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Non-Flammable Containment Bag and Enclosure Development for International Space Station Use

Sunil Inamdar, ILC Dover, Frederica, DE 19946
Dave Cadogan, ILC Dover, Frederica, DE 19946
Erica Worthy, NASA Johnson Space Center, Houston, TX 77058

Work conducted on the International Space Station (ISS) requires the use of a significant quantity of containment bags to hold specimens, equipment, waste, and other material. The bags are in many shapes and sizes, and are typically manufactured from polyethylene materials. The amount of bags being used on ISS has grown to the point where fire safety has become a concern because of the flammability of polyethylene. Recently, a new re-sealable bag design has been developed that is manufactured from a specialized non-flammable material called Armorflex 301 that was designed specifically for this application. Besides being non-flammable, Armorflex 301 is also FDA compliant, clear, flexible, and damage tolerant. The bags can be made with closure mechanisms that resemble ZipLoc® bags, or can be open top. Sample bags have been laboratory tested by NASA to verify materials properties, and evaluated by astronauts on the ISS in 2012. Flexloc bag manufacturing will commence in 2014 to support a transition away from polyethylene on ISS. In addition to re-sealable bags, other larger containment systems such as flexible gloveboxes, deployable clean rooms, and other devices manufactured from Armorflex 301 are being explored for use on ISS and in similar confined space locations where flammability is an issue. This paper will describe the development of the Armorflex 301 material, the Flexloc bag, and other containment systems being explored for use in confined areas.