

DO NOT USE FOR FLIGHT

Embraer E170 + E190

Checklist / Flow-Procedure

including basic Flight-Planning-Charts

*for Wilco E-Jet Series
with Microsoft Flight Simulator / Prepar3D*

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Print Notice: Page size DIN A5. Print 2 pages per A4 or Letter page. This page is the front cover.

Flight Planning:

Recommend: Asalink Route Finder Website (free) or FSBuild (great payware)

Parking Position:

- Dark & Cold (at Configurator) Set
- Load (at Configurator) Set
- FSX start & create E-Jet Series flight at your airport of choice

- Parkingbreak Set
- Load (inside FSX) Check
- Fuel (inside FSX) Set (see attached fuel table)
- IVAP-Connection Activate
- Dep-Metar Check & note
- Arr-Metar Check & note
- Flight –Plan Create with FSBuild or Asalink
- Door 1 Open (Shift + E)
- Gangway Enable (if available) (CTRL + J)
- Pedestal:
 - Start/Stop Selectors Stop (Engine Ignition Selectors)
- Overhead-Panel:
 - Battery 1 On
 - Battery 2 Auto
 - Master Warning Press (on Glareshield)
 - Cockpit-Light On (if needed)
 - Ground Power On (if available)
 - Battery Voltage Check 28V (MFD → Systems)
 - NAV Light On
 - Generator 1 Auto
 - Generator 2 Auto
 - “Black-Panel-Logic” Press all buttons illuminated
 - AC Fuel Pumps Auto / On
 - Cross Feed Off
 - DC Pump Auto
 - TRU 1 Auto
 - TRU 2 Auto
 - TRU Essential Auto
 - DC Bus Tie Auto

- Passenger Emergency Lights Armed
- No Smoking On
- Seat Belts On

- FMC
 - Com1-frequency → Set (active ATC or 122.800 UniCom)
 - NAV Page → NAV button
 - NAV Ident → LSK L1
 - POS INIT → LSK R6
 - GPS1 POS → Double-Click LSK R3
 - Check "Loaded" is displayed ---
 - Check "No Position entered" extinguished ---
 - FLT PLAN → LSK R6
 - Load flight plan:
 - Enter FPL name → LSK R3
 - FPL SEL → LSK R6
 - Activate → LSK R1
 - Create new flight plan:
 - Enter FPL name → LSK R3
 - It is recommend to name your flightplans "XXXXYYYY" with XXXX being the ICAO code for the departure airport and YYYY being the arrival airport.---
 - Enter DEP-Arpt 4-letter-code → LSK L1
 - Enter ARR-Arpt 4-letter-code → LSK R2
 - Enter Route:
 - 1st Waypoint → LSK L2
 - 2nd Waypoint → LSK L3
 - Continue entering all waypoints, after Line 5, you have to change to the next page with the NEXT button. ---
 - Enter Destination Airport as last waypoint !!!
 - FPL SEL → LSK L6
 - Activate → LSK R1
 - next step is optional ---
 - Enter Spd or Mach for each Waypoint → LSK Rx (x = 1 – 5)
 - next steps mandatory again ---
 - Activate → LSK R6
 - Departure page → LSK L6

- Choose DEP Arpt runway → LSK L/Rx (x = 1 – 5)
- Choose SID (Standard Instrument Departure) → LSK L/Rx
- Insert → LSK R6
- Check FPL for discontinuities and delete them → DEL → LSK Lx
- Check Arr Airport set as last waypoint, if not enter → LSK Lx
- Activate Route → LSK R6
- Perf Init → LSK R6
- Choose Climb, Cruise & Descent Speeds → LSK R3/4/5
- Next Page → NEXT
- Enter Strep Increment in ft. (or leave at default) → LSK L1
- Enter Fuel Reserve in LBS → LSK L2
- for recommendations see attachments ---
- Enter Contingency Fuel → LSK L4
- for recommendations see attachments ---
- Next Page → NEXT
- Enter Trans. Alt → LSK L1
- Enter Climb Speed Limit (and to which Alt.) → LSK R1
- Enter Cruise Flight Level → LSK L2
- ZFW = Gross Weight / Planned Takeoff Weight minus Fuel ---
- Enter Zero Fuel Weight (ZFW) → LSK L4
- Next steps are optional ---
- Enter True Air Temperature minus ISA → LSK R2
- Enter Temp / Wind at Cruise Flight Level and direction → LSK L3
- Enter Flight Level for Winds entered → LSK R3
- Next steps mandatory ---
- Confirm Init → LSK R6
- Check Perf Data Page → Next → Next → Takeoff → LSK R6
- Enter Wind Data → LSK R2 (step is optional)
- Takeoff Page 2 → Next → Check → Takeoff Page 3 → Next
- Enter V-Speeds, refer to V-Speeds table → LSK L1, L2, L3, R1
- Climb Page → LSK R6
- Check, change entries if required and / or as desired
- Cruise Page → LSK R6
- Enter Speed (Mach) → LSK L2
- Check Page to for enough fuel → Next
- Thrust Rating Page → TRS
- Set Thrust Rating or leave as preselected

- IVAP-flightplan Enter legs and other information
- Mach (or TAS) in flightplan Enter
- Departure Time Enter [UTC/Zulu]
- Check FPL MFD → Plan Page
- IFR-Clearance Request
- FP correction Correct (if needed)
- Clrc. data Note
- Note Squawk, First-Altitude, QNH → Readback ---
- Squawk Set (FMC, RADIO Page)
- TCAS On (TA/RA)
- Altimeter Set to atmospheric pressure (B)
- Door 1 Close (SHIFT + E)
- Gangway Disable (CTRL + J)

- Doors Check all closed
- APU Selector Start
- Hyd. / Elec. Pumps On / Auto
- EICAS Check for warnings
- Fuel Pumps Check all on
- Ignition Knobs Auto
- Anti-collision Red Beacon On
- Thrust Idle (check)

Engine s/u & Pushback:

- Engine s/u & p/b clrc Request
- Parkingbreak Release
- Pushback Start

- Engine 2 Start Cover Open
- Engine 2 Start Switch Start
- wait till Engine 2 started and back to idle---
- Engine 1 Start Cover Open
- Engine 1 Start Switch Start
- Flaps Select (as filled in FMC / step 4)
- APU Off
- Autobreak RTO

- Pitch/Trimm Check in Green Band
- Pushback End
- Taxi- & Logo-Lights On

Taxi:

- Taxi-Clrc Request
- Taxiways Note
- (Ground guidance Request if required)
- Taxi to h/p
 - T/O Config Button Press
 - T/O Config Check "takeoff okay"
 - F/D (Flight Director) On
 - A/P Speed Selection FMS
(FMS Speed button = hidden button over speed control knob)
 - A/P Initial Altitude Set
 - A/P FMS Button Press (=select FMS as nav source)
 - A/P Heading Select RWY heading

h/p:

- Hand-off GND to TWR Change frequency
- Sterile Light On
- l/u & t/o clrc Request (rdy for dep h/p xx)
- Strobe On
- Landing-Lights On
- IVAP-Transponder On
- Postion & hold Taxi & stop on rwy

Ready to Takeoff:

- Parkingbreak Set
- AT Engage On
- Thrust Levers Forward to t/o power
- Parkingbreak Release
- TO/GA Button Press
--- TO/GA button = hidden button over AT Engage ---
- Yoke (till 80 knots) Press forward
- V1 No abort of take-off

- VR Lift nose up
- V2 Lift-off

Takeoff:

- Trim settings Adjust (when needed)
- Gear Up (at positive climb rate)
---at 1000ft AGL---
- A/P On
- NAV (LNAV) On
--- Check LNAV indicated on PFD ---
- VNAV On
- Flaps Raise
- Airborne Publish when on Unicom
- Start time Note (if needed)
- Hand-off TWR to APP(DEP) Change frequency

Climb:

--- When cleared to next or final flight level ---

- Re-Set A/P Altitude Set to cleared FL
- Landing-Lights Off
- Taxi-Lights Off
- Sterile Light Off
- Seat Belts Off
- do the following things if required---
- Hand-off APP to CTR Change frequency
- Altimeter Readjust (above 18000ft)

Cruise:

- Radio /ATC contact Maintain
- Autopilot / FMC Check permanently
- FMC Check **PROG**ress page for fuel consumption
- If fuel imbalance occurs---
- Cross-feed On

Descent & Approach:

--- before Top of Descent (T/D) ---

- Descent preparations Begin 50nm before T/D
- Airport-/Meta-Information Retrieve
- FMC
 - NAV-Page NAV
 - FMC Arrival Page LSK R6
 - Runway LSK L1 → Select Rwy → Select Approach → Arr-Page
 - STAR LSK L3 → Select STAR → Select Transition → ArrPage
 - Insert LSK R6
- FMC should switch to FPL page (you might have to clear FMC messages)---
- Discontinuities Remove
- You remove discontinuities in the flight plan by switching waypoint after "Disc" 1 place up ---
- Activate LSK R6
- Request Descent Request 5-10nm before T/D
- A/P Altitude Reset to cleared descent altitude

---after T/D---

- FMC
 - PROG Page 2 → Note Actual Gross Weight
 - PERF Page → PERF
 - Landing → LSK R4
 - Landing Page 3 → NEXT → NEXT
- Refer to V-Speeds chart (VAP is about half way between Vac & Vref) ---
- Enter VAC, VAP & VREF speeds → LSK L1, L2, L3
- Correct VFS if needed → LSK R1
- Altimeter Readjust (under 18000ft)
- Monitor Descent Vert. Profile on MFD
- Seat Belts On
- Hand-off CTR to APP Change frequency
- Landing / Taxi Lights On
- Sterile Lights On
- Autobreaks Set

- RA / BARO Selector RA
- Decision Height Set (80 ft. RA or above)
- A/P Heading Set to RWY heading
- NAV 1 & 2 Set to LOC frequency (or Auto)
- A/P VOR/LOC V/L or Preview button
- PFD 1 & 2 Set to LOC inbound course

---PFD2 can be set via 3D cockpit & r-mouse-click on PFD2---

- A/P APP On

---Note App mode should be switched on after STAR before beginning ILS (or other) approach. Rule of Thumb: One or two waypoints before runway; about 10-15 nm.---

- Flaps Lower (as indicated on PFD)

Final approach & Landing (Autoland):

- Flaps Check at least Flap 5
- Gear Down
- ILS captured Announce
- Hand-off APP to TWR Change frequency
- Landing clrc Request
- Touchdown---
- Throttles Idle
- Thrust reversers Engage (if needed)
- Thrust reversers Disengage at 80kt, thrust idle
- Autopilot (AP) Disengage
- A/T (AP) Off
- F/D (AP) Off
- Runway Vacate („rwy vacated“)

Final approach & Landing (w/o Autoland):

- Gear Down
- ILS captured Announce
- Hand-off APP to TWR Change frequency
- Autopilot (AP) Disengage
- A/T (AP) Off

- F/D (AP) Off
- Trim settings Adjust (when needed)
- Landing clrc Request
- ---Touchdown---
- Throttles Idle
- Thrust reversers Engage (if needed)
- Thrust reversers Disengage at 80kt, thrust idle
- Runway Vacate („rwy vacated“)

Taxi:

- Transponder Stdby
- Hand-off TWR to GND Change frequency
- Taxiways Note and follow
- (Ground-Guidance Request if required)
- Flaps Set 0
- Autobreake Off
- Landing lights Off
- Strobe Off
- Landing time Note (if needed)
- APU Start

Parking Position:

- Parkingbreak Set
- Lights All Off (NAV on)
- Throttles Decrease full → Fuel Flow Off
- AC Fuel Pumps Off
- Engine Start/Stop Selectors Stop (Engine Ignition Selectors)
- Door 1 Open (shift + E)
- Gangway Enable (CTRL + J)
- Seat-Belts Off
- ATC contact End (state “on blocks”)
- Ground Power On

---continue if dark & cold needed---

- Emergency Exit Lights Off
- Ground Power Off
- APU Off
- NAV Light Off
- Cockpit Lights Off
- Battery 1 Off
- Battery 2 Off

Intentionally Blank

E170 --- Takeoff V-Speeds --- Flap 4 --- Mode T/O-1

<u>Pressure Alt.</u> (ft.)		<u>Static Air Temperature (°C)</u>															
SL →	-40 to 39	40 to 50															
1000 →	-40 to 38	39 to 48															
2000 →	-40 to 34	35 to 45	46 to 46														
3000 →	-40 to 29	30 to 41	42 to 44														
4000 →		-40 to 36	37 to 42														
5000 →		-40 to 31	32 to 40														
6000 →		-40 to 27	28 to 38														
7000 →			-40 to 31	32 to 36													
8000 →			-40 to 18	19 to 34													
<u>Weight</u>		↓			↓			↓			↓			<u>Flap 4</u>		<u>Full</u>	
<u>LBS</u>	<u>KG</u>	<u>V1</u>	<u>VR</u>	<u>V2</u>	<u>V1</u>	<u>VR</u>	<u>V2</u>	<u>V1</u>	<u>VR</u>	<u>V2</u>	<u>V1</u>	<u>VR</u>	<u>V2</u>	<u>Vfs</u>	<u>Vac</u>	<u>Vref</u>	
52911	24000	109	119	125	112	121	125	116	122	125	118	123	125	162	118	106	
54014	24500	111	121	126	114	122	126	117	124	126	120	125	126				
55116	25000	113	122	127	116	124	127	119	125	127	122	126	127	165	120	108	
56218	25500	114	124	128	118	125	128	121	126	129	123	128	129				
57320	26000	116	125	130	119	127	130	122	128	130	125	129	130	168	123	110	
58423	26500	118	127	131	121	128	131	124	129	131	126	130	131				
59525	27000	120	128	132	123	130	132	125	131	132	128	132	132	172	125	112	
60627	27500	121	130	133	124	131	133	127	132	133	129	133	134				
61730	28000	123	131	135	126	132	135	129	133	135	131	134	135	175	127	114	
62832	28500	124	132	136	128	134	136	130	135	136	132	135	136				
63934	29000	126	134	137	129	135	137	132	136	137	134	137	137	178	130	116	
65037	29500	128	135	138	131	136	138	133	137	138	135	138	138				
66139	30000	129	137	139	132	138	139	135	139	139	137	139	140	181	132	118	
67241	30500	131	138	141	134	139	141	136	140	141	138	140	141				
68344	31000	132	139	142	135	140	142	137	141	142	139	142	142	184	134	120	
69446	31500	134	140	143	136	142	143	139	142	143	141	143	143				
70548	32000	135	142	144	138	143	144	140	143	144	142	144	144	187	136	122	
71651	32500	137	143	145	139	144	145	141	145	145	143	145	145				
72753	33000	138	144	146	141	145	146	143	146	146	144	146	146	190	138	124	
73855	33500	139	146	147	142	146	147	144	147	147	146	148	148				
74958	34000	141	147	148	143	148	148	145	148	148	147	149	149	193	141	126	
76060	34500	142	148	149	145	149	149	147	149	150	148	150	150				
77162	35000	144	149	151	146	150	151	148	150	151	149	151	151	196	143	127	
78265	35500	145	150	152	147	151	152	149	151	152	150	152	152				
79367	36000	146	151	153	148	152	153	150	153	153	150	153	153	198	145	128	
80469	36500	147	153	154	150	153	154	151	154	154	149	154	154				
81571	37000	149	154	155	151	154	155	153	155	155	148	155	155	201	147	129	
82674	37500	150	155	156	152	155	156	154	156	156	147	157	157				

E190 --- Takeoff V-Speeds --- Flap 4 --- Mode T/O-1

<u>Pressure Alt.</u> <u>(ft.)</u>	<u>Static Air Temperature (°C)</u>																		
	-40 to 34	35 to 40	41 to 46	47 to 50															
SL →	-40 to 29	30 to 36	37 to 43	44 to 48															
1000 →	-40 to 26	27 to 31	32 to 38	39 to 45	46 to 46														
2000 →		-40 to 27	28 to 34	35 to 41	42 to 44														
3000 →		-40 to 22	23 to 29	30 to 36	37 to 42														
4000 →			-40 to 24	25 to 32	33 to 40														
5000 →			-40 to 19	20 to 27	28 to 38														
6000 →				-40 to 21	22 to 36														
7000 →				-40 to 15	16 to 34														
8000 →					-40 to 32														
9000 →					-40 to 30														
10000 →																			
<u>Weight</u>													<u>Flap 4</u>		<u>Full</u>				
<u>LBS</u>	<u>KG</u>	<u>V1</u>	<u>VR</u>	<u>V2</u>	<u>V1</u>	<u>Vfs</u>	<u>Vac</u>	<u>Vref</u>	<u>VR</u>	<u>V2</u>	<u>V1</u>	<u>VR</u>	<u>V2</u>	<u>Vfs</u>	<u>Vac</u>	<u>Vref</u>			
66139	30000	97	105	116	95	101	112	92	97	107	92	96	104	95	98	104	157	119	103
68344	31000	97	104	114	95	100	110	93	98	107	95	98	106	98	100	106	160	121	104
70548	32000	97	103	113	95	100	110	96	100	108	98	101	108	101	103	108	162	122	106
72753	33000	97	102	112	97	102	110	99	102	110	100	103	110	103	105	109	164	124	107
74958	34000	98	103	112	99	104	112	101	104	111	102	105	111	105	107	111	168	127	110
77162	35000	100	105	113	102	105	113	103	106	113	104	107	113	107	108	113	170	128	111
79367	36000	103	107	115	104	107	115	105	108	114	106	109	114	109	110	114	172	130	113
81571	37000	105	108	116	106	109	116	107	110	116	108	111	116	111	112	116	174	132	114
83776	38000	107	110	118	108	111	117	109	112	117	110	113	117	112	114	117	176	133	115
85981	39000	109	112	119	110	113	119	111	114	119	113	114	119	115	115	119	179	136	117
88185	40000	111	114	120	112	114	120	113	115	120	115	116	120	117	117	120	181	137	119
90390	41000	113	116	122	114	116	122	115	117	122	117	118	122	119	119	122	183	139	120
92595	42000	115	117	123	116	118	123	118	119	123	120	120	123	-	-	-	186	140	122
94799	43000	117	119	125	118	120	125	120	121	125	121	121	125	-	-	-	188	142	123
97004	44000	119	121	126	120	122	126	122	122	126	-	-	-	-	-	-	190	144	125
99209	45000	121	123	128	122	123	128	124	124	128	-	-	-	-	-	-	192	146	126
101413	46000	123	124	129	125	125	129	-	-	-	-	-	-	-	-	-	194	147	127
103618	47000	125	126	130	126	126	130	-	-	-	-	-	-	-	-	-	196	149	129
105822	48000	127	128	132	-	-	-	-	-	-	-	-	-	-	-	-	199	151	130
108027	49000	129	129	133	-	-	-	-	-	-	-	-	-	-	-	-	201	152	132
110232	50000	131	131	134	-	-	-	-	-	-	-	-	-	-	-	-	203	154	133

E-170 Fuel Planning Charts:

<u>Flightplan</u> Fuel only ISA, <u>no Wind</u>	MZFW 66.447 <u>lbs</u>	Fuel Consumed (<u>lbs</u>)	Break Release to Landing	Climb: 250 / 300 <u>kt</u> M 0.78	Cruise: M 0.78	Descend: M 0.78 300 / 250 <u>kt</u>
E170 max. Range at MZFW: ≈ 1500 nm						
<u>Fuelburn (lbs)</u> per hour ≈ 3500		<u>Fuelburn per 1nm</u> ≈ 7,78				
<u>Distance (nm)</u>	<u>Payload *</u> % / <u>lbs</u>	<u>Fuel (lbs) at FL 290/300</u>	<u>Fuel (lbs) at FL 310/320</u>	<u>Fuel (lbs) at FL 330/340</u>	<u>Fuel (lbs) at FL 350 - 410</u>	
100**	100 / 21100	1578	≈ 97% of FL290	≈ 94% of FL 290	≈ 91% of FL 290	
200						
300						
400						
500						
600						
700						
800						
900						
1000						
1500		12467				
After 1500nm Payload has to be traded for fuel. ***						
2000	76 / 16200	16356	≈ 97% of FL290	≈ 94% of FL 290	≈ 91% of FL 290	
2100	72 / 15400	17133				

- * Maximum Payload to MTOW (including pilots at 640lbs).
(Max Fuel = 20580 lbs)
- ** For a distance of 100nm altitudes of 15000ft maximum are assumed.
- *** Flying in higher altitudes - consuming less fuel - it is possible to carry the same payload over a longer range with the trade-off between the fuel, range and payload affecting the aircraft after a longer distance.

Fuel planning notes E170:

	<i>Basic Operating Weight (OEW)</i>	<i>046.385 LBS</i>	
+	<i>Payload (passengers & cargo)</i>	<i>XXX.XXX LBS</i>	
=	<i>Zero Fuel Weigh (ZFW)</i>	<i>XXX.XXX LBS</i>	<i>(max 66.447)</i>
+	<i>Minimum Landing Fuel</i>	<i>001.000 LBS</i>	
+	<i>Alternate Fuel (200nm distance)</i>	<i>001.500 LBS</i>	
+	<i>Contingency Fuel (holding, taxi, etc.)</i>	<i>001.000 LBS</i>	
=	<i>Planned Landing Weight (PLW)</i>	<i>XXX.XXX LBS</i>	<i>(max 72.312)</i>
+	<i>Flight Plan Fuel (fuel for route)</i>	<i>XXX.XXX LBS</i>	
=	<i>Planned Takeoff Weight (PTOW)</i>	<i>XXX.XXX LBS</i>	<i>(max 80.012)</i>

➔Flight Plan Fuel + 3.500 LBS = Total Fuel

➔ Total fuel = Enough fuel for route, 1h contingency (holding & taxi), problematic winds, alternate fuel for 200nm and a minimum landing fuel (1h). Modify alternate value as needed.

➔ Load all wing tanks with same amount of fuel; outer tanks full ➔ inner tanks ➔ center tanks.

E-190 Fuel Planning Charts:

<u>Flightplan</u> Fuel only ISA, <u>no Wind</u>	MZFW 89.947 <u>lbs</u>	Fuel Consumed (<u>lbs</u>)	Break Release to Landing	Climb: 250 / 300 <u>kt</u> M 0.78	Cruise: M 0.78	Descend: M 0.78 300 / 250 <u>kt</u>
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E190 max. Range at MZFW: ≈ 1650 nm

<u>Fuelburn (lbs)</u> per hour ≈ 4350		<u>Fuelburn</u> per 1nm ≈ 9,67			
<u>Distance (nm)</u>	<u>Payload * % / lbs</u>	<u>Fuel (lbs) at FL 290/300</u>	<u>Fuel (lbs) at FL 310/320</u>	<u>Fuel (lbs) at FL 330/340</u>	<u>Fuel (lbs) at FL 350 - 410</u>
100**	100 / 28800	1867	≈ 97% of FL290	≈ 94% of FL 290	≈ 91% of FL 290
200					
300					
400					
500					
600					
700					
800					
900					
1000					
1500					
1700					
After 1500nm Payload <u>has to be traded for fuel.</u> ***					
2000	88,8 / 17660	20133	≈ 97% of FL290	≈ 94% of FL 290	≈ 91% of FL 290
2400	74,6 / 21560	24000			

* Maximum Payload to MTOW (including pilots at 640lbs).
(Max Fuel = 28596 lbs)

** For a distance of 100nm altitudes of 15000ft maximum are assumed.

*** Flying in higher altitudes - consuming less fuel - it is possible to carry the same payload over a longer range with the trade-off between the fuel, range and payload affecting the aircraft after a longer distance.

Fuel planning notes E190:

	<i>Basic Operating Weight (OEW)</i>	<i>061.112 LBS</i>	
+	<i>Payload (passengers & cargo)</i>	<i>XXX.XXX LBS</i>	
=	<i>Zero Fuel Weigh (ZFW)</i>	<i>XXX.XXX LBS</i>	<i>(max 089.949)</i>
+	<i>Minimum Landing Fuel</i>	<i>001.250 LBS</i>	
+	<i>Alternate Fuel (200nm distance)</i>	<i>002.000 LBS</i>	
+	<i>Contingency Fuel (holding, taxi, etc.)</i>	<i>001.250 LBS</i>	
=	<i>Planned Landing Weight (PLW)</i>	<i>XXX.XXX LBS</i>	<i>(max 094.799)</i>
+	<i>Flight Plan Fuel (fuel for route)</i>	<i>XXX.XXX LBS</i>	
=	<i>Planned Takeoff Weight (PTOW)</i>	<i>XXX.XXX LBS</i>	<i>(max 110.893)</i>

➔Flight Plan Fuel + 4.500 LBS = Total Fuel

➔ Total fuel = Enough fuel for route, 1h contingency (holding & taxi), problematic winds, alternate fuel for 200nm and a minimum landing fuel (1h). Modify alternate value as needed.

➔ Load all wing tanks with same amount of fuel; outer tanks full ➔ inner tanks ➔ center tanks.