

# Task List High Powered “Cert” Rocket Manufacturing

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**Purpose:** Ensure successful designing and manufacturing of high powered rockets (sometimes called cert rockets).

**Description:** This document outlines designing and manufacturing of high powered rockets. The rockets are usually built from scratch and are relatively simple, but teach fundamental design techniques, building techniques, and how to launch a rocket.

## 1 SAFETY REQUIREMENTS

### 1.1 Manufacturing

- 1.1.1 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.
- 1.1.2 MSDS’s are located on the CPSS cloud drive under “Safety and Technical Specs”, accessible through the club computer in the conference room, and in a physical binder on top of the flammables cabinet in the filament winder room.
- 1.1.3 Nitrile Gloves shall be worn whenever using epoxy or other chemicals. Nitrile gloves of various sizes are located in the tool room.

## 2 Design

### 2.1 Reference Documents

- 2.1.1 “High Power Rocket Design and Fabrication” is a senior project by Kelly Scroggs that details the design process. It is contained in a green binder in the CPSS conference room.

### 2.2 Programs

- 2.2.1 CPSS computers have RockSim and OpenRocket. Both programs are suitable for designing these types of high powered rockets. OpenRocket is a free, open source program and RockSim is a premium program that is installed on CPSS computers.

## **2.3 Design**

- 2.3.1 “High Power Rocket Design and Fabrication” describes the design requirements and the parts to include in a rocket.
- 2.3.2 Approach any senior members in the club with any questions or to check a design. Most people have built a cert rocket in this club.

## **3 Manufacturing**

### **3.1 Reference Documents**

- 3.1.1 “High Power Rocket Design and Fabrication” is a senior project by Kelly Scroggs that details the design process. It is contained in a green binder in the CPSS conference room and is posted on the CPSS website.
- 3.1.2 Refer to “Composite Layups Task List” for specific information about performing a composite layup. Physical copy in “Task List Binder” and on CPSS cloud drive, accessible via a computer in the conference room under “Safety and Technical Specs”.

### **3.2 Manufacturing**

- 3.2.1 Follow the steps in “High Power Rocket Design and Fabrication”. The techniques used will produce a successful rocket, but utilizing the Student Machine Shop will result in better quality. Ask other CPSS members or Shop Techs how to make a part and they will show a way to make it.
- 3.2.2 Use proper PPE when working with composite, micro-balloons, and powered tools.
  - 3.2.2.1 Composite materials: Wear nitrile gloves when handling epoxy and carbon fiber sheets.
  - 3.2.2.2 Microballoons: Use a dust mask and nitrile gloves. These are very fine particles of glass spheres.
- 3.2.3 Power tools: Must have a red tag in the ME Student Machine Shop to use CPSS-owned power tools.