



Po Box 529 Lake Orion MI 48361

(248) 330-4707 www.RJSTACEY.COM

General Methods and Conditions Tapping/Linestopping

This entire document is to be considered part of our bid package.

The use of the pivoting and folding head process for isolating pipe systems has been universally accepted by various industries and is the preferred method currently in use worldwide to plug off high pressure and large diameter pipe systems.

We trust that if the customer has a basic knowledge of how the equipment operates they will then understand why RJ Stacey LTD, requires certain data to apply this technology in a safe and efficient manner. The request for data, to be provided to us, is the basis upon which RJ Stacey prepares and tests the equipment for field applications. Incomplete or incorrect information will cause RJS to prepare our equipment for conditions that may not exist. Correct and detailed information given to us by the customer will expedite our ability to provide professional level services.

DEFINITIONS:

A Pivoting/ Folding plugging head is a mechanical method of placing a temporary isolation device into to a pressurized pipe system through a hot tapped hole for the purpose of temporarily plugging the pipe system, thus permitting alterations to the pipe system without shutdown.

The Pivoting/Folding plugging head is subject to mechanical forces present in the pressurized pipeline. The forces in the pipeline must be addressed at the time the project is under consideration. Certain information is requested by RJS in order to permit us to select the proper fittings and equipment for each project and reflect safety issues that may be a part of the work.

1. FLOW is the movement of any liquid, gas or vapor within a pipe system. FLOW IS NOT PRESSURE; they are two entirely different aspects of the pipe system. The knowledge of the flow rate, as well as the pressure, is critical for the safe operation of the plugging equipment.

2. PRESSURE is the force of the liquid, gas or vapor that is placed on the plugging equipment.

PRESSURE IS NOT FLOW.

3. PIPE INSIDE DIAMETER: The result of measuring the pipe outside diameter and subtracting two times the pipe wall thickness. The Pipe inside Diameter is the basis upon which we set up the plugging equipment for field applications.

4. BLOWDOWN/ EQUALIZATION FITTING: A small fitting that is used to CONTROL the de-pressurization of the pipe system after the plugging head is placed into the pipeline. This fitting is also used to equalize the pressure around the plugging head at the completion of the work and allow the plugging head to be removed from the system. All Pivoting or Folding head plugging applications require the use of a blowdown /equalization fitting. The blowdown/equalization fitting size is sensitive to the pipeline size.

Hot-Tap Sequence

5.0 Before the fitting can be manufactured, the pipe outside diameter must be measured the pipe O. D. should never be assumed. It should be measured in the field at the point where the work is to take place.

5.1 A special fitting is permanently attached to the pipeline (steel pipe typically weld on, ductile, cement or weld hazardous area bolt on).

6. A standard **FULL BORE** valve is mounted to welded fitting in the case of a stand alone hot-tap or LineStopping applications where use of a completion system is not required. An RJS specialty overbored LineStop valve is mounted to the welded stopping fitting in cases where LineStop Valve recovery is required.

7. A hot tap machine with a special plug-retaining cutting tool, **CONTAINED WITHIN A PRESSURE TIGHT HOUSING**, is mounted to the Tapping/ LineStop valve, and a hot tap is made into the pipeline. The cut out pipe section is retracted into the tapping machine's pressure tight housing and the Tapping/LineStop valve is closed. The hot tap machine is safely de-pressurized and the product vented away from the work area and removed from the now closed Tapping/LineStop valve. The cut out pipe section (coupon) is measured for wall thickness, information to be used later if we are performing a LineStop.

8. Tapping Machine is removed Hot-Tap Complete.

NOTE: During the hot tap process some shavings and chips **WILL** enter the pipeline there is no way **ANY** tapping procedure can 100% guarantee against this. Scale, sediment, or other deposits adhered to pipe wall **WILL** be disturbed and may flow downstream, likewise no tapping procedure can guarantee against this 100%.

SPECIAL NOTE: Concrete Reinforced Cylinder Pipe/ Fiberglass Reinforced Pipe; Spalling of concrete or Fiberglass may occur due to several factors beyond the control of RJS that are characteristic to the manufacturing process.

LineStop Sequence and Plugging Head operating Principles

The plugging process can be used with permanent or temporary by-pass piping systems that are hot tapped and permit flow to take place around the isolated pipe section while work is being done.

9. The Hot-Tap machine is replaced by the Plugging machine. Within the Plugging machine is a pivoting or folding head appropriate for applicable conditions (decided upon in the job planning stage based on information provided by the client in the Tapping/LineStopping questionnaire) this head is then introduced into a live pipe system through a pressure tight housing.

10. We must know the pipe outside diameter (O. D.). the pipe O. D. Determines the type of fitting to be used in the plugging process and determines how the fitting will be manufactured. If we have been provided with the incorrect pipe outside diameter, or incorrect wall thickness, then we will calculate the wrong pipe inside diameter.

11. All pivoting head plugging tools (full size and folding head sizes) are designed to seal against the pipe inside diameter (I. D.). Plugging heads are designed to fit a RANGE of pipe inside diameters that address various conditions of erosion and or pipe manufacturing variances. They will NOT however span differing classes of pipe schedule without modifications. Example: Sch40 -8" pipe with 7.981 ID would use same head but different elastomeric seals and hardware than a Sch80- 8" pipe with a 7.625 ID.

12. The elastomeric seal used to isolate against the pipe inside diameter must be sized for EACH SPECIFIC plugging application. The tolerance on the seals are +0.0625" and minus 0". It is critical for the effective operation of the sealing element to know the pipe inside diameter.

13. The plugging head has an elastomeric seal captured between two steel plates. Normally the front steel plate (face plate) has a wheel on it to assist the plugging head in turning the corner and pivoting into sealing position in the pipe. The face plate diameter is an essential element for safely holding pressure. The face plate diameter is designed to address a specific range of pipe inside diameters. As the pipe inside diameters change, so to must the face plate diameters change.

14. Incorrect information given to us in regards to pipe id, temperature, pressure, flow rate or product type will cause us to set up the machine incorrectly. All these factors must be addressed BEFORE we prepare the equipment for field applications

ELASTOMERIC SEAL:

15. Sealing elements are manufactured to meet a range of conditions. Sealing Elements are designed to address a range of pressures, a range of temperatures and various types of chemicals. We fit the type, design and selection of sealing element materials based upon the working conditions provided to us by the customer. THERE IS NO UNIVERSAL SEALING ELEMENT THAT WILL MEET ALL THE VARIOUS TYPES OF JOB CONDITIONS WE MEET ON A DAILY BASIS.

16. The sealing element is captured between two steel plates.

17. The sealing element is tapered from front (nose wheel side) to back. The degree of taper is established at the factory based upon pipeline operating conditions.

18. The sealing element is introduced into the pipe through a hot tapped hole and the trailing edge (back edge) conforms to the pipe inside diameter. Once placed into the pipe system, the sealing element ALONE does not provide isolation. It only provides BLOCKAGE.

19. A PRESSURE DIFFERENTIAL, ACROSS THE SEALING ELEMENT, IS REQUIRED TO MAKE THE SEALING ELEMENT WORK.

20. Once seated in the pipe, the pressure “DOWN STREAM” of the plugging operation must be carefully lowered via a blowdown/equalization fitting to cause the seal to conform to the pipe inside diameter. If the pressure cannot be lowered “DOWN STREAM” of the sealing element, then no possibility of isolation can be achieved. Only by a pressure differential across the plugging head seal is the isolation achieved.

20.5 By carefully de-pressurizing the piping system through our blowdown/equalization fitting it will be possible to determine if any leak by of the LineStop or other system components exist BEFORE the pipe is opened for any work.

21. The seal cannot be adjusted inside the pipe. It must be removed from the pipe system, the LineStop valve closed and the plugging machine de-pressurized and removed from the pipe line. The steel face plate must be removed and the seal changed. In some cases the steel face plate may also have to be changed.

22. If there is a buildup of material on the pipe inside diameter such as paraffin, rust, Zebra Mussels, minerals, lime, etc. Or a seam weld, then these factors affects the plugging head’s ability to achieve 100% isolation. ALL PLUGGING HEADS THAT UTILIZE THE PIVOTING PRINCIPLE are subject to dealing with the inside diameter conditions of the pipe system.

23. In most cases the pivoting plugging head will achieve a 100% seal. The customer however must be prepared to perform pipeline remediation with some leakage. The extent of leakage is determined through the use of the blowdown /equalization fitting before the system is safely opened for work...

24. With the pipeline work completed downstream and sealed, the plugging head can be removed from the system. The purge / equalization fitting, provided by and hot tapped by RJS, is used to bring the “upstream” line pressure into the previously isolated pipe section (downstream). This process is called EQUALIZATION. The plugging head will not retract out of the pipe system unless the pressure is equalized on both sides, thus permitting its retraction back into the plugging machine’s pressure housing.

25. Failure to properly equalize the plugging head, using gauges and within close proximity to the plugging operation, can negatively impact the ability to remove the head from the system.

26. The purge / equalization fitting is also used to set the completion plug. The purge / equalization fitting must be in close proximity to the plugging fitting.

27. Once the plugging head has been removed from the pipeline, the RJS Linestop Valve is closed and the plugging machine is safely de-pressurized away from the work area.

Optional Completion System

28. The Plugging machine is removed from the LineStop Valve and replaced with the Completion machine. The Completion machine has a steel disc with an “O” ring (COMPLETION PLUG). The

Completion machine is connected to the purge / equalization fitting, via hose or high pressure piping, and the LineStop Valve is equalized and opened. The COMPLETION PLUG is lowered a measured distance into the fitting bore and locked into position.

29. The COMPLETION PLUG is verified locked in position by the technician and the Completion machine and LineStop Valve are then safely de-pressurized away from the work area and removed from the fitting. The COMPLETION PLUG REMAINS IN THE FITTING BORE.

30. In most cases the fitting can be re-accessed at some future time (to repeat the LineStop operation) by re-attaching the LineStop Valve and Completion Machine, equalizing the pressure and un-locking the COMPLETION PLUG.

31. Once the LineStop Valve and Completion machine have been removed (the COMPLETION PLUG is locked in place and is creating a seal between the pipe system and the top of the fitting) a blind flange is placed on the fitting outlet.

Field Support to be provided by the purchaser To RJ

Stacey Tapping/Linestopping Operations:

RJ Stacey Inc. is a specialty service company for performing alterations to live pipe systems while they remain in service and under pressure. RJ Stacey does not operate as a general contractor and, therefore, the below listed items are required to support our efforts.

RJS provides specialized equipment and one or two field technician for the application of our equipment ONLY. All other items to complete the work are to be provided by the purchaser. SHOULD YOU HAVE ANY QUESTIONS REGARDING ANY PHASE OF THE PLANNED PROJECT, PLEASE CONTACT RJS IMMEDIATELY FOR CLARIFICATION.

The following information is intended for general field applications. Please review carefully and IF site specific procedures are required, RJS would be pleased to provide them based upon a site meeting and prior to the scheduling of field operations.

Safety Training

1.0 General - Our technicians are among the most highly trained in the industry and we do meet several national training standards. If you have training standards that require written documentation for our technicians, please contact us to see if we are in compliance with those standards. We are ISnet, PIC, and PEC certified. We do comply with established procedures for drug and alcohol testing.

1.1 Site specific - Unless specifically addressed in our quotation, site specific training time will be considered as part of the normal daily work time listed in our quotation.

Materials, Welding and Pipefitting

1.2 For Tapping only applications customer may supply the fittings and Tapping valve. If customer is supplying Tapping Valve and Fittings the valve must be full line-bore and checked for any obstructions such as gate guides. Also be aware that all components are of the same class (ex. On a standard

8"Hot- tap with full bore 150# valve, weldneck flange and standard olet we can pass a 7.5" cutter. Substitute an x-heavy- olet the bore is reduced to 6.875"obviously not allowing for cutter passage.)

2. RJS must supply fittings for LineStopping applications to assure proper passage of LineStop head and to allow for recovery of LineStop valve via Completion machine (if requested).

2.0 Customers Welders should be pre-qualified to ASME section IX as a minimum and also to API 1104 and 1107 welding standard where applicable.

2.1 Ultra sound wall thickness measurement should be considered prior to welding on to any live pipe system.

2.2 RJS fittings are provided with suggested field installation instructions. Please review these instructions and if you have any questions, please contact us immediately.

2.3 DO NOT INTENTIONALLY SEAL WELD THE FITTING INSIDE BORE TO THE HEADER. Normal weld gap and penetration for a fillet weld is acceptable. Internal seal welding creates a heat affected zone and can cause hot tap cutter damage and may prevent successful completion of the hot tap required for plugging operations.

3.0 Alignment of Tapping valve bore nozzle bore is critical. Many applications have very little room for misalignment before the shell cutter starts cutting into side wall of the olet or nozzle. This will potentially chip cutter teeth, and could prevent successful hot-tap.

Flange MUST be welded square to the run of pipe. Angle taps are possible but only with special procedures that MUST be in place prior to welding fittings to pipe.

4. Testing - The installed fitting and mounted valve absolutely must be field pressure tested to insure threads / gasket seal properly and prior to the performance of any hot tap. Pressure testing should not exceed 10% above system operating pressure.

Bolt Up Process

5. Customer is to provide Lifting services, Scaffolding, physical support, power:

5.0 In most cases RJS will provide a pneumatic driven power unit for our equipment requiring 100cfm of 100psi air within 100' of jobsite In some applications you may be required to provide an electrical connection for our tapping machine.

5.1 Crane or Cherry picker as required for the duration of the project to offload, erect, and load our equipment.

5.2 Come along or other equipment movement devices as needed.

5.3 Required lifting slings, shackles, cables, etc.

5.4 OSHA approved excavation. Ladders, scaffolding or other elevated support systems if required.

5.5 Hot Tap assembly physical support, fitting, valve and hot tap machine.

5.5.0 Hot Tap Equipment weight and dimensions have been provided by RJS for your use. If you need a drawing, please advise.

5.6 Wrenches, studs, nuts gaskets to set and remove RJS equipment.

5.7 All support labor:

5.8 All support labor to set and remove RJS equipment.

5.9 Hot Work Permits as required by site safety conditions or owner

6.0 One bottle of compressed Nitrogen if Tapping /Plugging machine purge will be required.

7.0 Hydro-test components and media for onsite pressure testing if required.

Leak by Remediation

8 Customer must be prepared, in the field, to work with some slight gas/liquid leakage through the plugging equipment. In most cases RJS does achieve a 100% seal, however the internal conditions of the pipe impact the ability of the elastomeric sealing element to conform to the pipe inside diameter and affect a 100% shut down. The customer must be prepared to work with some slight leakage utilizing industry accepted practices such as cold cutting the pipe, using air movers, nitrogen purges and or plumber plug. Customer must also be prepared to dispose of any leak by waste at its own expense.

8.1 In all cases where Customer policy or Safety dictates we will recommend a “double block and bleed” , (back to back Linestops with a vent in between). Accepting this option is up to the client.

8.2 RJ Stacey provides equipment and elastomeric sealing elements set up according to information provided to us by our clients. This data is used at our shop to prepare for field applications. Occasionally this information is at variance with actual field conditions, or field conditions require a re-set of the Linestopping head. At no time will this be considered an RJ Stacey delay.

Workable Linestop

9 RJS field technicians are trained and experienced at evaluating the extent of the ‘WORKABLE’ seal achieved by our plugging equipment. Should any issue be raised concerning the safety of a workable seal, it will be resolved by RJS and the customer in conjunction with our best practices. RJS has over 20 years field experience in making tie-ins on gas/liquid pipe lines.

9.1 RJ Stacey is providing a “workable” Linestop.

9.2 Customer must be prepared to work with some leak-by if a 100% seal is not achieved due to site conditions including RJS LineStop equipment leak by, Customer valves in the same system not holding or a combination of the two. A “Workable” Stop is one that is less than 100% shutdown yet safe workable condition utilizing approved and accepted gas/liquid pipeline field procedures .These procedures may include cold cutting the pipe, nitrogen purges, air movers, spill remediation, alternative welding or fitting choices, and additional safety equipment.

Listed below is a typical chart of General responsibilities for the Tapping/Plugging field operation that has been quoted by RJ Stacey Inc. Please refer to your quote for specific flow chart.

ITEM		CLIENT	RJS
1	Fill Out RJS Tapping Questionnaire, exact dimension of the pipe, including outside diameter, wall thickness and pipe ID, design and operating criteria of the pipe and its contents	X	
2	Safe scaffolding, excavation and shoring, excavation maintenance, pumping and de-watering including product removal in accordance with OSHA safety	X	
3	All pipe and equipment supports including where applicable, gravel base, shoring, timbers for cribbing and support and thrust blocks.	X	
4	Grout for fitting installation and testing, if required		
5	Purchase RJS FITTINGS and purge nipple	X	
6	Installation of all welded fittings. All fittings will be installed 90° perpendicular to the header being tapped. Angle taps will require special fitting modifications prior to installation and must be pre-approved by the RJS Engineering Dept., test installation	X	
7	Install all Bolt-on fittings	X	
8	Furnish safety permit and the permits requirements		
9	Minimum of two (2) laborers/rigger/fitters to work under the direct supervision of the RJ Stacey Supervisor Provide wrenches and tooling to bolt/un-bolt RJS Equipment	X	
10	Provide recoverable LINESSTOP VALVE(S)		X
11	Provide suitable lifting service for the duration of the project. Provide lifting service operators as required	X	
12	Install / remove hot tap machine	X	
13	Inspect the hot tap machine installation		X
14	Perform the hot tapping operation		X
15	Close Line stop valves		X
16	Remove hot tap machine and install LineStop plugging machine(s)	X	X
17	Open LineStop Valve(s) and set LineStop		X
18	De-pressurize and purge the system. In order to perform the contractors remedial work Re-pressurize the system upon work completion	X	

ITEM		CLIENT	RJS
19	Customer/Contractor must be prepared to work with some slight leak by if RJS is unable to achieve a 100% seal due to site working conditions (in almost all cases RJS does achieve a 100% seal), but preparation for contingencies by the customer/contractor will prevent site delays	X	
20	Retract Pivoting Head and close LineStop Valve(s)		X
21	Remove Pivoting Head plugging machine(s) and install completion plug machine(s)	X	X
22	Set completion plug(s) into LineStop fitting(s)		X
23	Remove completion machine and LineStop Valve(s)	X	X
24	Furnish and install gasket, blind flange, studs and nuts	X	
25	Specialty safety equipment to include self-contained breathing apparatus (SCBA), specialty protective suits, air quality monitors, communications, confined space safety gear and testing	X	
26	Firefighting equipment and fire watch if required	X	
27	Fuel (gas or diesel) for Hydraulic Power Pack		X
28	Local Transport: from shop/lodging to work and return		X
29	Customs clearance, duties taxes, fees of materials, fittings and equipment	X	
30	Coordinate, arrange for and obtain all "Work Permits" required for job	X	
31	Rail safety	X	
32	Cleaning and decontamination of all Hot tap and Linestop equipment including disposal of any wastes prior to removal from jobsite location	X	
33	Draining and disposal of pipe contents.	X	

SHOULD YOU HAVE ANY QUESTION REGARDING THIS PROCESS, PLEASE CONTACT RJ STACEY PRIOR TO DISPATCH OF THE EQUIPMENT AND TECHNICIAN.

Please feel free to call RJ STACEY for clarification or additional information.

RJ Stacey Inc. 248.330.4707

Email ryan@rjstacey.com

Web Site: www.rjstacey.com