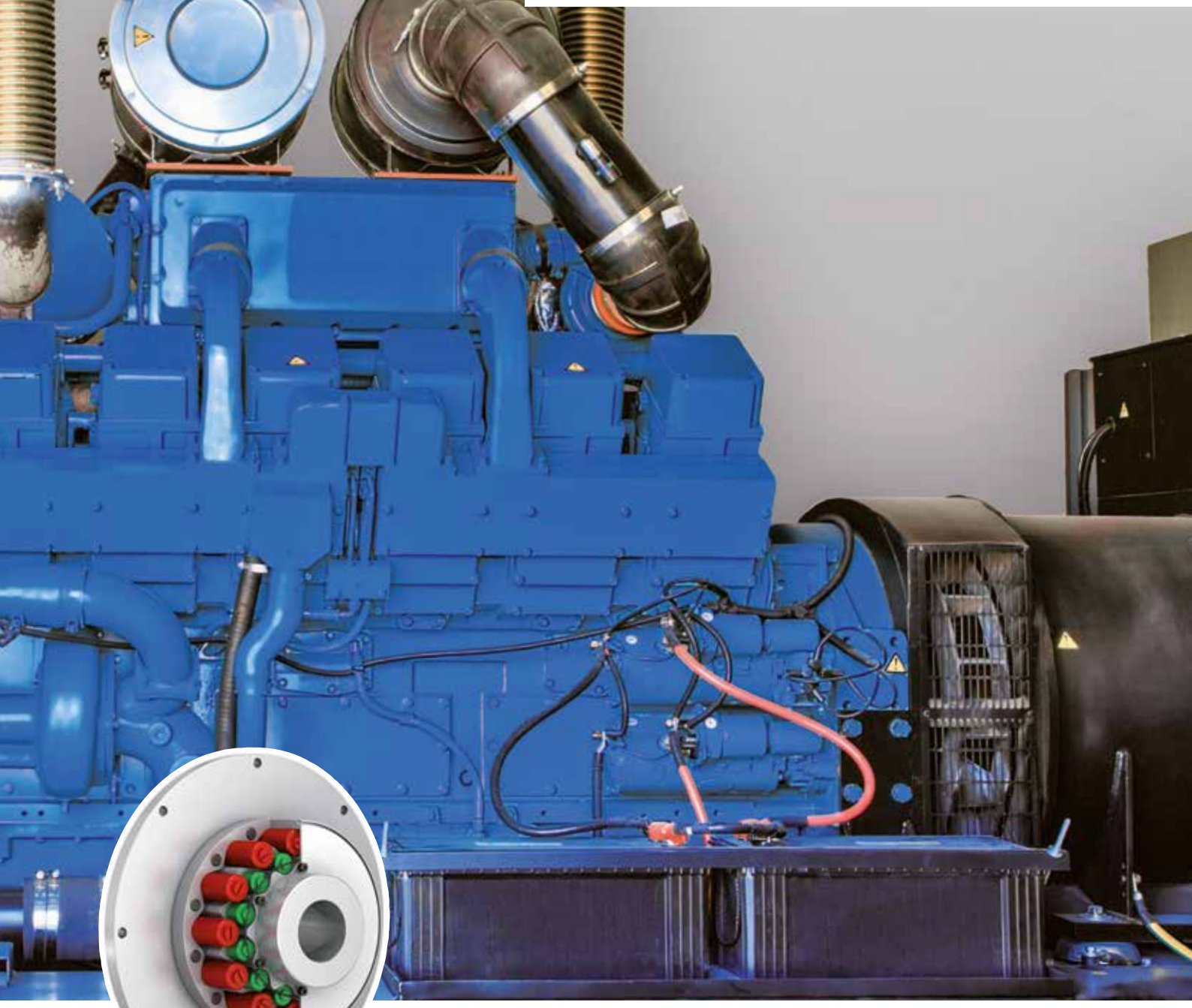
US
07|2016

TSCHAN

TNR

Torsional Highflex Couplings



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We offer locking devices, couplings, bearing housings and damping technology for OEMs but also for the final customer under our strong brand names RINGFEDER, TSCHAN, HENFEL and GERWAH. Our brand ECOLOC supplies reliable products off the shelf.

We not only provide competent advice to our customers on the basis of our 90 years of experience but also develop innovative ideas in cooperation with them. This is part of our aspiration to be a **Partner for Performance.**

Around the power transmission we promise

- Excellent know-how for our challenging customers
- Best cost-benefit ratio
- Short reaction times and a high product availability

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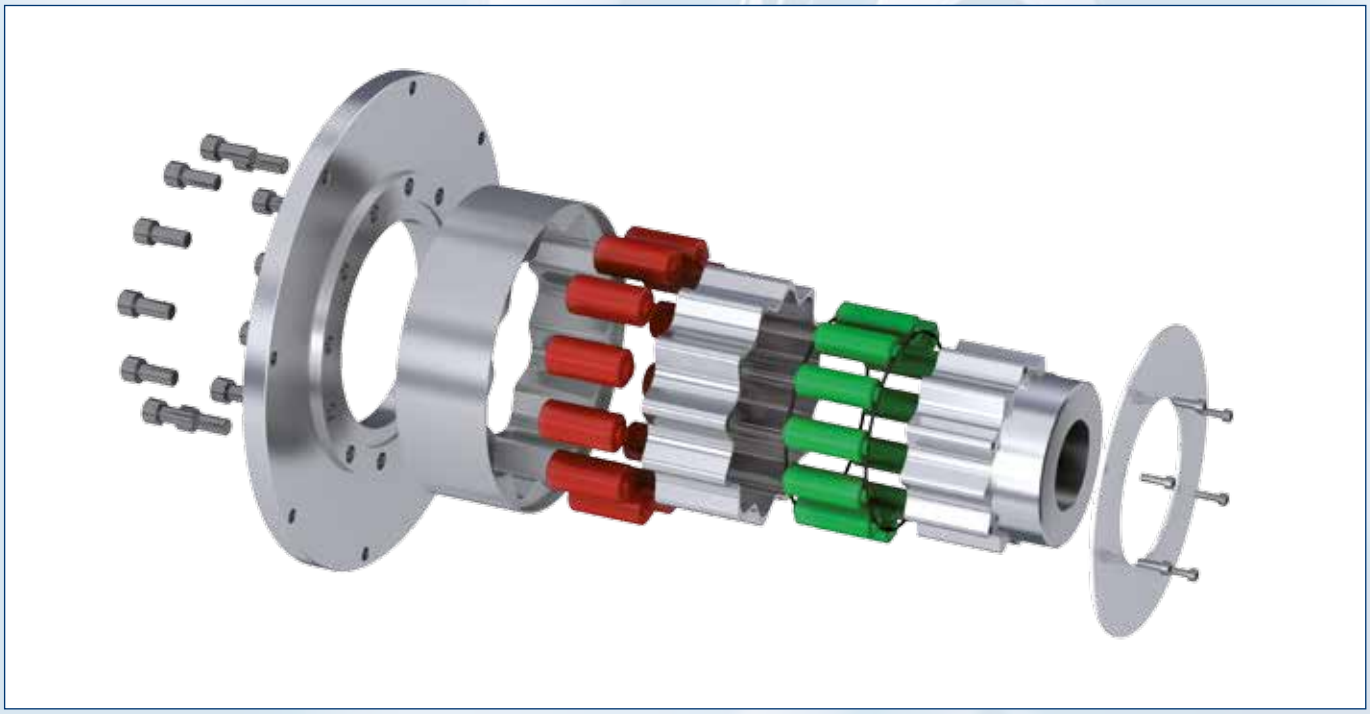

Torsional Highflex Couplings

TSCHAN®
TNR 2424.1

Single-row, SAE flange-shaft connection

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TSCHAN®
TNR 2424.2

Double-row, SAE flange-shaft connection

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TSCHAN®
TNR 2425.1

Single-row, SAE flange-shaft connection and taper lock bushing

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TSCHAN®
TNR 2425.2

Double-row, SAE flange-shaft connection and taper lock bushing

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Single-row, shaft-shaft connection

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TSCHAN®
TNR 2428.2

Double-row, shaft-shaft connection

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General description

Fig. 1: Cross sectional model of the double-row TSCHAN® TNR 2424.2

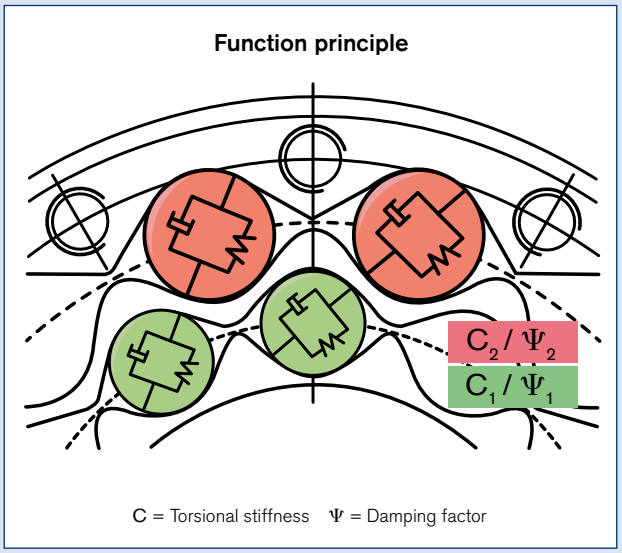


Fig. 2: Basic principle: Series arrangement of elastic buffers

Introduction

TSCHAN® TNR, the novel non-switchable coupling with adjustable dynamic parameters and unchanging outer dimensions.

The torsionally flexible coupling can move in all directions, adjusting for angular, axial and radial shaft misalignment between coupled machines.

Adjustable rigidity

Using combustion engines such as diesel and gas engines, but also other machines and plant generating undesirable torsional vibrations, the drive train is subject to dynamic excitations. Unavoidable resonances will occur should engine-side excitation frequencies and the resonance frequency of the drive train coincide.

These may be shifted from the desired range of operating speed range towards less critical frequencies by specific adjustments to the coupling rigidity, resulting in markedly smoother running. The smoothest running is often achieved in the hypercritical region, i.e. after passing through the resonances, which may be achieved through the use of highly elastic couplings.

Single-row coupling designs in the TSCHAN® TNR series already exhibit rigidities similar to those of conventional, highly flexible rotationally elastic couplings, especially for higher torques.

The TSCHAN® TNR range double-row coupling design furthermore allows adjustment of the dynamic properties without much effort. This is made possible over a wide range by the serial arrangement of the elastic buffers (see Figure 2), with constant external dimensions.

General description

Shifting the resonance position

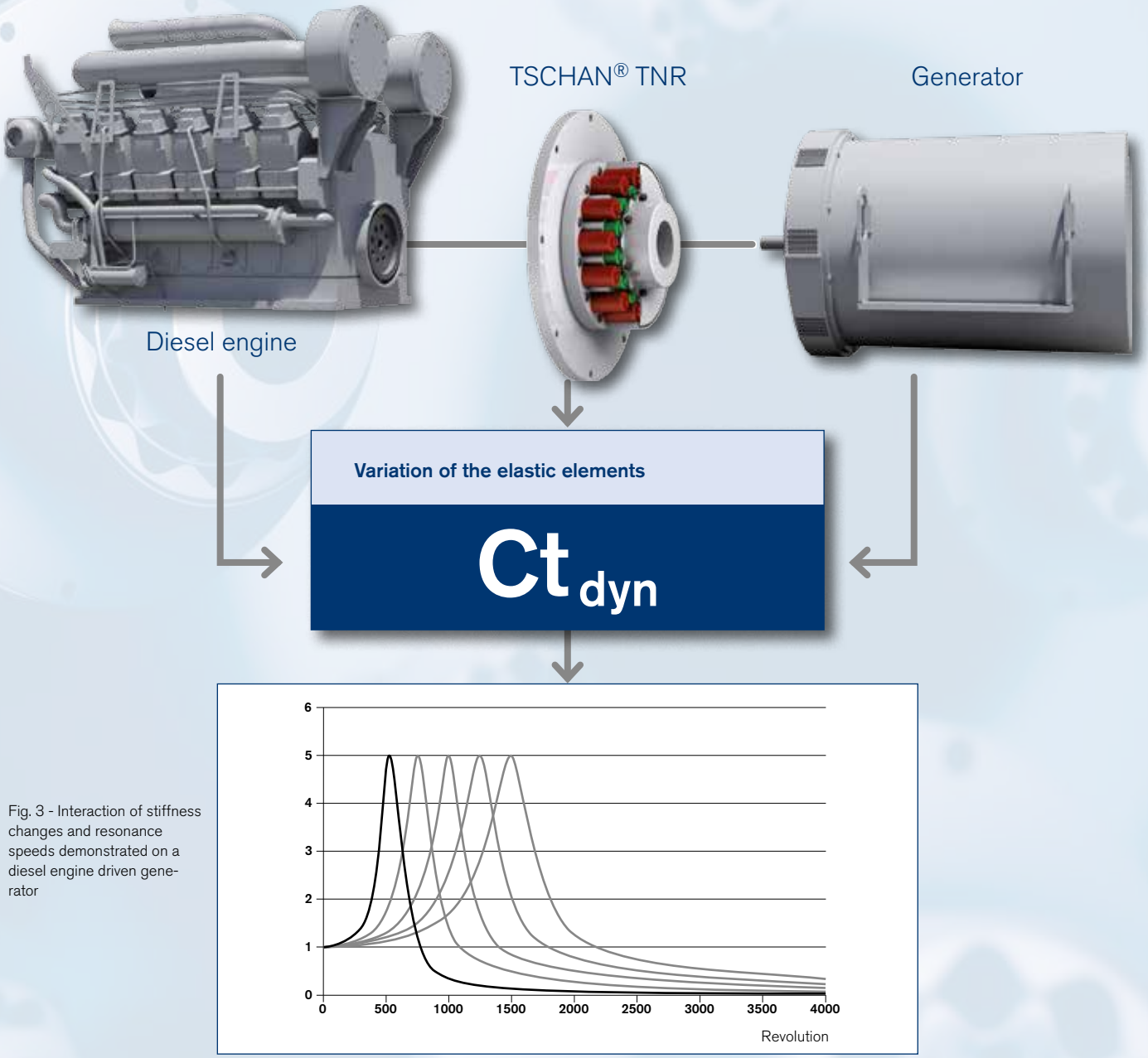


Fig. 3 - Interaction of stiffness changes and resonance speeds demonstrated on a diesel engine driven generator

Shifting the resonance position

As demonstrated in Figure 3, the effects of resonances may be shifted to lower speeds by reducing the dynamic coupling stiffness without changing the connected dimensions. Hyper-critical operation is possible and optimal running smoothness is achieved by adjusting the stiffness of coupling through judicious selection of elastic buffers.

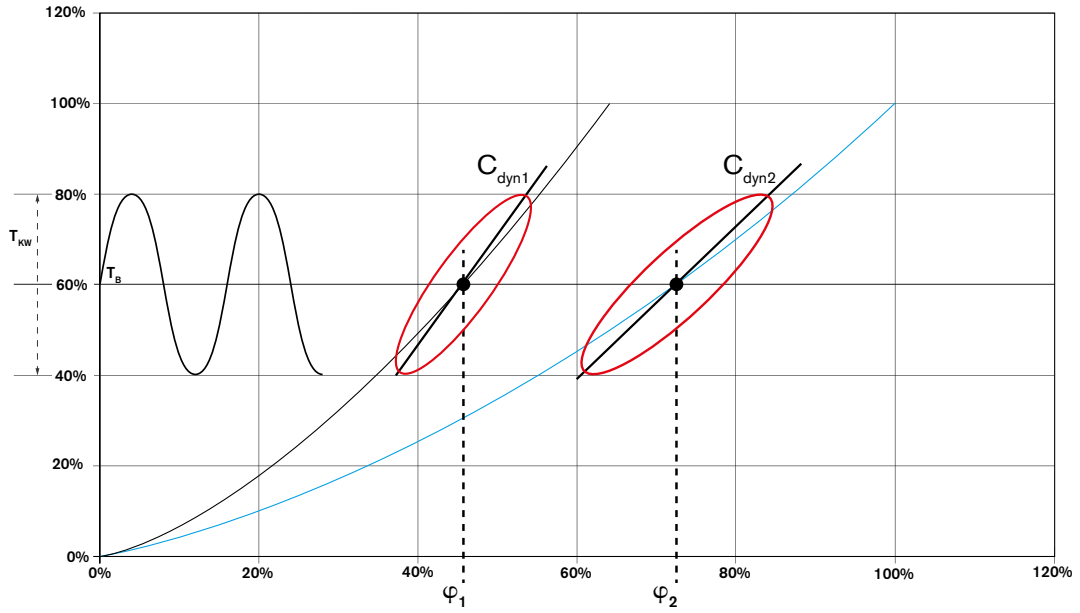


Fig. 4: Torsional characteristic for the single (C_{dyn1}) and double-row (C_{dyn2}) TSCHAN® TNR

Torsional characteristic

The stress the functional principle of the **TSCHAN® TNR** imposes on the elastic buffers causes high torsional displacement and thereby a soft characteristic with little progressivity in the single row design which, as opposed to linear characteristic couplings, also has a positive effect on smooth running.

The properties of the couplings are easy to change with the **TSCHAN® TNR**, to easily and optimally match the stiffness to the drive train.

Functional principle

Coupling hub and housing have special meshed gears. The relative torsional displacement under load causes the elastic buffer to roll in the gear teeth, whereby the free buffers will in the initial phase experience shear stress and then compressive stress at nominal torque. The elasticity and damping properties of the buffers together with the stress created by the special shape of the teeth lend the coupling its low torsional stiffness and excellent damping effect.

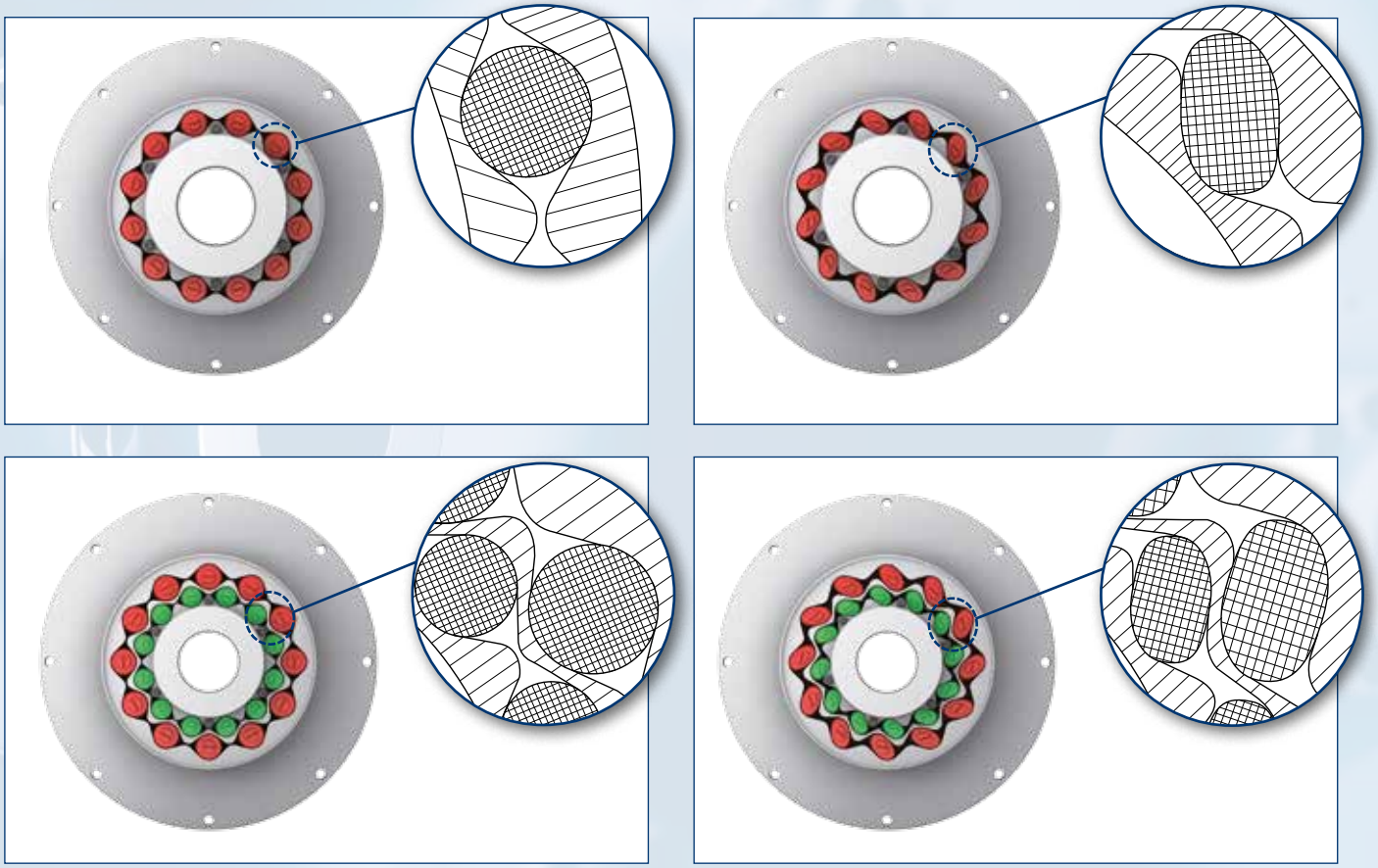


Fig. 5: Functional principle of the TSCHAN® TNR.1 and the TSCHAN® TNR.2

Buffer materials

Synthetic rubbers and a variety of polyurethanes of different hardness are used for the elastic TNR coupling buffers. The product range is supplemented by special materials for low and high temperatures to render reliable solutions under extreme environmental conditions. The catalogue includes data for standard combinations of the specific materials and customised solutions may be found on demand, with little effort required. The shore hardness of each elastomeric material is the indication of its load bearing capacity. These values allow indirect estimates of the transmissible torques for the coupling and its spring constant. Consult the technical data sheet for additional detail.

Environmental conditions

The elastomeric materials used are suited for ambient temperatures between –50 °C to +130 °C. For higher ambient temperatures, please enquire with us. The design guidelines below explain the effect of temperatures on the correct size of couplings. The coupling is for use only in normal industrial air. Aggressive media are a danger to reliable operation of the coupling, since they could attack components of the coupling such as screws and elastic elements.

Dimensioning of coupling - design directives

The dimensioning of the elastic TSCHAN® couplings is based on the nominal torque T_N and maximum impact torque T_{max} of the machines.

T_N = Nominal torque of machine [ft-lbs]
P_N = Machine power [hp]
n_N = Operating speed [rpm]

$$T_N = 5252 \cdot P_N / n_N \quad (1)$$

The following equation applies when subjected to the nominal torque:

$$T_{KN} > T_N \cdot S_\vartheta \cdot S_f \quad (2)$$

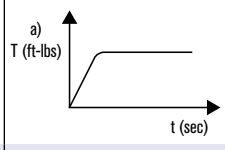
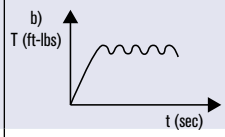
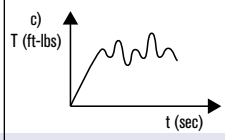
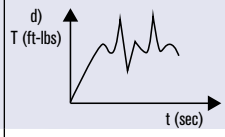
T_{KN} = Nominal torque of coupling [ft-lbs] acc. to catalogue data
T_N = Nominal torque of machine [ft-lbs] acc. to equation (1)
S_ϑ = Temperature factor [-] according to table
S_f = Service factor [-] $S_A \cdot S_L$
S_A = Load factor of drive side
S_L = Load factor of output side

Ambient temperature range [°F]	Temperature factor S_ϑ for intermediate buffer materials			
	PB	Vk	HT	TT
-58 < ϑ < -22	-	-	-	1.2
-22 < ϑ < +104	1	1	1	1
+104 < ϑ < +140	1	1.2	1	1.2
+140 < ϑ < +176	1	1.4	1	1.4
+176 < ϑ < +212	1.2	-	1	1.8
+212 < ϑ < +266	-	-	1.3	-

S_ϑ = Temperature factor depending on intermediate buffer materials

Drive side	Minimum load factor S_A
E-Motor, turbine	1
Hydraulic motor	1.1
Combustion machine 4 and more cylinders, U-degrees ≤ 1:100	1.2 (TVA)
Combustion machine 1 to 3 cylinders, U-degree > 1:100	1.4 (TVA)

S_A = Load factor of drive side:
We recommend for drivers with combustion machines to examine by a 'TVA' - torsional vibration calculation which coupling is suitable for the application!

Torque characteristics at operating point on outputside	Torque characteristics	Minimum load factor S_L
Constant, uniform without torque variation		1
Uniform with little variations, slight shocks		1,4
Non-uniform, also API-671, API-610 moderate shocks		1,75
Non-uniform, fluctuant, heavy shocks		2,5
Other torque characteristics	operating with or by piston engine	Own Specification/personal vibration calculation

S_L = Load factor of output side

Verifying the maximum torque of the coupling:
The following equation applies for transient impact torques, which occur e.g. by starting an electric motor:

$$T_{Kmax} > T_{max} \cdot S_\vartheta \cdot S_Z \quad (3)$$

T_{Kmax} = Maximum torque of the coupling [ft-lbs] according to catalogue
T_{max} = Maximum impact torque of machine [ft-lbs]
(e.g. when starting an electric motor: $T_{max} = T_{Kipp}$
T_{Kipp} = Tipping torque by starting with directly engaged asynchronous motor e.g. $T_{Kipp} \sim 2.5 \cdot T$; observe details of motor producer)

Start-ups per hour [1/h]	Start-up factor S_Z
< 120	1
120 - 140	1.3
>240	on request

S_Z = Start-up factor

Check selected coupling size

- Check whether the **hub bore** is able to accommodate the shaft diameters. The values of the maximum finish bores stated in the tables are applicable for keyed connections according to DIN 6885/1 and must not be exceeded.
- Check the power transmission capability of the **shaft-hub-connection**. The nominal torques stated in the tables will be reliably transmitted by the couplings. The introduction of the torque into the coupling hub has to be verified by the user of the coupling according to recognized rules of technology. If necessary, the second key is to be offset by 180°.
- Observe the **maximum permissible speed** of the coupling.
- Check whether **balancing** is necessary. We advise to balance the coupling parts or sub assemblies if the circum ferential speed at the outer diameter exceeds 22 m/s. Balancing can only be performed on couplings with finish-bores. Unless otherwise specified, the half-key convention applies, so that the coupling hubs are balanced prior to producing the keyways.

Dimensioning example

Example for dimensioning a coupling for a pump drive with electric motor type IEC 355; preselected type: TSCHAN® TNR.1 (single-row)

Coupling size TNR 320.1 with buffer quality Vk90 and 6269 ft-lbs nominal coupling torque are selected from the catalogue data sheet. The dimension of coupling TNR 320.1 is OK for the performance data. The operating speed of 1480 rpm results in a circumferential speed of 24.8 m/s. Therefore it is recommended to balance the coupling parts. If the shaft-hub connections are dimensioned sufficiently, this coupling can be used.

Input power P_N =	476 hp	
Operating speed n_N =	1480 min^{-1}	
Nominal torque TN =	5252 · P_N/ n = 5252 · 476 / 1480 = 1689 ft-lbs	Acc. to equation (1)
Ambient temperatur ϑ =	149 °F	
→ Temperature factor S_ϑ =	1.4	For Vk
Load factor		
Drive motor	Directly engaged asynchronous motor (Δ-connection)	
→ Load factor of drive side S_A =	1	
Working machine	Centrifugal pump - torque characteristics uniform with little variations, skight shocks	Figure b)
→ Load factor of output side S_L =	1.25	
Required nominal torque of the coupling T_{KN} >	$T_N \cdot S_\vartheta \cdot S_f$ = 1689 ft-lbs · 1.4 · 1.25 = 2956 ft-lbs	Acc. to equation (2)

Verifying the maximum torque of the coupling

Maximum torque T_{max} = $T_{max} = T_{Kipp}$ = Tipping torque when starting with directly engaged asynchronous motors	2.5 · T_N = 2.5 · 1689 ft-lbs = 4222.5 ft-lbs	
Ambient temperature ϑ =	149 °F	
→ Temperature factor S_ϑ =	1.4	For Vk90
Starts per hour	6	
→ Start-up factor S_Z =	1	For Vk90
Required maximum torque of the coupling T_{Kmax} >	$T_{max} \cdot S_\vartheta \cdot S_Z$ = 4222.5 ft-lbs · 1.4 · 1 = 5911.5 ft-lbs	Acc. to equation (3)

Verifying the dimensioning result

Value	System data	Coupling data TNR 320.1 Vk90
Nominal torque	2956 ft-lbs (without safety factor)	6269 ft-lbs
Maximum torque	5911.5 ft-lbs (without safety factor)	12539 ft-lbs
Speed	1480 rpm	Max. 3000 rpm
Shaft diameter motor	3.75 inch	Max. 6.496 inch
Shaft diameter pump	3.34 inch	Max. 5.709 inch

Technical installation instructions

Arrangement of the coupling parts
The coupling hubs have to be arranged on the shaft ends in accordance with the coupling type. In order to obtain a shaft-hub connection that is capable of carrying the load it is important to ensure that the hubs are pushed onto the shaft until the face of the hub is flush with the shaft end.

Bore
The stated values for the finished bores are valid for a keyway according to DIN 6885/1 and must not be exceeded. To ensure true running, select the bore fit in such a manner that, when mating it with the shaft tolerance, a tight fit or light interference fit, such as e.g. H7/m6 or tighter, results. Precise details are required for shrinking a keyless hub on a shaft.

Fastening on a shaft
If not specified TSCHAN® couplings are usually supplied with keyways according to DIN 6885/1. In addition, the hub should be axially locked in position, for example by means of a set screw, or by means of distance rings in case of longer shaft ends. The key must be axially fixed in the shaft.

Observe restoring forces
The coupling compensates the permissible misalignments with low restoring forces. Please observe the alignment values specified in the assembly and operation manual. If highly loaded bearings are involved, the additional loads resulting from the restoring forces should be taken into consideration. In such cases, please contact RINGFEDER POWER TRANSMISSION for more detailed information.

Shaft end bearings
The shaft ends to be coupled should be supported by bearings which are directly fitted in front and after the coupling.

Attention!
In the interest of further development, we reserve the right to make changes which serve technological progress. Carefully observe the actually instructions given in the relevant installation and operation manual, which can be downloaded from our webpage **www.ringfeder.com**.

Data overview:
The technical data sheets show the performance data and dynamic stiffness of the coupling types for the different materials and their combinations as a function of size. The materials comprise synthetic rubber materials and cast polyurethanes of different hardness. Coupling data is arranged by torque in ascending order. The principle again applies that harder buffers of the same material can transmit larger torques, but with increasing coupling stiffness.

To reduce the stiffness at a higher torque, the second buffer row, on a larger diameter, is added in series. The coupling data are tabulated based on this relationship. Only the preferred material combinations are included. Especially data for materials and their combinations for low and high temperature applications are available on request. The nominal torque shown for coupling T_{KN} can be transmitted permanently. The maximum coupling torque T_{Kmax} can be transmitted for a short period, such as during start-up.
RINGFEDER POWER TRANSMISSION may be commissioned to carry out more accurate methods of calculation (TVA) to select a coupling.

Please request RINGFEDER POWER TRANSMISSION to provide additional data for calculation if you need these for the calculation of torsional harmonics calculations.

Properties · Advantages
Elastic to highly elastic

- **Specific adjustment of dynamic characteristics by selection of the elastic buffers**
- **Positively disconnecting or, by a simple modification, not disconnecting**
- **Very compact construction, allowing the coupling to be installed in confined spaces**
- **Easy exchange of wearing parts without dismantling hubs or flanges**
- **The modular system design allows special solutions to be cost-effectively implemented**
- **Adjustment of the stiffness at no additional cost, even for single projects**

Applications

- **Energy recovery · Generation**
  Hydro and wind power plant, Generator sets
- **Industrial plant**
  Belt conveyors, Crushers, Mills, Mixers
- **Process technology**
  Pumps, Extractors, Compressors, Fans
- **Construction machines · Transport**
  Gas engines, Diesel engines
- **Test rigs**

Power Plant

Technical data sheet

Size	Buffer inside/outside	Nominal torque T_{KN}	Max. torque T_{Kmax}	Permanent oscillating torque *) T_{KW}	Max. speed n_{max}	
		ft-lbs	ft-lbs	ft-lbs	rpm	
120.1	Pb 60	118	236	71	6000	
160.2	Pb 60 / Pb 60	118	236	71	5000	
120.1	Pb 70	133	266	80	6000	
160.2	Pb 70 / Pb 60	133	266	80	5000	
120.1	Pb 80	221	443	133	6000	
160.2	Pb 80 / Pb 70	221	443	133	5000	
120.1	VK 80	221	443	133	6000	
160.2	VK 80 / Vk 80	221	443	133	5000	
120.1	VK90	376	752	226	6000	
160.2	VK 90 / Vk 80	376	752	226	5000	
160.1	Pb 60	240	479	144	5000	
200.2	Pb 60 / Pb 60	240	479	144	4000	
160.1	Pb 70	266	531	159	5000	
200.2	Pb 70 / Pb 60	266	531	159	4000	
160.1	Pb 80	443	752	266	5000	
200.2	Pb 80 / Pb 70	443	752	266	4000	
160.1	VK 80	443	885	266	5000	
200.2	VK 80 / Vk 80	443	885	266	4000	
160.1	VK 90	752	1505	451	5000	
200.2	VK 90 / Vk 90	752	1505	451	4000	
200.1	Pb 60	498	996	299	4000	
260.2	Pb 60 / Pb 60	498	996	299	3600	
200.1	Pb 70	553	1106	332	4000	
260.2	Pb 70 / Pb 60	553	1106	332	3600	
200.1	Pb 80	922	1844	553	4000	
260.2	Pb 80 / Pb 70	922	1844	553	3600	
200.1	VK 80	922	1844	553	4000	
260.1	VK 80 / Vk 80	922	1844	553	3600	
200.1	VK 90	1567	3135	940	4000	
260.2	VK 90 / Vk 80	1567	3135	940	3600	
260.1	Pb 60	996	1991	597	3600	
320.2	Pb 60 / Pb 60	996	1991	597	3000	
260.1	Pb 70	1106	2213	664	3600	
320.2	Pb 70 / Pb 60	1106	2213	664	3000	
260.1	Pb 80	1844	3688	1106	3600	
320.2	Pb 80 / Pb 70	1844	3688	1106	3000	
260.1	VK 80	1844	3688	1106	3600	
320.2	VK 80 / Vk 80	1844	3688	1106	3000	
260.1	VK 90	3135	6269	1881	3600	
320.2	VK 90 / Vk 80	3135	6269	1660	3000	

*) Permanent oscillating torque ± T_{KW} at f ≥ 10 Hz, $T_{KW} \cdot \sqrt{\frac{10}{f_x}}$ applies at higher frequencies f_x

The data shown are an extract and apply to preferred buffer material combinations. Especially data for material combinations for low and high temperature applications are available on request. The characteristics of elastic materials depend on ambient temperature, frequency of the excitation and load change sequence, also manufacturing tolerances. These physical characteristics underlie the given stiffness data of the TNR buffers and should be considered when interpreting the calculated torsional harmonics (TVA). Further information on request.

Technical data sheet

	Size	Dynamical stiffness (Ct_{dyn})			
		0,25 T_{KN}	0,5 T_{KN}	0,75 T_{KN}	1 T_{KN}
		10^3 ft-lbs/rad	10^3 ft-lbs/rad	10^3 ft-lbs/rad	10^3 ft-lbs/rad
	120.1	1.0	1.3	1.5	1.7
	160.2	0.7	0.9	1.0	1.2
	120.1	1.6	2.1	2.4	2.8
	160.2	1.0	1.2	1.3	1.5
	120.1	1.9	2.3	2.6	2.9
	160.2	4.1	1.5	1.7	1.9
	120.1	2.9	3.5	4.1	4.5
	160.2	1.9	2.4	2.7	3.0
	120.1	6.6	8.1	9.4	10.5
	160.2	3.1	3.8	4.4	4.9
	160.1	2.1	2.6	3.0	3.5
	200.2	1.4	1.8	2.1	2.3
	160.1	3.3	4.2	4.9	5.5
	200.2	1.8	2.4	2.7	3.1
	160.1	3.8	4.6	5.2	5.8
	200.2	2.4	3.0	3.5	3.8
	160.1	5.8	7.0	8.0	9.0
	200.2	3.8	4.7	5.3	6.1
	160.1	13.2	16.3	18.9	21.1
	200.2	6.3	7.7	8.9	10.0
	200.1	4.4	5.5	6.4	7.2
	260.2	2.9	3.6	4.2	4.8
	200.1	6.9	8.7	10.3	11.5
	260.2	3.8	4.9	5.7	6.4
	200.1	8.0	9.6	10.8	12.0
	260.2	5.1	6.2	7.1	7.9
	200.1	11.9	14.6	16.8	18.8
	260.1	8.0	9.7	11.2	12.5
	200.1	27.6	33.9	39.3	44.0
	260.2	12.8	15.7	18.1	20.3
	260.1	8.7	10.9	12.7	14.3
	320.2	5.8	7.2	8.4	9.5
	260.1	13.8	17.4	20.4	23.1
	320.2	7.7	9.7	11.3	12.8
	260.1	16.1	19.1	21.8	24.0
	320.2	10.1	12.3	14.2	15.8
	260.1	23.8	29.1	33.6	37.6
	320.2	15.9	19.5	22.4	25.1
	260.1	55.1	67.9	78.6	88.0
	320.2	25.6	31.3	36.2	40.6

To continue see next page

Technical data sheet

Size	Buffer inside/outside	Nominal torque T_{KN}	Max. torque T_{Kmax}	Permanent oscillating torque *) T_{KW}	Max. speed n_{max}	
		ft-lbs	ft-lbs	ft-lbs	rpm	
320.1	Pb 60	1991	3983	1195	3000	
400.2	Pb 60 / Pb 60	1991	3983	1195	2400	
320.1	Pb 70	2213	4425	1328	3000	
400.2	Pb 70 / Pb 60	2213	4425	1328	2400	
320.1	Pb 80	3688	7376	2213	3000	
400.2	Pb 80 / Pb 70	3688	7376	2213	2400	
320.1	VK 80	3688	7376	2213	3000	
400.2	VK 80 / Vk 80	3688	7376	2213	2400	
320.1	VK 90	6269	12539	3762	3000	
400.2	VK 90 / Vk 80	6269	12539	3762	2400	
400.1	Pb 60	3983	7966	2390	2400	
500.2	Pb 60 / Pb 60	3983	7966	2390	1800	
400.1	Pb 70	4425	8851	2655	2400	
500.2	Pb 70 / Pb 60	4425	8851	2655	1800	
400.1	Pb 80	7376	14751	4425	2400	
500.2	Pb 80 / Pb 70	7376	14751	4425	1800	
400.1	VK 80	7376	14751	4425	2400	
500.2	VK 80 / Vk 80	7376	14751	4425	1800	
400.1	VK 90	12539	25077	7523	2400	
500.2	VK 90 / Vk 80	12539	25077	7523	1800	
500.1	Pb 60	7966	15932	4779	1800	
640.2	Pb 60 / Pb 60	7966	15932	4779	1500	
500.1	Pb 70	8851	17702	5311	1800	
640.2	Pb 70 / Pb 60	8851	17702	5311	1500	
500.1	Pb 80	14751	29503	8851	1800	
640.2	Pb 80 / Pb 70	14751	29503	8851	1500	
500.1	VK 80	14751	29503	8851	1800	
640.2	VK 80 / Vk 80	14751	29503	8851	1500	
500.1	VK 90	25077	50155	15046	1800	
640.2	VK 90 / Vk 80	25077	50155	15046	1500	
640.1	Pb 60	15932	31863	9559	1500	
640.1	Pb 70	17702	35403	10621	1500	
640.1	Pb 80	29503	59006	17702	1500	
640.1	VK 80	29503	59006	17702	1500	
640.1	VK 90	50155	100310	30093	1500	

*) Permanent oscillating torque ± T_{KW} at f ≥ 10 Hz, $T_{KW} \cdot \sqrt{\frac{10}{f_x}}$ applies at higher frequencies f_x

The data shown are an extract and apply to preferred buffer material combinations. Especially data for material combinations for low and high temperature applications are available on request. The characteristics of elastic materials depend on ambient temperature, frequency of the excitation and load change sequence, also manufacturing tolerances. These physical characteristics underlie the given stiffness data of the TNR buffers and should be considered when interpreting the calculated torsional harmonics (TVA). Further information on request.

Technical data sheet

	Size	Dynamical stiffness (Ct_{dyn})			
		0,25 T_{KN}	0,5 T_{KN}	0,75 T_{KN}	1 T_{KN}
		10^3 ft-lbs/rad	10^3 ft-lbs/rad	10^3 ft-lbs/rad	10^3 ft-lbs/rad
	320.1	17.4	21.8	25.3	28.6
	400.2	11.6	14.5	16.9	19.0
	320.1	27.5	34.9	40.9	46.1
	400.2	15.3	19.3	22.6	25.5
	320.1	32.1	38.2	43.4	48.2
	400.2	20.3	24.7	28.4	31.6
	320.1	47.7	58.3	67.3	75.2
	400.2	31.8	38.9	44.8	50.1
	320.1	110.2	135.8	157.2	176.1
	400.2	51.1	62.8	72.5	81.1
	400.1	35.3	44.0	51.3	57.9
	500.2	23.2	29.0	33.8	38.1
	400.1	55.1	69.7	81.7	92.2
	500.2	30.8	38.7	45.2	51.0
	400.1	64.2	76.5	86.9	96.3
	500.2	40.6	49.3	56.7	63.2
	400.1	95.4	116.7	134.5	150.3
	500.2	63.6	77.7	89.7	100.2
	400.1	220.4	271.6	314.4	352.0
	500.2	102.2	125.5	144.9	162.2
	500.1	69.6	87.0	101.3	114.3
	640.2	46.4	58.0	67.6	76.2
	500.1	110.1	139.4	163.5	184.4
	640.2	61.5	77.4	90.5	102.1
	500.1	128.3	152.9	173.8	192.5
	640.2	81.1	98.8	113.5	126.5
	500.1	190.8	233.3	269.0	300.7
	640.2	127.2	155.6	179.3	200.5
	500.1	440.8	543.1	628.9	704.2
	640.2	204.5	251.0	289.9	324.4
	640.1	139.2	174.1	202.6	228.6
	640.1	220.3	278.8	327.0	368.8
	640.1	256.7	305.9	347.6	385.0
	640.1	381.5	466.7	537.9	601.3
	640.1	881.5	1086.2	1257.8	1408.2

TSCHAN® TNR 2424.1

Single-row torsional highflex TSCHAN® TNR 2424.1 for flange-shaft connection, flange connecting dimensions acc. to SAE J 620 d.

In mind of X_1 easy replacement of the elastic elements without axial movement of the coupled machines.

Dimensions

$d_{1f\ max}$	=	Max. bore diameter d_1 with keyway or other form closure connection
SAE	=	Flange connection to SAE J 620 d
A	=	Max. outer diameter
D_{PC7}	=	Pitch circle diameter of bore holes d_7
d_7	=	Bore diameter
n_{b7}	=	Quantity of bore d_7
D	=	Outer diameter
D_1	=	Outer diameter hub
C_1	=	Guided length in hub boring

Dimensions

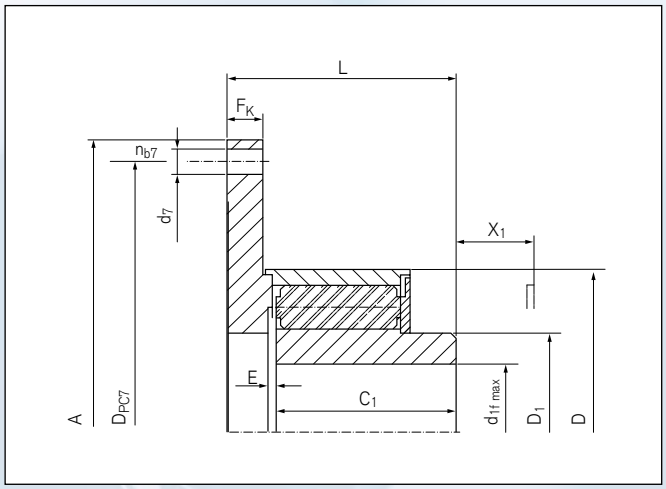
Size	$d_{1f\ max}$	SAE Size	A	D_{PC7}	d_7	n_{b7}	D	D_1	C_1
	inch		inch	inch	inch	pcs.	inch	inch	inch
120.1 - 06.5	1.969	6.5	8.500	7.875	0.374	6	4.724	2.874	2.559
120.1 - 07.5	1.969	7.5	9.500	8.752	0.374	8	4.724	2.874	2.559
120.1 - 08.0	1.969	8.0	10.374	9.625	0.433	6	4.724	2.874	2.559
120.1 - 10.0	1.969	10.0	12.375	11.625	0.433	8	4.724	2.874	2.559
160.1 - 06.5	2.756	6.5	8.500	7.875	0.374	6	6.299	3.937	3.543
160.1 - 07.5	2.756	7.5	8.750	8.398	0.374	8	6.299	3.937	3.543
160.1 - 08.0	2.756	8.0	10.374	9.625	0.433	6	6.299	3.937	3.543
160.1 - 10.0	2.756	10.0	12.375	11.625	0.433	8	6.299	3.937	3.543
200.1 - 07.5	3.543	7.5	8.750	8.398	0.374	8	7.874	5.079	4.528
200.1 - 08.0	3.543	8.0	10.374	9.625	0.433	6	7.874	5.079	4.528
200.1 - 10.0	3.543	10.0	12.375	11.625	0.433	8	7.874	5.079	4.528
200.1 - 11.5	3.543	11.5	13.875	13.139	0.433	8	7.874	5.079	4.528
260.1 - 10.0	4.528	10.0	12.375	11.625	0.433	8	10.236	6.496	5.512
260.1 - 11.5	4.528	11.5	13.875	13.139	0.433	8	10.236	6.496	5.512
260.1 - 14.0	4.528	14.0	18.375	17.250	0.571	8	10.236	6.496	5.512
260.1 - 16.0	4.528	16.0	20.375	19.252	0.571	8	10.236	6.496	5.512
320.1 - 14.0	5.709	14.0	18.375	17.250	0.571	8	12.598	8.268	6.890
320.1 - 16.0	5.709	16.0	20.375	19.252	0.571	8	12.598	8.268	6.890
320.1 - 18.0	5.709	18.0	22.501	21.374	0.709	6	12.598	8.268	6.890
400.1 - 16.0	7.283	16.0	20.375	19.252	0.571	8	15.748	10.827	9.055
400.1 - 18.0	7.283	18.0	22.501	21.374	0.709	6	15.748	10.827	9.055
400.1 - 21.0	7.283	21.0	26.500	25.252	0.709	12	15.748	10.827	9.055
400.1 - 24.0	7.283	24.0	28.875	27.252	0.866	12	15.748	10.827	9.055
500.1 - 21.0	9.055	21.0	26.500	25.252	0.709	12	19.685	13.189	11.811
500.1 - 24.0	9.055	24.0	28.875	27.252	0.866	12	19.685	13.189	11.811

Ordering example: TNR 2424.1

Series	Size	Buffer	d_{1f}	Further details*)
TNR 2424.1	200.1 - 08.0	Pb 70	3.150	*

*) Without any other specification, we deliver as a standard: with set screws and keyway acc. to DIN 6885-1, keyway side fit P9, bore tolerance H7

TSCHAN® TNR 2424.1



Sectional view

Dimensions

L = Total length
E = Gap width between left and right component
F_E = Tolerance of the gap width E
F_K = Flange thickness
X_1 = Required space for dismounting of the elastic buffer
J_F = Moment of inertia on thrust flange side
J_N = Moment of inertia hub side
Gw_{ub} = Weight, unbored

Dimensions

Size	L	E	F_E	F_K	X_1	J_F	J_N [1)]	Gw_{ub} [1)]
	inch	inch	inch	inch	inch	10^{-3}lbs-in^2	10^{-3}lbs-in^2	lbs
120.1 - 06.5	3.307	0.157	+/-0.039	0.512	1.093	20502	6834	9.1
120.1 - 07.5	3.307	0.157	+/-0.039	0.512	1.093	30753	6834	9.6
120.1 - 08.0	3.307	0.157	+/-0.039	0.512	1.093	41004	6834	10.3
120.1 - 10.0	3.307	0.157	+/-0.039	0.512	1.093	88842	6834	11.9
160.1 - 06.5	4.370	0.157	+/-0.039	0.591	0.906	30753	37587	18.9
160.1 - 07.5	4.370	0.157	+/-0.039	0.591	0.906	41004	37587	19.5
160.1 - 08.0	4.370	0.157	+/-0.039	0.591	0.906	54672	37587	20.3
160.1 - 10.0	4.370	0.157	+/-0.039	0.591	0.906	105927	37587	22.2
200.1 - 07.5	5.512	0.197	+/-0.059	0.709	1.102	78591	119595	37.3
200.1 - 08.0	5.512	0.197	+/-0.059	0.709	1.102	95676	119595	38.2
200.1 - 10.0	5.512	0.197	+/-0.059	0.709	1.102	153765	119595	40.5
200.1 - 11.5	5.512	0.197	+/-0.059	0.709	1.102	225522	119595	42.5
260.1 - 10.0	6.772	0.236	+/-0.059	0.945	1.575	314364	396372	77.3
260.1 - 11.5	6.772	0.236	+/-0.059	0.945	1.575	403206	396372	79.9
260.1 - 14.0	6.772	0.236	+/-0.059	0.945	1.575	888420	396372	89.0
260.1 - 16.0	6.772	0.236	+/-0.059	0.945	1.575	1301877	396372	94.3
320.1 - 14.0	8.346	0.276	+/-0.079	1.024	1.772	1619658	1281375	162.1
320.1 - 16.0	8.346	0.276	+/-0.079	1.024	1.772	2262054	1281375	168.9
320.1 - 18.0	8.346	0.276	+/-0.079	1.024	1.772	4083315	1281375	183.1
400.1 - 16.0	10.669	0.315	+/-0.079	1.220	1.811	2596920	4353258	313.1
400.1 - 18.0	10.669	0.315	+/-0.079	1.220	1.811	3317907	4353258	321.9
400.1 - 21.0	10.669	0.315	+/-0.079	1.220	1.811	5395443	4353258	337.3
400.1 - 24.0	10.669	0.315	+/-0.079	1.220	1.811	6953595	4353258	348.3
500.1 - 21.0	13.622	0.394	+/-0.098	1.339	2.047	8207634	14197635	637.1
500.1 - 24.0	13.622	0.394	+/-0.098	1.339	2.047	9830709	14197635	648.2

[1)] Weight and moment of inertia for unbored hubs

TSCHAN® TNR 2424.2

Double-row torsional highflex TSCHAN® TNR 2424.2 for flange-shaft connection, flange connecting dimensions acc. to SAE J 620 d.

In mind of X_1 easy replacement of the elastic buffers without axial movement of the coupled machines.

Dimensions

$d_{1f\ max}$ = Max. bore diameter d_1 with keyway or other form closure connection
SAE = Flange connection to SAE J 620 d
A = Max. outer diameter
D_{PC7} = Pitch circle diameter of bore holes d_7
d_7 = Bore diameter
n_{b7} = Quantity of bore d_7
D = Outer diameter
D_1 = Outer diameter hub
C_1 = Guided length in hub boring

Dimensions

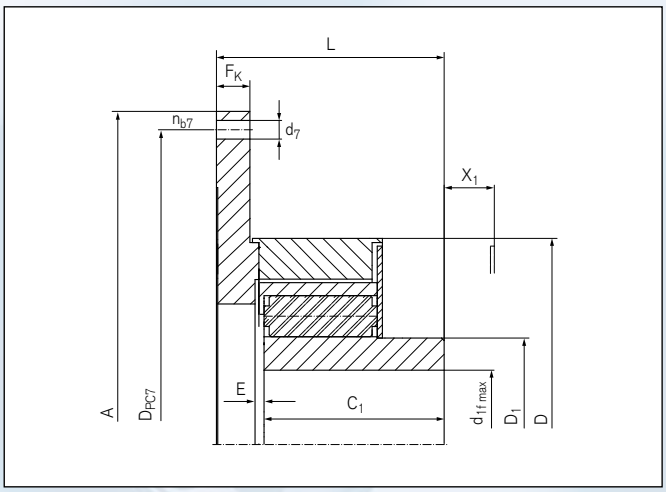
Size	$d_{1f\ max}$	SAE Size	A	D_{PC7}	d_7	n_{b7}	D	D_1	C_1
	inch		inch	inch	inch	pcs.	inch	inch	inch
160.2 - 06.5	1.969	6.5	8.500	7.875	0.374	6	6.299	2.874	2.559
160.2 - 07.5	1.969	7.5	9.500	8.752	0.374	8	6.299	2.874	2.559
160.2 - 08.0	1.969	8.0	10.374	9.625	0.433	6	6.299	2.874	2.559
160.2 - 10.0	1.969	10.0	12.375	11.625	0.433	8	6.299	2.874	2.559
200.2 - 07.5	2.756	7.5	8.750	8.398	0.374	8	7.874	3.937	3.543
200.2 - 08.0	2.756	8.0	10.374	9.625	0.433	6	7.874	3.937	3.543
200.2 - 10.0	2.756	10.0	12.375	11.625	0.433	8	7.874	3.937	3.543
200.2 - 11.5	2.756	11.5	13.875	13.139	0.433	8	7.874	3.937	3.543
260.2 - 10.0	3.543	10.0	12.375	11.625	0.433	8	10.236	5.079	4.528
260.2 - 11.5	3.543	11.5	13.875	13.139	0.433	8	10.236	5.079	4.528
260.2 - 14.0	3.543	14.0	18.375	17.250	0.571	8	10.236	5.079	4.528
260.2 - 16.0	3.543	16.0	20.375	19.252	0.571	8	10.236	5.079	4.528
320.2 - 14.0	4.528	14.0	18.375	17.250	0.571	8	12.598	6.496	5.512
320.2 - 16.0	4.528	16.0	20.375	19.252	0.571	8	12.598	6.496	5.512
320.2 - 18.0	4.528	18.0	22.501	21.374	0.709	6	12.598	6.496	5.512
400.2 - 16.0	5.709	16.0	20.375	19.252	0.571	8	15.748	8.189	6.890
400.2 - 18.0	5.709	18.0	22.501	21.374	0.709	6	15.748	8.189	6.890
400.2 - 21.0	5.709	21.0	26.500	25.252	0.709	12	15.748	8.189	6.890
400.2 - 24.0	5.709	24.0	28.875	27.252	0.866	12	15.748	8.189	6.890
500.2 - 21.0	7.283	21.0	26.500	25.252	0.709	12	19.685	10.551	9.055
500.2 - 24.0	7.283	24.0	28.875	27.252	0.866	12	19.685	10.551	9.055
640.2 - 24.0	9.055	24.0	28.875	27.252	0.866	12	25.197	13.189	11.811

Ordering example: TNR 2424.2

Series	Size	Buffer	d_{1f}	Further details*)
TNR 2424.2	260.2 - 14.0	Pb 70/Pb 60	3.150	*

*) Without any other specification, we deliver as a standard: with set screws and keyway acc. to DIN 6885-1, keyway side fit P9, bore tolerance H7

TSCHAN® TNR 2424.2



Sectional view

Dimensions

L	=	Total length
E	=	Gap width between left and right component
F_E	=	Tolerance of the gap width E
F_K	=	Flange thickness
X_1	=	Required space for dismounting of the elastic buffer
J_F	=	Moment of inertia on thrust flange side
J_N	=	Moment of inertia hub side
Gw_{ub}	=	Weight, unbored

Dimensions

	Size	L	E	F_E	F_K	X_1	J_F	J_N [1)]	Gw_{ub} [1)]
		inch	inch	inch	inch	inch	10^{-3}lbs-in^2	10^{-3}lbs-in^2	lbs
	160.2 - 06.5	3.386	0.157	-0.039	0.591	1.102	34170	10251	11.0
	160.2 - 07.5	3.386	0.157	-0.039	0.591	1.102	44421	10251	11.7
	160.2 - 08.0	3.386	0.157	-0.039	0.591	1.102	58089	10251	12.4
	160.2 - 10.0	3.386	0.157	-0.039	0.591	1.102	109344	10251	14.3
	200.2 - 07.5	4.528	0.197	-0.079	0.709	0.906	71757	47838	22.3
	200.2 - 08.0	4.528	0.197	-0.079	0.709	0.906	88842	47838	23.2
	200.2 - 10.0	4.528	0.197	-0.079	0.709	0.906	146931	47838	25.5
	200.2 - 11.5	4.528	0.197	-0.079	0.709	0.906	218688	47838	27.5
	260.2 - 10.0	5.787	0.236	-0.079	0.945	1.102	293862	150348	48.4
	260.2 - 11.5	5.787	0.236	-0.079	0.945	1.102	382704	150348	51.1
	260.2 - 14.0	5.787	0.236	-0.079	0.945	1.102	867918	150348	60.1
	260.2 - 16.0	5.787	0.236	-0.079	0.945	1.102	1281375	150348	65.4
	320.2 - 14.0	6.968	0.276	-0.079	1.024	1.535	1585488	492048	104.5
	320.2 - 16.0	6.968	0.276	-0.079	1.024	1.535	2227884	492048	111.2
	320.2 - 18.0	6.968	0.276	-0.079	1.024	1.535	4049145	492048	125.4
	400.2 - 16.0	8.504	0.315	-0.079	1.220	2.008	2528580	1578654	183.9
	400.2 - 18.0	8.504	0.315	-0.079	1.220	2.008	3249567	1578654	192.0
	400.2 - 21.0	8.504	0.315	-0.079	1.220	2.008	5327103	1578654	208.9
	400.2 - 24.0	8.504	0.315	-0.079	1.220	2.008	6885255	1578654	218.7
	500.2 - 21.0	10.866	0.394	-0.118	1.339	2.047	7951359	5275848	379.2
	500.2 - 24.0	10.866	0.394	-0.118	1.339	2.047	9574434	5275848	388.0
	640.2 - 24.0	14.173	0.591	-0.197	1.772	2.362	20481498	17426700	749.6

[1)] Weight and moment of inertia for unbored hubs

TSCHAN® TNR 2425.1

Single-row torsional highflex TSCHAN® TNR 2425.1 for flange-shaft connection and taper lock bushing systems, flange dimensions acc. to SAE J 620 d.

In mind of X_1 easy replacement of the elastic elements without axial movement of the coupled machines.

Dimensions

SAE = Flange connection to SAE J 620 d
A = Max. outer diameter
D_{PC7} = Pitch circle diameter of bore holes d_7
d_7 = Bore diameter
n_{b7} = Quantity of bore d_7
D = Outer diameter
D_1 = Outer diameter hub
C_1 = Guided length in hub boring

Dimensions

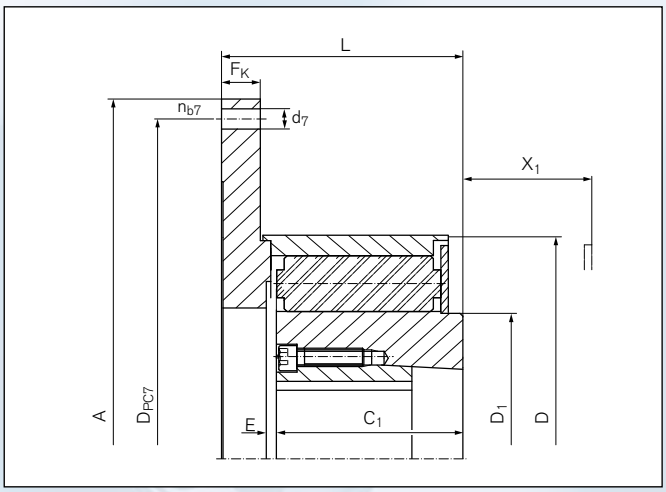
Size	Taper bushing	SAE Size	A	D_{PC7}	d_7	n_{b7}	D	D_1	C_1
			inch	inch	inch	pcs.	inch	inch	inch
120.1 - 06.5	1615	6.5	8.500	7.875	0.374	6	4.724	2.874	2.047
120.1 - 07.5	1615	7.5	9.500	8.752	0.374	8	4.724	2.874	2.047
120.1 - 08.0	1615	8.0	10.374	9.625	0.433	6	4.724	2.874	2.047
120.1 - 10.0	1615	10.0	12.375	11.625	0.433	8	4.724	2.874	2.047
160.1 - 06.5	2012	6.5	8.500	7.875	0.374	6	6.299	3.937	2.520
160.1 - 07.5	2012	7.5	9.500	8.752	0.374	8	6.299	3.937	2.520
160.1 - 08.0	2012	8.0	10.374	9.625	0.433	6	6.299	3.937	2.520
160.1 - 10.0	2012	10.0	12.375	11.625	0.433	8	6.299	3.937	2.520
200.1 - 07.5	2517	7.5	8.750	8.398	0.374	8	7.874	5.079	3.150
200.1 - 08.0	2517	8.0	10.374	9.625	0.433	6	7.874	5.079	3.150
200.1 - 10.0	2517	10.0	12.375	11.625	0.433	8	7.874	5.079	3.150
200.1 - 11.5	2517	11.5	13.875	13.139	0.433	8	7.874	5.079	3.150
260.1 - 10.0	3535	10.0	12.375	11.625	0.433	8	10.236	6.496	3.937
260.1 - 11.5	3535	11.5	13.875	13.139	0.433	8	10.236	6.496	3.937
260.1 - 14.0	3535	14.0	18.375	17.250	0.571	8	10.236	6.496	3.937
260.1 - 16.0	3535	16.0	20.375	19.252	0.571	8	10.236	6.496	3.937
320.1 - 14.0	4040	14.0	18.375	17.250	0.571	8	12.598	8.189	4.921
320.1 - 16.0	4040	16.0	20.375	19.252	0.571	8	12.598	8.189	4.921
320.1 - 18.0	4040	18.0	22.501	21.374	0.709	6	12.598	8.189	4.921
400.1 - 16.0	5050	16.0	20.375	19.252	0.571	8	15.748	10.551	6.142
400.1 - 18.0	5050	18.0	22.501	21.374	0.709	6	15.748	10.551	6.142
400.1 - 21.0	5050	21.0	26.500	25.252	0.709	12	15.748	10.551	6.142
400.1 - 24.0	5050	24.0	28.875	27.252	0.866	12	15.748	10.551	6.142

Ordering example: TNR 2425.1

Series	Size	Buffer	Taper bushing	Bore taper bushing
TNR 2425.1	200.1 - 08.0	Pb 70	2517	30

Taper bushing bore see page 30

TSCHAN® TNR 2425.1



Sectional view

Dimensions

L = Total length
E = Gap width between left and right component
F_E = Tolerance of the gap width E
F_K = Flange thickness
X_1 = Required space for dismounting of the elastic buffer
J_F = Moment of inertia on thrust flange side
J_N = Moment of inertia hub side
Gw_{ub} = Weight, unbored

Dimensions

Size	L	E	F_E	F_K	X_1	J_F	J_N [1)]	Gx_{ub} [1)]
	inch	inch	inch	inch	inch	10^{-3}lbs-in^2	10^{-3}lbs-in^2	lbs
120.1 - 06.5	2.795	0.157	0.039	0.512	1.614	20502	4783.8	6.2
120.1 - 07.5	2.795	0.157	0.039	0.512	1.614	30753	4783.8	6.8
120.1 - 08.0	2.795	0.157	0.039	0.512	1.614	41004	4783.8	7.4
120.1 - 10.0	2.795	0.157	0.039	0.512	1.614	88842	4783.8	9.1
160.1 - 06.5	3.307	0.157	+/- 0.039	0.591	1.969	30753	25969.2	11.6
160.1 - 07.5	3.307	0.157	+/- 0.039	0.591	1.969	41004	25969.2	12.3
160.1 - 08.0	3.307	0.157	+/- 0.039	0.591	1.969	54672	25969.2	13.0
160.1 - 10.0	3.307	0.157	+/- 0.039	0.591	1.969	105927	25969.2	14.9
200.1 - 07.5	4.094	0.197	+/- 0.059	0.709	2.520	78591	82008	22.5
200.1 - 08.0	4.094	0.197	+/- 0.059	0.709	2.520	95676	82008	23.4
200.1 - 10.0	4.094	0.197	+/- 0.059	0.709	2.520	153765	82008	25.7
200.1 - 11.5	4.094	0.197	+/- 0.059	0.709	2.520	225522	82008	27.7
260.1 - 10.0	5.197	0.236	+/- 0.059	0.945	3.150	314364	273360	44.8
260.1 - 11.5	5.197	0.236	+/- 0.059	0.945	3.150	403206	273360	47.5
260.1 - 14.0	5.197	0.236	+/- 0.059	0.945	3.150	888420	273360	56.5
260.1 - 16.0	5.197	0.236	+/- 0.059	0.945	3.150	1301877	273360	61.8
320.1 - 14.0	6.378	0.276	+/- 0.079	1.024	3.937	1619658	939675	98.3
320.1 - 16.0	6.378	0.276	+/- 0.079	1.024	3.937	2262054	939675	104.0
320.1 - 18.0	6.378	0.276	+/- 0.079	1.024	3.937	4083315	939675	110.8
400.1 - 16.0	7.756	0.315	+/- 0.079	1.220	4.961	2596920	3065049	185.0
400.1 - 18.0	7.756	0.315	+/- 0.079	1.220	4.961	3317907	3065049	193.0
400.1 - 21.0	7.756	0.315	+/- 0.079	1.220	4.961	5395443	3065049	210.0
400.1 - 24.0	7.756	0.315	+/- 0.079	1.220	4.961	6953595	3065049	219.8

[1)] Weight and mass moment of inertia for hubs without taper lock bushing

TSCHAN® TNR 2425.2

Double-row torsional highflex TSCHAN® TNR 2425.2 for flange-shaft connection and taper lock bushing systems, flange dimensions acc. to SAE J 620 d.

In mind of X_1 easy replacement of the elastic elements without axial movement of the coupled machines.

Dimensions

SAE = Flange connection to SAE J 620 d
A = Max. outer diameter
D_{PC7} = Pitch circle diameter of bore holes d_7
d_7 = Bore diameter
n_{b7} = Quantity of bore d_7
D = Outer diameter
D_1 = Outer diameter hub
C_1 = Guided length in hub boring

Dimensions

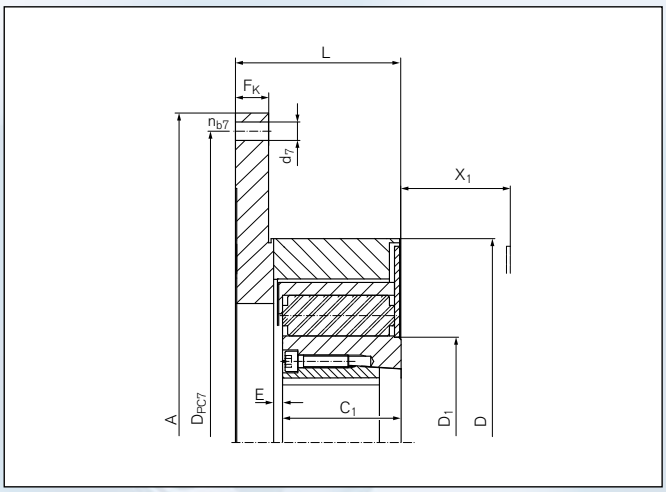
Size	Taper bushing	SAE Size	A	D_{PC7}	d_7	n_{b7}	D	D_1	C_1
			inch	inch	inch	pcs.	inch	inch	inch
160.2 - 06.5	1615	6.5	8.500	7.875	0.374	6	6.299	2.874	2.047
160.2 - 07.5	1615	7.5	9.500	8.752	0.374	8	6.299	2.874	2.047
160.2 - 08.0	1615	8.0	10.374	9.625	0.433	6	6.299	2.874	2.047
160.2 - 10.0	1615	10.0	12.375	11.625	0.433	8	6.299	2.874	2.047
200.2 - 07.5	2012	7.5	8.750	8.398	0.374	8	7.874	3.937	2.520
200.2 - 08.0	2012	8.0	10.374	9.625	0.433	6	7.874	3.937	2.520
200.2 - 10.0	2012	10.0	12.375	11.625	0.433	8	7.874	3.937	2.520
200.2 - 11.5	2012	11.5	13.875	13.139	0.433	8	7.874	3.937	2.520
260.2 - 10.0	2517	10.0	12.375	11.625	0.433	8	10.236	5.079	3.150
260.2 - 11.5	2517	11.5	13.875	13.139	0.433	8	10.236	5.079	3.150
260.2 - 14.0	2517	14.0	18.375	17.250	0.571	8	10.236	5.079	3.150
260.2 - 16.0	2517	16.0	20.375	19.252	0.571	8	10.236	5.079	3.150
320.2 - 14.0	3535	14.0	18.375	17.250	0.571	8	12.598	6.496	3.937
320.2 - 16.0	3535	16.0	20.375	19.252	0.571	8	12.598	6.496	3.937
320.2 - 18.0	3535	18.0	22.501	21.374	0.709	6	12.598	6.496	3.937
400.2 - 16.0	4040	16.0	20.375	19.252	0.571	8	15.748	8.189	4.921
400.2 - 18.0	4040	18.0	22.501	21.374	0.709	6	15.748	8.189	4.921
400.2 - 21.0	4040	21.0	26.500	25.252	0.709	12	15.748	8.189	4.921
400.2 - 24.0	4040	24.0	28.875	27.252	0.866	12	15.748	8.189	4.921
500.2 - 21.0	5050	21.0	26.500	25.252	0.709	12	19.685	10.551	6.142
500.2 - 24.0	5050	24.0	28.875	27.252	0.866	12	19.685	10.551	6.142

Ordering example: TNR 2425.2

Series	Size	Buffer	Taper bushing	Bore taper bushing
TNR 2425.2	260.2 - 14.0	Pb 70/Pb 60	2517	30

Taper bushing bore see page 30

TSCHAN® TNR 2425.2



Sectional view

Dimensions

L	=	Total length
E	=	Gap width between left and right component
F_E	=	Tolerance of the gap width E
F_K	=	Flange thickness
X_1	=	Required space for dismounting of the elastic buffer
J_F	=	Moment of inertia on thrust flange side
J_N	=	Moment of inertia hub side
Gw_{ub}	=	Weight, unbored

Dimensions

Size	L	E	F_E	F_K	X_1	J_F	J_N [1)]	Gx_{ub} [1)]
	inch	inch	inch	inch	inch	10^{-3}lbs-in^2	10^{-3}lbs-in^2	lbs
160.2 - 06.5	2.795	0.157	-0.039	0.591	1.614	34170	30753	8.2
160.2 - 07.5	2.795	0.157	-0.039	0.591	1.614	44421	41004	8.8
160.2 - 08.0	2.795	0.157	-0.039	0.591	1.614	58089	54672	9.6
160.2 - 10.0	2.795	0.157	-0.039	0.591	1.614	109344	105927	11.5
200.2 - 07.5	3.307	0.197	-0.059	0.709	1.969	71757	61506	15.0
200.2 - 08.0	3.307	0.197	-0.059	0.709	1.969	88842	78591	15.9
200.2 - 10.0	3.307	0.197	-0.059	0.709	1.969	146931	136680	18.2
200.2 - 11.5	3.307	0.197	-0.059	0.709	1.969	218688	208437	20.2
260.2 - 10.0	4.094	0.236	-0.059	0.945	2.520	293862	259692	33.5
260.2 - 11.5	4.094	0.236	-0.059	0.945	2.520	382704	348534	36.2
260.2 - 14.0	4.094	0.236	-0.059	0.945	2.520	867918	833748	45.3
260.2 - 16.0	4.094	0.236	-0.059	0.945	2.520	1281375	1247205	50.6
320.2 - 14.0	5.197	0.276	-0.079	1.024	3.150	1585488	1031934	66.3
320.2 - 16.0	5.197	0.276	-0.079	1.024	3.150	2227884	1462476	72.0
320.2 - 18.0	5.197	0.276	-0.079	1.024	3.150	4049145	2104872	78.8
400.2 - 16.0	6.378	0.315	-0.079	1.220	3.937	2528580	2186880	125.8
400.2 - 18.0	6.378	0.315	-0.079	1.220	1.220	3249567	2907867	133.9
400.2 - 21.0	6.378	0.315	-0.079	1.220	3.937	5327103	4985403	150.8
400.2 - 24.0	6.378	0.315	-0.079	1.220	3.937	6885255	6543555	160.6
500.2 - 21.0	7.756	0.394	-0.098	1.339	4.961	7951359	6663150	251.3
500.2 - 24.0	7.756	0.394	-0.098	1.339	4.961	9574434	8286225	260.1

[1)] Weight and mass moment of inertia for hubs without taper lock bushing

TSCHAN® TNR 2428.1

Single-row torsional highflex TSCHAN® TNR 2428.1 for shaft-shaft connection.

In mind of X_1 easy replacement of the elastic elements without axial movement of the coupled machines.

Dimensions

$d_{1f\ max}$ = Max. bore diameter d_1 with keyway or other form closure connection
$d_{2f\ max}$ = Max. bore diameter d_2 with keyway or other form closure connection
D = Outer diameter
D_1 = Outer diameter hub
D_2 = Outer diameter hub
C_1 = Guided length in hub boring
C_2 = Guided length in hub boring

Dimensions

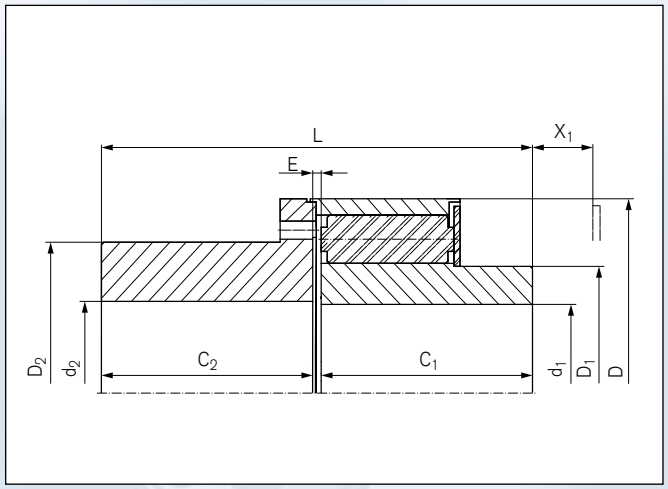
Size	$d_{1f\ max}$	$d_{2f\ max}$	D	D_1	D_2	C_1	C_2	
	inch	inch	inch	inch		inch	inch	
120.1	1.969	2.165	4.724	2.874	3.346	2.559	2.559	
160.1	2.756	2.953	6.299	3.937	4.528	3.543	3.543	
200.1	3.543	4.134	7.874	5.079	6.102	4.528	4.528	
260.1	4.528	5.118	10.236	6.496	7.677	5.512	5.512	
320.1	5.709	6.496	12.598	8.268	9.646	6.890	6.890	
400.1	7.283	8.465	15.748	10.827	12.008	9.055	9.055	
500.1	9.055	9.843	19.685	13.189	13.780	11.811	11.811	
640.1	11.811	12.598	25.197	16.929	17.717	14.961	14.961	

Ordering example: TNR 2428.1

Series	Size	Buffer	d_{1f}	d_{2f}	Further details*)
TNR 2428.1	260.1	Vk 90	3.937	3.543	*

*) Without any other specification, we deliver as a standard: with set screws and keyway acc. to DIN 6885-1, keyway side fit P9, bore tolerance H7

TSCHAN® TNR 2428.1



Sectional view

Dimensions

E = Gap width between left and right component
F_E = Tolerance of the gap width E
L = Total length
X_1 = Required space for dismounting of the elastic buffer
J_F = Moment of inertia on thrust flange side
J_N = Moment of inertia hub side
Gw_{ub} = Weight, unbored

Dimensions

	Size	E	F_E	L	X_1	J_F	J_N [1)]	Gx_{ub} [1)]
		inch	inch	inch		10^{-3}lbs-in^2		lbs
	120.1	0.157	+/- 0.039	5.276	1.102	17085	6834	14.8
	160.1	0.157	+/- 0.039	7.244	0.906	78591	37587	36.0
	200.1	0.197	+/- 0.059	9.252	1.102	283611	119595	77.0
	260.1	0.236	+/- 0.059	11.260	1.575	936258	396372	153.7
	320.1	0.276	+/- 0.079	14.055	1.969	2747268	1281375	302.0
	400.1	0.315	+/- 0.079	18.425	2.047	8142711	4353258	612.9
	500.1	0.394	+/- 0.098	24.016	2.362	21099975	14197635	1161.8
	640.1	0.591	+/- 0.177	30.512	2.677	72829938	45634035	2398.6

[1)] Weight and moment of inertia for unbored hubs

TSCHAN® TNR 2428.2

Double-row torsional highflex TSCHAN® TNR 2428.2 for shaft-shaft connection.

In mind of X_1 easy replacement of the elastic buffers without axial movement of the coupled machines.

Dimensions

$d_{1f\ max}$ = Max. bore diameter d_1 with keyway or other form closure connection
$d_{2f\ max}$ = Max. bore diameter d_2 with keyway or other form closure connection
D = Outer diameter
D_1 = Outer diameter hub
D_2 = Outer diameter hub
C_1 = Guided length in hub boring
C_2 = Guided length in hub boring

Dimensions

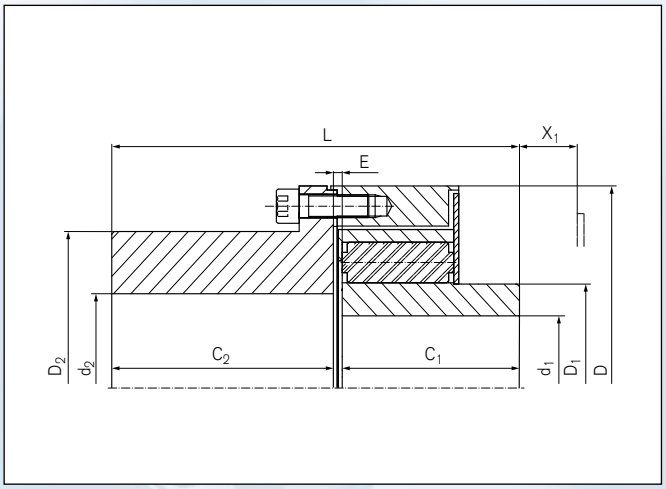
Size	$d_{1f\ max}$	$d_{2f\ max}$	D	D_1	D_2	C_1	C_2	
	inch	inch	inch	inch		inch	inch	
160.2	1.969	2.953	6.299	2.874	4.528	2.559	3.543	
200.2	2.756	4.134	7.874	3.937	6.102	3.543	4.528	
260.2	3.543	5.118	10.236	5.079	7.677	4.528	5.512	
320.2	4.528	6.496	12.598	6.496	9.646	5.512	6.890	
400.2	5.709	8.465	15.748	8.268	12.008	6.890	9.055	
500.2	7.283	9.843	19.685	10.827	13.780	9.055	11.811	
640.2	9.055	12.598	25.197	13.189	17.717	11.811	14.961	

Ordering example: TNR 2428.2

Series	Size	Buffer	d_{1f}	d_{2f}	Further details*)
TNR 2428.2	260.2	Vk 90/Vk 80	3.150	4.724	*

*) Without any other specification, we deliver as a standard: with set screws and keyway acc. to DIN 6885-1, keyway side fit P9, bore tolerance H7

TSCHAN® TNR 2428.2



Sectional view

Dimensions

E = Gap width between left and right component
F_E = Tolerance of the gap width E
L = Total length
X_1 = Required space for dismounting of the elastic buffer
J_F = Moment of inertia on thrust flange side
J_N = Moment of inertia hub side
Gw_{ub} = Weight, unbored

Dimensions

Size	E	F_E	L	X_1	J_F	J_N [1)]	Gx_{ub} [1)]
	inch	inch	inch		10^{-3}lbs-in^2		lbs
160.2	0.157	- 0.039	6.260	1.102	78591	10251	28.2
200.2	0.197	- 0.059	8.268	0.906	276777	47838	62.0
260.2	0.236	- 0.059	10.276	1.102	915756	150348	124.8
320.2	0.276	- 0.079	12.677	1.575	2713098	492048	242.5
400.2	0.315	- 0.079	16.260	1.969	8074371	1578654	482.9
500.2	0.394	- 0.098	21.260	2.047	20843700	5275848	901.7
640.2	0.591	- 0.177	27.362	2.362	71934684	17426700	1885.0

[1)] Weight and moment of inertia for unbored hubs

Ordering examples

Ordering examples

TNR 2424.1, size 260.1 – 16 Pb 70/4 inch H7/keyway to AGMA 9002/1 P9/set screw

Torsional highflex TSCHAN® TNR 2424.1, single-row, size 260, Pb 70 buffer and SAE flange connection size 16, hub bore diameter 4 inch H7 with keyway to AGMA 9002/1 tolerance P9 and set screw

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TNR 2424.2, size 260.2 – 16 Pb 70/Pb 60/90 H7/keyway to DIN 6885/1 P9/set screw

Torsional highflex TSCHAN® TNR 2424.2, double-row, size 260, Pb 70 buffer inside and Pb 60 outside and SAE flange connection size 16, hub bore diameter 90 H7 with keyway to DIN 6885/1 tolerance P9 and set screw

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TNR 2425.2, size 260.2 – 11.5 Vk 90/Vk 80/2517/1 1/4

Torsional highflex TSCHAN® TNR 2425.2, double-row, size 260, Vk 90 buffer inside and Vk 80 outside and SAE flange connection size 11.5, with taper lock bushing 2517 bush arbor hole 1 1/4 inch

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TNR 2428.1, size 260.1 Vk 90/100 H7/keyway to DIN 6885/1 P9/set screw/120 H7/keyway to DIN 6885/1 P9/ set screw

Torsional highflex TSCHAN® TNR 2428.1, single-row, size 260, Vk 90 buffer, hub bore diameter 100 H7 with keyway to DIN 6885/1 tolerance P9 and set screw flange hub bore diameter 120 H7 with keyway to DIN 6885/1 tolerance P9 and set screw

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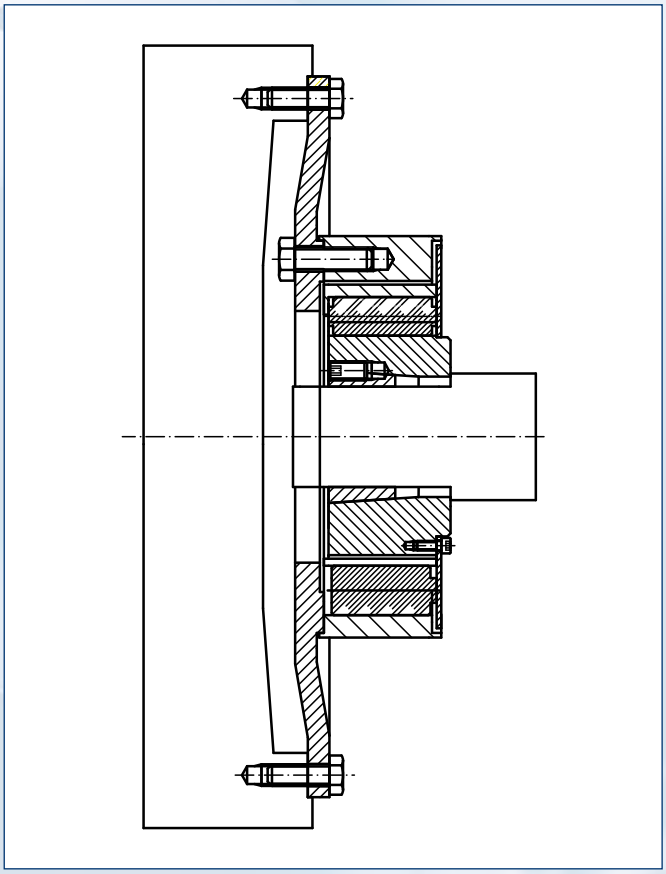
TNR 2428.2, size 260.2 Vk 90/Vk 80/100 H7/keyway to DIN 6885/1 P9/set screw/120 H7/keyway to DIN 6885/1 P9/set screw

Torsional highflex TSCHAN® TNR 2428.2 double-row, size 260, Vk 90 buffer inside, Vk 80 outside hub bore diameter 100 H7 with keyway to DIN 6885/1 tolerance P9 and set screw flange hub bore diameter 120 H7 with keyway to DIN 6885/1 tolerance P9 and set screw

Excerpt delivery program taper bushings

		Identifier					
Bore	Keyway width	1615	2012	2517	3535	4040	5050
1/2	1/8	X	X	X			
9/16	1/8	X	X	X			
5/8	3/16	X	X	X			
11/16	3/16	X	X	X			
3/4	3/16	X	X	X			
13/16	3/16	X	X	X			
7/8	3/16	X	X	X			
15/16	1/4	X	X	X			
1	1/4	X	X	X			
1 1/16	1/4	X	X	X			
1 1/8	1/4	X	X	X			
1 3/16	1/4	X	X	X	X		
1 1/4	1/4	X	X	X	X		
1 5/16	5/16	X	X	X	X		
1 3/8	5/16	X	X	X	X		
1 7/16	3/8	X	X	X	X	X	
1 1/2	3/8	X	X	X	X	X	
1 9/16	3/8	X	X	X	X	X	
1 5/8	3/8	X	X	X	X	X	
1 11/16	3/8	X	X	X	X	X	
1 3/4	3/8		X	X	X	X	
1 13/16	1/2		X	X	X	X	
1 7/8	1/2		X	X	X	X	
1 15/16	1/2		X	X	X	X	
2	1/2		X	X	X	X	
2 1/16	1/2		X	X	X	X	
2 1/8	1/2		X	X	X	X	
2 3/16	1/2			X	X	X	
2 1/4	1/2			X	X	X	
2 5/16	5/8			X	X	X	
2 3/8	5/8			X	X	X	
2 7/16	5/8			X	X	X	X
2 1/2	5/8			X	X	X	X
2 5/8	5/8			X	X	X	X
2 11/16	5/8			X	X	X	X
2 3/4	5/8				X	X	X
2 7/8	3/4				X	X	X
2 15/16	3/4				X	X	X
3	3/4				X	X	X
3 1/8	3/4				X	X	X
3 3/16	3/4				X	X	X
3 1/4	3/4				X	X	X
3 5/16	7/8				X	X	X
3 3/8	7/8				X	X	X
3 7/16	7/8				X	X	X
3 1/2	7/8				X	X	X
3 5/8	7/8				X	X	X
3 11/16	7/8				X	X	X
3 3/4	7/8				X	X	X
3 7/8	1				X	X	X
3 15/16	1				X	X	X
4	1					X	X
4 1/8	1					X	X
4 3/16	1					X	X
4 1/4	1					X	X
4 5/16	1					X	X
4 3/8	1					X	X
4 7/16	1					X	X
4 1/2	1						X
4 7/8	1 1/4						X
4 15/16	1 1/4						X
5	1 1/4						X

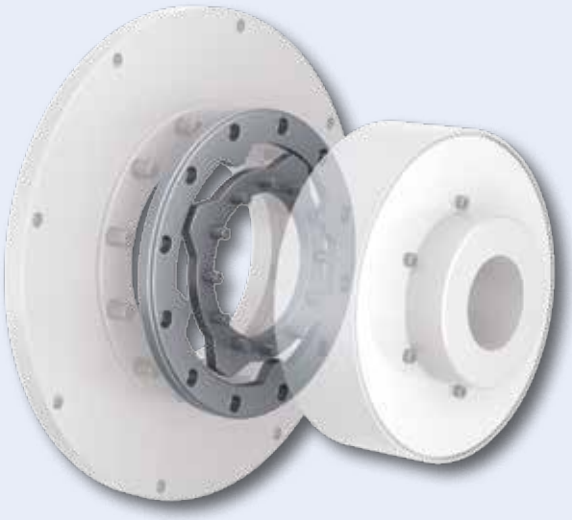
Solution for limited axial installation space



If axial space is extremely restricted, as demanded under DIN 6281, the free space in the flywheel may be utilised using a cropped SAE flange.

Prevention of disconnection

Disconnection may on request be prevented if it is necessary to ensure emergency operation of the couplings. This will maintain synchronism of the components. Disconnection prevention may be retrofitted for all coupling types.



The TSCHAN® TNR coupling will disconnect on failing (non fail-safe). This means that the drive train will disconnect should the elastic buffers be destroyed. The TSCHAN® TNR may be fitted to prevent disconnecting in applications where emergency operation must be enabled or a load must be supported. Metal claws which do not make contact under permissible loads will in this event transfer the torque.

Questionnaire on the dynamic coupling design

Questionnaire for coupling design for a simplified linear two-mass oscillator

to
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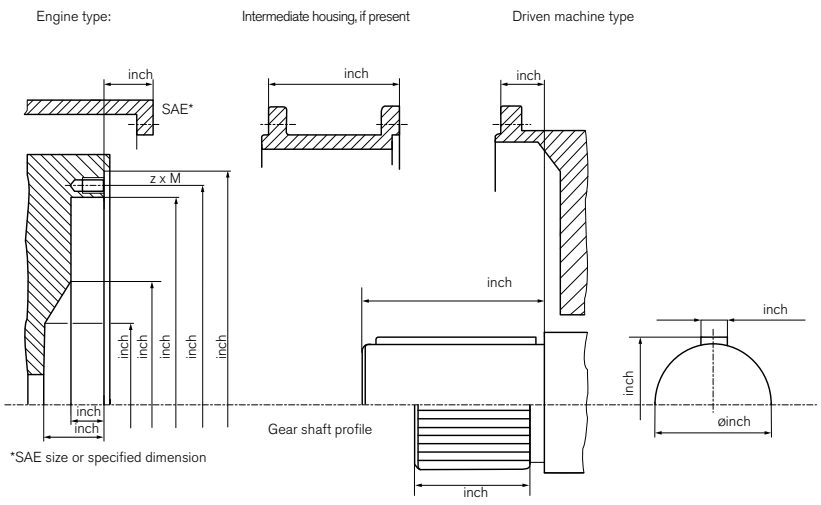
from	Department
Company	Address
Name	Fax/E-Mail

If the working machines must be flanged to the engine via an intermediate housing, we would appreciate dimensions and detail as indicated in the figure below in order to calculate the optimal installation position.



The coupling should always be adequately ventilated in the intermediate housing (e.g. via venting apertures in the intermediate housing).

Questionnaire on the dynamic coupling design

Drive side

Engine type/manufacturer's designation _____

Power _____ [kW]

Rpm/rpm range _____ [min^{-1}]

Mass moment of inertia of the engine _____ [kgm^2]

Mass moment of inertia of the flywheel _____ [kgm^2]

Total mass moment of inertia _____ [kgm^2]

For internal combustion engines
manufacturer and designation

Diesel ☐ Otto ☐ Gas engine ☐ In-line engine ☐ V-engine ☐

V-angle _____

Strokes _____

Displacement per cylinder _____ [cm^3]

Number of cylinders _____

Ignition sequence _____

Driven side

Generator ☐ Pump ☐ Compressor ☐ Other ☐

_____ _____ _____ _____

Manufacturer's designation

Mass moment of inertia of the driven side _____ [kgm^2]

Operating rpm, if not engine rpm _____ [min^{-1}]

Information on the coupling

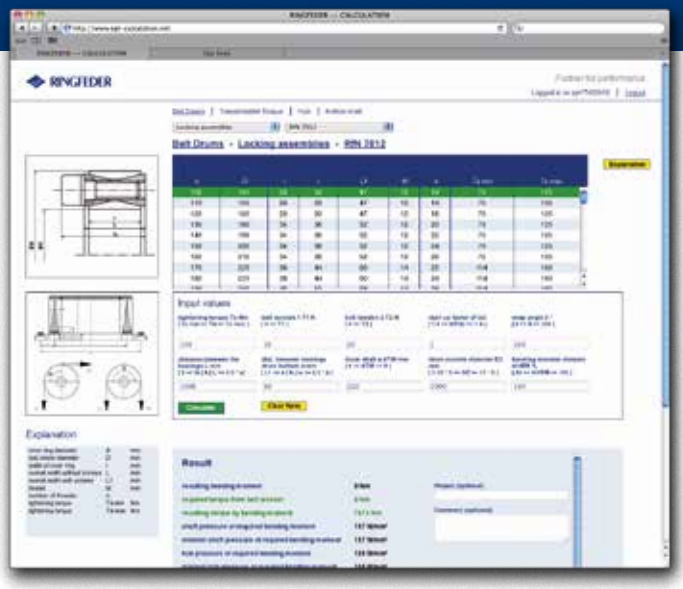
Ambient temperature _____

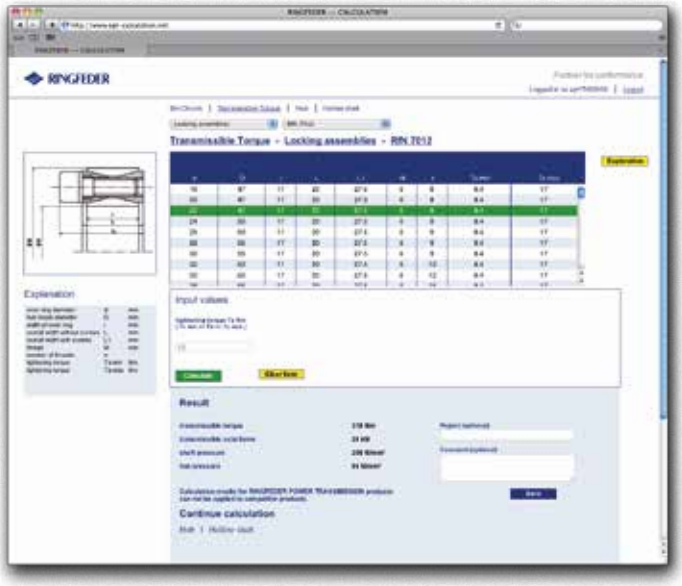
with overrun prevention _____

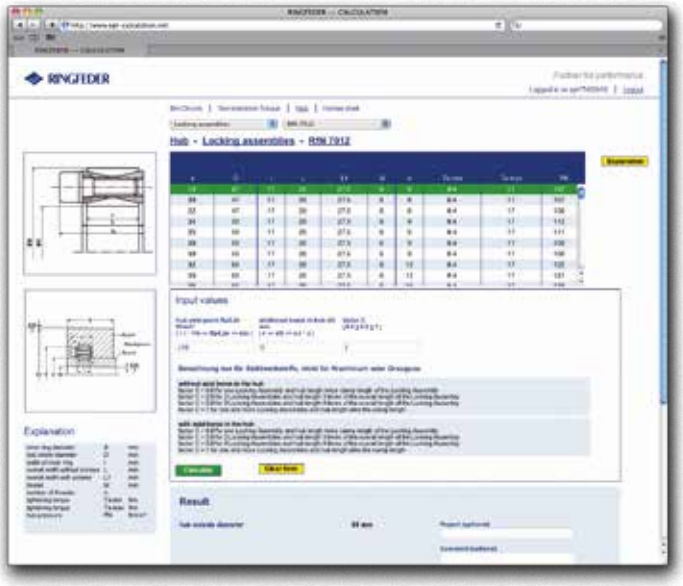
Connecting dimensions (sketch)
Special features

Notes

Notes







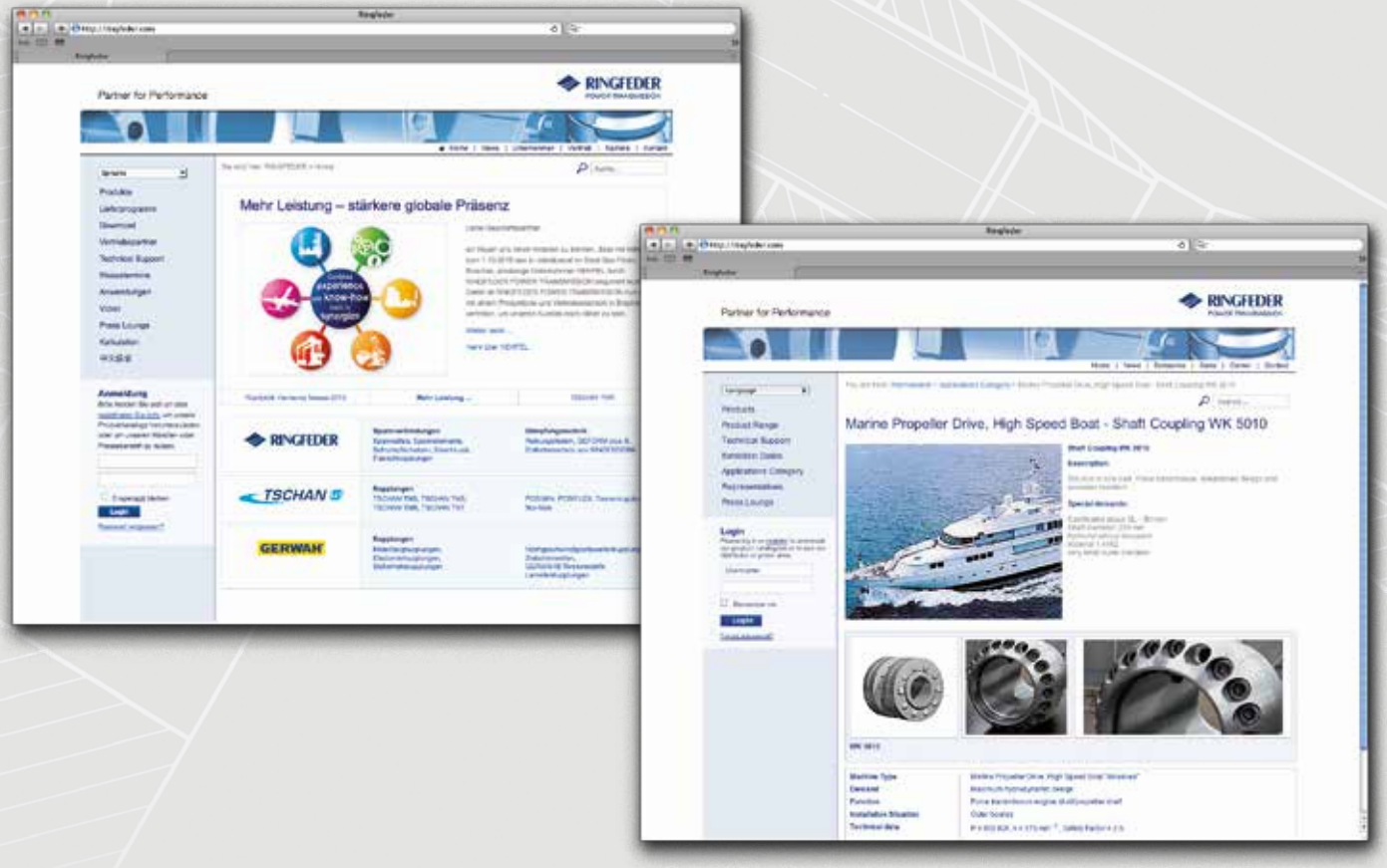
Calculation program for Locking Assemblies and Locking Elements

In order to meet the complex requirements on the correct design and selection of RINGFEDER products under practise-relevant demands, RINGFEDER POWER TRANSMISSION has developed a calculation program.

This calculation program offers the engineer a valuable aid in his or her daily work and simplifies the calculation of a wide range of tasks.

Once a product and the desired product size have been selected the program carries out the calculation, taking into account additional user input e.g. **transmissible torque and axial forces, resulting hub and shaft pressure, the outer diameter of the hub, the inner diameter of the hollow shaft** and for special tasks even the **forces and loads under bending moment loads.**

Interested? Visit our Website at **www.ringfeder.com!**



Our Website

Easily accessible information.
RINGFEDER POWER TRANSMISSION – one of the top addresses for drive and damping technology in mechanical engineering. You can find first-hand service details and information on our website. It contains both details on our entire range of products and numerous documents such as product catalogues, data sheets and assembly instruction for you to download. Visit **www.ringfeder.com** to get right up to date.

Download area Product Range and catalogues

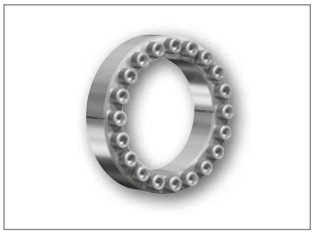
Available Instructions for Installation, Removal and Maintaining

RINGFEDER

Locking Devices

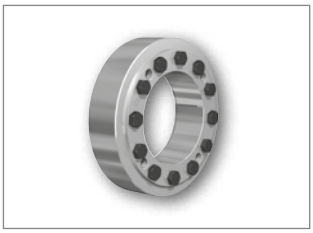
Locking Assemblies

Locking Assemblies for bending moments

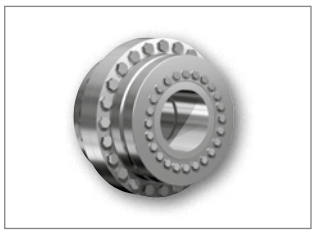


Locking Assemblies – Stainless steel

Locking Elements



Shrink Discs



Flange Couplings

Damping Technology

Friction Springs

DEFORM *plus*®

DEFORM *plus*® R

TSCHAN

Couplings

Torsionally Flexible Couplings

Torsionally Flexible Couplings

Torsionally Flexible Couplings

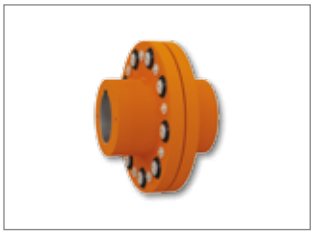
Torsionally Rigid Gear Couplings

Torsionally Rigid Barrel Coupling

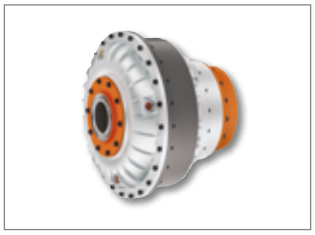
Couplings with variable Stiffness

HENFEL

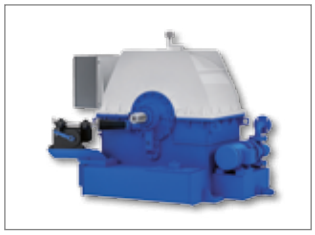
Couplings



Flexible Couplings Henflex

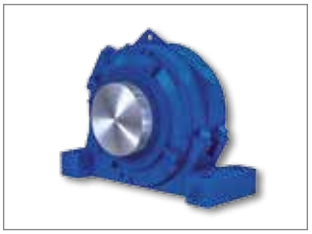


Hydrodynamic Couplings Henfluid



Hydrodynamic Couplings with variable speed

Bearing Housings



Bearing Housings

Remark:
HENFEL products are only available in South America and selected markets.

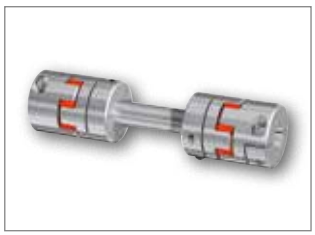
GERWAH®

Couplings

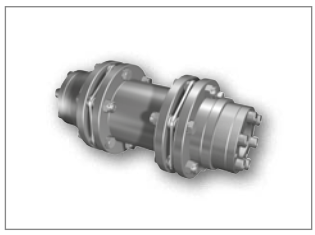
Metal Bellows Couplings

Servo-Insert Couplings

Safety Couplings



Line Shafts



Torsionally Rigid Disc Couplings

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