

Spec. No. 174

Date: March 31, 1943

MODEL SPECIFICATION

ENGINE, AIRCRAFT: MODEL V-1710-99

ALLISON DIVISION
General Motors Corporation
Indianapolis, Indiana

(ALLISON MODEL DESIGNATION V-1710-F26R)

MODEL SPECIFICATION

ENGINE, AIRCRAFT: MODEL V-1710-99

Allison Division of General Motors Corporation

(Allison Model Designation V-1710-F26R)

A. APPLICABLE SPECIFICATIONS

A-1. The following specifications of the issue in effect on date of invitation for bids shall form a part of this specification:

A-1a. Army-Navy Specification:

AN-9500 Engines, Aircraft; General Specification and applicable specifications of the issues indicated on page 16.

B. TYPE AND MODEL.

B-1. This specification covers the requirements for the V-1710-99 engine.

C. MATERIAL AND WORKMANSHIP.

C-1. The requirements for material and workmanship shall be as specified in Specification AN-9500.

D. GENERAL REQUIREMENTS.

D-1. See Section E.

E. DETAIL REQUIREMENTS.

E-2. Drawings. The following Allison Division drawings form part of this specification:

44646 Engine Assembly, Complete - (Showing Accessory Drive Oil Seals)

44645 Installation Drawing (Showing clearances for engine accessories and their removal)

43590 Priming System Assembly
 42113-U Carburetor, PD12K6 Bendix-Stromberg
 40600-N Spark Plug Assembly AC-LS85
 40601-I Spark Plug Assembly Champion C34S
 42354-D Terminal, Spark Plug (Contact)
 40208 Lubrication System Diagram
 41809-E Magneto
 42290-B Radio Shielding Assembly
 43016 Manifold Assem. - Spark Plug Cooling R.H.
 43017 Manifold Assem. - Spark Plug Cooling L.H.
 33536-Q Nut - Magneto Cable Shielding Conn.
 42348-D Shielding - Spark Plug Cable - Intake
 42547-I Shielding - Spark Plug Cable - Exhaust
 43801-D Control - Automatic Engine

E-3. Acceptance. The acceptance of this engine is based upon satisfactory completion of Government tests on the V-1710-81 run at Materiel Center. The approval was made by letter LS-JS-70-5 dated June 19, 1942.

The V-1710-99 is similar to the current production V-1710-81 except that the automatic engine control is provided on the -99 instead of the automatic pressure regulator.

The -81 engine was model tested in accordance with AN-9502 with the exception to Par. F-3b of AN-9504 (Torsional Vibration) that the vibration amplitude measured at the rear of the crankshaft shall not exceed $\pm 1.35^\circ$ for the 1 1/2 order single node vibration and $\pm 0.35^\circ$ for the 6th order 2 node vibration. The engine shall perform satisfactorily with these limits.

E-4. Weight. The total dry weight of the engine complete shall not exceed the values indicated below:

Basic engine, including integral supercharger, supercharger drive mechanism, propeller reduction gears, coolant pump and piping on the engine, engine lubrication system oil pumps, starter connection, including starter dog, tachometer drives, fuel pump drive, generator drive, vacuum

pump drives, propeller governor drive and all piping and controls between engine parts	1268.0 lbs.
Carburetor and Injection Nozzle	32.0
Carburetor Screens and Gaskets	1.0
Magneto, Shielded	13.0
Ignition Distributors (included in Shielding Assembly)	
Radio Shielded Ignition Assembly, complete with Cable and Distributors	31.0
Spark Plugs	7.0
Priming System on Engine	1.0
Cooling Air Deflectors and Baffles	none
Accessory Drive Covers	2.0
TOTAL DRY WEIGHT OF ENGINE	1355.0 lbs.

E-5. Performance Characteristics. The engine shall be equipped with an Allison automatic engine control, Part No. 43801, and its use shall be a requirement in the installation of this engine. The ratings specified herein and the curves and data specified herein and shown on page 13, 14, and 15 shall constitute the power and specific fuel consumption guarantee, except when otherwise stated on the curve sheet. The terms used and the standard conditions shall be in accordance with the applicable definitions contained in Spec. AN-9502.

E-5a. Ratings. The engine shall be rated as follows, using fuel conforming to Specification AN-F-28 and oil conforming to AN-VV-C-446, Grade 1120.

870 B.H.P. at 2600 R.P.M. at sea level
 1000 B.H.P. at 2600 R.P.M. normal rating at 14,400 ft.
 1200 B.H.P. at 3000 R.P.M. take-off for five minutes.
 1125 B.H.P. at 3000 R.P.M. military rating at 15,000 ft. for 15 minutes.
 3120 R.P.M. rated overspeed dive R.P.M.

E-5b. Curves. The following curves shall be furnished as part of this specification:

E-5b(1). Horsepower vs Altitude at Rated Speeds as shown on Page 13.

E-5b(2). Estimated performance data at altitude as shown on Page 14.

E-5b(3). Estimated fuel consumption curves as shown on Page 15.

E-5e. Specific Oil Consumption. The specific oil consumption shall not exceed .025 lb./BHP/hr. at normal rated power and speed, .025 lb./BHP/hr. at 70 per cent normal rated power and 89 per cent normal rated speed.

E-5h. Coolant Flow and Heat Rejection. The following guarantee is given for the coolant flow and heat rejection to the coolant:

Conditions:

Operation On dynamometer for 5 minutes.
 Power Take-off (1200 BHP)
 Speed Take-off (3000 RPM)
 Fuel Consumption. . . Auto Rich
 Oil Inlet Temp. . . . 185°F
 Oil Pressure. 65 p.s.i.
 Coolant Outlet Temp . 250°F
 Oil Flow 160 lb./min.
 Air Blast on Engine . 60°F at 10 MPH

Guarantee:

Coolant flow not to exceed - 250 GPM
 Heat rejection to coolant not to exceed - 430 HP

E-5i. Oil Flow and Heat Rejection. The following guarantee is given for the oil flow and heat rejection to the oil:

Conditions:

Operation On dynamometer for 5 minutes
 Power Take-off (1200BHP)
 Speed Take-off (3000RPM)
 Fuel Consumption. . . Auto Rich
 Oil Inlet Temp. . . . 185°F
 Oil Pressure. 65 pls.i.
 Coolant Outlet Temp . 250°F
 Coolant Flow. 250GPM
 Air Blast on Engine . 60°F at 10 MPH

Guarantee:

Oil flow not to exceed - 160 lb./min.
Heat rejection to oil not to exceed - 155 HP.

E-7. Propeller. The engine shall have a number 50 propeller shaft end. Provision shall be made for a governor type of propeller control mechanism of the hydromatic type.

E-12. Overall Dimensions. The overall dimensions of the engine shall not exceed the following:

Length	85 ²⁷ / ₃₂ inches
Width	29-9 ³² / ₃₂ inches
Height	36-3 ⁴ / ₄ inches

E-14. Preparation for Storage. The engine shall be prepared for storage in accordance with AN-F-E-568 with the following exceptions:

- (1) (Par. E-1b. AN-Aero. Standard Drawings). The following Allison Division drawings shall apply in lieu of AN parts.
 - 42288 - Plug Crankcase Dehydrator
 - 36411 - Cap - Prop. Shaft Thread
 - 43616 - Envelope - Engine Protector
- (2) (Par. F-2a(1) - Operation Procedure). The requirements of this paragraph shall be met except that the specified compound-lubricating oil mixture shall not be used in the manner specified. The engine shall be thoroughly flushed with the compound-lubricating oil mixture at a later operation during the preparation for storage procedure.
- (3) (Par. F-3h - Intake Manifold). A one pound bag of dehydrating agent shall be secured to the inside of the air intake cover.
- (4) (Par. F-3n - Crankcase). A dehydrator plug No. 42288 shall be installed in an appropriate opening of the crankcase.
- (5) (Par. F-4a(1) Packing Procedure). The base of the engine shipping box shall function as the shipping saddle and the upper case may be removed leaving the engine, bag, and shipping box base intact.

E-16b. Parts List of the Engine. The parts list applicable in all details ~~for this engine shall be~~ the same as for the engine which successfully completed model tests with the exception of (1) such design improvements as mutually agreed upon between the contractor and Government including the Intake Manifold Assembly No. 43330 and (2) the addition of parts relative to the Automatic Engine Control, Allison Part No. 43801.

E-18. Propeller Drive. The engine shall be equipped with a reduction gear ratio of 2.00:1. The direction of propeller rotation when viewed from the anti-propeller end shall be clockwise.

E-19. Impeller Gear. The impeller gear ratio shall be 9.6:1 and the impeller shall be 9-1/2 inches in diameter.

E-20. Pistons. The engine shall be fitted with pistons of 6.65:1 compression ratio.

E-23a(1). Spark Plugs. The engine shall be fitted with AC-LS85, or Champion C34S. spark plugs.

E-23b. Radio Shielded Ignition Assemblies. The engine shall be equipped with Allison designed radio shielded ignition assemblies with the following exceptions to AN-9510:

(1) (Ref. Par. D-1e. Mounting Lugs) Mounting clamps shall be provided in place of integral, soldered, or welded mounting lugs.

(2) (Ref. Par. E-8, Capacitance) The capacitance between the shielding and each ignition cable contained therein shall not exceed 175 micro-microfarads.

(3) (Ref. Par. E-1a. Single Cable Conduits) Single cable conduit connections shall be as shown on Allison Drawing Nos. 33536, ~~42349~~, and 42348.

E-23c. High Tension Ignition Cable. (Ref. AN-9500, Par. D-23c) The distributor to spark plug leads shall be 5mm neoprene covered ignition cable conforming to Packard Cable Part No. 52473R. All other cable shall conform to AN-J-C-56 (7mm).

E-23d. Magnetos. The engine shall be equipped with one Scintilla Type DFLN6 magneto in accordance with AN-9511 with the following exceptions:

(1) (Ref Par. D-1b(1). Threads) Connections for the high tension terminals are 15/16-18 threads.

(2) (Ref. Par. E-1b(2) Type D Magneto) The heads of screws for securing the bearing retainer in the flange project beyond the .125" minimum recess in pilot specified in Fig. No. 3.

(3) (Ref. Par. E-2c. Normal Operating Temperature) The temperature rise of this magneto is 55.5°C. (100°F) above room temperature.

(4) (Ref. Par. E-2d. Endurance; F-4a(11)b. Elevated Temperature Run) This magneto will not meet the temperature requirements specified except for very short periods of time.

(5) (Ref. Par. E-3e. Simulated Service; F-4a(10)a Rain and Spray Test) The magneto will not meet the requirements when subjected to the test specified in this paragraph. The installation of this magneto on a liquid-cooled V engine requires and permits maximum ventilation in breaker cover.

E-23f. Cooling. (Ref. AN-9500 Par. D-23f) The engine shall be so designed as to permit the installation of adequate means for cooling the magnetos to required maximum temperature of 80°C. (176°F) Provision for cooling the spark plugs and the spark plug elbows shall consist of air ducts, as shown on Installation Drawing No. 44645 and Drawings No. 43016 and 43017, to which the airplane manufacturer shall connect. For flight and ground operation, spark plug elbows shall be satisfactory, provided the ignition wire temperature measured in the elbow does not exceed 115°C (239°F) and provided the cable furnished in accordance with paragraph E-23C of this specification does not fail below this temperature.

E-24c. Oil Leakage Test. (Ref. AN-9500, Par. D-24c) With a mixture of equal parts of aviation gasoline and oil conforming to AN-VV-O-446, Grade 1100, supplied to the pressure oil pump inlet under a head of 36 inches the total flow of oil into the engine shall not exceed 0.2 pounds per hour.

E-24e. Scavenging System. The engine scavenging system shall adequately scavenge the oil under the following conditions:

- (a) No air traps exist in the external scavenging systems.
- (b) Operating conditions are normal.
- (c) Maximum back pressure on scavenge pumps:
 - Max. Flow 40 p.s.i.
 - Min. Idle 10 p.s.i.

Note: Since the gear type pump will not "prime" when air locked, the back pressures given above shall be permissible if not more than 2 p.s.i. of the pressure is due to a spring loaded relief valve. The reason is to permit free passage of air under airlock conditions.

- (d) Oil - grade 1100 or 1120 of AN-VV-O-446.
- (e) Viscosity of Inlet Oil - 100 ± 5 S.U.S.

E-24f. Pressure Pump. In addition to the requirements of Par. D-24f of AN-9500, the oil pressure pump shall function satisfactorily when the inlet pressure is 82% or more of the absolute atmospheric pressure down to a minimum of 8 inches Hg. absolute,

when no air leaks exist in the external oil inlet line.

E-24g. Oil Cleaner. The engine shall be equipped with one Manual Cuno oil strainer, Allison Part No. 44044, and shall meet the requirements of AN-9500, Par. D-24g under normal operating conditions.

E-24j. Provision for Oil Connections. The oil inlet connection shall be a 2 in., 4-stud opening as shown on Installation Drawing.

E-24q. Crankcase Breathers. Ample breathing capacity shall be provided in accordance with Par. D-24q of Specification AN-9500; however, the airplane manufacturer shall locate the front and rear breather outlets to maintain a crankcase pressure measured at the front within the limits of +8 to -4 inches of water on any new or modified airplane installation. It is desired that the pressure at the front breather be held to 2 to 6 inches of water higher than pressure at the rear breather to provide proper ventilation through the engine from front to rear.

E-25. Fuel Metering System. The engine shall be equipped with one Bendix-Stromberg Model PD-12K6 injection carburetor in accordance with AN-9515 except for the following:

- (1) (Ref. Par. D-7, Strainer) The carburetor shall meet requirements except that foreign material is not removed with the strainer.
- (2) (Ref. Par. D-17, Mixture Control) The mixture control positions are located as follows:
 - (A) Idle cut-off full forward.
 - (B) Automatic lean directly back of A.
 - (C) Automatic rich directly back of B.
 - (D) Full rich directly back of C.
 - (E) Manual Control Range Between A & B.
- (3) (Ref. Par. D-26, Protective Treatment of Steel Parts) Cadmium plated parts shall have a minimum plating thickness of .0003".
- (4) (Ref. Par. D-32a(1), Metering Characteristics - Sea Level) The carburetors shall meet requirements except that at 30 to 70 per cent of airflow for normal rated power and speed the variation in fuel/air ratio shall be plus or minus 2 per cent.
- (5) (Ref. Par. D-32b(1), Metering Characteristics, Master Carb.) At take-off power and speed, the carburetor shall contain a setting which in the rich mixture control position will furnish mixture strengths within +4 -0 per cent of the guaranteed fuel consumption.

- (6) (Ref. Par. D-32b(13), Carburetor Heat on Test) The complete airflow to the carburetor shall be heated to avoid icing conditions on test. Duplication of the airplane method of admitting warm air shall not be attempted.
- (7) (Ref. Par. D-32c, Metering Characteristic of Production Carburetors.) The carburetors shall meet requirements except that at 30 to 70 per cent of airflow for normal rated power and speed the variation in fuel/air ratio shall be plus or minus 2 per cent.
- (8) (Ref. Par. F-4e(3) Metering Tests of Production Carburetors) A procedure for air box testing production carburetors, in accordance with War Department, Air Corps, Materiel Division letter of April 29, 1938, Serial No. E-57-809-16, shall be used, the procedure being as follows:

Mixture readings are obtained on the normal rated power and speed propeller load curve, using the following points; such points are subject to change to agree with individual carburetor specifications:

<u>AIRFLOW</u>	<u>METERING TOLERANCE</u>	<u>MIXTURE CONTROL POSITION</u>		
Take-off airflow	±2%	Auto.Rich	Auto.Lean	Full Rich
100% rated power airflow	"	"	"	
75% " " "	"	"	"	
62-1/2% " " "	"	"	Auto.Lean	
50% " " "	"	"	"	Full Rich
35% " " "	"	"	"	
22-1/2% " " "	±5%	"	"	
15% " " "	"	"	"	
10% " " "	"	"	"	
Airflow at min. idling speed	"	"	"	Idle cut-off

In addition, carburetors designed for automatic altitude compensation are checked at an airflow equivalent to 50% of normal rated power airflow with the mixture control in the automatic rich position and readings are taken at air box pressures of 0, 4, 8, and 14 inches of Hg. less than atmospheric pressure.

E-26. Fuel Priming System. Provision shall be made for priming the engine with fuel from a separately installed priming pump and lead line, supplied by the airplane manufacturer and attached to the engine priming connection.

E-29. Coolant Pump. The coolant pump shall be supplied with an internal spring loaded packing. Replacement of the packing is made by disassembly of the pump. No provision shall be made for external packing adjustment.

E-30. Coolant Temperature. The cooling liquid outlet temperature for liquid cooled engines shall be 121°C (250°F).

E-31a(3). Supercharger Drain Valve. (Ref. AN-9500, Par.D-31a(3)). A fuel aspirator without a valve shall be the only provision made for automatic drainage of the induction system.

E-32a. Exhaust Flanges (Ref. AN-9500 Par. D-32a). The use of exhaust flanges in accordance with Allison Part No. 44018 (AMS-5080) or Part No. 34667 (AMS-5645) and exhaust flange gaskets Part No. 40751 shall be a requirement in the installation of this engine. The exhaust flanges shall not be furnished with the engine and separate procurement must be initiated by the airplane manufacturer. The gaskets and nuts shall be furnished with the engine.

E-36. Accessory Drives. The gear ratio of each accessory drive to the engine crankshaft, based on the lowest normal rated speed of the engine, the maximum permissible torque in inch-pounds for continuous operation, the maximum permissible static torque in inch-pounds, and the direction of rotation when looking at the end of the accessory drive shaft in the engine shall be as follows:

<u>ACCESSORY DRIVES</u>	<u>RATIO</u> <u>TO</u> <u>CRANKSHAFT</u>	<u>TORQUE RATINGS</u>		<u>ROTATION</u>
		<u>CONTINUOUS</u>	<u>STATIC</u>	
<u>Starter</u>	1.000:1	-	16200	C
<u>Generator</u>	1.440:1	600	6000	C
<u>Fuel Pump</u>	0.864:1	25	450	CC
<u>Vacuum Pump (Rear)</u>	1.440:1	150	2250	C
<u>Vacuum Pump (Side)</u>	1.440:1	150	2250	CC
<u>Tachometer (Two Drives)</u>	0.500:1	2.5	12.5	C
<u>Propeller Governor</u>	0.845:1	15	150	CC

NOTE: CC indicates counter-clockwise rotation.
C indicates clockwise rotation.

E-36a. Starter. The starter mounting pad and drive shall be Type I in accordance with Specification AN-9517. The direction of rotation when looking at the starter dog attached to the engine shall be clockwise.

E-36a(1). (Ref. AN-9517 Par. E-4b) Clearance shall be provided as shown on Installation Drawing No. 44645.

E-36c. Power Take-off Drive. A power take-off drive shall not be provided for driving gear box assembly.

E-36e. Pad and Drive for Gun Synchronizer Impulse Generator. Provision shall not be made for driving Gun Synchronizing Impulse Generators.

E-36e(1). Gun Synchronizing Impulse Generators. Gun Synchronizing Impulse Generators shall not be furnished.

E-36f. Vacuum and Hydraulic Mechanism Oil Pumps. Two Type II mounting pads and drives shall be furnished in accordance with AN-9521 with the exception to Par. E-3b that the slotted adapter bushing shall not be furnished as required in Figure 2 of AN-9521 on either pad, and the adapter flange shall not be furnished on the side drive.

F. METHODS OF SAMPLING, INSPECTION, AND TESTS

F-1 The requirements for sampling, inspection and tests shall be as shown in Specification AN-9500.

G. PACKAGING, PACKING, AND MARKING FOR SHIPMENT.

G-1. The requirements for packaging, packing and marking for shipment shall be as shown in Specification AN-9500.

ALTITUDE PERFORMANCE-HORSEPOWER AND MANIFOLD PRESSURE

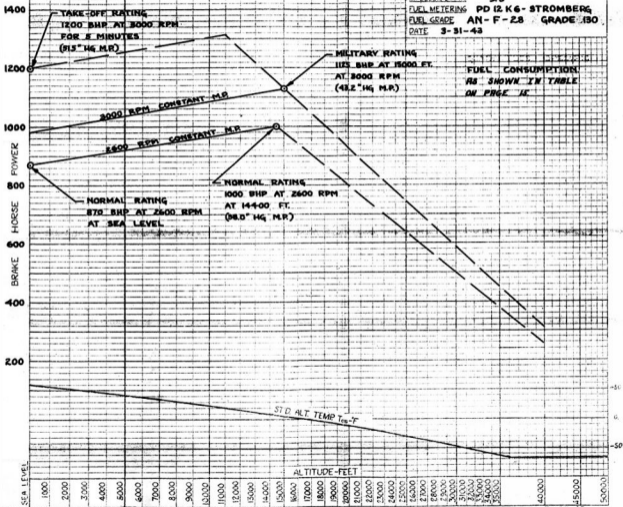
AT STANDARD ATMOSPHERIC CONDITIONS WITH BEST POWER MIXTURE STRENGTHS UNLESS OTHERWISE NOTED

WITHOUT RAM

AIRCRAFT ENGINE
NORMAL PERFORMANCE

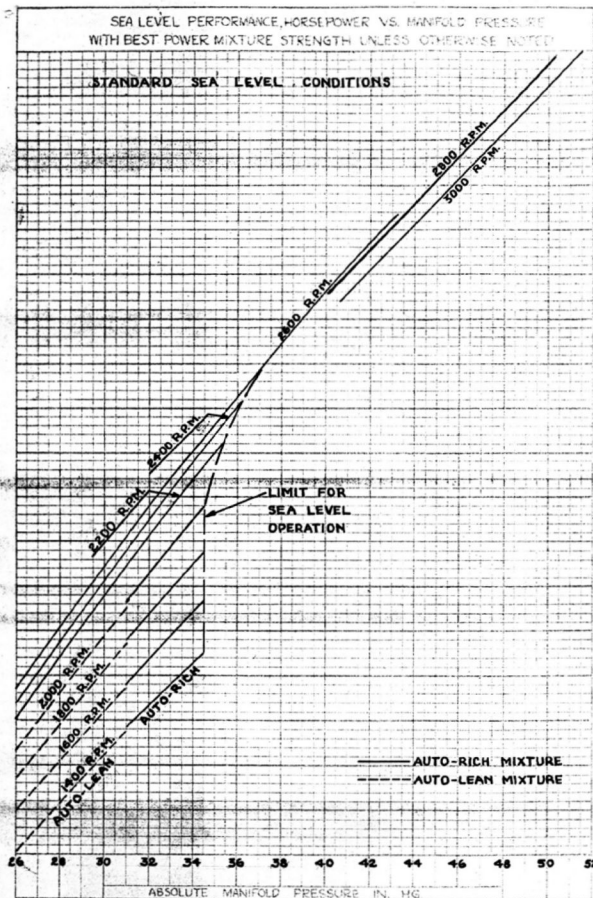
ENGINE MODEL V-1710-99 (F26R)
 PROP GEAR RATIO 2.0:1
 COMPRESSION RATIO 6.65:1
 IMPELLER GEAR RATIO 9.6:1
 IMPELLER DIA IN 9.5
 FUEL METERING PD 12 K 6 - STROMBERG
 FUEL GRADE AN-F-28 GRADE 130
 DATE 3-31-43

FUEL CONSUMPTION
 AS SHOWN IN TABLE
 ON PAGE 12



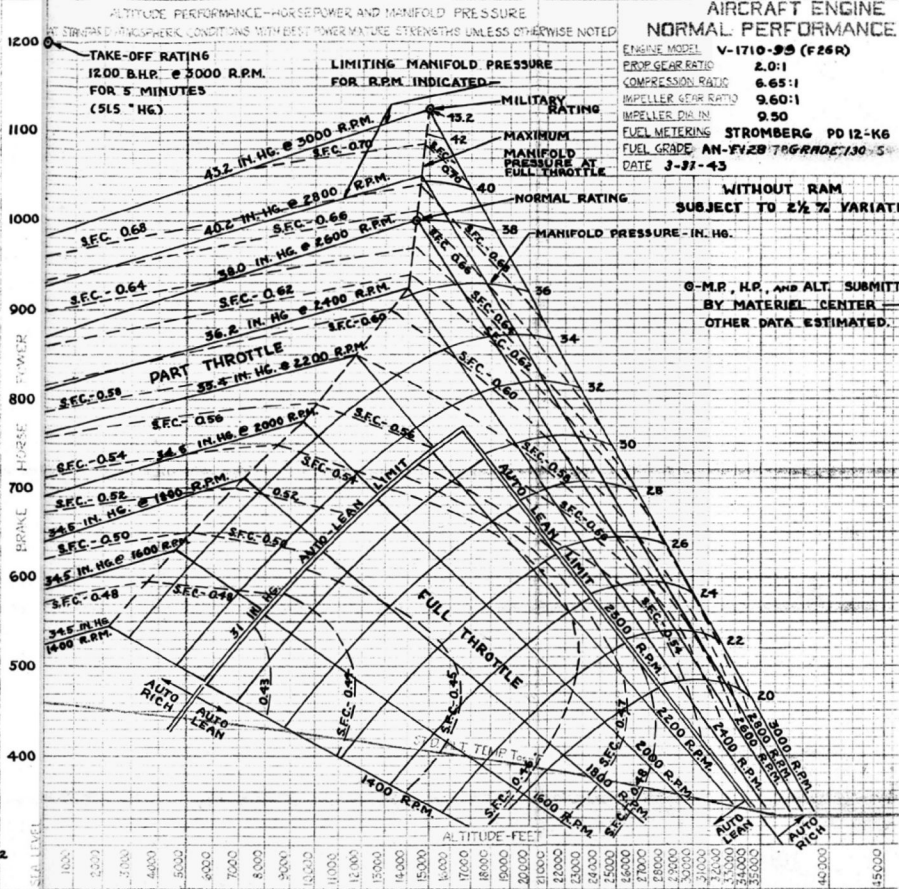
SEA LEVEL PERFORMANCE, HORSEPOWER VS. MANIFOLD PRESSURE WITH BEST POWER MIXTURE STRENGTH UNLESS OTHERWISE NOTED

STANDARD SEA LEVEL CONDITIONS



ALTITUDE PERFORMANCE—HORSEPOWER AND MANIFOLD PRESSURE

AT STANDARD ATMOSPHERIC CONDITIONS WITH BEST POWER MIXTURE STRENGTH UNLESS OTHERWISE NOTED

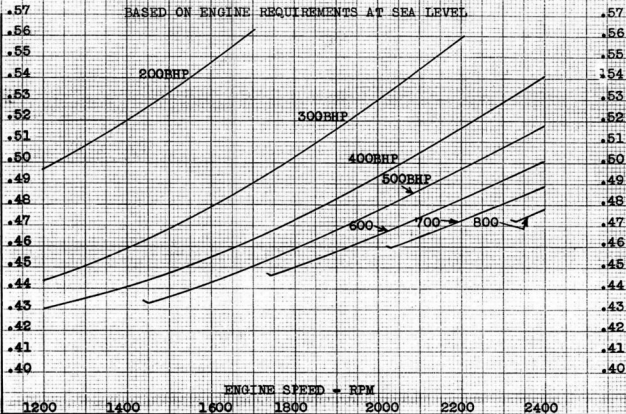


AIRCRAFT ENGINE
NORMAL PERFORMANCE
 ENGINE MODEL V-1710-99 (F26R)
 PROP. GEAR RATIO 2.0:1
 COMPRESSION RATIO 6.65:1
 IMPELLER GEAR RATIO 9.60:1
 IMPELLER DIAM. 9.50
 FUEL METERING STROMBERG PD 12-K6
 FUEL GRADE AN-FY28 TYP GRADE 130-5
 DATE 3-27-43

WITHOUT RAM
 SUBJECT TO 2 1/2 % VARIATION

G-M.P., H.P., AND ALT. SUBMITTED BY MATERIEL CENTER
 OTHER DATA ESTIMATED.

ESTIMATED DATA ON MINIMUM SPECIFIC FUEL CONS.
 BASED ON ENGINE REQUIREMENTS AT SEA LEVEL



ESTIMATED SPECIFIC FUEL
 CONSUMPTION ON PROP LOAD
 AS INDICATED USING PD12K6
 CARBURETOR AT SEA LEVEL

% Normal Power	LES/BHP/HR 870 BHP	LES/BHP/HR 1000 BHP
100%	0.64	0.66
90%	0.62	0.64
80%	0.58	0.60
75%	0.56	0.57
65%	0.52	0.53

Take-off Power-- 0.75
 At Sea Level

Military Power-- 0.70
 At 15,000 Feet

Specifications as of dates listed below shall be applicable to this model specification. Any specification revisions and/or amendments issued prior to date of bid for this model engine and after the particular dates listed below shall not be applicable.

Army-Navy Spec.	AN-9500a	March 30, 1940
" " "	AN-9501a	March 30, 1940
" " "	*AN-9502a	March 30, 1940
" " "	*AN-9503a	March 30, 1940
" " "	*AN-9504	March 1, 1939
" " "	(2)*AN-9506	March 1, 1939
" " "	(3)*AN-9507	March 1, 1939
" " "	(2)*AN-9510a	July 31, 1940
" " "	AN-9511a	July 31, 1940
" " "	AN-9513	March 1, 1939
" " "	*AN-9515a	March 30, 1940
" " "	AN-9516	March 1, 1939
" " "	AN-9517	March 1, 1939
" " "	AN-9518	March 11, 1939
" " "	AN-9519	March 1, 1939
" " "	*AN-9521	March 1, 1939
" " "	AN-9533	March 1, 1939

A-N Aero Spec.	AN-F-E-568	Nov. 27, 1941
" " "	*AN-GGG-S-126	July 5, 1939
" " "	*AN-J-C-56	Oct. 10, 1941
" " "	*AN-P-4	Jan. 14, 1942
" " "	*AN-QQ-M-181a	March 31, 1942
" " "	*AN-VV-C-566	Aug. 1, 1939
" " "	*AN-VV-F-746	Oct. 5, 1940
" " "	*AN-VV-F-748	Sept. 22, 1941
" " "	(5)*AN-F-2B-781	Sept. 25, 1942
" " "	AN-VV-O-446	Dec. 15, 1941

Army-Navy Dwg.	AN-4034	Feb. 25, 1939
" " "	AN-4037	June 10, 1940

AND DWG.	AND-10201	April 12, 1940
----------	-----------	----------------

Note: *(Asterisk) and preface number in () (parentheses) indicate that the specification has been amended and the particular amendment that is applicable.

Specification - 174

Comparison of V-1710-99 (F26R) Specification 174 and V-1710-81 (F20R) Specification 163-E.

The Allison V-1710-99 (F26R) engine is the same as the V-1710-81 (F20R) engine except that the F26R engine is equipped with an Automatic Engine Control and the F20R engine is furnished with an Automatic Manifold Pressure Regulator.

The detailed differences between Specification 163-E and Specification 174 are as follows (except that reference to Model designation and Basic engine and Installation drawings are not given):

Par. E-2 Drawings.

Specification 174 shows 43801-D Control Automatic Engine.

Specification 163-E shows 42685-K Regulator Assembly Automatic Manifold Pressure. Further reference to automatic control differences will not be made.

Par. E-3. Acceptance.

Specification 174 states that approval of the V-1710-99 (F26R) engine is based upon the satisfactory completion of tests conducted on the V-1710-81 (F20R).

Par. E-4. Weight.

Total weight in Specification 174 is 1355 lbs.

Total weight in Specification 163-E is 1352 lbs.

This difference in weight is due to the fact that the Automatic Engine Control weighs approximately three pounds more than the Automatic Manifold Pressure Regulator.