An IMCI Company

Lubrication with oil and air

BIJUR DElimon®
INTERNATIONAL

SKJ Jet

Lubrication with oil and air
About us

The BIJUR DELIMON International family includes well-known brands from the field of lubrication technology: BIJUR, DELIMON, DENCOR Lubrication, FARVAL and LUBE SITE.

Since its foundation over 140 years ago, BIJUR DELIMON International is one of the world’s leading manufacturers of central lubrication systems for all types of industry and applications. Today we have facilities in nine core markets throughout the world offering design, manufacture, development, sales, maintenance and service facilities, and employing over 1000 highly qualified and dedicated staff ready to provide solutions to your lubrication needs.

Service is provided over six continents, with our technical competence in the development of customer-specific solutions for the metallurgy industry, plant engineering and mining industries, being of vital importance to our global customers with international clients.

The development of innovative concepts using the latest 3D CAD/CAM technology, production in state-of-the-art high-performance machining centres and the continuous ongoing training of our employees mean that we can always offer our customers the best possible solution for their specific applications.

The BIJUR DELIMON product portfolio comprises innovative total solutions in the fields of central lubrication systems and cooling, together with all necessary components such as pumps, distributors, switchgear and control units, special lubrication equipment and accessories.

BIJUR DELIMON products and projects guarantee you absolute reliability and precision.

Supporting you with sophisticated technology

Efficiency, speed and sustainability are the key words for profitable production, and so production machinery and equipment must always meet the highest requirements.

Continuous or frequent, precisely metered lubrication is the best way of ensuring that your machinery does not fail unexpectedly or prematurely due to lack of lubrication. We have taken the varied requirements of our customers into account in a wide variety of ways in our Skyjet systems. Skyjet offers a customised complete solution that meets many practical application needs:

- State-of-the-art electronic control systems for very high levels of functional reliability.
- Simple integration into your automated process, with clear customer interface.
- Modular installation allows for quick setup and the use of cost-effective pipe work installation.
- Very low air consumption and the lowest possible lubrication requirements reduce the costs of ongoing operation.
- Integrated filters prevent contamination, which in turn helps to avoid failures and increased maintenance costs.
- The existing positive-pressure in the bearings prevents contamination from the outside.
- The lack of moving parts allows for practically maintenance-free operation.
- The compact design and high product quality of the individual components eliminates the need for cost-intensive stocking of expensive parts.
- Qualified personnel can devote themselves to other tasks.
- Dangerous plant fires caused by excess grease? – No longer a problem!
How does it work?

The SKYJET principle is based on the flow-related distribution of an oil-air mixture. This patented distribution system with no moving parts offers extremely high levels of process reliability, a very long service life, guarantees distribution to the individual lubrication points with precision levels of >95%. Of all the systems on the international market, SKYJET is the one that offers the lowest energy consumption with the highest distribution precision.

A constant airflow means that precisely measured volumes of lubricant are transported through the delivery system at fixed intervals to the lubrication points as continual drip-feed lubrication.

- Save operating costs
- Achieve amortisation of your investment as quickly as possible

An integrated nozzle system means that extremely low air consumption is achieved right from the system design, helping you:

A continual film of oil is always present in the pipe even with longer pipe runs and longer injection intervals: The flow of compressed air continuously moves the film of lubricant on the inner walls of the pipe, and delivers this to the lubrication points evenly and on an ongoing basis.

Areas of application

Typically all mechanical and plant applications relating to rolling bearing lubrication.

- Oil-air lubrication systems can be used wherever rolling occurs.
- The high levels of flexibility mean that Skyjet systems can also be used for special tasks:
  - For seals that are exposed to external influences such as dust or water
  - For hard-to-access lubrication points
  - Sump lubrication on vertical axes
  - Single lubrication points with monitoring for specific bearing points

System size

There is practically no limit to the number of bearing points that can be supplied using the Skyjet lubrication systems. The oil-air mixture can supply both individual lubrication points as well as systems with a few hundred to several thousand lubrication points.

Lubricants and volumes

Commercially available lubricating oils in the viscosity range from 68 to 680 cSt at 40°C can be used.

The volume of lubricant to be dispensed is individually designed depending on the bearing and sealing system in question. The volume of lubricant delivered per time interval will be significantly lower than with comparable grease lubrication. With sump lubrication, there is the option of dosing extremely small quantities with the purpose of maintaining the level or of replacing the lubricant in the sump.
Air pressure and air volume

The existing compressed air system should allow for minimum supply pressure of 6 bar, provided that a pre- and sub-distribution system is available.

For a system that only has components at the sub-distribution level (sub-distributors, lances or nozzles each at one outlet of the distribution cabinet), a supply pressure of 5 bar is sufficient.

Before entering the SKYJET system, the compressed air must be cleaned to remove particles and condensation.

The temperature of the injected air must not be below 20°C, and the oil must not be below 30°C with an oil viscosity of greater than 380 cSt. A specific air flow occurs, depending on the set operating pressure (default 5 bar), the pipe lengths and the arrangement of the components that allocate the oil-air flow.

System setup

Depending on the application and customer-specific requirements, SKYJET consists of the following main components:

Oil unit:
+ Tank volume 250, 500, 800, 1000 litre or on request
+ Motorised gear pumps (main pump and reserve pump)
+ Filter unit
+ Filling level indicator
+ Heating system with temperature regulation
+ Main line with shut-off valve

Electric control unit:
+ For parameterisation, control and monitoring of the entire system with customer interface, suitable for remote control or for operation with the touch panel
+ Either pre-assembled on the unit or delivered separately

Distribution cabinet:
The oil-air flow is generated in the SKYJET distribution cabinet via mixing blocks, and is then evenly distributed.
+ 1 to 8 outlets
+ Compressed air preparation unit with filter regulator
+ Air shut-off valve, oil supply solenoid value
+ Progressive distributors, electrically monitored
+ Airflow monitoring (optional)
+ Terminal box
**Distributors:**

SKYJET compact distributors (pre- and sub-distributor) with up to 6 outlets distribute the oil-airflow in equal, defined volumes. SKYJET lances can be customised for different consumers by adapting the installation length to the spacing of the rolling bearings and the volume distribution of the lubricant.

SKYJET compact distributors allow for a beneficial system setup in which one oil-air supply line is delivered close to a group of lubrication points, which are in turn supplied with lubricant by means of pre- and sub-distributors or lances, with short supply lines. This modular setup significantly reduces the amount of effort required for the pipe laying.

The listed components are combined to form a complete system in accordance with the customer’s specific requirements.

Figure 1: Example setup of a SKYJET system
Depending on the application size, complex systems with up to several hundred or thousand lubrication points are possible.

**Figure 2:** Diagram showing a complex SKYJET system with several distribution cabinets and pre- and sub-distributors

### Pipeline lengths and design of the pipeline diameters

There is no limit to the length of the main oil-air line between the outlet and the first component. With lines in excess of 3 metre long, there is a possibility that lubricant will not be evident at the lubrication point immediately after the system is switched on, and this must be taken into consideration before starting the machine being lubricated.

For the supply of individual lubrication points, an internal line diameter of 3 – 5 mm is recommended; in the event of more comprehensive equipment with a distribution system, the pipeline diameter can be calculated in accordance with the pipeline planning.

If sections of the pipeline are not exposed to radiant heat, then a clear plastic tube is recommended, which would provide visual indication of the air-oil flow (otherwise, steel or copper tubing should be provided). The oil-air line can be routed in any direction. The oil-air mixture is transported upwards in vertical pipelines, to heights not exceeding 7.5 metres.

### Control system design

The control system is fitted in a cabinet with external switches on the oil unit. The tried-and-tested standard software allows for the independent control of up to eight sub-systems with groups of up to eight individual distribution cabinets.

The parameters for oil dispensing and flow monitoring can be managed for each distribution cabinet. Rapid fault diagnostics is also possible thanks to the clear division of the user interface.

The system can be set to remote control via a control centre or a higher-level control system, and will then be controlled by means of the customer interface which allows for rapid fault diagnostics and the external control of a SCADA system.
System monitoring

The lubricant dosing and the airflow to the outlets of the distribution cabinets can be monitored. The use of transparent plastic tubing for the oil-air line, as mentioned above is sufficient for simple visual inspections. The lubricant supply is monitored by the limit switches on the progressive distributors. There is also the option of having the airflow from the outlets to the distribution cabinets monitored by flow transmitters. This is recommended if using inter-connectors in the oil-air main line from the outlet of the distribution cabinet through to the first allocating component.

SKYJET compact distributor

The SKYJET compact pre-distributor takes a volume of mineral oil introduced by air flow and distributes it to up to 6 sub-distributors in sub-volumes.

The SKYJET compact sub-distributor takes the volume of mineral oil introduced by air flow and distributes it to 2 to 4 or 5 to 6 lubrication points in equal sub-volumes.

The compact distributor can be attached directly to the system using socket head screws, without the need for any additional mounting brackets.

Both types of compact distributor can be attached directly to the system using socket head screws, without the need for any additional mounting brackets. The distributor is fitted with a filter element on the inlet port, which prevents possible contaminants introduced through coupling points and associated pipe work from entering the lubrication points. The compact distributor is made from seawater-resistant aluminium or stainless steel, providing a very long service life even in heavily corrosive operating conditions.

For use in a complex system, there is the option of pre- and sub-distribution. A SKYJET pre-distributor allows for distribution to up to 6 sub-distributors from 6 outlets, from where a maximum of 36 lubrication can be connected, using a wear-free pre-/sub-distributor system with no moving components.

SKYJET lances

The SKYJET lance distributes the lubricant supplied by an airflow to up to 5 lubrication points in equal or unequal sub-volumes.

SKYJET lances consist of several supply segments with spacers combined in a single distributor.

The lance is pre-assembled and delivered in one piece, designed to meet the requirements of the bearings and seals to be lubricated with regards to the dimensions and volume of air-oil. This makes the lance significantly easier to install and remove from the roll stand.

As with the compact distributor range, there are lances for the pre-distribution to a maximum of two additional lances downstream. They were developed to simultaneously supply the lance on the drive side and the lance on the none-drive side of a steel or aluminium mill with an oil-air mixture using just one connection line on to the mill stand.

Each lance distributor is fitted with a filter element, which prevents possible contaminants introduced through coupling points and associated pipe work from entering the lubrication points.
Since 1872 an innovator in lubrication technology

BIJUR DELIMON International has production facilities throughout the world, and these are certified to ISO 9001:2008 and ISO 14000. You can be confident that your centralised lubrication system satisfies the highest industrial quality standards. We are committed to quality and customer service!