

**SECTION 2
LIMITATIONS
CONTENTS**

	Page
General	2-1
Color Code for Instrument Markings	2-1
Airspeed Limits	2-1
Rotor Speed Limits	2-2
Powerplant Limitations	2-2
Weight Limits	2-3
Center of Gravity Limits	2-3
Flight and Maneuver Limitations	2-5
Kinds of Operation Limitations	2-6
Environmental Limitations	2-6
Fuel Limitations	2-7
Instrument Markings	2-8
Placards	2-10

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**SECTION 2
LIMITATIONS**

GENERAL

This section includes operating limitations, instrument markings, and basic placards required for safe operation of the helicopter, its engine, and other standard systems. This helicopter is approved as a normal category rotorcraft under FAA Type Certificate No. R00015LA as Model R66.

COLOR CODE FOR INSTRUMENT MARKINGS

Red Operating limit. Edge of red line indicates limit. Pointer should not enter red during normal operation.

Red Cross- Power-off V_{ne} .
Hatch

Yellow Precautionary or special operating procedure range.

Green Normal operating range.

AIRSPEED LIMITS

NEVER-EXCEED AIRSPEED (V_{ne})

2200 lb (998 kg) TOGW or above	130 KIAS
Below 2200 lb (998 kg) TOGW	140 KIAS
Autorotation	100 KIAS

For V_{ne} reductions with altitude and temperature, see placards on page 2-10.

ADDITIONAL AIRSPEED LIMITS

65 KIAS maximum above 83% torque.

100 KIAS maximum with any combination of cabin doors removed.

ROTOR SPEED LIMITS

	TACHOMETER READING	ACTUAL RPM
Power On		
Maximum continuous	101%	412
Minimum continuous	99%	404
Power Off		
Maximum	106%	432
Minimum	88%	359

POWERPLANT LIMITATIONS

ENGINE

One Rolls-Royce Model 250-C300/A1

OPERATING LIMITS

Gas generator speed (N_1)

 Maximum 105 % (53,519 RPM)

Output shaft speed (N_2)

 Maximum continuous 101 % (6076 RPM)

 Minimum continuous power on 99 % (5956 RPM)

 Maximum transient overspeed* 106 % (6377 RPM)

Measured Gas Temperature

 Maximum during start 927 °C (10 second
limit above
782 °C)

 Maximum operating 782 °C (5 minutes)
706 °C (continuous)

Torque

 5 minute limit 100 % (236 lb-ft)

 Continuous limit 83 % (196 lb-ft)

* Avoid large, rapid power changes. The engine governor reacts slowly and RPM excursions may occur. Intentional operation outside continuous RPM limits is prohibited. Should an inadvertent excursion occur, the transient limit applies.

POWERPLANT LIMITATIONS (cont'd)

OPERATING LIMITS (cont'd)

Oil Temperature, Maximum	107°C
Oil Pressure	
Maximum during start and warm up	150 psi
Maximum operating	130 psi
Minimum above 94% N ₁	115 psi
Minimum below 78% N ₁	50 psi
Minimum from 78% to 94% N ₁	90 psi
Oil Quantity, minimum for takeoff	4 qt (3.8 liters)

WEIGHT LIMITS

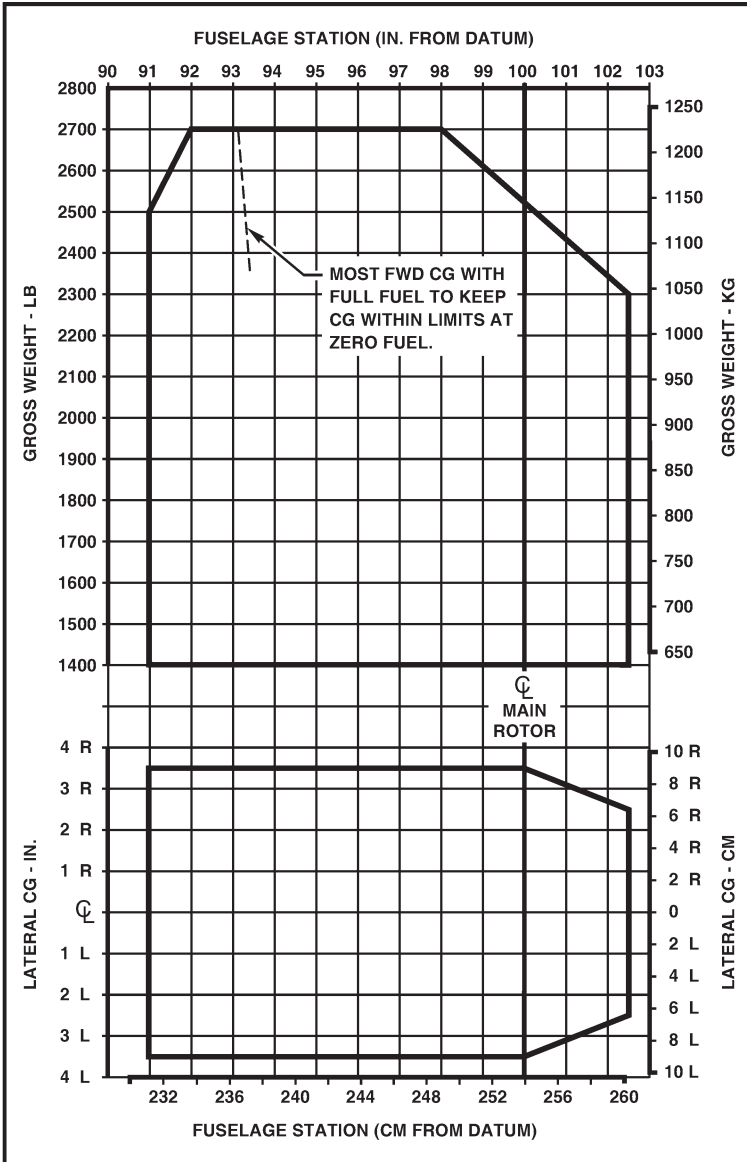
Maximum gross weight	2700 lb (1225 kg)
Minimum gross weight	1400 lb (635 kg)
Maximum per seat including under-seat compartment	300 lb (136 kg)
Maximum in any under-seat compartment	50 lb (23 kg)
Baggage Compartment	
Maximum distributed load	50 lb/ft ² (244 kg/m ²)
Maximum total load	300 lb (136 kg)

CENTER OF GRAVITY LIMITS

See figure on page 2-4. Reference datum is 100 inches forward of main rotor shaft centerline.

NOTE

With all doors installed and no load in baggage compartment, a solo pilot weight of 160 lb (73 kg) or greater will ensure CG within limits. For lower pilot weight, compute weight and balance; removable ballast may be required to obtain CG at or forward of aft limit. (See Loading Instructions in Section 6.)



CENTER OF GRAVITY LIMITS

FLIGHT AND MANEUVER LIMITATIONS

Aerobatic flight prohibited.

CAUTION

Abrupt control inputs may produce high fatigue stresses and cause catastrophic failure of a critical component.

Low-G cyclic pushovers prohibited.

CAUTION

A pushover (forward cyclic maneuver) performed from level flight or following a pull-up causes a low-G (near weightless) condition which can result in catastrophic loss of lateral control. To eliminate a low-G condition, immediately apply gentle aft cyclic. Should a right roll commence during a low-G condition, apply gentle aft cyclic to reload rotor before applying lateral cyclic to stop roll.

Maximum operating density altitude 14,000 feet.

Maximum operating altitude 9000 feet AGL to allow landing within 5 minutes in case of fire.

Closing throttle (twist grip) in flight prohibited above 10,000 feet density altitude to avoid possible engine flameout.

Closing throttle (twist grip) in flight prohibited with cabin heat ON to avoid possible engine flameout.

Minimum crew is one pilot in the right front seat. A flight instructor may act as pilot in command from the left front seat. Solo flight from right seat only.

Forward left seat belt must be buckled.

Operation up to 100 KIAS approved with any combination of cabin doors removed. All seat belts must be buckled and loose items in cabin must be properly secured during doors-off flight.

KINDS OF OPERATION LIMITATIONS

VFR day and night operations are approved.

VFR operation at night is permitted only when landing, navigation, instrument, and anti-collision lights are operational. Orientation during night flight must be maintained by visual reference to ground objects illuminated solely by lights on the ground or adequate celestial illumination.

NOTE

There may be additional requirements in countries outside the United States.

ENVIRONMENTAL LIMITATIONS

Maximum ambient temperature for operation is ISA plus 35°C (ISA plus 63°F), limited to 50°C (122°F).

Minimum ambient temperature for operation is -40°C (-40°F) at all altitudes.

NOTE

See fuel limitations for temperature restrictions.

Flight in known icing conditions prohibited.

Engine anti-ice must be on for operation in visible moisture in ambient temperatures at or below 4°C (40°F).

FUEL LIMITATIONS

APPROVED FUEL GRADES

Grade (Specification)	Operating Limits
Jet A or Jet A-1 (ASTM D 1655)	Anti-icing additive may be required (see below). Not approved for ambient temperatures below -32°C (-25°F).
Jet B (ASTM D 6615)	Anti-icing additive may be required (see below). Not approved for ambient temperatures above 32°C (90°F) at altitudes above 5000 feet.
JP-4 (MIL-DTL-5624)	Not approved for ambient temperatures above 32°C (90°F) at altitudes above 5000 feet.
JP-5 (MIL-DTL-5624)	Not approved for ambient temperatures below -32°C (-25°F).
JP-8 (MIL-DTL-83133)	Not approved for ambient temperatures below -32°C (-25°F).
No. 3 Jet Fuel (P.R. China GB 6537-2006)	Anti-icing additive may be required (see below). Not approved for ambient temperatures below -32°C (-25°F).

Anti-icing additive conforming to MIL-DTL-85470 must be added to Jet A, Jet A-1, Jet B, or No. 3 Jet Fuel when ambient temperature is below 4°C (40°F). Check with fuel supplier to determine if supply includes additive. If not, add per manufacturer's instructions.

FUEL CAPACITY

Total capacity: 74.6 US gallons (282 liters)
Usable capacity: 73.6 US gallons (279 liters)

INSTRUMENT MARKINGS

NOTE

Red lines offset so instrument pointer should not enter red. See color code on page 2-1.

AIRSPPEED INDICATOR

Green arc	0 to 110 KIAS
Yellow arc*	110 to 140 KIAS
Red cross-hatch	100 KIAS
Red Line	140 KIAS

*Earlier airspeed indicators without yellow arc must have the following placard adjacent:

DO NOT EXCEED 110 KIAS EXCEPT IN SMOOTH AIR

ROTOR TACHOMETER

Lower red line	88%
Green arc	88 to 106%
Upper red line	106%

ENGINE TACHOMETER (N₂)

Yellow arc	75 to 88% **
Power on – transient operation only. (No restrictions during autorotation.)	
Lower red line	99%
Green arc	99 to 101%
Upper red line	101%

**Earlier tachometers with yellow arc from 78 to 88% must have the following placard adjacent:

**TRANSIENT OPERATION ONLY 75–88% N₂
NO RESTRICTIONS DURING AUTOROTATION**

GAS PRODUCER TACHOMETER (N₁)

Green arc	60 to 105%
Red line	105%
White triangle	16%

(Later tachometers. Recommended fuel ON during normal start)

INSTRUMENT MARKINGS (cont'd)

MEASURED GAS TEMPERATURE

Green arc	150 to 706°C
Yellow arc (5 minute limit)	706 to 782°C
Red line	782°C
Red dot (start limit)	927°C

ENGINE OIL TEMPERATURE

Green arc	0 to 107°C
Red Line	107°C

ENGINE OIL PRESSURE

Lower red line	50 psi
Yellow arc (below 78% N ₁)	50 to 90 psi
Green arc	90 to 130 psi
Yellow arc (start and warm up)	130 to 150 psi
Upper red line	150 psi

TORQUE

Green arc	0 to 83%
Yellow arc (5 minute limit)	83 to 100%
Red line	100%

AMMETER

Green arc	0 to 160 amps
Red line	160 amps

PLACARDS

Adjacent to pilot's cyclic grip:

POWER-ON V_{ne} - KIAS

PRESS	OAT - °C										
ALT-FT	-40	-30	-20	-10	0	10	20	30	40	50	
SL	129									127	
2000	124		130					126	122		
4000	119	127			129	125	121	117	114		
6000	114	122		125	121	117	113	108			
8000	109	117	121	116	112	107	102	97			
10000	105	112	112	106	101	96	91	86			
12000	100	106	101	95	90						
14000	96	95	89	NO FLIGHT							
16000	90										

BELOW 2200 LB (998 KG) TOGW, ADD 10 KIAS

NOTE: 65 KIAS MAXIMUM ABOVE 83% TORQUE

AUTOROTATION V_{ne} - KIAS

PRESS	OAT - °C									
ALT-FT	-40	-30	-20	-10	0	10	20	30	40	50
6000			100							
8000						99	94	89		
10000				98	93	88	83	78		
12000		98	93	87	82					
14000	93	87	81	NO FLIGHT						
16000	82									

Near fuel tank filler cap:

FUEL

GRADE JET A, JET A1, JET B
OR AS SPECIFIED IN PILOT'S HANDBOOK

ANTI-ICE ADDITIVE MAY BE REQUIRED
SEE PILOT'S HANDBOOK

PLACARDS (cont'd)

Near fuel gage:

73.6 US GAL
279 LITERS

In clear view of pilot:

SEE PILOT'S HANDBOOK
FOR SOLO PILOT WEIGHT
LESS THAN 160 LB (73 KG)

THIS ROTORCRAFT APPROVED FOR
DAY AND NIGHT VFR OPERATIONS

LOW-G PUSHOVERS PROHIBITED

On removable cyclic grip:

SOLO FROM RIGHT SEAT ONLY

On or near collective controls:

NO STOWAGE
KEEP AREA CLEAR

In clear view of all occupants:

NO SMOKING

Inside cabin above each cabin door:

EXIT

Inside each cabin door near door handle:

TO CLOSE: SLIDE HANDLE AFT AND DOWN
TO OPEN: LIFT HANDLE AND SLIDE FORWARD

PLACARDS (cont'd)

Near lock on rear cabin doors:

**PUSH TO LOCK
DO NOT LOCK IN FLIGHT**

Inside each under-seat compartment:

CAUTION

DO NOT EXCEED THE FOLLOWING:

- **COMPARTMENT CAPACITY: 50 LB (23 KG)**
- **COMBINED SEAT PLUS COMPARTMENT: 300 LB (136 KG)**
- **MAX FILL LINE**

SEE PILOT'S HANDBOOK FOR ADDITIONAL LOADING INSTRUCTIONS.

Inside main baggage compartment:

CAUTION

- **MAXIMUM DISTRIBUTED FLOOR LOAD: 50 LB/FT² (244 KG/M²)**
- **MAXIMUM TOTAL COMPARTMENT LOAD: 300 LB (136 KG)**