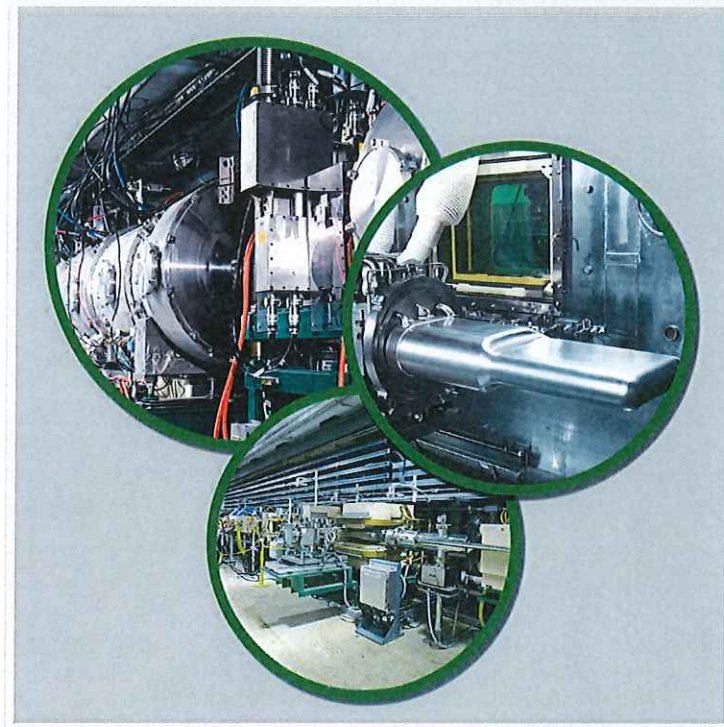


# PROTON POWER UPGRADE (PPU) PROJECT

## Acceptance Criteria

### SRF CAVITY VERTICAL TEST




Date: 6/16/2020

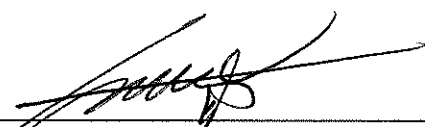
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PROTON POWER UPGRADE (PPU) PROJECT  
Acceptance Criteria – PPUP-202-TA0002

Date: 6/16/2020

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Revision History

Revision	Date Released	Description of Change
R0		

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TABLE OF CONTENTS

	Page
1 Scope .....	1
2 Related Production Procedures .....	1
3 Cavity Testing Requirements .....	1
4 Final Pass Cavity Acceptance Criteria .....	2

## **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  $Q_0$  value no less than  $5e9$ .
- All testing will be at 2.1 K

#### 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
2. Gradient Limit	Measure the Eacc vs Qo with admin limit at no greater than 22 MV/m	$\geq 18\text{ MV/m}$
3. Unloaded Q	As part of the Eacc vs Qo measurement	$Qo \geq 8e9$ up to 16MV/m
4. Field Probe Coupling	Calculated from decay measurement and power balance	Range: $7e11$ to $2e12$
5. Pi Mode Frequency	Measured with calibrated frequency counter in closed loop at 2.1K	$805.6 \pm 0.250\text{ MHz}$
6. Residual Magnetic field	Measured in dewar during cold test	$\leq 20\text{mG}$
7. Vacuum Integrity	Pressure measured at insert top plate	During Test: $\leq 1e-8\text{ Torr}$ After warmup: $\leq 1e-7\text{ Torr}$
8. RGA Spectrum	Gas Partial Pressures Measured on Test stand after testing warm	Mass 2 $\leq 2e-9\text{ Torr}$ Mass 4 $\leq 1e-10\text{ Torr}$ Mass 18 $\leq 4e-8\text{ Torr}$ Mass 28 $\leq 4e-9\text{ Torr}$ Mass 32 $\leq 1e-9\text{ Torr}$ Mass 44 $\leq 6e-10\text{ Torr}$