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NATO UNCLASSIFIED
NORTH ATLANTIC TREATY ORGANIZATION
ORGANISATION DU TRAITE DE L'ATLANTIQUE NORD

MILITARY AGENCY FOR STANDARDIZATION (MAS)
BUREAU MILITAIRE DE STANDARDISATION (BMS)
1110 BRUSSELS

20 OCT 1999

Current as of Aug 2000

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26/7

16 June 1999

MAS/755-SILCEP/1110

See Distribution List: STANAG AC/112 (NFLWG)

**STANAG 1110 SILCEP (EDITION 7)(AMENDMENT 5) - ALLOWABLE
DETERIORATION LIMITS FOR NATO ARMED FORCES FUELS, LUBRICANTS
AND ASSOCIATED PRODUCTS**

Reference:

MAS(AIR)194-IF&L/1110 dated 12 June 1996 (Edition 7)

1. The subject STANAG was promulgated by the document at reference. Addressees are requested to destroy the existing pages 1/2, B-1/2 and C-1/2 of the STANAG and substitute the revised ones attached.
2. AAP-4 should be amended to reflect the latest status of the STANAG.

A. Grønheim
A. GRØNHEIM
Major General, NOAF
Chairman MAS

Enclosure:

Revised pages 1/2, B-1/2 and C-1/2

NATO UNCLASSIFIED
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14 July 1998

MAS/288-ILCEP/1110

See Distribution List: STANAG AC/112(NFLWG)

**STANAG 1110 ILCEP (EDITION 7)(AMENDMENT 4) - ALLOWABLE
DETERIORATION LIMITS FOR NATO ARMED FORCES FUELS, LUBRICANTS AND
ASSOCIATED PRODUCTS**

Reference:

MAS(AIR)194-IF&L/1110 dated 12 June 1996 (Edition 7)

1. The subject STANAG was promulgated by the document at reference. Addressees are requested to destroy the existing pages 1 and 2 of the STANAG and substitute the revised ones attached.
2. AAP-4 should be amended to reflect the latest status of the STANAG.



J. GRØNHEIM
Major General, NOAF
Chairman MAS

Enclosure:

Revised pages 1 and 2

NATO UNCLASSIFIED
NORTH ATLANTIC TREATY ORGANIZATION
ORGANISATION DU TRAITE DE L'ATLANTIQUE NORD

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19 March 1998

MAS/124-ILCEP/1110

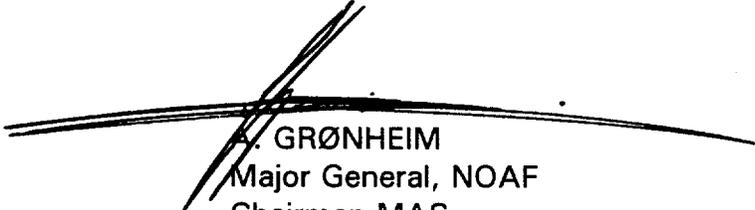
See Distribution List: STANAG AC/112(NFLWG)

**STANAG 1110 ILCEP (EDITION 7)(AMENDMENT 3) - ALLOWABLE
DETERIORATION LIMITS FOR NATO ARMED FORCES FUELS, LUBRICANTS AND
ASSOCIATED PRODUCTS**

Reference:

MAS(AIR)194-IF&L/1110 dated 12 June 1996 (Edition 7)

1. The subject STANAG was promulgated by the document at reference. Addressees are requested to destroy the existing pages A-1/A-2 and A/3 of the STANAG and substitute the revised ones attached.
2. AAP-4 should be amended to reflect the latest status of the STANAG.


A. GRØNHEIM
Major General, NOAF
Chairman MAS

Enclosure:

Revised pages A-1/A-2 and A/3

NATO UNCLASSIFIED
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27 FEB 1998
049/98

20 February 1998

MAS/86-ILCEP/1110

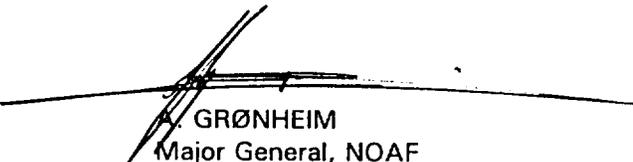
See Distribution List: STANAG AC/112(NFLWG)

**STANAG 1110 ILCEP (EDITION 7)(AMENDMENT 2) - ALLOWABLE
DETERIORATION LIMITS FOR NATO ARMED FORCES FUELS, LUBRICANTS AND
ASSOCIATED PRODUCTS**

Reference:

MAS(AIR)194-IF&L/1110 dated 12 June 1996 (Edition 7)

1. The subject STANAG was promulgated by the document at reference. Addressees are requested to destroy the existing pages C-1/C-3 of the STANAG and substitute the revised ones attached.
2. AAP-4 should be amended to reflect the latest status of the STANAG.


J. GRØNHEIM
Major General, NOAF
Chairman MAS

Enclosure:

Revised pages C-1/C-3

NATO UNCLASSIFIED
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28 OCT 1997

13 October 1997

MAS/381-ILCEP/1110

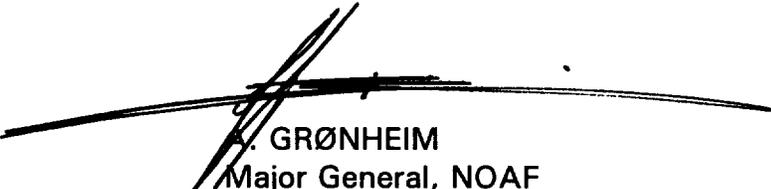
See Distribution List: STANAG AC/112 (NFLWG)

**STANAG 1110 (EDITION 7)(AMENDMENT 1) - ALLOWABLE DETERIORATION
LIMITS FOR NATO ARMED FORCES FUELS, LUBRICANTS AND ASSOCIATED
PRODUCTS**

Reference:

MAS(AIR)194-IF&L/1110 dated 12 June 1996 (Edition 7)

1. The subject STANAG was promulgated by the document at reference. Addressees are requested to destroy the existing page iii/iv of the STANAG and substitute the revised ones attached.
2. AAP-4 should be amended to reflect the latest status of the STANAG.



A. GRØNHEIM
Major General, NOAF
Chairman MAS

Enclosure:

Revised ratification/implementation details

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**NORTH ATLANTIC TREATY ORGANIZATION
ORGANISATION DU TRAITE DE L'ATLANTIQUE NORD**

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AIR BOARD

MAS(AIR)194-IF&L/1110

12 June 1996

To : DISTRIBUTION LIST AIR B

Subject : STANAG 1110 IF&L (EDITION 7) - ALLOWABLE
DETERIORATION LIMITS FOR NATO ARMED FORCES
FUELS, LUBRICANTS AND ASSOCIATED PRODUCTS

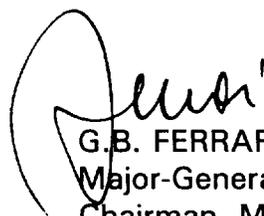
References : a. MAS(NAVY)247-F&L/1110 dated 18 September 1986
(Edition 6)
b. MAS(AIR)368-IF&L/1110 dated 16 October 1995
(Edition 7)(Ratification Draft 1)

Enclosure : STANAG 1110 (Edition 7)

1. The enclosed NATO Standardization Agreement which has been ratified by nations as reflected in page iii is promulgated herewith.
2. The references listed above are to be destroyed in accordance with local document destruction procedures.
3. AAP-4 should be amended to reflect the latest status of the STANAG.

ACTION BY NATIONAL STAFFS

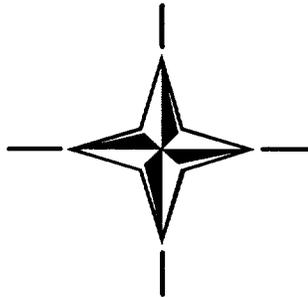
4. National staffs are requested to examine page iii of the STANAG and if they have not already done so, to advise the Air Board, MAS, through their national delegation as appropriate of their intention regarding its ratification and implementation.


G.B. FERRARI
Major-General, ITAF
Chairman, MAS

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STANAG No. 1110
(Edition 7)

**NORTH ATLANTIC TREATY ORGANIZATION
(NATO)**



**MILITARY AGENCY FOR STANDARDIZATION
(MAS)**

**STANDARDIZATION AGREEMENT
(STANAG)**

SUBJECT: ALLOWABLE DETERIORATION LIMITS FOR NATO ARMED FORCES
FUELS, LUBRICANTS AND ASSOCIATED PRODUCTS

Promulgated on 12 June 1996

A handwritten signature in black ink, appearing to read 'G.B. Ferrari', is positioned above the printed name and title.

G.B. FERRARI
Major-General, ITAF
Chairman, MAS

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RECORD OF AMENDMENTS

No.	Reference/date of amendment	Date entered	Signature

EXPLANATORY NOTES

AGREEMENT

1. This NATO Standardization Agreement (STANAG) is promulgated by the Chairman MAS under the authority vested in him by the NATO Military Committee.
2. No departure may be made from the agreement without consultation with the tasking authority. Nations may propose changes at any time to the tasking authority where they will be processed in the same manner as the original agreement.
3. Ratifying nations have agreed that national orders, manuals and instructions implementing this STANAG will include a reference to the STANAG number for purposes of identification.

DEFINITIONS

4. Ratification is "In NATO Standardization, the fulfilment by which a member nation formally accepts, with or without reservation, the content of a Standardization Agreement" (AAP-6).
5. Implementation is "In NATO Standardization, the fulfilment by a member nation of its obligations as specified in a Standardization Agreement" (AAP-6).
6. Reservation is "In NATO Standardization, the stated qualification by a member nation that describes that part of a Standardization Agreement that it will not implement or will implement only with limitations" (AAP-6).

RATIFICATION, IMPLEMENTATION AND RESERVATIONS

7. Page iii gives the details of ratification and implementation of this agreement. If no details are shown it signifies that the nation has not yet notified the tasking authority of its intentions. Page iv (and subsequent) gives details of reservations and proprietary rights that have been stated.

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Agreed English/French Texts

STANAG 1110
(Edition 7)

NAVY/ARMY/AIR

NATO STANDARDIZATION AGREEMENT
(STANAG)

ALLOWABLE DETERIORATION LIMITS FOR NATO ARMED FORCES
FUELS, LUBRICANTS AND ASSOCIATED PRODUCTS

WARNING (see paragraph 5)

- Annexes:
- A. Table of Allowable Deterioration Limits for Naval Products
 - B. Table for Allowable Deterioration Limits for Army Products
 - C. Table for Allowable Deterioration Limits for Air Products

- Related Documents:
- | | |
|--------------------|---|
| STANAG 1135 IF&L - | INTERCHANGEABILITY OF FUELS,
LUBRICANTS AND ASSOCIATED
PRODUCTS USED BY THE ARMED
FORCES OF THE NORTH ATLANTIC
TREATY NATIONS |
| STANAG 3149 IF&L - | MINIMUM QUALITY SURVEILLANCE
OF PETROLEUM PRODUCTS |

AIM

1. The aim of this agreement is to standardize the allowable deterioration limits for fuels, lubricants and associated products used by the NATO Armed Forces.

AGREEMENT

2. Participating nations agree that:
 - a. Within the allowable deterioration limits given in Annexes A, B and C fuels, lubricants and associated products, in bulk or packed, shall continue to be identified by the NATO Code Number.
 - b. The NATO Code Number may not be used in connection with any stocks deviating from specification beyond these limits. If such stocks have been marked with the NATO Code Number it must be crossed through in accordance with STANAG 3149.
 - c. In assessing whether or not the NATO Code Number is to be crossed through, no deviations are acceptable from requirements which appear in the relevant specifications but are not included in the tables.

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- d. The deterioration limits in Annexes A, B and C are absolute and not subject to corrections for tolerance of test methods.

GENERAL

3. STANAG 1135 incorporates identifying national product specifications which define the qualities or the essential characteristics which petroleum products for use by the Armed Forces of NATO nations should possess. In general, the purchase of these products is not immediately followed by their utilization and, therefore, a certain time will elapse between their acceptance and their use by the Armed Forces. During this time their physical and chemical properties may change, and, therefore, there is the risk that their characteristics at the time of delivery to actual users (ship, unit, aircraft) may no longer be within the limits prescribed in the product specification of STANAG 1135. The products shall comply with the specified limiting values. The specified limiting values must not be changed. This precludes any allowances for the test method precision and adding or subtracting digits.

4. The purpose of this STANAG is to define the extent to which these changes are acceptable so that the product may still be used for its intended purpose and to retain the NATO Code Number as defined in STANAG 3149 Annex A, paragraphs 5 and 6.

5. The deterioration limits in Annexes A, B and C are applicable to products within military supply distribution systems. Nations shall not use the limits detailed in the Annexes for procurement purposes.

IMPLEMENTATION OF THE AGREEMENT

6. This STANAG is implemented when its contents have been issued to the forces concerned.

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ANNEX A TO
STANAG 1110
(Edition 7)

TABLE OF ALLOWABLE DETERIORATION LIMITS FOR NAVAL PRODUCTS

No	PRODUCT DESCRIPTION	NATO CODE NUMBER	PROPERTY	UNIT OF MEASUREMENT	DETERIORATION LIMIT	TEST METHODS (6)	
						ASTM	ISO
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
1.	Fuel, Naval, Distillate	F-75 F-76	Colour Ash Content Distillation: 90% point less than End point less than Residue plus loss at final boiling point Water and Sediment	State % m/m °C (°F) °C (°F) % v/v % v/v	4 (max) 0.010 (max) 360 (680) 388 (730) 3.0 (max) 0.1 (max)	D 1500 D 482 D 86 D 86 (1) D 86 (1) D2709	2049 6245 3405 3405 3405 3734
2.	Fuel Residual	F-77	Viscosity at 50°C (122°F) Ash Content Water and Sediment Sediment	mm ² /s (cSt) % m/m % v/v % m/m	60 (max) 0.2 (max) 2.0 (max) 0.5 (max)	D 445 D 482 (2) D 1796 D 473	3104 6245 3734 3735
3.	Lubricating Oil, Compounded	0-254	Water Content	% v/v	1.0 (max)	D 95	3733

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ANNEX A TO
STANAG 1110
(Edition 7)

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
4.	Lubricating Oil, Naval Gear, Extreme Pressure	0-262	Water Content	% v/v	0.2 (max)	D 95	3733
5.	Lubricating Oil, Steam Cylinder	0-252 0-258	Ash Content Water Content	% m/m % v/v	0.1 (max) 1.0 (max)	D 482 D 95	6245 3733
6.	Lubricating Oil, Steam Turbine and Gear	0-240 0-249 0-250	Water Content Emulsion with Water: separation time Salt water corrosion Sediment after straining through an 80 micrometer gauze	% v/v minutes grade % m/v	0.2 (max) 45 (max) None 0.05 (max)	D 95 D 1401(3) D 665 (4)	3733 6614
7.	Lubricating Oil, Naval Diesel	0-274 0-278	Water Content Sediment after straining through an 80 micrometer gauze	% v/v % m/v	0.2 (max) 0.05 (max)	D 95	3733
8.	Hydraulic Fluid, Phosphate Ester, Fire Resistant	H-580	Water Content Neutralization	% v/v mg KOH/g	0.2 (max) 0.2 (max)	D 95 (5)	3733
9.	Hydraulic Fluid, Petroleum	H-572 H-573 H-575 H-576	Water Content Sediment after straining through an 80 micrometer gauze	% v/v % m/v	0.1 (max) 0.05 (max)	D 95	3733

NOTES: (1) Disregard paragraph 7.4 of D 86 and continue the distillation beyond 371°C (700°F) until the end point or final boiling point is observed.
(2) 50 gram sample is to be used.

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ANNEX A TO
STANAG 1110
(Edition 7)

- NOTES:** (3) Synthetic sea water is to be used as in Note 3 of ASTM D 1401.
(Cont'd) (4) Procedure B for synthetic sea water is used except that prior to the test the oil shall be water-washed as follows: stir 300 grams of the oil with 50 grams of water for 30 minutes at 90°C (194°F) in a 600 ml beaker using the stirrer described in ASTM Method D 665, transfer the mixture to a separatory funnel, separate the water layer and then proceed with procedure B.
(5) Test Method as shown in Specification MIL-H-19457/STM 7320.
(6) ASTM and ISO methods are given for reference, but any equivalent national or international methods may be used.

A-3

AMENDMENT 3

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ANNEX B TO
STANAG 1110
(Edition 7)

TABLE OF ALLOWABLE DETERIORATION LIMITS FOR ARMY PRODUCTS

No	PRODUCT DESCRIPTION	NATO CODE NUMBER	PROPERTY	UNIT OF MEASUREMENT	DETERIORATION LIMIT	TEST METHODS (1)	
						ASTM	ISO
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
1.	Gasoline, Automotive 96 RON	F-57	Distillation:				
			Final boiling point	°C (°F)	239 (462) (max)	D 86	3405
			Existent gum (washed residue)	mg/100 ml	7 (max)	D 381	6246
			Vapour pressure (Reid)	kPa	45 to 90	D 323	3007
			Octane number, motor		85 (min)	D 2700	5163
Octane number, research		95 (min)	D 2699	5164			
2.	Diesel Fuel Military	F-54	Sediment	mg/l	20 (max)	D 2276	DIS 6248
			Colour	state	6 (max)	D 1500	2049
			Distillation: 90% recovered	°C (°F)	360(680) (max)	D 86	3405
			Final boiling point	°C (°F)	380(716) (max)	D 86	3405
			Flash point	°C (°F)	55 (131) (min)	D 93	2719
			Ash content	% m/m	0.025 (max)	D 482	6245

AMENDMENT 5

B-1

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ANNEX B TO
STANAG 1110
(Edition 7)

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
3.	Kerosene	F-58	Flash point	°C (°F)	37.8(100 (min))	D 56	
4.	Lubricating Oil	O-176 O-182 O-183 O-186 O-196 O-199 O-203 O-204 O-208 O-218 O-226 O-228 O-236 O-237 O-238-O-239 O-1176 O-1236	Water content	% v/v	0.20 (max)	D 95	3733

NOTE: (1) ASTM and ISO methods are given for reference, but any equivalent national or international methods may be used.

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ANNEX C TO
STANAG 1110
(Edition 7)

TABLE OF ALLOWABLE DETERIORATION LIMITS FOR AIR PRODUCTS

No	PRODUCT DESCRIPTION	NATO CODE NUMBER	PROPERTY	UNIT OF MEASUREMENT	DETERIORATION LIMIT	TEST METHODS (NOTE)	
						ASTM	ISO
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
1.	Turbine Fuel, Aviation Wide Cut Type	F-40	Distillation: residue	% v/v	2 (max)	D86	3405
			Existent gum:	mg/100 cm ³	14 (max)	D381	6246
			Vapour pressure (Reid)	kPa	10.5 to 22.5	D323 or D5191	3007
			Fuel system icing inhibitor on delivery to aircraft	% v/v	0.07 to 0.2	D5006	
			Electrical conductivity	pS/m	100 to 700	D2624 or IP274	6297

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ANNEX C TO
STANAG 1110
(Edition 7)

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
2.	Turbine Fuel, Aviation, High Flash Type	F-44	Distillation: fuel evaporated at 205°C (400°F) residue Existent gum Fuel system icing inhibitor on delivery to aircraft	% v/v % v/v mg/100 cm ³ % v/v	7 (min) 2 (max) 14 (max) 0.07 to 0.2	D86 D381 D5006	3405 6246
3.	Turbine Fuel, Aviation, Kerosene Type	F-34 F-35	Existent gum Flash point Electrical conductivity Fuel system icing inhibitor on delivery to aircraft (applies to F-34 only)	mg/100 cm ³ °C(°F) pS/m % v/v	14 (max) 32(90) (min) 50 to 700 0.07 to 0.2	D381 D93 D2624 or IP274 D5006	6246 2719 6297
4.	Isopropyl Nitrate	S-746	Residue after evaporation on delivery to aircraft	ppm	100	DEF STAN 91- 89 Issue 1	

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ANNEX C TO
STANAG 1110
(Edition 7)

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
5.	Water (demineralized)	S-1739	Total solids on delivery to aircraft	mg/l	20 (max)	DEF STAN 68-253 Issue 1	
6.	Methanol/Water 44/56	S-1744	Total solids on delivery to aircraft	mg/l	20 (max)	DEF STAN 68-253 Issue 1	
7.	Fuel System Icing Inhibitor, High Flash Point	S-1745	Total water	m/m	0.4 (max)	D1364	

NOTE: ASTM and ISO methods are given for reference, but any equivalent national method may be used.

RATIFICATION AND IMPLEMENTATION DETAILS
STADE DE RATIFICATION ET DE MISE EN APPLICATION

NATION	NATIONAL RATIFICATION REFERENCE DE LA RATIFICATION NATIONALE	NATIONAL IMPLEMENTING DOCUMENT NATIONAL DE MISE EN APPLICATION	IMPLEMENTATION/MISE EN APPLICATION					
			FORECAST DATE PREVUE			ACTUAL DATE REELLE		
			NAVY MER	ARMY TERRE	AIR	NAVY MER	ARMY TERRE	AIR
BE	VS3/MAS-96-95720 of/du 17.7.96	STANAG				7.96	7.96	7.96
CA	2441-1110 (DTA 3 POL 1) of/du 27.12.95	CFTOC-82-005 001/AM-001				6.96		
DA	MA 204.68-S1110/MAM 3-15996 of/du 20.8.96	STANAG				9.96	9.96	9.96
FR	001996/DEF/DCSEA/SDE.1/189/ 00 of/du 28.3.96	STANAG				4.96	4.96	4.96
GE	BMVG FÜS1V2-AZ03-SI-60/1110 of/du 25.6.96	STANAG				11.96	11.96	11.96
GR	184261 of/du 20.2.96	STANAG				5.96	12.96	6.96
IT	A/183/12-H of/du 31.7.96	STANAG				7.96	7.96	7.96
LU	NOT PARTICIPATING/NE PARTICIPE PAS							
NL	RNLAF/NW 96016144 of/du 4.3.96	See overlea/ voir au verso				6.96	6.96	6.96
NO	MAS-315/96/FO/SST/ORG/EOB of/du 11.4.96	STANAG				9.96	9.96	9.96
PO*	CHOD PO RRN 081/96/DA of/du 3.5.96	STANAG				6.96		6.96
SP	EMACON 214-N/167 of/du 5.9.96	STANAG				1.97	1.97	1.97
TU	Gn.P.P:2307-6-96/And.D. (MAS.S/1110) of/du 8.1.96	STANAG					9.96	
UK								
US*	WL/POSF of/du 15.2.96	NAVAIR 00-80T- 109 MIL-HDBK-200				6.96	6.96	6.96

See overleaf reservations(*)/comments (+)
Voir au verso réserves (*)/commentaires (+)

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RESERVATIONS

- PO: This agreement will be implemented by POAF only in F-34 and F-35.
- US: F-44 supplied by US Navy ships to aircraft may not always meet the minimum of 0.07 vol% fuel system icing inhibitor (FSII). Aircraft pilots will be informed when FSII content is below this limit.

RESERVES

- PO: Cet accord ne sera mis en application par la POAF que pour les F-34 et F-35.
- US: Le F-44 fourni aux aéronefs par l'US Navy peut ne pas toujours satisfaire à l'exigence de teneur minimum en additif antiglace de 0,07 (% en volume). Les pilotes des aéronefs seront informés quand la teneur en additif antiglace (FSII) sera inférieure à cette limite.

NATIONAL IMPLEMENTING DOCUMENTS/
DOCUMENTS NATIONAUX DE MISE EN APPLICATION

NL:	RNLAF:	STANAG
	RNLNA:	VVKM 500
	RNLAR:	VI-BOX-018/037