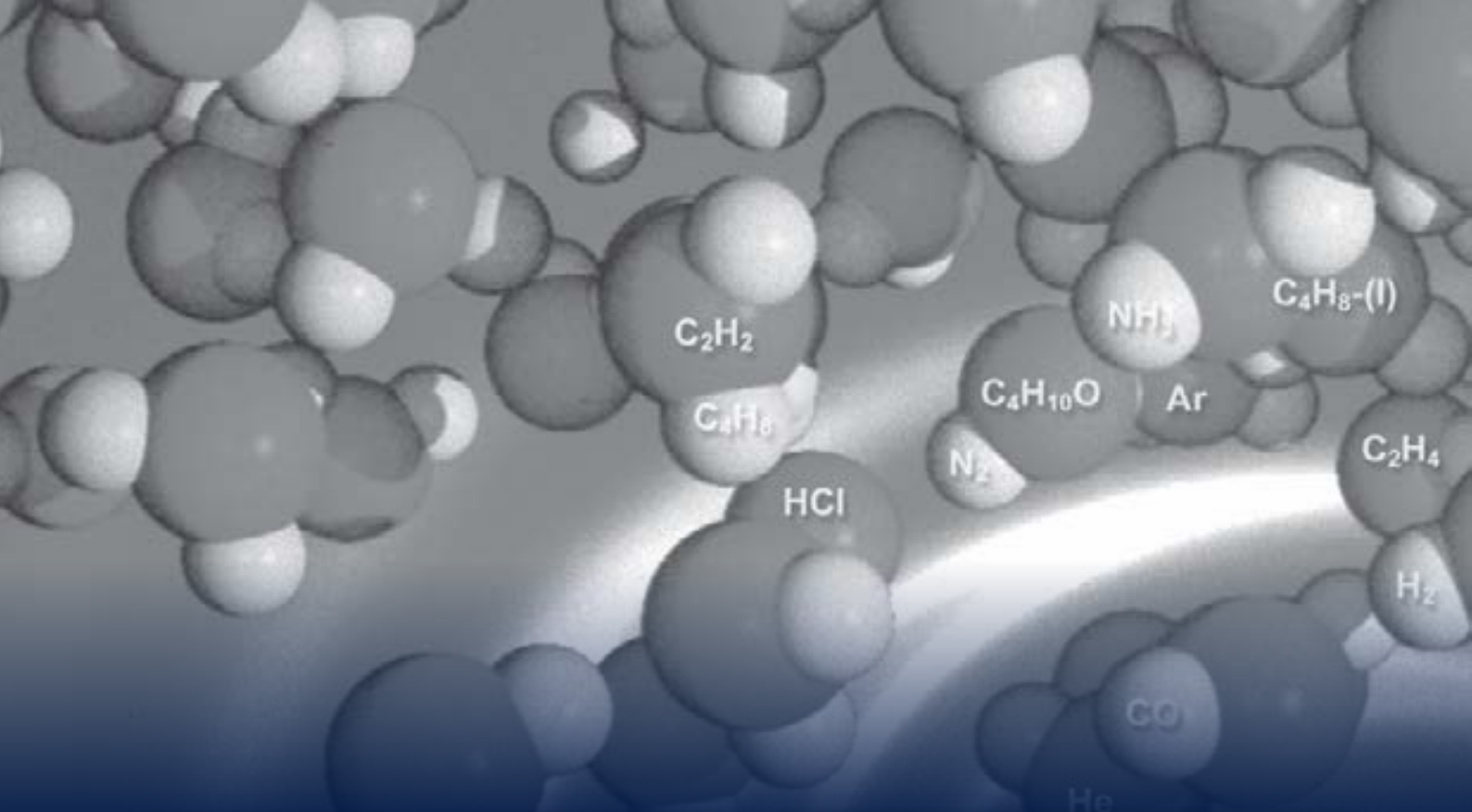




NEUMAN & ESSER
PROCESS GAS COMPRESSORS



WELL-FOUNDED AND GLOBAL

The experience of NEUMAN & ESSER in designing and constructing reciprocating compressors is just as profound, far-reaching and extensive as the years of operation of the enterprise itself since its foundation in the year 1830.

The whole "life cycle" of a process gas compressor is supervised by NEUMAN & ESSER GROUP, from the first "stroke of the pen" to the start-up commissioning and through its whole operating period. A typical life time of a NEA compressor comprises the following stages: analysis • solution proposal • design and engineering • manufacturing • testing • installation • commissioning and start-up • maintenance, and upon request, adjustment to modified process parameters.

The individual steps of the process are supported by digital simulations and are put into effect by means of adjusted IT solutions. Diagnostic and monitoring systems record and analyze the technical data during the operating period. Notwithstanding the number of techniques used, great importance is attached to the personal experience of the NEA engineers, which often is based on decades of practice and is decisive for the longevity of a compressor.

Clients of the chemical and petrochemical industry confirm that longevity is the key feature of a NEA compressor, built to API 618 or ISO 8012 standards. This not only applies to the lubricated design, but also to the dry-running one. For over 70 years, the NEA compressor has had a leading role as a highly developed dry-running unit. The technology and strategy of the enterprise were adjusted to market demands requiring absolutely oil-free compression.

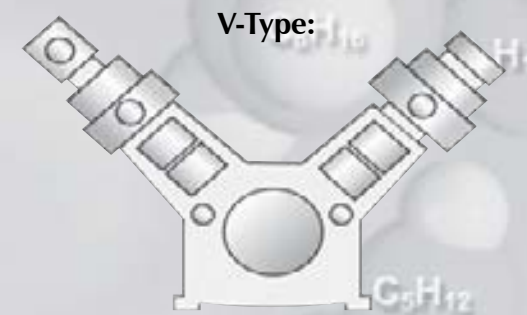
When leaving the workshop, the uniquely constructed NEA compressor is provided with a quality certificate. If requested by the client, the bare compressor can be completed as a packaged unit by one of the international NEA sales and engineering companies. This global engineering net, having special knowledge and experience in flexible order handling, guarantees the operating admission of the compressor plant, taking into consideration the legal and regulatory standards of each country. The world-wide presence of service centers warrants a high reliability and economic efficiency of each unit with its tailor-made service packages.

Experience



THE NEA PORTFOLIO

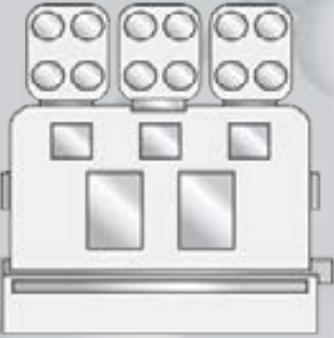
frame size	-	25	40	V1	30	63	130	190	300	320	500	320hs	Key to type designation: 4SVL190
cylinder lubrication	-	S,T	S,T	S,T	S,T	S,T	S,T	S,T	S,T	S,T	S,T	S,T	4-stage, lube 4-crank horiz. reciprocating compressor size 190
max. stroke	mm inches	150 5.9	100 3.9	120 4.7	110 4.3	170 6.7	200 7.9	230 9.1	270 10.6	350 13.8	450 17.7	175 6.9	4 — number of stages 1-8 S = lube T = non lube
max. rod load	kN	25	40	110	80	150	250	380	560	860	1700	470	V — number of cranks 1-8 (E-Z-D-V-S-A) L — S = vertical L = horizontal V = V-type
construction type	-	S	S	V	SL	SLV	SLV	SL	SL	SL	L	L	190 — frame size
max. power	kW hp	150 200	120 160	660 890	1440 1900	2700 3600	4500 6000	6840 9200	10080 13500	15480 20800	30600 41000	8460 11300	



V-Type:

- balanced mass forces 1st order
- horizontal mass forces only 2nd order
- less space required • low foundation loads
- oil-free or lubricated design

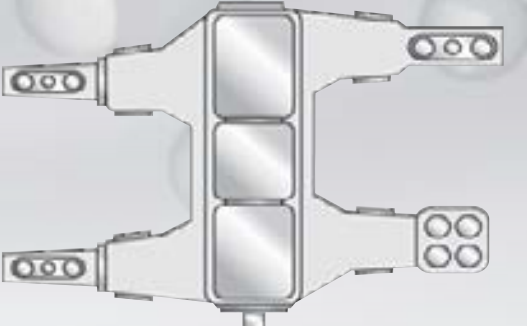
number of cranks: 1, 2
number of stages: 1 to 4
discharge pressures: max. 6,000 psi
power range: max. 1,500 hp
flow rates: max. 2,400 scfm



Vertical Type:

- most suitable for dry-running operation because of minor wear of the guide elements only
- appropriate for labyrinth compression for more precise guidance of piston and piston rod
- oil-free or lubricated design

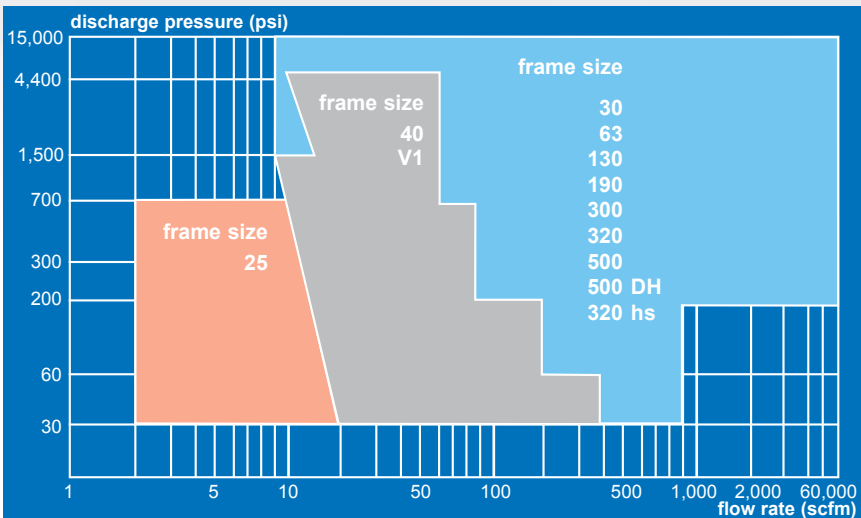
number of cranks: 1, 2, 3, 4
number of stages: 1 to 8
discharge pressures: max. 15,000 psi
power range: max. 20,800 hp
flow rates: max. 30,000 scfm



Horizontal Type:

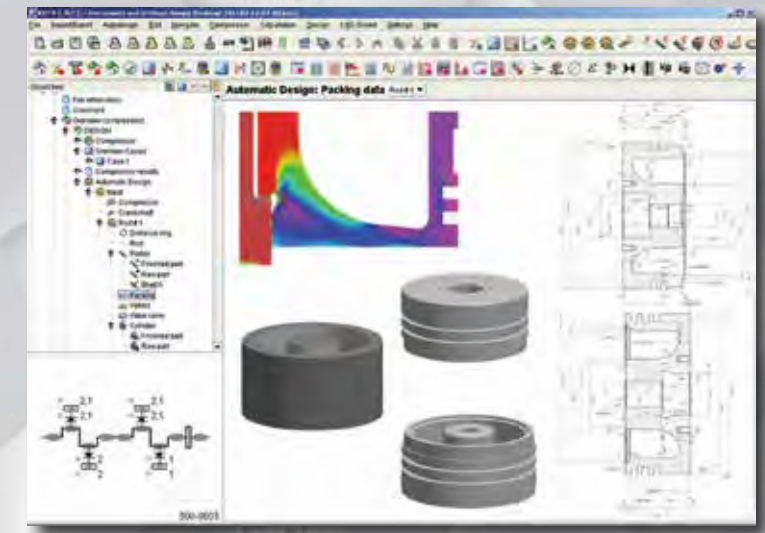
- balanced mass forces • excellent quietness in running
- low foundation loads • short maintenance time due to very good accessibility
- oil-free or lubricated design

number of cranks: 2, 4, 6, 8
number of stages: 1 to 8
discharge pressures: max. 15,000 psi
power range: max. 41,000 hp
flow rates: max. 60,000 scfm
 max. 100,000 Nm²/h



Models

SIMULATIONS FOR LONG-LIFE OPERATION

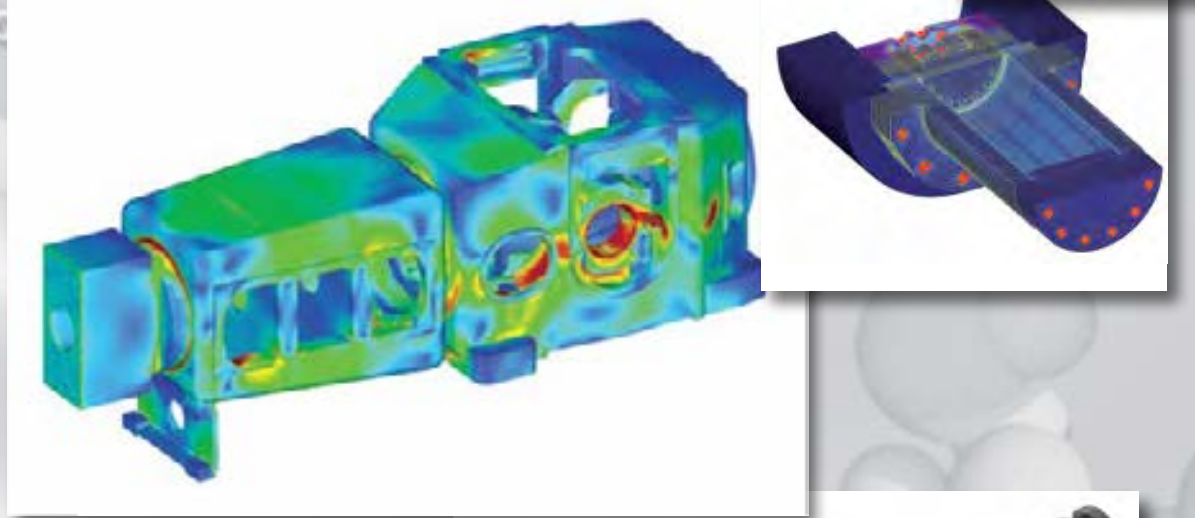


Finite Element Analysis and Multibody Simulation of Compressor Parts

Task: Determining stress and deformation of driving mechanism parts

Benefits:

- Highest utilization of strength
- Minimum residual risk of component failure
- Minimum oscillating masses
- Higher speeds possible
- Higher load rating of the driving mechanism

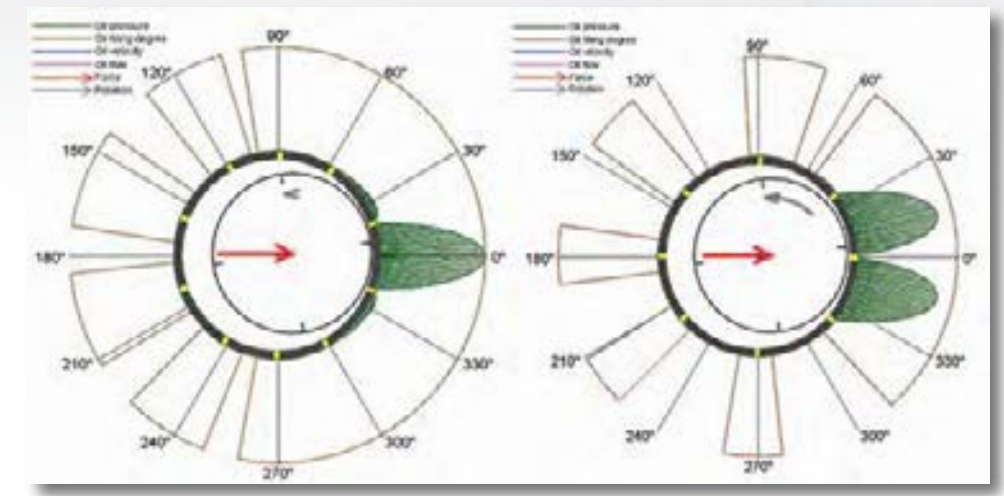


Analysis of the Drive Train's Torsional and Bending Vibrations

Task: Optimizing coupling and flywheel size

Benefits:

- Small fluctuations of the motor current
- Longest possible lifetime of motor windings
- Higher lifetimes for couplings
- Minimized risk of resonant vibrations



Journal Orbit of Plain Bearings

Task: Determining the smallest lubrication film thickness, maximum oil pressure and friction power

Benefit: Minimizing the danger of plain bearing damage



Analysis



TOTAL PROJECT ENGINEERING

Compressor Design and Optimization

- Determining the process parameters under various operating conditions for reciprocating compressors up to 8 stages and 8 cranks of any configuration and gas analysis
- Automatic examination as to the adherence to international standards (API 618, Pneurop, ISO 8012) and NEA's parameters
- Transferring interface data to the customer's engineering (among others utilities consumption, performance data, foundation loads, nominal width of piping, and flange ratings)
- Load tests of all driving mechanisms
- Delivering flow rate and performance diagrams (Panhandle)
- Designing pulsation dampers and defining residual pulsations in advance

3D Volume Modelling of Reciprocating Compressors

- Transparent management of parts and construction groups
- Comprehensive and flexible modelling functions for customer specific constructions of variants
- Rapid and faultless configuration of new orders by adhering to the relationships between parts and construction groups
- Deducing 2D drawings according to DIN and ISO standards with guaranteed correct reproduction of model changes in the drawings
- Optimized flow of information and transparent cooperation between internal and external development departments

Multi-dimensional System Planning and Visualization

- Dimensioning catalogues for piping parts in accordance with DIN and ANSI in a relational database
- Simple generating of customer specifications
- Any views and sectional presentations of piping plans and general arrangement plans
- Simple and quick preparation of flow sheets
- Preparing the 3D plant model on the basis of the R&I diagram
- Collision check with regard to the correct installation of pipes and other components
- Fully automatic extraction of isometrics and part lists
- Automatic dimensioning by indicating the item numbers
- Marking and summarizing weld seams of the piping system
- Studies to ensure optimal maintenance and operation of the plant
- Simultaneous access of several work stations to a central plant model

Plant System Load Simulations

- Defining torsional and bending stresses as well as stiffness of pipes and fittings by taking into account load cases occurring during operation such as thermal stresses or stresses due to dead weight and pressure
- Dynamic calculation of piping and vessel systems
- Comparison of superimposed stresses with admissible values in accordance with ANSI B 31.3
- Presenting thermal piping displacements

Vendor Data Book

- Assembly, operation and maintenance manuals for reciprocating compressors and plant periphery incl. detail drawings and instructions
- Inspection certificates of all components that require official approval
- 3D piping and general arrangement plans, foundation design data, R&I diagrams
- Protocol of release procedure for the start-up commissioning, incl. experts' inspections



■ Holdings

NEUMAN & ESSER Verwaltungs- und Beteiligungsgesellschaft mbH
Übach-Palenberg, Germany
NEUMAN & ESSER Investments, Inc.
Wilmington, Delaware, USA
NEUMAN & ESSER Investments Asia Ltd.
Hong Kong, China

■ Sales and Application Centers

NEUMAN & ESSER América do Sul Ltda
Belo Horizonte, Brazil
NEUMAN & ESSER (Beijing) Co., Ltd.
Beijing, China
NEUMAN & ESSER Compressor Application Centre Pvt. Ltd.
Pune, India
NEUMAN & ESSER Deutschland GmbH & Co. KG
Übach-Palenberg, Germany
NEUMAN & ESSER Eng. (India) Pvt. Ltd.
Pune, India
NEUMAN & ESSER Egypt Ltd.
Cairo, Egypt
NEUMAN & ESSER Grinding and Classifying USA, Inc.
Katy, Texas, USA
NEUMAN & ESSER Gulf FZE
Dubai, UAE
NEUMAN & ESSER Italia S.r.l.
Milan, Italy
NEUMAN & ESSER GmbH Mahl- und Sichtsysteme
Übach-Palenberg, Germany
NEUMAN & ESSER Rus Ltd.
Moscow, Russia
NEUMAN & ESSER Sistemas de Moagem e Classificação Ltda
Belo Horizonte, Brazil
NEUMAN & ESSER South East Asia Ltd.
Rayong, Thailand
NEUMAN & ESSER USA, Inc.
Katy, Texas, USA

■ Production Sites

NEUMAN & ESSER GmbH & Co. KG
Übach-Palenberg, Germany
NEUMAN & ESSER Maschinenfabrik Wurzen GmbH
Wurzen, Germany
STASSKOL GmbH
Stassfurt, Germany

■ Service Centers

NEAC Compressor Service GmbH & Co. KG
Übach-Palenberg, Germany
NEAC Compressor Service S.r.l.
Milan, Italy
NEAC Compressor Service USA, Inc.
Katy, Texas, USA
NEAC Compressor Service Ltda
Belo Horizonte, Brazil
NEAC Compressor Service Ltd.
Rayong, Thailand

■ Website

www.neuman-esser.com
www.neacusa.com
www.neac.de

Headquarters

Phone: +49 (0) 24 51 / 481-01
Fax: +49 (0) 24 51 / 481-100