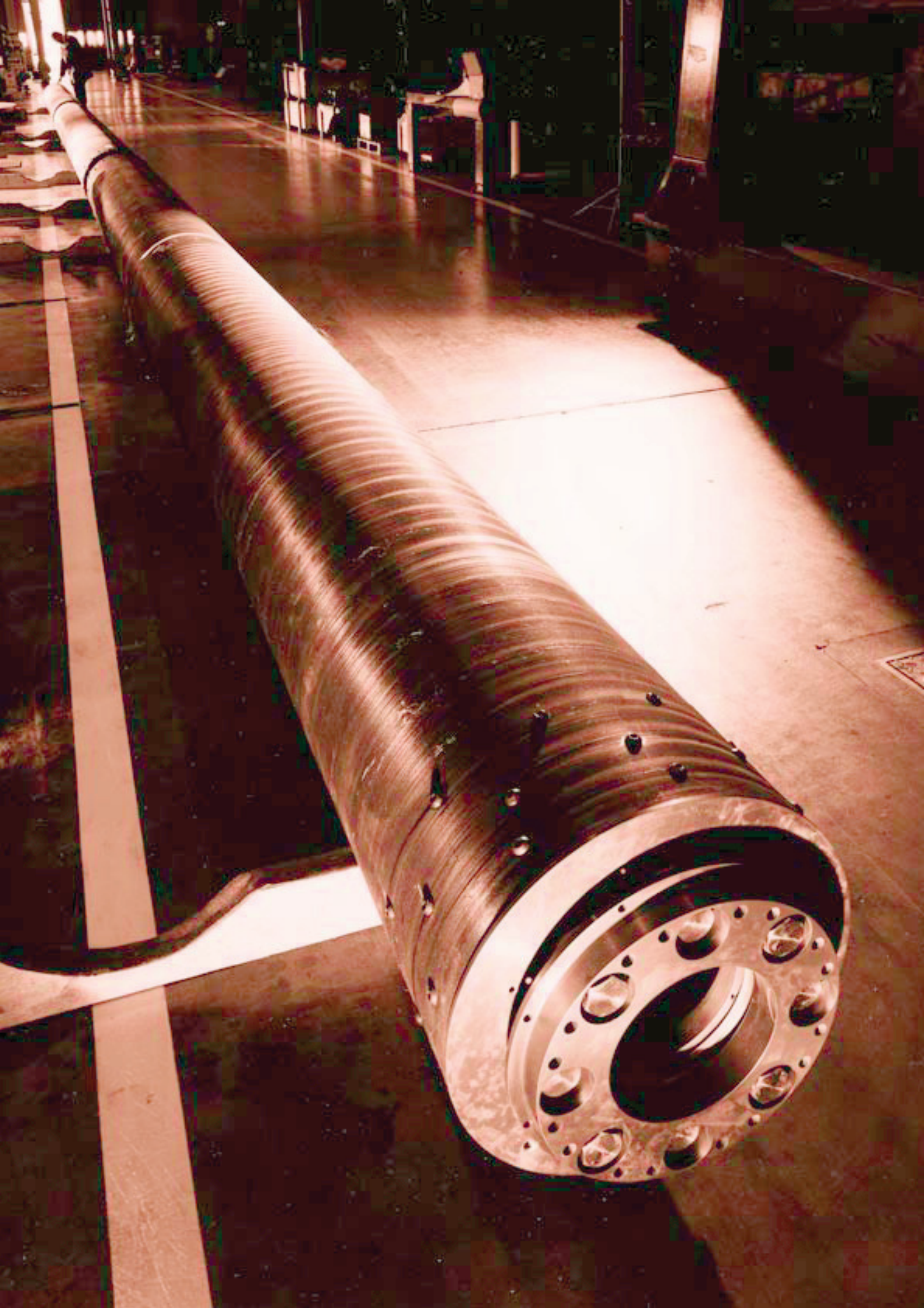
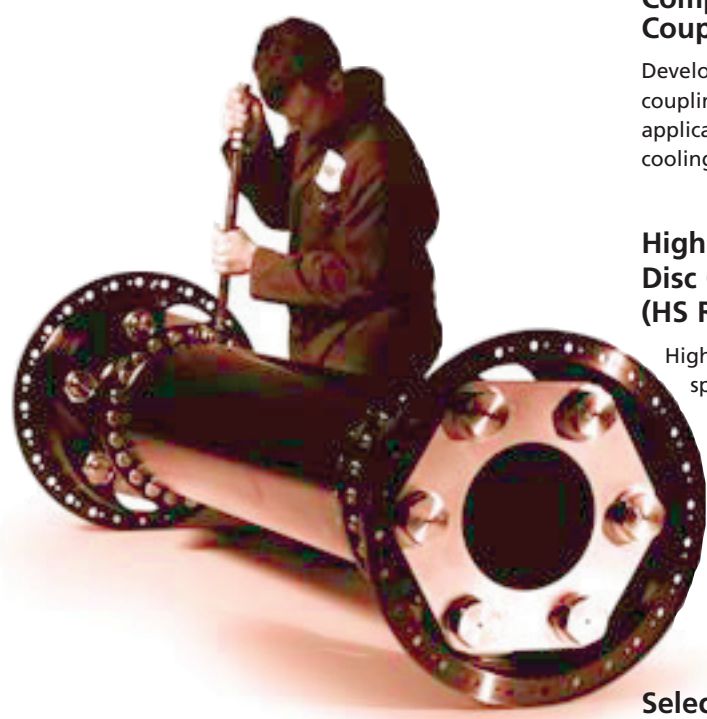




Turboflex
Disc Couplings







Introduction 2

Introduction to the company and the disc coupling product

General Purpose Disc Couplings (DJ/D/DS Ranges) 3-6

Standard disc couplings suitable for most general applications.

Composite Tube Couplings (DJCFT Range) 7-10

Development of the standard DJ disc coupling specifically for long shaft applications such as vertical pumps, cooling towers & marine drives.

High Performance Disc Couplings (HS Range) 11-14

High torque, low mass, units specifically for the more critical applications encountered in the turbomachinery sector. Also suitable for other critical applications.

Selection Procedure 15-16

Outline of the way in which to select the correct unit from the data in this brochure. Don't forget you can always contact our staff for assistance.

Misalignment Data 17-19

Data outlining the misalignment capacities for the products in this brochure.

General Engineering Information 20

Other information that may be of use in understanding and selecting the right product.

Introduction

A Company with Pedigree

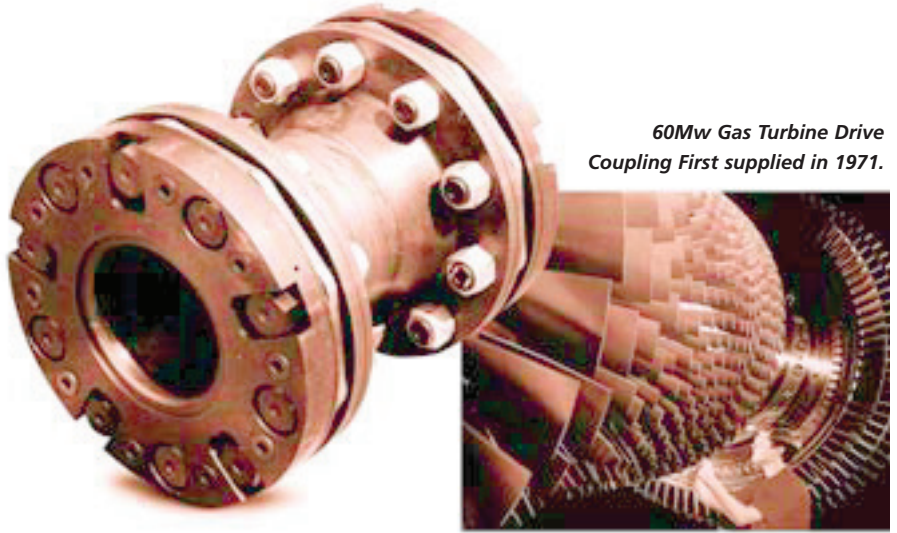
Bibby has been a market leader in flexible couplings & engineering solutions for rotating equipment continually for over 80 years.

Bibby Turboflex first developed the profiled disc coupling in 1958 and have constantly produced units for the "High Performance" market since that date. Consequently we offer over 40 years of, unbroken, design and manufacture of high performance disc couplings with tens of thousands of operational units. The latest developed models are shown in this brochure (HS range).

This extensive experience, developed on providing solutions to critical applications, has been utilised to produce a range of "General Purpose" disc couplings (D & DJ ranges). This offers a high quality but cost-effective solution for more general applications.

For long-span or mass critical applications, we offer a derivation of the general purpose DJ range of units with composite tube (DJCFT range).

Our policy of continuous development using the latest technology in both hardware and software, combined with our commitment to product excellence, enables us to maintain our position at the



*60Mw Gas Turbine Drive
Coupling First supplied in 1971.*

forefront of our market. In conjunction with our unrivalled experience, this also means that we are able to offer assured disc coupling solutions to precisely meet customer's application requirements, with virtually no limit in torque or speed.

An unrivalled knowledge of applications enables us to assist in the selection of the correct type of coupling design. Our own parametric design software enables us to produce couplings that offer the optimum solution for any application.

Please feel free to contact us with details of your specific requirements.

We operate an ISO9001 approved quality system and all our products are produced on modern, high accuracy, CNC machinery.

Bibby Transmissions offer a comprehensive range of couplings and torque limiting systems, many of which can be used in conjunction with the Bibby Turboflex disc coupling. For details, please contact our sales team.

Products with Pedigree

The operating principle of disc couplings is well documented. If you require a greater understanding please contact our staff who will gladly explain in detail or send appropriate literature.

If a formal training presentation is felt advantageous, our experienced staff will gladly visit your site with a view to educating any audience on relevant topics.

The general advantages of Bibby Turboflex disc couplings are as follows. Those advantages relating to specific ranges are highlighted in the individual sections of this brochure.

- **No lubrication**
Bibby Turboflex disc couplings require no lubrication for operation. (The presence of oil in the environment will not, however, effect the operation of the unit).
- **Maintenance free**
Since the disc couplings have no wearing parts, they require no maintenance.

- **Misalignment capability**
The design of Bibby Turboflex disc couplings is such that they will accept significant levels of angular, radial & axial misalignment without any loss of operating performance (See Page 17).
- **High torque to weight ratio**
All Bibby Turboflex disc couplings offer excellent "power to weight" ratios. This is emphasised on the composite (DJCFT) and high performance (HS) ranges.
- **Torsionally stiff**
By the nature of their design, disc couplings are torsionally stiff and backlash free. Within certain limits, the coupling designs can be adapted to adjust the torsional stiffness to permit tuning of systems.
- **Suitable for hostile environments**
A range of materials and a variety of surface coatings can be incorporated in the design of the couplings, making them suitable for operation in adverse environments.

- **Ease of installation**
All standard couplings can be installed and the flexible elements (disc packs) changed without disturbing the adjacent machinery.
- **Spark free**
All ranges of couplings shown in this brochure can be adapted to operate in explosive environments where the requirement is for 'spark free'.
- **API 610 / 671**
All the couplings shown in this brochure can be supplied to meet the requirements of API610 & API671.
- **Third party approval & inspection**
Bibby Turboflex can supply couplings to the rules of, and approval/inspection by, third parties such as Lloyds, DNV, ABS, etc.

DJ / D / DS Coupling Ranges

These couplings are designed for use on general applications. The units are offered as standard, but can also be modified to incorporate options including torque limitation, torque measurement, etc. The arrangement may be adapted to permit connection to machines by any conventional form.



Type DJ

Specific notes

The following section outlines data for the standard disc couplings for general purpose use. The following points should be noted in relation to these products:

- **DS units** will accept angular & axial misalignment only. If radial misalignment is expected, D or DJ units should be considered.
- **DJ units** consist of factory assembled transmission units. Installation involves fitting this transmission unit between the hubs and tightening the attachment screws only. This leads to easier and more rapid installation.
- **Variations in DBSE** are available to suit customer's requirements. For long spans, fabricated steel spacers are available (designation DJCT). The composite shaft, DJCFT, units may be considered.
- **Maximum speeds** are shown for standard materials. When higher speeds are required, consideration should be given to the high performance, HS, range of units.
- **Momentary overloads** of 2x and shock loads of 3.7x the stated rating are accepted by these units.
- **Larger rated units** are available by special design. Please contact our staff for more information.
- **Misalignment data** is shown on page 18.

Materials

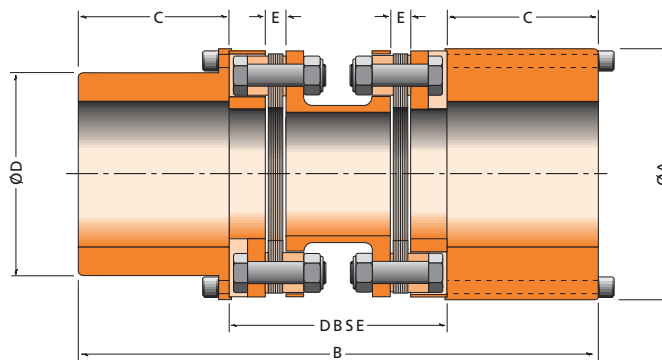
The following materials of construction are used in the General Purpose disc couplings as shown in bold. Alternative materials are available as indicated in italics.

If there is a specific requirement for a material not shown below, please contact our design team for discussion.

Hubs:	Carbon Steel <i>Alloy Steel</i> <i>Stainless Steel</i>
Spacers:	Carbon Steel <i>Alloy Steel</i> <i>Stainless Steel</i> <i>Titanium Alloy</i> <i>Aluminium Alloy</i>
DJ Adaptors:	Carbon Steel <i>Alloy Steel</i>
Discs:	Stainless Steel (301) <i>Inconel</i> <i>Monel</i>
Bolts:	Alloy Steel <i>Stainless Steel</i> <i>Inconel</i>
Nuts:	Alloy Steel <i>Stainless Steel</i>

General Purpose

Type DJ Double Element (Plug-in) Couplings



Type DJ

The Transmission Units (section between hubs) is factory assembled before despatch for ease of installation.

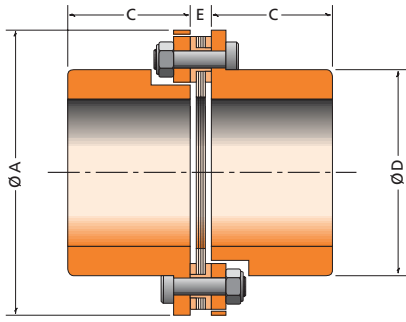
On sizes 62-143 these transmission units are interchangeable with other suppliers units.

- Variations in DBSE are available to suit customer requirements. Please refer to Bibby Turboflex for extreme variations. Long shafts may be fabricated in steel or composite tube (DJCFT) units may be considered.
- Momentary overloads of 2x stated rating and shock loads of 3.7x stated rating are permitted.
- Maximum speeds shown are for standard design & materials. Higher speeds may be possible. Consult Bibby Turboflex.
- The maximum bores shown are for cylindrical or tapered shafts with international standard rectangular keys. Units can be supplied with other forms of shaft connection. Please consult Bibby Turboflex.
- Unless specified to the contrary, hub bores will be manufactured with H6 tolerance up to 50mm diameter and H7 above 50mm.
- Unit inherent balance is better than Q16. Balance to Q6.3 or Q2.5 may be recommended or is available upon request.

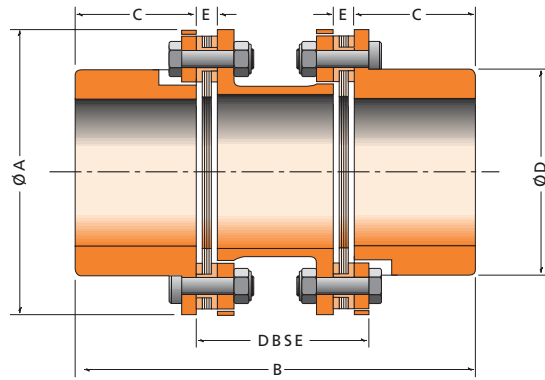
DJ Rating

Size	Rating		Max rpm	Bore (mm)		Dimensions						Mass (kg)	
	kW / rpm	kNm		Std.	Lrg.	A	B	C	D	E	Min. DBSE	Min Lg.	Extra 10mm
62	0.025	0.24	14500	45	51	82	160	45	63	6.5	70	3.8	0.027
82	0.034	0.32	12000	55	70	101	180	55	78.5	7.1	70	5.8	0.043
102	0.110	1.00	12000	73	90	127	242	75	101	9.6	92	13.6	0.055
103	0.130	1.22	12000	73	-	127	244	75	101	10.7	95	13.7	0.055
122	0.180	1.75	10000	85	102	149	277	85	117	10.7	110	21.7	0.067
123	0.240	2.25	10000	85	-	149	280	85	117	12.2	110	21.9	0.067
142	0.290	2.80	8500	105	-	176	348	105	144	12.2	140	39.3	0.10
143	0.390	3.70	8500	105	-	176	353	105	144	14.5	143	39.6	0.10
162	0.600	5.70	7500	120	-	203	395	120	166	16.4	155	60.7	0.16
163	0.730	7.00	7500	120	-	203	400	120	166	19.1	165	61.4	0.16
192	1.100	10.50	6000	145	-	241	476	145	199	19.7	190	106	0.26
193	1.400	13.10	6000	145	-	241	483	145	199	23.1	195	108	0.26
232	1.500	14.20	5000	170	-	283	540	170	235	18.6	200	167	0.32
233	2.000	19.00	5000	170	-	283	548	170	235	22.8	210	169	0.32
272	2.300	21.70	4000	203	-	335	623	200	280	20.5	225	275	0.39
273	3.000	28.90	4000	203	-	335	633	200	280	25.4	235	276	0.39
312	4.700	44.40	3600	230	-	385	710	230	322	23.3	250	410	0.66
313	6.300	60.00	3600	230	-	385	720	230	322	28.3	260	415	0.66

Type DS & D Couplings



Type DS



Type D

DS Type Single Element (Non-Spacer) Coupling

(Note: DS units do not accept Radial Misalignment).

D Type Double Element (Spacer) Coupling.

- Variations in DBSE are available on D Type to suit customer requirements. Please refer to Bibby Turboflex for extreme variations. Long shafts may be fabricated in steel or composite tube (DJCFT) units may be considered.
- Momentary overloads of 2x stated rating and shock loads of 3.7x stated rating are permitted.
- Maximum speeds shown are for standard design & materials. Higher speeds may be possible. Consult Bibby Turboflex.
- The maximum bores shown are for cylindrical or tapered shafts with international standard rectangular keys. Units can be supplied with other forms of shaft connection. Please consult Bibby Turboflex.
- Unless specified to the contrary, hub bores will be manufactured with H6 tolerance up to 50mm diameter and H7 above 50mm.
- Unit inherent balance is better than Q16. Balance to Q6.3 or Q2.5 may be recommended or is available upon request.

D Rating

Size	Rating		Max rpm	Bore (mm)		Dimensions						Mass (kg)	
	kW / rpm	kNm		Min.	Max.	A	B	C	D	E	Min. DBSE	Min Lg.	Extra 10mm
52	0.006	0.057	19000	-	26	60	80	25	37	5.0	30	0.8	0.030
62	0.020	0.19	14500	-	35	78	105	35	50	6.3	35	1.8	0.025
82	0.026	0.25	12000	-	45	95	125	45	65	6.3	35	3.2	0.035
102	0.065	0.62	12000	20	63.5	122	193	65	89	8.1	63	7.9	0.060
103	0.079	0.75	12000	20	63.5	122	195	65	89	8.8	65	8.0	0.060
122	0.126	1.20	10000	20	76.2	145	225	75	105	8.8	75	13.0	0.070
123	0.160	1.50	10000	20	76.2	145	229	75	105	10.0	79	13.2	0.070
142	0.220	2.10	8600	20	90	169	268	90	123	10.3	88	21.5	0.085
143	0.280	2.70	8600	20	90	169	273	90	123	11.9	93	22.0	0.085
162	0.350	3.30	7500	20	105	198	317	105	145	11.9	107	36.0	0.100
163	0.460	4.40	7500	20	105	198	323	105	145	13.8	113	36.5	0.100
192	0.710	6.80	6000	20	125	234	384	125	172	15.1	134	60.0	0.150
193	0.940	9.00	6000	20	125	234	392	125	172	17.8	142	61.0	0.150
232	1.290	12.30	5000	33	146	278	451	145	203	17.0	161	100	0.250
233	1.720	16.40	5000	33	146	278	461	145	203	20.5	171	102	0.250
272	1.760	16.80	4200	33	172	325	520	175	239	17.4	170	160	0.270
273	2.350	22.40	4200	33	172	325	530	175	239	20.9	180	162	0.270
312	3.720	35.50	3600	33	200	376	587	200	277	20.2	187	197	0.530
313	4.960	47.30	3600	33	200	376	600	200	277	24.0	200	200	0.530

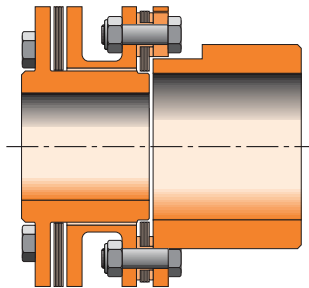
Note: Smaller DBSEs can be accommodated by using a bore smaller than the stated maximum.

General Purpose

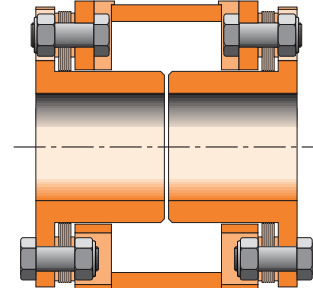
Available Standard Options

- Spark Free**
 The general purpose disc couplings can be easily adapted to offer "Spark Free" operation for use in explosive environments. This is achieved by replacing the standard steel overload washers with non-sparking Monel.
- Anti-Flail**
 This refers to a feature introduced to restrain the coupling spacer in the event of an element disc failure. In practice, the overload-washer / bolt system adopted in Bibby Turboflex general purpose disc couplings serves this requirement. However, if required a secondary anti-flail feature can be incorporated on the DJ range of units.
- Limited End Float (LEF)**
 Bibby Turboflex disc couplings can be adapted to offer a limited end float capability. The standard limitation is $\pm 3\text{mm}$ for a spacer coupling. Other limits are available on request. Please note that the non-linear axial stiffness of disc couplings means that, under most circumstances, they inherently limit the float of a motor rotor within it's bearing stops. As such, the addition of a limiting end float system is frequently not required. Please consult Bibby Turboflex for further information.

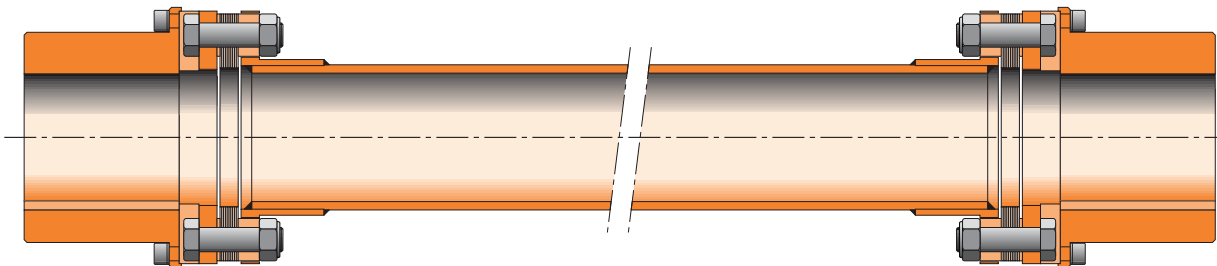
Alternative "Standard" Designs



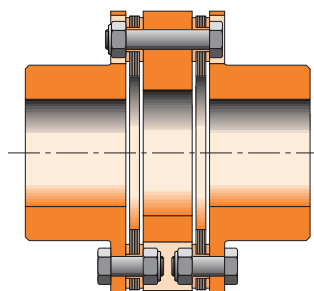
DCC Type Close Coupled unit.
 Note: Reversed hub accepts smaller bore than shown in table for D type.



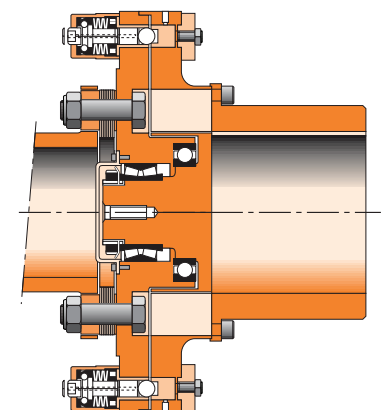
DGC Type "Horizontally Split" close coupled unit.
 Note: Hubs accept smaller bore than shown in table for D type.



DJCT "Fabricated" spacer coupling for long spans.
 See also DJCFT composite tube range (Pages 7-10)



DPS Type with "Plate" spacer for reduced DBSE.
 Note: Hubs accept smaller bores than those shown in table for D type



Adaption to incorporate SE torque limiter.

DJCFT Range

These couplings are a derivation of the standard DJ units incorporating central spacer tubes in composite material. They are specifically intended for use on long applications such as found on cooling towers, vertical pumps & marine drives. They can, however, be used on any application where the benefits are an advantage. The technology may, in certain cases, be applied to high-speed couplings. For further information please contact Bibby Turboflex.



DJCFT Coupling

Advantages of DJCFT Couplings

(These are in addition to those for the parent DJ couplings)

Low mass – The use of composite material for the coupling spacer considerably reduces the unit mass which can simplify installation and extend machinery life.

Temperature stability – Stationary long steel shafts will bow when subject to heating from one side only (e.g. sunlight on a cooling tower shaft) causing severe vibrations on start-up. With composite tubes the effect is negligible.

Simplified installation – The DJCFT range of couplings are specifically designed to make installation simple.

Less need for intermediate bearing supports – Composite shaft couplings can offer significantly higher lateral critical speeds than equivalent steel shafts. The result is that, for long shaft applications, it is frequently possible to use a single span shaft, eliminating the need for central bearings and all the installation and maintenance costs these incur.

Improved bearing life – The reduced mass and inherently excellent balance of these units reduces bearing forces and can significantly improve bearing life.

Specific Notes

The following section outlines data for the Composite Shaft Disc Couplings. The following points should be noted in relation to these products:

- Momentary overloads of 2x and shock loads of 3x the stated rating are accepted by these units.
- Larger rated units are available by special design. Please contact our staff for more information.
- Misalignment data is shown on page 18.

Materials

The basic materials of construction for the DJCFT are as for the DJ couplings (see General Purpose Disc Coupling section) with the obvious exception of the central Spacer. The standard materials (bold type) and options (italics) are as follows. In addition, there are a number of coatings available as options. If there is a specific requirement for a material or coating not shown below, please contact our design team for discussion.

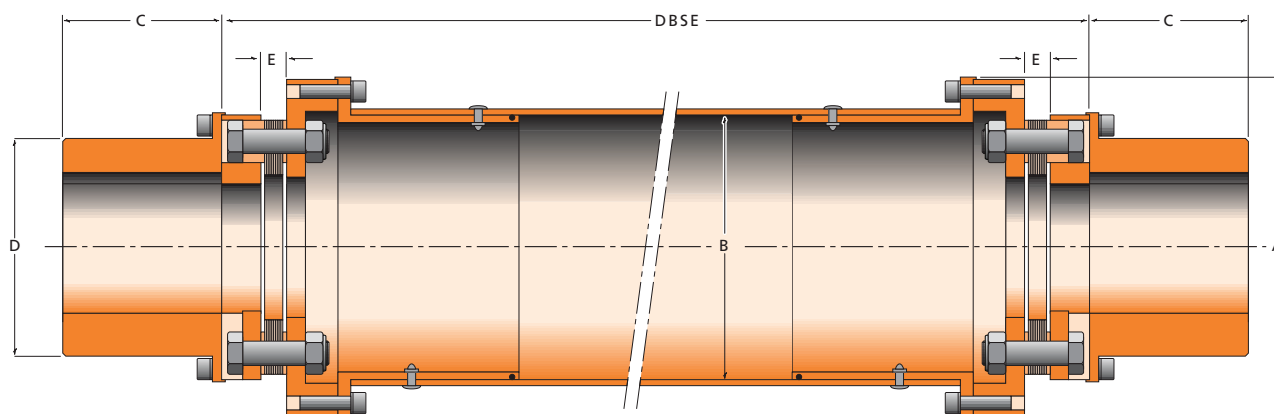
Spacers ends: **Carbon Steel**
Alloy Steel
Stainless Steel

Spacer tube: **Carbon Fibre**
Glass Fibre
High Modulus
- Carbon Fibre

Coatings:
(steel parts) **Phosphate**
Epoxy paint
Galvanise
Zinc spray.

Composite Tube

Type DJCFT Composite Tube ("Plug-in") Couplings



For "Standard" design options available see page 6.

- Momentary overloads of 2x stated rating are permitted (up to 100000 cycles during coupling life).
- Shock torques of 3x rating are permitted.
- The maximum bores shown are for cylindrical or tapered shafts with international standard rectangular keys. Units can be supplied with other forms of shaft connection. Please consult Bibby Turboflex.
- Unless specified to the contrary, hub bores will be manufactured with H6 tolerance up to 50mm diameter and H7 above 50mm.
- In certain cases it may not be possible to utilise the full length at a given torque. Always confirm your selection with Bibby Turboflex before making any critical decisions.
- For permissible misalignments see the relevant section of this brochure.

Tube ref	Max. DBSE (meters) @ rpm			
	3000	1500	1000	750
T2	2	3.4	4.1	4.8
T3	2.6	3.7	4.5	5.2
T4	3.1	4.5	5.5	6.3
T5	3.6	5.1	6.3	7.3
T6	4.1	5.7	7.1	8.2
T7	4.4	6.5	7.7	8.9

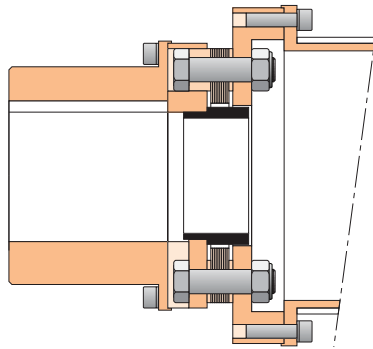
DJCFT Rating

Size	Rating		Bore max. (mm)	Applicable Tube	Dimensions				
	kW / rpm	kNm			A	B	C	D	E
62	0.025	0.24	75	T2	123	85	45	63	6.7
82	0.034	0.32	55	T2/T3	127/142	85/100	55	78.5	7.1
102	0.11	1.00	73	T3/T3	151/196	100/152	75	101	9.6
103	0.13	1.22	73	T3/T4	151/196	100/152	75	101	10.7
122	0.18	1.75	85	T4/T5	202/250	152/200	85	117	10.7
123	0.24	2.25	85	T4/T5	202/250	152/200	85	117	12.2
142	0.29	2.80	105	T4/T5/T6	202/250/306	152/200/256	105	144	12.2
143	0.39	3.70	105	T4/T5/T6	202/250/306	152/200/256	105	144	14.5
162	0.60	5.70	120	T5/T6	256/312	200/256	120	166	16.4
163	0.73	7.00	120	T5/T6	256/312	200/256	120	166	19.1
192	1.10	10.50	145	T5/T6	286/317	200/256	145	199	19.7
193	1.40	13.10	145	T5/T6	286/317	200/256	145	199	23.1
232	1.50	14.20	170	T5/T6/T7	330/330/417	200/256/337	170	235	18.6
233	2.00	19.00	170	T5/T6/T7	330/330/417	200/256/337	170	235	22.8
272	2.30	21.70	203	T6/T7	382/424	256/337	200	280	20.5
273	3.00	28.90	203	T6/T7	382/424	256/337	200	280	25.4
312	4.70	44.40	230	T6/T7	444/444	256/337/500	230	322	23.3
313	6.30	60	230	T6/T7	444/444	256/337/500	230	322	28.3

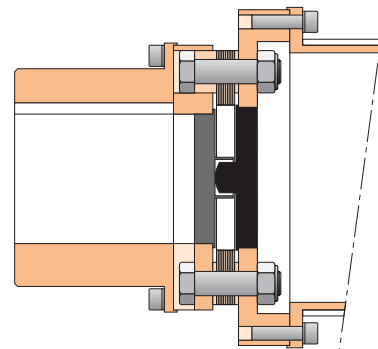
Standard Design Options with DJCFT Disc Couplings

The following outline the "standard" design options available with DJCFT Disc Couplings.

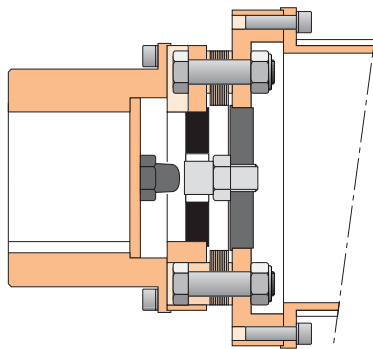
For further information please contact Bibby Turboflex.



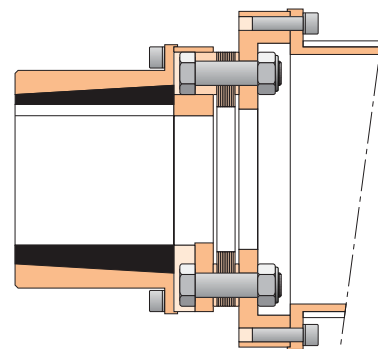
Anti-Flail system used to restrain the central, composite, spacer section in the event of a flexible disc failure.



Combined Anti-Flail system and Thrust Button. The Thrust Button is used to support the central spacer in vertical operation.



Anti-Flail and Thrust Button arrangement, shown in combination with a Rubber Buffer. This is used to restrict axial vibration of the central spacer during some operating conditions.



Taper Bush used in the hub at one end of the coupling to permit axial adjustment upon installation. Other clamp systems can also be incorporated into the designs. Please consult Bibby Turboflex.

Composite Tube

Type DJCFT Composite Tube ("Plug-in") Couplings

The DJCFT range of composite tube disc couplings has been designed using the latest material technology - providing lower mass and greater strength. This type of unit was, originally, designed to meet the requirements of cooling towers but has since been adapted to meet the requirements of many alternative applications, specifically long vertical pump and marine drives.

In addition to the disc coupling applications, Bibby Turboflex have developed the use of composite tubes in a number of other areas. The tubes have been designed and supplied for use in hovercraft fans, performance car drive shafts and high speed test beds.

The tubes are filament wound on accurate mandrels using computer controlled machinery. The resulting tube is cured whilst on the mandrel.

This process leads to high accuracy with regard to tube dimensions, roundness and straightness all of which aid in the ability of Bibby Turboflex to supply an extremely high quality product. We have supplied drive shaft systems in excess of 25 meters long.

Purpose developed software enables Bibby Turboflex to offer tube with fibre windings at angles adjusted to give the optimum performance for specific lateral critical, torque and torsional stiffness requirements.

Bibby Turboflex have the option to wind tubes using a variety of fibres, each of which give specific advantages.



Tubes have been designed, developed and supplied by Bibby Turboflex for performance car drive shafts and high speed test beds.

- **Carbon Fibre** – This is the principle material giving a high strength / low mass option for the tubes. This is considered as the standard for the DJCFT range of couplings.
- **Glass Fibre** – Glass fibre offers a low cost solution for many applications of moderate length. The mass to stiffness ratio is less favourable than that for Carbon Fibre but such units do have applications to which they are ideally suited.
- **Carbon/Glass Mix** – The fibre winding approach adopted by Bibby Turboflex enables us to combine these materials to use the advantages of both to give the optimum solution for a specific application.
- **High Modulus Fibre** – Due to its high cost and limited availability, the use of high modulus fibre is generally only adopted for the more extreme applications to give optimum solutions.

The tubes are wrapped in a pigment treated glass fibre layer, which serves to protect them against physical damage and Ultra-Violet degradation.

Type DJCFT - Specific Applications

Cooling Tower Fan Drives

Bibby Turboflex composite shaft couplings are perfectly suited for driving cooling tower fans. Their ability to operate over long lengths without central bearings, combined with their inherently low mass and generous misalignment capacity, keeps maintenance of the equipment to a minimum. The maintenance free nature of the Bibby Turboflex disc couplings means the units become virtually "fit & forget".



The design is such as to make site assembly as easy as possible.

The units can be supplied in standard carbon steel with a variety of protective coatings or, if required, in stainless steel.

Vertical Pump Drives

Bibby Turboflex composite shaft couplings can be employed to great advantage in deep well pump applications such as encountered in water & sewage pumping stations. Their ability to cover long spans without the need for central bearings and their inherent low mass can considerably reduce maintenance costs on units. This is something advantageous on remote operated or inaccessible plants especially in conjunction with the "fit & forget" nature of the Bibby Turboflex disc couplings.

Material & coatings can be varied to suit the requirements of particular applications.

Axial length adjustment can be incorporated in the couplings in various ways which, when coupled with the generous misalignment capacity and ease of assembly design, can reduce installation time.

When necessary, thrust pins can be added to the unit to support the mass of the central spacer.

Marine Drives

Bibby Turboflex composite shaft couplings have been successfully utilised in marine applications for both ships & hovercrafts. The low mass and minimal vibration levels, together with the ability to handle long spans without support bearings, have proved a benefit in many such applications.

Special Applications

Bibby Turboflex disc couplings with composite spacer shafts are used in many special applications. Their low mass & low inertia, coupled with the ability to adjust the torsional & lateral characteristics of the shaft during manufacture, have made them applicable for many cases where conventional couplings have been inappropriate. Whilst the application for these shafts is as wide as that for couplings themselves, particular success has been found in marine applications, automobile drives and high speed engine test beds.

Whilst the composite shafting is primarily intended for use with Bibby Turboflex disc couplings, it can equally well be incorporated into any other of our wide range of products.