



Pressure Testing Permit

Date: 11/12/2012

Type of Test: Hydrostatic Pneumatic

MAWP: 2.0 bar at room temperature. Test Pressure: 1.15 x MAWP = 2.3 bar

Test Pressure 2.3 bar/ 33.5 psig Maximum Allowable Working Pressure 2.0 bar/29.0 psig

Items to be Tested

CM2 2K helium circuit pressure test: with LN2 boiled off gas from a dewar

Satisfy the ASME piping code requirements for the new orbital welding machine welds of the Ti bellows between the magnet and cavity #8 2-phase pipe

Location of Test	ICB	Date and Time	November 14, 2012- 1.30pm
------------------	-----	---------------	------------------------------

Hazards Involved (use Hazard Analysis form FESHM 2060 if more space is required)

High pressure fluid, component rupture, ejection of test plugs

Safety Precautions Taken

See safety precautions in detailed test procedure

Special Conditions or Requirements

See detailed test procedure

Qualified Person and Test Coordinator	Tug Arkan		11/14/2012
Dept/Date	TD SRF DEV		

Division/Section Safety Officer	Rich Ruthe		11/14/12
Dept/Date	TD ES/H		

Results

Pressure remained at 29.0 psig for 10 minutes without dropping.

Witness		Dept/Date	TD ES/H 11/14/12
	(Safety Officer or Designee)		

* Must be signed by division/section safety officer prior to conducting test. It is the responsibility of the test coordinator to obtain signatures.

Form Instructions:

- Perform and initial each step in box [] provided
- Steps labeled “Independent Verification” are to be completed by someone other than the person who did the operation being verified.

1. Configure CM2 For Test

- 1.1. Verify that Blade Tuners are configured for pressure test
- 1.2. Verify that the beamline of the cavity string is at atmospheric pressure
- 1.3. Verify that RF engineers are monitoring the frequency of Cavity #1 and Cavity #8
- 1.4. Verify Longitudinal Restraints
 - 1.4.1. Confirm that all invar rod clamps are installed and tightened
 - 1.4.2. Confirm that all needle bearing restraints are free
 - 1.4.3. Confirm that support fixtures for the ends of the 2-phase line (line G) are installed
- 1.5. Install pressure test plugs
 - 1.5.1. Independent verification: verify torque wrench set point at 10 ft-lbs
 - 1.5.2. Install plug in both ends of cool-down pipe (line H). Torque to 10 ft-lbs.
 - 1.5.3. Install barricades (such as a welding screen), such that if a test plug is ejected, it will be stopped and not become a dangerous projectile. Install barricades to prevent anyone from standing directly in front of a test plug.

2. Pre-Test Safety Precautions

- 2.1.1. Attach the pressure test regulator setup to a LN2 boiled off gas dewar
- 2.2. Confirm all safety measures in place
 - 2.2.1. Independent verification: confirm that test setup conforms to schematic
 - 2.2.2. Remove all non-participants from test area
 - 2.2.3. Confirm that appropriate barricades and signs are in place
 - 2.2.4. Confirm that all participants have safety glasses
 - 2.2.5.

3. Perform pressure test

Caution: When building the specified pressure, do not overfill the 2-phase pipe with gas, always under-fill and achieve the specified pressure by adding the needed amount of gas

- 3.1. Record start time of test 2:25 PM
- 3.2. Using LN2 boiled-off gas, pressurize system to 5 psig. Dwell 2 minutes minimum. Monitor leak detector to search for leaks. RF checks
- 3.3. Pressurize system to 10 psig. Dwell 2 minutes minimum. Monitor leak detector to search for leaks. RF checks
- ✓ 3.4. Pressurize system to 15 psig. Dwell 2 minutes minimum. Monitor leak detector to search for leaks. RF checks
- 3.5. Pressurize system to 20 psig. Dwell 2 minutes minimum. Monitor leak detector to search for leaks. RF Checks
- ✓ 3.6. Pressurize system to 25 psig. Dwell 2 minutes minimum. Monitor leak detector to search for leaks. RF checks
- 3.7. Pressurize system to 27 psig. Dwell 2 minutes minimum. Monitor leak detector to search for leaks. RF checks
- 3.8. Pressurize system to 30 psig. Dwell 2 minutes minimum. Monitor leak detector to search for leaks. RF checks
- 3.9. Pressurize system to 33.5 psig. This is the peak pressure of the test.
- 3.10. Valve out gas source
- 3.11. Monitor leak detector to search for leaks
- 3.12. RF checks
- 3.13. Hold at maximum pressure for a minimum of 5 minutes.
- 3.14. Reduce pressure to MAWP of 29.0 PSIG.
 - 3.15. Valve out gas source/vent
 - 3.16. Monitor leak detector to search for leaks
 - 3.17. RF checks
 - 3.18. Hold at test pressure for a minimum of 10 minutes
- 3.19. Reduce pressure to 27 psig. Dwell 2 minutes minimum. RF checks

- [] 3.20. Reduce pressure to 25 psig. Dwell 2 minutes minimum. RF checks
- [] 3.21. Reduce pressure to 20 psig. Dwell 2 minutes minimum. RF checks
- [] 3.22. Reduce pressure to 15 psig. Dwell 2 minutes minimum. RF checks
- [] 3.23. Reduce pressure to 10 psig. Dwell 2 minutes minimum. RF checks
- [] 3.24. Reduce pressure to 5 psig. Dwell 2 minutes minimum. RF checks
- [] 3.25. Vent system back to ambient pressure

Record time at end of test _____

- [] 3.26. Test complete. Record results on permit form.

Test Setup

