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

GASES HANDLED (INCLUDING CORROSIVE, EXPLOSIVE AND TOXIC COMPOSITIONS)

C₄H₁₀ BUTANE
C₂H₄ ETHYLENE
CH₄ METHANE
Ar ARGON
C₃H₈ PROPANE
C₃H₆ PROPYLENE
CO₂ CARBON DIOXIDE

GAS TRANSPORT & STORAGE
Pipeline booster
Underground gas storage

REFINERY
Hydrocracking
Hydrotreatment
Hydrodesulphurisation
Fractionating
Reforming
Catalytic cracking
Dearomatization
Isomerisation
Denitrogenation
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

Hydrogen generation
Air separation
Gas cylinder filling
Polysilicon production
Biogas

CO CARBON MONOXIDE
N₂ NITROGEN
NH₃ AMMONIA
H₂ HYDROGEN
H₂S HYDROGEN SULPHIDE
Cl₂ CHLORINE
HCl HYDROGEN CHLORIDE
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 1’000 bar/14’500 psi (lubricated) and 500 bar/7’250 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/2’900 psi (lubricated) and 70 bar/1’015 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
RENOWNED TECHNICAL EXPERTISE

1 Hydrogen, discharge pressure 120 bara (1740 psia), non lubricated 12'000 h operation without maintenance

2 Carbon dioxide, discharge pressure 235 bara (3400 psia). Transcritical compression cycle

3 Ethylene, discharge pressure 288 bara (4177 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

PISTON RODS
- Hardened
- Coated

CROSSHEADS
- One piece or with replaceable shoes

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

BIG-END BEARINGS
- Interchangeable with main bearings

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

PISTON RODS
- Hardened
- Coated

CROSSHEADS
- One piece or with replaceable shoes

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

BIG-END BEARINGS
- Interchangeable with main bearings

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

PISTON RODS
- Hardened
- Coated

CROSSHEADS
- One piece or with replaceable shoes

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

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

IN-HOUSE DESIGN AND MANUFACTURING – FOR RELIABILITY

CROSSHEADS
- One piece or with replaceable shoes

PISTON RODS
- Hardened
- Coated

CYLINDERS
- Various designs and materials
- Replaceable liners

PISTONS
- Wide range of designs and materials
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>
</tr>
</thead>
<tbody>
<tr>
<td>BY</td>
<td>850</td>
<td>800 / 1’000</td>
<td>100 / 22’500</td>
<td>4’400 / 173</td>
<td>1’100 / 43</td>
<td>900 / 35</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1’500 / 59</td>
<td>4</td>
</tr>
<tr>
<td>BF</td>
<td>600</td>
<td>2’200 / 3’000</td>
<td>145 / 32’500</td>
<td>6’700 / 264</td>
<td>1’400 / 55</td>
<td>1’560 / 61</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2’300 / 91</td>
<td>4</td>
</tr>
<tr>
<td>BS</td>
<td>600</td>
<td>2’400 / 3’200</td>
<td>200 / 44’500</td>
<td>5’600 / 220</td>
<td>1’200 / 47</td>
<td>1’000 / 40</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2’150 / 84</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3’350 / 131</td>
<td>6</td>
</tr>
<tr>
<td>BX</td>
<td>520</td>
<td>5’400 / 7’200</td>
<td>350 / 79’000</td>
<td>7’750 / 305</td>
<td>1’390 / 54</td>
<td>890 / 35</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2’150 / 84</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3’390 / 133</td>
<td>6</td>
</tr>
<tr>
<td>BA</td>
<td>500</td>
<td>9’500 / 12’700</td>
<td>550 / 124’000</td>
<td>8’000 / 314</td>
<td>1’390 / 54</td>
<td>1’000 / 40</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2’800 / 110</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4’600 / 181</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6’400 / 251</td>
<td>8</td>
</tr>
<tr>
<td>BC</td>
<td>450</td>
<td>16’000 / 21’700</td>
<td>900 / 200’000</td>
<td>9’500 / 374</td>
<td>1’600 / 63</td>
<td>1’500 / 59</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3’500 / 138</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5’500 / 216</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7’500 / 295</td>
<td>8</td>
</tr>
<tr>
<td>BE</td>
<td>429</td>
<td>31’000 / 42’100</td>
<td>1’700 / 382’000</td>
<td>11’500 / 453</td>
<td>1’900 / 75</td>
<td>1’800 / 70</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4’000 / 158</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6’200 / 244</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8’800 / 347</td>
<td>8</td>
</tr>
</tbody>
</table>

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

GLOBAL DESIGN AND MANUFACTURING – FOR RELIABILITY

CONNECTING RODS
- Die-forged
- Lubricated from crosshead side

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

PISTON RODS
- Hardened
- Coated

CYLINDERS
- Various designs and materials
- Shrink fit liners

PISTONS
- Wide range of designs and materials

CROSSHEADS
- Three-piece crosshead acc. to API 618
- Exchangeable crosshead shoes
- Easy access for inspection and maintenance
M-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>
</tr>
</thead>
<tbody>
<tr>
<td>MQ</td>
<td>500</td>
<td>600 / 805</td>
<td>65 / 14'600</td>
<td>6'100 / 240</td>
<td>1'200 / 47</td>
<td>1'100 / 43</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2'300 / 90</td>
<td>4</td>
</tr>
<tr>
<td>MY</td>
<td>428</td>
<td>1'100 / 1'475</td>
<td>100 / 22'500</td>
<td>6'800 / 268</td>
<td>1'900 / 75</td>
<td>2'400 / 94</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3'700 / 146</td>
<td>4</td>
</tr>
<tr>
<td>MF</td>
<td>428</td>
<td>1'300 / 1'743</td>
<td>120 / 27'000</td>
<td>7'200 / 283</td>
<td>1'900 / 75</td>
<td>2'600 / 102</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4'300 / 169</td>
<td>4</td>
</tr>
<tr>
<td>MS</td>
<td>450</td>
<td>1'600 / 2'145</td>
<td>160 / 36'000</td>
<td>7'100 / 279</td>
<td>1'500 / 59</td>
<td>1'300 / 51</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2'900 / 114</td>
<td>4</td>
</tr>
<tr>
<td>MX</td>
<td>420</td>
<td>5'400 / 7'242</td>
<td>320 / 72'000</td>
<td>8'600 / 339</td>
<td>2'000 / 78</td>
<td>1'500 / 59</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3'400 / 133</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5'600 / 220</td>
<td>6</td>
</tr>
<tr>
<td>MA</td>
<td>333</td>
<td>5'550 / 7'445</td>
<td>450 / 101'000</td>
<td>9'500 / 374</td>
<td>1'900 / 75</td>
<td>3'100 / 122</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5'500 / 217</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7'900 / 312</td>
<td>6</td>
</tr>
<tr>
<td>MC</td>
<td>333</td>
<td>8'325 / 11'165</td>
<td>800 / 180'000</td>
<td>9'800 / 386</td>
<td>2'200 / 87</td>
<td>3'500 / 122</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5'900 / 232</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8'400 / 331</td>
<td>6</td>
</tr>
<tr>
<td>MW</td>
<td>333</td>
<td>16'200 / 21'725</td>
<td>1'240 / 278'800</td>
<td>11'000 / 433</td>
<td>2'200 / 87</td>
<td>4'000 / 157</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6'800 / 268</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9'600 / 378</td>
<td>6</td>
</tr>
</tbody>
</table>
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.
UNEQUALLED 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
Burckhardt Compression AG
CH-8404 Winterthur
Switzerland
Tel.: +41 52 262 55 00
Fax: +41 52 262 00 51
24-hour emergency tel.: +41 52 262 53 53
info@burckhardtcompression.com
www.burckhardtcompression.com