



OIL, ENGINE, INITIAL FILL AND SERVICE FILL, SAE 0W-20

WSS-M2C952-A1

1. SCOPE

This material specification defines the minimum acceptable performance requirements and physical/chemical properties of engine oils to be used by Ford Motor Company in its worldwide engine/vehicle manufacturing and service operations.

2. APPLICATION

This specification is released in Europe and, where applicable, in Rest of World (RoW) for initial fill and service fill engine oils used for lubrication of compression ignition engines using diesel fuel and for some of the spark ignition engines using gasoline fuel.

3. REQUIREMENTS**3.1 APPROVED SOURCES**

This specification requires the use of approved sources. Only the sources identified on the Ford Approved Source List (ASL) can be used when this specification is listed on the drawing, CAD file, or other documents. The list of approved sources is located within Ford at www.mats.ford.com or available externally through a Ford Materials Engineer.

3.2 PERFORMANCE

Where applicable, the spec shall meet engine and bench tests for ACEA C2 as per ACEA (2016) or the latest ACEA sequence, with the exception of SAE J300 viscosity grade, and in addition to Ford specific tests as stated here under.

3.2.1 General Test Requirements

All engine performance and bench testing used to support a claim of compliance with this specification should be conducted according to CEC, ASTM or Ford internal procedures as applicable. Formulation should be developed according to the relevant industry standards (ATIEL CoP, ATC CoP, ACC CoP & API guidelines) and data supporting ACEA claims should be generated according to the EELQMS system.

All tests under surveillance by CEC or ASTM must be conducted using test equipment monitored by and calibrated to the requirements of CEC or ASTM Test Monitoring systems.

All Ford in house tests as well as all physical and chemical bench tests to be run on final formulation.

3.2.2 Additional tests to be run:**3.2.2.1 CEC L038-94 (ACEA 2012 limits apply)**

All Ford in house tests as well as all physical and chemical bench tests to be run on final formulation.

3.2.3 In House Fuel Economy Test (Gasoline Engine)

Date	Action	Revisions	Rev. 02
2017 04 04	Revised	See summary of revisions	S. Abdelhalim, EU
2016 09 06	Revised	Removed ACEA (2012) from 3.2	S. Abdelhalim, FOE
2016 05 18	Released		S. Abdelhalim, FOE



Consult Ford Motor Company for details of the test.

3.2.4 In House Fuel Economy Test (Diesel Engine)
Consult Ford Motor Company for further details of the test.

3.2.5 In House Diesel Engine Chain Wear Test
Consult Ford Motor Company for further details of the test.

3.3 VISCOSITY GRADE

3.3.1 Shall meet all the requirements of 0W-20 SAE viscosity grade as defined in SAE Standard J300 (latest revision), "Engine Oil Viscosity Classification"

3.3.2 Low Temperature Pumping Viscosity at -40°C 60,000 mPa.s max
(ASTM D4684, MRV TP-1)

3.4 PHYSICAL/CHEMICAL PROPERTIES

3.4.1 Copper Corrosion, 1b max
(ASTM D 130 or ISO 2160, 3 h at 100 °C) (Dark Orange)

3.4.2 Gelation Index 12 max
(ASTM D5133, Scanning Brookfield)

3.4.3 TBN
To be greater than or equal to 7.0 mg KOH/g, when tested in accordance with ASTM D2896 and greater than or equal to 6.0 mg KOH/g when tested in accordance to ASTM D4739.

3.4.4 Phosphorus
Percentage mass to be between 0.06 – 0.08 when tested in accordance with ASTM D 5185

3.4.5 Sulphated Ash Products
To be no higher than 0.8% m/m, when tested in accordance with ASTM D874

3.4.6 Sulfur
To be no higher than 0.3% when tested in accordance with ASTM D5185.

3.4.7 Biodiesel Oxidation Test
(CEC L-109)
The average of three tests after 216 h of test shall be:

Oxidation	50 A/cm Max
Relative viscosity increase (KV 100)	40 % Max

3.4.8 Seal Compatibility
Shall be compatible with all current production component materials.

3.4.8.1 ACEA Seq 1.10, Oil/Elastomer Compatibility

Shall meet or exceed the requirements of ACEA C2 when tested in accordance with CEC-L-039-96 (Full data set including RE1, RE2, RE3 and RE4 plus Daimler DBL-AEM) or CEC-L-112 when available.



3.4.8.2 In House Timing Belt Compatibility Test

When tested in accordance with CEC-L-039-96 (7days at 150°C, closed cup testing), the Ford identified belt rubber samples shall meet the requirements listed in the attached table.

Fox Belt in Oil Compatibility Test		
Criteria	Unit	Limits
Micro Hardness Difference	IRHD or DIDC	-5 to +6
Relative Change in Volume	%	-5 to +5
Relative Change in Tensile Strength	%	-30 to +20
Relative Change in Elongation Rupture	%	-35

3.4.9 Physical Appearance and Odor

Shall be clear and bright with no objectionable odor.

3.4.10 Contaminants

Shall be free of carcinogens, toxins, metals not removed in refining or from previous use.

3.4.11 Cleanliness Specification (Initial Fill Only)

Particle Count and Distribution

In any 100 mL oil sample the particle count measured as per ISO 4407, shall meet the ISO 4406 classification 24 / 23 / 18.

3.5 "READ ACROSS" GUIDELINES

All performance tests must be conducted on the final oil formulations for consideration for initial fill. Exceptions may be permitted with supporting supplementary data on similar formulations to allow for approval in the absence of complete testing.

3.6 QUALIFICATION PROCEDURE

3.6.1 Documentation

Supplier must furnish to the affected Materials Engineering activity a completed and certified copy of the attached Supplement A, test reports demonstrating full compliance with all the requirements of this specification and a copy of the final American Chemistry Council (ACC – formerly CMA) and ERC summaries if available. The need for ACC and ATIEL & ATC registration of tests will be determined by the affected Materials Engineering activity. The copy of the ACC and ERC summaries should be sent directly from Registration Systems Inc. and ERC to the Materials Engineering activity unless specifically instructed by that activity.

The test reports must include results on both the candidate oil and the appropriate reference oils. The standard photographs of the test components are considered an essential part of the required test documentation. The oil sample code used for identification in each test document must be consistent. Any deviation in sample code uniformity must be explained and shown on the cover of each test report.

All tests must be certified by a qualified and authorized representative of the test facility.



The supplier shall identify all the formulation changes and modifications that occurred in the test program that coincide with the tests listed in the ACC and ERC Summaries. Individual formulations should be listed in Supplement A, and for registered tests, identified by the line item number and the formulation code.

3.6.2 Verification

The affected Materials Engineering activity reserves the right to conduct verification testing. If the test results do not support the originally submitted data, the supplier must re-test the product in coordination with the affected Materials Engineering activity. This re-test must be conducted and certified by a mutually agreed upon test facility.

3.6.3 Chemical and Physical Properties

Supplier shall furnish appropriate chemical and physical properties as required on Supplement A along with the manufacturing limits that apply to the material upon which approval is requested.

3.6.4 Performance Requirements

Conformance to the engine test requirements listed in Supplement A will be determined by using Multiple Test Acceptance Criteria (MTAC), where applicable. All data and reports from the tests used for MTAC must be provided by the supplier. On Supplement A identify the engine tests that have been used to determine the MTAC results by the corresponding line item number on the ACC Summary. The affected Materials Engineering activity reserves the right to use all tests when averaging in place of MTAC.

3.6.5 Quality Control

Upon engineering approval, supplier and affected Materials Engineering activity shall establish mutually agreed upon quality control limits, to be listed on Supplement B, and will be used for ongoing product verifications at mutually agreed upon frequencies. The infrared absorption spectra of the approved material shall constitute the reference standard and shall be kept on file. All samples shall produce infrared spectra that correspond to the reference standard when tested under the same conditions as those specified on the master spectra.

3.7 FLEET TESTING

Materials which, in the opinion of the affected Materials Engineering activity, constitute a significant departure from conventional formulations, whether in base stocks, refining processes or additive packages, must be fleet tested, in addition to the requirements outlined herein. These tests must include the type(s) of service judged to be affected by the difference in formulation technology. The affected Materials Engineering activity should be consulted prior to testing.

4. GENERAL INFORMATION

The information given below is provided for clarification and assistance in meeting the requirements of this specification. Contact gmfs@ford.com for questions concerning Engineering Material Specifications.



4.1 APPROVAL OF MATERIALS

Suppliers desiring approval of their materials shall first obtain an expression of interest from Purchasing, Design or Product Development, and Materials Engineering. The supplier shall submit a completed copy of their laboratory test reports, signed by a qualified and authorized representative of the test facility, demonstrating full compliance with all the requirements of the Material Specification. Tested material samples must be available for review upon request and kept for a minimum of one year. Upon request, the supplier will review the associated quality control documents (Process Failure Mode and Effects Analysis, Control Plans, Certification testing) with Ford.

4.2 SUPPLIER'S ONGOING RESPONSIBILITY

All materials must be equivalent in all characteristics to the material upon which approval was originally granted.

Prior to making any changes to the material originally approved, whether or not such changes affect the material's ability to meet the specification requirements, the supplier shall notify the affected Supplier Technical Assistance (STA), Purchasing, and Materials Engineering activities of the proposed changes (with reasons) by submission of a completed Suppliers Request for Engineering Approval, SREA.

For parts and components using Ford Engineering Material Specifications, all samples tested to the specifications for Design Verification (DV), Production Verification (PV) and Production Part Approval Process (PPAP) sign off must be kept until Job 1.

4.3 RESTRICTED SUBSTANCE MANAGEMENT STANDARD

Substance restrictions imposed by regulations or Company direction applies to the materials addressed by this document. The restrictions are identified in the Restricted Substance Management Standard WSS-M99P9999-A1 which is updated yearly. It is the supplier's responsibility to comply with this standard on a continuing basis through IMDS and or GMAP reporting.

5. SUMMARY OF REVISIONS

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|------------|--|
| 2017 04 04 | Clarified working in application
Added testing 3.2.2.1
Updated method for phosphorus section 3.4.4
Updated 3.4.7 biodiesel oxidation test
Updated seal compatibility, oil elastomer compatibility testing
Updated supplement forms
Added Diesel Turbocharger Deposit Test, Supplement A. |
| 2016 09 06 | Removed ACEA (2012) from the General Test Requirements in section 3.2 Performance. |