NATO STANDARD

AFLP-4714

MINIMUM QUALITY SURVEILLANCE FOR LUBRICANTS AND ASSOCIATED PRODUCTS

Edition C, Version 1
MAY 2022

NORTH ATLANTIC TREATY ORGANIZATION

ALLIED FUELS AND LUBRICANTS PUBLICATION

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NORTH ATLANTIC TREATY ORGANIZATION (NATO)

NATO STANDARDIZATION OFFICE (NSO)

NATO LETTER OF PROMULGATION

16 May 2022

1. The enclosed Allied Fuels and Lubricants Publication AFLP-4714, Edition C, Version 1, MINIMUM QUALITY SURVEILLANCE FOR LUBRICANTS AND ASSOCIATED PRODUCTS, which has been approved by the nations in the PETROLEUM COMMITTEE, is promulgated herewith. The agreement of nations to use this publication is recorded in STANAG 4714.

2. AFLP-4714, Edition C, Version 1, is effective upon receipt and supersedes AFLP-4714 , Edition B, Version 1 which shall be destroyed in accordance with the local procedure for the destruction of documents.

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4. This publication shall be handled in accordance with C-M(2002)60.

Dimitrios SIGOULAKIS
Major General, GRC (A)
Director, NATO Standardization Office

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RECORD OF RESERVATIONS

CHAPTER	RECORD OF RESERVATION BY NATIONS

The reservations listed on this page include only those that were recorded at time of promulgation and may not be complete. Refer to the NATO Standardization Document Database for the complete list of existing reservations.

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RECORD OF SPECIFIC RESERVATIONS

[nation]	[detail of reservation]
BGR	Due to the lack of appropriate equipment the Bulgarian Armed Forces will not implement the requirements of AFLP-4714 related to B-2 TESTS.
DNK	The Danish Defence Acquisition and Logistics Organization currently does not carry out the “Rust preventive properties” and “Steel Corrosion” tests prescribed for certain greases by STANAG 4714. However, compliance with the associated requirements in the respective national specifications (regarding “Rust preventive properties” and “Steel Corrosion”) is demanded from the supplier prior to acceptance. This reservation specifically applies to the following NATO code numbers (G-353, G-354, G-366, G-372, G-392, and G-395). This reservation reflects our current laboratory capabilities, but is subject to change as the aforementioned tests may be implemented in the future.
FRA	France has the following reservations: • no type B2 tests carried out by France on the following products: O-154, O-160, H-575, C-638, S-720, S-732, S-737, S-738, S-740, S-743, S-749, S-752, S-753, S-1735, S-1747, S-1748 and S-1764; • the marking of French packaging is exempt from contract number, contractor’s name and re-inspect date; • the following tests not carried out: - Penetration (worked) and steel corrosion for G-460; - Total base number for O-1179; - Foam stability for O-185, O-226 and O-228; - Copper corrosion for O-133 and O-1177; - Load carry capability for S-758; - Pour point for O-192; - Viscosity at 54.4°C for O-147; - Water content and pH for H-542; - Drop point and oil separation for G-414; - Antirust properties for G-353, G-354, G-366 and G-395; - Working stability for G-353, G-354, G-355, G-366, G-382, G-392 and G-395; Odor for G-354; - Oil separation for G-359, G-361, G-382; - Foaming for H-515; - Unworked penetration, resistance to aqueous solutions and fuel resistance to hydrocarbons for G-363; - Total acidity for H-580; - Protection and temperature stability for C-610; - Water displacement for C-634; - Corrosion and film appearance for C-620 and C-632; - Flash point, copper corrosion and neutralization number for S-756; - Corrosion for S-736; - Water content for S-745; - Suspended matter and refractive index for S-1717.

<table>
<tr><td>GRC</td><td>AIR FORCE: According to the current capabilities of the HAF laboratory, the tests requirements in the following table are not performed: (enclosed table)

Air Force: According to the current capabilities of the HAF laboratory, the tests requirements in the following table are not performed:
<table>
<tr><th>Test Requirement</th><th>Affected NATO Code Numbers</th></tr>
<tr><td>OXIDATION</td><td>O-133, O-147, O-157, G-403</td></tr>
<tr><td>PROTECTION</td><td>O-142, O-147</td></tr>
<tr><td>VISCOCITY AT -54º C</td><td>O-147</td></tr>
<tr><td>VISCOCITY AT -51º C</td><td>O-148</td></tr>
<tr><td>VISCOCITY AT -40º C</td><td>O-149, H-537</td></tr>
<tr><td>VISCOCITY AT (LOW TEMP)</td><td>S-758</td></tr>
<tr><td>RUST PREVENTIVE PRIORITIES</td><td>G-353, G-354, G-366, G-372, G-392, G-395</td></tr>
<tr><td>CORROSION</td><td>C-635</td></tr>
</table></td></tr>
<tr><td>SVK</td><td>The Slovak Republic reserves the right not to implement Chapter 3 “Naval petroleum products” since there are no Naval Forces in the structure of the Armed Forces of the Slovak Republic.</td></tr>
<tr><td>USA</td><td>The USA DoD minimum quality assurance (Shelf Life update testing) program does not require the Sulphated Ash test for NATO Code O-278, the Penetration (worked) test for NATO Code S-720, nor the TBN test for NATO Code C-640 and C-642.</td></tr>
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SECTION 1 MINIMUM COMMON REQUIREMENTS

MINIMUM COMMON REQUIREMENTS

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MINIMUM COMMON REQUIREMENTS

GENERAL

0101. Training of Personnel. All personnel required for the handling of petroleum products are to be suitably trained to ensure that they are fully competent to perform their duties.

0102. Specifications. The national specifications given at Annex C to STANAG 1135 set out the quality requirements of any product upon procurement.

0103. Qualification Testing. Before a nation accepts any product on which qualification testing is required it is necessary for that nation to ensure that the qualification tests are performed, officially or under official supervision. In the case of imported products, each nation is to ensure that the product has received qualification by the nation of origin. The general characteristics obtained during qualification shall be

available, on request, for subsequent identification of the product so that results obtained during quality control may be compared with them.

0104. Procurement or Source Inspection. An officially designated laboratory capable of carrying out full specification testing of petroleum products by the approved methods, is to be located in, or available to, each NATO nation, and be available to the Service Inspection Authority. Products shall not be accepted unless approved by the cognisant national inspecting authority in accordance with that nation's regulations (AQAP 2131 will aid in this process). Contractors supplying petroleum products shall, as a minimum requirement, meet ISO 9001 or AQAP 2110. Nations having contracts for petroleum products outside their own country, will be responsible for the provision of adequate procurement inspection, either by themselves or by a cross-servicing agreement with the national inspecting authority of the country in which the procurement is made.

0105. Conditions of Use of NATO Markings. The use, within any NATO nation, of the NATO marking system for identification of petroleum products, is to be conditional, not only upon observance of STANAG 1135 for the products themselves, but also upon the full application by that nation of the minimum quality surveillance measures in this STANAG.

0106. If a product becomes off-specification with respect to the NATO allowable deterioration limits given in STANAG 1110 before use, a line of colour contrasting with the NATO Marking and the background colour of the container, is to be drawn diagonally across and beyond the rectangle enclosing the NATO code number. The thickness of the line will be such that it is clearly visible and the NATO marking easily read. The NATO marking is then to be considered cancelled and the product may if desired, be considered as an emergency substitute for the original product and thus may only be used under technical advice.

0107. Packaging, Marking and Identification. Distribution of petroleum products shall be made only from batches that have passed the necessary inspection tests (see Section 1, paragraph 0115). All bulk and packaged products that are not in reusable containers (e.g. jerry cans, etc.) shall be identifiable and records are to be available enabling the origin, location, and history of products to be traced at any time. Details of the minimum marking requirements for packaged petroleum products are given in Section 1, paragraphs 0112-0114.

PACKED STOCK

0108. Container construction material must be compatible with the product. Internal protective coating must be resistant to product and water and not have a detrimental effect on the product. Internally galvanised containers and zinc-rich coatings are prohibited for aviation and naval fuels, lubricant and hydraulic fluids. Long term storage for any petroleum products in galvanised containers is also prohibited. The closure is

to be liquid and gas-tight and resistant to "breathing". Where practicable, the container closures are to be capable of being sealed by an overseal or wire and lead seal.

0109. Filling Containers. Before filling, all containers shall be clean and free from loose rust, paint flakes, etc. Where a product has been subjected to micro filtration, meticulous cleanliness of the container and filling equipment must be assured. Containers are to be closed immediately after filling and appropriately marked.

0110. Storage. For identification purposes different products are to be stored separately from each other. Stocks with similar filling dates are to be stored together wherever possible. Normally stocks are to be consumed on the basis of oldest stock first. Except in an emergency, containers **shall** not be stored in direct contact with the ground. They **shall** be stored on raised hard standings and whenever practicable under cover. In conditions where storage in the open is unavoidable, all filled drums (200 litres and above) are to be stored on their sides (belly stacked) with both closures below liquid level and in a position such that the depth of liquid above the closures is as large as possible. Whenever practicable this method of storage is preferable even under cover.

0111. Inspection. External inspection of containers is to be made periodically and markings renewed as necessary. Visual examination of the product shall also be carried out for evidence of degradation, or separation of the additive and evidence of oil separation in greases. Products suspected of being contaminated are to be tested in accordance with Section 1, paragraph 0115. Incorrectly marked, suspect, or off-specification stocks are to be quarantined pending disposal instructions. All dormant stocks are to be sampled and tested as laid down in Section 1, paragraph 0115 and Sections 2, 3, and 4. In particular the periodic testing requirements of Sections 2, 3, and 4 shall be applied to dormant stocks of air, marine and ground products respectively, regardless of the service holding the stocks.

MINIMUM CONTAINER MARKINGS FOR PACKED PETROLEUM PRODUCTS

0112. It is essential that containers for petroleum products are marked so that;

a. The product they hold may be readily identified in national and NATO supply systems.

b. The origin and age of the product may be established at any time.

c. The hazards associated with the product (e.g. flammable, toxic or corrosive) are clearly indicated.

0113. The following common markings are the minimum to be applied to all petroleum products packed in main base areas or manufacturers' works and, where possible, to products packed in the field:

a. NATO Marking (NATO code number in accordance with STANAG 1135 enclosed by a rectangle).

b. Nomenclature (product description).

c. * Batch number.

d. * Filling date (month and year).

e. * Contract No, or Contractor's name (or initials).

f. Particulars of weight or volume of contents.

g. Safety and use markings, where applicable.

h. Re-inspect date.

NOTE: * these markings may be in the form of a national code, if so desired.

0114. The minimum common marking for products packed in reusable containers (e.g. jerry cans), in the field is the NATO marking, but the markings listed in Section 1, paragraph 0113 will be applied when practicable. Additionally, the marking is to be in a position such that the NATO code number is readily seen when the containers are stacked. Where products are packed in outer containers such as boxes or cartons these minimum markings are also to be included in the markings placed on the outer container. When packed products (including the containers) have been re-inspected as dormant stock, in accordance with Section 1, paragraph 0115 and found fit for further use, the old re-test date should be deleted and the new re-inspection date is to be marked on all containers. The marking is to be in the following form:

RE-INSPECT (Month and year to be inserted).

Packed petroleum products do not have an indefinite shelf life. The procedure to be adopted when re-lifing petroleum products shall be as follows:
The first re-test date shall be at the original frequency stated in Sections 2, 3 and 4. Subsequent re-tests shall follow at half the initial frequency. After 72 months from date of fill, the product should no longer be authorised for NATO cross servicing and a line of colour contrasting with the NATO Marking and the background colour of the container, is to be drawn diagonally across and beyond the rectangle enclosing the NATO code number. The thickness of the line will be such that it is clearly visible and the NATO marking easily read. The NATO marking is then to be considered cancelled.

For small containers which are packed inside boxes or cartons, the markings may be placed on the outer container only. The locations and colour of the markings, the

method of marking, and the marking materials shall be as specified by the national authority and in accordance with STANAG 1135. However, all markings are to be clearly and legibly inscribed of a size appropriate for the type of container and the materials used are to be selected for durability. On coloured containers, the colour of the markings is to be in contrast with the colour of the container.

MINIMUM SAMPLING AND TESTING REQUIREMENTS

0115. The type of test to be used **shall**, at a minimum, be a Type B-2 at the periodicity identified in the product's respective Section/Table. Where an agreed testing periodicity has not been stipulated, the product shall be inspected at least annually.

a. Type A Test. Complete specification tests to be performed before acceptance of the product from the supplier.

b. Type B-2 Test. This test is to be performed to determine product quality after the prescribed periods of storage.

Notes:

1. Details of the individual tests applicable in each of the above-mentioned types of tests are given as under:

Type A Tests on all products shall be as per national/ implementing specification.	Sections 1, 2, 3 and 4
Type B-2 Tests on Aircraft Lubricants and Special Products	Section 2, Tables 2-III to 2-VIII
Type B-2 Tests on Naval Lubricants and Special Products	Section 3, Tables 3-I and 3-II
Type B-2 Tests on Army Lubricants and Special Products	Section 4, Table 4-III

2. In all cases, the methods of sampling used are to be EI or ASTM standard methods or their equivalent.

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SECTION 2 AVIATION LUBRICANTS AND ASSOCIATED PRODUCTS

AVIATION LUBRICANTS AND ASSOCIATED PRODUCTS

CONTENTS

AVIATION LUBRICANTS AND ASSOCIATED PRODUCTS

GENERAL

0201. The common requirements contained in Section 1 of this STANAG are to be applied to all aviation petroleum products, in addition to the detailed requirements laid down in this Section.

DISPENSING OF OILS

0202. Filters. The filters fitted to oil replenishment equipment are to be of the agreed minimum standard laid down in Section 2, Table 2-I.

OIL REPLENISHMENT PROCEDURE

0203. Filling of oil Replenishment Vehicles. When filling, check to ensure that the correct product is being used. The replenishment equipment should be capable of meeting the requirements of Section 2, Table 2-I, for filtration.

0204. Re-oiling Aircraft from Packed Stocks. Oil from packed stocks, e.g. drums and jerry cans, is to be filtered to the appropriate standard shown in Section 2, Table 2-I before dispensing to aircraft tanks. Oil from small hermetically sealed containers need not be filtered before dispensing to aircraft tanks. Any oil remaining in opened containers after aircraft servicing **shall** not be retained for future use but may be added to servicing equipment or disposed of as used oil. The container marking is to be checked to ensure that the correct product is being used.

0205. Replenishment with Grease. The container marking is to be checked to ensure that the correct product is being used. The most important considerations are to ensure cleanliness of the grease, the surfaces to which it is being applied, and of the equipment used in its application. The grease is to be taken from the original container and is not to be repackaged. The grease is to be applied, preferably, with a grease gun or similar device, and not by hand application. The lids of all containers are to be replaced immediately after use.

0206. Replenishment with Hydraulic Fluids. The most important consideration is to ensure cleanliness of the fluid and of the equipment used in its application. The container marking is to be checked, to ensure that the correct product is used. The different types of hydraulic fluid such as vegetable, petroleum, and synthetic based are to be kept segregated from each other.

0207. Fluid from non-hermetically sealed containers is to be filtered to the appropriate standards shown in Section 2, Table 2-1 before dispensing. Fluid from small hermetically sealed containers need not be filtered before dispensing to aircraft tanks. Any fluid remaining in open containers after servicing **shall** not be retained but may be added to servicing equipment or disposed of as used oil.

0208. The fluid is to be taken from the original container and is not to be repackaged. It is recommended that all hydraulic fluids should be supplied in containers not exceeding 5 litres, except when a larger container is needed for replenishment rigs.

AVIATION SPECIALITY PRODUCTS

0209. The quality surveillance requirements for grease and hydraulic fluids are, where practicable, to be applied to speciality products.

MINIMUM STANDARDS OF FILTRATION[1]

		Issues From all Installations				
Serial No	Product	To Railcars or Road Vehicles	To On-Base Operating Tanks	To Containers (Packed Stocks)	Into Refuelling Vehicles or Launches	Issues Into Aircraft
1	Lubricating Oil, Aircraft Turbine Engine	150 microns	-	150 microns	150 microns	From small hermetically sealed containers directly into aircraft - no filtration. Otherwise 10 microns.
2	Hydraulic Fluids	-	-	Either 5 microns filtration or specification control of particulate count and/or total weight of contaminants	-	Small hermetically sealed containers direct into aircraft no filtration. Otherwise see [2]
3	Thrust Augmentation Fluids (water and methanol water mixtures)	-		80 microns	80 microns	80 microns. In addition, for turbine engines, the fluid must meet requirements of Annex B, para 17 b.
Notes Applicable to Table see Page 2-5						

TABLE 2-I (Concluded on page 2-5)

Note 1: Comparison between filter mesh and micron sizes.

OPENING (MICRONS)	MESH SIZE (MEASURES PER INCH)
50	270
80	180
100	140
150	100
200	70
240	60

Note 2: Aircraft hydraulic fluid dispensing and servicing equipment is to be capable of supplying fluid to the following cleanliness standard:

MICRON SIZE RANGE	MAXIMUM PARTICULATE COUNT/100 ml SAMPLE	MAXIMUM PARTICULATE COUNT/100 ml SAMPLE
	(LATEX SPHERES)	(ACFTD)
5 - 15	30,000	42,000
> 15 - 25	1,000	2,800
> 25 - 50	250	875
> 50 – 100	25	150
> 100	10	75

MICRON SIZE RANGE	MAXIMUM PARTICULATE COUNT/100 ml SAMPLE
	(ISO 11171)
6 – 14	From 30,000 to 38,900 (7B)
> 14 - 21	1,000 to 3,460 (6C)
> 21 - 38	250 to 1,220 (7D)
> 38 - 70	25 to 212 (7E)
> 70	10 to 64 (8F)

For reference purposes the method to be used for particulate counting is that given in STANAG 3713

TABLE 2-I (Concluded)

MINIMUM FREQUENCY FOR TESTING AVIATION PETROLEUM PRODUCTS

Dormant stocks of aviation petroleum products are to be sampled and submitted for Type A or Type B-2 testing (see Section 1, para 0115) whenever stocks are suspected of being off-specification, or at the minimum frequency indicated below [(1), (2)]:

PRODUCT DESCRIPTION	MINIMUM FREQUENCY OF TESTING
Lubricating Oil, Greases, Hydraulic Fluids, Speciality Products, Corrosion Preventives and Propellants	See entries in Section 2, Table 2-III to 2-VIII See also note 2 below
Note 1: Under arctic storage conditions, inspection of aviation fuels and lubricants may be made every two years (where a shorter period is specified above or in Section 2, Table 2-III to 2-VII).	
Note 2: Where a visual check is specified in Section 2, Table 2-III to 2-VII, it shall be carried out by suitably trained personnel and entails inspection of a sample of the product taken from the container. In the case of liquid products, a bottom sample shall first be taken for examination for water, sediment or separation of components. After which the container shall be thoroughly agitated and a second sample taken for general examination (a bottom sample is not required from containers of capacity 5 litres or less). Containers shall be inspected at the same time for damage, leakage, rust and corrosion. Hermetically sealed products are liable to deterioration when opened and these products shall, after inspection, be used immediately or disposed of as authorised.	

TABLE 2-II

B-2 TESTS - LUBRICATING OIL, AIRCRAFT

NATO Code Number	O-133	O-135	O-136	O-138	O-142	O-147
TEST REQUIREMENTS (1)						
Appearance	X	X	X	X	X	X
Pour Point	X	X	X	X	X	X
Viscosity at 100°C			X	X		
Viscosity at 54.4°C						X
Viscosity at 40° C		X			X	
Viscosity at -54° C						X
Neutralization No (or Total and/or Mineral Acidity	X	X	X	X	X	X
Ash %		X	X	X		
Copper Corrosion	X	X	X	X	X	
Oxidation	X					X
Protection					X	X
Additive Content			X			
Minimum Re-Test Frequency (Months)	48	48	48	48	48	48
Visual Check Frequency (Months)	12	12	12	12	12	12
Note 1: The above tests are to be carried out in accordance with the appropriate national specification.						

TABLE 2-III (Continued on page 2-8)

B-2 TESTS - LUBRICATING OIL, AIRCRAFT

NATO Code Number	O-148	O-149	O-150	O-152	O-153	O-154	O-155
TEST REQUIREMENTS (1)							
Appearance	X	X	X	X	X	X	X
Pour Point					X		X
Viscosity at 100 °C	X	X	X	X		X	
Viscosity at 40 °C					X		X
Viscosity at -40 °C		X					
Viscosity at -51 °C	X						
Neutralization No (or Total and/or Mineral Acidity)	X	X	X	X	X	X	X
Copper Corrosion					X		X
Foaming Test	X						
Minimum Re-Test Frequency (Months)	48	48	48	48	48	48	48
Visual Check Frequency (Months)	12	12	12	12	12	12	12
Note 1: The above tests are to be carried out in accordance with the appropriate national specification.							

TABLE 2-III (Concluded on page 2-9)

B-2 TESTS - LUBRICATING OIL, AIRCRAFT

NATO Code Number	O-156	O-157	O-159	O-160	O-163
TEST REQUIREMENTS (1)					
Appearance	X	X	X	X	X
Pour Point		X		X	
Viscosity at 100 °C	X		X	X	X
Viscosity at 40 °C		X			
Viscosity at -40 °C			X		
Viscosity at -51 °C					X
Neutralization No (or Total and/or Mineral Acidity)	X	X	X	X	X
Precipitation No.		X			
Oxidation		X			
Foaming Test			X		X
Minimum Re-Test Frequency (Months)	48	48	48	48	48
Visual Check Frequency (Months)	12	12	12	12	12
Note 1: The above tests are to be carried out in accordance with the appropriate national specification.					

TABLE 2-III (Concluded)

B-2 TESTS - GREASE, AIRCRAFT

NATO Code Number	G-353	G-354	G-355	G-359	G-361
TEST REQUIREMENTS (1)					
Appearance (including visual oil separation)	X	X	X	X	X
Penetration (worked)	X	X	X	X	X
Working Stability	X	X	X		
Copper Corrosion	X	X	X	X	X
Dropping Point	X	X	X	X	X
Odour		X	X	X	X
Oil Separation	X	X	X	X	X
Rust Preventative Properties	X	X			
Minimum Re-Test Frequency (Months)	36	36	36	48	36
Visual Check Frequency (Months)	12	12	12	12	12
Note 1: The above tests are to be carried out in accordance with the appropriate national specification.					

TABLE 2-IV (Continued on page 2-11)

B-2 TESTS - GREASE, AIRCRAFT

NATO Code Number	G-363	G-366	G-372	G-382	G-392	G-394	G-395	G-396
TEST REQUIREMENTS (1)								
Appearance (including visual oil separation)	X	X	X	X	X	X	X	X
Penetration (un-worked)	X							
Penetration (worked)		X	X	X	X	X	X	X
Working Stability		X	X	X			X	X
Copper Corrosion	X	X	X	X	X	X	X	
Resistance to Aqueous Solutions	X							
Dropping Point	X	X	X	X	X	X	X	
Fuel Resistance	X							
Oil Separation		X	X	X	X	X	X	X
Odour		X		X	X	X	X	
Rust Preventative Properties		X	X		X		X	
Minimum Re-Test Frequency (Months)	36	36	36	36	36	36	36	36
Visual Check Frequency (Months)	6 (2)	12	12	12	12	12	12	12
Note 1: The above tests are to be carried out in accordance with the appropriate national specification.								
Note 2: G-363 shall be visually examined every 6 months for hardening.								

TABLE 2-IV (Concluded on page 2-12)

B-2 TESTS - GREASE, AIRCRAFT

NATO Code Number	G-397	G-398	G-399	G-1350
TEST REQUIREMENTS (1)				
Appearance (including visual oil separation)	X	X	X	X
Penetration (worked)	X	X	X	X
Working Stability				
Dropping Point				
Oil Separation	X	X	X	X
Copper Corrosion	X	X	X	X
Odour				
Rust Preventative Properties				
Minimum Re-Test Frequency (Months)	36	36	36	36
Visual Check Frequency (Months)	12	12	12	12
Note 1: The above tests are to be carried out in accordance with the appropriate national specification.				

TABLE 2-IV (Concluded)

B-2 TESTS - HYDRAULIC FLUIDS, AIRCRAFT

NATO Code Number	H-515	H-522 H-523 H-524	H-537	H-538
TEST REQUIREMENTS (1)				
Appearance	X	X	X	X
Flash Point	X	X	X	X
Pour Point	X	X	X	X
Viscosity at 40 °C	X			
Viscosity at 38 °C		X		
Viscosity at – 40 °C			X	X
Neutralization No. (or total and/or Mineral Acidity)	X	X	X	X
Copper Strip Corrosion	X			
Particulate Contamination	X	X	X	X
Foaming	X			
Minimum Re-Test Frequency (Months)	24	24	24	24
Visual Check Frequency (Months)	12	12	12	12
Note 1: The above tests are to be carried out in accordance with the appropriate national specification.				

TABLE 2-V

B-2 TESTS - AVIATION SPECIALITY PRODUCTS

NATO Code Number	S-712	S-716	S-717	S-718	S-720	S-722	S-732	S-736	S-737
TEST REQUIREMENTS (1)									
Appearance	X	X	X	X	X	X	X	X	X
Penetration (unworked)					X				
Penetration (worked)					X	X		X	
Acidity									X
Corrosion	X		X			X		X	
Ash									
Density									X
Flash Point	X								
Viscosity at 40 °C	X								
Total Solids Content			X						
Electric Strength (2)								X	
Fineness (particle size)							X		
High Temperature Evaporation and Bleeding (2)								X	
pH Value							X		
Minimum Re-Test Frequency (Months)	48		36		48	36	48	60	48
Visual Check Frequency (Months)	12	12	12	12	12	12	12	12	12
Note 1: The above tests are to be carried out in accordance with the appropriate national specification.									
Note 2: To be done if local facilities permit.									

TABLE-2-VI (Continued on page 2-15)

B-2 TESTS - AVIATION SPECIALITY PRODUCTS

NATO Code Number	S-738	S-740	S-742	S-743	S-745	S-747	S-749 (2)
TEST REQUIREMENTS (1)							
Appearance	X	X	X	X	X	X	
Melting Point				X			
Acidity or Neutralization No	X			X		X	
Corrosion		X					
pH Value			X		X		
Density	X		X		X	X	
Moisture		X					
Residue on Evaporation	X					X	
Fineness (particle size)		X					
Water Content							
Minimum Re-Test Frequency (Months)	48	48	24	48	24	48	24
Visual Check Frequency (Months)	12	12	12	12	12	12	6
Note 1: The above tests are to be carried out in accordance with the appropriate national specification.							
Note 2: S-749 coatings are to be tested for appearance, adhesion, thermal stability and endurance life if local facilities permit. If local facilities are not available, the material shall be discarded at the end of 24 months storage. A visual check is to be made at the end of the first six months. If separation has occurred and the solids cannot be re-mixed, the product is to be discarded.							

TABLE-2-VI (Continued on page 2-16)

B-2 TESTS - AVIATION SPECIALITY PRODUCTS

NATO Code Number	S-1712	S-1714	S-1716	S-1717	S-1718	S-1719	S-1720	S-1723	S-1724	S-1726
TEST REQUIREMENTS (1)										
Appearance	X	X	X	X (2)	X	X (2)	X	X	X	X
Suspended Matter				X (3)		X (3)		X (3)		
pH (ASTM E70)				X		X		X		
Refractive Index (ASTM D3321)				X		X		X		
Flash Point	X	X	X		X		X		X	X
Viscosity at 20 °C (ASTM D2196)						X (4)		X (4)		
Viscosity at 25 °C	X	X	X		X		X		X	X
Pour Point	X	X	X		X		X		X	X
Minimum Re-Test Frequency (Months)	60	60	60	24	60	24	60	24	60	60
Visual Check Frequency (Months)	12	12	12	12	12	12	12	12	12	12

TABLE 2-VI (Continued on page 2-18)

Note 1: The above tests are to be carried out in accordance with the appropriate national specification.
Note 2: Verify ADF colour is orange. Verify AAF colour is green.
Note 3: Representative sample should be substantially free of suspended (solid) material. Material must also be free of oil residues within the fluid and/or on the surface.
Note 4: Viscosity checks are important for AAFs, which are thickened fluids. ADF concentrates should exhibit no variation in viscosity at a fixed temperature. AAF viscosity should be measured on unshaken samples as these thickened fluids entrain air bubbles and do not release them for an extended time interval.

B-2 TESTS - AVIATION SPECIALITY PRODUCTS

NATO Code Number	S-1728	S-1732	S-1735 (1)	S-1736	S-1737 (2)	S-1738 (2)
TEST REQUIREMENTS (3)						
Appearance	X	X	X			
Flash Point	X	X				
Viscosity at 25 °C	X	X				
Pour Point	X	X				
Minimum Re-Test Frequency (Months)	60	60	-	-	12	12
Visual Check Frequency (Months)	12	12	12	12 (4)	6	6
Note 1: Separation layering of constituents of S-1735 shall not be reason for rejection.						
Note 2: S-1737 and S-1738 coatings are to be tested for appearance, adhesion, thermal stability, and endurance if local facilities permit. If local facilities are not available the material shall be discarded at the end of 12 months storage. A visual check will be made at the end of the first six months. If separation has occurred and the separated solids cannot be re-mixed, the product is to be discarded.						
Note 3: The above tests are to be carried out in accordance with the appropriate national specification.						
Note 4: Limit examination to visual check for container damage.						

TABLE 2-VI (Concluded on page 2-29)

B-2 TESTS – AVIATION SPECIALITY PRODUCTS

NATO Code Number	S-1739	S-1744	S-1745	S-1746	S-1747	S-1748	S-1749
TEST REQUIREMENTS (1)							
Appearance	X	X	X	X	X	X	X
pH Value (2)	X			X			
Freezing Point				X			
Dissolved or Total Solids	X (3)	X (4)					
Acidity		X (4)	X		X	X	
Density		X	X		X		
Viscosity at 40°C					X		
Water Content			X			X	
Minimum Re-Test Frequency (Months)	24	24	18	24	36	24	24
Visual Check Frequency (Months)	6	6	-	12	12	12	12
Note 1: The above tests are to be carried out in accordance with the appropriate national specification.							
Note 2: Conductivity values may be reported in lieu of pH for high purity waters on which pH measurement may not be meaningful.							
Note 3: Electrical conductivity and silica content may be reported in lieu of dissolved solids.							
Note 4: Electrical conductivity (20 $\pm$ 5) °C may be reported in lieu of both acidity and total solids.							

TABLE 2-VI (Concluded)

B-2 TESTS - AIRCRAFT CORROSION PREVENTATIVE OILS/COMPOUNDS

NATO Code Number	C-608	C-609	C-610	C-613	C-615
TEST REQUIREMENTS (1)					
Appearance	X	X	X	X	X
Corrosion				X	X
Dispersibility				X	
Flash Point					X
Protection		X	X		
Stability (high and low temperature)		X	X		
Precipitation No.		X	X		
Viscosity at 100 °C					X
Minimum Re-Test Frequency (Months)	-	36	48	36	48
Visual Check Frequency (Months)	36	-	-	-	-
Note 1: The above tests are to be carried out in accordance with the appropriate national specification.					

TABLE 2-VII (Concluded on page 2-21)

B-2 TESTS - AIRCRAFT CORROSION PREVENTATIVE OILS/COMPOUNDS

NATO Code Number	C-630	C-634	C-638
TEST REQUIREMENTS (1)			
Appearance	X	X	X
Corrosion		X (2)	
Flash Point		X	X
Water Displacement		X	
Viscosity at 100 °C			X
Viscosity at 40 °C			
Foaming			X
Protection (3)			X
Lead Corrosion			X
Emulsification Properties	X		
pH of the Emulsion	X		
Corrosion of the Emulsion	X		
Minimum Re-Test Frequency (Months)	48	48	36
Visual Check Frequency (Months)	-	-	-
Note 1: The above tests are to be carried out in accordance with the appropriate national specification.			
Note 2: Copper strip corrosion test.			
Note 3: To be done if local facilities permit.			

TABLE 2-VII (Concluded)

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SECTION 3 NAVAL PETROLEUM PRODUCTS

NAVAL PETROLEUM PRODUCTS

CONTENTS

NAVAL PETROLEUM PRODUTS

GENERAL

0301. The minimum common requirements contained in Section 1 of this STANAG are to be applied to all naval petroleum products, unless otherwise specified by the detailed requirements laid down in this Section.

BATCHING

0302. Lubricants in bulk are not generally batched but the origin and history of packaged stocks must be traceable from the markings on the packages.

MINIMUM FREQUENCY FOR TESTING NAVAL LUBRICANTS AND ASSOCIATED PRODUCTS

0303. All lubricating oils, greases, and special products are to be subjected to either a Type A or Type B-2 Test at the discretion of the Inspecting Authority, as defined in general terms in Section 1, paragraph 0115 of this STANAG and in accordance with the frequency noted in Table 3-I or 3-II, respectively.

NAVAL AVIATION LUBRICANTS AND ASSOCIATED PRODUCTS

0304. The provisions of Section 2 apply to Naval aviation lubricants and associated products.

B-2 TESTS REQUIRED ON NAVAL LUBRICANTS

	Steam Turbine Lub Oils	Diesel Engine Lub Oils	Steam Engine Cyl Oils	Refrigerant Equip Lub Oils	Gear Lubricating Oil
NATO Code Number	O-240 O-249 O-250 O-253	O-274 O-278	O-252	O-283 O-285 O-290	O-262
TEST REQUIREMENTS (1)					
Appearance	X	X	X	X	X
Copper Corrosion					X
Steel Corrosion (2)					X
Viscosity	X	X	X	X	X
Total Acidity				X (O-285 only)	X
Total Base Number		X			
Sulphated Ash		X			
Water Separability	X				
Water Content	X		X		
Bottom Sediment & Water	X		X		
Sediment	X	X			
Foam Characteristics					X
Minimum Retest Frequency (Months)	60 (3)	60 (3)	60 (3)	60 (3)	60 (3)
Visual Check Frequency (Months)	12	12	12	12	12
Note 1: The above tests are to be carried out in accordance with the appropriate national specification.					
Note 2: Test only required if copper corrosion fails.					
Note 3: Lubricating oils in bulk: 36 months.					

TABLE 3-I

B-2 TESTS REQUIRED ON NAVAL HYDRAULIC FLUIDS, GREASES, AND SPECIAL PRODUCTS

	Hydraulic Fluids	Fire Resistant [1] Hydraulic Fluids	Greases	Aqueous Urea
NATO Code Number	H-572 H-575 H-573 H-576 H-574	H-579 H-580	G-450 G-460	S-1765
TEST REQUIREMENTS [2]				
Appearance	X	X	X	X
Density		X		
Viscosity	X			
Total Acidity	X	X (H-580 only)		
pH		X (H-579 only)		
Penetration (worked)			X	
Steel Corrosion			X[3]	
Copper Corrosion			X	
Sediment	X [4]			
Foam Characteristics	X [4]			
Oil Separation			X	
Reserve Alkalinity				X
Refractive Index				X
Minimum Retest Frequency (Months)	60 [5]	60 [5]	48	12
Visual Check Frequency (Months)	12	12	12	
Note 1: Additional inspection may be necessary to check for deterioration of containers of aqueous hydraulic fluids.				
Note 2: The above tests are to be carried out in accordance with the appropriate national specification.				
Note 3: Not required for G-460				
Note 4: Not required for H-575.				
Note 5: Lubricating oils in bulk: 36 months.				

TABLE 3-II

SECTION 4 ARMY LUBRICANTS AND ASSOCIATED PRODUCTS

ARMY LUBRICANTS AND ASSOCIATED PRODUCTS

CONTENTS

ARMY PETROLEUM PRODUCTS

GENERAL

0401. The minimum common requirements contained in Section 1 of this STANAG are to be applied to all army petroleum products, unless otherwise specified by the detailed requirements laid down in this Section.

MINIMUM FREQUENCY FOR TESTING ARMY PETROLEUM PRODUCTS

Dormant stocks of POL products are to be sampled and submitted to Type A or Type B-2 tests (Section 1, para 0115), whenever stocks are suspected of being off-specification, with the minimum frequency indicated below:

Product	Table	Minimum frequency of Testing	
		Bulk	Packaged
Lubricating oils, greases, hydraulic fluids, cutting fluids, dry-cleaning solvent etc.	See Entries against each product in Section 4, Table 4-III. See notes, 1, 2 and 3 below.		
Note 1: Under condition of arctic storage, inspection of motor fuels and lubricants may be made every three years.			
Note 2: Under conditions of tropical storage, inspection of motor fuels and lubricants shall be made more frequently than indicated in this Table and Table 4-III.			
Note 3: Where a "visual check" is specified in Table 4-III, the visual check shall be carried out by suitably trained personnel and shall consist of inspection of a sample of the product taken from the container. In the case of liquid products, a bottom sample shall first be taken for examination of sediment or separation of components, then the container shall be thoroughly agitated and a second sample taken for general examination (a bottom sample is not required from containers of capacity 5 litres or less). Containers shall be inspected at the same time for damage, leakage, rust, and corrosion. In the case of hermetically sealed products that are liable to deteriorate when opened, these products shall after inspection, be used immediately or disposed of as authorised.			

TABLE 4-I

STANDARD OF FILTRATION

Product	Issues into containers (Packed stocks)	Issues into equipment
Hydraulic fluid	To be micronically filtered on manufacture (1)	1. When the fluid has been micronically filtered into small hermetically sealed containers it need not be refiltered before dispensing. 2. When the above does not apply, the fluid should be filtered into the equipment to at least 80 microns
Note 1: This shall be a filter capable of cutting off a minimum 96.5% by weight of all solid contaminants and/or particles of size 5 microns or larger.		

TABLE 4-II

B-2 TESTS REQUIRED ON ARMY LUBRICANTS AND SPECIAL PRODUCTS

	IC Engine Oils		E P Gear Lubricants
NATO Code Number	O-236 O-237 O-238 O-239	O-1176 O-1178 O-1179 O-1236	O-185 O-186 O-226 O-228
TEST REQUIREMENTS (1)			
Appearance	X		X
Foam Stability	X		X
Total Base Number	X (2)		
Minimum Re-test Frequency (Months)	60		48
Visual Check Frequency (Months)	12		12

Note 1: The above tests are to be carried out in accordance with the appropriate national specification.

Note 2: Not required for O-237, O-238, or O-1236.

TABLE 4-III (Continued on page 4-6)

B-2 TESTS REQUIRED ON ARMY LUBRICANTS AND SPECIAL PRODUCTS

	Machinery Oils	Insulating Oils
NATO Code Number	O-134	S-756
TEST REQUIREMENTS (1)		
Appearance	X	X
Flash Point		X
Copper Corrosion	X	X
Viscosity 40 °C	X	X
Viscosity 100 °C		
Saponification Value		
Neutralisation Number		X
Dielectric Strength		X
Minimum Re-test Frequency (Months)	60	48
Visual Check Frequency (Months)	12	-
Note 1: The above tests are to be carried out in accordance with the appropriate national specification.		

TABLE 4-III (Continued on page 4-7)

B-2 TESTS REQUIRED ON ARMY LUBRICANTS AND SPECIAL PRODUCTS

	Engine Lubricating Oil
NATO Code Number	O-1180
TEST REQUIREMENTS (1)	
Appearance	X
Foaming Stability	X
Total Base Number	X
Minimum Re-test Frequency (Months)	48
Visual Check Frequency (Months)	12
Note 1: The above tests are to be carried out in accordance with the appropriate national specification.	

TABLE 4-III (Continued on page 4-8)

B-2 - TESTS REQUIRED ON ARMY LUBRICANTS AND SPECIAL PRODUCTS

	Semi-fluid Lubricating Compounds	Two-stroke Gasoline Engine Lube Oils
NATO Code Number	O-158 O-204	O-1177
TEST REQUIREMENTS (1)		
Appearance	X	X
Copper Corrosion		X
Viscosity 40 °C		X
Penetration (worked)	X	
Neutralisation (acidity)	X (2)	
Odour	X	
Minimum Re-test Frequency (Months)	24	36
Visual Check Frequency (Months)	12	12
Note 1: The above tests are to be carried out in accordance with the appropriate national specification. Note 2: O-158 only.		

TABLE 4-III (Continued on page 4-9)

B-2 - TESTS REQUIRED ON ARMY LUBRICANTS AND SPECIAL PRODUCTS

	IC Engine Preservative Oils	Multi-purpose Preservative Oils	Armament Lub. Clean (Pres) Oils
NATO Code Number	C-640 C-642	O-190 O-192	S-758 S-761
TEST REQUIREMENTS (1)			
Appearance	X	X	X
Flash Point			X
Copper Corrosion			
Viscosity 40°C			
Viscosity 100°C			
Viscosity (low temp)			X
Load Carry Capability			X (2)
Pour Point		X	X
Sulphated Ash			
Foam Stability	X		
Total Base Number	X		
Minimum Re-test Frequency (Months)	48	48	36
Visual Check Frequency (Months)	12	12	12
Note 1: The above tests are to be carried out in accordance with the appropriate national specification.			
Note 2: Only if Load Carrying Capability test is required in spec.			

TABLE 4-III (Continued on page 4-10)

B-2 - TESTS REQUIRED ON ARMY LUBRICANTS AND SPECIAL PRODUCTS

	Cutting Fluids	Hydraulic Oils	Hydraulic/Brake Fluids (Synthetic)
NATO Code Number	O-214	H-540 H-544	H-542 H-547 H-549
TEST REQUIREMENTS(1)			
Appearance	X	X	X
Odour	X		
pH(3)			X(2)
Emulsification	X		
Water Content		X (4)	X
Total Acidity		X (5)	
Foam Tendency		X	
Minimum Re-test Frequency (Months)	48	36 (H-540 60 months)	48
Visual Check Frequency (Months)	12	12	12
Note 1: The above tests are to be carried out in accordance with the appropriate national specification.			
Note 2: Not required for H-547.			
Note 3: Test procedure according to relevant SAE Standard.			
Note 4: H-540 only.			
Note 5: H-544 only.			

TABLE 4-III (Continued on page 4-11)

B-2 - TESTS REQUIRED ON ARMY LUBRICANTS AND SPECIAL PRODUCTS

	Dry Cleaning Solvents	Antifreezes	Aqueous Urea	Greases	
NATO Code Number	S-752 S-753 S-760	S-757	S-1764	G-408 G-412	G-403 G-414 G-421
TEST REQUIREMENTS (1)					
Appearance	X	X	X	X	X
Flash Point	X				
Drop Point				X	X (2)
Penetration (worked)				X	X
Oxidation					X
Oil Separation					X
pH/Free Acidity		X (3)			
Reserve Alkalinity		X (3)	X		
Freezing Point 25/25 Water		X			
Refractive Index			X		
Minimum Re-test Frequency (Months)	48	48	12	36	36 (4)
Visual Check Frequency (Months)	12	12		12	12

Note 1: The above tests are to be carried out in accordance with the appropriate national specification.

Note 2: Not required for G-403.

Note 3: If applicable.

Note 4: US 24 months.

TABLE 4-III (Continued on page 4-12)

B-2 - TESTS REQUIRED ON ARMY LUBRICANTS AND SPECIAL PRODUCTS

	Corrosion Preventative Compounds		
NATO Code Number	C-614 C-620 C-632	C-633	C-635
TEST REQUIREMENTS(1)			
Appearance	X	X	X
Corrosion	X	X	X
Film Appearance	X		
Total Acidity (or Neut. No.)			X
Penetration (unworked)		X	
Foaming			X
Protection(2)			X
Particulate Contamination			X
Water Content			X
Minimum Re-Test Frequency (Months)	48	48	48
Visual Check Frequency (Months)	12	12	-

Note 1: The above tests are to be carried out in accordance with the appropriate national specification.

Note 2: To be done if local facilities permit.

TABLE 4-III (Concluded on page 4-13)

B-2 TESTS REQUIRED ON ARMY LUBRICANTS AND SPECIAL PRODUCTS

	Automatic Transmission Fluids	Fuel Additives
NATO Code Number	H-548	S-1750
TEST REQUIREMENTS(1)		
Appearance	X	X
Flash Point		X
Viscosity 40 °C		X
Foaming	X	
Minimum Re-test Frequency (Months)	48	24
Visual Check Frequency (Months)	12	12
Note 1: The above tests are to be carried out in accordance with the appropriate national specification.		

TABLE 4-III (Concluded)

AFLP-4714(C)(1)