



2024

# IQ

## Industry Qualification

Your reciprocating compressor training program from introductory to expert level inclusive calendar and registration

  
**HOERBIGER**



“

We are very satisfied with the training. We learned a lot in short time and the instructors were very skilled and engaged.

Engineer Operation & Maintenance, Norway

“

We learned a lot about piston compressors, got an insight into the interaction between the crankshaft and the piston rod and how important the balance of forces is for operating the compressor.

EPC Germany

## Overview

### Industry Qualification

HOERBIGER qualification program enables you to strengthen your IQ as well as to become an expert in your daily work and especially in your industry. Follow your individual qualification path for even more success through professional development.

We offer you a completely modular training catalog. Because we want to ensure that the right training is available for you and your level of knowledge. In our “Menu”, you will find 24 different training modules that you can attend online – Because they only take 1.5 hours each. In our “Knowledge Sessions” we have already compiled a comprehensive training for you. Here, you can choose whether you want to start with the basics or directly acquire expert knowledge. But that's not all: In our “Overhaul School”, consisting of theory and practice, you implement your received theoretical knowledge directly into practice on our training compressor. The HOERBIGER “Training Academy” offers you the complete package: Starting with the theoretical introductory through to practical exercises, you will become an industry expert in 10 days.

You will find all the details on the following pages.

# Become an industry expert: Your qualification path



## Introductory level

On this level we provide all the relevant fundamentals to achieve a good technical understanding of reciprocating compressors theory and working principles. This is not just the pure basics, but on this level HOERBIGER also offers less complex topics. These trainings are highly recommended for graduates, and career changer.



## Advanced level

If you already have good knowledge and experience in a subject area, HOERBIGER training package on an advanced level is exactly what you need. In these sessions you can deepen your knowledge about compressors and expand your professional skills in key areas on a system level. To participate in trainings on this level, you can attend courses from the introductory level in advance.



## Expert level

For the step to be an absolute expert in a specialist area, we recommend this highest qualification level. With the relevant professional experience or participation in training courses of the two previous levels, you will receive comprehensive specialist knowledge at expert level that at the end, a short test is conducted to check your level of knowledge. This will be noted on the certificate, of course.

# Our offering at a glance

## Online training “Menu”

### Choose what suits your “taste” best

- Training catalog
- 24 modules + 1
- 1.5 h each

### Already working experience

- Getting to know each other and our training content
- Flexible online offering

### All professional groups

- Update your knowledge
- Dive deep in specific topics

## Knowledge Session (in person)

### The selected program for you

- Training packages
- 3 levels (introductory to expert level)
- 2 days each

### New in business

- Modular approach
- Training on demand
- Classroom sessions (offline)

### Technical professional groups

- Qualification path (continuing education)
- Targeted specific content

## Overhaul School (in person)

### Hands-on experience

- 2 days practical theory
- 2 days hands-on training (at the reciprocating compressor)

### Operational

- Yearly scheduled
- Classroom sessions and practice (offline)

### Operators and maintenance manager

- Qualification path (continuing education)
- Practical knowledge

## Training Academy (in person)

### Shaping reciprocating compressor experts

- 6 days theory
- 2 days practical theory
- 2 days hands-on training

### Your talents

- Yearly scheduled
- Classroom sessions and practice (offline)

### Rotating equipment engineers

- Full reciprocating compressor knowledge
- Technical diploma

# Choose the training module which suits you best

## Training catalog – our “Menu” for you

- HOERBIGER offers 24 + 1 different modules for your specific needs
- Each module takes 1.5 hours
- Training modules in online meetings (min. 5 persons per webinar)
- Costs per live webinar (please ask your sales contact or inform you on our website)
- Deliverables: Theoretical presentation
- Lectures given in English



# Menu

Online training catalog

Module	Name   Order no.	Description	Level
1	Introduction to reciprocating compressors   Order no. D10715	Terms and definitions, applications	Introductory level
2	Working principle of reciprocating compressors   Order no. D10716	Crank mechanics and compression cycle	Introductory level
3	Introduction to compressor components   Order no. D10717	Description of major components	Introductory level
4	Basics of compressor valves   Order no. D10718	Design and working principles	Introductory level
5	Basics of compressor packings   Order no. D10719	Design and working principles	Introductory level
6	Compressor piston basics   Order no. D10720	Design and working principles	Introductory level
7	Basics of cylinder rings   Order no. D10721	Design and working principles	Introductory level
8	Basic thermodynamics   Order no. D10722	Thermodynamic principles, capacity, temperature, brake horse power	Advanced level
9	Applied thermodynamics   Order no. D10723	Multistage compression, gas composition, capacity control, blow-by	Advanced level
10	Compressor mechanics   Order no. D10724	Rod loads, unbalanced forces, torsional vibrations	Introductory level
11	Capacity control systems   Order no. D10725	Stepless/stepwise and finger/plug unloaders	Advanced level
12	Cylinder lubrication systems   Order no. D10726	Divider block, pump to point, non-lube	Advanced level

Module	Name   Order no.	Description	Level
13	nearZero-emissions RECIP's configurations   Order no. D10727	Purge systems, vent arrangements	Advanced level
14	Compressor monitoring systems and diagnostics   Order no. D10728	Online systems, snapshot monitoring	Advanced level
15	Capital parts   Order no. D10729	X-head, crank shaft, distance pieces aso.	Advanced level
16	Auxiliary equipment   Order no. D10730	Frame lube system, coolers, pulsation bottles, separators	Advanced level
17	API 618 and NACE   Order no. D10731	Compressor data sheet, NACE specification	Expert level
18	Compressor reliability   Order no. D10732	MTBF, MTBR, reliability improvements	Expert level
19	Compressor troubleshooting and root cause analysis (RCA)   Order no. D10733	Temperatures, knocks, emissions	Expert level
20	Compressor valve troubleshooting   Order no. D10734	Typical failure patterns	Expert level
21	Rings and packings troubleshooting   Order no. D10735	Typical failure patterns and how to avoid them	Expert level
22	Compressor operation   Order no. D10736	Periodic checks, start-stop procedures, alarms and shut-down	Expert level
23	Compressor valve and packing maintenance   Order no. D10737	Onboarding, critical parameters	Expert level
24	Capital parts maintenance   Order no. D10738	Onboarding, critical parameters	Expert level

**Our quarterly offered free of charge live webinar!**

25	Emissions 101	A discussion about the new global challenge	All levels
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# Participate on our personal training

## Knowledge Sessions

- HOERBIGER offers 3 different sessions from introductory to expert level and for your specific needs
- Each session lasts for 2 days covering 4 modules per day
- Training sessions in person in our global training locations or in-house at your company-site (face-to-face min. 4 persons)
- Costs per session including training material, coffee breaks and lunch, excluding travel and accommodation
- Deliverables: Theoretical presentation and training material plus attendees certificate
- Training language: English

When attending all Knowledge Session relevant webinars, you can reach the corresponding qualification level and get the attendee certificate as well. Contact us for more information.



# Session 1

## Getting to know

**Target group**  
All the technical professional groups that are looking for a growth path



Upon completion of this course, you will have the know-how about different types of compressors used in process application and the understanding of the basic theory of reciprocating compressor design. Further you will understand the rod load calculation as well as the effect of rod load reversal.

Order No. D10739

Topic	Duration	Modules from the "Menu" (p. 8)
Recips basic: Compression theory introduction and working principles	1 day	1 Introduction to reciprocating compressors
		3 Introduction to compressor components
		2 Working principles of reciprocation compressors
Compressor components fundamentals	1 day	10 Compressor mechanics
		4 Basics of compressor valves
		5 Basics of compressor packings
		6 Compressor piston basics
		7 Basics of cylinder rings

Introductory level

# Session 2

## System knowledge

**Target group**  
Professionals that have a solid sound recip background and are looking to gain a system view



Upon completion of this course you will be capable to perform basic calculations for capacity, power, temperature etc. and understand performance curves (PV diagram, PT diagram). Further you can identify and describe the function of key components of reciprocating compressors and understand how the compressor flow is controlled by different flow control mechanisms. You can distinguish between different types of cylinder and packing lubrication systems. Finally, you will be capable to describe the function and operation of auxiliary equipment like coolers, pulsation dampeners and separators.

Order No. D10740

Topic	Duration	Modules from the "Menu" (p. 8 and 9)
Auxiliary systems	1 day	11 Capacity control systems
		12 Cylinder lubrication systems
		13 nearZero-emissions RECIP's configurations
		16 Auxiliary equipment
RECIPs calculation basics	1 day	15 Capital parts
		14 Compressor monitoring systems and diagnostics
		8 Basic thermodynamics
		9 Applied thermodynamics

Advanced level

# Session 3

## Solving issues

**Target group**  

- Operators
- Maintenance managers
- Rotating equipment engineers



Upon completion of this course you will be capable to understand how to undertake maintenance procedure and to maintain as well as replace performance defining components like valves, packings, pistons and rider rings etc.. You can describe proper equipment operating procedures and evaluate compressor sizing using simulation program and analyze impact of different product technologies. Further, you are able to identify problems in reciprocating compressors using online/offline monitoring systems and gather relevant and discard non-relevant information. In addition, you can evaluate and analyze the problem symptoms and information to arrive at the root cause of a problem as well as define propose solutions. Understanding the key requirements of API 618 and NACE standards and reading of API 618 data sheets are also learning outcomes.

Order No. D10741

Topic	Duration	Modules from the "Menu" (p. 9)
Compressor maintenance and reliability	1 day	18 Compressor reliability
		24 Capital parts maintenance
		23 Compressor valve and packing maintenance
Compressor troubleshooting	1 day	17 API 618 and NACE
		19 Compressor troubleshooting and root cause analysis (RCA)
		20 Compressor valve troubleshooting
		21 Rings and packings troubleshooting
		22 Compressor operation

Expert level



**When participating in one of our Knowledge Sessions you have the possibility to book our quarterly offered free of charge "Emissions 101" webinar in advance!**

# Overhaul School

- |   |
|---|
| <b>Target group</b> <ul style="list-style-type: none"> <li>▪ Operators</li> <li>▪ Maintenance managers</li> <li>▪ Rotating equipment engineers</li> </ul> |
|---|

Deliverables	Title	Description
<b>Day 1</b>		
Practical Theory	a. Basic Thermodynamics	Thermodynamic principles , cylinder assembly & displacement, volumetric efficiency, compression principles
	b. Valves Introduction	Valves types, operating principles, indicated P-V diagram, valve characteristics & losses
	c. R&P Training	Materials, Cylinder rings, Packing & Oil Scrapers - Maintaining correct records during shutdowns
	d. Compressor & Parts Revamps	Examples of performance studies, possible upgrades & revamping of components
Practical Theory	e. Machinery Oil Analysis	Oil samples, Composition, Characteristics, Analysis & Contamination
	f. Piston Rods	Design Features, Working Principles, Measurements & Reconditioning
	g. Piston Design	Design Types, Piston Failure, Manufacturing Methods, Rod Mounting, Measurements & Reconditioning
	h. Bearing Failure	Failure Types & Main Indicators
<b>Day 2</b>		
Practical Theory	i. Bearing Replacement Criteria	Practical Rules to Assess the re-usability of the Bearing
	j. Bolting & Bolt Torques	Design Features, Types & Tools
	k. Coupling Alignment	Practical Rules & Measurements
	l. Control System	Stepless, stepwise, finger/plug unloaders
Hands-on	SECTION A	Site Preparation & Disassembly
<b>Day 3</b>		
Hands-on	SECTION B	Pistons, Cylinders, Intermediate Running Gear
Hands-on	SECTION C	Cylinder Valves, Unloader System
<b>Day 4</b>		
Hands-on	SECTION D	Crankcase Running Gear& Lubrication System
Practical Theory	Measurements sheet	Discussion

## Combine theory and practice

### Overhaul School

- HOERBIGER offers practical basic recip's knowledge and hands-on experience on a training compressor
- The school takes 4 days with 12 modules in classroom and 4 hands-on training sessions
- Overhaul school in person (face-to-face min. 4 and max. 8 persons) in our global training locations or in-house at your company-site
- Costs including training material, coffee breaks and lunch, excluding travel and accommodation
- Deliverables: Theoretical presentation, practical sessions and training material plus attendees certificate
- Training Language: English

Order No. D10742



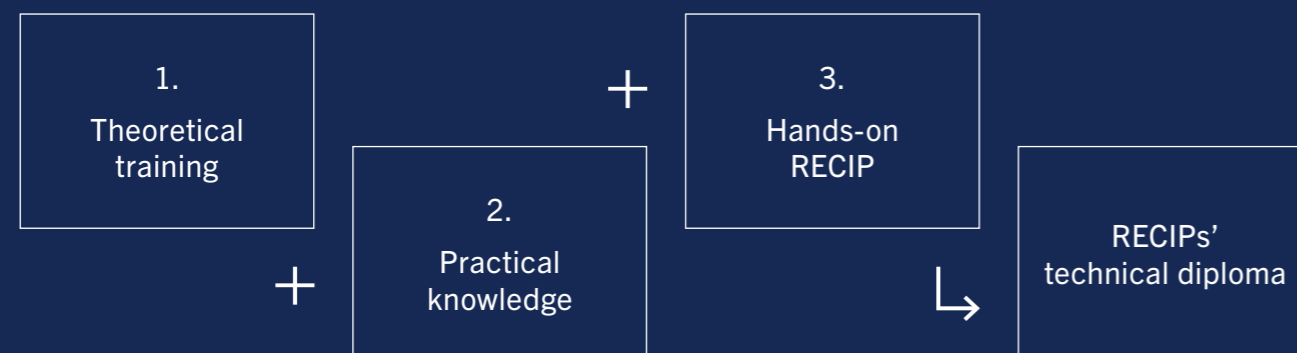


# Training Academy

## Book a full knowledge package

- HOERBIGER offers practical basic recip knowledge and hands-on experience on a training compressor
- 6 days theory (Knowledge Sessions) and 2 days practical theory plus 2 days hands-on training (Overhaul School) = 10 days divided in 2 weeks
- Training Academy in person at our global training locations (face-to-face max. 8 persons)
- Costs including training material, coffee breaks and lunch, excluding travel and accommodation
- Deliverables: Theoretical presentation, practical sessions and training material plus technical diploma
- Training Language: English

Order No. D10743



## Target group

- New employees in your company
- Engineers who want to upskill
- Rotating equipment engineers



# Training calendar for 2024

## Overview about dates and our training location

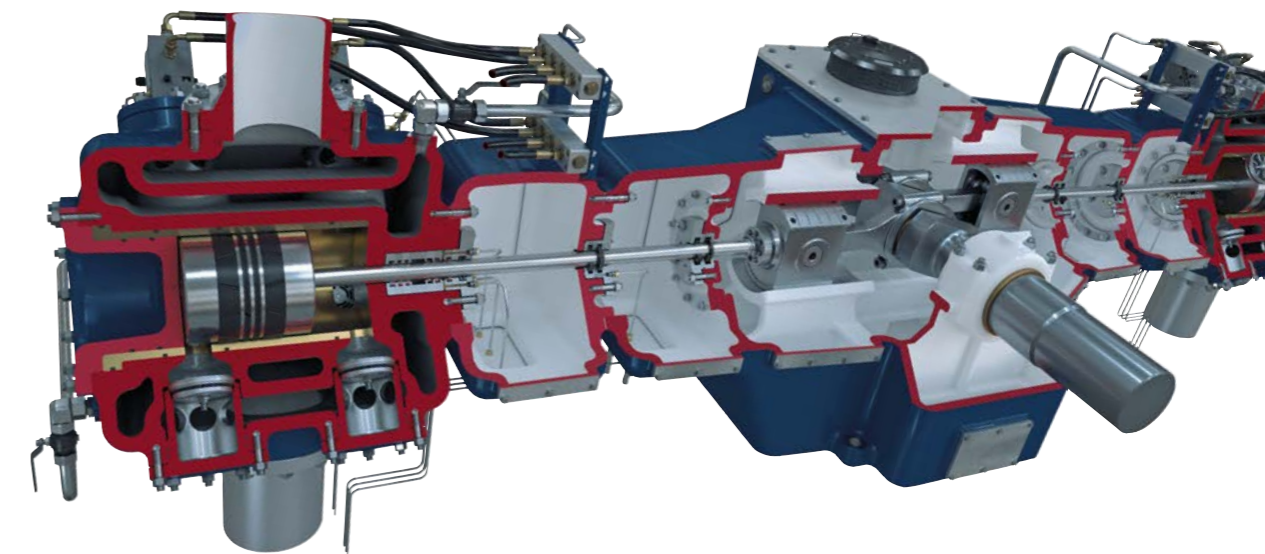
- Online webinars with technical expert trainer
- Standard webinar times: 9:00 a.m. CET/ CEST (APAC)  
3:00 p.m. CET/ CEST (NAM)
- Interactive Knowledge Sessions (online or in person)
- Practical hands-on training, distributed at HOERBIGER training centers around the globe
- Become an expert in our Training Academy: The right training for your talents worldwide
- All training sessions in English language

Name | Order no. Date Location

## “Menu”

1	Introduction to reciprocating compressors   Order no. D10715	Jan. 23	2024
2	Working principle of reciprocating compressors   Order no. D10716	Feb. 07	2024
3	Introduction to compressor components   Order no. D10717	Jan. 25	2024
4	Basics of compressor valves   Order no. D10718	Mar. 06	2024
5	Basics of compressor packings   Order no. D10719	Mar. 12	2024
6	Compressor piston basics   Order no. D10720	Apr. 04	2024
7	Basics of cylinder rings   Order no. D10721	Apr. 24	2024
8	Basic thermodynamics   Order no. D10722	Aug. 21	2024
9	Applied thermodynamics   Order no. D10723	Sep. 11	2024
10	Compressor mechanics   Order no. D10724	Feb. 21	2024
11	Capacity control systems   Order no. D10725	May 08	2024
12	Cylinder lubrication systems   Order no. D10726	May 22	2024
13	nearZero-emissions RECIP's configurations   Order no. D10727	Jun. 12	2024
14	Compressor monitoring systems and diagnostics   Order no. D10728	Aug. 07	2024
15	Capital parts   Order no. D10729	Jul. 24	2024
16	Auxiliary equipment   Order no. D10730	Jul. 03	2024
17	API 618 and NACE   Order no. D10731	Nov. 06	2024
18	Compressor reliability   Order no. D10732	Sep. 25	2024
19	Compressor troubleshooting and root cause analysis (RCA)   Order no. D10733	Nov. 13	2024
20	Compressor valve troubleshooting   Order no. D10734	Nov. 27	2024
21	Rings and packings troubleshooting   Order no. D10735	Dec. 04	2024
22	Compressor operation   Order no. D10736	Dec. 18	2024
23	Compressor valve and packing maintenance   Order no. D10737	Oct. 30	2024
24	Capital parts maintenance   Order no. D10738	Oct. 16	2024
25	Emissions 101	Oct. 02	2024

Online  
webinar



Name | Order no. Date Location

# Knowledge Session

Session 1 - Getting to know | Order no. D10739

Apr. 15-16 2024 Sept. 30 - Oct. 01 2024	Vienna
Jan. 28-29 2024 Jul. 14-15 2024	Jubail
Feb. 05-06 2024 Aug. 26-27 2024	La Porte *
TBD contact your local sales	Malaysia

Session 2 - System knowledge | Order no. D10740

May 15-16 2024 Nov. 06-07 2024	Vienna
Feb. 27-28 2024 Aug. 13-14 2024	Jubail
Mar. 27-28 2024 Oct. 09-10 2024	La Porte *
TBD contact your local sales	Malaysia

Session 3 - Solving issues | Order no. D10741

Jun. 13-14 2024 Dec. 12-13 2024	Vienna
Apr. 22-23 2024 Sept. 11-12 2024	Jubail
Apr. 25-26 2024 Nov. 14-15 2024	La Porte *
TBD contact your local sales	Malaysia

One Week RECIP knowledge training | Order no. D10744

Mar. 06-10 2024	Australia
Oct. 07-11 2024	Australia

# Overhaul School

Theory and practice | Order no. D10742

Jan. 23-26 2024 Dec. 03-06 2024	Vienna
May 27-30 2024 Oct. 07-10 2024	Jubail
Feb. 27 - Mar. 01 2024 Aug. 13-16 2024	La Porte *
Feb. 27 - Mar. 01 2024 Jul. 09-12 2024 Oct. 23-24 2024	Singapore

Name | Order no. Date Location

# Training Academy

Theoretical training, practical knowledge, hands-on RECIP | Order no. D10743

Jan. 15-26 2024 Nov. 25 - Dec. 06 2024	Vienna
May 19-30 2024 Sept. 29 - Oct. 10 2024	Jubail
Feb. 19 - Mar. 01 2024 Aug. 05-16 2024	La Porte *

\* Spanish Edition available on request

## You want to book a training? Contact us or fill out the form

First name *	Last name *
<input type="text"/>	<input type="text"/>
Email *	Company *
<input type="text"/>	<input type="text"/>
Country *	Message *
<input type="text"/>	<input type="text"/>

\* GDPR Agreement

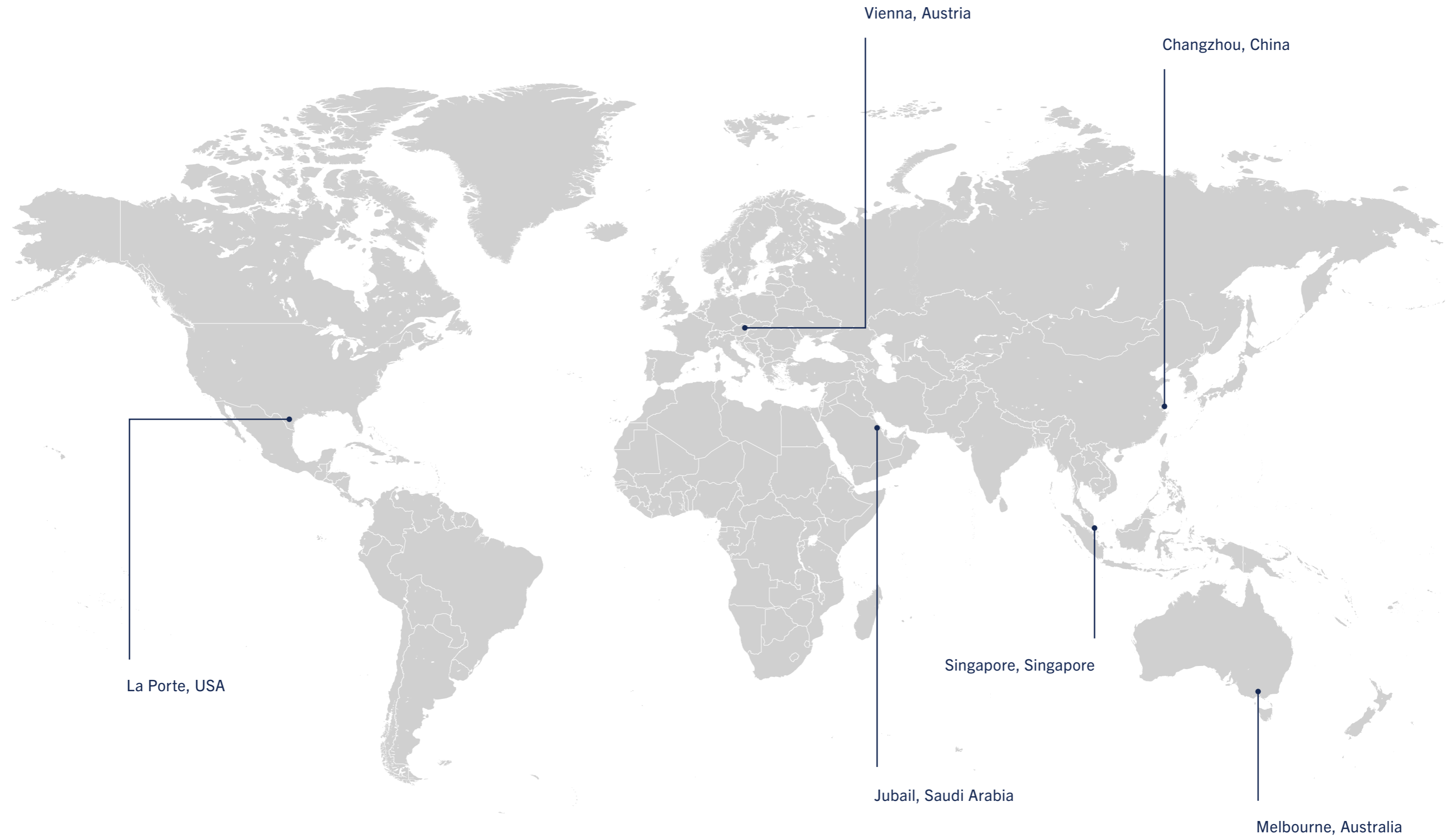
I consent to the transfer of this contact form and the storage of my personal information so that HOERBIGER can respond to my request.

See our privacy policy (<https://www.hoerbiger.com/dataprotection>) to learn more about how we use data.

**i** This file must be saved locally for editing and sending.

**SUBMIT**

# Our global training locations for you



La Porte, USA

Vienna, Austria

Changzhou, China

Singapore, Singapore

Jubail, Saudi Arabia

Melbourne, Australia



Scan for more information!



Contact us via email  
[c-globalmarketing@hoerbiger.com](mailto:c-globalmarketing@hoerbiger.com)



Scan for General Terms and  
Conditions for Customer Training

HOERBIGER is active throughout the world in the energy sector, the process industry, the automotive industry, the mechanical engineering sector, in safety engineering, and in the electrical industry. In 2022, its 5,726 employees achieved sales of 1.267 billion euros in 124 locations across 44 countries. Our products and services are used in reciprocating compressors, gas flow control units, vehicle drives, rotating unions, explosion protection, gas-powered engines, and in automobile hydraulics.

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