Overview of Products for Industry

1-0109-US

Centralized lubrication and minimal quantity lubrication for machinery and systems

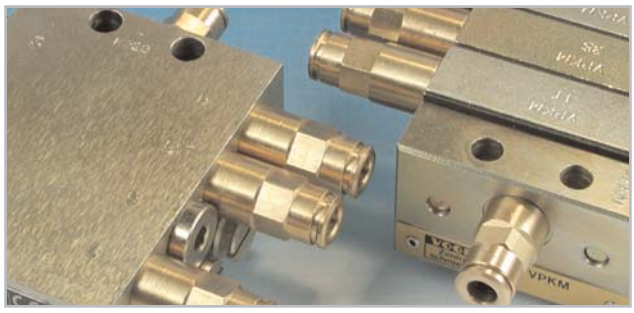
Total-loss centralized lubrication systems
Circulating oil lubrication systems

Solutions for special applications:
chain lubrication
minimal quantity metering systems

Minimal quantity lubrication

Quality Management
DIN EN ISO 9001: 2000

Environmental Management
DIN EN ISO 14001



Friction and wear are constant companions of systems and machines. So every year valuable raw materials are lost to nature, while billions of dollars are lost to the economy.
Lubrication systems help protect both: the environment and scarce resources.

• Centralized lubrication

A pump delivers grease or oil from a central reservoir through lines to the friction points and machine elements, and it does so fully automatically. As often as necessary and in exactly the right amounts. All connected lube points are provided with an optimal supply of lubricant. Friction and wear are reduced. That considerably increases the service life of machine elements while making it possible to reduce the consumption of lubricant.

• Minimal quantity lubrication

With minimal quantity lubrication it's possible to achieve effective lubrication of the cutting process with extremely small quantities of oil. The result is not only higher productivity due to faster cutting speeds but also longer tool lives and savings on cooling lubricants in the value-added process.

So centralized lubrication and minimal quantity lubrication make a positive contribution to environmental protection and significantly cut process costs.

In the following we'll give you an overview of our centralized lubrication systems for industrial applications, special solutions for chain lubrication systems as well as minimal metering installations and minimal quantity lubrication systems.

You can obtain further information and detailed leaflets from our sales and service centers in Germany, our international subsidiaries and agents, or directly from the head office in Berlin.

Our staff will be happy to advise you.

VOGEL is the world leader in the field of centralized lubrication technology. We outfit machines, plant, commercial vehicles and rail equipment.

Our Spandau Pumps product division is a highly innovative specialist in fluid pumps for industrial applications and processes.

After taking over the LubriLean range of products in 2001, VOGEL is now a competent partner in the field of minimal quantity lubrication as well.

We produce components, assemblies and complete systems. Our service escorts the customer from the time an order is placed until our units are no longer in use. We provide individual consultation, and we do the planning as fast and inexpensively as possible. We keep in close contact with our customers and their installations, and we train end users.

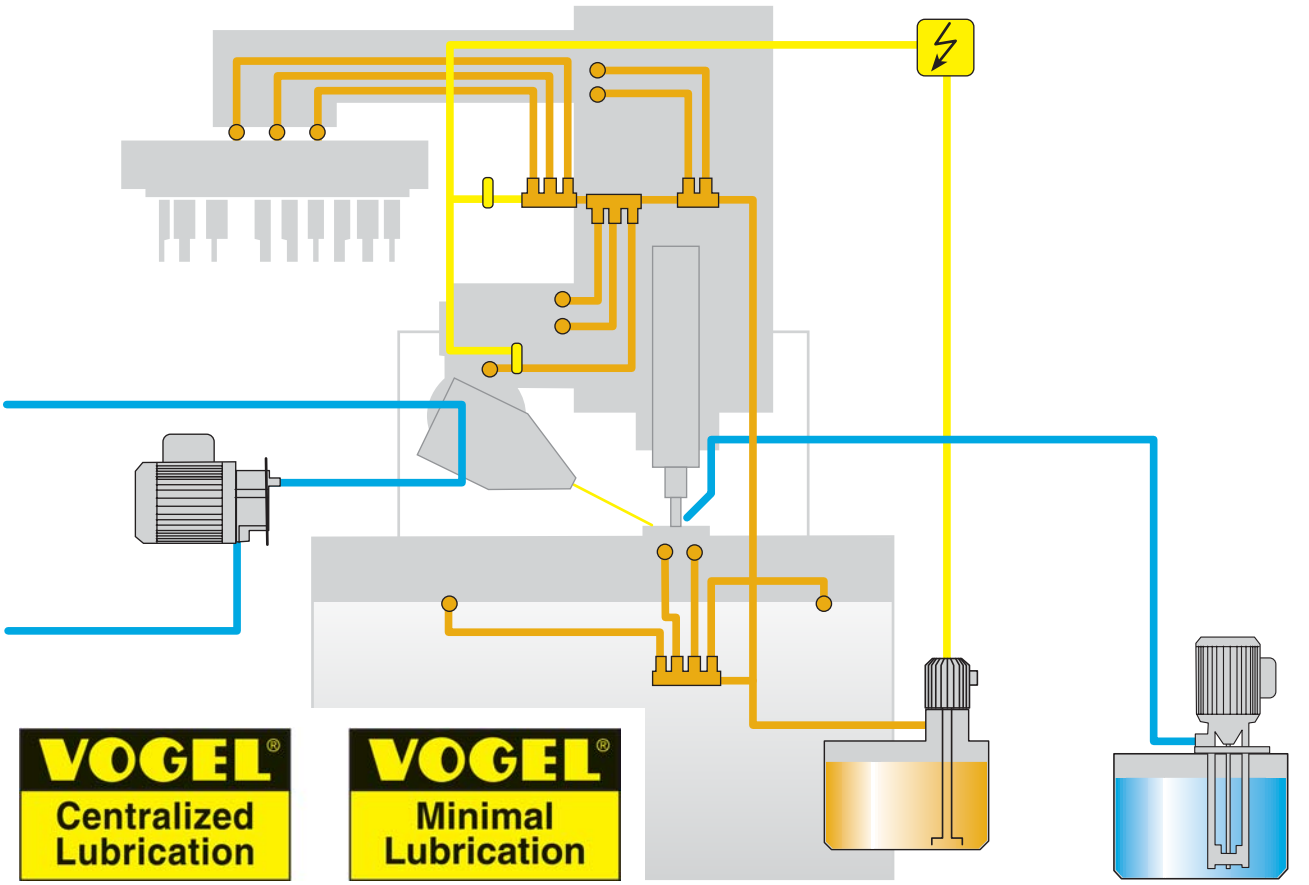
We're proud of our motivated and competent employees. Their flexibility and know-how help us guarantee our quality standards.

As a medium-size company we're big enough for large customers but also dynamic enough to handle turbulent world markets. VOGEL sees globalization as an opportunity, not a threat. We've responded to international networking with our international presence. Seven subsidiaries of our own and sales partners in 30 countries around the globe reflect these dynamics.

Our market is the world market, our home market Europe.

Our success is our customers' success.

We think in systems



Total-loss centralized lubrication systems
Single-line systems for oil or NLGI grade 000, 00 grease

Applications

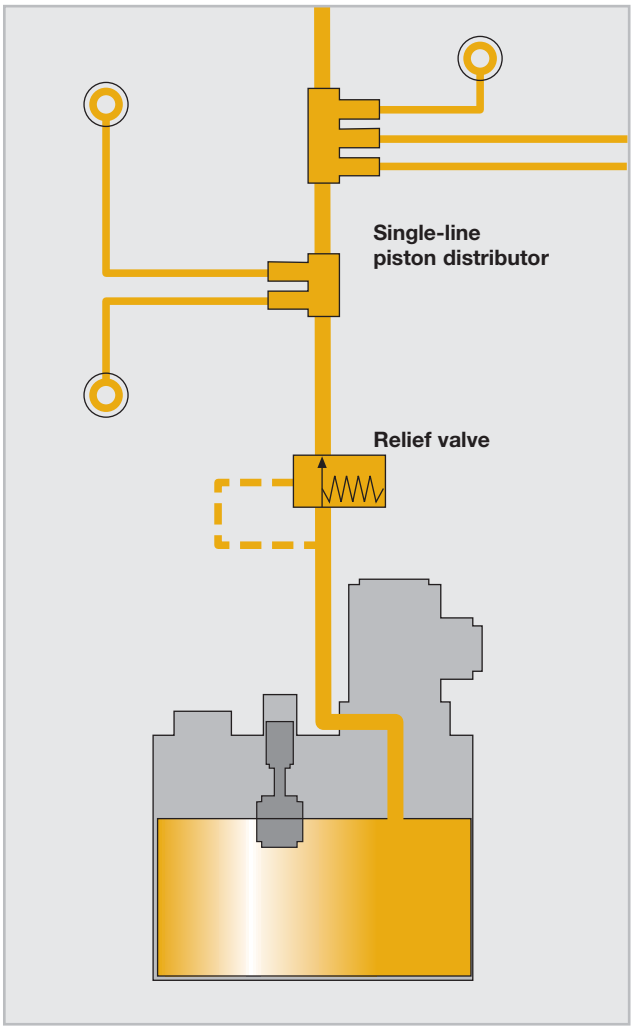
Machine tools, printing machines, textile machines, packaging machines and lots more.

Principle

Single-line (total-loss) centralized lubrication systems are designed to feed a machine's lube points with relatively small amounts of lubricant conforming to lubricant needs. They work intermittently, i.e. with intervals.

Single-line systems can be designed for oil or grease (NLGI grades 000, 00).

Automatic systems can be controlled on a time or load basis. Exchangeable metering nipples on the distributors make it possible to deliver the required amount of lubricant with every stroke or work cycle of the pump. The metering range runs from 0.01 to 1.5 ccm per lube pulse and lube point.



Components

Pump unit (piston pump or gear pump)

Piston distributors

Metering units

Control and monitoring unit
depending on the system configuration

Advantages

- Simple system planning
- Modular system
- Expandability

Choice of products

Manually operated piston pump for grease

Pneumatically operated piston pump

Gear pump unit with automatic pressure relief

Compact gear pump unit for oil with integrated control system

Total-loss centralized lubrication systems
Dual-line systems for oil or grease up to NLGI grade 3

Applications

Dual-line systems are preferably used to lubricate machines and machinery installations with a large number of lube points, long lines and rough operating conditions.

Coking plants, steel plants, continuous casting plants, hot and cold rolling mills, finishing lines, brown coal strip mining, coal-fired power plants, cement factories, deck cranes, etc.

Principle

These lubrication systems work with two main lines that are alter-nately pressurized and/or relieved. They are designed for ISO VG oil with a service viscosity of more than 50 mm²/s and also for grease up to NLGI grade 3.

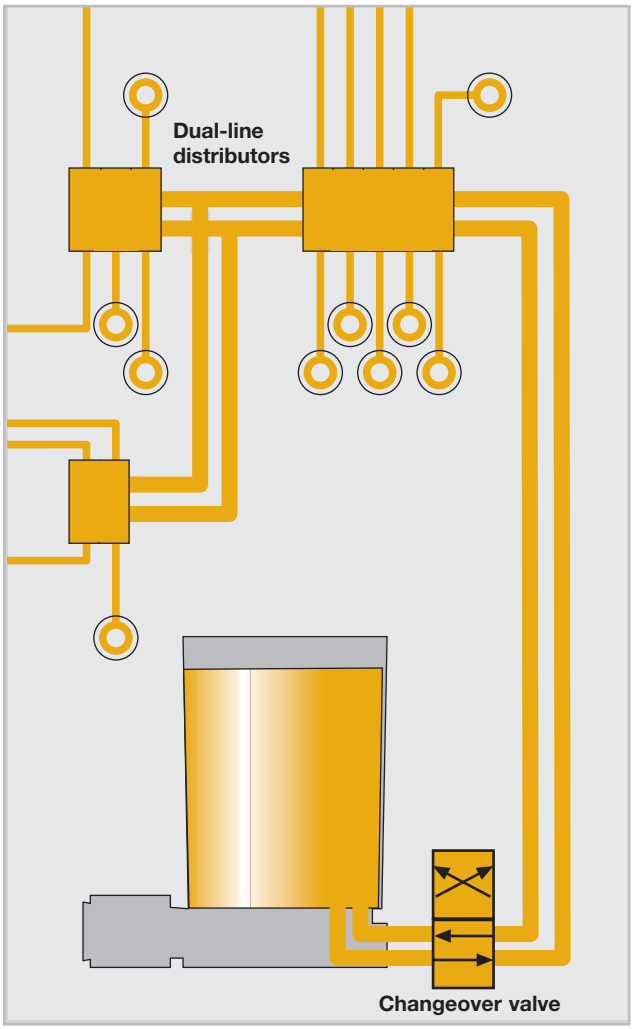
Dual-line systems are customarily designed as total-loss lubrication systems for intermittent operation.

Components

Dual-line systems consist mainly of a pump with reservoir, changeover valve, control unit, dual-line distributors, two main lines as well as the respective lube-point lines and fittings.

Advantages

- High functional reliability thanks to measurement of the differential pressure at the end of the line (upstream of the last dual-line distributor) with simultaneous monitoring for leakage in the main lines
- Great flexibility when it comes to adjusting the metered quantity to lubricant needs
- Systems with more than 1000 lube points are possible within a range of 100 m (effective line length) around the pump
- High lubricating reliability at the lube points is achieved with pressures of up to 400 bars



Choice of products

Dual-line pump

Electrical and hydraulic control units

Dual-line distributors

Total-loss centralized lubrication systems
Progressive systems for oil or grease up to NLGI grade 2

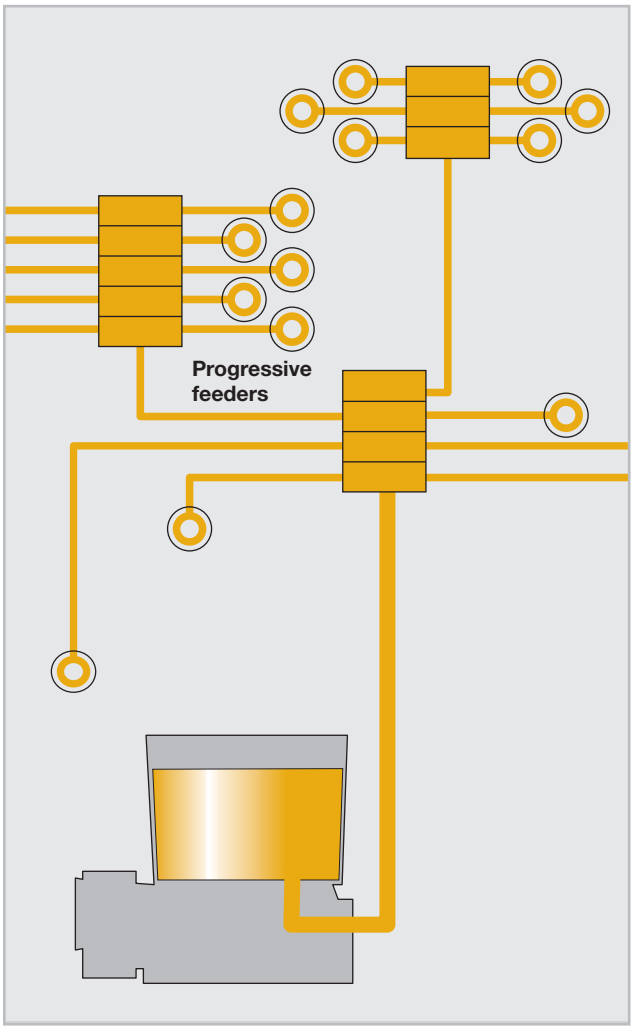
Applications

Printing machines, beverage filling plants, construction machinery, woodworking machines, presses, wind-power installations and lots more.

Principle

These systems deliver oil or grease up to NLGI grade 2 in intermittent operation, with or without central monitoring. The lubricant delivered by the pump is fed to the lube points after being divided up by the individual progressive feeders in keeping with the number of pistons and metered quantities.

The quantities are apportioned and the lubricant passed on to one lube point after another by positively actuated pistons that move back and forth. The piston diameter and travel determine the delivery rate per lube point. Each piston can only discharge its lubricant after the previous one has ejected its metered quantity. Every piston has two lubricant outlet ports at the two end positions of the piston's travel.



Components

A progressive system consists mainly of a pump, feeders and control system. Pneumatically or manually operated piston pumps as well as electrically driven ones are used in these systems.

Advantages

- Universally applicable in regard to their mode of operation (continuous / intermittent) and lubricants
- Central monitoring of functions of all feeders is possible at little expense

Choice of products

Multiline piston pump unit for grease

Electrically operated piston pump for grease

Progressive feeders

Circulating oil lubrication systems
Progressive systems

Applications

Forming machines (presses), paper machines, printing machines and lots more.

Principle

A continuous flow of oil produced by a pump and then divided up is required for machines or installations that use large amounts of oil for lubricating and cooling purposes.

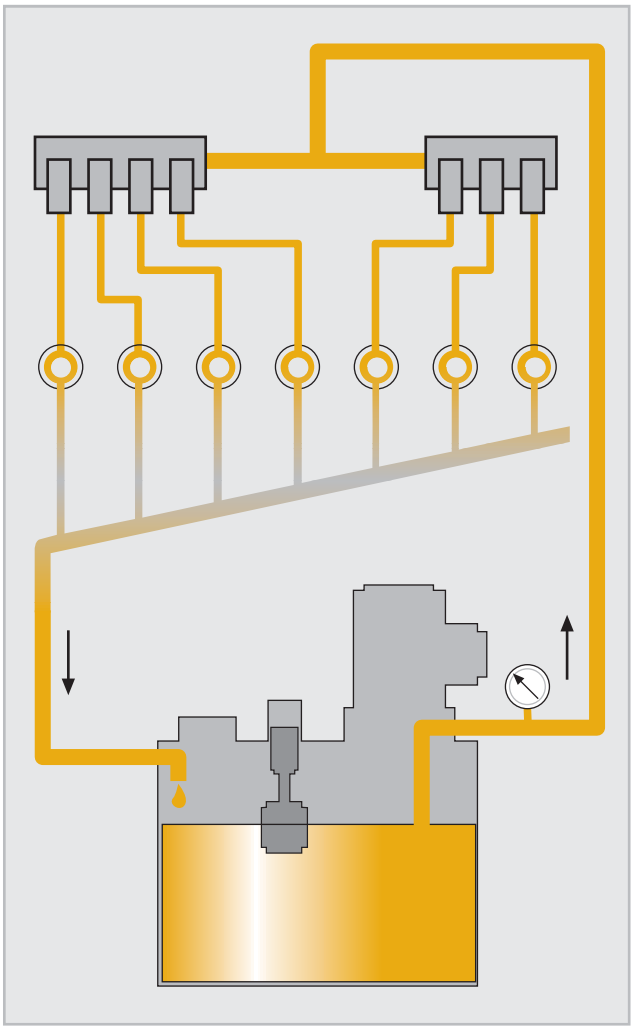
The lubricant for the lube points is apportioned by flow limiters, flow controllers, flow meters and/or progressive feeders.

Components

Screw or gear pumps, flow limiters, flow controllers, flow meters and progressive feeders

Advantages

- Individual adjustment of the volumetric flow
- Dynamic monitoring and viscosity-independent volumetric measurement of the flow
- Modular design and combinability
- Easy to service
- Simple, leakage-free monitoring of feeder functions



Choice of products

Pressurized oil station of a large circulating system

Flow meter

Progressive feeder

Multicircuit circulating oil lubrication systems
Hydrostatic lubrication systems

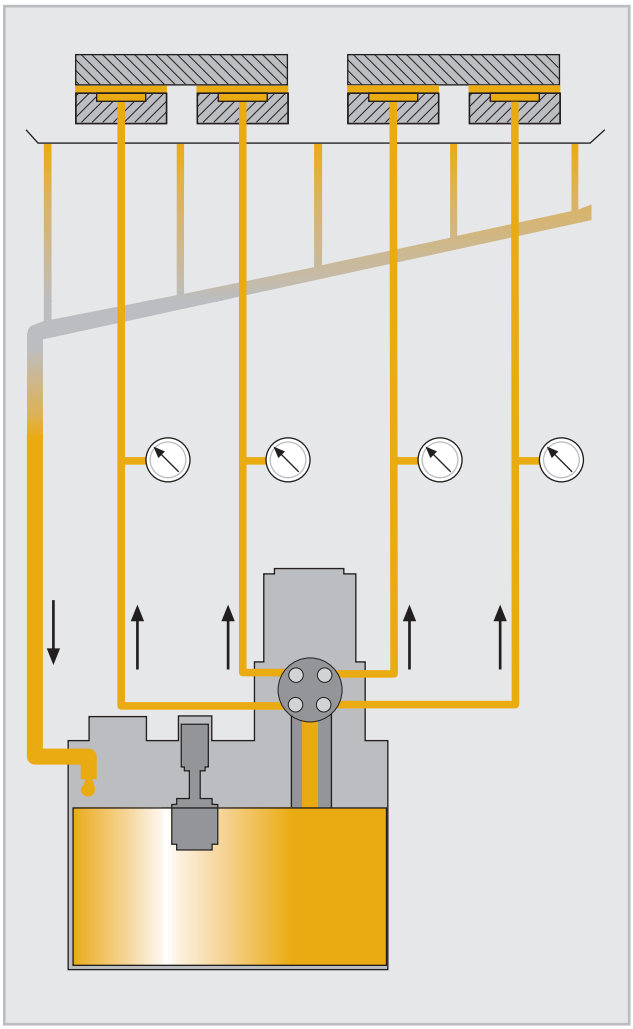
Applications

Bed guideways on machine tools

Principle

A multicircuit pump with a number of outlet ports delivers a constant flow of oil to the lube recesses on the workpiece slide. The discharged oil forms an extremely thin film of lubricant, thus providing for almost friction-free sliding. The workpiece slide is lifted a few µm and literally floats across the machine's bed.

A choice of lube recess sizes makes it possible to keep the pressure in the recesses within desired limits. Oil with an average viscosity is used, with the exception of a few special tasks.
In the case of bearing assemblies that are subjected to strong fluctuations in pressure it is possible to use a proportioning pressure valve to adjust the admission pressure to the respective pressure of a characteristic recess.



Components

Multicircuit gear or gerotor pumps,

safety valves, distributors,

main and secondary lines

Advantages

- Backlash-free bearings
- Jerk-free motion
- Low running noise
- Wear-free

Choice of products

Pump unit with reservoir

Gerotor pump unit

Multicircuit pump unit

Special solutions: Chain lubrication

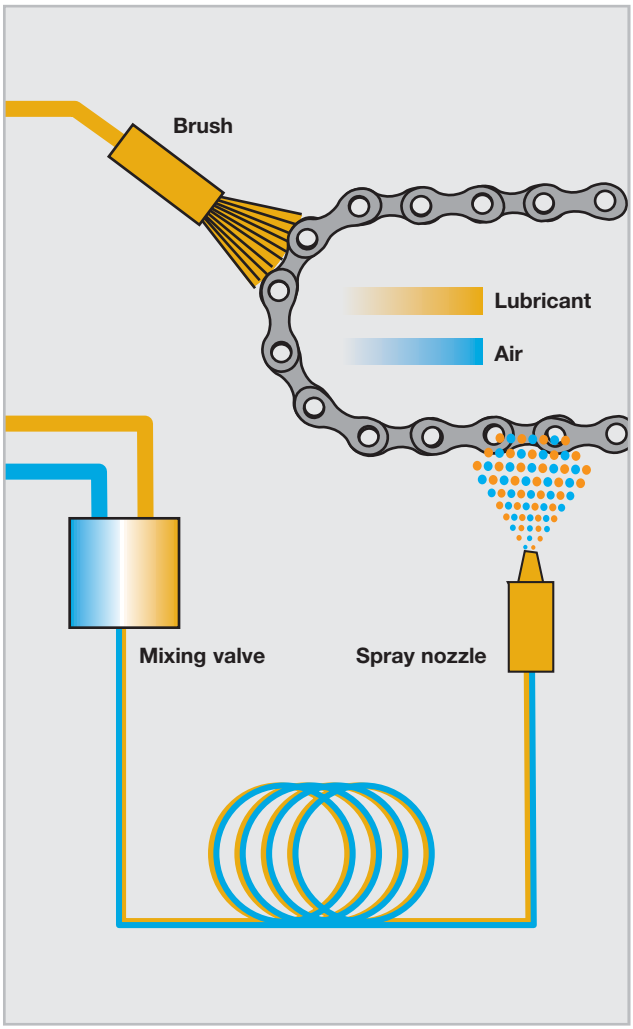
Applications

Drive chains and conveyor chains used in the

automobile industry: painting lines, kilns, surface finishing and assembly installations, conveyor systems

foodstuffs industry: sterilization systems, baking ovens, slaughterhouses, kilns

construction industry, woodworking industry, etc.



Principle

In the case of chain lubrication oil is applied from the outside (UC systems), grease injected into the chain studs with the help of a traveling system (GVP systems) or an aerosol sprayed onto the lube point (Vectolub). The lubrication system's control unit sees to exact positioning of the lubricating fixture, even when the chain is in motion.

UC systems: A magnetic piston pump supplies spray nozzles with oil. They spray precisely metered quantities of oil (20, 40 or 60 mm^3) exactly onto the lube points.

GVP systems: An injection head supplied by a pump briefly engages with the passing chain. The grease (0.35 to 1 ccm) is injected directly into the stud via a lube nipple. VISIOLUB® software is available for electronic process control and diagnoses when GVP systems are used.

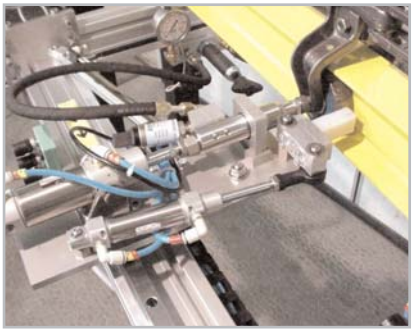
Vectolub: Metered lubricant is swirled with compressed air in a spray nozzle. That produces microdroplets that make their way to the friction point together with the carrier air without forming any mist.

Advantages

- Fully automatic chain lubrication without production interruptions
- Precise volumetric metering of lubricant
- Customized management of lubrication processes
- Precise, ecofriendly lubrication

Choice of products

UC system with magnetic piston pump



GVP traveling lube system

Vectolub minimal quantity lubrication system

Minimal quantity metering systems: Oil+air lubrication systems (OLA)

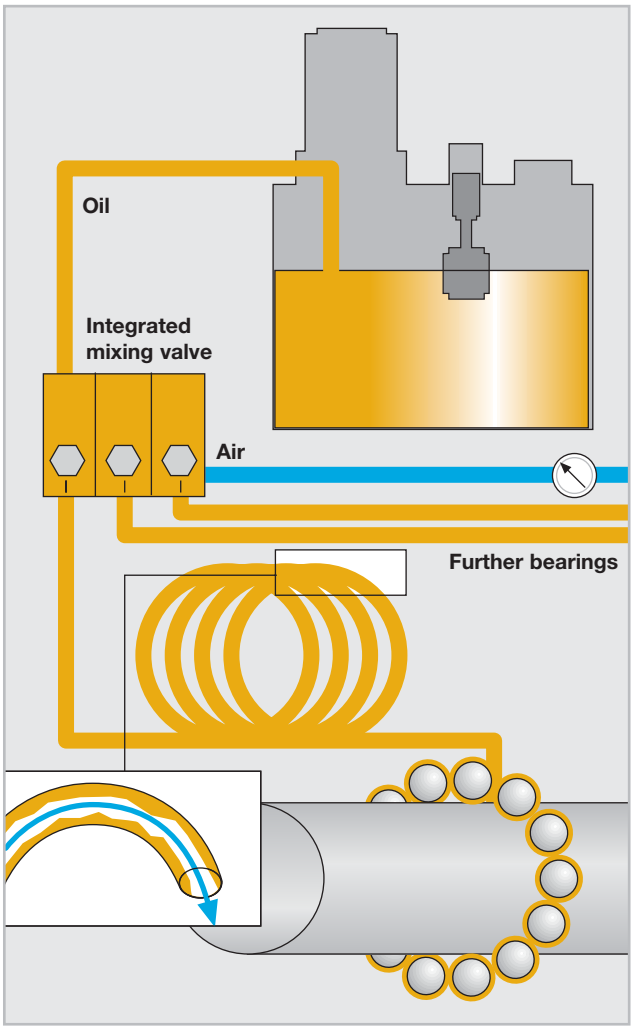
Applications

High-speed tool spindles,
bed ways, linear guides

Principle

Oil+air lubrication is a kind of minimal quantity lubrication. A stream of air in a narrow tube pulls a droplet of oil apart, thereby forming a streak that is fed in the direction of the lube point. The bearing is continuously supplied with fine droplets of oil via the outlet nozzle. The carrier air escapes from the bearing nearly oil-free.

The compressed air constantly emerging from the bearing also works as a barrier against particles of dirt. As a result, oil+air systems are also suitable for use on bed ways or linear guides when dirt poses a risk.



Components

Compact unit with gear pump or gear pump unit,
oil+air metering unit with built-in piston distributors,
ressure control valve for air, pressure gauge for the air pressure,
pressure switch for minimum air pressure, set of valves,
oil pressure switch, float switch, control unit, oil streak sensor.

The components can be purchased either as a unit (type OLA) or individually. The purchase of individual elements is advisable when (for reasons of space) the complete unit cannot be mounted on the machine.

Advantages

- Higher machining performance due to better speed characteristics
- Better operating reliability due to clean bearings — bearings protected from penetration by dirt
- Low consumption due to metering in line with the needs of every friction point

Choice of products

Oil+air system

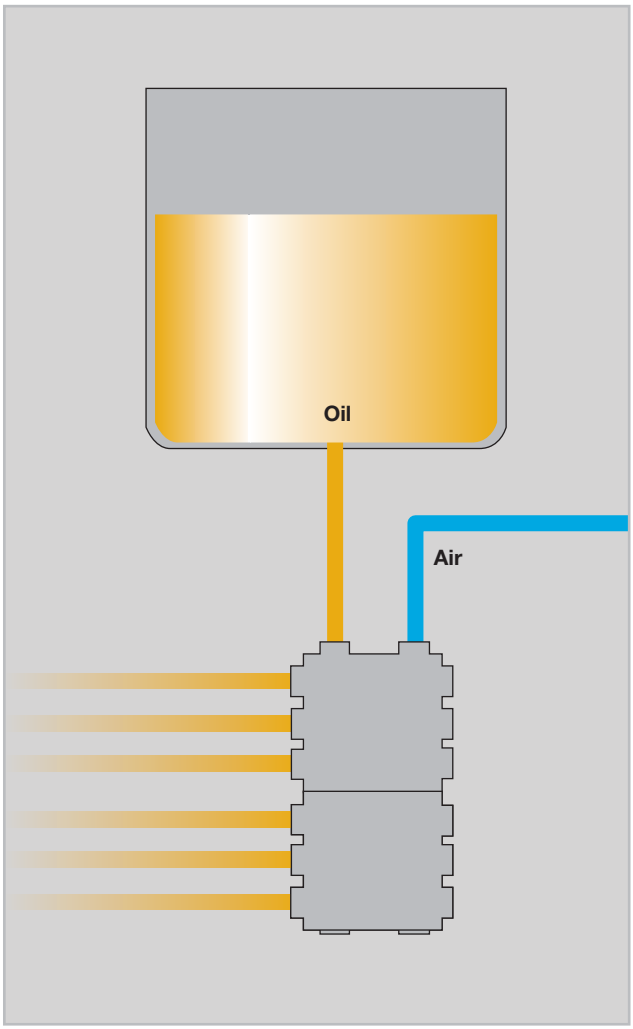
Mixing valve

Minimal quantity metering systems: Compressed air oiling

Applications

Pneumatic tools, cylinders and systems, cutting tools, welding electrodes, feed units, rolling bearings

Possible uses are spot or brush lubrication:
- Air oiling (assembly tools)
- Greasing of small parts (assembly support)
- Chain lubrication



Principle

Oil is added to the compressed air to increase the life and operating reliability of pneumatic equipment.

Injection oilers and micropumps meter out and deliver the lubricant. Injection oilers are used whenever suitable pulses of compressed air are available for their actuation and preparations have been made for the oiling process – either by atomization via mixing valves or by a direct feed of oil via mixing heads.
A micropump can be used for a lot of lubricating tasks. In particular, it can be used to spray oil by means of compressed air.

Components

Injection oiler, oil reservoir.

When used for only a few lube points it is possible to combine an injection oiler with a reservoir made of transparent plastic.

Advantages

- Optimal metering for each lube point regardless of line lengths and cross sections
- Lubricant supplied from a central reservoir, also via a central pressurized-oil line in the case of injection oilers
- Metering elements can be actuated individually or in groups
- Fast pulse sequence
- Space-saving design
- Ecofriendly: no oil in the exhaust air

Choice of products

Injection oiler

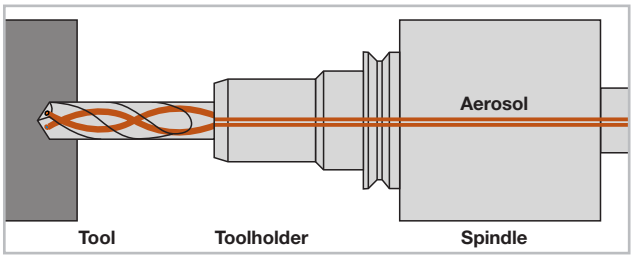
Injection oiler with reservoir

Micropump

Internal minimal quantity lubrication (MQL) LubriLean®

Wet machining

Dry machining



Internal minimal quantity lubrication

Principle

With internal MQL an aerosol is produced in the equipment's reservoir and fed through the rotating spindle to the tool. The oil supplied is completely used up with no residue being left when the optimum setting is used.

Minimal quantity lubrication is the clean alternative to wet machining and the ideal way to supplement dry machining. Instead of conventional aqueous cooling lubricants (emulsions, solutions) waterless biolubricants are used. They can be optimized for the respective machining process with the help of additives.

Advantages of minimal quantity lubrication

Cost cuts

- No cooling lubricant required
- Components like lubricant filters and conditioning systems can be dispensed with
- No disposal costs for chips and cooling lubricants
- No need to clean the workpieces

Better productivity

- Significant reduction of production time (30 - 50 %)
- Higher cutting efficiency
- Tool lives extended by as much as 300 %
- Reliable control of production processes

Exploitation of a technological advantage

- Solutions for OEMs and retrofitters
- Parallel use of wet and dry machining
- No change in spindle design required
- Better surface finish

Applications

Milling, rolling, shell end milling and form cutting, face milling, high speed cutting, hobbing, drilling, boring, tapping, buzz and band saws, forming and broaching.

Products

Modern machining centers with a large number of different tools require individual control of the aerosol quantity by stored-program control (SPC) of the machine tools. This control possibility is provided by the LubriLean® Digital system.

With the LubriLean® Vario system the required aerosol quality is set by manual regulation of the air pressure and lubricant quantity.

Advantages of almost LubriLean® range of products

- Can be used in all production processes, though they're specially suitable for small tools and high cutting speeds
- Short response times after tool changes
- No moving parts (wear-free)
- Easy to integrate in machine-tool systems

LubriLean® Digital 2

LubriLean® Vario

LubriLean®
MinimalLubricationSystems

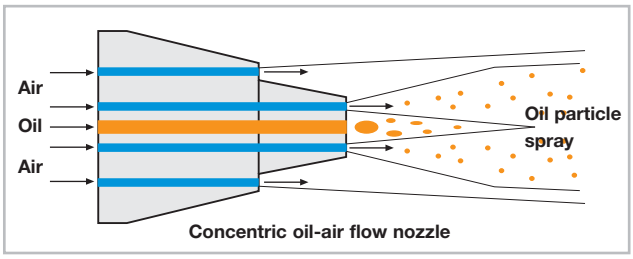
External minimal quantity lubrication (MQL) LubriLean®, Vectolub

Principle

With external minimal quantity lubrication a metered quantity of lubricant is atomized in a spray nozzle by compressed air. That produces microdroplets which make their way to the friction point together with the carrier air without producing any mist.

Applications

Cutting and forming tools



External minimal quantity lubrication

LubriLean®

The compressed air fed to the system pressurizes the lubricant reservoir. As a result, the lubricant is fed to the spray nozzle via a system of ducts and lines. The lubricant lines are coaxial so that the lubricant and atomizing air are fed to the spray nozzle separate from each other. Generation of the aerosol proper takes place in the nozzle's outlet. The lubricant is atomized and turned into extremely fine particles by the flow of compressed air. It is then sprayed onto the process spot with pinpoint accuracy.

Regulation of the required quantities of lubricant and atomizing air as well as the adjustment of pressure inside the lubricant reservoir are done by hand with the help of the control valves.

The **LubriLean® Basic** and **Smart** minimal quantity lubrication systems consist of a lubricant reservoir, one or more mixture regulating units and coaxial lubricant lines with spray nozzles.

Vectolub

A pneumatically actuated, positive-displacement micropump feeds lubricant through the internal capillaries of a coaxial tube to a spray nozzle.

The low-pressure carrier air directed through the tube is swirled in the nozzle. That splits the metered quantity of oil up into microdroplets that then make their way to the friction point together with the carrier air without any mist being formed. A closed layer of lubricant results due to the small size of these microdroplets.

A Vectolub system consists of the oil/air components and spray nozzles. These components are installed in a unit or in correspondingly prepared housings.

Advantages

- Retrofitting of conventional machine tools is inexpensive
- No dripping nozzles after shutdown
- Large spray distances possible (up to 300 mm)
- Small amount of jet splay thanks to special nozzle

LubriLean® Basic

LubriLean® Smart

Vectolub 1

Vectolub 2

Notes

Notice!

All products from VOGEL may be used only for their intended purpose. If operating instructions are supplied together with the products, the provisions and information therein of specific relevance to the equipment must be observed as well.

In particular, we call your attention to the fact that hazardous materials of any kind, especially the materials classified as hazardous by EC Directive 67/548/EEC, Article 2, Par. 2, may only be filled into VOGEL centralized lubrication systems and components and delivered and/or distributed with the same after consultation with and written approval from VOGEL.

All products manufactured by VOGEL are not approved for use in conjunction with gases, liquefied gases, pressurized gases in solution and fluids with a vapor pressure exceeding normal atmospheric pressure (1013 mbars) by more than 0.5 bar at their maximum permissible temperature.

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Your application	VOGEL centralized lubrication system					
	Total-loss systems			Circulating oil systems		
	Single-line	Dual-line	Progressive	Single-line	Multicircuit	Progressive
Brick-making machines				■		
Centrifuges			■			
Compressors	■					
Construction and material machinery			■			
Crane installations		■	■			
Escalators	■					
Food and beverage filling systems			■			
Large diesel engines				■		
Machine tools, machining centers	■		■		■	
Mining machines			■			
Mixing systems (granulate, concrete, etc.)		■	■			
Packaging machines	■					
Paper, cardboard and tissue machines	■		■	■		
Presses			■	■		■
Printing machines	■		■	■		
Purification plants		■	■			
Rolling mills		■	■			
Rubber and plastic machines	■		■			
Textile machinery	■					
Tunneling machines			■	■		
Waste incineration plants		■	■			
Water turbines			■			
Wind power installations	■	■	■			
Woodworking machines			■			

Special applications	Chain lubrication	Vectolub	Oil+air systems	Compressed air oiling
Conveyor and transport chains	■	■		■
Machine tool spindles			■	
Machine tools, driven by compressed air				■

Your application	Minimal quantity lubrication system	
	Internal MQL	Internal MQL
High-speed tools (turning, drilling, milling)	■	
Machine tool (drilling, milling, tapping, thread forming)		■
Universal milling machine		■