

PRINCETON PLASMA PHYSICS LABORATORY	ENGINEERING STANDARD	No. ES-MECH-018, Rev. 0 Page 1 of 3
Subject: CONTROLLED ATMOSPHERE BRAZING	Effective Date: September 19, 2017	Initiated: Fabrication Group
	Supersedes: New	Approved: Head, Engineering Department

PURPOSE

The purpose of this procedure is to provide the requirements for all controlled atmosphere brazing performed at the Laboratory.

SCOPE

This procedure applies to all controlled atmosphere brazing at PPPL. This procedure does not apply to controlled atmosphere brazing at other sites. PPPL controlled atmosphere brazing activities are the responsibility of the Fabrication Group of the PPPL Engineering Department. Controlled atmosphere brazing is performed at PPPL by trained, experienced personnel on unique joints, under guidance of the Welding Engineer, as documented on the brazing run record. The braze joints are usually made up of nonmetallic materials or metallic materials under very light loads, which do not require structural joints and are not code components. However there are rare occasions where a structural braze joint is required (as determined by the Cognizant Individual) or a code covers the particular assembly. When specified by the Cognizant Individual or applicable code, controlled atmosphere brazing shall be performed using procedures and personnel qualified in accordance with ASME Section IX, per PPPL Procedure ENG-037.

DEFINITIONS

Braze Shop: The Fabrication facility with controlled atmosphere furnaces and other equipment for controlled atmosphere brazing.

Brazing Run: An equipment and materials setup with a documented set of parameters that define a braze cycle, as well as the results of all tests and examinations performed on the completed braze joint.

Controlled Atmosphere: Control of environmental parameters to provide suitable conditions for quality furnace brazing operations.

REFERENCES

Braze Shop	Permanent Record Log Books
ASME Section IX	Welding & Brazing Qualifications
PPPL ENG-037	General Welding and Brazing Requirements

PROCEDURE

This procedure is presented in the following sections:

- A. Controlled Atmosphere Brazing Program Organization and Responsibilities
- B. Controlled Atmosphere Brazing Fabrication Process
- C. Controlled Atmosphere Brazing Procedure Development and Qualification
- D. Controlled Atmosphere Brazing Personnel Qualification

A. Controlled Atmosphere Brazing Program Organization and Responsibilities

<u>Responsibility</u>	<u>Action</u>
Fabrications Group Head	1. Designates PPPL engineer(s) as the Welding Engineer.
	2. Assigns the responsibility for and oversight of the PPPL controlled atmosphere brazing program to the Braze Technician.
Braze Technician	3. Develops, approves, and maintains the PPPL controlled atmosphere brazing run records and the braze acceptance criteria.
	4. Manages the PPPL controlled atmosphere brazing activities.
Welding Engineer	5. Qualifies program personnel in accordance with Section D of this procedure.
	6. Develops brazing procedure specifications, as required, per Section C2 of this procedure, supervises ASME Section IX procedure and performance qualification tests, and assures compliance with the PPPL brazing program.
Fabrications Group Head	7. Reviews and approves written procedures qualified per Section C2 of this procedure.

B. Controlled Atmosphere Brazing Fabrication Process

<u>Responsibility</u>	<u>Action</u>
Cog Individual	1. Requests controlled atmosphere brazing services, including applicable Code, examination and/or testing requirements.
Braze Technician	2. Furnishes brazing run record or qualified brazing procedure, and brazing personnel.
	3. Perform brazing run and complete run record.
Welding Inspector	4. Examines the braze and accepts or rejects it, when required, based on visual examination and/or nondestructive testing results.
Cog Individual	5. Examines the item to determine if it is fit for service.

C. Controlled Atmosphere Brazing Procedure Development and Qualification

<u>Responsibility</u>	<u>Action</u>
Braze Technician	1. When controlled atmosphere brazing is to be performed on materials not addressed by ASME Section IX, or ASME Section IX qualified procedures are not required by the Cognizant Individual or applicable Code, the brazing run parameters shall be established and documented in the Braze Shop Log Book, including the results of all tests and examinations performed on the completed joints. The log shall be referred to when establishing the parameters of future brazing runs on similar materials and joint types.
Welding Engineer	2. Develops Brazing Procedure Specifications (BPS) per ASME Section IX for work performed by PPPL when specified by the Cognizant Individual or applicable Code. BPS shall be developed per requirements of PPPL Procedure ENG-037, Sections C and F.

D. Controlled Atmosphere Brazing Personnel Qualification

<u>Responsibility</u>	<u>Action</u>
Welding Engineer	1. Determines position requirements. 2. Assesses personnel qualification and develops a training and/or qualification program to fill these positions.
Trainee	3. Completes the on-the-job training program under direction of the Braze Shop Supervisor. Performs ASME Section IX Code qualification tests, if applicable, under direction of Welding Engineer, in accordance with ENG-037, Sections D and F.
Welding Engineer	4. Oversees and monitors training program, and documents and approves successful completion. 5. Provides the Training in Office of Human Resources copies of the completed qualification record.
HR Training	6. Maintains copies of all qualification records.