PEO CS&CSS

Petroleum Expeditionary Analysis Kit Update

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Agenda

- Background
- History
- Technology
- Future
- Q&A

Background

- The Petroleum Expeditionary Analysis Kit (PEAK) replaces the Aviation Fuels Contamination Test Kit and provides fuel quality surveillance within all Brigade Combat Teams and Support Brigades. The PEAK is a standalone system that will rapidly verify the suitability of petroleum products prior to issue at point of consumption. The PEAK will have the capability to evaluate all kerosene-based and diesel fuels used in ground systems and aircraft. It will provide the field with the capability to determine fuel type, grade, and additives.
- Joint interest program with the USMC.
- PEAK is a replacement of the Aviation Fuel

Contamination test Kit.

  - 6630-01-008-5524/6630-01-347-9670/6630-01-558-5109
    - 1965 – current
  - Testing Capabilities
    - ASTM D1298/D7777 – API gravity
    - ASTM D2276 – particulate contamination
    - ASTM D3240 – free water

Key Dates

- NOV 2017 - PEAK Capability Development Document (CDD) approval
- OCT 2021 - Developmental Other Transaction Authority awarded
- APR 2022 - Flyoff testing completed/Successful Prototypes Determination
- JAN 2024 - Milestone C approval
- FEB 2024 - Production contract award
- MAR 2025 - Production Qualification Testing completed
- APR 2025 - Physical Configuration Audit completed (USMC MAY 2025)
- JUL 2025 - Full Rate Production Decision Full Material Release
- First Unit Equipped (FUE) / Initial Operational Capability (IOC)
- Full Operational Capability (FOC)

US Army Variant

USMC Variant

API Gravity

The DMA-35 Anton Paar Density Meter is the same instrument found in the Aviation Fuel Petroleum Test Kit and Petroleum Quality Analysis System-Enhanced

API gravity is used to Classifying the Fuel, check for contamination, and convert product volumes observed at temperatures other than 60°F. **Army Techniques Publication No. 4-43**

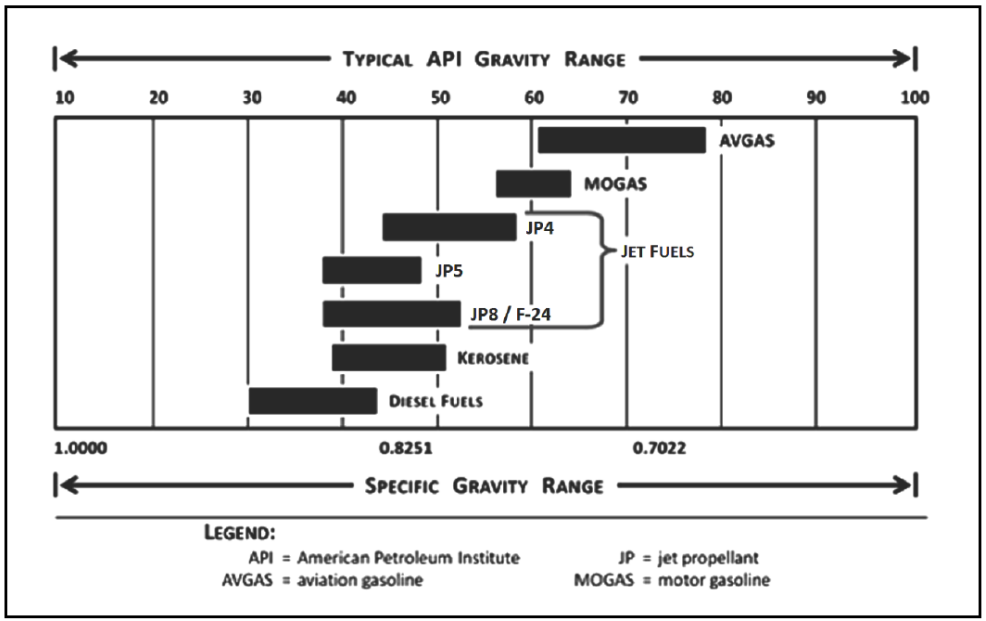


Figure J-1. Typical API gravity ranges (corrected to 60 degrees Fahrenheit)
Army Techniques Publication No. 4-43

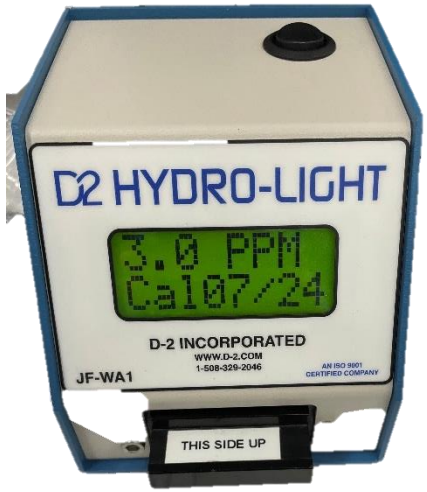
Free Water

JF-WA1 Hydro-Light Water Pad Reader replaces the Aqua-Glo Series V

Fuel with test results greater than 10 ppm is not suitable for Army use. **Army Regulation 703 – 2**

Aviation fuels may not be used if they contain more than 10 parts per million (ppm) of water. The water detection test checks to see that the filter separator is working properly. If a reading is below the maximum allowable amount (10 ppm), the fuel is within the limits prescribed by military specification. If the test shows more than 10 ppm of water in the sample, the fuel does not meet specification. **Army Techniques Publication No. 4-43**

For product to be acceptable for fueling aircraft, it shall not only meet specification/Intra-Governmental Receipt Limits requirements, but be clean and bright and contain no more than 10 ppm by volume of free water. **MIL-STD-3004-1C Change 1**



JF-WA1 Hydro-Light Water Pad Reader (ASTM 3240)

Electrical Conductivity

The JF-1A-ST D-2 Stick Conductivity Meter replaces the Model 1152 Digital Conductivity meter.

Static Dissipator Additive is introduced at prescribed levels to Jet A and Jet A-1 to improve the conductivity of the fuel and is only needed if fuel conductivity is below 150 picosiemens per meter (pS/m). It increases the rate of static charge dissipation. Note 1: The conductivity must be between 150 and 600 pS/m for F-34 (JP-8) and between 50 and 600 pS/m for F-35 (Jet A-1), at ambient temperature or 29.4 °C (85°F), whichever is lower, unless otherwise directed by the procuring activity. **Army Techniques Publication No. 4-43**

JF-1A-ST D-2 Stick Conductivity Meter 0-2,000 pS/m (ASTM D2624)

Fuel System Icing Inhibitor

The JF-1A-FSII D-2 Fuel System Icing Inhibitor Meter **replaces optical refractometer Petroleum Quality Analysis System-Enhanced and the Fuel Additive Injector Assembly FSII Sample Test Kit.**

FSII is added to fuel to prevent freezing of free water. This additive is soluble in both fuel and water and, in the presence of water, will migrate from the fuel to the water. It has the added benefit of dramatically slowing the growth of any microbial contaminants in the fuel. Recommended concentration of FSII in fuel is 0.07 to 0.10 volume percent for JP-8. **Army Techniques Publication No. 4-43**

FSII, vol % JP-5 JP-8, TS-1, F-24	 0.08-0.11 0.07 - 0.10	 0.07-0.15 0.06 - 0.15	D5006

MIL-STD-3004-1C Change 1

JF-1A-FSII D-2 Fuel System Icing Inhibitor Meter(ASTM D5006)

Particle Counter

The JF-PC-PEAK Automatic Particle Counter replaces the contamination analysis monitors for gravimetric determination of contaminant level, also know as Filter Effectiveness Test.

The purpose of particle counter testing is to evaluate the amount of particulate matter in the fuel downstream of the filter/separator. This ensures the filter/separators are performing to standard. Particle counter testing does not assess the properties of the fuel itself. The particle counter test is a snapshot in time which assesses filter/separator performance on the date the testing was performed, or the sample was taken.

All filter/separators in service are required to be sampled for filter effectiveness testing at least once every 30 days.
Army Regulation 703 – 2

JF-PC-PEAK Automatic Particle Counter
(FED STD 791 Method 1203 / ASTM D7619 equivalent)

Particle Counter

TABLE I. Intra-Governmental Receipt Limits (IGRL) for aviation turbine fuels: NATO F-34/JP-8 (MIL-DTL-83133), F-35/Jet A-1, NATO F-24/Jet A (ASTM D1655), F-44/JP-5 (MIL-DTL-5624) and TS-1 (GOST 10227)

Particle counting, cumulative channel Counts (For Receipt Use Only)[12,13,15]	Channel Counts	ISO Code	IP565, IP577, or D7619[18]
➢ 4 um (c)[16]	17	19	
➢ 6 um (c)[16]	17	17	
➢ 14 um (c)[16]	17	14	
➢ 30 um (c)[16]	17	13	

MIL-STD-3004-1C Change 1

Particle Size	Counts per mL	ISO Code
≥4 µm(c)	>2500-5000	19
≥6 µm(c)	>640-1300	17
≥14 µm(c)	>80-160	14
≥30 µm(c)	>40-80	13

µm(c) stands for equivalent circular diameter
ISO Code defined in ISO-4406

JF-PC-PEAK Automatic Particle Counter
(FED STD 791 Method 1203 / ASTM D7619 equivalent)

Flash Point

The Eralytics EraFlash replaces the MARFLASH to determine fuel flash point to ensure SOLAS requirements of JP-5 fuel.

The purpose of flash point testing is to determine the lowest temperature at which a fuel produces enough vapor to ignite, serving as a critical measure for safety and contamination detection. Fuel with flashpoint below 60°C (140°F), shall not be mixed into ship storage tanks, and aircraft containing fuel with flash point below 60°C (140°F), have restrictions on below deck storage.

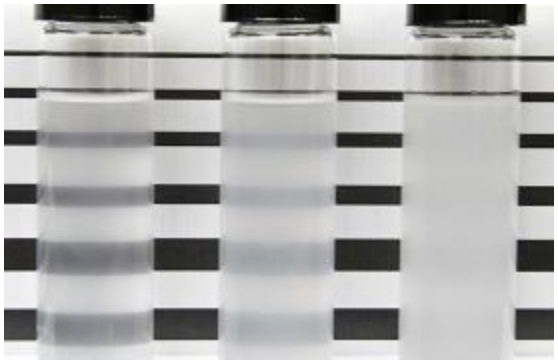
NAVAIR 00-80T-109

Eralytics EraFlash (ASTM D6450)

Future

- D-2 Inc. has integrated the conductivity and density measurements into particle counter for commercial procurements.

- NAVAIR has patented a novel method for the quantification of CI/LI additive. (US Patent #12474244)
  - Turbidity based measurement
  - Operable from 0°C to 50°C
  - Interlaboratory study completed 2QFY26



Sales beyond Army/USMC

- US Navy - Military Sealift Command & Fleet Readiness Center East
- US Coast Guard Aviation Logistics Center
- US Air Force - USMC Kits with Conductivity and Density Options on the APC
- SOCOM
- Boeing
- Lockheed Martin

Questions?