PROCESS GAS COMPRESSORS
COMPREHENSIVE API 618 COMPRESSOR PORTFOLIO

Compressors for a Lifetime®
BURCKHARDT COMPRESSION
OVER 170 YEARS OF KNOW-HOW AND EXPERTISE

OVER 170 YEARS OF EXPERIENCE
Burckhardt Compression is the worldwide market leader for reciprocating compressor systems and the only manufacturer and service provider that covers a full range of reciprocating compressor technologies and services. Its customized compressor systems are used in the upstream oil & gas, gas transport and storage, refinery, chemical, petrochemical and industrial gas sectors. Burckhardt Compression’s leading technology, broad portfolio of compressor components and the full range of services help customers around the world to find the optimized solution for their reciprocating compressor systems. Since 1844 its highly skilled workforce has crafted superior solutions and set the benchmark in the gas compression industry.

YOUR COMPRESSION SOLUTION PARTNER
As your partner, Burckhardt Compression supports you in all phases of your project. From the first idea until the end of your facility’s lifetime. We understand the different customer needs in terms of specification and cost-efficiency. Our gas compression experts support you in the selection and specification of the best Process Gas Compressor solution for your project.

We offer a complete range of API 618 Process Gas Compressor systems, from solutions with the highest possible availability and lowest life cycle costs to CAPEX-optimized systems, for all processes that require reciprocating compressors. In addition, our customers can benefit from a wide range of standardized sets and products based on decades of experience in industrial gas compression.

Online Portfolio:
www.recip.com/process-gas
MARKETS AND APPLICATIONS
FROM NATURAL GAS TO PROCESSING
APPLICATIONS AND INDUSTRIAL GASES

GAS TRANSPORT & STORAGE
Pipeline booster
Underground gas storage

REFINERY
Hydrocracking
Hydrotreatment
Hydrodesulphurisation
Fractionating
Reforming
Catalytic cracking
Dearomatisation
Isomerisation
Denitrogenation

GASES HANDLED (INCLUDING CORROSIVE, EXPLOSIVE AND TOXIC COMPOSITIONS)

- $\text{C}_4\text{H}_{10}$ BUTANE
- $\text{C}_2\text{H}_4$ ETHYLENE
- $\text{CH}_4$ METHANE
- Ar ARGON
- $\text{C}_3\text{H}_8$ PROPAINE
- $\text{C}_3\text{H}_6$ PROPYLENE
- CO$_2$ CARBON DIOXIDE
Petrochemical/Chemical Industry
- Polyolefins
- Aromatics/BTX
- Alcohols
- Ammonia
- Urea
- Polyethylene
- Ethylene oxide
- Ethylene glycol

Upstream Oil & Gas
- Gas processing
- Carbon capture & storage
- FPSO

Industrial Gases
- H₂ generation
- H₂ fuel station
- H₂ power-to-x
- H₂ cylinder/trailer filling
- Air separation
- Polysilicon production
- Biogas
TWO PRODUCT LINES
A COMPREHENSIVE PORTFOLIO

In addition to our premium B-Line API 618 Process Gas Compressors, which is specifically designed for lowest total cost of ownership (TCO). We offer a robust, modular and CAPEX-optimized API 618 Process Gas Compressors product line (M-Line). This enables Burckhardt Compression to offer a complete portfolio which covers the preferences of all our customers.

**B-LINE – PREMIUM & TCO-OPTIMIZED**

The Burckhardt Compression B-Line offers process gas compressors for most demanding and complex applications up to 1000 bar/14500 psi (lubricated) and 450 bar/6530 psi (non-lubricated) discharge pressure. The compressor, designed in Switzerland, is optimized to the customer’s process conditions in order to achieve longest possible lifetime and highest level of reliability.

**M-LINE – ROBUST & CAPEX-OPTIMIZED**

The Burckhardt Compression M-Line offers an extended range of compressors solutions, up to 200 bar/2900 psi (lubricated) and 70 bar/1015 psi (non-lubricated) discharge pressure. The modular compressor design enables cost-efficient engineering and manufacturing resulting in a capex-oriented compressor system. It is fully assembled and run-tested at our facilities in Switzerland or the U.S., according to API 618 requirements.

Burckhardt Compression has established a worldwide engineering organization with global processes, which enables us to benefit from synergies and competence centers around the world in order to offer the best product according to our customers’ specifications.
WORLDWIDE REFERENCES
RENNOWNED TECHNICAL EXPERTISE

1 Hydrogen, discharge pressure 120 bara (1'740 psia), non-lubricated 12'000 h operation without maintenance

2 Carbon dioxide, discharge pressure 235 bara (3'400 psia). Transcritical compression cycle

3 Ethylene, discharge pressure 288 bara (4'177 psia). Main stream Process Gas Compressor without a stand-by compressor due to its high availability

Guan Xinchun, Mechanical Maintenance Manager, CTM LDPE BASF-YPC Company Limited, Luhe District, Nanjing, China

“At our plant in Nanjing, we operate a Process Gas Compressor as booster/primary compressor with a piston diameter close to one meter, and a horizontal opposed reciprocating compressor (Hyper Compressor). Both units are crucial for the operation of our LDPE production plant. Safety, availability and reliability are the most important equipment requirements since the compressors are used within the main production line and we don’t have any stand-by units. We rely on Burckhardt Compression due to their high quality standards and their long-term experience in designing and manufacturing large reciprocating compressors”.

**B-LINE COMPRESSOR DESIGN**

**OPTIMIZED SOLUTION FOR HIGHEST AVAILABILITY AND EFFICIENCY**

**KEY COMPRESSOR COMPONENTS – FOR BEST PERFORMANCE AND LOWEST TOTAL COST OF OWNERSHIP**

**GUIDE RINGS**
- According to API 618
- Pressure relieved
- Very long lifetime
- Optimized mounting position

**PISTON RINGS**
- Decades of lubricated and non-lubricated experience
- Various own designs and materials for maximum durability
- Optimized wear compensation

**PISTON ROD PACKINGS**
- Applied technology based on decades of experience
- Heterogeneous systems allowing high pressure non-lubricated services
- Extremely high sealing efficiency and lifetime

**OIL SCRAPERS**
- Highly efficient oil removal
- Material selection according to specific application
- Long lasting design for minimum lube-oil consumption

**MAIN BEARINGS**
- Interchangeable with big-end bearings

**RUGGED DESIGN – FOR DURABILITY**

**LUBRICATION SYSTEM (NOT ILLUSTRATED)**
- According to API 618/614 or to customer requirements

**DISTANCE PIECES**
- Single- or two-compartment
- Vented
- Purged
- Pressurized

**CRANKSHAFT**
- Forged

**FRAME**
- Robust
- FEM optimized
PROCESS GAS COMPRESSORS

IN-HOUSE DESIGN AND MANUFACTURING – FOR RELIABILITY

BIG-END BEARINGS
- Interchangeable with main bearings

INTERMEDIATE PACKINGS
- Separates two-piece distance piece
- Purging and buffering

PISTONS
- Wide range of designs and materials

PISTON RODS
- Hardened
- Coated

CROSSHEADS
- One piece or with replaceable shoes

Cylinder LINER
- Service-friendly
- Easily replaceable
- Not shrink-fit

Cylinders
- Various designs and materials
- Replaceable liners

COMPRESSOR VALVES
- Burckhardt Plate Valve™
- Burckhardt Poppet Valve™
- Over 120 years of experience in design, manufacturing and service
- Selection and custom engineering according to application requirements
- Maximum durability due to in-house valve technology
B-LINE – TECHNICAL DATA
PERFORMANCE RANGE AND DIMENSIONS

PERFORMANCE RANGE

DIMENSIONS

<table>
<thead>
<tr>
<th>Type</th>
<th>Max. Speed rpm</th>
<th>Rated Power kW / hp</th>
<th>Max. Rod Load kN / lbs</th>
<th>Width mm / in</th>
<th>Height mm / in</th>
<th>Length mm / in</th>
<th>Cranks</th>
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Vertical 1, 2, 3 and 4 crank BY and BS compressors are also available as CY and CS.
M-LINE COMPRESSOR DESIGN
ROBUST SOLUTIONS FOR DEMANDING PROCESS GAS COMPRESSION

KEY COMPRESSOR COMPONENTS – FOR A CAPEX-OPTIMIZED COMPRESSION SOLUTION

GUIDE RINGS
– According to API 618
– Pressure relieved

PISTON RINGS
– Lubricated and non-lubricated piston rings

PISTON ROD PACKINGS
– Non-purged / purged
– Leak gas recovery
– Water cooled
– Rod drop sensor
– Temperature monitoring

OIL SCRAPERS
– Highly efficient oil removal
– Material selection according to specific application

MAIN BEARINGS
– Robust design

RUGGED DESIGN – FOR DURABILITY

LUBRICATION SYSTEM
(NOT ILLUSTRATED)
– According to API 618/614 or to customer requirements

DISTANCE PIECES
– Single- or two-compartment
– Vented
– Purged
– Drained

BASE PIECE
– Robust foundation-supported crosshead housing

CRANKSHAFT
– Forged
– Without oil hole structure
– Crankshaft-driven main lube oil pump

FRAME
– Robust
– FEM optimized
– Integrated lube oil reservoir
COMPRESSOR VALVES
- Burckhardt Plate Valve™
- Burckhardt Poppet Valve™
- Over 120 years of experience in design, manufacturing and service
- Selection and custom engineering according to application requirements
- Maximum durability due to in-house valve technology

INTERMEDIATE PACKINGS
- Separates two-piece distance piece
- Purging and buffering

CONNECTING RODS
- Die-forged
- Lubricated from crosshead side

CROSSHEADS
- Three-piece crosshead acc. to API 618
- Exchangeable crosshead shoes
- Easy access for inspection and maintenance

PISTONS
- Wide range of designs and materials

PISTON RODS
- Hardened
- Coated

CYLINDERS
- Various designs and materials
- Shrink fit liners

GLOBAL DESIGN AND MANUFACTURING – FOR RELIABILITY
M-LINE – TECHNICAL DATA
PERFORMANCE RANGE AND DIMENSIONS

PERFORMANCE RANGE

DIMENSIONS

<table>
<thead>
<tr>
<th>Type</th>
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<th>Rated Power kW / hp</th>
<th>Max. Rod Load kN / lbs</th>
<th>Width mm / in</th>
<th>Height mm / in</th>
<th>Length mm / in</th>
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ONLINE CONDITION MONITORING AND SIL3 MACHINE PROTECTION
MINIMIZE RISKS – MAXIMIZE UPTIME

MONITORING THE CRUCIAL PARTS

Preventing accidental breakdowns is vital. They can have serious consequences, such as risks for plant safety and the environment, production loss, expensive and time consuming repairs, etc.

Main measurements points for monitoring are:

- Vibration acceleration of crosshead
- Displacement of piston rod
- Crankshaft trigger for the crankshaft position
- Vibration velocity on crank gear
- Temperature and vibration acceleration on valves

WE RECOMMEND PROGNOST®

Burckhardt Compression recommends PROGNOST Systems – the technological leader in machine protection and online monitoring with more than 25 years of experience.

PROGNOST®-NT is an automated machinery diagnostic system incorporating SIL 3-certified and online condition monitoring. It has been developed specifically for reciprocating machinery and is also used for different kinds of rotating equipment. Its unique vibration signal segmentation detects impending failures at an very early stage and identifies the affected components. Operation-critical damages are avoided and maintenance work can be performed efficiently.
UNEQUALED SERVICE CAPABILITIES
FOR EVERY RECIPROCATING COMPRESSOR

REQUIREMENTS & SITUATION ANALYSIS
- Process Gas Compressor condition change
- Damaged parts/failure
- Worn out parts
- Troublesome parts
- Improved design to replacement parts with excessive wear
- Precarious or unsafe operating condition
- Maintenance or spare parts logistic scheduling

EVALUATION
- Root cause analysis/failure analysis
- Risk analysis
- Condition analysis
- Material analysis
- Feasibility studies
- FEA studies
- Non-destructive testing (NDT)
- Stock recommendations

ENGINEERING
- On-site, and/or in-house measurements of components
- Reverse engineering
- Retrofit
- Recalculation and dimensioning
- Engineering for repair procedures
- Material selection and sizing

MANUFACTURING
- Highest quality assurance
- In-house precision manufacturing of capital parts
- Fast track production upon request
- Reproduction (1:1 replacement incl. integration of latest quality standards)
- OEM guarantee

FIELD ACTIVITIES
- Extensive service network with our specialized field service engineers/troubleshooters
- Dismantling/Reassembly of parts
- Large parts stock
- Spare parts frame agreements
- Worldwide distribution and service center network
- Burckhardt e-shop™ spare parts identification and ordering system

INCORPORATING FULL DOCUMENTATION OF REQUIRED GUIDELINES AND STANDARDS (API 618/NACE ETC.) INCL. CERTIFICATION

INTERACTION WITH CUSTOMER REGARDING SPECIFICATIONS AND SCOPE OF WORK
INCORPORATING FULL DOCUMENTATION OF REQUIRED GUIDELINES AND STANDARDS (API 618/NACE ETC.) INCL. CERTIFICATION
YOUR SOLUTION PARTNER
FOR THE ENTIRE LIFE CYCLE OF COMPRESSOR SYSTEMS

COMPRESSOR COMPONENTS
BEST PERFORMANCE AND LONGEST LIFETIME

Compressor valves
Redura® rings & packings
Capacity control systems
Capital parts
Labyrinth piston compressor components
Hyper/secondary compressor components

SERVICES
THE FULL RANGE

Burckhardt Valve Service
Spare parts logistics
Field service
Technical support
Revamps & upgrades
Component repair
Condition monitoring & diagnostics
Training

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info@burckhardtcompression.com
www.burckhardtcompression.com

Compressors for a Lifetime®