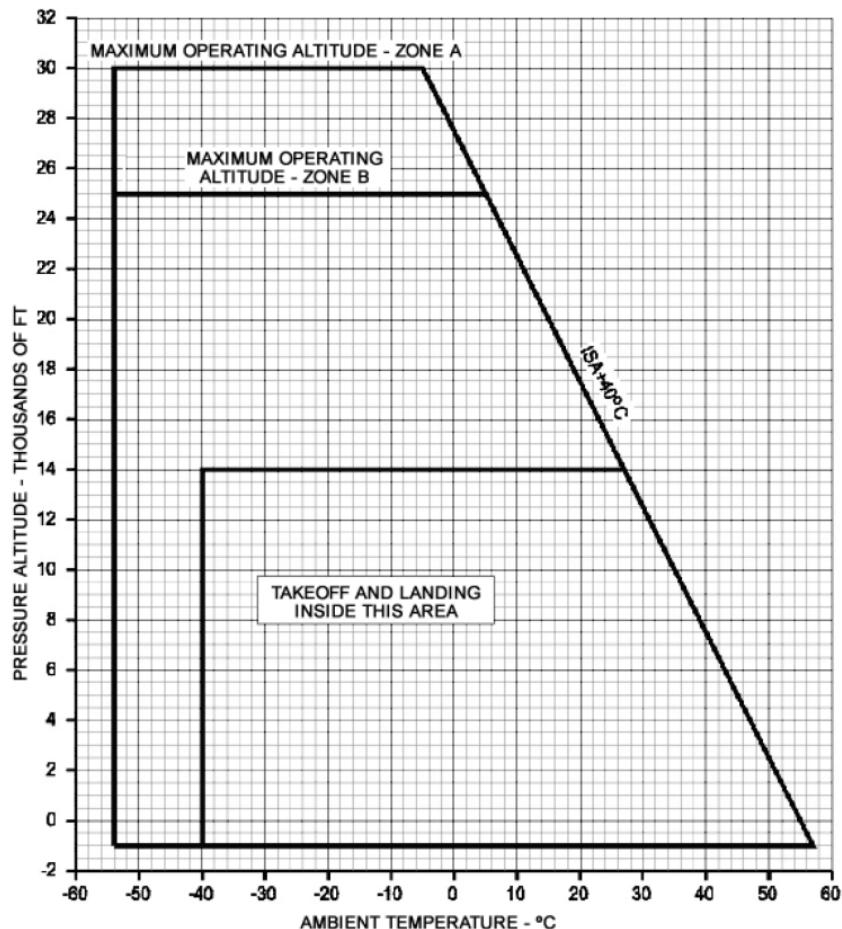


# LIMITATIONS DATA C-295M VT01

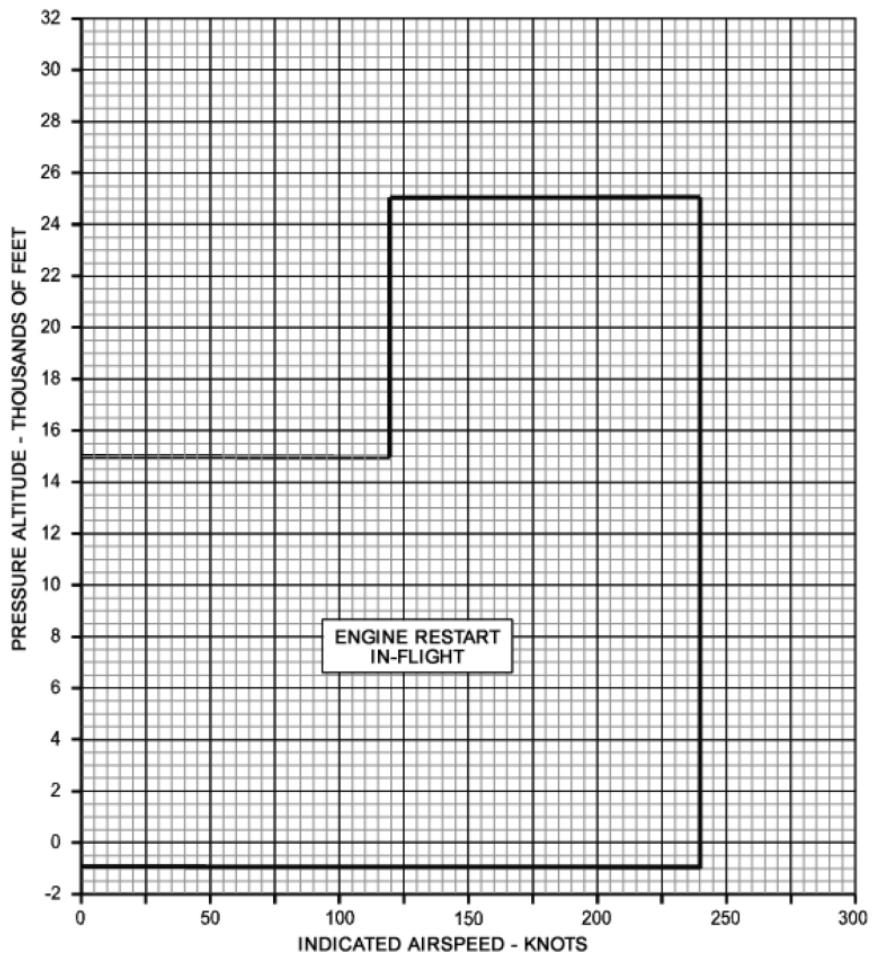
<b>GENERAL LIMITATIONS</b>	FLIGHT ENVELOPE	2	IN FLIGHT ENGINE RESTART ENVELOPE	3
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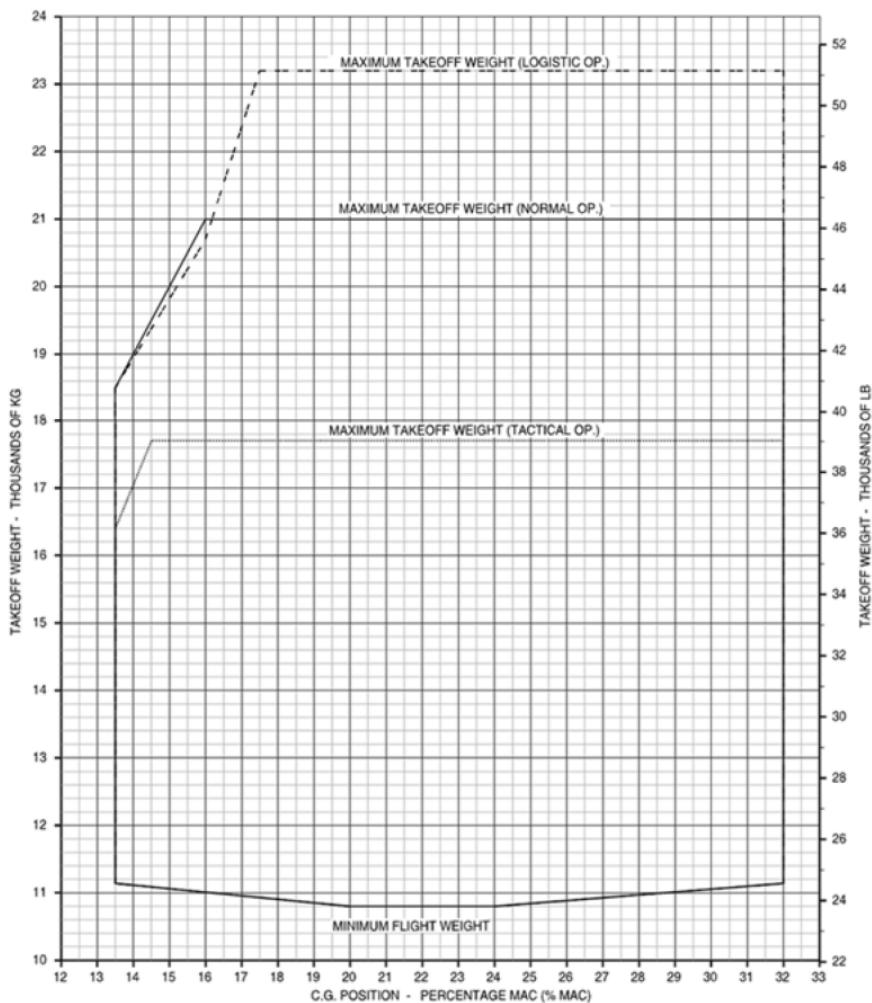
**NOTE:** These pages do not cover all limitations. Complete coverage is given in Section I of the Volume II from C-295M Operations Manual.

## FLIGHT ENVELOPE



## IN-FLIGHT ENGINE RESTART ENVELOPE



**CG DIAGRAM**

## WEIGHT / SPEED LIMITATIONS

	LOGISTIC	NORMAL	ASSAULT
<b>MZFW (Kg)</b>	20700	18500	16500
<b>MTOW (Kg)</b>	23200	21000	17700
<b>MLW (Kg) (Max Sink Rate)</b>	23200 (540 fpm)	20700 (600 fpm)	---

FL↓\SPEED (KIAS)	TURBU LENCE	V <sub>MO</sub>	TURBU LENCE	V <sub>MO</sub>	TURBU LENCE	V <sub>MO</sub>
250	175	180	175	202	175	202
220	179	192	186	215	186	215
180	184	208	195	232	195	232
140	189	225	196	247	196	247
100	195	229	197	247	197	247
75	195	232	198	247	198	247
40	195	236	199	247	199	247
0	195	240	200	247	200	247

<b>MAX. LOAD FACTOR</b>	-0.85 g up to 2.25 g	-1.0 g up to 2.50 g	-1.0 g up to 3.0 g
-----------------------------	-------------------------	------------------------	-----------------------

PR. ALT. ↓	MANEUVER SPEED (V <sub>A</sub> ) (KIAS)		
30000 ft	---	180	180
27500 ft	---		
25000 ft	180		
20000 ft		190	190
SL	190		

**MAX. AIRSPEEDS WITH FLAPS AND/OR LANDING GEAR EXTENDED**

MAX. SPEEDS FOR FLAPS			MAX. SPEEDS FOR LANDING GEAR	
FLAPS POSITION ↓	V <sub>FE</sub> (KIAS)		V <sub>LO</sub> = V <sub>LE</sub> (KIAS)	
	From SL to 19000 ft	At 25000 ft	From SL to 19000 ft	At 25000 ft
TO (10°)	190	160	180	160
APP (15°)	185	160	<b>When Landing Gear Emergency Lowering System is used:</b> Max. Airspeed is: 150 KIAS	
LNDG (23°)	180	160		
Between 19000 ft and 25000 ft, lineal transition has to be considered Landing Gear or Flaps extension above 25000 feet is prohibited.				

**MAX. AIRSPEEDS FOR RAMP AND PARATROOP DOORS OPERATION INFLIGHT**

Maximum speed at which any paratroops doors may be opened or closed or at which the aircraft may be flown with the doors open is 160 KIAS.

The maximum speed at which both rear door and ramp may be opened or closed or which the aircraft may be flown with both rear door and ramp open is 240 KIAS.

The maximum speed at which the aircraft may be flown with both rear door and ramp and one paratroops doors open simultaneously is 130 KIAS.

**MISCELLANEOUS SPEED LIMITATIONS**

Max. Demonstrated Airspeed to Operate Cockpit Window in Flight	200 KIAS
Max. Airspeed to Apply Full Reverse Power On Ground	120 KIAS
Tyre Limit Speed ( $V_{TLS}$ )	178 kts (ground speed)
$\Delta$ T.O. DISTANCE FOR "ROLLING T.O." = 400 FT	

**CONDITIONS FOR "UNSAFE TAKEOFF"**  
**WARNING**

With weight on wheels and one PL above 66.5°, the UNSAFE TO warning comes on if one of the following conditions does not happen:

- Flaps in 10° (TO)
- Rudder Pneumatic Actuator is on
- Parking brake off
- Elevator trim-tab in green band
- Autofeather connected
- AIRSPEED SEL in AUTO

**CONDITIONS FOR "GEAR UP" WARNING**

GEAR UP warning comes on in three cases, if the landing gear is not down and locked:

- 1-- Flaps above 15°.
- 2-- Flaps in 15° and the rate of descent exceed 300 fpm for more than five seconds. (GEAR UP warning continues until gear down or flaps below 15°).
- 3-- Radio altitude below 1000 ft and rate of descent exceed 300 fpm for more than five seconds. (GEAR UP warning continues until gear down or radio altitude above 1000 ft)

# SYSTEM LIMITATIONS

## POWER PLANT

### MAINTENANCE MESSAGES

Do not flight dispatch the aircraft if a power plant maintenance message is lighted.

### ENGINE STARTING

#### Starting Cycles

- |                     |   |
|---------------------|---|
| Starting operation: | <ul style="list-style-type: none"> <li>- 30 seconds on - 1 minute off.</li> <li>- 30 seconds on - 1 minute off.</li> <li>- 30 seconds on - 15 minutes off.</li> </ul> |
|---------------------|---|

Minimum cooling-off time after three (3) consecutive starts	15 minutes
---	------------

Maximum admitted starting transient ITT (five seconds maximum):	950°C
---	-------

At oil temperature below 10°C and until it reaches 21°C:

Maximum oil Pressure:	100 psi
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Minimum oil pressure:	40 psi
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#### Generator Assisted Engine Starting

Maximum permissible battery load indication	100 Amps on each indicator.
---	-----------------------------

#### Voltage Limits

	Internal Battery	External Battery	GPU (DC)
--	------------------	------------------	----------

Minimum	22	22	24
---------	----	----	----

Maximum	---	30	30
---------	-----	----	----

**ENGINE OIL PRESSURE**

MIN Oil Pressure:	40 psig (propeller feathered)	55 psig (propeller unfeathered)
MAX Oil Pressure:	65 psig (continuous operation)	100 psig (20 second limit)

**ENGINE OIL TEMPERATURE**

MIN Oil Temp.:	-54 °C (starting)	-40°C (unfeathering)	0°C (for Takeoff) (*)
MAX Oil Temp.:	125°C (steady)	125°C (hotel mode)	140°C (max. 20 seconds)

(\*) NOTE: Min Oil Temp. for Takeoff in icing conditions is: 45°C

**OIL CONSUMPTION**

Maximum oil consumption admitted for each engine, as gauged through the last 10 hours of engine operation, must not exceed 0.227 0kg/hour (0.500 lb/hour).

**PROPELLER BRAKE**

MAX ITT during engine operation with propeller-braked applied: 715°C.

MAX ITT during engine start-up with propeller brake applied: 950°C

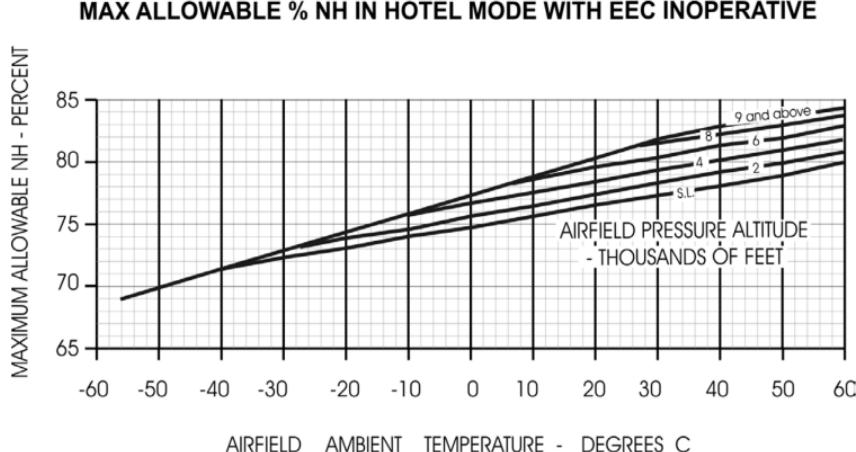
MIN admitted time between successive prop. Brake engagements: 10 min.

The engine must not be propeller-braked operated in case of tail wind.

Unattended propeller brake operation with engine running is prohibited. Walk around a braked propeller area is prohibited.

## POWER LEVERS

Flight with Beta Lock-Out System (BLS) de-activated is prohibited.  
It is prohibited to position power levers below flight idle stop while in-flight.  
Reverse Power operation is authorized for ground operations only.



## AUTOFEATHER/APR

AF/APR must be checked before the first flight of the day.  
AF/APR must be armed for takeoff and for approach and landing.

## POWER PLANT CONTROL COMPUTER

Engines will be operated in automatic control mode for normal flight (EEC, EPC on).

**SPEED CONVERSION VALUES**

100% TQ = 11576 lb·ft

100% NP = 20000 rpm of power turbine speed = 1200 rpm propeller speed.

100% NH = 33300 rpm high-pressure compressor speed.

100% NL = 27700 rpm low-pressure compressor speed.

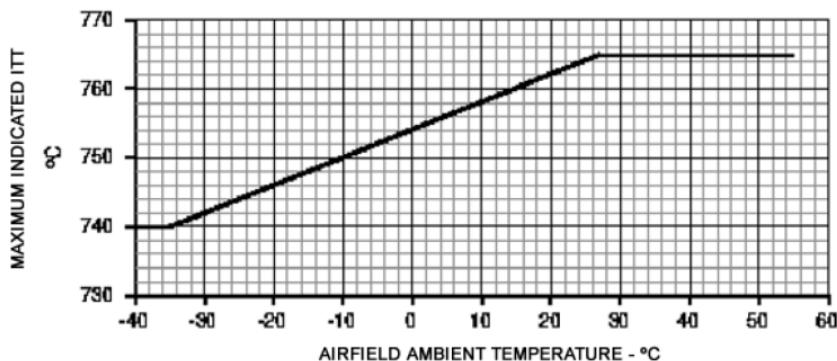
**TIME, TQ, ITT, NH NP, AND ENGINE POWER LIMITS**

Operating Conditions	Operating Limits				
	Time Limit	Max. Torque (%)	Max. ITT (°C)	Max. % NH	Max. % NP
Normal Takeoff (2 Engines Op.)	5 minutes	101	765 [1]	102.3	101
Maximum Takeoff (1 Engine Inop.)		112	800	103.7	
Maximum Continuous	Unrestricted [2]	112	800	103.7	101
Transition	20 seconds	125	840	104.3	120 [3]

[1] The value shown is absolute maximum. The steady-state ITT limit for the existing ambient conditions to be observed in normal takeoff (two-engine operation), must be obtained from the graph below.

[2] Maximum continuous power, although authorized for unlimited periods during flight, is intended for abnormal use (e.g., single-engine operation, heavy airframe ice accretion, compliance with ATC requirements or when obstructions dictate the use of an steep angle) at pilots discretion.

[3] The corresponding transient limit is further restricted to just five (5) seconds.

**MAX ITT IN TAKEOFF****FUEL****MAX FUEL UNBALANCE IN-FLIGHT**

MAX FUEL UNBALANCE IN-FLIGHT		AIRCRAFT WEIGHT ≤ 18000 KG ↓	
<b>AIRCRAFT WEIGHT &gt; 18000 KG</b> ↓		MAIN TANKS	AUX. TANKS
MAIN TANKS	AUX. TANKS	270 Kg (600 lb)	0 Kg (0 lb)
90 Kg (200 lb)	0 Kg (0 lb)	250 Kg (550 lb)	3 Kg (5 lb)
0 Kg (0 lb)	20 Kg (40 lb)	200 Kg (440 lb)	14 Kg (30 lb)
		150 Kg (330 lb)	25 Kg (55 lb)
		100 Kg (220 lb)	37 Kg (80 lb)
		50 Kg (110 lb)	48 Kg (105 lb)
		0 Kg (0 lb)	60 Kg (135 lb)
Maximum Fuel Unbalance			

**USABLE FUEL**

FUEL TANK ↓		MAX. USABLE FUEL ↓		
		LITERS	US GAL.	IMP. GAL.
RIGHT WING	MAIN TANK	1695	448	373
	AUX. TANK	2055	542	452
LEFT WING	MAIN TANK	1695	448	373
	AUX. TANK	2055	542	452
TOTAL		7500	1980	1650

**FUEL TANK TEMPERATURE LIMIT**

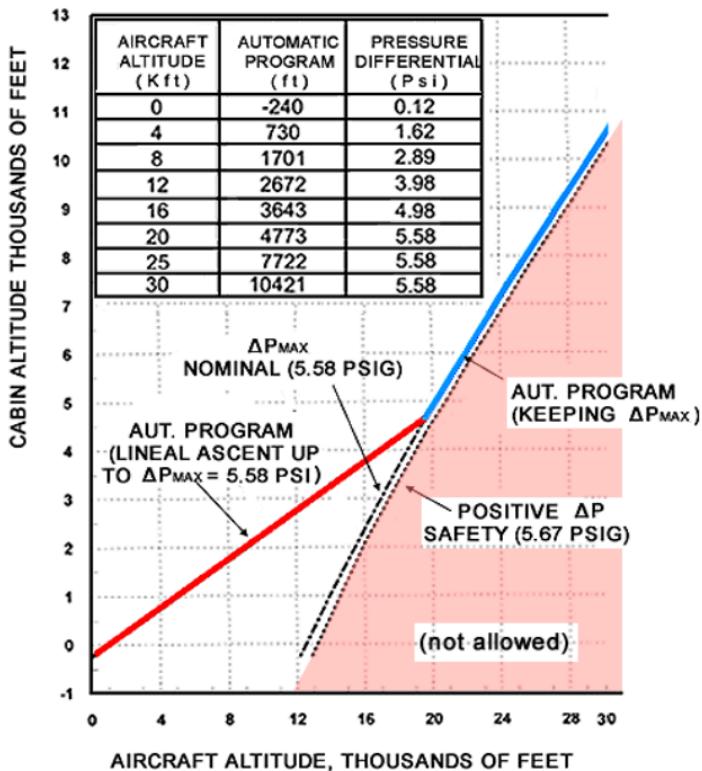
MAX	Fuel Tank Temperature	50°C (JP-8/Jet A/Jet A-1/JP-5) 35°C (JP-4/Jet B)
MIN	In-flight fuel tank temperature must be maintained at least 5°C above actual freezing point.	

## AIR CONDITIONING & PRESSURIZATION

Maximum differential pressure for normal operation: 5.58 psi.

Maximum differential pressure limit: 5.77 psi.

### ALTITUDE COMPARATIVE GRAPHIC



## ELECTRICAL

Maximum permissible continuous load on each generator is 400 Amps.

Generators may not be operated with loads above 400 Amps for periods lasting more than 5 minutes.

GPU Voltage Limits (AC)	MIN →	110 V
	MAX →	118 V
Minimum power of the GPU: 10 KVA		

## HYDRAULIC

Hydraulic pumps No. 1 and No. 2 must be turned on for takeoff, go-around and landing, when operating in manual mode.

When approved hydraulic fluid MIL-H-83282 (red) is used, whether it is mixed or not, lowest ambient temperature allowed is - 40°C.

## FLIGHT CONTROLS

### ARTCS

Automatic Rudder Travel Control System (ARTCS) must always be tested and considered operative before flight.

ARTCS automatic mode must be selected for normal flight.

### RBS

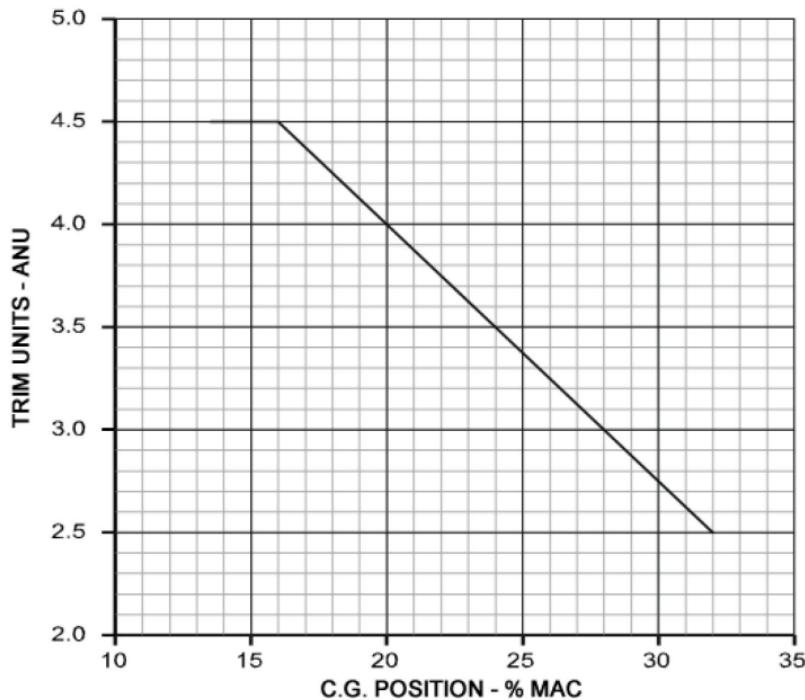
Rudder Booster System (RBS) must always be tested and considered operative before flight.

For normal flight, RBS will be operative and its primary RBS heater selected.

## FLAPS

Flaps System must always be tested and considered operative before flight.

### ELEVATOR NORMAL TRIM SELECTION FOR TAKEOFF



## OXYGEN

The minimum permissible flight crew supplement oxygen pressure for takeoff is 500 psi.

When flying above FL250 each crew-member oxygen mask must be connected to its oxygen socket, and masks must be immediately available.

### OXYGEN DURATION (MANHOURS) – FIXED GASEOUS OXYGEN INSTALLATION

↓ CABIN ALTITUDE	COCKPIT MANOMETER READING (PSI) ↓				
	1850	1500	1200	1000	800
Fixed installation supplying diluted oxygen (NOR air/oxygen mixture).					
5000	5.69	3.96	2.47	1.48	0.49
10000	4.52	3.14	1.96	1.18	0.39
15000	4.03	2.80	1.75	1.05	0.35
20000	3.73	2.59	1.62	0.97	0.32
25000	3.11	2.16	1.35	0.81	0.27
Fixed installation supplying pure oxygen (100%).					
5000	1.02	0.71	0.44	0.27	0.09
10000	1.25	0.87	0.54	0.33	0.11
15000	1.57	1.09	0.68	0.41	0.14
20000	1.96	1.37	0.85	0.51	0.17
25000	2.54	1.76	1.10	0.66	0.22

- NOTES:
- Duration in hours, to be divided by the number of users.
  - Oxygen pressure reading taken at 15°C (59°F) oxygen temperature.
  - Average breathing rate: 20 litres/minute BTPS.
  - Portable oxygen installation not taken into account.
  - 390 litres NTPD taken as reserve for fire fighting at 10000 ft.
  - Minimum bottle pressure at 200 psi.

## ICE PROTECTION

### ICING CONDITIONS

Icing conditions exist when:

- Indicated outside temperature is  $\leq 5^{\circ}\text{C}$ , and any moisture form is visible (clouds, fog with one mile or less visibility, rain, snow, sleet and ice crystals).
- ground outside temperature for takeoff purposes is  $\leq 5^{\circ}\text{C}$ , when operating on ramps, taxiways or runways where surface snow, ice, standing water, or slush may be engine-ingested or ease ice accretion on engines, nacelles or engine sensor probes.

Since automatic pilot may mask tactile indications concerning severe ice accretion, automatic pilot operation is prohibited under severe icing conditions.

Whether icing conditions are present or not, both pitot and AOA vane heating systems, as well as ice detector, must be turned on.

Engine air inlet de-icing system must be turned on at every ground/airborne operation when icing conditions do exist or are envisaged.

Both wing and tail leading edges pneumatic de-icing boots must be activated at the first sign of ice accretion, no matter the exact location, or when ICE FORM caution annunciator comes on.

Under icing conditions propeller de-icing system must be turned on.

When icing conditions are known before flight, perform an engine-running Ice-Protection System ground check on propeller, wing, tail and engine air inlet.

## PROPELLER

Under icing conditions, do not unfeather a propeller on ground until oil temperature is at or above: 45°C

Keep test time below 2 minutes above 15°C. Propeller de-icing system extended operation above that temperature may damage both de-icer and/or blades.

## TAXIING

Taxiing on compacted snow, slush or ice is dangerous, particularly when close to another aircraft, vehicles or snow drifts. Whenever possible, taxi slowly making wide turns.

Bear in mind any possible damage to personnel and equipment due to snow/ice as expelled while engines accelerate.

If the aircraft is going to taxi-or wait behind another aircraft, a greater separation must be observed. Exhaust gases from preceding aircraft may remove protective fluid from wings and engine inlets leading edges.

## MINIMUM AIRSPEED IN ICE FORMATION CONDITIONS

With known or suspected ice accreted on the airframe or in the presence of icing conditions, keep airspeed above the value  $1.24V_{SR} + 15$  KIAS. (Use table below)

WEIGHT (TONS)	12	13	14	15	16	17	18	19	20	21	22	23
	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
AIRSPEED MIN. (KIAS)	122	126	130	134	138	142	146	149	153	156	159	163

## APPROACH & LANDING

Landing with airframe ice accretion after passing through an icing zone, is performed with flaps at 23° and speed  $1.23 V_s + 15$  KIAS or  $V_{MCL} + 5$  KIAS, whichever higher.

Crosswind component must not exceed 20 Knots.

Required landing distance is increased 20% with respect to the corresponding value for flaps at 23°.

## AFTER LANDING

If approach was carried-out under icing conditions, or if the runway is snow/slush contaminated, do not retract flaps below 15°. This is intended to avoid airframe ice/slush damage.