

Fuels, Lubricants and Associated Products for the Swedish Armed Forces

Product Catalogue



**Product Catalogue, Fuels, Lubricants and
Associated Products for the
Swedish Armed Forces**

CD PRKAT DRIVMEDEL

Product Catalogue, Fuels, Lubricants and Associated Products for the Swedish Armed Forces

This is the approved product catalogue for 'Fuels, Lubricants and Associated Products for the Swedish Armed Forces', M7789-000193, dated 2 December 2019. The product catalogue for fuels, lubricants and associated products is obtainable from the Swedish Armed Forces book and form store (FBF), but is accessible primarily via the FMV external and internal websites, www.fmv.se and the Swedish Armed Forces intranet site 'Emilia'.

FMV has produced the product catalogue for 'Fuels, Lubricants and Associated Products for the Swedish Armed Forces' within project MKOK 502 'Fuels and fuelling equipment'. The purpose of the product catalogue is to provide information on the standardised fuels, lubricants and associated products that exist and are to be used in military equipment. The product catalogue for fuels, lubricants and associated products makes it easier for FM, FMV and suppliers to select the right standardised products. This product catalogue contains a collection of technical information on the standardised fuels, lubricants, greases, hydraulic oils, corrosion protection fluids (petroleum based), brake fluids and coolants procured for the Swedish Armed Forces.

This edition is a translation of version M7789-000183 CD PRKAT DRIVMEDEL dated 2 December 2019.

The Stock names, in the English edition of "Product catalogue for Fuels, Lubricants and Associated products", have been translated to make it easier to understand the Stock names. For the actual Stock names, see M7789-000 183 CD PRKAT DRIVMEDEL.

Camilla Gustafsson, Technical Manager

Ingela Bolin Holmberg, Product Manager Fuel

CONTENTS

1. Tables	9
2. Cross-reference list.....	19
3. Lubricating oils.....	25
4. Greases	77
5. Other lubricants.....	115
6. Corrosion protection and other products.....	143
7. Hydraulic fluids	177
8. Liquid fuels	197
9. Antifreeze fluids	213
10. Additives	223
11. General information about lubricants	233
12. General information about fuel	239
13. General information about additives.....	245
14. Quality assurance of fuel and lubricants	249
15. Environmental and health risks	253
16. Packaging	257
17. Products withdrawn from the product range	261
18. Selection of products within aviation.....	293
19. Selection of products within marine	297
20. Selection of products in lubrication schedules for ground systems.....	301

FOREWORD

Edition dated 2 December 2019.

This product catalogue contains a collection of technical information about the standardised fuels, lubricants, greases, hydraulic oils, corrosion protection fluids (petroleum based), brake fluids and coolants procured for the Swedish Armed Forces.

The products that are commonly used within the Swedish Armed Forces are marked with a symbol to the right of the product code and name. Corresponding symbols for products appear in the lubrication schedule.

The purpose of the product catalogue is to provide information on the standardised fuels, lubricants and associated products that exist and are to be used in military equipment. The product catalogue for fuels, lubricants and associated products makes it easier for suppliers to select the correct standardised product. This edition is a translation of version 'M7789-000183 CD PRKAT DRIVMEDEL' and is also accessible via the FMV webpage www.fmv.se (English) and the Swedish Armed Forces intranet site (Emilia). Note that the attached technical data sheets from suppliers are not translated.

FMV is responsible for the standardised fuels, lubricants and associated products, and FMLOG/TvK-Log procures and maintains stocks of these products.

CD PRKAT Fuel M7789-000193, 2 December 2019 edition, can be ordered from FBF. This edition supersedes the earlier edition dated 1 October 2018.

The aim is to revise the product catalogue once a year to keep it up to date.

A review of the product range is in progress and will be progressively incorporated into later editions.

Material safety data sheets (MSDS)

Material safety data sheets for products procured and stocked by FMLOG/TvK-Log are available from PRIO for Swedish Armed Forces personnel.

Search path to material safety datasheets in PRIO:

1. Login to PRIO, select SAPGUI/ECC.
2. Enter MM03 in the box just below the menu row and press "Enter".
3. Enter the store designation (M no) in the field "Material"/Data/Ytterligare data/Dokumentdata.
4. Double-click on the link in the "Dokument" column and open the PDF file.

For those without access to PRIO: Send an email logk-masterdata-fmlog@mil.se and request the safety datasheet for the required store designation.

Text format

Warning!

Text in warning boxes means that there is a high risk of injury to people or damage to equipment or the environment.

CAUTION!

Notes boxes mean that there is a risk of damage to equipment.

Note

Text in comment boxes provides other important information, e.g., alternative products.

1. TABLES

Contents

SAE viscosity classification for engine oils	10
SAE viscosity classification for gear lubricants	11
API (American Petroleum Institute) categories for engine oils	12
Petrol/Gasoline engines	12
Diesel engines	12
Classification of 2-stroke engine oil	13
ACEA (European Automobile Manufacturers' Association) classification of engine oils	14
Petrol/Gasoline and diesel engine oils	14
Oils for engines with catalytic converter	14
Heavy duty diesel engine oils	15
API transmission and axle lubricant service designations	16
GL-4	16
GL-5	16
MT-1	16
ISO viscosity grades	17
NLGI classification of grease	18

SAE viscosity classification for engine oils

SAE viscosity classes for engine oils are described in standard SAE J300.

- Viscosity at low temperatures is determined according to ASTM D 5293.
- The lowest pumping temperature is determined according to ASTM D 4684 at a max. viscosity of 60 000 mPa s.
- Viscosity at 100 °C is the low shear rate kinematic viscosity, determined according to ASTM D 445.
- Viscosity at 150 °C is the high shear rate kinematic viscosity, determined according to ASTM D 4683, ASTM D 4741 or ASTM D 5481.

Table 1. SAE viscosity classification for engine oils

SAE viscosity grade	Max viscosity at temperature (mPa s, °C)	Lowest pumping temperature (°C)	Low shear rate viscosity at 100 °C (mm ² /s)		High shear rate viscosity at 150 °C (HTHS) (mPa s)
			Min	Max	Min
0W	6 200 at -35	-40	3.8	–	
5W	6 600 at -30	-35	3.8	–	
10W	7 000 at -25	-30	4.1	–	
15W	7 000 at -20	-25	5.6	–	
20W	9 500 at -15	-20	5.6	–	
25W	13 000 at -10	-15	9.3	–	
8	–	–	4.0	<6.1	1.7
12	–	–	5.0	<7.1	2.0
16	–	–	6.1	<8.2	2.3
20	–	–	6.9	<9.3	2.6
30	–	–	9.3	<12.5	2.9
40	–	–	12.5	<16.3	3.5 (0W-40, 5W-40 and 10W-40)
40	–	–	12.5	<16.3	3.7 (15W-40, 20W-40, 25W-40 and 40)
50	–	–	16.3	<21.9	3.7
60	–	–	21.9	<26.1	3.7

SAE viscosity classification for gear lubricants

SAE viscosity classes for gear lubricants are described in standard SAE J306.

Viscosity at low temperature is determined according to ASTM D 2983 with a Brookfield viscometer.

Viscosity at 100 °C is the kinematic viscosity, determined according to ASTM D 445 or its direct equivalent.

Table 2. SAE viscosity classification for gear lubricants

SAE grade	Max temperature for viscosity 150 000 cP (°C)	Kinematic viscosity at 100 °C (mm ² /s)	
		Min	Max
70W	-55	3.8	–
75W	-40	3.8	–
80W	-26	8.5	–
85W	-12	11.0	–
65	–	3.8	<5.0
70	–	5.0	<6.5
75	–	6.5	<8.5
80	–	8.5	<11.0
85	–	11.0	<13.5
90	–	13.5	<18.5
110	–	18.5	<24.0
140	–	24.0	<32.5
190	–	32.5	<41.0
250	–	41.0	–

The SAE classification does not define the quality of the oil. Quality classification of oils requires a number of tests of various kinds, both in laboratories and under real-world conditions.

These are conducted in collaboration between vehicle and engine manufacturers and oil companies.

The results of these tests are used to define the requirements for lubricating oils and the quality classes that form the basis for oil recommendations for vehicles and engines.

API (American Petroleum Institute) categories for engine oils

In the API categorisation, the quality of engine oil is determined by means of engine tests which include checks on wear and contamination of cylinder walls, piston rings, bearings and valve mechanisms, soot and high temperature deposit formation, corrosion and oxidation.

Petrol/Gasoline engines

API categorises petrol engine oils with respect to their performance. The letter S of each category stands for 'Service'.

SJ: Engines manufactured in 2001 and earlier.

SL: Engines manufactured in 2004 and earlier.

SM: Engines manufactured in 2010 and earlier.

SN: Introduced in October 2010. Designed to provide improved high temperature deposit protection for pistons and turbochargers, more stringent sludge control, improved fuel economy, seal compatibility, emission control system compatibility, and protection of engines operating on ethanol-containing fuels up to E85. Equivalent to ILSAC GF-5.

Diesel engines

API categorises diesel engine oils with respect to their performance into different classes, of which there are C and F classes.

CH-4: Introduced in 1998. For 4-stroke engines designed to fulfil the 1998 emission requirements. CH-4 oils are specially designed for diesel fuels with sulphur contents of up to 0.5% by weight. May be used instead of CD, CE, CF-4 and CG-4 oils.

CI-4: Introduced in 2002. For 4-stroke engines designed to fulfil the emission requirements from 2004, implemented in 2002. CI-4 oils have been developed for use in engines with exhaust gas recirculation (EGR) and for use with diesel fuels with sulphur contents of up to 0.5% by weight. May be used instead of CD, CE, CF-4, CG-4 and CH-4 oils. Certain CI-4 oils may also be qualified for CI-4 PLUS designation.

CJ-4: For 4-stroke engines designed to fulfil 2010 Tier 4 emission requirements for diesel engines. These oils have been developed for use together with diesel fuels with a sulphur content of up to 500 ppm. Use of these oils together with fuels that contain more than 15 ppm sulphur may affect the after-treatment system and/or oil change intervals. CJ-4 oils are especially effective where particulate filters and other after-treatment systems are used. Provides optimum protection against catalyst poisoning, filter clogging, engine wear, piston deposits, low and high temperature stability, soot handling properties, oxidative thickening, foaming and viscosity loss due to shear. API CJ-4 oils exceed the performance criteria for API CI-4 with CI-4 PLUS, CI-4, CH-4, CG-4 and CF-4 and can effectively lubricate engines with these requirements.

CK-4: For 4-stroke engines designed to fulfil 2017 Tier 4 emission requirements for diesel engines as well as for earlier diesel engine models. These oils have been developed for use together with diesel fuels with a sulphur content of up to 500 ppm. Use of these oils together with fuels that contain more than 15 ppm sulphur may affect the after-treatment system and/or oil change intervals. CK-4 oils are especially effective where particulate filters and other after-treatment systems are used. API CK-4 oils provide optimum protection against oil oxidation, viscosity loss due to shear as well as protection against catalyst poisoning, filter blocking, engine wear, piston deposits, degradation of low and high temperature stability and soot-related viscosity increase. API CK-4 oils exceed the performance criteria of API CJ-4, CI-4 with CI-4 PLUS, CI-4, and CH-4 and can effectively lubricate engines calling for those API Service Categories. When using CK-4 oil with higher than 15 ppm sulphur fuel, consult the engine manufacturer for service interval recommendations.

FA-4: Describes certain XW-30 oils specifically formulated for use in select high-speed four-stroke cycle diesel engines designed to meet 2017 model year on-highway greenhouse gas (GHG) emission standards. These oils are formulated for use in on-highway applications with diesel fuel sulphur content up to 15 ppm. API FA-4 oils are blended to a high temperature high shear (HTHS) viscosity range of 2.9 to 3.2 mPa s. These oils are especially effective at sustaining emission control system durability where particulate filters and other advanced after-treatment systems are used. API FA-4 oils are designed to provide enhanced protection against oil oxidation, viscosity loss due to shear, and oil aeration as well as protection against catalyst poisoning, particulate filter blocking, engine wear, piston deposits, degradation of low- and high-temperature properties, and soot-related viscosity increase. API FA-4 oils are neither interchangeable nor backward compatible with API CK-4, CJ-4, CI-4 with CI-4 PLUS, CI-4, and CH-4 oils. Refer to engine manufacturer recommendations to determine if API FA-4 oils are suitable for use.

Classification of 2-stroke engine oil

The performance of 2-stroke engine oils is expressed by the API, ISO, JASO or NNMA classification. As for 4-stroke oil, the classification is determined from engine and laboratory tests.

API TA (ISO-L-ETA): 2-stroke engines for mopeds, lawn mowers and other low-powered machines. Generally under 50 cc. The classification is withdrawn and not in use any more.

API TC (ISO-L-ETC): Engines that may be susceptible to damage from premature ignition and where the oil needs to work at very high temperatures without the piston rings seizing. The performance of the oil is also sufficient for lubricating high-powered motorcycles, snowmobiles and chain saws. Generally 50–500 cc.

API TCS: As for API TC, but the product is synthetic. The classification is withdrawn and not in use any more.

JASO FB/ISO-L-EGB: Low-quality oil.

JASO FC/ISO-L-EGC: Minimum requirement for Japanese engine manufacturers.

JASO FCS: As JASO FC, but the product is synthetic.

ISO-L-EGD: 2-stroke oils with excellent cleaning properties and higher performance at high temperatures.

NNMA TC-W3: Outboard engine oil. Supersedes API TD.

ACEA (European Automobile Manufacturers' Association) classification of engine oils

The ACEA is an industry association for European automotive manufacturers, and the successor to the previous organisation, the CCMC. One task of the organisation is to develop classifications for engine oils with particular reference to European engines and operating conditions. Engine oils are divided into three classes: petrol/diesel engine oils for cars and vans (prefixed A/B), engine oils for vehicles with catalytic converters (C) and diesel engine oils for heavy-duty vehicles (E). To meet the requirements for a quality class, the oil must pass both laboratory and engine tests. The laboratory tests cover properties like the viscosity of the oil, its propensity to foam, shear stability and rust properties. The engine tests check things like the ability of the oil to prevent bearing corrosion, piston ring seizure and camshaft and cylinder wall wear. The ACEA classification of engine oils came into effect in 1996, when the earlier CCMC classes G4, G5, PD2, D4 and D5 disappeared.

Petrol/Gasoline and diesel engine oils

The ACEA 'A' classes are intended for petrol engine oils and ACEA 'B' classes are for diesel engine oils. From 1996 onwards, ACEA A and ACEA B were separate, but in 2004 they were combined into A/B classes and now apply to both petrol and diesel engines.

A3/B3: Stable, stay-in-grade oil intended for use in high performance petrol engines and car and light van diesel engines. For extended oil change intervals or year-round use of low viscosity oils and/or for severe operating conditions.

A3/B4: Stable, stay-in-grade oil intended for use in high performance petrol engines and direct injection diesel engines, but also suitable for the applications described under A3/B3.

A5/B5: Stable, stay-in-grade oil intended for use at extended oil change intervals in high performance petrol engines and car and light van diesel engines designed to be used with low viscosity oils with a HTHS viscosity of 2.9 to 3.5 mPa s.

Oils for engines with catalytic converter

These oils increase the lifetime of particle filters (DPF/GPF) and three way catalysts (TWC) and maintain the vehicle's fuel economy.

C1: Stable, stay-in-grade oil with the lowest SAPS-level (sulphated ash, phosphorus and sulphur) in group C. The oils are intended for use with extended oil change intervals in vehicles with modern after-treatment systems and in high performance cars and light-duty vans with gasoline/diesel engines capable of using low-viscosity oils with a minimum HTHS viscosity of 2.9 mPa s.

C2: Stable, stay-in-grade oil with mid SAPS-level (sulphated ash, phosphorus and sulphur). The oils are intended for use with extended oil change intervals in vehicles with modern after-treatment systems and in high performance cars and light-duty vans with gasoline/diesel engines capable of using low-viscosity oils with a minimum HTHS viscosity of 2.9 mPa s.

C3: Stable, stay-in-grade oil with mid SAPS-level (sulphated ash, phosphorus and sulphur). The oils are intended for use with extended oil change intervals in vehicles with modern after-treatment systems and in high performance cars and light-duty vans with gasoline/diesel engines capable of using low-viscosity oils with a minimum HTHS viscosity of 3.5 mPa s.

C4: Stable, stay-in-grade oil with low SAPS-level (sulphated ash, phosphorus and sulphur). The oils are intended for use with extended oil change intervals in vehicles with modern after-treatment systems and in high performance cars and light-duty vans with gasoline/diesel engines capable of using low-viscosity oils with a minimum HTHS viscosity of 3.5 mPa s.

C5: Stable, stay-in-grade oil with mid SAPS-level (sulphated ash, phosphorus and sulphur). The oils are intended for use with extended oil change intervals and further improve fuel economy in vehicles with modern after-treatment systems and in high performance cars and light-duty vans with gasoline/diesel engines that are designed to be capable, and are OEM-approved, for use with low-viscosity oils with a minimum HTHS viscosity of 2.6 mPa s.

Heavy duty diesel engine oils

E4: Stable, stay-in-grade oil with excellent control of piston cleanliness, wear, soot handling and lubrication stability. Recommended for highly rated diesel engines that fulfil Euro I, Euro II, Euro III, Euro IV and Euro V emission requirements and are used in very severe conditions, e.g. significantly extended oil change intervals. Suitable for engines without particulate filters and for certain exhaust gas recirculation (EGR) engines and certain engines with selective catalytic reduction (SCR) NO_x reduction systems.

E6: Stable, stay-in-grade oil providing excellent control of piston cleanliness, wear, soot handling and lubricant stability. It is recommended for highly rated diesel engines meeting Euro I, Euro II, Euro III, Euro IV, Euro V and Euro VI emission requirements and running under very severe conditions, e.g. significantly extended oil change intervals. It is suitable for EGR engines, with or without particulate filters, and for engines fitted with SCR NO_x reduction systems. E6 quality is strongly recommended for engines fitted with particulate filters and is designed for use in combination with low sulphur diesel fuel.

E7: Stable, stay-in-grade oil providing effective control with respect to piston cleanliness and bore polishing. It further provides excellent wear control, soot handling and lubricant stability. It is recommended for highly rated diesel engines meeting Euro I, Euro II, Euro III, Euro IV and Euro V emission requirements and running under severe conditions, e.g. extended oil change intervals. It is suitable for engines without particulate filters, and for most EGR engines and most engines fitted with SCR NO_x reduction systems.

E9: Stable, stay-in-grade oil providing effective control with respect to piston cleanliness and bore polishing. It further provides excellent wear control, soot handling and lubricant stability. It is recommended for highly rated diesel engines meeting Euro I, Euro II, Euro III, Euro IV and Euro V emission requirements and running under severe conditions, e.g. extended oil change intervals according to the manufacturer's recommendations. It is suitable for engines with or without particulate filters, and for most EGR engines and for most engines fitted with SCR NO_x reduction systems. E9 is strongly recommended for engines fitted with particulate filters and is designed for use in combination with low sulphur diesel fuel.

API transmission and axle lubricant service designations

The most important function of the oil in a transmission system is to prevent wear to the generally heavily loaded gears in different types of drive train. The lubrication requirement increases from straight, conical and spiral-shaped gear trains to gears whose axes are in different planes (so-called 'hypoid gears'). The API has divided these requirements into 7 different quality classes: API GL-1 to 6, of which now 1, 2 and 3 and 6 are now obsolete and MT-1.

GL-4

Oil with a large quantity of EP additives, generally used in manual gearboxes.

GL-5

Oil with a very large quantity of EP additives (roughly twice as much as GL-4). Used in heavily loaded gear boxes and hypoid gears. When choosing gearbox and differential oil, one should use oil corresponding to the recommended GL class. The use of GL-5 class oil in a gearbox for which API GL-4 is recommended may cause the synchromesh to work more slowly.

MT-1

Oil for nonsynchronised manual gearboxes (transmissions) in buses and heavy-duty vehicles.

ISO viscosity grades

The ISO system for viscosity classification of lubricating oils for industrial use - ISO 3448 - divides the oils into 20 viscosity grades.

The number of each viscosity grade (ISO VG) represents the midpoint of the viscosity range, measured in mm²/s at 40 °C. Each grade ranges ±10% from the mid-point.

Table 3. ISO viscosity grades

ISO VG	Viscosity at 40 °C (mm ² /s)	
	Min	Max
2	1.98	2.42
3	2.88	3.52
5	4.14	5.06
7	6.12	7.48
10	9.0	11.0
15	13.5	16.5
22	19.8	24.2
32	28.8	35.2
46	41.4	50.6
68	61.2	74.8
100	90	110
150	135	165
220	198	242
320	288	352
460	414	506
680	612	748
1 000	900	1 100
1 500	1 350	1 650
2 200	1 980	2 420
3 200	2 880	3 520

NLGI classification of grease

In the NLGI system, the types of grease are divided into nine classes which only take account of the consistency of the grease, measured in terms of the penetration figure as per ASTM D 217.

The NLGI system for classification is described in SAE J310.

Table 4. NLGI classification of grease

NLGI grade	Worked penetration range at 25 °C	Description
000	445-475	Fluid
00	400-430	Semi-fluid
0	355-385	Viscous
1	310-340	Semi-soft
2	265-295	Solid (Normal grease)
3	220-250	Firm
4	175-205	Very firm
5	130-160	Semi-hard
6	85-115	Very hard

2. CROSS-REFERENCE LIST

Contents

Cross-reference list: MIL and other international specifications	20
Cross reference list: NATO Codes	22

Cross-reference list: MIL and other international specifications

Standard	Stock code	Stock name
ASTM D910 (Grade 100 LL)	M0754-2330XX	AVIATION GASOLINE (FLYGBENSIN 33)
DOD-PRF-85734	M0741-8540XX	AIRCRAFT TURBINE OIL 854
FMVSS 116 (DOT 4)	M0747-4300XX	BRAKE FLUID 430
FMVSS 116 (DOT 5.1)	M0747-4320XX	BRAKE FLUID 432
MIL-C-11796 (Class 3) (obsolete)	M0722-0510XX	ANTI-CORROSION FLUID 051
MIL-DTL-25681	M0744-3071XX	LUBRICANT
MIL-DTL-5624 (JP-5)	M0754-3800XX	AVIATION FUEL NATO F-44
MIL-DTL-83133 (NATO F-35)	M0754-3750XX	AVIATION TURBINE FUEL (FLYGFOTOGEN 75)
MIL-DTL-83133 (JP-8)		AVIATION FUEL NATO F-34
MIL-DTL-85470	M0729-4670XX	ADDITIVE ANTI-ICE
MIL-G-21164	M0743-1230XX	GREASE 123
MIL-G-21164	M0743-1231XX	GREASE 1231
MIL-G-25537	M0743-0160XX	BALL-BEARING GREASE 016
MIL-G-81827	M0743-1390XX	GREASE 139
MIL-PRF-10924	M0743-0201XX	BEARING GREASE 020
MIL-PRF-14107	M0741-0470XX	LUBRICATING OIL
MIL-PRF-16173 (Grade 1)	M0722-0483XX	ANTI-CORROSION FLUID
MIL-PRF-16173 (Grade 2)	M0722-2970XX	ANTI-CORROSION SPRAY 297
MIL-PRF-16173 (Grade 2)	M0722-0481XX	ANTI-CORROSION FLUID 0481
MIL-PRF-16173 (Grade 3, Class 1)	M0741-8461XX	LUBRICATING OIL
MIL-PRF-16173 (Grade 4)	M0722-0482XX	ANTI-CORROSION FLUID 0482
MIL-PRF-16173 (Grade 5)	M0722-0610XX	ANTI-CORROSION FLUID 061
MIL-PRF-21260 (SAE 30)	M0722-0200XX	ANTI-CORROSION FLUID 020
MIL-PRF-23699 (STD)	M0741-8580XX	AIRCRAFT TURBINE OIL 858
MIL-PRF-23699 (STD)	M0741-8600XX	AIRCRAFT TURBINE OIL 860
MIL-PRF-23699 (STD)	M0741-8602XX	AIRCRAFT TURBINE OIL
MIL-PRF-23699 (C/I)	M0741-8601XX	AIRCRAFT TURBINE OIL
MIL-PRF-23699 (HTS)	M0741-8590XX	AIRCRAFT TURBINE OIL 859
MIL-PRF-23827 (Type I)	M0743-1181XX	GREASE 1181
MIL-PRF-23827 (Type I)	M0743-1210XX	GREASE 121
MIL-PRF-23827 (Type II)	M0743-2250XX	GREASE

2. Cross-reference list

Standard	Stock code	Stock name
MIL-PRF-25017	M0729-4630XX	ADDITIVE HITEC 580
MIL-PRF-25017	M0729-4632XX	ADDITIVE DCI-4A
MIL-PRF-27617 (Type II)	M0743-1080XX	GREASE 108
MIL-PRF-27617 (Type III)	M0743-1070XX	GREASE 107
MIL-PRF-32033 (Type I)	M0744-1040XX	LUBRICANT 104
MIL-PRF-5606	M0747-0210XX	HYDRAULIC FLUID 021
MIL-PRF-6083	M0722-0460XX	ANTI-CORROSION FLUID 046
MIL-PRF-6083	M0747-0130XX	HYDRAULIC FLUID 013
MIL-PRF-6083	M0747-0660XX	HYDRAULIC FLUID
MIL-PRF-6085	M0741-8430XX	INSTRUMENT OIL 843
MIL-PRF-6086 (Grade L)	M0741-2570XX	GEAR OIL 257
MIL-PRF-6086 (Grade M)	M0741-2580XX	GEAR OIL 258
MIL-PRF-63460	M0722-1020XX	CLEANING OIL CLP
MIL-PRF-7024 (Type II)	M0746-5100XX	CALIBRATION FLUID 510
MIL-PRF-7808 (Grade 3)	M0741-8560XX	AIRCRAFT TURBINE OIL 856
MIL-PRF-7870	M0741-0420XX	LUBRICATING OIL 042
MIL-PRF-81309 (Type II)	M0722-2570XX	ANTI-CORROSION FLUID 257
MIL-PRF-81309 (Type III)	M0741-8461XX	LUBRICATING OIL
MIL-PRF-81322	M0743-1370XX	GREASE 137
MIL-PRF-81322	M0743-1380XX	GREASE 138
MIL-PRF-8188	M0722-0021XX	ANTI-CORROSION FLUID 0021
MIL-PRF-83282	M0747-0230XX	HYDRAULIC FLUID 023
MIL-PRF-87252	M0758-0390XX	COOLANT 039
SAE-AMS-2518	M0743-0071XX	GRAPHITE GREASE 0071
SAE-AMS-G-4343	M0743-0870XX	SILICONE GREASE 087
SAE-AMS-G-6032 (Type I)	M0743-0140XX	SEALING GREASE 014
SAE-AS-8660	M0729-3010XX	SILICONE PASTE 301
SAE-AMS-M-7866	M0744-0050XX	LUBRICANT 005

Cross reference list: NATO Codes

Nato	Stock code	Stock name
C-615	M0741-8750XX	ENGINE OIL
C-628 (obsolete)	M0722-0510XX	ANTI-CORROSION FLUID 051
C-635	M0722-0460XX	ANTI-CORROSION FLUID 046
C-635	M0747-0130XX	HYDRAULIC FLUID 013
C-635	M0747-0660XX	HYDRAULIC FLUID
C-638	M0722-0021XX	ANTI-CORROSION FLUID 0021
C-642	M0722-0200XX	ANTI-CORROSION FLUID 020
F-18	M0754-2330XX	AVIATION GASOLINE (FLYGBENSIN 33)
F-34		AVIATION FUEL NATO F-34
F-35	M0754-3750XX	AVIATION TURBINE FUEL (FLYGFOTOGEN 75)
F-44	M0754-3800XX	AVIATION FUEL NATO F-44
G-353	M0743-1230XX	GREASE 123
G-353	M0743-1231XX	GREASE 1231
G-354	M0743-1181XX	GREASE 1181
G-354	M0743-1210XX	GREASE 121
G-355	M0743-0060XX	GRAPHITE GREASE 006
G-363	M0743-0140XX	SEALING GREASE 014
G-366	M0743-0160XX	BALL-BEARING GREASE 016
G-392	M0743-0870XX	SILICONE GREASE 087
G-394	M0743-0830XX	SILICONE GREASE 083
G-395	M0743-1370XX	GREASE 137
G-395	M0743-1380XX	GREASE 138
G-398	M0743-1080XX	GREASE 108
G-399	M0743-1070XX	GREASE 107
G-403	M0743-0201XX	BEARING GREASE 020
H-515	M0747-0210XX	HYDRAULIC FLUID 021
H-537	M0747-0230XX	HYDRAULIC FLUID 023
H-542	M0747-4300XX	BRAKE FLUID 430
O-142	M0741-0420XX	LUBRICATING OIL 042
O-147	M0741-8430XX	INSTRUMENT OIL 843
O-148	M0741-8560XX	AIRCRAFT TURBINE OIL 856

2. Cross-reference list

Nato	Stock code	Stock name
O-152	M0741-8601XX	AIRCRAFT TURBINE OIL
O-153	M0741-2570XX	GEAR OIL 257
O-154	M0741-8590XX	AIRCRAFT TURBINE OIL 859
O-155	M0741-2580XX	GEAR OIL 258
O-156	M0741-8580XX	AIRCRAFT TURBINE OIL 858
O-156	M0741-8600XX	AIRCRAFT TURBINE OIL 860
O-156	M0741-8602XX	AIRCRAFT TURBINE OIL
O-157	M0741-0470XX	LUBRICATING OIL
O-160	M0741-8540XX	AIRCRAFT TURBINE OIL 854
O-190	M0744-1040XX	LUBRICANT 104
S-1735	M0744-3071XX	LUBRICANT
S-1738	M0744-0840XX	LUBRICANT 084
S-1738	M0747-1060XX	LUBRICANT 106
S-1745	M0729-4670XX	ADDITIVE ANTI-ICE
S-1747	M0729-4630XX	ADDITIVE HITEC 580
S-1747	M0729-4632XX	ADDITIVE DCI-4A
S-1748	M0758-0390XX	COOLANT 039
S-720	M0743-0071XX	GRAPHITE GREASE 0071
S-722	M0744-0550XX	LUBRICANT 055
S-736	M0729-3010XX	SILICONE PASTE 301
S-740	M0744-0050XX	LUBRICANT 005
S-758	M0722-1020XX	CLEANING OIL CLP

3. LUBRICATING OILS

Contents

M0741-0310XX COMPRESSOR OIL 031	27
M0741-0311XX COMPRESSOR OIL 0311	28
M0741-0312XX COMPRESSOR OIL 0312	29
M0741-0313XX COMPRESSOR OIL	30
M0741-0314XX COMPRESSOR OIL	31
M0741-0420XX LUBRICATING OIL 042	32
M0741-0452XX COMPRESSOR OIL	33
M0741-0460XX LUBRICATING OIL 046	34
M0741-0461XX LUBRICATING OIL	35
M0741-0462XX LUBRICATING OIL	36
M0741-0470XX LUBRICATING OIL	37
M0741-2402XX MARINE ENGINE OIL 30	38
M0741-2405XX ENGINE OIL 1340	39
M0741-2414XX ENGINE OIL 15W/40	40
M0741-2430XX AIRCRAFT ENGINE OIL 15W/40	41
M0741-2505XX 2-STROKE OIL BIO LIQUID-COOLED	42
M0741-2506XX 2-STROKE OIL AIR-COOLED	43
M0741-2570XX GEAR OIL 257	44
M0741-2580XX GEAR OIL 258	45
M0741-2628XX TRANSMISSION OIL MP 80	46
M0741-2630XX TRANSMISSION OIL 80W/140	47
M0741-2633XX TRANSMISSION OIL 75W/140	48
M0741-2642XX TRANSMISSION OIL WB	49
M0741-2680XX TURBINE OIL 68	50
M0741-2701XX TRANSMISSION OIL A	51
M0741-3910XX SILICONE OIL 391	52
M0741-5360XX CUTTING OIL 536	53
M0741-5731XX CUTTING OIL (To be withdrawn)	54
M0741-8111XX SAW CHAIN OIL	55
M0741-8250XX PNEUMATIC TOOL OIL 825	56
M0741-8370XX ENGINE OIL SAE 30	57
M0741-8400XX ENGINE OIL 0W/30	58
M0741-8402XX ENGINE OIL 0W/20	59
M0741-8405XX ENGINE OIL 5W/30 SY	60
M0741-8408XX ENGINE OIL 5W/30	61
M0741-8409XX ENGINE OIL 5W/40	62
M0741-8430XX INSTRUMENT OIL 843	63
M0741-8440XX PROTECTIVE OIL 844 (To be withdrawn)	64
M0741-8461XX LUBRICATING OIL	65
M0741-8540XX AIRCRAFT TURBINE OIL 854	66
M0741-8560XX AIRCRAFT TURBINE OIL 856	67
M0741-8580XX AIRCRAFT TURBINE OIL 858	68
M0741-8590XX AIRCRAFT TURBINE OIL 859	69
M0741-8600XX AIRCRAFT TURBINE OIL 860	70

M0741-8601XX AIRCRAFT TURBINE OIL (To be withdrawn)	71
M0741-8602XX AIRCRAFT TURBINE OIL	72
M0741-8659XX TRANSMISSION OIL 75W/90	73
M0741-8660XX TRANSMISSION OIL 80W/90	74
M0741-8711XX TRANSMISSION OIL AS	75
M0741-8750XX ENGINE OIL	76

M0741-0310XX COMPRESSOR OIL 031

Technical basis

The oil must meet the requirements listed in the description.

Description

Compressor oil 031 is a fully synthetic polyolester oil (POE) that meets ISO VG 32.

ISO VG:	32
Viscosity at 40 °C:	28.8-35.2 mm ² /s

Principal use

Lubricating oil for refrigeration compressors using HFCs (incl. R134a) or carbon dioxide as coolants.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Mobil EAL Arctic 32](#)

M0741-0311XX COMPRESSOR OIL 0311

Technical basis

The oil must meet the requirements listed in the description.

Description

Compressor oil 0311 is a fully synthetic polyolester oil (POE) that meets ISO VG 22.

ISO VG:	22
Viscosity at 40 °C:	19.8-24.2 mm ² /s

Principal use

Lubricating oil for refrigeration compressors using HFCs (incl. R134a) or carbon dioxide as coolants.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Mobil EAL Arctic 22](#)

M0741-0312XX COMPRESSOR OIL 0312

Technical basis

The oil shall fulfil the requirements given in the description.

Description

Compressor oil 0312 is a fully synthetic polyolester (POE) oil that meets ISO VG 100.

ISO VG:	100
Viscosity at 40 °C:	90.0-110 mm ² /s

Principal use

Lubricant for refrigeration compressors that use HFC as a refrigerant.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Emkarate RL 100H](#)

M0741-0313XX COMPRESSOR OIL

Technical basis

The oil must meet the requirements listed in the description.

Description

Compressor oil M0741-0313XX is a fully synthetic polyolester oil (POE) that meets ISO VG 46.

ISO VG:	46
Viscosity vid 40 °C:	41.4-50.6 mm ² /s

Principal use

Lubricating oil for refrigeration compressors using HFCs (incl. R134a) or carbon dioxide as coolants.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Mobil EAL Arctic 46](#)

M0741-0314XX COMPRESSOR OIL

Technical basis

The oil must meet the requirements listed in the description.

Description

Compressor oil M0741-0314XX is a fully synthetic polyolester oil (POE) that meets ISO VG 68.

ISO VG:	68
Viscosity at 40 °C:	61.2-74.8 mm ² /s

Principal use

Lubricating oil for refrigeration compressors using HFCs (incl. R134a) or carbon dioxide as coolants.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Mobil EAL Arctic 68](#)

M0741-0420XX LUBRICATING OIL 042



Technical basis

US spec:	MIL-PRF-7870
Equivalent British spec:	DEF-STAN 91-47, OM-12
NATO code:	0-142
SAAB code:	1116-02

Description

Lubricating oil 042 is a low-viscosity mineral oil with additives to improve oxidation resistance and corrosion protection.

Viscosity at 38 °C:	min 10 mm ² /s
Viscosity at -40 °C:	max 4 000 mm ² /s
Pour point:	max -57 °C

Principal use

- Inhibiting oil for aircraft fuel systems in storage.
- Lubrication of instruments, controls etc. where a thin lubricating oil is required.
- Spindle oil for fast-rotating components.
- Thin manual lubrication oil.
- Lubrication for certain weapons, especially at low temperatures.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[AeroShell Fluid 3](#)

M0741-0452XX COMPRESSOR OIL

Technical basis

The oil must meet the requirements listed in the description.

Description

Compressor oil M0741-0452XX is a diester based synthetic oil that meets the specifications for ISO VG 150. The oil is approved and listed in UOP's T-509-02 "Reciprocating Compressor Spec Writer".

ISO VG:	150
Viscosity at 40 °C:	135-165 mm ² /s

Principal use

A compressor lubricating oil that is mainly used in compressors on ships.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

I [Anderol 755](#)

M0741-0460XX LUBRICATING OIL 046

Technical basis

The oil must meet the Rolls-Royce functional requirements in accordance with DIN 51517 CLP.

Description

Lubricating oil 046 is an ISO VG 68 gear oil for toothed and worm gears. It offers good corrosion protection, good oxidation stability, resistance to emulsion formation, resistance to mechanical shear as well as good high and low temperature properties.

ISO VG:	68
Viscosity at 40 °C:	61.2-74.8 mm ² /s

Principal use

Lubricating oil for toothed and worm gears.

CAUTION!

Not used for toothed and worm gears in vehicles.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Mobilgear 600 XP 68](#)

M0741-0461XX LUBRICATING OIL

Technical basis

The oil must meet the requirements listed in the description.

Description

Lubricating oil M0741-0461XX is an ISO VG 150 gear oil for toothed and worm gears. It is based on a synthetic oil of the wax-free polyalphaolefin type. Good corrosion protection, good oxidation stability, good demulsifying capability, resistant to mechanical shear, good high and low temperature properties.

ISO VG:	150
Viscosity at 40 °C:	135-165 mm ² /s

Principal use

Lubricating oil for toothed and worm gears.

CAUTION!

Not used for toothed and worm gears in vehicles.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

| [Mobil SHC 629](#)

M0741-0462XX LUBRICATING OIL

Technical basis

No applicable standard. The oil must meet the requirements listed in the description.

Description

Lubricating oil M0741-0462XX is an ISO VG 220 gear oil for toothed and worm gears. It is based on a synthetic oil of the wax-free polyalphaolefin type. Good corrosion protection, good oxidation stability, good demulsifying capability, resistant to mechanical shear, good high and low temperature properties.

ISO VG:	220
Viscosity at 40 °C:	198-242 mm ² /s

Principal use

Lubricating oil for toothed and worm gears.

CAUTION!

Not used for toothed and worm gears in vehicles.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Mobil SHC 630](#)

M0741-0470XX LUBRICATING OIL

Technical basis

US spec:	MIL-PRF-14107
Equivalent British spec:	DEF-STAN 91-102, OX-24 (obsolete)
NATO code:	O-157

Description

Lubricating oil M0741-0470XX is a pale synthetic lubricating and preserving oil for aircraft and ground based small weapons. The correct use of this oil ensures effective firing at low temperatures (17.8 °C to -56.6 °C).

Viscosity at 37.8 °C:	min 5.8 mm ² /s
Viscosity at -54 °C:	max 950 mm ² /s
Pour point:	min -59.4 °C

Principal use

Lubricating oil M0741-0470XX is a lubricating and preserving oil for aircraft and ground based small weapons. The correct use of this oil ensures effective firing at low temperatures.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Arpolube 14107](#)

M0741-2402XX MARINE ENGINE OIL 30

Technical basis

The oil must meet the functional requirements for SAE 30 and be approved by MTU engine manufacturers and meet the requirements for MTU category 2 products.

Description

Marine engine oil 30 is a mineral oil based single grade engine oil. The oil meets the ACEA E7 and MTU category 2 functional requirements. The MTU category 2 requirement is necessary for oils used in MTU marine diesel engines.

SAE grade:	30
Viscosity at 100 °C:	9.3-12.5 mm ² /s

Principal use

For marine diesels, stationary and mobile engines.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Fuchs Titan Universal HD SAE 30](#)

[Q8 T 750 SAE 30](#)

Note

OKQ8 new contractor since October 2019. Fuchs product will be phased out in the storage 2020.

M0741-2405XX ENGINE OIL 1340

Technical basis

The oil must meet the functional requirements for SAE 40 and API CF/SF.

Description

Engine oil 1340 is a single grade SAE-40 oil.

SAE grade:	40
Viscosity at 100 °C:	12.5-16.3 mm ² /s
HTHS:	min 3.7 mPa s

Note

Engine oil 1340 is the same as the earlier product Engine oil 40 (M0741-2404XX).

Principal use

Lubrication of low-speed marine diesel engines with separate crankcase lubrication. The oil has been used for older marine diesel engines with electroplated outer coatings and can be replaced with Marine engine oil 30 or a multigrade oil instead, e.g. Engine oil 15W/40.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

| [Mobil Delvac 1340](#)

M0741-2414XX ENGINE OIL 15W/40



Technical basis

The oil must meet the functional requirements for SAE 15W-40 and ACEA E7/E5. The engine oil must even meet the vehicle manufacturer specifications MB (Mercedes) 228.3, VDS 3 and MAN 3275.

Description

Engine oil 15W/40 is an engine oil that contains additives that improve its properties, like temperature independence, film strength, solvent and dispersant properties and corrosion protection capability and prevent oxidation of the oil.

SAE grade:	15W-40
Viscosity at 100 °C:	12.5-16.3 mm ² /s
Lowest pumpable temperature:	-25 °C
TBN:	min 10.0 KOH/g

Principal use

Lubrication of high-speed Otto and diesel engines.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Fuchs Titan Truck Plus SAE 15W-40](#)

[Q8 T 750 15W-40](#)

Note

OKQ8 new contractor since October 2019. Fuchs product will be phased out in the storage 2020.

M0741-2430XX AIRCRAFT ENGINE OIL 15W/40

Technical basis

The oil must meet the functional requirements for SAE 15W-40.

Description

Aircraft engine oil 15W/40 is a synthetic gas engine oil to be used principally for specific purposes.

SAE grade:	15W/40
Viscosity at 100 °C:	12.5-16.3 mm ² /s
Lowest pumpable temperature:	-25 °C
HTHS:	min 3.7 mPa s

Principal use

Aircraft gas engine oil for unmanned aerial vehicles (UAV).

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

| [Mobil Pegasus 1](#)

M0741-2505XX 2-STROKE OIL BIO LIQUID-COOLED



Technical basis

The oil must meet the functional requirements for NMMA TC-W3.

Description

Ash-free, readily biodegradable synthetic two-stroke oil.

Viscosity at 40 °C:	approx. 47 mm ² /s
Viscosity at 100 °C:	approx. 8.4 mm ² /s
Pour point:	-39 °C
Flash point:	250 °C

Principal use

For outboard engines, can also be used in land-based liquid-cooled two-stroke engines. Mixed with petrol in a 2% blend or according to the engine manufacturers' recommendations. Also for engines with separate lubrication.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Fuchs AquaWay Bio](#)

M0741-2506XX 2-STROKE OIL AIR-COOLED



Technical basis

The oil must meet the functional requirements for JASO FC, ISO L EGD, Huskvarna HVA 346 and HVA 232.

Description

Synthetic two-stroke oil.

Viscosity at 40 °C:	approx. 38 mm ² /s
Viscosity at 100 °C:	approx. 7 mm ² /s
Pour point:	approx. -40 °C
Flash point:	approx. 90 °C

Principal use

For all types of air-cooled two-stroke engines. Mixed with petrol in a 2% blend or according to the manufacturers' recommendations. Also for engines with separate lubrication.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

| [Castrol Power 1 TTS 2-takt](#)

M0741-2570XX GEAR OIL 257



Technical basis

US spec:	MIL-PRF-6086 (Grade L)
Equivalent British spec:	DEF STAN 91-112, OEP-30
NATO code:	0-153

Description

Gear oil 257 is a mineral oil with film-enhancing (EP) additives. The property requirements below are based on the MIL specification. DEF STAN requirements vary somewhat.

Viscosity at 37.8 °C:	23-34 mm ² /s
Pour point:	max -40 °C

Principal use

Lubricating oil for gears where high tooth loadings exist, especially at low temperatures.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Nycolube 64](#)

M0741-2580XX GEAR OIL 258



Technical basis

US spec:	MIL-PRF-6086 (Grade M)
Equivalent British spec:	DEF STAN 91-112, OEP-70
Equivalent French spec:	DCSEA 255/A
NATO code:	0-155

Description

Gear oil 258 is a mineral oil with film-enhancing (EP) additives. The property requirements below are based on the MIL specification. DEF STAN requirements vary somewhat.

Viscosity at 37.8 °C:	60-82 mm ² /s
Pour point:	-28.9 °C

Principal use

Lubricating oil for heavily loaded enclosed gears.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[AeroShell Fluid 5 M-A](#)

M0741-2628XX TRANSMISSION OIL MP 80

Technical basis

The oil must meet the functional requirements for SAE 80W-90 and API GL-5.

Description

Transmission oil MP 80 is a highly refined mineral oil in viscosity class SAE 80W-90 with EP additives that increase the adhesiveness of the oil and the bearing capacity of the oil film.

SAE grade:	80W-90
Viscosity at 100 °C:	13.5-18.5 mm ² /s

Principal use

- Axle gears in vehicles.
- Enclosed toothed and worm gears.
- Some vehicle gearboxes with built-in final drive.
- Gearboxes on some armoured vehicles and construction machinery.
- Chain oil for power saws.

Note

Transmission oil MP 80 is being phased out. Recommended replacement is M0741-8659XX Transmission oil 75W/90.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Fuchs Titan Supergear SAE 80W-90](#)

M0741-2630XX TRANSMISSION OIL 80W/140



Technical basis

The oil must meet the functional requirements for SAE 80W-140 and API GL-5. The oil must also meet the requirements of Scania STO 1:0.

Description

Transmission oil 80W/140 is a hypoid oil consisting of solvent-refined mineral oil containing EP additives and additives that give the oil good oxidation stability.

SAE grade:	80W-140
Viscosity at 100 °C:	24.0-32.5 mm ² /s

Principal use

Lubricating oil for vehicle transmissions, gearboxes, rear axles etc. where a hypoid or GL-5 oil is recommended.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Fuchs GearWay G5 80W-140](#)

[Q8 Axle Oil XG 80W-140](#)

Note

OKQ8 new contractor since October 2019. Fuchs product will be phased out in the storage 2020.

M0741-2633XX TRANSMISSION OIL 75W/140



Technical basis

The oil must meet the functional requirements for SAE 75W-140 and API GL-5. The oil must also meet the requirements of Scania STO 1:0.

Description

Transmission oil 75W/140 is a synthetic transmission oil that contains EP additives.

SAE grade:	75W-140
Viscosity at 100 °C:	24.0-32.5 mm ² /s

Principal use

Transmission oil for vehicle transmissions, manual transmissions, rear axles and hypoid gears.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Fuchs Gearway S5 75W-140](#)

[Q8 Trans XGS 75W-140](#)

Note

OKQ8 new contractor since October 2019. Fuchs product will be phased out in the storage 2020.

M0741-2642XX TRANSMISSION OIL WB



Technical basis

The oil must meet the functional requirements for API GL-4 and WB 101. The oil must also fulfil the requirements for the properties listed in the description.

Description

Transmission oil WB is a HTF (hydraulic transmission fluid). It contains additives that give the oil good protection against wear and corrosion and good oxidation stability.

Viscosity at 100 °C:	min 9 mm ² /s
Viscosity at -18 °C:	approx. 3 900 mPa s
Pour point:	max -36 °C

Principal use

For machinery intended for use in axles equipped with wet brakes where a transmission oil according to Cat TO-2 is specified.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Fuchs Titan Transway WB](#)

[Q8 T 2200](#)

Note

OKQ8 new contractor since October 2019. Fuchs product will be phased out in the storage 2020.

M0741-2680XX TURBINE OIL 68

Technical basis

The oil must meet the requirements listed in the description.

Description

Turbine oil 68 is a mineral oil based lubricating oil with additives to counter oxidation, foaming and corrosion. It is in viscosity class ISO VG 68.

Viscosity at 40 °C:	61.2-74.8 mm ² /s
Viscosity at 100 °C:	min 7.5 mm ² /s
Pour point:	max -9 °C
Flash point:	min 220 °C

Principal use

Lubrication of bearings and gears in turbines, compressors etc. and as hydraulic and governor oil where oil of viscosity class ISO VG 68 is specified.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Fuchs Turbway 68](#)

[Q8 van Gogh EP 68](#)

Note

OKQ8 new contractor since October 2019. Fuchs product will be phased out in the storage 2020.

M0741-2701XX TRANSMISSION OIL A



Technical basis

The oil must meet the requirements listed in the description.

Description

Transmission oil A is a so-called ATF oil (Automatic Transmission Fluid). It is a mineral oil with additives that improve oxidation stability, thermal stability, lubrication performance and the effect of temperature on viscosity. The oil meets the functional requirements for Dexron III, Alison C-4.

Viscosity at 100 °C:	min 7 mm ² /s
Viscosity at -40 °C:	max 18 000 mPa s
Colour:	Red

Principal use

- Hydraulic and lubricating oil in automatic gearboxes.
- Lubricating oil in some manual gearboxes.
- Hydraulic oil in some types of equipment.

Note

Transmission oil A will be phased out. The recommended replacement is M0741-8711XX Transmission oil AS.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Fuchs Titan ATF 4000](#)

[Q8 Auto 15](#)

Note

OKQ8 new contractor since October 2019. Fuchs product will be phased out in the storage 2020.

M0741-3910XX SILICONE OIL 391

Technical basis

No applicable standard.

Description

Silicone oil 391 is a silicone based oil in spray can without solvents.

Principal use

Silicone oil 391 can be used on various types of thermoplastics such as PVC, polyamides and thermosetting plastics like epoxy resin.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Korasilon M](#)

M0741-5360XX CUTTING OIL 536

Technical basis

No applicable standard.

Description

Cutting oil 536 is a completely synthetic cutting fluid made up of a combination of anionic additives, polar non-ionic lubricant and film-forming components.

pH concentrate:	9.3
pH in 3% solution:	8.7-9.0
Sulphur content, % by weight:	0

Principal use

Threading, reaming, sawing, milling, turning, drilling, etc.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Cargo Oil Tech Cool](#)

M0741-5731XX CUTTING OIL (To be withdrawn)

Technical basis

No applicable standard.

Description

Cutting oil M0741-5731XX is an ester based cutting oil free from chlorine, sulfur and phosphorus. It has very high lubrication performance and a particular odour.

Principal use

For demanding cutting processes on all grades of steel, as well as titanium, copper, aluminium and their alloys. Also recommended for plastic processing.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Fuchs CutWay Bio 250](#)

M0741-8111XX SAW CHAIN OIL

Technical basis

The oil must meet the requirements listed in the description.

Description

Saw chain oil, M0741-8111XX, is a mineral based saw chain oil according to ISO 6743 category L-AC. The Swedish Armed Forces has chosen a mineral based saw chain oil due to the poor long-term stability of environmentally friendly saw chain oils.

ISO VG:	100
Viscosity at 40 °C:	90.0-110.0 mm ² /s

Principal use

Lubrication of saw chains on forestry machines and chain saws.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Fuchs Planto Chainway Bio](#)

M0741-8250XX PNEUMATIC TOOL OIL 825

Technical basis

Defence standard: FSD 8118

Description

Pneumatic tool oil 825 is a mineral oil with additives that improve corrosion protection and film strength and prevent ice formation in pneumatic tools. It also contains additives to reduce the effect of temperature on viscosity (VI improvers), giving a very high viscosity index.

Viscosity at 40 °C: min 34 mm²/s
Viscosity at -40 °C: max 1 000 mm²/s
Pour point: max -48 °C

Principal use

Lubrication of pneumatic tools and as a pressure medium in hydraulic systems in mine drilling equipment.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Fuchs RockWay U](#)

M0741-8370XX ENGINE OIL SAE 30



Technical basis

No applicable standard, but the oil must meet the functional requirements for Wärtsilä engines (Nohab F, WN25).

Description

Engine oil SAE 30 is a marine diesel engine oil.

SAE grade:	30
Viscosity at 100 °C:	9.3-12.5 mm ² /s

Principal use

Marine diesel engine oil that is used on ships, primarily HMS Carlskrona. Specially developed for engines that run on low sulphur marine diesel and that operate in tough conditions as well as applications with low load under long periods.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Fuchs MarWay 1030](#)

[Q8 Mozart TM 30 SAE 30](#)

Note

OKQ8 new contractor since October 2019. Fuchs product will be phased out in the storage 2020.

M0741-8400XX ENGINE OIL 0W/30



Technical basis

The oil must meet the functional requirements for SAE 0W-30 and ACEA A5/B5.

Description

Engine oil 0W/30 is a mixture of highly refined mineral oils and additives.

SAE grade:	0W-30
Viscosity at 100 °C:	9.3-12.5 mm ² /s
Lowest pumpable temperature:	max -40 °C
HTHS:	min 2.9 mPa s

Principal use

For cars and light trucks with petrol or diesel engines with a requirement for lower fuel consumption. Recommended for the latest Volvo engines, amongst others.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Fuchs Titan Supersyn FE SAE 0W-30](#)

M0741-8402XX ENGINE OIL 0W/20



Technical basis

No applicable standard. The oil fulfils the functional requirements for Volvo VEA engines from 2016 onwards.

Description

Engine oil 0W/20 is a low viscosity engine oil.

SAE grade:	0W-20
Viscosity at 100 °C:	6.9-9.3 mm ² /s
Lowest pumpable temperature:	max -40 °C
HTHS:	min 2.6 mPa s

Principal use

There are new requirements for engine oils for new Volvo VEA engines from 2016 onwards. For this generation of engines Volvo has gone over to a 0W-20 with a new specification. This oil is only intended for the new generation of engines from Volvo and is not compatible with older models where 0W-30 is specified.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Fuchs Titan GT1 PRO V SAE 0W-20](#)

[Q8 Formula Ultra V 0W-20](#)

Note

OKQ8 new contractor since October 2019. Fuchs product will be phased out in the storage 2020.

M0741-8405XX ENGINE OIL 5W/30 SY



Technical basis

The oil must meet the functional requirements for SAE 5W-30 and ACEA C3. Additionally, the oil must meet the requirements in the vehicle manufacturer specifications VW 504.00, VW 507.00 and should meet the requirements for MB 229.51.

Description

Engine oil 5W/30 SY is a synthetic 'longlife' engine oil that is primarily used in cars and light trucks with petrol and small diesel engines.

SAE grade:	5W-30
Viscosity at 100 °C:	9.3-12.5 mm ² /s

Principal use

For cars and light trucks with petrol or diesel engines with a requirement for ACEA C3 with additive pack to prolong the service life of the catalytic converter and particulate filter.

Not suitable for heavy duty diesel engines.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Fuchs Titan GT1 PRO C-3 SAE 5W-30](#)

[Q8 Formula VX Long Life 5W-30](#)

Note

OKQ8 new contractor since October 2019. Fuchs product will be phased out in the storage 2020.

M0741-8408XX ENGINE OIL 5W/30



Technical basis

The oil must meet the functional requirements for SAE 5W-30 and ACEA E7. In add and Volvo VDS 3 (Volvo Drain Specification) and MAN M 3677.

Description

Engine oil 5W/30 is a SAE 5W-30 oil with a tougher low temperature viscosity requirement, which allows it to be used at lower temperatures than other standard oils of this type. The oil is developed for use with extended oil change intervals.

Viscosity at 100 °C:	9.3-12.5 mm ² /s
Lowest pumpable temperature:	max -35 °C
Pour point:	max -48 °C
TBN:	min 10.0 mg KOH/g

Principal use

Year round lubrication of diesel and otto engines, some gearboxes in vehicles and artillery pieces etc. Engine oil 5W/30 is the oil recommended as the first choice for the Swedish Armed Forces diesel-powered off-road equipment.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Fuchs Titan Cargo SL SAE 5W-30](#)

[Q8 Formula Truck 8700 FE 5W-30](#)

Note

OKQ8 new contractor since October 2019. Fuchs product will be phased out in the storage 2020.

M0741-8409XX ENGINE OIL 5W/40



Technical basis

The oil must meet the functional requirements for SAE 5W-40 and ACEA A3/B4. The engine oil must also meet the requirements for Mercedes MB 229.5 and Volkswagen VW 502.00 and VW 505.00.

Description

Engine oil 5W/40 is a fully synthetic engine oil.

SAE grade:	5W-40
Viscosity at 100 °C:	12.5-16.3 mm ² /s
Lowest pumpable temperature:	max -35 °C

Principal use

For heavy duty diesel engines Euro 4 and Euro 5 without diesel particle filter (DPF).

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Fuchs Titan Supersyn Longlife SAE 5W-40](#)

[Q8 Formula Excel Long Life 5W-40](#)

Note

OKQ8 new contractor since October 2019. Fuchs product will be phased out in the storage 2020.

M0741-8430XX INSTRUMENT OIL 843

Technical basis

US spec:	MIL-PRF-6085
Equivalent British spec:	DEF STAN 91-49, OX-14
Equivalent French spec:	AIR 3511
NATO code:	O-147
SAAB code:	7115-02

Description

Instrument oil 843 is a synthetic diester type oil with additives that improve oxidation stability and corrosion protection. Like all synthetic oils of this type, it has an adverse effect on some organic materials such as natural rubber, chloroprene and PVC, so it can only be used in systems where this has been taken into account.

Viscosity at 54 °C:	min 8 mm ² /s
Viscosity at -54 °C:	max 12 000 mm ² /s
Pour point:	max -57 °C
Flash point:	min 185 °C

Principal use

Lubrication of instruments at both low and high temperatures.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

| [AeroShell Fluid 12](#)

M0741-8440XX PROTECTIVE OIL 844 (To be withdrawn)

Technical basis

No applicable standard.

Description

Protective oil 844 is a synthetic oil of a less common type. It is water-repellent, provides good corrosion protection and has good lubricating properties.

The product is supplied in a pressurised spray can (non-aerosol) and in this form it is suitable for corrosion protection and lubrication of smaller parts, especially of steel, that are exposed to water.

Viscosity at 40 °C: approx. 20 mm²/s

Pour point: max -60 °C

Principal use

Lubrication and corrosion protection of steel parts.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[E-Z-1 Lubricant](#)

M0741-8461XX LUBRICATING OIL

Technical basis

US spec:	MIL-PRF-16173 (Grade 3, Class 1) MIL-PRF-81309 (Type III)
Equivalent spec:	Airbus TNA 007.10138

Description

Lubricating oil M0741-8461XX is an oil-reinforced, quick acting, deep-penetrating lubricant and protective agent. It forms a lasting oily layer that both lubricates and protects.

Principal use

A deep-penetrating lubricating oil for general use with extra corrosion protection.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

I [LPS 2](#)

M0741-8540XX AIRCRAFT TURBINE OIL 854



Technical basis

US spec:	DOD-PRF-85734
Equivalent British spec:	DEF STAN 91-1000
NATO code:	O-160

Description

Aircraft turbine oil 854 is a synthetic oil of the polyolester type. It can withstand high temperatures and has good lubricating properties in heavily loaded bearings. Like all synthetic oils of this type, it has an adverse effect on some organic materials such as natural rubber, chloroprene and PVC, so it can only be used in systems where this has been taken into account.

Viscosity at 40 °C:	min 23 mm ² /s
Viscosity at 100 °C:	4.9-5.4 mm ² /s
Viscosity at -40 °C:	max 13 000 mm ² /s
Pour point:	min -54 °C
Flash point:	min 246 °C

Principal use

The oil has been developed mainly for helicopters.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[AeroShell Turbine Oil 555](#)

M0741-8560XX AIRCRAFT TURBINE OIL 856



Technical basis

US spec:	MIL-PRF-7808 (Grade 3)
NATO code:	O-148

Description

Aircraft turbine oil is a synthetic oil of the polyolester type. It can withstand high temperatures and has good lubricating properties in heavily loaded bearings. Like all synthetic oils of this type, it has an adverse effect on some organic materials such as natural rubber, chloroprene and PVC, so it can only be used in systems where this is taken into account.

Viscosity at 40 °C:	min 11.5 mm ² /s
Viscosity at 100 °C:	min 3 mm ² /s
Viscosity at -51 °C:	max 17 000 mm ² /s
Flash point:	min 210 °C

Principal use

Lubricating oil with low viscosity suitable for APUs amongst others.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Eastman Turbo Oil 2389](#)

Note

Oil 2389 is the same oil. BP has stopped selling it as a BP product and new batches are produced by Eastman.

M0741-8580XX AIRCRAFT TURBINE OIL 858



Technical basis

US spec:	MIL-PRF-23699 (STD)
NATO code:	O-156

Description

Aircraft turbine oil 858 is a synthetic oil of the polyolester type. It can withstand high temperatures and has good lubricating properties in heavily loaded bearings. Like all synthetic oils of this type, it has an adverse effect on some organic materials.

Viscosity at 40 °C:	min 23 mm ² /s
Viscosity at 100 °C:	4.9-5.4 mm ² /s
Viscosity at -40 °C:	max 13 000 mm ² /s
Pour point:	max -54 °C
Flash point:	min 246 °C

Principal use

The only approved turbine oil for engine type RM15, installed in the SK 60 aircraft.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Mobil Jet Oil II](#)

M0741-8590XX AIRCRAFT TURBINE OIL 859



Technical basis

US spec:	MIL-PRF-23699 (HTS)
NATO code:	O-154

Description

Aircraft Turbine oil 859 is a synthetic oil of the polyolester type with additives that improve thermal stability (HTS). It can withstand high temperatures and has good lubricating properties in heavily loaded bearings. Like all synthetic oils of this type, it has an adverse effect on some organic materials.

Viscosity at 40 °C:	min 23 mm ² /s
Viscosity at 100 °C:	4.9-5.4 mm ² /s
Viscosity at -40 °C:	max 13 000 mm ² /s
Pour point:	max -54 °C
Flash point:	min 246 °C

Principal use

Lubricating oil for turbojet and turboshaft engines where a HTS (High Thermal Stability) oil is specified.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Eastman Turbo Oil 2197](#)

Note

Oil 2197 is the same oil. BP has stopped selling it under the BP code and new batches are produced by Eastman.

M0741-8600XX AIRCRAFT TURBINE OIL 860



Technical basis

US spec:	MIL-PRD-23699 (STD)
Equivalent British spec:	DEF STAN 91-101
NATO code:	O-156
SAAB code:	7136-02

Description

Aircraft turbine oil 860 is a synthetic oil of the polyolester type. It can withstand high temperatures and has good lubricating properties in heavily loaded bearings. Like all synthetic oils of this type, it has an adverse effect on some organic materials such as natural rubber, chloroprene and PVC, so it can only be used in systems where this has been taken into account.

Viscosity at 40 °C:	min 23 mm ² /s
Viscosity at 100 °C:	4.9-5.4 mm ² /s
Viscosity at -40 °C:	max 13 000 mm ² /s
Pour point:	max -54 °C
Flash point:	min 246 °C

Principal use

Lubricating oil for turbojet and turboshaft engines.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Eastman Turbo Oil 2380](#)

Note

Oil 2380 is the same oil. BP has stopped selling it under the BP code and new batches are produced by Eastman.

M0741-8601XX AIRCRAFT TURBINE OIL (To be withdrawn)

Technical basis

US spec:	MIL-PRF-23699 (C/I)
NATO code:	O-152

Description

Aircraft turbine oil M0741-8601XX is a synthetic oil of the polyol ester type. It can withstand high temperatures and has good lubricating properties in heavily loaded bearings. Like all synthetic oils of this type, it has an adverse effect on some organic materials such as natural rubber, chloroprene and PVC, so it can only be used in systems where this has been taken into account. The oil meets the same US military standards as aircraft engine oil, but with an extra corrosion inhibitor (C/I) added.

Viscosity at 40 °C:	min 23 mm ² /s
Viscosity at 100 °C:	4.9-5.4 mm ² /s
Viscosity at -40 °C:	max 13 000 mm ² /s
Pour point:	max -54 °C
Flash point:	min 246 °C

Principal use

This oil is used in the Visby class of ships which require extra corrosion protection. Castrol is about to cease production of this oil, which means that a new oil will have to be approved where this oil is specified.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Castrol Aerojet 5](#)

M0741-8602XX AIRCRAFT TURBINE OIL



Technical basis

US spec:	MIL-PRF-23699 (STD)
NATO code:	O-156

Description

Aircraft turbine oil is a synthetic oil of the polyol ester type. It can withstand high temperatures and has good lubricating properties in heavily loaded bearings. Like all synthetic oils of this type, it has an adverse effect on some organic materials such as natural rubber, chloroprene and PVC, so it can only be used in systems where this is taken into account.

Viscosity at 40 °C:	min 23 mm ² /s
Viscosity at 100 °C:	4.9-5.4 mm ² /s
Viscosity at -40 °C:	max 13 000 mm ² /s
Pour point:	max -54 °C
Flash point:	min 246 °C

Principal use

Lubricating oil for turbo jets and turbo shaft engines and is primarily used in certain Armed Forces helicopters.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Turbonycoil 600](#)

M0741-8659XX TRANSMISSION OIL 75W/90



Technical basis

The oil must meet the functional requirements for SAE 75W-90 and API GL-5. The oil must also meet the specification Scania STO 1:0 and should meet specifications MAN 342 and Volvo 97312.

Description

Transmission oil 75W/90 is a fully synthetic transmission oil with additives to increase the bearing capacity of the oil as well as to effectively prevent wear, surface fatigue and corrosion. The oil has lower viscosity at low temperatures than equivalent mineral oil, so can be used at lower temperatures. The special feature of synthetic oils of this type is also that they give a lower coefficient of friction and hence less friction and better lubrication than mineral oils.

SAE grade:	75W-90
Viscosity at 100 °C:	13.5-18.5 mm ² /s
Viscosity at -40 °C:	max 100 000 mPa s

Principal use

Lubricating oil for axle gears, toothed and worm gears in vehicles.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Fuchs Titan Gearway S5 75W-90](#)

[Q8 Trans XGS 75W-90](#)

Note

OKQ8 new contractor since October 2019. Fuchs product will be phased out in the storage 2020.

M0741-8660XX TRANSMISSION OIL 80W/90



Technical basis

The oil must meet the requirements listed in the description.

Description

Transmission oil 80W/90 is a transmission oil for manual gearboxes and is used where an oil according to API GL-1 is recommended.

SAE grade:	80W-90
Viscosity at -26 °C:	max 150 000 mPa s
Viscosity at 100 °C:	13.5-18.5 mm ² /s

Principal use

Lubricating oil for manual gearboxes in vehicles.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Fuchs GearWay G1 80W-90](#)

M0741-8711XX TRANSMISSION OIL AS



Technical basis

The oil must meet the functional requirements for GM Dexron III, Alison C-4 and Volvo 97431.

Description

Transmission oil AS is a so-called ATF oil (Automatic Transmission Fluid) and contains additives that reduce wear, fatigue and corrosion.

This type of oil has very good oxidation stability and low evaporation. It has good low-temperature properties and a high natural viscosity index, so no VI improvers are needed. It also gives a lower coefficient of friction than mineral oil, which reduces friction loss and wear.

Viscosity at 100 °C:	min 7 mm ² /s
Viscosity at -40 °C:	max 15 000 mPa s

Principal use

- Hydraulic and lubricating oil in automatic gearboxes.
- Lubricating oil in some manual gearboxes.

Note

Synthetic oils of this type can be mixed with mineral oils and behave in the same way in contact with organic materials. They can be used in equipment originally intended for mineral oil.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Fuchs Titan Transway ATF Extra](#)

[Q8 Auto 15 S](#)

Note

OKQ8 new contractor since October 2019. Fuchs product will be phased out in the storage 2020.

M0741-8750XX ENGINE OIL



Technical basis

British spec:	DEF-STAN 91-40/2 (withdrawn)
Equivalent french spec:	AIR 1503/B (type A)
NATO code:	C-615

Description

Engine oil M0741-8750XX is a mineral oil that is used for lubrication and protection in piston engines. The oil has a high viscosity index, good thermal stability and provides good protection against corrosion.

Viscosity index:	97
Viscosity at 40 °C:	228 mm ² /s
Viscosity at 100 °C:	19.5 mm ² /s
Pour point:	-21 °C

Principal use

Lubrication and protection of piston engines.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Total Aeroprotective 219](#)

4. GREASES

Contents

M0743-0060XX GRAPHITE GREASE 006	78
M0743-0071XX GRAPHITE GREASE 0071	79
M0743-0091XX GREASE	80
M0743-0110XX GREASE 011	81
M0743-0140XX SEALING GREASE 014	82
M0743-0160XX BALL-BEARING GREASE 016	83
M0743-0201XX BEARING GREASE 020	84
M0743-0210XX BEARING GREASE 021	85
M0743-0230XX GREASE	86
M0743-0251XX GREASE MP	87
M0743-0254XX GREASE	88
M0743-0800XX EYEPIECE GREASE 080	89
M0743-0810XX SILICONE GREASE 081	90
M0743-0830XX SILICONE GREASE 083	91
M0743-0850XX SILICONE GREASE 085 (To be withdrawn)	92
M0743-0860XX SILICONE GREASE 086	93
M0743-0870XX SILICONE GREASE 087	94
M0743-1070XX GREASE 107	95
M0743-1080XX GREASE 108	96
M0743-1090XX GREASE 109	97
M0743-1180XX GREASE 118	98
M0743-1181XX GREASE 1181	99
M0743-1210XX GREASE 121	100
M0743-1230XX GREASE 123	101
M0743-1231XX GREASE 1231	102
M0743-1310XX GREASE 131	103
M0743-1370XX GREASE 137	104
M0743-1380XX GREASE 138	105
M0743-1390XX GREASE 139	106
M0743-1900XX GREASE 190	107
M0743-2170XX GREASE 217	108
M0743-2180XX GREASE 218 (To be withdrawn)	109
M0743-2190XX GREASE 219	110
M0743-2200XX GREASE 220	111
M0743-2220XX GREASE	112
M0743-2250XX GREASE	113

M0743-0060XX GRAPHITE GREASE 006



Technical basis

British spec:	DEF STAN 91-54, XG-285 (obsolete)
French spec:	DCSEA 355/A (ex- AIR 4206)
NATO code:	G-355

Description

Graphite grease 006 is a saponified mineral grease containing 5% graphite. It contains rust protection additives and antioxidants. Graphite gives good lubrication performance under high or slow loads. At high temperatures it can serve to some extent as a dry lubricant. The grease is not intended for use in roller bearings.

Base oil viscosity at 40 °C:	approx. 40 mm ² /s
Consistency:	NLGI 2
Dropping point:	min 230 °C
Colour:	Black

Principal use

Lubrication of intermittently working sliding surfaces under high pressure at low speeds.

Temperature range

-40 °C – +120 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[NYCO Grease GN 06](#)

M0743-0071XX GRAPHITE GREASE 0071



Technical basis

US spec:	SAE-AMS-2518
Equivalent British spec:	DEF STAN 80-80, ZX-13
Equivalent French spec:	AIR 4247/A
NATO code:	S-720
SAAB code:	1186-08

Description

Graphite grease 0071 comprises equal parts vaseline and finely ground graphite. It is intended as an anti-seizing agent and is not really a grease.

Consistency:	NLGI 3-4
Colour:	Black

Principal use

- Bolted joints on vehicles.
- Anti-seizing paste for hot applications.
- Spark plug threads.

The product is the same as graphite grease 007, which is no longer stocked as the manufacturer has ceased production. For some aircraft graphite grease 007 is specified in the lubrication plan, while graphite grease 0071 is specified for others.

Note

When changing the product, check that the change is approved for use in e.g. the aircraft.

Temperature range

Up to +500 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[NYCO Grease GN GA 47](#)

M0743-0091XX GREASE

Technical basis

No available standard.

Description

Grease M0743-0091XX is a calcium-saponified mineral oil grease for applications where good water resistance is required.

Base oil viscosity at 40 °C:	approx. 135 mm ² /s
Consistency:	NLGI 1
Melting point:	88 °C
Colour:	Beige

Principal use

Grease M0743-0091XX is a universal lubricating grease.

Temperature range

Up to +77 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Lubriplate 130 AA](#)

M0743-0110XX GREASE 011

Technical basis

SAAB standard: STD 1183-09

Description

Grease 011 is a clay-thickened mineral grease. Grease of this type can generally withstand high temperatures for short periods because the bentonite clay does not melt. It provides limited protection against corrosion of steel.

Base oil viscosity at 40 °C: approx. 472 mm²/s

Consistency: NLGI 3

Dropping point: min 232 °C

Colour: Amber/yellow

Principal use

Lubrication of spline joints.

Temperature range

-30 °C – +175 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Plastilube no 3](#)

M0743-0140XX SEALING GREASE 014

Technical basis

US spec:	SAE-AMS-G-6032 (Type I)
NATO code:	G-363
SAAB code:	1189-09

Description

Sealing grease 014 is a fuel and oil resistant grease. It does not affect natural rubber. Note that Aeroshell Grease S.7108 has been withdrawn from the supplier's product range. SAAB has qualified a new product EZ Turn Lubricant and this grease fulfils the requirements according to SAAB 1189-09.

Consistency:	NLGI 3
Colour:	Yellow

Principal use

- Sealing agent in fuel systems.
- Lubricating oil for valves and other parts in fuel systems.
- Lubrication of metal-rubber sliding surfaces.

Temperature range

-40 °C – +100 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[EZ Turn Lubricant](#)

M0743-0160XX BALL-BEARING GREASE 016

Technical basis

US spec:	MIL-G-25537
Equivalent British spec:	DEF STAN 91-51, XG-284
NATO code:	G-366

Description

Ball-bearing grease 016 is a calcium-saponified mineral grease with good lubricating properties in applications exposed to damp and vibration

Base oil viscosity at 40 °C:	approx. 12.5 mm ² /s
Consistency:	NLGI 2
Dropping point:	min 140 °C
Colour:	Yellowish-brown

Principal use

Grease for rotor bearings in helicopters.

Temperature range

-54 °C – +71 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

| [AeroShell Grease 14](#)

M0743-0201XX BEARING GREASE 020



Technical basis

Defence standard:	FSD 8202
Civil spec:	ISO 6743: L-XEBIB2
	DIN 51502: KP2E-50

Description

Bearing grease 020 is a lithium-saponified mineral oil-based grease.

It contains anti-rust and EP additives. The base oil is of low viscosity, which means that the grease should mainly be seen as low-temperature and instrument grease. It has good rust protection properties.

Base oil viscosity at 40 °C:	approx. 9 mm ² /s
Consistency:	NLGI 2
Dropping point:	min 170 °C
Colour:	Pale yellow

Principal use

Lubrication of sliding bearings, lightly loaded roller bearings and some toothed gears in e.g. artillery pieces.

Temperature range

-50 °C – +90 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Acinol 112 EPLT](#)

M0743-0210XX BEARING GREASE 021



Technical basis

Civil spec:	ISO 12924: L-XD(F)DIB2
	DIN 51502: KPHC2N-40
Defence standard:	FSD 8214

Description

Bearing grease 021 is a lithium-saponified synthetic oil grease containing anti-rust and EP additives. It can be used to fill grease-once roller bearings and vibrating components under heavy loads. It can also be used in wet environments.

Base oil viscosity at 40 °C:	approx. 220 mm ² /s
Consistency:	NLGI 2
Dropping point:	min 260 °C
Colour:	Pale brown

Principal use

Basically the same as Grease MP but for applications where molybdenum disulphide is not desirable. Universal grease for wheel bearing and chassis lubrication in vehicles.

- Lubrication of some nautical equipment not directly exposed to water.
- Some weapons equipment.

Note

Bearing grease 021 has replaced Grease MP U MOL, M0743-0250XX. The supplier of bearing grease 021 has been replaced the product LGEP2 with 652 EPB, which have much better characteristics (temperature) and is also an excellent chassis grease. Both products are compatible and no extra measures are required.

Temperature range

-40 °C – +150 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Axellence 652 EPB](#)

M0743-0230XX GREASE



Technical basis

No applicable standard.

Description

Grease M0743-0230XX is a lithium thickened mineral oil grease for general purpose applications. It is an EP/AW grease with good water resistance. It contains rust prevention and anti-oxidation additives.

Base oil viscosity at 40 °C:	approx. 135 mm ² /s
Consistency:	NLGI 1
Dropping point:	approx. 190 °C
Colour:	Off-white

Principal use

Grease M0743-0230XX is a universal lubricant.

Temperature range

-15 °C – +132 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Lubriplate 630 AA](#)

M0743-0251XX GREASE MP



Technical basis

Civil spec:	ISO 6743: L-XCCIB2
	DIN 51502: KPF2K-30
Defence standard:	FSD 8201

Description

Grease MP is a lithium-saponified mineral oil-based grease. Along with other film-enhancing additives, it also contains 3% molybdenum disulphide, which helps the film to withstand very high pressures and shocks. The grease has good rust protection properties and good adhesion.

Base oil viscosity at 40 °C:	approx. 110 mm ² /s
Consistency:	NLGI 2
Dropping point:	min 170 °C
Colour:	Black

Principal use

- Universal grease for wheel bearing and chassis lubrication in vehicles.
- Lubrication of some nautical equipment not directly exposed to water.
- Some weapons equipment.

Note

The grease used to be available in a variant without molybdenum disulphide under the name M0743-0250XX Grease MP W/O MOL. Where this is specified, it should be replaced with Bearing Grease 021, M0743-0210XX or Grease M0743-2220XX.

Temperature range

-30 °C – +120 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Acinol 142 EPM3](#)

M0743-0254XX GREASE



Technical basis

No applicable standard.

Description

Grease M0743-0254XX is mineral oil-based with lithium soap as a thickener. It contains an EP additive consisting of 3% molybdenum disulphide in combination with other EP-improving additives.

Base oil viscosity at 40 °C:	approx. 114 mm ² /s
Consistency:	NLGI 2
Dropping point:	min 175 °C
Colour:	Black

Principal use

Grease with solid lubricant for metal/metal combinations, slow and sudden movements of roller and sliding bearings. The grease is used in Helicopter 15.

Temperature range

-30 °C – +130 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Dow Corning Molykote BR2 Plus](#)

M0743-0800XX EYEPIECE GREASE 080

Technical basis

Defence standard: FSD 8207

Description

Eyepiece grease 080 is a lithium-saponified silicone grease. It has good water-repellent, sealing and corrosion protection properties.

Consistency: NLGI 3-4
Dropping point: min 220 °C
Colour: White/light grey

Principal use

Lubrication of threads in oculars.

Temperature range

-40 °C – +120 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Dow Corning High-Vacuum Grease](#)

M0743-0810XX SILICONE GREASE 081

Technical basis

No applicable standard.

Description

Silicone grease 081 consists of silicone oil with an inorganic thickener. Resistant to water and most chemicals. Does not affect rubber or plastic. Food-grade lubricant and sealant for valves.

Consistency:	NLGI 4
Colour:	White/light grey

Principal use

Silicone grease for rubber and plastic parts such as gaskets, O-rings and sealing strips. Not for use in applications with oxygen.

Temperature range

-40 °C – +200 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Dow Corning Molykote 111 Compound](#)

M0743-0830XX SILICONE GREASE 083

Technical basis

British spec:	DEF STAN 91-56, XG-315
NATO code:	G-394
SAAB code:	7195-07

Description

Silicone grease 083 is a lithium-saponified silicone grease based on phenyl methyl silicone oil. It can be used at both very high and very low temperatures. It has good mechanical and thermal stability, is water repellent and gives good corrosion protection. Like all silicone lubricants, it has limited lubricating capability, so should only be used in applications where its other properties are crucial.

Consistency:	NLGI 2
Base oil viscosity at 25 °C:	approx. 100 mm ² /s
Dropping point:	min 200 °C
Colour:	White

Principal use

- Lubrication of some weaponry in the navy.
- Lubrication of lightly loaded small roller bearings.
- Lubrication of metal against rubber in pneumatic systems - not silicone rubber.

Temperature range

-73 °C – +180 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Dow Corning Molykote 33 Medium Bearing Grease](#)

M0743-0850XX SILICONE GREASE 085 (To be withdrawn)

Technical basis

No applicable standard.

Description

Lithium-saponified silicone grease with approx. 65% molybdenum disulphide, which improves the poor lubricating performance of the silicone oil. Very good EP characteristics and resistant to flushing with water.

Consistency:	NLGI 2
Base oil viscosity at 25 °C:	approx. 125 mm ² /s
Colour	Grey/black

Principal use

Lightly loaded bearings working at high temperatures, and lubrication of some instrument bearings.

Temperature range

-45 °C – +230 °C (as a paste) or +400 °C (dry).

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Molykote M-77 Solid Lubricant Paste](#)

M0743-0860XX SILICONE GREASE 086

Technical basis

No applicable standard.

Description

Silicone grease 086 is non-hardening silicone paste with high thermal conductivity.

Dropping point: approx. 300 °C

Colour: White

Principal use

Silicone paste for thermally connected transistors and thyristors for refrigeration units.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Dow Corning 340 Heat Sink Compound](#)

M0743-0870XX SILICONE GREASE 087

Technical basis

US spec:	SAE-AMS-G-4343
Joint service designation:	XG 269
NATO code:	G-392
SAAB code:	7196-08

Description

Silicone grease 087 consists of silicone oil diesters thickened with lithium soap. Resistant to oxidation and good corrosion protection properties.

Base oil viscosity at 25 °C:	approx. 100 mm ² /s
Consistency:	NLGI 2
Dropping point:	min 163 °C
Colour:	Off-white

Principal use

Pneumatic grease that prolongs the life of gaskets and prevents damage when fitting and removing.

Temperature range

-65 °C – +175 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Molykote 55 O-Ring Grease](#)

M0743-1070XX GREASE 107

Technical basis

US spec:	MIL-PRF-27617 (Type III)
NATO code:	G-399

Description

Grease 107 is a grease based on synthetic oil of the hydrofluorocarbon type. The thickener is of the teflon type. It is resistant to oxygen, fuel, oils, hydrogen peroxide, ammonia and most solvents.

Base oil viscosity at 40 °C:	approx. 243 mm ² /s
Consistency:	NLGI 2
Dropping point:	None
Colour:	White

Principal use

Lubrication of bearings that come into contact with engine fuel, oxygen, hydrogen peroxide etc.

Note

The product is very like Grease 108 which is covered by the same MIL standard. The difference is that the base oil has higher viscosity, which gives better lubricating performance under heavy loads and vibration stresses, but worse usability at low temperatures. The grease is very expensive.

Temperature range

-34 °C – +288 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[DuPont Krytox 240AC](#)

M0743-1080XX GREASE 108

Technical basis

US spec:	MIL-PRF-27617 (Type II)
NATO code:	G-398
SAAB code:	7158-09

Description

Grease 108 is based on synthetic oil of the hydrofluorocarbon type. The thickener is of the teflon type. It is resistant to oxygen, fuel, oils, hydrogen peroxide, ammonia and most solvents.

Base oil viscosity at 40 °C:	approx. 78 mm ² /s
Consistency:	NLGI 2
Dropping point:	None
Colour:	White

Principal use

Lubrication of bearings that come into contact with engine fuel, oxygen, hydrogen peroxide etc.

Note

The grease is very like Grease 107 which is covered by the same MIL standard. The difference is that the base oil has lower viscosity, which gives better lubricating performance at low temperatures. The grease is very expensive.

Temperature range

-40 °C – +204 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[DuPont Krytox 240AB](#)

M0743-1090XX GREASE 109

Technical basis

SAAB code: 7157-09

Description

Grease 109 consists of synthetic oil of the hydrofluorocarbon type thickened with teflon. It is intended for extreme lubrication conditions such as very high temperatures, the effects of aggressive chemicals and organic solvents. It has good corrosion protection properties.

Base oil viscosity at 40 °C: approx. 400 mm²/s
Consistency: NLGI 2
Dropping point: None
Colour: White

Principal use

Lubrication of roller bearings at very high temperatures and in aggressive environments.

CAUTION!

It cannot be mixed with other types of lubricating oil. Bearings that are to be greased with this must be very thoroughly cleaned of other lubricating oils.

Note

The grease is very expensive.

Temperature range

-40 °C – +260 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Barrierta L55/2](#)

M0743-1180XX GREASE 118

Technical basis

Defence standard:	FSD 8204
SAAB code:	1194-09

Description

Grease 118 is based on a synthetic diester oil thickened with lithium soap. It contains EP additives as well as corrosion protection additives and antioxidants.

It has very good lubrication properties both under heavy loads and at high speeds. It was originally produced as a universal grease for aircraft.

Since the grease contains synthetic oil it has an adverse effect on natural rubber and some polymers, its use is limited to bearings where this has been taken into consideration.

Base oil viscosity at 40 °C:	approx. 15 mm ² /s
Consistency:	NLGI 2
Dropping point:	min 190 °C
Colour:	Yellow

Principal use

- EP universal grease for aviation.
- Instrument lubricant.
- Bearings that need to run freely, especially at low temperatures.
- Lubrication of landing gear, rudders and control parts on aircraft.
- Lubrication of worm gears, toothed gears, chains etc.

CAUTION!

Grease 118 must not be mixed with Grease 121 or Grease 1181. Use the grease as specified in the instructions for the aircraft concerned.

Temperature range

-50 °C – +120 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Isoflex LDS 18 Special A](#)

M0743-1181XX GREASE 1181

Technical basis

US spec:	MIL-PRF-23827 (Type I)
Equivalent British spec:	DEF STAN 91-53
Equivalent French spec:	DSCEA 354/A
NATO code:	G-354
SAAB code:	1194-09

Description

Grease 1181 is based on a synthetic base oil of the diester type thickened with lithium complex soap. The grease contains EP, corrosion protection and oxidation stabilising additives and has good water resistance.

Base oil viscosity at 40 °C:	approx. 13 mm ² /s
Consistency:	NLGI 2
Dropping point:	min 165 °C
Colour:	Brown

Principal use

EP universal grease for aviation.

CAUTION!

Grease 121 and Grease 1181 must not be mixed with Grease 118. Use the grease as specified in the instructions for the aircraft concerned.

Temperature range

-73 °C – +121 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

| [Nyco Grease GN 10](#)

M0743-1210XX GREASE 121



Technical basis

US spec:	MIL-PRF-23827 (Type I)
Equivalent British spec:	DEF STAN 91-53
Equivalent French spec:	DCSEA 354/A
NATO code:	G-354
SAAB code:	7155-01

Description

Grease 121 is based on a synthetic base oil of the diester type thickened with lithium complex soap. The grease contains EP, corrosion protection and oxidation stabilising additives and has good water resistance.

Base oil viscosity at 40 °C:	approx. 14 mm ² /s
Consistency:	NLGI 2
Dropping point:	min 165 °C
Colour:	Green

Principal use

EP universal grease for aviation.

CAUTION!

Grease 121 must not be mixed with Grease 118. Use the grease as specified in the instructions for the aircraft concerned.

Temperature range

-73 °C – +121 °C

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[AeroShell Grease 33](#)

M0743-1230XX GREASE 123



Technical basis

US spec:	MIL-G-21164
Equivalent British spec:	DEF STAN 91-57, XG-276
Equivalent French spec:	DCSEA 353/A
NATO code:	G-353
SAAB code:	7156-01

Description

Grease 123 is based on a synthetic base oil of the diester type thickened with lithium complex soap and 5% molybdenum disulphide (Grease 121 + 5% MoS₂).

The grease contains EP, corrosion protection and oxidation stabilising additives and has good resistance to water.

Base oil viscosity at 40 °C:	approx. 14 mm ² /s
Consistency:	NLGI 2
Dropping point:	min 165 °C
Colour:	Dark grey

Principal use

Lubrication of heavily loaded steel bearing surfaces.

CAUTION!

Both Grease 123 and Grease 119 fulfill MIL-G-21164, but they cannot be mixed as they are of differing composition. Grease 123 consists of lithium complex soap, while GREASE 119 consists of a microgel soap.

Note

Grease 1231 meets the same standards as Grease 123; use the grease specified for the aircraft.

Temperature range

-73 °C – +121 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[AeroShell Grease 64](#)

M0743-1231XX GREASE 1231

Technical basis

US spec:	MIL-G-21164
Equivalent French spec:	DCSEA 353/A
NATO code:	G-353

Description

Grease 1231 is based on a synthetic base oil of the diester type thickened with lithium complex soap and 5% molybdenum disulphide. The grease contains EP, corrosion protection and oxidation stabilising additives and has good resistance to water.

Base oil viscosity at 40 °C:	approx. 14 mm ² /s
Consistency:	NLGI 2
Dropping point:	min 165 °C
Colour:	Brown

Temperature range

-73 °C – +121 °C

Principal use

Note

Grease 1231 meets the same standards as Grease 123; use the grease specified for the aircraft.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Nyco Grease GN 17](#)

M0743-1310XX GREASE 131

Technical basis

No applicable standard.

Description

Grease 131 is based on a synthetic base oil thickened with lithium complex soap and contains polytetrafluoroethylene (PTFE).

Base oil viscosity at 40 °C:	min approx. 11 mm ² /s
Consistency:	NLGI 2
Dropping point:	min 170 °C
Colour:	Beige

Principal use

Lubrication of small bearings for electrical engines and cooling units.

Temperature range

-50 °C – +140 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Berutox LF 20](#)

M0743-1370XX GREASE 137

Technical basis

US spec:	MIL-PRF-81322
Equivalent British spec:	DEF STAN 91-52, XG-293
Equivalent French spec:	DCSEA 395/A
NATO code:	G-395

Description

Grease 137 is based on a synthetic base oil of the type polyalphaolefin thickened with microgel. It contains EP additives as well as corrosion protection and antioxidation agents. Its distinguishing properties are usability at both high and low temperatures, very good lubricating properties even under heavy loads and its long life.

Base oil viscosity at 40 °C:	approx. 30 mm ² /s
Consistency:	NLGI 2
Dropping point:	min 232 °C
Colour:	Amber

Principal use

- Instrument bearings and bearings that have high requirements of running freely.
- Bearings in electric motors.
- Lubrication of wheel bearings on aircraft.
- Lubrication of landing gear, rudders and control parts on aircraft.
- Lubrication of instruments and fragile parts in armoured vehicles and ships.

Temperature range

-54 °C – +177 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[AeroShell Grease 22](#)

M0743-1380XX GREASE 138



Technical basis

US spec	MIL-PRF-81322
NATO code:	G-395
SAAB code:	7154-09

Description

Grease 138 is based on a synthetic base oil of the type polyalphaolefin thickened with an inorganic gel former of the clay type. It contains EP additives as well as corrosion protection and antioxidation agents. Its distinguishing properties are usability at both high and low temperatures, very good lubricating properties even under heavy loads and its long life.

Base oil viscosity at 40 °C:	approx. 30 mm ² /s
Consistency:	NLGI 1.5
Dropping point:	min 232 °C
Colour:	Dark red

Principal use

- Instrument bearings and bearings that have high requirements of running freely.
- Bearings in electric motors.
- Lubrication of wheel bearings on aircraft.
- Lubrication of landing gear, rudders and control parts on aircraft.
- Lubrication of instruments and fragile parts in armoured vehicles and ships.

Temperature range

-54 °C – +177 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

| [Mobilgrease 28](#)

M0743-1390XX GREASE 139

Technical basis

US spec:	MIL-G-81827
SAAB code:	7153-09

Description

Grease 139 is basically Grease 138 with 5% molybdenum disulphide added, which increases its lubrication performance when exposed to vibrations and extremely heavy loads.

The molybdenum disulphide means that the grease should only be used to lubricate steel against steel.

Base oil viscosity at 40 °C:	approx. 30 mm ² /s
Consistency:	NLGI 1.5
Dropping point:	min 232 °C

Principal use

Lubrication of heavily loaded steel surfaces at both low and high temperatures.

Temperature range

-54 °C – +177 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

–

M0743-1900XX GREASE 190

Technical basis

No available standard. The oil shall fulfil the functional requirement for NSN 9150-00-506-8497 and Bell Helicopter 204-040-755-005.

Description

Grease 190 is a lubricating grease with an inorganic thickener for couplings and gears. It contains EP additives, anti-wear additives and corrosion preventatives.

Base oil viscosity at 40 °C:	approx. 30 mm ² /s
Dropping point:	min 260 °C
Colour:	Black

Principal use

Lubricating grease for helicopter 14.

Temperature range

-40 °C – +177 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[NS-3913-G1](#)

M0743-2170XX GREASE 217

Technical basis

Defence standard: FSD 8217

Description

Grease 217 is based on a synthetic oil of the polyalphaolefin type thickened with barium complex soap.

This type of soap gives very good adhesion to metal surfaces, which enhances the good lubrication properties of the base oil - especially under sliding friction - and together with the additives gives very good corrosion protection.

Base oil viscosity at 40 °C: approx. 30 mm²/s

Consistency: NLGI 2

Dropping point: min 240 °C

Colour: White

Principal use

- Lubrication of mechanisms etc. in artillery pieces.
- Lubrication of high-speed roller bearings - particularly conical.
- Long-term lubrication of parts needing good corrosion protection.

Temperature range

-50 °C – +120 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Isoflex Topas NB 52](#)

M0743-2180XX GREASE 218 (To be withdrawn)

Technical basis

Defence standard: FSD 8218

Description

Grease 218 is mineral oil-based with barium complex soap as a thickener. It contains effective corrosion protection additives. It was originally intended for warm climates and marine environments. This type of soap gives very good adhesion to metal surfaces, which together with the additives gives very good corrosion protection and resistance to splashing with water.

Base oil viscosity at 40 °C: approx. 200 mm²/s

Consistency: NLGI 2

Dropping point: min 220 °C

Colour: Light brown

Principal use

Lubrication of weapons parts in marine environments.

Temperature range

-15 °C – +130 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Staburags NBU 12 K](#)

M0743-2190XX GREASE 219

Technical basis

Defence standard: FSD 8219

Description

Grease 219 is mineral oil-based with barium complex soap as a thickener. This is basically the same product as grease 218, but with 3% molybdenum disulphide added, which increases its lubrication performance under heavy loads.

Base oil viscosity at 40 °C: approx. 200 mm²/s

Consistency: NLGI 2

Dropping point: min 220 °C

Colour: Black

Principal use

Lubrication of heavily loaded bearings in a marine environment.

Temperature range

-20 °C – +150 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Staburags NBU 12](#)

M0743-2200XX GREASE 220



Technical basis

Civil spec:	ISO 6743: L-XBCIB2
	DIN 51502: KP2K-20
Defence standard:	FSD 8220

Description

Grease 220 consists of a high-viscosity mineral oil thickened with an anhydrous calcium soap. It is tough and very adhesive, has very good water resistance and gives very good corrosion protection.

The high base oil viscosity in combination with EP additives gives good resistance to vibration stresses in sliding bearing structures and heavily loaded roller bearings at low to normal speeds. Because the calcium soap is anhydrous, the grease can withstand higher temperatures than are normal for calcium saponified greases. The grease is not suitable for fast-moving roller bearings or bearings that need to run freely.

Base oil viscosity at 40 °C:	approx. 1 300 mm ² /s
Consistency:	NLGI 2
Dropping point:	min 125 °C
Colour:	Pale yellow

Principal use

- Heavily loaded sliding and roller bearings at normal speeds. Bearings under heavy shock and vibration stresses. Bearings that need good adhesion.
- Open gears.
- Applications exposed to water.
- Grease points that need extended lubrication intervals.

Temperature range

-20 °C – +120 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[HYCAL 272 WR](#)

M0743-2220XX GREASE

Technical basis

No applicable standard.

Description

Grease M0743-2220XX is based on a synthetic oil of the polyalphaolefin type thickened with lithium soap. It contains anti-rust and EP additives. It can be used to fill grease-once roller bearings and vibrating components under heavy loads.

Base oil viscosity at 40 °C:	approx. 130 mm ² /s
Consistency:	NLGI 2
Dropping point:	min 280 °C
Colour:	Red

Principal use

Grease for wheel bearing and chassis lubrication in vehicles.

Note

The grease can be replaced by Bearing grease 021 M0741-0210XX. The characteristics of Bearing grease 021 have been improved with the product Axellence 652 EPB.

Temperature range

-54 °C – +177 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Amsoil 09-114 GLC Multi Purpose Grease](#)

M0743-2250XX GREASE

Technical basis

US spec:	MIL-PRF-23827 (Type II)
Equivalent British spec:	DEF STAN 91-53
Equivalent French spec:	DCSEA 354

Description

Grease M0743-2250XX is based on a synthetic base oil of the diester type thickened with microgel (type of clay thickener). The grease contains EP, corrosion protection and oxidation stabilising additives and has good resistance to water.

Base oil viscosity at 40 °C:	approx. 10 mm ² /s
Consistency	NLGI 2
Dropping point:	165 °C
Colour:	Pale brown

Principal use

EP universal grease for aviation.

CAUTION!

Note that both Grease M0743-2250XX and Grease 121 M0743-1210XX satisfy MIL-PRF-23827, but they cannot be mixed as they are of differing composition. Grease M0743-2250XX consists of microgel soap, while Grease121 consists of a lithium complex soap. Use the grease as specified in the instructions for the aircraft concerned.

The grease has an adverse effect on certain sealing agents.

Temperature range

-73 °C- +121 °C

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

| [AeroShell Grease 7](#)

5. OTHER LUBRICANTS

Contents

M0744-0050XX LUBRICANT 005	116
M0744-0070XX LUBRICANT 007	117
M0744-0101XX LUBRICANT 010 BIO	118
M0744-0270XX LUBRICANT 027	119
M0744-0280XX LUBRICANT 028	120
M0744-0550XX GREASE 055	121
M0744-0720XX LUBRICANT 072	122
M0744-0731XX LUBRICANT	123
M0744-0750XX SOLID FILM LUBRICANT	124
M0744-0840XX LUBRICANT 084 (To be withdrawn)	125
M0744-0860XX LUBRICANT 086	126
M0744-0870XX LUBRICANT 087	127
M0744-0880XX LUBRICANT 088	128
M0744-0890XX LUBRICANT	129
M0744-0940XX LUBRICANT 094	130
M0744-1010XX LUBRICANT 101	131
M0744-1030XX LUBRICANT	132
M0744-1040XX LUBRICANT 104	133
M0744-1170XX LUBRICANT 117	134
M0744-1171XX LUBRICANT (To be withdrawn)	135
M0744-1520XX LUBRICANT	136
M0744-3040XX LUBRICANT TEF-GEL	137
M0744-3050XX GREASE 305 (To be withdrawn)	138
M0744-3071XX LUBRICANT (To be withdrawn)	139
M0744-8100XX LUBRICANT (To be withdrawn)	140
M0744-8110XX LUBRICANT (To be withdrawn)	141
M0744-8120XX LUBRICANT	142

M0744-0050XX LUBRICANT 005

Technical basis

US spec:	SAR-AMS-M-7866
Equivalent British spec:	DEF STAN 68-62, ZX 35
Equivalent French spec:	AIR 4223
NATO code:	S-740
SAAB code:	2216-01

Description

Lubricant 005 consists of finely ground molybdenum disulphide with a grain size of 4–10 µm.

Principal use

Dry lubrication of heavily loaded steel surfaces where grease or oil cannot be used.

Temperature range

-185 °C – +400 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Dow Corning Molykote Z Powder](#)

M0744-0070XX LUBRICANT 007

Technical basis

SAAB code: 2216-02

Description

Lubricant 007 consists of 60% finely ground molybdenum disulphide suspended in synthetic oil of the polyalkylene glycol type. At temperatures over 200 °C, the oil evaporates and leaves the molybdenum disulphide as a solid lubricant.

Principal use

Lubrication of heavily loaded steel parts at high temperatures.

Temperature range

-40 °C – 400 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

| [Dow Corning Molykote U-n Lubricant Paste](#)

M0744-0101XX LUBRICANT 010 BIO

Technical basis

No applicable standard.

Description

Lubricant 010 Bio is a biodegradable penetrating lubricating oil with teflon based on synthetic base oils. It has a high creep capability, protects against corrosion, and is water, dust and particle-repellent.

Principal use

Creep lubrication, chains, sliding surfaces, wire, rust removal etc.

Temperature range

-55 °C – +253 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Cargo Flow med Teflon](#)

M0744-0270XX LUBRICANT 027

Technical basis

No applicable standard.

Description

Lubricant 027 consists of colloidal graphite dispersed in ethanol. After application the ethanol evaporates and leaves a layer of graphite that acts as a dry lubricant.

CAUTION!

In long-term storage, the graphite tends to sink to the bottom of the pack, so very thorough stirring and shaking is needed.

Principal use

Dry lubricant in some bomb mechanisms, bolted joints etc.

Temperature range

After evaporation of the ethanol, up to 500 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Bonedrite L-GP 580 Acheson](#)

M0744-0280XX LUBRICANT 028

Technical basis

No applicable standard.

Description

Lubricant 028 consists of colloidal graphite in ethanol. The product also contains an organic resin as a film former. After application the ethanol evaporates and leaves a layer of graphite that acts as a dry lubricant.

Principal use

Dry lubricant for some parts of air supply and auxiliary power systems in the JAS 39.

Temperature range

After evaporation of the ethanol, up to 700 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Bonderite L-GP 386 Acheson](#)

M0744-0550XX GREASE 055

Technical basis

British spec:	DEF STAN 80-81, ZX-38
NATO code:	S-722

Description

Grease 055 is an anti-seizing paste consisting of a lithium-saponified grease with a mineral oil base mixed with 50% finely ground molybdenum disulphide.

The product is not intended as a general lubricant and must not be used in roller bearings.

Consistency:	NLGI 2-3
Dropping point:	min 140 °C
Colour:	Black

Principal use

Anti-seizing agent in threaded joints. Parts for aero engine RM 6.

Temperature range

Up to 250 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Nyco Grease GN 67](#)

M0744-0720XX LUBRICANT 072

Technical basis

No applicable standard.

Description

Lubricant 072 is an air-hardening anti-friction varnish containing molybdenum disulphide, either alone or mixed with other solid lubricants, but not graphite.

Principal use

Lubrication and corrosion protection of weapon and engine details, some aircraft parts, tools etc.
Repair varnish for Lubricant 084 (M0744-0840XX).

Temperature range

-200 °C – +310 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Dow Corning Molykote 3402-C LF](#)

M0744-0731XX LUBRICANT

Technical basis

No applicable standard.

Description

Lubricant M0744-0731XX is a bolted joint paste free from lead, copper and sulphur for high temperatures, based on graphite and calcium fluoride.

Principal use

Bolted joints. Not for oxygen.

Temperature range

-29 °C – +1 315 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Loctite 8009](#)

M0744-0750XX SOLID FILM LUBRICANT

Technical basis

SAAB code: 2223-05

Description

Solid Film Lubricant M0744-0750XX is an air-dried solid film lubricant that contains molybdenum disulfide and an epoxy binder system. It is lead-free and hardens at room temperature.

Principal use

Used for higher load carrying applications. Touch up lubricant for surfaces previously painted with solid film lubricant.

Temperature range

-73 °C – +121 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Lubri-Bond K](#)

M0744-0840XX LUBRICANT 084 (To be withdrawn)

Technical basis

SAAB code: 2224-05

Description

Lubricant 084 is a heat-hardening anti-friction varnish containing molybdenum disulphide. It is hardened in two hours at 150 °C or one hour at 200 °C.

The firm lubricant film is hard-wearing and gives good corrosion protection.

Principal use

Dry lubrication of grease-once mechanisms that are rarely in use but are exposed to high surface pressures.

Temperature range

-200 °C – +430 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Dow Corning Molykote 3400 A Thermosetting Anti-Friction Coating](#)

M0744-0860XX LUBRICANT 086

Technical basis

No applicable standard.

Description

Lubricant 086 consisting of approx. 7% fine-grained molybdenum disulphide and 3% graphite suspended in mineral oil thickened with calcium soap.

Principal use

Some weapons equipment and running-in paste for heavily loaded gears and bushings.

Temperature range

-35 °C – +450 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Dow Corning Molykote G-Rapid Plus](#)

M0744-0870XX LUBRICANT 087

Technical basis

No applicable standard.

Description

Lubricant 087 consisting of approx. 8% fine-grained molybdenum disulphide suspended in mineral oil thickened with calcium soap.

Principal use

–

Temperature range

-18 °C – +400 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Dow Corning Molykote G-n Metal Assembly](#)

M0744-0880XX LUBRICANT 088

Technical basis

SAAB code: 2218-06

Description

Lubricant 088 is an air-drying anti-friction varnish containing 6% molybdenum disulphide and 2% graphite that acts as a dry lubricant once it has dried.

Principal use

- Lubricate areas with high surface pressure and/or high temperatures.
- Protection against wear corrosion on bushings.
- Repair varnish for Lubricant 106 (M0747-1060XX).

Temperature range

-180 °C – +250 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Dow Corning Molykote D 321 R Anti-Friction Coating](#)

M0744-0890XX LUBRICANT

Technical basis

No applicable standard.

Description

Lubricant M0744-0890XX is a paste consisting of white coloured solid lubricant finely dispersed in mineral oil. It does not contain molybdenum disulfide.

Consistency: NLGI 2-3

Colour: Off-white

Principal use

Dry lubrication of heavily loaded details.

Temperature range

-25 °C – 250 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Dow Corning Molykote D Paste](#)

M0744-0940XX LUBRICANT 094

Technical basis

No applicable standard.

Description

Lubricant 094 is a paste consisting of white coloured solid lubricant dispersed in a lithium thickened mineral oil. It does not contain molybdenum disulfide.

Colour: Off-white

Principal use

Dry lubrication of highly loaded details.

Temperature range

-25 °C – 125 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Dow Corning Molykote DX Paste](#)

M0744-1010XX LUBRICANT 101

Technical basis

No applicable standard.

Description

Lubricant 101 is a white completely synthetic lubricant.

Principal use

Lubricant for motorcycle chains with or without O- and X-rings.

Temperature range

–

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

| [Castrol Chain Spray O-R](#)

M0744-1030XX LUBRICANT

Technical basis

No applicable standard.

Description

Lubricant M0744-1030XX consists of a waterproof, fully synthetic universal lubricant in an aerosol can.

Principal use

Lubrication of chains, sliders and toothed gears. The oil is food grade.

Temperature range

–

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Cargo Oil Super Stick](#)

M0744-1040XX LUBRICANT 104

Technical basis

US spec:	MIL-PRF-32033 (Type I)
Equivalent British spec:	DEF STAN 91-79, OX-18 (withdrawn)
NATO code:	O-190

Description

Lubricant 104 is a mineral oil based protective lubricating oil. It is water repellent and corrosion inhibiting.

Viscosity at 40 °C:	min 11 mm ² /s
Viscosity at -40 °C:	max 7 000 mm ² /s
Viscosity at -54 °C:	max 60 000 mm ² /s
Flash point:	min 135 °C
Pour point:	max -57 °C

Principal use

Preservative oil for storage of military equipment e.g small arms.

CAUTION!

Lubricant 104 shall not be used for protecting components in contact with fuel. The oil contains carboxylic acid that can react with metals and lead to problems with cold filter plugging.

Temperature range

Down to -40 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

I [Nycolube 30](#)

M0744-1170XX LUBRICANT 117

Technical basis

SAAB code: 7188-05

Description

Lubricant 117 is a synthetic oil of the perfluoropolyether type (PFPE). This type of oil is very resistant to both acids and oxidizing, or otherwise aggressive, chemicals. It can only be dissolved in certain solvents. It is not flammable.

Viscosity at 40 °C: 310-420 mm²/s

Viscosity at 100 °C: 30-40 mm²/s

Principal use

Lubricant for oxygen systems.

Temperature range

-20 °C – +240 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Fomblin YR PFPE Lubricant](#)

M0744-1171XX LUBRICANT (To be withdrawn)

Technical basis

No applicable standard.

Description

Lubricant M0744-1171XX is a light grey paste based on perfluoropolyether (PFPE).

Base oil viscosity at 20 °C:	250 mm ² /s
Penetration:	280-310 mm/10

Principal use

Lubricant for lubrication of QR locks for rescue harnesses.

Temperature range

-40 °C – +220 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Fomblin YNX](#)

M0744-1520XX LUBRICANT

Technical basis

No applicable standard.

Description

Lubricant M0744-1520XX is an electrically conductive paste consisting of a silver/nickel filler dispersed in a silicone oil based grease.

Colour: Beige

Principal use

Applications where an electrically conductive grease is required. Used in helicopter 14.

Temperature range

-55 °C – +200 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[CHO-LUBE E117](#)

M0744-3040XX LUBRICANT TEF-GEL

Technical basis

SAAB code: 1456-01

Description

Lubricant Tef-Gel is a synthetic lubricant that, among other things, consists of approx. 40% polytetrafluoroethylene (PTFE) and a synthetic binder. The lubricant provides a film that protects against contact between e.g. different metals and thereby prevents galvanic corrosion and protects against water.

Principal use

The lubricant can be used around bolts and nuts to prevent galvanic corrosion and on some moving parts and gaskets to, among other things, protect against corrosion and leakage.

Temperature range

-45 °C – +250 °C.

Material safety data sheet (MSDS)

–

Technical data sheet

[Tef-Gel 57 g burk](#)

M0744-3050XX GREASE 305 (To be withdrawn)

Technical basis

No applicable standard.

Description

Grease 305 consists of polytetrafluoroethylene (PTFE) powder and silicone oil, polydimethylsiloxane (PDMS).

Base oil viscosity at 25 °C: 1 000 mm²/s

Consistency: NLGI 2

Colour: White

Principal use

Warning!

Grease 305 must not be exposed to temperatures in excess of +290 °C, as toxic vapours are given off as it breaks down.

CAUTION!

Grease 305 must not be used on surfaces that are to be painted/varnished.

Temperature range

-40 °C – +200 °C

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Fluortek TP55 PTFE Grease](#)

M0744-3071XX LUBRICANT (To be withdrawn)

Technical basis

US spec:	MIL-DTL-25681
Joint service designation:	OX-70
NATO code:	S-1735

Description

Lubricant M0744-3071XX comprises 49-51% molybdenum disulfide (in accordance with AMS-M-7866) dispersed in silicone oil of the type methyl phenyl polysiloxane.

Base oil viscosity at 40 °C:	65-85 mm ² /s
Base oil viscosity at 100 °C:	16-22 mm ² /s
Flash point (base oil):	min 274 °C
Colour:	Black

Principal use

Dry lubrication of details that are used at high temperatures in aircraft turbines.

Temperature range

-7 °C – +400 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Castrol Braycote 868](#)

M0744-8100XX LUBRICANT (To be withdrawn)

Technical basis

No applicable standard.

Description

Lubricant M0744-8100XX is a dry lubricant based on solid lubricants consisting of 15% molybdenum disulphide and 1.5% graphite with an organic fixing agent. Resistant to oil, grease, solvents and many other chemicals.

Principal use

Lubricant for metal/metal sliding surfaces.

Temperature range

-70 °C – +380 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Dow Corning Molykote 7409](#)

M0744-8110XX LUBRICANT (To be withdrawn)

Technical basis

No applicable standard.

Description

Lubricant, M0744-8110XX, is a bolted joint paste for high temperatures based on mineral oil and special solid lubricant.

Consistency: NLGI 1

Principal use

Bolted joint paste.

Temperature range

-30 °C – +1 400 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

| [Dow Corning Molykote P 37](#)

M0744-8120XX LUBRICANT

Technical basis

No applicable standard.

Description

Lubricant M0744-8120XX is a bolted joint paste for high temperatures based on a mineral oil, thickener, solid lubricant and metal powder (copper).

Principal use

Bolted joint paste.

CAUTION!

Not to be used for equipment that comes into contact with fuel because copper can have an adverse effect on fuel.

Temperature range

-30 °C – +650 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

| [Dow Corning Molykote 1000](#)

6. CORROSION PROTECTION AND OTHER PRODUCTS

Contents

M0722-0020XX ANTI-CORROSION ADDITIVE (To be withdrawn)	144
M0722-0021XX ANTI-CORROSION FLUID 0021	145
M0722-0200XX ANTI-CORROSION OIL 020	146
M0722-0350XX ANTI-CORROSION FLUID 035	147
M0722-0360XX ANTI-CORROSION FLUID 036	148
M0722-0460XX ANTI-CORROSION FLUID 046 (To be withdrawn)	149
M0722-0481XX ANTI-CORROSION FLUID 0481	150
M0722-0482XX ANTI-CORROSION FLUID 0482	151
M0722-0483XX ANTI-CORROSION FLUID	152
M0722-0510XX ANTI-CORROSION FLUID 051	153
M0722-0570XX ANTI-CORROSION FLUID 057	154
M0722-0590XX ANTI-CORROSION FLUID 059	155
M0722-0610XX ANTI-CORROSION FLUID 061	156
M0722-0660XX ANTI-CORROSION FLUID 066	157
M0722-0880XX ANTI-CORROSION FLUID 088	158
M0722-1020XX CLEANING OIL CLP	159
M0722-1030XX LUBRICATION OIL SMX	160
M0722-1250XX VASELINE 125	161
M0722-1271XX VASELINE 127 (To be withdrawn)	162
M0722-2020XX ANTI-CORROSION FLUID 202	163
M0722-2030XX ANTI-CORROSION FLUID 203	164
M0722-2510XX ANTI-CORROSION FLUID 251	165
M0722-2520XX ANTI-CORROSION FLUID 252	166
M0722-2550XX ANTI-CORROSION FLUID 255	167
M0722-2570XX ANTI-CORROSION FLUID 257	168
M0722-2910XX CONTACT FLUID 291	169
M0722-2940XX CONTACT FLUID	170
M0722-2951XX CONTACT GREASE	171
M0722-2970XX ANTI-CORROSION SPRAY 297	172
M0729-3010XX SILICONE PASTE 301	173
M0729-4030XX COPPER PASTE	174
M0746-0670XX TRANSFORMER OIL 067 (To be withdrawn)	175
M0746-5100XX CALIBRATION FLUID 510 (To be withdrawn)	176

M0722-0020XX ANTI-CORROSION ADDITIVE (To be withdrawn)

Technical basis

The product shall meet the functional requirements for GE D50TF6-S1.

Description

Anti-corrosion additive M0722-0020XX consists of synthetic oil with an anti-corrosion agent. It is added to aircraft turbine oil when equipment is put into storage.

Viscosity at 38 °C:	40-48 mm ² /s
Flash point:	min 218 °C
Pour point:	max -51 °C
Colour:	Dark amber

Principal use

An anti-corrosion additive that is used when turbine engines and helicopter transmissions are put into storage. The additive is added to aircraft turbine oils which meet the specification MIL-PRF-23699.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Castrol Brayco 599](#)

M0722-0021XX ANTI-CORROSION FLUID 0021

Technical basis

US spec:	MIL-PRF-8188
NATO code:	C-638

Description

Anti-corrosion fluid 0021 is a synthetic ester-based fluid that may have an adverse effect on certain paints and elastomers.

Viscosity at 40 °C:	min 11.5 mm ² /s
Viscosity at 100 °C:	min 3.25 mm ² /s
Flash point:	min 210 °C

Principal use

Corrosion preventative oil for turboprop and turbojet engines or for engines that require a MIL-PRF-7808 engine oil e.g. aircraft turbine oil 856. Use when specified in the maintenance instructions.

Temperature range

-54 °C – +149 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

| [Brayco 589](#)

M0722-0200XX ANTI-CORROSION OIL 020

Technical basis

US spec:	MIL-PRF-21260 (SAE 30)
NATO code:	C-642

Description

Anti-corrosion oil 020 is a corrosion preventative engine oil which forms a thin oil film.

SAE grade:	30
API class:	CH-4
Viscosity at 100 °C:	9.34-12.5 mm ² /s
Viscosity index:	min 80
Film thickness:	approx. 10 µm
Lowest pumping temperature:	max -18 °C

Principal use

Use when specified in the maintenance instructions.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Tectyl 930](#)

M0722-0350XX ANTI-CORROSION FLUID 035

Technical basis

No applicable standard.

Description

Anti-corrosion fluid 035 consists of a wax/asphalt base which forms a thick, black film which provides a moisture-repellent film that protects against corrosion.

Film thickness: approx. 250 µm

Principal use

Anti-corrosion fluid 035 can be used as corrosion protection for, among other things, the underside of vehicles where this product is specified in the maintenance instructions.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Tectyl Bodysafe Spray](#)

M0722-0360XX ANTI-CORROSION FLUID 036

Technical basis

No applicable standard.

Description

Anti-corrosion fluid 036 is an all-round service spray consisting of mineral oil and naphtha in an aerosol can.

Principal use

An all-round service spray that acts as a rust remover, water displacer and corrosion protection agent and has a lubricating effect. The spray can be used for simpler maintenance jobs.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[WD-40](#)

M0722-0460XX ANTI-CORROSION FLUID 046 (To be withdrawn)

Technical basis

US spec:	MIL-PRF-6083
Equivalent British spec:	DEF STAN 80-142 (obsolete)
Equivalent French spec:	DSCEA 535a
NATO code:	C-635

Description

Anti-corrosion fluid 046 is a low-viscosity mineral oil-based hydraulic fluid. It contains additives that improve oxidation stability, protect against corrosion and prevent wear.

For ease of identification it is red coloured.

Viscosity at -40 °C:	min 700 mm ² /s
Viscosity at 40 °C:	min 13.2 mm ² /s
Viscosity at 100 °C:	min 4.6 mm ² /s
Pour point:	max -59 °C

Principal use

Used when storing hydraulic equipment or for other specified applications.

Temperature range

-54 °C – +135 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[AeroShell Fluid 71](#)

M0722-0481XX ANTI-CORROSION FLUID 0481

Technical basis

US spec: MIL-PRF-16173 (Grade 2)

Description

Anti-corrosion fluid 0481 forms a soft wax-like film that is water repellent and protects against corrosion.

Film thickness: max 50 µm

Sprayable temperature: 5 °C

Flash point: min 38 °C

Principal use

Used when specified in maintenance instructions.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Tectyl 502-C](#)

M0722-0482XX ANTI-CORROSION FLUID 0482

Technical basis

US spec: MIL-PRF-16173 (Grade 4)

Description

Anti-corrosion fluid 0482 forms a soft wax-like film that is water repellent and protects against corrosion.

Film thickness: max 50 µm

Sprayable temperature: 5 °C

Flash point: min 38 °C

Principal use

Used when specified in maintenance instructions.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

I [Tectyl 846](#)

M0722-0483XX ANTI-CORROSION FLUID

Technical basis

US spec: MIL-PRF-16173 (Grade 1)

Description

Anti-corrosion fluid M0722-0483XX forms a wax-like film that is water repellent and protects against corrosion.

Film thickness:	max 100 µm
Sprayable temperature:	5 °C
Flash point:	min 38 °C
Viscosity at 23 °C:	600-5 000 mPa s

Principal use

Used when specified in maintenance instructions.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Cortec VpCI-368](#)

M0722-0510XX ANTI-CORROSION FLUID 051

Technical basis

US spec:	MIL-C-11796 (Class 3) (Inactive for new design)
Equivalent British spec:	DEF STAN 80-85, PX-11 (Withdrawn)
Equivalent French spec:	AIR 8136 (Obsolete)
NATO code:	C-628 (Obsolete)

Description

Anti-corrosion fluid 051 consists of a mixture of 90% petroleum jelly and 10% beeswax. It forms a relatively hard, grease-like layer with a higher melting point than 100% petroleum jelly.

Consistency:	NLGI 3
Melting point:	min 57 °C
Flash point:	min 177 °C

Principal use

Corrosion protection for metal components e.g. piston assemblies, anti-friction bearings, chains and other small parts under temperate and tropical conditions. It is applied by dipping the components in melted material.

Note

Remove the product from components before use to ensure cleanliness.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[AeroShell Compound 05](#)

M0722-0570XX ANTI-CORROSION FLUID 057

Technical basis

No applicable standard.

Description

Anti-corrosion fluid 057 forms a waxy moisture-repellent film that protects against corrosion.

Film thickness: approx. 50 µm

Principal use

Anti-corrosion fluid 057 can be used as rust protection on cars, boats, tools, equipment and other iron and steel objects that are stored or transported where this product is specified in the maintenance instructions.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Dinitrol Rostskydd 77B](#)

[Tectyl 506-WD](#)

M0722-0590XX ANTI-CORROSION FLUID 059

Technical basis

No applicable standard.

Description

Anti-corrosion fluid 059 forms a waxy moisture-repellent film that protects against corrosion.

Film thickness: approx. 40 µm

Principal use

Anti-corrosion fluid can be used for areas of the aircraft that are exposed to elevated temperatures where this product is specified in the maintenance instructions.

Temperature range

Withstands temperatures up to 150 °C. Can also withstand up to 210 °C for short periods.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Ardrox AV 40](#)

M0722-0610XX ANTI-CORROSION FLUID 061

Technical basis

US spec: MIL-PRF-16173 (Grade 5)

Description

Anti-corrosion fluid 061 forms a waxy moisture-repellent film that protects against corrosion.

Film thickness: max 25 µm

Flash point: min 38 °C

Principal use

Anti-corrosion fluid can be used as corrosion protection during transport and indoors for storage of parts where this product is specified in the maintenance instructions.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Tectyl 511-M](#)

M0722-0660XX ANTI-CORROSION FLUID 066

Technical basis

No applicable standard.

Description

Anti-corrosion fluid 066 forms a wax-like film that is water repellent and protects against corrosion.

Film thickness:	approx. 30-50 µm
Flashpoint:	38 °C
Density:	870-910 kg/m ³ at 23 °C

Principal use

Anti-corrosion fluid can be used on painted and unpainted aircraft where this product is specified in the maintenance instructions.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Ardrox AV 30](#)

M0722-0880XX ANTI-CORROSION FLUID 088

Technical basis

No applicable standard.

Description

Anti-corrosion fluid 088 forms a waxy moisture-repellent film that protects against corrosion.

Film thickness: approx. 25-50 µm

Principal use

Anti-corrosion fluid 088 can be used for painted and unpainted areas of the aircraft where this product is specified in the maintenance instructions.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Ardrox AV 25](#)

M0722-1020XX CLEANING OIL CLP



Technical basis

Swedish defence standard:	FSD 7717
Equivalent US spec:	MIL-PRF-63460
NATO code:	S-758

Description

Cleaning oil CLP consists of synthetic oil, of the type polyalphaolefin (PAO), mixed with a solvent and teflon. The oil provides only short-term corrosion protection.

Flash point: min 65 °C

Principal use

Cleaning of weapons immediately after firing.

Temperature range

-51 °C – +71 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Break-Free CLP Vapenolja](#)

M0722-1030XX LUBRICATION OIL SMX



Technical basis

Swedish defence standard: FSD 7718

Description

Lubrication oil SMX consists of synthetic oil, of the type polyalphaolefin (PAO), corrosion inhibitors and teflon. The oil provides relatively short-term corrosion protection.

Principal use

Lubrication after maintenance of weapons in use and storage.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Break-Free SMX Vapenolja](#)

M0722-1250XX VASELINE 125

Description

Vaseline 125 is a high-viscosity grease-like petroleum distillate consisting of very long paraffin hydrocarbons.

Despite its grease-like consistency, vaseline is not a grease.

Principal use

Anti-corrosion agents for electrical contacts and battery terminals.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Fuchs White Vaseline](#)

M0722-1271XX VASELINE 127 (To be withdrawn)

Technical basis

No applicable standard.

Description

Vaseline 127 is a highly viscous grease-like petroleum distillate comprising very long paraffinic hydrocarbons.

Despite its grease-like consistency Vaseline 127 is not a grease.

Principal use

Corrosion prevention for electrical contacts and battery terminal bolts.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Statoil White Vaseline](#)

M0722-2020XX ANTI-CORROSION FLUID 202

Technical basis

No applicable standard.

Description

Anti-corrosion fluid 202 is a corrosion protection fluid added to the cooling water in internal combustion engines where no antifreeze is required.

Principal use

Anti-corrosion agents for cooling systems in liquid-cooled internal combustion engines.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Glyscorr G 93-94](#)

M0722-2030XX ANTI-CORROSION FLUID 203

Technical basis

Anti-corrosion fluid 203 meets the functional requirements for coolants in accordance with Deutz/MWM 0199-2091 and MAN 248.

Description

Anti-corrosion fluid 203 consists of organic carboxylic acid with corrosion protection and is free from nitrite, phosphorus and silicate. The fluid is normally mixed with water in a 5-10% blend.

Principal use

Anti-corrosion fluid 203 is used as corrosion protection in cooling systems for long periods where water is used as a cooling medium. Within the Swedish Armed Forces, anti-corrosion fluid 203 is used in some ships where this fluid is specified. Note that anti-corrosion fluid 203 only provides anti-corrosion protection and, unlike glycol-based antifreeze fluids, does not lower the freezing point of water.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Havoline XLI](#)

M0722-2510XX ANTI-CORROSION FLUID 251

Technical basis

Swedish defence standard: FSD 7709

Description

Anti-corrosion fluid 251 consists of rust-protection oil and a solvent, naphtha, which evaporates after application. The product produces a yellowish-brown greasy film that protects against corrosion.

Film thickness: 40 µm

Principal use

Anti-corrosion fluid 251 has a wide range of applications and provides good rust protection.

Temperature range

-40 °C – 80 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

| [Dinitrol 33](#)

M0722-2520XX ANTI-CORROSION FLUID 252

Technical basis

No applicable standard.

Description

Anti-corrosion fluid 252 forms a waxy moisture-repellent film that protects against corrosion.

Film thickness: approx. 8 µm

Principal use

Anti-corrosion fluid can be used for painted and unpainted areas of the aircraft where this product is specified in the maintenance instructions.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Ardrox AV 8](#)

M0722-2550XX ANTI-CORROSION FLUID 255

Technical basis

No applicable standard.

Description

Anti-corrosion fluid 255 forms a waxy moisture-repellent film that protects against corrosion.

Film thickness: approx. 30 µm

Principal use

Anti-corrosion fluid can be used for painted and unpainted areas of the aircraft where this product is specified in the maintenance instructions.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Ardrox AV 30](#)

M0722-2570XX ANTI-CORROSION FLUID 257

Technical basis

US spec:	MIL-PRF-81309 (Type II)
SAAB code:	1457-01

Description

Anti-corrosion fluid 257 forms a waxy moisture-repellent film that protects against corrosion.

Film thickness:	max 12 µm (0.5 mil)
Flashpoint:	min 60 °C

Principal use

Anti-corrosion fluid 257 can be used for painted and unpainted areas of the aircraft where this product is specified in the maintenance instructions.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[CorrosionX Aviation](#)

M0722-2910XX CONTACT FLUID 291

Technical basis

No applicable standard.

Description

Contact fluid 291 is an all-round service spray consisting of paraffin oil in an aerosol can.

Principal use

An all-round service spray that penetrates, lubricates and protects against rust and corrosion. The spray can be used for simple maintenance jobs.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[CRC 5-56](#)

M0722-2940XX CONTACT FLUID

Technical basis

No applicable standard.

Description

M0722-2940XX contact fluid consists of a mineral oil with a solvent.

Principal use

Universal maintenance fluid for electrical equipment. It cleans and dissolves corrosion, lubricates and protects metals and alloys in electrical equipment.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[CRC 2-26](#)

M0722-2951XX CONTACT GREASE

Technical basis

No applicable standard.

Description

M0722-2951XX Contact grease is based on a fully synthetic base oil of the type poly alkylene glycol (PAG). It has good compatibility with plastic and rubber material.

Base oil viscosity at 40 °C:	approx. 225 mm ² /s
Consistency:	NLGI 1
Dropping point:	approx. 250 °C
Colour:	Beige

Principal use

Contact grease for different types of electrical contacts. The contact grease can be applied to vertical surfaces since it does not flow (non-melting product). The contact grease may be applied to plastic and rubber surfaces.

Temperature range

-35 °C – +130 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[SGB Contact Treatment Grease](#)

M0722-2970XX ANTI-CORROSION SPRAY 297

Technical basis

US spec:	MIL-PRF-16173 (Grade 2)
Airbus:	TN A 007.10138 (Type I, Grade 2)

Description

Anti-corrosion fluid 297 consists of a spray can with rust-protection oil and a solvent.

Flashpoint:	min 38 °C
Film thickness:	max approx. 50 µm

Principal use

Corrosion protection with good protection against moisture, sand, dirt, salt and acid. Has a wide range of applications and can also be used on chains, cables and wires.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[LPS 3](#)

M0729-3010XX SILICONE PASTE 301

Technical basis

US spec:	SAE-AS-8660
NATO code:	S-736
SAAB code:	7197-09

Description

Silicone paste 301 consists of silicone oil and a thickening agent. It has strong water-repellent properties and is electrically insulating. The product should not be regarded as a grease.

Consistency:	NLGI 2
Colour:	White

Principal use

Insulating material in high-voltage electrical installations exposed to moisture, such as ignition systems in vehicles. Protection against oxidation of rubber strips.

Temperature range

-40 °C – +200 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Dow Corning 4](#)

M0729-4030XX COPPER PASTE

Technical basis

No applicable standard.

Description

Copper paste M0729-4030XX consists of copper powder and mineral oil with additives.

Consistency:

NLGI 1-2

Principal use

The copper paste can be used as an anti-seizing lubricating oil to prevent metal against metal contact between e.g. bolts, nuts and screws. Note that it must not be used for materials that come into contact with fuels because copper harms these fuels.

CAUTION!

Not to be used for equipment in contact with fuel. Copper has an adverse effect on fuel.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[CRC Kopparpasta](#)

M0746-0670XX TRANSFORMER OIL 067 (To be withdrawn)



Technical basis

Civil spec:	BS EN 60296:2012
Swedish defence standard:	FSD 8501

Description

Transformer oil 067 is a highly refined mineral oil. It contains oxidation inhibitors to enable it to withstand prolonged operation at elevated temperatures.

Note

Transformer oil of this type is, and has always been, entirely free from polychlorinated biphenyls (PCBs).

Principal use

Coolant and insulating agent in transformers, switches and radar equipment.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Shell Diala S3 ZX-I Dried](#)

M0746-5100XX CALIBRATION FLUID 510 (To be withdrawn)

Technical basis

Swedish defence standard:	FSD 8510
Equivalent US spec:	MIL-PRF-7024 (Type II)

Description

Calibration fluid 510 is a petroleum distillate within the boiling interval from 150 to 200 °C. The standard places strict requirements on the viscosity and density of the product.

Viscosity at 25 °C:	1.12-1.22 mm ² /s
Flash point:	min 38 °C
Density:	765-775 kg/m ³ at 15.6 °C

Principal use

Calibration of components in fuel systems.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[AeroShell Calibrating Fluid 2](#)

7. HYDRAULIC FLUIDS

Contents

M0747-0130XX HYDRAULIC FLUID 013	178
M0747-0210XX HYDRAULIC FLUID 021	179
M0747-0230XX HYDRAULIC FLUID 023	180
M0747-0331XX HYDRAULIC FLUID 0331	181
M0747-0332XX HYDRAULIC FLUID 0332 (To be withdrawn)	182
M0747-0510XX HYDRAULIC FLUID 051	183
M0747-0590XX HYDRAULIC FLUID 059	184
M0747-0600XX HYDRAULIC FLUID	185
M0747-0603XX HYDRAULIC FLUID BIO	186
M0747-0610XX HYDRAULIC FLUID	187
M0747-0660XX HYDRAULIC FLUID (To be withdrawn)	188
M0747-1060XX LUBRICANT 106	189
M0747-3200XX HYDRAULIC FLUID 320	190
M0747-3201XX HYDRAULIC FLUID 32	191
M0747-3960XX SILICONE OIL 396	192
M0747-4150XX RECOIL FLUID 415	193
M0747-4300XX BRAKE FLUID 430 (To be withdrawn)	194
M0747-4320XX BRAKE FLUID 432	195
M0747-4600XX HYDRAULIC FLUID 46	196

M0747-0130XX HYDRAULIC FLUID 013

Technical basis

US spec:	MIL-PRF-6083
NATO code:	C-635

Description

Brayco Micronic 783 is a low-viscosity petroleum based hydraulic oil with anti-wear, oxidation enhancing and corrosion protection additives.

For ease of identification, it is dyed red.

Viscosity at 40 °C:	min 13.2 mm ² /s
Viscosity at 100 °C:	min 4.6 mm ² /s
Viscosity at -40 °C:	max 700 mm ² /s
Viscosity at -54 °C:	max 3 300 mm ² /s
Pour point:	max -59 °C

Principal use

Hydraulic oil for UAV.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Castrol Brayco Micronic 783](#)

M0747-0210XX HYDRAULIC FLUID 021



Technical basis

US spec:	MIL-PRF-5606
Equivalent British spec:	DEF STAN 91-48, OM-15
Equivalent French spec:	DCSEA 415/A
NATO code:	H-515
SAAB code:	1215-01

Description

Hydraulic oil 021 consists of a low-viscosity mineral oil with large amounts of VI improver additives, which improve viscosity characteristics at different temperatures and enable the oil to be pumped at low temperature. It also contains additives that improve lubrication performance and oxidation resistance.

Because tough requirements are placed on cleanliness in aircraft hydraulic systems, the oil is thoroughly filtered.

For ease of identification, it is dyed red.

Viscosity at 40 °C:	min 13.2 mm ² /s
Viscosity at 100 °C:	min 4.9 mm ² /s
Viscosity at -40 °C:	max 600 mm ² /s
Pour point:	max -60 °C

Principal use

Hydraulic oil in aircraft hydraulics.

Temperature range

-54 °C – +135 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[AeroShell Fluid 41](#)

M0747-0230XX HYDRAULIC FLUID 023



Technical basis

US spec:	MIL-PRF-83282
Equivalent French spec:	DCSEA 437/A
NATO code:	H-537

Description

Hydraulic fluid 023 is a polyalphaolefin and diester based hydraulic oil with anti-wear, anti-oxidation, foam inhibiting and corrosion protection additives. It has a relatively high flash point.

Because tough requirements are placed on cleanliness in aircraft hydraulic systems, the oil is thoroughly filtered.

Viscosity at 40 °C:	min 14.0 mm ² /s
Viscosity at 100 °C:	min 3.45 mm ² /s
Viscosity at -40 °C:	max 2 200 mm ² /s
Pour point:	max -55 °C
Flash point:	min 205 °C

Principal use

Hydraulic oil in aircraft, helicopters and missiles.

CAUTION!

Aeroshell Fluid 31 meets the same standards as Hydraunycoil FH 2; use the oil specified for the aircraft.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[AeroShell Fluid 31](#)

[Hydraunycoil FH 2](#)

M0747-0331XX HYDRAULIC FLUID 0331

Technical basis

Swedish standard: SS 15 54 34 AM 46

Description

Hydraulic fluid 0331 is a mineral oil-based hydraulic oil containing additives to improve oxidation stability, corrosion protection and anti-wear.

ISO VG: 46

Viscosity at 40 °C: 39-57 mm²/s

Principal use

Hydraulic systems and hydraulic transmissions that are exposed to wide variations in temperature.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

| [Shell Tellus S2 V 46](#)

M0747-0332XX HYDRAULIC FLUID 0332 (To be withdrawn)

Technical basis

Swedish standard: SS 15 54 34 AM 32

Description

Hydraulic fluid 0332 is a mineral oil-based hydraulic oil containing additives to improve oxidation stability, corrosion protection and anti-wear. Can be replaced with Hydraulic fluid 320.

ISO VG: 32

Viscosity at 40 °C: approx. 26-39 mm²/s

Principal use

–

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Castrol Hyspin AWH-M](#)

M0747-0510XX HYDRAULIC FLUID 051



Technical basis

Swedish defence standard: FSD 8401

Description

Hydraulic fluid 051 is a mineral oil-based hydraulic oil with a very high viscosity index, achieved by the addition of large amounts of VI improvers. This means that the oil can be used over a wide range of temperatures.

It also contains zinc-free additives that improve oxidation stability, corrosion protection, lubrication performance under heavy loads and foaming properties.

The high content of VI improvers gives the oil the ability to form a stable emulsion with water, which can be both an advantage and a disadvantage.

Viscosity at 40 °C:	min 27 mm ² /s
Viscosity at 100 °C:	min 9.5 mm ² /s
Viscosity at -40 °C:	max 1 500 mm ² /s
Pour point:	max -51 °C
Flash point:	min 100 °C

Principal use

Pressure medium and lubricating oil in hydraulic systems and hydrostatic transmissions in vehicles, ships, artillery pieces and stationary equipment.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Fuchs Hydraulic Oil 131](#)

[Q8 Hindemith LT](#)

Note

OKQ8 new contractor since October 2019. Fuchs product will be phased out in the storage 2020.

M0747-0590XX HYDRAULIC FLUID 059

Technical basis

Hydraulic fluid shall fulfill the requirement according to FORD specification WSS-M2C204-A and approved according to Mercedes MB-345.0.

Description

Hydraulic fluid with additives compatible for elastomers and electronic hydraulic steering system. Caution use this hydraulic for the recommended application and it is not compatible with other hydraulic fluids.

Viscosity at 40 °C:	approx 6 mm ² /s
Viscosity at 100 °C:	approx 18 mm ² /s
Lowest flow temperature:	-57 °C
Flash point:	156 °C

Principal use

Hydraulic fluid 059 for servo steering system in vehicles.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Fuchs Pentosin CHF 11S](#)

M0747-0600XX HYDRAULIC FLUID

Technical basis

Swedish standard: SS 15 54 34 AAM 46

Description

Hydraulic fluid M0747-0600XX is a zinc-free hydraulic oil based on solvent-refined paraffin base oils that contain additives to improve anti-wear and air and water separation.

ISO VG: 46
Viscosity at 40 °C: approx. 39-57 mm²/s
Pour point: approx. -30 °C

Principal use

All indoor hydraulics and some outdoor hydraulics. Can also be used in mist and circulation systems.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Fuchs Hydraway HMA 46](#)

M0747-0603XX HYDRAULIC FLUID BIO

Technical basis

Swedish standard:	SS 15 54 34
Equivalent ISO:	ISO 15380 HEES

Description

Hydraulic fluid BIO is an environmentally friendly hydraulic fluid based on esters.

ISO VG:	32
Viscosity at 40 °C:	ca 32 mm ² /s
Viscosity at 100 °C:	ca 6,6 mm ² /s
Lowest flow temperature:	-42 °C
Flash point:	200 °C

Principal use

Mobile hydraulic, used by combat engineering bridges.

CAUTION!

Hydraulic fluid 32 should not be used in stored equipment. Its stability deteriorates in contact with water.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Fuchs Hydraway BIO SE 32](#)

M0747-0610XX HYDRAULIC FLUID

Technical basis

Airbus:	NSA307110
Bombardier:	BAMS 564-003

Description

Hydraulic fluid M0747-0610XX consists of a phosphate ester oil that has a slightly higher self-igniting temperature than other aircraft hydraulic fluids such as hydraulic fluid 021.

Density at 23 °C:	990-1 066 kg/m ³
Viscosity at -54 °C:	max 2 900 mm ² /s
Viscosity at 99 °C:	3.0-4.0 mm ² /s
Pour point:	max -62 °C
Flash point:	min 160 °C

Principal use

The hydraulic fluid is usually found in newer generation civil aircraft. Within the Swedish Armed Forces the hydraulic fluid is used in the FPL 102 (Gulfstream).

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

| [Skydrol 500B-4](#)

M0747-0660XX HYDRAULIC FLUID (To be withdrawn)

Technical basis

US spec:	MIL-PRF-6083
Equivalent British spec:	DEF-STAN 80-142
Equivalent French spec:	DSCEA 535a
NATO code:	C-635

Description

Hydraulic fluid M0747-0660XX consists of a phosphate ester oil with a slightly higher self-igniting temperature than other aircraft hydraulic oils such as Hydraulic fluid 021.

Viscosity at 40 °C:	min 13.2 mm ² /s
Viscosity at 100 °C:	min 4.6 mm ² /s
Viscosity at -40 °C:	max 700 mm ² /s
Viscosity at -54 °C:	max 3 300 mm ² /s
Pour point:	max -59 °C

Principal use

Hydraulic fluid for Helicopter 14.

Temperature range

-54 °C – +135 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Hydrauncoil FH 6](#)

M0747-1060XX LUBRICANT 106

Technical basis

SAAB code:	2218-05
NATO code:	S-1738

Description

Lubricant 106 is a heat-hardened anti-friction varnish containing molybdenum disulphide, a solvent and a binding agent. It 'burns in' at 150 °C in one hour. The firm lubricant film is hard-wearing.

Principal use

Dry lubricant for grease points exposed to heavy loads and/or high temperatures where there is no risk of corrosion.

Temperature range

-70 °C – +250 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Dow Corning Molykote 106](#)

M0747-3200XX HYDRAULIC FLUID 320



Technical basis

Swedish standard:	SS 15 54 34, AV 32
International standard:	DIN 51 524, HLP 32

Description

Hydraulic fluid 320 is a mineral oil based hydraulic oil in viscosity class ISO VG 32.

It has a viscosity index of approx. 150 to allow it to be used over a relatively wide range of temperatures.

ISO VG:	32
Viscosity at 40 °C:	approx. 32 mm ² /s
Viscosity at 100 °C:	approx. 6.3 mm ² /s
Pour point:	approx. -30 °C
Flash point:	approx. 180 °C

CAUTION!

Hydraulic fluid 320 is in roughly the same viscosity class as Hydraulic fluid 051, but has worse low temperature properties.

Principal use

Pressure medium in some hydraulic systems in the navy.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Castrol Hyspin HVI 32](#)

[Q8 Handel 32](#)

M0747-3201XX HYDRAULIC FLUID 32

Technical basis

Swedish standard:	SS 15 54 34 BV 32 Environmentally adapted
Equivalent ISO spec:	ISO 15380 HEES 32

Description

Hydraulic fluid 32 is an environmentally-friendly hydraulic oil based on esters.

ISO VG:	32
Viscosity at 40 °C:	26-39 mm ² /s
Pour point:	max -42 °C

Principal use

Mobile and stationary hydraulics.

CAUTION!

Hydraulic fluid 32 should not be used in stored equipment. Its stability deteriorates in contact with water.

Material safety data sheets (MSDS)

Available in PRIO.

Technical data sheet

[Binol Hyd 32](#)

M0747-3960XX SILICONE OIL 396

Technical basis

No applicable standard.

Description

Silicone oil 396 is a synthetic oil of the dimethyl siloxane type. Silicone oils of this type have a very high viscosity index, are chemically very stable and highly water-repellent. A special property is that - unlike other types of oil - they are compressible, which makes them suitable for use as damping fluids. They are poor lubricants, especially for steel against steel where they really must not be used.

Viscosity at 25 °C: 180-220 mm²/s

Principal use

Damping fluid in equipment, instruments, etc.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Xiameter PMX-200 Silicone Fluid 200 cSt](#)

M0747-4150XX RECOIL FLUID 415



Technical basis

Swedish defence standard: FSD 8403

Description

Recoil fluid 415 consists of 60% by weight ethylene glycol and 40% distilled water. It contains corrosion protection additives.

Principal use

For recoil damping systems in artillery pieces.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

Not available.

M0747-4300XX BRAKE FLUID 430 (To be withdrawn)



Technical basis

US spec:	FMVSS 116 (DOT 4)
Equivalent ISO-spec:	ISO 4925 (Class 4)
NATO code:	H-542

Description

Brake fluid 430 is glycol based DOT 4 brake fluid consisting of a complex mixture of ethers/polyethylene glycols with additives against oxidation and corrosion. All brake fluids of this type have the ability to dissolve water, which reduces the boiling point and hence increases the risk of steam formation. It is therefore important to change the brake fluid at the specified intervals. Brake fluid 430 meets the standards of FMVSS 116 DOT 4.

Viscosity at -40 °C:	max 1 800 mm ² /s
Dry boiling point:	min 230 °C
Wet boiling point:	min 155 °C

Principal use

For hydraulic braking systems in motor vehicles where this type of brake fluid is specified.

Note

Brake fluid 430 will be replaced Brake fluid 432 which is a DOT 5.1 brake fluid with somewhat better low temperature characteristics and boiling point. Brake fluid 430 and 432 consist of the same glycol based mixture and can be replaced when the brake system is emptied.

CAUTION!

Brake fluid 430 is a DOT 4 glycol based brake fluid and must not be mixed with FMVSS DOT 5 silicone based brake fluid

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Q8 Brake Fluid DOT 4+](#)

M0747-4320XX BRAKE FLUID 432



Technical basis

US spec:	FMVSS nr 116 (DOT 5.1)
Equivalent ISO spec:	ISO 4925 (Class 5-1)

Description

Brake fluid 432 is a glycol based DOT 5.1 brake fluid consisting of a complex mixture of ethers/ polyethylene glycols with additives to improve oxidation stability and corrosion protection. All brake fluids of this type have the ability to dissolve water, which reduces the boiling point and hence increases the risk of steam formation. It is therefore important to change the brake fluid at the specified intervals. Brake fluid 432 has somewhat better low temperature attributes and boiling point than Brake fluid 430.

Viscosity at -40 °C:	max 900 mm ² /s
Dry boiling point:	min 260 °C
Wet boiling point:	min 180 °C

Principal use

Brake fluid for disc and drum brakes in motorcycles and mopeds.

CAUTION!

Brake fluid 432 is a DOT 5.1 glycol based brake fluid and must not be mixed with FMVSS 116 DOT 5 silicone based brake fluid.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Fuchs Brake Fluid DOT 5.1](#)

[Q8 Brake Fluid DOT 5.1](#)

Note

OKQ8 new contractor since October 2019. Fuchs product will be phased out in the storage 2020.

M0747-4600XX HYDRAULIC FLUID 46

Technical basis

Swedish standard:	SS 15 54 34 BV 46 Environmentally adapted
Equivalent ISO spec:	ISO 15380 HEES 46

Description

Hydraulic fluid 46 is an environmentally adapted hydraulic fluid based on renewable raw materials. The product is biodegradable in ground and water.

ISO VG:	46
Viscosity at 40 °C:	39-57 mm ² /s
Pour point:	-39 °C

Principal use

Mobile and stationary hydraulics.

CAUTION!

The oil should not be used in stored equipment. Its stability deteriorates in contact with water.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Binol Hyd 46](#)

8. LIQUID FUELS

Contents

M0754-2110XX ALKYLATE GASOLINE 4-STROKE	198
M0754-2210XX ALKYLATE GASOLINE 2-STROKE	199
M0754-2330XX AVIATION GASOLINE (FLYGBENSIN 33)	200
M0754-2940XX UNLEADED GASOLINE 95	201
M0754-2980XX UNLEADED GASOLINE 98	202
M0754-3240XX KEROSENE 24	203
M0754-3750XX AVIATION TURBINE FUEL (FLYGFOTOGEN 75)	204
AVIATION FUEL NATO F-34	205
M0754-3800XX AVIATION FUEL NATO F-44	206
M0754-4100XX DIESEL MK 1	207
M0754-4300XX MARINE DIESEL MK 1	208
M0754-4600XX DIESEL FUEL OIL 60	209
M0754-7210XX ENGINE ALCOHOL 21	210
M0754-7350XX ALCOHOL 35	211

M0754-2110XX ALKYLATE GASOLINE 4-STROKE



Technical basis

Swedish standard: SS 15 54 61

Description

Alkylate gasoline 4-stroke is a class 1 flammable liquid and contains extremely low levels benzene and sulphur, amongst other things. This gives it properties with less impact on health and the environment compared to normal gasoline.

Octane rating, engine:	min 90.0
Benzene content:	max 0.1 vol%
Sulfur content:	max 10.0 mg/kg

Principal use

For machines with four-stroke engines used in the immediate vicinity of people, e.g. lawn mowers and snow blowers.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Fuchs Alkylate Gasoline 4-stroke](#)

M0754-2210XX ALKYLATE GASOLINE 2-STROKE

Technical basis

Swedish standard: SS 15 54 61

Description

Alkylate gasoline 2-stroke is a class 1 flammable liquid and contains extremely low levels of benzene and sulphur, amongst other things. This gives it properties with less impact on health and the environment compared to normal gasoline.

Octane rating, engine:	min 90,0
Benzene content:	max 0.1 vol%
Sulfur content:	max 10.0 mg/kg

Principal use

For machines with two-stroke engines that need a gasoline-oil mixture and are used in the immediate vicinity of people, e.g. chain saws and clearing saws.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Fuchs Alkylate Gasoline 2-stroke](#)

M0754-2330XX AVIATION GASOLINE (FLYGBENSIN 33)

Technical basis

US spec:	ASTM D 910 (Grade 100LL)
Equivalent British spec:	DEF STAN 91-90, AVGAS 100 LL
NATO code:	F-18

Description

Aviation gasoline (Flygbensin 33) is a petrol/gasoline with an octane rating of 100 according to the engine method. It contains max. 0.053 vol% tetraethyl lead as an octane enhancer.

A major difference between aviation gasoline and automotive gasoline is that aviation gasoline has a narrower distillation interval and its initial boiling point is lower. As a result it has lower vapour pressure, which reduces the risk of vapour lock formation. Unlike automotive gasoline, Aviation gasoline (Flygbensin 33) must not contain any ethanol or other oxygenates.

For further information refer to chapter 12. General information about fuel.

Principal use

Within the Swedish Armed Forces, the fuel is used only for UAVs (unmanned aerial vehicles). Other aircraft with piston-engines have been withdrawn.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[BPAVGAS 100 LL](#)

M0754-2940XX UNLEADED GASOLINE 95



Technical basis

Swedish standard: SS EN 228

Description

Unleaded gasoline 95 is a lead-free 95-octane environmental class 1 (MK1) fuel. According to Swedish standard, SS EN 228, unleaded gasoline may contain up to 10 vol% ethanol. In the Swedish Armed Forces unleaded gasoline 95 contains up to 5 vol% ethanol. Unleaded gasoline 95 is a flammable class 1 fuel.

Octane rating, RON:	95
Benzene content:	max 1.0 vol%
Sulfur content:	max 10.0 mg/kg

Principal use

Fuel mainly used in ignition engines that do not require a higher octane rating than 95 and two-stroke engines where alkylate gasoline is not used.

CAUTION!

Some older vehicles and installations without catalytic converters are not designed to run on unleaded gasoline. It is the material in the valve seats and the valves themselves that counts. If the material is high-alloy steel, the engine can run on unleaded gasoline. If the valve seat is of cast steel, the material must be protected against wear and a potassium additive must be used. TO AF DRIVM 600 000004 describes what vehicles are affected and how the additive is to be dosed into the fuel. One option is M0729-460133 Potassium additive in a 500 ml dosing bottle that can be added when refuelling.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[OKQ8 Bensin 95 98 MK1](#)

M0754-2980XX UNLEADED GASOLINE 98



Technical basis

Swedish standard: SS EN 228

Description

Unleaded gasoline 98 is a lead-free 98-octane environmental class 1 (MK1) fuel. According to Swedish standard, SS EN 228, unleaded gasoline may contain up to 10 vol% ethanol. In the Swedish Armed Forces Unleaded gasoline 98 contains up to 5 vol% ethanol. Unleaded gasoline 98 is a flammable class 1 fuel.

Octane rating:	98
Benzene content:	max 1.0 vol%
Sulfur content:	10.0 mg/kg

Principal use

Fuel mainly used in ignition engines that require a higher octane rating than 95.

CAUTION!

Some older vehicles and installations without catalytic converters are not designed to run on unleaded gasoline. It is the material in the valve seats and the valves themselves that counts. If the material is high-alloy steel, the engine can run on unleaded gasoline. If the valve seat is of cast steel, the material must be protected against wear and a potassium additive must be used. TO AF DRIVM 600 000004 describes what vehicles are affected and how the additive is to be dosed into the fuel. One option is M0729-460133 Potassium additive in a 500 ml dosing bottle that can be added when refuelling.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[OKQ8 Bensin 95 98 MK1](#)

M0754-3240XX KEROSENE 24



Technical basis

Defence standard: FSD 8613

Description

Kerosene 24 is a special fuel for kerosene-fired equipment, particularly with wick burners.

The product contains a very low level of aromatic hydrocarbons, is practically sulphur-free and has a high smoke point.

The flashpoint is so high that Kerosene 24 is in flammability class 3.

Principal use

Fuel for tent light, storm lanterns, blowlamps and other heating apparatus.

CAUTION!

Kerosene 24 has previously been used, not only as a fuel for kerosene-fired equipment, but also to dilute diesel fuel oil in extreme cold. Because of their low aromatic content, the new variants are not suitable for this purpose. If it should be necessary to dilute diesel fuel oil, aviation turbine fuel (flygfotogen 75) is suitable for this purpose.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Statoil Solvent 60](#)

M0754-3750XX AVIATION TURBINE FUEL (FLYGFOTOGEN 75)

Technical basis

Defence standard:	FSD 8607
Equivalent US spec:	MIL-DTL-83133 (NATO F-35) ASTM D1655 (JET A-I)
Equivalent British spec:	DEF STAN 91-091 (NATO F-35)
NATO code:	F-35

Description

Aviation turbine fuel (Flygfotogen 75), often shortened in Swedish to FF75, is the most used jet fuel within the Swedish Armed Forces. It is a petroleum distillate within the boiling range 150-300 °C, with a flash point of min. 38 °C and a freezing point of max. -47 °C. Aviation turbine fuel (Flygfotogen 75) is a class 2b flammable liquid.

Aviation turbine fuel (Flygfotogen 75) contains corrosion inhibitor/lubricity improver (CI/LI) additive to give low wear on fuel pumps, and static dissipator additive (SDA) to reduce the risk of build-up of electrostatic charge. Aviation turbine fuel (Flygfotogen 75) may contain antioxidants to improve storage stability. Aviation turbine fuel (Flygfotogen 75) does not contain icing inhibitor/anti-icing additive (FSII).

Aviation turbine fuel (Flygfotogen 75) is equivalent to NATO F-35 with added corrosion inhibitor/lubricity improver (CI/LI) additive.

For further information refer to chapter 12. General information about fuel.

Principal use

Fuel for turbine engines in aircraft and helicopters.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[BP Jet A-1](#)

AVIATION FUEL NATO F-34

Technical basis

US spec:	MIL-DTL-83133 (JP-8, NATO F-34)
Equivalent British spec:	DEF STAN 91-087 (AVTUR/FSII)
NATO code:	F-34

Description

Aviation fuel NATO F-34 is a petroleum distillate within the boiling range 150-300 °C with a flash point of min. 38 °C and a freezing point of max. -47 °C.

Aviation fuel NATO F-34 contains corrosion inhibitor/lubricity improver (CI/LI) additive to give low wear on fuel pumps, and static dissipator additive (SDA) to reduce the risk of build-up of electrostatic charge and icing inhibitor/anti-icing additive (FSII) to prevent ice crystal formation from water in the fuel. Aviation fuel NATO F-34 may contain antioxidants to improve storage stability.

Aviation fuel NATO F-34 is not included as a product in the Swedish Armed Forces and is not registered with a store designation. The Swedish Armed Forces has dosing equipment on tanker truck 21 which makes it possible to dose an anti-icing additive into Aviation turbine fuel (Flygfotogen 75) to produce NATO F-34.

For further information refer to chapter 12. General information about fuel.

Principal use

Aviation fuel for turbine engines in aircraft and helicopters. In the Swedish Armed Forces Aviation fuel NATO F-34 is used for Helicopter 16.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

–

M0754-3800XX AVIATION FUEL NATO F-44

Technical basis

US spec:	MIL-DTL-5624 (JP-5)
Equivalent British spec:	DEF STAN 91-86 (AVCAT/FSII)
NATO code:	F-44

Description

Aviation Fuel NATO F-44 is a petroleum distillate with a boiling range 150-300 °C and a minimum flash point of 60 °C.

It contains corrosion inhibitor/ lubricity improver (CI/LI) additive to give low wear in fuel pumps and also anti-icing additive (FSII) to prevent the formation of ice crystals from water in the fuel. There are no requirements in MIL-DTL-5624 to add an static dissipator additive (SDA) to increase the conductivity of the fuel.

For further information refer to chapter 12. General information about fuel.

Principal use

Aviation fuel for turbine engines in aircraft and helicopters that are fuelled from ships. Aviation fuel NATO F-44 has been developed to be handled and stored in ships that have a requirement of a flash point above 60 °C. The ships HMS Carlskrona and HMS Visby of the Swedish Armed Forces have aviation fuel tanks that can supply e.g. Helicopter 15 with aviation fuel NATO F-44.

This aviation fuel is adapted for marine environments and has a conductivity of approximately 1-20 pS/m. There are requirements on the limit values for the JAS 39 Gripen aircraft that do not approve such low conductivity. See respective aircraft manuals for applicable requirements.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Shell F-44](#)

M0754-4100XX DIESEL MK 1



Technical basis

Swedish standard: SS 15 54 35

Description

Diesel MK 1 is a petroleum distillate within the boiling range 180 - approx. 340 °C.

Diesel MK 1 is a class 3 flammable liquid.

The Swedish Armed Forces does not allow fatty acid methyl esters (FAME), so called biodiesel, in its diesel as it reduces the storage properties of the fuel. When refueling at non-military petrol/gas stations diesel usually contains 5-7 vol% FAME.

Aromatic content:	max 5 vol%
Sulphur content:	max 10 mg/kg/0.001 mass%
Flash point:	min 56 °C
Cold filter plugging point (CFPP):	max -35 °C

Principal use

Fuel for diesel engines and some gas turbines.

Note

When putting vehicles into storage ensure that the diesel is of winter quality (CFPP max -35 °C).

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[OKQ8 Diesel B0](#)

M0754-4300XX MARINE DIESEL MK 1

Technical basis

Swedish standard: SS 15 54 35

Description

Marine diesel MK 1 is a petroleum distillate within the boiling range 180 - approx. 300 °C.

Marine diesel MK 1 is a class 3 flammable liquid.

Aromatic content:	max 5 vol%
Sulphur content:	max 10 mg/kg/0.001 mass%
Flash point:	min 56 °C
Cold filter plugging point (CFPP):	max -32 °C

Principal use

Marine diesel for diesel engines and some gas turbines.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[OKQ8 Diesel MK1 B0](#)

M0754-4600XX DIESEL FUEL OIL 60

Technical basis

Swedish standard: SS 15 54 10

Description

Diesel fuel oil 60 is a standard diesel fuel, which within the Swedish Armed Forces is intended for use on board ships where a key requirement is that the fuel has a flammability class 3, i.e. have a flashpoint over 55 °C.

The properties of Diesel fuel oil 60, for example lubricity and cetane index, fulfil the requirements of the engine systems used on board Swedish Armed Forces naval vessels.

Diesel fuel oil 60 is available in summer and winter grades. The summer grade satisfies the requirement for low temperature properties, with a CFPP of -10 °C (CFPP: Cold Filter Plugging Point). The winter grade satisfies the requirement for a CFPP of -32 °C.

Principal use

Diesel fuel oil and turbine fuel for marine operation.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[OKQ8 Eldningsolja 1 E10](#)

[OKQ8 Eldningsolja 1 E32](#)

M0754-7210XX ENGINE ALCOHOL 21



Technical basis

Defence standard: FSD 8609

Description

Engine alcohol 21 consists of denatured 99.5% ethanol.

Engine alcohol 21 is a class 1 flammable liquid.

Principal use

Fuel for torpedoes.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Kemetyl Industrisprit A 99,5%](#)

M0754-7350XX ALCOHOL 35



Technical basis

Defence standard: FSD 8605

Description

Alcohol 35 is red-coloured and consists of 95% denatured ethanol.

Alcohol 35 is a class 1 flammable liquid.

Principal use

- Fuel for spirit burners.
- Ignition of kerosene burners.
- Additive for windscreen washer fluid.
- Cleaning agent.
- Additive to diesel fuel oil in winter time.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Kemetyl T-Röd](#)

9. ANTIFREEZE FLUIDS

Contents

M0758-0101XX PROPYLENE GLYCOL	214
M0758-0110XX ETHYLENE GLYCOL RED	215
M0758-0210XX ETHYLENE GLYCOL 021	216
M0758-0220XX ETHYLENE GLYCOL 022	217
M0758-0300XX HEXANDIOL 030 (To be withdrawn)	218
M0758-0390XX COOLANT 039	219
M0758-0410XX ALKANOL 041	220
M0758-8290XX ETHYLENE GLYCOL	221

M0758-0101XX PROPYLENE GLYCOL

Technical basis

No applicable standard.

Description

Propylene glycol is an antifreeze that prevents freezing and corrosion in cooling systems. It contains additives to prevent it from being aggressive against metals. It carries less of a health risk than ethylene glycol and is easily biodegradable.

Principal use

Antifreeze for cooling systems in internal combustion engines, and for heating and cooling systems in e.g. solar panels.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[OKQ8 Propylenglykol](#)

M0758-0110XX ETHYLENE GLYCOL RED

Technical basis

Ethylene glycol red must fulfil VW TL 774-D/F and should fulfil MAN 324 SNK. Sodium nitrite must not be present in the product.

Description

Ethylene glycol red is an antifreeze that prevents freezing and corrosion in cooling systems. It consists of ethylene glycol and corrosion inhibitors that stop it from attacking aluminium and other metals. It cannot be mixed with other types of glycol coolants.

Principal use

Antifreeze for cooling systems in liquid-cooled internal combustion engines in VW, Audi and Opel models from 1997 and later, and Land Rover models from 2001 and later.

Change to or choose primarily Ethylene glycol 021 M0758-02100XX instead of this product, Ethylene glycol red. Ethylene glycol 021 is an all-round glycol for ground and naval systems, and generally meets most requirements for glycol.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Fuchs Antifreeze LL Conc](#)

[Q8 Antifreeze Long Life](#)

Note

OKQ8 new contractor since October 2019. Fuchs product will be phased out in the storage 2020.

M0758-0210XX ETHYLENE GLYCOL 021



Technical basis

Ethylene glycol 021 must fulfil MTU standard MTL 5048 and be on the list of MTU approved glycol products in order for the product to be used in MTU engines. The product must not contain sodium nitrite.

Description

Ethylene glycol 021 is an antifreeze. It consists of ethylene glycol with corrosion protection additives and anti-foaming agents and dyes. The additives also provide the best possible corrosion protection for modern engines containing large quantities of aluminium.

Principal use

Antifreeze for cooling systems in liquid-cooled internal combustion engines. Ethylene glycol 021 is the most common glycol for both ships and road vehicles.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Fuchs Maintain Fricofin](#)

[Q8 Glykol Super](#)

Note

OKQ8 new contractor since October 2019. Fuchs product will be phased out in the storage 2020.

M0758-0220XX ETHYLENE GLYCOL 022

Technical basis

Ethylene glycol 022 must fulfil requirement for newer Scania engines. Scania proves OK Q8 longlife plus based on BASF G40.

Description

Ethylene glycol 022 is an antifreeze. It consists of ethylene glycol with Si-OAT, corrosion protection additives and anti-foaming agents and dyes.

Principal use

Antifreeze for cooling systems in liquid-cooled internal combustion engines. Antifreeze is a new product to fulfill the requirements for new Scania engine with sealants sensitive to M0758-0210XX ETHYLENE GLYCOL 021. Ethylene glycol 022 suits all Scania engine (old and new engines).

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Q8 Glykol Long Life Plus](#)

M0758-0300XX HEXANDIOL 030 (To be withdrawn)

Technical basis

Defence standard: FSD 8703

Note

The product is not centrally sourced. It can be obtained from VWR International AB, 163 94 Stockholm. The product name is 2-methylpentane-2,4-diol. The part number is 17776-1.

Description

Hexandiol 030 consists of pure hexylene glycol, 2-methyl-2,4-pentanediol.

Hexandiol 030 is a class 3 flammable product.

Principal use

Antifreeze for hydraulic equipment. Dosage: 0.25-1 vol%.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

—

M0758-0390XX COOLANT 039

Technical basis

US spec:	MIL-PRF-87252
Nato code:	S-1748

Description

Coolant 039 is a dielectric coolant fluid for flight electronics. Coolant 039 consists of a synthetic oil of the type polyalphaolefin (PAO) and contains additives to prevent oxidation and improve storage stability of the product.

Viscosity at -54 °C:	max 1 300 mm ² /s
Viscosity at -40 °C:	max 300 mm ² /s
Viscosity at 40 °C:	min 5,0 mm ² /s
Viscosity at 100 °C:	min 1,65 mm ² /s
Flash point:	min 150 °C
Dielectric strength:	min 35 kV
Resistivity at 25 °C:	min 1,0 x 10 ¹⁰ ohm-cm

Principal use

Coolant for radar systems.

Temperature range

-54 – +200 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Royco 602](#)

M0758-0410XX ALKANOL 041

Technical basis

Defence standard:	FSD 8705
Equivalent British spec:	BS 1595, AL-11
Equivalent French spec:	AIR 3660
NATO code:	S-737

Description

Alkanol 041 consists of 99% isopropanol. Alkanol 041 is a class 1 flammable liquid.

Principal use

- Anti-freeze for petrol-driven vehicles (engine alcohol).
- Additive for windscreen washer fluid in winter time.
- Anti-freeze for compressed air braking systems with alcohol drying.
- Cleaning measurement instruments in test equipment fuel/aviation fuel.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Statoil Isopropanol \(2-Propanol\)](#)

M0758-8290XX ETHYLENE GLYCOL

Technical basis

Ethylene glycol M0758-8290XX must meet the requirements of VW TL774-G. The product must not contain sodium nitrite.

Description

Ethylene glycol M0758-8290XX consists of ethylene glycol with corrosion protection additives. The additives give the best possible corrosion protection for modern engines containing large amounts of aluminium.

Principal use

Coolant for liquid cooled combustion engines. Newer Volvo engines require this glycol. Ethylene glycol M0758-8290XX cannot be mixed with Ethylene glycol 021 or other glycols on the market. Note that Ethylene glycol 021 should be used where possible to minimise the range of products out in the field.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Volvo Coolant VCS](#)

10. ADDITIVES

Contents

M0729-4600XX ADDITIVE POTASSIUM	224
M0729-4630XX ADDITIVE HITEC 580	225
M0729-4631XX ADDITIVE MDA	226
M0729-4632XX ADDITIVE DCI-4A	227
M0729-4650XX ADDITIVE STADIS	228
M0729-4660XX ADDITIVE ADBLUE	229
M0729-4670XX ADDITIVE ANTI-ICE	230
M0729-4680XX KATHON FP 1.5	231
M0729-4690XX GROTAMAR 82	232

M0729-4600XX ADDITIVE POTASSIUM

Technical basis

No applicable standard.

Description

Some older vehicles and units without catalytic converters are not designed to run on unleaded petrol/gasoline. When these vehicles are running on unleaded fuel, a potassium additive needs to be added to the fuel.

Principal use

If the material in the valve and valve seat is high-alloy steel, the engine can run on unleaded fuel. If the valve seat is of cast steel, the material must be protected against wear and a potassium additive must be used.

TO AF DRIVM 600 000004 describes which vehicles are affected and how the additive is to be dosed into the petrol/gasoline. Read the applicable safety data sheet.

CAUTION!

Vehicles with a catalytic converter must not run on fuel containing potassium additive since the additive will ruin the catalytic converter.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

—

M0729-4630XX ADDITIVE HITEC 580

Technical basis

Equivalent US spec:	MIL-PRF-25017
Equivalent British spec:	DEF STAN 68-251 (AL-61)
NATO code:	S-1747

Description

Additive Hitec 580 is an additive which improves lubrication as well as inhibiting corrosion. It consists mainly of mineral oil and petroleum distillate.

For further information refer to chapter 13. General information about additives.

Principal use

Hitec 580 is used as a corrosion inhibitor/lubricity improver (CI/LI) in Aviation turbine fuel (Flygfotogen 75) M0754-3750XX. According to FSD 8607 the requirement is that Flygfotogen 75 must contain 15-22.5 mg/l of Hitec 580 which corresponds to 16.4-24.6 ml/m³ (the density for Hitec 580 is 0.916 g/cm³).

Note

Additive Hitec 580 is going to be replaced with another of the approved corrosion inhibitor/lubricity improver (CI/LI) additives given in FSD 8607, Additive DCI-4A (M0729-4632XX).

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[HiTEC 580](#)

M0729-4631XX ADDITIVE MDA

Technical basis

Defence standard:	FSD 8607
Equivalent US spec:	MIL-DTL-83133
Equivalent British spec:	DEF STAN 91-091 (RDE/A/650)

Description

Additive MDA is a metal deactivator, which is used to improve and counteract the deterioration of the thermal oxidation stability of aviation fuel as a result of trace metal, e.g. copper contamination. The only approved MDA is N,N'-disalicylidene-1,2-propanediamine.

Principal use

Additive MDA is used if trace metals, e.g. copper, have been detected in Aviation turbine fuel (Flygfotoegen 75) (M0754-3750XX), Aviation fuel NATO F-34 or NATO F-44 (M0754-3800XX). It should only be added when needed due to known quality issues due to from contamination of trace metals. According to FSD 8607 max. 5.7 mg/l MDA should be added to Flygfotoegen 75 (M0754-3750XX).

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[HiTEC 4705E](#)

M0729-4632XX ADDITIVE DCI-4A

Technical basis

US spec:	MIL-PRF-25017
Equivalent British spec:	DEF STAN 68-251 (AL-61)
NATO code:	S-1747

Description

Additive DCI-4A is an additive which improves lubrication as well as inhibiting corrosion. DCI-4A is a replacement for the formerly used product Hitec 580. Note that DCI-4A unlike Hitec 580 is also marked as flammable goods. For further information refer to chapter 13. General information about additives.

Viscosity at 40 °C:	43-68 mm ² /s
Lowest flow temperature:	max -18 °C
Flash point:	min 34 °C

Principal use

DCI-4A is used as corrosion inhibitor/lubricity improver (CI/LI) in Aviation turbine fuel (Flygfotogen 75) M0754-3750XX. According to FSD 8607 ed 9 the requirement is that Flygfotogen 75 must contain 9-24 mg/l DCI-4A which corresponds to 9.7-23,8 ml/m³.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

| [DCI-4A](#)

M0729-4650XX ADDITIVE STADIS

Technical basis

Defence standard:	FSD 8607
Equivalent US spec:	MIL-DTL-83133

Description

Additive Stadis is a static dissipater additive (SDA). Fuel can be charged electrostatically during transportation, pumping, mixing or filtering. If the voltage difference between two points becomes too large, it may cause discharge. To increase the conductivity in aviation fuels, Stadis 450 is added.

Principal use

Stadis 450 is added to aviation turbine fuel (Flygfotoegen 75) at the time of delivery and additional additive may be needed after storage. According to FSD 8607 (Flygfotoegen 75) the conductivity must be between 50-600 pS/m.

The effect of adding Additive Stadis 450 may vary greatly between different batches of fuel and are therefore added in very small doses. The allowed dosage is specified in FSD 8607.

CAUTION!

The conductivity changes with the temperature. The measured conductivity must be related to the fuel temperature when measuring.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Stadis 450](#)

M0729-4660XX ADDITIVE ADBLUE

Technical basis

Civil European standard: ISO 22241

Description

In newer exhaust cleaning systems for diesel engines there are different cleaning techniques for nitrous oxides. The SCR technique (Selective Catalytic Reaction) requires a urea mixture with the trade name AdBlue. M0729-4660XX additive AdBlue consists of a mixture of 30% urea and 70% deionised water.

Principal use

AdBlue is developed for vehicles equipped with SCR technique (Selective Catalytic Reaction). The product is filled in a separate tank of the vehicle and must never be mixed with the diesel fuel. Note that the freezing point is only -10 °C, which means that handling, use and storage must be tailored to the freezing temperature.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

I [Yara AdBlue](#)

M0729-4670XX ADDITIVE ANTI-ICE

Technical basis

Equivalent US spec:	MIL-DTL-85470
Equivalent British spec:	DEF STAN 68-252 (AL-41)
NATO code:	S-1745

Description

The permitted anti-icing additive or fuel system icing inhibitor (FSII) for aviation turbine fuel is DiEGME (diethylene glycol monomethyl ether).

Water dissolved in aviation fuel may separate and fall out as free water at low temperatures. The water then forms crystals which can cause filters to block. The anti-icing additive is hygroscopic and passes to the water phase, lowers the freezing point of the water and prevents crystal formation.

Principal use

Anti-icing agent is permitted in the following aviation fuels:

- AVIATION FUEL NATO F-44 (M0754-3800XX)
- AVIATION FUEL NATO F-34

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Prist Hi-Flash Anti-Icing Additive](#)

M0729-4680XX KATHON FP 1.5

Technical basis

No applicable standard.

Description

Kathon FP 1.5 is a biocide that is a bactericide which kills micro-organisms (bacteria, mould and yeast) in aviation fuel. The biocide is primarily used to decontaminate cisterns, tanks and hoses etc. that are contaminated with micro-organisms.

Principal use

Kathon FP 1.5 is the only biocide approved to decontaminate aircraft and associated tanks and cisterns that are part of the fuel distribution of aviation fuel.

TO AF DRIVM 600 019023 gives instructions on how decontamination can be carried out. Read the applicable safety datasheet.

CAUTION!

Handling of biocides and contaminated aviation fuel is an activity that is hazardous to environment and health, which requires the personnel involved to have knowledge of the procedures that apply.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

| [Kathon FP 1.5](#)

M0729-4690XX GROTAMAR 82

Technical basis

No applicable standard.

Description

Grotamar 82 is a biocide that kills micro-organisms (bacteria, mould and yeast) in automotive diesel and marine diesel. The biocide can be used as a preventive measure, but is primarily used to decontaminate cisterns, tanks and hoses etc. that are contaminated with micro-organisms.

Principal use

In marine environments Grotamar 82 should be added to the marine diesel within the Swedish Armed Forces. The biocide is used as a preventive measure, as there has previously been large problems with microbial growth. Grotamar 82 is then added by the Swedish Armed Forces in a dosage of 250 ppm.

The Grotamar 82 additive can also be used in connection with decontamination of tanks that have been contaminated.

TO AF DRIVM 600 019023 gives instructions on how decontamination can be carried out. Read the applicable safety datasheet.

CAUTION!

Handling of biocides and contaminated diesel is an activity that is hazardous to environment and health, which requires the personnel involved to have knowledge of the procedures that apply.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Grotamar 82](#)

11. GENERAL INFORMATION ABOUT LUBRICANTS

Contents

General information about lubricants	234
Engine oil	234
Aircraft turbine oil	234
Transmission oil	234
Hydraulic oil	235
Lubricating grease	235
Metal-working fluid (cutting fluid)	235
Anti-corrosion fluid	235
Composition of oil-based lubricants	235
Base oils	235
Mineral oils	236
Vegetable oils	236
Synthetic oils	236
Additives	237
Organo-metallic additives	237
Viscosity index improver	237
EP additives	237
AW-additives	237
Corrosion inhibitors	237
Antioxidants	237
Biocides	237

General information about lubricants

Lubricants can generally be categorized into three categories:

- Lubricating oils
- Lubricating greases, and
- Solid lubricants

Lubricating oils and greases (which can be described simply as thickened oils) consist mainly of a base oil (normally >80%) with additives that improve certain properties. Solid lubricants are generally powders containing molybdenum disulphide or graphite. They can be used at higher temperatures than oil-based lubricants.

A simple breakdown of lubricating oils into application areas could be as follows: engine oil, aircraft turbine oil, transmission oil and hydraulic oil. Hydraulic oils or fluids are sometimes not classed as lubricants as this is not their main purpose, for this reason within the Swedish Armed Forces they are classed, along with brake fluids, as 'pressure fluids'. Other products that are made up from base oils but are not classified as lubricants are corrosion protection fluids.

There are also lubricants with specific application areas that do not fit into these categories, such as metal working (cutting) fluids, shaft oil, instrument oil, saw chain oil and vacuum oil.

The most common oil-based lubricants and fluids are described in more detail below.

Engine oil

Engine oil in vehicles, ships and aircraft with piston engines (i.e. diesel and petrol-powered Otto engines) operates in a very tough environment. The temperature is high and the oil comes in contact with combustion gases and soot particles. The oil's function is to cool, lubricate and clean the engine. To achieve this, the engine oil contains relatively large amounts of additives.

Engine oil can contain either mineral oil, semi-synthetic or synthetic base oil. The base oil in synthetic oil, PAO, dissolves the additives rather poorly. Synthetic ester oil can be added to make the solubility better. Semi-synthetic engine oils are a mixture of mineral oil and PAO.

In certain applications engine oil is also used in transmission systems.

Aircraft turbine oil

Aircraft turbine oil used for lubrication of jet engines must be resistant to very high temperatures up to 300 °C. The oil becomes hot as a small amount of oil lubricates an engine with high output.

Aircraft turbine oil is made of synthetic diester and polyolester oils, with additives to improve oxidation properties, provide corrosion protection and improve lubrication performance.

Aircraft turbine oil can be broken down by hydrolysis and by oxidation. Decomposition by hydrolysis can occur where water is present.

Transmission oil

Transmission oil includes e.g. gearbox oil, hypoid oil and ATF oil (for automatic transmission fluid). The main task of the transmission oil is to reduce friction and lubricate the gear contacts in manual gearboxes, angle gears, rear axles, hypoid gears and similar applications. As the name suggests, ATF oil is intended for automatic gearboxes, which place special requirements on the viscosity and friction properties of the oil.

Generally, mineral oil or PAO are used as base oils, but synthetic esters are also found.

Transmission oil contains additives to manage lubrication of the heavily loaded gear contacts. Hypoid gears place high demands on the oil's lubrication properties and therefore it contains an EP additive.

Hydraulic oil

Hydraulic oil, i.e. oil used to transfer forces in hydraulic systems, is not always classed as a lubricant, because its main function is not lubrication. As hydraulic oil, a mineral oil is generally used with a small amount of additive.

In biologically sensitive environments it is common to use environmentally friendly hydraulic oils composed of vegetable or synthetic esters.

Lubricating grease

In some situations, the lubricants have to be semi-solid/solid. A lubricating grease may simply be described as a thickened oil. The thickener acts roughly as a sponge that releases small amounts of the oil when it is compressed. In many cases, the thickener is a metallic soap. Besides oil and thickeners, different types of additives are required.

Metal-working fluid (cutting fluid)

The main purpose of metal working (cutting) fluid/oil is to cool, lubricate and remove shavings created during metalwork. They can be divided into those that can be mixed with water and those that cannot. The first group contains tensides and often biocides.

Anti-corrosion fluid

Anti-corrosion agents are used to prevent or reduce corrosion of metals caused by water and oxygen. Their primary function is to form a protective film. Anti-corrosion agents contain additives in the form of water-repelling agents and oxidation and rust inhibitors.

Composition of oil-based lubricants

The base oil is chosen on the basis of the intended use of the product/lubricating oil. Mineral oil is the most widely used base oil in lubricating oils.

Additives are used to improve the properties of the product for its intended use, e.g. to meet the requirements placed on the lubricant with respect to lubrication performance, change intervals, temperature range and corrosion protection.

The properties of the end-product are governed both by the base oil and the additives used. The amount of each additive used varies from a few mg/kg (parts per million, ppm) to 10–20%.

Base oils

There are three main types of base oil:

- Mineral oils - refined petroleum oils,
- Vegetable oils - refined plant oils, and
- Synthetic oils - oils produced synthetically from petroleum or plant oils.

The three main types of base oil are described below.

Mineral oils

The most common raw material for producing lubricating oil is petroleum, also known as crude oil. The crude oil is normally retrieved from bedrock and is distilled, which means that it is separated into a number of fractions by boiling point. Distillate from fractions used for the manufacture of lubricating oil contains many chemical compounds. Besides saturated hydrocarbons it also contains aromatics, sulphur, oxygen and nitrogen as well as metallic compounds. In order to produce a product that can be used as a base oil, the distillate is refined (purified) by various methods. The final base oil consists of a complex mixture of hydrocarbons with different structures.

Vegetable oils

Vegetable oils consist mainly of esters and are obtained from oil-rich plants such as rapeseed. One area of use for vegetable oils is in mobile hydraulic equipment, where there may be a risk of leakage and spillage into water courses and land. Vegetable oils biodegrade relatively easily, so they are more environmentally friendly than similar mineral oil-based products. The main disadvantage of natural vegetable oils is that they are sensitive to water which can break the oil down relatively quickly, in other words they have poor hydrolytic stability, they also have poor oxidation stability. There are other types of vegetable oil such as castor oil, but these are not very common today.

Synthetic oils

Synthetic oil is a broad term; the only common denominator is that they are made by chemical processes. The group includes different products such as polyalphaolefins (PAO), synthetic esters (polyesters, diesters, phosphate esters, saturated esters), silicone oils, polyglycols etc. These oils have quite different properties and hence different applications. The term 'synthetic oil' should therefore be used with caution; rather, one should specify the type of synthetic oil that is meant.

The different types of synthetic oils are described below.

Polyalphaolefin, PAO

The base oil in synthetic engine oil, intended for petrol and diesel automotive engines, is produced from polyalphaolefin, or PAO for short. PAO can be used for most applications that require a stable product. The finished base oil consists of synthetic hydrocarbons, with properties similar to normal mineral oil, and it can also be mixed with these. The difference is that all hydrocarbons in PAO have basically the same structure, which is determined during manufacture, whereas mineral oil is a mixture of hydrocarbons with an almost infinite number of variations.

PAO base oil is free from the impurities that may be present in mineral oil, such as polycyclic aromatic hydrocarbons (PAHs), which is an advantage from a health perspective.

Synthetic esters

Synthetic esters are made out of acid and alcohol, and due to the vast diversity in the end product, these esters can be made into a large number of products with different characteristics.

Synthetic ester oils are often used due to their excellent high temperature characteristics in e.g. aviation engine oils. These ester oils may be diesters or polyesters. Today polyesters are most common. Apart from diesters and polyesters there are other types of synthetic esters such as dimeresters, aromatic esters, monoesters and phosphate esters.

The disadvantages of ester oils are that they have a negative effect on many rubber materials and, like vegetable oils, are sensitive to water and easily broken down by hydrolysis.

Polyglycols

Polyglycols are a group of synthetic oils that are used as brake fluids and transmission oils, amongst others things. They can dissolve a certain quantity of water, which is an advantage in some situations.

Silicone oils

Silicone oils are synthetic oils which often contain polydimethylsiloxane, PDMS. They are very chemically stable but have poor lubrication properties. As they are compressible they are very suitable as brake fluids.

Additives

Additives can improve the properties of the base oil and introduce new properties to the final product.

Some examples of common additives:

Organo-metallic additives

Some of the most common additives used in oils are organo-metallic compounds. They often contain chemical elements such as zinc, phosphorus, sulphur, calcium, magnesium and molybdenum.

Viscosity index improver

Polymetacrylate, PMA, is a polymer used as a viscosity index improver, which means it reduces the oil's change in viscosity with temperature and to lower the pour point for hydraulic oil. This additive is used in very high doses, sometimes as high as 10–20%.

EP additives

EP (Extreme Pressure) additives are used to increase lubrication at high pressure and are common in transmission oils. Sulphur and phosphate compounds are often used as EP additives.

AW-additives

Aryl phosphate or phosphate esters are common AW (anti-wear) additives in hydraulic and engine oils. A very common AW additive is zinc dialkyldithiophosphate (ZDDP) which is sometimes categorised as an EP additive.

Corrosion inhibitors

Today phosphate esters, sulphonates and thiophosphates are used as corrosion inhibitors.

Antioxidants

Antioxidants prevent oxidative decomposition of the oil. Amines and phenols are examples of antioxidants.

Biocides

Biocides are used in water-soluble products to prevent biological decomposition of the oil by inhibiting bacterial growth. Triazines and thiazoles are examples of biocides.

12. GENERAL INFORMATION ABOUT FUEL

Contents

General information about fuel	240
AVIATION fuel	240
Aviation turbine fuel, Flygfotogen 75 (M0754-3750XX)	241
Aviation fuel NATO F-34	241
Jet A/Jet A-1	241
Aviation fuel NATO F-24	241
Aviation fuel NATO F-44 (M0754-3800XX)	241
Aviation gasoline, Flygbensin 33 (M0754-2330XX)	242
GROUND Fuel	242
Diesel MK 1 (M0754-4100XX)	242
European diesel	243
NATO F-54	243
NATO F-34	243
NATO F-63	243
Unleaded gasoline 95 (M0754-2940XX)/	
Unleaded gasoline 98 (M0754-2980XX)	243
NATO F-67	243
MARINE Fuel	244
Marine diesel MK 1 (M0754-4300XX)	244
Diesel fuel oil 60 (M0754-4600XX)	244
NATO F-76	244

General information about fuel

The most common petroleum based fuels consist of different petroleum fractions of liquid hydrocarbons and sometimes performance enhancing additives.

The three main types of fuel used in combustion engines are:

1. Petrol/gasoline - used for aviation and ground vehicles. Petrol is a volatile, flammable fuel used in internal combustion engines (Otto engines). It is a petroleum fraction with a boiling range of 25–205 °C which consists of hydrocarbons with 4 to 12 carbon atoms (C₄–C₁₂).
2. Aviation turbine fuel (jet fuel) - used in turbine engines mostly for aviation. It is a heavier petroleum fraction than petrol with a boiling range of 150–300 °C. Aviation turbine fuel consists of a complex mix of hydrocarbons with 8 to 16 carbon atoms (C₈–C₁₆) depending on manufacturing process and the type of crude oil. Its role in an engine is primarily as fuel, but also as a cooling and lubricating fluid. It is for this reason that there are strict requirements for the characteristics of aviation turbine fuel.
3. Diesel - used for ground vehicles and marine applications. Diesel is a petroleum fraction with a boiling range of 180–340 °C and consists of hydrocarbons with 10 to 22 carbon atoms (C₁₀–C₂₂). Diesel includes automotive diesel and diesel fuel oil, which is used in marine propulsion. In both types of engines the fuel is ignited by compression heat instead of a spark.

There are specifications which describe the requirements for all military and civilian fuels depending on how and where they are used. The requirements for aviation fuel are tougher than for ground fuel and marine fuel.

Taking into account the different requirements, the three main types of fuel will be described according to their field of application - aviation, ground and marine.

AVIATION fuel

The most common aviation fuels are presented in Table 1. The products used in the Swedish Armed Forces are those with M-designations and Aviation fuel NATO F-34.

Table 1. Aviation fuels

Swedish stock designation	Other designation	Standard	Note
Aviation turbine fuel (Flygfoto75) M0754-3750XX		FSD 8607	Sweden ¹
	NATO F-24	STANAG 3747	
Aviation fuel NATO F-34	NATO F-34 JP-8	STANAG 3747 MIL-DTL-83133 DEFSTAN 91-87	USA UK
	NATO F-35	STANAG 3747 MIL-DTL-83133 DEFSTAN 91-091	USA UK
Aviation fuel NATO F-44 M0754-3800XX	NATO F-44 JP-5	STANAG 3747 MIL-DTL-5624 DEFSTAN 91-86	USA UK
	Jet A/Jet A-1	ASTM D1655	Civil aviation fuel
Aviation gasoline (Flygbensin 33) M0754-2330XX	NATO F-18 AVGAS 100LL	DEFSTAN 91-90 ASTM D910	UK Civil aviation fuel

1. Aviation turbine fuel, Flygfoto75 (FF75) is most widely used in the Swedish Armed Forces. FF75 is equivalent to NATO F-35 with added corrosion inhibitor/lubricity improver (CI/LI).

Aviation turbine fuel, Flygfotogen 75 (M0754-3750XX)

Flygfotogen 75 (often shortened to FF75) is the most widely used type of aviation fuel in the Swedish Armed Forces. It is used for turbine engines for aeroplanes and helicopters. Flygfotogen 75 is a flammable liquid that contains a complex mix of hydrocarbons and has a flashpoint of at least 38 °C.

Flygfotogen 75 contains static dissipator additive to reduce the risk of electrostatic charges and corrosion inhibitor/lubricity improver additive (CI/LI). Fuel system icing inhibitor (FSII)/anti-icing additive is not permitted in Flygfotogen 75.

FSD 8607 specifies the requirements for Flygfotogen 75 and has harder environmental requirements than other international aviation fuel standards. Flygfotogen 75 must contain no more than 0.1 mass% sulphur compared with max 0.3 mass% in NATO aviation fuels (F-35/F-34). This means that Flygfotogen 75 fulfils the requirements for NATO F-35, whereas often international aviation fuels do not meet the requirements for FSD 8607. Furthermore, the additive requirements differ between the different fuel types.

Aviation fuel NATO F-34

Aviation fuel NATO F-34 is used for Helicopter 16 in the Swedish Armed Forces. Aviation fuel NATO F-34 follows the same specification as NATO F-35, with the additional requirement that it shall contain fuel system icing inhibitor (FSII) DiEGME. In the US, Aviation fuel NATO F-34 is also called JP-8. Within the Swedish Armed Forces aviation fuel NATO F-34 is obtained by adding anti-icing additive, M0729-4670XX to Flygfotogen 75.

Jet A/Jet A-1

Jet A and Jet A-1 are civilian jet fuels that are specified by ASTM D1655. They have less strict requirements for the amount of solid contaminants and acidity permitted than the military standards. Most of the other requirements are as strict as for military aviation fuels. The difference between Jet A and Jet A-1 is that Jet A has a less strict requirement for the freezing point than Jet A-1 (max -40°C compared with max -47°C for Jet A-1).

Additives that are allowed, though not mandatory, are antioxidants, metal deactivator additive (MDA), static dissipator additive (SDA), corrosion inhibitor/lubricity improver (CI/LI) additive and fuel system icing inhibitor (FSII).

Aviation fuel NATO F-24

Aviation fuel NATO F-24 has the same requirements as Jet A in accordance with ASTM D1655 and contains the same additives as NATO F-34, i.e static dissipator additive (SDA), corrosion inhibitor/lubricity improver (CI/LI) additive and fuel system icing inhibitor (FSII). NATO F-24 is mostly used in the USA.

Aviation fuel NATO F-44 (M0754-3800XX)

NATO F-44 is an aviation fuel used for refuelling aircraft and helicopters on board naval vessels. When storing and handling fuel onboard ships there is a requirement for a higher flash point (min 60 °C) thus decreasing the risk of fire.

Like aviation turbine fuel Flygfotogen 75, NATO F-44 has very strict requirements. Aviation fuel NATO F-44 which is used by the Swedish Armed Forces must meet the requirements of MIL-DTL-5624.

NATO F-44 contains anti-icing additive and corrosion inhibitor/lubricity improver additive. There is no requirement for static dissipator additive to raise the electrical conductivity of the fuel.

Aviation gasoline, Flygbensin 33 (M0754-2330XX)

Flygbensin 33 is an aviation gasoline. It is a low viscosity, volatile and flammable liquid with a blue colour. It is extremely flammable and has a boiling range of 35–160 °C which is narrower than for automotive petrol/gasoline. It has an octane number of 100 according to the Motor Octane Number method, which is higher than automotive petrol/gasoline and lowers the risk of vapour lock at elevated temperature

Flygbensin 33 is equivalent to NATO F-18 or AVGAS 100LL, where 100 stands for the octane number and LL stands for low leaded. It contains max. 0.053 vol% tetraethyl lead as an antiknock additive that improves the octane number.

Unlike automotive petrol/gasoline, Flygbensin 33 must not contain ethanol or other oxygenates. In the Swedish Armed Forces Flygbensin 33 is only used as fuel for UAVs (unmanned aerial vehicles).

GROUND Fuel

The most common fuels for ground vehicles are presented in Table 2, where M-designated products are used in the Swedish Armed Forces.

Table 2. Ground fuel

Swedish stock designation	NATO designation	Standard	Note
Diesel MK 1 M0754-410000		SS 15 54 35	
Unleaded gasoline 95 M0754-2940XX	NATO F-67	SS EN 228 STANAG 7090	
Unleaded gasoline 98 M0754-2980XX		SS EN 228	
	NATO F-34	STANAG 3747 MIL-DTL-83133 DEF STAN 91-87	USA UK
	NATO F-54	STANAG 7090 A-A-52557 BS EN 590	USA UK
	NATO F-63	STANAG 7090	USA - NATO F-34+S-1750

Diesel MK 1 (M0754-4100XX)

Diesel MK 1 is an automotive diesel 1 which is ignited by compression heat instead of ignition by a spark. It is used in diesel engines and some gas turbines. It is a class 3 flammable liquid with a flashpoint of at least 56 °C.

Diesel MK 1 meets the Swedish standard SS 15 54 35. In other countries some standards may differ, such as the sulphur or aromatic content.

The Swedish Armed Forces does not allow fatty acid methyl esters (FAME), known as biodiesel, in the diesel fuel, since it has poor storage stability. At civilian petrol stations there is usually 5–7 vol% FAME in the diesel fuel.

European diesel

European diesel meets the standards of EN 590. It is practically equivalent to Diesel MK1. Diesel MK1 meets the requirements of EN 590.

NATO F-54

NATO F-54 is a military diesel that can contain up to 50 ppm sulphur, compared to 10 ppm sulphur in European diesel (EN 590) and Diesel MK1.

Outside the borders of Europe the diesel requirements vary. The most varying properties are low temperature properties, cetane number, sulphur content and contaminants.

NATO F-34

NATO F-34 is primarily an aviation fuel but it can also be used as a fuel in certain ground vehicles without the need for extra additives. NATO F-34 has the same requirements as NATO F-35 but with added fuel system icing inhibitor (DiEGME). In the USA NATO F-34 is also called JP-8. Within the Swedish Armed Forces aviation turbine fuel Flygfotogen 75 is converted to NATO F-34 by adding anti-icing additive (M0729-4670XX).

NATO F-63

NATO F-63 is an aviation turbine fuel with an additive which enables it to work as a fuel for diesel engines in vehicles. The additive S-1750 (M0729-4700XX) is added to NATO F-34 at a concentration of 0,10 vol% to raise the cetane number and lubricity. The use of NATO F-63 is limited within Swedish Armed Forces and the fuel is mainly intended for international operations.

Unleaded gasoline 95 (M0754-2940XX)/

Unleaded gasoline 98 (M0754-2980XX)

Unleaded gasoline 95/98 is automotive petrol/gasoline with a boiling range of 25–205 °C. It is a volatile and flammable liquid used in four-stroke or two-stroke engines, where alkylate petrol/gasoline is not used. It is an extremely flammable liquid with a flash point of -40 °C.

Unleaded gasoline 95 and 98 meet the requirements of SS-EN 228. Unleaded gasoline 98 has a higher octane number than Unleaded gasoline 95 and is used in engines with a requirement for a higher octane number.

According to Swedish standard, SS EN 228, Motorbensin 95 and 98 may contain up to 10 vol% ethanol, which works as an oxygenater and improves the octane number of the fuel. The percentage of ethanol may vary in other countries.

In the Swedish Armed Forces Unleaded gasoline 95 and 98 contain up to 5 vol% ethanol.

Some vehicles made before 1989 require an additive containing potassium to protect the cast steel valve seats when running on lead-free petrol. TO AF DRIVM 600 000004 describes what vehicles are affected and how the additive is to be dosed into the petrol.

NATO F-67

NATO F-67 is an unleaded petrol/gasoline. It follows the same requirements as Unleaded gasoline 95 and 98. However it may have max 50 ppm sulphur compared to 10 ppm in Unleaded gasoline 95 and 98.

MARINE Fuel

Heavier petroleum distillates with higher boiling points than automotive diesel are used at sea, they are known as fuel oil. These fuels have less strict requirements than automotive diesel. They have lower cetane number and poorer combustion properties than automotive diesel and release more pollution e.g. sulphur dioxide.

The most common ship fuels are presented in Table 3, where M-designated products are used in the Swedish Armed Forces.

Table 3. Marine fuels

Swedish stock designation	Other designation	Standard	Note
Marine diesel MK1 M0754-4300XX	Diesel MK1	SS 15 54 35	
Diesel fuel oil 60 M0754-4600XX	Fuel oil 1 E10/E32	SS 15 54 10	
	NATO F-76	MIL-DTL-16884	Naval distillate fuel, USA

Marine diesel MK 1 (M0754-4300XX)

Marine diesel MK 1 is a diesel fuel which is ignited by compression heat instead of ignited by a spark. It is used in diesel engines and some gas turbines on ships. It is a class 3 flammable liquid with a flash point of at least 56 °C.

Marine diesel MK 1 is equivalent to Diesel MK 1 and has a sulphur level of max 10 ppm.

Diesel fuel oil 60 (M0754-4600XX)

Diesel fuel oil 60 is used in the Swedish Armed Forces on board ships. It is a class 3 flammable liquid with a flash point of at least 56 °C and contains up to 500 ppm (0.05 mass%) sulphur.

Diesel fuel oil 60 is available in summer and winter grades. The summer grade satisfies the requirement for Diesel fuel oil Eo1 E10 in SS 155410 and has low temperature properties up to max -10 °C (CFPP). The winter grade satisfies the requirement for Diesel fuel oil Eo1 E32 in SS 155410 and has a cold filter plugging point up to -32 °C.

The properties of Diesel fuel oil 60, for example lubricity and cetane index, fulfil the requirements of the engine systems used onboard the Swedish Armed Forces naval vessels.

Diesel fuel oil for ships is coloured green (tax-free) in Sweden. In other countries there may be other colours e.g. red in Germany and the UK.

NATO F-76

NATO F-76 is an international standard of marine fuel which is equivalent to summer grade diesel fuel oil Eo1 E10 in SS 155410 when it comes to low temperature properties, however the requirements for flashpoint is min 60 °C.

NATO F-76 may contain up to 10 000 mg/kg (1 mass%) sulphur, but fuels with a lower level of sulphur are preferred. MIL-DTL-16884 states a level of sulphur of max 15 mg/kg (0.0015 mass%) in NATO F-76.

13. GENERAL INFORMATION ABOUT ADDITIVES

Contents

Additives in aviation fuel	246
Corrosion inhibitor/lubricity improver additive (CI/LI)	246
Static dissipator additive (SDA)	247
Fuel system icing inhibitor (FSII)	247
Tetraethyl lead (TEL)	247
Metal deactivator (MDA)	248
Biocides	248
Additives in ground and marine fuel	248
Potassium additive	248
Cetane number and lubricating additive	248
Biocides	248

Additives in aviation fuel

The additives that are allowed in aviation fuel according to the most common fuel standards are presented in Table 1.

Table 1. Additives in aviation fuel

Swedish stock designation	NATO designation	Other designation	Common additives	Note
Aviation turbine fuel (Flygfotoegen 75) (M0754-3750XX)			<ul style="list-style-type: none"> • CI/LI • SDA 	<ul style="list-style-type: none"> • Additive Hitec 580 (M0729-4630XX)/ Additive DCI-4A (M0729-4632XX) • Additive Stadis (M0729-4650XX) FSII is not permitted
	NATO F-24		<ul style="list-style-type: none"> • CI/LI • SDA • FSII 	Refer to STANAG 3747 for approved additives
Aviation fuel NATO F-34	NATO F-34	JP-8	<ul style="list-style-type: none"> • CI/LI • SDA • FSII 	Refer to MIL-DTL-83133/ DEF STAN 91-87 for approved additives
	NATO F-35		<ul style="list-style-type: none"> • SDA 	Addition of CI/LI and FSII is permitted
Aviation fuel NATO F-44 (M0754-3800XX)	NATO F-44	JP-5	<ul style="list-style-type: none"> • CI/LI • FSII 	Refer to MIL-DTL-5624/ DEF STAN 91-86 for approved additives
		Jet A/Jet A-1	<ul style="list-style-type: none"> • SDA 	Addition of CI/LI and FSII is permitted
Aviation gasoline (Flygbensin 33) (M0754-2330XX)	NATO F-18	AVGAS 100LL	<ul style="list-style-type: none"> • Antiknock additive (TEL) • Blue dye 	AVGAS 100LL may contain CI/LI, SDA and FSII

Corrosion inhibitor/lubricity improver additive (CI/LI)

Corrosion inhibitor/lubricity improver (CI/LI) additives improve the lubricating properties of the fuel and prevent corrosion in steel components in the distribution and fuel system of the aircraft.

The NATO code for this additive is S-1747. Qualified additives are stated in QPL-25017 according to MIL-PRF-25017 or the relevant DEF STAN, depending on the type of aviation fuel. All qualified products work in the same way though their different formulations result in differing physical characteristics.

The additives used in the Swedish Armed Forces are Additive Hitec 580 (M0729-4630XX) and Additive DCI-4A (M0729-4632XX). Both additives are also qualified for use in NATO F-34 and F-44 according to MIL-PRF-25017 and the relevant DEF STAN.

The allowed dose of Additive Hitec 580 (M0729-4630XX) and Additive DCI-4A (M0729-4632XX) can be found in FSD 8607. Hitec 580 is not readily soluble in aviation fuel and thus must be added in small doses and while mixing.

Static dissipator additive (SDA)

Static dissipator additive increases the conductivity of the fuel. Fuel can be charged electrostatically during transportation, pumping, mixing or filtering. If the voltage difference between two points becomes too large, it may cause discharge. Without the additive the conductivity of aviation fuel is 0-10 pS/m. With the additive the conductivity should be between 50-600 pS/m for Flygfoto 75 according to FSD 8607.

The additive used in the Swedish Armed Forces is Additive Stadis (M0729-4650XX) which is approved according to MIL-DTL-83133 (NATO F-34 and F-35); DEF STAN 91-87 (NATO F-34) and DEF STAN 91-091 (NATO F-35).

The effect of the static dissipator additive may vary greatly with each batch of fuel. This depends on a number of factors that affects susceptibility to the additive, dosage is therefore case specific. The allowed SDA addition is specified in FSD 8607.

The conductivity in aviation fuel is also susceptible to change due to factors like temperature, transportation, storage, sun light, and must therefore be monitored regularly. These factors may also affect different batches of fuel differently.

Fuel system icing inhibitor (FSII)

Fuel system icing inhibitor is an anti-icing additive that prevents ice formation in the fuel system by lowering the freezing temperature of any water present in the fuel. The additive used in the Swedish Armed Forces is diethylene glycol monomethyl ether (DiEGME), NATO S-1745 according to MIL DTL-85470 and DEF STAN 68-252.

FSII is added using dosing equipment in the supply chain (M0729-467010, M0729467002) or by aerosol can "Prist Hi-Flow, Hi-Flo" (M0729-467093) according to TO AF DRIVM 500-021377.

The additive can affect water-absorbing filter elements in a negative way and should therefore be added after these filters.

The FSII is added in the following concentrations:

NATO F-34:	0.07-0.10 vol% according to MIL-DTL-83133
	0.10-0.15 vol% according to DEF STAN 91-87
NATO F-44:	0.08-0.11 vol% according to MIL-DTL-5624
	0.12-0.15 vol% according to DEF STAN 91-86

The amount of FSII for NATO F-34 differs from MIL-DTL-83133 and DEF STAN 91-87. Due to cost-reducing reasons in the US the amount of FSII in MIL-DTL-83133 was lowered from previous 0.10-0.15 vol% to the current 0.07-0.10 vol% while maintaining the effect. Within the Swedish Armed Forces, the amount of FSII that is considered acceptable in NATO F-34 is 0.07-0.15 vol% and in NATO F-44 is 0.08-0.15 vol%. The dosing equipment of the Swedish Armed Forces is calibrated to dose 0.11 vol% anti-icing additive.

Tetraethyl lead (TEL)

Tetraethyl lead (TEL) is an antiknock additive that boosts the octane rating in aviation gasoline. Flygbensin 33 contains max. 0.053 vol% TEL which is equivalent to 0.56 gPb/l.

TEL is added to Flygbensin 33 before delivery to the Swedish Armed Forces.

Metal deactivator (MDA)

A metal deactivator, N, N-disalicylidene-1,2-propanediamine, RDE/A/650 according to FSD 8607, may if necessary be added to the aviation fuel at a dose of up to 5.7 mg/l. This additive is used if the fuel has been contaminated with trace metals averse to the thermal stability such as copper, cadmium, iron, zinc and cobalt.

The additive that is used in the Swedish Armed Forces is Additive MDA (M0729-4631XX).

Biocides

Biocides are bactericides that kill micro-organisms and prevent further growth. As soon as abnormal growth of micro-organisms is established, the fuel and the equipment shall be treated with biocides according to TO AF DRIVM 600 019023. Biocides on the market are effective in rather low concentrations. They are also environmentally harmful and must be handled as such. Since the biocide is toxic, drained water containing biocides must be treated in an environmentally safe manner.

For aviation fuel the most common biocide is Kathon FP 1.5 (M0729-4680XX).

Additives in ground and marine fuel

Potassium additive

Some petrol/gasoline engines made before 1989 require an additive containing potassium to protect the cast iron valve seats when running on unleaded petrol/gasoline.

TO AF DRIVM 600-000004 describes which vehicles are affected and how the additive is to be dosed into the petrol. One option is Additive potassium (M0729-460133) in a 500 ml dosing bottle that can be added when refueling vehicles.

Cetane number and lubricating additive

To be able to use NATO F-34 aviation fuel in vehicles an additive is added to increase the cetane number and the lubricity. With the additive NATO F-34 is designated NATO F-63.

Cetane number and lubrication improving additive is added at a concentration of 0.10 vol%. The NATO code is S-1750 (M0729-4700XX). The use of this additive within the Swedish Armed Forces is limited and the additive is mainly intended for international operations.

Biocides

Biocides are bactericides that kill micro-organisms and prevent further growth. As soon as abnormal growth of micro-organisms is established, the fuel and the equipment shall be treated with biocides according to TO AF DRIVM 600 019023. Biocides on the market are effective in rather low concentrations. They are also environmentally harmful and must be handled as such.

The most common biocide for ground and marine fuel is Grotamar 82 (M0729-4690XX), which is also used in the Swedish Armed Forces. Grotamar 82 is a bactericide that kills micro-organisms (bacteria, mould and yeast).

The biocide is primarily used to decontaminate cisterns, tanks and hoses etc. that are contaminated with micro-organisms. The marine diesel supplied to the Swedish Armed Forces today has 250 ppm Grotamar 82 added as a preventive measure as there have previously been problems with microbial growth in diesel in marine environments.

14. QUALITY ASSURANCE OF FUEL AND LUBRICANTS

Contents

General information about quality assurance of fuel and lubricants	250
Fuel	250
Fuel sampling	250
Lubricants and other liquids	251
Sampling of lubricants and other liquids	252

General information about quality assurance of fuel and lubricants

The aim of quality monitoring of fuel and lubricants within the Swedish Armed Forces is to ensure the quality of the products with respect to their individual specifications and to avoid disruptions caused by malfunctions.

Fuel

The distribution route that fuel takes from refinery to its final point of use involves various types of transport and storage. Each stage in such a chain poses a potential risk of affecting or contaminating the fuel. The most common types of contamination are solid contaminants and water. Other types of contaminants are microorganisms, surfactants and mixing with incorrect fuel, all of which can lead to malfunctions and disruptions in vehicles and equipment. The quality assurance of fuel within the Swedish Armed Forces is regulated by TO AF DRIVM 060-019020 and TO AF DRIVM 060-019021.

In order to ensure that the Swedish Armed Forces' fuel maintains the required quality and to minimise the risk of functional disruptions the fuel must be inspected and tested on a regular basis. The extent of these inspections is related to the potential risk of quality related problems. If there is a high risk of malfunction then extensive testing is carried out, if there is less of a risk then reduced testing is carried out. The regular testing that is carried out is categorised into A test, B-1 test, B-2 test, C test and visual testing, where

- A test is a complete test that is carried out before a product can be accepted from a supplier.
- B-1 test is carried out after product transfer and includes the properties that are most likely to have been affected by distribution and transfer of the product.
- B-2 test is carried out to check the quality of the product after a certain time in storage. This is carried out by verifying the properties that are most affected by aging.
- C test is a quick and simple test to determine that the product is correct and that no mix-ups or changes in the product have occurred.
- Visual testing is a part of the C test and is also carried out after draining to assess the fuel quality. The aim is to detect any visible water and solid contaminants in the fuel.

If a problem with fuel quality is suspected, testing that is relevant to the actual problem is carried out.

Fuel sampling

In order for testing to give a meaningful answer to the question of whether a product fulfils the quality requirements that are placed on it and is fit for use, it is essential that the sample is representative of the volume of fuel in question. If sampling is carried out incorrectly it is impossible to say whether the product is fit for use or not. The value of the sample in assessing fuel quality is entirely dependent on how sampling is carried out. Guidelines on how sampling shall be carried out and which samples are to be taken in different scenarios are found in TO AF DRIVM 060-019020 and TO AF DRIVM 060-019021.

The most common examples of fuel sampling are:

- Directly from a fuel storage tank with a sampler.
- From the drainage point in a fuel storage tank or filter housing.
- A pipeline sample from the pipeline or from the pressurised fuelling coupling.

The type of sample that is required is dependent on the issue at hand.

Cleanliness of sampling equipment is fundamental to the sample's quality and how representative it is, therefore it is critical that the correct sampling equipment is used for the different types of tests that will be carried out. Samplers made from stainless steel are recommended to avoid the sampler's material reacting with the fuel and affecting it, which is something that can happen if e.g. samplers made from brass are used. The sample bottles used shall also be chosen so they avoid reacting with the fuel and having an effect on it. Sample bottles made from brown (M7061-608020) or transparent (M7061-304010) glass are provided. Brown glass bottles are recommended for reference samples that will be stored for a time, as the dark glass reduces light's effect and degradation of the fuel. Transparent glass bottles are recommended for samples that are sent to the laboratory for analysis. The point of sampling, sampler, sampling bottles and any other material that may come into contact with the sample shall always be rinsed well with the fuel to be sampled before sampling commences to avoid external contamination. If there are any doubts contact personnel trained in fuel handling. The most important points to think about when taking fuel samples are listed below:

- Avoid the introduction of external contaminants.
- Avoid sampling in wet weather or protect the sample from water.
- Clean around the sampling point.
- Rinse the sampling equipment twice with the fuel.
- Rinse the sampling bottles at least twice with the fuel. Rinsing is performed by filling the bottle with approx. 20% fuel, closing the lid, shaking the bottle thoroughly and finally discarding the fuel.
- Do not fill the sample bottle more than 95%.
- Protect fuel samples from sunlight.
- Let fuel settle (be still) for a sufficient time before taking samples.
 - Tanker truck: 10 min.
 - Fuel storage tank (cistern): 3 h per metre depth of liquid.
- Follow the relevant safety regulations.

Lubricants and other liquids

When a product is delivered a quality control check needs to be carried out to ensure the product has the specified quality. This applies to new batches of a product, when a product has been stored a certain amount of time and when a product has been transferred or decanted to different packaging. Decanting involves a potential risk for contaminating or affecting the product.

The condition of lubricants and other liquids in use in mechanical systems can be monitored to ensure that the quality of the product is maintained, which because of safety implications is of utmost importance in aviation. It is, however, applicable to all mechanical systems as the products only have a certain lifetime. Samples are taken from e.g. engines, hydraulic systems, gear boxes, and associated equipment and are analysed for properties that can show degradation in product quality e.g. viscosity, additive content and the presence of contaminants. The most common contaminants in lubricants and other liquids are water and solid contaminants e.g. wear particles, soot or sand.

Sampling of lubricants and other liquids

Guidelines on how sampling shall be carried out and which samples are to be taken in different scenarios are found in TO AF FPL 39 9470 023830 (and the relevant DMP/AMP), TO AF HKP 10 12-1, TO AF HKP 14 00-023145, TO AF HKP 15 12-012379, TO AF HKP 16 000-021445.

Samples are taken according to the regulations for respective systems. Samples should be representative for products in use and should therefore be taken as soon as practically possible after e.g. flying. For most samples it is important that specially designed sampling sets are used for the relevant system. Cleanliness at the time of sampling is also important so that samples do not get contaminated. If you have any questions about the recommended sampling bottles please contact the central laboratory (Element oil analysis, tel. +46 13-16 90 00).

If the quality of a packaged product is uncertain, it is recommended that the whole container is sent in for analysis rather than trying to take a sample of the product from the container.

15. ENVIRONMENTAL AND HEALTH RISKS

Information on the environmental and health risks from the individual products can be found in the material safety data sheets provided by the suppliers of the products.

Contents

Health risks and exposure	254
Skin contact	254
Inhalation	254
Eye contact	254
Ingestion	255
Additives – health risks	255
Environmental risks	255
Used oils	255
Safety measures	256
Personal protective equipment	256
Disposal and handling of waste	256

This chapter describes the general health and environmental risks relating to oils.

Information about the health and environmental risks for individual products are found in their material safety data sheets which are provided by the product suppliers. The material safety data sheets for products which are procured/stocked by FMLOG/TvK-Log are available in PRIO and via FMV's logistics portal (<http://logistikportalen.fmv.se>).

Health risks and exposure

Working with oils may carry the risk of exposure via skin contact, inhalation, contact with the eyes and ingestion. No oil product may be regarded as completely harmless to health. The degree of health hazard depends on the base oil used, how pure the product is, and what additives there are in it. The method of handling may also have a bearing on the health risks. Generally speaking, the health risks from handling an oil product increase with the scale of use.

Skin contact

For all types of oil, prolonged and repeated skin contact may have a degreasing effect, which may cause irritation and possibly eczema. Prolonged and repeated skin contact may also cause inflammation of the hair follicles and sebaceous glands, so-called oil spots. These are most often found in places where oil-soaked clothing rubs against the skin, such as the front of the thighs and the forearms.

In some products allergenic components are included in low concentrations e.g. certain resin acids and certain additives which may cause allergic eczema. These are labelled "May cause an allergic reaction" (or similar), but they carry no hazard symbol. The products are not considered a health risk with correct handling and proper use on the condition that prolonged skin contact is avoided and that the person handling the product has not previously been extra sensitive to the allergenic component. In the case of splashing or direct contact, the skin should be washed and contaminated clothes changed.

Highly refined mineral oils are almost free from so-called polycyclic aromatic hydrocarbons (PAHs), a group of substances with carcinogenic properties. Polycyclic aromatic hydrocarbons can also form when mineral oil is used, especially if the oil is exposed to high temperatures.

Oils of the polyalphaolefin (PAO) type, other synthetic oils and vegetable oils do not contain PAH.

Hydraulic oil lines are often under high pressure, which carries an increased risk of leaks and exposure to oil. A small hole in a hydraulic oil line can produce a fine jet coming out at great speed. This jet can cause injury and wounds that are slow to heal. Oil that has penetrated under the skin at high pressure can cause extensive tissue damage to the dermis.

Inhalation

Inhalation of oil in the form of vapour, fumes or mist causes irritation to the respiratory tract. Pain in the nose and throat, coughing and hoarseness may also be brought on by inhalation. High concentrations and prolonged inhalation can cause inflammation of the trachea and complaints resembling pneumonia.

Eye contact

High concentrations of oil in the form of vapour or mist, as well as direct splashing of oil, can irritate the eyes.

Ingestion

Swallowing a small amount of oil does not usually carry an acute risk of poisoning. If a free-flowing (low viscosity) oil is ingested, there is a risk of chemical pneumonia if the oil is drawn down into the lungs (aspiration). The risk increases if the person vomits after ingestion. Symptoms can appear within an hour or up to a day after ingestion.

Additives – health risks

The chemical additives used are of various types and also carry varying health risks.

Often the additives are present in very small amounts, which means that even if the substance itself can cause serious health risks, the product (e.g lubricating oil) may not be regarded as hazardous to health.

Apart from the fact that an individual additive may carry a health risk by itself, additives are also suspected of producing synergistic (combined) effects, either with the base oil or with other additive contained in the product. Chemical additives that contribute to the hazardous character of a product must be indicated in the safety datasheet and by labelling the product.

Environmental risks

Some oils pose an environmental risk for example because they can cause long-term damage to aquatic organisms.

In nature, the degradation rate (the speed of decomposition) for the base oils in lubricants is in general low, but they are all potentially degradable. In aquatic environments, vegetable base oils and some synthetic esters degrade faster than other base oils.

Lubricants have low water solubility and they frequently float on the water. The oil layer can cause physical damage to organisms and it has a negative effect on the transfer of oxygen at the interface between air/water and air/ground. Fish are affected as the water's oxygenation is affected by the oil film and also as the oil can get stuck in their gills. Components in mineral oil can impart odour and taste to the water even at low concentrations (down to a few mg/l).

After a spill on the ground, lubricants are usually absorbed easily by the soil.

In general, lubricant additives are not easily degradable by nature and they can be expected to be absorbed into organic materials.

Used oils

Lubricants are complex mixtures and they can also change during use. Base oils and additives can change by both external and internal factors, and various impurities may be added to the lubricating oil as it is used. The health hazard (possible health risks from the products) generally increases with use.

When oils are used, there is degradation, usually in the form of oxidation. At increased temperature (which is common), degradation is faster. Degradation can cause hazardous substances to be formed.

Metals, exhaust gases, soot particles and fuel are some of the contaminants the oil can absorb when used. PAH levels (polycyclic aromatic hydrocarbons) may be high in used engine oils. PAH levels may also increase in other types of oil during use, but not to the same extent as in engine oil. Some PAHs are carcinogenic.

Safety measures

Workplaces and working methods should be designed so as to avoid direct contact with oil and grease and inhalation of any vapour/mist/fumes.

Protective glasses or face protection should be worn if there is a risk of splashing. Safety gloves should be used in the case of repeated skin contact.

The risk of damage to the skin decreases with good personal hygiene. There must be facilities to wash the hands, particularly before meals, visits to the lavatory and smoking breaks. By using a softening hand cream, one can replace the natural oils in the skin which are washed away, significantly reducing the risk of dry and cracked skin.

It should also be possible to shower before changing out of work clothes into street clothes. Work clothes should be washed regularly.

Work should be carried out in well-ventilated spaces. Work should be planned so as to prevent inhalation of oil or products of decomposition. There is a hygienic limit for oil mist and fumes. There are also specific limits for many individual substances that may be present in oil or formed by degradation. The ventilation of the premises may need to be supplemented by ducting and/or point extractors to prevent the level of impurities in the air from becoming too high, particularly if oils are handled in such a way that mist/aerosols are formed.

Personal protective equipment

When selecting personal protective equipment, the information contained in the supplier's safety data sheets must be followed (section 8 in the safety data sheet).

For more information about the choice of personal protective equipment and for information about alternative protective equipment, refer to the TO below.

- Guidelines for selecting protective gloves AF ALLM 900 010929.
- Guidelines for selecting and using respiratory protection AF ALLM 900 012506.
- Guidelines for selecting and using goggles and protective clothing AF ALLM 900 015826.

In workplaces where large amounts of oil are handled in the open every day, or where the oil being handled may carry particular risks, written safety and handling instructions may be needed. Examples are used engine oil with high PAH levels or oils with high concentrations of bactericides.

Any skin problems or irritation of the respiratory tract that may be attributable to exposure to oil should be reported to the employer. If an oil causes problems for many employees, it may make sense to change to a different one.

Disposal and handling of waste

Oil spills constitute a risk of slipping. To prevent injuries, any oil spills should be removed immediately. Sand, dirt or other inert material may be used as absorbents if necessary.

Spillages and all used oil should be treated as hazardous waste.

16. PACKAGING

Contents

Packaging options	258
Marking	259

The last two digits of the stock code govern the packaging options for any given product. The stock codes are recorded in the Swedish Armed Forces inventory system FREJ and are also available from the PRIO and LIFT systems.

Packaging options

The table below shows the correlation between the last two digits of the stock code and the packaging options. The table is not complete, but gives examples of the pack sizes used for fuels and lubricants.

Table 1. Packaging options

Stock code (last 2 digits)	Packaging options
00	General code
01	Cistern/Tank
02	1/1 barrel (approx. 208 l)
03	1/4 barrel (approx. 60 l)
04	approx. 10 l or kg
05	approx. 5 l or kg
06	approx. 1 l or kg
07	approx. 410 g cartridge
08	approx. 16 l or kg
10	approx. 20 l or kg
12	1/2 barrel (approx. 110 l)
16	approx. 4 l
83	Spray (approx. 350 g or ml)
84	Spray (approx. 300 g or ml)
85	Spray (approx. 250 g or ml)
86	Spray (approx. 240 g or ml)
96	Spray (approx. 400 g or ml)
97	Spray (approx. 100 g or ml)

Marking

FMLOG/TvK-Log supplements the product labelling with a Swedish Armed Forces label; see the example below that shows the information given on the label.

	FBET M0747-023005
	
FBEN TRYCKOLJA 023	
Förp ST	Mtillv 01.02.2012
Mdok 5000245985/12	Mutg 01.02.2014
Levbet NYCO -HYDRAUNYCOIL FH 2	
Serienr	
Partnr 0000001741	Mastat
	

FBET Stock code (M number) for the product.

FBEN Stock name for product.

FÖRP How the product is accounted for in PRIO. The parameter can be unit, litre, metre etc.

MTILLV Supplier's date of manufacture of the product.

MDOK The material document number the product has been allocated in PRIO at the time of receipt. This is the product's M number and is connected to a specific order.

MUTG Expiry date of the product.

LEV BET Suppliers name for the product. NYCO is FMLOG/TvK-Log company letter code for the supplier. HYDRAUNYCOIL FH2 is the supplier's name of the product.

PARTINR The batch number the product has been assigned in PRIO at the time of receipt. This is the product's M number and is connected to the supplier's batch number for a product in a specific order. Applies to supplies with an expiry date.

17. PRODUCTS WITHDRAWN FROM THE PRODUCT RANGE

Contents

M0722-1010XX WEAPONS GREASE 101 (Withdrawn)	262
M0722-1510XX WHITE GREASE 151 (Withdrawn)	263
M0741-0430XX LUBRICATING OIL 043 (Withdrawn)	264
M0741-0582XX AERO ENGINE OIL 0582 (Withdrawn)	265
M0741-0584XX AERO ENGINE OIL 0584 (Withdrawn)	266
M0741-2631XX TRANSMISSION OIL 90/140 (Withdrawn)	267
M0741-2632XX TRANSMISSION OIL 30 (Withdrawn)	268
M0741-3211XX BEARING OIL 3211 (Withdrawn)	269
M0741-5250XX CUTTING OIL 525 (Withdrawn)	270
M0741-8390XX INSTRUMENT OIL 839 (Withdrawn)	271
M0741-8740XX LUBRICATING OIL 874 (Aircraft Turbo Engine) (Withdrawn)	272
M0743-0030XX LOW TEMPERATURE GREASE 003 (Withdrawn)	273
M0743-0070XX GRAPHITE GREASE 007 (Withdrawn)	274
M0743-1190XX GREASE 119 (Withdrawn)	275
M0743-1250XX GREASE 125 (Withdrawn)	276
M0743-2150XX GREASE 215 (Withdrawn)	277
M0743-2160XX GREASE 216 (Withdrawn)	278
M0744-0730XX LUBRICATING OIL (Withdrawn)	279
M0744-0900XX GEAR GREASE 090 (Withdrawn)	280
M0744-0940XX LUBRICATING OIL 094 (Withdrawn)	281
M0744-0950XX LUBRICATING OIL 095 (Withdrawn)	282
M0744-3060XX GREASE 306 (Withdrawn)	283
M0747-0220XX HYDRAULIC FLUID 022 (Withdrawn)	284
M0747-0330XX HYDRAULIC FLUID 033 (Withdrawn)	285
M0747-3900XX SILICON OIL 390 (Withdrawn)	286
M0747-3910XX SILICON OIL 391 (Withdrawn)	287
M0747-3920XX SILICON OIL 392 (Withdrawn)	288
M0747-3950XX SILICON OIL 395 (Withdrawn)	289
M0747-3980XX SILICON OIL 398 (Withdrawn)	290
M0747-3990XX SILICON OIL 399 (Withdrawn)	291
M0747-4000XX RECOIL FLUID 400 (Withdrawn)	292

M0722-1010XX WEAPONS GREASE 101 (Withdrawn)

Weapons grease 101 has been withdrawn from the product range; not being replenished.

Note

The decision was taken in 2003 to replace Weapons Grease 101 for guns (FMV Material 34 800:16195/03).

The weapons grease has been replaced for guns with:

- M0722-1020XX Cleaning Oil CLP
- M0722-1030XX Grease SMX

Technical basis

TB FMV-A 3166:

NLGI 0-1

Description

Weapons grease 101 is an aluminium-saponified mineral oil grease. Its composition was on the basis that it should act both as a cleaner and as a lubricating oil and anti-corrosion agent. In order for the grease to be usable at low temperatures it has a thin consistency and contains a low-viscosity base oil.

Consistency:

NLGI 0-1

Principal use

General lubricant and corrosion protection for weapons.

Material safety data sheet (MSDS)

Not available in PRIO.

Technical data sheet

Not available.

M0722-1510XX WHITE GREASE 151 (Withdrawn)

White grease 151 has been withdrawn from the product range; not being replenished.

Warning!

Because of the high levels of white lead, the product is classed as toxic and harmful to the environment and has been withdrawn from the product range.

It can be replaced with other products such as Grease 055 or Grease 085 as anti-seizing agents. For external corrosion protection, it can be replaced with a fully or semi-drying anti-corrosion agent or an adhesive grease such as Grease 220.

Technical basis

FMV-A:

TB 3169

Description

White grease 151 consists of a thin mineral oil, lanolin and white lead.

Principal use

- Anti-seizing agent for larger threaded joints
- Anti-corrosion agent for components exposed to the weather.

Material safety data sheet (MSDS)

Not available in PRIO.

Technical data sheet

Not available.

M0741-0430XX LUBRICATING OIL 043 (Withdrawn)

Lubricating oil 043 has been withdrawn from the product range; not being replenished.

Technical basis

No applicable standard.

Description

Lubricating oil 043 is a toothed and worm gear oil, ISO VG 32, based on a synthetic oil of the wax-free polyalphaolefin type. Good corrosion protection, good oxidation stability, good demulsifying capability, resistant to mechanical shear, good high and low temperature properties.

Viscosity at 40 °C:	approx. 32 mm ² /s
Viscosity at 100 °C:	approx. 6 mm ² /s
Viscosity index:	133
Pour point:	-54 °C
Flash point:	237 °C

Principal use

Lubricating oil for toothed and worm gears.

CAUTION!

Not used for toothed and worm gears in vehicles.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Mobil SHC 624](#)

M0741-0582XX AERO ENGINE OIL 0582 (Withdrawn)

Aero engine oil 0582 has been withdrawn from the product range; not being replenished.

Technical basis

Defence standard:	FSD 8106
Equivalent US spec:	SAE J-1966 Grade 30 ^a

a. SAE J-1966 Grade 30 has replaced MIL-L 6082 Grade 1065 (NATO O-113).

Description

Aero engine oil 0582 is a mineral oil, practically free from additives.

Viscosity at 100 °C:	approx. 12 mm ² /s
Pour point:	approx. -20 °C
Flash point:	230 °C

Principal use

Running-in oil for aero engines of type LY 4 and LY 5.

Material safety data sheet (MSDS)

Not available in PRIO.

Technical data sheet

[AeroShell Oil 65](#)

M0741-0584XX AERO ENGINE OIL 0584 (Withdrawn)

Aero engine oil 0584 has been withdrawn from the product range; not being replenished.

Technical basis

Defence standard:	FSD 8106
Equivalent US spec:	SAE J-1966 Grade 40 ^b

b. SAE J-1966 Grade 40 has replaced MIL-L 6082 Grade 1100.

Description

Aero engine oil 0584 is a mineral oil, practically free from additives.

Viscosity at 40 °C:	approx. 150 mm ² /s
Viscosity at 100 °C:	approx. 14 mm ² /s
Pour point:	approx. -17 °C
Flash point:	240 °C

Principal use

Running-in oil for aero engines of type LY 4 and LY 5.

Material safety data sheet (MSDS)

Not available in PRIO.

Technical data sheet

[AeroShell Oil 80](#)

M0741-2631XX TRANSMISSION OIL 90/140 (Withdrawn)

Transmission oil 90/140 has been withdrawn from the product range and replaced with transmission oil 80W/140 (M0741-2630XX).

Technical basis

Defence standard:	FSD 8123
Equivalent US spec:	MIL-L-2105 Grade 140

Description

Transmission oil 90/140 is a mineral oil with additives that improve the bearing capacity of the oil film. It is in viscosity class SAE 140 and is equivalent to GL 4 under the API system for transmission oils.

Viscosity at 40 °C:	approx. 320-325 mm ² /s
Pour point:	max -12 °C

Principal use

Lubricating oil for axle gears, enclosed toothed and worm gears and torpedoes.

Material safety data sheet (MSDS)

Not available in PRIO.

Technical data sheet

Not available.

M0741-2632XX TRANSMISSION OIL 30 (Withdrawn)

Transmission oil 30 has been withdrawn from the product range, not being replenished.

Technical basis

No applicable standard.

Description

Transmission oil 30 is a completely synthetic polyolester oil, ISO VG 32.

SAE class:	30
Viscosity at 40 °C:	min 80 mm ² /s
Viscosity at -35 °C:	max 48 500 mPa s
Viscosity index:	min 100
Pour point:	max -25 °C
Flash point:	min 220 °C

Principal use

For machinery with final axles and for hydraulic systems in combination with wet brakes where a transmission oil according to Cat TO-4 is specified.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Statoil Transway AC 30](#)

M0741-3211XX BEARING OIL 3211 (Withdrawn)

Bearing oil 3211 has been withdrawn from the product range, not being replenished.

Technical basis

Defence standard:	FSD 8116
Equivalent British spec:	DEF STAN 91-21, OC-160
NATO code:	0-254

Description

Bearing oil 3211 is a mineral oil mixed with 10% blown rape seed oil which causes the oil to form a stable emulsion with water.

Viscosity at 40 °C:	approx. 150 mm ² /s
---------------------	--------------------------------

Principal use

Lubrication of propeller shaft sleeves with oil-greased sealing box and other applications where oils that form emulsions in water are an advantage.

Material safety data sheet (MSDS)

Not available in PRIO.

Technical data sheet

Not available.

M0741-5250XX CUTTING OIL 525 (Withdrawn)

Cutting oil 525 is withdrawn from the product range because there is no demand for the product.

Technical basis

Defence standard: FSD 8124

Description

Cutting oil 525 is a mineral oil supplemented with an emulsifier that enables the oil to form a stable emulsion with water. It contains anti-corrosion agents.

Principal use

- Conserving the cooling water system in some marine engines.
- Coolant and lubricant in steel cutting processes.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Statoil CoolWay E32](#)

M0741-8390XX INSTRUMENT OIL 839 (Withdrawn)

Instrument oil 839 has been withdrawn from the product range, not being replenished.

Technical basis

Defence standard:	FSD 8121
Equivalent US spec:	MIL-L-3918

Description

Instrument oil 839 is a synthetic oil of a very specific type. It has very unusual surface tension properties for oils, enabling it to spread across metal surfaces.

Viscosity at 40 °C:	approx. 10 mm ² /s
---------------------	-------------------------------

Principal use

“Clockwork oil” for lubricating gemstone bearings in instruments.

Note

The oil is very expensive and may only be used for its intended purpose.

Material safety data sheet (MSDS)

Not available in PRIO.

Technical data sheet

Not available.

M0741-8740XX LUBRICATING OIL 874 (Aircraft Turbo Engine) (Withdrawn)

Technical basis

British spec:	DEF STAN 91-100
NATO code:	0-160
SAAB code:	7138-02

Description

Aircraft engine oil 874 is a synthetic oil of the polyolester type. It has very good oxidation resistance at high temperatures and has good lubricating properties in heavily loaded toothed gears. Like all synthetic oils of this type, it attacks some organic materials such as natural rubber, chloroprene and PVC, so it can only be used in systems where this has been taken into account.

Viscosity at 40 °C:	min 24 mm ² /s
Viscosity at 100 °C:	4.9-5.4 mm ² /s
Viscosity at -40 °C	max 9 500 mm ² /s
Pour point:	max -54 °C

Principal use

Lubricating oil for turbojet and turboshaft engines.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[BP Turbo Oil 25](#)

M0743-0030XX LOW TEMPERATURE GREASE 003 (Withdrawn)

Low temperature grease 003 has been withdrawn from the product range, not being replenished.

Note

Can be replaced in most cases with GREASE 138 (M0743-1380XX).

Technical basis

Defence standard: FSD 8212

Description

The grease is a lithium and calcium-saponified mineral oil-based grease. It is a lubricating oil of an older type based on American specifications that have now been withdrawn.

Consistency: NLGI 2
Dropping point: min 150 °C
Colour: brown

Principal use

Lubrication of low to normally loaded roller bearings and sliding bearings in older aviation equipment.

Temperature range

-55 °C – +80 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

Not available.

M0743-0070XX GRAPHITE GREASE 007 (Withdrawn)

Technical basis

US spec:	SAE-AMS-2518
Equivalent British spec:	DEF STAN 80-80, ZX-13
Equivalent French spec:	AIR 4247/A
NATO code:	S-720
SAAB code:	1186-08

Description

The product comprises equal parts of vaseline and finely ground graphite. It is intended as an anti-seizing agent and is not really a grease.

Consistency:	NLGI 3-4
Colour:	black

Principal use

- Bolted joints on vehicles.
- Anti-seizing paste for hot applications.
- Spark plug threads.

The product is similar to Graphite grease 0071 but it is made by Shell and this product is specified in the lubrication plan for some aircraft while Graphite grease 007 is specified for others.

Shell has stopped producing Aeroshell Compound 08. This means that FMLOG/TvK-Log can no longer replenish the product and has no more in stock. The equivalent product that can be used is M0743-0071XX Graphite grease 0071. Note that if the product is prescribed for airborne vehicles, the product must be qualified and approved to be used in each respective airborne vehicle.

Temperature range

Up to 500 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[AeroShell Compound 08](#)

M0743-1190XX GREASE 119 (Withdrawn)

Grease 119 has been withdrawn from the product range, not being replenished.

Note

Where Grease 119 is specified, it can be replaced with M0743-1230XX Grease 123.

Technical basis

Defence standard:	FSD 8205
Equivalent US spec:	MIL-G-21164D
Equivalent French spec:	DCSEA 353/A
NATO code:	G-353
SAAB code:	1193-9

Description

Grease 119 is based on a synthetic base oil of the diester type thickened with microgel soap and 5% molybdenum disulphide, which further increases lubrication performance under very heavy loads. The molybdenum disulphide means that the grease should only be used to lubricate steel against steel.

It attacks natural rubber and some polymers.

Base oil viscosity at 40 °C:	approx. 10 mm ² /s
Consistency:	NLGI 2
Dropping point:	min 165 °C
Colour:	black

Principal use

Lubrication of heavily loaded steel bearing surfaces.

CAUTION!

Note that Grease 119 and Grease 123 satisfy MIL-G-21164D, but they cannot be mixed as they are of differing composition. Grease 123 consists of lithium complex soap, while Grease 119 consists of a microgel soap.

Use the grease as specified in the instructions for the aircraft concerned.

Temperature range

-75 °C – +120 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[AeroShell Grease 17](#)

M0743-1250XX GREASE 125 (Withdrawn)

Grease 125 has been withdrawn from the product range, not being replenished.

Technical basis

Defence standard:	FSD 8206
Equivalent US spec:	MIL-G-25013D
Equivalent British spec:	DEF STAN 91-55, XG 300
NATO code:	G-372

Description

The grease consists of silicon oil thickened with teflon.

Because of the poor lubrication performance of the silicone oil, it can only be used for lightly-loaded bearings. It is usable over an extremely wide range of temperatures. It has very good mechanical stability and resilience at high temperatures. It is water-resistant and provides good corrosion protection.

Base oil viscosity at 40 °C:	approx. 40 mm ² /s
Consistency:	NLGI 2
Dropping point:	min 232 °C
Colour:	light brown

Principal use

Lubrication of lightly-loaded high-speed roller bearings, particularly where low torque is needed at low temperatures or long operating times at high temperatures.

Temperature range

-75 °C – +230 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[AeroShell Grease 15](#)

M0743-2150XX GREASE 215 (Withdrawn)

Technical basis

Defence standard: FSD 8215

Description

Grease 215 is based on a base oil consisting of mineral oil and polyalphaolefin. It is thickened with a soap of the aluminium complex type. The grease has good lubrication performance under heavy loads and gives good corrosion protection. It has high thermal and mechanical stability and good low temperature characteristic.

Base oil viscosity at 40 °C: approx. 40 mm²/s

Consistency: NLGI 2

Dropping point: min 230 °C

Colour: Yellow

Principal use

Lubricating oil in the central lubrication system in PBV 302.

The manufacturer has withdrawn this grease and no substitute on the market with aluminium complex type is available. If the grease prescribes for applications. Substitute need to be evaluated. Some application it is possible to change to M0743-0210XX Grease 021.

Temperature range

-50 °C – +150 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Divinol Fett AL 682 EP](#)

M0743-2160XX GREASE 216 (Withdrawn)

Grease 216 has been withdrawn from the product range, not being replenished..

Note

Where Grease 216 is specified, it can be replaced with Grease 118.

Technical basis

Bofors standard: W14-38

Description

Base oil viscosity at 40 °C: 9 mm²/s
Consistency: NLGI 1-2
Dropping point: min 180 °C

Principal use

- Lubrication of parts of Haub 77.
- Bearings that need to run freely.
- Lubrication of worm gears, toothed gears, chains etc.

Temperature range

-75 °C – +120 °C.

Material safety data sheet (MSDS)

Not available in PRIO.

Technical data sheet

[Isoflex PDL 300 A](#)

M0744-0730XX LUBRICATING OIL (Withdrawn)

Has been withdrawn from the product range, not being replenished.

Technical basis

US spec: MIL-PRF-907

Description

Lubricating oil, M0744-0730XX, is a copper-based bolted joint paste for high temperatures, based on 40% (copper and graphite).

Flash point: 149

Principal use

Bolted joint paste. Not for oxygen.

Temperature range

-29 °C – +982 °C:

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Loctite C5-A](#)

M0744-0900XX GEAR GREASE 090 (Withdrawn)

Gear grease 90 has been withdrawn from the product range, not being replenished.

Technical basis

Defence standard: FSD 8303

Description

Gear grease 090 is a mineral oil-based grease with an inorganic thickener. It contains bitumen, graphite and molybdenum disulphide. The grease has good adhesion and can even be applied to wet surfaces.

Base oil viscosity: approx. 180 mm²/sec at 40 °C

Consistency: NLGI 1

Dropping point: None

Colour: black

Principal use

Lubrication of open toothed gears, steel wires and heavy chains.

Temperature range

-35 °C – +300 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Q8 Giotto 1](#)

M0744-0940XX LUBRICATING OIL 094 (Withdrawn)

Lubricating oil 094 has been withdrawn from the product range, not being replenished.

Technical basis

No applicable standard.

Description

Lubricating oil 094 is a lubricating paste based on mineral oil, lithium soap, solid lubricant and corrosion protection improver.

Base oil viscosity: 110 mm²/s

Penetration: 285–315

Loading N: 4 800

Principal use

Lubricating oil for sliding and friction surfaces exposed to heavy loads.

Temperature range

-25 °C – +125 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Molykote DX](#)

M0744-0950XX LUBRICATING OIL 095 (Withdrawn)

Lubricating oil 095 has been withdrawn from the product range, not being replenished.

Technical basis

No applicable standard.

Description

Lubricating oil 095 is a light lubricating paste based on mineral and synthetic oils, lithium soap, solid lubricants and an adhesion improver. Counters washing out of cutting oils and emulsions.

Dropping point: 125

Principal use

Mounting paste for chucks and tightening tools.

Temperature range

-25 °C – +250 °C.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Molykote TP 42](#)

M0744-3060XX GREASE 306 (Withdrawn)

Grease 306 has been withdrawn from the product range, not being replenished.

Technical basis

Bofors standard: W14-8

Description

Grease 306 is a calcium-saponified mineral oil crease with corrosion protection additives. It is water resistant and provides good protection against corrosion.

Base oil viscosity at 40 °C: 170 mm²/s
Consistency: NLGI 2
Dropping point: min 90 °C
Colour: dark brown

Principal use

Lubrication and rust protection ring spring assemblies of Bofors design.

CAUTION!

The grease is only intended for the specified use, where only this grease may be used to prevent errors in the hysteresis of the suspension system.

Temperature range

-30 °C – +60 °C.

Material safety data sheet (MSDS)

Not available in PRIO.

Technical data sheet

Not available.

M0747-0220XX HYDRAULIC FLUID 022 (Withdrawn)

Technical basis

Defence standard: FSD 8402

SAAB code: 1216-01

Description

Hydraulic fluid 022 consists of a low-viscosity mineral oil with large amounts of VI improver added, giving a very high viscosity index. It also contains additives that improve lubrication performance and corrosion protection.

It consists of 80% hydraulic fluid 021 and 20% hydraulic oil with a corrosion additive according to the American specification MIL-H-6083. Because tough requirements are placed on purity in aircraft hydraulic systems, the oil is thoroughly filtered.

For ease of identification, it is dyed red.

Viscosity at 40 °C: min 13 mm²/sec

Viscosity at -40 °C: max 550 mm²/sec

Pour point: max -60 °C

Principal use

- Hydraulic oil in FPL 35.
- Damping oil in landing gear FPL 37.
- Hydraulic oil in some armoured vehicles and artillery pieces.

CAUTION!

Hydraulic fluid 022 was previously used as a hydraulic oil in many hydraulic systems for aircraft and armoured vehicles. Because of quality problems in manufacture, the oil has been withdrawn from the product range. The quality problem was that the corrosion protection additive affected the purity of the hydraulic oil in some cases. The choice of alternative oil should be specified by the production manager for the system concerned.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Hydrauncoil FH 46](#)

M0747-0330XX HYDRAULIC FLUID 033 (Withdrawn)

Hydraulic fluid 033 has been withdrawn from the product range, not being replenished.

Technical basis

No applicable standard.

Description

Hydraulic fluid 033 is a mineral oil-based hydraulic oil containing additives to improve oxidation stability, corrosion protection and anti-wear.

ISO VG:	68
Viscosity at 40 °C:	approx. 68 mm ² /s
Viscosity at 100 °C:	approx. 11 mm ² /s
Viscosity index:	min 150
Pour point:	approx. -36 °C
Flash point:	min 200 °C

Principal use

Hydraulic systems and hydraulic transmissions that are exposed to wide variations in temperature.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Shell Tellus Oil T68](#)

M0747-3900XX SILICON OIL 390 (Withdrawn)

Technical basis

No applicable standard.

NATO code: S-1712, S-1714, S-1720

Description

Silicon oil 390 oils are synthetic oils of the dimethyl siloxane type. Silicon oils of this type have a very high viscosity index, are chemically very stable and highly water-repellent. A special property is that – unlike other types of oil – they are compressible, which makes them suitable for use as damping fluids. They are poor lubricants, especially for steel against steel where they really must not be used.

Viscosity at 25 °C: 1.5-2.5 mm²/s

Principal use

Damping fluid in equipment, instruments, etc.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Xiameter PMX-200 Silicone Fluid 0,65-2 cSt](#)

M0747-3910XX SILICON OIL 391 (Withdrawn)

Technical basis

No applicable standard.

NATO code: S-1712, S-1714, S-1720

Description

Silicon oil 391 oils are synthetic oils of the dimethyl siloxane type. Silicon oils of this type have a very high viscosity index, are chemically very stable and highly water-repellent. A special property is that – unlike other types of oil – they are compressible, which makes them suitable for use as damping fluids. They are poor lubricants, especially for steel against steel where they really must not be used.

Viscosity at 25 °C: 4.5-5.5 mm²/s

Principal use

Damping fluid in equipment, instruments, etc.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Xiameter PMX-200 Silicone Fluid 5-20 cSt](#)

M0747-3920XX SILICON OIL 392 (Withdrawn)

Technical basis

No applicable standard.

NATO code: S-1712, S-1714, S-1720

Description

Silicon oil 392 oils are synthetic oils of the dimethyl siloxane type. Silicon oils of this type have a very high viscosity index, are chemically very stable and highly water-repellent. A special property is that – unlike other types of oil – they are compressible, which makes them suitable for use as damping fluids. They are poor lubricants, especially for steel against steel where they really must not be used.

Viscosity at 25 °C: 9.0-11.0 mm²/s

Principal use

Damping fluid in equipment, instruments, etc.

Material safety data sheet (MSDS)

Available in RIO.

Technical data sheet

[Xiameter PMX-200 Silicone Fluid 5-20 cSt](#)

M0747-3950XX SILICON OIL 395 (Withdrawn)

Technical basis

No applicable standard.

NATO code:

S-1712, S-1714, S-1720

Description

Silicon oil 395 oils are synthetic oils of the dimethyl siloxane type. Silicon oils of this type have a very high viscosity index, are chemically very stable and highly water-repellent. A special property is that – unlike other types of oil – they are compressible, which makes them suitable for use as damping fluids. They are poor lubricants, especially for steel against steel where they really must not be used.

Viscosity at 25 °C:

90-110 mm²/s

Principal use

Damping fluid in equipment, instruments, etc.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Xiameter PMX-200 Silicone Fluid 50-1000 cSt](#)

M0747-3980XX SILICON OIL 398 (Withdrawn)

Technical basis

No applicable standard.

NATO code: S-1712, S-1714, S-1720

Description

Silicon oil 398 oils are synthetic oils of the dimethyl siloxane type. Silicon oils of this type have a very high viscosity index, are chemically very stable and highly water-repellent. A special property is that – unlike other types of oil – they are compressible, which makes them suitable for use as damping fluids. They are poor lubricants, especially for steel against steel where they really must not be used.

Viscosity at 25 °C: 450-550 mm²/s

Principal use

Damping fluid in equipment, instruments, etc.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Xiameter PMX-200 Silicone Fluid 50-1000 cSt](#)

M0747-3990XX SILICON OIL 399 (Withdrawn)

Technical basis

No applicable standard.

NATO code:

S-1712, S-1714, S-1720

Description

Silicon oil 399 oils are synthetic oils of the dimethyl siloxane type. Silicon oils of this type have a very high viscosity index, are chemically very stable and highly water-repellent. A special property is that – unlike other types of oil – they are compressible, which makes them suitable for use as damping fluids. They are poor lubricants, especially for steel against steel where they really must not be used.

Viscosity at 25 °C:

900-1 100 mm²/s

Principal use

Damping fluid in equipment, instruments, etc.

Material safety data sheet (MSDS)

Available in PRIO.

Technical data sheet

[Xiameter PMX-200 Silicone Fluid 50-1000 cSt](#)

M0747-4000XX RECOIL FLUID 400 (Withdrawn)

Recoil fluid 400 has been withdrawn from the product range, not being replenished.

Note

Has been withdrawn and can be replaced in most cases with Recoil fluid 415 (M0747-4150XX).

Technical basis

Defence Standard: FSD 8405

Description

Recoil fluid 400 consists of 75% glycerol and 25% distilled water. It contains corrosion protection additives.

Principal use

For recoil damping systems in artillery pieces.

Material safety data sheet (MSDS)

Not available in PRIO.

Technical data sheet

Not available.

18. SELECTION OF PRODUCTS WITHIN AVIATION

Contents

General	294
Choice of product	294
Lubricating oil	294
Hydraulic oil	294
Grease	294
Liquid fuel	295
Other products	295

General

All products approved by FMV for use on the Swedish Armed Forces equipment can be found in CD PRKAT FUEL M7789-000193. Suitable products are determined by the equipment's technical specifications.

Choice of product

The equipment's technical specifications determine which product to choose. The most frequent products within each product group for applications on flying aircrafts are listed in the coming parts. More information about the products can be found under respective product in the catalogue.

Lubricating oil

M0741-0420XX LUBRICATING OIL 042.....	32
M0741-2430XX AIRCRAFT ENGINE OIL 15W/40.....	41
M0741-2580XX GEAR OIL 258.....	45
M0741-8430XX INSTRUMENT OIL 843	63
M0741-8540XX AIRCRAFT TURBINE OIL 854	66
M0741-8560XX AIRCRAFT TURBINE OIL 856	67
M0741-8580XX AIRCRAFT TURBINE OIL 858	68
M0741-8590XX AIRCRAFT TURBINE OIL 859	69
M0741-8600XX AIRCRAFT TURBINE OIL 860	70
M0741-8602XX AIRCRAFT TURBINE OIL	72

Hydraulic oil

M0747-0210XX HYDRAULIC FLUID 021	179
M0747-0230XX HYDRAULIC FLUID 023	180
M0747-0610XX HYDRAULIC FLUID	187
M0747-0660XX HYDRAULIC FLUID (To be withdrawn).....	188

Grease

M0743-0060XX GRAPHITE GREASE 006	78
M0743-0071XX GRAPHITE GREASE 0071	79
M0743-0110XX GREASE 011.....	81
M0743-0160XX BALL-BEARING GREASE 016	83
M0743-1070XX GREASE 107.....	95
M0743-1080XX GREASE 108.....	96
M0743-1181XX GREASE 1181.....	99
M0743-1210XX GREASE 121.....	100
M0743-1230XX GREASE 123.....	101
M0743-1231XX GREASE 1231.....	102

M0743-1310XX GREASE 131	103
M0743-1370XX GREASE 137	104
M0743-1380XX GREASE 138	105
M0743-2250XX GREASE	113
M0744-0550XX GREASE 055	121
M0744-1040XX LUBRICANT 104.....	133

Liquid fuel

M0754-3750XX AVIATION TURBINE FUEL (FLYGFOTOGEN 75).....	204
M0754-3800XX AVIATION FUEL NATO F-44.....	206

Other products

M0722-1020XX CLEANING OIL CLP	159
M0722-1030XX LUBRICATION OIL SMX	160
M0758-0390XX COOLANT 039.....	219

19. SELECTION OF PRODUCTS WITHIN MARINE

Contents

General	298
Choice of product	298
Lubricating oil	298
Hydraulic oil	298
Grease	298
Liquid fuel	299
Other products	299

General

All products approved by FMV for use on the Swedish Armed Forces equipment can be found in CD PRKAT FUEL M7789-000193. Suitable products are determined by the equipment's technical specifications.

Choice of product

The equipment's technical specifications determine which product to choose. The most frequent products within each product group for use in marine applications are listed in the coming parts. More information about the products can be found under respective product in the catalogue.

Lubricating oil

M0741-0310XX COMPRESSOR OIL 031	27
M0741-2402XX MARINE ENGINE OIL 30	38
M0741-2405XX ENGINE OIL 1340	39
M0741-2414XX ENGINE OIL 15W/40.....	40
M0741-2505XX 2-STROKE OIL BIO LIQUID-COOLED	42
M0741-2630XX TRANSMISSION OIL 80W/140	47
M0741-2633XX TRANSMISSION OIL 75W/140	48
M0741-2680XX TURBINE OIL 68	50
M0741-2701XX TRANSMISSION OIL A	51
M0741-8370XX ENGINE OIL SAE 30.....	57
M0741-8408XX ENGINE OIL 5W/30.....	61
M0741-8659XX TRANSMISSION OIL 75W/90	73
M0741-8660XX TRANSMISSION OIL 80W/90	74
M0741-8711XX TRANSMISSION OIL AS.....	75

Hydraulic oil

M0747-0331XX HYDRAULIC FLUID 0331	181
M0747-0332XX HYDRAULIC FLUID 0332 (To be withdrawn).....	182
M0747-0510XX HYDRAULIC FLUID 051	183
M0747-3200XX HYDRAULIC FLUID 320	190
M0747-4150XX RECOIL FLUID 415.....	193

Grease

M0743-0201XX BEARING GREASE 020	84
M0743-0210XX BEARING GREASE 021	85
M0743-1380XX GREASE 138.....	105
M0743-2170XX GREASE 217.....	108
M0743-2180XX GREASE 218 (To be withdrawn).....	109
M0743-2200XX GREASE 220.....	111

Liquid fuel

M0754-4600XX DIESEL FUEL OIL 60	209
M0754-7210XX ENGINE ALCOHOL 21	210

Other products

M0722-1020XX CLEANING OIL CLP	159
M0722-1030XX LUBRICATION OIL SMX	160
M0722-2020XX ANTI-CORROSION FLUID 202	163
M0758-0210XX ETHYLENE GLYCOL 021	216

20. SELECTION OF PRODUCTS IN LUBRICATION SCHEDULES FOR GROUND SYSTEMS

Contents

General	302
Symbols for lubrication schedule	302
How the symbols are used in lubrication schedules	303
Choice of product	303
Lubricating oil	303
Transmission oil	303
Hydraulic fluid	303
Grease	304
Liquid fuel	304
Other products	304













General

The handbook M7762-000861 HDB PROD MVSCH VFM (English) - Handbook for the production of equipment maintenance schedules according to Vårdsystem FM describes how lubrication schedules are rendered.

All products approved by FMV for use on the Swedish Armed Forces equipment can be found in CD PRKAT FUEL M7789-000193. At production of lubrication schedule these products shall be chosen when possible. Suitable products are determined by the equipment's technical specifications.

Symbols for lubrication schedule

The following symbols are used in the lubrication schedules for the different product types.

	Engine oil
	Transmission oil
	Hydraulic fluid
	Brake fluid
	Corrosion protection fluid
	Grease, hydraulic grease gun
	Grease, grease gun
	Grease
	Drip lubrication, engine oil
	Drip lubrication, with the schedules specified fluid
	Special fluid
	Glycol

How the symbols are used in lubrication schedules

Within the symbols denoting for example engine oil, transmission oil, hydraulic oil et al a number is typed in serial order; the number is added when a new product is included in the lubrication schedules. Numbers are typed in the symbol with start from 1 and then the serial number for the products used in respective lubrication schedule (SMSCH). Under the picture of the object to be handled there is a record of the products denoted with a serial number.

Choice of product

The equipment's technical specifications determine which product to choose in the lubrication schedules. The most frequent products within each product group for applications in ground applications are listed in the coming parts. More information about the products can be found under respective product in the catalogue.

Lubricating oil

M0741-2414XX ENGINE OIL 15W/40	40
M0741-2506XX 2-STROKE OIL AIR-COOLED	43
M0741-8400XX ENGINE OIL 0W/30	58
M0741-8402XX ENGINE OIL 0W/20	59
M0741-8405XX ENGINE OIL 5W/30 SY	60
M0741-8408XX ENGINE OIL 5W/30	61
M0741-8409XX ENGINE OIL 5W/40	62

Transmission oil

M0741-2630XX TRANSMISSION OIL 80W/140	47
M0741-2633XX TRANSMISSION OIL 75W/140	48
M0741-2642XX TRANSMISSION OIL WB	49
M0741-2701XX TRANSMISSION OIL A	51
M0741-8659XX TRANSMISSION OIL 75W/90	73
M0741-8660XX TRANSMISSION OIL 80W/90	74
M0741-8711XX TRANSMISSION OIL AS	75

Hydraulic fluid

M0747-0510XX HYDRAULIC FLUID 051	183
M0747-0590XX HYDRAULIC FLUID 059	184
M0747-0600XX HYDRAULIC FLUID	185
M0747-4150XX RECOIL FLUID 415	193
M0747-4320XX BRAKE FLUID 432	195

Grease

M0743-0060XX GRAPHITE GREASE 006	78
M0743-0071XX GRAPHITE GREASE 0071	79
M0743-0201XX BEARING GREASE 020	84
M0743-0210XX BEARING GREASE 021	85
M0743-0230XX GREASE.....	86
M0743-0251XX GREASE MP	87
M0743-1380XX GREASE 138.....	105
M0743-2170XX GREASE 217.....	108
M0743-2180XX GREASE 218 (To be withdrawn).....	109
M0743-2200XX GREASE 220.....	111

Liquid fuel

M0754-2110XX ALKYLATE GASOLINE 4-STROKE	198
M0754-2940XX UNLEADED GASOLINE 95.....	201
M0754-2980XX UNLEADED GASOLINE 98.....	202
M0754-3240XX KEROSENE 24.....	203
M0754-4100XX DIESEL MK 1	207
M0754-7350XX ALCOHOL 35	211

Other products

M0722-1020XX CLEANING OIL CLP	159
M0722-1030XX LUBRICATION OIL SMX.....	160
M0746-0670XX TRANSFORMER OIL 067 (To be withdrawn)	175
M0758-0210XX ETHYLENE GLYCOL 021	216
M0758-0410XX ALKANOL 041	220