



CERTIFICATE NUMBER	22-2280946-PDA
EFFECTIVE DATE	23-Aug-2022
EXPIRY DATE	22-Aug-2027
ABS TECHNICAL OFFICE	Hamburg Engineering Department

CERTIFICATE OF Product Design Assessment

This is to certify that a representative of this Bureau did, at the request of

KTR SYSTEMS GMBH

located at

CARL-ZEISS STR. 25, , D-48432 RHEINE, Germany

assess design plans and data for the below listed product. This assessment is a representation by the Bureau as to the degree of compliance the design exhibits with applicable sections of the Rules. This assessment does not waive unit certification or classification procedures required by ABS Rules for products to be installed in ABS classed vessels or facilities. This certificate, by itself, does not reflect that the product is Type Approved. The scope and limitations of this assessment are detailed on the pages attached to this certificate.

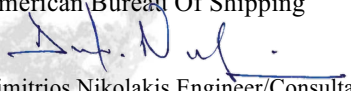
Product: Couplings
Model: ROTEX, Designs: No. 001, AFN No. 002, BFN No. 004, A-H, CF a. CFN No. 005, DF a. DFN No. 006, ZS-DKM-H, DKM No. 018, ZWN No. 017, ZR No. 037, BTAN No. 011, SBAN No. 013, AFN-SB spe...
Endorsements:
Tier: 5 - Unit Certification Required

This Product Design Assessment (PDA) Certificate remains valid until 22/Aug/2027 or until the Rules and/or Standards used in the assessment are revised or until there is a design modification warranting design reassessment (whichever occurs first).

Acceptance of product is limited to the "Intended Service" details prescribed in the certificate and as per applicable Rules and Standards.

This Certificate is valid for installation of the listed product on ABS units which exist or are under contract for construction on or previous to the effective date of the ABS Rules and standards applied at the time of PDA issuance. Use of the Product for non-ABS units is subject to agreement between the manufacturer and intended client.

American Bureau Of Shipping


Dimitrios Nikolakis, Engineer/Consultant

NOTE: This certificate evidences compliance with one or more of the Rules, Guides, standards or other criteria of ABS or a statutory, industrial or manufacturer's standards. It is issued solely for the use of ABS, its committees, its clients or other authorized entities. Any significant changes to the aforementioned product without approval from ABS will result in this certificate becoming null and void. This certificate is governed by ABS Rules 1-1-A3/5.9 Terms and Conditions of the Request for Product Type Approval and Agreement (2010)

KTR SYSTEMS GMBH

CARL-ZEISS STR. 25

D-48432 RHEINE

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Tier: 5 - Unit Certification Required

Product: Couplings

Model: ROTEX, Designs: No. 001, AFN No. 002, BFN No. 004, A-H, CF a. CFN No. 005, DF a. DFN No. 006, ZS-DKM-H, DKM No. 018, ZWN No. 017, ZR No. 037, BTAN No. 011, SBAN No. 013, AFN-SB special, SD No. 015, FNN No. 021 and FNN with fan.

Endorsements:

Intended Service:

Torsionally flexible claw type couplings for thruster drives and other auxiliary purposes.

Description:

The ROTEX coupling is a torsionally flexible claw type coupling that compensates axial, radial and angular displacements of the connected machinery. The two congruent coupling halves with concave claws on the inside are peripherally offset in relation to one another by half a pitch. They are designed to enable an involute spider in-between. Three types of rubber qualities are available for the spider in order to tune the coupling to the various system requirements. The maximum twisting angle amounts to 5°. The couplings could be fitted horizontally or vertically.

Rating:

For approved ratings click on link 'Additional Product Details'.

Service Restriction:

1. Unit certification is required for this product for thruster applications with APS, PAS and DPS Class Notation.
2. Subject couplings are not to be used for any direct thrust transmissions.
3. Ice-Class aspects remain to be specially considered on a case-by-case basis approval.
4. Couplings for generator set applications are to be capable of absorbing short time impact torque due to electrical short-circuit conditions up to six (6) times the nominal torque.
5. The intermediate shaft of ZWN couplings is to be of at least grade S355J2G3 quality.
6. The ZR couplings are intended only for non-essential auxiliary services (i.e. pump-drives, compressors etc.) further the intermediate tube shaft is to be of at least grade S235G2T quality.
7. Production tolerance on torsional stiffness: $\pm 20\%$.
8. Permissible power loss P_{subKW} given in the catalogue is valid for ambient temperature of 30 °C. At higher ambient temperature a linear decrease from 0 to 100 °C should be used.
9. Use of subject couplings at ambient temperatures at or below -18 °C would require special impact testing.
10. Materials with elongation ($L_0/d = 4$) of less than 16% are not to be used for subject thruster applications.
11. If the manufacturer or purchaser request an ABS Certificate for compliance with a specification or standard, the specification or standard, including inspection standards and tolerances, must be clearly defined.

Comments:

1. Couplings intended for thruster applications with APS, PAS and DPS Class Notation transmitting 375 kW (500 hp) or more are to be material tested in the presence of a Bureau's Surveyor.
2. Order related details of the coupling hubs including shrink-fit/key parameters (if any) and bolted input/output connections remain to be submitted for case-by-case approval as well as any deviation from series production and clamp type fixtures.
3. The couplings are to be operated and mounted in accordance with manufacturer's operating- /assembly instructions.

Notes/Drawing/Documentation:

See Attachment

Terms of Validity:

This Product Design Assessment (PDA) Certificate remains valid until 22/Aug/2027 or until the Rules and/or Standards used in the assessment are revised or until there is a design modification warranting design reassessment (whichever occurs first).

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Tier: 5 - Unit Certification Required

Acceptance of product is limited to the "Intended Service" details prescribed in the certificate and as per applicable Rules and Standards.

This Certificate is valid for installation of the listed product on ABS units which exist or are under contract for construction on or previous to the effective date of the ABS Rules and standards applied at the time of PDA issuance. Use of the Product for non-ABS units is subject to agreement between the manufacturer and intended client.

STANDARDS

ABS Rules:

2022 Rules for Conditions of Classification: 1-1-4/7.7, 1-1-A3 and A4, which covers the following:
2022 Rules for Building and Classing Marine Vessel Rules: 4-1-1/Table 2, 2-3-2/9, 4-3-2/1.1, /1.5, /3.1, /3.7, /5.1, /5.3, 5.19, 4-3-5/1.3, 1.5, 3.1, 3.3, 5.7.3.

2022 Rules for Conditions of Classification - Offshore Units and Structures: 1-1-4/9.7, 1-1-A2 and A3,
2022 Rules for Building and Classing Mobile Offshore Unit Rules: 6-1-4/1, 6-1-4/3, 6-1-4/Table 1

National:

NA

International:

NA

Government:

NA

EUMED:

NA

OTHERS:

NA

ROTEX® Flexible jaw couplings

Flexible jaw and pin & bush couplings

ROTEX®

ROFLEX®

POLY-NORM®

POLY

REVOLEX®

Technical data of standard spiders

92 Shore A spider made of T-PUR® and PUR															
ROTEX® size	Max. speed		Torsion angle ϕ with		Torque [Nm]				Damping power P _{KW} [W] ³⁾	Relative damping ψ	Resonance factor V _R	Torsion spring stiffness C dyn. [Nm/rad]			
	v=35 m/s cast material	v=40 m/s steel	T _{KN}	T _{K max}	DIN 740 ¹⁾			T _{K max} ²⁾				1.0 T _{KN}	0.75 T _{KN}	0.5 T _{KN}	0.25 T _{KN}
			Rated T _{KN}	Max. T _{K max}	Vibratory TKW										
14	22200	25400	6.4°	10°	7.5	15	2.0	22.5	—			0.38x10 ³	0.31x10 ³	0.24x10 ³	0.14x10 ³
19	16700	19000			10	20	2.6	30	4.8			1.28x10 ³	1.05x10 ³	0.8x10 ³	0.47x10 ³
24	12100	13800			35	70	9.1	105	6.6			4.86x10 ³	3.98x10 ³	3.01x10 ³	1.79x10 ³
28	10100	11500			95	190	25	285	8.4			10.9x10 ³	8.94x10 ³	6.76x10 ³	4.01x10 ³
38	8300	9500			190	380	49	570	10.2			21.05x10 ³	17.26x10 ³	13.05x10 ³	7.74x10 ³
42	7000	8000			265	530	69	795	12.0			23.74x10 ³	19.47x10 ³	14.72x10 ³	8.73x10 ³
48	6350	7250			310	620	81	930	13.8			36.7x10 ³	30.09x10 ³	22.75x10 ³	13.49x10 ³
55	5550	6350			410	820	107	1230	15.6			50.7x10 ³	41.59x10 ³	31.45x10 ³	18.64x10 ³
65	4950	5650	3.2°	5°	625	1250	163	1875	18.0	0.80	7.90	97.1x10 ³	79.65x10 ³	60.2x10 ³	35.7x10 ³
75	4150	4750			1280	2560	333	3840	21.6			113.3x10 ³	92.9x10 ³	70.3x10 ³	41.65x10 ³
90	3300	3800			2400	4800	624	7200	30.0			190.1x10 ³	155.9x10 ³	117.9x10 ³	69.9x10 ³
100	2950	3350			3300	6600	858	9900	36.0			253.1x10 ³	207.5x10 ³	156.9x10 ³	93x10 ³
110	2600	2950			4800	9600	1248	14400	42.0			415.5x10 ³	336.9x10 ³	257.6x10 ³	177.4x10 ³
125	2300	2600			6650	13300	1729	19950	48.0			647.7x10 ³	537.3x10 ³	412.2x10 ³	277.5x10 ³
140	2050	2350			8550	17100	2223	25650	54.6			813.4x10 ³	670.2x10 ³	519.7x10 ³	351.7x10 ³
160	1800	2050			12800	25600	3328	38400	75.0			1298x10 ³	1104x10 ³	901.9x10 ³	655.7x10 ³
180	1550	1800			18650	37300	4849	55950	78.0			2327x10 ³	1981x10 ³	1618x10 ³	1176x10 ³

98 Shore A spider made of T-PUR® and PUR															
ROTEX® size	Max. speed		Torsion angle ϕ with		Torque [Nm]				Damping power P _{KW} [W] ³⁾	Relative damping ψ	Resonance factor V _R	Torsion spring stiffness C dyn. [Nm/rad]			
	v=35 m/s cast material	v=40 m/s steel	T _{KN}	T _{K max}	DIN 740 ¹⁾			T _{K max} ²⁾				1.0 T _{KN}	0.75 T _{KN}	0.5 T _{KN}	0.25 T _{KN}
			Rated T _{KN}	Max. T _{K max}	Vibratory TKW										
14	22200	25400	6.4°	10°	12.5	25	3.3	37.5	—			0.56x10 ³	0.46x10 ³	0.35x10 ³	0.21x10 ³
19	16700	19000			17	34	4.4	51	4.8			2.92x10 ³	2.39x10 ³	1.81x10 ³	1.07x10 ³
24	12100	13800			60	120	16	180	6.6			9.93x10 ³	8.14x10 ³	6.16x10 ³	3.65x10 ³
28	10100	11500			160	320	42	480	8.4			26.77x10 ³	21.95x10 ³	16.6x10 ³	9.84x10 ³
38	8300	9500			325	650	85	975	10.2			48.57x10 ³	39.83x10 ³	30.11x10 ³	17.85x10 ³
42	7000	8000			450	900	117	1350	12.0			54.5x10 ³	44.69x10 ³	33.79x10 ³	20.03x10 ³
48	6350	7250			525	1050	137	1575	13.8			65.3x10 ³	53.54x10 ³	40.48x10 ³	24x10 ³
55	5550	6350			685	1370	178	2055	15.6			95x10 ³	77.9x10 ³	58.88x10 ³	34.9x10 ³
65	4950	5650	3.2°	5°	940	1880	244	2820	18.0	0.80	7.90	129.5x10 ³	106.2x10 ³	80.3x10 ³	47.6x10 ³
75	4150	4750			1920	3840	499	5760	21.6			197.5x10 ³	162x10 ³	122.5x10 ³	72.6x10 ³
90	3300	3800			3600	7200	936	10800	30.0			312.2x10 ³	256x10 ³	193.6x10 ³	114.7x10 ³
100	2950	3350			4950	9900	1287	14850	36.0			383.3x10 ³	314.3x10 ³	237.6x10 ³	140.9x10 ³
110	2600	2950			7200	14400	1872	21600	42.0			805.9x10 ³	663.1x10 ³	515.3x10 ³	360.5x10 ³
125	2300	2600			10000	20000	2600	30000	48.0			1207x10 ³	1003x10 ³	787.6x10 ³	552.5x10 ³
140	2050	2350			12800	25600	3328	38400	54.6			1549x10 ³	1283x10 ³	979.8x10 ³	674.1x10 ³
160	1800	2050			19200	38400	4992	57600	75.0			2481x10 ³	2137x10 ³	1781x10 ³	1275x10 ³
180	1550	1800			28000	56000	7280	84000	78.0			4220x10 ³	3635x10 ³	3031x10 ³	2170x10 ³

64 Shore D spider made of T-PUR®															
ROTEX® size	Max. speed		Torsion angle ϕ with		Torque [Nm]				Damping power P _{KW} [W] ³⁾	Relative damping ψ	Resonance factor V _R	Torsion spring stiffness C dyn. [Nm/rad]			
	v=35 m/s cast material	v=40 m/s steel	T _{KN}	T _{K max}	DIN 740 ¹⁾			T _{K max} ²⁾				1.0 T _{KN}	0.75 T _{KN}	0.5 T _{KN}	0.25 T _{KN}
			Rated T _{KN}	Max. T _{K max}	Vibratory TKW										
14	22200	25400	4.5°	7.0°	16	32	4.2	48	9.0			0.76x10 ³	0.62x10 ³	0.47x10 ³	0.28x10 ³
19	16700	19000			21	42	5.5	63	7.2			5.35x10 ³	4.39x10 ³	3.32x10 ³	1.97x10 ³
24	12100	13800			75	150	19.5	225	9.9			15.11x10 ³	12.39x10 ³	9.37x10 ³	5.55x10 ³
28	10100	11500			200	400	52	600	12.6			27.52x10 ³	22.57x10 ³	17.06x10 ³	10.12x10 ³
38	8300	9500			405	810	105	1215	15.3			70.15x10 ³	57.52x10 ³	43.49x10 ³	25.78x10 ³
42	7000	8000			560	1120	146	1680	18.0			79.9x10 ³	65.5x10 ³	49.52x10 ³	29.35x10 ³
48	6350	7250			655	1310	170	1965	20.7			95.5x10 ³	78.3x10 ³	59.22x10 ³	35.1x10 ³
55	5550	6350			825	1650	215	2475	23.4			107.9x10 ³	88.5x10 ³	66.9x10 ³	39.66x10 ³
65	4950	5650	2.5°	3.6°	1175	2350	306	3525	27.0	0.75	8.50	151.1x10 ³	123.9x10 ³	93.7x10 ³	55.53x10 ³
75	4150	4750			2400	4800	624	7200	32.4			248.2x10 ³	203.5x10 ³	153.9x10 ³	91.2x10 ³
90	3300	3800			4500	9000	1170	13500	45.0			674.5x10 ³	553.1x10 ³	418.2x10 ³	247.9x10 ³
100	2950	3350			6185	12370	1608	18555	54.0			861.2x10 ³	706.2x10 ³	533.9x10 ³	316.5x10 ³
110	2600	2950			9000	18000	2340	27000	63.0			1230x10 ³	1001x10 ³	773.1x10 ³	531.4x10 ³
125	2300	2600			12500	25000	3250	37500	72.0			1749x10 ³	1436x10 ³	1149x10 ³	832.1x10 ³
140	2050	2350			16000	32000	4160	48000	81.9			2312x10 ³	1929x10 ³	1521x10 ³	1082x10 ³
160	1800	2050			24000	48000	6240	72000	112.5			3415x10 ³	2961x10 ³	2471x10 ³	1830x10 ³
180	1550	1800			35000	70000	9100	105000	117.0			5670x10 ³	4917x10 ³	4103x10 ³	3038x10 ³

¹⁾ see catalogue page 15
²⁾ ≤ 1000 load cycles
³⁾ with +30 °C

Temperature factor S _t										
	-40 °C +30 °C	+40 °C	+50 °C	+60 °C	+70 °C	+80 °C	+90 °C	+100 °C	+110 °C	+120 °C
T-PUR®	1.0	1.0	1.2	1.3	1.45	1.6	1.8	2.1	2.5	3.0
PUR	1.0	1.0	1.3	1.4	1.55	1.8	2.2	—	—	—

With temperatures below -40 °C please consult with KTR.
Unless the Shore hardness of spider is explicitly specified in your order, we will supply spiders with Shore hardness 92 Shore A T-PUR®.
For circumferential speeds exceeding v = 30 m/s dynamic balancing is required. For circumferential speeds exceeding v = 35 m/s only steel or nodular iron.

22-2280946-PDA

Attachment to 22-2280946-PDA revalidation covering
Couplings

Models: ROTEX, Designs: No. 001, AFN No. 002, BFN No. 004, A-H, CF a. CFN No. 005, DF a. DFN No. 006, ZS-DKM-H, DKM No. 018, ZWN No. 017, ZR No. 037, BTAN No. 011, SBAN No. 013, AFN-SB special, SD No. 015, FNN No. 021 and FNN with fan.

Issuance Date: 23-August-2022

Expiry Date: 22-August-2027

Intended Service:

Torsionally flexible claw type couplings for thruster drives and other auxiliary purposes

Drawing List

Engineering Office:	Hamburg Engineering Department	
Submitter:	KTR SYSTMES GMBH (626476)	
Drawing No	Revision No	Drawing Title
414423	0	Rotex 125 Nabe
416706	0	Rotex 160 Hub
422446	0	Rotex 160 Standard
422447	0	Rotex 160 Hub
436231	0	Rotex 125 Standard
ActOnForm	0	ActOnForm
DeclarationOfConformity	0	DeclarationOfConformity
Fees Confirmation	0	Fees Confirmation
Rotex technical data's	0	New technical Data Brochure

22-2280946-PDA

Drawing List as per 17-HG1614024-PDA of March 2017

Engineering Office:	Hamburg Engineering Department	
Submitter:	KTR SYSTMES GMBH (626476)	
Drawing No	Revision No	Drawing Title
Verlaengerungsantrag ROTEX	0	Request for PDA Revalidation

Drawing List as per 07-HG198495-PDA of January 2007

Engineering Office:	Hamburg Engineering Department	
Submitter:	KTR SYSTMES GMBH (626476)	
Drawing No	Revision No	Drawing Title
436231	0	Rotex 125 Standard
438842	0	ROTEX 125 Spider
414423	0	Rotex 125 Nabe
None	0	Rotex Torsionally Flexible Couplings / Technical Data / Brochure
438844	0	Rotex 125 Spider
KTR-N 40210 E	0	Rotex Operating-/Assembly Instructions
416706	0	Rotex 160 Hub
422447	0	Rotex 160 Hub
436916	0	Rotex 125 Spider
438839	0	Rotex 160 Spider
436920	0	Rotex 160 Spider
436926	0	Rotex 160 Spider

22-2280946-PDA

422446	0	Rotex 160 Standard
None	0	ABS Calculations
None	0	Various Type Approval Certificates