Centralized circulating-oil lubrication systems
Dual-line centralized grease lubrication systems
Multiline centralized grease lubrication systems
We organize the international paper machine symposium

The people you get in touch with have many years of experience in the field of paper machine lubrication. They undergo constant training and are familiarized with the latest techniques to make sure they are always on top of current demands.

And then there is also the paper machine symposium we sponsor at regular intervals. In particular, the lively exchange of information between our staff (projects/development) and you – our customers from the paper machine industry – is highly appreciated by both parties.

That makes it possible for us to develop solutions for the future based on your experience and ideas, and to implement them together with you.

We will be pleased to provide you with project-related CAD drawings on a CD for inclusion in the literature that accompanies your products.

For our customers: the latest technology, detailed literature – a matter of course at Vogel!

Special leaflets provide information about the individual components that can be used to lubricate a paper machine. They can be sent for from us or downloaded via the Internet (www.vogelag.com).
We see to fast delivery of customized solutions thanks to modular technology and production on the latest CNC machines

The uppermost aim of our developers is to meet the customer’s wish for efficiency and dependability, i.e. to create an absolutely reliable lubrication system with variable delivery rates. To do so we use the latest design, production and quality-assurance technologies – from the outline to the installation.

The overall process consisting of the planning, manufacture, installation and finalization is lean and flexible at Vogel. Your order is executed in a short period of time.

For the production of our parts we exclusively use the latest CNC machining centers with a high degree of automation permitting complete machining with little operator intervention. All the workpieces are produced in constant qualities with the help of customized software.

All the lubrication system’s components undergo a programmed and documented final inspection at special testing stations.

Quality assurance thanks to a coordinate inspection machine integrated into the production line.
VOGEL thinks in terms of systems
We offer complete solutions – from the idea to the ready-to-go handover

Consultation and planning
Your VOGEL project engineer has the industry-related knowledge it takes to master your task. He will help you find the optimal solution for your paper or board machine.

Production
Our modular range of products and modern CNC manufacturing permit customized solutions.

All-round service
- implementation
- testing of all functional parts
- startup of system
- instruction of operators
- assurance of trouble-free operation
- constant optimization

Project: Schwedt PM 4
Paper machine manufacturer: Voith Paper
Unit 1 reservoir capacity 9,000 l 600 l/min
Unit 2 reservoir capacity 6,000 l 380 l/min
Unit 3 reservoir capacity 3,000 l 200 l/min
Flow meter cabinets: 24
Monitoring units: 64
Lube points: over 400

Project: Huatai PM 10 (China)
Paper machine manufacturer: Voith Paper
Flow meter cabinets: 19
Monitoring units: 53
Lube points: over 300

Project: Minfeng PM 21 (China)
Paper machine manufacturer: Voith Paper
Unit 1 reservoir capacity 5,000 l 260 l/min
Flow meter cabinets: 12
Monitoring units: 22
Lube points: over 200
Project: Hürth PM 1
Paper machine manufacturer: Voith Paper

<table>
<thead>
<tr>
<th>Unit</th>
<th>Reservoir Capacity</th>
<th>Flow Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit 1</td>
<td>10,000 l</td>
<td>570 l/min</td>
</tr>
<tr>
<td>Unit 2</td>
<td>9,000 l</td>
<td>450 l/min</td>
</tr>
<tr>
<td>Unit 3</td>
<td>1,000 l</td>
<td>53 l/min</td>
</tr>
</tbody>
</table>

Flow meter cabinets: 15
Monitoring units: 42
Lube points: over 300
For every lubrication task the right solution: centralized circulating-oil and grease lubrication systems

Centralized circulating-oil lubrication systems as well as dual-line and multi-line centralized grease lubrication systems are used in the paper machine industry.

The centralized grease and circulating-oil lubrication systems developed by Vogel are based on a modular structure. As a result, they can be adapted in optimal fashion to the technological requirements of all kinds of paper and board machines.
from the planning to the completion – we think in systems

Our centralized grease and circulating-oil lubrication systems are distinguished by:

- Economy
- Functional dependability
- Reliability
- Maintenance ease
- Flexibility
Centralized circulating-oil lubrication system with function-specific system solutions

How it works
In circulating-oil lubrication systems the pumps in the pressure oil unit deliver large amounts of oil to the friction points. Depending on the application this is done via flow meters (VARIOLUB system) or flow limiters (and downstream progressive feeders). The oil fed into the bearings for lubrication and cooling purposes flows back through return lines to the oil reservoir of the pressure oil unit. From there the oil is fed into the lubricating circuit again after recooling and separation from particles.

Places used
Circulating-oil lubrication systems are used wherever rolling bearings have to be lubricated and simultaneously cooled with large amounts of oil. Dry end, wet end, calender.

Components
Pressure oil unit, optionally consisting of an oil reservoir with a max. capacity of 30,000 liters, oil preheating, filtration system, plate separator to remove air and particles as well as an oil recooling installation.
SMD type flow meters, or optionally SP/SMB flow limiters, with or without downstream progressive feeders, control and monitoring devices

Advantages
- Customized version
  The heart of the circulating-oil lubrication system, the pressure oil unit, is tailored to each paper or board machine. It can be supplied in any size or version needed.
- Apportioning to meet the need
  The respective lube points are supplied with oil via the metering and distribution system best suited to your paper machine.
- Assurance of machine availability
  The flow rate and operating status are monitored constantly. That leads to high functional dependability and thus to reliability of the circulating-oil lubrication system as well.
- Extended oil service life thanks to plate separator technology
  Highly effective cleaning and maintenance systems like microfiltrers and plate separators technology in the oil reservoir make sure the circulating oil is cleaned and vented in optimal fashion.
VARIOLUB flow meter system

How it works
The task of flow meters is to divide up the volumetric flow of the main line into parallel individual flows to meet the need, and, if necessary, to shut off individual lines.

The lubricant coming from the supply line flows into the gear chamber of the gear-type flow indicator, past the two gears all the way to the throttle screw. The flow rate is regulated by the choice (fine throttle or coarse throttle) and the setting of the throttle screw.

The oil flow turns the gears in the gear chamber. A NAMUR switch installed above one of the gears detects the revolutions of the gears and thus the flow rate.

A bypass system is integrated as a standard feature for easier servicing and to avoid downtime. Any service work can be performed without the need to change the throttle screw's setting and without impairing the lubricant feed.

Advantages
- Flow meters can be optimally combined with each other
- Apportioning to meet the need
- Integrated bypass system
- Gear-type flow indicator
- Modular design
- Setting and monitoring of individual volumetric flows with optimal utilization of space and continuous system expandability
- Simple installation
- Modular design of the VARIOLUB electrical monitoring system
- The display and programming of the VARIOLUB circulating-oil lubrication system can be done either on a laptop with the software specially developed for this system or at the process control level (Profibus-DP)

Places used
Throttle systems are used wherever it has to be possible to make small adjustments and corrections to the lubricant feed while the machine is running. Dry end, wet end, calender

Components
The VARIOLUB monitoring system consists mainly of the pressure oil unit, flow meters and electrical monitoring units.
Flow limiter system

How it works
The task of flow limiters is to divide up the volumetric flow from the pressure oil unit into parallel individual oil flows and to “limit” them to meet the need, i.e. to keep them constant.

The individual flows are predefined with a nozzle. The lube point is supplied directly or via a progressive feeder downstream of the flow limiter.

Places used
Dry end, wet end, calender

Components
The flow limiter system consists mainly of a pressure oil unit, flow limiters, downstream progressive feeders and electrical monitoring units.

Advantages
- Apportioning to meet the need
- Easy installation
- The flow limiters are mounted as modular elements on a baseplate. This baseplate also contains the inlet and outlet ports.
- Constant oil flow
- The volumetric flow produced does not depend on the system’s pressure and is nearly independent of the viscosity.
- Adjustment of the oil flows at a later date
- Can be switched over to small or large oil flow – for start-up or normal operation of the paper machine
- This can be done hydraulically or electromagnetically (with a special version of the flow limiter) – without changing the system’s pressure.
- Sure and precise monitoring
- The oil flow can be monitored with both a gear-type flow indicator (dynamic) and an electrical sensor (static).
- Lube points supplied via flow limiters and downstream progressive feeders.

How it works
The task of flow limiters is to divide up the volumetric flow from the pressure oil unit into parallel individual oil flows and to “limit” them to meet the need, i.e. to keep them constant.

The individual flows are predefined with a nozzle. The lube point is supplied directly or via a progressive feeder downstream of the flow limiter.

Places used
Dry end, wet end, calender

Components
The flow limiter system consists mainly of a pressure oil unit, flow limiters, downstream progressive feeders and electrical monitoring units.
Monitoring systems

How it works

Monitoring units
The pulses generated by the gear-type flow indicator are detected by a pulse monitoring unit.

The individual IPM-12 units can be combined via an RS 232 interface to form a group. Fault and warning signals are reported via floating contacts as group alarms.

Moreover, with a gateway it is also possible to transfer the individual flow rates to the process control level via Profibus DP.

Display and programming unit
The display and programming unit is used for the local display of flow rates and to set specified values for groups of upstream pulse measuring units.

Advantages

• Both sensor systems are suitable for individual or group monitoring.
• Vogel’s software for circulating-oil lubrication systems makes it possible to use a PC or laptop to perform the same functions as the display and programming unit. It is possible to store data on a cyclical basis.
• We supply turnkey control cabinets, completed to meet the customer’s wishes.

Components

• IPM-12 pulse monitoring unit
• hand-held display unit
• PGA-2 display and programming unit
• Vogel software for circulating-oil lubrication systems
Dual-line centralized grease lubrication system

How it works
Dual-line centralized grease lubrication systems consist of two main lines that are alternately pressurized or relieved of pressure. They are suitable for oil with a service viscosity greater than 50 mm/s and also for grease up to NLGI grade 3.

Places used
Dual-line centralized grease lubrication systems are mainly used wherever operating conditions are found like those, for instance, in the wet end section of paper machines. There the grease performs the additional task of sealing the bearings off against water and dirt.

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

Advantages

- **High dependability** thanks to measurement of the pressure differential at the end of the line (before the last dual-line distributor) with simultaneous monitoring of the main lines for breaks

- **Apportioning to meet the need** The delivery rate is infinitely adjustable. Every lube point gets exactly the amount of grease it needs.

- **Great flexibility** The system can be arbitrarily expanded by means of branch lines. Systems with as many as 1000 lube points are possible. The permissible ambient temperature ranges from roughly -25 °C to +80 °C.

- **High lubricating reliability** A high degree of lubricating reliability at the lube points is achieved with maximum system pressures of 400 bars.

- **Great operating reliability** through the use of rugged, low-wear dual-line distributors and electrical monitoring devices. Dual-line centralized lubrication systems run fully automatically. An electronic control unit is specially matched to the respective operating conditions.
Multiline centralized grease lubrication system

How it works
With this lubrication system every lube point is supplied directly with grease via a line from the pump. The multiline grease pump has as many as 24 outlet ports. The delivery rate is infinitely adjustable at each pump element. If more than 24 friction points have to be supplied with lubricant, it is possible to install progressive feeders downstream of the direct lines. Multiline grease pumps are suitable for oil with a service viscosity greater than 50 mm²/s and also for grease up to NLGI grade 3.

Places used
Outdoor areas, conveyor belts, chipping machines, debarkers, fiber extraction machines, pulp grinders, wet end section

Components
Multiline centralized grease lubrication systems consist mainly of an electrically driven piston pump, distributors and control unit.

Multiline centralized grease lubrication system: every lube point is supplied with grease directly via a line (max. 24 pump elements) from the pump or indirectly via a progressive feeder.

Advantages
- Universally applicable in respect to the mode of operation (continuous/intermittent) and lubricant
- Central function monitoring possible at the respective progressive feeder with little time and expense
Our service assures your efficiency and runnability

Installation service
A smoothly functioning centralized lubrication system presupposes expert installation of the individual components.

Our service technicians have the competence.
They have many years of experience with the installation of every size of lubrication system. They are constantly informed about new and further developments and trained to deal with them in order to keep up to date with the latest lubrication technology.

Instruction service
Comprehensive instruction of your maintenance staff is provided on the spot by VOGEL’s service department.
Regular training courses – held by VOGEL – help to refresh and deepen your service staff’s knowledge.

Maintenance
Paper machines usually run in continuous operation around the clock, and thus their lubrication systems as well.
To prevent undue wear and the down-times entailed thereby, our VOGEL service team is available on the spot, among others for:
- regular inspections
- maintenance of lubrication system components
- replacement of worn parts

Installation of a plate separator. It is used to remove air, water and solids from the circulating oil.
Progressive feeders on baseplate: individual modules can be quickly and easily replaced. The pipework remains unaffected.
**Optimization and expansion service**

We will help you find the most economical solution in the event your paper machine is expanded or converted.

As specialists in the field of paper and board machine lubrication we are always able to bring the components of a lubrication system up to the state of the art required by your paper machine – from the pressure oil unit and distributor elements to the control and monitoring units.
We give our customers expert competence

You’re looking for optimal lubrication for your paper machine. We’ll help you find it with:

• personal consultation on site
• individual planning
• complete system solutions
• workshops and seminars
• up-to-date product documentation

Our performance goes far beyond the supply of products and components. It starts with extensive consultation, planning and engineering from our project engineer. He is responsible for the complete project – up until the successful startup. The installation and startup follow subsequent production of all the hardware used in the lubrication system (from the pressure oil unit and tubing, control and distributor elements all the way to the monitoring equipment).

Special software to fit your project, after-sales service and extensive digital documentation of the system round off our complete range of services.

The latest CAD workplaces make sure that even complex installations can be quickly and smoothly designed or adapted to meet your wishes.

We have the know-how it takes for our staff and yours to work out the optimal lubrication system for your facility.
Modern manufacturing and assembly equipment
at the Hockenheim plant

For more than 40 years now Willy Vogel
AG in Hockenheim (formerly Vögele,
Vogel fluidtec) has been planning, building
and supplying systems and components
for the lubrication of all kinds of
machinery, installations and vehicles.

Our strength as the market leader
in the systems business is to be found
not only in customized lubrication
installations for paper and board machi-
nies but also in our all-round service
available all over the world for your
system.

Extract from our list of references:

Our satisfied customers around the
world include every well-known
paper machine manufacturer and
user.
Components for circulating-oil lubrication systems

<table>
<thead>
<tr>
<th>Component Description</th>
<th>Rated flow</th>
<th>Leaflet No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>VARIOLUB circulating-oil lubrication system</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VARIOLUB modular circulating-oil lubrication system</td>
<td>204/03-07/1000</td>
<td></td>
</tr>
<tr>
<td>Flow meters SMD 1A, SMD 2, SMD 3</td>
<td>DSK 0-052-02</td>
<td></td>
</tr>
<tr>
<td>SMD 1A</td>
<td>0.05 to 0.25 l/min</td>
<td></td>
</tr>
<tr>
<td>SMD 2 (fine)</td>
<td>0.10 to 4.40 l/min</td>
<td></td>
</tr>
<tr>
<td>SMD 2 (coarse)</td>
<td>4.00 to 8.00 l/min</td>
<td></td>
</tr>
<tr>
<td>SMD 3</td>
<td>4.00 to 40.00 l/min</td>
<td></td>
</tr>
<tr>
<td>Circulating-oil lubrication system with flow limiters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flow limiter SP/SMB 9</td>
<td>1-3002</td>
<td></td>
</tr>
<tr>
<td>0.09 to 8.18 l/min</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flow limiter SP/SMB 10</td>
<td>1-3003</td>
<td></td>
</tr>
<tr>
<td>0.21 to 8.15 l/min</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flow limiter SP/SMB 13</td>
<td>1-3004</td>
<td></td>
</tr>
<tr>
<td>0.6 to 30 l/min</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flow limiter SP/SMB 14</td>
<td>1-3005</td>
<td></td>
</tr>
<tr>
<td>25 to 100 l/min</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flow limiter SP/SMB 8</td>
<td>DSK0-50-08</td>
<td></td>
</tr>
<tr>
<td>Mounted on base plate</td>
<td>0.09 to 8.18 l/min</td>
<td></td>
</tr>
<tr>
<td>Flow limiter SP/SMB 3 and SP/SMB 6</td>
<td>1-3001</td>
<td></td>
</tr>
<tr>
<td>SP/SMB 3</td>
<td>6.0 to 38 l/min</td>
<td></td>
</tr>
<tr>
<td>SP/SMB 6</td>
<td>25 to 132 l/min</td>
<td></td>
</tr>
<tr>
<td>Control and monitoring units for circulating-oil lubrication systems</td>
<td>DSN 0-007-0</td>
<td></td>
</tr>
<tr>
<td>Control and monitoring units</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Progressive feeders</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modular feeders PSG (PM)</td>
<td>1-3011</td>
<td></td>
</tr>
<tr>
<td>Delivery rates</td>
<td>0.8 ccm/stroke</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.6 ccm/stroke</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.4 ccm/stroke</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.2 ccm/stroke</td>
<td></td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>-15 °C to +110 °C</td>
<td></td>
</tr>
<tr>
<td>Lubricant</td>
<td>mineral and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>synthetic oils</td>
<td></td>
</tr>
<tr>
<td>Operating pressure</td>
<td>up to 200 bars</td>
<td></td>
</tr>
</tbody>
</table>
### Components for centralized grease lubrication systems

#### Technical data and reference to leaflets

The following detailed individual leaflets covering the field of lubrication technology for paper and board machines can be sent for from us or downloaded from our web site. The leaflets listed represent an extract from our extensive range of products.

Fax +49 (0) 62 05 / 27-101
www.vogelag.com

<table>
<thead>
<tr>
<th>Specification</th>
<th>Leaflet No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dual-line centralized grease lubrication systems</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Application, function, system layout</strong> (heavy machine sector)</td>
<td>1-0012</td>
</tr>
<tr>
<td><strong>Lube pumps</strong></td>
<td>1-0012-1</td>
</tr>
<tr>
<td>Delivery rate</td>
<td>up to 21 kg/h (FD3)</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>-25 °C to +80 °C</td>
</tr>
<tr>
<td>Lubricant</td>
<td>grease up to NLGI grade 3 (worked penetration &gt; 220 1/10 mm)</td>
</tr>
<tr>
<td>Operating pressure</td>
<td>up to 400 bars</td>
</tr>
<tr>
<td><strong>Hydraulic and electrical control units</strong></td>
<td>1-0012-2</td>
</tr>
<tr>
<td>Hydraulic and electrical changeover valves</td>
<td></td>
</tr>
<tr>
<td>Differential pressure switches</td>
<td></td>
</tr>
<tr>
<td>Electrical switching devices</td>
<td>(Profibus) Siemens S7</td>
</tr>
<tr>
<td>Infinitely adjustable delivery rates</td>
<td></td>
</tr>
<tr>
<td><strong>Lubricant distributors</strong> (block-type)</td>
<td>1-0012-3</td>
</tr>
<tr>
<td>Infinitely adjustable delivery rates</td>
<td>0 - 0.5 ccm/stroke</td>
</tr>
<tr>
<td></td>
<td>0 - 1.5 ccm/stroke</td>
</tr>
<tr>
<td></td>
<td>0 - 5.0 ccm/stroke</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>-25 °C to +80 °C</td>
</tr>
<tr>
<td>Lubricant</td>
<td>grease up to NLGI grade 3 (worked penetration &gt; 220 1/10 mm)</td>
</tr>
<tr>
<td>Operating pressure</td>
<td>up to 400 bars</td>
</tr>
<tr>
<td><strong>Lubricant distributors</strong> (modular)</td>
<td>1-0012-4</td>
</tr>
<tr>
<td>Infinitely adjustable delivery rates</td>
<td>0.10 - 1.0 ccm/stroke</td>
</tr>
<tr>
<td></td>
<td>0.25 - 3.0 ccm/stroke</td>
</tr>
<tr>
<td></td>
<td>0.25 - 24 ccm/stroke</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>-25 °C to +80 °C</td>
</tr>
<tr>
<td>Lubricant</td>
<td>grease up to NLGI grade 3 (worked penetration &gt; 220 1/10 mm)</td>
</tr>
<tr>
<td>Operating pressure</td>
<td>up to 400 bars</td>
</tr>
<tr>
<td><strong>Multiline centralized grease lubrication system</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Grease lubrication pump FB</strong></td>
<td>DSK 2-005-00</td>
</tr>
<tr>
<td>Delivery rate</td>
<td>5 ccm/min and outlet port or pump element</td>
</tr>
<tr>
<td>Number of pump elements</td>
<td>1 to 24</td>
</tr>
<tr>
<td>Operating pressure</td>
<td>up to 350 bars</td>
</tr>
</tbody>
</table>