

Title (en)  
ROTOR PAIR FOR A COMPRESSOR BLOCK OF A SCREW MACHINE

Title (de)  
ROTORPAAR FÜR EINEN VERDICHTERBLOCK EINER SCHRAUBENMASCHINE

Title (fr)  
PAIRE DE ROTORS POUR BLOC DE COMPRESSEUR D'UNE VISSEUSE

Publication  
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Application  
**EP 15736405 A 20150427**

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Abstract (en)  
[origin: WO2015162296A2] The invention relates to a rotor pair for a compressor block of a screw machine, wherein the rotor pair comprises a secondary rotor (NR) that rotates about a first axis (C1) and a main rotor (HR) that rotates about a second axis (C2), wherein the number of teeth (z2) of the main rotor (HR) is 3 and the number of teeth (z1) of the secondary rotor (NR) is 4. The relative profile depth of the secondary rotor (formula (I)) is at least 0.5, preferably at least 0.515, and at most 0.65, preferably at most 0.595. rk1 is an addendum circle radius drawn around the outer circumference of the secondary rotor (NR) and rf1 is a dedendum circle radius starting at the profile base of the secondary rotor, wherein the ratio of the axis distance (a) of the first axis (C1) from the second axis (C2) and the addendum circle radius rk1 (formula (II)) is at least 1.636, and at most 1.8, preferably at most 1.733.

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Citation (opposition)

Opponent : Atlas Copco Airpower N.V.

- FR 953057 A 19491130 - LJUNGSTROMS ANGTURBIN AB
- GB 627162 A 19490729 - LJUNGSTROMS ANGTURBIN AB
- US 3138110 A 19640623 - WHITFIELD JOSEPH E
- US 3275226 A 19660927 - WHITFIELD JOSEPH E
- US 3282495 A 19661101 - WALLS JOSEPH D
- CN 102352840 A 20120215 - SHAANXI FENGZE ELECTROMECHANICAL TECHNOLOGY CO LTD
- KR 100313638 B1 20011212 - KOREA AUTOMOTIVE TECH INST
- US 4350480 A 19820921 - BAMMERT KARL

Opponent : Firma ROTORCOMP VERDICHTER GmbH

- WO 9721926 A1 19970619 - BUSCH SA ATEL [CH], et al
- DE 1428265 A1 19690116 - SVENSKA ROTOR MASKINER AB
- US 2622787 A 19521223 - ROBERT NILSSON HANS
- DE 2911415 A1 19810115 - BAMMERT KARL
- DE 3230720 C2 19940505 - INGERSOLL RAND CO [US]
- DE 3246685 A1 19830630 - SULLAIR TECH AB [SE]
- DE 19539002 A1 19970424 - KUMWON CO [KR]
- RINDER, LAURENZ: SCHRAUBENVERDICHTER, 1979, pages 102 - 118
- HELPERTZ, MARKUS: "Methode zur stochastischen Optimierung von Schraubenrotorprofilen, Dortmund: Technische Universität Dortmund", DISSERTATION INSBES, 2003
- GRAFINGER, MANFRED, DIE COMPUTERUNTERSTÜTZTE ENTWICKLUNG DER FLANKENPROFILE FÜR SONDERVERZÄHNUNGEN VON SCHRAUBENKOM- PRESSOREN, 2010, ISBN: 978-3-8322-9215-7

Opponent : Ingersoll-Rand Company

- US 4350480 A 19820921 - BAMMERT KARL
- US 4350480 A 19820921 - BAMMERT KARL
- P.J 1986ET AL.: "Effect of Design Parameters on Oil-Flooded Screw Compressor Performance", INTERNATIONAL COMPRESSOR ENGINEERING CONFERENCE OF, August 1986 (1986-08-01), XP055545603
- "Screw Compressors - Mathematical Modelling and Performance Calculation", 2005, London, article NIKOLA STOSIC ET AL.: "Chapter 1, 2, 3, 4, 5", pages: 14-16, 20-39, 64-71 - 72, 78-87, 93-96, XP055545625
- YU-REN WU ET AL.: "Rotor Profile Design for the Twin-Screw Compressor Based on the Normal-Rack Generation Method", THE JOURNAL OF MECHANICAL DESIGN, vol. 130, April 2008 (2008-04-01), XP055545643
- "Obtaining the Optimum Geometrical Parameters of a Refrigeration Helical Screw Compressor", INTERNATIONAL COMPRESSOR ENGINEERING CONFERENCE, 1992, XP055545652
- NIKOLA STOSIC ET AL.: "Review of Mathematical Models in Performance Calculation of Screw Compressors", INTERNATIONAL JOURNAL OF FLUID MACHINERY AND SYSTEMS, vol. 4, no. 2, 2011, pages 200 - 217, XP055545676
- YOU ET AL.: "Optimum Rotor Geometrical Parameters in Refrigeration Helical Twin Screw Compressors", INTERNATIONAL COMPRESSOR ENGINEERING CONFERENCE, 1996, pages 1 - 6, XP055545687
- S RANE ET AL.: "CFD grid generation and analysis of screw compressor with variable geometry rotors", CITY UNIVERSITY LONDON, 2013, London, pages 601 - 612, XP055545705
- A KOVACEVIC ET AL.: "Grid Generation for Screw Compressors with Variable Geometry Rotors", APCOM & ISCM, 2013, XP055545710
- W.S. LEE ET AL.: "Performance and Bearing Load Analysis of a Twin Screw Air Compressor", THE CHINESE JOURNAL OF MECHANICS, vol. 15, no. 2, 1999, pages 69 - 78, XP055545714
- YU-REN WU ET AL.: "Optimization design of an explicitly defined rack for the generation of rotors for twin-screw compressors", CHINESE JOURNAL OF MECHANICS, vol. 44, 1999, pages 66 - 82, XP055545726
- YU-REN WU ET AL.: "Improved rotor profiling based on the arbitrary sealing line for twin-screw compressors", MECHANISM AND MACHINE THEORY, vol. 43, 2008, Taiwan, pages 695 - 711, XP055545752

- D. ZAYTSEV ET AL.: "Profile generation method for twin screw compressor rotors based on the meshing line", INFANTE FERREIRA INTERNATIONAL JOURNAL OF REFRIGERATION, vol. 28, 2005, pages 744 - 755, XP055545784
- J.S. FLEMING ET AL.: "Optimisation Techniques Applied to the Design of a Refrigeration TiN Screw Compressor", INTERNATIONAL COMPRESSOR ENGINEERING CONFERENCE, 1994, pages 641 - 646, XP055545797

Cited by

DE102020103384A1; WO2021160677A1; WO2019044390A1; EP3358189A1

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DOCDB simple family (publication)

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DOCDB simple family (application)

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