

Task List Composite Layups

Purpose: Ensure successful layups and fabrication of composite parts.

Description: CPSS uses composite parts to manufacture rockets. The primary composite materials used are carbon fiber or glass fiber and a polymer matrix. Pre-impregnated (pre-preg) composite are used on occasion.

1 SAFETY REQUIREMENTS

1.1 Resin

1.1.1 See section 1.4.1 below

1.1.2 The resin commonly used by CPSS is West Systems 105. (With 205, 206, or 209 hardener)

1.2 Fiber

1.2.1 Carbon fibers and fiberglass can cause irritation if there is significant exposure to the skin. Minimize the amount of contact with bare skin by wearing long pants and gloves. Nitrile gloves are recommended.

1.2.2 When cured, the edges of the part can be sharp. Remove excess fibers and remove sharp edges.

1.3 Machining

1.3.1 If machining is required on a cured part, a dust mask will minimize inhalation.

1.3.2 Using abrasive cutting methods are the best method for cutting composite parts.

1.4 Personal Protective Equipment

1.4.1 Choose and wear proper Personal Protective Equipment (PPE) according to the material manufacture's recommendation, the CPSS advisor, and/or MSDS's. PPE may include, but not limited to: safety glasses, long pants and closed toe shoes. Safety glasses may be borrowed for CPSS and are in a tub in the tool room.

1.4.2 MSDS's are located on the CPSS cloud drive under "Safety and Technical Specs" accessible via a club computer in the conference room and in a physical binder on the flammables cabinet in the filament winder room.

2 GENERAL TIPS

2.1 Resin

2.1.1 Mix in small batches. Heat is generated during the curing process and can melt plastic cups if large amount are mixed.

2.1.2 Resins have a specified ratio. Follow the ratio.

2.2 Fibers

2.2.1 Touch the fibers as little as possible to prevent oils and dirt getting on the fibers. This also prevents skin irritation.

2.2.2 Remove frayed fibers and fuzz.

2.3 Curing

2.3.1 When using a vacuum bag, ensure sharp edges can't puncture the bag.

2.3.2 Using a timer, set a time for the pumps to turn off if leaving for a long period of time. This is to keep the vacuum pumps in good health.

2.4 Fabrication

2.4.1 Use abrasive cutting methods to cut composite parts. Steel will dull and toothed cutters will break. Abrasive cutters provide a better cut too.

2.4.2 When machining, use Tungsten-Carbide or diamond coated tooling. High Speed Steel will dull quickly.

2.4.3 A damp cloth is useful for cleaning.