

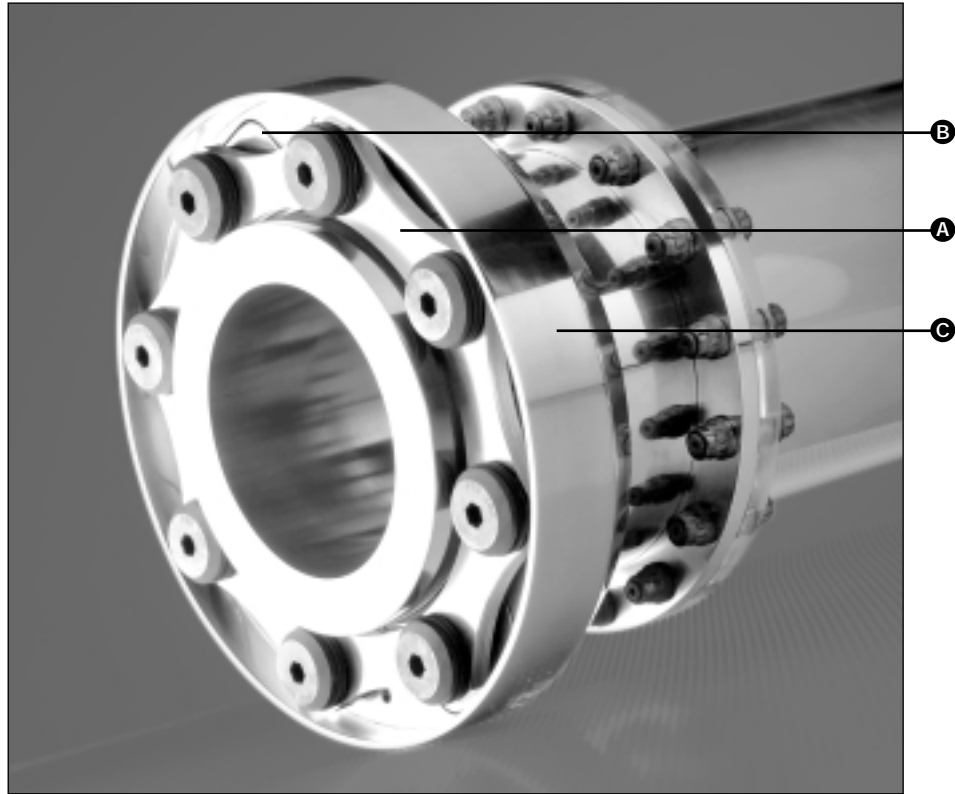


TSDE/TLDE

METASTREAM® High Performance Couplings

TSDE/TLDE

- A – Stainless Steel Flexible Discs
- B – Overload Feature
- C – Disc Shrouding



Product Description

Metastream® T-DE Couplings offer the lowest possible overhung moments, and additional shrouding of the flexible elements and bolts. This arrangement produces a high integrity coupling particularly suited to higher speed compressor drives.

- The factory assembled T-DE hub/flex units are designed to accommodate typical machine shaft sizes for turbo-compressor applications.
- The separate spacer on the T-DE can be varied to provide the appropriate distance between shaft ends and the required torsional stiffness to suit individual applications.
- On some applications, the T-DE hub assembly on a high speed compressor or gearbox input shaft is combined with the flanged T-JE arrangement for a turbine driver.

Design Features

- Lowest Overhung Moment Arrangement
- Factory Assembled Hub/Flex Element Units
- High Reliability Stainless Steel Flexible Disc Design
- Shrouded Discs and Associated Bolts to Minimize Windage
- Coplanar Construction Provides Additional Safety



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TSDE/TLDE Technical Data (mm)

Coupling Designation	Rating (kW/rpm)	Peak Torque (kNm)	Max. Speed (rpm)	Coupling Weight (kg)	Coupling Inertia (kg-m ²)	Torsional Stiffness (MNm/rad) Qs	Half Coupling C of G (mm) 'G'	Spacer Tube per Meter			Axial Displacement		Angular Misalignment	
								Weight (kg)	Inertia (kg-m ²)	Torsional Stiffness (MNm/rad) Qe	Max. per Coupling (±mm)	Equivalent Force (N)	Max. Angle (deg)	Restoring Moment (N-m/deg)
TSDE-0240	0.24	3.06	30,200	8.48	0.017	0.09	49.0	4.35	0.005	0.06	1.7	750	0.375	25
TLDE-0345	0.35	4.39	30,200	8.44	0.016	0.10	48.8	4.64	0.006	0.06	1.0	850	0.250	30
TSDE-0420	0.42	5.34	25,500	11.0	0.038	0.16	48.5	5.53	0.007	0.12	2.2	1,050	0.375	35
TLDE-0600	0.60	7.64	25,500	11.4	0.032	0.20	48.8	6.25	0.012	0.12	1.3	1,180	0.250	40
TSDE-0700	0.70	8.92	21,100	17.9	0.075	0.29	60.5	6.96	0.021	0.21	2.9	1,500	0.375	50
TLDE-1000	1.00	12.74	21,100	18.0	0.071	0.37	60.5	8.39	0.025	0.25	1.8	1,750	0.250	60
TSDE-1100	1.10	14.00	18,400	24.7	0.134	0.43	70.6	8.04	0.032	0.32	3.1	1,350	0.375	60
TLDE-1500	1.50	19.10	18,400	26.0	0.132	0.64	70.9	11.30	0.045	0.45	1.8	1,350	0.250	65
TSDE-1500	1.50	19.10	16,300	33.9	0.227	0.65	81.3	9.46	0.049	0.49	3.7	2,000	0.375	90
TLDE-2100	2.10	26.70	16,300	37.4	0.241	0.96	82.0	13.60	0.071	0.71	2.2	2,250	0.250	95
TSDE-2100	2.10	26.70	14,600	48.5	0.408	0.99	92.5	12.10	0.079	0.79	4.3	2,600	0.375	130
TSDE-2800	2.80	35.70	13,300	63.5	0.642	1.40	102.4	15.00	0.115	1.15	4.8	3,200	0.375	160
TLDE-3000	3.00	38.20	14,600	51.3	0.409	1.50	92.7	17.30	0.111	1.11	2.6	3,000	0.250	140
TSDE-3600	3.60	45.80	12,300	82.6	0.994	1.80	116.1	17.50	0.161	1.62	5.4	4,000	0.375	210
TLDE-4000	4.00	51.00	13,300	61.2	0.594	2.00	92.2	21.10	0.160	1.61	3.0	4,000	0.250	240
TLDE-5200	5.20	66.20	12,300	81.2	0.930	2.80	102.9	25.40	0.229	2.29	3.4	4,800	0.250	250
TLDE-6700	6.70	85.40	11,300	103.0	1.410	3.70	117.1	29.60	0.319	3.19	3.8	6,200	0.250	330
TLDE-8500	8.50	108.20	10,400	131.0	2.090	4.90	128.5	34.50	0.445	4.45	4.3	7,000	0.250	360
TLDE-9012	12.00	152.80	9,200	176.0	3.580	7.30	140.0	42.50	0.712	7.12	5.0	9,500	0.250	520
TLDE-9017	17.00	216.00	8,200	233.0	5.900	10.50	154.9	53.20	1.120	11.20	5.8	12,000	0.250	670

TSDE/TLDE Dimensional Data (mm)

Coupling Designation	A	B	C Max.	D	E	N	P	R	S Min.
TSDE-0240	129	71	51	66	61	73	68	111	79
TSDE-0420	153	85	65	80	75	92	87	130	93
TSDE-0700	184	104	78	94	88	112	107	157	108
TSDE-1100	210	119	90	108	103	129	124	174	121
TSDE-1500	234	135	101	119	114	146	141	191	132
TSDE-2100	262	151	114	137	129	164	158	215	156
TSDE-2800	288	166	125	148	140	179	172	232	167
TSDE-3600	315	182	137	160	152	195	188	255	179
TLDE-0345	123	71	51	66	61	74	68	111	79
TLDE-0600	146	89	64	80	74	92	86	136	94
TLDE-1000	174	110	79	94	89	113	107	157	107
TLDE-1500	200	126	90	108	103	130	123	174	121
TLDE-2100	225	141	101	119	114	148	140	197	132
TLDE-3000	251	158	113	137	128	165	156	221	157
TLDE-4000	274	174	125	148	140	180	170	238	167
TLDE-5200	298	190	136	160	151	196	185	261	180
TLDE-6700	325	207	148	171	163	213	202	280	190
TLDE-8500	351	226	162	190	182	233	221	306	209
TLDE-9012	394	258	185	220	210	265	252	339	241
TLDE-9017	441	287	205	240	230	298	283	371	261

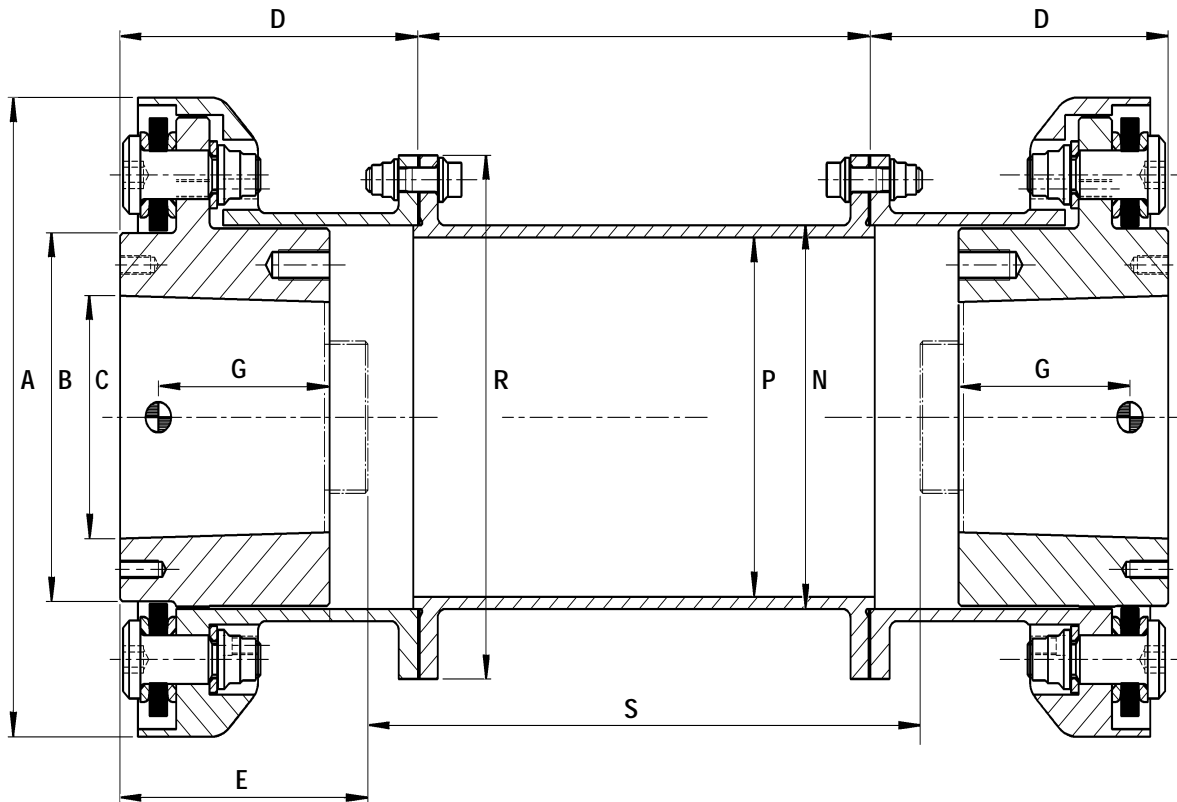
TSDE/TLDE



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TSDE/TLDE Typical Arrangement



NOTES:

1. A minimum application factor of 1.5 is recommended (see Selection Procedure).
2. Technical data based on standard couplings with nominal bore size hubs and 0.457m/18" DBSE (Distance Between Shaft Ends).
3. Maximum angular misalignment is per disc pack. For further information on misalignment capacities, see back page.
4. Torsional Stiffness assumes tapered hydraulic fit hubs including shaft. For other DBSE, stiffness is calculated by:
5. Bore capacity and hub lengths are nominal dimensions only. Consult John Crane for specific applications.
6. S dimension is minimum recommended DBSE for installation. Consult John Crane if shorter DBSE is required.

$$K_{\text{new}} = \frac{K_s K_e}{L \times K_s + K_e}$$

where L = DBSE - 18"

$$Q_{\text{new}} = \frac{Q_s Q_e}{L \times Q_s + Q_e}$$

where L = $\frac{\text{DBSE} - 0.457\text{m}}{1,000}$



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TSDE/TLDE Technical Data (inches)

Coupling Designation	Rating (HP/ 100 rpm)	Peak Torque (in-lb x 10 ³)	Max. Speed (rpm)	Coupling Weight (lb)	Coupling Inertia (lb-in ²)	Torsional Stiffness (lb-in/rad x 10 ⁶) Ks	Half Coupling C of G (in) 'G'	Spacer Tube per Inch			Axial Displacement		Angular Misalignment	
								Weight (lb)	Inertia (lb-in ²)	Torsional Stiffness (lb-in/rad x 10 ⁶) Ke	Max. per Coupling (±in)	Equivalent Force (lb)	Max. Angle (deg)	Restoring Moment (lb-in/deg)
TSDE-0240	32	27.1	30,200	18.7	58	0.76	1.93	0.25	0.48	19.4	0.067	170	0.375	220
TLDE-0345	46	39.0	30,200	18.6	53	0.88	1.92	0.26	0.51	20.5	0.039	191	0.250	265
TSDE-0420	56	47.3	25,500	24.3	129	1.42	1.91	0.32	0.99	39.8	0.087	240	0.375	310
TLDE-0600	80	67.6	25,500	25.2	108	1.73	1.92	0.35	1.06	42.7	0.051	270	0.250	350
TSDE-0700	94	78.9	21,100	39.4	256	2.53	2.38	0.39	1.81	72.4	0.114	340	0.375	440
TLDE-1000	134	113	21,100	39.7	243	3.31	2.38	0.47	2.19	88.1	0.071	390	0.250	530
TSDE-1100	148	124	18,400	54.4	457	3.85	2.78	0.45	2.78	112	0.122	300	0.375	530
TLDE-1500	201	169	18,400	57.2	450	5.65	2.79	0.63	3.89	156	0.071	300	0.250	580
TSDE-1500	201	169	16,300	74.8	777	5.71	3.20	0.53	4.27	172	0.146	450	0.375	800
TLDE-2100	282	236	16,300	82.4	825	8.46	3.23	0.76	6.12	246	0.087	510	0.250	840
TSDE-2100	282	236	14,600	107	1,393	8.76	3.64	0.68	6.88	277	0.169	590	0.375	1,150
TSDE-2800	375	316	13,300	140	2,193	12.1	4.03	0.84	10.0	402	0.189	720	0.375	1,420
TLDE-3000	402	338	14,600	113	1,397	12.8	3.65	0.97	9.62	386	0.102	670	0.250	1,240
TSDE-3600	483	405	12,300	182	3,397	16.0	4.57	0.98	14.0	563	0.213	900	0.375	1,860
TLDE-4000	536	451	13,300	135	2,031	17.7	3.63	1.18	13.9	560	0.118	900	0.250	2,120
TLDE-5200	697	586	12,300	179	3,179	24.3	4.05	1.42	19.9	798	0.134	1,080	0.250	2,210
TLDE-6700	898	756	11,300	228	4,805	32.4	4.61	1.66	27.7	1,112	0.150	1,393	0.250	2,940
TLDE-8500	1,140	958	10,400	289	7,144	43.1	5.06	1.93	38.6	1,551	0.169	1,600	0.250	3,190
TLDE-9012	1,609	1,352	9,200	389	12,223	64.3	5.51	2.38	61.8	2,481	0.197	2,100	0.250	4,600
TLDE-9017	2,280	1,912	8,200	514	20,152	93.1	6.10	2.98	97.5	3,917	0.228	2,700	0.250	5,930

TSDE/TLDE Dimensional Data (inches)

Coupling Designation	A	B	C Max.	D	E	N	P	R	S Min.
TSDE-0240	5.08	2.80	2.00	2.60	2.38	2.88	2.68	4.37	3.19
TSDE-0420	6.02	3.35	2.50	3.15	3.00	3.63	3.43	5.12	3.56
TSDE-0700	7.24	4.09	3.00	3.70	3.50	4.41	4.21	6.18	4.19
TSDE-1100	8.27	4.69	3.50	4.25	4.12	5.08	4.88	6.85	4.62
TSDE-1500	9.21	5.31	4.00	4.69	4.50	5.76	5.55	7.52	5.19
TSDE-2100	10.31	5.94	4.44	5.39	5.25	6.46	6.22	8.46	5.81
TSDE-2800	11.34	6.54	4.88	5.83	5.62	7.04	6.77	9.13	6.38
TSDE-3600	12.40	7.17	5.38	6.30	6.12	7.69	7.40	10.04	6.81
TLDE-0345	4.84	2.80	2.00	2.60	2.38	2.89	2.68	4.37	3.19
TLDE-0600	5.75	3.50	2.50	3.15	3.00	3.61	3.39	5.35	3.56
TLDE-1000	6.85	4.33	3.00	3.70	3.50	4.45	4.21	6.18	4.19
TLDE-1500	7.87	4.96	3.50	4.25	4.12	5.12	4.84	6.85	4.62
TLDE-2100	8.86	5.55	4.00	4.69	4.50	5.81	5.51	7.76	5.19
TLDE-3000	9.88	6.22	4.44	5.39	5.25	6.48	6.14	8.70	5.81
TLDE-4000	10.79	6.85	4.88	5.83	5.62	7.07	6.69	9.37	6.38
TLDE-5200	11.73	7.48	5.38	6.30	6.12	7.70	7.28	10.28	6.81
TLDE-6700	12.80	8.15	5.75	6.73	6.62	8.40	7.95	11.02	7.12
TLDE-8500	13.82	8.90	6.38	7.48	7.25	9.18	8.70	12.05	8.12
TLDE-9012	15.51	10.16	7.25	8.66	8.50	10.44	9.92	13.35	9.00
TLDE-9017	17.36	11.30	8.00	9.45	9.25	11.72	11.14	14.61	9.88

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TSDE/TLDE

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Selection Procedure

- For proper selection, the following data should be obtained:
 - Maximum Continuous Power (HP horsepower)
 - Speed (N rpm)
 - Peak Torque (short circuit/overload)
 - Maximum Speed
 - Distance Between Shaft Ends (DBSE)
 - Driver Shaft Diameter
 - Driven Shaft Diameter
 - Maximum Axial Displacements
 - Maximum Parallel Shaft Offset or Angular Alignment
- Calculate minimum coupling rating required using the appropriate application factor F.
NOTE: Minimum application factor of 1.5 is recommended.
- Minimum Required Coupling Rating = $\left(\frac{\text{kW} \times F}{N} \right)$ kW per rpm = $\left(\frac{100 \times \text{HP} \times F}{N} \right)$ HP per 100 rpm
- Select coupling size from tables provided.
- Check maximum hub bores will accommodate shaft sizes.
- Check maximum speed, misalignment, and peak torque capacities are adequate.

Example: Turbine to Compressor - API 671 required. Axial displacement specified ±2.03mm/0.080" min.

Max. Continuous Duty - 9,000 kW/12,000 HP at 8,000 rpm

Turbine Shaft - 89mm/3.5" tapered hydraulic fit

Compressor Shaft - 83mm/3.25" tapered hydraulic fit

DBSE (API 671) - 457mm/18"

Minimum Rating Required for API 671	= $\frac{9,000 \times 1.5}{8,000}$	= $\frac{100 \times 12,000 \times 1.5}{8,000}$
	= 1.688 kW per rpm	= 225 HP per 100 rpm

Selection: Metastream TLDE - 2100

Giving - Angular misalignment of ±1/4° per disc pack. Axial displacement of ±2.21mm/0.087".

Application Factor F

For smooth power driving machines (turbines, motors).

- Constant Torque1.50
(Centrifugal Compressors, Feed Pumps, etc.)
- API 6711.50
- Moderate Torque Fluctuations2.00
(Fans, Screw Compressors, etc.)

For Turbine/Generator drives, check peak torque capacity.

For synchronous motor drives or other applications where significant torque fluctuations or oscillations occur, consult John Crane.

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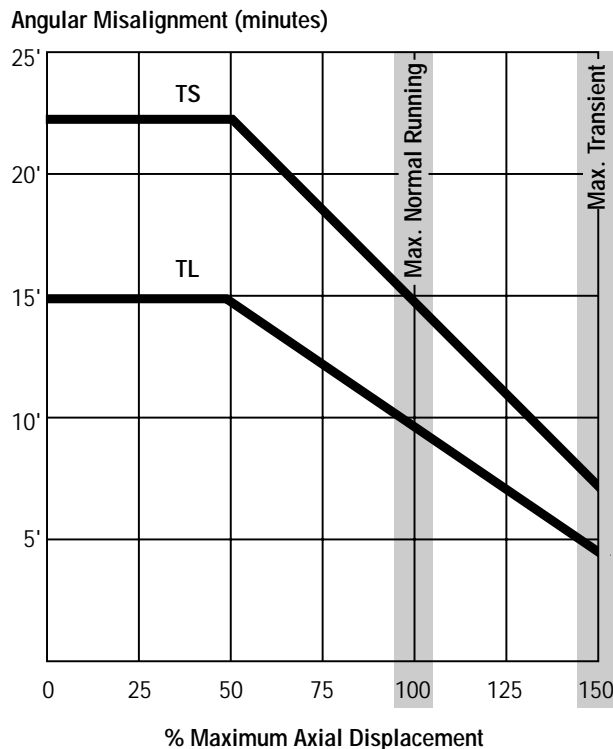


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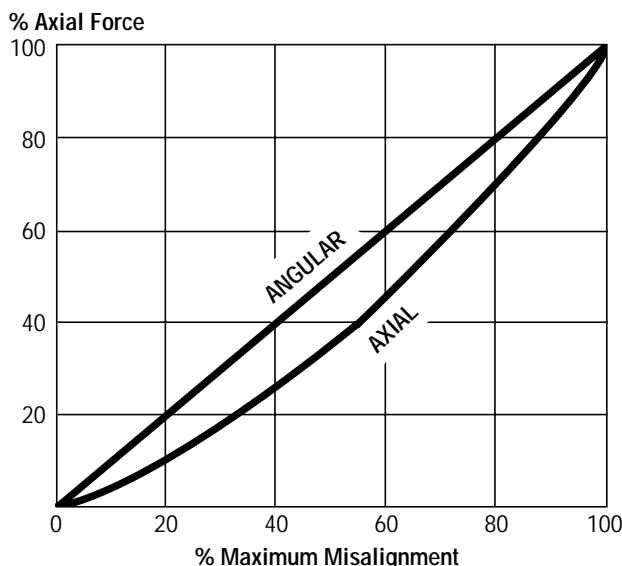
Angular Misalignment vs. Axial Displacement

Axial and angular misalignment have a combined effect on the flexible membrane stresses. Therefore, a reduction in one permits an increase in the other. The trade off is shown in the graph opposite. Transient or short term misalignment limits are also shown in this graph, and are usually applicable to the high thermal growths often caused during startup and shutdown of turbine drives. A detailed review of a coupling selection may require consideration of the relative casing and shaft expansions on such applications. Couplings can often be installed with axial pre-stretch to allow their continuous operation at lower displacements.



Restoring Force vs. Displacement

The axial and angular restoring forces can be calculated from the data given in the tables and the graph opposite. The axial load characteristic makes the Metastream coupling resistant to axial resonance. The nonlinear characteristic detunes the system, preventing high amplitudes of vibration. John Crane can provide full details of the axial response curves upon request.



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If the products featured will be used in a potentially dangerous and/or hazardous process, your John Crane representative should be consulted prior to their selection and use. In the interest of continuous development, John Crane Companies reserve the right to alter designs and specifications without prior notice.