

ENGINEERING & REVAMP PROJECTS, COMPRESSOR MODERNIZATIONS

FOR RECIPROCATING COMPRESSORS,
COMPRESSOR SYSTEMS AND AUXILIARY EQUIPMENT





DECADES OF EXPERIENCE IN RECIPROCATING COMPRESSOR SYSTEMS ENABLE US TO PROVIDE SUPERIOR SOLUTIONS FOR LOWEST LIFE CYCLE COSTS OF YOUR EQUIPMENT.

RELIABLE SOLUTIONS FOR NEW OPERATING CONDITIONS

YOUR COMPRESSOR SYSTEM ADJUSTED TO THE EVER CHANGING REQUIREMENTS

COMPRESSORS FOR A LIFETIME

Burckhardt Compression is one of the market leaders in the field of reciprocating compressors and the only manufacturer that offers a complete range of Process Gas Compressors API 618, Laby® (labyrinth piston), Laby®-GI and Hyper Compressors. As a compressor OEM with more than 170 years of experience, we are committed to innovative solutions for highest reliability and lowest life cycle costs for new or modified compressor systems. Burckhardt Compression is predestined to support you in any adjustments to changing requirements.

Compressor systems are an integral part of the surrounding production process. Throughout the entire lifetime the requirements a compressor system must meet keep changing. We make sure your compressor meets the latest requirements guaranteed.

CHANGING REQUIREMENTS – SUPERIOR SOLUTIONS

Decades of expert knowledge in a wide range of compressor applications enable us to provide:

- Comprehensive expertise
- Profound review of the requirements
- Thorough planning including proficient feasibility studies

Our dedicated team approaches every revamp project with the support of our in-house experts for design and manufacturing of new compressors. We incorporate up-to-date technologies where appropriate and provide a guarantee on our solutions.



MARKETS & SEGMENTS SERVED

- Upstream oil & gas
- Gas transport & storage
- Refinery
- Petrochemical/Chemical industry
- Industrial gases
- Food & beverage industry
- Wood & charcoal industry
- Mining industry
- Power stations
- Hydro-electric power plants
- Nuclear power plants

RECIPROCATING COMPRESSOR SYSTEMS

OEM WITH MORE THAN 170 YEARS OF EXPERIENCE IN DESIGNING AND MANUFACTURING COMPRESSOR SYSTEMS

MORE THAN JUST COMPRESSORS

Any kind of modification of a compressor system or parts of it requires the comprehensive evaluation of the entire system and processes including auxiliary equipment.

Depending on the new or changing requirements, the condition of your equipment and security and environmental regulations, we start the process with an extensive assessment of the situation.

Precise project planning in close cooperation with customers and with a focus on cost and time efficient completion is the basis for reliable execution.

Incorporating state of technology material, design and manufacturing improvements, reliability, availability and efficiency can be increased.

The aim of our activities is a comprehensive system solution that meets all customer requirements, incorporating lifetime extension, reduction of the maintenance costs of the renewed equipment, the on time finalization of the project and continuation of the plant production.

OUR INNOVATIVE SOLUTIONS WILL PROVIDE A SECOND LIFE FOR YOUR WELL ESTABLISHED EQUIPMENT

COMPRESSOR COMPONENTS

- Wear and capital parts
- Compressor valves
- Redura® rings and packings
- Capacity control systems
- Bearings
- High pressure equipment

VESSELS AND STEELWORK

- Dampers/separators
- Absorbers/drain systems
- Coolers/heat exchangers
- Piping (pre-fabricated/loose)
- Tubing
- Filters/strainers
- Pipe supports
- Platforms

SKID UNITS

- Oil supply units
- Cooling water units
- High pressure lubrication pump units
- Skid packaging

AUXILIARY VALVES

- Safety valves
- Control valves
- Process valves
- Manual valves

DRIVE SYSTEMS

- Electric motors (high voltage/low voltage)
- Frequency converters
- Gear boxes
- Belt drive systems
- Coupling systems

ELECTICAL, INSTRUMENTATION & CONTROL

- Control cabinets
- Local instrument boards
- Instrumentation/hook-ups
- Software
- Cabling
- Pressure, temperature, flow, level and vibration indication
- PLC programming

MONITORING & DIAGNOSTICS SYSTEMS

- Compressor control systems
- Monitoring and diagnostics safety systems
- Machinery protection systems
- Early warnings and trend analysis

ON-SITE SERVICES

- Site coordination
- Technical and electrical supervision
- Special tools
- Back-office support
- Turn-key projects
- Reciprocating compressor specialists



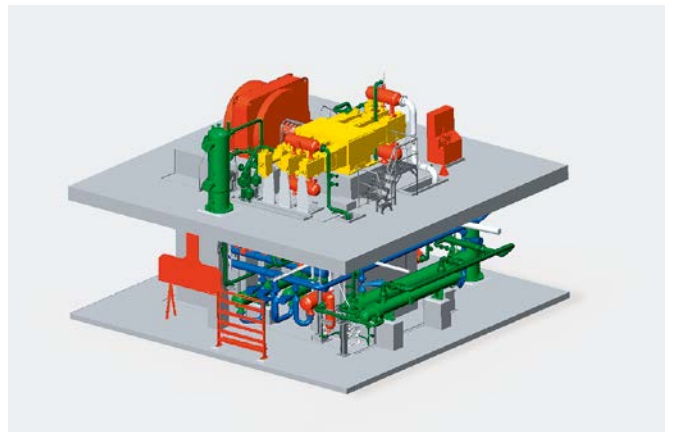
**COMPREHENSIVE REQUIREMENTS
REVIEW AND PROJECT PLANNING
UTILIZING SOPHISTICATED ANALYSIS
AND SIZING TOOLS**



**EFFICIENT EXECUTION –
PROFESSIONAL
PROJECT MANAGEMENT**

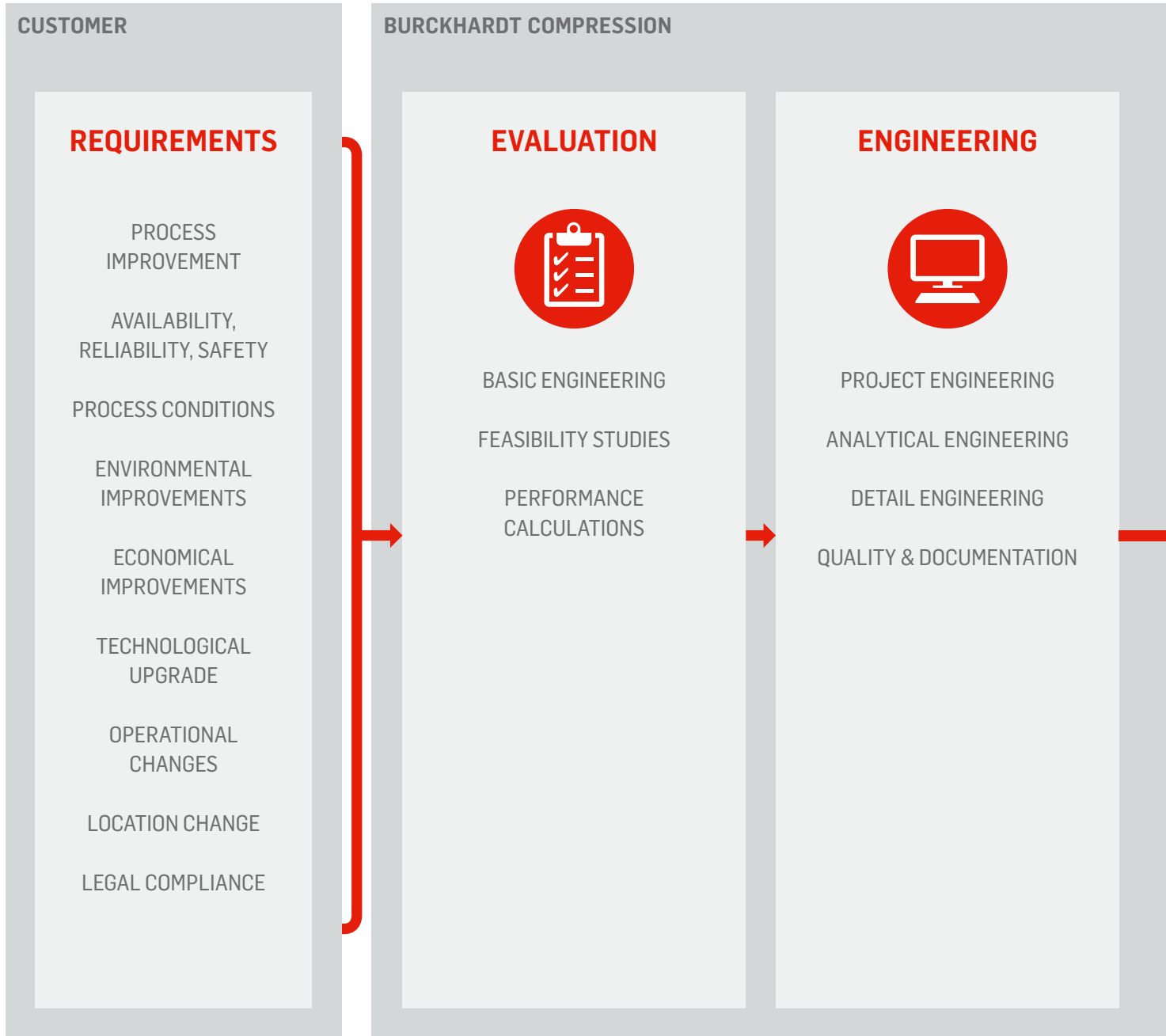


**ON SCHEDULE
PROJECT FINALIZATION –
ENSURING DEPENDABLE
CONTINUATION OF
PLANT PRODUCTION**



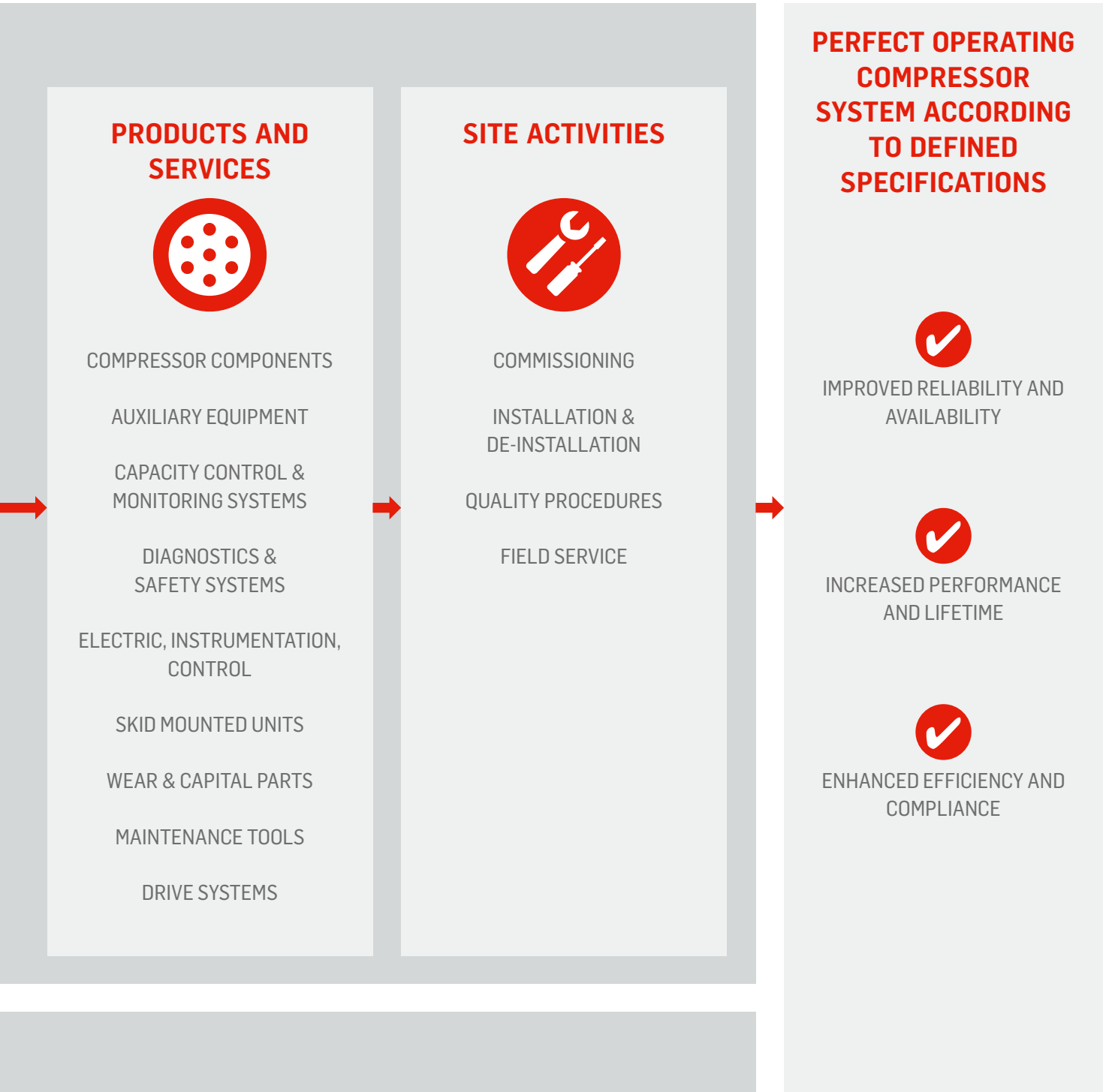
STANDARD PROCESSES

OUR WELL ESTABLISHED METHODS FOR MEETING YOUR REQUIREMENTS



A SOLID FOUNDATION FOR SUCCESSFUL PROJECTS

CONSTANT INTERACTION ADDS TRUST BETWEEN CUSTOMER AND BURCKHARDT COMPRESSION



DETAILED REQUIREMENT EVALUATION

PROFOUND ANALYSIS OF OPERATIONAL AND FINANCIAL IMPLEMENTATION EFFICIENCY FOR ULTIMATE PLANNING RELIABILITY

In order to provide optimally engineered solutions to meet the new system requirements, skilled reciprocating compressor professionals use our vast in-house expertise as a leading compressor OEM to provide highest planning reliability.

In close collaboration with clients we draw up detailed, customized solutions based on the plant production planning and scheduling to ensure efficient execution and on-time project completion.

EVALUATION PROCEDURES

- Feasibility check of new demands (incl. risk analysis)
- Compressor and plant assessments
- Failure analysis
- Material tests and analysis
- Oil test (pump ability)
- Proposals for suitable modification, upgrade and technical improvement options for: auxiliary equipment, drive system, control systems, monitoring systems, compressor components and technology
- Project and quality evaluation

USEFUL TECHNICAL INFORMATION

CUSTOMER INFORMATION	COMPRESSOR INFORMATION	PROCESS INFORMATION	QUOTATION INFORMATION	QUOTATION DOCUMENTS
CUSTOMER CONTACT	COMPRESSOR DESCRIPTION – No. of stages, – Horizontal, vertical	OPERATION CONDITION – Design data – Old/new	QUOTATION TYPE – Budget offer – Firm quote – Assessment – Study	INFORMATIONAL DOCUMENTS – P&I diagram – Process description – Maintenance records
PLANT LOCATION	– Lubricated, nonlubricated – Compressor speed – Motor power	GAS ANALYSIS – Design data	QUOTATION REASON – Revamp – Modernization – Retrofit – Relocation – Turnkey application – Spare requirement	– Compressor manual – Photos – Data sheets – Compressor data forms – Circuit diagrams – Logic diagrams – Control description
RESPONSIBILITIES	MANUFACTURER	LICENSER PROCESS – Design		
	SERIAL NO.			
	COMPRESSOR TYPE			
	GEOMETRICAL INFORMATION – Piston diameter – Stroke – Crankshaft – Piston rod dimensions			
	CAPACITY CONTROL SYSTEMS			
	FUNCTIONAL DESCRIPTION			
	COMPRESSOR CONTROL			

COMPREHENSIVE ENGINEERING SERVICES

IN-HOUSE SIZING AND ANALYSIS COMPETENCE FOR ANY RECIPROCATING COMPRESSOR

Burckhardt Compression has over 40 years of in-house experience in the field of structural analysis. With our latest in-house developed sophisticated sizing and analysis tools, we are able to provide mechanical and structural analysis of components as well as of entire compressor systems, particularly if operating conditions change or an increase in capacity is planned.

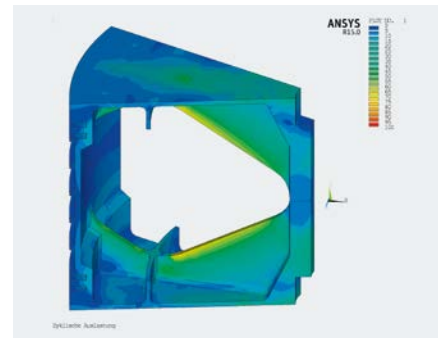
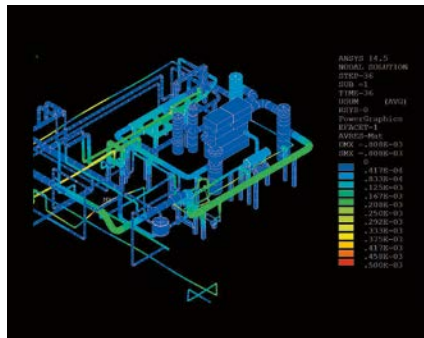
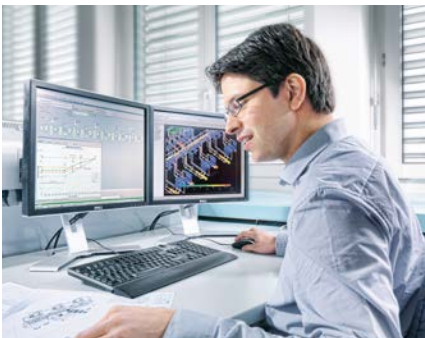
OUR IN-HOUSE COMPETENCE

DETAIL ENGINEERING

- P&I diagrams/isometric drawings
- General arrangements/foundation drawings
- Circuit diagrams, terminal diagrams, interface diagrams, logic diagrams, connecting diagrams, hardwired lists
- Instrument lists
- 3D modelling (plant, compressor)
- IOM (instructions and operational manual)
- Document management
- Project schedule

ANALYTICAL ENGINEERING

- Compressor performance calculations with RecipCalc™ (thermodynamic)
- Valve performance optimization
- Impact on foundation (forces and moments)
- Torsional analysis
- Pulsation and vibration studies
- Finite element analysis (FEA) studies



REVAMP

REJUVENATE OR TUNE YOUR COMPRESSOR SYSTEM

Changes to a compressor and/or compressor system for operational, technological, economical or environmental reasons, which can combine activities such as:

- Debottlenecking
- Capacity change
- Reapplications
- Modernizations

DEBOTTLENECKING

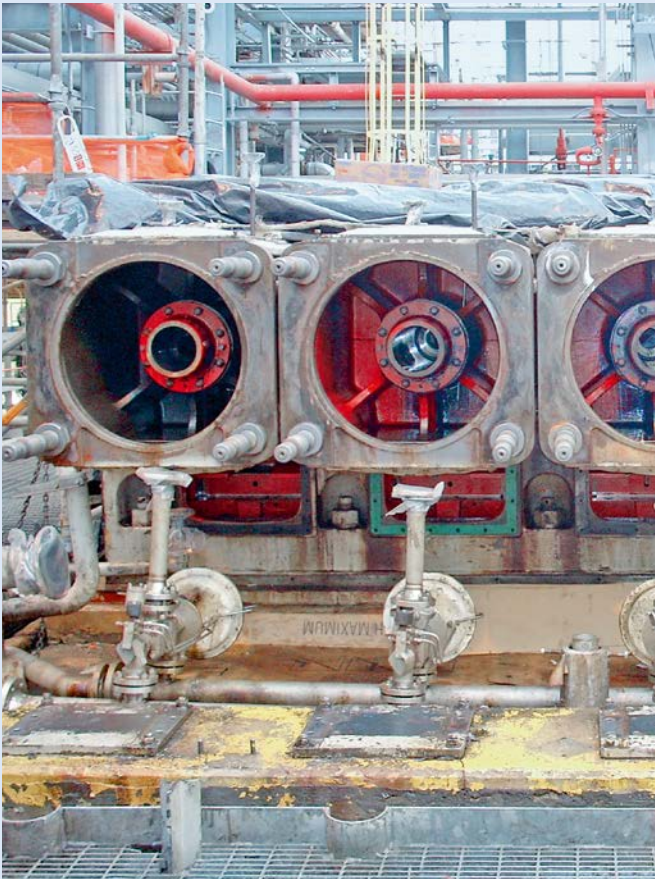
Changes to a compressor and/or compressor system to fit to new design or operation parameters and eliminate compressor system limitations; work performed includes theoretical calculations, size simulations and feasibility check/studies.

CAPACITY CHANGE

Changes to a compressor and/or compressor system to increase or decrease the output of an existing product/machine.

REAPPLICATION

Changes to a compressor and/or compressor system to meet revised process parameters.



CASE

Compressor type: Hyper Compressor
(10 Cylinder)

Application: Low-density polyethylene
production

Year of installation: 1978

SITUATION/CUSTOMER REQUIREMENTS

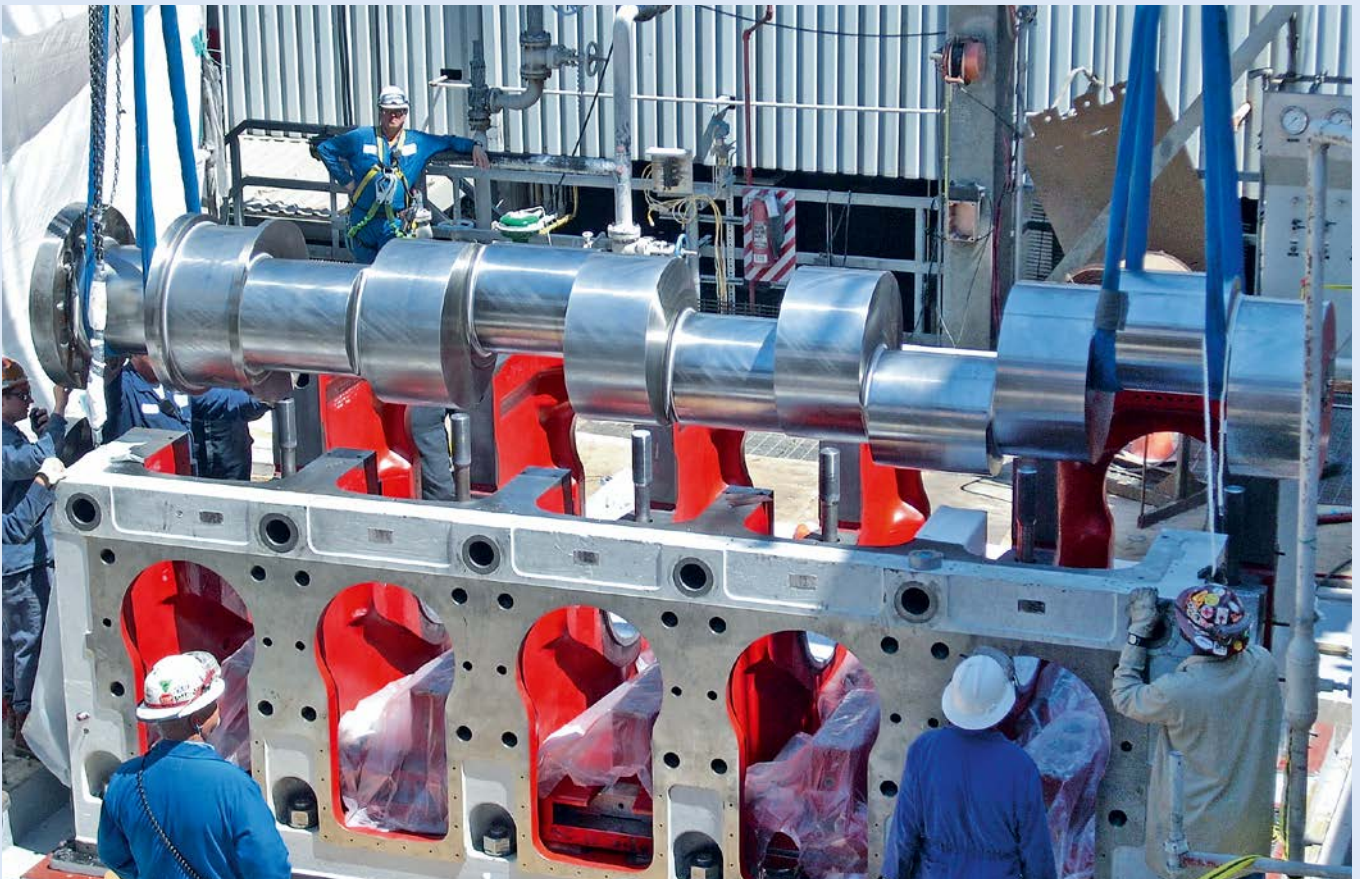
- Original foundation (provided by 3rd party) without oil resistant protection. Movement of the system led to damage of foundation
- Replacement of the damaged foundation and a complete revamp of the compressor system was required

SCOPE OF SUPPLY AND SERVICE

- Complete disassembling of compressor and connections
- Removal of old foundation and replacement with new, state of the art foundation
- Local refurbishment of entire compressor, motor and auxiliaries
- Concurrent coordination of all necessary suppliers and services

TECHNICAL HIGHLIGHTS

- Heavy duty equipment combined with high precision execution
- Highly accurate machining of large parts (e.g. crankcase)



MODERNIZATION

NEW LIFE – ENHANCED RELIABILITY

Upgrade, optimization, adjustment and/or modification of a compressor and/or a compressor system to state-of-the-technology for both software and hardware.

UPGRADE

Exchange of components or system for a state-of-the-art solution.

OPTIMIZATION

Changes to a compressor, compressor system and/or components to optimize conditions such as utility consumption, availability or extended lifetime.

ADJUSTMENT

Adjustment to a compressor and/or compressor system to meet legal requirements and regulations.

MODIFICATION

Quality and/or design improvement for compressor and/or compressor system parts.



CASE

Compressor type: Process Gas Compressor (2 cranks)

Application: Hydrogen in refinery

Year of installation: 1982

SITUATION/CUSTOMER REQUIREMENTS

- Increase reliability and availability of plant, which requires a modernization of old compressors

SCOPE OF SUPPLY AND SERVICE

- Service provided in immediate action
- Reconstruction work based on old, intensively used parts
- Complete dismantling of compressor, inspection (incl. NDT), cleaning, sand blasting and repair of the used parts

- Provided state-of-the-art components such as: bearings, cross heads & pins, additional distance pieces and crankshaft, complete cylinders incl. rings & packings, liners, valves etc.
- Reassembly of the complete compressor, incl. all new, modernized parts, piping on the compressor, painting and mechanical test run
- All engineering activities (including project management, design & manufacturing, documentation, quality services etc.)

TECHNICAL HIGHLIGHTS

- Successful combination of refurbished parts and new state-of-the-art components
- Complete modernized system solution



RETROFIT/REVERSE ENGINEERING

PERFECTLY ADAPTED COMPONENTS – IMPROVED QUALITY

Replication and substitution of existing components with components of original design and latest quality standards.

CASE

Compressor type: Process Gas Compressor, Non-Burckhardt Compression model

Application: Low-density polyethylene production

Year of installation: 1974

SITUATION/CUSTOMER REQUIREMENTS

- Fretting of bearing shell of connecting rod
- Investigate cause of fretting
- Provide appropriate solution

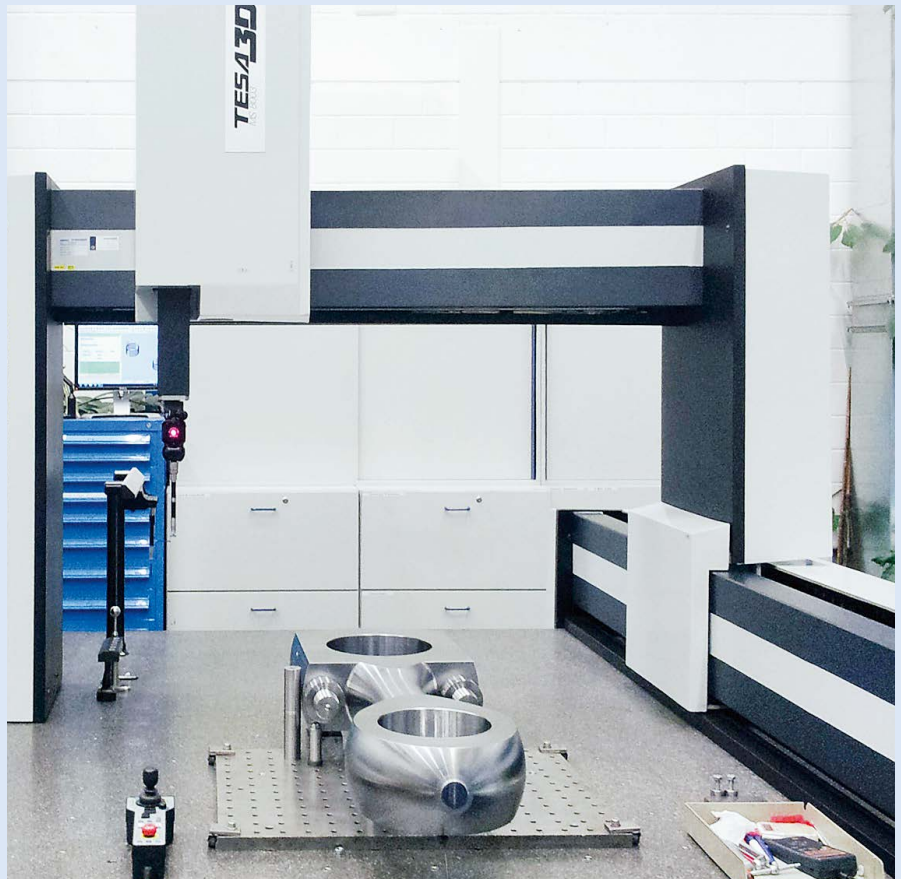
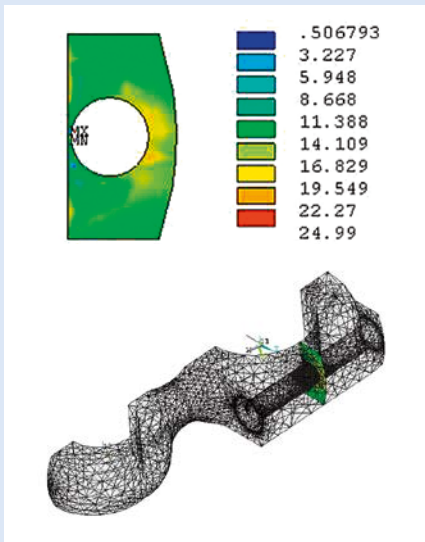
SCOPE OF SUPPLY AND SERVICE

- Scanning of existing parts without any documentation
- Redraw the complete connecting rod based on available information and on measurements

- Finite element study resulted in increased tightening to provide the correct pretension
- Material analysis and recommendations for improvements
- Specification of manufacturing and testing procedures
- Engineering, manufacturing and delivery of connecting rods

TECHNICAL HIGHLIGHTS

- Capital part manufacturing without existing original drawings
- Original part had to be measured to obtain the missing dimensions
- Complete modernized system solution



RELOCATION

A NEW LOCATION FOR YOUR WELL ESTABLISHED EQUIPMENT

Move and fit a compressor and/or a compressor system to a new location.

CASE

Compressor type: Laby® Compressor (3 cranks)

Application: Linear low-density polyethylene production

Year of installation: 2012

SITUATION/CUSTOMER REQUIREMENTS

- Move an existing compressor system to a different location
- In addition, evaluate and provide necessary changes to meet higher working pressure

SCOPE OF SUPPLY AND SERVICE

- Recalculation and exchange of equipment according to process parameters
- Revision and exchange of electrical components incl. new main motor
- Relocation of the entire equipment

TECHNICAL HIGHLIGHTS

- Foundation planning with new and old equipment
- Meet new legal requirements with old machine (CE, PED, ATEX)



REPLACEMENT NEW TECHNOLOGIES – IMPROVED LIFETIME

Exchange of compressor and/or compressor system with state-of-the-art solutions.

CASE

Compressor type: Laby® Compressor (4 cranks)

Application: Boil-off-gas handling

Year of installation: 1988

SITUATION/CUSTOMER REQUIREMENTS

- Replacement of old, purged control panels while ensuring dependable continuation of plant availability

SCOPE OF SUPPLY AND SERVICE

- Engineering of hardware and software
- 4 new installed compressor panels (including software package)
- 1 new installed cooling water panel (two old water panels combined in one)
- Panels nitrogen purged
- Complete set of documentation and quality certificates

TECHNICAL HIGHLIGHTS

- Successful on-site installation with short time slots between loading and unloading phases



TURN-KEY PROJECT

ONE SOURCE FOR YOUR COMPLETE SOLUTION

Solutions provided with sole responsibility for the complete execution of the contractually specified scope of works from the planning to the commissioning activities.

CASE

Compressor type: 3x Hyper Compressor (6 cylinder), Non-Burckhardt Compression model

Application: Low-density polyethylene production

Year of installation: 1978

SITUATION/CUSTOMER REQUIREMENTS

- Increase reliability and availability of compressors
- Turn-key solution for three lines of non-BC Hyper Compressors

SCOPE OF SUPPLY AND SERVICE

- Calculation and adaption of the system to new process parameters
- Engineering of new installed and revised

components

- Dismantling, revision, reassembly and commissioning of the compressor lines according to local regulations
- Partial replacement of components by new state-of-the-art technology
- Site installations in three steps (slot of 24 days for each compressor)
- Transport, storage and conservation of materials
- Coordination of local sub-suppliers and flexible planning of manpower, infrastructure and logistics

TECHNICAL HIGHLIGHTS

- Heavy duty equipment combined with high precision execution
- Flexible process adaptation to situation on site



ENGINEERING & REVAMP PROJECTS

WELL-DEFINED ACTION PLANS FOR SUPERIOR SOLUTIONS

REVAMP

DEBOTTLENECKING
CAPACITY CHANGE
REAPPLICATION

Changes to a compressor and/or compressor system for operational, technological, economical or environmental reasons, which can combine activities such as: debottlenecking, capacity change reapplications and even modernizations.

RETROFIT/REVERSE ENGINEERING

Replication and substitution of existing components with components of original design and latest quality standards.

RELOCATION

Move and fit a compressor and/or a compressor system to a new location.

MODERNIZATION

UPGRADE
OPTIMIZATION
ADJUSTMENT
MODIFICATION

Upgrade, optimization, adjustment and/or modification of a compressor and/or a compressor system to state-of-the-technology for both software and hardware.

REPLACEMENT

Exchange of compressor and/or compressor system with state-of-the-art solutions.

TURN-KEY PROJECT

Solutions provided with sole responsibility for the execution of all contractually specified scope of works from the planning to the commissioning activities.



**WITH OUR WELL ESTABLISHED PROCESSES
WE ACCOMPLISH OPTIMIZED REVAMP SOLUTIONS
ACCORDING TO DEFINED SPECIFICATIONS
PROVIDING:**

- IMPROVED RELIABILITY AND AVAILABILITY**
- INCREASED PERFORMANCE AND LIFETIME**
- ENHANCED EFFICIENCY AND COMPLIANCE**

**WITH OUR IN-HOUSE
EXPERTISE WE KEEP ANY
COMPRESSOR RUNNING
ENDLESSLY**



COMPRESSOR OEM WITH
MORE THAN 170 YEARS OF
EXPERIENCE



EFFICIENT EXECUTION
FOR ON SCHEDULE PLANT
AVAILABILITY



CUSTOMIZED SOLUTIONS
WITH OEM WARRANTY

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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