



AEROSPACE INFORMATION REPORT

AIR5717™

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Superseding AIR5717

Mitigating Wire Insulation Damage During Processing and Handling

RATIONALE

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Documents

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1. SCOPE

Wire and cable products progress through a series of handling or operational steps from the time they leave the manufacturer, and until a finished harness or assembly is ready for installation on a vehicle. Throughout these many steps, environmental or processing conditions may be present which can generate damage detrimental to the wire or cable and/or its intended application.

1.1 Application

This document discusses the various forms of wire and cable damage that may occur in an aerospace manufacturing environment. Characteristics of the different types of processes and/or equipment are described and associated with the types of damage as applicable. Mitigating actions are suggested where possible.

2. RELATED DOCUMENTS

There are no referenced publications specified herein.

3. EVIDENCE OR INDICATIONS OF DAMAGE

3.1 Insulation or Jacket Shrinkage

Insulation shrinkage (snapback), normally, is not immediately evident and is only discovered later in processing, or harness fabrication when the wire is cut or heated and the insulation 'snaps back'. Excessive tension on the wire will stretch it causing the entire wire to elongate. Constant tension on the wire or jerking will yield the same results. The conductor will yield, but the insulation remains in the elastic region of its stress-strain curve. Thus, when tension is relieved, and the insulation is free to move, it will return to its original dimension exposing the conductor. Frequently, this is the only evidence that the wire has been under too much tension. Measurement of conductor properties will usually not reveal the prior existence of too much tension. Wire manufacturers routinely monitor insulation shrinkage as a check of their processing conditions in addition to a constant monitoring of tension.

3.2 Abrasion and Cuts

Here, the surface of the insulation will show scuff marks from contact with rough surfaces. The culprits may be rough or improperly sized wire guides, sheaves that do not rotate, or counter wheels and pinch rollers, with rough or serrated surfaces. Serrated rollers/wheels, under too much pressure, frequently leave "tractor marks" along the surface of the insulation. If the serrations are sharp, and the impressions deep, it is possible to observe insulation cuts in some cases.