



# AIR TRANSPORTATION 49.0100.00

## TECHNICAL STANDARDS

An Industry Technical Standards Validation Committee developed and validated these standards on March 27, 2014. The Arizona Career and Technical Education Quality Commission, the validating authority for the Arizona Skills Standards Assessment System, endorsed these standards on May 13, 2014.

Note: Arizona's Professional Skills are taught as an integral part of the Air Transportation program.

**The Technical Skills Assessment for Air Transportation is available SY2017-2018.**

Note: In this document i.e. explains or clarifies the content and e.g. provides examples of the content that must be taught.

### STANDARD 1.0 DEMONSTRATE AN UNDERSTANDING OF THE HISTORY AND GROWTH OF THE AEROSPACE INDUSTRY

- 1.1 Discuss the birth of flight, including aviation's early pioneers
- 1.2 Understand the historical factors influencing the growth of aviation
- 1.3 Discuss the role of government in the growth and development of aviation
- 1.4 Understand the current challenges and opportunities in the further development of aviation

### STANDARD 2.0 DEMONSTRATE THE UNDERSTANDING OF FUNDAMENTALS OF FLIGHT

- 2.1 State and give examples of the application of flight (e.g., Newton's laws of motion, Bernoulli's principle, and Venturi effect)
- 2.2 Name and compare the four forces of flight (i.e., weight, lift, drag, thrust, etc.)
- 2.3 Identify the function and parts of an airfoil, including flight control surfaces (e.g., leading edge, trailing edge, chord, and upper and lower camber)
- 2.4 Identify specific aircraft handling characteristics

### STANDARD 3.0 DEMONSTRATE AN UNDERSTANDING OF FEDERAL AVIATION REGULATIONS (FAR) AND OTHER REQUIREMENTS

- 3.1 Define acronyms and terms most frequently used for reference documents and in pilot/controller communications [e.g., those listed in the CFR (Code of Federal Regulation), AIM (Aeronautical Information Manual), and the Lexicon of the ICAO (International Civil Aviation Organization)]
- 3.2 Describe the general content of section and parts of the CFR that pertain to the aviation industry [ref. 14 CFR Section A, Parts 1, 43, 61, 65, 67, 91, and 121; NTSB (National Transportation Safety Board) Part 830; and 49 CFR 1552-TSA (Transportation Safety Administration) Regulations]
- 3.3 Explain Aircraft Certificates and Documents, their operating limitations, placards, and markings, including the medical certificate class and duration (e.g., Certificate of Airworthiness, Certificate of Registration, Journey Log, Pilot Operating Handbook, Pilot License, Radio Operator's License, Interception Signals, and Weight and Balance Report)
- 3.4 Explain airworthiness requirements (e.g., day and night Visual Flight Rules, airworthiness compliance records, and airworthiness with inoperative instruments and equipment)
- 3.5 List the general eligibility requirements for a private pilot certificate (ref. 14 CFR/FAR 61.103)
- 3.6 Compare and contrast requirements for a private pilot certificate with requirements for other pilot certificates and ratings (i.e., student, sport, recreational, instrument, commercial, type, airline transport pilot certificates, etc.)
- 3.7 Identify and describe required documents that an airman must present for inspection upon reasonable, authorized requests (i.e., airman certificate, medical certificate, aircraft records, airworthiness documentation, etc.)

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## **STANDARD 4.0 DEMONSTRATE AN UNDERSTANDING OF AIRFRAME AND POWERPLANT SYSTEMS**

- 4.1 Describe and identify powerplant components and the theory of operation
- 4.2 Describe a basic cooling system, its equipment operations and possible malfunctions
- 4.3 Describe various aircraft fuel systems, their equipment operations and possible malfunctions
- 4.4 Demonstrate an understanding of basic electricity as it applies to various aircraft electrical systems
- 4.5 Describe a basic lubrication system, its equipment operations and possible malfunctions
- 4.6 Describe basic aircraft pneudraulics systems, their equipment operations and possible malfunctions
- 4.7 Demonstrate basic operation of an aircraft engine, including proper interpretation of engine instruments

## **STANDARD 5.0 DEMONSTRATE AN UNDERSTANDING OF AEROSPACE NAVIGATIONAL SYSTEMS AND PROCEDURES**

- 5.1 Define basic navigational concepts (e.g., pilotage, dead reckoning, and radio navigation)
- 5.2 Describe and demonstrate VOR and ADF equipment and navigation
- 5.3 Describe and demonstrate GPS equipment and operations
- 5.4 Understand RNAV principles
- 5.5 Understand the use of various flight planning computers
- 5.6 Explain sectional charts and their use and the use of PDAs for electronic replacement
- 5.7 Explain en-route and terminal approach and departure procedures
- 5.8 Explain emergency procedures for lost communications
- 5.9 Discuss and interpret aircraft performance
- 5.10 Plan and demonstrate a cross-country flight
- 5.11 Apply understanding of the national airspace system

## **STANDARD 6.0 DEMONSTRATE AN UNDERSTANDING OF AIRPORT OPERATIONS AND MANAGEMENT**

- 6.1 Understand the airport as a system of integrated components and operations
- 6.2 Understand airport flight and ground operations, including airport and runway signs, markings, and lighting
- 6.3 Demonstrate an understanding of how to improve runway incursion avoidance and detection capabilities
- 6.4 Understand airport support systems and function (e.g., air traffic control, security, aircraft support, terminal management, and information systems)
- 6.5 Use and explain aircraft voice communications equipment and proper phraseology in ATC communications, including phonetic alphabet

## **STANDARD 7.0 DEMONSTRATE SAFETY IN AVIATION**

- 7.1 Apply safety to aircraft ground handling operations
- 7.2 Understand shop safety considerations [FOD, tool accountability (usage, calibration, maintenance, storage), PPE, and hazmat]
- 7.3 Understand principles of flight safety (air and ground operations)

## **STANDARD 8.0 DEMONSTRATE AN UNDERSTANDING OF AVIATION METEOROLOGY**

- 8.1 Demonstrate an understanding of weather theory
- 8.2 Demonstrate an understanding of weather hazards and how to deal with them
- 8.3 Demonstrate the ability to access and analyze weather reports, charts, and forecasts from various sources

## **STANDARD 9.0 DEMONSTRATE FLIGHT PLANNING SKILLS**

- 9.1 Understand and demonstrate weight and balance theory and calculations
- 9.2 Demonstrate flight planning procedures (e.g., route, weather, fuel, airports, NOTAMS, flightlog, and post-flight operations)
- 9.3 Demonstrate understanding of aircraft performance and limitations (e.g., use of charts, tables, and data to determine performance; and effects of atmospheric conditions on aircraft performance)
- 9.4 Demonstrate understanding of VFR/IFR flight plans

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## STANDARD 10.0 DEMONSTRATE AN UNDERSTANDING OF HUMAN FACTORS

- 10.1 Understand concepts of CRM (Crew Resources Management)
- 10.2 Demonstrate situation awareness
- 10.3 Demonstrate correct ADM (Aeronautical Decision Making) skills
- 10.4 Understand basic aviation physiology (e.g., symptoms, causes, effects, and corrective actions for hypoxia, hyperventilation, middle ear, and sinus problems; spatial disorientation, motion sickness, carbon monoxide poisoning, stress and fatigue, and dehydration; and physiological aspects of night flying, light systems, night orientation, and night illusions)