

PROTON POWER UPGRADE (PPU) PROJECT

Acceptance Criteria

SRF CAVITY VERTICAL TEST



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Acceptance Criteria – PPUP-202-TA0002

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Revision History

Revision	Date Released	Description of Change
R0	16 JUN 2020	Initial Release
R1	07 FEB 2022	Deleted criteria 6 & 8, revised criteria 7, renumbered criteria

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1 Scope

PPU cavities will be fabricated, prepared for qualification and shipped to Jefferson Lab for vertical test qualification. This document outlines the vertical test criteria, for the final qualification pass for acceptance of a PPU cavity for use in a PPU cavity string. Vertical testing will be carried out by Jefferson Lab Staff. Acceptance of cavities performance and the recovery path for failed cavities will be determined by PPU. Jefferson Lab will perform all recovery path procedures.

2 Related Production Procedures

Jefferson Lab will utilize their pansophy vertical test traveler for documentation of PPU cavities.

3 Cavity Testing Requirements

- All cavity tests will be administratively limited to a gradient no greater than 22 MV/m and or a Qo value no less than 5e9.
- All testing will be at 2.1 K

The boxes below indicate where the acceptance criteria is verified in traveler SNSPPU-VTA-CAV-VTRF.

4 Final Pass Cavity Acceptance Criteria

Final Run Vertical Test Acceptance Criteria	Test to be Conducted	Nominal Value for Acceptance for PPU String Assembly
1. Field Emission at 16 MV/m	Measure Eacc vs Rad with admin limit at no greater than 22 MV/m	Integrated dose of $\leq 20\text{mR/hr}$ At 16MV/m Step 19-2
2. Gradient Limit	Measure the Eacc vs Qo with admin limit at no greater than 22 MV/m	$\geq 18\text{ MV/m}$ Step 14-1
3. Unloaded Q	As part of the Eacc vs Qo measurement	$Qo \geq 8e9$ up to 16MV/m Step 14-3
4. Field Probe Coupling	Calculated from decay measurement and power balance	Range: $7e11$ to $2e12$ Step 12-4
5. Pi Mode Frequency	Measured with calibrated frequency counter in closed loop at 2.1K	$805.6 \pm 0.250\text{ MHz}$ Step 10
6. Vacuum Integrity	Pressure measured at insert top plate	Before Cold Test: $\leq 1e-8\text{ Torr}$ Step 6