Standard Operating Procedure (SOP) for Preparation of an Operation & Configuration Control Plan (OCCP) of “Category B” Pressure Vessels/Systems

Engineering Directorate
Structural Engineering Division (SED)

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Standard Operating Procedure (SOP) for Preparation of an Operation & Configuration Control Plan (OCCP) of "Category B" Pressure Vessels/Systems

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DOCUMENT HISTORY LOG

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Baseline	N/A	January 2010	Preparation of an Operation & Configuration Control Plan (OCCP) for “Category B” Pressure Vessels/Systems (PV/S)
	Revision A	December 2017	Standard Operating Procedure (SOP) for Preparation of an Operation & Configuration Control Plan (OCCP) of Category B Pressure Vessels/Systems

1.0 PURPOSE

This Standard Operating Procedure (SOP) describes the requirements and methodology for preparation of an Operation & Configuration Control Plan (OCCP) as required by JPR 1710.13 to assure safe ground pressurization and pressurization during aircraft operations of “Category B” Pressure Vessels/Systems (PV/S) at Johnson Space Center (JSC), Ellington Field (EFD) and associated NASA spaceflight/aircraft operations facilities.

An OCCP is a written assessment showing that a “Category B” PV/S is safe for ground pressurization and pressurization during aircraft operations, within the bounds established by the OCCP.

2.0 SCOPE

This procedure applies to OCCP preparation for all “Category B” PV/S defined by JPR 1710.13. An OCCP is required prior to ground pressurization and EFD aircraft operations of “Category B” PV/S.

3.0 REFERENCES

The following references apply to operation and design of “Category B” PV/S. The PV/S owner should be familiar with these references. Such familiarization shall allow for more effective interaction between the PV/S owner and Materials and Processes Branch, the JSC organization tasked with review and approval of OCCP of the PV/S.

3.1 JPR 1710.13, "Design, Inspection, and Certification of Ground-Based Pressure Vessels and Pressurized Systems"

3.2 ANSI/AIAA S-080-1998; Space Systems - Metallic Pressure Vessels, Pressurized Structures, and Pressure Components

3.3 ANSI/AIAA S-081-2006; Space Systems - Composite Overwrapped Pressure Vessels (COPVs)

3.4 JSC 66901; Damage Threat Assessment (DTA) and Damage Control Plan (DCP) Template for Composite Overwrapped Pressure Vessels

3.5 DOT Title 49; United States Government Code, Department of Transportation

3.6 ASME Boiler and Pressure Vessel Code

4.0 DEFINITION OF TERMS

Nominal Operating Pressure: The pressure at which the PV/S operates during normal conditions. *The nominal pressure is established by the PV/S owner*.

Maximum Operating Pressure (MOP): The maximum pressure at which the PV/S could operate in a particular application. MOP includes the effects of temperature, transient peaks, vehicle acceleration, and relief valve tolerance and is one fault tolerant pressure. *MOP is synonymous with "Maximum Expected Operating Pressure (MEOP)." The MOP is established by the PV/S owner.*

Maximum Allowable Working Pressure (MAWP): The maximum pressure at which a PV/S can continuously operate based on allowable stress values and functional capabilities. *MAWP is synonymous with "Rated Pressure". The MAWP is established through the manufacturer's specification.*

Burst Pressure: The burst pressure is the ultimate pressure at which the PV/S ruptures and is typically available through the manufacturer's specification.

Proof Pressure: An acceptance pressure test to verify structural integrity of PV/S which is in excess of MOP by a defined factor, known as proof factor.

Factor of Safety (FOS): The burst pressure divided by the MOP. If the burst pressure is not available, the MAWP may be used in place of burst pressure.

5.0 RESPONSIBILITIES

The Materials and Processes Branch of the Structural Engineering Division (SED) is responsible for safe operation of "Category B" PV/S when pressurized at JSC, EFD and associated NASA spaceflight/aircraft operations facilities. Delegation of responsibility is exercised through the JSC Pressure Systems Manager's Office (PSMO) by means of an OCCP that provides information, guidelines, and requirements for assurance of safe pressurization during ground testing and pressurization during aircraft operations of "Category B" PV/S. Safety of all other categories of PV/S and ground support equipment (GSE) is the responsibility of the PSMO within the Safety & Mission Assurance (S&MA) organization.

It is the responsibility of the PV/S owner to provide the Materials and Processes Branch with system and part data sufficient for safety assessment of the system and preparation of the OCCP. This information must include, but is not necessarily limited to, the information identified in Section 7.0 and the requirements of references 3.0, as applicable.

6.0 PERSONNEL TRAINING AND CERTIFICATION

Formal and informal training is required for Materials and Processes Branch support personnel in preparation and approval of the OCCP. A Bachelor of Science degree and one year of experience with the design and safety of spaceflight pressurized systems is required. In addition, familiarity with the referenced documents and the general design and safety requirements for ground, aircraft operations and spaceflight systems is required.

PV/S owner submitting OCCP request must have a lead engineer with experience in pressurized systems design, standards, assembly and testing procedures.

7.0 INFORMATION REQUIREMENTS

This section identifies the information needed that is used to prepare an OCCP. It is recognized that some data may not be available or known. However, adherence to the information order and content outlined below shall facilitate processing of OCCP requests.

1. **Name of the Requestor and the Date the OCCP Required**
   - Name, e-mail and contact information of the PV/S owner who is familiar with PV/S.
   - Date of Request and required date of the OCCP.
     A prior coordination with Material & Processes Brach is required to ensure all information is submitted in a timely manner by the PV/S owner to generate the OCCP. The Materials and Processes Branch-walks down the system prior to the signature of the OCCP unless deletion of the walkdown has been agreed to.

2. **Statement of Purpose**
   - Define the purpose of the OCCP being requested (e .g. proof pressure test, leak test, operational test, combination, etc.).

3. **System Description**
   - PV/S owner shall include description of the hardware that includes picture, diagram, pressure system schematic, text, table of components, etc.
   - Specify where the pressurization and testing take place.
   - Include 3D Computer-Aided Design (CAD) schematics.
     Figure 2 provides an example of 3D CAD schematics of a PV/S.

4. **Fluid and Temperature Range**
   - Specify the system fluids.
   - Identify the temperature limits of the fluid for the system environment.
   - Demonstrate materials compatibility with the fluids being used in the experiment.
   - Assess whether leakage of the fluid is toxic, flammable, or hazardous.
     Toxic or flammable fluid may require additional analysis and/or testing to mitigate the catastrophic hazard.

5. **Pressure System Schematic Diagram**

- Provide pressure system schematic of the PV/S showing:
  - Reference Designations
  - PV Fill Pressure
  - Regulator and Relief Valve Set Pressure

  Figure 1 provides an example of PV/S schematics showing (i) Reference Designations, (ii) PV Fill Pressure, and (iii) Regulator and Relief Valve Set Pressure.

6. **Ground Filling of the PV/COPV**

- Ensure the PV/S owner addresses the ground filling procedure of the PV/COPV.
  If the OCCP includes the ground filling of the PV/COPV, submit answers to all the questions of section 7.0 for the ground fill system.

7. **Pressure Vessel**

- PV/COPV shall be designated by a Government or Commercial specification such as DOT, AIAA, ASME, etc.
- Provide the following information for metallic PV and/or COPV:

Parameter	PV/COPV
Pressure Vessel Specification	
Manufacturer Name	
Manufacturer Part Number	
Dimensions, inches	
Liner Material	
Fiber Material	
Fiber Resin	
Qualification Temperature Range, °F	
Operating Temperature Range, °F	
Operating Fluid	
Fill Pressure, psig	
MOP (including temp. excursion), psig	
MAWP (Rated Pressure), psig	
Proof Pressure, psig	
Design FOS on Ultimate at MAWP	
Actual Burst Pressure, psig	
Service Life, cycles or years	
Reinspection Interval, years	
Current PV/COPV Cert Expiration Date	

- *Provide a copy of the PV/COPV drawing from the manufacturer.*
- *Stress analysis report, burst test report, cycle test report, and NDE report for the PV/COPV and any other relevant information may be required.*

8. <u>What is the MOP of the [Lines, Fittings and Components]</u>

- Generate a Component Matrix.
  Table 1 provides an example of PV/S data table for component matrix.
- Define the MOP and how it is established.
  - *The MOP of lines, fittings and components must consider (a) One worst case failure upstream, and (b) Flow analysis through the system and relief valve for failed open regulator (example of relief valve sizing calculation is shown in Appendix B).*
  - *PV/S owner shall show that MAWP > MOP.*
  - *Other conditions such as runaway pumps, phase change/thermal relief, run-away heaters, etc. shall also be considered as needed for establishing MOP and relief valve sizing.*

9. <u>Pressure History</u>

- Provide a pressurization log history of the PV/COPV.

10. <u>Test Procedures</u>

- Provide written procedures for PV/S pressurization and testing.

11. <u>Pressure Vessel System Interfaces</u>

- List any pressurized GSE or other facility PV/S that interface with the current PV/S being certified.

12. <u>Spaceflight Hardware</u>

- Verify if PV/S is spaceflight hardware.
- Include Data Package and verify if the Safety Review Panel (SRP) or equivalent Panel has assessed the PV/S for spaceflight safety.

13. <u>Relief Valves/Burst Disk</u>

- Verify relief valve is sized properly for adequate flow in the event of a failed open regulator. (Example of relief valve sizing calculation is shown in Appendix B).
  All pressure relief valves shall be tested by a qualified vendor or the Measurement and Standards Calibration Laboratory (MSCL) at NASA to verify proper set pressure and be tagged according to JPR 1710.13G, 6.1 b.
- Submit a vendor certificate for the burst disk pressure rating tolerance that accounts for worst case temperature.

14. <u>Welds</u>

- Specify any welds, brazes, or fusion joints that exist in the PV/S.
- Specify Qualification and Acceptance requirements for the weld.
  In general, (a) Qualification includes welder certification and Process Control such as AWS, ASME, in-house, etc., and (b) Acceptance includes surface/volumetric NDE, proof test, etc.

- Assess any increased localized discontinuity stresses due to weld peaking and/or mismatching that significantly alter the static strength and service life capability (cycles to failure, critical crack size, leak-before-burst (LBB).

15. <u>Composite Overwrapped Pressure Vessel (COPV)</u>

- Verify the PV/S contains a COPV.
- Submit a damage control plan (DCP) to evaluate and mitigate defined threats to the COPV.
  JSC 66901 template may be used to generate PV/S specific DCP and is available from Materials and Processes Branch or EFD Aircraft Operation Division (AOD).
- Inspect the COPV using a qualified inspector as required by the DCP before adding the protective sleeve/cover or closing the lid of the panel.

16. <u>Special Consideration</u>

- Specify the PV/S contains 3D-printed or additively manufactured (AM) pressurized parts.
  All 3D and AM-printed parts require (a) establishing material allowable and fracture properties and (b) coordination with Materials and Processes Branch prior to submitting OCCP request.
- Verify that the non-metallic materials will be used within their certified life or that life extension has been approved by the Materials and Processes Branch.
- Verify that no corrosion damage will occur within the service life PV/S.

8.0 PROCEDURE

OCCPs for "Category B" PV/S are prepared by the hardware owner and approved by the Materials and Processes Branch, but may be prepared by others at their discretion.
The primary elements of an OCCP must include:

1. Identifying Title
2. Identifying Memo Number
3. Issue Date (furnished by Materials and Processes Branch)

OCCP content must embody the following sections in a simple format:

A. Purpose: States why the OCCP is written and can be standardized; ex."The purpose of this plan is to define the basic requirements and procedures in compliance with JSC Management Instruction 8833.2B and JPR 1710.13 to assure safe ground pressurizations and pressurization during aircraft operations of "Category B" PV/S."

B. Hardware Description: Provides a brief physical description of the hardware and lists major components such as PV, regulator, relief valve, and high pressure lines. The description establishes the general configuration and pressure capability of the hardware.

C. Assessment: Summarizes any assessment/analysis considered for the OCCP as pertinent to system safety. This includes consequence(s) of failure, MOP evaluation, FOS verification, LBB and/or damage tolerance assessment, proof pressure test and/or leak check factors and configurations, and any other analyses used to generate the OCCP.

D. Requirements: Identifies specific requirements necessary to comply with the intent of JPR 1710.13 and to assure safe operation of "Category B" PV/S in ground tests and pressurization during aircraft operations. These requirements are developed during the review of the information supporting the OCCP. The following are examples of requirements that might be listed:

1. Approved written procedures shall be followed for all operations involving pressurization, safe handling and testing of the PV/S on the ground and EFD aircraft.

2. The configuration other than what is covered by this OCCP must be approved by the Materials and Processes Branch prior to any pressurization activities.

3. All safety procedures normally implemented during pressurization activity shall be upheld and only persons familiar with the hardware shall be allowed to interface with it during pressurization.

4. The PV/S shall be compatible with the fluids used in pressurization and testing and the consequence of leakage (toxic, flammability, over-pressurization, etc.) shall be addressed.

5. A log of the pressurization cycles shall be recorded for the life of the PVs.

6. All PVs shall undergo periodic reinspection and hydrostatistic retest at a prescribed interval per manufacturer's specification for maintaining certification.

7. A Damage Control Plan (DCP) to evaluate and mitigate defined threats to a COPV shall be documented by the Project and maintained in the Data Package.

8. Inspection of a COPV by a qualified inspector shall be addressed as required by the DCP.

9. All pressure relief valves shall be tested by a qualified vendor or the NASA Cal Lab to verify proper set pressure and be tagged according to JPR 1710.13G, 6.1 b.

10. A certificate must be submitted for the burst disk pressure rating tolerance by the vendor that accounts for worst case temperature.

11. The system shall be visually examined by the PV/S owner for indications of damage prior to the Test Readiness Review (TRR). In the event that any limitation or requirement of this plan is violated after the TRR, the occurrence shall be immediately brought to the attention of the Materials and Processes Branch prior to re-pressurization on the ground, for flight, or re-flight.

12. No modifications or changes shall be made to the pressure system after the TRR without Materials and Processes Branch approval prior to ground and/or flight pressurization.

13. A copy of the signed OCCP and records, pertinent data, reviews, analyses, tests, etc. shall be maintained in the data package by the PV/S owner.

14. In the event that any limitation or requirement of this OCCP is violated, the occurrence shall be immediately brought to the attention of the PSMO and Materials and Processes for evaluation.

9.0 REVIEWS & RECORDS

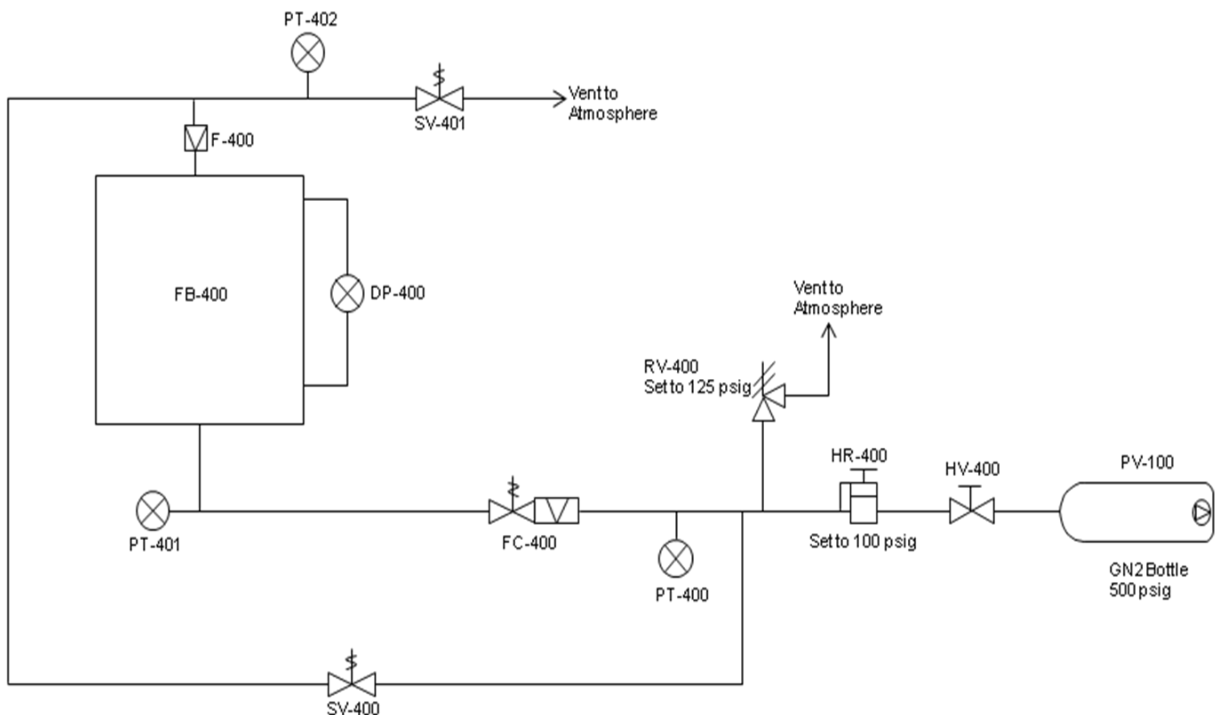
All OCCPs shall be reviewed and approved by the Materials and Processes Branch. A signed copy of approved OCCP shall be furnished to the PV/S owner and the PSMO prior to pressurization of "Category B" PV/S. Materials and Processes Branch shall maintain records of individual OCCP.

10.0 ACRONYM

AOD	Aircraft Operation Division
ANSI	American National Standards Institute
AIAA	American Institute of Aeronautics and Astronautics
ASME	American Society for Mechanical Engineers
CAD	Computer-Aided Design
COPV	Composite Overwrapped Pressure Vessel
DCP	Damage Control Plan
DOT	Department of Transportation
EFD	Ellington Field
FOS	Factor of Safety
GSE	Ground Support Equipment
JSC	Johnson Space Center
JPR	JSC Procedural Requirements
LBB	Leak-Before-Burst
MAWP	Maximum Allowable Working Pressure
MEOP	Maximum Expected Operating Pressure
MOP	Maximum Operating Pressure
MSCL	Measurement and Standards Calibration Laboratory
NASA	National Aeronautics and Space Administration
OCCP	Operation & Configuration Control Plan
PSMO	Pressure Systems Managers Office
PV	Pressure Vessel
PV/S	Pressure Vessel/System
SDP	Safety Data Package
SED	Structural Engineering Division
SOP	Standard Operating Procedure
S&MA	Safety & Mission Assurance
SRP	Safety Review Panel
TRR	Technical Readiness Review

For Reference Only

Figure 1. Pressure System Schematic



Note: The PV/S schematics shows (per reference section 7.5):
- Reference Designations
- PV Fill Pressure (PV-100 fill at 500 psig)
- Regulator Set Pressure (HR-400 set at 100 psig)
- Relief Valve Set Pressure (RV-400 set at 125 psig)

For Reference Only

Table 1. Pressure System Data Table for Component Matrix

Reference	Description	Manufacturer	Part Number	Operating Temp °F	Service Fluid	Nominal Operating Pressure psig	MOP† psig	MAWP†† psig	Burst Pressure psig	Leak Pressure psig	Proof Pressure psig
PV-100	Metallic PV	Luxfer	Add part #	65 to 95	N_2 Gas	500	500	2000	7600	DOT Cert	DOT Cert
HV-400	Ball Valve	Hook	Add part #	65 to 95	N_2 Gas	500	500	1500	5000	1.0 x MOP	1.5 x MOP
HR-400	Regulator	Tescom	Add part #	65 to 95	N_2 Gas	500	500	1200	4600	1.0 x MOP	1.5 x MOP
RV-400	Relief Valve	Generate	Add part #	65 to 95	N_2 Gas	100	500	1800	7000	1.0 x MOP	1.5 x MOP
PT-400	Pressure Gauge	Cecomp	Add part #	65 to 95	N_2 Gas	100	125	1000	4000	1.0 x MOP	1.5 x MOP
PT-401	Pressure Transducer	FGP	Add part #	65 to 95	N_2 Gas	100	125	1200	4500	1.0 x MOP	1.5 x MOP
PT-402	Pressure Transducer	FGP	Add part #	65 to 95	N_2 Gas	100	125	1200	4500	1.0 x MOP	1.5 x MOP
FC-400	Flow Controller	Alicat	Add part #	65 to 95	N_2 Gas	100	125	400	1500	1.0 x MOP	1.5 x MOP
FB-400	Fluidized Bed	NASA	Add part #	65 to 95	N_2 Gas	100	125	600	2500	1.0 x MOP	1.5 x MOP
DP-400	Delta Pressure Transducer	Dwyer	Add part #	65 to 95	N_2 Gas	100	125	900	3400	1.0 x MOP	1.5 x MOP
F-400	Filter, Parker	Parker	Add part #	65 to 95	N_2 Gas	100	125	1000	4000	1.0 x MOP	1.5 x MOP
SV-400	Solenoid Valve	Parker	Add part #	65 to 95	N_2 Gas	100	125	1100	4350	1.0 x MOP	1.5 x MOP
SV-401	Solenoid Valve	Parker	Add part #	65 to 95	N_2 Gas	100	125	1100	4350	1.0 x MOP	1.5 x MOP

† MOP is established by the PV/S owner *†† MAWP is established by the manufacturer* *(Refer to Section 4.0 for MOP and MAWP definitions)*

Note: All tubing is made of ¼″ 304L stainless steel, 0.035″ thickness and having MAWP > 1000 psig; no flex hose used in this application.

For Reference Only

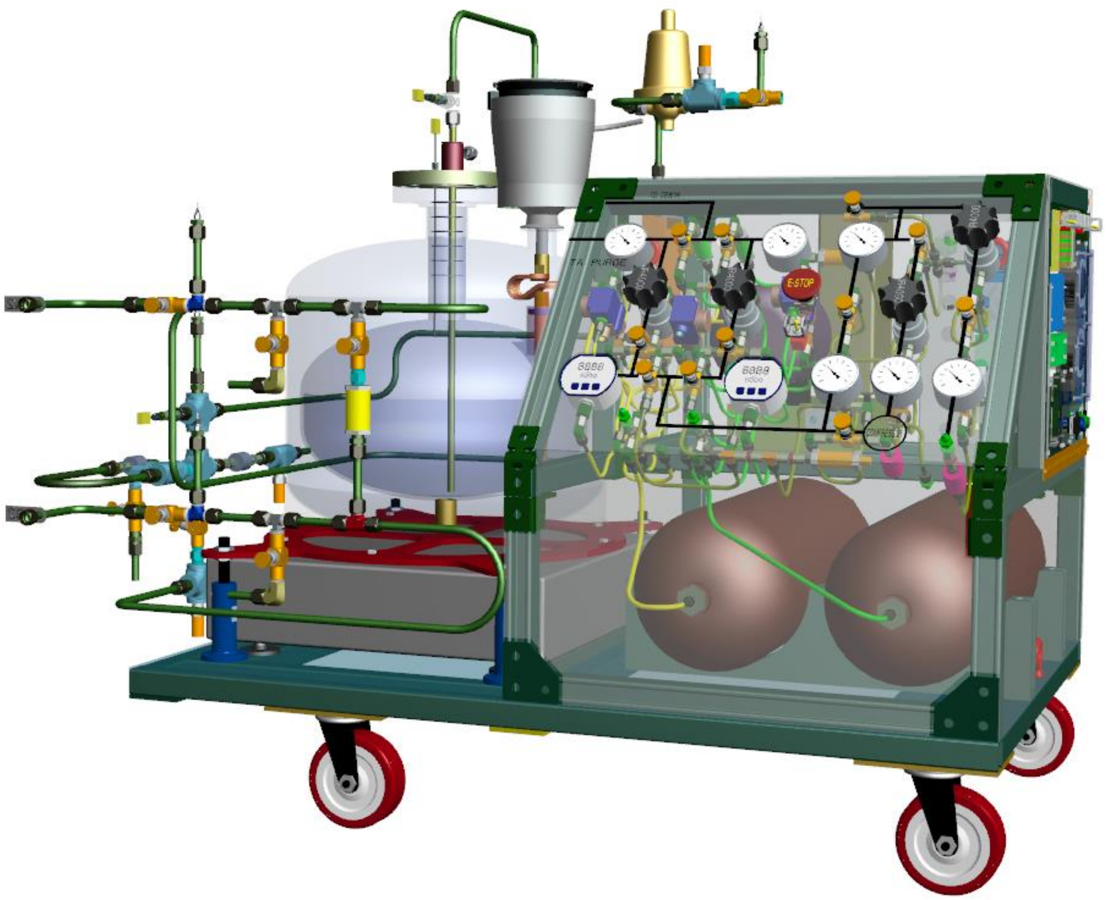


Figure 2
Example of 3D CAD Schematics of PV/S

Appendix A

Example of Calculating MOP of a PV/COPV

From Gas Law,

$$\frac{P_1}{T_1} = \frac{P_2}{T_2}$$

Fill Pressure (P_1) of the PV at room temperature (T_1) = 2500 psig

Room Temperature (T_1) = 70°F (294.26°K)

For WB-57 flight, 140°F is the worst temperature that the PV could experience during a hot summer day for dessert landing condition.

Therefore, T_2 = 140°F (333.15°K)

$$\frac{2500\ psig}{294.26\ °K} = \frac{P_2\ psig}{333.15\ °K}$$

Then, P_2 = 2830 psig

Therefore, MOP of the PV is 2830 psig
(MOP is established by the PV/S owner)

MAWP (rated Pressure) of the PV/COPV = 3000 psig
(MAWP is established the manufacturer)

Since the MAWP > MOP, the PV/COPV is good to go.

Note: This is a Conservative Approach in Calculating MOP of a PV

Appendix B

Example of Relief Valve Sizing Calculation for Failed Open Regulator

Flow Calculation for Gases

The coefficient of flow (Cv) is a formula which is used to determine a valve's flows under various conditions and to select the correct valve for a flow application. The Cv was designed for use with liquid flows, it expresses the flow in gallons per minute of 60° F water with a pressure drop across the valve of 1 psi. However, this same Cv value can be used to determine gas flows through a valve. The formula becomes more intricate for gases, as gases are a compressible fluids and are thus affected by temperature. Furthermore, two formulas are required to accurately estimate flow. When the upstream pressure equals or exceeds two times the downstream pressure, it is known as a "choked flow" situation. This calls for use of the Critical flow formula. If the upstream pressure is less than two times the downstream pressure, the Sub-Critical flow formula should be used.

Critical Flow When: $P_1 \geq 2 \times P_2$	**Sub - Critical Flow** When: $P_1 < 2 \times P_2$
$C_V = Q_G \dfrac{\sqrt{S.G. \times T}}{816 \times P_1}$	$C_V = \dfrac{Q_G}{962} \sqrt{\dfrac{(S.G. \times T)}{(P_1^2 - P_2^2)}}$
$Q_G = C_V \dfrac{816 \times P_1}{\sqrt{S.G. \times T}}$	$Q_G = 962 \times C_V \sqrt{\dfrac{(P_1^2 - P_2^2)}{(S.G. \times T)}}$

where:

Q_G = Gas Flow in Standard Cubic Feet per Hour

T = Absolute temperature in °R. (°F + 460)

P_1 = Upstream (inlet) pressure in psia

P_2 = Downstream (outlet) pressure in psia

psia = Absolute pressure. This is psig (gage pressure) plus 14.7 (atmospheric pressure)

S.G. = Specific Gravity of medium where air at 70° F and 14.7 psia = 1.0

Specific Gravities of gases	
Gas	**S.G.**
Acetylene	0.907
Air	1.000
Ammonia	0.588
Argon	1.379
Carbon Dioxide	1.529
Carbon Monoxide	0.965
Helium	0.138
Hydrogen	0.070
Hydrogen Chloride	1.268
Methane	0.554
Methyl Chloride	1.736
Nitrogen	0.967
Nitrous Oxide	1.517
Oxygen	1.105
Sulfur Dioxide	2.264

Source: http://www.idealvalve.com/pdf/Flow-Calculation-for-Gases.pdf

Example Calculation:

Initial Conditions
PV internal pressure : 2000 psig
Regulator : set at 200 psig
Relief valve : set at 225 psig
Establishing the flow analysis through a relief valve for failed open regulator

Step 1:
Determine whether regulator flow is Critical (Sonic) or Sub-Critical (Sub-Sonic) using formula in page 18.

Inlet Pressure (P_1) = 2000 psig (2014.7 psia)

Outlet pressure of failed open regulator is relief valve set pressure (P_2) = 225 psig (239.7 psia)

Room temperature = 70°F = 530°R

Specific gravity (S.G.) of air = 1.0

Since $P_1 > 2 \times P_2$, it is "critical flow" consideration.

Therefore, use:

$$Q_G = C_V \frac{816 \text{ x } P_1}{\sqrt{S.G. \text{ x } T}}$$

Step 2:
Determine regulator flow coefficient, C_V

Coefficient of flow (C_V) = 0.15 (established from manufacturer's specification)

Step 3:
Calculation of gas flow in standard cubic feet per hour (SCFH) through failed open regulator

$$Q_G = C_V \frac{816 \text{ x } P_1}{\sqrt{S.G. \text{ x } T}}$$

$$Q_G = \frac{(0.15 \text{ x } 816 \text{ x } 2014.7)}{\text{SQRT } (1 \text{ x } 530)}$$

Q_G = 10,712 SCFH = 178.5 SCFM

Step 4:
Compare flows between regulator and relief valve

Relief valve flow must be ≥ regulator flow. Therefore, a relief valve is needed whose flow rate matches or exceeds 178.5 SCFM.

Step 5:
Calculation of gas flow in standard cubic feet per minute (SCFM) through relief valve

Inlet size of the relief valve is ¼″ and set pressure is 225 psig

Searching through manufacturer's specification, the flow rate is 262 SCFM @ 225 psig as shown in the Table below.

Step 6:
Results

Since the flow rate of the relief valve is greater than the flow rate through the failed open regulator, the relief valve has been sized properly for adequate flow.

Step 7:
Extrapolation of flow rate

If relief valve is set @ 230 psig for example, extrapolation is necessary to determine flow rate.

225/230 = 262/X
i.e., X = 268 SCFM

ASME SECTION VIII AIR (U.S.,SCFM)

Set pressure (psig)	Inlet ¼"	½"
3	14	29
5	18	37
10	26	51
15	33	65
20	38	75
25	43	85
50	70	139
75	97	194
100	125	249
125	152	304
150	180	359
175	207	414
200	235	469
225	262	524
250	290	579
275	317	634
300	345	689
325	372	744
350	400	799
375	427	854
400	455	909

Relief Valve Capacity Information (Typically Available From Manufacturer)

Note: This is an example of relief valve sizing calculation. There are numerous software codes and spreadsheets for such calculation and PV/S owner may use any of them for relief valve sizing.

Appendix C

Flow Diagram for OCCP Approval Processes