



CERTIFICATE NUMBER

07-HG198495-PDA

DATE

10 January 2007

ABS TECHNICAL OFFICE

Hamburg Engineering Services

CERTIFICATE OF Design Assessment

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

KTR KUPPLUNGSTECHNIK GMBH

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. It will remain valid as noted below or until the Rules or specifications used in the assessment are revised (whichever occurs first).

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.

ABS RULE: 2006 Steel Vessel Rules, 1-1-4/7.7, 2-3-2/9, 4-3-2/1.1, 1.5, 3.1, 3.7.2, 5.1, 5.3, 5.19, Table 1 & 2, 4-3-5/1.3.3,
1.5, 3.1, 3.3, 3.3.2, 5.7.3.

OTHER STANDARD:

AMERICAN BUREAU OF SHIPPING

Hartmut Grommel

Engineering Type Approval Co-ordinator

TERMS & CONDITIONS OF ABS Design Assessment

1. AGREEMENT

The issuance and interpretation of this certificate is subject to the terms and conditions of the Request for Product Type Approval and Agreement which are hereby incorporated by reference.

2. REPRESENTATIONS AS TO DESIGN ASSESSMENT

Design Assessment is representation by ABS as to the structural and mechanical fitness for a particular use or service in accordance with its Rules and standards. The Rules of American Bureau of Shipping are not meant as a substitute for the independent judgement of professional designers, naval architects and marine engineers nor as a substitute for the quality control procedures of shipbuilders, engine builders, steel makers, suppliers, manufacturers and sellers of marine vessels, materials, machinery or equipment. ABS being a technical society can only act through Surveyors or others who are believed by it to be skilled and competent. ABS represents solely to the vessel Owner or other client (hereinafter "Client") of ABS that when assigning class it will use due diligence in the development of Rules, Guides, and standards and in using normally applied testing standards, procedures and techniques as called for by the Rules, Guides, standards or other criteria of ABS for the purpose of assigning and maintaining class. ABS further represents to the Client of ABS that its certificates and reports evidence compliance only with one or more of the Rules, Guides, standards or other criteria of ABS in accordance with the terms of such certificate or report. Under no circumstances whatsoever are these representations to be deemed to relate to any third party.

3. SUSPENSION OF CERTIFICATION

Any of the following events will cause immediate suspension of the certificate of design assessment unless the change is submitted to ABS for a new review

- Redesign of the product or products covered by this certificate.
- Substantial change in management organization;
- Failure to pay ABS fees.

4. RESPONSIBILITY AND LIABILITY

It is understood and agreed that the Certificate of Design Review (hereinafter referred to as "certificate") issued as part of the services rendered under the Agreement is a representation only that the vessel, structure, item of material, equipment or machinery or any other item covered by a certificate has met one or more of the Rules or Standards of American Bureau of

Shipping and is issued solely for the use of ABS, its committees, clients or other authorized entities. The validity, applicability and interpretation of a certificate issued under the terms of or in contemplation of the Agreement is governed by the Rules and standards of American Bureau of Shipping who shall remain the sole judge thereof. Nothing contained in this certificate or any report issued in contemplation of this certificate shall be deemed to relieve any designer, builder, owner, manufacturer, seller, supplier, repairer, operator or other entity of any warranty express or implied nor to create any interest, right, claim or benefit in any third party. It is understood and agreed that nothing expressed herein is intended or shall be construed to give any person, firm or corporation, other than the parties hereto, any right, remedy or claim hereunder or any provisions herein contained; all provisions hereof are for the sole and exclusive benefit of the parties hereto.

5. LIMITATION

ABS makes no representations beyond those contained herein and in the provisions of the Agreement regarding its reports, statements, plan review, surveys, certificates or other services.

6. HOLD HARMLESS

The party to whom this certificate is issued, and his assignee and successor in interest, agree to indemnify and hold harmless ABS from and against any and all claims, demands, lawsuits, or actions for damages, including legal fees, to persons or other legal entities and property, tangible, intangible, or otherwise which may be brought against ABS incidental to, arising out of or in connection with the work done, services performed or material to be furnished under this certificate, except for those claims caused solely and completely by the negligence of ABS, its agents, employees, officers, directors or subcontractors.

7. ARBITRATION

Any and all differences and disputes of whatsoever nature arising out of this agreement shall be put to arbitration in the City of New York pursuant to the laws relating to the arbitration there in force, before a board of three persons, consisting of one arbitrator to be appointed by ABS, one by Client, and one by the two so chosen. The decision of any two of the three on any point or points shall be final. Until such time as the arbitrators finally close the hearings either party shall have the right by written notice served on the arbitrators and on an officer of the other party to specify further disputes or difference under this Agreement for hearing and determination. The arbitration is to be conducted in accordance

with the rules of the Society of Maritime Arbitrators, Inc. The arbitrators may grant any relief, other than punitive damages, which they, or a majority of them, deem just and equitable and within the scope of the agreement of the parties, including, but not limited to, specific performance. Awards made in pursuance to this clause may include costs including a reasonable allowance for attorney's fees and judgment may be entered upon any award made hereunder in any court having jurisdiction. ABS and client hereby mutually waive any and all claims to punitive damages in any forum.

Client shall be required to notify ABS within thirty (30) days of the commencement of any arbitration between it and third parties which may concern ABS's work in connection with this Agreement and shall afford ABS an opportunity, at ABS's sole option, to participate in the arbitration.

8. TIME BAR TO LEGAL ACTION

Any statutes of limitation notwithstanding, Client expressly agrees for itself and its affiliated companies that its right to bring or to assert against ABS any and all claims, demands or proceedings whether in arbitration or otherwise shall be waived unless (a) notice is received by ABS within thirty (30) days after Client or its affiliates had notice of or should reasonably have been expected to have had notice of the basis for such claims; and (b) arbitration or legal proceedings, if any, based on such claims or demands of whatever nature are commenced within one (1) year of the date of such notice to ABS.

9. LIMITATION OF LIABILITY

The combined liability of American Bureau of Shipping, its officers, employees, agents or subcontractors for any loss, claim, or damage arising from negligent performance or non-performance of any services under this Agreement, of from breach of any implied or express warranty of workmanlike performance in connection with the services, or from any other reason, to any person, corporation, partnership, business entity, sovereign, country or nation, shall be limited to the greater of a) \$100,000 or b) an amount equal to ten times the sum actually paid for the services alleged to be deficient.

The limitation of liability may be increased up to an amount twenty-five times that sum paid for services upon receipt of Client's written request at or before the time of performance of service and upon payment by Client of an additional fee of \$10.00 for every \$1,000.00 increase in the limitation.

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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.

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.

Ratings:

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

Service Restriction:

Unit certification is required for this product for thruster applications with APS, PAS and DPS Class Notation. Materials with elongation ($Lo/d = 4$) of less than 16% are not to be used for subject thruster applications. Subject couplings are not to be used for any direct thrust transmissions. Ice-Class aspects remain to be specially considered on a case-by-case basis. 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. The intermediate shaft of ZWN couplings is to be of at least grade S355J2G3 quality. 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. Production tolerance on torsional stiffness: $\pm 20\%$. 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. Use of subject couplings at ambient temperatures at or below -18 °C would require special impact testing.

Comments:

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. 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. The couplings are to be operated and mounted in accordance with manufacturer's operating- /assembly instructions.

Notes/Documentation:

Term of Validity:

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This Design Assessment Certificate number 07-HG198495-PDA, dated 10/Jan/2007 will expire on 09/Jan/2012 or at an earlier date should there be alterations to the product's design or changes to the referenced ABS Rules and other specifications, which affect the product. Product use on or after 1 January 2008, will be subject to compliance with the ABS Rules or specifications in effect when the vessel, MODU or facility is contracted. The product's acceptability on board ABS-classed vessels or facilities is defined in the service restrictions of this certificate.

STANDARDS**ABS Rules:**

2006 Steel Vessel Rules, 1-1-4/7.7, 2-3-2/9, 4-3-2/1.1, 1.5, 3.1, 3.7.2, 5.1, 5.3, 5.19, Table 1 & 2, 4-3-5/1.3.3, 1.5, 3.1, 3.3, 3.3.2, 5.7.3.

National:**International:****Government Authority:****EUMED:****Others:**