King Schools Online
Internet Learning Programs

HIGH ALTITUDE ENDORSEMENT GROUND TRAINING

Additional Training Required for Acting As Pilot in Command of a Pressurized Aircraft Capable of Operating at High Altitudes

SYLLABUS

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High Altitude Endorsement Ground Training

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Pilot Training Syllabus

INTRODUCTION
The King Schools Online *High Altitude Endorsement Ground Training Course* meets the pilot training requirements specified in 14 CFR 61.31(g)(1) to act as pilot in command of a pressurized aircraft capable of operating at high altitudes. This course:

- Covers the ground training required to act as pilot in command of a pressurized aircraft with a service ceiling or maximum operating altitude (whichever is lower) above 25,000 feet MSL
- Provides the training record required by the FAA
- Is offered only through individual Internet study

COURSE ELEMENTS AND STRUCTURE
The King Schools Online *High Altitude Endorsement Ground Training Course* contains seven major subject areas (Labs) with two or more distinct Lessons per Lab. Following each Lesson's study materials, the pilot sees a quiz containing multiple-choice and/or True/False questions. There are approximately 65 questions in the course. Most pilots will require approximately two hours to complete this course.

COMPLETION STANDARDS
Lesson completion requires accessing each lesson page of study materials and correctly answering all questions in the quiz associated with that Lesson. An individual Lab is finished after completing all of the Lessons contained in that Lab. Pilots complete the course when all the Labs are checked off with a completion date on the course main menu.

CERTIFICATE OF COMPLETION
A Completion Certificate individualized for the pilot enrolled in the Course may be accessed at the "Print Your Course Complete Certificate Materials and Endorsement" icon/link on the main menu after the entire course has been completed. Pilots clicking this icon/link before the Course has been completed receive a message saying that the certificate will be available after the entire course is completed.

ENROLLMENT PROCEDURES
A pilot may individually order and enroll in the King Schools Online *High Altitude Endorsement Ground Training Course*, or flight departments may order multiple courses and receive a "key" for each course ordered. The flight department then assigns a key to each pilot requiring High Altitude training. Each pilot registers individually at *https://ilearn.kingschools.com* for the *High Altitude Endorsement Ground Training Course*.

COURSE STUDY
The pilot first enrolls in the *High Altitude Endorsement Ground Training Course*, and then logs in to access the course. If the pilot has insufficient time to complete the course in one session, the pilot may log out. The program records all Lesson and Lab completions and every question answered. When returning to the course, the pilot may resume at the last point of progress.

LAB 1

HIGH-ALTITUDE AERODYNAMICS

LESSONS

1 Determining True Airspeed

Lesson Objective: To learn (given indicated airspeed, pressure altitude, and indicated temperature) how to calculate true airspeed for high-altitude, high-speed jets by applying the appropriate corrections, including corrections for the effects of compressibility and temperature rise.

2 Understanding Your Speed Limits

Lesson Objective: To learn the significance of Vmo and Mmo, and when each becomes the limiting factor.

3 Why You Should Respect the M_{MO}

Lesson Objective: To learn the consequences of exceeding M_{MO}.

4 How Aircraft Design Is Used to Minimize High Mach Effects

Lesson Objective: To learn the techniques aircraft designers use to minimize the effects of high Mach numbers.

5 Converging High-Speed and Low-Speed Buffet—The Coffin Corner

Lesson Objective: To learn why the margins between Mach buffet and stall buffet can in some cases be very narrow, and how to avoid that situation.

LAB 2

HIGH-ALTITUDE METEOROLOGY

LESSONS

1 Warm Temperatures Aloft Are Bad News

Lesson Objective: To learn about the International Standard Atmosphere and how to calculate the effect on aircraft performance of non-standard temperatures aloft.

2 Jet Streams

Lesson Objective: To learn where jet streams are typically located and what weather is normally associated with them.

3 The U.S. High-Level Significant Weather Prognostic Chart

Lesson Objective: To learn how to interpret the U.S. High-Level Significant Weather Prognostic Chart, including jet stream locations and speeds, turbulence locations and intensities, and thunderstorm activity.

4 Practical Tips for Jet Stream Turbulence Avoidance

Lesson Objective: To learn how to avoid the worst jet stream turbulence.

5 Techniques for Thunderstorm Avoidance

Lesson Objective: To be introduced to airborne radar and other tools for thunderstorm avoidance, and to learn practical tips on how to use them.

6 Coping with Icing Conditions

Lesson Objective: To learn about the special issues that icing conditions create for jets.

7 Mountain Waves

Lesson Objective: To learn the significance of mountain wave conditions for high-altitude flight.

LAB 3

RESPIRATION AND HYPOXIA

LESSON

1 Respiration Is Otherwise Known As Breathing

Lesson Objective: To learn how the partial pressure of oxygen and the saturation levels in the blood are affected by higher cabin altitudes.

2 Hypoxia Is Lack of Sufficient Oxygen to Tissues

Lesson Objective: To learn about the symptoms of hypoxia and what conditions may contribute to your having hypoxia.

LAB 4

USING SUPPLEMENTAL OXYGEN

LESSON

1 Supplemental Oxygen Increases the Oxygen in Each Breath

Lesson Objective: To learn the cabin altitudes appropriate for reliance on oxygen masks and pressure breathing systems.

2 Pressure Changes on the Body Can Cause Problems

Lesson Objective: To learn about the potential effects on your body of altitude changes when the aircraft is not pressurized, including gas expansion and gas bubble formation, and about preventive measures.

3 Using Oxygen Can Be a Pain

Lesson Objective: To learn the effects of the prolonged use of supplemental oxygen and why using supplemental oxygen is often not the most desirable solution to flight at high altitudes.

LAB 5

PRESSURIZATION

LESSON

1 Pressurizing the Cabin Solves a Lot of Problems

Lesson Objective: To learn how pressurization systems work.

2 How You Operate a Pressurization System

Lesson Objective: To learn the controls and gauges for a pressurization system, and how to manage a pressurization system in flight.

3 Dealing with Depressurization

Lesson Objective: To learn why an aircraft might depressurize, what physical phenomena occur when it does, and what you should do in response; and to be knowledgeable about your duration of consciousness without supplemental oxygen (the Time of Useful Consciousness).

LAB 6

FAA OXYGEN REGULATIONS (SIMPLIFIED)
14 CFR 91.211

LESSON

1 Requirements Based on Cabin Altitude

Lesson Objective: To learn the regulatory oxygen requirements based on the pressure altitude of the aircraft cabin.

2 Requirements Based on Flight Level

Lesson Objective: To learn the regulatory oxygen requirements based on the flight level at which the aircraft is flying.

LAB 7

AIRSPACE, EQUIPMENT, AND FLIGHT PLANNING

LESSON

1 Airspace

Lesson Objective: To review the requirements for flight at and above 18,000 feet MSL including the requirements for flight in Class A airspace, and to be introduced to RVSM (Reduced Vertical Separation Minimum) airspace.

2 Equipment Requirements

Lesson Objective: To review the requirements for transponder and DME equipment when flying in the flight levels.

3 Flight Planning

Lesson Objective: To review when High Altitude IFR Enroute Charts must be used, and to cover some special weather considerations for planning a high altitude flight.