GUMMI

Pneumatic clutches and brakes
Type **FKE FKR**

Total Quality

ECOLOGICAL TECHNOLOGY

DNV

ISO 9002 REGISTERED FIRM
DNV Certification B.V., THE NETHERLANDS

Accredited by the RvA
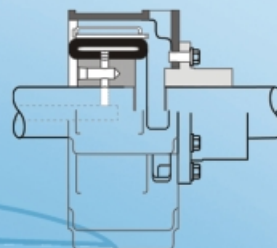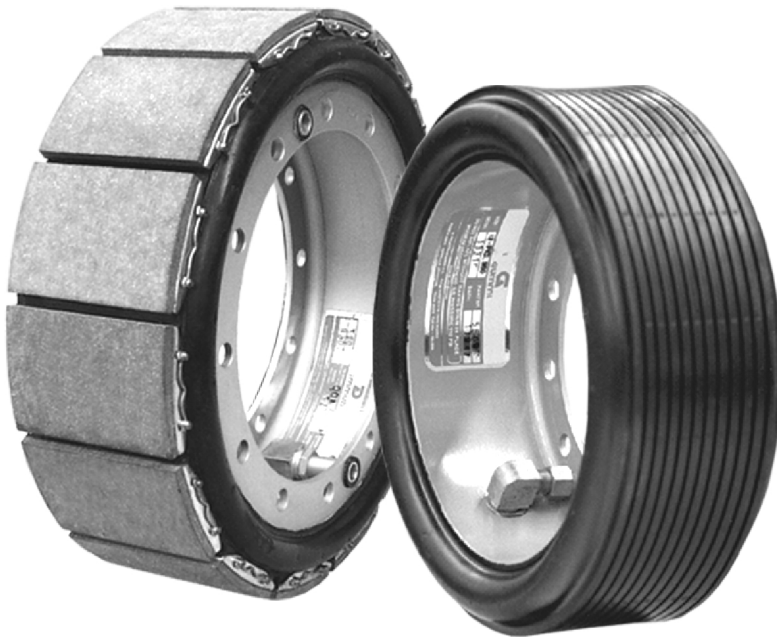
The FKE type elements are appropriate for low speed applications, with smooth starting and stopping loads. They can commonly be used as slip clutches and tensioning brakes. The FKE elements have a design similar to the FK type elements, including their manufactured characteristics. A neoprene rubber tube is reinforced by cord plys and is vulcanized to the outer part of a steel rim. Sets of friction shoes are held in place by a shoe pin and lock wire assembly on the outside diameter of the tube. Torque is transmitted by the sidewalls of the tube. When the tube is pressurized, this forces the friction shoes to expand and engage within the inside diameter of the drum.

This expanding design allows the element to function as a centrifugal clutch. The radial rigid-ness of the air tube determines the speed on which the friction shoes will retract from the inside diameter of the drum.

The three smallest models have a tube that is vulcanized to the outside diameter of a solid hub, which are keyed and bored allowing for direct shaft mounting. The air passage can be provided in the hub face, or as a radial hole thru the hub.

The other larger sizes are attached to the shaft via a separate element hub.

The elements capacity to transmit torque depends on the applied air pressure and velocity. The values indicated in the catalog are given at a pressure of 75 psi (5,2 bar) and zero r.p.m. 110 psi (7,6 bar), which is the maximum recommended pressure. Adjustments and correction values for operating pressure and speed appear in the selection procedure section of the catalog.

The FKE type elements are available in 11 sizes. They are identified in inches by the inside diameter of the drum to which they expand, and the width in inches of their friction linings. For example, a 16FKE475 element is designed to work inside a 16" drum that has friction lining width of 4,75". The smallest size of the FKE models works on a drum with an inner diameter of 4 inches (102 mm.) and the largest on a drum with an inner diameter of 24 inches (610 mm.). On the smallest size (4FKE125), the friction shoes are not replaceable because they are vulcanized directly to the tube.

The construction of the FKR elements is similar to the FKE element, with the exception of the friction shoes. The FKR elements engage the drum directly with the outer surface of the tube. This contact surface provides for a high torque in a relative small package; and also functions as insulation between the connecting shafts.
The FKR type elements are usually used as shaft couplings, or holding breaks where the speed differential between the shafts must be at zero. They are ideal for applications where disconnection must be done without stopping the primary movement, or where the driving and or driven components connections are drawn from the drive on a frequent basis.

FKR elements are identified in the same way as FKE elements. They are available in 10 sizes. The smallest element expands on an inner diameter of 3 inches (76 mm.), while the largest to and inner diameter of 24 inches. They are used in Laundry, Pulp and Paper, Textile, Tire Fabrication, and Marine Industries.

10 to 24 FKE

4, 6 and 8 FKE
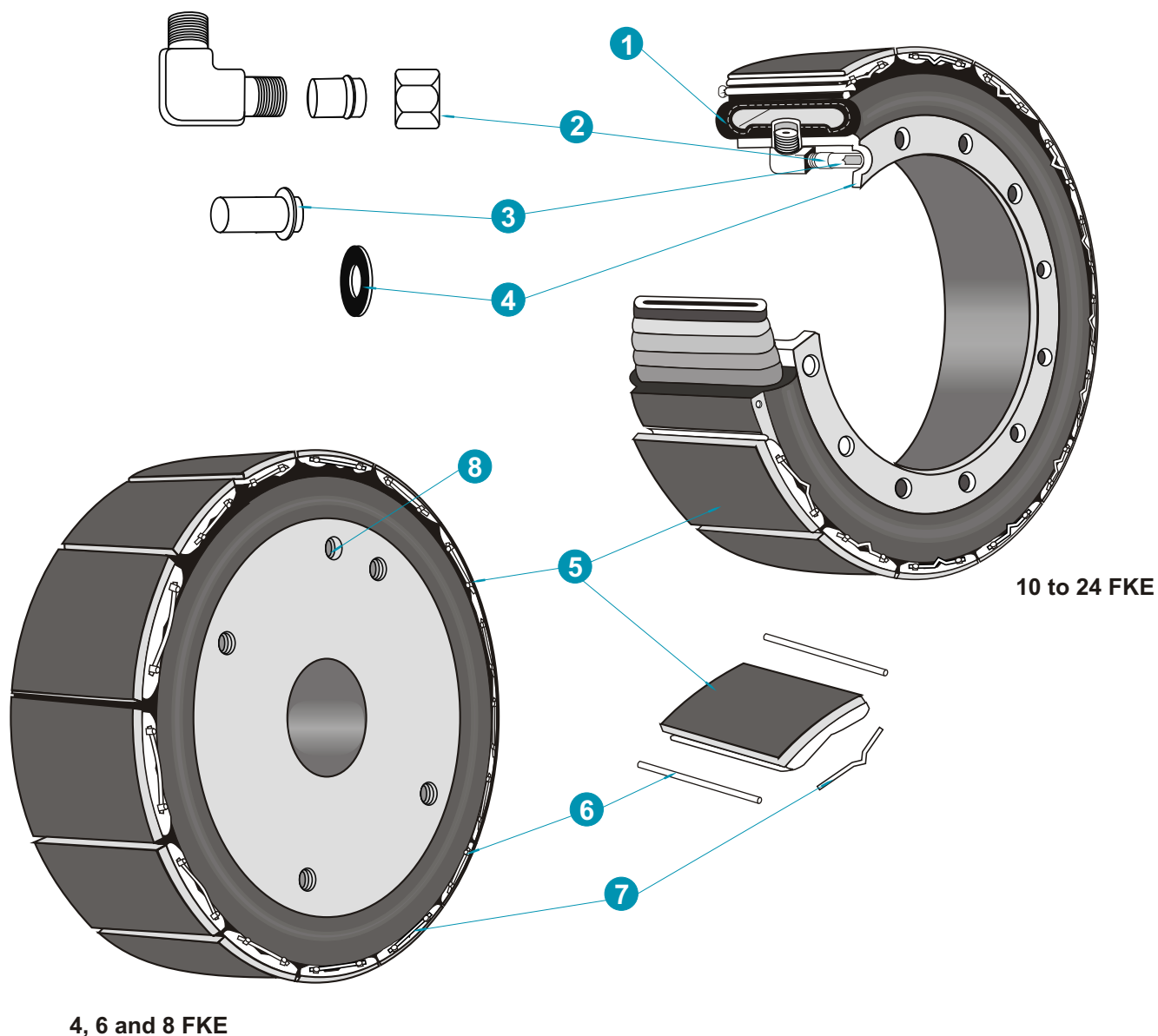
SIZE	Torque rating	
	lb.in @ 75 psi	N.m @ 5,2 bar
4-FKE125	390	44.1
6-FKE-200	910	103
8-FKE-250	2220	251
9-FKE-325	3750	424
10-FKE-300	4275	483
12-FKE-350	7500	848
14-FKE-400	12000	1360
16-FKE-475	18750	2120
19-FKE-475	27000	3050
21.5-FKE-475	36000	4070
24-FKE-475	45000	5090

SIZE	Torque rating	
	lb.in @ 75 psi	N.m @ 5,2 bar
3-FKR125	400	45.2
6-FKR-200	1540	174
8-FKR-250	3550	401
10-FKR-300	6600	746
12-FKR-350	12300	1390
14-FKR-400	22600	2550
16-FKR-475	32600	3680
19-FKR-475	47600	5380
21.5-FKR-475	63000	7120
24-FKR-475	83500	9440

Components description

1 - **Rim and Tube Assembly**
2 - **Elbow**
3 - **Air Connection tube**
4 - **Air Connection Gasket**
5 - **Friction Shoe**
6 - **Shoe Pin**
7 - **Lock wire**
8 - **Pipe Plug**
5, 6, 7 - **Replacement kit friction shoe**

Drive principle

The FKE and FKR elements use a neoprene tube reinforced with cord ply's, which expands in a radial way, when the element is pressurized. This action causes the contact surface to expand against the inner diameter on the drum. Its ability to transmit torque depends on the applied air pressure and velocity.
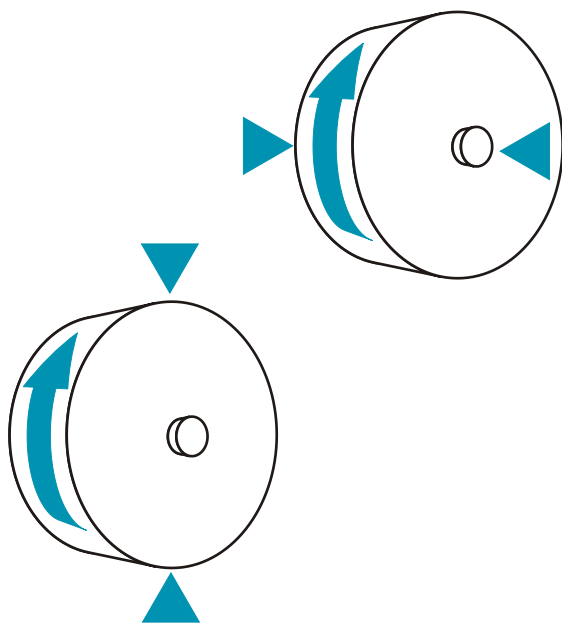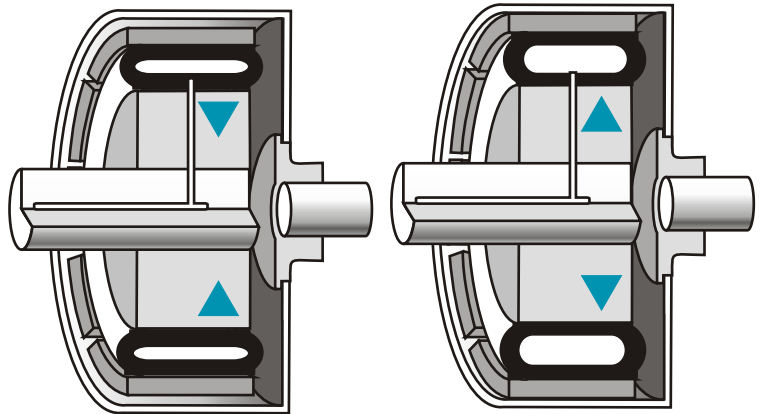
Force applied at maximum radius from axis

The FK Elements concentrate all the frictional force on the inter diameter of the drum, obtaining the maximum torque. The torque lever arm is the drum radius, not a reduced radius that is common in plate clutches. The force in not only generated through the optimal radius, but is also applied around the circumference of the drum.
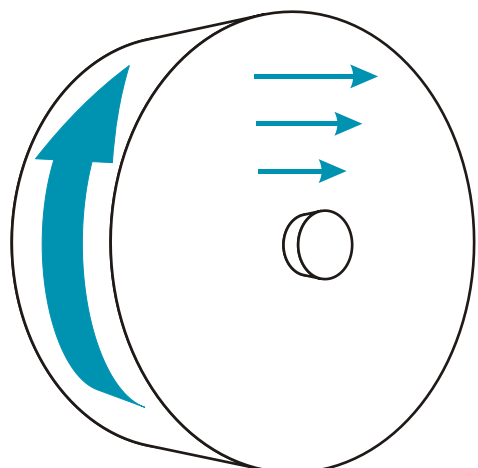
Uniform contact speeds

The contact velicty of the friction shoe to the across the interior diamater of the drum surface remains constant, unlike plate-types where the contact speed varies across the the drum.

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Temperature dissipation

The temperature generated within the inner surface of the drum is quickly transmitted to the outer surface, where it dissipates. This type of configuration is ideal for slip clutches and tensioning break applications where the temperature must be continuously dissipated away from the interior diameter of the drum.
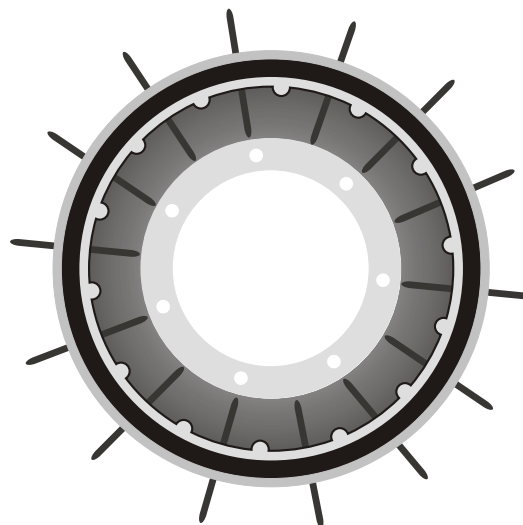
It operates in any plane

The expanding design allows the element to work in any plane, unlike a plate type that can only function in a vertical plane.
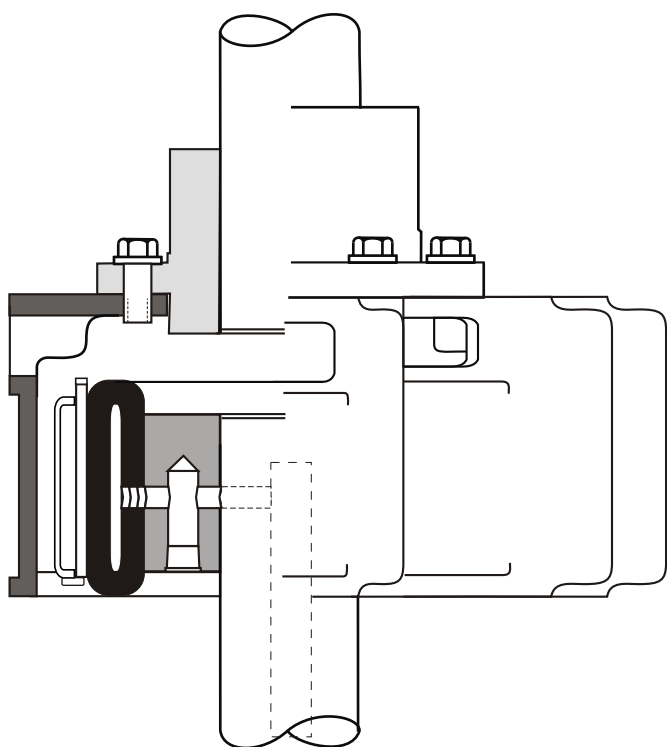
Automatic adjustment

The pneumatic element automatically compensates for the wear of the friction lining on the shoe assembly, eliminating the necessity of adjustment at normal wear, without reducing the capacity to transmit torque.

Without lubrication

This element does not require lubrication, because there are no close fitting sliding components.

Dimensional data

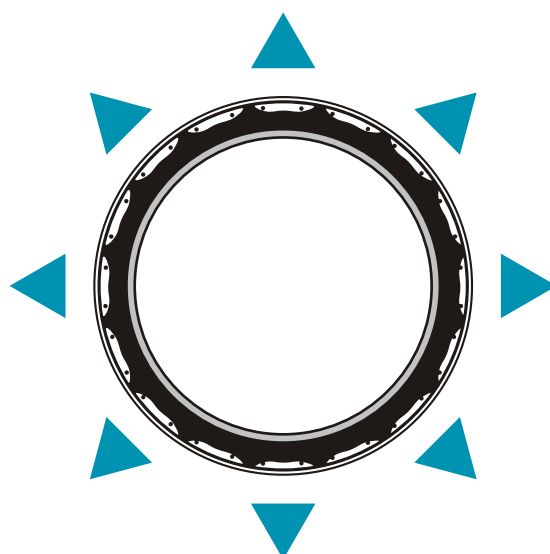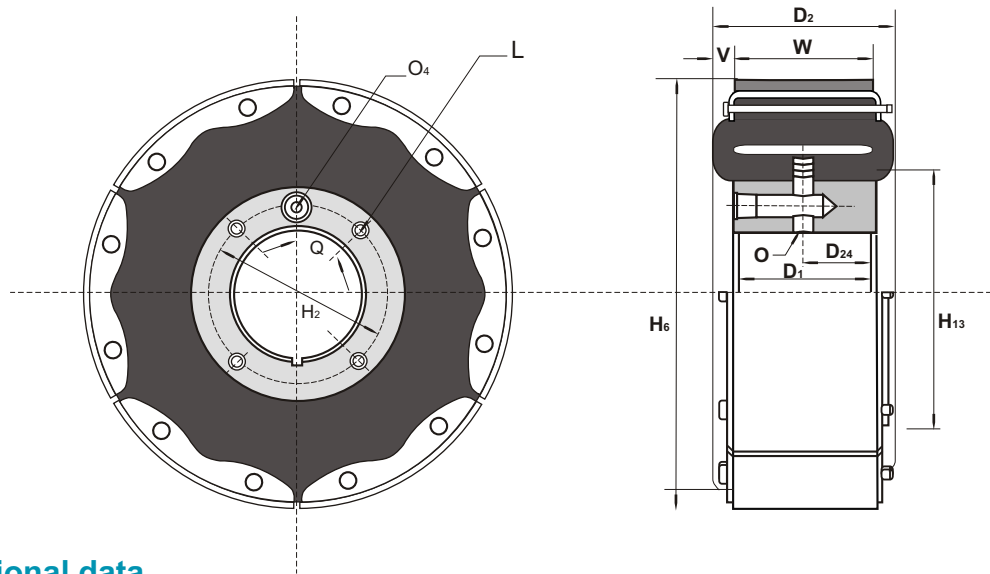| ENGLISH	lb.pulg @ 75 psi	Dimensions in inches														
4FKE125	114000	390	0.88	1.50	1.50	1.75	0.75	2.12	3.94	2.75	4	5/16-18	0.31	1/4-18	45.0	0.25	10	1.25
6FKE200	114001	910	0.88	1.75	2.00	2.75	1.00	2.50	5.91	3.38	4	3/8-16	0.31	1/4-18	45.0	0.38	6	2.00
8FKE250	114002	2220	1.25	3.50	2.50	3.25	1.25	4.38	7.84	5.38	4	3/8-16	0.31	1/4-18	45.0	0.38	8	2.50

Size	Part [1] number	M. Torque rating [2]	min max Bore Range min max		D_1	D_2	D_{24}	H_2	H_6	H_{13}	N size L [3] N size		O	O_4 [4]	Q (deg)	V	N width W N width	
4FKE125	114000	44.1	22	38	38	44	19	54	100	70	4	5/16-18	8	1/4-18	45.0	6	10	32
6FKE200	114001	103	22	44	51	70	25	64	150	86	4	3/8-16	8	1/4-18	45.0	10	6	51
8FKE250	114002	251	32	89	64	83	32	111	199	137	4	3/8-16	8	1/4-18	22.5	10	8	64
SI	N.m @ 5,2 bar	Dimensions in milimeters																

Technical data

ENGLISH	lb.in @ 75 psi	rpm	psi/rpm²	lb.ft²	lb	in²	inches new worn		in³	in
4FKE125	114000	390	1800	*	0.01	2.3	13	[6]	[6]	5	4.09
6FKE200	114001	910	1800	1.1	0.25	7	36	0.14	0.06	10	6.09
8FKE250	114002	2220	1800	1.2	1.00	19	60	0.12	0.06	15	8.09

Size	Part [1] number	M. Torque rating [2]	max. speed	aumento por fuerza centrífuga	Wk² [5] J	Weigth Mass	Friction area	Lining Thickness		Air tube cavity [7]	Maximun drum diameter
4FKE125	114000	44.1	1800	*	0.004	1.0	84	[6]	[6]	0.08	104
6FKE200	114001	103	1800	0.1	0.01	3.2	232	4	2	0.16	155
8FKE250	114002	251	1800	0.1	0.04	8.6	387	3	2	0.25	205
SI	N.m @ 5,2 bar	rpm	bar/rpm²	kg.m²	kg	cm²	new worn milimeters		dm³	mm

* The data displayed in the catalogue is current and subject to change without previous notice.

NOTES:

1- Reference by 10" of part. When ordering, please indicate which air entry hole 0 or 04.
2- The torque indicated is dynamic; with the static torque is being approximately 25% greater. The torque in each application depends on the air pressure and the speed.
3- UNC thread
4- NPT thread
5- Based on minimum holes.
6- In the models where the friction shoe is vulcanized on to the rubber tube, replace the complete element when the wear on the friction surpasses the 3,88 (98m) inches in diameter.
7- Drum Contact with worn shoes.

ENGLISH	lb.in @ 75 psi	rpm	psi/rpm²	lb.ft²	lb	in²	Inches		in³	in
							new	worn		
9FKE325 114003	3750	1800	1.6	1	9	88	0.20	0.06	30	9.09
10FKE300 114004	4275	1800	2.2	1	10	91	0.20	0.06	47	10.09
12FKE350 114005	7500	1800	3.4	3	16	126	0.20	0.06	45	12.09
14FKE400 114006	12000	1500	4.3	5	23	167	0.20	0.06	55	14.09
16FKE475 114007	18750	1300	6.4	11	40	232	0.26	0.06	195	16.13
19FKE475 114008	27000	1100	10	20	49	270	0.26	0.06	235	19.13
21FKE475 114009	36000	1000	13	34	62	306	0.26	0.06	280	21.63
24FKE475 114010	45000	900	20	39	68	344	0.26	0.06	315	24.63

Size	Part number [1]	M. Torque rating [2]	Maximun speed	C_s Centrifugal Gain	Wk² / J [5]	Weigth / Mass	Friction area	Lining Thickness		Air tube cavity [4]	Maximun drum diameter
9FKE325	114003	424	1800	0.1	0.042	4.1	568	5	2	0.49	231
10FKE300	114004	484	1800	0.2	0.042	4.5	587	5	2	0.77	256
12FKE350	114005	848	1800	0.2	0.126	7.2	813	5	2	0.74	307
14FKE400	114006	1356	1500	0.3	0.210	10	1077	5	2	0.90	358
16FKE475	114007	2120	1300	0.4	0.462	18	1496	7	2	3.20	410
19FKE475	114008	3050	1100	0.7	0.840	22	1742	7	2	3.85	486
21FKE475	114009	4070	1000	0.9	1.43	28	1974	7	2	4.59	549
24FKE475	114010	5090	900	1.4	1.64	31	2219	7	2	5.17	626
SI	N.m @ 5,2 bar	rpm	bar/rpm²	kg.m²	kg	cm²	new	worn		dm³	mm

* The data displayed in the catalogue is current and subject to change without previous notice.

NOTES:

1- Refers to only to the basic part number.

2- The torque indicated is dynamic, while static torque is approximately 25 % greater.
   The torque in each application depends on the air pressure and the speed.
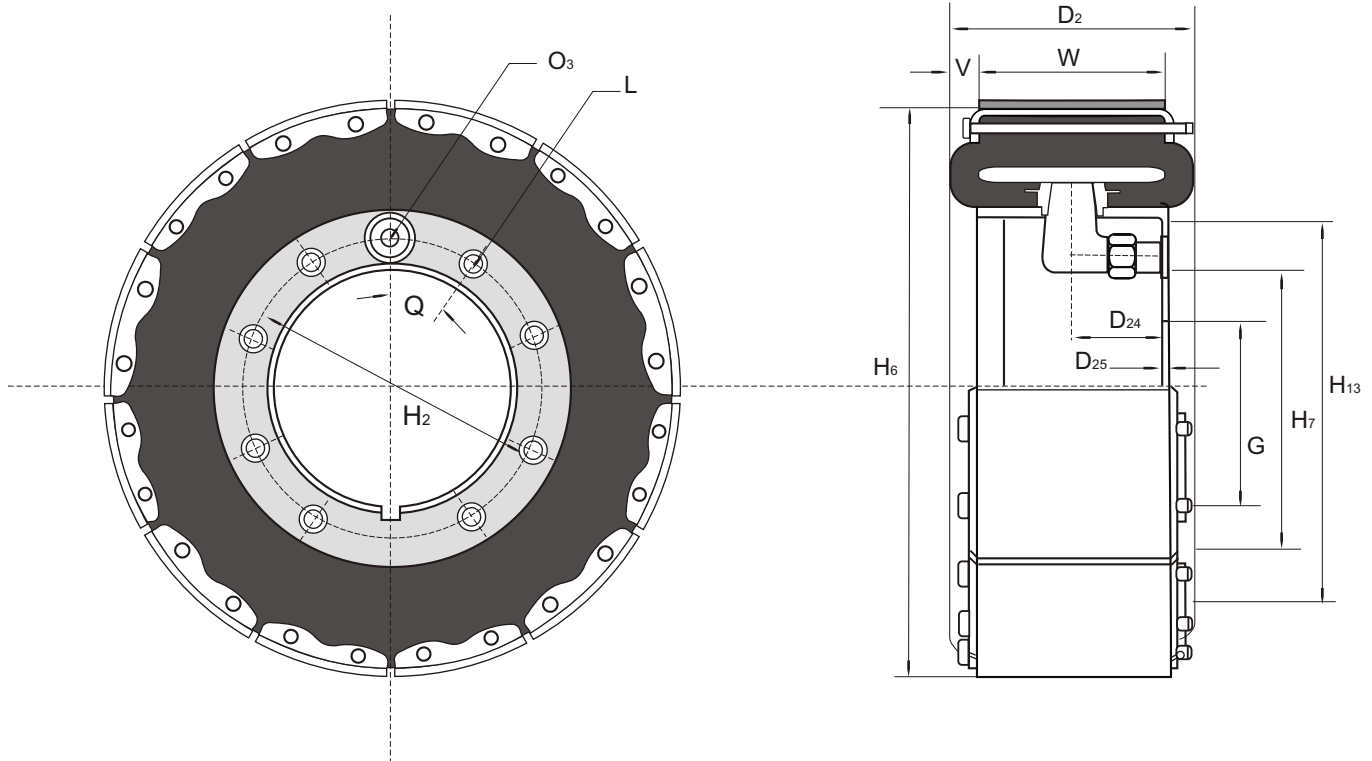
3- Tolerance by size:
   4 to 14
   + 0.005 / - 0.000 inches (0.13 / - 0.00 mm)
   16 to 24
   + 0.010 / - 0.000 inches (0.25 / -0.00 mm)

4- Drum Contact with worn shoes.

Size	Part number [1]	M. Torque rating [2]	D₂	D₂₄	D₂₅	G	H₂ [3]	H₆	H₇	H₁₃	N / Dia (L)		O₃	Q (Deg)	V	N / width (W)	
ENGLISH		lb.in @ 75 psi	*Dimensions in inches*														
9FKE325	114003	3750	4.13	1.86	0.19	3.500	4.62	8.84	4.62	6.00	8	0.50	0.31	22.5	0.44	9	3.25
10FKE300	114004	4275	3.88	1.56	0.16	4.250	5.25	9.84	5.25	7.00	8	0.50	0.31	22.5	0.44	10	3.00
12FKE350	114005	7500	4.38	1.88	0.19	6.250	7.25	11.84	7.25	9.00	12	0.50	0.31	15.0	0.44	12	3.50
14FKE400	114006	12000	4.88	1.88	0.19	8.250	9.25	13.84	9.25	11.00	12	0.50	0.38	15.0	0.44	14	4.00
16FKE475	114007	18750	6.38	2.50	0.25	8.250	9.63	15.81	9.63	11.38	8	0.50	0.38	22.5	0.81	12	4.75
19FKE475	114008	27000	6.38	2.50	0.25	9.625	11.00	18.81	11.00	14.38	6	0.75	0.38	30.0	0.81	14	4.75
21FKE475	114009	36000	6.38	2.50	0.31	12.125	13.50	21.31	13.50	16.88	8	0.75	0.38	22.5	0.81	16	4.75
24FKE475	114010	45000	6.38	2.50	0.31	14.625	16.00	23.81	16.00	19.38	8	0.75	0.38	22.5	0.81	18	4.75
9FKE325	114003	424	105	47	5	88.9	117	225	117	152	8	13	8	22.5	11	9	83
10FKE300	114004	484	99	40	4	108.0	133	250	141	178	8	13	8	22.5	11	10	76
12FKE350	114005	848	111	48	5	158.8	184	301	192	229	12	13	8	15.0	11	12	89
14FKE400	114006	1356	124	48	5	209.6	235	352	243	279	12	13	8	15.0	11	14	102
16FKE475	114007	2120	162	64	6	209.6	245	402	244	289	8	13	10	22.5	21	12	121
19FKE475	114008	3050	162	64	6	244.5	279	478	279	365	6	19	10	30.0	21	14	121
21FKE475	114009	4070	162	64	8	308.0	343	541	343	429	8	19	10	22.5	21	16	121
24FKE475	114010	5090	162	64	8	371.5	406	605	406	492	8	19	10	22.5	21	18	121
SI		N.m @ 5,2 bar	*Dimensions in milimeters*														

ENGLISH		lb.in @ 75 psi	rpm	lb.ft²	lb	in³	in
3FKR125	114060	400	1800	0.01	1.1	4	3.09
6FKR200	114061	1540	1800	0.1	7	20	6.09
8FKR250	114062	3550	1800	0.5	18	35	8.09
Size	Part number ❶	M. Torque rating ❷	Maximun speed	Wk²	weigth	Air tube cavity ❺	Maximun drum diameter
				J ❻	ma ss		
3FKR125	114060	45.2	1800	0.001	0.5	0.07	78
6FKR200	114061	174	1800	0.004	3.2	0.33	155
8FKR250	114062	401	1800	0.02	8.2	0.57	205
SI		N.m @ 5,2 bar	rpm	kg.m²	kg	dm³	mm

* The data displayed in the catalogue is current and subject to change without previous notice.

NOTES:

1- Refers only to the basic part number, when ordering please specify which air entry hole, 0 or 04 should be used.

2- Static torque

3- UNC threads.

4- NPT threads.

5- Contact with installed drum

6- Based upon Minimum bores.
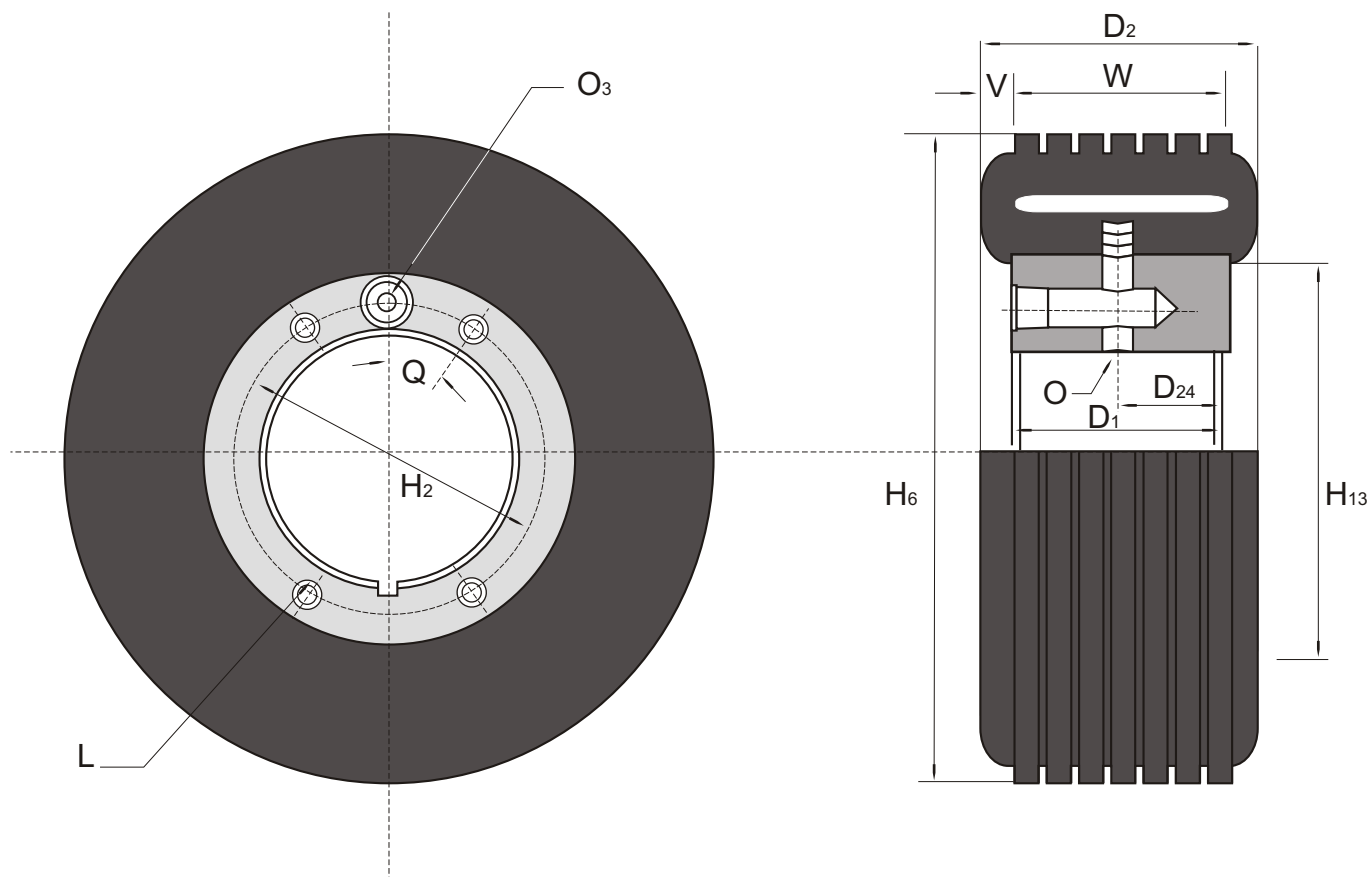
ENGLISH		lb.in @ 75 psi	Dimensions in inches																
3FKR125	114060	400	-	0.98	1.50	1.75	0.75	NA	2.94	1.75	NA	NA	NA	0.38	NA	NA	0.25	1.25
6FKR200	114061	1540	0.88	1.75	2.00	3.06	1.00	2.50	5.91	3.38	4	3/8-16	0.62	0.31	1/4-18	45.0	0.53	2.00
8FKR250	114062	3550	1.25	3.50	2.50	3.56	1.25	4.38	7.91	5.38	4	3/8-16	0.62	0.31	1/4-18	22.5	0.53	2.50

Size	Part ❶ number	M. Torque rating ❷	min Bore Range min	max max	D_1	D_2	D_{24}	H_2	H_6	H_{13}	N L ❸ N	size size	O	❹ O_4	Q	V	W
3FKR125	114060	45.2	-	25	38	44	19	NA	75	44	NA	NA	NA	10	NA	NA	6	32
6FKR200	114061	174	22	44	51	78	25	64	150	86	4	3/8-16	16	8	1/4-18	45.0	13	51
8FKR250	114062	401	32	89	64	90	32	111	201	137	4	3/8-16	22	8	1/4-18	22.5	13	64

| SI		N.m @ 5,2 bar	Dimensions in milimeters

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ENGLISH		lb.in @ 75 psi	rpm	lb.ft²	lb	in³	in
10FKR300	114063	6600	1800	0.8	8	75	10.09
12FKR350	114064	12300	1800	2	13	80	12.09
14FKR400	114065	22600	1500	4	17	105	14.09
16FKR475	114066	47600	1300	7	31	135	16.13
19FKR475	114067	32600	1100	15	39	330	19.13
21FKR475	114068	63000	1000	27	52	335	21.63
24FKR475	114069	83500	900	41	61	375	24.13
Size	Part number ❶	M. Torque rating ❷	Maximun speed	Wk² / J ❻	weigth / mass	Air tube cavity ❺	Maximun drum diameter
10FKR300	114063	746	1800	0.03	3.6	1.23	256
12FKR350	114064	1390	1800	0.08	5.9	1.31	307
14FKR400	114065	2550	1500	0.17	7.7	1.72	358
16FKR475	114066	3680	1300	0.29	14	2.21	410
19FKR475	114067	5380	1100	0.63	18	5.41	486
21FKR475	114068	7130	1000	1.13	24	5.49	549
24FKR475	114069	9440	900	1.72	28	6.15	613
SI		N.m @ 5,2 bar	rpm	kg.m²	kg	dm³	mm

NOTES:

1- Refers only to the basic part number.

2- Static torque.

3- Contact with installed drum.
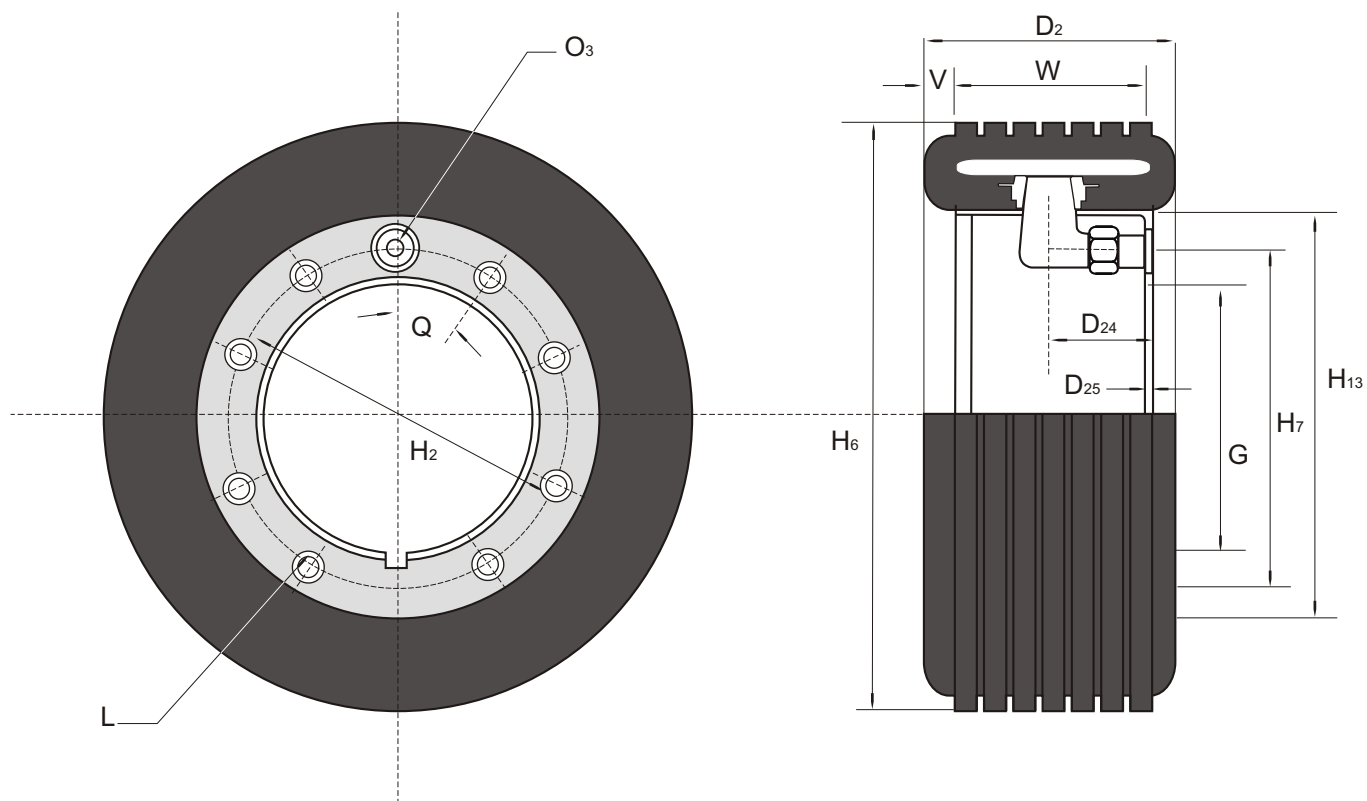
ENGLISH	lb.in @ 75 psi	Dimensions in inches													
10FKR300	114063	6600	4.25	1.56	0.16	4.250	5.25	9.90	5.56	7.00	8	0.50	0.31	22.5	0.63	3.00
12FKR350	114064	12300	4.75	1.88	0.19	6.250	7.25	11.90	7.56	9.00	12	0.50	0.31	15	0.63	3.50
14FKR400	114065	22600	5.25	1.88	0.19	8.250	9.25	13.91	9.56	11.00	12	0.50	0.31	15	0.63	4.00
16FKR475	114066	32600	6.63	2.50	0.25	8.250	9.63	15.81	9.56	11.38	8	0.50	0.38	22.5	0.94	4.75
19FKR475	114067	47600	6.63	2.50	0.25	9.625	11.00	18.81	11.00	14.38	8	0.75	0.38	30	0.94	4.75
21FKR475	114068	63000	6.63	2.50	0.31	12.125	13.50	21.31	13.50	16.88	8	0.75	0.38	22.5	0.94	4.75
24FKR475	114069	83500	6.63	2.50	0.31	14.625	16.00	23.81	16.00	19.38	8	0.75	0.38	22.5	0.94	4.75

Size	Part ❶ number	M. Torque rating ❷	D_2	D_{24}	D_{25}	G	H_2	H_6	H_7	H_{13}	N Dia (L)	N Dia (L)	O_3	Q	V	W
10FKR300	114063	746	108	40	4	108.0	133	251	141	178	8	13	8	22.5	16	76
12FKR350	114064	1390	121	48	5	158.8	184	302	192	229	12	13	8	15	16	89
14FKR400	114065	2550	133	48	5	209.6	235	353	243	279	12	13	8	15	16	102
16FKR475	114066	3680	168	64	6	209.6	245	402	244	289	8	13	10	22.5	24	121
19FKR475	114067	5380	168	64	6	244.5	279	478	279	365	8	19	10	30	24	121
21FKR475	114068	7130	168	64	8	308.0	343	541	343	429	8	19	10	22.5	24	121
24FKR475	114069	9440	168	64	8	371.5	406	605	406	492	8	19	10	22.5	24	121

SI	N.m @ 5,2 bar	Dimensions in milimeters

* The data displayed in the catalogue is current and subject to change without previous notice.

General

The technical section of the catalogue contains information that belongs to the selection of assembly, direction and control of brakes and clutches; in general the formulas, symbols and units are identified. It is recommended to review the technical section before trying to classify a specific product for an application.

Operation speed

The design of the expanding elements allows them work as centrifugal clutches. In the FKE and FKR models the elasticity of the tube resists and counter act the effects of centrifugal force, which also allows them to idle while disengaged. The recommended element idle speed is indicated in the following table.

Size	RPM
3FKR125	1200
4FKE125	1100
6FKE / FKR200	800
8FKE / FKR250	650
9FKE / FKR300	600
10FKE / FKR300	520
12FKE / FKR350	420
14FKE / FKR400	340
16FKE / FKR475	270
19FKE / FKR475	200
21,5FKE / FKR475	120
24FKE / FKR475	100

The FKR elements use a rubber friction surface that contacts the drum. They are made to be used as shaft couplings and or holding breaks, and should only be engaged at a zero speed differential between the drum and actual element.

Torque of adjustment of elements

The nominal torque of each element is indicated in the catalog and is based upon an effective pressure P_r of 75 psi (5.2 bar). The nominal torque ratings must be adjusted by the operation pressure P_o, parasitic loss P_p and operation speeds. The maximum permissible pressure depends on the construction of the element and the frequency of engagement. In general the pressures indicated in the following table, should not be exceeded.

Maximum recommended pressur		
Model	Psi	Bar
FKE & FKR	110	7.6

The elements have an inherent parasitic pressure (**Pp**) required to obtain contact between the friction break shoe and the drum, which represents the pressure to surpass the resistance of the actuating tube, and for the elements FKE-V and FKR-EV, the pressure to surpass the resistance of the friction shoe release springs. The parasitic pressure **Pp** is indicated in the following table and must be deducted from the operation pressure.

Parasitic pressure Pp		
Size	Psi	Bar
3 FKR125	20	1.38
4 FKE125	20	1.38
6 and 8 FKE & FKR	7	0.48
10 and 12 FKE & FKR	6	0.41
All other FKE & FKR	4	0.28

Thermal capacity

Rotating elements must have their torque rating adjusted to compensate for the effects of the centrifugal force that is acting upon on the friction break shoes. The method used to calculate the centrifugal pressure **Pc** and to add its value to the applied pressure. **Po**.

Pc = Cs . n . E - 06

Where:

Pc: compensating pressure (psi or bar).

Cs: constant speed (obtained of page of the element catalogue).

n: r.p.m. of the element.

The value of the adjusted torque ME is calculated:

$$Me = \frac{Po - Pp - Pc}{Pr} . Mr$$

The adjusted torque **Me** must be equal or greater than the required clutch torque **Mc,** or brake torque **Mb.**

Example 1 illustrates the use of these formulas.

Continuous thermal capacity

The expanding elements, when being used in combination with air agitating vaned drums, are ideal for applications suited for constant thermal dissipation. It's recommended that the drum be located on the driving side within a clutch application and on the shaft side on a brake application.
The thermal rank **Pt** varies according to the speed of operation, as it is demonstrated in the graphic.
For an ideal performance and operating life of the linings, the maximum pressure should be set at a limit of 20 psi (1.4 bar) and the slipping speed of 1600 fpm (8 mps.).
For elements that will be used in continuous slip service, a LO-CO friction material must be specified.

Cyclical thermal capacity

Since expanding elements generally only have a single air inlet, they are limited at the rate at which they can be cycled. It is recommended to not allow rates greater than 10 cycles per minute. For extreme operations, consult with our technical department. Use the thermal power indicted in the graphs below for cyclical operations **Pc**.
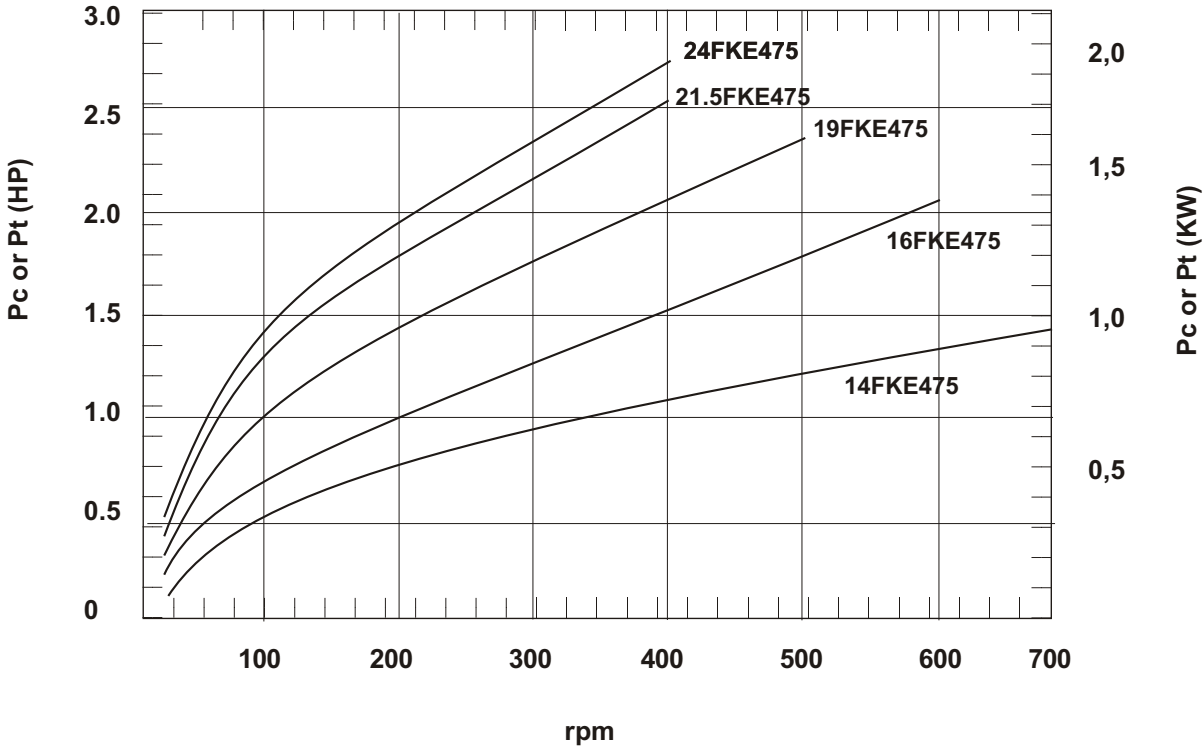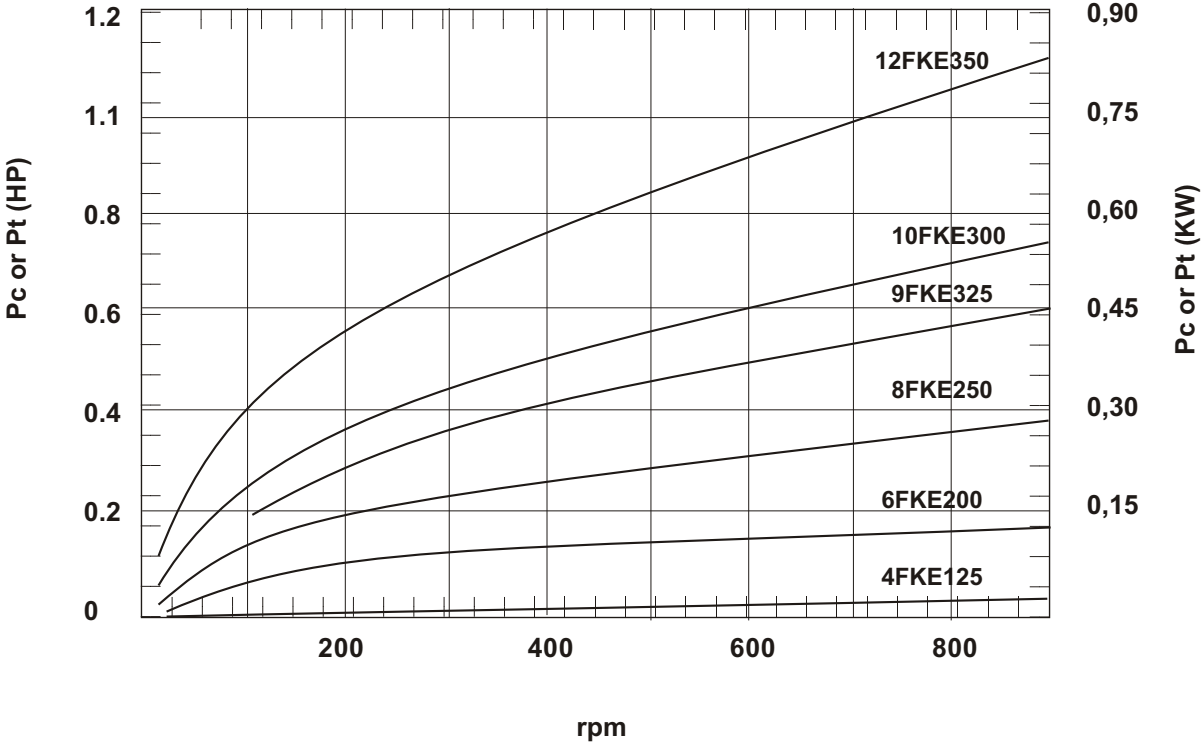
Non-cyclical thermal capacity

The friction area of the element, the mass of the drum, thermal conductivity and heat capacity determine the non-cyclical capacity. The properties of our standard iron drums, results in the their limits represented in the graph.

The calculated thermal energy for the load is adjusted to include the energy associated with the acceleration and deceleration of the components of the clutches and/or brakes that have been tentatively selected.

The adjustment of the thermal energy Wt is divided by the friction area A of each element. Then the average power loading Pave is calculated by:

$$Pave = \frac{Pt}{A}$$

The point (Wt/A, Pave) is shown in the graph. If the point falls underneath the appropriate limit line of the product, the selection will be able to handle the thermal load. If not, an element with a greater friction surface area must be used.

Example 4 at the end of this section illustrates the use of the graph.

**Non-Cyclical Thermal Capacity
(Gray Smelting Bell)**

FKE Element

Non-Cyclical Thermal Capacity (Gray Smelting Bell) — Wt/A (ft-lb/in²) vs Pave (HP/in²)

Wt/A (Joule/cm²) vs Pave (kW/cm²)
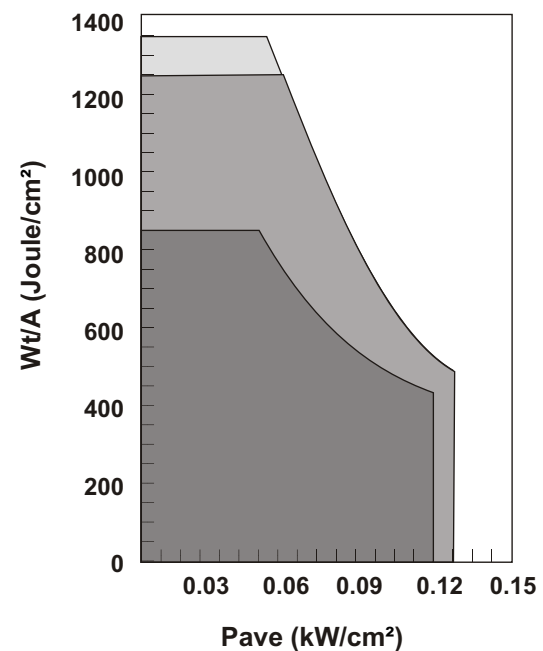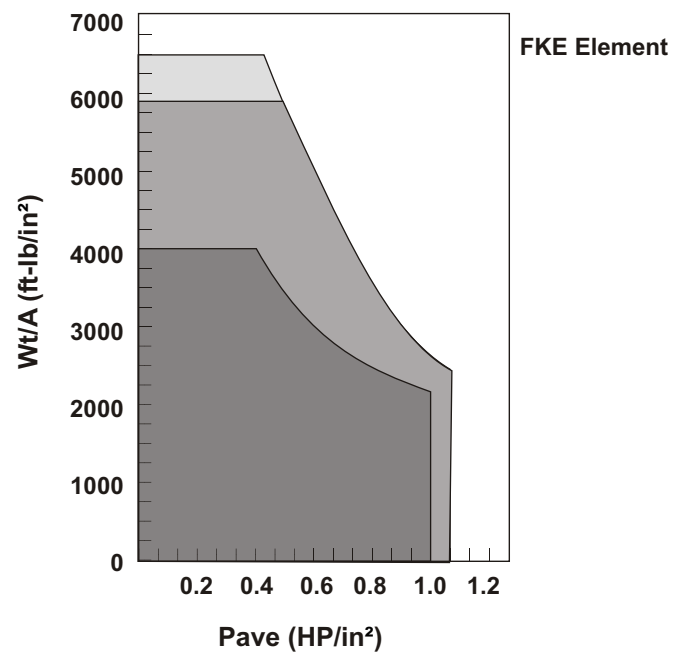
Peripheral speed of bell:

The peripheral speed of the drum should not exceed 8500 fpm. (43 mps.). In some applications, the drums may need freewheel at speed that are greater than their engaged running speeds. This must be taken in consideration at the moment of calculating their speeds.

The speeds are calculated:

V (fpm) = 0,262. n.
D V (fpm) = 5,236E - 05. n. D

Where **D** is outside drum diameter (in inches or mm).

Method of selection:

There are two ways to arrive at the selection. The analytical method, which is the optimal way to do it, whereas by the service factor method may result in a selecting an under or oversized unit. Whenever possible, the analytical method should be used.

Analytical method

The steps to follow are:
1- Determine the required torque.
2- Determine the thermal requirement.
3- Determine the arrangements of the mounting space and diameters of shafts.
4- Make a tentative selection attempt using steps 1, 2 and 3.
5- Adjust the nominal torque rating of the tentative selection to mirror the operating pressure and speed, and determine if it still meets the requirement.
6- Adjust the thermal requirement to include the energy of the components of the clutch or brake which are accelerated and decelerated and determine if it falls within the tentative selection capacity.
7- Check the peripheral speed of the spider and drum to determine if they are within the operational limits of the components given in the table.

Step 3 requires some measurements to assure that the arrangement will not be interfered with in regards to its surroundings. If the attempt selection does not meet the requirements of the steps 5, 6 and 7; a smaller dual element or large single elements should be considered. Steps 4 thru 7 will be repeated for the new selection. If the new selection still does not meet the requirements of steps 5 and 6, a product from a different line needs to be considered. If the selection does not need the requirements of the step 7, it might be possible to fabricate the components of other materials, which can resist the difficulties and stresses associated with the high speeds.

Method of selection by service factor fs:

Select the Service Factor **fs,** of the corresponding table; if you do not find the machine or equipment listed, select a Service Factor **fs** of a machine with similar characteristics and function. Multiply the primary mover power **Pp** by **fs** and you will obtain the calculated design power **P**d.

Pd = Pp.fs

For clutch applications that will be operating at 75 psi (5.2 bar), use the graph with the to select the element which has the power capacity at the elements operating speed.. These graphics are for single elements; for dual elements, the illustrated capacity is duplicated, having twice the capcity shown.

For clutches that operate at other pressures, or for stationary brakes, the service factor is applied to prime movers toque **Mp,** refered to the brake or clutch shaft.

The required torque for **Mc** clutch or **Mb** brakes is used to make an tentative selection of the element. The indicted **Mr** torque for a element is adjusted according to the operting velocity and the the applied air pressure as explained earlier. The adjusted element torque **Me**, must be greater than **Mc** or **Mb**.