
Special Requirements for Crew Interface Labels on the International Space Station

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External Labels

Label materials for external use were one of the early challenges facing label designers for the long-duration mission of ISS. The flight crew integration standard required labels to meet the same functional life requirements as the equipment they were mounted on or associated with. That ensured that inks, pigments and other organic materials could not be used for external labels because of environmental life limits caused by Atomic Oxygen, a corrosive element existing in ISS orbits. This environmental effect limited available colors, adhesives and protective materials and shielding. An example of a material that was limited in use by the environment is clear Teflon, originally thought to be a promising material for protecting pigmented labels. Clear Teflon becomes opaque when exposed to the orbital environment. Although it would protect the label, it also would prevent viewing of it. This doesn't investigate the technical and scientific details of these material problems, but will note their limiting effects on label material choices and ultimately on the visual cues that external labels could provide. As noted in the discussion of internal labels, color is an important part of visual communication, particularly in safety-related information. Yellow and red are commonly used for cautions and warnings. Material designers determined that a gold anodize could be produced for EVA handrails that were normally yellow on other space craft. This same gold anodized material could be used as a

substitute for yellow on warning labels. A red material was found to meet environmental life requirements for labels although it did not match the MSIS spectral requirements for red safety labeling. Because the costs of producing a useable red were high, the program accepted a reduced dependence on red as a cue in certain types of external labels such as those that point to the Airlock. Those Airlock labels became part of the location coding requirements

The most useful material that was found to meet the long-life requirements for external labeling in harsh environments was a photosensitive aluminum foil (Metalphoto or its equivalent) that provided black (photographically exposed) characters, symbols and borders on a silver white (unexposed aluminum) background. The foils specified by Boeing Huntington Beach were available in hardened aluminum (H18) with matte finish in the following thickness (5, 8, 20 and 32 mil) and an annealed, dead soft aluminum with satin finish in a 5-mil thickness. Most labels attached to hard surfaces were the 5 mil thickness, while labels tied to cables and soft surfaces such as insulation were 20 mil thickness. The thicker material was used on soft material because the thicker edge could be rounded to eliminate sharp edge hazards, that were not a risk when the 5 mil labels were securely attached with adhesive to hard surfaces.