PUMP ELEMENT DATA CHART

Element Size	Theo. Max. GPM (1 cPs)	Theo. GPM per 100 RPM	Max. Particle Size	Velocity per 100 RPM (ft/sec)	Shear Rate per 100 RPM (sec^{-1})	Initial Torque (lbf-in. / stage)	Hyd Torque (lbf-in. / stage)	Maximum Speed and Pressure for Abrasive Classes							
								None		Light		Medium		Heavy	
								RPM	PSI/Stg	RPM	PSI/Stg	RPM	PSI/Stg	RPM	PSI/Stg
006	.67	.056	.08	.41	148.5	6.8	.02	1200	60	900	50	600	30	300	15
025	3	.26	.15	.58	92.9	6.3	.1	1200	60	900	50	600	30	300	15
01	10	.86	.2	.87	93.0	15.7	.32	1200	75	900	60	600	35	300	15
02	24	2.02	.3	1.17	93.0	21	.74	1200	75	900	60	600	35	300	15
05	47	5.2	.4	1.55	78.2	41.4	1.91	900	75	675	60	450	35	225	15
12	105	11.7	.6	2.01	76.3	126	4.30	900	75	675	60	450	35	225	15
6-12	108	12	.7	2.03	63.2	101	4.4	900	75	675	60	450	35	225	15
19	141	18.8	.8	2.37	71.3	180	6.77	750	75	565	60	375	35	190	15
22	165	22	.85	2.47	63.5	172	8.1	750	75	565	60	375	35	190	15
28	208	27.7	.8	2.79	84.2	210	10.08	750	75	565	60	375	35	190	15
36	216	36	1.1	2.87	56.4	146	13.2	600	75	450	60	300	35	150	15
44	261	43.05	1.0	3.15	79.9	504	15.44	600	75	450	60	300	35	150	15
65	391	65.2	1.0	3.84	97.5	630	23	600	75	450	60	300	35	150	15
065	390	65	1.4	3.53	58.0	367	23.4	600	87	450	70	300	40	150	15
115	518	115	1.5	4.31	65.6	758	42.3	450	87	350	70	225	40	125	15
175	788	175	1.75	4.96	63.9	1370	58.8	450	87	350	70	225	40	125	15
335	1005	335	1.8	8.2	105.9	3420	117.5	300	87	225	70	150	40	75	15

NPSHR & Velocity Limit Curves

These curves show the association between pump speed, internal velocity and internal velocity head drop or NPSHR. The NPSHR is the net positive suction head or the net inlet pressure required by the pump.

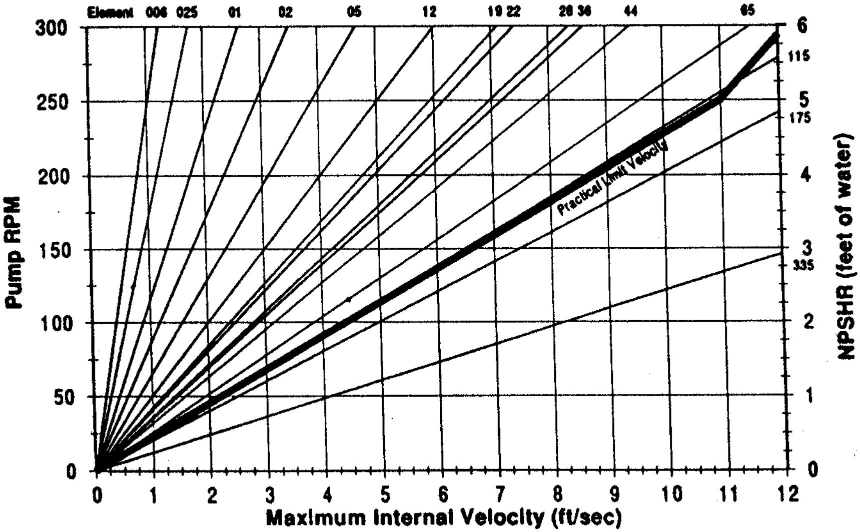
Since the design constants of each element size are different, the velocity of the material moving through the elements will be different for a given speed. Also, as the velocity through the pump changes, the head loss through the pump will change. This change is a direct function of the square of the velocity ($V^2=2gH$). This relationship gives a theoretical limit velocity curve. The normal head supported by standard barometric pressure at sea level is approximately 33.93 feet of water. Thus, the maximum theoretical velocity that this head can support is approximately 46.73 feet per second.

The ideal states outlined above cannot be fully realized, since in nearly all applications these items are not perfect. For that reason, the curves indicate a more conservative Practical Limit Velocity curve following the general shape of the theoretical limit velocity curve.

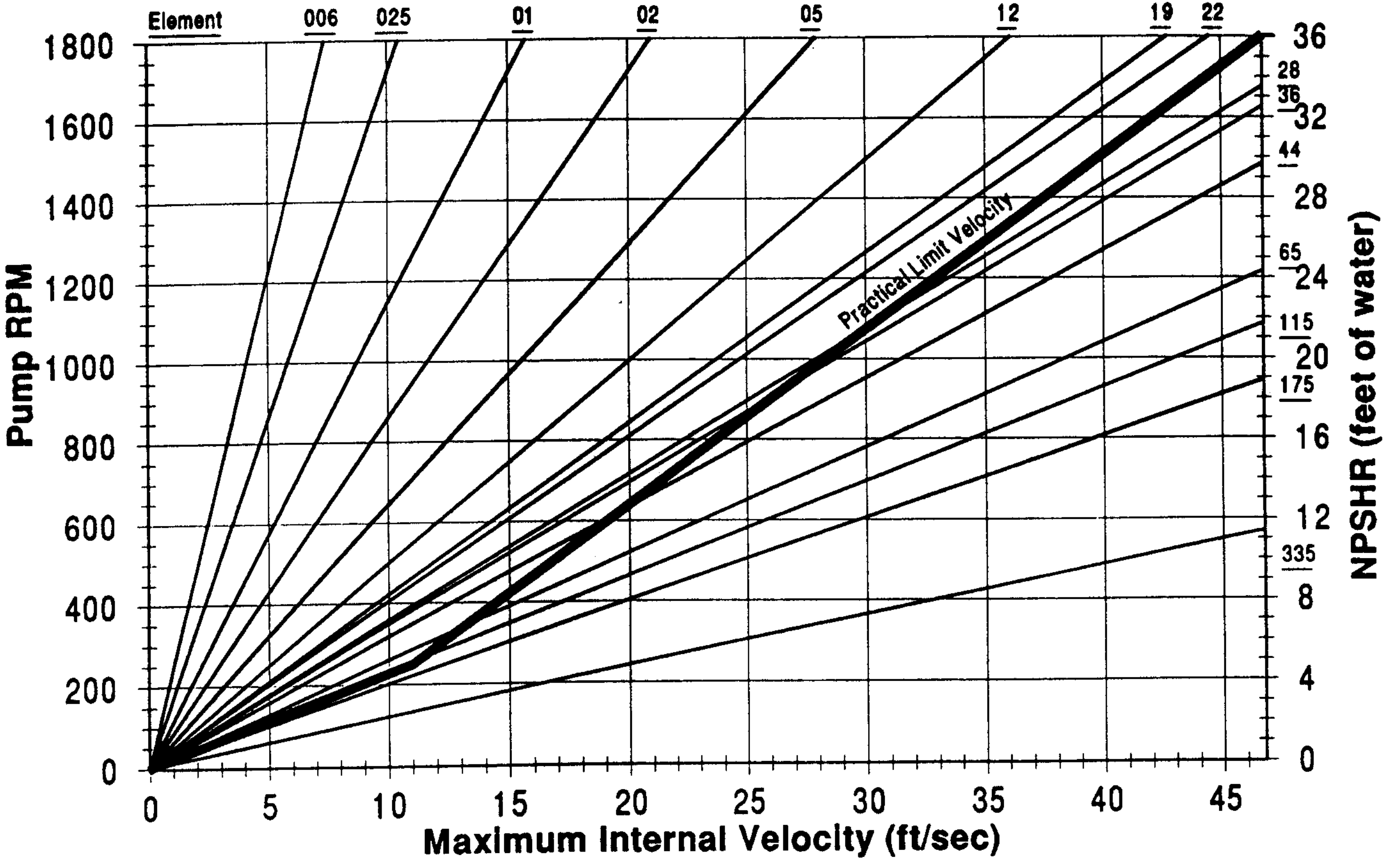
To use: Enter the curves, from the left, at the speed the pump will operate. Draw a line horizontally, to the right, to cross the line for the proper element size. From this intersection, draw a line vertically, either up or down, to cross the Practical Limit Velocity curve. (Note that by drawing a line vertically downward from this point to the bottom scale, the maximum internal velocity for this element and speed may be read.) From the intersection of the Practical Limit Velocity curve and the vertical line drawn, continue horizontally, to the right, to cross the scale at the right side of the curve. This gives the internal velocity head drop or NPSHR for this element size and speed selected.

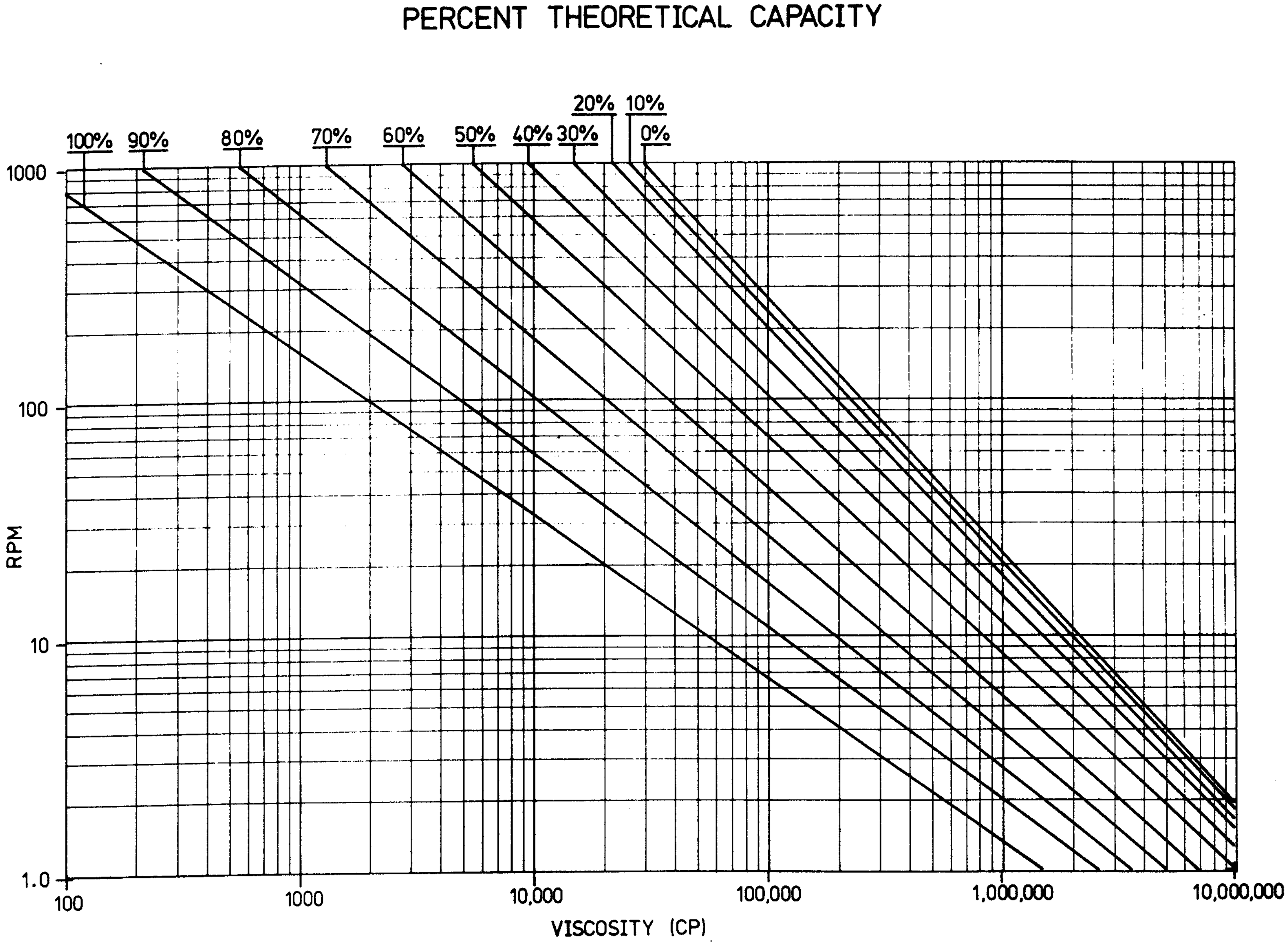
The curve below is an enlarged view of the lower left corner of the curve on the next page. This enlarged view may be helpful in determining NPSHR for lower speed operation.

Velocity Limits



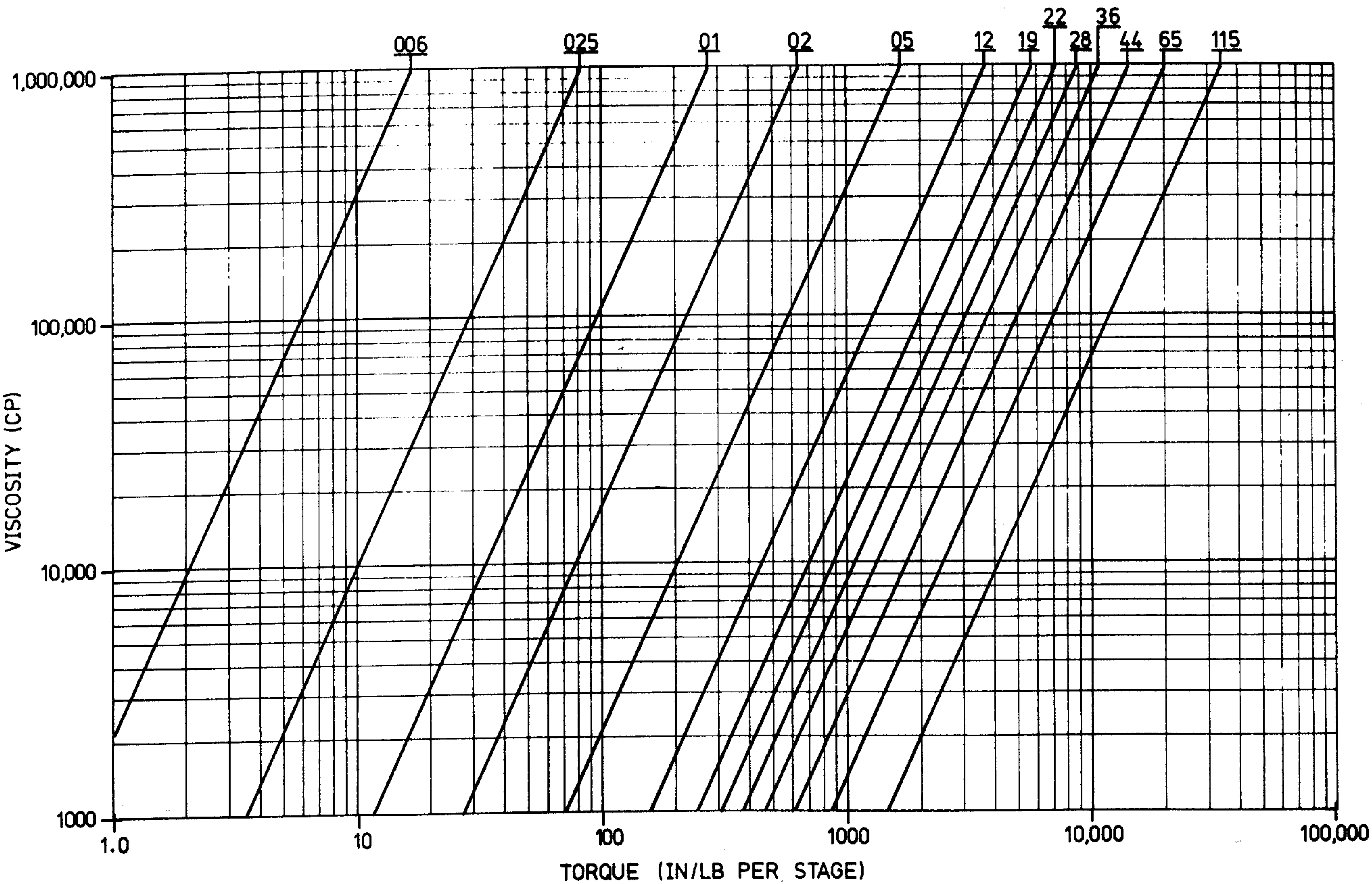
Velocity Limits





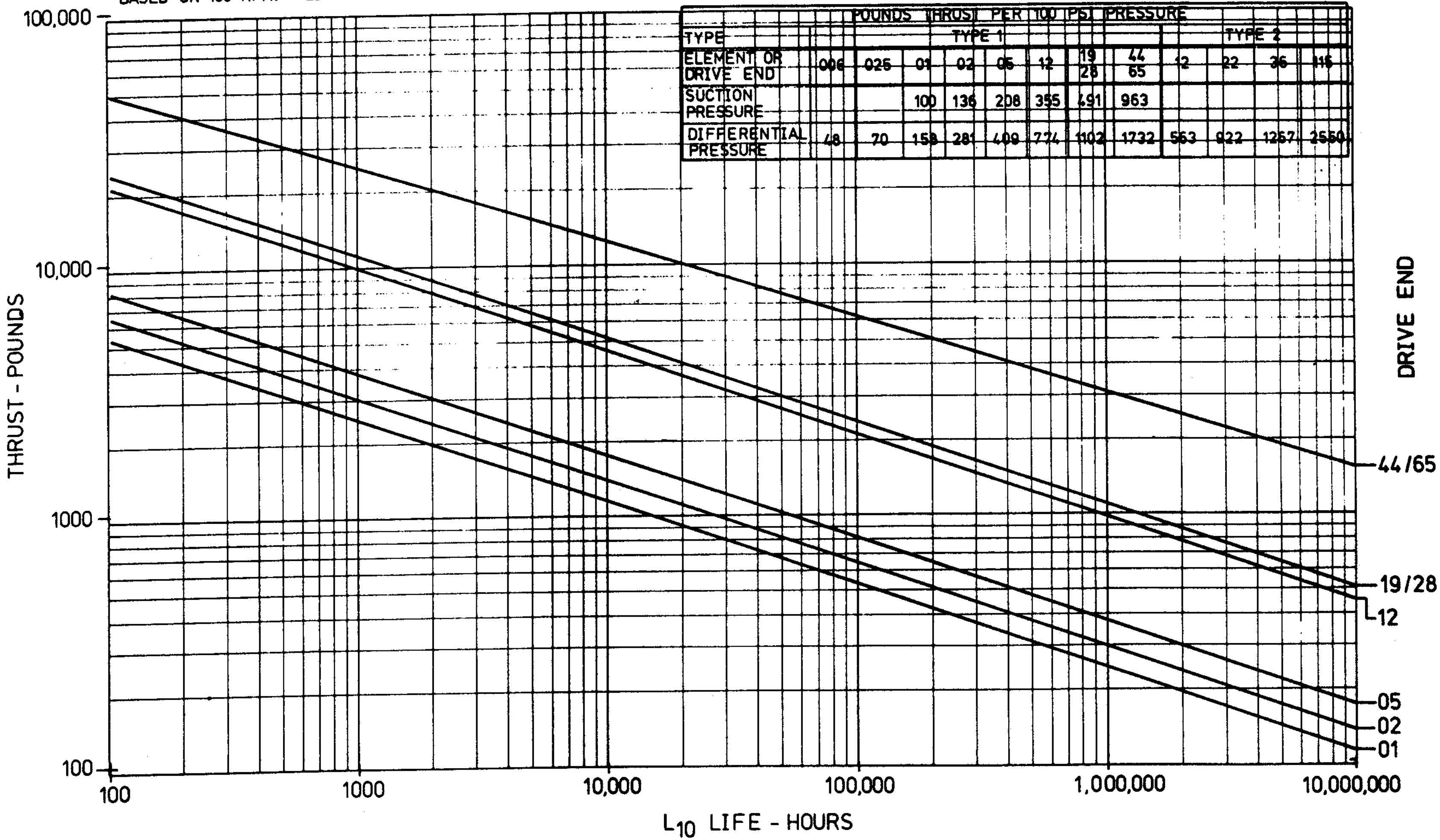
PERCENT THEORETICAL CAPACITY
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
1000
100
10
1.0
RPM
100
1000
10,000
100,000
1,000,000
10,000,000
VISCOSITY (CP)

TORQUE ADDITIVES FOR VISCOSITY



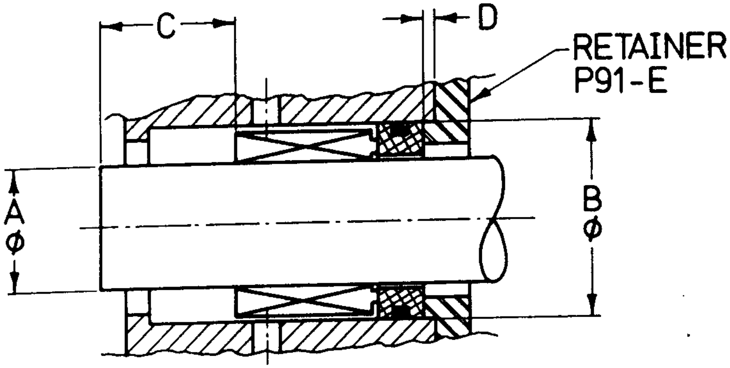
ESTIMATED BEARING LIFE VS THRUST LOAD

BASED ON 100 RPM. LIFE AT X RPM MAY BE FOUND BY MULTIPLYING LIFE FOUND ON CHART BY $\frac{100}{X}$.

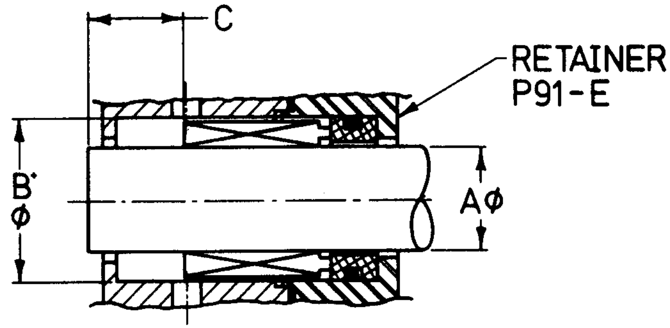


POUNDS THRUST PER 100 PSI PRESSURE												
TYPE	TYPE 1								TYPE 2			
ELEMENT OR DRIVE END	006	025	01	02	05	12	19 28	44 65	12	22	36	116
SUCTION PRESSURE			100	136	208	355	491	963				
DIFFERENTIAL PRESSURE	48	70	158	281	409	774	1102	1732	563	922	1267	2550

S-0512



02-65



01*

*MODIFIED BOX BORE REQUIRED.

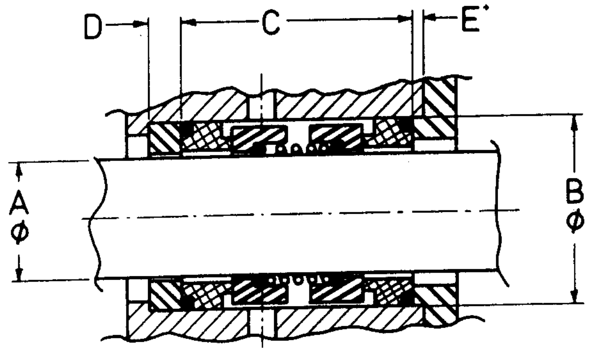
UNIT	A	B	C			D	E
			CRANE TYPE 1	CRANE TYPE 9T	DURAMETALLIC CBR		
7X201*	1.125	1.750*	1.06	2.06	1.72	—	27 OR 28
7X202	1.313	2.063	1.0	1.94	1.5	.25	33
7X205	1.625	2.375	.78	2	1.62	1.0	34
7X212	2.125	3.130	1.19	2.38	2.5	.94	35
7X2 19/28	2.500	3.505	1.0	2.62	2.25	.94	36
7X2 44/65	3.500	4.750	.84	2.78	2.59	1.44	37

ROPER PROGRESSING CAVITY PUMP
TYPICAL DIMENSIONS

SETTING DIMENSIONS C ARE FOR RETAINERS P91-E WITH D DIMENSIONS AS SHOWN. IF RETAINER USED HAS A DIFFERENT D DIMENSION THAN SHOWN, MAKE APPROPRIATE ADJUSTMENT TO C DIMENSION.

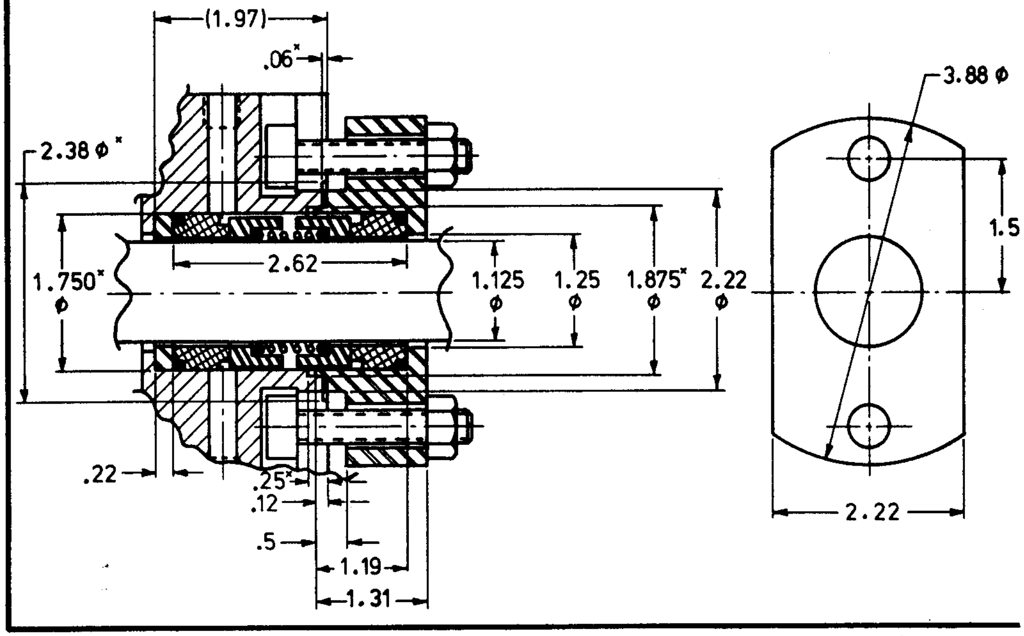
BASED ON ROPER STANDARD SEAL DIMENSIONS.

NO. S-0514



7X202 - 7X265

7X201



PUMP	A	B	C	D	E*
7X202	1.313	2.063	2.62	.12	.38
7X205	1.625	2.375	2.88	.38	.75
7X212	2.125	3.130	2.88	.44	1.31
7X219/28	2.500	3.505	2.88	.44	1.38
7X244/65	3.500	4.750	3.12	1.38	1.62

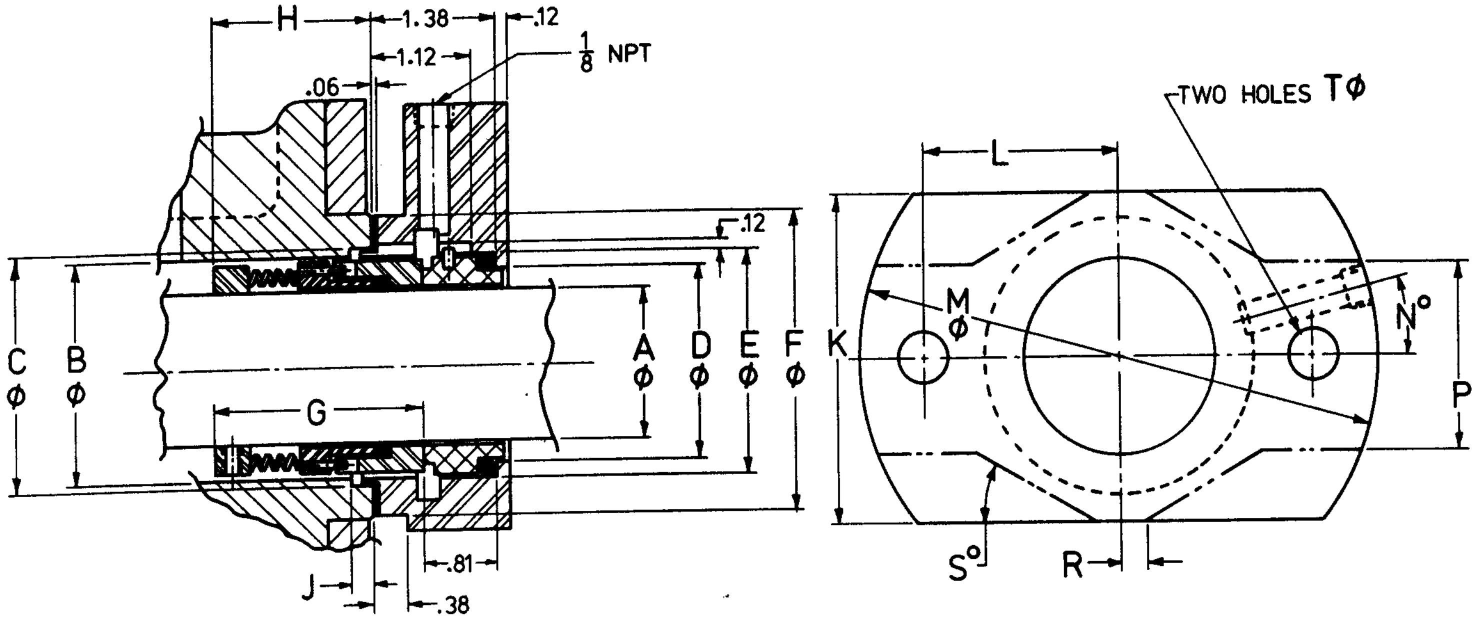
ROPER PROGRESSING CAVITY PUMP
DURAMETALLIC DOUBLE CRO MECHANICAL SEAL

TYPICAL DIMENSIONS

NO. S-0272

NOTES:

1. TYPE CRO DURA SEALS CAN BE APPLIED ONLY TO NON-LUBRICATING LIQUIDS.
2. MAXIMUM STUFFING BOX TEMPERATURE 120°F.
3. DOUBLE CRO DURA SEALS REQUIRE SEALING WATER BETWEEN THE SEALS MAINTAINED AT A PRESSURE OF 15-25 PSIG MINIMUM ABOVE STUFFING BOX PRESSURE AND CIRCULATED AT A FLOW RATE OF .25 TO .5 GPM.
* 4. 7X201 PUMP REQUIRES MODIFIED BOX BORE AS SHOWN.
• 5. 7X202 THROUGH 7X265 PUMPS MAY USE STANDARD PACKING GLAND AS A SEAL RETAINER BY FACING TO LENGTH SHOWN.
6. ALL DIMENSIONS IN INCHES UNLESS SPECIFIED OTHERWISE.



PUMP	A	B	C*	D	E	F	G	H	J*	K	L	M	N	P	R	S	T	PUMP
7X201*	1.125	1.750*	1.875	1.515	1.875	2.25	1.62	1.06	.25	2.25	1.56	4.25	25	NA	NA	NA	.5	7X201*
7X202*	1.313	2.063	2.188	1.703	2.063	2.44	1.62	1.06	.25	2.62	1.88	5.12	20	NA	NA	NA	.56	7X202*
7X205*	1.625	2.375	2.500	2.015	2.375	3.19	1.75	1.19	.25	3.5	2.12	5.62	15	2	.28	30	.56	7X205*
7X212	2.125	3.130	NA	2.515	2.875	3.94	1.75	1.19	NA	4.12	2.75	6.88	15	2.5	.53	30	.62	7X212
7X219/28	2.500	3.505	NA	2.890	3.250	4.44	1.75	1.19	NA	4.62	3.06	7.88	15	2.88	.62	30	.62	7X219/28
7X244/65	3.500	4.750	NA	4.078	4.438	5.94	1.75	1.19	NA	6.25	4.12	9.88	15	3.5	.75	30	.75	7X244/65

ROPER PROGRESSING CAVITY PUMP

DURAMETALLIC RO MECHANICAL SEAL

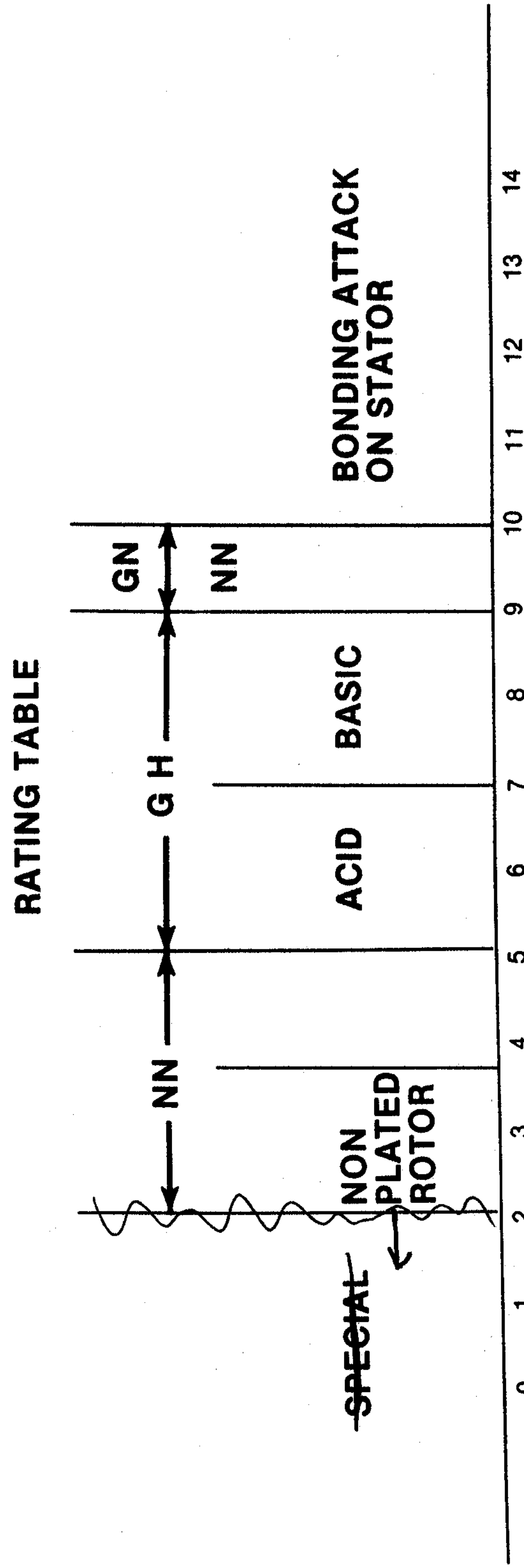
TYPICAL DIMENSIONS

NOTES:

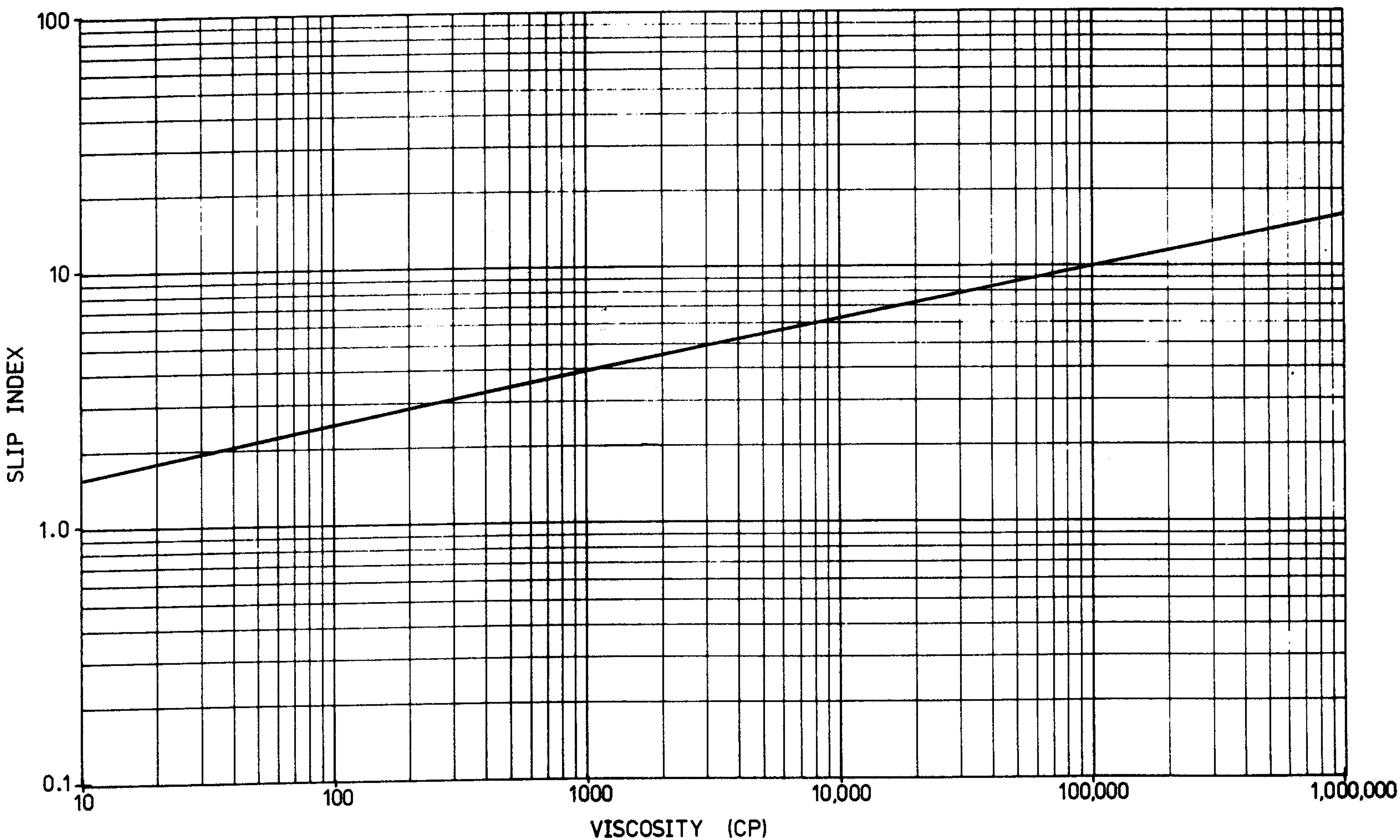
*1. 7X201 THROUGH 7X205 PUMPS REQUIRE A MODIFIED BOX BORE AS SHOWN.

TYPICAL STARTING TORQUES IN INCH POUNDS FOR NEMA DESIGN B PROTECTED AND TEFC 3/60/230-460 VOLT MOTORS

HP	3600 RPM	1800	1200RPM
1/2			
3 / 4			69
1		96	89
1-1/2	46	131	130
2	59	164	168
3	84	226	244
5	131	324	394
7-1/2	184	459	591
10	236	578	788
15	341	840	1103
20	455	1050	1418
25	569	1313	1772
30	683	1576	2127
40	875	1961	2836
50	1050	2451	3545
60	1260	2941	4254
75	1379	3676	5318
100	1838	4376	6565
125	2188	4814	8206
150	2626	5777	9848



SLIP INDEX VS. VISCOSITY



NO. S-0509