

*ENGINES AND MAINTENANCE PARTS*

**SPECIFIED AND  
ALTERNATE GRADE FUEL  
FOR AIRCRAFT-ENGINE  
COMBINATIONS**

**NOTE** *The work directed in paragraph 3. will be accomplished as specified by service activities with the aid of base maintenance facilities, if necessary. Commanding Officers will be responsible that the contents of this Technical Order are brought to the attention of all pilots cleared for operation of the aircraft listed in the table B. This Technical Order contains specific instructions for pilots and should be available for transition flying as contemplated in AAF Regulation 50-16. The AAF Resident Representative of contractor's plants or modification centers will be responsible to see that one copy of this Technical Order is placed in the back of the affected Pilot's Handbook of Flight Operating Instructions, carried in the aircraft specified in this Technical Order, prior to delivery of the aircraft to the Army Air Forces. The base Air Inspector, Technical, will be responsible to see that a copy of this Technical Order is placed in aircraft previously delivered to the Army Air Forces.*

*Published by authority of the Commanding General, Army Air Forces.*

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**RESTRICTED**

T.O. No. 02-1-38

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Paragraph 5.d. of Army Regulation 380-5 relative to the handling of restricted printed matter is quoted below:

"d. Dissemination of restricted matter.—The information contained in restricted documents and the essential characteristics of restricted material may be given to *any person known to be in the service of the United States and to persons of undoubted loyalty and discretion who are cooperating in Government work*, but will not be communicated to the public or to the press except by authorized military public relations agencies."

**Instructions Applicable to Navy Personnel.**

Navy Regulations, Article 75½, contains the following paragraphs relating to the handling of restricted matter:

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"(c) *Restricted* matter may be disclosed, under special circumstances, to persons not in the Government service when it appears to be in the public interest."

The Bureau of Aeronautics Circular Letter No. 12-43 further states:

"Therefore, it is requested that all naval activities check their own local regulations and procedures to make sure that handbooks, service instructions and other *restricted* technical publications are actually being made available to both civilian and enlisted personnel who have use for them."

**General.**

These instructions permit the issue of restricted publications to civilian contract and other accredited schools engaged in training personnel for Government work, to civilian concerns contracting for overhaul and repair of aircraft or aircraft accessories, and to similar commercial organizations.

**LIST OF REVISED PAGES ISSUED**

*NOTE:* A heavy black vertical line, to the left of the text on revised pages, indicates the extent of the revision. This line is omitted where more than 50 percent of the page is revised.

Page No.	Latest Revision Date
7.....	1 March 1945
11.....	1 March 1945

**ADDITIONAL COPIES OF THIS PUBLICATION MAY BE OBTAINED AS FOLLOWS:**

**AAF ACTIVITIES.**—Submit requisitions through the Air Inspector, Technical, whenever practicable, in accordance with T. O. No. 00-25-3 to the Commanding General, Fairfield Air Service Command, Patterson Field, Ohio. Attn: Publications Distribution Branch, as outlined in AAF Regulation 5-9. For details of Technical Order distribution, see T. O. No. 00-25-3.

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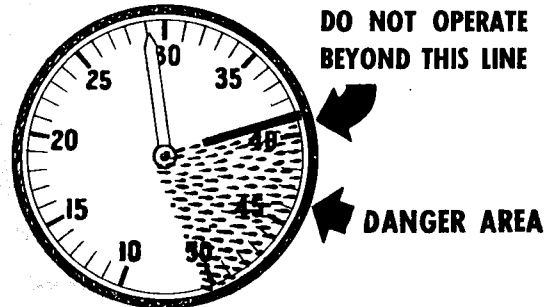
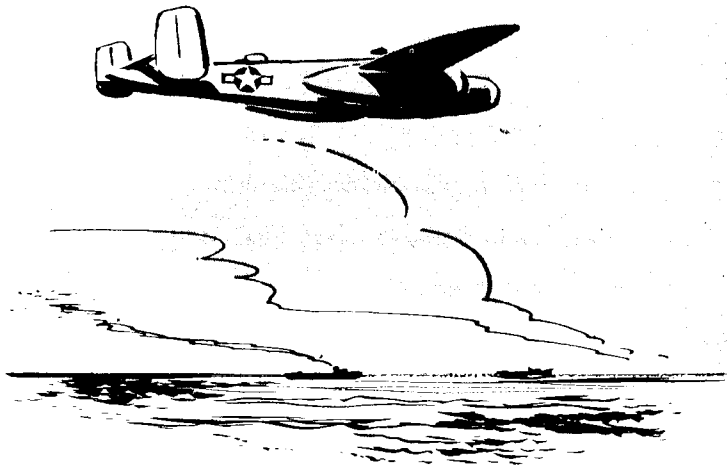
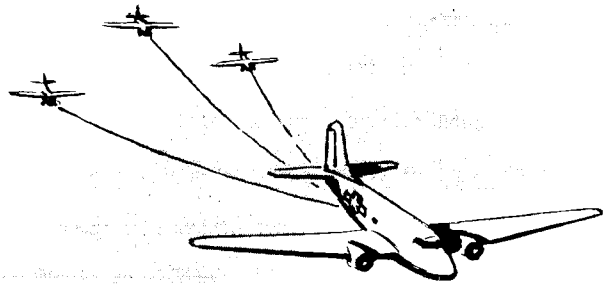
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## 1. PURPOSE.

a. To specify in table A the grade of fuel that will normally be used in all aircraft-engine combinations and to prescribe the alternate grade of fuel which may be used in order to maintain a regulated distribution of all grades of fuel, for the conduct of domestic operations by all Air Forces and Commands within the continental limits.

b. To furnish precautionary instructions and specific operating limits in table B for certain aircraft-



engine combinations normally rated on grade 130 fuel which are permitted to operate on grade 91/96 fuel, Specification No. AN-F-26, in order that Air Forces and Commands can maintain the issue of fuel, grade 130, within the monthly volumes allotted.

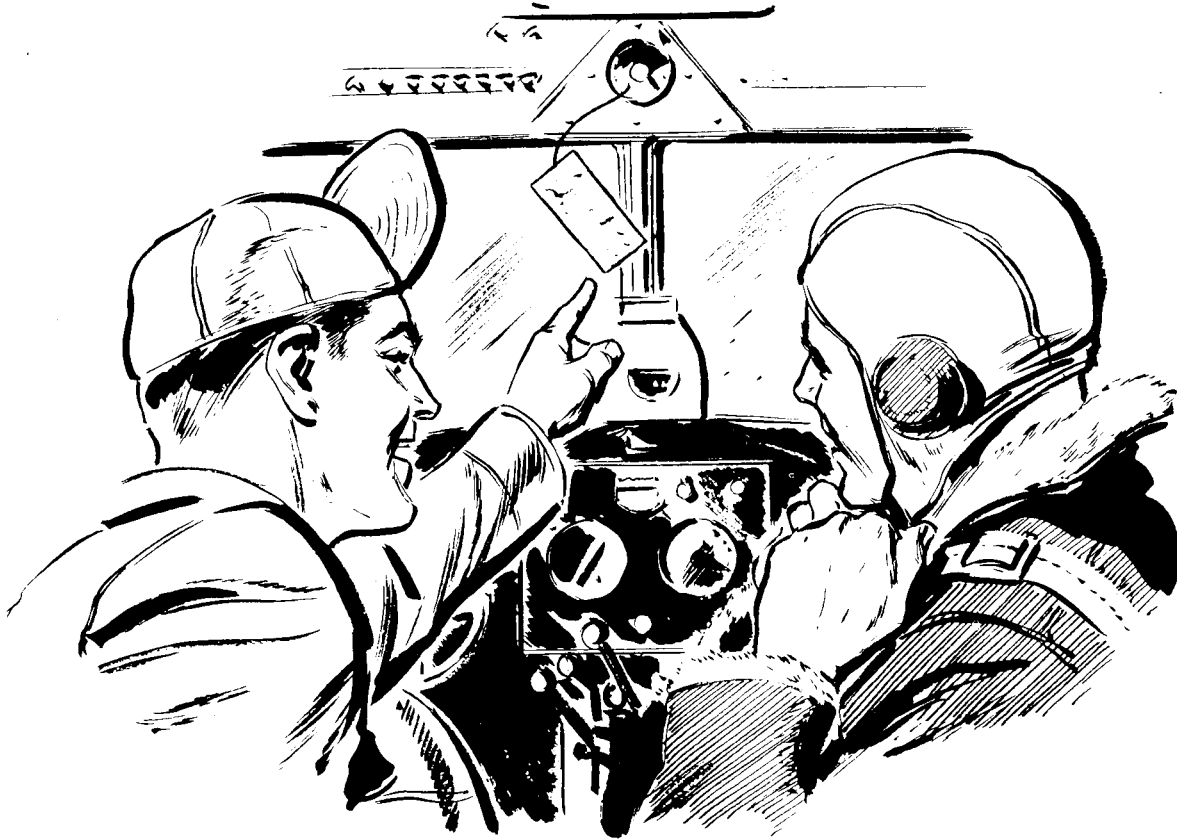
## 2. GENERAL INSTRUCTIONS.

a. It is mandatory that all aircraft-engine combinations be operated on the grade of fuel specified in table A of this Technical Order except as follows:

(1) When the grade of fuel specified in table A is not available and the particular aircraft-engine combination is not listed in table B, the aircraft may be

serviced with the next higher grade as an alternate in order to maintain required flight schedules. In the case of transient aircraft, the alternate grade of fuel serviced will be limited to a quantity sufficient to continue to the nearest army air field enroute having the specified grade of fuel. (See T. O. No. 00-35A-2.)

(2) When grade 130 fuel, specified in table A for any aircraft-engine combination is not available and that combination is listed in table B, fuel, grade 91/96, Specification No. AN-F-26, will be serviced as an alternate and the aircraft operated according to the specific operating limits listed in table B observing all precautionary instructions contained in paragraph 3.



**CAUTION** (1) All aircraft-engine combinations which are serviced under any circumstances with fuel, grade 130, Specification No. AN-F-28, will be operated at all times using the most economical power and cruising conditions.

(2) Continental Air Forces and Commands will maintain the issue of fuel, grade 130, Specification No. AN-F-28, within the volumes allotted monthly.

(3) Daily rate of consumption by local flying activities will be maintained consistent with the rate indicated by the local monthly quota of this grade established by the Air Force or Command concerned.

(4) Local control at each flying activity will be maintained to reserve a sufficient quantity of fuel, grade 130, Specification No. AN-F-28, for the accomplishment of all missions described in paragraph 3. which will not be conducted with fuel, grade 91/96.

### 3. PRECAUTIONARY INSTRUCTIONS.

a. When the aircraft-engine combinations listed in table B are serviced with fuel, grade 91/96, Specification No. AN-F-26, the following precautionary instructions will be observed:

#### (1) MISSIONS PROHIBITED.

(a) All extended missions over salt water, such missions to include coastal patrol operations where load, distance and safety are factors which in the joint opinion of the local operations and maintenance officers preclude the use of fuel, grade 91/96, Specification No. AN-F-26.

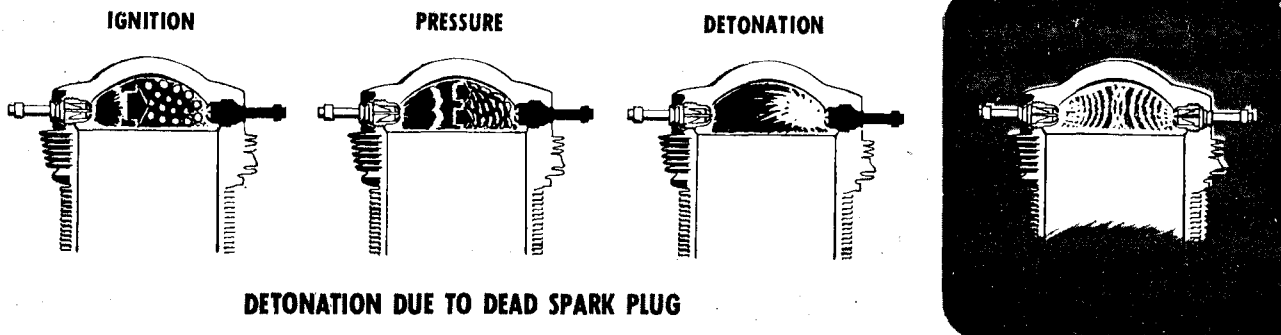
(b) Operation involving aircraft being ferried on overseas projects, the domestic destination being a staging area or port of embarkation.

(c) Operation involving aircraft being finally staged for overseas flight.

(d) Operation involving glider and target towing only when excessive operating temperatures are encountered with the use of fuel, grade 91/96, Specification No. AN-F-26.

(e) Missions which cannot be performed in accordance with the specific operating limits in table B for the type of aircraft-engine combination involved.

b. It is imperative that the operating limits established in table B are not exceeded for any aircraft-engine combination operating with grade 91/96 fuel, Specification No. AN-F-26. It is permissible to mix fuels, grades 91/96, Specification No. AN-F-26, and grade 130, Specification No. AN-F-27A or AN-F-28, when occasions demand; however, in all such cases, the fuel mixture will be considered to be the lower

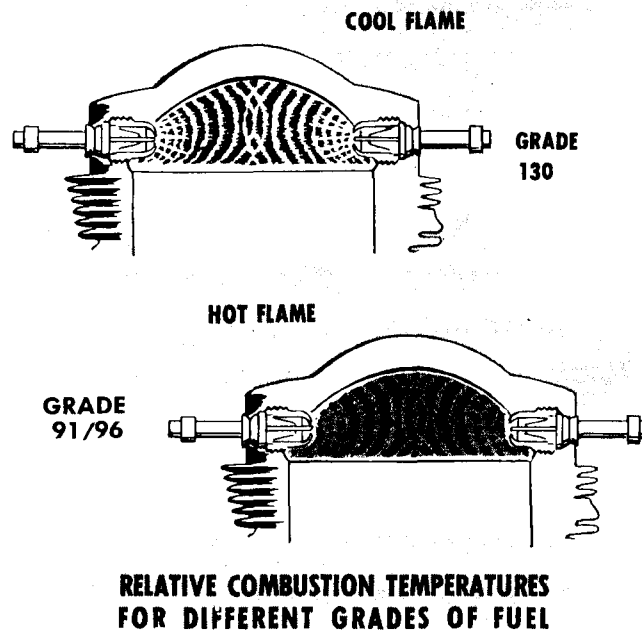
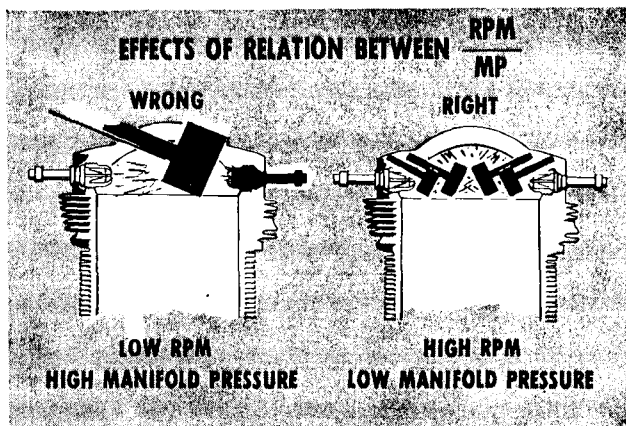


grade and all operations will be in accordance with the specific limits listed in table B for the applicable combination.

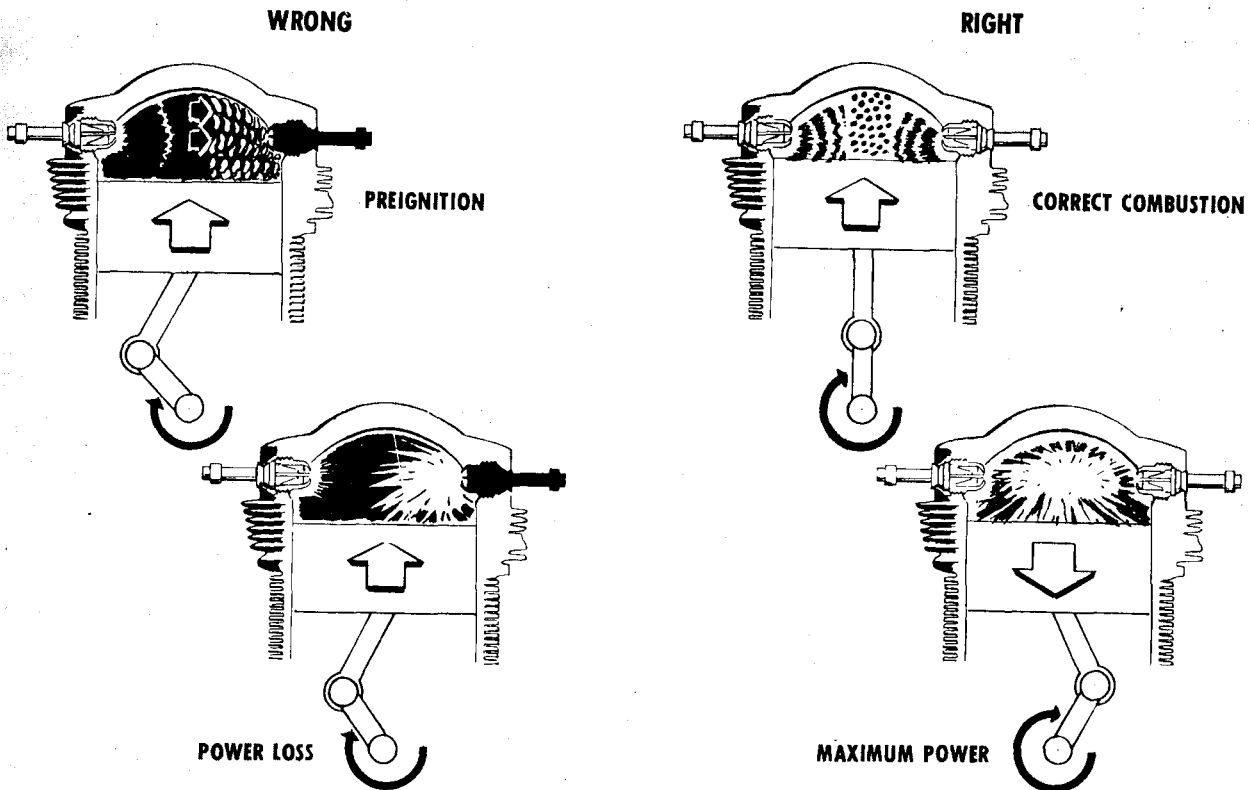
c. Emphasis is placed on the fact that the specific operating instructions in the table apply specifically to the engines by type and model number and the aircraft by type only. It will be the responsibility of all pilot and servicing personnel to determine the type and model of engines installed in aircraft to insure compliance with these instructions.

d. Applicable aircraft listed in table B which are serviced for operation with fuel grade 91/96, Specification No. AN-F-26, will have a suitable warning notice typewritten on a blank tag or sticker bearing the following information secured conspicuously on the control column or ignition switch: Warning to Pilot. -

This Aircraft Serviced With Fuel, Grade 91/96, Specification No. AN-F-26. Operate Engine (or Engines) Within The Following Limits Prescribed by T. O. No. 02-1-38. The limits to be placed on the warning tag or sticker (example shown herein for guidance only) will be those for the particular aircraft shown in table B of this Technical Order.



C-49E AIRPLANE				
R-1820-G102A ENGINES				
Warning to Pilot. - This Aircraft is serviced with Fuel, Grade 91/96, Specification No. AN-F-26. Operate Engines Within the Following Indicated Limits Prescribed in T. O. No. 02-1-38.				
	HP	RPM	M.P. IN. HG.	MIXTURE SETTING
TAKE-OFF OR MAX				
CONDITION OF OPERATION	1100	2350 (MAX)	43.0 (MAX)	AUTO-RICH
NORMAL RATED POWER	900	2300 (MIN)	35.0 (MAX)	AUTO-RICH
MAX CRUISING	675	2020 (MIN)	32.0 (MAX)	AUTO-RICH
DESIRED CRUISING	500	1700 (MIN)	25.5 (MAX)	AUTO-LEAN



e. Engines equipped with two-speed integral superchargers will normally be operated in low blower ratio. High blower ratio will be used only during daily ground and flight inspections to prevent sludging of the supercharger clutches, or at altitude when it is necessary to obtain the power conditions specified in table B.

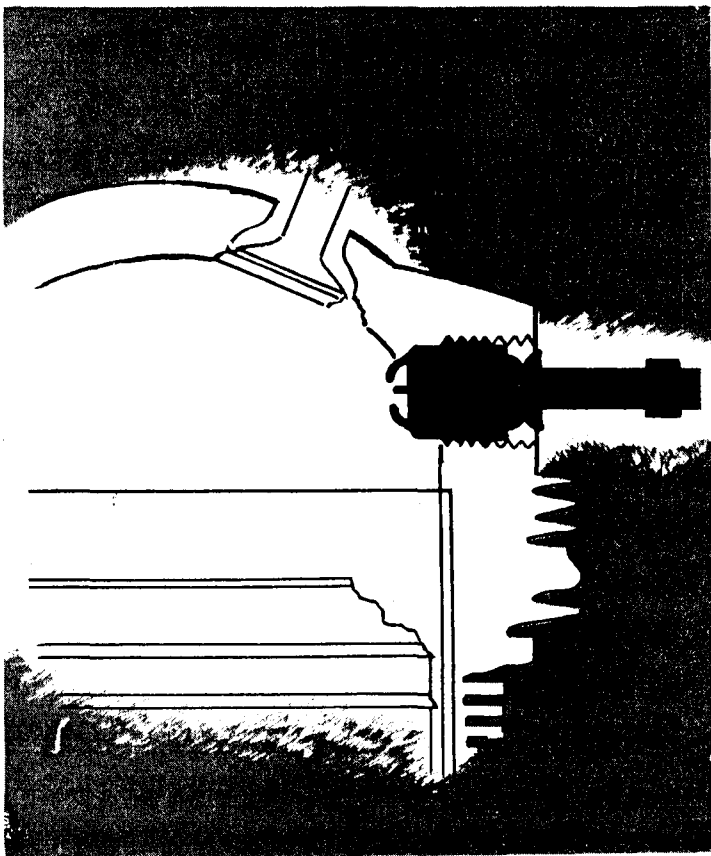
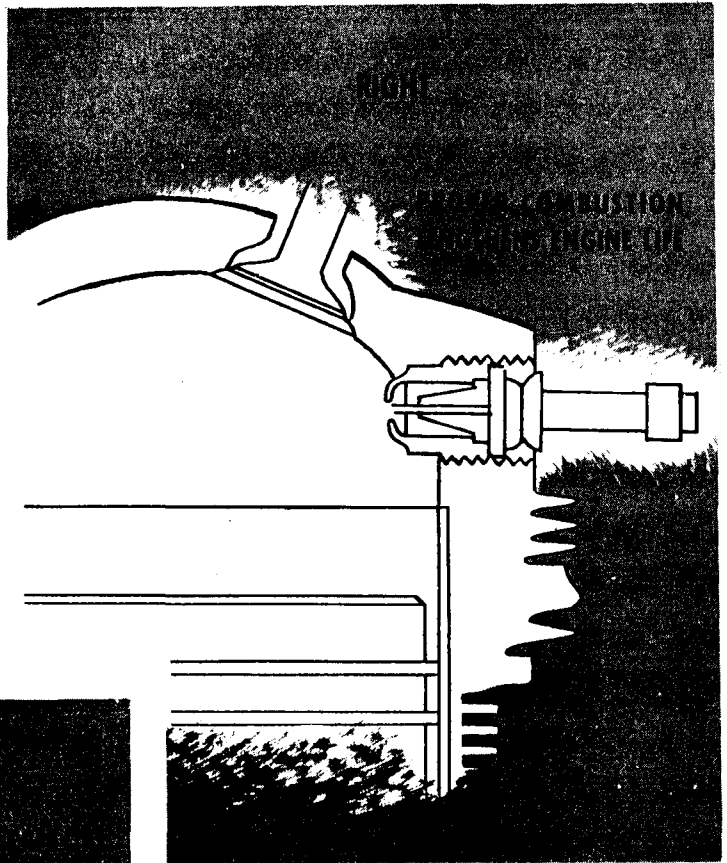
f. All types of airplanes except P-38 series (for P-38 series see T. O. No. 02-5A-66) which are equipped with turbosuperchargers have a separate cockpit supercharger control. The use of the turbosupercharger is authorized at any time it is necessary to obtain manifold pressure for a given set of flight conditions up to the maximum manifold pressures permitted in table B.

g. The lightest loads possible will be carried when operating aircraft in accordance with instructions in table B. Take-off with normal load may not be possible with all aircraft with the restrictions imposed.

h. The principal concern of operating personnel is necessarily the tendency of engines to detonate when operating on fuel of a different grade than that for which the engine was designed. Special care must be taken to see that all spark plugs are operating. The

result of one spark plug being inoperative is to cause detonation which will develop into preignition on that side of the piston where the dead spark plug is installed. High heat resulting from preignition will aggravate any tendency of the piston rings to disintegrate and cause scoring of the cylinder walls and piston skirt with the resulting failure of the piston. Operating personnel will be familiar with the relationship of manifold pressure versus engine revolutions and it should be particularly borne in mind that the specific operating instructions listed in table B for cruising conditions are the minimum rpm and the maximum manifold pressure for a given horsepower output. If the rpm is increased and the manifold pressure reduced, the engine is being operated under a condition more favorable to long engine life. Fuel consumption will be increased appreciably by the increase in rpm.

i. The operating conditions specified herein for use with fuel, grade 91/96, Specification No. AN-F-26, are the safest which can be established. Service activities experiencing any type of failures or maintenance difficulties which might be attributed to the use of fuel, grade 91/96, Specification No. AN-F-26, will submit an Unsatisfactory Report on the condition, describing in detail the trouble experienced and stating the grade and specification of the fuel used.



By Command of General ARNOLD:

Prepared by Engine Section,  
Maintenance Div, Hq, ATSC.

B. E. MEYERS  
Major General, U.S.A.  
Deputy Director  
Air Technical Service Command

**See Following Charts**

TABLE A

SPECIFIC GRADE OF FUEL TO BE USED IN EACH AIRCRAFT-ENGINE COMBINATION

**NOTE** All aircraft having the same type, model, and series designations and block designations where applicable, and aircraft included therein to which auxiliary prefix symbols having been authorized (Reference No. T. O. No. 01-1-81), will use the same grade of fuel as indicated for the basic type and model. Example: Fuel required for CB-17F, FB-17F, RB-17F, TB-17F, and XB-17F is the same as that specified for the B-17F.

Aircraft Type and Model	Engine Type and Model	Fuel Grade Recommended	Aircraft Type and Model	Engine Type and Model	Fuel Grade Recommended
BOMBARDMENT (LIGHT) SYMBOL A			BOMBARDMENT (MEDIUM & HEAVY) SYMBOL B		
A-17	R-1535-11	91/96	B-10	R-1820-17	91/96 †
A-17A	R-1535-13	91/96	B-10B	R-1820-33	91/96 †
A-18	R-1820-87	130 #	B-17B	R-1820-51	130 #
A-20	R-2600-11	130 #	B-17C	R-1820-65	130 #
A-20A	R-2600-11	130 #	B-17D	R-1820-65	130 #
A-20B	R-2600-11	130 #	B-17E	R-1820-65	130 #
A-20C	R-2600-23/A5BO	91/96 *	B-17F	R-1830-65/97	130 #
A-20G	R-2600-23	91/96 *	B-17G	R-1820-65/97	130 #
A-20H	R-2600-13,29	130 #	B-18	R-1820-45	91/96
A-20J	R-2600-13	91/96 *	B-18A	R-1820-53	130 #
A-20K	R-2600-29	130 #	B-18B	R-1820-53	130 #
DB-7B	R-2600-23/A5BO	91/96 *	B-19A	V-3420-19	130
A-24	R-1820-52	130	B-23	R-2600-3	130 #
A-24A	R-1820-52	130	B-24	R-1830-33/43	130 #
A-24B	R-1820-60	130	B-24A	R-1830-33/43	130 #
A-25A	R-2600-8	130 #	B-24B	R-1830-43	130 #
A-26	R-2800-27	130	B-24C	R-1830-43	130 #
A-26A	R-2800-27	130	B-24D	R-1830-43/65	130 #
A-26B	R-2800-27	130	B-24E	R-1830-43/65	130 #
A-26C	R-2800-27	130	B-24G	R-1830-43/65	130 #
A-28A	R-1830-67	130 #	B-24H	R-1830-43/65	130 #
A-29	R-1820-87	130 #	B-24J	R-1830-43/65	130 #
A-29A	R-1820-87	130 #	B-24K	R-1830-75	130
A-29B	R-1820-87	130 #	B-24L	R-1830-43/65	130 #
A-30	R-2600-8	130 #	B-24M	R-1830-43/65	130 #
A-30	R-2600-19	91/96 *	B-24N	R-1830-75	130
A-31	R-2600-19	91/96 *	B-25	R-2600-9	130 #
A-31C	R-2600-19	91/96 *	B-25A	R-2600-9	130 #
A-33	R-1820-87	130 #	B-25B	R-2600-9	130 #
A-34	R-2600-19	91/96 *	B-25C	R-2600-13	130 #
A-35A	R-2600-19	91/96 *	B-25D	R-2600-13	130 #
A-35A	R-2600-13	130 #	B-25E	R-2600-13	130 #
A-35B	R-2600-13	130 #	B-25G	R-2600-13	130 #
A-36A	V-1710-87	130 #	B-25H	R-2600-13	130 #

\* Engines formerly rated on grade 130 fuel. Use grade 91 as shown with no change in operating instructions contained in the applicable Technical Order Handbook of Operation Instructions.

# Engines rated on grade 130 fuel; however, operation may be accomplished on alternate grade 91/96, using power limits listed in table B for all missions except those listed in paragraph 3. of this Technical Order.

‡ Engines formerly rated on fuel grade 87, which is no longer supplied. Use grade 91/96 with no change in operating instructions contained in the applicable Technical Order Handbook of Operation Instructions.

\$ Engines rated on grade 73 fuel; however, operation may be accomplished on alternate grade 80 motor fuel (all purpose) Specification No. 2-103.

TABLE A (Cont)

Aircraft Type and Model	Engine Type and Model	Fuel Grade Recommended	Aircraft Type and Model	Engine Type and Model	Fuel Grade Recommended
B-25J	R-2600-13/29	130 #	C-45	R-985-AN-1	91/96 ‡
B-26	R-2800-5/43	130	C-45A	R-985-AN-1-3	91/96 ‡
B-26A	R-2800-5	130	C-45B	R-985-AN-1-3	91/96 ‡
B-26A-1	R-2800-39	130	C-45C	R-985-AN-1-3	91/96 ‡
B-26B	R-2800-5	130	C-45D	R-985-AN-1	91/96 ‡
B-26B-1	R-2800-43	130	C-45E	R-985-AN-3	91/96 ‡
B-26B-2	R-2800-41	130	C-45F	R-985-AN-1-3	91/96 ‡
B-26C	R-2800-43	130	C-46	R-2800-51	130 #
B-26E	R-2800-43	130	C-46A	R-2800-51	130 #
B-26F	R-2800-43	130	C-46A	R-2800-75	130 #
B-26G	R-2800-43	130	C-46D	R-2800-75	130 #
B-29	R-3350-13/19/21/23/41	130	C-47	R-1830-92	130 #
B-29A	R-3350-23/23A/57/59	130	C-47A	R-1830-92	130 #
B-32	R-3350-13	130	C-47B	R-1830-90C	130 #
B-32	R-3350-23/23A/57/59	130	C-47C	R-1830-92	130 #
B-34	R-2800-31	130 #	C-48	R-1830-92	130 #
B-34A	R-2800-31	130 #	C-48A	R-1830-51/82/92	130 #
B-34B	R-2800-31	130 #	C-48B	R-1830-S1C3G	130 #
B-35	R-4360-17/21	130	C-48C	R-1830-S1C3G	130 #
B-36	R-4360-25	130	C-49	R-1820-71	91/96 *
B-37	R-2800-31	130	C-49B	R-1820-71	91/96 *
B-39	V-3420-19	130	C-49C	R-1820-71	91/96 *
B-40	R-1820-65	130 #	C-49D	R-1820-71	91/96 *
TRANSPORT (CARGO & PERSONNEL) SYMBOL C OR UC			C-49E	R-1820-G102A	91/96 *
			C-49F	R-1820-G202	91/96 *
			C-49G	R-1820-G2E	91/96 *
			C-49H	R-1820-G102A	91/96 *
			C-49J	R-1820-71	91/96 *
			C-49K	R-1820-71	91/96 *
			C-50	R-1820-85	91/96 *
			C-50A	R-1820-85	91/96 *
			C-50B	R-1820-81	91/96 *
			C-50C	R-1820-79	91/96 *
C-50D	R-1820-79	91/96 *			
C-51	R-1820-83	91/96 *			
C-52	R-1830-51	130 #			
C-52A	R-1830-51	130 #			
C-52B	R-1830-51	130 #			
C-52C	R-1830-51	130 #			
C-53	R-1830-92	130 #			
C-53A	R-1830-92	130 #			
C-53B	R-1830-90/92	130 #			
C-53C	R-1830-92	130 #			
C-53D	R-1830-92	130 #			
C-54	R-2000-3/7	130 #			
C-54A	R-2000-3/7	130 #			
C-32A	R-1820-33	91/96 ‡			
C-33	R-1820-25	91/96			
C-34	R-1820-25	91/96			
UC-36	R-985-13	91/96 ‡			
UC-36A	R-985-13	91/96 ‡			
UC-36B	R-1340-49	91/96 ‡			
UC-36C	R-975	91/96 ‡			
UC-37	R-985-13	91/96 ‡			
C-38	R-1820-45	91/96			
C-39	R-1820-55	91/96			
UC-40A	R-985-17	91/96 ‡			
C-41	R-1830-21	130 #			
C-41A	R-1830-21	130 #			
C-42	R-1820-53	130 #			
UC-43	R-985-AN/1/3	91/96 ‡			
UC-43A	R-975-11	91/96 ‡			
UC-43C	R-985-13/17/23	91/96 ‡			
UC-43C	R-915	73			
UC-43D	L-5/5M/5MB	73			

\* Engines formerly rated on grade 130 fuel. Use grade 91 as shown with no change in operating instructions contained in the applicable Technical Order Handbook of Operation Instructions.

# Engines rated on grade 130 fuel; however, operation may be accomplished on alternate grade 91/96, using power limits listed in table B for all missions except those listed in paragraph 3. of this Technical Order.

‡ Engines formerly rated on fuel grade 87, which is no longer supplied. Use grade 91/96 with no change in operating instructions contained in the applicable Technical Order Handbook of Operation Instructions.

§ Engines rated on grade 73 fuel; however, operation may be accomplished on alternate grade 80 motor fuel (all purpose) Specification No. 2-103.

RESTRICTED  
T. O. No. 02-1-38

TABLE A (Cont)

Aircraft Type and Model	Engine Type and Model	Fuel Grade Recommended	Aircraft Type and Model	Engine Type and Model	Fuel Grade Recommended
C-54B	R-2000-3/7	130 #	C-109	R-1830-43/43A/65/65A	130
C-54D	R-2000-11	130	DC-2	SGR-1820-30	130 #
C-54E	R-2000-11	130	DC-3	R-1830-92	130 #
C-54F	R-2000-11	130	ARMY RECONNAISSANCE (PHOTOGRAPHIC) SYMBOL F		
C-54G	R-2000-9	130			
C-56	R-1820-79	130 #			
C-56B	R-1820-G102A	130 #			
C-56D	R-1830-S1C3G	130	F-2	R-985-19/23	91/96 †
C-56E	R-1820-G202A	130	F-3	R-2600-11	130 #
C-57	R-1830-51/55	130	F-4	V-1710-27/29	130 #
C-57B	R-1830-S1C3G	130	F-4-1	V-1710-27/29	130 #
C-59	R-1690-25	91/96	F-4A	V-1710-49/53	130 #
C-60	R-1820-87	130 #	F-4A-1	V-1710-27/29	130 #
C-60A	R-1820-87	130 #	F-5	V-1710-51/55	130 #
C-60B	R-1820-87	130 #	F-5A	V-1710-49/53	130 #
UC-61	R-500-1	73	F-5A-	V-1710-51/55	130 #
UC-61A	R-500-1	73	1/3/5/10		
UC-61E	6-410-B1	73	F-5B	V-1710-89/91	130 #
C-64A	R-1340-AN-1	91/96 †	F-7	R-1830-43	130 #
UC-67	R-2600-3	130 #	F-8	MERLIN 31	130
C-69	R-3350-35	130	F-9	R-1820-39	130
UC-70	WASP JR. SB	91/96 †	F-11	R-4360-31	130
UC-70B	L-6MB	73			
UC-71	R-985-13/17	91/96 †	LIAISON - SYMBOL L		
UC-72	R-985-13	91/96 †			
UC-72D	W-670M	73	L-1 (0-49)	R-680-9	91/96 †
C-73	R-1340-S1H1G	91/96 †	L-1A	R-680-9	91/96 †
C-74	R-4360-27	130	(0-49A)		
C-76	R-1830-92	130 #	L-1B	R-680-9	91/96 †
C-76A	R-1830-92	130 #	(0-49B)		
UC-78	R-755-9	73	L-1C	R-680-9	91/96 †
UC-78A	R-755-9	73	L-2 (0-57)	0-170-3	73 \$
C-78B	R-755-9	73	L-2A	0-170-3	73 \$
C-78C	R-755-9	73	(0-57A)		
C-78E	R-755-9	73	L-2B	0-170-3	73 \$
C-78F	R-755-9	73	L-2C	0-170-3	73 \$
UC-81	R-680	91/96 †	L-2M	0-170-3	73 \$
C-81C	R-680	91/96 †	L-3 (0-58)	0-170-3	73 \$
C-81D	R-985	91/96 †	L-3A	0-170-3	73 \$
C-81F	R-985	91/96 †	(0-58A)		
C-81K	R-680	91/96 †	L-3B	0-170-3	73 \$
UC-86	6-410-33	73	(0-58B)		
C-87	R-1830-43/65	130 #	L-3C	0-170-3	73 \$
C-97	R-3350-57/59/23/23A	130	L-4 (0-59)	0-170-3	73 \$
C-99	R-4360-25	130	L-4A	0-170-3	73 \$
C-108	R-1820-97	130	(0-59A)		

\* Engines formerly rated on grade 130 fuel. Use grade 91 as shown with no change in operating instructions contained in the applicable Technical Order Handbook of Operation Instructions.

# Engines rated on grade 130 fuel; however, operation may be accomplished on alternate grade 91/96, using power limits listed in table B for all missions except those listed in paragraph 3. of this Technical Order.

† Engines formerly rated on fuel grade 87, which is no longer supplied. Use grade 91/96 with no change in operating instructions contained in the applicable Technical Order Handbook of Operation Instructions.

\$ Engines rated on grade 73 fuel; however, operation may be accomplished on alternate grade 80 motor fuel (all purpose) Specification No. 2-103.

TABLE A (Cont)

<u>Aircraft Type and Model</u>	<u>Engine Type and Model</u>	<u>Fuel Grade Recommended</u>	<u>Aircraft Type and Model</u>	<u>Engine Type and Model</u>	<u>Fuel Grade Recommended</u>
L-4B	0-170-3	73 \$	P-38H	V-1710-51/55	130 #
L-4C	0-145-B1	73 \$	P-38J	V-1710-89/91	130 #
L-4E	A-75-8/9	73 \$	P-38K	V-1710-111/113	130 #
L-4F	A-75-8	73 \$	P-38L	V-1710-111/113	130 #
L-4G	0-145-2	73 \$	P-39	V-1710-37	130 #
L-5	0-435-1	73 \$	P-39D	V-1710-35	130 #
L-5B	0-435-1	73 \$	P-39E	V-1710-35	130 #
L-6	0-200-5	73 \$	P-39F	V-1710-35	130 #
L-9B	4AC-199-E2/E3	73 \$	P-39K	V-1710-63	130 #
			P-39L	V-1710-63	130 #
			P-39M	V-1710-83	130 #
			P-39N	V-1710-83/85	130 #
			P-39Q	V-1710-83/85	130 #
0-46A	R-1535-7	91/96	P-40	V-1710-33	130 #
0-47A	R-1820-49	91/96	P-40B	V-1710-33	130 #
0-47B	R-1820-57	130 #	P-40C	V-1710-33	130 #
0-52	R-1340-51	91/96 †	P-40D	V-1710-39	130 #
0-54	0-170-1	73	P-40E	V-1710-39	130 #
0-55	0-170-3	73	P-40F	V-1650-1	130 #
0-60	R-915-3	91/96	P-40K	V-1710-73	130 #
			P-40L	V-1650-1	130 #
			P-40M	V-1710-81	130 #
			P-40N	V-1710-81/99	130 #
			P-40Q	V-1710-85/99	130 #
			P-42	R-1830-31	130
			P-43	R-1830-47	130 #
			P-43A	R-1830-57	130 #
			P-43B	R-1830-49	130
			P-43C	R-1830-49	130
			P-43E	R-1830-35/47/57	130 #
			P-47B	R-2800-21	130 #
			P-47C	R-2800-59/63	130
			P-47D	R-2800-59/63	130
			P-47E	R-2800-59/63	130
			P-47G	R-2800-59/63	130
			P-47J	R-2800-61	130
			P-47K	R-2800-61	130
			P-47L	R-2800-59	130
			P-47M	R-2800-57	130
			P-47N	R-2800-57	130
			P-51	V-1710-39	130 #
P-38	V-1710-27/29	130 #	P-51A	V-1710-39/81	130 #
P-38A	V-1710-27/29	130 #	P-51B	V-1650-3/7	130
P-38D	V-1710-27/29	130 #	P-51C	V-1650-3/7	130
P-38E	V-1710-27/29	130 #	P-51D	V-1650-3/7	130
P-38F	V-1710-49/53	130 #	P-51F	V-1650-3/7	130
P-38G	V-1710-51/55	130 #			

OBSERVATION - SYMBOL 0

HELICOPTER - SYMBOL R

AMPHIBIAN - SYMBOL OA

FIGHTER - SYMBOL P

\* Engines formerly rated on grade 130 fuel. Use grade 91 as shown with no change in operating instructions contained in the applicable Technical Order Handbook of Operation Instructions.

# Engines rated on grade 130 fuel; however, operation may be accomplished on alternate grade 91/96, using power limits listed in table B for all missions except those listed in paragraph 3. of this Technical Order.

† Engines formerly rated on fuel grade 87, which is no longer supplied. Use grade 91/96 with no change in operating instructions contained in the applicable Technical Order Handbook of Operation Instructions.

\$ Engines rated on grade 73 fuel; however, operation may be accomplished on alternate grade 80 motor fuel (all purpose) Specification No. 2-103.

RESTRICTED  
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TABLE A (Cont)

Aircraft Type and Model	Engine Type and Model	Fuel Grade Recommended	Aircraft Type and Model	Engine Type and Model	Fuel Grade Recommended
P-51K	V-1650-7	130	TRAINING (ADVANCE) - SYMBOL BC (AT)		
P-59A	I-16-1	JP-1	BC-1	R-1340-47	91/96 ‡
P-59B	I-16-1	JP-1	BC-1A	R-1340-47	91/96 ‡
P-60C	R-2800-10	130	TRAINING (BASIC) - SYMBOL BT		
P-60E	R-2800-10	130	BT-9	R-975-7	91/96 ‡
P-61	R-2800-10	130	BT-9A	R-975-7	91/96 ‡
P-61A	R-2800-10	130	BT-9B	R-975-7	91/96 ‡
P-61B	R-2800-10	130	BT-9C	R-975-7	91/96 ‡
P-61C	R-2800-59/73/77	130	BT-12	R-985-AN-1	91/96 ‡
P-62	R-3350-17	130	BT-13	R-985-25	91/96 ‡
P-63A	V-1710-47/93/117	130	BT-13A	R-985-AN-1/3	91/96 ‡
P-64	R-1820-77	91/96 ‡	BT-13B	R-985-25	91/96 ‡
P-70	R-2600-11	130 #	BT-15	R-985-11A/25/27	91/96 ‡
P-70A	R-2600-23	91/96 *	BT-15	R-975-11	91/96 ‡
P-75A	V-3420-23	130	TRAINING (PRIMARY) - SYMBOL PT		
P-77	V-770-6/7	91/96	PT-13	R-680-5	73
P-80	I-40	JP-1	PT-13A	R-680-7	73
P-322	V-1710-49/53/51/55	130 #	PT-13B	R-680-11/17	91/96 ‡
P-400	V-1710-35	130 #	PT-13C	R-680-11	91/96 ‡
TRAINING (ADVANCE) - SYMBOL AT			PT-13D	R-680-17	91/96 ‡
AT-6	R-1340-47	91/96 ‡	PT-15	R-670-1	73
AT-6A	R-1340-49	91/96 ‡	PT-16A	R-440-1	73
AT-6B	R-1340-AN-1	91/96 ‡	PT-17	R-670-5	73
AT-6C	R-1340-AN-1	91/96 ‡	PT-17A	R-670-5	73
AT-6D	R-1340-AN-1	91/96 ‡	PT-18	R-755-7	73
AT-7	R-985-AN-1/3	91/96 ‡	PT-19	L-440-1	73
AT-7B	R-985-23/25	91/96 ‡	PT-19A	L-440-1	73
AT-7C	R-985-AN-1/3	91/96 ‡	PT-19B	L-440-1	73
AT-8	R-680-9	91/96 ‡	PT-21	L-440-3	73
AT-9	R-680-9/13	91/96 ‡	PT-22	R-540-1	73
AT-9A	R-680-13	91/96 ‡	PT-22A	R-540-1	73
AT-10	R-680-9/13	91/96 ‡	PT-23	R-670-4	73
AT-11	R-985-AN-1/3	91/96 ‡	PT-23A	R-670-4	73
AT-12	R-1830-45	91/96 ‡	PT-25	0-435-1	73
AT-13	R-1340-AN-1	91/96 ‡	PT-26	L-440-3/7	73
AT-15	R-1340-AN-1	91/96 ‡	PT-26A	6-440-C-5	73
AT-16	R-1340-AN-1	91/96 ‡	PT-27	R-670-5	73
AT-17	R-755-9	73	TARGET - SYMBOL PQ		
AT-17A	R-755-9	73	PQ-8	0-200-1	73
AT-17B	R-755-9	73	PQ-8A	0-290-1	73
AT-17C	R-755-9	73	PQ-12A	0-435	73
AT-18	R-1820-87	130 #	PQ-14A	0-300-11	91
AT-18A	R-1820-87	130 #	PQ-14B	0-300-11	91
AT-19	R-680-13	91/96 ‡			
AT-20	R-915-5/7	73			
AT-21	V-770-11/15	91/96			

\* Engines formerly rated on grade 130 fuel. Use grade 91 as shown with no change in operating instructions contained in the applicable Technical Order Handbook of Operation Instructions.

# Engines rated on grade 130 fuel; however, operation may be accomplished on alternate grade 91/96, using power limits listed in table B for all missions except those listed in paragraph 3. of this Technical Order.

‡ Engines formerly rated on fuel grade 87, which is no longer supplied. Use grade 91/96 with no change in operating instructions contained in the applicable Technical Order Handbook of Operation Instructions.

\$ Engines rated on grade 73 fuel; however, operation may be accomplished on alternage grade 80 motor fuel (all purpose) Specification No. 2-103.

TABLE 6  
SPECIFIC OPERATING LIMITS FOR CERTAIN AIRCRAFT WITH ALTERNATE GRADE OF FUEL

Engine Designation	Installed Aircraft Designation	TAKE-OFF OR MAXIMUM CONDITION OF OPERATION				NORMAL RATED POWER				MAXIMUM CRUISING CONDITION				DESIRED CRUISING CONDITION				COMMENTS
		Horse Power	Maximum R.P.M.	Maximum Manifold Pressure In. Hg.	Carburetor Mixture Setting	Horse Power	Minimum R.P.M.	Maximum Manifold Pressure In. Hg.	Carburetor Mixture Setting	Horse Power	Minimum R.P.M.	Maximum Manifold Pressure In. Hg.	Carburetor Mixture Setting	Horse Power	Minimum R.P.M.	Maximum Manifold Pressure In. Hg.	Carburetor Mixture Setting	
R-1830-13	P-36	1050	2700	43.0	Auto-Rich	900	2550	34.0	Auto-Rich	850	2550	27.0	Auto-Rich	450	1650	29.0	Auto-Lean	(Single Speed Blower)
-17	P-36	1100	2700	43.0	Auto-Rich	1000	2550	43.0	Auto-Rich	825	2230	36.0	Auto-Rich	500	1650	30.0	Auto-Lean	(Single Speed Blower)
-21	C-41	1100	2700	43.0	Auto-Rich	1000	2550	38.6	Auto-Rich	670	2230	27.5	Auto-Rich	500	1650	30.0	Auto-Lean	(Single Speed Blower)
-33	B-24																	
-35	P-43	1100	2700	43.0	Auto-Rich	1000	2550	43.0	Auto-Rich	825	2230	36.0	Auto-Rich	500	1650	30.0	Auto-Lean	(Single Speed Blower)
-43	B-24, C-87, F-7																	
-47	P-43	1100	2700	43.0	Auto-Rich	1000	2550	43.0	Auto-Rich	825	2230	36.0	Auto-Rich	500	1650	30.0	Auto-Lean	(Single Speed Blower)
-51	C-52	1175	2700	46.0	Auto-Rich	1050	2550	42.0	Auto-Rich	790	2250	34.5	Auto-Rich	550	1700	32.5	Auto-Lean	(Single Speed Blower)
-53		1175	2700	46.0	Auto-Rich	1050	2550	42.0	Auto-Rich	790	2250	34.5	Auto-Rich	550	1700	32.5	Auto-Lean	(Single Speed Blower)
-57	P-43	1100	2700	43.0	Auto-Rich	1000	2550	43.0	Auto-Rich	825	2230	36.0	Auto-Rich	500	1650	30.0	Auto-Lean	(Single Speed Blower)
-65	B-24, C-87																	
-67	A-28	1100	2700	43.0	Auto-Rich	1000	2550	38.6	Auto-Rich	670	2230	27.5	Auto-Rich	500	1650	30.0	Auto-Lean	(Single Speed Blower)
-82	C-48	1175	2700	46.0	Auto-Rich	1050	2550	42.0	Auto-Rich	790	2250	34.5	Auto-Rich	550	1700	32.5	Auto-Lean	(Single Speed Blower)
R-1830-90*	C-47	1125	2700	43.0	Auto-Rich	1000	2550	43.0	Auto-Rich	825	2230	36.0	Auto-Rich	550	1700	32.0	Auto-Lean	(Low Blower)
		(*)				900	2550	36.0	Auto-Rich	610	2230	26.0	Auto-Rich	425	1700	24.0	Auto-Lean	(High Blower)
-92	C-47, C-48, C-53 C-76, DC-3, OA-10	1175	2700	46.0	Auto-Rich	1050	2550	42.0	Auto-Rich	790	2250	34.5	Auto-Rich	550	1700	32.5	Auto-Lean	(Single Speed Blower)
R-2000-3	C-54	(1200)	2700	43.5	Auto-Rich	1000	2550	35.0	Auto-Rich	670	2230	27.8	Auto-Rich	515	1700	27.0	Auto-Lean	(Low Blower)
		(*)				900	2550	35.5	Auto-Rich	610	2230	26.2	Auto-Rich	465	1700	26.0	Auto-Lean	(High Blower)
-7	C-54	(1200)	2700	43.5	Auto-Rich	1000	2550	35.0	Auto-Rich	670	2230	27.8	Auto-Rich	515	1700	27.0	Auto-Lean	(Low Blower)
						900	2550	35.5	Auto-Rich	610	2230	26.2	Auto-Rich	465	1700	26.0	Auto-Lean	(High Blower)
R-2800-21	P-47																	
R-2800-31	B-34																	
R-2800-51	C-46																	
R-2800-75	C-46																	
SGR-1820-30	DC-2	790	1950	33.5	Auto-Rich	750	1950	32.0	Auto-Rich	560	1700	27.0	Auto-Rich	375	1270	22.0	Auto-Lean	(Single Speed Blower)
R-1820-51	B-17	1000	2200	42.0	Auto-Rich	800	2100	36.5	Auto-Rich	600	1840	32.0	Auto-Rich	400	1365	27.0	Auto-Lean	(Single Speed Blower)
-52	A-24	(1000)	2350	41.0	Auto-Rich	950	2300	37.0	Auto-Rich	710	2020	30.0	Auto-Rich	425	1500	27.0	Auto-Lean	(Low Blower)
		(*)				800	2300	35.5	Auto-Rich	600	2020	28.0	Auto-Rich	400	1500	26.0	Auto-Lean	(High Blower)
-53	B-18	(1000)	2200	40.0	Auto-Rich	860	2100	35.0	Auto-Rich	645	1840	30.0	Auto-Rich	430	1365	27.0	Auto-Lean	(Low Blower)
		(*)				850	2100	38.0	Auto-Rich	640	1840	31.0	Auto-Rich	425	1365	27.0	Auto-Lean	(High Blower)
-57	O-47	1060	2350	42.0	Auto-Rich	900	2200	35.5	Auto-Rich	675	1925	30.0	Auto-Rich	450	1430	27.0	Auto-Lean	(Single Speed Blower)
-60	A-24	(1100)	2550	42.0	Auto-Rich	900	2300	35.0	Auto-Rich	675	2020	29.0	Auto-Rich	450	1500	25.0	Auto-Lean	(Low Blower)
		(*)				800	2300	36.0	Auto-Rich	600	2020	30.0	Auto-Rich	350	1500	22.0	Auto-Lean	(High Blower)
-65	B-17	1025	2500	41.0	Auto-Rich	800	2300	35.0	Auto-Rich	670	2200	31.0	Auto-Rich	470	1700	28.0	Auto-Lean	(Single Speed Blower)
-79	C-50, C-56	1100	2350	43.0	Auto-Rich	900	2300	35.0	Auto-Rich	675	2020	32.0	Auto-Rich	500	1700	25.5	Auto-Lean	(Single Speed Blower)
-87	A-29, A-33, AT-18,	(1050)	2500	42.0	Auto-Rich	900	2300	35.0	Auto-Rich	675	2020	29.0	Auto-Rich	500	1700	25.0	Auto-Lean	(Low Blower)
	C-60	(*)				800	2300	36.0	Auto-Rich	600	2020	30.0	Auto-Rich	430	1700	23.0	Auto-Lean	(High Blower)
-97	B-17	1025	2550	41.0	Auto-Rich	800	2300	35.0	Auto-Rich	670	2200	31.0	Auto-Rich	470	1700	28.0	Auto-Lean	(Single Speed Blower)

\* Do not take off in high blower.

NOTE: Operating conditions specified above are for the maximum allowable B.M.E.P. - To decrease wear on engine, decrease manifold pressure and increase R.P.M. - Fuel consumption will increase appreciably.

TABLE B

Engine Designation	Installed Aircraft Designation	TAKE-OFF OR MAXIMUM CONDITION OF OPERATION				NORMAL RATED POWER				MAXIMUM CRUISING CONDITION				DESIRED CRUISING CONDITION				COMMENTS
		Horse Power	Maximum R.P.M.	Maximum Manifold Pressure In. Hg.	Carburetor Mixture Setting	Horse Power	Minimum R.P.M.	Maximum Manifold Pressure In. Hg.	Carburetor Mixture Setting	Horse Power	Minimum R.P.M.	Maximum Manifold Pressure In. Hg.	Carburetor Mixture Setting	Horse Power	Minimum R.P.M.	Maximum Manifold Pressure In. Hg.	Carburetor Mixture Setting	
R-1820-6102A	C-49	1100	2350	43.0	Auto-Rich	900	2300	35.0	Auto-Rich	675	2020	32.0	Auto-Rich	500	1700	25.5	Auto-Lean	(Single Speed Blower)
-6202	C-49	1100	2500	43.5	Auto-Rich	900	2300	37.0	Auto-Rich	675	2020	31.0	Auto-Rich	500	1700	25.5	Auto-Lean	(Single Speed Blower)
R-2600-3	R-23,C-67	(1400 *)	2400	38.5	Auto-Rich	1200	2300	33.0	Auto-Rich	900	2020	28.0	Auto-Rich	600	1500	25.0	Auto-Lean	(Low Blower)
						1100	2300	36.0	Auto-Rich	800	2020	29.0	Auto-Rich	500	1500	25.0	Auto-Lean	(High Blower)
-8	A-25	(1500 *)	2800	39.5	Auto-Rich	1300	2400	34.0	Auto-Rich	975	2100	29.0	Auto-Rich	650	1500	26.0	Auto-Lean	(Low Blower)
						1100	2400	35.0	Auto-Rich	800	2100	29.0	Auto-Rich	550	1560	26.0	Auto-Lean	(High Blower)
-9	B-25	(1500 *)	2600	39.5	Auto-Rich	1300	2400	34.0	Auto-Rich	975	2100	29.0	Auto-Rich	650	1560	26.0	Auto-Lean	(Low Blower)
						1100	2400	33.0	Auto-Rich	800	2100	27.0	Auto-Rich	550	1560	24.0	Auto-Lean	(High Blower)
-11	A-20,F-3,P-70	(1400 *)	2400	38.5	Auto-Rich	1200	2300	33.0	Auto-Rich	900	2020	28.0	Auto-Rich	600	1500	25.0	Auto-Lean	(Low Blower)
						1100	2300	36.0	Auto-Rich	800	2020	29.0	Auto-Rich	500	1500	25.0	Auto-Lean	(High Blower)
-13	B-25,B-37,A-35, A-30,A-20	(1500 *)	2600	39.5	Auto-Rich	1300	2400	34.0	Auto-Rich	975	2100	29.0	Auto-Rich	650	1560	26.0	Auto-Lean	(Low Blower)
						1100	2400	35.0	Auto-Rich	800	2100	29.0	Auto-Rich	550	1560	26.0	Auto-Lean	(High Blower)
-29	B-25	(1500 *)	2600	39.5	Auto-Rich	1300	2400	34.0	Auto-Rich	975	2100	29.0	Auto-Rich	650	1560	26.0	Auto-Lean	(Low Blower)
						1100	2400	35.0	Auto-Rich	800	2100	29.0	Auto-Rich	550	1560	26.0	Auto-Lean	(High Blower)
V-1650-1	P-40	(1120 **)	3000	***42.0	Auto-Rich	1000	2650	44.2	Auto-Rich	810	2320	37.3	Auto-Rich	500	1850	31.0	Auto-Lean	(Low Blower)
						990	2650	44.2	Auto-Rich	760	2320	36.0	Auto-Rich	495	1850	32.0	Auto-Lean	(High Blower)
V-1710-27	F-4,P-38,P-322				USE FUEL, GRADE 91/96				SPECIFICATION NO. AN-F-26, ACCORDING TO INSTRUCTIONS CONTAINED IN T.O. NO. 02-5A-66.									
-29	F-4,P-38,P-322				USE FUEL, GRADE 91/96				SPECIFICATION NO. AN-F-26, ACCORDING TO INSTRUCTIONS CONTAINED IN T.O. NO. 02-5A-66.									
-33	P-40				USE FUEL, GRADE 91/96				SPECIFICATION NO. AN-F-26, ACCORDING TO INSTRUCTIONS CONTAINED IN T.O. NO. 02-5A-66.									
-35	P-39,P-400				USE FUEL, GRADE 91/96				SPECIFICATION NO. AN-F-26, ACCORDING TO INSTRUCTIONS CONTAINED IN T.O. NO. 02-5A-66.									
-37	P-39				USE FUEL, GRADE 91/96				SPECIFICATION NO. AN-F-26, ACCORDING TO INSTRUCTIONS CONTAINED IN T.O. NO. 02-5A-66.									
-39	P-40,P-51				USE FUEL, GRADE 91/96				SPECIFICATION NO. AN-F-26, ACCORDING TO INSTRUCTIONS CONTAINED IN T.O. NO. 02-5A-66.									
-49	F-4,P-38				USE FUEL, GRADE 91/96				SPECIFICATION NO. AN-F-26, ACCORDING TO INSTRUCTIONS CONTAINED IN T.O. NO. 02-5A-66.									
-51	F-5,P-38				USE FUEL, GRADE 91/96				SPECIFICATION NO. AN-F-26, ACCORDING TO INSTRUCTIONS CONTAINED IN T.O. NO. 02-5A-66.									
-53	F-4,P-38				USE FUEL, GRADE 91/96				SPECIFICATION NO. AN-F-26, ACCORDING TO INSTRUCTIONS CONTAINED IN T.O. NO. 02-5A-66.									
-55	F-5,P-38				USE FUEL, GRADE 91/96				SPECIFICATION NO. AN-F-26, ACCORDING TO INSTRUCTIONS CONTAINED IN T.O. NO. 02-5A-66.									
-63	P-39				USE FUEL, GRADE 91/96				SPECIFICATION NO. AN-F-26, ACCORDING TO INSTRUCTIONS CONTAINED IN T.O. NO. 02-5A-66.									
-73	P-40				USE FUEL, GRADE 91/96				SPECIFICATION NO. AN-F-26, ACCORDING TO INSTRUCTIONS CONTAINED IN T.O. NO. 02-5A-66.									
-81	P-40,P-51				USE FUEL, GRADE 91/96				SPECIFICATION NO. AN-F-26, ACCORDING TO INSTRUCTIONS CONTAINED IN T.O. NO. 02-5A-66.									
-83	P-39				USE FUEL, GRADE 91/96				SPECIFICATION NO. AN-F-26, ACCORDING TO INSTRUCTIONS CONTAINED IN T.O. NO. 02-5A-66.									
-85	P-39				USE FUEL, GRADE 91/96				SPECIFICATION NO. AN-F-26, ACCORDING TO INSTRUCTIONS CONTAINED IN T.O. NO. 02-5A-66.									
-87	A-36				USE FUEL, GRADE 91/96				SPECIFICATION NO. AN-F-26, ACCORDING TO INSTRUCTIONS CONTAINED IN T.O. NO. 02-5A-66.									
-89	P-38				USE FUEL, GRADE 91/96				SPECIFICATION NO. AN-F-26, ACCORDING TO INSTRUCTIONS CONTAINED IN T.O. NO. 02-5A-66.									
-91	P-38				USE FUEL, GRADE 91/96				SPECIFICATION NO. AN-F-26, ACCORDING TO INSTRUCTIONS CONTAINED IN T.O. NO. 02-5A-66.									
-99	P-40				USE FUEL, GRADE 91/96				SPECIFICATION NO. AN-F-26, ACCORDING TO INSTRUCTIONS CONTAINED IN T.O. NO. 02-5A-66.									
-111	P-38				USE FUEL, GRADE 91/96				SPECIFICATION NO. AN-F-26, ACCORDING TO INSTRUCTIONS CONTAINED IN T.O. NO. 02-5A-66.									
-113	P-38				USE FUEL, GRADE 91/96				SPECIFICATION NO. AN-F-26, ACCORDING TO INSTRUCTIONS CONTAINED IN T.O. NO. 02-5A-66.									
-115	P-40				USE FUEL, GRADE 91/96				SPECIFICATION NO. AN-F-26, ACCORDING TO INSTRUCTIONS CONTAINED IN T.O. NO. 02-5A-66.									

\* Do not take off in high blower.

\*\* Do not take off in high blower and do not use high blower below 12000 feet.

\*\*\* When ground air temperature exceeds 100° F., reduce manifold pressure for take-off 2" for every 10° F. increase.

NOTE: Operating conditions specified above are for the maximum allowable B.M.E.P. - To decrease wear on engine, decrease manifold pressure and increase R.P.M. - Fuel consumption will increase appreciably.

RESTRICTED

RESTRICTED  
T. O. No. 02-1-38