Spec. No. 162-E
Date: Oct. 13, 1941
Revised: Feb. 6, 1942
March 30, 1942
May 25, 1942
July 20, 1942
Aug. 15, 1942
Nov. 30, 1942

MODEL SPECIFICATION

ENGINE, AIRCRAFT: MODEL V-1710-89 & 91

ALLISON DIVISION
General Motors Corporation
Indianapolis, Indiana

(ALLISON MODEL DESIGNATION V-1710-F17R & F17L)

MODEL SPECIFICATION

ENGINE, AIRCRAFT: MODEL V-1710-89 and -91
Allison Division of General Motors Corporation
(Allison Model Designation V-1710-F17R & F17L)

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 18.

B. TYPE AND MODEL.

B-1. This specification covers the requirements for the V-1710-89 and -91 engines.

C. MATERIAL AND WORKMANSHIP.

C-1. The requirements for material and workmanship shall be as specified in Spec. 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:

42266 Engine Assembly, Complete (Showing Accessory Drive Oil Seals) V-1710-89 (F17R)

42271 Engine Assembly, Complete (Showing Accessory Drive Oil Seals) V-1710-91 (F17L)

42265-D Installation Drawing (Showing clearances for engine accessories and their removal) V-1710-89 (F17R)

42270-D Installation Drawing (Showing clearances for engine accessories and their removal) V-1710-91 (F17L)

43590 Priming System Assembly

42112-F Carburetor, PD12K7 Bendix-Stromberg

40600-K Spark Plug Assembly AC-LS85
40601-F Spark Plug Assembly Champion C34S
43389 Spark Plug Assembly Champion C35S

42354-D Contact Assembly, Spark Plug (Terminal)

40208 Lubrication System Diagram

42279-G Magneto

43553 Radio Shielding Assembly V-1710-89 (F17R)

43577 Radio Shielding Assembly V-1710-91 (F17L)

43016 Manifold Assem. Spark Plug Cooling R.H.

43017 Manifold Assem. Spark Plug Cooling L.H.

33536-Q Nut - Magneto Cable Shielding Conn.

42348-C Shielding - Spark Plug Cable - Intake

43556-B Shielding - Spark Plug Cable - Exhaust

41616-C Bag - Engine Shipping

36411-F Nut #50 Prop. Shaft Thread Protector

42288-B Plug - Crankcase Dehydrator

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

(1) (Ref. Par. F-3b. Torsional Vibration and AN Spec. 9504, Par. E-3c and E-3e.) The vibration amplitude measured at the rear of the crankshaft shall not exceed ±1.35° for the 1-1/2 order, single node vibration, and 0.35° for the 6th order 2 node vibration. The engine shall perform satisfactorily with these limits.

1100 BHP at 2600 RPM at sea level.

1100 BHP at 2600 RPM from sea level to 27,000 feet normal rating with an exhaust turbo supercharger installation of suitable output.

1425 BHP at 3000 RPM take-off for five minutes.

1425 BHP at 3000 RPM military rating from sea level to 27,000 feet, for 15 minutes with an exhaust turbo supercharger installation of suitable output.

3120 RPM rated overspeed dive.

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 14.

E-5b.(2) Estimated horsepower at full throttle vs. altitude as shown on Page 15.

E-5b.(3) Specific fuel consumption as shown on Page 16.

E-5b.(4) Engine power vs. exhaust back pressure curves will be incorporated on Page 17 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 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 heat rejection to the coolant:

Conditions:

Operation	On dynamometer for 5 min.
Power	Take-off - 1425 BHP
Speed	Take-off - 3000 RPM
Fuel Consumption	Guaranteed Specific
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

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

(1) (Ref. Par. F-3h. Intake Manifold) The dehydrator bags shall be placed on the top of the carburetor screen and the carburetor sealed by securing a gasketed cover to the carburetor.

(2) (Ref. Par. F-3n. Crankcase) A dehydrator plug conforming to Allison Division drawing No. 42288 shall be installed in an appropriate opening of the crankcase.

(3) (Ref. Par. F-3o. Propeller Shaft) A propeller shaft thread cap conforming to Allison Division Drawing No. 36411 shall be installed.

(4) (Ref. Par. F-4a. Packing Procedure) The engine bag shall conform to Allison Division Drawing No. 41616.

(5) (Ref. Par. F-4a (1). After removing the engine from the engine case it shall be possible to reheat seal the openings which must be cut in the engine bag to insert the lifting hooks.

(6) (Ref. Par. F-4b.) The engine shipping case shall conform to Allison Division Drawing No. 37780 which provides a window through which the indicator card may be inspected instead of a hinged door.

E-16b. Parts List of the Engine. The parts list applicable in all details to the engine which successfully completes Government tests shall constitute a requirement of this specification.

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-1710-89 (F17R) and counter-clockwise for the V-1710-91 (F17L) engine.

E-19. Impeller Gear. The impeller gear ratio shall be 8.1:1 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 Champion C34S, Champion C35S, or AC-LS85 spark plugs.

E-23b. Radio Shielded Ignition Assemblies. The ignition distributors and magneto shall be designed to permit supercharging. A single connection to a suitable location in the turbo outlet duct shall be made by the airplane manufacturer. The engine shall be equipped with Allison designed radio shielded ignition assemblies with the following exceptions to Spec. 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, 43556, and 42348.

E-23c. High Tension Ignition Cable. (Ref. AN-9500 Par. D-23c.) High tension ignition cable conforming to U.S. Army Spec. 95-32152 (5 mm) shall be used on all distributor head to spark plug leads. All other high tension cable shall conform to AN-J-C-56 (7 mm).

E-23d. Magnetos. The engine shall be equipped with one Scintilla type DFLN-6 magneto in accordance with Spec. 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-2c. Normal Operating Temperature) The temperature rise of this magneto is 55.5°C. (100°F.) above room temperature.

(3) (Ref. Par. E-2d Endurance) These requirements shall be met except that during the Operating Run, Par. F-4a(11)a, the breaker shall be lubricated at intervals of approximately 100 hours, and during the Elevated Temperature Run, Par. F-4a(11)b, the ambient temperature shall be 150°F.

E-23f. Cooling. (Ref. Spec. 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 Drawings No. 42265 and 42270, 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 U.S. Army Spec. 95-32152 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 Spec. 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 after the model test.

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 system.
(b) Operating conditions are normal.
(c) Maximum back pressure on scavenge pump:

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 requirements of D-24f (Spec. 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 lines.

E-24g. Oil Cleaner. The engine shall be equipped with one Automatic Cuno No. 10863, oil strainer, and shall meet the requirements of AN-9500, Par. D-24g under normal operating conditions.

E-24j. Provision for Oil Connection. The oil inlet connection shall be a 2 inch 4-stud opening as shown on Installation Drawings No. 42265 and 42270.

E-24q. Crankcase Breathers. Ample breathing capacity shall be provided in accordance with Par. D-24q of Spec. 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 PD12K7 injection carburetor in accordance with Spec. 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.

(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 air flow for normal rated power and speed the variation in fuel/air ratio shall be plus or minus 2 per cent.

(5) (Ref. Par. D-3b(1) Metering Characteristics, Master Carburetor) 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 to -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 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) (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 being subject to change to agree with individual carburetor specifications:

AIRFLOW	METERING TOLERANCE	MIXTURE CONTROL POSITION			
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 lines Assembly 43590.

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. Spec. 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. Spec. AN-9500 Par. D-32a) Exhaust flanges and gaskets in accordance with Installation Drawing Nos. 42265 and 42270 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:

ACCESSORY DRIVES	RATIO TO CRANKSHAFT	TORQUE RATINGS IN. LBS. CONTINUOUS	STATIC	ROTATION -89	ROTATION -91
Starter	1.000:1	-	16200	C	CC
Generator	1.440:1	600	6000	C	C
Fuel Pump	0.864:1	25	450	CC	CC
Vacuum Pump (Rear)	1.440:1	150	2250	C	C
Vacuum Pump (Side)	1.440:1	150	2250	CC	CC
Tachometer (Two drives)	0.500:1	2.5	12.5	C	C
Propeller Governor	0.845:1	15	150	CC	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 AN-9517. The direction of rotation when looking at the starter dog attached to the engine shall be clockwise on the -89 and counter-clockwise on the -91.

E-36a(1) (Ref. Spec. AN-9517 Par. E-4b) Starter clearance shall be provided as shown on Installation Drawing Nos. 42265 and 42270.

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 shall not be furnished.

E-36f Vacuum and Hydraulic Mechanism Oil Pump. Provision shall be made for two Type II drives in accordance with AN-9521 with the exception that the slotted drive adapter bushing shall not be furnished as required in Fig. 2 of AN-9521.

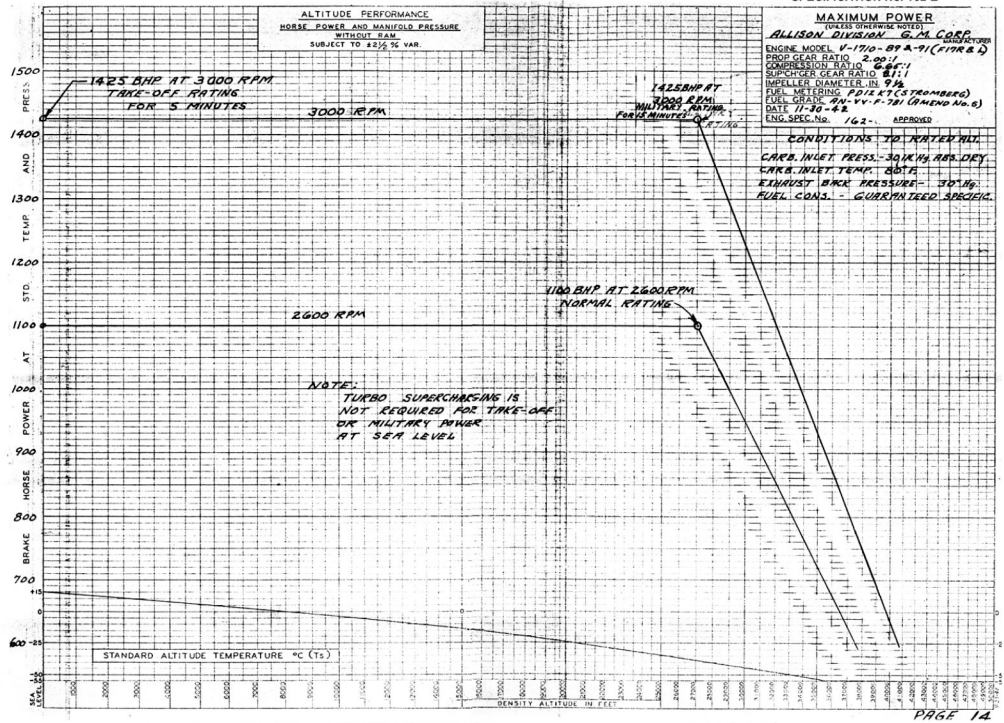
E-45. Interchangeability. The V-1710-89 engine can be built at assembly from the detail parts of the V-1710-91 engine, or vice versa, by the substitution, addition, or deletion of a few uncommon parts that have been held to a practical minimum that is commensurate with similar performance and durability for either direction or rotation.

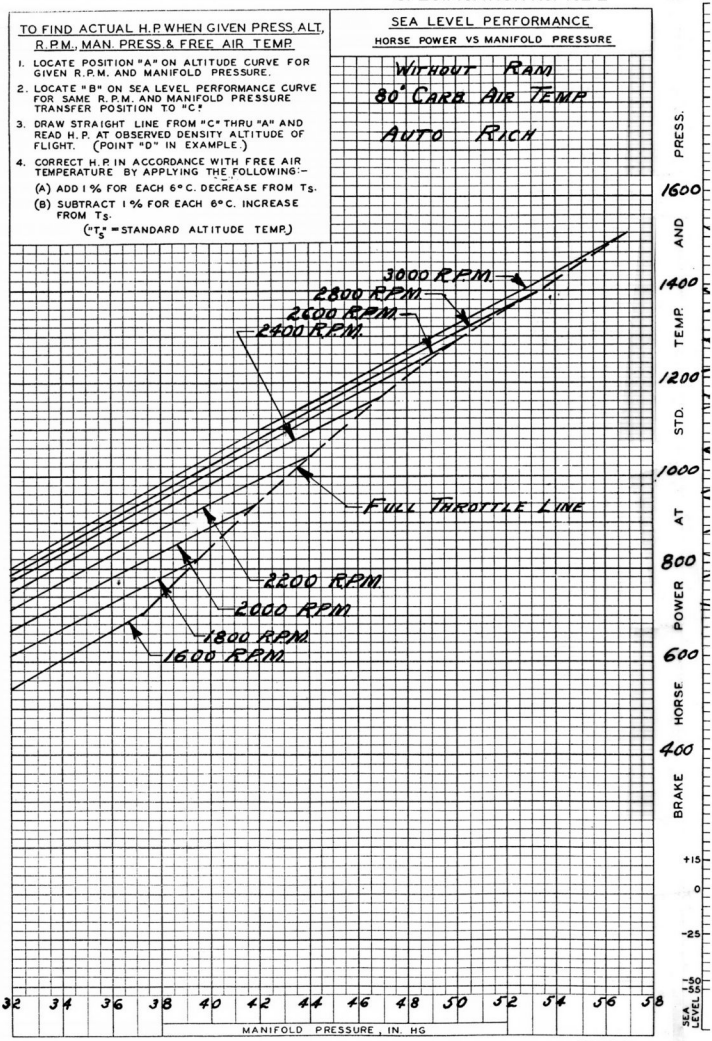
F. METHODS OF SAMPLING, INSPECTION, AND TESTS.

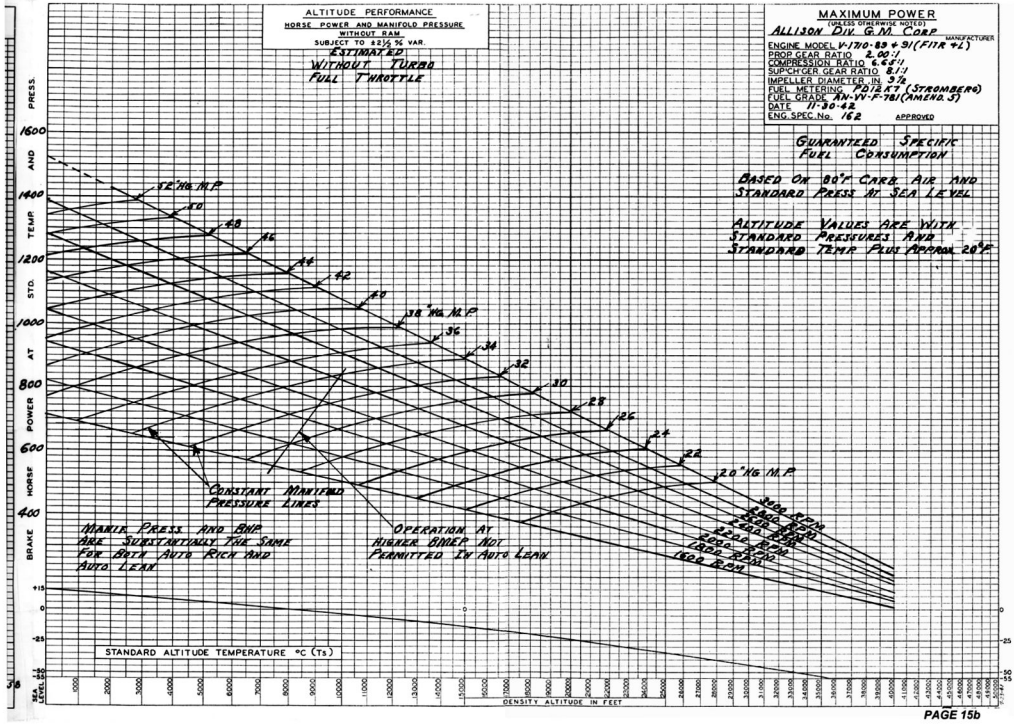
F-1. The requirements for sampling, inspection and tests shall be as shown in Spec. AN-9500.

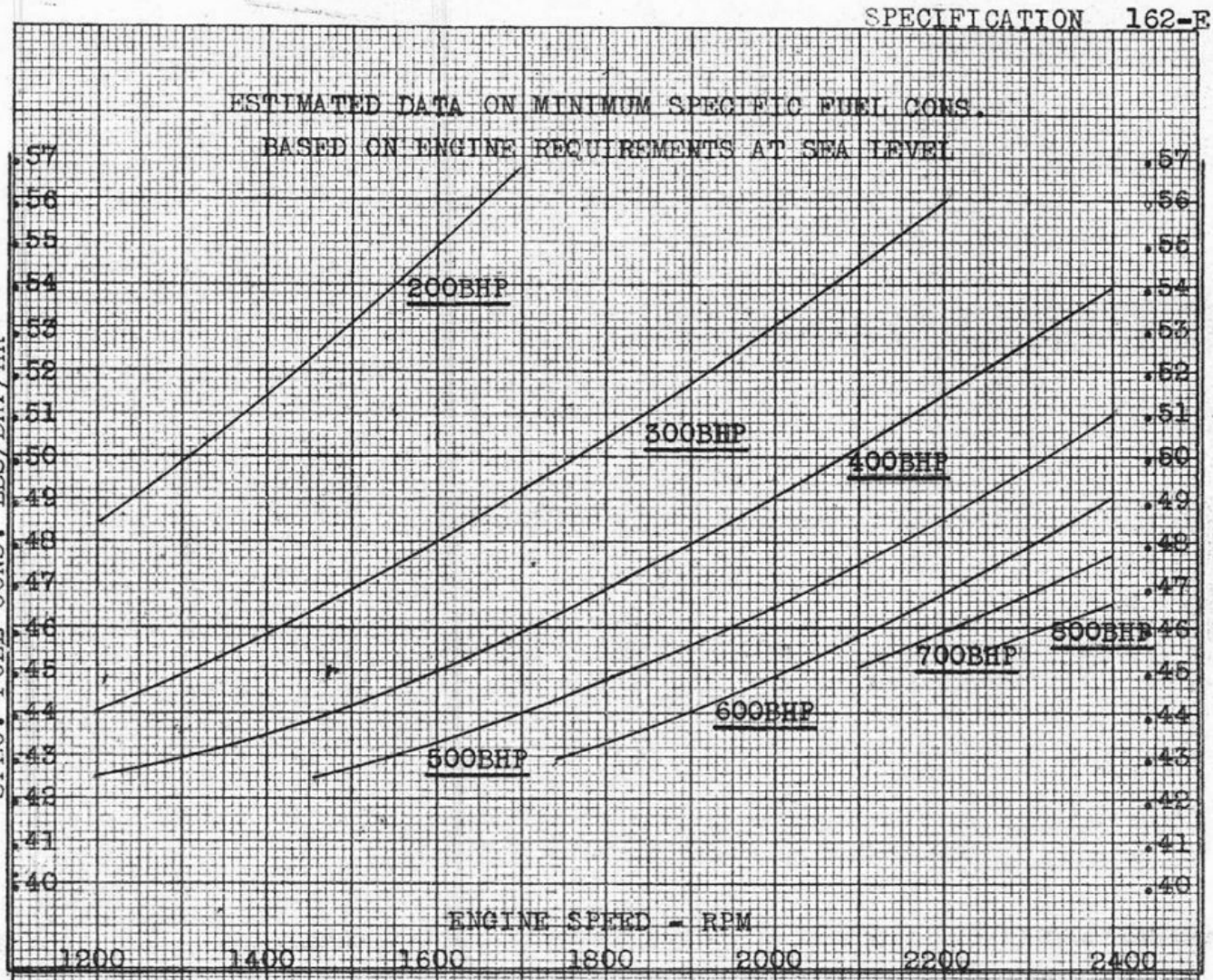
G. PACKAGING, PACKING, AND MARKING FOR SHIPMENT.

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


ALTITUDE PERFORMANCE
HORSE POWER AND MANIFOLD PRESSURE
WITHOUT RAM
SUBJECT TO ±2½ % VAR.
MAXIMUM POWER
(UNLESS OTHERWISE NOTED)
ALLISON DIVISION G.M. CORP.
MANUFACTURER
ENGINE MODEL V-1710-89 & -91 (F17R & L)
PROP GEAR RATIO 2.00:1
COMPRESSION RATIO 6.65:1
SUPCHGER GEAR RATIO 6.1:1
IMPELLER DIAMETER, IN. 9.14
FUEL METERING PDIE K1CS (TROMBERG)
FUEL GRADE AN-VV-F-781 (AMEND No. 6)
DATE 11-30-42
ENG. SPEC. No. 162- APPROVED
CONDITIONS TO RATER ALT.
CARB. INLET PRESS. - 30 IN. HG. ABS. DRY
CARB. INLET TEMP. 20° F.
EXHAUST BACK PRESSURE - 30" Hg.
FUEL CONS. - GUARANTEED SPECIFIC.
1425 BHP AT 3000 RPM
TAKE-OFF RATING
FOR 5 MINUTES
3000 R.P.M.
1425 BHP AT 3000 R.P.M.
MILITARY RATING
FOR 15 MINUTES ONLY
2600 R.P.M.
1100 BHP AT 2600 R.P.M.
NORMAL RATING
NOTE:
TURBO SUPERCHARGING IS
NOT REQUIRED FOR TAKE-OFF
OR MILITARY POWER
AT SEA LEVEL
STANDARD ALTITUDE TEMPERATURE °C (Ts)
DENSITY ALTITUDE IN FEET
BRAKE HORSE POWER AT STD. TEMP. AND PRESS.


TO FIND ACTUAL H.P WHEN GIVEN PRESS ALT, R.P.M., MAN. PRESS & FREE AIR TEMP.
1. LOCATE POSITION "A" ON ALTITUDE CURVE FOR GIVEN R.P.M. AND MANIFOLD PRESSURE.
2. LOCATE "B" ON SEA LEVEL PERFORMANCE CURVE FOR SAME R.P.M. AND MANIFOLD PRESSURE TRANSFER POSITION TO "C".
3. DRAW STRAIGHT LINE FROM "C" THRU "A" AND READ H.P. AT OBSERVED DENSITY ALTITUDE OF FLIGHT. (POINT "D" IN EXAMPLE.)
4. CORRECT H.P IN ACCORDANCE WITH FREE AIR TEMPERATURE BY APPLYING THE FOLLOWING:—
(A) ADD 1% FOR EACH 6°C. DECREASE FROM Ts.
(B) SUBTRACT 1% FOR EACH 6°C. INCREASE FROM Ts.
("Ts" = STANDARD ALTITUDE TEMP.)
SEA LEVEL PERFORMANCE
HORSE POWER VS MANIFOLD PRESSURE
WITHOUT RAM
80° CARB AIR TEMP
AUTO RICH
3000 R.P.M.
2800 R.P.M.
2600 R.P.M.
2400 R.P.M.
FULL THROTTLE LINE
2200 R.P.M.
2000 R.P.M.
1800 R.P.M.
1600 R.P.M.
BRAKE HORSE POWER AT STD. TEMP. AND PRESS.
1600
1400
1200
1000
800
600
400
+15
0
-25
-50
-55
SEA LEVEL
32 34 36 38 40 42 44 46 48 50 52 54 56 58
MANIFOLD PRESSURE, IN. HG


ALTITUDE PERFORMANCE
HORSE POWER AND MANIFOLD PRESSURE
WITHOUT RAM
SUBJECT TO ±2½% VAR.
ESTIMATED
WITHOUT TURBO
FULL THROTTLE
MAXIMUM POWER
(UNLESS OTHERWISE NOTED)
ALLISON DIV. G.M. CORP
MANUFACTURER
ENGINE MODEL V-1710-83 & 91 (F17R & L)
PROP GEAR RATIO 2.00:1
COMPRESSION RATIO 6.65:1
SUPCH'GER GEAR RATIO 8.1:1
IMPELLER DIAMETER IN. 9.75
FUEL METERING PDIR.R.T. (STROMBERG)
FUEL GRADE AN-VV-F-781 (AMEND. 3)
DATE 11-30-42
ENG. SPEC. No. 162
APPROVED
GUARANTEED SPECIFIC FUEL CONSUMPTION
BASED ON 80°F. CARB. AIR AND STANDARD PRESS AT SEA LEVEL
ALTITUDE VALUES ARE WITH STANDARD PRESSURES AND STANDARD TEMP. PLUS APPROX 20°F
52" HG M.P
50
48
46
44
42
40
38" HG M.P
36
34
32
30
28
26
24
22
20" HG M.P
CONSTANT MANIFOLD PRESSURE LINES
MANIF. PRESS AND BHP ARE SUBSTANTIALLY THE SAME FOR BOTH AUTO RICH AND AUTO LEAN
OPERATION AT HIGHER BMEP NOT PERMITTED IN AUTO LEAN
BRAKE HORSE POWER AT STD. TEMP AND PRESS.
1600
1400
1200
1000
800
600
400
STANDARD ALTITUDE TEMPERATURE °C (Ts)
+15
0
-25
-50
SEA LEVEL
DENSITY ALTITUDE IN FEET



Guaranteed B.S.F.C. on normal propeller load with conditions as stated in Par. E-5a of this Spec.

% Normal Power	LBS/BHP/HR	Mix. Con. Position
100%	0.63	AR
90%	0.61	AR
80%	0.56	AR
75%	0.52	AR
65%	0.50	AR
60%	0.46	AL
Take-off Power	0.68	AR
Military Power	0.68	AR

NOTE:

Engine power vs. exhaust back pressure curve will be incorporated on this page after calibration with the particular aircraft manufacturer's exhaust piping. Exhaust piping design, as well as back pressure, affects power variation.

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 1, 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	August 1, 1939
" " "	*AN-VV-F-746	Oct. 5, 1940
" " "	*AN-VV-F-748	Sept. 22, 1941
" " "	(5)*AN-VV-F-781	Sept. 26, 1940
" " "	AN-VV-O-446	Dec. 15, 1941
U. S. Army Spec.	95-32152	Nov. 5, 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.

REVISION RECORD 162-E

V-1710-89 & -91 (F17R & L)

This revision was made to incorporate the 8.1:1 supercharger gears instead of the 7.48:1. This change was necessary in order to increase the available take-off horsepower for emergency operation.

Several detailed changes were made in the paragraphs as listed below:

Page 1 — Revision date November 30, 1942 added.

Par. E-2. Drawings.

42265 revision B to revision D
42270 revision B to revision D
43325 changed to 43590
Revision F added to 42112
40600 revision J to revision K
40601 revision B to revision F
42354 revision C to revision D
42279 revision G added
42360 changed to 43553
42361 changed to 43577
37583 D changed to 43016
37584 D changed to 43017
33536 P changed to Q
42348 revision C added
42347 changed to 43556-B

Par. E-3. Acceptance.

The vibration amplitude has been changed from ±1.25° to ±1.35°.

The following sentence has been added, "The engine shall perform satisfactorily with these limits".

Par. E-4. Weight.

Weights on the various units shown in detail have been revised resulting in a change of the total dry weight from 1365 to 1350 lbs.

Par. E-5a. Ratings.

The following has been added to the end of the first paragraph, "except where otherwise specified".

The critical altitude for both normal and military powers has been increased from 25,000 to 27,000 feet.

Par. E-5b(3) Curves.

The following phrase, "and ram vs. altitude" has been deleted since data on ram pressure has not been included on this curve sheet.

Par. E-5h. Coolant Flow and Heat Rejection.

The oil flow has been changed from 155 to 160 lb./min.

Heat rejection to coolant has been changed from 455 to 460 HP.

Par. E-5i. Oil Flow and Heat Rejection.

The oil flow has been changed from 155 to 160 lb./min.

Par. E-12. Overall Dimensions.

The overall length has been changed from 85-7/8 to 85-27/32 inches.

Par. E-14. Preparation for Storage.

The first item of 162-D concerning the flushing oil used for the carburetor has been deleted from the 162-E revision. Therefore, the numbering of the paragraphs has been moved up by one number.

In Item #2 of 162-E (which was Item #3 of 162-D) the following phrase has been deleted, "as soon as it can be made available".

Par. E-19. Impeller Gear.

The impeller gear ratio has been changed from 7.48:1 to 8.1:1.

Par. E-23b(3) Radio Shielded Ignition Assemblies.

Part number 42347 changed to 43556.

Par. E-23f. Cooling (Ignition).

Part numbers pertaining to the spark plug cooling tubes have been changed from 37583 and 37584 to 43016 and 43017.

Par. E-26. Fuel Priming System.

The priming lines assembly number 43325 has been changed to 43590.

Par. E-26. Fuel Priming System. (continued)

The following sentence was deleted from the end of the paragraph, "studs on the rear of the carburetor shall be lengthened to provide mounting for an electric primer. "

Page 14. Performance at Rated Speeds.

The critical altitude has been increased from 25,000 to 27,000 feet.

"For 5 minutes" added to the take-off rating note.

"For 15 minutes" has been added to the military rating note.

The supercharger gear ratio changed from 7.48:1 to 8.1:1.

The sea level manifold pressure calibration has been deleted and is shown on Page 15.

Page 15. Performance data at altitude without turbo supercharging has been modified to show the change in performance due to the change in supercharger ratio.

The following notes have been added:

"Guaranteed specific fuel consumption".

"Based on 80° carburetor air and standard pressure at sea level".

"Altitude values are with standard pressures and standard temperatures plus approximately 20°F".

The sea level manifold pressure calibration shown on this page is in automatic rich instead of auto lean. The auto-lean values have been deleted.

Page 16. All specific fuel consumption values have been adjusted to conform to the new requirements of the 8.1:1 supercharger ratio.

Ramming pressure vs. altitude data has been deleted.

REVISION RECORD 162-E

Page 18. AN-9520 has been deleted from the list of applicable specifications.

(2)*AN-QQ-M-181, March 24, 1939 has been changed to AN-QQ-M-181a, March 31, 1942.

Note: This revision record is submitted for your convenience. In case of discrepancy between the revision record and the specification, the specification shall be considered correct.