## General notes

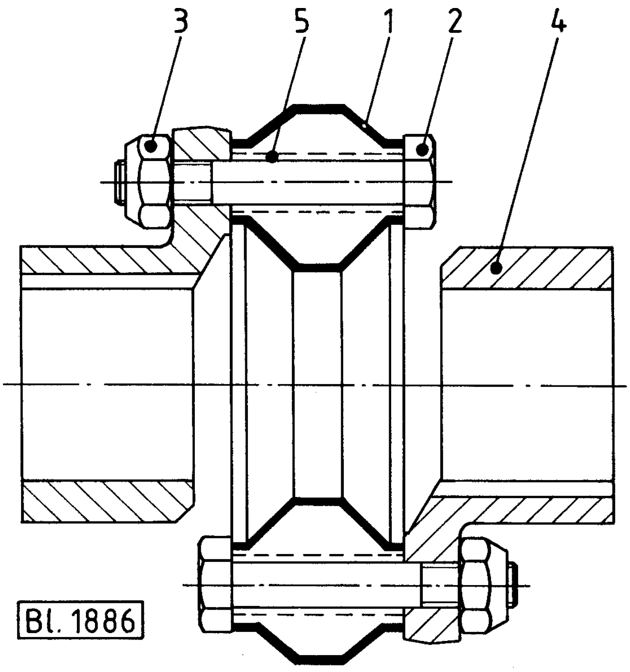


## Product data sheet



# Contents

## Construction and operation




This inexpensive coupling consists of a few simple components. A square, hexagonal or octagonal design of Giubo coupling ring (**1**), is connected to two identical flanges (**4**) using normal commercial bolts (**2**, Grade 8.8) and self-locking nuts (**3**). Roll pins (**5**) made of steel are vulcanised at the bolting points of these high resilience couplings in such a way as to ensure an even distribution of the stress. Ortlinghaus high resilience couplings are rotationally resilient, shock damping, angular motion shaft couplings. They excel due to their small dimensions, freedom from maintenance and long service life. They are also suitable for the construction of rotationally resilient cardan shafts which are particularly good for damping torsional shocks and alternating torques due to their elasticity.
The high resilience ring is installed in a radially pre- stressed state. The compressive pre- stress (about 10% in relation to the pitch circle diameter of the holes) is achieved by an encircling metal band which reduces the diameter of the ring to the nominal diameter. When assembly has been carried out the metal band has to be removed.

## Instructions for installation

The standard design of resilient coupling ring is based on natural rubber and supplied at a standard hardness of 65 Shore A. Its working temperature range is between -25° C and +70° C. If higher temperatures could occasionally occur it is recommended that a larger coupling be selected in order to reduce the loading and with it the internal heating effect due to the deformation.
The rubber material is resistant to sea water but is not oil resistant though small splashes of oil on the surface will not have a detrimental effect. If coming under the influence of sea water or of a generally damp environment the metal parts of the couplings should be corrosion protected. Although the vast majority of applications can be handled with couplings rings with a standard hardness of 65 Shore A, there are also rings with a higher hardness available so that it is possible to match particular forms of vibration (e.g. resonance) for a drive unit.
If difficult application conditions are present please take advantage of our advisory service.

## Types of stress

### Torsion

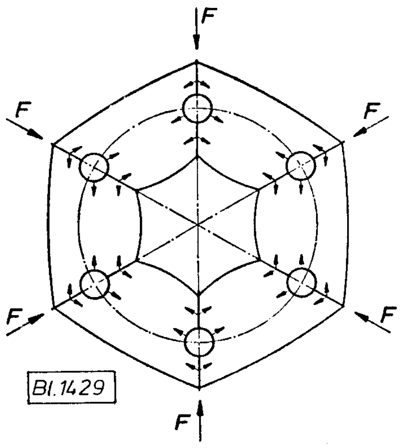



Figure 1: Coupling element, radially pre-stressed

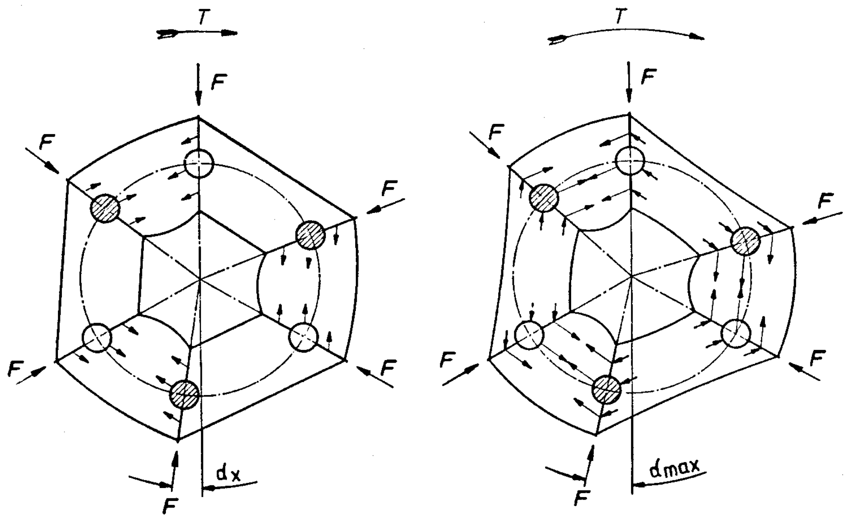
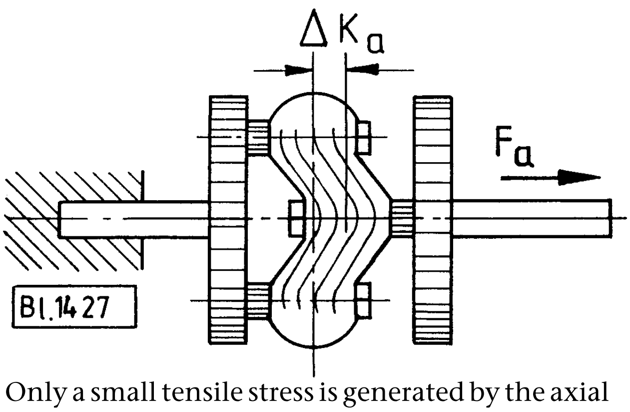



Figure 2: Coupling elements with superimposed torques

On the left Figure 2 shows the stress characteristics after an additional torque at the same level as the compressive pre-stress has been applied. Of the 6 rubber columns 3 are in compression which is superimposed on the applied compressive pre-stress. The rest of the rubber columns are relieved of the compressive stress and are stress free. The illustration on the right shows the stresses after a larger torque has been applied. In the rubber columns which are in compression the compressive stress continues to rise; in the columns previously free of stress a small tensile stress is generated.

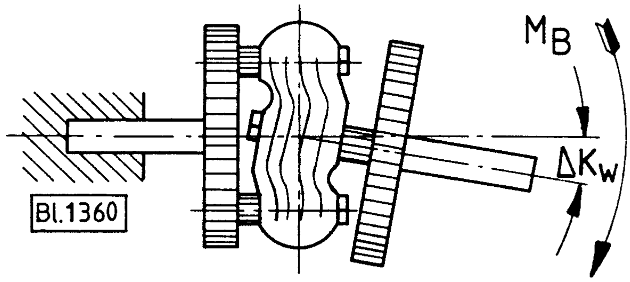
This is of importance for the practical use of rubber-metal structural components as rubber is well-known to have a large working capacity in compression but due to its structural build-up it can only take continuous tensile stresses within moderate limits.

### Axial displacement



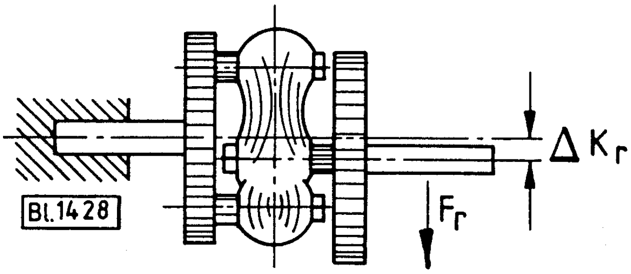

Only a small tensile stress is generated by the axial displacement $\Delta K_a$ because of the length of the rubber columns. Thus when using the coupling elements in cardan shafts it is possible in most cases to dispense with the use of the splines which would normally be used to allow longitudinal compensation.

### Angular displacement




When superimposing torsion and angular displacement the rubber columns are put into sheer and torsion. Since due to the relatively long rubber columns the resultant stresses remain within moderate limits, the permissible deformations $\Delta K_w$ quoted are possible even at moderately high speeds. To maintain the correct geometric relationships however it is necessary for the axes of rotation to intersect on the centre of the element.

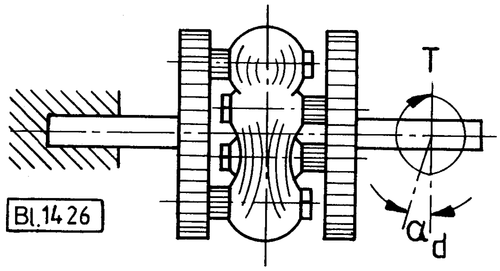
## Radial displacement



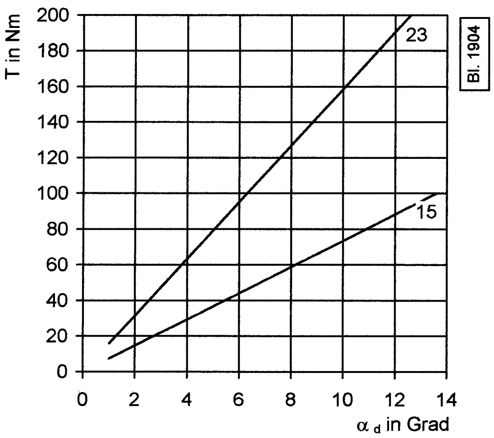

Due to radial displacement $\Delta K_r$, tensile and compressive stresses are generated which rise quickly with large axial displacements. So that the normal geometric relationships are not excessively disturbed a larger coupling is recommended for larger axial displacements.

## Diagram for static deformation of the coupling ring (hardness of ring: 65 Shore A)

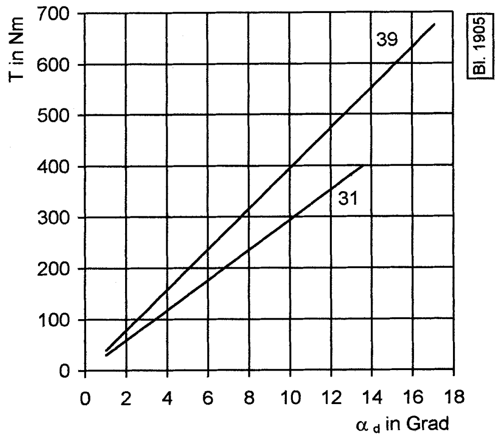
**Torque $T = f(\alpha_d)$**



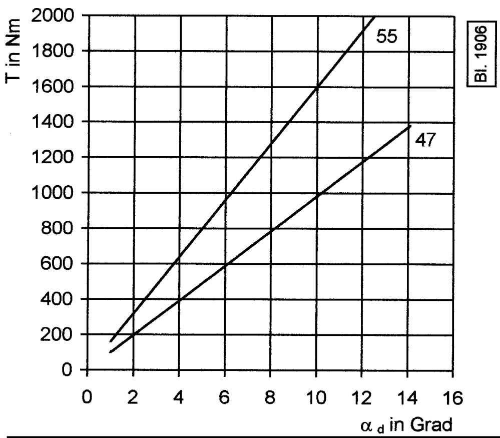

Sizes 15 and 23
Größen 15 und 23



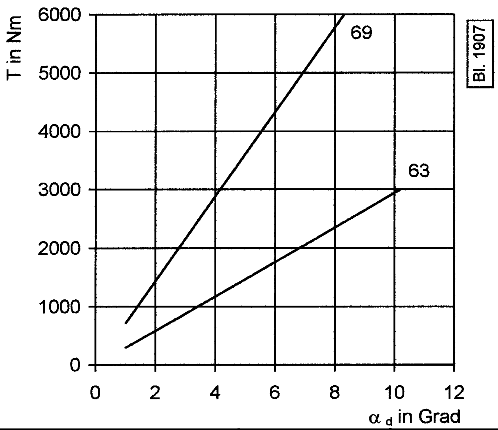

Sizes 31 and 39
Größen 31 und 39



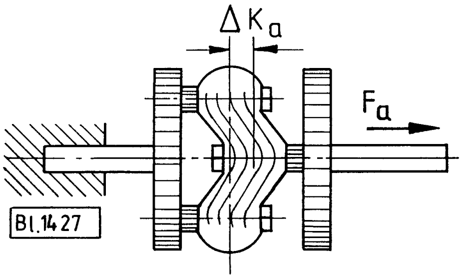

Sizes 47 and 55
Größen 47 und 55



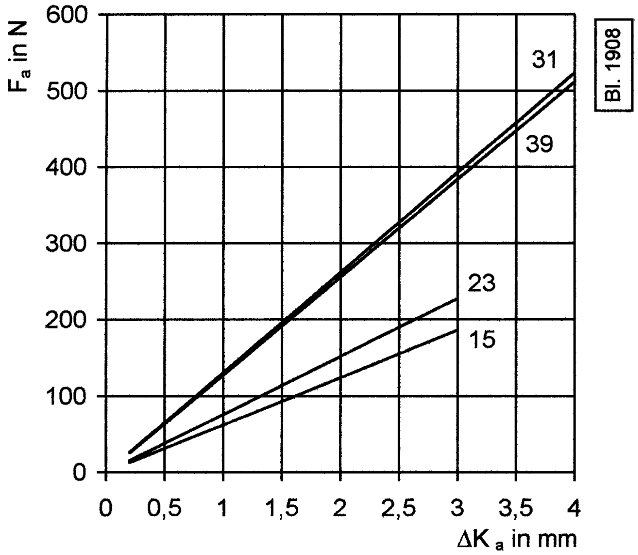

Sizes 63 and 69
Größen 63 und 69



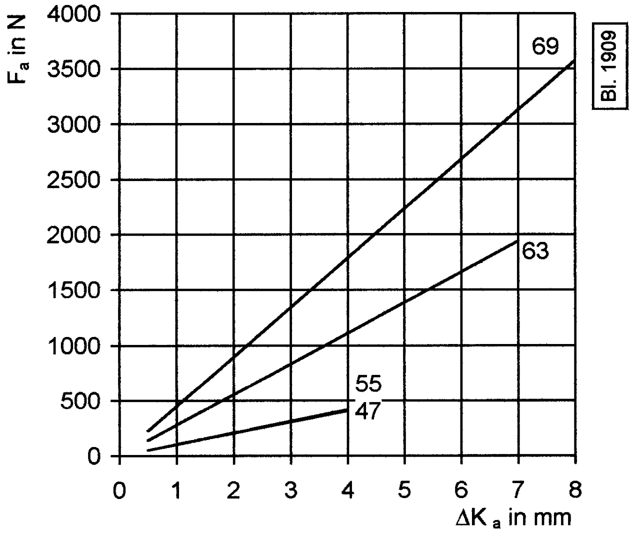
**Axial force $F_a = f(\Delta K_a)$**



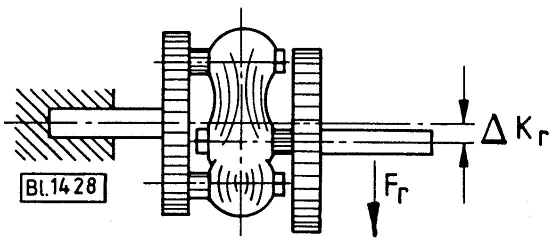

Sizes 15 to 39
Größen 15 bis 39



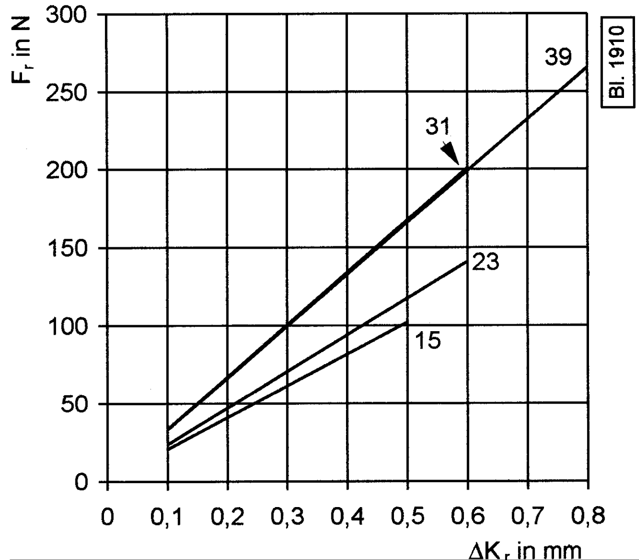

Sizes 47 to 69
Größen 47 bis 69



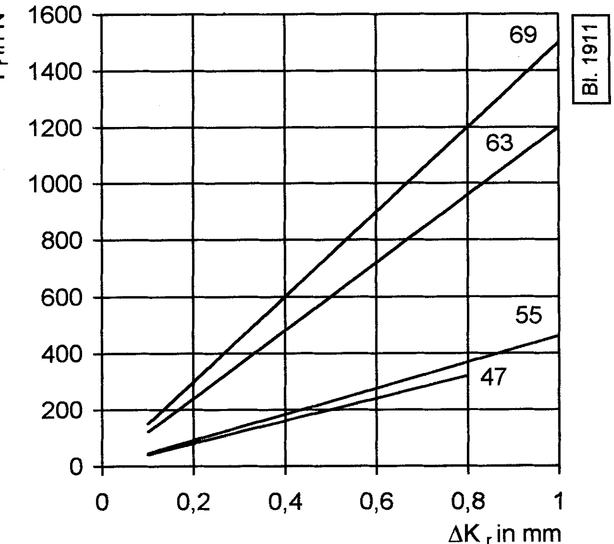

**Radial force $F_r = f(\Delta K_r)$**



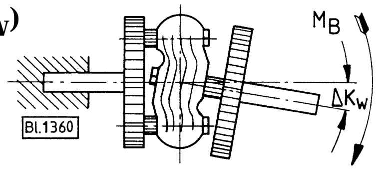

Sizes 15 to 39
Größen 15 bis 39




Sizes 47 to 69
Größen 47 bis 69

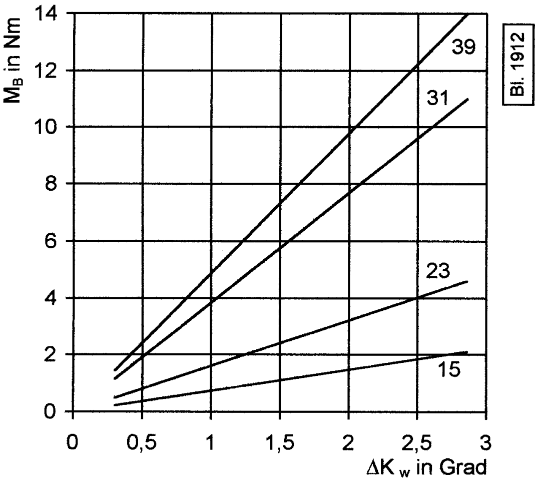


**Bending moment $M_B = f(\Delta K_w)$**



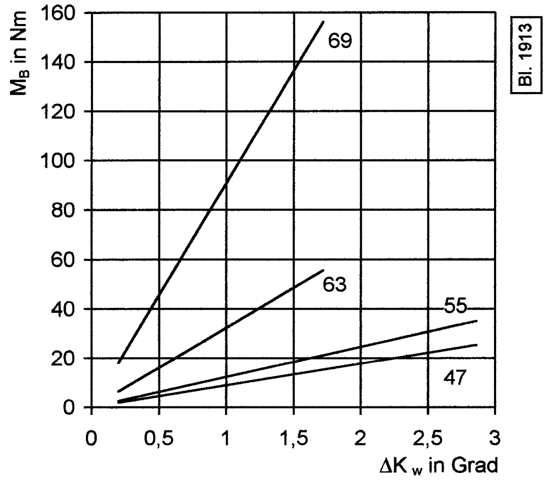

Sizes 15 to 39

Größen 15 bis 39




Sizes 47 to 69

Größen 47 bis 69




## Coupling size

Determining the coupling size is difficult in applications with high vibration stresses. Basically care should be taken during the design stage to ensure that the coupling will always operate in the **permissible** elastic range.

In order to comply with this requirement the starting shocks and shaft displacements ccurring during operation can be allowed for, in a rough estimate, by using the shock or safety factors from the following table.

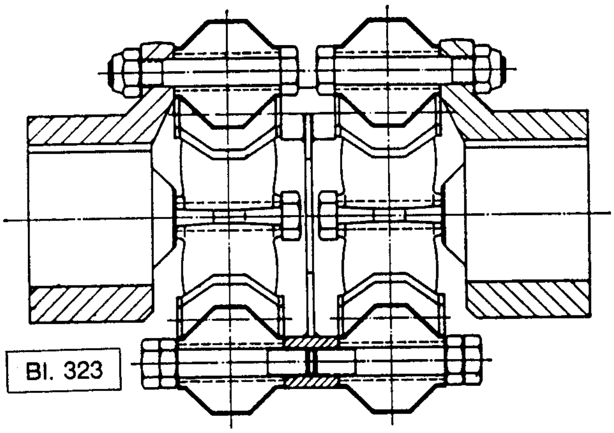
| Minimum safety factors | **Prime movers** | | |
|---|---|---|---|
| | Electric motors<br>Steam turbines<br>Multi-cylinder engines | Gas engines,<br>Steam engines,<br>2 cylinder engines | 1 cylinder engines |
| **Working machinery** | **Safety factor K** | | |
| Generators, chain conveyors, centrifugal compressors, sand blasting blowers, textile machinery, transport systems, fans, centrifugal pumps | 1 | 1,3 | 1,6 |
| Lifts, bucket elevators, rotary kilns, coilers, travelling winches and cranes, rotary cooling drums, winches, agitating machines, shearing machines, grinding machines and machine tools, washing machines, looms, brick moulding machines | 1,3 | 1,6 | 2 |
| Excavators, drilling plant, briquetting presses, mine ventilators, rubber rolling machines, lifting gear, edge mills, plunger pumps, tumbling barrels, vibrators, combination mills | 1,6 | 2 | 2,3 |
| Piston compressors, reciprocating saws, wet presses, calendering machinery, roller tables, drying cylinders, rolling mills, cement mills, centrifuges | 2 | 2,3 | 2,6 |

$$T_{kN} = 9555 \cdot \frac{P \,.\, K}{n} \quad \text{in Nm}$$

$T_{kN}$ = Rated torque in Nm
P = Power in kW
n = Speed in $min^{-1}$
K = Shock factor

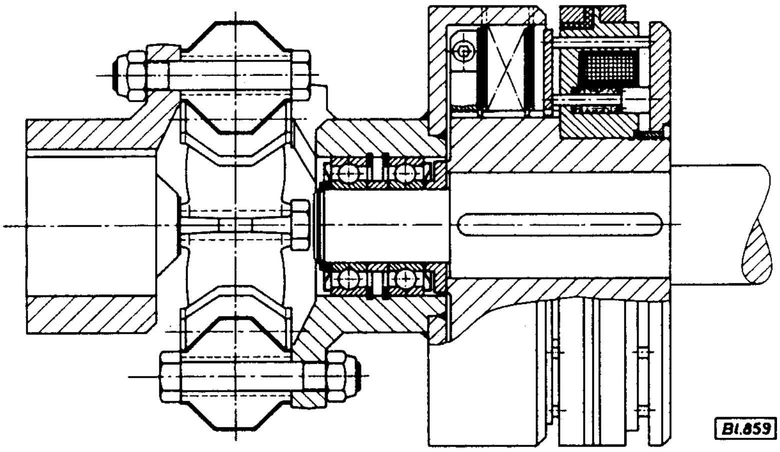
If critical torques have to be allowed for in the proposed installation then a calculation to DIN 740, Sheet 2 will be necessary. We recommend that you leave the choice of coupling size to us. For this we need the details listed in the questionnaire to suit the application (See Product Group summary).

## Examples of combinations and installations



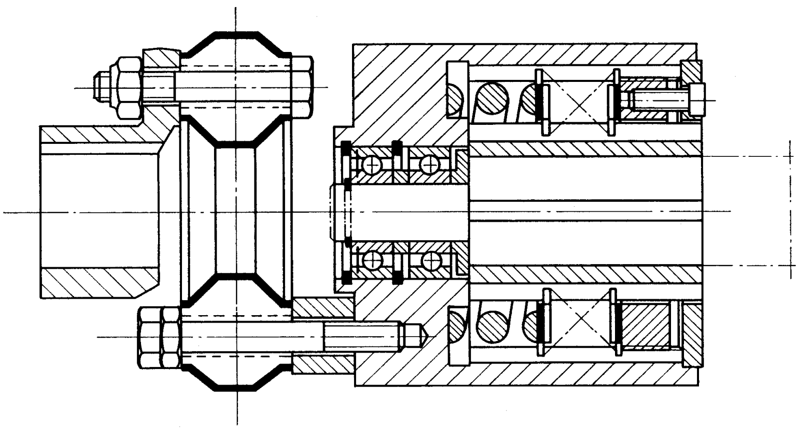
Bl. 323

A combined highly flexible double coupling with intermediate flange and normal flange hubs (to double the resilience figures for particular installation requirements).



Bl.859

Highly flexible coupling of the hub design, in combination with an electromagnetic multi-plate clutch.



Combination of a highly flexible coupling with a multi-plate slipping clutch.

Bl. 1211

# Highly flexible couplings

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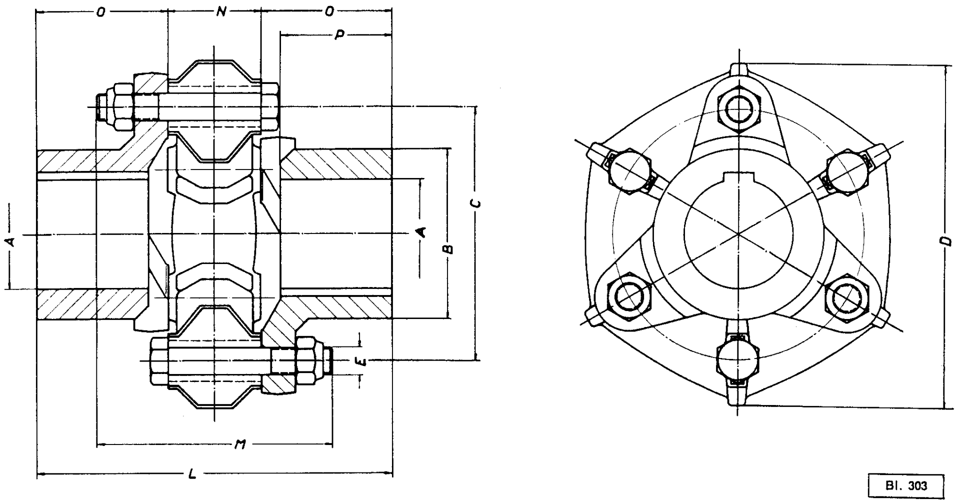


Bl. 303

| Series<br>Coupling size | | | 0007-033-size-000000<br>15 | 23 | 31 | 39 | 47 | 55 | 63 | 69 |
|---|---|---|---|---|---|---|---|---|---|---|
| Design | | | hexagon | | | | | | octagon | |
| Characteristics | Desc. | Units | | | | | | | | |
| Rated torque | $T_{KN}$ | Nm | 40 | 80 | 160 | 270 | 550 | 800 | 1200 | 2400 |
| Maximum torque | $T_{K\ max}$ | Nm | 100 | 200 | 400 | 675 | 1380 | 2000 | 3000 | 6000 |
| Continuous alternating tor. | $T_{KW}$ | Nm | 22 | 50 | 100 | 167 | 360 | 510 | 590 | 1540 |
| Axial elasticity | $\pm \Delta K_a$ | mm | 3 | 3 | 4 | 4 | 4 | 4 | 7 | 8 |
| Radial elasticity | $\pm \Delta K_r$ | mm | 0,5 | 0,6 | 0,6 | 0,8 | 0,8 | 1 | 1 | 1 |
| Angular elasticity | $\pm \Delta K_w$ | rad [1] | 0,05 | 0,05 | 0,05 | 0,05 | 0,05 | 0,05 | 0,03 | 0,03 |
| Torsional rigidity [2] | $C_{T\ stat}$ | Nm/rad | 421 | 906 | 1688 | 2257 | 5618 | 9180 | 16855 | 41300 |
| Axial rigidity | $C_a$ | N/mm | 62 | 76 | 131 | 128 | 102 | 105 | 277 | 447 |
| Radial rigidity | $C_r$ | N/mm | 204 | 235 | 335 | 332 | 402 | 461 | 1200 | 1500 |
| Angular rigidity | $C_w$ | Nm/rad | 42 | 92 | 219 | 281 | 506 | 702 | 1854 | 5210 |
| Proportional damping | $\Psi$ | – | 0,8 … 1 | | | | | | | |
| Resonance factor | $V_R$ | – | ~ 7 | | | | | | | |
| Max. permissible speed | $n_{max}$ | $min^{-1}$ | 6000 | 6000 | 6000 | 4700 | 3600 | 3300 | 3000 | 2000 |
| Max. permis. temperature | $t_{max}$ | ° C | Highest ambient temperature 70 °C | | | | | | | |
| Starting factor | $S_z$ | – | For figures for the application in question see DIN 740, Sheet 2, Table 3 | | | | | | | |
| Frequency factor | $S_f$ | – | | | | | | | | |
| Temperature factor | $S_t$ | – | | | | | | | | |
| Moment of inertia | J | $kgm^2$ | 0,00038 | 0,001 | 0,003 | 0,009 | 0,03375 | 0,05125 | 0,1 | 0,3875 |
| Mass (weight) | $F_G$ | kg | 1 | 1,8 | 3,5 | 6,5 | 14,5 | 18,5 | 28 | 61 |
| Diameter | A max | H7 | 30 | 40 | 48 | 60 | 70 | 80 | 95 | 130 |
| | Keyway | DIN 6885 | 8x3,3 | 12x3,3 | 14x3,8 | 18x4,4 | 20x4,9 | 22x5,4 | 25x5,4 | 32x7,4 |
| | | B | 45 | 58 | 72 | 90 | 115 | 125 | 145 | 200 |
| | | C | 65 | 85 | 100 | 132 | 170 | 186 | 210 | 280 |
| | | D | 93 | 118 | 142 | 181 | 234 | 254 | 281 | 380 |
| | | E | M8 | M10 | M12 | M14 | M20 | M20 | M20 | M27 |
| Usable inside Ø in the Giubo coupling ring | | | 25 | 35 | 40 | 60 | 80 | 85 | 105 | 145 |
| Length dimensions | | L | 100 | 124 | 160 | 180 | 234 | 260 | 300 | 380 |
| | | M | 72 | 84 | 104 | 120 | 158 | 172 | 182 | 220 |
| | | N | 28 | 36 | 46 | 50 | 62 | 68 | 78 | 100 |
| | | O | 36 | 44 | 57 | 65 | 86 | 96 | 111 | 140 |
| | | P | 30 | 36 | 48 | 53 | 71 | 82 | 90 | 118 |
| Torque loading for the bolts | | Nm | 25 | 47 | 78 | 120 | 330 | 330 | 330 | 800 |
| Giubo coupling ring (65 Shore A)<br>Order Ref. 1007-110-size-003000 | | Size | 15 | 23 | 31 | 39 | 47 | 55 | 63 | 69 |

[1] 1 Radian (rad) = 57,297 degrees

[2] $C_{T\ dyn} = 1,4 \times C_{T\ stat}$

Unbored version series **0007-533-..-000000**