

OPERATING LIMITATIONS

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OPERATING LIMITATIONS

NOTICE

CERTIFICATION AND OPERATIONAL LIMITATIONS ARE CONDITIONS OF THE TYPE AND AIRWORTHINESS CERTIFICATES AND MUST BE COMPLIED WITH AT ALL TIMES AS REQUIRED BY LAW.

GENERAL

The limits presented in this section focus primarily on the operational capabilities of the airplane. Specific system limits and instrument markings are presented in this section. The airplane must be operated in accordance with published operating procedures.

CERTIFICATION STATUS

This airplane is certified in accordance with 14 CFR, Part 23 Commuter Category, Part 34 (Fuel Venting and Exhaust Emissions), Part 36 (Noise Requirements), and Special Conditions as prescribed by the Administrator.

OPERATIONS AUTHORIZED

This airplane is approved for day and night, VFR and IFR operations, and flight into known icing conditions when the required equipment is installed and operating as defined in Section II, Operating Limitations, Kinds of Operations Equipment List.

This airplane is eligible for over-water operations with applicable equipment specified in the appropriate operating rules.

WEIGHT LIMITS

Maximum design ramp weight	17,230 Pounds
Maximum design takeoff weight	17,110 Pounds
Maximum design landing weight.	15,660 Pounds
Maximum design zero fuel weight	12,500 Pounds

Takeoff weight is limited by the most restrictive of the following requirements:

- Maximum certified takeoff weight (Flaps 0° or 15°) 17,110 Pounds
- Maximum takeoff weight permitted by climb requirements. Refer to Section IV, Performance, TAKEOFF
- Takeoff field length Refer to Section IV, Performance, TAKEOFF

Landing weight is limited by the most restrictive of the following requirements:

- Maximum certified landing weight. 15,660 Pounds
- Maximum landing weight permitted by climb requirements or brake energy limits. Refer to Section IV, Performance, APPROACH AND LANDING
- Landing distance. Refer to Section IV, Performance, APPROACH AND LANDING

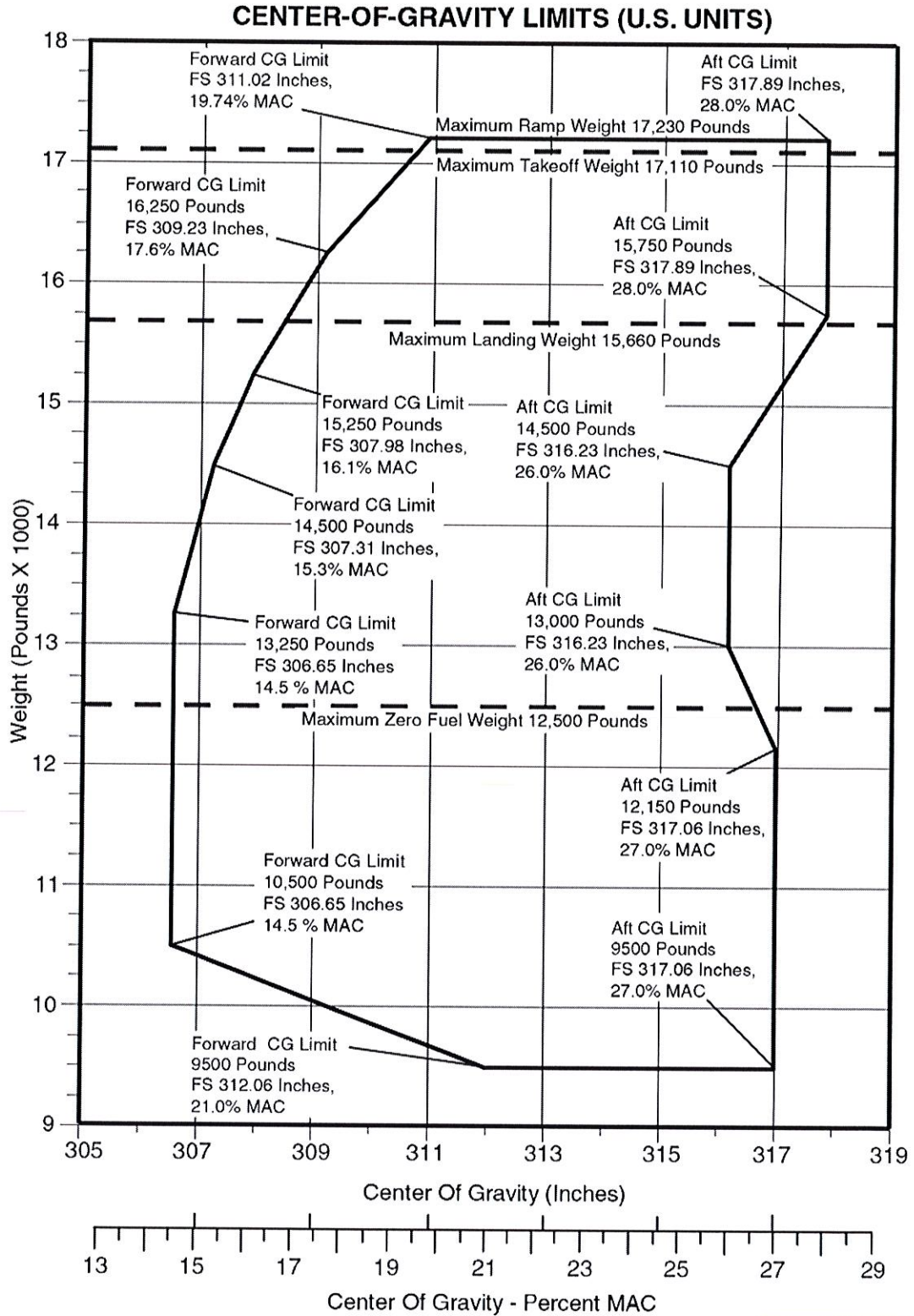
Baggage Compartments

Maximum baggage weight in nose compartment	400 Pounds
Maximum baggage weight in tailcone compartment.	600 Pounds
Maximum load distribution (nose baggage compartment)	35 Pounds per Square Foot
Maximum load distribution (tailcone baggage compartment)	150 Pounds per Square Foot

CENTER-OF-GRAVITY LIMITS

Center-of-Gravity Limits envelope Refer to Figure 2-110-1

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Figure 2-110-1*

WEIGHT AND BALANCE DATA

The airplane must be operated in accordance with the approved loading schedule. Refer to Weight and Balance Data Sheet in Section VI.

TAKEOFF AND LANDING OPERATIONAL LIMITS

Maximum altitude limit 14,000 Feet
 Maximum tailwind component 10 Knots
 Maximum/minimum ambient temperature Refer to Figure 2-110-2
 Maximum fuel imbalance Refer to Operating Limitations, FUEL LIMITS

Dispatch is not allowed with any red annunciator or red message displayed. Refer to applicable Minimum Equipment List (MEL) for dispatch with amber annunciator or amber message.

Takeoff is prohibited with an amber ENGINE CTRL SYS FAULT L and/or R message displayed.

The autopilot and yaw damper must be disengaged for takeoff and landing.

- Dispatch with the yaw damper inoperative is prohibited.

Takeoff is prohibited if the antiskid system is inoperative.

Takeoff is prohibited until the battery charging amps is 20 amps or less.

Cabin must be depressurized prior to landing.

Takeoffs and landings are limited to paved runway surfaces.

Except where required by AFM procedures, speed brakes must be retracted prior to 500 feet AGL for landing.

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TAKEOFF AND LANDING OPERATIONAL LIMITS (Continued)

Takeoff is limited to the flaps 0° configuration when Type II, III, or IV anti-ice fluid has been applied to the airplane.

NOTE

Refer to Section VII for information regarding ground deicing and anti-icing procedures.

Takeoff is prohibited with the following forms of contamination:

1. With frost adhering to the following critical areas:
 - a. Wing leading edge
 - b. Upper wing surface
 - c. Windshield
2. With ice, snow, or slush adhering to the following critical areas:
 - a. Wing leading edge and upper wing surface
 - b. Flight control surfaces including all hinge gaps
 - c. Horizontal stabilizer
 - d. Vertical stabilizer
 - e. Engine inlets
 - f. Top of engine pylons
 - g. Top of fuselage
 - h. Windshield
 - i. All pitot probes and static ports
 - j. Angle of attack vane
 - k. Upper surface of nose forward of the windshield

A visual and tactile (hand on surface) check of the wing leading edge and wing upper surface must be performed to ensure the wing is free from frost, ice, snow, or slush when the outside air temperature is less than 5°C or if it cannot be determined that the wing fuel temperature is above 0°C and any of the following conditions exist:

1. There is visible moisture present (rain, drizzle, sleet, snow, fog, etc.); or
2. Water is present on the upper wing surface; or
3. The difference between the dew point and the outside air temperature is 3°C or less; or
4. The atmospheric conditions have been conducive to frost formation.

WARNING

The cockpit displayed fuel temperature must not be used for the tactile check. The heating effects of the fuel motive flow system or the addition of fuel can result in differences between the fuel tank temperature and the wing skin temperature.

The tactile check must be accomplished within five minutes of takeoff under conditions where additional contamination may reasonably be expected (rain, drizzle, sleet, snow, fog, active frost formation, decreasing temperatures, etc.). If the aircraft is treated with the appropriate deicing/anti-icing fluids (refer to Section VII), the tactile check may be accomplished any time between final application of the fluid and takeoff, provided that time is within the maximum applicable holdover time.

ENROUTE OPERATIONAL LIMITS

Maximum operating altitude	FL450
Maximum operating altitude with WING XFLOW on	FL410
Maximum/minimum ambient temperature	Refer to Figure 2-110-2
Maximum altitude for extension of flaps and/or landing gear	FL180
Maximum operating altitude with inoperative yaw damper	FL240
Maximum operating altitude with amber DC GENERATOR OFF L-R displayed	FL350

TAKEOFF/LANDING/ENROUTE TEMPERATURE LIMITS

NOTE

- Ambient air temperature is obtained from the SAT (Static Air Temperature) display located at the bottom of the copilot's MFD (or the pilot's MFD when in the engine start format, or on each PFD when in display reversion).
- On the ground, an accurate SAT is displayed only with an engine running. Ambient air temperature may also be obtained from an appropriate ground station.

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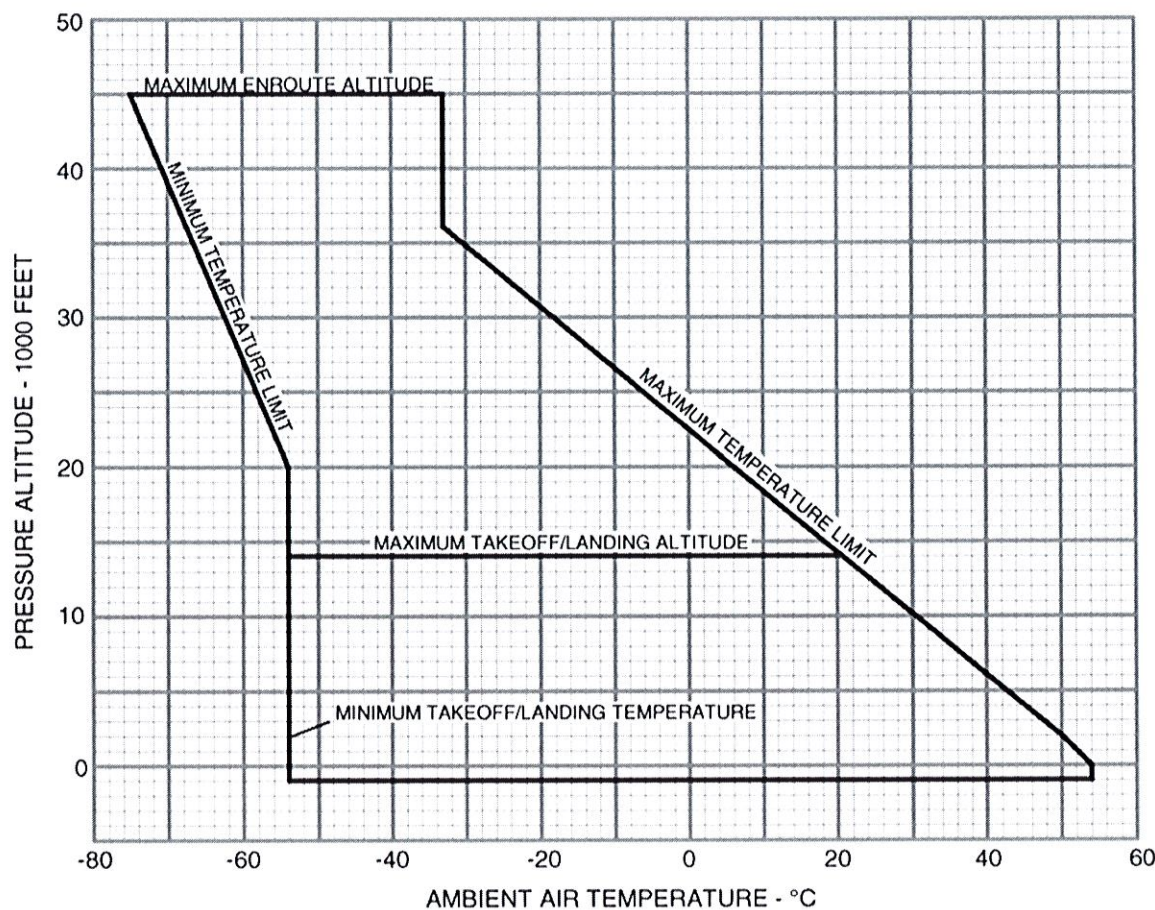


Figure 2-110-2

FUEL LIMITS

Refer to Figure 2-110-3 for fuels that are approved for use.

NOTE

Maximum demonstrated fuel imbalance for emergency return following a fuel system malfunction is 600 lbs.

Maximum approved fuel imbalance for normal operation 200 lbs

APPROVED FUELS

APPROVED FUEL GRADES (TYPE)	FUEL ADDITIVES (REFER TO NOTES BELOW)	SPECIFICATION	MINIMUM FUEL TEMPERATURE °C	MAXIMUM FUEL TEMPERATURE °C
JET A	1, 6 and 7	ASTM-D1655	-40	+57
JET A1	1, 6 and 7	ASTM-D1655	-40	+57
Jet No. 3	1, 5, 6, and 7	GB6537	-40	See Figure 2-110-4
JP-5	2, 6, and 7	MIL-PRF-5624	-40	+57
JP-8	1, 6 and 7	MIL-T-83133	-40	+57
RT	3, 4, 6 and 7	GOST 10227	-40	See Figure 2-110-4
RT	3, 4, 6 and 7	GSTU 320.00149943.007	-40	See Figure 2-110-4
TS-1	3, 4, 6 and 7	GOST 10227	-40	See Figure 2-110-4
TS-1	3, 4, 6 and 7	GSTU 320.00149943.011	-40	See Figure 2-110-4

NOTE

The following optional fuel system additives may be added to the fuels as noted at the following concentrations. Use of these fuel additives is not required. Refer to Section III, Operational Information ANTI-ICE ADDITIVES for blending instructions.

1. MIL-DTL-27686 (EGME) or MIL-DTL-85470 (DiEGME) in a concentration of 0.10 to 0.15 percent by volume
2. MIL-DTL-27686 (EGME) or MIL-DTL-85470 (DiEGME) in a concentration of 0.10 to 0.20 percent by volume
3. GOST 8313 (Fluid I) in a concentration of 0.10 to 0.30 percent by volume
4. CIS TU6-10-1458 (Fluid I-M) in a concentration of 0.10 to 0.30 percent by volume
5. T1301 (SH0396-92) in a concentration of 0.10 to 0.15 percent by volume
6. Stadis 450 as required to bring fuel up to 300 conductive units, not to exceed 1 ppm (parts per million)
7. Biobor JF at a concentration not to exceed 20 ppm of elemental boron (270 ppm of total additive)

Figure 2-110-3*

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FUEL LIMITS (Continued)

MAXIMUM FUEL TEMPERATURE FOR JET NO.3, RT AND TS-1

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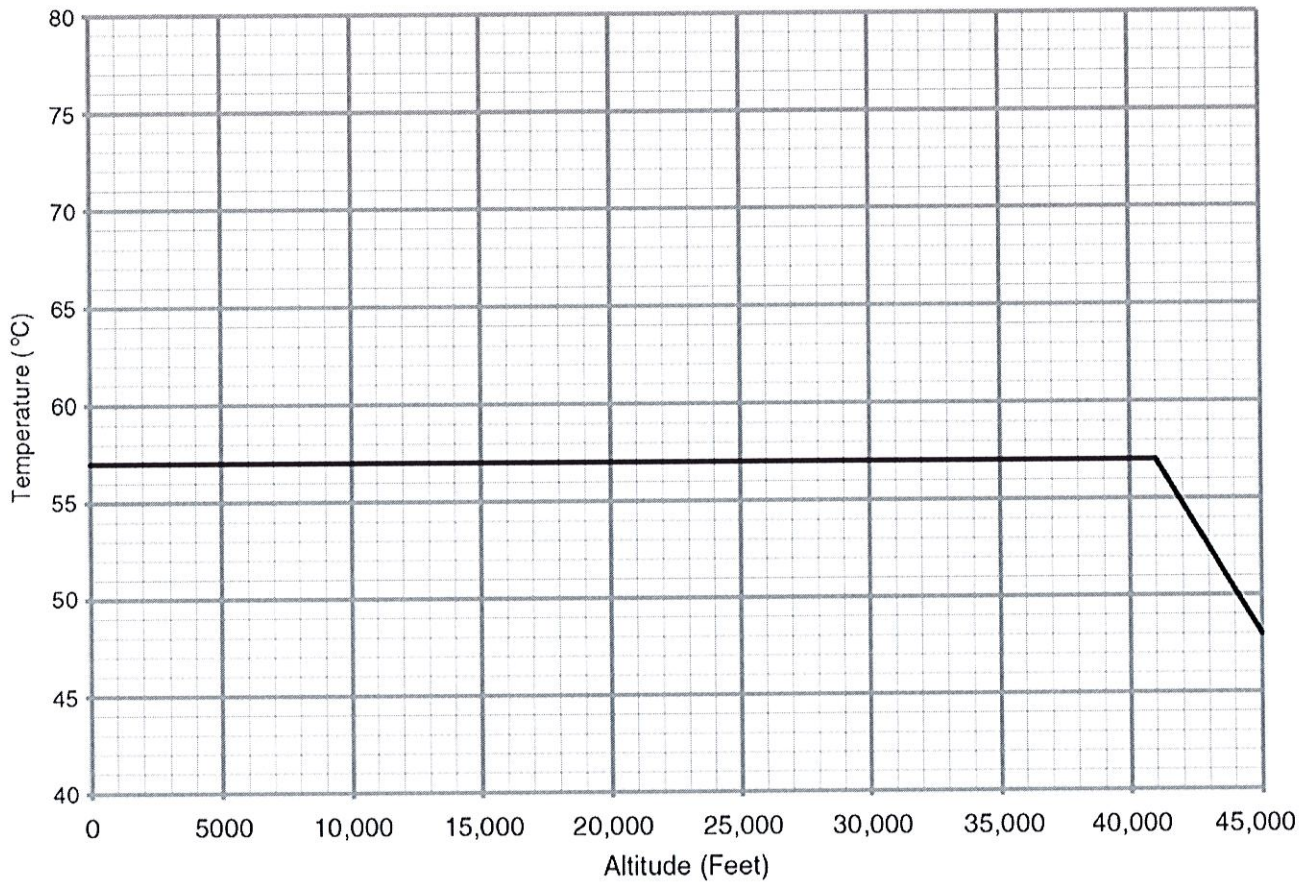


Figure 2-110-4*

SINGLE POINT REFUELING LIMITS

Single point refueling operations must be conducted per the procedures contained on the placard installed on the single point refueling access door. Refueling pressure range is 10-55 psi; maximum defuel pressure is -10 psi.



POWERPLANT LIMITS

Engine Type Williams International (WI) FJ44-4A turbofan producing 3621 lbs. thrust at sea level up to 26°C

Figure 2-210-1 illustrates the engine operating limits for time, temperature, RPM, oil pressure, and oil temperature under the selected operating conditions. Figure 2-210-2 illustrates the engine ITT limits and Figures 2-210-3 and 2-210-4 illustrate the engine overspeed limits.

FADEC (FULL AUTHORITY DIGITAL ENGINE CONTROLLER)

Engine start and/or dispatch with an amber ENGINE CTRL SYS FAULT L-R message displayed is prohibited.

APPROVED OILS

NOTE

1. Mobil Jet II is the preferred oil.
2. Mixing of approved oils is permissible.

APPROVED BRAND (NOTE 2)	SPECIFICATION
Mobil Jet II (NOTE 1)	MIL-L-23699
Mobil 254	MIL-L-23699

In addition, approved oils are listed for the engine in the latest revision to Williams International FJ44-4A Engine Installation and Operating Instructions (P/N EO110675).

Maximum oil consumption is 0.032 gallons per 1 hour period (1 qt or 1 L per 8 hours). Refer to the aircraft maintenance manual when oil consumption exceeds this value.

ENGINE OPERATION DURING LOW-G MANEUVERING FLIGHT

The engine is limited to 10 seconds of continuous flight at zero- or negative-g.

CAUTION

Oil pressure can decrease to below the transient oil pressure limit and reach zero when operating at zero- or negative-g. If the above time limit is exceeded during such maneuvering, engine damage can occur due to oil starvation.

ENGINE OPERATING LIMITS

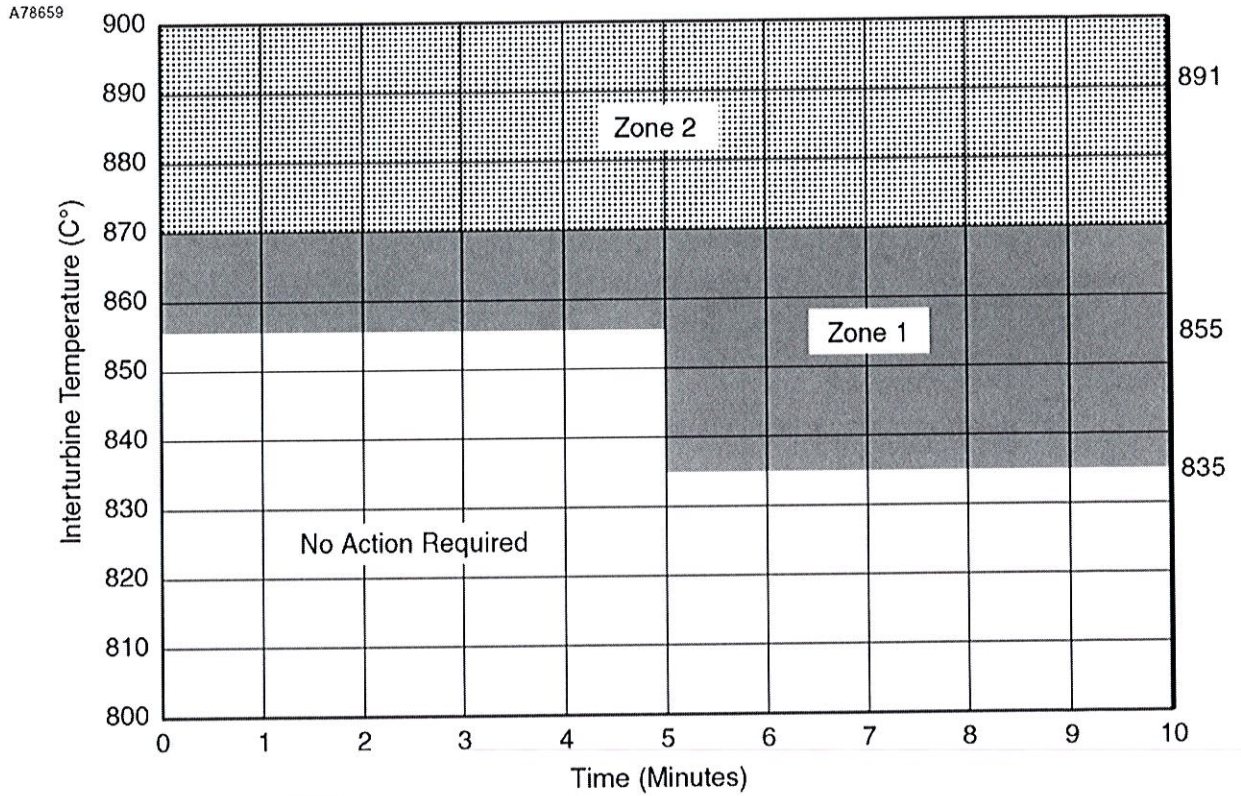
NOTE

1. Takeoff thrust settings, which are normally limited to 5 minutes duration for all engine operating conditions, may be used for up to 10 minutes for one engine inoperative operations. Timing begins when throttle lever is advanced to the TO detent. Takeoff thrust (N1) is defined in Figure 4-230-1, and is more limiting than engine overspeed limits and must be observed. Performance data, including V_{MCA} and V_{MCG} in Section IV, is based on use of the takeoff thrust setting.
2. Climb thrust (CLB detent) is defined by Figure 4-230-2 (single-engine) and Figure 4-230-3 (multi-engine). These thrust settings (N1) are more limiting than engine overspeed limits and must be observed. Performance data in Section IV is based on use of the appropriate maximum climb thrust setting.
3. ITT may exceed 835°C, up to a takeoff limit of 855°C, for not more than 5 minutes (multi-engine) or 10 minutes (single-engine).
4. Minimum oil pressure is 30 PSI when operating below 80% N2; 40 PSI when operating at or above 80% N2. Oil pressure may exceed 120 PSI, up to the transient limit of 130 PSI, for not more than 5 minutes.
5. A transient minimum oil pressure of 23 PSI is permitted for up to 5 minutes with $N2 < 80\%$.
6. The engine must not be operated above 80% N2 until oil temperature is above 10°C. When the ambient temperature (SAT) is below -20°C, the engine must not be operated above 80% N2 until the oil temperature has been above 27°C for at least 5 minutes. This is to make sure adequate heat capacity exists to heat cold fuel at takeoff thrust settings.
7. Oil temperature may exceed 135°C, up to the maximum transient limit of 149°C, for not more than 5 minutes when operating below 80% N2.

OPERATING CONDITIONS	OPERATING LIMITS						
	THRUST SETTING	TIME LIMIT (MINUTES)	MAX OBSERVED ITT °C	N2%	N1%	OIL PRESSURE PSI	OIL TEMPERATURE °C
START	---	---	REFER TO FIGURE 2-210-2	---	---	---	-40 TO 135 (NOTE 6)
GND IDLE	CONTINUOUS	---	---	53.4 (MIN)	---	30 to 120 (NOTE 4)	-40 TO 135 (NOTE 6)
FLT IDLE	CONTINUOUS	---	---	60.7 (MIN)	---	30 to 120 (NOTE 4)	-40 TO 135 (NOTE 6)
TAKEOFF	5 (NOTE 1)	855 (MAX) (NOTE 3)	100.8	104.7 (NOTE 1)	40 to 120 (NOTE 4)	10 TO 135 (NOTE 6)	
CLIMB	CONTINUOUS	835 (MAX) (NOTE 3)	100.8	104.7 (NOTE 2)	40 to 120 (NOTE 4)	10 TO 135 (NOTE 6)	
CRUISE	CONTINUOUS	835 (MAX) (NOTE 3)	100.8	104.7	40 to 120 (NOTE 4)	10 TO 135 (NOTE 6)	
TRANSIENT	---	REFER TO FIGURE 2-210-2 (NOTE 3)	REFER TO FIGURE 2-210-3	REFER TO FIGURE 2-210-4	23 (MIN) (NOTE 5) 130 (MAX) (NOTE 4)	149 (NOTE 7)	

Figure 2-210-1*

INTER-TURBINE TEMPERATURE (ITT) LIMITS (EXCEPT STARTING)



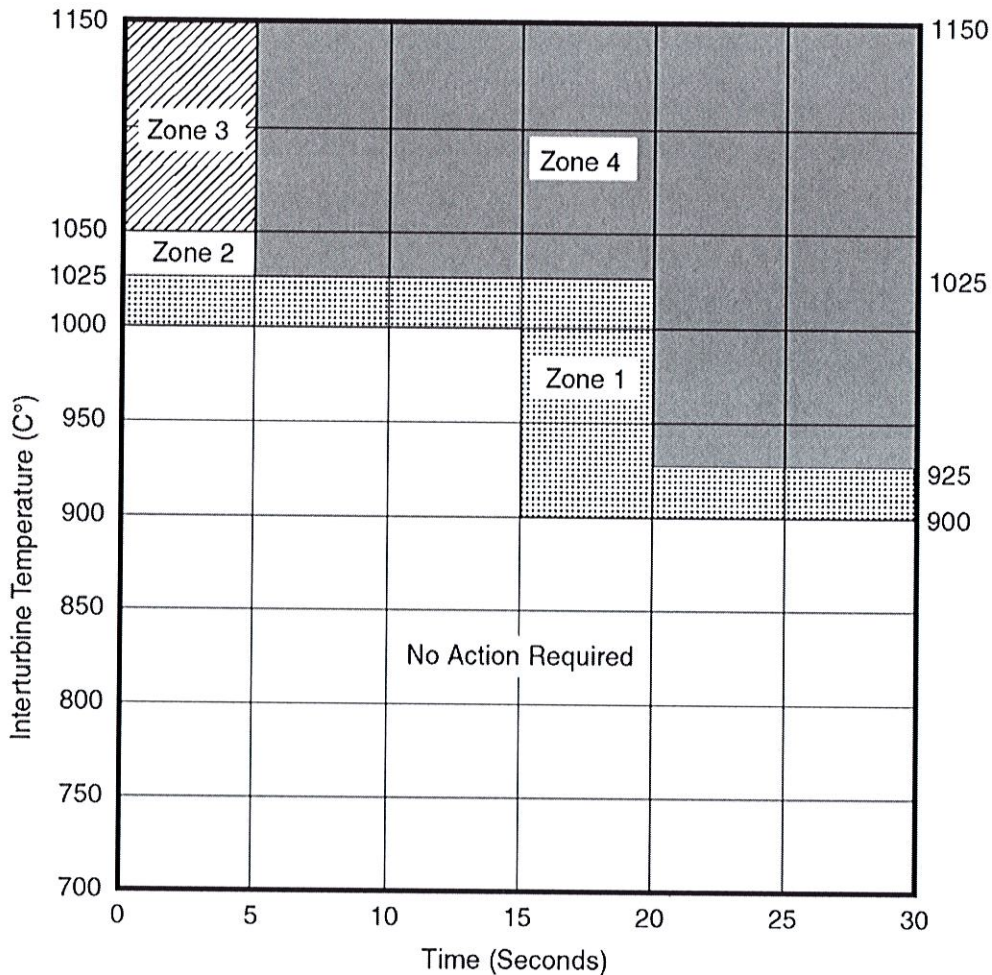
Zone 1: Determine and correct the cause of overtemperature.

Zone 2: Perform inspection of hot section (Ref. Maintenance Manual 71-00-01 P.B. 601) including NDI of HP turbine rotor assembly (Ref Maintenance Manual 71-42-15 P.B. 601). If visual inspection reveals indications of overtemperature, disassemble LP turbine module and perform NDI inspection of LP turbine rotor assembly.

Figure 2-210-2 (Sheet 1 of 2)

INTER-TURBINE TEMPERATURE (ITT) LIMITS (STARTING)

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Zone 1 : Determine and correct the cause of overtemperature.

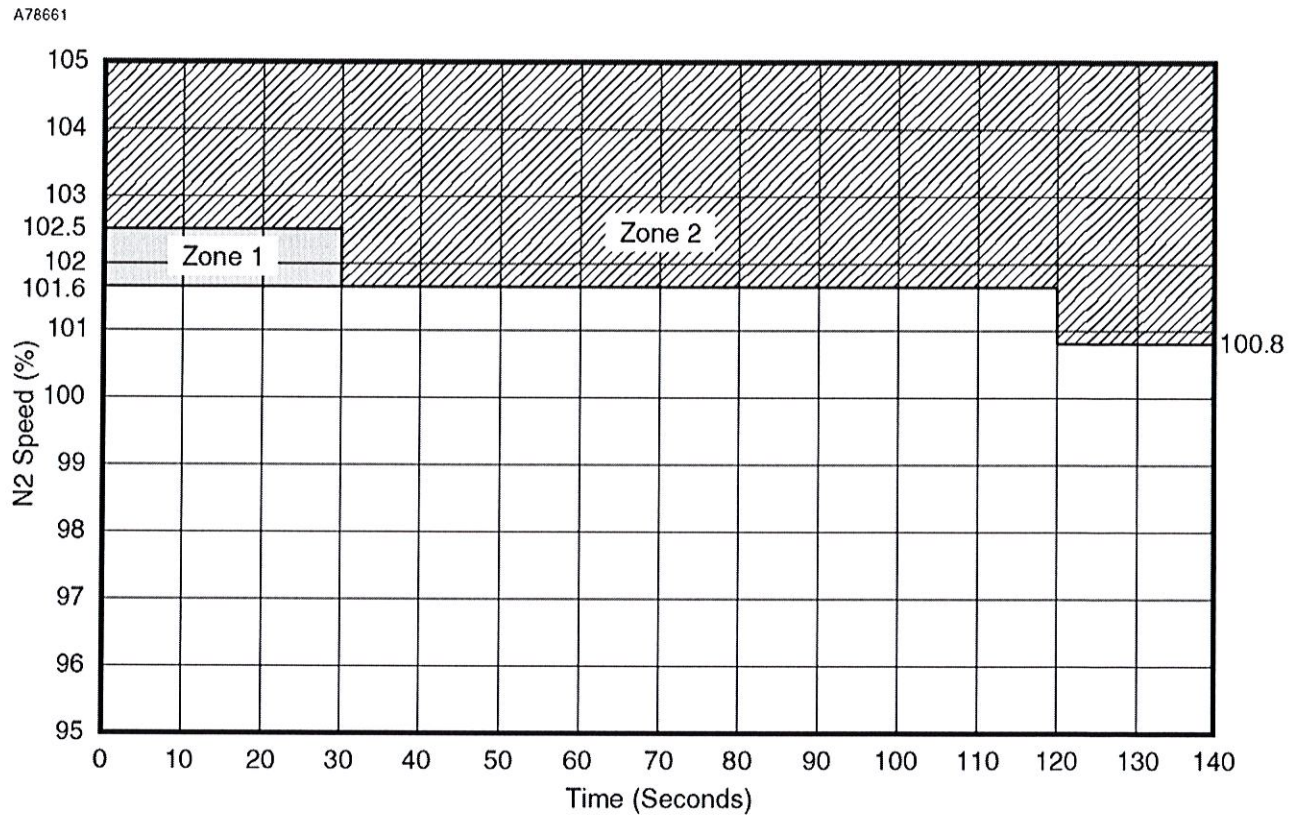
Zone 2 : 1. Perform borescope inspection on HP turbine area (Ref. Maintenance Manual 71-00-40, P.B. 601).
2. Perform a performance check ground run test (Ref. Maintenance Manual 71-00-00, P.B. 501).

Zone 3 : 1. Perform borescope inspection on HP turbine area (Ref. Maintenance Manual 71-00-40, P.B. 601).
2. Perform a performance check ground run test (Ref. Maintenance Manual 71-00-00, P.B. 501).
3. Download FADEC files and submit them to WI for further disposition.

Zone 4: Perform visual inspection of hot section including NDI of HP turbine rotor assembly (Ref. Maintenance Manual 70-42-15, P.B. 601). If visual inspection reveals indications of overtemperature, disassemble LP turbine module and perform NDI inspection on LP turbine rotor assembly.

Figure 2-210-2 (Sheet 2 of 2)

N2 ENGINE OVERSPEED LIMITS

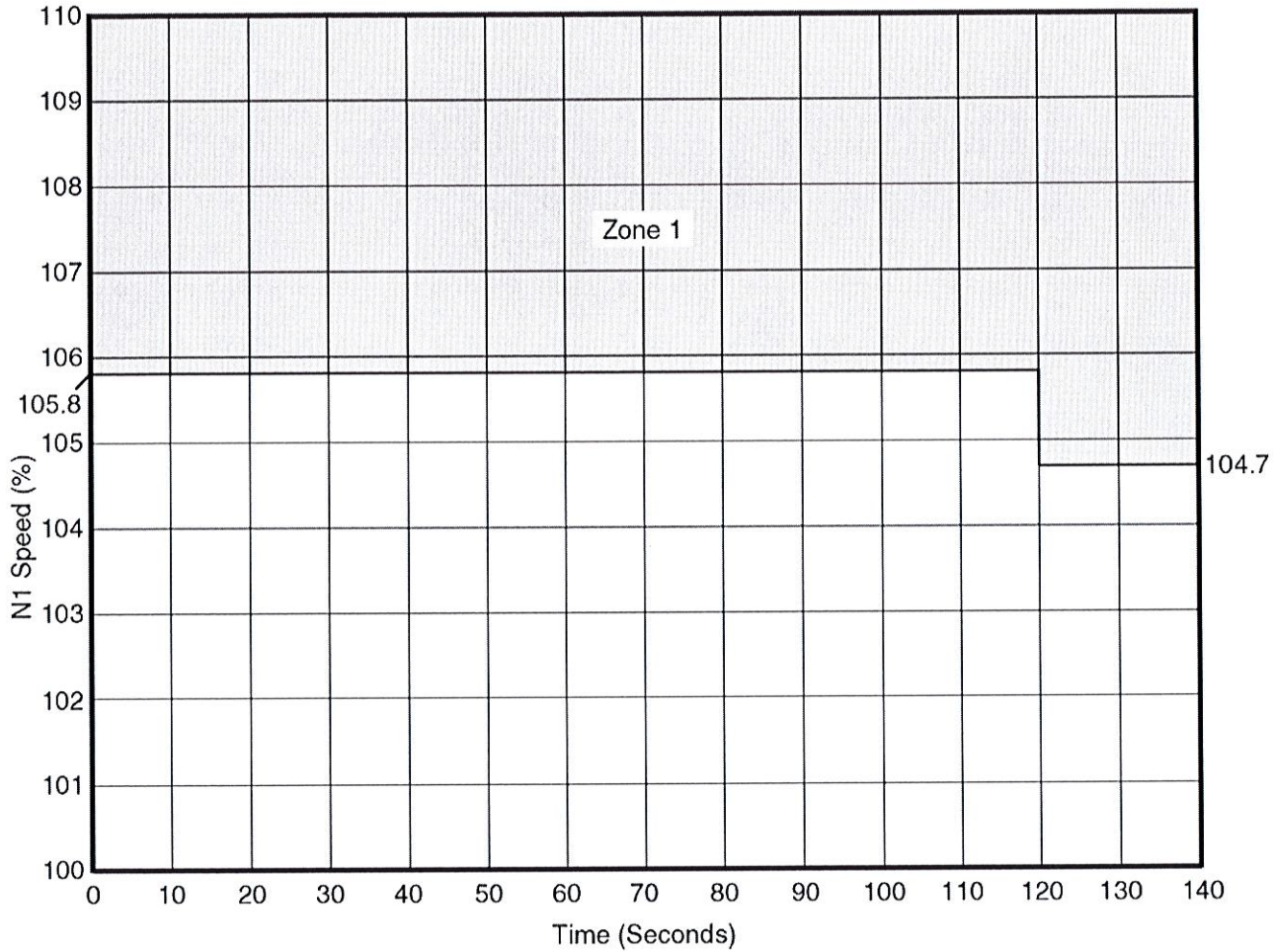


- Zone 1:** Perform visual inspection of hot section including NDI of HP turbine rotor assembly (Ref. Maintenance Manual 70-42-15, P.B. 601). If visual inspection reveals indications of overtemperature, disassemble LP turbine module and perform NDI inspection on the LP turbine rotor assembly.
- Zone 2:** Return to approved facility for inspection of compressor zone (Ref. Engine Manual 72-00-00, P.B.801).

Figure 2-210-3

N1 ENGINE OVERSPEED LIMITS

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Zone 1: Perform inspection of the 1st LP turbine rotor (Ref. Engine Manual 72-55-31, P.B. 801) and 2nd LP turbine rotor (Ref. Engine Manual 72-55-33, P.B. 801). Above 110% N1, return to approved facility for inspection of compressor zone (Ref. Engine Manual 72-00-00, P.B. 801)

Figure 2-210-4

ENGINE START LIMITS

GENERAL

Amber ENGINE CTRL SYS FAULT message displayed Engine start prohibited
 Maximum ambient temperature for engine start Refer to Figure 2-110-2
 Generator switches ON for engine starts

NOTE

Time to light-off is defined as the time from first indication of fuel flow until an ITT increase is observed.

Maximum time to light-off 10 seconds (ground starts only)
 Minimum time prior to power increase above 80% N2 2 minutes

Refer to Section II, Operating Limitations, START CYCLE LIMITS and BATTERY LIMITS for additional limits associated with engine starting.

GROUND STARTS

Maximum elevation for battery or cross generator starts 14,000 Feet

CAUTION

Prior to engine start, the airplane should be positioned to eliminate or reduce tailwinds and crosswinds as much as possible. The wind limits stated below are inclusive of gust factor and must not be exceeded. Caution must be exercised when starting the engine in a tailwind or crosswind, especially in gusty conditions. Engine instruments must be closely monitored throughout the start for unusual indications, such as a hesitation and/or sudden decrease in ITT or N2, indicative of a potential flameout. If such indications are observed, immediately abort the start to stop fuel flow into the engine. Failure to adhere to these limitations and instructions can result in a fire.

Maximum tailwind component 10 Knots
 Maximum crosswind component 10 Knots
 Minimum battery voltage for battery start 24 VDC

CAUTION

Normal starter current draw is approximately 1100 amperes peak. External power units with variable maximum current shutoff should be set to 1200 amperes. Use of an external power source with voltage in excess of 29VDC or current in excess of 1200 amps may damage the starter or gearbox.

Minimum/maximum external power current capacity for start 800/1200 AMPS

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ENGINE START LIMITS (Continued)

NOTE

- Engine oil must be preheated to at least -40°C prior to conducting a start.
- Lithium batteries must be preheated to at least -10°C prior to start (SYSTEMS 1 format/overlay on MFD).
- Nickel-cadmium and lead-acid batteries must be preheated to at least -20°C prior to start (SYSTEMS 1 format/overlay on MFD).
- If the airplane has been cold soaked in ambient temperatures below -40°C, the FADECs must be warmed with electrical power for at least 3 minutes followed by a power cycle with the battery switch.

Minimum engine oil temperature (indicated on EIS) -40°C

AIR STARTS

Airspeed/altitude limits (airstart envelope) Refer to Figure 3-610-1

START CYCLE LIMITS

NOTE

This limit is independent of starter power source (i.e., battery, generator assisted cross start, or external power unit) and applies to both starting and dry motoring of the engine.

Engine starter limits Three engine starts per 30 minutes.
Three cycles of operation with a 60-second rest period between cycles is permitted.

SPEED LIMITS

The maximum operating limit speeds may not be deliberately exceeded in any regime of flight (climb, cruise or descent) unless a higher speed is authorized for flight test or pilot training.

Maximum operating limit speeds

M_{MO} (above 27,884 feet)	Mach 0.77 (indicated)
V_{MO} (between 8000 and 27,884 feet)	305 KIAS
V_{MO} (below 8000 feet)	260 KIAS

Full application of rudder and aileron controls as well as maneuvers that involve angle-of-attack near the stall should be confined to speeds below maximum operating maneuvering speed. Refer to LOAD FACTOR limits for pitch maneuvering limits.

Maximum operating maneuvering speeds - V_O Refer to Figure 2-310-1

Maximum flap extended speed - V_{FE}

Takeoff and approach position (15°)	200 KIAS
Landing position (35°)	160 KIAS

Maximum landing gear extended speed - V_{LE} 200 KIAS

Maximum landing gear operating speed - V_{LO} (Extending or Retracting) 200 KIAS

Maximum speed brake operation speed - V_{SB} No Limit

Maximum autopilot operation speed 305 KIAS or Mach 0.77

Minimum speed for sustained flight In icing conditions (Flaps 0°) 160 KIAS

Minimum control speeds (V_{MCA} and V_{MCG}) Refer to Section IV, Performance, GENERAL

Maximum tire ground speed 165 Knots

Minimum speed in RVSM airspace: Refer to Section II, Operating Limitations, RVSM OPERATIONS

MANEUVER LIMITS

Acrobatic maneuvers, including spins, are prohibited.

Intentional stalls are prohibited above 18,000 feet.

LOAD FACTOR

These accelerations limit the angle-of-bank in turns and limit the severity of pull-up and push-over maneuvers.

Flaps up (0°)	-1.52 to +3.6G at 17,110 Pounds
Flaps takeoff and approach (15°) or landing (35°)	0.0 to +2.0G at 17,110 Pounds

MAXIMUM OPERATING MANEUVERING SPEEDS

WARNING

Avoid rapid and large alternating control inputs, especially in combination with large changes in pitch, roll, or yaw (e.g., large sideslip angles) as they may result in structural failures at any speed, including below V_O .

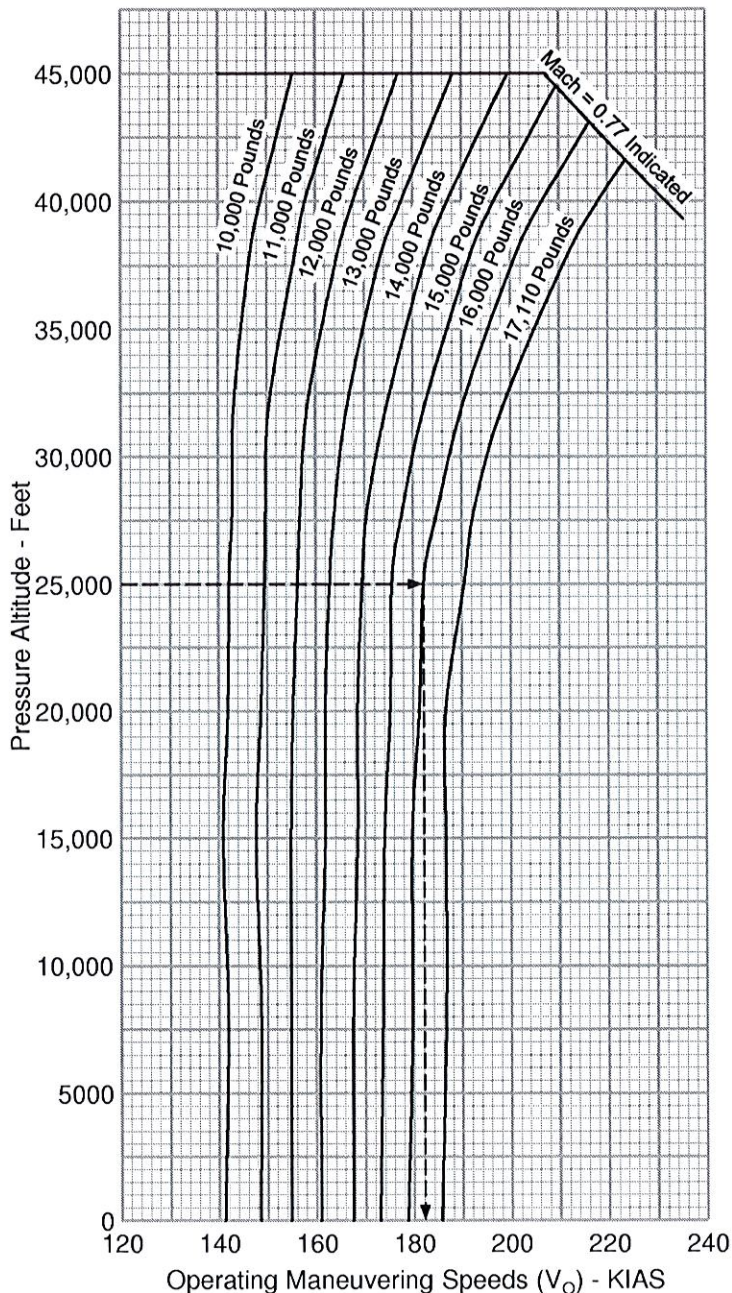


Figure 2-310-1*

EXAMPLE:

- Pressure Altitude - 25,000 FEET
- Weight - 16,000 POUNDS
- Maximum Operating Maneuvering Speed - 182 KIAS

KINDS OF OPERATIONS EQUIPMENT LIST

This airplane may be operated in day or night VFR or IFR and flight into known icing conditions when the appropriate equipment is installed.

The following equipment list identifies the systems and equipment upon which type certification for each kind of operation was predicated. All equipment must be installed and operative unless the airplane is approved to be operated in accordance with an approved Minimum Equipment List (MEL).

NOTE

The following systems and equipment list does not include all equipment required by the 14 CFR Parts 91 and 135 Operating Requirements. It also does not include components obviously required for the airplane to be airworthy such as wings, primary flight controls, empennage, engine, etc.

SYSTEM and/or COMPONENT	KIND OF OPERATION					COMMENTS
	VFR DAY	VFR NIGHT	IFR DAY	IFR NIGHT	ICING	
AVIONICS						
1 - VHF COM 1	0	0	1	1	1	ATC2 is required for TCAS operation.
2 - Static wicks- wing trailing edge (including aileron)	4	4	4	4	4	
3 - Static wicks - horizontal stabilizer (including elevators)	4	4	4	4	4	
4 - Static wicks - rudder	1	1	1	1	1	
5 - Static wicks - stinger	0	0	0	0	0	
6 - Transponder	0	0	1	1	1	
7 - VHF NAV 1	0	0	1	1	1	
8 - Yaw damper	1	1	1	1	1	

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KINDS OF OPERATIONS EQUIPMENT LIST (Continued)

SYSTEM and/or COMPONENT	KIND OF OPERATION					COMMENTS
	V F R	V F R	I F R	I F R	I C I N G	
	D A Y	N I G H T	D A Y	N I G H T		
ELECTRICAL						
1 - Battery	1	1	1	1	1	Includes amperage, voltage, and temperature. Includes amperage and voltage.
2 - Battery indications	3	3	3	3	3	
3 - DC generator	2	2	2	2	2	
4 - DC generator indications	2	2	2	2	2	
5 - AC alternators	0	1	2	2	2	
6 - Transformer Rectifier Unit (TRU)	1	1	1	1	1	
7 - Battery disconnect	1	1	1	1	1	
ENVIRONMENTAL/PRESSURIZATION						
1 - ECS PRSOV	2	2	2	2	2	
2 - Outflow valve/safety valve	2	2	2	2	2	
3 - Door seal	1	1	1	1	1	
4 - Pressurization controller	1	1	1	1	1	
5 - Emergency press dump valve	1	1	1	1	1	
6 - Fresh air fan	1	1	1	1	1	
7 - Differential pressure, rate, and cabin altitude indication	1	1	1	1	1	
8 - Environmental temperature control systems	2	2	2	2	2	
9 - Cabin altitude warning system	1	1	1	1	1	

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KINDS OF OPERATIONS EQUIPMENT LIST (Continued)

SYSTEM and/or COMPONENT	KIND OF OPERATION					COMMENTS
	V F R D A Y	V F R N I G H T	I F R D A Y	I F R N I G H T	I C I N G	
EQUIPMENT AND FURNISHINGS						
1 - Exit sign (lighted)	2	2	2	2	2	One per occupied seat. Crew seats and all occupied passenger seats.
2 - Seat belt						
3 - Shoulder harness						
FIRE PROTECTION						
1 - Engine fire detection system	2	2	2	2	2	
2 - Engine fire extinguisher system	1	1	1	1	1	
3 - Portable fire extinguisher	2	2	2	2	2	
4 - Baggage smoke detection systems	2	2	2	2	2	
FLIGHT CONTROLS						
1 - Flap position indicator	1	1	1	1	1	
2 - Flap system	1	1	1	1	1	
3 - Trim tab position indicators (rudder, aileron, and elevator)	3	3	3	3	3	
4 - Trim systems (rudder, aileron, primary and secondary elevator)	4	4	4	4	4	
5 - Stick shaker system	1	1	1	1	1	
6 - Speed brake system	1	1	1	1	1	
7 - Ground spoiler system	1	1	1	1	1	
8 - Rudder bias system	1	1	1	1	1	

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KINDS OF OPERATIONS EQUIPMENT LIST (Continued)

SYSTEM and/or COMPONENT	KIND OF OPERATION					COMMENTS
	V F R D A Y	V F R N I G H T	I F R D A Y	I F R N I G H T	I C I N G	
FLIGHT/NAVIGATION INSTRUMENTS						
1 - Airspeed indicator	2	2	2	2	2	
2 - Sensitive altimeter	2	2	2	2	2	
3 - Dual PFD (Primary Flight Display)	2	2	2	2	2	
4 - MFD (Multi-Function Display)	1	1	1	1	1	
5 - Vertical speed indicator	2	2	2	2	2	Dual PFD/air data
6 - Standby flight display	1	1	1	1	1	Includes attitude, heading, and air data.
7 - Clock	0	0	1	1	1	PFD or CDU
FUEL/ENGINE						
1 - Fuel boost pumps	2	2	2	2	2	
2 - Fuel flow indication	2	2	2	2	2	
3 - Fuel quantity system	2	2	2	2	2	
4 - Fuel temperature indication	2	2	2	2	2	
5 - Fuel transfer system	1	1	1	1	1	
6 - Firewall shutoff system	2	2	2	2	2	
7 - Fuel low level indication	2	2	2	2	2	Includes both Engine Indication System (EIS)/CAS and annunciator.
8 - Fuel low pressure indication	2	2	2	2	2	
9 - Engine driven fuel pump	2	2	2	2	2	
10 - FADECs	2	2	2	2	2	All channels must be operating.

(Continued Next Page)

KINDS OF OPERATIONS EQUIPMENT LIST (Continued)

SYSTEM and/or COMPONENT	KIND OF OPERATION					COMMENTS
	V F R D A Y	V F R N I G H T	I F R D A Y	I F R N I G H T	I C I N G	
FUEL/ENGINE (Continued)						
11 - Dual ignitor system, each engine (including EIS indication of IGN)	2	2	2	2	2	
12 - Engine indication (N1, ITT, N2, oil pressure, and oil temperature)	2	2	2	2	2	
13 - Hydraulic pressure indication	2	2	2	2	2	

ICE AND RAIN PROTECTION						
1 - Engine anti-ice system	2	2	2	2	2	
2 - Engine TT2 probe heat	2	2	2	2	2	
3 - Wing anti-ice system	0	0	0	0	2	
4 - Windshield heat system	1	1	1	1	2	
5 - Pitot-static heat	2	2	2	2	2	
6 - AOA heat	1	1	1	1	1	
7 - Standby pitot-static heat	1	1	1	1	1	
8 - Tail deice system	0	0	0	0	1	
9 - Glareshield ice detect lights	0	0	0	2	2	Required for night ice detection.

(Continued Next Page)

KINDS OF OPERATIONS EQUIPMENT LIST (Continued)

SYSTEM and/or COMPONENT	KIND OF OPERATION					COMMENTS
	V F R D A Y	V F R N I G H T	I F R D A Y	I F R N I G H T	I C I N G	
LANDING GEAR/BRAKES						
1 - Landing gear position Indicator	3	3	3	3	3	
2 - Gear unsafe indicators	3	3	3	3	3	
3 - Landing gear aural warning system	1	1	1	1	1	
4 - Emergency extension system	1	1	1	1	1	
5 - Power brake system	1	1	1	1	1	
6 - Antiskid system (including annunciation)	1	1	1	1	1	
7 - Emergency brake system	1	1	1	1	1	
LIGHTING						
1 - Cockpit and instrument light system	0	1	0	1	0	All illuminated buttons must be operational.
2 - Landing & taxi lights	0	2	0	2	0	
3 - Navigation light	0	3	0	3	0	
4 - Anti-collision light (wing tip strobe)	0	2	0	2	0	
5 - Wing inspection light	0	0	0	1	1	Required for night ice detection.
6 - Passenger safety system	1	1	1	1	1	
7 - Emergency lighting system	0	1	0	1	0	
OXYGEN						
1 - Oxygen system (including pressure gauge)	1	1	1	1	1	If any passenger seat is occupied, the number of installed masks must equal the number of installed passenger seats plus one.
2 - Passenger masks						
3 - Crew oxygen mask	2	2	2	2	2	One for each occupied crew seat.

(Continued Next Page)

KINDS OF OPERATIONS EQUIPMENT LIST (Continued)

SYSTEM and/or COMPONENT	KIND OF OPERATION					COMMENTS	
	V F R	V F R	I F R	I F R	I C I N G		
WARNING/CAUTION							
1 - Systems test	1	1	1	1	1	All audio warnings are required	
2 - Master caution	1	1	1	1	1		
3 - Master warning	1	1	1	1	1		
4 - Audio warnings							
5 - ELV TRIM NO TAKEOFF annunciator	1	1	1	1	1		
6 - Tone warnings							All tone warnings are required
7 - Overspeed warning system	1	1	1	1	1		
MISCELLANEOUS EQUIPMENT							
1 - FAA Approved Airplane Flight Manual	1	1	1	1	1	One required for each occupied cockpit seat. One required for each occupied seat.	
2 - Hand microphones	2	2	2	2	2		
3 - Passenger briefing cards							

SINGLE PILOT
The following are required when the airplane is operated with a crew of one pilot; per applicable operating rules:
1 - Operable FCS-3000 autopilot.
2 - Headset with microphone (must be worn).
3 - FAA Approved Pilot's Abbreviated Checklist, Cessna PN 525CCLNP-00 and 525CCLEAP-00 or latest revision, or as amended by Section V of this manual.
4 - Provisions for storage and retention of navigation charts, accessible to the pilot from the pilot station.

MINIMUM CREW

Except where otherwise prescribed by applicable operating limitations, the minimum crew for all operations is:

1 Pilot, provided:

1. The pilot holds a CE525S single pilot type rating.
2. The airplane is equipped for single pilot operation as specified in Section II, Operating Limitations, KINDS OF OPERATIONS EQUIPMENT LIST.
3. The pilot must occupy the left pilot's seat.

Or

1 Pilot and 1 Copilot, provided:

1. The pilot in command holds a CE525S type rating or
2. The pilot in command holds a CE525 type rating and the copilot has as a CE525 second-in-command rating or meets applicable operating regulation.

BATTERY LIMITS

Lead-acid and nickel-cadmium batteries are approved for use in the CJ4. Lithium batteries may not be used for ground or flight operations unless approved by later AFM revision.

The battery temperature indicating system must be operational for all ground and flight operations.

NOTE

- If a lead acid battery is installed and the static air temperature (SAT) is less than -20°C on the ground or in flight, the battery temperature indication on the EICAS may show an amber indication. If the amber battery temperature indication occurs on the ground before engine start, the battery must be preheated to at least -20°C before start. (Refer to ENGINE START LIMITS, this section.) If the amber battery temperature indication occurs after engine start or in flight, no pilot action is required.
- During prolonged cold weather operations, the battery should be removed from the airplane and stored in a warm environment. (Refer to Section III, Operational Information, Cold Weather Operations)

If the red BATTERY OVERTEMP message displays during ground operations, do not take off until the proper maintenance procedures have been accomplished. Even if the message subsequently clears, dispatch is prohibited until after the proper maintenance procedures have been accomplished.

NOTE

- If the battery limit is exceeded, ground maintenance is required. Refer to the CJ4 Maintenance Manual for procedures.
- Three engine external power unit starts (ground power current greater than or equal to 1000 amps) is equivalent to one engine battery start.
- One engine external power unit start (ground power current less than 1000 amps) is equivalent to one engine battery start.
- Three generator assisted cross starts are equivalent to one engine battery start.

Battery start limit Three engine starts per hour

ELECTRICAL POWER SYSTEMS

Steady state generator limits are listed in Figure 2-410-1.

NOTE

Transients greater than these numbers are permissible provided the amber DC GEN OVERCURRENT message does not appear. Refer to Figure 2-410-2.

STATUS	LIMIT
Ground	240 Amps
Air ≤ FL250	300 Amps
> FL250 and ≤ FL450	Linear decrease from 300 Amps to 170 Amps

Figure 2-410-1

HYDRAULIC FLUID

Use MIL-PRF-87257 type fluids only.

CABIN PRESSURIZATION LIMITS

Structural cabin pressurization limits (-0.5 to 9.0 PSI) \pm 0.1 PSI Differential

SUPPLEMENTAL OXYGEN SYSTEM

Service the oxygen system with Aviator's Breathing Oxygen (MIL-O-27210). The use of medical oxygen is prohibited.

The following aircraft certification requirements are in addition to the requirements of applicable operating rules. The most restrictive requirements (certification or operating) must be observed:

WARNING

- **Some large eyeglasses, headsets, hats, or hairstyles may interfere with the quick donning capability of the mask. It is the crew member's responsibility to ensure the mask can be donned quickly.**
 - **Passenger oxygen masks are intended for use during an emergency descent down to an altitude not requiring supplemental oxygen.**
1. Crew and passenger oxygen masks are not approved for use above 40,000 feet cabin altitude. Prolonged use of passenger masks above 25,000 feet cabin altitude is not recommended.
 2. Prior to flight, the crew oxygen mask must be checked and stowed properly in its receptacle to qualify as a quick donning oxygen mask.
 3. For single pilot operations, a crew oxygen mask must be available for a passenger occupying the right crew seat. The mask must be checked during preflight and passenger briefed on its use.

PASSENGER COMPARTMENT

For taxi, takeoff, and landing, all adjustable seats must be fully upright and outboard; all occupied seats must have the head rest extended, seat controls inboard, seat tracked away from the table and then outboard, and passenger seat belts and shoulder harnesses must be fastened.

The maximum number of occupants in the passenger compartment is eight (nine with the optional two-place side-facing couch installed).

The lavatory door must be latched open for taxi, takeoff, and landing.

The lavatory is limited to one occupant.

GROUND OPERATIONAL LIMITS

Limit ground operation of pitot/static heat to two minutes to prevent damage to the pitot tubes and angle of attack vane.

Ground operation at greater than 75% N2 engine RPM with wing anti-ice on is limited to two minutes. Do not operate with wing anti-ice on more than one minute after the cyan or amber WING ANTI-ICE COLD message(s) have extinguished during preflight checks.

Ambient surface temperature must be obtained from the SAT field on the cockpit displays, with either or both engines operating, or from an appropriate ground station.

The control lock must not be set if the airplane will be exposed to temperatures below -10°C.

RVSM OPERATIONS

OPERATIONS AUTHORIZED

The Model 525C is approved for operations in Reduced Vertical Separation Minimum (RVSM) airspace when required equipment is maintained in accordance with the airplane Maintenance Manual. This does not constitute operational approval. Individual airplane and operational approval must be obtained in accordance with applicable operating rules.

REQUIRED EQUIPMENT

The following equipment must be installed and operating normally upon entering RVSM airspace:

NOTE

- Any changes to the pitot/static, air data computer, autopilot, altitude alerting and/or transponder systems, or other changes that affect operation of these systems, must be evaluated for impact on the RVSM approval.
 - The standby altimeter is not approved for RVSM operations.
1. Pilot and copilot primary altimeters.
 2. Autopilot.
 3. Altitude alerter.
 4. ATCRBS transponder.

FLIGHT CREW TRAINING

Each operator must ensure compliance with required crew training and operating practices and procedures.

AIRSPEED LIMITS

Minimum speed in RVSM airspace 130 KIAS

WEIGHT LIMITS

Minimum weight in RVSM airspace 11,050 Pounds

ENGINE AND SYSTEMS DISPLAYS AND OTHER INDICATORS

ENGINE INDICATING SYSTEM

FAN (N1) RPM INDICATORS

NOTE

- Tape/Pointer and Digital Readout will flash red for 5 seconds, then remain steady red, if operating limits are exceeded.
- White Tape/Pointer represents Green band.

Scale Markings	Red Line	104.8% RPM
Tape/Pointer and Digital Readout	Red	RPM ≥104.8%
Tape/Pointer	White	≤ 104.7% RPM
Digital Readout	Green	≤ 104.7% RPM

INTER-TURBINE TEMPERATURE INDICATORS

NOTE

- When the Tape/Pointer changes to amber or red, it flashes for 5 seconds then remains steady.
- If a start is aborted while ITT is above the engine running red line but below the start limit, the ITT tape/pointer will flash red. This does not indicate that an actual ITT overtemp condition has occurred unless the tape/pointer was above the start limit.
- White Tape/Pointer represents Green band.
- If the Tape/Pointer turns red, the amber scale will also turn red.

Engine Start

Scale Markings	Red	1001°C
	Amber	841°C - 1000°C
Tape/Pointer	Red	>1000°C ≥901°C for > 15 sec ≥841°C for > 30 sec
	Amber	≥901°C > 10 sec ≥841°C for > 25 sec
	White	≥901°C for ≤ 10 sec ≥841°C ≤ 25 sec ≤ 840°C

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ENGINE AND SYSTEMS DISPLAYS AND OTHER INDICATORS

(Continued)

Engine(s) Running

Scale Markings	Red	856°C
	Amber	836°C - 855°C
Tape/Pointer	Red	> 855°C
		≥836°C for >5 MIN (Two Engines Running)
		≥836°C for >10 MIN (One Engine Running)
	Amber	836°C for >3 MIN (Two Engines Running)
		≥836°C for >8 MIN (One Engine Running)
	White	≥836°C for ≤3 MIN (Two Engines Running)
		≥836°C for ≤8 MIN (One Engine Running)
		≤ 835°C

TURBINE (N2) RPM INDICATORS

NOTE

Digital Readout will flash red for 5 seconds, then remain steady red, if operating limits are exceeded.

Digital Readout	Red	≥101.6% RPM
	Amber for 120 sec, then red	100.9% ≤ RPM < 101.6%
	Green	< 100.8% RPM

OIL TEMPERATURE INDICATORS

NOTE

- Pointer and digital readout will flash red or amber for 5 seconds, then remain steady red or amber, if operating limits are exceeded.
- Digital readout is displayed only when temperature is in a red or amber range, or when the EIS is in the compressed format.
- If the Pointer and Digital Readout turn red while in an amber band, the amber band will also turn red.

N2 < 80%

Scale	Red	≥150°C, ≤-40°C
	Amber	≤ 9°C, 136°C - 149°C
	Green	10°C - 135°C

Pointer and Digital Readout	Red	≥150°C, ≤-40°C
		136°C - 149°C for ≥ 5 MIN
	Amber	≤ 9°C, 136°C - 149°C for < 5 MIN
	Green	10°C - 135°C

N2 ≥ 80%

Pointer, Digital Readout, and Scale	Red	≤ 9°C, ≥136°C
	Green	10°C - 135°C

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ENGINE AND SYSTEMS DISPLAYS AND OTHER INDICATORS

(Continued)

OIL PRESSURE INDICATORS**NOTE**

- Pointer and digital readout will flash red or amber for 5 seconds then remain steady red or amber if operating limits have been exceeded.
- Digital readout is displayed only when pressure is in a red or amber range, or when the EIS is in the compressed format.
- If the Pointer and Digital Readout turn red while in an amber band, the amber band will also turn red.

N2 < 80%

Scale	Red	≤22 PSI ≥131 PSI
	Amber	23 - 29 PSI 121 - 130 PSI
	Green	30 - 120 PSI

Pointer and Digital Readout	Red	≤22 PSI 23 - 29 PSI for ≥5 MIN 121 - 130 PSI for ≥5 MIN ≥131 PSI
	Amber	23 - 29 PSI for < 5 MIN 121 - 130 PSI for < 5 MIN
	Green	30 - 120 PSI

N2 ≥ 80%

Scale	Red	≤39 PSI ≥131 PSI
	Amber	121 - 130 PSI
	Green	40 - 120 PSI

Pointer and Digital Readout	Red	≤39 PSI 121 - 130 PSI for ≥5 MIN, ≥131 PSI
	Amber	121 - 130 PSI for < 5 MIN
	Green	40 - 120 PSI

SYSTEMS DISPLAYS**FUEL QUANTITY DIGITAL DISPLAY**

Green	≥250 lb
Amber	<250 lb (approximately)
Red	0 lb

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ENGINE AND SYSTEMS DISPLAYS AND OTHER INDICATORS

(Continued)

BATTERY CURRENT, TEMPERATURE, AND VOLTAGE DIGITAL DISPLAYS

BATT AMP	Green	$-5 \leq A \leq 200A$
	Amber	$>300A$ for >120 sec after engine start (Lithium only) $>200A$ for >120 sec after engine start (Nickel-Cadmium and Lead-Acid only)
BATT TEMP°C	Green	$\leq 63^\circ C$
	Red (Nickel-cadmium & lead-acid only)	$> 63^\circ C$
	Red (Lithium only)	$> 71^\circ C$
	Amber (Lithium only)	$< -10^\circ C, \geq 63^\circ C$
	Amber (Nickel-cadmium & lead-acid only)	$< -20^\circ C$
BATT VOLTS (Normal)	Green	24 to 31V
	Amber	$< 23V$ or $> 31V$
BATT VOLTS (Engine Starting)	Green	0 to 31V
	Amber	$> 31V$

HYDRAULIC PRESSURE DIGITAL DISPLAY

HYD PSI	Green	$2200 < \text{PSI} < 3400$
	Amber	$\leq 2200 \text{ PSI}, \geq 3400 \text{ PSI}$

PRESSURIZATION DIGITAL DISPLAYS

CAB ALT (Normal)	Green	$< 9800 \text{ FT}$
	Red	$\geq 9800 \text{ FT}$ (increasing), $\geq 8300 \text{ FT}$ (decreasing)
CAB ALT (High Elevation Mode)	Green	$< 14,800 \text{ FT}$
	Amber	$\geq 14,800 \text{ FT}$ (increasing) $\geq 12,600 \text{ FT}$ (decreasing)
CAB RATE Display	Green	$-9999 < \text{FPM} < 9999 \text{ FPM}$
CAB DIFF	Green	$-0.5 \leq \text{PSI} \leq +9.1 \text{ PSI}$
	Red	$< -0.5 \text{ PSI}$ or $> +9.1 \text{ PSI}$

OTHER INDICATORS

Airspeed Indication	Red Line	$> 305 \text{ KIAS} / \text{Mach } 0.77$ $> 260 \text{ KIAS}$ (Below 8000 Feet)
Oxygen Pressure Indicator - Nose Baggage	Range Only	0 to 2500 PSI
Oxygen Pressure Indicator - Cockpit	Green Band	351-2400 PSI
	Amber Band	0 - 350 PSI
	Indications align with the amber OXYGEN PRESSURE message. Cockpit calibration is as follows:	
Hydraulic Reservoir Volume	Range Only	OFF, 0 to 335 Cubic Inches

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ENGINE AND SYSTEMS DISPLAYS AND OTHER INDICATORS

(Continued)

Brake and Gear Pneumatic Pressure Indicator - Nose Baggage	Range Only	0-4000 PSI
Brake Hydraulic Accumulator Pressure Indicator - Aft Left Overwing	Narrow Red Arc	Underpressure
	Light Green Arc	Precharge Pressure
	Amber Arc	Caution
	Wide Green Arc	Normal Operating Range
	Wide Red Arc	Overpressure

ROCKWELL COLLINS FCS-3000 INTEGRATED FLIGHT CONTROL SYSTEM

The following limits do not address any installed Flight Management Systems or GPS units. Refer to the appropriate supplement(s) in Section V for applicable operating limits.

1. The Rockwell Collins Pro Line 21 Avionics System with IFIS for the Cessna Citation CJ4 Operator’s Guide Publication Number 523-0809086, Edition 1, dated 13 November 2009 or later revision, must be immediately available to the flight crew.
2. Category II approaches are not approved.
3. Operating in the composite mode is limited to training and display failure conditions.
4. Taxiing the airplane is prohibited until all AHRS ground alignment is completed.
5. Autopilot:
 - a. Use of the autopilot or yaw damper is prohibited during takeoff or landing.
 - b. One pilot must remain seated with seat belt fastened during all autopilot operations.
 - c. The autopilot minimum engage height, during climb following takeoff or go-around, is 300 feet AGL.
 - d. The autopilot minimum use height is:
 - (1) ILS approach (CAT I) & LPV/WAAS - 200 feet AGL (flaps 0°-35°)
 - (2) Other non-precision approach - 200 feet AGL
 - (3) Cruise - 1000 feet AGL

NOTE

Overriding the autopilot in pitch does not cancel the autopilot automatic trim. If a force is applied to the column with the autopilot engaged, then automatic trim will run to oppose the applied force. This can lead to a severe out of trim condition during any phase of flight.

- e. Do not override the autopilot in pitch during normal operation.
- f. Use of the autopilot is prohibited if primary elevator trim is inoperative.

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ROCKWELL COLLINS FCS-3000 INTEGRATED FLIGHT CONTROL SYSTEM (Continued)

6. VOR approaches must not be conducted in the NAV mode of the flight director. Use the APPR mode, or manually track the approach course using the HDG mode. This limit applies to both flight director only and autopilot coupled operation.
7. Autopilot coupled operation is prohibited during any portion of a VOR approach in which the VOR is located behind the airplane by more than 15 miles, unless the HDG mode of the flight director is being used to manually track the approach course.
8. VOR approaches conducted without DME must be intercepted greater than 6 nautical miles from the VOR.
9. It is prohibited to display the non-coupled side Flight Director unless the coupled side Flight Director is being displayed. Failure to adhere to this limit will result in incorrect Flight Director guidance. Use of the coupled side Flight Director by itself will operate correctly.
10. When conducting an approach that utilizes a localizer (ILS, LOC, LOC-BC, LDA, SDF), the approach mode (APPR) must not be selected until the course deviation indicator (CDI) has clearly moved away from a full scale deflection and the aircraft is within the published service volume for the approach. Failure to observe this limit may result in capture of a false localizer lobe, resulting in incorrect lateral guidance.

ANGLE-OF-ATTACK AND STICK SHAKER SYSTEM

The angle-of-attack system may be used as a reference, but does not replace the airspeed display in the PFD as a primary instrument.

The angle-of-attack system can be used as a reference for approach speed (V_{REF}) at all airplane weights, CG locations, and flap positions. V_{REF} is indicated by approximately 0.6 on the AOA gauge, green circle on AOA indexer (if installed), and by the green circle on the pilot and copilot's airspeed indicators.

STANDBY FLIGHT DISPLAY

The GH-3000 Pilot's Guide, Part Number TP-547 Rev D, dated August 31, 2003, with Service Letter SL-251 dated December 3, 2009, or later revision must be immediately available to the flight crew.

COCKPIT SPEAKER MUTE

The pilot(s) must use a headset(s) when the overhead cockpit speaker audio is muted.

PULSELITE SYSTEM

The pulse light system must be OFF and remain OFF during the following night ground and night flight operations: taxi, takeoff, and landing approach at 300 feet AGL and below.

WEATHER RADAR

The RTA-4100 Series MultiScan Automatic Weather Radar Operator's Guide, P/N 523-0816797-001117, 1st Edition or later revision, must be immediately available to the flight crew when operating the weather radar system.

Personnel and equipment (sensitive to X-band RF energy) must remain at least 2 feet from the aircraft nose when the radar is operating.

ICE AND RAIN PROTECTION

NOTE

- Icing conditions in flight exist when SAT is +10°C or colder and visible moisture in any form is present (such as clouds, fog with visibility of one mile or less, rain, snow, sleet, or ice crystals).
- Icing conditions on the ground exist with an OAT or SAT below +5°C or colder and where surface snow, slush, ice or standing water may be ingested by the engines or freeze on engine nacelles, or engine sensor probes.

In icing conditions, the airplane must be operated, and its ice protection systems must be used, as described in Section III, Normal Procedures, ICE PROTECTION SYSTEMS. Specific operational speeds, procedures, and performance information must be used where established for such conditions.

The wing icing inspection light must be operative prior to flight into known or forecast icing conditions at night.

All anti-ice and de-ice systems must be ON in flight when operating in icing conditions, except tail de-ice must be off when SAT is below -30°C.

Engine anti-ice must be ON during ground operations in icing conditions, except selection of anti-ice on is prohibited for 1 minute after ground engine start (to ensure accurate RAT for takeoff). If engine anti-ice was inadvertently turned ON prior to 1 minute of engine operation, the anti-ice must be turned off for 2 minutes before turning it back on. If minor engine vibrations are felt or heard during ground operations, the crew must momentarily increase engine speed (typically 20-30% N1) to assist with shedding the accumulated ice from the spinner, fan, and stators.

NOTE

- When SAT is below -40°C, the wing and engine anti-ice systems may be operated in the ENG ONLY position if it can be visually verified that no ice is accumulating.
- Failure to operate engine anti-ice may result in amber ENG CTRL SYS FAULT messages due to ice accumulation on the engine PT2/TT2 probe.

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ICE AND RAIN PROTECTION (Continued)**CAUTION**

Do not operate deice boots when SAT is below -30°C as cracking of the boots may occur.

Minimum temperature for operation of tail deicing boots (SAT) -30°C

Minimum airspeed for sustained flight in icing conditions (except takeoff, approach, and landing) is 160 KIAS. If wing anti-ice protection has failed and/or ice has accumulated on the wing leading edge, maintain 160 KIAS minimum until approaching to land and disengage the autopilot prior to extending flaps or reducing airspeed below 160 KIAS.

In icing conditions, operating the airplane at other than flaps 0° and landing gear up for an extended period of time (except approach and landing) is prohibited.

Minimum engine N2 speed for effective wing anti-icing 75% N2

OPERATIONS IN SEVERE ICING CONDITIONS**WARNING**

- **Severe icing may result from environmental conditions outside of those for which the airplane is certified. Flight in freezing rain, freezing drizzle, or mixed icing conditions (supercooled liquid water and ice crystals) may result in ice build-up on protected surfaces exceeding the capability of the ice protection system or may result in ice forming aft of the protected surfaces.**
- **This ice may not shed when the ice protection systems are used and may seriously degrade the performance and controllability of the airplane. In some icing conditions, it is normal for runback ice to extend approximately 6 to 18 inches aft of the heated leading edge on the wing upper surface and/or to build in a ridge on the lower wing surface just behind the heated leading edge. Satisfactory performance and controllability has been demonstrated with this type of ice accumulation and it should not be considered an indication of severe icing.**

Operation in severe icing is prohibited. The airplane has not been designed or certified to provide protection against severe icing conditions, including freezing drizzle, freezing rain, or severe conditions of mixed or clear ice.

OPERATIONS IN SEVERE ICING CONDITIONS (Continued)

Severe icing conditions that exceed those for which the airplane is certificated shall be determined by the following visual cues:

1. Unusually extensive ice accumulation on the airframe and windshield in areas not normally observed to collect ice (such as the outboard 1/3 of forward windshield).
2. Unusual accumulation of ice on the upper surface of the wing (significant accumulations on the heated surfaces, ridge formations running inboard to outboard on the upper surface, runback ice extending more than 18 inches aft of the heated leading edge).

If one or more of these visual cues exist:

1. Use of the autopilot is prohibited.
2. Immediately request priority handling from Air Traffic Control to facilitate a route or altitude change to exit the icing conditions.
3. Leave flaps in current position, do not extend or retract.
4. Avoid abrupt and excessive maneuvering that may aggravate control problems.
5. If unusual or uncommanded roll control movement is observed, reduce angle-of-attack.

Since the autopilot, when installed and operating, may mask tactile cues that indicate adverse changes in handling characteristics, use of the autopilot is prohibited when:

1. Unusual lateral trim is required while the airplane is in icing conditions.
2. Autopilot trim warnings are encountered while the airplane is in icing conditions.

ADS-B OUT OPERATION

When ADS-B Out is required by operating rule, the following limitations apply:

1. ATC2 must be selected as the operating transponder, unless an applicable emergency/ abnormal procedure requires the selection of ATC1.
2. One FMS CDU must display the primary TUNE (1/2) page and the pilot must periodically check it for an amber XPDR FAIL message, indicating an ADS-B Out failure condition.