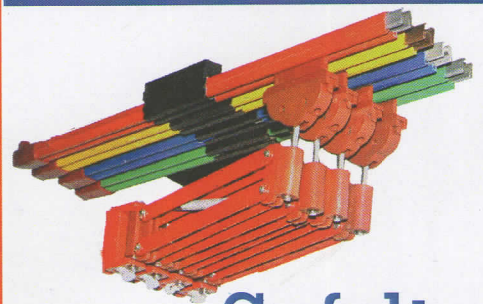


## MILL DUTY D.C. BRAKES

**ANAND SYSTEMS ENGINEERING PVT. LTD.**

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- A.C. Electro Magnetic Brakes.
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# Description of mill Duty D.C. Electro - Magnetic Brakes

Anand Systems Mill duty D.C. Electro magnetic Brake are suitable for 220 V. D.C. supply for a wide range of drum sizes from 100 mm to 800 mm.

Electromagnetic brake are used, when a load must be stopped rapidly to prevent the load from rotating due to the motor and load inertia at a select-predetermined time or at a selected point of travel or to prevent overtravelling.

To calculate the size of anand systems Electro-magnetic brake for a given application. It is necessary to take into consideration. The H.P. rating and speed in R.P.M. to obtain the required retarding torque. The calculations are made as.

$$\text{Torque in Kg M} = \frac{71620 \times \text{H.P.}}{\text{Speed in RPM} \times 100}$$

To obtain maximum efficiency the brake should be mounted directly on the motor shaft. The application involving arduous duty with more self sustaining load characteristic such as hoist motions of E.O.T. Crane, skip hoist equipments, overload factor must be taken in consideration. In applications of this nature it is usual to assess the brake torque required on the basis of 150-175% full load torque.

## 1. SALIENT FEATURES :

- a) The mill duty brakes are superior in construction to the usual heavy duty E.M. Brakes as the base is of fabricated construction, the arms are cast steel or fabricated construction. The pins are of hardened steel and lubrication is provided for brakes of 400 mm dia. and above as a rule.
- b) The brake shoes are designed for 70° angle which is in accordance with modern practice and this makes it easy for replacement of brake shoes without any major dismantling.
- c) The coils are either class "F" or class "H" and are liberally designed to allow for high ambient temperature prevailing in the steel plants.
- d) The magnet housing is of dust proof construction and the magnet system is of quick acting type which is achieved by use of economy resistor and forcing contactor. This enables the brake to operate on very high frequency of operation (600 to 720 per hour).

- e) Mill duty D.C. Electro Magnetic Brakes are manufactured in a wide range of Drum diameters from 100 mm upto 800 mm Preferred series and standard metric size dia meters are available. The torque range available in this series is from 200 kg. CM (for the smaller brake) upto 1,25,000 kg CM (for the largest brake). These torques correspond to 25% intermittent duty which is applicable to most of the medium duty cranes of steel plants. The ratings of 40% and 100% duty cycle are also given in the charts.

## 2. OPERATION.

- a) On energizing the coil, the operating magnet releases the brake and on deenergizing the powerful spring which sets the brake acts up on the brake shoes through the brake arms. The magnet armature is an integral part of one shoe arm whilst the other arm is directly coupled to the magnet field member by means of a steel tie-rod which passes through the spring and over the brake wheels
- b) The heavy coil spring exerts rapid and steady force on the brake shoes and breakedrum through the arms and the maximum stress is well within safe limits. Equal travel and balanced movement on both shoes applies even and positive torque in either direction of rotation.
- c) Because the movement is almost directly exerted on the brake shoes, the Magnet designed for a very short stroke, with small air-gap and very high electro magnetic efficiency. Since the total movement generally responds to clearances between brake shoes and brake wheel, this takes place with remarkable speed and with smooth, quiet action in.
- d) Installation is easy and routine adjustment are few. Braking torque is set correctly at installation and requires no major adjustment except when shoe/linings are renewed.

## 3. ELECTRO MAGNET.

Brake magnets are series-wound or shunt-wound according to the service for which the brakes are to be used. If the nature of the work is such that the brake action must be independent of the motor, a shunt-wound brake is necessary. The action of a series-wound brake depends directly upon the current taken by the driving d.c. motor.

For shunt-wound brake operating on 220 volts D.C. a series resistor (economy resistor) is supplied with each brake in the coil is energized on full voltage (220 V) so as to ensure the quick opening (release) of the brake after which the economy resistor is introduced into circuit by a timer/contacter arrangement which is an integral part of the rectifier unit.

Sufficient force would still be developed by the magnet to hold the brake in open (released) position and at the same time the heating of the brake coil is greatly reduced.

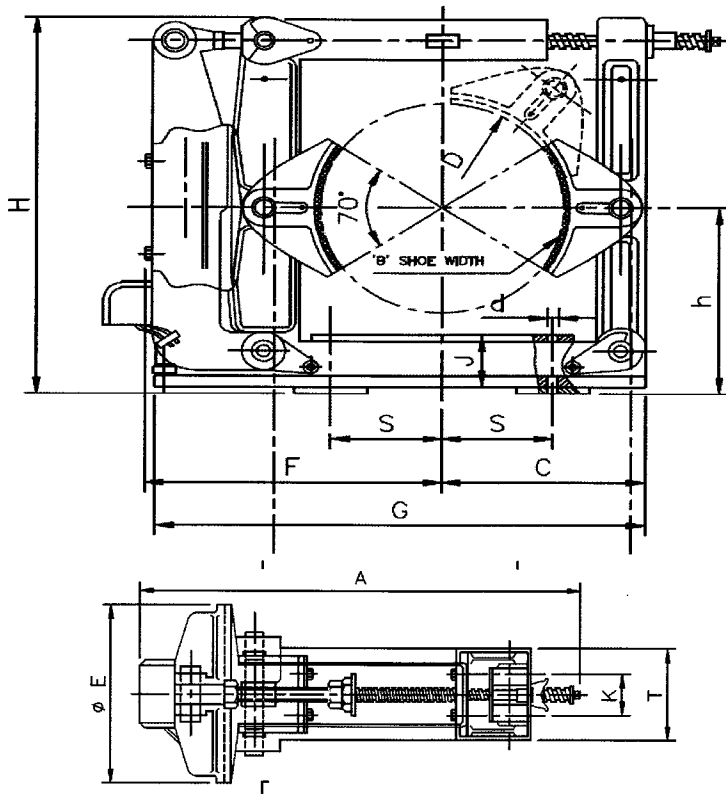
This ensures that the coil operates well within the temperature limits for the type of insulation used and gives long life, and reliability.

The coils are designed to operate at 85% to 110% of the rated voltage, which is the normal practice for all control gear. The maximum braking torque specified in the rating chart corresponds to 25% intermittent duty i.e. total "on" time of 2.5 minutes in maximum cycle of 10 minutes which can be repeated indefinitely. The brake coils and economy resistor are matched suitably to give the desired performance at the specified intermittent duty factor.

## TORQUE RATINGS OF ANAND SYSTEMS MILL DUTY D.C BRAKES 100 TO 800MM DIA.

Brake Type	Drum Dia. (mm)	Duty Cycle	Maximum Braking Torque Kg. Cm.	Minimum Braking Torque Kg. Cm.
DCM 100	100	25%	200	100
		40%	160	80
		100%	100	50
DCM 150 DCM 160	150 160	25%	1300	500
		40%	1000	500
		100%	700	320
DCM 200	200	25%	1600	600
		40%	1250	600
		100%	1000	400
DCM 250	250	25%	4170	2800
		40%	3500	2800
		100%	2200	800
DCM 300 DCM 315	300 315	25%	5000	3000
		40%	4200	3000
		100%	2500	1000
DCM 400	400	25%	15000	7500
		40%	12000	6000
		100%	5500	2750
DCM 500	500	25%	25000	12500
		40%	19000	9500
		100%	8500	4250
DCM 600	600	25%	50000	25000
		40%	35500	17500
		100%	15500	7800
DCM 700	700	25%	80000	40000
		40%	57500	28750
		100%	28000	14000
DCM 800	800	25%	125000	62500
		40%	91000	45500
		100%	44000	22000

- NOTE: 1. Coils are shunt wound. Class 'B' insulated according to requirement.  
 2. Shunt wound coils are generally supplied with matching economy resistor suitable for 220V D.C. supply.  
 3. Brakes are suitable for 720 operations per hour maximum at an ambient temperature of 55°C unless otherwise specified.



BRAKE TYPE	DRUM DIA. D	A	B	C	d	E $\phi$	F	G	h	H	J	K	L	M	N	S	(App.) Wt. in kg.
DCM 100	100	391	70	125	13	145	240	260	100	272	6	40	4	65	8x8	110	16
DCM 150/160	150/160	440	70	180	13	190	305	330	150	385	6	50	6	80	10x10	155	36
DCM 200	200	571	90	190	17	190	335	400	170	450	8	60	6	90	11x11	185	41
DCM 250	250	600	110	245	21	245	430	500	200	510	10	70	8	105	12x12	220	70
DCM 300	300/315	753	140	285	21	245	465	590	240	602	12	80	8	120	14x14	265	94
DCM 400	400	948	180	300	25	355	504	780	320	660	90	90	250	300	520	340	240
DCM 500	500	1111	200	375	25	450	575	915	400	823	115	100	315	375	640	375	364
DCM 600	600	1312	240	450	38	522	675	1080	475	950	140	126	380	420	780	450	600
DCM 700	700	1512	280	505	38	600	770	1215	550	1108	180	150	430	495	890	505	960
DCM 800	800	1628	320	585	38	688	853	1420	600	1255	200	180	480	580	1020	585	1360

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