2	278-345	2300	478
1000	6	TY15E	2	227-285	2100	478
1000	6	TY15E	2	181-230	1900	478
1000	6	TY15E	2	155-196	1760	478
1000	6	TX15F	2	268-361	2950	478
1250	6	TX15E	2	275-329	2950	478
1250	6	TY15E	2	278-347	2350	478
1250	6	TY15E	2	265-331	2300	478
1250	6	TY15E	2	214-274	2100	478
1250	6	TY15E	2	170-215	1900	478
1250	6	TX15F	2	246-348	2950	478
1500	8	PD08A	2	151-175	1800	335



SPP Fire Pump Listings
UL Listed and FM Approved
End Suction Fire Pump



Capacity GPM	Size Inches	Model Designation	Rated Pressure psi	Approximate Speed RPM	Maximum Working Pressure psi
200	2	KP05E	70-112	2600	239
200	3	KP08V	52-81	2950	203
200	2.5	KP06D	55-101	2950	203
200	2	KP05E	93-148	2950	239
200	3	KP08V	74-115	3500	203
200	3	AV03N	51-78	3500	203
250	2	KP05E	90-108	2600	239
250	2.5	KP06D	55-101	2950	203
250	2	KP05E	88-142	2950	239
250	3	KP08V	51-78	2950	203
250	3	KP08V	73-112	3500	203
250	3	AV03N	50-77	3500	203
300	3	KP08E	89-147	2950	203
300	3	KP08E	80-132	2800	203
300	3	KP08E	69-114	2600	203
300	3	KP08E	55-92	2350	203
300	2	KP05E	122-135	2950	239
300	2.5	KP06D	52-100	2950	203
300	3	KP08V	49-76	2950	203
300	3	KP08V	71-110	3500	203
300	3	AV03N	48-75	3500	203
400	5	KP12Y	107	1900	203
400	5	KP12Y	96	1800	203
400	5	KP12Y	67	1500	203
400	5	KP12Y	62	1450	203
400	3	KP08E	86-145	2950	203
400	3	KP08E	77-130	2800	203
400	3	KP08E	66-112	2600	203
400	3	KP08E	52-91	2350	203
400	2.5	KP06D	62-97	2950	203
400	3	KP08V	46-71	2950	203
400	3	KP08V	68-104	3500	203
400	3	AV03N	43-70	3500	203
450	3	KP08E	84-144	2950	203
450	3	KP08E	75-129	2800	203
450	3	KP08E	63-111	2600	203
450	3	KP08E	50-88	2350	203
450	3	KP08V	44-68	2950	203
450	3	KP08V	67-100	3500	203
450	3	AV03N	40-67	3500	203
500	3	KP08E	82-142	2950	203
500	3	KP08E	72-127	2800	203
500	3	KP08E	61-108	2600	203
500	3	KP08E	86	2350	203
500	3	KP08V	64-97	3500	203
500	6	KP15Y	112-159	3000	247
500	6	KP15Y	108-154	2950	247
500	6	KP15Y	98-138	2800	247
500	6	KP15Y	85-149	2600	247
750	6	KP15Y	111-158	3000	247
750	6	KP15Y	107-153	2950	247
750	6	KP15Y	97-137	2800	247
750	6	KP15Y	83-148	2600	247
1000	6	KP15Y	110-157	3000	247
1000	6	KP15Y	106-152	2950	247
1000	6	KP15Y	95-136	2800	247
1000	6	KP15Y	79-145	2600	247
1250	6	KP15Y	105-154	3000	247
1250	6	KP15Y	101-149	2950	247
1250	6	KP15Y	89-132	2800	247
1250	6	KP15Y	74-142	2600	247
1500	6	KP15Y	99-150	3000	247
1500	6	KP15Y	95-149	2950	247
1500	6	KP15Y	80-127	2800	247

SPP Pump Model	Shaft Size (Inch)	Max Impeller mm	Min Impeller mm	Primary Flow Rating (USgpm)	Primary Flow Rating Speed (Rpm)
TB08D	1	235	190	200 / 250 / 300 / 400 / 500	3550
TB08E	1	210	160	500	3550
TB10D	1 5/8	245	210	400 / 500 / 750	3550
TE10D	1 5/8	370	270	500	1760
TB10E	1 5/8	210	184	500 / 750	3550
TD10E	1 1/8	280	225	200 / 250	3550
TB12D	1 5/8	245	210	500 / 750 / 1000	3550
TB12E	1 5/8	210	180	750 / 1000	3550
TB12F	1 5/8	245	205	1000 / 1250	3550
TC12F	1 1/8	286	210	500 / 750	3550
TC12G	1 1/8	274	230	500 / 750 / 1000	3550
TD12F	1 5/8	282	230	750 / 1000 / 1250	3550
TE12E	1 5/8	380	285	750 / 1000	3000
TY12D	2	400	350	500	1760
TB15E	1 5/8	252	215	1000 / 1250 / 1500	3550
TD15F	1 5/8	325	280	1000	1760
TE15D	1 5/8	375	302	1000 / 1250 / 1500	1760
TE15E	1 5/8	375	275	1000 / 1250	1760
TF15E	2 1/8	275	375	1000	1760
TY15E	2	405	365	500 / 750 / 1000	1760
TD20D	2 1/8	340	281	1500	1760
TD20E	2 1/8	285	240	1500 / 2000	3550
TF20D	2 1/8	480	386	2000 / 2500	1760
TF20E	2 1/8	480	352	2000 / 2500	1760
TF20F	2 1/8	480	352	1500 / 2000 / 2500	1760

Pumps: Assembled complete with soft packed glands

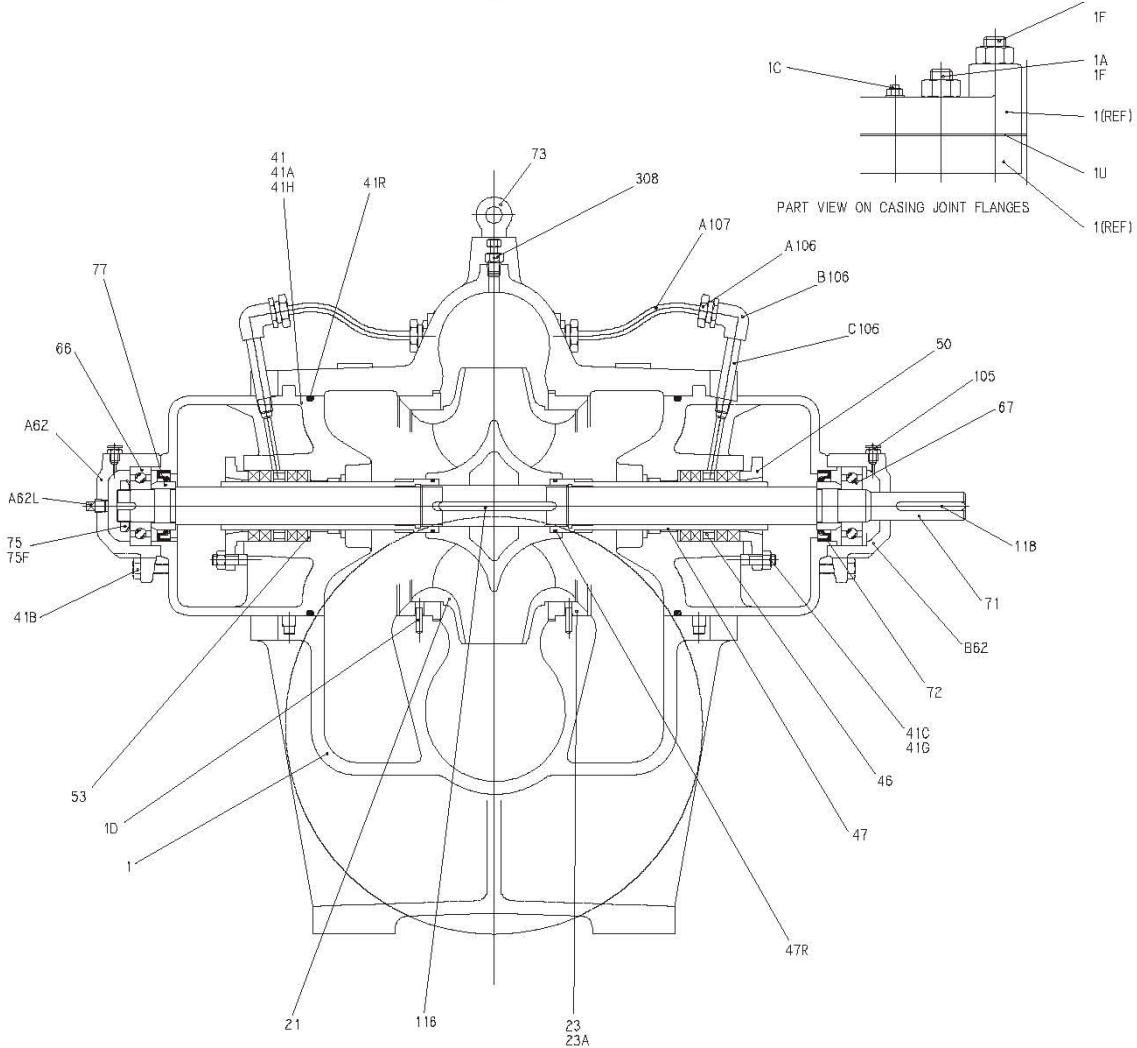
**Materials: CI casing : Bronze impeller : HTS shaft : Bronze gland follower
st st gland studs : st st plugs**

Pumps: Imperial studs & nuts : ANSI flanges (125 or 250)



Cross Sectionals

MODULE 3 - Soft Packed Sectional Arrangement



ITEM No.	DESCRIPTION	ITEM No.	DESCRIPTION	ITEM No.	DESCRIPTION
1	CASING	41H	WASHER	72X	LOCATING SLEEVE
1A	STUD - CASING	41R	'O' RING - INSERT	73	EYE BOLT
1B	STUD - CASING	46	LANTERN RING	75	BRG RETAINING NUT
1C	DOWEL PIN - CASING	47	SLEEVE	75F	LOCKING WASHER
1D	DOWEL PIN - INSERT	47R	'O' RING	77	SHOULDER RING
1F	NUT - CASING	51	GLAND	105	GREASE NIPPLE
1U	GASKET - CASING	53	SPACER	A106	STUD COUPLING
21	IMPELLER	A62	BRG HOUSING - N.D.E.	B106	ELBOW
23	WEAR RING - CASING	A62L	PLUG BRG. HOUSING - N.D.E.	C106	TUBULAR PIECE
23A	DOWEL PIN - WEAR RING	B62	BRG HOUSING - D.E.	A107	PIPE (BALANCING)
41	INSERT	66	BEARING - N.D.E.	116	KEY - IMPELLER
41B	HEX. HEAD SCREW	67	BEARING - D.E.	118	KEY - COUPLING
41C	STUD	71	SHAFT	308	AIR VALVE
41G	NUT	72	OIL SEAL		

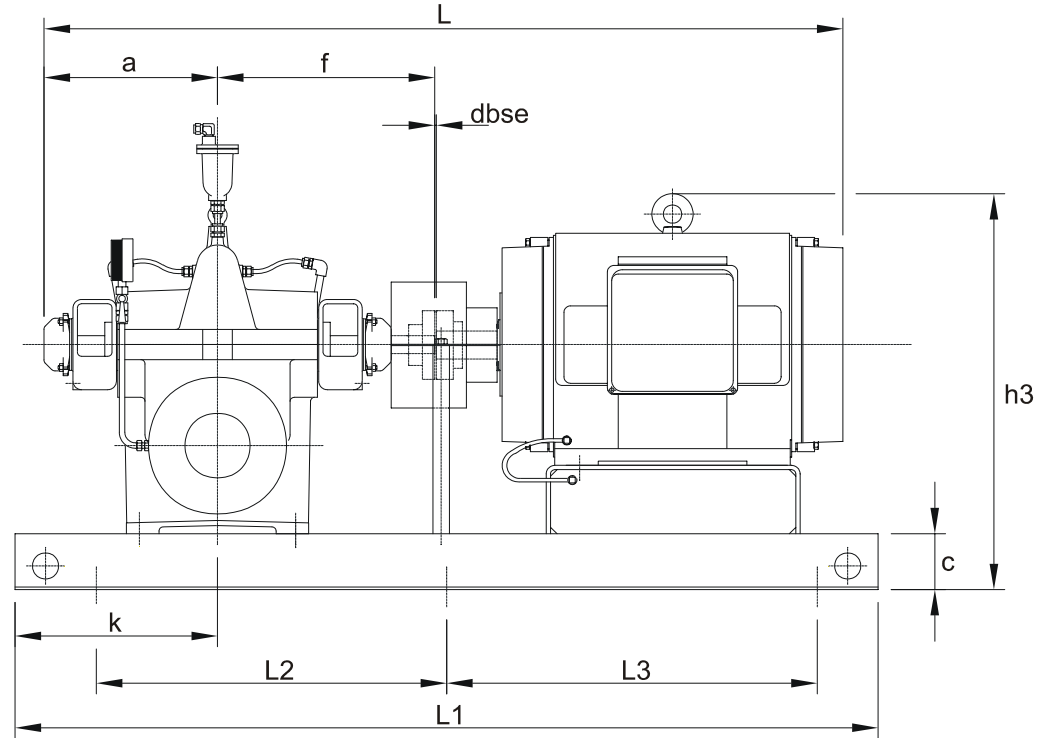
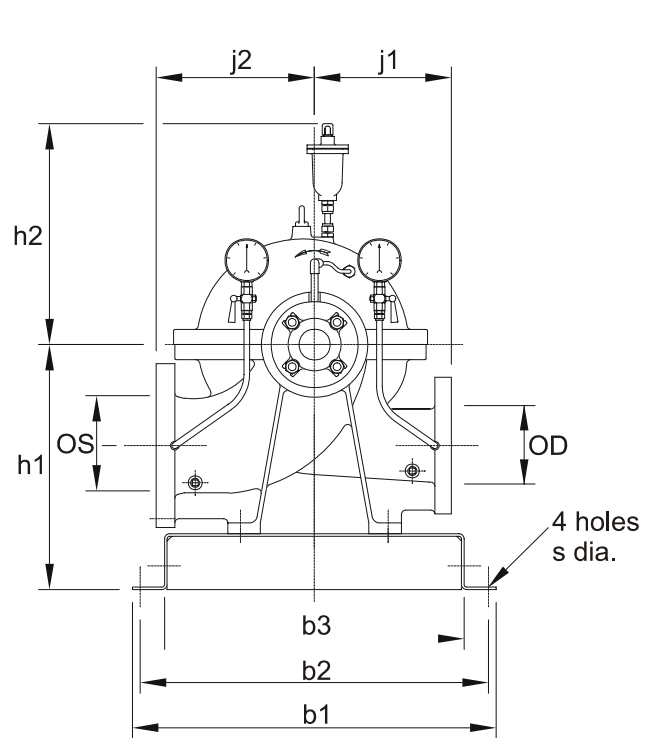


Outline Drawings Electric Driven Fire Pumps



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PUMP TYPE:- TB08D / E



Model	Hp	Motor	Pole	OS	OD	a	f	h1	h2	h3	dbse	L	L1	L2	L3	B1	B2	B3	c	s	K	j1	j2	lbs
TB08	25	256T	2	4	3	13	15.69	15	9.81	18.37	0.25	51.34	64	4	28	32	30	27	4	7/8	16	10.62	9.06	807
TB08	30	284TS	2	4	3	13	15.69	15	9.81	20.02	0.25	50.94	64	4	28	32	30	27	4	7/8	16	10.62	9.06	915
TB08	40	286TS	2	4	3	13	15.69	15	9.81	20.02	0.25	52.44	64	4	28	32	30	27	4	7/8	16	10.62	9.06	999
TB08	50	324TS	2	4	3	13	15.69	15	9.81	22.11	0.25	53.63	64	4	28	32	30	27	4	7/8	16	10.62	9.06	1060
TB08	60	326TS	2	4	3	13	15.69	15	9.81	22.11	0.25	55.12	64	4	28	32	30	27	4	7/8	16	10.62	9.06	1146
TB08	75 / 100	364/5TS	2	4	3	13	15.69	15	9.81	25.22	0.25	56.58	64	4	28	32	30	27	4	7/8	16	10.62	9.06	1277

Notes:-

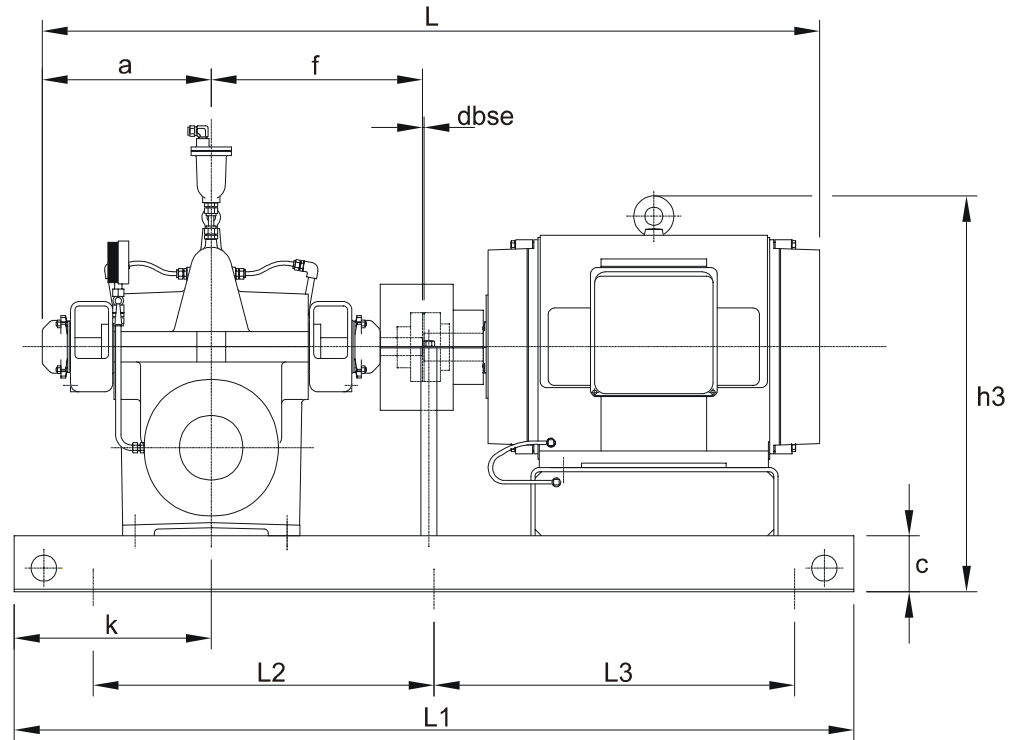
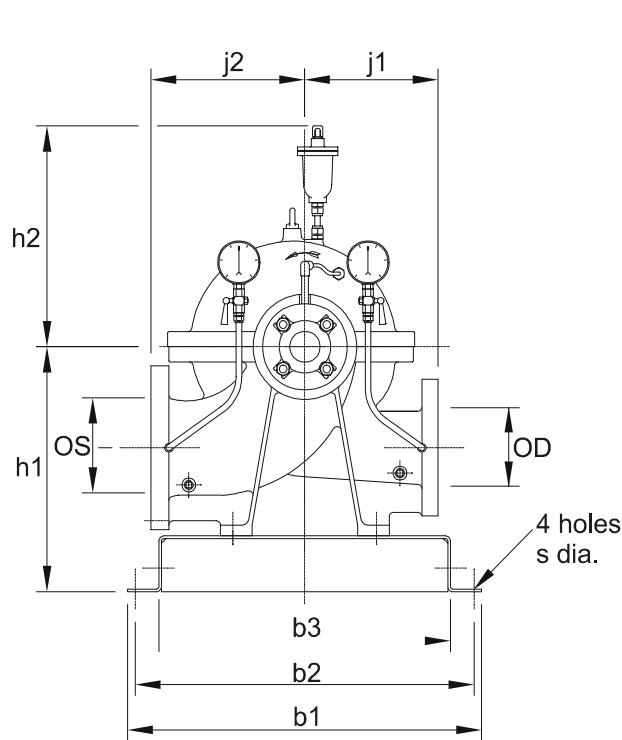
- 250lb Suction / 250lb Discharge Flat Face ANSI Flanges.
- Suction / Discharge Gauges and Automatic Air Release Valve Shown Are Available At Additional Cost.

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PUMP TYPE:- TB10D / E



Model	Hp	Motor	Pole	OS	OD	a	f	h1	h2	h3	dbse	L	L1	L2	L3	B1	B2	B3	c	s	K	j1	j2	lbs
TB10	40	286TS	2	6	4	15.75	19.68	17.38	12.12	20.02	0.25	59.18	64	4	28	32	30	27	4	7/8	16	12.19	9.81	1047
TB10	50	324TS	2	6	4	15.75	19.68	17.38	12.12	22.11	0.25	60.37	64	4	28	32	30	27	4	7/8	16	12.19	9.81	1108
TB10	60	326TS	2	6	4	15.75	19.68	17.38	12.12	22.11	0.25	61.86	64	4	28	32	30	27	4	7/8	16	12.19	9.81	1194
TB10	75 / 100	364/5TS	2	6	4	15.75	19.68	17.38	12.12	25.22	0.25	63.32	74	4	32	36	34	31	4	7/8	16	12.19	9.81	1500

Notes:-

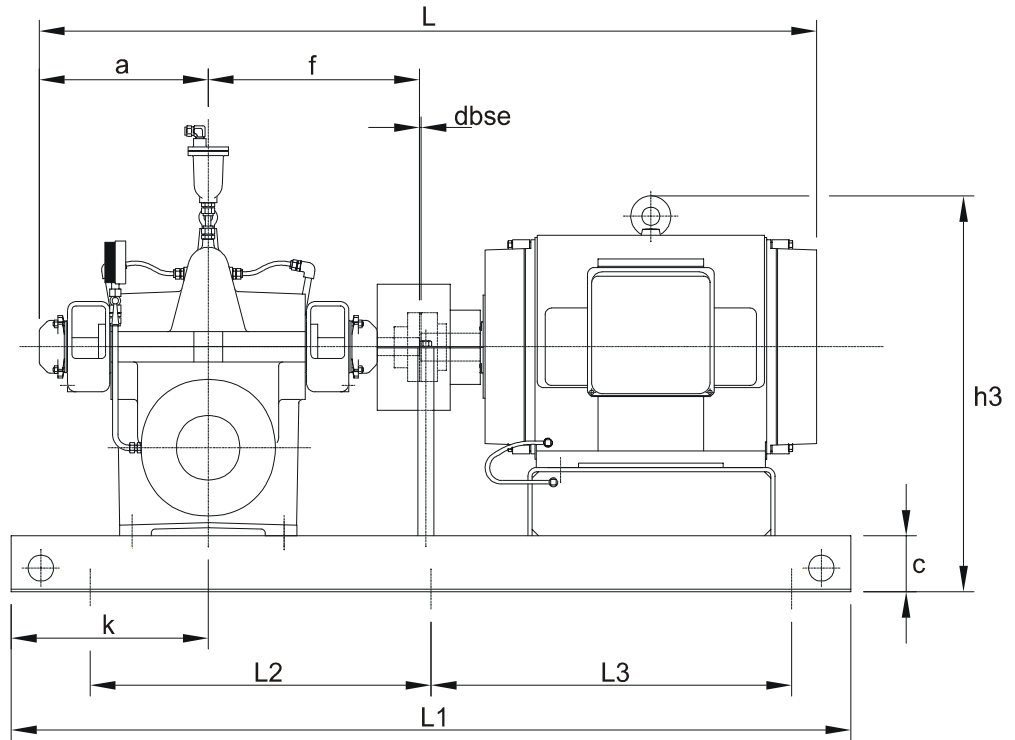
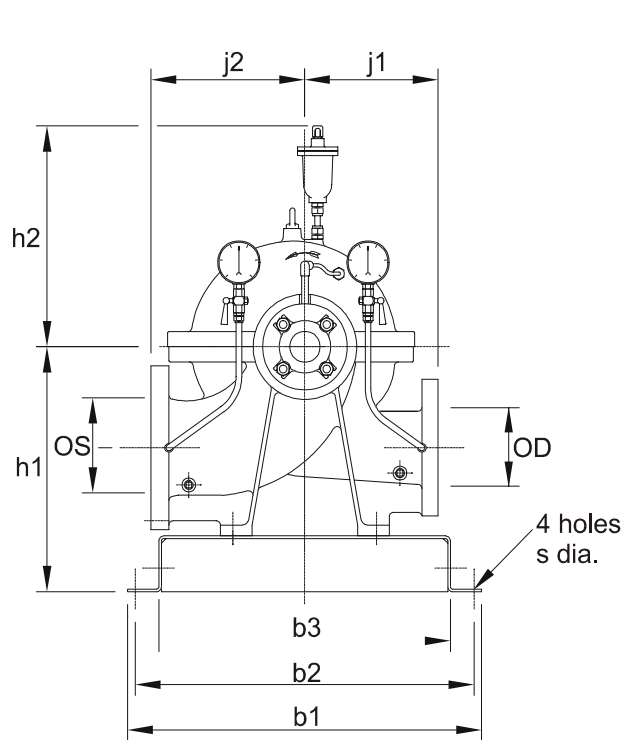
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PUMP TYPE:- TB12D / E / F



Model	Hp	Motor	Pole	OS	OD	a	f	h1	h2	h3	dbse	L	L1	L2	L3	B1	B2	B3	c	s	K	j1	j2	lbs
TB12	50	324TS	2	6	5	15.75	19.68	17.38	11.62	22.11	0.25	60.37	64	4	28	32	30	27	4	7/8	16	13.78	9.81	1108
TB12	60	326TS	2	6	5	15.75	19.68	17.38	11.62	22.11	0.25	61.86	64	4	28	32	30	27	4	7/8	16	13.78	9.81	1194
TB12	75 / 100	364/5TS	2	6	5	15.75	19.68	17.38	11.62	25.22	0.25	63.32	74	4	32	36	34	31	4	7/8	16	13.78	9.81	1500
TB12	125 / 150	404/5TS	2	6	5	15.75	19.68	17.38	11.94	26.2	0.25	66.82	74	4	32	36	34	31	4	7/8	16	13.78	9.81	1570

Notes:-

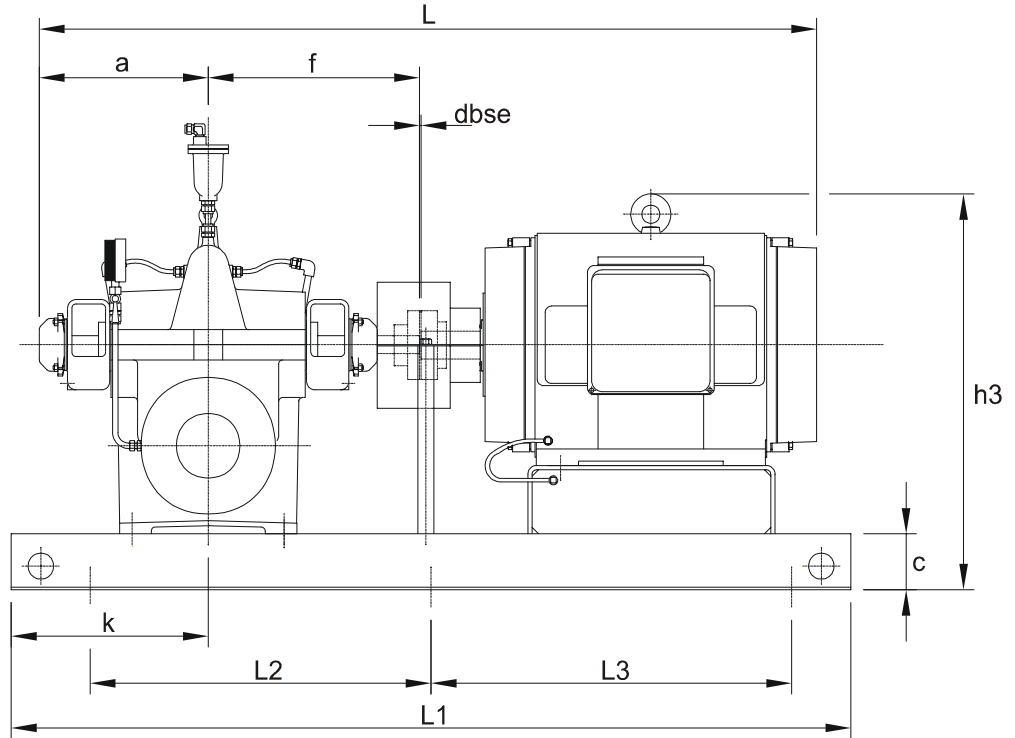
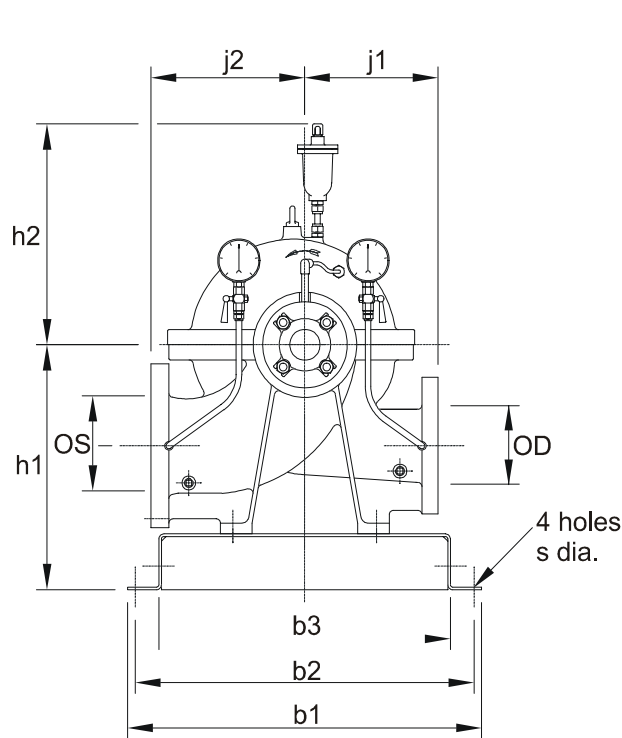
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PUMP TYPE:- TB15E



Model	Hp	Motor	Pole	OS	OD	a	f	h1	h2	h3	dbse	L	L1	L2	L3	B1	B2	B3	c	s	K	j1	j2	lbs
TB15	75 / 100	364/5TS	2	8	6	15.75	19.68	19.38	11.62	25.22	0.25	63.32	74	4	32	36	34	31	4	7/8	16	14.38	12.19	1700
TB15	125 / 150	404/5TS	2	8	6	15.75	19.68	19.38	11.94	26.2	0.25	66.82	74	4	32	36	34	31	4	7/8	16	14.38	12.19	1940
TB15	200 / 250	444/5TS	2	8	6	15.75	19.68	19.38	11.94	29.98	0.25	71.74	74	4	32	36	34	31	4	7/8	16	14.38	12.19	2307

Notes:-

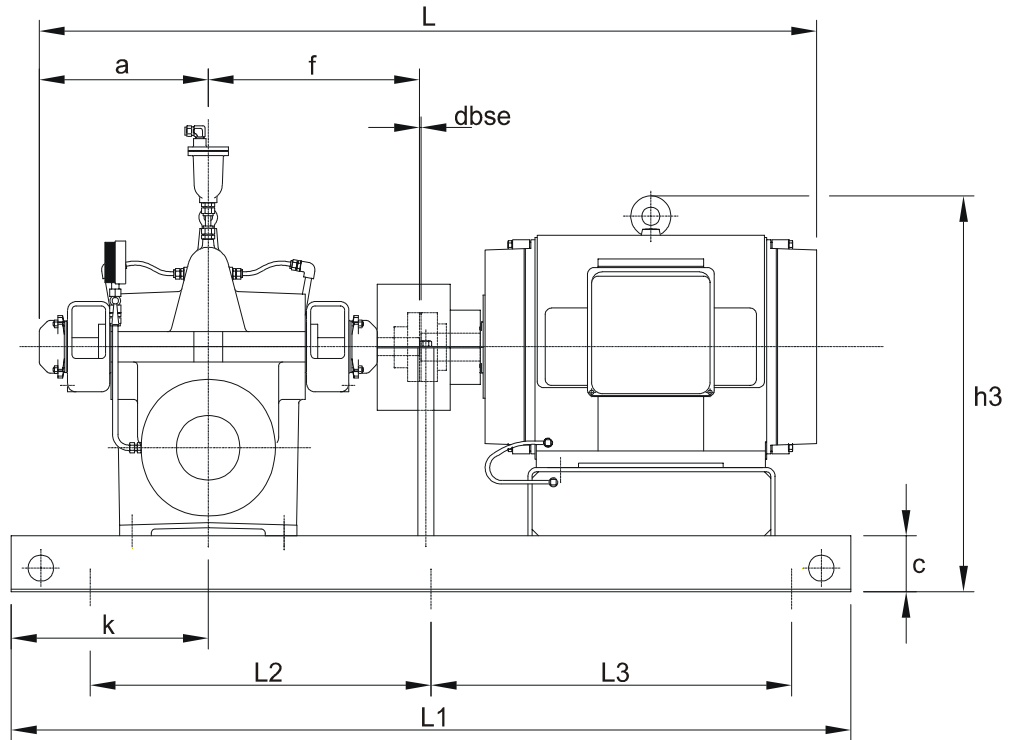
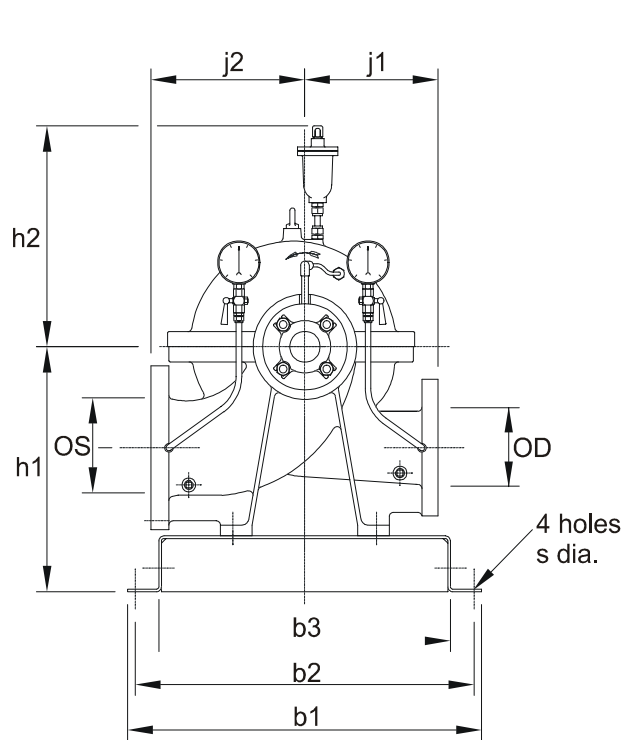
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PUMP TYPE:- TC12F / G



Model	Hp	Motor	Pole	OS	OD	a	f	h1	h2	h3	dbse	L	L1	L2	L3	B1	B2	B3	c	s	K	j1	j2	lbs
TC12	125 / 150	404/5TS	2	6	5	13	15.69	17.38	11.56	26.2	0.25	60.08	64	4	28	32	30	27	4	7/8	16	12.19	11.14	1570
TC12	200 / 250	444/5TS	2	6	5	13	15.69	17.38	11.56	29.98	0.25	65	74	4	32	36	34	31	4	7/8	16	12.19	11.14	2251

Notes:-

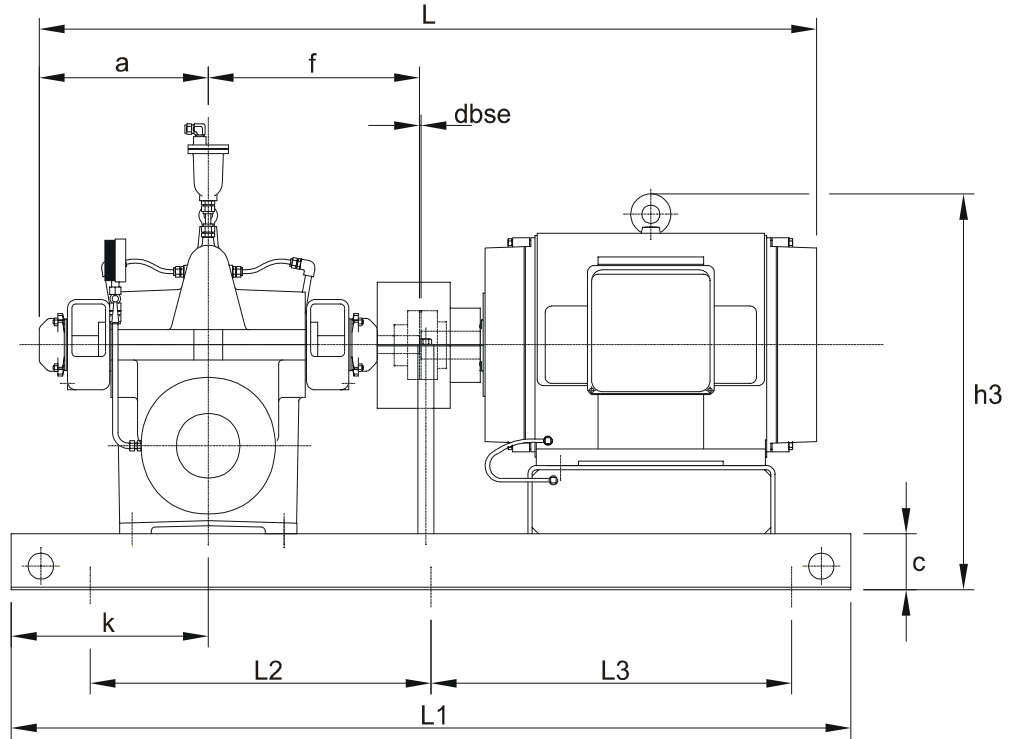
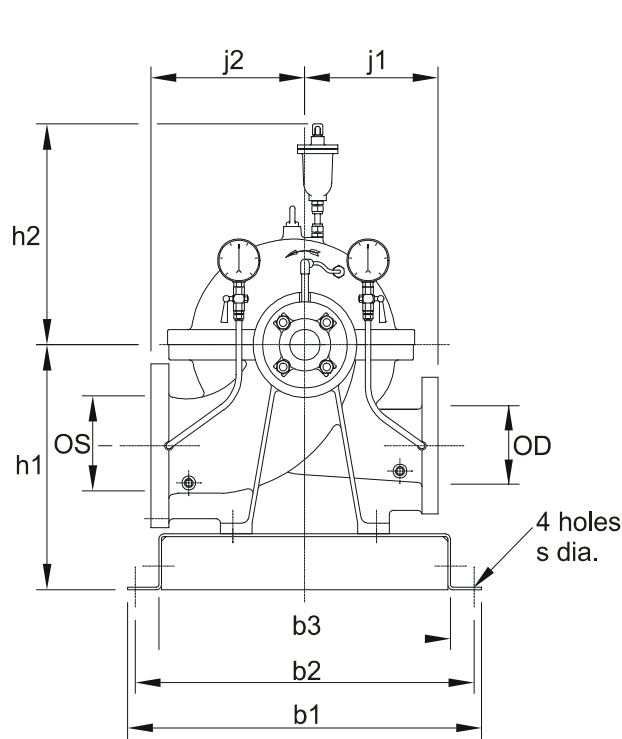
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PUMP TYPE:- TD10E



Model	Hp	Motor	Pole	OS	OD	a	f	h1	h2	h3	dbse	L	L1	L2	L3	B1	B2	B3	c	s	K	j1	j2	lbs
TD10	75 / 100	364/5TS	2	5	4	13	15.69	16.6	11.77	25.22	0.25	56.58	64	4	28	32	30	27	4	7/8	16	12.6	10.83	1425
TD10	125 / 150	404/5TS	2	5	4	13	15.69	16.6	11.77	26.2	0.25	60.08	64	4	28	32	30	27	4	7/8	16	12.6	10.83	1530

Notes:-

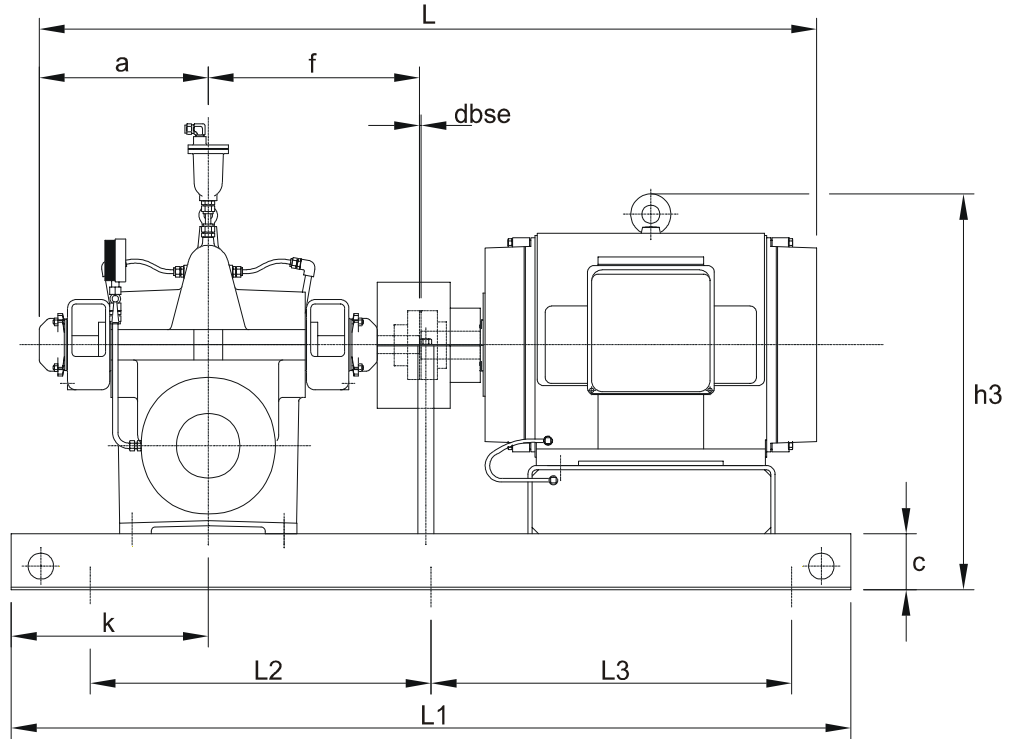
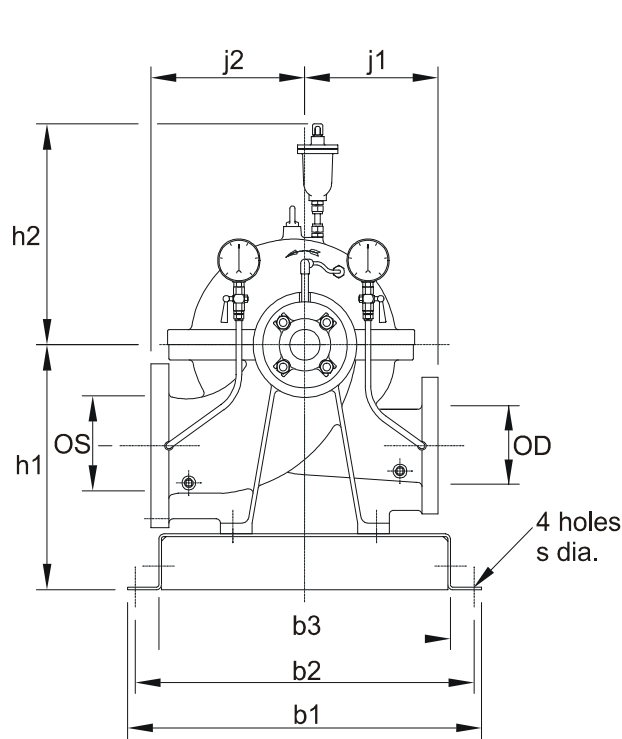
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PUMP TYPE:- TD12F



Model	Hp	Motor	Pole	OS	OD	a	f	h1	h2	h3	dbse	L	L1	L2	L3	B1	B2	B3	c	s	K	j1	j2	lbs
TD12	125 / 150	404/5TS	2	6	5	15.75	19.68	17.38	12.16	26.2	0.25	66.82	74	4	32	36	34	31	4	7/8	16	13.19	11.44	1771
TD12	200 / 250	444/5TS	2	6	5	15.75	19.68	17.38	12.16	29.98	0.25	71.74	74	4	32	36	34	31	4	7/8	16	13.19	11.44	2270

Notes:-

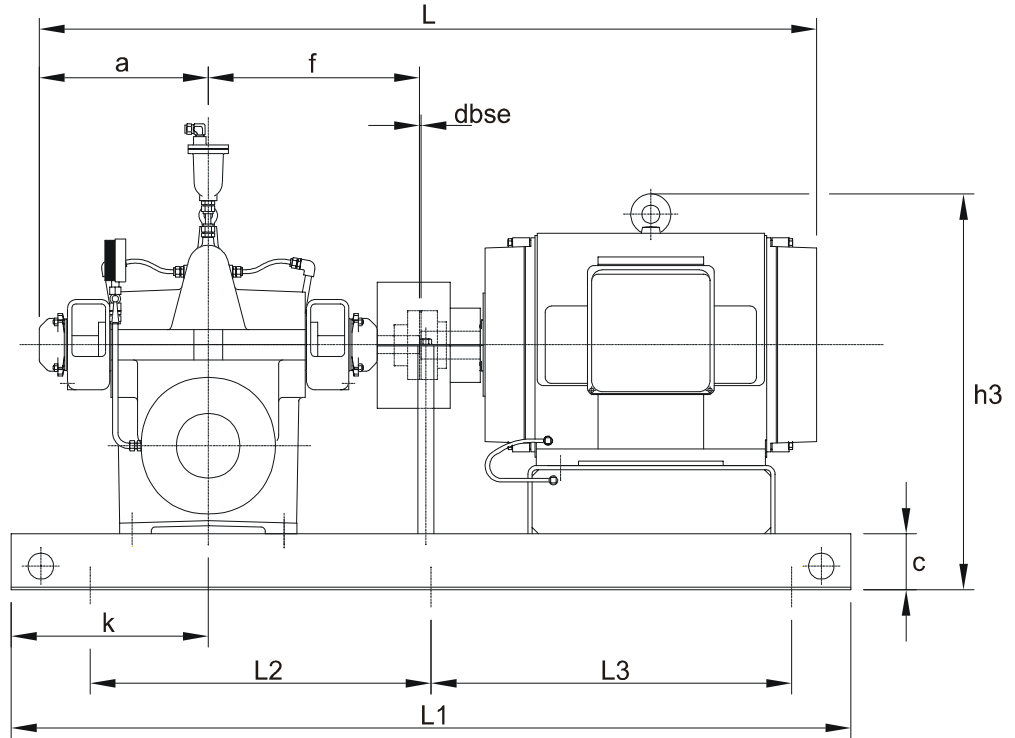
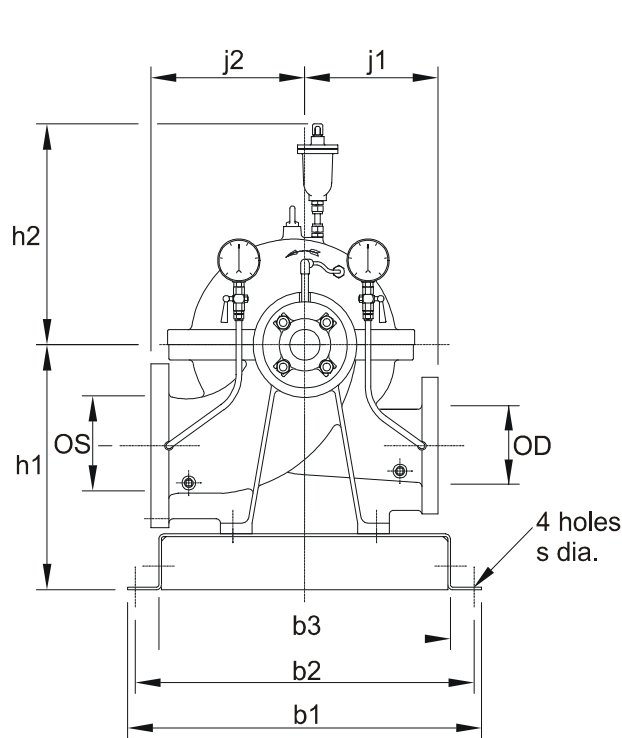
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PUMP TYPE:- TD20E



Model	Hp	Motor	Pole	OS	OD	a	f	h1	h2	h3	dbse	L	L1	L2	L3	B1	B2	B3	c	s	K	j1	j2	lbs
TD20	200 / 250	444/5TS	2	10	8	18.12	23	25.25	15	29.98	0.25	77.43	88	4	40	40	38	35	4	7/8	20	17.72	15.16	3132

Notes:-

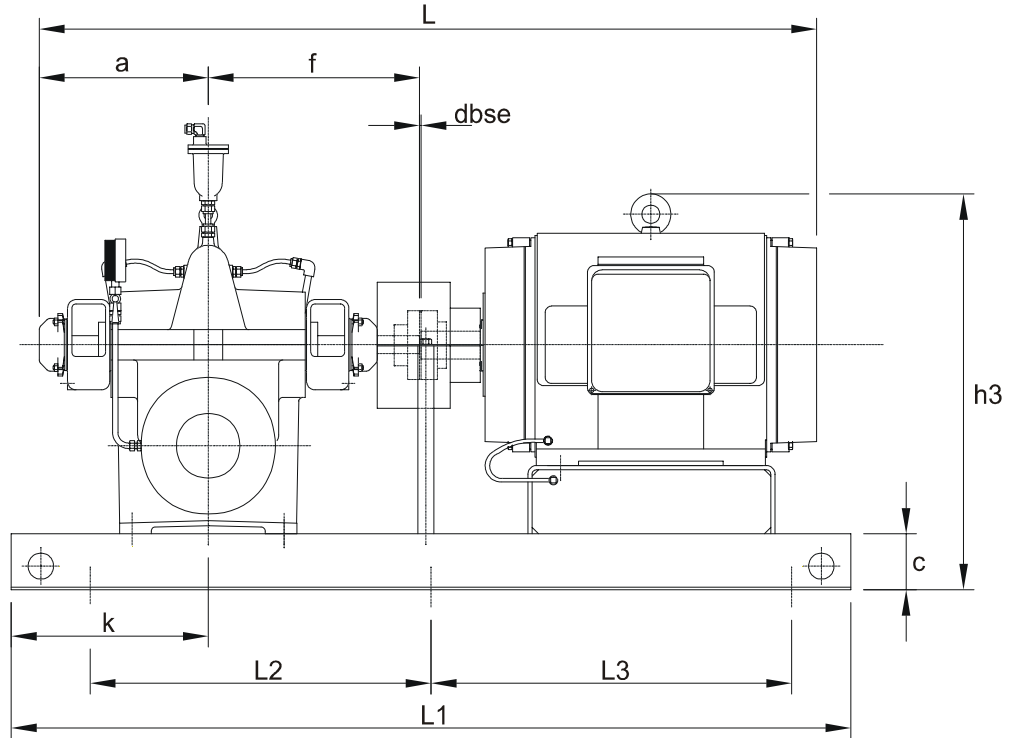
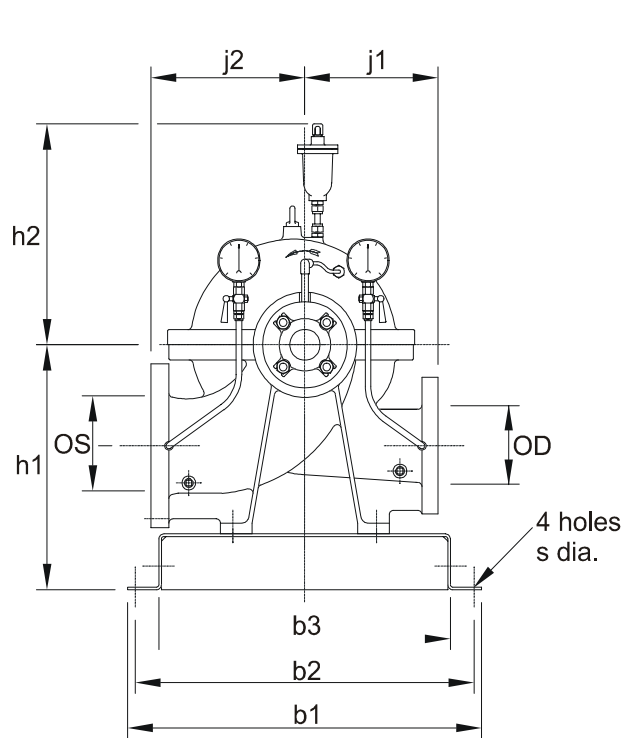
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PUMP TYPE:- TC12F



Model	Hp	Motor	Pole	OS	OD	a	f	h1	h2	h3	dbse	L	L1	L2	L3	B1	B2	B3	c	s	K	j1	j2	lbs
TC12	20	256T	4	6	5	13	15.68	17.38	11.56	18.37	0.25	51.34	64	4	28	32	30	27	4	7/8	16	12.19	11.14	890

Notes:-

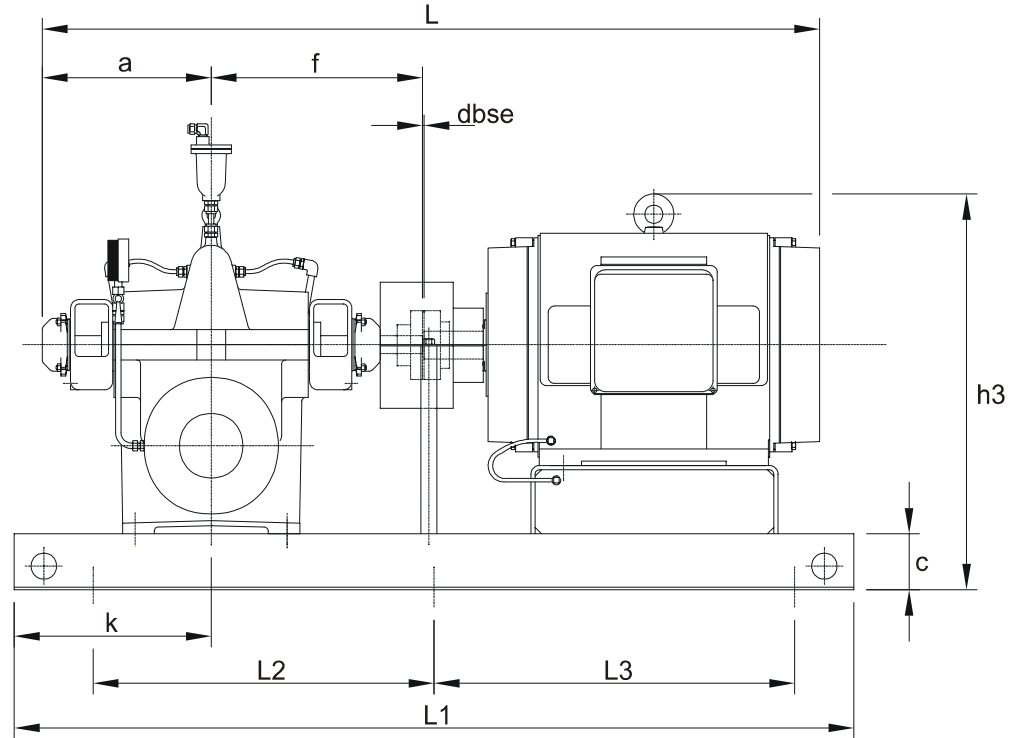
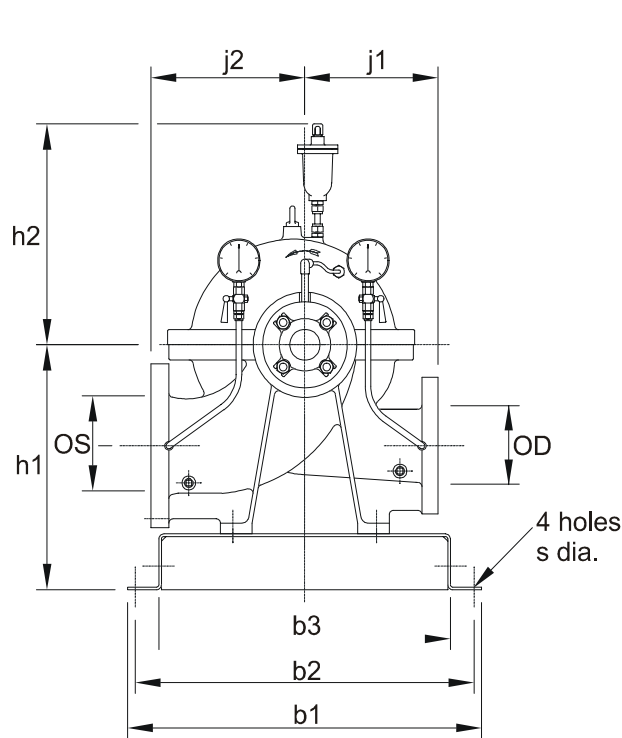
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PUMP TYPE:- TD12F



Model	Hp	Motor	Pole	OS	OD	a	f	h1	h2	h3	dbse	L	L1	L2	L3	B1	B2	B3	c	s	K	j1	j2	lbs
TD12	25	284T	4	6	5	15.75	19.68	17.38	12.16	20.02	0.25	59.07	64	4	28	32	30	27	4	7/8	16	13.19	11.44	986
TD12	30	286T	4	6	5	15.75	19.68	17.38	12.16	20.02	0.25	60.56	64	4	28	32	30	27	4	7/8	16	13.19	11.44	1072

Notes:-

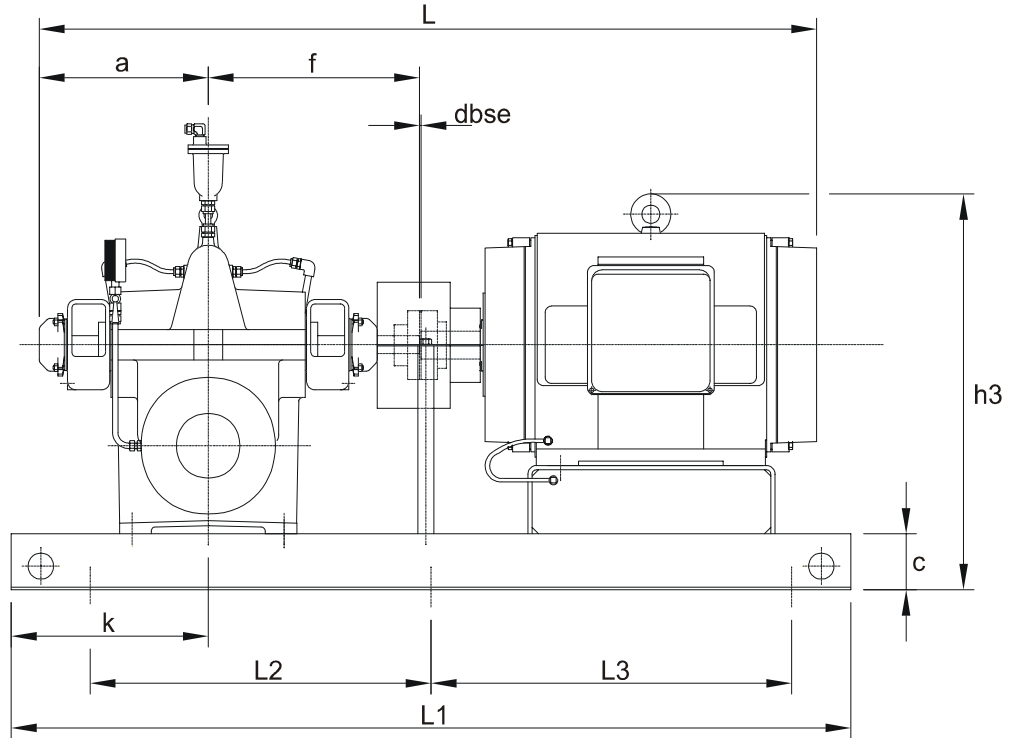
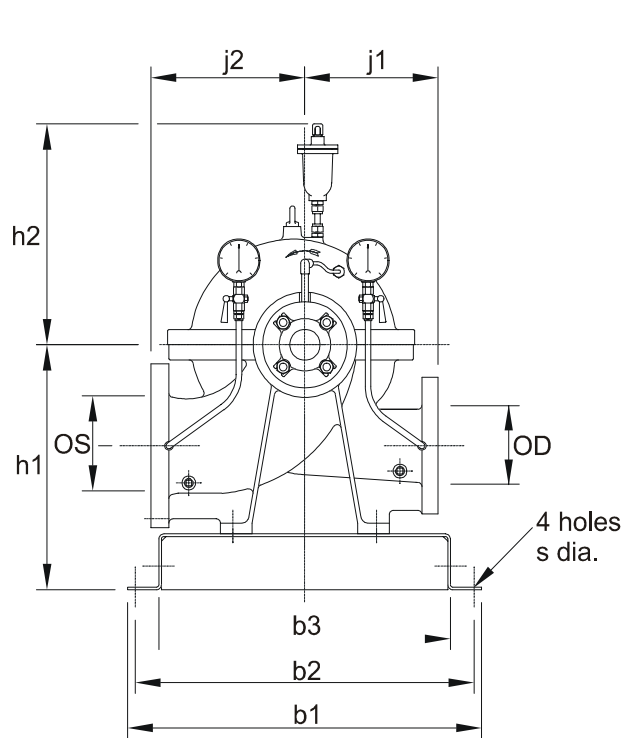
- 1 250lb Suction / 250lb Discharge Flat Face ANSI Flanges.
- 2 Suction / Discharge Gauges and Automatic Air Release Valve Shown Are Available At Additional Cost.

Our policy is one of continuous improvement and we reserve the right to alter specifications at any time.



SPP PUMPS INC.
 6710 Best Friend Road
 Norcross, GA, 30071, USA
 Tel:- (770) 409 - 3280
 Fax:- (770) 409 - 3290
 Email:- john_kahren@sppumps.com
 Web:- www.sppumps.com

PUMP TYPE:- TD15F



Model	Hp	Motor	Pole	OS	OD	a	f	h1	h2	h3	dbse	L	L1	L2	L3	B1	B2	B3	c	s	K	j1	j2	lbs
TD15	40	324T	4	8	6	15.75	19.68	21.32	14.13	22.11	0.25	61.86	64	4	28	32	30	27	4	7/8	16	14.38	12.4	1230

Notes:-

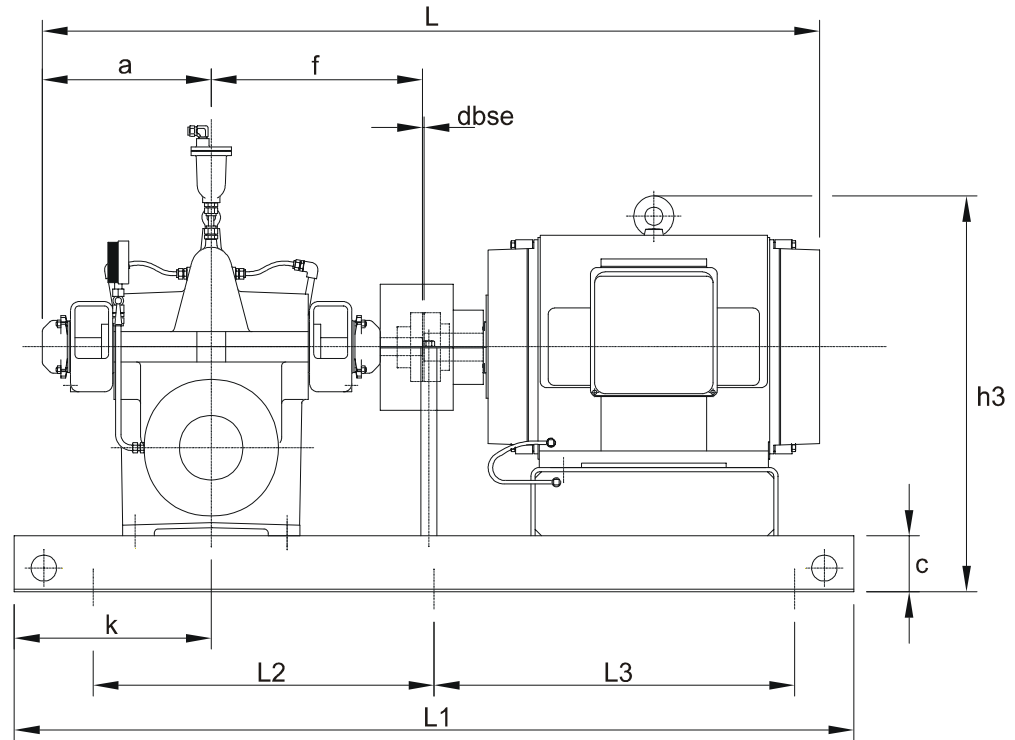
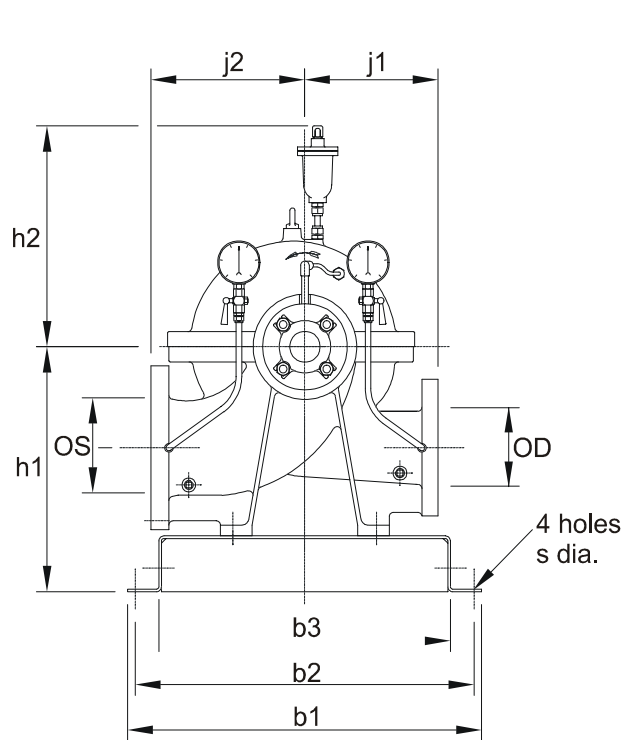
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PUMP TYPE:- TD20D / E



Model	Hp	Motor	Pole	OS	OD	a	f	h1	h2	h3	dbse	L	L1	L2	L3	B1	B2	B3	c	s	K	j1	j2	lbs
TD20	50	326T	4	10	8	18.12	23	25.25	15	22.11	0.25	69.04	88	4	32	36	34	31	4	7/8	16	17.72	15.16	1663
TD20	60 / 75	364/5T	4	10	8	18.12	23	25.25	15	25.22	0.25	71.13	88	4	32	36	34	31	4	7/8	16	17.72	15.16	1950
TD20	100 / 125	404/5T	4	10	8	18.12	23	25.25	15	26.2	0.25	75.5	88	4	40	40	38	35	4	7/8	20	17.72	15.16	2180

Notes:-

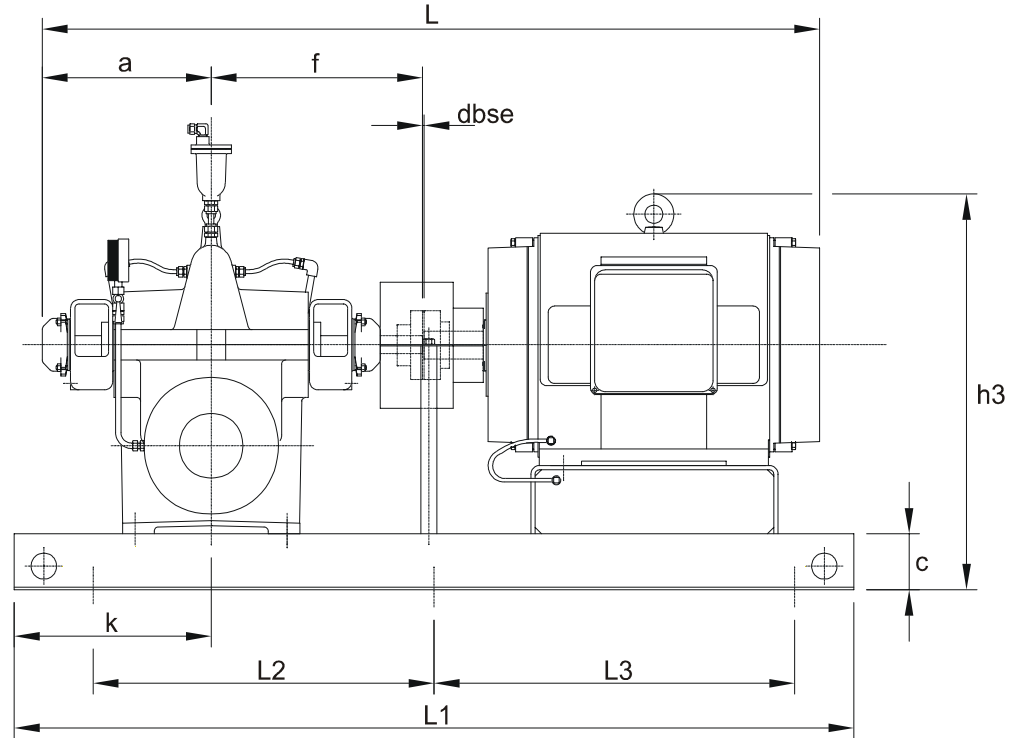
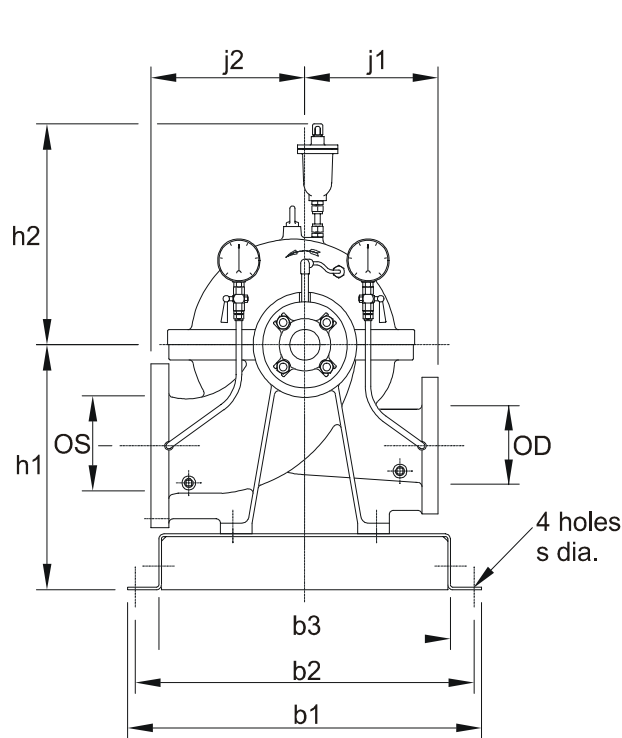
- 1 250lb Suction / 250lb Discharge Flat Face ANSI Flanges.
- 2 Suction / Discharge Gauges and Automatic Air Release Valve Shown Are Available At Additional Cost.

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PUMP TYPE:- TE10D



Model	Hp	Motor	Pole	OS	OD	a	f	h1	h2	h3	dbse	L	L1	L2	L3	B1	B2	B3	c	s	K	j1	j2	lbs
TE10	25	284T	4	6	4	15.75	19.68	17.38	13.62	20.02	0.25	59.07	64	4	28	32	30	27	4	7/8	16	13.38	13.78	966

Notes:-

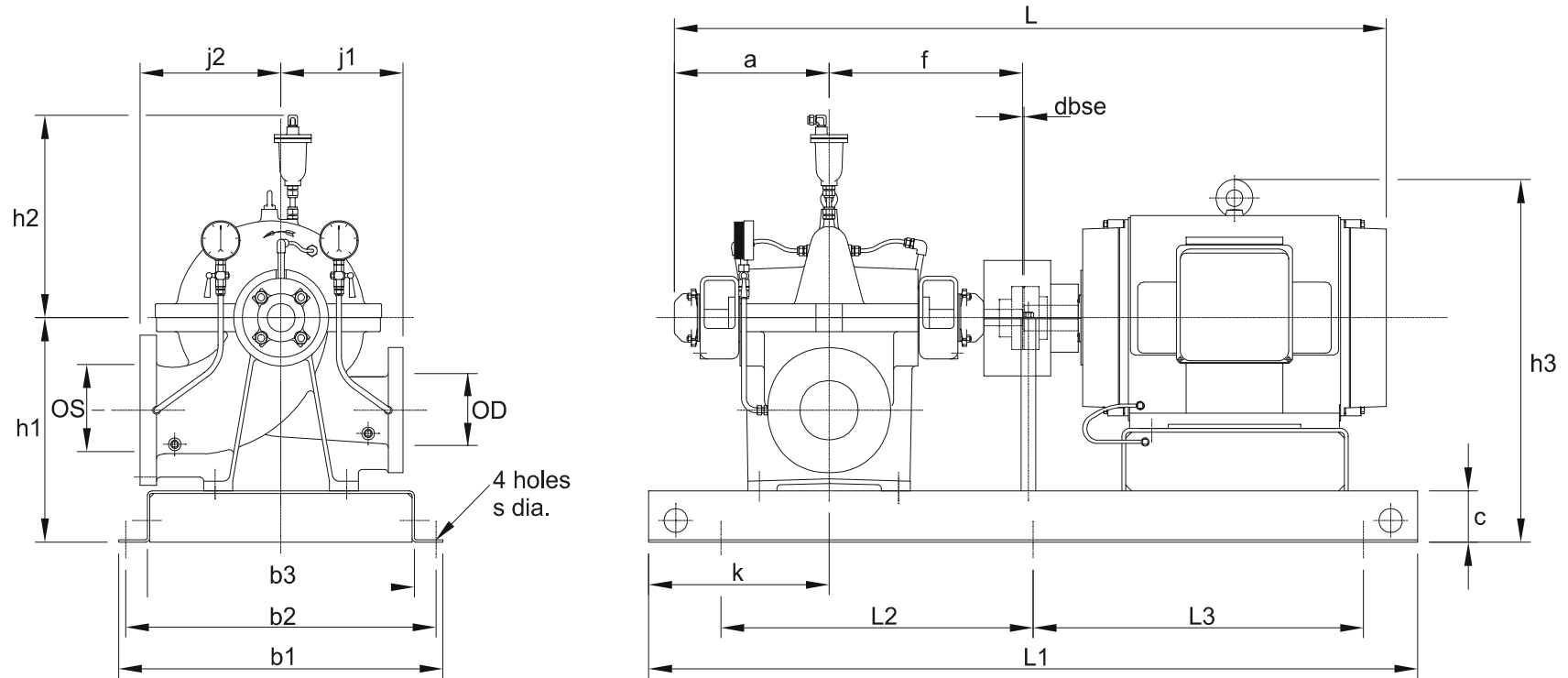
- 1 250lb Suction / 250lb Discharge Flat Face ANSI Flanges.
- 2 Suction / Discharge Gauges and Automatic Air Release Valve Shown Are Available At Additional Cost.

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 Web:- www.sppumps.com

PUMP TYPE:- TE15D / E



Model	Hp	Motor	Pole	OS	OD	a	f	h1	h2	h3	dbse	L	L1	L2	L3	B1	B2	B3	c	s	K	j1	j2	lbs
TE15	50	326T	4	8	6	15.75	19.68	21.32	14.75	22.11	0.25	63.35	64	4	28	32	30	27	4	7/8	16	16.14	13.78	1350
TE15	60 / 75	364/5T	4	8	6	15.75	19.68	21.32	14.75	25.22	0.25	65.44	74	4	32	36	34	31	4	7/8	16	16.14	13.78	1712
TE15	100 / 125	404/5T	4	8	6	15.75	19.68	21.32	14.75	26.2	0.25	65.44	74	4	32	36	34	31	4	7/8	16	16.14	13.78	1939

Notes:-

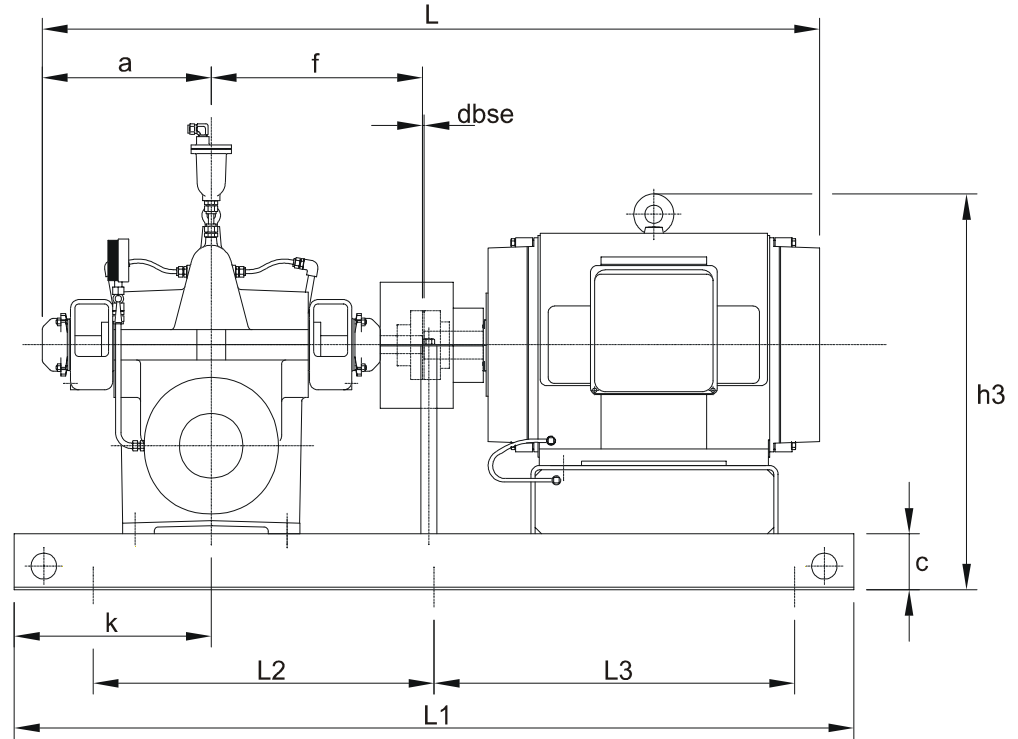
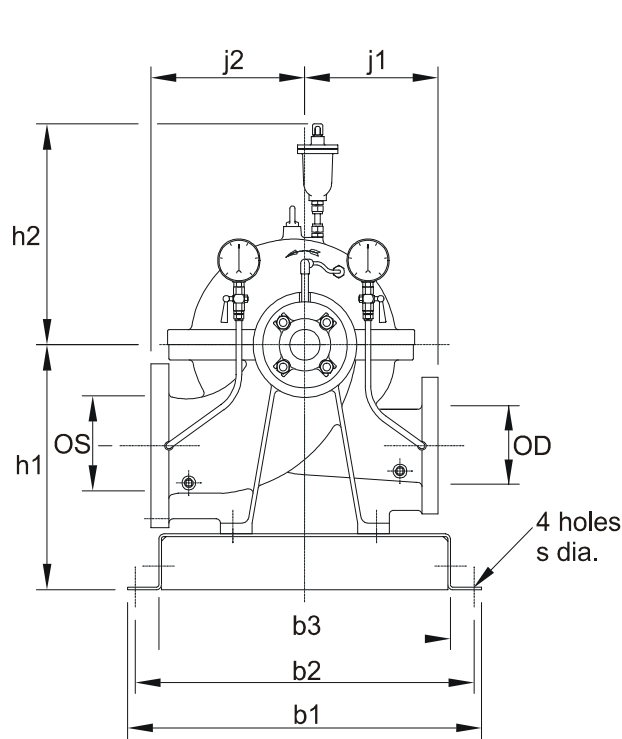
- 1 250lb Suction / 250lb Discharge Flat Face ANSI Flanges.
- 2 Suction / Discharge Gauges and Automatic Air Release Valve Shown Are Available At Additional Cost.

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 Web:- www.sppumps.com

PUMP TYPE:- TF15E



Model	Hp	Motor	Pole	OS	OD	a	f	h1	h2	h3	dbse	L	L1	L2	L3	B1	B2	B3	c	s	K	j1	j2	lbs
TF15	100 / 125	404/5T	4	8	6	18.12	23	25.25	17.78	26.2	0.25	75.48	88	4	40	40	38	35	4	7/8	20	20.08	17.72	2290
TF15	150 / 200 / 250	444/5T	4	8	6	18.12	23	25.25	17.78	29.98	0.25	81.17	88	4	40	40	38	35	4	7/8	20	20.08	17.72	2975

Notes:-

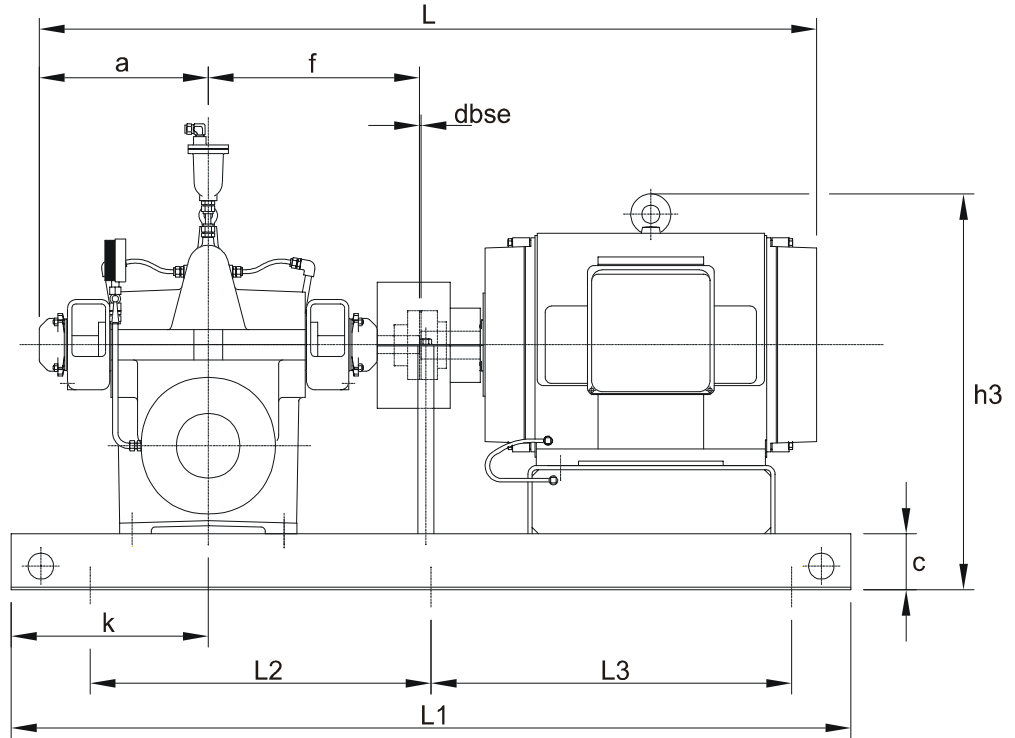
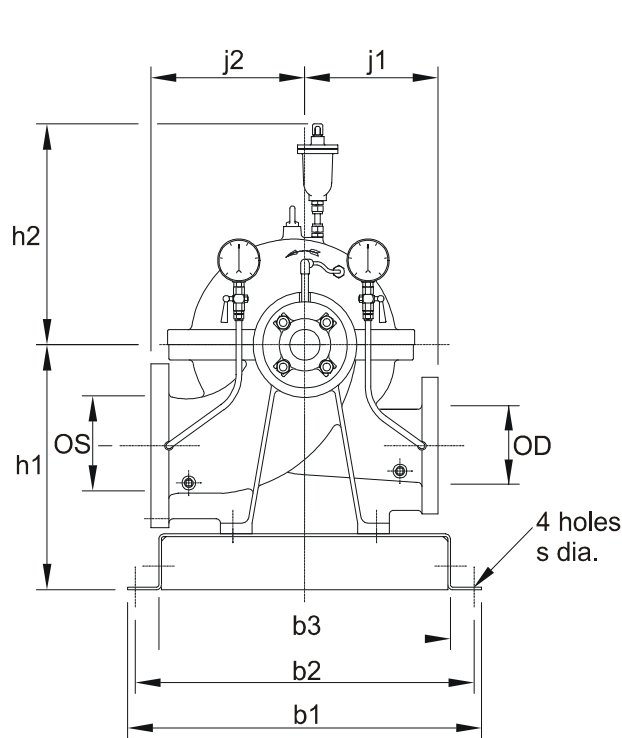
- 1 250lb Suction / 250lb Discharge Flat Face ANSI Flanges.
- 2 Suction / Discharge Gauges and Automatic Air Release Valve Shown Are Available At Additional Cost.

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 Web:- www.sppumps.com

PUMP TYPE:- TF20D / E / F



Model	Hp	Motor	Pole	OS	OD	a	f	h1	h2	h3	dbse	L	L1	L2	L3	B1	B2	B3	c	s	K	j1	j2	lbs
TF20	100 / 125	404/5T	4	10	8	18.12	23	25.25	17.52	26.2	0.25	75.48	88	4	40	40	38	35	4	7/8	20	21.65	17.72	2319
TF20	150 / 200 / 250	444/5T	4	10	8	18.12	23	25.25	17.52	29.98	0.25	81.17	88	4	40	40	38	35	4	7/8	20	21.65	17.72	3264

Notes:-

- 1 250lb Suction / 250lb Discharge Flat Face ANSI Flanges.
- 2 Suction / Discharge Gauges and Automatic Air Release Valve Shown Are Available At Additional Cost.

Our policy is one of continuous improvement and we reserve the right to alter specifications at any time.



**Outline Drawings
Diesel Driven Fire Pumps
with UL driveshafts**



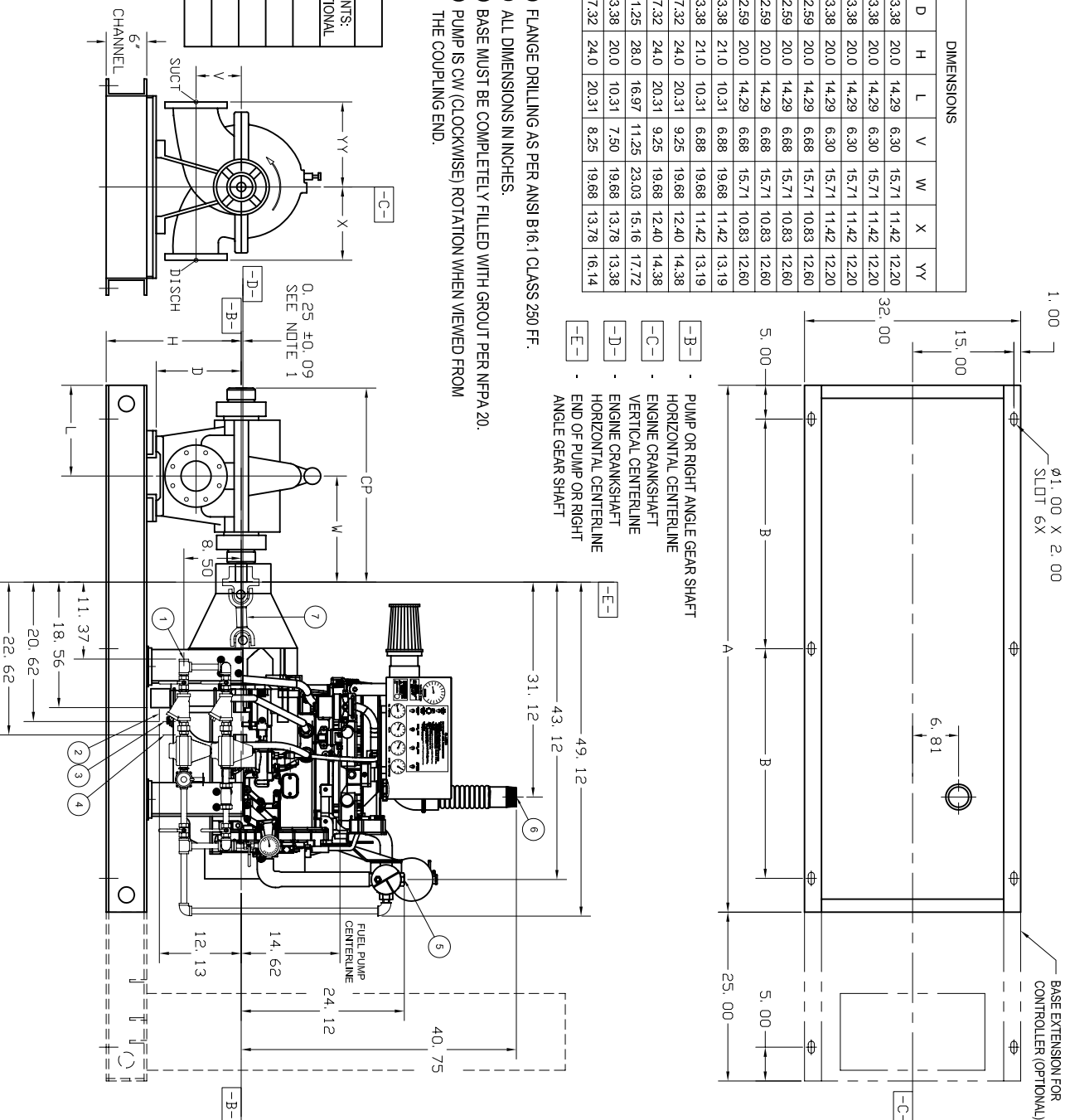
CLARKE FIRE PUMP DRIVERS JU4H-Naturally Aspirated Engine Models

PUMP TYPE	ENGINE MODEL	BRANCHES		DIMENSIONS									
		SUCT	DISCH	A	B	CP	D	H	L	V	W	X	YY
TC12F	JU4H-U-F10	6"	5"	78.0	34.0	28.75	13.38	20.0	14.29	6.30	15.71	11.42	12.20
	JU4H-U-F12	6"	5"	78.0	34.0	28.75	13.38	20.0	14.29	6.30	15.71	11.42	12.20
TD10E	JU4H-U-F14	6"	5"	78.0	34.0	28.75	13.38	20.0	14.29	6.30	15.71	11.42	12.20
	JU4H-U-F22	5"	4"	78.0	34.0	28.75	12.59	20.0	14.29	6.68	15.71	10.83	12.60
TD12F	JU4H-U-F14	5"	4"	78.0	34.0	28.75	12.59	20.0	14.29	6.68	15.71	10.83	12.60
	JU4H-U-F22	5"	4"	78.0	34.0	28.75	12.59	20.0	14.29	6.68	15.71	10.83	12.60
TD15F	JU4H-U-F10	6"	5"	78.0	34.0	28.75	13.38	21.0	10.31	6.88	19.68	11.42	13.19
	JU4H-U-F20	8"	6"	88.0	39.0	35.43	17.32	24.0	20.31	9.25	19.68	12.40	14.38
TD20E	JU4H-U-F10	10"	8"	88.0	39.0	41.14	21.25	28.0	16.97	11.25	23.03	15.16	17.72
	JU4H-U-F20	5"	4"	78.0	34.0	35.43	13.38	20.0	10.31	7.50	19.68	13.78	13.38
TE15D	JU4H-U-F20	8"	6"	88.0	39.0	35.43	17.32	24.0	20.31	8.25	19.68	13.78	16.14

NOTES:

- 1) THE DRIVESHAFT IS DESIGNED TO OPERATE AT A 2° ANGLE WITH THE INPUT AND OUTPUT SHAFTS IN PARALLEL. THE ENGINE CRANKSHAFT IS TO BE SET WITH A PARALLEL OFFSET OF 0.25 ± 0.09 INCHES VERTICALLY ABOVE THE PUMP SHAFT AND 0.00" ± 0.09 INCH PARALLEL OFFSET HORIZONTALLY RIGHT OR LEFT OF THE PUMP SHAFT. REFER TO THE CERTIFIED DRIVESHAFT INSTRUCTIONS MANUAL FOR ALIGNMENT INSTRUCTIONS.
- 2) FLANGE DRILLING AS PER ANSI B16.1 CLASS 250 FF.
- 3) ALL DIMENSIONS IN INCHES.
- 4) BASE MUST BE COMPLETELY FILLED WITH GROUT PER NFPA 20.
- 5) PUMP IS CW (CLOCKWISE) ROTATION WHEN VIEWED FROM THE COUPLING END.

①	Raw Water-Inlet (Pre-Piped)	1/2" NPTF
②	Heater Junction Box	HEATER VOLTAGE REQUIREMENTS: 115 VAC 1500 WATT, 230 VAC OPTIONAL
③	Fuel Return Conn. (Flexible Hose) (Shipped Loose)	3/8" NPTF Far Side
④	Fuel Supply Conn. (Shipped Loose)	1/2" NPTF Far Side
⑤	Raw Water-Outlet	1" NPTF
⑥	Flexible Exhaust Outlet Conn.	3" NPT
⑦	Listed Drive Shaft Model	CDS10-SC





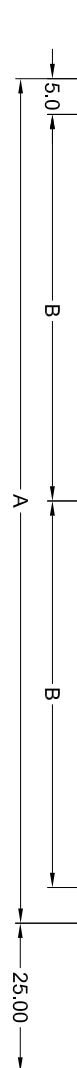
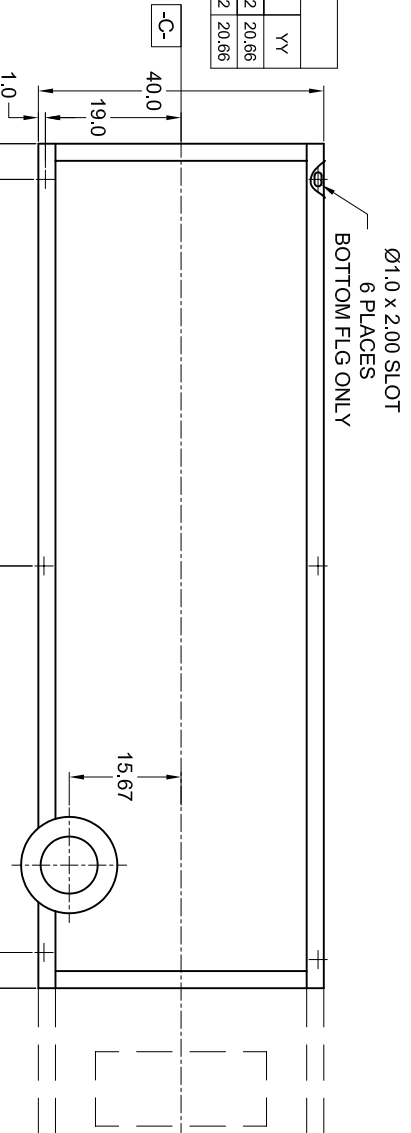
CLARKE FIRE PUMP DRIVERS

JX6H Engine Models

EPA NSPS TIER 3 CERTIFIED

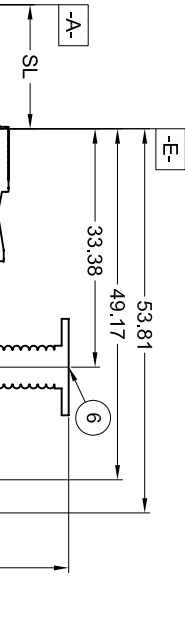
PUMP TYPE	ENGINE MODEL	BRANCHES		DIMENSIONS											
		SUCT	DISCH	A	B	CP	D	H	L	V1	V2	W	X	YY	
12HYF20D	JX6H-UJFADK0	16"	12"	128.0	99.0	99.84	26.57	35.00	27.13	13.78	13.78	13.78	32.88	23.62	20.66
12HYF20D	JX6H-UJFADN0	16"	12"	128.0	99.0	99.84	26.57	35.00	27.13	13.78	13.78	13.78	32.88	23.62	20.66

X	Engine Model	Difshaft Model	UL STATUS	VO	SL
	JX6H-UJFADFO	SC2140*	NONLISTED	0.35	17.50
	JX6H-UJFAD60, KO, NO, PO	SC2155*	NONLISTED	0.35	17.50
	JX6H-UJFAD88	SC2160*	NONLISTED	0.45	20.38

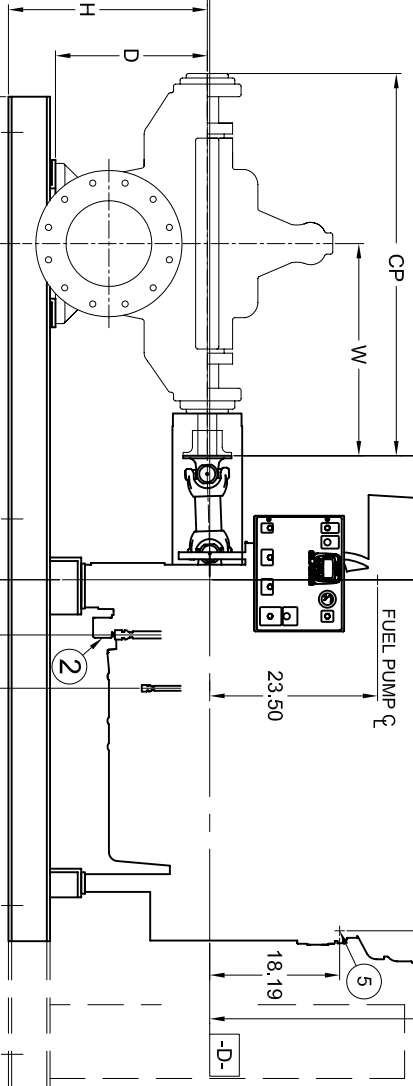
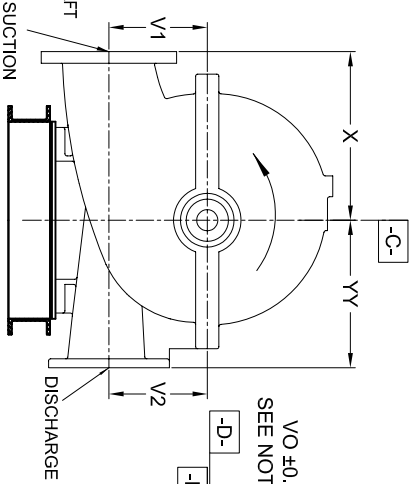


25.00

②	Heater Junction Box	HEATER VOLTAGE REQUIREMENTS: 230 VAC 2500 WATT, 115 VAC OPTIONAL
③	Fuel Return Conn.	1/2" FNPT Fastide
④	Fuel Supply Conn.	3/4" NPTF Fastide
⑤	Raw Water-Outlet	1-1/4" FNPT
⑥	Flexible Exhaust Outlet Conn.	8" 150# FLANGE



- NOTES:
- 1) THE DRIVESHAFT IS DESIGNED TO OPERATE AT A 2° ANGLE WITH THE INPUT AND OUTPUT SHAFTS IN PARALLEL. THE ENGINE CRANKSHAFT IS TO BE SET WITH A PARALLEL OFFSET OF DIMENSION "VO" ±0.10 INCHES VERTICALLY ABOVE THE PUMP SHAFT AND 0.00" ±0.10 INCH PARALLEL OFFSET HORIZONTALLY RIGHT OR LEFT OF THE PUMP SHAFT. REFER TO ENGINE MANUAL FOR ALIGNMENT.
 - 2) FLANGE DRILLING AS PER ANSI B16.1 CLASS 250 FF.
 - 3) ALL DIMENSIONS IN INCHES.
 - 4) BASE MUST BE COMPLETELY FILLED WITH GROUT PER NFPA 20.
 - 5) PUMP IS CW (CLOCKWISE) ROTATION WHEN VIEWED FROM THE COUPLING END.



- A- END OF PUMP OR RIGHT ANGLE GEAR SHAFT
- B- PUMP OR RIGHT ANGLE GEAR SHAFT HORIZONTAL CENTERLINE
- C- ENGINE CRANKSHAFT VERTICAL CENTERLINE
- D- ENGINE CRANKSHAFT HORIZONTAL CENTERLINE
- E- MOUNTING FACE OF FLYWHEEL





CLARKE FIRE PUMP DRIVERS
EPA NSPS TIER 3 CERTIFIED
JW6H Engine Models

PUMP TYPE	ENGINE MODEL	BRANCHES		DIMENSIONS									
		SUCT	DISCH	A	B	CP	D	H	L	V	W	X	YY
8HYE23B	JW6H-U/FAD80	10"	8"	118.0	54.0	51.97	19.89	26.00	21.06	10.63	28.94	20.47	22.83
12HYF20D	JW6H-U/FAD80	16"	12"	128.0	59.0	59.84	26.58	33.00	27.12	13.78	32.88	20.67	23.62

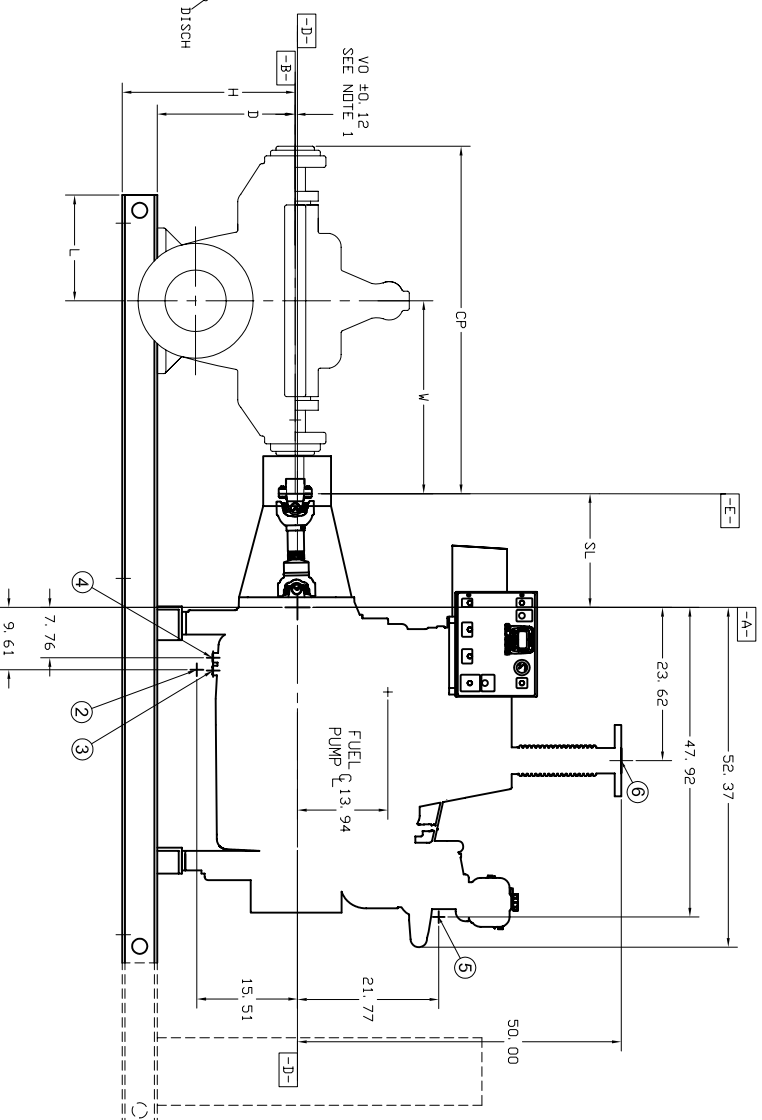
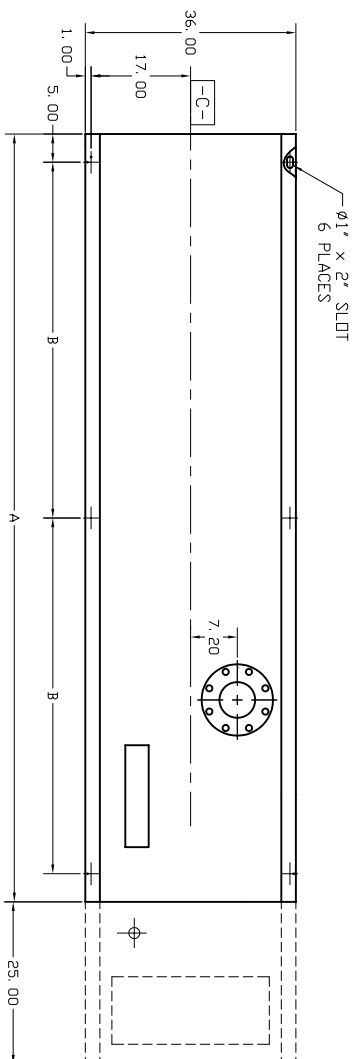
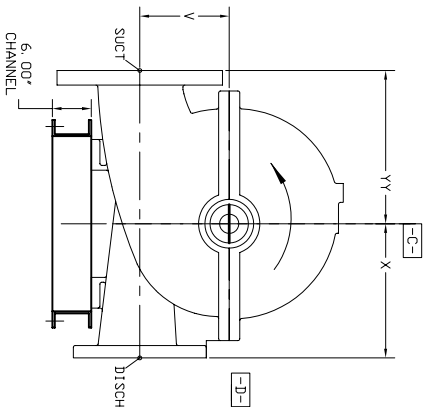
X	Engine Model	Driveshaft Model	UL STATUS	VO	SL
	JW6H-U/FAD80 (2100 RPM)	CDS50-SC	LISTED	0.45	20.38
	JW6H-U/FAD80 (1760 RPM)	SC81A*	NONLISTED	0.45	20.38

*NO LISTED DRIVESHAFT AVAILABLE IN THIS HP AND RPM RANGE.

NOTES:

- 1) THE DRIVESHAFT IS DESIGNED TO OPERATE AT A 2° ANGLE WITH THE INPUT AND OUTPUT SHAFTS IN PARALLEL. THE ENGINE CRANKSHAFT IS TO BE SET WITH A PARALLEL OFFSET OF DIMENSION "VO" ±0.11 INCHES VERTICALLY ABOVE THE PUMP SHAFT AND 0.00" ±0.11 INCH PARALLEL OFFSET HORIZONTALLY RIGHT OR LEFT OF THE PUMP SHAFT. REFER TO ENGINE MANUAL FOR ALIGNMENT.
- 2) FLANGE DRILLING AS PER ANSI B16.1 CLASS 250 FF.
- 3) ALL DIMENSIONS IN INCHES.
- 4) BASE MUST BE COMPLETELY FILLED WITH GROUT PER NFPA 20.
- 5) PUMP IS CW (CLOCKWISE) ROTATION WHEN VIEWED FROM THE COUPLING END.

②	Heater Junction Box (Flexible Hose)	HEATER VOLTAGE REQUIREMENTS: 115 VAC 1500 WATT, 230 VAC OPTIONAL
③	Fuel Return Conn. (Flexible Hose) (Shut-off Valve)	3/8" NPTF
④	Fuel Supply Conn. (Shut-off Valve)	1/2" NPTF
⑤	Raw Water Outlet	1-1/4" NPTF
⑥	Flexible Exhaust Outlet Conn.	6" 150# FLANGE



- A- END OF PUMP OR RIGHT ANGLE GEAR SHAFT
- B- PUMP OR RIGHT ANGLE GEAR SHAFT HORIZONTAL CENTERLINE
- C- ENGINE CRANKSHAFT VERTICAL CENTERLINE
- D- ENGINE CRANKSHAFT HORIZONTAL CENTERLINE
- E- MOUNTING FACE OF FLYWHEEL





CLARKE FIRE PUMP DRIVERS EPA NSPS TIER 3 CERTIFIED 2-STAGE JU6H Engine Models

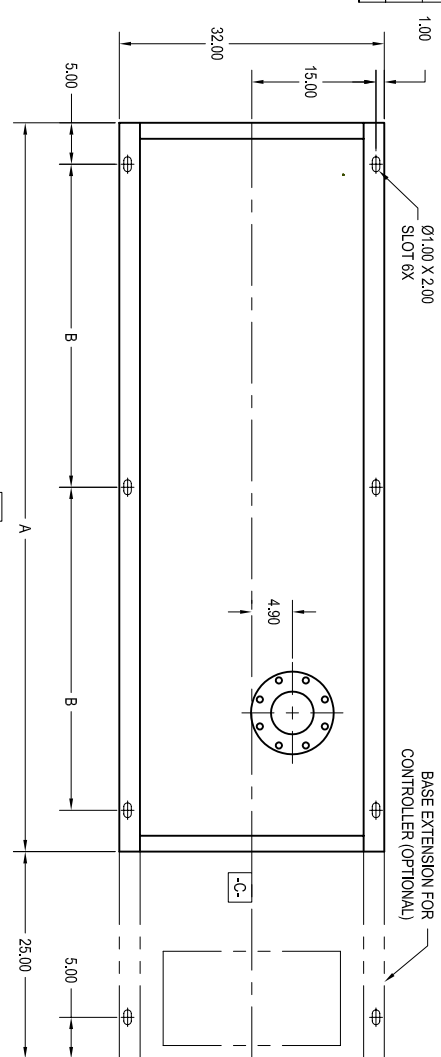
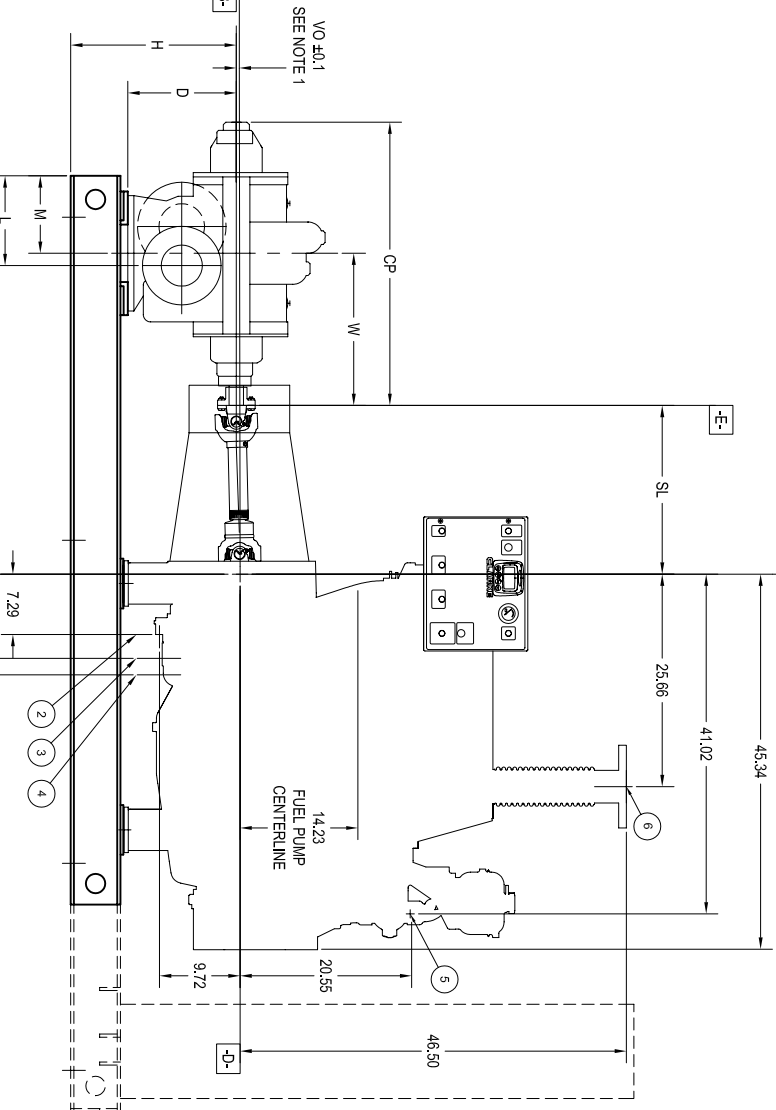
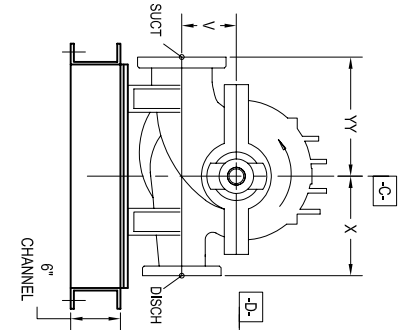
PUMP TYPE	ENGINE MODEL	BRANCHES												
		SUCT	DISCH	A	B	CP	D	H	L	M	V	W	X	YY
TY15E	JU6H-UFADT0	8"	6"	98.0	44.0	46.65	17.72	25.0	16.38	14.41	9.06	25.59	14.96	21.25

X	Engine Model	Driveshaft Model	UL STATUS	VO	SL
	JU6H-UFADKO, UFADNO	CDS30-S1	LISTED	0.35	15.63
	JU6H-UFAD88, UFAD98	CDS50-SC	LISTED	0.45	20.38
	JU6H-UFADT0 (2100 & 1760 RPM)	CDS50-SC	LISTED	0.45	20.38
	JU6H-UFADT0 (2350 RPM)	SC81A*	NONLISTED	0.45	20.38

*NO LISTED DRIVESHAFT AVAILABLE IN THIS HP AND RPM RANGE.

	HEATER VOLTAGE REQUIREMENTS: 115 VAC 1500 WATT, 230 VAC OPTIONAL
② Heater Junction Box	
③ Fuel Return Conn. (Flexible Hose) (Shipped loose)	3/8" NPTF Faiside
④ Fuel Supply Conn. (Flexible Hose) (Shipped loose)	1/2" NPTF Faiside
⑤ Raw Water-Outlet	1" NPTF
⑥ Flexible Exhaust Outlet Conn.	5" 150# FLANGE

- NOTES:
- 1) THE DRIVESHAFT IS DESIGNED TO OPERATE AT A 2° ANGLE WITH THE INPUT AND OUTPUT SHAFTS IN PARALLEL. THE ENGINE CRANKSHAFT IS TO BE SET WITH A PARALLEL OFFSET OF ± 0.10 INCHES VERTICALLY ABOVE THE PUMP SHAFT AND 0.00 ± 0.10 INCH PARALLEL OFFSET HORIZONTALLY RIGHT OR LEFT OF THE PUMP SHAFT. REFER TO THE CERTIFIED DRIVESHAFT INSTRUCTIONS MANUAL FOR ALIGNMENT INSTRUCTIONS.
 - 2) FLANGE DRILLING AS PER ANSI B16.1 CLASS 250 FF.
 - 3) ALL DIMENSIONS IN INCHES.
 - 4) BASE MUST BE COMPLETELY FILLED WITH GROUT PER NFPA 20.
 - 5) PUMP IS CW (CLOCKWISE) ROTATION WHEN VIEWED FROM THE COUPLING END.
- A- MOUNTING FACE OF FLYWHEEL
 - B- PUMP OR RIGHT ANGLE GEAR SHAFT HORIZONTAL CENTERLINE
 - C- ENGINE CRANKSHAFT VERTICAL CENTERLINE
 - D- ENGINE CRANKSHAFT HORIZONTAL CENTERLINE
 - E- END OF PUMP OR RIGHT ANGLE GEAR SHAFT



ALL VIEWS 3rd ANGLE PROJECTION





CLARKE FIRE PUMP DRIVERS EPA NSPS TIER 3 CERTIFIED 2-STAGE JU6H Engine Models

PUMP TYPE	ENGINE MODEL	DIMENSIONS														
		BRANCHES		A	B	CP	D	H	L	M	V	W	X	YY		
TY15E	JU6H-UFADKO	SUCT	DISCH	8"	6"	98.0	44.0	46.65	17.72	25.0	16.38	14.41	9.06	25.59	14.96	21.25

X	Engine Model	Driveshaft Model	UL STATUS	VO	SL
	JU6H-UFADKO, UFADNO	CDS30-S1	LISTED	0.35	15.63
	JU6H-UFAD88, UFAD98	CDS50-SC	LISTED	0.45	20.38
	JU6H-UFADT0 (2100 & 1760 RPM)	CDS50-SC	LISTED	0.45	20.38
	JU6H-UFADT0 (2350 RPM)	SC81A*	NONLISTED	0.45	20.38

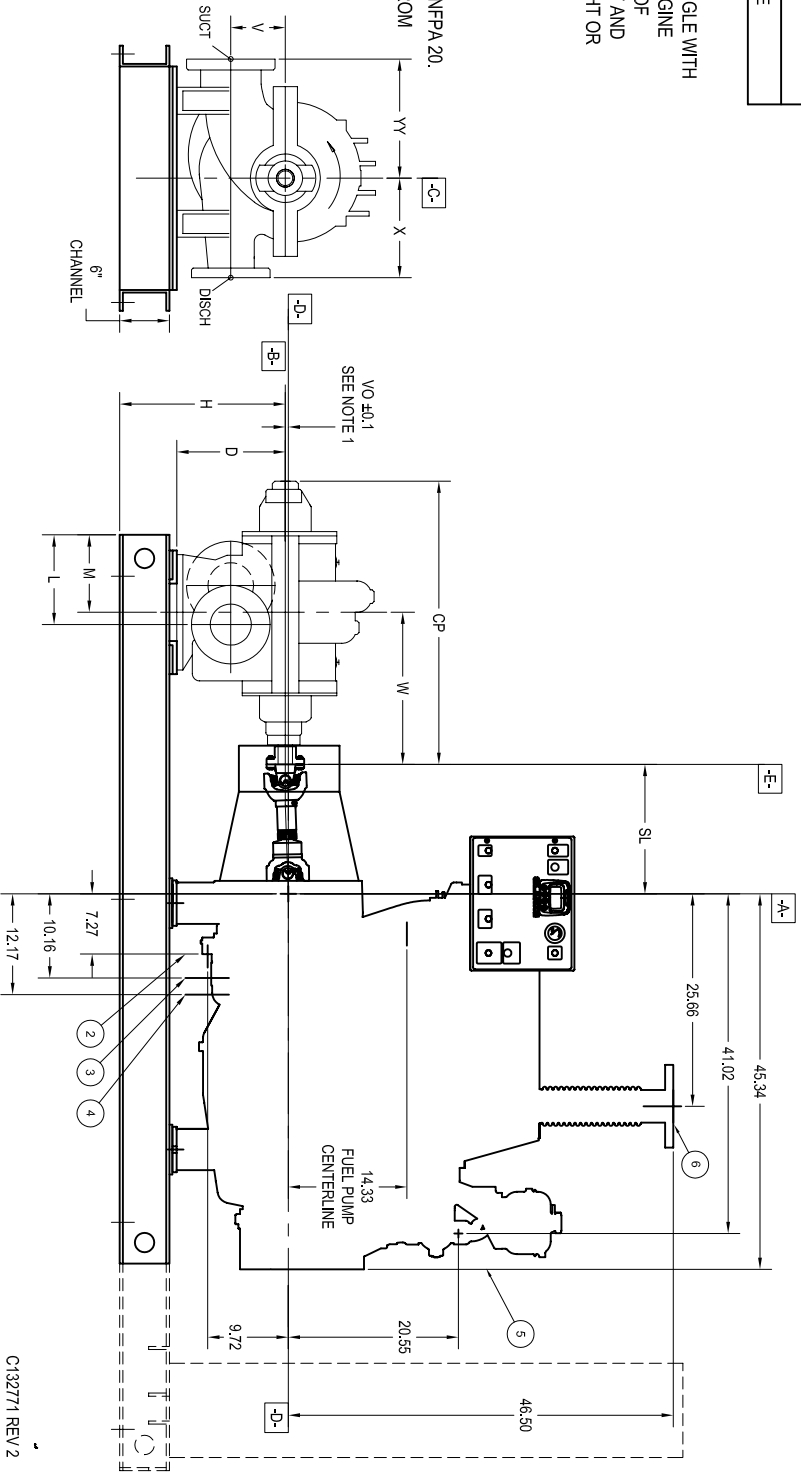
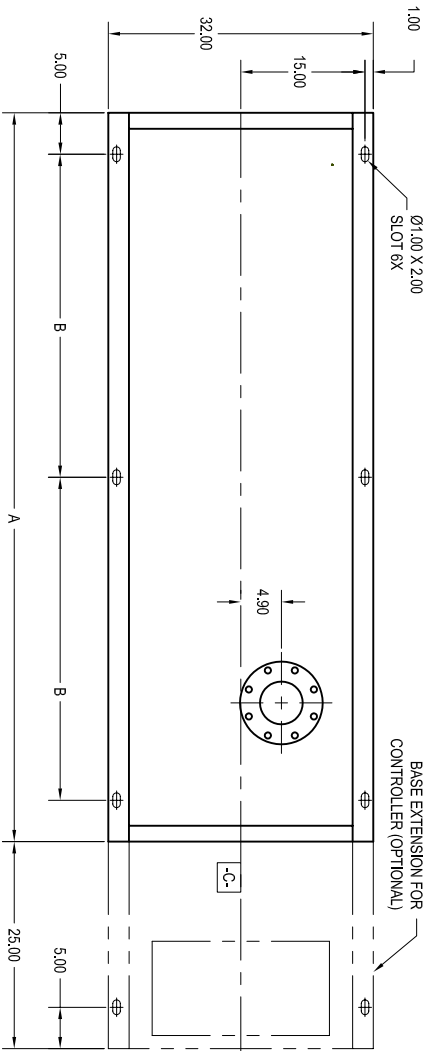
*NO LISTED DRIVESHAFT AVAILABLE IN THIS HP AND RPM RANGE.

②	Heater Junction Box	HEATER VOLTAGE REQUIREMENTS: 115 VAC, 1500 WATT, 230 VAC OPTIONAL
③	Fuel Return Conn. (Flexible Hose) (Stripped Loose)	3/8" NPTF Farside
④	Fuel Supply Conn. (Flexible Hose) (Stripped Loose)	1/2" NPTF Farside
⑤	Raw Water-Outlet	1" NPTF
⑥	Flexible Exhaust Outlet Conn.	5" 150# FLANGE

NOTES:

- 1) THE DRIVESHAFT IS DESIGNED TO OPERATE AT A 2° ANGLE WITH THE INPUT AND OUTPUT SHAFTS IN PARALLEL. THE ENGINE CRANKSHAFT IS TO BE SET WITH A PARALLEL OFFSET OF *VO±0.10 INCHES VERTICALLY ABOVE THE PUMP SHAFT AND 0.00*±0.10 INCH PARALLEL OFFSET HORIZONTALLY RIGHT OR LEFT OF THE PUMP SHAFT. REFER TO THE CERTIFIED DRIVESHAFT INSTRUCTIONS MANUAL FOR ALIGNMENT INSTRUCTIONS.
- 2) FLANGE DRILLING AS PER ANSI B16.1 CLASS 250 FF.
- 3) ALL DIMENSIONS IN INCHES.
- 4) BASE MUST BE COMPLETELY FILLED WITH GROUT PER NFPA 20.
- 5) PUMP IS CW (CLOCKWISE) ROTATION WHEN VIEWED FROM THE COUPLING END.

- A- MOUNTING FACE OF FLYWHEEL
- B- PUMP OR RIGHT ANGLE GEAR SHAFT HORIZONTAL CENTERLINE
- C- ENGINE CRANKSHAFT VERTICAL CENTERLINE
- D- ENGINE CRANKSHAFT HORIZONTAL CENTERLINE
- E- END OF PUMP OR RIGHT ANGLE GEAR SHAFT



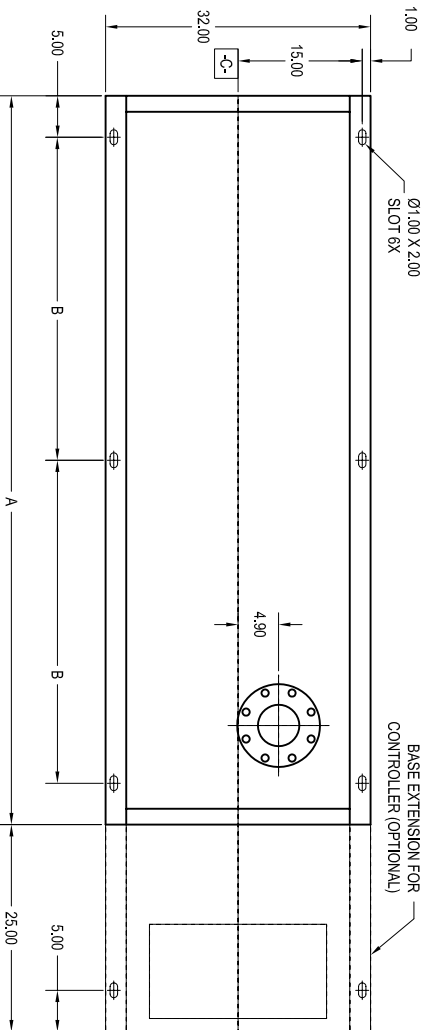


CLARKE FIRE PUMP DRIVERS EPA NSPS TIER 3 CERTIFIED JU6H Engine Models

PUMP TYPE	ENGINE MODEL	BRANCHES				DIMENSIONS							
		SUCT	DISCH	A	B	CP	D	H	L	V	W	X	YY
TF15E	JU6H-JUFADT0	8"	6"	98.0	44.0	41.14	21.25	28.0	16.97	10.62	23.03	20.08	17.72

X	Engine Model	Driveshaft Model	UL STATUS	VO	SL
	JU6H-JUFADKO, UFADNO	CDS30-S1	LISTED	0.35	15.63
	JU6H-JUFAD88, UFAD98	CDS50-SC	LISTED	0.45	20.38
	JU6H-JUFADT0 (2100 & 1760 RPM)	CDS50-SC	LISTED	0.45	20.38
	JU6H-JUFADT0 (2350 RPM)	SC81A*	NONLISTED	0.45	20.38

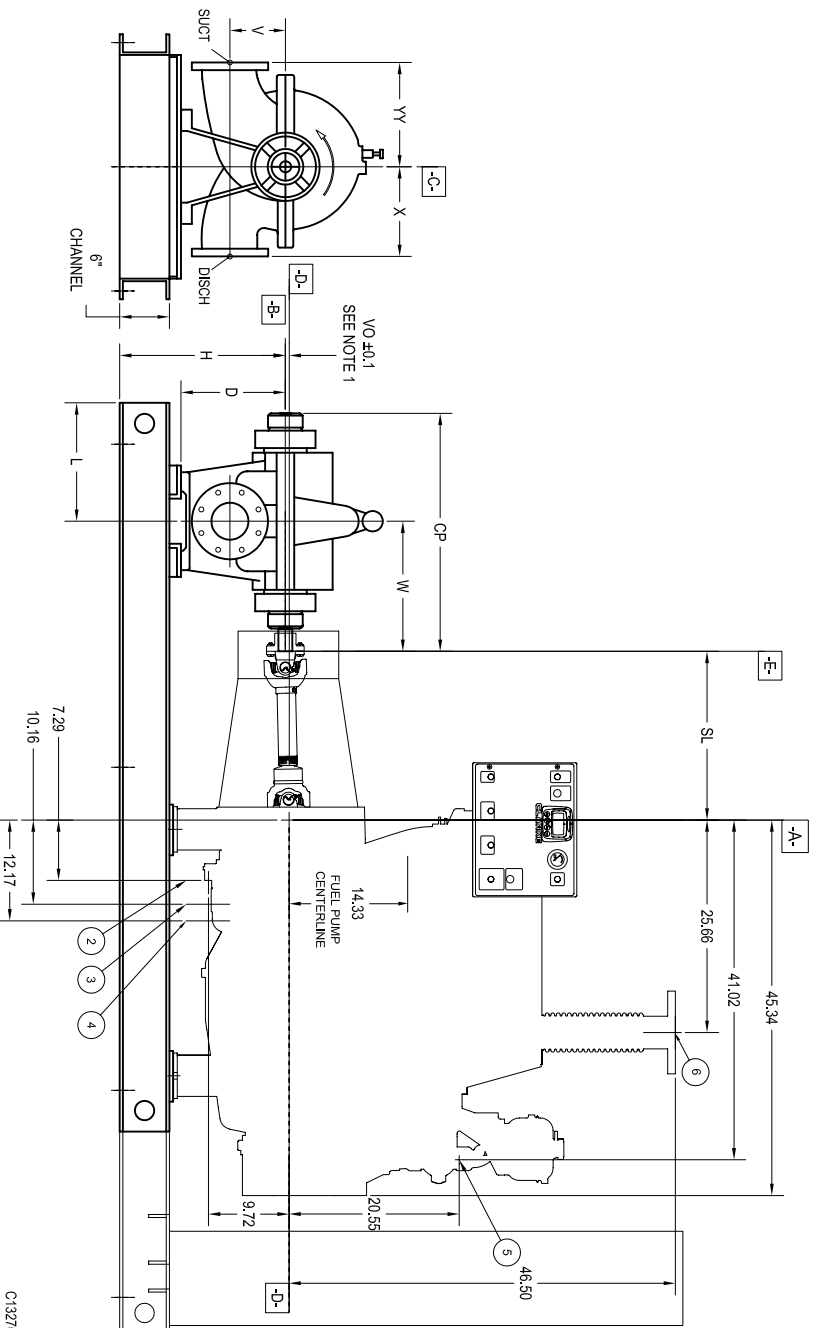
*NO LISTED DRIVESHAFT AVAILABLE IN THIS HP AND RPM RANGE.



- NOTES:
- 1) THE DRIVESHAFT IS DESIGNED TO OPERATE AT A 2° ANGLE WITH THE INPUT AND OUTPUT SHAFTS IN PARALLEL. THE ENGINE CRANKSHAFT IS TO BE SET WITH A PARALLEL OFFSET OF ± 0.10 INCHES VERTICALLY ABOVE THE PUMP SHAFT AND 0.00 ± 0.10 INCH PARALLEL OFFSET HORIZONTALLY RIGHT OR LEFT OF THE PUMP SHAFT. REFER TO THE CERTIFIED DRIVESHAFT INSTRUCTIONS MANUAL FOR ALIGNMENT INSTRUCTIONS.
 - 2) FLANGE DRILLING AS PER ANSI B16.1 CLASS 250 FF.
 - 3) ALL DIMENSIONS IN INCHES.
 - 4) BASE MUST BE COMPLETELY FILLED WITH GROUT PER NFPA 20.
 - 5) PUMP IS CW (CLOCKWISE) ROTATION WHEN VIEWED FROM THE COUPLING END.

②	Heater Junction Box	HEATER VOLTAGE REQUIREMENTS: 115 VAC 1500 WATT, 230 VAC OPTIONAL
③	Fuel Return Conn. (Flexible Hose) (Shipped Loose)	3/8" NPTF Faiside
④	Fuel Supply Conn. (Flexible Hose) (Shipped Loose)	1/2" NPTF Faiside
⑤	Raw Water-Outlet	1" NPTF
⑥	Flexible Exhaust Outlet Conn.	5" 150# FLANGE

- A- MOUNTING FACE OF FLYWHEEL
- B- PUMP OR RIGHT ANGLE GEAR SHAFT HORIZONTAL CENTERLINE
- C- ENGINE CRANKSHAFT VERTICAL CENTERLINE
- D- ENGINE CRANKSHAFT HORIZONTAL CENTERLINE
- E- END OF PUMP OR RIGHT ANGLE GEAR SHAFT



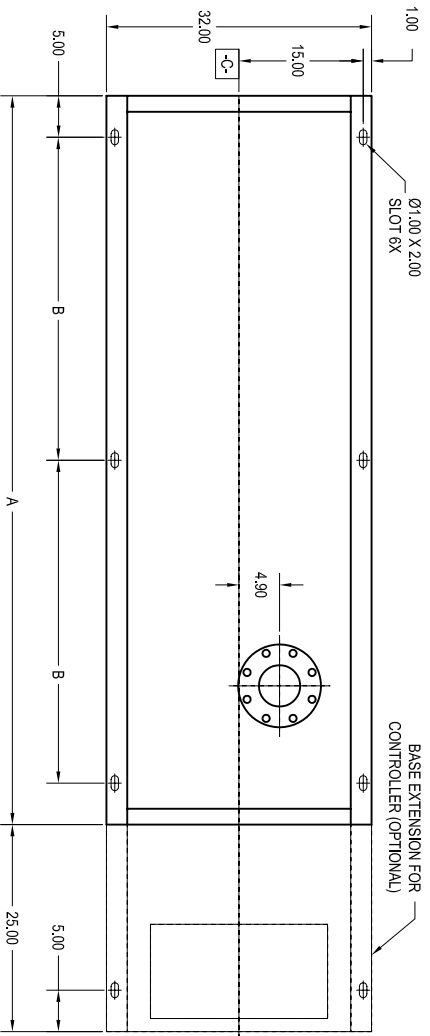


CLARKE FIRE PUMP DRIVERS EPA NSPS TIER 3 CERTIFIED JU6H Engine Models

PUMP TYPE	ENGINE MODEL	BRANCHES		DIMENSIONS									
		SUCT	DISCH	A	B	CP	D	H	L	V	W	X	YY
TF15E	JU6H-U/FADKO	8"	6"	98.0	44.0	41.14	21.25	28.0	16.97	10.62	23.03	20.08	17.72
TF15E	JU6H-U/FADNO	8"	6"	98.0	44.0	41.14	21.25	28.0	16.97	10.62	23.03	20.08	17.72

X	Engine Model	Driveshaft Model	UL STATUS	VO	SL
	JU6H-U/FADKO, U/FADNO	CDS30-S1	LISTED	0.35	15.63
	JU6H-U/FAD88, U/FAD98	CDS50-SC	LISTED	0.45	20.38
	JU6H-U/FADT0 (2100 & 1760 RPM)	CDS50-SC	LISTED	0.45	20.38
	JU6H-U/FADT0 (2350 RPM)	SC81A*	NONLISTED	0.45	20.38

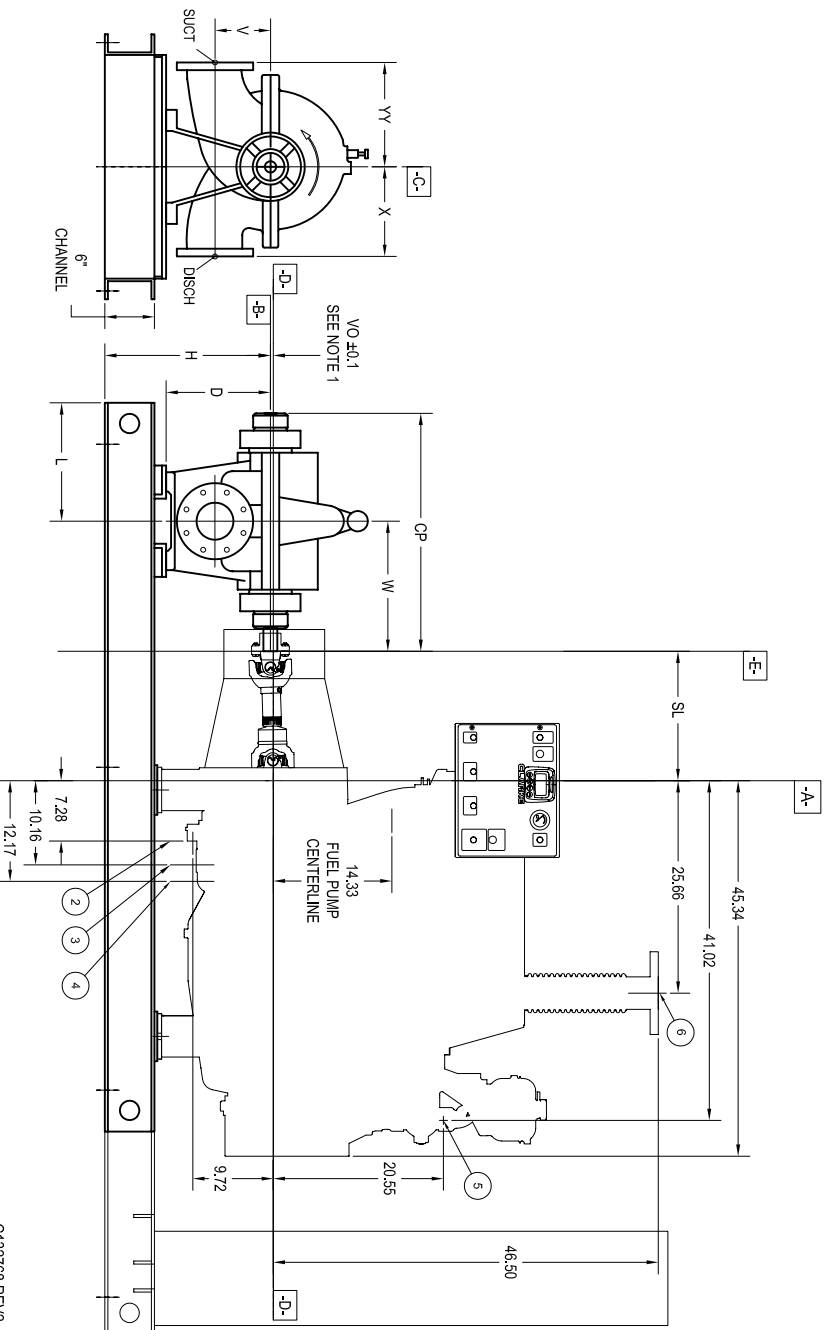
*NO LISTED DRIVESHAFT AVAILABLE IN THIS HP AND RPM RANGE.



- NOTES:
- 1) THE DRIVESHAFT IS DESIGNED TO OPERATE AT A 2° ANGLE WITH THE INPUT AND OUTPUT SHAFTS IN PARALLEL. THE ENGINE CRANKSHAFT IS TO BE SET WITH A PARALLEL OFFSET OF "VO" ±0.10 INCHES VERTICALLY ABOVE THE PUMP SHAFT AND 0.00" ±0.10 INCH PARALLEL OFFSET HORIZONTALLY RIGHT OR LEFT OF THE PUMP SHAFT. REFER TO THE CERTIFIED DRIVESHAFT INSTRUCTIONS MANUAL FOR ALIGNMENT INSTRUCTIONS.
 - 2) FLANGE DRILLING AS PER ANSI B16.1 CLASS 250 FF.
 - 3) ALL DIMENSIONS IN INCHES.
 - 4) BASE MUST BE COMPLETELY FILLED WITH GROUT PER NFPA 20.
 - 5) PUMP IS CW (CLOCKWISE) ROTATION WHEN VIEWED FROM THE COUPLING END.

②	Heater Junction Box	HEATER VOLTAGE REQUIREMENTS: 115 VAC 1500 WATT, 230 VAC OPTIONAL
③	Fuel Return Conn. (Flexible Hose) (Shipped Loose)	3/8" NPTF Female
④	Fuel Supply Conn. (Flexible Hose) (Shipped Loose)	1/2" NPTF Female
⑤	Raw Water-Outlet	1" NPTF
⑥	Flexible Exhaust Outlet Conn.	5" 150# FLANGE

- A- MOUNTING FACE OF FLYWHEEL
- B- PUMP OR RIGHT ANGLE GEAR SHAFT HORIZONTAL CENTERLINE
- C- ENGINE CRANKSHAFT VERTICAL CENTERLINE
- D- ENGINE CRANKSHAFT HORIZONTAL CENTERLINE
- E- END OF PUMP OR RIGHT ANGLE GEAR SHAFT



ALL VIEWS 3rd ANGLE PROJECTION





CLARKE FIRE PUMP DRIVERS JX6H Engine Models

PUMP TYPE	ENGINE MODEL	BRANCHES		DIMENSIONS										
		SUCT	DISCH	A	B	CP	D	H	L	V1	V2	W	X	YY
PC08D	JX6H-UJF60	10"	8"	108.0	49.0	33.75	21.30	27.00	21.00	10.40	10.40	23.00	23.20	16.50

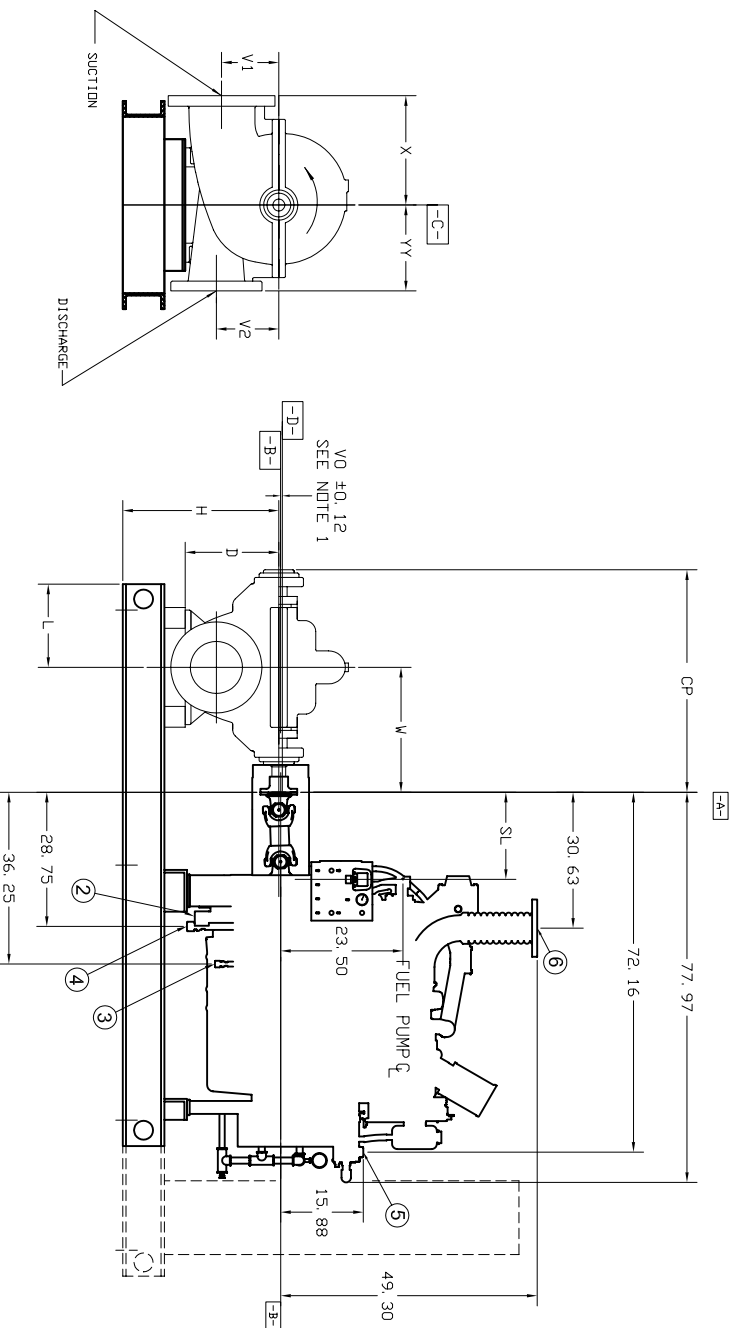
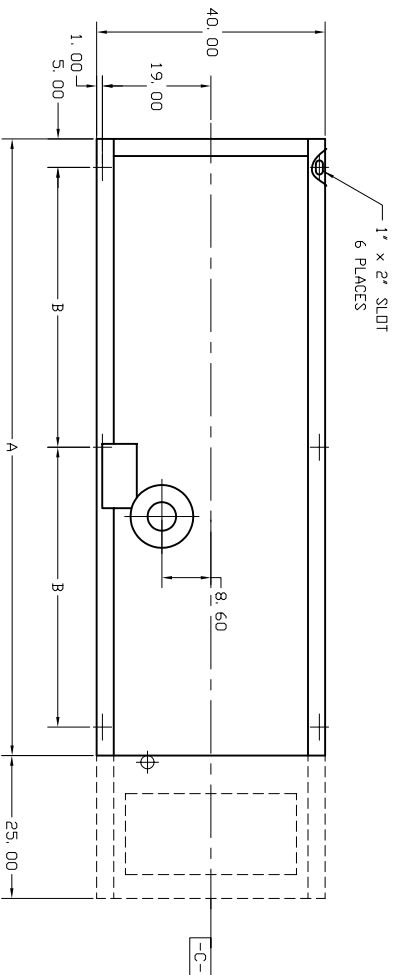
X	Engine Model	Driveshaft Model	UL STATUS	VO	SL
	JX6H-UJF30 (2100 RPM)	CDS50-SC	LISTED	0.45	20.38
	JX6H-UJF30 (1470-1760 RPM)	SC2140*	NONLISTED	0.35	17.50
	JX6H-UJF40	SC2140*	NONLISTED	0.35	17.50
	JX6H-UJF50, UJF60, UJF70	SC2155*	NONLISTED	0.35	17.50

*NO LISTED DRIVESHAFT AVAILABLE IN THIS HP AND RPM RANGE.

NOTES:

- 1) THE DRIVESHAFT IS NOT DESIGNED TO OPERATE AT 0.0° ANGLE. THE ENGINE CRANKSHAFT IS TO BE A PARALLEL OFFSET OF DIMENSION VO±0.12 INCH ABOVE THE PUMP SHAFT. THE ENGINE CRANKSHAFT MAY BE PARALLEL OFFSET FROM THE PUMP SHAFT 0.45 INCH RIGHT OR LEFT. REFER TO THE ENGINE MANUAL FOR ALIGNMENT.
- 2) FLANGE DRILLING AS PER ANSI B16.1 CLASS 250 FF.
- 3) ALL DIMENSIONS IN INCHES.
- 4) BASE MUST BE COMPLETELY FILLED WITH GROUT PER NFPA 20.
- 5) PUMP IS CW (CLOCKWISE) ROTATION WHEN VIEWED FROM THE COUPLING END.

-A-	END OF PUMP OR RIGHT ANGLE GEAR SHAFT	1" NPTM
-B-	PUMP OR RIGHT ANGLE GEAR SHAFT HORIZONTAL CENTERLINE	HEATER VOLTAGE REQUIREMENTS: 230 VAC 2500 WATT, 115 VAC OPTIONAL
-C-	ENGINE CRANKSHAFT VERTICAL CENTERLINE ENGINE CRANKSHAFT HORIZONTAL CENTERLINE	12" FNPT Farside 3/4" NPTF Farside
-D-	ENGINE CRANKSHAFT HORIZONTAL CENTERLINE	1-1/4" FNPT
①	Raw Water-Inlet (Pre-Piped)	6" 150# FLANGE OR 8" 150# FLANGE
②	Heater Junction Box	
③	Fuel Return Conn.	
④	Fuel Supply Conn.	
⑤	Raw Water-Outlet	
⑥	Flexible Exhaust Outlet Conn.	





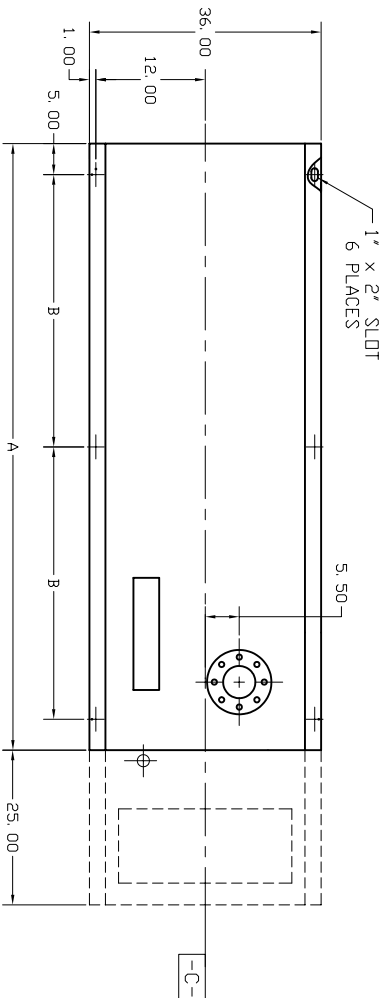
CLARKE FIRE PUMP DRIVERS

JW6H Engine Models

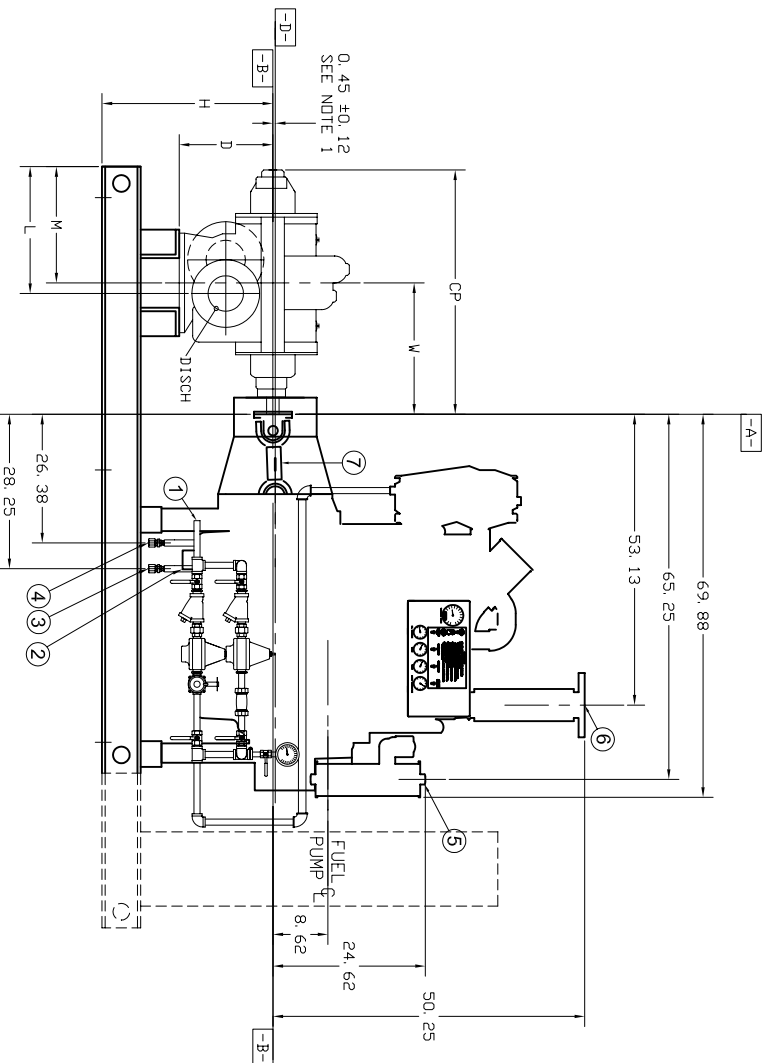
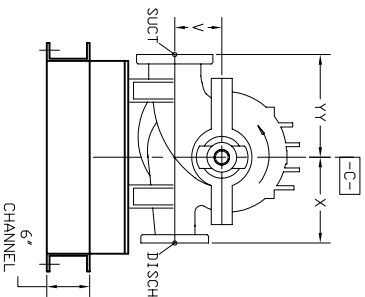
PUMP TYPE	ENGINE MODEL	BRANCHES		DIMENSIONS										
		SUCT	DISCH	A	B	CP	D	H	L	M	V	W	X	YY
TY12D	JW6H-UJF40	6"	5"	118.0	54.0	46.65	17.72	24.00	26.38	24.41	9.06	25.59	17.72	19.68
TY15E	JW6H-UJF40	8"	6"	118.0	54.0	46.65	17.72	24.00	26.38	24.41	9.06	25.59	14.96	21.25
TY15E	JW6H-UJF60	8"	6"	118.0	54.0	46.65	17.72	24.00	26.38	24.41	9.06	25.59	14.96	21.25

NOTES:

- 1) THE DRIVESHAFT IS DESIGNED TO OPERATE AT A 2° ANGLE WITH THE INPUT AND OUTPUT SHAFTS IN PARALLEL. THE ENGINE CRANKSHAFT IS TO BE SET WITH A PARALLEL OFFSET OF 0.45"±0.11 INCHES VERTICALLY ABOVE THE PUMP SHAFT AND 0.00"±0.11 INCH PARALLEL OFFSET HORIZONTALLY RIGHT OR LEFT OF THE PUMP SHAFT. REFER TO THE CERTIFIED DRIVESHAFT INSTRUCTIONS MANUAL FOR ALIGNMENT INSTRUCTIONS.
- 2) FLANGE DRILLING AS PER ANSI B16.1 CLASS 250 FF.
- 3) ALL DIMENSIONS IN INCHES.
- 4) BASE MUST BE COMPLETELY FILLED WITH GROUT PER NFPA 20.
- 5) PUMP IS CW (CLOCKWISE) ROTATION WHEN VIEWED FROM THE COUPLING END.



-A-	· END OF PUMP OR RIGHT ANGLE GEAR SHAFT
-B-	· PUMP OR RIGHT ANGLE GEAR SHAFT HORIZONTAL CENTERLINE
-C-	· ENGINE CRANKSHAFT VERTICAL CENTERLINE
-D-	· ENGINE CRANKSHAFT HORIZONTAL CENTERLINE
①	Raw Water-Inlet (Pre-Piped) 1" NPTF
②	Heater Junction Box HEATER VOLTAGE REQUIREMENTS: 230 VAC 2500 WATT, 115 VAC OPTIONAL
③	Fuel Return Conn. (Flexible Hose) (Shipped Loose) 3/8" NPTF Far Side
④	Fuel Supply Conn. (Flexible Hose) (Shipped Loose) 1/2" NPTF Far Side
⑤	Raw Water-Outlet 1-1/4" NPTF
⑥	Flexible Exhaust Outlet Conn. 6" 125# FLANGE
⑦	Listed Drive Shaft Model CDS50-SC





CLARKE FIRE PUMP DRIVERS

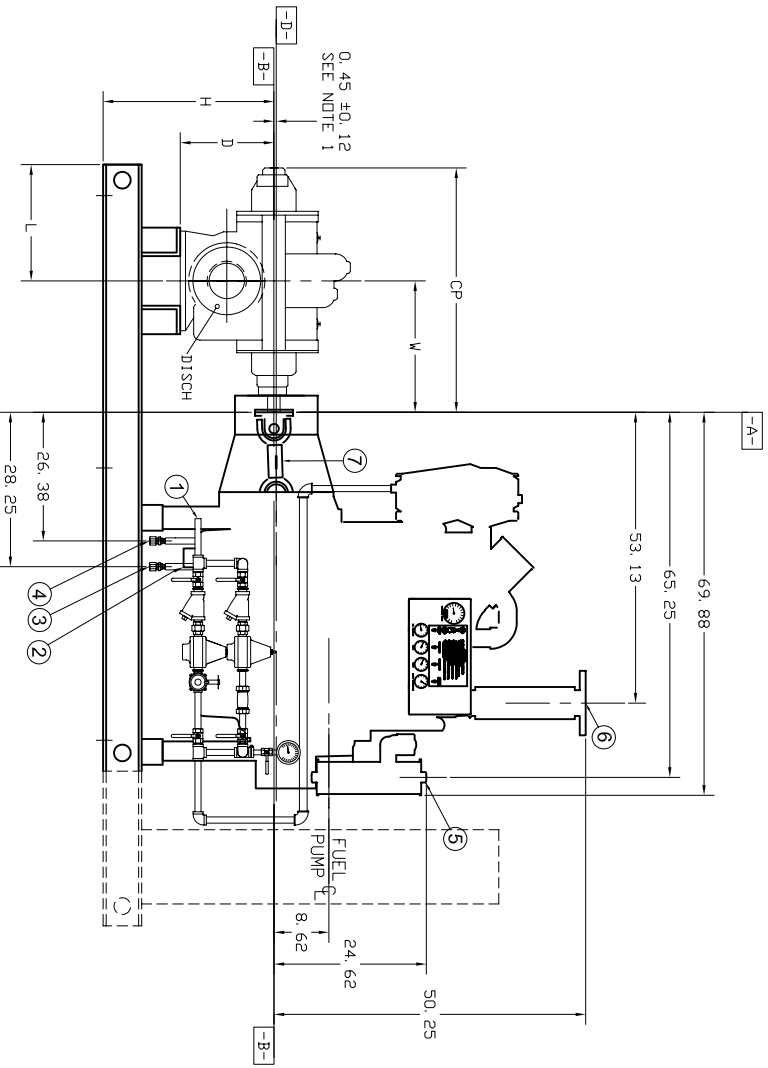
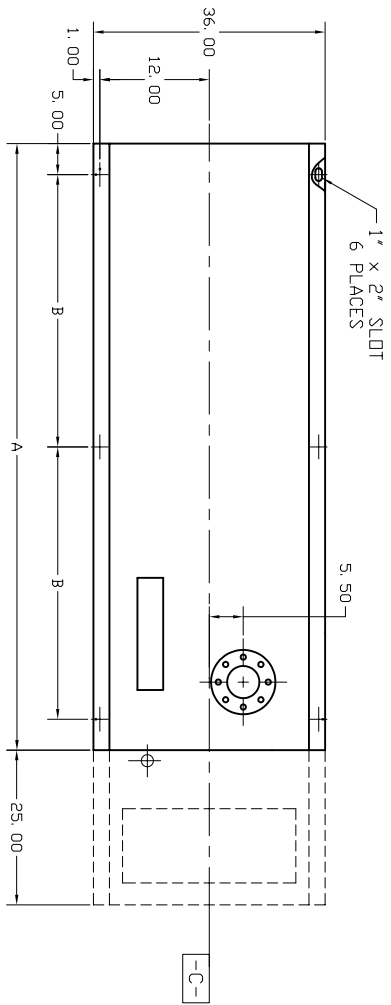
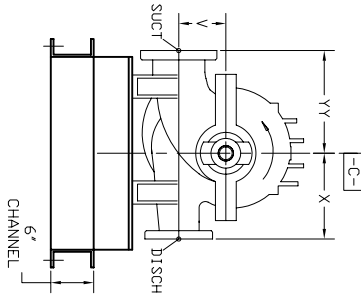
JW6H Engine Models

PUMP TYPE	ENGINE MODEL	BRANCHES		DIMENSIONS									
		SUCT	DISCH	A	B	CP	D	H	L	V	W	X	YY
TE20D	JW6H-UJF50.52	10"	8"	108.0	49.0	41.14	18.11	25.00	16.97	8.86	23.03	16.54	18.90
TD20D	JW6H-UJF50.H8	10"	8"	108.0	49.0	41.14	21.25	28.00	16.97	11.22	23.03	15.15	17.71
TT20E	JW6H-UJF60	10"	8"	108.0	49.0	41.14	21.25	28.00	16.97	10.63	23.03	17.72	21.65
TF20F	JW6H-UJF18	10"	8"	108.0	49.0	41.14	21.25	28.00	16.97	10.63	23.03	17.72	21.65

NOTES:

- 1) THE DRIVESHAFT IS DESIGNED TO OPERATE AT A 2° ANGLE WITH THE INPUT AND OUTPUT SHAFTS IN PARALLEL. THE ENGINE CRANKSHAFT IS TO BE SET WITH A PARALLEL OFFSET OF 0.45"±0.11 INCHES VERTICALLY ABOVE THE PUMP SHAFT AND 0.00"±0.11 INCH PARALLEL OFFSET HORIZONTALLY RIGHT OR LEFT OF THE PUMP SHAFT. REFER TO THE CERTIFIED DRIVESHAFT INSTRUCTIONS MANUAL FOR ALIGNMENT INSTRUCTIONS.
- 2) FLANGE DRILLING AS PER ANSI B16.1 CLASS 250 FF.
- 3) ALL DIMENSIONS IN INCHES.
- 4) BASE MUST BE COMPLETELY FILLED WITH GROUT PER NFPA 20.
- 5) PUMP IS CW (CLOCKWISE) ROTATION WHEN VIEWED FROM THE COUPLING END.

-A-	· END OF PUMP OR RIGHT ANGLE GEAR SHAFT	1" NPTF
-B-	· PUMP OR RIGHT ANGLE GEAR SHAFT HORIZONTAL CENTERLINE	HEATER VOLTAGE REQUIREMENTS: 230 VAC 2500 WATT, 115 VAC OPTIONAL.
-C-	· ENGINE CRANKSHAFT VERTICAL CENTERLINE	3/8" NPTF Far Side
-D-	· ENGINE CRANKSHAFT HORIZONTAL CENTERLINE	1/2" NPTF Far Side
①	Raw Water-Inlet (Pre-Piped)	1" NPTF
②	Heater Junction Box	HEATER VOLTAGE REQUIREMENTS: 230 VAC 2500 WATT, 115 VAC OPTIONAL.
③	Fuel Return Conn. (Flexible Hose) (Shipped Loose)	3/8" NPTF Far Side
④	Fuel Supply Conn. (Flexible Hose) (Shipped Loose)	1/2" NPTF Far Side
⑤	Raw Water-Outlet	1-1/4" NPTF
⑥	Flexible Exhaust Outlet Conn.	6" 125# FLANGE
⑦	Listed Drive Shaft Model	CDS50-SC





CLARKE FIRE PUMP DRIVERS

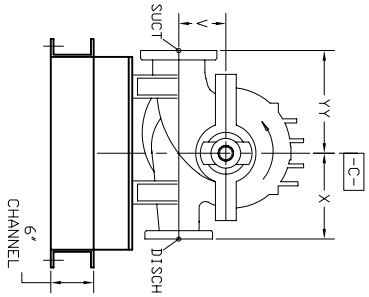
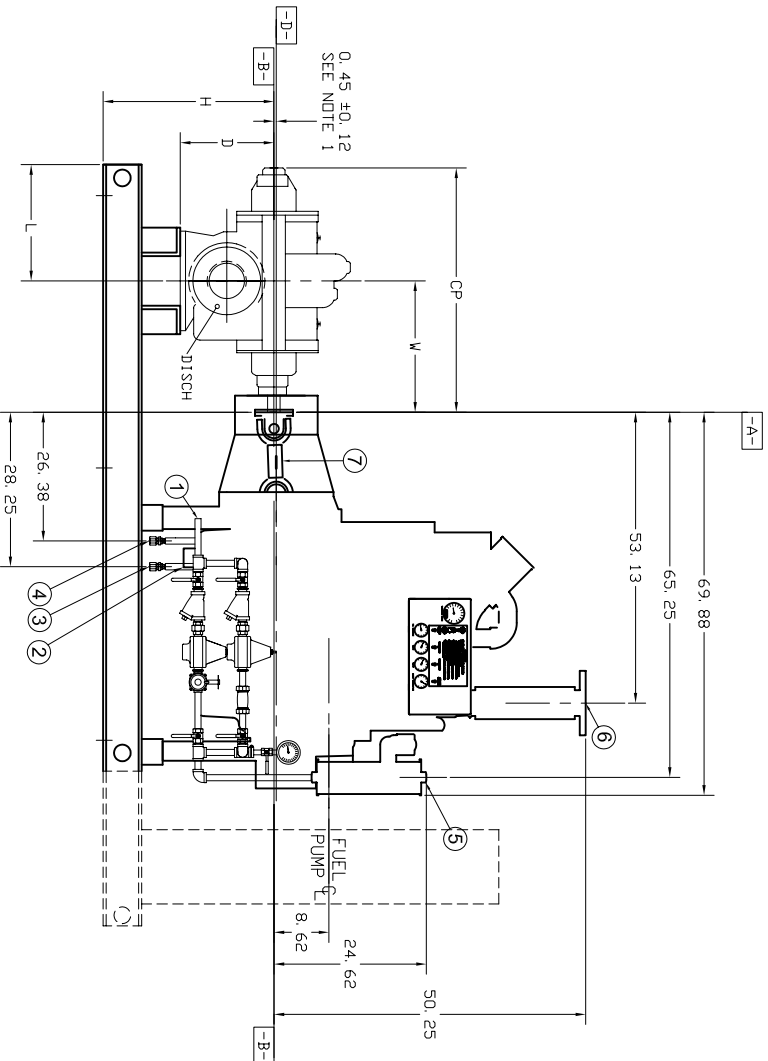
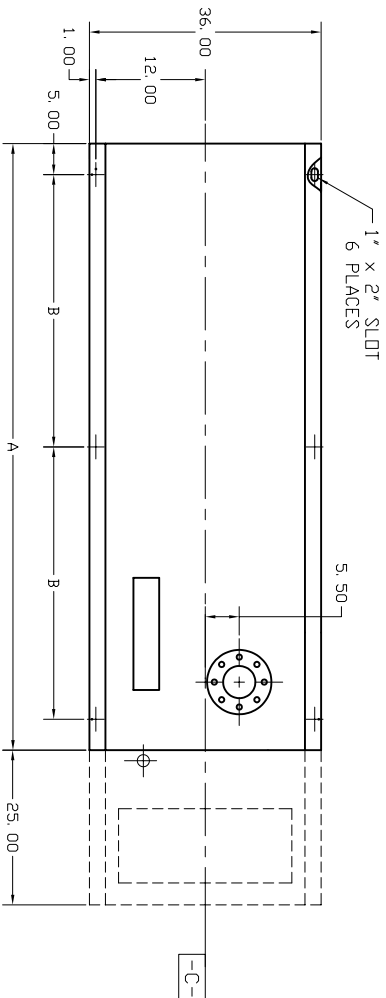
JW6H Engine Models

PUMP TYPE	ENGINE MODEL	BRANCHES		DIMENSIONS										
		SUCT	DISCH	A	B	CP	D	H	L	V	W	X	YY	
TF15E	JW6H-UJF30, -UJF38	8"	6"	98.0	44.0	41.12	21.25	28.00	16.97	10.62	23.00	20.06	17.75	
TE25A	JW6H-UJF38	12"	10"	98.0	44.0	41.10	21.30	28.00	16.97	10.40	18.10	16.50	23.20	
TE40D	JW6H-UJF32			98.0	44.0	41.10	21.30	28.00	16.97	7.48	10.60	13.78	13.78	
TF20F	JW6H-UJF38	10"	8"	108.0	49.0	41.14	21.25	28.00	16.97	10.63	23.03	17.72	21.65	

NOTES:

- 1) THE DRIVESHAFT IS DESIGNED TO OPERATE AT A 2° ANGLE WITH THE INPUT AND OUTPUT SHAFTS IN PARALLEL. THE ENGINE CRANKSHAFT IS TO BE SET WITH A PARALLEL OFFSET OF 0.45±0.11 INCHES VERTICALLY ABOVE THE PUMP SHAFT AND 0.00±0.11 INCH PARALLEL OFFSET HORIZONTALLY RIGHT OR LEFT OF THE PUMP SHAFT. REFER TO THE CERTIFIED DRIVESHAFT INSTRUCTIONS MANUAL FOR ALIGNMENT INSTRUCTIONS.
- 2) FLANGE DRILLING AS PER ANSI B16.1 CLASS 250 FF.
- 3) ALL DIMENSIONS IN INCHES.
- 4) BASE MUST BE COMPLETELY FILLED WITH GROUT PER NFPA 20.
- 5) PUMP IS CW (CLOCKWISE) ROTATION WHEN VIEWED FROM THE COUPLING END.

-A-	· END OF PUMP OR RIGHT ANGLE GEAR SHAFT	1" NPTF
-B-	· PUMP OR RIGHT ANGLE GEAR SHAFT HORIZONTAL CENTERLINE	HEATER VOLTAGE REQUIREMENTS: 230 VAC 2500 WATT, 115 VAC OPTIONAL.
-C-	· ENGINE CRANKSHAFT VERTICAL CENTERLINE	3/8" NPTF Far Side
-D-	· ENGINE CRANKSHAFT HORIZONTAL CENTERLINE	1/2" NPTF Far Side
①	Raw Water-Inlet (Pre-Piped)	6" 125# FLANGE
②	Heater Junction Box	CDS50-SC
③	Fuel Return Conn. (Flexible Hose) (Shipped Loose)	
④	Fuel Supply Conn. (Flexible Hose) (Shipped Loose)	
⑤	Raw Water-Outlet	
⑥	Flexible Exhaust Outlet Conn.	
⑦	Listed Drive Shaft Model	





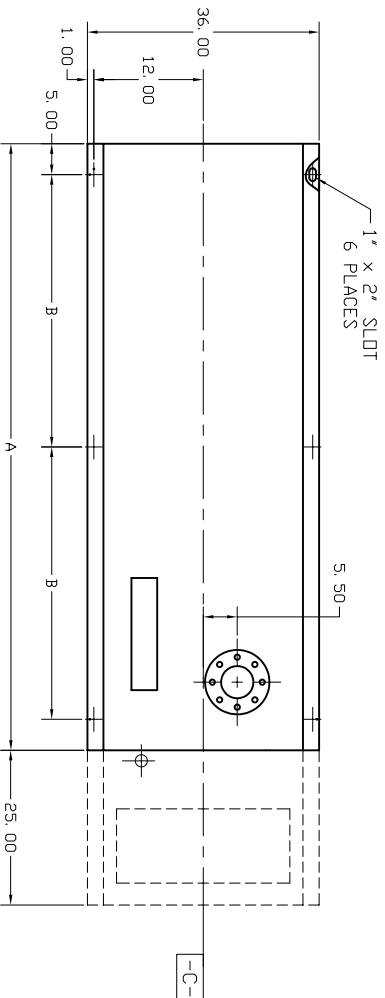
CLARKE FIRE PUMP DRIVERS

JW6H Engine Models

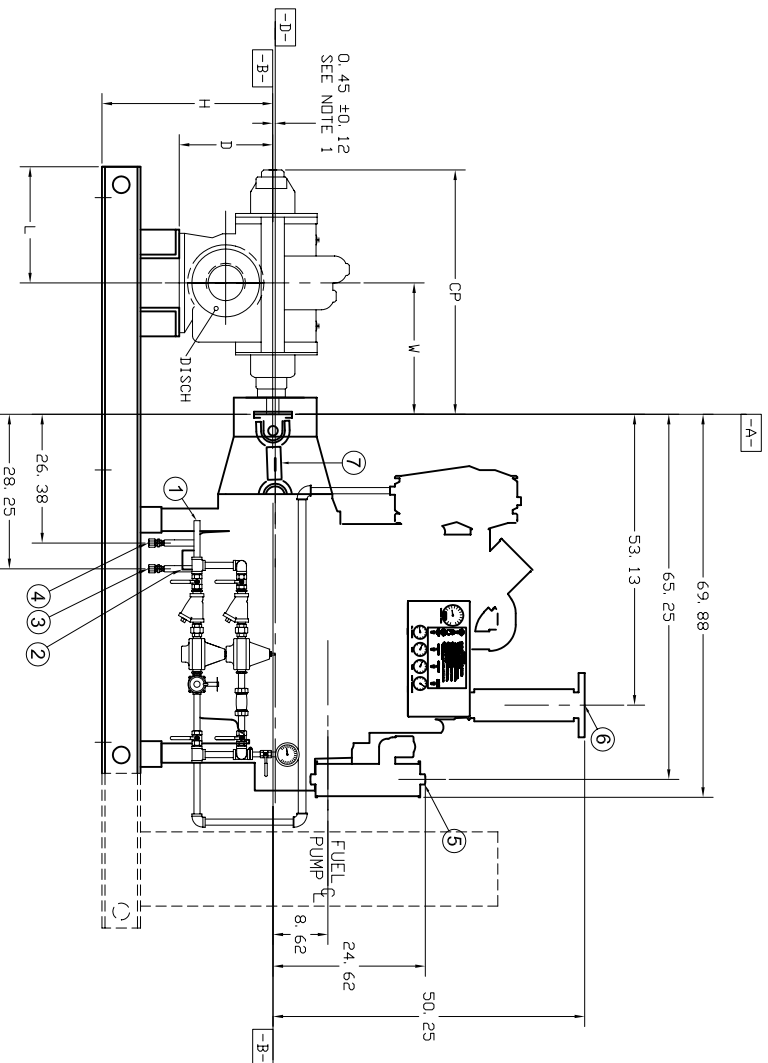
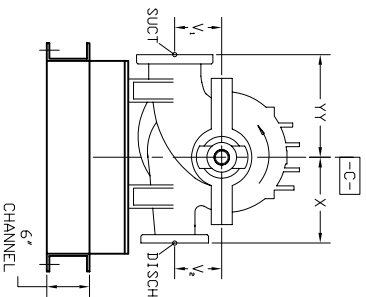
PUMP TYPE	ENGINE MODEL	DIMENSIONS												
		SUCT	DISCH	A	B	CP	D	H	L	V ₁	V ₂	W	X	YY
PC08H	JW6H-JF40	8"	6"	98.0	44.0	31.25	15.00	24.00	12.50	9.00	9.50	17.50	14.50	16.00

NOTES:

- 1) THE DRIVESHAFT IS DESIGNED TO OPERATE AT A 2° ANGLE WITH THE INPUT AND OUTPUT SHAFTS IN PARALLEL. THE ENGINE CRANKSHAFT IS TO BE SET WITH A PARALLEL OFFSET OF 0.45±0.11 INCHES VERTICALLY ABOVE THE PUMP SHAFT AND 0.00±0.11 INCH PARALLEL OFFSET HORIZONTALLY RIGHT OR LEFT OF THE PUMP SHAFT. REFER TO THE CERTIFIED DRIVESHAFT INSTRUCTIONS MANUAL FOR ALIGNMENT INSTRUCTIONS.
- 2) FLANGE DRILLING AS PER ANSI B16.1 CLASS 250 FF.
- 3) ALL DIMENSIONS IN INCHES.
- 4) BASE MUST BE COMPLETELY FILLED WITH GROUT PER NFPA 20.
- 5) PUMP IS CW (CLOCKWISE) ROTATION WHEN VIEWED FROM THE COUPLING END.



-A-	· END OF PUMP OR RIGHT ANGLE GEAR SHAFT	1" NPTF
-B-	· PUMP OR RIGHT ANGLE GEAR SHAFT HORIZONTAL CENTERLINE	HEATER VOLTAGE REQUIREMENTS: 230 VAC 2500 WATT, 115 VAC OPTIONAL
-C-	· ENGINE CRANKSHAFT VERTICAL CENTERLINE	3/8" NPTF Far Side
-D-	· ENGINE CRANKSHAFT HORIZONTAL CENTERLINE	1/2" NPTF Far Side
①	Raw Water-Inlet (Pre-Piped)	
②	Heater Junction Box	
③	Fuel Return Conn. (Flexible Hose) (Shipped Loose)	
④	Fuel Supply Conn. (Flexible Hose) (Shipped Loose)	
⑤	Raw Water-Outlet	
⑥	Flexible Exhaust Outlet Conn.	
⑦	Listed Drive Shaft Model	



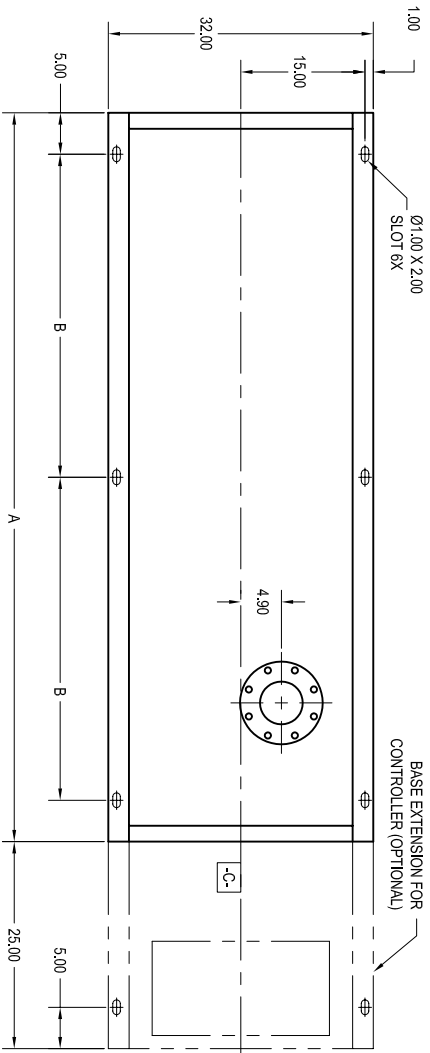


CLARKE FIRE PUMP DRIVERS JU6H Engine Models

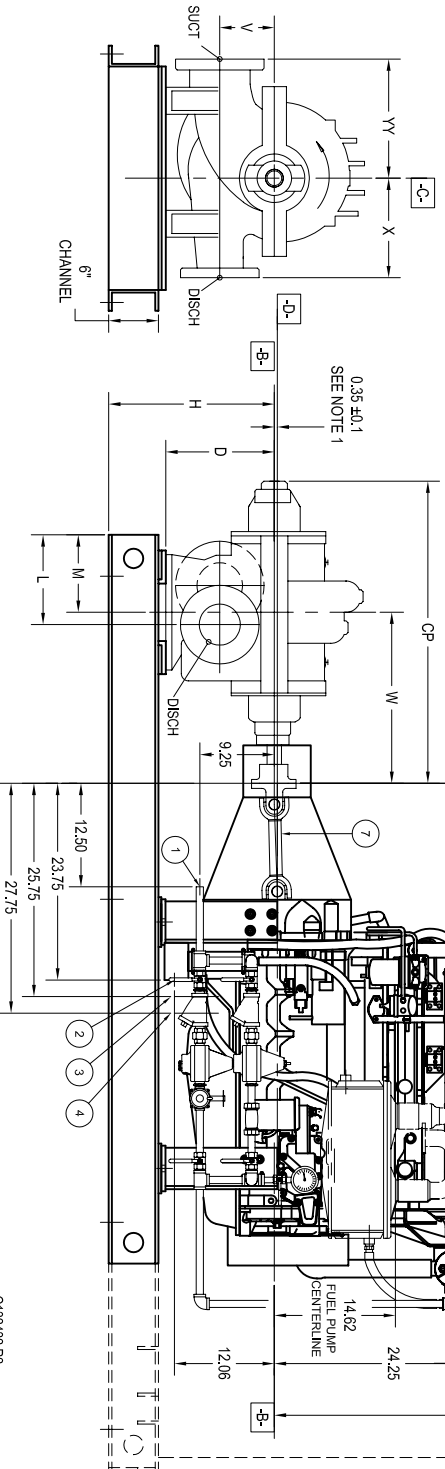
PUMP TYPE	ENGINE MODEL	BRANCHES												
		SUCT	DISCH	A	B	CP	D	H	L	M	V	W	X	YY
TY12D	JU6H-U60	6"	5"	98.0	44.0	46.65	17.72	25.0	16.38	14.41	9.06	25.59	17.72	19.69
TY12D	JU6H-U84	6"	5"	98.0	44.0	46.65	15.75	22.00	16.38	14.41	7.09	25.59	13.78	17.72
TY15E	JU6H-U60	8"	6"	98.0	44.0	46.65	17.72	23.00	16.38	14.41	9.06	25.59	14.96	21.25
TX15E	JU6H-U84	8"	6"	98.0	44.0	46.65	15.75	22.00	16.38	14.41	7.06	25.59	15.75	19.68

- B- PUMP OR RIGHT ANGLE GEAR SHAFT HORIZONTAL CENTERLINE
- C- ENGINE CRANKSHAFT VERTICAL CENTERLINE
- D- ENGINE CRANKSHAFT HORIZONTAL CENTERLINE
- E- END OF PUMP OR RIGHT ANGLE GEAR SHAFT

- NOTES:
- 1) THE DRIVESHAFT IS DESIGNED TO OPERATE AT A 2° ANGLE WITH THE INPUT AND OUTPUT SHAFTS IN PARALLEL. THE ENGINE CRANKSHAFT IS TO BE SET WITH A PARALLEL OFFSET OF 0.35"±0.10 INCHES VERTICALLY ABOVE THE PUMP SHAFT AND 0.00"±0.10 INCH PARALLEL OFFSET HORIZONTALLY RIGHT OR LEFT OF THE PUMP SHAFT. REFER TO THE CERTIFIED DRIVESHAFT INSTRUCTIONS MANUAL FOR ALIGNMENT INSTRUCTIONS.
 - 2) FLANGE DRILLING AS PER ANSI B16.1 CLASS 250 FF.
 - 3) ALL DIMENSIONS IN INCHES.
 - 4) BASE MUST BE COMPLETELY FILLED WITH GROUT PER NFPA 20.
 - 5) PUMP IS CW (CLOCKWISE) ROTATION WHEN VIEWED FROM THE COUPLING END.



① Raw Water-Inlet (Pre-Piped)	1" NPTF	HEATER VOLTAGE REQUIREMENTS: 115 VAC 1500 WATT, 230 VAC OPTIONAL	
② Heater Junction Box	3/8" NPTF Far Side		
③ Fuel Return Conn. (Flexible Hose)	1/2" NPTF Far Side		
④ Fuel Supply Conn. (Flexible Hose)	1" NPTF		
⑤ Raw Water-Outlet	5" 150# FLANGE		
⑥ Flexible Exhaust Outlet Conn.	Engine Model	Driveshaft Model	
	JU6H-UFD0, DZ.30, 32.34	CDS20-S1	
⑦ Used Driveshafts	JU6H-UFG8, ABL8, ABL0, ABL2, M8, M0, M2, S8, S0, S2, S4, 68, 80, 82, AB76, 84	CDS30-S1	

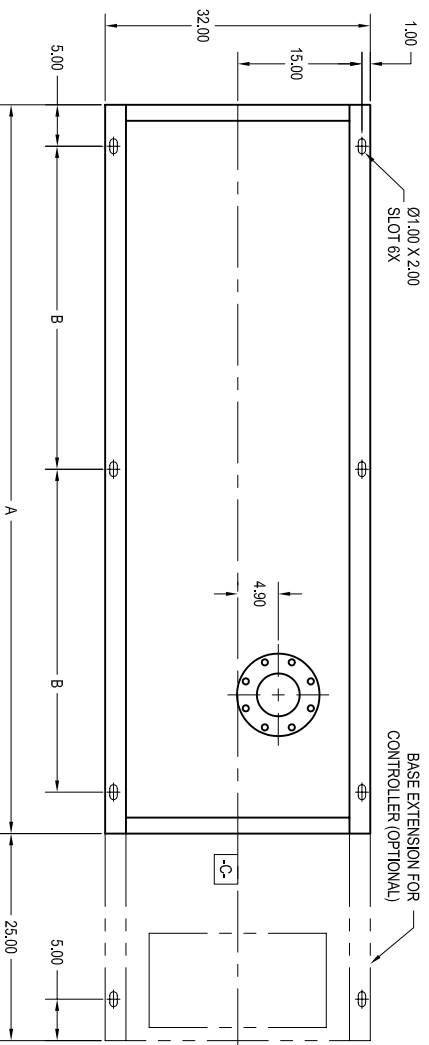




CLARKE FIRE PUMP DRIVERS

JU6H Engine Models

PUMP TYPE	ENGINE MODEL	BRANCHES		DIMENSIONS									
		SUCT	DISCH	A	B	CP	D	H	L	V	W	X	YY
TD25A	JU6H-JU30	250	250	98.0	44.0	38.98	21.25	28.0	18.78	9.84	21.45	15.74	16.92

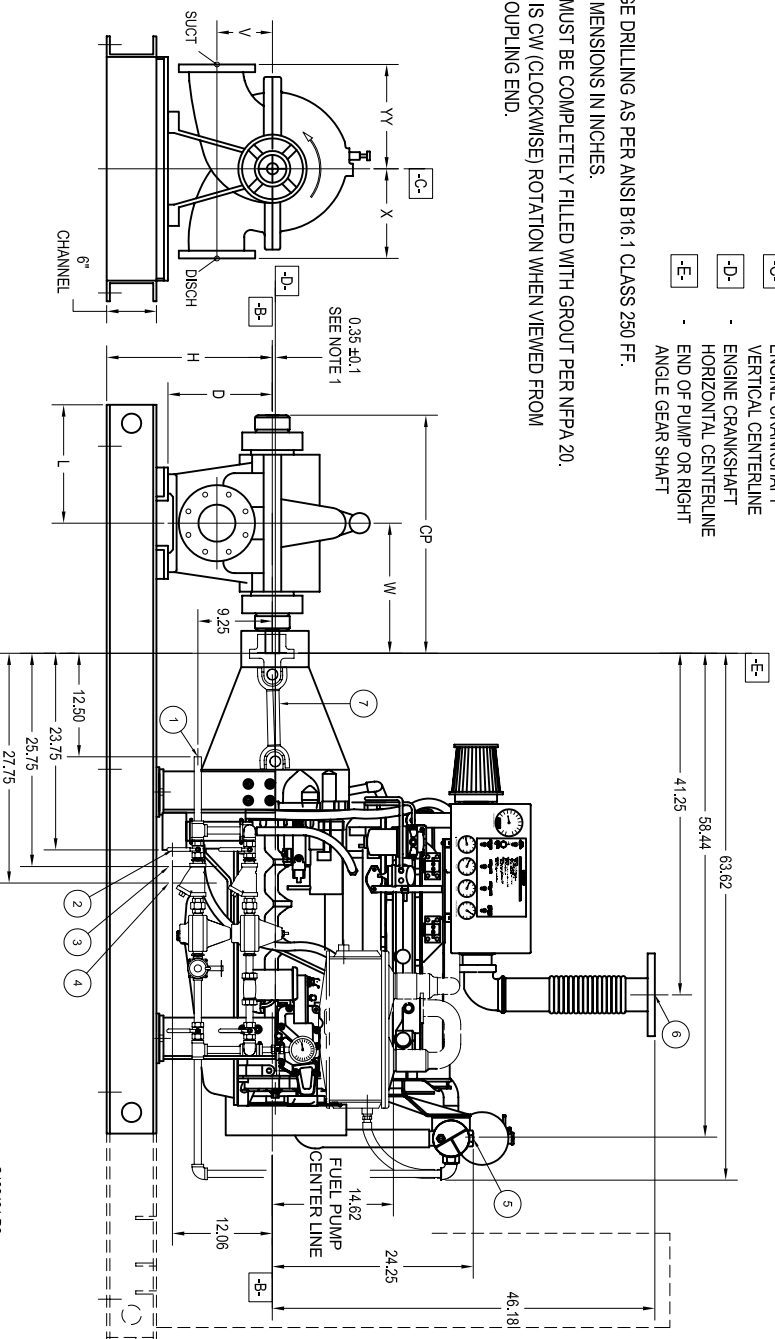


NOTES:
 1) THE DRIVESHAFT IS DESIGNED TO OPERATE AT A 2° ANGLE WITH THE INPUT AND OUTPUT SHAFTS IN PARALLEL. THE ENGINE CRANKSHAFT IS TO BE SET WITH A PARALLEL OFFSET OF 0.35±0.10 INCHES VERTICALLY ABOVE THE PUMP SHAFT AND 0.00±0.10 INCH PARALLEL OFFSET HORIZONTALLY RIGHT OR LEFT OF THE PUMP SHAFT. REFER TO THE CERTIFIED DRIVESHAFT INSTRUCTIONS MANUAL FOR ALIGNMENT INSTRUCTIONS.

- 2) FLANGE DRILLING AS PER ANSI B16.1 CLASS 250 FF.
- 3) ALL DIMENSIONS IN INCHES.
- 4) BASE MUST BE COMPLETELY FILLED WITH GROUT PER NFPA 20.
- 5) PUMP IS CW (CLOCKWISE) ROTATION WHEN VIEWED FROM THE COUPLING END.

- B- PUMP OR RIGHT ANGLE GEAR SHAFT HORIZONTAL CENTERLINE
- C- ENGINE CRANKSHAFT VERTICAL CENTERLINE
- D- ENGINE CRANKSHAFT HORIZONTAL CENTERLINE
- E- END OF PUMP OR RIGHT ANGLE GEAR SHAFT

①	Raw Water-Intel (Pre-Piped)	1" NPT	
②	Heater Junction Box	HEATER VOLTAGE REQUIREMENTS: 115 VAC 1500 WATT, 230 VAC OPTIONAL	
③	Fuel Return Conn. (Flexible Hose) (Shipped Loose)	3/8" NPT F Female	
④	Fuel Supply Conn. (Flexible Hose) (Shipped Loose)	1/2" NPT F Female	
⑤	Raw Water-Outlet	1" NPT	
⑥	Flexible Exhaust Outlet Conn.	5" 150# FLANGE	
		Engine Model	Driveshaft Model
		JU6H-JUFD0 D2.30, 32.34	CDS20-S1
⑦	Listed Driveshafts	JU6H-JUFG8, ABL 8, ABL 0, ABL 2, M8, M0, M2, 58.50, 52.54, 68, 60, 62, ABL76, 84	CDS30-S1



CLARKE FIRE PUMP DRIVERS JU6H Engine Models

PUMP TYPE	ENGINE MODEL	BRANCHES				DIMENSIONS							
		SUCT	DISCH	A	B	CP	D	H	L	V	W	X	YY
TD12F	JU6H-JUF34	6"	5"	88.0	39.0	35.43	13.38	21.0	10.31	6.88	19.68	11.42	13.19
	JU6H-UJFD0, -UJFD2	8"	6"	98.0	44.0	35.43	17.32	24.0	20.31	9.25	19.68	12.40	14.38
TD15F	JU6H-JUF32, -JUF34	8"	6"	98.0	44.0	35.43	17.32	24.0	20.31	9.25	19.68	12.40	14.38
	JU6H-UJF54	8"	6"	98.0	44.0	35.43	17.32	24.0	20.31	9.25	19.68	12.40	14.38
TD20D	JU6H-UJF30	10"	8"	98.0	44.0	35.43	17.32	24.0	20.31	9.25	19.68	12.40	14.38
	JU6H-UJF84	10"	8"	98.0	44.0	35.43	17.32	24.0	20.31	9.25	19.68	12.40	14.38
TD20E	JU6H-UJF50	10"	8"	98.0	44.0	35.43	17.32	24.0	20.31	9.25	19.68	12.40	14.38
	JU6H-UJF62	10"	8"	98.0	44.0	35.43	17.32	24.0	20.31	9.25	19.68	12.40	14.38
TE10D	JU6H-UJF32	5"	4"	88.0	39.0	35.43	13.38	20.0	10.31	7.50	19.68	13.78	13.38
	JU6H-UJF54	5"	4"	88.0	39.0	35.43	13.38	20.0	10.31	7.50	19.68	13.78	13.38
TE12E	JU6H-UJF30, -UJF32, -UJF54	6"	5"	98.0	44.0	35.43	15.35	22.0	20.32	8.25	19.68	13.78	15.75
	JU6H-UJF84	6"	5"	98.0	44.0	35.43	15.35	22.0	20.32	8.25	19.68	13.78	15.75
TF15E	JU6H-UJF30, -UJF32, -UJF84, -UJF88, -UJF60	8"	6"	98.0	44.0	35.43	15.35	22.0	20.32	8.25	19.68	13.78	15.75
	JU6H-UJF84	8"	6"	98.0	44.0	35.43	15.35	22.0	20.32	8.25	19.68	13.78	15.75
TF20D	JU6H-UJF50	10"	8"	98.0	44.0	35.43	15.35	22.0	20.32	8.25	19.68	13.78	15.75
	JU6H-UJF60	10"	8"	98.0	44.0	35.43	15.35	22.0	20.32	8.25	19.68	13.78	15.75
TF20E	JU6H-UJF50	10"	8"	98.0	44.0	35.43	15.35	22.0	20.32	8.25	19.68	13.78	15.75
	JU6H-UJF60	10"	8"	98.0	44.0	35.43	15.35	22.0	20.32	8.25	19.68	13.78	15.75

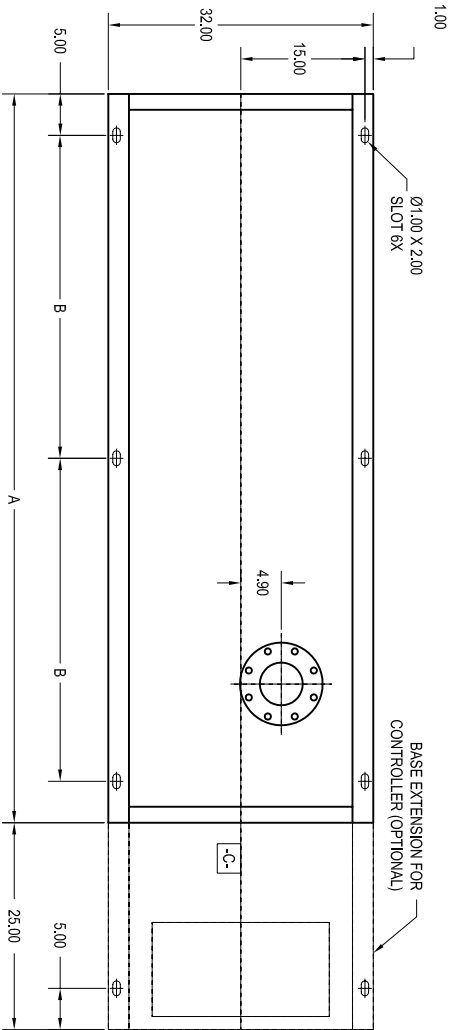
NOTES:

- 1) THE DRIVESHAFT IS DESIGNED TO OPERATE AT A 2° ANGLE WITH THE INPUT AND OUTPUT SHAFTS IN PARALLEL. THE ENGINE CRANKSHAFT IS TO BE SET WITH A PARALLEL OFFSET OF 0.35"±0.10 INCHES VERTICALLY ABOVE THE PUMP SHAFT AND 0.00"±0.10 INCH PARALLEL OFFSET HORIZONTALLY RIGHT OR LEFT OF THE PUMP SHAFT. REFER TO THE CERTIFIED DRIVESHAFT INSTRUCTIONS MANUAL FOR ALIGNMENT INSTRUCTIONS.

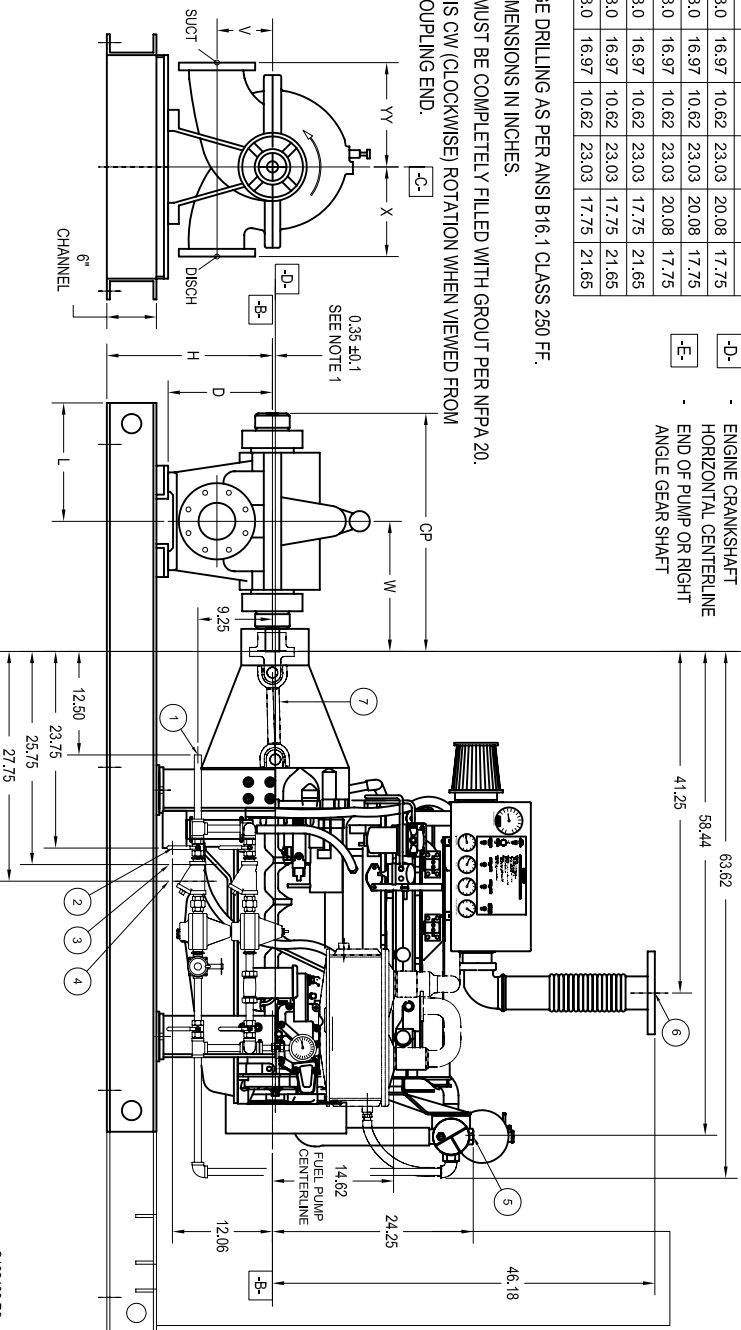
① Raw Water-Inlet (Pre-Filtered)	1" NPTF	
② Heater Junction Box	HEATER VOLTAGE REQUIREMENTS: 115 VAC 1500 WATT, 230 VAC OPTIONAL	
③ Fuel Return Conn. (Flexible Hose)	3/8" NPTF Farkle	
④ Fuel Supply Conn. (Flexible Hose)	1/2" NPTF Farkle	
⑤ Raw Water-Outlet	1" NPTF	
⑥ Flexible Exhaust Outlet Conn.	5" 150# FLANGE	
⑦ Listed Driveshafts	Engine Model JU6H-UJFD0, D2, 30, 32, 34 CD520-S1	Driveshaft Model CD520-S1
	M8, M10, M2, S8, 50, 52, 54, 68, 80, 82, AB76, 84	CD530-S1

- 2) FLANGE DRILLING AS PER ANSI B16.1 CLASS 250 FF.
- 3) ALL DIMENSIONS IN INCHES.

- 4) BASE MUST BE COMPLETELY FILLED WITH GROUT PER NFPA 20.
- 5) PUMP IS CW (CLOCKWISE) ROTATION WHEN VIEWED FROM THE COUPLER END.



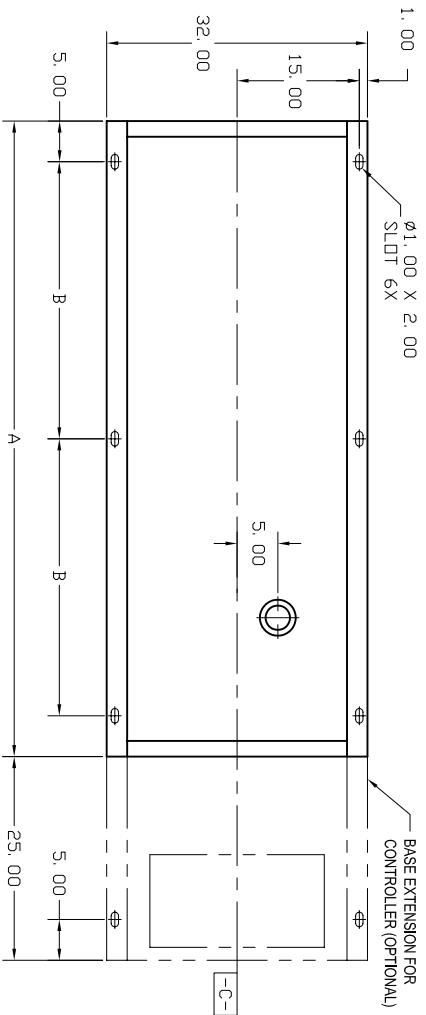
- B- PUMP OR RIGHT ANGLE GEAR SHAFT HORIZONTAL CENTERLINE
- C- ENGINE CRANKSHAFT VERTICAL CENTERLINE
- D- ENGINE CRANKSHAFT HORIZONTAL CENTERLINE
- E- END OF PUMP OR RIGHT ANGLE GEAR SHAFT





CLARKE FIRE PUMP DRIVERS JU4H-Turbocharged Engine Models

PUMP TYPE	ENGINE MODEL	BRANCHES		DIMENSIONS											
		SUCT	DISCH	A	B	CP	D	H	L	V	W	X	YY		
TC12G	JU4H-UJF54	6"	5"	78.0	34.0	28.75	13.38	20.0	14.29	6.30	15.71	11.42	12.20		
TD12F	JU4H-UJF52-UJF54	6"	5"	78.0	34.0	35.43	13.38	21.0	10.31	6.88	19.68	11.42	13.19		
TD15F	JU4H-UJF50	8"	6"	88.0	39.0	35.43	17.32	24.0	20.31	9.25	19.68	12.40	14.38		
TD20D	JU4H-UJF52	8"	6"	88.0	39.0	35.43	17.32	24.0	20.31	9.25	19.68	12.40	14.38		
TD20D	JU4H-UJF50	10"	8"	88.0	39.0	41.14	21.25	28.0	16.97	11.25	23.03	15.16	17.72		
TE10D	JU4H-UJF52	5"	4"	78.0	34.0	35.43	13.38	20.0	10.31	7.50	19.68	13.78	13.38		



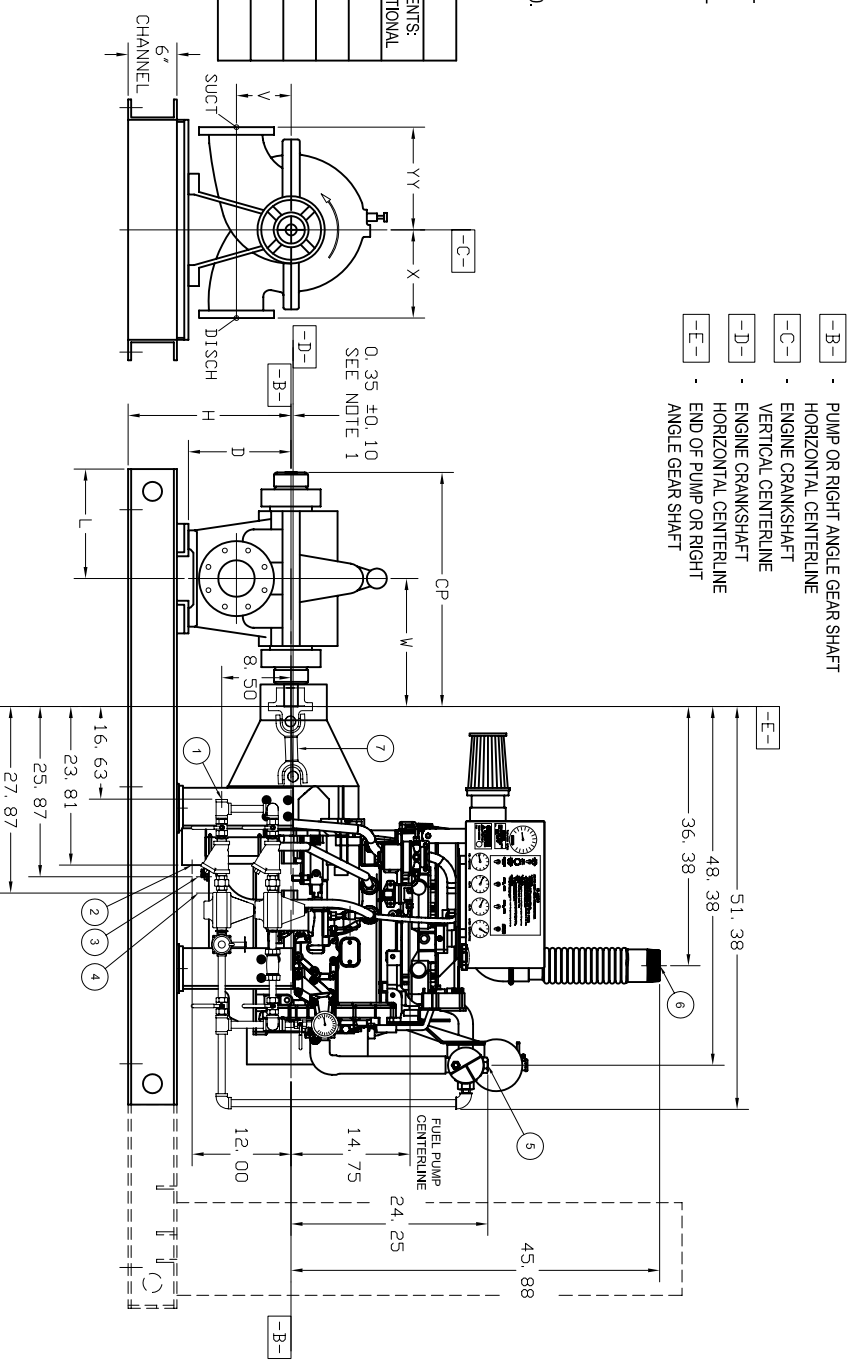
- B- PUMP OR RIGHT ANGLE GEAR SHAFT
- C- HORIZONTAL CENTERLINE
- D- ENGINE CRANKSHAFT
- E- VERTICAL CENTERLINE

- D- ENGINE CRANKSHAFT
- E- HORIZONTAL CENTERLINE
- E- END OF PUMP OR RIGHT ANGLE GEAR SHAFT

- E- 0.35 ±0.10 SEE NOTE 1

- 1) THE DRIVESHAFT IS DESIGNED TO OPERATE AT A 2° ANGLE WITH THE INPUT AND OUTPUT SHAFTS IN PARALLEL. THE ENGINE CRANKSHAFT IS TO BE SET WITH A PARALLEL OFFSET OF 0.35±0.10 INCHES VERTICALLY ABOVE THE PUMP SHAFT AND 0.00±0.10 INCH PARALLEL OFFSET HORIZONTALLY RIGHT OR LEFT OF THE PUMP SHAFT. REFER TO THE CERTIFIED DRIVESHAFT INSTRUCTIONS MANUAL FOR ALIGNMENT INSTRUCTIONS.
- 2) FLANGE DRILLING AS PER ANSI B16.1 CLASS 250 FF.
- 3) ALL DIMENSIONS IN INCHES.
- 4) BASE MUST BE COMPLETELY FILLED WITH GROUT PER NFPA 20.
- 5) PUMP IS CW (CLOCKWISE) ROTATION WHEN VIEWED FROM THE COUPLING END.

①	Raw Water-Inlet (Pre-Piped)	1/2" NPTF
②	Heater Junction Box	HEATER VOLTAGE REQUIREMENTS: 115 VAC 1500 WATT, 230 VAC OPTIONAL
③	Fuel Return Conn. (Flexible Hose) (Shipped Loose)	3/8" NPTF Far Side
④	Fuel Supply Conn. (Flexible Hose) (Shipped Loose)	1/2" NPTF Far Side
⑤	Raw Water-Outlet	1" NPTF
⑥	Flexible Exhaust Outlet Conn.	4" NPT
⑦	Listed Drive Shaft Model	CDS30-S1





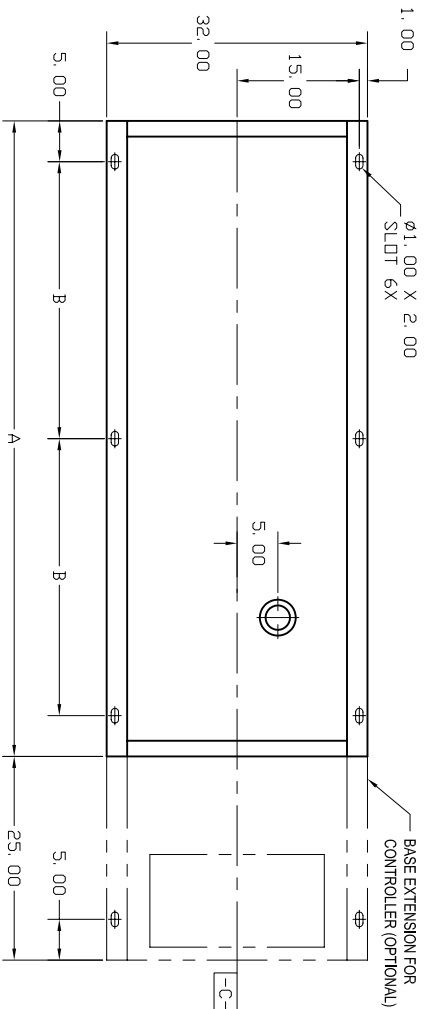
CLARKE FIRE PUMP DRIVERS JU4H-Turbocharged Engine Models

PUMP TYPE	ENGINE MODEL	DIMENSIONS											
		SUCT	DISCH	A	B	CP	D	H	L	V	W	X	YY
TC12G	JU4H-UJF34	6"	5"	78.0	34.0	28.75	13.38	20.0	14.29	6.30	15.71	11.42	12.20
	JU4H-UJF34	5"	4"	78.0	34.0	28.75	12.59	20.0	14.29	6.68	15.71	10.83	12.60
TD10E	JU4H-UJF10	5"	4"	78.0	34.0	28.75	12.59	20.0	14.29	6.68	15.71	10.83	12.60
	JU4H-UJF30	6"	5"	78.0	34.0	35.43	13.38	21.0	10.31	6.88	19.68	11.42	13.19
TD12F	JU4H-UJF34	6"	5"	78.0	34.0	35.43	13.38	21.0	10.31	6.88	19.68	11.42	13.19
	JU4H-UJF42, H2	6"	5"	78.0	34.0	35.43	13.38	21.0	10.31	6.88	19.68	11.42	13.19
JU4H-UJF52, S4	JU4H-UJF30	6"	5"	78.0	34.0	35.43	13.38	21.0	10.31	6.88	19.68	11.42	13.19
	JU4H-UJF30	8"	6"	88.0	39.0	35.43	17.32	24.0	20.31	9.25	19.68	12.40	14.38
TD15F	JU4H-UJF40	8"	6"	88.0	39.0	35.43	17.32	24.0	20.31	9.25	19.68	12.40	14.38
	JU4H-UJF50	8"	6"	88.0	39.0	35.43	17.32	24.0	20.31	9.25	19.68	12.40	14.38
TD20D	JU4H-UJF40	8"	6"	88.0	39.0	35.43	17.32	24.0	20.31	9.25	19.68	12.40	14.38
	JU4H-UJF50	10"	8"	88.0	39.0	41.14	21.25	28.0	16.97	11.25	23.03	15.16	17.72
TE08D	JU4H-UJF32	4"	3"	78.0	34.0	36.02	12.59	20.0	10.31	6.89	19.68	13.78	13.39
	JU4H-UJF30	5"	4"	78.0	34.0	35.43	13.38	20.0	10.31	7.50	19.68	13.78	13.38
TE10D	JU4H-UJF40, 42	5"	4"	78.0	34.0	35.43	13.38	20.0	10.31	7.50	19.68	13.78	13.38
	JU4H-UJF10	5"	4"	78.0	34.0	35.43	13.38	20.0	10.31	7.50	19.68	13.78	13.38
TE15D	JU4H-UJF30	5"	4"	78.0	34.0	35.43	13.38	20.0	10.31	7.50	19.68	13.78	13.38
	JU4H-UJF30	8"	6"	88.0	39.0	35.43	17.32	24.0	20.31	8.25	19.68	13.78	16.14
TE12E	JU4H-UJF50	6"	5"	88.0	39.0	35.43	15.35	22.0	20.32	8.27	19.68	13.78	15.75
	JU4H-UJF40	8"	6"	88.0	39.0	35.43	17.32	24.0	20.32	8.27	19.70	13.78	16.14

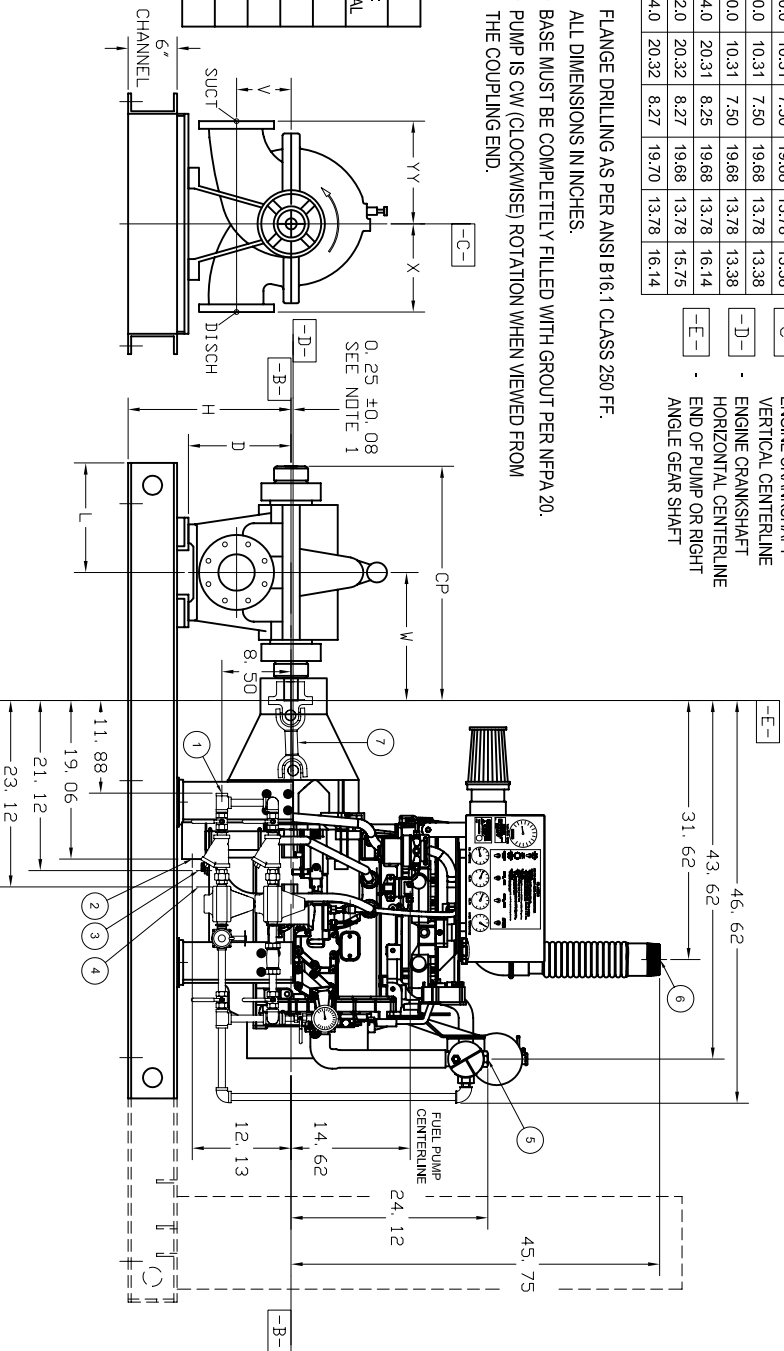
NOTES:

- 1) THE DRIVESHAFT IS DESIGNED TO OPERATE AT A 2° ANGLE WITH THE INPUT AND OUTPUT SHAFTS IN PARALLEL. THE ENGINE CRANKSHAFT IS TO BE SET WITH A PARALLEL OFFSET OF 0.25 ±0.08 INCHES VERTICALLY ABOVE THE PUMP SHAFT AND 0.00 ±0.08 INCH PARALLEL OFFSET HORIZONTALLY RIGHT OR LEFT OF THE PUMP SHAFT. REFER TO THE CERTIFIED DRIVESHAFT INSTRUCTIONS MANUAL FOR ALIGNMENT INSTRUCTIONS.
- 2) FLANGE DRILLING AS PER ANSI B16.1 CLASS 250 FF.
- 3) ALL DIMENSIONS IN INCHES.
- 4) BASE MUST BE COMPLETELY FILLED WITH GROUT PER NFPA 20.
- 5) PUMP IS CW (CLOCKWISE) ROTATION WHEN VIEWED FROM THE COUPLING END.

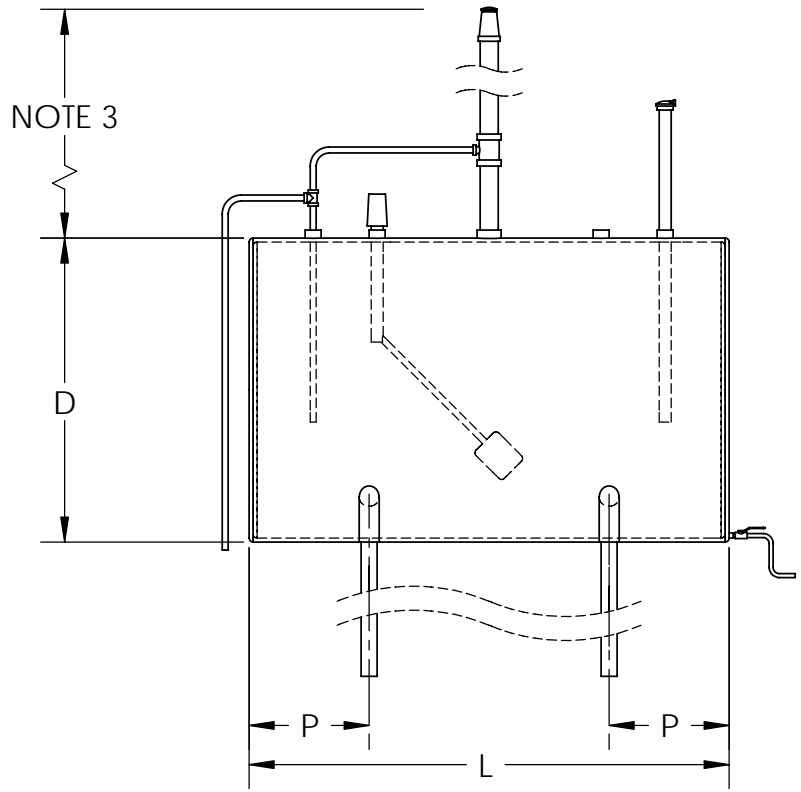
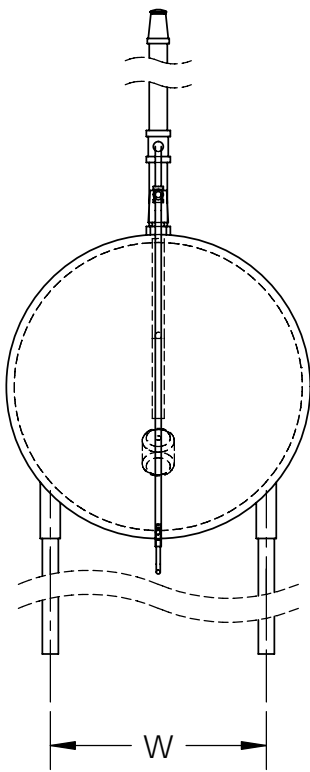
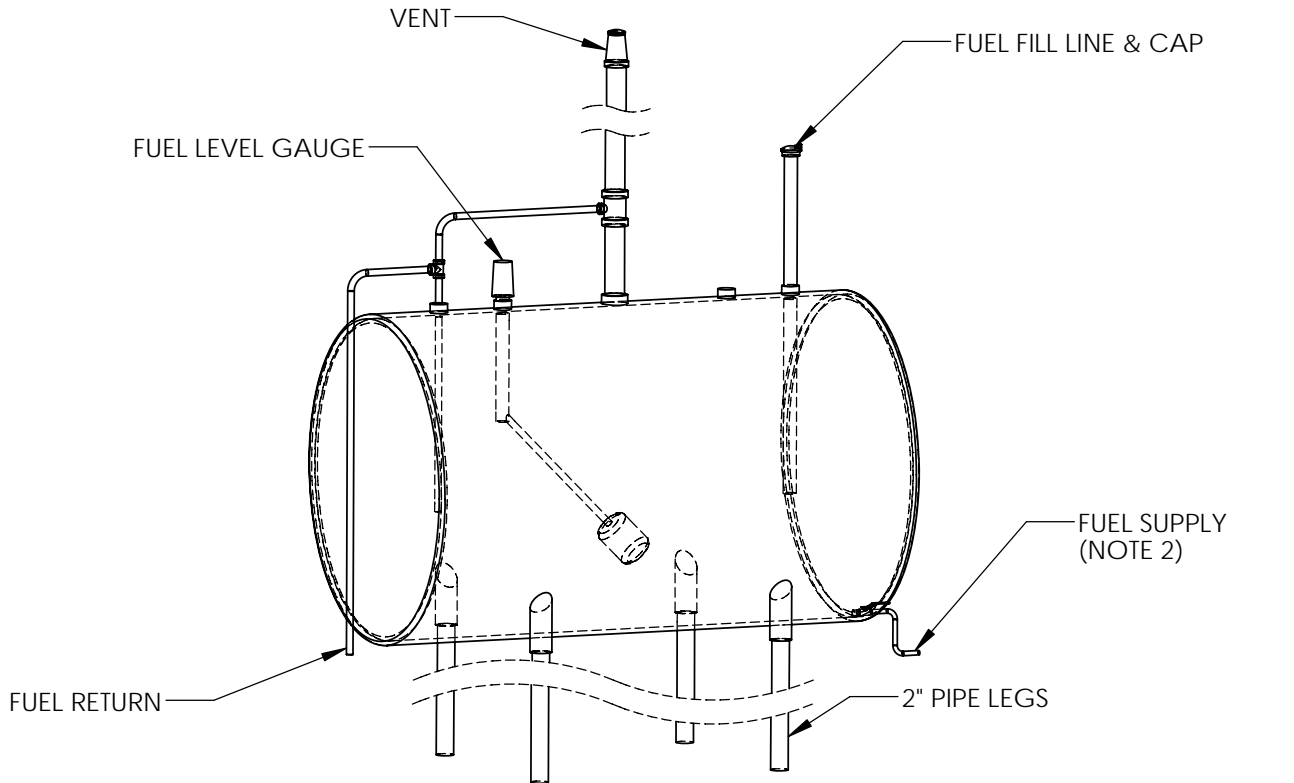
①	Raw Water-Inlet (Pre-Fliped)	1/2" NPTF
②	Heater Junction Box	HEATER VOLTAGE REQUIREMENTS: 115 VAC 1500 WATT, 230 VAC OPTIONAL.
③	Fuel Return Conn. (Flexible Hose)	3/8" NPTF Far Side
④	Fuel Supply Conn. (Flexible Hose)	1/2" NPTF Far Side
⑤	Raw Water-Outlet	1" NPTF
⑥	Flexible Exhaust Outlet Conn.	4" NPT
⑦	Listed Drive Shaft Model	CDS20-SC



- B- PUMP OR RIGHT ANGLE GEAR SHAFT
- B- HORIZONTAL CENTERLINE
- C- ENGINE CRANKSHAFT
- C- VERTICAL CENTERLINE
- D- ENGINE CRANKSHAFT
- D- HORIZONTAL CENTERLINE
- E- END OF PUMP OR RIGHT ANGLE GEAR SHAFT




SINGLE WALL FUEL TANK



- NOTES:
- 1) TANK TO BE SLOPED 1/4" PER FOOT LENGTH TO CREATE 5% EXPANSION AND 5% SUMP
 - 2) LEGS TO BE LONG SO FUEL OUTLET IS HIGHER THAN FUEL PUMP CENTERLINE
 - 3) PIPE TANK VENTS A MINIMUM OF 10 FEET ABOVE TOP OF FUEL FILL CAP

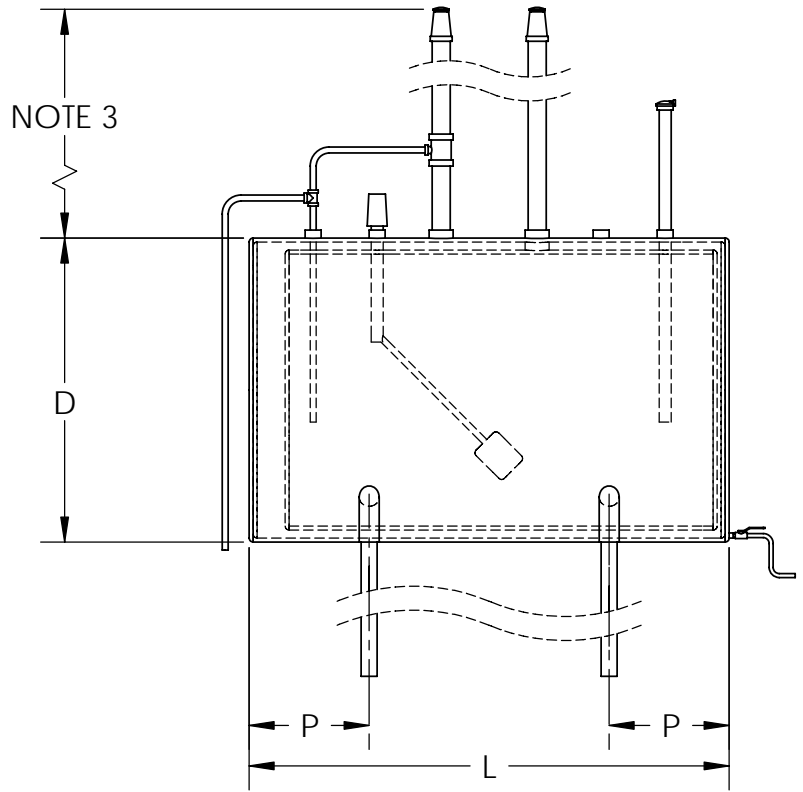
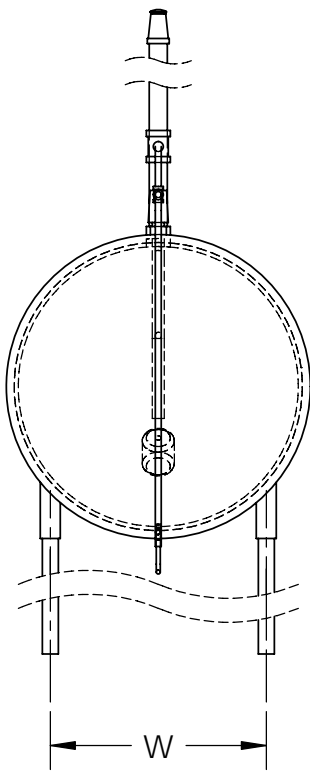
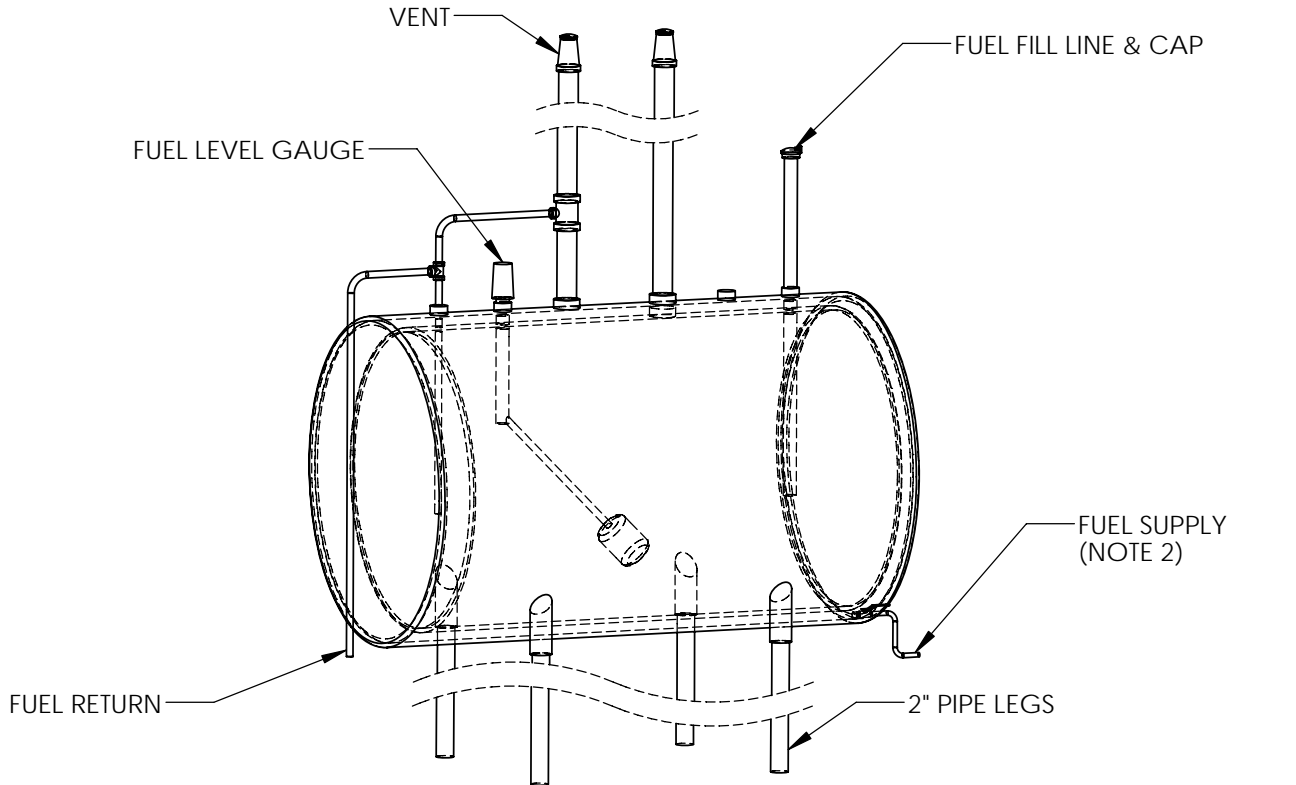
CAP	D	L	W	P	WEIGHT
70	24"	36"	17"	6"	170
140	24"	72"	17"	15"	265
250	32"	72"	23"	15"	350
285	38"	60"	27"	15"	375
300	38"	62"	27"	15"	385
350	38"	72"	27"	15"	425
500	48"	65"	32"	15"	515
520	48"	67"	32"	15"	525
700	48"	90"	32"	15"	680



**SINGLE WALL
FUEL TANK**

SIZE	DWG. NO.		REV.
A	DWG NUMBER		

DOUBLE WALL FUEL TANK



- NOTES:
- 1) TANK TO BE SLOPED 1/4" PER FOOT LENGTH TO CREATE 5% EXPANSION AND 5% SUMP
 - 2) LEGS TO BE LONG SO FUEL OUTLET IS HIGHER THAN FUEL PUMP CENTERLINE
 - 3) PIPE TANK VENTS A MINIMUM OF 10 FEET ABOVE TOP OF FUEL FILL CAP

CAP	D	L	W	P	WEIGHT
70	24"	36"	17"	6"	380
140	24'	72"	17"	15"	530
250	32"	72'	23"	15"	800
285	38"	60"	27"	15"	855
350	38"	72"	27"	15"	1060
500	48"	65"	32"	15"	1200
520	48"	67"	32"	15"	1225
700	48"	90"	32"	15"	1560



DOUBLE WALL FUEL TANK

SIZE	DWG. NO.	REV.
A	DWG NUMBER	



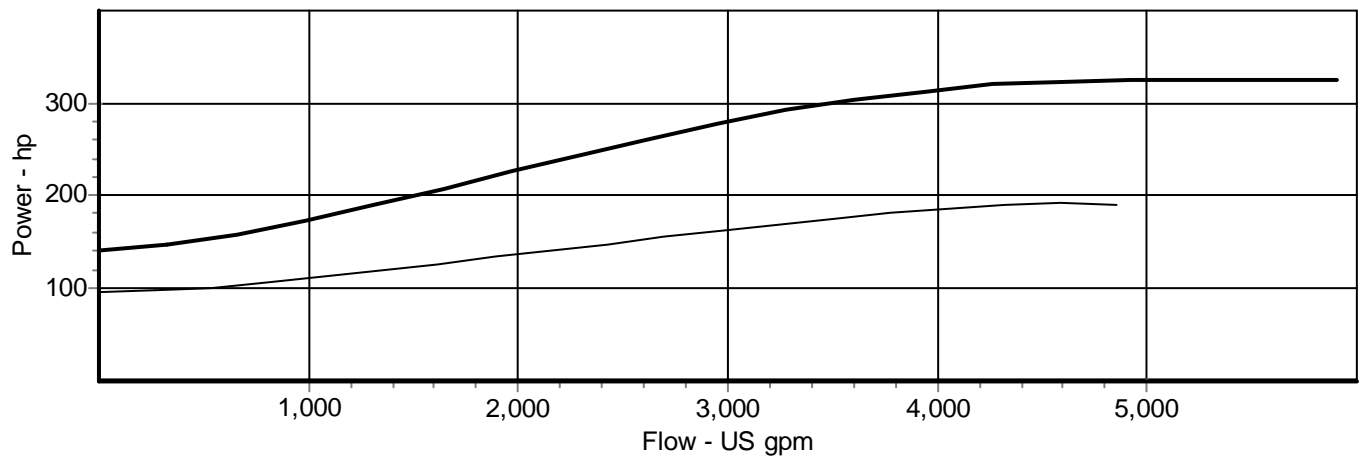
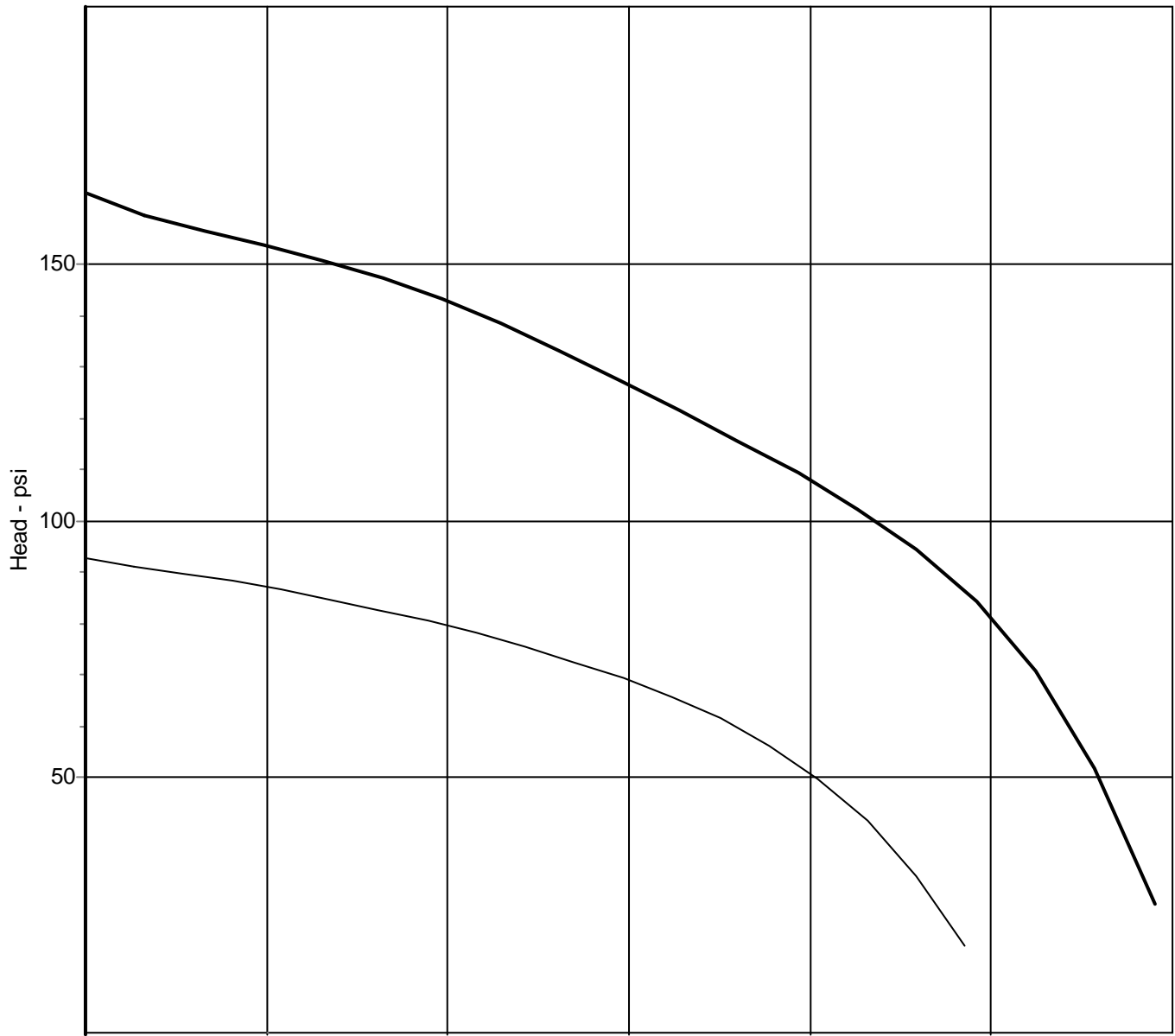
Performance Curves

1750 RPM

Pump Model: **SPP - TF20E(I)**
Curve No.: **TF20E-C1760/1H**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **1760 RPM**
Impeller Dia.: **480/352 mm**
Fluid: **Water**

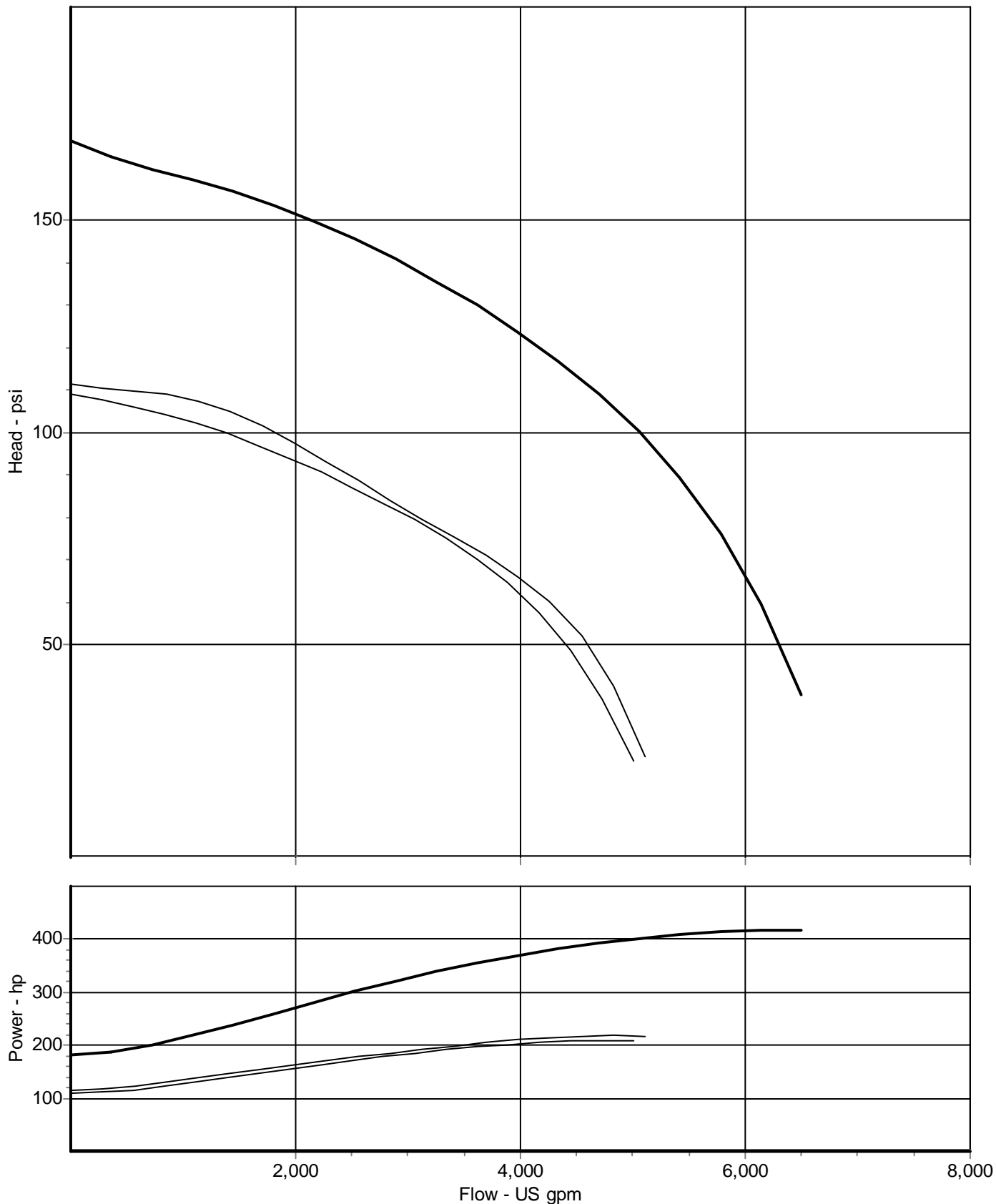
Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Pump Model: **SPP - TF20D(I)**
Curve No.: **TF20D-C1760/1H**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **1760 RPM**
Impeller Dia.: **480/386 mm**
Fluid: **Water**

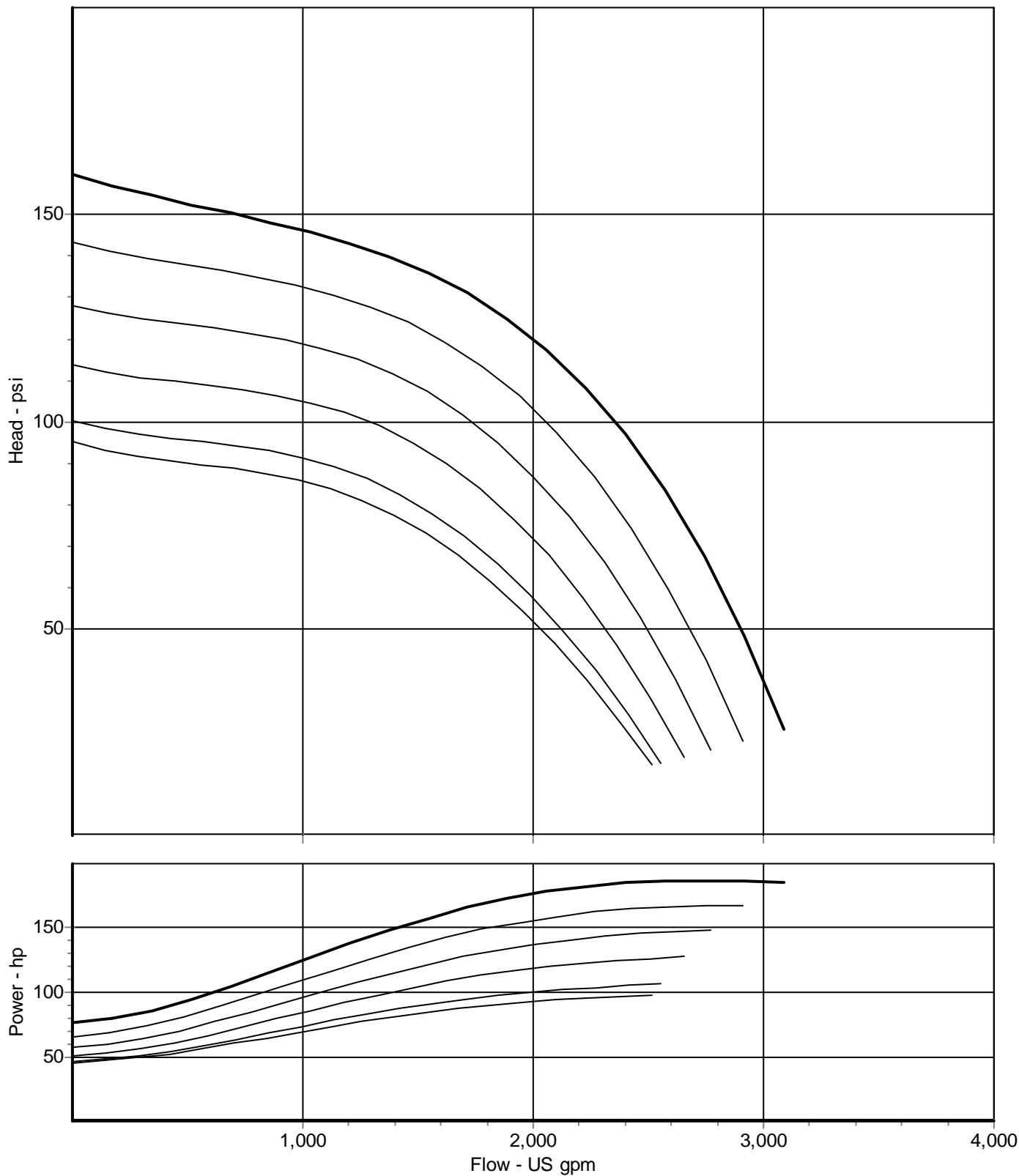
Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Pump Model: **SPP - TF15E**
Curve No.: **TF15E-C1760/1G-C1**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **1760 RPM**
Impeller Dia.: **475/365 mm**
Fluid: **Water**

Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Comments:

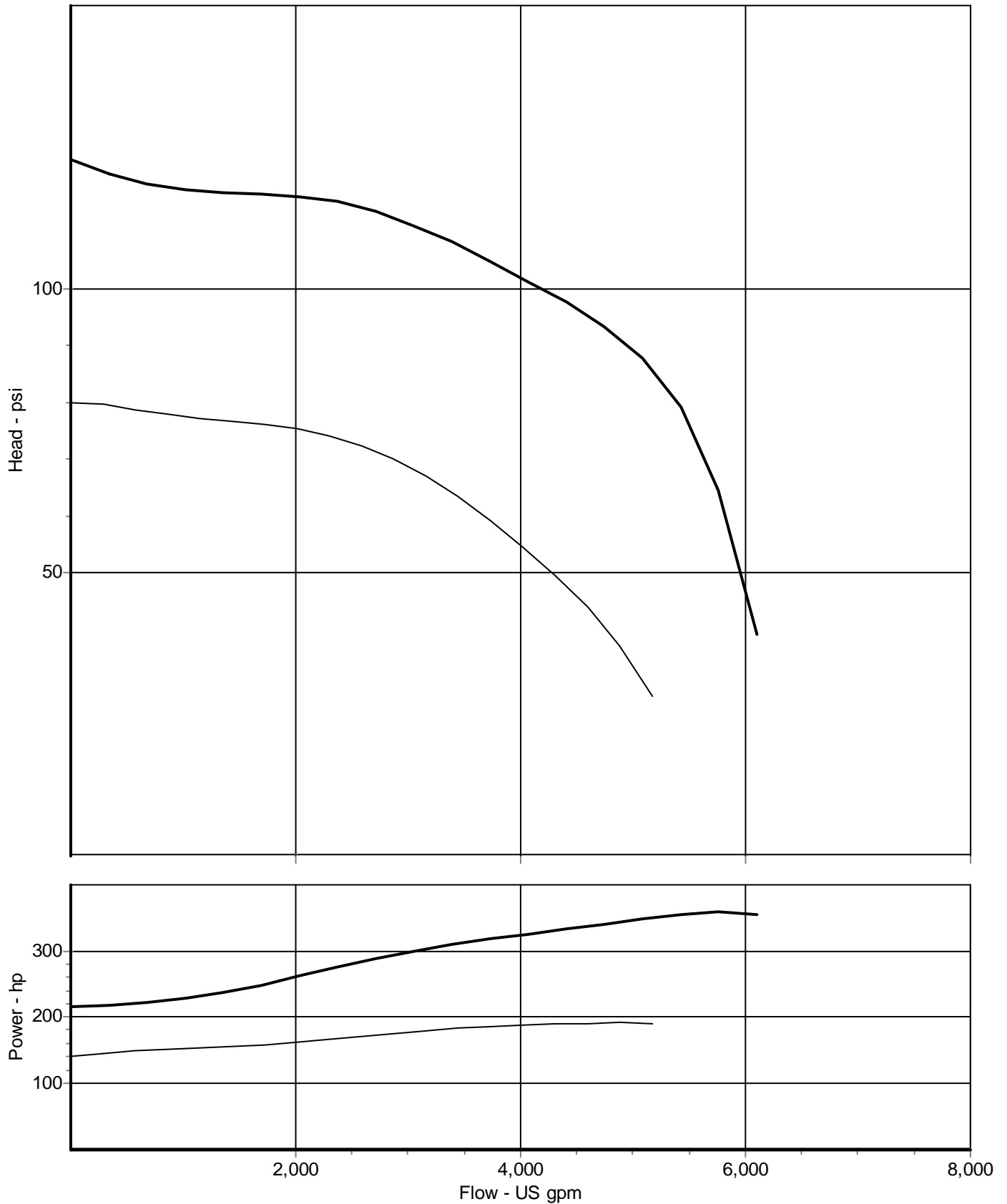
NPSH REQUIRED at centreline of impeller. Add 0.5m to Laboratory NPSH curve for field applications



Pump Model: **SPP - TE25A(I)**
Curve No.: **TE25A-C1760/1H**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **1760 RPM**
Impeller Dia.: **421/346 mm**
Fluid: **Water**

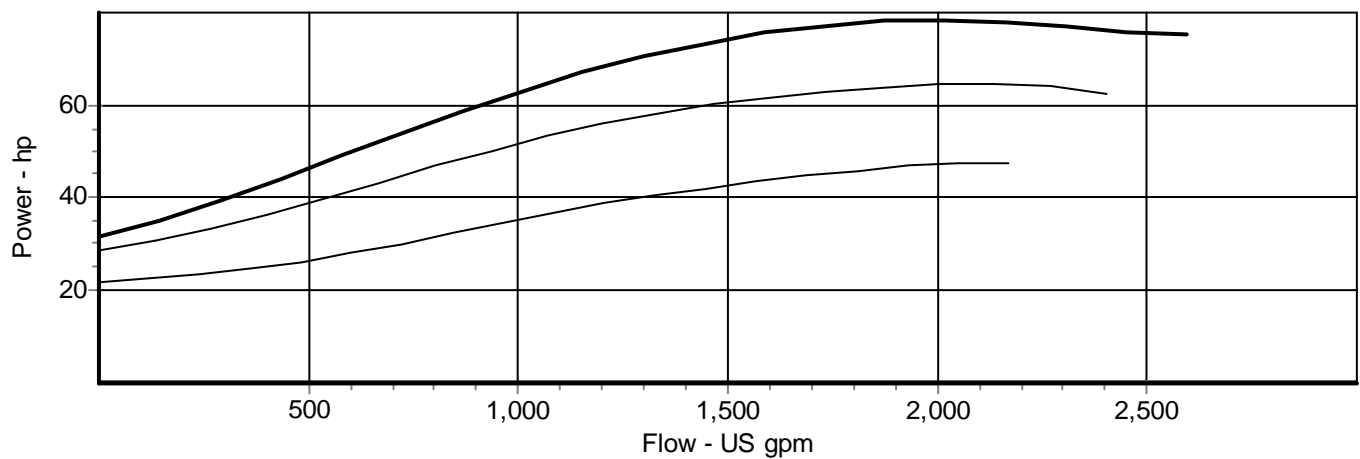
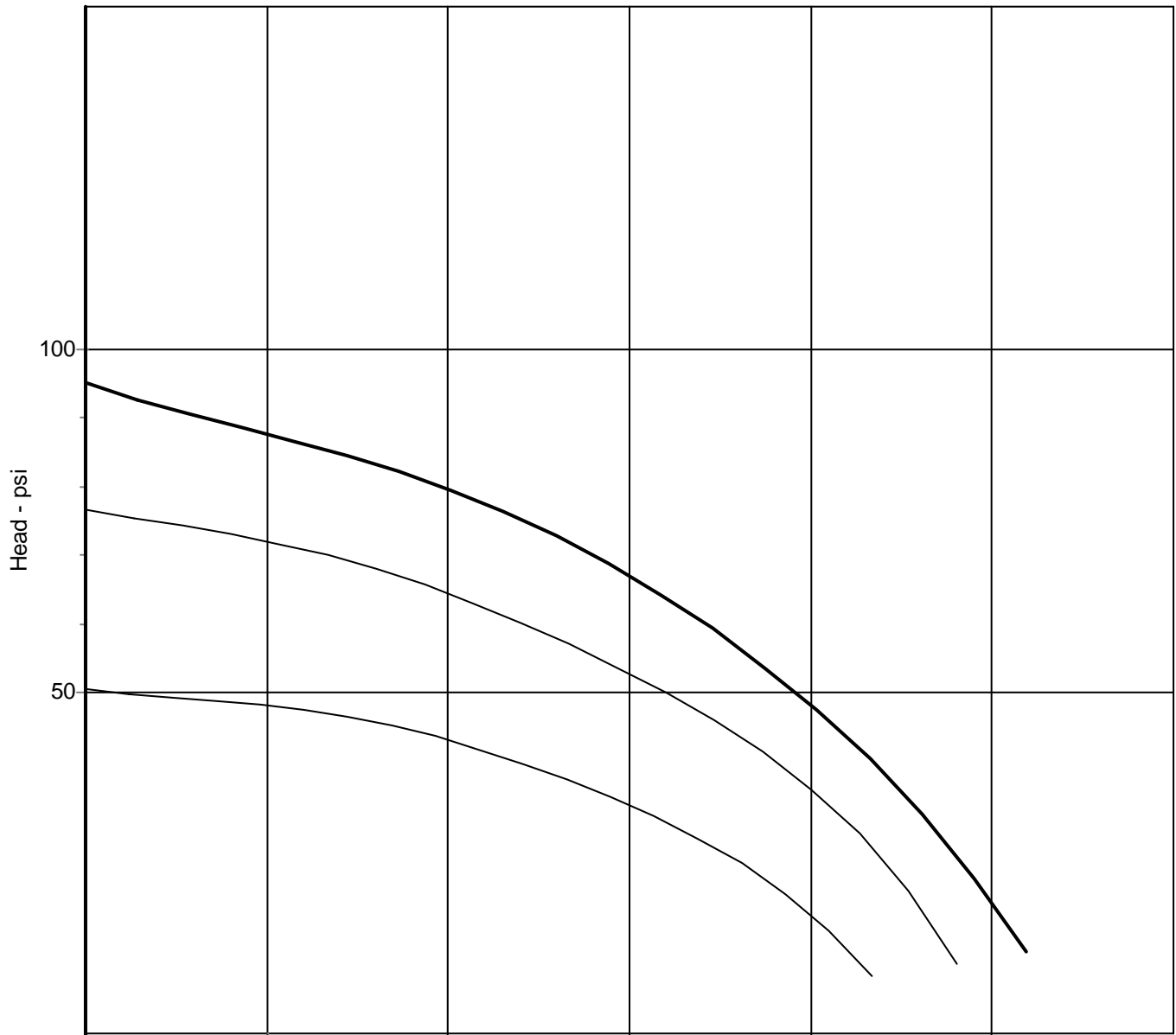
Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Pump Model: **SPP - TE15E(I)**
Curve No.: **TE15E-C1760/1H**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **1760 RPM**
Impeller Dia.: **375/275 mm**
Fluid: **Water**

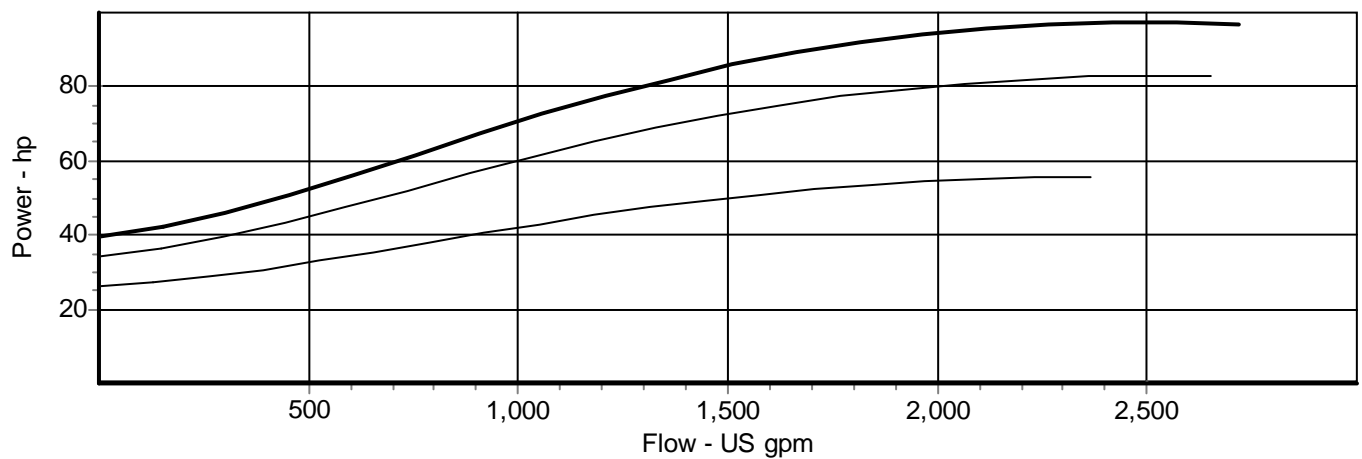
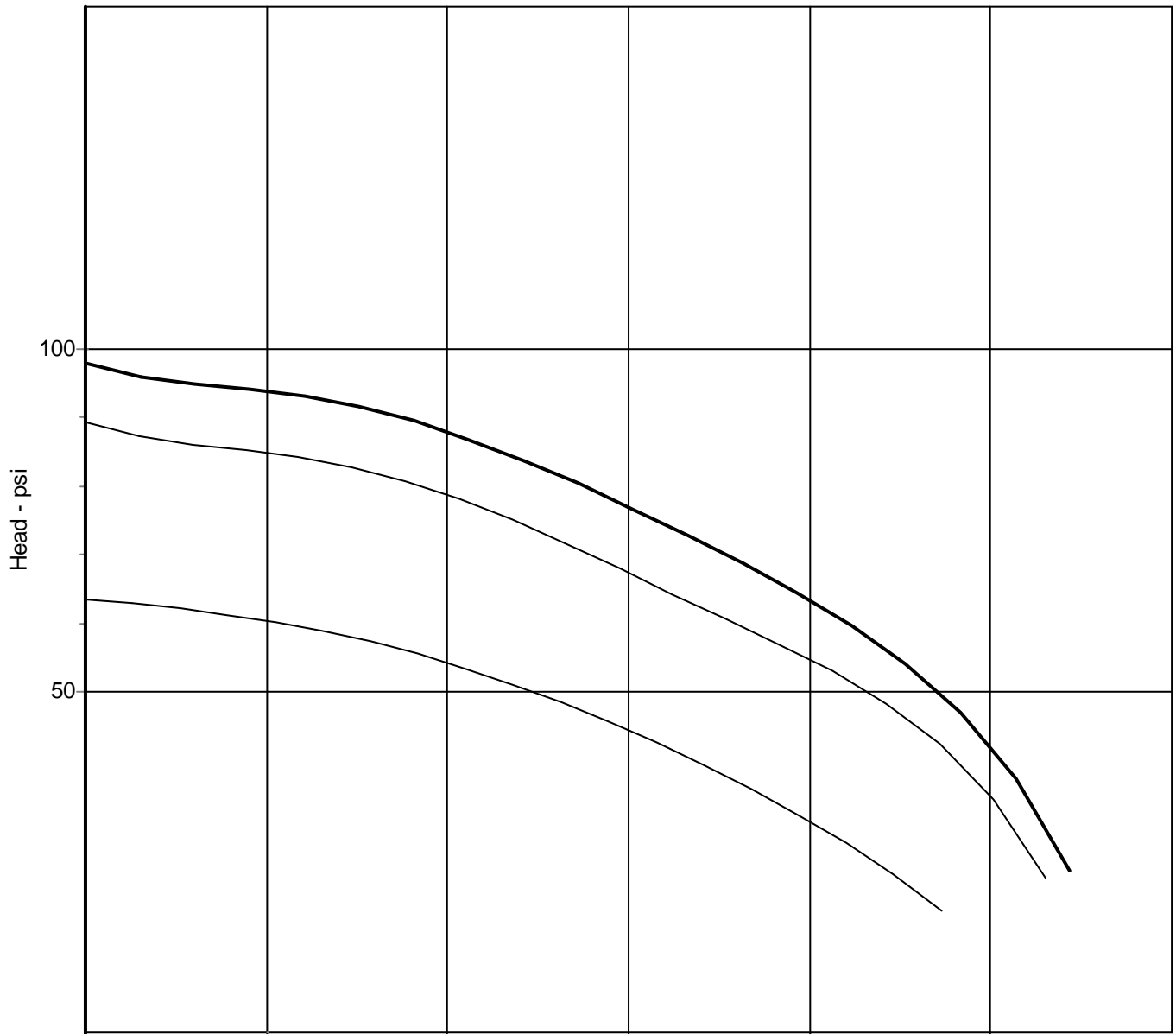
Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Pump Model: **SPP - TE15D(I)**
Curve No.: **TE15D-C1760/1H**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **1760 RPM**
Impeller Dia.: **375/302 mm**
Fluid: **Water**

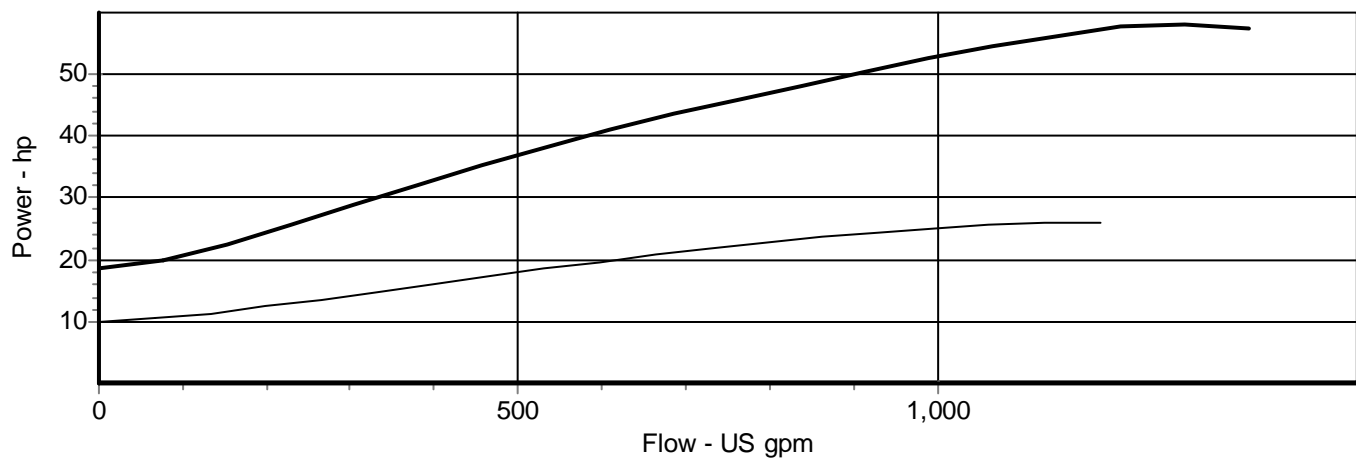
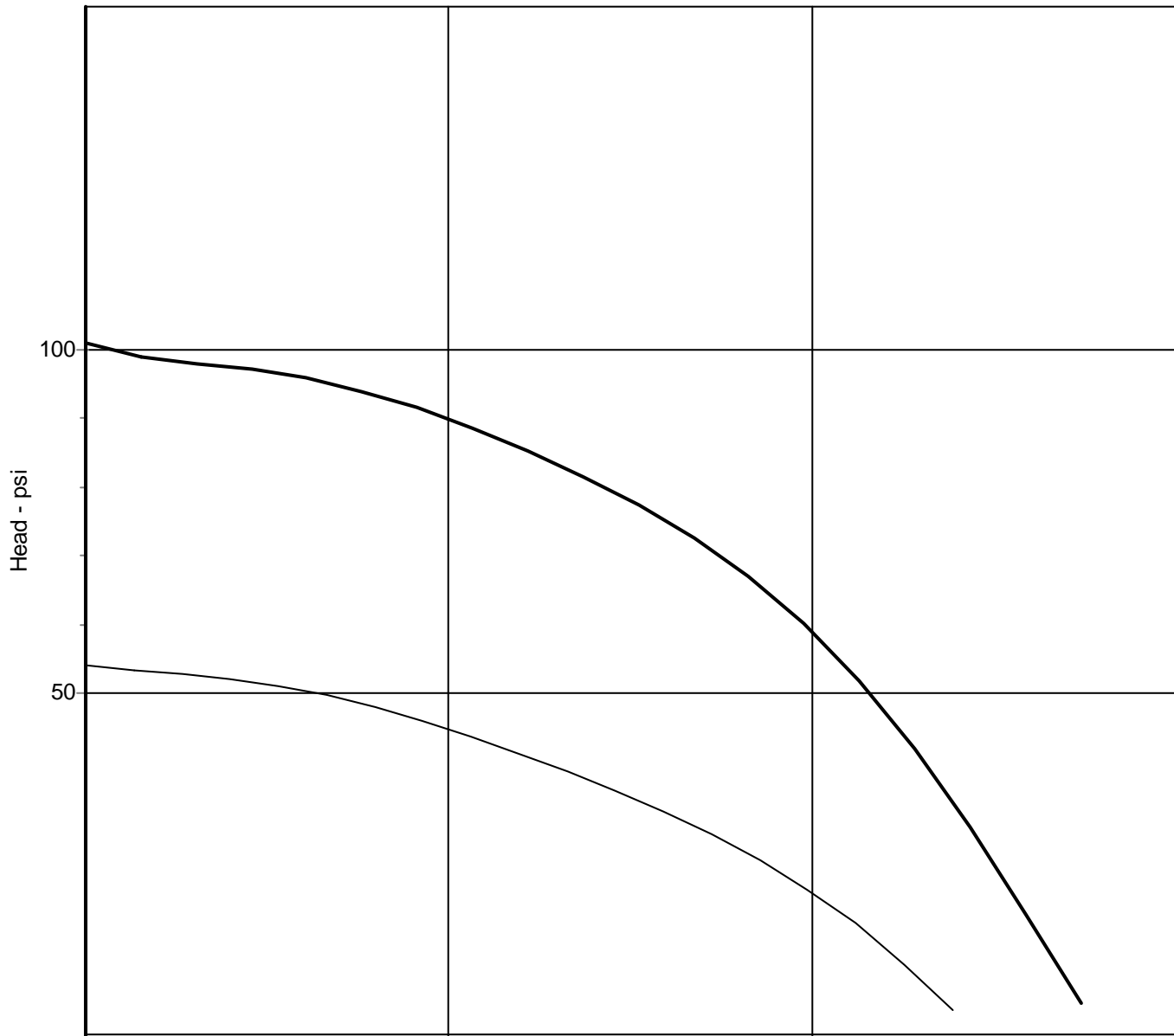
Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Pump Model: **SPP - TE10D(I)**
Curve No.: **TE10D-C1760/1H**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **1760 RPM**
Impeller Dia.: **370/270 mm**
Fluid: **Water**

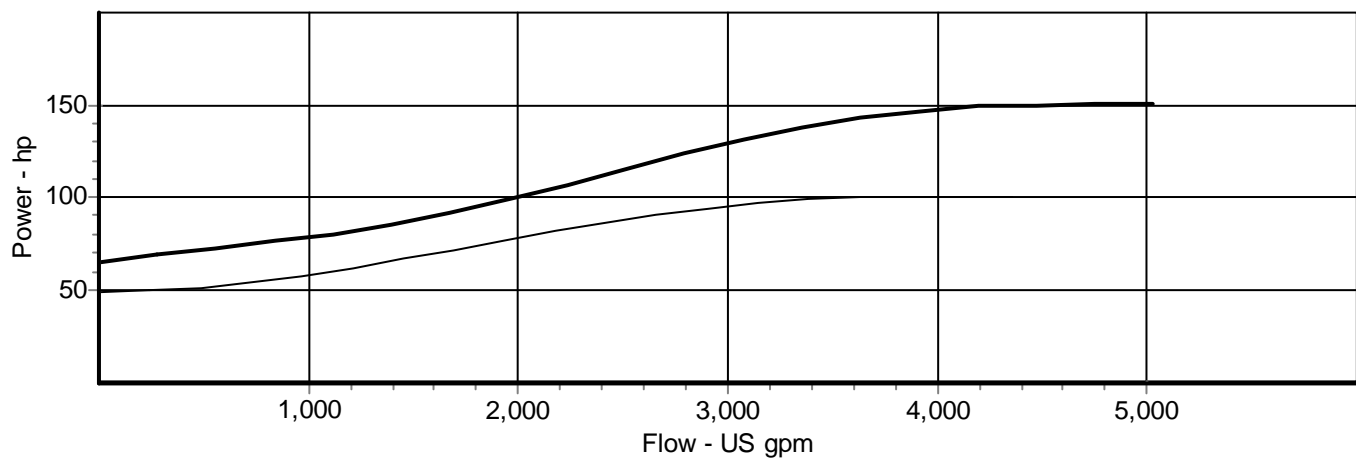
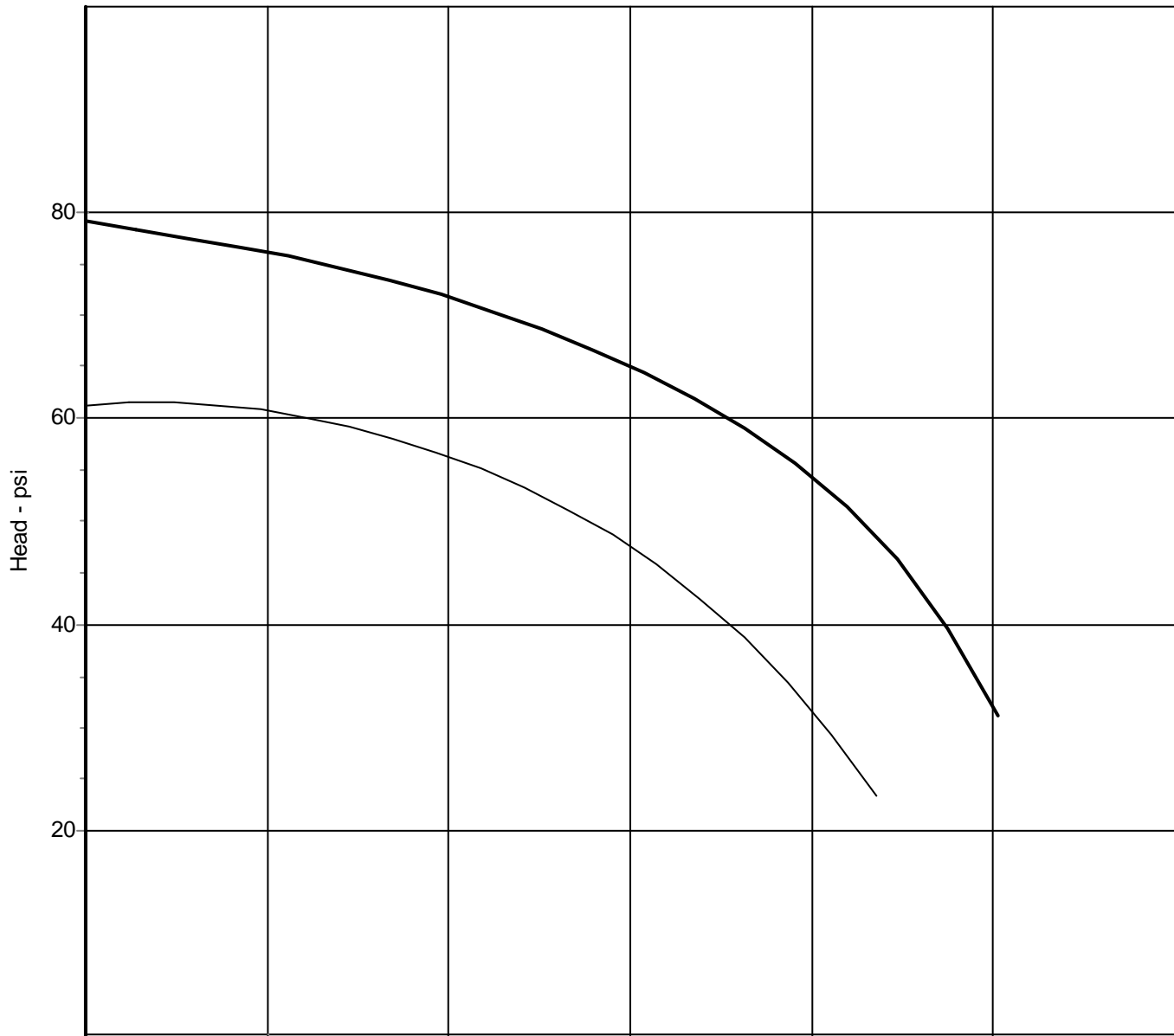
Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Pump Model: **SPP - TD25A(I)**
Curve No.: **TD25A-C1760/1H**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **1760 RPM**
Impeller Dia.: **318/289 mm**
Fluid: **Water**

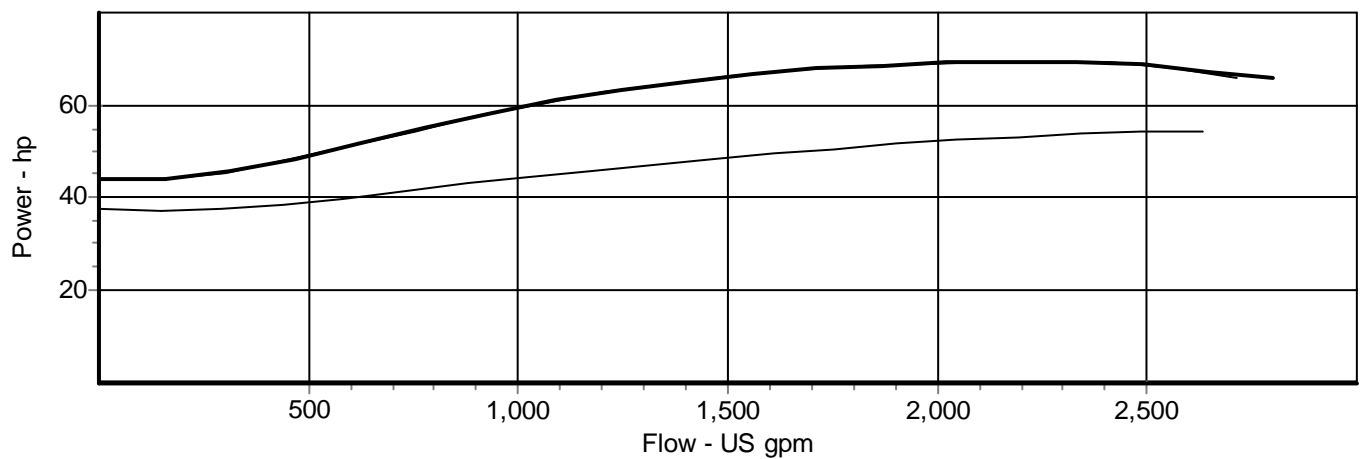
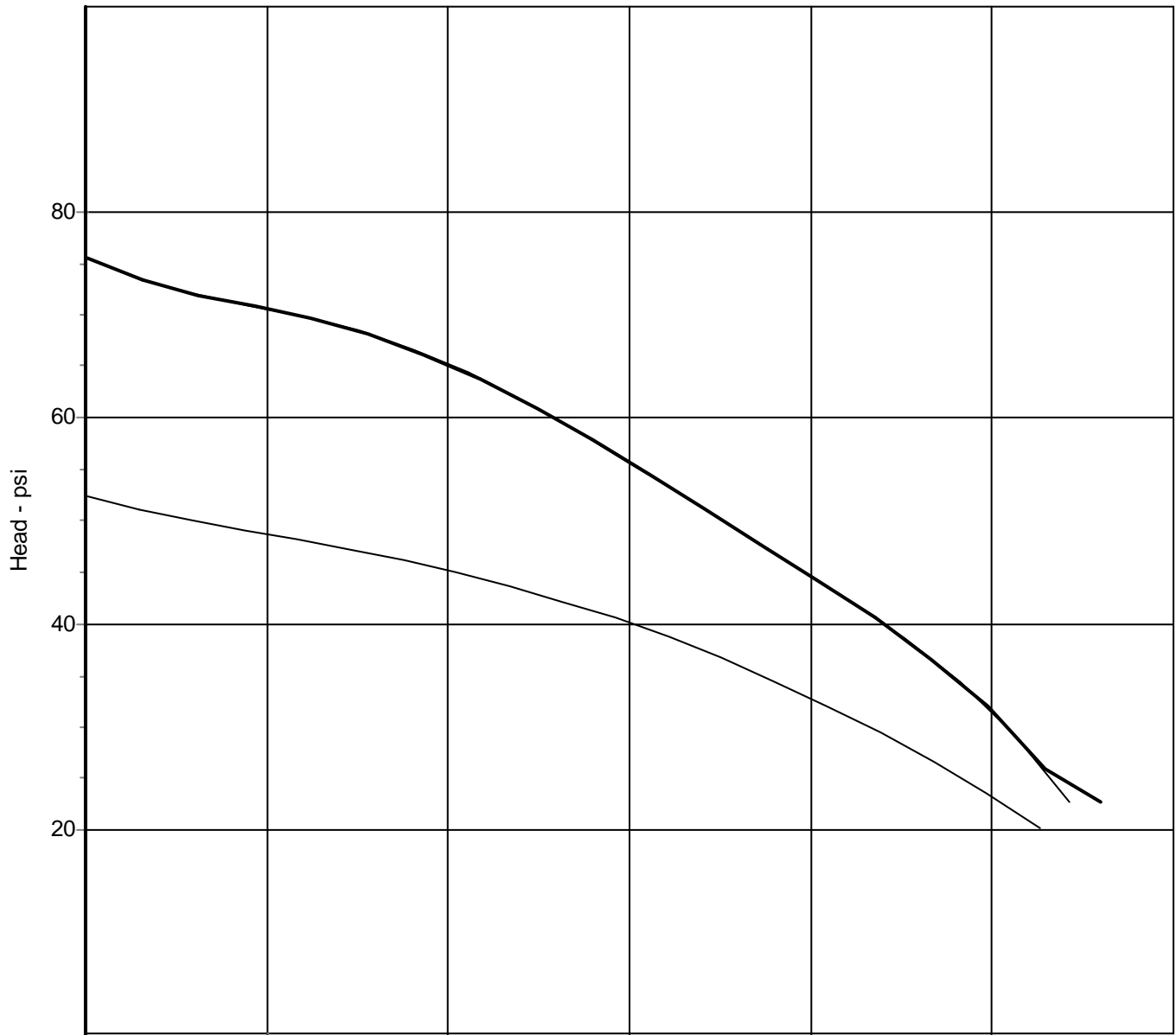
Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Pump Model: **SPP - TD20E(I)**
Curve No.: **TD20E-C1760/1H**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **1760 RPM**
Impeller Dia.: **340/282 mm**
Fluid: **Water**

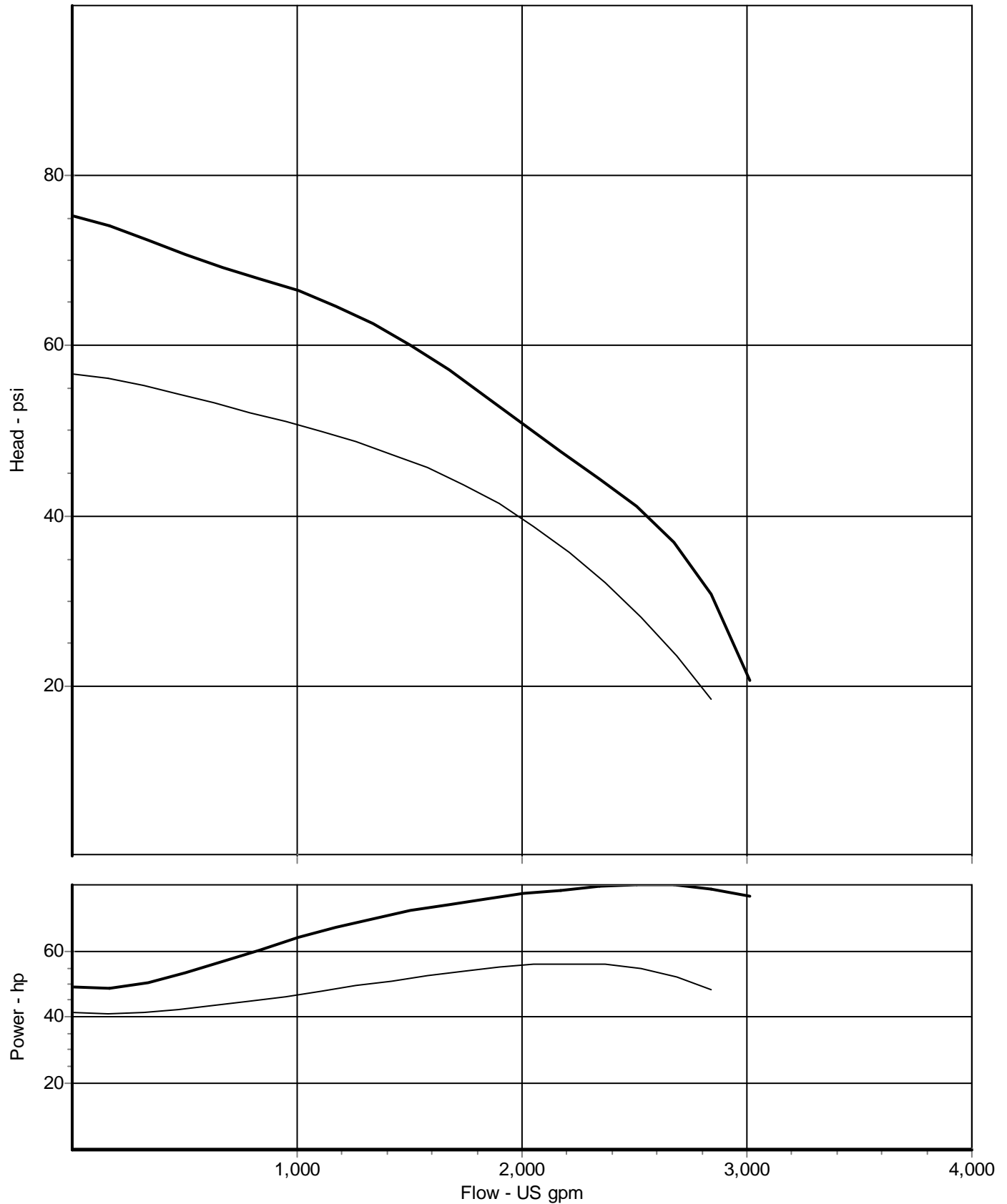
Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Pump Model: **SPP - TD20D(I)**
Curve No.: **TD20D-C1760/1H**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **1760 RPM**
Impeller Dia.: **340/281 mm**
Fluid: **Water**

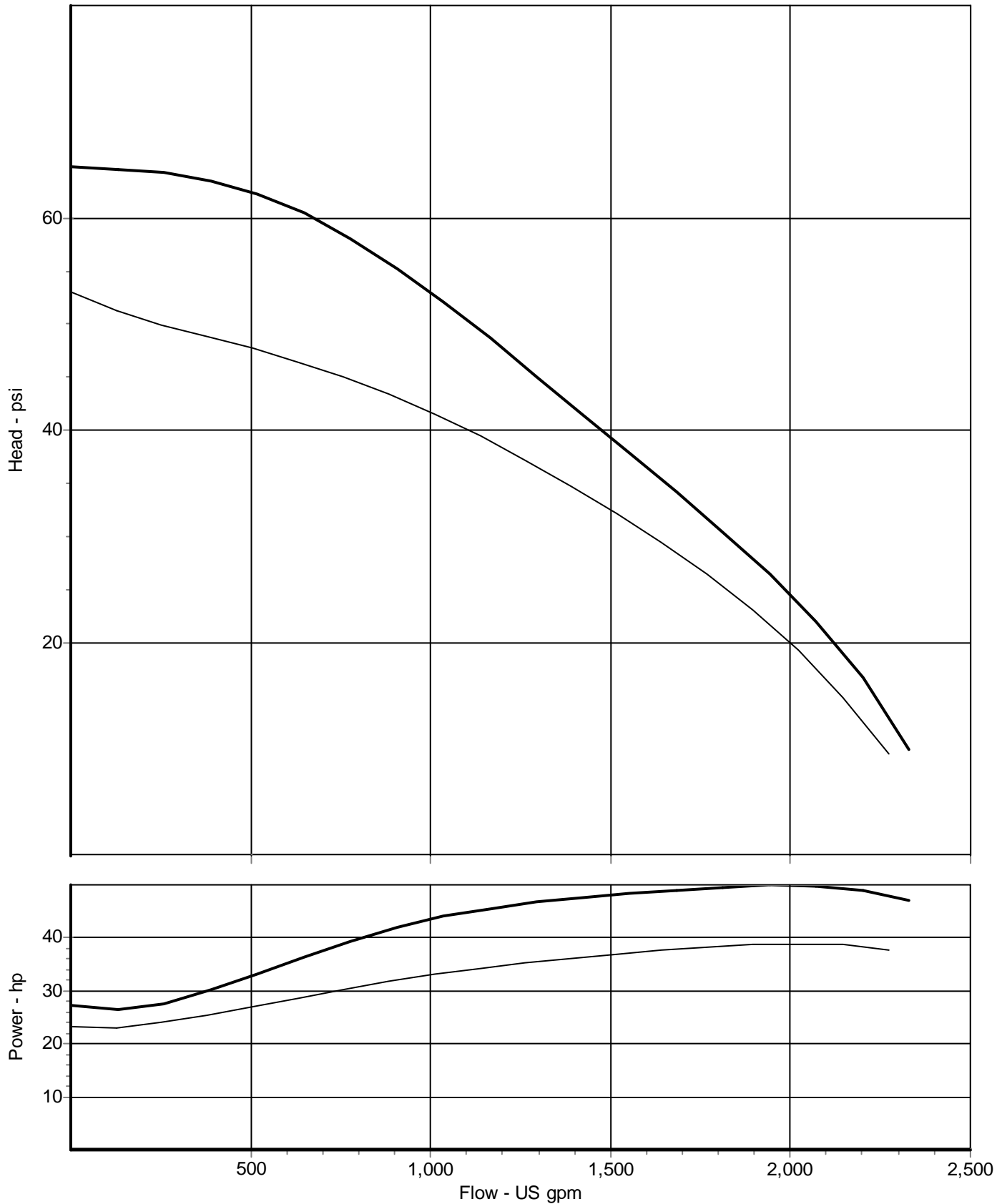
Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Pump Model: **SPP - TD15F(I)**
Curve No.: **TD15F-C1760/1H**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **1760 RPM**
Impeller Dia.: **325/280 mm**
Fluid: **Water**

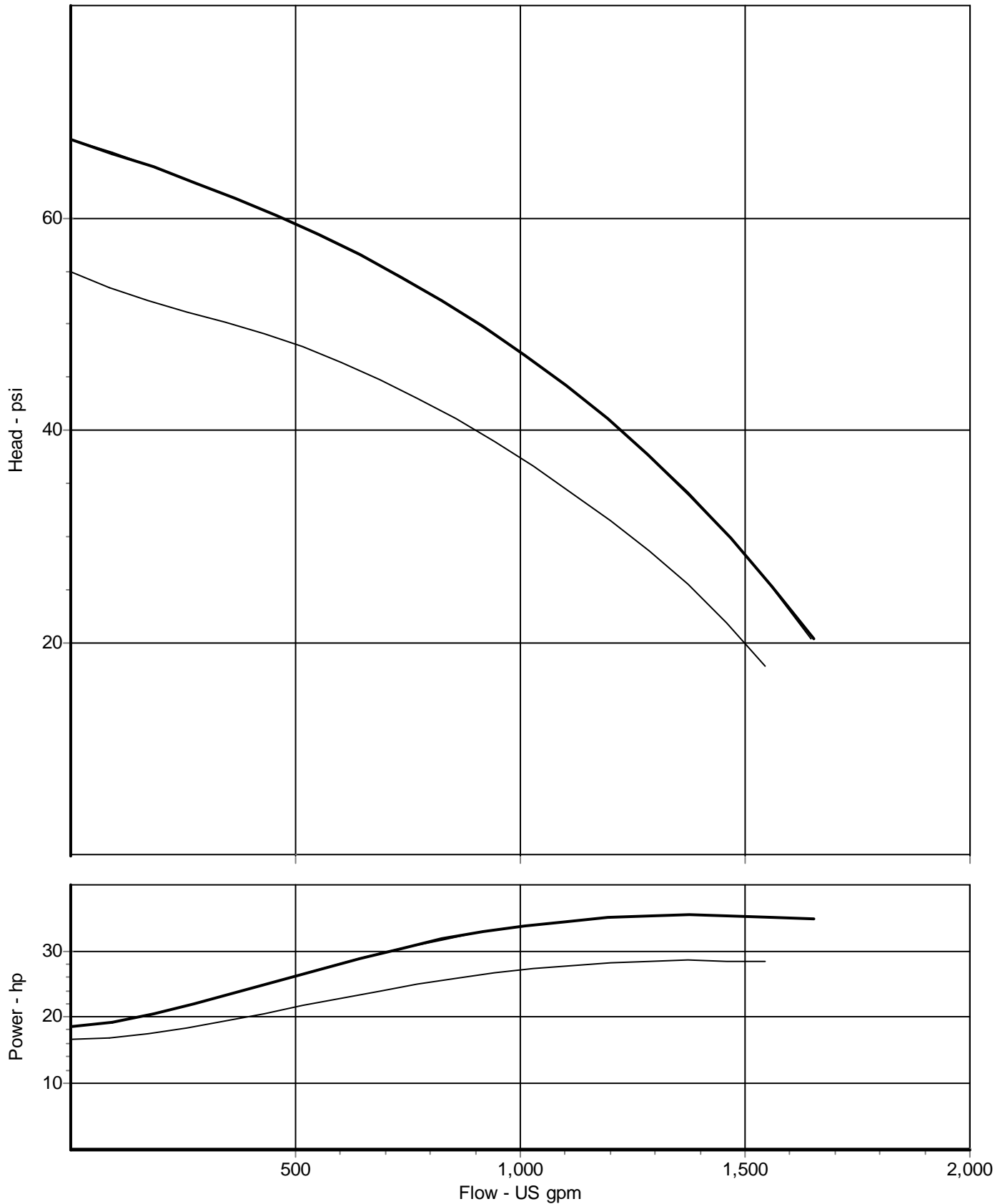
Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Pump Model: **SPP - TD12F(I)**
Curve No.: **TD12F-C1760/1H**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **1760 RPM**
Impeller Dia.: **308/275 mm**
Fluid: **Water**

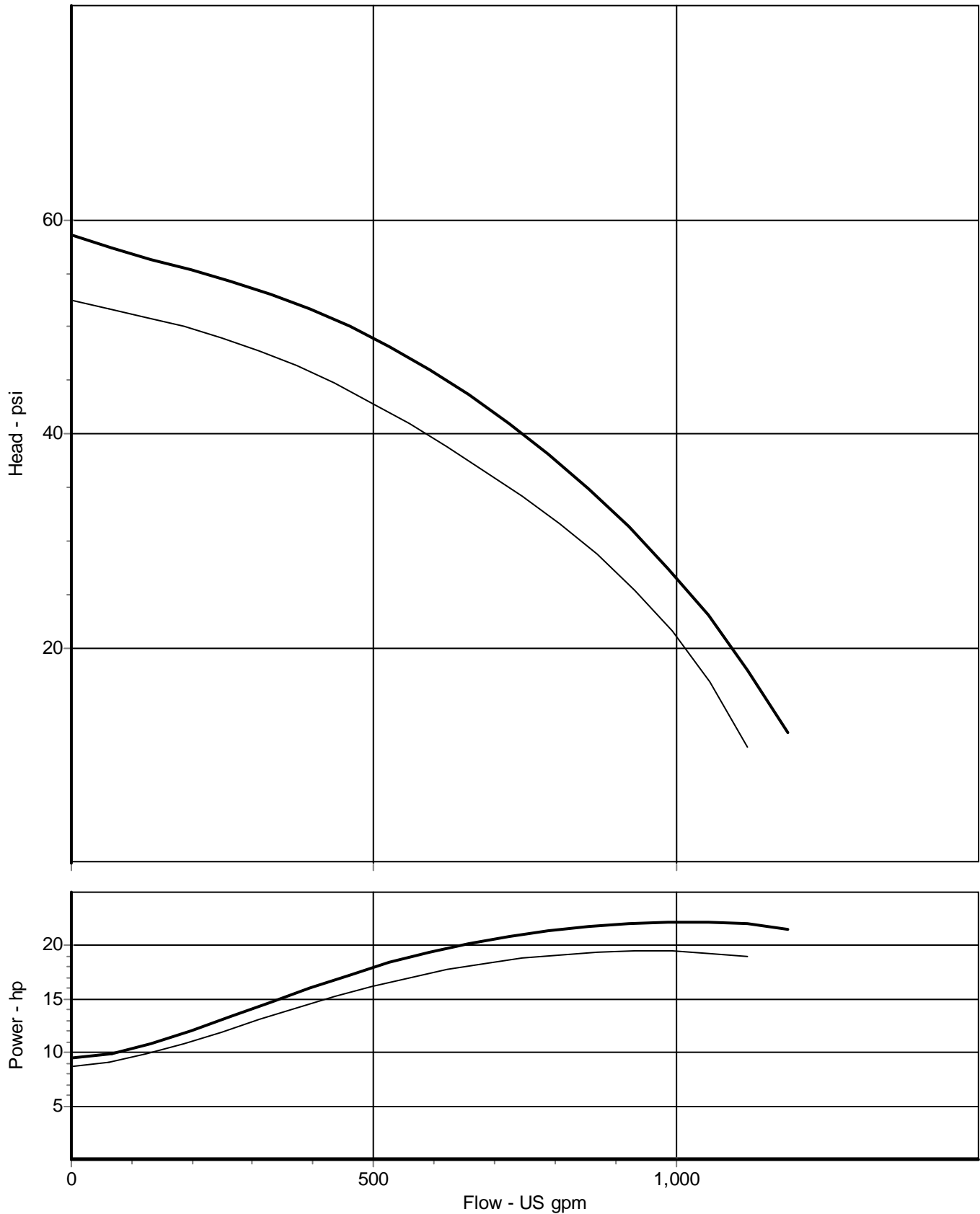
Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Pump Model: **SPP - TC12F(I)**
Curve No.: **TC12F-C1760/1H**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **1760 RPM**
Impeller Dia.: **286/274 mm**
Fluid: **Water**

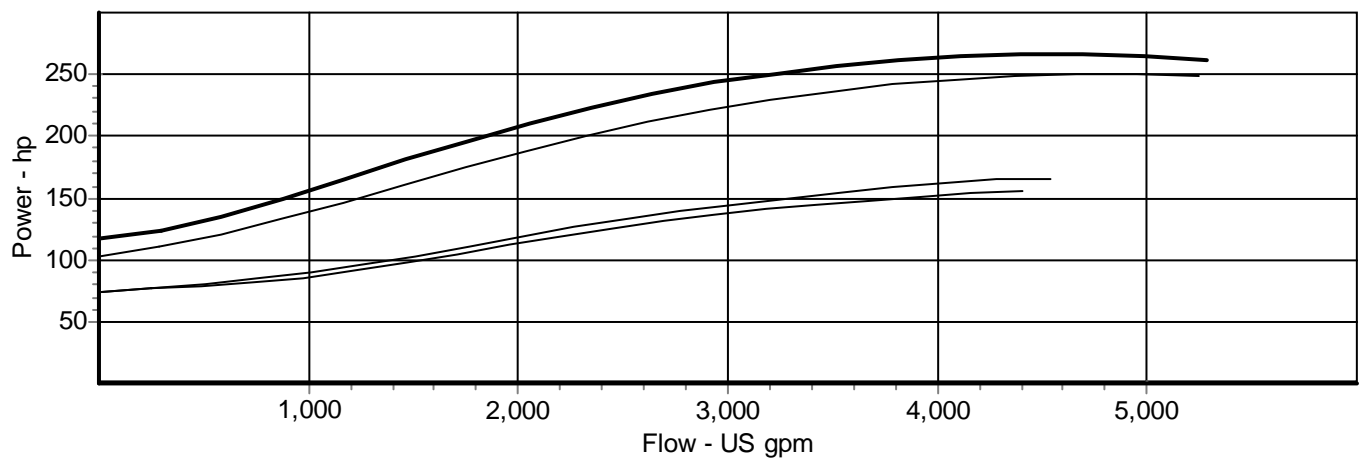
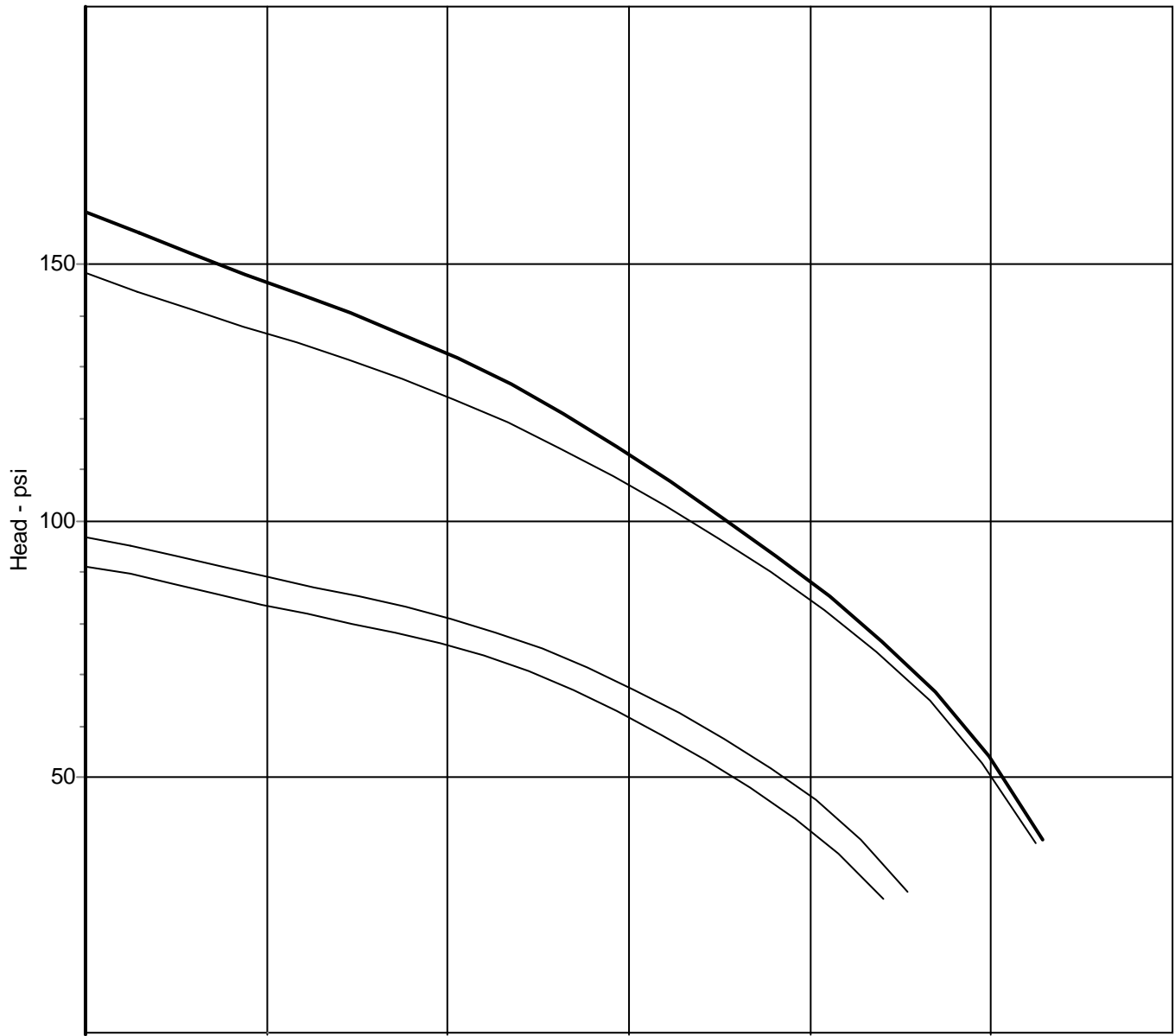
Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Pump Model: **SPP - TF20F(I)**
Curve No.: **TF20F-C1760/1H**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **1760 RPM**
Impeller Dia.: **480/352 mm**
Fluid: **Water**

Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**





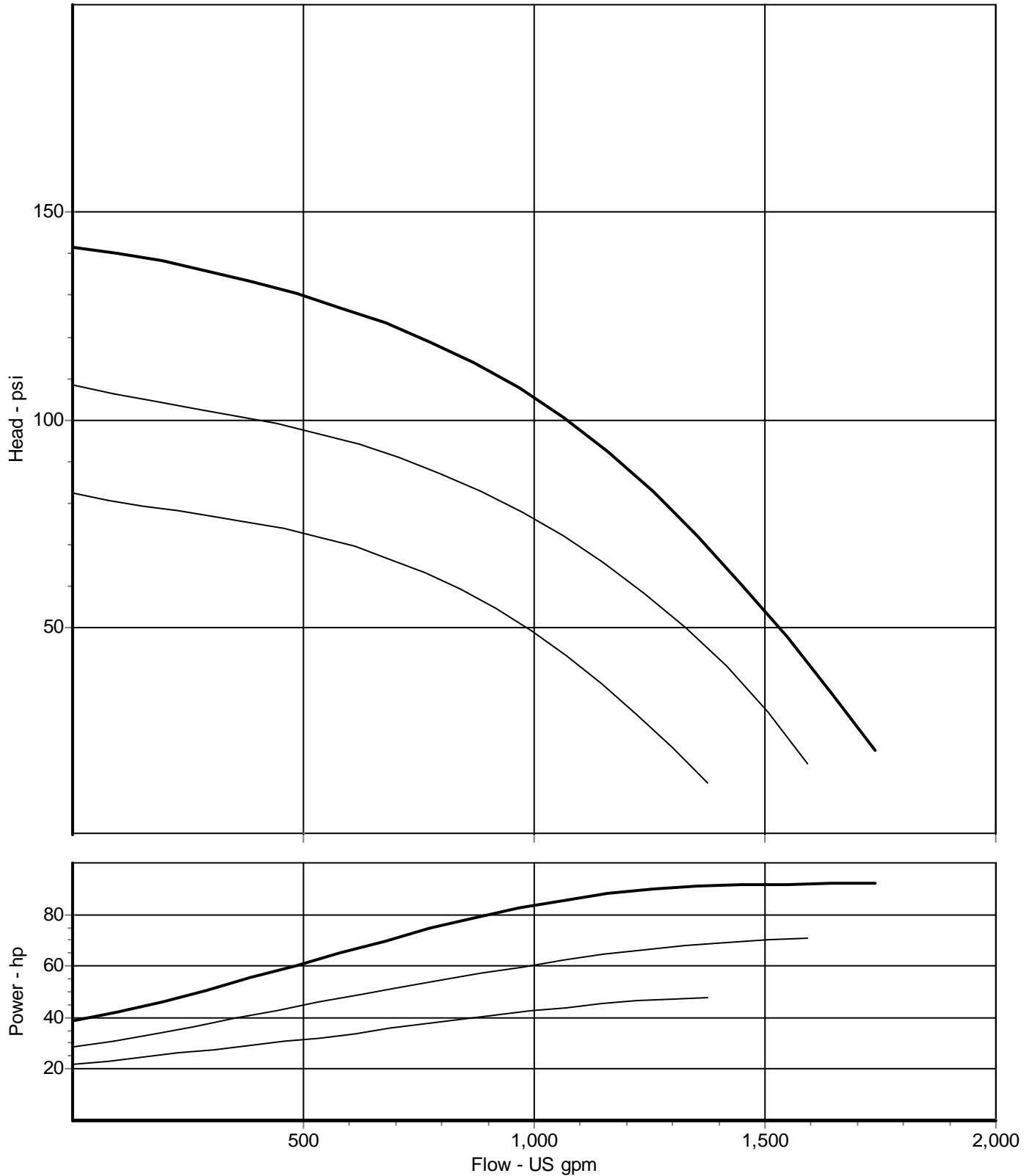
Performance Curves

2100 RPM

Pump Model: **SPP - TE12E**
Curve No.: **TE12E-FMT-C2100/-0**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **2100 RPM**
Impeller Dia.: **380/285 mm**
Fluid: **Water**

Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**

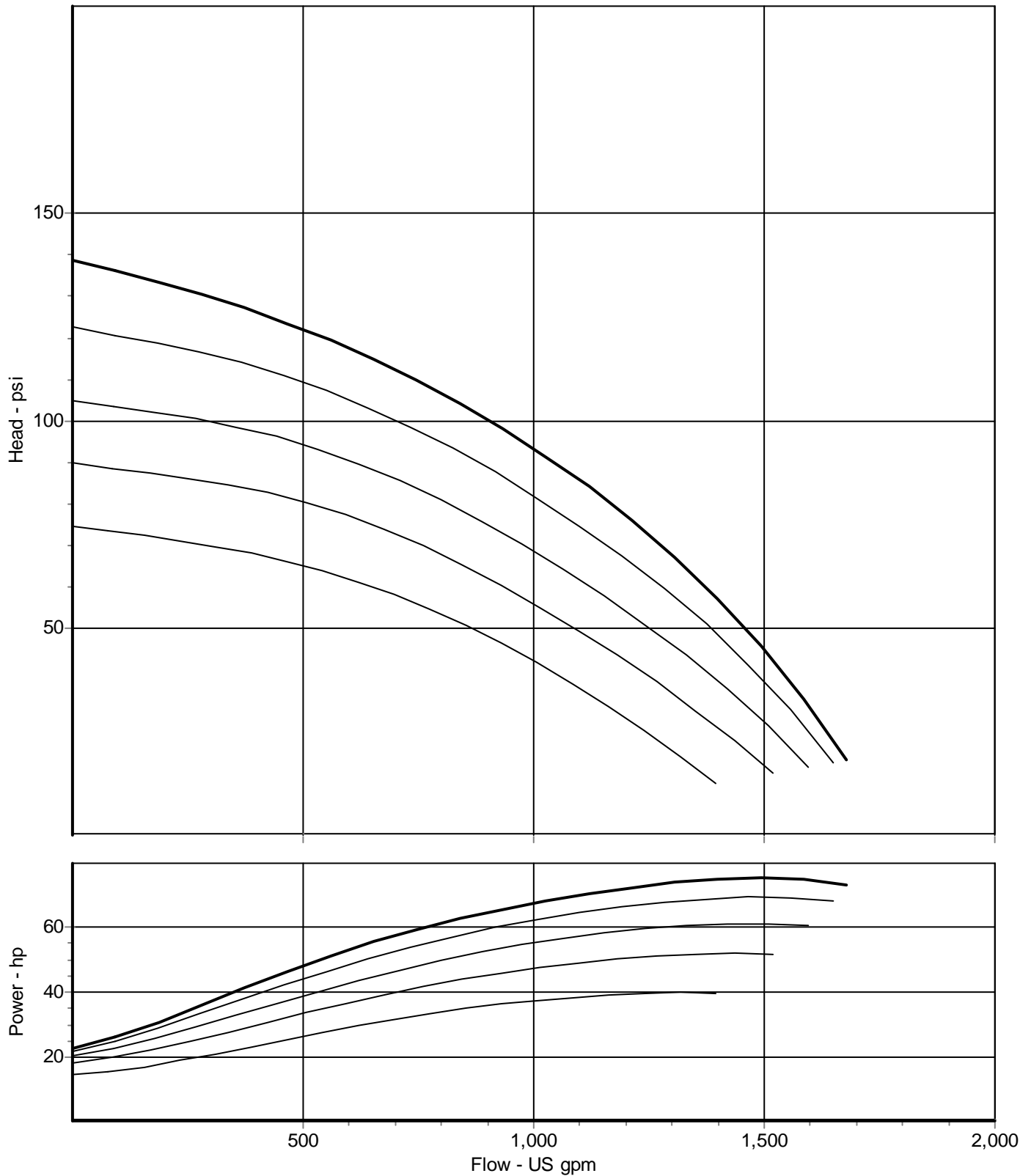


Comments:
NPSH REQUIRED at centreline of impeller. Add 0.5m to Laboratory NPSH curve for field applications

Pump Model: **SPP - TE10D**
Curve No.: **TE10D-C2100/1G-A1**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **2100 RPM**
Impeller Dia.: **370/270 mm**
Fluid: **Water**

Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**

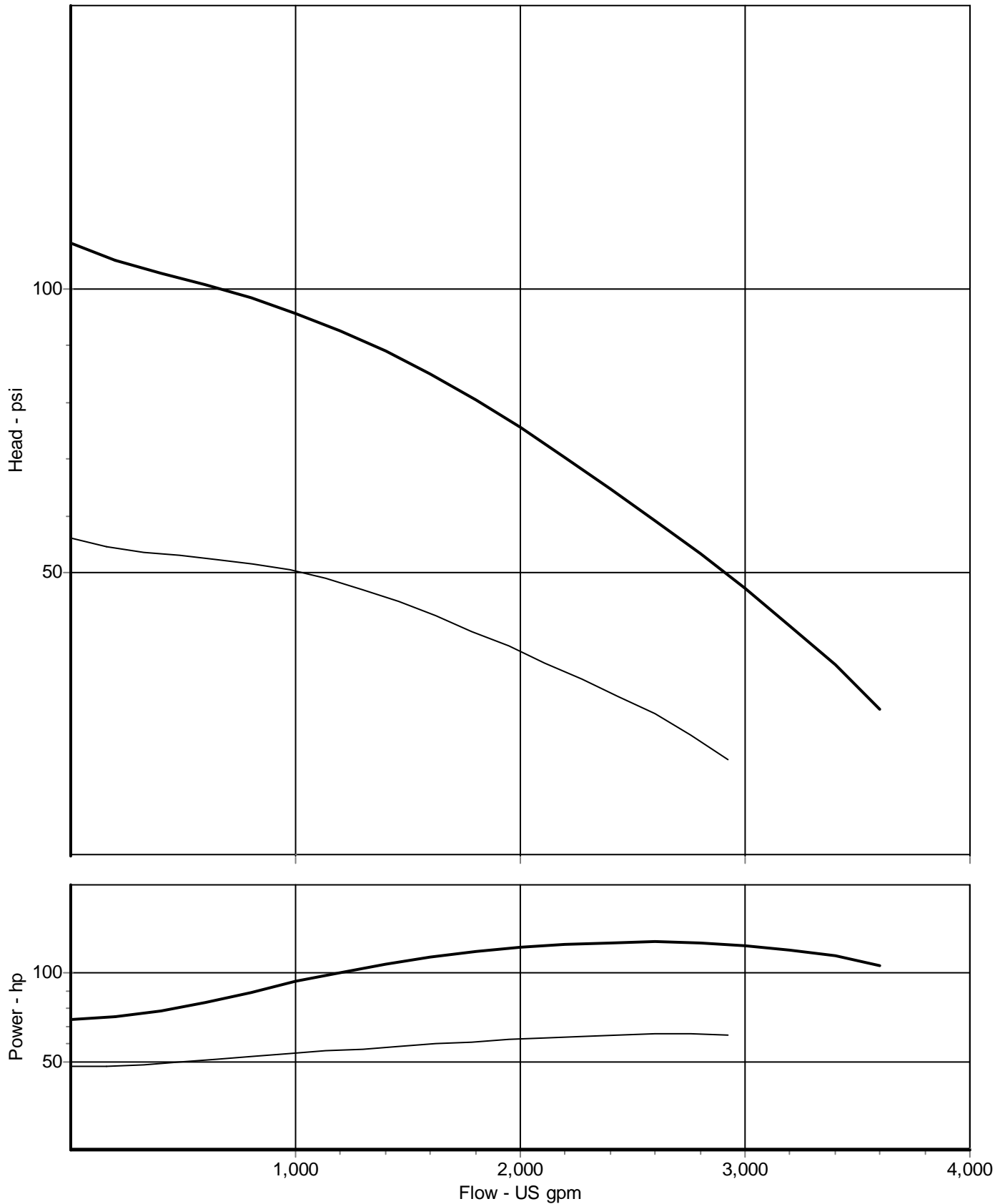


Comments:
NPSH REQUIRED at centreline of impeller. Add 0.5m to Laboratory NPSH curve for field applications

Pump Model: **SPP - TD20E(I)**
Curve No.: **TD20E-C2100/1H**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **2100 RPM**
Impeller Dia.: **340/246 mm**
Fluid: **Water**

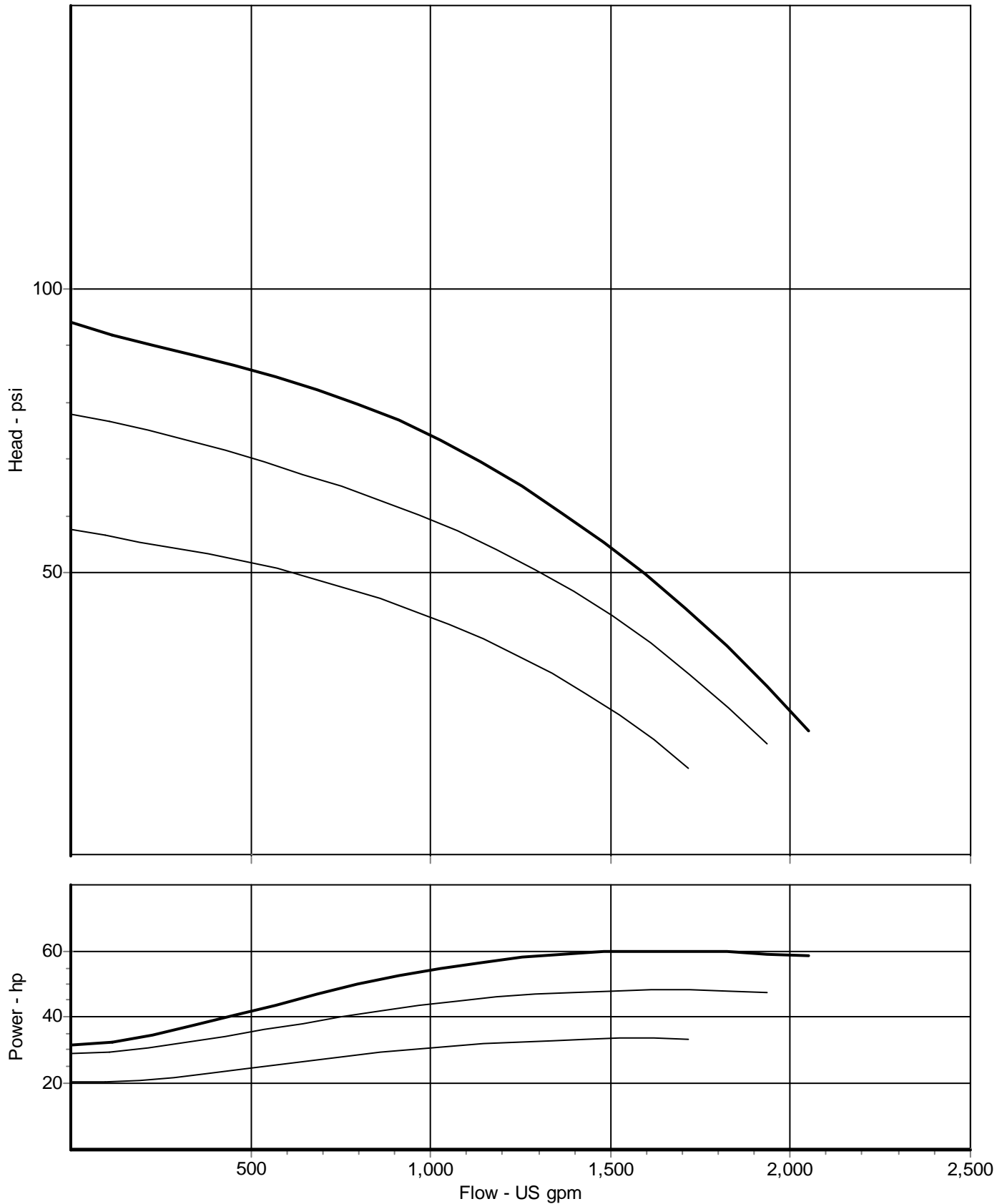
Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Pump Model: **SPP - TD12F(I)**
Curve No.: **TD12F-C2100/1H**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **2100 RPM**
Impeller Dia.: **308/236 mm**
Fluid: **Water**

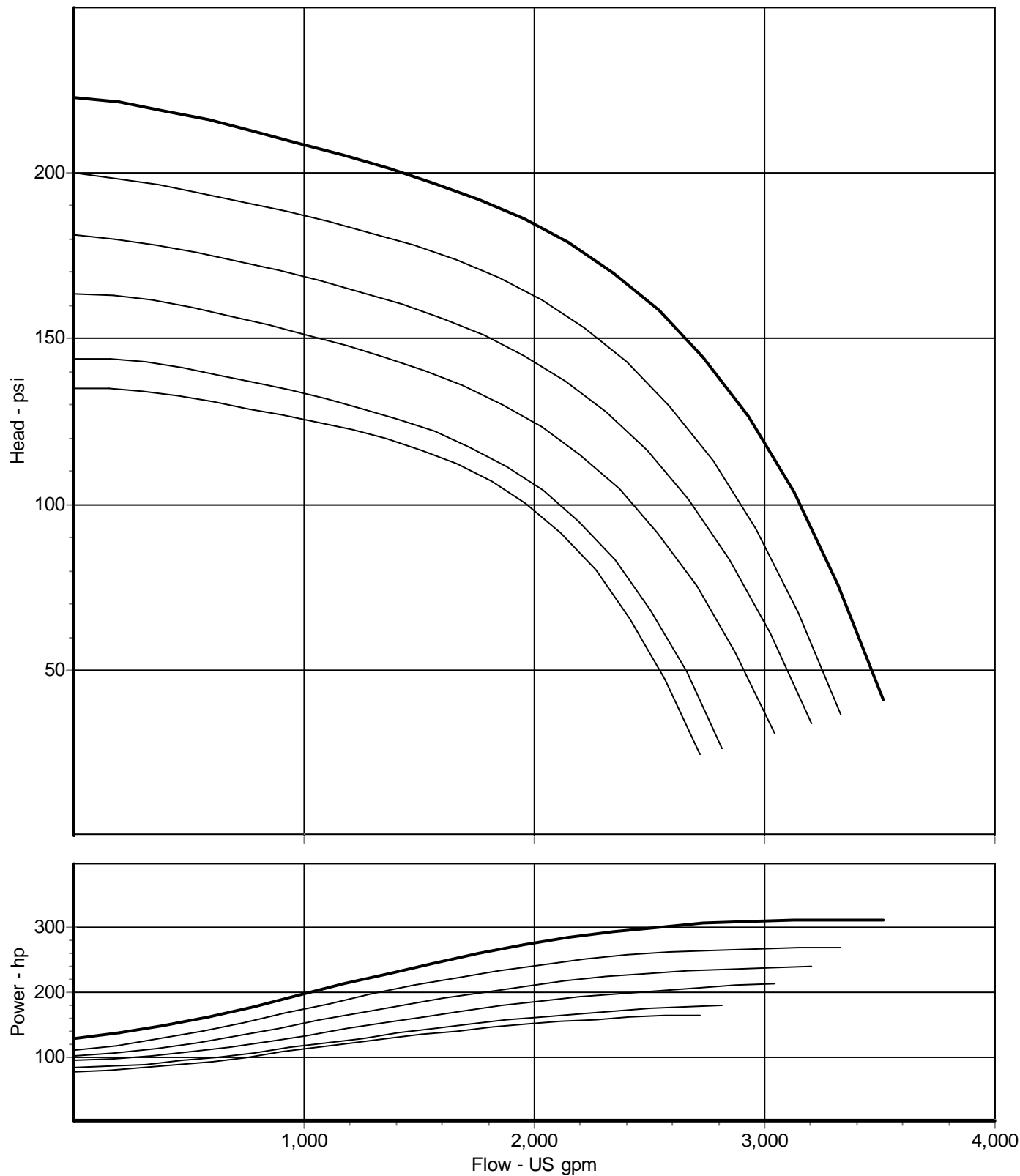
Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Pump Model: **SPP - TF15E**
Curve No.: **TF15E-C2100/1G-C1**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **2100 RPM**
Impeller Dia.: **475/365 mm**
Fluid: **Water**

Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Comments:

NPSH REQUIRED at centreline of impeller. Add 0.5m to Laboratory NPSH curve for field applications





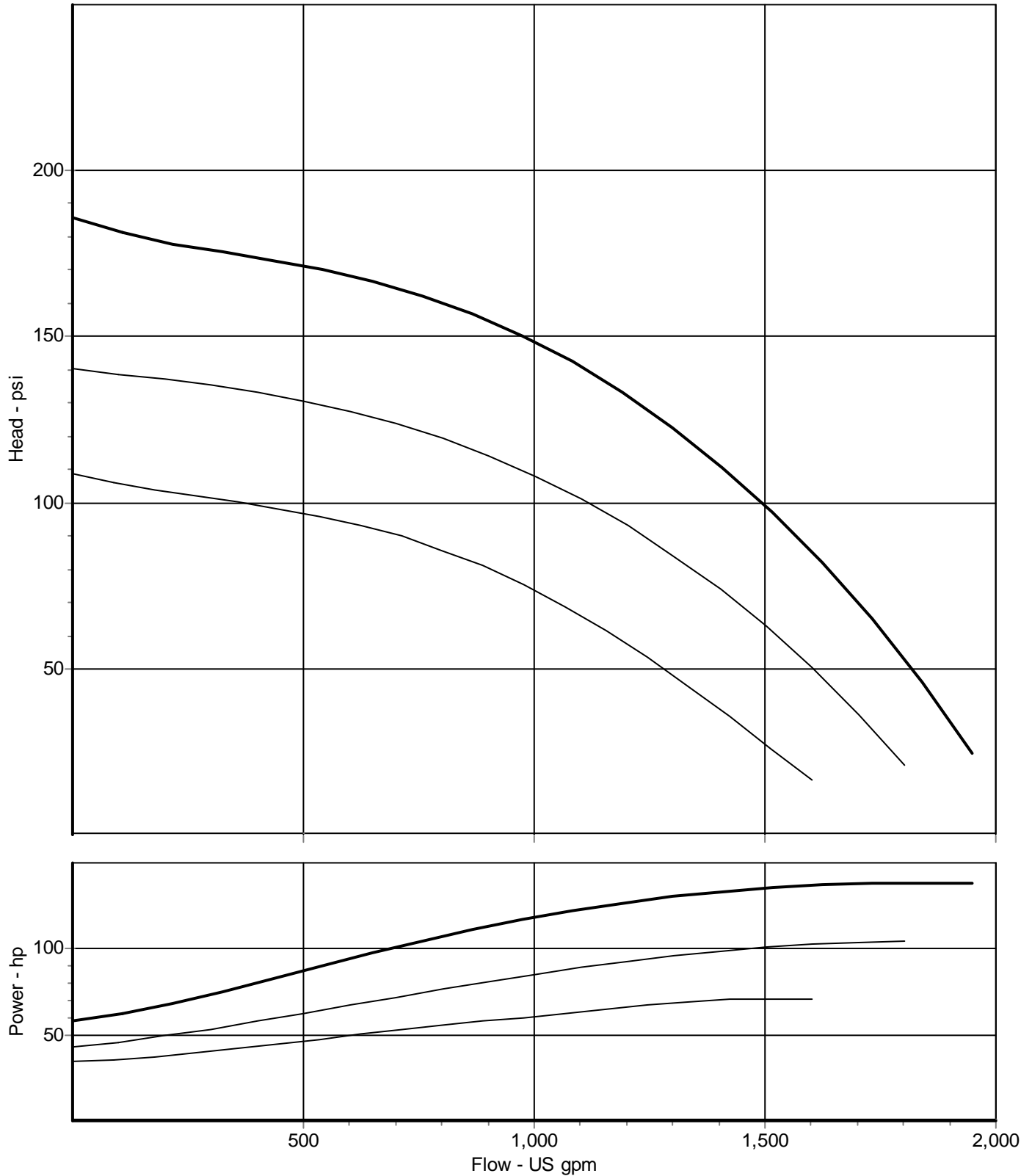
Performance Curves

2350 RPM

Pump Model: **SPP - TE12E**
Curve No.: **TE12E-FMT-C2400/-0**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **2400 RPM**
Impeller Dia.: **380/285 mm**
Fluid: **Water**

Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Comments:

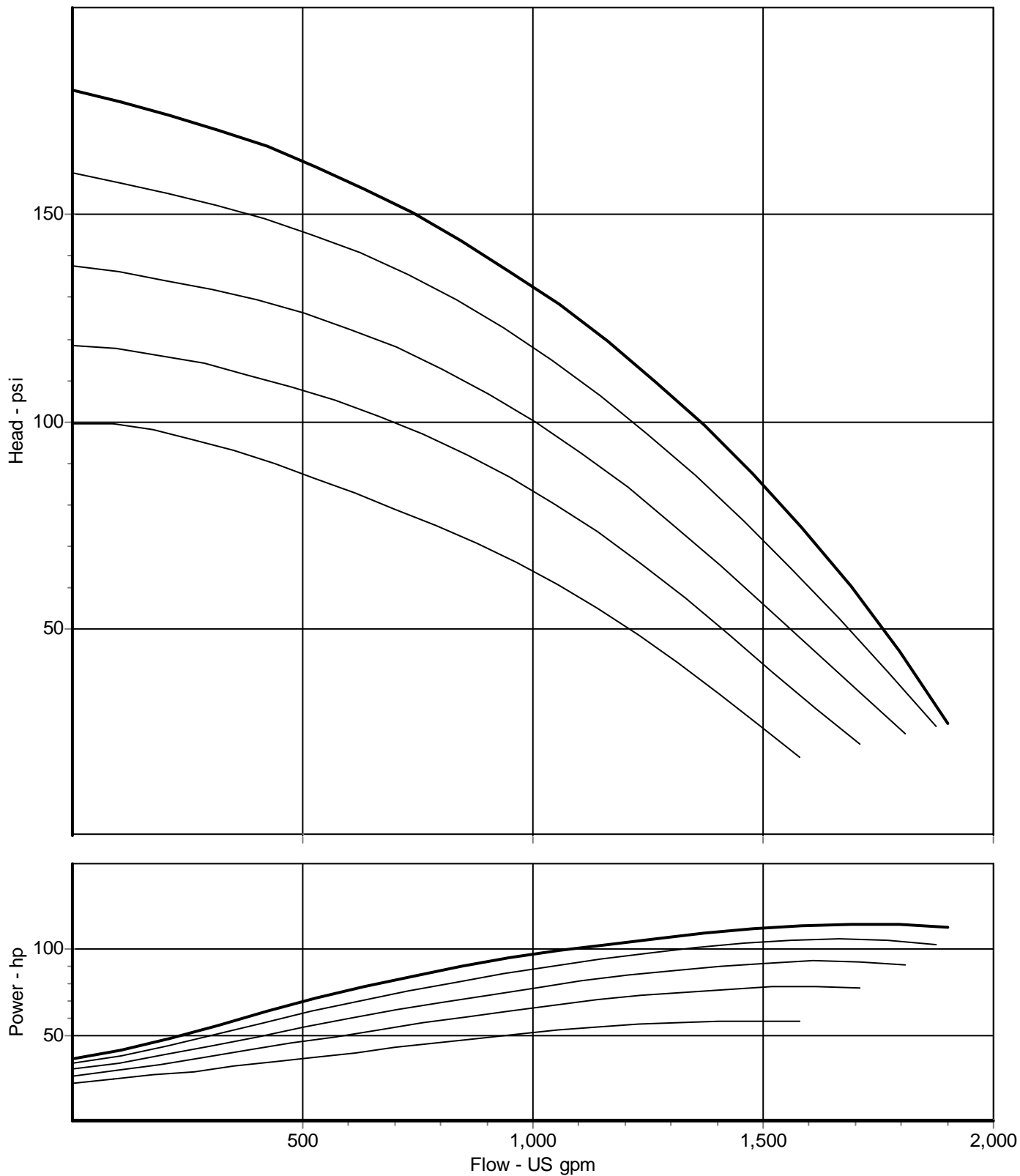
NPSH REQUIRED at centreline of impeller. Add 0.5m to Laboratory NPSH curve for field applications



Pump Model: **SPP - TE10D**
Curve No.: **TE10D-C2400/1G-A1**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **2400 RPM**
Impeller Dia.: **370/270 mm**
Fluid: **Water**

Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Comments:

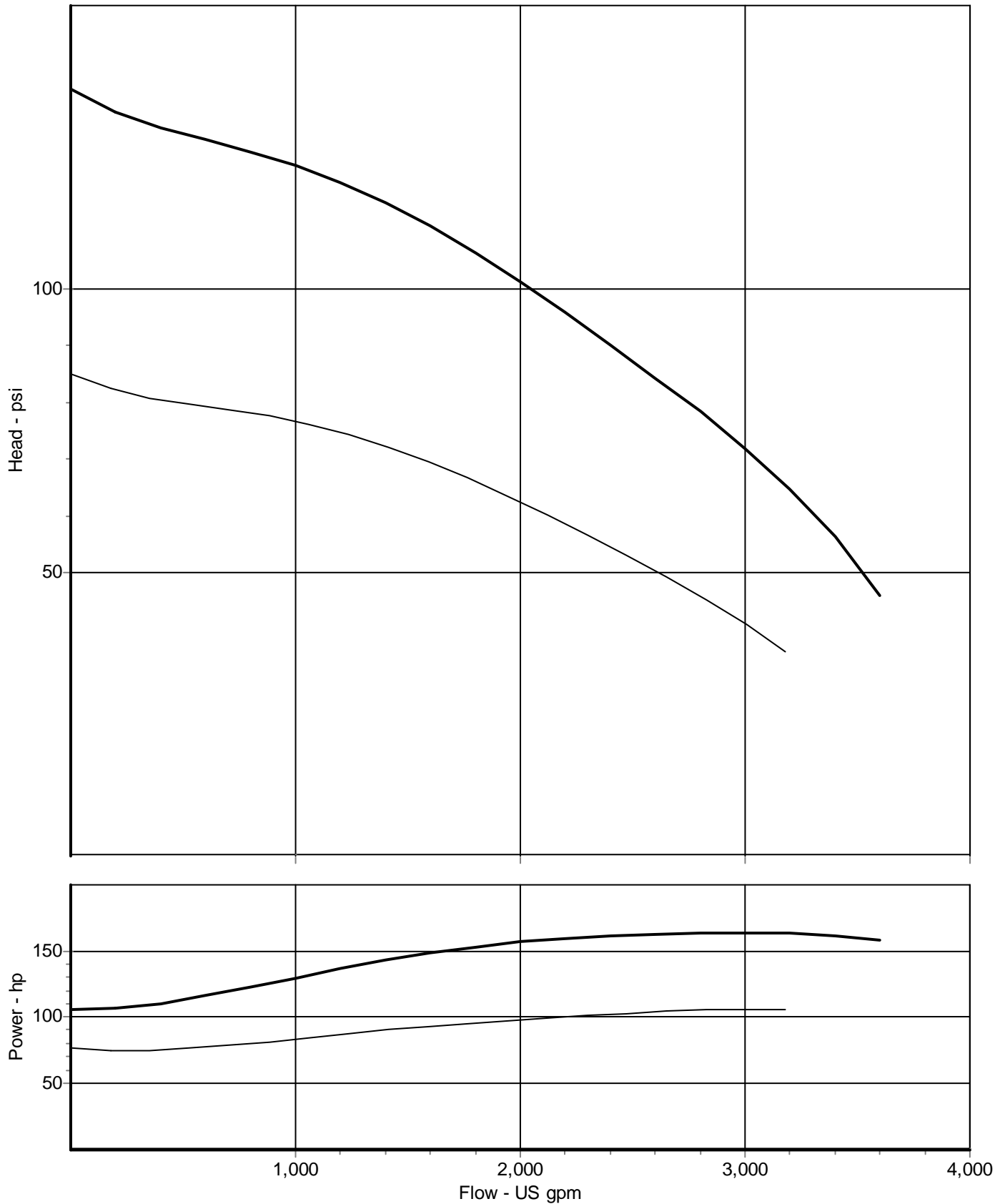
NPSH REQUIRED at centreline of impeller. Add 0.5m to Laboratory NPSH curve for field applications



Pump Model: **SPP - TD20E(I)**
Curve No.: **TD20E-C2350/1H**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **2350 RPM**
Impeller Dia.: **340/268 mm**
Fluid: **Water**

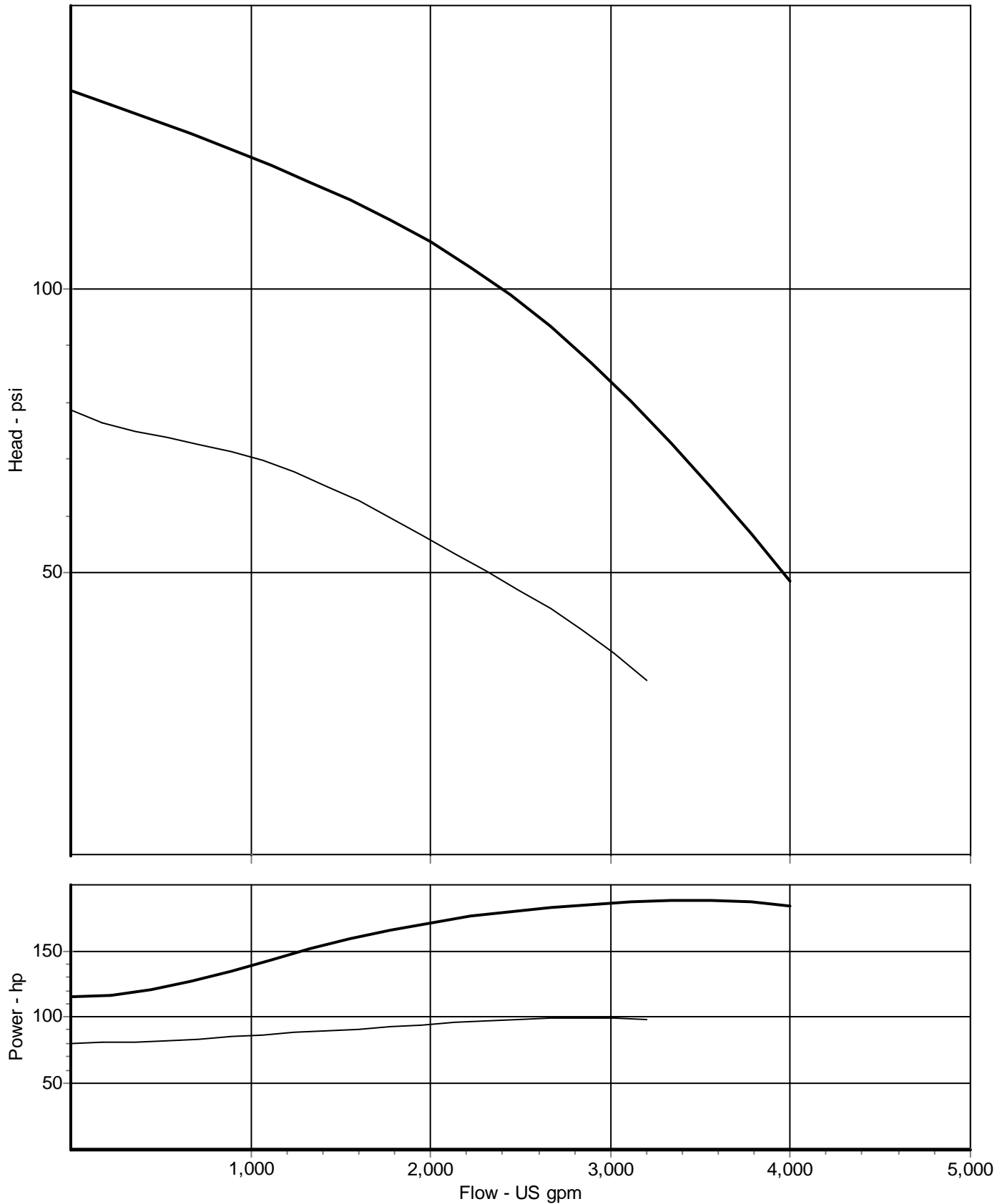
Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Pump Model: **SPP - TD20D(I)**
Curve No.: **TD20D-C2350/1H**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **2350 RPM**
Impeller Dia.: **340/253 mm**
Fluid: **Water**

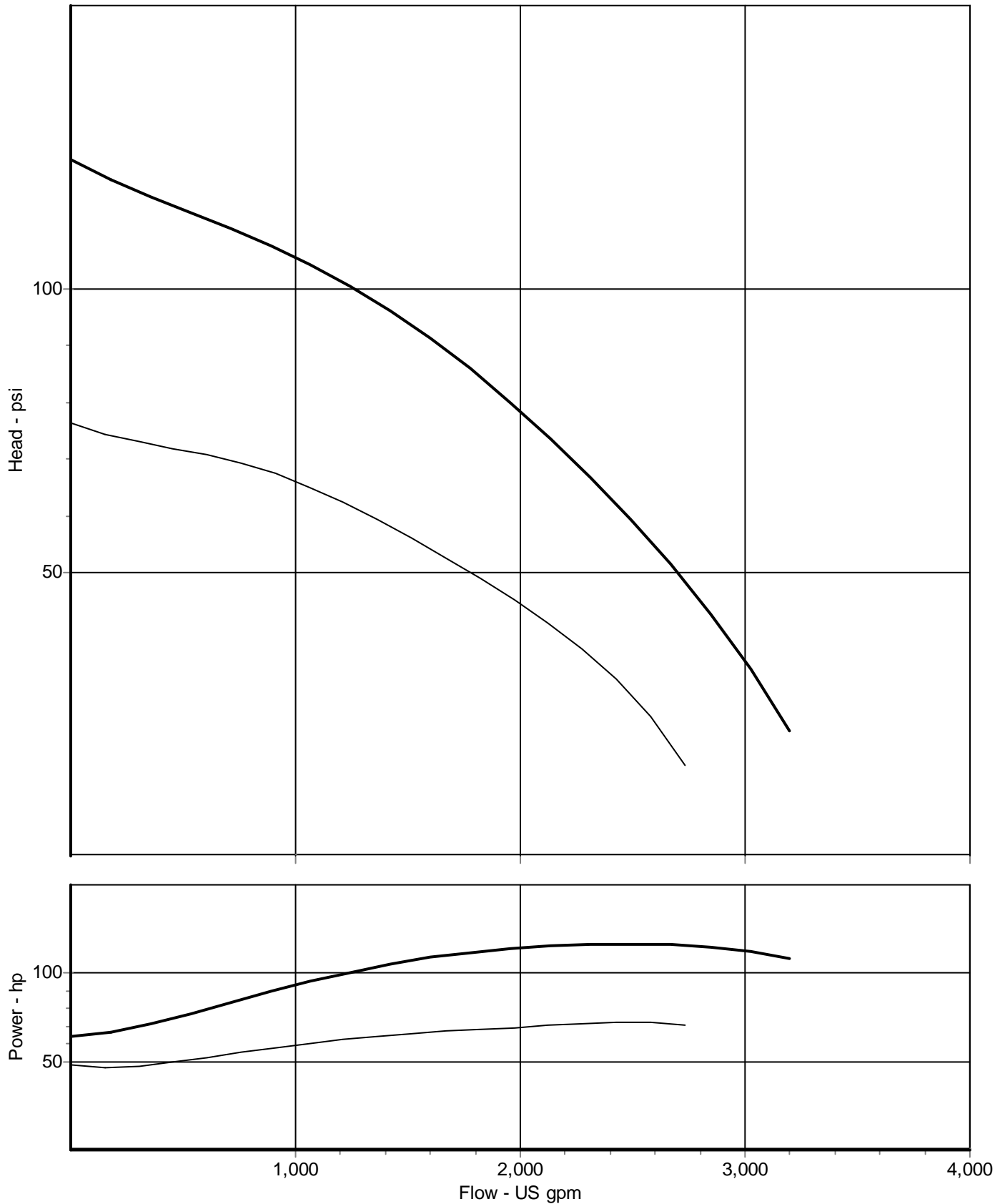
Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Pump Model: **SPP - TD15F(I)**
Curve No.: **TD15F-C2350/1H**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **2350 RPM**
Impeller Dia.: **325/254 mm**
Fluid: **Water**

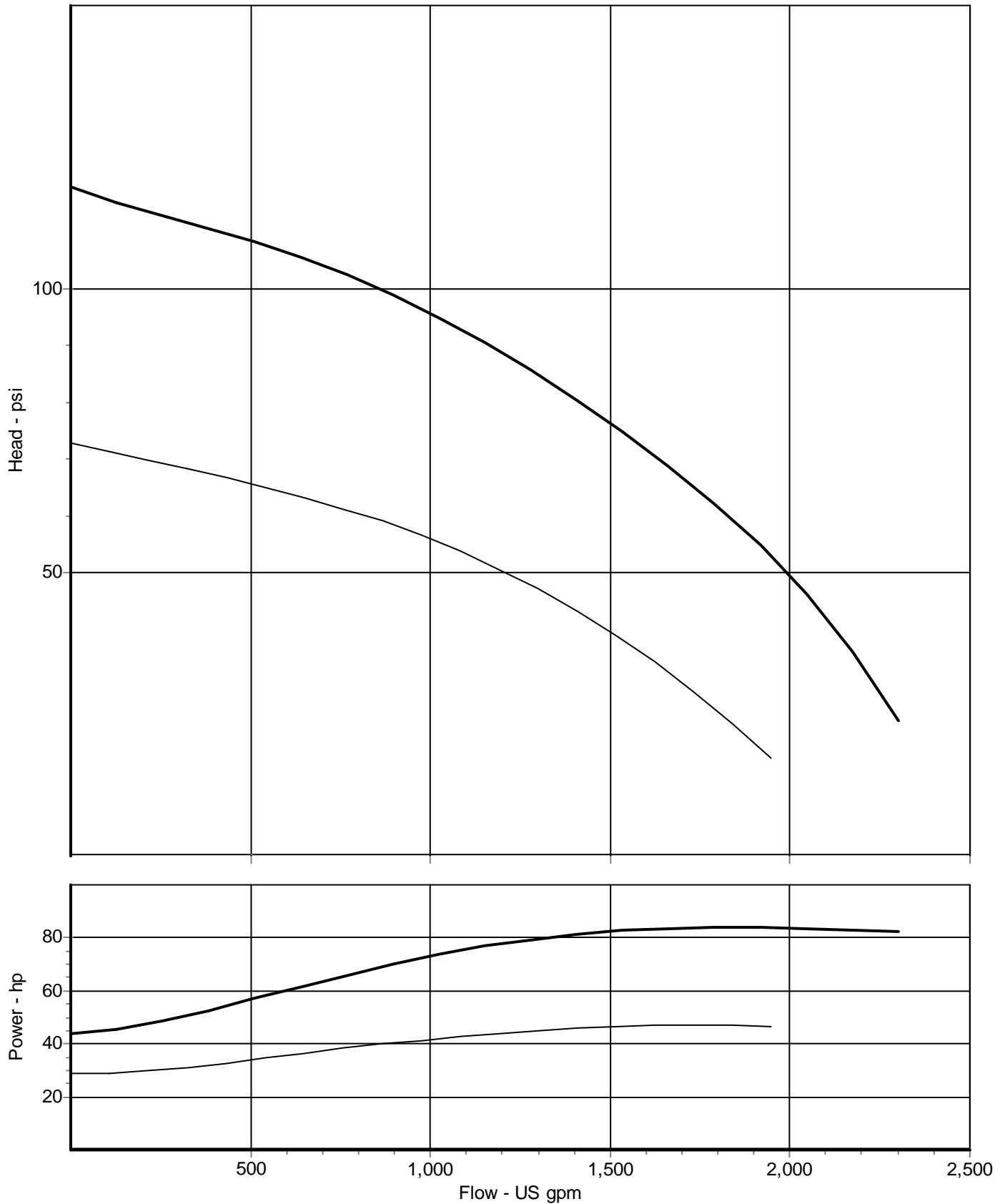
Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Pump Model: **SPP - TD12F(I)**
Curve No.: **TD12F-C2350/1H**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **2350 RPM**
Impeller Dia.: **308/236 mm**
Fluid: **Water**

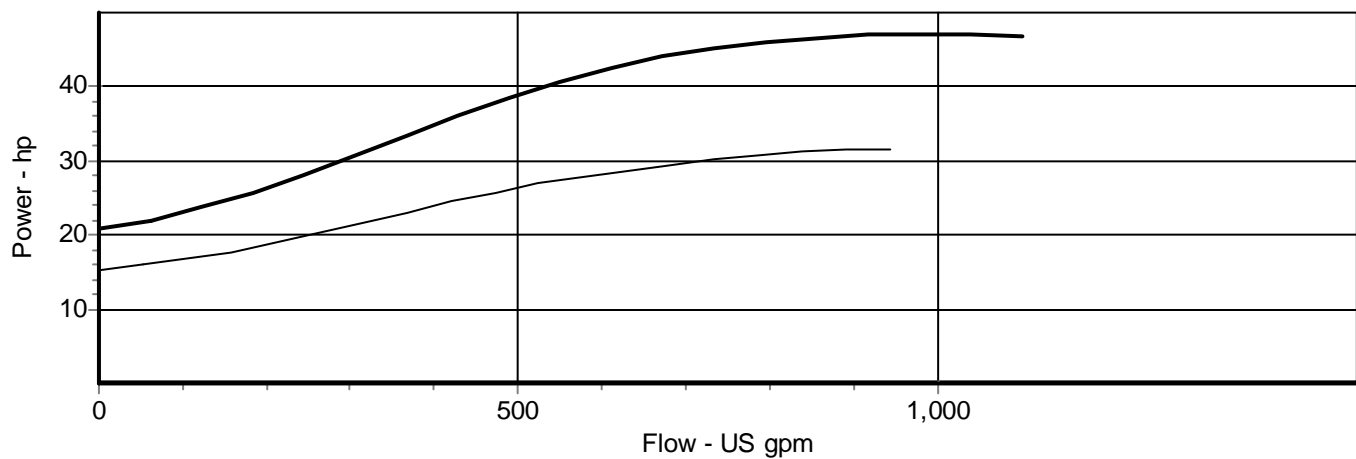
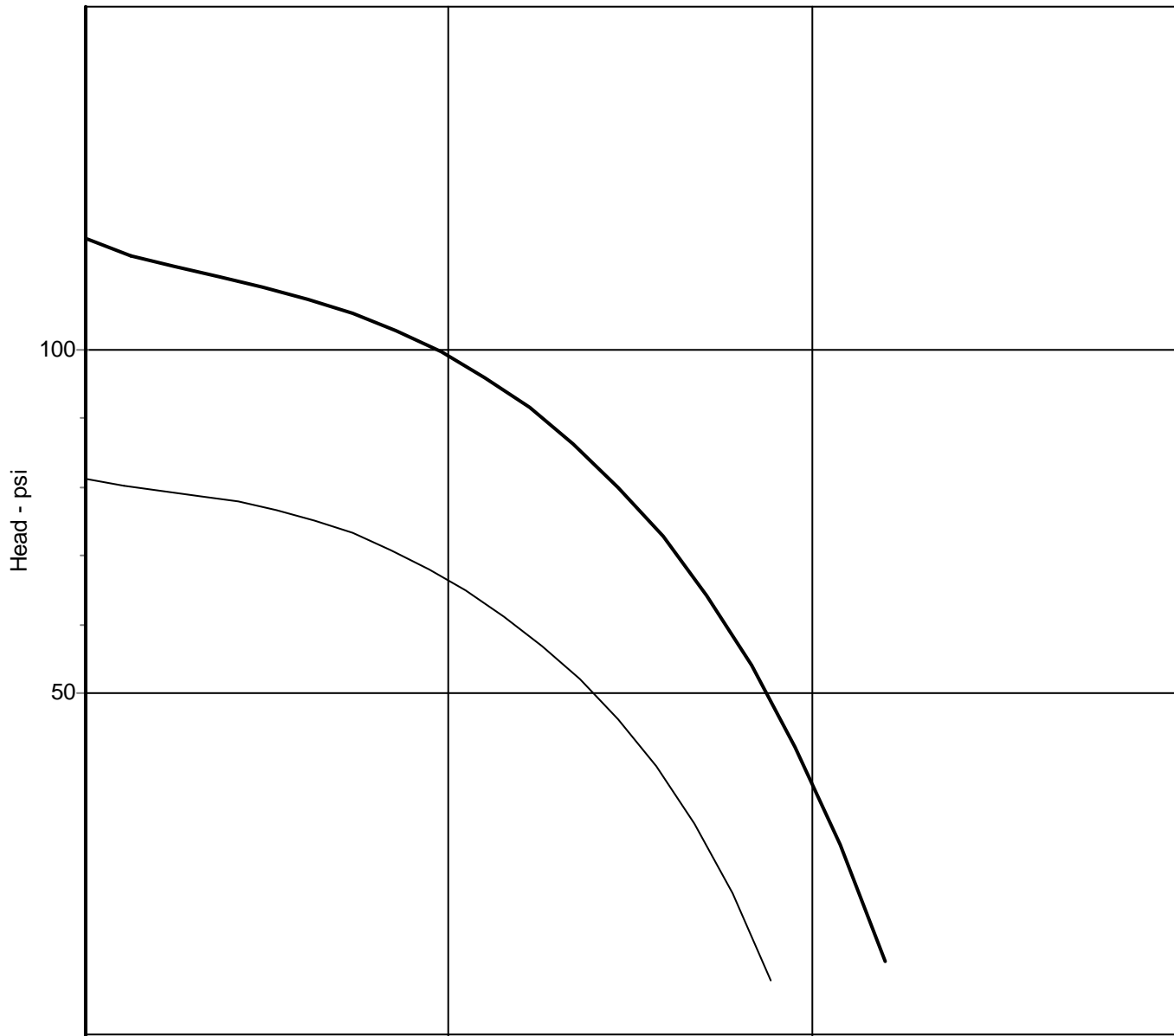
Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Pump Model: **SPP - TD10E(I)**
Curve No.: **TD10E-C2350/1H**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **2350 RPM**
Impeller Dia.: **303/255 mm**
Fluid: **Water**

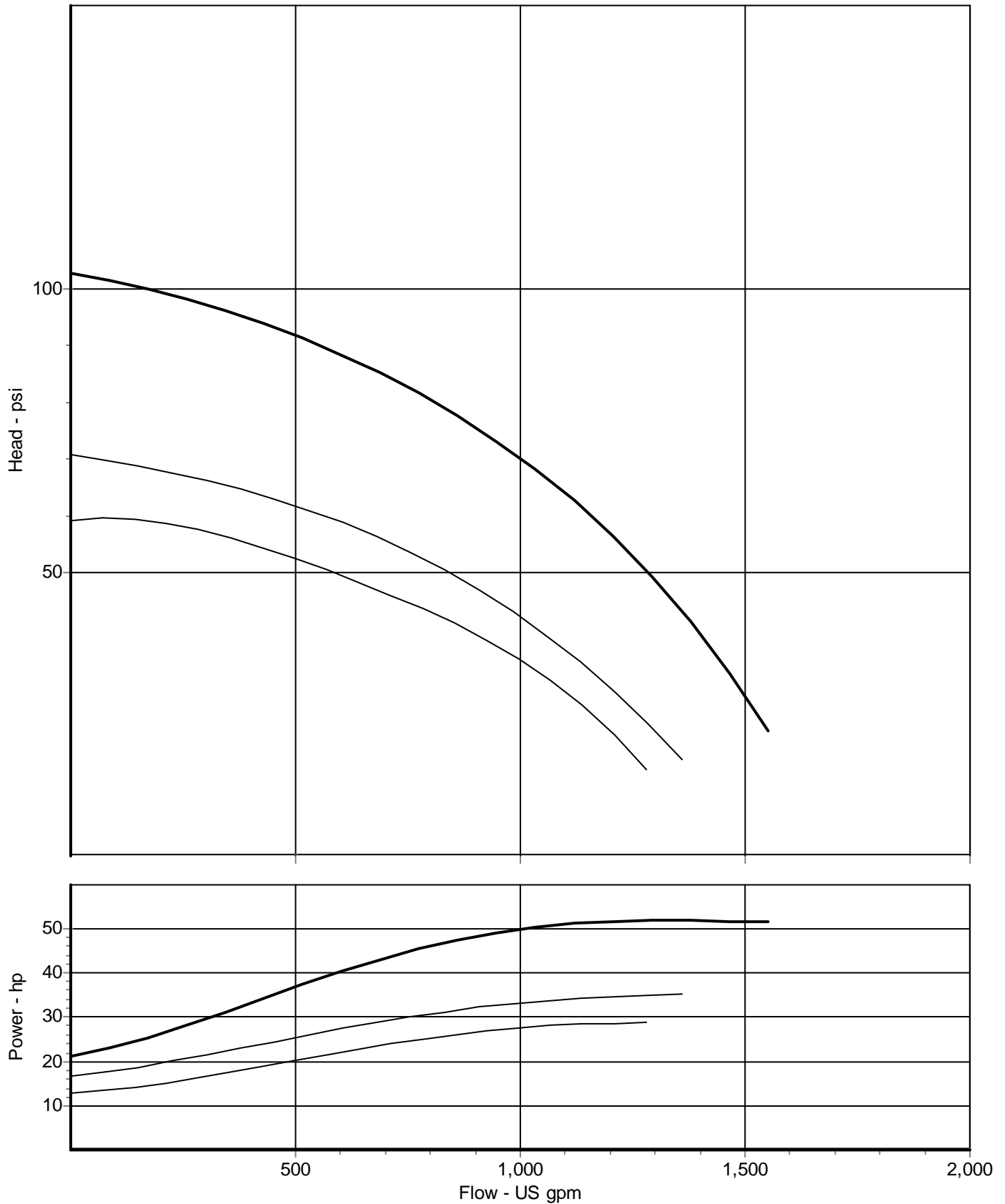
Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Pump Model: **SPP - TC12F(I)**
Curve No.: **TC12F-C2350/1H**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **2350 RPM**
Impeller Dia.: **286/216 mm**
Fluid: **Water**

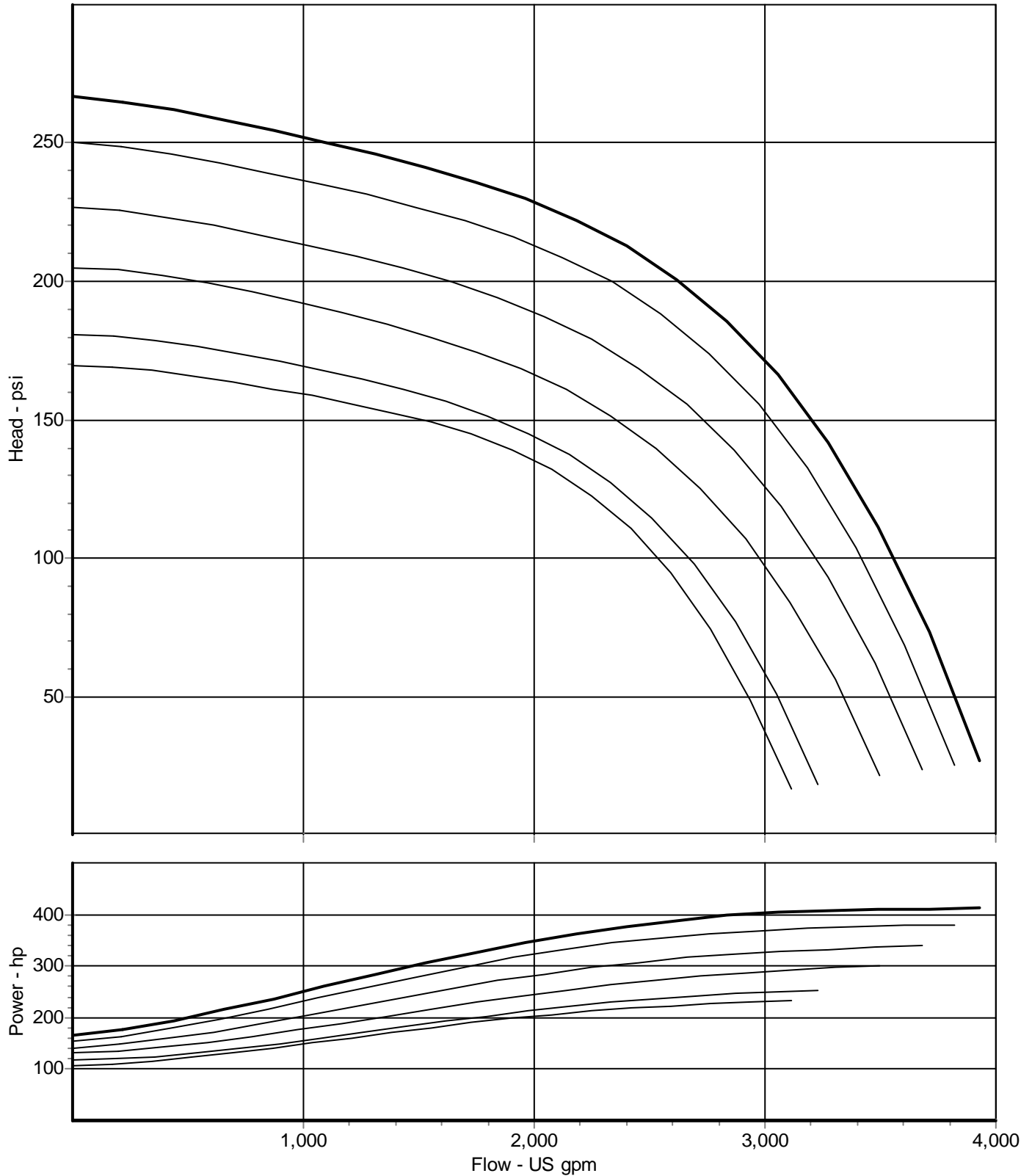
Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Pump Model: **SPP - TF15E**
Curve No.: **TF15E-C2350/1G-C1**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **2350 RPM**
Impeller Dia.: **465/365 mm**
Fluid: **Water**

Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Comments:

NPSH REQUIRED at centreline of impeller. Add 0.5m to Laboratory NPSH curve for field applications





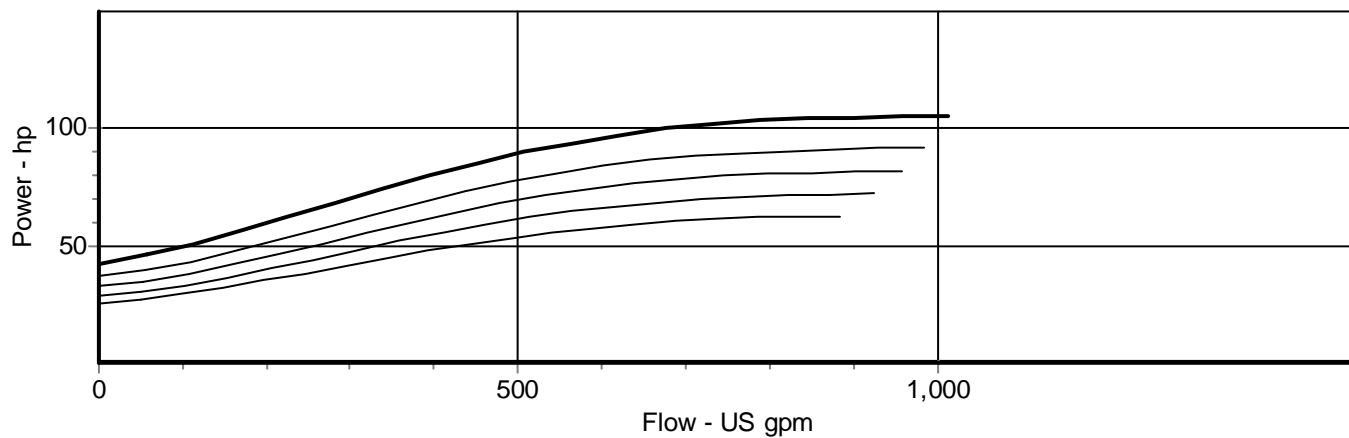
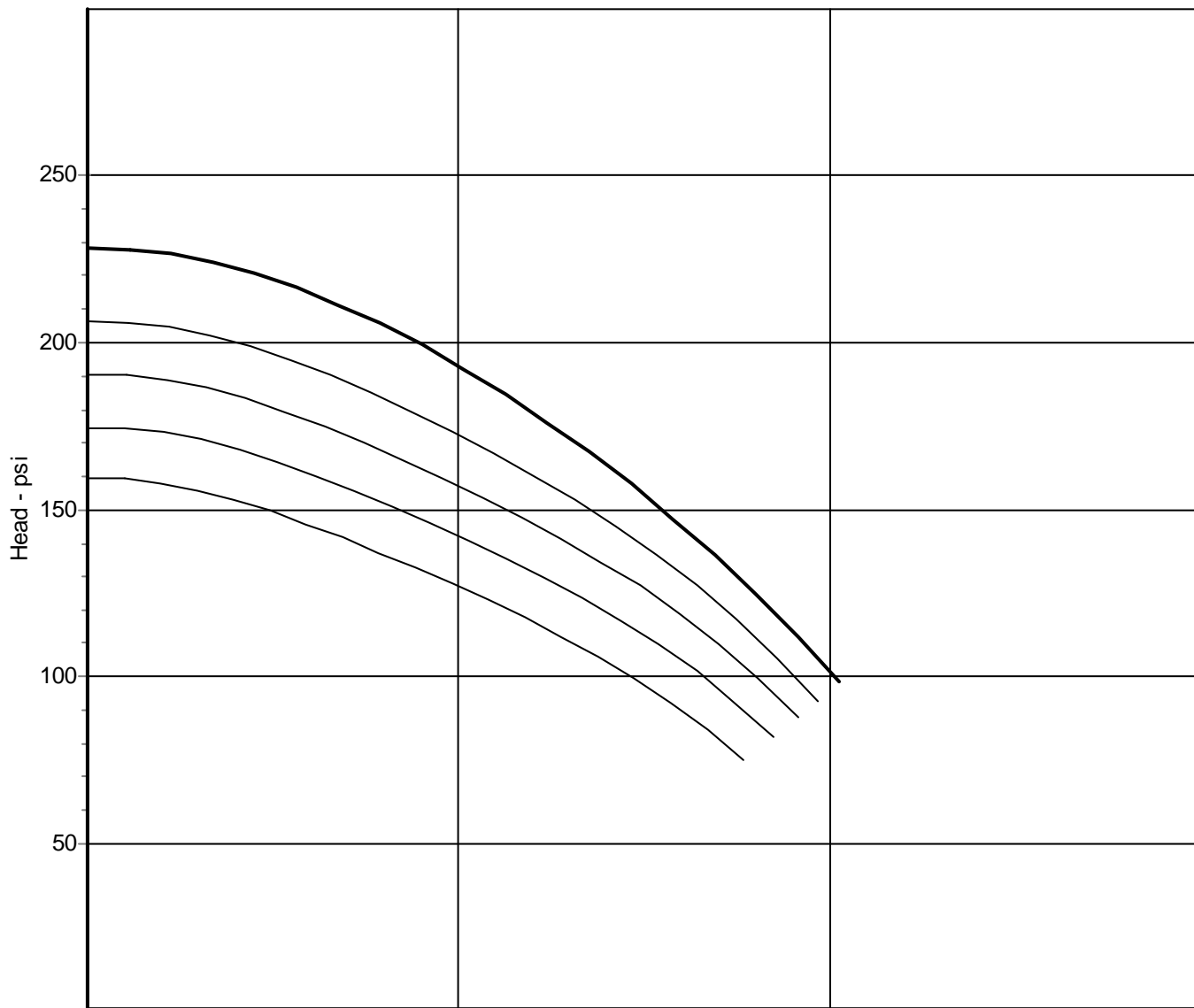
Performance Curves

2600 RPM

Pump Model: **SPP - TE08D**
Curve No.: **TE08D-C2600/1G-C1**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **2600 RPM**
Impeller Dia.: **395/330 mm**
Fluid: **Water**

Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**

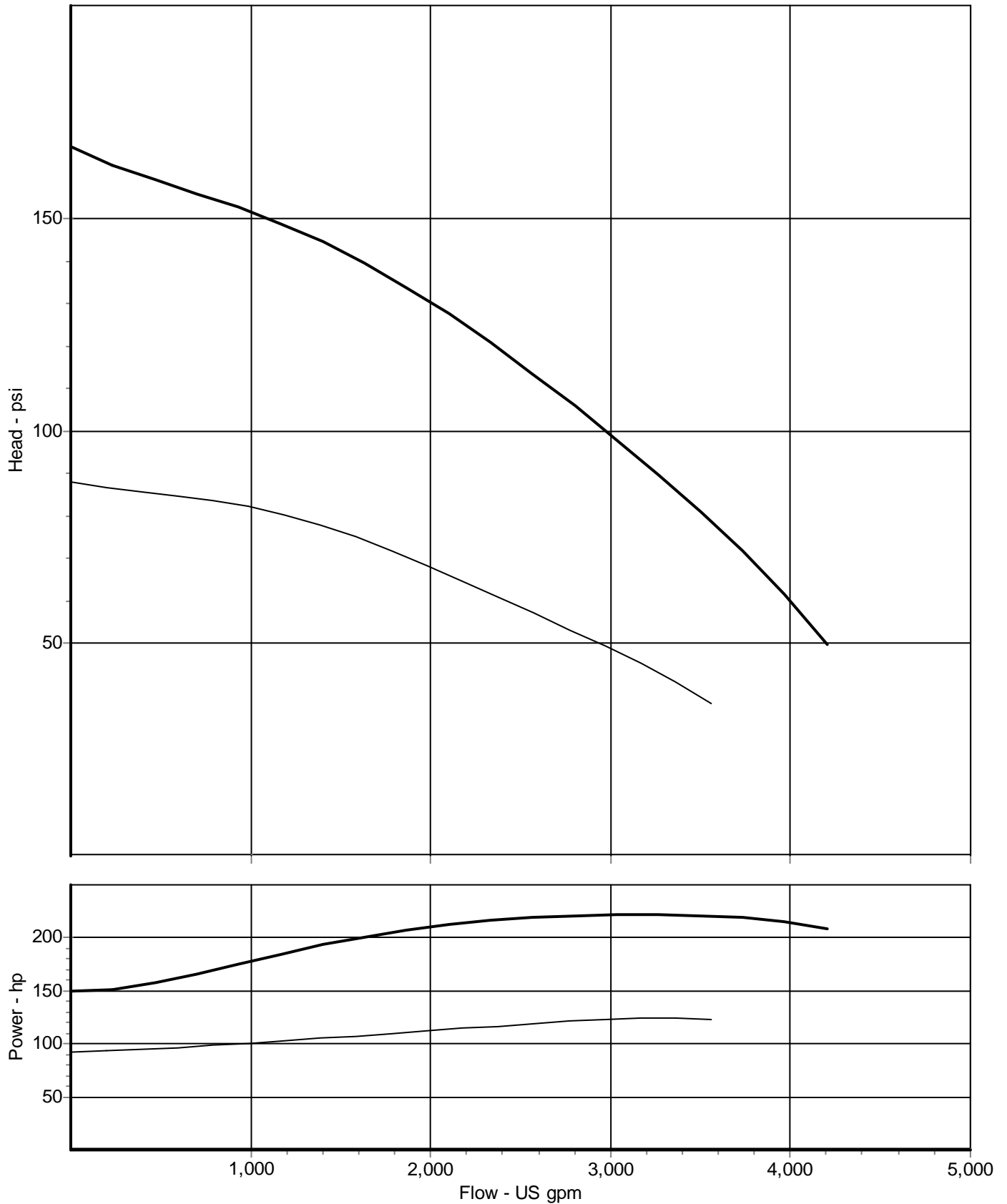


Comments:
NPSH REQUIRED at centreline of impeller. Add 0.5m to Laboratory NPSH curve for field applications

Pump Model: **SPP - TD20E(I)**
Curve No.: **TD20E-C2600/1H**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **2600 RPM**
Impeller Dia.: **340/246 mm**
Fluid: **Water**

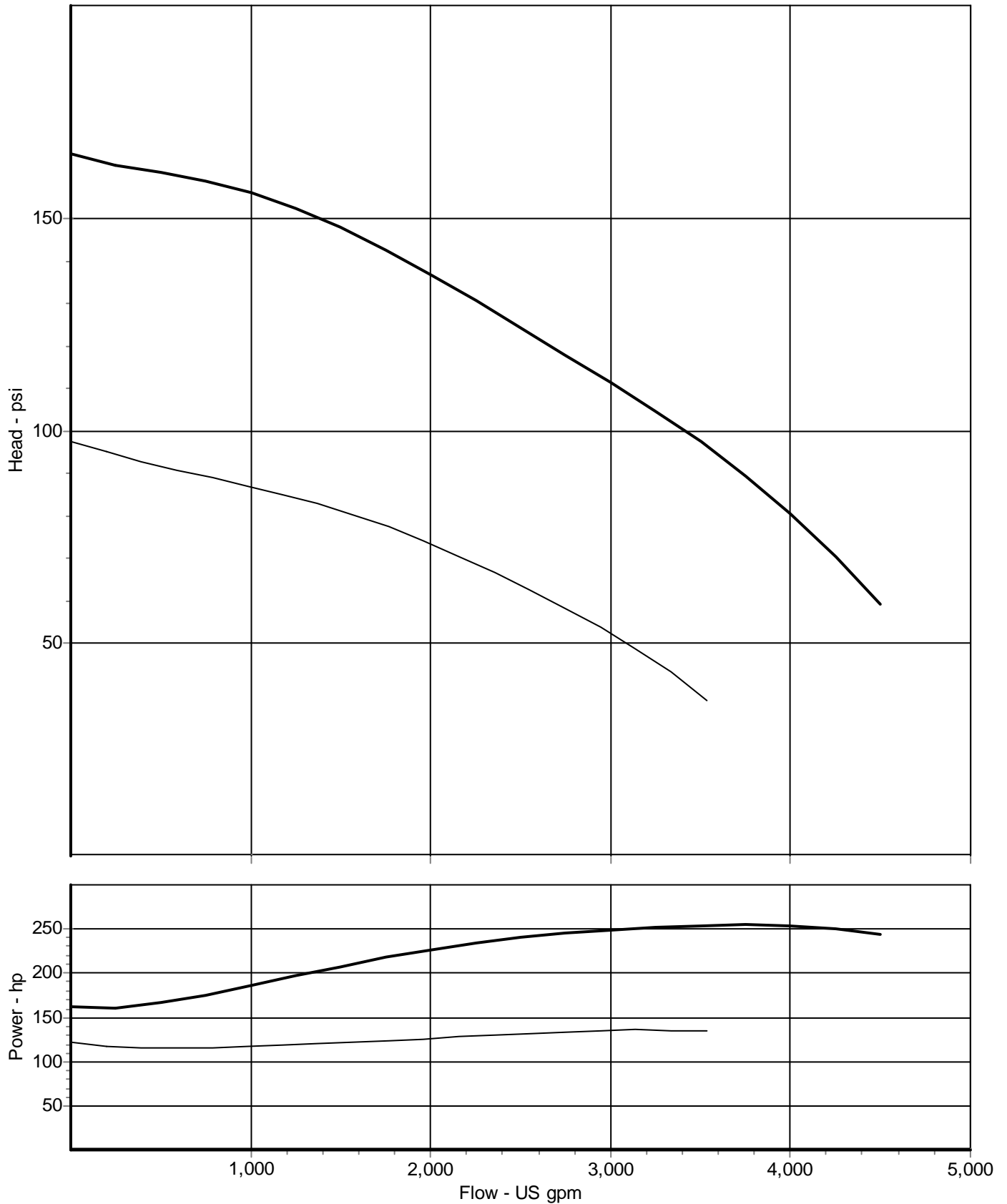
Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Pump Model: **SPP - TD20D(I)**
Curve No.: **TD20D-C2600/1H**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **2600 RPM**
Impeller Dia.: **340/253 mm**
Fluid: **Water**

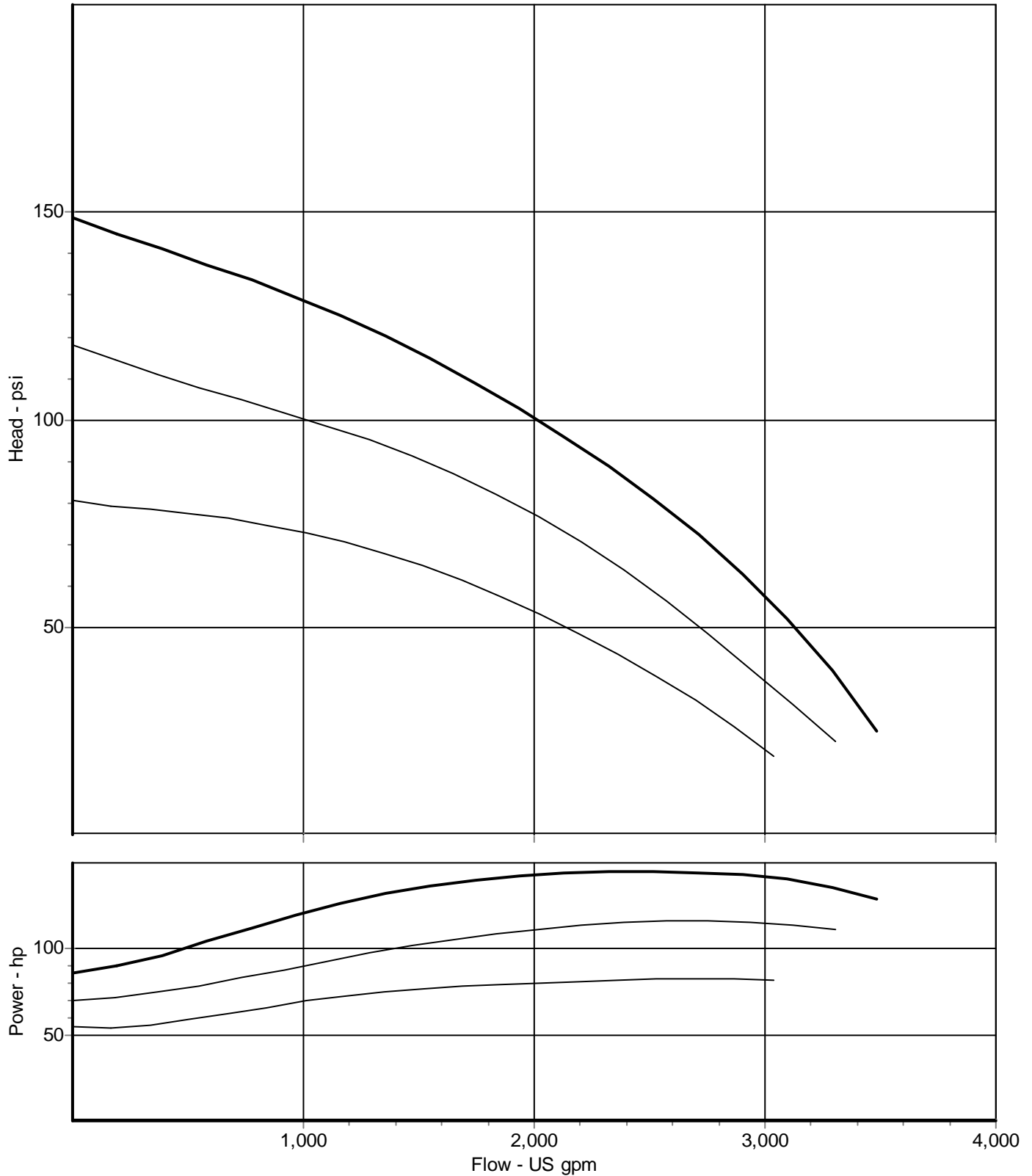
Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Pump Model: **SPP - TD15F**
Curve No.: **TD15F-C2600/1G-A1**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **2600 RPM**
Impeller Dia.: **325/240 mm**
Fluid: **Water**

Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Comments:

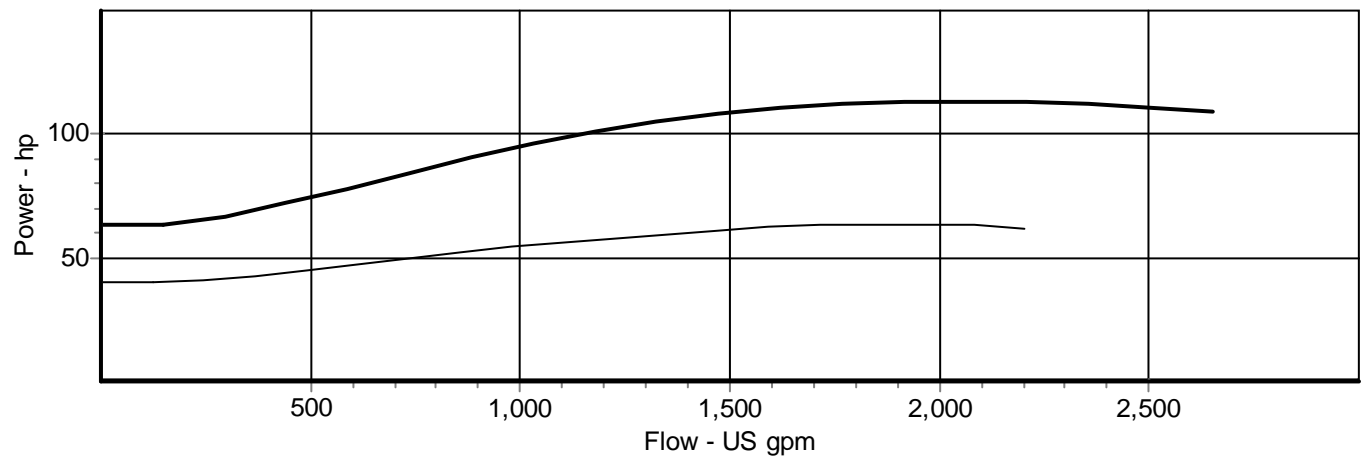
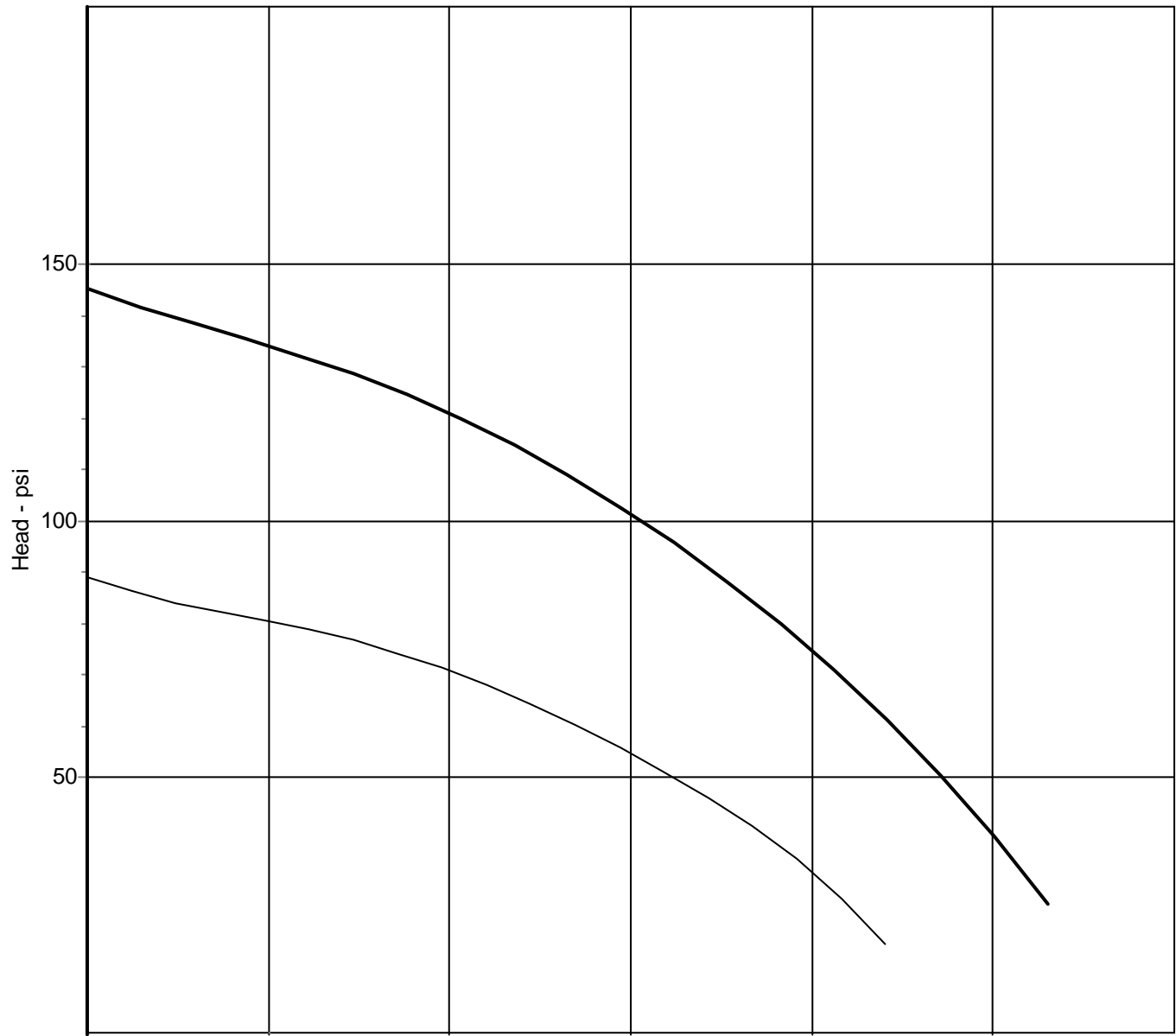
NPSH REQUIRED at centreline of impeller. Add 0.5m to Laboratory NPSH curve for field applications



Pump Model: **SPP - TD12F(I)**
Curve No.: **TD12F-C2600/1H**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **2600 RPM**
Impeller Dia.: **308/236 mm**
Fluid: **Water**

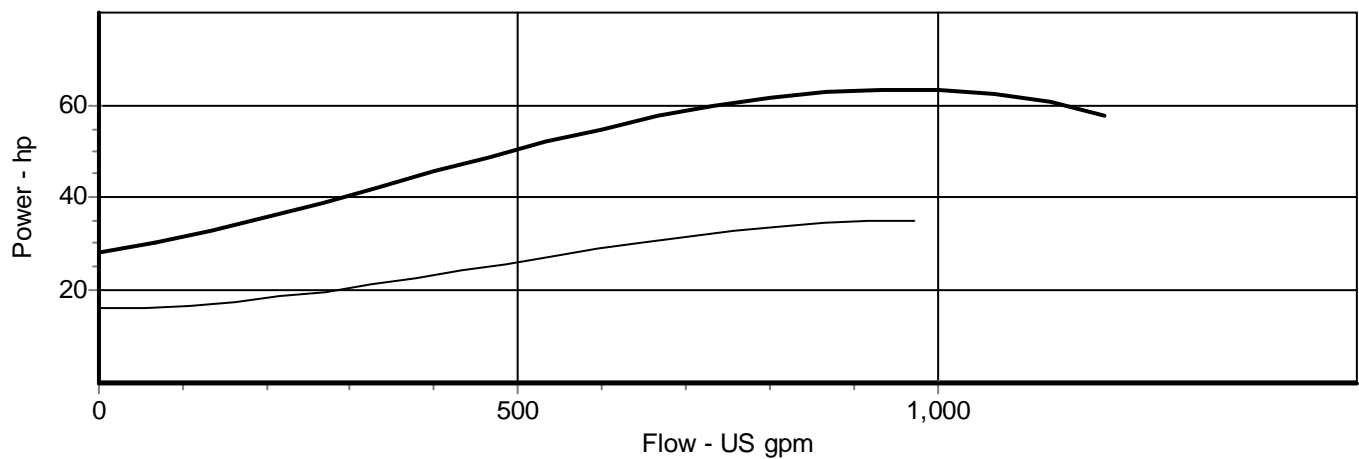
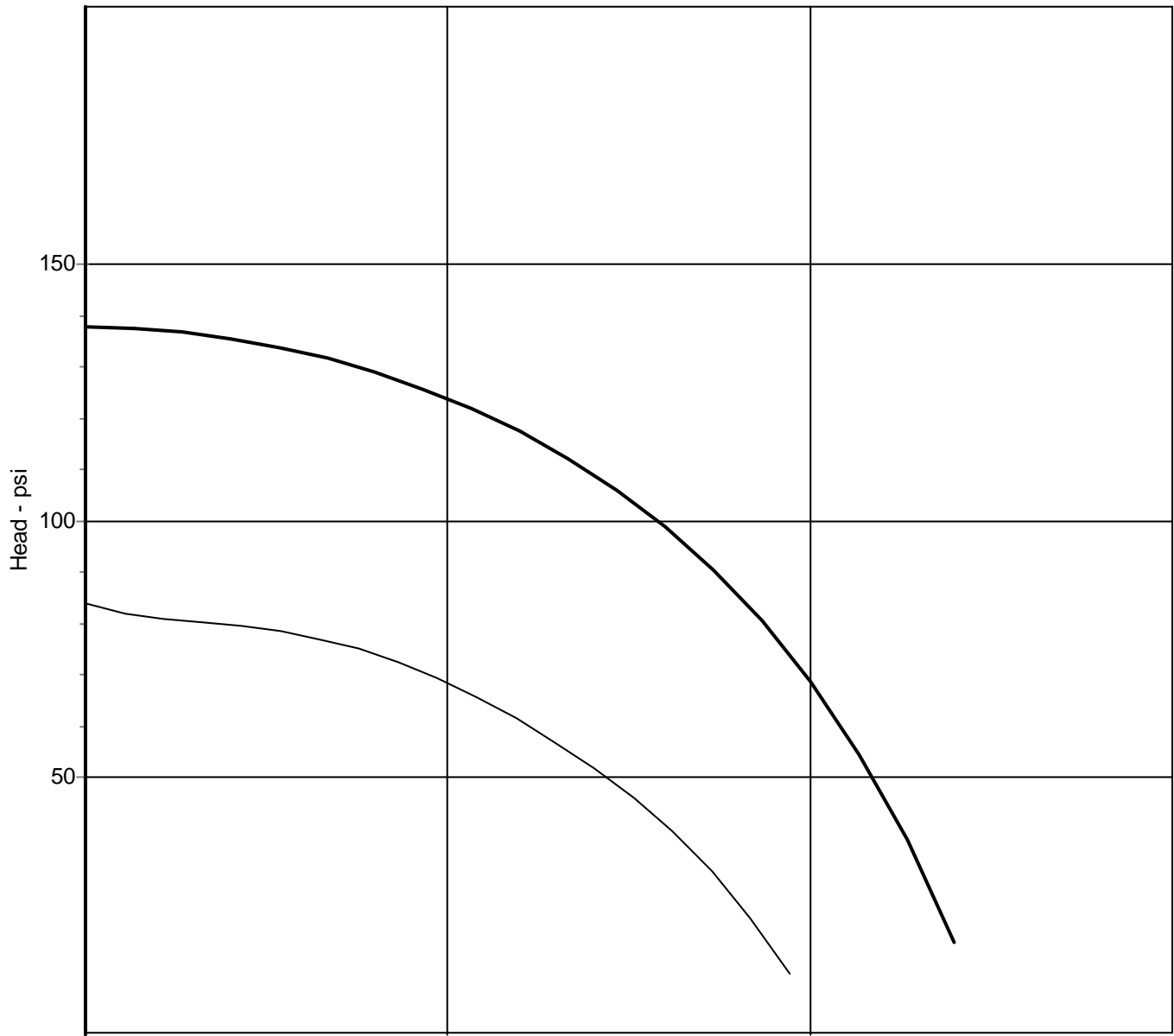
Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Pump Model: **SPP - TD10E(I)**
Curve No.: **TD10E-C2600/1H**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **2600 RPM**
Impeller Dia.: **303/231 mm**
Fluid: **Water**

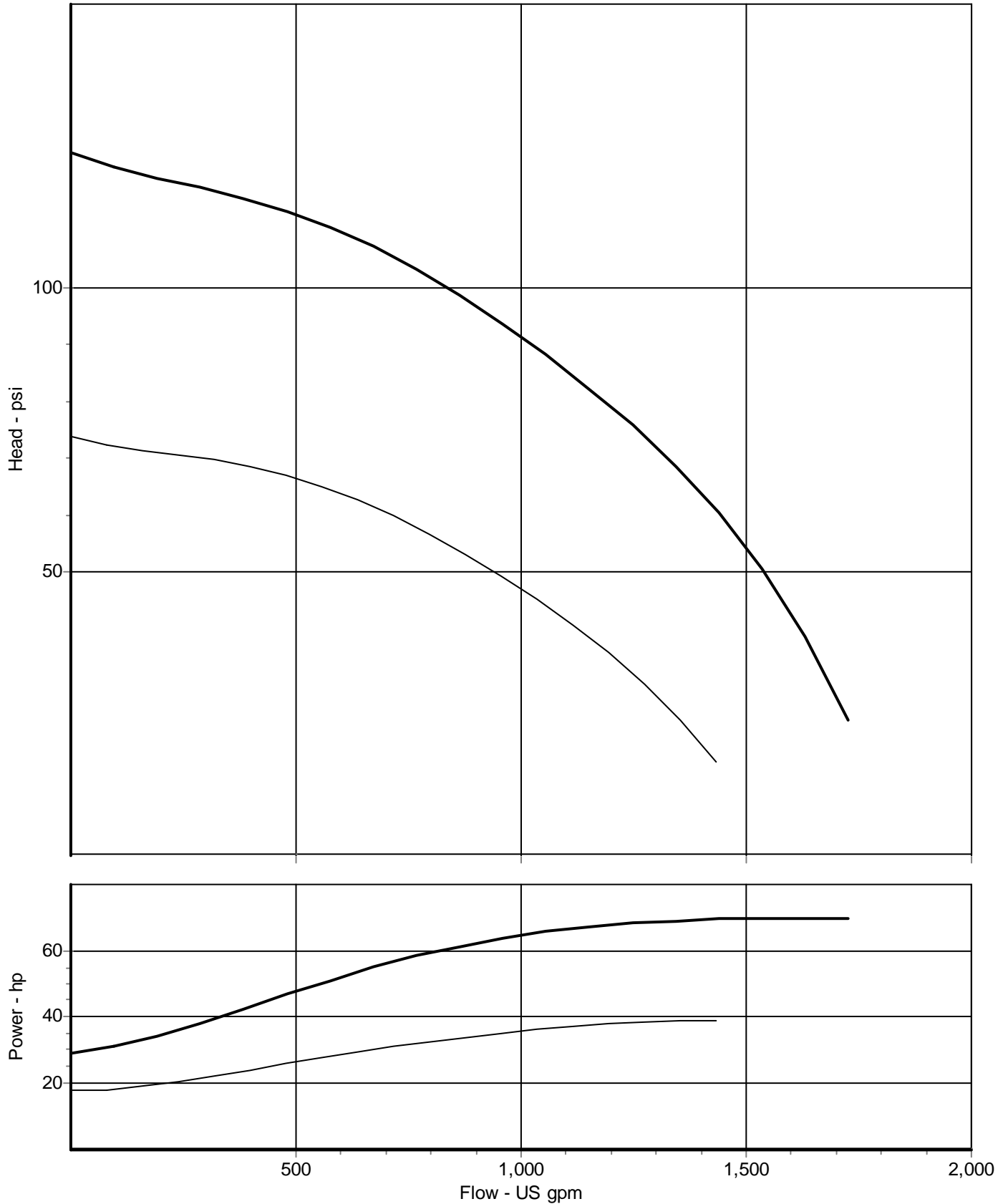
Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Pump Model: **SPP - TC12F(I)**
Curve No.: **TC12F-C2600/1H**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **2600 RPM**
Impeller Dia.: **286/216 mm**
Fluid: **Water**

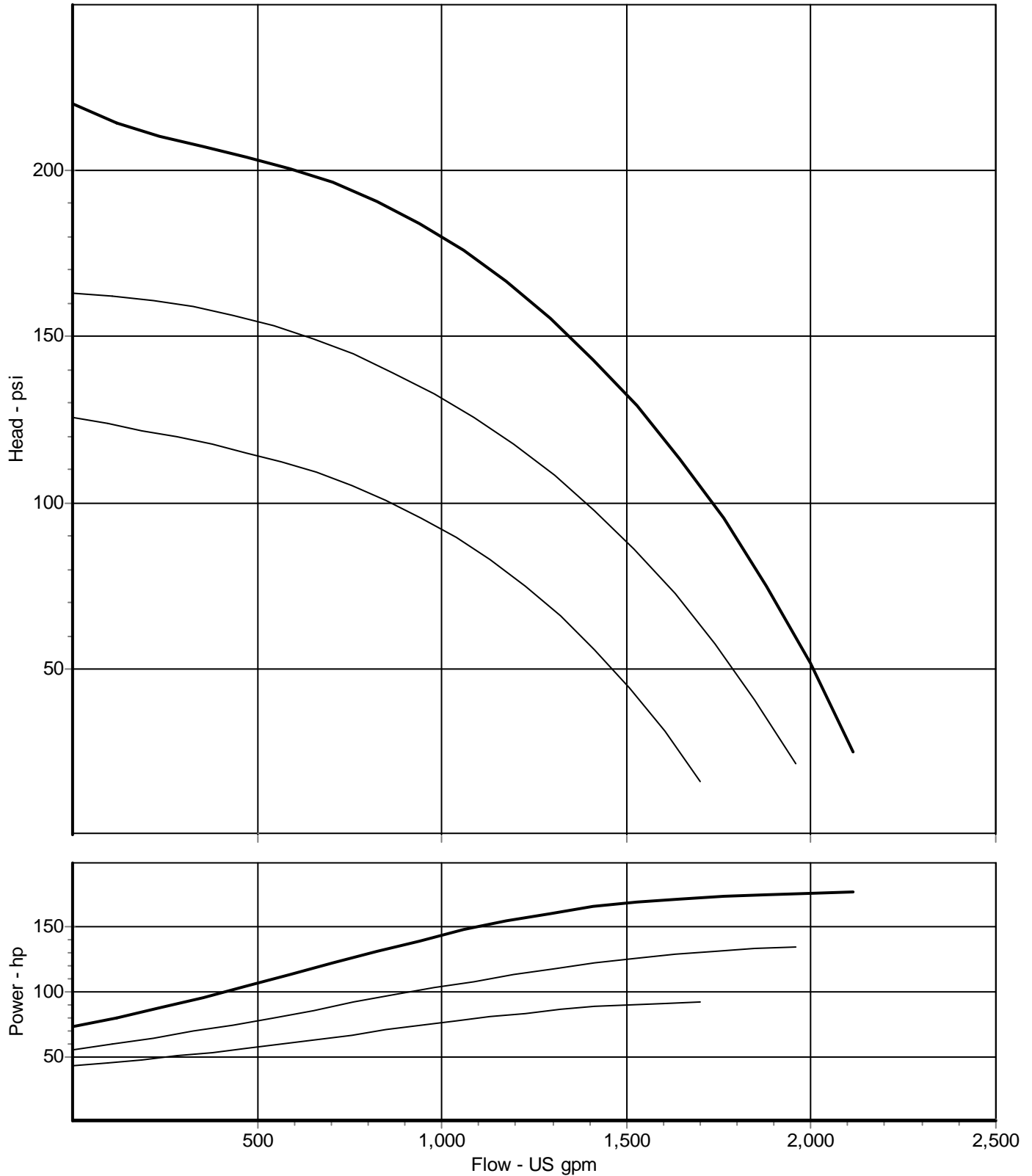
Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Pump Model: **SPP - TE12E**
 Curve No.: **TE12E-FMT-C2600/-0**
 Impeller No.
 Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **2600 RPM**
 Impeller Dia.: **380/285 mm**
 Fluid: **Water**

Temperature: **68 °F**
 Viscosity: **1.01 cP**
 Density: **62.3 lb/ft³**



Comments:
 NPSH REQUIRED at centreline of impeller. Add 0.5m to Laboratory NPSH curve for field applications





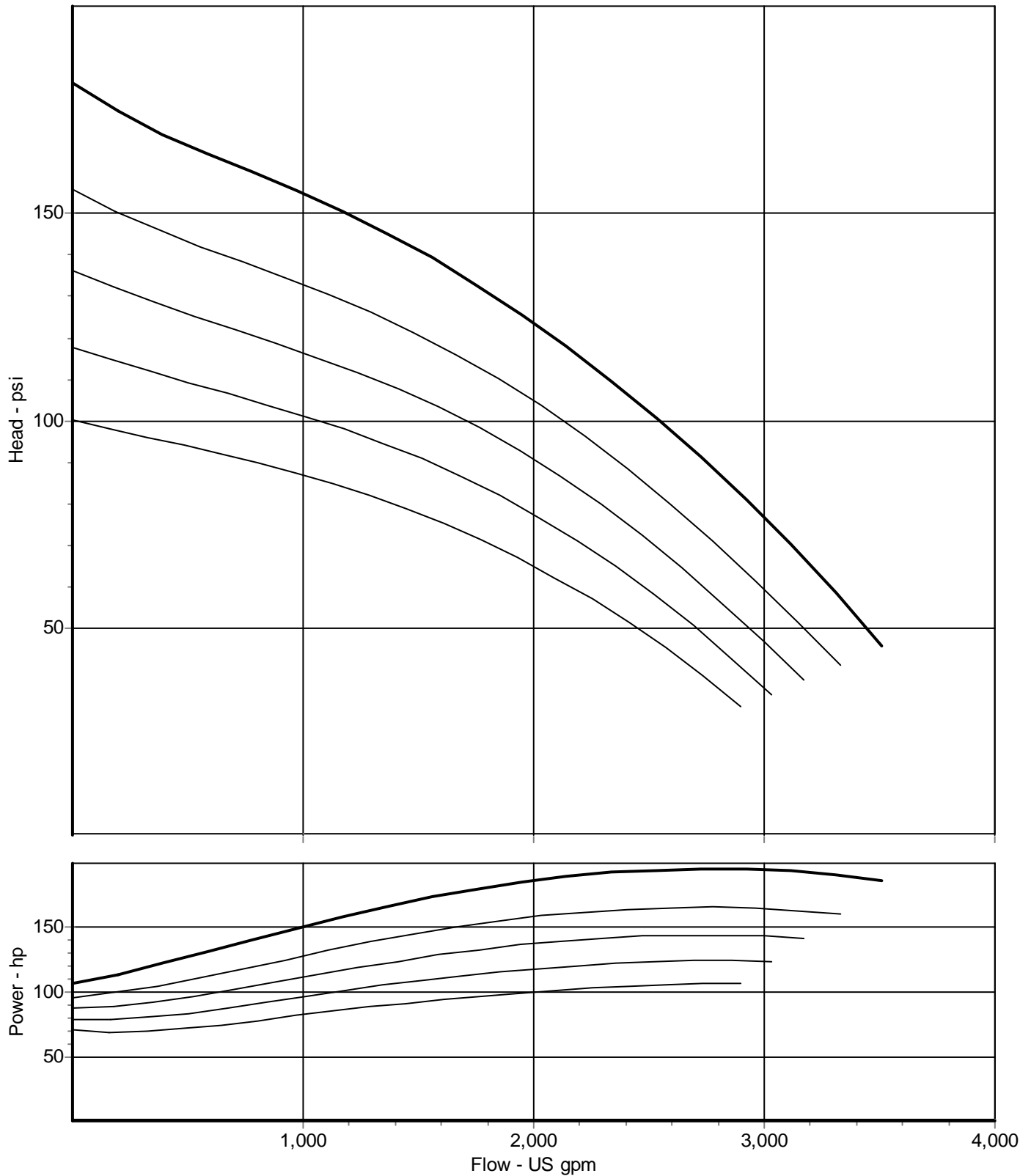
Performance Curves

2800 RPM

Pump Model: **SPP - TD15F**
Curve No.: **TD15F-C2800/1G-C2**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **2800 RPM**
Impeller Dia.: **325/240 mm**
Fluid: **Water**

Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Comments:

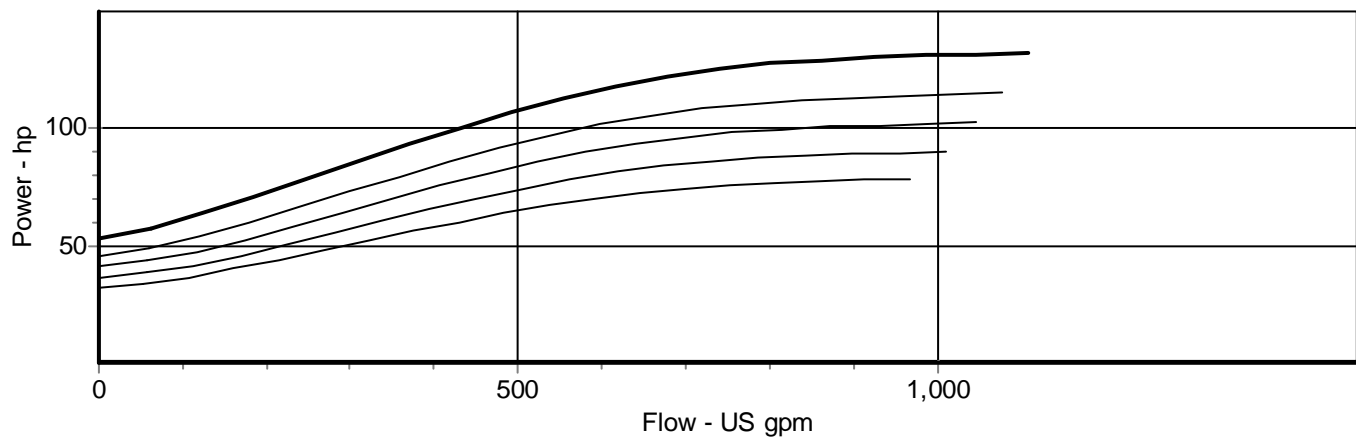
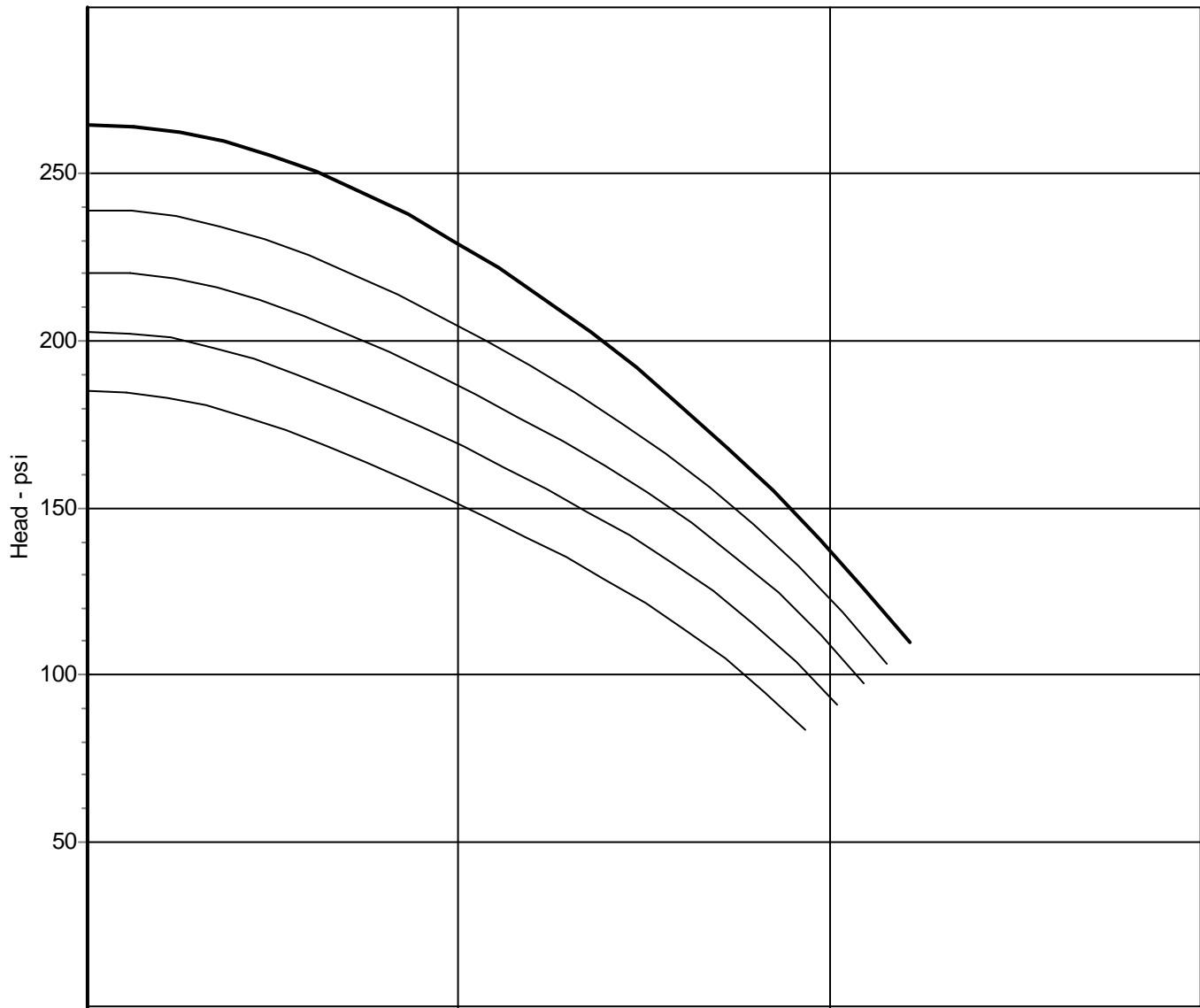
NPSH REQUIRED at centreline of impeller. Add 0.5m to Laboratory NPSH curve for field applications



Pump Model: **SPP - TE08D**
Curve No.: **TE08D-C2800/1G-C1**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **2800 RPM**
Impeller Dia.: **395/330 mm**
Fluid: **Water**

Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Comments:
NPSH REQUIRED at centreline of impeller. Add 0.5m to Laboratory NPSH curve for field applications





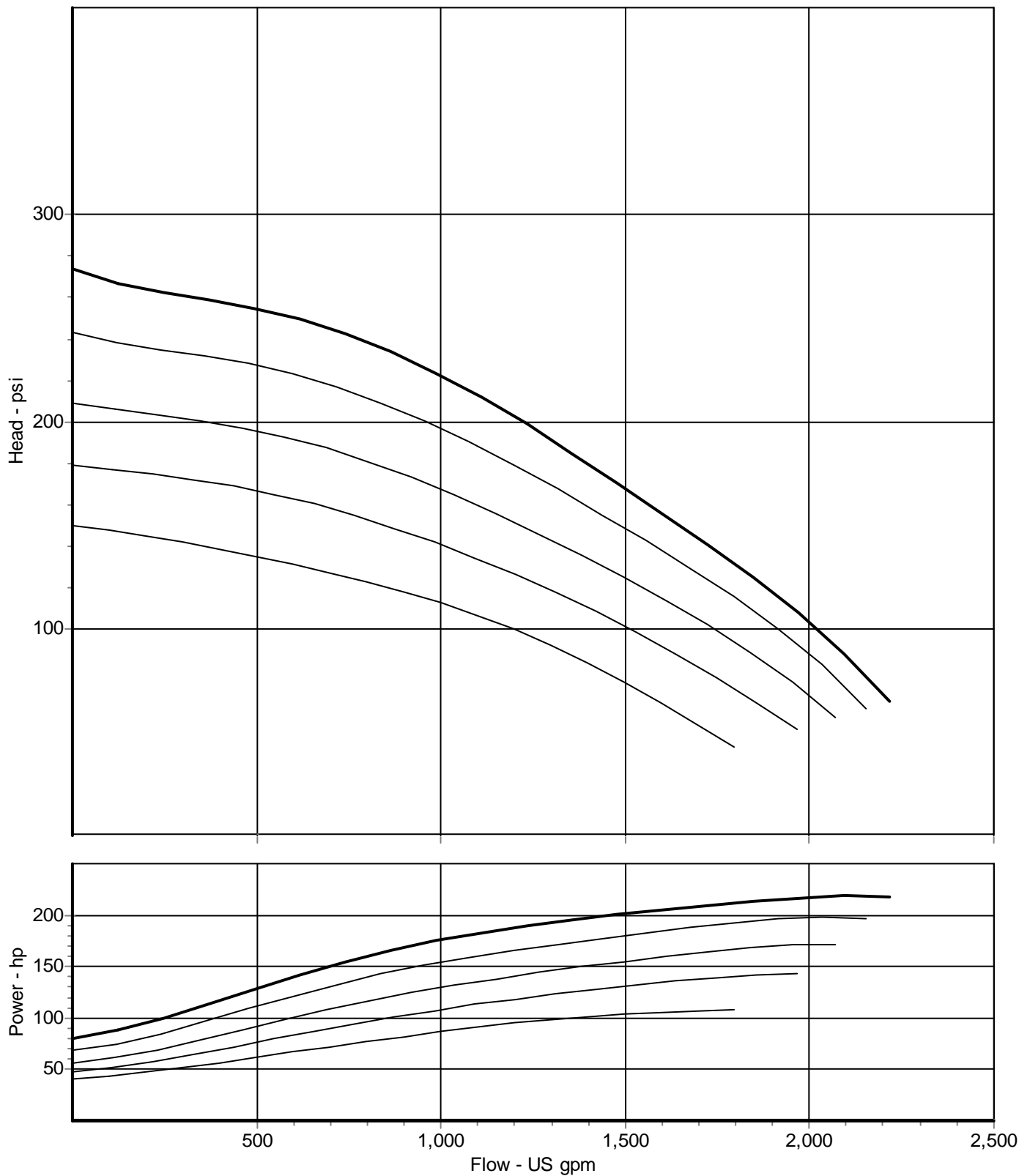
Performance Curves

2950 RPM

Pump Model: **SPP - TE10D**
Curve No.: **TE10D-C2950/1G-C2**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **2950 RPM**
Impeller Dia.: **370/270 mm**
Fluid: **Water**

Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



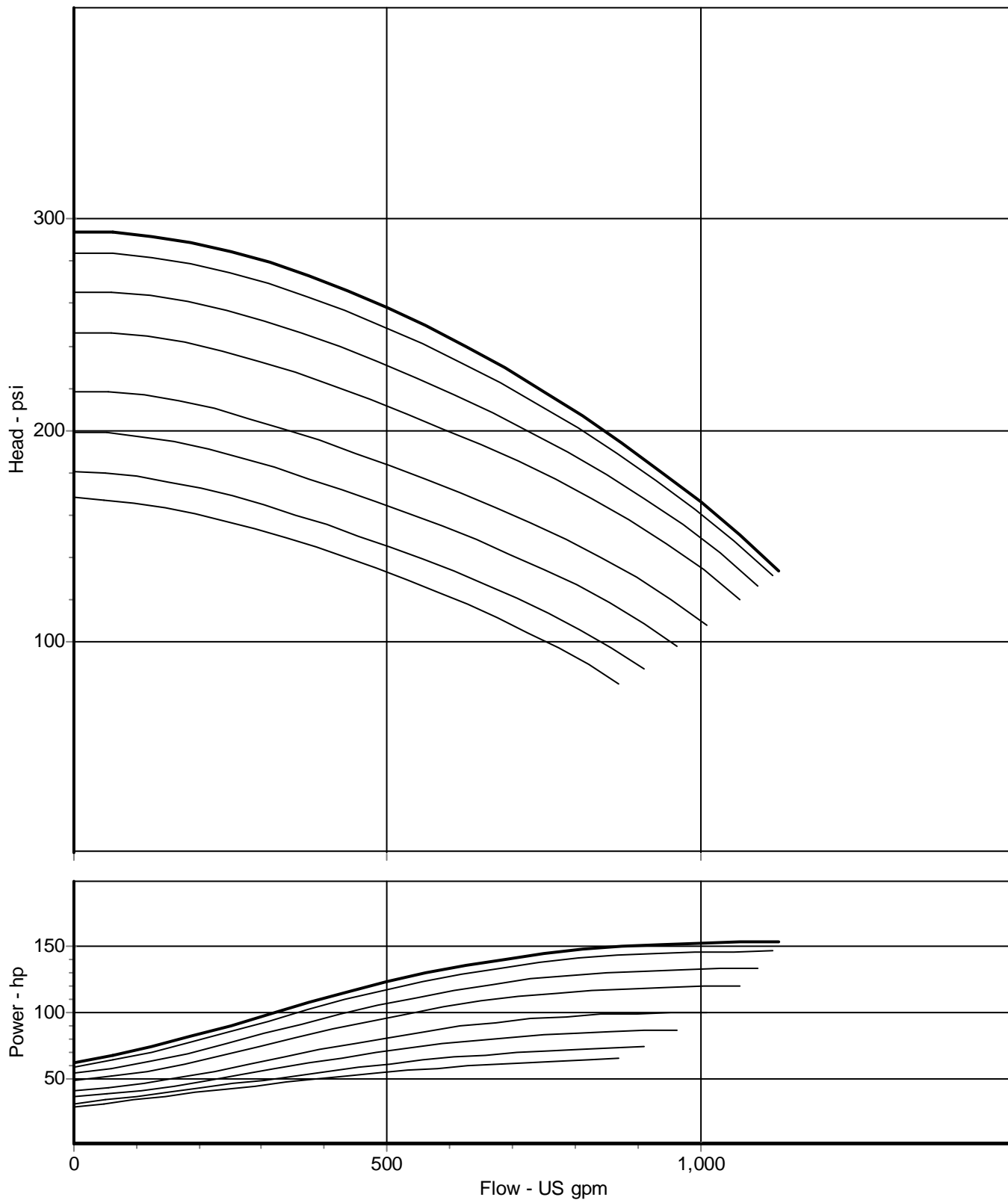
Comments:
NPSH REQUIRED at centreline of impeller. Add 0.5m to Laboratory NPSH curve for field applications



Pump Model: **SPP - TE08D**
Curve No.: **TE08D-C2950/1G-A3**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **2950 RPM**
Impeller Dia.: **395/300 mm**
Fluid: **Water**

Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Comments:

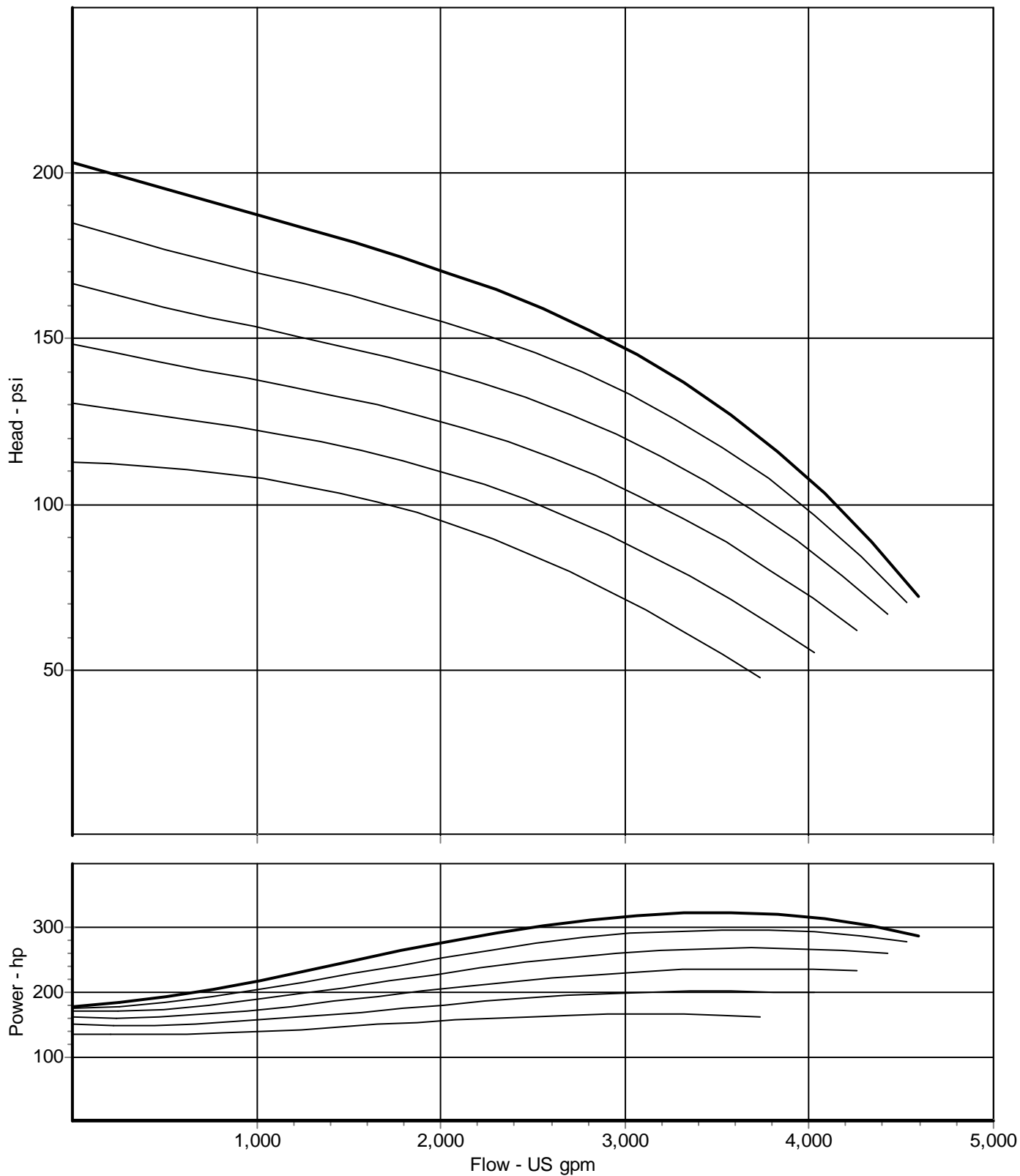
NPSH REQUIRED at centreline of impeller. Add 0.5m to Laboratory NPSH curve for field applications



Pump Model: **SPP - TD20E**
Curve No.: **TD20E-C2950/2G-A1**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **2950 RPM**
Impeller Dia.: **340/240 mm**
Fluid: **Water**

Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Comments:

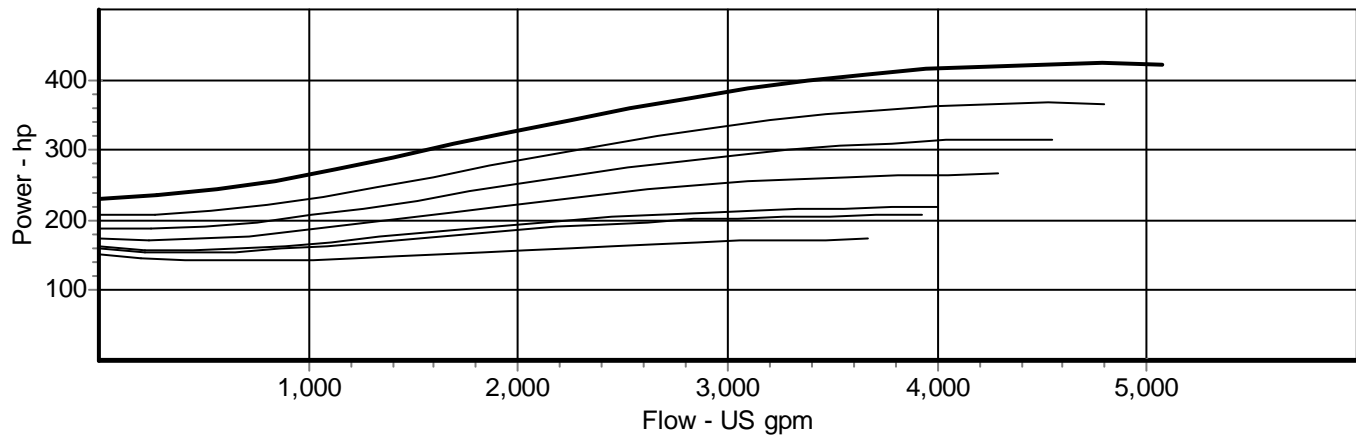
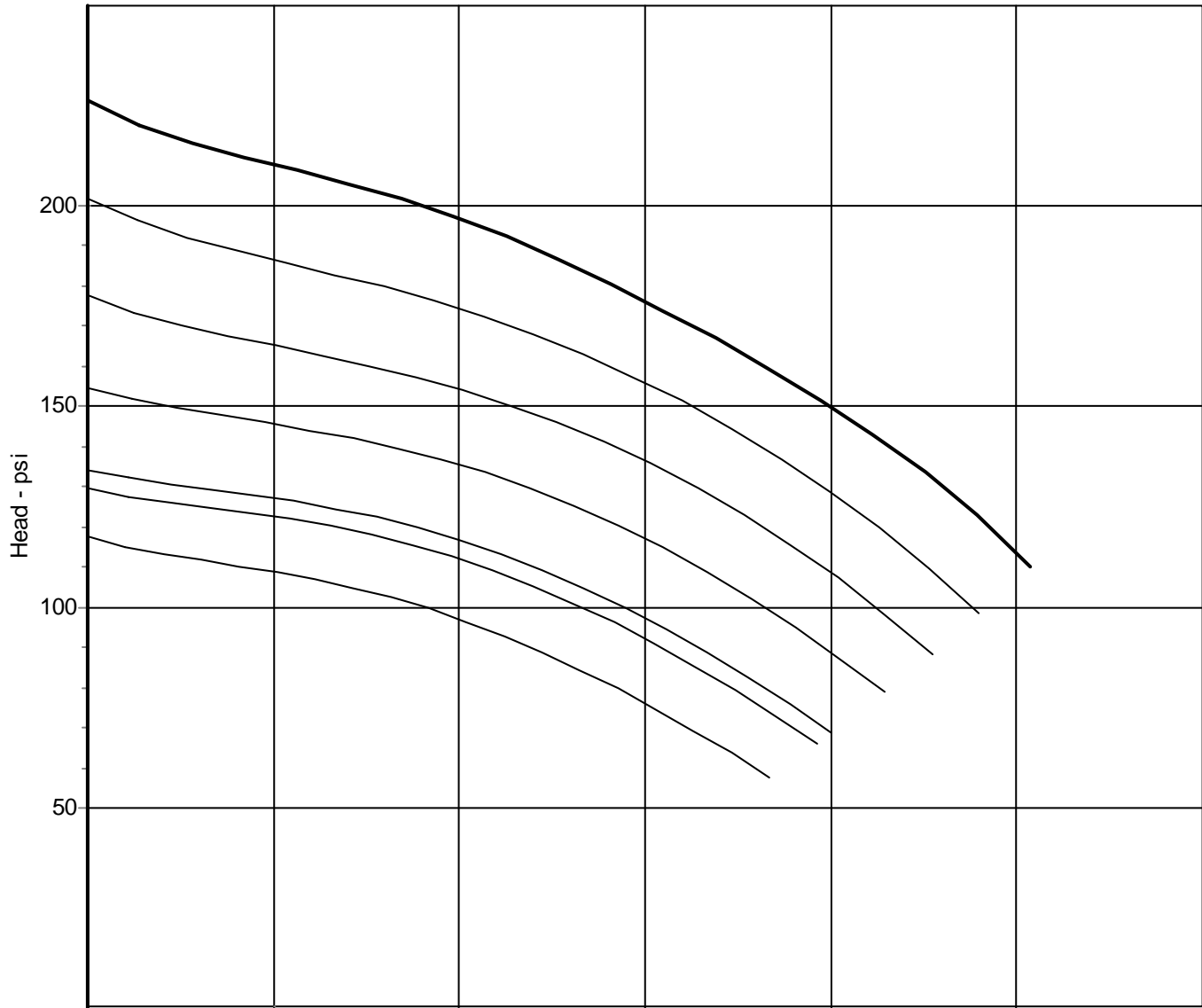
NPSH REQUIRED at centreline of impeller. Add 0.5m to Laboratory NPSH curve for field applications



Pump Model: **SPP - TD20D**
 Curve No.: **TD20D-C2960/1G-C1**
 Impeller No.
 Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **2960 RPM**
 Impeller Dia.: **340/240 mm**
 Fluid: **Water**

Temperature: **68 °F**
 Viscosity: **1.01 cP**
 Density: **62.3 lb/ft³**

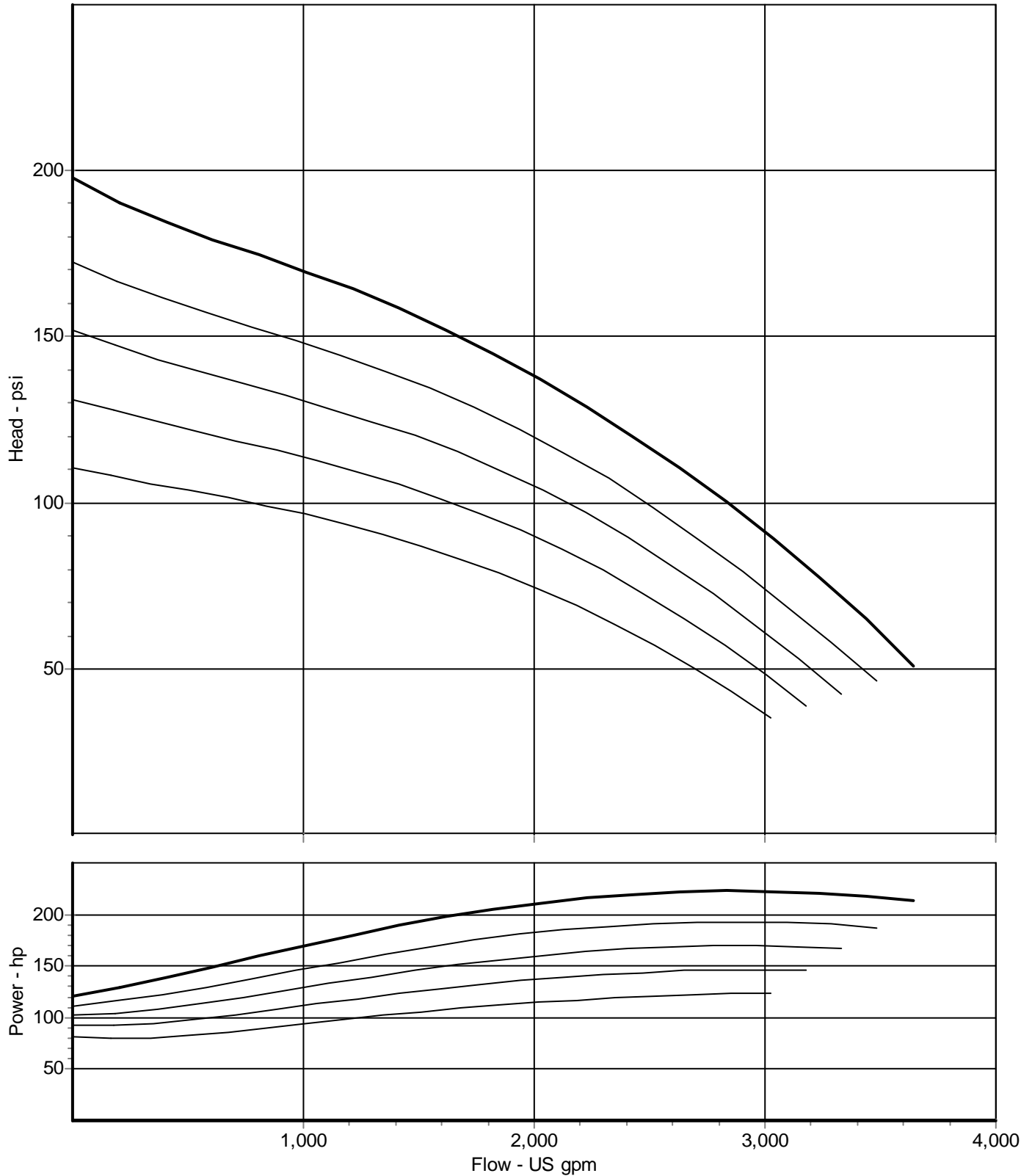


Comments:
 NPSH REQUIRED at centreline of impeller. Add 0.5m to Laboratory NPSH curve for field applications

Pump Model: **SPP - TD15F**
Curve No.: **TD15F-C2950/1G-A2**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **2950 RPM**
Impeller Dia.: **325/240 mm**
Fluid: **Water**

Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**

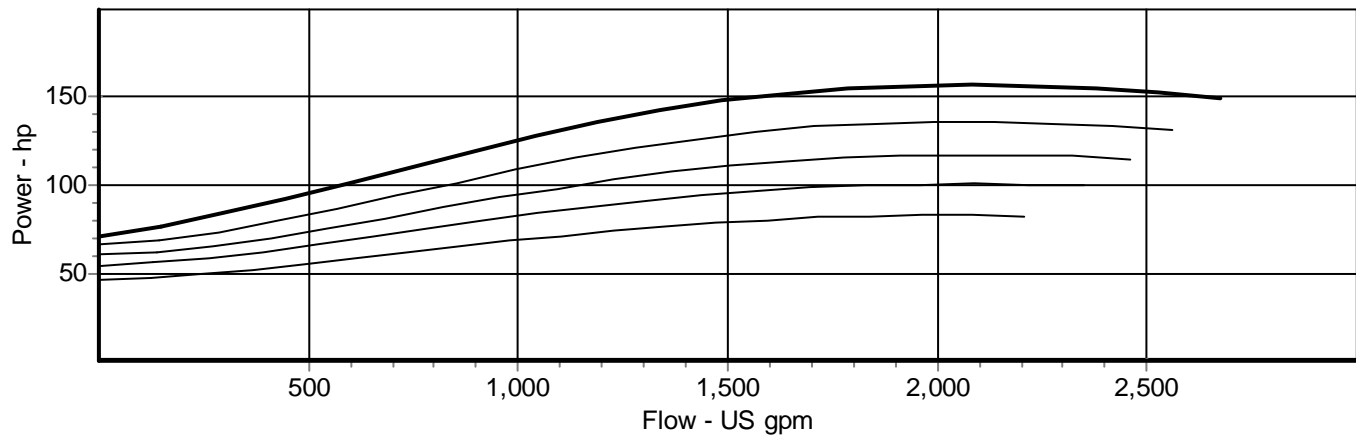
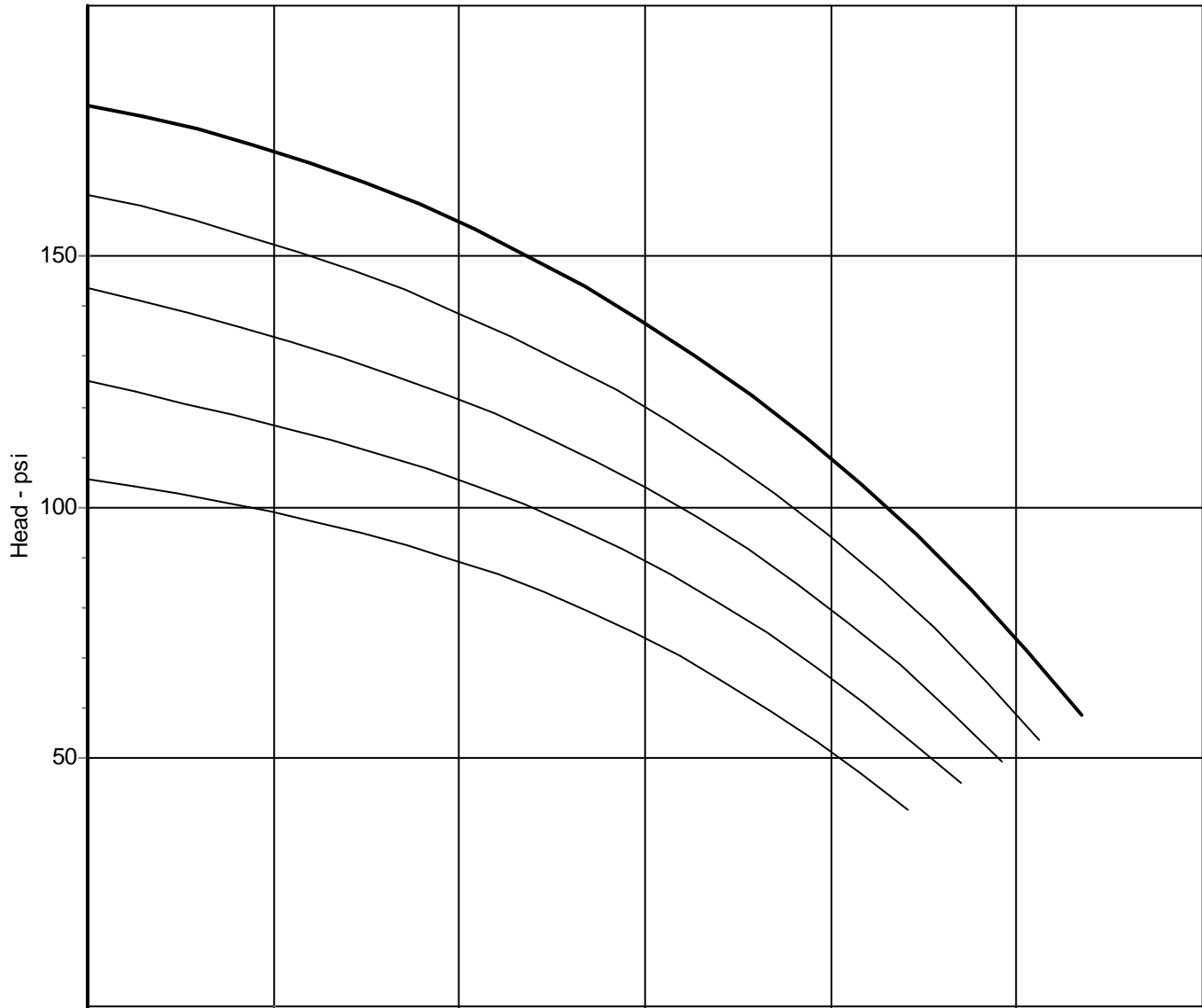


Comments:
NPSH REQUIRED at centreline of impeller. Add 0.5m to Laboratory NPSH curve for field applications

Pump Model: **SPP - TD12F**
Curve No.: **TD12F-C2950/1G-A1**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **2950 RPM**
Impeller Dia.: **308/230 mm**
Fluid: **Water**

Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**

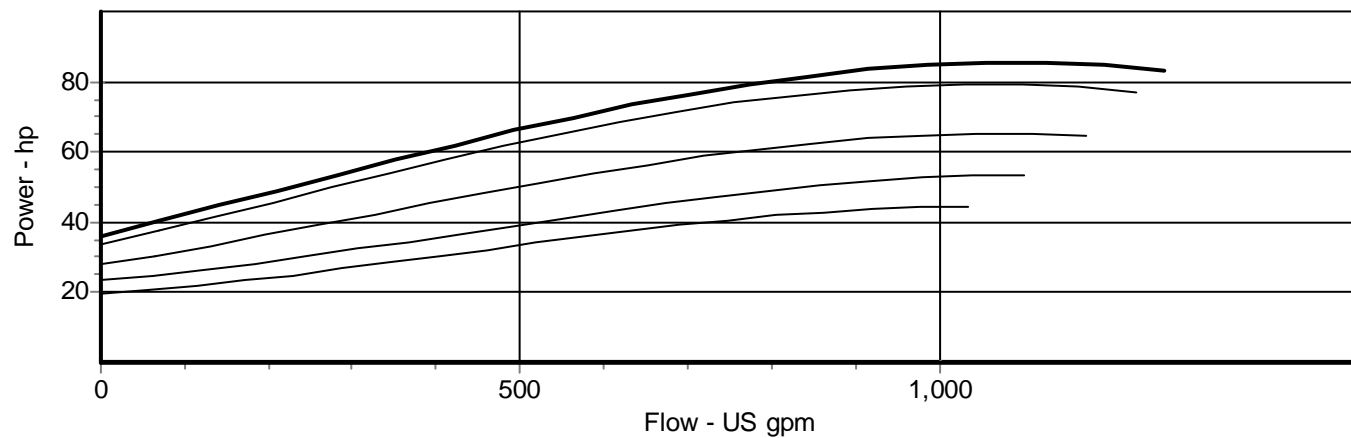
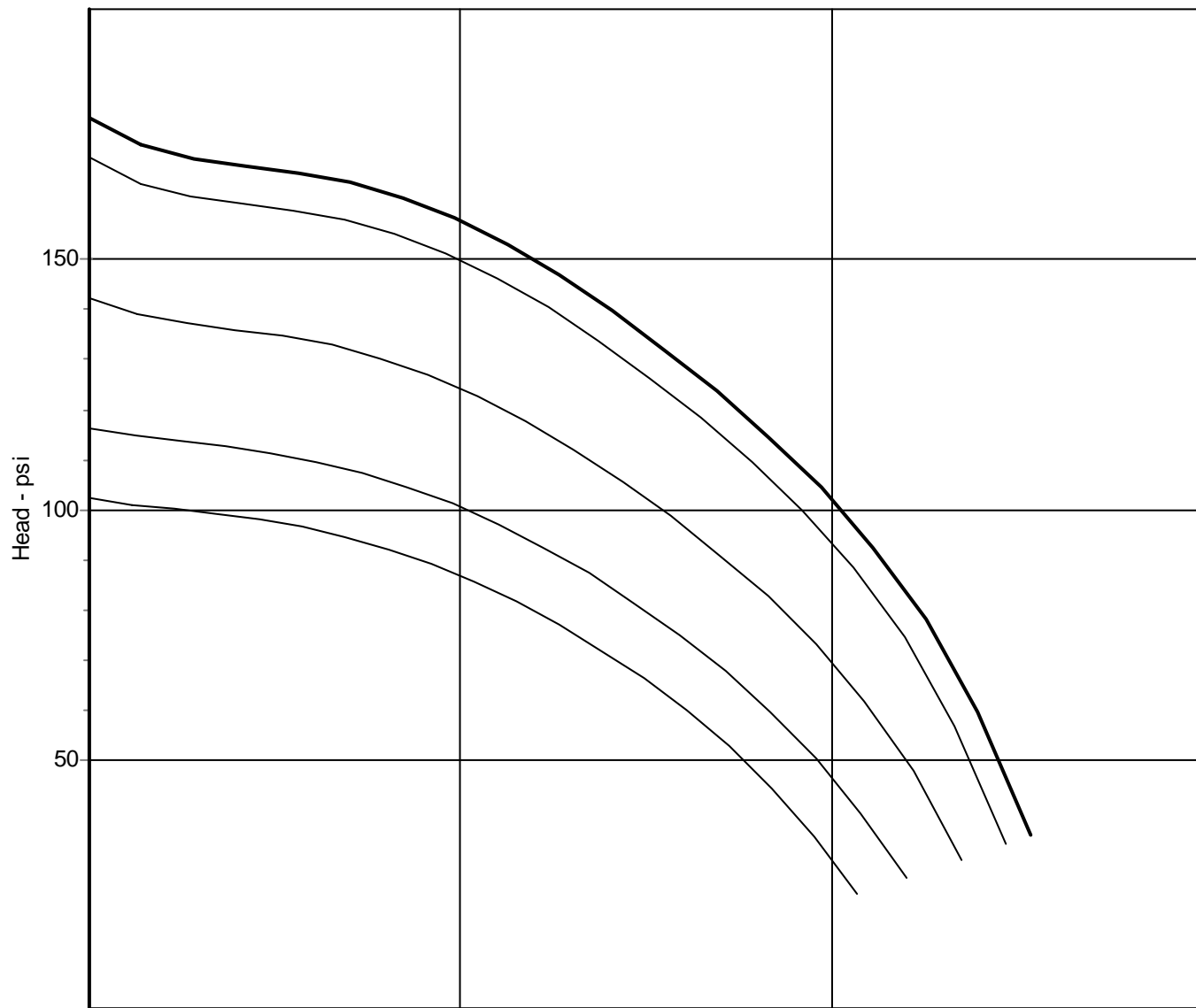


Comments:
NPSH REQUIRED at centreline of impeller. Add 0.5m to Laboratory NPSH curve for field applications

Pump Model: **SPP - TD10E**
Curve No.: **TD10E-C2950/1G-A1**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **2950 RPM**
Impeller Dia.: **303/225 mm**
Fluid: **Water**

Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



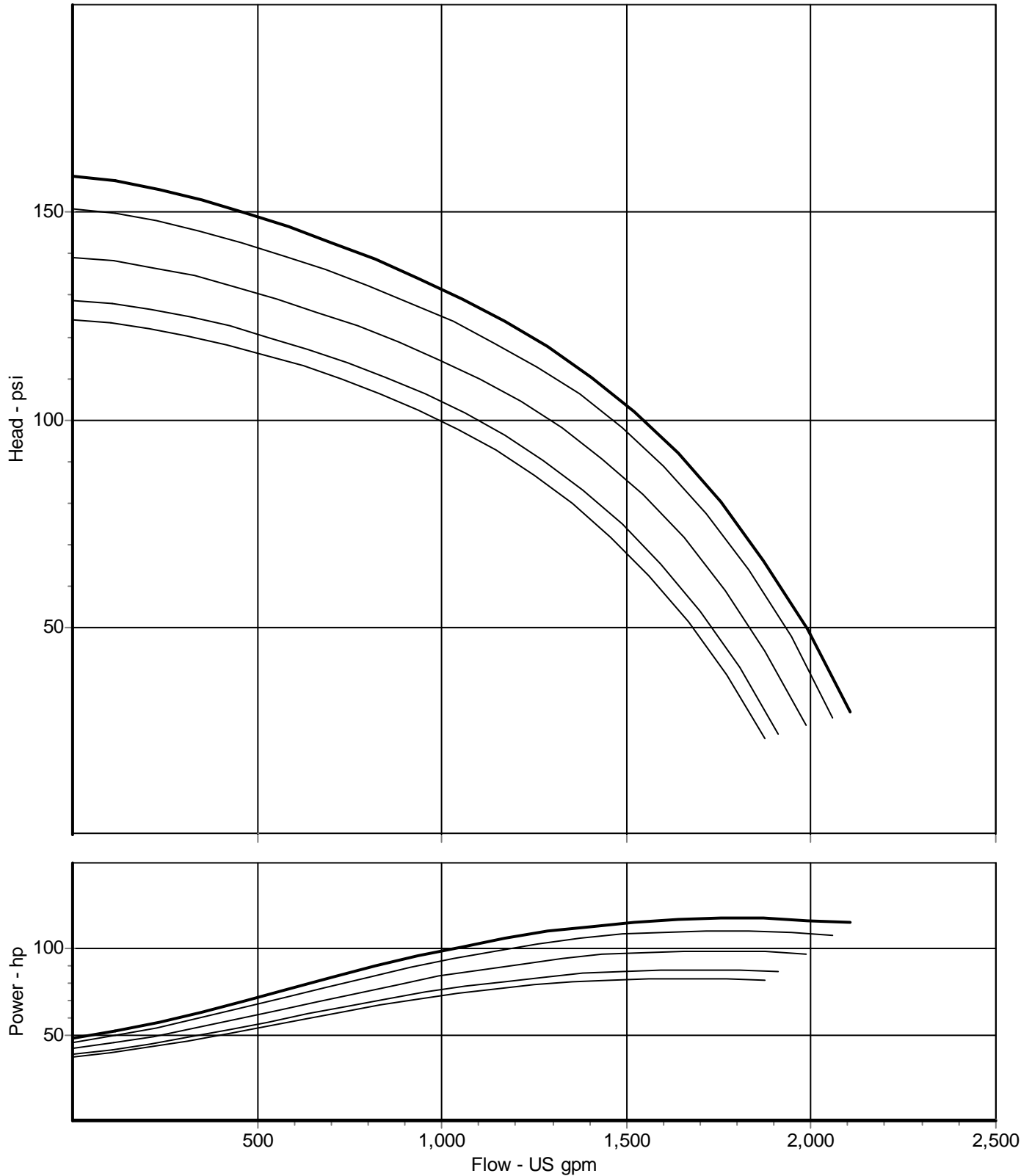
Comments:
NPSH REQUIRED at centreline of impeller. Add 0.5m to Laboratory NPSH curve for field applications



Pump Model: **SPP - TC12G**
Curve No.: **TC12G-C2950/1G-A1**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **2950 RPM**
Impeller Dia.: **286/255 mm**
Fluid: **Water**

Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**

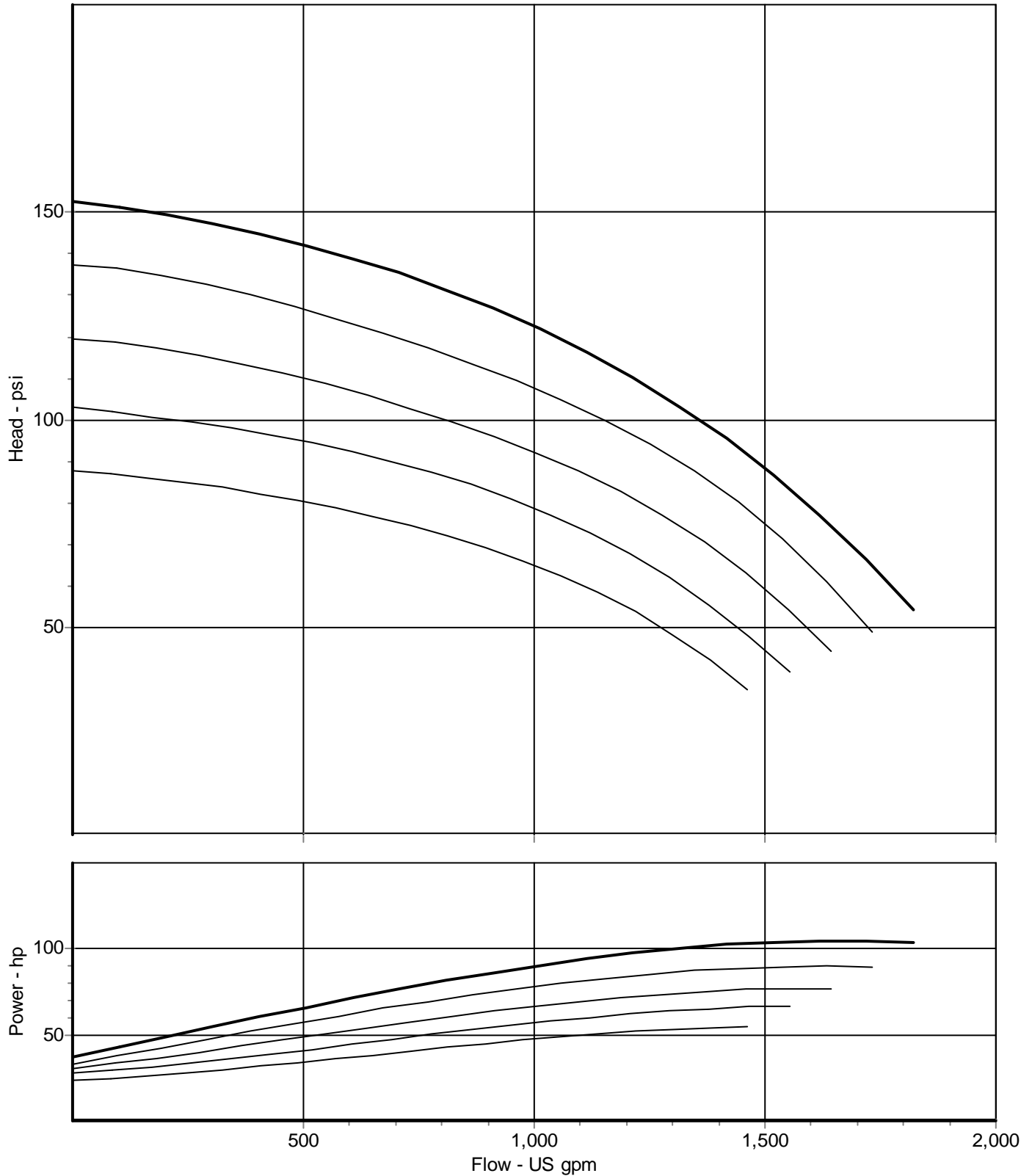


Comments:
NPSH REQUIRED at centreline of impeller. Add 0.5m to Laboratory NPSH curve for field applications

Pump Model: **SPP - TC12F**
Curve No.: **TC12F-C2950/1G-A1**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **2950 RPM**
Impeller Dia.: **286/210 mm**
Fluid: **Water**

Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**

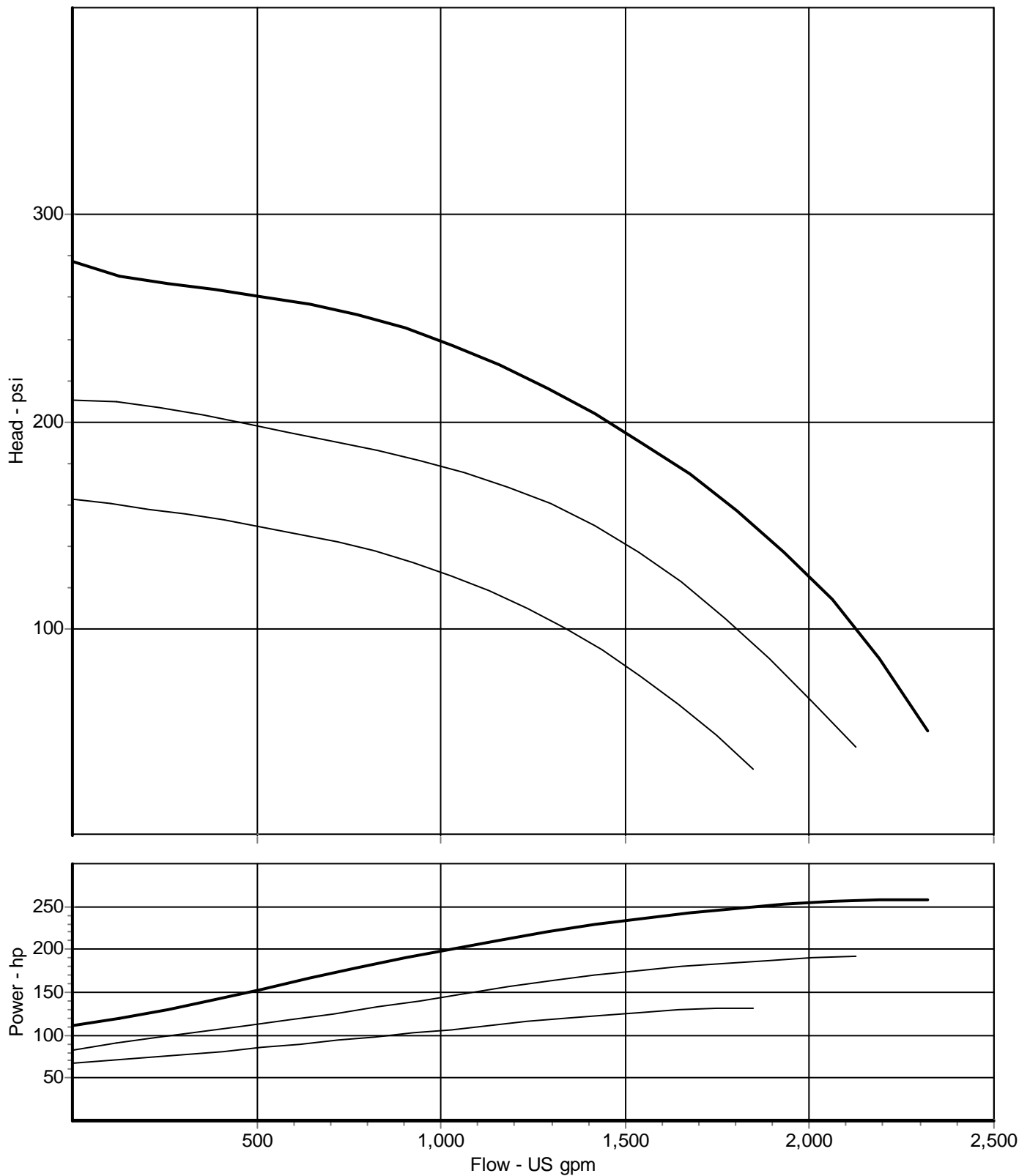


Comments:
NPSH REQUIRED at centreline of impeller. Add 0.5m to Laboratory NPSH curve for field applications

Pump Model: **SPP - TE12E**
Curve No.: **TE12E-FMT-C2950/-0**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **2950 RPM**
Impeller Dia.: **380/285 mm**
Fluid: **Water**

Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Comments:

NPSH REQUIRED at centreline of impeller. Add 0.5m to Laboratory NPSH curve for field applications





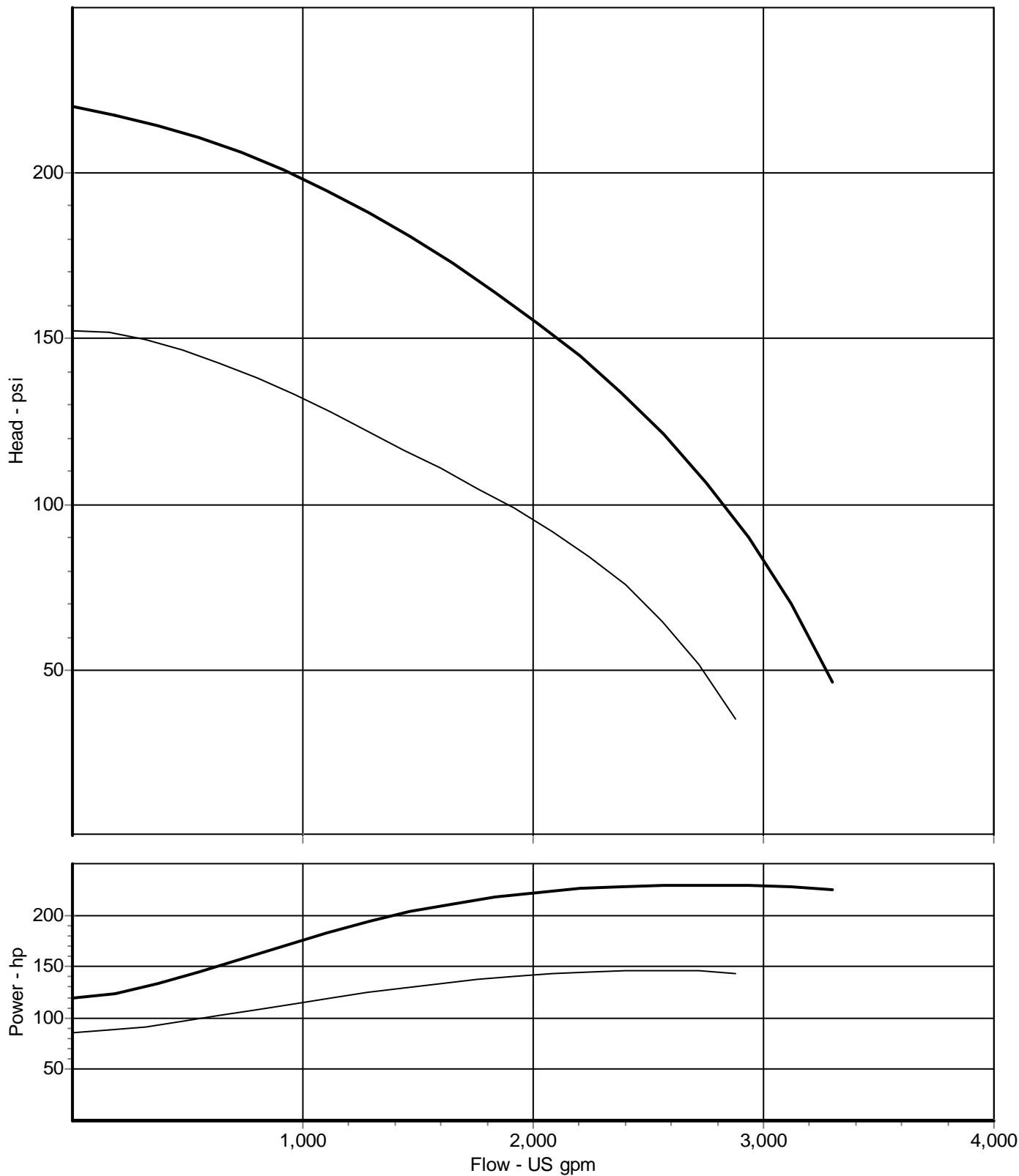
Performance Curves

3550 RPM

Pump Model: **SPP - TD12F**
Curve No.: **TD12F-FMT-C3550/-0**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **3550 RPM**
Impeller Dia.: **282/230 mm**
Fluid: **Water**

Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Comments:

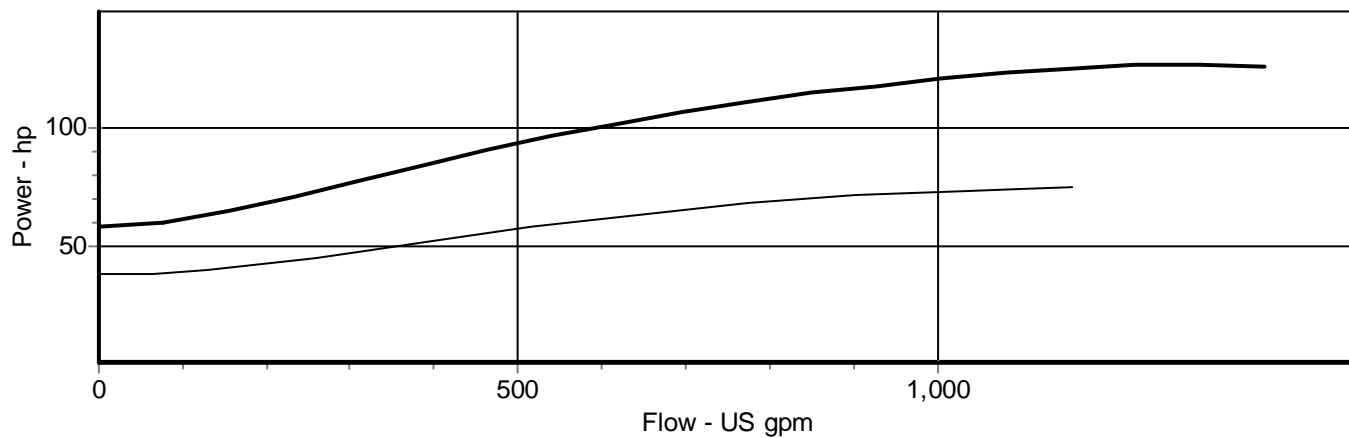
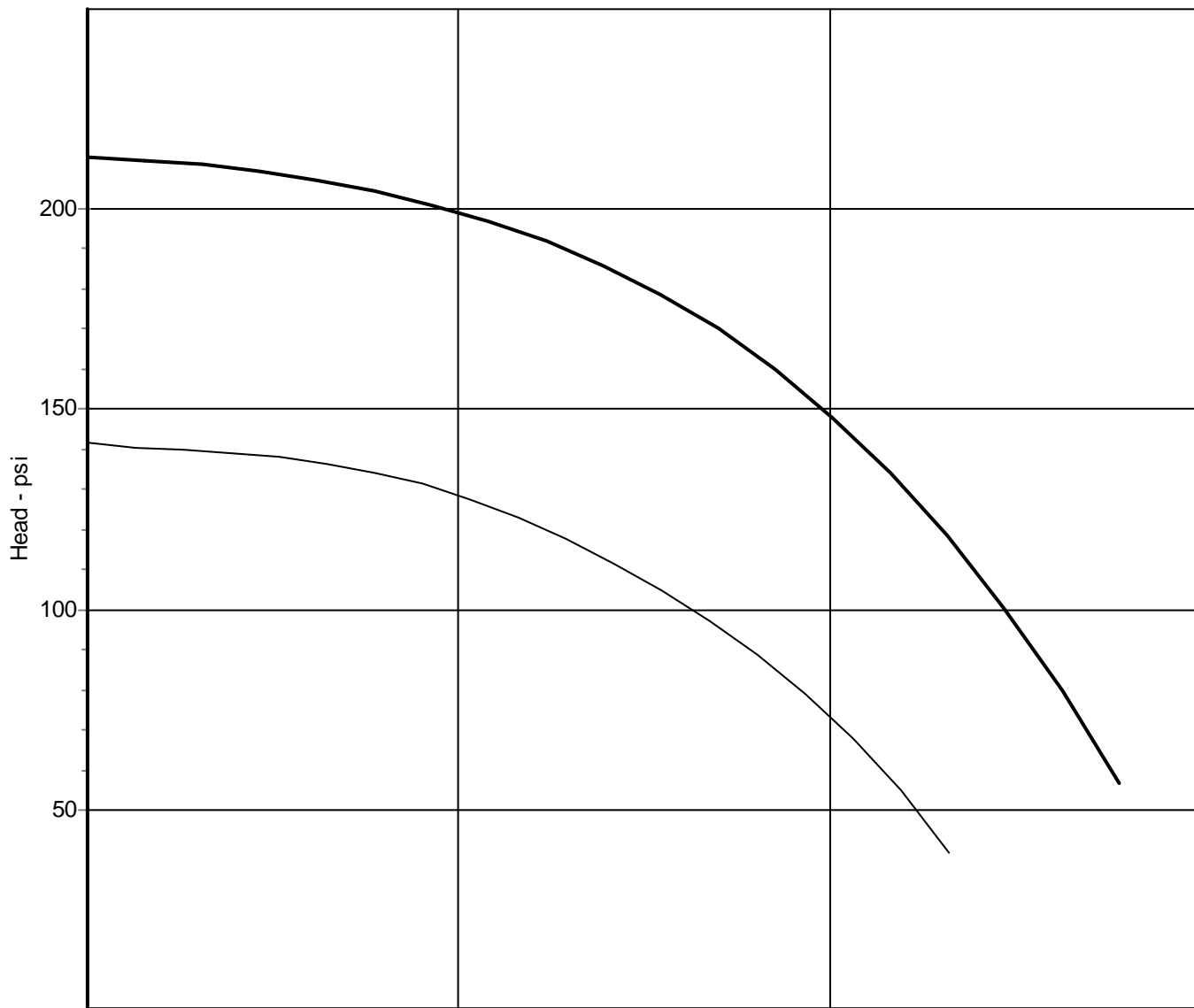
NPSH REQUIRED at centreline of impeller. Add 0.5m to Laboratory NPSH curve for field applications



Pump Model: **SPP - TD10E**
 Curve No.: **TD10E-FMT-C3550/-2**
 Impeller No.
 Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **3550 RPM**
 Impeller Dia.: **280/225 mm**
 Fluid: **Water**

Temperature: **68 °F**
 Viscosity: **1.01 cP**
 Density: **62.3 lb/ft³**

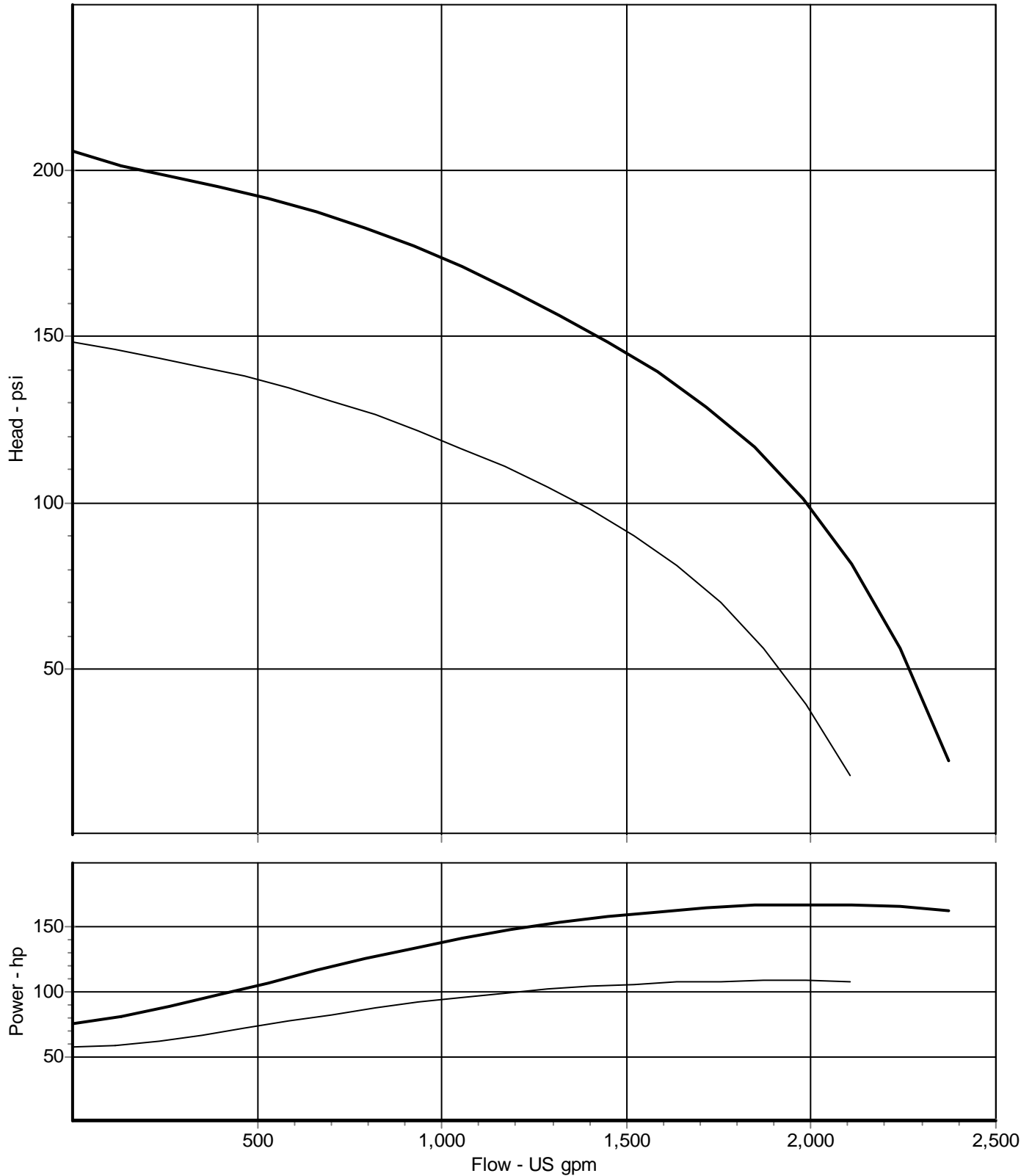


Comments:
 NPSH REQUIRED at centreline of impeller. Add 0.5m to Laboratory NPSH curve for field applications

Pump Model: **SPP - TC12G**
Curve No.: **TC12G-FMT-C3550/0**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **3550 RPM**
Impeller Dia.: **274/230 mm**
Fluid: **Water**

Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**

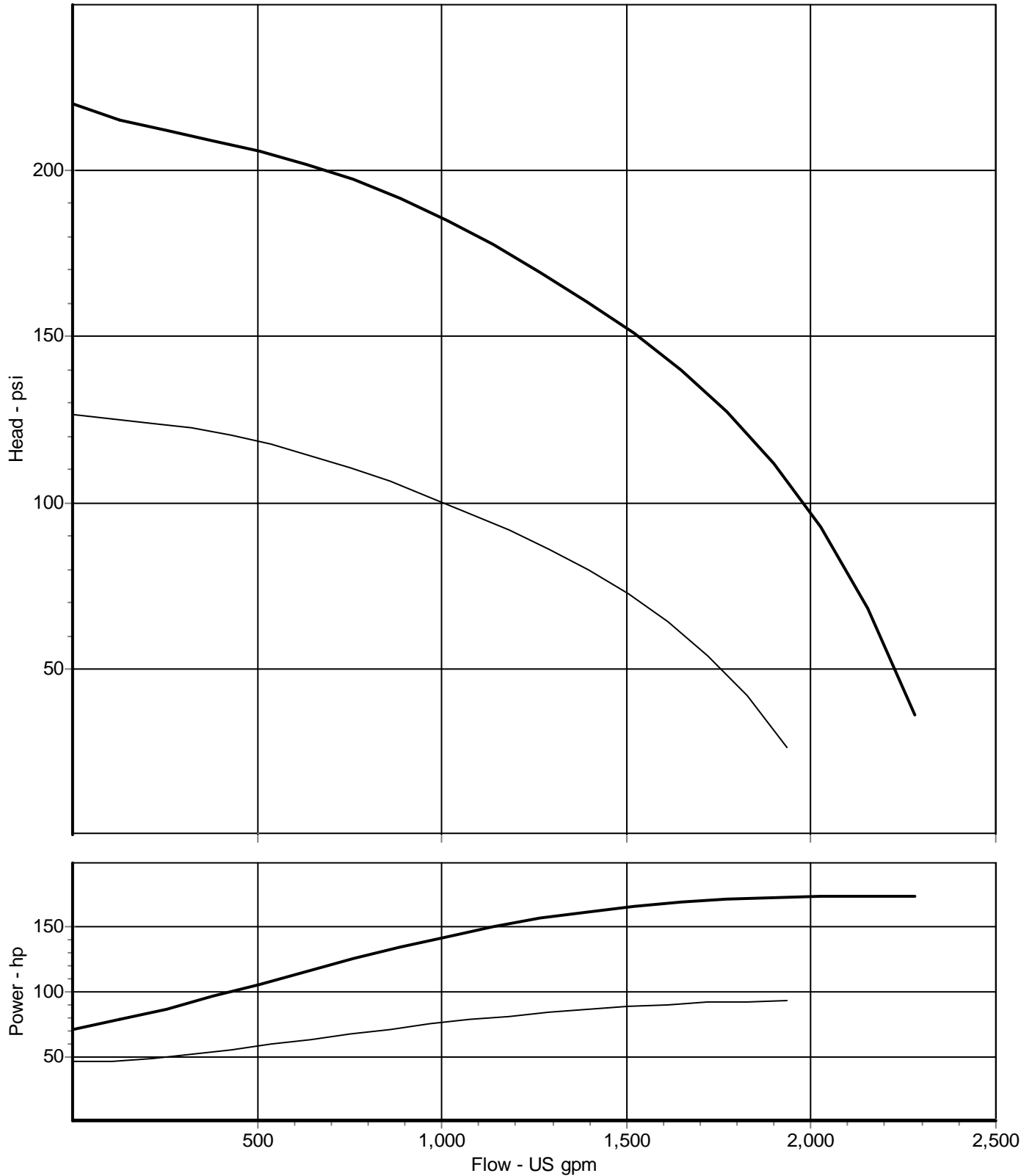


Comments:
NPSH REQUIRED at centreline of impeller. Add 0.5m to Laboratory NPSH curve for field applications

Pump Model: **SPP - TC12F**
Curve No.: **TC12F-FMT-C3550/-0**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **3550 RPM**
Impeller Dia.: **286/210 mm**
Fluid: **Water**

Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**

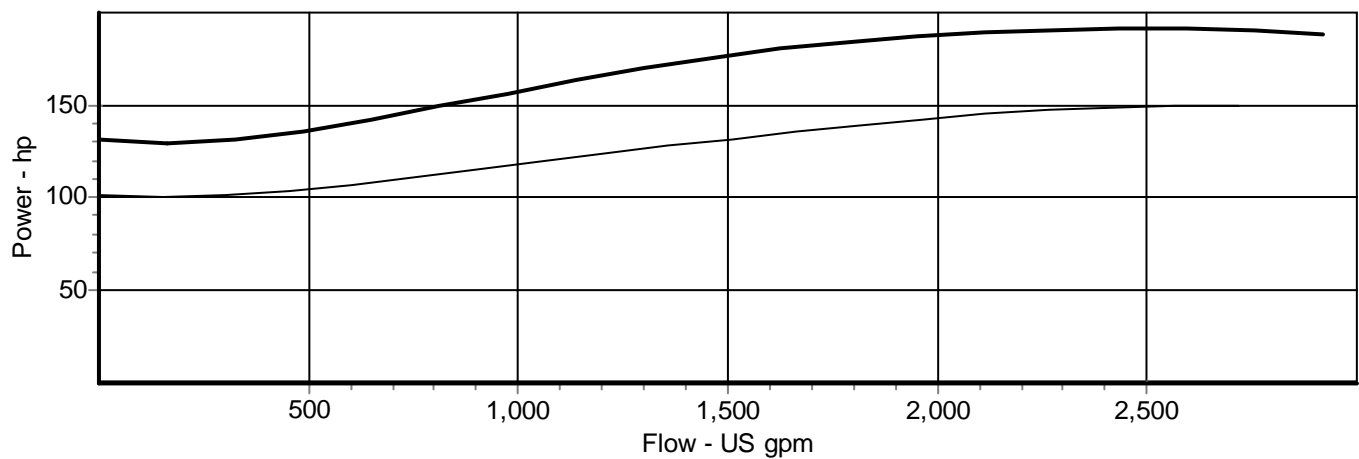
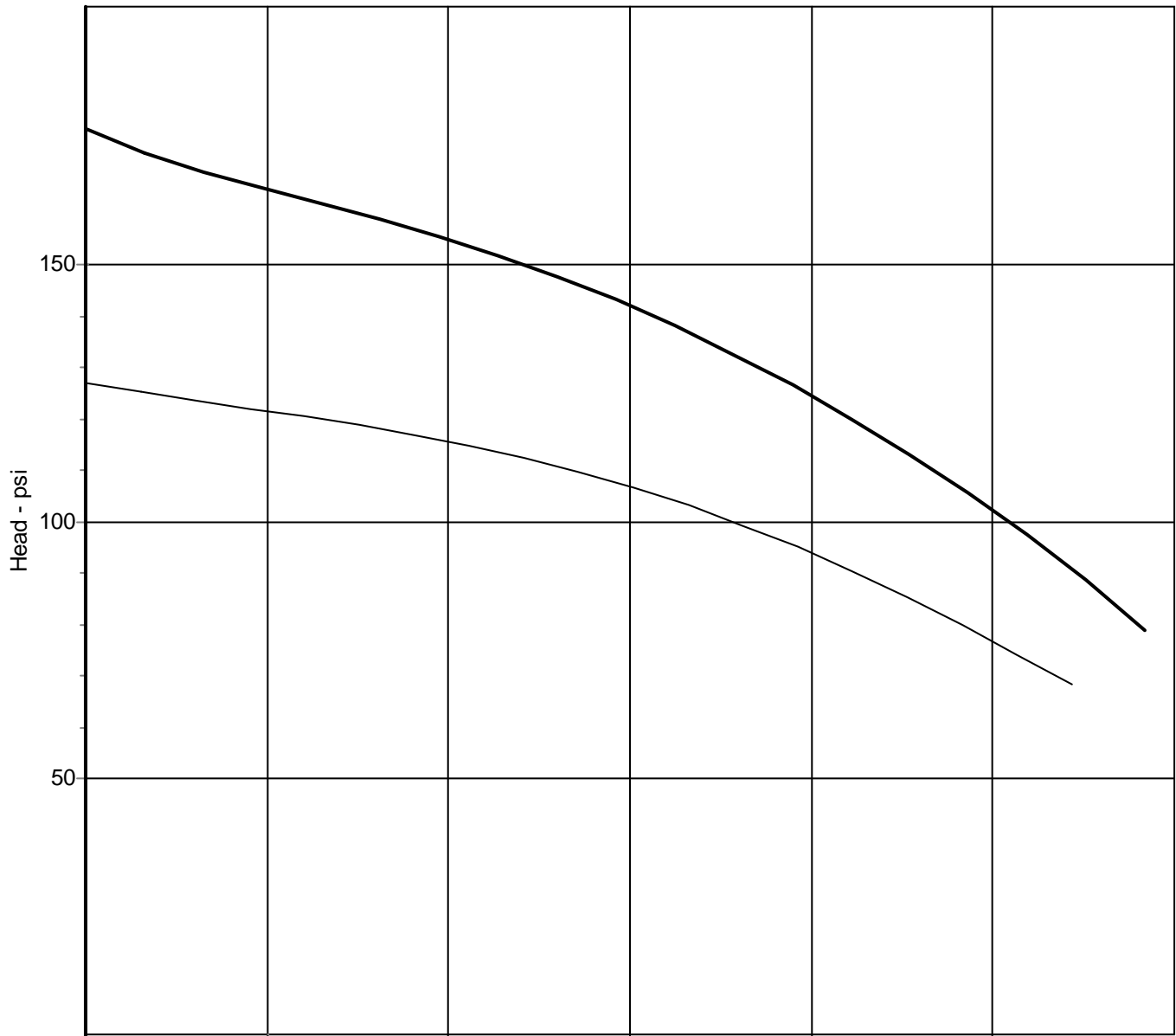


Comments:
NPSH REQUIRED at centreline of impeller. Add 0.5m to Laboratory NPSH curve for field applications

Pump Model: **SPP - TB15E(I)**
Curve No.: **TB15E-C3550/1H**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **3550 RPM**
Impeller Dia.: **252/215 mm**
Fluid: **Water**

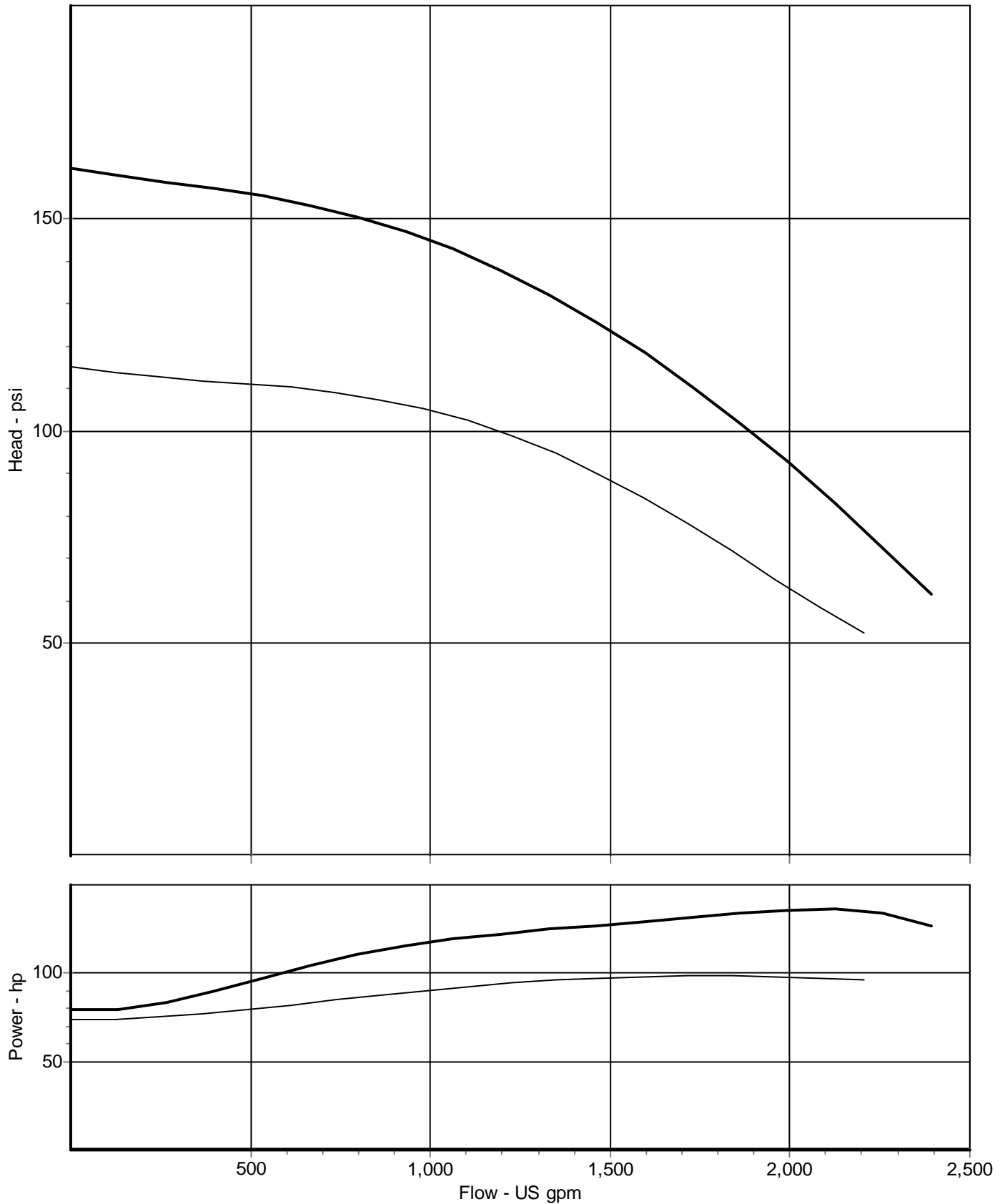
Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Pump Model: **SPP - TB12F(I)**
Curve No.: **TB12F-C3550/1H**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **3550 RPM**
Impeller Dia.: **245/205 mm**
Fluid: **Water**

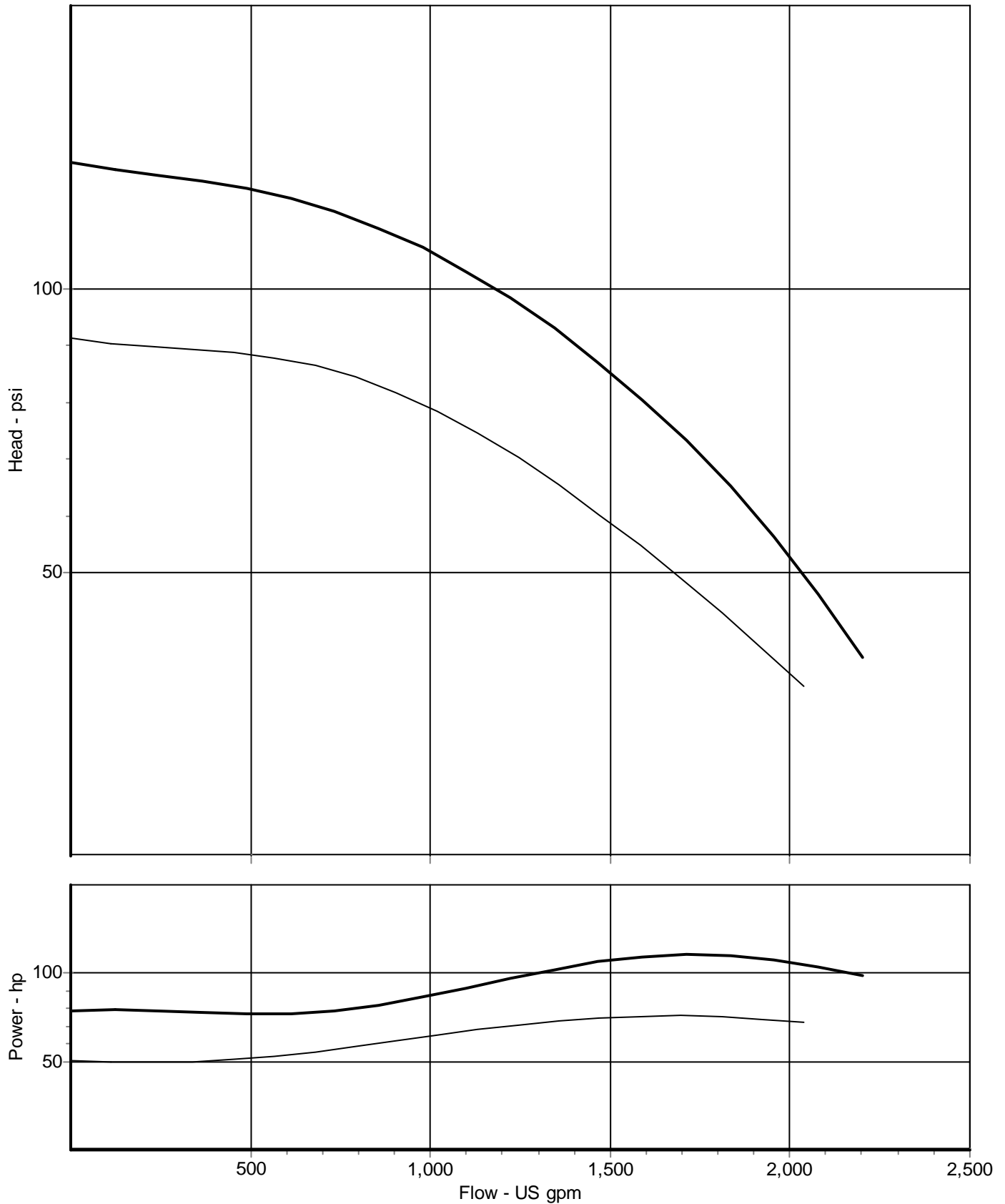
Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Pump Model: **SPP - TB12E(I)**
Curve No.: **TB12E-C3550/1H**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **3550 RPM**
Impeller Dia.: **210/180 mm**
Fluid: **Water**

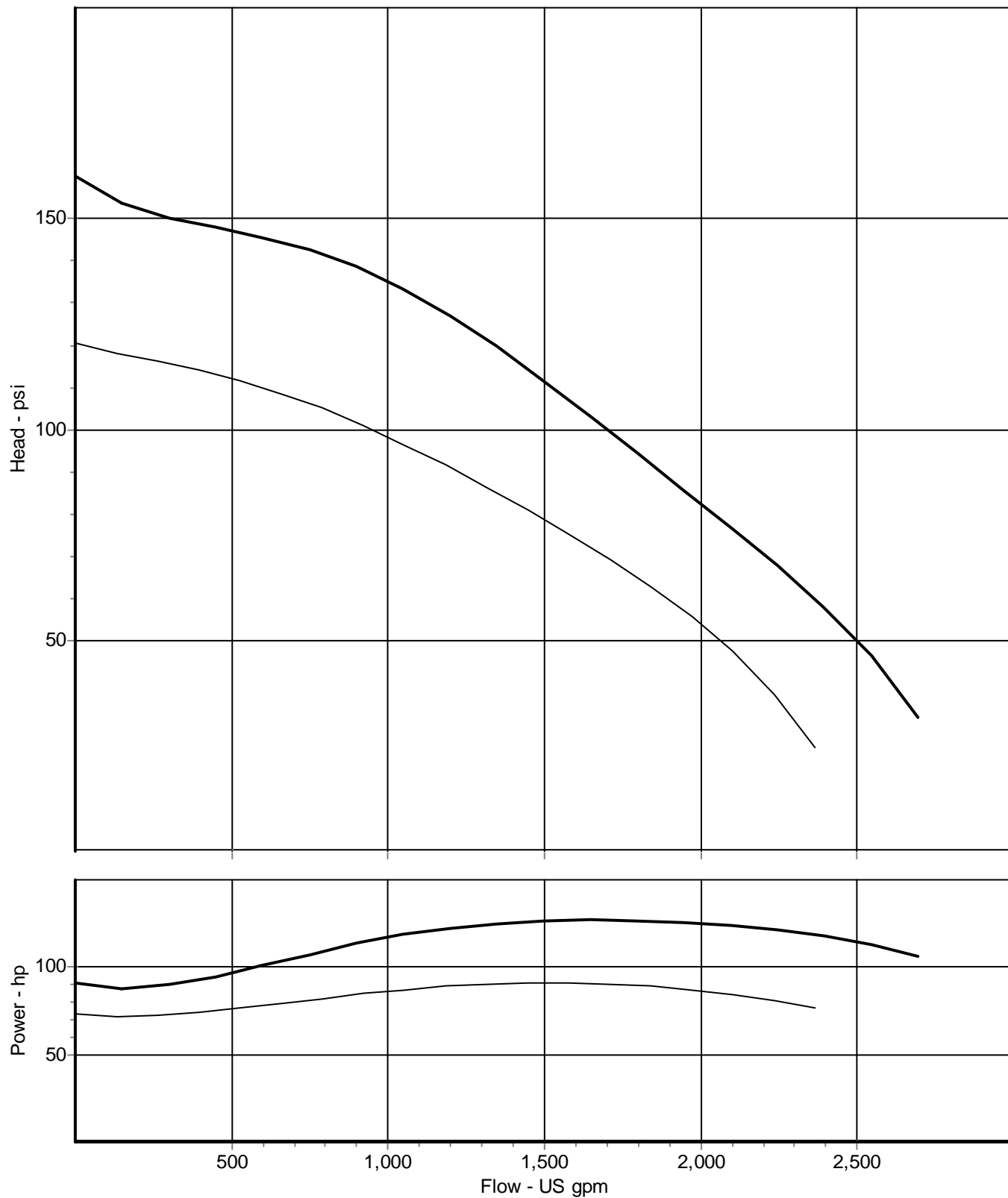
Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Pump Model: **SPP - TB12D**
Curve No.: **TB12D-FMT-C3550/-0**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **3550 RPM**
Impeller Dia.: **245/210 mm**
Fluid: **Water**

Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Comments:

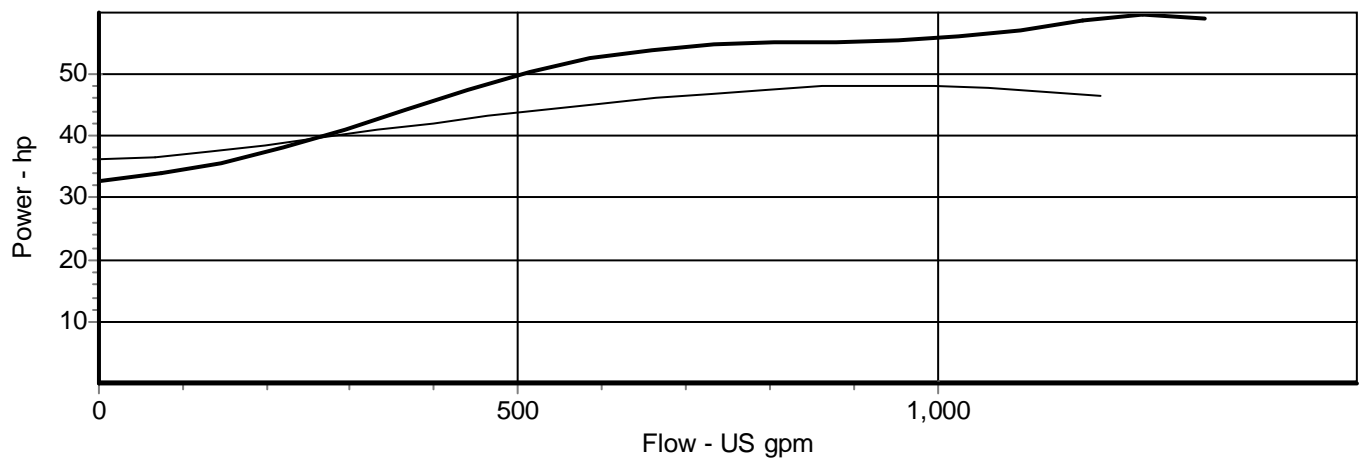
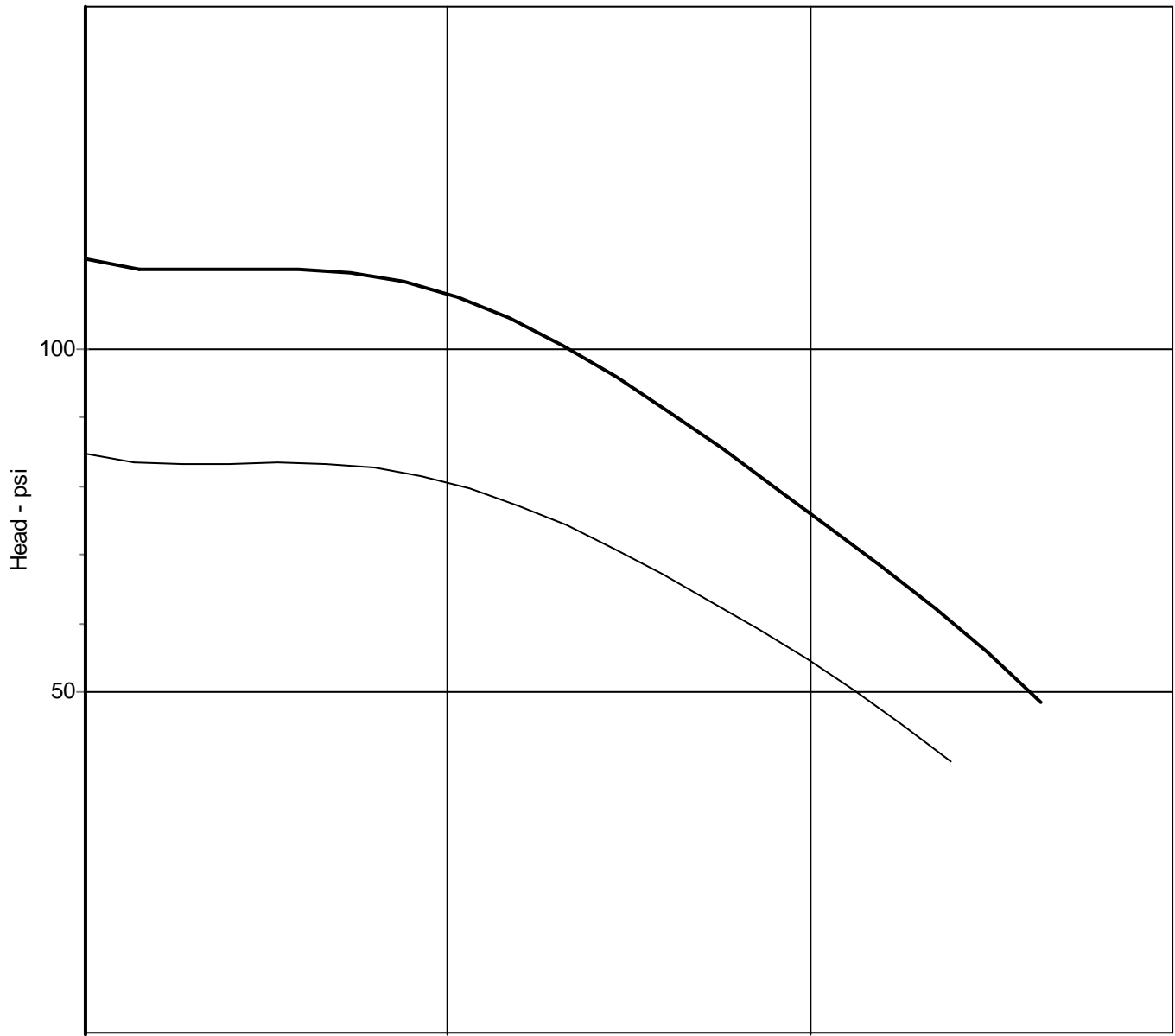
NPSH REQUIRED at centreline of impeller. Add 0.5m to Laboratory NPSH curve for field applications



Pump Model: **SPP - TB10E(I)**
Curve No.: **TB10E-C3550/1H**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **3550 RPM**
Impeller Dia.: **210/184 mm**
Fluid: **Water**

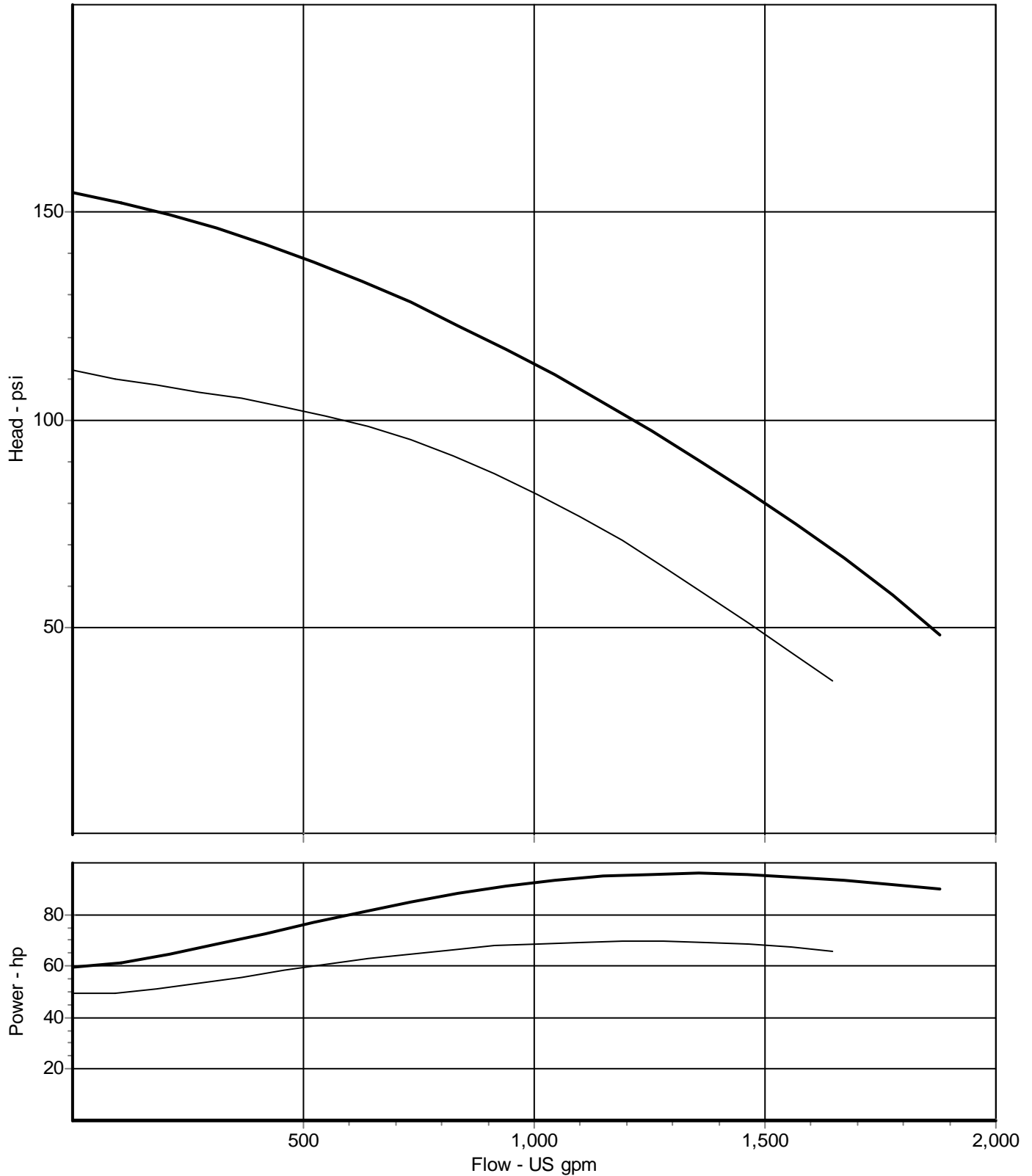
Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Pump Model: **SPP - TB10D**
Curve No.: **TB10D-FMT-C3550/-0**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **3550 RPM**
Impeller Dia.: **245/210 mm**
Fluid: **Water**

Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Comments:

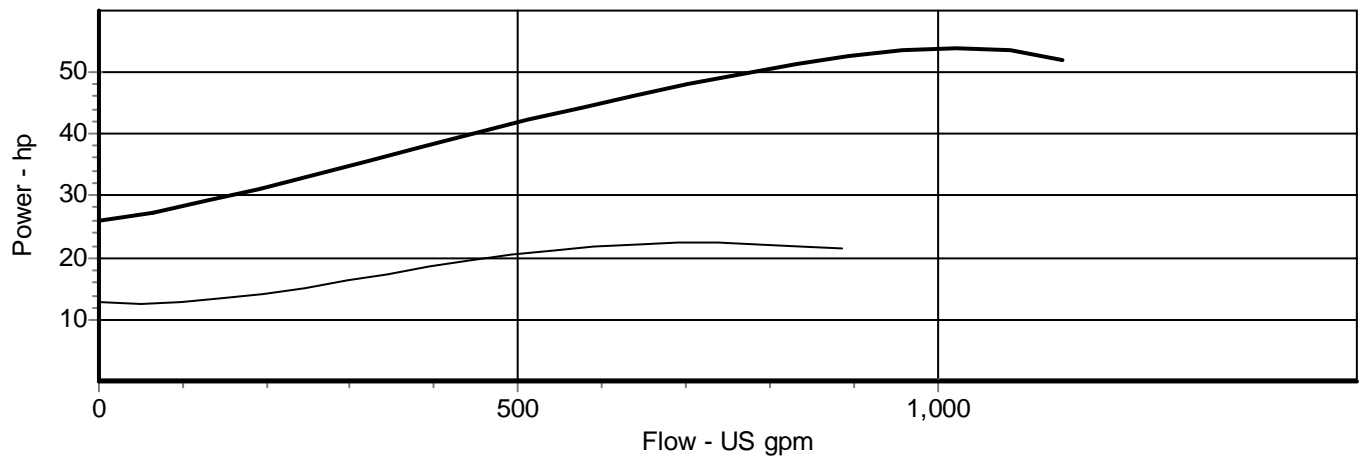
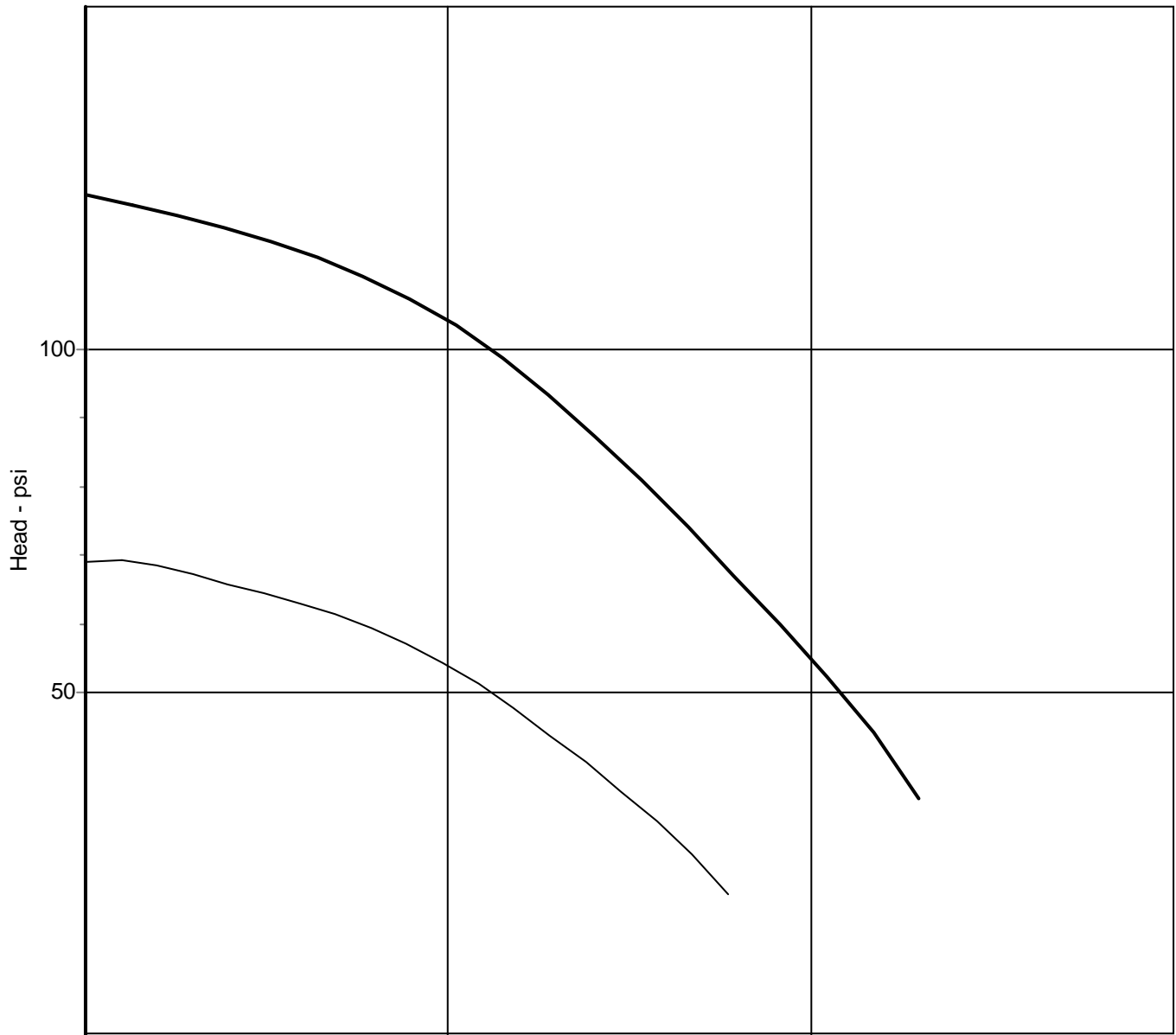
NPSH REQUIRED at centreline of impeller. Add 0.5m to Laboratory NPSH curve for field applications



Pump Model: **SPP - TB08E(I)**
Curve No.: **TB08E-C3550-LX//1H**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **3550 RPM**
Impeller Dia.: **210/160 mm**
Fluid: **Water**

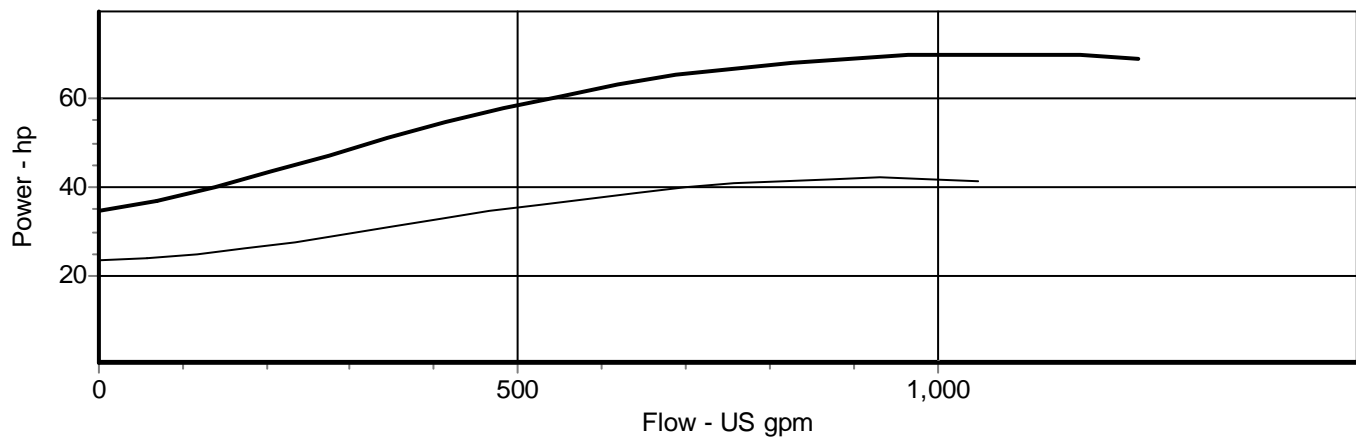
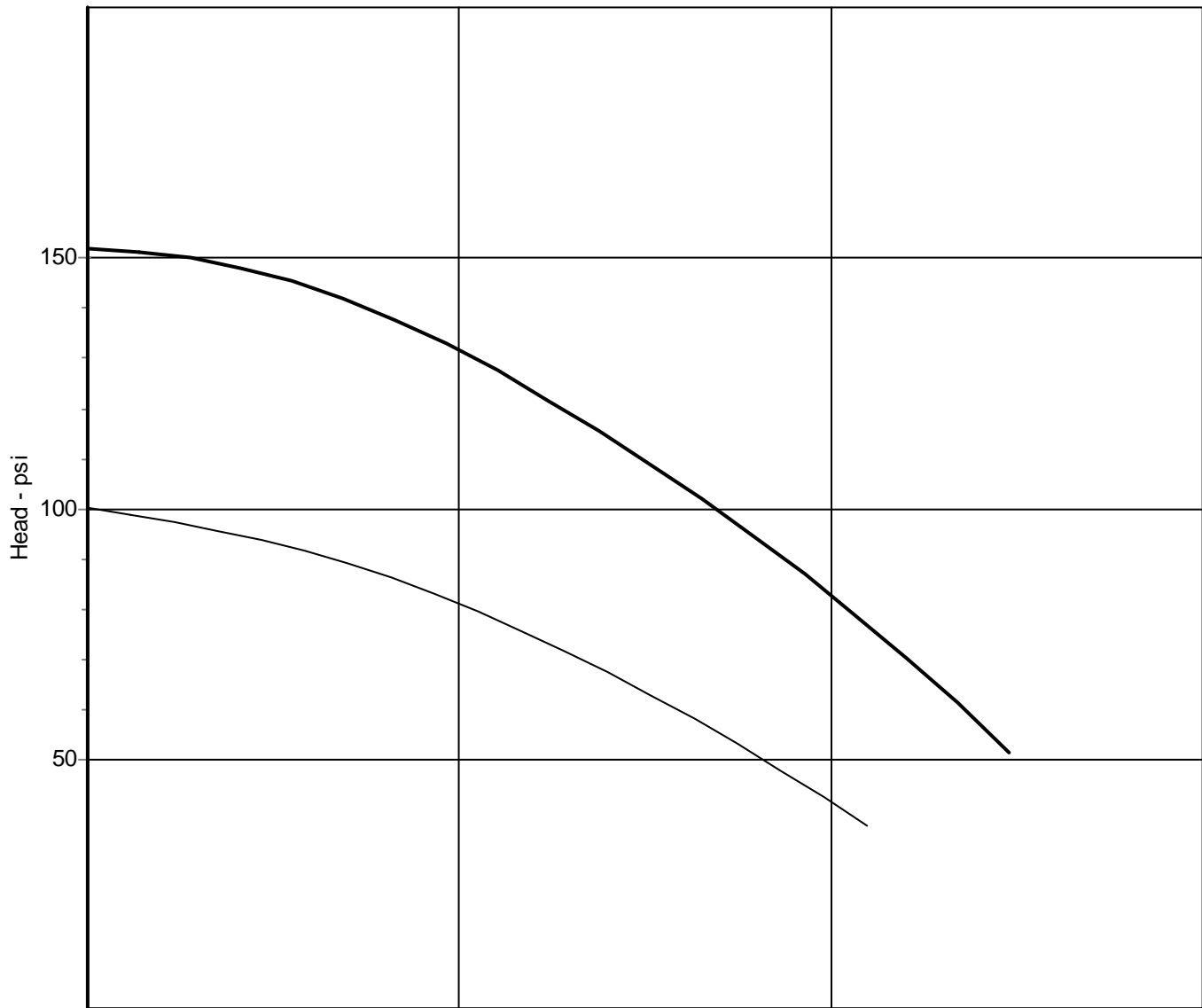
Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Pump Model: **SPP - TB08D**
Curve No.: **TB08D-FMT-C3550/-0**
Impeller No.
Tolerance : **Hydraulic Institute (ENG)**

Nom. Speed: **3550 RPM**
Impeller Dia.: **235/190 mm**
Fluid: **Water**

Temperature: **68 °F**
Viscosity: **1.01 cP**
Density: **62.3 lb/ft³**



Comments:
NPSH REQUIRED at centreline of impeller. Add 0.5m to Laboratory NPSH curve for field applications



Pump Model: **SPP - TD20E**

Nom. Speed: **3550 RPM**

Temperature: **68 °F**

Curve No.: **TD20E-FMT-C3550/-0**

Impeller Dia.: **285/240 mm**

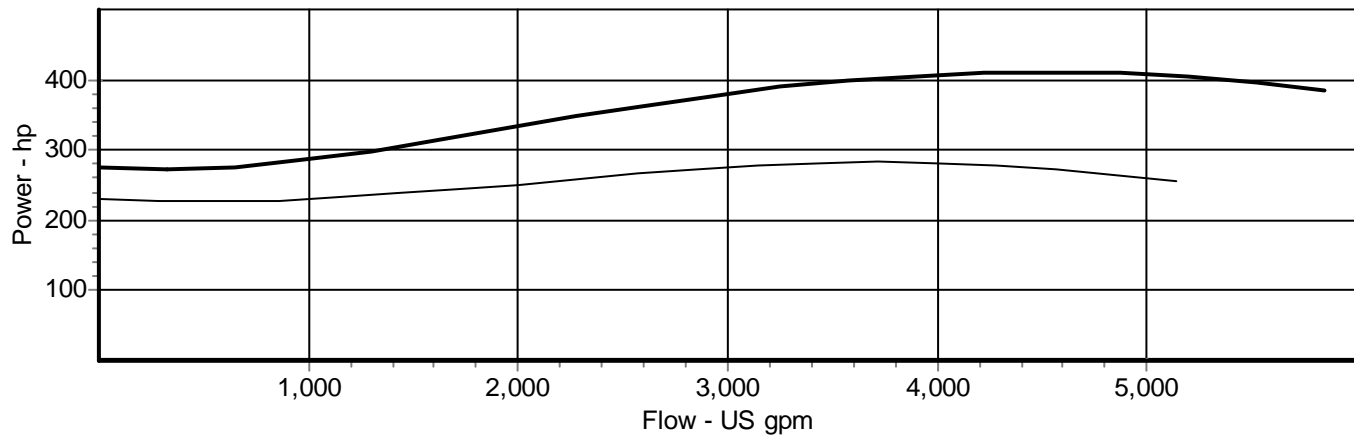
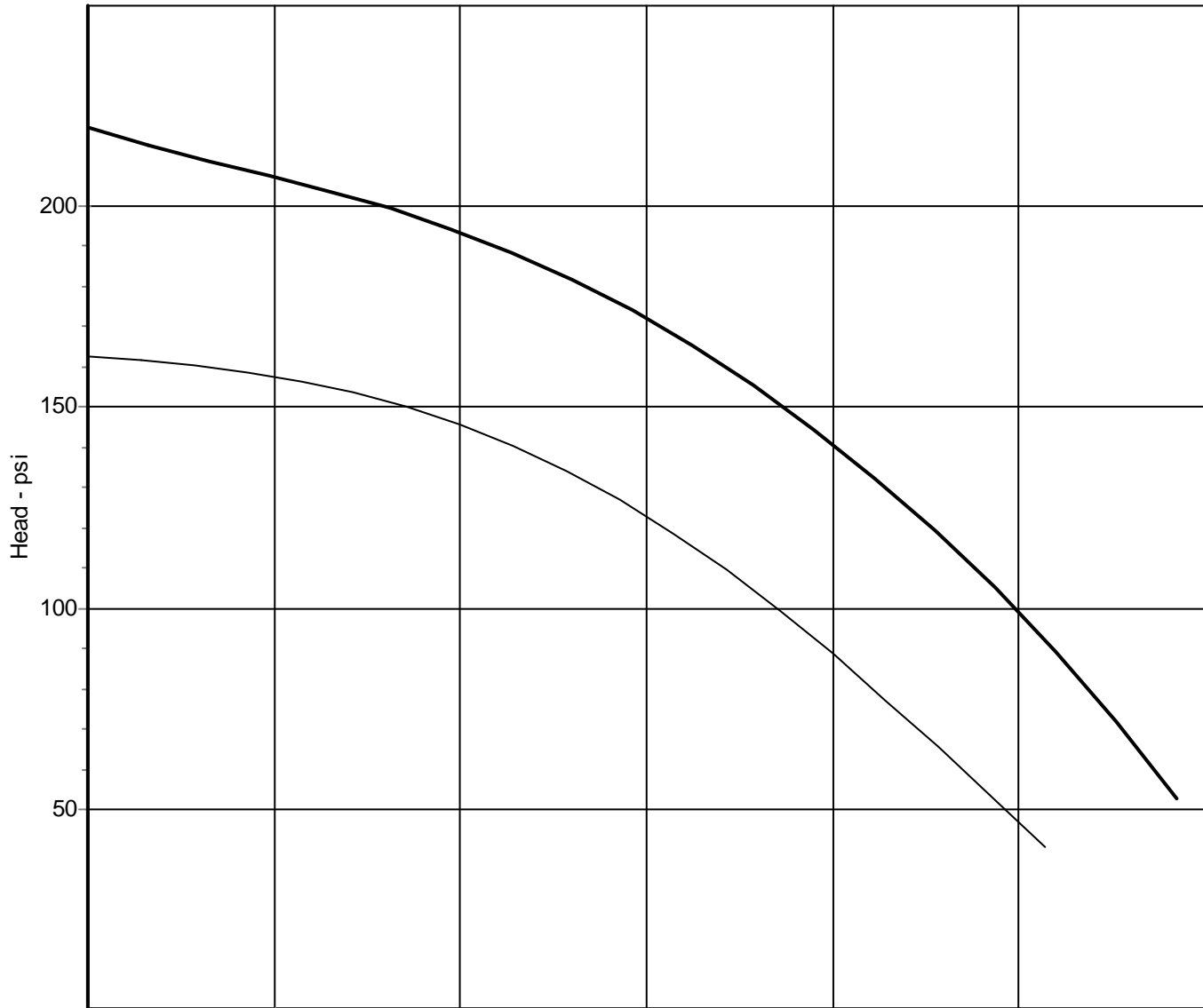
Viscosity: **1.01 cP**

Impeller No.

Fluid: **Water**

Density: **62.3 lb/ft³**

Tolerance : **Hydraulic Institute (ENG)**



Comments:

NPSH REQUIRED at centreline of impeller. Add 0.5m to Laboratory NPSH curve for field applications



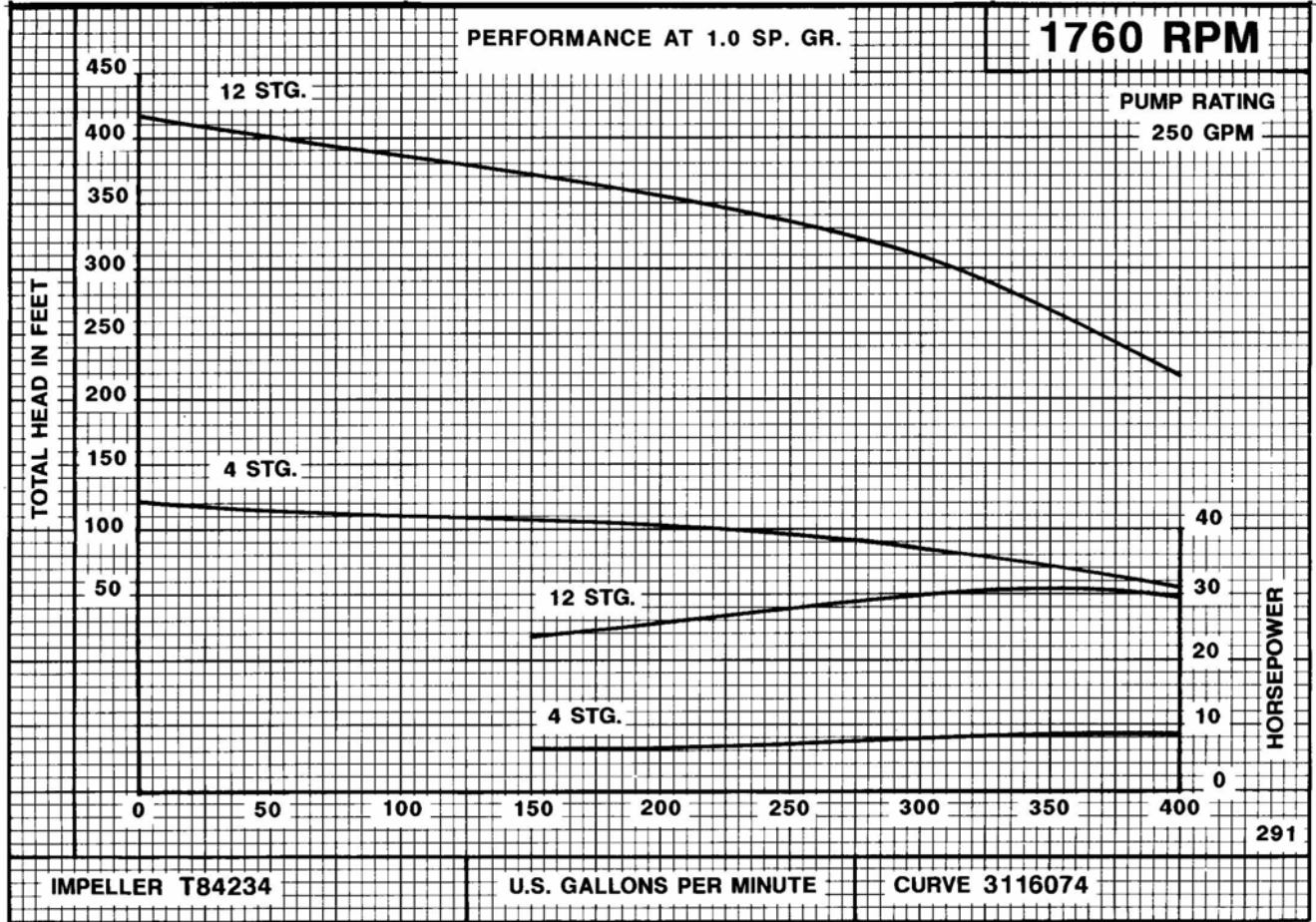


Performance Curves Vertical Turbine



VERTICAL TURBINE FIRE PUMPS

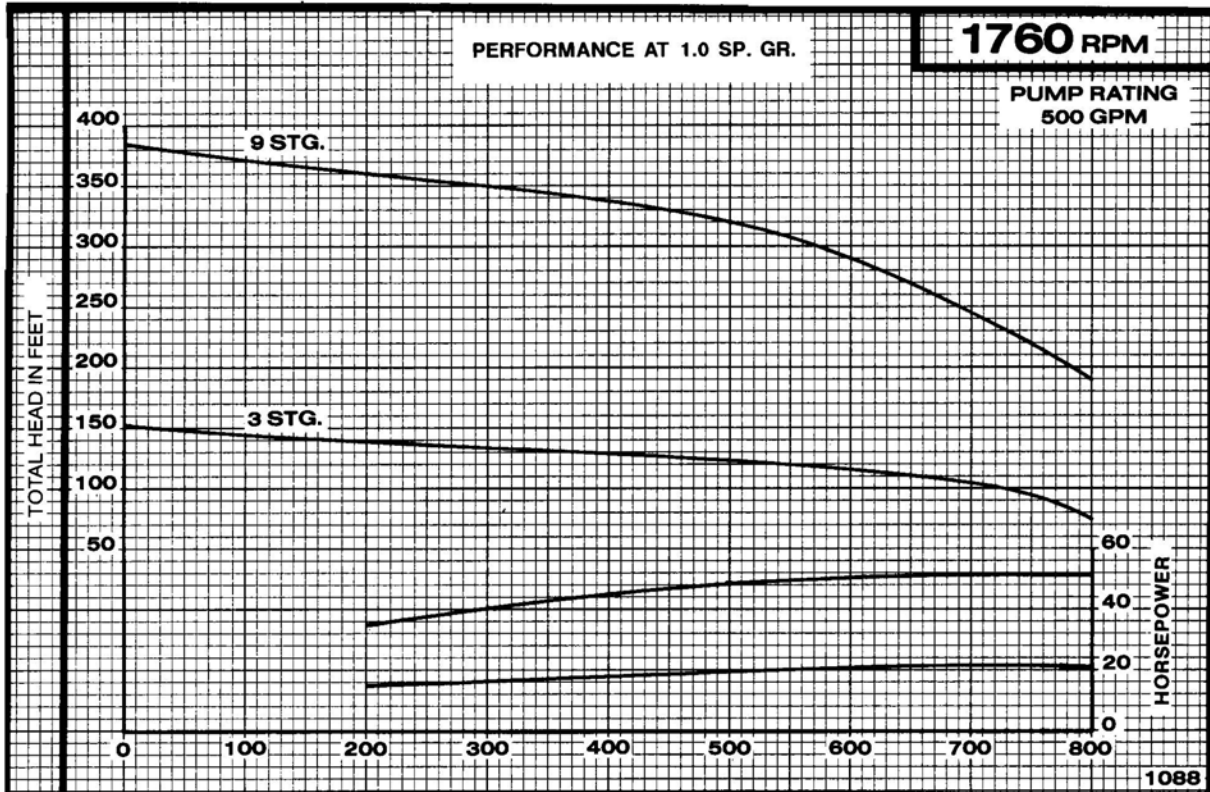
PE08A





VERTICAL TURBINE FIRE PUMPS

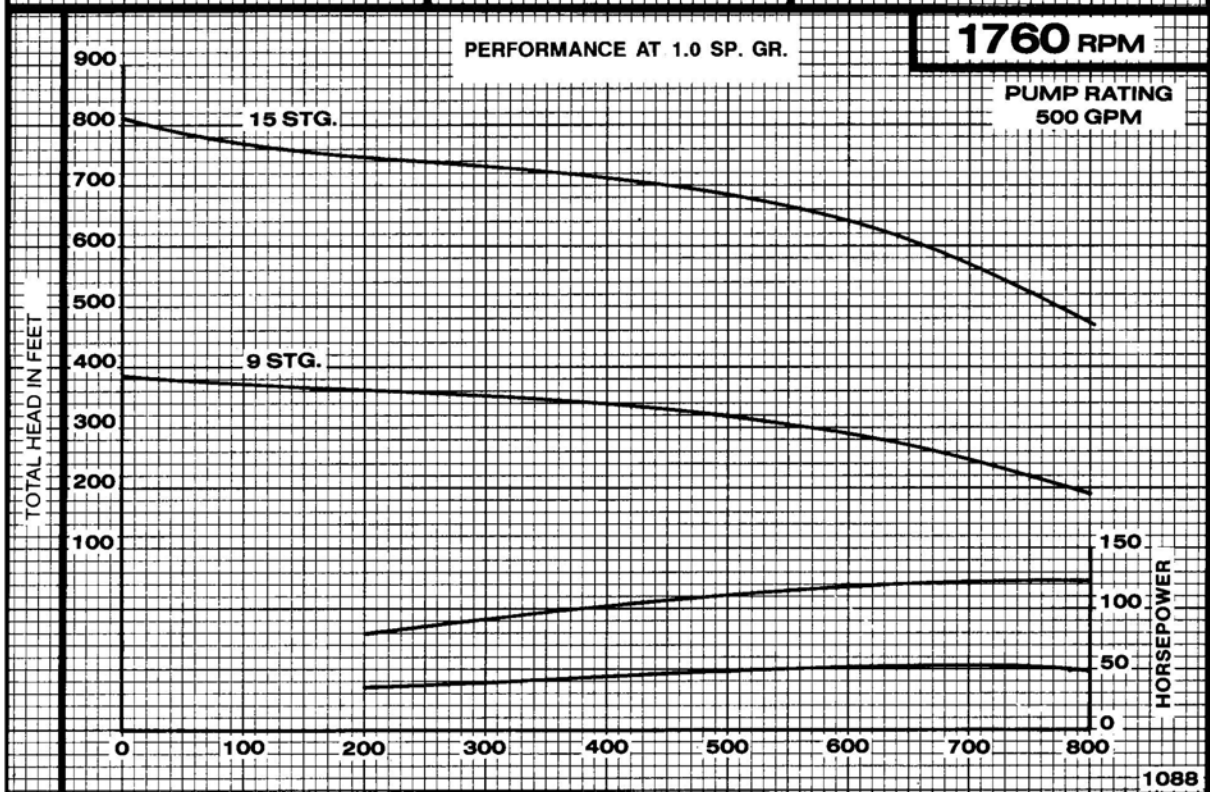
PE10D



IMPELLER 2624288

U.S. GALLONS PER MINUTE

CURVE 3116069



IMPELLER 2624288

U.S. GALLONS PER MINUTE

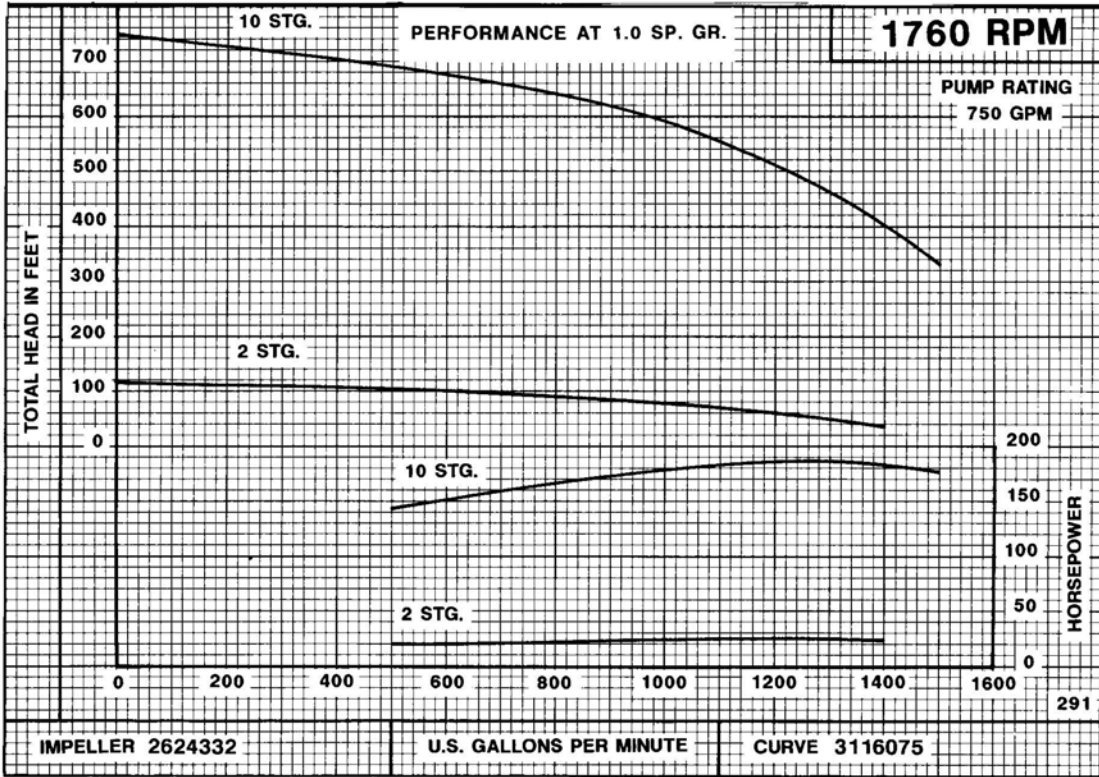
CURVE 3116070



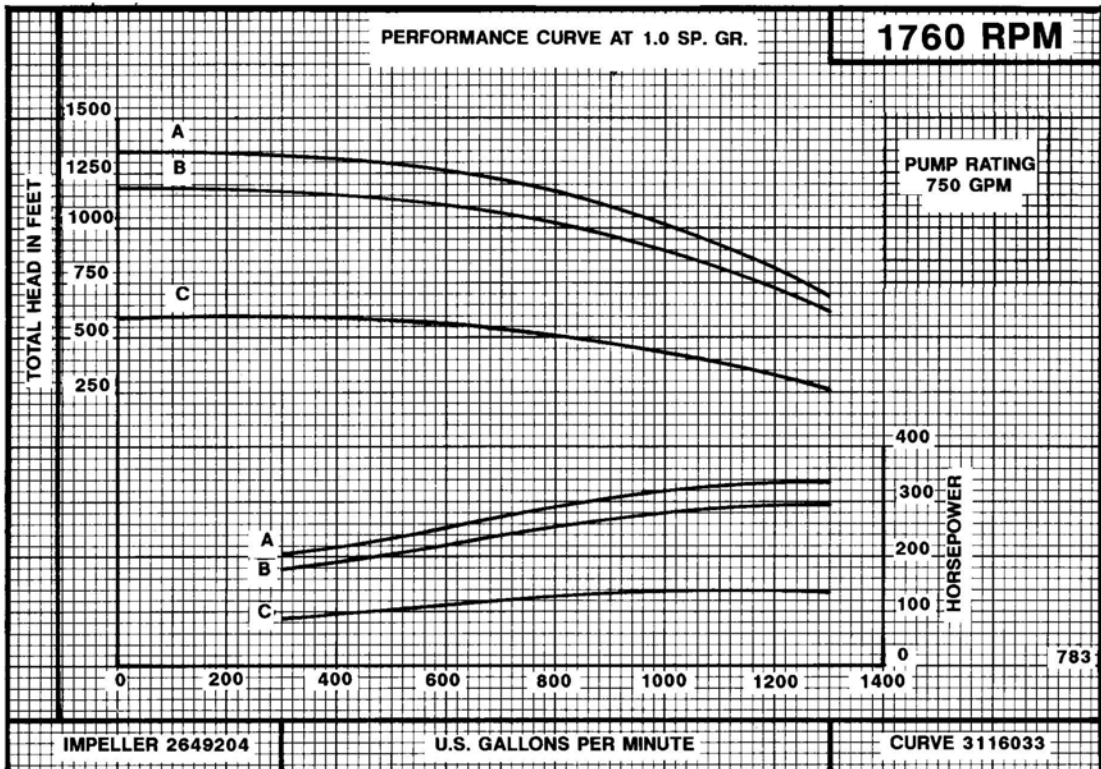
VERTICAL TURBINE FIRE PUMPS

PE12F & PE12C

PE12F



PE12C

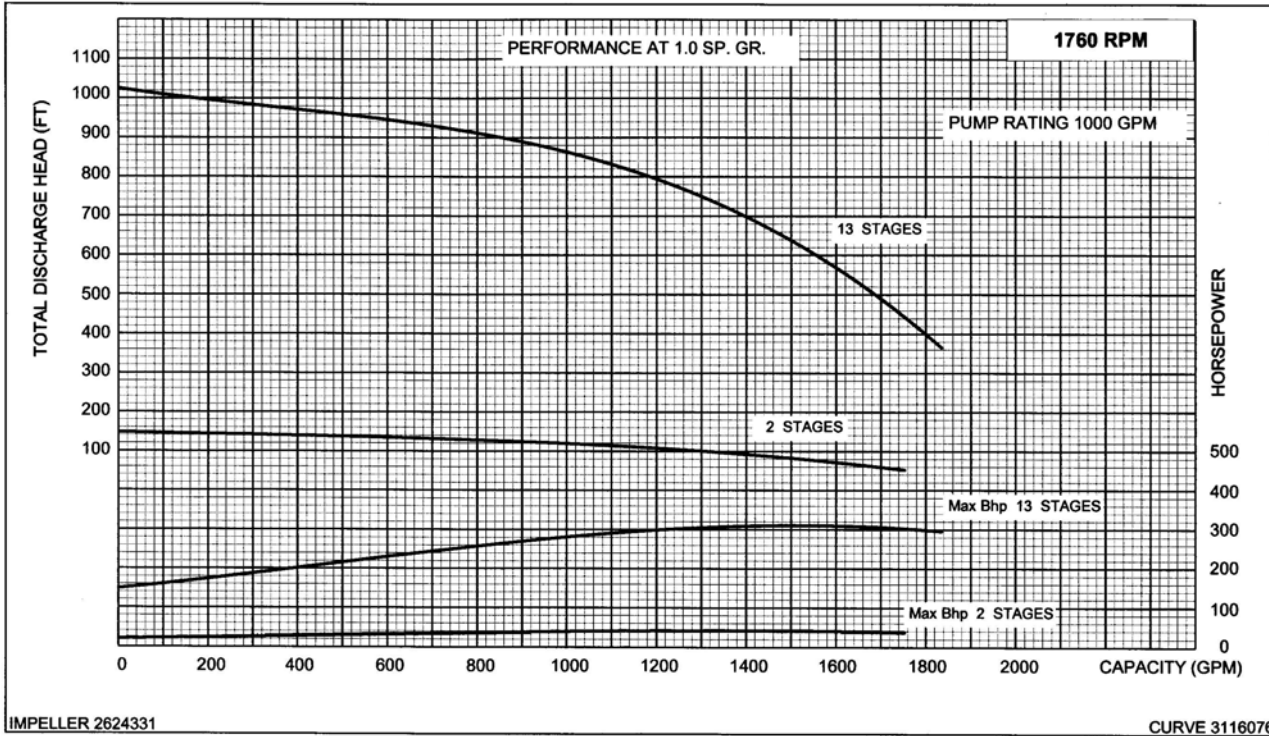




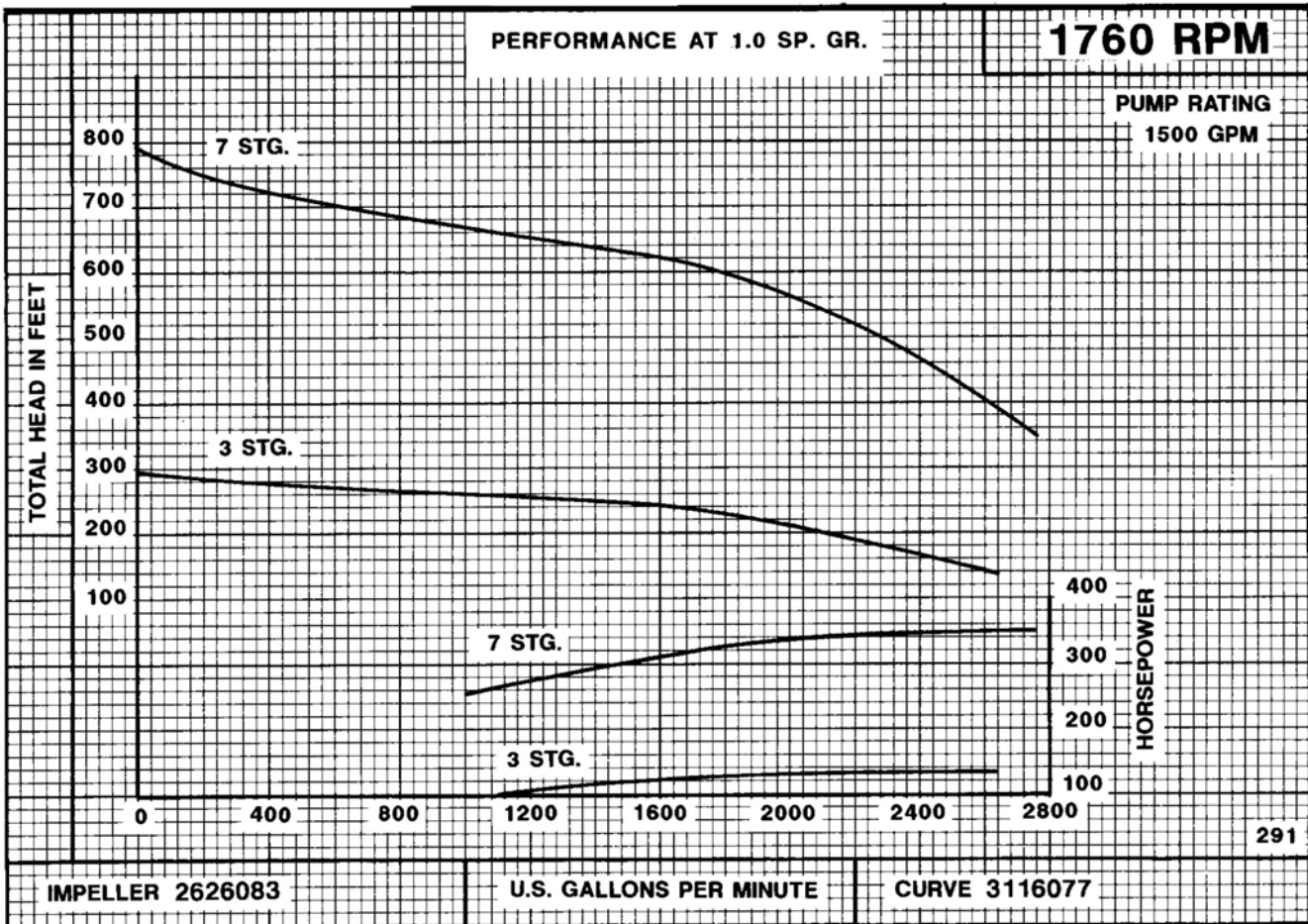
VERTICAL TURBINE FIRE PUMPS

PE12G & PE14D

PE12G

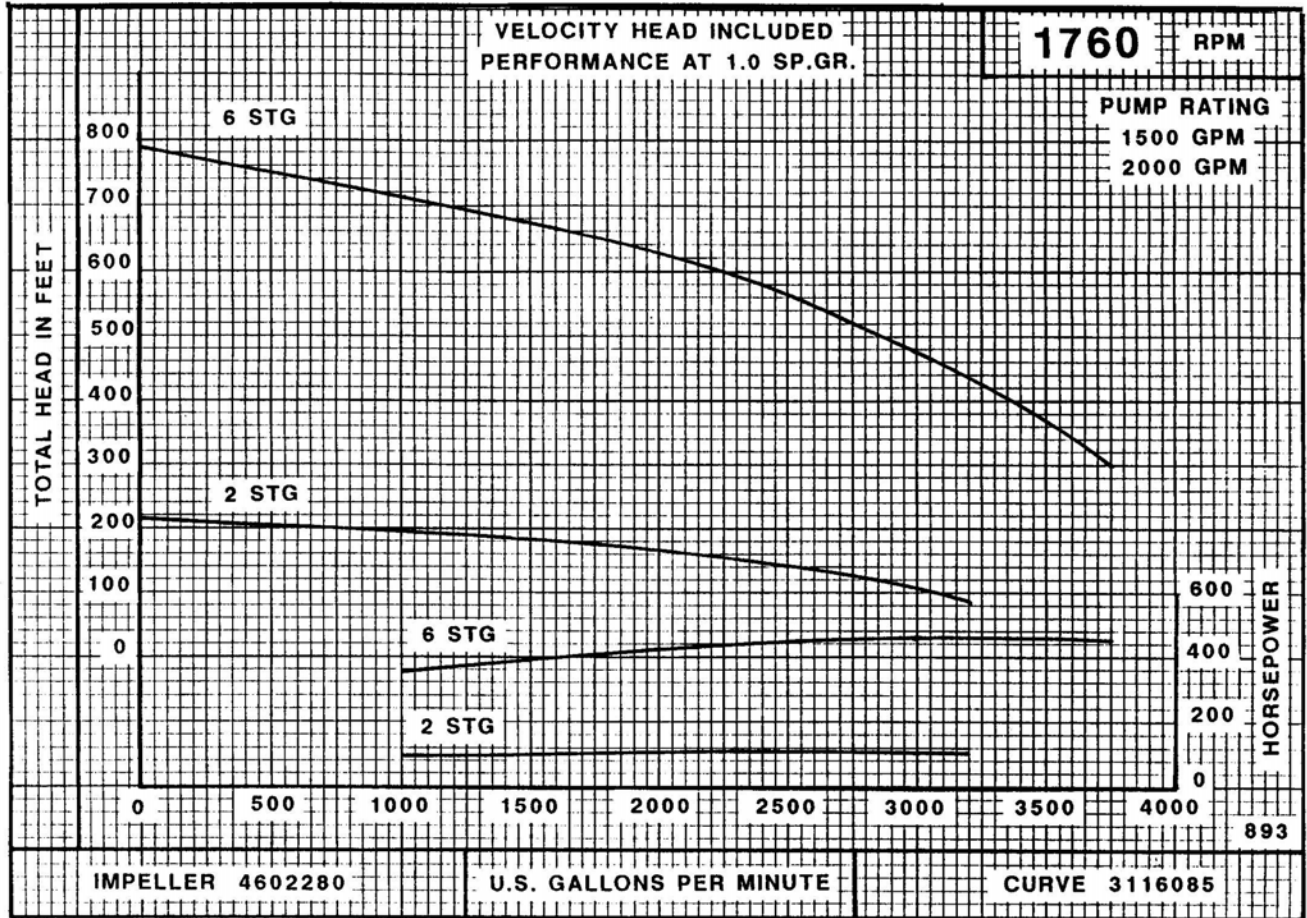


PE14D





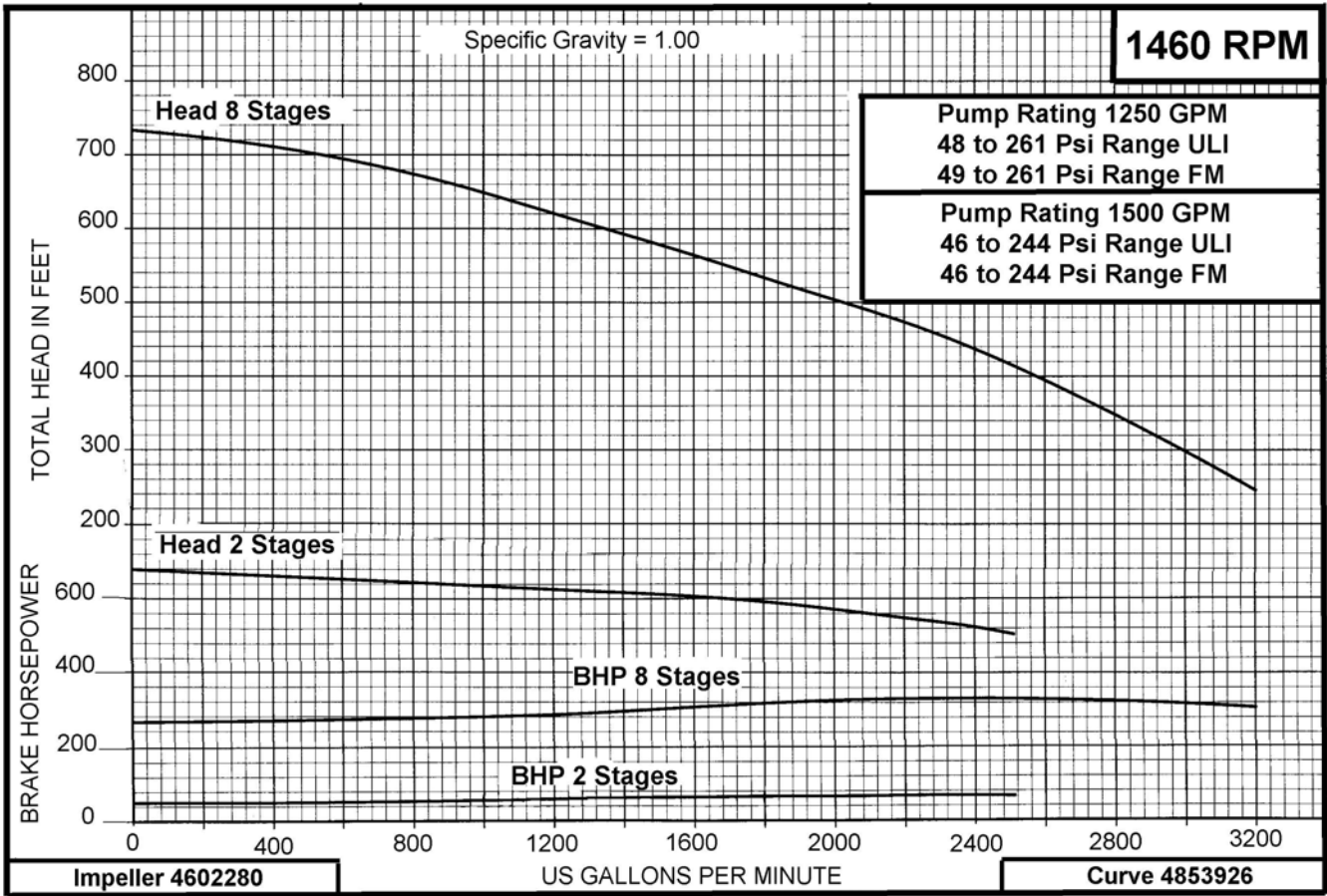
VERTICAL TURBINE FIRE PUMPS PE14G





VERTICAL TURBINE FIRE PUMPS

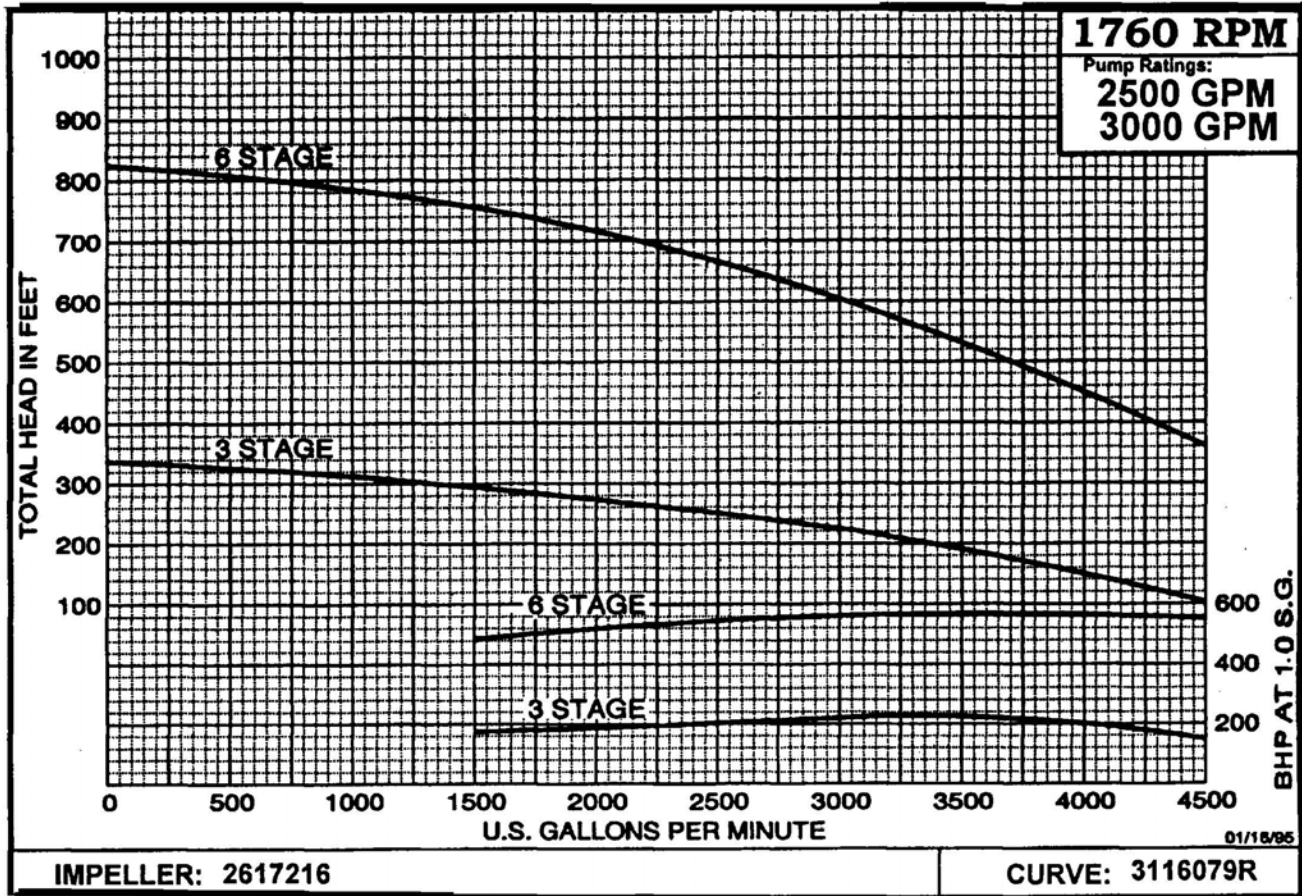
PE14D





VERTICAL TURBINE FIRE PUMPS

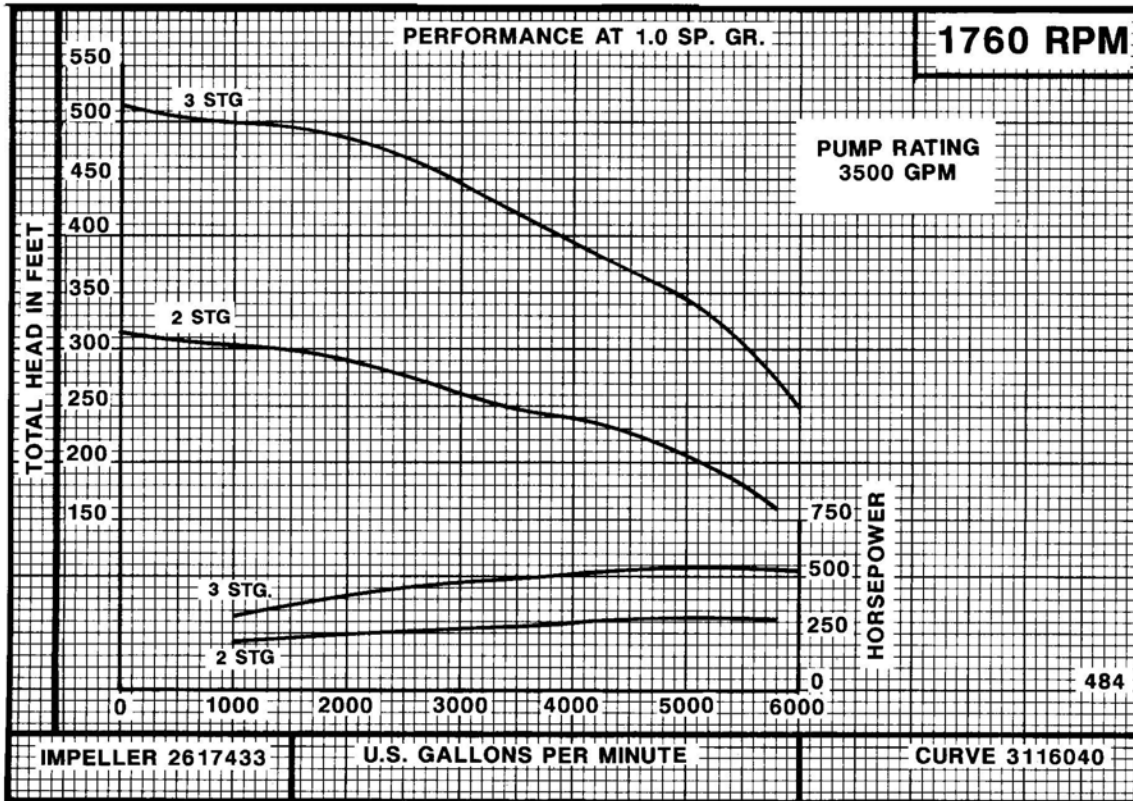
PE16E



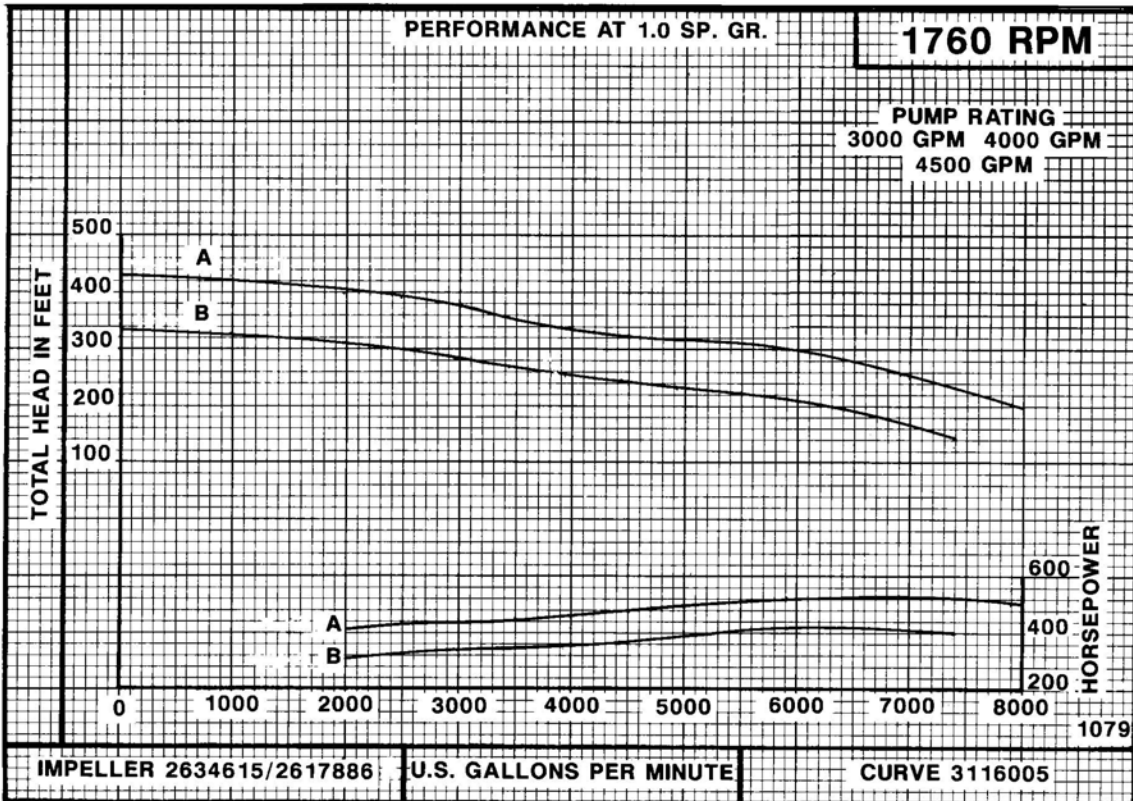


VERTICAL TURBINE FIRE PUMPS PE18E & PE20K

PE18E



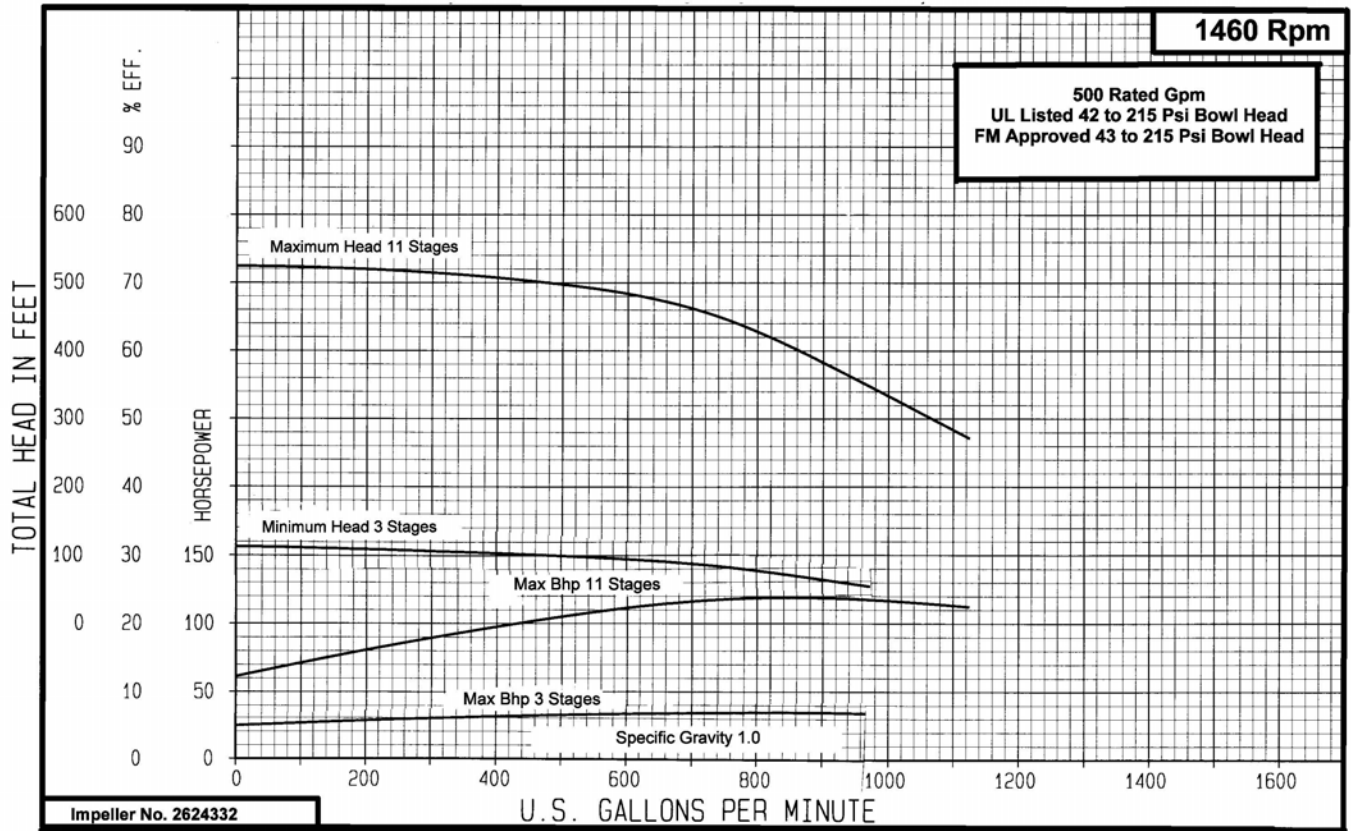
PE20K





VERTICAL TURBINE FIRE PUMPS

PE12F



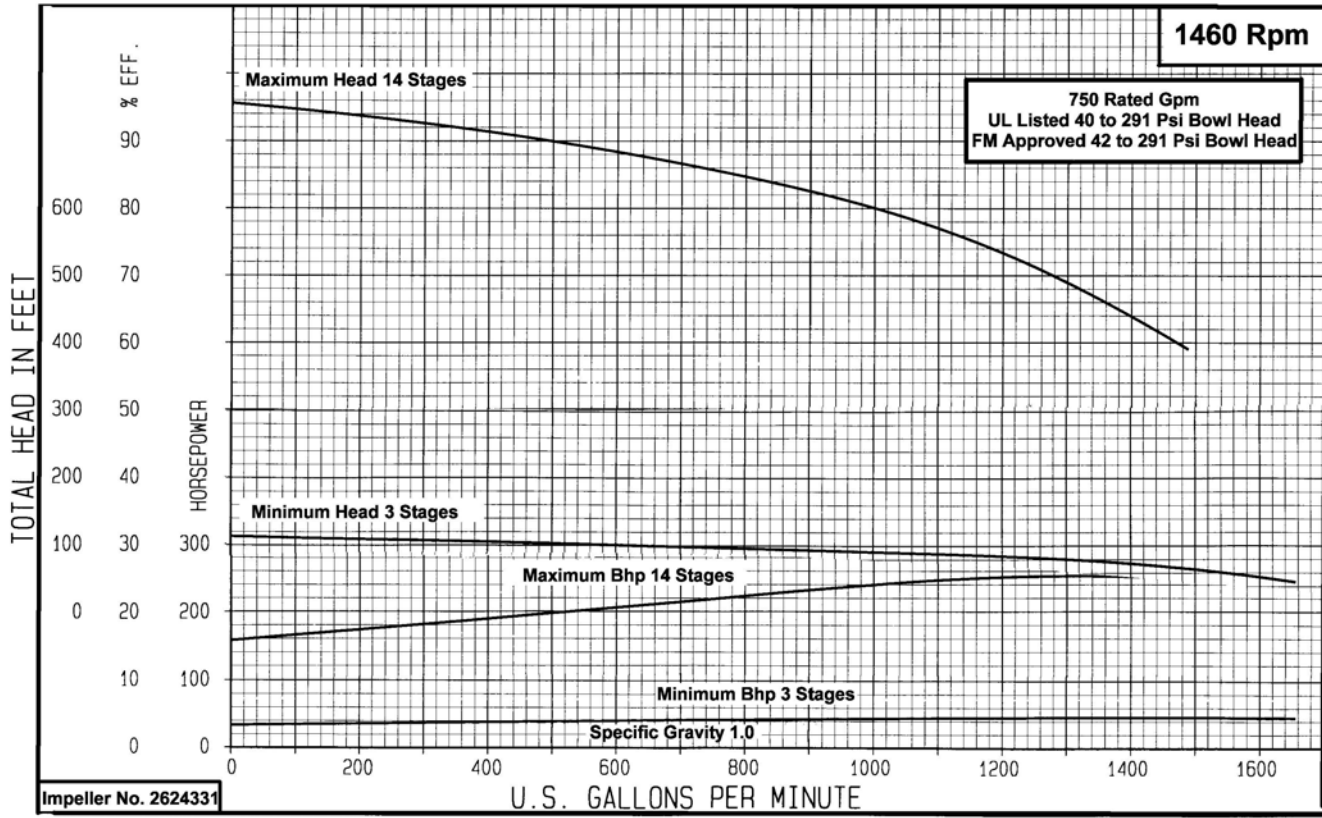


VERTICAL TURBINE FIRE PUMPS

PE12G

1460 Rpm

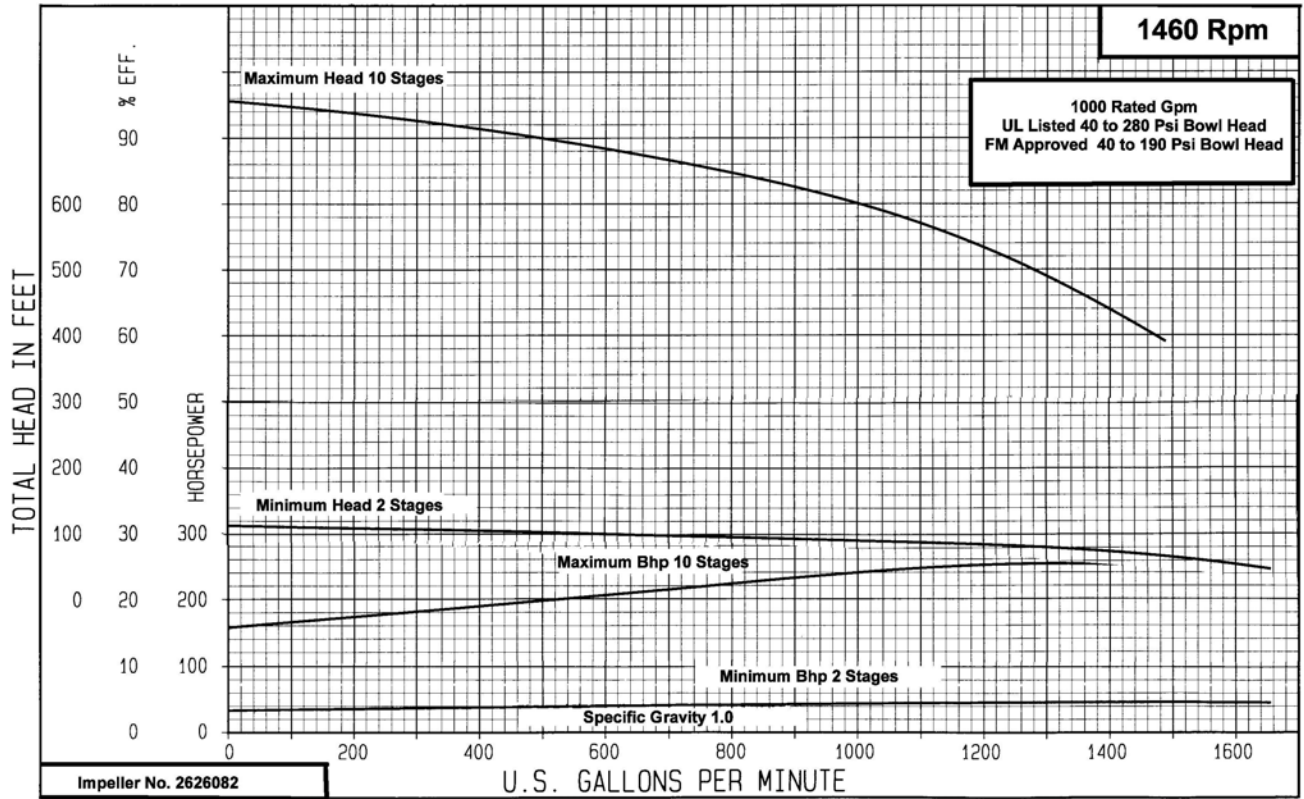
750 Rated Gpm
UL Listed 40 to 291 Psi Bowl Head
FM Approved 42 to 291 Psi Bowl Head





VERTICAL TURBINE FIRE PUMPS

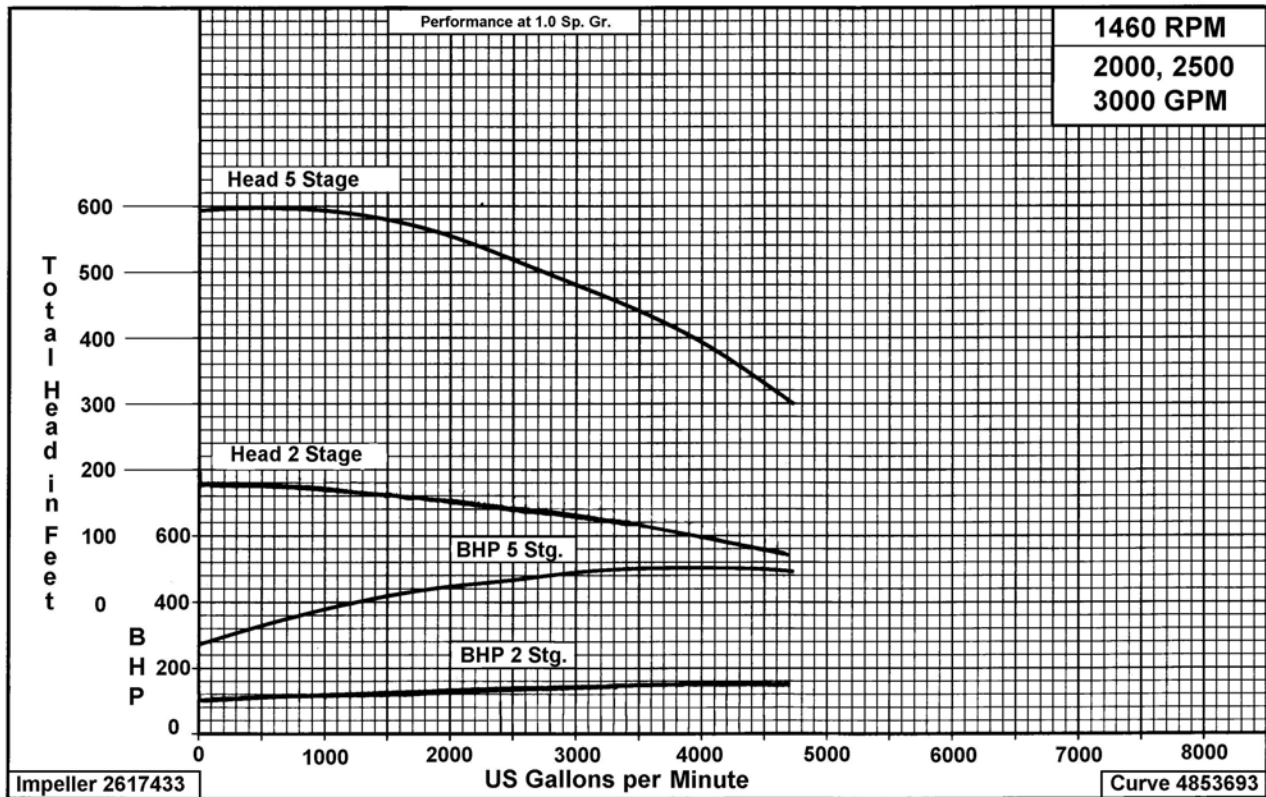
PE14D





VERTICAL TURBINE FIRE PUMPS

PE18E





Installation and Operation Manual



TECHNICAL INSTRUCTIONS

W12-008E

ISSUE 0

THRUSTREAM RANGE

OF

SPLIT CASE PUMPS

INSTALLATION & OPERATION FOR FM / UL FIRE PUMPS

TB08D (FM/UL)	TB10D (FM/UL)	TF20E (FM/UL)
TB08E (FM/UL)	TB10E (FM/UL)	TF20F (FM/UL)
TC12F (FM/UL)	TB12E (FM/UL)	TE10A (FM)
TC12G (FM/UL)	TB12F (FM/UL)	TE10D (FM/UL)
TD10E (FM/UL)	TB12D (FM/UL)	TE12E (FM/UL)
TD12F (FM/UL)	TB15E (FM/UL)	TF15E (FM/UL)
TD15F (FM/UL)	TE15D (FM/UL)	TY12D (FM/UL)
TD20D (FM/UL)	TE15E (FM/UL)	TY15E (FM/UL)
TD20E (FM/UL)	TF20D (FM/UL)	

SPP Pumps Inc.,

6710 Best Friends Road,
Norcross, GA, 30071, USA.

Telephone: (770) 447-4443. Fax (770) 447-4443.

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1. INTRODUCTION**1.1 GENERAL**

The pumps covered by this manual, when correctly installed and maintained, will give long and reliable service. It is essential that the instructions given here are followed at all times.

1.2 WARRANTY

Refer to your Sales Contract for coverage.

1.3 PUMP IDENTIFICATION

An identification plate is attached to the body of all pumps and contains the following minimum information:

PUMP TYPE, SERIAL No., CAPACITY, SPEED, HEAD.

Additional information may also be given covering impeller details, materials used, sales order line number etc. Reference should be made to this data when reading the manual.

1.4 HEALTH & SAFETY**1.4.1 GENERAL****I. QUALIFICATION AND TRAINING OF PERSONNEL**

Personnel responsible for the installation, commissioning, operation and maintenance of this pumpset must be adequately qualified for their respective tasks. Scope of responsibility must be defined by the operator and appropriate supervision provided. The operator should also ensure that the contents of this manual are fully understood by the personnel.

II NON-COMPLIANCE WITH SAFETY INSTRUCTIONS

Non-compliance with safety instructions may produce a risk to personnel as well as to the environment and the pumpset, and result in loss of any right to claim damages.

Risks may include:

- Failure of the pumpset.
- Exposure of people to electrical, mechanical and chemical hazards.
- Endangering the environment by releasing hazardous substances.

III COMPLIANCE WITH SAFETY AT WORK REGULATIONS

When operating the pumpset, the instructions contained in this manual, the relevant national accident prevention regulations and any other service and safety instructions issued by the operator are to be observed.

IV UNAUTHORIZED ALTERATIONS AND FITTING OF SPARE PARTS

Modifications should not be carried out without consultation and approval of SPP PUMPS INC. In the interests of safety and reliability only OEM spare parts supplied by SPP PUMPS INC. shall be used. Failure to comply in these respects could affect warranty.

V. UNAUTHORISED USE

Pumpset performance and reliability can only be guaranteed providing if the system is used in the manner and for the purpose for which it was intended.

1.4.2 SPECIFIC RECOMMENDATIONS

1.4.2.1 Your safety and that of others must always be the first consideration when working on machines. Safety is a matter of understanding the operations being undertaken and the potential dangers. Be on your guard at all times.

WARNING! The following health and safety recommendations must be strictly observed.

- (1) While this pump set has been designed to be safe under normal operating conditions, there are potential hazards that the operator should be aware of. These can include: rotating components; electrical potentials; high temperature exhaust surfaces and gases (where diesel driven); and hazardous fluids.
- (2) When lifting the unit ensure that all lifting equipment has a safe working load rating, suitable for the operation. Only perform lifting operations using suitably trained personnel, and in line with instructions contained in this manual.
- (3) Persons working on the unit should always wear suitable protective clothing and footwear. Loose, frayed or baggy clothing and light footwear can be extremely dangerous. Clothing impregnated with oil or similar can constitute a health hazard through prolonged contact with the skin and may also create a fire risk. Wear protective goggles and gloves when handling battery acid.
- (4) Liquids used with some pumpsets are harmful if taken internally or come into contact with unprotected skin or eyes. In the event of an accident, obtain qualified medical assistance immediately.
- (5) Always use suitable masks or respirators during maintenance or other operations where there is a risk of inhalation of fibrous dust or harmful fumes.
- (6) Always ensure that all safety guards supplied are correctly installed following any maintenance operation.
- (7) Ensure that the pumpset is not run outside its operational limits. This can put the unit under excessive loads and cause breakdown.
- (8) When working on electric motor driven pump sets, take care to see that the controller is in the "OFF" position, and a conspicuous notice is displayed warning that the unit is under repair. If a major overhaul is being carried out it is advisable to have a qualified electrician temporarily disconnect the unit.

1.4.2.2 PUMP HAZARDS

- (1) Ensure that the pump has no air in the suction line or casing. The pump rotating components rely on the liquid being pumped for cooling and lubrication. A failure to prime the unit could result in pump failure.
- (2) Pump operation with insufficient lubrication to the bearings could result in overheating and seizure, with potentially catastrophic results.
- (3) Where soft packed sealing is used it is essential that a small leakage is present. Over tightening of the gland will result in damage to the packing, scoring of the shaft or sleeves and bearing seizure.
- (4) Ensure that all pressure has been released before working on the unit.
- (5) Always check that the drive shafts and couplings are correctly aligned following installation. Failure to do so could result in reduced life or a possible failure of the coupling, or bearings. (see Section 2.7).

1.4.2.3 HAZARDS RELATED TO ENGINE DRIVEN PUMPSETS

- (1) When working with gaseous fuels, ensure that the area is well ventilated and avoid naked flames, smoking, sparks etc. A Carbon Dioxide fire extinguisher should be kept close at hand.
- (2) Parts of the package, in particular, the exhaust system and engine surfaces can become very hot during and after operation and can cause severe burns.
- (3) Beware of the danger of scalding when removing cooling system pressure caps and hoses, or draining engine oil. Allow the system to cool first, then remove caps slowly.
- (4) Rectify all water, oil or fuel leaks immediately and clean up any spillage.
- (5) Before carrying out any work on the pumpset confirm that the fuel and electrical supplies to the engine are isolated correctly, and that there is no danger that it can be started. A conspicuous notice should be placed on the unit warning others that the unit is under repair.

1.4.2.4 PUMPSETS FITTED WITH ELECTRONIC COMPONENTS

CAUTION Damage can occur to the internal components when electric welding or high voltage "Megger" tests are carried out. Electronic components should always be disconnected before carrying out any work of this kind.

1.5 AFTER SALES

SPP PUMPS INC. operate a comprehensive Spares and Service Support network throughout the world, and can be contacted as follows:

SPARE PARTS:

SPP Pumps Inc.
6710 Best Friends Road,
Norcross,
GA, 30071
USA.

Telephone: (770) 447-4443
Fax: (770) 447-0230
Direct Fax line: (770) 447-4443
(for Spares only)

SERVICE:

For On Site Installation, Commissioning, Contracts & Breakdowns :


SPP Pumps Inc. (Service Office)
6710 Best Friends Road,
Norcross,
GA, 30071
USA.



Telephone: (770) 447-4443
Fax: (770) 447-0230
Direct Fax line: (770) 447-4443
Emergency Breakdowns: (770) 447-4443
(Telephone outside office hours)

For Off Site Repair & Refurbishment:

SPP Pumps Inc. (Service Centre)
6710 Best Friends Road,
Norcross,
GA, 30071
USA.

Telephone: (770) 447-4443
Fax: (770) 447-0230

		SPP Pumps Ltd. Reading ENGLAND RG31 7SP Tel:++44(0)118 932 3123	
PUMP TYPE		SERIAL No.	
CAPACITY	L/s		
SPEED	rpm	HEAD	m

	SPP Pumps Limited Reading ENGLAND RG31 7SP Tel: ++44(0)1189 323123 Fax: ++44(0)1189 323302			Year	
				Weight	kg
				Serial No.	

INSTALLATION

2.1 RECEIVING PUMP

On receipt of pump, a visual check should be made to determine if any damage has occurred in transit. Typical points to look for are:

- a Broken or cracked equipment e.g. baseframe, motor, pump feet and flanges.
- b Bent shafts.
- c Damaged motor end bells, bent eyebolts or damaged boxes.
- d Missing items.

Loose parts are often wrapped individually and/or fastened to the equipment. If any damage or losses have occurred notify SPP PUMPS INC and the transit company immediately.

When unloading pump units, only lift the unit using the lifting eyes on the baseframe or support frame. **DO NOT USE THE LIFTING POINTS ON THE PUMP OR MOTOR**

Pump and motor shafts are in alignment when shipped, however the alignment must be re-checked before use.

2.2 TEMPORARY STORAGE

If the pump is not to be installed immediately it should be stored in a clean, dry area, with protection from moisture, dust, dirt and foreign bodies. In particular, the following action should be taken:

- a Ensure the bearings are packed with the recommended grease, to prevent moisture from entering around the shaft.
- b Remove the glands, packing and lantern rings from the stuffing box, where soft packed sealing is used.
- c Check that the pump suction and discharge ports are covered to prevent foreign objects entering.
- d If, for a short period only, the pump has to be stored outside it should be covered to protect it from the effects of the weather.
- e Every 6 weeks, rotate the pump shaft to prevent bearing pitting.

2.3 PREPARATION

Before installing the pump, clean the suction and discharge flanges thoroughly and remove the protective coating from pump shafts, where applicable.

If the pump has been in storage and prepared in the manner as above, the bearing grease should be removed, the bearings cleaned (using an approved cleaning fluid) and then re-lubricated following the procedure detailed in Section 4. It is strongly recommended that this work is carried out by SPP PUMPS INC (see Section 1.5). This is a chargeable service; however pump warranty will be protected.

2.4 LOCATION

The pump should be installed as near to the liquid source as possible, with the shortest and most direct suction pipe practical.

Allow sufficient accessibility for inspection and maintenance, and ample headroom should be allowed for the use of an overhead crane or hoist sufficiently strong to lift the unit.

Where pumps are electric motor driven, power source electrical characteristics should be appropriate for those shown on motor data plate.

2.5 FOUNDATION

The foundation should be sufficiently substantial to absorb vibrations and rigid enough to avoid any twisting or misalignment. As a rough guide it should be 12.00 inches wider on all sides with the weight at least 1-1.5 times as heavy as the pumpset. Depth should be sufficient to achieve the necessary weight and deep enough to accommodate drilling pockets for fixing bolts.

$$\text{Min. Foundation depth (feet)} = \frac{W}{150 \times B \times L}$$

W (pounds) = total weight of pumpset; 150 (pounds/foot³)= concrete density;
B (feet) = foundation width; L (feet) = foundation length

A suitable concrete mixture by volume is 1:2:3 (Cement : Sand : Aggregate) with a maximum 4.00 inches slump, and a 28 day compressive strength of 1,750 tonf/in². The foundation should be reinforced with layers of 6.00 inches **square No.8 gauge** steel wire fabric, or equivalent, horizontally placed 6.00 inches apart.

Loose bolt type anchors should be checked for tightness periodically, as there is a tendency to loosen off with vibration. Chemical type anchors are a suitable alternative.

2.6 INSTALLATION OF BASEFRAMES

Foundation concrete should be poured without interruption to within 0.50 inches to 1.50 inches of the finished height. The top surface should be well scored and grooved, before the concrete sets, to provide a bonding surface for the grout. The foundation should be allowed to cure for several days before the baseframe is shimmed and grouted.

Chemical Anchor type foundation bolts are recommended as these are less inclined to loosen off in service, and generally simplify installation. Manufacturer's instructions for installation and final torque figures should be rigorously followed. Allow enough bolt length for grout, shims, lower baseframe flange, nuts and washers. Fixing bolt diameter should be the largest capable of being inserted through the baseframe fixing holes.

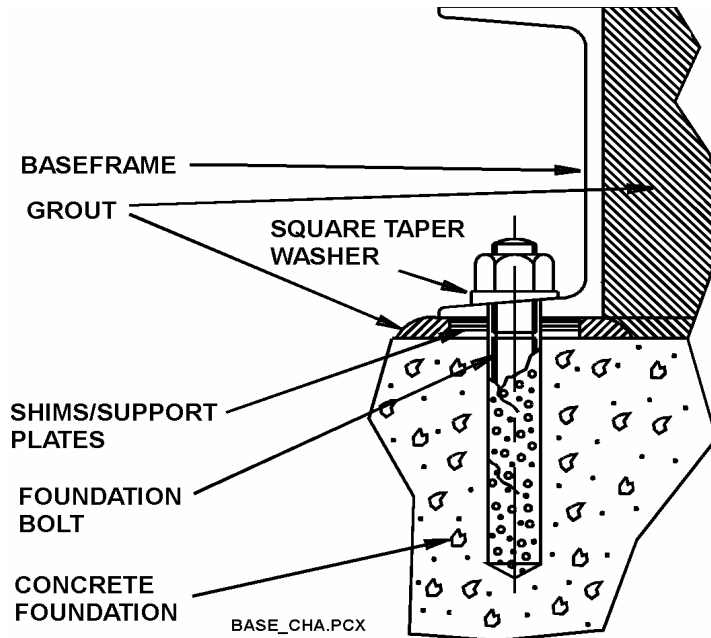
For installation purposes, baseframes can generally be divided into 4 different categories:

- Channel Section
- Folded Sheet Metal with side flange
- Folded Sheet-metal without side flange
- Box Section, and Cast Iron baseframes.

Follow the appropriate installation procedure.

2.6.1 INSTALLATION FOR CHANNEL SECTION BASEFRAMES

Position pumpset and mark through baseframe fixing bolt holes. Move pumpset to one side and drill pockets for fixings. Install fixing anchors in line with manufacturer's instructions. Reposition pumpset using blocks and shims under the base for support either side of foundation bolts, and midway between the bolts, to locate the base approximately 1.00 inch above the concrete foundation with the studs extending through the holes in the baseframe.



Add or remove shims under the base to level the pump-shaft in the case of horizontally mounted pumpsets; or to position the pump-shaft as near plumb vertical as possible in the case of vertically mounted pumpsets. The baseframe itself does not have to be level.

Torque down fixing nuts tight against the baseframe and observe pump and motor shafts or coupling hubs for alignment.

Note, square tapered washers should be used on the channel section flanges, to ensure that the fixing bolts are not bent.

Grout baseframe in completely using non-shrink grout and allow it to dry thoroughly before attaching piping to pump (24 hours is sufficient time with the approved grouting procedure).

The suction and discharge piping should be installed after the pumpset, ensuring that no pipe strain is placed on either flange, and that both pump and pipe flanges are square to each other

GROUTING PROCEDURE

Grouting compensates for uneven foundations, distributes weight of unit and prevents shifting. Use an approved, non-shrinking grout as follows:

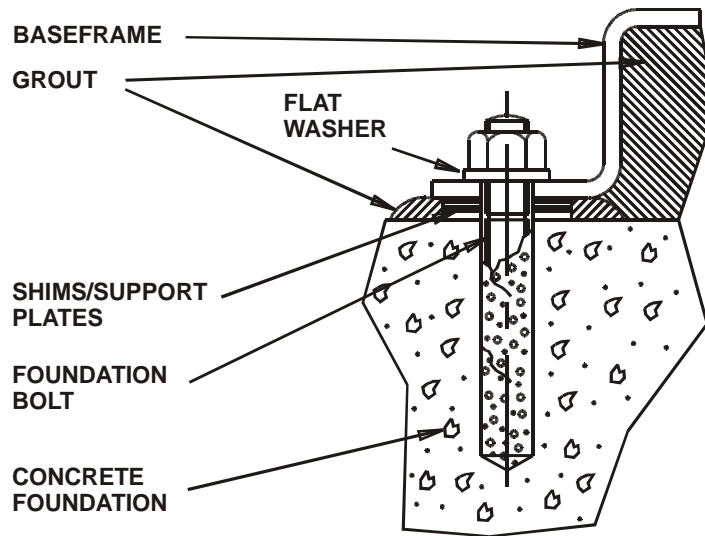
Soak top of concrete foundation thoroughly, then remove surface water. Completely fill baseframe with grout.

After grout has thoroughly hardened check foundation bolts and re-tighten if necessary, then re-check alignment.

Approximately 14 days after the grout has been poured or when the grout has thoroughly dried, apply an oil based paint to the exposed faces of the grout to prevent air and moisture from coming into contact.

2.6.2 INSTALLATION FOR FOLDED METAL BASEFRAMES WITH SIDEFLANGES

Move pumpset into position and drill fixing pockets using baseframe fixing holes as a guide. Install fixing anchors in line with manufacturer's instructions. Use blocks and shims under the base for support, either side of foundation bolts and midway between bolts, to raise the base approximately 1.00 inch above the concrete foundation.



Add or remove shims under the base to level the pump-shaft. The baseframe itself does not have to be level.

Torque down fixing nuts tight against the baseframe and observe pump and motor shafts or coupling hubs for alignment.

Flat plain washers should be used on top of the flanges.

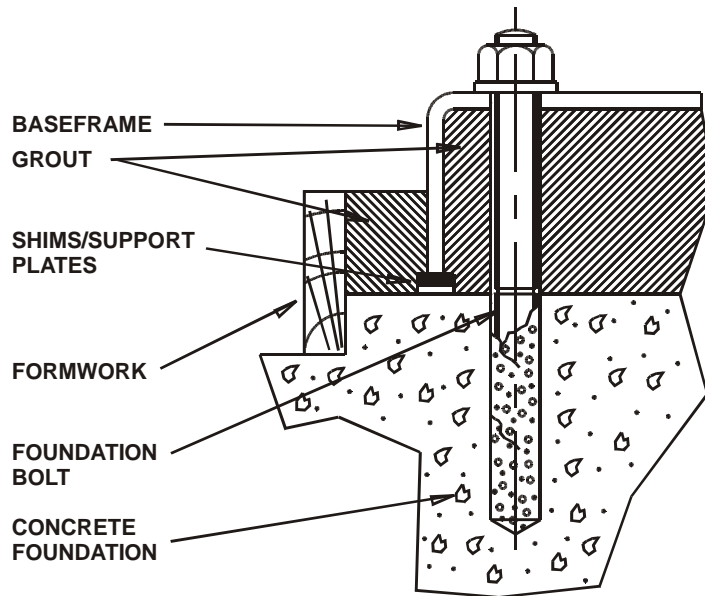
Grout baseframe in completely using non-shrink grout and allow it to dry thoroughly before attaching piping to pump (24 hours is sufficient time with the approved grouting procedure). See procedure detailed under Channel Section baseframes.

The suction and discharge piping should be installed after the pumpset, ensuring that no pipe strain is placed on either flange, and both pump and pipe flanges are square to each other.

2.6.3 INSTALLATION FOR FOLDED METAL BASEFRAMES WITHOUT SIDEFLANGES

Position baseframe and, using a long enough bit, drill fixing pockets through the holes in the baseframe. It may be necessary to move the pumpset in order to complete the fixing bolt installation, which should be done in line with manufacturers instructions.

Use blocks and shims under base for support, either side of foundation bolts and midway between bolts, to position base approximately 1.00 inch above the concrete foundation with studs extending through holes in the baseframe.



Add or remove shims under the base to level the pump-shaft. The baseframe itself does not have to be level.

Grout baseframe in completely and allow grout to dry thoroughly before attaching piping to pump (24 hours is sufficient time with the approved grouting procedure).

The suction and discharge piping should be installed after the pumpset, ensuring that no pipe strain is placed on either flange and that both pump and pipe flanges are square to each other.

GROUTING PROCEDURE

Grouting compensates for uneven foundations, distributes weight of unit and prevents shifting. Use an approved, non-shrinking grout as follows, after setting and levelling unit:

Build strong formwork around foundation to contain grout.
 Soak top of concrete foundation thoroughly, then remove surface water.

Completely fill baseframe with grout.

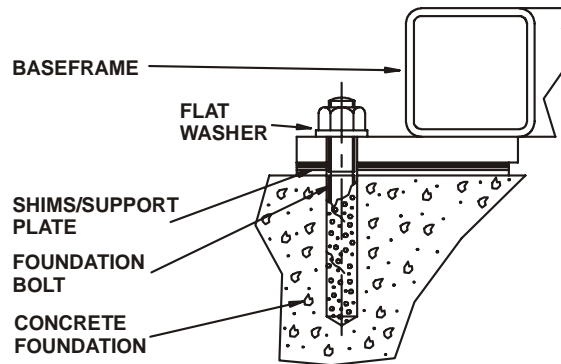
After grout has thoroughly hardened, torque down foundation bolts, then re-check alignment. Flat plain washers should be used on top of the baseframe.

Approximately 14 days after the grout has been poured or when the grout has thoroughly dried, apply an oil based paint to the exposed faces of the grout to prevent air and moisture from coming into contact.

2.6.4 INSTALLATION FOR BOX SECTION & CAST IRON BASEFRAMES

Foundation concrete should be prepared in line with the General recommendations and allowed to cure for several days. Height should be only slightly below finished to allow for shimming.

Suction pipework may be installed in advance and the pumpset positioned and shimmed to align with it, taking care that no strain is put onto the pump flange. Once positioned fixing pockets can be drilled directly through the baseframe lugs and fixtures inserted without disturbing the position of the pumpset.



Add or remove shims under the base to level the pump-shaft in the case of horizontally mounted pumpsets; or to position the pump-shaft as near plumb vertical as possible in the case of vertically mounted pumpsets. The baseframe itself does not have to be level.

Filling the frame with grout is not necessary, and is a purely optional detail, for aesthetic or cleanliness reasons only. The delivery pipework can be connected after pumpset installation, again ensuring no strain is placed on the pump flanges.

After completion, foundation bolts should be checked for tightness, then alignment checked.

Cast Iron baseframes are used with some vertically mounted pumpsets. The installation method for these is the same as the above, only bolting through the cast mounting flanges in place of the welded steel lugs on the box section.

2.7 ALIGNMENT PROCEDURE (Excluding Cardan Shafting)

The pump driver, if supplied, is correctly aligned on its baseframe at the factory. A certain amount of deformation of the baseframe is possible during transit and it is therefore essential to check alignment, prior to final grouting.

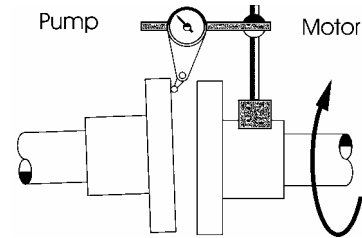
A flexible coupling will only compensate for a small amount of misalignment and should not be used to compensate for excessive misalignment of the pump and driver shafts. Inaccurate alignment results in vibration and excessive wear on the bearings, sleeve or shaft, and wear rings.

There are three forms of misalignment:

- Angular
- Parallel
- Axial

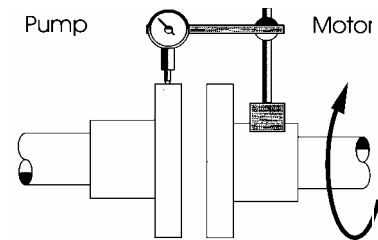
2.7.1 ANGULAR - shafts with concentric axes but not parallel.

To check for angular alignment, mount a dial indicator gauge on either flange and rotate it against the other flange close to its edge. The variation in reading should generally be within 0.003 inch, unless coupling details state otherwise.



2.7.2 PARALLEL - shafts with axes parallel but not concentric.

To check for parallel alignment, mount a dial indicator gauge on either hub and rotate it against the outer diameter of the other hub. Alignment is ideally correct when there is no variation in the reading. Check coupling details for specific limits.



In both Angular and Parallel Alignment adjustments can be made by shimming under the driver mounting feet. After each adjustment, it is necessary to recheck all features of alignment.

2.7.3 AXIAL - the distance between the shaft ends should be correct.

Axial alignment should be checked last and can be achieved by moving the coupling hubs relative to the shafts. The distance between the shaft ends (DBSE) should be as stated on the General Assembly (GA) drawing, or in the coupling data.

Alignment should be performed after the baseframe has been properly set and grout has dried thoroughly according to instructions. Final alignment should be made by shimming the driver only.

2.8 SUCTION & DISCHARGE PIPING

The following precautions should be observed during installation:

In the case of channel section and folded metal baseframes without side flanges, piping should be run to the pump. Do not move pump to pipe, this could make final alignment impossible.

Both suction and discharge piping should be supported independently and close to the pump so that no strain is transmitted to the pump when the flange bolts are tightened. Use pipe hangers or other supports at intervals necessary to provide support. When expansion joints are used in the piping system, they must be installed beyond the piping supports closest to the pump.

Install piping as straight as possible, avoiding unnecessary bends. Where necessary, use 45° or long sweep 90° fitting to decrease friction losses.

Make sure that all piping joints are air tight. Provide pipe expansions when hot fluids are to be pumped. Where reducers are used, eccentric reducers are to be fitted in suction lines and straight taper reducers in discharge and vertical lines. Undulations in the pipe runs are also to be avoided. Failure to comply with this may cause the formation of air pockets in the pipework and thus prevent the correct operation of the pump.

The suction pipe should be as short and direct as possible, and should be flushed clean before connecting to the pump. Where suction lift is not very high, it is advisable to use a foot valve. Horizontal suction lines must have a gradual rise to the pump.

The discharge pipe is usually preceded by a non-return valve or check valve and a discharge gate valve. The check valve is to protect the pump from excessive back pressure and reverse rotation of the unit and to prevent back flow into the pump in case of stoppage or failure of the driver. The discharge valve is used in priming, starting and when shutting down the pump.

The use of butterfly valves in suction lines is not recommended, however if unavoidable there should be a distance of at least 5 pipe diameters between the valve and the pump inlet flange.

FM FIREPUMP INSTALLATIONS (Loss Prevention Data 3-7N/13-4N)

Table 2-20 The diameter of the suction pipe, discharge pipe and gate valve should not be less than that shown in the Table.

Para.3-1.2 The horizontal centrifugal fire pump in horizontal or vertical position should not be used where a static suction lift is involved.

3. OPERATION

3.1 BEFORE STARTING (After Installation or Maintenance)

Before initially starting the pump, make the following inspection:

The unit baseframe must be grouted (where applicable), and bolted to the foundation.

Make sure all rotating parts are found to be free when turned by hand.

Ensure motor is correctly wired to its starting device. Check that the voltage, phase and frequency on the motor nameplate are correct for the line circuit.

Confirm correct direction of motor rotation prior to coupling to pump. Check by starting motor and switching off immediately, observing rotation is the same as the arrow direction on the pump casing.

Check the alignment between pump and motor.

Check bearing lubrication is provided (see lubrication section). Also check driver lubrication.

If the pump has soft packed sealing, check that the stuffing box has been packed.

Close drain valves. Ensure that the pump is primed. Never run the unit dry. The liquid in the pump serves as a lubricant for close running fits within the pump and the pump may be damaged if operated dry. Pumps may be primed by using an ejector, exhauster or vacuum pump. If a foot valve is used in the suction line, the pump may be primed by venting and filling the casing with liquid. Vent and drain plugs are provided either in the casing, or in external pipework.

Suction pipework should have been flushed clean during installation. Failure to do this is a common reason for commissioning failures.

3.2 STARTING

Close valve in discharge line. Open fully all valves in the suction line.

Turn on seal water to the stuffing box where external pipe supplied.

Prime the pump and start the pump driver.

When the pump is operating at full speed, open the discharge valve slowly.

Do not operate the pump for prolonged periods with a closed discharge valve, so as to avoid overheating.

The pump should be shut down at once and the trouble corrected if the pump is running at its rated speed and found to have any of the following defects:

- a No liquid delivered.
- b Not enough liquid delivered.
- c Not enough pressure.
- d Loss of liquid after starting.
- e Excess vibration.
- f Motor runs hot.
- g Pump bearing overheating.

3.3 RUNNING

While the pump is running, a periodic inspection should be made of:

Bearings Check the bearings for temperature, which should not normally exceed 158°F, after running in period.

- a Stuffing Box (if Soft Packed)- Ensure there is sufficient leakage to lubricate the packing.
- b Suction and discharge gauge readings (if fitted).

3.4 STOPPING

a Slowly close delivery valve then shut down driving unit in accordance with manufacturer's instructions.

b Shut off external sealing liquid supply to relieve stuffing box pressure, where fitted

c Successful operation of the pump depends on accurate coupling alignment. It is recommended that the alignment is re-checked after the preliminary run.

TABLE 1 **FAULT FINDING CHART (for Electric Motor driven sets)**

PROBABLE CAUSES	POTENTIAL FAULT OR DEFECT							REMEDIAL ACTION (See Table 2)
	No liquid delivered	Insufficient liquid delivered	Liquid delivered at low pressure	Loss of liquid after starting	Excessive vibration	Motor runs hot	Excessive noise from pump cavitation	
Pump not primed	■							1
Speed too low	■	■	■					2
Speed too high						■	■	3
Air leak on suction	■	■	■	■	■			4
Air or gas in liquid	■	■	■	■	■			5
Discharge head too high (above rating)	■	■	■	■		■		6
Suction lift too high	■	■	■				■	7
Not enough suction head for hot liquid	■	■	■	■			■	8
Inlet pipe not sufficiently submerged	■	■		■	■		■	9
Liquid viscosity greater than rating	■	■	■			■	■	10
Liquid density greater than rating						■	■	11
Insufficient net inlet head	■	■	■	■	■		■	12
Impeller plugged up	■	■	■		■	■	■	13
Wrong direction of rotation	■	■	■				■	14
Excessive wear ring clearance		■	■					15
Damaged impeller		■	■		■		■	16
Rotor binding					■	■		17
Defect in motor						■		18
Voltage/frequency lower than rating			■			■		19
Lub. oil dirty or contaminated							■	20
Foundation not rigid					■			21
Misalignment of pump/driver					■	■	■	22
Bearing worn					■	■	■	23
Rotor out of balance					■		■	24
Bent or damaged pump shaft					■	■	■	25
Impeller undersize		■	■					26
Air leak in stuffing box		■	■	■				27

TABLE 2 FAULT RECTIFICATION

FAULT	CAUSES	REMEDY
1	Pump not primed - lack of prime- incomplete priming.	Fill pump and suction pipe completely with liquid.
2	Speed too low	Check whether motor is directly across-the-line and receiving full voltage. Frequency may be too low. Motor may have an open phase.
3	Speed too high.	Check voltage on motor.
4	Air leak in suction. Loss of prime.	If pumped liquid is water or non-explosive, find leak using flame around flanges. For such liquid as gasoline, suction line can be tested by shutting off or plugging inlet and putting line under pressure. Rectify leak as appropriate. Check for leaks in suction pipe joints and fittings; vent casing to remove accumulated air.
5	Air or gas in liquid.	May be possible to over rate pump to the point where it will provide adequate pressure despite condition.
6	Discharge head too high	Check pipe friction losses. Larger piping may correct condition. Check that valves are fully open.
7	Suction lift too high.	If no obstruction at inlet, check for pipe friction losses. Static lift may be too great, measure with vacuum gauge while pump operates. If static lift is too high, liquid to be pumped must be raised or pump lowered.
8	Not enough suction head for liquid	Consult SPP PUMPS INC.
9	Inlet pipe not submerged enough.	If inlet cannot be lowered, chain a board to suction pipe. It will be drawn into eddies, smothering the vortex.
10	Viscosity of liquid greater than rating.	Use large driver. Consult supplier for recommended size.
11	Liquid heavier than rating.	Use larger driver. Consult supplier for recommended size.
12	Insufficient net inlet head.	Increase positive suction head on pump by lowering pump.
13	Impeller plugged up or partially choked.	Dismantle pump and clean impeller.
14	Wrong direction of rotation.	Check motor rotation with directional arrow on pump casing.
15	Excessive wear ring clearance.	Dismantle, inspect and replace if necessary.
16	Damaged impeller.	Inspect impeller. Replace if damaged, or vane sections are badly eroded.
17	Rotor binding.	Check deflection of rotor. Check bearings for damage or excessive wear.
18	Defects in motor.	Check any motor defects. The motor may not be ventilated properly due to a poor site location.
19	Voltage and/or frequency lower than rating.	The voltage and frequency of the electrical current may be lower than that for which the motor was rated. Consult supplier for correct supply.
20	Lubricating oil/grease dirty, or contaminated.	Clean bearings and bearing housings as per instructions and re-lubricate.
21	Foundation not rigid.	Check if foundation bolt nuts are drawn tight against base. Check the foundations comply with the recommendations in instructions.
22	Misalignment of pump and driver.	Realign pump and driver.
23	Bearing worn.	Check bearings for damage and excessive wear. Any irregularities will cause a drag on the shaft.
24	Rotor out of balance	Check for causes. Consult supplier.
25	Shaft bent.	Check deflection of rotor. Total indicator run-out should not exceed 0.002 inch on shaft and 0.004 inch on impeller wear ring surface.
26	Impeller too small.	Check with supplier to see if a larger impeller can be used, otherwise cut pipe losses or increase speed or both, but be careful not to overload driver.

FAULT	CAUSES	REMEDY
27	Air leak in stuffing box.	Increase seal lubricant pressure to above atmosphere.
OTHER	Head lower than rating.	Machine impeller O/D to size advised by supplier.
	Foot valve too small or partially obstructed.	Area through ports of valve should be at least as large as area of suction pipe - preferably 1½ times. If strainer is used, net clear area should be 3 to 4 times area of suction pipe.
	Obstruction of liquid passages.	Dismantle pump and inspect passages of impeller and casing. Remove obstruction.
	Defective packing.	Replace packing and sleeves if badly worn.

4. MAINTENANCE

4.1 ROUTINE MAINTENANCE

This section gives details of routine preventative maintenance. Where repair or major overhaul is required please contact SPP PUMPS INC Service at the addresses shown in section 1.5.

4.1.1 GENERAL

Routine maintenance is essential to maintain the plant in a serviceable condition, and a sound insurance against enforced inopportune shutdown.
A high degree of cleanliness of equipment and surrounding areas should be maintained during all maintenance procedures.

4.1.2 FREQUENCY OF INSPECTIONS

A general guide is shown in Table 3.
Depending on operation and environmental conditions together with a comparison of previous inspections, the frequency may be altered to maintain satisfactory operation of the plant to suit established operating procedures.

4.2 LUBRICATION

GREASE LUBRICATED BEARINGS

Bearings are initially lubricated during manufacture or re-assembly. The re-greasing interval depends upon the running speed of the unit:

TABLE 3 BEARING RE-GREASING INTERVALS

PUMP RUNNING SPEED	RE-GREASING INTERVAL	AMOUNT OF GREASE
1750 RPM	5000 HOURS	1.80 OUNCES
3600 RPM	3000 HOURS	1.80 OUNCES

To recharge the bearings with fresh grease, use a grease gun through the two lubricating nipples provided.

DO NOT APPLY LUBRICANT WHEN PUMP IS RUNNING.

Every 10,000 hours or 2 years, remove bearings from pump, de-grease, thoroughly clean, recharge with fresh grease and refit in accordance with re-assembly instructions.

Recommended grease:-

Texaco Regal Multifak All purpose EP2 (or equivalent)

4.3 BEARINGS – GENERAL

These instructions do not supersede any information issued by the bearing manufacturers, to whom application should be made for more comprehensive literature.

Care and maintenance of bearings is a matter of ensuring that they are:

1. Correctly lubricated at intervals.
2. Removed, cleaned and refitted with care.
3. Tools used and work areas should be clean.

To remove a bearing, use correctly suited withdrawal equipment. If other means are not available, a hammer and soft metal drift may be used to tap evenly around the circumference of the inner ring.

CAUTION: Damage can be caused by exerting force against the outer ring of a ball bearing.

Ball bearings should not be dismantled.

Clean bearings thoroughly with an approved fluid.

Dry the bearings with dry compressed air. Do not spin a clean dry bearing. All the cleaning fluid must be removed from the bearing since it might damage the lubricating properties of the grease.

Inspect the bearing for wear, fractures, cracks, corrosion or other damage which may necessitate bearing replacement.

Work approximately 1.00 ounce of grease into both sides of bearing immediately after drying and inspecting, to prevent corrosion.

Check that the bearing, shaft and housing are clean and undamaged.

When fitting the bearing on the shaft, the use of a soft drift and hammer should be avoided if possible. The drift could shed flakes of metal into the bearing. If a lock nut is used to "push-home" the bearing then a special hook or "C" spanner must be used to turn it. A drift and hammer applied to one slot would cause damage to the nut and introduce flakes of metal into the bearing. The tab washer should not be in place during this procedure since there is a risk of shearing off the inner tab. The nut should be removed when the bearing is fully pushed home then the tab washer placed in position and the nut refitted.

In general soaking bearings in a hot oil bath prior to fitting to the shaft is recommended.

After assembly and when the bearing housings are in position, the bearing housing cavity incorporating the grease nipple should be fully charged with the recommended grease leaving the cavity on the other side of the bearing free of grease.

4.4 SOFT PACKED SEALING

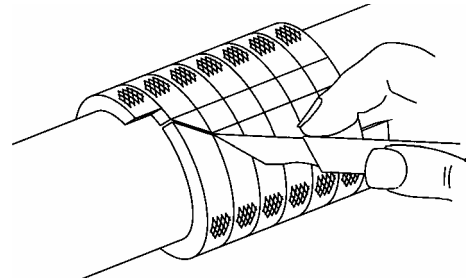
Fire pumps are supplied with soft packed stuffing boxes with seal lubrication via external nylon or copper pipework. Refer to Table 5 and the following when carrying out maintenance:

GLAND PACKING REPLACEMENT

Isolate pump driver, close all valves and relieve any liquid pressure. Remove gland follower, gland packing, lantern ring and split bush or neck ring (where fitted). A screw type packing ring extractor will aid removal but take care not to damage the stuffing box. During removal take careful note of the order and position of the parts so that the reverse procedure can be carried out for re assembly. Various different arrangements of sealing are employed on the Thrustream range of pumps with the following combinations of parts being three variations (refer to specific sectional drawing for actual arrangement):

- 1) Soft packing + lantern ring
- 2) Split bush + lantern ring + soft packing
- 3) Neck ring + 2 off lantern rings + soft packing

Clean and inspect all components for wear and surface finish. If satisfactory, cut new rings diagonally at 45° as shown in Figure 4.4.1. using a dummy shaft of the same diameter as the pump shaft. Refer to the appropriate table at the end of this manual for details of number and lengths.



SOFT PACKING INSERTION

4.4.1 Soft packing + lantern ring

Insert the first packing ring and tap to the bottom of the stuffing box. Each following ring should be installed in the same manner ensuring that the cut in each packing ring is rotated approximately 120° to the last.

Install the lantern ring in the appropriate position aligning with the lubrication connection. Make due allowance for the lantern ring to be pushed deeper into the stuffing box during adjustment.

4.4.2 Split bush + lantern ring + soft packing

Install the split bush and push to the bottom of the stuffing box followed by the lantern ring. Check that the lantern ring aligns with the lubrication connection.

4.4.3 Neck ring + 2 off lantern rings + soft packing

Install the neck ring and push to the bottom of the stuffing box followed by the lantern ring. Check that the lantern ring aligns with the lubrication connection.

Insert the first packing ring and tap it down to the lantern ring. Install the following ring in the same manner ensuring that the cut in the packing ring is rotated approximately 120° to the first. Install the second lantern ring followed by the last packing ring.

FINAL RE ASSEMBLY

The last packing ring should never protrude beyond the stuffing box face thus allowing the gland follower to 'start' in the stuffing box. If this is not the case, then dismantle and check that the correct numbers of rings have been used and that they have seated correctly.

Bring the gland follower up squarely against the last packing ring and finger-tighten the securing nuts evenly.

Turn the shaft to ensure that no binding is taking place.

Pressurise the stuffing box, ensuring there is no trapped air. The gland should start to leak heavily almost immediately. If it does not, stop the pump immediately and investigate.

GLAND FOLLOWER ADJUSTMENT

After the pump has been running for 10 minutes at full pressure, adjust the follower nuts by one sixth of a turn every 10 minutes until there is a small leakage only. This leakage is essential to ensure packing is lubricated.

4.5 MECHANICAL SEALS 4.5

In the case of pumps fitted with mechanical seals no specific routine maintenance is required. Where major overhaul is required contact SPP PUMPS INC SERVICE at the address shown in Section 1.5

TABLE 4 ROUTINE MAINTENANCE CHART

Every Week	Visually check for leaks. Check for vibration. Hand test bearing housing for any sign of temperature rise. Adjust gland as necessary to maintain slight leakage.
Every Month	Check bearing temperature with a thermometer.
Every 3 Months	Check running hours and consult re-lubrication interval chart. Check grease lubricated bearings for saponification - i.e. signs of any deposits, oil separation and undue hardening and softening of grease.
Every 6 Months	Check running hours and consult re-lubrication interval chart. Check soft packed gland packing, where fitted, and replace if necessary. Check shaft or shaft sleeve for scoring. Check alignment of pump and motor. Check holding down bolts for tightness. Check coupling for wear.
Every Year	Check rotating element for wear. Check wear ring clearances. Clean and re-grease bearings. Check running hours and consult re-lubrication interval chart.

TABLE 5 FIRE PUMP SOFT PACKED SEALING DETAILS

Pump Type	No. of Rings	Packing Ring Size(mm)	Approx. length of one ring(mm)
TB08D TB08E TC12F TC12G TD10E	4	10 x 10	175
TD12F TD15F	4	10 x 10	230
TD20D TD20E	4	10 x 10	280
TB10D TB10E TB12E TB12F TB12D TB15E TE15D TE15E	4	12 x 12	230
TF20D TF20E TF20F	4	12 x 12	280
TE08D TE10A TE10D TE12E	2	12 x 12	230
TF15E	2	12 x 12	280
TY12D TY15E	3	12 x 12	305



TECHNICAL INSTRUCTIONS

W12-008E

ISSUE 0

Maintenance Record

Date	Summary of maintenance & repairs done - replacement parts fitted etc.:
	Installed & Commissioned

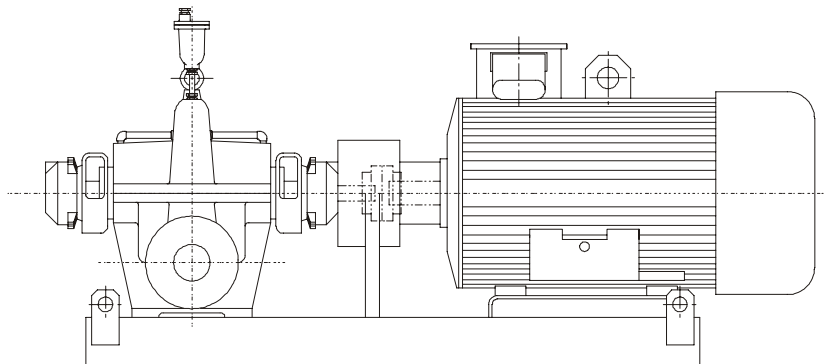
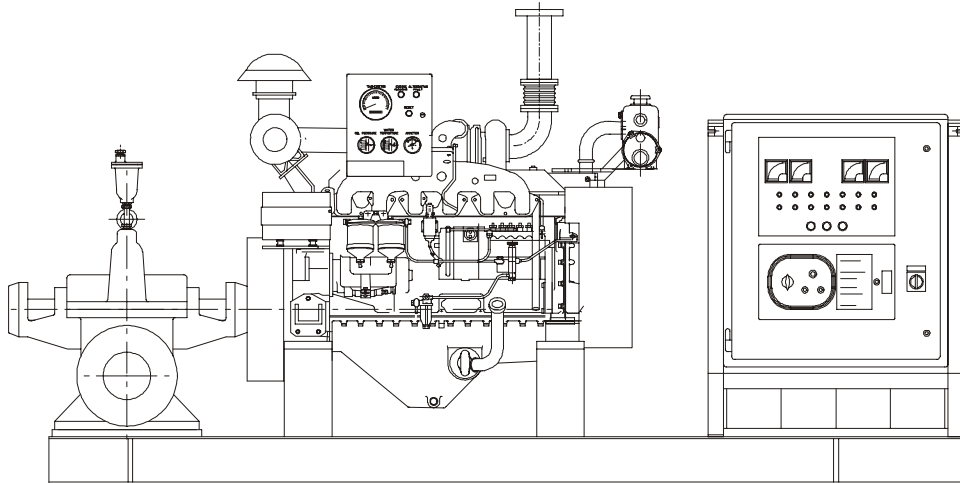


NFPA Installation Guide



NFPA / FM / UL FIRE PUMP INSTALLATION GUIDE

GUIDE TO THE INSTALLATION OF FIRE PUMPING STATIONS WITH NFPA FM OR UL EQUIPMENT



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Revision No: 0

Date Issued: Mar 2005
Produced at SPP Pumps Inc.
Inc, Norcross, GA

Safety Instructions

The products supplied by SPP Pumps Inc. have been designed with safety in mind. Where hazards cannot be eliminated, the risk has been minimised by the use of guards and other design features. Some hazards cannot be guarded against and the instructions below **MUST BE COMPLIED WITH** for safe operation. These instructions cannot cover all circumstances; **YOU** are responsible for using safe working practices at all times.

- 1 SPP Pumps Inc. products are designed for installation in designated areas, which are to be kept clean and free of obstructions that may restrict safe access to the controls and maintenance access points.
- 2 Access to the equipment should be restricted to the personnel responsible for installation, operation and maintenance and they must be trained, adequately qualified and supplied with the appropriate tools for their respective tasks.
- 3 SPP Pumps Inc. requires that all personnel that are responsible for installation, operation or maintenance of the equipment, have access to and study the product instruction manual **BEFORE** any work is done and that they will comply with all local and industry based safety instructions and regulations.
- 4 Ear defenders should be worn where the specified equipment noise level exceeds locally defined safe levels. Safety glasses or goggles should be worn where working with pressurised systems and hazardous substances. Other personal protection equipment must be worn where local rules apply.
- 5 Do **NOT** wear loose or frayed clothing or jewellery that could catch on the controls or become trapped in the equipment.
- 6 Read the instruction manual before installation, operation or maintenance of the equipment. Check and confirm that the correct instruction manual is used by comparing the serial number on the equipment with the documentation.
- 7 Refer to the data plates on the equipment supplied, operation of the equipment outside these specifications will increase the risk to operators and may lead to premature and hazardous pump failure.
- 8 **IMPROPER INSTALLATION, OPERATION OR MAINTENANCE OF THIS SPP PUMPS INC. PRODUCT COULD RESULT IN INJURY OR DEATH.**
- 9 Within the manual, safety instructions are marked with safety symbols.



Hazard
This symbol refers to general mechanical aspects of safety.



Hazard
This symbol refers to electrical safety.

ATTENTION

This symbol gives warning of a hazard to the pump itself, which in turn, could cause a risk to personal safety.

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1 Introduction

The extensive range of SPP Pumps Inc. approved fire pumps are designed to suit most fire protection applications. SPP Pumps Inc. usually supplies pumping and control equipment to specialist fire protection contractors who are responsible for the installation of sprinklers, pipework, pumps, control panels and alarm systems etc. This manual gives an overview of the requirements for installation, operation and maintenance of fire pump station equipment and therefore will refer to equipment that may not have been manufactured or supplied by SPP Pumps Inc., but is necessary for the successful operation of the system.

Before attempting to install the equipment it is important to familiarise yourself with the main items supplied and to ensure that the appropriate cables, pipes and fittings are

available to mount and connect the equipment. The equipment supplied by SPP Pumps Inc. is shown on the contract documentation. The fire protection contractor is responsible for the provision of all other items required to complete the installation.

Fire pump stations will contain a variety of equipment to meet the requirements of the specific fire protection installation but usually will comprise the following main items:

1.1 Duty Pump, Electric Driven Pumpset

Selected from the SPP Pumps Inc. range of fire pumps to suit the required system operating parameters, these pumps meet the standards set by Factory Mutual, Underwriters Laboratories & National Fire Protection Association and provide reliable trouble free service. These pumps may be end suction or split case construction and are driven through a suitable flexible coupling by an electric motor selected to meet the pump power and duty requirements.

1.2 Standby Pump, Diesel Driven Pumpset

This equipment comprises an approved SPP Pumps Inc. fire pump matched to an engine which has been specially prepared and approved for fire pump applications, together with a SPP Pumps Inc.' or other manufacturer's approved control panel. These items are mounted on a rigid base frame with batteries and engine cooling system, providing a self-contained unit for

ease of installation.

The fuel tank assembly is usually mounted separately and consists of an approved design of tank sized to match the power and duty requirements of the pump and fitted with gauges and switches to suit customer requirements.

1.3 Control System

SPP Pumps Inc. can supply a full range of control panels for both electric and diesel driven fire pumps, optionally to meet special customer specifications, proprietary control panels from other manufacturers may be supplied. The fire protection contractors are responsible for the provision and setting of suitable pressure switches.

Where required, SPP Pumps Inc. can supply a Remote Alarm Panel to provide notification of fire and the status of the system at a remote security monitoring station.

1.4 Pressure Maintenance (Jockey) Pump

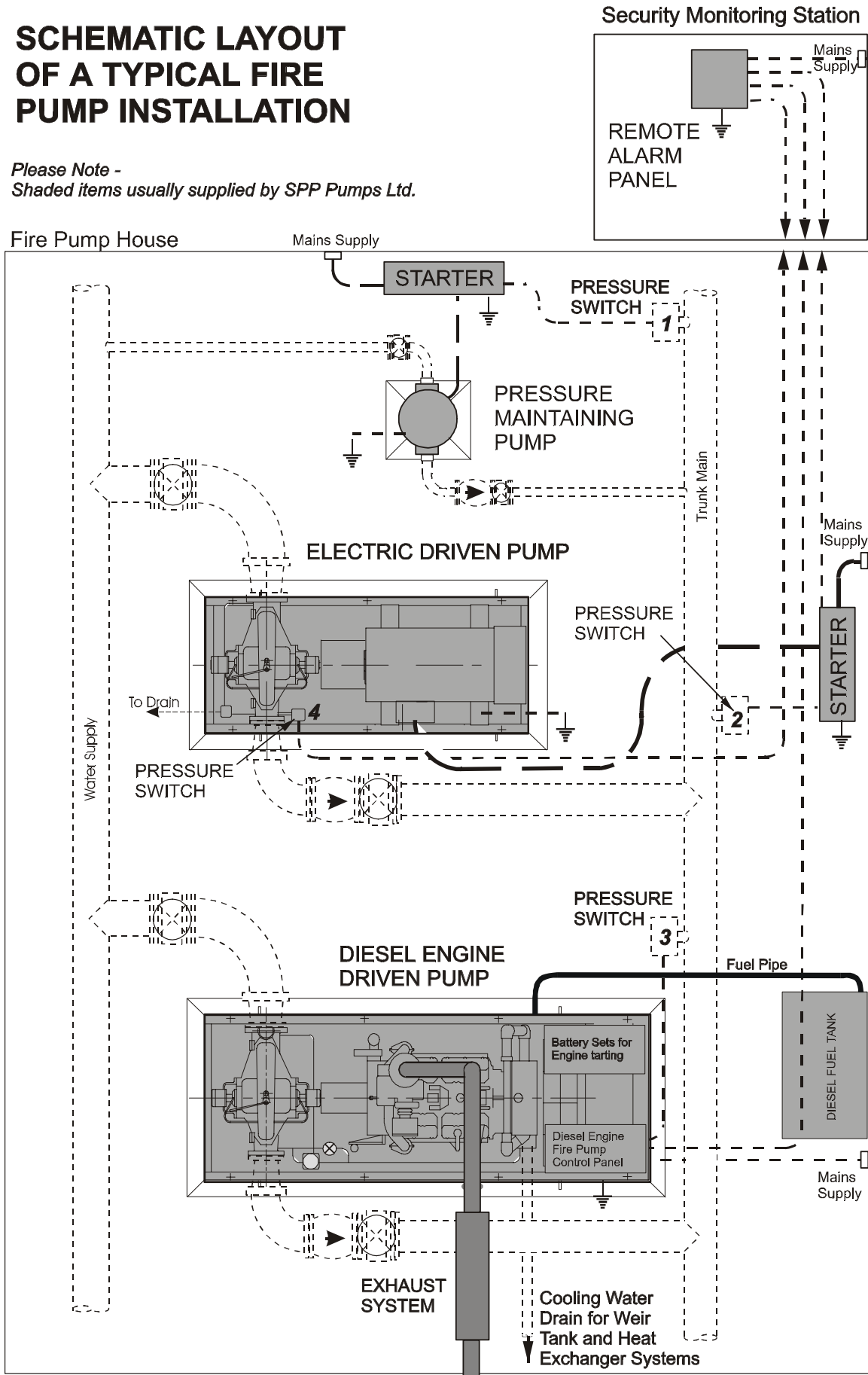
This is usually a small pump that is designed to maintain pressure in the trunk main system at a pre-set level such that the system is primed for operation. On larger installations this pump may be a SPP Pumps Inc. product but on smaller installations a proprietary multistage pump is often supplied.

1.5 Typical Pump House Schematic Layout

This diagram shows the main features of fire pump house installations, these will vary depending upon the number and types of pumps to be installed and they will be placed to suit the position of main pipe runs etc.

SCHEMATIC LAYOUT OF A TYPICAL FIRE PUMP INSTALLATION

*Please Note -
Shaded items usually supplied by SPP Pumps Ltd.*



It is usual for all the main items of equipment to have been supplied by SPP Pumps Inc., but other manufacturer's items may have been specified and supplied to meet special installation requirements. The contractor responsible for the installation must provide all other items.

2 Installation

Please Note:-

Fire water pumpsets and control systems should be installed, and Accepted, in full accordance with NFPA 20. Failure to Install SPP Pumps Inc supplied equipment in full accordance with NFPA 20 will affect equipment warranty.

2.1 Pump Location

The pump should be installed as near to the water source as possible, with the shortest and most direct suction pipe practical.

Allow sufficient access for inspection and maintenance with enough headroom for an overhead crane or hoist of sufficient capacity to lift the heaviest item of equipment.

The location for a diesel engine driven pump may be dictated by the requirement for an air supply and the need to vent the exhaust.

Air is required for combustion and cooling purposes, with air and radiator cooled engines in particular needing large volumes of air for cooling. Inlet and outlet apertures, suitably sized and positioned to prevent air recirculation, must be provided in the pump house structure. It is recommended that a low level vent matches a high level vent in the opposite wall.

Exhaust runs should be as short as possible. Small bore pipe and/or excessive length will cause backpressure on the engine, reducing engine performance and therefore pump output.

2.2 Foundations

A foundation plinth should be constructed to support each pumpset on a floor area free from expansion joints. These foundation plinths should be sufficiently substantial to absorb vibrations and rigid enough to avoid any twisting or misalignment. As a rough guide, they should be at least 12 inches wider than the pumpset on all sides and weigh between 1 and 1.5 times the weight of the pumpset. Plinths for fire pumps are recommended to have a minimum height of 300mm but height should be sufficient to achieve the necessary weight and to accommodate the pockets for fixing bolts.

Foundation height may be calculated thus:

$$\text{Height (feet)} = \frac{W}{150 \times B \times L}$$

where:

W (pounds) = total weight of pumpset

150 (pounds/foot³) = concrete density

B (feet) = foundation width

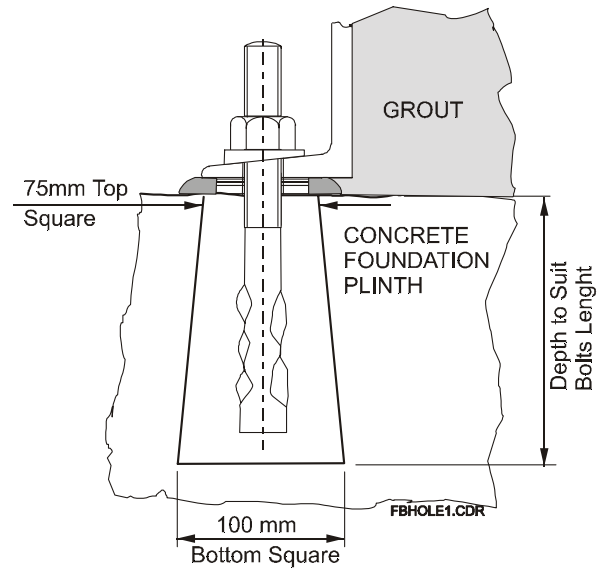
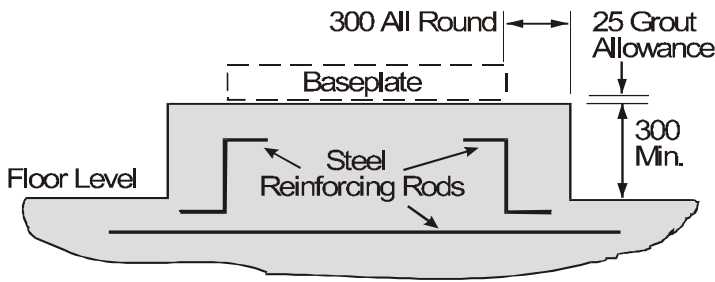
L (feet) = foundation length

Use a suitable concrete mixture by volume is 1:2:3 (Cement : Sand : Aggregate) with a maximum 4.00 inches slump, and a 28 day compressive strength of 1,750 tonf/in²

The foundation should be reinforced with layers of 6.00 inch square No.8 gauge steel wire fabric, or equivalent, horizontally placed 6.00 inches apart.

Foundation concrete should be poured without interruption to within 1.00 inch of the finished height.

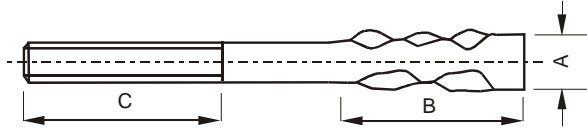
The top surface should be well scored and grooved before the concrete sets to provide a bonding surface for the grout. The foundation should be allowed to cure for several days before installation of the baseframe.



2.3 Foundation Bolts

Two types of foundation bolts are normally used; either rag bolts set into pre cast pockets in the plinth or, chemical anchor bolts for which pockets are drilled into the plinth after casting.

Rag Bolts



Bolt size		Clearance hole size	Bolt dimensions (see Figure 1)		
Dia.	Length		A	B	C
16	160/240	19	32	80	40
20	300/350	24	40	100	50
24	350	28	48	120	60

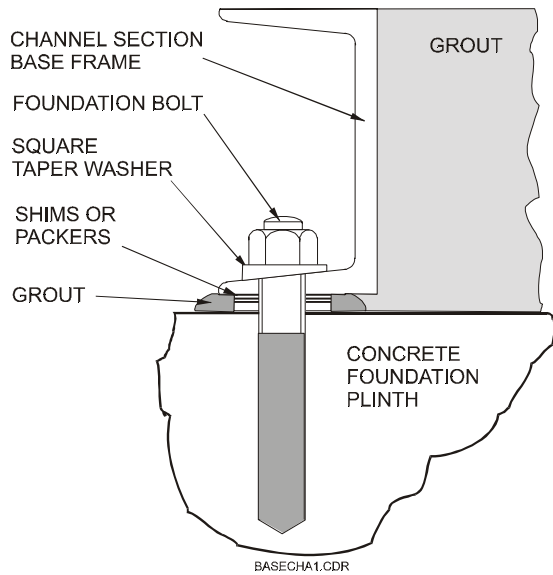
Pocket Dimensions:

Tapered pockets are recommended for fire pump installations.

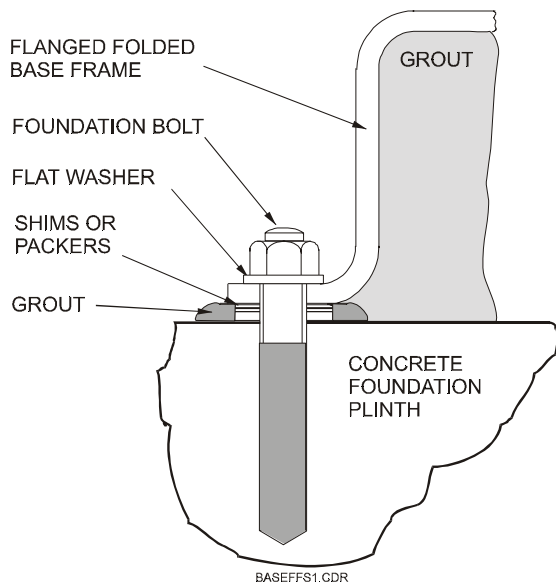
For Chemical Anchor Bolts, refer to the manufacturers installation instructions.

2.4 Baseframe Types

There are four main types of baseframe as illustrated below. Note that these figures show chemical type anchor bolts.

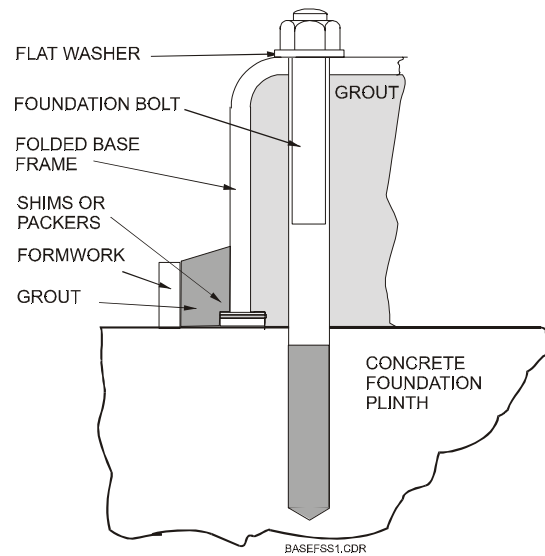


Channel Section Baseframe

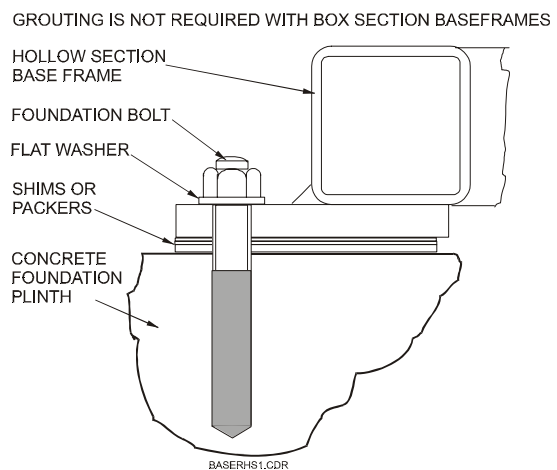


Folded Baseplate with Flanges

ATTENTION



Folded Baseplate without Flanges



Box Section Baseframe

2.5 Installing the Pumpset(s)

It is important to install fire pumpsets **BEFORE** installing the main suction and delivery pipework. This is to ensure that the pipes are positioned to match the pump location and do not transmit load and induce strain in the pump casing.

For long coupled pumpsets, remove the coupling guard to provide access to the shaft and coupling.

When using rag bolt fixing, suspend the pumpset over the plinth and hang the foundation bolts from their holes using tapered washers for channel base frames and plain washers for other types, with the

nuts showing at least one full thread through.

Place sufficient metal packing pieces on both sides of each foundation bolt hole to support the base frame at about 25mm above the plinth surface. Lower the pumpset and insert the rag bolts into their pockets. Continue lowering until the pumpset is supported by the packing.

ATTENTION

Adjust the height of the packing with shims in each position until the **shaft** is horizontal and the pump **flanges** are vertical, do not level from the baseplate as this may not be true to the shaft and flanges.

Ensure that the foundation bolts are vertical to permit easy lifting of the pumpset, and then grout the bolts with non- shrinking grout. Allow sufficient time for the grout to harden, usually 24 hours or as recommended in the grout manufacturer's instructions. Tighten the nuts to the torque recommended below.

Bolt Size	16	20	24
Torque Nm	95	185	320

For chemical anchor fixing with channel section base frames it will be necessary to mount the pumpset, mark the foundation bolt positions and lift off the pumpset to give access for drilling. Hang the anchor bolts in their holes and lower the pumpset in position having inserted the anchors into their fixing holes.

For other base frame types, refer to the manufacturer's instructions for drilling, installation and torque details.

After allowing sufficient time for the bond to cure, tighten the anchor bolts to the torque setting recommended in the manufacturer's instructions.

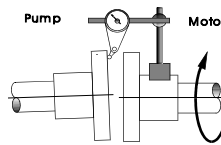
Whilst tightening the fixing bolts check the shaft level and coupling alignment and if required, adjust the packers to maintain the shaft level and the coupling alignment within acceptable figures.

Refer to the pump and coupling instruction

manuals for details of shaft alignment procedures and tolerances or proceed generally thus:

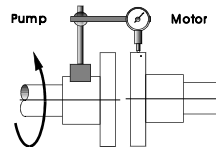
a) Lateral Alignment

Mount a dial gauge on the motor shaft or coupling with the gauge running on the outer-machined diameter of the pump coupling. Turn the motor shaft and note the total indicator reading.



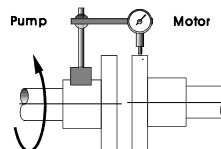
b) Angular Alignment

Mount a dial gauge on the motor shaft or coupling to run on a face of the pump coupling as near the outside diameter as possible. Turn the motor shaft and note the total indicator reading.



c) Confirm Lateral Alignment

Mount the dial gauge on the pump shaft or coupling with the gauge running on the outer-machined diameter of the motor coupling. Turn the pump shaft and note the total indicator reading.



- d) Adjustment
The motor must be shimmed and re-positioned to align the shafts to the coupling manufacturer's specifications.
- f) Alternative Method
If a dial gauge is not available, callipers or taper gauge may be used to measure the distance between the coupling flanges at four points around the circumference and a straight edge used to check the lateral alignment of the outer flange diameters.

2.6 Suction & Delivery Piping

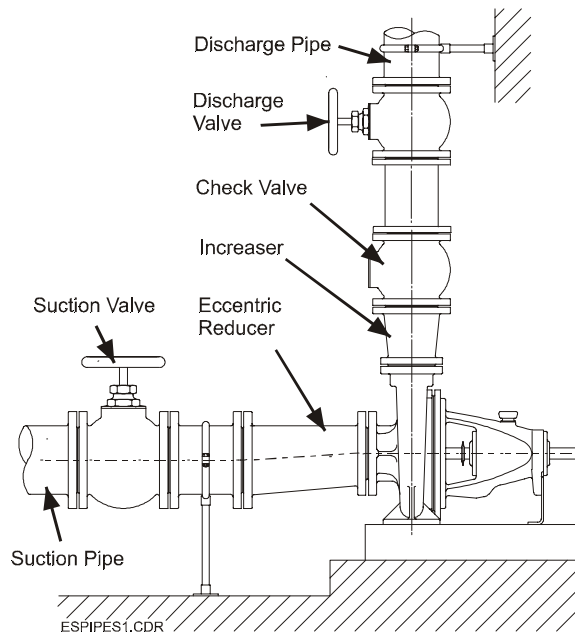
Ensure that bolt grouting or chemical anchors are allowed to dry thoroughly before connecting any pipework.

Note that fire pumpsets have regulatory requirements for piping and these must be strictly observed. Refer to the appropriate standard for details.

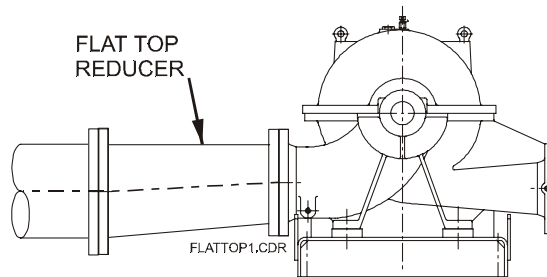
Both suction and discharge piping should be supported independently and close to the pump so that no strain is transmitted to the pump when the flange bolts are tightened. Use pipe hangers or other supports at intervals necessary to provide support. When expansion joints are used in the piping system, they must be installed beyond the piping supports closest to the pump.

Install piping as straight as possible, avoiding unnecessary bends. Where necessary, use 45° or long sweep 90° bends to decrease friction losses.

Make sure that all piping joints are airtight. Where reducers are used, eccentric or 'flat top' reducers are to be fitted in suction lines and concentric or straight taper reducers in discharge and vertical lines. Undulations in the pipe runs are also to be avoided. Failure to comply with this may cause the formation of air pockets in the pipework and thus prevent the correct operation of the pump.



Typical End Suction Pump Piping installation



Eccentric Reducer on a Split Case Pump

The suction pipe should be as short and direct as possible, and should be flushed clean before connecting to the pump. For suction lift applications, it is advisable to use a foot valve. Horizontal suction lines must have a gradual rise to the pump. If the pumped fluid is likely to contain foreign matter then a filter or coarse strainer should be fitted to prevent ingress to the pump.

ATTENTION

A non-return valve or check valve and a discharge gate valve usually precede the discharge pipe. The check valve is to protect the pump from excessive backpressure and reverse rotation of the unit and to prevent back flow into the pump in case of stoppage or failure of the driver. The discharge valve is used when shutting down the pump for maintenance.

Shaft alignment must be checked again after the final positioning of the pump unit and

connection to pipework as this may have disturbed the pump or motor mounting positions.

3 Connection to Services

The following section covers the normal service requiring connection, but the actual requirements for each installation will vary depending upon the equipment supplied. Therefore, some of the items covered may not be relevant to specific installations.

Ensure that site electrical power supply characteristics match the data on the equipment data plates

If the control panels were manufactured or supplied by SPP Pumps Inc. wiring diagrams will be included with the instruction manual. If others have supplied the panels, refer to their literature for electrical details and wiring instructions.

All cables should be installed by a competent electrical contractor in accordance with the latest edition of the IEE regulations (UK) or to the latest regulations appropriate to the territory of installation

3.1 Electric Motor Driven Pumpsets

Install the electric motor starter panel in a convenient position for use and wire up to mains supply, to the electric motor and to the trunk main pressure switch. Earth bonding connections are provided on all base frames and must be connected to a suitable earth point.

3.2 Diesel Engine Driven Pumpsets

3.2.1 Control Panels

Where diesel engine control panels are supplied fitted to the baseframe all connections and wiring to the engine is completed. For separate diesel engine control panels, mount the panel in a convenient position for use and wire up to the diesel driven pumpset following instructions on the wiring diagrams supplied in the manual.

Connect the control panel to the mains electrical supply as shown in the wiring diagram.

Where a pressure switch in the trunk main

initiates the start, fit the pressure switch in a convenient position and wire up in accordance with wiring diagram.

3.2.2 Fuel Tank

If the fuel tank is supplied separately, it is intended to be positioned in a safe location with convenient filling access and giving short and direct fuel line runs.

When a fuel tank stand is supplied it is normally designed to be fixed to a floor having the same level as the pump house. If a stand is not supplied or when special conditions apply, reference should be made to the diesel engine manufacturer's instructions for guidance on the correct level to mount the fuel tank. It is important to comply with the requirement for gravity fuel feed to fire pump engines and to provide access for refilling and topping up the fuel.

The fuel gauge is normally supplied loose and must be fitted to the fuel tank as per the manufacturer's instructions or installed and calibrated thus:

- 1 Fit the float through the 1.5" boss on the top of the tank; set the float to the bottom of the tank, i.e. in the empty position.
- 2 Screw the gauge into the boss and confirm that it reads 'empty'.
- 3 If the gauge needs to be calibrated, remove the face of the gauge and extract the pointer, replace the pointer in the Empty position and refit the face of the gauge.

Fill the tank with sufficient fuel for one hour running for commissioning tests.

3.2.3 Water Cooling Systems

Most fire pump diesel engine installations use water-cooling systems. These fall into three categories - radiator, heat exchanger and weir tank.

Radiator cooled engines employ a fan to draw air through the radiator thus directly cooling the closed engine circuit. The pump house must have inlet and outlet vents of suitable size to provide adequate air without re-circulation.

Heat exchanger closed engine circuits, are cooled by a supply of coolant from the

pump outlet. A flow control system is fitted to prevent continuous flow of water to waste under standstill conditions. This supply is passed through the heat exchanger and is then piped to waste.

3.2.5 Batteries

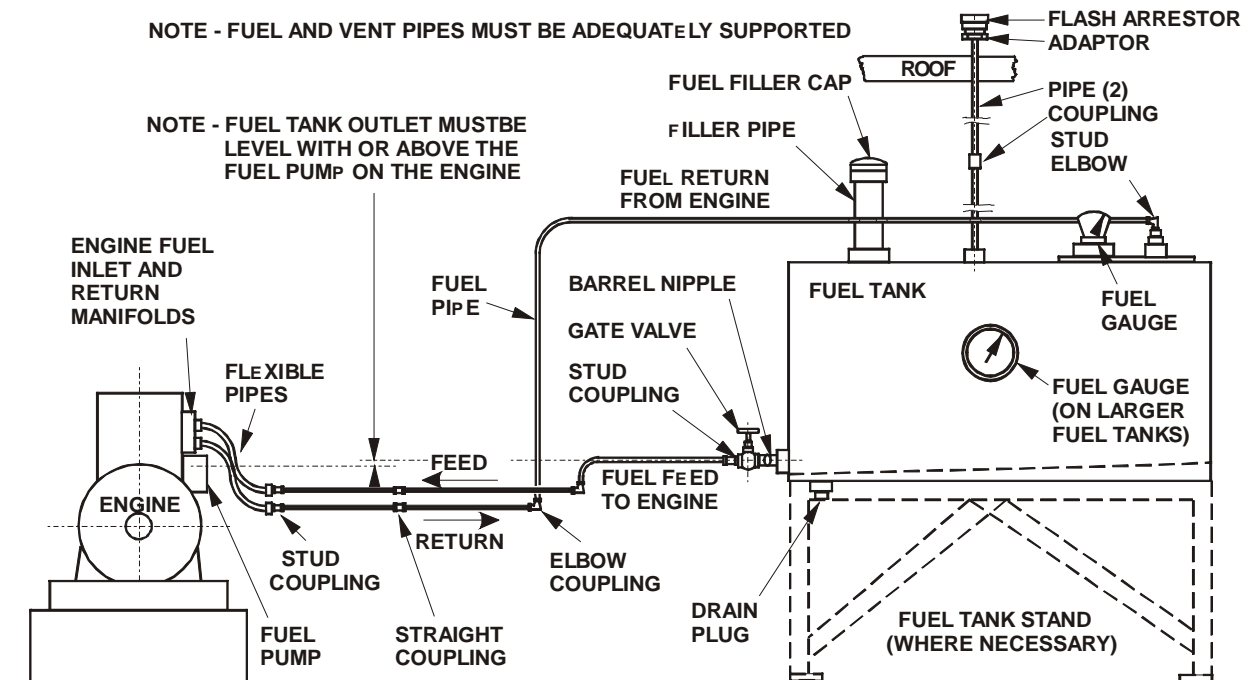
Batteries for diesel engine starting may be either lead acid or nickel cadmium type.

Lead acid batteries may be dry charged or conventional; they may be supplied dry or pre-filled and charged. Refer to the battery manufacturer's manual for details on putting new batteries into use.

Where nickel cadmium batteries are supplied they are charged and have travel plugs fitted, removal of travel plugs and the commissioning engineer usually does connection.

Note that a single-phase electrical supply to the panel is required for the battery chargers. For packaged pumpsets supplied with lead acid batteries a hydrometer is supplied in the tool kit.

Typical Fuel Tank Arrangement



3.2.6 Exhaust System

Unless special conditions apply, a set of standard exhaust system components is supplied to suit typical pump house applications. Assemble the engine exhaust system (flexible pipe, solid pipe and silencer) with the flexible section attached to the engine and the discharge passing through the nearest outside wall. Exhaust pipe runs should be as short as possible to minimise back pressure on the engine. If it is required that the exhaust system is extended, refer to SPP Pumps Inc. for guidance as the system may need to be

increased in diameter to avoid excessive backpressure.

3.3 Ancillary Connections

Electric motor and air or radiator cooled diesel engine driven pumps will have a recirculation system fitted to provide sufficient water circulation to cool the pump when it is running with the discharge valve closed. For these units a feed is taken from the pump outlet, via a pressure differential valve, either back into the system well upstream of the pump, or must be piped to waste.

A pilot line taken from the pump inlet controls the pressure differential valve. With the pump stopped the valve remains closed and thus prevents a continuous flow, which could occur under flooded suction conditions. With the pump running the suction on the pilot line opens the valve and allows flow. The differential pressure valve is not adjustable and its operation is entirely automatic.

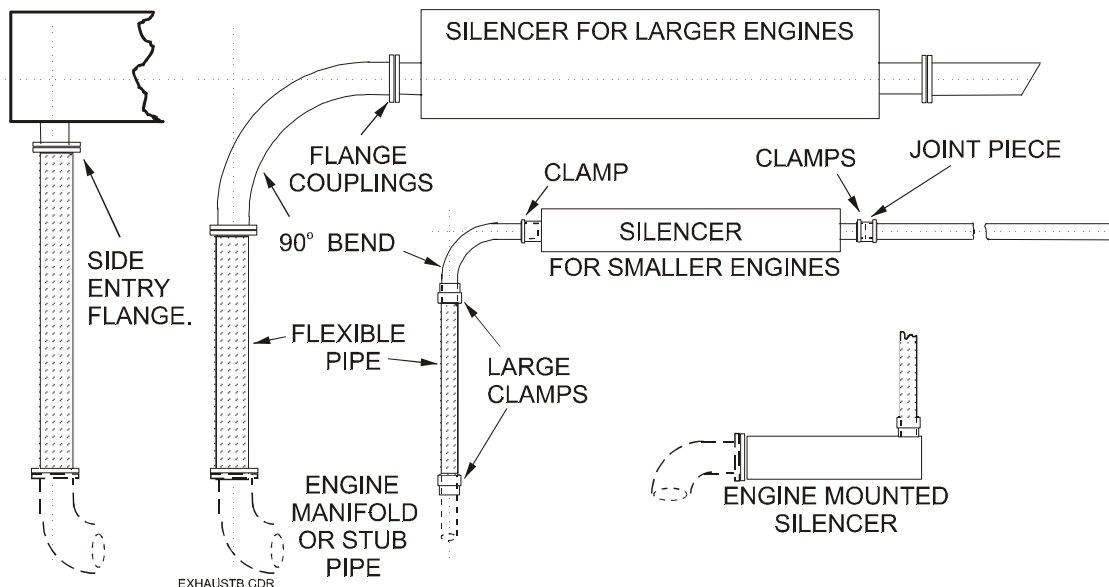
For heat exchanger and weir tank cooled diesel engines, the cooling water is taken from the pump outlet. This is sufficient to meet the minimum flow requirement. The

components of this line are designed to meet the requirements of FM /UL.

Waste water lines should be run from all ancillary connections such as gland drains or tundish etc. Where applicable, these are shown on the General Arrangement Drawing provided.

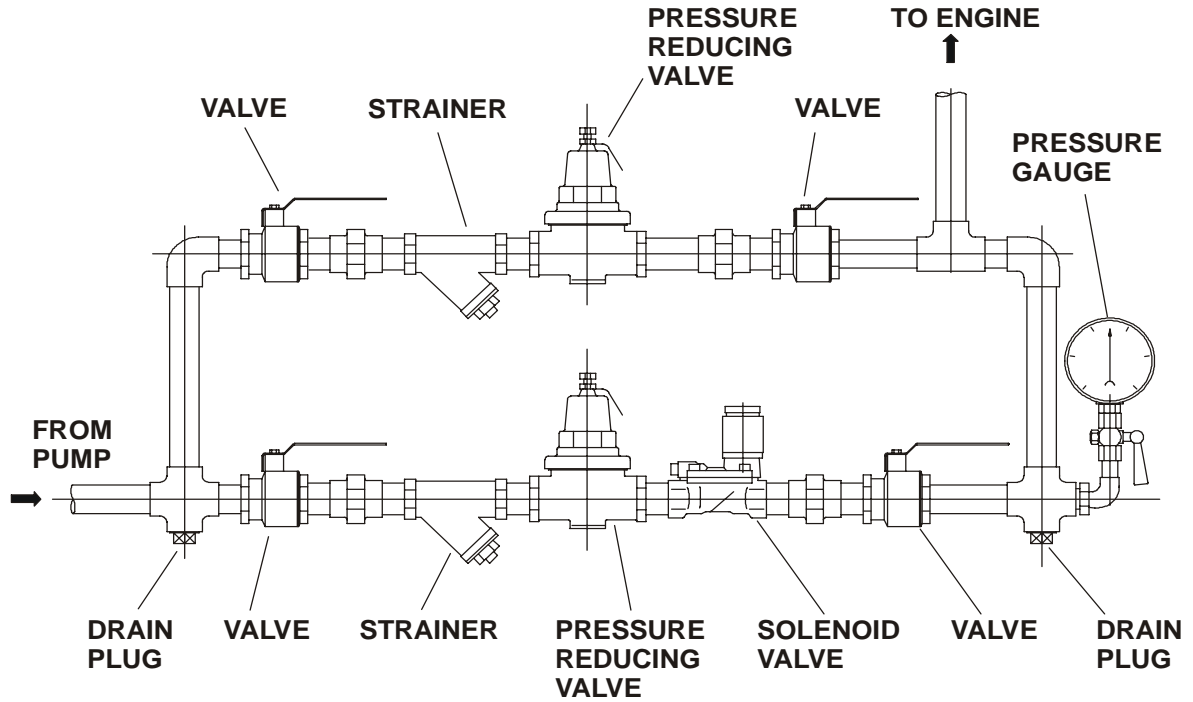
When installed under positive head conditions pumps should be provided with an air release valve on the top of the pump casing to provide a means of exhausting trapped air.

Typical Exhaust Systems



- NOTE S :-**
1. EXHAUST SYSTEM MUST BE SUPPORTED SUCH THAT THERE IS NO WEIGHT ON THE FLEXIBLE PIPE
 2. THE FLEXIBLE PIPE MUST BE INSTALLED STRAIGHT. IT IS DESIGNED TO ACCOMODATE EXPANSION NOT MISALIGNMENT

Cooling Line Components



5 Grouting

After successful commissioning, grouting is required to compensate for uneven foundations, distribute the weight of the pumpset, prevent movement and reduce vibration. Use only an approved high-strength grout, prepared and poured in accordance with the manufacturer's instructions.

Build any formwork required to contain the grout.

If an epoxy grout is to be utilised then the foundation surface should remain dry. For other types of grout, soak the top of the concrete foundation thoroughly with water until absorption stops, and then remove any excess.

Fill the space between baseframe and foundation with grout ensuring that there are no air pockets. Allow the grout to harden.

Completely fill baseframe with grout (See NOTE). Alternatively, to reduce cost, the baseframe may be filled with concrete of the same mix as the foundation. Ensure that an even fill is carried out and the formation of air pockets is avoided. DO NOT use vibration techniques to aid this procedure.

After the grout/concrete has thoroughly hardened check the foundation bolts and re-tighten if necessary. Re-check shaft alignment.

Approximately 14 days after the grout/concrete has been poured or when it has thoroughly dried, apply an oil based paint to the exposed faces of the grout to prevent air and moisture from coming into contact.

NOTE - With box section base frames, grouting is not necessary, and is a purely optional detail, for aesthetics or cleanliness only.

6 Operation

This section outlines a 'typical' fire pump installation comprising one electric motor driven pumpset, one diesel engine driven pumpset and one pressure maintenance pump often referred to as a Jockey Pump.

This pressure maintenance pump is electric motor driven. Installation of this pumpset follows an identical procedure to the main pumpsets but reference should be made to the manufacturer's manual for further detail.

The equipment supplied may vary in quantity and type to suit the operational requirements of the installation, but the principles outlined are common.

The pressure maintenance (jockey) pump is controlled with a pressure switch in the trunk main. It will switch the pump on and off periodically to maintain trunk main pressure at a high level, ready for initial sprinkler operation.

The operation of fire pumps is also controlled with pressure switches in the main trunk main, set to start the pumps at predetermined pressure levels.

In the event of a fire, water is released into the region of the fire. The pressure in the trunk main then falls and at a pre-set level the pressure switch signals the duty pump to start.

If due to electrical or mechanical failure the duty pump fails to function or the sprinkler demand exceeds the capacity of the duty pump, the pressure will continue to fall until another pressure switch set at a lower level signals the standby diesel engine driven pump

3.4 Pre-commissioning Check

If SPP Pumps Inc. is contracted to carry out the commissioning, the following check list shows items to be completed before the commissioning engineer arrives.

Pre-commissioning Check List	
1 Installation: Mounting plinths comply with instructions for size, construction and location Steel packers position the base frame 25 mm above the top surface of the plinth. The shaft is level. The fixing bolts are grouted as instructed and tightened to the required torque. The shaft alignment has been checked and set to within the stated tolerances.	
2 Suction and delivery pipework is adequately supported and NEGLIGIBLE forces are transmitted to the pump casing.	
3 Where applicable, all drain, minimum flow, and test pipelines are fitted, together with valves gauges and flow meters.	
4 Sufficient water supply is available for the commissioning proof run.	
5 The diesel engine exhaust has been fitted in line with recommendations.	
6 The engine fuel tank is filled with sufficient fuel for at least one hour running time.	
7 Batteries are filled and charged in accordance with the manufacturer's instructions.	
8 All wiring to controls and to remote alarm panels is completed in line with appropriate regulations & power supplies are connected.	
9 The area is clear of all builders' material and rubbish to allow access to the pumps.	
10 A customer's representative is available to witness the pump tests and the setting of pressure switches.	

It is SPP Pumps Inc. policy that commissioning engineers will give as much assistance as possible to the customer in solving site problems. However, if due to incomplete installation or failure of equipment not supplied by SPP Pumps Inc., further visits are required to complete commissioning, for which additional charge will be made.

4 Commissioning

It is recommended that this is done by an SPP Pumps Inc. commissioning engineer. Refer to the pump instruction manual for general instructions for commissioning pumpsets. Please note that these do not cover pressure switch setting levels for fire pump installations.

to start.

On receipt of a start signal, the diesel engine control panel commences a predefined starting sequence. This will give the required number of rotations using battery sets alternately for the pre-set number of start attempts or until the engine starts.

When the engine starts, the automatic starting sequence is cancelled on receipt of a signal from the engine. If, after the completion of the automatic start sequence, the engine fails to start, an audible alarm is sounded and the engine is returned to a standby condition in which manual starting is available.

NOTE - Fire pumps continue running until switched off manually.

Routine System Testing:

Periodic testing of fire pumps is required to meet insurance requirements to ensure that adequate fire protection is available at all times.

For details of testing procedures, refer to the manufacturer's manuals for the pump, driver and control panel.

After testing it is important to ensure that all power and control panel switches are correctly set and that the fire pumps are ready for operation.

It is also important to ensure that sufficient fuel is provided for diesel driven pumps to give the required number of hours of running.

7 Maintenance**7.1 Safety****Electric Shock & Accidental Starting Hazard -**

ISOLATE the equipment before any maintenance work is done. Switch off the mains supply, remove fuses, apply lock-outs where applicable and affix suitable isolation warning signs to prevent inadvertent re-connection.

In addition, on diesel engine driven pumps, disconnect the battery supply leads. Using insulated tools remove the negative connection first and isolate the fuel supply.

It is recommended that a conspicuous notice is displayed stating:

PUMP UNDERGOING REPAIRS

**Hazardous Materials**

Wear a suitable mask or respirator when working with packing or gasket components that contain fibrous materials as these can be hazardous when the fibrous dust is inhaled. Be cautious, if other supplier's components have been substituted for genuine SPP Pumps Inc. parts, these may then contain hazardous material.

ATTENTION

Do NOT use 'MEGGER' type testing equipment without first disconnecting

any electronic speed sensors, alternators and control panels, as damage can occur to internal components which will prevent operation of the equipment.

ATTENTION

Do NOT connect welding earth lines to the base frame or to diesel engines without first disconnecting any electronic speed sensors and alternators fitted to diesel engine driven pumpsets as damage can occur to internal components which will prevent operation of the equipment.

7.2 Maintenance

Fire water pumpsets and control systems should be operated and maintained in full accordance with NFPA 25. Failure to operate or maintain SPP Pumps Inc supplied equipment in full accordance with NFPA 25 may affect equipment warranty.

SPP Pumps Inc.. Service Department offers maintenance and repair facilities for all SPP Pumps Inc. equipment. For fire pumpsets, two visits per year are recommended. This ensures that the equipment remains capable of the service required both by the customers and their insurers.

NOTE: - The visits by SPP Pumps Inc. engineers do not relieve the site occupier of the need to perform routine checks needed to comply with insurance company requirements, these include:

- 1 Battery electrolyte level checking and topping up.
- 2 Diesel engine oil and fuel level checking and topping up.
- 3 General inspections for leaks, loose bolts, etc.
- 4 Weekly thirty minute running test.

Maintenance visits by SPP Pumps Inc. engineers can normally be arranged on dates suitable for the site occupier, assuming the work can be carried out during normal working hours.

The following service is offered:

- 1 Inspect pumps to ensure that bearings are correctly lubricated and the pump gland is functioning correctly.
- 2 Check pump/driver alignment and inspect coupling.
- 3 General inspection to identify any damage or wear to equipment supplied by SPP Pumps Inc. Issuing a report indicating the extent of repairs and/or replacements required.
- 4 Inspect electrical apparatus, including electric motor, starter motor, control panel and remote alarm panel.
- 5 General examination of diesel engine to ensure correct operation of rev counter, oil pressure and water temperature gauges.
6. Any repairs would be undertaken by the manufacturer's authorised agent and would be charged extra.
- 7 Final check of entire pump installation to ascertain generated pressure, speed, cooling water output, etc. Engine speed would be reset as necessary.

Fitting of normal replacement spare parts in the course of routine visits is included (wherever possible) within the agreed service price. Other spares will be charged extra at prices ruling at the time. Our engineers carry some stock spares and these would be utilised wherever possible.

Should a maintenance agreement be taken out after the warranty period has expired, SPP Pumps Inc. may require to inspect the equipment before acceptance. Any replacements or repairs highlighted by this inspection must be completed before commencement of the contract visits.

--- " ---

SPP Pumps Inc. operate a comprehensive Spares and Service support network, and can be contacted as follows:

SPARES & SERVICE Telephone:

++ (770) 409-3280

For spare parts, supply only.

ask for - **Spares Dept.**

For breakdowns, spare parts and, on-site fitting, pump installation and, commissioning, and service contracts.

ask for - **Service Dept.**

For breakdowns outside office hours.

Telephone : **++ (770) 409-3280**

Spares & Service Office

SPP Pumps Inc.
6710 Best Friend Road
Norcross, GA
30071
USA

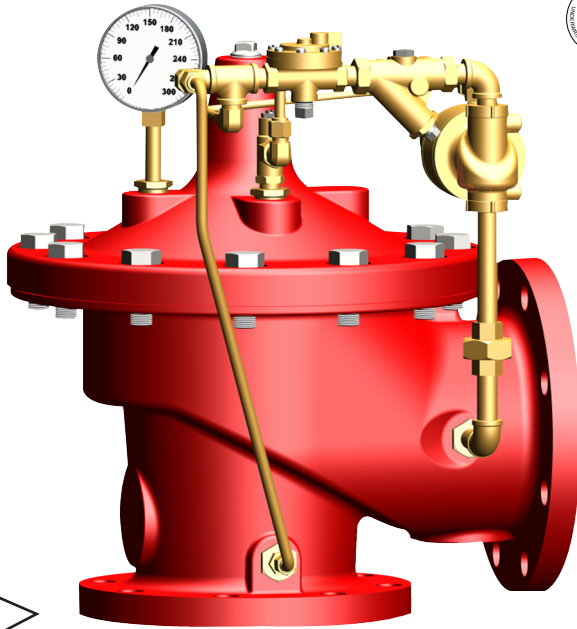
General Fax line:

++ (770) 409-3290



— MODEL — **50B-4KG-1**

Fire Protection Pressure Relief Valve



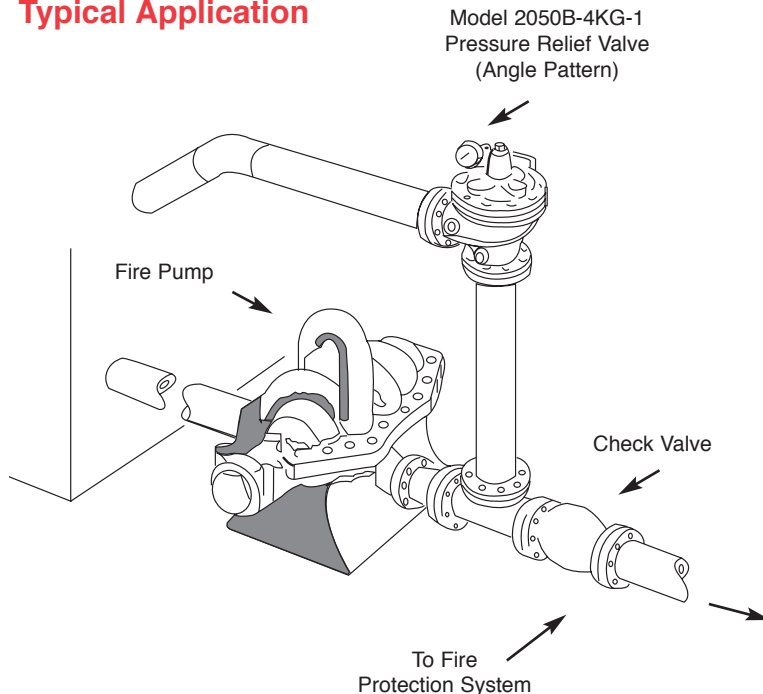
- **U.L. Listed / U.L.C. Listed**
- **Factory Mutual Approved**
- **Fast Opening to Maintain Steady Line Pressure**
- **Accommodates Wide Range of Flow Rates**
- **Closes Gradually for Surge-Free Operation**
- **Adjustable Pressure Settings, Not Affected by Pressure At Valve Discharge**

The Cla-Val Model 50B-4KG-1 Globe / 2050B-4KG Angle Pressure Relief Valve is designed specifically to automatically relieve excess pressure in fire protection pumping systems. Pilot controlled, it maintains constant system pressure at the pump discharge within very close limits as demands change.

U.L. Listed.....Sizes 3" thru 8"
F.M. Approved.....Sizes 3" thru 8"
U.L.C. Listed.....Sizes 2" thru 10"

2050B-4KG1 (Angle)

Typical Application



Operation Sequence

At pump start, Cla-Val Relief Valve modulates to relieve excess pump capacity, maintaining positive system pressure at the pump discharge.

When fire demand slows or ceases, Cla-Val Model 50B-4KG-1 opens, diverting entire pump output to discharge, allowing fire pump to be stopped without causing surging in the lines.

(Please note that if the Model 50B-4KG-1 is to be used on a continuous duty basis to maintain fire-system pressure, suitable back pressure must be provided on the valve to prevent cavitation damage. Consult the factory for details.)

"Fluid Control at It's Best"



Specifications

- Sizes** *Globe:* 2" - 12" flanged
Angle: 2" - 12" flanged
- End Details** 150 and 300 ANSI B16.42
- Pressure Ratings** class - 175 psi Max.
class - 300 psi Max
Water, to 180°F Max.
- Materials** **Main Valve Body & Cover**
Ductile Iron ASTM A-536
Naval Bronze ASTM B61
Other Material Available
Standard Main Valve Trim:
Bronze Seat, Teflon Coated
Stainless Steel Stem, Delrin Sleeved
Standard Pilot Control System:
Cast Bronze with
Stainless Steel trim
- Adjustment Range** Available in the following relief pressure ranges:
20-200 psi (150 Class)
100-300 psi (300 Class)
- Optional** Protective epoxy resin coating of wetted surfaces of main valve cast iron components (UL listed HNFx EX2855)

Purchase Specifications

The Fire Pump Pressure Relief Valve shall modulate to relieve excess pressure in a fire protection system. It shall maintain constant pressure in the system regardless of demand changes. It shall be pilot controlled and back pressure shall not affect its set point. It shall be actuated by line pressure through a pilot control system and open fast in order to maintain steady system pressure as system demand decreases. It shall close gradually to control surges and shall re-seat drip-tight within 5% of its pressure setting. The main valve shall be of the hydraulically-operated, pilot-controlled, diaphragm-type, globe or angle valve. It shall have a single, removable, teflon-coated seat, a grooved stem guided at both ends, and a resilient disc with a rectangular cross section, being contained on 3 1/2 sides. No external packing glands shall be permitted and the diaphragm shall not be used as a seating surface. The pilot control shall be a direct-acting, adjustable, spring-loaded, diaphragm-type valve designed for modulating service to permit flow when controlling pressure exceeds spring setting. This valve shall be UL Listed and Factory Mutual approved. It shall be the Model 50B-4KG-1 (globe) or Model 2050B-4KG-1 (angle) Pressure Relief Valve as manufactured by Cla-Val Newport Beach, California.

*Special Note:

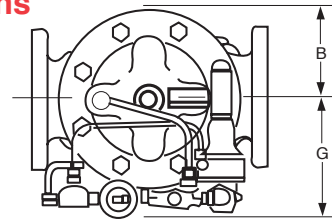
The Model 50B-4KG-1 Pressure Relief Valve is available with 300# ANSI inlet flange and 150# ANSI outlet flange. This valve is used on higher pressure systems where 300# flange connections are required, and allows for adapting of a discharge cone (generally supplied with 150# flange) to accommodate "atmospheric break" at relief valve discharge. This relief valve, with 300# / 150# flanges is available on special order, and is UNDERWRITERS LABORATORIES LISTED AND FACTORY MUTUAL APPROVED.

Specifications Seawater Service Option

Sizes *Globe:* 2" - 10" flanged
Angle: 2" - 10" flanged

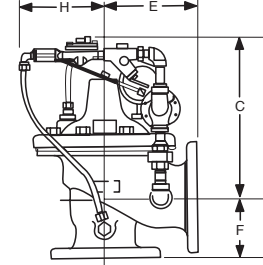
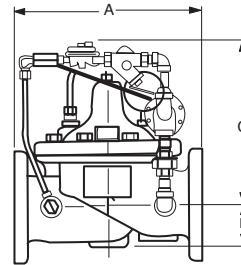
Consult factory for materials and flange ratings.

Dimensions



Model 50B-4KG-1 Globe

Model 2050B-4KG-1 Angle



We recommend providing adequate space around valve for maintenance work.

Valve Size (inches)	2"	2 1/2"	3"	4"	6"	8"	10"	12"
Threaded Ends	9.38	11.00	12.50	--	--	--	--	--
A 150 Flanged	9.38	11.00	12.00	15.00	20.00	25.38	29.75	34.00
300 Flanged	10.00	11.62	13.25	15.62	21.00	26.38	31.12	35.50
300 x 150			12.88	15.31	20.56	25.88	30.44	34.75
B	3.31	4.00	4.56	5.75	7.88	10.00	11.81	14.00
C	12.00	12.25	12.50	13.00	14.31	16.31	18.00	20.56
D	1.50	1.69	2.56	3.19	4.31	5.31	9.25	10.75
Threaded Ends	4.75	5.50	6.25	--	--	--	--	--
E 150 Flanged	4.75	5.50	6.00	7.50	10.00	12.75	14.88	17.00
300 Flanged	5.00	5.88	6.38	7.88	10.50	13.25	15.56	17.75
Threaded Ends	3.25	4.00	4.50	--	--	--	--	--
F 150 Flanged	3.25	4.00	4.00	5.00	6.00	8.00	8.62	13.75
300 Flanged	3.50	4.31	4.38	5.31	6.50	8.50	9.31	14.50
G & H	6.00	6.69	7.75	7.88	8.50	9.75	13.25	14.25

Valve Size (mm)	50	65	80	100	150	200	250	300
Threaded Ends	238	279	318	--	--	--	--	--
A 150 Flanged	238	279	305	381	508	645	756	864
300 Flanged	254	295	337	397	533	670	790	902
300 x 150	--	--	327	389	522	657	773	883
B	84	102	116	146	200	254	300	356
C	305	311	318	330	363	414	457	522
D	38	43	65	81	109	135	235	273
Threaded Ends	121	140	159	--	--	--	--	--
E 150 Flanged	121	140	152	191	254	324	378	432
300 Flanged	127	149	162	200	267	337	395	451
Threaded Ends	83	102	114	--	--	--	--	--
F 150 Flanged	83	102	102	127	152	203	219	349
300 Flanged	89	109	111	135	165	216	236	368
G & H	152	170	197	200	216	248	337	362

Valve Capacity

Valve Sizes in Inches:	2"	2 1/2"	3"	4"	6"	8"	10"	12"
NFPA 20 Maximum								
Recommended GPM	208	300	500	1000	2500	5000	11000	16000

Represented By:



CLA-VAL

PO Box 1325 Newport Beach CA 92659-0325 • Phone: 949-722-4800
Fax: 949-548-5441 • Web Site: cla-val.com • E-mail: claval@cla-val.com

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E-Mail: sales@cla-val.ca

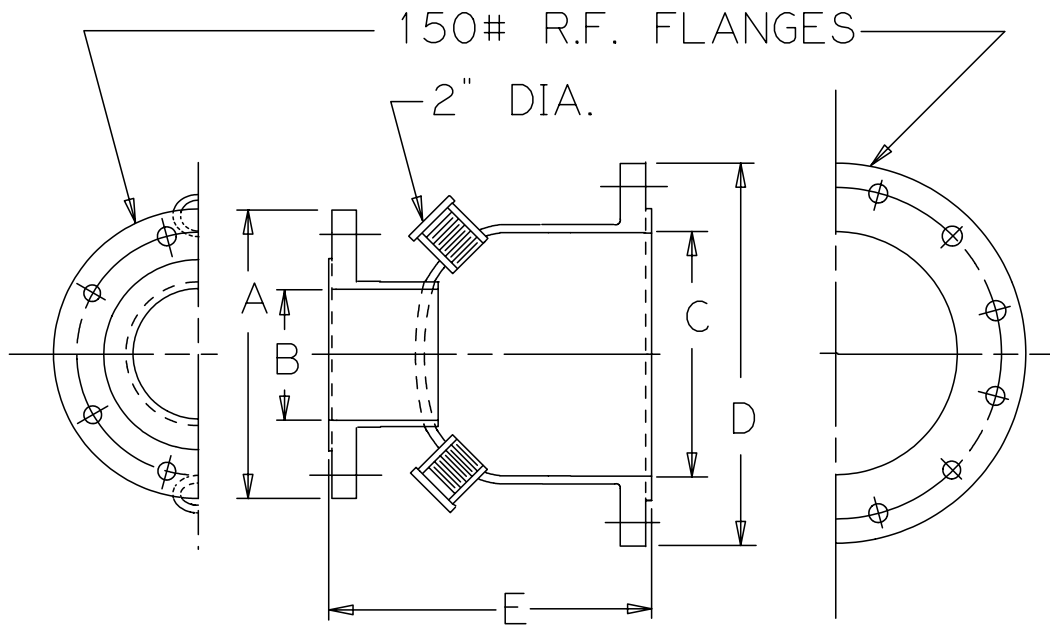
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Lausanne, Switzerland
Phone: 41-21-643-15-55
Fax: 41-21-643-15-50
E-Mail: cla-val@cla-val.ch

CLA-VAL UK

Dainton House, Goods Station Road
GB - Tunbridge Wells
Kent TN11 2 DH England
Phone: 44-1892-514-400
Fax: 44-1892-543-423
E-Mail: info@cla-val.co.uk

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GPM	SIZE	A	B	C	D	E
500	3 X 5	7.5	3	5	10	8.5
750	4 X 6	9	4	6	11	9
1000	4 X 8	9	4	8	13.5	10.25
1500	6 X 8	11	6	8	13.5	10.25
2000 2500	6 X 10	11	6	10	16	11.5
3500	8 X 12	13.5	8	12	19	13
4000	8 X 14	13.5	8	14	21	14

ALL DIMENSIONS ARE IN INCHES

DO NOT SCALE DRAWING

SPP PUMPS, INC.

6710 BEST FRIEND ROAD
NORCROSS, GA. 30071
(404) 409-3280

**WASTE CONE DIMENSIONS
OPEN & CLOSED TYPE**

DWG. NO.

WC-1

(6) 2-1/2" NPT EXTRA HEAVY HALF COUPLINGS

A-A

10"-150# R.F. FLG.

(12) 1" \varnothing HOLES EQUALLY SPACED
ON 14.25" \varnothing B.C.
HOLES TO STRADDLE C-L EQUALLY AS SHOWN

C-L

60° TYP.

A-A

10.75" \varnothing REF.

9.15 \pm .25

16" \varnothing REF.

1.18" REF.

.06" REF.

4.0" \pm .25

DO NOT SCALE DRAWING

SPP PUMPS, INC.

6710 BEST FRIEND ROAD
NORCROSS, GA. 30071
(404) 409-3280

HOSE HEADER-150# FLG.

10" X 6 OUTLETS

DWG. NO. HH-10x6-DIM

(6) 2-1/2" NPT EXTRA HEAVY HALF COUPLINGS
 LOCATE COUPLINGS AS SHOWN

8"-150# RF FLG

(8) 7/8" DIA. HOLES EQUALLY SPACED
 ON 11.75" Ø B.C.
 HOLES TO STRADDLE C-L EQUALLY AS SHOWN

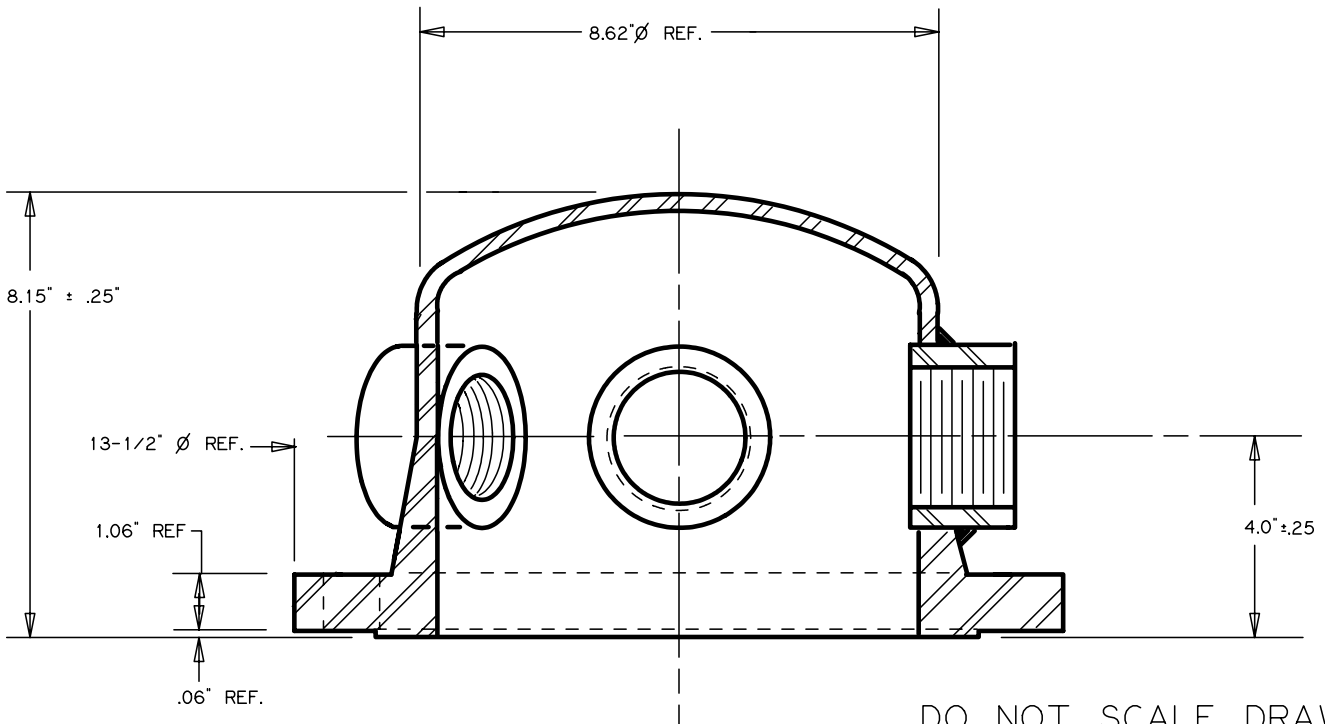
A-A

A-A

C-L

60° TYP.

22.5°



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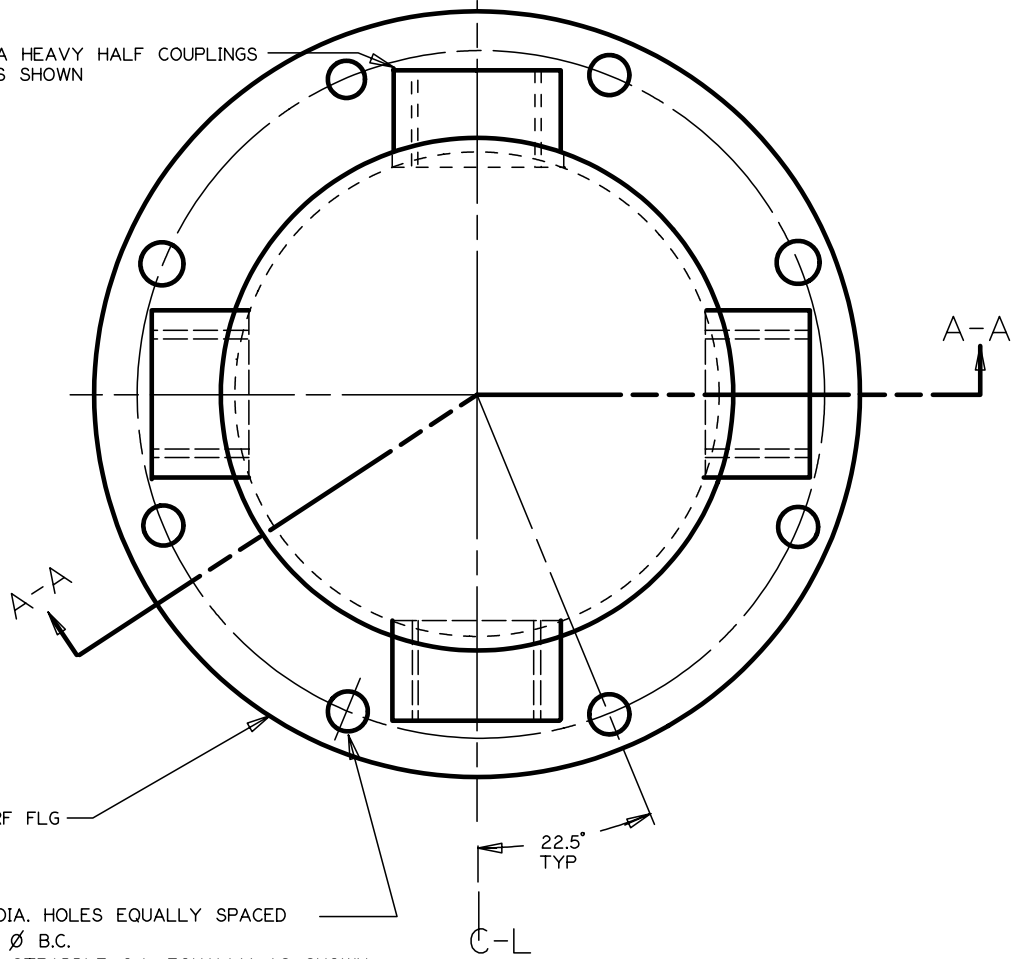
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6710 BEST FRIEND ROAD
 NORCROSS, GA. 30071
 (404) 409-3280

HOSE HEADER-150# FLG.
 8" X 6 OUTLETS

DWG. NO. HH-8x6-DIM

(4) 2-1/2" NPT EXTRA HEAVY HALF COUPLINGS
 LOCATE COUPLINGS AS SHOWN
 90° APART



8"-150# RF FLG

(8) 7/8" DIA. HOLES EQUALLY SPACED
 ON 11.75" Ø B.C.
 HOLES TO STRADDLE C-L EQUALLY AS SHOWN

8.62" Ø REF

8.15" ±.25"

13.5" Ø REF

1.06" REF

.06" REF.

4.0" ±.25

DO NOT SCALE DRAWING

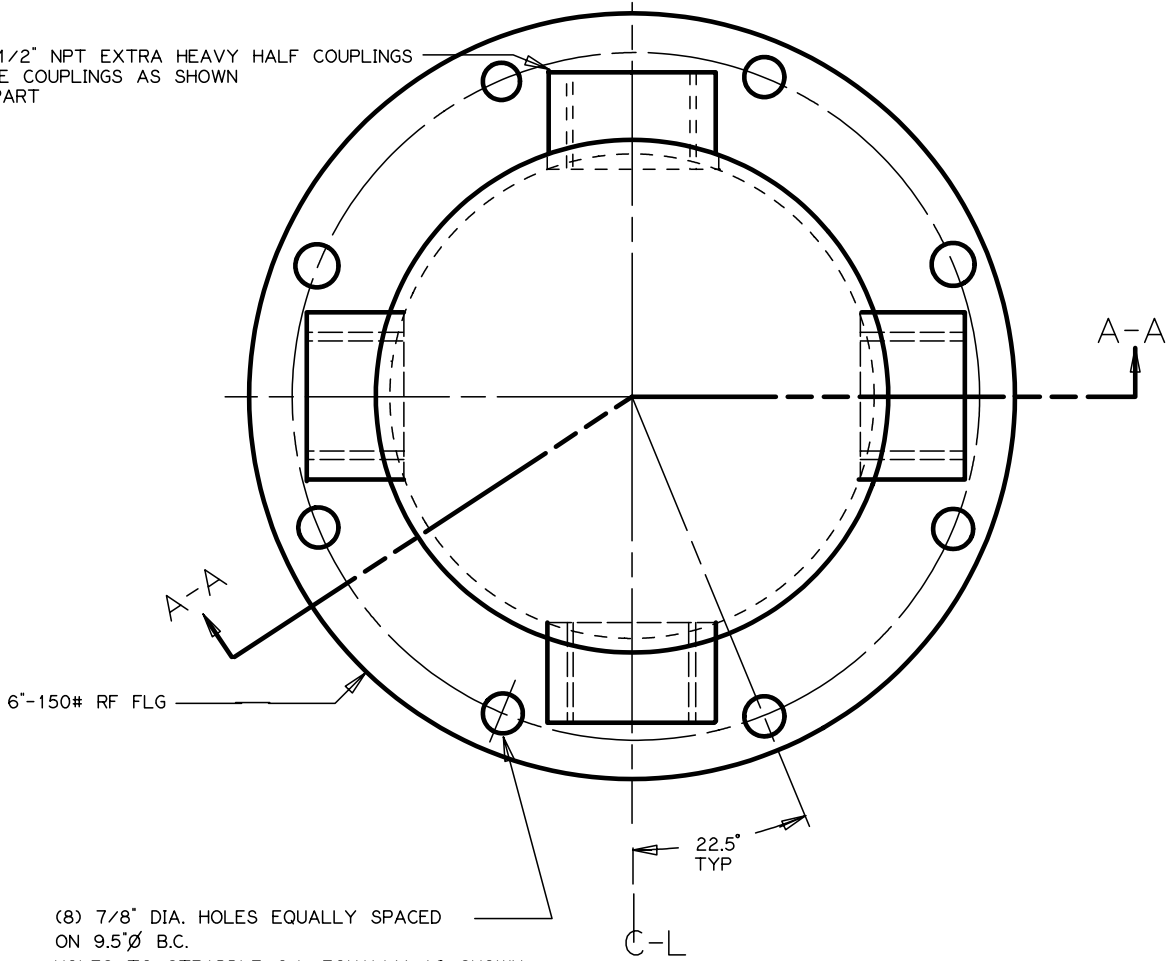
SPP PUMPS, INC.

6710 BEST FRIEND ROAD
 NORCROSS, GA. 30071
 (404) 409-3280

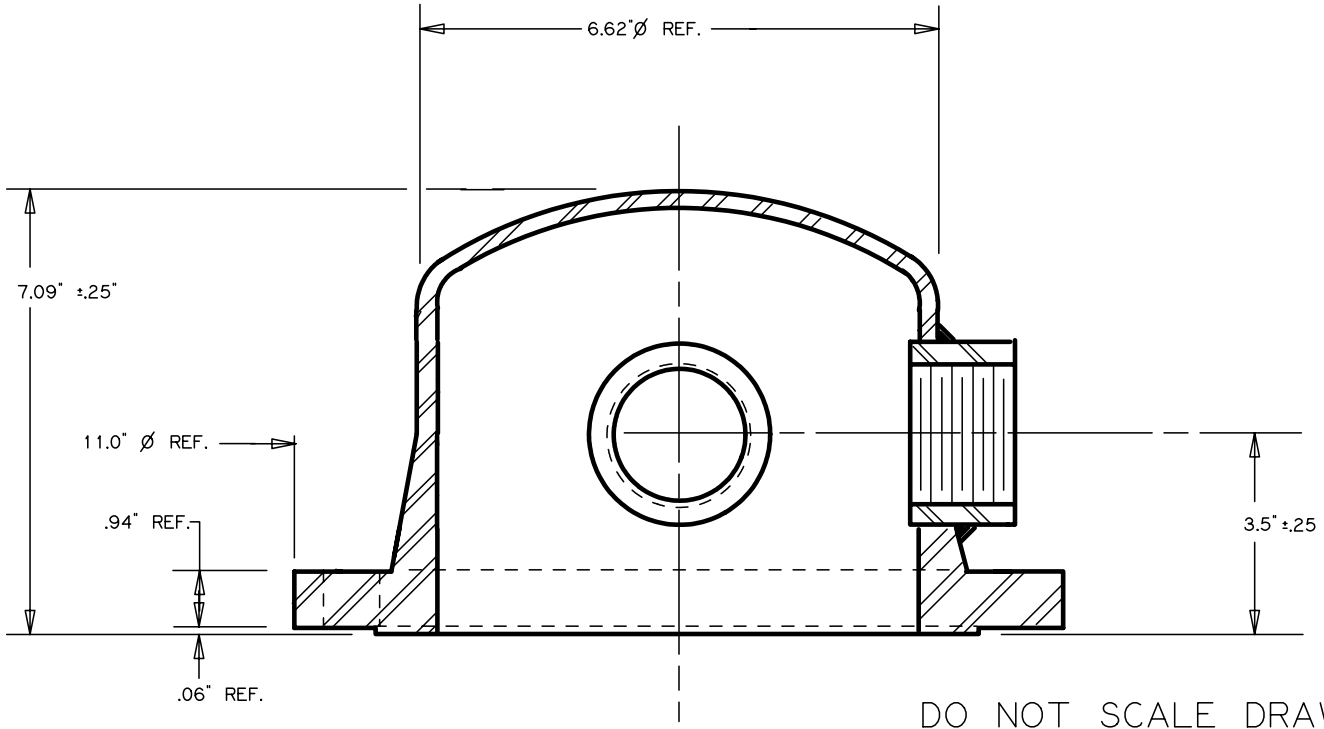
HOSE HEADER-150# FLG.
 8" X 4 OUTLETS

DWG. NO. HH-8x4-DIM

(4) 2-1/2" NPT EXTRA HEAVY HALF COUPLINGS
 LOCATE COUPLINGS AS SHOWN
 90° APART



(8) 7/8" DIA. HOLES EQUALLY SPACED
 ON 9.5" Ø B.C.
 HOLES TO STRADDLE C-L EQUALLY AS SHOWN



DO NOT SCALE DRAWING

SPP PUMPS, INC.

6710 BEST FRIEND ROAD
 NORCROSS, GA. 30071
 (404) 409-3280

HOSE HEADER-150# FLG.

6" X 4 OUTLETS

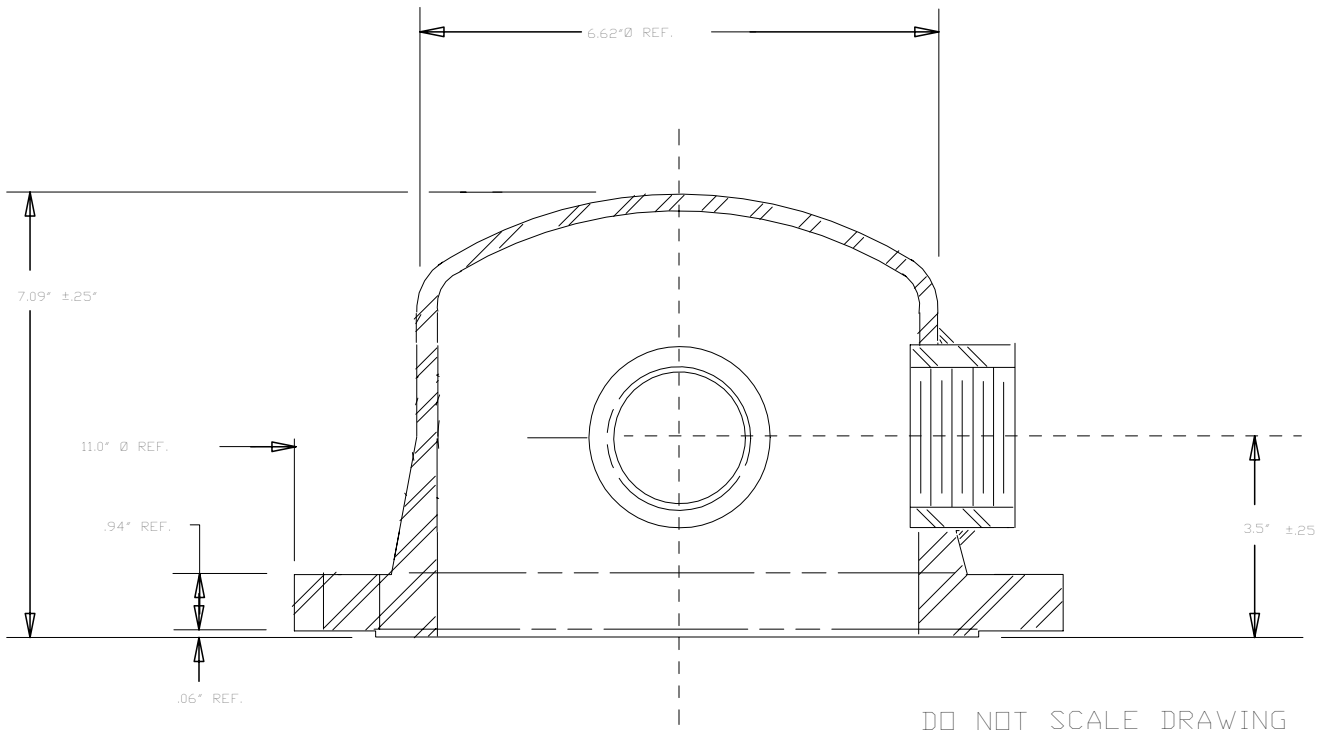
DWG. NO. HH-6x4-DIM

(3) 2-1/2" NPT EXTRA HEAVY HALF COUPLINGS
 LOCATE COUPLINGS AS SHOWN
 120° APART

6"-150# RF FLG.

(8) 7/8" DIA. HOLES EQUALLY SPACED
 ON 9.5" Ø B.C.
 HOLES TO STRADDLE C-L EQUALLY AS SHOWN

22.5° TYP
 60° TYP
 C-L



DO NOT SCALE DRAWING

SPP PUMPS, INC.

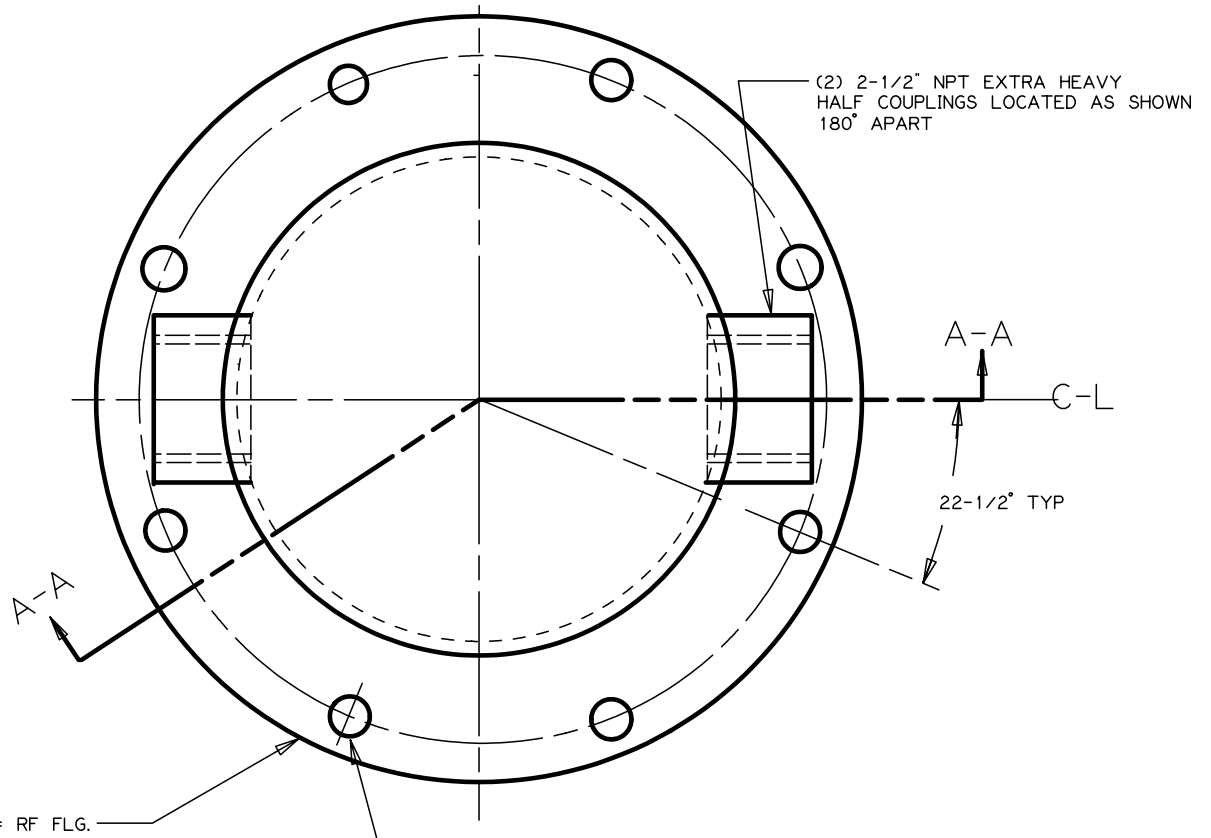
6710 BEST FRIEND ROAD
 NORCROSS, GA. 30071
 (404) 409-3280

HOSE HEADER -150# FLG.

6" X 3 OUTLETS

DWG. NO.

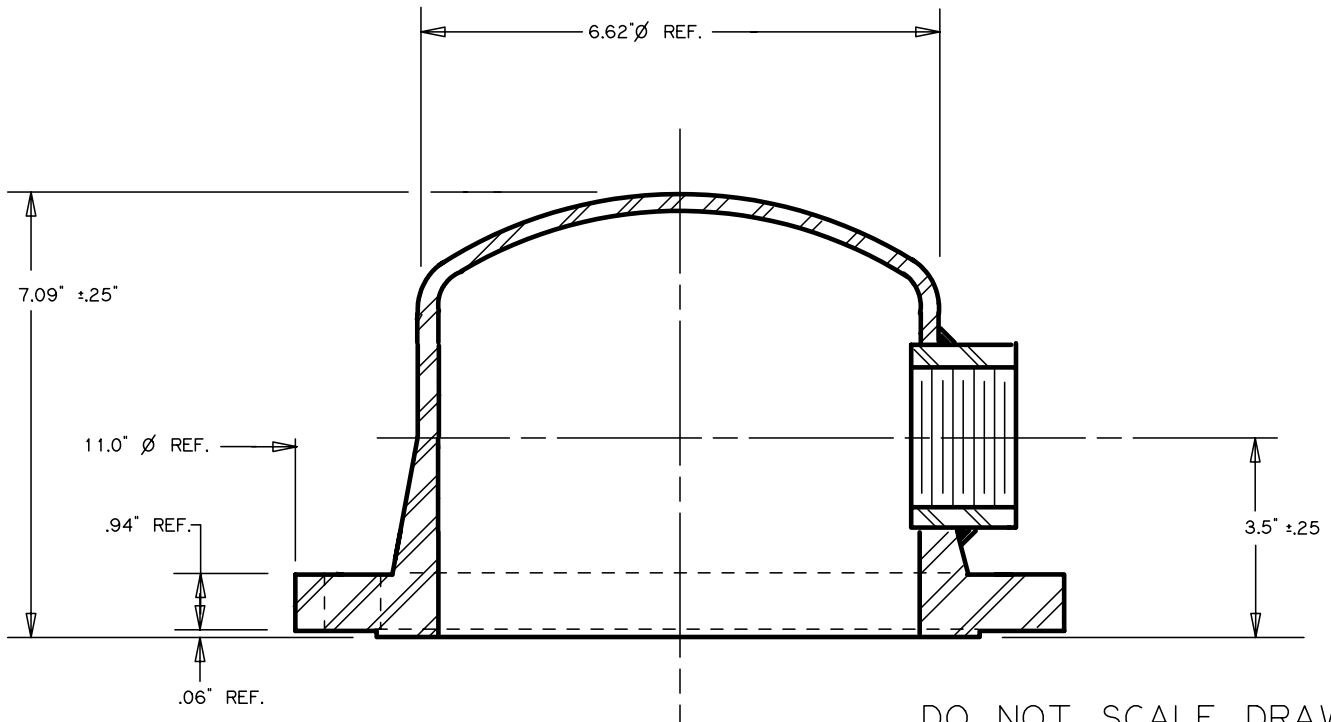
HH-6x3-DIM



(2) 2-1/2" NPT EXTRA HEAVY HALF COUPLINGS LOCATED AS SHOWN 180° APART

6"-150# RF FLG.

(8) 7/8" DIA. HOLES EQUALLY SPACED ON 9.5" Ø B.C. HOLES TO STRADDLE C-L EQUALLY AS SHOWN



DO NOT SCALE DRAWING

SPP PUMPS, INC.
 6710 BEST FRIEND ROAD
 NORCROSS, GA. 30071
 (404) 409-3280

HOSE HEADER-150# FLG.	
6" X 2 OUTLETS	
DWG. NO.	HH-6x2-DIM

(8) EXTRA HEAVY 2-1/2" NPT HALF COUPLINGS

10"-150# R.F. FLG

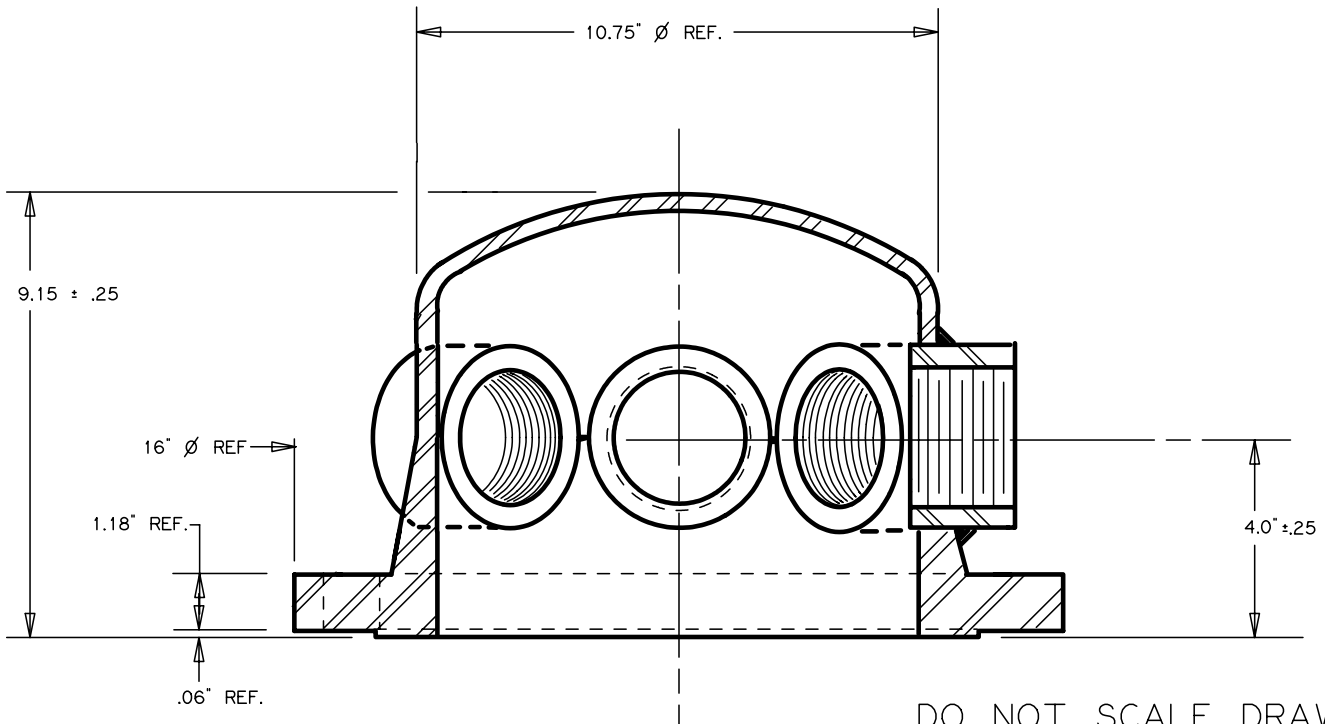
(12) 1" \varnothing HOLES EQUALLY SPACED
ON 14.25" \varnothing B.C.
HOLES TO STRADDLE C-L EQUALLY AS SHOWN

45° TYP

C-L

A-A

A-A



DO NOT SCALE DRAWING

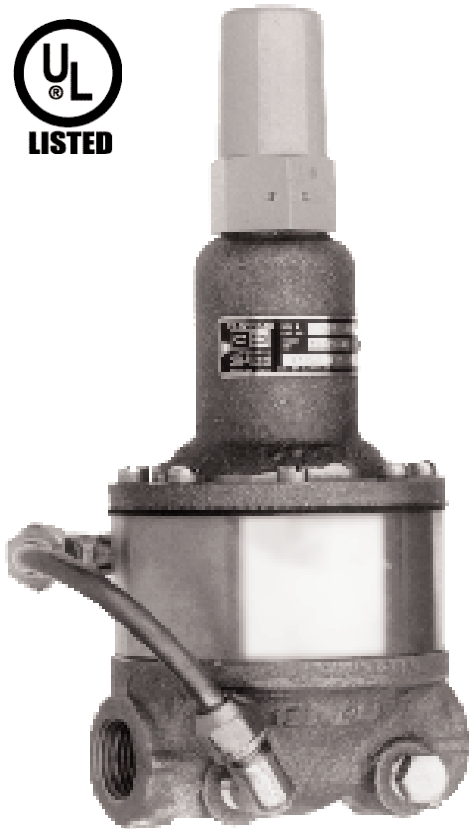
SPP PUMPS, INC.

6710 BEST FRIEND ROAD
NORCROSS, GA. 30071
(404) 409-3280

HOSE HEADER-150# FLG.
10" X 8 OUTLETS

DWG. NO. HH-10x8-DIM

Pressure Relief Valve



- **UL Listed**
- **Factory Mutual Approved**
- **Direct Acting - Precise Pressure Control**
- **Positive Dependable Opening**
- **Drip Tight Closure**
- **No Packing Glands or Stuffing Boxes**
- **Sensitive to Small Pressure Variations**

The Cla-Val Model 55L (**UL Listed FM approved**) Pressure Relief Valve is a direct-acting, spring loaded, diaphragm type relief valve. The valve may be installed in any position and will open and close within very close pressure limits.

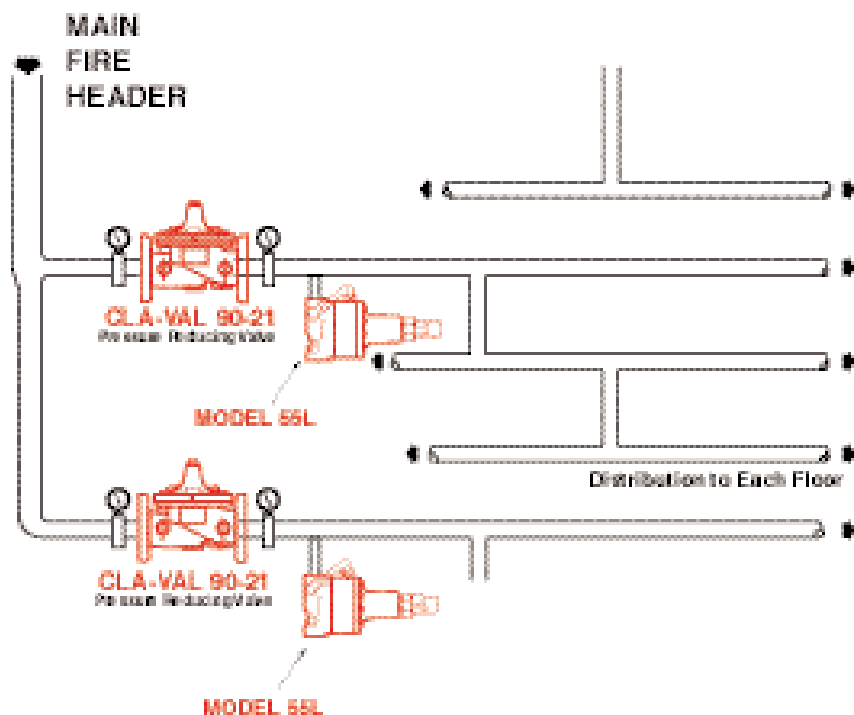
The Model 55L is normally held closed by the force of the compression spring above the diaphragm. When the controlling pressure applied under the diaphragm exceeds the spring setting, the disc is lifted off its seat, permitting flow through the control. When control pressure drops below the spring setting, the spring forces the control back to its normally closed position. The controlling pressure is applied to the chamber beneath the diaphragm through an external tube on the 55L.

Pressure adjustment is simply a matter of turning the adjusting screw to vary the spring load on the diaphragm. The 55L is available in three pressure ranges; 0 to 75 psi, 20 to 175 psi, 100 to 300 psi. To prevent tampering, the adjustment cap can be wire sealed by using the lock wire holes provided in the cap and cover.

Note: Also Available in Seawater Service Material

Typical Applications

Fire Protection System Service
Using the **Model 55L** in a fire protection system or other closed type system, prevents pressure build-up whenever line pressure exceeds the setting of the spring. The valve will relieve excess pressure to atmosphere preventing damage to the distribution network.



Specifications

Size	1/2" & 3/4" Threaded
Temperature Range	Water, Air: to 180°F Max.
Materials	
Body & Cover:	Cast Bronze ASTM B62 Stainless Steel ASTM A743-CF-16Fa
Trim:	Brass & Stainless Steel 303
Rubber:	Buna-N® Synthetic Rubber

UL Listed 55L Range psi	Approximate Increase for Each Clockwise Turn of Adjusting Screw
20 to 175	28.0 psi

FM Approved 55L Range psi	Approximate Increase for Each Clockwise Turn of Adjusting Screw
0 to 75	8.5 psi
20 to 200	28.0 psi
100 to 300	18.0 psi

Pressure Ratings Cast Bronze 400 psi Max.
Stainless Steel 400 psi Max.

Other Materials Available on special order

Adjustment Ranges 0 to 75 psi
20 to 200 psi
100 to 300 psi

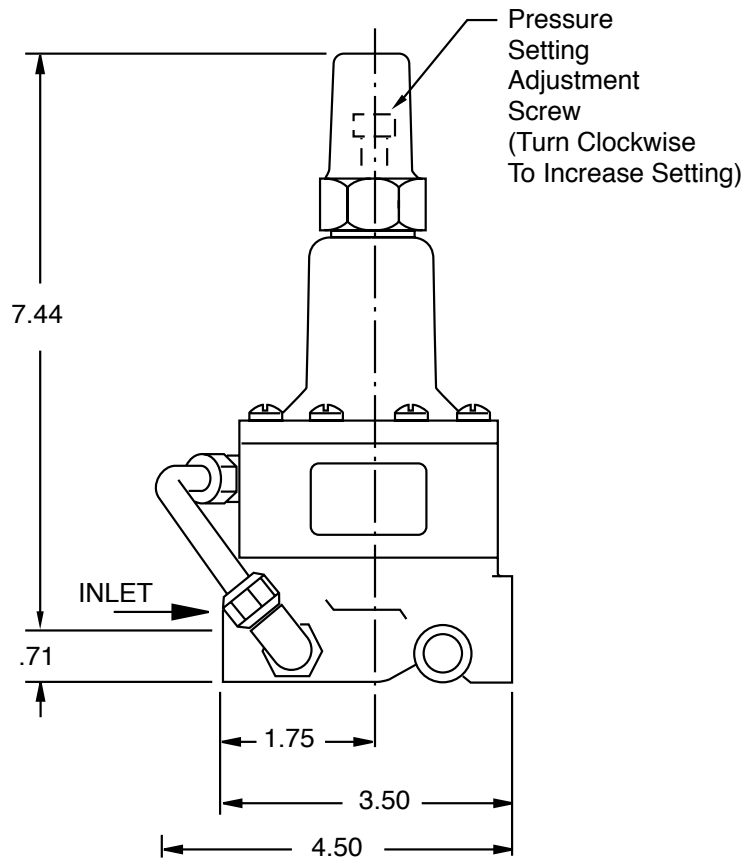
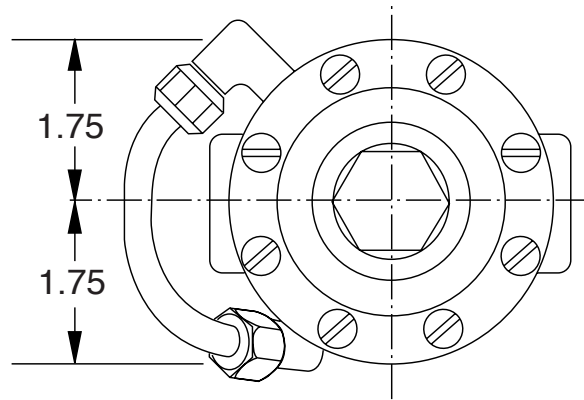
Flow Loss Chart (Full Open Valve)

Valve Size	C _v Factor	Flow of Water - Gallons Per Minute				
		5	10	15	20	30
1/2"	6	0.7	2.7	6	11	
3/4"	8.5	0.3	1.4	3.1	5.5	12.2

When Ordering, Please Specify

1. Catalog No. 55L
2. Valve Size
3. Adjustment Range Desired
4. Optional Materials

55L Basic Valve Dimensions (In Inches)



0 to 75 and 20 to 175 psi design



E-55L (R-11/05)

CLA-VAL

PO Box 1325 Newport Beach CA 92659-0325
Phone: 949-722-4800 • Fax: 949-548-5441

CLA-VAL CANADA

4687 Christie Drive
Beamsville, Ontario
Canada LOR 1B4
Phone: 905-563-4963
Fax: 905-563-4040

CLA-VAL EUROPE

Chemin d'Es Mesanges 1
CH-1032 Romanel/
Lausanne, Switzerland
Phone: 41-21-643-15-55
Fax: 41-21-643-15-50

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Specifications subject to change without notice.

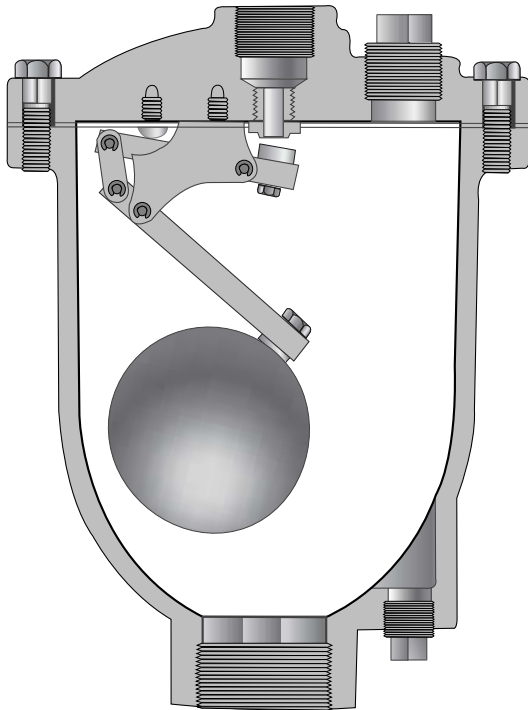
www.cla-val.com

Represented By:



Series 34

Air Release Valves



- **Stainless Steel Trim Standard**
- **Stainless Steel Floats Guaranteed**
- **Easily Serviced Without Removal From Pipeline**
- **Working Pressures to 800 PSI**
- **Engineered For Drip Tight Seal At Low Pressures**

The Cla-Val Series 34 Air Release Valve is designed to protect pipelines from entrained air that collects at high points in a pipeline. This valve continuously eliminates air from a system by releasing small amounts of air before large air pockets can occur. In many installations, continuing accumulations of air in the pipeline (lacking air release valves); flow capacity slowly decreases; power consumption slowly increases; un-noticeable at first, until flowage drops dramatically, even stopping due to air blocks in the piping. Another problem resulting from excessive air accumulation is un-explained pipeline rupture. These ruptures are passed off as the result of ground settling or defective pipe, Where as in reality its large air pockets that greatly increase pressure surges (normally occurring) when flowage stops and starts causing the rupture. During normal pipeline operation, air accumulation at the high point will displace the liquid within the air valve and lower the water level in relation to the float. As level of the liquid lowers where the float is no longer buoyant, the float drops, opens the valve orifice seat and permits the accumulated air to be exhausted to atmosphere. After air is released, the liquid level in the air valve rises and closes the valve orifice seat. This cycle automatically repeats as air accumulates inside the air release valve. Thereby preventing the formation of air pockets

Installation

Series 34 Air Release Valves are typically installed at high-points in pipelines and at regular intervals of approximate 1/2 mile along uniform grade line pipe.

Mount the unit in the vertical position on top of the pipeline with an isolation valve installed below each valve in the event servicing is required. A vault with adequate air venting and drainage is recommended.

Note:

Vacuum check valves can be supplied on the discharge of all size air release valves to prevent air re-entering the system during negative pressure conditions

Purchase Specifications

The air release valve shall be of the float operated, simple lever or compound lever design, and capable of automatically releasing accumulated air from a fluid system while the system is pressurized and operating.

An adjustable designed orifice button shall be used to seal the valve discharge port with drip-tight shut-off. The orifice diameter must be sized for use within a given operating pressure range to insure maximum air venting capacity.

General Specifications

Sizes

1/2", 3/4", 1", 2", 3" NPT

Pressure Ratings (see note)

150 psi

300 psi

800 psi

Temperature Range

Water to 180°F

Note: Specify when operating pressure below 10 PSI

Materials

Body and Cover:
Cast Iron ASTM-A-126, Class B

Float:
Stainless Steel

Internal Parts:
Stainless Steel

Seal:
Viton, Buna-N®

The float shall be of all stainless steel construction and guaranteed to withstand the designed system surge pressure without failure. The body and the cover shall be cast iron or the valve internal parts shall be stainless steel and the Viton Buna-N® for water tight shut-off.

The air release valve shall be Series 34 from Cla-Val in Newport Beach, CA, U.S.A.





AIR RELEASE VALVE DATA

Air Release Valve Sizing

- Exact air release valve sizing requires determining the volume of air that must be released from pipeline high points during normal operation and the diameter of the pipeline. Series 34 Air Release Valves are primarily used to continuously release pockets of air (as they develop) from high points. Hence it is not critical to determine exact volume of air to be released.
- If the volume of air to be released has been determined, then use the venting capacity charts on page 3 Series 34 for sizing the air release valves. Use maximum pipeline operating pressure (in psi) and flow (in SCFM) to determine orifice size. Select the largest inlet size for each series to insure adequate venting capacity.

AIR RELEASE VALVE SIZING CHART

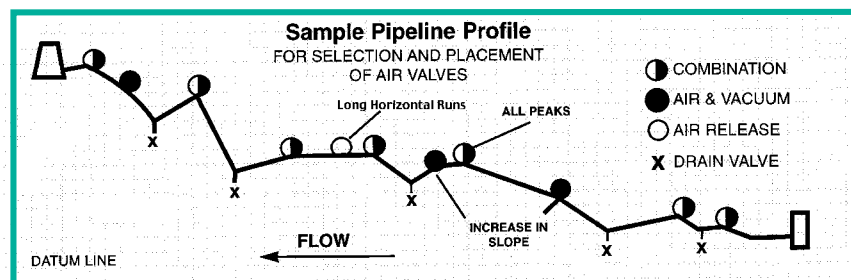
PIPE LINE DIAMETER (INCHES)	PUMPING CAPACITY (GPM)	PIPELINE OPERATING PRESSURE					
		1 TO 150 PSI			1 TO 300 PSI		
		MODEL No.	INLET SIZE	ORIFICE SIZE	MODEL No.	INLET SIZE	ORIFICE SIZE
2"-3"-4" Diameter	200/800 GPM	34AR-116	1/2"	1/16"	N/A		
		34AR-116	3/4"				
		34AR-116	1"				
6"-8"-10" Diameter	800/2,200 GPM	34AR-332	1/2"	3/32"	34AR-116.3	1/2"	1/16"
		34AR-332	3/4"		34AR-116.3	3/4"	
		34AR-332	1"		34AR-116.3	1"	
12"-14"-16" Diameter	2,200/5,000 GPM	34AR-18	3/4"	1/8"	34AR-116.3	3/4"	5/64"
		34AR-18	1"		34AR-116.3	1"	
18"-20" Diameter	5,000/15,000 GPM	34AR-316C	1"	3/16"	34AR-332.3C	1"	3/32"
		34AR-316C	2"		34AR-332.3C	2"	
24" and Larger Diameter	15,000/50000 GPM	34AR-38C	2"	3/8"	34AR-732.3C	2"	7/32"
		34AR-38C	3"		34AR-732.3C	3"	

INSTALLATION TIPS

- The effectiveness of Series 34 Air Release Valve is dependent upon it being located at appropriate high points in a pipeline and at uniform intervals of approximately 2500 feet on horizontal pipelines.
- There are four variables that can cause an air pocket to form slightly downstream of the true high point in a piping system:
 - Severity of the slope adjacent to the high point or change of gradient
 - Velocity of the liquid
 - Texture of the inside surface of the pipe being used
 - Viscosity of the fluid

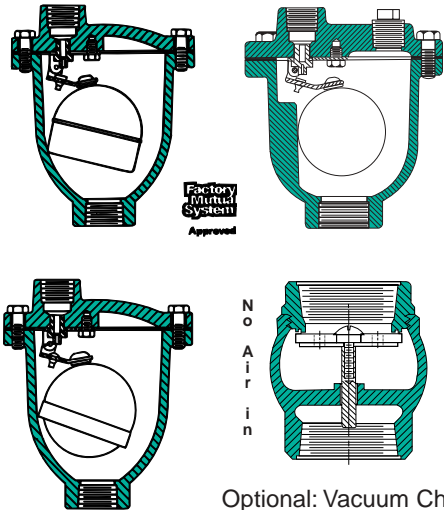
If it is thought that there is the possibility for an air pocket forming slightly downstream of the high point, it is suggested that an additional Series 34 Air Release Valve be installed at this point.

- Cla-Val has available, upon request, a Slide Rule Air Valve Calculator. It will greatly reduce the amount of time to size valves for pipeline service.



DATA AND SIZING GUIDE

Simple Lever Type

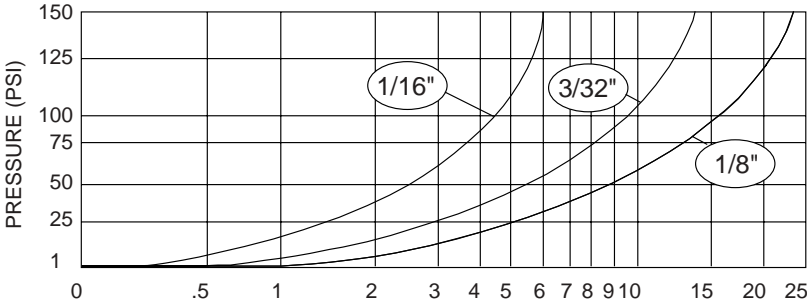


For service up to 175 psi

Optional: Vacuum Check Valve prevents air entry into system.

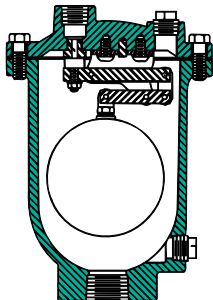
Model No.	Orifice Size	Inlet Size	Outlet Size	Max W.P.	Height	Width	Wt. lbs
34AR-116	1/16"	1/2", 3/4", 1"	3/8" NPT	175 psi	5 1/4"	4 3/4"	6
34AR-332.3	3/32"	1/2", 3/4", 1"	1/2" NPT	175 psi	6 1/4"	5 1/8"	8
34AR-018	1/8"	3/4", 1"	1/2" NPT	175 psi	7"	6 1/8"	11

VENTING CAPACITY IN CUBIC FEET OF FREE AIR/MINUTE

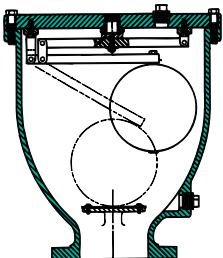


DISCHARGE OF AIR THROUGH AN ORIFICE IN S.C.F.M. (STANDARD CUBIC FEET OF FREE AIR PER MINUTE)

Compound Lever Type

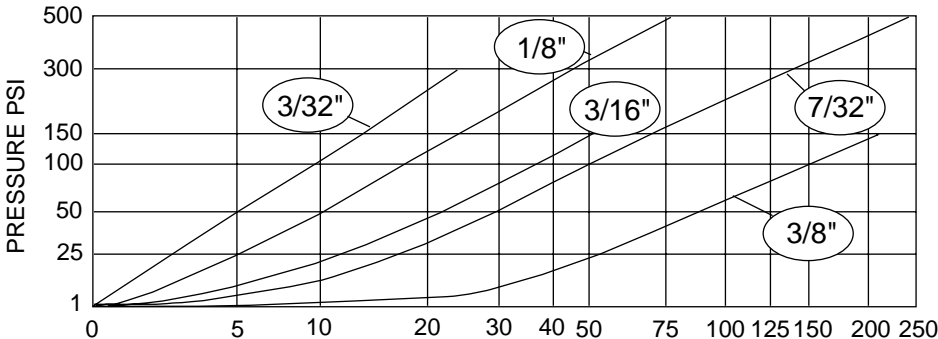


For service up to 800 psi



6" Air Release Valve

Model No.	Orifice Size	Inlet Size	Outlet Size	Max W.P.	Height	Width	Wt. lbs
34AR-316C	3/16"	1" NPT	1/2" NPT	175 psi	10"	7"	23
34AR-332.3C	3/32"	1" NPT	1/2" NPT	300 psi	6 1/4"	5 1/8"	23
34AR-316C	3/16"	2" NPT	1/2" NPT	175 psi	10"	7"	23
34AR-332.3C	3/32"	2" NPT	1/2" NPT	300 psi	10"	7"	23
34AR-038C	3/8"	2" NPT	1" NPT	175 psi	12-1/4"	9 1/2"	44
34AR-732.3C	7/32"	2" NPT	1" NPT	300 psi	12-1/4"	9 1/2"	44
34AR-038C	3/8"	3" NPT	1" NPT	175 psi	12-1/4"	9 1/2"	44
34AR-732.3C	7/32"	3" NPT	1" NPT	300 psi	12-1/4"	9 1/2"	44
34AR-732.2C	7/32"	2" NPT	1" NPT	500 psi	13"	10 7/8"	72
34AR-018.2C	1/8"	2" NPT	1" NPT	800 psi	13"	10 7/8"	77
34AR-1.6C	1"	6" FLG	1" NPT	150 psi	22"	18 3/4"	200



DISCHARGE OF AIR THROUGH AN ORIFICE IN S.C.F.M. (STANDARD CUBIC FEET OF FREE AIR PER MINUTE)

When Ordering, Please Specify:

1. Model Number
2. Inlet Size (NPT)
3. Inlet Pressure Rating
4. Orifice Size

Bourdon Tube Pressure Gauge Type 111.10SP Sprinkler Gauge Standard Series

WIKA Datasheet 111.10SP

Applications

- Fire sprinkler systems
- Suitable for all media that will not obstruct the pressure system or attack copper alloy parts

Special features

- UL-listed (UL-393), United States and Canada
- Factory Mutual (FM) approved
- Reliable and economical

Standard Features

Design

EN 837-1 & ASME B40.100

Sizes

4" (100 mm)

Accuracy class

± 3/2/3% of span (ASME B40.100 Grade B)

Ranges

0/80 psi, retard to 250 psi (air)

0/300 psi (water)

Working pressure

Steady: 3/4 of full scale value

Fluctuating: 2/3 of full scale value

Short time: full scale value

Operating temperature

Ambient: -40°F to 140°F (-40°C to 60°C)

Media: 140°F (+60°C) maximum

Temperature error

Additional error when temperature changes from reference temperature of 68°F (20°C) ±0.4% for every 18°F (10°C) rising or falling. Percentage of span.

Bourdon tube

Material: copper alloy

C-type



Bourdon Tube Pressure Gauge Type 111.10SP

Pressure connection

Material: copper alloy
1/4" NPT lower mount (LM)

Movement

Copper alloy

Dial

White aluminum with stop pin; black and red lettering

Pointer

Black aluminum

Case

Black polycarbonate

Window

Snap-in clear polycarbonate

Approvals

UL listed (UL-393)

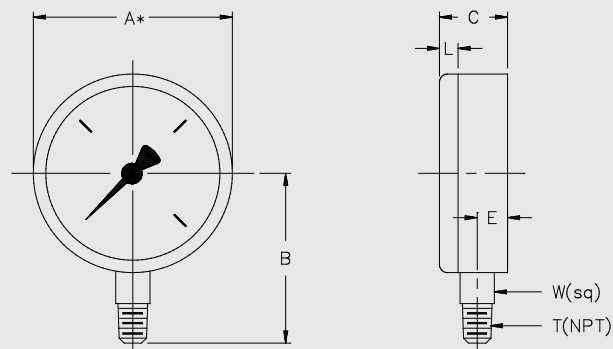
Factory Mutual

Optional Extras

(not all options are UL or FM approved)

- Brass restrictor
- Friction-fit cover ring (requires steel case)
- Glass window (requires steel case & friction ring)
- Black-painted steel case
- Stainless steel case
- Special case colors
- Nickel-plated connection
- Custom dial layout
- Special threaded connection
- Custom dial layout
- Other pressure scales available:
bar, kPa, MPa, kg/cm² and dual scales

Dimensions



Size		A	B	C	E	L	T	W	Weight
4"	mm	100	83.5	30	11.5	3.75		14	
	in	4.0	3.29	1.18	0.45	0.15	1/4"	0.55	0.35 lb.

Ordering information

Pressure gauge model / Nominal size / Scale range / Size of connection / Optional extras required
 Specifications and dimensions given in this leaflet represent the state of engineering at the time of printing.
 Modifications may take place and materials specified may be replaced by others without prior notice.

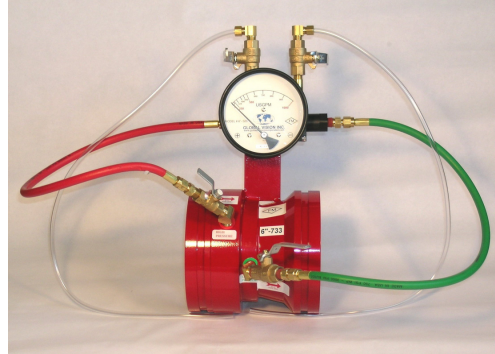


WIKAL Instrument Corporation
 1000 Wiegand Boulevard
 Lawrenceville, GA 30045
 Tel (770) 513-8200 Toll-free 1-888-WIKA-USA
 Fax (770) 338-5118
 E-Mail info@wika.com
 www.wika.com



GLOBAL VISION INC.

VENTURI FIRE PUMP FLOW SYSTEM



DATED 07-01-07

Line Size	Pump GPM	Meter Range Min. & Max. GPM	Model Number Grooved	Model Number Butt Weld	Model Number 150# Flanged	Model Number <Threaded> *300# FLANGED*
**1-1/4"	25	12.5 – 50	* 1.25"-25-G	1.25"-25-B	* 1.25"-25-F	1.25"-25-T
**2"	50	25 – 100	* 2"-50-G	2"-50-B	* 2"-50-F	2"-50-T
**2-1/2"	100	50 - 200	2.5"-100-G	2.5"-100-B	2.5"-100-F	*2.5"-100-F3
3"	150	75 – 300	3"-150-G	3"-150-B	3"-150-F	*3"-150-F3
3"	200	100 – 400	3"-200-G	3"-200-B	3"-200-F	*3"-150-F3
4"	250	125 – 500	4"-250-G	4"-250-B	4"-250-F	*4"-250-F3
4"	300	150 – 600	4"-300-G	4"-300-B	4"-300-F	*4"-300-F3
4"	400	200 – 800	4"-400-G	4"-400-B	4"-400-F	*4"-400-F3
4"	450	225 – 900	4"-450-G	4"-450-B	4"-450-F	*4"-450-F3
5"	450	225 – 900	5"-450-G	5"-450-B	5"-450-F	*5"-450-F3
5"	500	250 – 1000	5"-500-G	5"-500-B	5"-500-F	*5"-500-F3
5"	750	375 – 1500	5"-750-G	5"-750-B	5"-750-F	*5"-750-F3
6"	500	250 – 1000	6"-500-G	6"-500-B	6"-500-F	6"-500-F3
6"	750	375 – 1500	6"-750-G	6"-750-B	6"-750-F	6"-750-F3
6"	1000	500 – 2000	6"-1000-G	6"-1000-B	6"-1000-F	6"-1000-F3
6"	1250	625 - 2500	6"-1250-G	6"-1250-B	6"-1250-F	6"-1250-F3

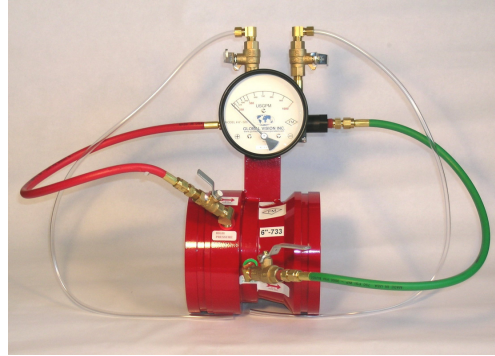
*** DENOTES NON-STOCK ITEM, PLEASE CHECK WITH FACTORY FOR AVAILABILITY**

****SIZES 1-1/4", 2", 2-1/2", & 14" ARE NOT FM APPROVED PER FACTORY MUTUAL****



GLOBAL VISION INC.

VENTURI FIRE PUMP FLOW SYSTEM



DATED 07-01-07

Line Size	Pump GPM	Meter Range Min. & Max. GPM	Model Number Grooved	Model Number Butt Weld	Model Number Flanged	Model Number 300 # Flanged
8"	1000	500 – 2000	8"-1000-G	8"-1000-B	8"-1000-F	8"-1000-F3
8"	1250	625 – 2500	8"-1250-G	8"-1250-B	8"-1250-F	8"-1250-F3
8"	1500	750 – 3000	8"-1500-G	8"-1500-B	8"-1500-F	8"-1500-F3
8"	2000	1000 – 4000	8"-2000-G	8"-2000-B	8"-2000-F	8"-2000-F3
8"	2500	1250 – 5000	8"-2500-G	8"-2500-B	8"-2500-F	8"-2500-F3
8"	3000	1500 – 6000	8"-3000-G	8"-3000-B	8"-3000-F	8"-3000-F3
10"	1500	750 – 3000	10"-1500-G	10"-1500-B	10"-1500-F	10"-1500-F3
10"	2000	1000 – 4000	10"-2000-G	10"-2000-B	10"-2000-F	10"-2000-F3
10"	2500	1250 – 5000	10"-2500-G	10"-2500-B	10"-2500-F	10"-2500-F3
10"	3000	1500 – 6000	10"-3000-G	10"-3000-B	10"-3000-F	10"-3000-F3
10"	3500	1750 – 7000	10"-3500-G	10"-3500-B	10"-3500-F	10"-3500-F3
10"	4000	2000 – 8000	10"-4000-G	10"-4000-B	10"-4000-F	10"-4000-F3
10"	4500	2250 – 9000	10"-4500-G	10"-4500-B	10"-4500-F	10"-4500-F3
12"	2500	1250 – 5000	* 12"-2500-G	* 12"-2500-B	* 12"-2500-F	*12"-2500-F3
12"	3000	1500 – 6000	* 12"-3000-G	* 12"-3000-B	* 12"-3000-F	*12"-3000-F3
12"	3500	1750 – 7000	* 12"-3500-G	* 12"-3500-B	* 12"-3500-F	*12"-3500-F3
12"	4000	2000 – 8000	* 12"-4000-G	* 12"-4000-B	* 12"-4000-F	*12"-4000-F3
12"	4500	2250 – 9000	* 12"-4500-G	* 12"-4500-B	* 12"-4500-F	*12"-4500-F3
12"	5000	2500 - 10000	12"-5000-G	12"-5000-B	12"-5000-F	12"-5000-F3
**14"	4000	2000 – 8000	*14"-4000-G	*14"-4000-B	*14"-4000-F	*14"-4000-F3
**14"	4500	2250 – 9000	*14"-4500-G	*14"-4500-B	*14"-4500-F	*14"-4500-F3
**14"	5000	2500 - 10000	*14"-5000-G	*14"-5000-B	*14"-5000-F	*14"-5000-F3
**14"	6000	3000- 12000	*14"-6000-G	*14"-6000-B	*14"-6000-F	*14"-6000-F3

*** DENOTES NON-STOCK ITEM, PLEASE CHECK WITH FACTORY FOR AVAILABILITY**

****SIZES 1-1/4", 2", 2-1/2", & 14" ARE NOT FM APPROVED PER FACTORY MUTUAL****

EVMU(L) / EVMUG

Model EVMU(L) / EVMUG

EBARA Stainless Steel Vertical Multistage

Contents

Item No.	Specifications	Selection Chart	Performance Curve	Pump Dimensions	Sectional View
EVMU(L)3	803	804	805	815	823-826
EVMU(L)5			806		
EVMU(L)10			807	817	829-834
EVMU(L)18			808		
EVMUG32			809	819, 821	839
EVMUG45			810		
EVMUG64			811	820, 821	841



Features

- **Standard NEMA motors**
- **Integral thrust bearing on 5 HP and larger pumps to handle axial thrust loads**
- **Air vent** in casing cover allows proper venting preventing air entrapment and dry run
- **Liner ring** is a self-aligning, floating design constructed to prevent swelling at high temperatures
- **Tungsten carbide lower pump bearings** and sleeves are standard construction for all services, providing maximum operating life
- **Direct drive** pump and motor shafts are keyed for positive, reliable power transmission with **no adjustments necessary**
- **“Flexible” floating outer casing** allows for thermal expansion in hot water applications, preventing deformation due to pressure fluctuations
- **Anti-erosion measures** – a dish-shaped insert is fitted to the intermediate casing designed to promote smooth flow and prevent high velocity areas that accelerate erosion
- **Square-edge spline shaft** provides positive location and drive of impellers eliminating wear from sliding between faces
- **Dimensions & flanges** – installation is to market accepted dimensions for easy upgrade of existing installations
- **Mechanical seal** – Silicon/Carbon/Viton mechanical shaft seal; cartridge seal standard on Models 32, 45, and 64
- **Positive Sealing** – O-rings between intermediate casings provide positive sealing

Applications

- **Water Supply**
- **Reverse Osmosis**
- **Water Boosting**
- **Washing Systems**
- **Fire Fighting**
- **Water Treatment Plants**
- **Boiler Feed**
- **Hot & Cold Water**
- **Circulation**
- **Irrigation**
- **Sprinkler Systems**
- **Filtration**
- **Heat Exchangers**

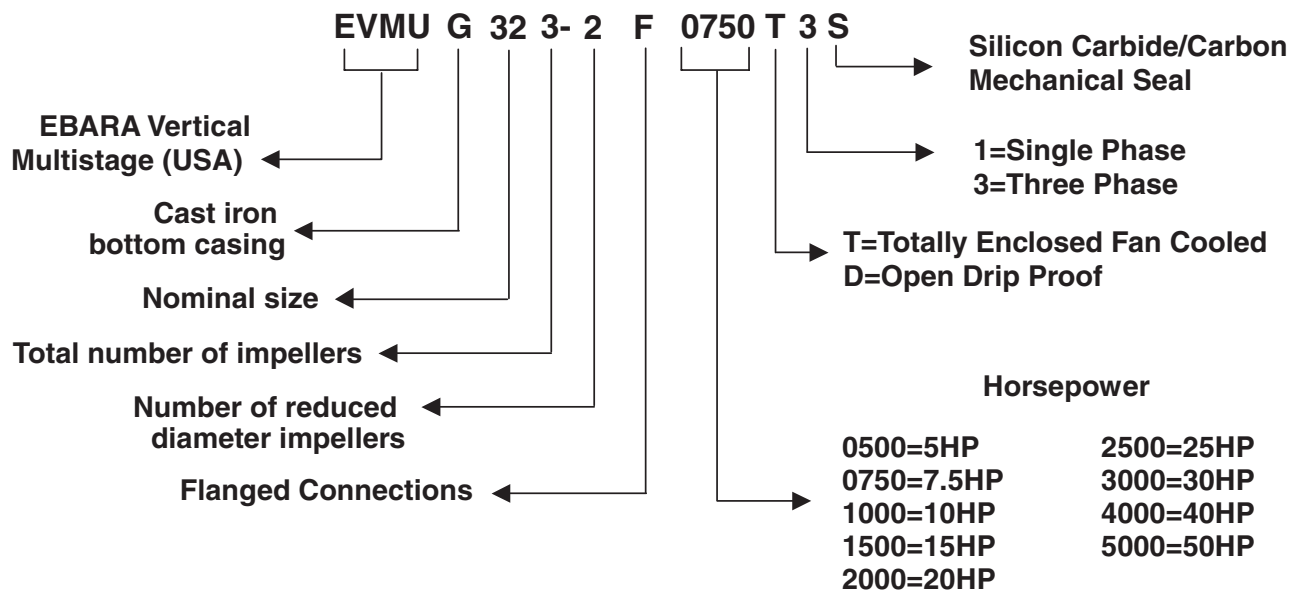
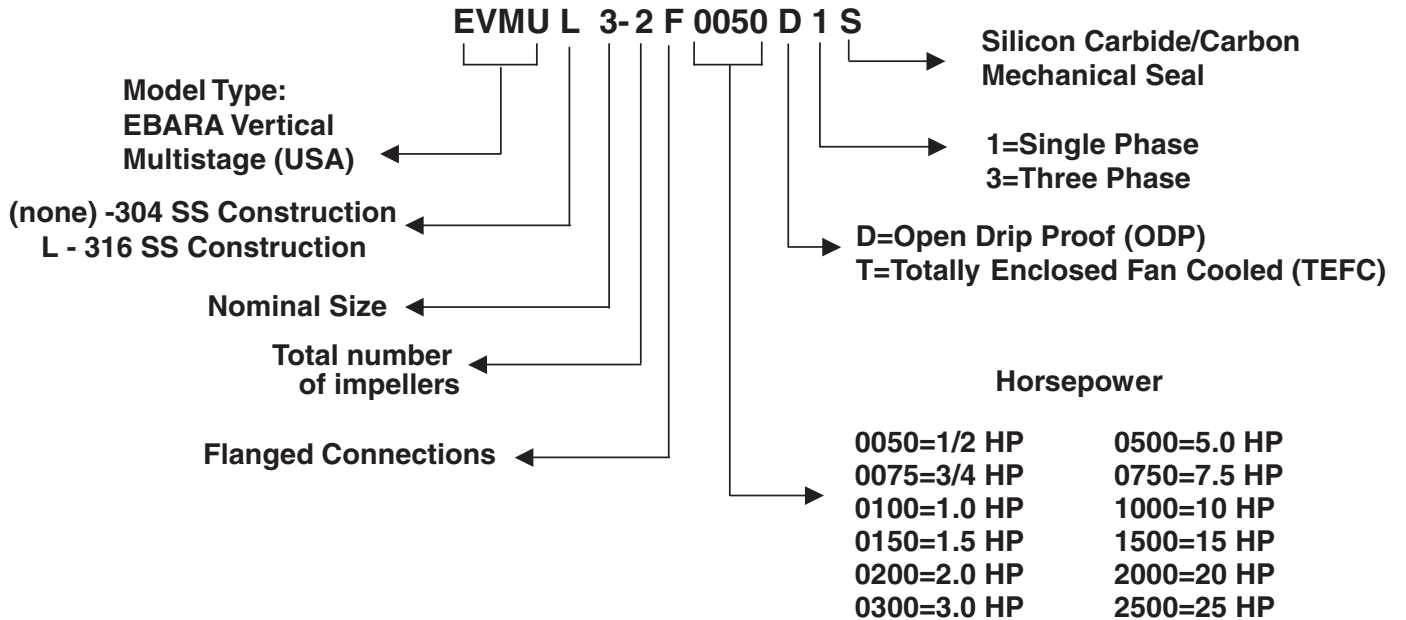


EVMU(L) / EVMUG

Model EVMU(L) / EVMUG

EBARA Stainless Steel Vertical Multistage

Model Designation



EVMU(L) / EVMUG

Model EVMU(L) / EVMUG

EBARA Stainless Steel Vertical Multistage

Specifications

	EVMU/EVMUL	EVMUG	
Size			
Suction	ANSI raised face 1 1/4" for EVMU 3 and 5 2" for EVMU 10 and 18	ANSI raised face 2 1/2" for EVMUG32 3" for EVMUG45 4" for EVMUG64	
Discharge	1 1/4" for EVMU 3 and 5 2" for EVMU 10 and 18	2 1/2" for EVMUG32 3" for EVMUG45 4" for EVMUG64	
Range of HP	1/2 to 25HP	5 to 50HP	
Range of Performance	at 3450 RPM		
Capacity	4 to 118 GPM	66 to 390 GPM	
Head	27 to 830 feet	44 to 930 feet	
Liquid handled	Clean water		
Type of liquid	5° to +248°F (-15° to 120°C)		
Temperature	360 PSI (25 Bar) max.		
Working pressure	to 430PSI (30 Bar) max.		
Materials	EVMU	EVMUL	EVMUG
Impeller (closed centrifugal)	AISI 304	AISI 316	AISI 304
Intermediate casing	AISI 304	AISI 316	AISI 304
Bottom casing	AISI 304	AISI 316	Cast iron
Casing cover	AISI 304	AISI 316	Cast iron
Outer casing	AISI 304	AISI 316	AISI 304
Shaft	AISI 316	AISI 316	AISI 316
Liner ring		PTFE/AISI 316	
Motor bracket	Cast iron/304	Cast iron/316	Cast iron
Base	Cast iron/304	Cast iron/316	Cast iron
Pump Bearing	Sealed ball bearing/tungsten carbide		
Shaft Seal			
Mechanical seal	Standard *optional cartridge type		Cartridge type EVMUG32, 45, 64 Balanced seal for: EVMUG 32 9 EVMUG 32 10-1
Material	Silicon/Carbide/Carbon/FPM		
Motor			
Type	NEMA C/TC/TSC frame		<i>Consult factory for optional motor types</i>
Speed	60 Hz, 3450 RPM (2 poles)		
Three Phase	208-230/460V		
Direction of Rotation	Clockwise when viewed from motor end		
Test standard	ISO 9906 annex A		



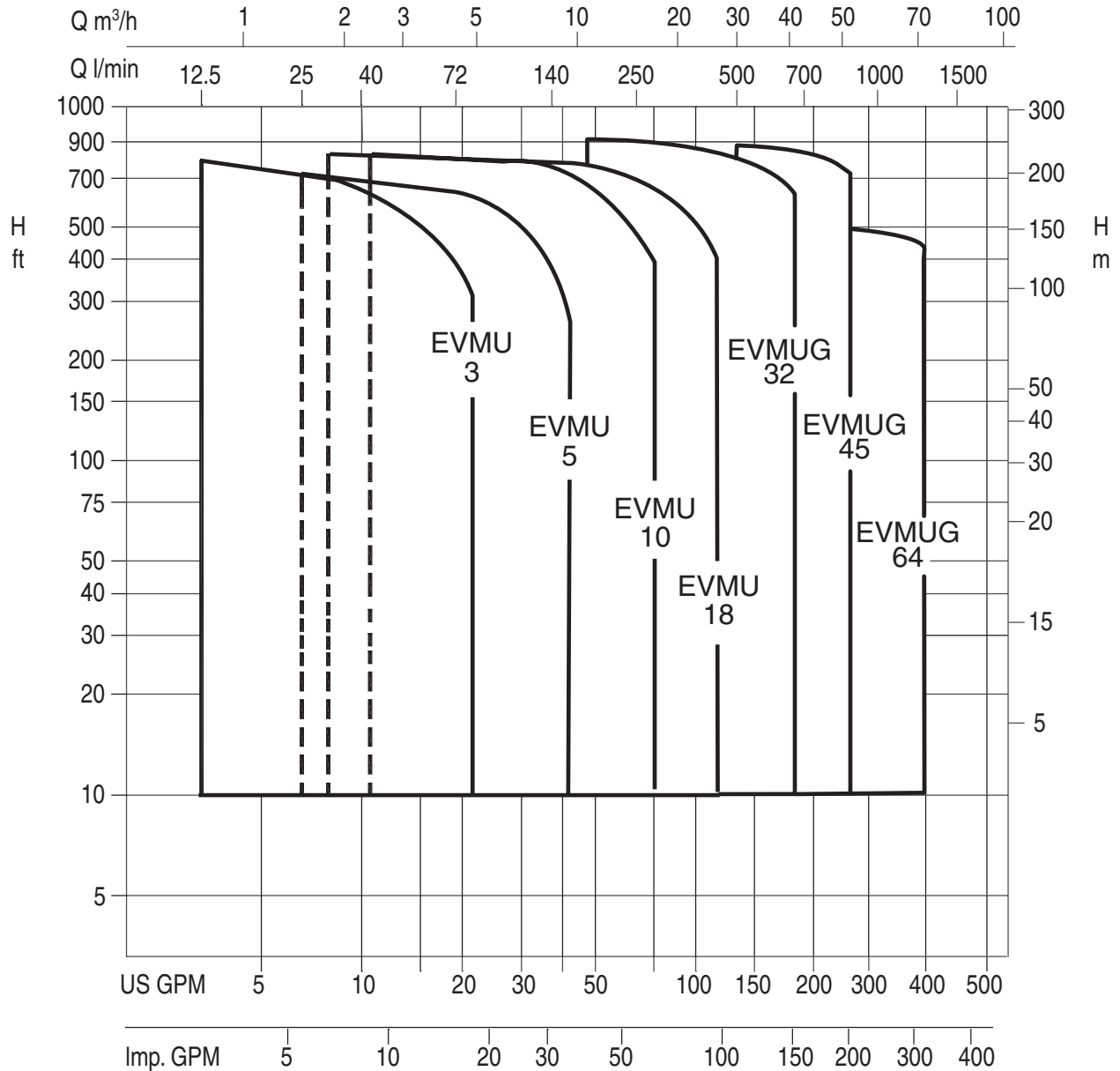
EVMU(L) / EVMUG

Model EVMU(L) / EVMUG

EBARA Stainless Steel Vertical Multistage

Selection chart

60 Hz, Synchronous Speed 3450 RPM



EVMU(L) / EVMUG

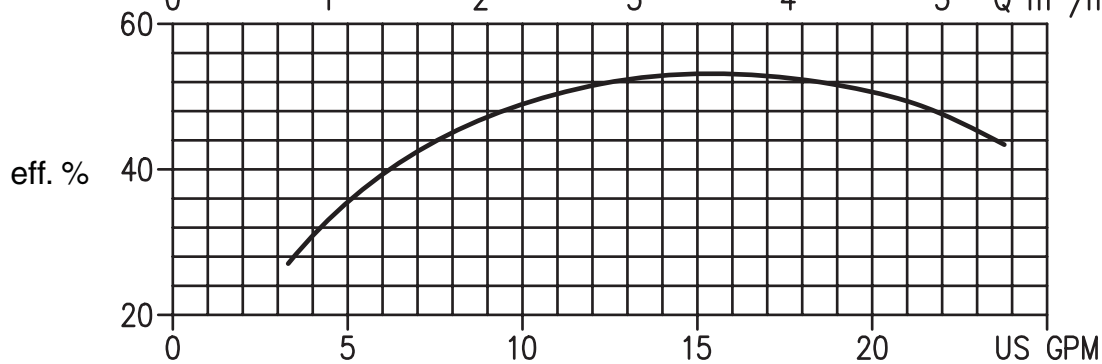
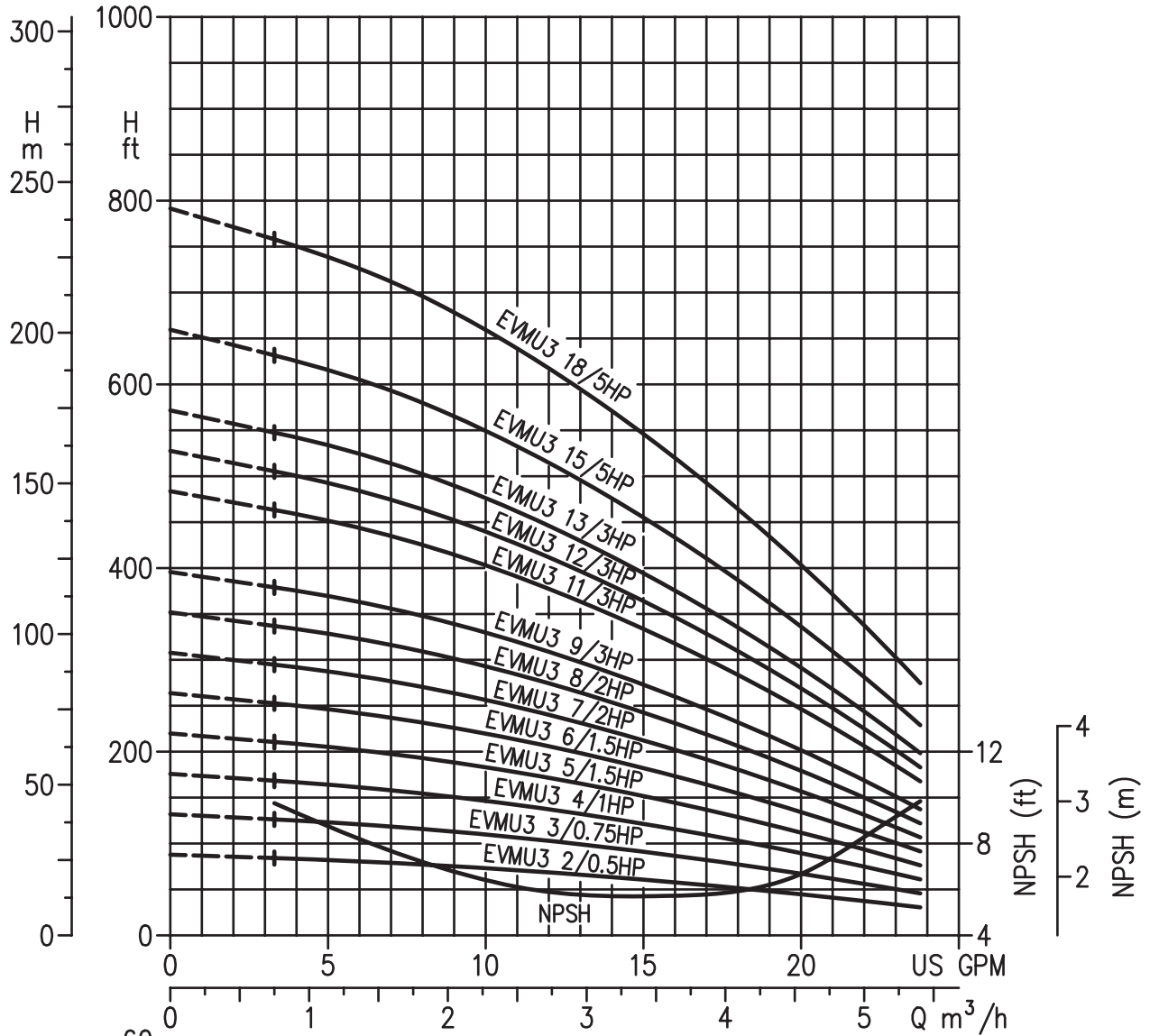
Model EVMU / EVMUL
Performance Curves

EBARA Stainless Steel Vertical Multistage
EVMU 3 1/2HP - 5HP

EVMU3 2 - EVMU3 18

Synchronous Speed: 3450 RPM

250# ANSI 1 1/4" 4-Bolt



Water Temperature: 20° C (68° F)



EVMU(L) / EVMUG

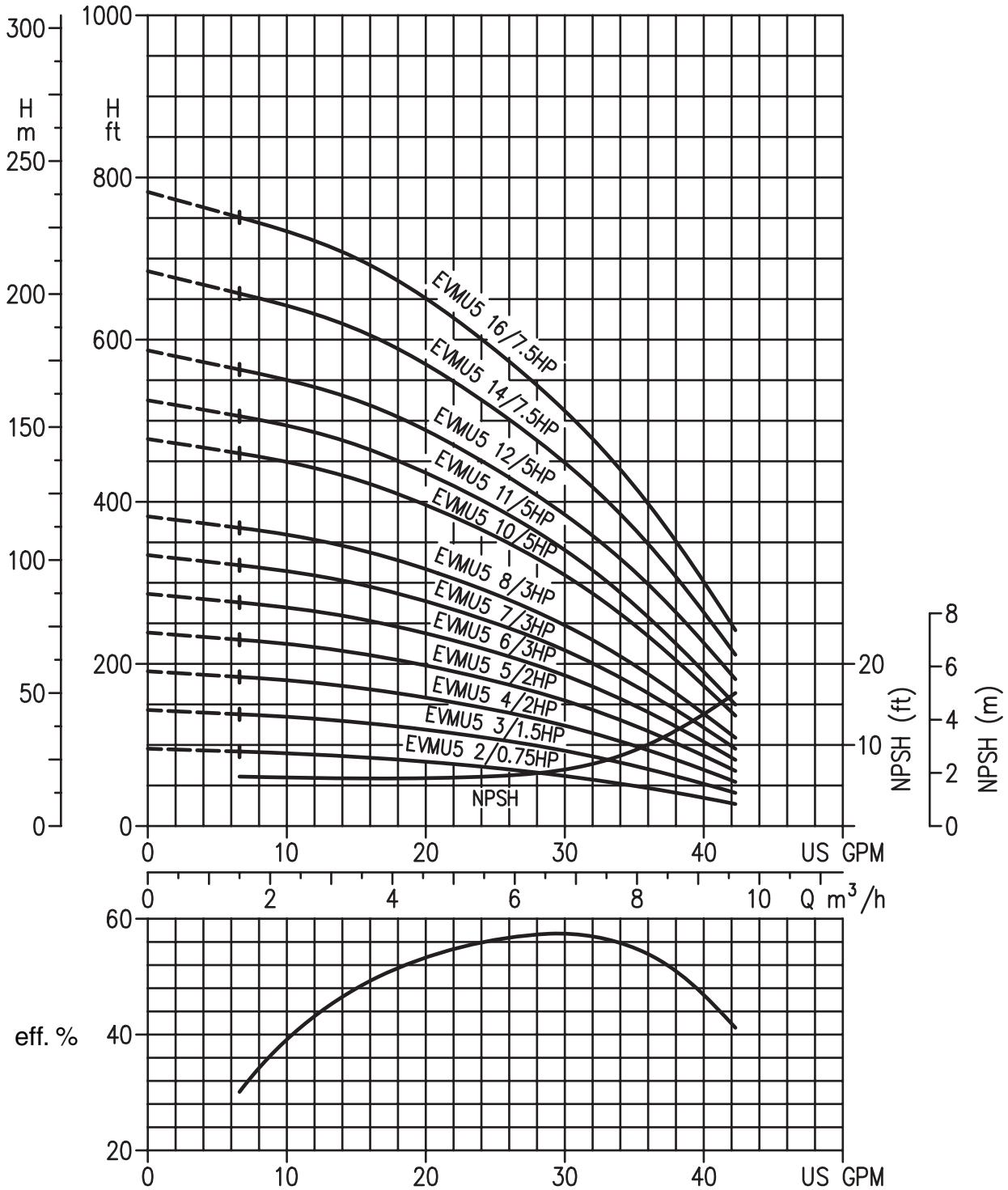
Model EVMU / EVMUL
Performance Curves

EBARA Stainless Steel Vertical Multistage
EVMU5 3/4 HP - 7 1/2 HP

EVMU5 2 - EVMU5 16

Synchronous Speed: 3450 RPM

250# ANSI 1 1/4" 4-Bolt



Water Temperature: 20° C (68° F)



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rev. 07/06

EVMU(L) / EVMUG

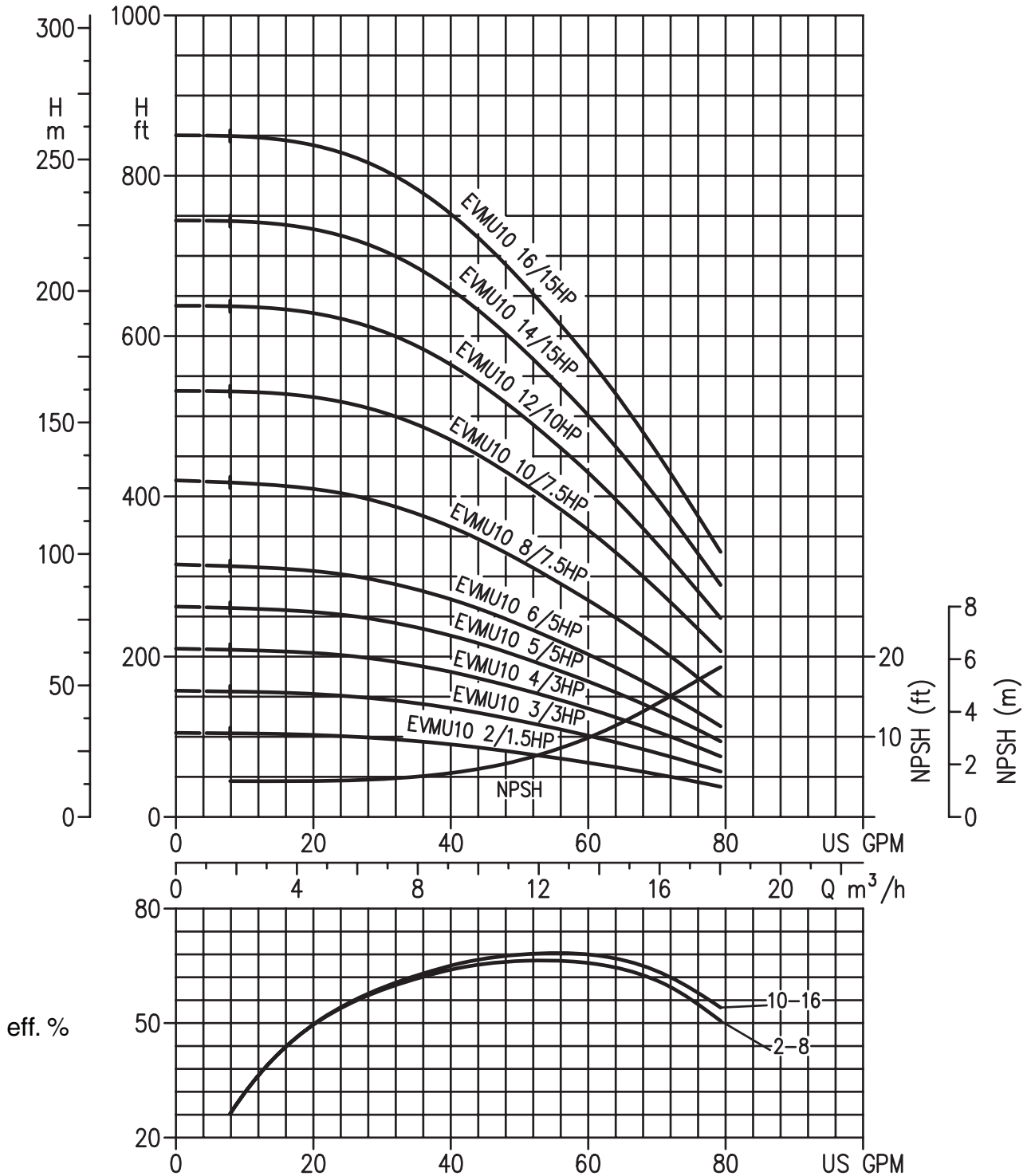
Model EVMU / EVMUL
Performance Curves

EBARA Stainless Steel Vertical Multistage
EVMU10 1½ HP -7½ HP

EVMU10 2 - EVMU10 16

Synchronous Speed: 3450 RPM

250# ANSI 2" 8-Bolt



Water Temperature: 20° C (68° F)



EVMU(L) / EVMUG

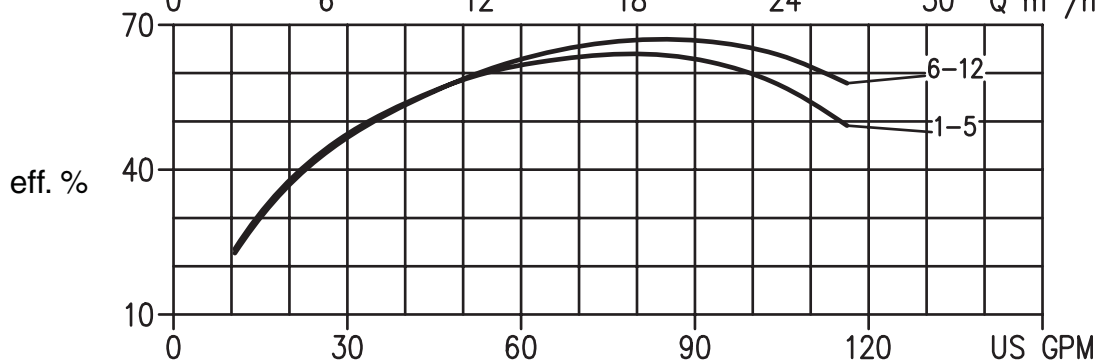
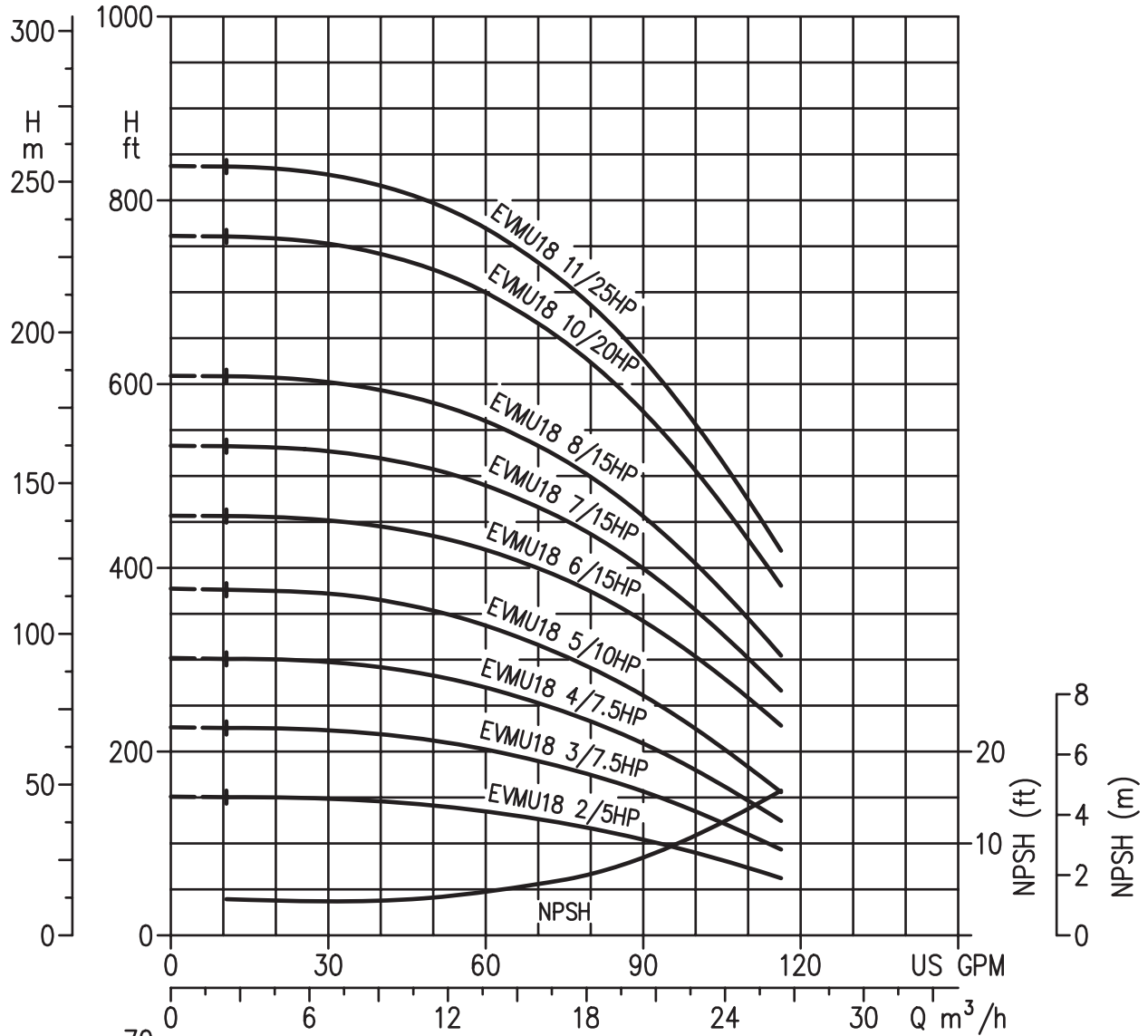
Model EVMU / EVMUL
Performance Curves

EBARA Stainless Steel Vertical Multistage
EVMU18 5HP - 25HP

EVMU18 2 - EVMU18 11

Synchronous Speed: 3450 RPM

250# ANSI 2" 8-Bolt



Water Temperature: 20° C (68° F)



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EVMU / EVMUG

Model EVMUG

EBARA Stainless Steel Vertical Multistage

Performance Curves

EVMUG32 5HP - 40HP

EVMUG32 1 – EVMUG32 4-3

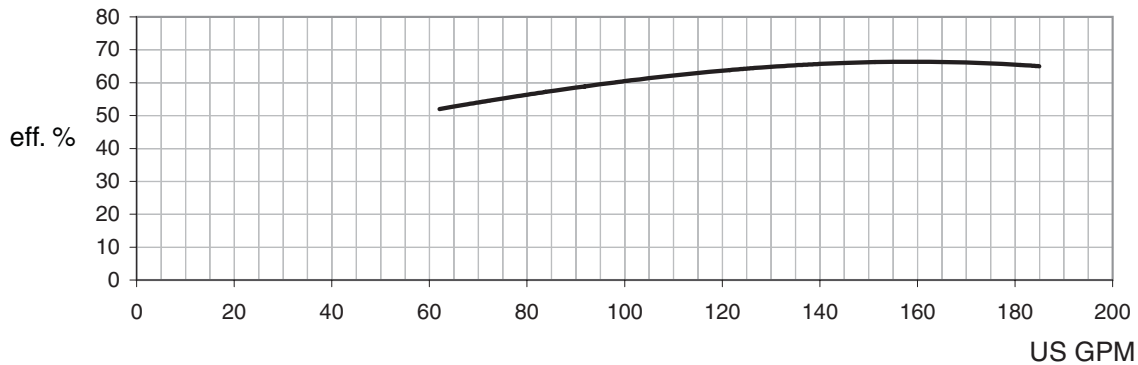
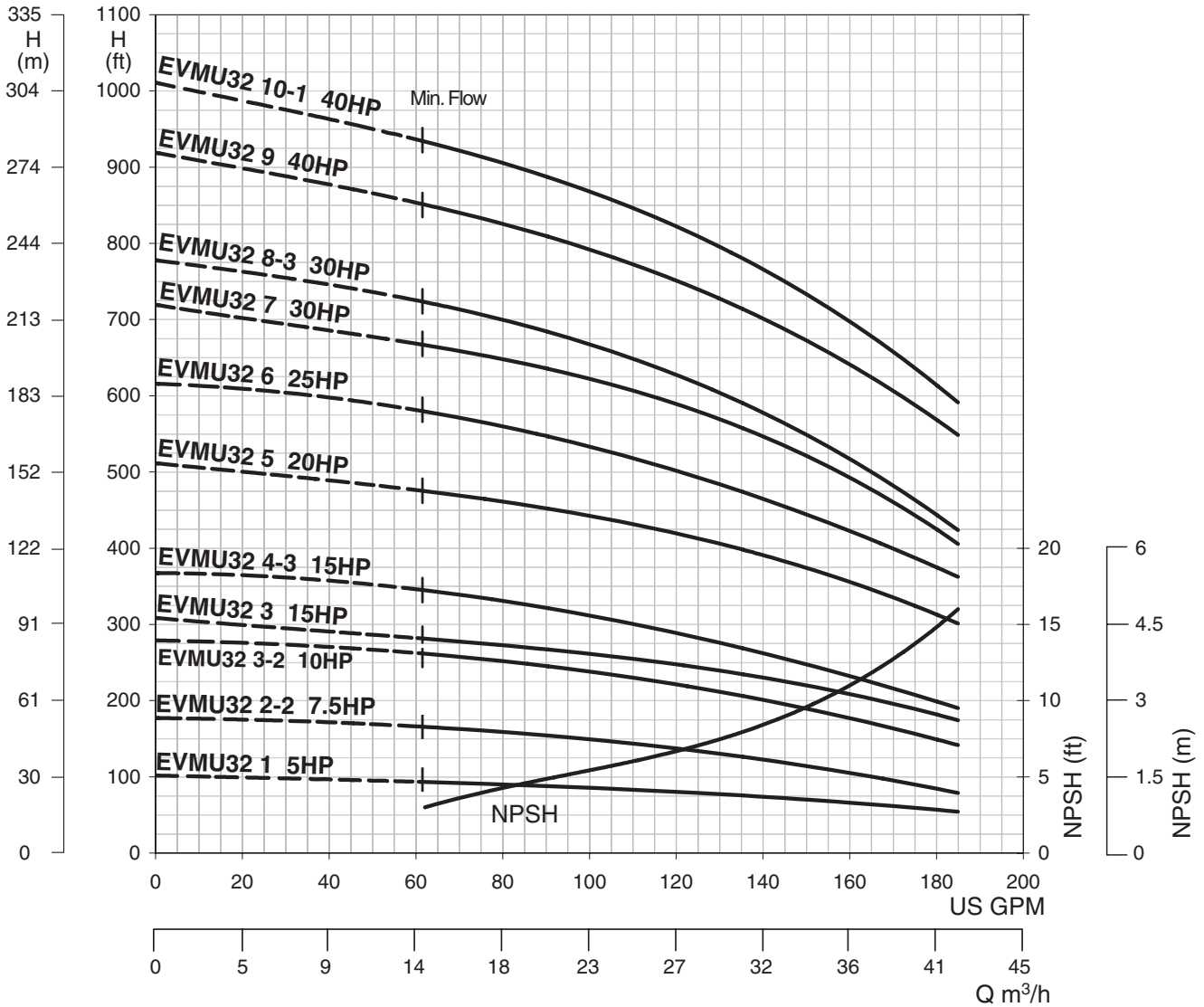
3500RPM

150# ANSI 2½" 4-Bolt

EVMUG32 5 – EVMUG32 10-1

3500RPM

300# ANSI 2½" 8-Bolt



Water Temperature: 20° C (68° F)



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EVMU / EVMUG

Model EVMUG
Performance Curves

EBARA Stainless Steel Vertical Multistage
EVMUG45 7.5HP - 50HP

EVMUG45 1-1 – EVMUG45 3

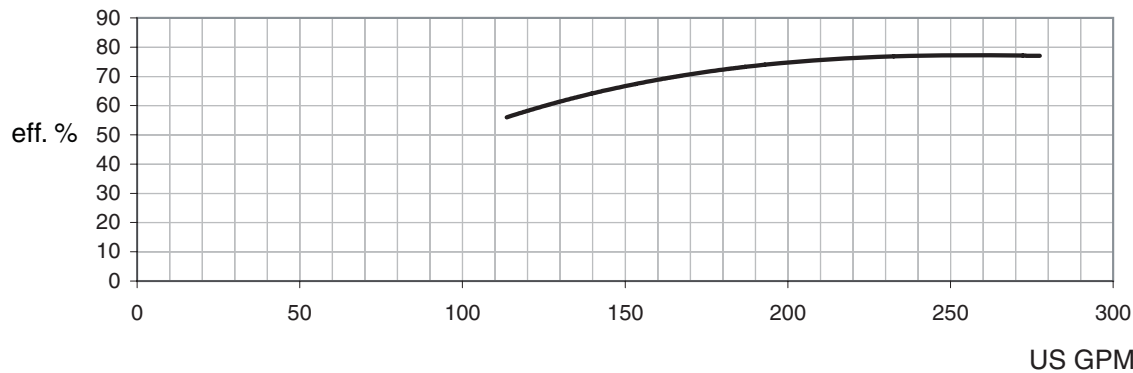
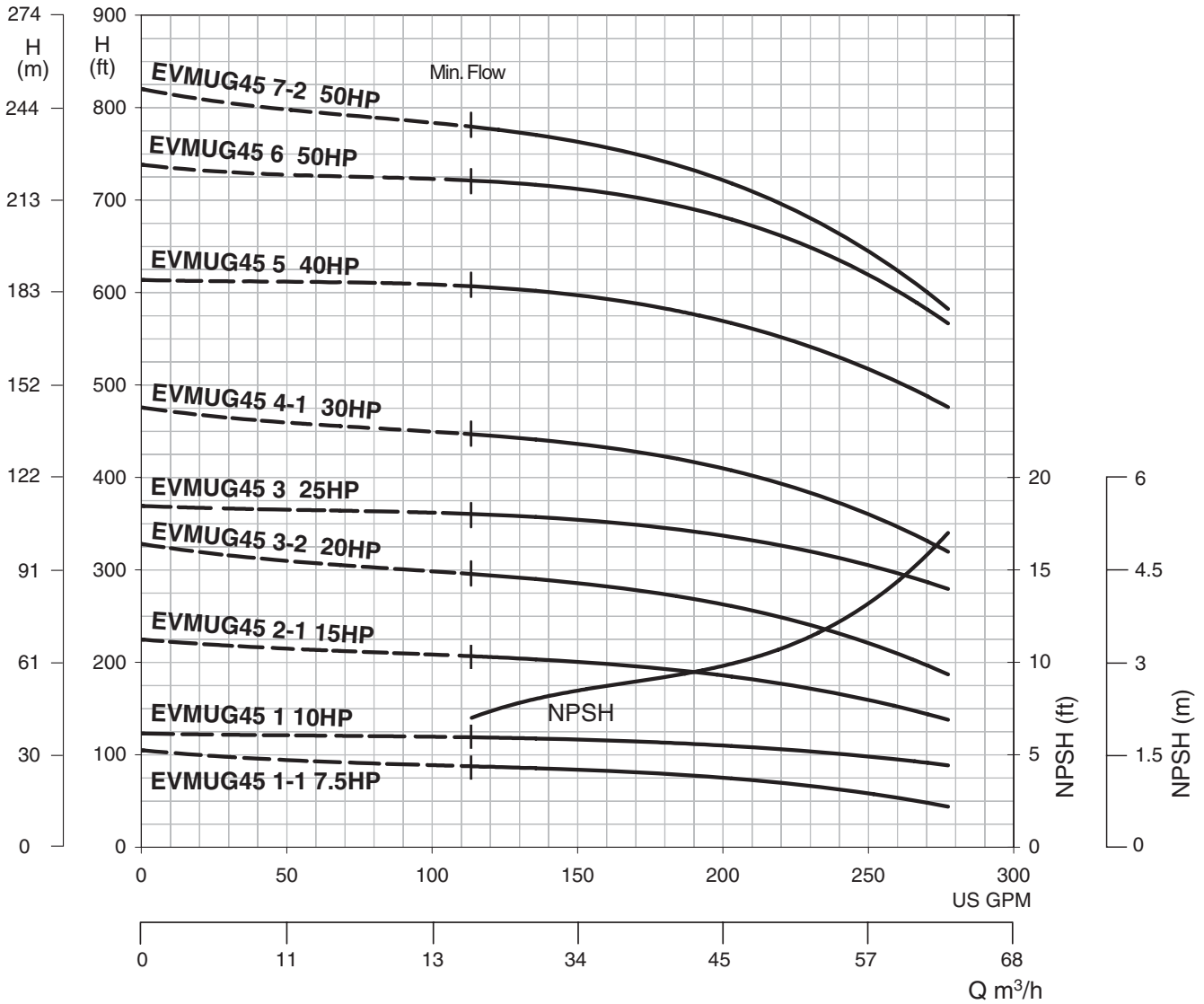
3500RPM

150# ANSI 3" 4-Bolt

EVMUG45 4-1 – EVMUG45 7-2

3500RPM

300# ANSI 3" 8-Bolt



Water Temperature: 20° C (68° F)



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EVMU(L) / EVMUG

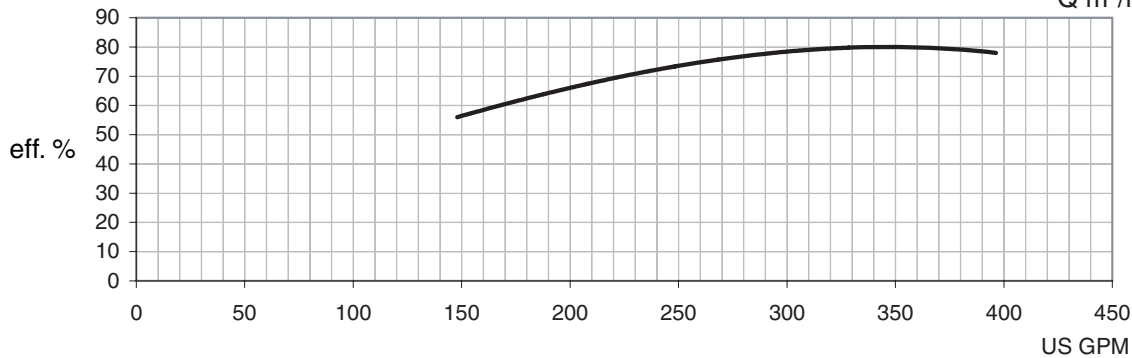
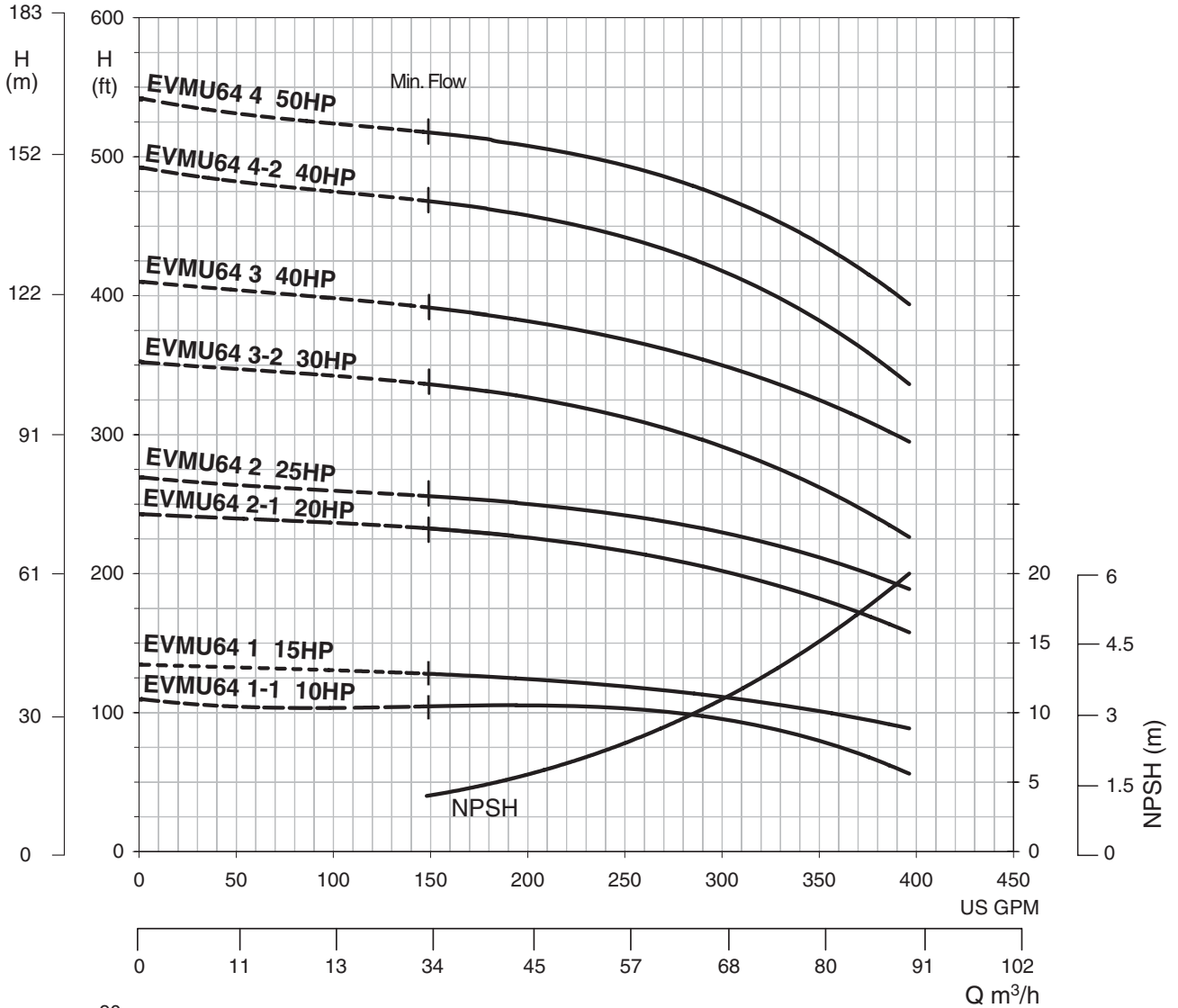
Model EVMUG
Performance Curves

EBARA Stainless Steel Vertical Multistage
EVMUG64 10HP - 50HP

EVMUG64 1-1 – EVMUG64 4

3500RPM

300# 4" ANSI 8-Bolt



Water Temperature: 20° C (68° F)

EVMU(L) / EVMUG

Model EVMU(L) / EVMUG

EBARA Stainless Steel Vertical Multistage

Technical Information

Maximum Working Pressure

Model	Maximum Working Pressure
EVMU(L)3 2 – EVMU(L)3 9	230 PSI
EVMU(L)5 2 – EVMU(L)5 10	
EVMU(L)10 2 – EVMU(L)10 8	
EVMU(L)18 2 – EVMU(L)18 6	
EVMUG32 1 – EVMUG32 4-3	
EVMUG45 1-1 – EVMUG45 3	
EVMUG64 1-1 – EVMUG64 3	
EVMU(L)3 11 – EVMU(L)3 18	360 PSI
EVMU(L)5 11 – EVMU(L)5 16	
EVMU(L)10 10 – EVMU(L)10 16	
EVMU(L)18 7 – EVMU(L)18 11	
EVMUG32 5 – EVMUG32 8-3	
EVMUG45 4-1 – EVMUG45 7-2	
EVMUG64 4-2 – EVMUG64 4	430 PSI
EVMUG32 9 – EVMUG32 10-1	

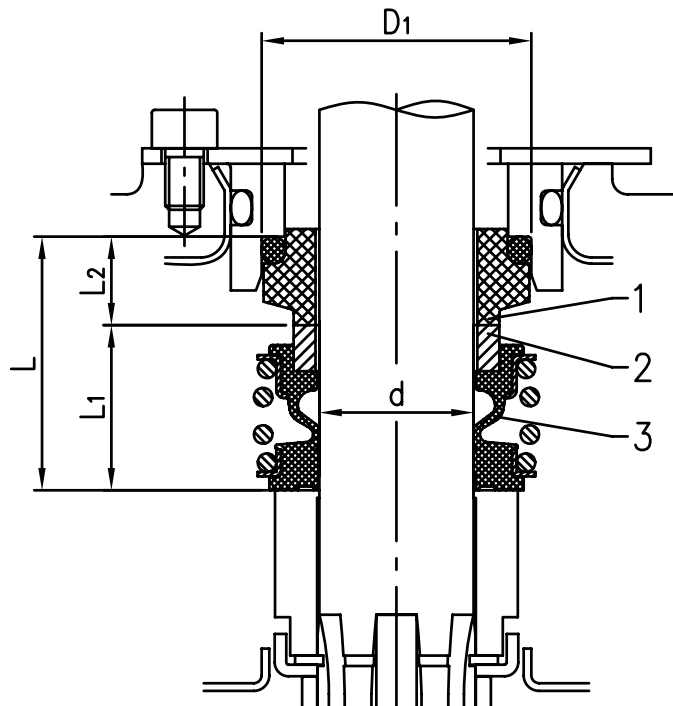


Dimensions

Mechanical Seal

EVMU(L) 3, 5, 10, 18

Mechanical Seal



Pump Type	Size [inch]	Max.working pressure [PS]	d [inch]	D ₁ [inch]	L [inch]	L ₁ [inch]	L ₂ [inch]	Material		
								1 stationary seal ring	2 rotary seal ring	3 rubber
3-5	0.5	230	0.5	0.91	0.93	0.63	0.3	Carbon graphite	Silicon carbide	FRM
		360								
10	0.63	230	0.63	1.06	1.06	0.67	0.39			
		360								
18	0.79	230	0.79	1.38	1.3	0.85	0.45			
		360								

EVMU(L) / EVMUG

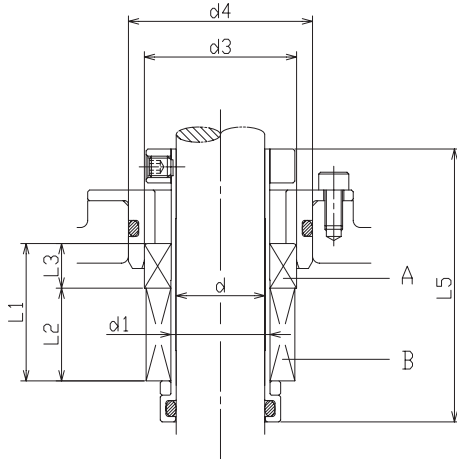
Model EVMU / EVMUG

EBARA Stainless Steel Vertical Multistage

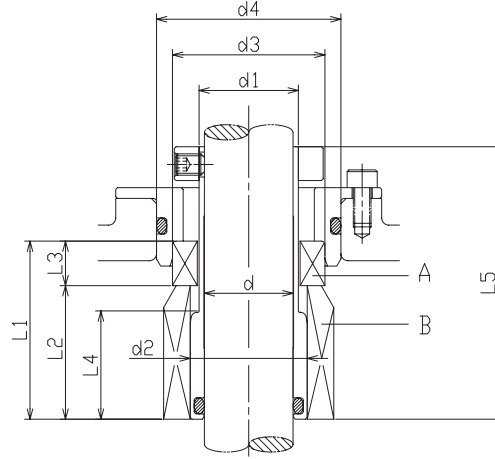
Dimensions

Mechanical Seal

EVMUG 32, 45, 64



working pressure to 360 PSI
Standard seal



working pressure to 430 PSI
Balanced seal

Size (inch)	Max. working pressure (psi)	d (inch)	d1 (inch)	d2 (inch)	d3 (inch)	d4 (inch)	L1 (inch)	L2 (inch)	L3 (inch)	L4 (inch)	L5 (inch)	Material		
												A stationary seal ring	B rotary seal ring	rubber
1.102	230	0.984	1.102	-	1.693	2.047	1.535	1.043	0.492	-	2.894	Carbon graphite	Silicon Carbide	FPM
	360			1.299										
	430			1.969										



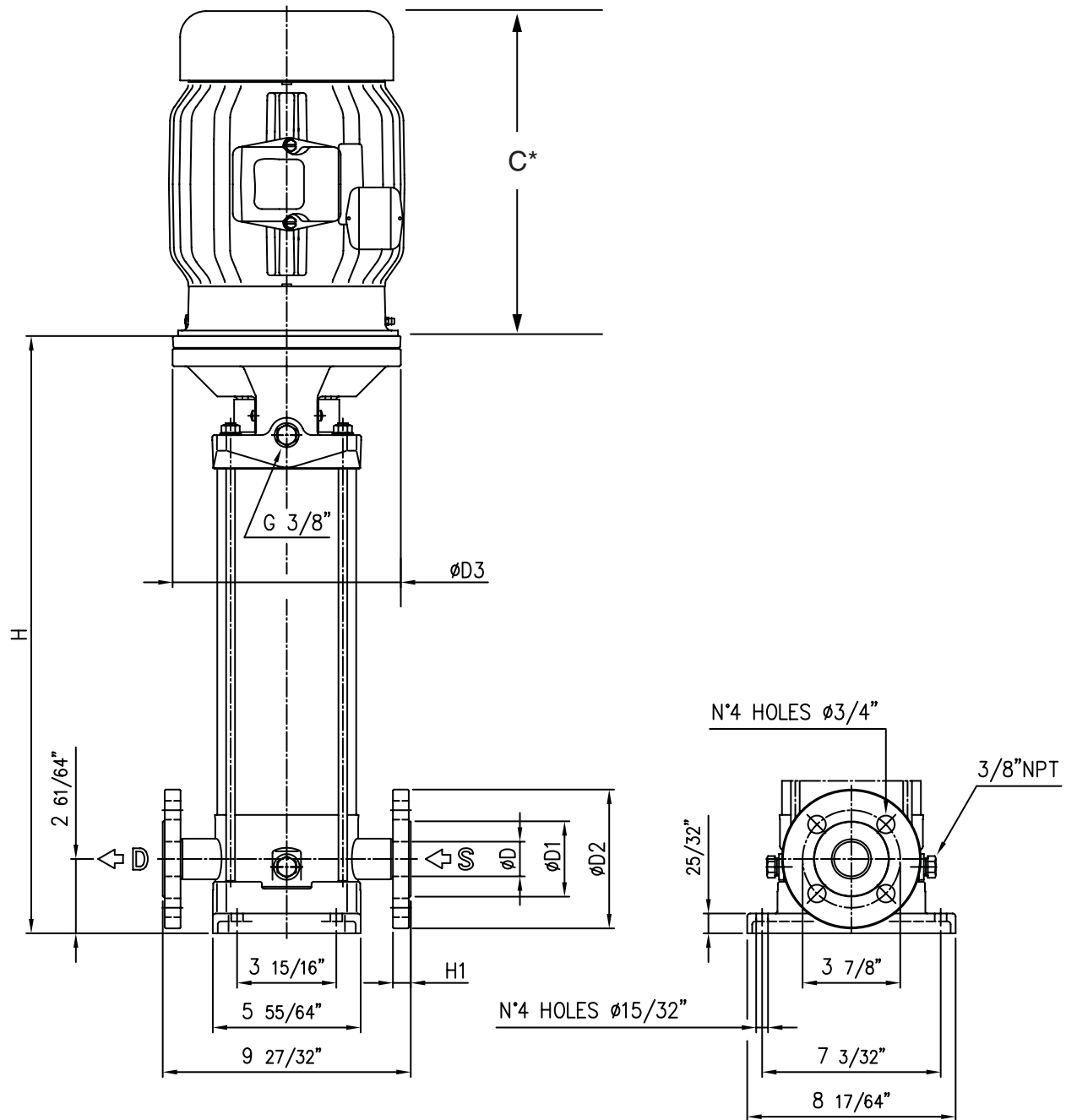
EVMU(L) / EVMUG

Model EVMU/ EVMUL

EBARA Stainless Steel Vertical Multistage

Dimensions

Models EVMU(L)3
EVMU(L)5



Flange Detail:

EVMU(L)3 250lb. ANSI

EVMU(L)5 250lb. ANSI

* C = Motor Dimension - Refer to Motor Manufacturer's catalog

Refer to page 816 for dimension details.

EVMU(L) / EVMUG

Model EVMU / EVMUL

EBARA Stainless Steel Vertical Multistage

Dimensions

Models EVMU(L)3
EVMU(L)5

Pump Type EVMU(L)	HP	Motor Frame	Dimensions						Weight [lbs]
			D	D1	D2	D3	H	H1	
3 2	.5	56C	1 3/8"	2 63/64"	5 33/64"	6 39/64"	11 5/16"	23/32"	38.2
3 3	.75	56C	1 3/8"	2 63/64"	5 33/64"	6 39/64"	12 9/64"	23/32"	39.2
3 4	1	56C	1 3/8"	2 63/64"	5 33/64"	6 39/64"	12 31/32"	23/32"	40.3
3 5	1.5	143TC	1 3/8"	2 63/64"	5 33/64"	6 39/64"	13 55/64"	23/32"	41.4
3 6	1.5	143TC	1 3/8"	2 63/64"	5 33/64"	6 39/64"	14 11/16"	23/32"	43.5
3 7	2	145TC	1 3/8"	2 63/64"	5 33/64"	6 39/64"	15 17/32"	23/32"	43.9
3 8	2	145TC	1 3/8"	2 63/64"	5 33/64"	6 39/64"	16 23/64"	23/32"	44.3
3 9	3	145TC	1 3/8"	2 63/64"	5 33/64"	6 39/64"	17 3/16"	23/32"	45.9
3 11	3	145TC	1 3/8"	2 63/64"	5 33/64"	6 39/64"	18 27/32"	23/32"	44.6
3 12	3	145TC	1 3/8"	2 63/64"	5 33/64"	6 39/64"	19 43/64"	23/32"	46.1
3 13	3	145TC	1 3/8"	2 63/64"	5 33/64"	6 39/64"	20 57/64"	23/32"	49.1
3 15	5	184TC	1 3/8"	2 63/64"	5 33/64"	9 1/16"	22 57/64"	23/32"	55.6
3 18	5	184TC	1 3/8"	2 63/64"	5 33/64"	9 1/16"	25 3/8"	23/32"	63.5
5 2	.75	56C	1 3/8"	2 63/64"	5 33/64"	6 39/64"	11 7/8"	23/32"	41.7
5 3	1.5	143TC	1 3/8"	2 63/64"	5 33/64"	6 39/64"	13 1/32"	23/32"	42.8
5 4	2	145TC	1 3/8"	2 63/64"	5 33/64"	6 39/64"	14 9/64"	23/32"	44.8
5 5	2	145TC	1 3/8"	2 63/64"	5 33/64"	6 39/64"	15 15/64"	23/32"	46.1
5 6	3	145TC	1 3/8"	2 63/64"	5 33/64"	6 39/64"	16 23/64"	23/32"	47.4
5 7	3	145TC	1 3/8"	2 63/64"	5 33/64"	6 39/64"	17 55/64"	23/32"	49.2
5 8	3	145TC	1 3/8"	2 63/64"	5 33/64"	6 39/64"	18 61/64"	23/32"	50.5
5 10	5	184TC	1 3/8"	2 63/64"	5 33/64"	9 1/16"	21 33/64"	23/32"	55.8
5 11	5	184TC	1 3/8"	2 63/64"	5 33/64"	9 1/16"	22 5/8"	23/32"	58.2
5 12	5	184TC	1 3/8"	2 63/64"	5 33/64"	9 1/16"	23 23/32"	23/32"	59.7
5 14	7.5	184TC	1 3/8"	2 63/64"	5 33/64"	9 1/16"	25 59/64"	23/32"	64.8
5 16	7.5	184TC	1 3/8"	2 63/64"	5 33/64"	9 1/16"	28 5/32"	23/32"	67.7



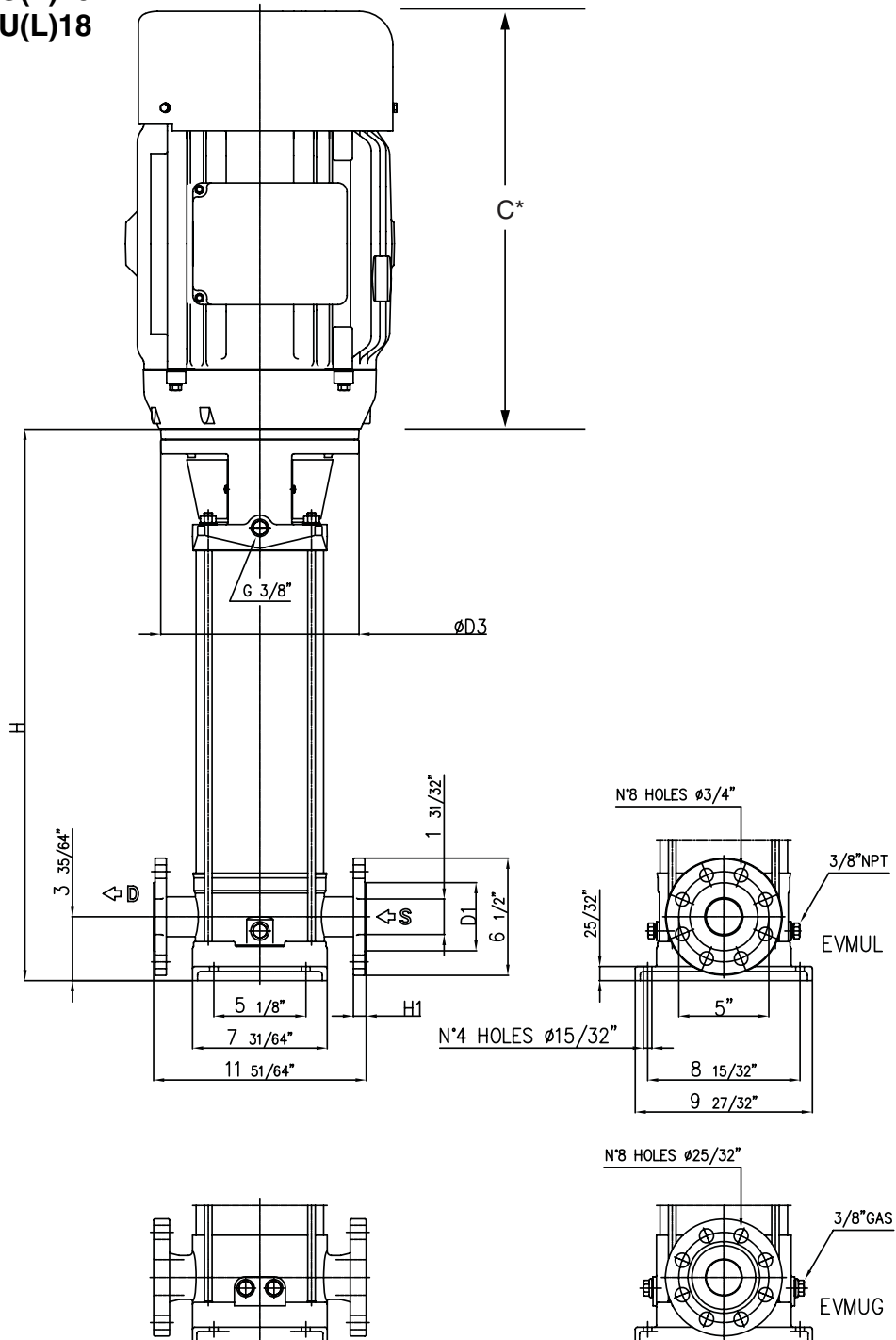
EVMU(L) / EVMUG

Model EVMU / EVMUL

EBARA Stainless Steel Vertical Multistage

Dimensions

Models EVMU(L)10
EVMU(L)18



Flange Detail:

EVMU(L)10 250Lb. ANSI
EVMU(L)18 250Lb. ANSI

* C = Motor Dimension - Refer to
Motor Manufacturer's catalog

Refer to page 818 for dimension details.



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EVMU(L) / EVMUG

Model EVMU / EVMUL

EBARA Stainless Steel Vertical Multistage

Dimensions

Models EVMU(L)10
EVMU(L)18

Pump Type EVMU(L)	HP	Motor Frame	Dimensions				Weight [lbs]
			D1	D3	H	H1	
10 2	1.5	143TC	4 1/64"	6 39/64"	14 1/64"	23/32"	130.9
10 3	3	145TC	4 1/64"	6 39/64"	15 13/64"	23/32"	138.2
10 4	3	145TC	4 1/64"	6 39/64"	16 49/64"	23/32"	149.8
10 5	5	184TC	4 1/64"	9 1/16"	18 13/16"	23/32"	152.8
10 6	5	184TC	4 1/64"	9 1/16"	20"	23/32"	160.1
10 8	7.5	184TC	4 1/64"	9 1/16"	22 3/8"	23/32"	192.1
10 10	7.5	184TC	4 1/64"	9 1/16"	24 3/4"	23/32"	196.6
10 12	10	215TC	4 1/64"	9 1/16"	27 7/64"	23/32"	242.2
10 14	15	215TC	4 1/64"	9 1/16"	29 41/64"	23/32"	254.3
10 16	15	215TC	4 1/64"	9 1/16"	32"	23/32"	279.1
18 2	5	184TC	4 1/64"	9 1/16"	15 9/16"	23/32"	182.9
18 3	7.5	184TC	4 1/64"	9 1/16"	17 41/64"	23/32"	190.2
18 4	7.5	184TC	4 1/64"	9 1/16"	19 7/32"	23/32"	190.2
18 5	10	215TC	4 1/64"	9 1/16"	20 25/32"	23/32"	236.4
18 6	15	215TC	4 1/64"	9 1/16"	22 9/16"	23/32"	258.8
18 7	15	215TC	4 1/64"	9 1/16"	24 9/64"	23/32"	271.0
18 8	15	215TC	4 1/64"	9 1/16"	25 45/64"	23/32"	278.3
18 10	20	256TC	4 1/64"	9 1/16"	28 55/64"	23/32"	329.3
18 11	25	284TSC	4 1/64"	11 1/32"	30 37/64"	23/32"	336.6



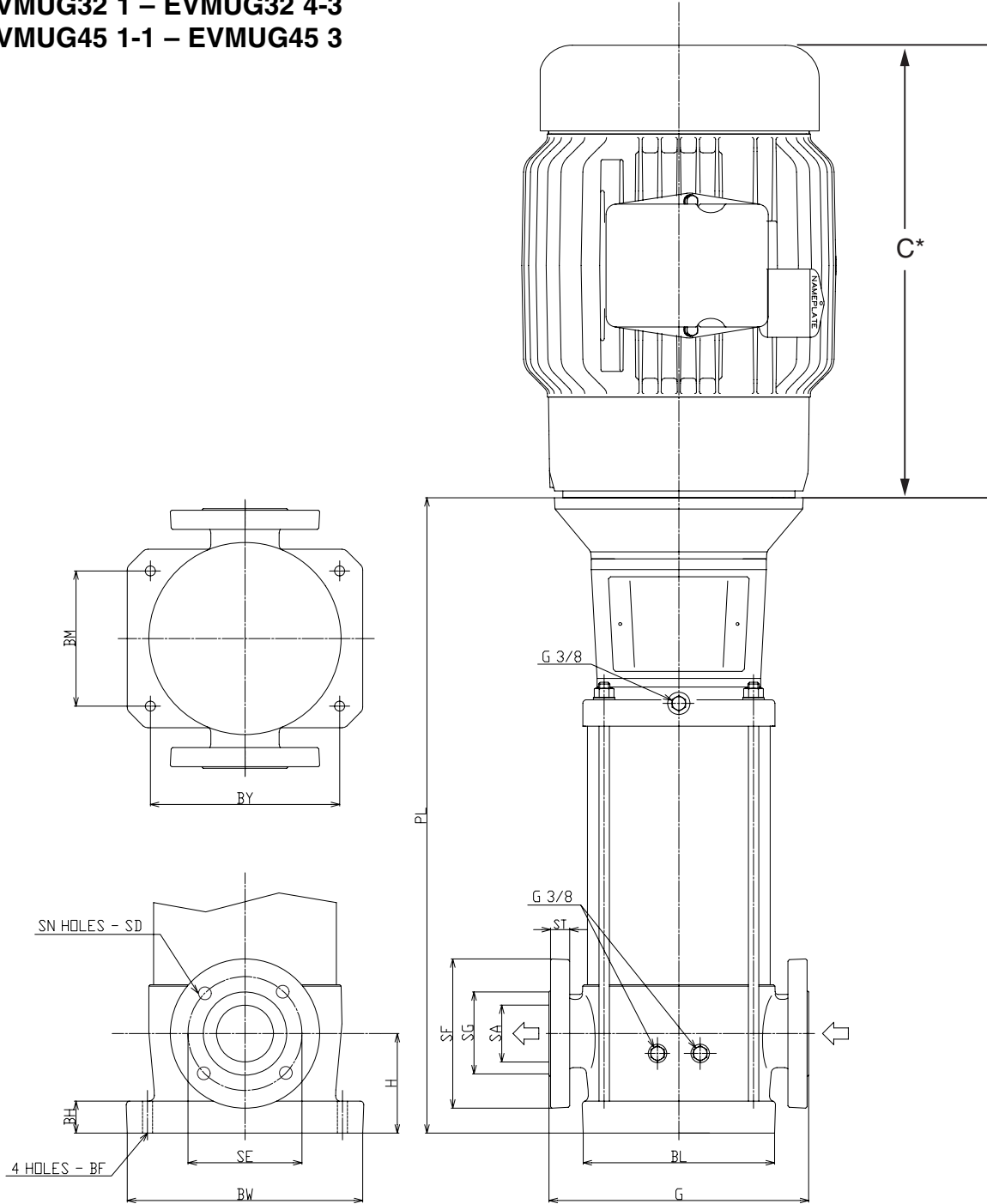
EVMU(L) / EVMUG

Model EVMUG

EBARA Stainless Steel Vertical Multistage

Dimensions

Models EVMUG32 1 – EVMUG32 4-3
EVMUG45 1-1 – EVMUG45 3



Flange Detail:

EVMUG32 2 1/2" 150Lb. ANSI
EVMUG45 3" 150Lb. ANSI

* C = Motor Dimension - Refer to Motor Manufacturer's catalog

Refer to page 822 for dimension details.



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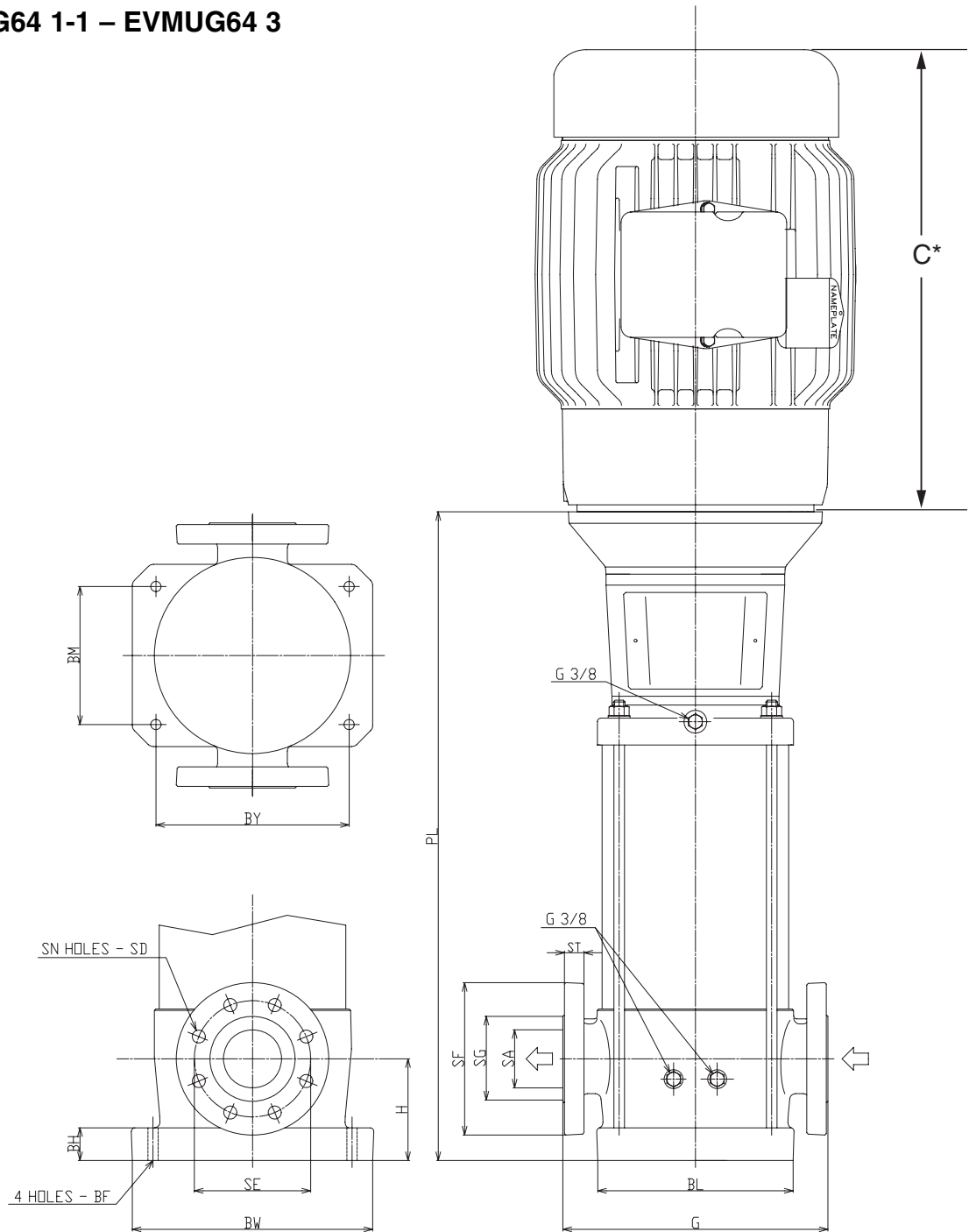
EVMU(L) / EVMUG

Model EVMUG

EBARA Stainless Steel Vertical Multistage

Dimensions

Models EVMUG64 1-1 – EVMUG64 3



Flange Detail:

EVMUG64 4" 150Lb. ANSI

* C = Motor Dimension - Refer to
Motor Manufacturer's catalog

Refer to page 822 for dimension details.



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820
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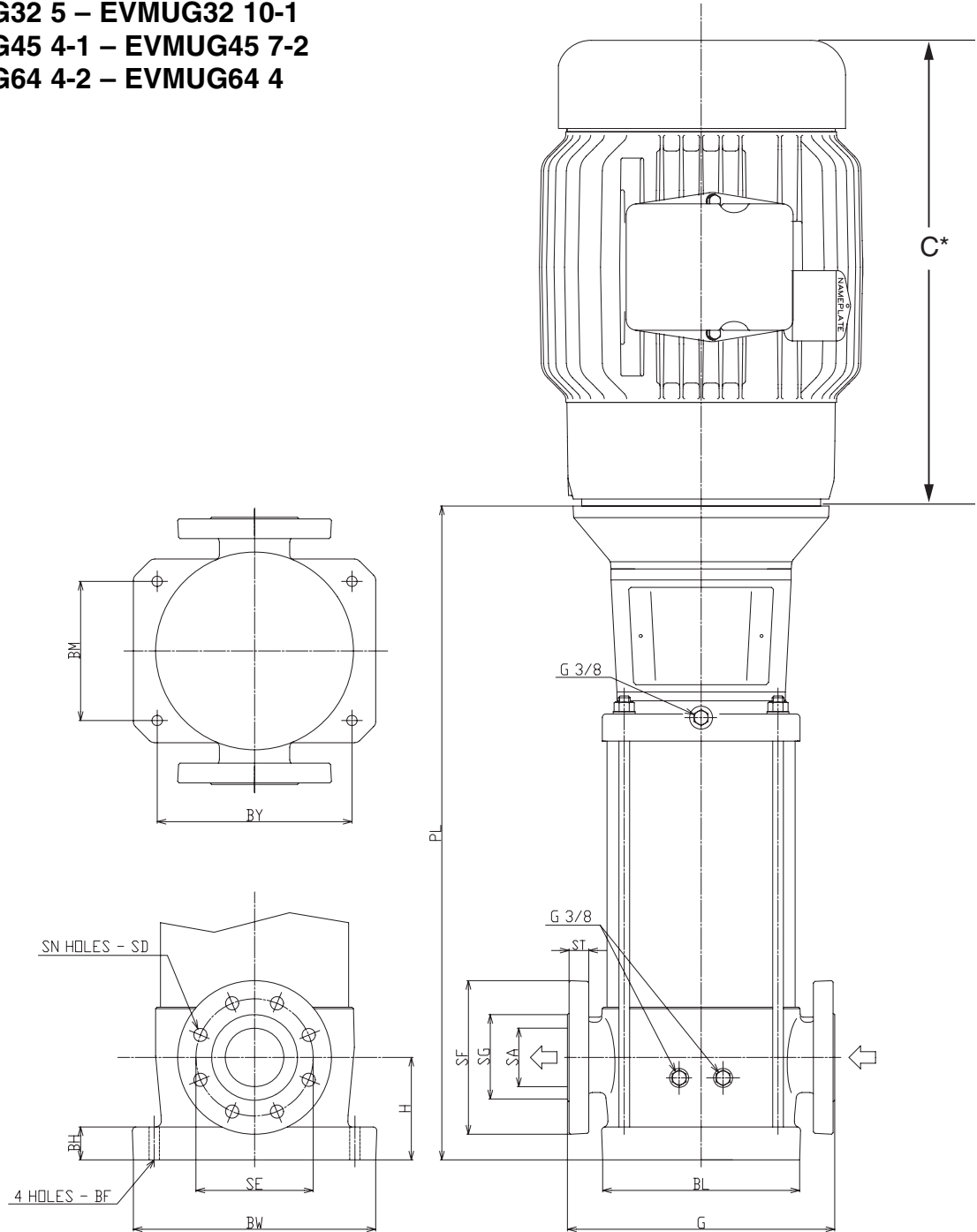
EVMU(L) / EVMUG

Model EVMUG

EBARA Stainless Steel Vertical Multistage

Dimensions

Models EVMUG32 5 – EVMUG32 10-1
 EVMUG45 4-1 – EVMUG45 7-2
 EVMUG64 4-2 – EVMUG64 4



Flange Detail:

EVMUG32 2 1/2" 300Lb. ANSI
 EVMUG45 3" 300Lb. ANSI
 EVMUG64 4" 300Lb. ANSI

* C = Motor Dimension - Refer to
 Motor Manufacturer's catalog

Refer to page 822 for dimension details.



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EVMU(L) / EVMUG

Model EVMUG

EBARA Stainless Steel Vertical Multistage

Dimension Table

Pump Type					Dimensions (inches)							
Model	HP	Weight Lbs. †	Motor Frame*	PL	H	G	ST	SA	SG	SF	SD	SN
32 1	5	117	184TC	18 3/16	4 9/64	12 9/32	54/64	2 9/16	4 21/64	7	25/32	4
32 2-2	7 1/2	126	184TC	20 19/32								
32 3-2	10	170	215TC	22 31/64								
32 3	15	172	215TC	27 41.64								
32 4-3	15	176	215TC	29 17/32								
32 5	20	194	256TC	31 27/64								
32 6	25	200	284TSC	33 7/64								
32 7	30	207	286TSC	35								
32 8-3	30	225	286TSC	36 57/64								
32 9	40	240	324TSC	39 3/8								
32 10-1	40	247	324TSC	41 17/64								
45 1-1	7 1/2	148	184TC	21 29/64	5 33/64	14 3/8	15/16	3 5/32	4 23/32	7 1/2	25/32	4
45 1	10	152	215TC	21 29/64								
45 2-1	15	192	215TC	29 29/64								
45 3-2	20	207	256TC	32 9/32								
45 3	25	207	284TSC	32 2/32								
45 4-1	30	229	286TSC	34 59/64								
45 5	40	260	324TSC	38 11/32								
45 6	50	276	326TSC	41 3/16								
45 7-2	50	287	326TSC	44 1/64								
64 1-1	10	179	215TC	21 29/64								
64 1	15	201	215TC	26 5/8	5 33/64	14 3/8	1 1/32	3 15/16	5 33/64	9	25/32	8
64 2-1	20	213	256TC	29 29/64								
64 2	25	214	284TSC	29 1/4								
64 3-2	30	221	286TSC	32 3/32								
64 3	40	223	324TSC	32 11/16								
64 4-2	40	245	324TSC	35 33/64								
64 4	50	251	326TSC	35 33/64								
									1 21/64			10

Pump Type				Dimensions (inches)						
Model	HP	Motor Frame*	SE	BM	BY1	BL	BW	BF	BH	
32 1	5	184TC	5 1/2	6 11/16	9 29/64	8 17/64	11 1/32	35/64	1 3/8	
32 2-2	7 1/2	184TC								
32 3-2	10	215TC								
32 3	15	215TC								
32 4-3	15	215TC								
32 5	20	256TC	5 7/8							
32 6	25	284TSC								
32 7	30	286TSC								
32 8-3	30	286TSC								
32 9	40	324TSC								
32 10-1	40	324TSC								
45 1-1	7 1/2	184TC	6	7 31/64	10 15/32	9 57/64	13 1/32	35/64	1 49/64	
45 1	10	215TC								
45 2-1	15	215TC								
45 3-2	20	256TC								
45 3	25	284TSC								
45 4-1	30	286TSC								6 5/8
45 5	40	324TSC								
45 6	50	326TSC								
45 7-2	50	326TSC								
64 1-1	10	215TC								
64 1	15	215TC	7 1/2	7 31/64	10 15/32	9 57/64	13 1/32	35/64	1 49/64	
64 2-1	20	256TC								
64 2	25	284TSC								
64 3-2	30	286TSC								
64 3	40	324TSC								7 7/8
64 4-2	40	324TSC								
64 4	50	326TSC								

*Motor frame for Three Phase TEFC only. Consult factory for single phase and alternate enclosures.

EVMU(L) / EVMUG

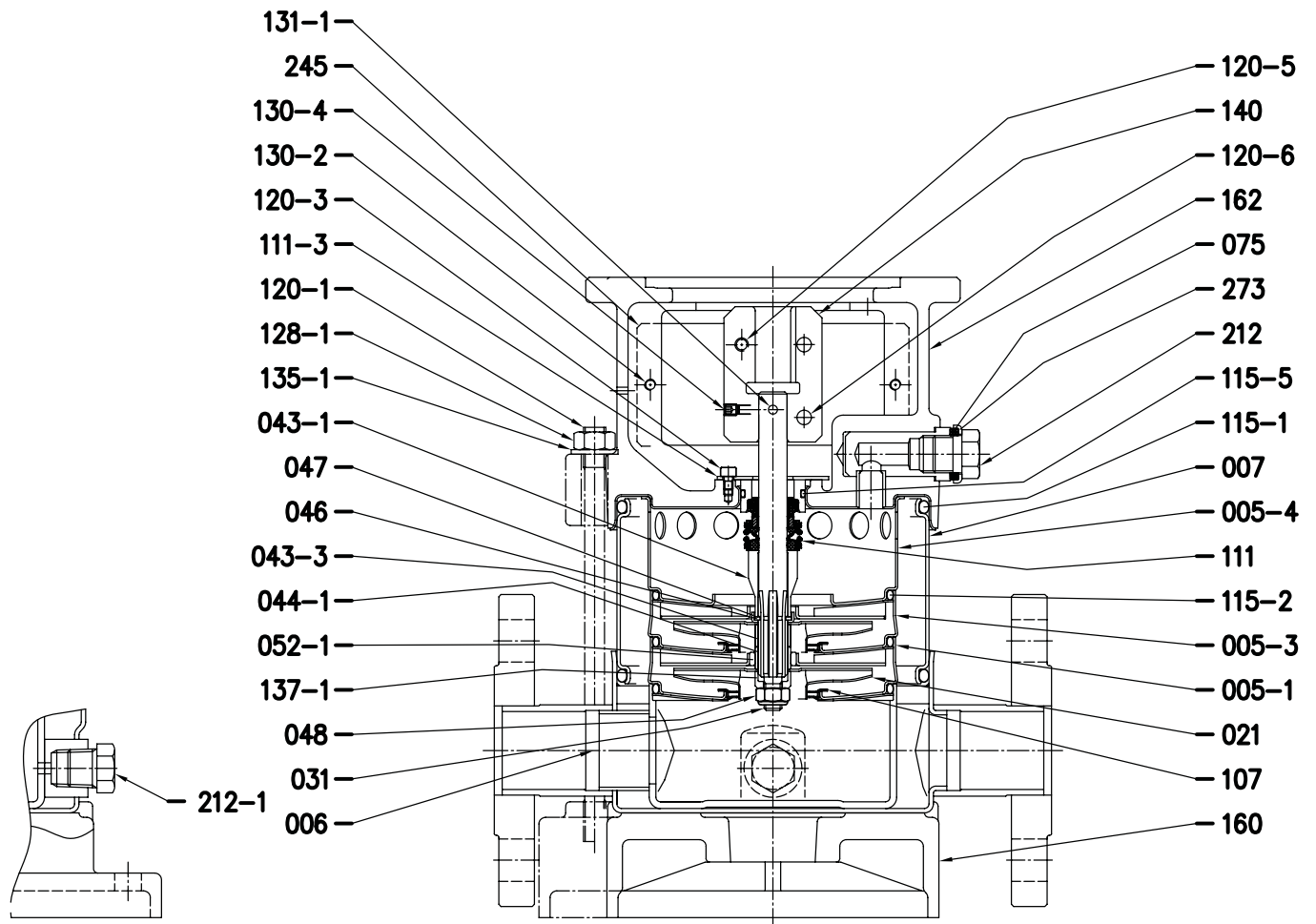
Model EVMU / EVMU(L)

EBARA Stainless Steel Vertical Multistage

Sectional View

(For reference only. See pricing for part availability.)

Models EVMU(L)3 2 – EVMU(L)3 7



Refer to page 827 for material details.



EVMU(L) / EVMUG

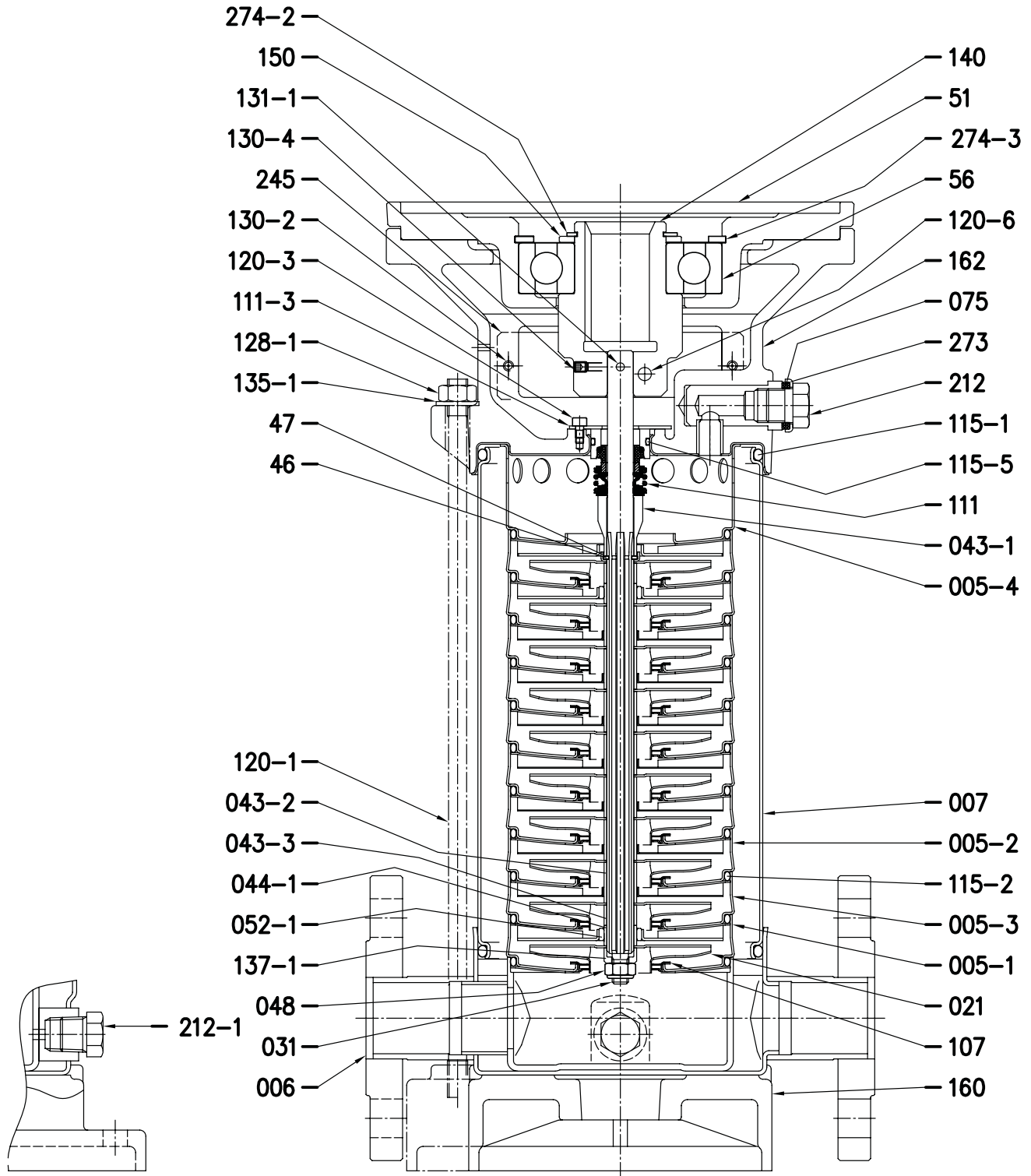
Model EVMU(L) / EVMUG

EBARA Stainless Steel Vertical Multistage

Sectional View

(For reference only. See pricing for part availability.)

Models EVMU(L)3 13 – EVMU(L)3 18



Refer to page 827 for material details.

EVMU(L) / EVMUG

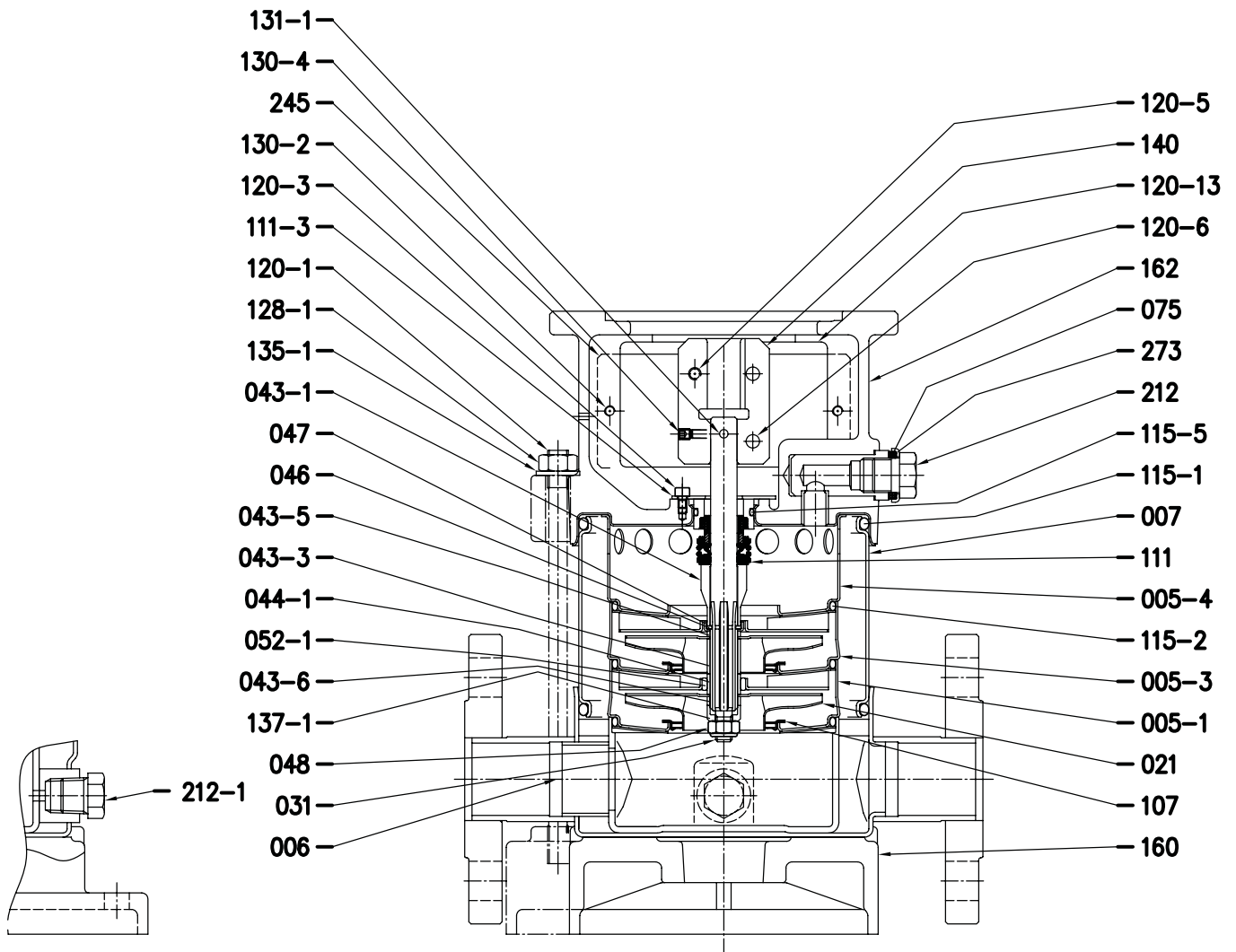
Model EVMU(L) / EVMUG

EBARA Stainless Steel Vertical Multistage

Sectional View

(For reference only. See pricing for part availability.)

Models EVMU(L)5 2 – EVMU(L)5 4



Refer to page 827 for material details.



EVMU(L) / EVMUG

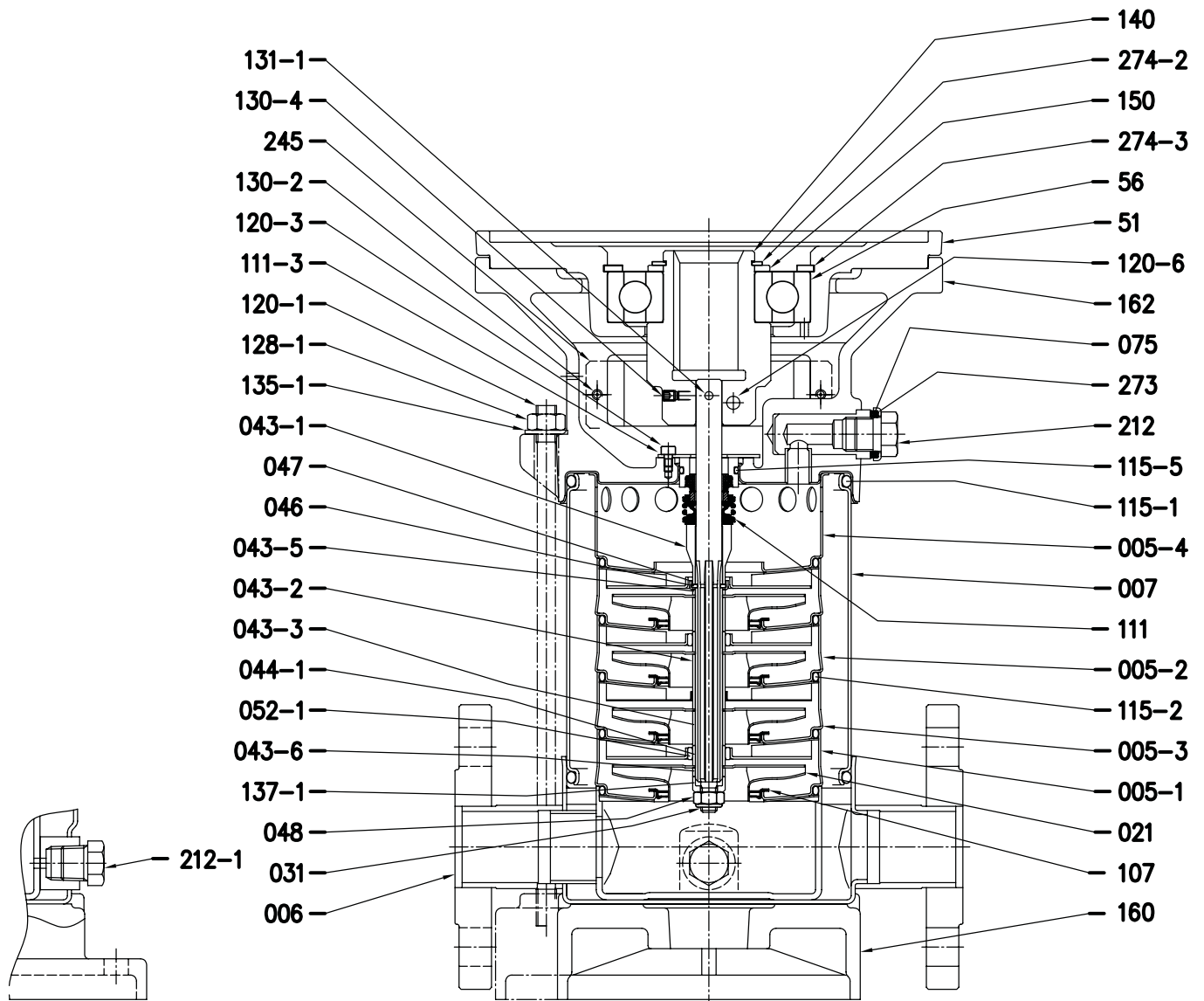
Model EVMU(L) / EVMUG

EBARA Stainless Steel Vertical Multistage

Sectional View

(For reference only. See pricing for part availability.)

Models EVMU(L)5 7 – EVMU(L)5 16



Refer to page 827 for material details.



EVMU(L) / EVMUG

Model EVMU(L) / EVMUG

EBARA Stainless Steel Vertical Multistage

Sectional View – part reference

(See pricing for part availability.)

N°	Part name	Material	
		EVMU	EVMUL
005-1	Suction casing	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
005-2	Intermediate casing	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
005-3	Intermediate casing bearing	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
005-4	Discharge casing	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
006	Bottom casing	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
007	Outer casing	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
021	Impeller	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
031	Shaft	EN 1.4401 (AISI 316)	
043-1	Shaft sleeve (mechanical seal)	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
043-2	Shaft sleeve (intermediate)	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
043-3	Shaft sleeve (bearing)	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
043-5	Shaft sleeve (last stage)	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
043-6	Shaft sleeve (adjustment)	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
044-1	Shaft sleeve bearing	Tungsten carbide	
046	Split ring (mechanical seal)	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
047	Ring holder	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
048	Impeller nut	A2-70 UNI 7323 with inox insert	A4-70 UNI 7323 with inox insert
051	Motor adapter	Cast iron EN-GJL-200-EN 1561	
052-1	Bearing	Tungsten carbide	
056	Ball bearing		
070-1	Ring for bearing	EN 1.4301(AISI 304)	
075	O-ring (plug)	FPM	
075-1	O-ring (plug)	FPM	
107	Liner ring	PTFE/EN 1.4401 (AISI 316)	
111	Mechanical seal	Silicon carbide/Carbon/FPM	
111-3	Mechanical seal seat	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
115-1	O-ring (outer casing)	FPM	
115-2	O-ring (intermediate casing)	FPM	
115-5	O-ring	FPM	



EVMU(L) / EVMUG

Model EVMU(L) / EVMUG

EBARA Stainless Steel Vertical Multistage

Sectional View – part reference

(See pricing for part availability.)

N°	Part name	Material	
		EVMU	EVMUL
120-1	Tie rod	Zincate steel	
120-3	Screw	A2-70 UNI 7323	
120-5	Screw for coupling	Zincate steel 8.8 strenght class ISO 898/1	
120-6	Screw for coupling	Zincate steel 8.8 strenght class ISO 898/1	
128-1	Nut for tie rod	Zincate steel	
130-2	Screw for coupling guard	A2-70 UNI 7323	
130-4	Set-screw	Carbon steel	
131-1	Pin for shaft	Carbon steel	
135-1	Washer	Zincate steel	
135-4	Washer (bearing)	Carbon steel	
137-1	Impeller spacer	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
140	Coupling	Brass OT 58 UNI 5705	
150	Spacer	Carbon steel	
160	Base	Cast iron EN-GJL-200-EN 1561	
162	Motor bracket	Cast iron EN-GJL-200-EN 1561+ EN 1.4301(AISI 304)	Cast iron + EN 1.4401 (AISI 316)
169	Motor adapter	Cast iron EN-GJL-200-EN 1561	
212	Plug	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
212-1	Plug	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
245	Coupling guard	EN 1.4301(AISI 304)	
273	Washer (plug)	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
273-1	Washer (plug)	EN 1.4301(AISI 304)	/
274-2	C-type snap ring (coupling)	EVMU3 13, EVMU5 7 ,8 EVMU3 15, 18, EVMU5 10 to 16	Carbon steel TC 80
274-3	C-type snap ring (bracket)	EVMU3 13, EVMU5 7 ,8 EVMU3 15, 18, EVMU5 10 to 16	Carbon steel TC 80



EVMU(L) / EVMUG

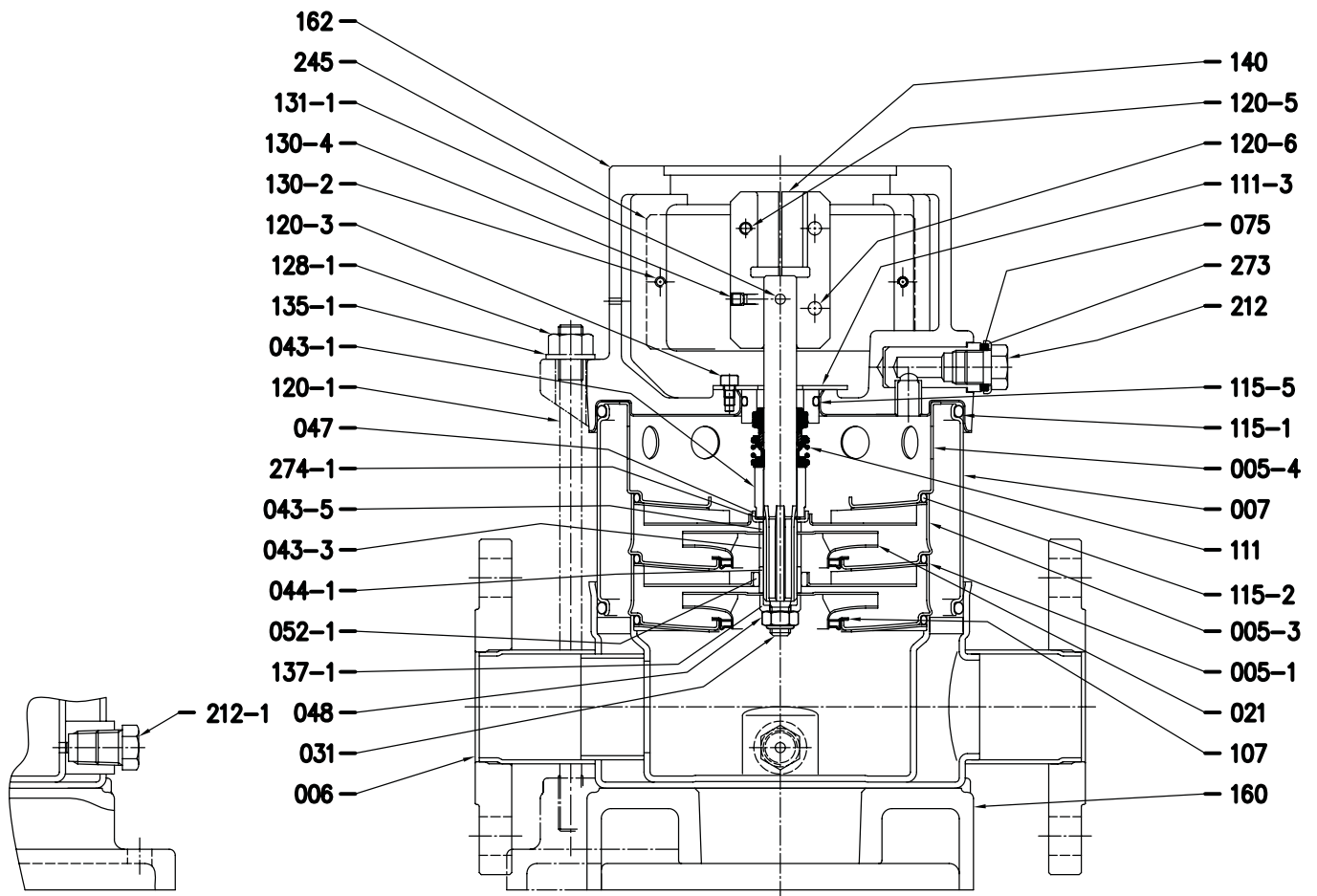
Model EVMU(L) / EVMUG

EBARA Stainless Steel Vertical Multistage

Sectional View

(For reference only. See pricing for part availability.)

Models EVMU(L)10 2 – EVMU(L)10 3



Refer to page 835 for material details.



EVMU(L) / EVMUG

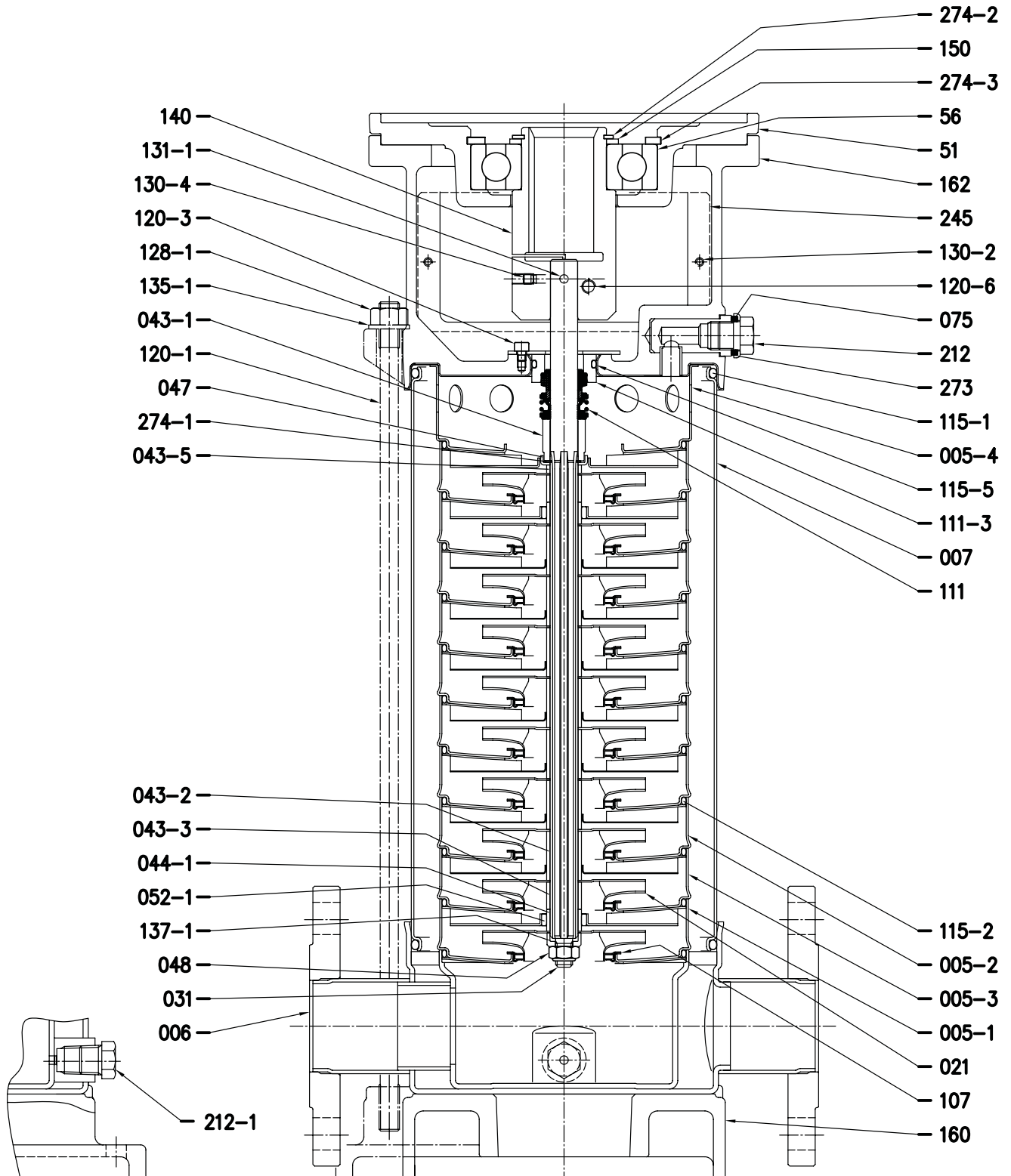
Model EVMU(L) / EVMUG

EBARA Stainless Steel Vertical Multistage

Sectional View

(For reference only. See pricing for part availability.)

Models EVMU(L)10 4 – EVMU(L)10 12



Refer to page 835 for material details.

EVMU(L) / EVMUG

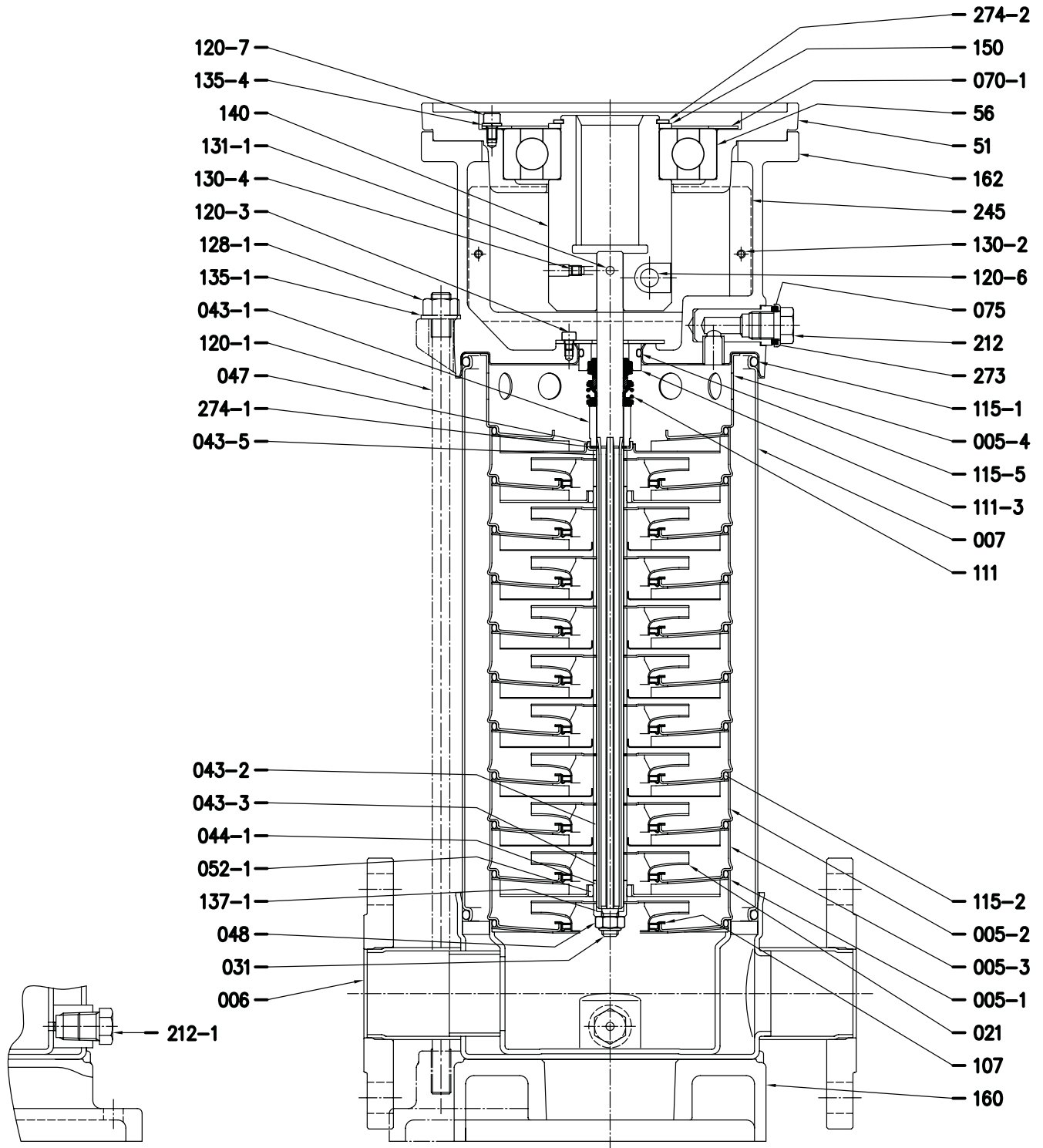
Model EVMU(L) / EVMUG

EBARA Stainless Steel Vertical Multistage

Sectional View

(For reference only. See pricing for part availability.)

Models EVMU(L)10 14 – EVMU(L)10 16



Refer to page 835 for material details.

EVMU(L) / EVMUG

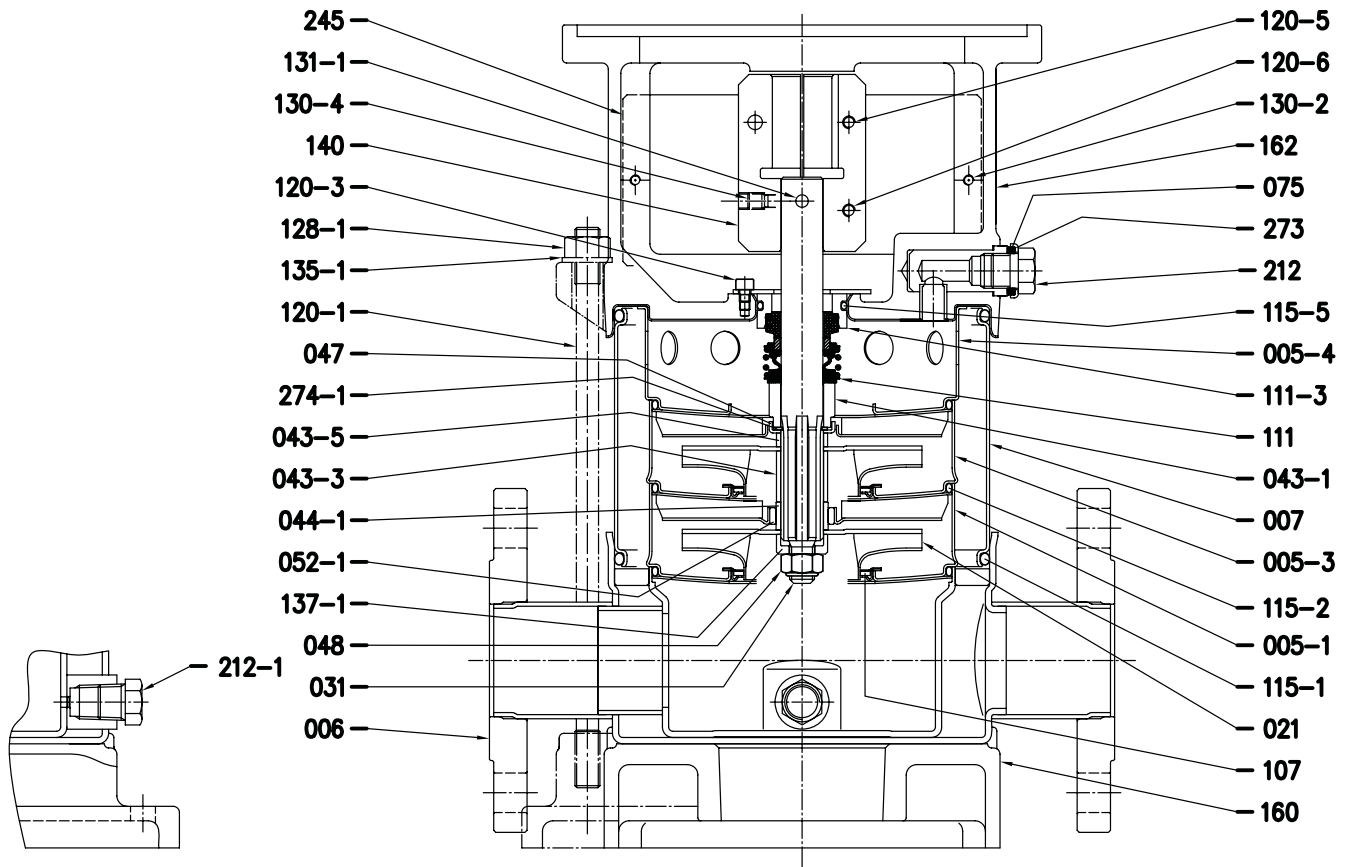
Model EVMU(L) / EVMUG

EBARA Stainless Steel Vertical Multistage

Sectional View

(For reference only. See pricing for part availability.)

Models EVMU(L)18 2



Refer to page 835 for material details.



EVMU(L) / EVMUG

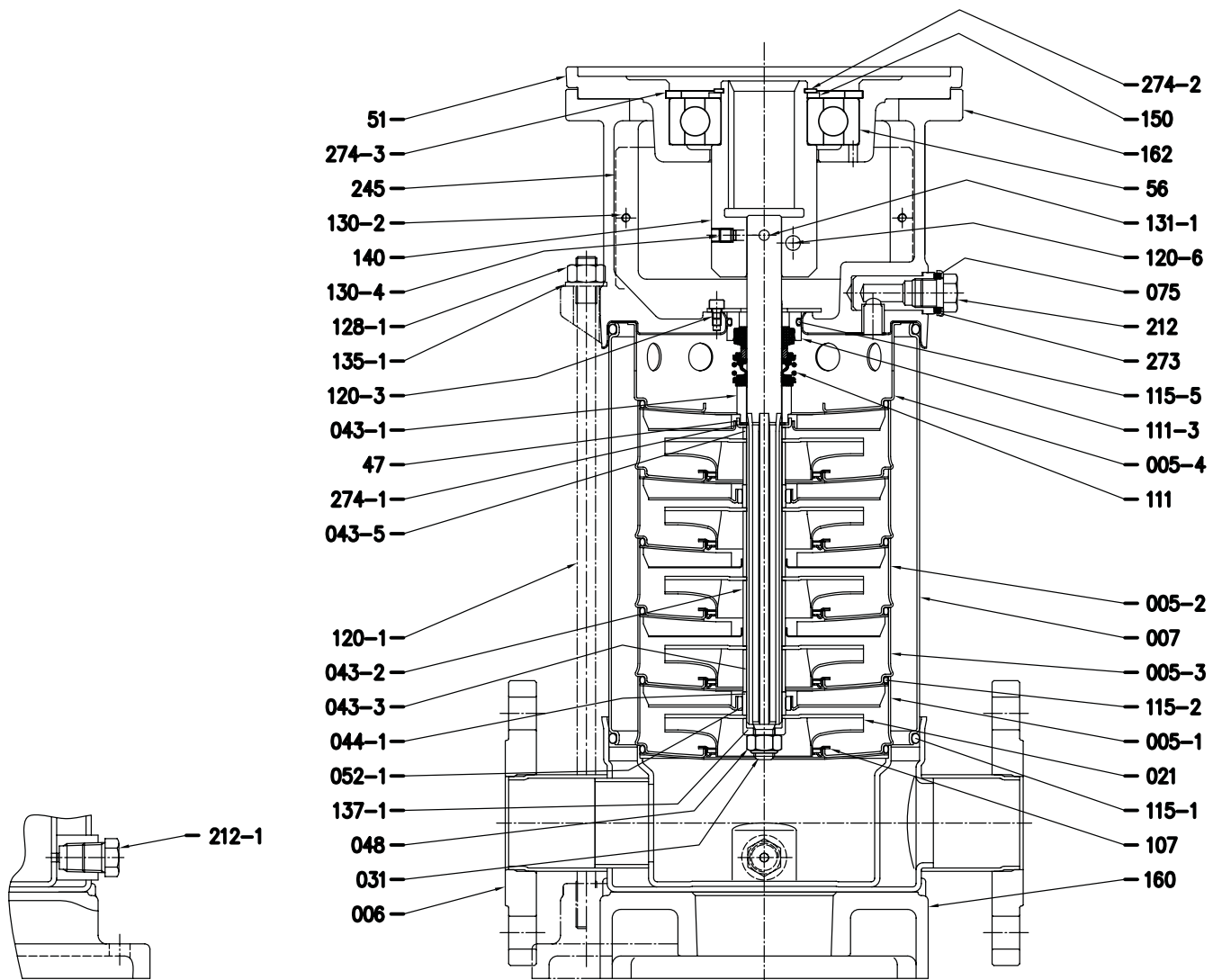
Model EVMU(L) / EVMUG

EBARA Stainless Steel Vertical Multistage

Sectional View

(For reference only. See pricing for part availability.)

Models EVMU(L)18 3 – EVMU(L)18 5



Refer to page 835 for material details.



EVMU(L) / EVMUG

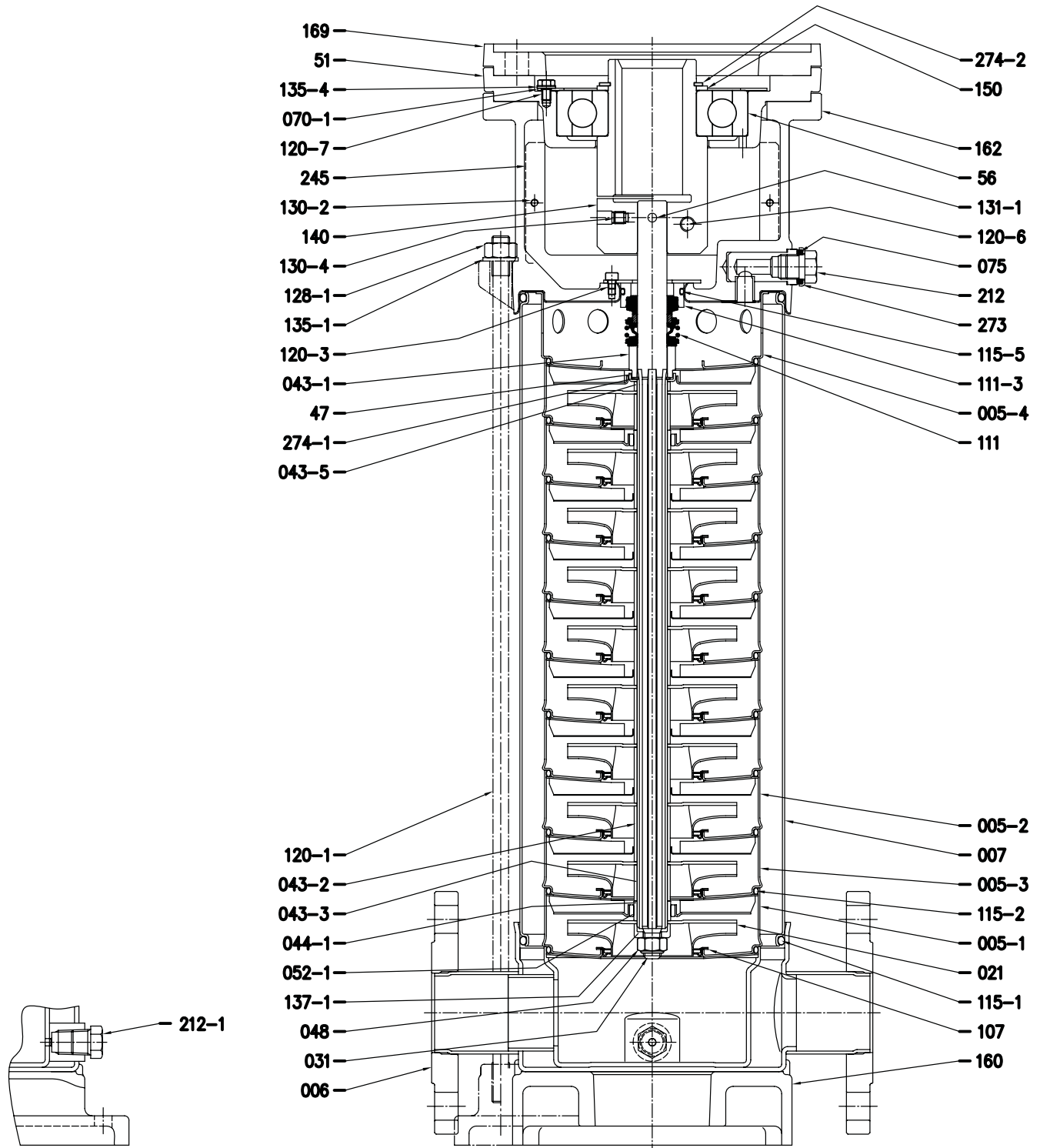
Model EVMU(L) / EVMUG

EBARA Stainless Steel Vertical Multistage

Sectional View

(For reference only. See pricing for part availability.)

Models EVMU(L)18 6 – EVMU(L)18 11



Refer to page 835 for material details.



EVMU(L) / EVMUG

Model EVMU(L) / EVMUG

EBARA Stainless Steel Vertical Multistage

Sectional View – part reference

(See pricing for part availability.)

N°	Part name	Material	
		EVMU	EVML
005-1	Suction casing	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
005-2	Intermediate casing	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
005-3	Intermediate casing bearing	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
005-4	Discharge casing	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
006	Bottom casing	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
007	Outer casing	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
021	Impeller	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
031	Shaft	EN 1.4401 (AISI 316)	
043-1	Shaft sleeve (mechanical seal)	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
043-2	Shaft sleeve (intermediate)	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
043-3	Shaft sleeve (bearing)	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
043-5	Shaft sleeve (last stage)	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
043-6	Shaft sleeve (adjustment)	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
044-1	Shaft sleeve bearing	Tungsten carbide	
046	Split ring (mechanical seal)	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
047	Ring holder	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
048	Impeller nut	A2-70 UNI 7323 with inox insert	A4-70 UNI 7323 with inox insert
051	Motor adapter	Cast iron EN-GJL-200-EN 1561	
052-1	Bearing	Tungsten carbide	
056	Ball bearing	See table pag. 500	
070-1	Ring for bearing	EN 1.4301(AISI 304)	
075	O-ring (plug)	FPM	
075-1	O-ring (plug)	FPM	/
107	Liner ring	PTFE/EN 1.4401 (AISI 316)	
111	Mechanical seal	Silicon carbide/Carbon/FPM	
111-3	Mechanical seal seat	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
115-1	O-ring (outer casing)	FPM	
115-2	O-ring (intermediate casing)	FPM	
115-5	O-ring	FPM	



EVMU(L) / EVMUG

Model EVMU(L) / EVMUG

EBARA Stainless Steel Vertical Multistage

Sectional View – part reference

(See pricing for part availability.)

N°	Part name	Material	
		EVMU	EVML
120-1	Tie rod	Zincate steel	
120-3	Screw	A2-70 UNI 7323	
120-5	Screw for coupling	Zincate steel 8.8 strenght class ISO 898/1	
120-6	Screw for coupling	EVMU10 2, EVMU10 3	
		EVMU10 4 to12	
		EVMU10 14 to16	
120-7	Screw (bearing)	Zincate steel 8.8 strenght class ISO 898/1	
128-1	Nut for tie rod	Zincate steel	
130-2	Screw for coupling guard	A2-70 UNI 7323	
130-4	Set-screw	Carbon steel	
131-1	Pin for shaft	Carbon steel	
135-1	Washer	Zincate steel	
135-4	Washer (bearing)	Carbon steel	
137-1	Impeller spacer	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
140	Coupling	Brass OT 58 UNI 5705	
150	Spacer	Carbon steel	
160	Base	/	Cast iron EN-GJL-200-EN 1561
162	Motor bracket	Cast iron EN-GJL-200-EN 1561+ EN 1.4301(AISI 304)	Cast iron + EN 1.4401 (AISI 316)
169	Motor adapter	Cast iron EN-GJL-200-EN 1561	
212	Plug	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
212-1	Plug	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
245	Coupling guard	EN 1.4301(AISI 304)	
273	Washer (plug)	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
273-1	Washer (plug)	EN 1.4301(AISI 304)	/
274-1	C-type snap ring (coupling)	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
274-2	C-type snap ring (coupling)	EVMU10 4	
		EVMU10 5 to 8	
		EVMU10 10 to 12	
		EVMU10 14 to16	
274-3	C-type snap ring (bracket)	EVMU10 4	
		EVMU10 5 to 8	
		EVMU10 10 to 12	



EVMU(L) / EVMUG

Model EVMU(L) / EVMUG

EBARA Stainless Steel Vertical Multistage

Sectional View – part reference

(See pricing for part availability.)

N°	Part name	Material	
		EVMU	EVML
005-1	Suction casing	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
005-2	Intermediate casing	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
005-3	Intermediate casing bearing	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
005-4	Discharge casing	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
006	Bottom casing	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
007	Outer casing	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
021	Impeller	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
031	Shaft	EN 1.4401 (AISI 316)	
043-1	Shaft sleeve (mechanical seal)	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
043-2	Shaft sleeve (intermediate)	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
043-3	Shaft sleeve (bearing)	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
043-5	Shaft sleeve (last stage)	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
043-6	Shaft sleeve (adjustment)	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
044-1	Shaft sleeve bearing	Tungsten carbide	
046	Split ring (mechanical seal)	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
047	Ring holder	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
048	Impeller nut	A2-70 UNI 7323 with inox insert	A4-70 UNI 7323 with inox insert
051	Motor adapter	Cast iron EN-GJL-200-EN 1561	
052-1	Bearing	Tungsten carbide	
056	Ball bearing	See table pag. 500	
070-1	Ring for bearing	EN 1.4301(AISI 304)	
075	O-ring (plug)	FPM	
075-1	O-ring (plug)	FPM	/
107	Liner ring	PTFE/EN 1.4401 (AISI 316)	
111	Mechanical seal	Silicon carbide/Carbon/FPM	
111-3	Mechanical seal seat	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
115-1	O-ring (outer casing)	FPM	
115-2	O-ring (intermediate casing)	FPM	
115-5	O-ring	FPM	



EVMU(L) / EVMUG

Model EVMU(L) / EVMUG

EBARA Stainless Steel Vertical Multistage

Sectional View – part reference

(See pricing for part availability.)

N°	Part name	Material	
		EVMU	EVML
120-1	Tie rod	Zincate steel	
120-3	Screw	A2-70 UNI 7323	
120-5	Screw for coupling	Zincate steel 8.8 strenght class ISO 898/1	
120-6	Screw for coupling	EVMU18 2	
		EVMU18 3 to 5	
		EVMU18 6 to 11	
120-7	Screw (bearing)	Zincate steel 8.8 strenght class ISO 898/1	
128-1	Nut for tie rod	Zincate steel	
130-2	Screw for coupling guard	A2-70 UNI 7323	
130-4	Set-screw	Carbon steel	
131-1	Pin for shaft	Carbon steel	
135-1	Washer	Zincate steel	
135-4	Washer (bearing)	Carbon steel	
137-1	Impeller spacer	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
140	Coupling	Brass OT 58 UNI 5705	
150	Spacer	Carbon steel	
160	Base	Cast iron EN-GJL-200-EN 1561	
162	Motor bracket	Cast iron EN-GJL-200-EN 1561+ EN 1.4301(AISI 304)	Cast iron + EN 1.4401 (AISI 316)
169	Motor adapter	Cast iron EN-GJL-200-EN 1561	
212	Plug	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
212-1	Plug	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
245	Coupling guard	EN 1.4301(AISI 304)	
273	Washer (plug)	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
273-1	Washer (plug)	EN 1.4301(AISI 304)	/
274-1	C-type snap ring (coupling)	EN 1.4301(AISI 304)	EN 1.4401 (AISI 316)
274-2	C-type snap ring (coupling)	EVMU18 3 to 4	
		EVMU18 5	
		EVMU18 6 to 10	
		EVMU18 11	
274-3	C-type snap ring (bracket)	EVMU18 3 to 4	
		EVMU18 5	



Model EVMUG

EBARA Stainless Steel Vertical Multistage

Sectional View – part reference

(See pricing for part availability.)

Model EVMUG32

Location No.	Part Name	Material
005-1	Stage casing (suction)	AISI304
005-2	Stage casing	AISI304
005-3	Stage casing (bearing)	AISI304
005-4	Stage casing (top)	AISI304
006	Bottom casing	Cast iron
007	Outer sleeve	AISI304
011	Casing cover	Cast iron
021	Impeller	AISI304
031	Shaft	AISI316
039-1	Key (coupling)	Steel
043-1	Shaft sleeve (mechanical sleeve)	AISI304
043-2	Shaft sleeve (stage)	AISI304
043-3	Shaft sleeve (bearing/upper)	AISI304
043-4	Shaft sleeve (bearing/lower)	AISI304
043-5	Shaft sleeve (top)	AISI304
044-1	Bearing sleeve (stage)	Tungsten carbide
045	Adjusting ring	Steel
047	Split ring retainer	AISI304
048	Friction nut	AISI304
051	Bearing housing	Cast iron
052-1	Bearing (stage)	Tungsten carbide
056	Ball bearing	–
070-1	Bearing holder	AISI304
107	Wear ring	AISI 316+PTFE
111	Mechanical seal (Cartridge assembly)	SiC/Carbon/FPM/316
115-1	O-ring (outer)	FPM
115-2	O-ring (stage)	FPM
120-1	Tie rod bolt	Zincate steel
120-3	Bolt (mechanical seal)	Stainless steel A2-70
120-4	Bolt (casing cover)	Stainless steel A2-70
120-5	Bolt (coupling M-side)	Zincate steel
120-6	Bolt (coupling P-side)	Zincate steel
120-7	Bolt (bearing)	Zincate steel
120-8	Bolt (bearing housing)	Zincate steel
120-10	Bolt (base plate)	Zincate steel
128-1	Nut (tie-rod bolt)	Zincate steel
130-1	Screw (mechanical seal)	Stainless steel A2-70
130-2	Screw (coupling guard)	Stainless steel A2-70
130-3	Screw (mechanical seal)	Stainless steel A2-70
130-4	Screw (coupling pin)	Stainless steel
131-1	Pin (shaft)	Steel
135-1	Washer (tie-rod bolt)	Zincate steel
135-3	Spring washer (coupling bolt M-side)	Zincate steel
135-4	Spring washer (bearing)	Zincate steel
137-1	Shaft end sleeve	AISI304
140-1	Coupling upper half	Steel
140-2	Coupling lower half	Steel
150	Spacer (coupling)	Steel
160	Base plate	Cast iron
163	Motor stool	Cast iron
169	Motor liner	Cast iron
212	Vent plug (with seal ring)	AISI304/FPM
217	Plug (with seal ring)	AISI304/FPM
245	Coupling guard	AISI304
274-1	C-ring (top)	AISI304
274-2	C-ring (coupling)	Carbon tool steel
613	Pump flange	Steel

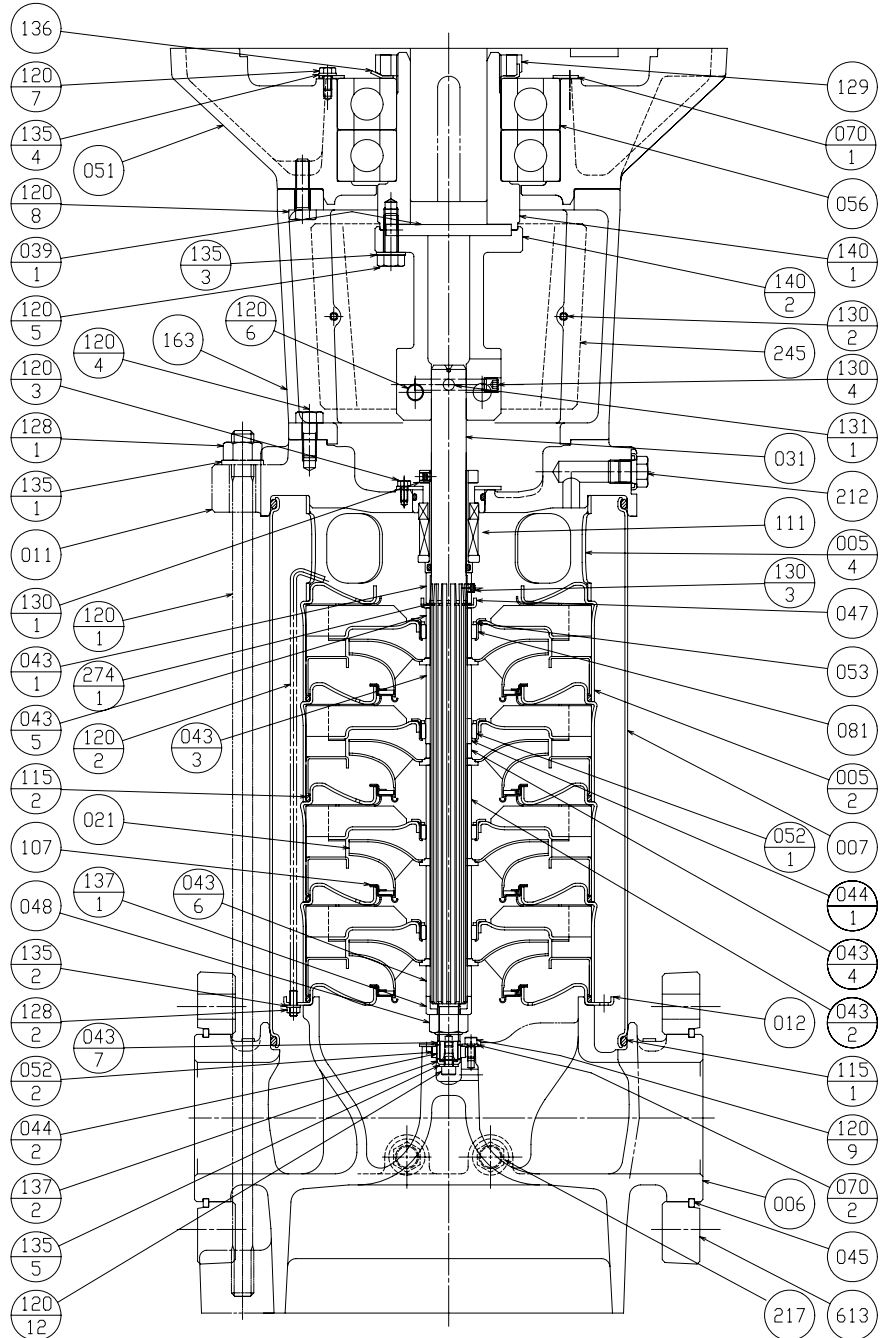
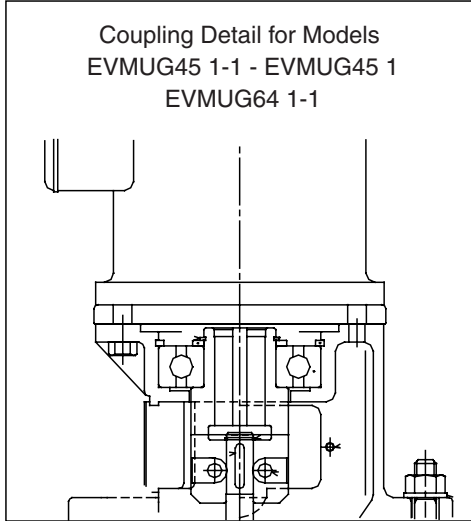


Model EVMUG

EBARA Stainless Steel Vertical Multistage

Sectional View

Models EVMUG45
EVMUG64



Refer to page 842 for material details.



Model EVMUG

EBARA Stainless Steel Vertical Multistage

Sectional View – part reference

(See pricing for part availability.)

Model EVMUG45 EVMUG64

Location No.	Part Name	Material
005-2	Stage casing	AISI304
005-4	Top casing	AISI304
006	Bottom casing	Cast iron
007	Outer sleeve	AISI304
011	Casing cover	Cast iron
012	Suction cover	AISI304
021	Impeller	AISI304
031	Shaft	AISI316
039-1	Key (coupling)	Steel
043-1	Shaft sleeve (mechanical seal)	AISI304
043-2	Shaft sleeve (stage)	AISI304
043-3	Shaft sleeve (bearing/upper)	AISI304
043-4	Shaft sleeve (bearing/lower)	AISI304
043-5	Shaft sleeve (top)	AISI304
043-6	Shaft sleeve (suction)	AISI304
043-7	Shaft sleeve (bottom bearing)	AISI304
044-1	Bearing sleeve (stage)	Tungsten carbide
044-2	Bearing sleeve (bottom bearing)	Tungsten carbide
045	Adjusting ring	Steel
047	Split ring retainer	AISI304
048	Friction nut	AISI304
051	Bearing housing	Cast iron
052-1	Bearing (stage)	Tungsten carbide
052-2	Bearing (bottom)	Tungsten carbide
053	Bush holder	AISI304
056	Ball bearing	-
070-1	Bearing holder	AISI304
070-2	Bearing holder (bottom bearing)	AISI304
081	Bush	PTFE (alloy)
107	Wear ring	AISI316+PTFE
111	Mechanical seal Cartridge ass'y	SiC/Carbon/FPM/316
115-1	O-ring (outer)	FPM
115-2	O-ring (stage)	FPM
120-1	Tie-rod bolt	Zincate steel
120-2	Stack bolt	AISI304
120-3	Bolt (mechanical seal)	Stainless steel A2-70
120-4	Bolt (casing cover)	Stainless steel A2-70
120-5	Bolt (coupling M-side)	Zincate steel
120-6	Bolt (coupling P-side)	Zincate steel
120-7	Bolt (bearing)	Zincate steel
120-8	Bolt (bearing housing)	Zincate steel
120-9	Bolt (bottom bearing)	Stainless steel A2-70
120-12	Bolt (shaft end)	Stainless steel A2-70
128-1	Nut (tie-rod bolt)	Zincate steel
128-2	Nut (Stack bolt)	AISI304
129	Bearing nut (coupling)	Carbon steel
130-1	Screw (mechanical seal)	Stainless steel A2-70
130-2	Screw (coupling guard)	Stainless steel A2-70
130-3	Screw (mechanical seal)	Stainless steel A2-70
130-4	Screw (coupling pin)	Stainless steel
131-1	Pin (shaft)	Steel
135-1	Washer (tie-rod bolt)	Zincate s steel
135-2	Spring washer (Stack bolt)	AISI304
135-3	Spring washer (coupling bolt M-side)	Zincate steel
135-4	Spring washer (bearing)	Zincate steel
135-5	Spring washer (shaft end)	AISI304
136	Bearing washer (coupling)	Carbon steel
137-1	Shaft end sleeve	AISI304
137-2	Shaft end sleeve	AISI304
140-1	Coupling upper half	Steel
140-2	Coupling lower half	Steel
163	Motor stool	Cast iron
212	Vent plug (with seal ring)	AISI304/FPM
217	Plug (with seal ring)	AISI304/FPM
245	Coupling guard	AISI304
274-1	C-ring (top)	AISI304
613	Pump flange	Steel



EBARA Fluid Handling

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