

# **International Conference on Screw Machines (ICSM 2022)**

IOP Conference Series: Materials Science and Engineering  
Volume 1267

Dortmund, Germany  
7 – 8 September 2022

ISBN: 978-1-7138-6426-4  
ISSN: 1757-8981

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

This work is licensed under a Creative Commons Attribution 3.0 International Licence.  
Licence details: <http://creativecommons.org/licenses/by/3.0/>.

No changes have been made to the content of these proceedings. There may be changes to pagination and minor adjustments for aesthetics.

Printed with permission by Curran Associates, Inc. (2023)

For permission requests, please contact the Institute of Physics  
at the address below.

Institute of Physics  
Dirac House, Temple Back  
Bristol BS1 6BE UK

Phone: 44 1 17 929 7481  
Fax: 44 1 17 920 0979

[techtracking@iop.org](mailto:techtracking@iop.org)

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2633  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# TABLE OF CONTENTS

International Conference on Screw Machines 2022

Peer Review Statement

Design and Analysis of Conical Rotary Compressor.....	1
<i>Y Lu, K Hoang, D Noake, N Low</i>	
Systematic Engineering Design Approach for Improvement of Oil-Free Twin-Screw Compressors.....	12
<i>Thibaud Plantegenet, Thibault Tam, Ahmed Kovacevic, Sham Rane, Brijeshkumar Patel, Aleksander Krupa, Richard Leach, Donald Lawson, Manoj Heiyantuduwa, Billy Milligan, James Ure</i>	
Laser-Optical Shear-Flow Analysis Across the Annular Gap of a Simplified Displacement Compressor Model .....	25
<i>Robin Leister, Andreas Brümmer, Jochen Kriegseis</i>	
One-Dimensional Calculation Approach for Gaseous Clearance Flows .....	34
<i>T Jünemann, A Brümmer</i>	
Numerical Investigation of Contact Loads of Unsynchronised, Dry-Running Screw Machines .....	52
<i>D Aurich, A Brümmer, A Wittig, D Stangier, W Tillmann, C-A Thomann, A Wittrock, J Debus</i>	
Contribution of Modern Rotor Profiles to Energy Efficiency of Screw Compressors .....	69
<i>S Patil, M Davis, N Stosic, A Kovacevic, N Asati</i>	
Investigation of Radial Gap Size Change Under Load and the Impact on Performance for a Twin Screw Compressor Using Numerical Simulation .....	77
<i>R Andres, J Hesse, A Spille</i>	
Analysis of the Flow Through the Blowhole of Twin-Screw Machines with Different Rotor Profiles Using Dimensionless Numbers .....	93
<i>M Hesemann, A Brümmer</i>	
Design Parameter Study to Extend the Capacity Range of Dry Twin Screw Compressors.....	108
<i>J-G Persson</i>	
Validation of Inhomogeneous Chamber States in Rotary Positive Displacement Vacuum Pumps.....	118
<i>H Pleskun, T Jünemann, A Brümmer</i>	
Simulating the Dynamic Behavior of a Triple Screw Pump Without CFD .....	142
<i>S Kosmann, O Trossmann, M-J Fikacek, Dr H Tielbörger</i>	
Experimental Investigations and 3D Simulations by the Overset Grid Method on Twin-Screw Machines in Both Pump and Turbine Mode .....	157
<i>A H Moghaddam, B Kutschelis, F Holz, R Skoda</i>	
Rheological Modelling of Viscoelastic Fluid in a Generic Gap of Screw Pump .....	168
<i>S Mehrnia, L Kerres, M Kuhr, P F Pelz</i>	
Conjugate Heat Transfer Analysis of a Twin-Screw Compressor with 4-6 Configuration and Internal Cooling Channels.....	182
<i>A Saravana, H Liu, N Able, J Collins, E A Groll, D Ziviani</i>	

Thermodynamic Simulation and Experimental Validation of an Oil-Free Twin-Screw Expander .....	195
<i>M Grieb, A Brümmer</i>	
Transient Chamber Filling in Rotary Positive Displacement Vacuum Pumps.....	206
<i>H Pleskun, A Syring, A Brümmer</i>	
Use of CFD to Optimize the Design of a Shunt Pulsation Trap (SPT) Used for Noise and Vibration Mitigation in Oil Free Screw Compressors .....	226
<i>J Willie, S W Yonkers, P X Huang, R B Ganatra</i>	
Pulsating Flow Velocity Profile Measurement at an Acoustically Reflecting and Non-Reflecting Open Pipe End Using Laser Doppler Anemometry (LDA).....	242
<i>F Nal, A Brümmer</i>	
A Novel Screw Compressor with a Shunt Enhanced Compression and Pulsation Trap (SECAPT).....	256
<i>P X Huang, S Yonkers, J Willie</i>	
A Two-Phase Approach for Simulation of Water-Flooded Twin-Screw Machines Validated for Expander Applications.....	271
<i>A Nikolov, A Brümmer</i>	
On Performance Optimisation for Oil-Injected Screw Compressors Using Different Evolutionary Algorithms.....	293
<i>A Kumar, A Kovacevic, S A Ponnusami, S Patil, S Abdan, N Asati</i>	
Experimental and Numerical Analyses of the Thermodynamic and Mechanical Performance of an Oil-Injected and Economized 4/6 Twin-Screw Compressor.....	310
<i>A Saravana, H Liu, E A Groll, D Ziviani</i>	
Experimental Research on Influence of Interstage Oil Injection in a Dual-Motor-Driven Two-Stage Screw Air Compressor.....	321
<i>X Liao, C Wang, H Yuan, Z Xing</i>	

**Author Index**