

Your perma Partner:

# Lubrication Solutions Mining and Heavy Industry



The Expert in Lubrication Solutions

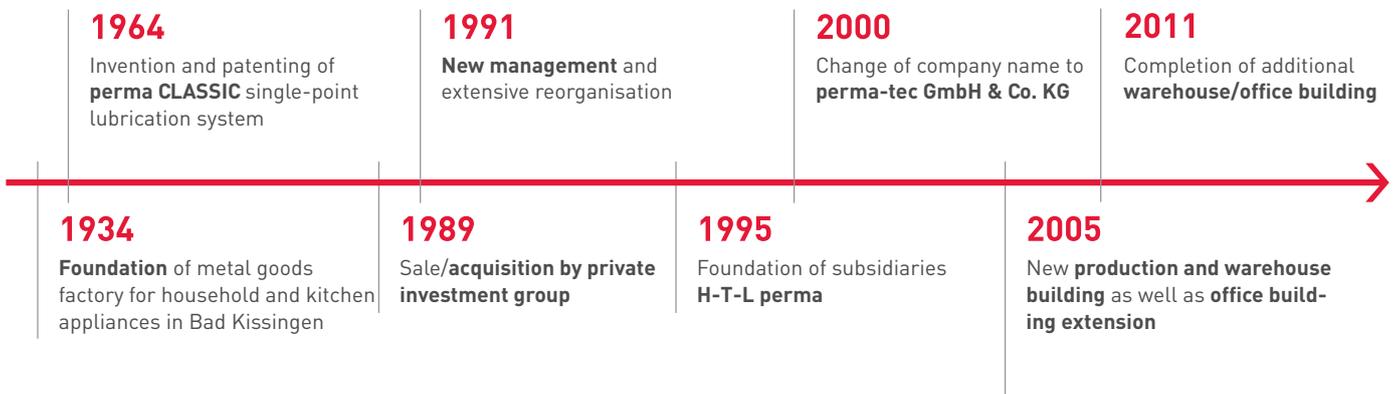
**perma**

## Company introduction – perma-tec

For more than 50 years, the perma name has stood for innovative and creative lubrication solutions. perma single- and multi-point lubrication systems are used in almost all types of industries and applications around the world.

perma's leadership in the single-point lubrication market is based on numerous patented and specifically certified products. All perma products are developed, tested and manufactured in the company's headquarters in Germany and meet the quality standard "Made in Germany".

With many years of sales experience and a global network of own subsidiaries and competent partners around the world, perma can offer customers many solutions that meet the highest technical requirements.



### Legend

#### Applications:



Conveyors



Electric motors



Pumps



Blowers / Fans

The four main applications represent the most common equipment used for heavy duty materials handling and processing tasks. perma-tec can assist with solutions on other heavy duty applications and equipment.

#### Ex-proof certification:

Testing and certification of equipment intended for use in potentially explosive atmospheres. It certifies that the device was tested and is in compliance with ex-proof requirements and safety standards.



**Ex**  
→ Europe



**IECEX**  
→ Global

**ANZEx**

**ANZEx**  
→ Australia and New Zealand

**TIIS**

**TIIS**  
→ Japan



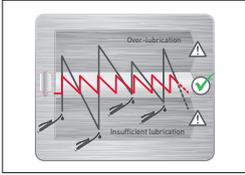
**FM APPROVED**  
→ Canada and USA



**FM APPROVED**  
→ USA



**UL (Underwriters Laboratories)**  
→ Canada and USA



### Benefits of automatic lubrication

4-9

- Bearing life extension
- Contamination prevention
- Safe work practices

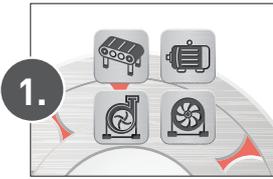


### Assessment & selection procedure

10-11

- 4 simple STEPS to choose the right lubrication solution

4 steps to the best practice lubrication solution



### STEP 1: Assess application / equipment

12-19

- perma Lubrication Systems for **Conveyors, Electric motors, Pumps, Blowers / Fans**



### STEP 2: Assess installation method

20-21

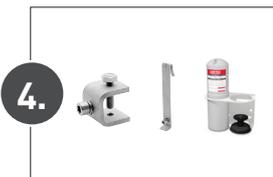
- Direct mount / remote mount decision making



### STEP 3: Select system / lubricant

22-25

- Selection single-point lubrication system
- Grease fill selection
  - Regular load / high speed greases
  - Multipurpose / extreme pressure greases



### STEP 4: Select mounting type / kit

26-33

- INSTALLATION KITS Standard Duty: Beam clamp mount, cage hanger mount, rail mount
- INSTALLATION KITS Heavy Duty: Beam clamp mount, cage hanger mount



### Accessories & mounting components

34-38

- **Catalog information and article numbers for:**  
 Brackets, mounting beam clamps and cage hangers, hose and connector fittings, accessories for perma FLEX / perma STAR VARIO, angles, special purpose fittings, reducers and extensions



### perma SERVICE

39

- **www.perma-tec.com:** Product- / Application flyer, perma SELECT APP, Videos / Photos, Installation Instructions
- **perma SERVICE:** Project Planning, Installation, Maintenance, perma MLP, perma ACADEMY

## Benefits of automatic lubrication



### Bearing life extension

Lubrication systems which deliver small volumes of lubricant at short time intervals extend bearing service life and deliver a reliability advantage. The example below provides a statistical demonstration of a single-point lubrication system program at work.

A site with 500 perma single-point lubrication systems (in this example perma STAR VARIO 250 with an average setting of 3 months) reveals the following statistics:

- 1 injection of grease, somewhere on site, every 32 seconds
- 2,667 individual injections per day
- 1,946 injections of grease per year to each point
- Almost 1 million individual injections each year

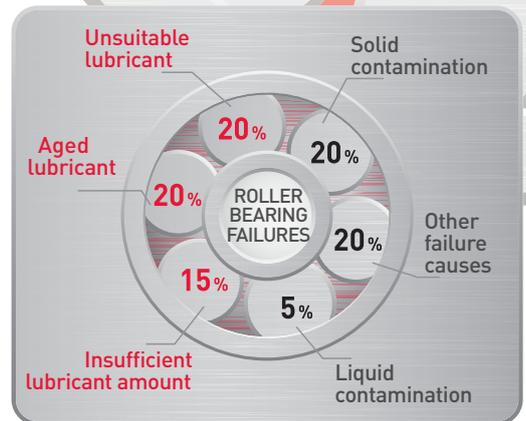
## Introduction

To maintain their competitiveness, mining and heavy industry operations such as steel mills must maximize production output while minimizing long-term operating costs. A key component to achieve this is the implementation of preventative maintenance strategies which extend equipment service life and minimize the downtime required for maintenance, repair and overhaul. Success in this area reduces the total cost of ownership of production assets and ultimately improves business performance.

Cost and downtime due to premature wear is significant. For grease lubricated bearings, well considered lubrication strategies have a dramatic effect on extending bearing service life and therefore reducing costs and improving equipment reliability. The chart provides estimates of the causes of premature bearing failures. Major causes are poor lubrication practices and contamination.

In recognition of this, industry leading businesses invest in automatic lubrication systems for the purpose of bearing re-lubrication and contaminant exclusion because they deliver superior reliability results compared to manual lubrication.

**Source:**  
Calculation leading bearing manufacturers: Material cost and time, maintenance runs / roller bearing industry



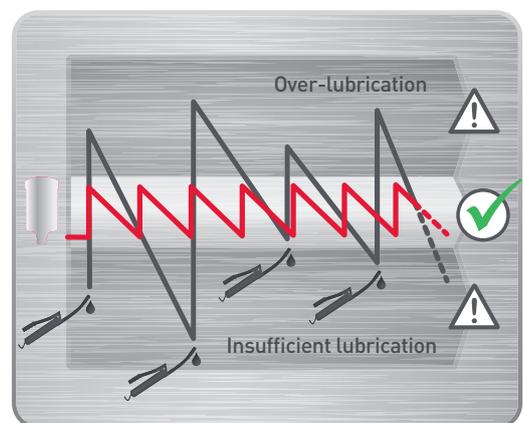
## Benefits of short re-lubrication intervals

Bearing re-lubrication addresses the need to maintain sufficient fresh grease around the working components of bearings as they rotate. Insufficient or infrequent re-lubrication leads to deterioration of lubrication conditions, lubricant starvation and to premature wear. Meanwhile, for high speed bearings, the rapid supply of excessive amounts of grease can cause over-lubrication which leads to degradation of grease condition and threatens the service life of bearings.

The longest bearing service life is achieved when grease is added in small amounts at short intervals. When implemented correctly, this regime of grease delivery maintains a steady-state of lubrication protection where over-lubrication and lubricant starvation do not occur.

Factors which reduce the service life of grease include high speeds, elevated operating temperatures, vibration and high loads. When operating conditions such as these prevail, the benefits of delivering small amounts of grease at short time intervals are at their greatest.

The diagram to the right demonstrates the differences between re-lubrication methods which deliver small amounts of grease at short intervals and those which deliver large amounts at extended intervals.

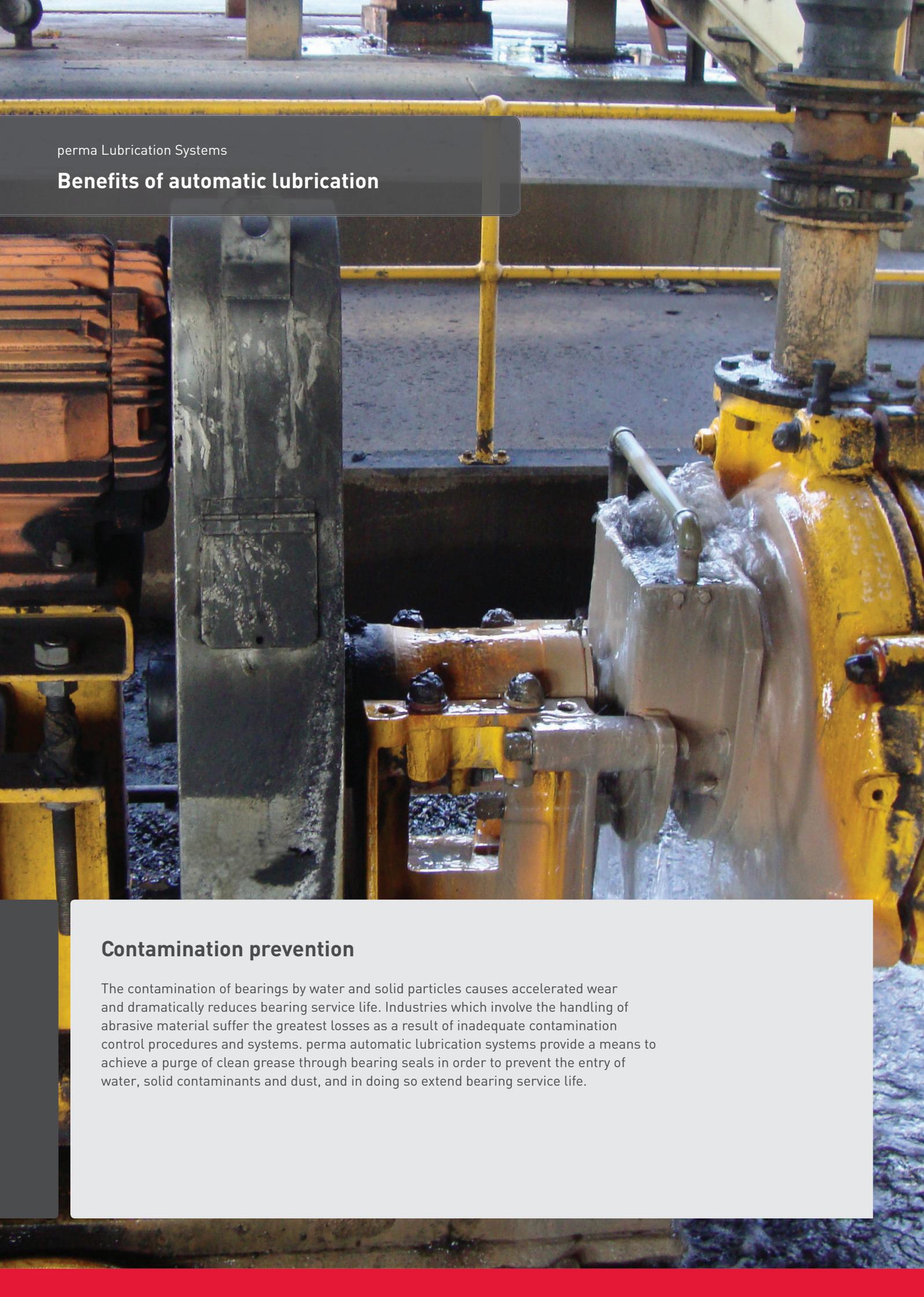


### Too much grease

- Potential for elevated operating temperature and rapid degradation of grease for high speed bearings
- Less efficient use of fresh grease
- Potential to damage contact type seals

### Too little grease

- Starvation causing premature wear
- Under-lubrication leads to accelerated degradation of remaining grease
- Increased potential for contamination entry due to lack of lubricant purge

A close-up photograph of industrial machinery. On the right, a yellow automatic lubrication system is actively spraying a white, foamy substance onto a grey metal component. To the left, a large, dark, cylindrical metal part is visible. The background shows a concrete floor and yellow safety railings, suggesting an industrial or construction site environment.

perma Lubrication Systems

## Benefits of automatic lubrication

### Contamination prevention

The contamination of bearings by water and solid particles causes accelerated wear and dramatically reduces bearing service life. Industries which involve the handling of abrasive material suffer the greatest losses as a result of inadequate contamination control procedures and systems. perma automatic lubrication systems provide a means to achieve a purge of clean grease through bearing seals in order to prevent the entry of water, solid contaminants and dust, and in doing so extend bearing service life.

## Preventing contamination in harsh operating environments

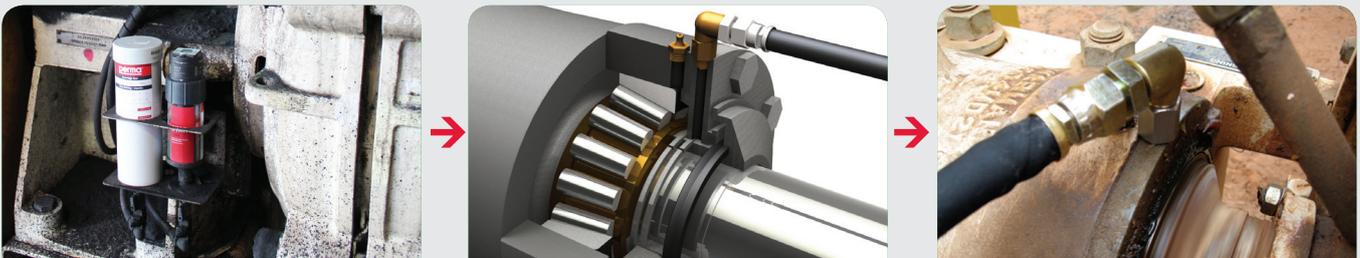
When solid or liquid contaminants enter a bearing they cause accelerated wear and the early onset of fatigue. For solid contaminants the rate of wear increases with the size, concentration and hardness of contaminants. Smaller particles lead to abrasive wear whilst larger particles can cause indentation of bearing raceways which later become sources of surface initiated fatigue. Greasing practices which prevent the ingress of contaminants provide long-term financial return by means of longer bearing service life and reduced downtime.

Strategies for preventing contamination vary depending on bearing housing and seal configurations. For bearings with free-purging labyrinth or taconite seals contamination prevention is achieved by delivering a consistent purge of clean grease through the seals. In simple terms, if clean grease is purging out of the seal, contaminants (solid or liquid) cannot enter the bearing. Bearings which operate in harsh environments, including high humidity and high levels of liquid or particulate contaminants, demand the strictest attention to regular seal purging. Under such conditions automated purging of seals provides the greatest benefits.

### Strategies for the prevention of bearing contamination

#### Strategy 1 – Slurry pump seal purging

Automated purging of labyrinth seals provides constant protection against ingress of solids and liquids. For pumps where the wet-end seal is subjected to water spray a higher rate of automated purging is commonly applied to compensate for the elevated rate of grease washout.



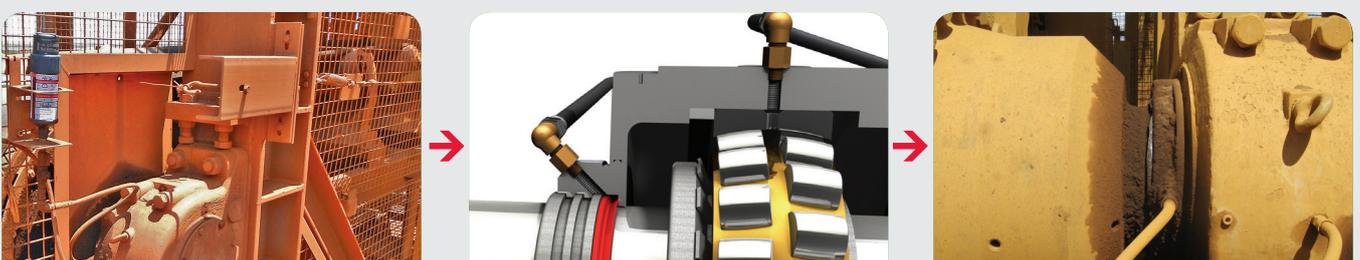
#### Strategy 2 – Conveyor pulley bearing re-lubrication & seal purging

Automated lubrication provides constant protection against the ingress of contaminants. For the example shown bearing re-lubrication and seal purging is provided by a single automatic lubrication system.



#### Strategy 3 – Conveyor pulley bearing seal purging (hybrid solution)

Automated purging of taconite or labyrinth seals provides constant protection against the ingress of contaminants. For the hybrid solution, bearing re-lubrication is provided manually on a periodic maintenance cycle. The hybrid system can provide a practical balance between automated and manual greasing for large pulley bearings.



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## Benefits of automatic lubrication



**DANGER**  
ISOLATE ENERGY  
SOURCE BEFORE  
REMOVING GUARD

### Safe work practices

Workplace safety is of ultimate importance. Reliable systems which reduce the interface between people and operating equipment are a key element to reduce the likelihood of workplace accidents.

Automatic lubrication systems significantly minimize the time required to lubricate equipment and workplace accidents.

## Workplace safety and efficiency improvements

Automatic lubrication systems are maintenance tools which make a positive contribution to workplace safety and efficiency. This is particularly the case for large operations in hot and cold climates where the physical demands of performing regular manual greasing increases the risk of fatigue, heat exhaustion and hypothermia.

The implementation of automatic lubrication systems does not mean that the frequency of equipment inspections should be reduced. Automated systems save time which can be invested into other tasks such as mechanical inspections, condition monitoring data collection, breather maintenance and oil cleanliness management activities such as filtration and clarification.

### Strategies to improve safety and efficiency

**Strategy 1** – Remote mount lubrication systems for large electric motors, fans and pumps which would otherwise be difficult to reach, at safe and easy-to-reach locations at ground level.

**Safety gain** – Improve safety via the remote installation of lubrication systems at safe-to-access locations to avoid the temptation for personnel to step up onto, or climb onto, equipment structures.

**Efficiency gain** – Save time which would otherwise be required to locate and use safety steps.

**Example** - The perma STAR VARIO lubrication systems shown are mounted to the cage by using a cage hanger kit to lubricate the bearings of a fan shaft mounted on an elevated frame via remote 2 meter grease hoses.



**Strategy 2** – Remote mount lubrication systems used for conveyor pulley bearings which are located behind cages to avoid unnecessary manual handling of cages.

**Safety gain** – Improve safety by avoiding the need to lift and handle cages and guards.

**Efficiency gain** – Save time which would otherwise be required during shutdowns for permits, isolations, cage removal and cage reinstatement.

**Example** - The perma STAR VARIO lubrication systems shown provide consistent grease delivery to the tail pulley bearings of a conveyor.



**Strategy 3** – Automatically lubricate equipment which would otherwise require working at heights or confined space permits.

**Safety gain** – Improve safety by reducing the need to perform work at heights or within confined spaces.

**Efficiency gain** – Save time which would otherwise be required during shutdowns for permits, isolations, equipment preparation and other time consuming requirements.

**Example** - The perma STAR VARIO lubrication system shown is lubricating the bearing of a gravity take-up pulley on a conveyor via a 5 meter remote grease hose.



## Benefits of automatic lubrication



### Assessment of equipment lubrication

Equipment lubrication requirements will most commonly be categorized according to one of the main applications: Conveyors, electric motors, pumps or blowers / fans.

Assessment may also include: Reference to lubrication specifications from original equipment manufacturer (OEM), consideration of variations in equipment, bearing size and orientation as well as bearing housing and seal configuration.

Additional operational and environmental assessment criteria include: Equipment operating speeds, ambient temperature, operating temperature, bearing load and drive type, equipment vibration and the presence and severity of solid and liquid contaminants.

This catalogue has been developed to assist the reader by outlining the application and equipment assessment process and linking this to the specification of a complete perma automatic lubrication solution.

## Assessment & selection procedure

perma Application engineers and specialists have developed a 4-step process for determining the most appropriate combinations of perma lubrication systems and mounting solutions for common equipment categories. The 4-step process can be used for conducting site surveys and preparing formal lubrication recommendations.

This catalog guides the reader through the 4-step assessment and specification process:

Steps 1 & 2 relate to equipment requirements and decision making for lubrication system installation practices.

Steps 3 & 4 relate to selection of lubrication system type and suitable perma installation and mounting methods.

1.

### STEP 1: Page 12-19 ASSESS APPLICATION / EQUIPMENT



#### Assessment of the application or equipment type:

- Determine the application type, equipment OEM, frame or model size, bearing part designations
- Determine the influence of operating parameters (speed, load, vibration, temperature)
- Determine the influence of environmental factors (water, moisture, abrasive particles, slurry, air movement, ambient temperature)
- Assess re-lubrication rates referencing OEM specifications or the perma SELECT calculation

2.

### STEP 2: Page 20-21 ASSESS INSTALLATION METHOD



#### Assess the application location, equipment physical size, access to lubrication points, proximity to hazardous areas or materials, restrictions due to guarding, exposure to high vibration or temperature:

- Conduct the remote installation decision making process to find out if your lubrication point requires direct or remote installation
- Assess requirement for lubrication system protection and select standard or heavy duty bracket design

3.

### STEP 3: Page 22-25 SELECT SYSTEM / LUBRICANT



#### Select preferred perma automatic lubrication system and lubricant:

- Select a perma automatic lubrication system based on the application/equipment assessment (technical data and operating characteristics, remote grease hose length restrictions, environmental conditions)
- Select grease suitability by application or by site preferences

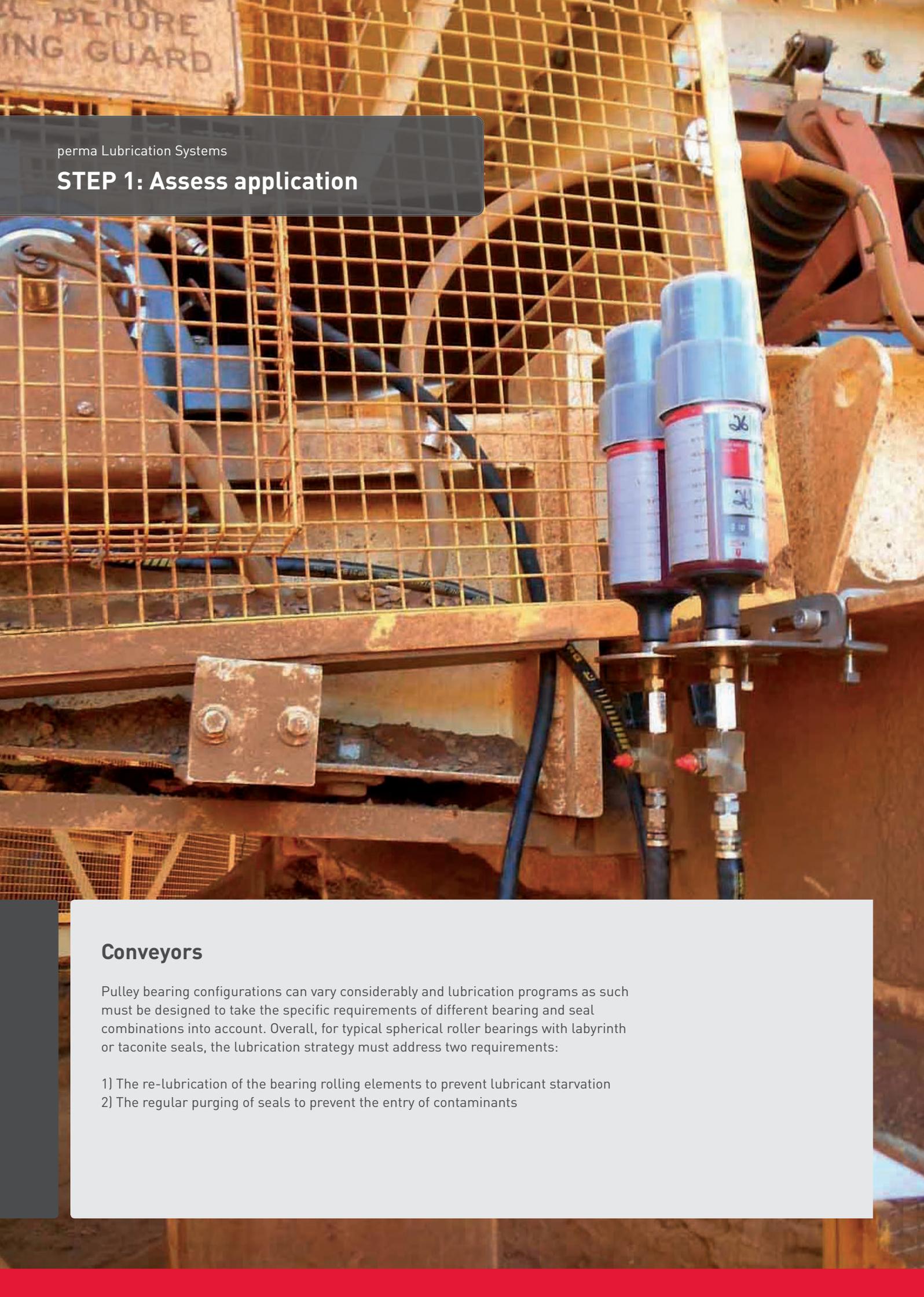
4.

### STEP 4: Page 26-33 SELECT MOUNTING TYPE / KIT



#### Select and specify installation kits, mounting types and accessories based on the application /equipment assessment:

- Select installation kit to suit perma lubrication system
- Select installation kit design and mounting method based on number of lubrication points and requirement for standard or heavy duty
- Select additional accessories required (angles, reducers, extensions)



perma Lubrication Systems

## STEP 1: Assess application

### Conveyors

Pulley bearing configurations can vary considerably and lubrication programs as such must be designed to take the specific requirements of different bearing and seal combinations into account. Overall, for typical spherical roller bearings with labyrinth or taconite seals, the lubrication strategy must address two requirements:

- 1) The re-lubrication of the bearing rolling elements to prevent lubricant starvation
- 2) The regular purging of seals to prevent the entry of contaminants



## Challenges

### Lubrication challenges associated with conveyor bearing maintenance include:

- Typical large amounts of particle contamination particularly at feed and transfer points or ground level
- Large conveyor systems may feature remote locations and cover geographically large areas. Stairs or walkways may be incorporated to access transfer points located above surge storage bins or processing plants
- Time required for manual greasing cycle leaves less time for effective re-lubrication frequency / volumes
- Restricted access due to hazardous conditions (under transfer / conveyor feed points, elevated take-up pulleys or take-up trolleys)

### Maintenance challenges which restrict or limit effective re-lubrication may result in:

- Inadequate grease purging of seals, allowing water or abrasive particle contaminants to enter the bearing housing
- Contamination of bearings (from inadequate lubrication) causing rapid deterioration of lubrication conditions
- Accelerated wear rates (caused by contaminants) and finally premature bearing failure



## Lubrication assessment criteria

For conveyor pulley bearing lubrication the following factors are generally assessed in order to develop the lubrication solution:

- Bearing types & speeds
- Seal types
- Characteristics of recommended lubricant
- Operating conditions
- Historical lubrication practices
- Requirements for safe access
- Desired service schedule
- Location of lubrication points on bearing housings

## Solutions



**Industry:** Quarry  
**Application:** Conveyor bearings  
**Lubrication system:** perma FLEX  
**Installation solution:** Direct mount



**Industry:** Iron ore mining  
**Application:** Conveyor bearing / seal (hybrid solution)  
**Lubrication system:** perma STAR VARIO  
**Installation solution:** Remote cage hanger mount

## STEP 1: Assess application



### Electric motors

Electric motor bearing re-lubrication is a critical aspect of maintenance. As with other high speed bearing applications, it is important for re-lubrication practices to consider the risks associated with over-lubrication while providing sufficient re-lubrication to deliver long bearing service life.

The combination of the following practices can provide a lubrication program which avoids over-lubrication and lubricant starvation:

- Add small amounts of grease at short intervals using an automatic lubrication system which provides accurate dispensing rates, independent of temperature
- Re-lubricate when the motor is in operation
- Always ensure that discharged grease can escape from the bearing housing via well maintained grease escape holes or collection traps



## Challenges

### Lubrication challenges associated with electric motor maintenance include:

- High speed and high mechanical working of the grease requires more frequent and controlled grease replenishment /exchange
- Insufficient grease exchange intervals may result in lubrication deterioration or more extreme 'starvation' conditions
- Large or excess grease addition volumes result in grease 'churning' and overheating
- Hazardous working conditions (rotating equipment pinch points, falling from access ladders or platforms, falling debris and high levels of airborne dust)
- Maintenance staff may have limited understanding of motor lubrication requirements



### Maintenance challenges which restrict or limit effective re-lubrication may result in:

- Inadequate / excessive lubrication causing deteriorating lubrication conditions, accelerated grease ageing, oxidation and wear rates
- Contamination of bearings (from inadequate lubrication) causing rapid deterioration of lubrication conditions
- Accelerated wear rates (caused by contaminants or inadequate / excessive grease replenishment) and finally premature bearing failure



## Lubrication assessment criteria

For electric motor lubrication the following factors are generally assessed in order to develop the lubrication solution:

- Motor manufacturer's recommendations
- Motor speed
- Grease trap / escape port design, access and condition
- Bearing types
- Historical lubrication practices
- Requirements for safe access
- Desired service schedule
- Location of lubrication points on bearing housings

## Solutions



**Industry:** Mining  
**Application:** Electric motor bearings  
**Lubrication system:** perma STAR VARIO  
**Installation solution:** Remote beam clamp mount



**Industry:** Mining  
**Application:** Electric motor bearings  
**Lubrication system:** perma STAR VARIO  
**Installation solution:** Direct mount

perma Lubrication Systems

## STEP 1: Assess application



### Pumps

Slurry pumps used in operations such as coal preparation plants and other wet-plant operations must endure harsh conditions. Efforts to prevent the entry of water and solid contaminants to pump barrels will extend bearing service life. The use of automatic lubrication systems to provide a regular purge of fresh grease through the labyrinth seals of pump barrels is a common and proven method of preventing contaminant entry. The harsher the operating conditions the greater the importance of automatic purging.

Pumps which are subjected to regular wash down or which face water impingement to the wet-end labyrinth demand higher labyrinth purge rates.



## Challenges

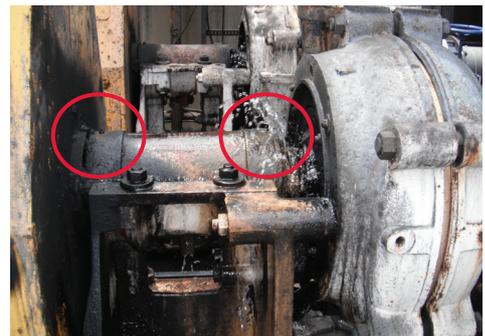
### Lubrication challenges associated with pump maintenance include:

- Liquid and slurry contamination require frequent or continuous grease purging to prevent ingress into the pump mechanical assembly
- High speed / high mechanical working of the grease on large pumps require more frequent and controlled grease replenishment /exchange
- Insufficient grease exchange intervals may result in lubrication deterioration or more extreme 'starvation' conditions
- Large or excess grease addition volumes results in grease 'churning' and overheating
- Hazardous working conditions (rotating equipment pinch points, falling into open drains or sumps, or exposure to hazardous chemicals)



### Maintenance challenges which restrict or limit effective re-lubrication may result in:

- Contamination of bearings (from inadequate seal purging) causing rapid deterioration of lubrication conditions
- Inadequate / excessive lubrication causing deteriorating lubrication conditions, accelerated grease ageing, oxidation and wear rates
- Accelerated wear rates (caused by contaminants or inadequate / excessive grease replenishment) and finally premature bearing failure

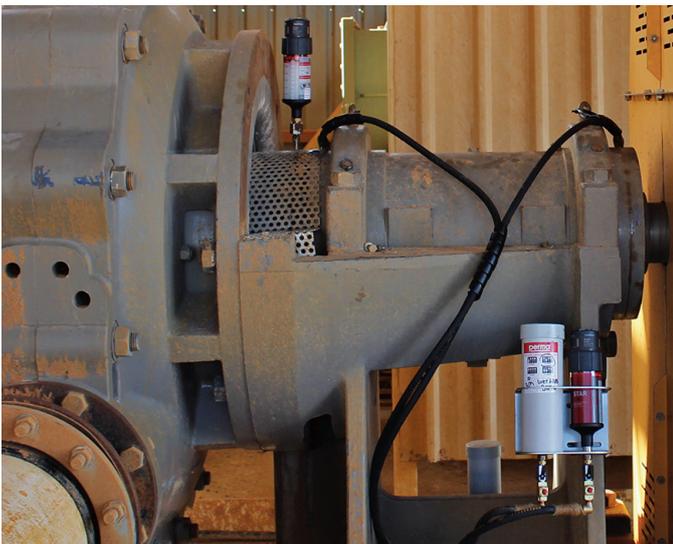


## Lubrication assessment criteria

For slurry pump lubrication the following factors are generally assessed in order to develop the lubrication solution:

- Pump manufacturer's recommendations
- Seal types
- Characteristics of recommended lubricant
- Typical bearing operating temperatures
- Operating conditions
- Bearing types, lubrication points and grease migration directions
- Historical lubrication practices
- Desired service schedule
- Wash down procedures
- Requirements for safe access

## Solutions



**Industry:** Iron Ore Mining  
**Application:** Slurry pump  
**Lubrication system:** perma STAR VARIO  
**Installation solution:** Remote beam clamp mount



**Industry:** Mining  
**Application:** Slurry pump  
**Lubrication system:** perma STAR VARIO  
**Installation solution:** Remote beam clamp mount

## STEP 1: Assess application



### Blowers / Fans

Fan support bearings require particular attention when devising a lubrication strategy. Because a broad range of bearing types can be employed it is important to understand the bearing and seal types before proceeding. This information is critical in order to understand the optimal grease delivery points, grease flow paths, the requirements for efficient grease exchange and the point(s) of grease exit from bearing housings.



## Challenges

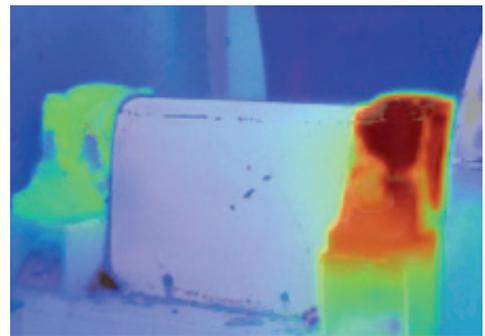
### Lubrication challenges associated with fan maintenance include:

- High speed and high mechanical working of the grease requires more frequent and controlled grease replenishment / exchange
- High operating temperature for hot fan applications requires more frequent and controlled grease replenishment and exchange
- Insufficient grease exchange intervals may result in lubrication deterioration or more extreme 'starvation' conditions
- Large or excess grease addition volumes results in grease 'churning' and overheating
- Hazardous working conditions (rotating equipment pinch points, falling from access ladders or platforms, exposure to high levels of airborne dust or heat / steam)



### Maintenance challenges which restrict or limit effective re-lubrication may result in:

- Inadequate / excessive lubrication causing deteriorating lubrication conditions, accelerated grease ageing, oxidation and wear rates
- Contamination of bearings (from inadequate lubrication) causing rapid deterioration of lubrication conditions
- Accelerated wear rates (caused by contaminants or inadequate / excessive grease replenishment) and finally premature bearing failure



## Lubrication assessment criteria

For fan bearing and seal lubrication the following factors are generally assessed in order to develop the lubrication solution:

- Bearing types & speeds
- Seal types
- Characteristics of recommended lubricant
- Operating conditions
- Historical lubrication practices
- Requirements for safe access
- Desired service schedule
- Location of lubrication points on bearing housings

## Solutions



**Industry:** Quarry  
**Application:** Fan / blower bearings  
**Lubrication system:** perma STAR VARIO  
**Installation solution:** Direct mount



**Industry:** Power Plant  
**Application:** Fan / blower bearings  
**Lubrication system:** perma STAR VARIO  
**Installation solution:** Remote mount

Selection made easy

## STEP 2: Assess installation method

**NO!**  
= Direct mounting

Order  
lubrication system +  
accessories for  
direct mounting

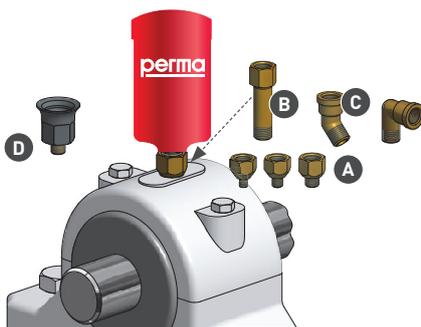


## REMOTE INSTALLATI

For many lubrication points it is beneficial to remote mount lubrication systems at locations which are safe to access while machinery is operating. The following questions can be used to help guide remote mounting decisions.

A **“YES”** to any of the questions indicates that **remote mounting** is likely to be required.

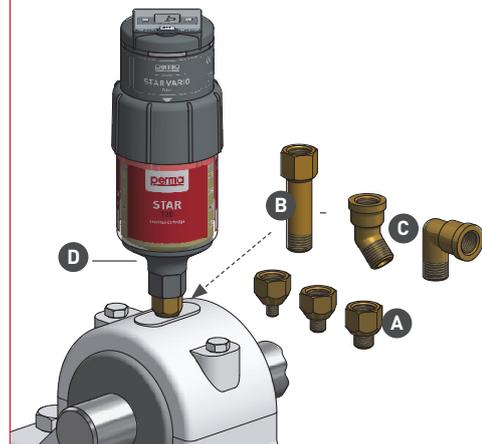
Direct mounting example for  
perma CLASSIC / FUTURA / FLEX / NOVA



### Common mounting accessories

<b>A</b>	1 x Reducer G1/8 male x G1/4 female 1 x Reducer M6 male x G1/4 female 1 x Reducer M8x1 male x G1/4 female 1 x Reducer M10x1 male x G1/4 female
<b>B</b>	1 x Extension G1/4 male x G1/4 female – 45 mm
<b>C</b>	1 x Angle 45° G1/4 male x G1/4 female
<b>D</b>	1 x Support flange FLEX Gen 2.0 G1/4 male x G1/4 female >> only for perma FLEX

Direct mounting example for  
perma STAR VARIO



### Common mounting accessories

<b>A</b>	1 x Reducer G1/8 male x G1/4 female 1 x Reducer M6 male x G1/4 female 1 x Reducer M8x1 male x G1/4 female 1 x Reducer M10x1 male x G1/4 female
<b>B</b>	1 x Extension G1/4 male x G1/4 female – 45 mm
<b>C</b>	1 x Angle 45° G1/4 male x G1/4 female
<b>D</b>	1 x Support flange STAR Gen 2.0 G1/4 male x G1/4 female (only with Art. No. 101477)

→ Go to page 35 for accessories



# ON DECISION MAKING

1. Is it necessary to remove protective guards or safety cages to access the lubrication point?
2. Is it difficult or unsafe-to-access the lubrication point while equipment is running?
3. Is the lubrication point subject to severe vibration or high temperatures which may damage the lubrication system?
4. Is it necessary to get permits to access lubrication points such as those in confined spaces or located at heights?
5. Is the lubrication point exposed to excessive amounts of water, process materials or impact from solid material?

**YES!**

= Remote mounting



There are two main categories of brackets - Standard Duty and Heavy Duty. Both categories include stainless steel construction, G1/4 female sockets and laser cut profiles to minimize contamination build-up. Heavy Duty brackets also feature a C-section design which provides a robust holding system for the lubrication system covers. The C-section design is especially suited to installations which are exposed to water wash down, as would be anticipated for applications such as slurry pumps in coal preparation plants. This design also provides greater mounting flexibility due to the 4-slot design of the bracket mounting face.

The images of 2-point brackets shown demonstrate the differences between Standard Duty and Heavy Duty designs.

## Standard Duty INSTALLATION KITS

are highly versatile and can be adapted for attachment to beam sections or square mesh safety cages.



## Heavy Duty INSTALLATION KITS

have been specifically designed for use in operational areas which are subject to regular wash down and water impact, such as the conditions found in coal handling preparation plants.



**→ Go to page 26 for INSTALLATION KITS**

Selection made easy

## STEP 3: Select system / lubricant

### Selection single-point lubrication system

	perma CLASSIC / perma FUTURA	perma FLEX	perma NOVA	perma STAR VARIO
				
<b>Specifications</b>				
	Activator 	Rotary switch 	Push button + LCD display 	Push button + LCD display + LED signals red/green 
		Complete system	Reusable NOVA Control unit	Reusable STAR VARIO Drive
	0 to +40 °C	-20 to +60 °C		-10 to +60 °C
	max. 4 bar	max. 5 bar	max. 6 bar	6 bar
	120 cm <sup>3</sup>	60, 125 cm <sup>3</sup>	65, 125 cm <sup>3</sup>	60, 120, 250 cm <sup>3</sup>
	Electrochemical			Electromechanical Battery pack STAR VARIO
	Tamper-proof	Discharge period can be altered at any time/system can be shut down		
	1, 3, 6, 12 months at +20 °C / perma Multipurpose grease SF01	1, 2, 3 ... 12 months at +20 °C / perma Multipurpose grease SF01	1, 2, 3 ... 12 months independent of operating temperature	1, 2, 3 ... 12 months independent of operating temperature and counter pressure
	< 1 meter hose extension at +20 °C with lubricant SF01, hose iØ 9.5 mm, Art. No. 101555	< 2 meter hose extension at +20 °C with lubricant SF01, hose iØ 9.5 mm, Art. No. 101555		< 5 meter hose extension at +20 °C with lubricant SF01, hose iØ 9.5 mm, Art. No. 101555
	Contact perma for specific mining certifications	IP 68	IP 65	IP 65
	CE Ex	CE Ex TECEx EFM APPROVED TIIS	CE Ex TECEx ANZEx	CE UL LISTED

Total resistance to grease flow must be less than the pressure delivery capability of the lubrication system. Note that for the previous model of the perma STAR VARIO the guideline for maximum grease hose length was 3 meters.

1. STEP 1: Page 12-19  
ASSESS APPLICATION / EQUIPMENT

2. STEP 2: Page 20-21  
ASSESS INSTALLATION METHOD

3. STEP 3: Page 22-25  
SELECT SYSTEM / LUBRICANT

4. STEP 4: Page 26-33  
SELECT MOUNTING TYPE / KIT

## Lubrication system and grease fill selection

					
					
		Conveyors	Electric motors	Pumps	Blowers / Fans
<b>Single-point lubrication systems</b>					
	<b>perma CLASSIC / perma FUTURA</b>	+	0	+	0
	<b>perma FLEX</b>	+	+	++	++
	<b>perma NOVA</b>	+	++	+	++
	<b>perma STAR VARIO</b>	++	++	++	++
<b>RL GREASES (Regular load / high speed greases)</b>					
	Shell Gadus S2 V100 2 (Alvania RL 2)		✓		✓
	Shell Gadus S5 T100 2 (Stamina RLS 2)		✓		✓
	ExxonMobil MOBIL POLYREX EM		✓		✓
	ExxonMobil MOBILITH SHC 100		✓		✓
	Castrol Spheerol AP 2		✓		✓
<b>EP GREASES (Multipurpose / extreme pressure greases)</b>					
	perma Multipurpose grease SF01	✓		✓	
	Shell Gadus S3 V220C 2 (Albida EP 2)	✓		✓	
	ExxonMobil MOBILGREASE XHP 222	✓		✓	
	Castrol Spheerol EPLX 200-2	✓		✓	
	Chevron STARPLEX EP 2	✓		✓	

Lubrication systems can be filled with lubricants from other manufacturers such as Shell, ExxonMobil, Phillips 66, BP Castrol, Chevron, Royal Purple, Klüber Lubrication, Total S.A., etc. upon request. Technical data on lubricants can be sourced from perma or related oil company.

Selection made easy

## STEP 3: Select system / lubricant

Which grease is in the lubrication system?  
Information is provided on the label.

Art.No. 106757 | FM-1632-37337  
perma High performance grease  
SF04  
120 cm<sup>3</sup> / 4.23 fl.oz. (US)

← Art. No. | Serial number  
(Product designation –  
year/week of manufacture  
– internal no.)  
Lubricant designation

1st order and ReOrder:



1st order and ReOrder:



Drive / Activator

perma CLASSIC / FUTURA

perma FLEX

Activator, **yellow**  
1 month, 101331



Activator, **green**  
3 months, 101332



Activator, **red**  
6 months, 101333



Activator, **grey**  
12 months, 101335



For harsh environments:

Protection cap incl.  
support flange FLEX G1/4 male x  
G1/4 female (steel / alu)  
101428

Lubrication systems/  
LC (= Lubricant Cartridge)



Grease

perma CLASSIC  
120 cm<sup>3</sup>

perma FUTURA  
120 cm<sup>3</sup>

perma FLEX  
60 cm<sup>3</sup>

perma FLEX  
125 cm<sup>3</sup>

### RL GREASES (Regular load / High temp greases)

Shell Gadus S2 V100 2 (Alvania RL 2)	103861	107120	107253	107211
Shell Gadus S5 T100 2 (Stamina RLS 2)	109914	109915	109916	109917
ExxonMobil MOBIL POLYREX EM	100395	107080	107245	107198
ExxonMobil MOBILITH SHC 100	110036	110037	110038	110039
Castrol Spheerol AP 2	110046	110047	110048	110049

### EP GREASES (Multipurpose / Extreme pressure greases)

perma Multipurpose grease SF01	100020	106997	107224	107155
Shell Gadus S3 V220C 2 (Albida EP 2)	109922	107119	109923	107210
ExxonMobil MOBILGREASE XHP 222	100305	107069	108969	107194
Castrol Spheerol EPLX 200-2	110056	110057	110058	110059
Chevron STARPLEX EP 2	100340	109938	109939	109940

1. STEP 1: Page 12-19  
ASSESS APPLICATION / EQUIPMENT

2. STEP 2: Page 20-21  
ASSESS INSTALLATION METHOD

3. STEP 3: Page 22-25  
SELECT SYSTEM / LUBRICANT

4. STEP 4: Page 26-33  
SELECT MOUNTING TYPE / KIT

1st order:

ReOrder:

1st order:

ReOrder:

perma NOVA	perma STAR VARIO	GREASE GUN
<p><b>NOVA Control unit / 1, 2, 3, ... 12 months</b> 107271</p>	<p><b>STAR VARIO Drive Gen 2.0</b> 1, 2, 3, ... 12 months 107529</p>	<p><b>Grease gun</b> 101455</p>
	<p><b>Battery pack STAR VARIO</b> 101351</p> <p>Make sure to exchange the battery pack for STAR VARIO Drive when you replace the empty LC.</p>	<p>Hose with rotary joint, slide and hydraulic coupling for grease gun</p> <p>110199</p>

perma NOVA LC 65 cm <sup>3</sup>	perma NOVA LC 125 cm <sup>3</sup>	perma STAR LC 60 60 cm <sup>3</sup>	STAR LC 120 120 cm <sup>3</sup>	STAR LC 250 250 cm <sup>3</sup>	Cartridge 400 g for grease gun

109913	110298	106216	104252	106289	104906
109918	110299	108990	104257	109919	109920
109921	110300	104170	101068	104673	101690
110041	110301	110042	110043	110044	110045
110050	110302	110052	110053	110054	110055

107415	110281	104044	100724	104473	101585
109924	110303	-	104250	109926	104905
109927	110304	104145	100957	104609	101657
110060	110305	110062	110063	110064	110065
109942	110306	109943	100999	109944	109945

Selection made easy

## STEP 4: Select mounting type / kit

### A. Brackets

Compact stainless steel brackets are available which can be easily attached to square cage mesh using a hook attachment design or to beam sections using beam clamps.

### B. Beam clamp

Easy-to-use beam clamps, supplied with case hardened cup head set screws and stainless steel assembly screws.  
**30 or 65 mm available**

### C. Purge connection with manual valve G1/4

Used for convenient additions of supplementary grease, line purging and grease blockage cleaning.

### D. Angle 90° R1/4 male x G1/4 female

Use optional. One angle included per lubrication point.

### E. Hose connector G1/4 male

For hose iØ 9.5 mm push-lock (steel, zinc-plated). Two included per lubrication point

### F. Heavy Duty hose

Supplied with iØ 9.5 mm and easy-to-use push-lock type swivel hose ends. Hose 1 m per lubrication point is included, other lengths upon request.

### G. Reducing adapter

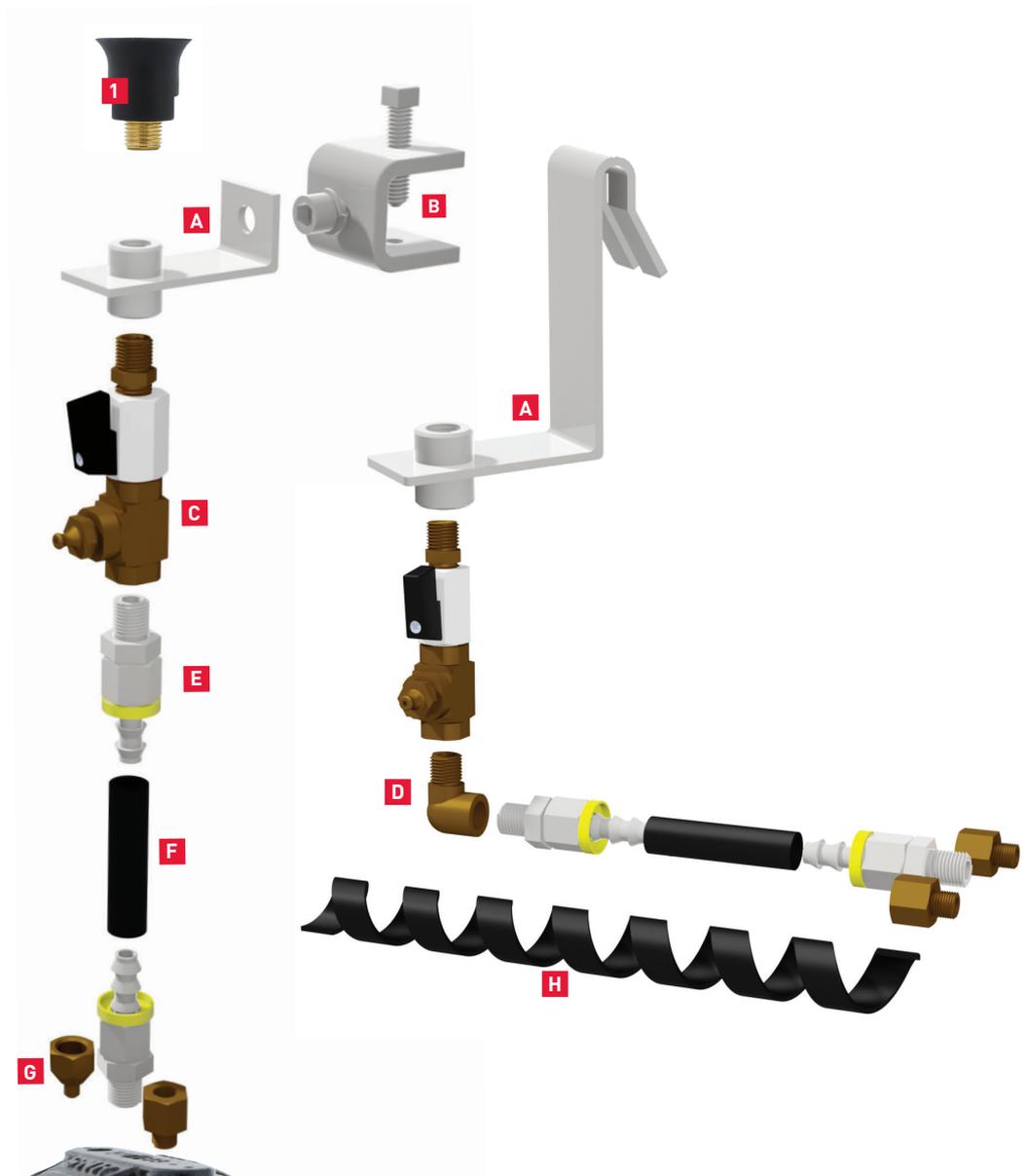
Three reducers R1/8, R1/4 and M10x1 included for each lubrication point.

### H. Hose spiral guard

Use to bundle hoses in multi-point kits.

**1. Support flange FLEX Gen 2.0 G1/4 male x G1/4 female**  
Only for perma FLEX.  
Please order separately.

### Electrochemical Standard Duty remote assembly





Typical kit configuration shown below. perma Lubrication systems not included in INSTALLATION KIT.  
Different kit configuration available upon request.

## INSTALLATION KIT Standard Duty beam clamp mount

<b>INSTALLATION KIT</b> CLASSIC / FUTURA / FLEX / NOVA Standard Duty 1-point beam clamp mount incl. 1 m hose	<b>INSTALLATION KIT</b> CLASSIC / FUTURA / FLEX / NOVA Standard Duty 2-point beam clamp mount incl. 2 m hose



110068

110070



110069

110071



## INSTALLATION KIT Standard Duty cage hanger mount

<b>INSTALLATION KIT</b> CLASSIC / FUTURA / FLEX / NOVA Standard Duty 1-point cage hanger mount incl. 1 m hose	<b>INSTALLATION KIT</b> CLASSIC / FUTURA / FLEX / NOVA Standard Duty 2-point cage hanger mount incl. 2 m hose

110072

110073



Selection made easy

## STEP 4: Select mounting type / kit

### Electromechanical remote assembly



#### A. Brackets incl.

1. Support flange STAR
2. Cover clip for protection cap
3. Protection cap STAR VARIO Heavy Duty 250 (plastic)

Compact stainless steel brackets are available which can be easily attached to square cage mesh using a hook attachment design or to beam sections using beam clamps.

#### B. Beam clamp

Easy-to-use beam clamps supplied with case hardened cup head set screws and stainless steel assembly screws.  
**30 or 65 mm available**

#### C. Purge connection with manual valve G1/4

Used for convenient additions of supplementary grease, line purging and grease blockage cleaning.

#### D. Angle 90° R1/4 male x G1/4 female

Use optional. One angle included per lubrication point.

#### E. Hose connector G1/4 male

For hose iØ 9.5 mm push-lock (steel, zinc-plated). Two included per lubrication point

#### F. Heavy Duty hose

Supplied with iØ 9.5 mm and easy-to-use push-lock type swivel hose ends. Hose 2 m per lubrication point is included, other lengths upon request.

#### G. Reducing adapter

Three reducers R1/8, R1/4 and M10x1 included for each lubrication point.

#### H. Hose spiral guard

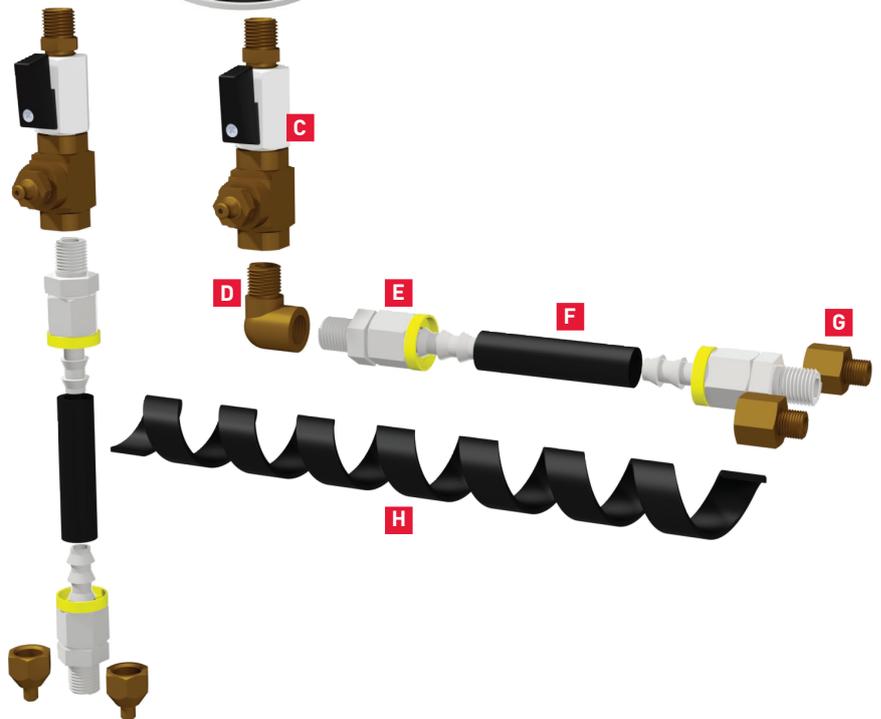
Use to bundle hoses in multi-point kits.



Heavy Duty beam clamp mount



Standard Duty beam clamp mount



1. STEP 1: Page 12-19  
ASSESS APPLICATION / EQUIPMENT

2. STEP 2: Page 20-21  
ASSESS INSTALLATION METHOD

3. STEP 3: Page 22-25  
SELECT SYSTEM / LUBRICANT

4. STEP 4: Page 26-33  
SELECT MOUNTING TYPE / KIT

Typical kit configuration shown below. perma Lubrication systems not included in INSTALLATION KIT.  
Different kit configuration available upon request.

### INSTALLATION KIT Standard Duty beam clamp mount

	<b>INSTALLATION KIT STAR Standard Duty 1-point beam clamp mount</b> incl. 2 m hose	<b>INSTALLATION KIT STAR Standard Duty 2-point beam clamp mount</b> incl. 4 m hose	<b>INSTALLATION KIT STAR Standard Duty 3-point beam clamp mount</b> incl. 6 m hose	<b>INSTALLATION KIT STAR Standard Duty 4-point beam clamp mount</b> incl. 8 m hose
<b>30 mm</b>	110074	110076	110078	110080
<b>65 mm</b>	110075	110077	110079	110081



### INSTALLATION KIT Heavy Duty beam clamp mount

	<b>INSTALLATION KIT STAR Heavy Duty 1-point beam clamp mount</b> incl. 2 m hose	<b>INSTALLATION KIT STAR Heavy Duty 2-point beam clamp mount</b> incl. 4 m hose	<b>INSTALLATION KIT STAR Heavy Duty 3-point beam clamp mount</b> incl. 6 m hose	<b>INSTALLATION KIT STAR Heavy Duty 4-point beam clamp mount</b> incl. 8 m hose
<b>30 mm</b>	110082	110084	110086	110088
<b>65 mm</b>	110083	110085	110087	110089



Selection made easy

## STEP 4: Select mounting type / kit

### Electromechanical remote assembly



#### A. Cage hanger incl.

1. Support flange STAR
2. Cover clip for protection cap
3. Protection cap STAR VARIO Heavy Duty 250 (plastic)

Compact stainless steel brackets are available which can be easily attached to square cage mesh using a hook attachment design or to beam sections using beam clamps.

#### B. Cage hanger

Compact stainless steel brackets are available which can be easily attached to square cage mesh using a hook attachment design.

#### C. Purge connection with manual valve G1/4

Used for convenient additions of supplementary grease, line purging and grease blockage cleaning.

#### D. Angle 90° R1/4 male x G1/4 female

Use optional. One angle included per lubrication point.

#### E. Hose connector G1/4 male

For hose iØ 9.5 mm push-lock (steel, zinc-plated). Two included per lubrication point

#### F. Heavy Duty hose

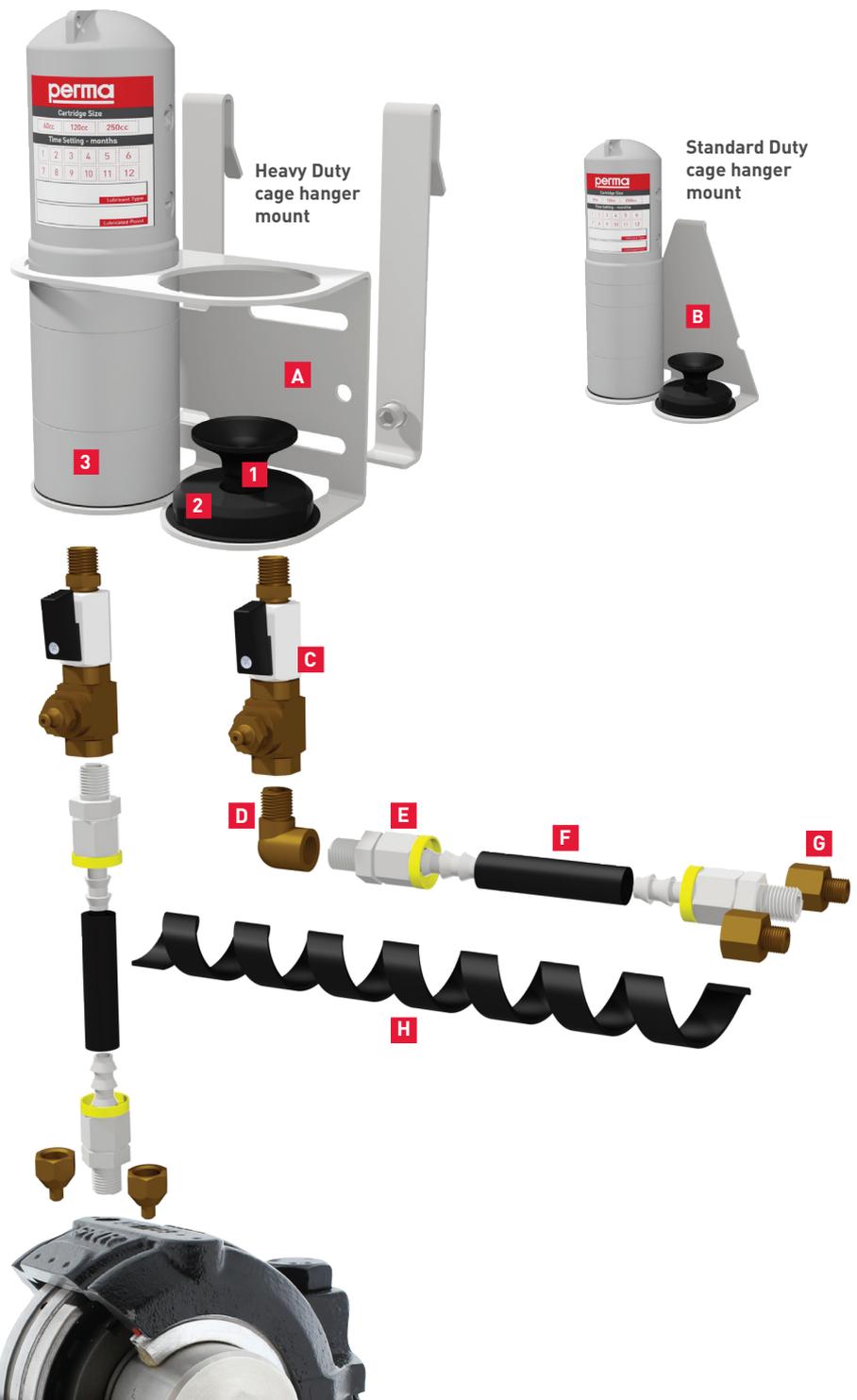
Supplied with iØ 9.5 mm and easy-to-use push-lock type swivel hose ends. Hose 2 m per lubrication point is included, other lengths upon request.

#### G. Reducing adapter

Three reducers R1/8, R1/4 and M10x1 included for each lubrication point.

#### H. Hose spiral guard

Use to bundle hoses in multi-point kits.



1. STEP 1: Page 12-19  
ASSESS APPLICATION / EQUIPMENT

2. STEP 2: Page 20-21  
ASSESS INSTALLATION METHOD

3. STEP 3: Page 22-25  
SELECT SYSTEM / LUBRICANT

4. STEP 4: Page 26-33  
SELECT MOUNTING TYPE / KIT

Typical kit configuration shown below. perma Lubrication systems not included in INSTALLATION KIT.  
Different kit configuration available upon request.

### INSTALLATION KIT Standard Duty cage hanger mount

<b>INSTALLATION KIT STAR Standard Duty 1-point cage hanger mount</b> incl. 2 m hose	<b>INSTALLATION KIT STAR Standard Duty 2-point cage hanger mount</b> incl. 4 m hose	<b>INSTALLATION KIT STAR Standard Duty 3-point cage hanger mount</b> incl. 6 m hose	<b>INSTALLATION KIT STAR Standard Duty 4-point cage hanger mount</b> incl. 8 m hose
110090	110091	110092	110093

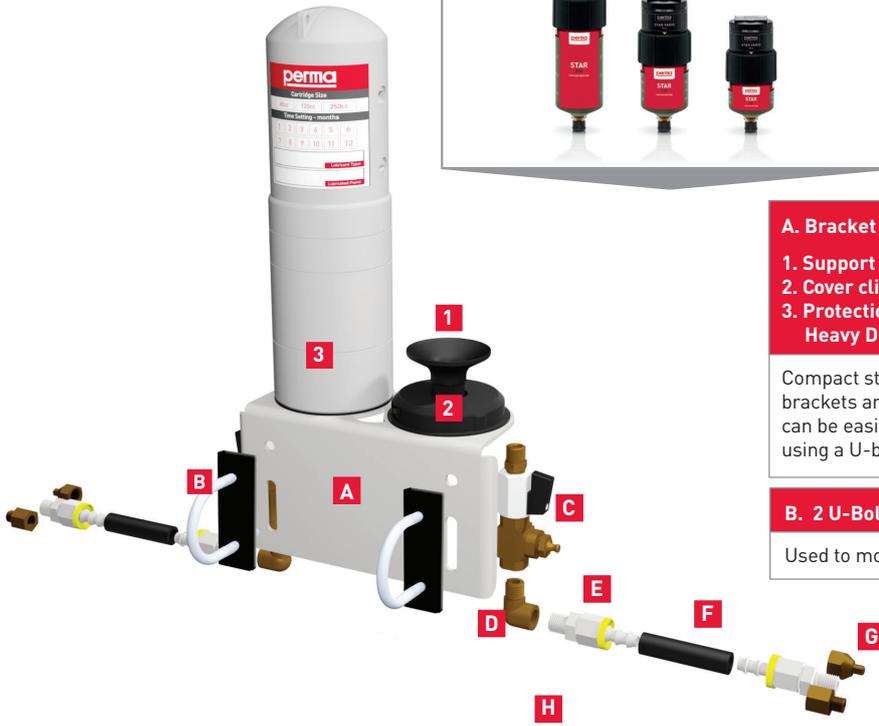
### INSTALLATION KIT Heavy Duty cage hanger mount

<b>INSTALLATION KIT STAR Heavy Duty 1-point cage hanger mount</b> incl. 2 m hose	<b>INSTALLATION KIT STAR Heavy Duty 2-point cage hanger mount</b> incl. 4 m hose	<b>INSTALLATION KIT STAR Heavy Duty 3-point cage hanger mount</b> incl. 6 m hose	<b>INSTALLATION KIT STAR Heavy Duty 4-point cage hanger mount</b> incl. 8 m hose
110094	110095	110096	110097

Selection made easy

## STEP 4: Select mounting type / kit

### Electromechanical remote assembly



#### A. Bracket STAR rail mount incl.

1. Support flange STAR
2. Cover clip for protection cap
3. Protection cap STAR VARIO Heavy Duty 250 (plastic)

Compact stainless steel brackets are available which can be easily attached to rail using a U-bolt design.

#### B. 2 U-Bolts

Used to mount bracket to rail

#### C. Purge connection with manual valve G1/4

Used for convenient additions of supplementary grease, line purging and grease blockage cleaning.

#### D. Angle 90° R1/4 male x G1/4 female

Use optional. One angle included per lubrication point.

#### E. Hose connector G1/4 male

For hose iØ 9.5 mm push-lock (steel, zinc-plated). Two included per lubrication point

#### F. Heavy Duty hose

Supplied with iØ 9.5 mm and easy-to-use push-lock type swivel hose ends. Hose 2 m per lubrication point is included, other lengths upon request.

#### G. Reducing adapter

Three reducers R1/8, R1/4 and M10x1 included for each lubrication point.

#### H. Hose spiral guard

Use to bundle hoses in multi-point kits.

## INSTALLATION KIT rail mount (for rails up to 1 1/2" diameter)

			
<b>INSTALLATION KIT STAR 1-point rail mount</b> incl. 2 m hose	<b>INSTALLATION KIT STAR 2-point rail mount</b> incl. 4 m hose	<b>INSTALLATION KIT STAR 3-point rail mount</b> incl. 6 m hose	<b>INSTALLATION KIT STAR 4-point rail mount</b> incl. 8 m hose
110098	110099	110100	110101

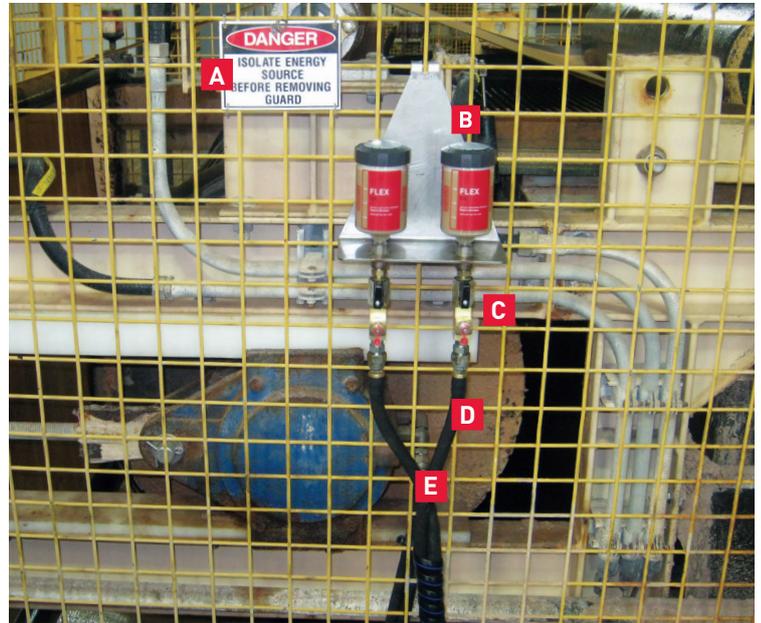




## Guidelines for remote installation

Year by year, improvements to safe work practices and increased production demands lead to an increasing requirement to remote mount automatic lubrication systems.

- A** Locate where lubrication systems can be safely and easily accessed while equipment is operating
- B** Select stainless steel brackets which can be easily removed if required for maintenance access
- C** Include manual purge points to provide an efficient means of occasional manual purging
- D** Use only full bore elbow fittings
- E** Use  $\varnothing$  9.5 mm grease hose and run lines under or around cages



## Hose length installations

Restrict maximum grease hose length to

- 1 meter** for perma CLASSIC / FUTURA
- 2 meters** for perma FLEX / NOVA
- 5 meters** for perma STAR VARIO

Limits depend on variables such as grease hose diameter, grease type, ambient temperature and the resistance of the lubrication point itself. Please consult perma for detailed analysis.



- ← Prime grease hose and fittings.
- Route grease hose under or around cage mesh, not through and locate perma lubrication systems at a safe point of access.



Selection made easy

## Accessories & mounting components

perma STAR VARIO should always be used with support flange. Use protection cap (109999) with cover clip (108606) and support flange (109420) for heavy duty applications. The table below includes bare brackets. Note that STAR Standard Duty and Heavy Duty C-Section brackets can be ordered with support flange, cover clip and full length protection cap. With the exception of some cage hanger brackets only bare brackets without mounting attachment are pictured below.

### 1 Choose mounting type



or



or



### 2 Choose bracket >>

For perma CLASSIC, FUTURA, FLEX, NOVA	Pic.	Art. No. - stainless steel
Mounting Bracket CLASSIC, FUTURA, FLEX, NOVA 1-point G1/4 female	1	109685
Mounting Bracket CLASSIC, FUTURA, FLEX, NOVA 2-point G1/4 female	2	109686
Mounting Bracket CLASSIC, FUTURA, FLEX, NOVA cage hanger 1-point G1/4 female	3	109689
Mounting Bracket CLASSIC, FUTURA, FLEX, NOVA cage hanger 2-point G1/4 female	4	109690






**for Electrochemical**



### 2 Choose bracket >>

For perma STAR VARIO	Pic.	Art. No. - stainless steel
Mounting Bracket STAR Standard Duty 1-point G1/4 female	5	109663
Mounting Bracket STAR Standard Duty 2-point G1/4 female	6	109667
Mounting Bracket STAR Standard Duty 3-point G1/4 female	7	109670
Mounting Bracket STAR Standard Duty 4-point G1/4 female	8	109673






Mounting Bracket STAR Heavy Duty C-section 1-point G1/4 female	9	109664
Mounting Bracket STAR Heavy Duty C-section 2-point G1/4 female	10	108648
Mounting Bracket STAR Heavy Duty C-section 3-point G1/4 female	11	109671
Mounting Bracket STAR Heavy Duty C-section 4-point G1/4 female	12	109674






Mounting Bracket STAR Standard Duty cage hanger 1-point G1/4 female	13	109665
Mounting Bracket STAR Standard Duty cage hanger 2-point G1/4 female	14	109668




**for perma STAR**



## 2 Choose bracket >>

For perma STAR VARIO	Pic.	Art. No. - stainless steel
Mounting Bracket STAR rail mount 1-point G1/4 female incl. 2 U-Bolts	1	110014
Mounting Bracket STAR rail mount 2-point G1/4 female incl. 2 U-Bolts	2	110015
Mounting Bracket STAR rail mount 3-point G1/4 female incl. 2 U-Bolts	3	110016
Mounting Bracket STAR rail mount 4-point G1/4 female incl. 2 U-Bolts	4	110017



For rails up to 1 1/2" diameter.

**for perma STAR**



## 3 Choose accessories >>

Hose / Connector / Accessories	Pic.	Art. No.
Heavy Duty hose up to +100 °C oØ 16 mm x iØ 9.5 mm (with NBR lining and fabric insert)	1	101555
Hose connector G1/4 male for hose iØ 9.5 mm - push-lock (steel, zinc-plated)	2	101554
Purge connection with manual valve G1/4 female	3	109684
Hose spiral guard 25 mm (plastic) - per meter	4	109695
Hose prefill adapter for Heavy Duty hose	5	107633
Grease gun	6	101455
Hose with rotary joint, slide and hydraulic coupling for grease gun	7	110199



Accessories for FLEX / STAR	Pic.	Art. No.
Support flange FLEX Gen 2.0 G1/4 male x G1/4 female (brass / plastic)	1	101427
Protection cap incl. support flange FLEX G1/4 male x G1/4 female (steel / alu)	2	101428
Protection cap STAR Standard Duty 250 (plastic)	3	109519
Protection cap STAR Standard Duty 120 / 60 (plastic)	4	109520
Support flange STAR Gen 2.0 G1/4 male x G1/4 female (brass / plastic)	5	109420
Cover clip for protection cap STAR VARIO Heavy Duty	6	108606
Protection cap STAR VARIO Heavy Duty (plastic)	7	109999
Manifold 2-to-1 G1/4 male (stainless steel)	8	109696

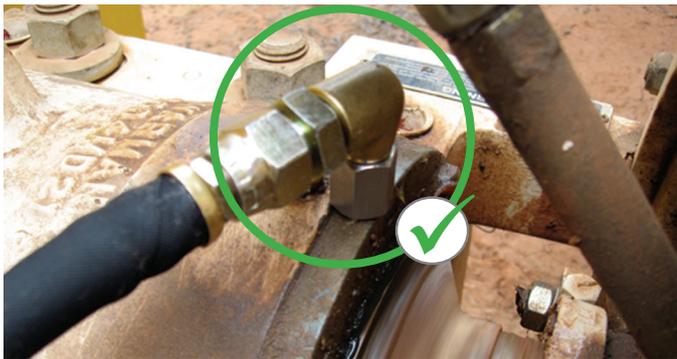


Cover clip (no. 6) can only be used with support flange and protection cap.

Standard protection cover must be removed when using any of the full size protection caps shown above (pic. 3 / 4 / 7).



Seal all connection parts with a metal bonding adhesive (medium)



perma STAR VARIO lubrication systems have a G1/4 male thread at the grease outlet. Where reducers, elbows or extensions are required to simplify installation it is important to adhere to the following guidelines:

- When using reducing adaptors with fine threads such as 6 mm metric or 1/4" UNF select stainless steel to avoid breakage
- Minimize the number of elbow fittings
- Always select full bore elbows

Angles	Pic.	Art. No. - brass
Angle 45° G1/4 male x G1/4 female	1	104823
Angle 45° M6 male x G1/4 female	2	104824
Angle 45° M8x1 male x G1/4 female	3	104825
Angle 45° M10x1 male x G1/4 female	4	104826
Angle 90° G1/4 male x G1/4 female	5	104827
Angle 90° M6 male x G1/4 female	6	104828
Angle 90° M8x1 male x G1/4 female	7	104829
Angle 90° M10x1 male x G1/4 female	8	104830
Angle 90° R1/4 male x G1/4 female	9	109849
Angle 90° R1/4 male x G1/4 female square	10	109850
Angle 90° R1/8 male x G1/4 female	11	109851
Angle 90° R1/8 male x G1/4 female square	12	109852
Angle 45° R1/4 male x G1/4 female square	13	109853

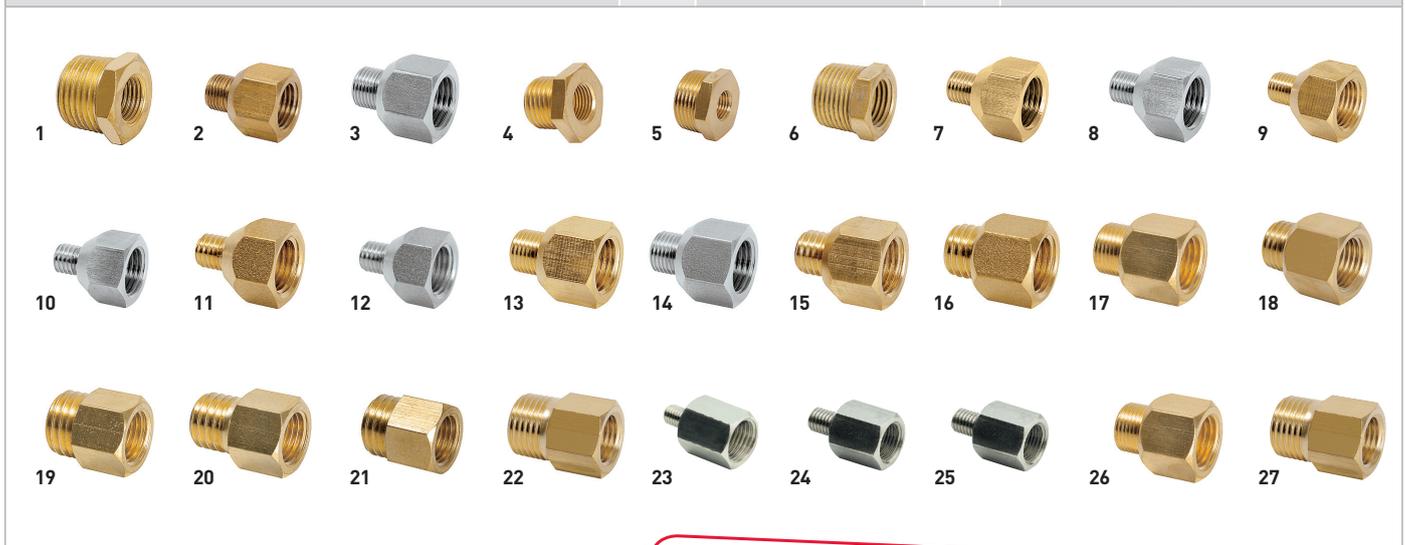


Special purpose fittings	Pic.	Art. No.
Swivelling screw fitting G1/4 male x G1/4 female - rotary type (brass)	14	104831
T-Adapter 3 x G1/4 female (brass)	15	110025
Y-Adapter 2 x G1/4 female x R1/4 male (brass nickel-plated)	16	109002
Sleeve G1/4 female (brass)	17	104853
Relief valve G1/8 male (0.35 bar)	18	109683
Hexagon-nipple R1/4 male (brass)	19	104852



Check thread size at lubrication point

Reducers	Pic.	Art. No. - brass	Pic.	Art No. - stainless steel
Reducer R1/2 male x G1/4 female	1	104832		-
Reducer G1/8 male x G1/4 female	2	104833	3	104875
Reducer G1/4 male x G1/8 female	4	104834		-
Reducer R3/4 male x G1/4 female	5	104835		-
Reducer R3/8 male x G1/4 female	6	104836		-
Reducer M6 male x G1/4 female	7	104837	8	104876
Reducer M8x1 male x G1/4 female	9	104838	10	104877
Reducer M8 male x G1/4 female	11	104839	12	104878
Reducer M10x1 male x G1/4 female	13	104840	14	104879
Reducer M10 male x G1/4 female	15	104841		-
Reducer M12 male x G1/4 female	16	104842		-
Reducer M12x1 male x G1/4 female	17	104843		-
Reducer M12x1.5 male x G1/4 female	18	104844		-
Reducer M14x1.5 male x G1/4 female	19	104845		-
Reducer M14 male x G1/4 female	20	104846		-
Reducer M16 male x G1/4 female	21	104847		-
Reducer M16x1.5 male x G1/4 female	22	104848		-
Reducer 1/4 UNF male x G1/4 female		-	23	109845
Reducer 1/4 UNF male x G1/8 female		-	24	109846
Reducer M6 male x G1/8 female		-	25	109847
Reducer R1/8 male x G1/4 female	26	109953		-
Reducer R1/4 male x G1/4 female	27	109954		-



Not familiar with perma's thread descriptions?  
perma uses ISO denomination. See examples:

G1/4 male = 1/4 BSPP-M  
G1/4 female = 1/4 BSPP-F

R1/4 male = 1/4 BSPT -M  
R1/4 female = 1/4 BSPT-F

Extensions	Pic.	Art. No. - brass	Pic.	Art. No. - stainless steel
Extension 30 mm G1/4 male x G1/4 female	1	104854		-
Extension 45 mm G1/4 male x G1/4 female	2	104855	3	104887
Extension 75 mm G1/4 male x G1/4 female	4	104856	5	104888
Extension 115 mm G1/4 male x G1/4 female	6	104857		-
Extension 50 mm M6 male x G1/4 female		-	7	109697
Extension 75 mm M10x1 male x G1/4 female	8	108923		-
Extension 115 mm M10x1 male x G1/4 female	9	108924		-
Extension 50 mm R1/8 male x G1/4 female	10	109848		-
Extension 50 mm 1/4 UNF male x G1/4 female		-	11	109854



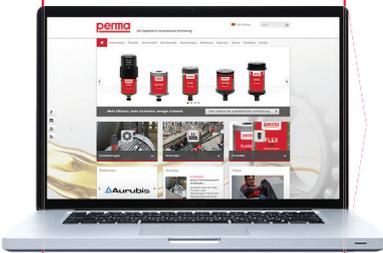
Service equipment	Pic.	Art. No.
50 ml Bottle Loctite® 243™ thread sealant (medium strength)	1	110278
perma Fitting thread tester	2	110374
<b>perma REDUCER KIT</b> includes several different reducers → Detailed bill of material on request or on our website	3	110373
<b>perma UNIVERSAL ACCESSORY KIT</b> includes reducers, angels, extensions, hose connectors, service equipment, ... → Detailed bill of material on request or on our website	4	110372



Original size and color may vary from the illustrations

## Additional service tools & support

[www.perma-tec.com](http://www.perma-tec.com)



Visit our website and conveniently download operating manuals or installation instructions, brochures or other product information on all perma lubrication systems.

### Product- / Application Flyer



### perma SELECT APP Selection Software

Free download for iOS and Android:



### Videos / Installation Instructions



[www.perma-tec.com/videos](http://www.perma-tec.com/videos)

### perma SERVICE



Do you have any technical questions? Do you need help in selecting the right lubrication system and lubricant?

**Contact us!**  
Your perma SERVICE Team.

### Project Planning, Installation, Maintenance



### perma MLP: Maintenance Lubrication Program

<https://mlp.perma-tec.com>



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Do you need any marketing material?

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### Products Pocket Guides

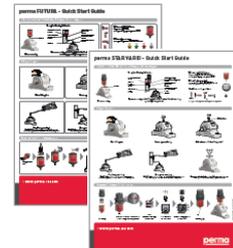


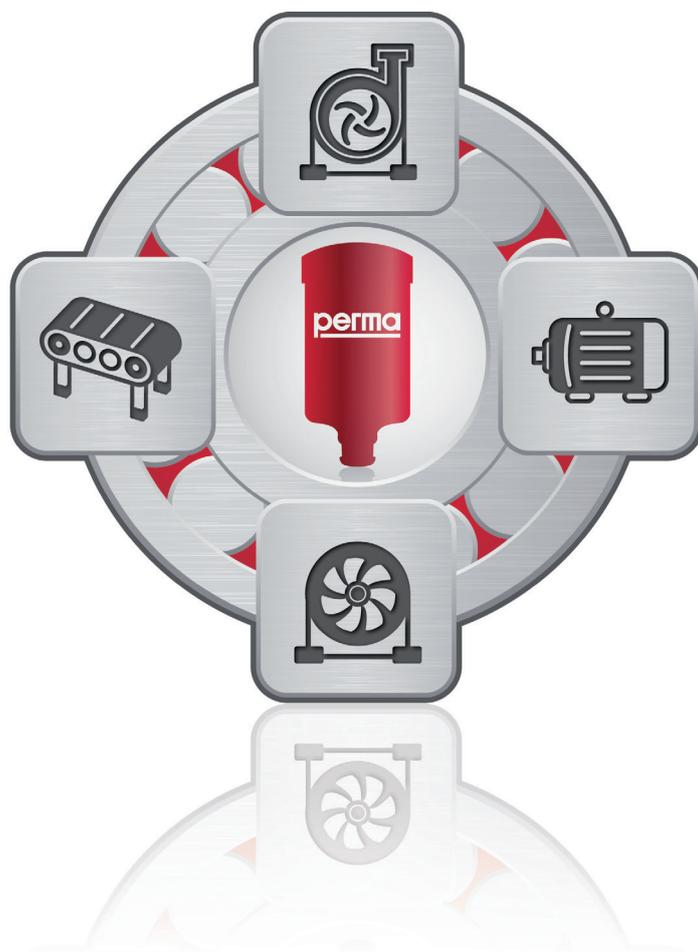
### Heavy Duty Literature



### Quick Start Installation Poster

[www.perma-tec.com](http://www.perma-tec.com)





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