Flammability in the ISS

A fire on the ISS would be very dangerous as it is a closed container where all the heat and smoke would remain while the crew is stuck inside with it. NASA takes the prevention of fire very seriously. Many of the materials used in the space program are chosen to help prevent fires.

The main method of minimize the chance of fire is to cut back on flammable materials on the station. The majority of the station is made of aluminum and stainless steel—not very flammable. Also NASA chooses to make many of the bags that hold supplies out of Nomex—a non flammable cloth often used by fire fighters and race car drivers for the same reason. Just by choosing to use these materials, we are making the chances of a fire very small.

There are very few methods of igniting a fire on the ISS. The only place that a flame occurs on the ISS is in specific experiments that are designed to handle very small fires and take many precautions to prevent the spread of a fire. The most probable method of a fire starting would be by an electrical short. The equipment on the ISS is designed to minimize this risk but we still have to take precautions and we try to keep any flammable materials away from electrical outlets.

There are many things on the Station that are flammable like paper, ziplock bags, running clothes, Velcro. One of the most flammable materials on the Station is hair. All of these things are important on the space station for obvious reasons and we do best to keep the numbers of these things down. Crew are taught to keep flammable materials stowed when not in use—ziplock bags, clothing, printer paper are kept in Nomex bags most of the time so they would not be exposed to a fire if it occurred. Hair falls out of people’s heads and off their body all the time, so we have to keep the Station clean by vacuuming off the air filters on a regular basis.

Paper, velcro or clothing are considered flammable because if a flame or other heat source is in contact with them for a short time, they will continue to burn even if the flame or heat source is removed. ABS plastic, polyelthene plastics (ziplock bags) or nylon are other materials that are used occasionally on the Station but are kept in locations that would protect them from a flame or something that would get hot.

For NASA, non-flammable means that if you hold a flame to the material it may burn but if you remove the flame, the material will self extinguish. This is what happens to many materials like Nomex, Gortex (another cloth), Polycarbonate plastic, ULTEM plastic, Teflon plastic. Other materials don’t burn at all like fiber glass cloth, aluminum, titanium or stainless steel.

**When designing hardware for the space program, you can build your prototype out of anything to represent your idea; however, be ready to describe materials you expect to build your equipment out of for the flight hardware and expect that someone will ask you about flammability of your materials. If your idea is chosen to be made into flight hardware, NASA engineers will help choose materials that will be acceptable for the ISS.**