

European Forum for Reciprocating Compressors



5th EFRC Conference

Special Feature:
Compressor Training

March 21-23, 2007

Hotel Diplomat
Prague, Czech Republic

Programme

Conference Goals

Exchange of Experience and Information

Owners, operators, manufacturers and contractors, as well as scientists engaged in research, shall be given the opportunity to report on their experience with reciprocating compressors and to share solutions to industry problems.

Discuss Present and Future Applicability of Reciprocating Compressors

It shall be shown that reciprocating compressors meet all the requirements of modern machines and even offer expanded possibilities. Related Research & Development projects shall be presented. Proposals for pre-competitive research are welcome.

Conference Focus

The 5th EFRC conference concentrates on the fields of:

- Reliability and Economics of Compressors
- General Compression Systems
- Innovation for Reliability Increase
- **Additional Feature: half day Training Session prior to the conference on March 21, 2007**

Special Topic

“The Role of Reciprocating Compressors in a Future Energy Supply Chain”: Papers will be presented about LNG and FPSO.

New Feature:

Training “Compressor Control”

EFRC offers for the first time a compressor training session focussing on Compressor Control.

Young engineers from operators, engineering companies and suppliers will be given an in-depth overview of technical features for a safe and long lasting operation of the compressor unit.

TRAINING PROGRAMME

WEDNESDAY, March 21

From	Until	Prague A+B
13:00	↔ 13:15	Introduction to the Programme <i>René Peters;</i> TNO SCIENCE & INDUSTRY
13:15	↔ 14:00	Introduction to Capacity Control and Thermodynamic Design <i>Peter Duineveld;</i> THOMASSEN COMPRESSION SYSTEMS
14:00	↔ 14:45	Valve Unloading, Clearance and Bypass Control <i>Norbert Helling;</i> NEUMAN & ESSER
14:45	↔ 15:30	Speed Control <i>Matthias Tanner and Markus Gehlert;</i> BURCKHARDT COMPRESSION
15:30	↔ 16:00	Coffee Break
16:00	↔ 16:45	Stepless Reverse Flow Control <i>Klaus Stachel & Axel Rumpold;</i> HOERBIGER
16:45	↔ 17:30	Effect on Pulsations and Vibrations <i>Harry Korst;</i> TNO SCIENCE & INDUSTRY
17:30	↔ 18:15	Monitoring and Diagnostics <i>Thorsten Bickmann;</i> PROGNOST SYSTEMS
18:15	↔ 18:30	Summary and Conclusions <i>René Peters;</i> TNO SCIENCE & INDUSTRY

18:30 Closing

Welcome Reception
sponsored by

ARIEL CORPORATION

on March 21, 2007
from 19:30 to 22:00 h



CONFERENCE PROGRAMME

THURSDAY, March 22

Prague A+B		From	Until	Prague C+D	
Welcome Address by EFRC Chairman		09:00	↔ 09:05	Welcome Address by EFRC Chairman	
NATURAL GAS FOR EUROPE - THE NEW SUPPLY HIGHWAYS <i>Prof. Dr.-Ing. Klaus Homann; CEO RWE TRANSGAS NET and CEO RWE TRANSPORTNETZ GAS</i>		09:05	↔ 9:30	NATURAL GAS FOR EUROPE - THE NEW SUPPLY HIGHWAYS <i>Prof. Dr.-Ing. Klaus Homann; CEO RWE TRANSGAS NET and CEO RWE TRANSPORTNETZ GAS</i>	
Coffee Break & Exhibition		9:30	↔ 10:00	Coffee Break & Exhibition	
DESIGN & ENGINEERING <i>Chairman: Hans Quack</i>				PULSATIONS & VIBRATIONS <i>Chairman: Peter Duineveld</i>	
	Improved Method for Job Specific Crankshaft Stress Calculation <i>Willem van der Toom; THOMASSEN COMPRESSION SYSTEMS</i>	10:00	↔ 10:30		Further Improvement of Pulsation and Vibration Studies for Reciprocating Compressors <i>Georg Samland, Nicole Retz; BURCKHARDT COMPRESSION</i>
	Design of Horizontal Opposed Reciprocating Compressor for Hydrogen Provided by Stepless Capacity Control <i>Jaroslav Kraml; CKD NOVE ENERGO</i>	10:35	↔ 11:05		Dynamic Analysis of Large Intercoolers and Tubular Reactors Installed in LDPE Plants with a Hyper Compressor <i>Marco Passeri, Fabrizio Zagli, Matteo Romiti, Stefano Generosi, Paolo Battagli; GE OIL & GAS</i>
	The Role of Improved Valve Technology in the Utilization of Natural Gas Resources <i>Bernhard Spiegl; HOERBIGER</i>	11:10	↔ 11:40		Mitigation of High-Frequency Pulsations Using Multi Bore Restriction Orifices <i>Harry Korst, Leonard van Lier; TNO SCIENCE AND INDUSTRY</i>
Lunch Break & Exhibition		11:40	↔ 13:10	Lunch Break & Exhibition	
FUNDAMENTALS <i>Chairman: Klaus Hoff</i>				OPERATIONS & MAINTENANCE <i>Chairman: Siegmund Cierniak</i>	
	Performance Measurements with the TU Dresden CO₂ Expander/Compressor <i>Hans Quack, J. Nickl, G. Will; TU DRESDEN</i>	13:10	↔ 13:40		Troubleshooting During Commissioning of Compressor Installations <i>Heinrich Ochs; BASF</i>
	Advances in Fundamental Understanding of the Dynamic Sealing Action in Packing Systems <i>Tino Lindner-Silwester; HOERBIGER</i>	13:45	↔ 14:15		Practice Report - Design and Putting into Operation of New Compressor Units <i>Claus Pollok; E.ON HANSE</i>
	Dry-Running Sealing Systems in Practice - New Challenges by New Materials <i>Nobert Feistel; BURCKHARDT COMPRESSION</i>	14:20	↔ 14:50		Reciprocating Compressor Foundations - They do not last forever <i>Robert van Lienen, Harry Lankenau; NEAC COMPRESSOR SERVICE</i>
Coffee Break & Exhibition		14:50	↔ 15:50	Coffee Break & Exhibition	
VALVES <i>Chairman: Alex Deitermann</i>				DESIGN & ENGINEERING <i>Chairman: George Kopschick</i>	
	Evaluation of the Coefficients used for Simulation for Cylinder Valves for Reciprocating Compressors <i>Fabio Manfrone, Massimo Schiavone, Enzo Giacomelli; COZZANI</i>	15:50	↔ 16:20		Extensive Optimisation Analyses of the Piping of Two Large Underground Gas Storage Compressors <i>Andre Eijk, Gert Ploumen; TNO SCIENCE AND INDUSTRY and ESSENT</i>
	Semi-Active Compressor Valve Development and Testing <i>Klaus Brun, John P. Platt; SOUTHWEST RESEARCH INSTITUTE, BP EXPLORATION & PRODUCTION TECHNOLOGY</i>	16:25	↔ 16:55		Minimisation of Gas Loss During Condensate Drains <i>Thomas Heumesser, Ernst Huttar, Rainer Scheifinger; LEOBERSDORFER MASCHINENFABRIK</i>
	The Application of Elastomeric Materials to Reciprocating Compressor Valves <i>Kevin Durham; COOK MANLEY</i>	17:00	↔ 17:30		Dynamic Design of the Foundation of Reciprocating Machines for Offshore-Installations - Case Study <i>Jan Steinhausen; KÖTTER CONSULTING ENGINEERS</i>
Closing Remarks of Session Chairman		17:30	↔ 17:35	Closing Remarks of Session Chairman	
Departure for Dinner		18:15		Departure for Dinner	

FRIDAY, March 23

Prague A+B

JOINT RESEARCH AT EFRC

Peter Steinrück

From Until

09:00 ↔ 09:20

Prague C+D

JOINT RESEARCH AT EFRC

Peter Steinrück

EDUCATION AT EFRC

Siegmond Cierniak

09:20 ↔ 09:45

EDUCATION AT EFRC

Siegmond Cierniak

Coffee Break & Exhibition

9:45 ↔ 10:15

Coffee Break & Exhibition

EFRC RESEARCH

Chairman: Georg Samland

OPERATIONS & MAINTENANCE

Chairman: Heinrich Ochs

Modelling Fluid Dynamics, Heat Transfer and Valve Dynamics in a Reciprocating Compressor

Roland Aigner, H. Steinrück, L. Savic; TU VIENNA

10:15 ↔ 10:45

Optimized MTBM with Model Based Online Diagnostics

Christian Koers; PROGNOST SYSTEMS

Model Based Diagnostics of Reciprocating Compressors

Matthias Huschenbett; TU DRESDEN

10:50 ↔ 11:20

Ethylene Boil Off Gas Compressor in Petrochemical Plant Availability and Reliability Enhancement

Syed Fuad Abbas, Mousa A. Al-Haijan; SABIC Klaus Hoff; NEUMAN & ESSER

Identification of Noise Sources in Reciprocating Compressors

Leonard van Lier; TNO SCIENCE AND INDUSTRY

11:25 ↔ 11:55

Increased Availability and Reliability by OEM Maintenance Agreements

Hans Bongers, Rob Crena de Longh; THOMASSEN COMPRESSION SYSTEMS and NAM

Lunch Break & Exhibition

11:55 ↔ 13:30

Lunch Break & Exhibition

SPECIAL TOPIC: LNG

Chairman: René Peters

Overhaul of a 8-Cylinder Ingersoll Rand Compressor for a Liquefaction Process

Burkhard Katzenbach; RWE ENERGY

13:30 ↔ 14:00

Pros and Cons of Various Coupling Types for Reciprocating Compressor Installations

Gerhard Knop; Klaus H. Hoff; NEUMAN & ESSER

Online Condition Monitoring of LNG Boil Gas Compressors

Josu Elorza; BAHIA BISCAYA GAS Thorsten Bickmann; PROGNOST SYSTEMS

14:05 ↔ 14:35

Torsional Design Considerations for Reciprocating Compressors

Thomas J. Stephens; ARIEL CORPORATION

Coffee Break & Exhibition

14:35 ↔ 14:55

Coffee Break & Exhibition

SPECIAL TOPIC: FPSO

Chairman: Leonhard Keller

Dynamic Analysis of Reciprocating Compressors on FPSO Topside Modules

Chris Harper; BETA MACHINERY ANALYSIS

14:55 ↔ 15:25

Optimisation of Reciprocating Compressor Plants by Using Flexible Couplings Supported by Advanced Engineering Methods

Andreas Laschet, Michael Matzkeit; ARLA MASCHINENTECHNIK, VULKAN KUPPLUNGS- UND GETRIEBEBAU B. HACKFORTH

Large Reciprocating Compressor Packages on FPSOs

Graham Gilkison; INDEPENDENT TECHNOLOGY Steve Rowntree; FLOTECH

15:30 ↔ 16:00

Utilization of Soft-Starter VDF in Reciprocating Compressor Applications

Carsten Ritter, Heinz Kobi, Peter Morf; ABB SWITZERLAND

Closing Remarks of Session Chairman

16:00

Closing Remarks of Session Chairman

End of 5th EFRC Conference

16:10

End of 5th EFRC Conference

Authors, Lecturers and Session Chairmen from:

ABB Schweiz AG, Baden, Switzerland:

Heinz Kobi, Peter Morf, Carsten Ritter

ARIEL Corporation, Mt. Vernon, Ohio, USA:

George M. Kopscick, Thomas J. Stephens

ARLA Maschinentechnik GmbH, Wipperfürth, Germany:

Dr.-Ing. Andreas Laschet

BASF AG, Ludwigshafen, Germany: *Heinrich Ochs*

BAHIA Biscaya Gas, Zierbena, Bizkaia, Spain: *Josu Elorza*

BETA Machinery Analysis, Calgary, Canada: *Chris Harper*

BP Exploration & Production Technology, Houston, Texas, USA:

John B. Platt

Burckhardt Compression AG, Winterthur, Switzerland:

Dr.-Ing. Norbert Feistel, Markus Gehlert, Dr.-Ing. Leonhard Keller,

Dr. Georg Samland, Nicole Retz, Matthias Tanner

CKD Nove Energo, Prague, Czech Republic: *Jaroslav Kraml*

COOK MANLEY, Stafford, Texas, USA: *Kevin Durham*

DOTT. ING. MARIO COZZANI S.r.l., Arcola, Italy:

Enzo Giacomelli, Fabio Manfrone, Massimo Schiavone

E.ON Hanse AG, Hamburg, Germany: *Claus Pollok*

ESSENT, te 's Hertogenbosch, The Netherlands: *Gert Ploumen*

FLOTECH LIMITED, Stockholm, Sweden: *Steve Rowntree*

GE Oil & Gas, Florence, Italy: *Paolo Battagli, Stefano Generosi,*

Marco Passeri, Matteo Romiti, Fabrizio Zagli

HOERBIGER Ventilwerke GmbH, Vienna, Austria:

Axel Rumpold, Tino Lindner-Silwester, Dr. Bernhard Spiegl,

Klaus Stachel, Dr. techn. Peter Steinrück

INDEPENDENT Technology, New Plymouth, New Zealand:

Graham Gilkison

KÖTTER Consulting Engineers, Rheine, Germany:

Dr.-Ing. Jan Steinhausen

Leobersdorfer Maschinenfabrik AG, Leobersdorf, Austria:

Thomas Heumesser, Dr.-Ing. Ernst Huttar, Rainer Scheifinger

Nederlandse Aardolie Maatschappij B.V., Assen, The Netherlands:

Rob Crena de Longh

NEAC Compressor Service GmbH & Co KG, Übach-Palenberg, Germany:

Harry Lankenau, Robert van Lienen

NEUMAN & ESSER GmbH & Co KG, Übach-Palenberg, Germany:

Norbert Helling, Dr.-Ing. Klaus Hoff, Gerhard Knop

PROGNOST Systems GmbH, Rheine, Germany:

Thorsten Bickmann, Alex Deitermann, Christian Koers

RWE Energy AG, Dortmund, Germany: *Dr.-Ing. Siegmund Cierniak,*

Dr.-Ing. Burkhard Katzenbach

RWE Transportnetz Gas GmbH, Essen, Germany, and

RWE Transgas Net, Prague, Czech Republic: *Prof. Dr.-Ing. Klaus Homann*

SABIC, Al-Jubail, Saudi Arabia: *Syed Fuad Abbas, Mousa A. Al-Haijan*

Southwest Research Institute, BP Company, San Antonio, TX, USA:

Klaus Brun, Ph.D.

Technical University of Dresden, Germany: *Matthias Huschenbett,*

J. Nickl, Prof. Dr.-Ing. Hans Quack, Prof. Dr.-Ing. Habil. Gotthard Will

Technical University of Vienna, Institute of Fluid Mechanics

and Heat Transfer, Austria: *Roland Aigner, L. Savic,*

Prof. Dr. techn. H. Steinrück

THOMASSEN Compression Systems B.V., Rheden, The Netherlands:

Hans Bongers, Peter Duineveld, Willem van der Toom

TNO Science & Industry, Delft, The Netherlands:

André Eijk, Leonhard van Lier, Harry Korst, Dr.-Ing. René Peters

VULKAN Kupplungs- und Getriebebau B. Hackforth GmbH & Co. KG,

Herne, Germany: *Michael Matzkeit*

Fees & Payment

Conference €860,- incl. VAT

The conference fee includes conference proceedings (binder), 2 buffet lunches, all conference beverages and the conference dinner on March 22, 2007.

One free conference admission per lecture!

Compressor Training €195,- incl. VAT

Including conference beverages and training documentation.

Hotel accommodation €121,-/night incl. VAT

Includes accommodation in Diplomat Hotel in single (€121,-) or double room (€131,-) incl. buffet breakfast.

Accompanying person €95,- each incl. VAT

For private persons only including conference dinner on March 22, 2007 except conference participation and proceedings. For sightseeing tours and theatre reservations, please, see more details at www.pragint.cz

Registration

For registration, please, cut off the last page and send the form duly filled in and signed per mail or fax to:

PragInt

Attn. Mrs. Katerina Lyachova

Prokopova 9

130 00 Praha 3

Czech Republic

Phone: +420 221 416 496

Fax: +420 224 224 246

eMail: efrc@pragint.cz

Registration also possible via Internet:

www.pragint.cz

Closing date for registration:

March 2, 2007

Payment

Upon receipt of your registration the invoice (confirmation) will be sent by **PragInt**. Please note that the confirmation is valid only after receipt of the payment. Banking charges are at the expense of the payer.

Credit cards

We accept Visa, EuroCard, MasterCard, Diners Club or American Express

Cancellation for conference and hotel registration

Cancellation can only be accepted in writing.

Up to March 9, 2007:

70% cancellation fee

After March 9, 2007:

100% cancellation fee

Promotion

Exhibition

Exhibition space of 2x3 m
(without booth equipment).

The person named for the exhibition must register to the EFRC conference.

Advertisement in the conference binder

The advertising rates are:

1/1 page 4C, € 1,500,- incl. VAT
1/2 page 4C, € 1,000,- incl. VAT
1/1 page b/w, € 1,000,- incl. VAT
1/2 page b/w, € 800,- incl. VAT

If you are interested in one of these promotion offers we are happy to send you more information.

Peter Huber

Member Task Force EFRC,

**Conference Organisation
c/o Burckhardt Compression AG**

Im Link 5, P.O. Box 65

CH-8404 Winterthur, Switzerland

Phone: +41 (0) 52 262 52 81

Fax: +41 (0) 52 262 03 48

email: efrc@burckhardtcompression.com
www.recip.org

€ 500,- incl. VAT

Registration form

European Forum for Reciprocating Compressors

5th EFRC Conference & Compressor Training

March 21-23, 2007 Prague

In CAPITAL LETTERS, please

(one form per registration only)

Title: _____ Mr. Mrs.

Surname: _____

First name: _____

Company: _____

Address: _____

City Code: _____

City: _____

Country: _____

Phone: _____

Fax: _____

eMail: _____

Please mark

Position

- | | |
|--|---|
| <input type="checkbox"/> Managing Director | <input type="checkbox"/> Plant Supervisor |
| <input type="checkbox"/> Plant Manager | <input type="checkbox"/> R&D Engineer |
| <input type="checkbox"/> Engineer | <input type="checkbox"/> Process Engineer |
| <input type="checkbox"/> Maintenance Manager | <input type="checkbox"/> Scientist |
| <input type="checkbox"/> Rotating Equipment Engineer | <input type="checkbox"/> Others _____ |

Industry

- | | |
|--|--|
| <input type="checkbox"/> Petrochemical Industry | <input type="checkbox"/> Refinery |
| <input type="checkbox"/> Chemical Industry | <input type="checkbox"/> Industrial Gas |
| <input type="checkbox"/> Compressor Manufacturer | <input type="checkbox"/> Contractors |
| <input type="checkbox"/> Component Manufacturer | <input type="checkbox"/> Engineering Company |
| <input type="checkbox"/> University | <input type="checkbox"/> R&D Organisation |
| <input type="checkbox"/> Gas Gathering,
Gas Transport,
Gas Storage | <input type="checkbox"/> Consulting Engineer |
| | <input type="checkbox"/> Service provider |
| | <input type="checkbox"/> Others _____ |

I want to register for:

5th EFRC Conference on March 22-23, 2007

Training Session on March 21, 2007

I am a lecturer and presenter

Accommodation

arrival date _____

departure date _____

Single room Double room

Smoker Non Smoker

Garage
€ 16 per day to be paid at hotel reception.

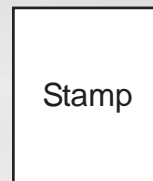
CD-Rom with proceedings at EUR 50,- (incl. VAT)

Payment will be done by

Bank Transfer Credit Card

I accept the registration conditions _____

Signature



Stamp

PragInt, spol. s.r.o.
Attn. Mrs. Katerina Lyachova
Prokopova 9
130 00 Praha 3
Czech Republic