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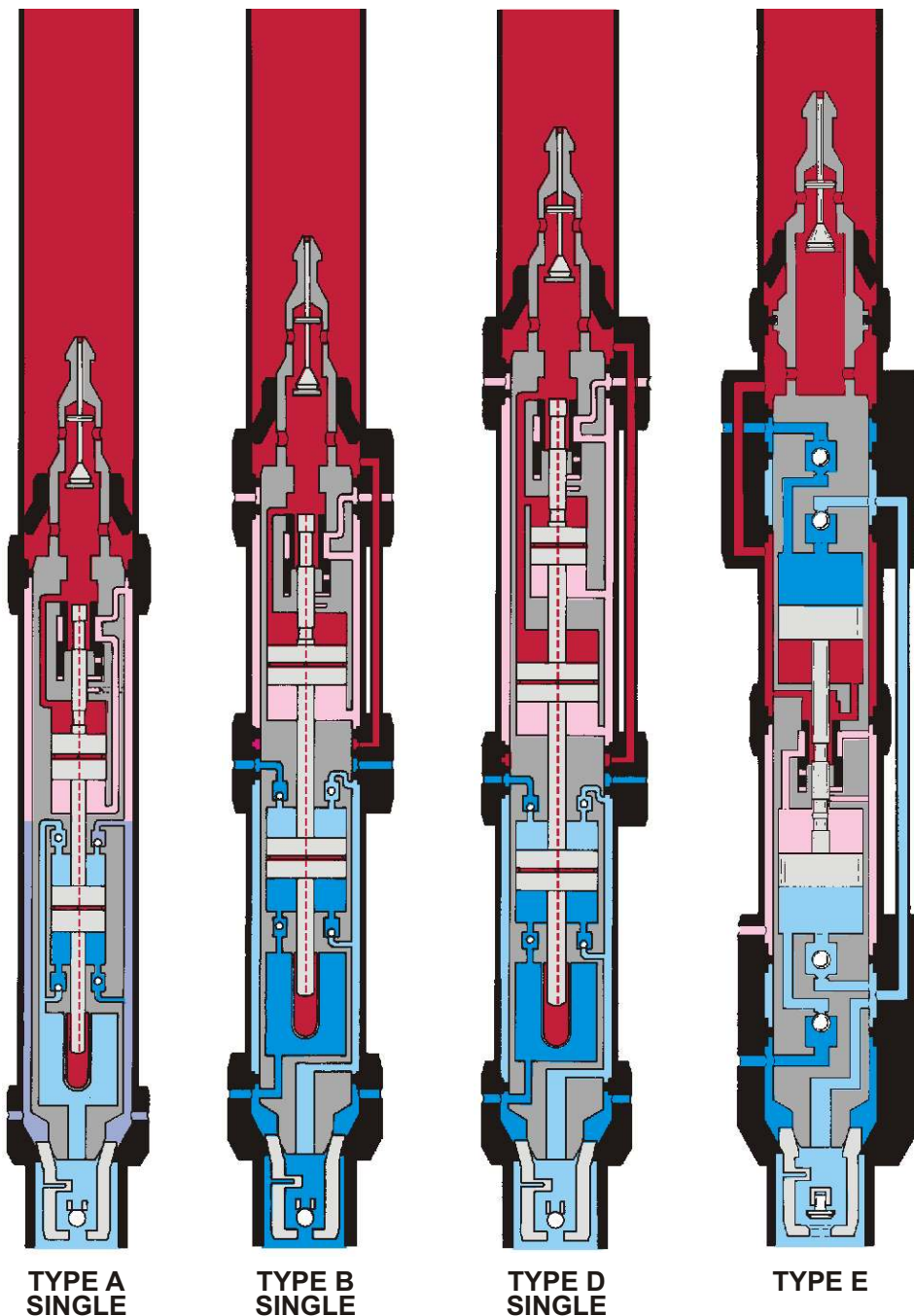
Hydraulic Piston Pumps

Kobe Type A Pump

All fluid passages are enclosed within the outer tubes of this pump design, making it applicable to either the Fixed Insert or "Free Pump" installation. The design requires only a single external seal when run as a "Free Pump" into the downhole bottom hole assembly. Type A Pumps are available in 2 through 4 inch tubing sizes and may be fitted with single or double pump ends.

Kobe Type B Pump

The Type B Pump is designed as a "Free Pump" to utilize the bottom hole assembly for fluid passages which are external to the pump. This permits use of larger pump and engine pistons to gain greater displacement capacity. These passages are established between the pump and the bottom hole assembly by means of multiple external seals on the pump. The Type B Pump is available as a "Free Pump" for 2, 2-1/2 and 3 inch tubing sizes and may be fitted with single or double pump ends.



PUMP SIZE Nominal X Engine - Pump X Pump (inches)	Part Number	DISPLACEMENT			Area Ratio		Max. Fluid Lift (ft.)	Approx. Pump Length (lb.)	Approx. Pump Weight (lb.)
		Pump End at Rated Speed	(BPD per SPM)		P/E	E/P			
			Engine	Pump					
TYPE A DOWNHOLE PUMPS									
<i>Fits in 2-3/8" O.D. Tubing or Larger</i>									
2 X 13/16 -- 13/16	43-50-21	139	1.20	1.15	1.000	1.000	10,000	78	42
2 X 1 -- 13/16	44-30-21	139	2.15	1.15	0.545	1.834	15,000	78	42
2 X 1 -- 1	44-40-21	255	2.15	2.10	1.000	1.000	10,000	78	42
2 X 1 -- 1-3/16	44-50-21	393	2.15	3.25	1.546	0.647	6,500	78	42
2 X 1-3/16 -- 13/16	45-50-21	139	3.30	1.15	0.353	2.831	15,000	78	42
2 X 1-3/16 -- 1	45-40-21	255	3.30	2.10	0.647	1.545	15,000	78	42
2 X 1-3/16 -- 1-3/16	45-50-21	393	3.30	3.25	1.000	1.000	10,000	78	42
2 X 1-3/16 -- 1 X 1	45-44-21	508	3.30	4.20	1.290	0.775	7,700	132	70
2 X 1-3/16 -- 1-3/16 X 1	45-54-21	647	3.30	5.35	1.647	0.607	6,100	132	70
2 X 1-3/16 -- 1-3/16 X 1-3/16	45-55-21	787	3.30	6.50	2.000	0.500	5,000	132	70
<i>Fits in 2-7/8" O.D. Tubing or Larger</i>									
2-1/2 X 1 -- 1	53-20-21	256	2.66	2.56	1.000	1.000	10,000	105	85
2-1/2 X 1-1/4 -- 1	54-20-21	256	5.02	2.56	0.520	1.923	15,000	105	85
2-1/2 X 1-1/4 -- 1-1/8	54-30-21	367	5.02	3.67	0.746	1.340	13,400	105	85
2-1/2 X 1-1/4 -- 1-1/4	54-40-21	492	5.02	4.92	1.000	1.000	10,000	105	85
2-1/2 X 1-1/4 -- 1-7-16	54-50-21	703	5.02	7.03	1.431	0.700	7,000	105	85
2-1/2 X 1-7/16 -- 1-1/8	55-30-21	367	7.13	3.67	0.522	1.917	15,000	105	85
2-1/2 X 1-7/16 -- 1-1/4	55-40-21	492	7.13	4.92	0.700	1.428	14,300	105	85
2-1/2 X 1-7/16 -- 1-7/16	55-50-21	703	7.13	7.03	1.000	1.000	10,000	105	85
2-1/2 X 1-1/2 -- 1-1/2	56-60-21	745	7.55	7.45	1.000	1.000	10,000	105	85
2-1/2 X 1-5/8 -- 1-1/4	57-40-21	492	9.27	4.92	0.521	1.920	15,000	105	85
2-1/2 X 1-5/8 -- 1-7/16	57-50-21	703	9.27	7.03	0.770	1.290	13,000	105	85
2-1/2 X 1-5/8 -- 1-1/2	57-60-21	745	9.27	7.45	0.820	1.220	12,200	105	85
2-1/2 X 1-5/8 -- 1-5/8	57-70-21	944	9.27	9.09	1.000	1.000	10,000	105	85
2-1/2 X 1-7/16 -- 1-1/4 X 1-1/4	55-44-21	984	7.13	9.84	1.400	0.714	7,200	175	140
2-1/2 X 1-7/16 -- 1-7/16 -- 1-1/4	55-54-21	1195	7.13	11.95	1.701	0.588	5,900	175	140
2-1/2 X 1-7/16 -- 1-7/16 -- 1-7/16	55-55-21	1406	7.13	14.06	2.000	0.500	5,000	175	140
2-1/2 X 1-5/8 -- 1-5/8 X 1-5/8	57-77-21	1818	9.27	18.18	2.000	0.500	5,000	175	140
<i>Fits in 3-1/2" O.D. Tubing or Larger</i>									
3 X 1-1/2 -- 1-1/4	64-20-21	486	9.61	5.59	0.592	1.686	15,000	136	168
3 X 1-1/2 -- 1-3/8	64-30-21	646	9.61	7.43	0.787	1.271	12,700	136	168
3 X 1-1/2 -- 1-1/2	64-40-21	821	9.61	9.44	1.000	1.000	10,000	136	168
3 X 1-1/2 -- 1-3/4	64-50-21	1218	9.61	14.00	1.480	0.676	6,700	136	168
3 X 1-3/4 -- 1-1/2	65-40-21	821	14.17	9.44	0.676	1.480	14,800	136	168
3 X 1-3/4 -- 1-3/4	65-50-21	1218	14.17	14.00	1.000	1.000	10,000	136	168
3 X 2 -- 1-3/4	67-50-21	1218	19.35	14.00	0.727	1.375	13,750	136	168
3 X 1-3/4 -- 1-1/4 X 1-1/4	65-22-21	973	14.17	11.18	0.800	1.249	12,500	223	280
3 X 1-3/4 -- 1-1/2 X 1-1/2	65-44-21	1642	14.17	18.88	1.351	0.740	7,400	223	280
3 X 1-3/4 -- 1-3/4 X 1-1/2	65-54-21	2093	14.17	23.44	1.675	0.597	6,000	223	280
3 X 1-3/4 -- 1-3/4 X 1-3/4	65-55-21	2436	14.17	28.00	2.000	0.500	5,000	223	280
<i>Fits in 4-1/2" O.D. Tubing or Larger</i>									
4 X 2 -- 1-3/4	84-30-21	1109	21.44	14.40	0.687	1.456	14,600	173	370
4 X 2 -- 2	84-40-21	1617	21.44	21.00	1.000	1.000	10,000	173	370
4 X 2 -- 2-3/8	84-50-21	2503	21.44	32.50	1.541	0.649	6,500	173	370
4 X 2-3/8 -- 2	85-40-21	1617	32.94	21.00	0.649	1.540	15,000	173	370
4 X 2-3/8 -- 2-3/8	85-50-21	2503	32.94	32.50	1.000	1.000	10,000	173	370
4 X 2-3/8 -- 2 X 1-3/4	85-43-21	2726	32.94	35.40	1.094	0.914	9,200	283	614
4 X 2-3/8 -- 2 X 2	85-44-21	3234	32.94	42.00	1.299	0.770	7,700	283	614
4 X 2-3/8 -- 2-3/8 X 2	85-54-21	4120	32.94	53.50	1.650	0.606	6,100	283	614
4 X 2-3/8 -- 2-3/8 X 2-3/8	85-55-21	5005	32.94	65.00	2.000	0.500	5,000	283	614

PUMP SIZE Nominal X Engine - Pump X Pump (inches)	Part Number	DISPLACEMENT			Area Ratio		Max. Fluid Lift (ft.)	Approx. Pump Length (lb.)	Approx. Pump Weight (lb.)
		Pump End at Rated Speed	(BPD per SPM)		P/E	E/P			
			Engine	Pump					
TYPE B DOWNHOLE PUMPS									
<i>Fits in 2-3/8" O.D. Tubing or Larger</i>									
2 X 1-3/8 -- 1-3/16	49-50-22	381	4.54	3.15	0.700	1.429	14,000	97	60
2 X 1-3/8 -- 1-3/8	49-90-22	544	4.54	4.50	1.000	1.000	10,000	97	60
2 x 1-3/8 -- 1-3/16 X 1-3/16	49-55-22	750	4.54	6.21	1.380	0.725	7,200	129	77
2 X 1-3/8 -- 1-3/8 X 1-3/16	49-59-22	914	4.54	7.55	1.680	0.595	5,900	129	77
2 X 1-3/8 -- 1-3/8 X 1-3/8	49-99-22	1076	4.54	8.90	1.980	0.505	5,000	129	77
<i>Fits in 2-7/8" O.D. Tubing or Larger</i>									
2-1/2 X 1-3/4 -- 1-1/2	59-60-22	744	10.96	7.44	0.685	1.460	14,600	125	100
2-1/2 X 1-3/4 -- 1-3/4	59-90-22	1086	10.96	10.86	1.000	1.000	10,000	125	100
2-1/2 X 1-3/4 -- 1-1/2 X 1-1/2	59-66-22	1452	10.96	14.52	1.336	0.749	7,500	185	135
2-1/2 X 1-3/4 -- 1-3/4 X 1-1/2	59-96-22	1794	10.96	17.94	1.652	0.605	6,000	185	135
2-1/2 X 1-3/4 -- 1-3/4 X 1-3/4	59-99-22	2136	10.96	21.36	1.957	0.519	5,200	185	135
<i>Fits in 3-1/2" O.D. Tubing or Larger</i>									
3 X 2-1/8 -- 1-7/8	69-60-22	1388	21.75	15.96	0.740	1.351	13,500	158	186
3 X 2-1/8 - 2-1/8	69-90-22	1875	21.75	21.55	1.000	1.000	10,000	158	186
3 X 2-1/8 -- 1-7/8 X 1-7/8	69-66-22	2727	21.75	31.34	1.454	0.688	6,900	210	260
3 X 2-1/8 -- 2-1/8 X 1-7/8	69-96-22	3214	21.75	36.94	1.714	0.583	5,800	210	260
3 X 2-1/8 -- 2-1/8 X 2-1/8	69-99-22	3700	21.75	42.53	1.974	0.507	5,100	210	260
TYPE D DOWNHOLE PUMPS									
<i>Fits in 2-3/8" O.D. Tubing or Larger</i>									
2 X 1-3/16 X 1-3/8 -- 1-3/8	4D-90-22	544	7.79	4.50	0.581	1.721	15,000	122	75
2 X 3/16 X 1-3/8 -- 1-3/16 X 1-3/16	4D-55-22	750	7.79	6.21	0.802	1.247	12,000	154	90
2 X 3/16 X 1-3/8 -- 1-3/8 X 1-3/16	4D-95-22	914	7.79	7.55	0.976	1.025	10,000	154	90
2 X 1-3/16 X 1-3/8 -- 1-3/8 X 1-3/8	4D-99-22	1076	7.79	8.90	1.150	0.870	8,700	154	90
<i>Fits in 2-7/8" O.D. Tubing or Larger</i>									
2-1/2 X 1-7/16 X 1-3/4 -- 1-1/2	5D-60-22	744	17.99	7.44	0.411	2.433	15,000	168	135
2-1/2 X 1-7/16 X 1-3/4 -- 1-3/4	5D-90-22	1086	17.99	10.86	0.608	1.645	15,000	168	135
2-1/2 X 1-7/16 X 1-3/4 -- 1-1/2 X 1-1/2	5D-66-22	1452	17.99	14.52	0.813	1.230	12,300	228	180
2-1/2 X 1-7/16 X 1-3/4 -- 1-3/4 X 1-1/2	5D-96-22	1794	17.99	17.94	0.976	1.025	10,000	228	180
2-1/2 X 7/16 X 1-3/4 -- 1-3/4 X 1-3/4	5D-99-22	2136	17.99	21.36	1.196	0.836	8,400	228	180
<i>Fits in 3-1/2" O.D. Tubing or Larger</i>									
3 X 1-3/4 X 2-1/8 -- 1-7/8	6D-60-22	1388	35.74	15.96	0.449	2.227	15,000	202	240
3 X 1-3/4 X 2-1/8 -- 2-1/8	6D-90-22	1875	35.74	21.55	0.606	1.650	15,000	202	240
3 X 1-3/4 X 2-1/8 -- 1-7/8 X 1-7/8	6D-66-22	2727	35.74	31.34	0.882	1.134	11,300	253	300
3 X 1-3/4 X 2-1/8 -- 2-1/8 X 1-7/8	6D-96-22	3214	35.74	36.94	1.039	0.962	9,600	253	300
3 X 1-3/4 X 2-1/8 -- 2-1/8 X 2-1/8	6D-99-22	3700	35.74	42.53	1.197	0.835	8,300	253	300
TYPE E DOWNHOLE PUMPS									
<i>Fits in 2-7/8" O.D. Tubing or Larger</i>									
2-1/2 X 1-3/4	5E-00-22	2400	35.45	40.63	1.146	0.873	8,700	185	110
<i>Fits in 3-1/2" O.D. Tubing or Larger</i>									
3 X 2-1/8	5E-00-22	4007	62.77	71.70	1.142	0.876	8,700	220	165

NOTE: Last two digits of part numbers are -- 21 for OPF (Open Power Fluid); 22 for CPF (Closed Power Fluid) Production Unseat, and 23 for Closed Power Fluid PRU (Power Return Unseat).

PUMP STROKE LENGTH FOR TYPE A & ALP: For 2" pump, 12"; for 2-1/2" pump, 18"; for 3" pump, 24"; and for 4" pump, 30".

PUMP STROKE LENGTH FOR TYPE B & D: For 2" pump, 12"; for 2-1/2" pump, 18"; for 3" pump, 24".

PUMP STROKE LENGTH FOR TYPE E: For 2-1/2" pump, 57"; for 3" pump, 68".

MAXIMUM PUMP O.D. TYPE A & ALP: For 2" pump, 1.889"; for 2-1/2" pump, 2.326"; for 3" pump, 2.826"; and for 4" pump, 3.826".

MAXIMUM PUMP O.D. TYPE B, D & E: For 2" pump, 1.889"; for 2-1/2" pump, 2.326"; for 3" pump, 2.826".

MAXIMUM RATED SPEED FOR TYPE A & ALP: For 2" pump, 121 SPM; for 2-1/2" pump, 100 SPM; for 3" pump, 87 SPM; for 4" pump, 77 SPM.

MAXIMUM RATED SPEED FOR TYPE B & D: For 2" pump, 121 SPM; for 2-1/2" pump, 100 SPM; for 3" pump, 87 SPM.

MAXIMUM RATED SPEED FOR TYPE E: For 2-1/2" pump, 59 SPM; for 3" pump, 56 SPM.

Kobe Type D Pump

The Type D Pump is an extension of the Type B by the addition of a second engine piston and cylinder for increased engine displacement. Available pump ends are the same as for the Type B. This design extends the depth of lift capability or permits reduced operating pressure. The Type D is available as a "Free Pump" for 2, 2-1/2 and 3 inch tubing sizes and may be fitted with single or double pump ends.

Kobe Type E Pump

The Type E Pump is a high-volume, double-acting "Free Pump". The design of the type E allows for a long, slow stroke, thereby increasing engine valve and production valve life, and a high compression ratio which virtually eliminates gas locking.

Double pump-end combinations are not possible with the Type E, as all pump sizes have only two pistons each acting as engine and pump, depending on the position of the engine valve. For example, on an upstroke, the top piston is acting as engine and pump, while the bottom piston is pulling well fluid into the lower cylinder and expelling spent power fluid from the previous stroke at the same time. When the engine valve reverses and a downstroke is made, the bottom piston then becomes the engine and pump, while the top cylinder is filling with well fluid.



Weatherford®

Worldwide Customer Service
515 Post Oak Blvd. Houston, Texas 77027
Phone: (713) 693-4800 als@weatherford.com

WESTERN HEMISPHERE

Canada
Phone: (403) 269-7788

Latin America
North - Lecheria, Venezuela
Tel.: 58 281 2814211

South - Buenos Aires, Argentina
Phone: 54 (11) 5077 0077

EASTERN HEMISPHERE

Europe
Phone: (44) 1224 331 331

CIS & Middle East
Phone: (43) 9714-3325999

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