

GHATGE PATIL



FLUID COUPLINGS



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FLUID COUPLINGS

Fluid Coupling transfers the power or torque from prime-mover to driven machine by means of fluid medium. Since there is no mechanical connection between input and output members, the power is transmitted smoothly, absorbing the shock loads inherent in many driven equipments.

CONSTRUCTION

The fluid Coupling consists of two rotating elements, the inner impeller or input member and outer impeller or output member. Refer Fig. 2. The impeller is mounted between outer impeller and the casing, filled with a prescribed quantity of oil. Both impellers have radial vanes. All these three components are made of Aluminium die cast material, which provides low weight and smooth surface for easy flow of fluid minimising frictional losses. The inner impeller has a hollow hub for directly mounting on electric motor or can be provided with coupling flange. For mounting on diesel engines, the input side will have mounting flanges to suit the flywheel on diesel engine. On output side various options are available like flexible couplings, 'V' pulley, stub shaft or brake drum, to suit particular installation.

OPERATION

When the prime-mover is at stand still, the oil is in the central chamber. As the prime-mover starts, the impeller acts as a centrifugal pump thus giving kinetic energy to the fluid. In other words, inner impeller absorbs mechanical energy from prime-mover and transfers it into kinetic energy. This fluid kinetic energy is then released on outer impeller which in principle runs as turbine. Under the normal working conditions the fluid coupling will operate with 3% slip without loss of torque. This nominal slip is however essential for the operation of fluid coupling. In case of electric motor as prime-mover equipped with fluid coupling. It is initially under no load and therefore can accelerate rapidly towards maximum torque condition where current demand is relatively low. The representative graphs of starting and running conditions are given in figure No. 1.

ADVANTAGES

I - With Electric motor as prime-mover

- 1) The motor starts free of load, accelerates towards maximum torque condition where the current demand is relatively low. The maximum torque that can be transmitted through fluid coupling does not exceed 200% of nominal motor torque. Due to this, low priced squirrel cage motor can be used in place of specially wound motor.
- 2) Prevention of motor stalling and burning, even under sudden overloads.
- 3) Frequent starts and breaking by reversal of the motor is possible.
- 4) Since power transmission is through medium of fluid the shock loads are absorbed by the fluid coupling.
- 5) Resilient plates are not needed in our fluid couplings. Hence no problem of maintenance and misalignment.
- 6) Fins are provided on outer surface of the fluid coupling for effective dissipation of the heat.
- 7) For additional safety, a special bolt is provided which positively clamps the fluid coupling on motor shaft.

II - With I. C. Engine as prime-mover

- 1) Engine starts on no load condition.
- 2) Even under stall conditions the engine continues to run, thus eliminating chances for damage to engine.
- 3) Wear and tear in engine is greatly reduced as the torsional vibrations and shock loads are absorbed by fluid coupling.

SELECTION

The main criteria for the selection of Fluid Coupling is Horse Power to be transmitted at specific RPM. This will decide the basic model of the coupling. Different versions of the basic model are available both for in-line transmissions and 'V' belt drives for suitable fitment. Figure No. 3 shows general reference chart of HP vs input speed alongwith Selection Table.

FIGURE-1

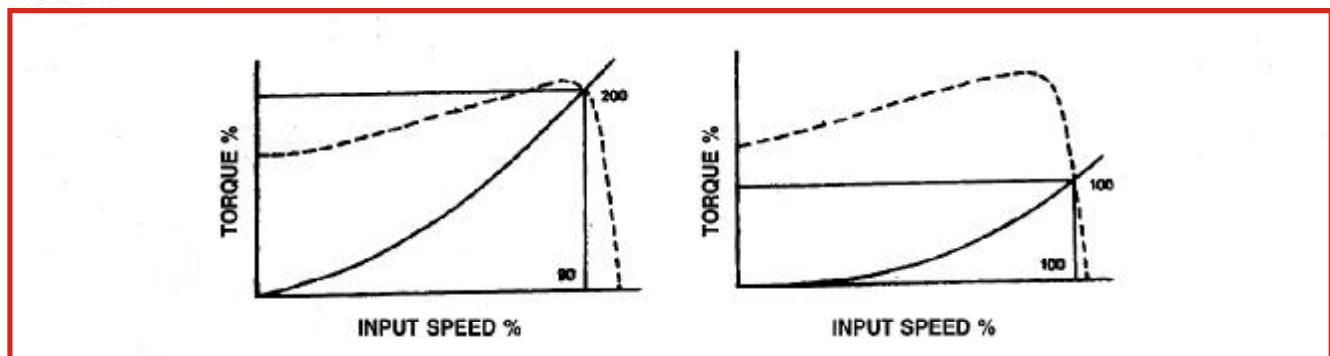


FIGURE-2

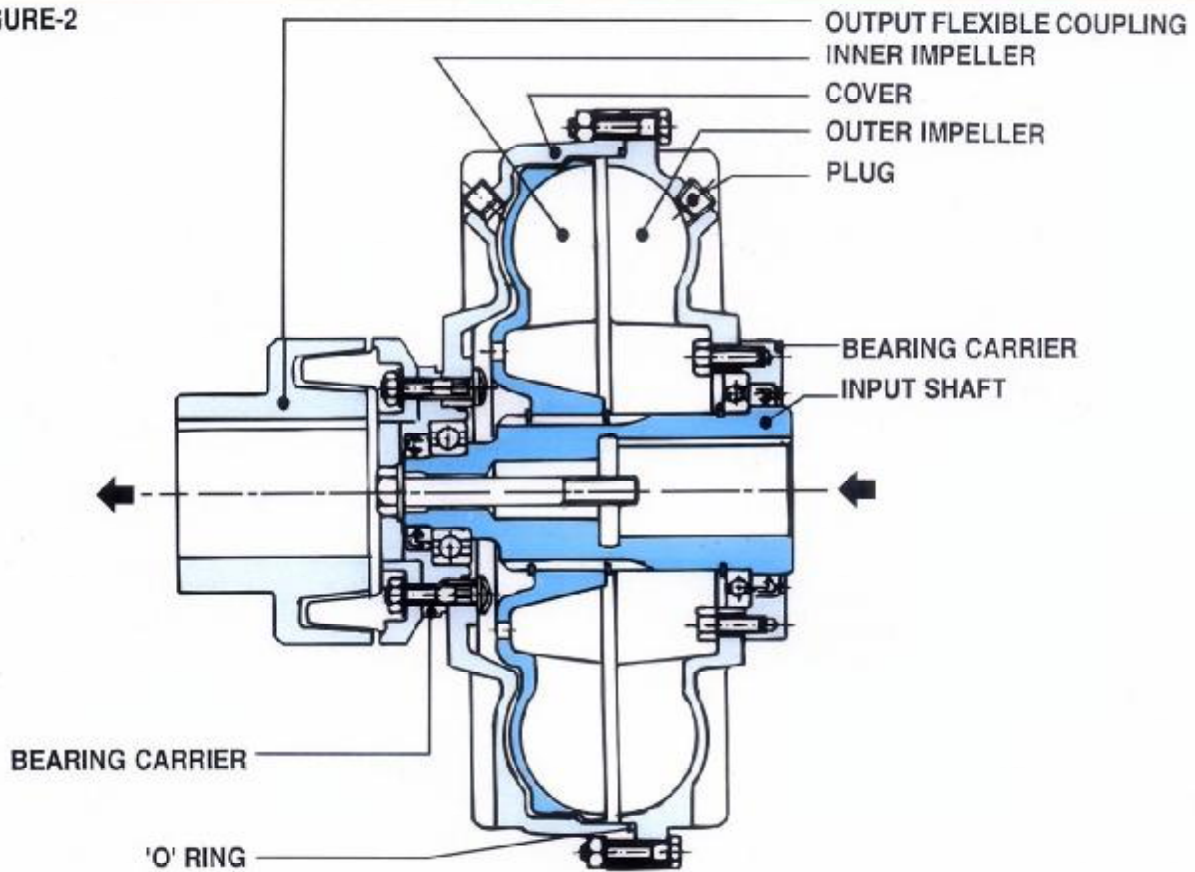
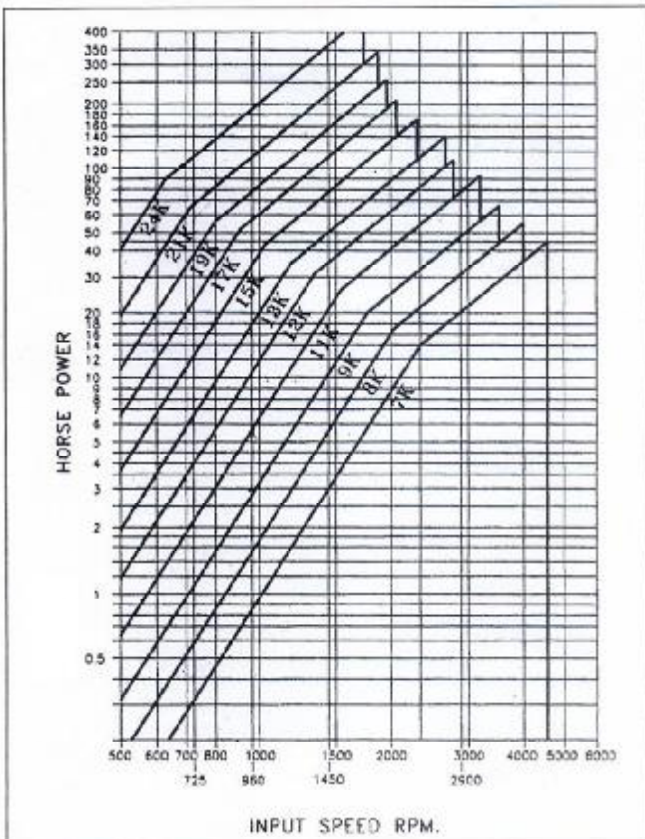


FIGURE-3
General Ref. HP Chart

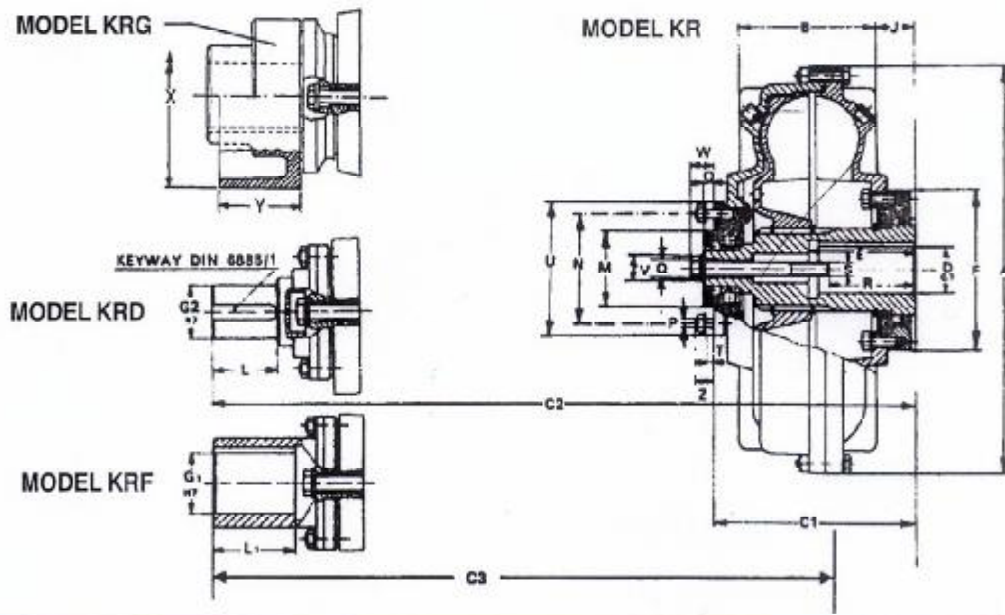


SELECTION TABLE
Maximum Operating HP / KW Ratings at various speeds

Size	720 RPM	960 RPM	1440 RPM	2900 RPM
7k	0.30 0.22	0.75 0.55	2.80 2.10	20.00 15.00
8k	0.55 0.41	1.40 1.05	5.25 3.90	32.50 24.36
9k	1.00 0.75	2.50 1.87	9.50 7.10	50.00 37.50
11k	2.10 1.57	5.30 3.98	20.00 15.00	90.00 67.50
12k	3.70 2.77	9.50 7.10	34.00 25.50	---
13k	6.50 4.80	16.00 12.00	50.00 37.50	---
15k	11.40 8.60	30.00 22.50	80.00 60.00	---
17k	21.00 15.75	55.00 41.25	125.00 93.75	---
19k	35.00 26.25	80.00 60.00	190.00 142.50	---
21k	60.00 45.00	130.00 97.50	290.00 217.50	---
24k	125.00 93.75	220.00 165.00	400.00 300.00	---

KR-KRG-KRB-KRD-KRF Model Fluid Couplings for Electric Motors

FIGURE-4



● STANDARD DIMENSIONS

□ REDUCED DEPTH KEYWAY DIN 6885-2

WHEN ORDERING PLEASE SPECIFY :

'MODEL', AND DIMENSIONS 'D' AND 'G'

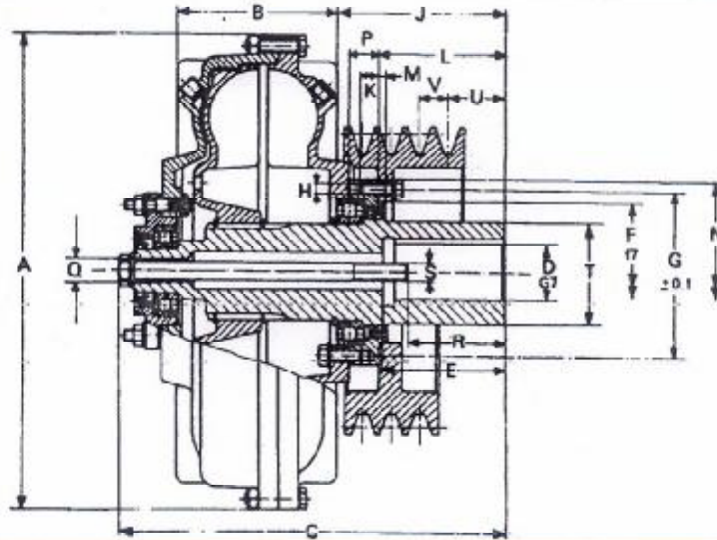
FOR KRB MODELS PLEASE SPECIFY DIM 'X' AND 'Y'

Size	A	B	C1	C2	C3	D		E		F	G1 Max.	G2	J	L	L1	M	N
7K	228	77	112	173	176	●19	●24	40	50	114	38	28	22	40	50	40	73
						●28	38	60	80								
8K	256	86	117	176	181	24	●20	50	60	114	38	28	21	40	50	40	73
						36		80									
9K	295	96	145	226	231	20	●30	60	80	126	48	38	31	50	64	60	88.9
						42	48	110									
11K	325	107	154	235	240	28	●39	90	80	126	48	42	27	50	64	60	88.9
						42	48	110									
12K	370	115	154	235	240		●39	90		145	48	42	24	50	64	60	88.9
						42	48	110									
13K	398	130	180	272	278	42	48	110	140	177	60	48	28	60	78	80	122.2
						55	60										
15K	460	149	205	310	333	43	55	110	140	203	75	55	35	70	105	90	136
						60	65	140									
17K	520	170	223	---	---	75	80	140	170	225	---	---	37	---	---	125	160
						80	85	140									
19K	565	184	223	---	---	75	80	140	170	225	---	---	17	---	---	125	160
						80	85	140									
21K	620	200	260	---	---	75		140		250	---	---	45	---	---	160	228
						80	90	170									
24K	710	230	260/295	---	---	90		170		250	---	---	21/56	---	---	160	228
						100		210									

Size	O	P		Q	R		S		T	U	V	W	Z	Flex Coupl.	Bolo Drum		Wright (kg) (without oil)		Oil Max. lit
		No.	Di _a		X	Y	KR	KRG											
7K	3	6	M7	M12	27	35	MR	MR	6	88	21	12	14	BT10	150	50	5.1	8.3	0.92
				M14	40	36	M10	M12							160	60			
8K	3	6	M7	M14	40	35	MR	M10	6	88	21	12	14	BT10	150	50	6.1	9.3	1.28
					61		M12								160	60			
9K	8	6	M8	M15	43	54	M10	M12	6	107	27	19	15	BT20	160	70	10	16	1.95
				M20	74		M16								200	70			
11K	8	6	M8	M15	42	63	M10	M12	6	107	27	19	15	BT20	160	70	12	18	2.75
				M20	63		M16								200	70			
12K	8	6	M8	M15	63		M12		6	107	27	19	15	BT20	160	70	15	21	4.1
				M20	83		M16								200	70			
13K	5	8	M10	M27	84		M16		7	142	34	17	17	BT30	200	70	23	33	5.2
					84	104	M20								250	80			
15K	5	8	M10	M27	81		M16	M20	8	156	34	19	19	BT40	250	80	36	49	7.65
					111		M20								320	110			
17K	5	12	M10	M27	104		M20		8	180	34	24	19	BT50	320	110	50	78	11.7
					104	134									400	110			
19K	5	12	M10	M27	104		M20		8	180	34	24	19	BT50	320	110	57	83	14.2
					104	134									400	110			
21K	5	8	M14	M36	100		M20		14	255	40	15	30	BT60	400	130	86	128	19
					130		M20	M24							500	140			
24K	5	8	M14	M36	130		M20	M24	14	255	40	15	30	BT60	400	130	104	146	28.4
					165		M24								500	140			

KSD Model Fluid Couplings for bolted pulleys (sheaves) for Electric Motors

FIGURE-5



- STANDARD DIMENSIONS
- BOLTED SHEAVE / PULLEY
- ★ ONLY FOR D = 19-24

WHEN ORDERING UNITS PLEASE SPECIFY :
 'MODEL', DIMENSIONS 'D', NUMBER OF GROOVES
 AND PITCH DIA, OF SHEAVE
 EXAMPLE : 9KSD, D = 38, SHEAVE 5 SPAS - 5A, P.D. = 112

Size	A	B	C Max	D		E		F	G	No. H Dia	J	K	L	M	N	P	R		
7 KSD	228	77	159/174	19	24	43	50	75	90	4	M6	55/70	8	35/50	3	114	14	29	36
				28	38	60	80											43	54
8 KSD	256	86	194	24	28	50	80	75	90	4	M6	84	8	65	3	114	14	33	43
				36	80	54													
9 KSD	295	96	250	28	38	60	80	96	114	8	M8	116	13	85	5	128	20	39	54
				42	48	110	78												
11 KSD	325	107	259	28	38	60	80	96	114	8	M8	113	13	85	5	128	20	38	63
				42	48	110	88												
12 KSD	370	115	274	36	48	80	110	112	130	8	M8	125	13	98	7	145	22	54	83
				42	48	110	76												
13 KSD	398	130	359	42	55	110	140	135	155	12	M8	190	13	158	6	177	29	76	106
				55	60	110	140											71	101
15 KSD	480	149	384	55	60	110	140	150	178	12	M10	195	17	159	7	203	28	101	102
				65	75	140	102											142	
17 KSD	520	170	455	60	75	140	170	180	200	12	M10	245	17	180	7	225	60	102	142
				75	80	140	102											142	
19 KSD	565	184	455	60	85	140	170	180	200	12	M10	225	17	180	7	225	45	102	142
				75	80	140	102											142	
21 KSD	620	200	505/545	80	90	170	210	200	228	8	M14	260	20	190	7	250	57	135	125
				300	230	165													

Size	Q	S		T Max.	Weight with- out sheave (without oil) kg	Weight with sheave (without oil) kg	Oil Max. Lit	SHEAVE				U	V	
		No. Groove	Section					Pitch Dia.						
7 KSD	M12	M6	M8	42	5.9	4.5 ~ 6.4	0.92	2 SPA - 2A	● 80	90	● 100	○ 125	11.5 FOR D = 19-24 26.5 FOR D = 24-38	15
	M14	M10	M12	50										
8 KSD	M14	MB	M10	50	7.1	8.3 ~ 9.6	1.28	3 SPA - 3A	● 90	100	● 112	○ 160	26.5	15
		M12	2 SPA - 21					○ 125						
9 KSD	M16	M10	M12	69	13	14.6 ~ 20.4	1.95	5 SPA - 5A	● 125	160	● 200	○ 250	10	15
	M20	M16	4 SPA - 4B					15.34						
11 KSD	M16	M10	M12	69	15	16 ~ 22	2.75	3 SPB - 3B	● 200	112	● 250	○ 315	58	15
								M20						
12 KSD	M16	M10	M12	80	19	23 ~ 27	4.1	4 SPB - 4B	● 125	160	● 200	○ 250	12	19
								M20						
13 KSD	M27	M16	M20	88	31	37.6 ~ 45.5	5.2	4 SPA - 4B	● 180	180	● 200	○ 250	50	19
								M20						
15 KSD	M27	M20	M24	102	46	55.7 ~ 67.5	7.65	8 SPB - 8B	● 200	160	● 200	○ 280	12	19
								M20						
17 KSD	M27	M20	M24	132	74	97.5 ~ 99	11.7	10 SPB - 10B	● 224	280	● 224	○ 280	31	19
								M20						
19 KSD	M27	M20	M24	132	82	107 ~ 108	14.2	10 SPB - 10B	● 224	280	● 224	○ 280	31	19
								M20						
21 KSD	M36	M20	M24	145	110	148.5	19	12 SPB - 12B	● 250	315	● 250	○ 315	12 FOR D = 80 ~ 90 52 FOR D = 100	90
								M24						

V-groove sizes shown above are for special pulleys. Standard pulleys with V-grooves as per IS : 3142-1965 also available

ACCESSORY FOR OVERLOAD PROTECTION

FUSIBLE PLUG

In overload conditions, when the slip reaches high value, the oil temperature rises damaging the seals and causing the oil leakges. In order to avoid damages, in critical applications. It is advisable to fit a fusible plug.

Coupling is supplied with fusible plug at 125°C (or) 175°C on request.)

FILLING INSTRUCTIONS

Fluid couplings are supplied without oil. It is essential to follow proper oil filling procedure.

1. With the fluid coupling mounted in a horizontal position, turn the coupling until the 'X' mark is in vertical position, which will ensure the filler/level plug is in the correct angular position as shown in Figure 6.
2. Fill oil until it overflows through filter hole. During fillings, rock the coupling on its axis to ensure venting of air from the circuit. Table A shows oil quantities for these fillings. The procedure for intermediate fills is the same as above. Please ensure that chosen number is at the top of the unit.
3. Use thread sealant on filler plug thread to avoid leakage during operation.
4. To obtain sealant on filler plug thread to avoid leakage during operation.
5. For applications with ambient temperature upto -10°C , Oil SAE 10W must be used (see below recommended oils,) at lower temperature use SAE 5W oil.
6. Also for vertical mounted applications, recommended oil fills are indicated in Table A.

RECOMMENDED OIL	:	SAE 10W
Agip	:	OSO 32
Aral	:	VITAM GF 32
Bp	:	ENERGOL HLP 32
Castrol	:	HYPIN AWS 32
Chevron	:	HYDRAULIC OIL EP 32
Esso	:	NUTO H 32
Mobile	:	DTE (OIL LIGHT 24)
Shell	:	TELLUS 32
Texaco	:	RANDO HD 32
Total	:	AZOLLA ZS 32

FIGURE-6

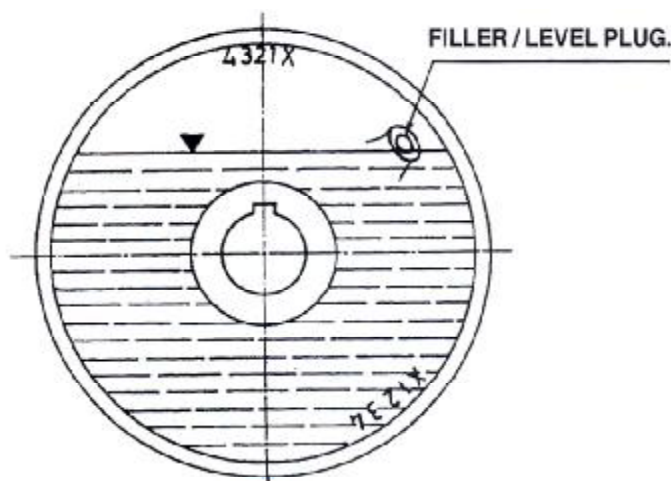


TABLE - A

SIZE	FILLINGS	OIL QUANTITY L.
		FILL X
6		0.50
7		0.92
8		1.50
9		1.95
11		2.75
12		4.10
13		5.20
15		7.65
17		11.70
19		14.20
21		19.00
24		23.40
27		42.00
29		55.00
34		82.50
D 34		162.00

FIELDS OF APPLICATIONS

BUILDING MACHINERY

- Tower cranes (translation, rotation)
- Bridge cranes (translation, rotation)
- Rotating jib cranes
- Belt conveyors
- Screw conveyors
- Stat conveyors
- Slat conveyors
- Chain conveyors
- Crushers
- Ball, barrel and hammer mills
- Concrete mixers
- Bucket excavators
- Machines to produce centrifuged concrete piles
- Stone cutting machines
- Brick machines
- Mills

CHEMICAL, FOOD AND BOTTLING MACHINERY

- Mixers
- Centrifuges
- Soaps cutter
- Rotating filters
- Rubber calenders

TEXTILE MACHINES

- Barrels for tannery
- Carding machines
- Washing machines

MECHANICAL AND AUTOMOTIVE MACHINES

- Balancing machines
- Wheel balancing machines
- Gate closing control drive
- Centrifugal fans
- Centrifugal and reciprocating compressors
- Centrifugal and volumetric pumps

METALWORKING MACHINES

- Machines to twist ropes and wires
- Foundry machines
- Rotary furnaces
- Presses
- Forming machines
- Wire Drawing machines

PAPER MACHINERY

- Paper winding drums
- Pulpers

WOOD WORKING MACHINES

- Chipping machines
- Plywood pressing machines
- Debarking drums

MISCELLANEOUS

- Winches
- Mine car haulage
- Luna-Park, merry-go-round
- Ski-lift
- Waste disposal (chain conveyor)
- Fork lift trucks
- Small dumpers
- Small loaders
- Farm tractors
- Industrial and airport tractors
- Marine propulsion
- Chillers