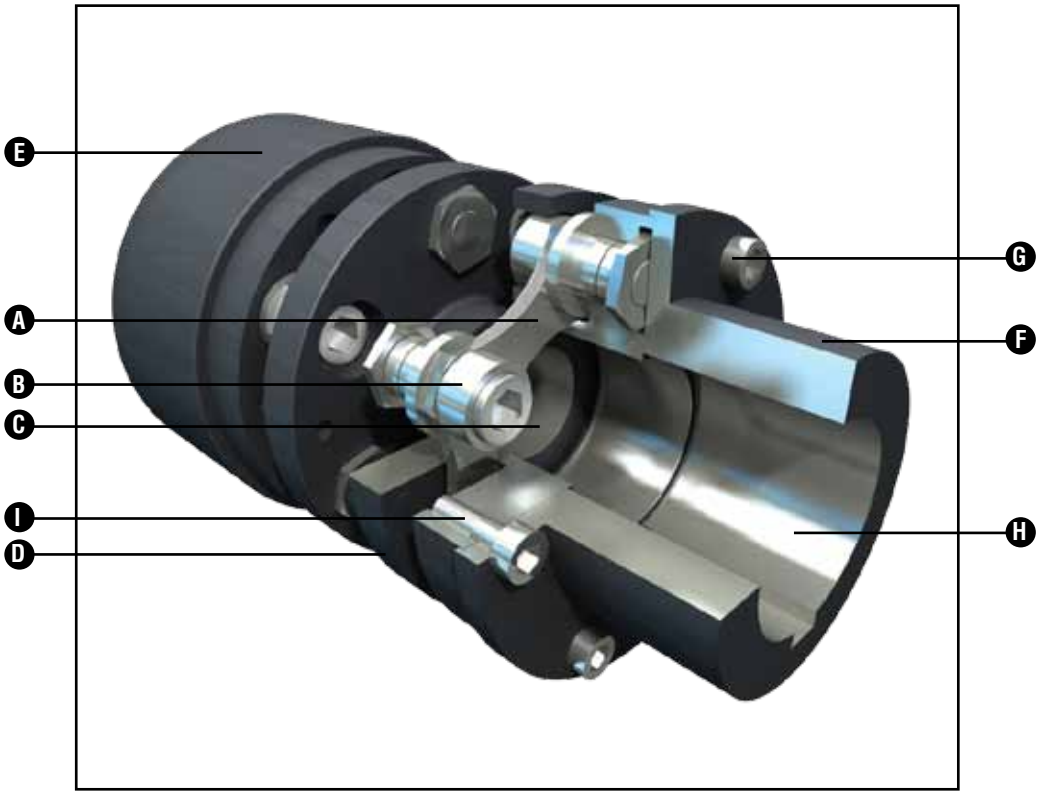
TYPE TSK/TLK

METASTREAM® T Series Metal Membrane Couplings

A – Stainless Steel Flexible Membranes
B – Overload Collars
C – Cartridge Transmission Unit
D – Anti-Fly Feature
E – Anti-Corrosion Treatment
F – Hubs With Puller Holes
G – Robust Hub Bolt
H – Large Shaft Diameters Accommodated
I – Locked Thread



Product Description

Metastream® T Series Couplings incorporate scalloped, stainless steel, flexible discs. This design gives the most flexible solution for high torque and misalignment conditions. This range of couplings has been specifically designed to meet the exacting standards of API 610 (ISO13709) and ISO 14691.

The coupling comes as a cartridge design to maximize reliability, while also making it very easy to fit on site. This concept ensures the high level of integral balance is maintained when the coupling is installed.

The coupling incorporates many features listed as standard, to ensure safe and trouble free operation, giving the user that fit and forget reliability expected of all Metastream products.

- Easy to fit
- Meets API 610 (ISO13709) and ISO 14691. Can be supplied to API 671 (ISO10441)
- Intrinsic balance exceeds AGMA class 9
- Ideally suited to pump applications, electric motor and turbine drives in critical process industry, marine and power generation applications
- Coated carbon steel for corrosion protection
- Choice of hub configuration to suit shaft diameters
- ATEX compliant

Design Features

- **Fit and Forget:** The T Series coupling is designed for infinite life, and with correct machinery alignment, will often outlast the machines it connects
- **Overload Protection:** The coupling is fitted with overload collars to prevent flexible disc rupture in the event of severe torsional overload
- **Anti-Fly Retention:** The spacer is retained by specially designed anti-fly guard rings to ensure safe operation, even in the unlikely event of flexible disc and bolt failure
- **Low Imposed Loads:** The flexible discs have been designed to optimize their torque capability, while minimizing the reaction forces due to misalignment, thus maximizing the life of the machines connected
- **Zero Maintenance**: The coupling has no relative moving parts, and hence requires no lubrication or routine maintenance
- **Standard Features:** The coupling hubs are fitted with puller holes as standard. A self locking feature ensures the hub bolts remain in place under all vibration conditions. Compression and jacking features ease assembly and removal
- **No Backlash:** The coupling design, with fitted bolts and torsionally stiff flexible discs, ensures there is zero backlash. This makes the coupling ideal for drives where constant speed is crucial

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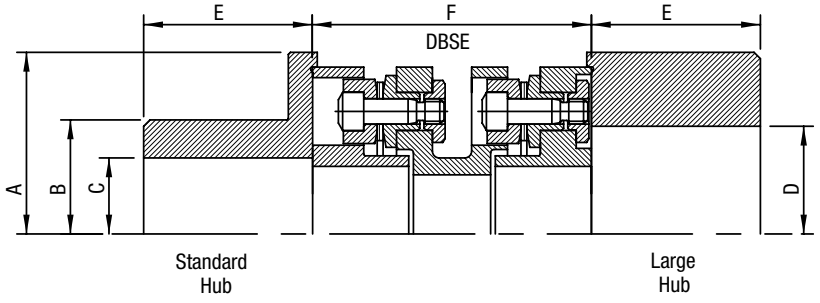
TSK Technical Data (Metric)

Coupling Size	Rating	Max. Continuous Torque	Peak Overload Torque	Max. Speed	Weight - Transmission Unit		Weight - Unbored Hub	
					Minimum DBSE	Extra DBSE	Standard	Large
	kW/1000 rpm	Nm	Nm	rpm	Kg	Kg/m	Kg	Kg
0013	13	125	310	25,500	1.4	3.2	0.9	1.8
0033	33	315	790	20,000	2.7	5.3	1.6	3.1
0075	75	715	1,800	16,500	5.1	6.8	3.4	5.7
0135	135	1,290	3,200	14,400	8.9	11	5.6	8.8
0230	230	2,200	5,500	12,000	12.8	13.1	8.8	13.9
0350	350	3,350	8,400	10,500	16	12.5	15.7	-
0500	500	4,780	12,000	9,500	20.1	15.7	20.6	-
0740	740	7,070	17,700	8,000	25.4	19.8	29.4	-
0930	930	8,880	22,200	7,000	32.6	23.4	37.9	-
1400	1,400	13,370	33,400	6,000	46.2	31.4	51.8	-

Note:
The coupling sizes shaded are non preferred, and TLK couplings should be selected whenever possible.

TSK Typical Arrangement



TSK Dimensional Data (mm)

Coupling Size	A	B	(1) C (Max)	(1) D (Max)	E	(2) F - DBSE							
						Min. mm	3.5 In.	100 mm	5 In.	140 mm	7 In.	180 mm	250 mm
0013	86	54	36	51	40	66	X	X	X	X	X	X	-
0033	105	69	46	70	45	79	X	X	X	X	X	X	-
0075	130	90	65	90	55	99	-	X	X	X	X	X	X
0135	152	112	80	102	62	121	-	-	-	X	X	X	X
0230	179	131	90	121	70	130	-	-	-	X	X	X	X
0350	197	163	115	-	90	131							
0500	222	181	127	-	95	133							
0740	247	206	140	-	107	138							
0930	272	223	155	-	115	148							
1400	297	248	172	-	130	171							

Notes:
- The coupling sizes shaded are non preferred, and TLK couplings should be selected whenever possible.
- Dimensions should not be used for construction. Certified dimensions furnished upon request.

1 Maximum bores shown are based on standard DIN/BS rectangular keys.
Unless otherwise specified, parallel bores will be machined to an IT 7 tolerance, with Js9 key-ways to DIN 6885, BS 4235 or BS 46 Pt1 (inch)

2 These DBSE sizes are more readily available. Other lengths to suit specific shaft separations are available on request.

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Selection Procedure (Metric)

1. Select appropriate service factor (SF)
2. Calculate the coupling rating R from:

$$R = \frac{kW \times 1000 \times SF}{N}$$

Where:
kW = rated power for drive equipment (kW)
N = speed (rev./min)

3. Select a coupling with the same or higher rating
4. Check the hub bore capacity is suitable, if not select a large hub, or a larger size coupling
5. Check peak torque capability is suitable for application
6. Check speed capability
7. Check whether additional dynamic balancing is required
8. Specify Distance Between Shaft Ends (DBSE) as appropriate

Example:
900 kW electric motor connected to a centrifugal pump at 1500 rpm with a 180 mm DBSE.
SF = 1.0

$$R = \frac{900 \times 1000 \times 1.0}{1500}$$

R = 600 kW per 1000 rpm

Selection: TLKS – 0750
Maximum standard shaft bore is 110 mm
Large hub bore is 148 mm
Peak torque capability – 14.2 kNm
Additional balancing should not be required

Service Factor (SF)

Suggested service factors for electric motor, steam turbine, and gas turbine drivers are given below.

Torque Variation		Service Factor
Constant Torque	Centrifugal Pump Centrifugal Compressor Axial Compressor Centrifugal Blower	1.0*
Slight Torque Fluctuation	Screw Compressor Gear, Lobe and Vane Pumps Forced Draft Fan Medium Duty Mixer Lobe Blower	1.5
Substantial Torque Fluctuations	Reciprocating Pumps Heavy Duty Mixers Induced Draft Fans	2.0

*Use a minimum service factor of 1.25 on electric motor drives through a gearbox.

The examples given are for typical machines and are empirically based guidelines. Knowledge of actual torque characteristics may indicate a different service factor. Consult John Crane for advice.

Kselect

Kselect is an internet based selection program for the TSK/TLK. This selection program provides all necessary technical data including inertias and torsional stiffness.

Visit www.johncrane.com to access this program.

Available Options

- Spark-resistant couplings for hazardous zone operation
- Special materials for low temperature applications and/or higher corrosion resistance
- Adjustable shims for taper shafts, insulated couplings, and couplings with a bone shaft for an axially rigid construction
- Torque limiting and shear pin designs
- Consult John Crane for any other special requirements. Metastream couplings can be adapted to suit virtually all power transmission coupling needs.

TYPE TSK/TLK

METASTREAM® T Series Metal Membrane Couplings

Coupling Alignment

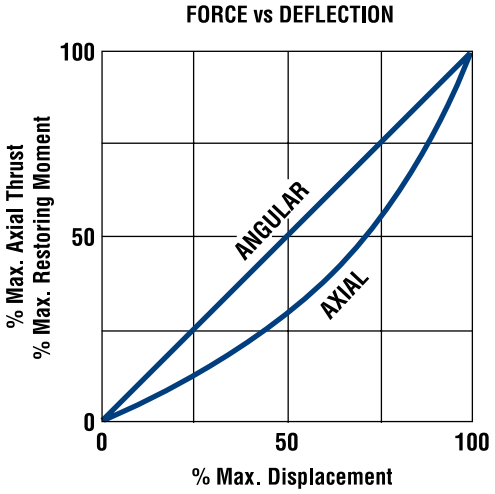
Correct installation and alignment of couplings is essential for reliaible machinery performance.

The angular and axial restoring forces in the table below are given at maximum deflections. The chart can be used to determine forces across the full deflection range. The nonlinear characteristics can detune a system to prevent high amplitude axial vibration.

TSK - Misalignment Capabilities					
Coupling Size	Max. Axial ± mm	Equivalent Thrust kN	(4) Max. Angular Degrees	Restoring Moment at Max. Angle Nm	Max. Parallel ± mm
0013	1	0.2	0.5	4	0.3
0033	1.25	0.3	0.5	6	0.35
0075	1.5	0.4	0.5	9	0.45
0135	2	0.6	0.5	12	0.55
0230	2.5	0.7	0.5	15	0.6
0350	2.8	0.8	0.5	34	0.65
0500	3.25	1.1	0.5	40	0.65
0740	3.75	1.3	0.5	48	0.7
0930	4.3	1.5	0.5	54	0.7
1400	5	2.7	0.5	60	0.8

TLK - Misalignment Capabilities					
Coupling Size	Max. Axial ± mm	Equivalent Thrust kN	(4) Max. Angular Degrees	Restoring Moment at Max. Angle Nm	Max. Parallel ± mm
0300	1.4	1.2	0.33	23	0.4
0500	1.7	2.2	0.33	43	0.5
0750	1.9	2.8	0.33	67	0.6
1050	2.2	4	0.33	100	0.6
1500	2.4	5	0.33	145	0.7
2000	2.7	6	0.33	190	0.8
2600	3	7.1	0.33	250	0.8
3350	3.2	8.3	0.33	320	0.8
4250	3.5	9.5	0.33	410	0.9
6010	3.9	11.4	0.33	580	**1**
8500	4.4	13.5	0.33	780	1.1
9013	5	16.9	0.33	1130	1.2
9017	5.5	19.5	0.33	1400	1.3
9021	6	22.4	0.33	1700	1.4
9036	7.1	29.2	0.33	2900	1.6
9049	7.9	34	0.33	3800	1.8

John Crane supplies a variety of shaft alignment equipment and offers alignment training courses. ***Lase-A-Lign Ex*** is one of the toughest and most robust measurement and alignment systems available. For alignment work in potentially explosive environments, equipment needs to be explosion-protected. ***Lase-A-Lign Ex*** complies with the latest ATEX standards for work in such environments.



Notes:

- The coupling sizes shaded are non preferred, and TLK couplings should be selected whenever possible.

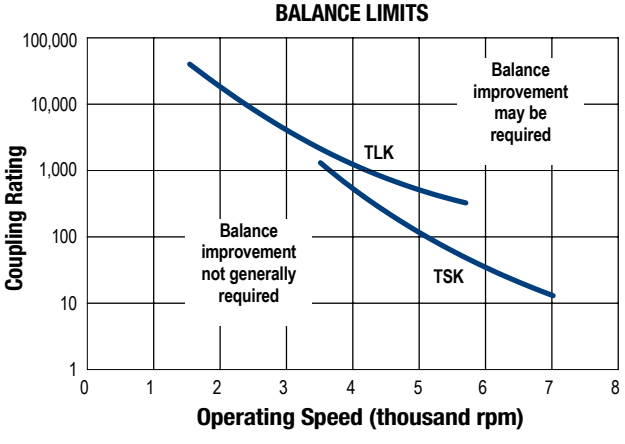
4 Meets NEMA end float specifications without modification.

Balance Condition

These couplings are designed with a high inherent balance, due to the precision of the manufacturing process. It is important that all parts are carefully stored and fitted to maintain this integrity.

This inherent balance of the T Series meets AGMA standard 9000-C90 class 9. The adjacent chart relates the T series rating to operating speeds on the basis of the AGMA class 9 characteristic to provide a general guide to determine if dynamic balance improvement is necessary.

When balancing improvement is requested, John Crane will dynamically balance the transmission unit. Hubs may also be dynamically balanced, and this will be carried out after machining the bore but before cutting single keyways.



TYPE TSK/TLK

METASTREAM® T Series Metal Membrane Couplings

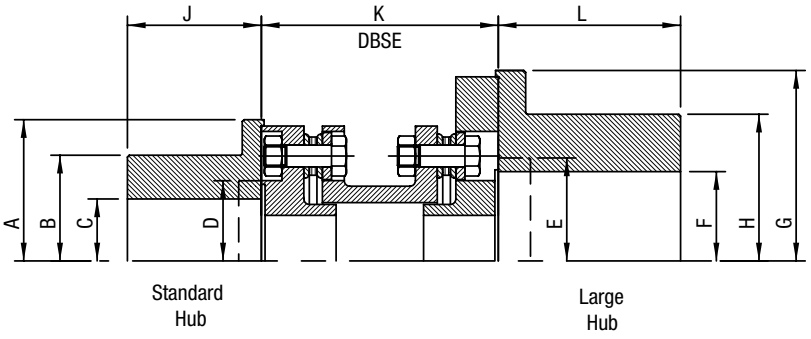
TLK Technical Data (Metric)

Coupling Size	Rating	Max. Continuous Torque	Peak Overload Torque	Max Speed		Weight - Transmission Unit		Weight - Unbored Hub	
				Standard Hub	Large Hub	Minimum DBSE	Extra DBSE	Standard	(3) Large
	kW/1000 rpm	kNm	kNm	rpm	rpm	Kg	Kg/m	Kg	Kg
0300	300	2.9	5.8	15,300	11,300	8.6	16.2	8	21.9
0500	500	4.8	9.6	12,800	10,100	13.6	21.7	13.7	34.3
0750	750	7.1	14.2	11,300	9,000	19.5	27.2	19.3	46.6
1050	1,050	10	20	10,100	9,000	27.9	34	31.1	45.5
1500	1,500	14.3	28.6	9,000	8,200	37.5	41.8	42.2	58
2000	2,000	19.1	38.2	8,200	7,400	49	49	54	77
2600	2,600	24.8	49.6	7,400	-	66	60	71	-
3350	3,350	32	64	6,900	-	80	68	101	-
4250	4,250	40.5	81	6,300	-	105	81	135	-
6010	6,010	57.3	115	5,600	-	147	101	189	-
8500	8,500	81	162	5,000	-	212	132	269	-
9013	13,000	124	248	4,200	-	340	169	406	-
9017	17,000	162	324	3,800	-	454	203	709	-
9021	21,000	200	400	3,600	-	547	234	873	-
9036	36,000	344	688	3,050	-	867	328	1,423	-
9049	49,000	468	936	2,800	-	1,153	403	1,934	-

Notes:
- For a complete coupling, weights of two appropriate hubs plus a transmission unit are required

3 Additional weight of extended guard ring is included

TLK Typical Arrangement



TLK Dimensional Data (mm)

Coupling Size	A	B	(1) C (Max)	D	E	(1) F (Max)	G	H	J	(2) K - DBSE					L
										Min. mm	140 mm	7 In.	180 mm	250 mm	
0300	155	116	82	106	143	110	209	161	84	130	X	X	X	X	110
0500	185	143	100	127	167	134	235	187	100	148	-	X	X	X	134
0750	209	161	110	143	185	148	262	208	110	169	-	X	X	X	148
1050	235	187	134	167	185	148	262	208	134	183	-	X	X	X	148
1500	262	208	148	185	200	161	288	225	148	207	-	-	-	X	161
2000	288	225	161	200	229	184	318	255	161	229	-	-	-	X	166
2600	318	255	184	229	-	-	-	-	166	241	-	-	-	X	-
3350	342	286	212	257	-	-	-	-	191	255	-	-	-	X	-
4250	371	315	235	285	-	-	-	-	212	273	-	-	-	X	-
6010	417	354	260	320	-	-	-	-	234	303	-	-	-	-	-
8500	465	402	290	365	-	-	-	-	261	345	-	-	-	-	-
9013	529	464	330	424	-	-	-	-	297	381	-	-	-	-	-
9017	611	546	420	503	-	-	-	-	378	422	-	-	-	-	-
9021	653	588	446	538	-	-	-	-	401	457	-	-	-	-	-
9036	761	696	520	632	-	-	-	-	468	533	-	-	-	-	-
9049	834	769	580	695	-	-	-	-	522	587	-	-	-	-	-

Notes:
- Dimensions should not be used for construction. Certified dimensions furnished upon request.

1 Maximum bores shown are based on standard DIN/BS rectangular keys.
Unless otherwise specified, parallel bores will be machined to an IT 7 tolerance, with Js9 key-ways to DIN 6885, BS 4235 or BS 46 Pt1 (inch)

2 These DBSE sizes are more readily available. Other lengths to suit specific shaft separations are available on request.

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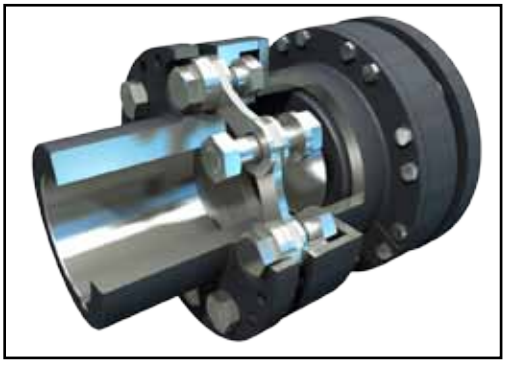
METASTREAM® T Series Metal Membrane Couplings

Alternative Coupling Designs

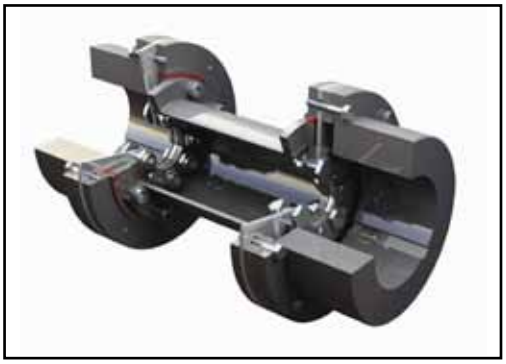


T Series

The Metastream® TSR/TLR range of membrane couplings has been specifically designed to provide a solution for close coupled machinery. The key benefit of this coupling is the ability to replace membranes without the need to move either of the connected machines.

M Series

Metastream® MHS Series couplings incorporate a radial stainless steel, flexible membrane design pioneered by John Crane.



H Series

Metastream® H-FE couplings feature a factory assembled transmission unit, providing high torque capacity with low weight. The hub bores possible with the design make this range particularly suitable for use on electric motor or generator drive applicartions, where larger shaft sizes are generally in use.

For your nearest John Crane facility, please contact one of the locations below.

North America
Morton Grove, IL USA

1-800-SEALING
Tel: 1-847-967-2400
Fax: 1-847-967-3915

Europe
Slough, UK

Tel: 44-1753-224000
Fax: 44-1753-224224

Latin America
São Paulo, Brazil

Tel: 55-11-3371-2500
Fax: 55-11-3371-2599

Middle East & Africa
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Tel: 971-481-27800
Fax: 971-488-62830

Asia Pacific
Singapore

Tel: 65-6518-1800
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