FRP Composite Missile Launcher Keeps The U.S. Navy’s Submarines "Current"

**Product:** Large 7+ foot diameter FRP composite missile housings with integral end plates, and 14" and 20" diameter FRP composite rocket launcher tubes.

**Customer:** The manufacturer of the U.S. Navy's attack class of submarines.

**Application:** A new "Flexible Payload Module" design concept for the U.S. Navy's submarines. Each module has ten each 14" diameter and two each 20" diameter FRP composite launch tubes for cruise missiles, spy satellites, and unmanned drone aircraft.

**Background:** The role of the U.S. Navy's existing submarines has dramatically changed. There has been no firing of torpedoes in anger since the Vietnam war. (Afghanistan and Iraq do not have many naval ships.) Thus, the U.S. Navy, and its builder of submarines, has a program to develop new payload modules that can be used to retrofit the torpedo bays of existing submarines with airborne missile launchers assemblies.

The new launcher modules must be light weight, portable; and since they will see salt water exposure, corrosion resistant. In addition, the missile launcher must endure explosive shock and launch loads. FRP composites are the natural materials of construction choice. Only Industrial Fiberglass and one other fabricator were invited to participate in this new technology.

**Method and Materials of Construction:** To provide maximum strength, but yet light weight, the 84" diameter payload housings and the 14" and 20" diameter launcher tubes were filament wound. The special design end closure plates were contact molded with the 14" and 20" launcher tube openings integral.

A proprietary premium grade vinylester resin was used for the launcher tubes and end plates. This special vinylester resin is custom manufactured to Industrial Fiberglass'...
specifications - to meet rigid performance standards for heavy wall composites, with minimum and controlled shrinkage.

Since the end plates were made with a "step" so that half the thickness would be installed inside the large housing, that 84" tube dimension had to be controlled and maintained uniform and round.

The 85" diameter end plates presented special challenges. Besides the 1/2" square ledge that had to be maintained around the entire plate, the plate had to be made flat, with no bow, tilt-back, or warpage. And, each end plate had to include the seven each 14" diameter and two each 20" diameter tube "holes" that are absolutely straight, true, and "in line" between the two plates. To maintain the tolerances between the top and bottom end plates - using Industrial Fiberglass' extensive tooling and manufacturing skills - those holes and ledges were tooled and molded integral in each plate.

In order to be installed through the missile housing's end plates, the "forest" of missile launcher tubes (see photo) had to be filament wound with precise and controlled outside diameters. This was successfully accomplished by superior materials control technology, and using computer controlled filament winding equipment.

After assembly, the spaces between the large missile housing and the launcher tubes will be filled with a special closed cell high temperature, light weight, and high strength foam.

**Customer Benefits:** As is often typical for military projects, this customer sent a four man qualification team to our Dayton plant before production started. After a day of intensive discussions they left convinced that the right vendor had been selected; and we were released to start production.

**Opportunities for Your Customers:** Which one of your customers or clients could benefit from Industrial Fiberglass' unique ability to take a "never been done before" project from concept design to a finished solution - using ingenuity; and superior resin, tooling, and fabrication technology?