



**NPD 8710.5D**  
 Effective Date: March 12, 2008  
 Expiration Date: March 12, 2023

**COMPLIANCE IS MANDATORY**

[Printable Format \(PDF\)](#)

Request Notification of Change (NASA Only)

**Subject: Policy for Pressure Vessels and Pressurized Systems (Revalidated with Change 2)**

**Responsible Office: Office of Safety and Mission Assurance**

**CHANGE LOG**

<b>Change No.</b>	<b>Date</b>	<b>Description</b>
1	03/25/13	Revalidated with changes to incorporate NPR 1400.1 requirements, updated authorities and applicable documents, moved references to Attachment A, clarified a few statements, rewrote a couple requirements as statements of fact, and deleted the numbers from the requirement tags.
2	01/12/18	Revalidated to update with 1400 compliance, citations corrected throughout document.
3	09/07/18	Update paragraphs 1.a.(3), 4.f., and 4.g. to reflect current standards for space flight PVS, and replace "national consensus standard" with "voluntary consensus standard."

**1. POLICY**

a. It is NASA policy to manage risk to people, facilities, and the environment posed by flight and ground-based pressure vessels and pressurized systems (PVS) (including boilers), by performing the following activities:

- (1) Design, acquire, fabricate, inspect, test, install, repair and alter, operate, and maintain all ground-based PVS in accordance with the applicable codes, standards, guides, and regulations as detailed in NASA-STD-8719.17.
- (2) Certify all ground-based PVS in accordance with this NPD and NASA-STD-8719.17 prior to operation.
- (3) Qualify and accept space flight PVS, including qualification units, in accordance with ANSI/AIAA S-080A-2018 and ANSI/AIAA S-081B-2018.
- (4) Qualify and accept atmospheric flight (non-space flight) PVS in accordance with the Federal Aviation Administration regulations in 49 CFR pts. 171-178. For NASA owned or operated Department of Defense aircraft; maintain, operate, and modify aircraft PVS in accordance with approved technical orders from the Department of Defense cognizant agency for the aircraft.
- (5) For ground-based PVS (including flight PVS converted for ground use), where it is not practical (due to age or design) to meet the requirements of paragraph 1.a(1), evaluate, certify, and accept risk for specific operational parameters in accordance with this NPD, NPR 8715.3, NASA-STD-8719.17, and Center policy or procedure prior to operation.

- (6) For space flight PVS, where it is not practical to meet the requirements of paragraph 1.a(3), evaluate, certify, and accept risk in accordance with program management risk acceptance requirements prior to operation.
- (7) Exclude categories of ground-based or specific ground-based PVS from Center PVS certification programs only after review, evaluation, and documentation (in the PVS configuration management system) of the rationale supporting the exclusion. Typical examples of excluded items that are permissible for use without certification are low-risk, off-the-shelf commercial systems that meet all applicable standards.
- (8) Perform periodic inspection and recertification for all PVS to ensure their ongoing fitness for service and to document and assess relevant changes in condition or knowledge that materially affect risk assessment.
- (9) Document and maintain the certification status of PVS to indicate all exceptions, waivers, nonconformances, special constraints, or instructions required for safe operation of the PVS.
- (10) Ensure that PVS are operated and maintained in accordance with applicable voluntary consensus codes and standards and by skilled, adequately trained, and qualified personnel who are certified in accordance with NPR 8715.3.
- (11) Establish a configuration management program to control the engineering and maintenance changes made to PVS.
- (12) Evaluate tenant and transient (e.g., construction, and not including onsite support service) contract PVS programs to determine whether they can be accepted as meeting the requirements of this NPD by providing an equivalent level of safety or if they need to be incorporated into a NASA-operated PVS program.
- (13) Exceptions, adjustments, deviations, and waivers are processed in accordance with this NPD, NPR 8715.3, and NASA-STD-8719.17.

## **2. APPLICABILITY**

- a. This directive is applicable to NASA Headquarters and NASA Centers, including Component Facilities and Technical and Service Support Centers. This directive applies to the Jet Propulsion Laboratory (a Federally-Funded Research and Development Center), other contractors, recipients of grants, cooperative agreements, and other agreements only to the extent specified or referenced in the applicable contracts, grants, or agreements.
- b. This NPD applies to NASA-owned or -operated temporary or permanent ground-based PVS and flight PVS and to non-NASA-owned contractor or tenant PVS operated on NASA property, if those PVS are determined to pose a risk to NASA personnel, facilities, or equipment.
- c. In this directive, all mandatory actions (i.e. requirements) are denoted by statements containing the term "shall." The terms: "may" or "can" denote discretionary privilege or permission, "should" denotes a good practice and is recommended, but not required, "will" denotes expected outcome, and "are/is" denotes descriptive material.
- d. In this directive, all NASA document citations are assumed to be the latest version unless otherwise noted.

## **3. AUTHORITY**

National Aeronautics and Space Act , 51 U.S.C. § 20113(a).

## **4. APPLICABLE DOCUMENTS AND FORMS**

- a. 49 CFR pts. 171-178 Hazardous Material Regulations
- b. NPD 1000.3, The NASA Organization.
- c. NPR 1400.1, NASA Directives and Charters Procedural Requirements.
- d. NPR 8715.3, NASA General Safety Program Requirements.
- e. NASA-STD-8719.17, NASA Requirements for Ground-Based Pressure Vessels and Pressurized Systems (PVS).
- f. ANSI/AIAA S-080A-2018, Space Systems Metallic Pressure Vessels, Pressurized Structures, and Pressure Components.
- g. ANSI/AIAA S-081B-2018, Space Systems Composite Overwrapped Pressure Vessels (COPV).

## **5. RESPONSIBILITY**

- a. The Chief, Safety and Mission Assurance:

(1) Ensures, as required by NPD 1000.3 section 4.13 and NPR 1400.1 paragraph 2.13.1, that Centers and programs

establish and document their PVS program in accordance with this NPD and NASA-STD-8719.17;

(2) Approves, as required by NPD 1000.3 section 4.13 and NPR 1400.1 paragraph 4.2.1.3, waivers and deviations to this directive in accordance with NPR 8715.3, paragraph 1.13.

b. For space and atmospheric flight PVS, Program/Project Managers and Institutional Managers shall;

(1) Designate an individual with responsibility for establishing a qualification and acceptance or recertification process to ensure safe and reliable testing and use of space and atmospheric-flight PVS.

(2) Qualify space and atmospheric flight PVS and accept the associated residual risks in accordance with paragraphs 1.a(3), 1.a(4), and 1.a(6).

(3) Accept the risk for waivers and deviations in accordance with this NPD and NPR 8715.3, paragraph 1.13.

c. Center Directors, including Directors of Component Facilities, shall perform the following activities for ground-based PVS:

(1) Designate an individual qualified to perform the duties delineated in paragraph 5.e below and in NASA-STD-8719.17, to serve as Pressure Systems Manager (PSM) and Technical Authority for PVS.

(2) Accept the risks of operation in accordance with this NPD and the risk matrix contained in NASA-STD-8719.17 for PVS, with Risk Acceptance Code (RAC) 1 or 2 after mitigation (residual risk).

(3) Ensure that all requests for waivers and deviations are processed and maintained in accordance with this NPD and NPR 8715.3, paragraph 1.13.

(4) Accept the risks of operation for waivers and deviations in accordance with this NPD and the risk matrix contained in NASA-STD-8719.17 for PVS, with Risk Acceptance Code (RAC) 1 or 2 after mitigation (residual risk).

(5) Provide sufficient resources to implement the PVS program.

(6) Direct application of this NPD to non-NASA-owned PVS that pose risks to NASA personnel, facilities, equipment, or property through contract provisions or other means (agreements, memoranda of agreement, joint use agreements) based on guidance from the PSM.

(7) Ensure that the PSM is functionally independent (does not oversee his own work, has a mechanism established to avoid undue influence from those he oversees, and has an alternative reporting path to upper management) of organizational units that own or operate PVS that are subject to the requirements of this NPD and NASA-STD-8719.17, and has sufficient authority to perform the duties delineated in paragraph 5.e below.

d. The management of the organization responsible for the ground-based PVS shall perform the following activities:

(1) Ensure that operating, inspection, and maintenance procedures are developed and implemented to assure compliance with the operational limits of the PVS.

(2) Ensure personnel are properly trained, qualified, and certified to operate a specific PVS.

(3) Submit designs or procurement specifications for new PVS or modifications to existing PVS for review and evaluation by the PSM or designee prior to initiating the procurement action or the modification.

(4) Design, acquire, fabricate, inspect, test, install, repair, alter, operate, and maintain all PVS items in accordance with the requirements of this NPD, NASA-STD-8719.17, and the design specifications.

(5) Ensure all PVS are certified (or qualified/accepted) in accordance with this NPD prior to use.

(6) Accept the risks of operation for waivers and deviations in accordance with this NPD and NPR 8715.3, paragraph 1.13.

(7) Control the configuration of PVS, including the engineering and maintenance changes made to PVS, through the use of a configuration management system.

e. The PSM shall perform the following activities for ground-based PVS:

(1) Serve as Technical Authority.

(2) Ensure that Center-specific procedures are developed and implemented for PVS design, acquisition, fabrication, inspection, testing, installation, repair, alteration, operation, maintenance, certification, and documentation of noncompliance to meet the requirements of this NPD and NASA-STD-8719.17.

(3) Evaluate and certify PVS in accordance with paragraph 1.a(2) or paragraph 1.a(5) and NASA-STD-8719.17 prior to operation.

(4) Review design and procurement specifications for compliance with this NPD and NASA-STD-8719.17.

- (5) Specify voluntary consensus standards that apply to ground-based PVS consistent with the requirements of NASA-STD-8719.17 and interpret voluntary consensus standard application(s) to the Center.
- (6) Review and approve, or disapprove, requests for relief from the requirements of this NPD based on the technical merits of the request.
- (7) Advise the Contracting Officer and Center Director on the application of this NPD and NASA-STD-8719.17 to contractor or tenant operations, if a non-NASA-owned PVS operated on NASA property poses risk to NASA personnel, facilities, or equipment.
- (8) Based on periodic review of equivalency, accept applicable non-NASA tenant or transient (e.g., construction, and not including on-site support service) contractor PVS safety programs as meeting the requirements of this NPD, or require incorporation of the affected PVS in the Center PVS program.
- (9) Identify, review, and evaluate specific PVS or categories of PVS that may be excluded from Center PVS programs on the basis of negligible operational risk or hazard to personnel under any foreseeable failure, in accordance with NASA-STD-8719.17, and document the rationale for the exclusion in the PVS configuration management system.
- (10) Ensure that periodic inspection and recertification is performed for all ground-based PVS to assure their ongoing fitness for service and to document and assess relevant changes in condition or knowledge that materially affect risk assessment.
- (11) Document and maintain the certification status of PVS in the configuration management system, including indication of all exceptions, waivers, nonconformances, special constraints, or instructions required for safe operation of the PVS (see para 1.a(9)).

f. The Contracting Officer shall perform the following activities:

(1) Notify the PSM of a proposed procurement for PVS which has not been reviewed by the PSM per paragraph 5.e(4).

(2) On advice of the PSM, and direction of Center management, implement the requirements of this NPD and NASA-STD-8719.17 on contracts and acquisitions.

g. Center, or Component Facility Safety Directors shall review and approve, or disapprove, requests for relief from requirements of this NPD.

## **6. DELEGATION OF AUTHORITY**

a. The Chief, Safety and Mission Assurance is delegated the authority to approve waivers and deviations for this NPD.

b. Safety and Mission Assurance Technical Authority is delegated to the PSM.

## **7. MEASUREMENT/VERIFICATION**

Compliance with the requirements contained within this directive is continuously monitored by the Centers and by the SMA Technical Authority. Compliance may also be verified as part of selected life cycle reviews and by assessments, reviews, and audits of the requirements and processes defined within this directive.

## **8. CANCELLATION**

NPD 8710.5C, NASA Safety Policy for Pressure Vessels and Pressurized Systems, dated September 26, 2003.

## **ATTACHMENT A: REFERENCES**

A.1 Occupational Safety and Health Standards, 29 CFR pt. 1910.

A.2 Safety and Health Regulations for Construction, 29 CFR pt. 1926.

A.3 Basic Program Elements for Federal Employee Occupational Safety and Health Programs and Related Matters, 29 CFR pt. 1960.

A.4 Gases; Preparation and Packaging, 49 CFR subpt. G.

A.5 NPR 8705.6, Safety and Mission Assurance Audits, Reviews, and Assessments.

## **(URL for Graphic)**

None.

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