A310 SSW OPERATING LIMITATIONS

Aircraft General

Manoeuvre on ground:

- When the weight is higher than 158 tonnes (348 320 Ib) do not exceed ± 65° on nose wheel travel during towing
- When the weight is higher than 153.9 tonnes (339 290 Ib) do not exceed a maximum taxying speed of 15 kt during a turn.

1. Weight limitations

	KG	POUNDS
MAXIMUM TAXI WEIGHT	164900	363 600
MAXIMUM TAKE-OFF WEIGHT (BRAKES RELEASE)	164000	361 620
MAXIMUM LANDING WEIGHT	124000	273 420
MAXIMUM ZERO FUEL WEIGHT	114000	251 370
MINIMUM WEIGHT	80000	176400

2 - SPEED

A. Minimum control speeds V_{MCG} / V_{MCA}

ALT (ft)	0	2000	4000	6000	8000	8500
V_{MCG} (kt CAS)	118	117	114	110.5	107	106.5
V_{MCA} (kt CAS)	122	121	117.5	114	110.5	109.5

B. Maximum flaps/slats speeds (VFE)

MAXIMUM SLATS/FLAPS EXTENDED SPEEDS OR OPERATING SPEEDS
Maximum operating altitude: 20000 ft

	SLATS	FLAPS	SPEED (IAS)
TAKE-OFF	15	0	245 KT
TAKE-OFF AND APPROACH	15	15	210 KT
TAKE-OFF, APPROACH AND LANDING	20	20	195 KT
LANDING	20 30	20 40	195 KT 180 KT

HOLDING AND « EN ROUTE »	15	0	245 KT/M 0.54

C. Gear operating speeds

MAXIMUM SPEED AT WHICH THE LANDING GEAR MAY BE EXTENDED OR RETRACTED:
V_{LO} = 270 KT OR M 0.59
MAXIMUM SPEED WITH LANDING GEAR LOCKED DOWN: V_{LE} = 270 KT OR M 0.65

D. Kruger:

If Kruger cannot be retracted, do not exceed ..... 300 KT / 0.65 M

E. Manual pitch trim

When operating with manual pitch trim only, do not exceed ..... 285 KT / 0.78 M

F. Maximum bank

Maximum bank angle ..... 45°

3 - MISCELLANEOUS

Flight maneuvering load acceleration limits:

CLEAN CONFIGURATION: + 2.5 g to - 1 g
TAKE-OFF
LANDING CONFIGURATION: + 2 g to 0 g
HOLDING
(SLATS EXTENDED)

Airport Operation limitations

RUNWAY SLOPE (MEAN) ..... ± 2 %

Runway altitude ..... 8,500 ft

WIND: TAIL WIND COMPONENT (TAKE-OFF AND LANDING) .....10 kt

AUTOPILOT:

- Minimum altitude for use of the autopilot in a cruise mode: 500 ft.
- Minimum altitude for use of VERTICAL SPEED mode in approach: 200 ft.

AUTOTHROTTLE

TAKE OFF:
In case ENGINE TRIM is inoperative, do not use ATS at TAKE OFF.

AUTOLAND

AIRPLANE CONFIGURATION
Certified configuration: slats 30°/flaps 40°.

ALTITUDE EFFECT
The altitude effect on Autoland above 2 500 ft has not been evaluated.
Therefore, for autoland operation above 2 500 ft elevation, it is recommended that each operator assesses the autoland capability in good visibility conditions for each runway prior to performing CAT II or CAT III operation.
This should be done in the frame of each operator operational approval and does not preclude complying with other applicable local operational regulations.

CATEGORY II APPROACH AND AUTOMATIC LANDING

Minimum decision height: 100 ft.
AP in CMD only.
Certified capability: CAT 2, CAT 3.

CATEGORY III APPROACH AND AUTOMATIC LANDING WITH DECISION HEIGHT

Minimum decision height: 15 ft.
2 AP in CMD and 1 autothrottle at least.
Certified capability: CAT 3.

CATEGORY III APPROACH AND AUTOMATIC LANDING WITH NO DECISION HEIGHT

2 AP in CMD and 1 autothrottle at least.
Certified capability: CAT 3.
Minimum runway visual range: 75 m.
Minimum height demonstrated for approach interruption: 15ft.

AUTOMATIC LANDING AND ROLL OUT

- DEMONSTRATED WIND CONDITIONS:
  Head wind ..... 30 KT
  Cross wind ..... 20 KT
  Tail wind .....10 KT
- Performance of ROLL OUT mode has been demonstrated on dry and wet runway.
- Do not use ROLL OUT mode on snow covered or icy runway.

4 - AIR CONDITIONING AND PRESSURIZATION

A. Air Conditioning with LP ground unit.

It is prohibited to use conditioned air simultaneously from PACKS and LP ground unit (to avoid chattering of non return valves).

B. Ram Air Inlet :

OPEN ONLY IF DIFFERENTIAL PRESSURE IS LOWER THAN 1 PSl.

C. Maximum cabin differential pressure.

- Positive differential pressure limitation .... 8.40 PSl

- MAXIMUM NEGATIVE DIFFERENTIAL PRESSURE ..... MINUS 1 PSl - SAFETY RELIEF MAXIMUM DIFFERENTIAL PRESSURE ..... 8.85 PSl

- Maximum cabin differential pressure for landing ..... 1 PSl
- Cabin signs « ON ».....11,300 ± 500 ft

D. Warnings

- Maximum cabin altitude (CAB ALT) ……. 9,550 ± 350 ft

5 - ANTI-ICE

It is recommended that extended flight in icing conditions with slats extended should be avoided. In icing conditions, in the event of wing anti-icing system failure, the approach speed must be increased by 10 kt.

6 - APU

A. Starting

In flight APU starting is allowed up to :
- 41 000 ft within the whole flight envelope when electric supply is by engine generator(s).
- 20 000 ft when electric supply is by batteries only.

Minimum oil quantity indication before start 1/4

Minimum oil quantity indication when APU operates at 100 % N (stabilized conditions)..... MIN

Minimum cooling intervals between start cycles …… 1 mn

Notes :

1 - These minimum oil indication requirements allow a normal APU operation for further 60 hours.
2 - After 3 starter motor duty cycles of 70 sec each, separated by 1 mn cool down, 60 mn must be allowed for cooling (not necessary at high altitude).

3 - Three start attempts are allowed within one hour below 37 000 ft. Five start attempts are allowed within one hour above 37 000 ft. Best starting capability is ensured up to 37 000 ft.

B. Operations

- AIR BLEED EXTRACTION :
Allowed for AIR COND or/and WING ANTI ICE or ENG START up to .....20 000 ft

Note : APU air bleed allows to supply either:

- 2 air conditioning packs or
- 1 air conditioning pack + wing anti ice system

- ELEC POWER EXTRACTION:

• At or below 35 000 ft .....1 (90 kVA)

• Above 35 000 ft up to 41 000 ft :

ISA and below .....1 (90 kVA)
ISA + 20 .....0.83 (75 kVA)
ISA + 35 .....0.44 (40 kVA)

C. Rotor speed
Maximum N .....109 %

D. EGT
Maximum EGT .....585° C

7 - BRAKES

Maximum brake temperature allowed for take-off ..... 300° C

8 - ELECTRICAL

A. AC power

NOMINAL LOAD PER GENERATOR : (CONTINUOUS) .....1 (90 KVA)

B. DC power

NOMINAL LOAD PER T.R. (CONTINUOUS) 150 AMP

9 - FUEL

A. Usable fuel tank capacity

TANK	LITER	US GAL
OUTER TKS	7400	1955
INNER TKS	27900	7371
CTR	19640	5189
ACT	14400	3804
TRIM	6150	1625
Total	75490	19944

B. Fuel quantity indications

Tank fuel remaining when the respective quantity indicator reads zero, cannot be safely used in flight.

C. Take-off restrictions

1 - Take-off on center tank is prohibited when fuel quantity is below 1000 kg (2200 Ib).
2 - Take-off with inner tanks and center tank empty is prohibited when the fuel quantity in each outer tank is below 700 kg (1545 Ib).

D. Landing restrictions

- Except under abnormal conditions, landing with more than 2000 kg (4400 Ib) in trim tank is not allowed.

10 - HYDRAULICS

A. PWR TRANSF operation in flight

PWR TRANSF operation is possible if green system is powered by 2 engine driven pumps or by 1 engine driven pump and the electric pumps.

B. System pressure

Normal pressure range :
2800 to 3300 psi
Note : *When PTU is in used, 3500 psi may be reached.*

10A - NAVIGATION

Operation above latitudes of 72° 30' N and 60°S is not permitted.

11 - POWER PLANT

A. Thrust setting/EGT limits :

CONDITION	TIME LIMITATION	EGT (* C) Limitation	NOTE
MAX TAKE OFF and MAX GO-AROUND	5 min* 10 min*	960 960	Only in case of engine failure
MAX CONTINUOUS	Unlimited*	925	
MAX CLIMB	Unlimited*	890	
MAX CRUISE**	Unlimited*	835	
STARTING	40 seconds	750-820	Must be recorded. Repetitive starsts Are cause for Maintenance Actions.
		820-870	Must be recorded. Maintenance Action is required Before the next start. (Intended flight may be completed).
STARTING	Unlimited*	750	

* : Certified TIME/EGT limits apply when the MAX CONTINUOUS limit EGT is exceeded.
** : operating restriction, not certified limit.

B. RPM

- MAXIMUM N1 .....117.5 %
- MAXIMUM N2.....112.5 %

C. Oil temperature :

- MAXIMUM TRANSIENT (15 min).....175° C
- MAXIMUM CONTINUOUS.....160° C

D. Starter

• Starter air pressure :
- Recommended.....25-55 psi
• Starter duty cycle :
- Max continuous.....5 mn
- Cool starter for 30 s per mn of operation.
- Cool starter for 10 mn after two consecutive 5 mn cycles and prior to each additional 5 mn cycle.
• Starter reengagement:
- Maximum N2.....30 %

E. Reverse thrust:

Use of reverse thrust in flight is prohibited.
Max reverse thrust should not be used below 80 Kt.