FLYING THE JET CITY AIRCRAFT 717-200

The 717-200 is a fun, easy airplane to fly provided you understand some basic fundamentals about it. The purpose of this brief guide is to walk you through a flight in the 717, pointing out some key features and characteristics of the airplane that will help you to pilot it successfully.

This document is not intended for real world flight and is by no means a complete “Operations Manual” type of document, as many aspects of flying involve specific settings in the cockpit that we won’t cover here. Because users of this airplane could be using a variety of cockpit environments, we will do our best to keep descriptions as generic as possible and will omit panel-specific procedures where we can. Please note that the speeds and figures listed below are only for general reference only; your airplane may need slight adjustments to account for aircraft weight, engine thrust, and weather conditions, but overall the figures below will work in most situations.

There are a few basic things you need to remember about the 717-200.

First, the airplane requires special attention on the ground. Your main landing gear are nearly 60 feet behind the cockpit, and those main gear are your pivot points in sharp turns. Therefore, making sharp turns such as lining up on the runway for takeoff will require some practice. Make your turns slow, as the 717 has a tendency to skid during turns if you are going too fast.

Second, the airplane has a relatively small wing. To help compensate for this, you may be utilizing slats and flaps earlier in your descent than you are accustomed to help maintain lift. Takeoff will also require the correct flap setting and stabilizer trim or the airplane will be difficult to get airborne.

Lastly, the engines on the 717 are quite capable. The airplane will accelerate quickly and climb at steep angles similar to the MD-90, so keep an eye on your speed!

So, are you ready? Let’s get started! Today we’ll be flying the standard model 717-200 equipped with BMW/Rolls-Royce BR700-715A1-30 engines, producing 18,700 lbs of thrust each.

PREPARATION

One of the most important parts of a successful flight is being prepared. Plan your flight, know your routing, and plan your fuel load accordingly.

COMPUTING MINIMUM DISPATCH FUEL

The following flight plan factors must be considered to determine the dispatch minimum fuel requirements:

- Flight plan fuel as calculated
- Alternate fuel as calculated
- Taxi fuel: 450 lbs for each stop
- Contingency: 650 lbs (to cover unexpected deviations)
- Reserves: 4500 lbs

The minimum fuel required for takeoff is 8,000 lbs. We have provided a fuel and flight planning quick reference chart at the end of this document to assist you with your fuel planning. The main fuel tanks in the wings should be utilized first, then the center tank(s).

Once in the cockpit, prepare the airplane for the flight as per your cockpit procedure and checklists. At this time, load up the fuel you’ll need for your flight. When you’re ready to go, switch to external view to do a quick visual check of the airplane to make sure your doors are all closed and ground service equipment is out of the way. Since you are outside the airplane, now is a good time to check the movement of your flight controls – rudder, elevators, stabilizer trim, ailerons, and spoilers should all move freely. While in external view, go ahead and get all your doors closed and stairs retracted. Switch back to cockpit view, turn on the anti-collision beacons to let the ground crew know you are ready to push, and let’s get going.

PUSHBACK, STARTUP, and TAXI

Push back from the gate and go ahead and start your left (No. 1), or port engine. When it's stable, you can start the right (No. 2), or starboard engine. In the 717, you can start engines at the gate prior to pushback, or start them during the pushback process, or push back, set the parking brake, and start them once pushed out away from the boarding area. Power backs in the 717 are not authorized due to an agreement with the engine manufacturer. You also have the option of a single engine taxi, which will reduce fuel burn on the ground at airports where there are long waits to take off. Remember that all engines must be started at least 3 minutes prior to takeoff, so plan accordingly. Once your engine(s) are running and you are cleared to taxi, the fun begins!

Turn on your taxi lights, release the parking brake, and advance the throttles slowly until airplane moves slowly forward. At heavy weights, the airplane may take as much as 50% N1 to get moving; At lighter weights, the airplane may begin to creep forward without any additional throttle input.

Keep the nose wheel centered until the aircraft starts rolling then apply pressure to the nose wheel steering to make the desired turn. Differential power or wheel braking may be used for sharp turns but do not lock the pivot wheels as this causes premature tire wear.

Keep engines below 50% N1 / 1.2 EPR when departing the gate where possible. Once clear of the gate area, you can increase thrust to achieve a taxi speed of between 10 and 20 knots. Ground handling can vary greatly depending on weight and winds. A heavy airplane could need a steady 25-28% N1 to sustain taxi speed. Lighter aircraft, on the other hand, may not need any thrust beyond the idle setting to taxi. The more you fly the airplane and get to know the feel of it, the sooner you will become familiar with its ground handling capabilities and limitations.

After leaving the ramp, verify that your stabilizer trim and flaps are at the proper takeoff settings, and spoilers are retracted.

TAKEOFF AND CLIMBOUT

When clearance is received for takeoff, scan the panel for warning indicators and taxi onto the runway. Set the heading bug on the runway heading as an aid in maintaining directional control in the event an engine fails after V1.

NOTE: Takeoff in the 717-200 can be a highly automated process with the benefit of the Autoflight system. For the sake of those who do not have a panel with the Autoflight system modeled, we will hand fly the takeoff and landing for today's flight.

Turn on your landing lights, and turn on your strobes at this time as well.

When beginning your takeoff roll, smoothly advance throttles to around 1.4 EPR and allow your engines to spool up a bit. Scan your engine instruments for abnormal indications. If all is OK, continue advancing the throttles until reaching takeoff EPR (See Chart). Have your takeoff power set by 60 knots.

At VR, initiate a smooth pull back on the yoke to create a 2.5°/sec rotation to achieve lift-off attitude in 2-3 seconds. After lift-off, continue to rotate to approximately 15° pitch attitude.

The autopilot may be engaged, although it is common practice for pilots to hand-fly the airplane until the flaps and slats are retracted and the airplane is in a clean configuration.

With a positive rate of climb indicated on the altimeter, retract the landing gear and turn off your nose gear taxi lights. Continue the climb to 1,500 feet AGL at minimum V2+10 airspeed, not to exceed 20° pitch.

NORMAL CLIMBOUT: Passing 1,500 feet, set climb thrust and reduce climb rate in order to accelerate to 250 knots. Once at 250 knots, increase your climb rate to maintain 250 knots to 10,000 feet. Your climb rate will vary depending on the aircraft weight, engine performance, and weather. Remember to retract your flaps and slats according to the schedule in the tables below.

> **NOISE ABATEMENT CLIMBOUT:** Passing 1,500 feet, set climb thrust and continue to climb at V2+10. At 3,000 feet, reduce climb rate in order to accelerate to 250 knots. Once at 250 knots, increase your climb rate to maintain 250 knots to 10,000 feet. Your climb rate will vary depending on the aircraft weight, engine performance, and weather. Remember to retract your flaps and slats according to the schedule in the tables below.

At 10,000 feet, turn off your landing lights. Lower the climb rate to approximately 1,500 ft/min (give or take, depending on weight) and let the airplane accelerate to a climb speed of 290 knots. At 290 knots, raise the nose again and maintain a 290 knot climbout. When 290 knots equals mach .74 (around FL280), maintain a mach speed of .72 - .74 up to cruise altitude.

If you are using the autopilot to maintain your climb rate, about 1,000 feet before capturing your cruise altitude, lower the vertical speed setting in the autopilot to 500-700 ft/min. This will enable a nice, smooth altitude capture (as the ability of the simulator to capture an altitude is less than optimal in most aircraft).

NOTE: Because of the design limitations of the autopilot in the simulator, many self-taught virtual pilots think that climbing up to cruise altitude is as simple as setting the autothrottle, altitude, and vertical speed, then kicking back and enjoying the ride. This is NOT a realistic way to climb in an airliner! Operating a large jet requires constant monitoring of EPR or N1 fan speed, air speed, and climb rate; it's not a "Set it and forget it" type of deal. As you are learning, it's almost easier to control the airplane's climb manually than with the autopilot vertical speed settings. What you want to do is set your climb EPR and then adjust your rate of climb higher or lower in order to maintain a certain air speed. Remember that as you get higher, it takes more power to climb and maintain that airspeed... The reaction is to give it more throttle, but you need to do avoid touching the throttles and instead reduce your rate of climb, which will in turn allow you to maintain your airspeed. You may be able to climb at 3,000 ft/min at FL100 and by the time you are at FL280, your climb rate may be as little as 500 ft/min in order to maintain 290 knots and your climb EPR setting. This is perfectly normal when flying airliners. And of course, the settings you use today may not be the same as what you need tomorrow, as aircraft weight and weather impact performance greatly. That's part of the fun of flying… it's always different!

CRUISE

Do not normally exceed .76 mach during cruise. Max cruise speed is .78 mach, normal cruise speed is .76 mach, and econo cruise is .74 mach.

DESCENT

From cruise altitude, rotate the vertical speed wheel on the AP to your desired descent rate. Maintain Mach cruise speed until FL280. At FL280, adjust the descent rate to descend at idle thrust and 290 knots. Reduce your descent rate to about 1000 ft/min at 12,000 feet to start bleeding off speed as you need to be at or below 250 knots at 10,000 feet. At 10,000 feet, turn on your landing lights. Set your IAS for 250 knots. Maintain 250 knots for the remainder of your descent until advised by ATC to reduce speed.

APPROACH AND LANDING

Determine aircraft landing weight. If the panel you are using does not supply this information, you can figure it out by subtracting the fuel consumed by both engines from the ramp gross weight.

Be sure to extend your slats and flaps according to the schedule listed in the tables below. By 30nm from the airport, you should be at 10,000 ft and 250 knots. At 15nm, your slats and flaps should be extended as required and your airspeed should be around 210 knots. Passing 4,000 ft, start slowing to 170 knots; you should be at 170 knots at 2,000 feet, approximately 6 nm from the airport. Passing through 2,000 ft, lower the landing gear, set landing flaps, arm your ground spoilers, and slow to your target speed. At 1,000 ft, you should be approximately 3mn from the airport in full landing configuration. At 500 ft, your vertical speed should be <1500 fpm and engines should be spooled.

You should not have to touch the throttles much during the final approach phase of flight, as the added drag from the gear and flaps will slow the aircraft down gradually.

Minimum altitude for disengaging autopilot is 50 feet AGL unless in Autoland mode.

Plan to pass over the runway numbers at 50 feet AGL. At approximately 20 feet AGL, slowly reduce throttles to idle and initiate the flare. Maximum pitch attitude at touchdown is 10°. The airplane will gently settle onto the runway.

When the main gear touches down, the spoilers will extend. Pull the throttle levers immediately to the idle position while gently lowering the nose to the runway. Once the nose wheel is on the ground, reverse thrust power may be used up to 80% N1.

Upon reaching 70 knots, gradually reduce reverse thrust to reach the idle detent by 60 knots and then use manual braking to reduce to taxi speed. Delay application of the wheel brakes until below 80 knots if possible.

Vacate the runway at the first available turnoff. When clear of the active runway, turn off your landing lights and turn off your strobes. Turn on your taxi lights and retract your spoilers, slats, and flaps.

Upon reaching the parking area, set the parking brake, shut down both engines, and turn off your rotating beacons.

That’s the general procedure for flying the 717-200.

Most of the settings listed in this document were taken directly from official flight/aircraft documents, and only modified where necessary to compensate for shortcomings in the simulator.

717-200 LIMITATIONS

WEIGHT LIMITATIONS:	**BASIC AIRPLANE MODELS**		**HGW MODEL**
Max Ramp Weight:	111,000 lbs	119,000 lbs	122,000 lbs
Max Takeoff Weight:	110,000 lbs	118,000 lbs	121,000 lbs
Max Landing Weight:	100,000 lbs	102,000 lbs	110,000 lbs
Max Zero Fuel Weight:	94,000 lbs	96,000 lbs	100,500 lbs
Operating Empty Weight:	67,500 lbs	67,500 lbs	68,500 lbs
Max Structural Payload:	26,500 lbs	28,500 lbs	32,000 lbs

Takeoff and landing weights may be further restricted by runway lengths and performance requirements.

FUEL REQUIREMENTS AND CAPACITIES

Minimum fuel for takeoff: 8,000 lbs, 4,000 lbs in each main tank
Minimum fuel for go-around: 1,000 lbs in each main tank

Fuel Capacity (density of 6.7 ppg)

- Main Tanks: 2 @ 1,400 gallons each (18,760 lbs total)
- Center Tank: 870 gallons (5,830 lbs)
- Fwd Auxiliary Tank (Optional on HGW Model): 460 gallons (3,080 lbs)
- Aft Auxiliary Tank (Optional on HGW Model): 270 gallons (1,810 lbs)
- Total: 3,670 gallons (24,590 lbs) or optionally 4,400 gallons (29,480 lbs)

AIRSPEED LIMITATIONS:

Vmo: 340 KIAS
Mmo: 0.82 Mach

FLAPS EXTEND MAX SPEEDS

Slats:	280 KIAS / 0.57 Mach
Flaps 0-10:	280 KIAS / 0.57 Mach
Flaps 10.1-20:	240 KIAS / 0.57 Mach
Flaps 20.1-25:	220 KIAS / 0.57 Mach
Flaps 25.1-40:	200 KIAS / 0.57 Mach

LANDING GEAR MAX OPERATING SPEEDS

Extension: 300 KIAS
Retraction: 250 KIAS

TURBULENCE PENETRATION MAX SPEED

IAS/MACH:	270 KIAS / 0.75 Mach
BELOW 10,000 FT:	250 KIAS

TIRE LIMITS

Do not exceed 195 knots ground speed

MAXIMUM OPERATIONAL ALTITUDE

37,000 feet

ENGINE REVERSERS

Reverse taxiing is prohibited
In-flight reversing is prohibited

WIND COMPONENTS

Maximum 10 knots Tailwind
Maximum 30 knots Crosswind (Dry Runway) or 25 knots (Wet Runway)
Maximum 15 knots Crosswind (Autoland)

SPOILERS

The speed brakes must only be used with flaps <20°. Slats can be extended or retracted.
Do not move the speed brake lever to the ground spoiler position in flight
Do not extend the gear with the speed brakes deployed
Do not arm the ground spoilers prior to gear extension

TAKEOFF AND LANDING LIMITATIONS

Maximum Takeoff and Landing Altitude: 8,500 ft
Minimum Takeoff and Landing Altitude: -1,000 ft
Hard Landing Limits: 600 feet/min

717-200 REFERENCE CHARTS

DESCENT DISTANCE / TIME

(290 knots above 10,000 feet / 250 knots below 10,000 feet)

ALTITUDE (Feet)	25000	27000	29000	31000	33000	35000	37000
DISTANCE (nm)	68	75	81	88	94	101	108
TIME (minutes)	18	19	20	21	22	23	24

717-200 SLAT/FLAP SETTINGS

SLATS RETRACTED / FLAPS 0
SLATS EXTENDED / FLAPS 0
SLATS EXTENDED / FLAPS 13
SLATS EXTENDED / FLAPS 18
SLATS EXTENDED / FLAPS 25
SLATS EXTENDED / FLAPS 40

TAKEOFF SPEEDS

	FLAPS 13			FLAPS 18		
WEIGHT (lbs)	V1	VR	V2	V1	VR	V2
68,000	89	97	113	87	95	110
72,000	94	103	116	91	99	114
76,000	99	108	120	96	104	117
80,000	102	111	123	99	107	120
84,000	107	115	125	104	111	122
88,000	111	118	127	108	114	124
92,000	114	121	130	111	117	127
96,000	117	125	133	115	120	129
100,000	121	127	135	118	123	131
104,000	125	130	137	121	126	134
108,000	129	134	140	126	130	136
112,000	133	136	142	130	133	138
116,000	137	139	144	134	136	141
120,000	141	143	148	138	139	144

If over 100 degrees F or over 4,000 feet altitude, add +2 to V1 / VR

V1 = Take-off decision speed. Before V1, the pilot can abort take-off. After V1, the pilot MUST take off
VR = Take-off rotation speed at which the pilot pulls the flight controls to raise the nose and take off
V2 = Take-off safety speed to be reached before passing 35 ft above runway altitude

MINIMUM MANEUVERING AND LANDING SPEEDS

	MINIMUM MANEUVERING FLAP / SLAT						LANDING		LANDING	
WEIGHT (lbs)	0 RET	0 EXT	13 EXT	18 EXT	25 EXT	40 EXT	FLAPS	VREF	FLAPS	VREF
64,000	152	118	111	111	111	111	25	110	40	108
68,000	156	122	115	113	112	111	25	112	40	111
72,000	161	126	118	117	115	112	25	115	40	112
76,000	165	129	121	120	118	115	25	118	40	115
80,000	170	132	124	123	121	118	25	121	40	118
84,000	174	136	127	126	124	121	25	124	40	121
88,000	178	139	130	129	127	124	25	127	40	124
92,000	182	142	133	132	130	126	25	130	40	126
96,000	186	145	136	135	133	129	25	133	40	129
100,000	190	148	139	138	136	132	25	136	40	132
104,000	193	151	142	140	138	134	25	138	40	134
108,000	197	154	145	143	141	137	25	141	40	137
112,000	201	157	147	146	144	140	25	144	40	140
116,000	204	159	150	148	146	142	25	146	40	142
120,000	208	162	152	151	149	144	25	149	40	144

FLAPS = Recommended flaps setting for landing
VREF = Speed at which the aircraft should cross the runway threshold during landing
RET = Retracted
EXT = Extended

717-200 CHECKLISTS

PRESTART

Master Battery Switch	On
Electrical	On
Position Lights	On
Air Conditioning System	On
Radios	On
FMS/GPS	Checked

ENGINE START

Parking Brakes	Check
Fuel Quantity	Check
Beacons	On
Doors	Check
Air Conditioning Supply	Check
Throttle Levers	Idle
Fuel Boost Pumps	Check On
Ignition	Both
Pneumatic Pressure	Check
Fuel Heat	Set
Port Engine	Start
Starboard Engine	Start

AFTER START / BEFORE TAXI

Electrical Power	Check
Electrical Bus	Check
Ignition Switch	Off
Yaw Damper	On
Air Conditioning Temperature Switches	Check
Emergency Lights / Cabin Signs	Check
Hydraulic Pressure Indicators	Check

TAXI

Flight Instruments	Check
Taxi Lights	On
Fuel Heat	As Required
Flaps and Slats	Set Takeoff
Takeoff EPR	Set
Stabilizer Trim	Check
Flight Controls	Check
Brake Temperature	Check

TAKEOFF

Landing Lights	On
Strobes	On
Ignition	Both
Ice Protection	Check
Hydraulic Booster Pumps	On
Transponder	On
Radio Altimeter	Set

CLIMB AND CRUISE

Flaps and Slats	Full Up
Taxi Lights	Off
Landing Gear	Up
Ignition	Off
Boost Pumps	As Required
Air Conditioning Shutoff	Override
Hydraulic Boost Pumps	Off
Radio Altimeter	Check
Cabin Pressurization	Set
Passing 10,000ft - Landing Lights	Off

DESCENT

Cabin Pressure	Set
EPR Bug	Set
Hydraulic Boost Pumps	On
Passing 10,000ft - Landing Lights	On

APPROACH

Hydraulic Boost Pumps	Check On
Cabin Signs	On
Altimeters	Set
Navaids	Check
Flight Instruments	Check

LANDING

Landing Gear	Down / 3 Green
Ignition	Both
Spoilers	Auto
Annunciator Panel	Check
Landing Weight and Data	Check
Hydraulic Indicators	Check
Flaps and Slats	Set
Landing Lights	On

AFTER LANDING

Hydraulic Boost Pumps	Off
Flaps and Slats	Full Up and Retract
Spoilers	Retract
Landing Lights	Off
Strobes	Off
Ignition	Off
Anti-Ice Switches	Off
Taxi Lights	On

PARKING

Parking Brake	Set
Emergency Lights / Cabin Signs	Off
Air Conditioning Supply	As Needed
Taxi Lights	Off
Beacons	Off
Engines	Off
Flight Recorders	Off

SECURE

External Lighting	Off
Air Conditioning System	Off
Radios	Off
Electrical	Off
Master Battery Switch	Off