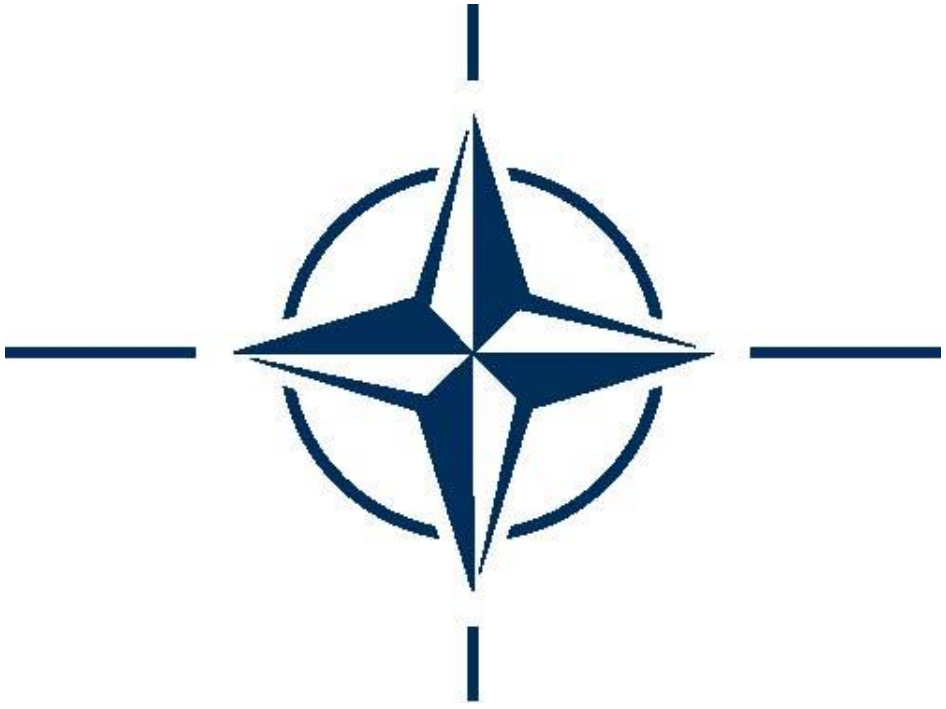
NATO STANDARD

AFLP-4596

GUIDE SPECIFICATION FOR LUBRICATING OIL, NAVAL DIESEL ENGINE, SEVERE SERVICE, GRADE 40 (O-278)

Edition A Version 1
SEPTEMBER 2018



NORTH ATLANTIC TREATY ORGANIZATION

ALLIED FUELS AND LUBRICANTS PUBLICATION

Published by the
NATO STANDARDIZATION OFFICE (NSO)

INTENTIONALLY BLANK

NORTH ATLANTIC TREATY ORGANIZATION (NATO)

NATO STANDARDIZATION OFFICE (NSO)

NATO LETTER OF PROMULGATION

7 September 2018

1. The enclosed Allied Fuels and Lubricants Publication AFLP-4596, Edition A, Version 1, GUIDE SPECIFICATION FOR LUBRICATING OIL, NAVAL DIESEL ENGINE, SEVERE SERVICE, GRADE 40 (O-278), 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 4596.

2. AFLP-4596, Edition A, Version 1, is effective upon receipt.

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

for

Dieter Schmaglowski
Deputy Director NSO
Branch Head P&C

Zoltán GULYÁS
Brigadier General, HUNAF
Director, NATO Standardization Office

INTENTIONALLY BLANK

RESERVED FOR NATIONAL LETTER OF PROMULGATION

INTENTIONALLY BLANK

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.	

INTENTIONALLY BLANK

RECORD OF SPECIFIC RESERVATIONS

[nation]	[detail of reservation]

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.

INTENTIONALLY BLANK

TABLE OF CONTENTS

INTENTIONALLY BLANK

SECTION 1 GENERAL

0101. STANAG 1135, Annex C lists under individual product descriptions of national specifications which have been agreed as interchangeable.

0102. 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. An MN's individual procurement document may be more stringent depending upon its equipment. This STANAG is not designed to be used in the direct procurement of products.

0103. This Guide Specification represents the minimum quality acceptable under the NATO Codification.

0104. Nations' specifications shall comply with these minimum requirements before the subject of these specifications are accepted as standardized products under the NATO Codification.

0105. In order to promote a product development, any nation's specification may include additional tests, or improved quality requirements to those in this Guide Specification.

0106. This Guide Specification shall be subject to review with the object of improving the product quality as required by operational use.

0107. The information contained in Section 2 is commercial-in-confidence and release of it must be consistent with NATO and national disclosure policies and regulations.

INTENTIONALLY BLANK

SECTION 2 GUIDE SPECIFICATION FOR LUBRICATING OIL, NAVAL DIESEL ENGINE, SEVERE SERVICE, GRADE 40 (O-278)

Scope: This oil is suitable for use in marine diesel engines operating on distillate fuels, ranging from the small cylinder normally aspirated type, to the multi-cylinder, highly-rated, pressure-charged type.

	REQUIREMENT	UNITS	TEST METHOD	LIMITS	NOTES
(a)	(b)	(c)	(d)	(e)	(f)
1	Composition			The oil shall consist of refined mineral oil blended with additives as necessary to meet the requirements of this specification	
2	Appearance		Visual examination	Homogeneous, clear, free from visible water, particles in suspension and sediments	
3	Kinematic Viscosity at 100 °C	mm^2s^{-1}	ISO 3104	12.5 - <16.3 (SAE 40)	ASTM D445 is technically equivalent
4	Viscosity Index		ISO 2909	Minimum 90	ASTM D2270 is technically equivalent
5	Pour Point	°C	ISO 3016	Maximum –12	ASTM D97 is technically equivalent
6	Copper Corrosion (Test at 100 °C for 3 hours)	Rating	ISO 2160	Maximum 1b	ASTM D130 is technically equivalent
7	Foaming Characteristics: Foam Stability; (i) Sequences I & III (at 24 °C) (ii) Sequence II (at 93,5 °C)	 ml ml	ISO 6247	 Maximum 30 Maximum 50	ASTM D892 is technically equivalent

(a)	(b)	(c)	(d)	(e)	(f)
8	Rust Prevention		ISO 7120 Procedure B	No rusting	ASTM D665 Procedure B is technically equivalent
9	Engine Performance: **Either;** (i) ACEA Classification **or** (ii) API Classification		 (i) ACEA E7 (ii) API CI	 (i) Minimum E7 (2012) (ii) Minimum CI	If ACEA or API classification is used to define engine performance then the oil supplier must provide appropriate supporting documentation (Note 1)
10	Load-carrying Capacity: FZG Gear Test Rig	Failure Load Stage	CEC L07-A-95	Minimum 12 (i.e. must pass Load Stage 11)	ASTM D5182 & DIN 51354 are technically equivalent

Note 1: There is no current category or engine testing available for mono-grade engine oils. It is therefore acceptable for manufacturers of O-278 SAE 40 mono-grade oils to test an additive package in a multi-grade formulation. If that multi-grade formulation complies with the engine performance requirements as stated for test 9 above then the same additive package may be used at the same treat rate to manufacture the O-278 SAE 40 mono-grade formulation.

INTENTIONALLY BLANK

AFLP-4596(A)(1)