

Hot Tapping

Pretect Pipeline Intervention. Hot Tapping

What is Hot Tapping

Definition

Hot Tapping is a method of making a connection into an existing pipe or vessel which is still under pressure or live.

What is it used for?

Additional branches allowing supply to and from other areas of plant etc.

Monitoring points for temperature probes etc.

Entry points for isolation equipment (Stopples)

What advantages are there?

Can be performed with out the need to shut down the plant.

No need for loss of production or supply to other areas

Where can it be Used?

Petrochemical Industry

- ❖ Hydrocarbons – crude & heavy oils
- ❖ Light oils, diesel, kerosene, petroleum, motor oils
- ❖ Various chemicals

Power Generating Industry

- ❖ Steam & Water

Pharmaceutical & Food Industry:

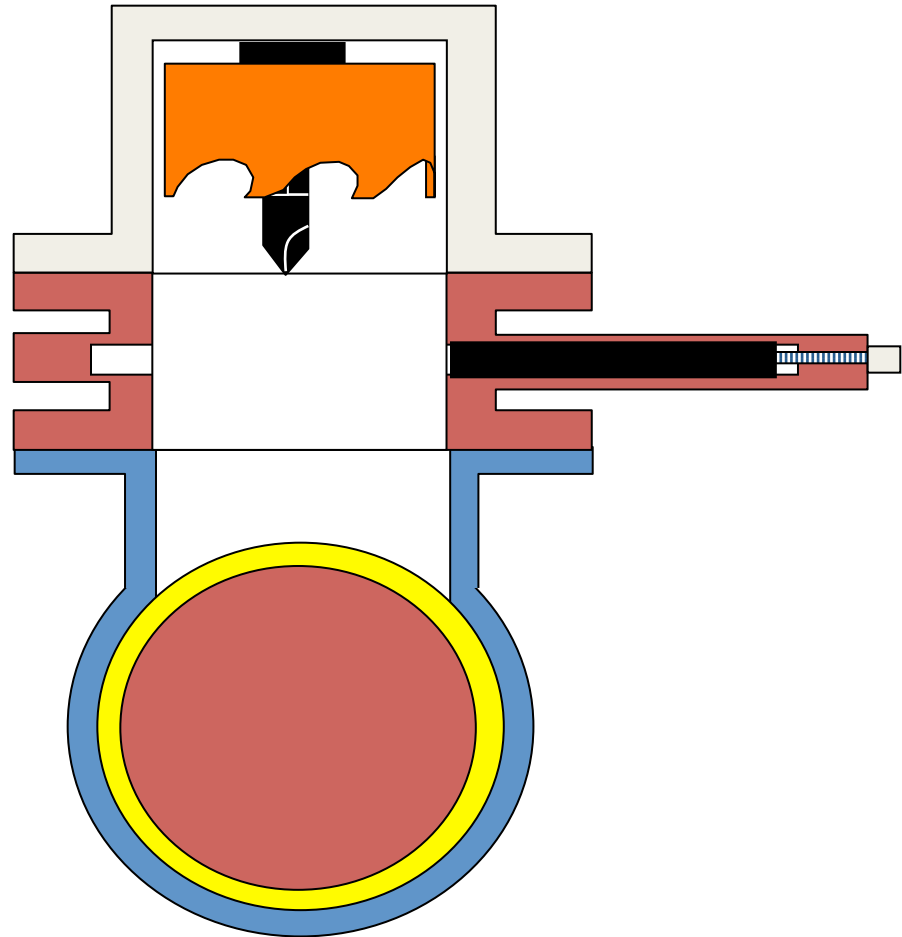
- ❖ Compressed air
- ❖ Food products

Water Industry:

- ❖ Potable Water & Sewerage

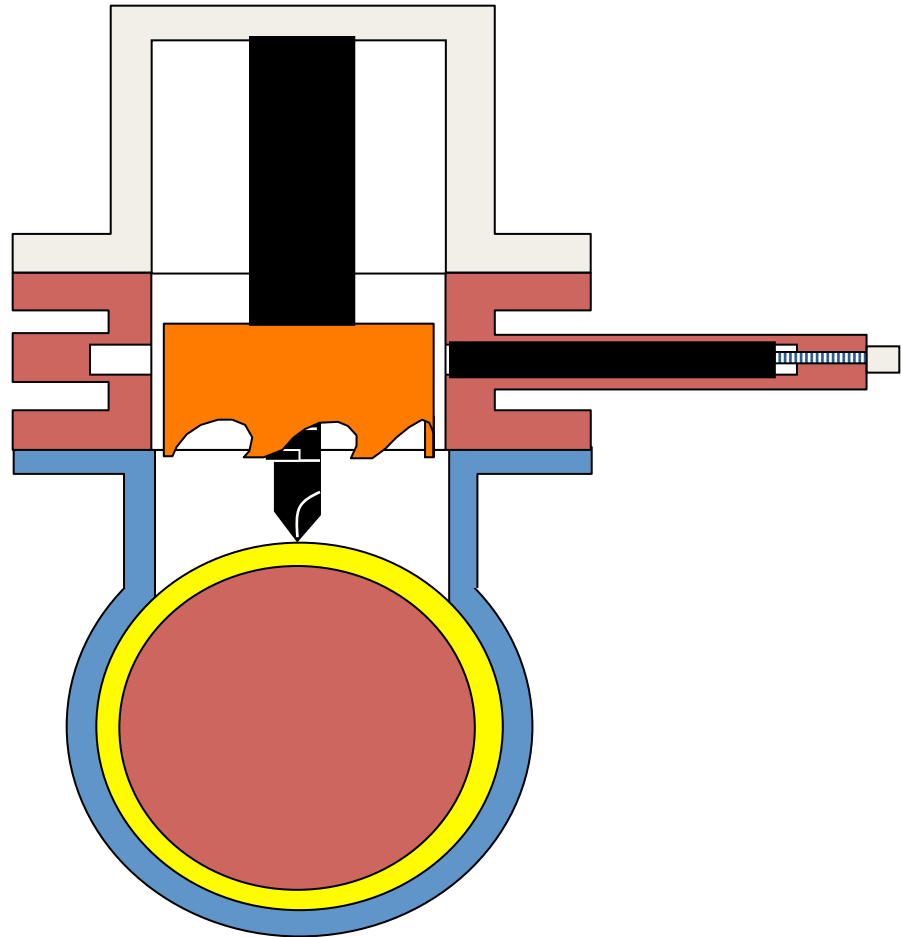
Step 1

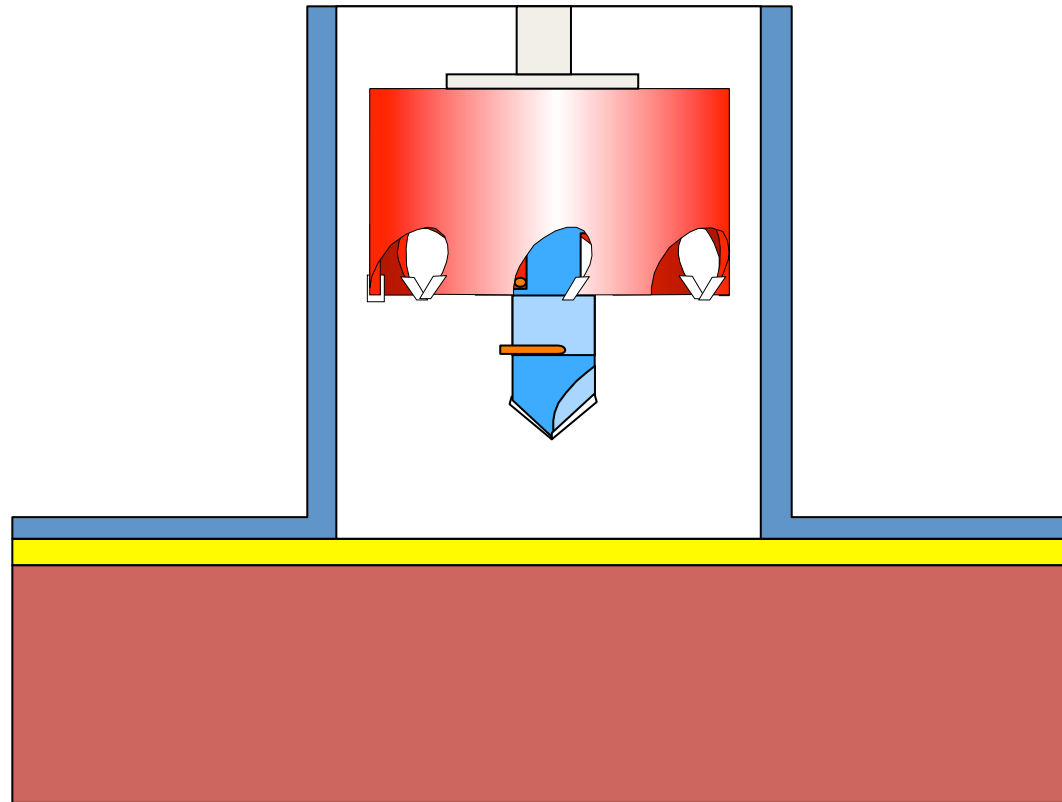
**Mount the
hot tapping
machine to
the tapping
valve.**

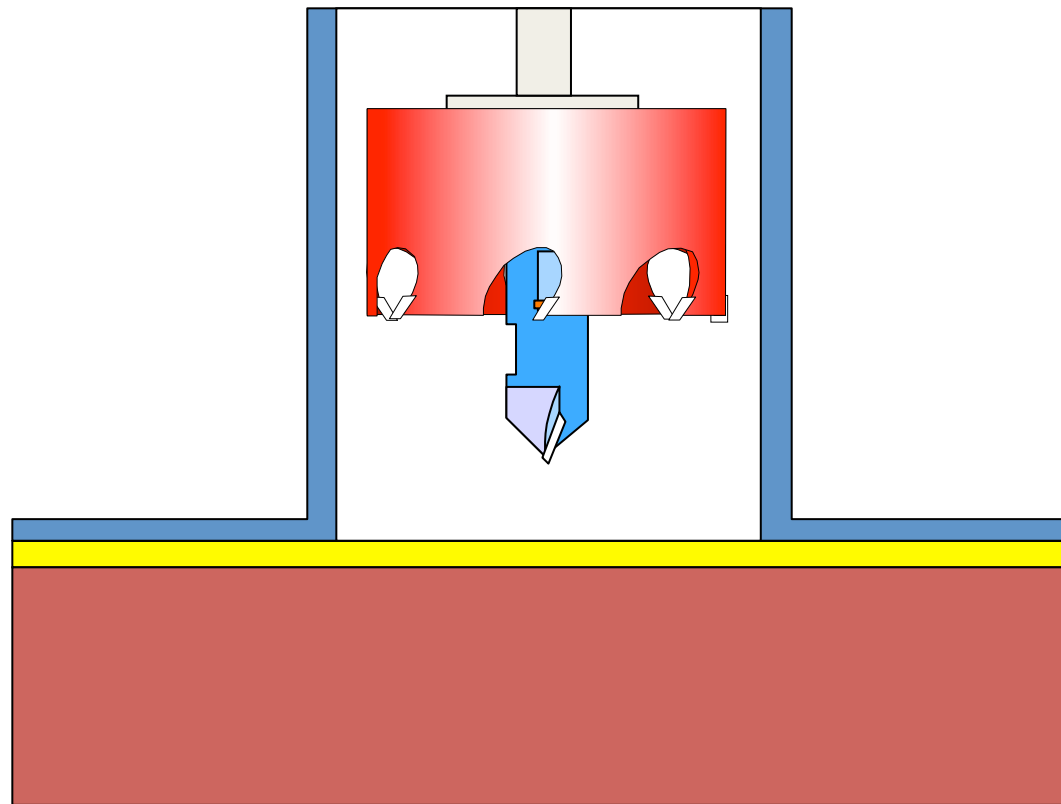


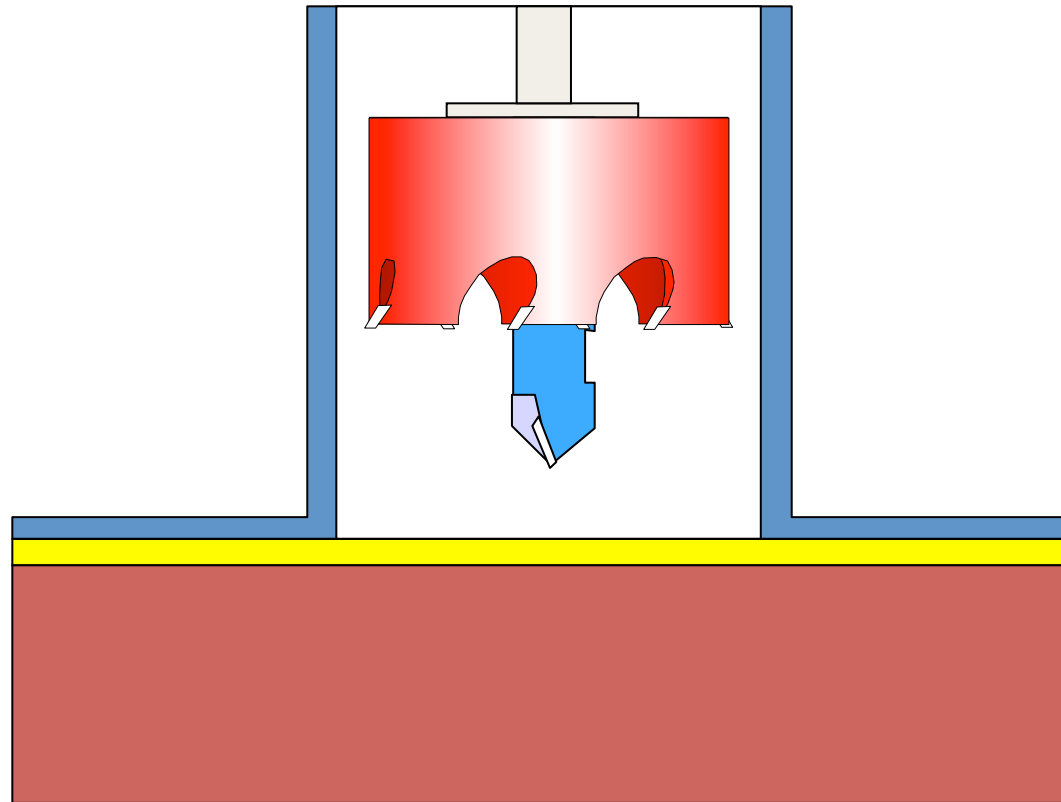
Step 2

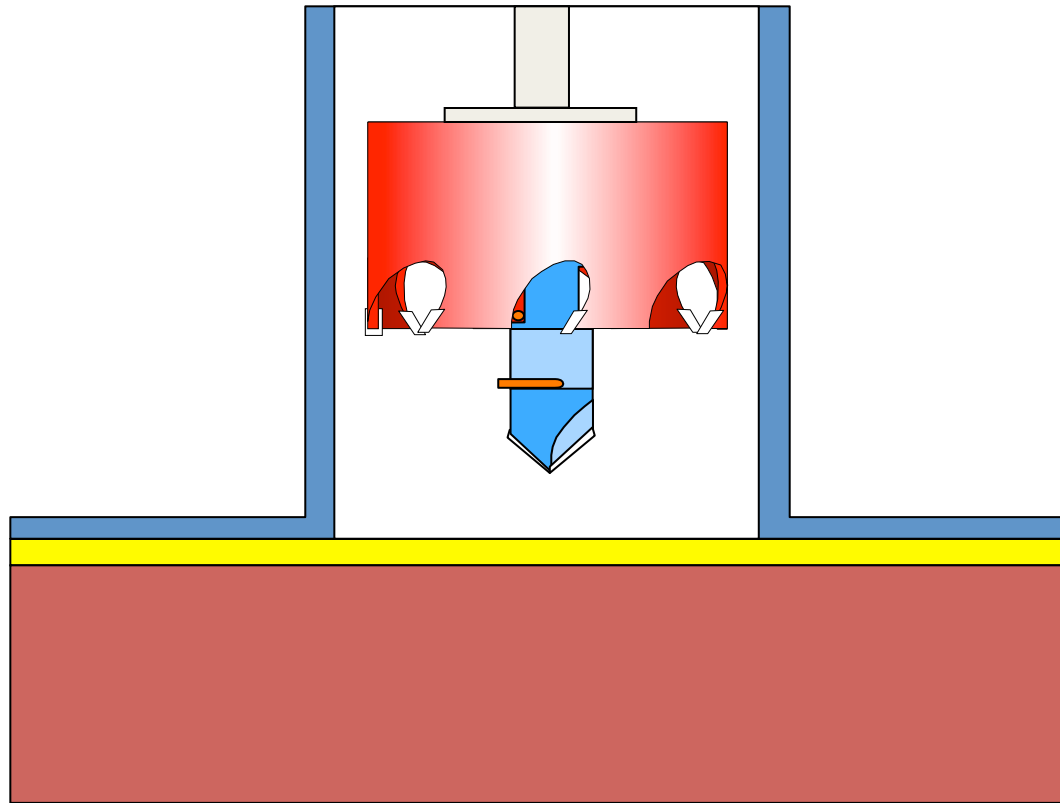
**Advance
cutter/pilot
assembly
until it
touches the
parent pipe,
then start the
hot tap.**

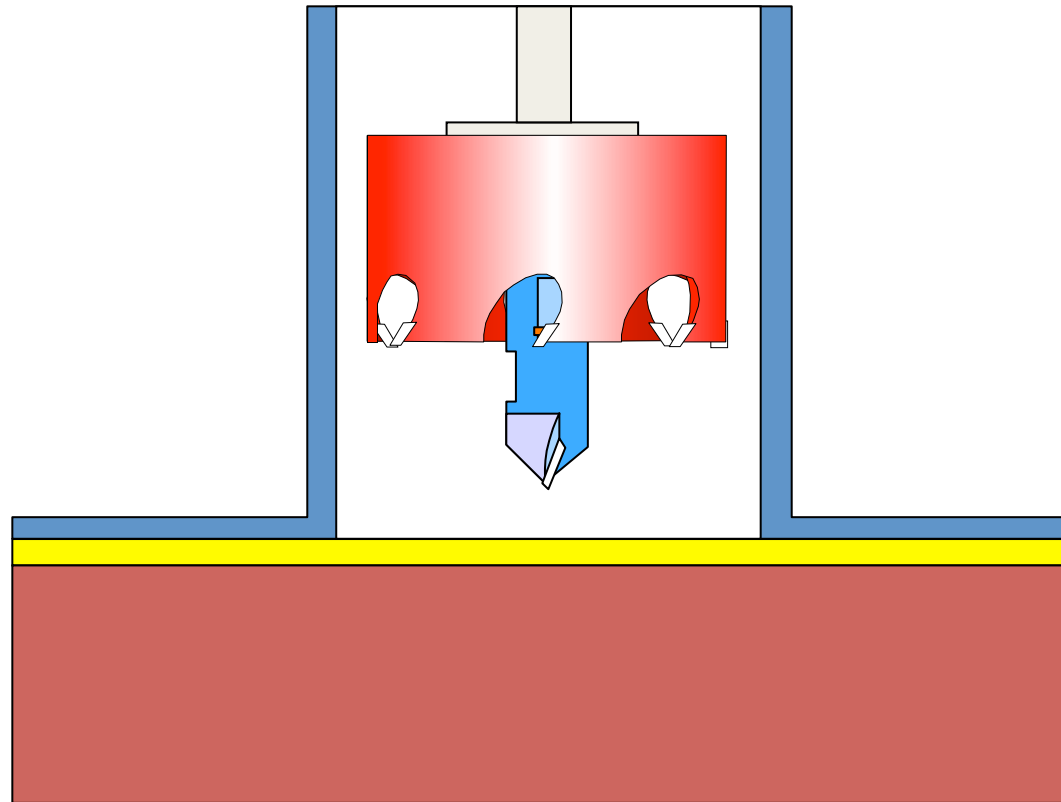


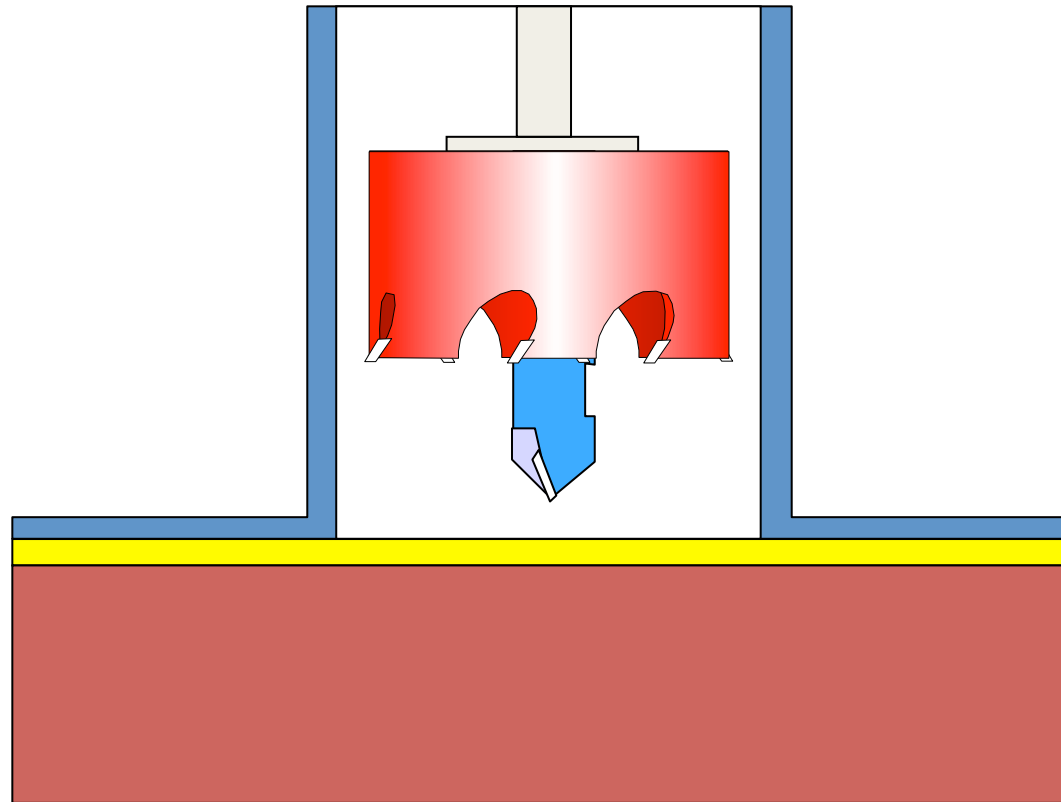


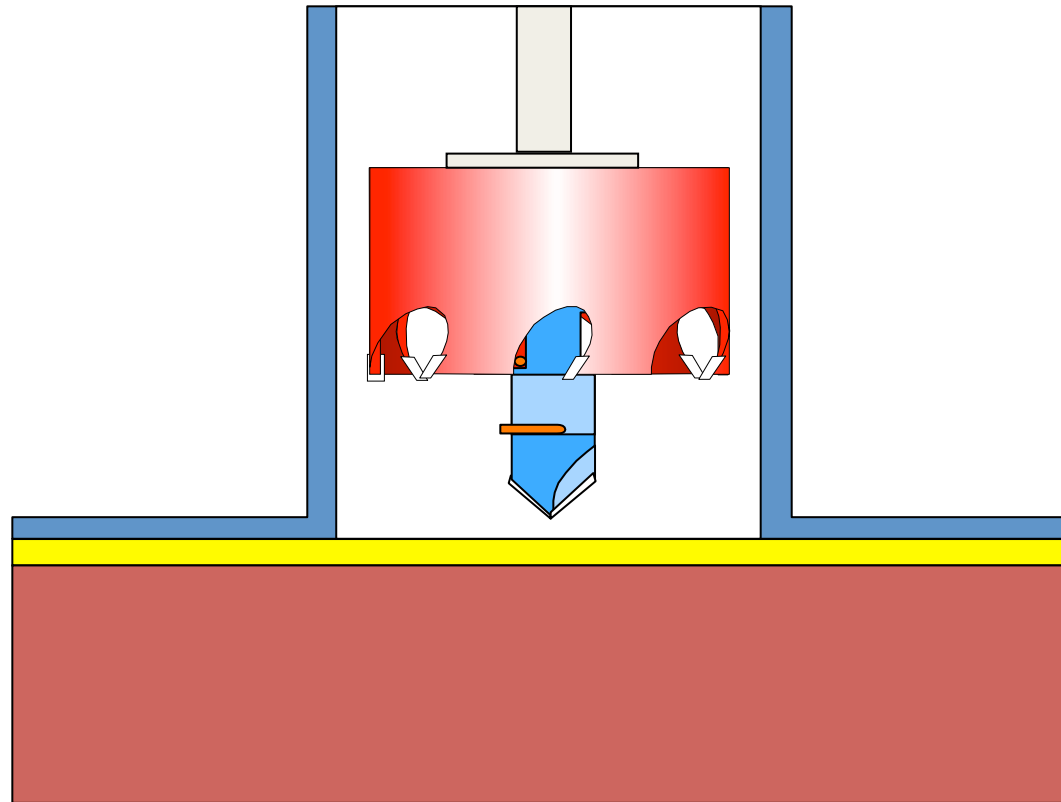


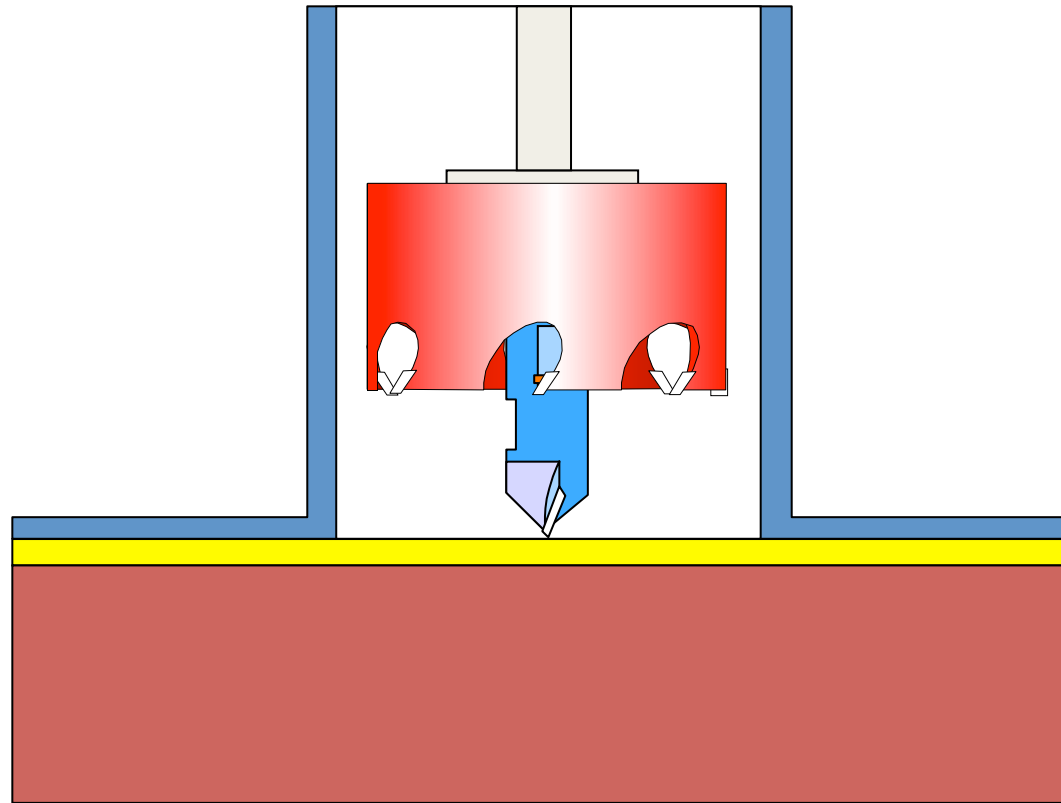


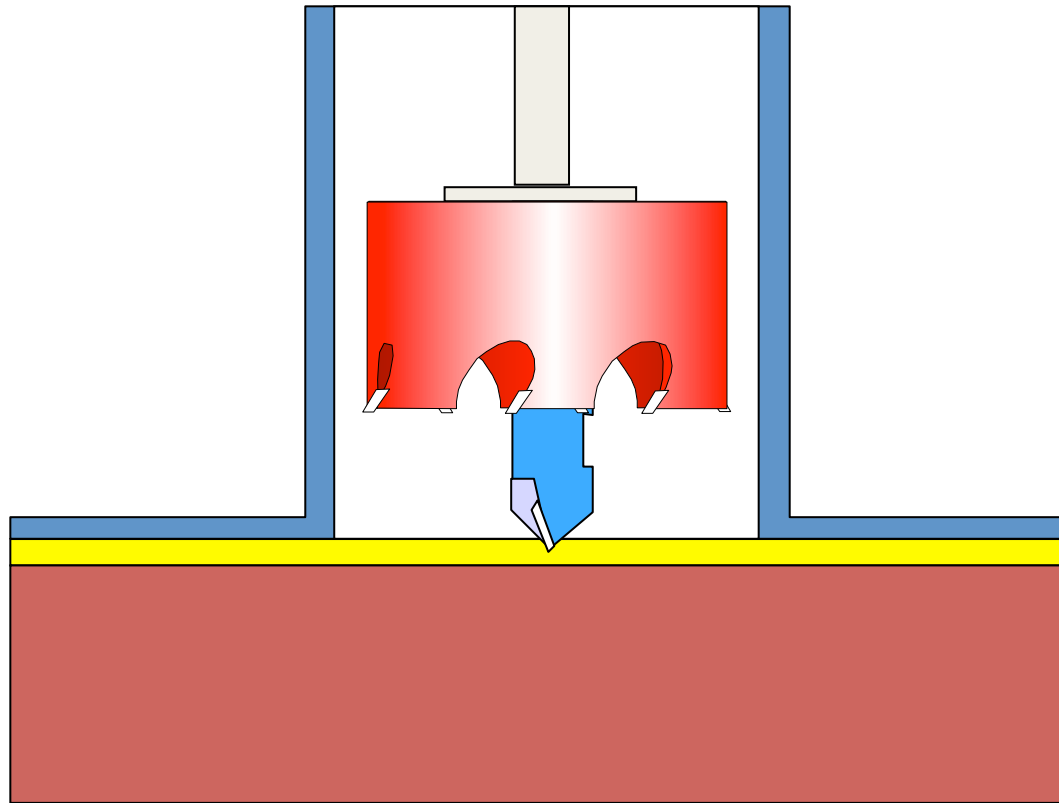


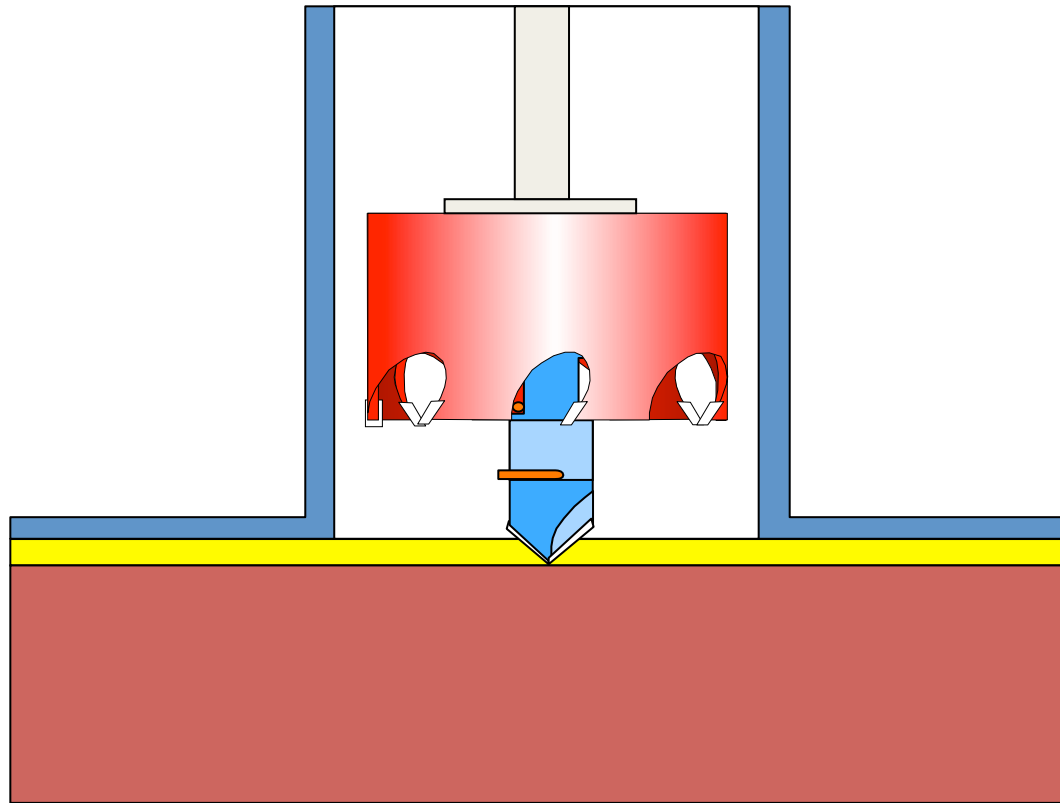






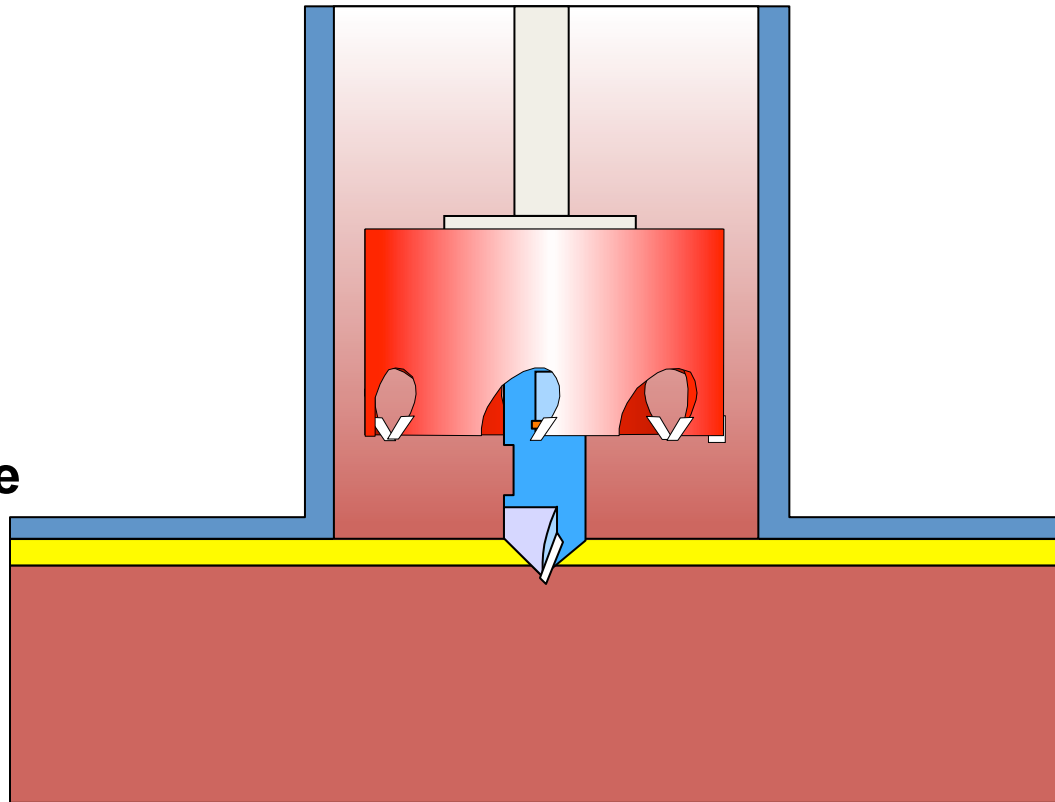


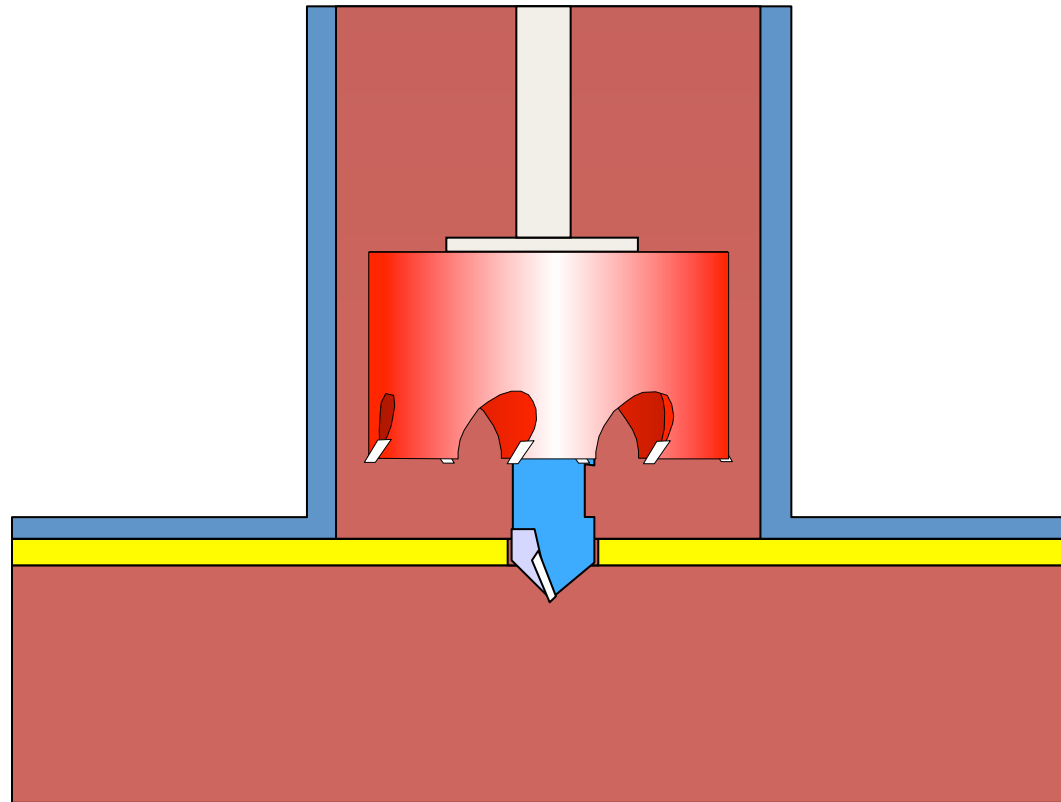




Step 3

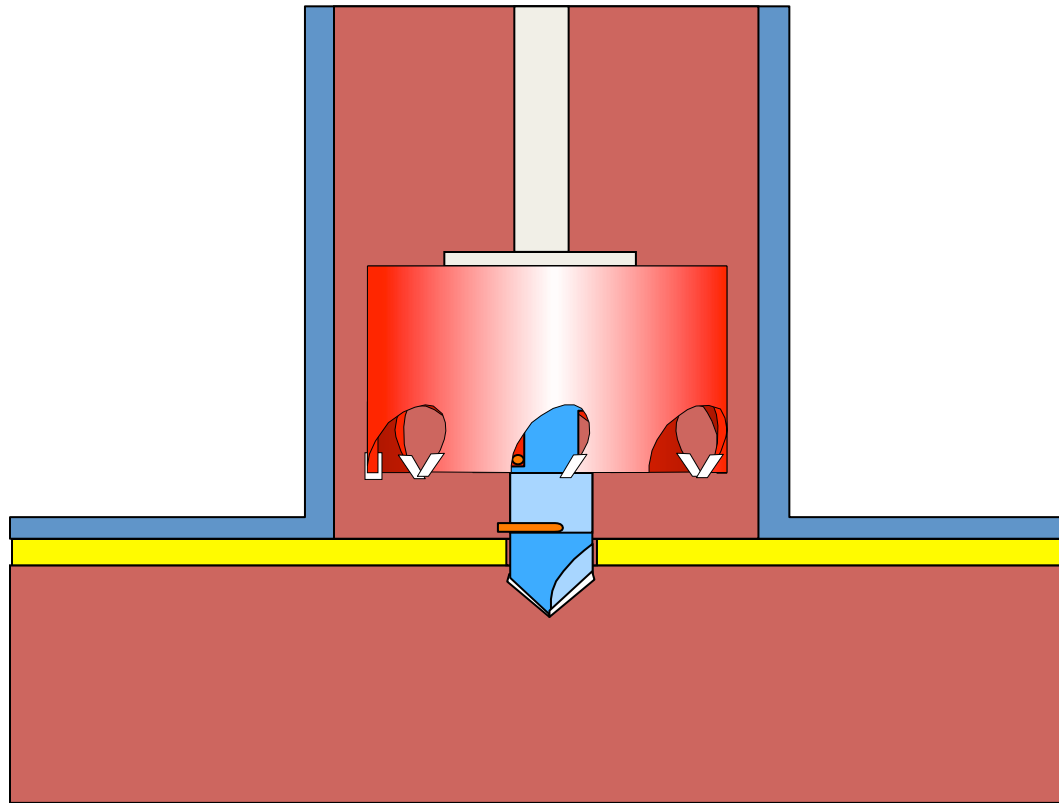
**When pilot
breaks through
product fills the
void, air is
expelled
through the
tapping machine
purge valve and
valve is then
closed to retain
the pressure.**

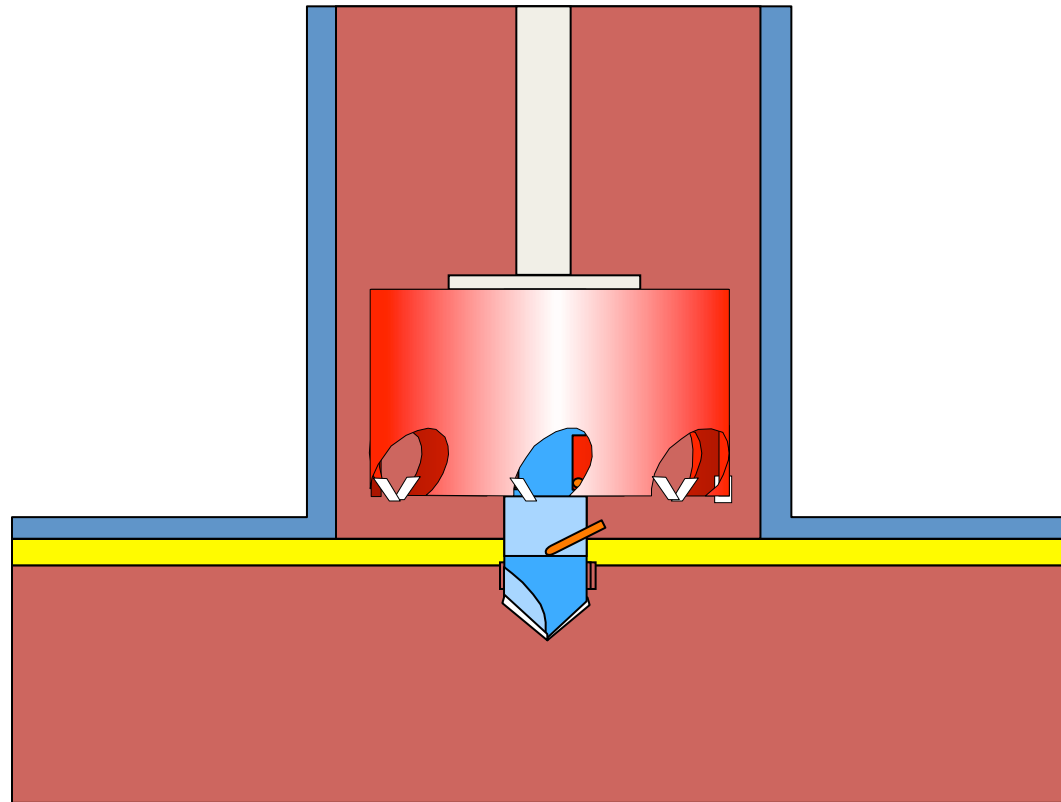


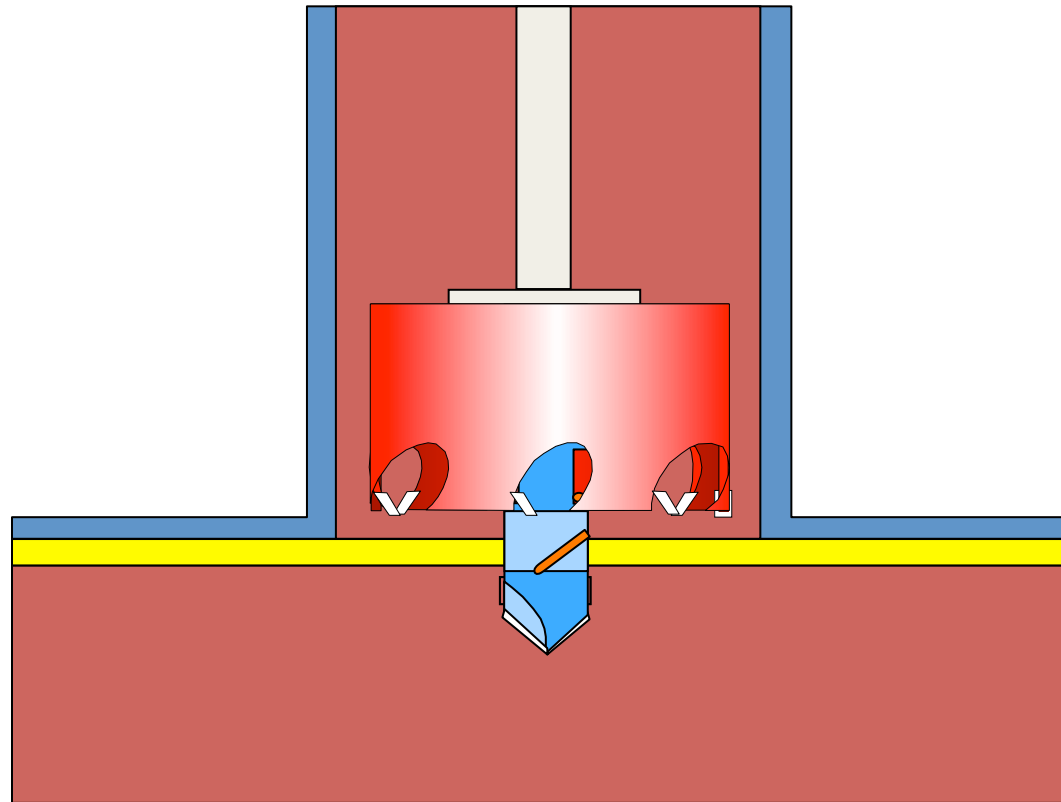


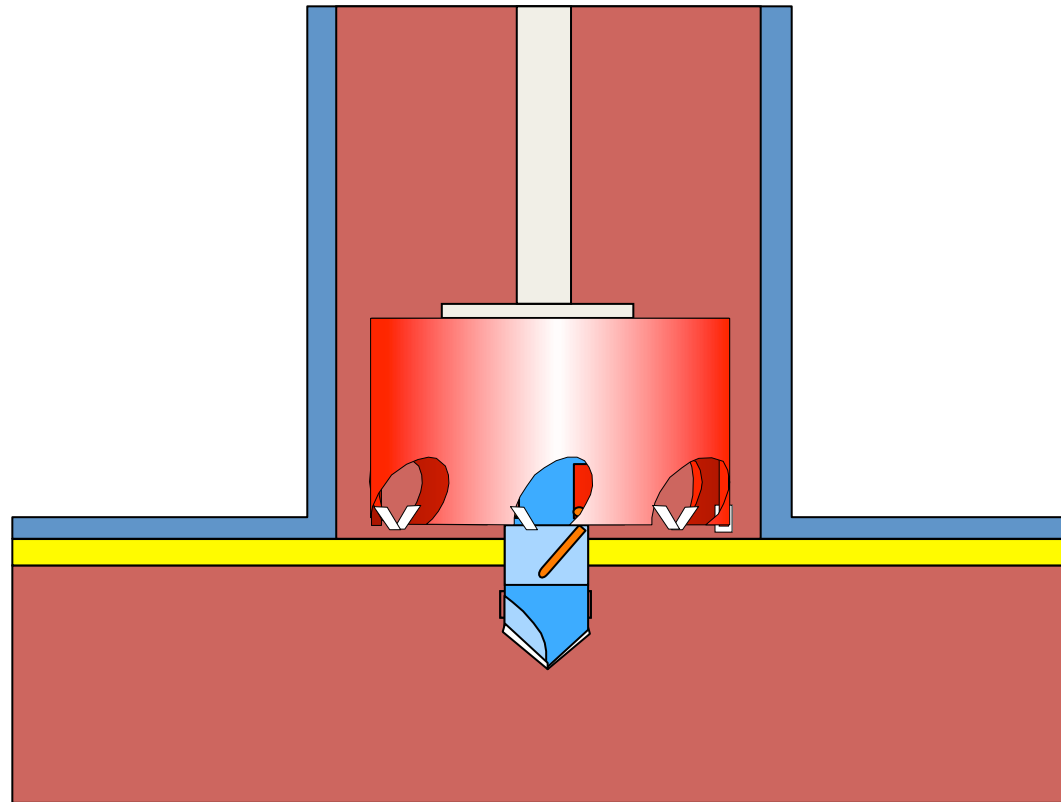
Step 4

When pilot is completely through stop rotation & advance to allow u-wires to drop.



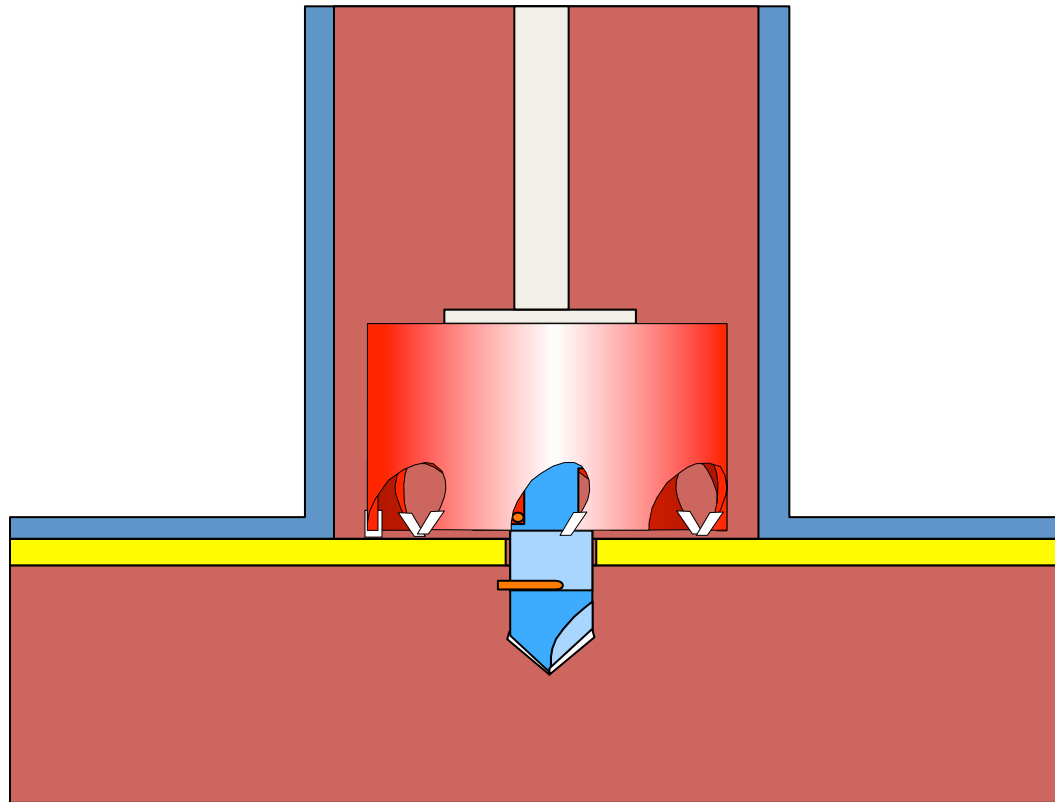


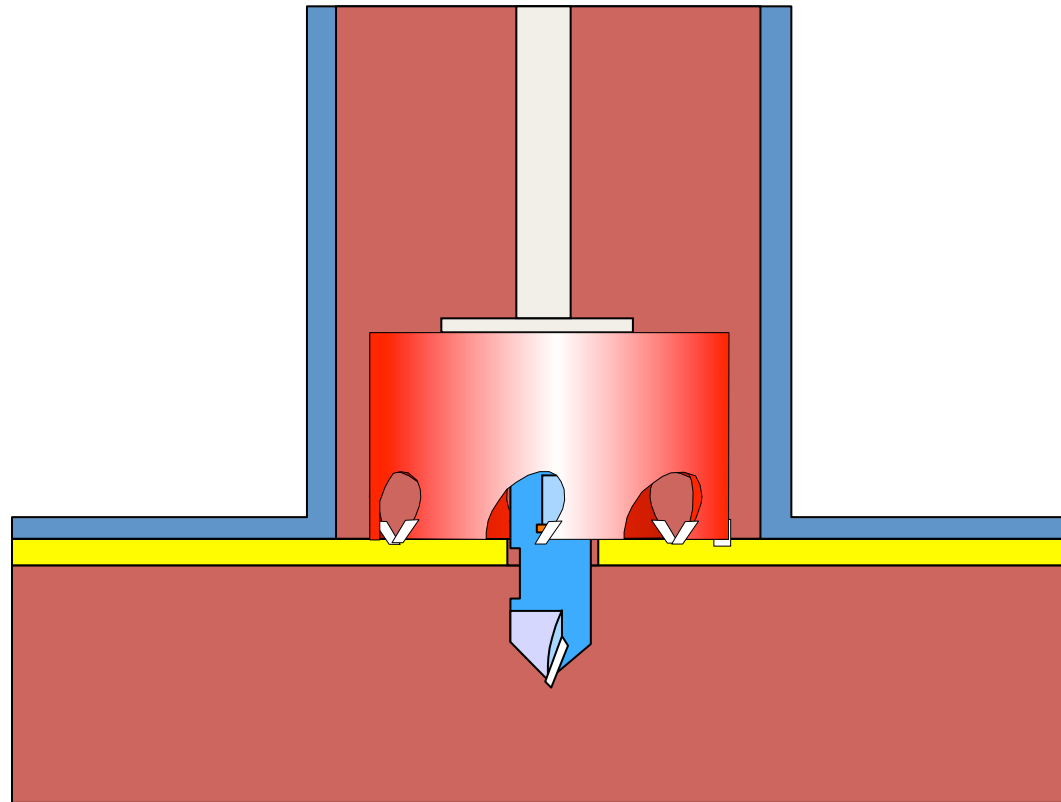


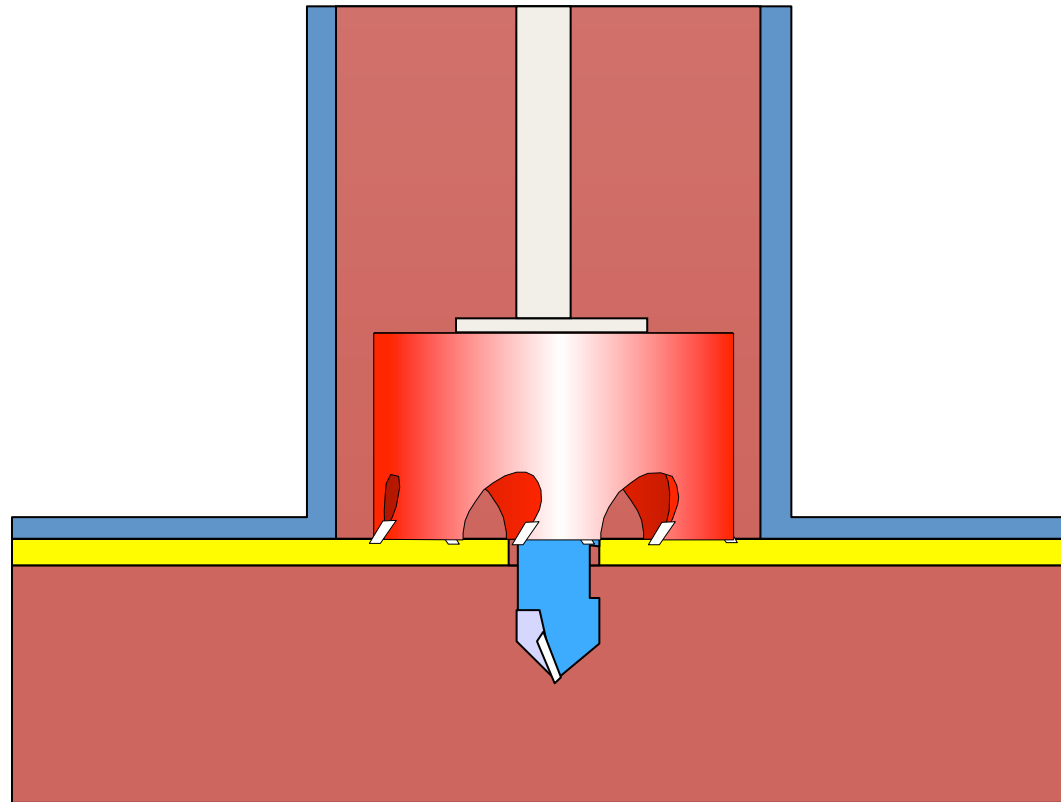


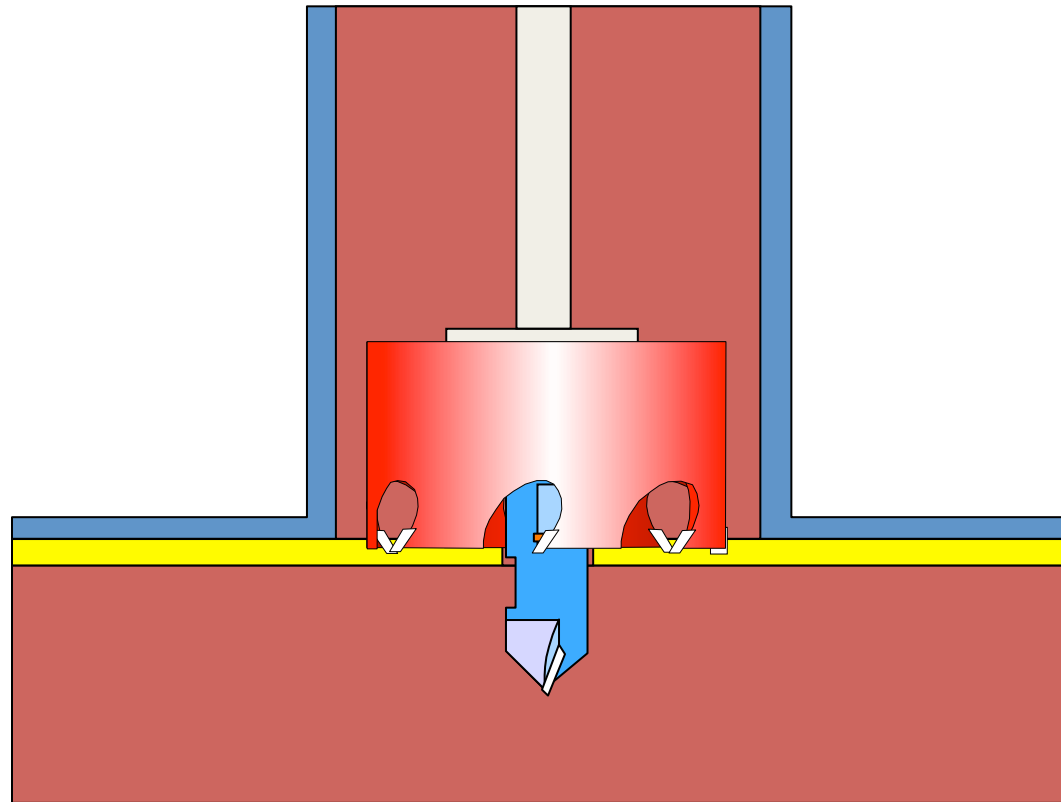
Step 5

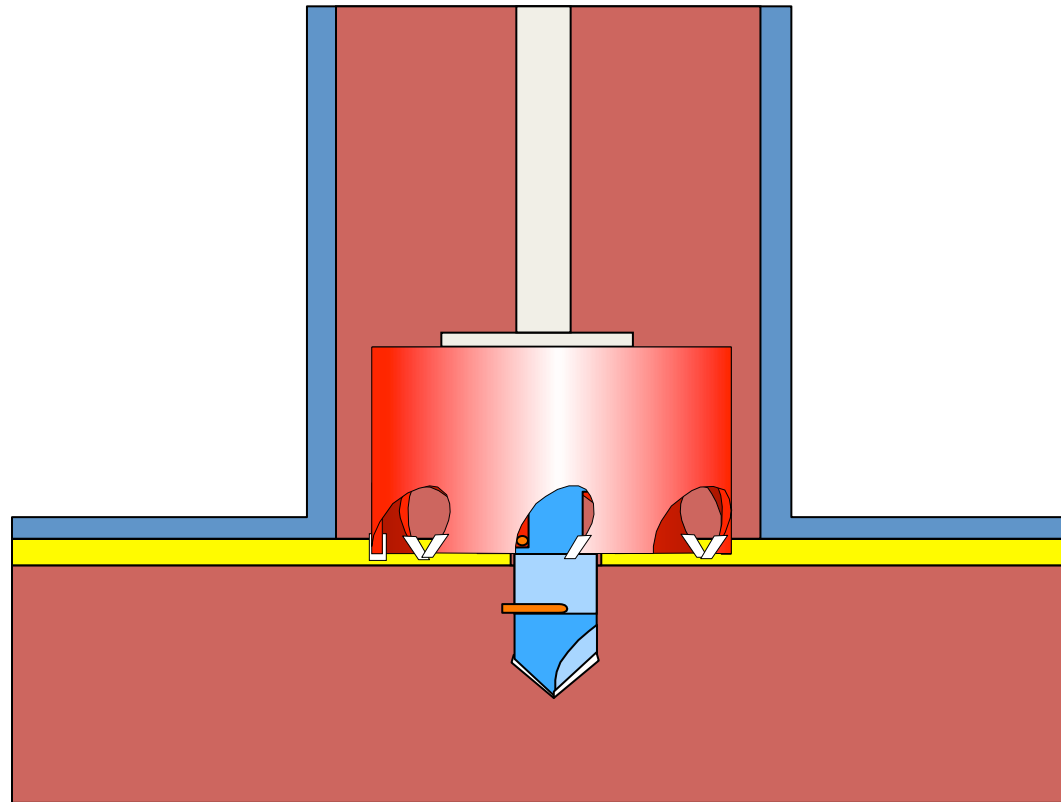
**When cutter
touches top
of pipe
restart
machine to
complete the
cut.**





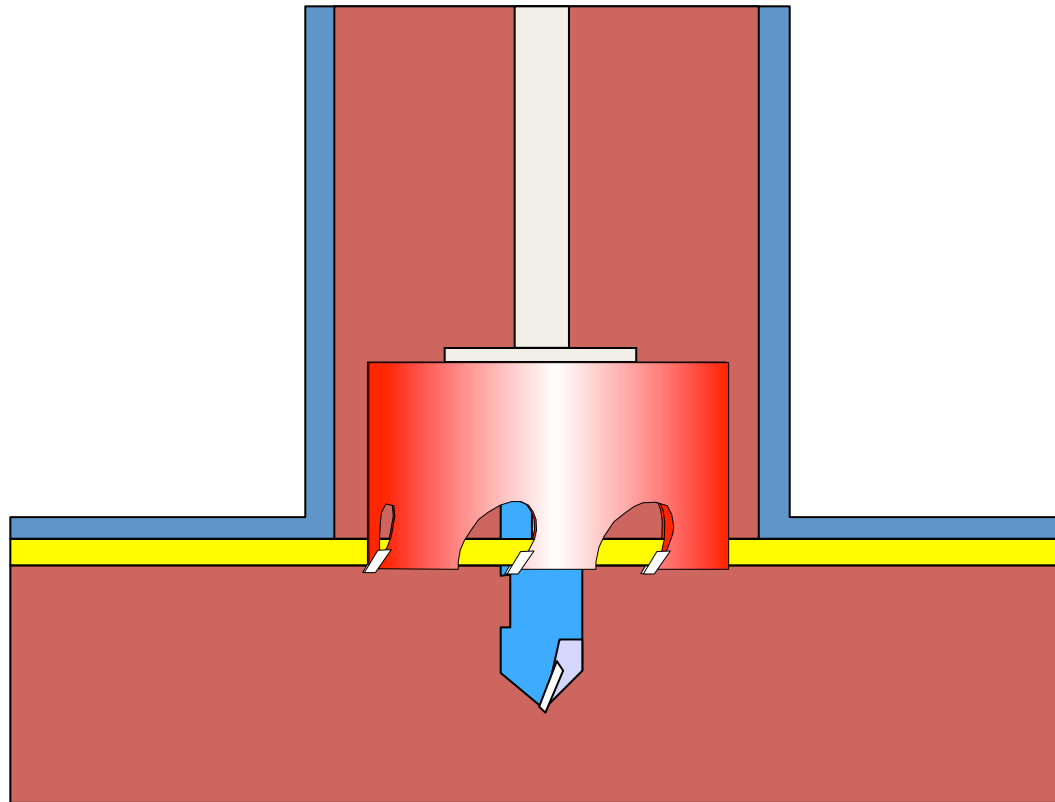


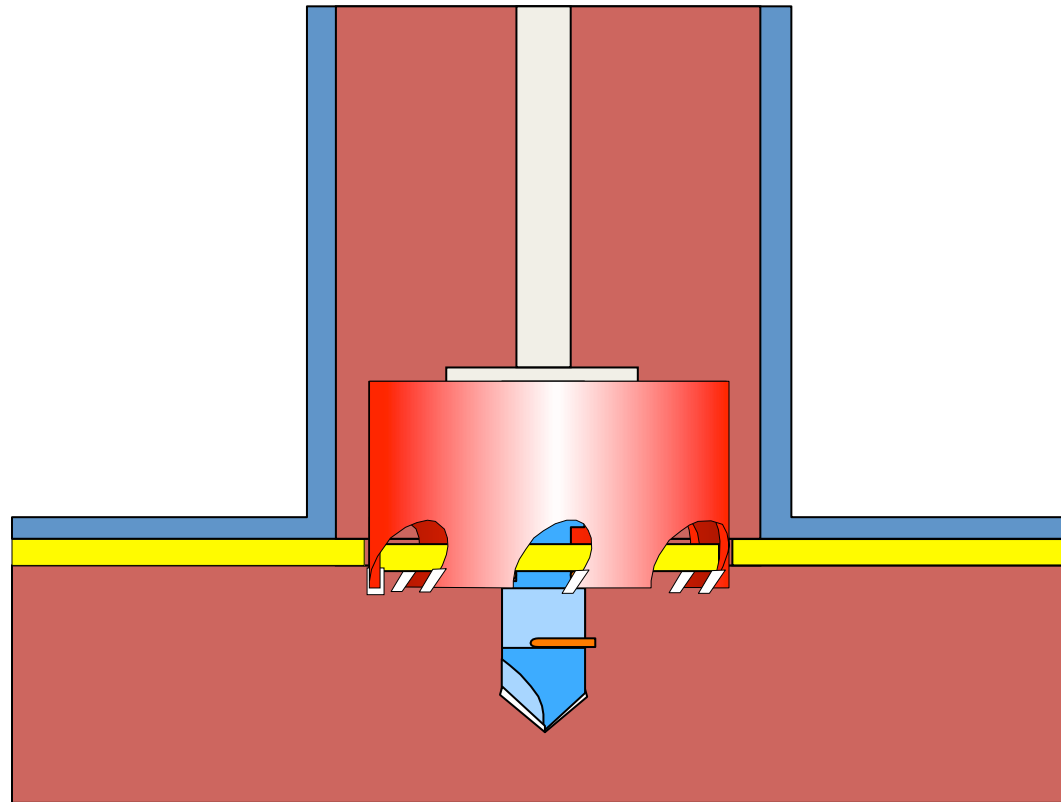


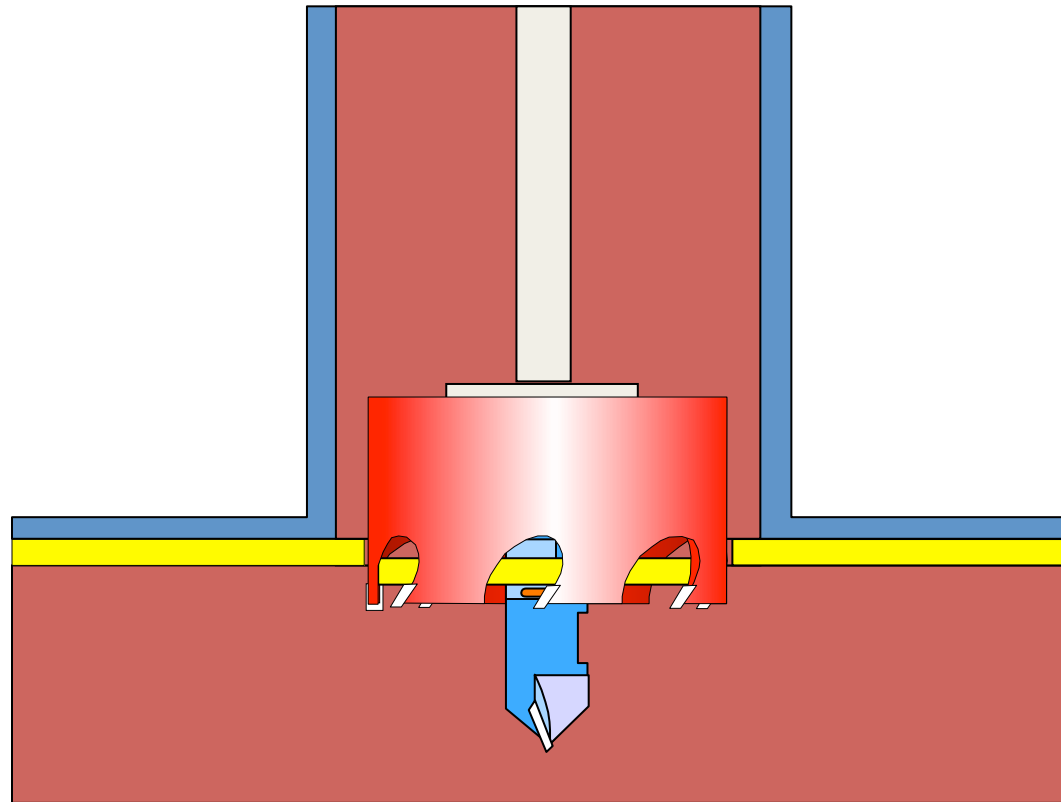


Step 6

When the cut is complete the machine should be stopped and cutter advanced to confirm tap complete.

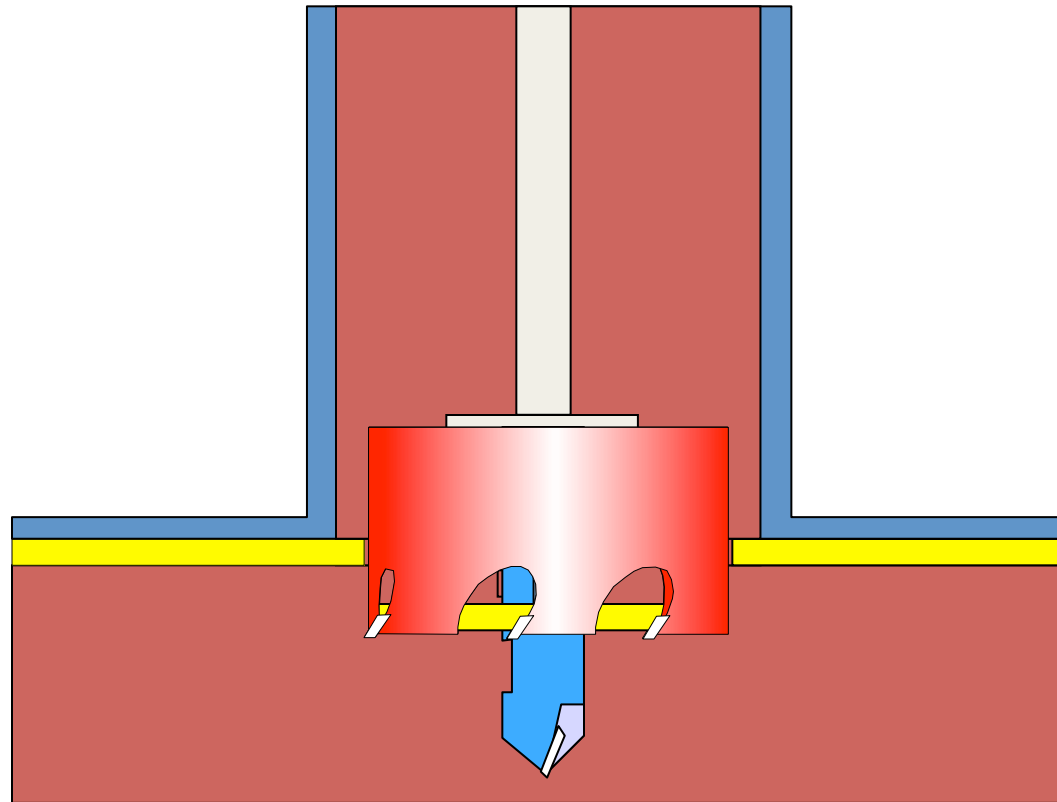


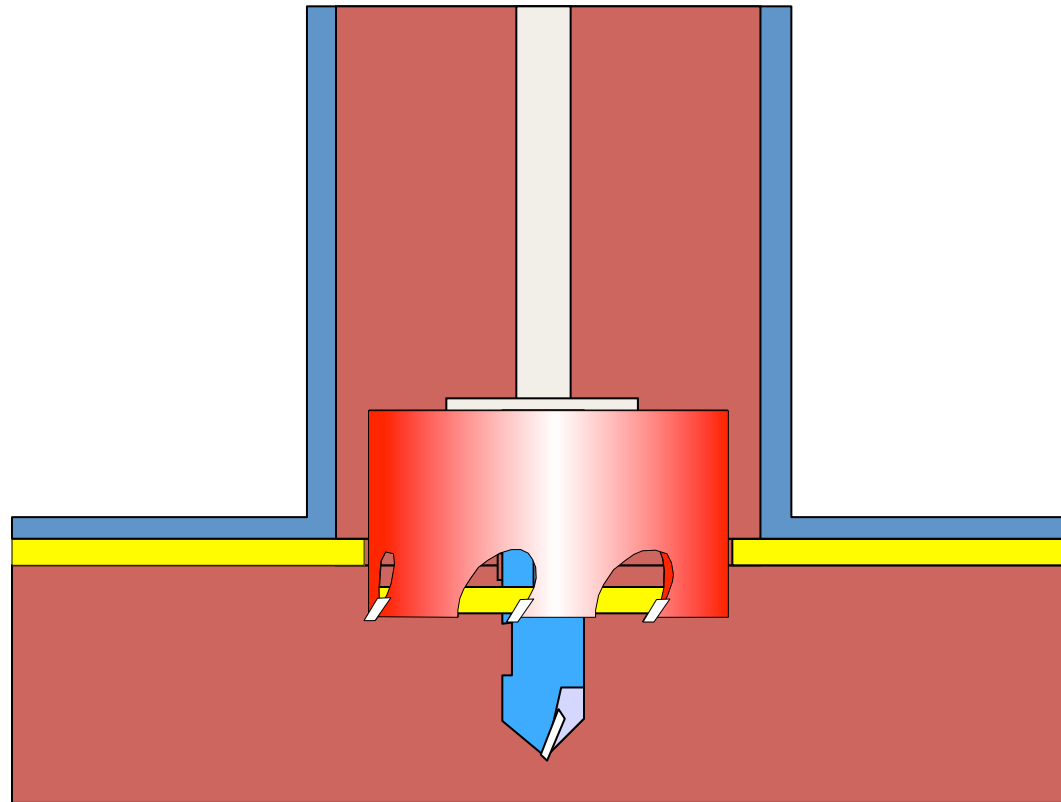


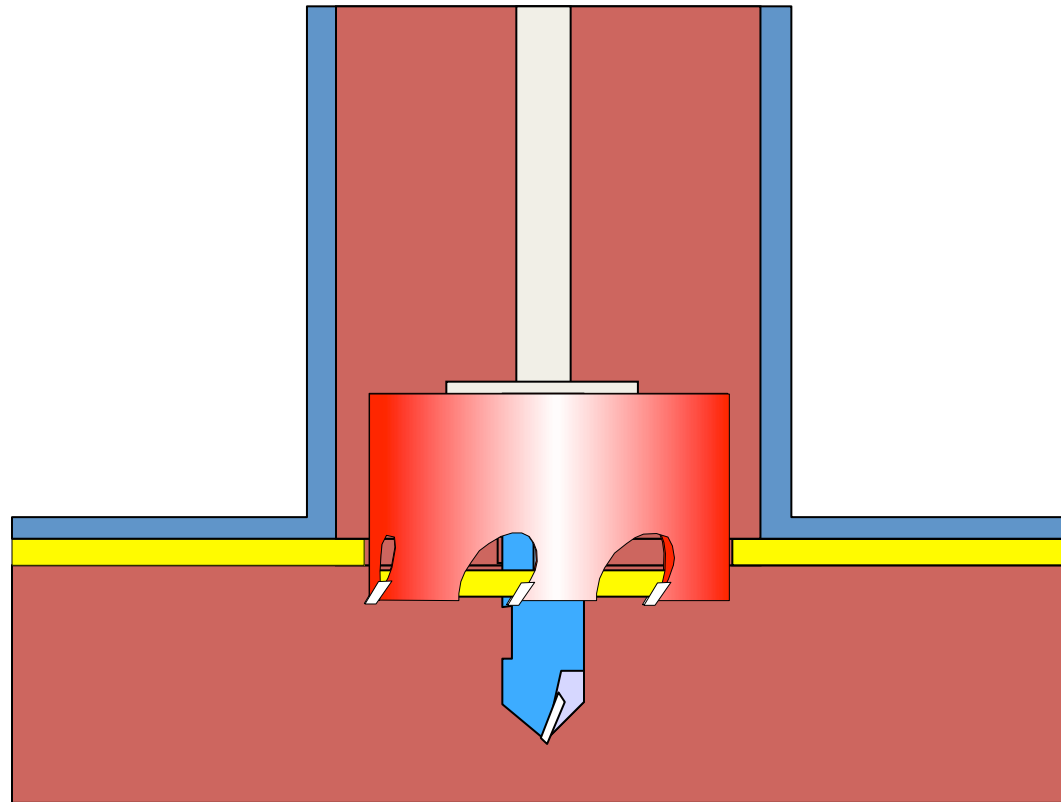


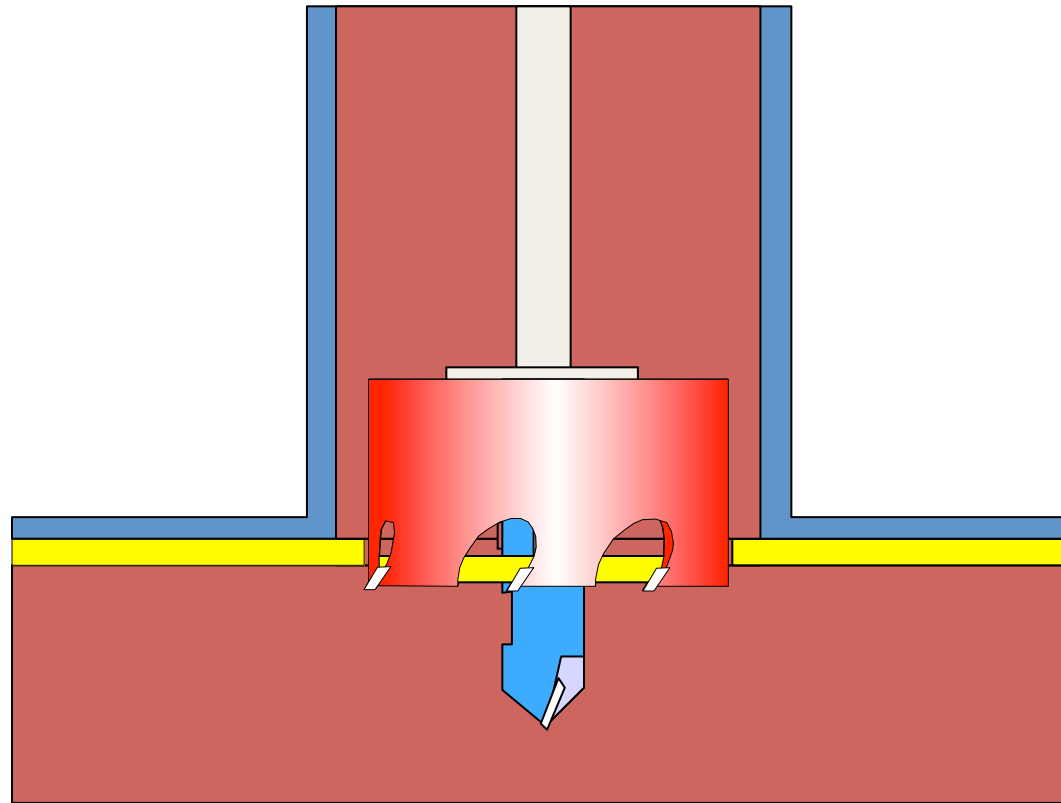
Step 7

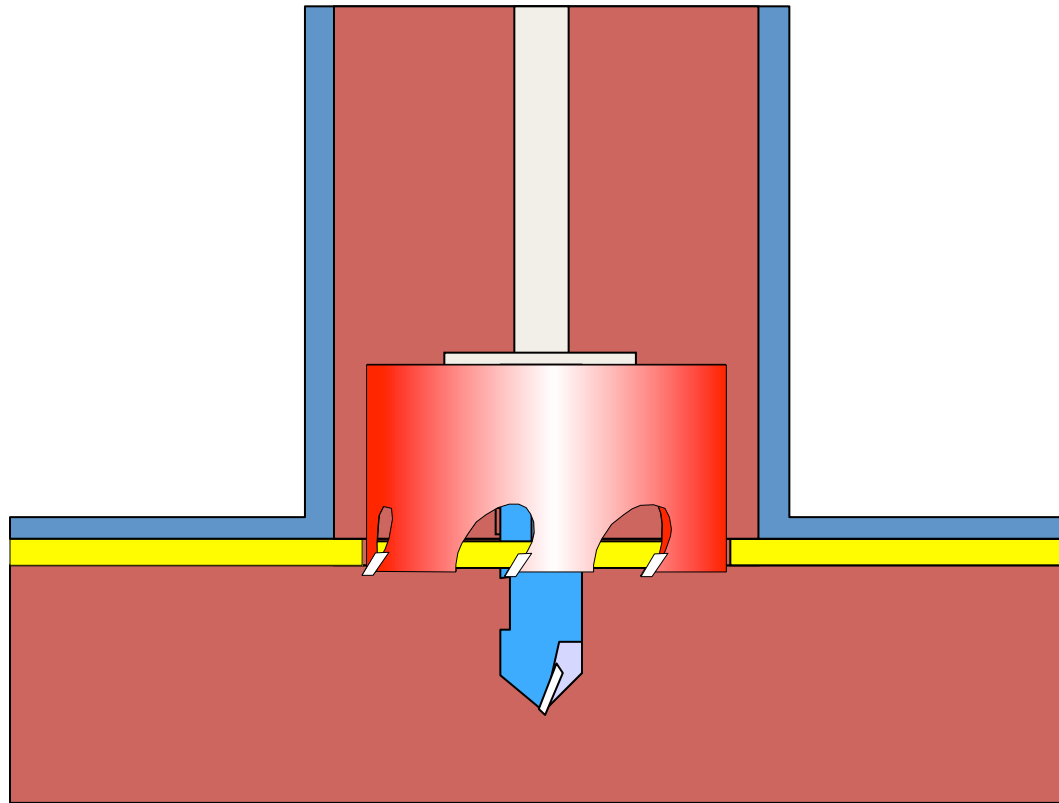
**Coupon
and cutter
are
withdrawn
with
the coupon
or cut out
retained by
the u-wires.**

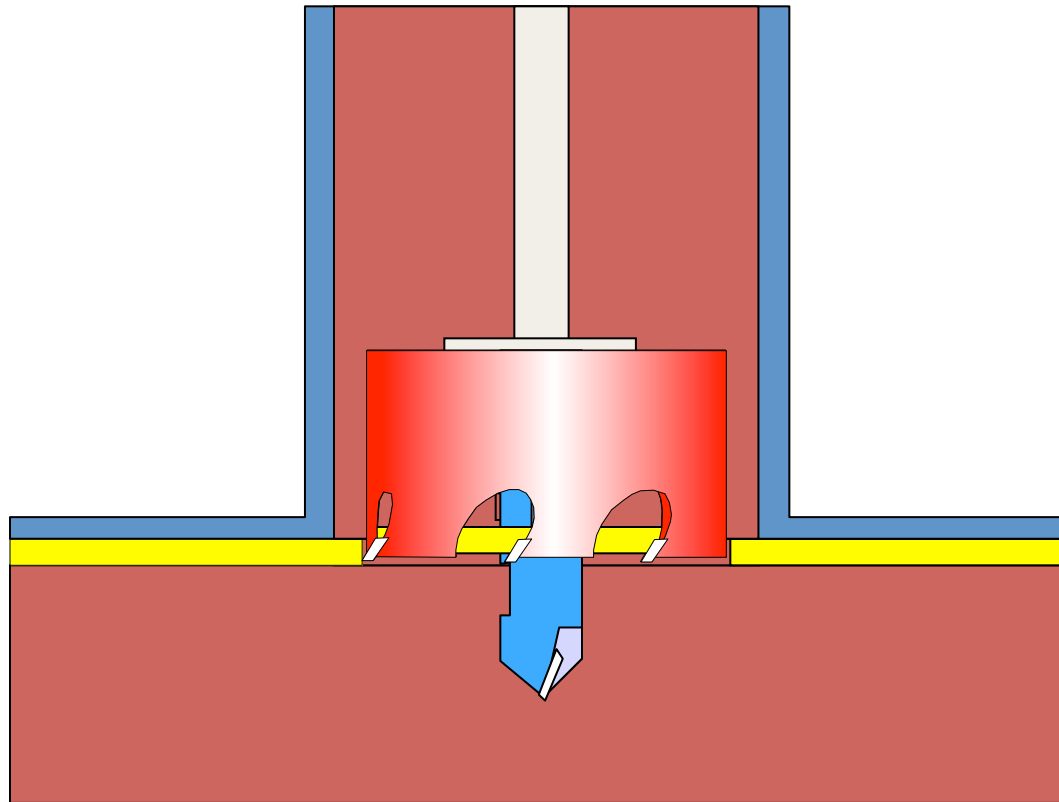


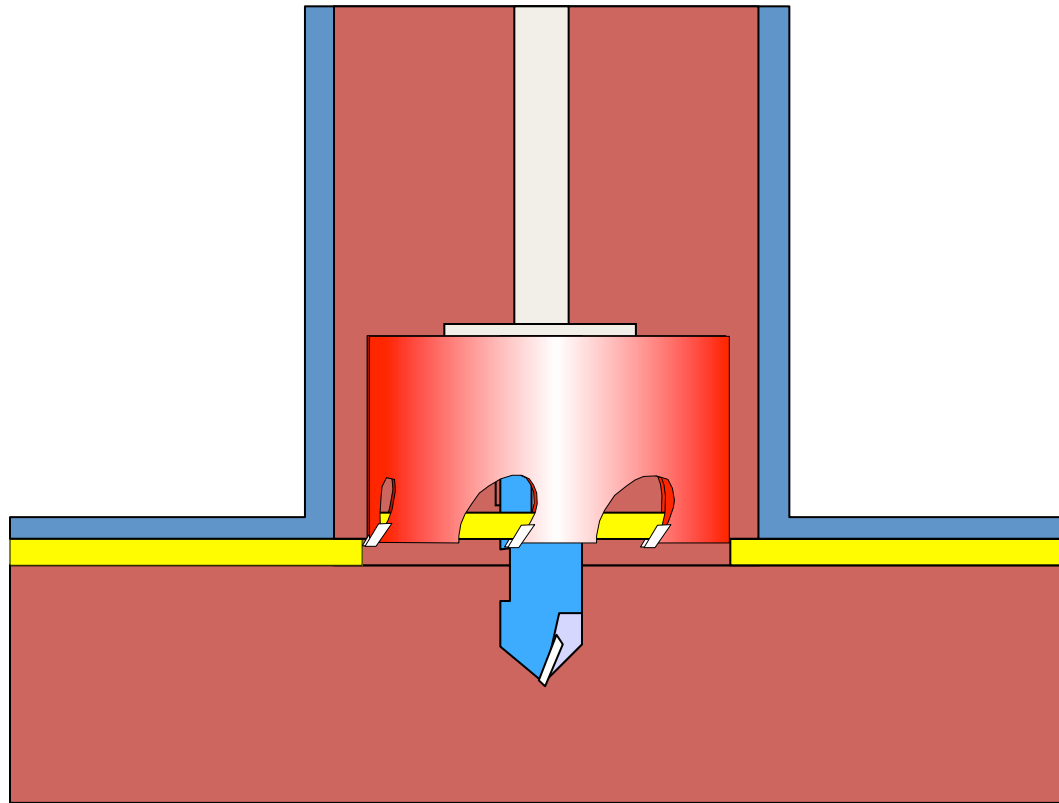


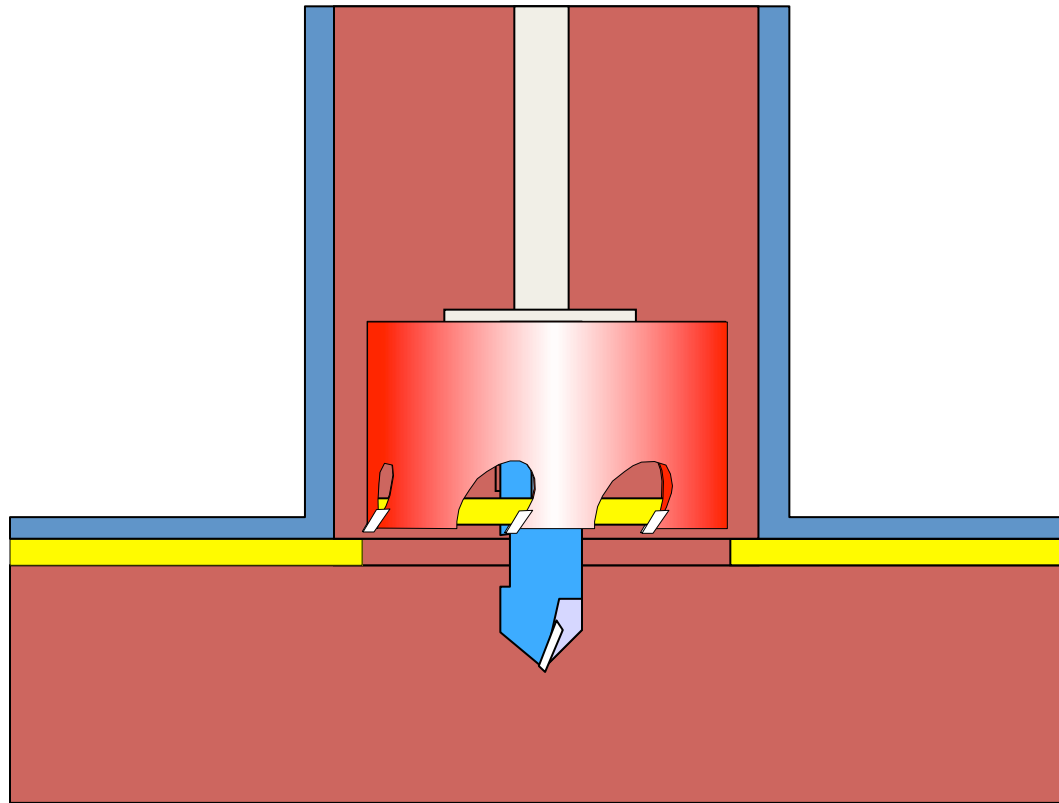


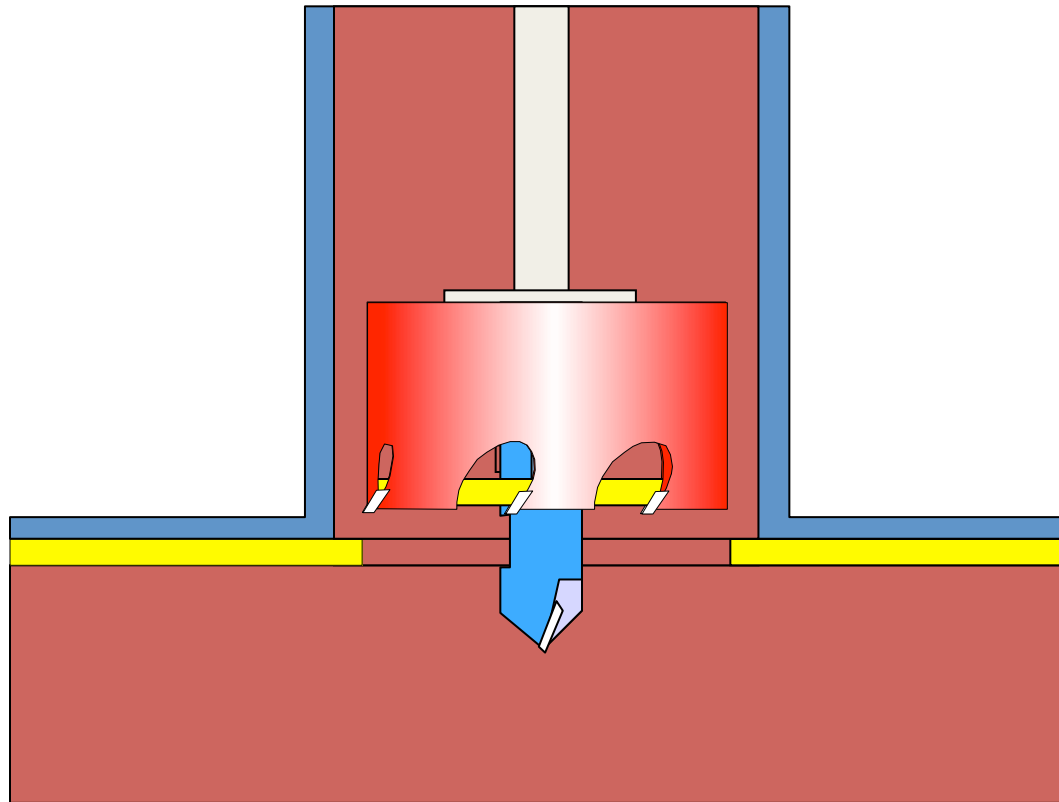


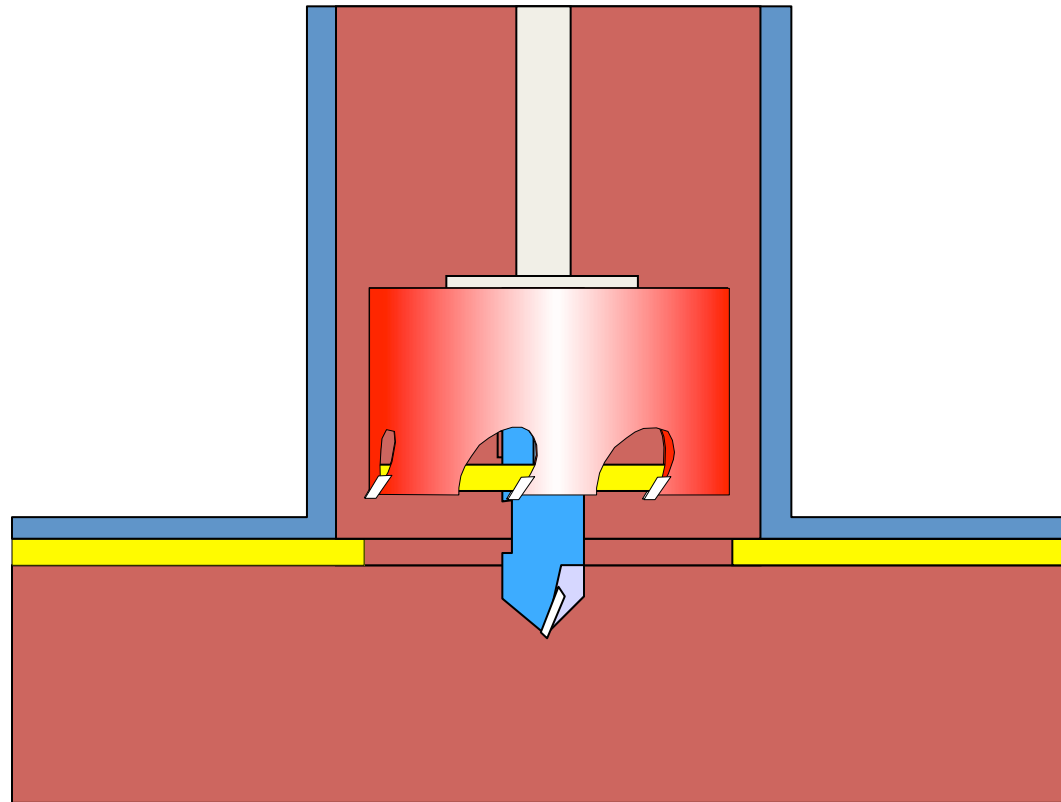


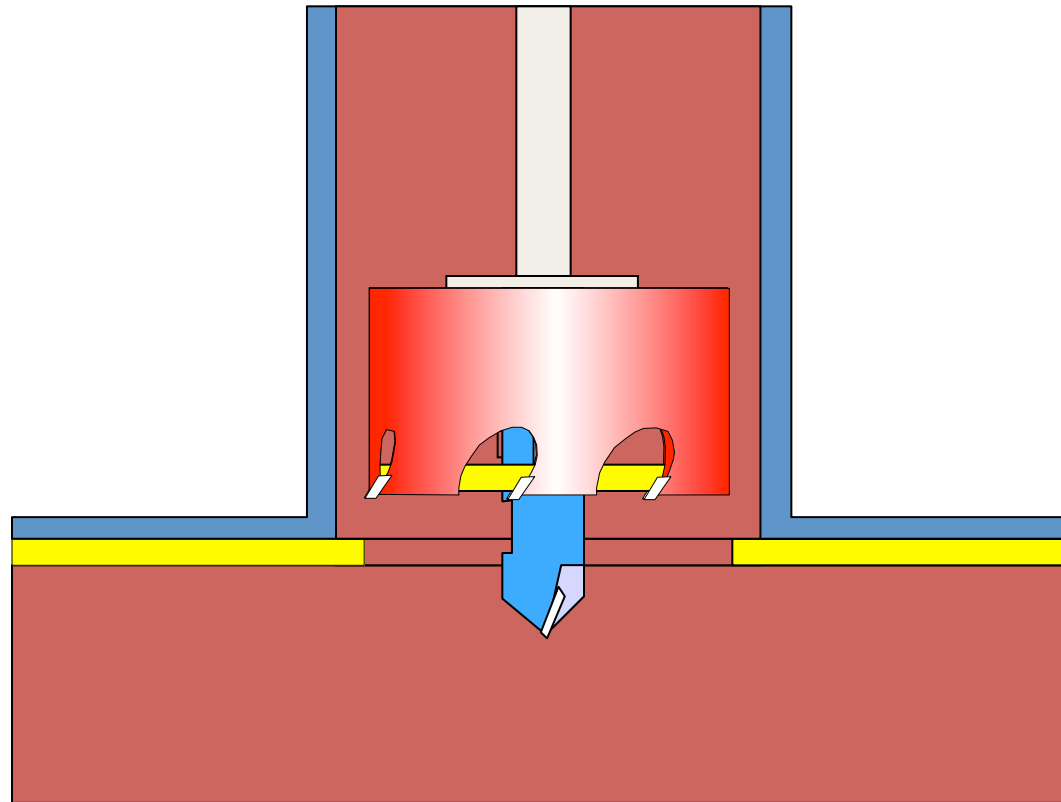


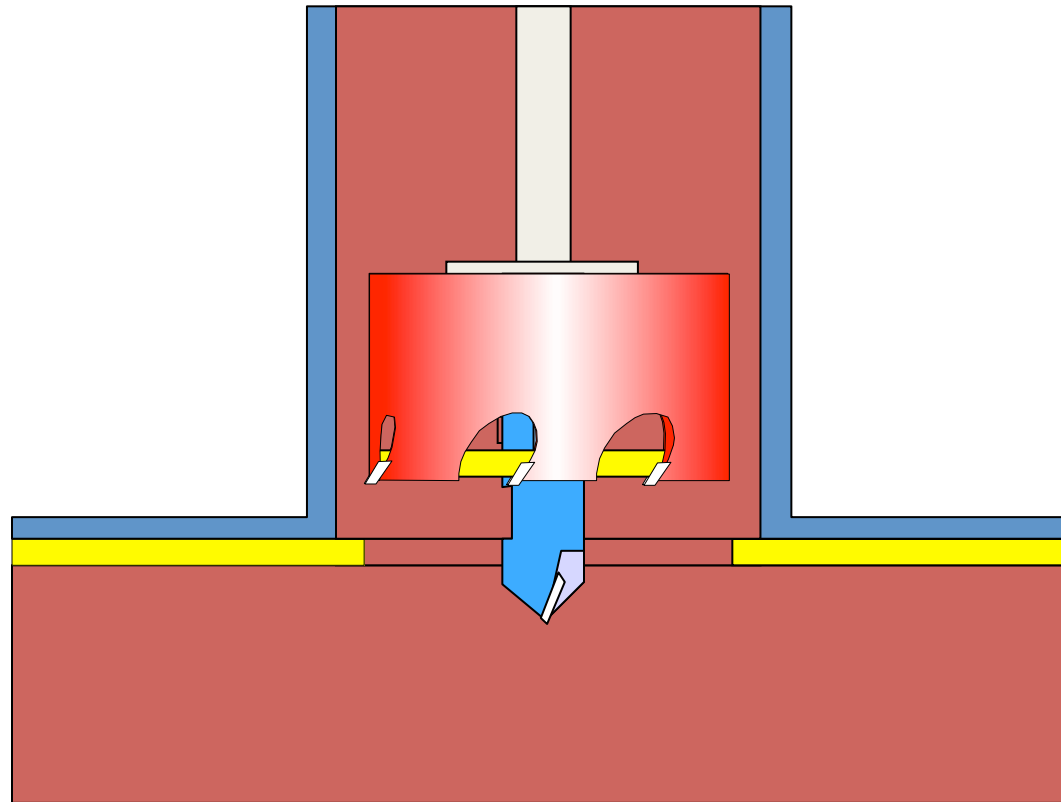


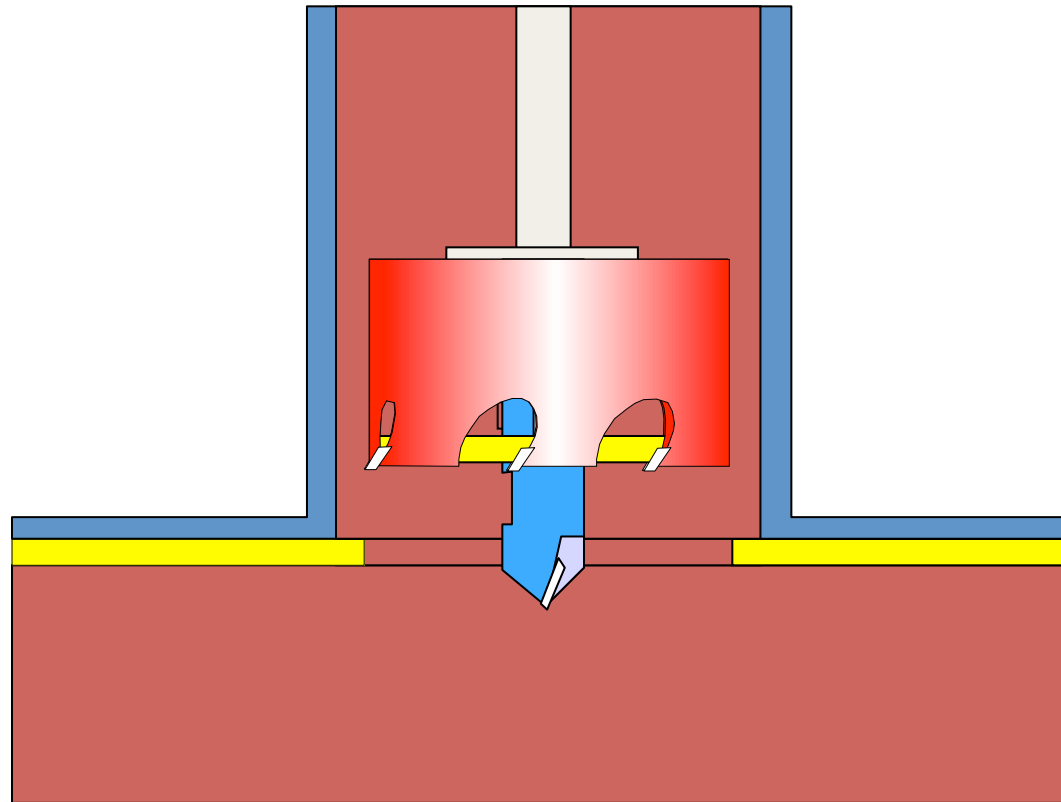


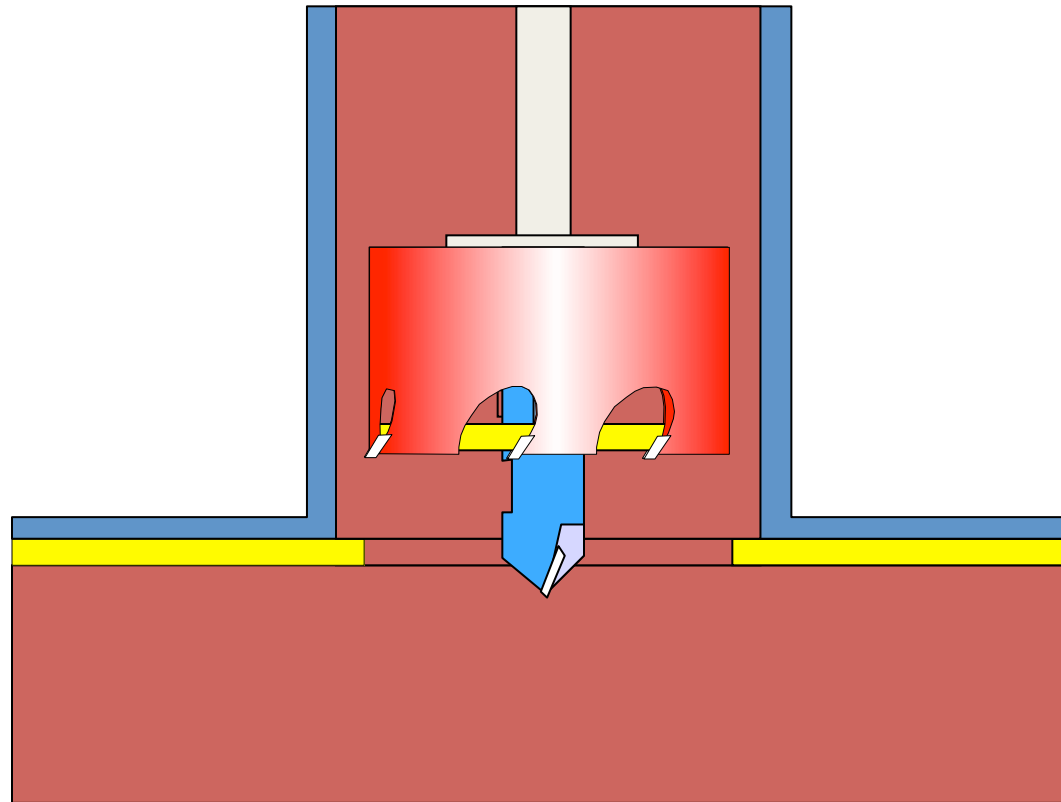


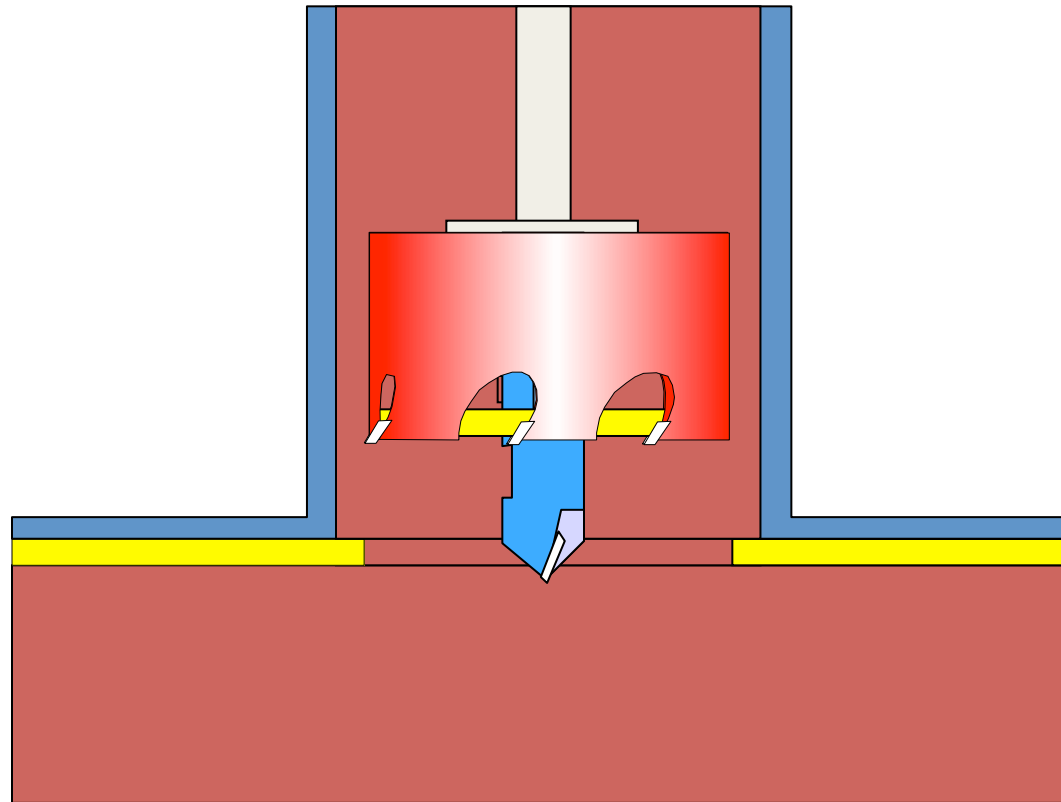


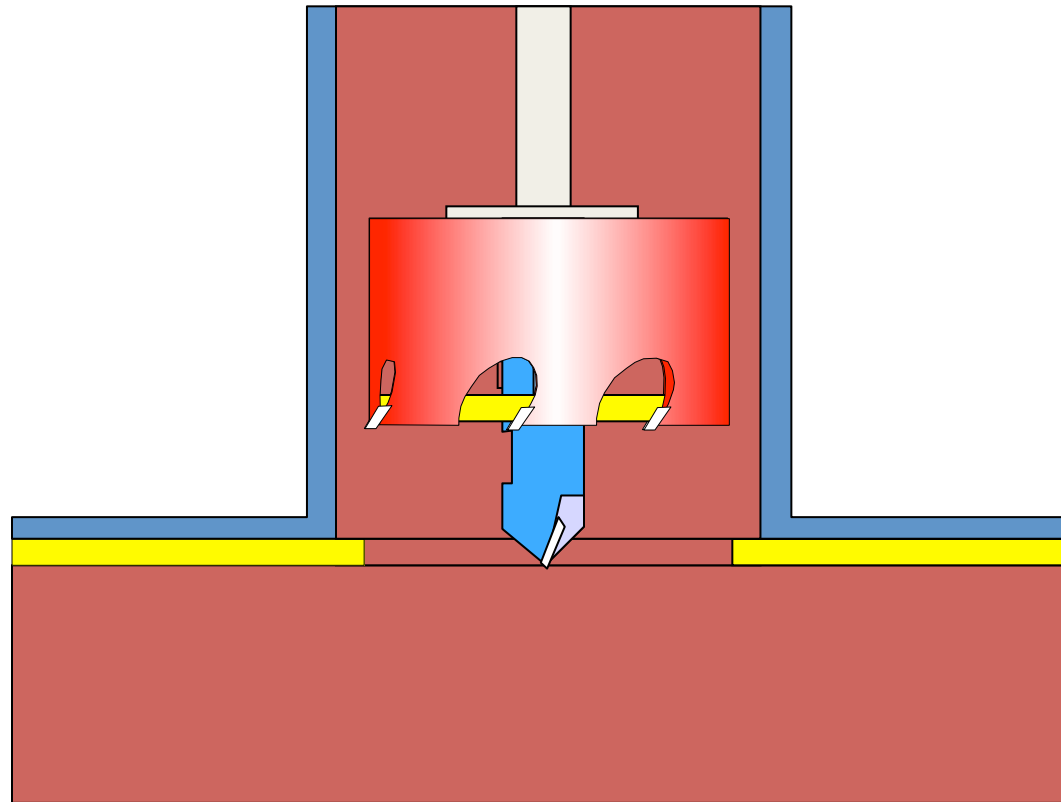


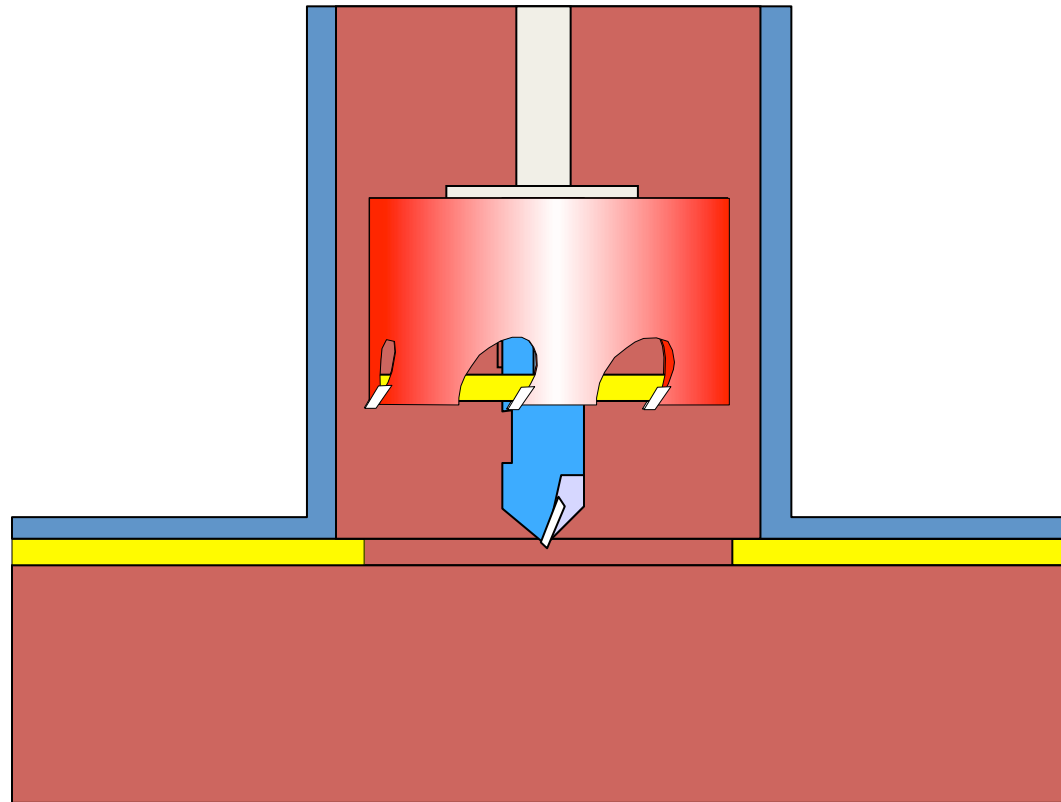


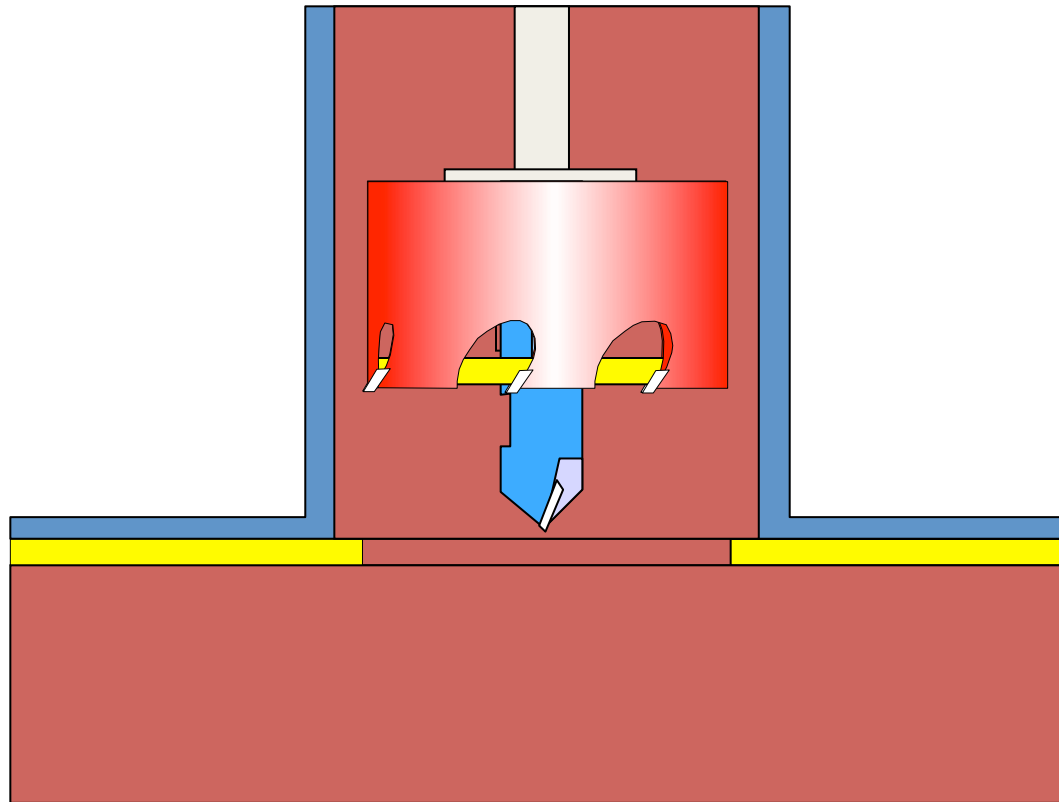


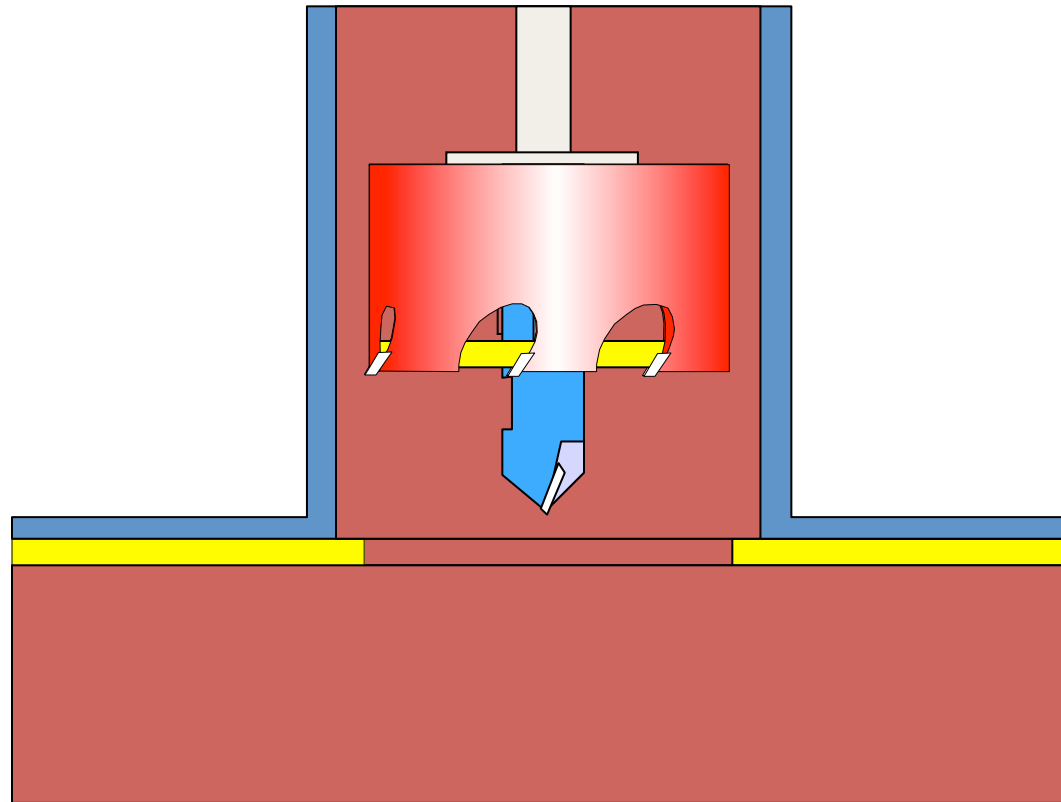


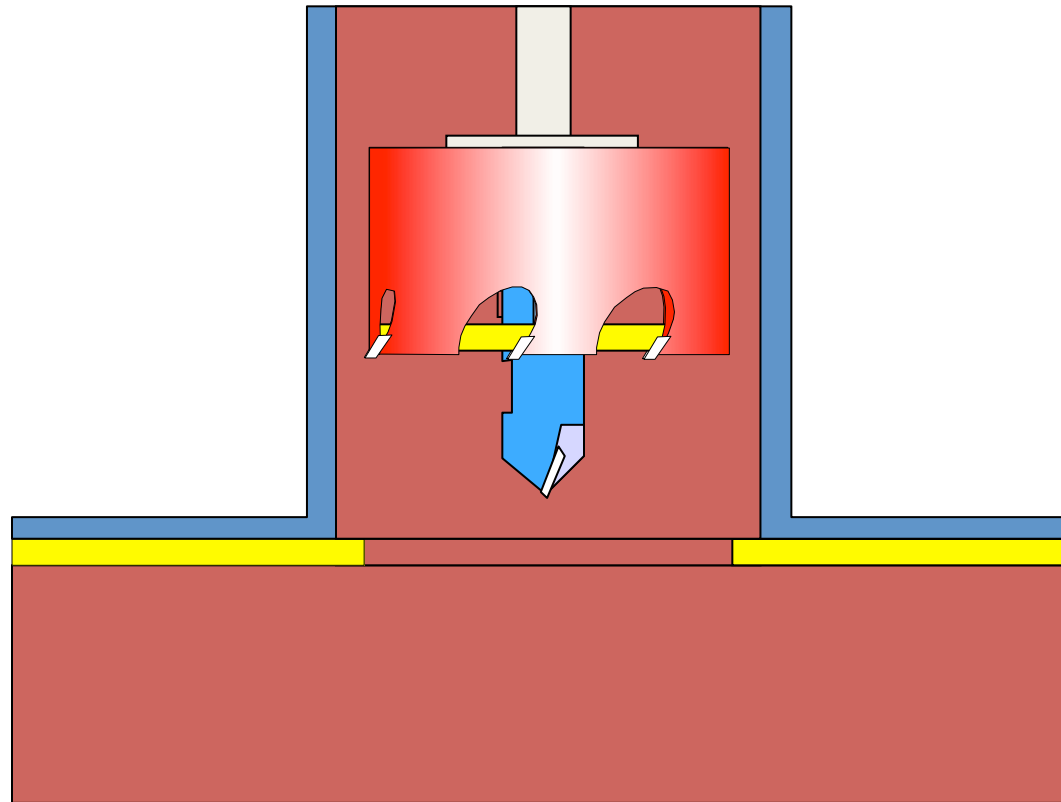






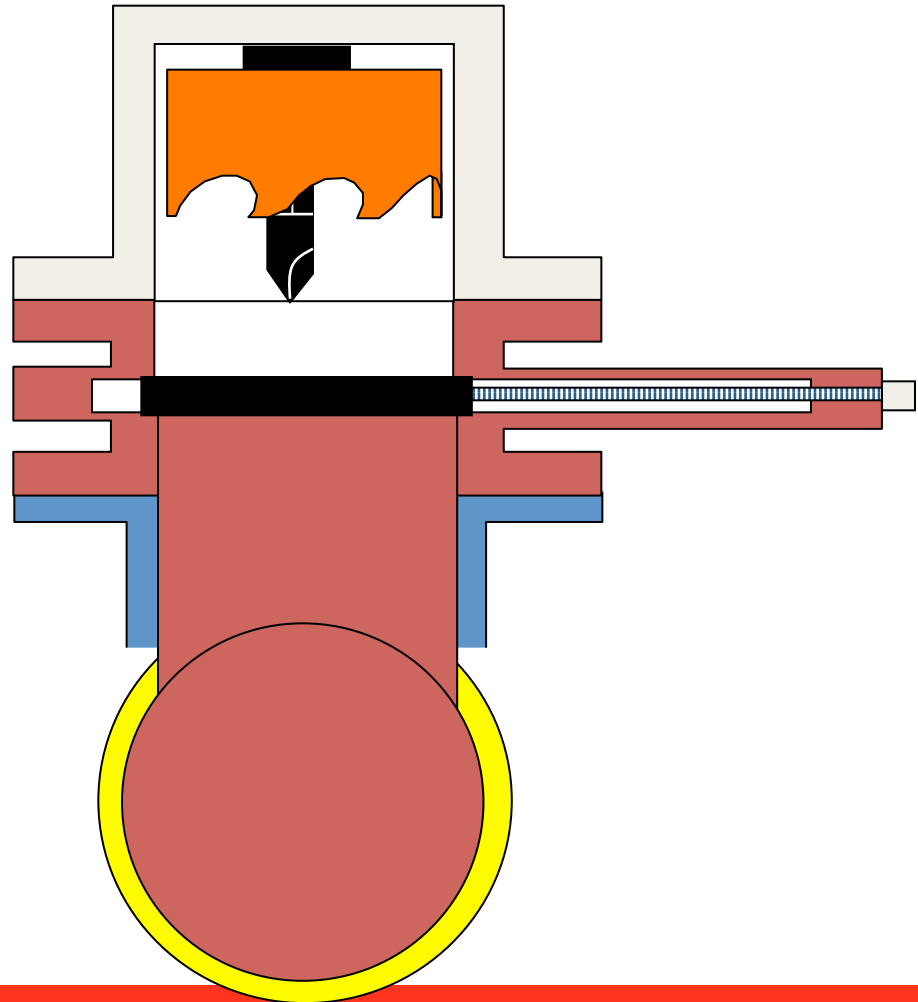




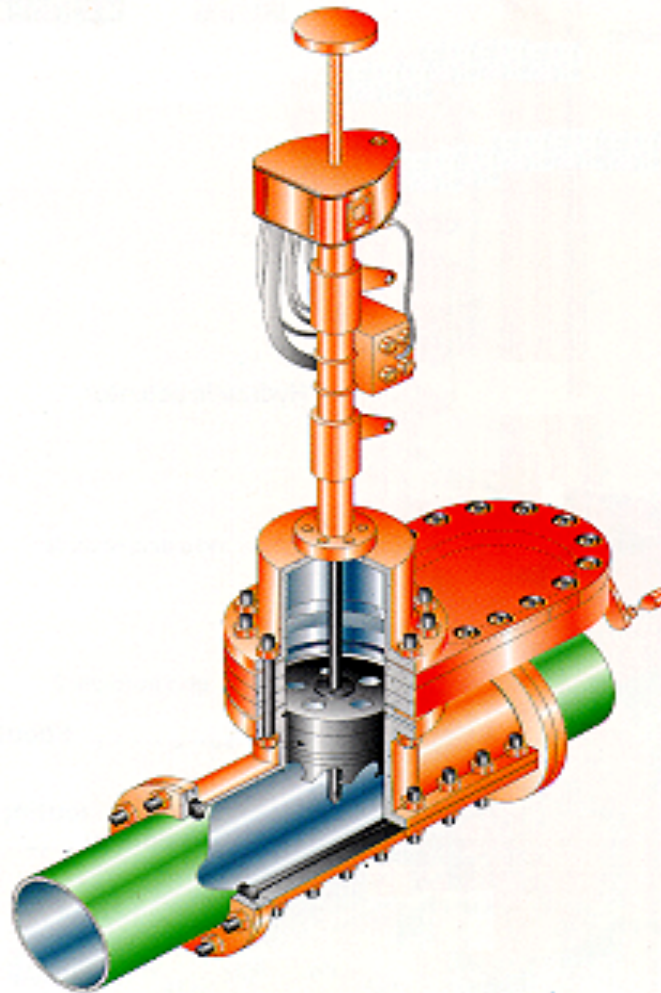


Step 8

The tapping valve is then closed and the machine can be removed.



Typical Hot Tapping Assembly.



How do we retain the Coupon?

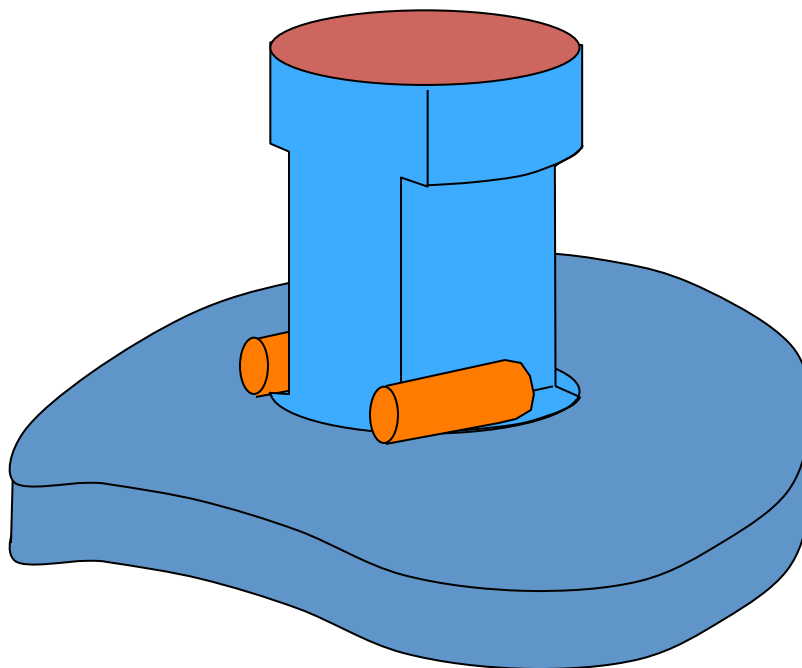
Standard Option - U-wires

Pilot drill has u-wires which prevent the coupon from falling into the line.

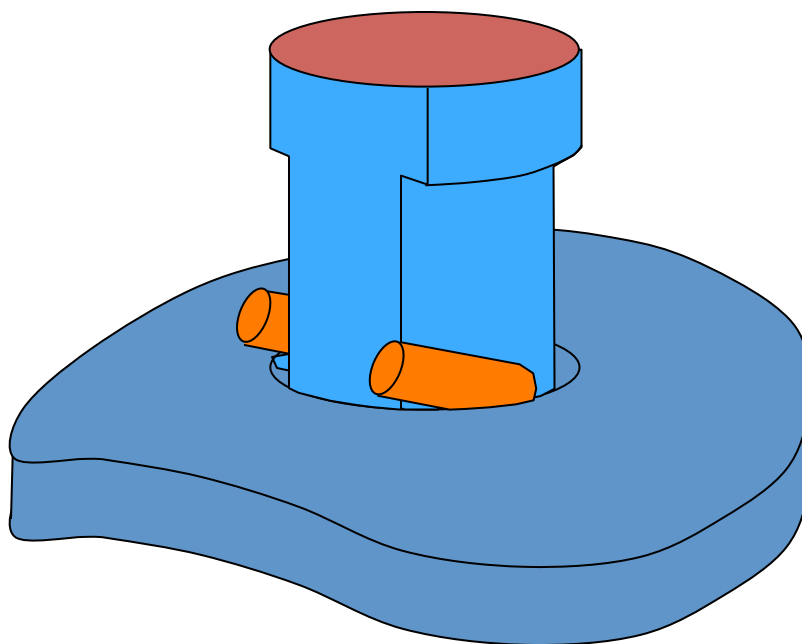
This method is suitable for the vast majority of hot taps.

- Limits are:-
 - gas velocities of up to 10 m/s (20 mph)
 - liquid velocities of up to 5 m/s (10 mph)

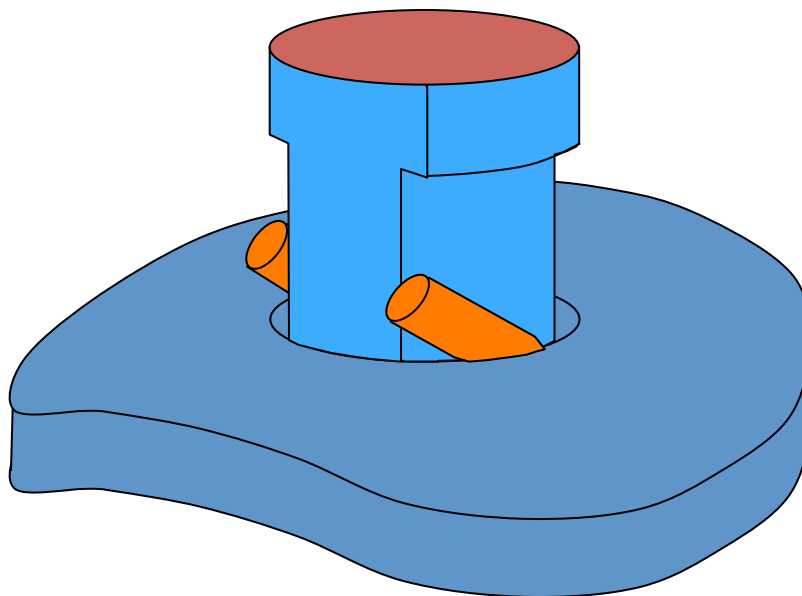
Coupon Catcher in Operation



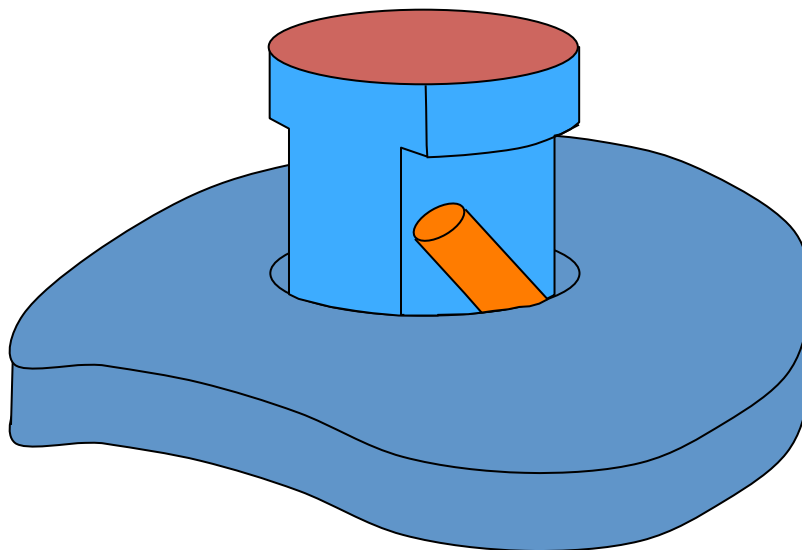
Coupon Catcher in Operation



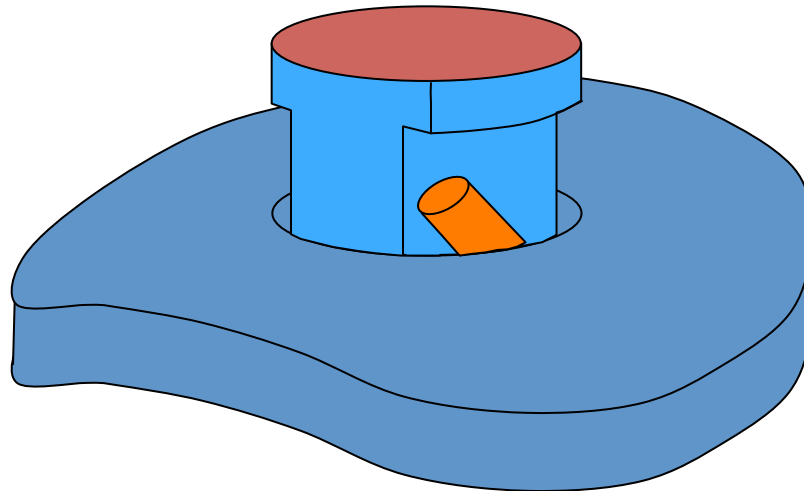
Coupon Catcher in Operation



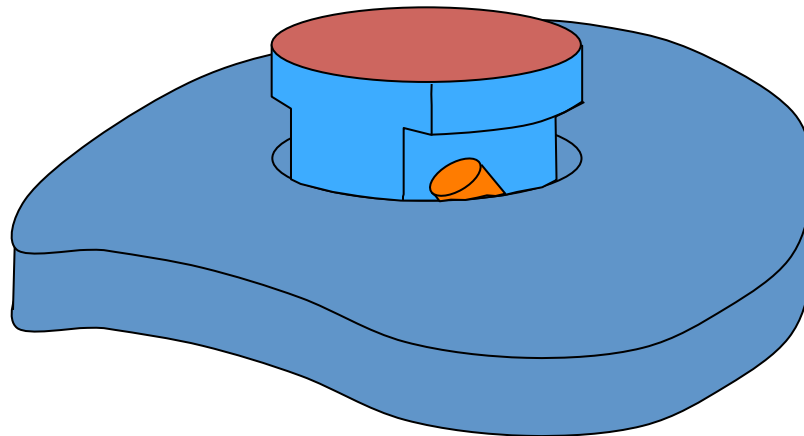
Coupon Catcher in Operation



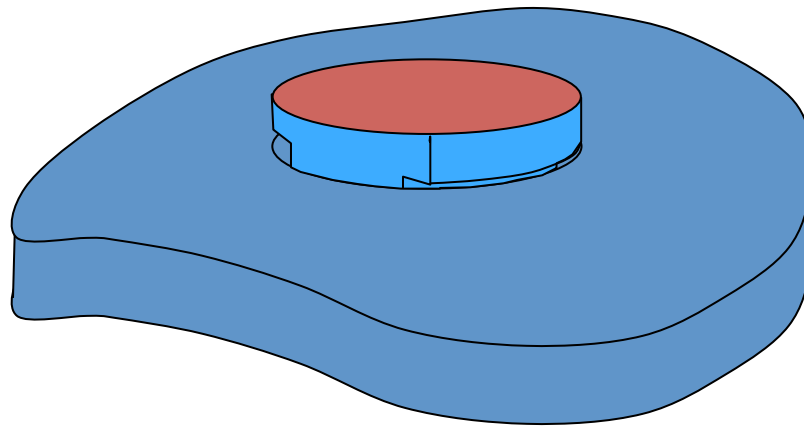
Coupon Catcher in Operation



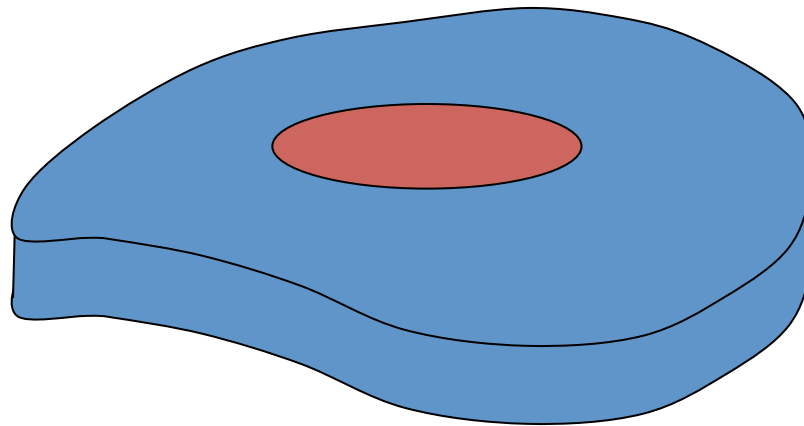
Coupon Catcher in Operation



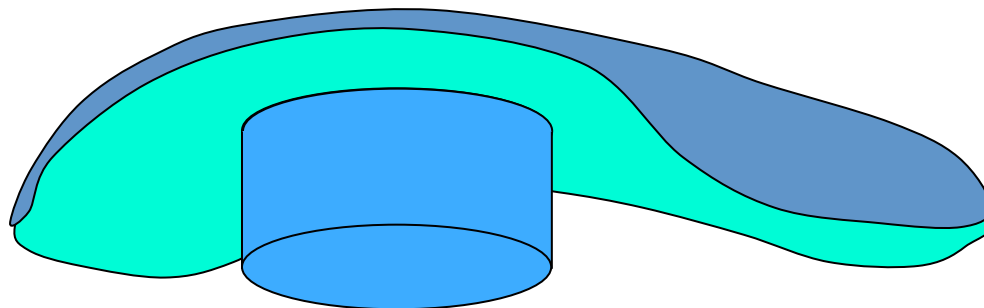
Coupon Catcher in Operation



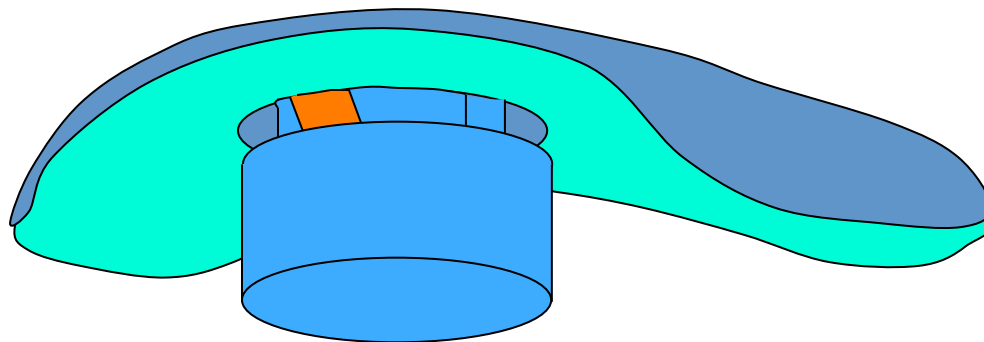
Coupon Catcher in Operation



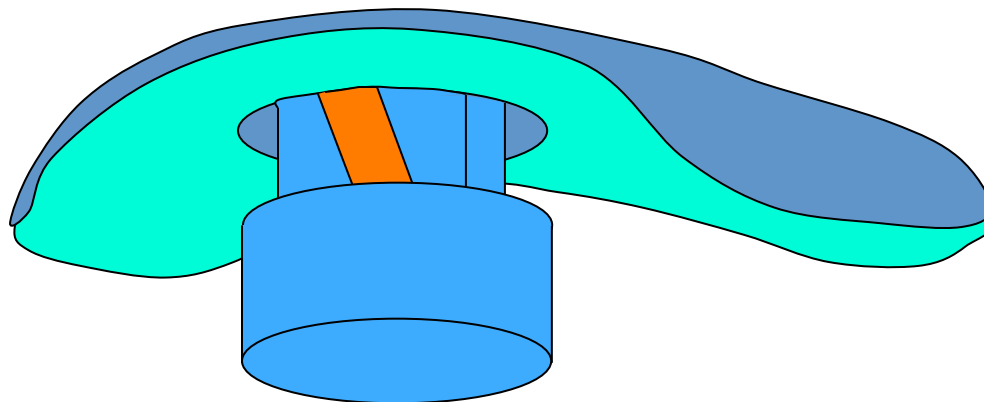
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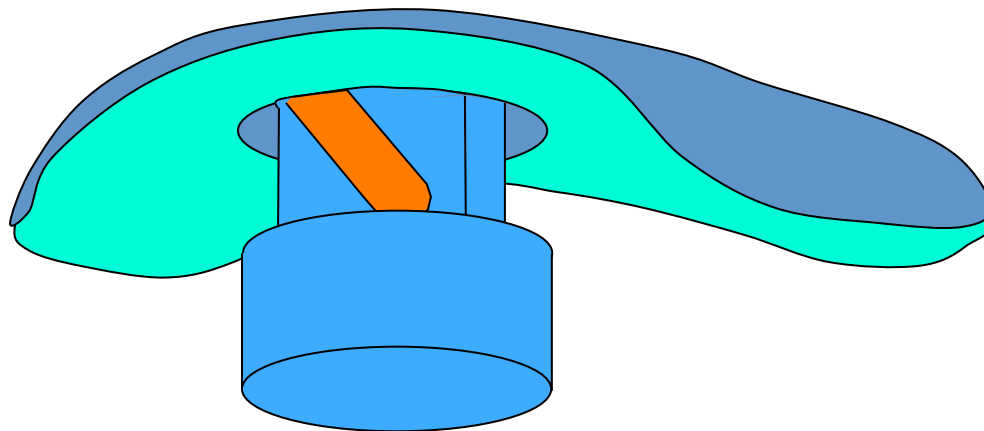
Coupon Catcher in Operation



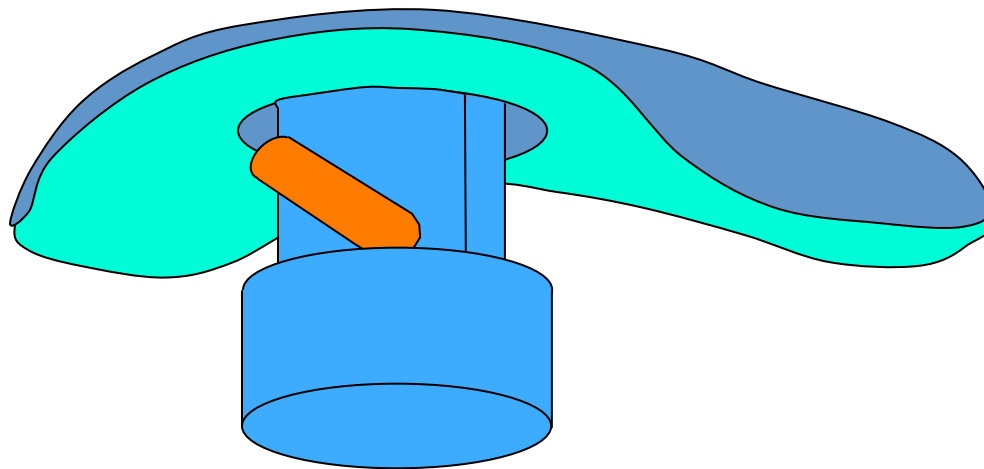
Coupon Catcher in Operation



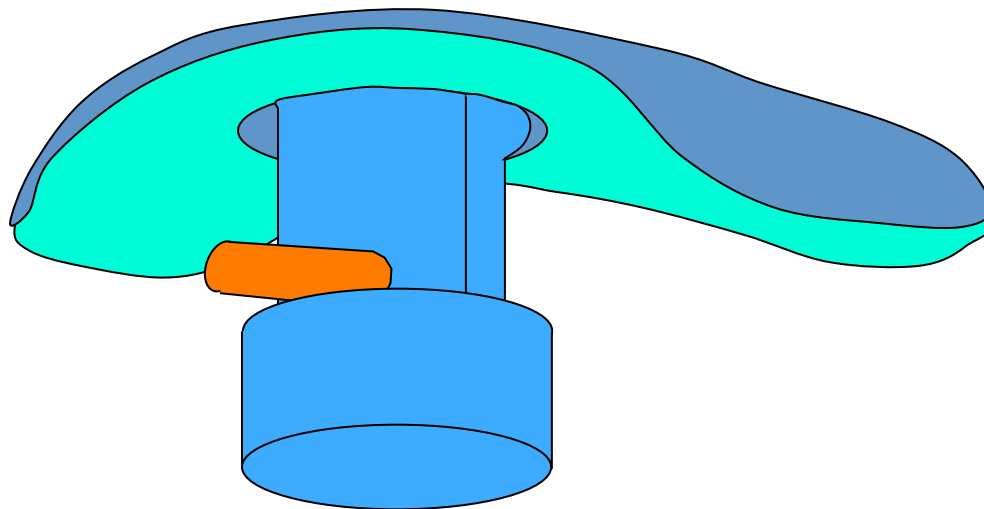
Coupon Catcher in Operation



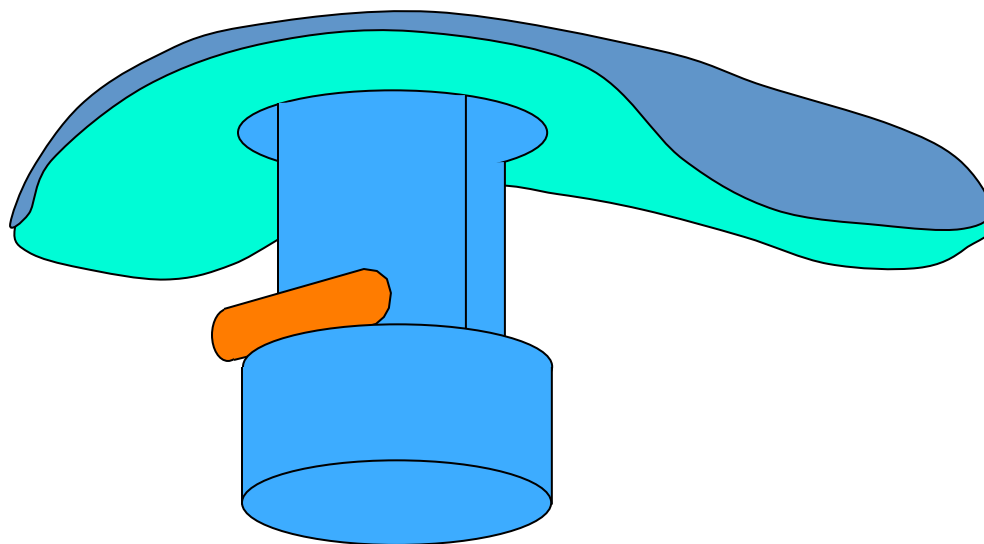
Coupon Catcher in Operation



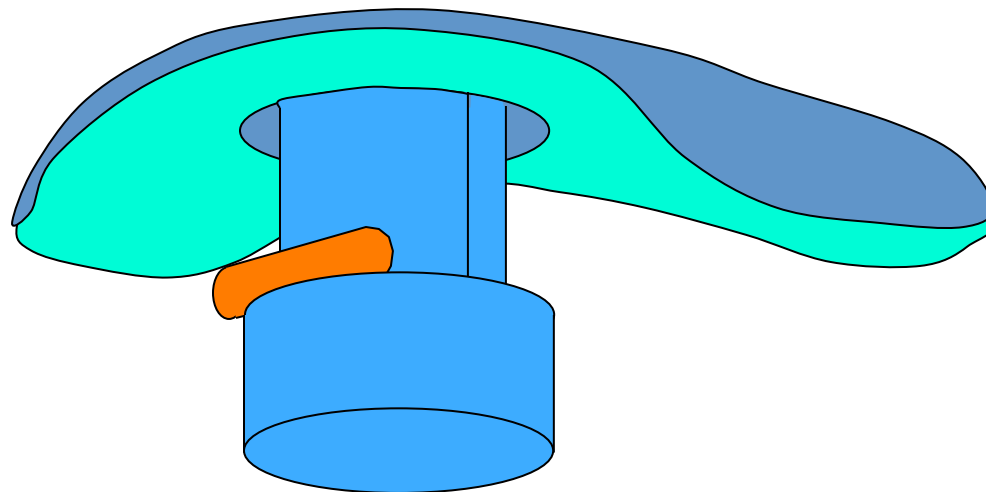
Coupon Catcher in Operation



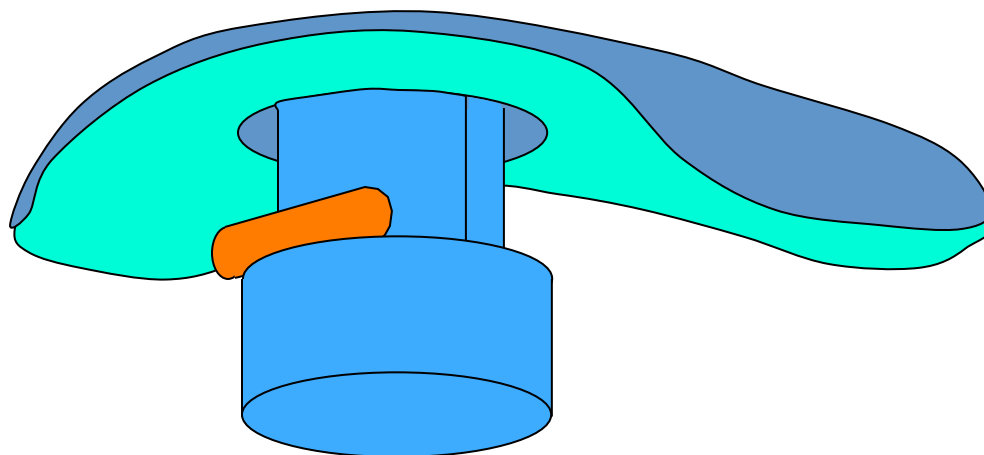
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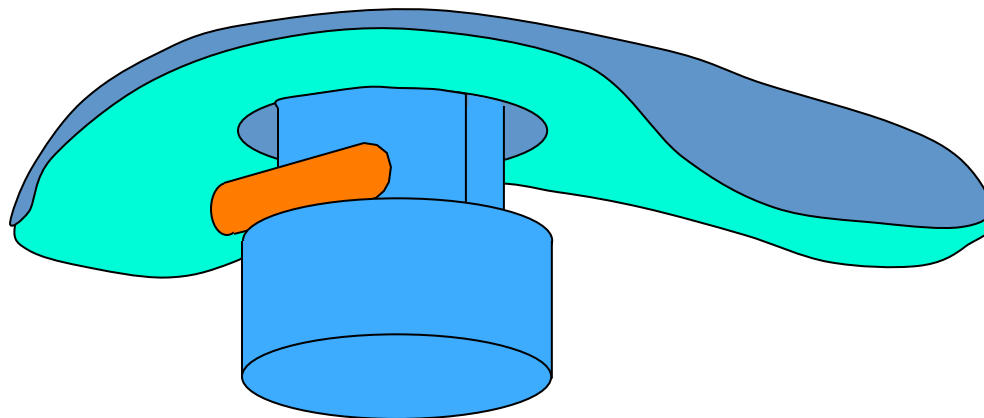
Coupon Catcher in Operation



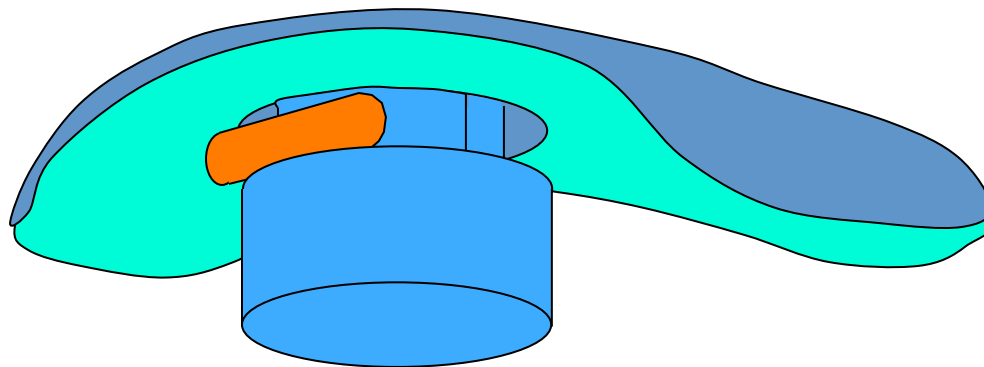
Coupon Catcher in Operation



Coupon Catcher in Operation

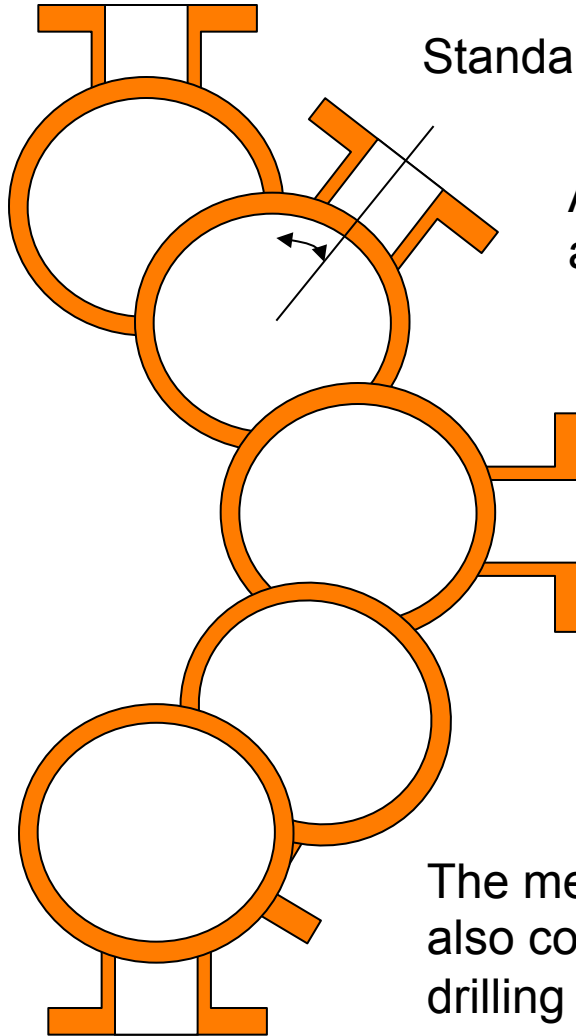


Coupon Catcher in Operation



**Standard
cutter
with pilot
drill and
coupon.**





Standard vertical tap - no unusual problems

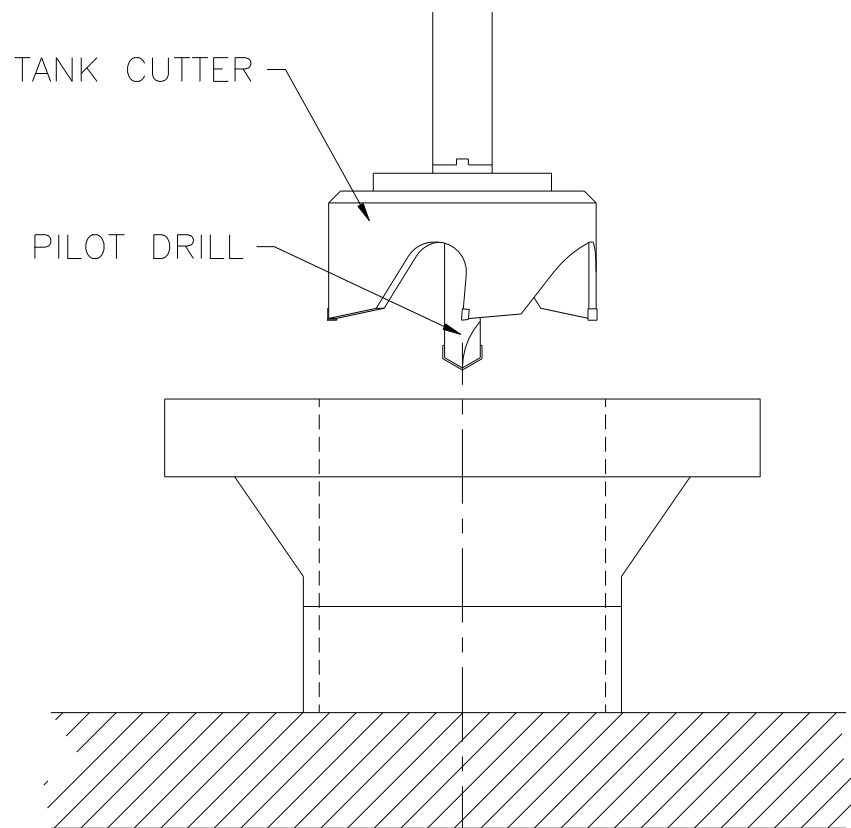
Angled vertical tap - no problems for angles less than 45 degrees

As the angle of tap rotates around there becomes more chance of the swarf from the tap coming back towards the valve and the tapping machine adapter resulting in problems closing the valve and with drawing the cutter fully.

The measuring rod will tend to fall out. It is also considerably harder to install the drilling machine into position.

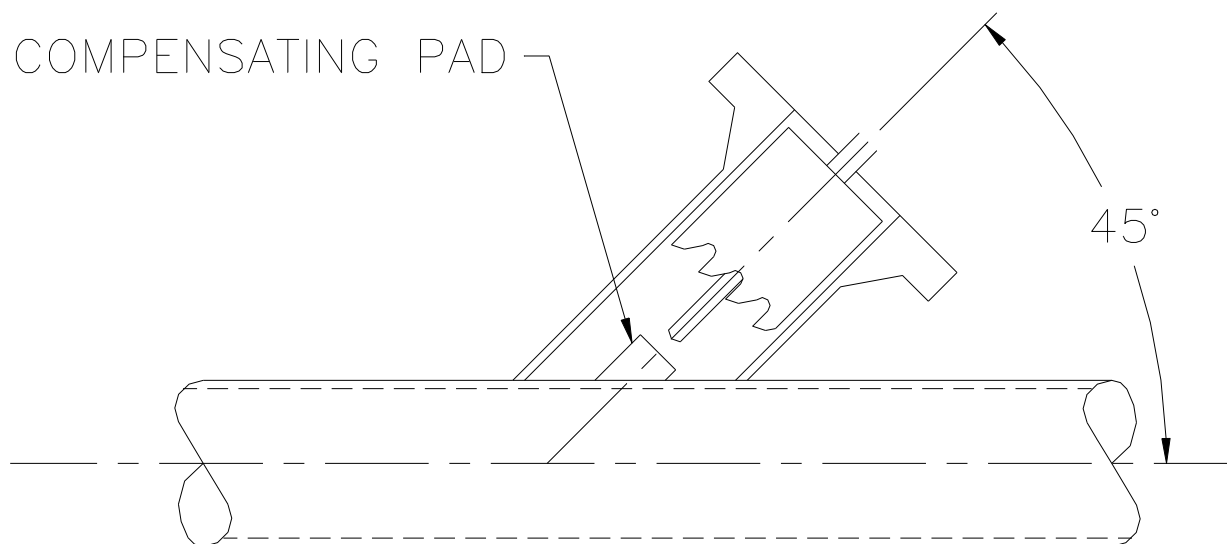
Non-standard Hot Taps

Tank Tops



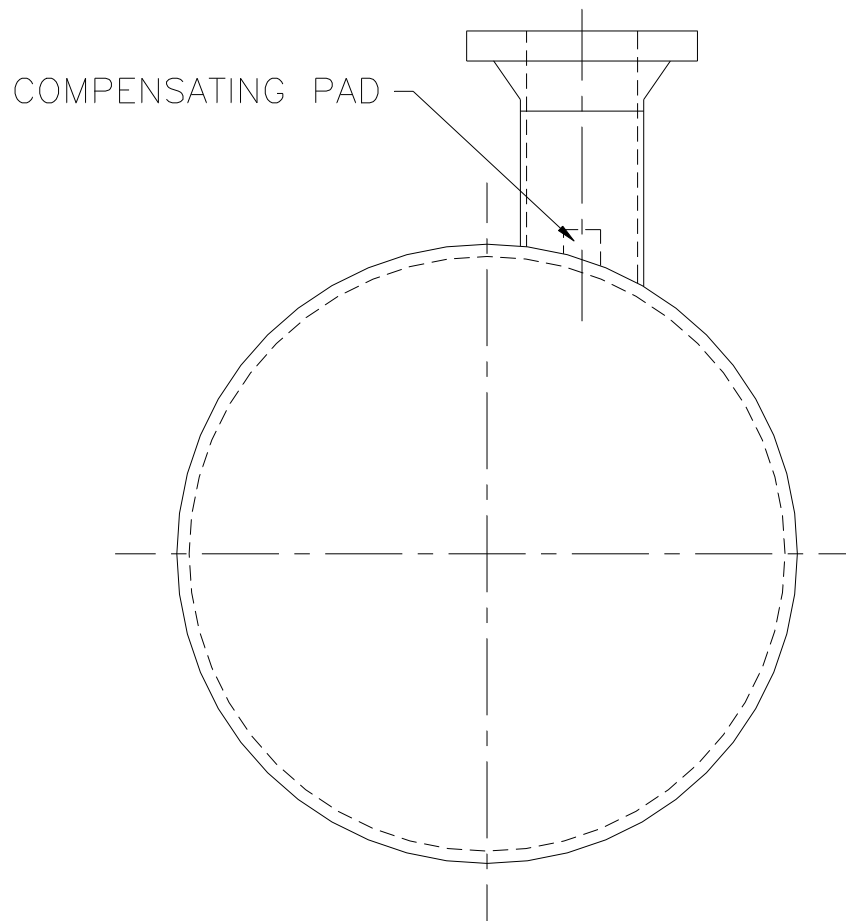
Non-standard Hot Taps

**Lateral
or
Angled
Taps**



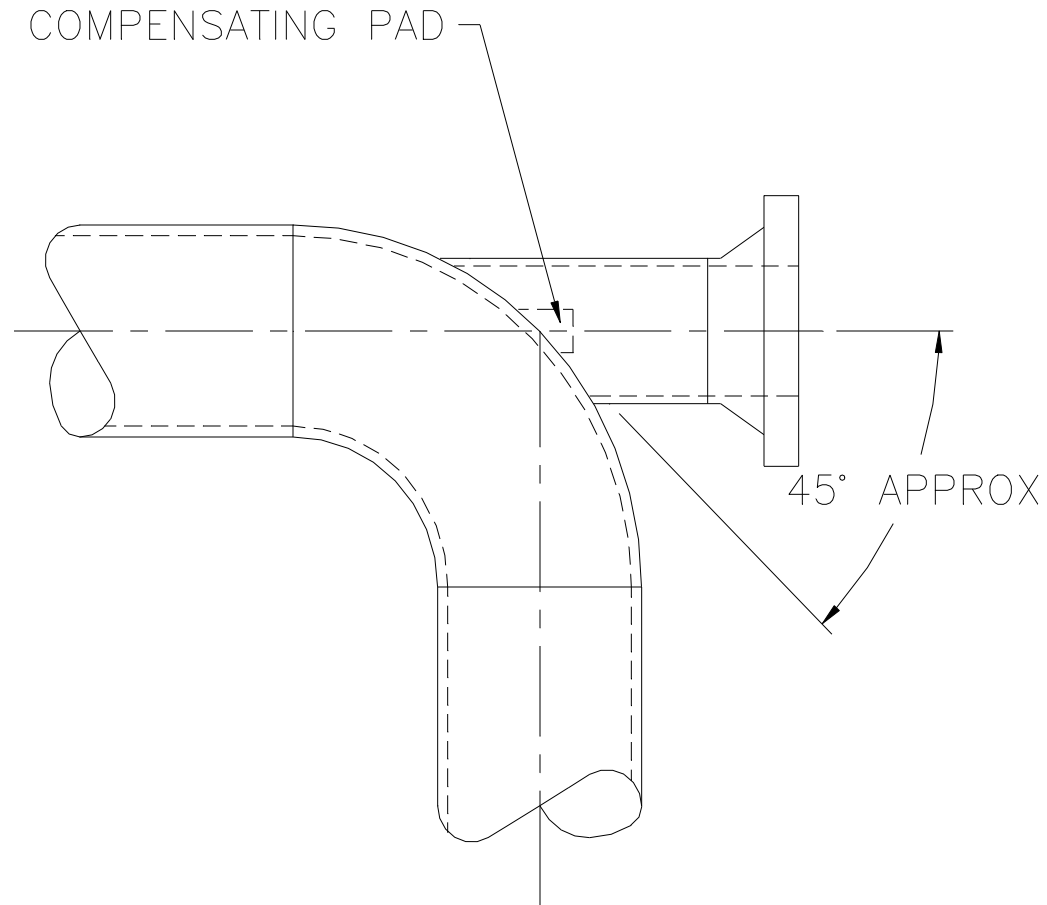
Non-standard Hot Taps

Hillside Taps



Non-standard Hot Taps

Elbow Taps



Limitations

Maximum Pressure

- ❖ Equipment is rated to 1440 PSI (100 bar) @ 100°F (38°C)
- ❖ Pressures above this can be hot tapped, specialist procedures & equipment required (Refer to Kendal Office)

Maximum Temperature

- ❖ Equipment is rated to 700°F (371°C) @ 700 PSI (48 Bar)

What information is required?

Line Details

- ❖ Nominal size
- ❖ Wall thickness
- ❖ Design parameters –contents, pressure & temperature
- ❖ Operating conditions - if different

Branch Details

- ❖ Nominal size
- ❖ Wall thickness
- ❖ Length
- ❖ Flange/interface specification
- ❖ Clearance space for hot tapping machine

Valve Details

- ❖ Valve type - e.g. ball, gate.
- ❖ Valve bore
- ❖ Overall length

What information is Required?

PRETECT CUSTOMER HOT TAPPING DATA SHEET
Value Through Performance

Customer :	Site Contact:	
Site Address :	Tel:	
	Fax:	
Are Hot Taps for Probes? ☐ If Yes, what is maximum diameter of probe:		
A) Line Details 1. Line Size 2. Wall Thickness 3. Line Material 4. Seamless/Seamed/Spiral Wound 5. Contents 6. If Sour Service, advise H2S ppm 7. Design Pressure 8. Operating Pressure 9. Design Temperature 10. Operating Temperature 11. Flow Rate (in m/s) 12. Orientation of Pipe 13. Line Pluggable (Yes/No) 14. Pipe Coating/Unling - Type & Thickness	B) Branch Details 1. Branch Size 2. Branch Wall Thickness 3. Flange Spec / Rating - RF or RTJ 4. Branch Length 5. Clearance beyond Valve 6. Above/Below Ground Level 7. Orientation of Tap C) Valve Details 1. Valve Type 2. Valve Length 3. Valve Face to Top of Gate 4. Minimum Bore D) General Details 1. Dimensions from Top of Parent Pipe to Top Face of Valve 2. Minimum bore of Branch or Valve whichever is smaller	
Signed:		Date:

PRETECT HOT TAPPING/ LINE PLUGGING FITTING DATA SHEET
Value Through Performance

Customer :	Site Contact:	
Site Address :	Tel:	
	Fax:	
* TYPE OF FITTING *		
Size Fitting	Qty Required	
Flange Rating:	PN 16 ☐ 150 ☐ 300 ☐ 600 ☐ Other ☐ Please Specify:	
Flange Facing:	RF ☐ RTJ ☐	
Construction of Fitting:	Full Encirclement ☐ Nozzle/Weldolet ☐ Mechanical ☐	
	Other ☐ Specify:	
Type of Fitting Required:	Hot Tap ☐ Line stop/ Closures ☐ 3-way Closures Tee* ☐	
	Other ☐ Specify:	
*If 3-Way Tee	Wall Thickness of pipework attaching to butt weld outlet is:	
Is the line Pluggable:	Yes ☐ No ☐	
Type of Plug if applicable	Std Plug ☐ Scarfed Plug ☐ Flow through Guide Bar Plug ☐	
Special Notes:		
MAIN PIPELINE DETAILS		
Material Grade:	Design Pressure:	
Line Content:	Design Temperature (Min):	
Wall Thickness:	Design Temperature (Max):	
Outer Diameter:	Orientation of Pipework:	
Material certification:	Orientation of Tapping:	
MANUFACTURING DETAILS		
Design/ Manufacturing Code	ASME B31.3 ☐ ASME B31.4/6 ☐ T/SP/IF/4 ☐	
	Client Specific ☐ Details of Client Specific:	
Design Factor	0.4 ☐ 0.5 ☐ 0.6 ☐ 0.72 ☐	
Is a Corrosion Allowance required	Yes ☐ No ☐ If "yes" please specify: mm	
Gasket Type (if applicable)	CAF (PRETECT Std.) ☐ Other ☐ Please Specify:	
Stud/ Bolt Type (if Applicable)	Studs ASTM A193 B7 & Nuts ASTM A194 - 2H (PRETECT Std.) ☐	
	Other ☐ Please specify:	
Is Hydrostatic Pressure test require	Yes ☐ No ☐	
Is Stress relieving Required?	Yes ☐ No ☐	
Are Materials for Sour Service?	Yes ☐ No ☐	
Should all materials comply with NACE (if for Sour service)	Yes ☐ No ☐	
IS HIC Testing Required? (if for Sour Service)	Yes ☐ No ☐	
Special Notes:		
CUSTOMER COMMENTS/ DESCRIPTION OF WORK SCOPE		

Equipment Preparation

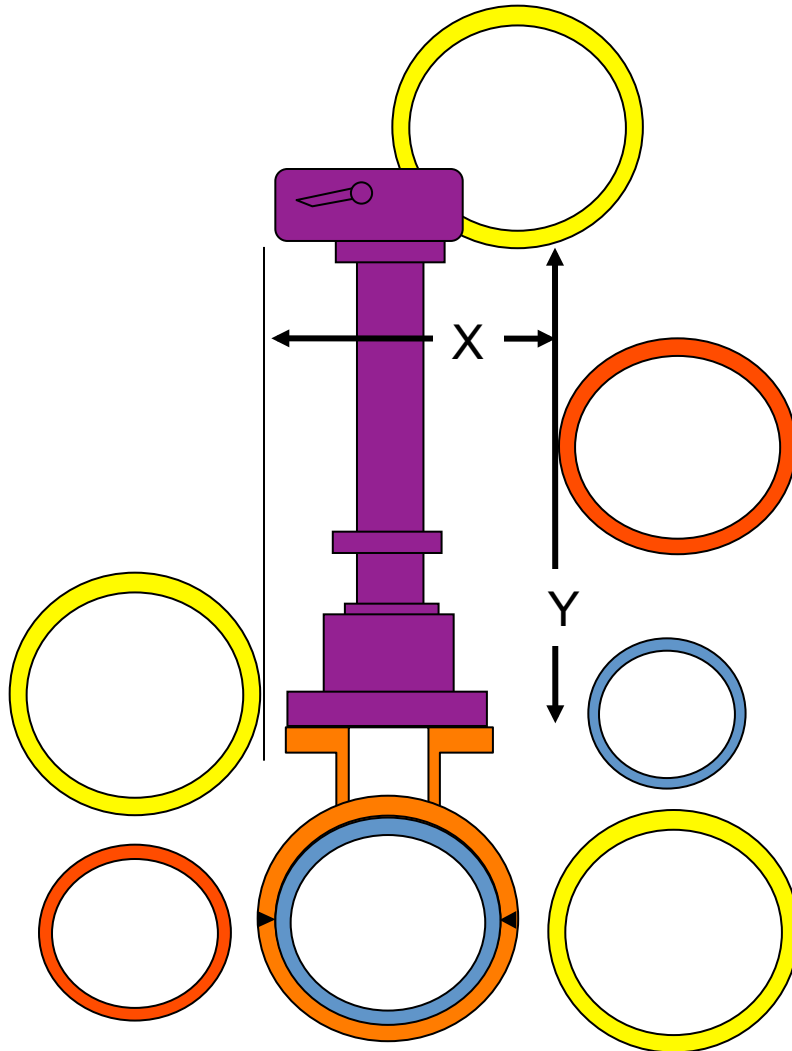
Machine Selection

- ❖ Size of branch to be hot tapped & cutter to be used
- ❖ Size of parent pipe (type of cutter)
- ❖ Wall thickness of parent pipe (power required)
- ❖ Material of parent pipe (cutting material & form)
- ❖ Total combined length of valve & branch (travel)
- ❖ Contents, pressure & temperature (seal suitability)
- ❖ Clearance space for machine

Machine Preparation

- ❖ Valve Adapter
- ❖ Cutter type
- ❖ Pilot drill
- ❖ Cutter Holder

Clearance Required for Hot Tap Machines



NOTE:
Not just X and Y
but how to get
the machine into
position

The End