NBC GROUP LTD

GREASEMAX®

continuous automatic lubricator

clean

cost effective

no downtime

maximum protection

the optimum lubricating technique

MADE IN GERMANY

GREASEMAX®

continuous automatic lubricator

GreaseMax is a chemically operated automatic lubricator.

A chemical reaction commences when the activator cap is screwed into GreaseMax. Gas so generated expands a diaphragm, causing pressure on a piston, which results in the discharge of the lubricant. When the cartridge is empty the piston becomes visible in the transparent cone.

GreaseMax steel body allows it to be used in hot applications and where pressure is needed, on long feed lines for example.

GreaseMax greases bearings and seals and is also excellent for purging and preventing ingress of contaminants.

Colour	Operating Period*
White	1 month
Blue	3 months
Red	6 months
Grey	12 months

* at 25°C.
For discharge periods at other ambient environmental temperatures, refer to the table below

GreaseMax Discharge Table

	WHITE TYPE 1 1 month		BLUE TYPE 3 3 month		RED TYPE 6 6 month		GREY TYPE 12 12 month	
Average temp.	Life in months	Grease supply / day grams	Life in months	Grease supply / day grams	Life in months	Grease supply / day grams	Life in months	Grease supply / day grams
55°C	0.3	12.0	1	3.6	2	1.8	4	0.9
45°C	0.5	7.3	1.5	2.3	3	1.2	6	0.6
35°C	0.7	5.2	2.5	1.5	4.5	0.8	9	0.4
25°C	1	3.6	3	1.2	6	0.6	12	0.3
15°C	1.5	2.3	4.5	0.8	9	0.4	18	0.2
5°C	2	1.8	6	0.6	12	0.26	24	0.13
-5°C	4	0.9	12	0.3	24	0.15	48	0.08

Average temperature is the average ambient air temperature

Lubricants

GreaseMax standard lubricant:

Product Code	Thickening Medium	Base Oil Viscosity at 40°C	Temp Range 0°C	Application
001	Lithium / Calcium	150mm²/s	-30°- 120°	Normally stressed roller and plain bearings, normal to high speeds, dusty and moist operating conditions. Contains chemically active EP additives.

A range of lubricants are available. Contact NBC for details
GreaseMax contains 125cc of lubricant.

GreaseMax

- Provides continuous lubrication at a constant rate, for a set period
- Works without maintenance or adjustment
- Has no electrics or mechanical items for complete reliability
- Can be quickly and simply changed over at the end of its operating period
- Can be used on moving and vibrating applications, long feed lines and underwater
- Is self regulating. The rate of discharge is not affected by bearing condition, seal condition or grease-way resistance

GreaseMax Advantages

- Better mechanical reliability. Less down-time from bearing failure and therefore lower maintenance costs, better production rates and lower cost of production
- Direct cost savings with lower labour requirements
- Proven in-service performance
- Reliability - based on a proven design and many years of in-service use
- A safe product. GreaseMax has safety certification from the German TÜV organisation
- Safety - there is no temptation to hand grease moving equipment when GreaseMax is installed
- Economical unit cost
- Product support - long experience in this market

Site Benefits

GreaseMax can generally be set up to allow change-overs without the requirement for plant operations or equipment items to be isolated and shut down. This is expected to provide benefits in 2 areas:

- production improvements and ROI benefits as production equipment remains on-line
- a reduction in personnel time for the required management process to isolate and re-activate process equipment

Safety – site exposure

Use of automatic lubricators reduces human resource requirements. With fewer people needed there is a lessened site personnel risk exposure

Installation

GreaseMax is easily installed. Simply activate the GreaseMax unit by screwing in the activator cap and install the GreaseMax unit. Feed lines up to 2M can be used.

See GreaseMax Technical Notes on our website or ask our technical department for advice

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NBC Group Ltd

GreaseMax Distributor for UK and Northern Ireland
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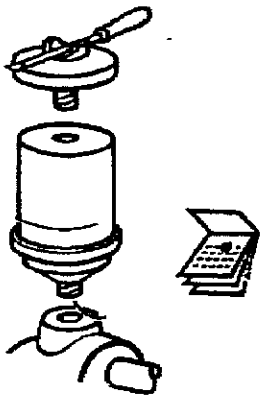
NBC GROUP LTD

Installation Instructions

Read before using!

please follow these 4 simple steps for trouble-free GREASE MAX ® operation



1. **Screw in the starter cap by hand.**
   (You will hear the seals break while doing this)
   Use a screw driver or similar to tighten firmly (picture).
2. **Record change over date.**
3. **Pre-grease bearing before first installation.**
4. **Install GREASE MAX ® hand tight into grease point.**

Do NOT open GREASE MAX ®! Do NOT remove GREASE MAX ® until the change over date!

- **GREASE MAX ®** is designed to operate at an average environmental temperature of 25° C. Refer to brochure for information about using **GREASE MAX ®** at different temperatures. Allow 8 - 40 hours for operation to commence depending on **GREASE MAX ®** type.
- If **GREASE MAX ®** is to be installed with extension lines, use min. 8 mm D tubing. The maximum recommended length are 1,5 metres.
- Do not screw the starter cap into **GREASE MAX ®** until ready to activate the unit.
- If fittings are required, refer to the list on the reverse of this page.
- Wear protective gloves when activating **GREASE MAX ®**.
- Dispose of used **GREASE MAX ®** in the industrial waste bin.

COLOUR CODES: Colour of the activator in the base of **GREASE MAX ®** and the starter cap

White:	1 month unit	Type: 01W
Blue:	3 months unit	Type: 03B
Red:	6 months unit	Type: 06R
Grey:	12 months unit	Type: 12G

⇨ Note: colour of starter cap must match colour of activator in base of GREASE MAX ®

WARNING: **GREASE MAX ®** uses a small quantity of potassium hydroxide as part of it's operation. If **GREASE MAX ®** is opened or accidentally damaged and the liquid escapes onto the skin or eyes, wash with water and seek medical advice. Refer to material safety data sheet.

GREASE MAX ® is a quality product according to the German safety regulations of appliances and is proofed among other things corresponding TÜV PS PPP 52007 06.96; GefStoffV i.d.F. v. 26.10.93.

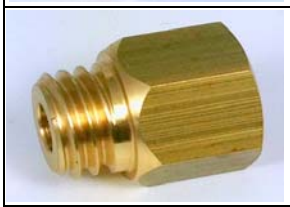
SOHM Schmierstofftechnik • PO Box 24 67 • D - 77614 Offenburg

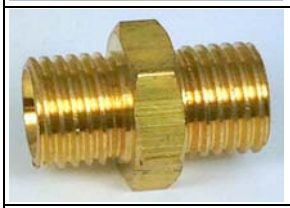
GreaseMax identification data

Cap colours & discharge rates		
01W	**White**	1 month
03B	**Blue**	3 month
06R	**Red**	6 month
12G	**Grey**	12 month

Grease code	Grease type
F001	Multi Purpose EP
F002	High Temp Grease
F003	Multi Purpose + MOS2
F004	High Temp + MOS2
F006	Gearing Grease EP
F100	Food Grade NSF-H1
F219	TOTAL Ceran HV or Ceran XM 460

Part number example: **GREASEMAX 03B/F219**

Accessories		
	**AF060100**	Adapter 1/4" BSP female to M 6x1 male
	**AF080100**	Adapter 1/4" BSP female to M8x1 male
	**AF080125**	Adapter 1/4" BSP female to M8x1.25 male
	**AF100100**	Adapter 1/4" BSP female to M10x1 male
	**AF100150**	Adapter 1/4" BSP female to M10x1.5 male
	**AF120150**	Adapter 1/4" BSP female to M12x1.5 male
	**AF120175**	Adapter 1/4" BSP female to M12x1.75 male
	**AF140200**	Adapter 1/4" BSP female to M14x2 male
	**AF160150**	Adapter 1/4" BSP female to M16x1.5 male

	**AF000108**	Adapter 1/4" BSP female to 1/8" BSP male
	**AF000104**	Adapter 1/4" BSP female to 1/4" BSP male
	**AF000308**	Adapter 1/4" BSP Female to 3/8" BSP male
	**AF000102**	Adapter 1/4" BSP female to 1/2" BSP male
	**AX000104**	Hexagon nipple 1/4" BSP male to 1/4" BSP male
	**AM104000**	Sleeve 1/4" BSP female to 1/4" BSP female
	**AT000104**	T-Adaptor for 2 Lubricators. 2 x 1/4" BSP female to 1/4" BSP male
	**AR000104**	Control Valve for Oil Units 1/4" BSP female to 1/4" BSP male
	**AP020045**	Oil Brush 5x3cm, 1/4" BSP female

	**AW450104**	Angle 45 deg, 1/4 " BSP female to 1/4" BSP male
	**AW900104**	Angle 90 deg 1/4" BSP female to 1/4" BSP male
	**AH000500**	Plastic Clamp for attaching GreaseMax to structure
	**AH000501**	Plastic Clamp for Non-return Valve
	ASS00100	6/8 mm clear Nylon x 1 m
	**ASI00104**	Tube connection 6/8mm to 1/4" BSP female
	**ASA00104**	Tube connection 6/8mm to 1/4" BSP male
	**ASA00108**	Tube connection 6/8mm to 1/8" BSP " male
	**AM104030**	Extension tube, brass, 1/4" BSP female to 1/4" BSP male; length 30mm

	**AM104080**	Extension tube, brass, 1/4" BSP female to 1/4" BSP male, length 80mm
	**AM104120**	Extension tube, brass, 1/4" BSP female to 1/4" BSP male, length 120mm

All parts on system as GREASEMAX xxxxxxx

e.g. Checklist for parts:

If you are selling connections, draw the layout out ona piece of paper and build it up by components

If the GreaseMax unit is to be mounted directly onto the bearing housing

GreaseMax unit	
Adapter to bearing housing	

If the GreaseMax unit is to be mounted remotely from the housing

GreaseMax unit	
Plastic clamp	**AH000500**
Sleeve 1/4" BSP to 1/4" BSP	**AM104000**
1'4" BSP Adapter to pipe	**ASI00104**
Length of pipe	
Pipe to 1/4" BSP female	**ASA00104**
1'4" BSP Adapter to pipe	**ASI00104**
Adapter to bearing housing grease point	

Grease Max pricing data

Article			Selling	Box Qty >20
GMA F001	Multi Purpose EP		**£ 14.90**	£ 12.67
GMA F002	High Temp Grease		**£ 16.50**	£ 14.03
GMA F003	Multi Purpose + MOS2		**£ 15.60**	£ 13.26
GMA F004	High Temp + MOS2		**£ 16.70**	£ 14.20
GMA F006	Gearing Grease EP		**£ 16.30**	£ 13.86
GMA F100	Food Grade NSF-H1		**£ 18.40**	£ 15.64
GMA F219	TOTAL Ceran HV		**£ 17.20**	£ 14.62
	Part number example: **GREASEMAX 03B/F219**			
	01W (White)/ 03B (Blue) / 06R (Red) / 12G (Grey)			
	Boxes of 20			

Accessories

AF060100	Adapter BSP 1/4" f /M 6x1m		**£ 2.80**
AF0680100	Adapter BSP 1/4" f /M8x1m		**£ 2.80**
AF080125	Adapter BSP 1/4" f /M8x1.25m		**£ 2.80**
AF100100	Adapter BSP 1/4" f /M10x1m		**£ 2.80**
AF100150	Adapter BSP 1/4" f /M10x1.5m		**£ 2.80**
AF120150	Adapter BSP 1/4" f /M12x1.5m		**£ 2.80**
AF120175	Adapter BSP 1/4" f /M12x1.75m		**£ 2.80**
AF140200	Adapter BSP 1/4" f /M14x2m		**£ 2.80**
AF160150	Adapter BSP 1/4" f /M16x1.5m		**£ 2.80**
AF000108	Adapter BSP 1/4" f /BSP 1/8"m		**£ 2.80**
AF000104	Adapter BSP 1/4" f /BSP 1/4"m		**£ 2.80**
AF000308	Adapter BSP 1/4" f /BSP 3/8"m		**£ 2.80**
AF000102	Adapter BSP 1/4" f /BSP 1/2m		**£ 2.80**
AX000104	Hexagon nipple BSP 1/4"m,m		**£ 1.80**
AM104000	Sleeve BPS 1/4" f,f		**£ 1.80**
AR000104	T-Adaptor for 2 Lubricators BSP 1/4" f,f,m		**£ 5.30**
AR000104	Control Valve for Oil Units BSP 1/4" f,m		**£ 11.70**
AP020045	Oil Brush 5x3cm, BSP 1/4" f		**£ 11.20**
AW450104	Angle 45 deg BSP 1/4" f,m		**£ 3.60**
AW900104	Angle 90 deg BSP 1/4" f,m		**£ 3.60**
AH000500	Plastic Clamp for GreaseMax		**£ 7.00**
AH000501	Plastic Clamp for Non-return Valve		**£ 4.40**

ASS00100	Tube Nylon 6/8mmx1m		**£ 4.30**
ASI00104	Tube connection Lubricator 6/8mm / BSP 1/4" f		**£ 2.60**
ASA00104	Tube connection greasing Point 6/8mm / BSP 1/4" m		**£ 2.60**
ASA00108	Tube connection greasing Point 6/8mm / BSP 1/8" m		**£ 2.60**
AM104030	Extension Metal BSP 1/4" f,m / 30mm		**£ 3.20**
AM104080	Extension Metal BSP 1/4" f,m / 80mm		**£ 4.40**
AM104120	Extension Metal BSP 1/4" f,m / 120mm		**£ 6.30**

All parts on system as GREASEMAX xxxxxxx

MULTIS COMPLEX EP2

A LITHIUM COMPLEX GREASE WITH EXTREME PRESSURE ADDITIVES

Uses

- Incorporating the most modern grease technology; Extreme pressure additives are combined with the very highest quality base oils and carefully blended with complex lithium soaps to produce a grease capable of withstanding abnormal operating conditions such as high temperatures, excessive loading and presence of water.

Properties

- Will withstand high temperatures, excessive loading and presence of water.
- Extended service life reduces maintenance costs.
- Excellent adhesive properties.
- Reduces grease consumption.

Characteristics

	Units	MULTIS COMPLEX EP2
Colour	-	Red
Texture	-	smooth
Thickener	-	lithium complex
NLGI Classification	-	No 2
Penetration (worked) (IP50)	-	265-295
Copper Corrosion (IP112)	-	Pass
Oxidation stability (IP142)	-	0.21
(max pressure drop 100 hrs. Bars)	-	
Drop point	°C	+230
Working temperature range -continuous	°C	-30 to 150
Working temperture range-short periods	°C	160
Base oil viscosity @ 40°C	cSt	159.6

Summary of application

Wheel bearings and all rolling bearings subjected to heavy loads and high temperatures.
All bearings where re-lubrication may be infrequent.
Any application where a high temperture grease is specified and where excellent adhesion and water resistance are desirable.
Where greater adhesive properties are required use Multis Complex TEP2

REF:L82111 **DATE:06/94**
CS-LM-82111-01

CERAN XM 460

Grease

Extreme-pressure water resistant high temperature *"NEW GENERATION"* calcium sulfonate complex grease.

APPLICATIONS

Multi purpose heavy duty water resistant grease.

Shock loaded applications in industry even in severe demanding environment (water, dust, high temperature).

- **CERAN XM 460** is made of the ***NEW GENERATION*** calcium sulfonate complex soap designed by TOTAL Lubrifiants. This new soap has enhanced properties in terms of water and thermal resistance, load capacity, anticorrosion properties while keeping a very high level of pumpability and ability to lubricate well in case of high loads.
- **CERAN XM 460** is suitable for the lubrication of all kinds of components subject to high loads and temperatures, shocks, working in conditions where the grease is in frequent contact with water (even sea water due to enhanced antirust performances).
- **CERAN XM 460** is suitable for the lubrication of **bearings in steel plants** (continuous castings and rolling mills) and in **paper industry**. Ceran XM 460 is also suitable for the lubrification of hard wood **granular presses** and in all industrial applications under severe conditions (wet, loaded, high temperature, dust,…) namely **mining and cement industries.**
- **CERAN XM 460** is suitable for use in centralized greasing systems.
- Always avoid contamination of the grease by dust and/or dirt when applying. Preferably use a pneumatic pump system.

SPECIFICATIONS

- ISO 6743-9: L-XBFIB 1/2
- DIN 51 502: KP1/2R -30

ADVANTAGES

True multi purpose.
Shock loads.
Water resistant.
Anti corrosion.

- The ***NEW GENERATION*** of calcium sulfonate complex soap developed by TOTAL Lubrifiants allows **CERAN XM 460** to present outstanding performances even at high nDm. This ***NEW GENERATION*** keeps all benefits in terms of corrosion protection, bearings lifetime, high loads and thermal resistance.
- Excellent anti-oxidation and anti-corrosion properties thanks to the excellent behaviour of the calcium sulfonates, also in the presence of sea water.

NEW GENERATION
allowing use in high speed factors.

- The ***NEW GENERATION*** of calcium sulfonate complex soap allows to keep outstanding **CERAN XM 460** performances even in case of high speed applications where normally polyurea or lithium complex greases are requested.

No harmful substances.

- **CERAN XM 460** does not contain lead, or other heavy metals considered harmful to human health and the environment.

TYPICAL CHARACTERISTICS	METHODS	UNITS	CERAN XM 460 *(typical values)*
Soap/thickener		-	Calcium sulfonate
NLGI grade	ASTM D 217/DIN 51 818	-	1-2
Color	Visual	-	Brown
Appearance	Visual	-	Smooth
Operating temperature range		°C	- 25to 180
Kinematic viscosity of the base oil at 40°C	ASTM D 445/DIN 51 562-1/ISO 3104/ IP71	mm²/s (cSt)	460
Mechanical stability			
Penetration at 25°C	ASTM D 217/DIN 51 818	0.1 mm	280-310
Penetration after 100 000 strokes	ISO 2137	0.1 mm	+21
Shell Roller 100 hours at 80°C	ASTM D 1831 mod	0.1 mm	0
Shell Roller 100 hours at 80°C + 10% water	ASTM D 1831 mod	0.1 mm	-34
Thermal stability			
Dropping point	IP 396	°C	> 300
Oil release 50 hours, 100 °C	ASTM D 6184	%	1.7
Oil release 168 hours, 40°C	NF T 60-191	%	1.1
Oxidation stability at 99°C +-0.5°C			
Pressure drop after 100 hours	ASTM D 942	Psi	5
Pressure drop after 500 hours		Psi	16
Antirust properties			
EMCOR, distilled water	ISO 11007	Rating	0-0
EMCOR, synthetic sea water	ISO 11007	Rating	0-0
Copper corrosion, 24 hours at 100°C	ASTM D 4048	Rating	1b
Antiwear and EP properties			
Four ball wear (scar diameter)	ASTM D2266	mm	0.43
Four ball weld load	ASTM D2596	kgf	420-440
Cold properties			
Penetration at -20°C	ISO 13737	0.1 mm	95
Flow pressure at -20°C	DIN 51 805	mbar	1160
Flow pressure at 1400 mbar	DIN 51 805	°C	-25
Torque at -20°C			
Starting torque	ASTM D 1478	g.cm	890
After 1 hour		g.cm	72

Above characteristics are mean values given as an information.

automatic lubricator
simply superior!

Distributed in UK and Ireland by

Orleton Lane, Wellington, Telford, TF1 2BG, Shropshire
www.nbcgroup.co.uk

Disclaimer

The information in this document is for general use by *GREASE MAX*® users. It is not intended to be exhaustive in content but will cover most of the points that should be known. Please contact **NBC Group Ltd** for specialist advice.

Every effort has been made to provide accurate and complete information. However **NBC Group Ltd** assumes no responsibility for any direct, indirect, incidental, or consequential damages arising from the use of information in this document. The manufacturer and importer reserve the right to make changes to the design and specifications of *GREASE MAX* ® without notice.

Copyright Notice

Trade Marks

GREASE MAX® is a Trade Mark of **SOHM Schmierstofftechnik**, Germany.

TÜV safety certified – Certificate No.: Z1A 12 03 30942 004

Contents Page

1. *GREASE MAX* ® - DESCRIPTION

GREASE MAX® is a chemically operated automatic lubricator.

It is designed to be screwed into the bearing grease nipple seating, or onto an extension line, and to feed lubricant at a **CONSTANT RATE** for a **SET PERIOD** of time.

GREASE MAX®is designed to operate for a set period of time. There are 4 operating periods; 1, 3, 6, and 12 months. After the service time has elapsed, the unit is replaced with a new unit.

Because it is self regulating it should be used in conjunction with the plant maintenance scheduling. Therefore changeovers of the *GREASE MAX*® can be planned and carried out at set periods.

GREASE MAX ®operation is simple and trouble free. Quite frequently its capabilities are not at first appreciated because of it's simplicity.

GREASE MAX®can be used anywhere; on most applications, both large and small, even underwater.

Importantly, *GREASE MAX*®has **no electrical or mechanical components** and has only one moving part, which is the piston. For this reason *GREASE MAX*® is extremely reliable.

2. ADVANTAGES

- **Direct cost savings over manual greasing**.
- **Direct cost savings by reducing the necessity to stop machinery and production for lubrication.**
- **Indirect cost saving with reduced maintenance** and down time from bearing failures caused by incorrect or missed lubrication.
- **Lubrication occurs when the plant is in operation**, when it is of the most benefit.
- Constant replenishment of new grease, which **minimises bearing wear**.
- The **bearing is sealed** while *GREASE MAX* ® is in use.
- **Dust and moisture are prevented from entering the bearing**.
- The **lubrication is fully automated** and changeovers can be programmed into the plant maintenance schedule.

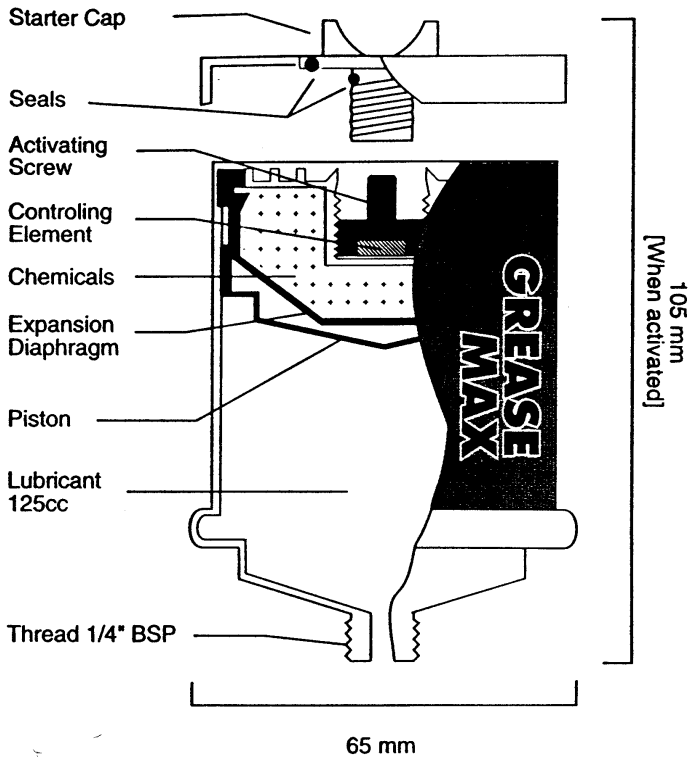
- **Lubrication is cleaner and environmentally responsible**; there is no excess lubricant affecting either plant cleanliness or the environment.
- **Safety is improved** as operators are not required to lubricate hazardous areas so frequently.
- *GREASE MAX* ® ensures that as a warm or hot bearing cools, the slight **vacuum normally created does not draw in foreign material**.
- A continuous supply of fresh lubricant **flushes out any foreign matter, moisture or harmful chemical substances** which may otherwise accumulate in the bearing if it is unused for some time.
- A constant grease supply ensures that **seals are lubricated and more effective in preventing contamination**. This is particularly the case with labyrinth seals.
- *GREASE MAX*® **has no electrical or mechanical components** (which can contribute to unreliability).
- *GREASE MAX*® **has a steel body** ensuring that it efficiently handles high output pressures and heat with total reliability.
- *GREASE MAX* ® **has the highest output pressure** of any product of this type.

3. OPERATION OF *GREASE MAX* ®

GREASE MAX® is activated by screwing in the colour coded plastic starter cap. The colour coding of this cap should match the colour coding of the plastic activating screw in the base of *GREASE MAX*®, (into which this cap is screwed).

When the starter cap is screwed in, a controlling element located internally in *GREASE MAX*® is forced into a reagent, contained in a neoprene expansion diaphragm. When this occurs a galvanic reaction commences, and gas is produced. The gas expands the diaphragm and as it does so a steel piston (located between the diaphragm and the lubricant) is pushed down and the lubricant is forced out.

See diagram of *GREASE MAX* ® on next page.



GREASE MAX® requires a minimum of approximately 8 hours for a type 1 unit to approximately 40 hours for a type 12 unit to develop sufficient internal pressure to commence discharging lubricant. This period is normally not a problem for well maintained bearings however if lubrication is required in less than the start up period then activate *GREASE MAX* ® in advance.

GREASE MAX® has NO INTERNAL PRESSURE prior to activation. Pressure is developed, and the lubricant discharge pressure is virtually in equilibrium with bearing or grease line resistance.

The chemical reaction is so designed as to give a CONSTANT rate of reaction, over the whole life of the unit**. This results in a CONSTANT lubricant output**. **The** *GREASE MAX*® **discharge rate is not affected by bearing or seal condition, movement, vibration, etc.**

It is often assumed that *GREASE MAX*® has some sort of pre-loaded internal pressure. This is NOT the case. If it were, *GREASE MAX*® could not operate as a truly self regulating automatic lubricator as it would then rely on bearing and line resistance to control its operation.

4. INSTALLATION

The starter caps are color coded. **Ensure that the color of the starter cap matches the color of the activator screw in the base of the** *GREASE MAX* ®, into which the starter cap will be screwed.

1. Screw the starter cap in hand tight. (While the starter cap is being turned down, the seals will be heard to break. Continue to turn the starter cap in until it is **tight**).

2. **Then use a screw driver or similar with a shank size of 8mm - 10mm to tighten the cap FIRMLY (approximately 1/4 of a turn more). This is essential to ensure a gas and liquid tight seal.**

Do not loosen the starter cap or attempt to remove it.

When this has occurred *GREASE MAX*® is operational. Allow the following minimum starting times: 1 month units - 8 hours, 3 month units - 24 hours, 6 month units - 30 hours, 12 month units - 40 hours, for lubricant discharge to commence. (see "Operation of *GREASE MAX* ®" section 3.).

Pre grease with a grease gun before the first installation. The short time delay will not adversely affect bearings which have been properly pre greased before the installation of *GREASE MAX*®. For subsequent installations, pre greasing is not necessary as prior use of *GREASE MAX*® will have ensured that there is adequate grease in the bearings.

Pre-greasing before the first installation of *GREASE MAX*® is also important to ensure that all grease ways are free of old hard grease which can block completely the grease ways.

GREASE MAX® is designed to operate in most conditions. It will operate satisfactorily in:

- **Areas of severe vibration**. (If this includes high shock loading, to prevent long term failure of the plastic mounting points, use mounting brackets and flexible feed lines, supplied by **SOHM Schmierstofftechnik**).

- **Underwater or wet installations**.

- *GREASE MAX*® is not affected by large daily temperature cycles which can cause condensation problems with some types of equipment.

- **Heat and cold** (see discharge table below for discharge rate variations)

- *GREASE MAX*® units with grease may be mounted in any position. Movement is OK but brackets may be required to support the unit. For oil filled units see section 4.5.

4.1. Affect of heat on the discharge rate of *GREASE MAX* ®

GREASE MAX® is designed to operate at an average environmental temperature of 25^{0}C. The discharge rates and operating period of *GREASE MAX*® will be different if the average temperature is different. The table below gives details.

	Type 01 White (1 mth)		Type 03 Blue (3 mth)		Type 06 Red (6 mth)		Type 12 Grey (12 mth)	
Ambient environ-mental temp.	**Life in months**	**Grease supply / day grams**	**Life in months**	**Grease supply / day grams**	**Life in months**	**Grease supply / day grams**	**Life in months**	**Grease supply / day grams**
65^{0}C	0.15	24.0	0.5	8.0	1	3.6	2	1.8
55^{0}C	0.3	12.0	1	3.6	2	1.8	4	0.9
45^{0}C	0.5	7.3	1.5	2.3	3	1.2	6	0.6
35^{0}C	0.7	5.2	2.5	1.5	4.5	0.8	9	0.4
25^{0}C	1	3.6	3	1.2	6.0	0.6	12	0.3
15^{0}C	1.5	2.3	4.5	0.8	9.0	0.4	18	0.2
5^{0}C	2	1.8	6	0.6	14	0.26	28	0.13
-5^{0}C	4	0.9	12	0.3	24	0.15	48	0.08
-15^{0}C	6	0.6	18	0.2	36	0.1		
-25^{0}C	9	0.4	27	0.13				

Note: The average environmental temperature is the average temperature that occurs over the <u>whole life of the unit</u>.

Temperature variations above or below 25^{0}C over a short period of time will have little or no affect on the overall life of *GREASE MAX*® . For example, periods of exceptionally hot or cold days.

4.2. Output pressure of *GREASE MAX* ®

GREASE MAX®can develop a maximum discharge pressure of approximately 150 psi. In practice, the operating pressure is much lower than this as the pressure required to move grease into a rotating bearing, with the grease nipple removed, is not great. *GREASE MAX*® **holds the output pressure virtually in equilibrium with grease way resistance.**

A grease gun needs high pressure, principally to overcome the resistance of the grease nipple. It also has to get grease into a stationary bearing, which can require a lot of pressure in some instances.

GREASE MAX ® has enough pressure to move grease through 2 metres of extension line. See below for details.

4.3. Affect of bearing and grease way pressure

GREASE MAX® builds up discharge pressure to the point where fundamentally a balance exists between the resistance of the grease way and the output pressure of the *GREASE MAX*® . For example, if *GREASE MAX*® is activated and allowed to discharge without being placed on a bearing, the full operating period will be taken before the unit is empty. If *GREASE MAX*® is activated and placed on a grease-way requiring pressure *GREASE MAX*® will build up to this pressure and then discharge according to its' normal operating period. *GREASE MAX*® **adjusts to grease way resistance, but does not rely on this resistance to control its' operation.**

GREASE MAX® will maintain the pressure balance. If something occurs to change the grease way resistance then *GREASE MAX* ® will automatically adjust its' discharge pressure to accommodate this change.

4.4. Installation with extension lines

GREASE MAX ® may be used with extension lines supplied by **SOHM Schmierstofftechnik** for remote positioning. Extension lines are also useful for installations where extreme movement or shock loadings may be applied to the *GREASE MAX*®. In this case, mount the *GREASE MAX*® firmly in a bracket (which **NBC Group Ltd** can supply) and feed the lubricant into the bearing via tubing.

Lubricant	Maximum line length	Min. INSIDE diameter
Grease	2 metres	8 mm
Oil	10 metres	3 mm

Note: It is possible to install *GREASE MAX*® on longer feed lines than the above. For proposed installations outside these limits consult NBC Gropup Ltd for specialist advice.

All extension lines MUST be pre-filled with lubricant. We recommend only nylon extension lines, so that the condition of the lubricant can always be observed.

4.5. Oil units

GREASE MAX®can be used with a variety of oils for lubrication of bushes, slides, chains, conveyors, -for example to lubricate the undersides of steel slat type conveyors used in applications such as bottle manufacturing and so on.

GREASE MAX®oil units should be mounted with the outlet upwards or preferably used with a **control valve** (Part Number GF16000) to prevent the oil draining out if the outlet is downwards or if the *GREASE MAX*® oil unit is feeding an extension line, particularly if the extension line feeds vertically upwards. Control valves are also needed if *GREASE MAX*® oil units are being used to lubricate pneumatic systems.

Chain lubrication: *GREASE MAX*® can efficiently and economically lubricate chains of all types. You will need to use 115 oil which has special tacky additives for use on chains, slides etc. and some fittings: a control valve, a bracket, a brush and possibly a flexible extension line. A full list of *GREASE MAX*® product codes and fittings is on the Fittings page.

5. CHANGING *GREASE MAX* ®

Ideally *GREASE MAX*®should be used in conjunction with the plant maintenance schedule. This minimises the time taken for lubrication and ensures that an orderly change over of expired units takes place.

GREASE MAX®are designed to have a small service life overrun to prevent damage to bearings if the changeover date is not accurately kept. For example, a type 3 unit, at normal temperature, will operate for 100 days, which is of course 9 days more than the 91 day average for 3 consecutive months.

We recommend that time is not spent checking for the piston to appear in the cone of the unit after expiry of the scheduled time. It is far more economical to change the units on a fixed schedule, even if a small amount of grease remains. In any event the costs and savings are calculated on set time periods, and the cost in time of attempting to exceed these periods with the resulting requirement for very regular checking is more than the value of the small amount of lubricant remaining.

GREASE MAX®is designed so that the piston will first become visible as a silver ring in the plastic end cone when there is approximately 10 % of lubricant remaining. This is to give a visual forward warning of expiry. *GREASE MAX*® will continue to operate until all lubricant is expelled. At this point all of the piston is visible.

Caution: When using Moly grease in *GREASE MAX*® the piston may not be visible at expiry. (This is due to the opacity of the grease).

6. LUBRICANTS

GREASE MAX®uses only very high grade lubricants. Most lubricants are not suitable for use under constant pressure, and suffer from separation under these conditions.

A range of greases and oils is available to cover most applications. **NBC Group Ltd** are able to advise customers with special lubrication requirements as to the possibility of using alternative greases.

GREASE MAX ® **standard lubricants:**

Product Code	Description	Base	Temp Range ^{0}C	Drop Point ^{0}C	Application
F001	**Multi purpose grease EP**	Li/Ca	-30 – 120	155	Universal
F002	**High temp grease**	Polyurea	-30 – 150 170 inter.	215	High temp applications
F003	**Multi purpose grease + Moly**	Li/Ca	-40 – 120	150	High load applications
F006	**Gearing grease**	Na	-20 – 120	175	Open gears, chain gears
F100	**Food grade grease**	Hectorit (inorganic)	-15 – 130	none	Food machinery; American FDA regulations & German DAB approval
F 219	**Heavy duty lubricant**	Calcium Sulfonate	-25 - 180	> 300	Industrial applications in severe conditions e.g. mining / quarrying and cement industries
O004	**Light oil**	Mineral oil	Visc. @ 40^{0}C	ISO VG 46	Light oil for slides, spindles, pneumatic systems etc.
O015	**Heavy tacky oil**	Mineral oil	Visc @ 40^{0}C	ISO VG 320	Heavy tacky oil for slides, chains, bushes etc.

Full lubricant specification sheets are available on request

7. IDENTIFICATION OF *GREASE MAX* ®

1. **Lubricant type**: *GREASE MAX*®has a 4 digit alphanumeric code on the label, which corresponds with the lubricant code (see table above).
2. The other 4 digit numeric group on *GREASE MAX*® label is the production code (MM.YY).
3. **Operating Period**: *GREASE MAX*®are color coded according to the operating period. Look for the activator screw in the base of the unit, which will be one of the following colors, with corresponding discharge times:

Color	Type	Discharge Period @ 25° C
White	01	1 month
Blue	03	3 months
Red	06	6 months
Grey	12	12 months

The color of the activating screw in the base of the unit must match the color of the starter cap.

8. WHICH *GREASE MAX* ® SHOULD BE USED?

There are no hard and fast rules for selecting the type of *GREASE MAX*® to be used on any given application. Every bearing is different, the variety of operating conditions is unlimited, and other factors need to be taken into account such as wear, seal condition, moisture presence, heat, etc.

However the following can be taken as a guide:

Shaft Size	*GREASE MAX* ® **type**
100 mm-160 mm	1 mth
60 mm-100 mm	3 mth
30 mm-60 mm	6 mth
up to 30 mm	12 mth

- For shaft sizes greater than 160mm, use one or more *GREASE MAX*® coupled together.
- **If moisture, severe dirt or dust, wear, heavy vibration or other factors are present, consideration should be given to using a quicker acting** *GREASE MAX*®**.**

Additionally, the following "rule of thumb" may prove helpful:

In terms of strokes per day from a small hand grease gun, output approx. 0.6 cc per stroke, the *GREASE MAX*® discharge is roughly equivalent to:

GREASE MAX ® **type**	**Strokes per day**
1 mth	4 - 6
3 mth	2 - 3
6 mth	1
12 mth	0.5

Please contact **NBC Group Ltd** for specialist advice. We offer advice free of charge, including site visits where installations are being planned or advice is needed.

9. SHELF LIFE

GREASE MAX® and the lubricants used in it have a shelf life of 2 years.

10. SAFETY

GREASE MAX®will improve plant personnel safety by reducing the need to visit hazardous plant and equipment to lubricate. When properly installed, it is possible to change *GREASE MAX*® without stopping moving machinery, saving on down time.

GREASE MAX®uses a small quantity of 28 % solution of potassium hydroxide as part of its operation. For this reason it is important that the activating cap is not removed after the *GREASE MAX*® is placed in service. The screw cap is designed to prevent liquid under pressure exiting the unit. If this does occur wash any affected skin areas with water and refer to the MSDS. Note that it is not possible for the liquid to escape unless the unit is deliberately cut open or opened as above. Internally the steel piston has rubber seals so that in the unlikely event that the neoprene diaphragm is damaged the liquid cannot escape into the lubricant and gas pressure is maintained.

GREASE MAX®is designed to partially release the plastic cone from the metal body when discharge pressure exceeds 150 psi. This is to prevent continued pressure build up to dangerous levels.

Should a *GREASE MAX*®be observed in this state immediate maintenance is required as this situation is generally caused by blockages of the grease ways by old grease.

GREASE MAX®, made in Germany, has been tested as required by all the relevant German Safety Authorities and approved for both manufacturing and mining use without restriction. Further details are available on request.

11. COST ADVANTAGES OF *GREASE MAX* ®

GREASE MAX® is economical. At an average price of $ 30.00 for example, a type 6 unit with multi-purpose grease costs just 16 cents per day, a 12 month unit 8 cents per day. (**The price of *GREASE MAX*® depends on the number purchased and may be higher or lower than the price in this example)**.

GREASE MAX ® type	**Daily cost of use**
1 mth	**$ 1.00**
3 mth	**33 c**
6 mth	**16 c**
12 mth	**8 c**

This is economical in anyone's terms.

More specifically, *GREASE MAX*® offers savings in the following areas:

1. **Direct cost savings over manual greasing**

2. **Direct cost savings attained by increasing production time by allowing machinery to continue operating when it would otherwise need to be stopped for greasing.**

3. **Indirect cost savings with a reduction in break downs and associated down time**

12. ON SITE ADVICE AND TRAINING

As part of our commitment to total customer support and service **NBC Group Ltd and the manufacturer** will make site visits for customer personnel training, and general advice and technical support for engineering staff.

13. FITTINGS

A full range of fittings, to suit all requirements for mounting *GREASE MAX*® are available. Please refer to the list on page 18. Specialist fittings are also able.

14. THE ENVIRONMENT & DISPOSAL

Expired *GREASE MAX* ® should placed in the industrial waste. They retain pressure for a period after the service life is completed and this, combined with good housekeeping, means they should not be left lying around. *GREASE MAX*® does not contain any item which precludes burial in land fill or similar either according to law or according to good environmental practice. They may be recycled but the method should be chosen with care as *GREASE MAX*® should not be opened because of the residual pressure that remains for a period after expiry and as they contain a small quantity of caustic solution.

15. QUALITY

GREASE MAX®**is manufactured to the highest quality standards. SOHM Schmierstofftechnik is committed to providing the best product of this type together with the best technical support and training of personnel. As part of this commitment we will not introduce any element into the design of** *GREASE MAX* ®**which can contribute to unreliability, such as electrical or mechanical components, plastic bodies, or by reducing components or using cheaper material including lubricants, to save on production costs.**

16. COMMON QUESTIONS ASKED ABOUT *GREASE MAX* ®

1. How do I know *GREASE MAX* ® is working, when the position of the piston can't be seen?

Firstly, remember that *GREASE MAX*® has only one moving part, (the piston), no mechanical parts, and no electrics. It uses an operating system proven to be absolutely reliable over 25 years. The manufacturer has stringent quality control to ISO 9001 standard. It is very unlikely that non performance will be encountered.

The *GREASE MAX*® design is fail safe; the starter cap cannot be screwed in without turning the activator screw down, which in turn can only break the seals and release the controlling element into the chemicals. The only possible result then is the production of gas which must push the piston forward and the lubricant out. The gas is retained in a gas tight neoprene bag and also as part of the fail safe design by the gas tight seals on the piston and the double O-rings on the starter cap.

However, to be assured, check the following:

- Simply feel the bearing temperature if safe to do so, or use a thermometer.
- A fresh discharge of grease around the seals will be visible when *GREASE MAX* ® is operating.

2. If I have a worn bearing will *GREASE MAX* ® discharge faster?

No, definitely not. *GREASE MAX*® is self regulating and is a true automatic lubricator. It will maintain it's correct discharge rate regardless of the bearing type, tolerance or operating conditions.

3. Does the orifice size affect the discharge rate?

No. See section 3., Operation of *GREASE MAX* ®.

4. Is a 12 month *GREASE MAX* ® larger than a 1 month?

No, they are all the same size. The only difference is the discharge rates. (see the diagram and notes on section 4.1.).

5. The plant is regularly stopped, for example at the week end. Will this create a problem with over greasing?

No. *GREASE MAX*® discharges at a very slow controlled rate and the amount of grease it can push into a bearing while the bearing is stopped for a few days will not a cause a problem.

GREASE MAX® is able to maintain a fine balance of pressure and if the plant is stopped for short periods, for instance at the week end, the resistance of the grease way is increased. This will temporarily stop *GREASE MAX*® . When the plant starts again, the grease will be released into the moving bearing. (Eventually *GREASE MAX*® would build enough pressure to move grease into the stopped bearing).

6. Will the 120 grams of grease in the *GREASE MAX* ® be enough?

When greasing is done with a grease gun, excess grease is used. Only a very small amount of grease is actually used by a bearing, the rest is wasted. Because *GREASE MAX* ® introduces grease into the bearing at a slow controlled rate while the bearing is moving only a small output quantity is required.

Providing the correct *GREASE MAX*® is chosen to begin with, the output will be sufficient. An additional benefit is that the plant will remain much cleaner!

7. For our application, *GREASE MAX* ® output is not sufficient, even with a 1 month unit.

Several *GREASE MAX*® can be grouped together into one line to provide a higher feed rate.

8. Can we use one *GREASE MAX* ® to feed two or more lines?

No, never. The discharge cannot be evenly split, as every bearing has a different grease resistance. Inevitably one bearing will be starved of grease.

9. We took the unit off and nothing came out!

This is the most common "complaint" or misunderstanding with this product.

GREASE MAX ® **will only show a large and obvious discharge if it has been used on a bearing with a reasonable amount of grease way resistance.**

If *GREASE MAX* ® **is applied to a bearing with little or no grease way resistance (which is common) and** *GREASE MAX* ® **is unscrewed, nothing**

should come out, except at A VERY SLOW RATE. Remember, *GREASE MAX* ® **operates in equilibrium with resistance.**

This situation has confused many people so far, especially if they have removed the product from one bearing which has some resistance, seen the resulting discharge, and then removed another *GREASE MAX*® from a similar neighbouring bearing, which has no resistance and which therefore will not show an immediate discharge.

10. Why shouldn't *GREASE MAX* ® be removed from the bearing during operation?

If *GREASE MAX*® **is operating under a lot of pressure, when removed this pressure will be lost.** The unit may have been at say, half life, so the piston will be halfway down the cylinder. The chemical reaction which produces the pressure is very slow **and to re-pressurise up to the required pressure the second time may take a considerable period**. Under-lubrication during this period may result.

(Note: when first installed there is no problem with the time taken to accumulate pressure as the internal volume in the expansion diaphragm is fully taken up with liquid so pressure develops quickly).

11. Why doesn't *GREASE MAX*® have a transparent body?

GREASE MAX ® has a steel body for a very good reason. Steel does not deform under the heat and pressure likely to be encountered when using *GREASE MAX* ® in some applications. Plastic does. If this were to occur, *GREASE MAX* ® would suffer failure.

The disadvantage of course is that the progress of the piston can't be seen but the advantages in terms of the performance and reliability of the unit far outweigh the disadvantages.

12. We think it is better to manually inspect the bearings while greasing

As will be apparent, the time spent on manual greasing can be used more efficiently and the expense applied to a better maintenance outcome. If inspections are required they are better done by qualified personnel as part of a Condition Monitoring program. If the bearings are correctly lubricated and then correctly inspected, (which need only be at relatively extended intervals), bearing life will be considerably improved. Maintenance costs will be greatly reduced and the costs of unscheduled production stoppages in terms of lost production and unscheduled maintenance will be lowered.

13. Why isn't *GREASE MAX*® adjustable?

GREASE MAX® is made to be completely reliable in all conditions. We prefer not to compromise with any design aspect but particularly this one. To make it adjustable would mean added complexity and the addition of electrical components. This would inevitably degrade the reliability factor.

14. How should *GREASE MAX*® be disposed of?

In the industrial waste. DO NOT leave the expired units lying around for the curious to tamper with. Remember, *GREASE MAX*® contains a small amount of potassium hydroxide and a small amount of pressure for some weeks after expiry. The amount of lubricant remaining in an expired *GREASE MAX*® is very small and does not give rise to environmental concerns for disposal.

17. *GREASE MAX* ® UNITS

Description	Part No.
GreaseMax 1 mth / Multi purpose grease EP	01W/F001
GreaseMax 3 mth / Multi purpose grease EP	03B/F001
GreaseMax 6 mth / Multi purpose grease EP	06R/F001
GreaseMax 12 mth / Multi purpose grease EP	12G/F001
GreaseMax 1 mth / High temp. grease	01W/F002
GreaseMax 3 mth / High temp. grease	03B/F002
GreaseMax 6 mth / High temp. grease	06R/F002
GreaseMax 12 mth / High temp. grease	12G/F002
GreaseMax 1 mth / Multi purpose grease + MoS_2	01W/F003
GreaseMax 3 mth / Multi purpose grease + MoS_2	03B/F003
GreaseMax 6 mth / Multi purpose grease + MoS_2	06R/F003
GreaseMax 12 mth / Multi purpose grease + MoS_2	12G/F003
GreaseMax 1 mth / Gearing grease	01W/F006
GreaseMax 3 mth / Gearing grease	03B/F006
GreaseMax 6 mth / Gearing grease	06R/F006
GreaseMax 12 mth / Gearing grease	12G/F006
GreaseMax 1 mth / Food grade grease	01W/F100
GreaseMax 3 mth / Food grade grease	03B/F100
GreaseMax 6 mth / Food grade grease	06R/F100
GreaseMax 12 mth / Food grade grease	12G/F100
GreaseMax 1 mth / Light oil	01W/O004
GreaseMax 3 mth / Light oil	03B/O004
GreaseMax 6 mth / Light oil	06R/O004
GreaseMax 12 mth / Light oil	12G/O004
GreaseMax 1 mth / Heavy oil tacky	01W/O015
GreaseMax 3 mth / Heavy oil tacky	03B/O015
GreaseMax 6 mth / Heavy oil tacky	06R/O015
GreaseMax 12 mth / Heavy oil tacky	12G/O015

18. *GREASE MAX* ® FITTINGS

Description	Part No.
Bracket for GreaseMax	**GF10000**
Extension, Flexible, 150mm 1/4 BSP M & F	**GF10015**
Extension, Flexible, 250mm 1/4 BSP M & F	**GF10025**
Extension, Flexible, 500mm 1/4 BSP M & F	**GF10050**
Extension, Flexible, 750mm 1/4 BSP M & F	**GF10075**
Extension, Flexible, 1000mm 1/4 BSP M & F	**GF10100**
Extension, Flexible, 1250mm 1/4 BSP M & F	**GF10125**
Extension, Flexible, 1500mm 1/4 BSP M & F	**GF10150**
Extension, Brass, 40mm 1/4 BSP M & F	**GF11040**
Extension, Brass, 85mm 1/4 BSP M & F	**GF11085**
Extension, Brass, 125mm 1/4 BSP M & F	**GF11125**
Elbow, 90^0, Brass, 1/4BSP M&F	**GF12000**
Adaptor, 45^0, Brass, 1/4 BSP F - 1/4SAE M	**GF13014**
Adaptor, 45^0, Brass, 1/4 BSP F - 1/8BSP M	**GF13018**
Adaptor, Brass, 1/4 BSP F - 6mm x 1 M	**GF14006**
Adaptor, Brass, 1/4 BSP F - 8mm x 1 M	**GF14008**
Adaptor, Brass, 1/4 BSP F - 10mm x 1 M	**GF14010**
Adaptor, Brass, 1/4 BSP F - 1/4 SAE M	**GF14014**
Adaptor, Brass, 1/4 BSP F - 1/8 BSP M	**GF14018**
Tee, Brass, 1/4 BSP F	**GF15000**
Control Valve 1/4 BSP F	**GF16000**
Brush 1/4BSP F	**GF17000**
Hex Nipple, Brass, 1/4 BSP M	**GF18000**
Male tail piece, 1/4 BSP M x 8mm	**GF19081**
Female tail piece, 1/4 BSP F x 8mm	**GF19082**
8mm Nylon reinforced tube, 1m	**GF20001**
8mm Nylon reinforced tube, 20m	**GF20020**