3-GP-904a
April 1964
CANCELLATION
May 1972

CANADIAN GOVERNMENT SPECIFICATIONS BOARD

Specification
for

LUBRICATING OIL, AIRCRAFT TURBINE ENGINE, SYNTHETIC, 3.0 cSt

This specification is cancelled as of May 1972 because the material described is no longer specified.

3-GP-904a
17 April 1964
AMENDMENT NO. 1
31 December 1964

CANADIAN GOVERNMENT SPECIFICATIONS BOARD

Specification
for

LUBRICATING OIL, AIRCRAFT TURBINE ENGINE,
SYNTHETIC: 3.0 cSt

---

4. DETAIL REQUIREMENTS

4.9 Rubber Swell - Change the minimum limit from 12 to 15 and the maximum limit from 35 to 30.

4.14 Load-Carrying Capacity

4.14.2 Acceptance Requirement

4.14.2.2 IAE Gear Test - Change to read:

4.14.2.2 IAE Gear Test - When tested at 4,000 rpm with oil flow of 1/2 Imp pt per min at 75°C (167°F), the average load-carrying capacity shall be not less than 35 pounds.

3-GP-0 Method 58.4

4.15 Foaming - Change the section to read:

4.15 Foaming - The oil shall have the following foaming characteristics:

4.15.1 In the initial aeration test at 75 ± 1°F (23.9 ± 0.5°C), 25 ml max limit on the amount of foam immediately following the bubbling period, and complete foam collapse within 90 seconds (NOTE 1).

4.15.2 In the intermediate aeration test sequence at 200 ± 1°F (93.3 ± 0.5°C), 25 ml max limit on the amount of foam immediately following the bubbling period, and complete foam collapse within 50 seconds (NOTE 1).

4.15.3 In the final aeration test sequence at 75 ± 1°F (23.9 ± 0.5°C), 25 ml max limit on the amount of foam immediately following the bubbling period, and complete foam collapse within 90 seconds (NOTE 1).

Par 5.4.3

NOTE 1: After 90 seconds in the initial and final tests, and after 50 seconds in the intermediate test, some small bubbles remaining on the surface at the periphery shall not be cuase for rejection provided most of the oil surface is exposed.

Withdrawn/Retirée

5. QUALIFICATION AND ACCEPTANCE TESTS, SAMPLING AND TEST METHODS

5.4 Testing

5.4.6 Trace Sediment - Change to read:

5.4.6 Trace Sediment - The determination of trace sediment shall be carried out as for precipitation value (3-GP-0/6.3) except that no diluent shall be used and the oil sample shall be well shaken rather than allowed to settle 24 hours. Two tubes, each containing 100 ml of oil, shall be centrifuged and the resultant volumes of sediment added to obtain the total volume of trace sediment in ml per 200 ml of oil.

Withdrawn/Retirée

ARCHIVES COPY

3-GP-904a
17 April 1964
AMENDMENT NO. 2
16 April 1966
Supersedes
Amendment No. 1

CANADIAN GOVERNMENT SPECIFICATIONS BOARD

Specification
for

LUBRICATING OIL, AIRCRAFT TURBINE ENGINE,
SYNTHETIC: 3.0 cSt

4. DETAIL REQUIREMENTS

4.9 Rubber Swell - Change the minimum limit from 12 to 15 and the maximum limit from 35 to 30.

4.14.2.2 IAE Gear Test - Change to read:

When tested at 4,000 rpm with oil flow of 1/2 Imp pt per min at 75°C (167°F), the average load-carrying capacity shall be not less than 35 pounds.

3-GP-0 Method 58.4

4.15 Foaming - Change the section to read:

4.15 Foaming - The oil shall have the following foaming characteristics:

4.15.1 In the initial aeration test at 75 ± 1°F (23.9 ± 0.5°C), 25 ml max limit on the amount of foam immediately following the bubbling period, and complete foam collapse within 90 seconds (NOTE 1).

4.15.2 In the intermediate aeration test sequence at 200 ± 1°F (93.3 ± 0.5°C), 25 ml max limit on the amount of foam immediately following the bubbling period, and complete foam collapse within 50 seconds (NOTE 1).

4.15.3 In the final aeration test sequence at 75 ± 1°F (23.9 ± 0.5°C), 25 ml max limit on the amount of foam immediately following the bubbling period, and complete foam collapse within 90 seconds (NOTE 1).

Par 5.4.3

NOTE 1: After 90 seconds in the initial and final tests, and after 50 seconds in the intermediate test, some small bubbles remaining on the surface at the periphery shall not be cause for rejection provided most of the oil surface is exposed.

5. QUALIFICATION AND ACCEPTANCE TESTS, SAMPLING AND TEST METHODS

*5.4.6 Trace Sediment - Change to read:

The determination shall be performed in accordance with ASTM D2273 except that no diluent shall be used. Two tubes, each containing 100 ml of oil, shall be centrifuged and the resultant volumes of sediment added to obtain the total volume of trace sediment in ml per 200 ml of oil.

* Change from previous amendment

Withdrawn/Retirée

CANADA

CANADIAN GOVERNMENT SPECIFICATIONS BOARD

SPECIFICATION

FOR

LUBRICATING OIL, AIRCRAFT TURBINE ENGINE, SYNTHETIC: 3.0 cSt

3-GP-904a

17 APRIL 1964

SUPERSEDES 3-GP-904
5 MAY 1961

Withdrawn/Retirée

THIS SPECIFICATION APPLIES TO ONE GRADE OF SYNTHETIC BASE LUBRICATING OIL SUITABLE FOR USE IN AIRCRAFT TURBINE ENGINES AND ANCILLARY EQUIPMENT.

NATIONAL RESEARCH COUNCIL, OTTAWA, CANADA

Price
15 CENTS

COMMENTS AND ENQUIRIES REGARDING THIS PUBLICATION SHOULD BE ADDRESSED TO THE CGSB SECRETARY

COMMITTEE ON PETROLEUM

(Membership at date of approval by the Committee)

* Parkin, Dr. J.H. (Chairman)	National Research Council
Attendu, S/L M.C.	Department of National Defence/RCAF
Barton, H.B.	Texaco Canada Limited
Black, J.W.	Department of National Defence/Army
Broughton, Dr. J.W.	National Research Council
Campbell, R.O.	British American Oil Company, Limited
Charlesworth, J.S.	Research Council of Alberta
Draper, R.G.	Department of Mines & Technical Surveys
Grimsey, R.G.	Department of National Defence/Navy
Kerr, D.	Shell Canada Limited
Kuhring, M.S.	National Research Council
Lamoureux, P.E.	Trans-Canada Air Lines
McIntyre, Capt. J.S.	Department of National Defence/Army
Montgomery, Dr. D.S.	Department of Mines & Technical Surveys
Newcomen, T.R.	BP Canada Limited
Rhodes, D.F.	Shell Canada Limited
Shimizu, T.Y.	Department of Public Works
Showalter, Dr. H.A.	Inspection Services/DND
Smith, Major G.R.	Department of National Defence/Army
Whitfield, L.F.	Imperial Oil Enterprises Limited
Mitton, H.E. (Secretary)	CGSB/National Research Council

Withdrawn/Retirée

* Senior Consultant to the Division of Mechanical Engineering as of April/57.

3-GP-904a
17 April 1964
Supersedes 3-GP-904
5 May 1961

CANADIAN GOVERNMENT SPECIFICATIONS BOARD

Specification
for

LUBRICATING OIL, AIRCRAFT TURBINE ENGINE, SYNTHETIC: 3.0 cSt

Withdrawn/Retirée

1. DEFINITION

1.1 This specification applies to one grade of synthetic base lubricating oil suitable for use in aircraft turbine engines and ancillary equipment.

1.2 For more information on uses, see 6.1.

2. APPLICABLE PUBLICATIONS

2.1 The following publications are applicable to this specification:

2.1.1 CGSB 3-GP-0, Methods of Testing Petroleum and Associated Products.

2.1.2 ASTM Standards on Petroleum Products and Lubricants.

2.2 Reference to the above publications is to the issues in effect on the date of invitation to tender, unless otherwise specified.

3. GENERAL REQUIREMENTS

3.1 Oil to this specification shall be a synthetically prepared product with necessary additive materials to impart oxidation stability, corrosion preventive properties, and antiwear properties. When tricresyl phosphate is included in the oil formulation, the supplier shall certify that the tricresyl phosphate used does not contain more than 1 per cent of the ortho isomer.

3.2 The finished product shall be transparent, uniform in appearance, and free from sediment, cloudiness, suspended matter or other adulteration when examined visually in reflected light both before and after centrifuging.

4. DETAIL REQUIREMENTS

Requirements contained herein are not subject to corrections for tolerance of test methods. If multiple determinations are made by the inspecting laboratory, average results will be used except for those test methods where repeatability data are given. In those cases, the average value derived from the individual results that agree within the repeatability limits given for the test methods will be used. For purposes of determining conformance with each requirement, an observed value or calculated value shall be rounded off "to the nearest unit" in the last right-hand place of figures used in expressing the limiting value, in accordance with the rounding-off procedure given in ASTM E29, Recommended Practices for Designating Significant Places in Specified Limiting Values.

The lubricating oil shall comply with the following detail requirements:

		Min	Max	Test Method
4.1	Viscosity at 210 °F (99 °C), cSt	3.0	-	ASTM D445
4.2	Viscosity at 100 °F (37.8 °C), cSt	11.0	-	ASTM D445
4.3	Flash Point, °F (°C)	400 (204.4)	-	ASTM D92
4.4	Pour Point, °F (°C)	-	−75 (-59.4)	ASTM D97
4.5	Total Acid Number	-	0.30	ASTM D664
4.6	Trace Sediment, ml/200 ml	-	0.005	Par 5.4.6
4.7	Color (ASTM), No.	-	3	ASTM D1500
4.8	Evaporation at 400 °F (204.4 °C), $6\frac{1}{2}$ hr, % by wt	-	35	Par 5.4.1
4.9	Rubber Swell, % volume increase	12	35	3-GP-0/59.10

4.10 Viscosity Stability at -65 °F (-53.9 °C) - The two viscosity determinations under the 3 hour test shall not differ by more than 6 per cent of the lowest value and both shall be below 13,000 centistokes. All determinations made under the 72 hour test (i.e., at 6 hours, 24 hours, etc.) shall be below 17,000 centistokes.

3-GP-0 Method 36.5

4.11 Corrosion and Resistance to Oxidation

4.11.1 Corrosion - The change in weight of steel, silver, aluminum alloy and magnesium alloy, when subjected to the action of the lubricating oil for 72 hours at 175 °C (347 °F), shall be not greater than ± 0.2 mg per sq cm of surface. The change in weight of copper under the same conditions shall be not greater than ± 0.4 mg per sq cm of surface. There shall be no pitting, etching nor visible corrosion on the surface of any of the metals when viewed under magnification of 20 diameters. Staining of the metals will be permitted.

4.11.2 Resistance to Oxidation - The lubricating oil shall not have changed by more than -5 or + 15 per cent from the original viscosity in centistokes at 100 °F (37.8 °C) after being subjected to the oxidation-corrosion test for 72 hours at 175 °C (347 °F). The total acid number of the oxidized oil shall not have increased by more than 2.0. Darkening of the lubricating oil during the test will be permitted.

Par 5.4.2

4.12 Silver and Copper Corrosion - The loss in weight of silver and copper shall not exceed 3.0 mg per sq in. when subjected to the lubricating oil for 50 hours at 450 °F (232 °C).

3-GP-0 Method 60.27

4.13 Lead Corrosion - The loss in weight of lead when subjected to the lubricating oil for 1 hour at 325 °F (163 °C) shall not exceed 6 mg per sq in.

3-GP-0 Method 60.28

Withdrawn/Retirée

4.14 Load-Carrying Ability

4.14.1 Qualification Requirement (Ryder Gear Test) - When evaluated under standard operating conditions, the average rating from eight determinations shall be not less than 68 per cent of the rating obtained on Reference Oil "B". (Details of test method may be obtained from the Qualification Authority.)

4.14.2 Acceptance Requirement - The oil shall meet either the Ryder or the IAE Machine acceptance requirements as follows:

4.14.2.1 Ryder Gear Test - A minimum number of determinations shall be made as listed below. The reported relative rating shall be the average of all determinations made.

Number of Determinations	Relative Rating per cent (min)
2	76
4	72
6	70
8	68

(Details of test method may be obtained from the Qualification Authority.)

4.14.2.2 IAE Gear Test - When tested according to 3-GP-0 Method 58.4 at 4,000 rpm with oil flow of $\frac{1}{2}$ Imp pt per min at 75 °C (167 °F), the average load-carrying capacity shall equal or exceed a value of 5 lb less than the average load-carrying capacity of the qualification sample.

3-GP-0 Method 58.4

4.15 Foaming - The oil shall have the following foaming characteristics:

4.15.1 In the initial aeration test at 75 ± 1 °F (23.9 ± 0.5 °C), 20 ml max limit on the amount of foam immediately following the bubbling period, and complete foam collapse within 90 seconds.

4.15.2 In the intermediate aeration test sequence at 200 ± 1 °F (93.3 ± 0.5 °C), 20 ml max limit on the amount of foam immediately following the bubbling period, and complete foam collapse within 50 seconds.

4.15.3 In the final aeration test sequence at 75 ± 1 °F (23.9 ± 0.5 °C), 20 ml max limit on the amount of foam immediately following the bubbling period, and complete foam collapse within 90 seconds.

Par 5.4.3

4.16 Deposition Number

4.16.1 Qualification Requirement - The average deposition number for the lubricating oil shall not exceed 3.5. Four runs shall be made and no individual run shall exceed 4.25.

4.16.2 Acceptance Requirement - The average deposition number for the lubricating oil shall not exceed 3.5. Two runs shall be made and no individual run shall exceed 4.25.

3-GP-0 Method 65.2

Withdrawn/Retiree

4.17 Compatibility - The lubricating oil shall be compatible with each of the lubricating oils specified by the purchaser. At the end of each test the mixtures shall not be turbid or have precipitate in excess of 0.005 ml per 200 ml of oil.

(Details of method may be obtained from the Qualification Authority.)

4.18 Engine Test - When subjected to the 100 hour engine endurance test, the engine shall have a deposit, wear and corrosion rating of 2.83 or better. The engine filter weight increase shall not exceed 0.020 pound per hour and the average oil consumption shall be less than 1.25 pounds per hour. The right is reserved to subject used oil samples to any or all the tests in this specification. Significant changes in physical or chemical properties as a result of engine operation may be cause for rejection.

(Details of method may be obtained from the Qualification Authority.)

4.19 Storage Stability (Accelerated Test) - After storage periods of 2 and 7 days at 230 °F (110 °C), the lead corrosion value of the oil shall not exceed 25 and 150 mg/sq in. respectively.

Par 5.4.4

4.20 Storage Stability (Extended Period) - There shall be no separation, sedimentation or discoloration of the oil when examined visually after storage for 3, 6 and 12 months at 75 °F (23.9 °C). After 12 months storage the oil shall meet all requirements of this specification.

Par 5.4.5

5. QUALIFICATION AND ACCEPTANCE TESTS, SAMPLING AND TEST METHODS

5.1 Qualification Tests - Tests for qualification shall consist of tests for all requirements of this specification.

5.2 Acceptance Tests - Acceptance tests on individual lots or batches shall consist of the tests for all requirements of this specification except Viscosity Stability (par 4.10), Compatibility (par 4.17), Engine Test (par 4.18), Storage Stability (Accelerated Test) (par 4.19) and Storage Stability (Extended Test) (par 4.20).

5.3 Sampling

5.3.1 Qualification Test Sample - A sample of the size required by the laboratory conducting the qualification tests shall be provided for qualification.

5.3.2 Acceptance Test Sample - Acceptance test samples shall consist of five Imperial gallons of the finished lubricating oil obtained in accordance with ASTM D270.

5.4 Testing - The methods of testing shall be those in CGSB 3-GP-0 or in ASTM Standards on Petroleum Products and Lubricants, as specified, using the procedure prescribed with each requirement.

5.4.1 Evaporation - The test shall be conducted in accordance with ASTM D972 except that it shall be carried out at 400 °F (204.4 °C) for the specified number of hours. NOTE: Assembly of apparatus at room temperature is recommended, as at 400 °F metal expansion may interfere with assembly.

Withdrawn/Retired

5.4.2 Corrosion and Resistance to Oxidation - The test shall be conducted in accordance with 3-GP-0 Method 38.4 except that the cadmium-plated steel test metal shall be replaced by a silver or silver-plated steel panel. Four specimens shall be arranged in the order of aluminum alloy, magnesium alloy, steel and copper, tied together to form a square, and the silver test specimen inserted as a diagonal between the copper-and-steel and aluminum-and-magnesium intersections.

5.4.3 Foaming Characteristics - The test shall be carried out in accordance with ASTM D892 except that the foam collapse periods for sequences 1, 2 and 3 shall be 90 seconds, 50 seconds and 90 seconds, respectively.

5.4.4 Storage stability (Accelerated Test) - Place two 1-gallon cans of the oil in an unvented oven capable of maintaining a temperature of 230 ± 2 °F (110 ° ± 1 °C). After 2 and 7 days remove a 500 ml sample from each can and run a lead corrosion test on each sample (3-GP-0 Method 60.28). Return the cans to the oven after each sample removal (no replenishment oil shall be added to the cans).

5.4.5 Storage Stability (Extended Period Test) - Place one 5-gallon can and one 1-quart clear glass sealed container of the oil in a dark room maintained at 75 ± 5 °F (23.9 ± 3 °C). After 3, 6 and 12 months visually inspect the oil in the glass container for evidence of separation, either in the form of stratification or sediment, and for change in color. Remove samples from the 5-gallon can at the end of the 12 month period and carry out the following tests: Viscosity at 100 °F (ASTM D445), Flash Point (ASTM D92), Pour Point (ASTM D97), Viscosity Stability at -65 °F (3-GP-0/36.5), Evaporation at 400 °F, 6½ hours (par 5.4.1), Corrosion and Resistance to Oxidation (par 5.4.2), Foaming (par 5.4.3) and Trace Sediment (par 4.6). The lead corrosion test (3-GP-0/60.28) shall be run for information.

5.4.6 Trace Sediment - The determination of trace sediment shall be carried out as for precipitation value (3-GP-0/6.3) except that no diluent shall be used and the result shall be based on 200 ml of oil instead of 100.

6. NOTES

6.1 Intended Uses - Oil to this specification is intended for use in aircraft turbine engines and helicopter transmissions.

6.2 The NATO symbol for the product covered by this specification is O-148.

6.3 Related Specifications - At the time of publication, the undernoted document was an equivalent specification:

6.3.1 U.S. Military Specification MIL-L-7808E, Lubricating Oil, Aircraft Turbine Engine, Synthetic Base.

6.4 The publications listed in par 2.1.1 may be obtained from the CGSB Secretary.

6.4.1 The publication listed in par 2.1.2 may be obtained from the American Society for Testing and Materials, 1916 Race St., Philadelphia 3, Pa., U.S.A.

6.5 Qualification Procedure - Information regarding the procedure for the qualification of aircraft lubricating oil to this specification in connection with Department of National Defence purchases may be obtained from the Commanding Officer, RCAF Materiel Laboratory, RCAF Station Rockcliffe, Ottawa, Ontario.

Withdrawn/Retire