

Sound measurements

Twice a year, sound measurements are offered by the EAS sound measurement group. The dates are published on the EAS homepage <http://www.experimental.ch/events>

The legal basis for the measurement is VLL 748.215.3. For our aircraft, it refers to ICAO Annex 16, Chapter 10 and paragraphs 10.2 to 10.6. The sound limits depend on the MTOW of the aircraft, see Table Page 5.

In Switzerland, four charge classes/noise limits are defined at the moment:
 A applies only to Aircraft put into service before 4.11.1999. Newer aircraft <1500 kg have B as maximum limit. C limit is valid up to 2dB(A) below limit B, but maximum 85 dB(A). The D charge class is 2dB(A) below C. The 75 dB(A) value is valid as a maximum value for tug aircraft and 65 dB(A) is the maximum value for Ecolight.

FAQ:

What is measured and how?

- The basis is the "ICAO Noise Test Procedure",
- to fly over the microphone 2.5 km after takeoff, to simplify this, approach at a pre-calculated altitude and climb at the intersection with the climb curve at maximum power and vy.
- see below measurement / flight profile

Who needs to take a measurement in the first place?

- In principle, every aircraft must be measured, unless it corresponds to a previously measured aircraft in terms of type (model, weight, performance data), propulsion system (engine and propeller) and silencer system. In the case of aircraft of the same type with the same drive system (propeller, engine, silencer), the FOCA may dispense with a measurement.

What are the requirements?

- Registration form filled in with the correct data (EAS Form 15.11)
- Defined weather conditions (wind max. 5kt, no rain, no snow coverage, etc.)
- Exact flying of the flight profile with vy on the measurement line

What is the cost of sound measurement per aircraft?

Subject	Costs CHF
EAS Member Experimental	400.00
Externe Experimental (D, F, I, OE)	600.00
EAS Member <i>certified</i> Aircraft	1200.00
Externe <i>certified</i> Aircraft	1800.00

Where is the exact procedure of the "**sound measurement**" process specified?

- **EAS Form 15.12_E**

Daily schedule measurement day

At the announced time (three aircraft/pilots) of the measurement day, a short briefing takes place on the airfield, in which the procedure is pointed out again and the order is confirmed. In case of a large number of aircraft to be measured, a morning and an afternoon group is divided.

Once again, reference is made to the measurement sheet sent out, which lists the height above ground at which the measurement point is to be approached and what the flight profile must look like. According to ICAO, the microphone must be flown over 2.5 km after takeoff. To simulate this, the measuring point is approached at a pre-calculated altitude and climbed with V_y from the point of intersection with the climb curve (see graphic flight profile).

The data on the engine, propeller and exhaust are compared on the aircraft with those in the AFM. Furthermore, the aircraft is equipped with a sensor box (under the right wing) and a cockpit tablet. The following values are collected by these devices and transmitted online to the ground station: Air temperature, RPM, altitude.



Checkout and Sensorbox

Photographs of the propulsion components (exhaust, engine, propeller) are made for reference during rechecks. The propeller diameter will be checked. A W&B (MTOW) must be submitted in paper form. The pilot is responsible for the required MTOW (possibly passenger).

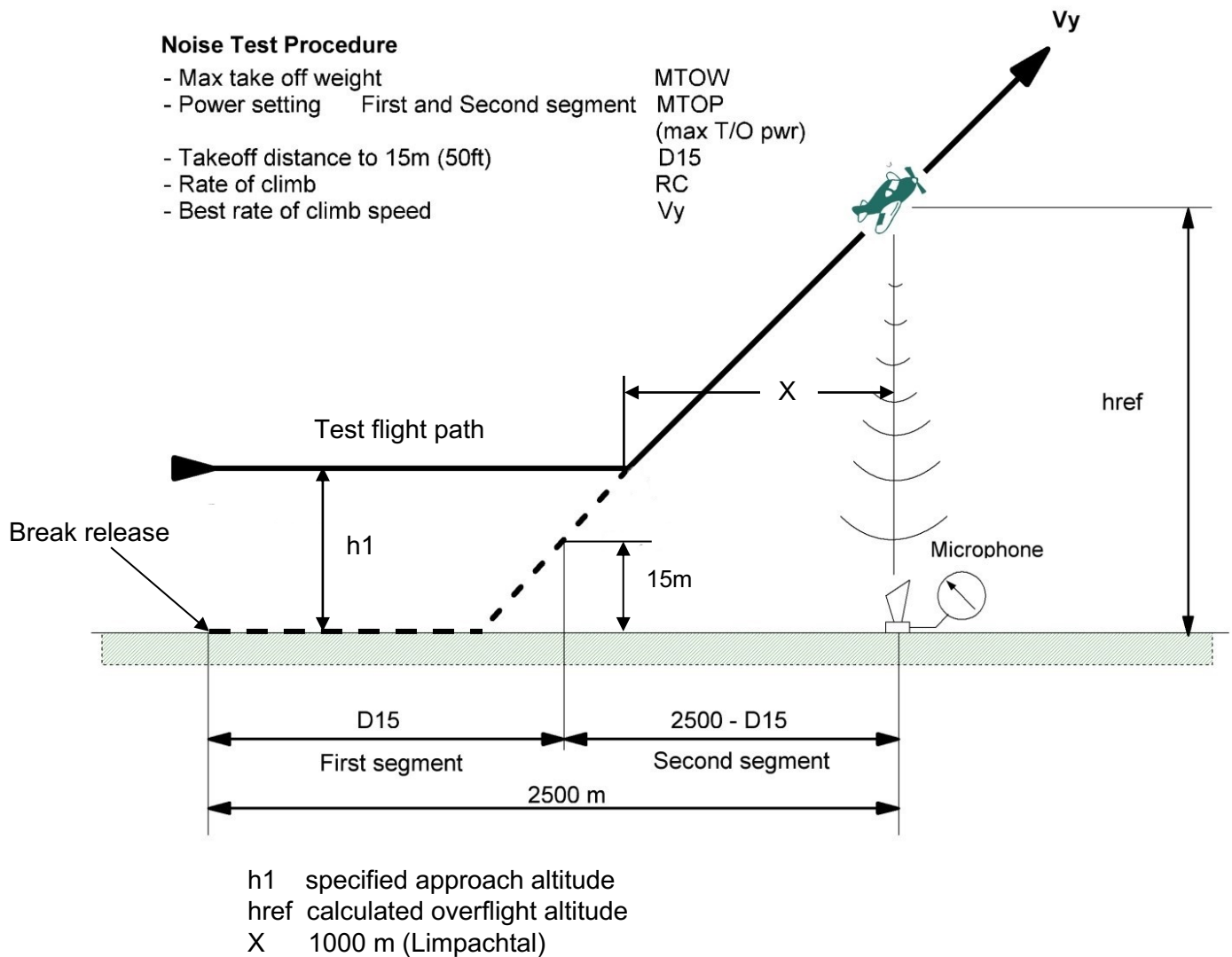
In a side valley to the airfield Grenchen (Limpachtal in the area of the ARA) the measurement is performed. Entry into the ready area (Holding EAS, area Schnottwil) in 2900 ft AMSL and call on the frequency 130.105 at the measuring point. As soon as the measurement area is free, the pilot is requested to enter the downwind of the measurement area.

Measurement-/ flight profile

The approach is made in climb configuration, according to the values recorded in the AFM. To simulate a takeoff, climb is started at the specified point, at maximum power and exactly V_y . The overflight is continued beyond the microphone until the "turn off" indicator lights up on the cockpit tablet. The measuring station informs the pilot whether the overflight was valid. This procedure is repeated for 6 valid overflights to obtain the required number of usable readings.

During overflight, the flight altitude and the lateral deviation from the measuring point determine the validity.

ICAO Appendix 6 , Annex 16



Measured value determination



Sound measurement with measuring point

The recorded data are stored, likewise the prevailing environmental data such as wind, temperature, humidity, air pressure. These are used to correct the measured sound values in order to calculate the specific values for classification into the charge classes/noise limits. (see picture charge classes)

After returning from the measurement flights to the Grenchen airfield, a short debriefing is conducted.

The processed data is sent to the FOCA, which checks it and issues the noise certificate. The FOCA may also decide that a further measurement must be carried out.

The noise limits depend on the weight of the aircraft (see table below).

Four fee classes are currently used in Switzerland:

- A applies only to aircraft placed in service before Nov. 4, 1999.
- B with maximum limit under 1500 kg.
- C Limit value up to 2dB(A) below limit value B, but maximum 85 dB(A)
- D anything 2dB(A) below B, 75 dB(A) maximum value for tug aircraft as well as 65 dB(A) maximum value for ecolight.

Charge classes and noise limits ICAO Annex 16, Chapter 10

Bundesamt für Zivilluftfahrt
Luftfahrtentwicklung, Sektion Umwelt

05.01.2007/nhl

