Operating manual
of the flying school

Westflug Flight Training GmbH & Co KG

Merzbrück airfield
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DE. ATO. 212

PART C "EN ROUTE FLIGHT"

OM Editorial

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All	O	W.Ka	01.12.2020	Re-creation

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OM-C 1Flight performance/execution

1.1 Flight performance

Speeds of our training aircraft

Speed	DA 20	DA 40	C 150	C 172 R	PA 28-161	E 300
V_S retracted flaps	41 kts	51 kts	55 MPH	44 kts	50 kts	64 kts
V_S extended flaps	37 kts	49 kts	48 MPH	33 kts	44 kts	----
Withdrawal speed	57 kts	59 kts	55 MPH	51 kts	50 kts	68 kts
V_X	57 kts (Flaps "Start")		70 MPH	60 kts	63 kts	96 kts
V_Y	65 kts (Flaps "Start")	66 kts (Flaps "Start")	76 MPH	79 Kts	79 kts	106 kts
Travel climb	69 kts (flaps "travel")	73 kts (flaps "travel")	80 MPH	80 kts	87 kts	110 kts
V_A (MTOW)	104 kts	108 kts	109 MPH	99 kts	111 kts	138 kts 154 kts (Acro)
V_{FE}	81 kts	91 kts	100 MPH	85 kts	103 kts	---
V_{NO}	118 kts	129 kts	120 MPH	129 kts	126 kts	138 kts
V_{NE}	161 kts	178 kts	162 MPH	163 kts	160 kts	219 kts
best glide angle	72 kts	73 kts	70 MPH	65 kts	73 kts	90 kts
V_{REF}	57 kts	71 kts	60 MPH	62 kts	63 kts	82 kts
Highest proven crosswind component	15 kts	20 kts	15 MPH	15 kts	17 kts	15 kts

Weights
(the information in the flight manual is authoritative)

Weights	DA 20 D-EWAG D-EWAV	DA 40 D-EWAQ	C 150 D-EWAD	C 172 R D-EWAE	PA 28-161 D-EFXE D-EHCN	E 300
Empty mass	532 kg 537 kg	804 kg	516 kg	761 kg	660 kg 673 kg	668 kg
Maximum take-off weight	730 kg	1150 kg	726 kg	1111 kg	1055 kg	950 kg
Max. Landing weight	730 kg	1150 kg	726 kg	1111 kg	1055 kg	950 kg
Max. Payload with full tanks	143 kg 138 kg	250 kg	148 kg	198 kg	262 kg 249 kg	147 kg
Max. Fuel quantity with max 2. persons on board (2x 84 kg)	30 kg 25 kg 42 Ltr 35 Ltr	Full	50 kg 69 Ltr	Full	Full	114 kg 158 Ltr

Take-off and landing distances
(the information in the flight manual is authoritative)

The indications in black apply for the following conditions:

- # Windstill
- Max. Take-off / tandem mass
- QNH Standard
- Sea Level
- Standard temperature

The data in (red) apply to following conditions

*wind calm
*Max . Take-off / tandem mass
*QNH 993 hPa
*Elevation 2,000 ft
* OAT 30° C

Routes	DA 20	DA 40	C 150	C 172 R	PA 28-161	Extra 330 LX
Take-off taxiway	340 m (550 yards)	330 m (450 yards)	224 m (305 ft)	289 m (408 ft)	330 m (520 yards)	115 m (167 ft)
Start distance	480 m (740 yards)	540 m (870 yards)	422 m (557 ft)	514 m (737 ft)	540 m (890 ft)	248 m (359 ft)
landing strip	454 m (500 yards)	780 m (860 m)	328 m (381 ft)	395 m (436 ft)	340 m (530 yards)	581 m (620 ft)
Landing taxiway	228 m (245 ft)	280 m (340 yards)	136 m (158 ft)	168 m (195 yards)	180 m (220 yards)	177 m (204 ft)

The table is intended to show the effects of adverse conditions such as a high outside temperature, low barometric pressure and/or higher elevation. A headwind component and/or lower take-off or landing mass will shorten the take-off and landing distances listed in the table.

1.2 Supervision of solo training flights

See OM-A 20

OM-C 2Flight planning

2.1 Obligation to prepare for flight

A full flight preparation shall be conducted for any flight that extends beyond the vicinity of the aerodrome: A full flight preparation includes:

- ✈ Preparation of a flight execution plan
- ✈ Fuel demand calculation
- ✈ Masses and centre of gravity determination
- ✈ Map Preparation
- ✈ Obtaining weather information
- ✈ Obtaining route information

The flight preparation is to be carried out by the student pilot. The flight instructor has to control the flight preparation. He remains responsible for the correctness and completeness.

2.2 Equipment

A cross-country flight may only be commenced if all documents necessary for the flight are on board:

Personal documents:

- ✈ Flightlog
- ✈ Licence (flight instructor)
- ✈ Valid certificate of examination
- ✈ Flight order (for solo cross-country flights)

Aircraft documents:

- ✈ Board book included:
  - Verification certificate airframe/engine
  - Verification certificate avionics
  - Confirmation of insurance
  - Registration certificate
  - Certificate of Airworthiness
  - Noise certificate
- ✈ Flight Manual
- ✈ Checklists for normal and emergency procedures

Documents for the execution of the flight

- ✈ Flight execution plan including fuel requirement calculation
- ✈ Mass and centre of gravity calculation
- ✈ Valid set of maps at a scale of 1:500 000 aeronautical chart for the entire route
- ✈ Weather data for the route (GAFOR, METAR, TAF printout via PC Met)
- ✈ VFR approach charts of the departure, destination and, if applicable, alternate aerodrome
- ✈ Course triangle
- ✈ Course ruler with scale 1:500.000
- ✈ Navigation computer - mech. or electr.
- ✈ Felt pen, ballpoint pen and kneeboard

Mobile additional equipment

- ✈ Flashlight (night flight training)
- ✈ Device (goggles, canopy or similar) for flying under assumed instrument flight conditions
- ✈ Lashing material (flights lasting several days)

2.3 Minimum safety heights

VFR cross country flights

The minimum safety altitude is defined in SERA.505. Westflug Flight Training does not make any special regulations for the minimum altitude of cross-country flights

Altimeter settings

The altimeter setting for flights under visual flight rules is regulated in § 35 LuftVO. Westflug Flight Training does not have any special regulations for the minimum altitude of cross-country flights.

Emergency Landing Exercises

Engine failures during cruise flight are simulated as part of the training for private aircraft pilots. These emergency landing exercises may only be conducted over undeveloped terrain. The flight instructor must familiarize himself with the terrain at the beginning of such an exercise. Emergency landing exercises shall not be conducted when:

- ✈ There are obstacles in the approach or departure area.
- ✈ There are people or animals on or in the immediate vicinity to the selected emergency landing field
- ✈ Flying model airplanes nearby
- ✈ high voltage line would have to be flown over at low altitude would have to

A real failure of the engine, especially in the take-off phase, should be taken into account. Therefore, the emergency landing field should be such that, taking all circumstances into account, there is no particular danger to the occupants in the event of a real emergency landing.

Westflug Flight Training has a permit issued by the Düsseldorf District Government for these purposes to fall below the minimum safety altitude. The emergency landing exercise must be carried out at an altitude of
30 ft GND to be aborted. Special reference is made to § 1 LuftVO:
Every participant in air traffic must behave in such a way that safety and order in air traffic are guaranteed and that others are not endangered, harmed or harassed.

Aerobatics/UPRT

Aerobatic training with flight instructor/UPRT

For aerobatics and UPRT a minimum altitude of 450 meters/GND must be maintained. Falling below this altitude, even to pick up speed (energy), is not permitted.

Solo aerobatics

Solo aerobatics shall be performed in such a way that the aerobatic flight is terminated at an altitude of 600 metres/GND at the latest.

2.4 Flight planning

2.4.1 Cross-country flights:

The learning objective of the cross-country flight briefings is to provide the student with the knowledge to prepare and conduct cross-country flights independently. In detail, the following skills are to be taught:

- Terrestrial navigation
- Radio navigation
- Small-scale orientation
- entry into the aerodrome circuit
- Commercial airport briefings
- Radiotelephony
- Behaviour in case of loss of orientation
- Flight Management

2.4.2 Flight Execution Plan:

Cross-country flights are planned exclusively with our software "Jeppesen Flight Star". Other, student's own flight preparation programs are not accepted. Either the "Expanded Log" or "Standard Log" can be used as flight log. The advantage of the "Expanded Log" is that it includes information about engine power settings and wind. The disadvantage is the wide format, which is unwieldy on the kneeboard, and the somewhat confusing fields for recording flight times. During the flight, records of the flight progress are to be kept. This means the actual overflight times of the turn- or control points (Actual Time Over ATO) and the expected, corrected overflight times of the next fix (Estimated Time Over ETO). Checkpoints must be scheduled at least every 15 minutes of flight. Even on short routes, at least one checkpoint must be scheduled. It is important that the records are also made in the appropriate fields. (Take off time, landing time etc. must also be recorded in the appropriate fields).

2.4.3 Fuel demand calculation:

General

A flight may only be commenced if sufficient fuel is on board in accordance with the quantities specified in this Operations Manual.

All route-relevant weather information as well as the relevant legal regulations and ordinances must also be taken into account for fuel calculation.

During a flight, a flight plan may only be deviated from if, inter alia, all requirements regarding the amount of fuel to be carried are met, except in emergency situations.

Definitions

Taxi Fuel: Fuel required for starting, taxiing and engine checking.

Trip Fuel : Fuel for cruise climb power to the top of climb
+ Proportion of fuel in cruise flight for the section between top of climb and point of descend (flow rate calculated for a mixture setting "max Power" at the selected power setting)
+ Fuel for the descent to the altitude of the airfield
+ a surcharge for the approach and landing of 10 minutes

Contingency: 10% of trip fuel, but not less than for a flight time of 5 minutes.

Alternate Fuel: Fuel for the flight to the alternate airport at an altitude of 5,000 ft. The flight to the alternate airport must be planned according to the standard route and must include at least the fuel for a missed approach at the destination aerodrome. The fuel quantity for the flight to the alternate aerodrome must be sufficient for a flight time of at least 15 minutes.

Final reserve fuel: VFR: Fuel for a flight time of 30 flight minutes

Additional Fuel: Additional fuel for the flight time, which is spent e.g. for practice approaches or flight exercises.

Reserve fuel: Contingency
+Alternate fuel
+ Final reserve fuel
+Additional fuel results in the reserve fuel

Minimum T/O Fuel: Trip Fuel + reserve Fuel results in the minimum T/O fuel.

Extra Fuel: Difference between the actual and the permitted take-off weight. If and how much extra fuel is taken on board is at the discretion of the pilot in command.

Burn off: Fuel burned off after landing during a normal flight according to the flight plan.

Uplift: Fuel the aircraft has on board when it rolls off the ramp.

Calculation of the fuel requirement

As part of the theory lessons, our students receive extensive knowledge about the determination of fuel requirements. By passing a theory exam in the subject "flight planning", the proof of sufficient knowledge in this subject is provided. Since the majority of pilots, whether private or professional, carry out a fuel requirement calculation in practice with the aid of an EDP program, the handling of such programs is practised in the course of the practical training. In our school we use the flight preparation program of the company Jeppesen. (Flight Star) In our company, the training manager is responsible for updating the program.

Notice:
The pilot in command is responsible for the correctness of a fuel requirement calculation with the aid of an EDP program. He has to make sure that the values given in the program correspond to the data in the flight manual.
If a computer program is not available, the fuel requirement calculation will be made with the help of the values given in the flight manual according to the pattern described below. The flight instructor must satisfy himself at least once during the training that the student is still proficient in this type of calculation.

Scheme for a fuel demand calculation

	trip fuel	(=Climb + Cruise + Descent)
	+ Contingency Fuel	(=10% of Trip Fuel; but not less than Fuel for 5 min
Reserve fuel	+ Alternate Fuel	
	+ Final reserve fuel	
	+ Additional fuel	10 Minutes for 2 Circuits
	= Minimum T/O fuel	(= Fuel required)
	+ Extra Fuel	
	= T/O Fuel	
	+ Taxi Fuel	
	= Total Fuel	(= Block Fuel)

Notes:

If there are several sections, the burn off from the first section is subtracted from the original uplift. This calculation gives the (theoretical) uplift for the second leg and so on. Before take off, the pilot in command must be satisfied that the actual fuel quantity is greater than or equal to the minimum take off fuel.
For the departure from the circuit in Aachen and for the entry into the circuit at the destination aerodrome, 5 flight minutes "Approach Time" each, i.e. in total 10 flight minutes, must be taken into account. It must be ensured that the remaining fuel quantity after a stopover, if refuelling is not required, is correctly stated. For this purpose, not only the fuel for the trip (Trip Fuel) but also the fuel for the 10 minutes Approach Time (Additional Fuel) must be deducted from the originally refuelled fuel quantity.

2.4.4 Map preparation:

For cross-country flights, only the aeronautical chart at a scale of 1:500,000 is to be used. The course lines, the control points and a wind arrow are to be entered on the chart. The lines must be drawn clearly (no thin pencil lines). However, care should be taken not to overdraw any navigationally important information. (e.g. frequencies, identifications etc.) The lines must be drawn in such a way that they cannot be blurred during the flight. (Waterproof pens or tape over with transparent tape). Likewise, the aerodrome circuit must be transferred from the AIP to the aeronautical chart. This ensures that the student is familiar with the aerodrome circuit and that he gets a feeling for the different scale of the AIP approach sheet and the ICAO chart. During flight the chart must be held in the direction of flight. (Not "North Up")

Cockpit Management:

During cross-country flights, care must be taken to ensure that a practical arrangement system is also used in the cockpit. Basically a DIN A5 knee board (for space reasons no DIN A4) is to be used, which is to be fastened with a belt or similar on the right leg for right-handers and on the left leg for left-handers. There must be a pin on a cord on the knee board. The pin must not have a cap that must be removed before use. The aeronautical chart must be folded before the flight in such a way that the entire route can be seen without folding it again. If the route covers more than one card, the following cards have to be folded accordingly. If necessary, use staples (not tape, otherwise it will be difficult to change the route during the flight and outside the folded area) to keep the map in the desired shape. Approach sheets are to be kept either handy in the side pocket or, depending on the design, in the kneeboard.

Flight Management:

In the case of cross-country flights, in addition to the actual navigation, the manner in which one controls and conducts such a flight is also important. The departure should be briefed before take-off. That is, the first heading and the first navigational salient feature should be announced. The take-off is to be arranged in such a way that one takes off in the desired direction on the shortest possible way. (So do not first go up to altitude and then fly off from the centre of the airfield, as was the earlier doctrine). After reaching the altitude of the aerodrome, climb at cruising speed. During longer flights, radiotelephony with the flight information is to be recorded. The transponder must always be switched on before take-off (incl. altitude interrogation). If a fuel selector switch is available, it must be switched on after take-off after a flight time of 30 minutes, thereafter at intervals of 60 flight minutes. The destination aerodrome must be called at least 5 minutes before reaching the aerodrome circuit (not only when the destination aerodrome is already in sight). The descent must be planned in time to arrive at the destination aerodrome at aerodrome level. A landing briefing must be conducted in good time. The briefing must contain the aerodrome circuit altitude, the approach to the aerodrome circuit, the runway direction, the approach speed (V_{TGT}) as well as the flight path in case of a take-off. After landing, the landing time, the time counter reading and the remaining fuel quantity and the resulting "burn off" must be entered in the flight execution plan. It must also be checked whether the remaining fuel quantity is sufficient for the next leg according to the flight plan, or whether refuelling is necessary.

OM-C 3 Loading

General

The pilot in command (flight instructor) must ensure that the load and the centre of gravity are within the permissible range according to the flight manual.

For all flights a mass and C.G. calculation must be made. For cross-country flights, this calculation must be carried in the form of a loading plan. The loading plan must show the actual take-off weight and the expected landing weight.

A take-off is not permitted until the pilot in command (flight instructor) is satisfied that:

- ✈ fuel and other operating materials are on board in accordance with the loading plan.
- ✈ take-off and landing weights are within the permissible range
- ✈ The number of persons on board is identical to the number of persons shown in the loading plan.
- ✈ The centre of gravity is within the permissible range for the entire duration of the flight.

Notice:
The fuel gauges in smaller aircraft can sometimes show considerable differences between the fuel quantity displayed and the actual fuel quantity. In case of doubt, it is essential to determine the actual fuel quantity with the aid of a dipstick.

Standard weights

For crew members, standard weights may be used to simplify flight preparation. Exception: the standard weight obviously deviates strongly from the actual weight. As soon as standard weights are calculated, the standard weight must be used for **ALL** crew members.

The standard weight for crew members including navigation bag is

85 kg/187 lbs per person.

Some of our training aircraft are operated with both "AVGAS" and "MOGAS". The specific gravity of both fuels can be assumed to be 0.7.

Method of mass and centre of gravity determination

Within the framework of theory lessons, our students receive extensive knowledge about the determination of masses and the centre of gravity. By passing a theory examination in the subject "mass and centre of gravity", proof of sufficient knowledge in this subject is provided. Since the majority of pilots, whether private or professional, carry out a mass and centre of gravity determination with the help of a computer-aided program in practice, the handling of such programs is practised during the practical training. In our school we use the flight preparation program "FlightStar" from the company Jeppesen. In our company, the training manager is responsible for updating the program.

Notice:
The pilot in command is responsible for the correctness of a determination of the masses and the centre of gravity by means of a computer program. He must satisfy himself that the values given in the program correspond to the actual weights.
If a computer program is not available, the mass and C.G. determination shall be made using the method provided in the AFM. The flight instructor must satisfy himself at least once during the training that the student is still proficient in this method of determination.

OM-C 4/5 Weather minima/Dual and Solo

The following minimum weather conditions and maximum wind conditions apply to Westflug Flight Training training flights:

Training phase	Visibility (km)		Main cloud base (feet)		HWC/CWC (kts)	
	dual	solo	dual	solo	dual	solo
Familiarization flights/airwork (LAPL; PPL; CRI, FI, CR SEP)	8		2.000		25/15	
Course laps (LAPL,PPL, CRI, FI, CR SEP without TD)	1,5	3	1.000	1.300	25/15	15/10
Target landings/emergency landing exercises (LAPL; PPL; CRI, FI, CR SEP without TD)	8	8	2.000	2.300	25/15	15/10
Course rounds CR SEP Taildragger)	1,5	3	1.000	1.300	25/10	15/05
Cross-country flights/radio navigation (LAPL/PPL, CRI, FI)	5	10+	1.000	2.000	25/15	15/10
Exam preparation (LAPL; PPL; CRI, FI)	10+		3.000		15/10	
Aerobatics - individual exercises	8	10+	3.500	3.500	25/10	15/05
Aerobatics Program	8	10+	3.500	4.000	25/10	15/05
Spin (CRI; FI; KFB; UPRT)	8	10+	3.500	4.500	25/10	15/05
Upset procedure	8		3.500		25/10	
night flight aerial laps	8	10+	1.500	1.500	25/15	15/10
Night flight overland	8		3.000		25/15	

OM-C 6 Training routes/areas

6.1 Training location

The training location of our ATO is the airfield Aachen - Merzbrück (EDKA). Basically, every training project starts at the training location. An exception to this is only possible after consultation with the training manager and only in justified individual cases. Examples for such individual cases would be:

- ✈ The training aircraft could not return to the airfield Aachen - Merzbrück due to weather conditions.
- ✈ For night flight training the aircraft was stationed at another airfield for several days.
- ✈ In the case of training on the owner/operator's aircraft, the aircraft is located at another airfield and must be transferred from there to Aachen.

The above mentioned reasons are only examples. The flight preparation and the briefing have to take place in Aachen beforehand in any case.

6.2 Training airfields

In principle, VFR training flights with flight instructor can be carried out to all commercial airports and commercial airfields (not special airfields !) within Germany, provided that they fulfil the following criteria:

- ✈ TODA and LDA at least 1.6 times the required take-off and landing distance respectively
- ✈ The aerodrome is approved for the aircraft category

In the training manuals for the LAPL and PPL training, specific airfields are provided for the first cross-country flight briefings. As soon as the cross-country flight briefings provided for in the training manual have been carried out and the student requires further cross-country flights, the flights to the above-mentioned airfields can be carried out.

Airfield/Airport	Identifier	Learning Goal
Mönchengladbach	EDLN	Commercial airport briefing, night flight
Grefrath	EDLF	Landing grass (Soft Field)
Kamp Lintfort	EDLC	Landing grass (Soft Field)
Lower Rhine	EDLV	Commercial airport briefing, night flight
Stadtlohn	EDLS	Stopover Nav Triangle
Münster Telgte	EDLT	Stopover Nav Triangle
Dinslaken	EDLD	Automatic announcement, blind transmission, night flight
Bonn Hangelar	EDKB	Behaviour in foreign places
Dahlem Binz	EDKV	Behaviour in foreign places

6.3 Flights to aerodromes in neighbouring countries

Within the scope of cross-country flight briefings, the following places in neighbouring countries may also be approached with a flight instructor. These flights serve to practice English radiotelephony and the transmission and handling of flights with a flight plan obligation. No solo flights may be made by student pilots abroad.

Airfield/Airport	Identifier	Learning objective/special features
Spa	EBSP	Skydiving
Liege	EBLG	Commercial airport briefing
Maastricht	EHBK	Commercial airport briefing

6.4 Practical training in the FSTD

Westflug Flight Training does not currently employ an FSTD.