

### 1. DEFINITION AND SPECIFICATION

Hot tapping is a method of adding a branch connection to pressurized equipment without removing the equipment from service. This procedure only applies to the Water Works Tools, Quad Rail Heavy Duty Hot Tap Machine.

### 2. GENERAL REQUIREMENTS

2.1. Hot tap operations are to be permitted only when:

2.1.1. Continuity of service is essential.

2.1.2. Shutdown of the system is impractical.

2.1.3. Documented procedures are followed and the Hot Tap Permit is completed and signed.

2.1.4. Personnel are trained on specific equipment to be used.

2.1.5. Hot tap operating parameters are not exceeded.

2.2. The hot tap procedure includes the attachment weld, hydrostatic or pneumatic test of the hot tap bar and associated pipe and the actual drilling of the pipe.

### 3. COLD TAPPING

Cold tapping is a method of adding a branch connection to equipment that has been blocked, depressurized, purged and is open to the atmosphere.

3.1. A cold tap may be completed without the use of a valve to tap through.

3.2. An atmospheric test must be performed inside of the tank, vessel, line, or piping that the cold tap is to be performed

### 4. SAFETY PRECAUTIONS AND RULES

4.1. Hot tapping is not allowed on ASME Coded vessels.

4.2. The hot tap machine must be rated for the working temperature and pressure of the line to be penetrated. The seals and material that the machine is made of must be compatible with the material that is contained in the line.

- 4.2.1. The current hot tap machine used at the Calhoun Mill is the Water Works Tools, Quad Rail Heavy Duty Hot Tap Machine. Rated design and capacity NOT to exceed 400 psi @ operating temperatures between -10 to 100°F OR 200 psi @ operating temperatures between -10 to 250°F.
- 4.3. Before each hot tap operation a competent person must inspect the bar, cutter and pilot bit.
- 4.4. Vessels or lines to be hot tapped must be identified and documented as such.
- 4.5. Vessels or lines to be hot tapped must be inspected to determine proper wall thickness, min .1875, and to ensure that there are no imperfections or laminations in the material.
- 4.6. The oxygen level in the equipment must be controlled, less than 5%, to prevent formation of an explosive or flammable mixture.
- 4.7. Welders must be competent in accordance with the applicable code and specification.
- 4.8. Hot taps are not to be performed on the following:
  - 4.8.1. Lines containing flammables or combustibles BELOW atmospheric pressures.
  - 4.8.2. Lines in the following services: acetylene, butadiene, chlorine, air, compressed air lines, oxygen lines, ammonia, hydrogen, H<sub>2</sub>S, ammonia, caustic, ethylene.
- 4.9. Hot tap procedures cannot be performed on compressed air lines with air remaining in the line. This is due to the explosive mixture that may be created by the lube oil that may remain in the system. Cleaning or flushing with inert gases may be required before starting to weld on a branch connection. Or a cold tap maybe performed.
- 4.10. Hot tapping closer than 18 inches to a flange or threaded connection or within 3 inches of a welded seam is not permitted.
- 4.11. When hot tapping tanks the liquid level shall be maintained 3 feet higher than where the hot tap will penetrate the tank wall. All suction and discharge lines as well as agitation devices that can cause the conditions in the tank to change shall be isolated by blinding, energy isolation, or tagging before the hot tap procedures can start.
- 4.12. Line flow must be determined and maintained for duration of hot tap to ensure dissipation of heat.

- 4.13. Welding on low temperature equipment (below -20°F) shall be reviewed since brittle fractures can occur in some steels at low temperatures.
- 4.14. No Hot Tap work may be permitted on Asbestos Containing Material or lead coatings, lead paint, or lead bearing surfaces.

## **5. PROCEDURES**

- 5.1. These minimum conditions shall be satisfied:
  - 5.1.1. The current hot tap machine used at the Calhoun Mill is the Water Works Tools, Quad Rail Heavy Duty Hot Tap Machine. Rated design and capacity NOT to exceed 400 psi @ operating temperatures between -10 to 100°F OR 200 psi @ operating temperatures between -10 to 250°F.
  - 5.1.2. All personnel involved with the hot tap must be trained and experienced in the Quad Rail Heavy Duty Hot Tap Machine before performing a live hot tap.
  - 5.1.3. All applicable permits must be obtained, a fire watch shall be assigned, and the appropriate safety equipment shall be placed in the work area.
  - 5.1.4. Signs and barricades must be placed to keep non-essential personnel out of the work area.
  - 5.1.5. Affected personnel that are on site shall be notified and the nearest isolation valves and shutdown devices shall be identified. Procedures shall be developed in case of a line failure.
  - 5.1.6. When working on flammable or combustible liquid, all personnel who are assigned to the hot tap crew shall wear Flame Retardant clothing. When working on corrosive liquid lines all personnel must adhere to current PPE policy and line breaking guidelines. All requirements contained in the line breaking procedure must be adhered to and followed.
  - 5.1.7. Never stand directly above the hot tap machine.
  - 5.1.8. An operational representative shall be present during the hot tap and shall have joint authorization with the maintenance supervisor to oversee the project.
  - 5.1.9. The location of the hot tap must be clearly marked on the piping wall.
  - 5.1.10. Ensure proper hot tap machine sizing and proper bore sizing.

- 5.1.11. The substance that is in the line to be hot tapped must be determined and documented prior to welding on the line.
- 5.1.12. The operating pressure that is on the line to be tapped must be determined.
- 5.1.13. Line size and grade as well as wall thickness and outside diameter must be determined.
- 5.1.14. A verification of pipe thickness is required before an attachment weld can be made, minimum 0.1875. The absence of any imperfection or lamination must be verified and documented.
- 5.1.15. Any variations in the pipe wall thickness in excess of 10% must be reported to the Safety Department, and a written approval must be given before the hot tap can proceed.
- 5.1.16. The same information must be gathered for the pipe that will be used for the branch connections plus the flange size if a flange fitting is used.
- 5.1.17. A determination must be made as to whether or not additional reinforcement is required between the branch connection and the pipe.
- 5.1.18. A safety meeting shall be held to discuss hot tap procedures and what to do in the event of an emergency. All personnel who are assigned to the hot tap project shall attend the safety meeting. The Hot Tap Permit will be completed at this time.
- 5.1.19. After the saddle is welded on and the reinforcement pad is welded, the boring bar with a drill bit is attached to the valve and saddle. The entire assembly must be pressure tested to 110% of the operating line pressure.
- 5.1.20. The hot tap machine and the bit must be measured and the thickness of the pipe must be determined. The calculation from these figures will determine the stopping point so that there is no possibility of drilling through the other side of the pipe that is being drilled. Mark the maximum cut out on the hot tap machine.
  - Start hot tap machine
  - When the pilot penetrates the pipe, lower the cutter to the pipe
  - Verify the pilot to cutter
  - When the cutter reached the cut out mark, the cut out should be verified
  - Complete hot tap cut out

- Do NOT exceed maximum cut out marking
- Retract the boring bar and close valve
- Depressurize and remove the hot tap machine

5.1.21. Involved personnel must perform a 'Dry Run" before the hot tap is performed.

5.1.22. The boring bar cutter assembly must be run through the full port valve to ensure that there is no jam or drag between the valve body and the cutter.

5.1.23. Close ball valve and open vent valve to blow down residual pressure in valve body before disconnecting hot tap machine.

5.1.24. Ensure coupon is retrieved from cutting head behind the pilot drill retention wire. Coupon retrieval must be verified at the end of the job on the Hot Tap Permit.



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**Scott Palmer**  
**General Manager**



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**Dallas Jones**  
**Health & Safety Manager**



<b>Hot Tap Permit Safety Check List and Report</b>		
Supervisor _____	Date _____	
Operating Area _____	Location/Line _____	
<b>Main Pipe/Spool Line Information</b>		
Pipe Size: _____	Schedule: _____	Outside Diameter: _____ Wall Thickness: _____
<b>Branch Connection Information</b>		
Pipe Size: _____	Schedule: _____	Outside Diameter: _____
Wall Thickness: _____	Flange Size: _____	Rating: _____
<b>Calculations and Inspections</b>		
1). Entire crew trained and qualified to perform Hot Tap?	<input type="checkbox"/> Yes	
2). Is Repad Required?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
3). What is the operating pressure on the line to be penetrated?	_____ PSI	
4). What was the line pressure at the time of the attachment weld?	_____ PSI	
5). What was the line pressure at the time of the penetration?	_____ PSI	
6). What size of bit will be used to make the penetration?	_____ Inch	
7). Was coupon retrieved after hot tap completed?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>Test Results</b>		
8). What is the test pressure on the bar, stub and valve?	_____ PSI	
9). What is the maximum test pressure to be used on the stub?	_____ PSI	
10). What pressure was the hot Tap Machine Tested to?	_____ PSI	
<b>Approvals and Acceptance</b>		
Maintenance Supervisor _____	Date: _____	
Operations Supervisor _____	Date _____	
Safety Department _____	Date _____	
Notes:		
a). All test pressures must be 100% of operating pressure at a minimum.		
b). Variations in excess of 10% in pipe wall thickness require safety department approval before hot tap can be made.		