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Central Region

Date: March 24, 2025

Subject: CEN24FA218 - Materials Lab Testing

Contact: Nancy McAtee, Senior Chemist, Materials Laboratory, NTSB

Below is an excerpt from an email from Ms. McAtee regarding the orange residue found on the fuel manifold cap.

The fuel manifold cap of the accident aircraft was submitted to the Materials Laboratory for examination. On the interior side of the cap, an amber-colored, translucent waxy residue was present. A swab of the material was taken and examined using a Fourier Transform Infrared (FTIR) spectrometer with a diamond attenuated total reflectance (ATR) accessory in accordance with ASTM E1252-98 (American Society for Testing Materials E1252-98: Standard.Practice.for.General.Techniques.for.Obtaining.Infrared.Spectra.for.Qualitative.Analysis.and.American.Society.for.Testing.Materials). The spectrometer was used to collect and process infrared wavelength absorbance spectra of the unknown material.

The unknown sample spectrum contained the following combination of spectral peaks corresponding to particular functional groups found within molecular structure of the material. The presence of a strong doublet peak between $\sim 2920\text{ cm}^{-1}$ and $\sim 2850\text{ cm}^{-1}$ is indicative of a carbon-hydrogen (C-H) single stretching bond. The presence of peaks at $\sim 1460\text{ cm}^{-1}$ and $\sim 1380\text{ cm}^{-1}$ are indicative of carbon-hydrogen (C-H) antisymmetric and deformation bonds. Peaks at $\sim 1260\text{ cm}^{-1}$ and $\sim 1050\text{ cm}^{-1}$ are indicative of carbon-carbon skeletal (single) bonds. This combination of functional groups is consistent with straight-chained aliphatic hydrocarbon. A spectral library search was performed on unknown spectrum. The unknown spectrum was a good match for several olefinic/paraffinic waxes and other similar materials. The source of the residue could not be determined.

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