Code 540

GSFC Pressure Vessel/Systems Program Permit Plan Procedure

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TABLE OF CONTENTS

SECTION **PAGE**

1. PURPOSE 5
2. SCOPE 5
3. REFERENCE 5
4. DEFINITIONS 5
5. PERMIT SYSTEM 5
   5.1 Intent 5
   5.2 Procedure 6
   5.3 Maintenance & Audit 6
   5.4 Considerations 6
   5.5 Tagging 6
6. ADDITIONAL REQUIREMENTS 7
   6.1 Do 7
   6.2 Do Not 7

1. PURPOSE

This document outlines the procedure for generating a PVS Permit for Owners of Class R systems as defined by GPR 8710.3 under the GSFC PVS Program.

2. SCOPE

The scope of this document is for the PVS Permit requirements and guidelines that shall be followed by Owners of Class R Systems. The proposal drafted by the Owner is subject to approval from the Pressure Systems Manager (PSM) or a designee. The PVS Permit is subject to all criteria outlined in this document.

3. REFERENCE

NASA-STD-8719.17, Revision A: Requirements for Ground-Based Pressure Vessels and Pressure Systems (PVS)

GPR-8710.3, Revision B: Certification and Recertification of Ground-Based Pressure Vessels and Pressurized Systems (PVS)

4. DEFINITIONS

Term	Definition
Class R System	Class R, Research and Development (R&D) PVS, applies to those PVS that are assembled from PSM approved components for a limited duration for the purpose of experimental support to a research and development project, or to support a specific flight project test.
Free-standing Component	Not permanently attached to or a part of a certified PVS
MAWP	Maximum Allowable Working Pressure

5. PERMIT SYSTEM

5.1 Intent

The PVS Permit System is meant to be used for Owners that create new PVS from various parts that are pre-approved by the PSM or a designee. These systems are usually used for a brief period, 90 days or less, and then taken apart again to its basic component/system level. The Permit System will allow these Owners to continue this “quick” turn-around time without requiring approval at every stage of the process. The PVS Program shall do an initial evaluation of all potential PVS the Owner might create or review the Owner’s design rules for creating a new PVS, and grant them permission to operate within a set boundary.

5.2 Procedure

Owners requesting a PVS Permit shall complete these steps and basic requirements prior to receiving an approved PVS Permit.

1. Owner shall generate a proposal of the systems that are intended for use under this Permit System. The proposal shall contain the following:
    a. All combinations of potential PVS to be used or Owner generated design rules that summarize all possible configurations
    b. Method/Procedure to segregate free-standing components that are intended to be used under the permit from oils, solvents, abrasives, and debris
    c. Analysis of potential PVS proving adequate design
    d. Data sheets/specification sheets for all free-standing components that are intended to be used under the Permit System.
2. Submit proposal to PSM or designee for approval

5.3 Maintenance & Audit

Upon approval of the proposal by the PSM or a designee, the Owner is subject to a regular audit of their PVS. The audit will occur once a year to ensure that the boundaries of the PVS Permit are being maintained during use.

The Owner shall also demonstrate safe maintenance practices to ensure durability of all free-standing components being used under the permit. Such procedures should be made readily available for review upon request.

5.4 Considerations

The PVS used shall be designed and built by the PVS Permit Owner and/or personnel working with the PVS Permit Owner. The Owner will be ultimately responsible for complying with the terms of operation of the PVS Program issued PVS Permit.

5.5 Tagging

Once the submitted Permit Plan is approved, the PVS Program shall issue a tag for each component under the permit plan number. These components shall then be tracked by the PVS Program and maintained by the Owner based on the issued In-Service Inspection plan interval. The Owner should note the listed Pressure Rating of each component on the tag prior to assembling a new PVS. The listed value indicates the maximum pressure that is allowed to enter into that component. This shall be monitored by the PVS Program during regular audits for compliance. Under no circumstance is the Owner allowed to use a lower rated component in a PVS without adequate safety measures put in place upstream, and approval from the PSM.

The below figure is an example of what information shall be on the tag for each component in the permit plan. The provided tag shall be Purple colored tag.

Permit Plan Number
Component Number
Owner Code
Pressure Rating of Component in PSIG
Allowable Fluid Code

Table 1: Permit Plan Tag Minimum Content

The allowable fluid code is modeled after the system level naming and tagging convention. The fluid category is intended to only identify the type of fluid being used, and is not to be confused with traditional fluid category designations specified by other national standards. The table below summarizes the possible values for this field in the Permit Plan Tag.

Pressure Class (1st character)		State/Temperature (2nd character)		Fluid Category (3rd character)	
Code	**Description**	**Code**	**Description**	**Code**	**Description**
A	Atmospheric Pressure	A	Ambient Temperature	D	Inert
H	>150 psig	C	Cryogenic	F	Flammable/Combustible
L	14.7 < P ≤ 150 psig	E	Elevated Temperature	O	Oxidizer
V	< 14.7 psig	L	Liquid	M	Lethal

Table 2: Fluid Description Codes

6. ADDITIONAL REQUIREMENTS

6.1 Do

- Consider all fluids to be used when designing PVS.
- Design PVS to meet the requirements of the end effect.
- Perform design pressure calculations for all piping and free-standing components; must be made available upon request.
- Perform relief load requirement calculations for all free-standing pressure relief devices used in PVS for adequate sizing; must be made available upon request.
- Perform external load calculations on PVS (i.e. dynamic, thermal, vibrations, etc.); must be made available upon request.
- Verify relief device set pressure is equal to or less than the lowest pressure rated component in the system. A good rule of thumb is to have the operating pressure approximately 10% less than the set pressure of the relief device.
- Perform leak test of final array for pressure containment prior to use.

6.2 Do Not

- Borrow/remove/alter pressure relief devices from existing PVS that are certified systems without approval from the PSM.
- Use un-tagged pressure relief devices as primary safety devices in PVS.
- Use free-standing components deemed unfit for service in PVS.