

**Reference Material:** Note: Exam may contain “accepted practice” type questions not found in the reference material listed below  
 NFPA 1901, *Standard for Automotive Fire Apparatus*, Chapters 20, 21 and appropriate annex  
 NFPA 1911 *Standard for Inspections, Maintenance, Testing and Retirement of In-Service Automotive Fire Apparatus*  
 Chapters 3, 6, 12, 13, 21, 23, 24 and appropriate annex  
 IFSTA *Principals of Foam Firefighting* 2<sup>nd</sup> edition Chapters 2, 3, 4, 5, glossary and appendix  
 IFSTA Pumping Apparatus, *Driver/Operator Handbook*, 3<sup>rd</sup> edition Chapters 14, 15, 16, glossary and appendix.  
 Contact IFSTA at 800-654-4055

Fire pump manufacturer’s operations manual

**Hale CAFS Pro System User Operation Training Manual.**

<http://www.manualsdir.com/manuals/545153/hale-cafspro.html>

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

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

<http://www.waterousco.com/media/wysiwyg/pdfs/cafsystems/eclipse/sec2412.pdf>

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

<http://www.waterousco.com/media/wysiwyg/pdfs/cafsystems/pto-driven-air-compressor-kits/sec3036.pdf>

[http://www.waterousco.com/media/wysiwyg/pdfs/cafsystems/pto-driven-air-compressor-kits/sec2422\\_200-P\\_.pdf](http://www.waterousco.com/media/wysiwyg/pdfs/cafsystems/pto-driven-air-compressor-kits/sec2422_200-P_.pdf)

**FoamPro Form 829 Installation and Operation Manual**

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

Manufacturer’s web sites go to [www.waterousco.com](http://www.waterousco.com) or [www.wsdarley.com](http://www.wsdarley.com) or [www.foampro.com](http://www.foampro.com)

### LEARNING OBJECTIVES FOR THE F7 EXAM

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
    - (3) Benefits
    - (4) Concentrate Properties
    - (5) Adding Foam to Tank
  - 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
    - (4) Mixing Chamber/Static Mixer
    - (5) Foam Solution
    - (6) Surfactant
    - (7) Milspec
    - (8) CAFS
    - (9) Slug Flow
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
  - (8) Direct injection
  - b. Operations
    - (1) Cleaning and Flushing
    - (2) Labeling
    - (3) Safety
    - (4) Injections rates
    - (5) Pressure
  - c. Foam Concentrate Storage

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**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
- c. Hose
- d. Strainers
- e. Check Valves
- f. Flow Meters
- g. Controllers
  - (1) Electronics
- h. Proportioners
  - (1) Eductors
    - (a) inline
    - (b) 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
- 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
    - (b) Flow Meters
  - (2) Gauges
  - (3) Performance Test
- b. Troubleshooting guides
  - (1) Air compressor systems
  - (2) Proportioning systems
  - (3) Foam Solutions
  - (4) Contaminated Foam
- c. Repairs
  - (1) Air compressor drives
  - (2) Proportioning systems
  - (3) Out of service criteria