



# Reciprocating Compressors 101



# Speakers



## **Dr. Gunther Machu**

Head of Global Product Management Compressor Solutions

Studied chemical engineering at the Technical University, Vienna; PhD in Fluidmechanics at the Technical University, Graz;

Started 2001 with HOERBIGER as R&D engineer, In 2007 appointed for head of Corporate R&D Compressor Solutions. Since 2009 head of Global Product Management Compressor Solutions.

# Speakers



## **Ing. André Eijk**

Senior Mechanical Consultant

Bachelor's in Mechanical Engineering;  
Working for the TNO since 1979; Member of the task force groups of the API Standard 618 (reciprocating compressors), API 674 (reciprocating pumps) and API 688 (pulsation & vibration control of positive displacement machinery); project leader of the ISO Standard 10816-8 (standard for vibrations in reciprocating compressor systems); chairman of the standardization group of the European Forum for Reciprocating Compressors (EFRC);

# Agenda

## **0. Introduction**

- Speakers
- Agenda
- Types of compressors
- Applications where reciprocating compressors are used

## **1. Manufacturing and sizing**

- API and NACE standards
- Compressor sizing
- Compressor limitations

## **2. Principles of compression**

- Gas law and working principle
- Volumetric efficiency, calculating capacity and power
- Valve losses

# Agenda

## **3. Foundations and anchors**

- Introduction Anchor Bolt and Foundation Design
- Static and Dynamic Loads for Anchor Bolt & Foundation Design
- Concrete Block Design Rules
- Soil, pile and foundation interaction
- Choosing Anchor Bolts
- Installation Anchor Bolts
- Grout (Cement & Epoxy)
- Thermal Expansion & Fatigue of Bolts

## **4. Installation, operation and maintenance**

- Best installation practices
- Mechanical failure modes, how to recognize them, and what to do
- Process-related (gas composition, piping configurations, etc.)
- Maintenance-related (component defects, scheduling, etc.)
- Operating-related (lubrication levels, off-design operation, etc.)
- Control methods (bypass, step control, stepless, etc.)
- Condition monitoring (parameters, machinery protection, etc.)

# Agenda

## **5. Pulsation and vibration**

- Acoustic Analysis of Reciprocating Compressors
- Mechanical Analysis of Reciprocating Compressors
- Summary of the API 618 Standard 5th edition
- Optional analysis according API 618, 5th edition
- Summary of allowable levels of the API 618, Design Approach 3, 5th edition
- Summary ISO Standard 10816-8 (Field Surveys)
- Case Study API 618 Pulsation & Vibration Analysis

## **6. Summary and conclusion**