

HOT TAPPING

Under pressure live drilling of pipe work

Pipefreezing Services Ltd. have carried out a number and great variety of Hot Tap works in the past few years, on a range of pipe sizes, materials and at high profile sites in London and across the UK.

A 'Hot Tap' as it is known, is a method of achieving a new connection line off of an existing pipeline, without the need to drain, shut off systems, or stop the flow of the existing pipe work to be 'tapped'.

For instance, if a new set of CHW Flow and Return pipes are needed to feed new Fan Coil Units (FCU), yet the CHW supplies critical plant such as Computer Room Air Conditioning (CRAC) units and as such can in no way be shut down, stopped or isolated; a Hot Tap connection onto the existing pipe work will provide the new connections needed without affecting the pipeline's operation in any way.

How it works:

A new connection point is affixed to the outside of the pipe, via means of arc-welding the new stabbings with flanges or threads; or with the use of purpose made full encirclement clamps, with either threaded or flanged connections secured and sealed to the outside wall of the existing pipe work.



Above: A 2"/50mm Threaded short is welded to the outside wall of existing pipe work

A new, full bore isolating valve (either ball or gate) is then installed onto the connection flange / thread in the normal way and the new connection point is tested via means of water pressure testing using the new valve, so that we can ensure the new welded stabbing or new encirclement clamp has been installed correctly and will withstand the water pressure of the live pipe work, before any drilling is carried out. We typically pressure test to at least 1.5 times the system working pressure of the pipe work to be drilled, giving us a high degree of confidence that all joints will remain watertight once the live pressure is introduced.



Above: A new 2" isolating ball valve is fitted to the new threaded short

Once this test has been passed, witnessed and signed off as required by the client it is time to begin the drilling phase of the operation.

The hole that we cut into the pipe is achieved via the use of standard hardware, a pilot drill bit, a hole cutter (typically a few mm smaller than the bore of the valve so as not to score the valve during drilling) a drilling shaft and either the use of a 110V rotary core drill, or in certain cases the use of a ratchet on the end of the shaft to drill by hand.



Above: A pilot bit and hole cutter (44mm) installed onto the drilling shaft.

The difference when Hot Tapping; drilling a hole into live under pressure pipe work, is the [Hot Tapping Rig](#);

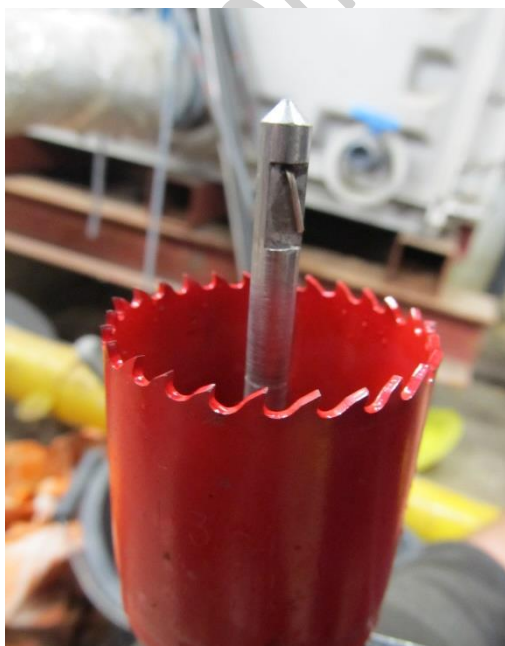
A Hot Tapping rig is a clever piece of design that enables us to drill into live pipe work safely, whilst barely losing a cup of water from the system, the ability to do this is owed to a series of 'O' rings that the shaft must pass through inside the rig, creating a watertight seal. The rig also provides safety when drilling pressurised systems with the use of grub screws that grip the shaft, and a clutch system that enables us to progress the drill bit and cutter toward and through the pipe wall with a high degree of control and precision. The rig is wound onto the new valve via a range of adapters that we carry.



Above: The rig in it's protective case,
Right: The rig and shaft now wound onto the new valve,
ready to wind onto the valve.



With the valve open, drilling of the pilot hole is commenced, using the clutch system and drill speed control to smoothly progress the drill bit into the pipe wall. A bleed valve is used to determine when the wall is broken and the pilot hole complete. The shaft is then retracted, the valve closed and the drill bit exchanged for a 'coupon catcher assembly', (detailed below), so that drilling of the required hole size can begin.



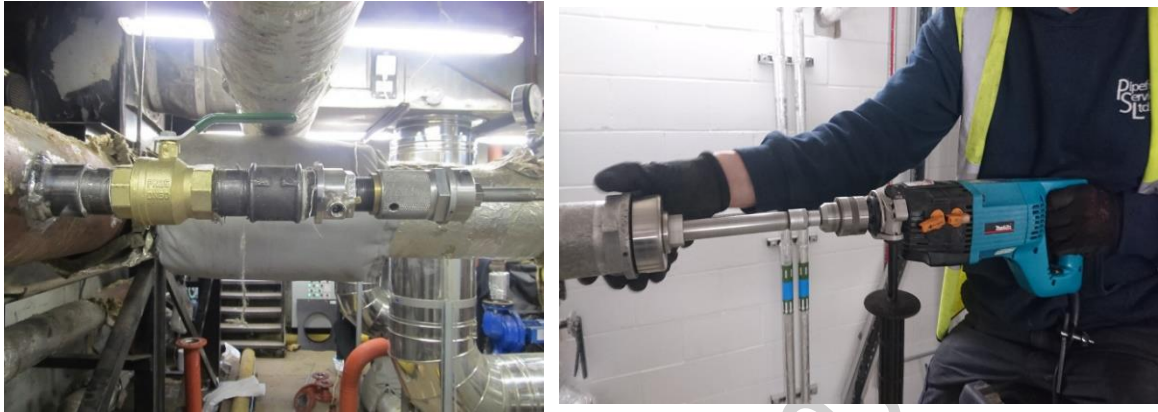
Coupon Catcher Technical Explanation:

Once we have drilled a 'pilot hole' into the pipe work, we will retract our cutting assembly, closing the tapping valve; and exchange the initial standard drill bit for a purpose designed 'coupon catcher' or a threaded drill bit, depending on the circumstances.

Coupon catcher assembly (pictured): This is a drill bit with a pair of 5mm hooks designed to drop through the previously drilled pilot hole grabbing and locking into the coupon (cut by bi-metal hole saw) when the cutter and catcher assembly are retracted.

Threaded drill bit catcher assembly: This is a drill with a custom-built die that threads the inner of the pilot hole whilst it is drilled and prior to the drilling of the coupon with a hole saw. This enables the drill bit itself to pull the coupon out of the pipe on retraction.

The rig is once again wound onto the valve, the valve opened and cutting of the full hole commenced. The technician once again uses the locking grub screws and clutch system to progress the hole-saw through the pipe wall safely and with control. The drilling continues until the engineer reaches a measured depth and feels the cutter free itself of the metal, indicating the hole is fully cut and the coupon free of the pipe wall.



Above: Ready to drill

Once drilling of the full size hole is complete, the shaft is retracted, the valve closed and the kit unwound from the valve. The machine is broken down and the coupon released from the catcher assembly, the only way to do this is to remove the assembly from the cutter Arbor, due to the design that makes it very difficult to remove it or lose it in the pipe work whilst drilling.



Above: the coupon has been caught by the catcher assembly, and removed ready to hand to client for inspection.

Once complete we will as standard inspect new connections, touch up welds with red oxide as required and install plugs or blanks as necessary to the new valves, leaving the client with a new ready to connect live connection.

We can provide services for all phases of the operation, such as the welding, supply of specialist valves

PSL assure that with our technician's 10 year + experience in performing this procedure, and use of our brand new, purpose built rigs, that we carry out live-drilled branch connections to the highest standard.

Pipetfreezing Services Ltd.