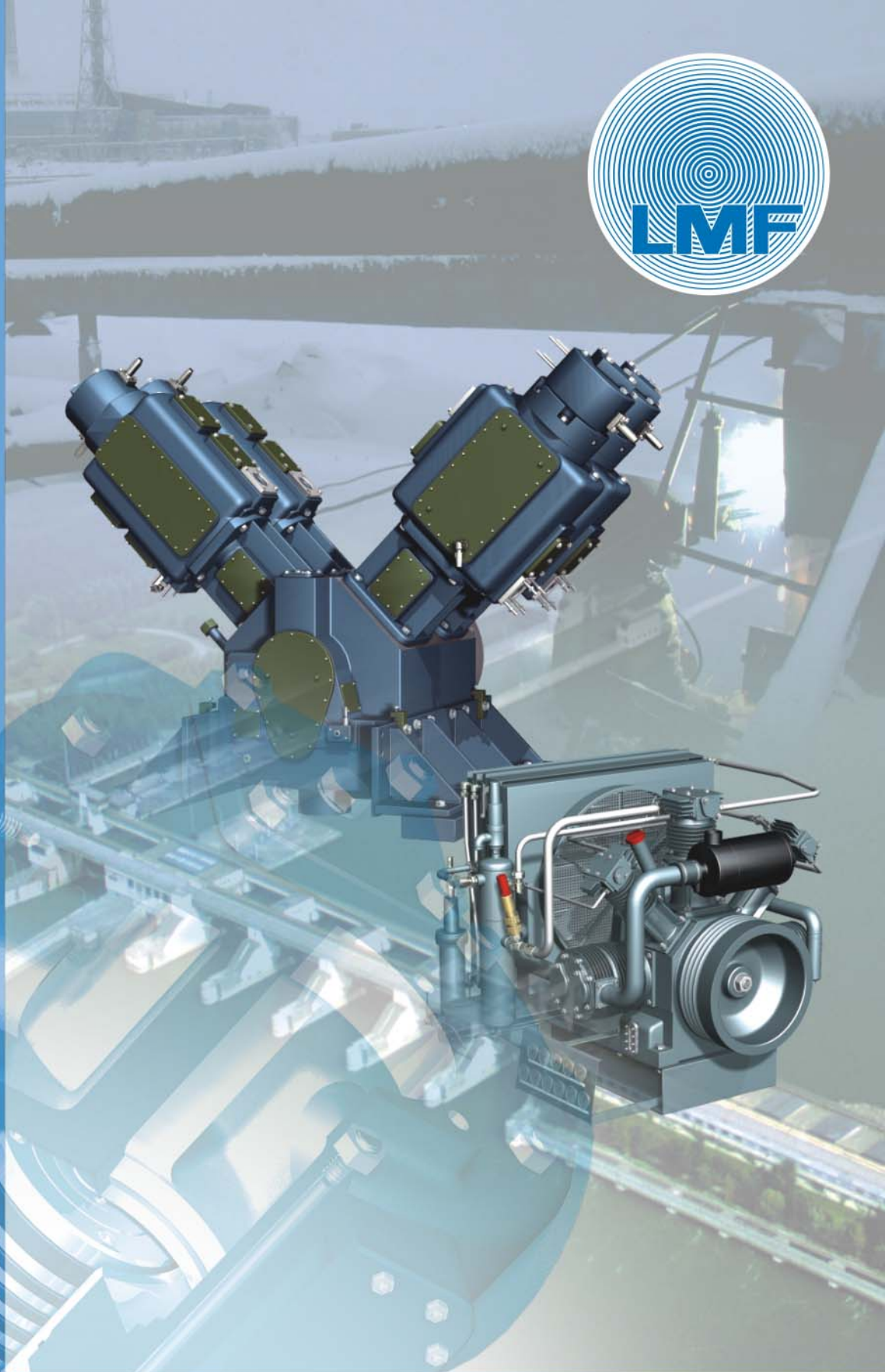


# COMPRESSOR TECHNOLOGY



**HEAVY DUTY  
HIGH PRESSURE  
COMPRESSORS**

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# OVERVIEW PRODUCTS

## Overview Product range / Field of Applications

LMF's high pressure compressor systems for the compression of air, natural gas, technical and industrial gases (process gases) are designed according to international standards, using standard design principles.

As a single source LMF offers design, engineering, production, testing under full load, erection, start-up and related services with over 50 years of experience in the high pressure compressor business.

LMF's special modular system makes it possible to find the optimal solution in each specific case - both from a technical and an economical point of view.

The careful selection of materials and components ensures troublefree operation, even under the most arduous operating conditions.

Aircooled V-compressors		Aircooled High Speed Boxer		Compound Systems	Watercooled V-compressors		Process Gas Compressors API 618		
V 16	V 7(d)	BT 4	BS 102	BT	VGd	VC	T 91-93	B 92-94	V 92-94
V 17			BS 204	BS	VHGd	VCS	T 121-123	B 122-124	V 122-124
VP 2			BS 302	VC / VCS		VCL	T 151-153	B 152-154	
			BS 604	Nitrogen			T 181-183	B 182-184	B 252-256
<b>Oil / Gas Applications</b>									
■		■		■					
			■	■					
			■	■					
			■		■			■	
			■					■	
							■	■	■
	■						■	■	■
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■			■					■	
■			■	■				■	
<b>CNG</b>									
■			■						
			■						
<b>PET</b>									
						■			
<b>Industrial Applications</b>									
■			■						
■		■	■						
■			■			■			
	■					■			
				■					
			■	■					

- Seismic research
  - Pipeline testing
  - Well-services
  - Gasgathering/ -lift and -transport
  - Flaregas / Gasreinjection
  - Petrochemical plants
  - Refineries
  - Chemical plants
  - ind. gas handling H<sub>2</sub>, CO, CO<sub>2</sub>
  - Fuel injection
  - Platform motion compensation
- CNG**
- Bus stations
  - Private cars
- PET**
- Bottle blowing
- Industrial Applications**
- Power plants
  - Marine / Defence
  - Heavy duty applications (mining)
  - Dry industrial air
  - Wind tunnels
  - Wet oxydation

### Customer's benefit

In this brochure we present to you **air- and watercooled V-standard compressors for "Heavy Duty" applications.**

LMF's comprehensive product range enables you to find the optimal technical solution for your specific compression requirements. All you need from a single source.



# AIRCOOLED IN GENERAL

## Aircooled High Pressure V-Compressors

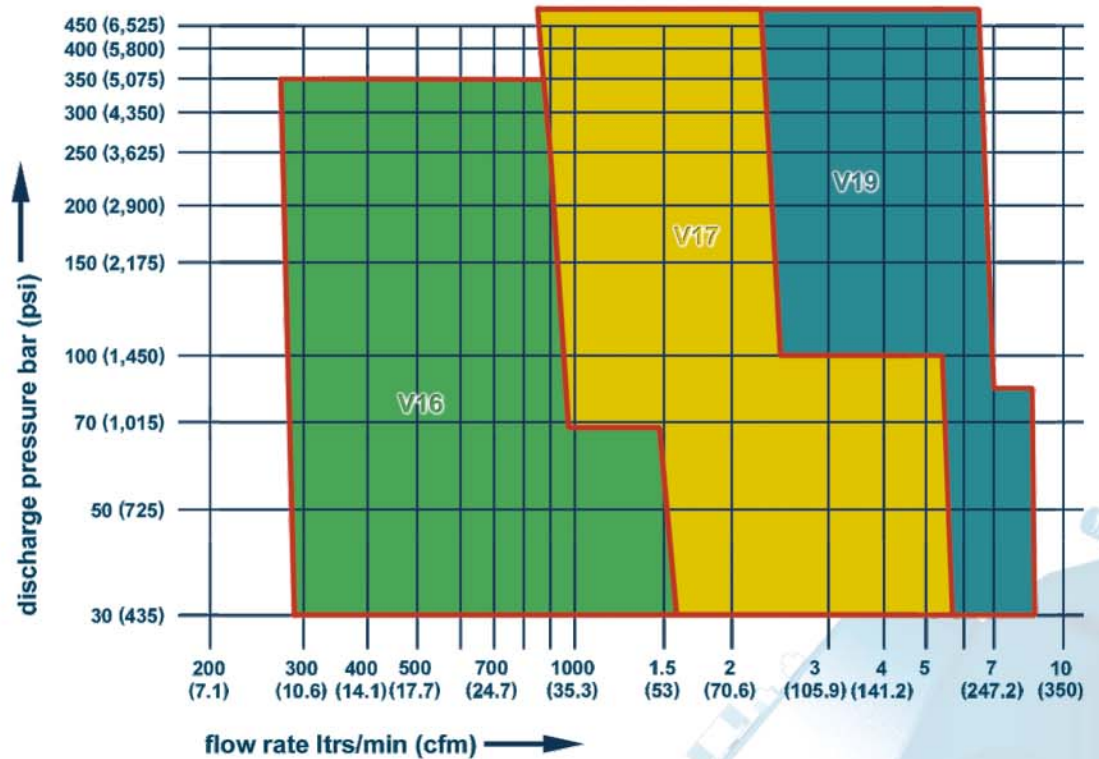
LMF's aircooled V-compressors for air and other gases are laid out for tough application requirements.

They are designed as two to five-stage units (in special cases six-stage units), with two to six single-acting, conven-

tional, deep finned cylinders.

Suction, discharge and safety valves are selected to suit the operating conditions in each case. All valves used conform with international standards.

Performance diagram - aircooled high pressure compressors



For further technical information see brochure on technical data

A heavy-duty inlet filter with silencer cleans the air or another gas entering the system. This filter is specially selected for the operating conditions on each particular site.

The compressor is mounted on a supporting frame, if required adapted for the application in question.

A dustproof or gastight crankcase can be supplied upon request.

Roller bearings are used for the crankshaft, needle or friction bearings for the connecting rods on the crankpin and gudgeon pin.

coupled with electric prime movers.

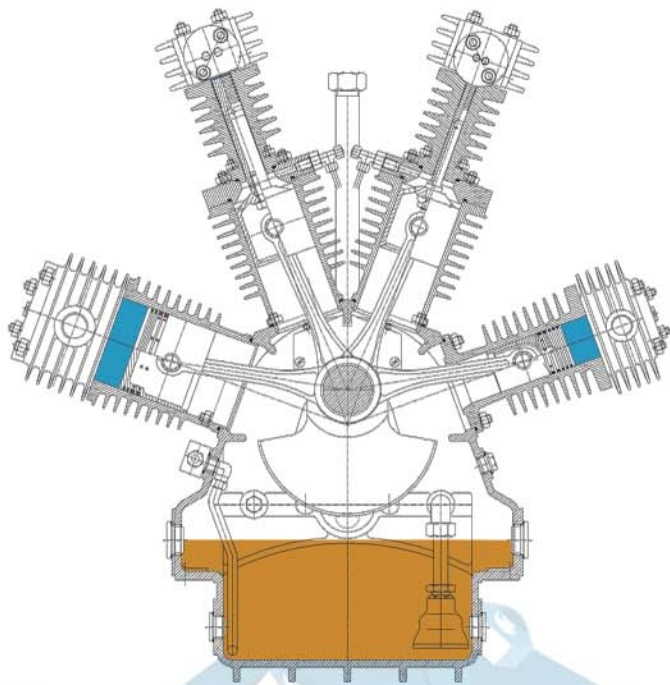
Lubrication is by means of a forced feed system.

The compressors are driven by V-belt (standard) or can optionally be directly

There is a cooler and a condensate drain after each compression stage.

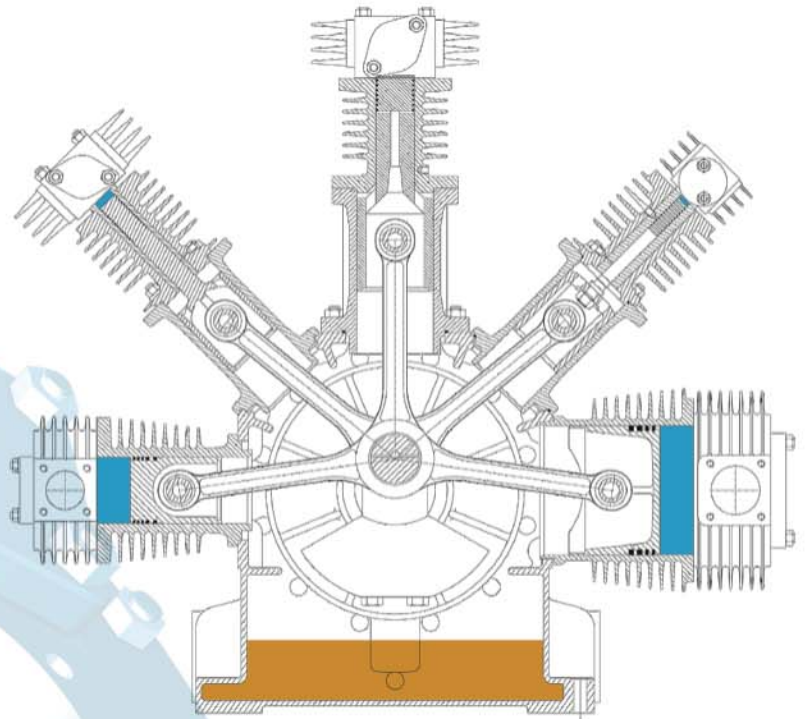
### Definition "Heavy Duty"

"Heavy Duty" characteristics for LMF's aircooled V-compressors mean - each axis has one cylinder and not multiple assemblies - resulting in a sturdy design configuration.



▲ Sectional view of four-stage V16

▼ Sectional view of five-stage V17



Intercoolers and aftercooler are built together into one cooler block. A fan draws cooling air through this block, then forces it over the cylinders.

The aftercooler is designed so that the outlet temperature of the compressed gas is approx.

10°C (18°F) higher than the inlet temperature. LMF compressor units can be fitted with either a standard control system or one that is fully automatic, depending on the operating conditions in each case.

Thanks to their sturdy design - one cylinder per axis only - LMF compressors are suitable for both intermittent and continuous operation. They can also be used as booster units with elevated inlet pressure rates and final pressure rates up to 450 bar (6525 psi).

Due to the extensiveness of the permutations in design, it is not possible to include booster compressors in the data tables given in this brochure.

### LMF-Advantages for you

- ▶ Single source supplier for bare blocks or complete units
- ▶ Flexible cylinder configurations
- ▶ Sturdy design for continuous operation
- ▶ Selection for different applications



# WATERCOOLED IN GENERAL

## Watercooled High Pressure V-Compressors

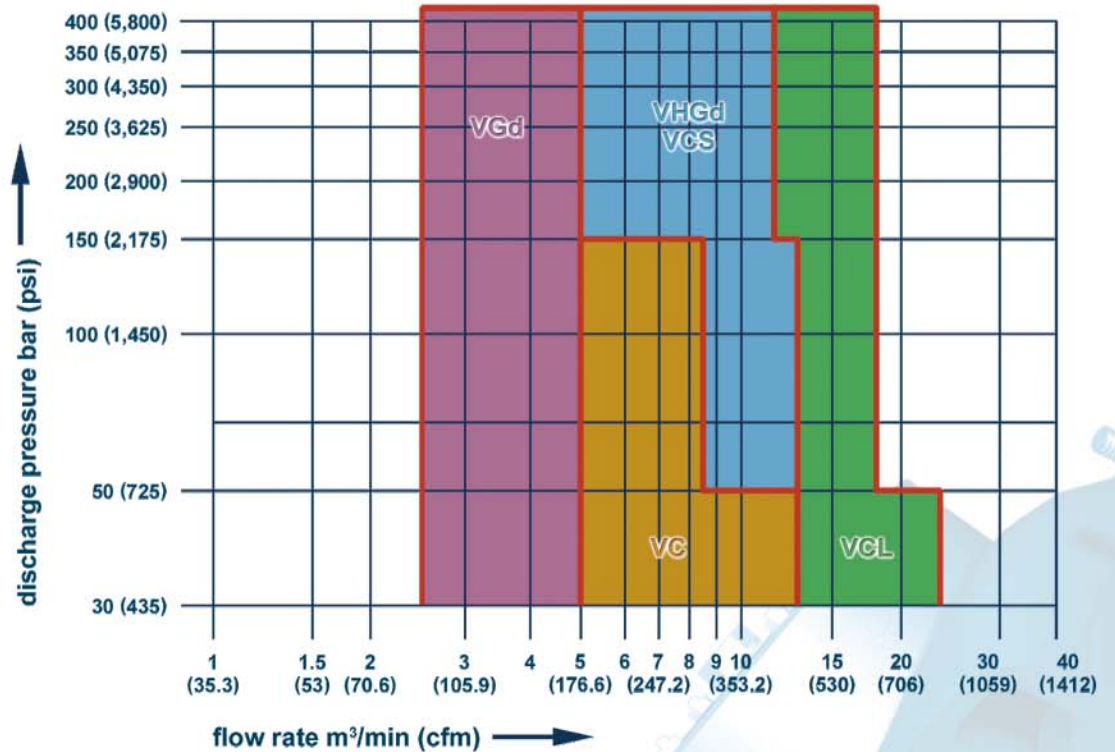
LMF's watercooled V-compressors for air and other gases are designed as three to five-stage units (in special cases one, two or six-stage units).

The two to six cylinders are usually a combination of step cylinders and double-acting cylinders. All models are

of crosshead design.

In each stage, both the cylinder and the compressed gas are watercooled, either by means of an "open" system (continuous flow system) or a "closed circuit" (coolant circulating through heat exchanger).

Performance diagram - double-acting models



For further technical information see brochure on technical data

Due to their sturdy design, LMF compressors are suitable for both intermittent and continuous operation.

They can also be used as booster units for final pressure rates of up to 450 bar (6525 psi).

The compressor is mounted on a supporting frame, if required adapted for the application in question.

with either a standard control system or one that is fully automatic, depending on the operating conditions in each case.

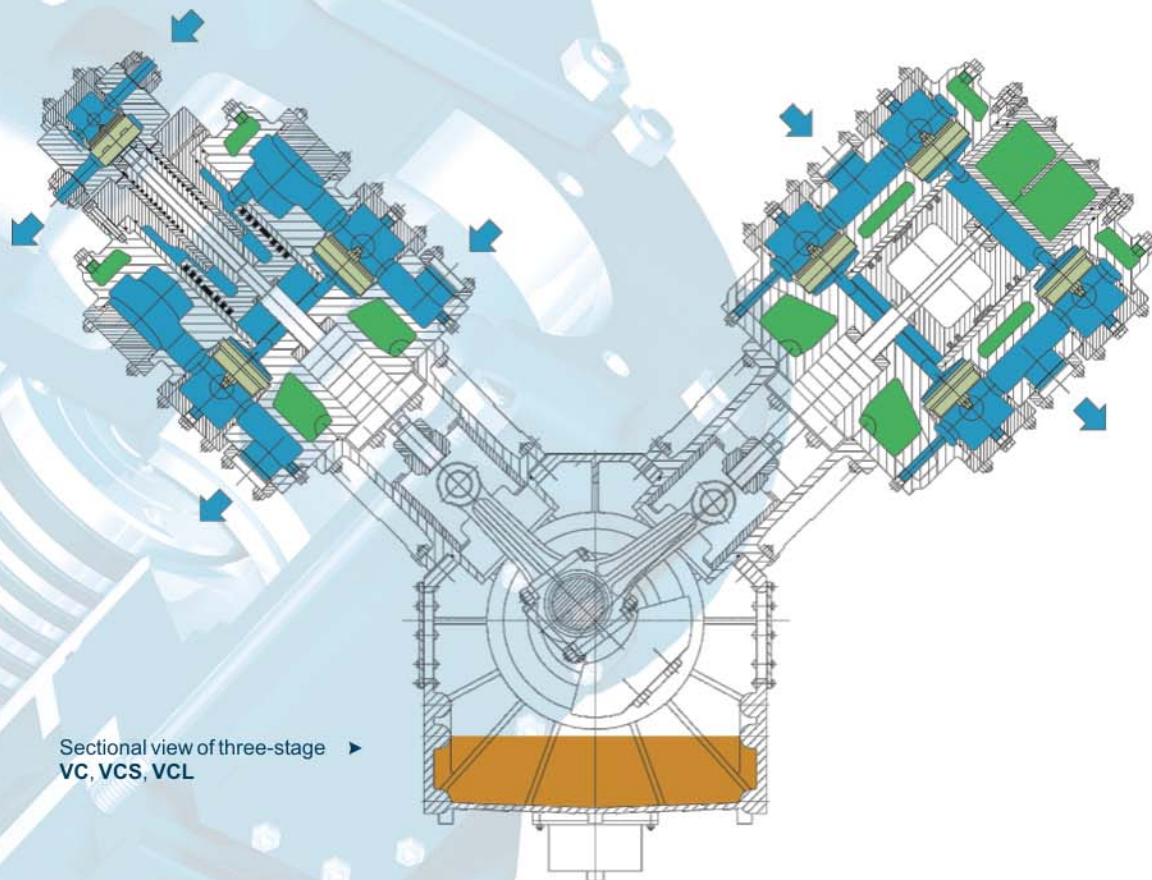
LMF compressor units can be fitted

## Various application fields

LMF's heavy duty watercooled V-compressors are best suited for challenging applications on vessels, power plants or for oilfree operation, e.g. PET bottle blowing (see also separate brochure).

## Crosshead Models VGd, VHGd, VC, VCS and VCL

- ▶ Low-vibration, compact design due to "V" or "W" configuration of cylinders
- ▶ High efficiency at low temperatures due to crosshead design and water-cooled cylinders
- ▶ Direct coupling with prime mover possible up to  $n = 1200$  rpm
- ▶ Both lubricated and non-lubricated cylinders are available to suit specific applications
- ▶ Interchangeability of parts due to modular system based on 85 or 100 mm piston stroke
- ▶ Minimal pressure loss due to generously dimensioned piping
- ▶ All compressor valves of superior quality using technically advanced materials
- ▶ Maximum possible lifetime of compressor valves ensured by high quality design and material
- ▶ Uncomplicated valve service with no dismantling of gas or water pipes
- ▶ Long working life of stuffing box packings, as not exposed to final discharge pressure
- ▶ Extremely long periods between gear oil changes due to high efficiency of oil cooling system
- ▶ Simple piston ring change due to easily removable cylinder units
- ▶ Complete compressor unit mounted on elastic supports



Sectional view of three-stage  
VC, VCS, VCL ▶

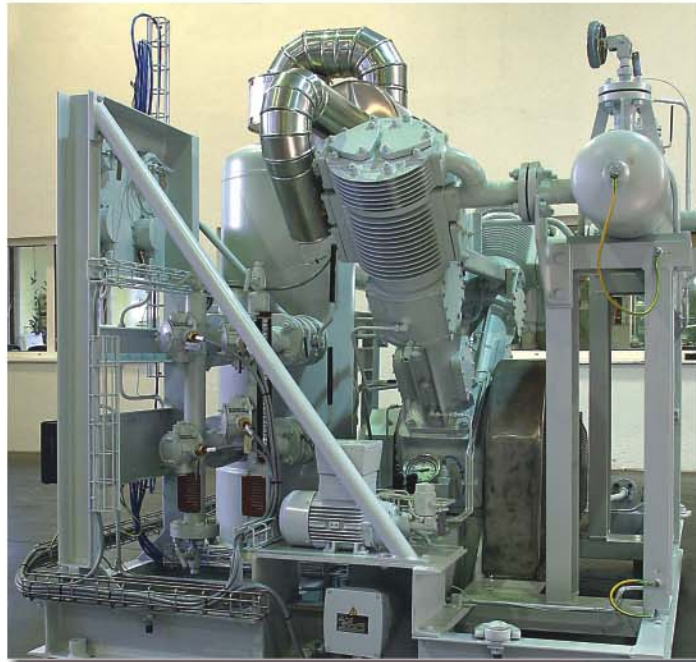
### LMF-Advantages for you

- ▶ Single source supplier for bare blocks or complete units
- ▶ Flexible cylinder configurations
- ▶ Sturdy design for continuous operation
- ▶ Selection for different applications



# APPLICATIONS AIRCOOLED

▶ **V16/3410 L5**  
delivery 1.4 m<sup>3</sup>/min (50 cfm),  
working pressure 50 bar (725 psi),  
electric motor 18.5 kW (25 hp)

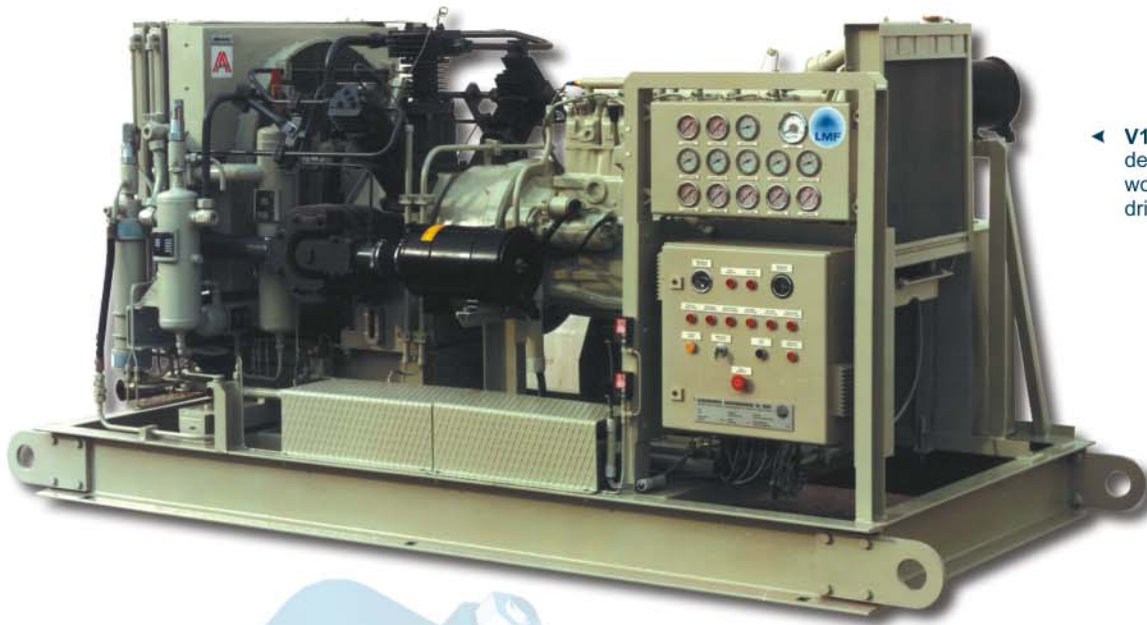


◀ **V7d/2107 L4.0**  
delivery 10 m<sup>3</sup>/min (350 cfm),  
suction pressure 10 bar (145 psi),  
working pressure 40 bar (480 psi),  
electric motor 55 kW (75 hp)



◀ **V17/5518 L20**  
delivery 2200 ltrs/min (78 cfm),  
working pressure 200 bar (2900 psi),  
driven by electric motor



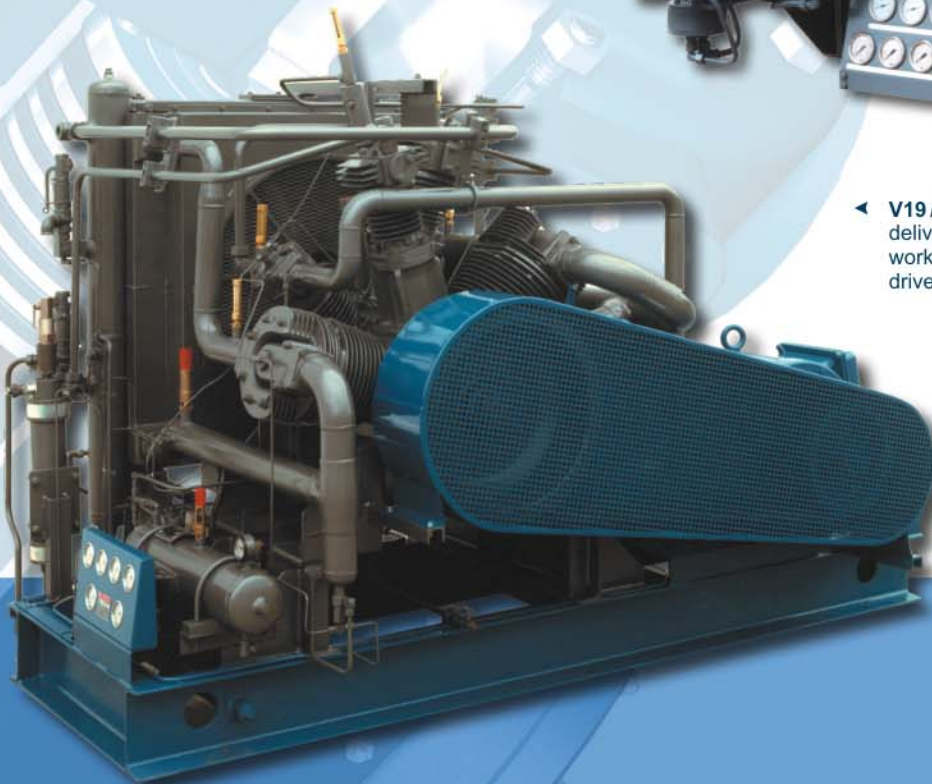


◀ **V17 / 5518 L 20**  
delivery 2580 ltrs/min (91 cfm),  
working pressure 200 bar (2900 psi),  
driven by direct-coupled diesel engine

**V17 / 5518 L 35** ▶  
delivery 2580 ltrs/min (91 cfm),  
working pressure 350 bar (5075 psi),  
driven by 75 kW (100 hp) electric motor



◀ **V19 / 5621 L 35**  
delivery 4570 ltrs/min (161 cfm),  
working pressure 350 bar (5075 psi),  
driven by 110 kW (150 hp) electric motor





# APPLICATIONS WATERCOOLED



▲ **VHGd 3622 W 3**, delivery 15 m<sup>3</sup>/min (560 cfm),  
working pressure 30 bar (435 psi), driven by 160 kW (216 hp) electric motor



▲ Two **VGd 1314 W 2.8** models, supersilent,  
maximum delivery 74.3 m<sup>3</sup> /min (2770 scfm),  
suction pressure 7-18 bar (102-261 psi),  
working pressure 28 bar (406 psi),  
driven by 108 kW (145 hp) natural gas engine



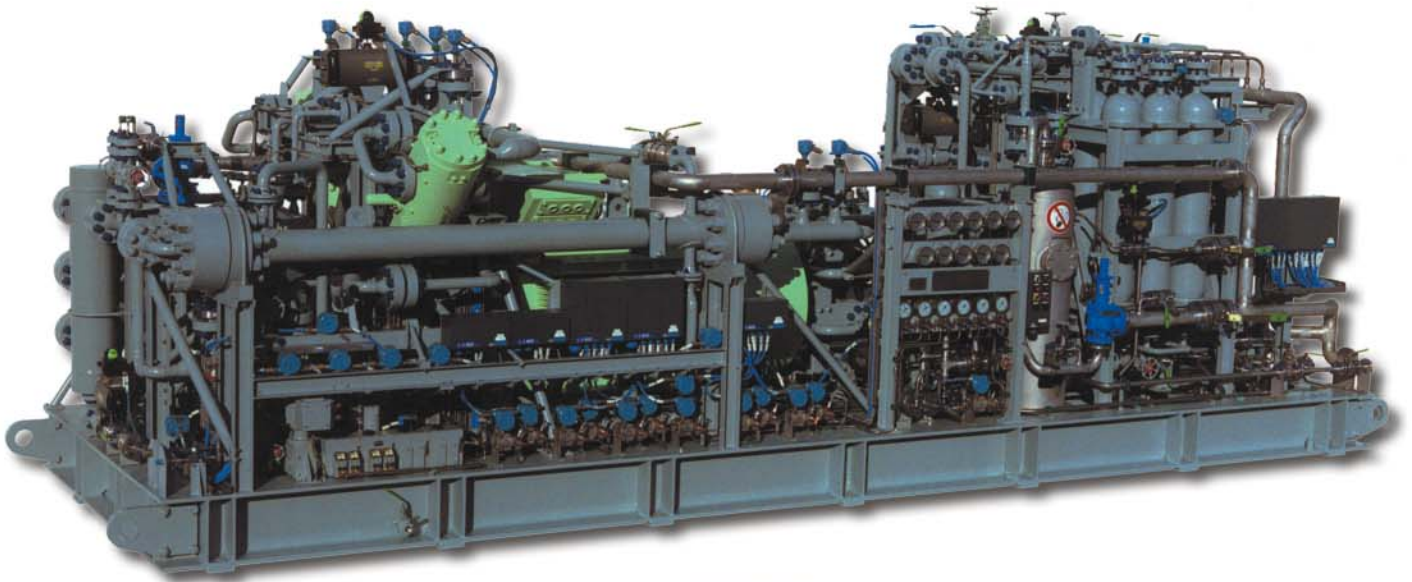
**VC 1207 W 36** ▶  
delivery 7250 m<sup>3</sup> /h (4290 scfm),  
working pressure 360 bar (5220 psi),  
driven by 280 kW (380 hp) electric motor



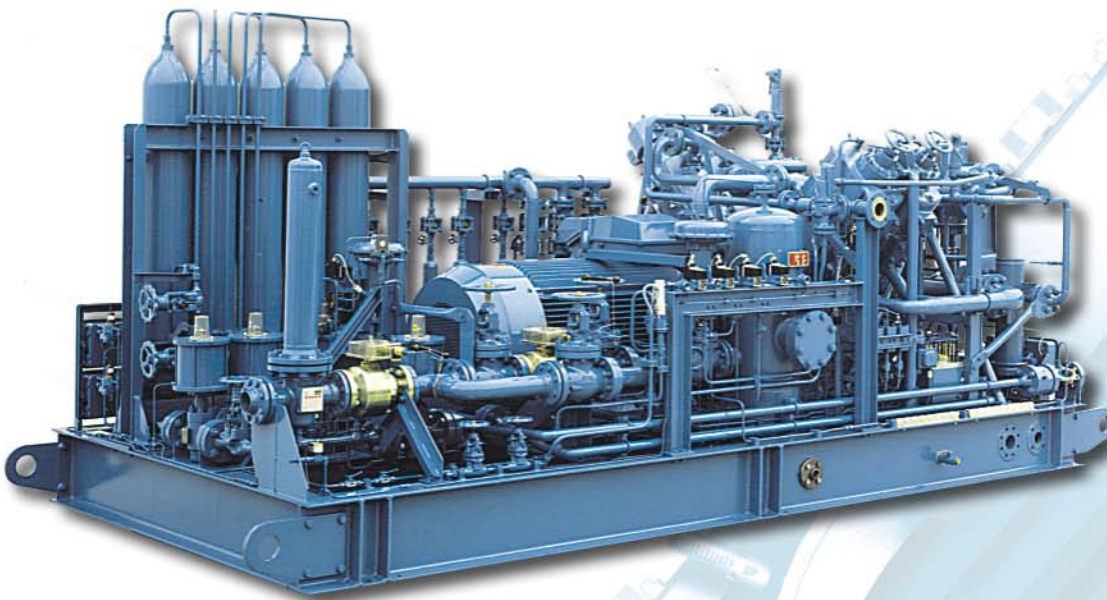
▼ Nitrogen compressor package with HP-compressor **VC 3216 N 6.6**  
delivery 1655 m<sup>3</sup> /h (980 scfm), working pressure 66 bar (957 psi),  
driven by 180 kW (245 hp) electric motor





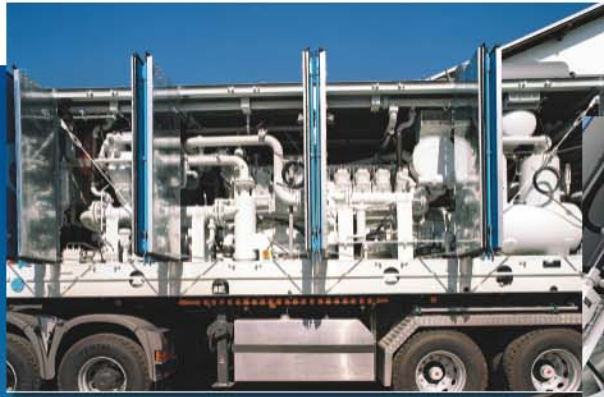


▲ **VC 1209 W 36**  
delivery 5990 m<sup>3</sup> /h (3525 scfm), working pressure 365 bar (5295 psi),  
driven by 400 kW (540 hp) electric motor



▲ High pressure natural gas package with HP-compressor **VCS 3414 W 35**  
delivery 1900 m<sup>3</sup> /h (1125 scfm), working pressure 350 bar (5075 psi),  
driven by 400 kW (540 hp) electric motor





▲ Truck-mounted compressor units with HP compressor **VCS-3421 W 15**  
 delivery 67 m<sup>3</sup>/min (2370 cfm), working pressure 150 bar (2175 psi),  
 driven by 16 cylinder 1.3 MW (1770 hp) diesel engine, containerized for ambient temperatures +35/-50 °C

▼ **VCS 3414 W 35**, truck-mounted, delivery max. 56 m<sup>3</sup> /min (2090 scfm),  
 suction pressure max. 35 bar (508 psi), working pressure 350 bar (5075 psi),  
 driven by 550 kW (740 hp) diesel engine, supersilent (without casing)





# AFTER SALES & SERVICE

## After sales service - a very important duty

After sales service is considered by LMF as a very important duty. The utmost attention is therefore paid to all requests for service and spares.

Spare parts are delivered in the shortest possible time to any destination required, and service engineers are sent out on request to operating sites around the globe.



## Training

LMF also conducts training courses for customer operating and maintenance staff, either on site during start-up, or in the LMF factory. Training handbooks either in printed form or on CD-ROM as well as maintenance videos are also part of the strategy of keeping customer satisfaction high.

