

## **COUPP PRESSURE CONTROL MECHANICAL DESCRIPTION**

The pressure control is used to maintain any desired operating pressure in the bubble chamber as well as a rapid quenching over-pressure to collapse any bubbles that form.

The "slow" pressure control is operated by a stepping motor driving a screw jack which moves a piston in a hydraulic cylinder to add or remove fluid in the bubble chamber. Approximately 3 liters of fluid can be displaced. The system is fitted with a pressure switch and limit switches for protection as well as a pressure transducer and a magnetostrictive position sensor to monitor performance.

The "quencher" consists of a diaphragm air cylinder with a spring return coupled to a hydraulic cylinder. Air is stored under pressure in a 3 gallon tank and is controlled by a fast acting normally open 3-way solenoid valve. The valve opens in 14 ms or less. A normally open valve is used to raise the chamber pressure in case of electrical power failure. The chamber pressure is returned to normal by activating the solenoid valve, the rate of change is controlled by a needle valve on the exhaust. Another way to reset the quencher is by increasing the pressure with the "slow" control, pushing the cylinder back to the starting point and then activating the 3-way valve. This allows the return to normal pressure to be controlled in any desired fashion. The quencher is fitted with a magnetostrictive position sensor to monitor the piston position. Fluid displacement is .32 liters maximum. The ratio of air pressure to hydraulic pressure is approximately 0.2:1.

## HAZARD ANALYSIS

Work Plan Title: *COUPE PRESSURE CONTROL  
SHUT-DOWN*

Date: *5-16-07*

Prepared By: *EARL LINDENMEYER*

Reviewed By:(optional)

Approved By (Supervisor/Task Manager):

Description of work: *SAFE SHUT-DOWN PROCEDURE FOR COUPE  
PRESSURE CONTROLS*

**Personal Protective Equipment:** (Check protective equipment required for the job.)

- |  |                                       |   |
|--|---------------------------------------|---|
| <input checked="" type="checkbox"/> Safety glasses                 | <input type="checkbox"/> Side shields | <input type="checkbox"/> Chemical splash goggles              |
| <input type="checkbox"/> Hearing Protection                        |                                       | <input type="checkbox"/> Hard Hats                            |
| <input type="checkbox"/> 3.0 Braising goggles                      |                                       | <input type="checkbox"/> Impact goggles                       |
| <input type="checkbox"/> Face shield                               |                                       | <input type="checkbox"/> Rubber apron                         |
| <input type="checkbox"/> Leather gloves                            |                                       | <input type="checkbox"/> Hot/Cold thermal protective gloves   |
| <input type="checkbox"/> Chemical resistant gloves (specify type): |                                       | <input type="checkbox"/> Respirators                          |
| <input type="checkbox"/> Other required PPE (specify):             |                                       | <input type="checkbox"/> Fall protection equipment (specify): |

**Equipment required for the job:** (List the tools needed to perform the job.)

*NONE*

**Work Plan History Information:** (List any lessons learned accidents from this job, tips from previous jobs)

## HAZARD ANALYSIS

Step	Description	Hazards	Precautions / Safety Procedures
1	CONSULT WITH EXPERIMENTER ABOUT SAFETY OF INNER CHAMBER	INTERNAL CHAMBER CAN BE DESTROYED	
2	RELIEVE HYDRAULIC PRESSURE	STORED ENERGY	RUN SLOW PRESSURE CONTROL TO LIFT PISTON UNTIL PRESSURE IS RELIEVED
3	RELIEVE AIR PRESSURE	STORED ENERGY	OPEN "OSHA" VALVE, LOCK OUT IF NEEDED
4	RELIEVE AIR PRESSURE IN BOOSTRAP COMPRESSOR IF APPLICABLE	STORED ENERGY	DISCONNECT AIR INPUT OPEN RELIEF VALVE
5	REMOVE ELECTRICAL POWER	SHOCK HAZARD	PULL PLUG
6			
7			
8			
9			
10			

(Use additional pages as needed.)