

# European Forum for Reciprocating Compressors



## 7<sup>th</sup> EFRC Conference

**Special Feature:  
Compressor Training**

**October 20-22, 2010**

**Palazzo dei Congressi  
Florence, Italy**

**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.

### Focus of the 7<sup>th</sup> EFRC Conference The Reciprocating Compressor and the Environment

#### Why Recips are the Better Answer to Compression Problems

- Technology for reliability improvements
- Technology for efficiency improvements
- Case studies on flexible and efficient usage
- Case studies on reliable usage
- Comparative studies on different types of compression equipment
- Trends in operation

### Special Feature: Half Day Training Session on October 20, 2010



EFRC

## Special Feature: Training Reliable Operation of Reciprocating Compressors in Challenging Conditions

EFRC offers a compressor training session focusing on operating reciprocating compressors in a challenging environment such as aggressive and corrosive gases, extreme process conditions and dynamic surroundings. Young engineers from operators, engineering companies and suppliers will be given an in-depth overview of technical features for a reliable, safe and long lasting operation of a compressor unit.

## TRAINING PROGRAMME

WEDNESDAY, October 20

From	Until	Palazzo degli Affari
13:00		<b>Introduction to the Programme</b> <i>René Peters; TNO SCIENCE &amp; INDUSTRY</i>
13:15 ↔ 13:45		<b>Corrosive Components in the Gas Stream</b> <i>Peter Duineveld;</i> <i>THOMASSEN COMPRESSION SYSTEMS</i>
13:45 ↔ 14:15		<b>Impact of Liquids and Dynamic Phenomena on Integrity</b> <i>Leonard van Lier; TNO SCIENCE &amp; INDUSTRY</i>
14:15 ↔ 14:45		<b>Valve Selection and Design under Harsh Conditions</b> <i>Gunther Machu; HOERBIGER VENTILWERKE</i>
14:45 ↔ 15:15		<b>Coffee Break</b>
15:15 ↔ 15:45		<b>Impact of Challenging Environments on Seals and Packings</b> <i>Marc Langela; STASSKOL</i>
15:45 ↔ 16:15		<b>Effect of Loading on the Reliability of Operations</b> <i>Luzi Valaer; BURCKHARDT COMPRESSION</i>
16:15 ↔ 16:45		<b>Condition Monitoring to Protect the Machine</b> <i>Tobias Ahlert; PROGNOST SYSTEMS</i>
16:45		<b>Conclusion and Evaluation</b>
17:00		<b>Closing</b>

## Welcome Reception

sponsored by

GE OIL & GAS



GE Oil & Gas

October 20, 2010 from 19:30 to 22:00 h  
Location: Palazzo Budini Gattai, Florence

# THURSDAY, October 21

Auditorium	From	Until
<b>A Word of Welcome by Siegmund Cierniak</b>	<b>09:00</b>	
 <b>Innovations and Refining by <i>Giacomo Rispoli</i></b> Research and Development Senior Vice President, Division Refining & Marketing, ENI, Rome, Italy	<b>09:05 ↔ 09:30</b>	
<b>Coffee Break &amp; Exhibition</b>	<b>09:30 ↔ 10:00</b>	
<b>Operations</b> <i>Chairman: Eike Drewes</i>		
 <b>Reliability Check for a 70 Year Old Compressor</b> <i>Ms Qing Yang, Harry Lanckenau;</i> BASF, NEAC COMPRESSOR SERVICE	<b>10:00 ↔ 10:30</b>	
 <b>Modernization of Reciprocating Compressors</b> <i>Thomas Knebel, Andreas Raschke, Samuel Burkhalter,</i> <i>Manfred Straessler; VNG, BURCKHARDT COMPRESSION</i>	<b>10:35 ↔ 11:05</b>	
 <b>Indirect Evidence of a Liquid Slugging</b> <i>Marcel Hempen;</i> NEUMAN & ESSER	<b>11:10 ↔ 11:40</b>	
<b>Lunch Break &amp; Exhibition</b>	<b>11:40 ↔ 13:10</b>	
<b>Condition Monitoring</b> <i>Chairman: Enzo Giacomelli</i>		
 <b>Early Failure Detection of a Crosshead Fatigue Failure</b> <i>Tobias Ahlert;</i> PROGNOST SYTEMS	<b>13:10 ↔ 13:40</b>	
 <b>New Generation of Machinery Monitoring and Protection for Recips</b> <i>Martin Schubert, Christian Prinz; HOERBIGER VENTILWERKE</i>	<b>13:45 ↔ 14:15</b>	
 <b>Integration of a Advanced Diagnostic Tool in an Optimization Platform</b> <i>Riccardo Fani, Ms Gaia Rossi; GE OIL AND GAS, GE ENERGY</i>	<b>14:20 ↔ 14:50</b>	
<b>Coffee Break &amp; Exhibition</b>	<b>14:50 ↔ 15:50</b>	
<b>Operations</b> <i>Chairman: Heinrich Ochs</i>		
 <b>Piston Rod Defection and Damage on a CO<sub>2</sub> Compressor - Correction of this Effect</b> <i>Thomas Heumesser, Roman Gabriel;</i> LEOBERSDORFER MASCHINENFABRIK	<b>15:50 ↔ 16:20</b>	
 <b>Lessons Learned from a Reciprocating Compressor for CO<sub>2</sub> Injection</b> <i>Marlies van Osch, Bas van den Beemt, Jeroen van Meel,</i> <i>Michel Bezemer; TNO SCIENCE AND INDUSTRY, CONPACKSYS</i>	<b>16:25 ↔ 16:55</b>	
 <b>Straight or Twisted? - 'Laser Talks'</b> <i>Stefan Damberg, Harry Lanckenau;</i> NEAC COMPRESSOR SERVICE	<b>17:00 ↔ 17:30</b>	
<b>Closing Remark of Session Chairman</b>	<b>17:30 ↔ 17:35</b>	
<b>Conference Gala Dinner</b>	<b>19:30</b>	

Sala Verde
<b>Coffee Break &amp; Exhibition</b>
<b>Innovation &amp; Technology</b> <i>Chairman: Georg Samland</i>
 <b>Innovative Method and Sensor for Direct Measurement of Rider Ring Wear</b> <i>Lau Koop, Peter Duineveld;</i> THOMASSEN COMPRESSION SYSTEMS
 <b>The BCD Packing Ring - a New High Performance Design</b> <i>Tino Lindner-Silwester, Christian Hold;</i> HOERBIGER VENTILWERKE
 <b>Development of a New Stepless Flow Control System</b> <i>Roland Aigner, Alexandre Voser, Andreas Allenspach;</i> BURCKHARDT COMPRESSION
<b>Lunch Break &amp; Exhibition</b>
<b>Pulsation &amp; Vibrations</b> <i>Chairman: René Peters</i>
 <b>The Impact of an API 618 4<sup>th</sup> or 5<sup>th</sup> Edition Analysis on the Design of a Very Large Hydrogen Compressor</b> <i>Leonard van Lier, Bert Egas, Cesar Luis Fernandez Valdes;</i> TNO SCIENCE AND INDUSTRY, REPSOL
 <b>Compressor Station Dynamic Losses</b> <i>Klaus Brun, Marybeth Nored, Dennis Tweten, Rainer Kurz;</i> SOUTHWEST RESEARCH INSTITUTE, SOLAR TURBINES
 <b>Cylinder Manifold Forced Response</b> <i>Marco Passeri, Stefano Generosi;</i> GE OIL AND GAS
<b>Coffee Break &amp; Exhibition</b>
<b>Design &amp; Engineering</b> <i>Chairman: Peter Duineveld</i>
 <b>Methods of Load and Strength Evaluation of Connecting Rods</b> <i>Gerhard Knop, Marcel Naumann; NEUMAN &amp; ESSER</i>
 <b>High-Speed Upstream to Moderate-Speed Downstream Short Stroke Reciprocating Compressors</b> <i>Greg Phillippi, Joe Spiller; ARIEL, SHELL</i>
 <b>Supplementary Challenges for UGS Applications of Reciprocating Compressors with Centrifugal Machinery</b> <i>Burkhard Lenth, Joachim Wermeling;</i> RWE GASPEICHER
<b>Closing Remark of Session Chairman</b>
<b>Conference Gala Dinner</b>

# FRIDAY, October 22

## Auditorium

From Until

## Sala Verde

### EFRC

Chairman: Peter Steinrück

### Fundamentals

Chairman: Klaus Hoff



#### Joint R&D in EFRC

Georg Samland;  
MT SEALING TECHNOLOGY

09:00 ↔ 09:30

#### Use of the four Pole Transfer Matrix in the 1D Time Domain Pulsation Simulations

Grzegorz Zelek, Piotr Cyklis;  
CRACOW UNIVERSITY OF TECHNOLOGY



#### Comparison of Field Vibration Data with 'EFRC Guidelines for Vibrations in Reciprocating Compressor Systems'

Roland Schumann, André Eijk;  
BASF, TNO SCIENCE AND INDUSTRY

09:35 ↔ 10:05

#### Material Development - Transferability Counts

Marc Langela;  
STASSKOL



#### Educating Reciprocating Compressor Engineers at the EFRC

Siegmond Cierniak;  
RWE

10:10 ↔ 10:40

#### Thermo-Fluid-Dynamic Design of Reciprocating Compressor Cylinders

Riccardo Traversari, Marco Faretra;  
CST COMPRESSION SERVICE TECHNOLOGY



### Coffee Break & Exhibition

10:40 ↔ 11:10

### Coffee Break & Exhibition

### Operations

Chairman: Steffen Gast

### Pulsation & Vibrations

Chairman: George Kopscick



#### Compressor Reliability Survey

André Eijk, Leonard van Lier;  
TNO SCIENCE AND INDUSTRY

11:10 ↔ 11:40

#### Multi Dimensional Gas Passage Response Analysis for a Modern High Speed Reciprocating Compressor

Marybeth Nored;  
SOUTHWEST RESEARCH INSTITUTE



#### Stabilization of Compressor Foundations, Thorsten Reisser, Wolfgang Blankart, Heinrich Ochs; BASF

11:45 ↔ 12:15

#### Development and Application of a Three-Dimensional Vibration Absorber

Johann Lenz;  
KÖTTER CONSULTING ENGINEERS



#### Fracture Mechanics Life Assessment for Hypercompressor Lubrication Quills

Marco Manetti, Carmelo Maggi, Nicola Campo, Guido Volterrani, Marco Innocenti; UNIVERSITY OF FLORENCE, GE OIL & GAS

12:20 ↔ 12:50

#### Noise Reduction at a Hydrogen Compressor Plant

Andreas Allenspach, Samuel Burkhalter;  
BURCKHARDT COMPRESSION



### Lunch Break & Exhibition

12:50 ↔ 14:00

### Lunch Break & Exhibition

### Design & Engineering

Chairman: Ernst Huttar

### Rings, Valves & Packings

Chairman: Leonhard Keller



#### Decreasing Time and Cost Effort by Virtual Prototyping in the Compressor Development

Tobias Spilker, Matthias Budde, Martin Rebbert, Christoph Steffens;  
FEV MOTORENTECHNIK

14:00 ↔ 14:30

#### Next Generation Valve Technology for High Speed Compressors

Bernhard Spiegl, Markus Testori, Gunther Machu;  
HOERBIGER KOMPRESSORTECHNIK HOLDING



#### New Crosshead Lubrication Design to Uprate the Power Density of LDPE Reciprocating Compressors

Carmelo Maggi, Nicola Campo, Filippo Gerbi;  
UNIVERSITY OF FLORENCE, GE OIL & GAS

14:35 ↔ 15:05

#### Heavy & Unusual Wear of PEEK Piston Rings

Georg Höltl, Thomas Heumesser;  
LEOBERSDORFER MASCHINENFABRIK



#### Design Challenges for Reciprocating Compressors in Specialty Gas Services

Mike Cyca, Kelly Eberle;  
BETA MACHINERY ANALYSIS

15:10 ↔ 15:40

#### Operating Experience of CC Valves Installed in Refinery Plant

Andrea Raggi, Fabio Manfrone;  
DOTT. ING. MARIO COZZANI



### Closing Session & Apple iPad-Tombola

15:50

### Awards of Best Papers & Students Competition

16:15

### End of the 7<sup>th</sup> EFRC Conference

16:30

## Authors, Lecturers and Session Chairmen from:

### **ARIEL Corporation, Mt. Vernon, Ohio, USA:**

*Georg Kopschick, Greg Phillipi, Joe Spiller*

### **BASF AG, Ludwigshafen, Germany:**

*Wolfgang Blankart, Heinrich Ochs, Thorsten Reisser, Roland Schumann, Ms Qing Yang*

### **BETA Machinery Analysis, Calgary, Canada:**

*Mike Cyca, Kelly Eberle*

### **BORSIG ZM Compression GmbH, Meerane, Germany:**

*Steffen Gast*

### **Burckhardt Compression AG, Winterthur, Switzerland:**

*Dr. Roland Aigner, Andreas Allenspach, Samuel Burkhalter, Dr. Leonhard Keller, Manfred Straessler, Dr. Luzi Valaar, Dr. Alexandre Voser*

### **ConPackSys, Dordrecht, The Netherlands:**

*Michel Bezemer, Jeroen van Meel*

### **Crakow University of Technology, Crakow, Poland:**

*Piotr Cyklis, Grzegorz Zelek*

### **CST Compressor Service Technology S.r.l., Florence, Italy:**

*Riccardo Traversari, Marco Faretra*

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

*Enzo Giacomelli, Fabio Manfrone, Andrea Raggi*

### **ENI S.p.A., Rome, Italy: Giacomo Rispoli**

### **FEV Motorentechnik GmbH, Aachen, Germany:**

*Matthias Budde, Martin Rebbert, Tobias Spilker, Christoph Steffens*

### **GE Oil & Gas, GE Energy, Florence, Italy:**

*Riccardo Fani, Stefano Generosi, Marco Passeri, Ms Gaia Rossi*

### **HOERBIGER Kompressortechnik Holding GmbH, Vienna, Austria:**

*Bernhard Spiegl, Dr. Peter Steinerück*

### **HOERBIGER Ventilwerke GmbH, Vienna, Austria:**

*Christian Hold, Tino Lindner-Silwester, Dr. Gunther Machu, Christian Prinz, Martin Schubert, Markus Testori*

### **KÖTTER Consulting Engineers, Rheine, Germany:**

*Dr. Johann Lenz*

### **Leobersdorfer Maschinenfabrik AG, Leobersdorf, Austria:**

*Roman Gabriel, Thomas Heumesser, Georg Hörtl, Dr. Ernst Huttar*

### **MT Sealing Technology Inc., Winthertur, Switzerland:**

*Dr. Georg Samland*

### **NEAC Compressor Service GmbH & Co KG,**

*Übach-Palenberg, Germany: Stefan Damberg, Harry Lankenau*

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

*Dr. Marcel Hempten, Dr. Klaus Hoff, Gerhard Knop, Marcel Naumann*

### **PROGNOST Systems GmbH, Rheine, Germany:**

*Tobias Ahlert, Eike Drewes*

### **RWE AG, Essen, Germany: Dr. Siegmund Cierniak**

### **RWE Gasspeicher GmbH, Dortmund, Germany:**

*Burkhard Lenth, Joachim Wermeling*

### **Southwest Research Institute, Solar Turbines, San Antonio, TX, USA:**

*Klaus Brun, Rainer Kurz, Marybeth Nored, Dennis Tweten*

### **STASSKÖL GmbH, Stassfurt, Germany:**

*Dr. Marc Langela*

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

*Peter Duineveld, Lau Koop*

### **TNO Science and Industry, Delft, The Netherlands:**

*Bas van den Beemt, André Eijk, Bert Egas, Leonard van Lier, Marlies van Osch, Dr. René Peters*

### **Repsol S.A., Madrid, Spain: Cesar Luis Fernandez Valdes**

### **University of Florence, Florence, Italy:**

*Nicola Campo, Marco Innocenti, Carmelo Maggi, Filippo Gerbi, Marco Manetti, Guido Volterrani*

### **VNG Verbundnetz Gas AG, Leipzig, Germany:**

*Thomas Knebel, Andreas Raschke*

## Fees:

### Early Bird, till June 30, 2010

including superior upgrade  
of hotel room

€ 750,- excl. VAT

Registration after June 30, 2010

€ 850,- excl. VAT

The conference fee includes conference proceedings (binder), 2 buffet lunches, all conference beverages and the conference dinner on October 21, 2010.

**One free conference admission per lecture.**

### Compressor Training

€ 195,- excl. VAT

Including beverages and training documentation

### Accompanying Person

€ 95,- excl. VAT

Including conference dinner on October 21, 2010. Except conference participation and proceedings.

### Hotel Accomodation

Choice from options of 3- and 4 star hotels.

Starting from

€ 119,- incl. VAT

## Online Registration & Information: [www.recip.org](http://www.recip.org)

For any queries, please, send your email to the conference agency **Carlson Wagonlit Travel:**  
[efrc2010@carlsonwagonlit.it](mailto:efrc2010@carlsonwagonlit.it)

## Closing Date for Registration: October 8, 2010

## Payment

Upon receipt of your registration the order confirmation and the invoice will be sent by our local partner Carlson Wagonlit Travel (CWT).

## Credit Cards

Carlson Wagonlit Travel can only accept credit card payment, such as by Visa, MasterCard, Diners Club or American Express.

## Cancellation for conference and hotel registration

Cancellation can only be accepted in writing.

Up to October 8, 2010: 70% cancellation fee  
After October 8, 2010: 100% cancellation fee

## Promotion

### Exhibition

€ 950,- excl. VAT

Exhibition space of 3x2 m  
(excluding booth equipment).

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

### Advertisement in the conference binder

Advertising rate:

1/1 page 4 colour

€ 1,200,- excl. VAT

If you are interested in this promotion offer,  
please, download the order form and information  
in the registration tool on [www.recip.org](http://www.recip.org)  
or contact directly:

Marco Scanderbeg  
Member Taskforce EFRC  
Conference Organisation  
c/o Burckhardt Compression AG

Im Link 5, P.O. Box 65  
CH-8404 Winterthur, Switzerland  
Phone: +41 (0) 52 262 57 08  
Fax: +41 (0) 52 262 03 48  
Email: [efrc@burckhardtcompression.com](mailto:efrc@burckhardtcompression.com)

## NEW Conference Features

### ● Sponsoring

The EFRC offers interested parties a sponsor package for the Conference Gala Dinner at the *Palazzo Corsini*, a venue *sui generis*, on Oct. 21, 2010. As a sponsor your company name and logo gets presented on:

- banners during the EFRC conference
- all conference bags
- the dinner invitation cards
- the menu cards

Due to admission restrictions max. 5 sponsors can be considered according to the rule "*first come, first served*". The rate for this great promotion package is € 5,000. If interested, please, send your application informally by email to *Martina Frenz*:

[martina.frenz@neuman-esser.de](mailto:martina.frenz@neuman-esser.de).

Confirmation and invoice will be sent by Carlson Wagonlit Travel.

### ● Closing Session & Tombola

Subsequent to the last lectures, *Dr. Siegmund Cierniak, Chairman of the EFRC Board*, will hold the Closing Session and lead over to the Tombola. Hostesses from the conference agency, Carlson Wagonlit Travel, will nominate 3 winners by drawing lots. The price for each winner: an **Apple iPad** with a multi-touch screen that runs thousands of apps, up to a value of € 700 each.

**The presence of the winner is mandatory(!)**

**Oct. 22, 2010 at 15:50 h in the Auditorium**

### ● Awards of Best Papers & Students Competition

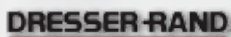
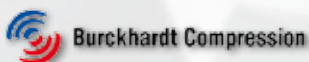
Right after the Tombola, the conference will taper to its highlight: the award ceremonies. *Dr. Cierniak* will grant prizes to the first three winners of the Students Workshop whereas *Dr. Peter Steinrück, Member of the EFRC Board*, will lead through the programme of the Best Paper Awards. For the first time, the EFRC will award the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> prize to lecturers at a EFRC conference. Written papers and presentations given will be evaluated according to defined criteria by the Organising Committee of the EFRC.

**Oct. 22, 2010 at 16:15 h in the Auditorium**

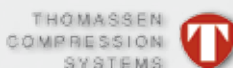
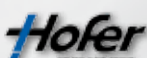
### Please, note:

Book your flights back after the awards - *it's worth doing so* - or extend your stay in Florence - *it will top off your visit!*  
Great social programmes for the weekend are available.  
Contact: [efrc2010@carlsonwagonlit.it](mailto:efrc2010@carlsonwagonlit.it)

# EFRC Members



GE Oil & Gas



For Online Registration and further details see the website of EFRC:

[www.recip.org](http://www.recip.org)