


# Gear Couplings Overview

AFC & AFX series



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# Overview

The Baker Hughes Lufkin Gears business provides reliable power transmission technologies and services to solve the unique needs of every application across industry segments.

Since 1946, we have delivered thousands of COMELOR and Lufkin Gears couplings. This document reviews our two standards series, AFC and AFX, which have decades of proven service in all kinds of transmission applications around the world. We have the experience, knowledge, and specialized engineering expertise to develop a customized solution that meets any requirements you may have.

For AFC and AFX30 to AFX180 couplings, the basic speed is 1,000 rpm. For AFX200 to AFX650 couplings, the basic speed is 300 rpm. Coupling capability can be adjusted based on customer application speed.

Our Lufkin Gears flexible gear couplings are designed to enable precise centering of floating parts on the toothed hubs, and can run at the speeds listed in tables 1 and 2 without balancing. Dynamic balancing will allow much higher speeds with stable, noiseless, and vibration-free operation.

Whatever the lubrication method selected, this function is vital for the smooth running of the coupling. The coupling life is closely related to the life of the sealing elements, but also to the proper maintenance of the assembly. Your coupling package will include instructions for mounting, lubrication, and maintenance instructions. Tables 1 and 2 list the speed limitations of the proposed lubrication solution.

Lufkin Gears coupling references are stamped on the outer diameter of sleeves. Unique for each coupling, these marks enable retrieval of all features for spare part request (material, balancing, sizing, lubrication). Traceability is also ensured by sales order reference.

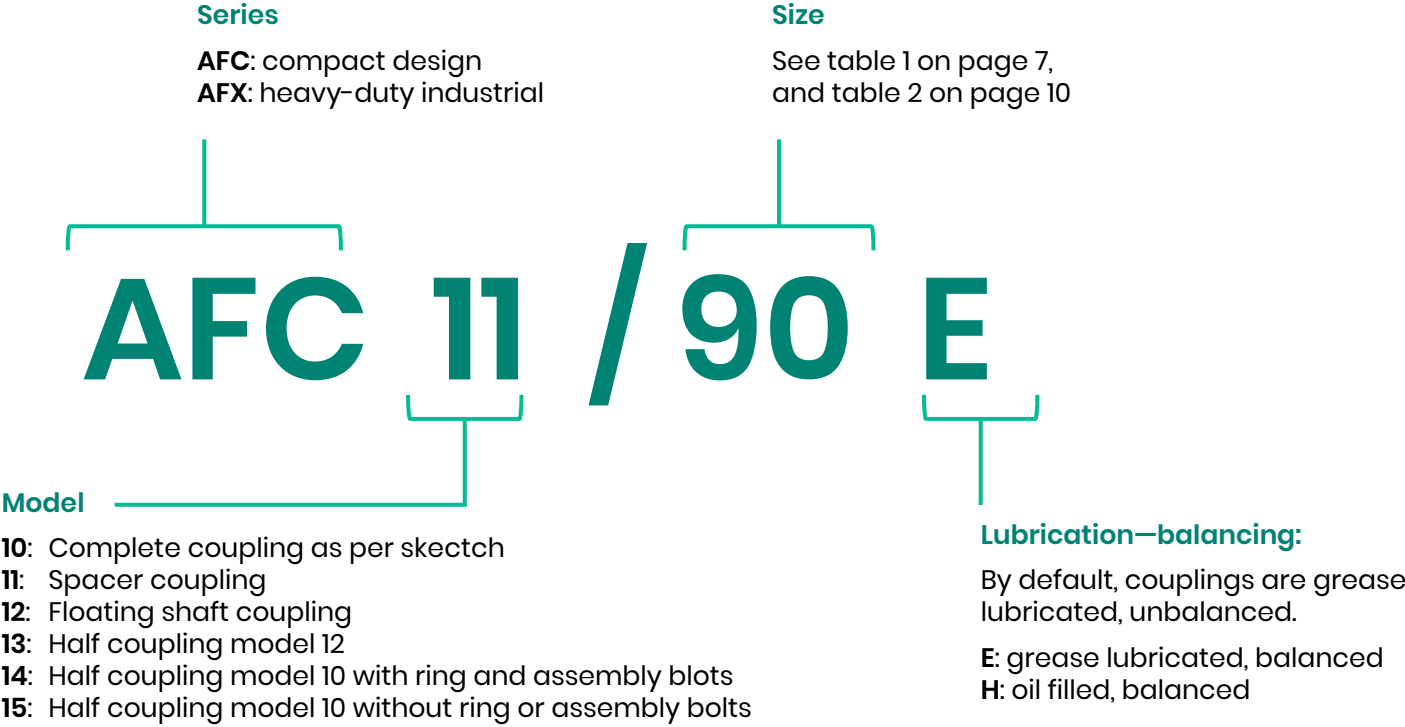


**Our couplings can be installed in nuclear plants and explosive areas.**



II 2G Ex h IIC T6...T3 Gb X  
II 3G Ex h IIC T6...T3 Gc X

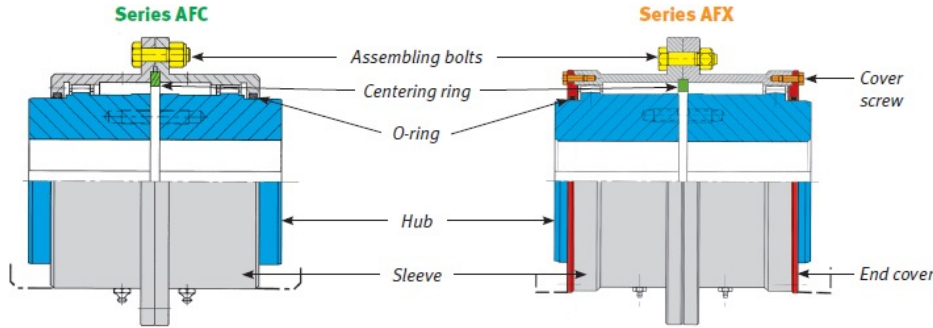
# Standard coupling designation



See page 4 for coupling sketch

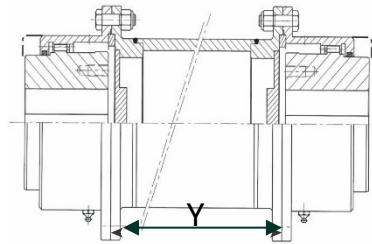
# Standard models

**Model 10: complete coupling** consisting of two flexible halves with gear teeth



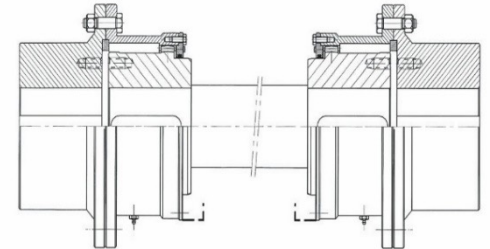
**Model 11: spacer coupling** is made of two models 14 and one integral or fabricated spacer.

Spacer length calculation: dimension Y depends on the distance between shaft ends. It is equal to the distance between shaft ends + E (tables 1 and 2).



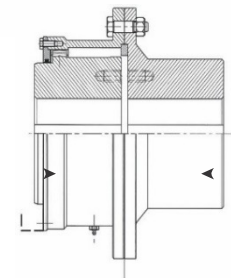
**Model 12: floating shaft coupling** made of two models 13 and one shaft, enables use of coupling halves of different sizes. The bore diameters accepted by the rigid halves can be greater than those accepted by the hubs of the corresponding standard couplings.

**Model 13: single engagement coupling** must NEVER BE USED ALONE, but always coupled to another model 13 to create a model 12.



**Model 14: flexible half with ring and assembling bolts**

**Model 15: flexible half without ring or assembling bolts**



# AFC series

# AFC series

## Compact design

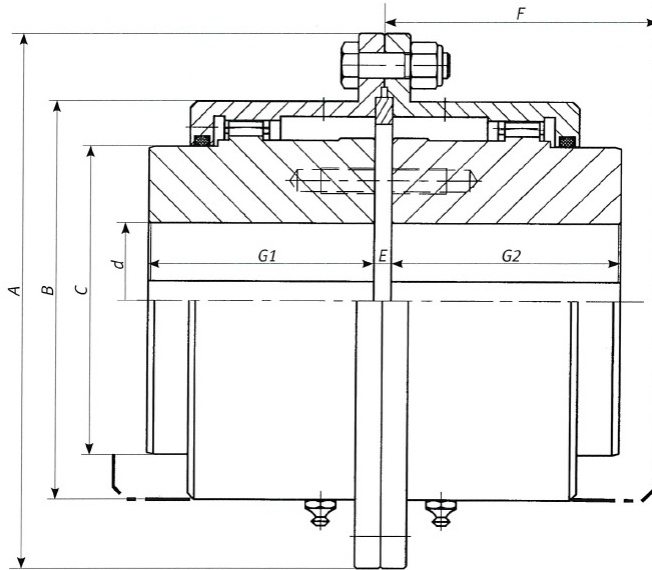
This series has all the essential qualities that characterize flexible gear couplings applicable in every industry. The connection capacity of an AFC coupling enables mounting on shafts up to 265 mm in diameter for optimized overall dimensions.

## Construction

Simple construction with a centering ring enables complete interchangeability of the flexible halves. This coupling has a very attractive ratio of bore diameter to overall dimensions. Its dynamic characteristics (moment of inertia, weight, and balancing possibility) make it ideal in high-speed applications.



# AFC series



The transmittable torques  $T_t$  have been calculated for:

- Misalignment:  $0^\circ 30'$  under load,  $1^\circ 30'$  under no load
- 12 hour per day operation
- Service factor  $K_s$ : 1
- Speed factor  $K_v$ : 1
- No balancing

Bolt circle diameter  $H$   
Number of bolts  $L$   
Bolt diameter  $M$

AFC SIZE	Tt max. (daNm) at basic speed	Max. speed (rpm), grease lube	Max. speed (rpm), oil lube	Bore d (mm)			Dimensions (mm)										With d max. shrink fit	
				In stock	Max. key fit	Max. shrink fit	A	B	C	E	F	G1/G2	H	L	M	Weight kg	J Kg.m <sup>2</sup>	
42	150	5,150	6,950	12	42	35	116	82	60	3	67	55	100	6	7	3.1	0.004	
53	285	4,570	6,170	16	53	48	145	104	75	4	86	65	125	6	8	6.5	0.013	
65	465	4,170	5,620	20	65	60	175	124	93	5	101	75	150	8	10	10.6	0.030	
75	655	3,860	5,200	24	75	70	205	144	110	6	115	85	175	8	12	15	0.065	
90	1,065	3,580	4,830	28	90	80	230	166	126	7	130	95	200	10	12	21	0.113	
100	1,415	3,380	4,560	32	100	90	250	186	144	8	145	105	220	10	12	30	0.193	
115	1,905	3,190	4,300	36	115	100	280	208	161	9	158	115	245	12	14	36	0.298	
125	2,670	3,040	4,100	40	125	110	300	228	178	10	171	125	265	12	14	48	0.450	
140	3,740	2,870	3,870	44	140	125	335	256	200	10	188	138	295	12	16	61	0.670	
160	4,630	2,730	3,680	50	160	140	370	284	224	12	211	156	330	12	16	83	1.160	
180	6,115	2,600	3,510	56	180	160	400	312	246	14	236	175	355	12	18	115	1.900	
200	8,150	2,490	3,360	64	200	180	440	340	270	16	266	200	390	12	20	171	3.250	
220	11,450	2,350	3,170	72	220	200	495	382	302	18	299	225	440	12	22	237	6.000	
240	16,120	2,220	3,000	80	240	220	550	426	340	20	329	250	490	12	24	317	10.13	

Table 1: overall dimensions and data of AFC couplings

# AFX series



# AFX series

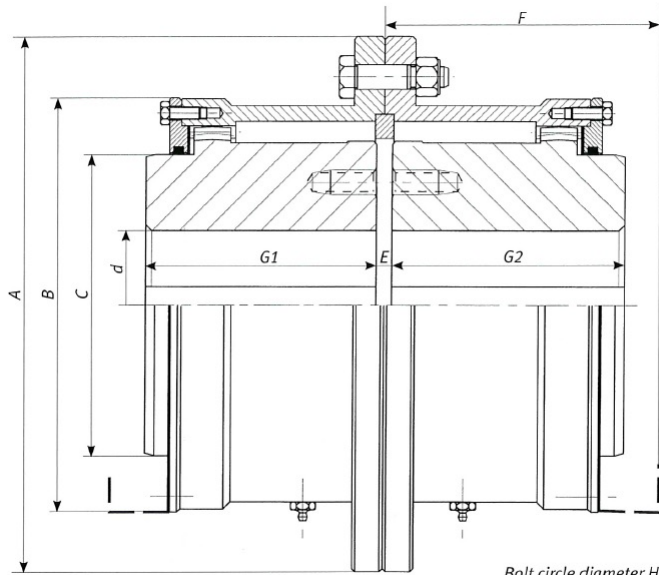
## Heavy-duty industrial

Primarily designed for heavy industries such as steel, aluminum, copper, rubber, sugar, this coupling has high torque capacity for applications requiring extreme loads.

It differs from the compact AFC series by its removable sleeve covers. This series enables connection to shafts of up to 900 mm diameter. The weight of such large couplings may exceed 10 tons.



# AFX series



Bolt circle diameter H  
Number of bolts L  
Bolt diameter M

The transmittable torques  $T_t$  have been calculated for:

- Misalignment: 0° 30' under load, 1° 30' under no load
- 12 hour per day operation
- Service factor  $K_s$ : 1
- Speed factor  $K_v$ : 1
- No balancing

AFX SIZE	Tt max. (daNm) at basic speed	Max. speed (rpm), grease lube	Max. speed (rpm), oil lube	Bore d (mm)				Dimensions (mm)									With d max. shrink fit	
				In stock	Max. key fit	Max. shrink fit	Max I&S std	A	B	C	E	F	G1/G2	H	L	M	Weight kg	J Kg.m <sup>2</sup>
30	295	4,550	6,130	12	50	50	40	150	114	70	3	75	60	125	6	8	7	0.015
40	440	4,170	5,620	16	65	60	50	180	132	88	4	84	68	150	8	10	11	0.035
50	725	3,840	5,180	20	80	70	60	210	157	108	5	98	80	175	8	12	18	0.077
60	1220	3,570	4,820	24	90	85	70	240	177	125	6	111	90	200	10	12	26	0.147
70	1605	3,360	4,530	28	100	95	80	260	195	141	7	126	105	220	10	12	34	0.230
80	2140	3,200	4,310	32	110	105	90	290	225	157	8	144	120	245	12	14	51	0.430
90	2,855	3,040	4,100	36	125	115	100	310	246	175	9	158	135	265	12	14	66	0.640
100	3,965	2,890	3,900	40	140	130	110	345	268	195	10	174	150	295	12	16	87	1.040
110	4,790	2,760	3,720	44	150	140	125	380	288	210	10	185	165	330	12	16	112	1.600
125	6,605	2,620	3,530	50	170	160	140	410	325	241	12	211	185	355	12	18	153	2.670
140	8,085	2,510	3,380	56	190	180	160	455	352	267	14	233	210	390	12	20	204	4.320
160	12,085	2,360	3,180	64	215	200	180	510	392	305	16	265	240	440	12	22	300	7.950
180	16,865	2,230	3,010	72	245	230	200	570	444	343	18	298	270	490	12	24	420	14.15
200	25,880	2,110	2,850	80	270	250	220	630	488	381	20	330	300	545	12	27	576	23.50
220	30,265	2,040	2,760	170	290	270	250	630	521	405	22	350	275	555	16	30	586	26.25
250	40,735	1,950	2,630	190	320	300	280	685	566	450	24	385	310	605	16	30	787	42.00
280	52,685	1,830	2,480	210	360	340	310	760	640	510	28	434	350	678	18	33	1,109	74.50
310	72,070	1,740	2,350	240	400	380	350	844	710	570	30	483	390	754	18	36	1,532	127.0
350	96,965	1,640	2,210	280	460	430	400	930	798	645	35	511	420	840	18	42	1,994	204.0
400	13,6715	1,550	2,080	320	520	485	450	1035	894	728	40	557	455	940	22	45	2,740	352.0
450	167,225	1,450	1,960	360	590	550	500	1,160	1,010	825	45	607	495	1,060	24	48	3,787	621.0
500	320,445	1,380	1,860	400	640	600	550	1,280	1,120	920	50	658	535	1,170	24	52	5,093	1,022

Table 2: overall dimensions of AFX couplings

# AFC and AFX coupling selection

# AFC and AFX coupling selection process

## Type of operation

If the application requires intensive use under high torque at low rotation speeds, or if it is governed by the French iron and steel industry standard, an AFX will be chosen. Otherwise, the choice will first go to an AFC.

## Max. bore diameter

The coupling size is often defined by the maximum bore diameter, but this condition is not sufficient—it is also absolutely necessary to verify the transmittable torque (tables 1 and 2).

## Rotation speed

For rotation speeds greater than those shown in tables 1 and 2, please contact a Lufkin Gears representative, who will orient your choice towards the appropriate solution.

## Speed factor $K_v$

Gear coupling capacities change according to the rotation speed. The slower the coupling rotates, the higher its capacities are. The transmittable torque is therefore increased or reduced depending on the use (tables 3 and 4).

## Service factor $K_s$

This factor takes account of the coupling environment. In the event of a 24 hour/day operation, the service factor shall be multiplied by 0.8 (table 5). The factor to be considered is that representing the most unfavorable operating characteristic (see selection example).

## Torque capacity verification

For an AFC or AFX coupling, the operating torque that can actually be transmitted,  $T$ , is defined by  $T = T_t \times K_s \times K_v$ .  $T$  shall be higher than the normal operating torque. The peak or accidental torque transmitted by an AFC or AFX coupling is at least twice the torque  $T$ .

## Misalignment

The higher misalignment, the fewer number of teeth in contact. The transmittable torques calculated with a misalignment of  $0^\circ 30'$  under load and  $1^\circ 30'$  under no load cover most coupling cases. If the coupling must work at a misalignment greater than  $0^\circ 30'$ , please contact a Lufkin Gears representative.

# AFC and AFX coupling corrective factors

AFC Size	Speed correction Kv - Speed (rpm)						
	50	100	200	500	1000	1500	3600
42	1.40	1.26	1.13	1.04	1.00	0.97	0.90
53	1.38	1.25	1.13	1.04	1.00	0.97	0.90
65	1.42	1.28	1.14	1.04	1.00	0.97	0.88
75	1.43	1.29	1.15	1.05	1.00	0.97	-
90	1.42	1.28	1.15	1.05	1.00	0.96	-
100	1.45	1.30	1.16	1.05	1.00	0.96	-
115	1.47	1.32	1.17	1.06	1.00	0.96	-
125	1.46	1.31	1.17	1.06	1.00	0.96	-
140	1.46	1.32	1.17	1.06	1.00	0.96	-
160	1.49	1.34	1.19	1.07	1.00	0.95	-
180	1.52	1.36	1.20	1.07	1.00	-	-
200	1.51	1.35	1.20	1.07	1.00	-	-
220	1.54	1.37	1.21	1.08	1.00	-	-
240	1.54	1.38	1.21	1.08	1.00	-	-

Table 3: speed correction for AFC

AFX Size	Speed correction Kv - Speed (rpm)						
	50	100	200	500	1000	1500	3600
30	1.35	1.23	1.12	1.04	1.00	0.97	0.90
40	1.37	1.25	1.13	1.04	1.00	0.97	0.89
50	1.40	1.27	1.14	1.05	1.00	0.97	-
60	1.40	1.27	1.14	1.05	1.00	0.97	-
70	1.43	1.29	1.15	1.05	1.00	0.96	-
80	1.45	1.31	1.16	1.06	1.00	0.96	-
90	1.48	1.32	1.18	1.06	1.00	0.96	-
100	1.47	1.32	1.18	1.06	1.00	0.96	-
110	1.47	1.32	1.18	1.06	1.00	0.96	-
125	1.50	1.34	1.19	1.07	1.00	-	-
140	1.53	1.36	1.20	1.07	1.00	-	-
160	1.52	1.36	1.20	1.07	1.00	-	-
180	1.55	1.38	1.22	1.08	1.00	-	-
	30	50	100	200	300	500	750
200	1.48	1.37	1.23	1.08	1.00	0.96	0.92
220	1.51	1.40	1.24	1.09	1.00	0.95	0.91
250	1.52	1.40	1.24	1.09	1.00	0.95	0.91
280	1.59	1.46	1.28	1.10	1.00	0.94	0.89
310	1.60	1.46	1.28	1.10	1.00	0.94	-
350	1.67	1.52	1.32	1.11	1.00	0.93	-
400	1.69	1.53	1.32	1.12	1.00	0.93	-
450	1.85	1.65	1.39	1.13	1.00	0.93	-
500	1.82	1.64	1.39	1.14	1.00	-	-
550	1.88	1.66	1.37	1.12	1.00	-	-
600	1.90	1.68	1.38	1.13	1.00	-	-
650	1.92	1.69	1.38	1.13	1.00	-	-

Table 4: speed correction for AFX

Factor Ks (for 12 hr/day operation)				
Operating characteristics of driven machine			Driving machine	
Shocks	Inertia	Tmax/Tn	Uniform operation	Non-uniform operation
No	Very light	< 1.5	1.00	0.80
Light	Light	< 2.0	0.89	0.71
Medium	Medium	< 2.5	0.80	0.62
Heavy	High	< 3.0	0.71	0.56

Table 5: service factor for AFC and AFX

# Selection example

Our custom coupling designs are all derived from the AFX and AFC standards.

They all present specific capability developed to match the most challenging conditions and very specific power transmission requirements.

The correct selection is an AFX 11/200 with 670 mm long spacer to I&S standard. In addition, the motor and gearbox side bore diameters (shrink fit) will have to be specified.

If the desired coupling is not found or if further information is required, please do not hesitate to contact a Lufkin Gears representative who will guide your choice and offer a customized coupling if necessary.

	Characteristics	Selection
<b>Application</b>	Iron and steel industry Speed 50 rpm Normal operating torque 20,000 daNm	AFX to I&S standard
<b>Coupling model</b>	With spacer (distance between shaft ends 650 mm)	Model 11
<b>Required bore diameter</b>	220 mm, motor side (shrink fit) 200 mm, gearbox side (shrink fit)	AFX 200
<b>Maximum operating speed</b>	50 rpm	Speed is less than max speed for a standard coupling Lubrication: grease Balancing: no
<b>Kv</b>	50 rpm for AFX 200	1.37
<b>Ks</b>	Electric motor No shicks Light inertia $T_{max}/T_n = 2.2$	0.80
<b>Torque verification</b>	$T = 19,945 \times 0.80 \times 1.37 = 21,860 \text{ daNm}$	Under these conditions, the torque that can be transmitted by the coupling is greater than the required normal operating torque: the coupling is suitable.

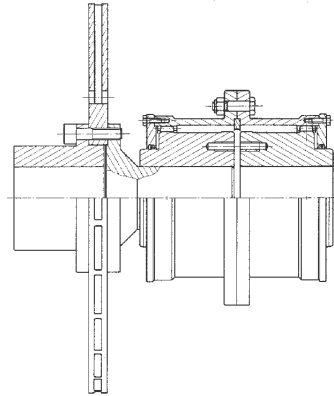
# Custom applications

# AFC and AFX custom applications

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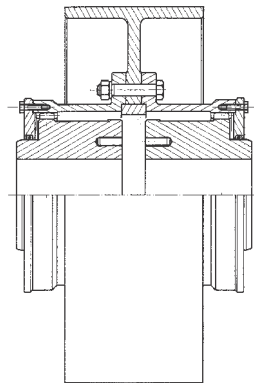
## Disc-brake coupling

- Fitted with a disk brake
- Used, for example, in hoist drive of overhead crane



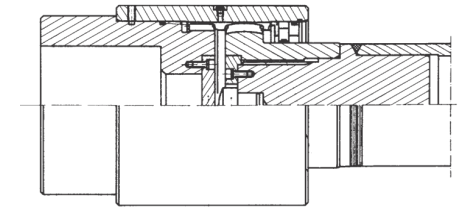
## Brake-wheel coupling

- Fitted with a handwheel brake
- Used, for example, in hoist drive of overhead crane



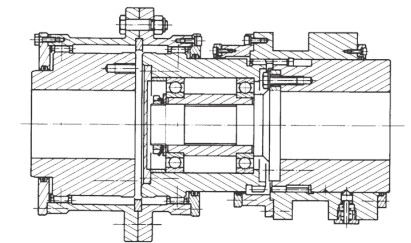
## AGD coupling with large misalignment capacity

- Provides an increased capability to deal with misalignment
- Used, for example, in mill roll drive



## Disengageable coupling

- Can be engaged or disengaged with the driver and the driven equipment
- Used, for example, as connection between tandem motors



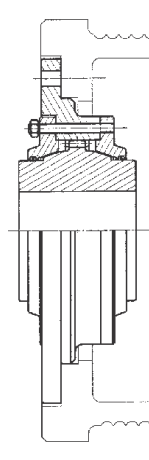


# AFC and AFX custom applications

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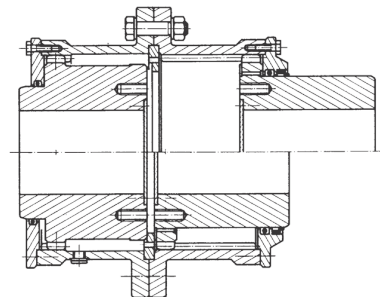
## AFR rope drum carrier coupling

- Used, for example, as connection between speed reducer and winch drum



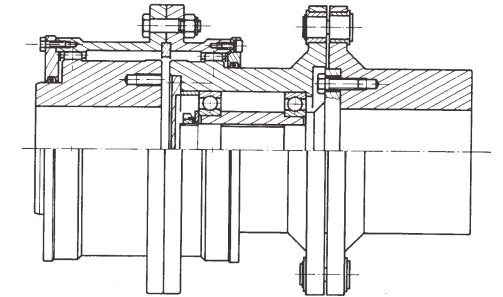
## AGV high speed coupling

- Designed for high-speed applications, for example, as connection between speed increaser/reducer gearbox and compressor or turbine



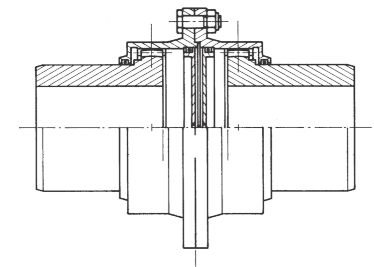
## Shear pin coupling

- Fitted with shear pins used as over-torque protection
- Used in any application where over torque can occur, for example, crusher or roll mill



## Telescopic coupling

- Fitted with a sliding capacity of the hub, enabling it to accommodate variable distance between shafts
- Used, for example, for hydrafiner drive in a paper mill



# Contact information

## New units & repairs

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