NWCG Equipment Technology Committee

Equipment Advisory: 22-03

March 16, 2022

To: Wildland Fire Community

From: Dave Haston, Chair, NWCG Equipment Technology Committee (ETC)

Subject: Performance Differences Between Pre- and Post-2006 Fire Shelters

Issue: Recent analysis of fire shelter deployments confirms that design improvements implemented in 2006 provide an increased margin of safety for firefighters. Fire shelters manufactured prior to 2006 function as intended but may experience greater delamination when deployed. This bulletin provides technical information to support agency-specific decision-making regarding replacement of fire shelters manufactured prior to 2006.

Background: Fire shelters manufactured prior to 2006 have single stitched seams and a four-piece floor design. These fire shelters used a silica cloth that was not treated with silane. The Forest Service National Technology and Development Program (NTDP) introduced design changes in 2006 to delay delamination between silica cloth and aluminum foil, improve floor design, and make the shake handles easier to grab. An integrated silane coating on the silica cloth provides better adhesion and improved performance against delamination. Double stitched seams, a one-piece floor, and shake handle inserts were also added. These design changes were planned product lifecycle improvements and were not implemented due to any product failures.

NTDP detected differing levels of fire shelter degradation during two separate entrapments in 2020 where fire shelters were deployed. Further investigation revealed the fire shelters that showed more degradation were manufactured prior to 2006.

NTDP then tested and compared the material strength and the laminate bond strength of eight fire shelters manufactured prior to 2006 and eight fire shelters manufactured after. Test results demonstrated greater laminate bond adhesion and stronger material strength in the newer fire shelters. NTDP determined the differences in material strength and laminate bond strength, plus the one-piece floor design contributed to the differences in fire shelter performance during the two 2020 fire shelter deployments.

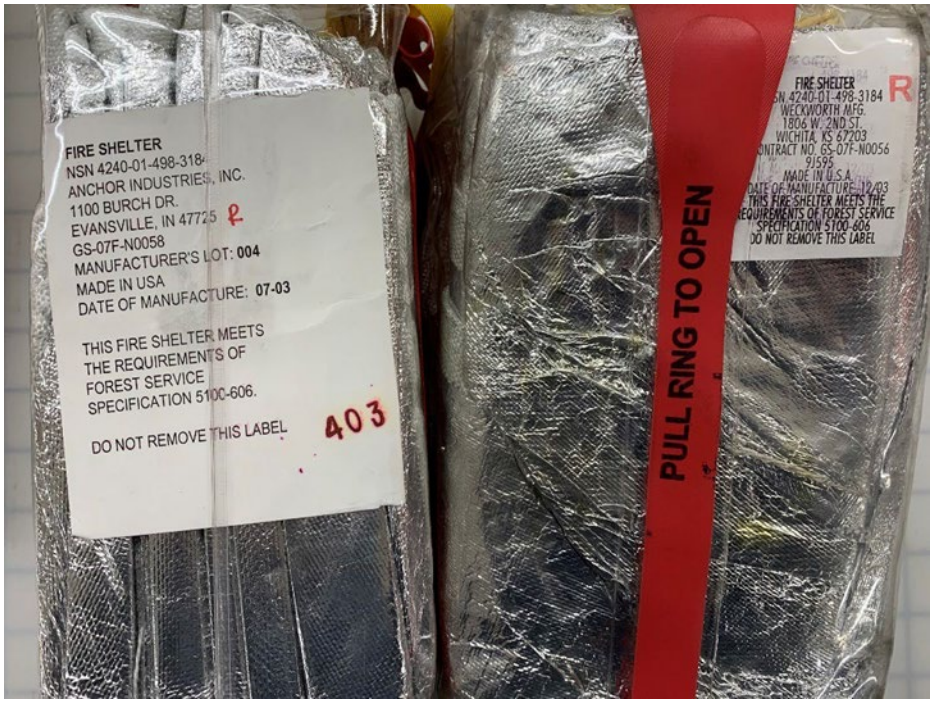
Identifying Pre-2006 Fire Shelters: The first new generation fire shelters were only available in the regular size (manufactured to FS Specification 5100-606). Fire shelters built to this specification have a paper insert label inside the polyvinyl chloride bag that is either white or pink (see photos below). Regular fire shelters built to more recent specification revisions have a green insert label (FS Specification 5100-606A, 5100-606B, and 5100-606C) or yellow insert label (FS Specification 5100-606D).

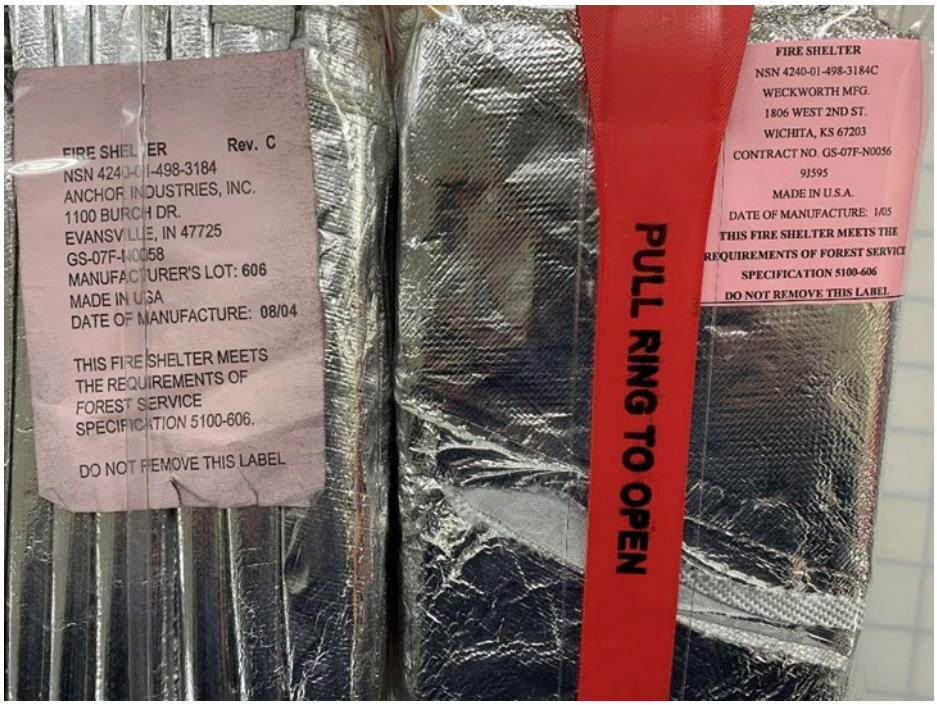
Table 1: Insert Label Colors for Regular-Sized Fire Shelters

Label Color	**Recommendation**
White or Pink	Identifies fire shelters *without* design improvements
Green or Yellow[1]	Identifies newer shelters *with* design improvements

[1] A limited number of fire shelters with the green label were manufactured in late 2005. Any questions regarding suitability for use can be directed to the contact in this bulletin.

Pre-2006 fire shelters with white and pink labels.





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