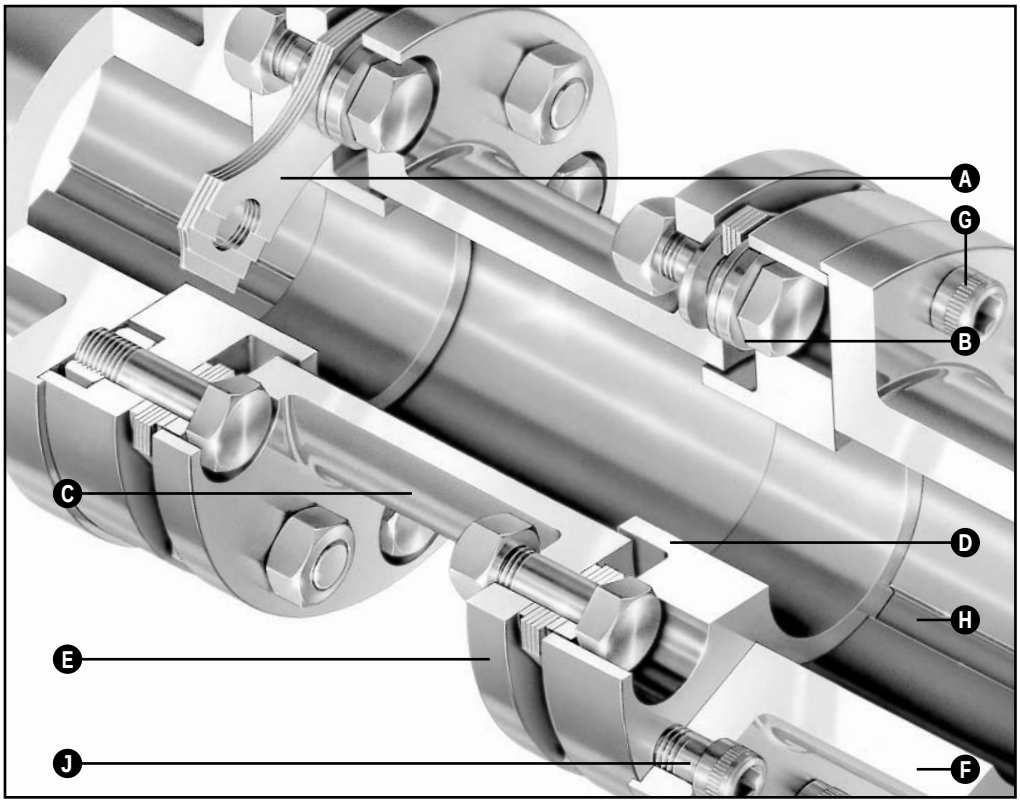
T SERIES

METASTREAM™ Membrane Couplings Types TSK & TLK

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 Bolts
H – Large Shaft Diameters accommodated
J – Locked thread



Product Description

Metastream® T Series Couplings, pioneered by John Crane Flexibox® incorporate scalloped, stainless steel, flexible membranes. 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, to all its editions.

The coupling comes as a cartridge design to maximise reliability, whilst 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 (all editions). TLK meets API 671, and the TSK range can be supplied to API 671, if required
- 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

Design Features

Fit and Forget: The T Series coupling is designed for infinite life, and with correct machinery alignment will out last the machines it connects.

Overload Protection: The coupling is fitted with overload collars to prevent membrane 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 un-likely event of membrane and bolt failure.

Low Imposed Loads: The membranes have been designed to optimise their torque capability, whilst minimising the reaction forces due to misalignment, thus maximising the life of the machines connected.

Zero Maintenance: The coupling has no relative moving parts, and hence requires no lubrication or routine maintenance.

Standards Features: The coupling hubs are fitted with puller holes as standard. Self locking threads ensure the hub bolts remain in place under all vibration conditions. The transmission unit has compression and jacking bolt features to ease assembly and removal.

No Backlash: The coupling design, with fitted bolts, and torsionally stiff membranes ensures that there is zero backlash. This makes the coupling ideal for drives where constant speed is crucial.

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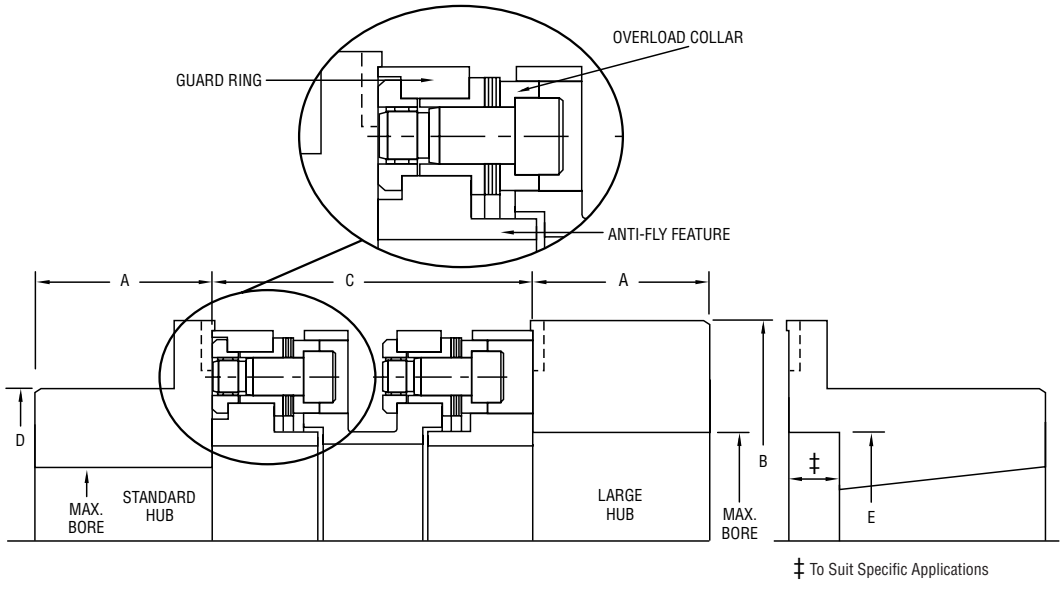
TSK Technical Data

Coupling Size	Rating kW/1000 rpm	Torque Continuous Nm	Torque Peak Nm	Max Speed rpm	Weight Transmission Unit Min. DBSE Kg	Weight Transmission Unit Extra DBSE Kg/m	Weight Unbored Hubs Standard Kg	Weight Unbored Hubs Large Kg	Weight Unbored Hubs Long 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	3.7
0135	135	1,290	3,200	14,500	8.9	11	5.6	8.8	6.7
0230	230	2,200	5,500	12,000	12.8	13.1	8.8	13.9	11.1
0350	350	3,350	8,400	10,500	16	12.5	15.7	-	18.8
0500	500	4,780	12,000	9,500	20.1	15.7	20.6	-	26.2
0740	740	7,070	17,700	8,000	25.4	19.8	29.4	-	37.2
0930	930	8,880	22,200	7,000	32.6	23.4	37.9	-	50.3
1400	1,400	13,370	33,400	6,000	46.2	31.4	51.8	-	72.5

Note: The coupling sizes shaded are non preferred, and TLK couplings should be selected whenever possible.
For a complete coupling, weights of two appropriate hubs plus a transmission unit are required
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)

TSK Typical Arrangement



TSK Dimensional Data

Coupling Size	A	B	Distance Between Shaft Ends (DBSE) C - Preferred * Min.	In.	mm	In.	mm	In.	mm	mm	D	E Max.	Maximum Bores Standard Hub**	Maximum Bores Large Hub**
0013	40	86	66	3.5	100	5.0	140	7.0	180	-	54	-	36	51
0033	45	105	79	3.5	100	5.0	140	7.0	180	-	69	-	46	70
0075	55	130	99			5.0	140	7.0	180	250	90	82	65	90
0135	62	152	121				140	7.0	180	250	112	104	80	102
0230	70	179	130				140	7.0	180	250	131	123	90	121
0350	90	197	131						180	250	163	116	115	-
0500	95	222	133						180	250	181	132	127	-
0740	107	247	138						180	250	206	151	140	-
0930	115	272	148						180	250	223	166	155	-
1400	130	297	171						180	250	248	180	172	-

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

NOTES: * These DBSE sizes are more readily available. Other lengths to suit specific shaft separations are available on request.
** Maximum bores shown are based on standard DIN/BS rectangular keys.

T SERIES

METASTREAM™ Membrane Couplings Types TSK & TLK

TLK Technical Data

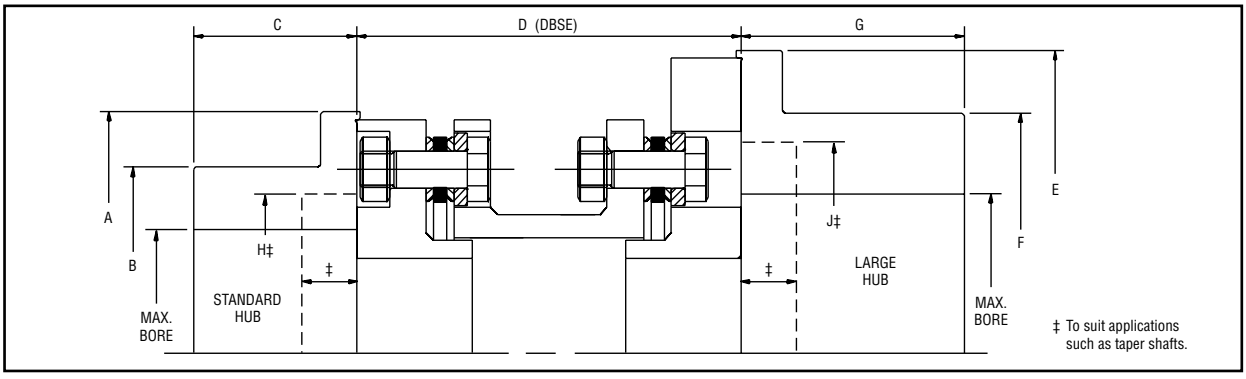
Coupling Size	Rating kW/1000 rpm	Torque Continuous kNm	Torque Peak kNm	Max. Speed Standard Hub rpm	Max. Speed Large Hub rpm	Weight Transmission Unit Min. DBSE Kg	Weight Transmission Unit Extra DBSE Kg/m	Weight Unbored Hubs Standard Kg	Weight Unbored Hubs Large* Kg
0300	300	2.9	5.8	15,300	11,300	8.8	16.2	8	22
0500	500	4.8	9.6	12,800	10,100	14.0	21.7	13.7	34.3
0750	750	7.1	14.2	11,300	9,000	20.1	27.2	19.3	46.6
1050	1,050	10.0	20.0	10,100	9,000	28.5	34.0	31.1	45.5
1500	1,500	14.3	28.6	9,000	8,200	38.7	41.8	42.2	58
2000	2,000	19.1	38.2	8,200	7,400	51	49	54	77
2600	2,600	24.8	49.6	7,400	-	68	60	71	-
3350	3,350	32.0	64.0	6,900	-	82	68	101	-
4250	4,250	40.5	81.0	6,300	-	107	81	135	-
6010	6,010	57.3	115	5,600	-	150	101	189	-
8500	8,500	81.0	162	5,000	-	216	132	269	-
9013	13,000	124	248	4,200	-	346	169	406	-
9017	17,000	162	324	3,800	-	461	203	709	-
9021	21,000	200	400	3,600	-	557	234	873	-
9036	36,000	344	688	3,050	-	879	328	1,423	-
9049	49,000	468	936	2,800	-	1,167	403	1,934	-

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

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)

* Additional weight of extended guard ring is included

TLK Typical Arrangement



TLK Dimensional Data

Coupling Size	A	B	C	Distance Between Shaft Ends D - Preferred * Min.		In.			E	F	G	Maximum Bores** Standard Hub	Maximum Bores** Large Hub	H Max. Standard Hub	J Max. Large Hub
0300	155	116	84	130	140	7	180	250	209	161	110	82	110	106	143
0500	185	143	100	148	-	7	180	250	235	187	134	100	134	127	167
0750	209	161	110	169	-	7	180	250	262	208	148	110	148	143	185
1050	235	187	134	178	-	7	180	250	262	208	148	134	148	167	185
1500	262	208	148	207	-	-	-	250	288	225	161	148	161	185	200
2000	288	225	161	229	-	-	-	250	318	255	166	161	184	200	229
2600	318	255	166	241	-	-	-	250	-	-	-	184	-	229	-
3350	342	286	191	255	-	-	-	300	-	-	-	212	-	257	-
4250	371	315	212	273	-	-	-	300	-	-	-	265	-	285	-
6010	417	354	234	303	-	-	-	-	-	-	-	260	-	320	-
8500	465	402	261	345	-	-	-	-	-	-	-	290	-	365	-
9013	529	464	297	381	-	-	-	-	-	-	-	330	-	424	-
9017	611	546	378	422	-	-	-	-	-	-	-	420	-	503	-
9021	653	588	401	457	-	-	-	-	-	-	-	446	-	538	-
9036	761	696	468	533	-	-	-	-	-	-	-	520	-	632	-
9049	834	769	522	587	-	-	-	-	-	-	-	580	-	695	-

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

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

** Maximum bores shown are based on standard DIN/BS rectangular keys.

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Selection Procedure

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 – 14.3 kNm

Additional balancing should not be required

Load Factor SF

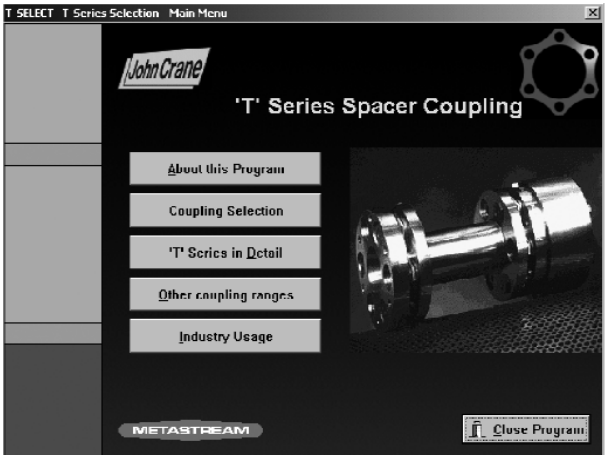
Suggested service factors for electric motor, steam turbine, and gas turbine drivers are given below.

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

The examples given are for typical machines and are empirically based guidelines. Knowledge of actual torque characteristics may indicate a different service factor. For example, variable-speed electric motors may exhibit a fluctuating torque characteristic. Consult John Crane for advice.

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

Computer Aided Selection



A Windows® based selection program for the T series coupling is available. This selection programme provides all the necessary technical data, inertias, torsional stiffness, etc.

Contact John Crane or visit the John Crane Web site on: **www.johncrane.com**

T SERIES

METASTREAM™ Membrane Couplings Types TSK & TLK

Coupling Alignment

TSK MISALIGNMENT DATA				
TSK Coupling Size	* Axial Misalignment		** Max. Parallel Misalignment	
	± mm	Equivalent Thrust kN	± mm	Restoring Moment Nm
13	1.0	0.2	0.30	4
33	1.3	0.3	0.35	6
75	1.5	0.4	0.45	9
135	2.0	0.6	0.55	12
230	2.5	0.7	0.60	15
350	2.8	0.8	0.65	34
500	3.3	1.1	0.65	40
740	3.8	1.3	0.70	48
930	4.3	1.5	0.70	54
1400	5.0	2.7	0.80	60

TLK MISALIGNMENT DATA				
TLK Coupling Size	* Axial Misalignment		*** Max. Parallel Misalignment	
	± mm	Equivalent Thrust kN	± mm	Restoring Moment Nm
0300	1.4	1.2	0.4	23
0500	1.7	2.2	0.5	43
0750	1.9	2.8	0.6	67
1050	2.2	4.0	0.6	100
1500	2.4	5.0	0.7	145
2000	2.7	6.0	0.8	190
2600	3.0	7.1	0.8	250
3350	3.2	8.3	0.8	320
4250	3.5	9.5	0.9	410
6010	3.9	11.4	1.0	580
8500	4.4	13.5	1.1	780
9013	5.0	16.9	1.2	1130
9017	5.5	19.5	1.3	1400
9021	6.0	22.4	1.4	1700
9036	7.1	29.2	1.6	2900
9049	7.9	34.0	1.8	3800

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

John Crane supplies a variety of shaft alignment equipment and offers alignment-training courses.

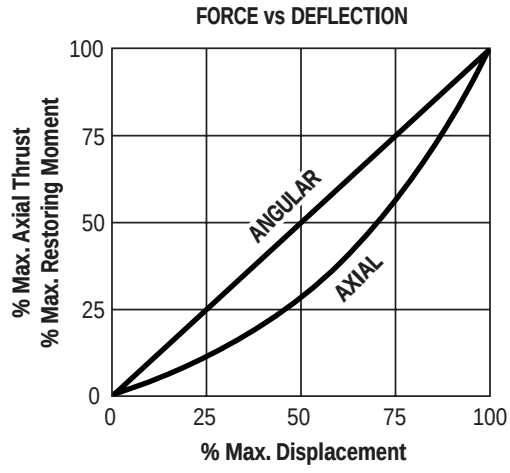
These values are maximums for each type of misalignment. It is recommended that the coupling is initially aligned to 10% of these values to allow for inevitable movements during the life of the machines.

* Meets NEMA end float specification without modification.

** Values based on angular deflection of 1/2° per end.

*** Values based on angular deflection of 1/3° per end.

The chart can be used to determine forces across the full deflection range. The axial force has a non-linear characteristic, which can de-tune systems to prevent high amplitude axial vibration.

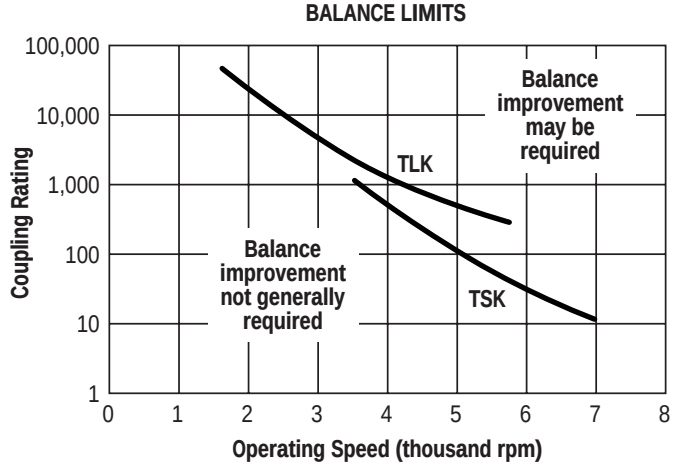


Balance Condition

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.

The inherent balance of the T Series range 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.



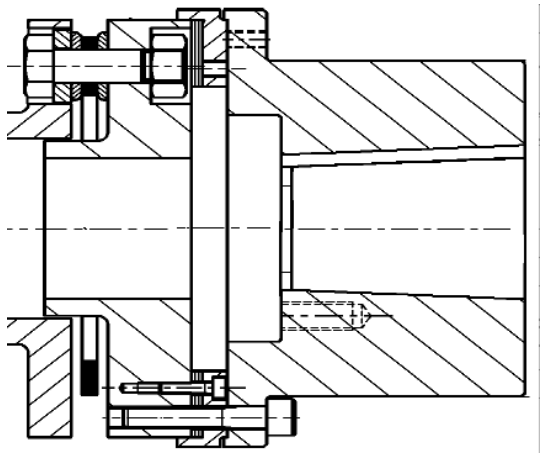
T SERIES

METASTREAM™ Membrane Couplings Types TSK & TLK

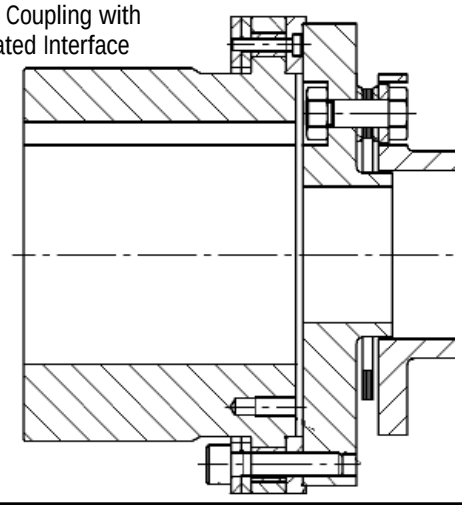
Available Options

- 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 – see below

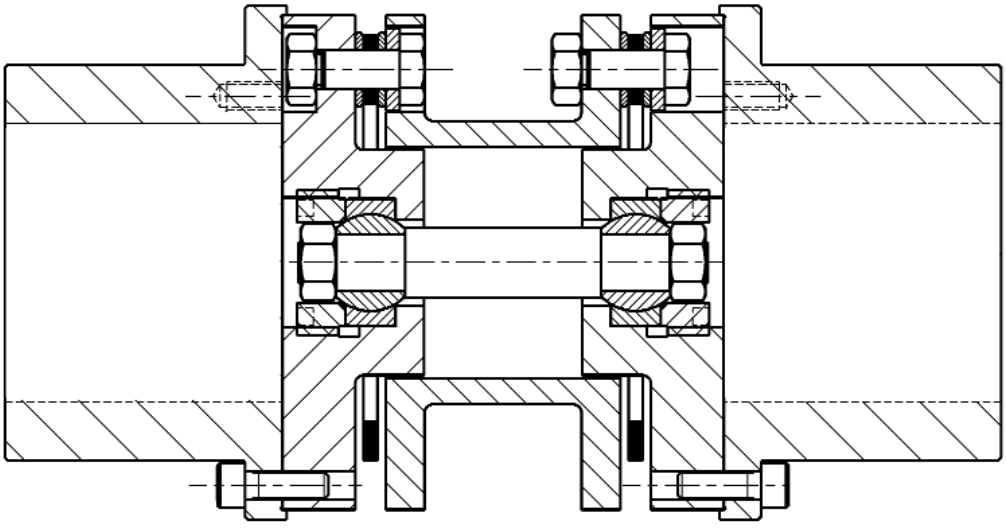
TLKA Coupling with Adjustable Shims



TLKN Coupling with Insulated Interface



TLKB Coupling fitted with Bone shaft for axially rigid construction



Consult John Crane for any other special requirements. Metastream couplings can be adapted to suit virtually all power transmission coupling needs.

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smiths

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

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