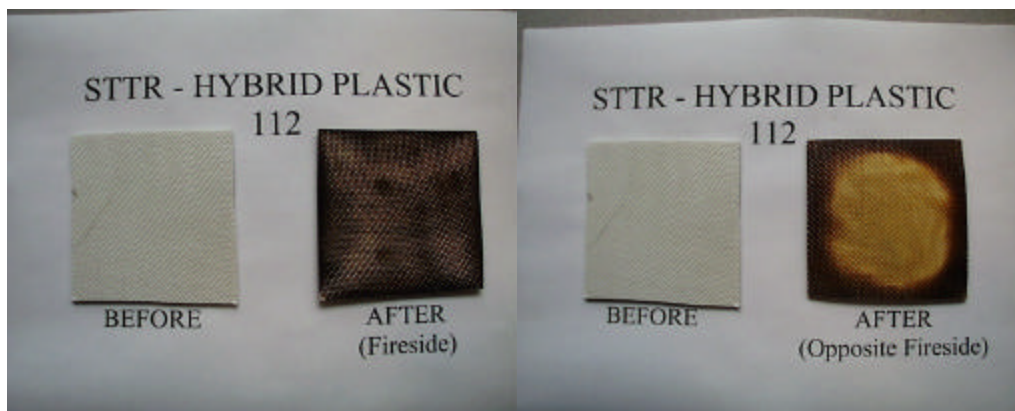


Hybrid Plastics' POSS® Nanocomposites Achieve Previously Unattainable "Mil Spec" for Reducing Flammability of U. S. Navy Ship Composite Structures

Fountain Valley, CA: Hybrid Plastics has successfully completed a research contract utilizing POSS® nanomaterials as nonhalogenated additives to reduce the flammability of currently employed vinyl-ester resins in U.S. Navy ship composite structures. For the first time, the Navy has been able to approach "mil spec" for flame reduction. The Navy is now able to approach these fire retardancy goals without relying on halogens, a class of substances with known adverse environmental aspects.

The program utilized a Vi/Ph POSS® nanocomposite resin. Using low carbon content POSS® with nonvolatile, depolymerizable monomers allow the resultant resins to exceed the fire performance of existing halogen fire-retarded polyesters and approach the military standard 2031 specification. The POSS®-resin approach is also superior in that it eliminates the use of all volatile organic components from the manufacturing process, and, thereby, improves workplace safety as it minimizes inadvertent chemical exposure risks. In summary, the POSS® nanocomposite approach can be successfully used to design and manufacture nonflammable and nonhalogenated resins with appropriate viscosity for VARTM [Vacuum Assisted Resin Transfer Molding] manufacturing and which also have acceptable physical characteristics for use as composites in Navy ships.



Fire-side and back side of the High Vi/Ph POSS glass reinforced composites

POSS® is a revolutionary new Nanotechnology based on silicon-derived building blocks that provide nanometer-scale control to dramatically improve the thermal and mechanical properties of traditional polymers while offering easy incorporation using existing manufacturing protocols. These compounds have an average diameter of just 1.5 nanometers, or billionth of a meter. POSS® nanomaterials can be used both as direct replacements for hydrocarbon based materials or as low-density performance additives to traditional plastics. They release no VOCs, and, thereby, produce no odor or air pollution. They are biocompatible, recyclable, non-

flammable, and competitively priced with traditional polymer feedstocks. POSS® Nanostructured™ materials can be readily incorporated into virtually any existing polymer system through blending, grafting or copolymerization. These hybrid nanochemicals were hailed by R&D magazine as one of the 100 most technologically significant new products for the year 2000.

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