**Pressurized Systems Questionnaire for Science Instruments**

Provide Pressurized System Schematic or diagram of the system. Things to include are cylinder sizes/type, maximum source pressure, valves, type of tubing, system pressure throughout, pressure rating of all the components in the system, and overpressure protection (if required).

**Pressure Vessels:**

What type of pressure vessel will be used for the science instrument? (DOT cylinder, ASME pressure vessel, dewar, special fabricated vessel, etc…)

How many vessels will be used?

For DOT cylinders, is the hydrostatic testing current on the cylinder? Provide last test date.

For composite overwrapped pressure vessels (COPVs), in addition to the hydrostat date, what is the service life of the vessel? How old is the vessel? Provide manufacturer date. Is it DOT? If not, was it designed in accordance with AIAA S-081A-2006?

For pressurized cryogenic dewars, is there a relief valve or rupture disc installed on the dewar? For the relief valve, provide the last pressure test date and a copy of the results. Periodic re-testing of the relief valve is required every 3 years for gas systems above 200 psi. Every 5 years for gas systems 200 psi and below.

For special fabricated vessel, provide stress analysis of the vessel and proof pressure test records. The stress analysis must include at least safety factors, maximum allowable working pressure (MAWP) of the vessel, and physical dimensions of the vessel. Proof pressure tests are required to verify that the materials, manufacturing processes, and workmanship meet design specifications and that the hardware is suitable for flight. Provide a copy of the pressure test procedures and results.

*Per FAA regulation, FAR Part 25.1438 Pressurization and pneumatic systems,*

*(a) Pressurization system elements must be burst pressure tested to 2.0 times, and proof pressure tested to 1.5 times, the maximum normal operating pressure.*

*(b) Pneumatic system elements must be burst pressure tested to 3.0 times, and proof pressure tested to 1.5 times, the maximum normal operating pressure.*

*(c) An analysis, or a combination of analysis and test, may be substituted for any test required by paragraph (a) or (b) of this section if the Administrator finds it equivalent to the required test.*

How is the vessel pressurized?

What is the source pressure?

Is there overpressure protection provided for the vessel?

**Overpressure Protection for Pressurized System:**

For a typical compressed gas cylinder pressurized system configuration that uses a pressure regulator to reduce the pressure from the gas cylinder, overpressure protection is required in the event of a regulator failure. Whether the compressed gas cylinder is used as the source pressure to pressurize a system or just to purge out the science instrument, it requires some type of pressure relief device downstream of the pressure regulator to protect the downstream components.

Information required for the relief device includes:

* Provide relief device sizing calculation to show that the relief device is properly sized to handle the worse- case flow capacity in the event of a failed open regulator.
* Provide relief device certification documentation.
* Provide relief device specification data sheet.
* For relief valves, provide record of its last periodic pressure test to include test date and results. (Periodic re-testing of the relief valve is required every 3 years for gas systems above 200 psi. Every 5 years for gas systems 200 psi and below.)

For pressurized systems using cryogenic fluids, is there overpressure protection installed for all vacuum and cryogenic vessels, and also for any cryogenic lines that have the potential to trap cryogenic fluids. Provide relief device certification documentation. In addition, provide record of its last periodic pressure test to include test date and results. Periodic re-testing of the relief valve is required every 3 years for gas systems above 200 psi. Every 5 years for gas systems 200 psi and below.

**Send response to this questionnaire to the AFRC Pressure Systems Manager:**

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