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NATO STANDARD

AFLP 4601

GUIDE SPECIFICATION FOR HYDRAULIC FLUIDS FOR NAVAL APPLICATIONS (H-573, H-574 AND H-576)

Edition B, Version 1

DECEMBER 2020



NORTH ATLANTIC TREATY ORGANIZATION
ALLIED FUELS AND LUBRICANTS PUBLICATION

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NORTH ATLANTIC TREATY ORGANIZATION (NATO)

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NATO LETTER OF PROMULGATION

2 December 2020

1. The enclosed Allied Fuels and Lubricants Publication AFLP-4601, Edition B, Version 1, GUIDE SPECIFICATION FOR HYDRAULIC FLUIDS FOR NAVAL APPLICATIONS (H-573, H-574 AND H-576), 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 4601.
2. AFLP-4601, Edition B, Version 1, is effective upon receipt and supersedes AFLP-4601, Edition A, 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.



Zoltán GULYÁS
Brigadier General, HUNAF
Director, NATO Standardization Office

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RECORD OF SPECIFIC RESERVATIONS

[nation]	[detail of reservation]
FRA	<p>France makes the following reservations regarding AFLP-4601 that differs from ISO 11158 to which France refers as far as H-573 is concerned.</p> <ul style="list-style-type: none"> - the maximum limit for air release at 50 °C, H-573, (see Section 2, serial number 7) is 10 min instead of 8 min; - the maximum limit for water content, H-573, (see Section 2, serial number 14) is 250 mg/kg instead of 100 mg/kg.
PRT	<p>Portuguese Armed Forces does not have the capability to verify all requisites and specifications required by this STANAG, namely, what is written on the section 2 referring to the H-574.</p>
SVK	<p>The Slovak Republic reserves the right to implement only those paragraphs related to products with NATO Code Numbers as follows: H-573 and H-576, which are used in the Armed Forces of the Slovak Republic.</p>
USA	<p>The US national specification MIL-PRF-17672E Grade 2110-T-H has no requirement for Kinematic Viscosity at 0 °C or Air Release at 50 °C. Additionally, MIL-PRF-17672E does not comply with the H-573 limit requirement for Flash Point or for Kinematic Viscosity at 100 °C as noted in AFLP 4601 EDB V1 RD1.</p>
<p>Note: 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.</p>	

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SECTION 1 GENERAL

0101. This standard represents the minimum quality acceptable under the appropriate NATO Code Number (H-573, H-574 and H-576).

0102. Nations' specifications shall comply with these minimum requirements before the subject of these specifications are accepted as standardized products under the appropriate NATO Code Number (H-573, H-574 and H-576).

0103. In order to promote product development, any nation's specification may include additional tests, or improved quality requirements to those in standard.

0104. This standard shall be subject to review with the object of improving the product quality as required by operational use.

0105. The information contained in Section 2 of this standard is commercial-in-confidence and the release of it must be made consistent with NATO and national disclosure policies and regulations.

0106. STANAG 1135/AFLP-1135 Section 4 lists under NATO Code Numbers H-573, H-574 and H-576 national specifications which have been agreed as interchangeable.

0107. The quality standards contained in this document are to be used by member nations (MNs) in the preparation and maintenance of their individual procurement specifications and standards. A MN's individual procurement document may be more stringent depending upon its equipment. This standard is not designed to be used in the direct procurement of products.

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SECTION 2 GUIDE SPECIFICATION FOR HYDRAULIC FLUIDS FOR NAVAL APPLICATIONS (H-573, H-574 AND H-576)

SERIAL No	PROPERTY	TEST METHOD (Note 1)	UNIT	LIMIT, H-573		LIMIT, H-574		LIMIT, H-576		REMARKS
				MIN	MAX	MIN	MAX	MIN	MAX	
1	Classification	ISO 6743-4		ISO-L-HL 46		ISO-L-HM 46		ISO-L-HM 32		
2	Appearance	Visual examination		Clear, homogeneous, free from visible impurities						
3	Kinematic Viscosity	ISO 3104								ASTM D 445 is technically equivalent
3.1	@ 100 °C		mm ² /s	6,1		6,1				
3.2	@ 40 °C		mm ² /s	41,4	50,6	41,4	50,6	28,8	35,2	
3.3	@ 0 °C		mm ² /s		780				500	
3.4	@ -10 °C		mm ² /s				2000			
4	Flash Point	ISO 2592	°C	185		185		175		ASTM D 92 is technically equivalent
5	Pour Point	ISO 3016	°C		-23		-24		-30	ASTM D 97 is technically equivalent
6	Foaming Foam volume at end of 5 minutes blowing period and 10 minutes setting period	ISO 6247 Seq. 1: Seq. 2: Seq. 3:	mL mL mL		150 / 0 75 / 0 150 / 0		150 / 0 75 / 0 150 / 0		150 / 0 75 / 0 150 / 0	ASTM D 892 is technically equivalent. NOTE: A ring of small bubbles around the edge of the graduate after 10 min setting period shall be considered satisfactory as evidence of nil foaming
7	Air release at 50°C	ISO 9120	Min		8		8		5	
8	Acid Number (AN)	ISO 6619	mg KOH/g		0,3		1,5		0,3	ASTM D 664 is technically equivalent

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SERIAL No	PROPERTY	TEST METHOD (Note 1)	UNIT	LIMIT, H-573		LIMIT, H-574		LIMIT, H-576		REMARKS
				MIN	MAX	MIN	MAX	MIN	MAX	
9	Copper Corrosion 3 hr at 100 °C	ISO 2160			1b		1b		1b	ASTM D 130 is technically equivalent
10	Rust preventive Characteristics	ISO 7120 Procedure B		No rusting (light rusting is tolerable) (Note 2)						ASTM D 665 Procedure B is technically equivalent
11 a	Either Oxidation Stability: Time required until the AN of 2,0 mg KOH/g is reached or Until an increase of the AN by 2,0 mg KOH/g is measured Or	ISO 4263 - 1	hr	1000		1000		1000		ASTM D 943 is allowed
11 b	Time to a pressure drop of 175 kPa	IP 229	min					180		
12	Wear Prevention: 392 N, 1 hr	ASTM D 4172	mm				0,60		0,75	IP 239 is allowed
13	Load Carrying Capacity: Failure load stage	ISO 14635-1				10 (Note 3)		10 (Note 3)		ASTM D 5182 and CEC L 07-95 are technically equivalent
14	Water Content	ISO 6296	mg/kg		100		200		150	ASTM D 6304 is technically equivalent

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SERIAL No	PROPERTY	TEST METHOD (Note 1)	UNIT	LIMIT, H-573		LIMIT, H-574		LIMIT, H-576		REMARKS
				MIN	MAX	MIN	MAX	MIN	MAX	
15	Filterability (wet) Stage I Stage II	ISO 13357-1	%			70 50		60 50		
16	Delmulsification Test at 54°C after 30 minutes settling time Emulsion Layer	ISO 6614	ml		3		3		3	ASTM D 1401 is technically equivalent
17	Elastomer compatibility NBR 28/PX (ISO 13226) or NBR 1, 100°C, 168h – relative increase in volume – change in Shore A hardness	ISO 6072	% -			5 0	12 -7	0 0	12 -7	

Note 1: The test methods given in the column are the referee methods. However, national specifications can invoke technically equivalent methods, such as ASTM, IP, DIN, AFNOR, etc.

Note 2: Light rusting is defined in ISO 7120 as: max. 6 points, each of them max. 1 mm diameter.

Note 3: Must pass load stage 9.

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