General info and limitations

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Weather limitations

Weather minimums for landing

Approach mode	Minimums	
	Decision height, m	Visibility, m
Automatic approach	30	350
Directors / ILS CatIII	60	550
ILS	100	1200
By two ADF	120	1800
By one ADF	250	4000
Visual approach	210	4000

Maximum wind

On taxi and pushback 30 m/s;

Wind limits on take-off and landing:

- headwind 30 m/s;

- tailwind 10 m/s;

- side wind 90° to runway:

- normal conditions 17 m/s;

- failure of two hydraulic systems 10 m/s;

- precipitation:

- if water level is under 3mm – see the table below

- if water lever above 3mm 5 м/с.

Maximum side wind

Runway friction coeficient	0.3	0.4	0.5	0.6+
Maximum side wind part, m/s	5	11	17	17

Maximal flight altitude

Flight level	11100 m 36500 ft	11600 m 38000 ft	12100 m 39700 ft
Maximum gross weight, kg	No limits	93500	85000

General flight limitations

Gross weight limits

Maximum taxi weight……. ……...100,5 t.

Maximum take-off weight…… 100 t.

Maximum landing weight…….. ……80 t.

Maximum zero fuel weight……. ……...74 t.

Maximum commercial load……. ……...18 t.

CG limitations

Maximum forward CG position on take-off, LG extended……. ……21 % MAC.

Maximum forward CG position on landing, LG extended ……..18 % MAC.

Maximum back CG position, LG retracted:

(а) normal flight…… ……..32 % MAC;

(б) if take-ff weight is less than 80 t and flightlevel is under 330, Autopilot works only in manual mode and commercial load doesn't allow to reach 32% MAC CG position, then it is allowed to fly with CG position up to 40% MAC.

CG for tail overturn on ground.……...…….52,5 % MAC.

Maximum G-overloads

Maximum G load for any weight

- flaps retracted…….……. 2.5

- flaps extended……..…….……... 2.0

Minimum G load for any weight

- flaps retracted…….……. 0.0

- flaps extended……...……... 0.2

Maximum bank angle

When maneuvering under 250m altitude or airspeed less than 340 km/h on takeoff and less than 280 km/h on landing……. 15°

Extending and retracting flaps…… ……...25°

All other situations……..30°

Speed limits

Maximum operation speed (V мо) and M number (M мо):

- with CG position 32% MAC and less:

- on altitudes less than 7000 m .....…….……600 km/h;

- on altitudes more than 7000 m .....…….. 575 km/h, M = 0,86.

- with CG position more than 32% MAC .....….....……..... 525 km/h.

Maximum speed V max and M max:

- on altitudes less than 7000 m .....…..... 650 km/h;

- on altitudes more than 7000 m and less than 10300 m ..... 625 km/h;

- on altitudes > 10300 m ..... M = 0,95.

Maximum airspeed with yaw or roll damper failure .....……...525 km/h, M = 0,85.

Maximum speed with flaps, extended to angle:

- 15° ..... 420 km/h;

- 28° ..... 360 km/h;

- 36° ..... 330 km/h;

- 45° ..... 300 km/h.

While retracting flaps from 15° to 0° it is allowed to reach speed 430 km/h.

Maximum landing gear operating speed:

- in normal conditions .....……..... 400 km/h;

Maximum speed for flight with non-flight stabilizer position..... 450 km/h.

Maximum speed for operating stabilizer ...……..... 425 km/h.

When take-off or go-around, while stabilizer moves to in-flight position…….. 450 km/h,.

Maximum speed with slats extended…….. .....……..425 km/h.

While slats retracts, it is allowed to speed up to.....…..... 450 km/h.

Maximum speed to operate landing lights…….. .....…...400 km/h

Maximum groundspeed:

- rising nose-wheel (rotate) .....……... 315 km/h
- take-off main gears…….. .....…..... 325 km/h
- touchdown main gears……. .....…….. 280 km/h
- touchdown nose-wheel……. .....…….... 270 km/h
- start using brakes when air temperature is:
- +30 °C and below.....….....…..…… 240 km/h
- more than +30 °C .....….... 225 km/h

Synchronized stabilizer positions

Aircraft configuration	Flaps angle, deg	Slats position	CG position %MAC		
			Less than 24	24-32	More than 32
			Stab setting		
			F green color	M black color	B yellow color
			Stabilizer position, deg		
Flight	0	Retracted	0	0	0
Take-off	15, 28	Extended	3	1.5	0
Landing	36, 45	Extended	5.5	3	0

Aircraft configuration on each flight stage

Take-off:

- flaps extended to 15° or 28°,
- slats extended;
- stabilizer in sync position;
- spoilers retracted;
- landing gear deployed.

In flight:

- flaps retracted;
- slats retracted;
- stabilizer in flight position (0°);
- spoilers retracted (may be extended on descend);
- landing gears retracted.

Emergency descend:

- flaps retracted;
- slats retracted;
- stabilizer in flight position (0°);
- middle spoilers extended;
- landing gear deployed.

On landing:

- flaps:
- in normal conditions extended to 45° or 36°,
- when landing with two working engines, extended to 36°;
- when landing with one engine, extended to 15°;
- slats extended;
- stabilizer synchronized, see table above;
- middle and inner spoilers deploys automatically on touchdown;
- landing gears deployed.

Take-off speeds

Flaps 28°

Weight, t	70	75	80	85	90	95	100
V1, km/h	205	210	220	230	235	240	250
Vr, km/h	215	220	230	240	245	250	260
V2, km/h	235	245	250	260	270	275	280
V flaps to 15°, km/h	Not less than 330						
V flaps to 0°, km/h	Not less than 360						365

Flaps 15°

Weight, t	70	75	80	85	90	95	100
V1, km/h	220	230	235	245	250	260	270
Vr, km/h	230	240	245	255	260	270	280
V2, km/h	270	280	285	295	305	315	320
V flaps to 0°, km/h	Not less than 360						365

Approach speeds

Weight, t	60	65	70	75	80	85	90
Flaps 0°, slats 0°	318	332	344	356	368	380	401
Flaps 0°	295	307	317	328	340	351	361
Flaps 15°	251	261	270	280	288	297	305
Flaps 28°	236	247	255	265	273	282	288
Flaps 36°	232	242	250	260	268	276	283
Flaps 45°	230	240	247	257	265	272	280