BILLERUD

**EHS SAFETY**

| **Subject: Hot Tap Checklist** | | **Doc ID: #34482** | **Page** 1 **of** 6 |
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| **Effective:** | **Document Owner: Safety Manager** | **Approved By:** | |

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# GENERAL

NOTE: All references to "section" in this document refer to API Recommended Practices 2201 (Reaffirmed October, 2010).

Completion of the Quinnesec Mill Hot Tap Checklist/Permit is required for all hot tap work taking place on the Quinnesec Mill site. Contractors may use their own company hot tap checklists/permits in addition to the Quinnesec checklist/permit if they choose.

| | | Y | N | N/A |
|---|---|---|---|---|
| 1 | Lockout/Tag-out completed (*if applicable*) | | | |
| | **PREPARATIONS** | | | |
| | **PROCESS HAZARD MANAGEMENT** | | | |
| 1 | Review has been given to the hazards that may be introduced to the process system as the result of planned use of the hot tap connection. | | | |
| 2 | The material in the line or vessel is stable under heated conditions. | | | |
| | **PERSONNEL QUALIFICATIONS** | | | |
| 1 | Welders are qualified in accordance with the applicable codes and specifications. | | | |
| 2 | Welders are thoroughly familiar with the welding equipment and hot tap and welding procedures to be used. | | | |
| 3 | Skilled, competent personnel mount and assemble the hot tapping machine | | | |
| | **TOXICITY CONSIDERATIONS**<br>*If potential for exposure is possible, provide appropriate control measures, including the following:* | | | |
| 1 | Materials in the tank or piping have been identified. | | | |
| 2 | Safety Data Sheets have been obtained, reviewed and precautions followed. | | | |
| 3 | Personal protective equipment, engineering or administrative controls provided to minimize skin contact and breathing of vapors or fumes. | | | |
| 4 | Workers instructed to keep work areas clean and well ventilated, and spills cleaned up promptly. | | | |
| | **HOT TAPPING MACHINES** | | | |
| 1 | Hot tapping machine inspected and meets requirements as stated in Section 7.1 & 7.2 (*Must be able to retain & remove the blank or coupon. Manufactured to withstand temperatures, pressure, & mechanical stresses imposed during operation.)* | | | |
| 2 | Manufacturer's instructions have been reviewed and followed for commercial hot tap machines. | | | |
| | **HOT TAP WELDING METALLURCY AND DESIGN** | | | |
| | **GENERAL** | | | |
| | When possible and where conditions indicate need, vessels or lines to be welded or hot tapped are visually or NDT inspected for adequate wall thickness and absence of imperfections.<br>(Section 6.1: *An engineering evaluation should be conducted before in-service welding is performed on materials* | | | |

*which contain laminations or other imperfections. Vessels or lines to be welded and hot tapped must also be inspected for adequate wall thickness and absence of imperfections*.)

| | **METAL THICKNESS** | **Y** | **N** | **N/A** |
|---|---|---|---|---|
| 1 | Piping or equipment base metal thickness will provide support for the new connection and the hot tapping machine. | | | |
| 2 | Minimum base thickness requirements shall be stated in the written documentation for the job. A minimum base metal thickness of 3/16 in. (4.8 mm) is recommended for most applications of welding and hot tapping | Document Min Thickness Here | | |
| 3 | The metallurgy of the weld materials, the hot tap fitting, and the weld is compatible with the metallurgy of the equipment to be welded or hot tapped. | | | |
| 4 | Special welding considerations given for high tensile strength steels to avoid weld cracking and the need for post weld heat treatment. | | | |
| | **BURN THROUGH PREVENTION** | | | |
| 1 | Welder understands that first weld pass to piping or equipment less than ¼ inch (6.4 millimeter) thick should be made with a 3/32 inch (2.4 millimeter) or smaller diameter welding electrode to limit heat input. | | | |
| 2 | Welder understands that subsequent passes should be made with a 1/8 inch (3.2 millimeters) diameter electrode, or smaller if the metal thickness does not exceed ½ inch (12.8 millimeters). | | | |
| | **FLOW IN LINES**<br>*For metal thickness less than ¼ inch (6.4 millimeters), some flow during hot tapping minimizes the potential of overheating liquids, burn through caused by elevated metal temperatures, and fluid thermal expansion in closed systems. However, higher flow increases cooling rate and the risk of cracking.* | | | |
| 1 | Flow rates and the effect of those rates verified and understood? | | | |
| | **FITTINGS** | | | |
| 1 | A qualified or competent person shall select the proper fitting for the connection | | | |
| 2 | Fittings are properly sized to accommodate the hot tapping machine. | | | |
| 3 | Fittings allow for full depth of cutter penetration within the travel limits of the machine. | | | |
| 4 | Fittings allow for uninterrupted tapping valve closure when the cutter and cut out coupon are retrieved. | | | |
| | **HOT TAP CONNECTION AND WELDING DESIGN** | | | |
| 1 | The connection is positioned so as to allow for the installation, operation, and removal of the hot tapping machine. | | | |
| 2 | Welding or hot tapping is not closer than 18 in. to a flange or threaded connection, or approximately 3 in. to a welded seam (including a longitudinal seam of welded piping) unless determined by an engineering review to be acceptable. | | | |
| | | **Y** | **N** | **N/A** |

| | | | | |
|---|---|---|---|---|
| 3 | Access and egress in case of potential relates or emergency established and communicated to all workers associated with hot tap work. | | | |
| **INSTALLING THE HOT TAPPING MACHINE**<br>*When installing the hot tapping machine follow the installation instructions and the following items:* | | | | |
| 1 | The hot tap valve to be used is of adequate size and rating, is of the proper metallurgy, and is a full opening valve. | | | |
| 2 | The hot tap valve is tested for seat leakage prior to installation:<br>*This includes the inspection, examination, and testing requirements for resilient-seated, nonmetallic-seated, and metal-to-metal-seated gate, glove, plug, ball, check, and butterfly valves* | | | |
| 3 | The hot tap valve is centered on the nozzle flange during installation. | | | |
| 4 | The boring bar has been run through the valve opening to be sure the cutter does not jam or drag. | | | |
| 5 | The travel distance of the cutter has been calculated to ensure that the tap can be completed within the dimensional limits, that the cut will be stopped before the cutter or pilot drill touches the opposite side of the tapped pipe or equipment and that the retrieved cut-out coupon can be retracted far enough to allow unimpeded closure of the tapping valve. | | | |
| 6 | Confirm that the bleed-off valve will hold pressure and is not plugged | | | |
| 7 | Precautions have been established for safe bleed off and disposal of material collected in the machine and above the hot tap. | | | |
| **TESTING THE WELD AND HOT TAPPING MACHINE**<br>*The welded attachment and the hot tapping machine should be tested to assure they are in accordance with applicable codes before the cutting is started, as follows:* | | | | |
| 1 | Tightness of bolts, packing, packing nuts and any bypass lines have been checked to avoid leakage. | | | |
| 2 | Hydrostatic test completed when applicable. | | | |
| **COMPLETION** | | | | |
| 1 | Provisions have been taken to assure the adequate containment of liquids and vapors trapped within the hot tapping machine after work is complete. | | | |
| **PIPING AND EQUIPMENT CONTENTS**<br>*Welding and hot tapping should not be performed on tanks, piping or equipment containing the following materials (Confirm the safe level of these materials by checking the box after each item):* | | | | |
| | | **SAFE LEVEL** | | |
| 1 | Vapor/air or vapor/oxygen mixtures near or within their flammable explosive range. | | | |
| 2 | Oxygen or oxygen enriched atmospheres | | | |
| 3 | Compressed air systems, unless known to be free of flammables and combustibles such as lubricating oil residues. | | | |
| | | **SAFE LEVEL** | | |

| | | | | |
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| 4 | Hydrogen, unless an appropriate engineering review has been performed by a qualified person who approves welding on such equipment. Carbon and ferritic alloy steel is susceptible to high-temperature hydrogen attack during process operations. | | | |
| 5 | Caustics, amines, and acids (such as HF acid), where the concentrations and temperatures are such that the fabrication specifications require PWHT since they may cause cracking in the weld area or heat affected zone. | | | |
| 6 | Unsaturated hydrocarbons (such as ethylene). | | | |
| 7 | Temperature-sensitive, chemically reactive materials (for example, peroxides, chlorine, or other chemicals which might violently decompose or become hazardous from the heat of welding) | | | |
| **HOT TAPPING ON TANKS IN SERVICE**<br>*When hot tapping above the tank level, vapor zone considerations related to ignitability must be evaluated by safety, engineering and project leader.* | | **Y** | **N** | **N/A** |
| 1 | Controls established and in place to prevent ignitable vapors from reaching welding area, | | | |
| 2 | Workers are instructed to immediately stop work if flammable vapors are detected in the work area. | | | |
| 3 | Measurements of tank level have been determined with a hand type gauge to verify the accuracy of automatic or remote reading gauges. | | | |
| 4 | Tank level is determined to be and maintained at least 3 feet above the point of hot work. | | | |
| **HOT TAPPING ABOVE OR BELOW GRADE** | | | | |
| 1 | Provisions have been made for an easy means of egress. | | | |
| 2 | Test have been conducted for oxygen, flammable vapors and toxic air contaminants and indicated as safe. | | | |
| 3 | Confined space entry permit has been issued listing the requirements and approving the entry into the confined space and how work therein. | | | |
| 4 | Ventilation provided to eliminate oxygen deficient atmosphere, and remove flammable or hazardous contaminant atmospheres. | | | |
| 5 | Respiratory protection provided for protection from hazardous contaminants, vapors, or fumes emitted as a result of welding. | | | |
| 6 | Air monitoring provided as necessary. | | | |
| **HOT TAPPING ON LINED PIPING OR LINED EQUIPMENT OR CASED LINES** | | | | |
| 1 | Hot tapping will not be permitted on in-service lined piping or lined equipment or cased lines unless specifically authorized by specialized procedures or following engineering evaluation. *Note: specialized procedures includes the Quinnesec Mill Hot Tap Procedure*. | | | |
| **HOT TAPPING UPSTREAM OF EQUIPMENT AND VALVES** | | | | |
| 1 | Hot tapping is not upstream of rotating equipment or automatic control valves, unless such equipment is protected from the cuttings by filters or traps.<br>*Equipment must be designed to accomplish this* | | | |
| 2 | Have the pressure and temperature of the contained materials been reduced as much as the process operation will allow? | | | |

| PROCEDURES | | | | |
|---|---|---|---|---|
| **PRELIMINARY PROCEDURES**<br>*Before proceeding with hot tapping or welding, the following conditions shall be satisfied:* | | **Y** | **N** | **N/A** |
| 1 | The area where the connection is to be made has been identified and physically marked. | | | |
| 2 | A plan has been prepared to monitor and control process variables within their required limits while hot tapping or welding is being performed. | | | |
| 3 | Signs and barriers have been provided when warranted to isolate the job site from the public and unauthorized personnel. | | | |
| **INSPECTING THE WELD** | | | | |
| 1 | All attachment welds are inspected after welding using appropriate inspection procedures. *Per API RP 2201 Section 10.3* | | | |

This permit is to be completed & issued along with a Hot Work Permit before Hot Tapping or Hot Work is conducted on lines or vessel in service.

# HOT TAP PERMIT

Department:_____ Date _____

**This permit is to be completed and issued along with a Hot Work Permit and Initial Line Breakage Permit (if needed) before the hot tapping or hot work is conducted on lines or vessels in service.**

| | | |
|---|---|---|
| Hot Work Contract signed by | Operations Rep | Person Doing Work |
| Vessel/Line Being Tapped | Name | Equip # |
| Exact Location | | |
| Quinnesec Mill Hot Tap Checklist Reviewed by | Maint/Contractor Supv. | Person Doing Work |
| Hot Tap Procedure Reviewed by | Maint/Contractor Supv. | Person Doing Work |
| Line Breakage Permit Reviewed by (if needed) | Operations Rep | Person Doing Work |
| Process Safety Management Requirements Reviewed by (if needed) | Operations Rep | Person Doing Work |
| Hot Tap Approval | Maint Supv/Job Owner | Operation Rep |
| | Contractor Supv | Person Doing Work |
| Post Hot Tap Review Approval | Person Doing Work | Operation Rep |