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SPACE BRICK – MODULAR EPP ELEMENTS FOR FUTURE SPACE TRANSPORTATION AND CARGO MISSIONS

Abstract

Sabelt is specialized in space cargo operations, restraint and support systems. Thanks to the experience in space cargo payload storage and retaining systems, Sabelt has supported the delivery of many tons of materials to the International Space Station since 2011. The SPACE-BRICK is a modular element made of fireproof EPP (Expanded Polypropylene) qualified for flight. It has a density of 30 to 60 g/l and good performances in terms of flammability, compression, and thermal isolation. It is food compatible and has been qualified by ESA and NASA for toxicity, flammability and off-gassing. It is small, thin and very light. Every brick is obtained by specific aluminum molds where the steam activates the micro-capsule expansion that merges the granule in a solid component. The process comes at the end with the post-production stabilization in a warm environment. This final treatment stabilized the internal structure making the material rigid and resistant to mechanical shock. The same row material is currently used for producing the module accessories and currently flies to the ISS. Space bricks can be assembled together mechanically in three different directions in order to increase thickness, height and length. The junction is solid and permits to create floors, walls, protections, boxes, caps and supports. They can be easily stored or reused to create different shapes (Sabelt has already patented two geometries). They can be used also for crew quarter organizations, shipments to the space or back to the Earth, to build protections for electronic devices, compartments to store materials, self-supporting walls or joined with perpendicular bulkheads.