Quality products for Mechanical
& Fluid Power

06
22

CORRECT COUPLING SELECTION

delicate transmission

TO PACKING A PUNCH

highly flexible
to
rigid as . . .

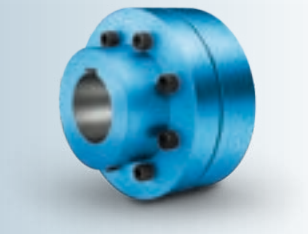
TECHNIQUES LIMITED

Flender Mechanical Power Transmission Couplings available from jbj Techniques

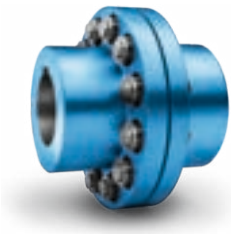
FLENDER

N-EUPEX®, RUPEX® and N-BIPEX®
Flexible Couplings

Flexible Flender couplings have a wide range of possible applications. A broad standard modular system as well as specially designed application specific couplings are available.



N-EUPEX
cam couplings
Rated torque: 19 Nm … 85,000 Nm



RUPEX
pin-and-bush couplings
Rated torque: 200 Nm … 1,300,000 Nm

N-BIPEX
cam couplings
Rated torque: 12 Nm … 1,300 Nm

ELPEX®, ELPEX-B® and ELPEX-S®
Highly Flexible Couplings

ELPEX® couplings are free of circumferential back-lash. Their damping capacity and low torsional stiffness make them especially well-suited for coupling machines with widely variable torque characteristics or large shaft misalignment.

ELPEX
elastic ring couplings
Rated torque: 1,600 Nm … 90,000 Nm

ELPEX-B
elastic tire couplings
Rated torque: 24 Nm … 14,500 Nm

ELPEX-S
rubber disk couplings
Rated torque: 330 Nm … 63,000 Nm

ZAPEX® gear couplings and ARPEX® all-steel couplings
Torsionally Rigid Couplings

For transmission of high torques, we offer both ARPEX all-steel disc couplings and ZAPEX gear couplings in a range of versions. The applications vary according to specific requirements, with respect to shaft misalignment, temperature and torque.

ZAPEX
gear couplings
Rated torque: 1,300 Nm … 7,200,000 Nm

ARPEX
high performance disc couplings
Rated torque: 1,000 Nm … 80,000 Nm

N-ARPEX and ARPEX
all-steel disc couplings
Rated torque: 92 Nm … 2,000,000 Nm

BIPEX-S® and SIPEX®
Backlash-Free Couplings

The vibration-damping, electrically insulating plug-in BIPEX-S elastomer couplings and SIPEX metal bellows couplings deliver especially accurate component positioning.

BIPEX-S and SIPEX
Rated torque: 0.1 Nm … 5,000 Nm

Hello and thank you for downloading this document from jbj Techniques Limited which aims to serve two purposes:

The first to provide a useful resource to assist in the correct selection of coupling type and then coupling size for your application.

The second is to introduce the range of Flender couplings now available from jbj Techniques since the official UK sole partnership agreement was announced 10 February 2021 (see page 28).

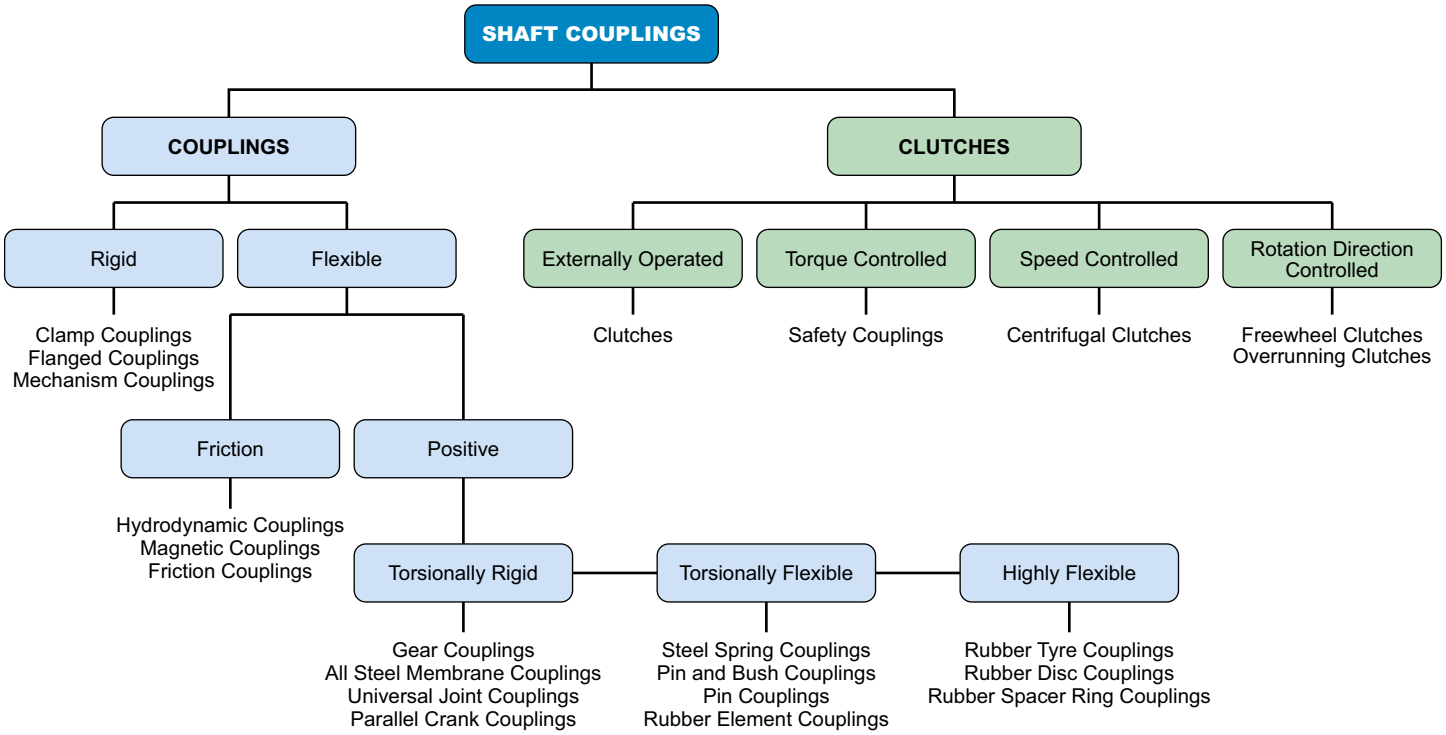
	Page
The reason for couplings	1 - 2
Shaft misalignment	3
Balancing	4 - 6
Shaft hub connections	6
Key to symbols & selection of coupling series	6
Standards	7
Formula symbols	8
Application factors	9 - 10
Quick reference selection grid	11 - 12
Coupling type selection	13
Coupling size selection	14 - 17
Fitting recommendations	18 - 21
Adverse conditions and ATEX	22 - 23
New double cardanic N-Eupex DK series	24 - 27
Flender announcement of UK partnership with jbj Techniques Limited	28
jbj Techniques Limited introduction	29 - 32

The mechanical drivetrain comprises individual units such as motor, gear unit and driven machine. The coupling connects these component assemblies. As well as the transmission of rotary motion and torque, other requirements may be made of the coupling.

» Compensation for shaft misalignment with low restorative forces.
» Control of characteristic angular vibration frequency and damping.
» Interruption or limitation of torque.
» Noise insulation and electrical insulation.

Couplings are frequently chosen after the machines to be connected have already been selected. Thanks to a large number of different coupling assembly options, specified marginal conditions for clearance and connection geometry can be met from the standard range. The coupling also performs secondary functions, e.g. providing a brake disk or brake drum for operating or locking brakes, the ability to measure rotational speed and options for the attachment of sprockets or pulleys.

Couplings are divided into two main groups, couplings and clutches.



Clutches interrupt or limit the transmissible torque. The engaging and disengaging forces on externally operated clutches are introduced via a mechanically, electrically, hydraulically or pneumatically operating mechanism. Overload, centrifugal or freewheel clutches draw their engaging energy from the transmitted output.

Rigid couplings, designed as clamp, flanged or mechanism couplings, connect machines whose shafts are perfectly aligned. Hydrodynamic couplings, also known as fluid or *Fottinger* couplings, are used on applications where there is a need to accelerate driven parts with high mass moment of inertia up to the required operating speed. In drive technology very often flexible, positive couplings, which may be designed to be torsionally rigid, torsionally flexible or highly flexible, are used.

Torsionally rigid couplings are designed to be rigid in a peripheral direction and flexible in radial and axial directions. The angle of rotation and torque are conducted through the coupling without a phase shift.

Torsionally flexible couplings have resilient elements usually manufactured from elastomer materials. Using an elastomer material with a suitable Shore*A* hardness provides the most advantageous torsional stiffness and damping for the application. Shaft misalignment causes the resilient elements to deform. Highly flexible couplings have large-volume (elastomer) resilient elements of low stiffness. The angle of rotation and torque are conducted through the coupling with a considerable phase shift.

This guide will help with the various considerations when choosing the most appropriate coupling for your application.

jbj Techniques Limited is an organisation that manufactures and integrates all the diverse components of a drivetrain providing the experience to help you select the best component combination for your application. Simple coupling-bellhousing-pump combinations, to mechanical drives for subsea wave energy, steel works crucible handling equipment or marine winch drives, jbj's team is recognised for its expertise in the selection and configuration of hydraulic and mechanical transmission systems.

Able to draw on an extensive product range that provides the building blocks for bespoke systems both large and small, jbj Techniques Limited offers a complete service, ranging from assessment of customer requirements to full technical backup, including product specification, CAD based system design, system build and certification. Moreover customers can take advantage of jbj's own machine-shop facilities and skilled engineers to guarantee quality and control costs.

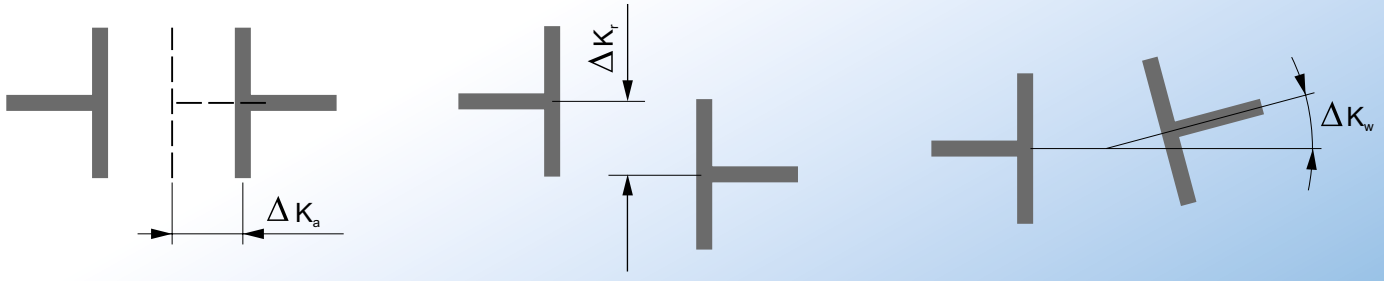
Based in Redhill, Surrey, U.K. assisting customers around the world.

- **product specification**
  team of design engineers to assist in design process, simple or complex, standard or bespoke.
- **prompt product supply**
  large stocks for next day delivery on many items.
- **machine shop**
  full machining services for bespoke designs.

jbj Techniques offers a high level of in-house expertise plus a huge selection of products to meet a very broad range of customer applications. From specification, through technical advice and manufacture to after-sales support jbj Techniques provides a comprehensive and valued service to the power transmission and hydraulics industries. The company fields a UK-wide team of technical sales engineers to ensure that the business is close to its customers, and it enjoys excellent associations with European & North American manufacturers, acting as sole UK distributor in many cases.

Contact
jbj Techniques Limited
for friendly help and advice
telephone: **+44 (0)1737 767493**
email: **info@jbj.co.uk**

Depending on the direction of the effective shaft misalignment a distinction is made between:



Axial misalignment **Radial misalignment** **Angular misalignment**

Shaft Misalignment

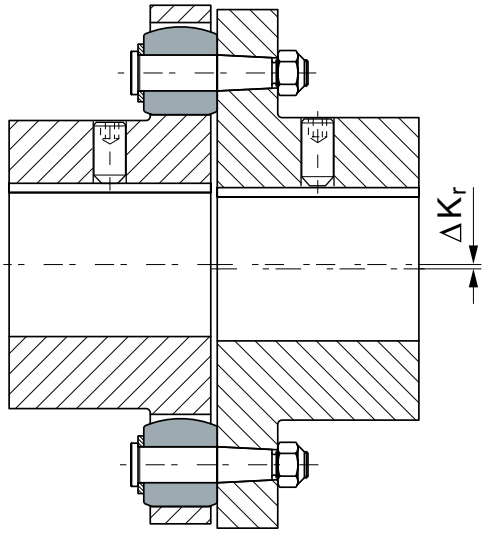
Shaft misalignment is the result of displacement during assembly and operation and where machines constructed with two radial bearings each are rigidly coupled causing high loads to be applied to the bearings. Elastic deformation of base frame, foundation and machine housing will lead to shaft misalignment which cannot be prevented, even by precise initial setup alignment. Furthermore, because individual components of the drive train heat up differently during operation, heat expansion of the machine housings causes shaft misalignment. Poorly aligned drives are often the cause of seal, rolling bearing or coupling failure. Alignment should be carried out by specialist personnel in accordance with operating instructions.

Couplings can be categorized into one of the following groups:

Single-Joint Couplings

Couplings with flexible elements mainly made of elastomer materials. Shaft misalignment results in deformation of the elastomer elements. The elastomer elements can absorb shaft misalignment as deformations in an axial, radial and angular direction. The degree of permissible misalignment depends on the coupling size, the speed and the type of elastomer element. Single-joint couplings do not require an adapter and are therefore short versions.

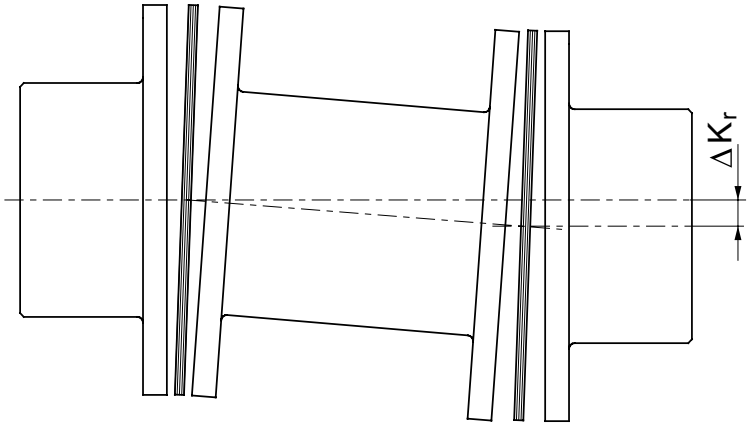
Example:
In the case of a RUPEX RWN 198 coupling with an outer diameter of 198 mm and a speed of 1500 rpm, the permitted radial misalignment is ΔKr = 0.3 mm.



Two-Joint Couplings

Two-joint couplings are always designed with an adapter. The two joint levels are able to absorb axial and angular misalignment. Radial misalignment occurs via the gap between the two joint levels and the angular displacement of the joint levels. The permitted angular misalignment per joint level is frequently about 0.5°. The permitted shaft misalignment of the coupling can be adjusted via the length of the adapter. If there are more than two joint levels, it is not possible to define the position of the coupling parts relative to the axis of rotation. (The less frequently used parallel-crank couplings are an exception).

Example:
N-ARPEX ARN-6 NEN 217-6 with a shaft distance of 140 mm with a permitted radial misalignment of
$\Delta Kr = 2.2$ mm (angle per joint level 1.0°).



Balancing

Balance quality levels

The so-called quality level G to DIN ISO 21940 indicates a range of permitted residual imbalance from zero up to an upper limit. Applications can be grouped on the basis of similarity analysis. For many applications a coupling balance quality of G 16 is sufficient. On drives susceptible to vibration the balance quality should be G 6.3. Only in special cases is a better balance quality required.

Balancing standard in accordance with DIN ISO 21940-32

Besides the required balance quality, it is necessary to set standards which define how the mass of the parallel key is to be taken into consideration when balancing. In the past, motor rotors have frequently been balanced in accordance with the full parallel key standard. The "appropriate" balance condition of the coupling hub was described as "balancing with open keyway" or "balancing after keyseating".
Today it is usual for the motor rotor, as well as the gear unit and driven machine shaft, to be balanced in accordance with the half parallel key standard.

Full parallel key standard

The parallel key is inserted in the shaft keyway, then balancing is carried out. The coupling hub must be balanced without parallel key after keyseating. Marking of shaft and hub with "F" (for "full").

Half parallel key standard

The balancing standard normally applied today. Before balancing, a half parallel key is inserted in the shaft and another in the coupling hub. Alternatively, balancing can be carried out before cutting the keyway. The balanced parts must be marked with an "H". This marking can be dispensed with if it is absolutely clear which parallel key standard has been applied.

No parallel key standard

Balancing of shaft and coupling hub after key seating, but without parallel key. Not used in practice. Marking of shaft and hub with "N" (for "no"). The length of the parallel key is determined by the shaft keyway. Coupling hubs may be designed considerably shorter than the shaft.

To prevent imbalance forces caused by projecting parallel key factors when balancing in accordance with the half parallel key standard, in the case of applications with high balancing quality requirements, grooved spacer rings can be fitted or stepped parallel keys used.

Flender Balancing Standard

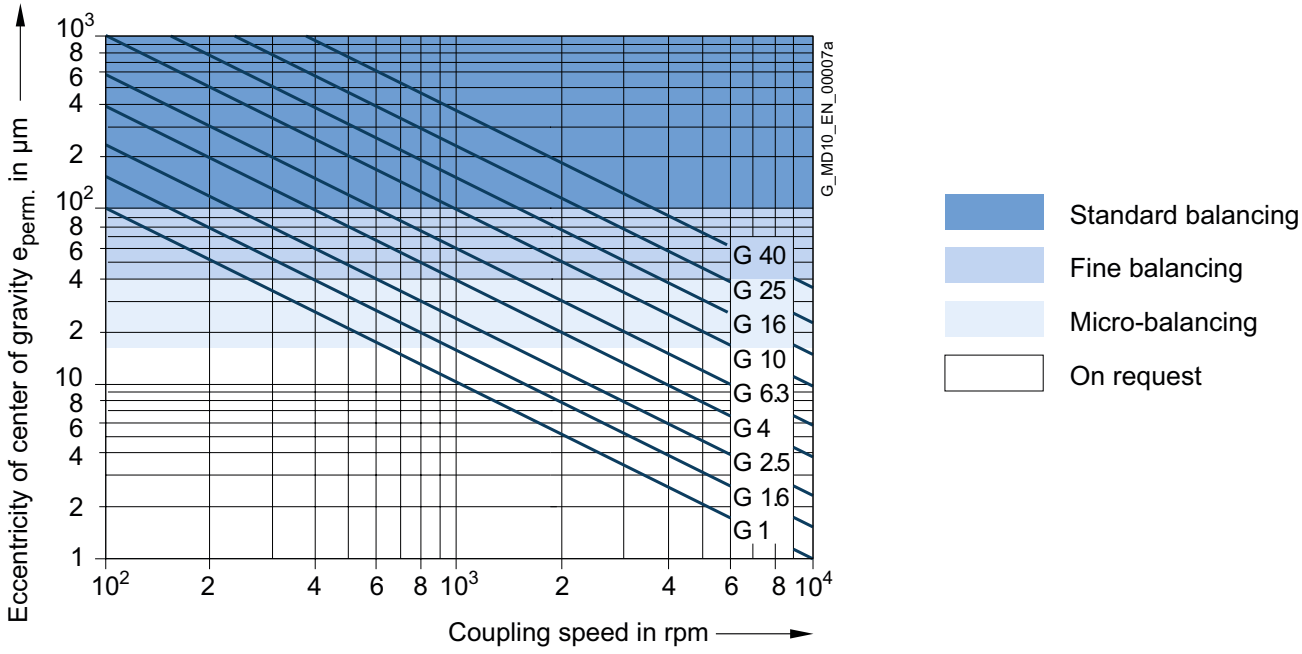
The balancing quality level, together with the operating speed, results in the maximum permissible eccentricity of the centre of gravity of the coupling or the coupling subassembly. In the Flender part number the balancing quality can be preset with the help of the definitive ordering code. Additionally, the balance quality level to DIN ISO 21940, can be preset in combination with the application operating speed.

$$e_{perm} = 9550 \cdot \frac{G}{n}$$

$$e_{coupl} \leq e_{perm}$$

Permitted eccentricity of center of gravity: **e_{perm} in µm**
Eccentricity of centre of gravity of coupling: **e_{coupl} in µm**
Balancing quality level: **G in mm/s**
Coupling speed: **n in rpm**

Eccentricity of centre of gravity of coupling e_{coupl}	Flender balancing quality	Order code
maximum 100 µm	standard balancing	without specification
maximum 40 µm	fine balancing	W02
maximum 16 µm	micro-balancing	W03
better than 16 µm	special balancing	on request



Example:
Coupling speed = 1450 rpm required balancing quality level G 6.3

$$e_{perm} = 9550 \cdot \frac{G}{n} = 9550 \cdot \frac{6.3\ \mu m}{1450}$$

Thus, the required eccentricity of centre of gravity is 41.5 µm. The fine balancing with a maximum eccentricity of centre of gravity of 40 mm fulfills this requirement; therefore, the order code W02 has to be specified when ordering.

For many applications the following balancing quality recommendation applies:

Coupling	standard balancing v = DA · n/19100	fine balancing
Short version with LG ≤ 3 x DA	v ≤ 30 m/s	v > 30 m/s
Long version with LG > 3 x DA	v ≤ 15 m/s	v > 15 m/s

Peripheral speed: **v in mm/s.**
Coupling outer diameter: **DA in mm.**
Coupling speed: **n in rpm.**
Coupling length: **LG in mm.**

The following standards on balancing must be observed:

- couplings are balanced in subassemblies.
- hub parts without finished bore are unbalanced.
- the number of balancing levels (one- or two-level balancing) is specified by Flender.
- without special specification, balancing is done in accordance with the half-parallel-key standard. Balancing in accordance with the full-parallel-key standard must be specified in the order number.
- FLUDEX, when operating at speeds up to 1800 rpm, are always balanced to DIN ISO 1940 G6.3. For higher speeds micro-balancing can be requested (Ordering code + W03 must be quoted). Balancing is made in accordance with the half parallel key standard and the 2 level system with 75% oil filling.
- ARPEX couplings are unbalanced as standard. This is due to the steel components being machined all over and adaptors being precisely located. This ensures standard balancing is always adhered to.

Shaft-hub connections

The shaft hub connections are determined by the design of the machine shaft. In the case of IEC standard motors, the shaft and key details are specified in accordance with DIN EN 50347. For diesel engines, the flywheel connections are generally specified to SAE J620d or DIN 6288 standards. The relevant coupling hub parallel bore and keyway dimensions are normally specified to DIN 6885. Splined bores to DIN 5480, DIN5482 and SAE standards are common.

The correct form of the coupling hub can only be determined when shaft details and application details are confirmed. In the case of the shaft – hub connection with parallel key, the coupling hub must be secured, e.g. either with a set screw or shaft end bolt and washer. The parallel key must also be secured against axial movement.

All Flender couplings with finish bore and keyway are supplied with a set screw, the exception being some of the Fludex series which are designed for use with end bolt and washer.

Please turnover for standards

Standards

Machines

2006/42/EG	EC Machinery Directive.
2014/34/EU	ATEX Directive – Manufacturer.
1999/92/EG	ATEX Directive – Operator – and ATEX Guideline to Directive 1999/92/EC.
DIN EN 80079-36	Non-electrical equipment for use in potentially explosive atmospheres.
DIN EN 1127	Explosive atmospheres, explosion prevention and protection.
DIN EN 50347	General-purpose three-phase induction motors having standard dimensions and outputs.

Couplings

DIN 740	Flexible shaft couplings Part 1 and Part 2.
VDI Guideline 2240	Shaft couplings - Systematic subdivision according to their properties VDI Technical Group Engineering Design 1971.
API 610	Centrifugal pumps for petroleum, chemical and gas industry services.
API 671	Special Purpose couplings for petroleum, chemical and gas industry services
ISO 10441	Petroleum, petrochemical and natural gas industries – Flexible couplings for mechanical power transmission special-purpose applications.
ISO 13709	Centrifugal pumps for petroleum, petrochemical and natural gas industries.

Balancing

DIN ISO 21940	Requirements for the balancing quality of rigid rotors.
DIN ISO 21940-32	Mechanical vibrations; standard governing the type of parallel key during balancing of shafts and composite parts.

Shaft-hub connections

DIN 6885	Driver connections without taper action – parallel keys – keyways.
SAE J620d	Flywheels for industrial engines.
DIN 6288	Reciprocating internal combustion engines. Dimensions and requirements for flywheels and flexible couplings.
ASME B17.1	Keys and keyseats.
DIN EN 50347	General-purpose three-phase induction motors with standard dimensions and output data.
BS 46-1:1958	Keys and keyways and taper pins specification.

Name	Symbols	Unit	Explanation
Torsional stiffness, dynamic	CT_{dyn}	Nm/rad	For calculating torsional vibration.
Excitation frequency	f_{err}	Hz	Excitation frequency of motor or driven machine.
Moment of inertia	J	kgm^2	Moment of inertia of coupling sides 1 and 2.
Axial misalignment	ΔK_a	mm	Axial misalignment of the coupling halves.
Radial misalignment	ΔK_r	mm	Radial misalignment of the coupling halves.
Angular misalignment	ΔK_w	°	Angular misalignment of the coupling halves.
Service factor	FB		Factor expressing the real coupling load as a ratio of the nominal coupling load.
Frequency factor	FF		Factor expressing the frequency dependence of the fatigue torque load.
Temperature factor	FT		Factor taking into account the reduction in strength of flexible rubber materials at a higher temperature.
Weight	m	kg	Weight of the coupling.
Rated speed	n_N	rpm	Coupling speed.
Maximum coupling speed	n_{Kmax}	rpm	Maximum permissible coupling speed.
Rated power	P_N	kW	Rated output on the coupling, usually the output of the driven machine.
Rated torque	T_N	Nm	Rated torque as nominal load on the coupling.
Fatigue torque	T_W	Nm	Amplitude of the dynamic coupling load.
Maximum torque	T_{max}	Nm	More frequently occurring maximum load, e.g. during starting.
Overload torque	T_{OL}	Nm	Very infrequently occurring maximum load, e.g. during short circuit or blocking conditions.
Rated coupling torque	T_{KN}	Nm	Torque which can be transmitted as static torque by the coupling over the period of use.
Maximum coupling torque	T_{Kmax}	Nm	Torque which can be frequently transmitted (up to 25 times an hour) as maximum torque by the coupling.
Coupling overload torque	T_{KOL}	Nm	Torque which can very infrequently be transmitted as maximum torque by the coupling.
Fatigue coupling torque	T_{KW}	Nm	Torque amplitude which can be transmitted by the coupling as dynamic torque at a frequency of 10 Hz over the period of use.
Resonance factor	V_R		Factor specifying the torque increase at resonance.
Temperature	T_a	°C	Ambient temperature of the coupling in operation
Damping coefficient	Ψ	psi	Damping parameter

The specified application factors are recommendations; regulations, rules and practical experience take priority as assessment criteria.

No application factor need be taken into account with FLUDEX couplings.

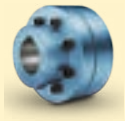
Example applications	Application factor FB
Electric motor without gear unit	
Centrifugal pumps	1.0
Piston pumps	1.5
Vacuum pumps	1.5
Fans with T_N less than 75 Nm	1.5
Fans with T_N from 75 to 750 Nm	1.75
Fans with T_N larger than 750 Nm	1.75
Blowers	1.5
Frequency converters /generators	1.25
Reciprocating compressors	1.75
Screw-type compressors	1.5
Internal-combustion engine without gear unit	
Generators	1.75
Pumps	1.5
Fans	1.75
Hydraulic pumps, excavators, construction machines	1.5
Compressors / screw-type compressors	1.5
Agricultural machinery	1.75
Other	
Turbine gear units	1.5
Hydraulic motor - gear unit	1.25
Electric motor with gear unit	
Chemical industry	
Extruders	1.5
Pumps - centrifugal pumps	1.0
Pumps - piston pumps	1.75
Pumps - plunger pumps	1.5
Reciprocating compressors	1.75
Calenders	1.5
Kneaders	1.75
Cooling drums	1.25
Mixers	1.25
Stirrers	1.25
Toasters	1.25
Drying drums	1.25
Centrifuges	1.25
Crushers	1.5
Power generation and conversion	
Compressed air, reciprocating compressors	1.75
Compressed air, screw-type compressors	1.25
Air - Blowers	1.5
Air - Cooling tower fans	1.5
Air - Turbine blowers	1.5
Generators, converters	1.25
Welding generators	1.25
Metal production, iron and steel works	
Plate tilters	1.5
Ingot pushers	1.75
Slabbing mill	1.75
Coiling machines	1.5
Roller straightening machines	1.5
Roller tables	1.75
Shears	1.75
Rollers	1.75
Metal working machines	
Plate bending machines	1.5
Plate straightening machines	1.5
Hammers	1.75
Planing machines	1.75
Presses, forging presses	1.75
Shears	1.5
Grinding machines	1.25
Punches	1.5
Machine tools: Main drives	1.5
Machine tools: Auxiliary drives	1.25

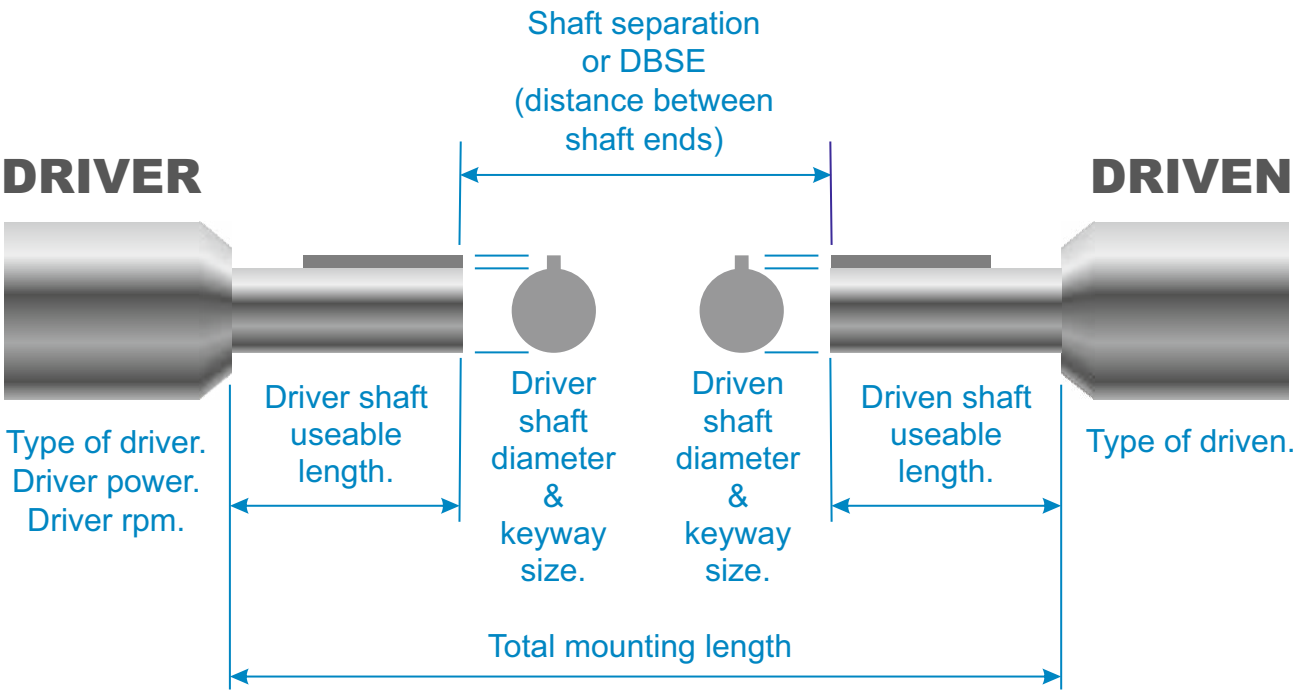
In the case of highly flexible couplings of the ELPEX, ELPEX-S and ELPEX-B series, deviating application factors are stated in the product descriptions.

FLUDEX couplings are mostly mounted on the high-speed gear shaft.

Example applications	Application factor FB
Food industry	
Filling machines	1.25
Kneading machines	1.5
Mashers	1.5
Sugar cane production	1.5
Production machines	
Construction machines, hydraulic pumps	1.25
Construction machines, traversing gears	1.5
Construction machines, suction pumps	1.5
Construction machines, concrete mixers	1.5
Printing machines	1.25
Woodworking - barking drums	1.5
Woodworking - planing machines	1.5
Woodworking - reciprocating saws	1.5
Grinding machines	1.5
Textile machines - winders	1.5
Textile machines - printing machines	1.5
Textile machines - tanning vats	1.5
Textile machines - shredders	1.5
Textile machines - looms	1.5
Packaging machines	1.5
Brick moulding machines	1.75
Transport and logistics	
Passenger transport - elevators	1.5
Passenger transport - escalators	1.5
Conveyor systems - bucket elevators	1.5
Conveyor systems - hauling winches	1.5
Conveyor systems - belt conveyors	1.5
Conveyor systems - endless-chain-conveyors	1.5
Conveyor systems - circular conveyors	1.5
Conveyor systems - screw conveyors	1.5
Conveyor systems - inclined hoists	1.5
Crane traversing gear	1.5
Hoisting gear	1.5
Crane lifting gear	2.0
Crane traveling gear	1.5
Crane slewing gear	1.5
Crane fly jib hoists	1.5
Cable railways	1.5
Drag lifts	1.5
Winches	1.5
Cellulose and paper	
Paper-making machines, all	1.5
Pulper drives	1.5
Cement industry	
Crushers	1.75
Rotary furnaces	1.5
Hammer mills	1.75
Ball mills	1.75
Pug mills	1.75
Mixers	1.5
Pipe mills	1.5
Beater mills	1.75
Separators	1.5
Roller presses	1.75

SELECTION CRITERION		 ZAPEX	 ARPEX	 N-ARPEX	 N-EUPEX
Torque Range	Rated coupling torque T_{KN} in Nm up to:	7,200,000	80,000	2,000,000	85,000
Speed Range	Peripheral speed v_{max} = DA • n_{max}/19100	60 m/sec	100 m/sec	108 m/sec	36 m/sec
Torque Load	uniform	✓	✓	✓	✓
	non uniform	✓	✓	✓	✓
	variable	✓	✓	✓	X
	widely variable	✓	✓	✓	X
Installation & Alignment	Rigid installation, well aligned	✓	✓	✓	✓
	Rigid installation, roughly aligned	✓	✓	✓	X
	Flexible installation	✓	✓	✓	X
Torsional Stiffness	Torsionally rigid	✓	✓	✓	X
	Torsionally flexible	X	On request	On request	✓
	Highly flexible	X	X	X	X
Torque Transmission	Free of torsional backlash	X	✓	✓	X
	Low torsional backlash	✓	X	X	X
	Overload capability	✓	✓	✓	✓
Assembly	Plug-in assembly	On request	X	X	✓
	with taper clamping bushes	X	On request	On request	On request
Maintenance	Wear parts easily disassembled	✓	✓	✓	✓
	Maintenance-free	X	✓	✓	X
	Low-maintenance - interval 1 year	✓	X	X	✓
Environment	ATEX approval	✓	✓	✓	✓
	Operating temperature range	-20 to +80 °C	-40 to +280 °C	-60 to +280 °C	-50 to +100 °C
	Chemically aggressive	On request	On request	On request	On request
Coupling Material	Cast iron	X	X	X	✓
	Steel	✓	✓	✓	X
	Stainless steel	X	On request	On request	X
Add-on Parts/types	Adapter	✓	✓	✓	✓
	Brake disk	✓	On request	On request	✓
	Brake drum	✓	On request	On request	✓
	Axial backlash limiter	✓	✓	✓	X
	Shiftgear	✓	On request	On request	X
	Flange type	On request	✓	✓	✓
	Flange to SAE J620d	On request	On request	On request	On request

 N-EUPEX DS	 N-EUPEX DK	 RUPEX	 N-BIPEX	 ELPEX-B	 ELPEX-S	 ELPEX	 BIPEX-S	 SIPEX
21,200	2300	1,300,000	4,650	14,500	63,000	90,000	1300	5,000
36 m/sec	36 m/sec	60 m/sec	45 m/sec	35 m/sec	66 m/sec	60 m/sec	25 m/sec	30 m/sec
✓	✓	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓	✓
X	X	✓	✓	✓	✓	✓	✓	✓
X	X	X	X	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓	✓
X	✓	X	X	✓	X	✓	X	✓
X	X	X	X	✓	X	On request	X	X
X	X	X	X	X	X	X	X	✓
✓	✓	✓	✓	X	X	X	✓	X
X	X	X	X	✓	✓	✓	X	X
X	X	On request	X	✓	X	✓	X	✓
X	X	✓	✓	X	✓	X	✓	X
X	✓	✓	✓	X	On request	✓	✓	✓
✓	✓	✓	✓	X	✓	X	✓	X
X	X	X	X	✓	✓	X	X	X
✓	✓	✓	X	✓	✓	✓	X	X
On request	X	X	X	X	X	X	X	✓
✓	✓	✓	✓	✓	✓	✓	✓	X
✓	✓	✓	✓	X	✓	X	✓	X
-30 to +80 °C	-50 to +100 °C	-50 to +100 °C	-50 to +100 °C	-50 to +70 °C	-40 to +120 °C	-40 to +80 °C	-50 to +120 °C	-30 to +120 °C
On request	On request	On request	On request	On request	On request	On request	On request	On request
✓	✓	✓	✓	✓	✓	✓	X	X
X	✓	✓	X	✓	✓	✓	✓	✓
X	X	On request	X	On request	X	X	X	✓
✓	X	On request	X	✓	On request	On request	X	X
X	X	✓	X	On request	On request	On request	X	X
X	X	✓	X	On request	On request	On request	X	X
X	X	On request	X	X	On request	On request	X	X
X	X	On request	X	X	On request	On request	X	X
X	X	✓	X	On request	✓	✓	X	X
X	X	On request	X	On request	✓	✓	X	X



Selection of the Coupling Series / Type

The coupling series is frequently determined by the driven machine and the design of the drivetrain. Common selection criteria are listed below and assigned to coupling properties, which are used to select the coupling series. Additionally, the price of the coupling and availability are important criteria for determining the coupling series to be used.

The FLUDEX series operates positively and transmits the torque with the aid of a flowing oil or water filling.

FLUDEX couplings are used to reduce starting and/or overload torques. During starting, the motor may, for example, run up within a very short time; because of the FLUDEX coupling, the drive train with the driven machine may accelerate after a delay and without increased torque load.

The FLUDEX coupling cannot compensate for shaft misalignment and is therefore designed in combination with a displacement coupling, a cardan shaft or a belt drive. The displacement coupling may be selected in accordance with the criteria described below.

Coupling Type	Torque Range Rated Coupling Torque T_{KN}	Speed Range Peripheral Speed $v_{max} = DA \cdot n_{max}/19100$	Torsionally Rigid	Torsionally Flexible	Highly Flexible	Operating Temperature Range
ZAPEX	850 ... 7,200,000 Nm	60 m/s	■	–	–	-20 ... +80 °C
N-ARPEX	350 ... 2,000,000 Nm	110 m/s	■	–	–	-50 ... +280 °C
ARPEX	92 ... 80,000 Nm	100 m/s	■	–	–	-40 ... +280 °C
N-EUPEX	19 ... 85,000 Nm	36 m/s	–	■	–	-50 ... +100 °C
N-EUPEX DS	19 ... 21,200 Nm	36 m/s	–	■	–	-30 ... +80 °C
RUPEX	200 ... 1,300,000 Nm	60 m/s	–	■	–	-50 ... +100 °C
N-BIPEX	12 ... 4,650 Nm	45 m/s	–	■	–	-50 ... +100 °C
ELPEX-B	24 ... 14,500 Nm	35 m/s	–	–	■	-50 ... +70 °C
ELPEX-S	330 ... 63,000 Nm	66 m/s	–	–	■	-40 ... +120 °C
ELPEX	1600 ... 90,000 Nm	60 m/s	–	–	■	-40 ... +80 °C

Selection of the Coupling Size

The torque load of the coupling must be determined from the output of the driven machine and the coupling speed.

Rated coupling load $T_N = 9550 \times P_N / n_N$
(T_N in Nm; P_N in kW; n_N in rpm)

The rated coupling load obtained in this way must be multiplied by factors and compared with the rated coupling torque. An ideal but expensive method is to measure the torque characteristic on the coupling. For this, Flender offers special adapters fitted with torque measuring devices.

The rated coupling torque T_{KN} is the continuous torque that can be transmitted when the load is applied statically and at room temperature.
Application factors are to express the deviation of the real coupling load from the "ideal" load condition.

Coupling Load in Continuous Operation

The operating principles of the driving and driven machines are divided into categories and the application factor FB derived from these in accordance with DIN 3990-1.
Application factor for N-EUPEX, N-EUPEX-DS, RUPEX, N-BIPEX, ELPEX-B, N-ARPEX, ARPEX, ZAPEX and FLUDEX

Application factor FB				
Torque characteristic of the driven machine	Torque characteristic of the driving machine			
	Uniform	Uniform	Variable	Widely Variable
uniform	1.0	1.25	1.5	1.75
uniform with moderate shock loads	1.25	1.5	1.75	2.0
non uniform	1.5	1.75	2.0	2.5

Examples of torque characteristic of driving machines:

uniform: Electric motors with soft starting, steam turbines.

uniform with moderate shock loads: Electric motors without soft starting, hydraulic motors, gas and water turbines.

non uniform: Internal-combustion engines.

Examples of torque characteristic in driven machines:

uniform: Generators, centrifugal pumps for light fluids.

uniform with moderate shock loads: Centrifugal pumps for viscous fluids, elevators, machine tool drives, centrifuges, extruders, blowers, crane drives.

non uniform: Excavators, kneaders, conveyor systems, presses, mills.

very rough: Crushers, excavators, shredders, iron/smelting machinery.

Temperature Factor FT											
Coupling	Elastomer Material	Low Temperature °C	Temperature T_a on the Coupling								
			under -30°C	-30°C up to 50°C	up to 60°C	up to 70°C	up to 80°C	up to 90°C	up to 100°C	up to 110°C	up to 120°C
N-EUPEX	NBR	-30	–	1.0	1.0	1.0	1.0	–	–	–	–
N-EUPEX	NR	-50	1.1[1)]	1.0	–	–	–	–	–	–	–
N-EUPEX	HNBR	-10	–	1.0	1.0	1.0	1.0	1.25	1.25	–	–
N-EUPEX DS	NBR	-30	–	1.0	1.0	1.0	1.0	–	–	–	–
RUPEX	NBR	-30	–	1.0	1.0	1.0	1.0	–	–	–	–
RUPEX	NR	-50	1.1	1.0	–	–	–	–	–	–	–
RUPEX	HNBR	-10	–	1.0	1.0	1.0	1.0	1.25	1.25	–	–
N-BIPEX	TPU	-50	1.0	1.0	1.0	1.0	1.0	1.0	1.0	–	–
ELPEX	NR	-40	1.1	1.0	1.25	1.40	1.60	–	–	–	–
ELPEX-B	NR	-50	1.1	1.0	–	–	–	–	–	–	–
ELPEX-B	CR	-15	–	1.0	1.0	1.0	–	–	–	–	–
ELPEX-S SN, NN, WN	NR	-40	1.1	1.0	1.25	1.40	1.60	–	–	–	–
ELPEX-S NX	VMQ	-40	1.1	1.0	1.0	1.0	1.0	1.1	1.25	1.4	1.6

[1)] The N-EUPEX coupling is not suitable for shock loads when used at low temperatures.

NR = natural rubber, natural-synthetic rubber mixture.
NBR = nitril-butadiene-rubber (Perbunan).
HNBR = hydrated acrylonitrile butadiene rubber.
CR = chloroprene rubber (FRAS fire-resistant and anti-static).
VMQ = silicone.
TPU = polyurethane.

Coupling size $T_{KN} \geq T_N \cdot FB \cdot FT$

In the case of ARPEX and ZAPEX coupling types, no temperature factor (FT = 1.0) need be taken into account.

Coupling Load at Maximum and Overload Conditions

The maximum torque is the highest load acting on the coupling in normal operation. Maximum torques at a frequency of up to 25 times an hour are permitted and must be lower than the maximum coupling torque.

Examples of maximum torque conditions are:

Starting operations, stopping operations or usual operating conditions with maximum load.

$T_{Kmax} \geq T_{Max} \cdot FT$

Overload torques are maximum loads which occur only in combination with special, infrequent operating conditions. Examples of overload torque conditions are: Motor short circuit, emergency stop or stalling because of component breakage. Overload torques at a frequency of once a month are permitted and must be lower than the maximum overload torque of the coupling. The overload condition may last only a short while, i.e. fractions of a second.

$T_{KOL} \geq T_{OL} \cdot FT$

Coupling Load Due to Dynamic Torque Load

Applying the frequency factor FF, the dynamic torque load must be lower than the coupling fatigue torque.

Dynamic torque load
$T_{KW} \geq T_W \cdot FF$

Frequency of the dynamic torque load
$f_{err} \leq 10$ Hz frequency factor FF = 1.0

Frequency of the dynamic torque load
$f_{err} > 10$ Hz frequency factor FF = $\sqrt{(f_{err}/10\ Hz)}$

For the ZAPEX and ARPEX series, the frequency factor is always FF = 1.0.

Selection of the Coupling Size

Checking the maximum speed

For all load situations $n_{Kmax} \geq n_{max}$

Checking Permitted Shaft Misalignment

For all load situations, the actual shaft misalignment must be less than the permitted shaft misalignment.

Checking Bore Diameter, Mounting Geometry and Coupling Design

The check must be made on the basis of the dimension tables. The maximum bore diameter applies to parallel keyways to DIN 6885. For other keyway geometries, the maximum bore diameter can be reduced. On request, couplings with adapted geometry can be provided.

Coupling Behaviour Under Overload Conditions

The ZAPEX, N-ARPEX, ARPEX, N-EUPEX, RUPEX and N-BIPEX coupling series can withstand overloads until the breakage of metal parts. These coupling series are designated as fail-safe.
The N-EUPEX DS, ELPEX-B, ELPEX-S and ELPEX coupling series throw overload. The elastomer element of these couplings is irreparably damaged without damage to metal parts when subjected to excessive overload. These coupling series are designated as non-fail-safe. These types that fail can be fitted with a so-called fail-safe device. This additional component enables emergency operation, even after the rubber element of the coupling has been irreparably damaged.

Checking Shaft-Hub Connection

The torques specified in the tables of power ratings data of the coupling series do not necessarily apply to the shaft hub connection. Depending on the shaft-hub connection, proof of form stability is required. It is recommended that the following standards are used to ensure proof of form strength is obtained.

Shaft-hub connection	Suggestion for calculation method
Keyway connection to DIN 6885-1	DIN 6892
Shrink fit	DIN 7190
Spline to DIN 5480	
Bolted flange connection	VDI 2230
Flange connection with close-fitting bolts	

Fitting recommendations for the shaft-hub connection are detailed within the following pages.
The coupling hub is normally fitted flush with the shaft end face. If the shaft protrudes care must be taken to ensure that other coupling parts do not clash. If the shaft is set back, the correct positioning of the hub must be checked to confirm sufficient shaft-hub engagement exists and that there is sufficient load bearing capacity. If the bearing hub length is insufficient, restorative forces may cause wear and possible axial displacement. Also, care must be taken to ensure sufficient parallel shaft or key length exists.

Checking Low Temperature and Chemically Aggressive Environment
The minimum permitted coupling temperature is specified in the Temperature factor FT table (page 15). In the case of chemically aggressive environments, please consult jbj Techniques technical office, telephone 01737 767493 or email: info@jbj.co.uk.

Features of the Flender Product Range.

Couplings	Features of Standard Type
All coupling series except ARPEX clamping hubs and FLUDEX with keyway to ASME B17.1	Bore tolerance H7
N-ARPEX and ARPEX clamping hubs	Bore tolerance H6
FLUDEX couplings with keyway to ASME B17.1	Hollow shafts: bore tolerance K7 other parts: Bore tolerance M7
All coupling series with bore imperial bore diameter	Parallel keyway to ASME B17.1
Metric bore diameter for ZAPEX, N-ARPEX and ARPEX coupling series as well as coupling hubs with applied brake disks or brake drums of the N-EUPEX and RUPEX series.	Parallel keyway to DIN 6885-1 keyway width P9
Metric bore diameter for N-EUPEX, RUPEX, N-BIPEX, ELPEX-S, ELPEX-B ELPEX, FLUDEX coupling series.	Parallel keyway to DIN 6885-1 keyway width JS9
All coupling series except FLUDEX	Axial locking by means of set screw
FLUDEX coupling series	Axial lock by means of set screw or end washer
All coupling series	Balancing in accordance with half parallel key standard
ZAPEX, N-ARPEX, ARPEX, N-EUPEX, RUPEX, N-BIPEX, ELPEX-S, ELPEX-B and ELPEX coupling series	Balancing quality G16
FLUDEX coupling series	Balancing quality G6.3
All series	Unpainted
All series	Preservation with cleaning emulsion
FLUDEX couplings	Fuse 140 °C

Fitting Recommendations

For most applications, the fit tolerances m6/H7 are normally acceptable, alternatively as the following tabulation.

Description	Application	Shaft tolerance	Bore tolerance
Sliding fit with parallel key connection not suitable for reversing operation.	For steel and cast hubs	j6	H7
		h6	J7
Press fit with parallel key connection not suitable for reversing operation.	For steel and cast hubs	h6	K7
		k6	H7
Interference fit with parallel key connection suitable for reversing operation.	For steel and cast hubs	m6	H7
		n6	H7
		h6	M7
	Only for steel hubs Preferred for ZAPEX and ARPEX coupling series.	h6	P7
		k6	M7
		m6	K7
		n6	J7
		p6	H7
		s6	F7
Shrink fit connection without parallel key.	Only for steel hubs The permitted hub tension must be urgently checked.	u6	H6
		v6	H6
		x6	H6

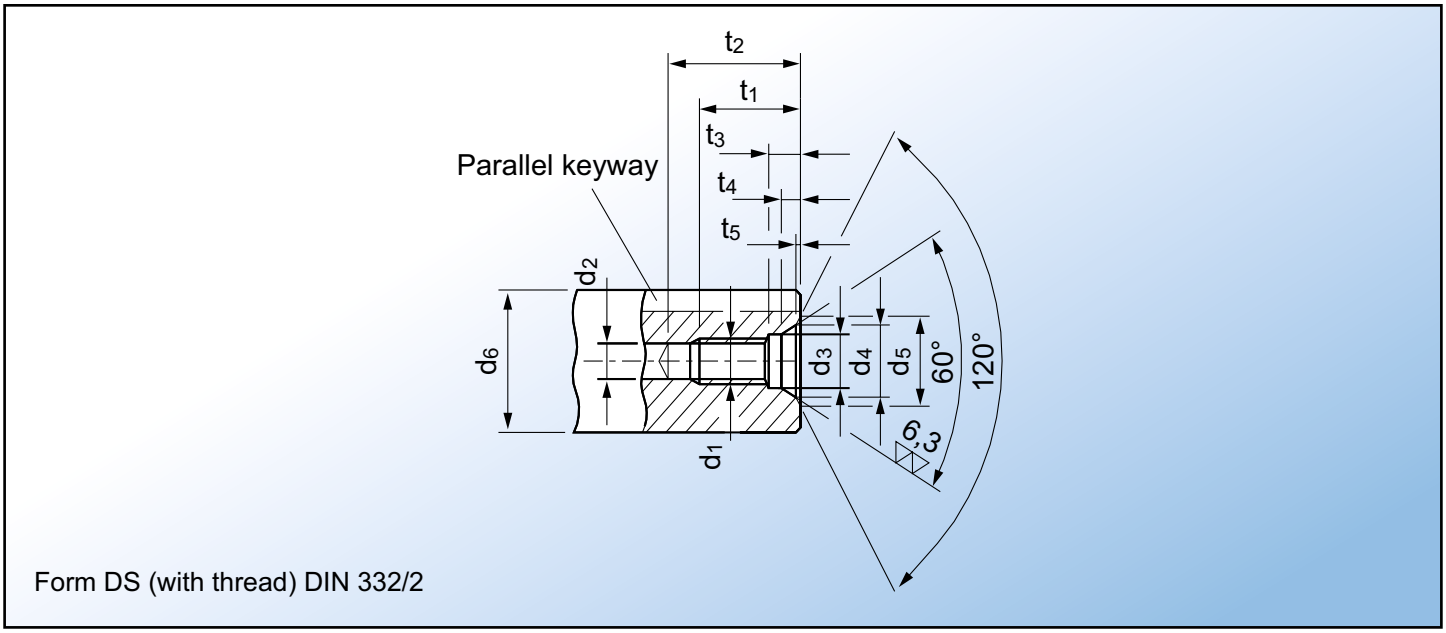
Tolerance Table to DIN ISO 286 for Above-Mentioned Fits for Bore Diameters from 10 to 250 mm

Bore Diameter		Tolerances in µm											
		Bore						Shaft					
Above	Up to	F7	H7	J7	K7	M7	P7	h6	j6	k6	m6	n6	p6
10	18	+34	+18	+10	+6	0	-11	0	+8	+12	+18	+23	+29
		+16	0	-8	-12	-18	-29	-11	-3	+1	+7	+12	+18
18	30	+41	+21	+12	+6	0	-14	0	+9	+15	+21	+28	+35
		+20	0	-9	-15	-21	-35	-13	-4	+2	+8	+15	+22
30	50	+50	+25	+14	+7	0	-17	0	+11	+18	+25	+33	+42
		+25	0	-11	-18	-25	-42	-16	-5	+2	+9	+17	+26
50	80	+60	+30	+18	+9	0	-21	0	+12	+21	+30	+39	+51
		+30	0	-12	-21	-30	-51	-19	-7	+2	+11	+20	+32
80	120	+71	+35	+22	+10	0	-24	0	+13	+25	+35	+45	+59
		+36	0	-13	-25	-35	-59	-22	-9	+3	+13	+23	+37
120	180	+83	+40	+26	+12	0	-28	0	+14	+28	+40	+52	+68
		+43	0	-14	-28	-40	-68	-25	-11	+3	+15	+27	+43
180	250	+96	+46	+30	+13	0	-33	0	+16	+33	+46	+60	+79
		+50	0	-16	-33	-46	-79	-29	-13	+4	+17	+31	+50

Cylindrical Shaft Ends, Extract from DIN 748 Part 1 (long)

Diameter in mm																					
	24	25	28	30	32	35	38	40	42	45	48	50	55	60	65	70	75	80	85	90	95	100
ISO tolerance zone	k6												m6									
End length in mm	50	60		80				110					140					170				210

Central Holes According to DIN 332 Part 2



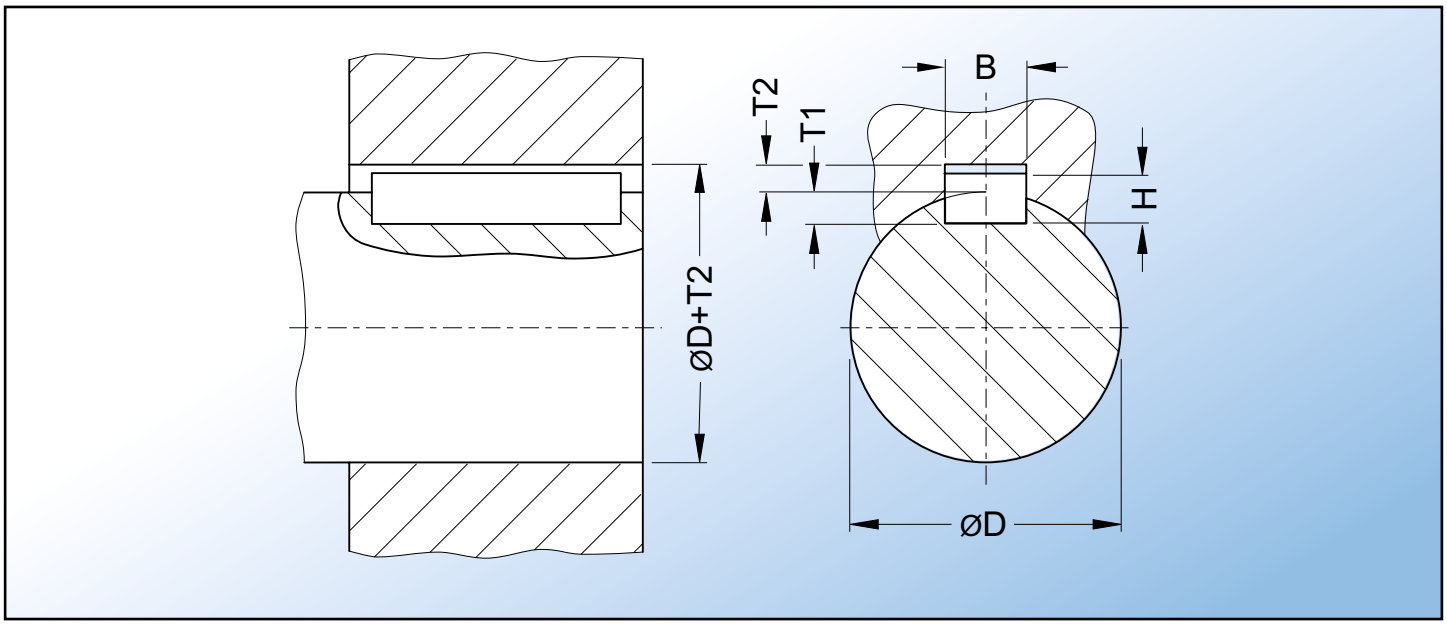
Form DS (with thread) DIN 332/2

Recommended diameter ranges d_6 [1]		DS form dimensions									
above	up to	d1	d_2 [2]	d3	d4	d5	t1 +2	t2 min.	t3 +1	t4 approx.	t5 approx.
7	10	M3	2.5	3.2	5.3	5.8	9	12	2.6	1.8	0.2
10	13	M4	3.3	4.3	6.7	7.4	10	14	3.2	2.1	0.3
13	16	M5	4.2	5.3	8.1	8.8	12.5	17	4	2.4	0.3
16	21	M6	5	6.4	9.6	10.5	16	21	5	2.8	0.4
21	24	M8	6.8	8.4	12.2	13.2	19	25	6	3.3	0.4
24	30	M10	8.5	10.5	14.9	16.3	22	30	7.5	3.8	0.6
30	38	M12	10.2	13	18.1	19.8	28	37	9.5	4.4	0.7
38	50	M16	14	17	23	25.3	36	45	12	5.2	1.0
50	85	M20	17.5	21	28.4	31.3	42	53	15	6.4	1.3
85	130	M24	21	25	34.2	38	50	63	18	8	1.6
130	225	M30 [3]	26.5	31	40.2	44.6	60	77	22	8	1.9
225	320	M36 [3]	32	37	49.7	55	74	93	22	11	2.3
320	500	M42 [3]	37.5	43	60.3	66.6	84	105	26	15	2.7

[1] Diameter refers to the finished workpiece.
[2] Tap hole drill diameter according to DIN 336 Part 1.
[3] Dimensions not according to DIN 332 Part 2.

Parallel Key Connections to DIN 6885-1

For moderate operating conditions, the hub keyway tolerance JS9 is recommended. In harsh operating conditions or during reversing operation, the keyway width tolerance P9 should be used. With two parallel keyways, the keyway width tolerance JS9 should be specified in order to simplify the assembly. The shaft keyway width has to be specified with the tolerance N9.



Diameter		Keyway width	Parallel key height	Shaft keyway depth	Hub keyway depth	Deviation for shaft & hub keyway depth	Deviation table for keyway width B	
above D mm	up to D mm	B mm	H mm	T1 mm	T2 mm	mm	JS9 µm	P9 µm
6	8	2	2	1.2	1	+0.1	+12.5	-6
							-12.5	-31
8	10	3	3	1.8	1.4	+0.1	+12.5	-6
							-12.5	-31
10	12	4	4	2.5	1.8	+0.1	+15	-12
							-15	-42
12	17	5	5	3	2.3	+0.1	+15	-12
							-15	-42
17	22	6	6	3.5	2.8	+0.1	+15	-12
							-15	-42
22	30	8	7	4	3.3	+0.2	+18	-15
							-18	-51
30	38	10	8	5	3.3	+0.2	+18	-15
							-18	-51
38	44	12	8	5	3.3	+0.2	+21.5	-18
							-21.5	-61
44	50	14	9	5.5	3.8	+0.2	+21.5	-18
							-21.5	-61
50	58	16	10	6	4.3	+0.2	+21.5	-18
							-21.5	-61

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Diameter		Keyway width	Parallel key height	Shaft keyway depth	Hub keyway depth	Deviation for shaft & hub keyway depth	Deviation table for keyway width B	
above D mm	up to D mm	B mm	H mm	T1 mm	T2 mm	mm	JS9 µm	P9 µm
58	65	18	11	7	4.4	+0.2	+21.5	-18
							-21.5	-61
65	75	20	12	7.5	4.9	+0.2	+26	-22
							-26	-74
75	85	22	14	9	5.4	+0.2	+26	-22
							-26	-74
85	95	25	14	9	5.4	+0.2	+26	-22
							-26	-74
95	110	28	16	10	6.4	+0.2	+26	-22
							-26	-74
110	130	32	18	11	7.4	+0.2	+31	-26
							-31	-88
130	150	36	20	12	8.4	+0.3	+31	-26
							-31	-88
150	170	40	22	13	9.4	+0.3	+31	-26
							-31	-88
170	200	45	25	15	10.4	+0.3	+31	-26
							-31	-88
200	230	50	28	17	11.4	+0.3	+31	-26
							-31	-88
230	260	56	32	20	12.4	+0.3	+37	-32
							-37	-106
260	290	63	32	20	12.4	+0.3	+37	-32
							-37	-106
290	330	70	36	22	14.4	+0.3	+37	-32
							-37	-106
330	380	80	40	25	15.4	+0.3	+37	-32
							-37	-106
380	440	90	45	28	17.4	+0.3	+43.5	-37
							-43.5	-124
440	500	100	50	31	19.4	+0.3	+43.5	-37
							-43.5	-124

Corrosion Protection

Depending on the environmental conditions, suitable corrosion protection must be specified for the coupling. Unless otherwise specified in the order, steel and cast iron surfaces are shipped with a simple preservative.

Ambient Conditions

Because of the environment, the coupling has to meet a large number of additional requirements. Couplings must be as suitable for use in a potentially explosive environment as for use at a high or low ambient temperature. The environment may be defined as chemically aggressive or be subject to laboratory conditions or requirements of food manufacture.

The following applies to products shown within this brochure which are suitable for intended use in potentially explosive atmospheres.

ATEX and EC Machinery Directive

Wherever a potentially explosive environment cannot be ruled out, the machinery used must meet special conditions in order to prevent the outbreak of fire as far as possible. Within the European Union, Directive 94/9/EC applies to these applications. This directive, harmonizes the individual states' legal requirements for explosion prevention and clearly defines the procedure for checking and circulating machines and parts. Whether or not a machine is used in potentially explosive atmospheres, the manufacturer is required under EC Machinery Directive 2006/42/EC to assess and as far as possible prevent hazards which may arise from his product.

The operator has an obligation to ascertain whether an environment is potentially explosive. Details of this are laid down in Directive 1999/92/EC.

The manufacturer is responsible for ensuring that the product is safe as defined in the EC Machinery Directive and conforms to Directive 94/9/EC if the EX requirement is specified by the operator.
The drive train mostly comprises individual pieces of equipment which are put together to form a subassembly. If the individual pieces of equipment, such as motor, coupling, gear unit or driven machine conform to Directive 94/9/EC, the manufacturer of the overall unit can limit the risk assessment to the additional hazards which arise from the combination of different individual pieces of equipment. The hazards which can arise from the individual pieces of equipment are assessed by the relevant suppliers.

The Directive 2014/34/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to equipment and protective systems intended for use in potentially explosive atmospheres will supersede the Directive 94/9/EC of 23 March 1994 with effect from 20 April 2016.

The following applies to the products shown in this brochure with a suitable for intended use in potentially explosive atmospheres:

- **Products placed on the market before 20 April 2016 meet the requirements of Directive 94/9/EC.**
- **Products placed on the market from 20 April 2016 meet the requirements of Directive 2014/34/EC.**

The coupling series suitable for use in potentially explosive environments are marked with EX in the catalogue.

FLENDER couplings are to be rated as components according to the new EC Machinery Directive 2006/42/EC.
Therefore, Flender do not issue a declaration of incorporation for these products.

Overload Conditions

Overload conditions are operating conditions that go beyond the limit loads of the coupling. Overload conditions may occur

under abnormal operating conditions, e.g. drive blockage, short circuit or supply deviations, as well as under normal operating conditions, e.g. during starting or breaking. Particularly in the case of high mass moments of inertia of the driven machine, torques that are a multiple of the motor starting torque may become effective during direct starting or star-delta starting. Overload conditions may damage not only the coupling but also the entire drive train.

Overload conditions can frequently be prevented with special design measures. SIRIUS soft starters or SINAMICS frequency converters are suitable for considerably reducing starting torques of asynchronous motors. If drive blockages and overloads of the driven machine cannot be ruled out, torque limiting SECUREX couplings can prevent damage to the drive train.

Coupling Behaviour Under Overload Conditions

Coupling behaviour under overload where the torque is considerably above the limits of use of the coupling concerned is determined by the engineering design of the coupling series.

The ZAPEX, ARPEX, N-ARPEX, N-EUPEX, RUPEX and N-BIPEX coupling series can withstand overloads until the breakage of metal parts.

These coupling series are designated as fail-safe. Coupling types which can withstand overload, i.e. fail-safe types, are used e.g. in crane systems. In case of coupling breakage due to overloads, the splintering metall parts may cause injury to persons and property damages.

The N-EUPEX DS, ELPEX-B, ELPEX-S and ELPEX coupling series throw overload. The elastomer element of these couplings are irreparably damaged without damage to the metal parts when subjected to excessive overload. These coupling series are designated as non-fail-safe. The types that fail can be fitted with a failsafe device. This component enables emergency operation, even after the rubber element of the coupling has been irreparably damaged.

The fluid couplings of the FLUDEX series withstand a load for a short time. Persistent overload causes the FLUDEX coupling to heat up beyond limits, causing the fuse to operate and so emptying the coupling and interrupting the torque transmission. Torsional and bending vibrations On drives which are prone to torsional and bending vibrations, measurements or calculations such as natural frequency calculations, torsional vibration simulations or bending vibration calculations are necessary.

The drive train may, depending on complexity, be regarded as a two-mass vibration-generating system or N-mass vibration-generating system. The vibration-generating masses are defined by the rotating bodies and the couplings by the coupling stiffness and shaft stiffness. The effect of torsional vibration excitations on the behaviour of the system is calculated.

Torsional vibration excitations may occur during the starting of an asynchronous motor, during a motor short circuit or in diesel engine drives. Bending vibrations may be critical if the coupling is insufficiently balanced and/or at an operating speed close to the critical speed.

The details needed for calculating torsional vibration are specified in the coupling catalogue:

- Dynamic torsional stiffness
- Damping (specification of the damping coefficient ψ or Lehr's damping $D = \psi/4\pi$).
- Mass moment of inertia of the coupling halves.

Torsionally Flexible Couplings

N-EUPEX SERIES: A PROVEN STANDARD AT A NEW LEVEL!

A new type,

N-EUPEX DK

added to the modular principle of N-EUPEX with performance & bore capacity of all types increased.

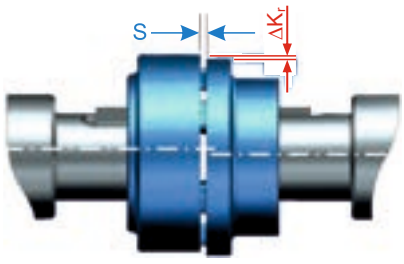
NEW TYPE: N-EUPEX DK

Double-cardanic system

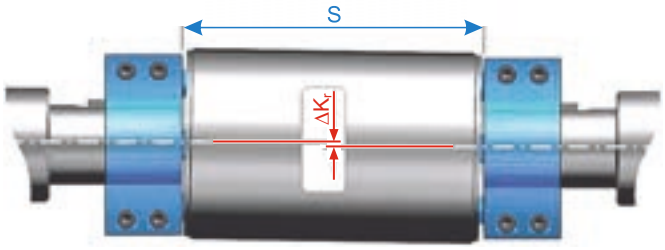
With the new double-cardanic design, the coupling compensates for not only a greater range of shaft angular offsets, but also a considerably greater radial offset so that shaft ends can be connected where that offers the drive greater protection. With this two-joint version, compensation for the radial offset that occurs between the shaft ends is enabled by a corresponding angle of inclination in the elastomer joints. This increases the range of possible radial offset by more than a multiple of four. Especially with pump applications where shaft ends that are not 100% in alignment present a significant problem. In this case, the N-EUPEX DK provides a solution for many

Suitable for use in potentially explosive areas ATEX certification on request

problems because, depending on the coupling length and size, it enables compensation for a radial offset of up to 3 millimetres. Furthermore, in contrast to the previous N-EUPEX, the new coupling type "DK" makes use of not just one, but two series of elastomer elements, which guarantees increased damping over the entire drive train. In addition, due to the double-cardanic design, significantly lower restoring forces are generated. The high ratio of shaft and joint clearance also decreases the restoring forces. Depending on size, offset and installation dimensions, the restoring forces decrease



N-EUPEX single joint coupling



Double-cardanic system of the N-EUPEX DK

by more than half. The result is a lower load on the shafts along with a lower load on the bearings. This is advantageous especially with smaller diameter shafts, which can be damaged due to the wrong coupling design or improper installation, even up to the breakage point. The spacer, made of aluminum with a joined pocket part made of gray cast iron, comes in standard increments for shaft spacing from 100 mm to 250 mm, so its length can be adapted to the customer's design.

www.jbj.co.uk/n-eupex.html#DK

Flender has succeeded in increasing both the performance and the bore capacity of the entire N-EUPEX series by nearly one-third. As a result, users benefit from greater torque, higher rotation speeds and a reduction in coupling size. The N-EUPEX series has proven itself for decades as a standard solution, and it has now been elevated to a new level of connector technology.

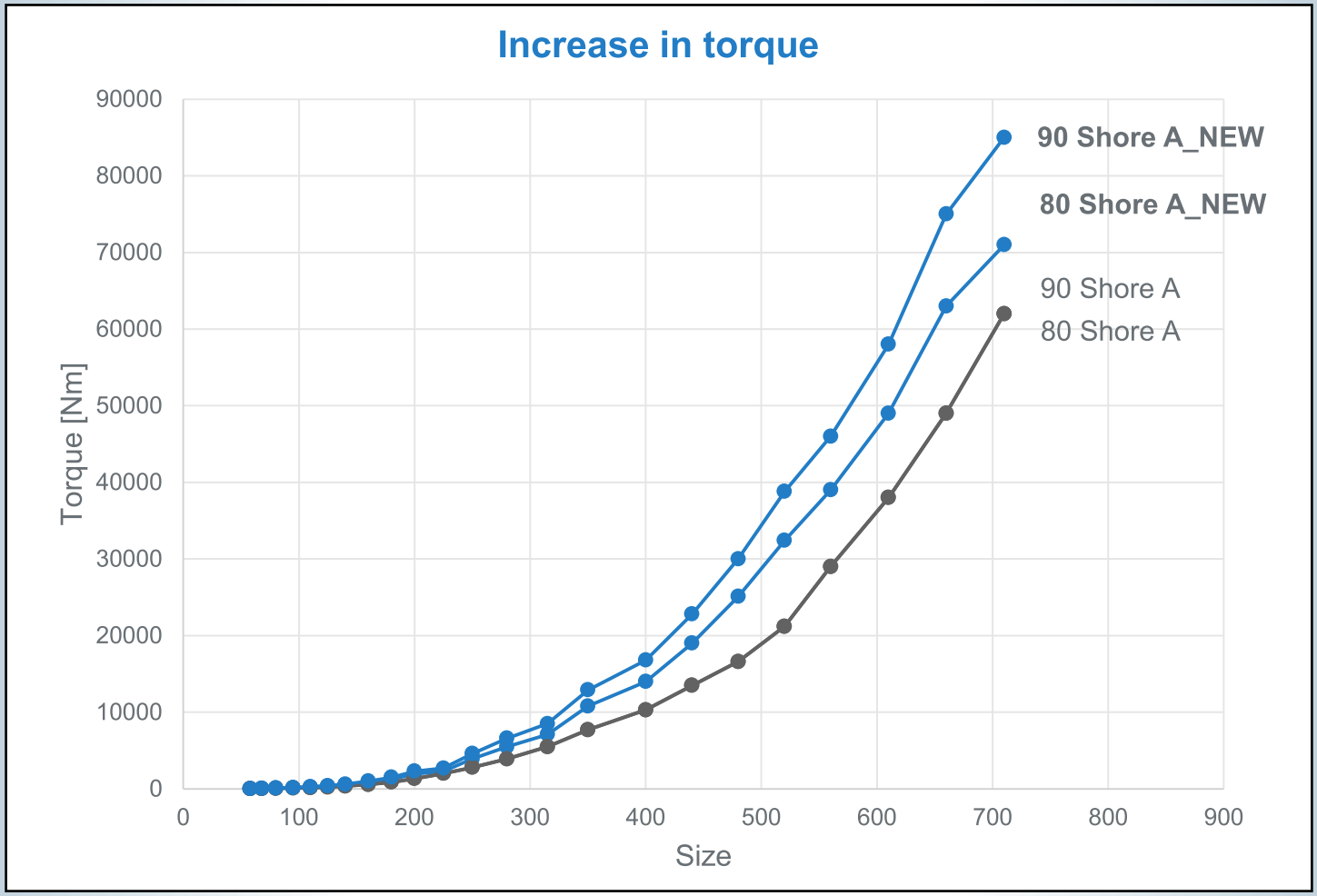
Increased Performance and Higher Bore Capacity

For all types in the N-EUPEX series, Flender is increasing both the performance and the bore capacity of the hubs. To do so, extensive testing was carried out and materials were optimized.

2.1 Increased Performance

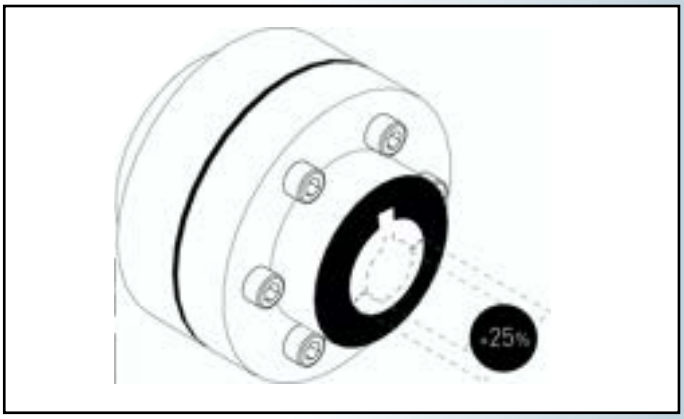
For all types in the N-EUPEX series, Flender increased performance by an average of 30 percent. This means that higher torque and higher rotation speed is guaranteed for all types.

The graphic shows a comparison between the previous and the new torque based on degrees of hardness of the elastomer elements of 90 and 80 Shore A. The progression of the blue curves compared with that of the gray curve shows the increase in torque. For example, for the degree of hardness of 90 Shore A for size 710, torque was increased by more than 20,000 newton meters (Nm).



2.2 Higher Bore Capacity

In addition to enhanced performance, the bore capacity of the hubs was also increased by up to 25 percent. Due to the higher bore capacity and increased performance, the same performance can now be achieved with a smaller coupling size. The change in size is reflected immediately in a reduction in purchasing costs as well as installation space.



3. N-Eupex Modular Principle

3.1 Introducing a Steel Jumbo Hub.

The expansion of the N-EUPEX modular principle continues with the introduction of a new jumbo hub made of steel in one-piece and split versions.

The Jumbo Hub Advantage

In contrast to the existing hubs, the new hub diameter is not reduced, therefore the inner diameter and the possible bore capacity are greater.

The Steel Hub Advantage

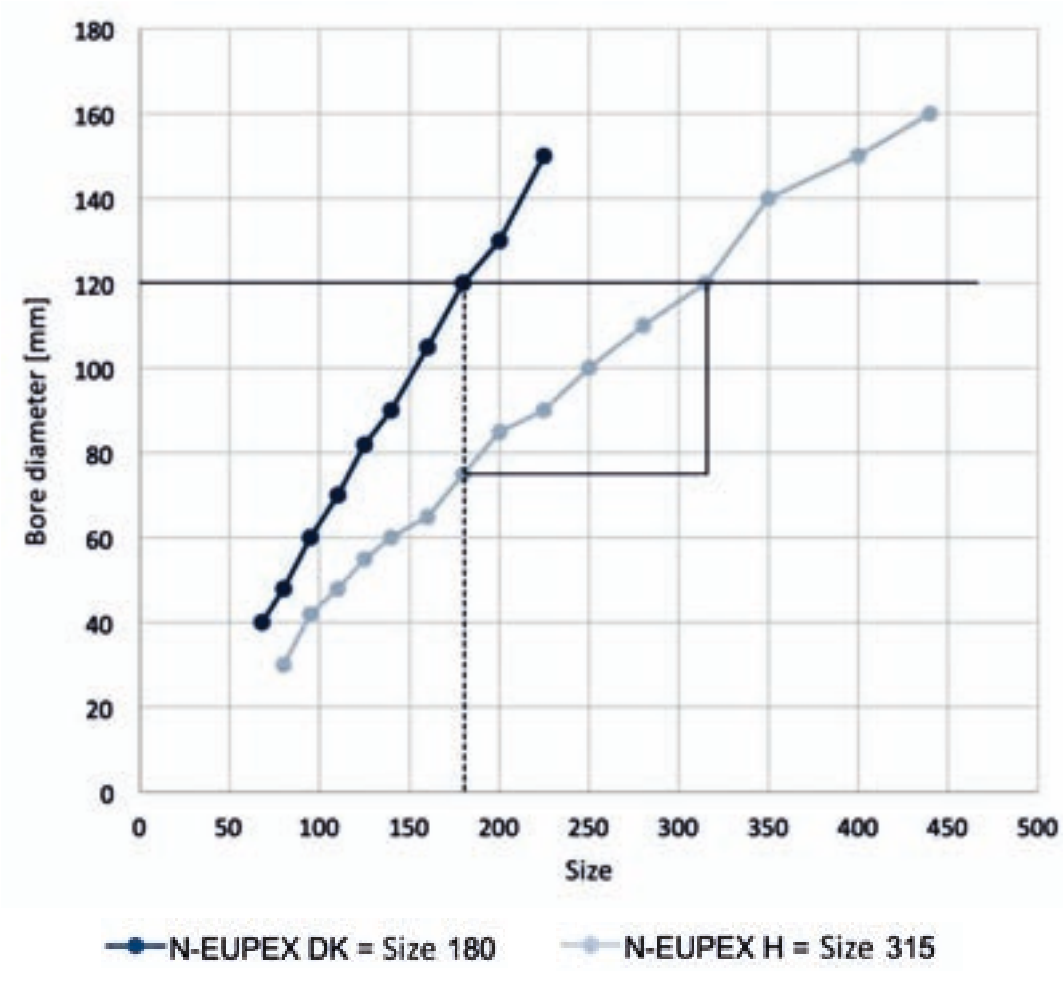
In addition to the previous hub version, a typical cast iron machine element, Flender is now also offering another hub made of steel – initially in ten sizes. The addition of the steel hub to the modular principle makes customized shaft-hub connections possible as well as a higher bore capacity. For example this allows various clamping elements to be integrated more easily.

The hub innovations increase bore capacity by an average of 40 percent. This allows users to select couplings in a smaller size. Purchasing costs are lower and less installation space is required.

Standard hub

Jumbo hub

Example: shaft diameter of 120 mm



3.3 High-Quality Elastomers ~ Functionality

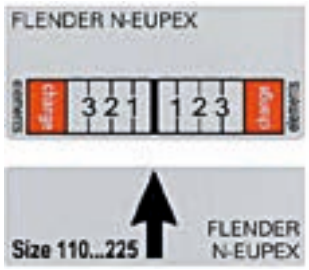
In the N-EUPEX, torque is transferred by highly advanced elastomer elements, flexible coupling assemblies made of synthetic rubber. The special design of the N-EUPEX allows the elastomer element to have just the right amount of space it needs to deflect under load with simultaneous offset.

The coupling reacts as follows in the event of radial shaft offset: While the pins and the assembly form an interlocking connection, the deformation of the rubber compensates for the corresponding offset. Each rotation works the elastomer element. No abrasive wear occurs within the permitted range of offset values. In case of angular offset between shafts, a horizontal compensation procedure is performed which also works the elastomer element without abrasive friction.

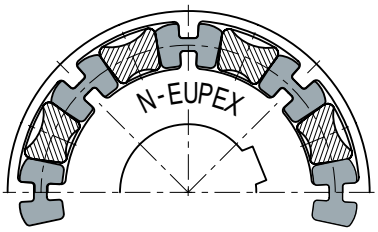
Thanks to the elastomer elements, the N-EUPEX has very good damping capacity. This significantly reduces the disruption of alternating torque during start-up situations with an asynchronous motor. In addition, selecting the right Shore hardness can create distance between the drive's natural frequency and that of the exciting frequency and thus prevent a critical resonance situation.

The wear is limited to the elastomer elements, which must be replaced at the end of their service life. Depending on the type, the elastomer elements can be exchanged without moving the coupled machines. The wear indicator for N-EUPEX couplings makes it quite easy to evaluate the condition of the flexible elements. The indicator is affixed to the outer diameter of the coupling after the coupling is mounted. A stroboscope can be used to determine wear condition even while the coupling is rotating. This means that the production process can continue uninterrupted.

Flexible elements made of synthetic rubber (NBR)

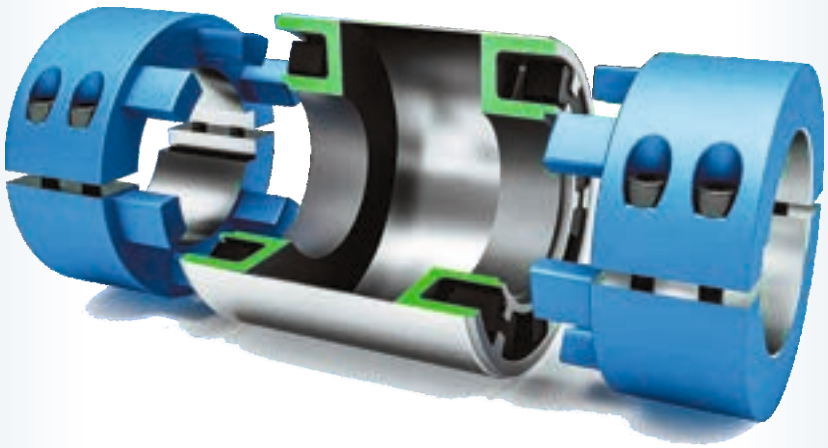


The wear indicator of the N-Eupex couplings



Conclusion

With the introduction of the N-EUPEX DK, Flender is expanding the modular principle of the N-EUPEX series. The double-cardanic version is being added to the existing short and long types. It is universally applicable, but it is particularly suitable for pump applications. With the introduction of the double-cardanic type, the selection of N-EUPEX couplings can be even more specific with regard to the respective application. At the same time, through extensive testing and material optimisation, Flender has succeeded in increasing both the performance and the bore capacity of the entire N-EUPEX series by nearly one-third. Users now benefit from greater torque, higher rotation speeds and a change in size. The N-EUPEX series has proven itself for decades as a standard solution, and it has now been elevated to a new level of connector technology.



Flender
9,544 followers
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https://lnkd.in/eArCCRi

New distribution partnership in the UK: We have now partnered with **jbj Techniques Limited** as the official partner for our whole couplings range in the United Kingdom and kicked off our cooperation by a digital signing of the partnership contract. JBJ has a wealth of experience in established and niche applications, such examples are: Mechanical drives for subsea wave energy, steel works crucible handling equipment or marine winch drives. We are happy to have them on our side for our UK coupling customers, especially for the supply of the recently optimized N-EUPEX!

Get to know the industry benchmark in couplings and reach out to **Mat Jackson**, Product Manager Couplings at Flender UK, and **Mike Davis**, Managing Director at JBJ for further queries.

Learn more about our couplings range here: **https://lnkd.in/dAir-av**

#flender #couplings #neupex #newpartnership #cooperation #WeMoveTheWorld

quality products for mechanical & fluid power

Getting the most out of your machinery often depends on close integration between all components. An organisation that manufactures and integrates all the diverse components of a drivetrain provides the experience to help you select the best component combination for your application. jbj Techniques' in-house design team and manufacturing facility provide tailored solutions for your applications at competitive prices with quick delivery.

The following examples are a simplistic view of how jbj Techniques assists customers.

Hydraulic Adaptors
Designed primarily to allow the close coupling of hydraulic pumps to a variety of prime movers, such as diesel / petrol engines, electric, air or hydraulic motors, they can also be used in the connection from prime mover to alternative driven parts i.e. gear boxes, generators, water or vacuum pumps etc. An additional range of engine front PTO adaptors, which provide additional connection between the engine pulley and the driven part are also available.

The kit comprises of a bellhousing and flexible drive coupling that are fully machined to suit the driving and driven components. These can be to suit either shaft to shaft, flange (flywheel) to shaft or even flange to flange connections.

Getting the most out of your equipment will demand close integration between all components. In specifying jbj Techniques as your preferred supplier, you will have selected a company with the experience to specify, manufacture and integrate all of the diverse components that will ensure the best component combination for your application.

jbj's in house design team and manufacturing facility provide tailored solutions for your applications at competitive pricing and on-time deliveries.

Pump shaft alignment is key to preventing unnecessary wear and damage to the pump shaft seal and bearing. Improper alignment may lead to premature pump failure.

Also to be considered are unwanted torsional resonant frequencies in the system which can quickly cause damage to components in the drivetrain and reduce system life and performance. Improper pump installation can lead to premature failure, increased maintenance costs and reduced production levels of final product.

jbj Techniques can advise on the correct installation of hydraulic pumps into Industrial / mobile / marine / machine tool / agricultural / offshore industries and can specify complete driveline systems from their extensive range of components which are available from stock or manufactured to order, albeit simple or complex, standard or bespoke.

Electric Motor – Hydraulic Pump Adaptors (safe area)
jbj Techniques Limited offer the most comprehensive range of bellhousings in Europe. Designed to connect electric motors with frame size IEC D56 - D400 (0.06kW – 750kW) and can be compatible with electric motor 'B5' or 'B14' flange configurations. Accompanying the metric frame units above is a complete range of mountings to suit Nema and imperial frame motors with 'C' face or 'D' flange fitments.

With fully machined torsionally flexible couplings, or torsionally rigid couplings available, jbj ensure the most suitable combination is selected for the application in hand. As an example spider couplings are available in various materials including aluminium, grey cast iron, nodular iron, steel and stainless steels and can be finish machined with parallel, taper or splined bores to DIN, SAE, ANSI or ISO standards.

Bellhousings can be manufactured in aluminium or cast iron material as standard, however, units can be produced in a variety of exotic materials on request.

The aluminium product range is produced in either monoblock or composite formats giving great flexibility in design and allows for early delivery time, often with same or next day delivery possibilities.

For applications where low noise levels are a

requirement then a complete range of anti-vibration and noise reduction components add to the range.

Electric motor – Hydraulic Pump Adaptors (hazardous area)
Designed to meet the exacting safety standards of the offshore and chemical process industries, jbj Techniques produce adaptor kits certificated to Directive 2014/34/EU II2GD-IM2-TX -50 C< Service Temp < +105 C. Harmonised standards BS EN 1127:1, BS EN 13463:1, BS EN13463:5, BS EN 50303, BS EN 1834-1,BS EN 1834-3.

Generally manufactured in Cast or Nodular iron, bellhousings can be produced in steel, stainless steel or alternative exotic materials on customer request.

Couplings supplied for these applications are the jbj Techniques 'JXL' pin and bush range which provide an anti-static and flameproof drive which meet zone 1 area requirements, conforming to all of the above standards.
Also available are spider and gear couplings which are certified to zone 2 standards. (Contact jbj Techniques for details).

An important development of equipment for use within hazardous areas is the wet mount series of bellhousings. Commissioned to research and develop a product that would control the high temperature generated by a piston pump shaft seal when working within cycling applications. A little considered issue is the frictional heat generated at the shaft seal when the application requires the pump to cycle between different pressures causing the seal temperature to increase. This process will often take the seal temperature out and above the levels required by the relevant ATEX standards requirement. This specially designed assembly allows a pumped cooling flow to be passed over the seal face and through an auxiliary cooler, this in turn reduces the seal face temperature which can be maintained at an acceptable level. With a vast array of components to select from, jbj are well placed to provide all required components to support the required cooling system.

Diesel Engine – Hydraulic Pump Adaptors
A complete range of bellhousing and couplings exist for the connection of a diesel engine flywheel to a specified driven component, be it an oil hydraulic pump, water pump, generator or similar device. With the bellhousing available in various materials to suit all application areas. With a standard range to connect Diesel engines with SAE dimensions from SAE '6' to SAE '0' jbj are well placed to satisfy the majority of customer requirements. Couplings to complete the assembly are available in either torsionally flexible or torsionally rigid design ad can be supplied to suit SAE flywheel dimensions from SAE 6.5" to SAE 18".

For hydraulic pumps to be mounted to engines that do not conform to SAE dimensions, we offer a full range of assembly parts, some of which (but not all) are shown here » for diesel engines

All bellhousings within this range can be finished machined to accept any, piston, vane or gear pump interfaces requested by customer.

As with the electric motor range of product jbj offer complete solutions for ATEX environments, using our well proven 'JXL' coupling range which has standard design to connect to the engine flywheel.
Directive 2014/34/EU II2GD-IM2-TX -50°C ≤ Service Temp ≤ +105°C.
Harmonised Standards: BS EN 1127:1 BS EN 13463:1 BS EN 13463:5 BS EN 50303.

Petrol Engine – Hydraulic Pump Adaptors
Petrol engine adaptors have been developed for use with industrial petrol engines. Design exists to suit Honda, Briggs and Stratton, Kawasaki, Kubota, Hatz, Mag, Robin, Suzuki, Winsconsin, to name but a few, all adaptors can be finished to accept most hydraulic pumps. Adaptors to suit engine crankshaft drives and for vertical mounting are available on request.

Small Individual Components to Large Combinations

"ensuring a continuing high quality service in which customers can have complete confidence."

jbj Techniques is a specialist supplier of high-quality products for the mechanical power transmission and fluid power sectors. The company offers a high level of in-house expertise plus a huge selection of products to meet a very broad range of customer applications.
From specification, through technical advice and manufacture to after-sales support, jbj Techniques provides a comprehensive and valued service to the power transmission and hydraulics industries. The company fields a UK-wide team of technical sales engineers to ensure that the business is close to its customers, and it enjoys excellent associations with European manufacturers, acting as sole UK distributor in many cases.

jbj's team is recognised for its expertise in the selection and configuration of hydraulic and mechanical transmission systems. Able to draw on an extensive product range that provides the building blocks for bespoke systems both large and small, the in-house design team offers a complete service, ranging from an assessment of customer requirements to full technical backup, including product specification, CAD based system design, system build and certification. Moreover customers can take advantage of jbj's own machine-shop facilities and skilled engineers to guarantee quality and control costs.

jbj Techniques provides one of the widest ranges of couplings available within the UK; mechanical power transmission couplings for a vast range of applications. Ranging from miniature couplings, all steel gear couplings, flexible spider couplings, shaft couplings, torque limiting couplings, disc and grid type couplings, ATEX compliant and shaft locking devices. Magnetic couplings for power transmission between hermetically sealed areas. However as extensive as the selection is, couplings make up a fraction of jbj's portfolio. As power transmission specialists the company stock and provide gearboxes, clutches, pumps, hydraulic motors, flow meters, fluid power accessories including: cooling & heat exchange products, reservoirs, pipe flanges, seals and level indicators, as well as a variety of bellhousings and engine adaptors, to name just a few of the product categories.

jbj Techniques Limited is proud of it's relationship and reputation with customers and suppliers. The core client base is stable and loyal, which is testament to the quality of service provided by the company. A similar relationship exists with suppliers, ensuring a continuing high quality service in which customers can have complete confidence.

jbj TECHNIQUES LIMITED

an excellence in engineering

www.jbj.co.uk/productlist.html














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quality products for mechanical & fluid power

01737 767493 info@jbj.co.uk www www.jbj.co.uk

jbj Techniques Limited
28 Trowers Way Holmethorpe Industrial Estate
Redhill Surrey RH1 2LW. UNITED KINGDOM

quality products for mechanical & fluid power

01737 767493 info@jbj.co.uk www.jbj.co.uk