

NORTHEAST REGION OPERATING INSTRUCTION 16-1

24 JANUARY 2016

Operations

TURBOCHARGED SINGLE ENGINE AIRCRAFT

CAP Pilots in the Northeast Region requesting privileges to act as PIC in CAP Turbocharged Cessna Aircraft (TCA) must receive ground and flight training along with an endorsement by a CAP TCA IP/CP approved by the NER DOV.

1. Objective:

To standardize the operating procedures for turbocharged aircraft and to train CAP pilots to safely operate TCA in the NER with proper knowledge, correct procedures, and proficiency.

This is a training guide on how to operate TCA to the standards set by the Northeast Region. This guide has been approved by the Northeast Region Commander and the Northeast Region Director of Standardization and Evaluation.

2. Requirements:

- Pilots must be G-1000 qualified to start training.
- Pilots with no prior TCA experience will be required to receive ground and flight instruction in NER TCA to include a minimum of three hours flight training. An abbreviated form 5 check ride will be required. The pilot must have an endorsement from an approved TCA IP or CP stating the minimum NER requirements have been met before he/she will be allowed to take the check ride. One hour of this requirement may be satisfied by the check ride if approved by the Instructor Pilot and Check Pilot.
- Pilots with previous TCA experience will be required to receive ground and flight instruction in NER TCA to include a minimum of two hours flight training. The pilot will be required to documentation to the IP showing prior experience. An abbreviated form 5 check ride will be required. The pilot must have an endorsement from an approved TCA IP or CP stating the minimum NER requirements have been met before he/she will be allowed to take the check ride. One hour of this requirement may be satisfied by the check ride if approved by the Instructor Pilot and Check Pilot.

3. Academic Outline:

Pilots will demonstrate an understanding of the following:

- Schematic design and description of turbocharger systems.
 - Manifold pressure variation with engine RPM, Altitude, Airspeed, and Mixture
 - Momentary overshoot of manifold pressure.
- Engine monitoring systems (CHT), Fuel Flow systems, and Turbine Inlet Temperature (T.I.T.).
- Oxygen systems and FAA requirements.
- Mixture/Power management for all flight conditions including Engine start, Taxi, Run-up, Takeoff, Climb out, Cruise, Descent, Approach, Landing, Balked landing, and Engine cool down.
- Propeller Heat
- TCA POH for model of aircraft.
- Emergency Procedures
 - Turbocharger failure in flight.

4. Power Management of Turbocharged Aircraft:

NOTE: Make all power changes slowly and smoothly. Avoid making large rapid power changes. Plan to keep power settings in the green at all times except during takeoff and landing.

- **Preflight Inspection:** In addition to the items included in the CAP approved checklist, an Oxygen Supply Pressure check and Oxygen Mask check are required.
- **Takeoff:** On the C182T Nav III, the waste gate is automatically adjusted so the pilot only needs to refer to the manifold pressure during takeoff to confirm it does not exceed red line. Throttle should be set at 32 in. hg and 2400 RPM. Mixture should be set to 24 GPH (Green mark on fuel flow indicator).
- **Climb out:** Once established in enroute climb, power should be adjusted to the recommended settings in the POH. Normally, 25 in hg, 2400 RPM, for a cruise climb of 90 – 100 KIAS. The mixture should be set at 16 GPH (White index mark on fuel flow indicator).
- **Cruise, Descent, and Landing:** Cruise power setting in accordance with the POH, recommended power setting for 65% power is achieved with the following settings, 23 in hg, and 2100 RPM for maximum engine life and fuel efficiency.
 - Leaning using the Turbine Inlet Temperature (T.I.T.) –
 - T.I.T. less than 1685 degrees.
 - Best economy is lean to peak T.I.T.

- Smooth engine operation with Cylinder Head Temperature less than 400 degrees.

Gradual power reductions during cruise descents and keeping MP in the green normal operating range as long as practical will reduce the risk of shock cooling of the cylinder heads.

- **Balked Landing:** Maximum power should be used in go-arounds. Throttle control should be performed slowly and carefully. The POH recommended settings are, 32 in hg, 2400 RPM, 24 GPH fuel flow, 20 degrees of flaps, and 55 KIAS.
- **Engine Cool Down:** Turbo cool-down is generally not an issue in an airplane. The engine is operating at low power settings throughout the final approach, landing, taxiing, and shutdown. This provides adequate time to cool-down the turbo. If the pilot believes the turbo has not had an adequate cool-down period, then the engine should be run at 800-1000 RPMs for two minutes prior to engine shutdown. Taxi time is included in this cool down time.

5. Training by Instructor Pilot or Check Pilot:

NOTE: This training syllabus must be used and an endorsement stating the pilot is qualified to operate Turbocharged Aircraft to NER standards is mandatory. This can be entered on an abbreviated form 5 under Other Endorsements. A complete CAP Form 5 is not required but could be completed depending on the training and evaluation situation at the discretion of the Check Pilot. Make sure to upload the Form 5 into Ops Quals for documentation of training and endorsement.

- The training will include, but is not limited to:
 - All operations as outlined in the SOP
 - Engine start, Taxiing, Takeoff, Climb-out, Cruise, Descent, Approach, Landing, Go-arounds, and After Landing Taxi.
 - Flight Maneuvers as outlined on the Form 5 for training and flight operations.
 - Take off and Climbs, Touch and Go, Stalls, Patterns, Slow Flight, Go-arounds, Emergency Procedures for all flight operations, Descents from Altitude, Approaches and Landings, and Shut Down Procedures.

DANIEL LECLAIR, Col, CAP
Commander