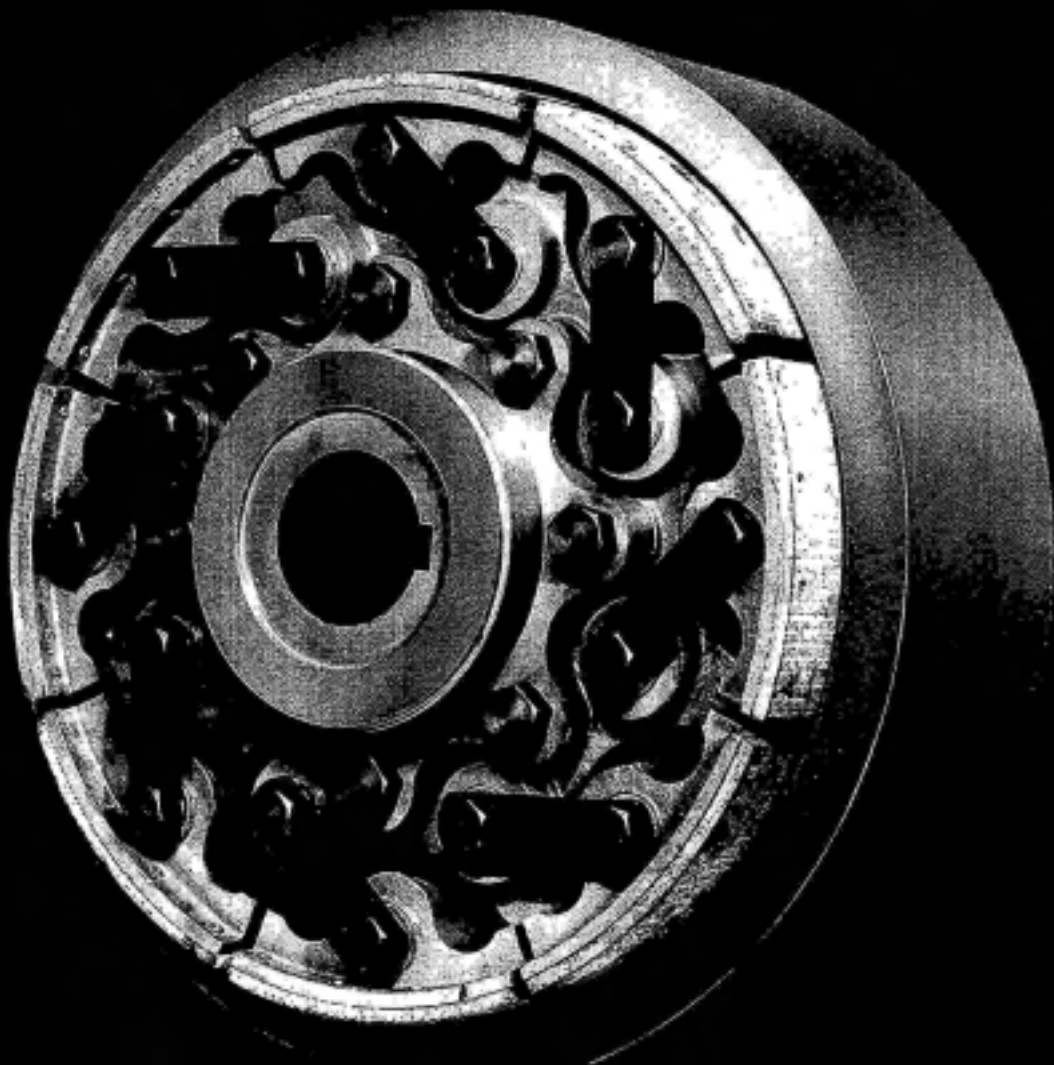




The Power Transmission Problem Solvers

CENTRIFUGAL CLUTCH COUPLINGS



BN109



“An inexpensive, well proven, highly efficient means of starting heavy machinery.”

INTRODUCTION TO CENTRIFUGAL CLUTCH COUPLINGS

General Description

A hub is connected to the driving member and a drum to the driven member giving complete disconnection when at rest. Lined shoes are mounted around the periphery of hub and joined by links mounted through rubber bushes. Rotation of the driving member creates the centrifugal force necessary to outwardly move the lined shoes into engagement with the drum, giving a smooth take up of the drive. No slip takes place at operating speed, giving a 100% form of power transmission. The rubber bushes provide for mis-alignment tolerances, act as an efficient flexible coupling and in the flexiclutch design give torsional flexibility and damping. Adjustment can be made to vary the engaging speed and starting of high inertia drives can be achieved with larger size trailing shoes.

Perfect for engine drives because:

- Engine starts and can idle free of load.
- Serves as automatic throttle-controlled clutch.
- Eliminates shock loads.
- Prevents engine stall under sudden overload.
- Prevents engine reverse swing when coming to rest.
- Limits vibratory torques to safe level.
- Combines advantages of an efficient flexible coupling.
- 100% efficiency saves fuel.
- Long trouble-free life with no routine maintenance.
- Totally eliminates torsional vibration criticals at low speeds.

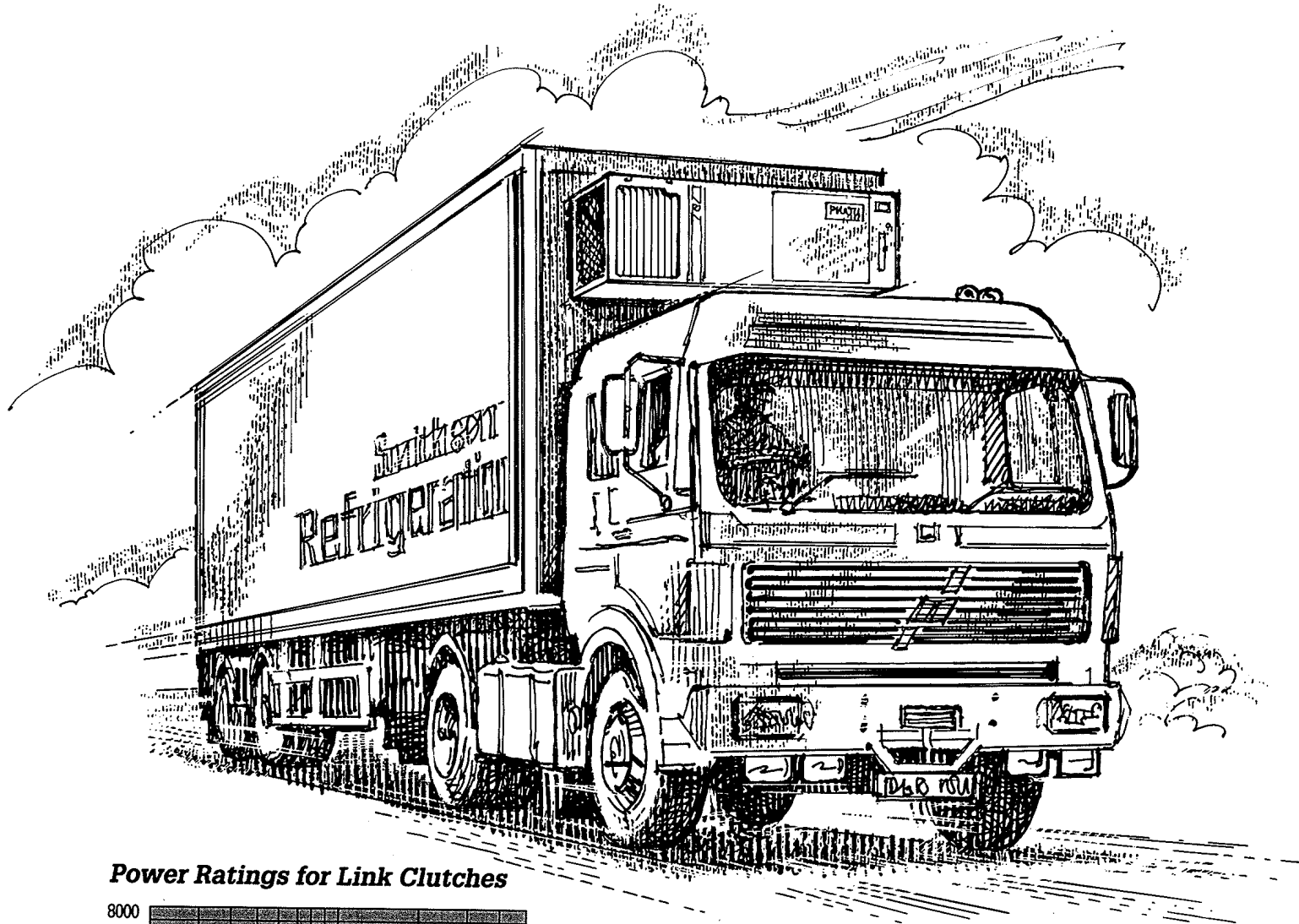
Perfect for electric motors drives because:

- Motor is started under no load.
- Uses peak motor torque to start heavy inertia machinery.
- Loads are smoothly accelerated giving soft start.
- Reduces shock on shafts and gearing.
- Gives protection against momentary overloads.
- 100% efficient power transmission.
- Serves as an efficient flexible coupling.
- Automatic action, ideal for dual/stand-by drives.
- Saves energy therefore saves costs.
- No routine maintenance required.

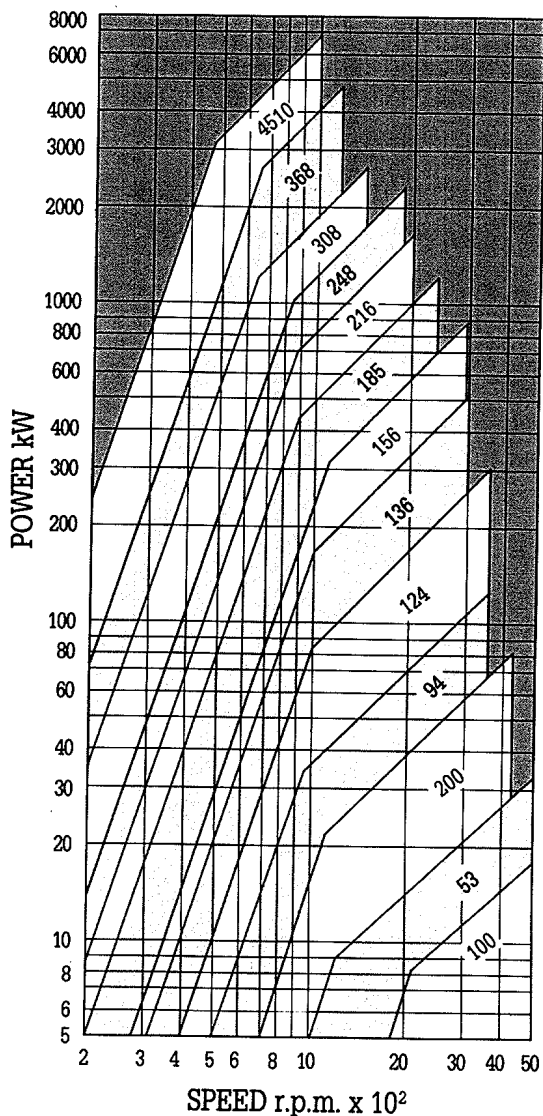
SHAFT ALIGNMENT

The figures in the following table give the maximum permissible alignment tolerances. The three forms of misalignment may co-exist.

SIZE	100	53	200	94	124	136	156	185	216	248	308	368	4510
RADIAL mm	0.30	0.30	0.40	0.40	0.40	0.40	0.50	0.60	0.50	0.50	0.60	0.70	0.70
ANGULAR DEGREES	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
AXIAL	This is not critical provided that running clearance is established between the end face of the driving unit and the drum. Allowance must be for any small axial movement of the shaft that may be present.												



Power Ratings for Link Clutches



Information required

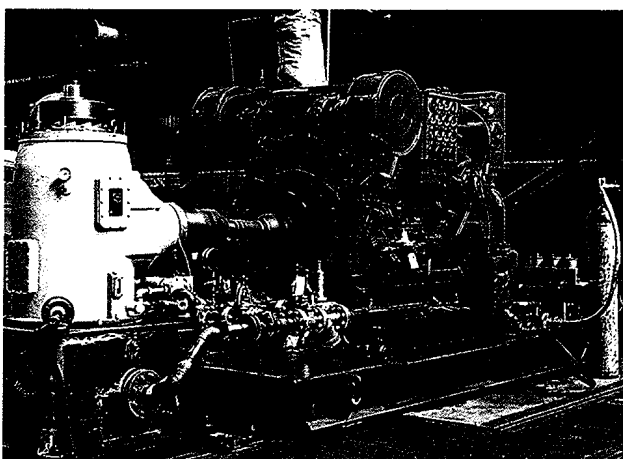
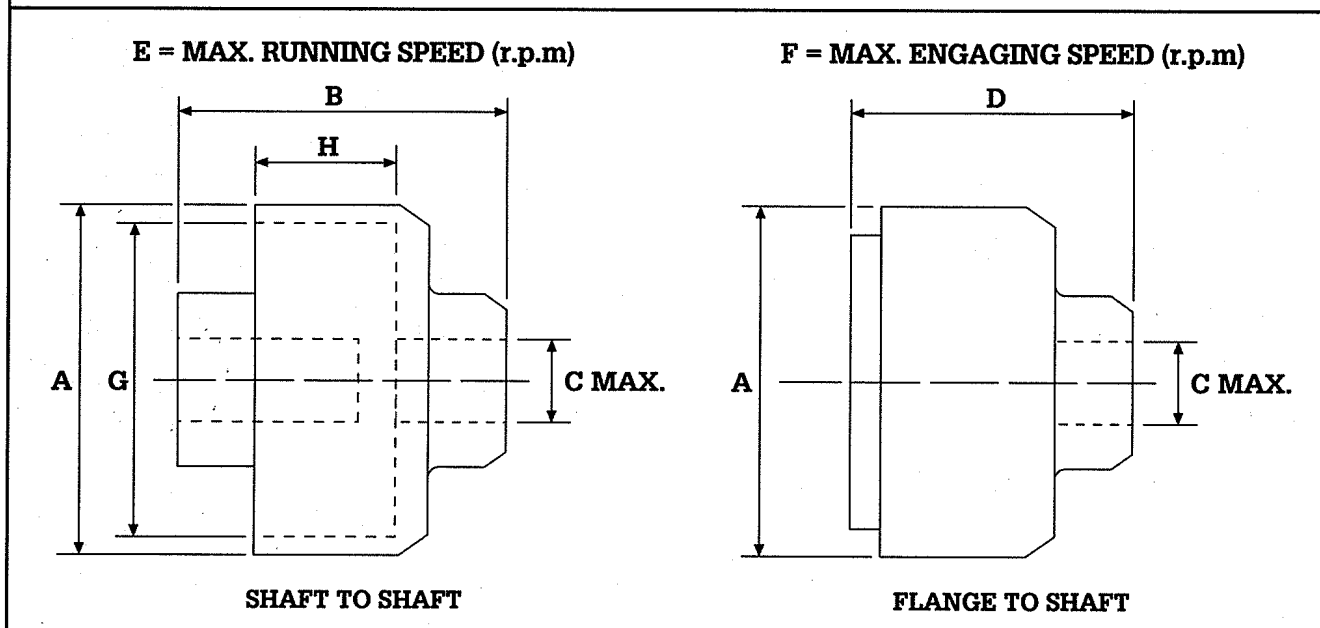
- A Power and RPM and No. of cylinders or motor power and speed.
- B Torque, speed characteristics of prime mover.
- C Engine manufacture and model no.
- D Driven machinery:
 - 1 Type, including whether rotary or reciprocating.
 - 2 Starting load (torque speed curve if possible).
 - 3 Inertia referred to clutch speed.
- E Gearbox drives: What is output speed and total inertia referred to input speed.
- F Type of mounting: (i.e. flywheel to shaft, shaft to shaft, with bearing assembly, if possible, shaft diameters, flywheel SAE no, mating flange details if clutch is to be fitted with internal bearings).
- G Purpose of clutch: (i.e. to ease starting, overload protection, torsional vibration damping, to provide disconnection at rest: especially upon standby drives etc.)
- H Uni or Bi-Directional.
- I Engaging speed requirements: (is clutch to provide for uncoupled engine idling, if so, what is the idling speed).
- J Minimum operating speed and maximum absorbed power at this speed.
- K Sequence of clutch operation required.
- L Frequency of starting.

Initial selection is provisional and torsional analysis is required to establish whether unit is torsionally suitable or whether re-selection is necessary to provide for satisfactory torsional system. **Twiflex Engineers can undertake to carry out a full torsional vibration analysis on a system, upon receipt of all relevant data.**

Overall Dimensions of Standard Unit

MODEL	100	C53	200	C94	C124	C136	C156	C185	C216	C248	C308	C368	C4510
A	117	156	210	267	350	356	413	492	578	654	813	978	1220
B	73	98	117	148	313	210	384	478	375	557	670	781	546
C	29	38	51	76	89	89	114	127	152	165	178	235	229
D	101	118	130	150	224	197	292	327	275	378	475	594	721
E	6000	5600	4300	3300	3500	3000	2900	2400	2000	1850	1500	1250	1000
F	1800	1600	1700	1500	1200	800	875	725	600	650	400	350	250
G	106.4	143.1	190.6	244.6	311.2	336.8	381.0	457.2	539.9	609.7	762.2	914.4	1143.0
H	44.5	54.0	62.0	71.4	85.7	88.9	117.5	144.5	136.5	149.2	175	180	235
WEIGHT	2.60	5.54	15.1	20.8	47.5	54.0	103	141	212	283	494	915	1680
DRIVING INERTIA*	0.0012	0.0045	0.020	0.056	0.214	0.317	0.695	1.519	4.52	8.022	11.55	16.5	150
DRIVEN INERTIA**	0.003	0.010	0.061	0.072	0.28	0.36	1.11	2.15	3.45	5.07	13.8	28.4	108

*Weight - kg. **INERTIA (Wr²) kg m².



Fire pumps for North Sea oil platforms.

Typical Applications

- Fans
- Automatic Doors[†]
- Pumps
- Armoured Tanks
- Conveyors
- Marine Propulsion Drives
- Mixers
- Vibrating Rollers
- Centrifuges
- Refrigeration Units
- Ball Mills
- Dual and Standby Drive
- Crushers
- Agricultural Equipment
- Compressors
- Turbines
- Pulverisers
- Generators
- Locomotives
- Elevators[†]
- Lifeboat Davits[†]

[†] Speed Limiting Brake



Tugs, Workboats and Ferries. Twiflex Centrifugal Clutches fitted to main propulsion drive.

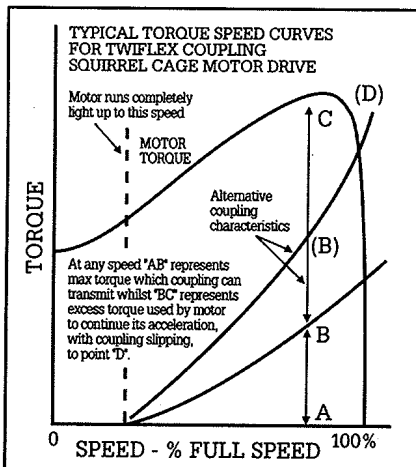


Diagram 1

Consider the advantages of using a TWIFLEX automatic clutch coupling with a standard squirrel cage motor. The diagram (1) shows typical torque speed curves. The motor starts completely free, the starting current conditions corresponding to those of a motor running light, and accelerates rapidly to point D. The driven load is subjected to an increasing accelerating torque as the motor speed rises, this torque being represented at any particular motor speed by AB.

If the load has a high inertia the motor speed dwells at point D, the full coupling torque there being

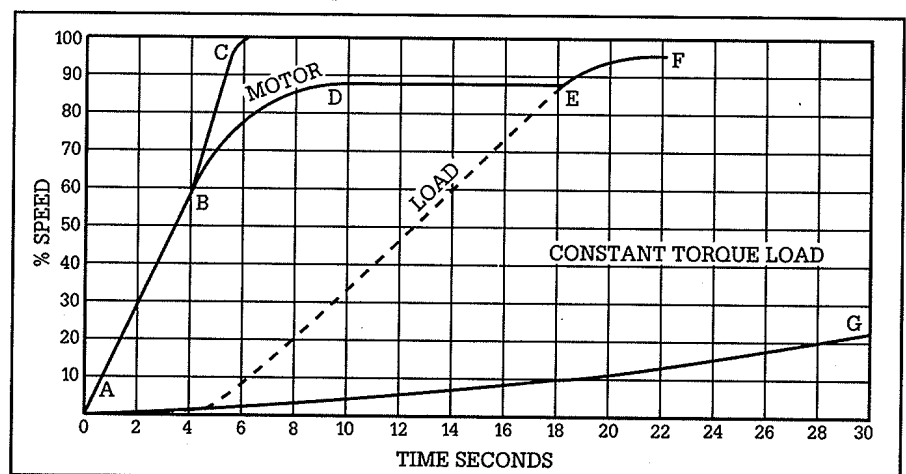


Diagram 2

applied to accelerate the load to the corresponding speed. It can be seen that a much higher torque is available for load acceleration using a TWIFLEX clutch coupling than with a solidly coupled motor, thus permitting the use of the smallest possible standard motor.

The diagram (2) shows speed plotted against time for the acceleration of a constant torque load from rest by a typical squirrel cage motor, the load having twice the inertia of the motor.

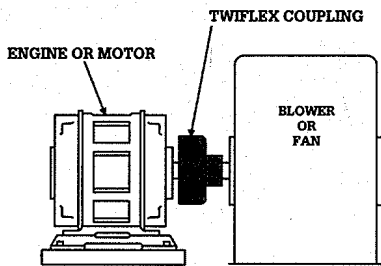
The motor speed follows curve ABDE, dwelling at a constant speed approaching

90 per cent. of full load speed whilst the load is accelerated steadily to point E. From E to F motor and load accelerate together as if solidly coupled.

The curve AG shows the behaviour of the same motor and load if solidly coupled, the actual time taken to full speed being **60 seconds as compared with 22 seconds.**

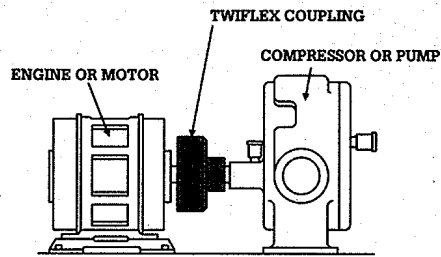
With really high inertia drives this means greatly reduced sustained starting current loads on cables and switchgear and a substantial reduction in the temperature reached by the motor windings - frequently a limiting factor with high-powered drives.

Typical Applications



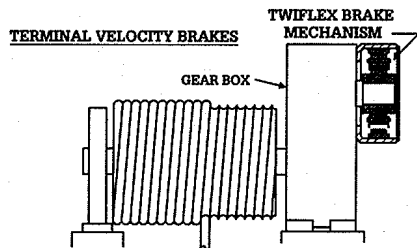
BLOWER OR FAN DRIVE

Frees motor load at start - reduces inrush current to permit across-the-line starting - provides smooth acceleration of high inertia drives - serves as flexible coupling.



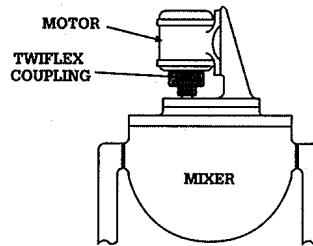
COMPRESSOR OR PUMP DRIVE

Smooths out pulsating torque - prevents build up of torsional resonance - can start compressor without auxiliary unloading equipment. Eliminates flexible coupling.



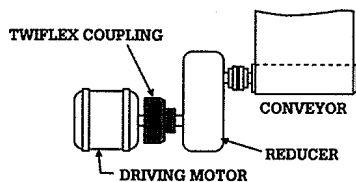
SPEED LIMITING BRAKE

Limits falling speeds of elevators, doors, lifeboats, etc. Automatic speed control with no external controls.



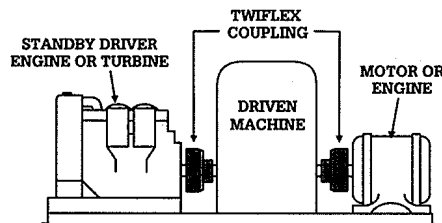
MIXER DRIVE

Protects motor from overload when consistency changes. Smooths out current peaks - imposes maximum torque when resistance increases - eliminates flexible coupling.



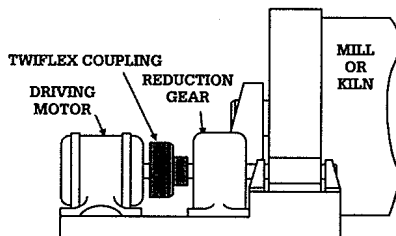
CONVEYOR DRIVE

Provides a smooth start. Eliminates dumping or dis-arranging of material being conveyed - provides overload protection against jams - eliminates costly starting equipment - softens shock loading on gears - eliminates flexible coupling.



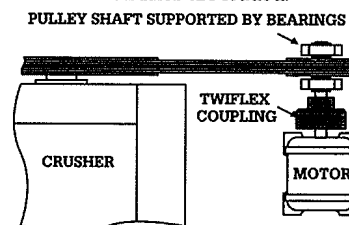
DUAL DRIVE

Automatic action requires no external controls or manual disconnect clutch - provides smooth pickup of load and overload protection where needed. Softens shock load on drive components. Reduces peak electrical consumption by transferring to engine drive when lines are loaded.



MILL OR KILN DRIVE

Use standard squirrel cage motor with across-the-line starting - eliminate costly reduced voltage starter - reduces shock loading on gear teeth - smooths out pulsating loads and current peaks - eliminates flexible coupling.



CRUSHER DRIVE

Frees motor from load at start - reduces inrush current to permit across-the-line starting - provides smooth acceleration of high inertia drives - serves as flexible coupling.

YOUR NEAREST REPRESENTATIVE

TWIFLEX

Twiflex Limited.

The Green Twickenham
TW2 5AQ England

Tel: 020 8894 1161

Fax: 020 8894 6056

Website: www.twiflex.com

e-mail: sales@twiflex.co.uk