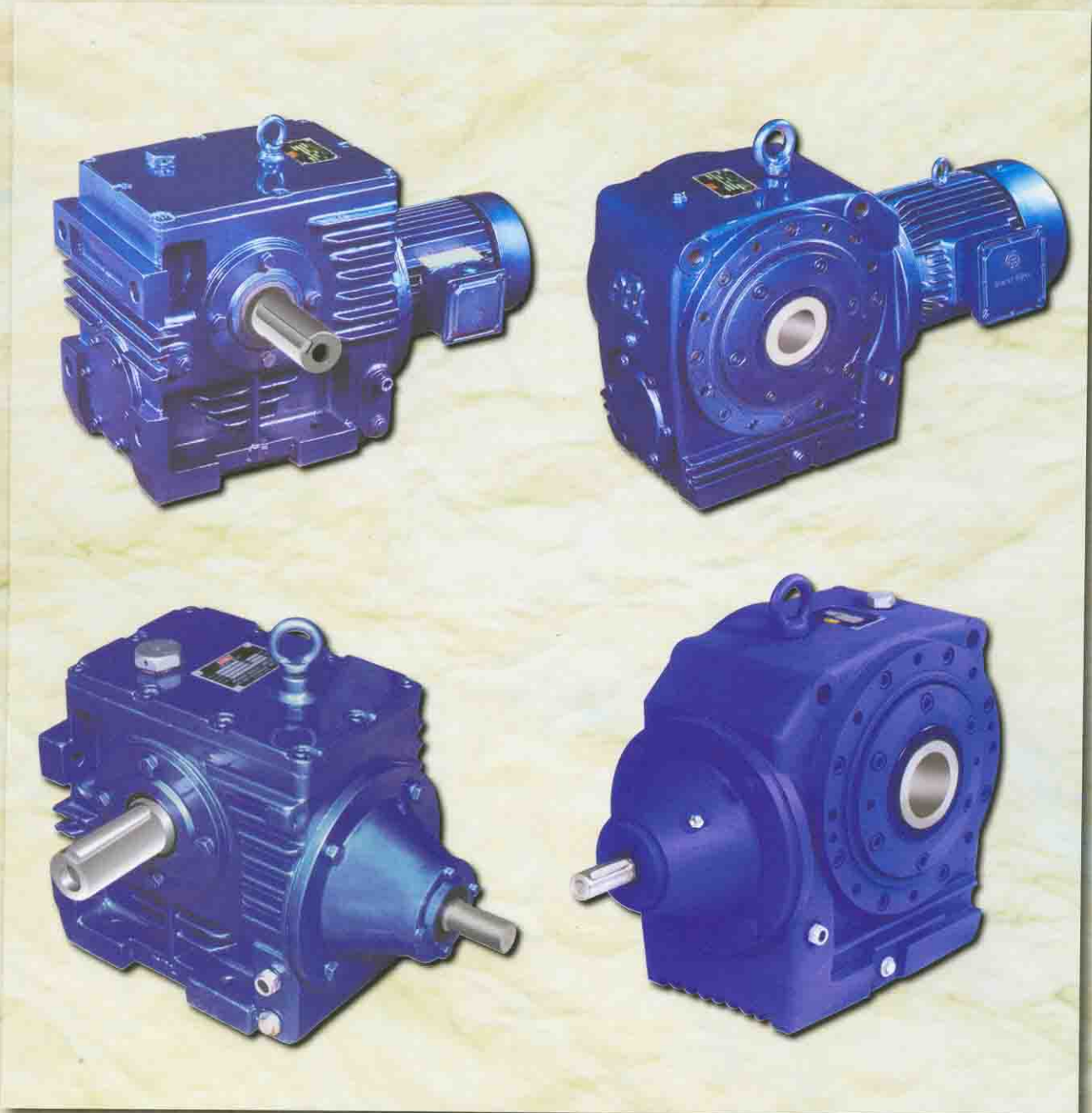




PBL HELIWORM GEARED MOTORS



PBL started manufacturing Helical Geared Motors in 1972 under technical collaboration from renowned German Manufacturer Rudolf Muchna KG. With a view to have more concentrated and effective capturing of the already competitive Geared Motor market, PBL introduced Geared Motors with the combination of Helical & Worm Gears. PBL continues to maintain leadership in the market due to continuous research and development in the field of mechanical power transmission equipment, understanding individual application and working out the most suitable and economical solution. PBL is happy to release this catalogue on Heliworm Geared Motors, incorporating in it, the essence of its long experience and expertise in the field. This catalogue supersedes all earlier catalogues for PBL Heliworm Geared Motors.

GENERAL

PBL Heliworm Geared Motors and Reducers are designed and manufactured to provide efficient and simple drive for all slow running equipment and machineries. This design has considerable advantage over conventional gearboxes particularly for higher efficiency, compactness, rugged construction and versatile mounting. First stage reduction is achieved by helical gears and second stage reduction by worm gears. Both the stages of reduction are housed in single piece gear housing to make the unit compact.

In solid shaft construction, electric motor and the gearbox are built as one unit with output shaft right angle to motor shaft or input shaft. Foot mounted Solid Shaft Heliworm Geared Motors and Reducers are provided with two mounting faces right angle to each other with identical mounting dimensions and can be provided with output shaft at both ends.

In hollow shaft construction, electric motor and the gearbox are built as one unit with output shaft axis right angle to motor shaft or input shaft.

DESIGN STANDARDS

Wherever applicable international standards are used both for material and machining tolerances. This also takes care of relevant Indian Standards. The unit as a whole also conforms to International Standards and the accuracy class "A".

GEAR CASE

Gear case is of streamlined design, rugged in construction, made of close-grain cast iron. It is completely oil-tight, dust-proof, and capable of being installed in the open without a separate cover. The faces and bores are accurately machined and bored to ensure perfect alignment.

WORM/WORM WHEEL

The worm is made of case hardening alloy steel, carburized, hardened, ground and polished, and is integral with the shaft. Worms are generated on special purpose worm milling machines.

Worm wheels are made of centrifugally cast phosphor bronze rims, shrink fitted and brazed with C.I. centres. Worm wheels are hobbled on precision hobbing machines with high accuracy hobs. Each and every wheel is checked to match with the master worms to ensure complete interchangeability.

OUTPUT SHAFT

In Solid Shaft construction, the output shaft is made of carbon steel. It is of large diameter to carry the torsional as well as bending loads which may be induced by overhung drives. All output shafts up to 58 mm diameter have tolerance as per IS k6 and over 58 mm dia as per IS m6. Keyways are manufactured as per IS 2048 Threading in output shaft is provided as per DIN 332.

In hollow shaft construction, the output shaft is made of carbon steel all hollow shaft bores have tolerances as per IS H7. Keyways are manufactured as per IS 2048

HELICAL GEARS

All wheels and pinions are manufactured from high quality alloy steel and are case hardened with special heat treatment techniques.

ELECTRICALS

Electric motor provided with Heliworm Geared motor is TEFC squirrel cage induction motor suitable for operation on 415V, 3 phase, 50 Hz, AC power supply as per IS 325. All motors are provided in IP-55 enclosure and with class "F/B" insulation.

LUBRICATION

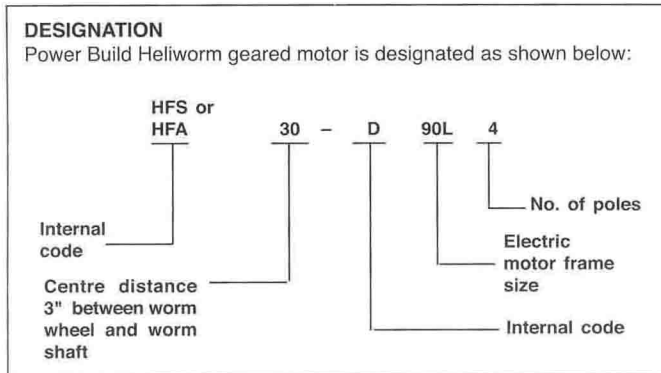
The lubrication of the gears and bearings is fool-proof, being achieved automatically by splash of oil. Thus, no special care is required except occasional topping up of the oil to the required level. A large oil filler-cum-breather and a drain plug are provided.

COOLING

The gear case is designed for surface cooling. The ribs are provided on the gear case so as to give maximum heat dissipation effect.

SERVICE FACTOR

Depending upon the nature of the load, characteristics of prime mover and duration of operation, an appropriate service factor must be applied while selecting Heliworm geared motor or gear reducer. Multiply the nominal absorbed HP by the factor specified in table No.2 and use this new figure to determine the size of gearbox. Electric motor corresponding to nearest standard output HP can be selected for coupling with the gearbox chosen as mentioned above.



- HFS = Heliworm Solid Shaft Geared Motor
- HFA = Heliworm Hollow Shaft Geared Motor
- D = Standard Shaft of Electric Motor

TABLE NO. 1 : LOAD CHARACTERISTIC

Agitator and mixers :		Conveyors :		Screens :	
Liquids, semi-liquids	- U	Uniformly loaded	- U	Air washing	- U
Liquids, variable density	- M	Rough or non-uniform drive	- M	Rotary (stone/gravel)	- M
		Reciprocating & shaker	- M		
Blowers :		Crane hoists :	- M	Sugar industry :	
Centrifugal, vane	- U			Cane knives	- M*
Lobe	- M	Crushers :	- H	Crushers	- M*
				Mills	- M*
Brewing & Distilling :		Elevators :		Oil industry :	
Bottle machinery	- U	Bucket, Uniform load	- U	Chillers	- M
Brew kettle	- U	Bucket, Heavy load	- M	Rotary kilns	- M
Cookers, scale hopper	- M	Bucket, Cont. load	- U		
(frequent start)		Centrifugal discharge	- U	Paper mills :	
Cane knives	- M	Gravity discharge	- U	Bleacher conveyor	
Clarifiers	- U			press, winder	- U
Clay working machinery :		Fans :		Calenders, agitators,	
Brick press, brigquette machine	- H	Centrifugal	- U	beater & pulper	- M
Pug mill, clay working		Induced draft	- M		
machinery	- M	Large (mine, industrial, etc.)	- M	Pumps :	
		Light (small diameter)	- U	Centifugal	- U
Compressors :		Feeders :		Reciprocating	
Centrifugal	- U	Apron	- M	(3 or more cylinders)	- M
Lobe	- M	Belt	- M		
Reciprocating, multi-cylinder	- M	Disc	- U	Textile industry :	
Reciprocating, single cylinder	- H	Reciprocating	- H	Batchers	- M
Food Industry :		Rubber & Plastic industry :		Calenders	- M
Beet slicer	- M	Crackers	- H*	Dyeing machinery	- M
Cereal cooker	- U	Fixing mills	- H*	Spinners	- M
		Laboratory Equipment	- M	Washers	- M
Laundry machines :		Refiners	- M*	Winders	- M
Washers, tumblers	- M	Sheeters	- M*	Wire-drawing machinery	- M
Line shaft mills	- U	Tubers & strainers	- M*		
Hammers	- H	Warming mills	- M*		
Balls kiln, pebbles	- M				
Rod tumbling barrels	- H				

U = Uniform load
H = Heavy shock load
M = Medium shock load

*Marked thus should be selected on the basis of 24 hours/day service only.

TABLE NO. 2 : SERVICE FACTORS

Prime mover	Duration of service	Uniform U	Moderate shock M	Heavy Shock H
	2 hours/day	0.75	0.80	1.25
	4 hours/day	0.80	1.0	1.30
Electric motor	8 hours/day	0.90	1.1	1.45
	12 hours/day	1.10	1.25	1.55
	24 hours/day	1.25	1.5	1.75

- For drive from diesel or petrol engine, multiply above factor by 1.2.
- When the number of starts and stops per hour is more than twenty, consult us.

RATING TABLE OF PBL HELIWORM (SOLID SHAFT) GEARED MOTORS

HP	Output RPM	Output Torque in Kgm	S. F.	Type	HP	Output RPM	Output Torque in Kgm	S. F.	Type		
0.16	6	10.4	1.25	HFS25-D63K4	0.25	47	3.04	4.4	HFS25-D63K4		
	7.5	8.61	1.25			52	2.75	4.4			
	9.6	6.9	1.87			58	2.58	4.4			
	10.5	6.32	1.87			65	2.27	6.4			
	12	5.58	1.87			71	2.29	6.4			
	13.5	5.05	1.87			80	1.9	6.8			
	14.8	4.8	2.5								
	16.5	4.42	2.5			0.33	2.5	48.22		1.2	HFS40-90S8
	19	3.92	3.1				2.9	43.2		1.2	
	21	3.62	3.1				3.9	32.12		1.2	
	23.2	3.4	3.75		4.5		29.41	2			
	25.5	3.11	3.75								
	28.5	2.83	3.75		5.3		25	1.8	HFS40-D71K6		
	30.8	2.65	5		6		22.45	2.7			
	34.5	2.4	5								
	35	2.35	6.5		7.8		16.93	1.2	HFS30-D71K4		
	39.3	2.22	6.25		8.6		16.5	1.2			
	46.4	2	7		9	14.4	1.35				
	51	1.8	7		10	13.24	1.5				
	57	1.64	7		11.5	11.71	1.5				
58	1.64	8.1	14	9.96	1.8						
64	1.5	10									
70	1.36	10									
79	1.23	10.6									
0.25	5.4	18.8	1.6	HFS30-D63K4		15.5	9.61	1.2	HFS25-D71K4		
	6.2	17.15	2		17	8.9	1.2				
	6.7	15.8	1.6		19.5	8	1.5				
	7.6	14	1.6		22	7.2	1.5				
	8.5	12.7	1.6		24	6.8	1.8				
					26.5	6.24	1.8				
	10.7	9.9	1.2		29.5	5.69	1.8				
	12.3	8.6	1.2		35.5	4.79	2.4				
	15	7.6	1.6		41	4.32	3				
	16.8	6.82	1.6		48	3.94	3.3				
	17.5	6.68	2	53	6.62	3.3					
	19.2	6.13	2	59	3.28	3.3					
	21.5	5.58	2	66.5	2.96	4.85					
	23.5	5.26	2.4	73	2.72	4.85					
	26	4.82	2.4	81.5	2.44	5.1					
	29	4.38	2.4	95	2.09	4.5	HFS25-D63K2				
	31.3	4.18	3.2	104	1.93	4.5					
	35	3.7	3.2	116	1.73	4.85					
	40	3.35	4	119	1.72	6.65					
				131	1.58	7.3					
			144	1.44	7.3						
			161	1.29	7.9						

1. ITEM PRINTED IN BOLD ARE NON-STANDARD AND DELIVERY MAY BE ASCERTAINED
 2. 'D' IN THE TYPE SHOWS STANDARD SHAFT OF ELECTRIC MOTOR

RATING TABLE OF PBL HELIWORM (SOLID SHAFT) GEARED MOTORS

HP	Output RPM	Output Torque in Kgm	S. F.	Type	HP	Output RPM	Output Torque in Kgm	S. F.	Type
0.5	2.8	70	1.6	HFS50-90S8	0.75	2.8	105.5	1.1	HFS50-90L8
						4.2	74.18	1.3	HFS50-D80L6
	3.5	57.29	1.8	HFS50-80K6		5.1	62.14	1.3	
						6	53.72	1.85	
	4	51	2	HFS50-D80K6					
	4.7	42.67	2.6			7	47.57	1.7	HFS50-D80K4
	5.1	39.32	1.2	HFS40-D71L4		8	39.6	1.1	HFS40-D80K4
	6	34.26	1.6			9	35.8	1.5	
	7	30.18	1.6			10.3	31.81	1.6	
	8	26.86	1.6			11.4	29.7	1.35	
	9.2	24.13	2.4			13	26.44	1.8	
	10	22.56	2.4			14.6	23.55	2.1	
	11	20.5	2			15.7	22.93	2	
	12.8	17.91	2.8			17.5	20.56	2.2	
	14	16.88	3			19.5	18.73	2.8	
	15.5	15.48	3						
						22	16.36	1.6	HFS30-D80K4
	17	14.11	1.6	HFS30-D71L4		24	16.11	1.3	
	19	12.6	2			26	15.08	1.7	
	21.5	11.61	2.4			28.5	14.14	1.8	
	23.5	10.97	2			31.5	12.8	2.1	
	25.5	10	2.6			35	11.67	2.4	
	28	9.46	2.8			39	11.02	2.8	
						44	9.77	2.8	
	29.5	8.46	1.2	HFS25-D71L4		49	9.1	2.7	
	32	8.06	1.6			54	8.86	2.9	
	35.7	7.22	1.6			60.5	7.55	3	
	41	6.63	2			64.4	7.26	3.6	
	48.5	5.9	2.2						
	53	5.5	2.2			74	6.32	4	HFS30-D80K4
	59	4.92	2.2			81	5.83	4.4	
	67	4.5	3.2			91	5.25	4.4	
	73	4.12	3.2						
	82	3.67	3.4			99	4.56	2	HFS25-D71L2
						108	4.22	2	
	98	3.1	3	HFS25-D71K2		121	3.82	2.1	
	108	2.82	3			136	3.48	3.2	
	120	2.53	3.2			150	3.15	3.2	
	136	2.3	4.8			167	2.83	3.5	
	149	2.11	4.8						
	166	1.22	5.2						

1. ITEM PRINTED IN BOLD ARE NON-STANDARD AND DELIVERY MAY BE ASCERTAINED
2. 'D' IN THE TYPE SHOWS STANDARD SHAFT OF ELECTRIC MOTOR

RATING TABLE OF PBL HELIOWORM (SOLID SHAFT) GEARED MOTORS

HP	Output RPM	Output Torque in Kgm	S. F.	Type	HP	Output RPM	Output Torque in Kgm	S. F.	Type	
1	3.4	122	1.3	HFS60-100L8	1.5	4.3	152.4	1.1	HFS60-D90L6	
	4	109.2	1.4	HFS60-D100L8		5	131.1	1.3		
	4.3	101.6	1.6	HFS60-D90S6		6	107.43	1.2		
	5.2	81.65	1	HFS50-D90S6		7.1	98.45	1.3	HFS60-D90S4	
	6.1	68.1	1.4			8	87.29	1.5		
						9	78.8	1.5		
	7	63.43	1.3	HFS50-D80L4		10.5	66.5	2.3		
	8	56.4	1.4							
	9.3	48.5	1.8			12.3	57.64	1.1	HFS50-D90S4	
	11.2	40.28	2.3			14	51.4	2		
						16	45	1.9		
	13	35.26	1.4	HFS40-D80L4		18	41.78	2.2		
	14	33.77	1.8			20	37.6	2.4		
	15.7	30.6	1.5							
	17.5	27.8	1.7			22	33.2	1.5	HFS40-D90S4	
	19.5	25	2.1			24	32.23	1.9		
	22	22.13	2.3			26.5	29.19	2		
	24	21.19	2.9			29	27.4	2.3		
	26	19.84	3			32	25.18	2.4		
	28.5	18.34	3.5			35	23	2.4		
	31.4	17.1	3.7			37	23.52	2.05		
	35	15.35	3.7			40.6	21.7	2.2	HFS40-D90S4	
	39	14.69	2.1	HFS30-D80L4		45	19.8	2.3		
	44	13	2.1			50	18	3		
	49	12.13	2			55	16.41	3.1		
	54	11.14	2.2							
	60	10	2.3			61	14.8	1.5	HFS30-D90S4	
	64	9.74	2.7							
	74	8.42	3			65	14.22	1.8	HFS30-90S4	
	81	7.78	3.3			75	12.46	2		
90	7	3.3								
				82	11.53	2.2	HFS30-D90S4			
100	6.3	3	HFS30-D80K2	92	10.4	2.2				
110	5.73	3.3								
123	5.18	3.5		101	9.36	2	HFS30-D80L2			
131	4.92	4.1		111	8.52	2.1				
150	4.29	4.2		124	7.71	2.3				
165	3.91	4.6		132	7.33	2.7				
184	3.54	4.6		151	6.4	2.8				
				166	5.9	3				
				185	5.29	3				

1. ITEM PRINTED IN BOLD ARE NON-STANDARD AND DELIVERY MAY BE ASCERTAINED
2. 'D' IN THE TYPE SHOWS STANDARD SHAFT OF ELECTRIC MOTOR

RATING TABLE OF PBL HELIWORM (SOLID SHAFT) GEARED MOTORS

HP	Output RPM	Output Torque in Kgm	S. F.	Type	HP	Output RPM	Output Torque in Kgm	S. F.	Type	
2	7.1	131.1	1.1	HFS60-D90L4	3	7.1	202.75	1.33	HFS70-132S8	
	8	116.38	1.1							
	9	106.6	1.15				HFS70-D132S8			
	10.5	88.67	1.75				8	177.26	1.4	
	12.5	79.64	1.95				9	162.34	1.9	
	14	73.66	2.4				10	147.18	1.9	
	15.7	67.51	2.8				11	136.73	1.9	
	17.7	57.45	2.4				12	128.9	2.3	
	20	50.85	1.8			HFS50-D90L4	13.5	106.64	1.3	
	22	46.23	1.9				15	98.84	1.4	
	24	44.76	2.5				16	98.7	1.4	
	26.4	41.23	2.6				18	86	1.6	
	29	38	3.2				20	81.11	1.9	
	31.5	35.47	3.4				22.5	73.53	2	
	35	31.11	1.85	HFS40-D90L4		24.5	66.65	1.6	HFS50-D100L4	
	37	31.36	1.55				26.7	61.56		1.7
	40.5	29	1.65				30	55.15		2
	45	23.1	1.75				32	52.7		2.7
	50	24	2.3				36	47.74		2.6
55	21.87	2.3			37.5	47.55	1.8			
61	19.9	2.4			41	43.86	1.8			
					46	39.7	2			
65	19.17	2.8	HFS40-90L4							
				50.3	35.9	1.5	HFS40-D100L4			
74.6	16.7	3.2	HFS40-D90L4	55.2	32.97	1.5				
82	15.37	3.2		62	29.8	1.6				
91	13.85	3.3								
				66	28.45	1.8	HFS40-100L4			
100	12.53	1.5	HFS30-90S2							
				75.4	24.8	2.2	HFS40-D100L4			
110	11.46	1.6	HFS30-D90S2	83	22.88	2.2				
123	10.37	1.75		93	20.61	2.2				
131	9.84	2.1	HFS30-90S2	101	18.65	2.2	HFS40-D90L2			
150	8.6	2.1		111	17.09	2.4				
				124	15.4	2.4				
				132	14.72	2.8				
165	7.89	2.3	HFS30-D90S2							
185	7.07	2.3		166	11.75	1.5	HFS30-D90L2			
				185	10.57	1.5				

1. ITEM PRINTED IN BOLD ARE NON-STANDARD AND DELIVERY MAY BE ASCERTAINED
2. 'D' IN THE TYPE SHOWS STANDARD SHAFT OF ELECTRIC MOTOR

RATING TABLE OF PBL HELI WORM (SOLID SHAFT) GEARED MOTORS

HP	Output RPM	Output Torque in Kgm	S. F.	Type	HP	Output RPM	Output Torque in Kgm	S. F.	Type
4	8	239.9	1.6	HFS80-D160M8	5	15	175.47	1.5	HFS60-D112M4
	9	216.45	1.65			16	167.86	1.8	
	10	200.5	2			17.7	155	1.9	
	11.3	173.66	2.1			19	143.09	1.5	
	12.2	171.75	2.75			21	131.88	1.6	
				23		124.36	1		
	14	153.68	2.4	HFS70-D132S6		26.5	106.75	1.9	HFS50-D112M4
	15	139.42	1.9			29	96.07	1.3	
	16	134.29	2.2			32	87.96	1.4	
	17.7	124.07	2.4	36		78.48	1.5		
	19	114.47	1.9	HFS60-D112M4		37.5	79.26	1.1	
	21	105.45	2.05			41	73.17	1.2	
	23	99.4	1.25	HFS50-D112M4		46	66.17	1.2	
	26.5	85.41	2.15			50	61.69	1.6	
	29	76.86	1.6			55	56.32	1.6	
	32	70.37	1.7			62	50.14	1.6	
	36	62.8	1.9						
	37.5	63.4	1.4			66	47.45	1.1	
	41	58.54	1.5			HFS40-112M4	75	41.76	1.3
	46	52.94	1.5				83	38.16	1.3
	50	49.35	1.95	93			34.07	1.3	
55	45	2							
62	40.11	2.05	102	30.64	1.3				
66	37.95	1.4	HFS40-112M4	112	28.25	1.4			
				125	25.3	1.45			
75	33.41	1.6	HFS40-D112M4	153	21.16	1.8			
83	30.54	1.6		168	19.44	1.9			
93	27.25	1.65		188	17.39	1.9			
			HFS40-D100L2						
102	24.52	1.65							
112	22.59	1.8							
125	20.24	1.8							
153	16.93	2.3							
168	15.55	2.4							
188	13.91	2.4							
5	8	304.4	1.25	HFS80-D160M8	7.5	10	376	1.1	HFS80-D160M8
	9	270.57	1.3			11.3	337.17	1.15	
	10	250.67	1.6			12.2	322.05	1.45	
	11.3	222.78	1.7			15	267.64	2	
	12.2	214.68	2.2						
				17		242.25	1.4		
	14	191.84	1.9	HFS70-D132S6					HFS70-132S4
						18.5	217	1.15	
						20.2	198	1.15	
			22.6		180	1.2			
			24.6	173	1.55				
			27	158.87	1.65				
			30	143.24	1.65				

1. ITEM PRINTED IN BOLD ARE NON-STANDARD AND DELIVERY MAY BE ASCERTAINED
 2. 'D' IN THE TYPE SHOWS STANDARD SHAFT OF ELECTRIC MOTOR

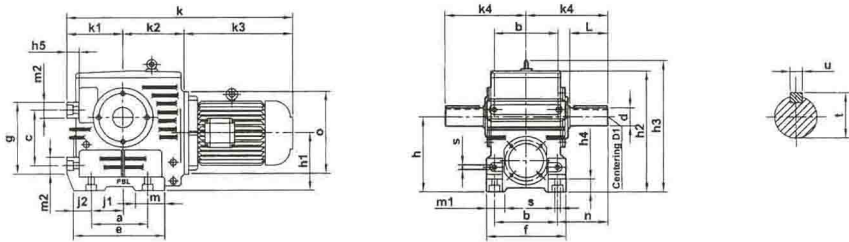
RATING TABLE OF PBL HELIORM (SOLID SHAFT) GEARED MOTORS

HP	Output RPM	Output Torque in Kgm	S. F.	Type	HP	Output RPM	Output Torque in Kgm	S. F.	Type		
7.5	32.5	136.64	1.4	HFS60-D132S4	15	51	188.85	1	HFS70-D160M4		
	36	124	1.4			56	172	1.1			
	38	119.35	1.3			62	155.6	1.15			
	41.5	109.3	1.3								
	46	96.92	1.3				67	145.14	1.4	HFS70-160M4	
	56	84.13	1.8								
	62	76.17	1.9					77	122.78	1.1	HFS60-160M4
								85	111.2	1.15	
	67	71.19	1.3			HFS50-132S4		95	99.8	1.2	
	76	62.9	1.4								
84	57.4	1.4									
	94	51.37	1.45								
10	15	352.85	1.05	HFS80-D160M6	20	42	294.43	1.05	HFS80-D160L4		
	16.5	326.59	1.4			46.5	266.45	1.1			
	20	279.32	1.6			50	256.97	1.2			
	22	268.9	1.2								
								60	215.33	1.4	HFS80-160L4
	24.6	227.64	1.15	HFS70-D132M4							
	27	211.84	1.2			62	208.85	1.25	HFS80-D160L4		
	30	191.44	1.25								
	33	181.22	1.05			67	193.52	1.07	HFS70-160L4		
	37	162.6	1.1								
	41.5	149	1.45				84	155.7	1.15	HFS70-D160L4	
	46.4	133.36	1.5			94	139.14	1.26			
	50	127.63	1.5								
	56	112.17	1.35	HFS60-D132M4	25	51	312.5	1	HFS80-D180M4		
	62	101.44	1.4					60	268.58	1.1	HFS80-180M4
67	92.98	1.5	HFS60-132M4			62	261.93	1	HFS80-D180M4		
76	82.27	1.7	HFS60-D132M4			67	242.9	1.2	HFS80-180M4		
84	76.53	1.1	HFS50-132M4			76	215.8	1.35	HFS80-D180M4		
94	68.4	1.1									
							85	191.27	1	HFS70-180M4	
					94	173.33	1	HFS70-D180M4			
15	19.5	421.5	1	HFS80-160M4							
					30	60	322.2	1	HFS80-180L4		
	25	342.7	1.2	67		289.9	1				
	30.5	280.9	1.22								
	33.4	273	1				76	258.4	1.1	HFS80-D180L4	
	37	246.45	1.1				84	234.3	1.15		
	42	220.82	1.4				94	209.37	1.2		
	47	197.71	1.45								

1. ITEM PRINTED IN BOLD ARE NON-STANDARD AND DELIVERY MAY BE ASCERTAINED

2. 'D' IN THE TYPE SHOWS STANDARD SHAFT OF ELECTRIC MOTOR

PRINCIPAL DIMENSIONS OF HELIWORM (SOLID SHAFT) GEARED MOTOR



TYPE	a	b	c	e	f	g	h	h ₁	h ₂	h ₃	h ₄	h ₅	i	j ₁	j ₂	k	k ₁	k ₂	k ₃	k ₄	m	m ₁	m ₂	n	o	s	d	L	t	u	D
HFS 25-63 71	100	110	100	155	136	125	-0.5 112.5	0.5 95	180	18	20	35	45	30	382 434	85	106	191 243	126	45	38	25	71	124 139	11	^{h5} 25	50	28	8	M8
HFS 30-63 71 80 90S 90L	130	130	130	196	160	160	-0.5 141.2	-0.5 115	230	275	23	18	40	60	36	417 465 494 509 534	106	128	183 231 260 275 300	160	52	40	30	95	124 139 157 148 148	14	^{h8} 35	70	38	10	M12
HFS 40-71 80 90S 90L 100L 112M	135	150	135	216	185	175	-0.5 176.8	-0.5 135	290	335	28	27	60	75	43	521 535 546 571 610 632	132	147	242 256 267 292 331 353	190	70	45	40	115	139 157 148 148 163 177	18	^{h8} 45	90	48.5	14	M16
HFS 50-80 90S 90L 100L 112M 132S 132M	180	200	180	260	250	235	-0.5 217	-0.5 160	350	395	34	30	82	92	43	585 593 618 656 678 704 742	150	185	250 258 283 321 343 369 407	250	80	55	55	150	157 148 148 163 177 267 267	22	^{h6} 50	110	53.5	14	M16
HFS 60-90S 90L 100L 112M 132S 132M 160M 160L	235	250	235	330	300	300	-1 272.4	-0.5 200	442	495	40	35	90	115	45	660 685 718 740 801 839 934 982	180	225	255 280 313 335 396 434 529 577	287	100	65	65	162	148 148 163 177 267 267 324 318	26	^{h6} 60	120	64	18	M20
HFS 70-132S 132M 160M 160L 180M 180L	255	300	255	390	370	330	-1 307.8	-0.5 220	508	560	45	40	100	125	75	885 923 1007 1055 1077 1115	220	280	385 423 507 555 577 615	325	120	90	75	175	267 267 324 318 360 360	33	^{h8} 65	130	69	18	M20
HFS 80-160M 160L 180M 180L	275	350	275	415	430	365	-1 363.2	-0.5 260	593	655	50	45	115	135	80	1057 1105 1127 1165	245	325	487 535 557 595	370	140	100	90	195	324 318 360 360	36	^{h8} 70	140	74.5	20	M20

NOTE : ALL DIMENSIONS ARE IN mm. DIMENSIONS k, k₃, o MAY VARY AS PER MAKE OF THE MOTOR.