



FLIGHT HANDBOOK

OPERATING LIMITATIONS

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NOTE: Modified for Microsoft FlightSimulator - DO NOT USE IN REAL AIRCRAFTS –

1.01 Maximum Operating Weights

MAXIMUM TAKE-OFF / LANDING WEIGHT

The maximum weight approved for take-off varies with airport altitude, ambient field static air temperature, available runway length, runway slope and wind component existing at time of take-off.

The Maximum Take-off Weight shall in no case exceed 29,480 kg (65,000 lb).

The Maximum Landing Weight shall in no case exceed 26,760 kg (59,000 lb).

MAXIMUM ZERO FUEL WEIGHT 24,720 kg (54,500lb)

1.02 Fuel Distribution

Fuel must be distributed between the two main tanks in such a way, that an asymmetry of 680 kg (1,500 lb) is not exceeded.

1.03 Loading

The aircraft must be loaded in accordance with an approved loading schedule based upon authorized weights and associated center of gravity limits.

1.04 Center of Gravity

The center of gravity of the aircraft must be maintained between the forward and aft limits shown in the table appropriate to the conditions.

The center of gravity limits as shown, apply to the landing gear extended and retracted configuration.

The datum referred to is Station 0, which is located 2220 mm (87.4 inches) in front of forward leveling pin in nose wheelbay (tip of a/c nose).

The Mean Aerodynamic Chord (MAC) is 3506 mm (138.03 inches). The leading edge of the Mean Aerodynamic Chord is 10797,5 mm (425,10 inches) aft of datum.

The following center of gravity limits shall be adhered to:

Landing Gear Extended							
Gross Weight		Forward			Aft		
		Aft of datum		%MAC	Aft of datum		%MAC
kgf	lbf	mm	inches		mm	inches	
29,480	65,000	11466	451,43	19,07	12025	473,41	35,00
27,800	60,800	11429	449,95	18,00	12025	473,41	35,00
and lower	and lower	11429	449,95	18,00	12025	473,41	35,00

Landing Gear Retracted							
Gross Weight		Forward			Aft		
		Aft of datum		%MAC	Aft of datum		%MAC
kgf	lbf	mm	inches		mm	inches	
29,480	65,000	11437	450,27	18,24	12095	476,17	37,00
27,440	60,500	11393	448,56	17,00	12095	476,17	37,00
and lower	and lower	11393	448,56	17,00	12095	476,17	37,00

The C of G limits for weights between the given figures shall be interpolated linearly.

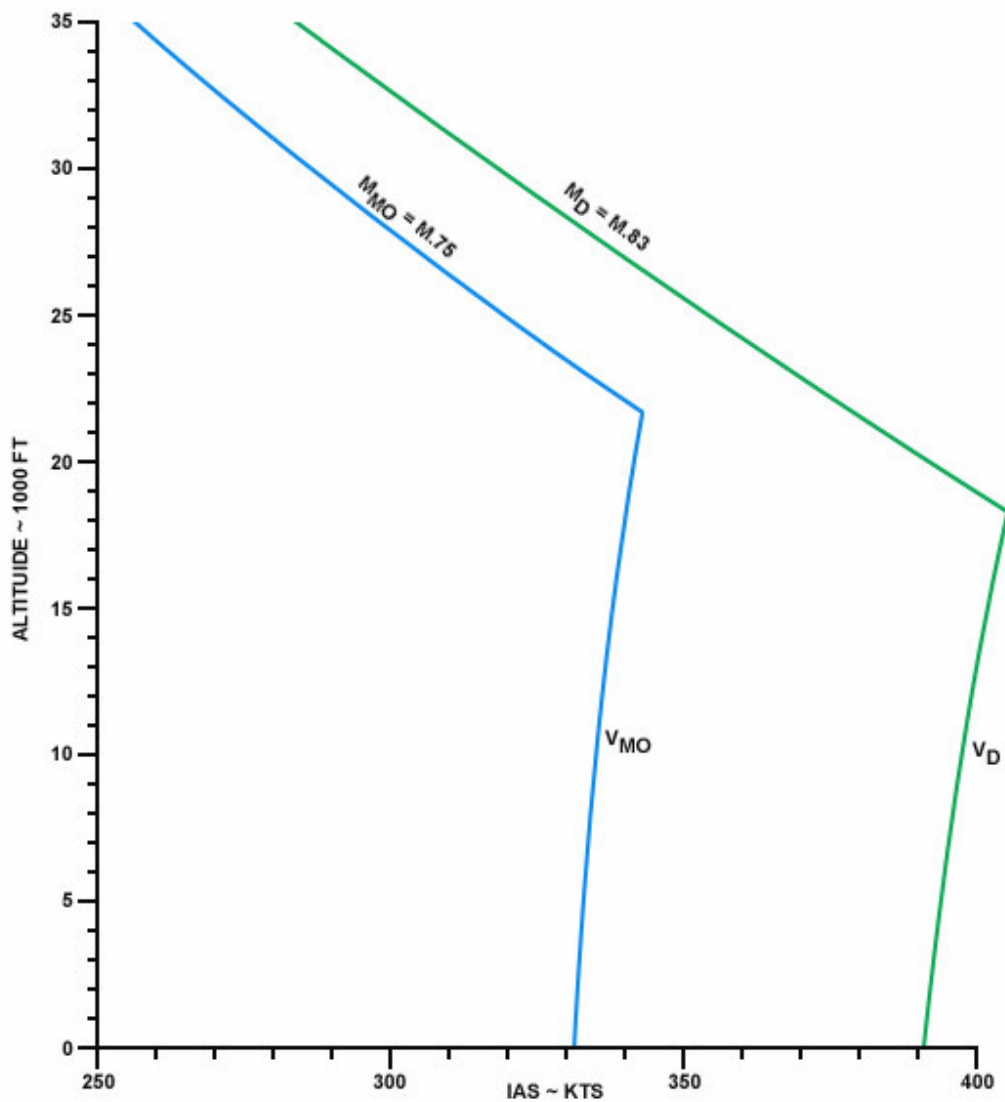
1.05 Speed Limitations

Unless otherwise designated, all speeds in this F-28 Flight Handbook are indicated airspeeds (IAS).

V_{MO} / M_{MO} MAXIMUM OPERATING SPEED

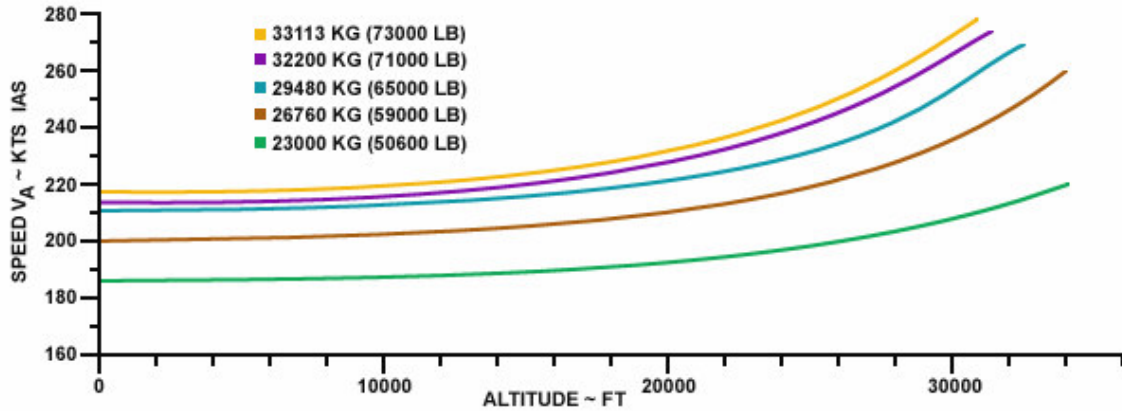
The maximum operating speed shall not be deliberately exceeded in any regime of flight (climb, cruise or descent), except where a higher speed is specifically authorized for flight test or pilot training operations.

V_D / M_D MAXIMUM DESIGN DIVING SPEED



V_A MANOEUVRING SPEED

The manoeuvring speeds to be adhered to are limited by those manoeuvres involving either angles of attack near the stall or by loads due to full application of rudder and aileron controls.



V_{FE} MAXIMUM FLAP EXTENDED SPEED AND ALTITUDE

Flap settings: up to 25 deg.

200 Knots IAS up to 15,000 ft
180 Knots IAS up to 20,000 ft

42 deg.

165 Knots IAS up to 20,000 ft

V_{LO} MAXIMUM LANDING GEAR OPERATING SPEED AND ALTITUDE

The maximum speed at which the landing gear may be extended or retracted is:

200 Knots IAS up to 15,000 ft
180 Knots IAS up to 20,000 ft

Note: The nose landing gear may not retract at speeds above 180 Knots IAS.

V_{LE} MAXIMUM LANDING GEAR EXTENDED SPEED AND ALTITUDE

The maximum speed with landing gear extended and locked is:

200 Knots IAS up to 15,000 ft
180 Knots IAS up to 20,000 ft

MAXIMUM LANDING, TAXI AND FLARE-OUT LIGHTS EXTENDED SPEED

V_{MO} / M_{MO} is the maximum speed with the landing lights, taxi lights and flare-out lights extended.

MAIN LANDING GEAR DOOR, MAXIMUM ALTERNATE RETRACTION SPEED

The maximum speed during retraction of the wheel doors by means of the winch is:

Flap settings: 25 deg.	155 Knots IAS
42 deg.	140 Knots IAS

The maximum speed after wheel doors have been retracted to the intermediate position, (door not fully closed) by means of the winch is:

Flap settings: 25 deg.	180 Knots IAS
42 deg.	155 Knots IAS

1.06 Flight Load Acceleration Limits

Flap up :	+ 2.5 g and – 1.0 g
Flap down:	+ 2.0 g and 0.0 g

The above acceleration limits restrict the permissible severity of pull-up manoeuvres and restrict the permissible angle of bank in coordinated steady level turns for flap UP to 66 degrees and for flap DOWN to 60 degrees.

1.07 Operational Limitations

Runway slope	+ 2% up to -2%
Limiting tail wind component	10 knots
Maximum operating altitude	35,000 ft
Maximum take-off and landing altitude	8,000 ft
Minimum take-off and landing altitude	-1,000 ft
Maximum take-off and landing and enroute temp.	ISA + 35 deg. C
Minimum take-off and landing temperature	-54 deg. C
Minimum enroute temperature	-70 deg. C
Maximum crosswind	30 knots

1.08 Engines

Manufacturer: Rolls-Royce Limited
Number and Type: (2) Two-shaft Bypass Jet Engines
“RB.183” MK.555-15P.
Bypass Ratio: 1.0

ENGINE LIMITATIONS				
Conditions	% HP RPM	% LP RPM	TGT (°C)	Time Limit
Starting and Relight	-	-	570	2 seconds
Max. Take-off	102.5	109.5	565	10 minutes (see note 1)
Max. Continuous	98.5	108.5	520	Unrestricted
Operational essential	97.5	108.5	510	-
Climb	96.5	108.5	500	-
Cruise	95.0	108.5	480	-
Ground Idle	51.0 – 52.0	-	520	(see note 2)
Max. Overspeed	105.5	115.5	-	20 seconds (see note 3)
Max. Overspeed rature during take-off	-	-	585	20 seconds

Notes see next page

- Notes:
1. Use of maximum take-off power for normal schedule operation is limited to a maximum period of 5 minutes. In the event of an engine failure the remaining engine may be operated at take-off power for maximum total period of 10 minutes.
 2. These limits are adjustment limits, applicable to a warm engine. For a cold engine, directly after starting, the limit is 47% to 53% HP rpm.
 3. If the overspeed limitations (RPM or time) are exceeded, the engine should be shut down.

OIL PRESSURE

Minimum acceptance at max. take-off rpm	34	psi.
Minimum to complete flight at max. cont. rpm.	25	psi.
Normal at max. continuous rpm	30 – 55	psi.
Minimum at ground idling	16	psi.

OIL TEMPERATURE			
Conditions	Temp.	Time	Remarks
Maximum	+120 deg C	15 minutes	Maximum during transient overshoots on reducing rpm at top of climb
Maximum	+100 deg C	Unrestricted	
Minimum	-40 deg C	For starting	
Minimum	-30 deg C	For opening up	

OIL QUANTITIES

System total capacity :	13.6 Litres or 3.6 U.S.Gal. or 3.0 Imp.Gal.
Oil tank capacity :	6.8 Litres or 1.8 U.S.Gal. or 1.5 Imp.Gal.
Usable oil :	5.1 Litres or 1.35 U.S.Gal. or 1.1 Imp.Gal.

1.09 Fuel System

USABLE FUEL

Maximum usable fuel in main tanks (total)

Pressure fueling : 9,640 Litres or 2.551 U.S.Gal. or 2.121 Imp.Gal.
Overwing fueling : 9,740 Litres or 2.573 U.S.Gal. or 2.143 Imp.Gal.

Center wing tank (if installed): 3,300 Litres or 882 U.S.Gal. or 726 Imp.Gal.

Center wing tank, freight configuration:
3,100 Litres or 820 U.S.Gal. or 683 Imp.Gal.

FUEL TEMPERATURE

Maximum at HP pump inlet (15 minutes) + 110 deg C
(Maximum during transient overshoots on reducing rpm at top of climb)

Maximum at HP pump inlet (unrestricted) + 90 deg C

1.10 Center Wing Tank (if installed)

- If the required fuel load exceeds the capacity of the main tanks, the center wing tank may be filled with the excess only.

- In flight the center wing tank fuel load must be transferred to the main tanks as soon as the fuel load remaining in each main tank is 2,948 kg (6,500 lb).

1.11 Auxiliary Power Unit

Condition	Max. RPM (%)	Max. TGT (deg C)
Start	-	705
Transient 10 seconds	110	705
Unrestricted	105	650

1.12 Automatic Pilot

With the autopilot engaged the following applies:

- One pilot shall be strapped in his seat
- V_{MO} / M_{MO} and V_{FE} shall be adhered to

The minimum height down to which the autopilot may be used during coupled ILS-approaches is 50 ft.

Wind velocity limits for CAT 2 operations are:

Max. wind velocity	:	20 knots
Max. crosswind velocity	:	15 knots
Max. tailwind velocity	:	10 knots

1.13 Maximum Fueling and Defueling Pressures

Maximum allowable fueling pressure at the hose connection:	50 psi.
Defueling suction	: 11 psi.

1.14 Electrical System

GENERATORS (include APU generator)

Continuous rating of each generator :	20 KVA (1.0 AC load meter)
Overload rating of each generator :	25 KVA for 3 hours (1.25 AC load meter)

TRANSFORMER RECTIFIER UNITS

Continuous rating of each TRU	:	100 A (28 V DC)
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C.S.D. Limitations

OIL TEMPERATURE

Max. oil inlet temperature (unrestricted)	120 deg C
Max. oil inlet temperature (15 minutes)	140 deg C (Maximum during transient overshoot on reducing rpm)
Max. oil temperature rise (normal operation)	10 deg C ($T_{outlet} - T_{inlet}$)

Max. oil temperature rise
(full generator load and/or
single generator operation)

15 deg C
($T_{\text{outlet}} - T_{\text{inlet}}$)

1.15 Cabin Pressurization

The maximum cabin pressure differential (relief valve setting) is 7.75 psi.
The cabin must be depressurized for landing.

1.16 Instrument Colour Marking

GREEN	-	Normal Operating Range
YELLOW	-	Caution Range
RED	-	Limit of Operation

1.17 Hydraulic System

The hydraulic pressure must be 3000^{+200}_{-100} psi.

1.18 Take-Off and Landing Speeds

The take-off and landing speeds are obtained as follows:

It is assumed that $V_1 = V_R$.

For take-off with flaps 28 deg or 11 deg the take-off speeds are based
on $V_2 = 1.20 V_S$

For take-off with flaps 6 deg V_2 's ranging from 1.20 to 1.30 V_S may be scheduled in
order to increase the take-off weight for those conditions where sufficient runway
length is available but a climb limit exists.

Enter the booklet at the correct weight page.

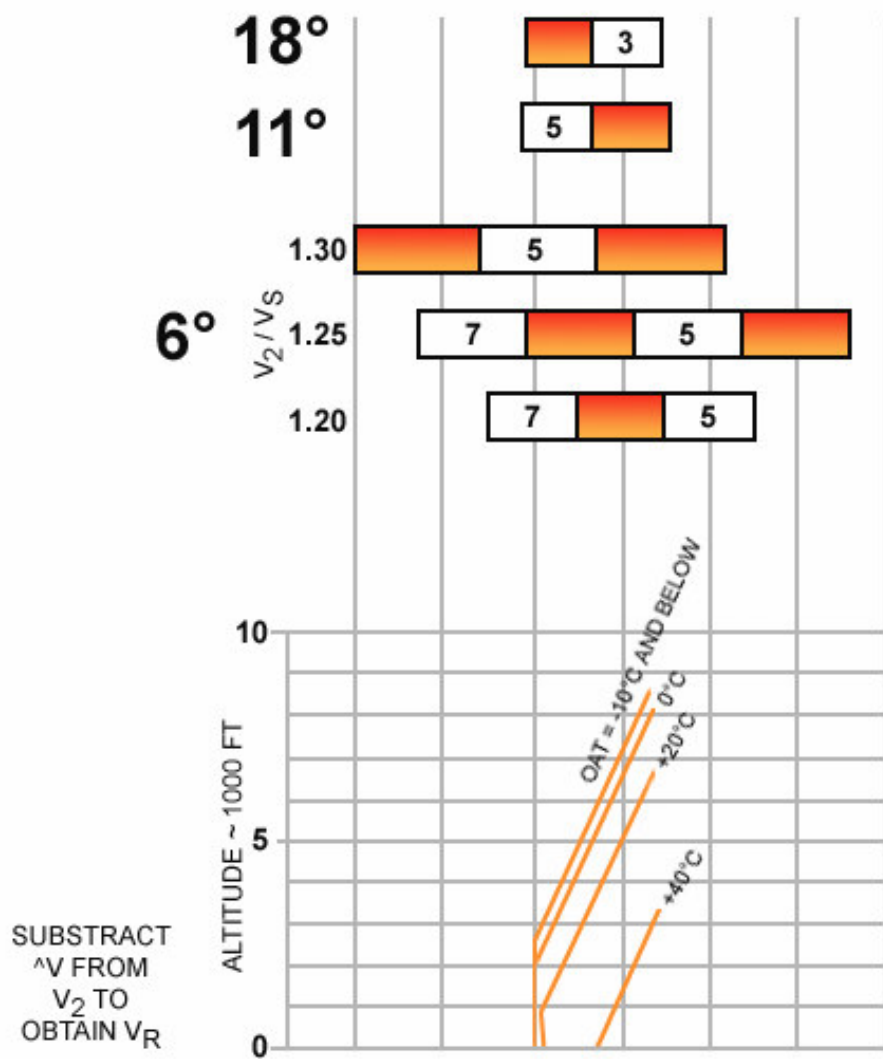
On the lower chart find V_2 , V_{FR} and V_{FC} for the particular flap setting.

To calculate V_R :

Enter the upper chart at the field elevation, move horizontally to the OAT line and
vertically to the particular flap bracket and find ΔV .

Subtract ΔV from V_2 to find $V_R (=V_1)$.

At the bottom of the lower page the threshold speeds for landing are presented.



TAKE-OFF					
FLAP	6°			11°	18°
V ₂ / V _S	1.20	1.25	1.30		
V ₂	142	148	153	136	131
V _{FR0}	151		153	151	
V _{FC}	178				

LANDING			
FLAP	0°	25°	42°
V_{THR}	163	136	125