

Spec. No. 133-F
Date Issued: March 30, 1939

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Revised: Aug. 18, 1941
Revised: September 20, 1941
Revised: Sept. 26, 1941

MODEL SPECIFICATION

ENGINE, AIRCRAFT: MODEL V-1710-49 and -53

ALLISON DIVISION

General Motors Corporation

Indianapolis, Indiana

(ALLISON MODEL DESIGNATION V-1710-F5R & F5L)

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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 No. 16.

A-1b. U. S. Army Specification. -

None Applicable

B. TYPE AND MODEL

B-1. This specification covers the requirements for the V-1710-49 and -53 engines.

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 Engineering Drawings form part of this specification:

37311 Engine Assembly, Complete - (showing accessory drive oil seals.) V-1710-49

41451 Engine Assembly, Complete - (showing accessory drive oil seals.) V-1710-53

37310-A	Installation Drawing (Showing clearances for engine accessories and their removal)	V-1710-49
41450-A	Installation Drawing (Showing clearances for engine accessories and their removal)	V-1710-53
41282-B	Priming System Assembly	
37261-H	Carburetor, PD-12G1 Bendix Stromberg	
37228-D	Spark Plug Assembly BG LS321	
40010-A	Spark Plug Assembly Bendix 6S9	
40600-B	Spark Plug Assembly AC-LS85	
40601	Spark Plug Assembly Champion - C34S	
37466-C	Terminal, Spark Plug (Contact)	
40208	Lubrication System Diagram	
33006-N	Magneto	
40185-F	Radio Shielding Assembly	V-1710-49
37948-K	Radio Shielding Assembly	V-1710-53
37583-B	Manifold Assem. - Spark Plug Cooling R. H.	
37584-B	Manifold Assem. - Spark Plug Cooling L. H.	
33536-G	Nut - Magneto Cable Shielding Conn.	
36496-H	Nut - Spark Plug Cable Shielding	
37463-M	Shielding - Spark Plug Cable - Intake (early engines)	
37463-O	Shielding Spark Plug Cable - Intake (late engines)	
37476-O	Shielding - Spark Plug Cable - Exhaust (early engines)	
37476-Q	Shielding - Spark Plug Cable - Exhaust (late engines)	
40844-B	Manifold Assem. - Gas Intake (with intake port type backfire screens)	

E-3. Acceptance. - The engine shall be model tested in accordance with specification AN-9502, with the following exception:

(1) (Reference, Paragraph F-3c., Power Calibration) Power calibration of the engine shall be made without loading the accessory drives

(2) (Reference, Paragraph F-3b., Torsional Vibration, and AN Spec. 9504, Paragraphs E-3c.) The vibration amplitude measure at the rear of the crankshaft shall not exceed $\pm 1.2^\circ$ for the 1-1/2 order, single node vibration,

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.	1256.3 lbs.
Carburetor and injection nozzle	34.5
Carburetor Screens and Gaskets	1.0
Magneto, Shielded	13.2
Ignition Distributors (included in Shielding Assembly)	
Radio Shielded Ignition Assembly, complete with Cable and Distributors	31.1
Spark Plugs	7.2
Priming System on Engine	.5
Cooling Air Deflectors and Baffles	None
Accessory Drive Covers	1.2
TOTAL DRY WEIGHT OF ENGINE	1345 lbs.

E-5. Performance Characteristics. - The ratings specified herein, and the curves specified herein and shown on pages 13, 14 and 15 shall constitute the power and specific fuel consumption guarantees. The terms used and the standard conditions shall be in accordance with the applicable definitions contained in specification AN-9502.

E-5a. Ratings. - Both engines shall be rated as follows, using fuel conforming to specification AN-VV-F-781 and oil conforming to specification AN-9532, grade 1120.

- 1000 B.H.P. at 2600 R.P.M. at sea level
- 1000 B.H.P. at 2600 R.P.M. from sea level to 25000 feet with an exhaust turbo supercharger installation of suitable output.
- 1325 B.H.P. at 3000 R.P.M. Take-off for 5 minutes.
- 1325 B.H.P. at 3000 R.P.M. military rating from sea level to 25,000 ft., for 15 minutes, with an exhaust turbo supercharger installation of suitable output.
- 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). Curve as specified in Paragraph E-5b(1) of specification AN-9501.
- E-5b.(3). The curves shall be constructed as shown on page 13.
- E-5b.(4). Engine power vs. exhaust back pressure curves will be incorporated on page 14 after calibration has been made on the particular airplane manufacturer's turbo exhaust piping.

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 percent normal rated power and 89 percent normal rated speed.

E-5h. Coolant Flow and Heat Rejection. - The following estimate is given for the heat rejection to the coolant on the first one hundred (100) production -49 and -53 engines delivered.

When operating the engine on a dynamometer at take-off power and speed for five (5) minutes operation with 250°F. coolant outlet temperature and with an oil inlet temperature of 185°F. and with an oil flow not to exceed 150 lbs./min., and running at guaranteed specific fuel consumption, the coolant flow to the radiator shall not exceed 265 gals./min., and the heat rejection to the coolant shall not exceed 430 B.H.P. The above estimates are based upon an auxiliary blower providing a 10 M.P.H. and 60°F. air blast on the engine during dynamometer operation.

Following the acceptance of the first one hundred (100) production -49 and -53 engines and with the experience gained in obtaining actual average values of coolant flow and heat rejection to the coolant on these engines, the contractor will furnish a guarantee on maximum coolant flow and heat rejection to the coolant for later production engines. The guarantee shall in no case exceed the estimates given above.

E-5h.(1); E-5h.(1)(a); E-5h(1)(b) - Coolant Pump data required shall be furnished as part of this specification after completion of model test.

E-5i. Oil Flow and Heat Rejection. - The following estimate is given for the heat rejection to the oil on the first one hundred (100) production -49 and -53 engines delivered.

When operating the engine on a dynamometer at take-off power and speed for 5 minutes operation and with an oil inlet temperature of 185°F. and with 250°F. coolant outlet temperature and with a coolant flow not to exceed 265 gals./min. and running at guaranteed specific fuel consumption, the oil flow at 65 pounds per square inch pressure shall not exceed 150 lbs./min. and the heat rejection to the oil shall not exceed 150 B. H. P. The above estimates are based upon

an auxiliary blower providing a 10 M. P. H. and 60° F. air blast on the engine during dynamometer operation.

Following the acceptance of the first one hundred (100) production -49 and -53 engines and with the experience gained in obtaining actual average valves of oil flow and heat rejection to the oil on these engines, the contractor will furnish a guarantee on the maximum oil flow and heat rejection to the oil for later production engines. The guarantee shall in no case exceed the estimates given above.

E-6. Engine Performance. - (Reference, specification AN-9500, paragraph D-6.) - The complete engine shall function satisfactorily at military rated power up to an altitude of 25,000 ft., in combination with an exhaust turbo installation of suitable output and performance. The contractor guarantees that the engine shall function satisfactorily between 25,000 ft. and the service ceiling of the airplane, assuming 25,000 ft. at critical altitude and the power falling off from this a altitude as a normal, integrally supercharged engine having a critical altitude rating of 25,000 ft.

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 5/8 inches
Width	29 9/32 inches
Height	36 17/32 inches

E-14. Preparation for Storage. - The engine shall be prepared for storage in accordance with Allison Technical Order No. 150, Appendix "A", dated September 5, 1941.

E-16b. Parts List of the Engine. - The parts list applicable in all details to the engine which successfully completed Government tests, with exception of later design improvements as since agreed upon between the contractor and the Government, shall constitute a requirement of this specification. The engine and parts list shall also include a special designed Intake Manifold with port type backfire screens in accordance with Drawing No. 40844.

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 for the V-1710-49 and counter-clockwise for the V-1710-53 engine.

E-19. Impeller Gear. - The impeller gear ratio shall be 7.48:1 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 BG-LS321 Bendix 6S9, Champion C34S, or AC-LS85 spark plugs.

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

- (1) (Reference, paragraph D-1e, Mounting Lugs) Mounting clamps shall be provided in place of integral, soldered, or welded mounting lugs.
- (2) (Reference, paragraph E-8, Capacitance) The capacitance between the shielding and each ignition cable contained therein shall not exceed 175 micro-microfarads.
- (3) (Reference, paragraph E-1a, Single Cable Conduits) Single Cable conduit connections shall be as shown on Allison drawings, 33536, 36496, 37463 and 37476.

E-23c. High Tension Ignition Cable. - (Reference, Specification AN-9500, paragraph D-23c.) - High Tension ignition cable conforming to Air Corps specification 32152 shall be used on all distributor head to spark plug leads.

E-23d. Magnetos. - The engine shall be equipped with one Scintilla Type DF 4 pole magneto with breaker Cam Scintilla Part No. 10-24176, in accordance with Specification AN-9511 with the following exceptions:

(1) (Reference, paragraph D-1a, (1), Distributor Block) The holes in the distributor head and the high tension terminals of the magneto for the cable connecting the magneto and distributor heads are for 9 mm cable.

(2) (Reference, paragraph D-1a(4)a, Type Designations.) This magneto does not have a numeral in the type designation to indicate number of cylinders. A direction arrow plate instead of letters "R" or "L" denotes rotation.

(3) (Reference, paragraph D-1b(1), Threads) - Connections for the high tension terminals are 15/16-18 threads.

(4) (Reference, paragraph 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 Figure No. 3.

(5) (Reference, paragraph E-2c., Normal Operating Temperature) - The temperature rise of this magneto is 55.5°C. (100°F.) above room temperature.

(6) (Reference, paragraph 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.

(7) (Reference, paragraph E-3b, Voltage Speed Characteristics) - F-4a(6) - Voltage Characteristics Test) - The breakers of this magneto are assembled to provide a 9° stagger spark, measured on the magneto drive shaft. Accordingly, the voltage output for both breakers will not be equal, particularly at 50% rated maximum rotor speed. Following are the minimum peak voltages for this magneto:

FULL ADVANCE

ROOM TEMP. 98.9°C. (210°F.)

100 R.P.M. (engine)	8 K. V.	6 K. V.
300 R.P.M. (engine)	12 K. V.	10 K. V.
50% rated max. rotor speed	15 K. V.	13 K. V.
75% rated max. rotor speed	16 K. V.	14 K. V.
Rated max. rotor speed	16 K. V.	14 K. V.

(8) (Reference, paragraph E-3b(1), Voltage Output) - F-4a(6)a, Voltage Output Test.) - The minimum voltage of either breaker at 50% rated maximum rotor speed is 15 K. V.

(9) (Reference, paragraph 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.

(10) (Reference, paragraph I-4, Qualification Tests) - This magneto has not been submitted to the Army for type test under Specification AN-9511a. It has been supplied to the Army under Specification 28159-C,

E-23f. Cooling. - (Reference, Specification AN-9500, paragraph 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 drawings Nos. 37310 and 41450, and drawings Nos. 37583 and 37584, 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 A. C. Specification 32152 does not fail below this temperature.

E-24c. Oil Leakage Test. - (Reference, specification AN-9500, paragraph D-24c.) - With a mixture of equal parts of aviation gasoline and oil conforming to Specification AN-9532, 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-24g. Oil Cleaner. - The engine shall be equipped with one Automatic Cuno, No. 10863, oil strainer.

E-24q. Crankcase Breathers. - Ample Breathing capacity shall be provided in accordance with paragraph 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 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-12G1 injection carburetor in accordance with Specification AN-9515, except for the following:

(1) (Reference, paragraph D-7, Strainer). - The carburetor shall meet requirements except that foreign material is not removed with the strainer.

(2) (Reference, paragraph 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.

(3) (Reference, paragraph D-26, Protective Treatment of Steel Parts.) - Cadmium plated parts shall have a minimum plating thickness of .0003".

(4) (Reference, paragraph D-32a.(1), Metering Characteristics - Sea Level.) - The carburetors shall meet requirements except that at 30 to 70 percent of airflow for normal rated power and speed the variation in fuel/air ratio shall be plus or minus 2 percent.

(5) (Reference, paragraph 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 percent of the guaranteed fuel consumption.

(6) (Reference, paragraph 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) (Reference, paragraph D-32c., Metering Characteristics of Production Carburetors.) - The carburetors shall meet requirements except that at 30 to 70 percent of airflow for normal rated power and speed the variation in fuel/air ratio shall be plus or minus 2 percent.

(8) (Reference, paragraph 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 being subject to change to agree with individual carburetor specifications:

AIR FLOWMETERING TOLERANCE MIXTURE CONTROL POSITION

Take-off Airflow		± 2%	Auto. Rich	Auto. Lean	Full Ri
100% rated power airflow		" "	" "	" "	" "
75% " " "		" "	" "	" "	" "
62-1/2% " " "		" "	" "	Auto. Lean	" "
50% " " "		" "	" "	" "	" "
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. - (Reference, Specification AN-9500, paragraph D-31a(3).) - A Gurgle passage without a valve shall be the only provision made for automatic drainage of the induction system.

E-32a. Exhaust Flanges. - (Reference, paragraph D-32a, Specification AN-9500.) - Exhaust flanges and gaskets in accordance with installation drawings nos. 37310 and 41450 shall be supplied, but shall not be included in the engine dry weight. Flanges and gaskets shall be shipped with, or separate from the engine, at the request of the procuring agency.

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 to Crankshaft</u>	<u>TORQUE RATINGS</u>		<u>Rotation</u>	
		<u>IN. - Lbs. Continuous</u>	<u>Static</u>	<u>-49</u>	<u>-53</u>
<u>Starter</u>	1.000:1	-	16200	C	C C
<u>Generator</u>	1.440:1	600	6000	C	C

<u>Accessory Drives (Cont.)</u>	Ratio to <u>Crankshaft</u>	TORQUE RATINGS		Rotation	
		IN. - LBS. <u>Continuous</u>	<u>Static</u>	-49	-53
<u>Fuel Pump</u>	0.864:1	25	450	C C	C C
<u>Vacuum Pump (Rear)</u>	1.440:1	150	2250	C	C C
<u>Vacuum Pump (Side)</u>	1.440:1	150	2250	C C	C C
<u>Tachometer (two drives)</u>	0.500:1	2.5	12.5	C	C
<u>Propeller Governors</u>	0.845:1	15	150	C C	C

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 V-1710-49 engine shall be clockwise, and the rotation of starter dog on the V-1710-53 engine shall be counter-clockwise.

E-36a(1) (Reference, Specification AN-9517, paragraph E-4b) - Clearance shall be provided for a Type F-2 starter installed as shown on Installation Drawings Nos 37310 and 41450. Also clearance is provided for type G-6.

E-36c. Power Take-Off Drive. - A power take-off drive shall not be provided for driving a 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 shall not be furnished.

E-45. Interchangeability. - The V-1710-49 engine can be built at assembly from the detail parts of the V-1710-53 engine, or vice versa, by the substitution, addition or deletion, of a few uncommon parts that have been held to a practical minimum that is commensurate with similar performance and durability for either direction of rotation.

F. METHODS OF SAMPLING, INSPECTION, AND TESTS.

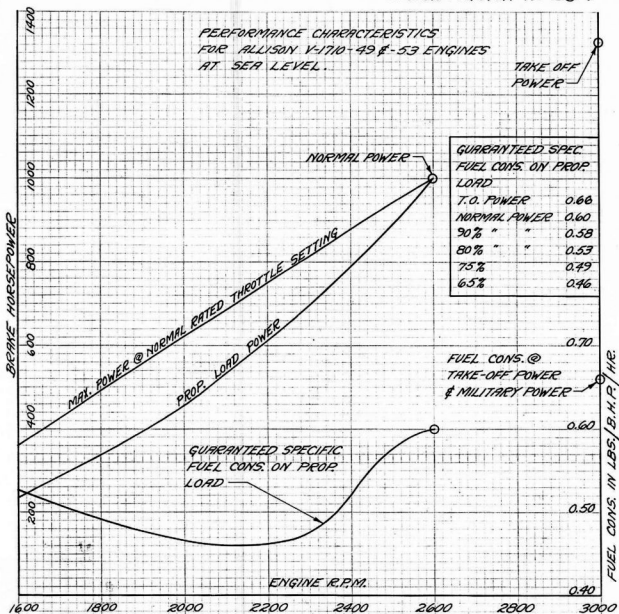
F-1. The requirements for sampling, inspection and tests shall be as shown in Specification AN-9500.

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.

PERFORMANCE CHARACTERISTICS
FOR ALLISON V-1710-49 & -53 ENGINES
AT SEA LEVEL.

TAKE OFF
POWER



RAMMING PRESSURE
IN H₂O

ALTITUDE FEET

RAMMING PRESSURE
FOR NORMAL RATED
POWER @ R.P.M. @
FULL THROTTLE.

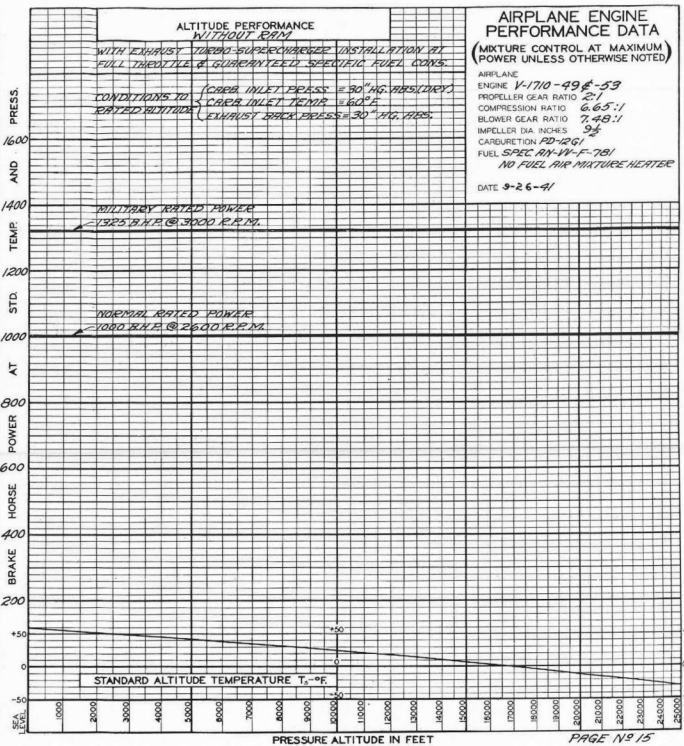
NOTE: Engine power vs. exhaust back pressure curve will be incorporated on this page after calibration of the particular airplane manufacturers exhaust piping. Exhaust piping design, as well as back pressure, affect power variation.

BRAKE POWER
AT MANIFOLD
INLET TEMP

SEA LEVEL PERFORMANCE
WITHOUT RAM

NOTE: ALTITUDE
MANIFOLD PRESS
CURVE FOR RPM
TRANSFER TO C.
IT LINE & READ
ALTITUDE D.
FOR VARIATION
E T FROM
TEMPERATURE T₀ BY

ACTUAL HP
CORRECTION FOR
M T₀



AIRPLANE ENGINE PERFORMANCE DATA

(MIXTURE CONTROL AT MAXIMUM POWER UNLESS OTHERWISE NOTED)

AIRPLANE
ENGINE V-1710-49A-53
PROPELLER GEAR RATIO 2:1
COMPRESSION RATIO 6.65:1
BLOWER GEAR RATIO 7.48:1
IMPELLER DIA. INCHES 9 1/2
CARDURETION PD-12G1
FUEL SPEC AN-VV-F-781
NO FUEL AIR MIXTURE HEATER

DATE 3-26-41

ABSOLUTE MANIFOLD PRESSURE, IN. HG.

PRESSURE ALTITUDE IN FEET

PAGE No 15

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	Mar. 30, 1940
" " "	AN-9501a	Mar. 30, 1940
" " "	*AN-9502a	Mar. 30, 1940
# " "	*AN-9503a	Mar. 30, 1940
" " "	*AN-9504	Mar. 1, 1939
" " "	(2)*AN-9506	Mar. 1, 1939
" " "	(3)*AN-9507	Mar. 1, 1939
Air Corps Spec.	3568-E or B	Aug. 21, 1939
Army-Navy Spec.	AN-9509a	July 18, 1940
" " "	AN-9510a	July 31, 1940
" " "	AN-9511a	July 31, 1940
" " "	(2)*AN-9512	Mar. 1, 1939
Air Corps Spec.	(4)#32152-A	May 4, 1939
Army-Navy Spec.	AN-9513	Mar. 1, 1939
" " "	*AN-9515a	Mar. 30, 1940
" " "	AN-9516	Mar. 1, 1939
" " "	AN-9517	Mar. 1, 1939
" " "	AN-9518	Mar. 1, 1939
" " "	AN-9519	Mar. 1, 1939
" " "	(2)*AN-9520	Mar. 1, 1939
" " "	*AN-9521	Mar. 1, 1939
" " "	(2)*AN-9522	Mar. 1, 1939
A-N Aero Spec.	(2)*AN-QQ-M-181	Mar. 24, 1939
" " "	AN-VV-C-566	Aug. 1, 1939
" " "	AN-GGG-S-126	July 5, 1939
Army-Navy Spec.	(2)*AN-VV-F-781	Sept. 26, 1940
" " "	AN-9532	Mar. 1, 1939
" " "	AN-9533	Mar. 1, 1939
Army-Navy Drawing	AN-4033	Mar. 1, 1939
" " "	AN-4034	Mar. 1, 1939
" " "	AN-4037	Mar. 1, 1939
AND Drawings	AND-10201	Apr. 12, 1940

NOTE: (*) Asterisk and preface number in () parenthesis indicates that the specification has been amended and the particular amendment that is applicable.