

Maintenance-Free Miniature Guideways Last a Lifetime

INTRODUCTION

For years, maintenance engineers servicing equipment requiring precision motion systems have been challenged by a common issue: relubricating miniature guideways in space-constrained positions. These guideways have holes in the ends of their carriages to insert oil or grease. However, in cramped locations, maintenance engineers can find it exceedingly difficult to insert oil or grease into the component. If not regreased at regular intervals, the oil layer between the guideway's balls and racetrack will be lost — damaging the guideway and possibly ending its operating life.

To solve this problem, SCHNEEBERGER has developed the LUBE-S maintenance-free option for its MINIRAIL line of miniature guideways. This solution is ideal for applications that require high motion accuracy and precision, but where there is little or no space to perform lubrication.

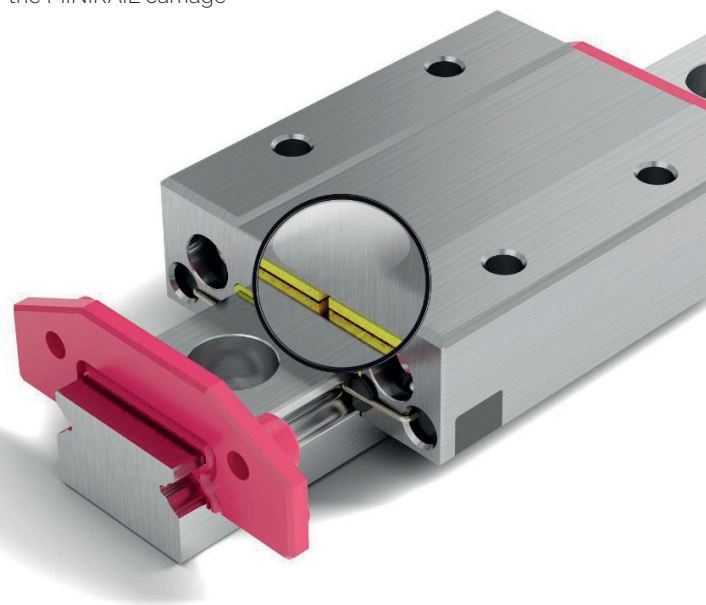
This application brief will review the operation of the LUBE-S integrated long-term lubricator, explore its primary applications, and discuss the benefits of its use.

How does the LUBE-S lifetime lubricator work?

The LUBE-S option is a lubricant reservoir that fits inside the MINIRAIL guideway's carriage. Its pad is made of a special material that holds the oil, but maintains its form in the carriage. The pad is soft enough to work as a reservoir to retain the lubricant, even when the carriage is moving up to 30 G. The LUBE-S utilizes the capillary effect to dispense stored lubricant by tangential contact, in all possible installation orientations, directly to the ball-rolling elements. Its reservoir contacts the ball bearings at a single point. The push forces of the carriage is very low and the smoothness of the MINIRAIL system is maintained at a high level.

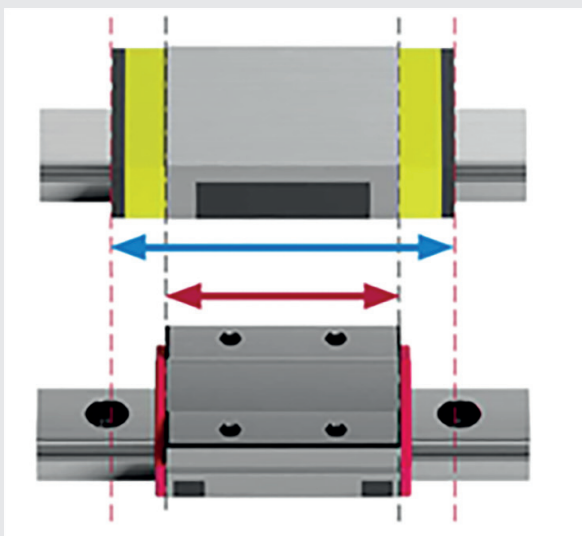
Since the external dimensions of the MINIRAIL carriages remain the same with the LUBE-S option, the guideway's maximum stroke is not affected. LUBE-S ensures proper lubrication even in short-stroke applications.

LUBE-S is integrated inside the MINIRAIL carriage



SCHNEEBERGER'S lubrication partner has developed a LUBE-S oil that will work in a 20° C to 80° C temperature range while retaining the correct viscosity. Selecting the appropriate oil viscosity was an essential issue. If too high, the oil will remain in the pad and not be released, limiting the lubrication quality. If the viscosity is too low, the oil will be too thin and will be released from the pad too soon, reducing the lubrication lifetime. In addition, a special oil for the LUBE-S lubricator is available that is certified for food and pharmaceutical applications.

When installing the LUBE-S option, a grease application is applied during the first few meters of MINIRAIL carriage travel. The grease serves as a blocker, stopping oil flow. After several kilometers of carriage running time, the grease is removed and the oil remains for the lifetime of the guideway. This saves oil during the start-up phase of the MINIRAIL system.



The carriage length of the MINIRAIL with LUBE-S remains unchanged and does not affect the stroke

LUBE-S:

The Optimal Extended Lubrication Option for Short-Stroke Applications

While other linear guideway suppliers have extended lubrication options, SCHNEEBERGER is the only one with the lubrication pad/oil reservoir mounted inside the carriage. With a short-stroke application, the LUBE-S lubricator ensures the oiling of the guideways' pre-loaded balls – guaranteeing maintenance-free operation. Other suppliers' options locate the reservoir package on the side of the guideway or in its retainer hole. With a short-stroke application where the balls move only a few millimeters, some of the balls will never be lubricated with these extended lubrication options.

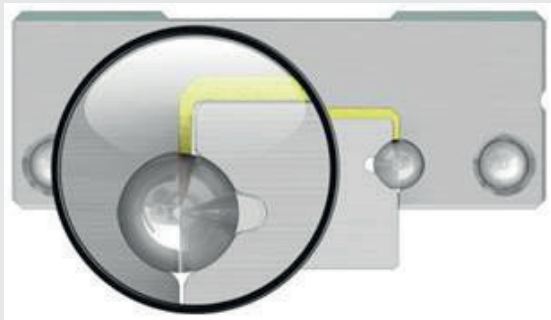
Who Needs the LUBE-S option?

Lubrication is critical for short-stroke, high-speed, high-acceleration applications. With today's emphasis on miniaturization, guideways typically operate in small, hard-to-reach spaces. As a result, lifetime lubrication systems such as LUBE-S become highly desirable options.

Examples of these applications include vision systems that make multiple images to create a 3D picture. Or electronic pick-and-place equipment that inserts microelectronic components on a circuit board. These high-speed systems require short, accurate movements of 200 micrometers.

Linear XY table systems for laser mapping equipment, telecom instruments, microscopy, and spectroscopy represent additional applications where no lubrication maintenance is an attractive benefit. Robotic systems also are ideal for incorporating MINIRAILS with LUBE-S in their arms.

The MINIRAIL with LUBE-S lubricates the ball bearings which are directly under the load



Customization without Trepidation

Applying miniature guideways to OEM products frequently involves customization. The MINIRAIL can be customized or optimized very easily, and these alterations will not affect the addition of the LUBE-S option. An OEM engineer can add the LUBE-S option to a standard MINIRAIL design without any additional effort since the MINIRAIL's fixing holes and dimensions meet ISO norms. This makes it easy to incorporate LUBE-S technology and avoid additional collaborative engineering work.

The Benefits of the LUBE-S Option

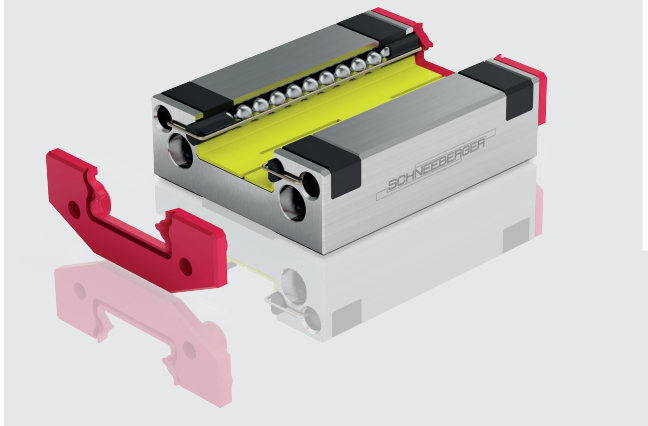
The primary benefit of LUBE-S technology is maintenance-free¹ operation over the lifetime of the MINIRAIL guideway. The long-lasting LUBE-S oil provides uninterrupted, safe guideway movement for 20,000 km under normal environmental conditions.² If an application runs only a few hours a day, the MINIRAIL guideway would perform maintenance-free over the lifetime of the OEM system. In addition, the LUBE-S option's oil is certified for a 5-year lifetime by SCHNEEBERGER'S lubrication partner. Experience has shown that the OEM customer's product will typically wear out before the MINIRAIL with LUBE-S system.

Along with a substantial reduction in maintenance costs, the LUBE-S option creates additional value for OEM design engineers.

- In a short-stroke application, the LUBE-S lubricator ensures the oiling of the guideways' pre-loaded balls — guaranteeing maintenance-free operation for short-stroke movement. This lifetime lubrication is possible because SCHNEEBERGER is the only supplier that mounts the lubrication pad/oil reservoir inside the guideway's carriage.
- The integrated LUBE-S technology does not enlarge the installation footprint of the MINIRAIL miniature guideway and does not impair its travel path. It preserves the full scope of the MINIRAIL's running characteristics and displacement forces.
- Since the LUBE-S pads operate inside the carriage, there are no changes in guideway dimensions. This makes replacement with a new MINIRAIL and Lube-S option a simple, drop-in procedure with no OEM redesign time or engineering costs.
- The LUBE-S oil tank comes into contact with the guideway balls only when necessary. This enables the scroll guide system to remain at the highest performance level. There is no decrease in strength and all circumferential balls are uniformly covered with lubricant.
- Lubricant oil consumption is minimized for low environmental impact.

Most importantly, the LUBE-S option provides the OEM with unique competitive advantage by offering customers guaranteed maintenance-free operation of their products' miniature guideways.

The MINIRAIL with LUBE-S



Helping Dark Factories Stay Dark

As manufacturers evolve towards full automation, lifetime lubrication becomes an enabling factor. In these “dark” or “smart” factories, little or no human labor will be needed to create production output. Unmanned facilities and their robotics will operate in the dark without heat, light or other environmental needs. Production equipment with lifetime lubrication such as LUBE-S will be essential when no human intervention or maintenance is planned.

CONCLUSION

With the miniaturization of many precision motion systems, maintenance engineers have experienced difficulty relubricating components in space-constrained positions. The MINIRAIL with LUBE-S option solves this problem by providing maintenance-free operation in systems with short-stroke, high-speed, high-acceleration characteristics. The LUBE-S technology fits inside the MINIRAIL guideway's carriage. Its oil reservoir utilizes the capillary effect to dispense stored lubricant directly to the ball-rolling elements — even when the carriage is moving up to 30 G. With almost 100,000 MINIRAIL with LUBE-S units entering the market each year, design engineers have a proven solution that offers maintenance-free guideways in their OEM products.

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PROSPECTUSES

- CUSTOMIZED BEARINGS
- GEAR RACKS
- LINEAR BEARINGS AND RECIRCULATING UNITS
- MINERAL CASTING SCHNEEBERGER
- MINISLIDE MSQSCALE
- MINI-X MINIRAIL / MINISCALE PLUS / MINISLIDE
- MONORAIL AND AMS PROFILED LINEAR GUIDEWAYS WITH INTEGRATED MEASURING SYSTEM
- MONORAIL AND AMS APPLICATION CATALOG
- SCHNEEBERGER BALL SCREWS SBS
- POSITIONING SYSTEMS
- SLIDES



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