Guide to Familiarisation and differences training between Single Engine Piston (SEP) variants for flight instructors or pilots

Can also be used as a guide for instructors giving differences training for Single Engine Piston (SEP)

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Can also be used as a guide for instructors giving differences training for Single engine Piston (SEP).

This guide focuses on familiarisation training for Single Engine Piston (SEP) aeroplanes since there is no requirement for this training to be conducted at an ATO, DTO or by a qualified instructor, as it is for differences training.

The Norwegian Civil Aviation Authority highly recommends that all training, also familiarisation training between variants be conducted at an ATO, DTO, or for SEP with a qualified flight instructor.

Definitions of variant and base aircraft

- **Variant** means an aircraft within the same rating that has differences to the base aircraft requiring difference training or familiarisation training.
- **Base aircraft** means an aircraft used as a reference to compare differences with another aircraft. Usually the aircraft variant the pilot has a current rating on.

Requirements*
The regulation states that, to fly another variant a pilot shall complete either:

- **Differences training** or **Familiarisation training.**

- ***Differences training*** *requires the acquisition of additional knowledge and training on an appropriate training device or the aircraft. This training* ***shall*** *be conducted at an ATO, DTO or qualified instructor for SEP.*

- ***Familiarisation training*** *requires the acquisition of additional knowledge. There is NO requirement for this training to be completed at a training organisation or qualified instructor. (CAA Norway highly recommends that familiarisation training should be conducted at a training organisation or qualified instructor).*

Pilots should complete differences training or familiarisation training in accordance with EASA publication List of Aeroplanes — Class and Type Ratings and Endorsement List, that can be found on the EASA website:
https://www.easa.europa.eu/document-library/product-certification/typeratings-and-licence-endorsement-lists.
This list is also reproduced in the guidance material for FCL.700, that includes class rating. Parts of this list is copied below where this is explained.

There is no requirement for re-current differences training for the SEP class of aircraft. It is recommended that SEP variants follow the requirements for other class and type variants. If variant has not been flown within 2 years following the differences training, a further differences training or a proficiency check (PC) in that variant shall be completed.

The differences training or the proficiency check in that variant shall be entered in the pilots' logbook equivalent record and signed by the instructor or examiner as appropriate. (It is recommended that all training should be documented).

*Regulations can be found in (EU) 1178/2011 FCL.700 and FCL.710 with acceptable means of compliance (AMC) and guidance material (GM).

The list below determines which training is needed between variants of the same class of aircraft (SEP).

The list below does not include information on manufacturer's models of aircraft but is divided into SEP which are equipped differently that determines if you will need **differences training** or **familiarisation training.**

Note 1: the list below is extracted from GM1 FCL.700

1	2	3	4
Manufacturer	**Aeroplanes** Class SEP (land)	D	**Licence Endorsement**
All manufacturers	SEP (land)	D	SEP (land)
	SEP (land) with variable pitch propellers (VP)		
	SEP (land) with retractable undercarriage (RU)		
	SEP (land) with turbo or super charged engines (T)		
	SEP (land) with cabin pressurization (P)		
	SEP (land) with tail wheels (TW)		
	SEP (land) with Electronic flight instrument system (EFIS)		
	SEP (land) with "single lever power control» (SLPC)		

1	2	3	4
Manufacturer	**Aeroplanes** Class SEP (sea)	D	**Licence Endorsement**
All Manufacturers	SEP (sea)	D	SEP (sea)
	SEP (sea) with variable pitch propellers (VP)		
	SEP (sea) with turbo or super charged engines (T)		
	SEP (sea) with cabin pressurization (P)		
	SEP (sea) with Electronic flight instrument system (EFIS)		
	SEP (sea) with "single lever power control» (SLPC)		

Note 2:
Colum 1 describes all manufacturers of SEP.
Colum 2 describes class of and variants of the same class.
Colum 3 describes when differences training is required. The D indicates that differences training is required between variants on different lines. Different variants within the same line requires ***familiarisation training.***
Colum 4 describes what is written on the pilot licence, "licence endorsement".

Note

- Touring Motor Glider (TMG), requires as a minimum, familiarisation training between variants.
- Single-engine turbo-prop (SET), requires differences training between variants.
- Multi-engine piston (MEP), requires differences training between variants.

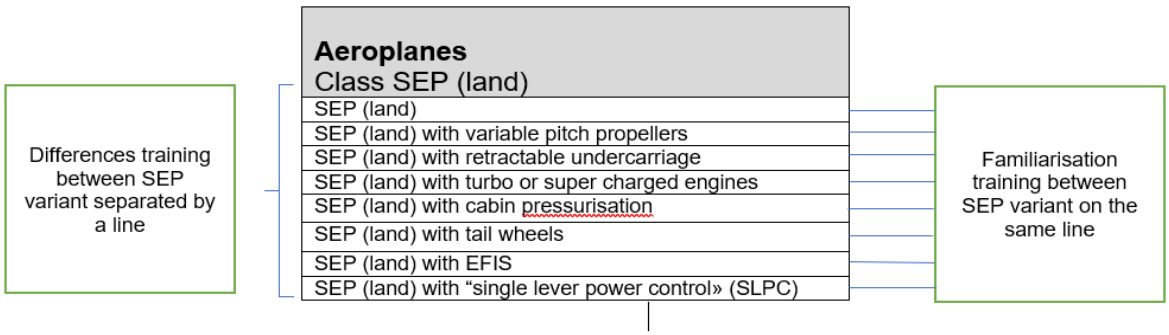
Explanation of the table above

Familiarisation training is needed if you are going from a SEP to another variant of SEP within the same line. For example, a Cessna 172 to Piper 161.

Differences training is needed if you are going from a SEP with different "equipment" as defined in Colum 2 in the table above. For example, a standard SEP like a Cessna 172 to another SEP variant with either variable pitch propeller, retractable undercarriage, turbo or super charged engines, cabin pressurization, EFIS or "single lever power control» (SLPC). All differences training shall be done at an ATO or DTO or with an qualified flight instructor for SEP, MEP and TMG.

The differences training shall be entered in the pilots' logbook or equivalent record and signed by the instructor or examiner as appropriate if a PC is conducted. The Norwegian Civil Aviation Authority recommends that also familiarisation training should be entered in the pilot's logbook or equivalent record and signed by the instructor.

Visually explained:



Content of the familiarisation training

It is important with at proper ground theoretical training and flight training. The whole flight manual and systems should be reviewed and thoroughly understood with focus on the difference between the variant the pilot is qualified on and to the new variant. Make sure that mass and balance, performance planning are understood and practiced.

Training flight items can be based on the exercise items of the proficiency check, as deemed relevant by the instructor and depending on the experience of the pilot. The briefing should include a discussion on *Threat and Error Management* (TEM) with special emphasis on loss of control in flight and decision-making on how to avoid loss of control when flying the aircraft in configurations low to the ground. Take the time needed for proper training, use several lessons if necessary.

Periodically practice stall avoidance and recovery at a safe altitude after the pilot has received enough instruction to feel comfortable. Stall recognition and recovery should not be self-taught. Your first experience should not come from an inadvertent stall that catches you by surprise.

Familiarisation/differences training guide checklist

1. Checklist for finding out what training is required. Familiarisation training or Differences training		
From the list below, find the line where the base aircraft variant the pilot is qualified on are located. Then find line the new variant of SEP comes under: • If the two variants are on the same line, then **familiarisation training** shall be completed between the variants. It is recommended that this training should be conducted at an ATO, DTO or with a flight instructor. • If the two variants are **NOT** on the same line, then **differences training** shall be completed at an ATO, DTO or with a flight instructor.		
	Going from:	**To:**
This requires what type of training:	☐	☐
➢ SEP	☐	☐
➢ SEP with variable pitch propellers	☐	☐
➢ SEP with retractable undercarriage	☐	☐
➢ SEP with turbo or super charged engines	☐	☐
➢ SEP with cabin pressurization	☐	☐
➢ SEP with tail wheels	☐	☐
➢ SEP with EFIS	☐	☐
➢ SEP (land) with "single lever power control» (SLPC)	☐	☐

2. Personal detail of the pilot seeking checkout on a new variant	
Last name	First name(s)
Address	City and zipcode
Phone	E-mail
Check before traning • Valid class rating on SEP • Valid medical certificate class 1 or 2 • Valid language proficiency • Total time on the class (SEP): • Total time on similar variants: • Total flying time: • Use point 1 above to determent training needed	

3. If training is by done by an instructor, enter instructor details	
Last name	First name(s)
Phone	E-mail
Instructor certificate and ratings • Valid class rating on SEP • Valid instructor certificate with valid variant rating • Valid medical certificate class 1 or 2 • Valid language proficiency	

Theoretical part of the training

Theoretical review/ground training		Theoretic training
Review these elements with the instructor for training to the new aircraft variant. For familiarisation training you may review these elements as self-study, however it is recommended to use an instructor. Use all available information on the new variant such as the aircraft manual, manufacturer information or other relevant information.		Training subject
1	**Pilot responsibilities and licensing** • Review pilot responsibilities as a pilot in command according to NCO.GEN.105 • Review the difference between difference training and familiarisation training to another variant of aircraft and when it is required (FCL.700 and FCL 710 and EASA Type Ratings and Licence endorsement list with explanatory notes	☐
2	**System differences to the new variant** • Thorough review of the aircraft's flight controls and systems with a focus on the differences in the new variant • Identify and discuss any unique controls, configurations, and functions in the new aircraft variant. • If checklist used for differences training review in detail differences between SEP variants with variable pitch propellers, retractable undercarriage, turbo or super charged engines, cabin pressurization, tail wheels, EFIS and Single lever power control if applicable.	☐
3	**The new variants flight characteristics** Review and discuss the flight characteristics of the new variant in relation to other variants you fly in the same class of aircraft, for example: • Possible challenges with «low-inertia, high-drag" on the new variant • Possible challenges form a light and low performance variant to another variant with high performance/engine power • Possible great variation in critical flight characteristics like, slow flight, approach to stall and spin	☐
4	**Engine** • Review differences to the new variant, engine, engine control(s), and what to look for with the new variant engine, oil, ignition/start (engine settings etc., fuel and oil types and quantities. • Review engine check, start, operation and known engine problems	☐
5	**Stalls characteristics** • Discuss the stall characteristics and indications of the new variant in relation to others and in where stall can occur during flight. • Review the stall exercises to be flown. (Stall recognition and recovery should not be self-taught, practice stalls with an instructor before you can practice yourself)	☐
6	**Spin characteristics** • Review spin characteristics on the new variant with focus on where spin can occur during flight, spin avoidance and how to get out of a spin. • Review «spin avoidance" and recovery. (Shall not be practiced in the aircraft)	☐
7	**Review of exercises** • Review normal exercises to be completed. • Review ab-normal exercises • Review emergency exercises • Review engine settings through alle exercises	☐

8	**Limitations** • Review the operational limitations of the new variant and the importance of always check that you are within all limits before and during flight	☐
9	**Mass and balance** • Review and practice mass and balance calculations with focus on the importance of this, and how easy it might be is to exceed limits when approaching the maximum limitations in a light aircraft. • Practice what it takes for the variant to exceed limit for both mass and balance in different load configurations. (extra fuel, baggage, and passengers)	☐
10	**Aircraft Performance** • Review and practice performance calculations in several scenarios and weights for, take off, departure, climbing, gliding and landing distances with different runway surfaces.	☐
11	**Aircraft speeds** • Review and review the aircrafts speeds, Vs, Vr, Vx, Vy, Va, Vno, Vne, best glide, cruise climb, other	☐
12	**Taxiing technique** • Review the technique for taxiing • Review use of pedals and brakes	☐
13	**Takeoff/departure discussion** • Torque, P-faktor, og gyroscopic effect • Review the use of pedals/brakes on take off • Review crosswind and crosswind component. Aircraft max crosswind limit and your own limit. • Review s short field takeoff • Review take off from runways with other surfaces (gravel, grass and snow) • Engine run-up procedure • Takeoff and departure briefing including emergency plan scenarios.	☐
14	**Airwork/flight profiles discussion** • Review departure, climb, descent, approach and landing profiles, including different performance scenarios (light or heavy aircraft) • Review energy management • Review awareness of high sink rates with low airspeeds on approach	☐
15	**Landing discussions** • Review technique for landing flare and touchdown • Review the use of pedals/brakes during landing • Review crosswind and crosswind component. What is the maximum aircraft limit and your own limit. • Review flapless landing • Review landing on other surfaces (gravel, gras and snow) • Review short field landing • Review go-arounds • Review recovery from bounced or ballooned landings	☐
16	**Use of checklist** • Review the importance of checklist use • Practice the use of checklist	☐
17	**Cockpit Management** • Adjustment of seat and seat belt • Opening and closing of exits and emergency exits • Review and review the differences in cockpit design from different variants. • Review cockpit management in the actual variant • Drill checklist, procedures, controls and switches • Review situational awareness • Review decision making • Review risk and TEM and measures to reduce risk with focus on loss of control in flight. • Review the importance of keeping good “look out”	☐
18	**Management** • Discuss and check correct aircraft documents • Discus the procedures for filing of fuel oil check • Daily inspection • Weather and NOTAM • ATC flight plan • Review filling out aircraft log before and after flight • Review checking and filling out technical log before and after flight • Review «pre-flight» procedure • Review «post-flight» procedure and securing of aircraft.	☐

Practical flying part of the training

All training is recommended to be performed in daylight conditions.

Pre-flight operations and departure		Practical training
Section 1		Training subject
1.1	Pre-flight including: Documentation, mass and balance, performance calculation weather briefing, NOTAM	☐
1.2	Pre-start checks	☐
1.2.1	External	☐
1.2.2	Internal, with use of radio and navigation aids	☐
1.3	Engine starting: Normal malfunctions	☐
1.4	Taxiing	☐
1.5	Pre-departure checks: Engine run-up (if applicable)	☐
1.6	Take-off procedures: – normal with flight manual flap settings, – crosswind (if conditions available)	☐
1.7	Climbing: – Vx/Vy – turns onto headings; and – level off.	☐

Airwork		Practical training
Section 2		Training subject
2.1	Straight and level flight at various airspeeds including flight at critically low airspeed with and without flaps	☐
2.2	Steep turns (360° left and right at 45° bank)	☐
2.3	Stalls and recovery: (i) clean stall (ii) approach to stall in descending turn with bank with approach configuration and power (iii) approach to stall in landing configuration and power (iv) approach to stall, climbing turn with take-off flap and climb power (Single engine aeroplane only) (It is NOT recommended to practice stalls in a new aircraft that you not familiar with. If new to the aircraft practice stalls for the first time with a flight instructor)	☐
2.4	Handling using autopilot and flight director, (may be conducted in section 3) if applicable	☐

Arrivals and landings		Practical training
Section 3		Training subject
3.1	Aerodrome arrival procedure	☐
3.2	Normal landing	☐
3.3	Flapless landing	☐
3.4	Crosswind landing (if suitable conditions)	☐
3.5	Approach and landing with idle power from up to 2 000 ft above the runway (SEP only)	☐
3.6	Go-around from minimum height	☐

Abnormal and emergency procedures (This section may be combined with Section 1 through 4)		Pactical training
Section 4		Training subject
4.1	Rejected take-off at a reasonable speed review	☐
4.2	Simulated engine failure after take-off review	☐
4.3	Simulated forced landing without power review	☐
4.4	Simulated emergencies: (i) Fire or smoke in flight (ii) Systems' malfunction as appropriate	☐

4. Details of the flight			
Registration	Type / Class of aeroplane and variant:	Block on	On ground
Departure aerodrome	Destination aerodrome	Block off	Take-off
Name of PIC		Total block	Total

5. Remarks by the instructor		
☐ De-briefing / taken part of comments above	Date	Signature of pilot candidate