NTN SNR

Experts & Tools WITH YOU

INDUSTRY **Lubrication**

« Providing you with a complete range of tools and services for your bearings, adapted to your application, size and resources »

Experts & Tools

NTN-SNR Experts & Tools, working to serve our customers.

Every customer has specific expectations in terms of bearing maintenance and lubrication, therefore NTN-SNR Experts & Tools offers solutions designed for your application and priorities, not forgetting budget.

Every application requires specific expertise. Wind turbine maintenance differs from press or crusher maintenance. NTN-SNR is able to provide the expertise and tools you need thanks to almost one century of theory and practice in everyday contact with industrial applications.

Our recommendations will be based on the scale and difficulty of your maintenance and lubrication operations of your units. We provide customised solutions in terms of tools or organisation depending on your situation.

With nearly 18,000 employees working throughout the world, NTN-SNR prepares and improves maintenance methods and tools on a daily basis. Our aim is to provide easy-to-implement products and services. When we design our tools and organise our services, we aim to improve your effectiveness. From reducing the duration of maintenance and servicing operations to optimising the life cycle of your bearings, our services can lead to real benefits, improve safety and extend service lives.

This catalogue includes our full range of greases, automatic Lubricator and centralised lubrication systems, plus our related services. Our maintenance tools are listed in a separate catalogue. (See opposite)

LUB'SOLUTIONS, let us solve your lubrication problems

All bearings, mechanical parts and industrial processes need reliable and suitable lubrication to operate in an optimal and long-term manner. In addition to supplying quality bearings, NTN-SNR is aware of the critical nature of lubrication for your applications, and can provide its expertise and products to manage this fundamental issue.

The LUB'SOLUTIONS product range includes lubricants specially selected for various applications, and all items you may need to reliably distribute and apply just the right amount of lubricant each mechanical part requires.

However, **LUB'SOLUTIONS is above all a team of experts** ready to assist you in implementing the right solutions for your environment. Our technicians are available to solve your problems, from providing advice in defining your requirements to installing lubrication systems for your application, including made-to-measure projects.

LUB'SOLUTIONS, the Experts & Tools way of thinking. Our experts are available and determined to provide you with customised solutions to ensure that your bearings and machines operate in optimal conditions, applying their Experts & Tools way of thinking.

GENERAL CONTENTS

1 - LUBRICANTS

WHAT THE EXPERTS SAY:

Only appropriate lubrication can guarantee the optimal operation of bearings and the related mechanical assembly.

55% of premature bearing failure is caused by inappropriate lubrication.
Inadequate lubrication will substantially shorten the service life of the bearing.
Bearing lubrication is often neglected due to the difficulty of accessing bearings and the operator's lack of lubricant knowledge.
Selecting the right lubricant, the right lubrication method, the precise quantity required for the bearing and the frequency of monitoring the lubrication are all critical points.

A - PRINCIPLE AND BENEFITS OF GOOD LUBRICATION

- A film of lubricant (oil film) between the balls or rollers and the bearing raceway prevents **wear and seizure**.
- Lubrication protects components **from corrosion**
- Lubrication also protects the components **from liquids** and external pollution, and evacuates wear debris.
- Lubrication reduces **friction**, reducing the power consumed by the machine, and thereby providing **energy savings**.
- Circulating oil distributes heat and contributes to the thermal equilibrium of the machine.

The service life of the bearing is directly related to the effectiveness of the oil film, which depends on:

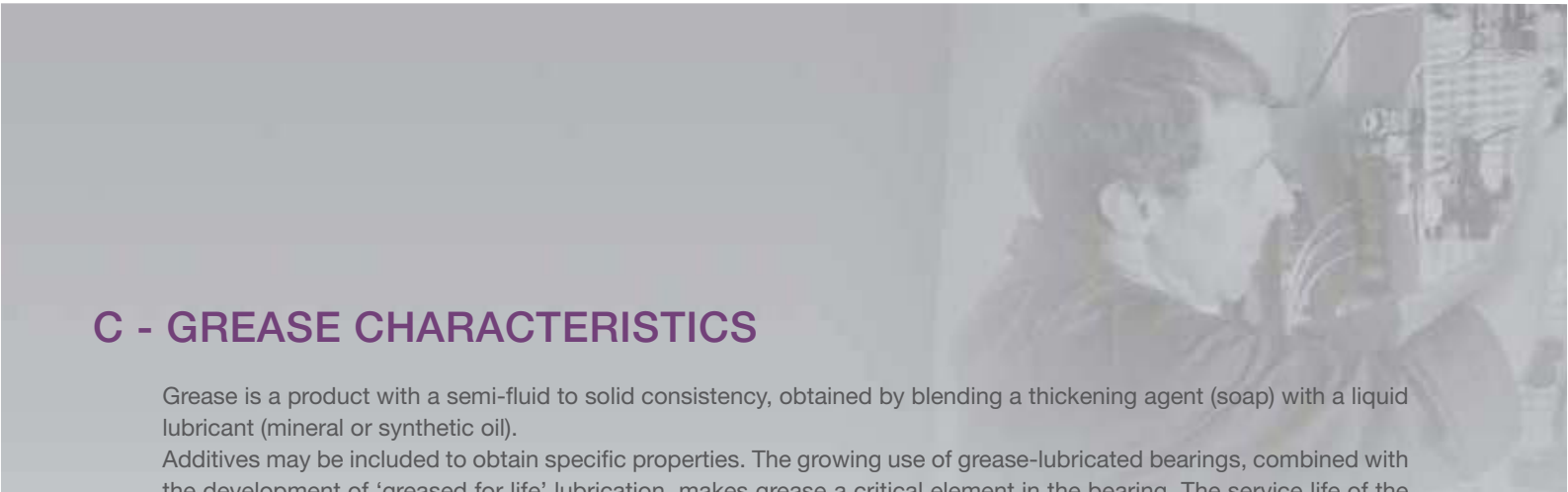
- the type of lubricant; its specific heat capacity, resistance to vibrations, etc.
- the load and speed of the bearing.

Greases for general use do not always meet the specific requirements of some applications. Bearings requested to operate in specific load, speed or temperature conditions, or in the presence of water, humidity or vibrations, require the use of carefully selected grease.

NTN-SNR has carried out research in this field with the leading international lubricant manufacturers for more than half a century.
We therefore have knowledge and practical experience for most lubricants used with bearings.

B - SELECTING YOUR TYPE OF LUBRICATION

	OIL LUBRICATION	GREASE LUBRICATION
ADVANTAGES	• Good penetration into the bearing • Good physical and chemical stability • Cooling • Easy lubricant control: volume and level	• Clean mechanisms • Simplified sealing • Protection • Simple assembly • Easy handling • Reduced or no lubricant replacement required • Option to use pre-greased bearings
DISADVANTAGES	• Sealing required for assembly • Inadequate protection against corrosion and humidity in case of extended periods of non-running • Time delay, if it is necessary to start independent circulation prior to rotation of the bearing	• Higher friction coefficient than oil • Reduced heat transfer • The bearing must be dismantled and washed in order to be replaced (if necessary) • No option to check the level of grease, therefore grease levels must be reliable or periodic top-up is required to compensate for leaks, pollution and aging



C - GREASE CHARACTERISTICS

Grease is a product with a semi-fluid to solid consistency, obtained by blending a thickening agent (soap) with a liquid lubricant (mineral or synthetic oil).
Additives may be included to obtain specific properties. The growing use of grease-lubricated bearings, combined with the development of 'greased for life' lubrication, makes grease a critical element in the bearing. The service life of the bearing and its behaviour in various environments significantly depends on the properties of the grease used.

Physical and chemical characteristics:

Consistency

- NLGI (National Lubrication Grease Institute) grades correspond to a value of worked penetration in the grease (according to test specification ASTM/D217)
- For bearings, the consistency generally adopted is grade 2 (normal).

Viscosity of basic oil: generally defined in cSt (mm^2/S) at 40°C.

Density: approx. 0.9

Drop point: the temperature at which the first drop of a sample liquefied by heating drips
Approximately: 180°C/260°C depending on the composition of the grease. The maximum service temperature of the grease is always well below the drop point.

NLGI GRADES	WORKED PENETRATION	CONSISTENCY
0 1	385 - 355 340 - 310	Semi-fluid Very soft
2 3	295 - 265 250 - 220	Soft Normal
4	205 - 175	Firm

Functional characteristics

The working conditions imposed on the lubricant (rolling, mixing) require special greases for bearings which cannot be selected simply on the basis of their physical and chemical characteristics.

The NTN-SNR Research and Test Centre is continuously testing to approve bearings, enabling us to offer advice on the most suitable grease for each application.

Approval specifications are based on the following criteria:

- endurance for ball bearings
- endurance for roller bearings
- water resistance
- resistance to high and low temperatures
- adhesion (centrifugation)
- resistance to vibrations (false brinelling)
- esistance to high speeds
- etc.

Other criteria can be added depending on the final results required by the customer. Selecting a type of grease will represent the best compromise based on the specifications for the application.

D - TECHNICAL CHARACTERISTICS OF LUBRICANTS AND MAKING A CHOICE

The grease will be selected on the basis of operating conditions, which must be defined as precisely as possible: temperature, speed, load, environment, vibrations and any other specific limitations inherent to the application.
Select which grease to use with the assistance of your NTN-SNR contact.
The table on the pages 12 & 13 provides initial guidance

1-LUBRICANTS

UNIVERSAL Multi purpose

Grease for general usage, in industry or for automobiles

10

STANDARD APPLICATIONS
Agricultural equipment, washing machines, handling equipment, general mechanical devices, low-power electric motors, car wheel bearings, small tools, etc

BENEFITS
Good properties in the presence of water, excellent protection against wear and corrosion

TEMPERATURE RANGE
from -25 to +140°C

HEAVY DUTY High Load

Top quality grease for very high-pressure applications, suitable for many applications, intended for arduous applications in heavy industry: metallurgy, construction, transport, etc.

10

STANDARD APPLICATIONS
Conveyors, lifting devices, truck wheel hubs, high-power electric motors, water pumps, presses, etc.

BENEFITS
Excellent performance under heavy loads, including at high speeds, good properties in the presence of water, excellent protection against wear and corrosion.

TEMPERATURE RANGE
from -25 to +140°C

VIB Vibrations & Shocks

This grease is an ideal lubricant for parts subjected to extensive vibrations or impact. Recommended for quarries, cement plants, public works and agricultural operations, high-load applications in humid environments, paper plants, boring, etc.

11

STANDARD APPLICATIONS
Shafts in scoops, crushers, grinders, vibrating scalpers, washing machines, industrial fans, etc.

BENEFITS
Excellent resistance to impact, vibrations and heavy loads, excellent resistance to water guaranteeing long-term lubrication.

TEMPERATURE RANGE
from -20 to +140°C

HIGH TEMP High temperature

This grease is the ideal solution for long-term lubrication at high temperatures up to +150°C. Accepts occasional peaks at +175°C.

11

STANDARD APPLICATIONS
Textile machines, paper transformation machines, hot fans, dryers, tensioning rollers, vehicle water pumps, etc.

BENEFITS
Extremely long resistance to high temperatures, excellent protection against wear and corrosion, for ball and roller bearings, for horizontal and vertical shafts.

TEMPERATURE RANGE
from -40 to +160°C

FOOD Food Sure

Multi-purpose grease for the food and pharmaceutical industries.
Complies with NSF-H1* recommendations*

11

STANDARD APPLICATIONS
At any point where accidental contact with food is technically possible. Bottling machines, dairy equipment, industrial baking, pasta manufacturing, confectionery, slaughterhouses, etc.

BENEFITS
Wide range of service temperatures, good protection against corrosion, good resistance to washing with hot and cold water, and many disinfectant solutions and detergents.

TEMPERATURE RANGE
from -30 to +120°C
* NSF: National Sanitation Foundation /H1: Occasional contact with food

CHAIN OIL

Synthetic oil for high-temperature chains

11

STANDARD APPLICATIONS
Textile and plastic injection machines: in levelling equipment, stenter frames, multi-layer systems, festoon dryers, festoon steamers and coating units.
For all types of stenter chains lubricated with oil (roller chains, clips with ball bearings, sliding with guide bars) and chain/chain shaft articulations.

BENEFITS
Excellent lubrication, even with the presence of high temperatures and loads, excellent spreading properties, ensuring the rapid formation of a film of lubrication, excellent resistance to loads and wear, good adhesion therefore no spray, little formation of residue thanks to 100% synthetic components.

TEMPERATURE RANGE
from -20 to +250°C

ULTRA HIGH TEMP - Extreme High Temperature

This grease is for long-term lubrication for any type of bearing subjected to extreme temperatures

11

STANDARD APPLICATIONS
Textile drying machines, corrugated board production units, the plastic industry, rolling tail pipes, copy machines, furnace equipment, kiln cars, electric motors operating at extreme temperatures, etc.

BENEFITS
For very high service temperatures up to +260°C, good ability to absorb pressure, excellent resistance to aggressive agents, compatible with most plastics and seals.

TEMPERATURE RANGE
from -30 to +260°C

HIGH SPEED Spindles

Low-temperature grease for very high speeds

11

STANDARD APPLICATIONS
Textile machine spindles, spindles in power-operated tools running at high speeds (milling shafts, lathes, grinders, drills, etc.)

BENEFITS
Reduced running-in time for spindle bearings, excellent resistance to water (protects against the premature failure of bearings and reduces maintenance costs), reduced bearing temperature due to low friction torque (extended bearing service life), mineral oil + low-viscosity ester ensuring a wide range of service temperatures and excellent cold temperature resistance

TEMPERATURE RANGE
from -50 to +120°C

GREASE CHARACTERISTICS
(physical, chemical and mechanical properties, packaging)

Lubricants: description	UNIVERSAL	UNIVERSAL +	HEAVY DUTY	HEAVY DUTY +
NLGI consistency grade	2	2	2	2
Base oil	Mineral	Mineral	Mineral	Mineral
Thickener / type of soap	Lithium	Lithium /Calcium	Lithium with EP additives	Lithium with EP additives
Colour	Amber	Light Brown	Amber	Brown
Base oil viscosity (cSt) - at 40°C	115	100	115	150
- at 100°C	11	9	11	15
Service temperature range (°C)	From -25 to +140°C	From -25 to +130°C	From -25 to +140°C	From -30 to +150°C
Drop point (°C) DIN ISO2176	> 190	> 175	> 190	> 190
Suitable for medium loads P<C/5	+		++	
Suitable for high loads P<C/5	-		++	
Suitable for low speeds n.Dm <100,000	+		+	
Suitable for high speeds n.Dm >100,000	+		+	
Properties in humid environments, in the presence of water	++		++	
Suitable for low-amplitude oscillations	+		+	
Suitable for vibrations when shutdown	-		-	
Adhesion	+		+	
Low torque	+		+	
Low noise levels	+		+	
Anti-corrosion protection	++		++	
Resistance to chemical agents	-		-	
Pumpability	++		++	
Sizes available	400 g cartridge 1 kg can 5 kg bucket 23 & 50 kg drums	Lubricator BOOSTER	400 g cartridge 1 kg can 5 kg bucket 23, 50 and 190 kg drums	Lubricator BOOSTER
Remarks	Previous name: MS		Previous name: EP	

N.Dm: rpm x mean diameter (millimetres)
++ : Excellent performance
+ : Good performance
- : Not recommended
/ : Not applicable

HIGH TEMP	VIB	FOOD	ULTRA HIGH TEMP	HIGH SPEED	CHAIN OIL
2	2	2	2	2	
Semi-synthetic	Paraffinic mineral	Paraffinic mineral	Perfluorinated polyether synthetic	Ester + Mineral	Ester + PAO
Polyurea	Lithium /Calcium	Aluminium complex	PTFE	Lithium	
Light Brown	Light Brown	Pale yellow	White	Yellow	Pale green
160	360	195	420	24	320 (*)
18	25	22	40	5	28 (*)
From -40 to +160°C	From -20 to +140°C	From -30 to +120°C	From -30 to +260°C	From -50 to +120°C	From -20 to +250°C
> 250	> 190	> 220	Not measurable (*)	> 190	-25
+	+	+	++	+	/
-	++	+	++ (**)	-	/
+	++	+	++	-	/
+	-	+	+	++	/
+	+	+	+	++	/
++	++	+	++	+	/
-	-	-	-	++	/
++	++	+	++	+	/
+	-	+	-	++	/
+	-	-	-	++	/
+	+	+	+	++	/
-	-	-	++	-	/
++	++	++	++	++	/
400 g cartridge 1 kg can Lubricator BOOSTER	400 g cartridge 1 kg can 5 kg bucket Lubricator BOOSTER	400 g cartridge 1 kg can Lubricator BOOSTER	800 g cartridge	1 kg can	ECO and SMART BOOSTER
Previous name: HT	Previous name: VX	Previous name: AL1 - Meets NSF requirements as an H1 product	* According to standard DIN 2176, the drop point of this grease cannot be determined, i.e. this grease fails to melt **If T<200°C	Pay attention to quantity, and grease levels Previous name: GV+	*Base oil viscosity at 20°C = 1200cSt

E - SELECTING AN NTN-SNR GREASE SUITABLE FOR YOUR APPLICATIONS

PREVAILING OPERATION	OPERATING LIMITS		EXAMPLES OF APPLICATIONS
	TEMPERATURE °C	SPEED	
General usage	-25 to +130	< maximum bearing speed	**Industry and automobile:** Agricultural equipment, general mechanical devices, handling equipment, electrical tools, car wheel bearings, etc.
High loads	-25 to +140	< 2/ 3 maximum bearing speed	**Arduous applications in heavy industry:** Iron and steel, construction, transport, conveyors, lifting devices, high-power electric motors, water pumps, presses, truck wheel hubs, etc.
High temperature	-40 to +160	< 2/ 3 maximum bearing speed	Textile machines, paper transformation machines, hot fans, dryers, tensioning rollers, vehicle water pumps, etc.
	-30 to +260	< 2/ 3 maximum bearing speed	Corrugated board production, the plastic industry, textile drying machines, rolling tail pipes, copy machines. Electric motors operating at very high temperatures, furnace equipment, kiln cars, etc.
Low temperature	Until - 50	< 2/ 3 maximum bearing speed	Aviation, special devices.
High speed	-20 to +120	< 4/ 3 maximum bearing speed	Machine tool spindles, textile machine spindles, miniature electric motors
Humidity	-30 to +120	< 2/ 3 maximum bearing speed	Washing machines
High-amplitude impacts or vibrations **Centrifugation Rotating outer ring**	-20 to +130	< 2/ 3 maximum bearing speed	For quarries, cement plants, public works and agricultural operations, high-load applications in humid environments, paper plants, drilling and boring Shafts in scoops, crushers, grinders, vibrating scalpers, washing machines, industrial fans, etc.
Food usage	-30 to +120	< 2/ 3 maximum bearing speed	**Applications where accidental contact with food is technically possible:** Bottling machines, dairy equipment, industrial baking, pasta manufacturing, confectionery, slaughterhouses, etc
High-temperature chain oil	-20 to +250		**Applications in the textile and plastics industries with all types of oil-lubricated chains:** Levelling machines, stenter frames, multi-layer systems, festoon steamers, dryers, coating units.

TYPICAL RECOMMENDATIONS	EXPERTS & TOOLS RECOMMENDATIONS
Mineral oil Traditional soap (lithium, calcium, etc.) Grade 2 consistency is generally used for large bearings or bearings with specific operating properties. Reduced performance above 90°C (continuous).	UNIVERSAL or UNIVERSAL +
Similar to general purpose greases with extreme pression additives	HEAVY DUTY or HEAVY DUTY +
Polyurea thickener with highly viscous or semi-synthetic mineral base oil. Important: greases with silicon base oil have reduced resistance when subjected to high loads.	HIGH TEMP
100% synthetic grease Important: greases with silicon base oil have reduced resistance when subject to high loads	ULTRA HIGH TEMP
Base oil with very low viscosity Important: the grease becomes fluid if temperature >80°C	HIGH SPEED
Oil with very low viscosity	
Traditional grease doped with anti-corrosion additive	UNIVERSAL or HEAVY DUTY (normal or +)
Grease with grade 2 consistency and high adhesion	VIB
Meets NSF requirements as an H1 product *NSF: National Sanitation Foundation /H1: Occasional contact with food	FOOD
Oil with good adhesion and good creep properties (spreading)	CHAIN OIL

GREASE COMPATIBILITY

It is not generally advised to mix two lubricating greases.
If two greases are mixed (e.g.: when grease is changed in a lubrication system), check the compatibility of the two greases, i.e. of their base oils and their thickeners.

OIL	MINERAL	PAO POLY ALPHA-OLEFIN	ESTER	P. POLY GLYCOL	POLYPHENYL ETHER	SILICONE (METHYL)	SILICONE (PHENYL)	FLUORINATED
MINERAL	C							
PAO POLY ALPHA-OLEFIN	C	C						
ESTER	C	C	C					
P. POLY GLYCOL	NC	NC	C	C				
POLYPHENYL ETHER	C	C	C	NC	C			
SILICONE (METHYL)	NC	NC	NC	NC	NC	C		
SILICONE (PHENYL)	C	C	C	NC	C	C	C	
FLUORINATED	NC	NC	NC	NC	NC	NC	NC	C

Legend : C : Compatible - NC - Not Compatible

THICKENER	ANHYDROUS CALCIUM SOAP	CALCIUM COMPLEX SOAP	LITHIUM SOAP	LITHIUM COMPLEX SOAP	LITHIUM / CALCIUM SOAP	ALUMINIUM COMPLEX SOAP	BENTONE SILICA GEL	POLYUREA	FLUORINATED
ANHYDROUS CALCIUM SOAP	C								
CALCIUM COMPLEX SOAP	NC	C							
LITHIUM SOAP	C	NC	C						
LITHIUM COMPLEX SOAP	C	C	C	C					
LITHIUM / CALCIUM SOAP	C	NC	C	C	C				
ALUMINIUM COMPLEX SOAP	C	NC	NC	NC	NC	C			
BENTONE SILICA GEL	C	NC	NC	NC	NC	NC	C		
POLYUREA	C	C	C	C	NC	C	NC	C	
FLUORINATED	NC	NC	NC	NC	NC	NC	NC	NC	C

Legend : C : Compatible - NC - Not Compatible

Single-point lubrication P. 16

MANUAL

GREASE OR OIL GUN

Easy one-handed lubrication

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APPLICATIONS
The grease gun is the ideal tool for easy, clean and quick greasing in industrial and agricultural environments.

BENEFITS

- **Practical**
  The pump can be operated with one hand
  Easy grip thanks to the knurled casing
  Can be used either with cartridges or filled directly with grease.
- **Robust**
  Designed for industrial applications with a maximum pressure of 360 bars.
  The high quality impact-proof steel guarantees long-life.
- **Clean and precise application**
  The special grease nozzle developed by NTN-SNR can be screwed to the grease gun. Use this nozzle to inject grease cleanly and precisely into the bearing.
  Slow and controlled grease flow: 0.8 cm3 /travel

PRODUCT NAME
LUB GREASE GUN

AUTOMATIC

WHAT THE EXPERTS THINK

Reduce your maintenance times and operating costs while improving safety for your personnel and machines.

The automatic Lubricator can be used to ensure the constant and regular lubrication of your bearings. The Lubricator is easy to integrate into various applications (mechanical and automobile industries, steelworks, paper plants, etc.), and can be used to optimise lubrication without any need to modify your Installations.

AUTOMATIC LUBRICATORS CAN BE USED TO ACHIEVE CONTINUOUS, RELIABLE, CLEAN AND EXTREMELY PRECISE LUBRICATION FOR YOUR BEARINGS:

- They provide a constant and controlled supply of quality grease, 24 hours a day, 7 days a week.

➢ **Less friction = energy savings**

- They actively contribute to extending the service cycle of the bearings.

➢ **They improve the reliability of industrial equipment**

- They eliminate the risk of excessive or inadequate lubrication
- They reduce the risk of contamination
- They guarantee the right lubrication with the right grease

➢ **Reducing the number of premature failures**

- They can be used to extend mean time between maintenance operations on the machine

➢ **Reducing the risks of accidents, particularly in dangerous or difficult-to-access areas**

CHOOSE THE MOST APPROPRIATE AUTOMATIC LUBRICATOR AND GREASE FOR YOUR APPLICATIONS

	UNIVERSAL +	HEAVY DUTY +	VIB	HIGH TEMP	FOOD
DESCRIPTION					
	General purpose grease for industrial use	Suitable for very high loads, compatible with many applications, intended for arduous applications	Parts subject to extensive vibrations or impact. For high-load applications in humid environments.	This grease is ideal for long-term lubrication at high temperatures up to +150°C. Accepts peaks of +175°C	Multi-purpose grease for the food and pharmaceutical industries. Complies with NSF-H1 recommendations
APPLICATIONS					
	Agricultural equipment, handling equipment, general mechanical devices, low-power electric motors, etc.	Heavy industry: metallurgy, construction, transport, conveyors, lifting devices, water pumps, etc.	Quarries, cement works, public works and humid environments: paper works, boring, crushers, vibrating scalpers, etc.	Textile machines, paper transformation machines, hot fans, dryers, water pumps, etc.	Bottling machines, dairy equipment, industrial baking, pasta manufacturing, confectionery, slaughterhouses, etc.
TECHNICAL DATA					
Soap	Lithium Calcium	Lithium	Lithium Calcium	Polyurea	Aluminium complex
Oil	Mineral	Mineral	Synthetic	Synthetic	Paraffinic mineral
Service temperature	-25°C/+130°C	-30°C/+150°C	-20°C/+140°C	-40°C/+160°C	-30°C/+120°C
Viscosity at 40°C	100 cSt	150 cSt	360 cSt	160 cSt	195 cSt
PRODUCT RANGE					
ECO Booster	•	•	•	•	•
SMART Booster	•	•	•	•	•
DRIVE Booster	•	•	•	•	•

ECO BOOSTER

- 120 cm^3
- Low-cost
- Robust (reinforced base)
- Ergonomic: excellent grease level visibility
- Can be used in explosive areas

SMART BOOSTER

- + capacity: 130 cm^3
- Precise, ergonomic
- Adjustable discharge (in months) using an LCD
- Constant flow, regardless of ambient temperature
- Recyclable: re-usable control unit
- Suitable for explosive areas

DRIVE BOOSTER

- Polyvalent
- 2 sizes: 120 cm^3 and 250 cm^3
- Multi-purpose
- Precise
- Powerful: suitable for remote lubrication
- Rechargeable

* For lubrication using CHAIN OIL, refer to the following pages, describing each Automatic Lubricator in detail.

1 / ECO BOOSTER 120

This system is ideal for humid environments, exposed to corrosive environment or requiring optimised hygiene standards, just like in the food industry.

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ECO BOOSTER: the robust and low-cost model

A • DESCRIPTION

This model is suitable for a wide range of applications, particularly for arduous environments which could cause corrosion in electronic systems, or in industrial sectors with high demands in terms of cleanliness and hygiene.

The grease is pressurised by an inert gas generated by a chemical reaction.
The duration of distribution for the **120 cm³** of grease can be adjusted to 1, 3, 6 or 12 months by selecting the appropriate colour coded activation screw.

B • APPLICATIONS

Designed for the single-point lubrication of plain or rolling element type bearings, open gears, chains, ball screws, linear guide bars, etc. The units resistance to corrosion makes it very popular in the food industry.

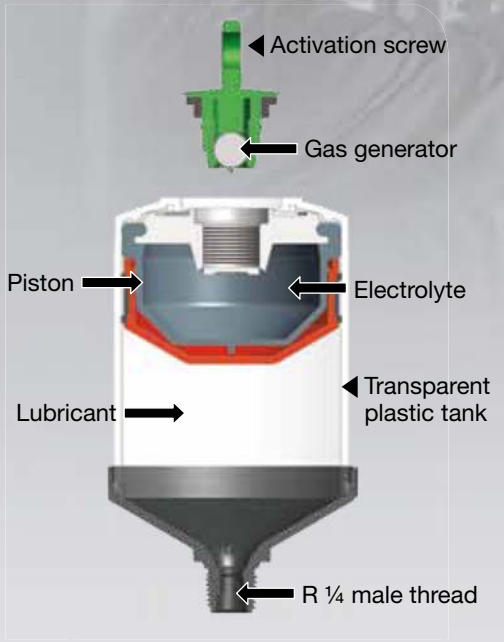
C • CHARACTERISTICS AND BENEFITS

• Compact design with reinforced flange	• Easy to install, even in confined locations
• Certification CE Ex I M2 c X II 2G c IIC T6 X II 2D c T80°C X	• Can be used in explosive areas
• Transparent tank in high density polyamide	• Easy to check grease level
• Watertight and dustproof	• Corrosion and vibration resistant • Can operate in all positions.
• Flow limiter valve integrated in the oil version	• Simple installation

D • TECHNICAL DATAS

Drive: **gas-operated with a chemical reaction***
Capacity: **120 cm3**
Max. pressure: **4 bars**
Duration of distribution: **1, 3, 6 or 12 months**
Immediate start-up: **1 day**
Service temperature: **from -0°C to +40°C**
** citric acid-based electrolyte: ecological*

Available with advanced NTN-SNR greases, especially developed for bearings, and with special synthetic oil for chains. Contact us for other types of lubricants



E • DESIGNATION

DESIGNATION	PRODUCT	LUBRICANT
LUBER ECO UNIVERSAL +	ECO BOOSTER	**Grease UNIVERSAL +** (General usage)
LUBER ECO HEAVY DUTY +	ECO BOOSTER	**Grease HEAVY DUTY +** (High loads)
LUBER ECO HIGH TEMP	ECO BOOSTER	**Grease HIGH TEMP** (High temperatures)
LUBER ECO VIB	ECO BOOSTER	**Grease VIB** (Vibrations and shocks)
LUBER ECO FOOD	ECO BOOSTER	**Grease FOOD** (Compatible with food contact)
LUBER ECO CHAIN OIL	ECO BOOSTER	**Oil CHAIN OIL** (High performance for chains)
LUBER ECO 1M ACTIVATOR	Activation screw 1 month	
LUBER ECO 3M ACTIVATOR	Activation screw 2 months	
LUBER ECO 6M ACTIVATOR	Activation screw 6 months	
LUBER ECO 12M ACTIVATOR	Activation screw 12 months	

2 / SMART BOOSTER 130

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The advanced and low-cost lubrication solution, ideal for applications subject to temperature variations

SMART BOOSTER: the low-cost model whatever the temperature

A • DESCRIPTION

SMART BOOSTER, the first electrochemical Automatic Lubricator equipped with a re-usable control unit, providing measured flow independent of the ambient temperature.

Guaranteed continuous lubricant flow, with the correct volume for your application, regardless of temperature
This smart Automatic Lubricator is equipped with a temperature probe which adjusts pressure to distribute just the right amount of grease selected at start-up.

The duration of distribution is easy to adjust (from 1 to 12 months) simply by selecting the appropriate period on the control unit.
The control unit can be re-used several times, only the **130 cm³** grease cartridge requires replacement.

B • APPLICATIONS

Designed for the single-point lubrication of plain or rolling element type bearings, open gears, chains, ball screws, linear guide bars, etc. This model is ideal for environments facing substantial temperature variations (e.g: fans mounted under roofs) or requiring intrinsic safety (e.g: petrochemical industry).

C • CHARACTERISTICS AND BENEFITS

• Adjustable between 1 and 12 months using the re-usable touchpad control unit, with an ON/OFF function.	• Flexible, precise and multipurpose, reducing operating costs while improving the lubrication of rotating parts.
• Integrated temperature compensation with a wide range of service temperatures	• High level of reliability: controlled grease flow, unaffected by temperature for the entire duration of distribution • Universal usage
• Compact design with reinforced flange	• Robust, easy to install, even in confined locations
• Certification CE Ex I M2 c X II 2G c IIC T6 X II 2D c T80°C X	• Can be used in explosive areas
• Protection IP65	• Can be used in many dusty and humid environments
• Transparent tank in high density polyamide	• Easy to check grease level • Can operate in all positions.
• Flow limiter valve integrated in the oil version	• Simple installation

D • TECHNICAL DATAS

Drive: **gas generating cells with electronic temperature compensation**

Capacity : **130 cm³**

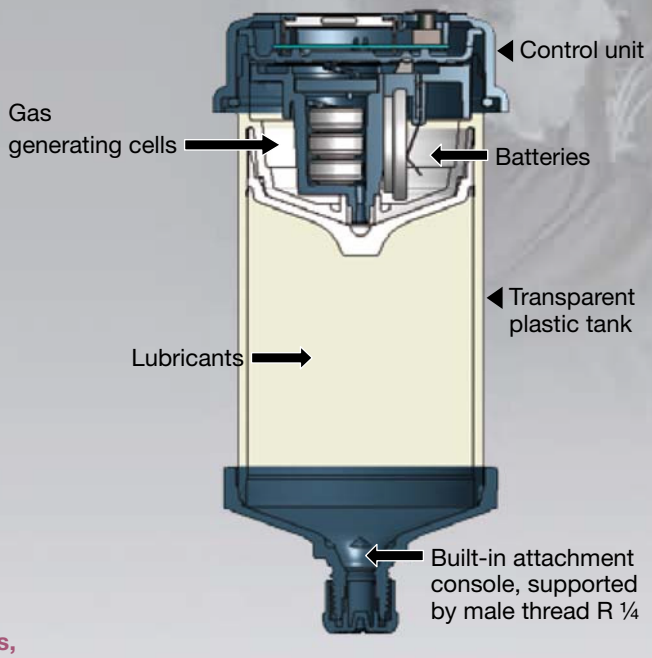
Max. pressure : **6 bars**

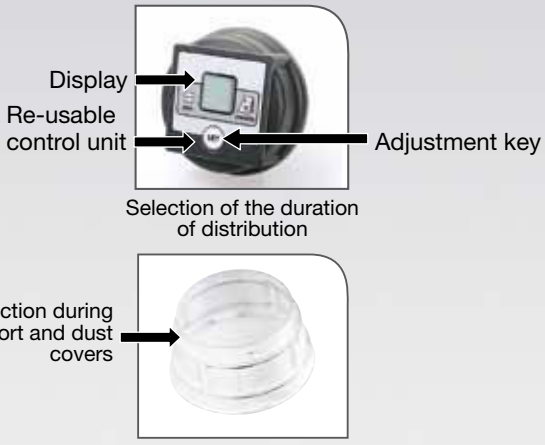
Duration of distribution : **1, 2, 3, …. 12 months**

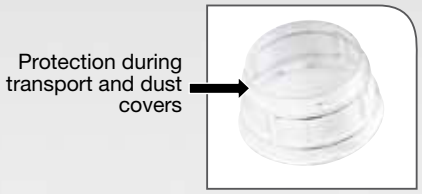
Immediate start-up: **1 day**

Service temperature: **from -20°C to +60°C**

Available with advanced NTN-SNR greases, especially developed for bearings, and with special synthetic oil for chains. Contact us for other types of lubricants







E • DESIGNATION

LUBER SMART (name of the grease) : Complete kit including: control unit + lubricant tank with gas generating cells and batteries + protective covers)

LUBER SMART REFILL (name of the grease) : Lubricant tank with gas generating cells and batteries + protective covers)

DESIGNATION	PRODUCT	LUBRICANT
LUBER SMART UNIVERSAL +	SMART BOOSTER complete	**Grease UNIVERSAL +** (General usage)
LUBER SMART REFILL UNIVERSAL +	Refill unit	
LUBER SMART HEAVY DUTY +	SMART BOOSTER complete	**Grease HEAVY DUTY +** (High loads)
LUBER SMART REFILL HEAVY DUTY +	Refill unit	
LUBER SMART HIGH TEMP	SMART BOOSTER complete	**Grease HIGH TEMP** (High temperatures)
LUBER SMART REFILL HIGH TEMP	Refill unit	
LUBER SMART VIB	SMART BOOSTER complete	**Grease VIB** (Vibrations and shocks)
LUBER SMART REFILL VIB	Refill unit	
LUBER SMART FOOD	SMART BOOSTER complete	**Grease FOOD** (Compatible with food contact)
LUBER SMART REFILL FOOD	Refill unit	
LUBER SMART CHAIN OIL	SMART BOOSTER complete	**Oil CHAIN OIL** (High performance for chains)
LUBER SMART REFILL CHAIN OIL	Refill unit	

3 / DRIVE BOOSTER 120 & 250

50

Advanced and ecological lubrication solution, designed for applications requiring highly precise dosing either in contact with the lubrication point or from a distanc

DRIVE BOOSTER: the top-of-the-range model for all situations

A • DESCRIPTION

DRIVE BOOSTER, an electromechanical Automatic Lubricator for extremely precise lubrication, regardless of the temperature, with high service reliability.

Available in 2 sizes, 120 cm^3 and 250 cm^3, meeting the requirements of most lubrication applications.
Electromechanical drive:

- Guarantees a constant and reliable pressure of 5 bars for the entire duration of distribution
- Distances of up to 3 metres are possible for grease systems and up to 5metres for oil systems.
- Can be re-used several times, helping to protect the environment.

This is the ideal solution for lubrication in dangerous and difficult-to-access areas, and in locations subject to high ambient temperatures or severe vibrations.

B • APPLICATIONS

Designed for the single-point lubrication of plain or rolling element type bearings, open gears, chains, ball screws, linear guide bars, etc. This model is suitable for a wide range of applications and operating conditions, regardless of ambient air pressure and temperature. This model can be installed up to 3 metres from the lubrication point for grease systems and up to 5 metres for oil systems.

C • CHARACTERISTICS AND BENEFITS

• Robust electric motor drive • Easy adjusting	• Unaffected by ambient temperature and pressure • Unaffected by vibrations • High level of reliability: constant grease flow for the entire duration of distribution
• Re-usable	• Ecological
• Transparent tank in high density polyamide, with reinforced flange	• Display of grease level
• Fitted with illuminated indicators	• Indicates the operating status and can be used for quick and remote monitoring
• Compact design	• Easy to install, even in confined locations
• Lubricator kit comes with all accessories	• The connector set included means the Lubricator can be immediately fitted to 95% of applications
• Refill unit consisting of a tank of lubricant and battery pack	• Service warranty

D • TECHNICAL DATAS

Drive: **electromechanical, re-usable**

Power supply: **battery pack**

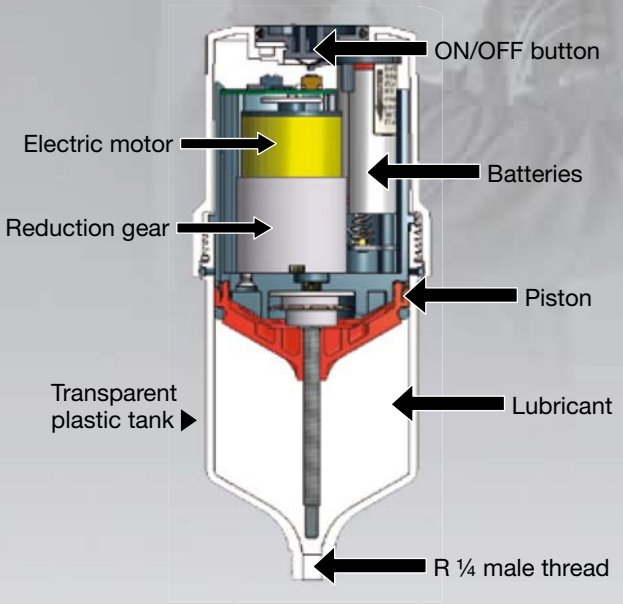
Capacity: **120 cm³ or 250 cm³**

Max. pressure : **5 bars**

Duration of distribution **1, 3, 6 or 12 months**

Service temperature: **from -10°C to +50°C**

Available with advanced NTN-SNR greases especially developed for bearings. Contact us for other types of lubricants



E • DESIGNATION

LUBER DRIVE KIT (capacity, grease name): Complete Automatic Lubricator kit including: Motor + 120 or 250 cm³ lubricant tank + battery pack + reinforced base + 4 reduction gear connectors.

LUBER DRIVE REFILL (capacity, grease name): Refill including: 120 or 250 cm³ lubricant tank + battery pack

The complete commercial reference is based on the same logic for other lubricants: UNIVERSAL+, HEAVY DUTY+, HIGH TEMP, VIB, FOOD.

DESIGNATION	PRODUCT	LUBRICANT
LUBER DRIVE KIT 120 UNIVERSAL +	DRIVE BOOSTER 120 kit	**Grease UNIVERSAL +** (General usage)
LUBER DRIVE KIT 250 HEAVY DUTY +	DRIVE BOOSTER 250 kit	**Grease HEAVY DUTY +**
LUBER DRIVE REFILL 120 HIGH TEMP	Refill unit 120	**Grease HIGH TEMP**
LUBER DRIVE REFILL 250 VIB	Refill unit 250	**Grease VIB**

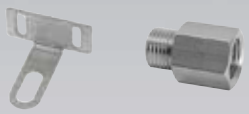
To order:

- a complete 250 cm³ DRIVE BOOSTER kit with the High Temp grease,
  ▶ the reference is LUBER DRIVE KIT 250 HIGH TEMP
- a 120 cm³ refill with the HEAVY DUTY grease,
  ▶ the reference is LUBER DRIVE REFILL 120 HEAVY DUTY+

4 / ACCESSORIES FOR THE BOOSTER RANGE

Select the most appropriate accessory

Support brackets:

			
DESCRIPTION	Plastic ECO and DRIVE attachment clip	Plastic SMART attachment clip	support bracket + stainless steel insert
PRODUCT NAME	LUBER CLIP	LUBER CLIP SMART	LUBER BRACKET

Hose connector:

	
DESCRIPTION	female connector for Booster + 1 hose (Nylon, length 1m , outer/inner dia.: 8/6 mm) + 1 G1/4 male connector
PRODUCT NAME	LUBER HOSE & CONNECTORS 1 M

Elbows:

		
DESCRIPTION	45° Elbow G1/4 - G1/4	90° Elbow G1/4 - G1/4
PRODUCT NAME	LUBER ANGLE 45 G1/4	LUBER ANGLE 90 G1/4

Adapters:

						
DESCRIPTION	Adapter G1/4 - G1/8	Adapter G1/4 - M6	Adapter G1/4 - M8 x1	Adapter G1/4 - M8	Adapter G1/4 - M10 x1	Adapter G1/4 - M10
PRODUCT NAME	LUBER REDUCER G1/4 - G1/8	LUBER REDUCER G1/4 - M6	LUBER REDUCER G1/4 - M8 x1	LUBER REDUCER G1/4 - M8	LUBER REDUCER G1/4 - M10 x1	LUBER REDUCER G1/4 - M10

Extensions:

		
DESCRIPTION	Extension R1/40 x G1/4 - 30mm	Extension R1/40 x G1/4 - 75mm
PRODUCT NAME	LUBER EXTENSION G1/4 30 mm	LUBER EXTENSION G1/4 75 mm

Brushes:

				
DESCRIPTION	Brush dia. 20 G1/4	Brush 40X30 mm G1/4	Brush 60X30 mm G1/4	Brush 100X30 mm G1/4
PRODUCT NAME	LUBER OIL BRUSH diam 20 -G1/4	LUBER OIL BRUSH 40 x 30 -G1/4	LUBER OIL BRUSH 60 x 30 -G1/4	LUBER OIL BRUSH 100 x 30 -G1/4

Drive accessories:

			
DESCRIPTION	Reinforced base G1/4 (copper / plastic)	Protection cap 120 cm^3	Protection cap 250 cm^3
PRODUCT NAME	LUBER PROTECTION BASE	LUBER PROTECTION COVER 120	LUBER PROTECTION COVER 250

Centralised lubrication systems P. 28

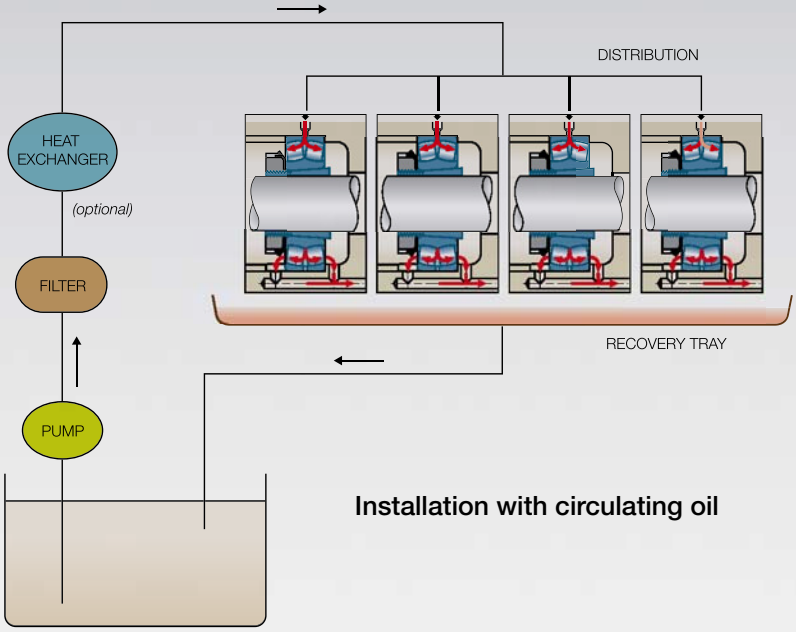
3- CENTRALISED LUBRICATION

SELECTING THE APPROPRIATE TECHNOLOGY

The 2 principles of lubrication: The lubricant is recirculated or lost

3-1 - CIRCULATING LUBRICANTS

If machine components require a large quantity of lubricant, or if it is necessary for the lubricant to be cooled or heated, a lubrication system with circulating oil should be used. In all other cases, lubricant is not recovered after lubricating the component



Installation with circulating oil

Description of the system:

Oil circulation provides continuous flow to the point requiring lubrication. Used oil is returned to the main tank and then repumped around the circuit. The pumping station can be equipped with a cooling or heating system to maintain the lubricant at an optimal temperature.

With this principle, the correct oil level is always maintained within the bearing housing. The circulation of the oil removes the heat generated and allows for higher speeds and better reliability.

The key to this type of lubrication system is the careful surveillance of the supply of lubricant.

STANDARD APPLICATIONS: paper and metal industries, gearboxes, etc.

3-2 - LOST LUBRICANT

These are the most frequently used types of centralised systems. A pump distributes small amounts of lubricant from a central tank to each lubrication point. The new lubricant replaces the old. Different methods can be used, depending on the pressure required, and based on, among other factors, pressure loss due to the viscosity of the lubricant and the varying lengths and diameters of the hoses carrying the lubricant.

Different solutions for lost lubrication

Both manual and automatic systems are available. While automatic systems require more substantial initial investment, they are more reliable and lead to long-term savings.

3-2•1 - LOST LUBRICANT WITH MANUAL SUPPLY

Centralised lubrication with manual supply

Description of the system:

All of the lubrication points are connected to a single distribution manifold with an external grease nipple. An operator connects a grease gun during scheduled maintenance and injects the recommended amount of lubricant. The distribution manifold distributes this between the individual locations. It is possible to connect a programmed pump, to inject the lubricant at regular intervals.

APPLICATIONS : Applications requiring only occasional lubrication, or applications with few locations, and which do not require a permanent pump (single machines…)

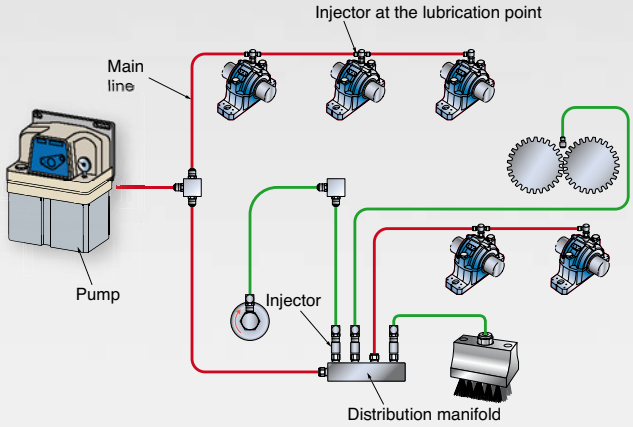
3-2•2 - LUBRICANT LOST WITH AUTOMATIC LUBRICANT SUPPLY

▶ Automatic volumetric lubrication (for oil or semi-liquid greases)

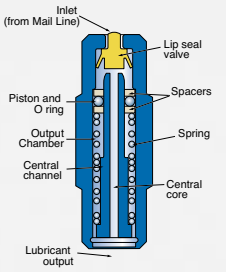
Description of the system:

At each cycle, the pump starts and forces the lubricant to the injector under pressure, via the main line. The injectors gradually fill. When they are full, pressure rises in the main line. A pressure switch will stop the pump when the max pressure threshold is reached.

The amount of lubricant accumulated in the injectors is discharged to the lubrication point just before or after the pump cuts out, depending on the type of injector used (direct or indirect):

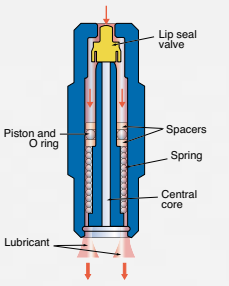


Operation of a direct injector:



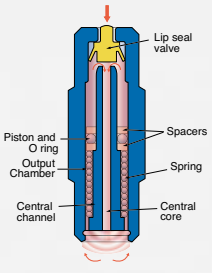
PHASE 1

When the pressure rises, the oil enters the injector. The lip seal valve allows the oil to enter until it fills the central channel.



PHASE 2

The lubricant enters the upper part of the chamber, which pushes the piston and its o'ring downwards and discharges the oil accumulated in the output chamber to the lubrication point.



PHASE 3

When the pressure drops, the rimmed seal valve closes the injector inlet. During this phase, the spring pushes the piston and its o'ring upwards. The lubricant goes through the central channel to fill the output chamber from which it will be discharged during the next cycle.

APPLICATIONS :Volumetric systems are dedicated to the cyclic lubrication of small and medium-sized machines and units with multiple locations requiring lubrication (machine tools, wrapping machines, food processing machines, etc.). These systems are easy to design and modify.

3- CENTRALISED LUBRICATION

▶ Automatic single-line progressive lubrication (for oil or grease with NLGI grade 000 - 2).

Description of the system:

The amount of lubricant sent by the pump is split and sent to each lubrication point via a distributor. These distributors are equipped with several pistons which move successively in turn, and in a cycle, hence the name, progressive system.

A «progressive» distributor includes at least three interdependent pistons. When the distributor receives the pressurised lubricant from the pump at the inlet, the piston is displaced and injects the volume of lubricant stored in the chamber from the other end. When it reaches its travel stop, the next piston is released and displaced. The lubricant received by the piston will be released during return travel, triggered by the travel stop of the previous piston.

▶ Automatic multi-line progressive lubrication

Description of the system

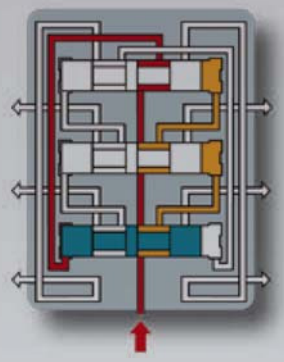
Each unit can activate several pumps, all acting independently. Each pump supplies a circuit, which may be fitted with a progressive distributor.

APPLICATIONS

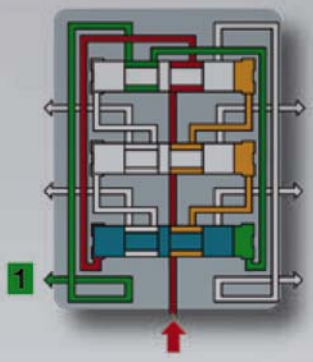
Applications where the different locations requiring lubrication need very different lubricant flows (pellet presses, etc.)

Diagram showing the operation of a progressive distributor

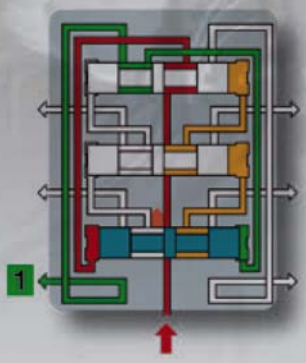
Inlet Static volume (balancing) Output



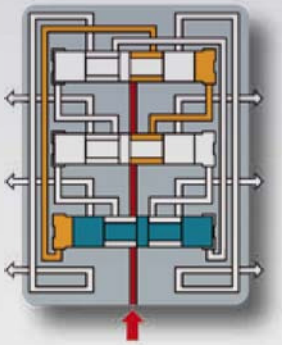
1-The flow of oil will create positive pressure on the left side of the bottom piston. The piston will start to move to the right



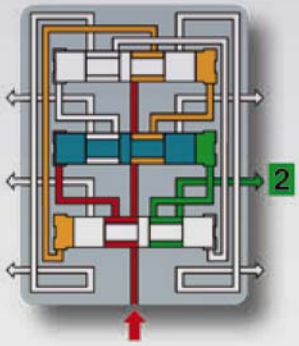
2-During displacement, the piston pushes the volume of oil on its right towards the outlet (1)



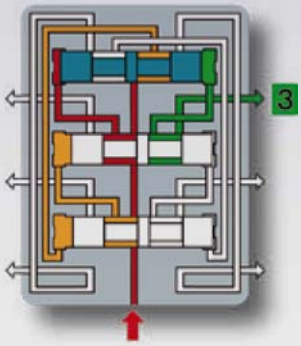
3-**IMPORTANT COMMENT:** the flow of high pressure oil via the middle column crosses the different levels, regardless of the position of the pistons. The passing of a piston mid-displacement will not interrupt its movement and the piston will continue to its travel stop.



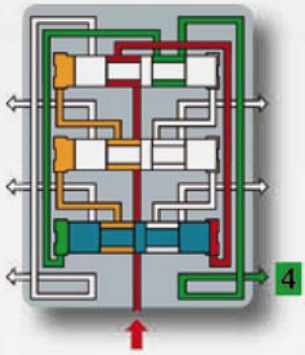
4- The bottom piston has completed its displacement to the right



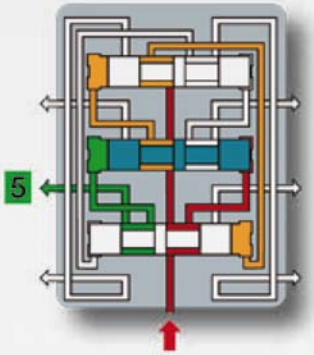
5- Displacement enables positive pressure to be created on the left side of the middle piston. This piston will start moving to the right, and push the oil accumulated on the right to the outlet (2)



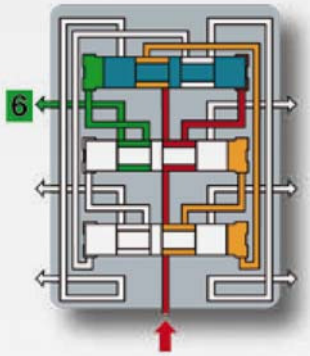
6- When at the right stop, the middle piston will allow positive pressure to form on the left side of the top piston. This piston will start moving to the right, and push the oil on the right to the outlet (3)



7-When at the right stop, the top piston will allow positive pressure to form on the right side of the bottom piston. This piston will start moving to the left, and push the oil on the left to the outlet (4).



8-When at the left stop, the bottom piston will allow positive pressure to form on the right side of the middle piston. This piston will start moving to the left, and push the oil on the left to the outlet (5).



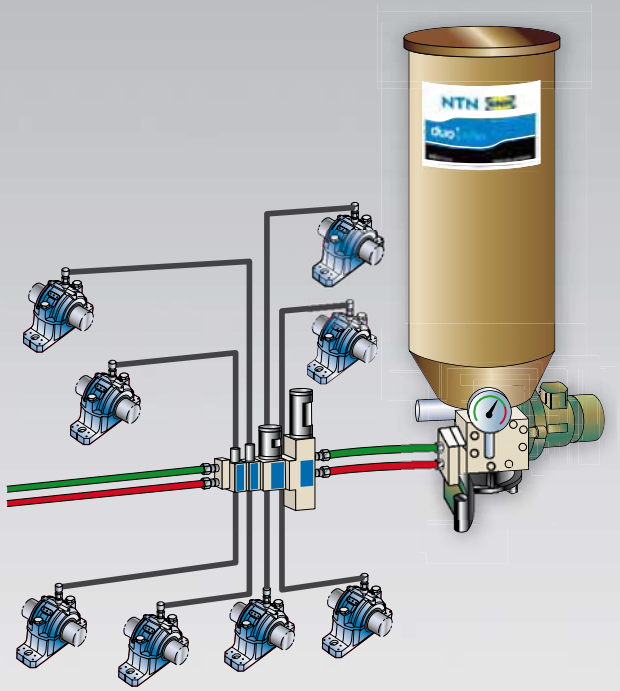
9-When at the left stop, the middle piston will allow positive pressure to form on the right side of the top piston. This piston will start moving to the left, and push the oil on the left to the outlet (6). This displacement brings the system back to stage 1 and the cycle will restart.

APPLICATIONS

Progressive systems are generally used for medium and large-sized equipment, lubricated with oil or grease, which require high pressure to move the lubricant. Sequential operation is blocked if one of the locations lubricated is clogged. This can be detected either visually or automatically.

3- CENTRALISED LUBRICATION

▶ Automatic dual-line lubrication (for oil or grease with NLGI grade 000 to 3)



Description of the system

A dual-line lubrication system comprises a pump which feeds many injectors via two separate circuits. The circuits are pressurised alternatively by a reverser. When the pressure in the 1st circuit reaches an upper threshold, the reverser reverses the pressure in the 2 circuits and so on. System operation is controlled and monitored by a control unit.

A visual indicator is available on each dual-line injector as standard. Unlike the progressive system, a blocked outlet or defective injector will not lead to an interruption in lubrication to other locations.

APPLICATIONS : The advantage of a dual-line unit is the ability to precisely dose the amount of lubricant over large distances (cement plants, steel works, mines, electrical plants, large machines).

▶ Automatic air/oil lubrication

Description of the system:

The oil is precisely dosed by a pneumatic pulse generator. The oil is injected into a mixing chamber with compressed air. The length of hose between this chamber and the outlet is enough to generate a continuous flow of oil. Small drops of oil are dispersed at the hose outlet, directly onto the lubrication point, with no mechanical contact.

Cycle times and dosing may be adjusted to a range of conditions.

APPLICATIONS : This system is the most appropriate for the lubrication of bearings operating at high speeds, such as spindles in machine tools. It can also be used to lubricate presses.

ACTIVITY	APPLICATION	SINGLE-POINT	VOLUME*	PROGRESSIVE (OIL OR GREASE)	DUAL LINE	AIR/OIL	CIRCULATION (OIL)
AGRICULTURE	Tractor						
	Agricultural machinery						
FOOD	Food manufacturing						
	Bottling						
	Confectionery						
MINES & PUBLIC WORKS	Mines						
	Cement works						
	Construction equipment						
MACHINES AND EQUIPMENT	Packing machine						
	Mining machinery						
	Machine tools						
HANDLING	Lifts						
	Cranes						
	Escalators						
	Cable cars						
	Conveyors						
	Chains						
PAPER	Paper mills						
	Printing						
PUMPS AND MOTORS	Electric motors						
	Fans						
	Pumps						
METALLURGY	Rolling machines						
	Presses						
	Furnaces						
DRIVE SYSTEMS	Gearboxes						
PRODUCTION OF ENERGY	Wind turbines						
NAVAL	Locks						
	Dams						
	Ships						
RAIL SECTOR	Locomotives						
	Rolling stock						

* Oil or grease, max. grade 00

3- CENTRALISED LUBRICATION

A - PRODUCTS

LUB'SOLUTIONS PRODUCTS FOR VOLUMETRIC LUBRICATION

IN'PULSE PUMPS

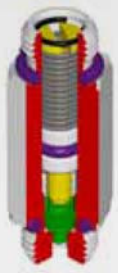
BENEFITS

Reliable and advanced:
Gear pump for flows up to 180 cm^3 / minute at 30 bars equipped with a high-performance electric motor with minimum electrical consumption.
Service temperature: from -5°C to +60°C.
Fully equipped:
Low level sensor, pressure indicator and switch, 3-litre transparent plastic tank.
Multi-parameter programmer with LCD (option).

DISTRIBUTION MANIFOLDS

BENEFITS

Practical and light:
Aluminium manifold designed for rapid assembly. Fitted with a quick push-in connector to each outlet. An additional plug is supplied as standard to close the circuit. Available versions: 1 to 6 outlets.



INJECTORS

BENEFITS

Practical
Injectors delivered with a quick push-in connector. Simply screw the injectors into the manifold and couple to the hoses.
Injected volumes available: 0.03, 0.06, 0.1, 0.2, 0.3 and 0.5 cm^3

HOSES

BENEFITS

Reliable and advanced:
Hoses with a capacity of 30 bars in hydrocarbon-resistant material.

Practical:
2 hose sizes available (downstream and upstream from the injectors), suitable for the quick push-in connectors on the distributors, manifolds and injectors.

For other options (type of connectors, installation services, etc). please contact us.

NOTE: the technical characteristics of pumps and their accessories may change.
Please refer to our web site www.ntn-snr.com, to check the latest updates, or contact us.