escodisc

FLEXIBLE DISC TYPE COUPLINGS

Index

In a world where efficiency, extended life, less maintenance and reduced life cycle costs are becoming more and more important, the role of the coupling (the connection between two machines) and its influence cannot be underestimated. This is why designers and manufacturers of rotating machines are asking for larger torques, better misalignment capacities, excellent production quality, lower weights and significantly reduced reaction forces.

Disc type couplings offer the user numerous advantages: they are maintenance free, they have very low reaction forces in case of misalignment, and thanks to their high degree of inherent balance, create no vibrations which might cause damage to components such as mechanical seals, bearings, etc...

The Esco engineers have succeeded in **optimising the design of the disc type coupling** in order to reduce the reaction forces to an absolute minimum level. Also phenomena such as "fretting corrosion" and buckling, that can significantly limit the life of a disc type coupling, have ben eliminated. Escodisc couplings have been developed, tested and manufactured for **infinite life, maintenance free use, reduced assembly costs and increased machine efficiency.**

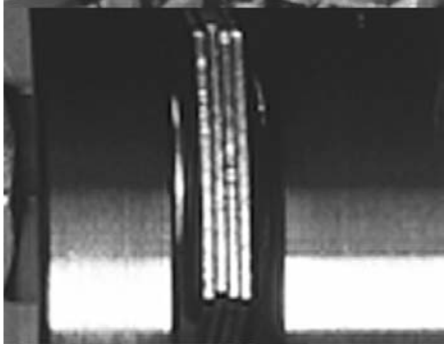
Series DLC
Torque: up to 1600 Nm
Bore: up to 105 mm

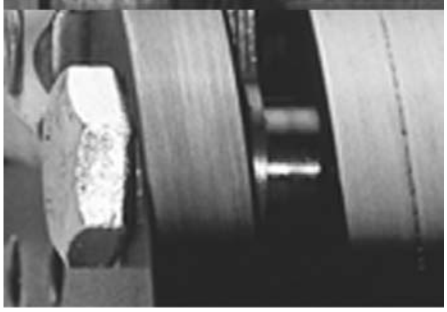
Series DMU
Torque: up to 260000 Nm
Bore: up to 370 mm

Series DPU
Torque: up to 23100 Nm
Bore: up to 220 mm

Printed in Belgium 03/2001

Why Escodisc ?





High Torque and Misalignment capacity

Thanks to the optimised disc shape and thickness (which could be obtained by finite element analysis and laser cutting), the optimised number of bolts and the standard use of 12.9 quality bolts, Escodisc couplings have a high torque and misalignment capacity combined with reduced reaction forces on connected equipment (bearings, mechanical seals...).

Infinite life

All Escodisc couplings have been calculated, designed and tested for infinite life. This is possible thanks to the use of discs in AISI 301 stainless steel with special surface treatment, the standard use of fillers between the discs to eliminate fretting corrosion and the use of high Safety margin on catalogue values.

No Buckling

In order to guarantee perfect centring of the spacer under all working condition (very important for long DBSE applications) and well controlled stresses in the disc pack, Escodisc couplings have been calculated and tested to have no buckling up to the peak torque. This results in trouble free operation, maximum efficiency and reduced risk for disc failure.

Flexible Spacer Design

Thanks to the unique design of the Escodisc spacer (flanges bolted to the intermediate tube section - see catalogue drawings DMU/DPU), its length is easily adaptable to customer requirements. Therefore quick delivery (even for non-standard DBSE) is possible and customer stock can be reduced to a minimum level.

Suitable for extreme temperatures and corrosive environment

Escodisc couplings can operate at temperatures as high as 270°C and as low as -40°C, (lower or higher temperature level on request). Furthermore, thanks to the use of stainless steel discs, the standard use of Dacromet protection for the hardware and a special surface treatment, Escodisc couplings are ideal for use in a corrosive environment.

Easy assembly and disassembly

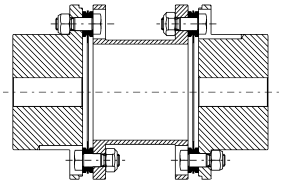
To save cost at the assembly and the disassembly stages, the design of all Escodisc couplings has been optimised (factory assembled disc pack or transmission unit, shipping screws...).

Torque transmission in case of disc pack failure

In the unlikely event of a disc pack failure, the Escodisc couplings have been designed in such a way that torque transmissions remains guaranteed for a limited time (trough the bolts). This system furthermore keeps the spacer well centred and works as an anti-fly system through which optimum user safety can be assured.

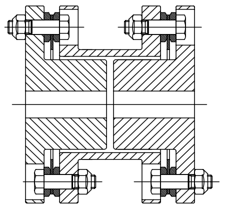
Printed in Belgium 03/2001

DLC ← A110



Standard

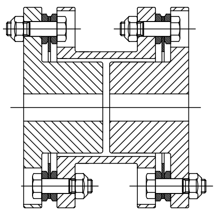
DLCC ← A111



Close coupled

DLFR

← A112

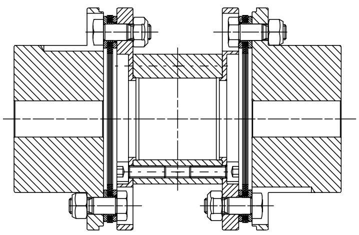


Flex-rigid

Single disc

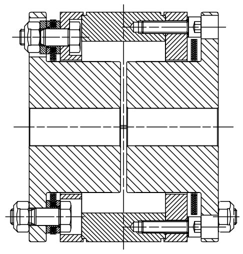
DMU

← A115 & 116



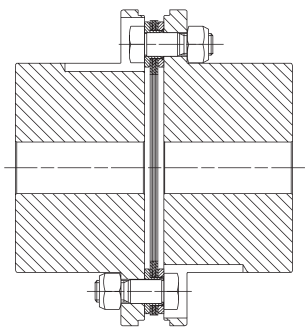
Unitized multi discs

DMUCC ← A117



Close coupled

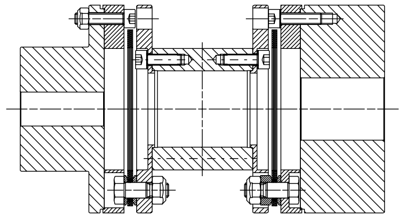
DMUFR ← A118



Flex-rigid

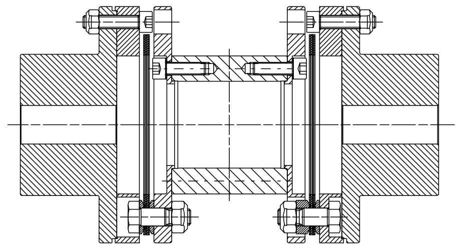
← ← ← AVAILABILITIES ↓ ↓ ↓

DPUSL ← A121



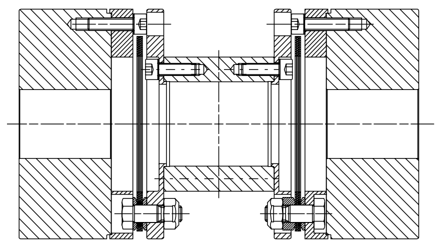
S Hub L Hub

DPUSS ← A121



S Hub S Hub

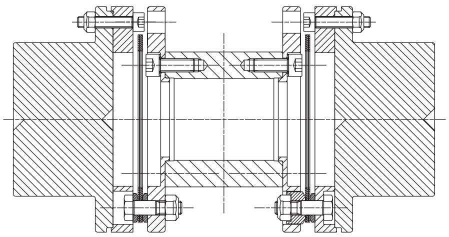
DPULL ← A121

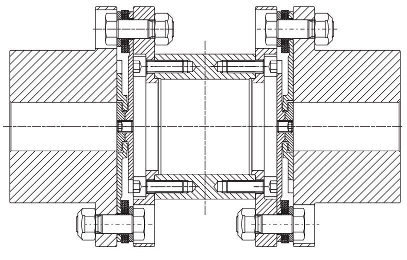


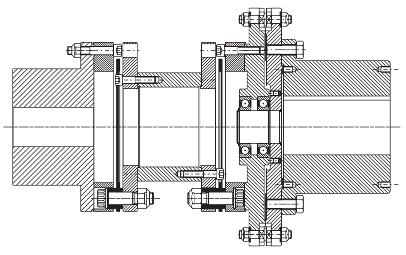
L Hub L Hub

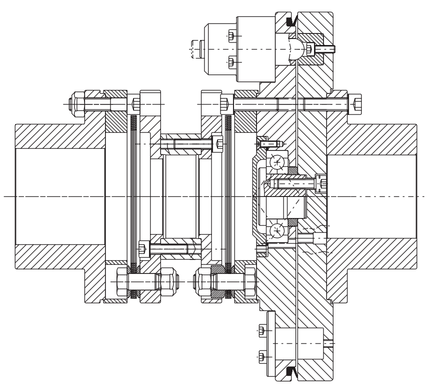
Pre-assembled disc pack

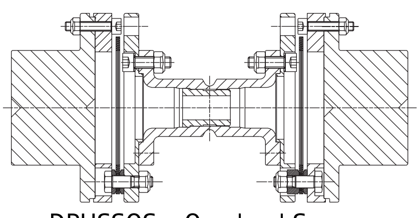
Special Execution Available (on request)

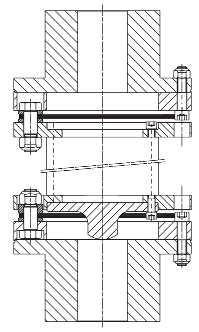

DPUSSNS - Non Sparking Execution

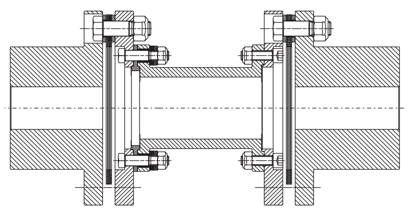

DMULE - Limited End Float

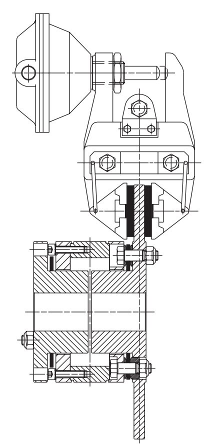

DPUSSSP - Shear Pin Overload Protection

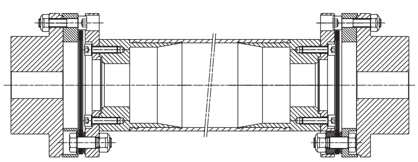

DPSSET - Esco Torque Overload Protection (adjustable)

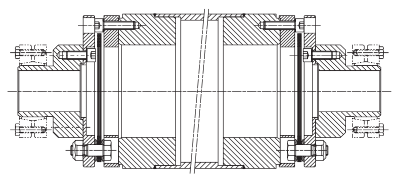

DPUSSOS - Overload Spacer


DPUSSV - Vertical Execution


DMUIN - Electrically Insulated


DMUCCBD - With Integrated Brake Disc


DPUSSCP - With Composite Spacer


DPUEDSS - Extended Diameter

Dimensions in mm without engagement — Printed in Belgium 03/2001

HOW TO SELECT THE RIGHT COUPLING SIZE

1. **BASED ON APPLICATION DATA**
   Depending on torque, speed, distance between shaft ends and the shaft sizes of the two machines to be connected, a first selection can be made. DLC couplings are limited in torque and bore capacity so for medium to high torque application DMU or DPU series have to be used. For torques > 23100 Nm, DMU is preferred. High Speed applications are, thanks to its concept, best covered by the DPU series. For short DBSE application, DLCC or DMUCC can be selected while for long DBSE application (DBSE > 1000 mm) requiring balancing, escodisc DMU or DPU have to be used. In the below table an overview of the coupling characteristics are given for quick selection.

2. **BASED ON SPECIFIC APPLICATION REQUIREMENTS**
   Specific application requirements can also determine the escodisc type to be used. These requirements might be balancing, conformity to API specifications, non-sparking execution, special materials, assembly, available space etc... In the below table, an overview of the conformity of the DLC/DMU/DPU to specific application requirements can be found.

3. **BASED ON COMMERCIAL REQUIREMENTS**

4. **BASED ON CUSTOMER STANDARDISATION/PREFERENCE**

	DLC	DLCC	DMU	DMUCC	DPU
Torque Capacity (1)	1600	1600	260000	19800	23100
Bore Capacity	105	85	370	170	220
Balancing (2)			Q 2,5		Q 2,5
Short DBSE (<50 mm)		Yes		Yes	
Long DBSE (>1000 mm)			Yes		Yes
Large Hub					Yes
Non Sparking				Optional	Optional
High Speed Applications (>3000 rpm)					Optional
API 610			Yes		Yes
API 671					Optional
Electrical Insulation	Optional		Optional		Optional
Limited End Float			Optional		Optional
Shear Pin Overload Protection					Optional
Esco Torque Overload Protection					Optional
Overload Spacer			Optional		Optional
Vertical Execution					Optional

Remarks: (1) Indicated Torque capacity is for standard range. Larger sizes are available on request.

(2) Indicated balance degree gives the maximum advisable balance degree. Standard couplings are not balanced.

HOW TO SELECT THE RIGHT COUPLING SIZE

1. MISALIGNMENT CAPACITY

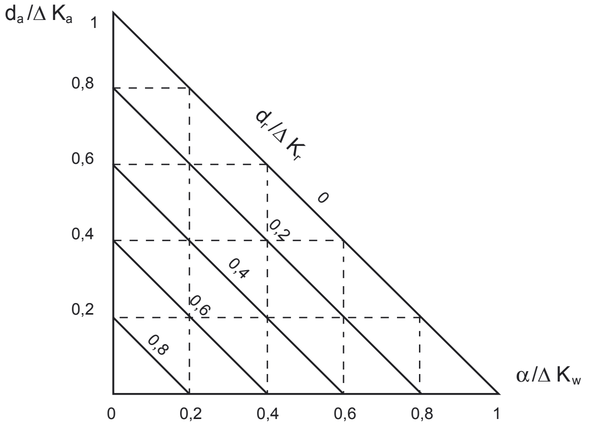
ESCODISC COUPLING CAN ACCOMMODATE 3 TYPES OF MISALIGNMENT:

Axial displacement:
d_a mm per coupling
ΔK_a = max. axial displacement
(see data sheet)

Angular misalignment:
α degree per half coupling:
α = max. (α_1, α_2)
ΔK_w = max. angular misalignment
(see data sheet)

Offset misalignment:
d_r mm per coupling
ΔK_r = max. offset misalignment
(see data sheet) ($\Delta K_r = S \text{ tg } \Delta K_w$)

Max. combined misalignment during operation is calculated by using the graph:



or the formula:

$$\frac{d_a}{\Delta K_a} + \frac{\alpha}{\Delta K_w} + \frac{d_r}{\Delta K_r} \leq 1$$

Example:
For ESCODISC DMU 65 - 75, max. values given in data sheet are:
$\Delta K_a = 2{,}6$ mm; $\Delta K_w = 0{,}5°$; $\Delta K_r = 0{,}8$ mm.

Check if actual misalignment values are permissible:
$d_a = 0{,}8$ mm; $\alpha = 0{,}15°$ and $d_r = 0{,}2$ mm

$$\frac{d_a}{\Delta K_a} + \frac{\alpha}{\Delta K_w} + \frac{d_r}{\Delta K_r} = \frac{0{,}8}{2{,}6} + \frac{0{,}15}{0{,}5} + \frac{0{,}2}{0{,}8} = 0{,}85 \leq 1 \text{: OK}$$

In case of use in potentially explosive atmospheres Ex , European Directive 94/9/EC, the combination of misalignement may not exceed 0,8.

$$\frac{d_a}{\Delta K_a} + \frac{\alpha}{\Delta K_w} + \frac{d_r}{\Delta K_r} \leq 0{,}8$$

At assembly, we however recommend not to exceed 20% of the complete misalignment capacity of the coupling.
See installation and maintenance instructions (IM).

2. TORQUE CAPACITY AND SELECTION

2.1 Tabulated torques are independent from misalignment and speed conditions as far as combined misalignment is within the specified values (see above) and speed does not exceed tabulated values.

2.2 How to select?

A. First select the size of ESCODISC coupling that will accommodate the largest shaft diameter.

B. Make sure this coupling has the required nominal torque capacity according to the formula: Torque in Nm = $\frac{9550 \times P \times F_u \times F_{Ex}}{n}$

Where P = Power in kW, n = speed in min^{-1}.
F_U = Service factor depending on the connected machine (see below).
F Ex = 1,5 in case of use in potentially explosive atmospheres Ex. In normal atmospheres, **F Ex = 1.**

The coupling selected per A must have an equal or greater nominal torque capacity T_n (see planographs A104 to A121) than the result of the formula B. If not, select a larger size coupling.

C. Check that the selected coupling has the required peak torque capacity according to the following formula :
Calculated peak torque= Peak torque of the application x F Ex ; F Ex, see above (Point B)
For application with direct starting of an AC motor, the transmitted peak torque has to be calculated with the following formula :

$$\text{Calculated Peak Torque} = 7 \times T_{nm} \times \frac{J_2}{(J_1 + J_2)} F_{Ex}$$

where T_{nm} = nominal torque of motor (Nm)
J_1 = inertia of motor (kgm^2)
J_2 = inertia of the driven machine (kgm^2)
F Ex = see above (point B).

For application using a brake, calculated peak torque = brake torque x 1,5 x F Ex.
Peak torque capacity Tp of the coupling (see planographs A105 to A121) must be higher than the calculated peak torque. If not, select a larger coupling.

D. Check if shaft/hub assembly will transmit the torque. (If in doubt, please consult Esco).

E. Read carefully assembly and maintenance instructions (IM).

2.3 Service factor F_u

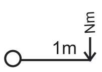
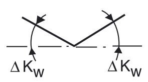
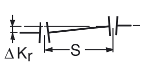
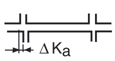
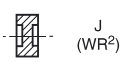
Service factor depends on coupled machines (driver and driven = F_M) and on the working condition (F_W). $F_u = F_M \cdot F_W$

	DRIVER MACHINE	DRIVEN MACHINE
$F_M = F_N$	Electric and hydraulic motors, Turbines	See tabulation
$F_M = F_N + 0{,}4$	Piston engine with 4 cylinders and more	
$F_M = F_N + 0{,}9$	Piston engine with 1 to 3 cylinders	below for F_N

$F_W = 1$ for non reversing applications — $F_W = 1{,}25$ for reversing applications — for more than 2 starts per min.

DRIVEN MACHINE	F_N	DRIVEN MACHINE	F_N
<u>Agitators</u>		<u>Handling equipment</u>	
- High inertia * and/or heavy liquids	1,75	- Conveyor	1,75
- Low inertia and light liquids	1	- Crane	2
<u>Compressors</u>		- Elevator	1,5
- Centrifugal	1,5	- Hoist	1,75
- Reciprocating	2,5	<u>Machines - Various</u>	
<u>Generators</u>		- laundry washer	1,75
- Continuous duty	1	- packing and bottling	1,5
- Welding	1,75	- paper and textile	2
<u>Machine tool</u>		- rubber mill	2
- Auxiliary drives	1	- wood and plastic	1,5
- Main drives	1,75	<u>Metallurgy</u>	
<u>Pumps</u>		- Continuous casting	2,5
- Centrifugal	2,5	- Convertor	2,5
- Gears	1,5	- Shear, Stripmill	2,25
- High inertia * and/or heavy liquids	1,75	<u>Mining, cement, briquetting</u>	
- Low inertia and light liquids	1	- Crusher	3
- Propeller	1,25	- Mixer (concrete)	1,75
- Waterjet pump	1,25	- Rotating oven	2
<u>Ventilators, axial or radial blowing</u>		<u>Wire drawing</u>	2
- Great capacity *, cooling tower	2		
- Low inertia	1		

* If $J_1 < 2\,J_2$ with J_1 = inertia of electric motor and J_2 = inertia of the driven machine.

LEGEND OF USED PICTOGRAM		
	Ømax.	MAXIMUM BORE (mm)
	Ømin.	MINIMUM BORE (mm)
	Tn	MAXIMUM NOMINAL TORQUE (Nm)
	Tp	MAXIMUM PEAK TORQUE (Nm)
		MAXIMUM SPEED (rpm)
		MAXIMUM ANGULAR MISALIGNMENT (degree)
		MAXIMUM OFFSET MISALIGNMENT (mm)
		MAXIMUM AXIAL MISALIGNMENT (mm)
		INERTIA (kgm^2)
		WEIGHT (kg)

Notes for series DL — DMU — DPU

1 For key according to ISO R 773.

2.1 Maximum transmissible torque for:

$\% \Delta K_w + \% \Delta K_a + \% \Delta K_r \leq 100\%$ or 80% in Ex atmosphère

3 Higher speed on special request.

3.3 Depend on S.

4 For solid bore.

5 For pilot bored hubs.

8 Values for S minimum. S maximum depends on torque and speed.

11 For larger S, contact us.

12 Following DIN 740.

13 $\Delta K_r \cong S \times tg\, \Delta K_w$

** Max. torque, speed and misalignment tabulated values may not be cumulated. See IM/A100-2, -3, -4.*

SERIES DLC

The Economic Single Disc Concept for low to medium duty applications
Maximum torque capacity: up to 1600 Nm - Bore Capacity: up to 105 mm

Economic Solution

The simplified design and single disc concept of the Escodisc DLC makes it the most cost effective solution for simple low to medium torque/speed applications where a maintenance free coupling is required.

Single Disc Concept

Thanks to finite element analysis and the standard use of laser cutting, the single disc concept can be used without problems (no fretting corrosion, no buckling) for low to medium duty applications.

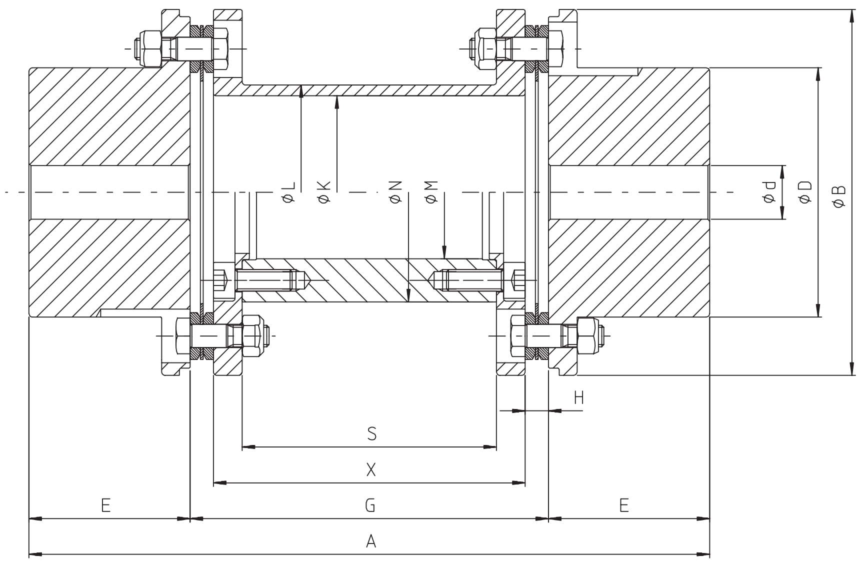
Close Coupled design

The Escodisc DLC coupling is also available in close coupled design (DLCC) to provide the user with a very compact solution for his application. A distance between shaft ends as small as 3 mm can be obtained with maximum misalignment capacity.

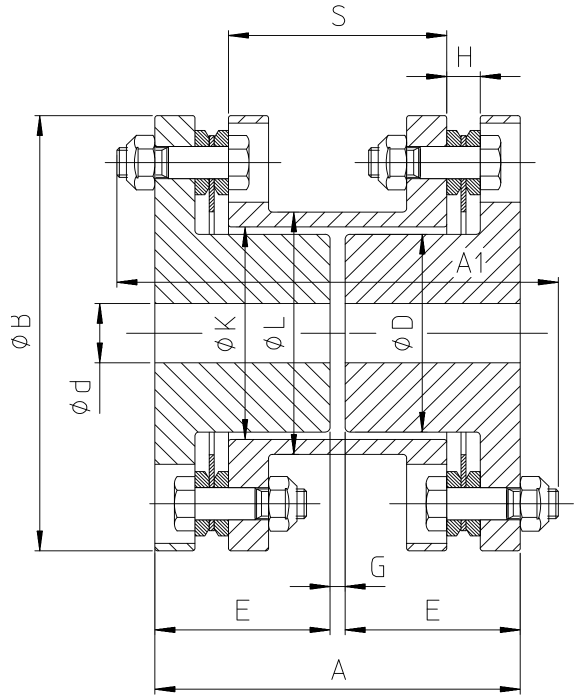
Escodisc Series DLC - Quick Selection Table

Coupling size	Maximum Power (kW)															Max. Speed	Max. Bore
	1000 Rpm			1500 Rpm			1800 Rpm			3000 Rpm			3600 Rpm				
	SF 1	SF 1,5	SF 2	SF 1	SF 1,5	SF2	SF 1	SF 1,5	SF2	SF 1	SF 1,5	SF2	SF 1	SF 1,5	SF2	(Rpm)	(mm)
DLC 28-28	7	5	4	11	7	5	13	9	7	22	15	11	26	18	13	5800	28
DLC 38-45	12	8	6	17	12	9	21	14	10	35	23	17	41	28	21	5000	45
DLC 45-55	21	14	10	31	21	16	38	25	19	63	42	31	75	50	38	5600	55
DLC 55-65	37	24	18	55	37	27	66	44	33	110	73	55	132	88	66	4600	65
DLC 65-75	68	45	34	102	68	51	123	82	61	204	136	102	245	163	123	3900	75
DLC 75-90	105	70	52	157	105	79	188	126	94	314	209	157	377	251	188	3500	90
DLC 85-105	168	112	84	251	168	126	302	201	151	503	335	251	603	402	302	3000	105

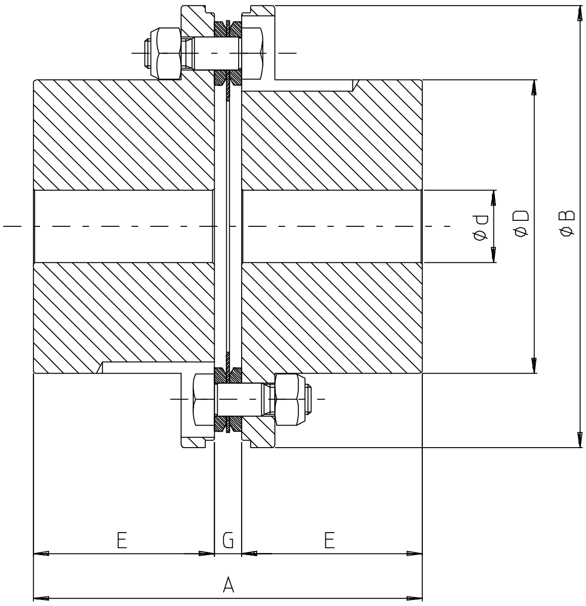
esco



←A105			Type DLC 28-28	38-45	45-55	55-65	65-75	75-90	85-105
d Ø max.	1	mm	28	45	55	65	75	90	105
d Ø min.	1	mm	0	0	0	0	25	32	38
Nm 1m Tn	2.1	Nm	70	110	200	350	650	1000	1600
Nm 1m Tp	2.1	Nm	125	190	350	620	1150	1750	2800
min.max.		tr/min omw/min rpm min^{-1}	5800	5000	5600	4600	3900	3500	3000
ΔK_w ΔK_w	12	degré graad degree Grad	2x0,75	2x0,75	2x0,5	2x0,5	2x0,5	2x0,5	2x0,5
ΔK_a	12	mm: ±	1,2	1,8	1,2	1,4	1,6	2	2,4
ΔK_r S	12 13	mm: ±	0,8	0,8	0,8	0,8	0,8	0,8	1,1
J (WR^2)	4	kgm^2	0,001	0,002	0,004	0,010	0,022	0,048	0,101
	5	kg	1,6	2,6	4,2	7,0	10,6	16,9	26,9
mm: ± A	11	mm	156	170	190	200	220	240	310
B		mm	76	88	102	123	147	166	192
D		mm	40	58,5	69,5	82	97,5	113	132
E		mm	28	35	45	50	60	70	85
G	11	mm	100	100	100	100	100	100	140
H		mm	6,5	6,7	6,5	7	9	10	13
K		mm	30	43	54	67	81	96	112
L		mm	36	49	60	74	88	104	122
M		mm		21	37	48	54	65	76
N		mm		41	61	72	86	98	116
S	11	mm	71	70,6	71	64	60	48	80
X		mm	87	86,6	87	86	82	80	114



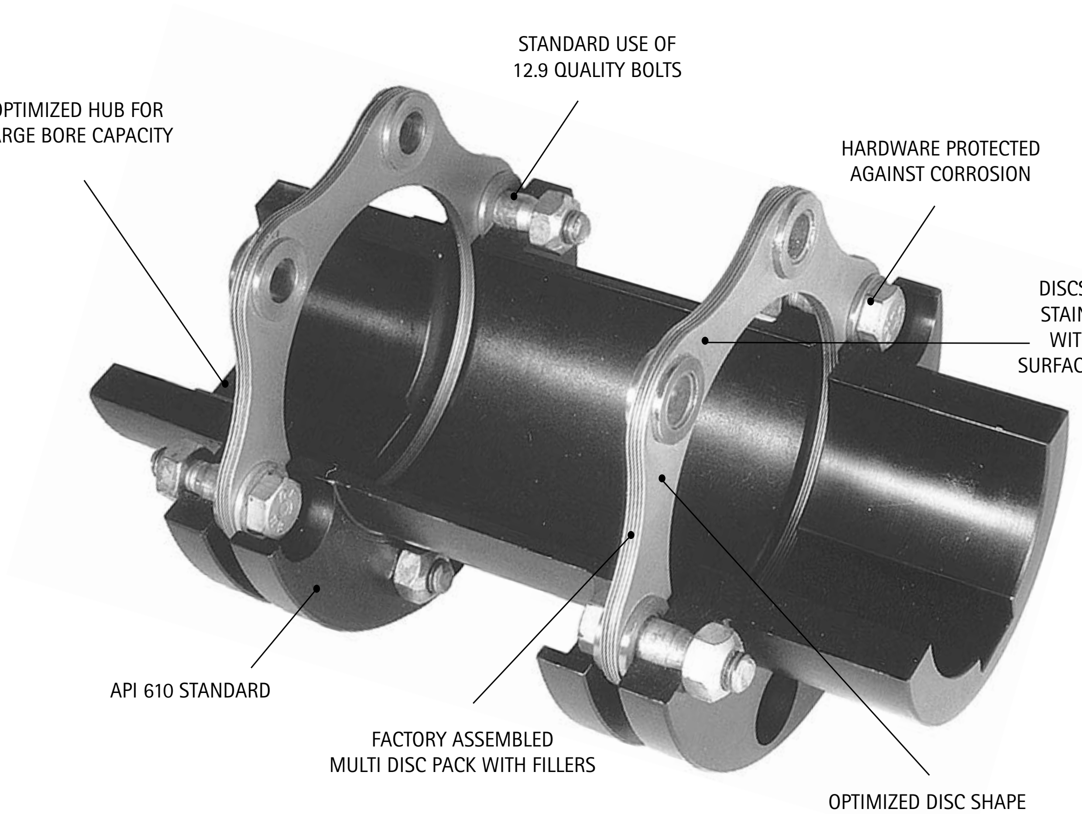
←A105				Type DLCC						
				28-20	38-28	45-40	55-50	65-60	75-70	85-85
d	Ø max.	1	mm	20	28	40	50	60	70	85
	Ø min.			0	0	0	0	25	32	38
1m Nm	Tn	2.1	Nm	70	110	200	350	650	1000	1600
	Tp			125	190	350	620	1150	1750	2800
min.max.			tr/min omw/min rpm min^{-1}	5800	5000	5600	4600	3900	3500	3000
ΔKw ΔKw		12	degré graad degree Grad	2x0,75	2x0,75	2x0,5	2x0,5	2x0,5	2x0,5	2x0,5
ΔKa		12	mm: ±	1,2	1,8	1,2	1,4	1,6	2	2,4
ΔKr S		12	mm: ± 13	0,8	0,8	0,8	0,8	0,8	0,8	1,1
J (WR^2)		4	kgm^2	0,0008	0,0016	0,003	0,009	0,018	0,041	0,084
		5	kg	1,4	2,05	3,2	5,8	8,5	13,5	22,1
mm ±	A	11	mm	116 (66)	116 (73)	116 (93)	122 (103)	122	132	174
	B		mm	76	88	102	123	147	166	192
	D		mm	29	40	52	65	78	92	108
	E		mm	28	35	45	50	59	64	85
	G	11	mm	60 (10)	46 (3)	26 (3)	22 (3)	4	4	4
	H		mm	6,5	6,7	6,5	7	9	10	13
	K		mm	30	43	54	67	81	96	112
	L		mm	36	49	60	74	88	104	122
	S	11	mm	87 (37)	86,6 (43,6)	87 (64)	86 (67)	82	80	114
	A1		mm	133 (83)	133 (90)	133 (110)	142 (123)	148	162	210



←A105				Type DLFR						
				28-28	38-45	45-55	55-65	65-75	75-90	85-105
d Ø max.		1	mm	28	45	55	65	75	90	105
d Ø min.				0	0	0	0	25	32	38
Nm 1m	Tn	2.1	Nm	70	110	200	350	650	1000	1600
	Tp			125	190	350	620	1150	1750	2800
min.max.			tr/min omw/min rpm min^{-1}	5800	5000	5600	4600	3900	3500	3000
ΔKw		12	degré graad degree Grad	0,75	0,75	0,5	0,5	0,5	0,5	0,5
ΔKa		12	mm: ±	0,6	0,9	0,6	0,7	0,8	1	1,2
ΔKr S		12	mm: ±	0	0	0	0	0	0	0
J (WR^2)		4	kgm^2	0,0005	0,0012	0,0027	0,007	0,015	0,032	0,068
		5	kg	1	1,9	3,2	5,3	8,3	13,1	21
mm ±	A		mm	62,5	76,7	96,5	107	129	150	183
	B		mm	76	88	102	123	147	166	192
	D		mm	40	58,5	69,5	82	97,5	113	132
	E		mm	28	35	45	50	60	70	85
	G		mm	6,5	6,7	6,5	7	9	10	13

SERIES DMU

The General Purpose High Torque/High Misalignment Solution
Maximum torque capacity: up to 260000 Nm - Bore Capacity: up to 370 mm



General Purpose Design

Because of the high torque, bore and misalignment capacity of the Escodisc DMU coupling range, its high degree of natural inherent balance (AGMA class 9) up to size 85 and the fact that it meets the API 610 standards, this coupling is the ideal solution in a multitude of applications up to 260000 Nm (and larger upon request).

Unitised Disc Pack

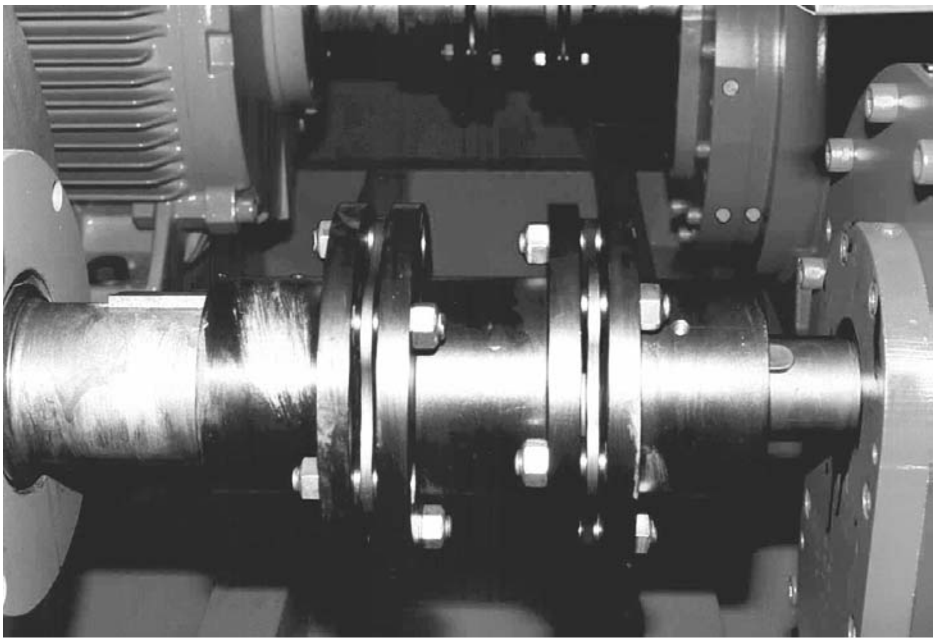
The DMU disc pack consists of an optimised number of discs or separated links (for sizes greater or equal to size 190) and has been factory assembled for easy field assembly. To eliminate fretting corrosion (which limits disc type coupling life), stainless steel fillers between the discs are used.

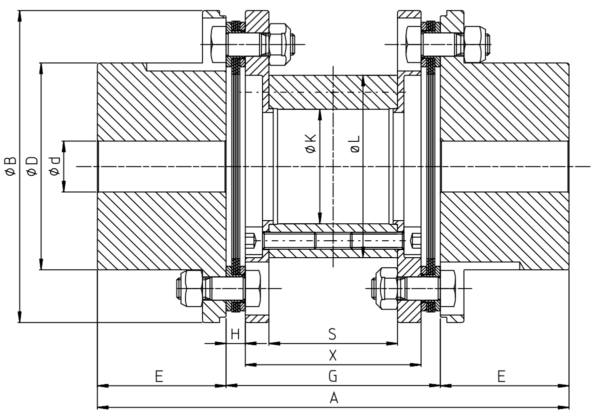
Close Coupled Design

The Escodisc DMU coupling is also available in close coupled design (DMUCC). The high torque/bore capacity makes it an ideal maintenance free alternative for close coupled gear and elastic type couplings and can be modified in such a way that replacement of gear and elastic couplings is possible without modifications to an existing installation. Furthermore, thanks to the split spacer design, disconnection of the two machines and replacement of the disc pack is possible without axial displacement of the connected machines.

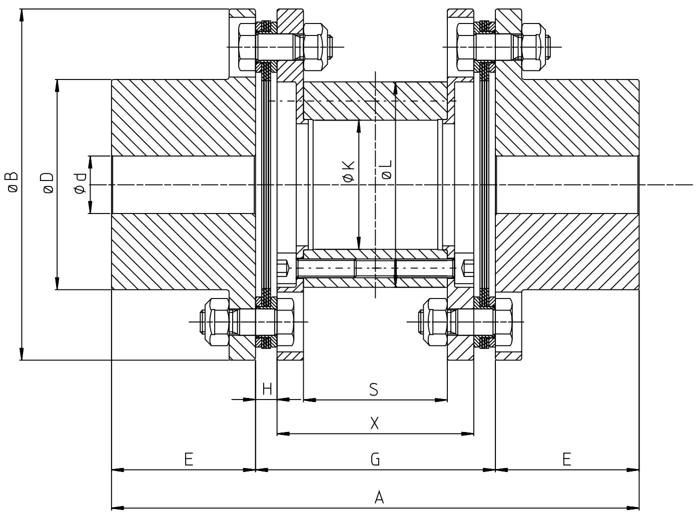
Escodisc Series DMU - Quick Selection Table

Coupling size	Maximum Power (kW)															Max. Speed (Rpm)	Max. Bore (mm)
	1000 Rpm			1500 Rpm			1800 Rpm			3000 Rpm			3600 Rpm				
	SF 1	SF 1,5	SF 2	SF 1	SF 1,5	SF2	SF 1	SF 1,5	SF2	SF 1	SF 1,5	SF2	SF 1	SF 1,5	SF2		
DMU 38-45	20	13	10	30	20	15	36	24	18	60	40	30	72	48	36	16000	45
DMU 45-55	35	23	17	52	35	26	62	41	31	104	69	52	124	83	62	13600	55
DMU 55-65	79	52	39	118	79	59	141	94	71	236	157	118	283	188	141	12000	65
DMU 65-75	139	93	70	209	139	104	251	167	125	418	279	209	501	334	251	10000	75
DMU 75-90	230	154	115	346	230	173	415	276	207	691	461	346	829	553	415	8600	90
DMU 85-105	366	244	183	550	366	275	660	440	330	1099	733	550	1319	880	660	7200	105
DMU 95-105	586	391	293	880	586	440	1056	704	528	1759	1173	880	2111	1407	1056	6400	105
DMU 110-120	838	558	419	1257	838	628	1508	1005	754	2513	1675	1257	3016	2010	1508	5600	120
DMU 125-135	1141	761	571	1712	1141	856	2054	1370	1027	3424	2283	1712	4109	2739	2054	5000	135
DMU 140-160	1487	991	744	2231	1487	1115	2677	1784	1338	4461	2974	2231	5353	3569	2677	4600	160
DMU 160-185	2074	1383	1037	3109	2073	1554	3735	2490	1868	6226	4151	3113	11245	7497	5623	4000	185





Size 38 -45 to 85 -105



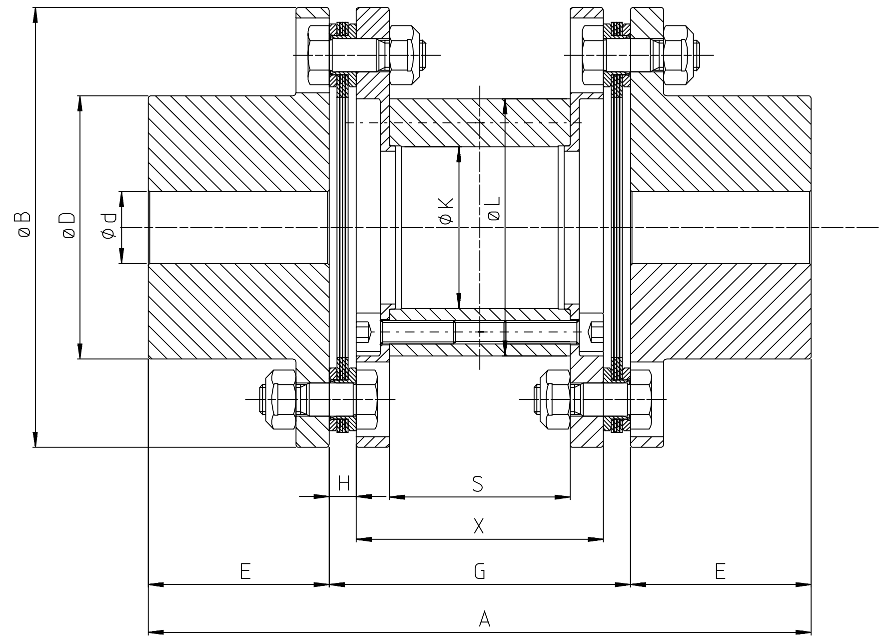
Size 95 -105 to 160 -185

←A105			Type DMU										
			38-45	45-55	55-65	65-75	75-90	85-105	95-105	110-120	125-135	140-160	160-185
d Ø max.	1	mm	45	55	65	75	90	105	105	120	135	160	185
d Ø min.			0	0	0	25	32	38	45	55	65	65	80
Nm 1m Tn	2.1	Nm	190	330	750	1330	2200	3500	5600	8000	10900	14200	19800
Tp			290	500	1120	2000	3320	5200	8400	12000	16400	21200	29600
min.max.	3	tr/min omw/min	8000	6800	6000	5000	4300	3600	3200	2800	2500	2300	2000
		rpm min^{-1}	16000*	13600*	12000*	10000*	8600*	7200*	6400*	5600*	5000*	4600*	4000*
ΔK_w ΔK_w	12	degré graad degree Grad	2x0,75	2x0,5	2x0,5	2x0,5	2x0,5	2x0,5	2x0,5	2x0,5	2x0,5	2x0,5	2x0,5
ΔK_a	12	mm: ±	2,4	2	2,4	2,6	3	4	4	4,4	5,2	6,6	6,8
ΔK_r S	12	mm: ±	0,8	0,8	0,8	0,8	1,1	1,1	1,1	1,4	1,4	2	2
J (WR^2)	4	kgm^2	0,0015	0,004	0,008	0,018	0,04	0,084	0,136	0,262	0,434	0,779	1,436
	5	kg	3,08	4,98	8	12,05	20,12	30,65	39,5	59,8	79,04	115,5	163,6
mm ± A	11	mm	170	190	200	220	280	310	330	400	430	530	570
B		mm	88	102	123	147	166	192	224	244	273	303	340
D		mm	58,5	69,5	82	97,5	113	132	133	154	175	196	228
E		mm	35	45	50	60	70	85	95	110	125	140	160
G	11•	mm	100	100	100	100	140	140	140	180	180	250	250
H		mm	6,7	6,5	7	9	10	13	14	15,5	19	20	20
K		mm	21	37	48	54	65	76	94	108	123	143	165
L		mm	41	61	72	86	98	116	134	156	171	191	221
S	11	mm	70,6	71	64	60	88	80	76	103	96	160	154
X		mm	86,6	87	86	82	120	114	112	149	142	210	210

* Balancing needed — • Other lenght available — Please consult us.

escodisc

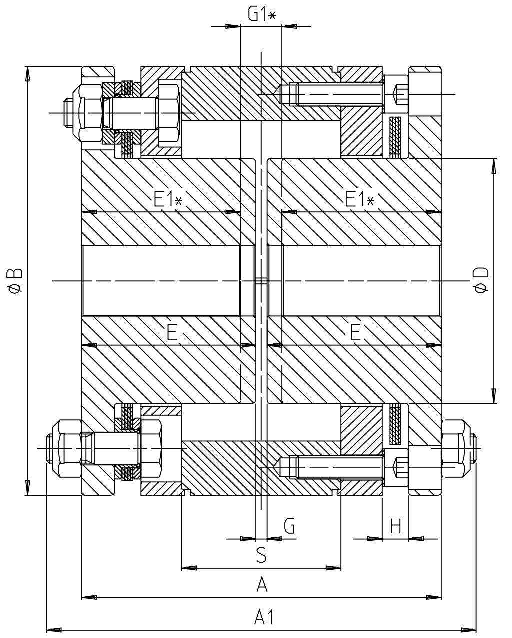
DMU 190-220 ⇨ 360-370

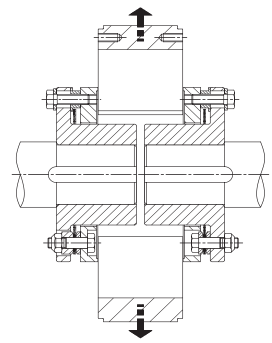


← A105				Type DMU					
				190-220	220-255	250-290	280-320	320-360	360-370
d	Ø max.	1	mm	220	255	290	320	360	370
	Ø min.			90	120	150	180	200	200
Nm 1m	Tn	2.1	Nm	30700	53000	93000	120000	167000	260000
	Tp			46000	80000	140000	180000	250000	390000
/min.max.		3	tr/min omw/min rpm min^{-1}	1800	1500	1300	1200	1050	900
ΔK_w ΔK_w		12	degré graad degree Grad	2x0,33	2x0,33	2x0,25	2x0,25	2x0,2	2x0,2
ΔK_a		12	mm: ±	5	6,6	7,6	8	9	6
ΔK_r S		12	mm: ±	1,4	1,6	1,3	1,4	1,3	1,4
J (WR^2)		4	kgm^2	3	7,3	11,6	23	36	72
		5	kg	222	358	418	680	916	1400
mm ±	A	11	mm	630	720	800	900	1020	1120
	B		mm	383	445	515	554	604	704
	D		mm	266	320	350	392	431	504
	E		mm	190	220	250	280	320	360
	G		mm	250	280	300	340	380	400
	H		mm	22	24,6	38	41	44,9	34
	K		mm	204	254	292	314	330	432
	L		mm	268	318	364	394	426	528
	S		mm	158	174,8	160	186	217,2	252
	X		mm	206	230,8	224	258	290,2	332

escodisc

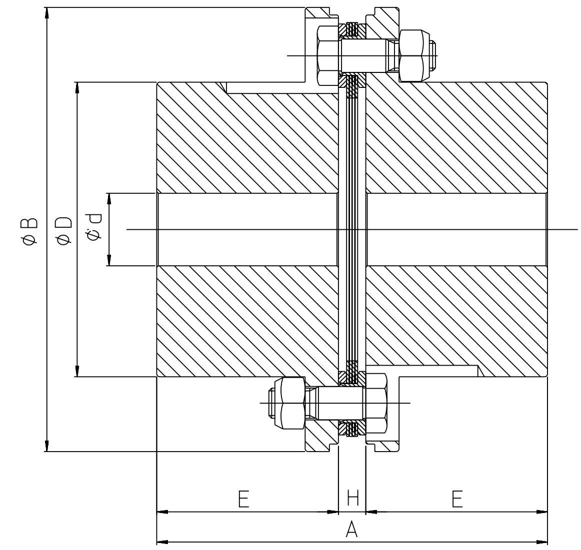
DMUCC 45-45 ⇨ 160-170





←A105			Type DMUCC 45-45	55-50	65-65	75-75	85-90	95-95	110-115	125-130	140-140	160-170
d Ø max.	1	mm	45	50	65	75	90	95	115	130	140	170
d Ø min.	1	mm	0	0	25	32	38	45	55	65	65	80
1m Nm Tn	2.1	Nm	330	750	1330	2200	3500	5600	8000	10900	14200	19800
1m Nm Tp	2.1	Nm	500	1120	2000	3320	5200	8400	12000	16400	21200	29600
min.max.	3	tr/min omw/min rpm min^{-1}	6800	6000	5000	4300	3600	3200	2800	2500	2300	2000
ΔK_w ΔK_w	12	degré graad degree Grad	2x0,5	2x0,5	2x0,5	2x0,5	2x0,5	2X0,5	2X0,5	2X0,5	2X0,5	2X0,5
ΔK_a	12	mm: ±	2	2,4	2,6	3	4	4	4,4	5,2	6,6	6,8
ΔK_r S	12	mm: ±	0,8	0,8	0,8	0,8	1,1	1,1	1,4	1,4	2	2
J (WR^2)	4	kgm^2	0,006	0,014	0,032	0,062	0,135	0,272	0,459	0,8	1,36	2,5
	5	kg	4,52	7,57	12,01	17,42	29,08	42,7	61,2	84,3	118	170
mm ± A	11	mm	93	103	122	132	174	194	226	256	286	328
A1	11	mm	108	123	146	160	204	230	269	302	336	382
B		mm	102	123	147	166	192	224	244	273	303	340
D		mm	59	70	84	97	112	126	151	166	182	213
E		mm	45	50	59	64	85	95	110	125	140	160
E1*		mm	43	47,5	56	60,5	80	89,5	104,8	118	132,5	153,5
G	11	mm	3	3	4	4	4	4	6	6	6	8
G1*		mm	7	8	10	11	14	15	16,5	20	21	21
H		mm	6,5	7	9	10	13	14	15,5	19	20	20
S		mm	46	43	54	46	76	88	98	117	135	167

* E1 and G1 are min. dimensions to allow disc-pack disassembly without moving the machines.

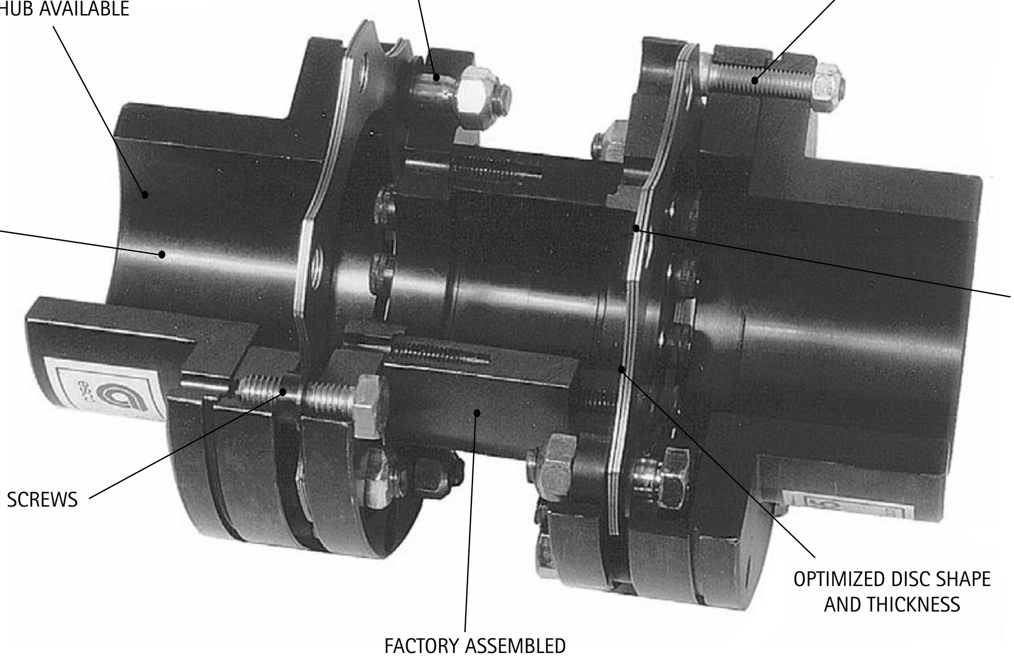


← A105			Type DMUFR 38-45	45-55	55-65	65-75	75-90	85-105	95-105	110-120	125-135	140-160	160-185
d Ø max.	1	mm	45	55	65	75	90	105	105	120	135	160	185
d Ø min.			0	0	0	25	32	38	45	55	65	65	80
Tn	2.1	Nm	190	330	750	1330	2200	3500	5600	8000	10900	14200	19800
Tp			290	500	1120	2000	3320	5200	8400	12000	16400	21200	29600
min.max.	3	tr/min omw/min rpm min^{-1}	8000	6800	6000	5000	4300	3600	3200	2800	2500	2300	2000
			16000*	13600*	12000*	10000*	8600*	7200*	6400*	5600*	5000*	4600*	4000*
ΔK_w	12	degré graad degree Grad	0,75	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5
ΔK_a	12	mm: ±	1,2	1	1,2	1,3	1,5	2	2	2,2	2,6	3,3	3,4
ΔK_r S	12	mm: ±	0	0	0	0	0	0	0	0	0	0	0
J (WR^2)	4	kgm^2	0,001	0,003	0,007	0,015	0,032	0,0683	0,1095	0,2035	0,3493	0,601	1,136
(weight)	5	kg	1,91	3,23	5,31	8,3	13,15	21,13	26,21	38,94	54,3	77,35	113,6
mm ± A	11	mm	76,7	96,5	107	129	150	183	204	235,5	269	300	340
mm ± B		mm	88	102	123	147	166	192	224	244	273	303	340
mm ± D		mm	58,5	69,5	82	97,5	113	132	133	154	175	196	228
mm ± E		mm	35	45	50	60	70	85	95	110	125	140	160
mm ± H		mm	6,7	6,5	7	9	10	13	14	15,5	19	20	20

* Balancing needed

SERIES DPU

The easy to assemble High Torque/High Misalignment Solution
Maximum torque capacity: up to 23100 Nm - Bore Capacity: up to 220 mm



Easy assembly and disassembly

Thanks to the standard use of shipping screws and the factory assembled transmission unit, Escodisc DPU couplings combine the high torque and misalignment capacity of the DMU couplings with easiness of assembly. On average users can cut down assembly and disassembly costs by 50% when using Escodisc DPU couplings. Furthermore, because the transmission unit is factory assembled, the risk for assembly errors is reduced to an absolute minimum level which results in reliable operation and extended life of the coupling.

High Speed/Long DBSE applications

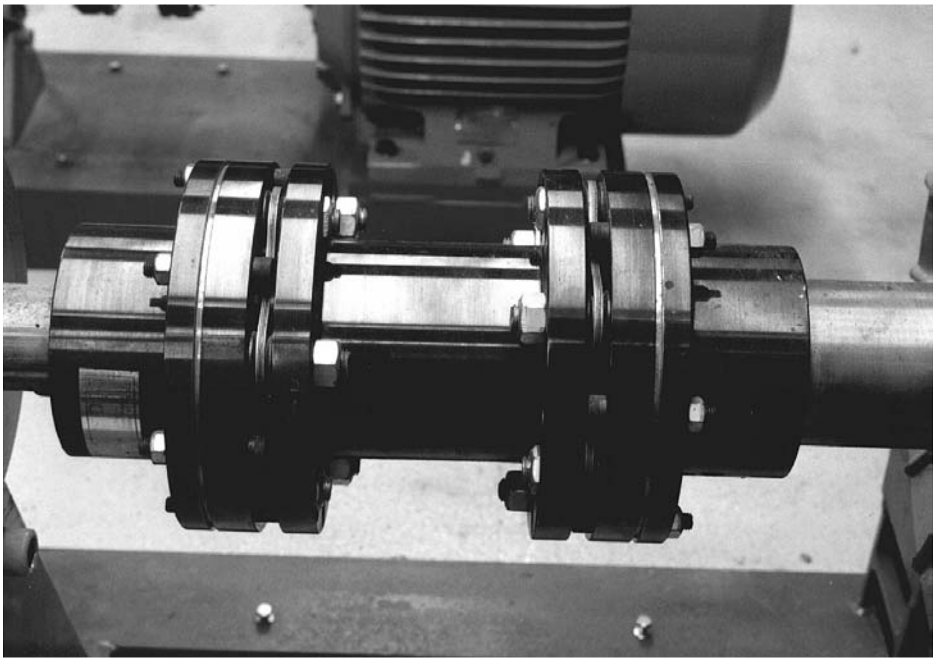
Thanks to the concept of the DPU coupling range (centring spigots) and the high manufacturing standards, it is ideal for use in medium to high speed applications with no or minor modifications. Furthermore, thanks to the perfect centring of the transmission unit, it can be used in applications where a long DBSE is required (e.g. cooling towers) and it can be adapted to meet the API 671 requirements.

Large Bore Capacity

The Large Hub execution (L-hub) of the Escodisc DPU series makes selection virtually independent of the shaft size which makes it possible in several applications to downsize compared with DLC or DMU type couplings.

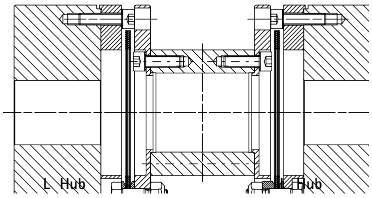
Escodisc Series DPU - Quick Selection Table

Coupling size	Maximum Power (kW)															Max. Speed	Max. Bore	
	1000 Rpm			1500 Rpm			1800 Rpm			3000 Rpm			3600 Rpm				S-Hub	L-Hub
	SF 1	SF 1,5	SF 2	SF 1	SF 1,5	SF2	SF 1	SF 1,5	SF2	SF 1	SF 1,5	SF2	SF 1	SF 1,5	SF2	(Rpm)	(mm)	(mm)
DPU 38-60	20	13	10	30	20	15	36	24	18	60	40	30	72	48	36	24000	45	60
DPU 45-70	35	23	17	52	35	26	62	41	31	104	69	52	124	83	62	20400	55	70
DPU 55-80	79	52	39	118	79	59	141	94	71	236	157	118	283	188	141	18000	65	80
DPU 65-100	139	93	70	209	139	104	251	167	125	418	279	209	501	334	251	15000	75	100
DPU 75-110	230	154	115	346	230	173	415	276	207	691	461	346	829	553	415	12900	90	110
DPU 85-130	366	244	183	550	366	275	660	440	330	1099	733	550	1319	880	660	10800	105	130
DPU 95-145	696	464	348	1044	696	522	1253	836	627	2089	1393	1044	2507	1671	1253	9600	105	145
DPU 110-160	979	653	490	1469	979	734	1762	1175	881	2937	1958	1469	3525	2350	1762	8400	120	160
DPU 125-180	1330	887	665	1995	1330	997	2394	1596	1197	3990	2660	1995	4887	3192	2394	7500	135	180
DPU 140-200	1738	1159	869	2607	1738	1304	3129	2086	1564	5215	3476	2607	6258	4172	3129	6900	160	200
DPU 160-220	2149	1613	1075	3626	2418	1813	4358	2906	2179	7624	4843	3812	8719	5811	4359	6000	185	220

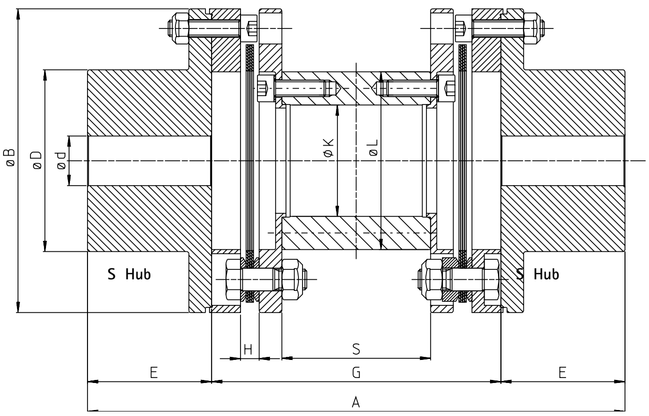


escodisc

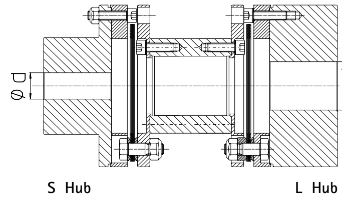
DPU 38-60 ⇨ 160-220



DPULL



DPUSS



DPUSL

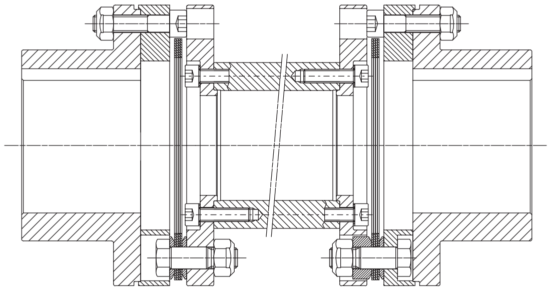
←A105								Type DPU					
				38-60	45-70	55-80	65-100	75-110	85-130	95-145	110-160	125-180	140-200	160-220
d, S Hub	Ø max.	1	mm	45	55	65	75	90	105	105	120	135	160	185
	Ø min.			0	0	0	25	32	38	45	55	65	65	80
d1, L Hub	Ø max.	1	mm	60	70	80	100	110	130	145	160	180	200	220
	Ø min.			0	0	0	25	32	38	45	55	65	65	80
Nm, 1m	Tn	2.1	Nm	190	330	750	1330	2200	3500	6650	9350	12700	16600	23100
	Tp			290	500	1120	2000	3320	5200	10000	14000	19100	24900	34650
min.max.		3	tr/min omw/min rpm min^{-1}	8000	6800	6000	5000	4300	3600	3200	2800	2500	2300	2000
				24000*	20400*	18000*	15000*	12900*	10800*	9600*	8400*	7500*	6900*	6000*
ΔK_w ΔK_w		12	degré graad degree Grad	2x0,75	2x0,5	2x0,5	2x0,5	2x0,5	2x0,5	2x0,33	2x0,33	2x0,33	2x0,33	2x0,33
ΔK_a		12	mm: ±	2,4	2	2,6	2,8	3,2	4	2,5	2,8	2,6	3	3,4
ΔK_r, S		12 13	mm: ±	0,6	0,6	0,6	0,9	0,8	1,1	1	1,4	1,4	1,4	1,4
J (WR^2) •		4	kgm^2	0,003	0,0057	0,015	0,033	0,07	0,145	0,259	0,475	0,775	1,3	2,39
•		5	kg	3,54	5,49	9,07	14,8	22,8	36,35	47	71,7	94,2	128	179
mm ±	A	11	mm	170	190	200	260	280	350	370	470	500	530	570
	B		mm	88	102	123	147	166	192	224	244	273	303	340
	D		mm	58,5	69,5	82	97,5	113	132	133	154	175	196	228
	E		mm	35	45	50	60	70	85	95	110	125	140	160
	G	11	mm	100	100	100	140	140	180	180	250	250	250	250
	H		mm	7,1	6,5	7	9	10	13	14	15,5	19	20	20
	K		mm	21	37	48	54	65	76	94	108	123	143	165
	L		mm	41	61	72	86	98	116	134	156	171	191	221
	S	11	mm	51,8	53	40	72	54	82	74	122	111	99	89
				4 bolts <	> 6 bolts				<	> 8 bolts				>

*Balancing needed - Consult us - • For DPUSS

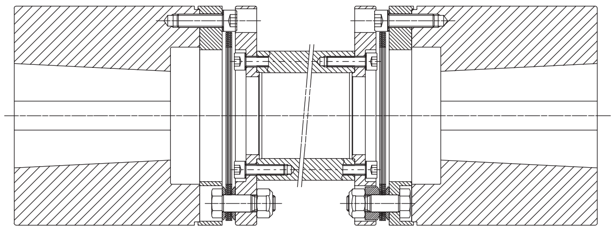
Torque Capacity (Nm): 100, 250, 500, 750, 1000, 1500, 2000, 3000, 5000, 7500, 10000, 15000

Escodisc DPU	Flender ARH	John Crane Flexibox Metastream TSKS	Jaure Lamidisc DO-6	Wellman Bibby Euroflex DJ	Kopflex KD2	Rexnord Thomas Series 71
38-60	96-6	0013	110-6	62	053	150
45-75	120-6	0033	132-6	82	103	175
55-80	142-6	0075	158-6	102	153	225
65-100	162-6	0135	185-6	103	203	300
75-110	190-6	0230	202-6	122	253	350
85-130	214-6	0350	228-6	123	303	375
95-145	230-6	0500	255-6	142	353	412
110-160	245-6	0740	278-6	143	403	462
125-180	275-6	0930	302-6	162	453	512
140-200	310-6	1400		163		562
	345-6			192		600
				193		712
				232		800

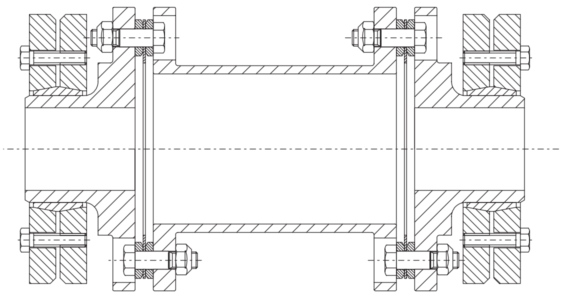
Escodisc Shaft Connections



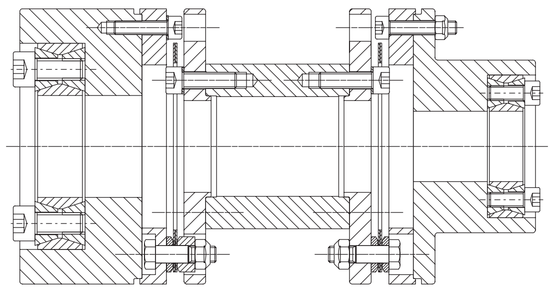
Cylindrical Bore and Keyway
(Esco uses H7 as standard bore tolerance
and keyway is according to DIN 6885/1)



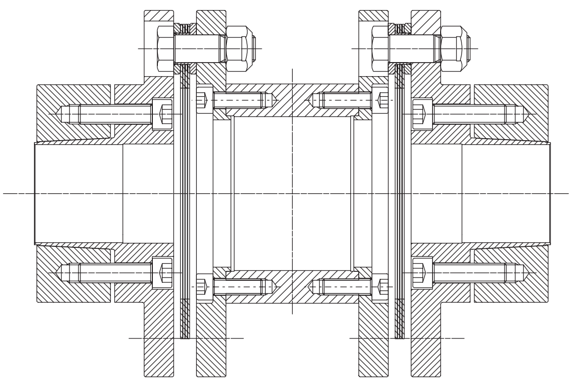
Conical Bore



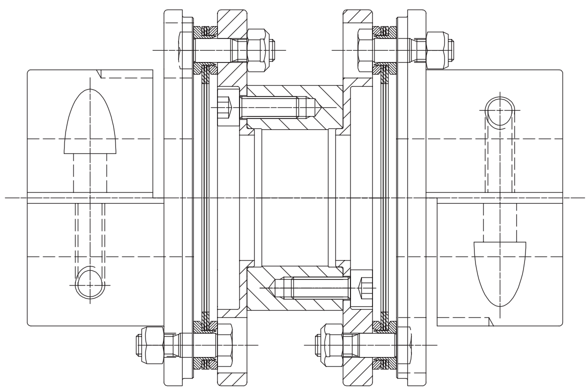
External Clamping Device



Internal Clamping Device



Clamping Hubs



Split Clamping Hubs

For more details on the above mentioned Shaft Connections - Please Consult us

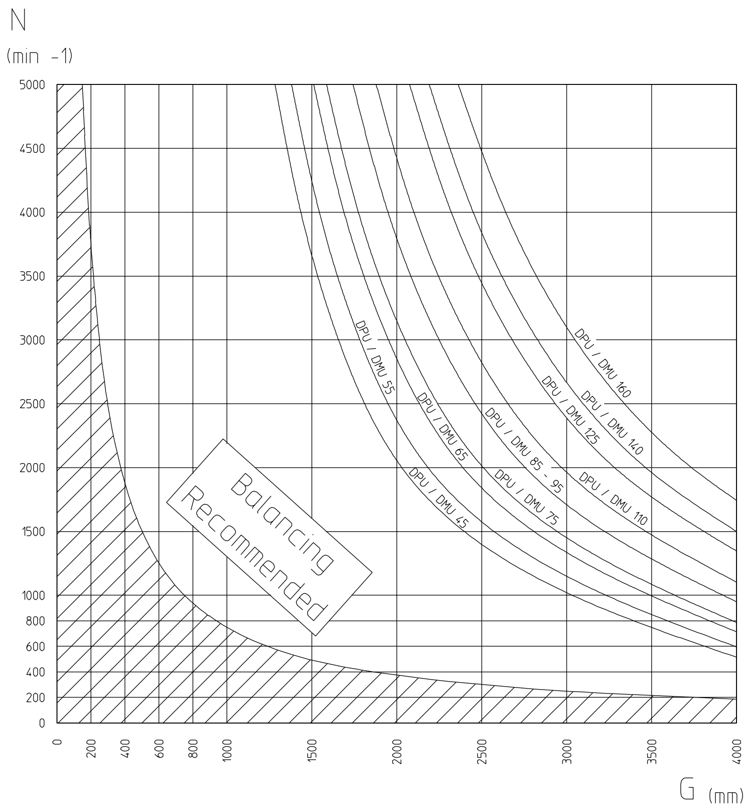
Balancing of escodisc couplings

1. Balancing Requirements

The actual requirement for balancing of a coupling depends amongst other on:

- Manfacturing quality of the coupling (Natural Inherent Balance Quality)
- Application speed
- The mass of the coupling (relative to the masses of the machine rotors)
- Distance between shaft ends
- Sensitivity of the system

Thanks to their high manufacturing quality, escodisc couplings have a high degree of natural inherent balance and generally don't require additional balancing for normal speed applications. Up to size 95, escodisc DLC/DMU/DPU couplings have a minimum balance quality of Q6.3 at 1500 rpm. For larger sizes, Q6.3 is guaranteed without any additional balancing until 1000 rpm. In the below graph you can find when additional balancing is required based on application speed and DBSE. Also you c an find the maximum limits for high speed/long DBSE applications based on the coupling size. Above these limits, please consult us. For applications requiring additional balancing, the use of DLC couplings is not recommended.



2. Esco Balancing Procedures

Based on the application data or specific customer requirements, Esco Transmissions will perform a component balancing to Q6.3 or Q2.5 (as specified - Q1 is obtainable yet not advisable for standard couplings) for standard couplings and a component balancing followed by an assembly balancing procedure for high speed applications. Esco transmissions will also perform balancing before the keyway, if any, is shaped in the coupling. Other balancing options are of course available upon request but must be cleary specified when ordering.

Remark: for DMU couplings, only component balancing is possible.