

From: [McAtee Nancy](#)
To: [Young Brian](#)
Cc: [Budinski Michael](#)
Subject: DCA18FM025 email report-protective blanket material identification
Date: Friday, March 1, 2019 14:40:30

Brian,

A sample of the unknown blanket material was submitted to the Materials Laboratory. The material was examined using a Fourier Transform Infrared (FTIR) spectrometer with a diamond attenuated total reflectance (ATR) accessory in accordance to ASTM E1252-98 (American Society for Testing Materials E1252-98: *Standard Practice for General Techniques for Obtaining Infrared Spectra for Qualitative Analysis*). The spectrometer was used to collect and process infrared wavelength absorbance spectra of the unknown material(s).

The spectrum for the material contained the following combination of spectral peaks corresponding to particular functional groups found within the molecular structure of the material. The presence of a peak $\sim 3200\text{ cm}^{-1}$ is indicative of a carbon-hydrogen (C-H) (aromatic) bond. The presence of a triplet peak at $\sim 2975\text{ cm}^{-1}$, $\sim 2925\text{ cm}^{-1}$ and $\sim 2850\text{ cm}^{-1}$ is indicative of a carbon-hydrogen (C-H) (alkane) stretching bond. A peak at $\sim 1720\text{ cm}^{-1}$ is indicative of a carbon-oxygen (C=O) double bond. Peaks at $\sim 1450\text{ cm}^{-1}$ and $\sim 1400\text{ cm}^{-1}$ are indicative of a carbon-carbon (C=C) double bond. A peak at $\sim 1340\text{ cm}^{-1}$ is indicative of a carbon-hydrogen(3) (C-H₃) bending bond. A series of peaks at $\sim 1240\text{ cm}^{-1}$, 1095 cm^{-1} and 1020 cm^{-1} is indicative of a carbon-oxygen-carbon (C-O-C) bond. A peak at $\sim 730\text{ cm}^{-1}$ is indicative of a carbon-hydrogen(2) (C-H₂) bending bond. The spectrum was consistent with an ester with aromatic and straight chained groups.

A spectral library search was performed on the unknown spectrum. The spectral search found a very strong match for polyethylene terephthalate (PET). PET is a thermoplastic polymer of the polyester family. It's commonly found in disposable plastic bottles and used as a textile fiber (like those used in the protective blanket submitted to the Materials Laboratory). The melting temperature range for PET is 250 - 255 °C (482 - 491 °F). Without the addition of fire retardant materials, PET will combust like any hydrocarbon fuel once liquified.

If you have any question, please let me know.

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Chemist
RE-30