

Reference Material: Note: Exam may contain “accepted practice” type questions not found in the reference material listed below

NFPA 1900 **Standard for Aircraft Rescue and Firefighting Vehicles, Automotive Fire Apparatus, Wildland Fire Apparatus, and Automotive Ambulances**, 1901 section Chapters 18, 19 and appropriate annex
 NFPA 1910 **Standard for Inspections, Maintenance, Refurbishment, Testing and Retirement of In-Service Emergency Vehicles and Marine Firefighting Vessels**, 1911 section, Chapters 3, 6, 12, 13, 23, 24, 26 and appropriate annex
 IFSTA **Principals of Foam Firefighting** 2nd edition Chapters 2, 3, 4, 5, glossary and appendix
 IFSTA Pumping Apparatus, **Driver/Operator Handbook**, 3rd edition Chapters 14, 15, glossary and appendix.
 Contact IFSTA at 800-654-4055

Fire pump manufacturer’s operations manual

Hale FoamLogix Rotary Gear Manual 3.3/5.0/6.5

https://smhttp-ssl-61500.nexcesscdn.net/media/pdf/FoamLogix_Digital_3.3-5.0_Manual.pdf

Hale Smart CAFS Troubleshooting Guide b

https://smhttp-ssl-61500.nexcesscdn.net/media/pdf/FSG-MNL-00177_SmartCAFS_Troubleshooting_Guide-A.pdf

Waterous “Eclipse” CAFS System Operation and Maintenance Form F1031 Section 2412

<https://www.waterousco.com/media/pdfs/F1031-2412.pdf>

Waterous 200P PTO Driven Compressor Kit Installation (3036) and Operations (2422) Instructions.

<https://www.waterousco.com/media/pdfs/F1031-3036.pdf>

https://www.waterousco.com/media/pdfs/F1031-2422_200-P_.pdf

FoamPro Form 829 Installation and Operation Manual

<http://fireresearch.com/foampro-lit/manuals/Form-829.pdf>

FoamPro Power Fill Form 809 <https://fireresearch.com/foampro-lit/manuals/Form-809.pdf>

VFIS.com Firefighting Foam <https://education.vfis.com/Portals/0/Documents/fire-and-ems-operations/VFIS-FirefightingFoam.pdf>

FFFC.org Best Practice Guidance for use of Class B Firefighting Foams

https://www.fffc.org/files/ugd/331cad_188bf72c523c46adac082278ac019a7b.pdf

Manufacturer’s web sites

www.waterousco.com/ www.wsdarley.com <https://www.fireresearch.com/foampro> www.haleproducts.com

LEARNING OBJECTIVES

1. **Principals of Foam:** The Fire Apparatus Technician should understand the principals of foam firefighting
 - a. Foam Types
 - b. Characteristics
 - (1) Expansion
 - (2) Safety
 - (a) environmental impact
 - (b) personal impact
 - (3) Benefits
 - (4) Concentrate Properties
 - (5) Adding Foam to Tank
 - (a) viscosity
 - (b) drainage
 - (6) Freezing and Thawing
 - (7) Freeze protection
 - c. Application/Uses
 - (1) Induction
 - (2) Injection
 - (3) Pre-mix
 - (4) Batch-mix
 - d. Limitations
 - e. Storage
 - f. Definitions
 - (1) Proportioning
 - (2) Scrubbing
 - (3) Foam Generators
 - (a) low energy
 - (b) high energy
 - (4) Mixing Chamber/Static Mixer
 - (5) Foam Solution
 - (6) Surfactant
 - (7) Milspec
 - (8) CAFS
 - (9) Slug Flow
 - (10) Eduction
 - (11) Venturi Principal
 - (12) PFAS-Per & polyfluoroalkyl substances
2. **Foam Systems and Operations:** The Fire Apparatus Technician should understand the requirements for foam systems and operations
 - a. Systems
 - (1) Eductor Type
 - (a) Characteristics
 - (b) Requirements
 - (2) Installed In-line Eductor System
 - (3) Around the Pump Proportioners
 - (4) By-pass Balanced Pressure Proportioners
 - (a) Requirements
 - (5) Variable Flow - Demand Type Pressure Proportioner
 - (6) Variable Flow - Variable Rate Direct
 - (7) C.A.F.S.
 - (a) Compressor Engagements
 - (b) Operation & Schematics
 - (i) Air Flow
 - (ii) Hydraulic
 - b. Operations
 - (8) Direct injection
 - (1) Cleaning and Flushing
 - (2) Labeling
 - (3) Safety
 - (4) Proportioning
 - (a) mixing proportions
 - (b) Injections rates

- (5) Pressure
- c. Foam Concentrate Storage

3. Mechanical Components: The Fire Apparatus Technician should understand the requirements for mechanical components

- a. Nozzles
 - (1) Poor foam solution
- b. Tanks
 - (1) Atmosphere
 - (2) Pressure
 - (3) Fill tower opening
 - (4) Foam fill system
- c. Hose
- d. Strainers
- e. Check Valves
- f. Flow Meters
- g. Controllers
 - (1) Electronics
- h. Proportioners
 - (1) Eductors
 - (a) inline
 - (b) installed
 - (c) foam class
 - (2) Venturi
 - (3) Flush Line
- i. Manifolds
- j. Water Filters
- k. Oil Separators
- l. Compressors
- m. Injectors
- n. Pressure Indicating Devices & Gauges
- o. Compressor control circuit
- p. Pressure vessel tank
 - (1) Fill cap
- q. Foam pump
- r. Air control circuit
- s. Compressor Hydraulic Circuit
- t. Valves

4. Maintenance and Testing: The Fire Apparatus Technician should understand the proper maintenance and testing procedures

- a. Maintenance
 - (1) Air Compressor Systems
 - (a) Frequency
 - (b) Filters/Strainers
 - (c) Fluids
 - (d) Adjustments
 - (e) Compressor Drives
 - (2) Proportioning System
 - (a) Flushing
 - (b) Calibration
 - (c) Strainers
 - (d) Frequency
 - (e) Hydraulic Drive
- b. Testing
 - (1) Air Compressor Systems
 - (a) Air Flow
 - (b) Pressure Balance
 - (c) Frequency
 - (d) Methods
 - (2) Proportioning Systems
 - (a) Test Methods
 - (b) Concentration Flows
 - (i) accuracy
 - (c) Flow Meters
 - (3) Gauges
 - (4) Performance Test
 - (a) Engine Driven Accessories
- c. Troubleshooting Guides
 - (1) Air compressor systems
 - (2) Proportioning systems
 - (3) Foam Solutions
 - (4) Contaminated Foam
- d. Repairs
 - (1) Air compressor drives
 - (2) Proportioning systems
 - (3) Out of service criteria