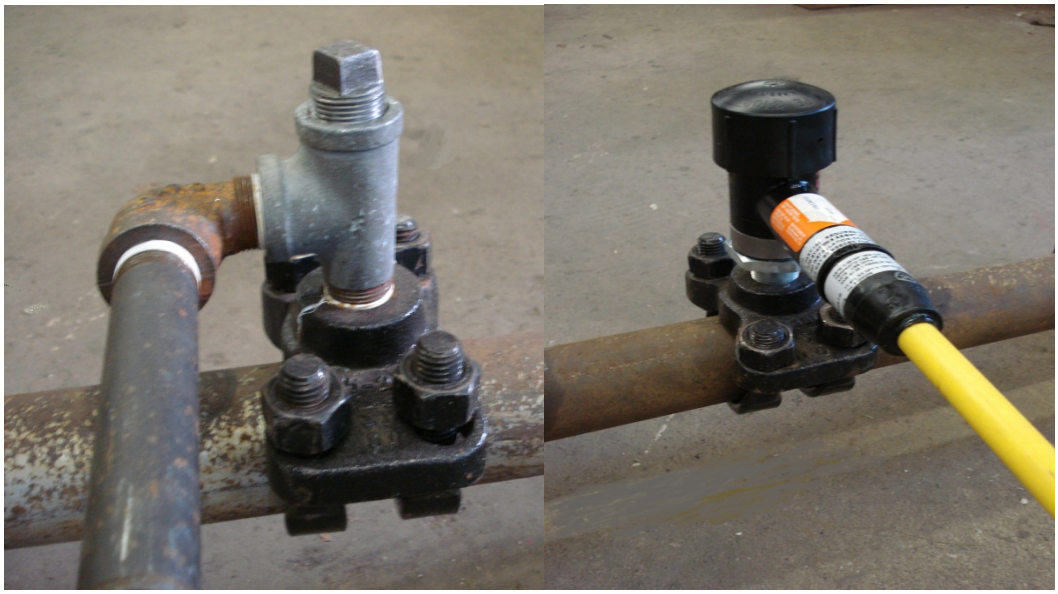
Keyhole Technology

Service Renewal (up to 100PSIG)

For mechanical saddles on a steel main



The procedure known as service renewal is a procedure in which an aged steel service is replaced with a plastic service. This particular service renewal procedure is designed for the replacement of a saddle mounted steel service tee with a polyethylene service tee that is fitted with a steel threaded inlet connection. These plastic service tees are equipped with a stab coupling on the outlet or service connection to insure a leak free connection between the service run and the tee. In many of these installations the service line is inserted inside the retired steel service to eliminate the need to trench or drill the new service line from the meter to the main. It should be noted that this is a "No-blow" procedure that is designed to be performed in an 18" diameter cored "Keyhole" excavation.

This first half of this procedure is performed using the same steps as those used to perform a "Service retirement for mechanical saddles on a steel main" with the exception of assembly of the stainless steel band clamp to permanently seal the opening in the main.

The second half of this procedure is similar to the process for installing a plastic service into a plastic tee that is equipped with a stab coupling. After the service has been installed and tested a light weight pressure chamber is used to "gas up" the service and complete the installation of the new plastic service tee.

This Tellus procedure has been designed to address those mains that were either drilled or torched during the original installation of the service. This is facilitated by the use of a gas camera inside the operating pressure chamber thus allowing the operator the ability to inspect the opening in the main then carry out the procedure that is appropriate for the existing installation.

PROCESS DESIGN

All Tellus procedures and tooling have been designed and developed to employ innovative methods and specialized equipment for the performance of standard maintenance processes through core cut openings (18" diameter) in the road surface or pavement.

PROCESS INTEGRITY

A high level of process integrity can only be achieved through analysis and understanding the failure modes and hazards that may exist. Tellus Underground Technology works closely with the LDC's and their contractors to develop standard operating procedures and tool sets that are designed to address and resolve those unexpected situations in which events do not progress as expected.

OPERATING COST SAVINGS

When the costs of "Keyhole" procedures are compared to conventional methods operating costs are significantly reduced. The elimination of street restoration costs along with labor cost savings have resulted in operating cost reductions of as much as 50%.

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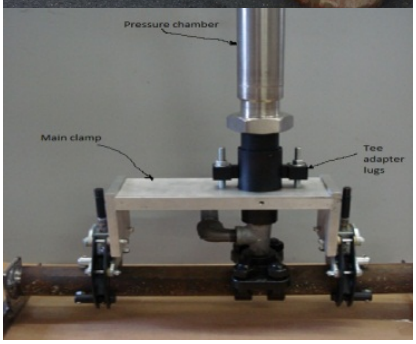
Tooling Description and



The keyhole tooling utilized to remove the steel service tee from a pressurized steel main is based upon the use of a pressure chamber to perform the first half of the steps in this "no-blow" procedure. After the main has been plugged the "U-bolt" saddle is removed from the main and replaced with a new mechanical saddle using tools that are common to many other standard Tellus procedures.

At this point in time the service tee and service line are installed along with any curb valves or EFV's that may be required using standard Tellus tools and procedures. This installation is then completed using a light weight pressure chamber that is connected directly to the new plastic service tee to remove the steel plug from the main and reinstall the plastic plug in the tee.

If for any reason the gas mechanic determines that he would prefer to abort the "Keyhole" procedure and perform the procedure using conventional open excavation methods, our tooling and procedures are designed with stopping points that give the operator the ability to abort the keyhole procedure and safely seal the main. He can then secure the main for completion of this job at a later day or time.

All Tellus processes are supported by a flow chart and a step by step operating procedure. Just as in any scientific or medical procedure each step must be performed exactly as designed and in the prescribed sequence to achieve repeatable and successful results. When well-designed tools are utilized in a thoughtfully-designed procedure the operating gas mechanic can always expect professional results.

Tool Requirements

Tool Description	Tellus P/N
¾" locking square drive extension (6 ft. length)	GTN-1006
Tee handle, ¾" drive	GTN-1005
Pneumatic extension saw, ¾" to 2" (6 ft. length)	GTN-1010
¼" hex drive w/remote release, (6 ft. length)	HEX-1011
2" pressure chamber w/¾" service tee adapter	GTN-1030
Main clamping fixture for 2" or 3" to 6" mains	SAS-1336
Service insertion kit for ¾" to 1-1/4"services	SAS-1352
Sandblasting extension tool	GTN-1013
Light weight pressure chamber w/Perfection tee adapter	SRP-1242
Sandblasting extension tool	GTN-1013
Additional optional tooling:	
Gas camera w/ 6 ft. rigid cable	
Stuffing box for 2" pressure chamber	

TECHNICAL SUPPORT

We work with your operating crews and contractors to insure that they fully understand every detail of the keyhole process. We also work with your technicians and procurement staff to insure that all of your operating standards are fully satisfied.

SUPERIOR QUALITY

Tellus tools are professional quality tools designed for use by utility professionals. These tools are designed to exceed all of the demands of the underground gas distribution industry.

STATE OF THE ART TECHNOLOGY

The Tellus organization is constantly and consistently engaged in R&D and product development efforts. We are also in constant contact with gas utility industry equipment and hardware suppliers to insure that the latest developments will be applied to all new procedures and keyhole devices.

For more information on any of our products or services please visit us on the Web at:
www.tellusunderground.com

SERVICES AVAILABLE

Technical Support
Setup and Training
Tool Maintenance Support
Procedure Mapping
Special Application Design

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