

HOLDING PROCEDURES

OBJECTIVE

To teach the instrument student knowledge of the elements related to holding procedures.

COMPLETION STANDARDS

1. Changes to the holding airspeed appropriate for the altitude or aircraft when 3 minutes or less from, but prior to arriving at, the holding fix.
2. Uses entry procedure that ensures the aircraft remains within the holding pattern airspace for a standard, nonstandard, published, or nonpublished holding pattern.
3. Recognizes arrival at the holding fix and initiates prompt entry into the holding pattern.
4. Complies with ATC reporting requirements.
5. Uses the proper timing criteria, where applicable, as required by altitude or ATC instructions.
6. Complies with pattern leg lengths when a DME distance is specified.
7. Uses proper wind correction procedures to maintain the desired pattern and to arrive over the fix as close as possible to a specified time.
8. Maintains the airspeed within 10 knots; altitude within 100 feet (30 meters); headings within 10°, and tracks a specified course, radial, or bearing.

DESCRIPTION

The aircraft is maneuvered to enter either a standard (right turns) or non-standard (left turns) holding pattern using an entry procedure as described in the Aeronautical Information Manual. Wind correction is applied so as to remain within protected airspace and accurately track on the inbound course. The straight and level segments will be timed, or referenced to the DME in order to establish the desired inbound leg length.

PROCEDURE

1. Determine type of entry to be used. (See diagram on page 57.)

2. If airspeed is above maximum holding speed, slow to max holding speed or less within three minutes or less of the holding fix.
3. Upon crossing the holding fix, think six T's.
Time / Turn / Tune-Twist / Throttle / Tires / Talk.
4. Note the **time** when you cross the fix. Write it down or start the time on an elapse time piece. If executing DME legs, no time is required.
5. **Turn** to execute the appropriate entry procedure.
 - a. **Direct** — When crossing the fix start a turn toward the holding pattern to the outbound heading. Continue with normal holding procedures.
 - b. **Teardrop** — When crossing the fix turn 30° or less into the holding pattern for one minute. Reverse course by turning toward and intercepting the inbound course.
 - c. **Parallel** — When crossing the fix turn to parallel the outbound heading. After one minute reverse course and return to the holding fix, or intercept the inbound course.
6. **Tune** in new frequencies if necessary. **Twist** the OBS, if holding on a VOR radial, to the course for the inbound leg.
7. Adjust **throttle** if necessary.
8. **Tires** — up.
9. **Talk** — Advise ATC of entering hold giving entering time and altitude or flight level.
10. Intercept the inbound course and establish the wind correction angle (WCA).
11. Begin time inbound when wings are level.
12. After crossing the fix turn to the outbound heading (triple the inbound WCA to compensate for the winds during the 2 turns).
13. Begin timing the outbound leg when abeam the fix if it can be determined, if not then wings level.
 - a. VOR/LORAN/GPS - When holding at a station or waypoint, abeam position is determined by the to/from flag reversal.
 - b. DME fix - When using DME legs, the abeam position is determined when the DME equals the fix distance. If executing DME legs, no timing is required.
 - c. Compass Locator/ADF - When holding over a station, the abeam position is determined when the relative bearing is

90 degrees or 270 degrees, as appropriate, plus or minus the WCA.

d. Airway intersection - Wings level is the abeam position.

14. Adjust the time and wind correction angle of the outbound leg so at the completion of the turn inbound, the inbound course will be intercepted and one minute long.
15. If executing DME legs, begin turn to inbound leg at the DME distance.
16. Leave holding according to ATC instructions. If cleared for a timed approach from the holding fix, adjust outbound leg so as to cross the fix at the clearance time.
17. Notify ATC of leaving hold.

Note: If above 14,000 MSL, then the inbound pattern leg will be one minute and thirty seconds.

References

Instrument Rating Practical Test Standards FAA-S-8081-4C, pg. 1-6.

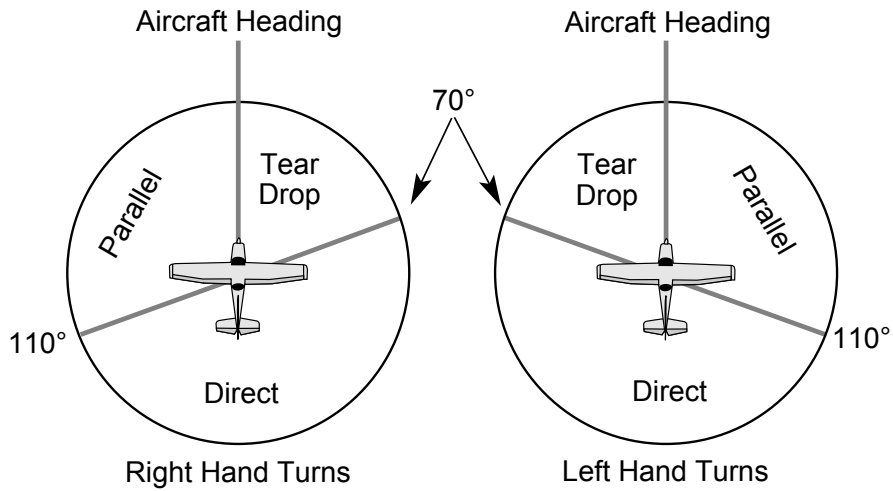
Instrument Flying Handbook FAA-H-8083-15, pg. 10-10 ⇒ 10-13, 10-19 ⇒ 10-20.

Aeronautical Information Manual, para. 5-3-7.

HOLDING PROCEDURES

Holding Entries

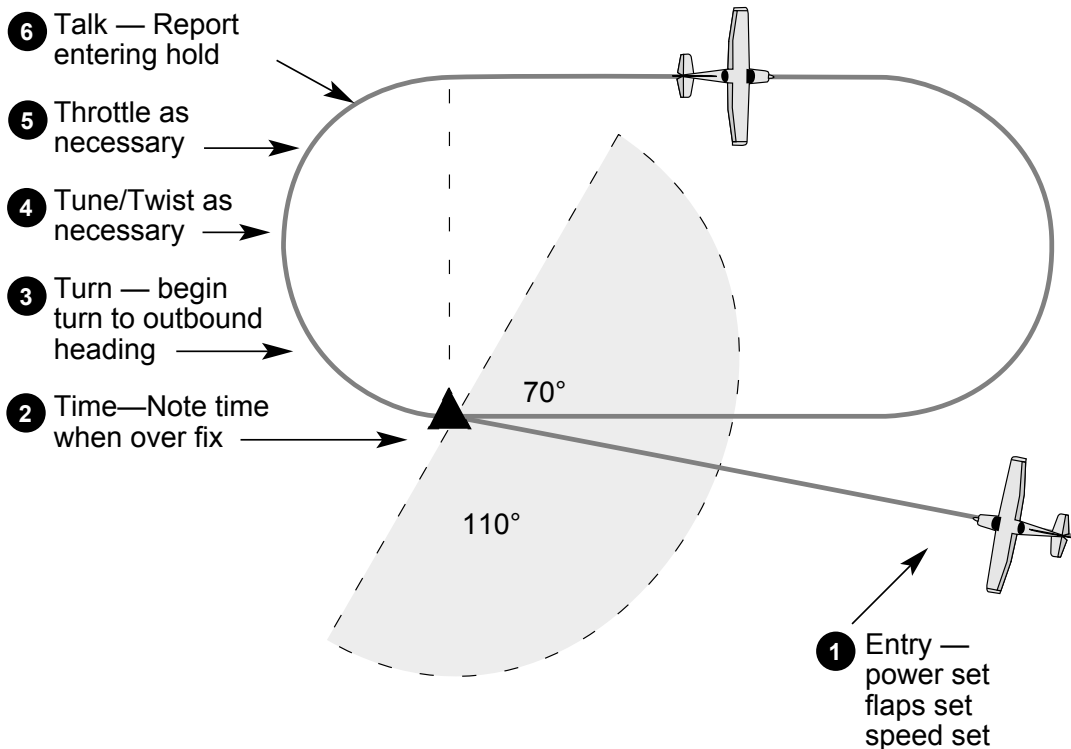
To determine holding entry, find where outbound heading falls on the circle.



A/C	AS	POWER	FLAPS
C172	90	2200	0°

Maximum Holding Speeds
MHA ⇒ 6000 - 200 KIAS
6000 ⇒ 14000 - 230 KIAS
14001 and up - 265 KIAS
Or as depicted

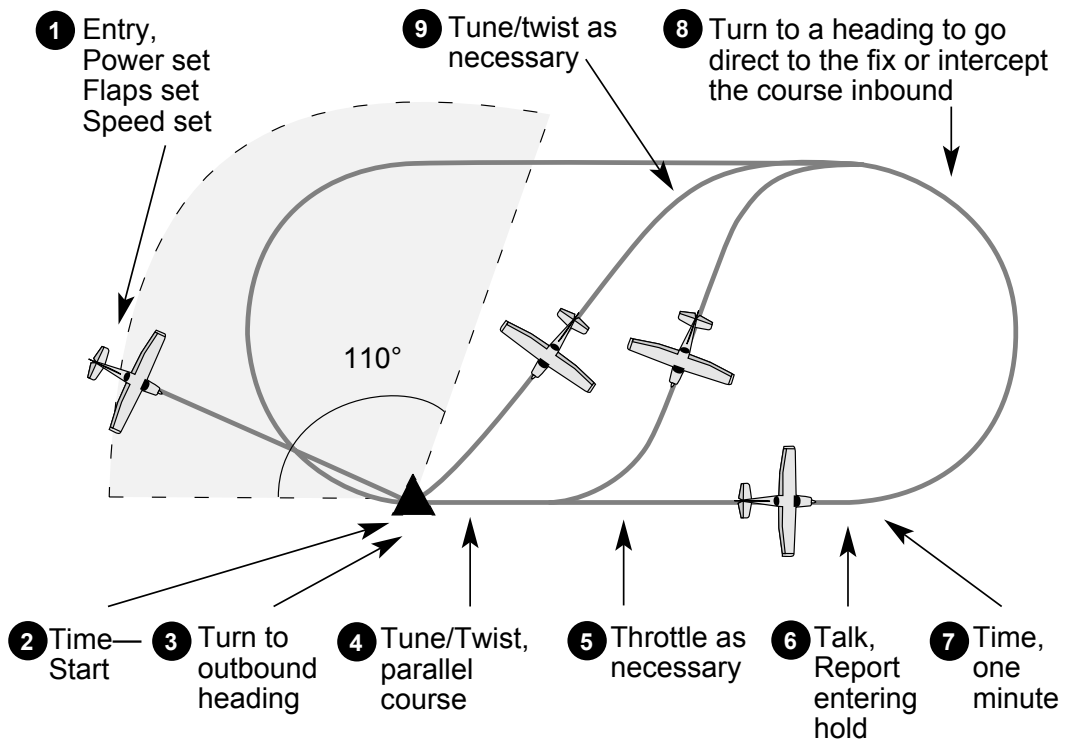
Direct Entry



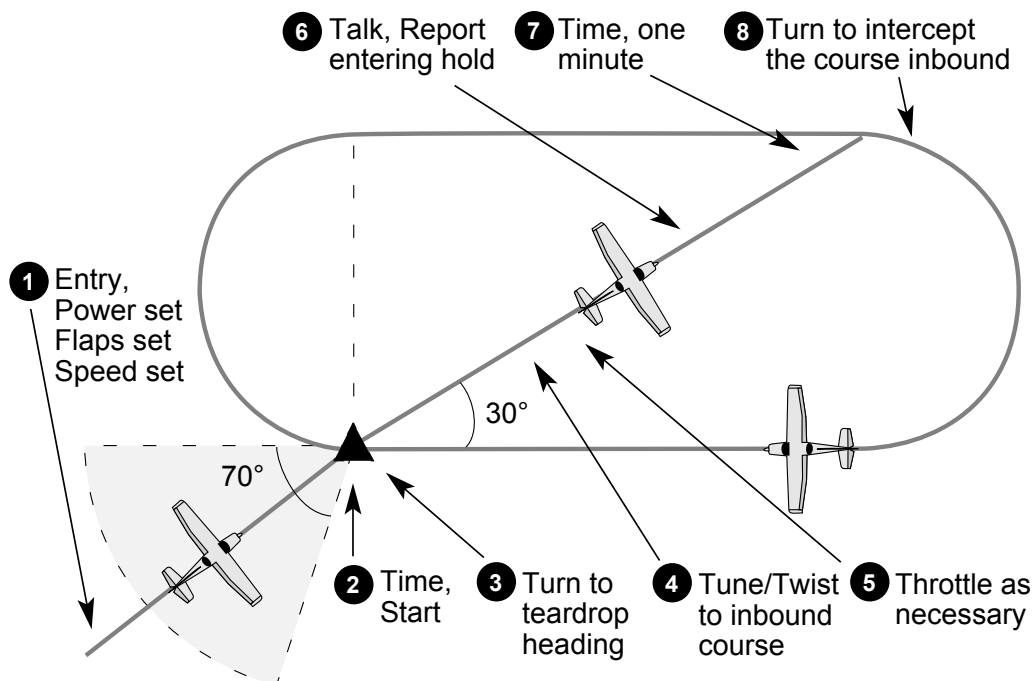
Limitations — Altitude ± 100 feet • Airspeed ± 10 knots • Headings $\pm 10^\circ$

HOLDING PROCEDURES

Parallel Entry

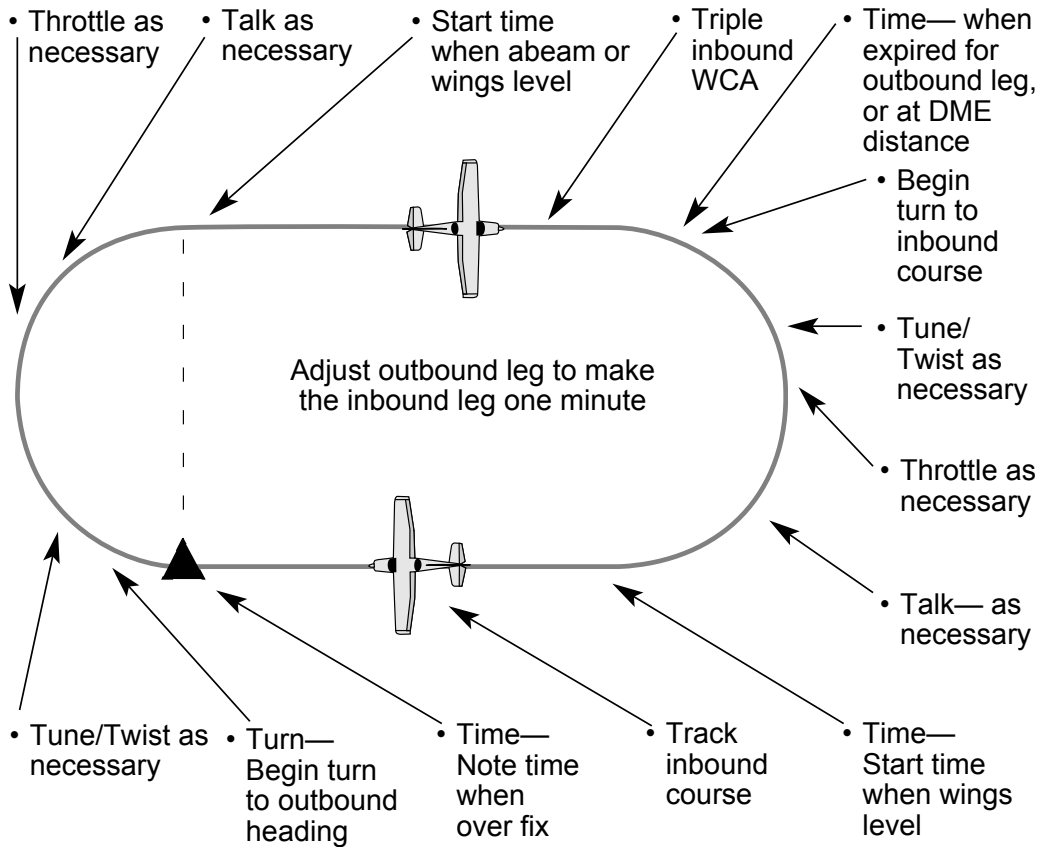


Teardrop Entry



HOLDING PROCEDURES

Holding Pattern



Rules of Thumb

$$\text{TIME ADJUSTMENT FOR OUTBOUND LEG} = \frac{\text{TIME INBOUND LEG IS OFF}}{2}$$

	OUTBOUND	INBOUND	DIFFERENCE	CORRECTION
1ST LAP	1:00	:48	:12	:06
2ND LAP	1:06	1:02	:02	:01
3RD LAP	1:05	1:00	:00	:00
4TH LAP				