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MANAV SCHOOL OF ENGINEERING & TECHNOLOGY
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WORKSHOP PRACTICE

SECTION :- TAP&DIES

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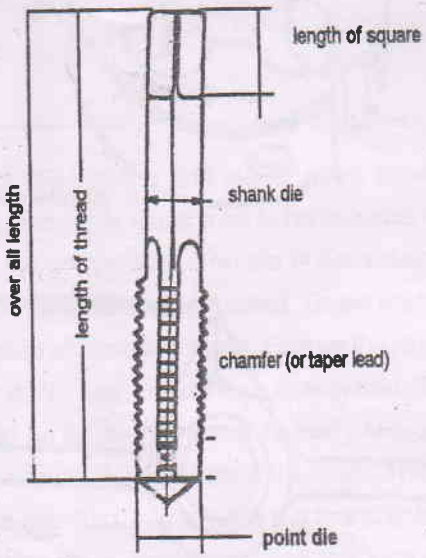
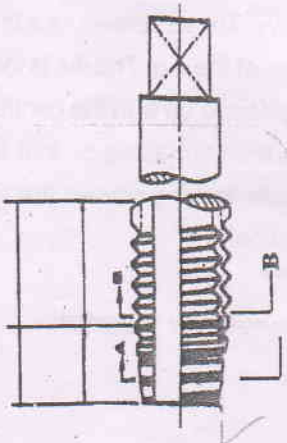
TAPPING
THREAD FORMING
with Taps & Dies

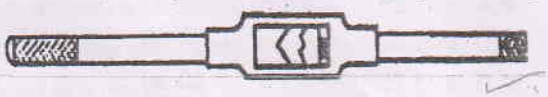
Tapping is the operation of cutting tool known as a tap. Straight-flute hand taps are used. These taps are made from hardened high-speed steel. They are supplied in sets of three taps differ in the length of chamfer at the point known as the leashe one with the longest lead is referred to as the **taper** or **first tap**. The next as the **second** or **intermediate tap**. The third tap known as the **bottoming** or **plug tap**. Tap third has a very short lead. A square head is provided at one end so that the tap can be easily rotated by holding it in a tap wrench.The chuck type of wrench is used for the smaller tap sizes.



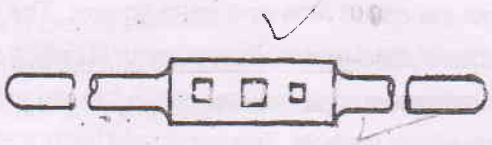
Nomenclature for taps



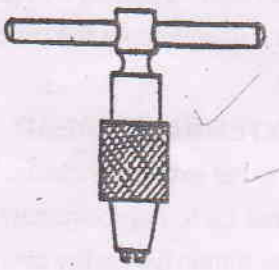
Plug Tap or Bottoming



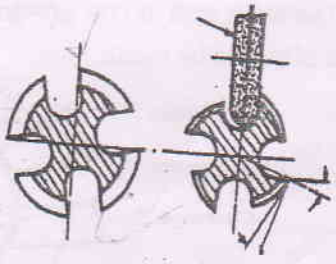
Adjustable tap wrench for medium taps



Solid tap wrench for large taps



Chuck wrench for very small taps



The first stage in tapping is to drill a hole of the correct size. This is known as the tapping size and is normally slightly larger than the root diameter of the thread. The tapping sizes for ISO metric threads are shown in table.

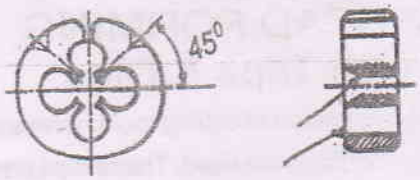
Table Tapping sizes for ISO metric threads

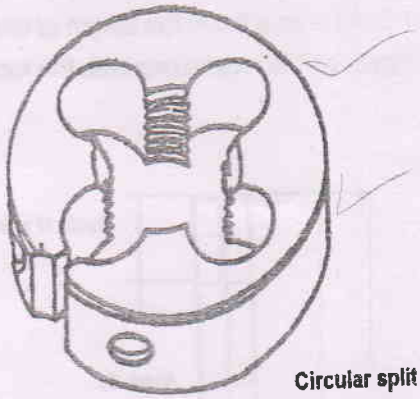
Thread diameter and pitch (mm)	Drill diameter for tapping (mm)
1.6 x 0.35	1.25
2.0 x 0.40	1.60
2.5 x 0.45	2.05
3.0 x 0.50	2.50
4.0 x 0.70	3.30
5.0 x 0.80	4.20
6.0 x 1.00	5.00
8.0 x 1.25	6.80
10.0 x 1.50	8.50
12.0 x 1.75	10.20

Tapping is then started using the tapper or first tap securely held in a tap wrench. The long lead enables it to follow the drilled hole and keep square. The tap is rotated, applying downward pressure until cutting starts. No further pressure is required since the tap will then screw itself into the hole. The tap should be turned back quite often to help clear chip from the flutes. The tap should be withdrawn completely now and then to remove chips formed. Tapping compound should be used for easier cutting and for the production of good-quality threads.

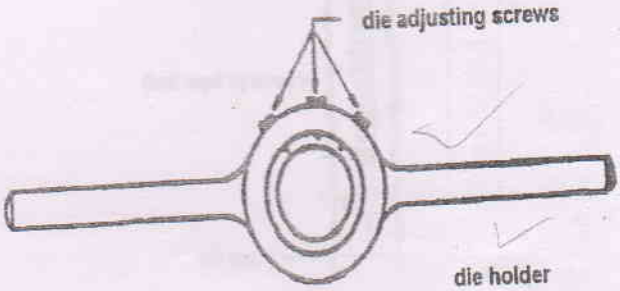
DIES FOR EXTERNAL THREAD

Dies are used to cut external threads. These are available in sizes up to approximately 36 mm thread diameter. The common type is the circular split die.The die is made from high-speed steel hardened and tempered. The die is split at one side to enable small adjustments of size to be made.

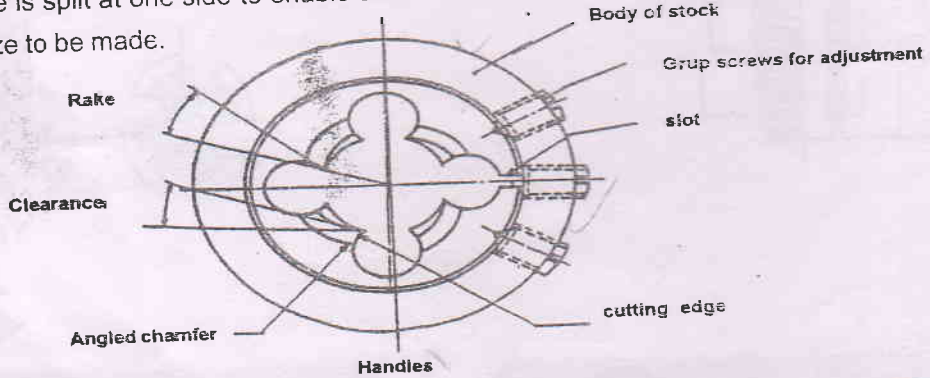


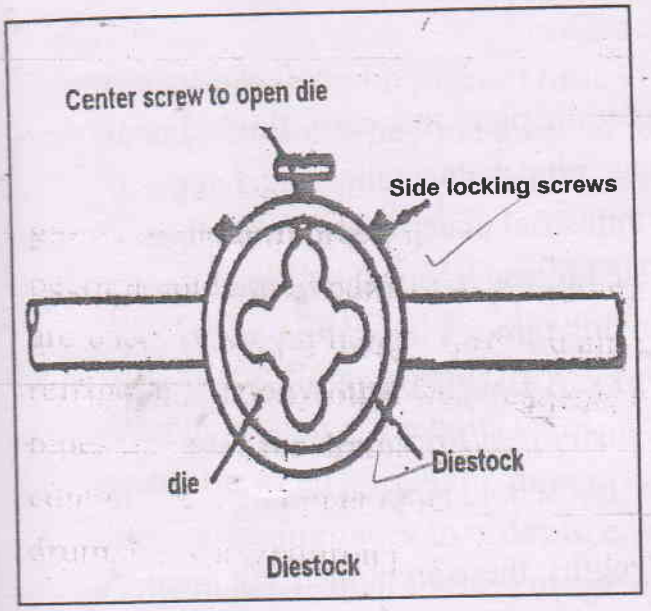


Circular split die



The die is held in a holder known as a die stock. The die stock has a central screw for adjusting the size and two side locking screws. These screws lock in dimples in the outside diameter of the die. The die is inserted in the holder with the split lined up with the central screw. The central screw is then tightened so that the die is expanded. The two side locking screws are tightened to hold the die in position.





Dies have a lead on the first two or three threads, to help start cutting. It is usual also to have a chamfer on the end of the component. The die is placed squarely on the end of the bar and is rotated. Down ward pressure is applied until cutting starts. Ensure that the stock is horizontal. No further pressure is required. The die then should be rotated backwards every two or three turns. This is to break up and clear the chips. The thread can now be checked with a nut. If it is found to be tight, the central screw is slackened, and the side locking screw are tightened. The die is run down the thread again. This can be repeated until the final size is teached.

Who cutting compound is used, cutting is easier and better threads are produced.

1. What is tapping ?
2. Why is used ?
3. How many taps form a set of tap.
4. Why three taps are used to form a thread.
5. To which diameter the hole is drilled before tapping
6. List out the sizes of drills and taps as per ISO standard.
7. What is meant by lead.
8. Why lead of tap is decreasing from second to third.
9. When do you use solid tap wrench, adjustable tap wrench and chuck wrench.
10. Draw a tap and name the parts.
11. What is a die block.
12. To what for die block are used.
13. Why is the block split.
14. What is the die material.
15. What are the functions of three screws in die stock.
16. What are the advantages of using a compound in die.
17. What is the maximum size upto which a die block can be used.

Plumbing is concerned to join and repair the pipes that carry fluids and gases. In modern urban life water and drainage pipe, baths, toilets etc. have become integrated parts of any building. In industrial undertakings, pipe lines are used for supplying compressed air, gas, steam, water, oil, chemical fluids, refrigerants or any other item, capable of flowing through them. Previously clay pipes are used for drainage and sewerage works. A Babcock and Wilcox boiler contains many copper tubes (pipes) which transfer heat from furnace to the drum. Galvanized iron pipes supply water for household purposes.

As the pipes are supplied in standard lengths, these are joined, cut, bent, fitted to carry out the intended engineering functions. Certain accessories like taps, control valves, nipples etc. are also needed to control the flow of the liquid or gas to or from the container.

WORKSHOP TOOLS

A plumber needs to perform a number of operations inside the workshop or at site, such as pipe cutting, pipe threading, pipe bending, soldering, etc. Most of the tools are connected with fitting shop and have already been described in details in chapter. Some commonly required fitter's hand tools and instruments used in plumbing work include a fitters bench, parallel jaw vice, steel rule, hand hacksaw, centre punch, engineers try square, scriber, dividers, calipers, hand vice, hammers, files,drill bits and drilling machine,bench or pedastal grinder, taps with tap handles, dies with die stock, V-block with clamp, etc.

In addition to the above fitters tools and equipment a plumber needs anumber of other tools and equipment. These aremeant exclusively for pipework only. Prominent among these is a pipe vice. This vice is used for lholding the pipes in position during cutting, threading and similar other

operations done on pipes. These vices are available in different sizes and shapes to suit various types and sizes of pipes. However, the most useful form of these is a quick-opening type pipe vice shown in figure.

It consists of a cast iron base and a cast iron frame. The frame is made in two parts. The upper part is hinged to the bottom part on one side. The botton part is cast integral with the base. The base carries holes on both sides for accommodating the bolts to secure it to the work bench. The vice carries two jaws, between which the pipe is gripped. Both these jaws carry serrations at their gripping faces in order to ensure a positive grip. One of these jaws, the lower jaw is fitted to the lower part of the frame while the other jaw (upper jaw) is fitted to the bottom of the vertical screw of the quick release hand lever. A locking device is provided on the left side of the frame. In operation, the pipe is placed on the lower jaw, the upper frame moved about the hinge and brought in position and locked and then by tightening the screw of the hand lever pressure is exerted by the upper jaw on the pipe. Thus, the pipe is tightly gripped between the two jaws.