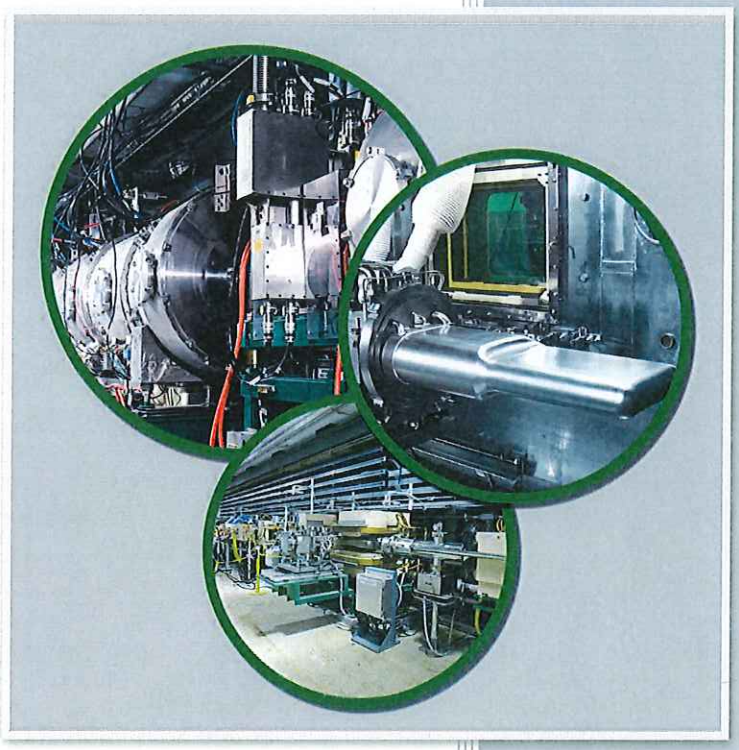
PPUP-202-TA0002 R00

PROTON POWER UPGRADE (PPU) PROJECT

Acceptance Criteria

SRF CAVITY VERTICAL TEST



Date: 6/16/2020

OAK RIDGE NATIONAL LABORATORY
MANAGED BY UT-BATTELLE FOR THE US DEPARTMENT OF ENERGY

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

Date: 6/16/2020

Prepared by: _____ Date 6/16/20
Project Level 3 Manager

Approved by: _____ Date 6/16/20
Project Level 2 Manager

Approved by: _____ Date 6/16/2020
PPU Project Technical Director

Approved by: _____ Date Jun 16, 2020
Partner Lab Level 2 Manager

Revision History

Revision	Date Released	Description of Change
R0		

Prepared by
OAK RIDGE NATIONAL LABORATORY, P.O. Box 2008, Oak Ridge, Tennessee 37831-6285
managed by UT-Battelle, LLC for the U.S. DEPARTMENT OF ENERGY
under contract DE-AC05-00OR22725

TABLE OF CONTENTS

Page

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

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 ≤ 20mR/hr At 16MV/m
2. Gradient Limit	Measure the Eacc vs Qo with admin limit at no greater than 22 MV/m	≥18 MV/m
3. Unloaded Q	As part of the Eacc vs Qo measurement	Qo ≥ 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 ± 0.250 MHz
6. Residual Magnetic field	Measured in dewar during cold test	≤ 20mG
7. Vacuum Integrity	Pressure measured at insert top plate	During Test: ≤ 1e-8 Torr After warmup: ≤ 1e-7 Torr
8. RGA Spectrum	Gas Partial Pressures Measured on Test stand after testing warm	Mass 2 ≤ 2e-9 Torr Mass 4 ≤ 1e-10 Torr Mass 18 ≤ 4e-8 Torr Mass 28 ≤ 4e-9 Torr Mass 32 ≤ 1e-9 Torr Mass 44 ≤ 6e-10 Torr