GOVT.TOOL ROOM & TRAINING CENTRE

KARNATAKA

DIPLOMA IN TOOL & DIE MAKING / DIPLOMA INPRECISION MANUFACTURING

REFERENCE NOTES

ENGINEERING DRAWING - III

SUBJECT CODE: DTDM-IIIS 305

Contact Hrs. /Week: 4 **Contact Hrs. / Semester: 80**

1. ASSEMBLY AND DETAIL DRAWINGS

- Review previously done assemblies.
- Concept of assembly drawings from the given part drawings.
- Indication and interpretation of surface roughness symbols as per IS 696:1972.
- Indication of fits and tolerances in assembly drawings.

2. Preparation of assembly drawings and parts list for the following:

- Leaf Drill Jig
- Universal Coupling
- Tool Head of shaping Machine
- Lathe slide rest
- Tail Stock
- Machine Swivel Vice
- Machine Vice
- Swivel Bearing
- Knuckle Joint
- 2 Stage Progressive Tool
- Blanking Tool

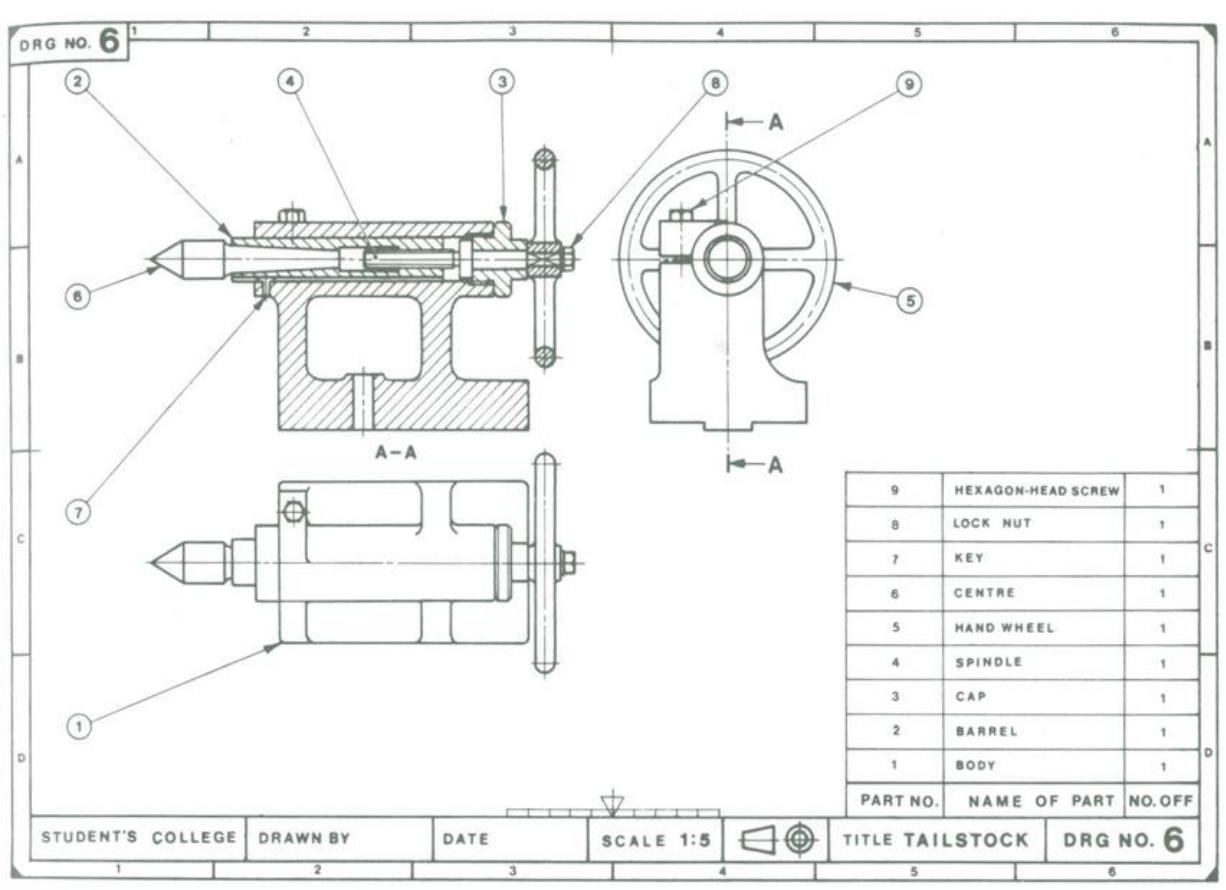
Note : No changes in this question paper, please be followed as per earlier procedure

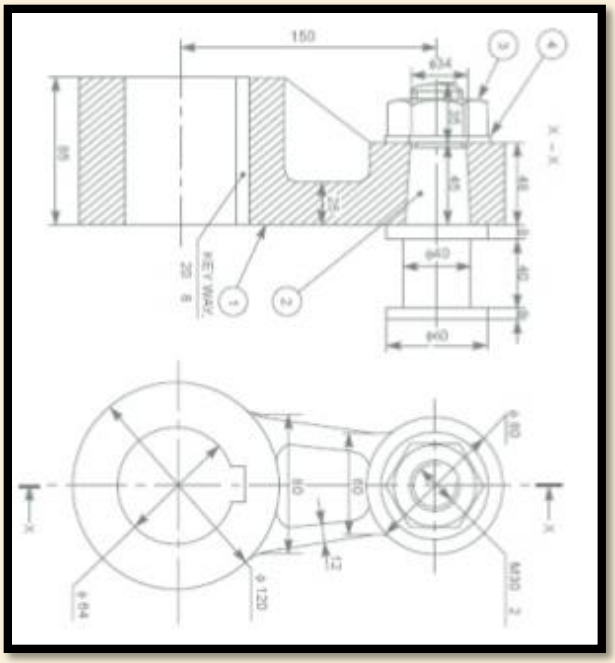
Reference books

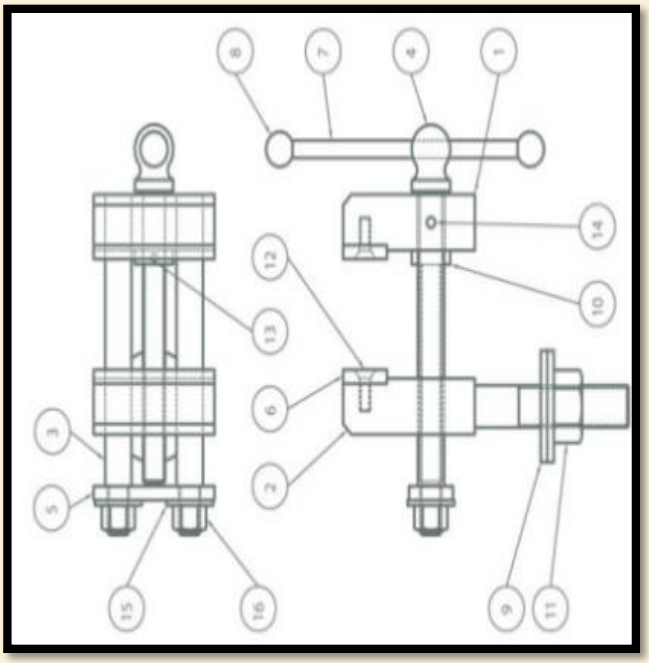
- Machine Drawing by KRG & N D Bhatt,
- Engineering drawing with problems & solutions by K R Hart,
- Engineering drawing for mechanical trades by K L Narayana, P Kannaiah, K Venkata Reddy.
- Fundamentals of Engineering drawing by Warren J Luzadder, Jon M Duff

ASSEMBLY DRAWING

It is representation of the product, consisting of several parts which are assembled together to fulfill the necessary working of the product for which it is designed.



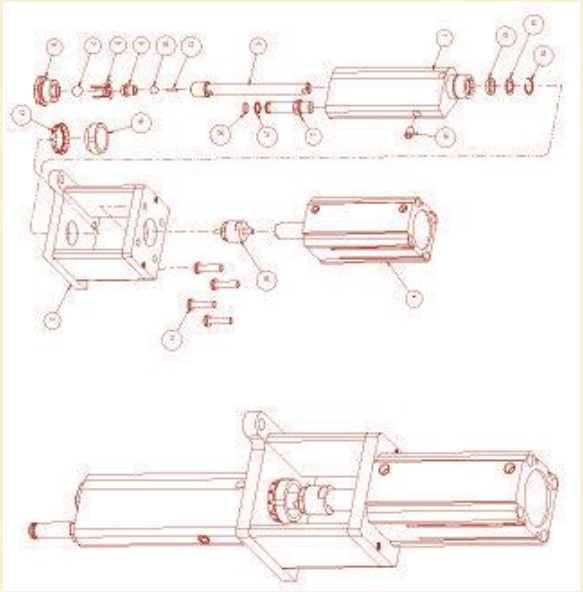


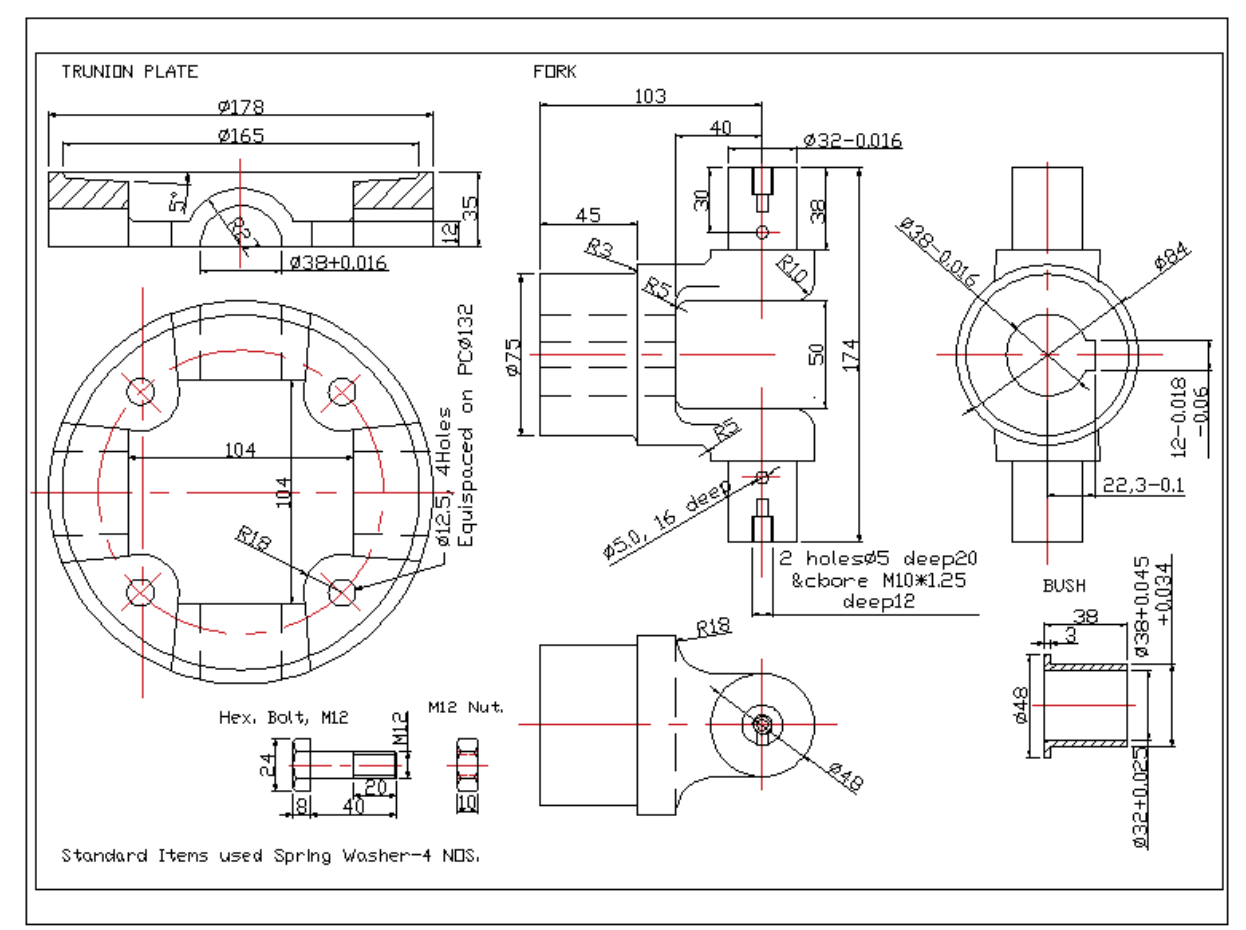


DETAIL DRAWING

It is the drafting of parts individually, which are de-assembled & every detail of the part like size, shape, dimensions etc., are represented for ease of manufacturing in a systematic way.

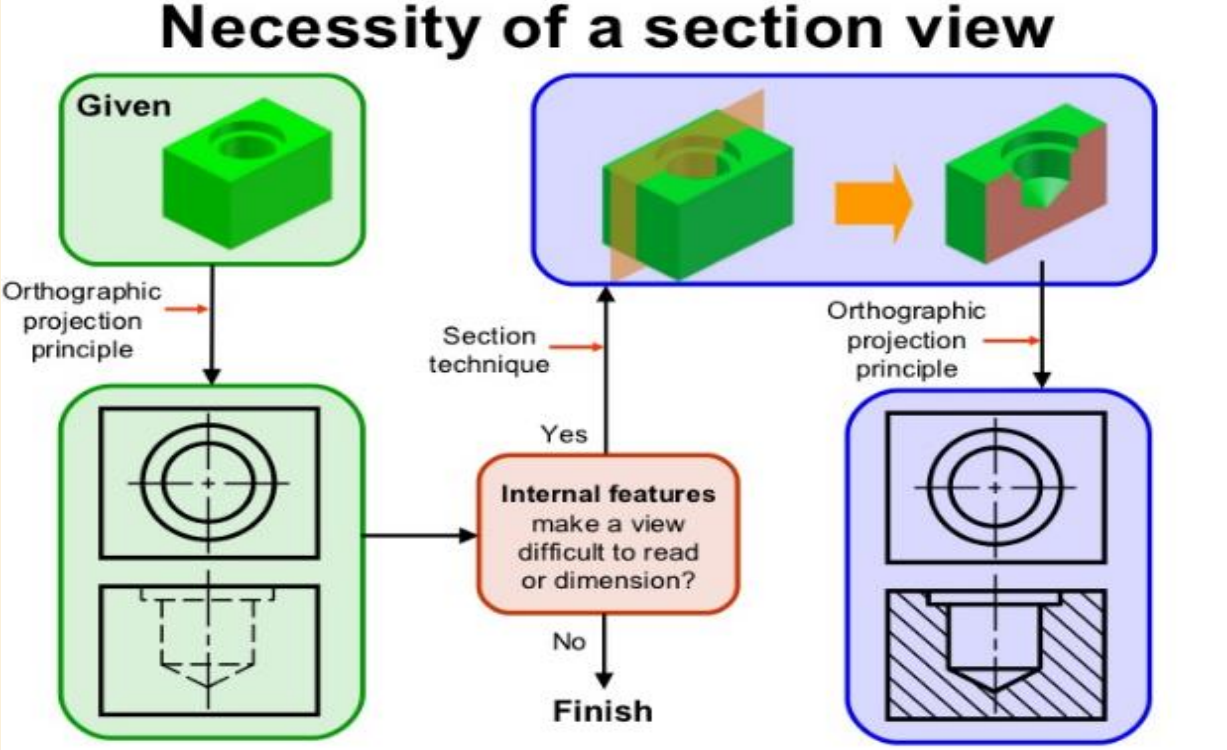
A detailed part drawing is needed to define a part with dimensions, tolerances, materials, finishes, etc. The drawing will be used to generate quotes for tooling and manufacturing.



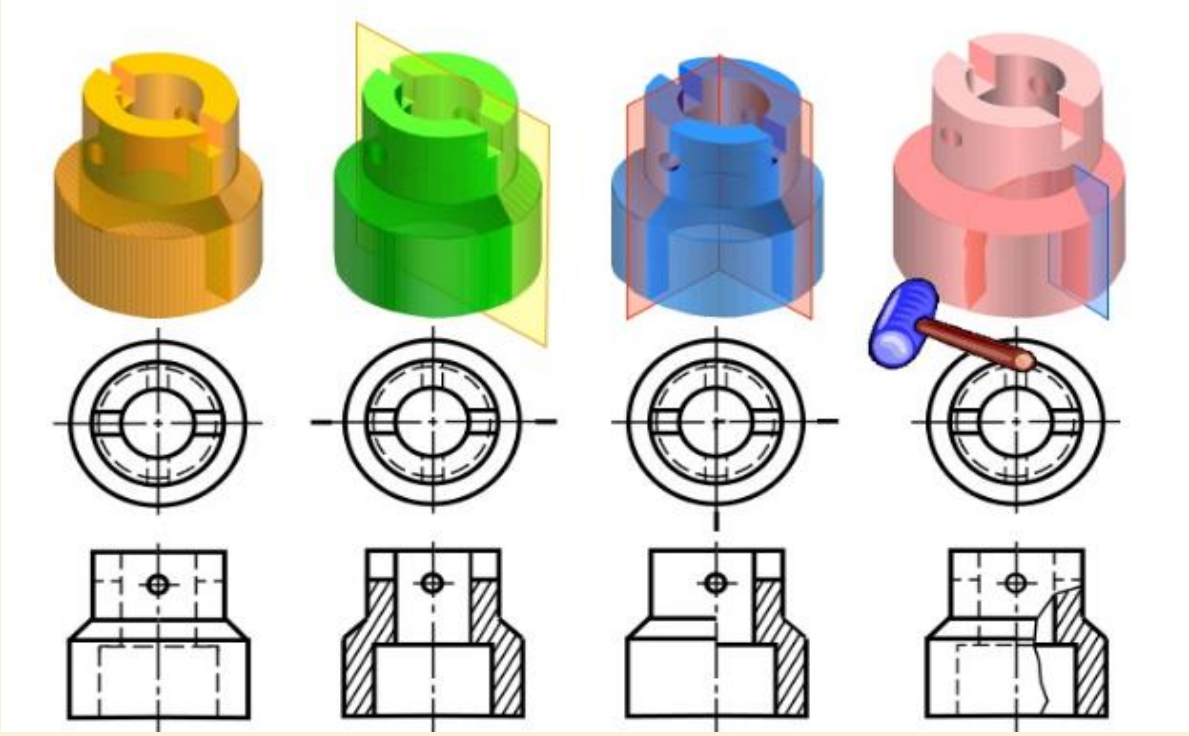

TRUNION PLATE
Ø178
Ø165
5°
R2
Ø38+0.016
12
35
104
104
R18
ø12.5, 4Holes
Equispaced on PCØ132
Hex. Bolt, M12
M12
24
20
8
40
M12 Nut.
FORK
103
40
Ø32-0.016
30
38
45
R3
R10
R5
Ø75
50
174
R5
Ø5.0, 16 deep
2 holesØ5 deep20
&cbore M10*1.25
deep12
R18
Ø48
Ø38-0.016
Ø84
12-0.018
-0.06
22,3-0.1
BUSH
38
3
Ø38+0.045
+0.034
Ø48
Ø32+0.025
Standard Items used Spring Washer-4 NOS.

How to Draw the sectional views and interpret them correctly?

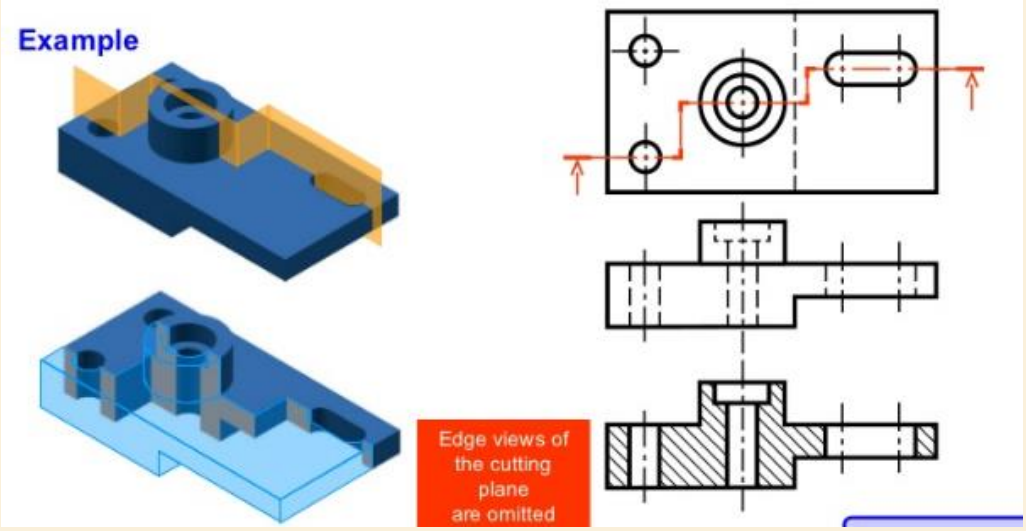
Need of sectioning.



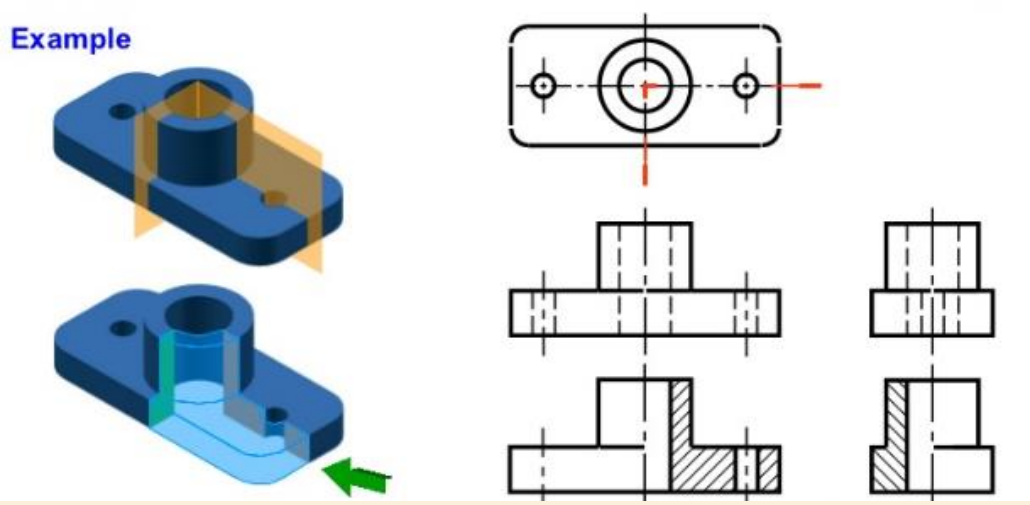
Types of sectioning.



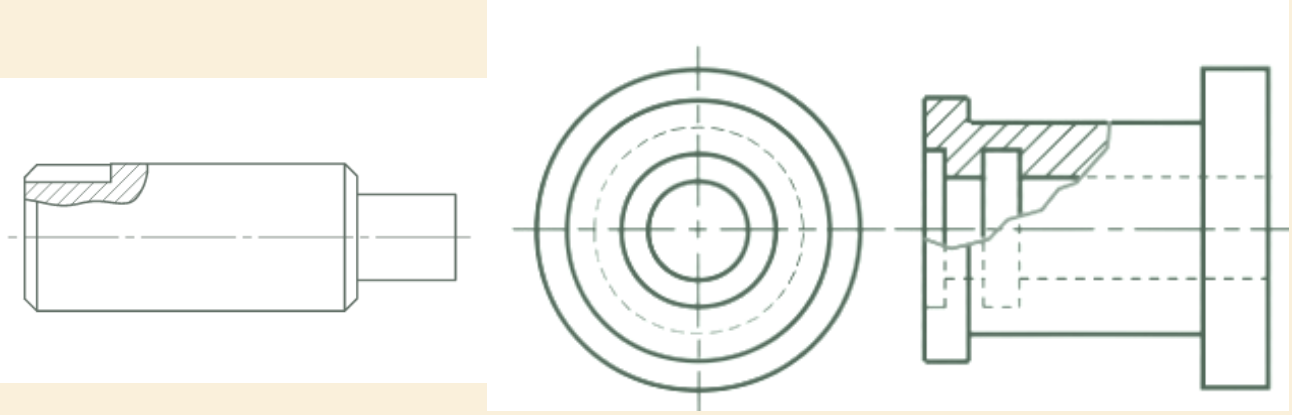
Sectioning plane Representation.



Partial Sectioning.



Showing internal profile details without sectioning Plane indication.



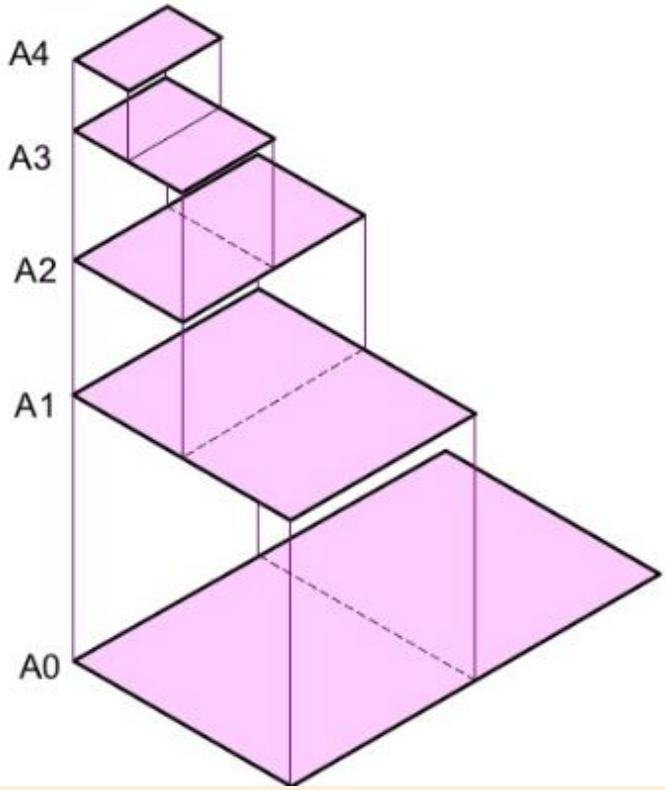
Drawing Sheet Sizes

Size	Width x Height
A0	841 × 1189 mm
A1	594 × 841 mm
A2	420 × 594 mm
A3	297 × 420 mm
A4	210 × 297 mm
A5	148.5 × 210 mm

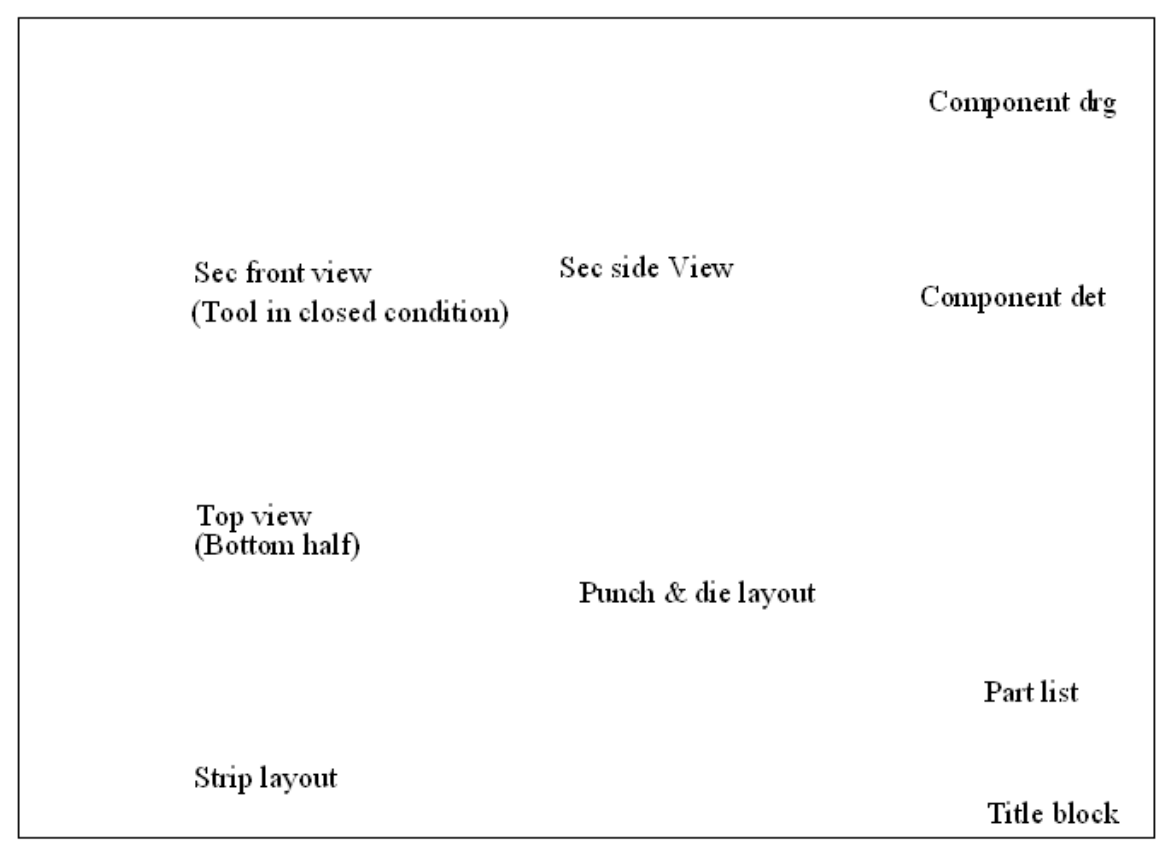
- Trimmed paper of a size A0 ~ A4.
- Standard sheet size (**JIS**)

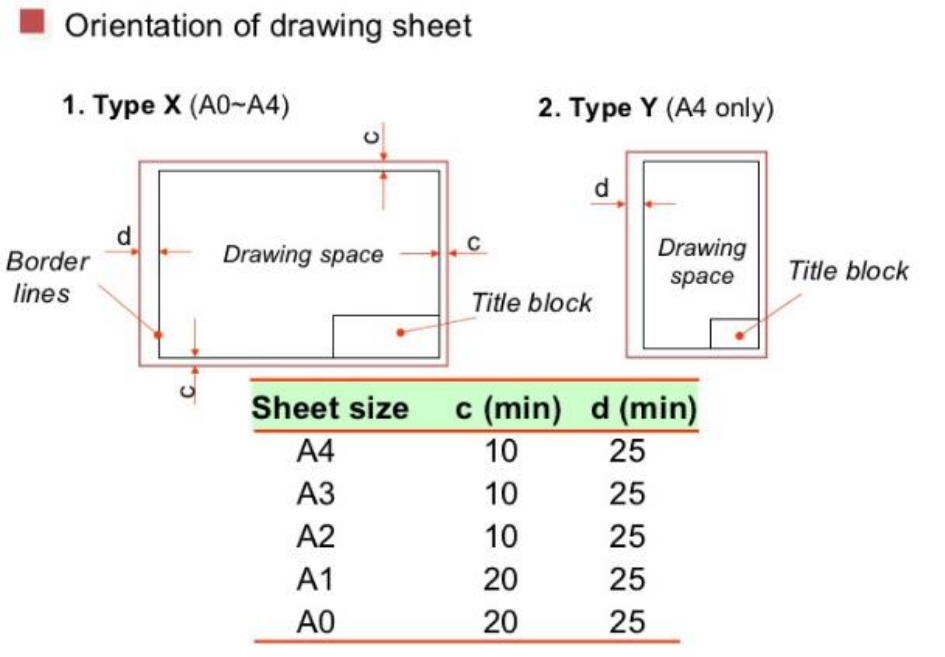
A4	210 x 297
A3	297 x 420
A2	420 x 594
A1	594 x 841
A0	841 x 1189

(Dimensions in millimeters)



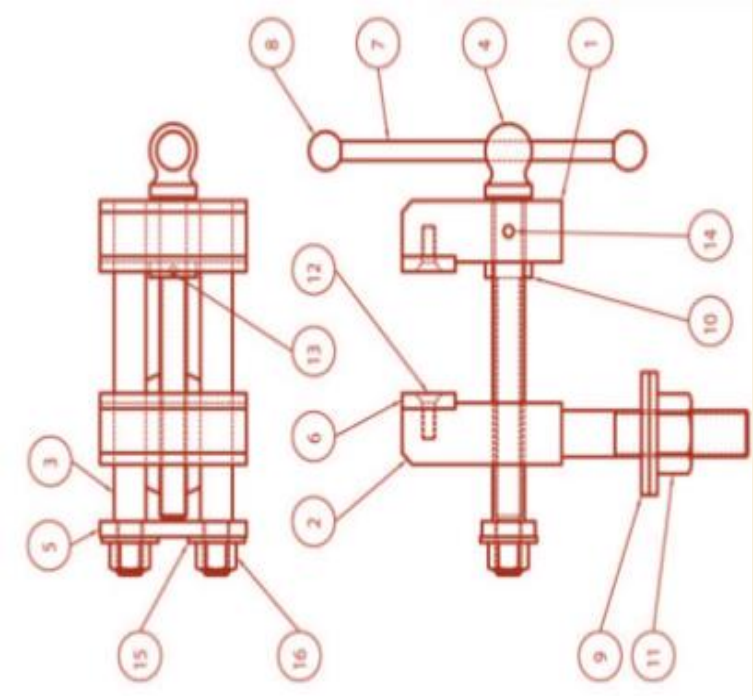
Lay-out in Drawing Sheet for a Progressive Press Tool.





Sheet size	c (min)	d (min)
A4	10	25
A3	10	25
A2	10	25
A1	20	25
A0	20	25

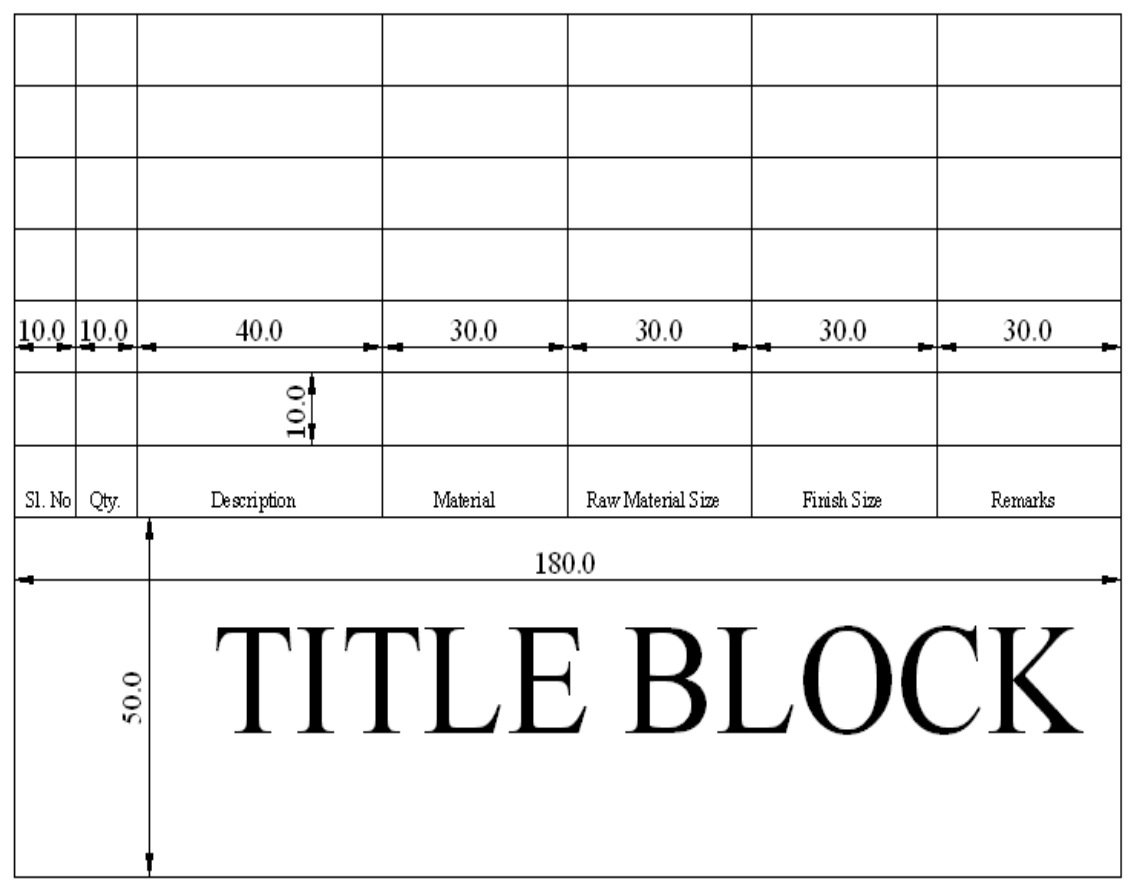
Ballooning



- Ballooning is done to identify & correlate the part list to Assembly drawings.
- Ballooning is to be done in a systematic way.
- Sometimes the Quantity of the part is also mentioned in the balloon.

Part List.

Observe the dimensions of each block



Specify the parts in this order 1) Flats 2) Square 3) Rounds 4) Heat treated parts in the same order 5) Standard Items

Part list serial No. to be in ascending order as the parts added in future for performance improvable of the product can be added in the part list.

The part list details to be in legible engineering script & the material & other specifications to be as per IS standards.

Dimensioning.

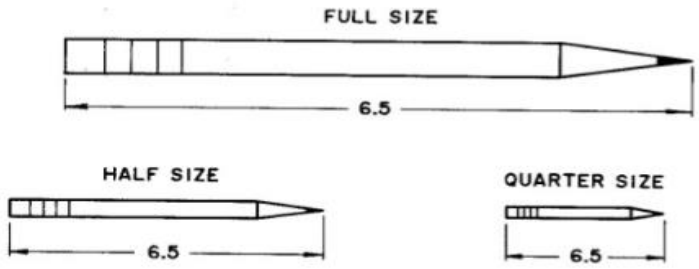
➢ **What is our goal when dimensioning a part?**

→ Basically, dimensions should be given in a clear and concise manner and should include everything needed to manufacture and inspect the part exactly as intended by the designer.

- It is important that all persons reading a drawing interpret it exactly the same way.
- Parts are dimensioned based on two criteria:
  - Basic size and locations of the features
  - Details of construction for manufacturing

Scaling vs. Dimensioning

- Drawings can be a different scales, but dimensions are ALWAYS at full scale.



Dimensions are given in the form of *linear distances*, *angles*, and *notes*.

→ Notes: Used to dimension diameters, radii, chamfers, threads, and other features that can not be dimensioned by the other two methods.

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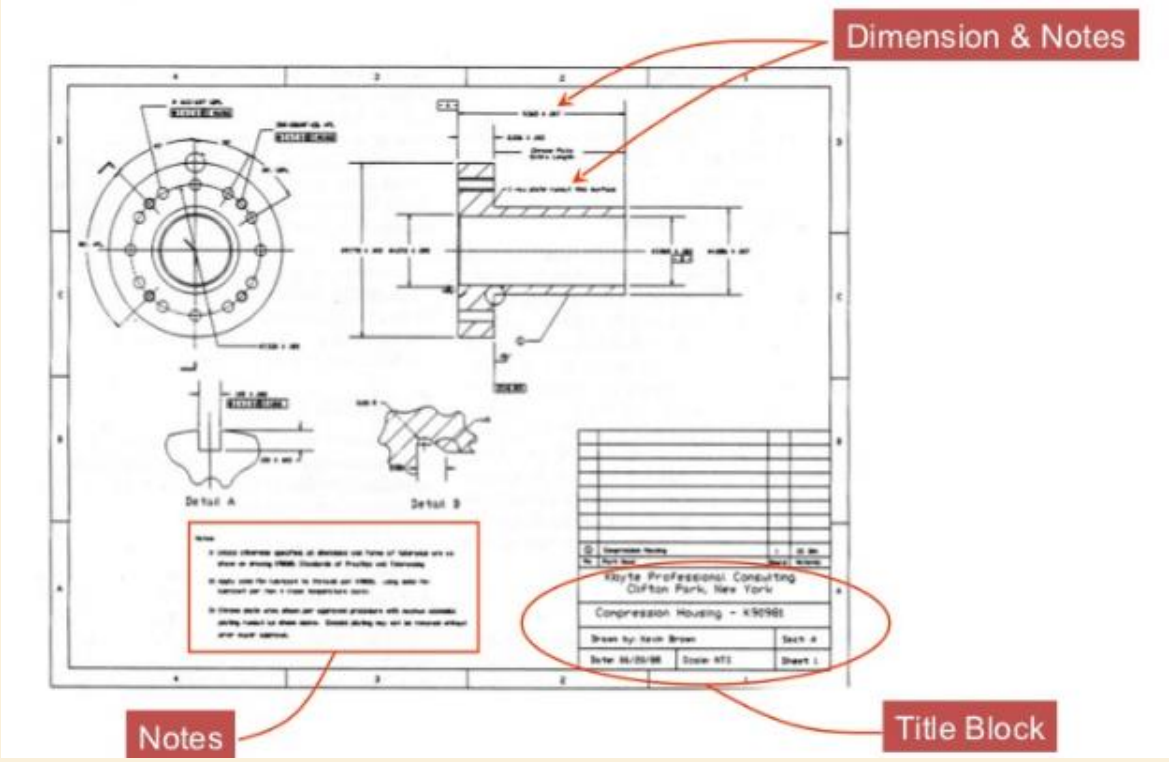


Spacing & Readability.

➢ **Dimensions should be easy to read, and minimize the possibility for conflicting interpretations.**

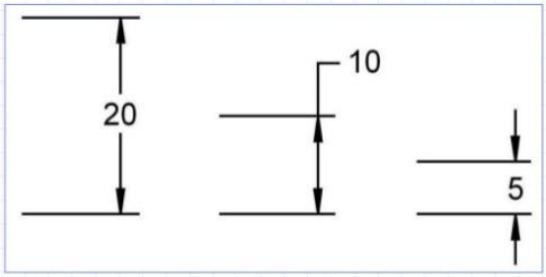
Lettering

- **Lettering should be legible, easy to read, and uniform throughout the drawing.**
  - → **Upper case** letters should be used for all lettering unless a lower case is required.
  - → The minimum lettering height is 0.12 in (3 mm).

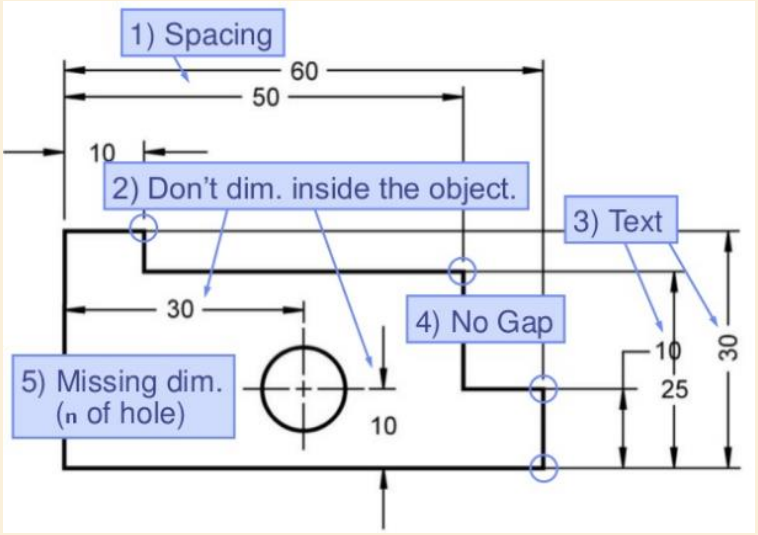
Arrow Heads.

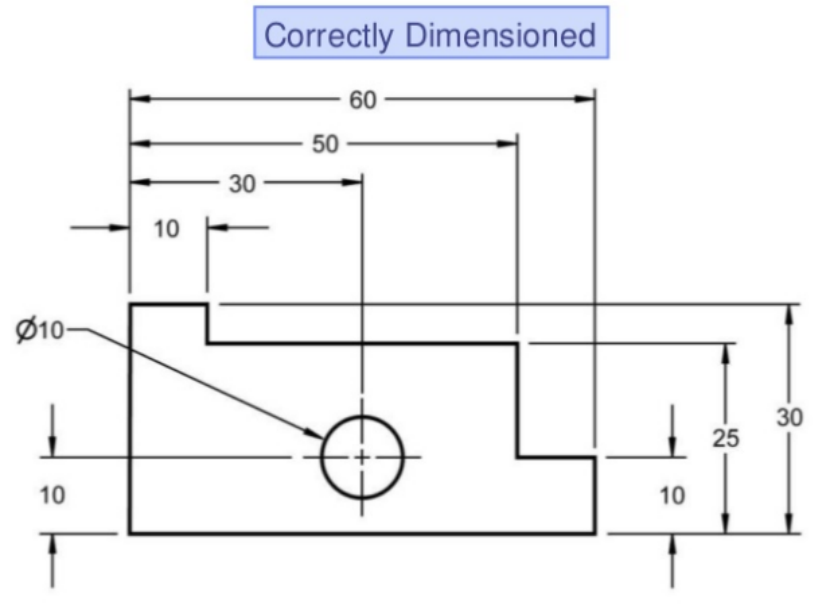
Maintain the ratio of Arrow 1:3

- Arrowheads are drawn between the extension lines if possible. If space is limited, they may be drawn on the outside.

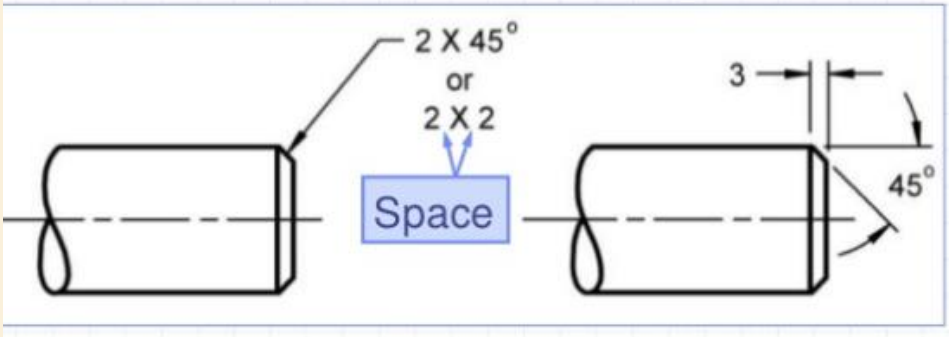


DO'S & DO NOT'S in Dimensioning





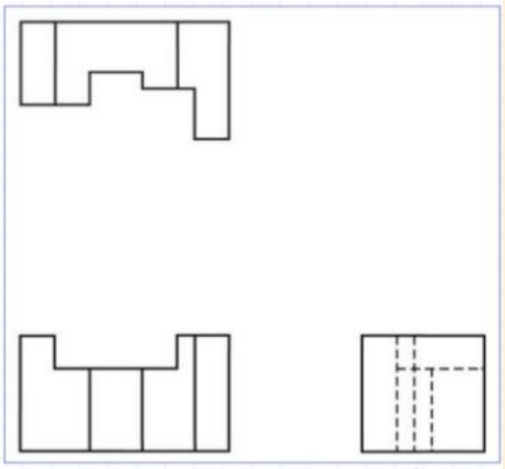
Chamfers: Dimensioned by a linear dimension and an angle, or by two linear dimensions.



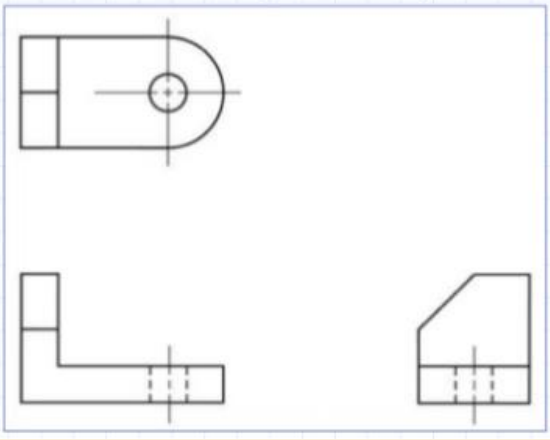
If an inch dimension is given on a millimeter drawing or visa versa, the abbreviations **IN** or **mm** should be placed after the dimension value.

Exercises for Dimensioning.

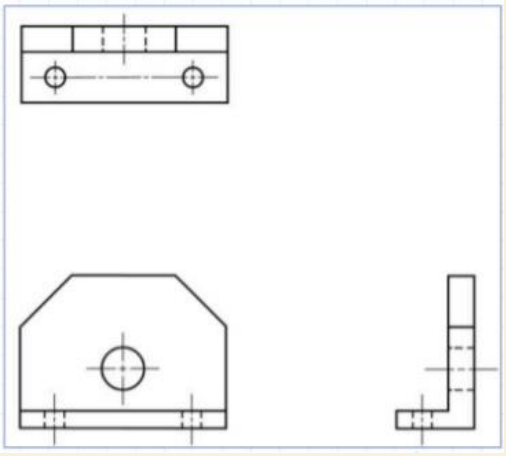
- Dimension the following object using proper dimensioning techniques.



- Dimension the following object using proper dimensioning techniques.



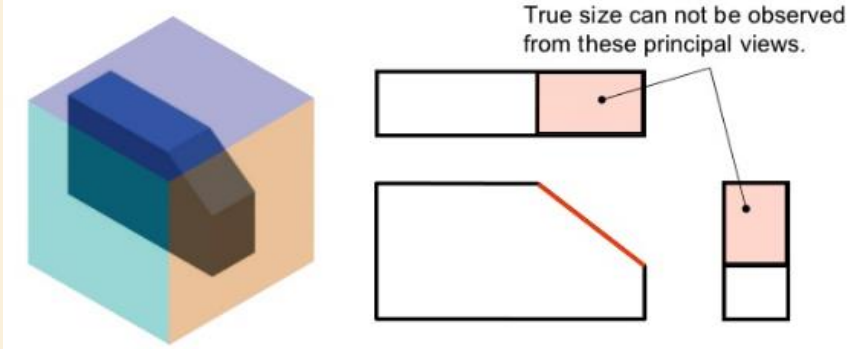
- Dimension the following object using proper dimensioning techniques.



AUXILLARY VIEWS

Necessity

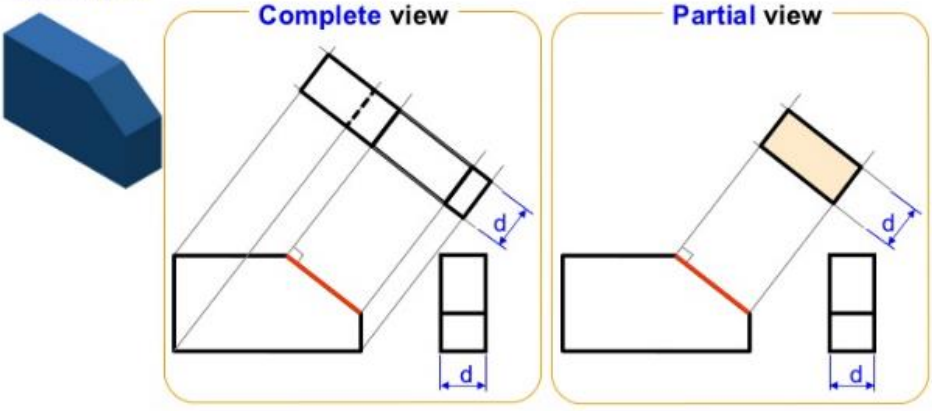
- Auxiliary view is needed when it is desirable to show the true size and shape of a surface that is not parallel to one of the principal planes of projection.



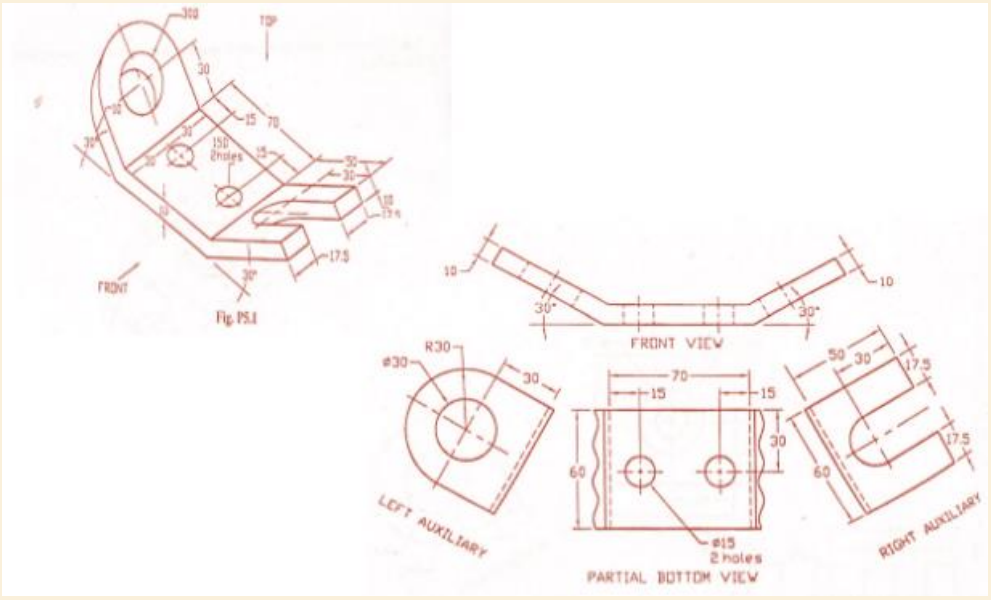
Use of auxiliary view

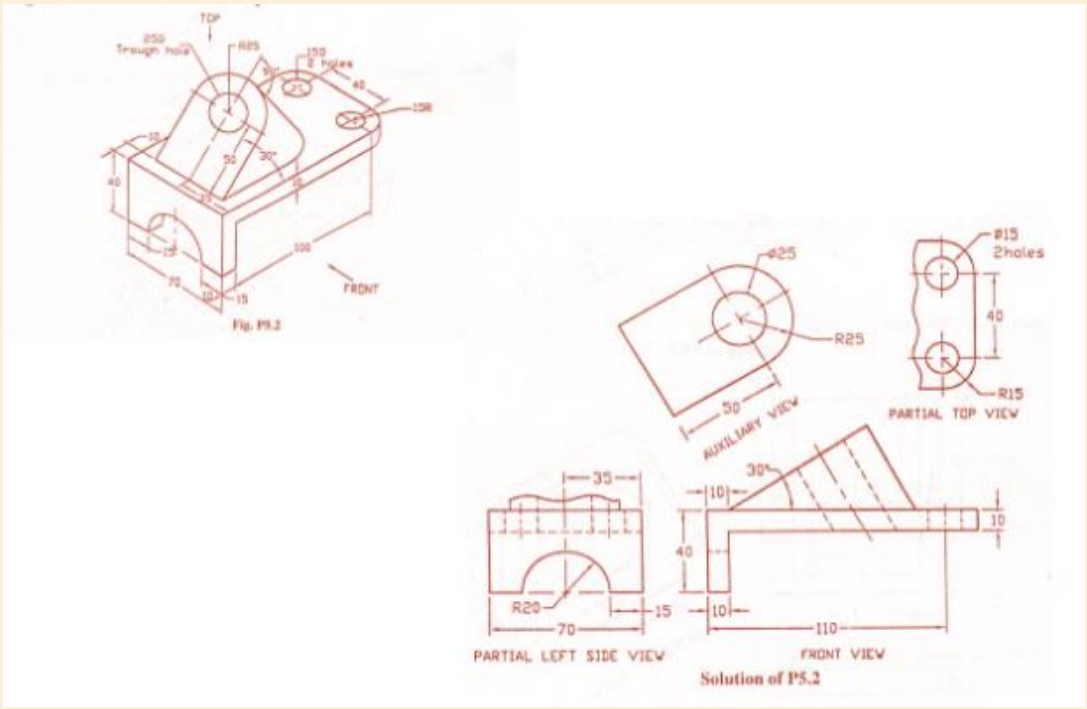
- In practice, an auxiliary view is usually a partial view showing only the desired information.

Example



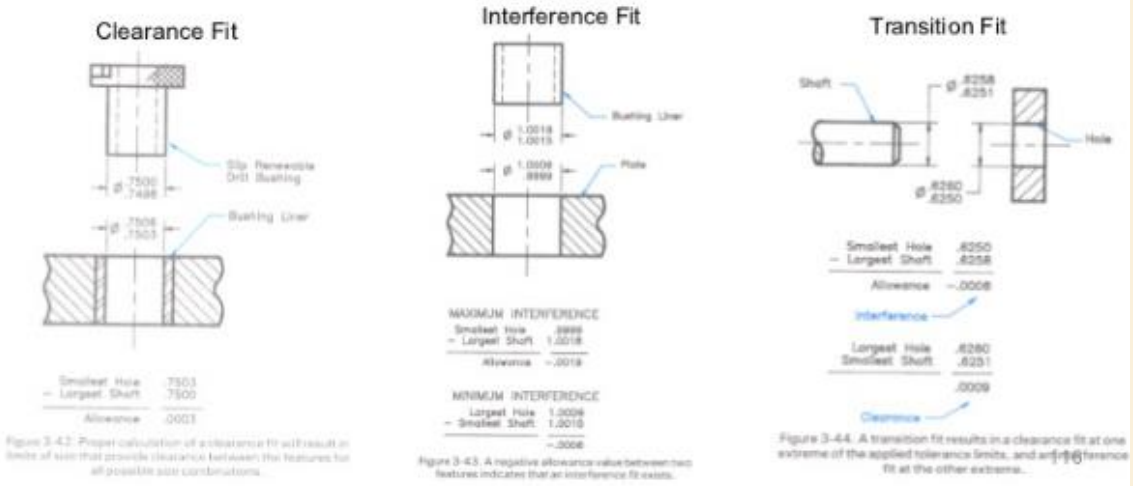
SHOWING DETAILS OF SHEET METAL COMPONENT BY AUXILLARY VIEWS





Fit Between Parts

1. Clearance fit: The shaft maximum diameter is smaller than the hole minimum diameter.
2. Interference fit: The shaft minimum diameter is larger than the hole maximum diameter.
3. Transition fit: The shaft maximum diameter and hole minimum have an interference fit, while the shaft minimum diameter and hole maximum diameter have a clearance fit



Class I - Loose fit - Use for all possible hole - shaft applications where function will permit.

Class II - Free Fit - Running fits with speeds of 600 R.P.M. or over and journal pressures of 500 lbs/sqin or over. Wobble or shake between mating parts very slight. Part will turn and slide freely.

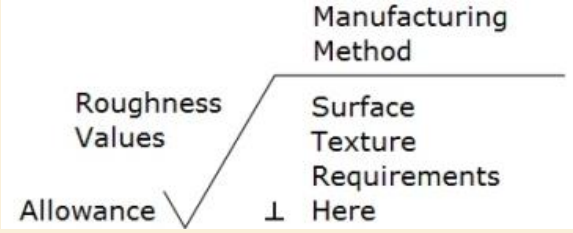
Class III - Medium Fit - Running fits under 600 R.P.M and journal pressures under 600 lbs/sqin and for sliding fits. Wobble or shake between mating parts noticed only on parts with short bearing length.

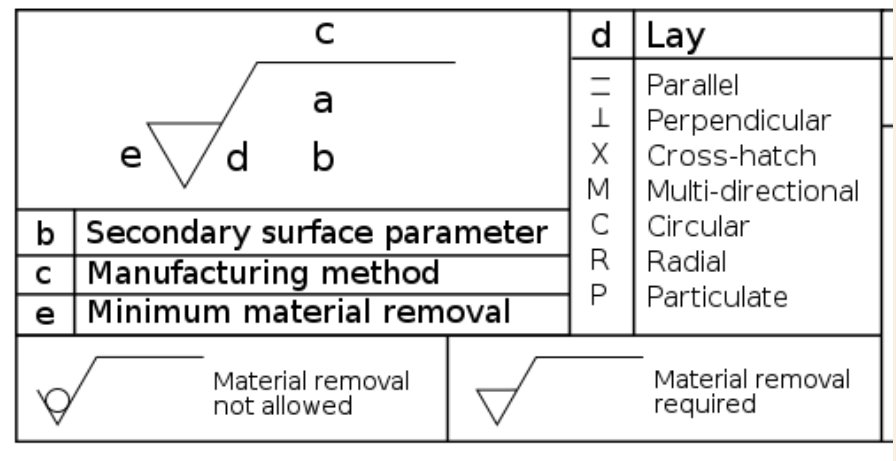
Class IV - Transitional Fit (Snug) - Closest fit which can be assembled by hand and necessitates work of considerable precision. Should be used where no perceptible shake is permissible and, where moving parts are not intended to move freely under a load.

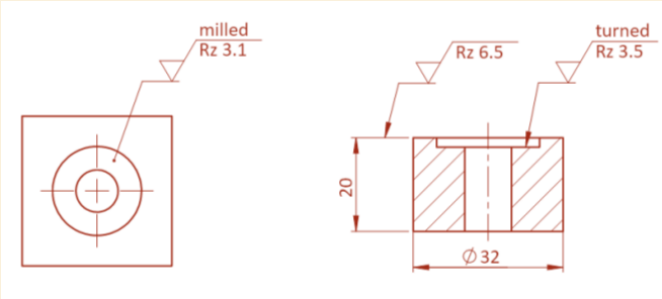
Class V - Interference Fit - Considerable pressure is required to assemble these fits and the parts are considered more or less permanently assembled. Bushings and similar uses.

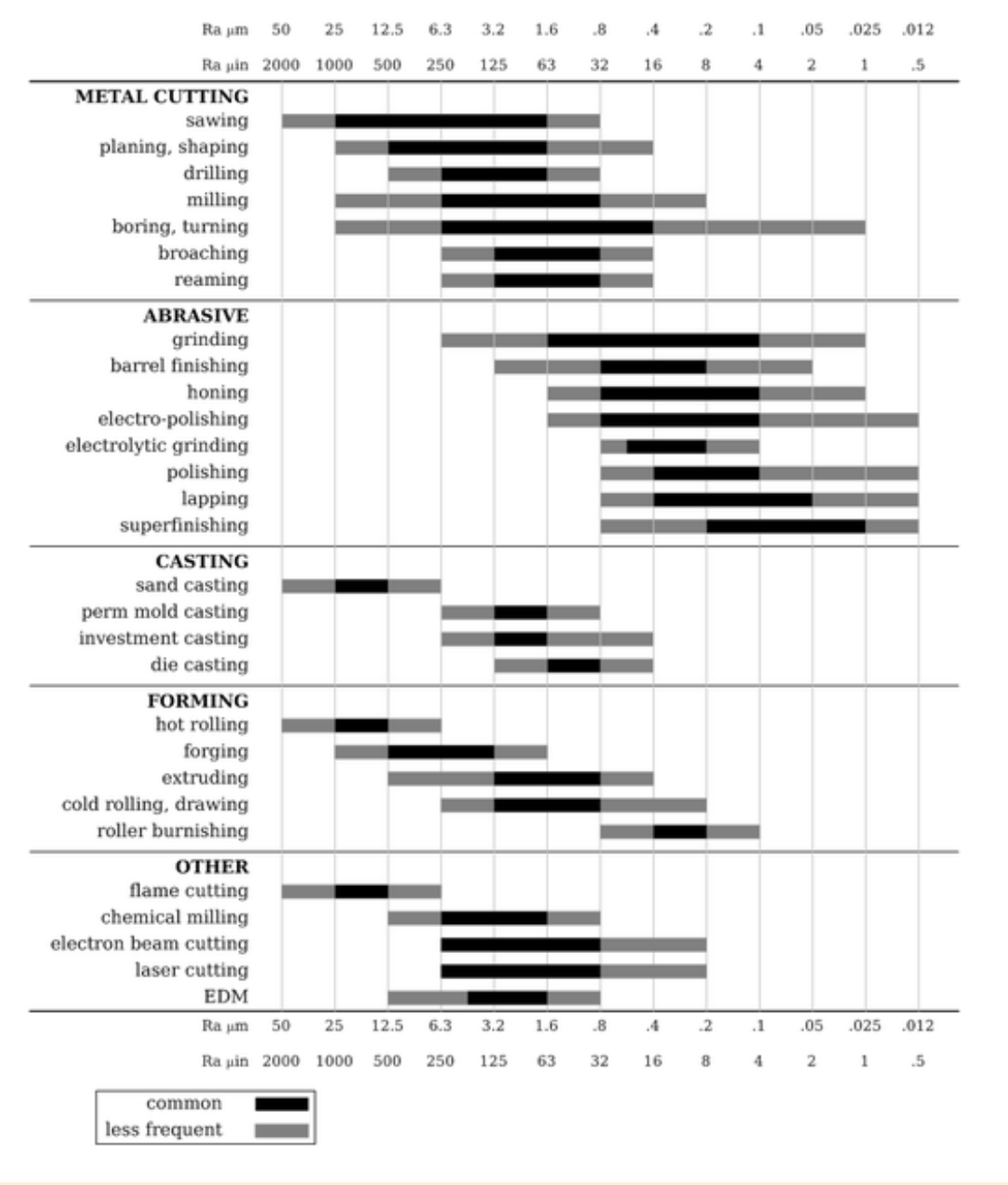
	ISO SYMBOL			
	HOLE BASIS	SHAFT BASIS		
CLEARANCE FITS	H11/c11	C11/h11	LOOSE RUNNING FIT	FOR WIDE COMMERCIAL TOLERANCES OR ALLOWANCES ON EXTERNAL MEMBERS.
	H9/d9	D9/h9	FREE RUNNING FIT	NOT FOR USE WHERE ACCURACY IS ESSENTIAL, BUT GOOD FOR LARGE TEMPERATURE VARIATIONS, HIGH RUNNING SPEEDS, OR HEAVY JOURNAL PRESSURES.
	H8/f7	F8/h7	CLOSE RUNNING FIT	FOR RUNNING ON ACCURATE MACHINES AND FOR ACCURATE LOCATION AT MODERATE SPEEDS AND JOURNAL PRESSURES.
	H7/g6	G7/h6	SLIDING FIT	NOT INTENDED TO RUN FREELY, BUT TO MOVE AND TURN FREELY AND LOCATE ACCURATELY.
	H7/h6	H7/h6	LOCATIONAL CLEARANCE FIT	PROVIDES SNUG FIT FOR LOCATING STATIONARY PARTS; BUT CAN BE FREELY ASSEMBLED AND DISASSEMBLED.
TRANSITION FITS	H7/k6	K7/h6	LOCATIONAL TRANSITION FIT	FOR ACCURATE LOCATION, A COMPROMISE BETWEEN CLEARANCE AND INTERFERENCE.
	H7/n6	N7/h6	LOCATIONAL TRANSITION FIT	FOR MORE ACCURATE LOCATION WHERE GREATER INTERFERENCE IS PERMISSIBLE.
INTERFERENCE FITS	H7/p6*	P7/h6	LOCATIONAL INTERFERENCE FIT	FOR PARTS REQUIRING RIGIDITY AND ALIGNMENT WITH PRIME ACCURACY OF LOCATION BUT WITHOUT SPECIAL BORE PRESSURE REQUIREMENTS.
	H7/s6	S7/h6	MEDIUM DRIVE FIT	FOR ORDINARY STEEL PARTS OR SHRINK FITS ON LIGHT SECTIONS, THE TIGHTEST FIT USABLE WITH CAST IRON.
	H7/u6	U7/h6	FORCE FIT	SUITABLE FOR PARTS WHICH CAN BE HIGHLY STRESSED OR FOR SHRINK FITS WHERE THE HEAVY PRESSING FORCES REQUIRED ARE IMPRACTICAL.

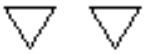
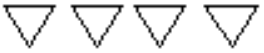
REPRESENTATION OF SURFACE FINISH

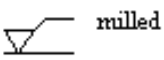




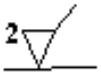

milled
Rz 3.1
Rz 6.5
turned
Rz 3.5
20
∅32

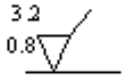

Ra µm 50 25 12.5 6.3 3.2 1.6 .8 .4 .2 .1 .05 .025 .012
Ra µin 2000 1000 500 250 125 63 32 16 8 4 2 1 .5
METAL CUTTING
sawing
planing, shaping
drilling
milling
boring, turning
broaching
reaming
ABRASIVE
grinding
barrel finishing
honing
electro-polishing
electrolytic grinding
polishing
lapping
superfinishing
CASTING
sand casting
perm mold casting
investment casting
die casting
FORMING
hot rolling
forging
extruding
cold rolling, drawing
roller burnishing
OTHER
flame cutting
chemical milling
electron beam cutting
laser cutting
EDM
Ra µm 50 25 12.5 6.3 3.2 1.6 .8 .4 .2 .1 .05 .025 .012
Ra µin 2000 1000 500 250 125 63 32 16 8 4 2 1 .5
common
less frequent

S.No.	Roughness values Ra(µm)	Roughness Grade Number	Symbol
1.	50	N_{12}	
2.	25	N_{11}	
	12.5	N_{10}	
3.	6.31	N_9	
	3.21	N_8	
	1.61	N_7	
4.	0.80	N_6	
	0.41	N_5	
	0.21	N_4	
5.	0.10	N_3	
	0.051	N_2	
	0.025	N_1	

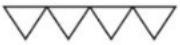
i)  - Machining operation specified as milling.

ii)  - Removal of material is prohibited.

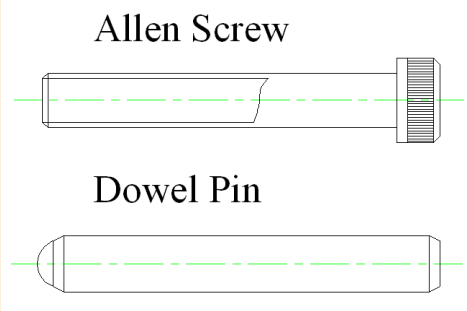
iii)  - Machining Allowance

iv)  - Machining is required. Roughness should lie in between 0.8 microns to 3.2 microns.

Surface finish symbols

Roughness values R_a *µm*	*Roughness grade number*	*Roughness grade symbol*
50	N12	
25	N11	
12.5	N10	
6.3	N9	
3.2	N8	
1.6	N7	
0.8	N6	
0.4	N5	
0.2	N4	
0.1	N3	
0.05	N2	
0.025	N1	

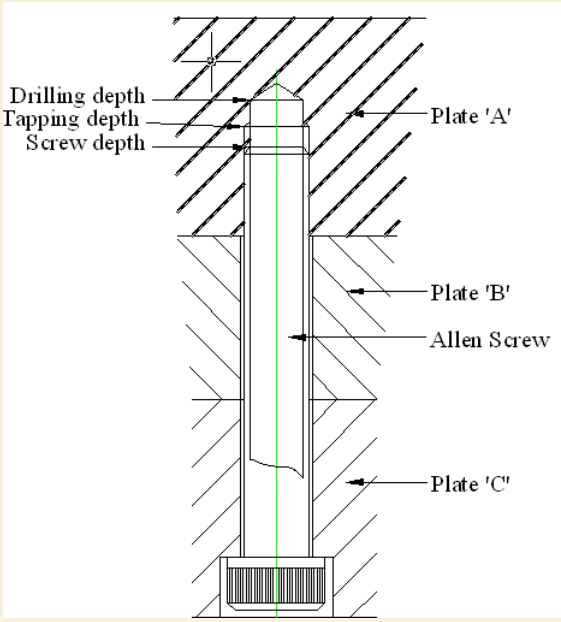
How to Represent Allen Screw & Dowel Pin



Observe the chamfers at appropriate positions.

Observe the driver (radius) & driven side of dowel pin.

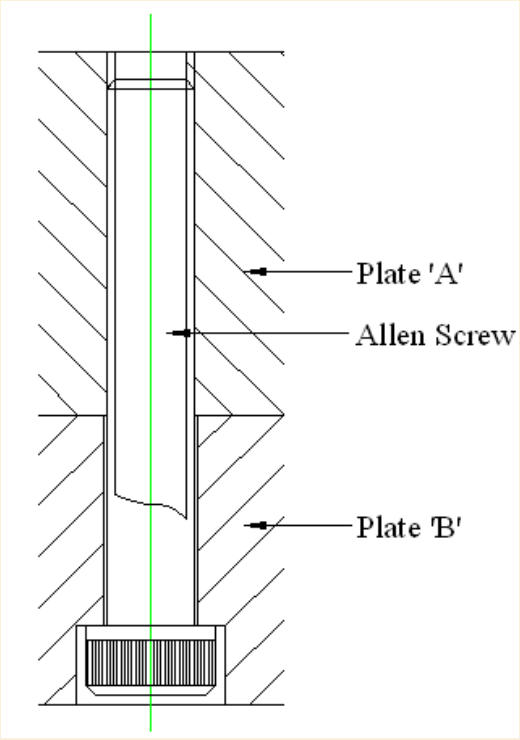
How to Represent Allen Screw Clamping in Blind threaded hole.



Observe different depths of Drilling, Tapping, and Screw length.

Observe Relief holes in 2 Plates (B, C)

How to Represent Allen Screw Clamping in through threaded hole?



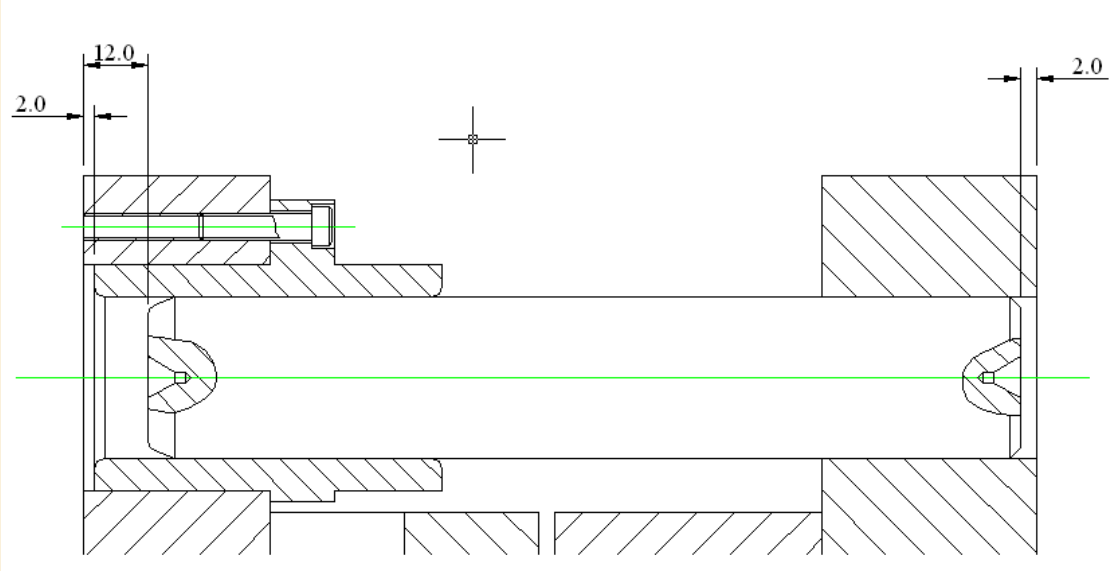
Observe Allen screw head inside plate B

Observe Allen screw thread inside plate A

Observe Relief hole in Plate B

Observe Thread length ending in Plate B Side

How to draw Guide PILLAR & Guide BUSH in Assembly?

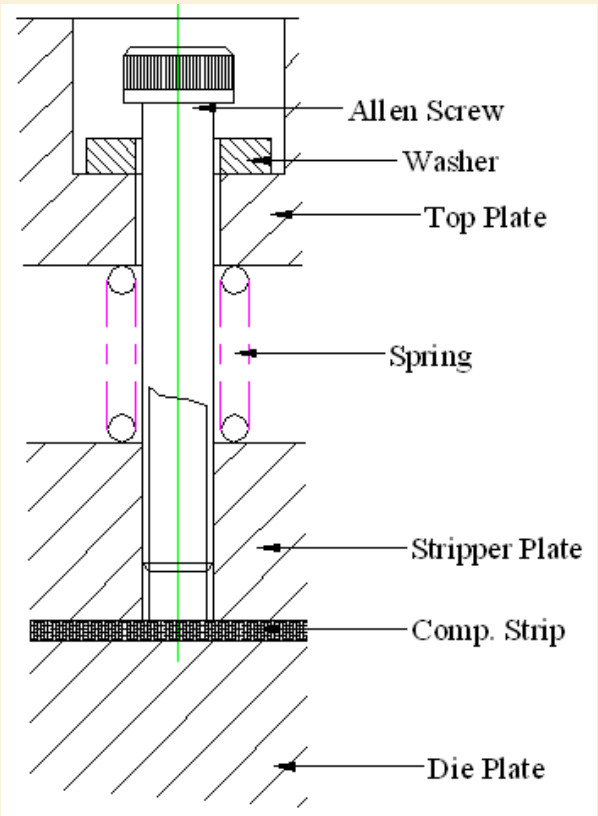


Observe Center drill at both ends of Guide Pillar

Observe Fitting of Guide Bush (H7h6) using Allen Screw &

Guide Bush by press fit (H7g6)

How to draw floating Stripper Plate in Assembly



Observe Spring Representation.

Observe Allen Screw Representation.

Observe Allen Screw raised up in tool closed condition.

LEAF DRILL JIG

• Leaf jig has hinged jig plate.

• Drill bushes are fitted on the jig plate which is hinged at one end.

• The jig plate can be swung aside to provide clear path for work piece loading and unloading.

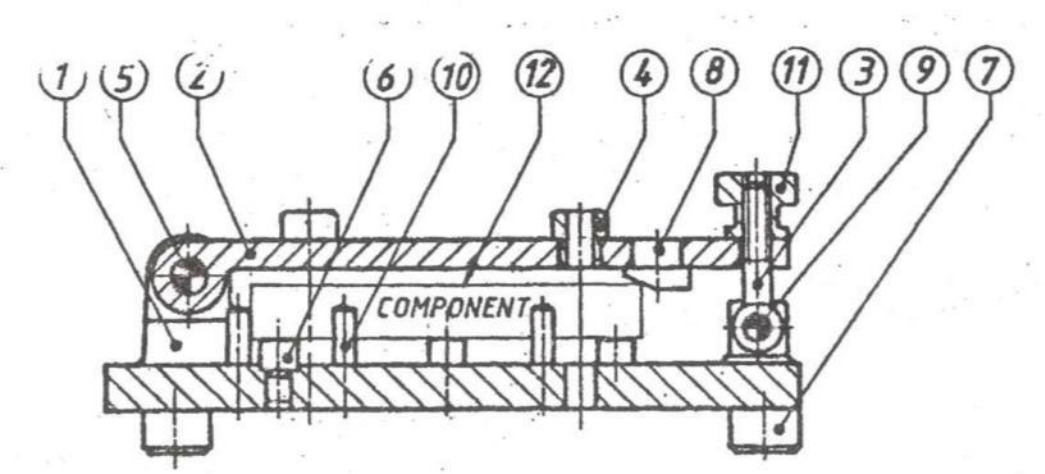
• Clamping screw and drill bushes are accommodated in jig pate.

• The jig plate must have positive resting surface.

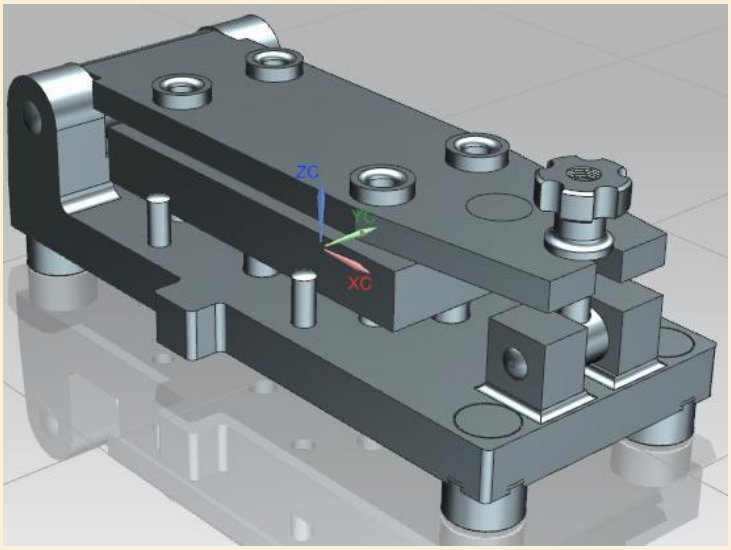
• The jig plate is clamped against the resting face by an eyebolt.

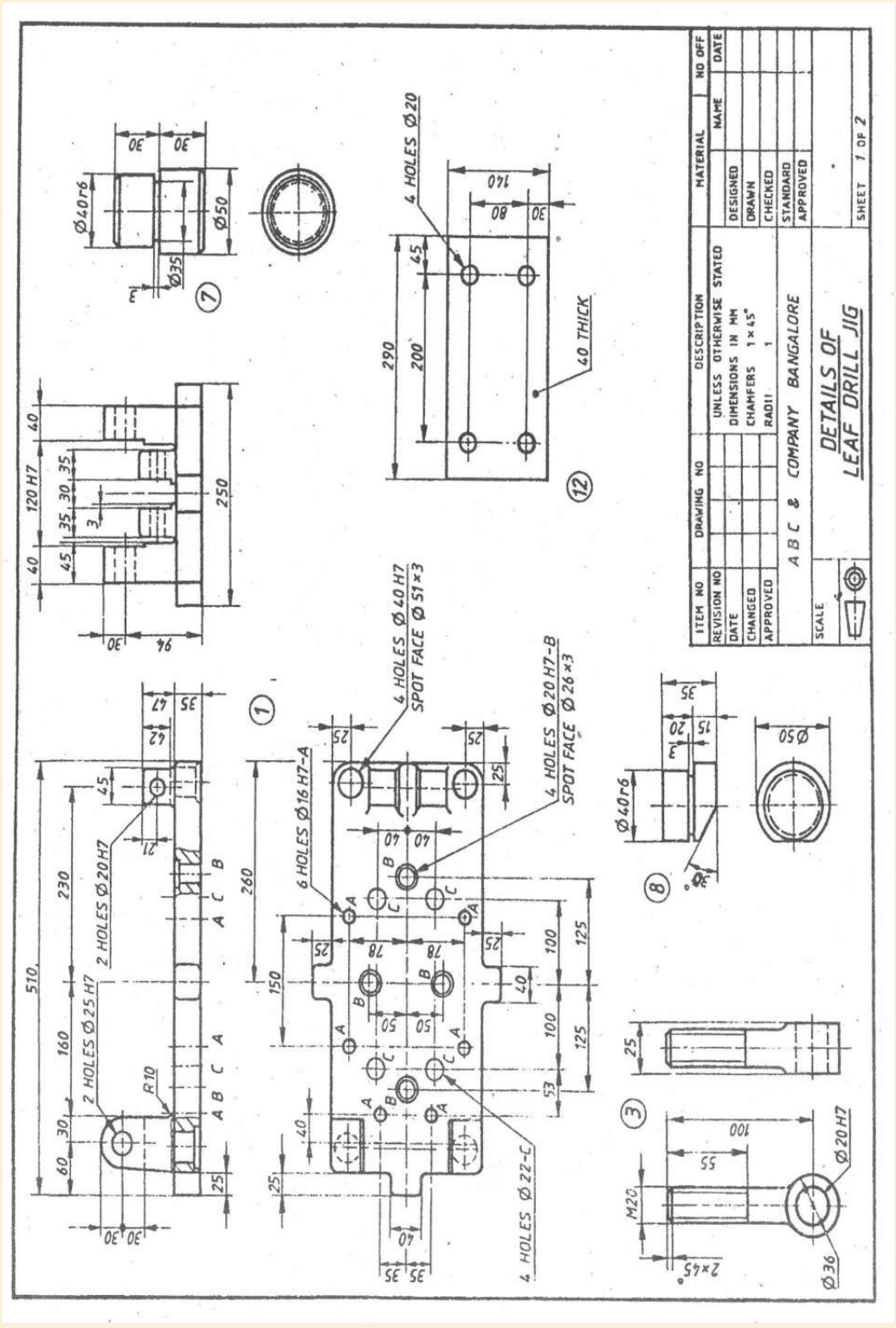
• Quick clamping and unclamping of the jig plate is possible.

• Hand knob is provided to facilitate clamping



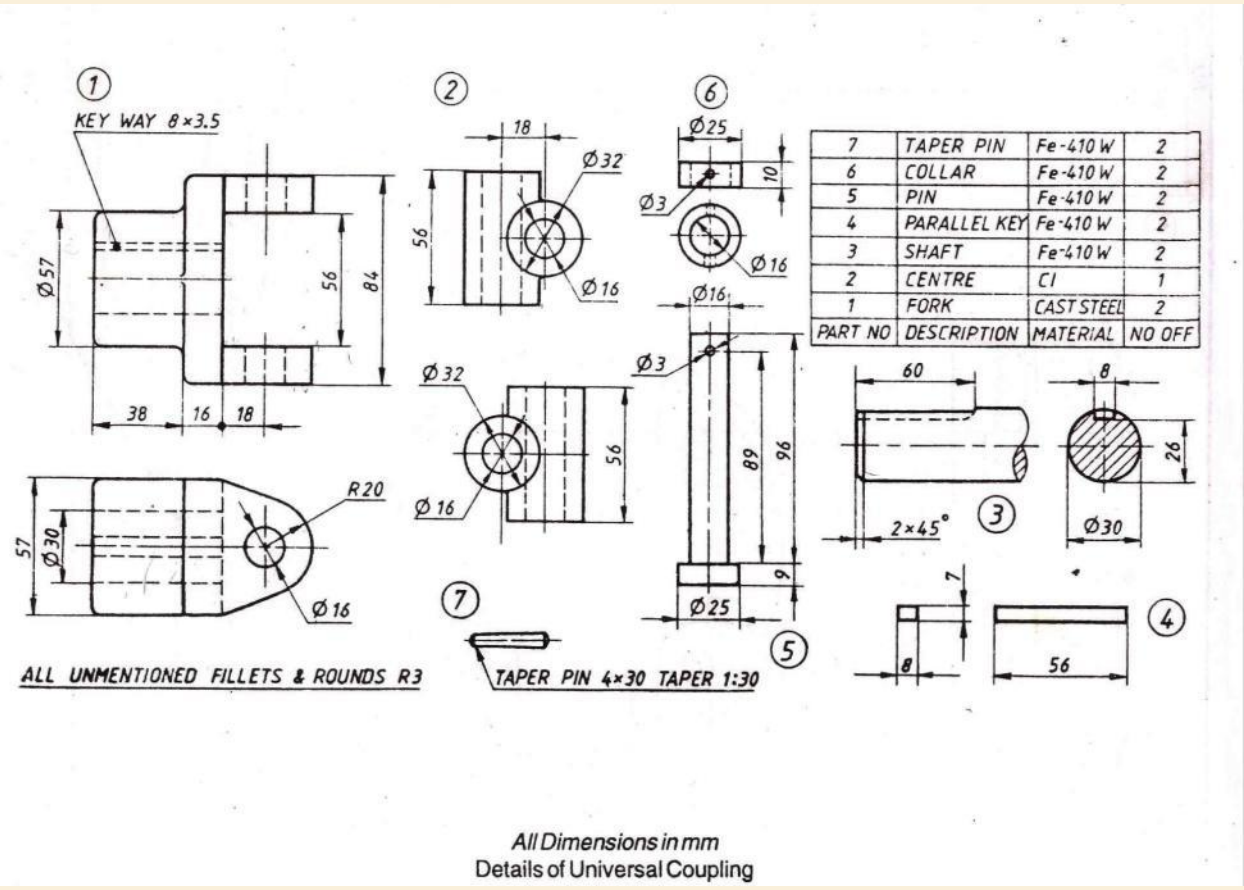
Leaf Drill Jig


ZC
YC
XC


DETAILS OF
LEAF DRILL JIG
A B C & COMPANY BANGALORE
SHEET 1 OF 2
ITEM NO
DRAWING NO
DESCRIPTION
MATERIAL
NO OFF
REVISION NO
DATE
CHANGED
APPROVED
UNLESS OTHERWISE STATED
DIMENSIONS IN MM
CHAMFERS 1 × 45°
RADII 1
DESIGNED
DRAWN
CHECKED
STANDARD
APPROVED
NAME
SCALE
4 HOLES Ø20
40 THICK
4 HOLES Ø40 H7
SPOT FACE Ø51×3
4 HOLES Ø20 H7-B
SPOT FACE Ø26×3
6 HOLES Ø16 H7-A
4 HOLES Ø22-C
2 HOLES Ø20 H7
2 HOLES Ø25 H7
R10
Ø40r6
Ø50
Ø35
120 H7
Ø20 H7
Ø36
M20
2×45°

UNIVERSAL COUPLING,

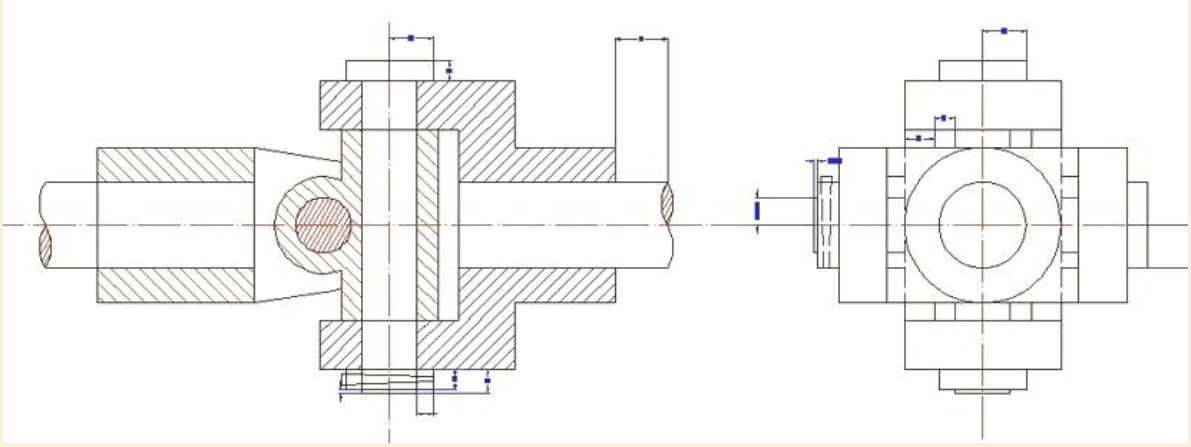
A universal joint (universal coupling, U-joint, Cardan joint, Spicer or Hardy Spicer joint, or Hooke's joint) is a joint or coupling connecting rigid rods whose axes are inclined to each other, and is commonly used in shafts that transmit rotary motion. It consists of a pair of hinges located close together, oriented at 90° to each other, connected by a cross shaft. The universal joint is not a constant-velocity joint.

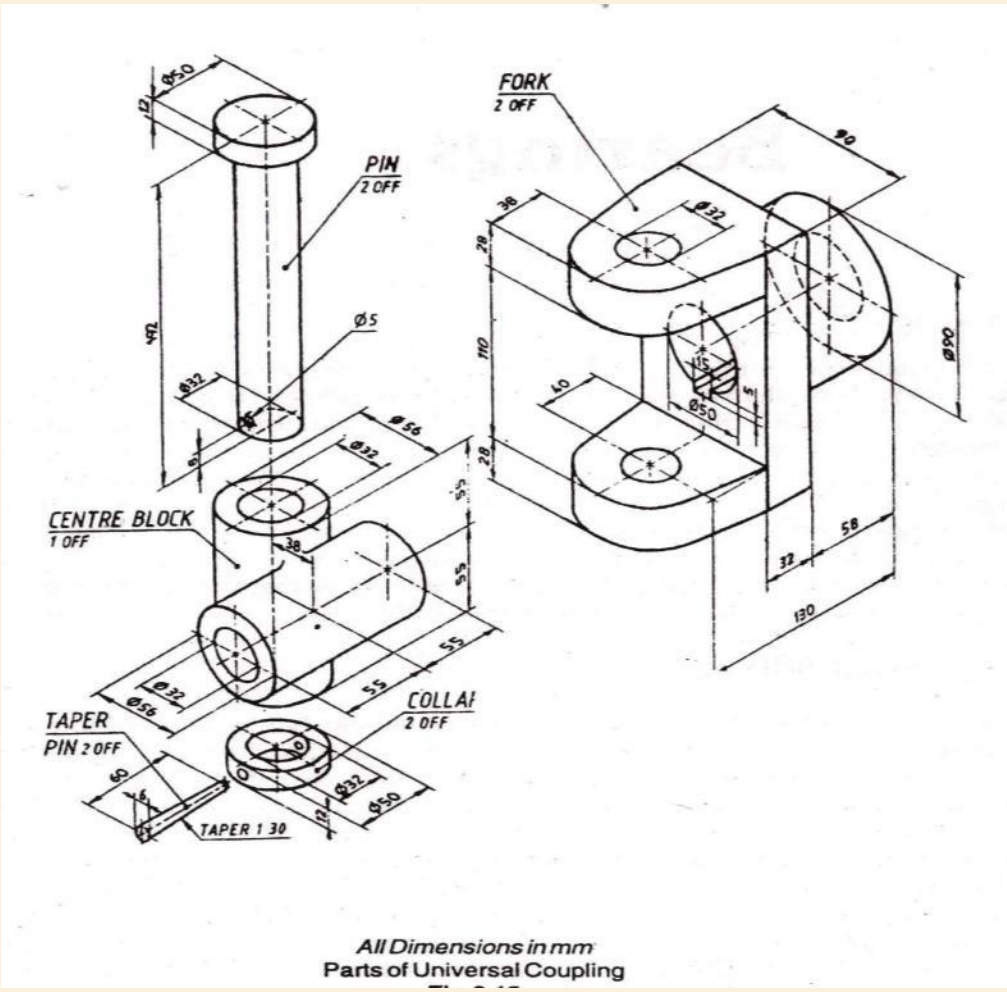


PART NO	DESCRIPTION	MATERIAL	NO OFF
7	TAPER PIN	Fe-410 W	2
6	COLLAR	Fe-410 W	2
5	PIN	Fe-410 W	2
4	PARALLEL KEY	Fe-410 W	2
3	SHAFT	Fe-410 W	2
2	CENTRE	CI	1
1	FORK	CAST STEEL	2

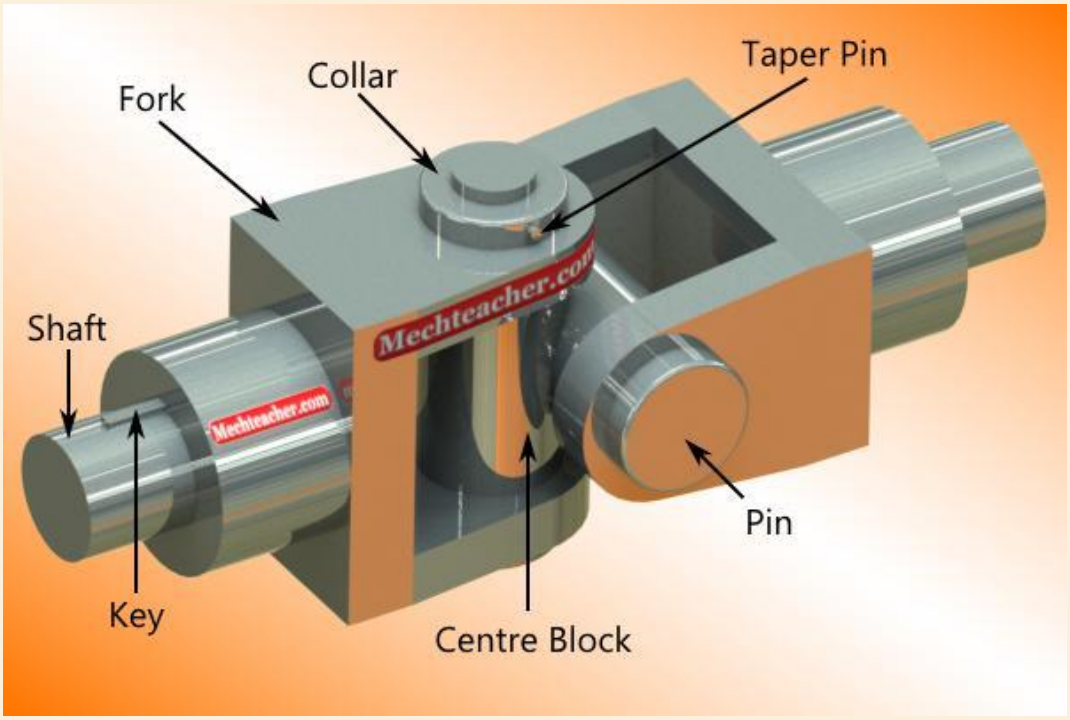
All Dimensions in mm

Details of Universal Coupling



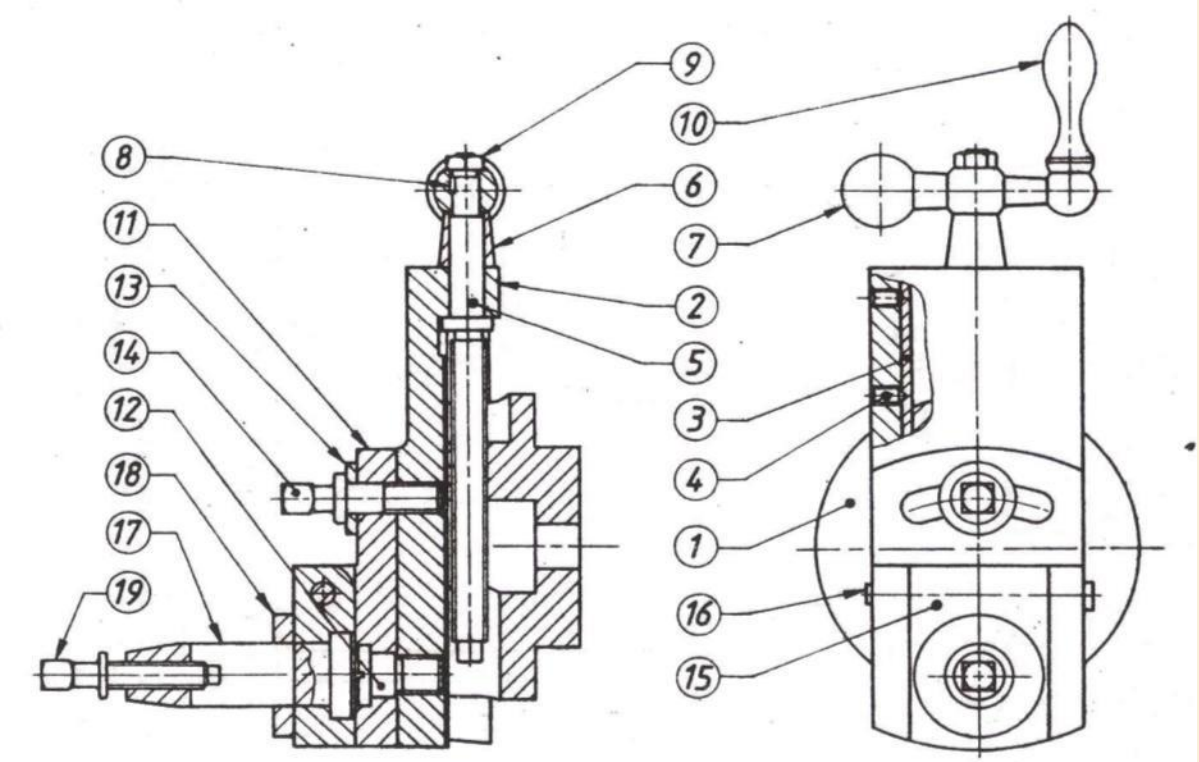


Parts of Universal Coupling

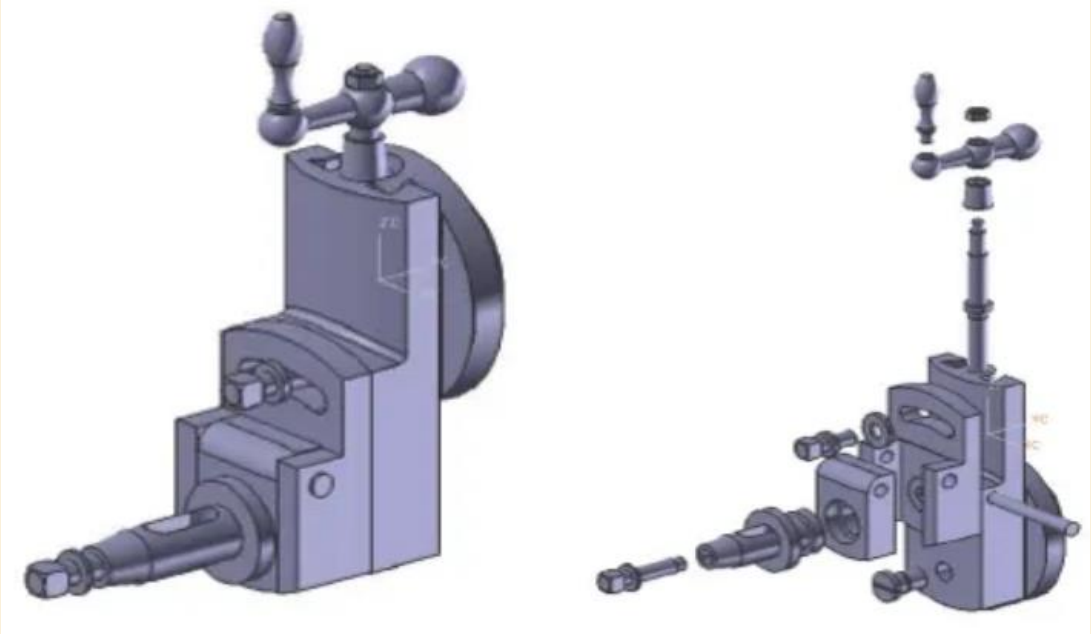

Fork
Collar
Taper Pin
Shaft
Key
Centre Block
Pin
Mechteacher.com

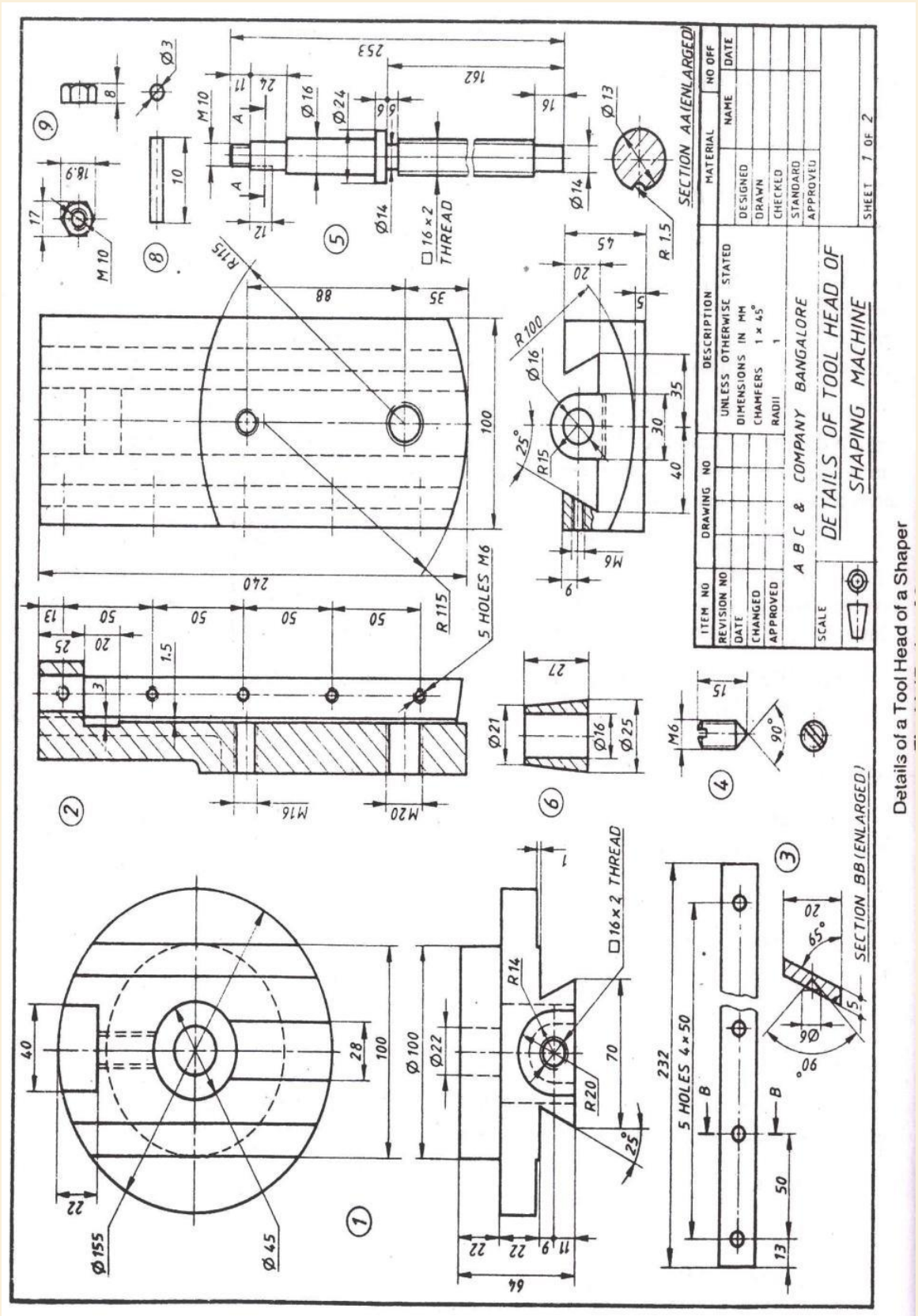
SHAPER TOOL HEAD

The tool head of a shaping machine comprises of the tool holding and the feeding devices with add optional arrangements to set them inclined to the vertical It will be mounted on the front end of the ram of the shaping machine.

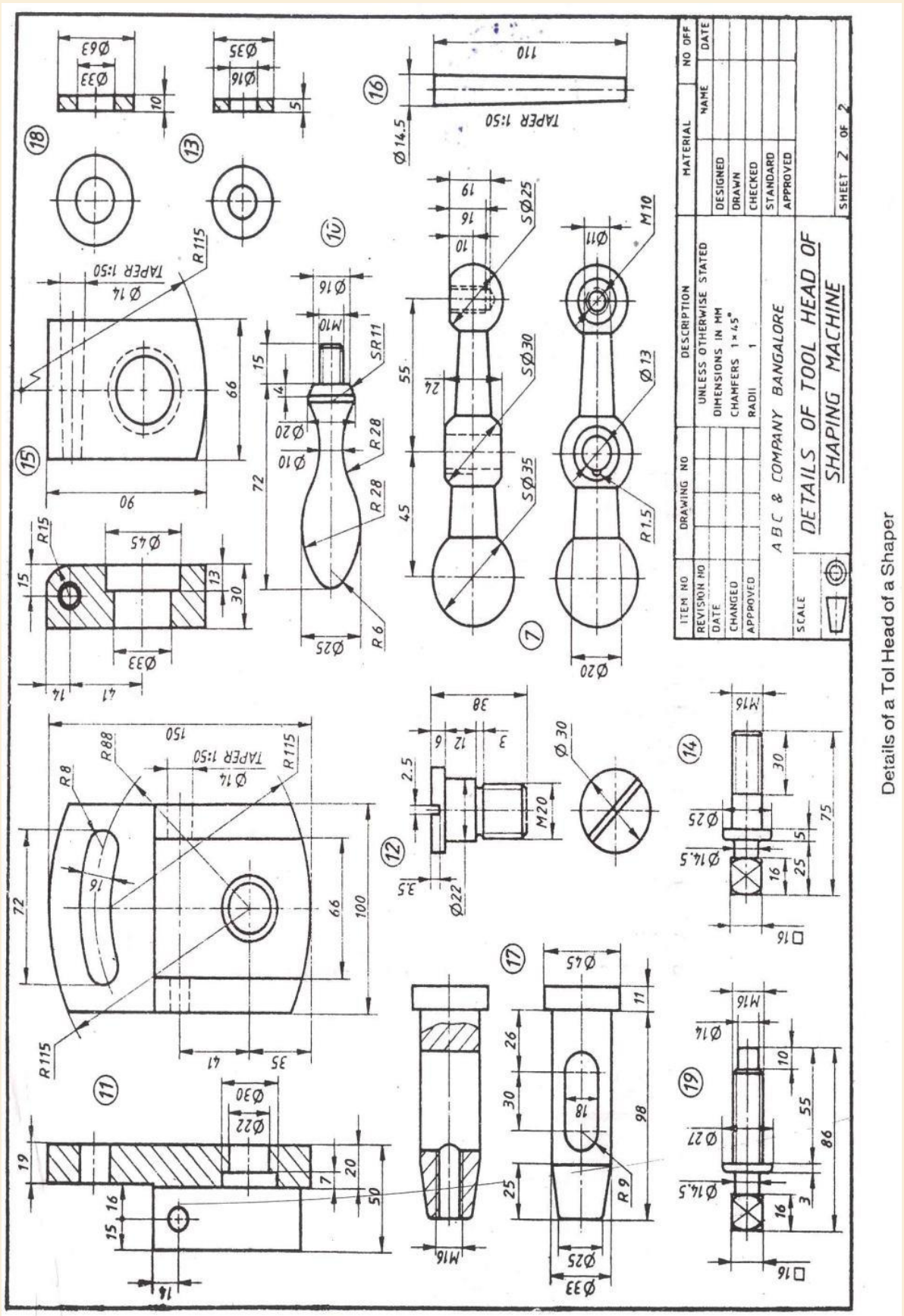


Tool Head of Shaper





Details of a Tool Head of a Shaper



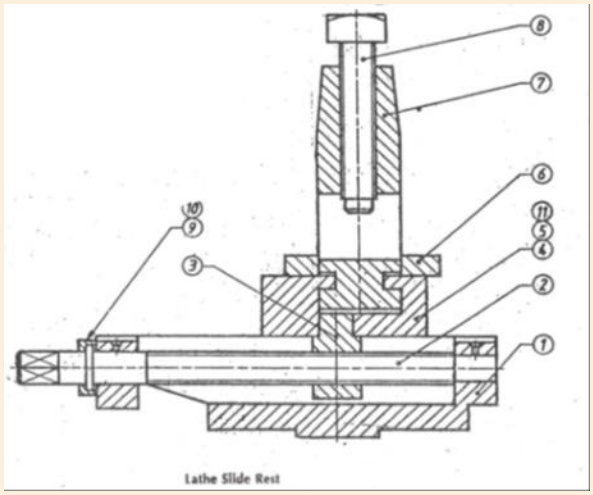
Details of a Tol Head of a Shaper

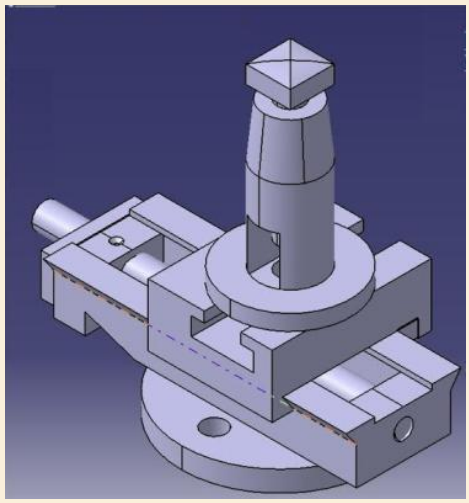
PART NO	DESCRITION	MATERIAL	NO. OFF
1	BACK PLATE	CAST STEEL	1
2	VERTICAL SLIDE	CAST STEEL	1
3	ADJUSTABLE STRIP	Fe 410 W	1
4	GRUB SCREW	Fe 410 W	5
5	SCREW ROD	Fe 410 W	1
6	SPACER BUSH	Fe 410 W	1
7	HANDLE BAR	Fe 410 W	1
8	ROUND KEY	Fe 410 W	1
9	NUT M10	Fe 410 W	1
10	HANDLE	Fe 410 W	1

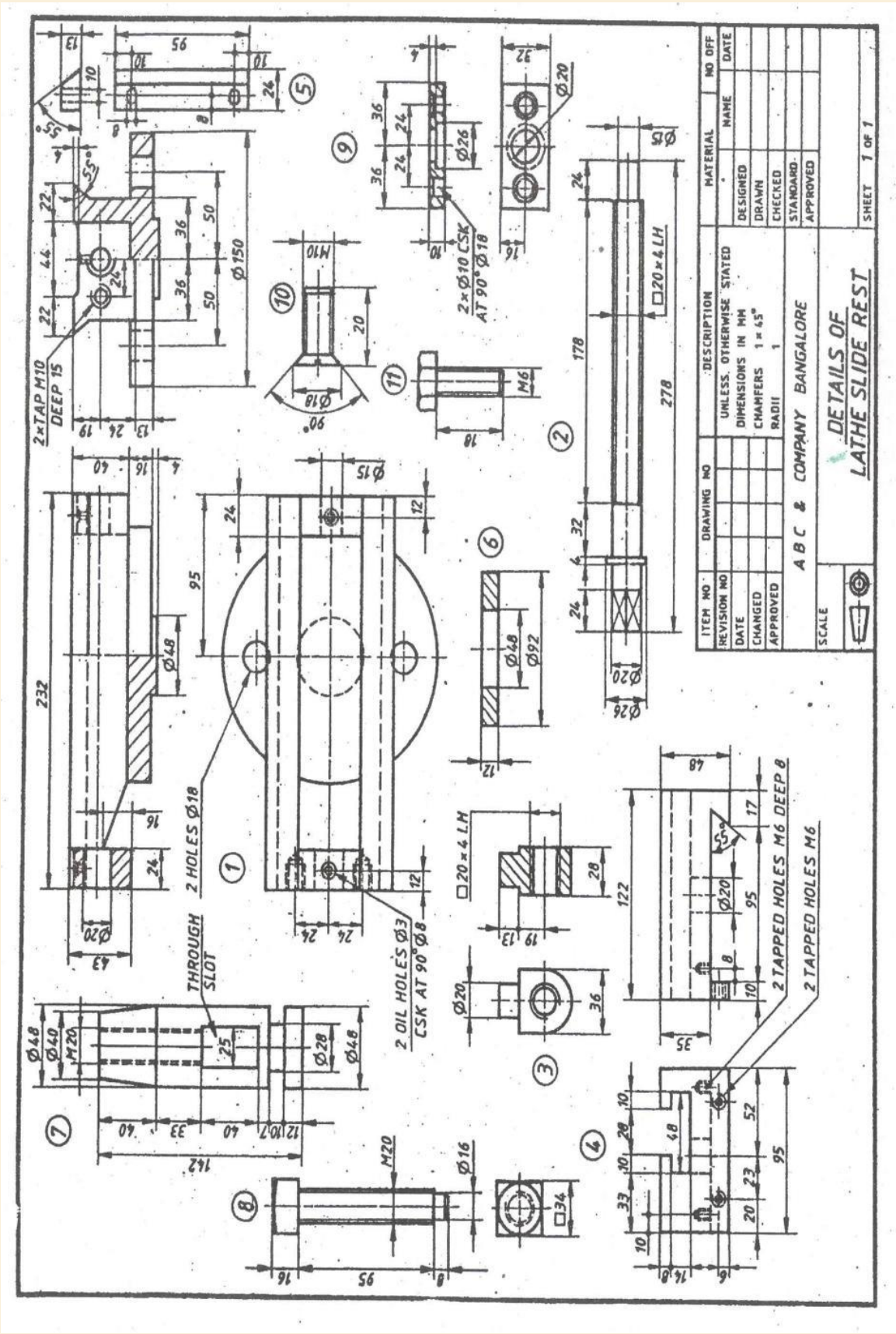
PART NO	DESCRITION	MATERIAL	NO. OFF
11	SWIVEL PLATE	CAST STEEL	1
12	SWIVEL SCREW PIN	Fe 410W	1
13	WASHER	Fe 410W	1
14	CLAMPING SCREW	Fe 410 W	1
15	DRAG PLATE	Fe 410W	1
16	PIVOT PIN	Fe 410 W	1
17	TOOL HOLDER	Fe 410 W	1
18	WASHER	Fe 410W	1
19	TOOL FIXING SCREW	STEEL	1

LATHE SLIDE RES

Compound rest: Compound rest is a part which connects cross slide and compound slide. It has a circular base on which angular graduations are marked. The compound rest can be swiveled to the required angle while turning tapers. A top slide known as compound slide is attached to the compound rest by dove tail joint. Tool post: This is located on top of the compound slide. It is used to hold the tools rigidly. Tools are selected according to the type of operation and mounted on the tool post and adjusted to a convenient working position. There are different types of tool posts and they are: 1. Single screw tool post 2. Four bolt tool post 3. Four-way tool post 4. Open side tool post






ABC & COMPANY BANGALORE
DETAILS OF
LATHE SLIDE REST
SHEET 1 OF 1
SCALE
APPROVED
CHANGED
DATE
REVISION NO
ITEM NO
DRAWING NO
DESCRIPTION
MATERIAL
NO OFF
NAME
DATE
DESIGNED
DRAWN
CHECKED
STANDARD
UNLESS OTHERWISE STATED
DIMENSIONS IN MM
CHAMFERS 1 × 45°
RADII 1
2 HOLES Ø18
THROUGH SLOT
2 OIL HOLES Ø3 CSK AT 90° Ø8
2 TAPPED HOLES M6 DEEP 8
2 TAPPED HOLES M6
2 × Ø10 CSK AT 90° Ø18
2 × TAP M10 DEEP 15
□20 × 4 LH

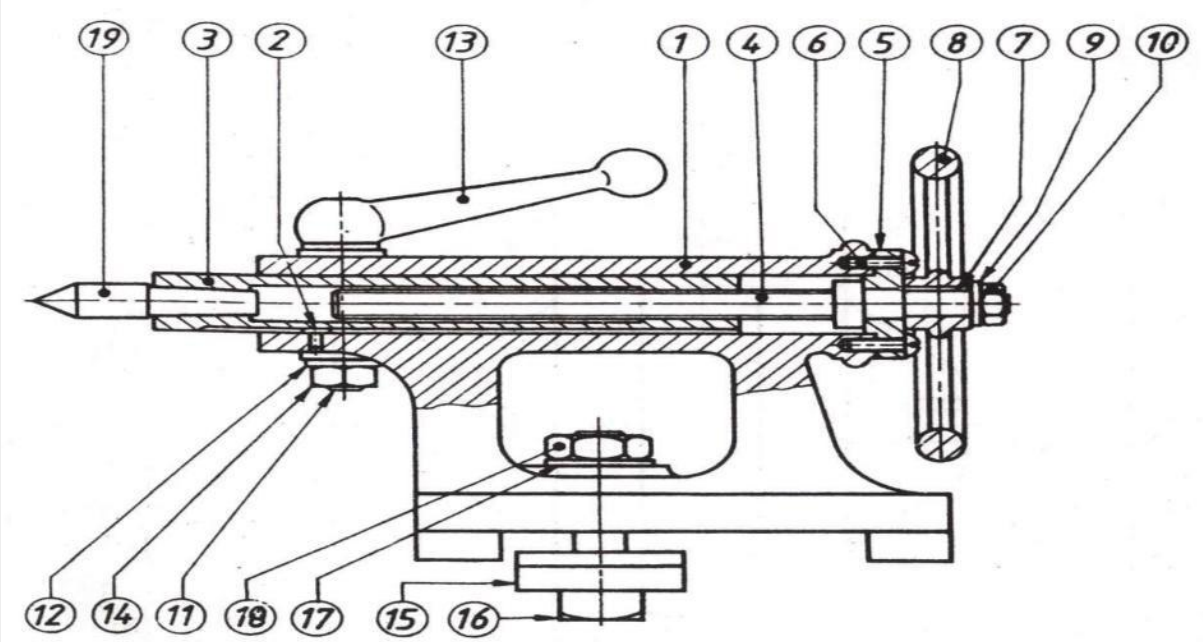
PART NO.	DESCRIPTION	MATERIAL	NO. OFF
1	COMPOUND SLIDE BASE	CAST IRON	1
2	SCREW SPINDLE	Fe 410 W	1
3	SLIDING NUT	CAST IRON	1
4	SLIDE BLOCK	CAST IRON	1
5	WEAR STRIP	CAST IRON	1
6	WASHER	Fe 410 W	1

PART NO.	DESCRIPTION	MATERIAL	NO. OFF
7	TOOL HOLDER	Fe 410 W	1
8	SQ. HEAD SCREW	Fe 410 W	1
9	CLAMP PLATE	Fe 410 W	1
10	CSK SCREW	Fe 410 W	2
11	HEX. SCREW	Fe 410 W	4

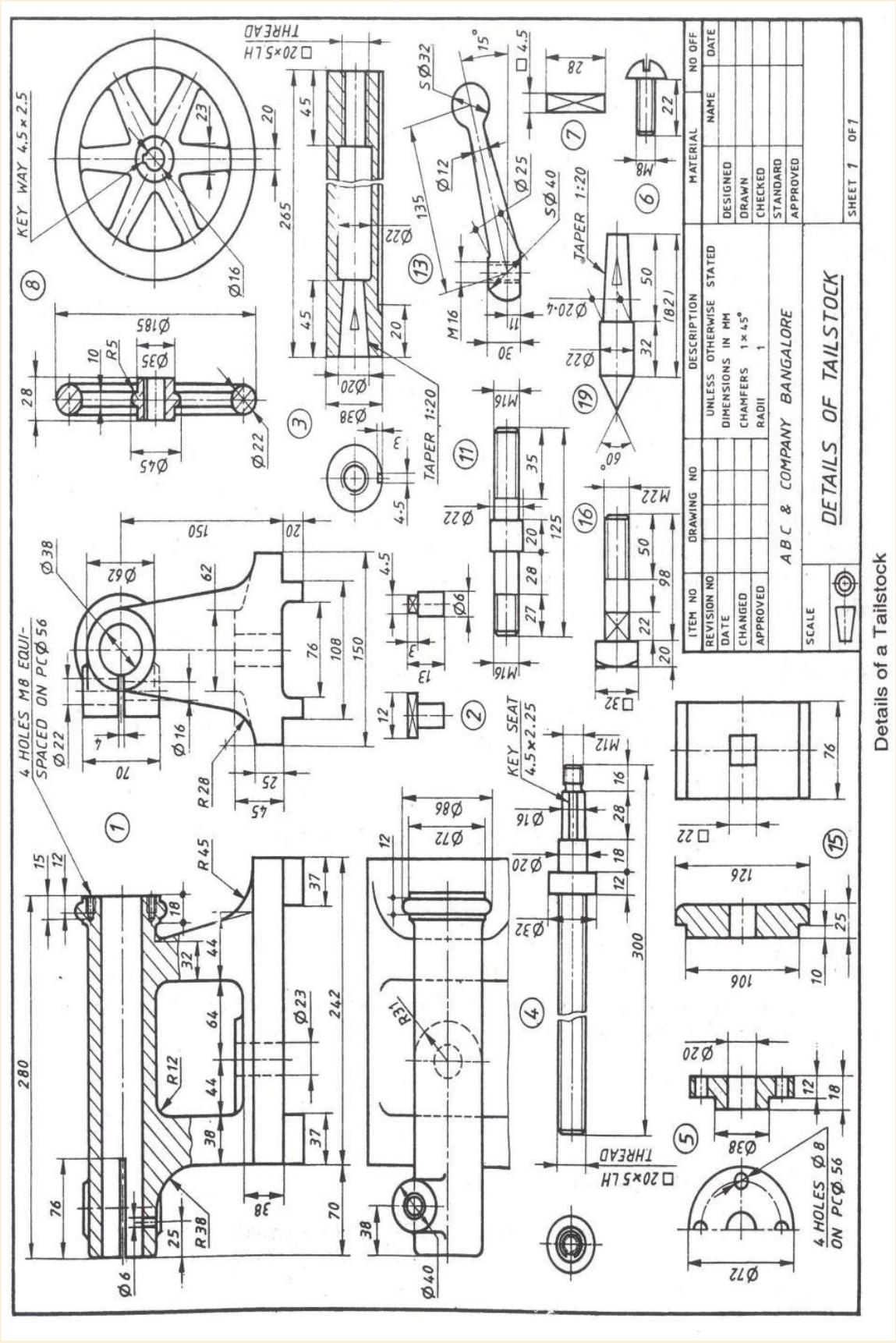
LATHE TAIL STOCK

Tailstock is located on the inner guide ways at the right side of the bed opposite to the headstock. • The body of the tailstock is bored and houses the tailstock spindle or ram. • If the tailstock hand wheel is rotated in the clockwise direction, the spindle advances.

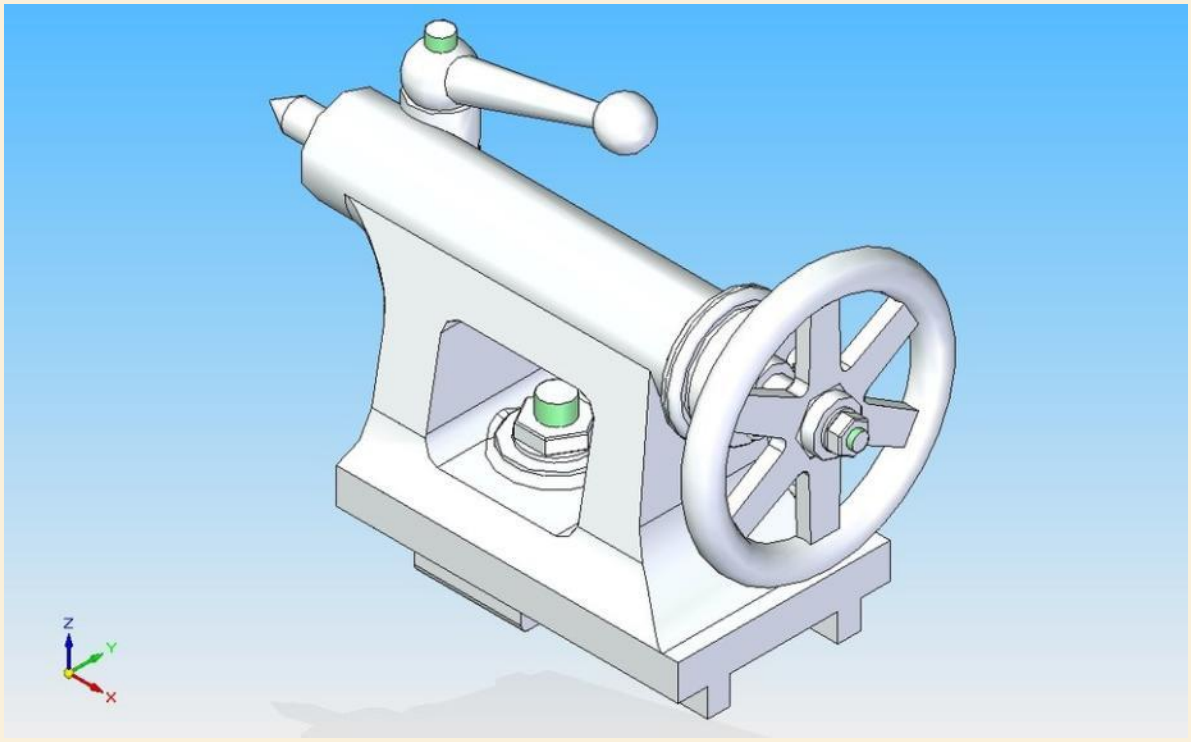
The uses of tailstock • It supports the other end of the long workpiece when it is machined between centres. • It is useful in holding tools like drills, reamers and taps when performing drilling, reaming and tapping. • The dead centre is off set by a small distance from the axis of the lathe to turn tapers by set over method. • It is useful in setting the cutting tool at correct height aligning the cutting edge with lathe axis.



Tailstock



Details of a Tailstock



PART NO	DESCRITION	MATERIAL	NO. OFF
1	BODY	CAST IRON	1
2	FEATHER	Fe 410W	1
3	BARREL	CAST IRON	1
4	SCREW SPINDLE	Fe 410 W	1
5	FLANGE	CAST IRON	1
6	SCREW	Fe 410 W	4
7	FEATHER KEY	Fe 410 W	1
8	HAND WHEEL	CAST IRON	1
9*	WASHER M12 STD	Fe 410 W	1
10*	HEX NUT M12	Fe 410 W	1

PART NO	DESCRITION	MATERIAL	NO. OFF
11	STUD	Fe 410 W	1
12*	WASHER M16 STD	Fe 410W	2
13	HANDLE	CAST IRON	1
14	HEX. NUT M16	Fe 410 W	1
15	CLAMPING PLATE	CAST IRON	1
16	SQ. HEAD BOLT	Fe 410 W	4
17*	WASHER M22 STD	Fe 410 W	1
18	HEX. M22	Fe 410 W	1
19	CENTRE	CAST STEEL	1

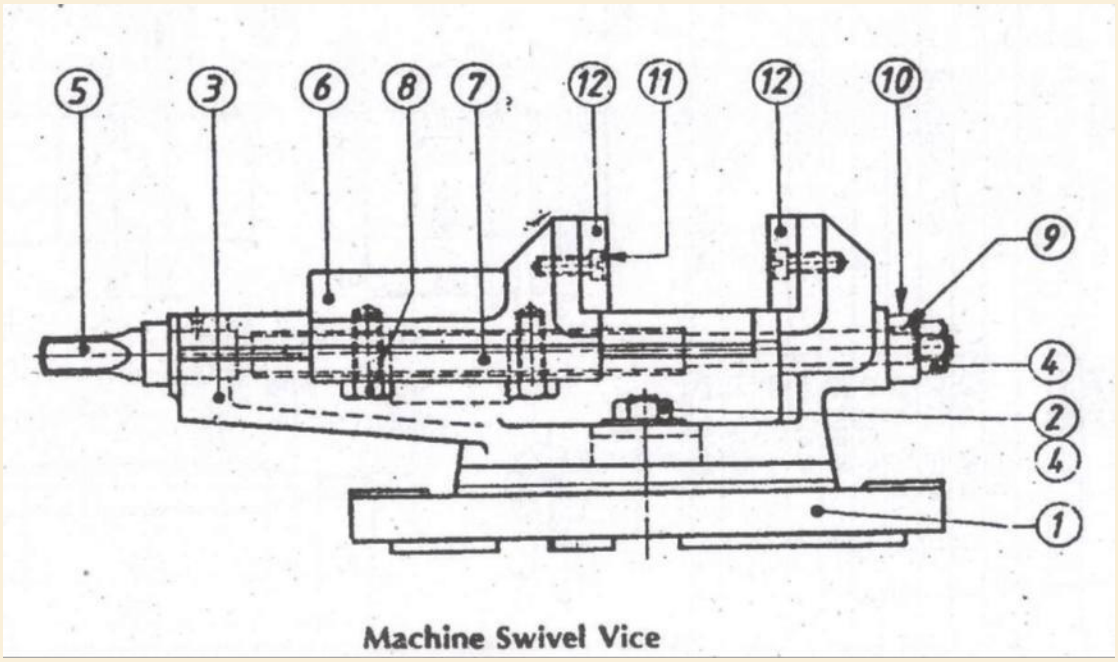
*NOT DRAWN - COMMERCIAL

MACHINE SWIVEL VICE

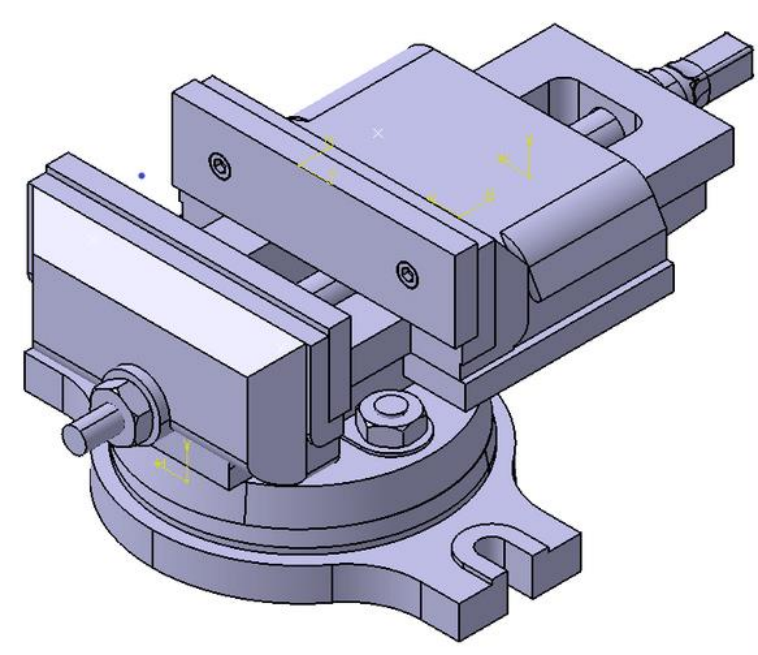
A machine vise — a mechanical device designed to hold work pieces still during machining operations — can function as manual components or as a machining device. Many typical manufacturing facilities use machining vises for applications that have tight tolerances and require high precision. Although there are many merits associated

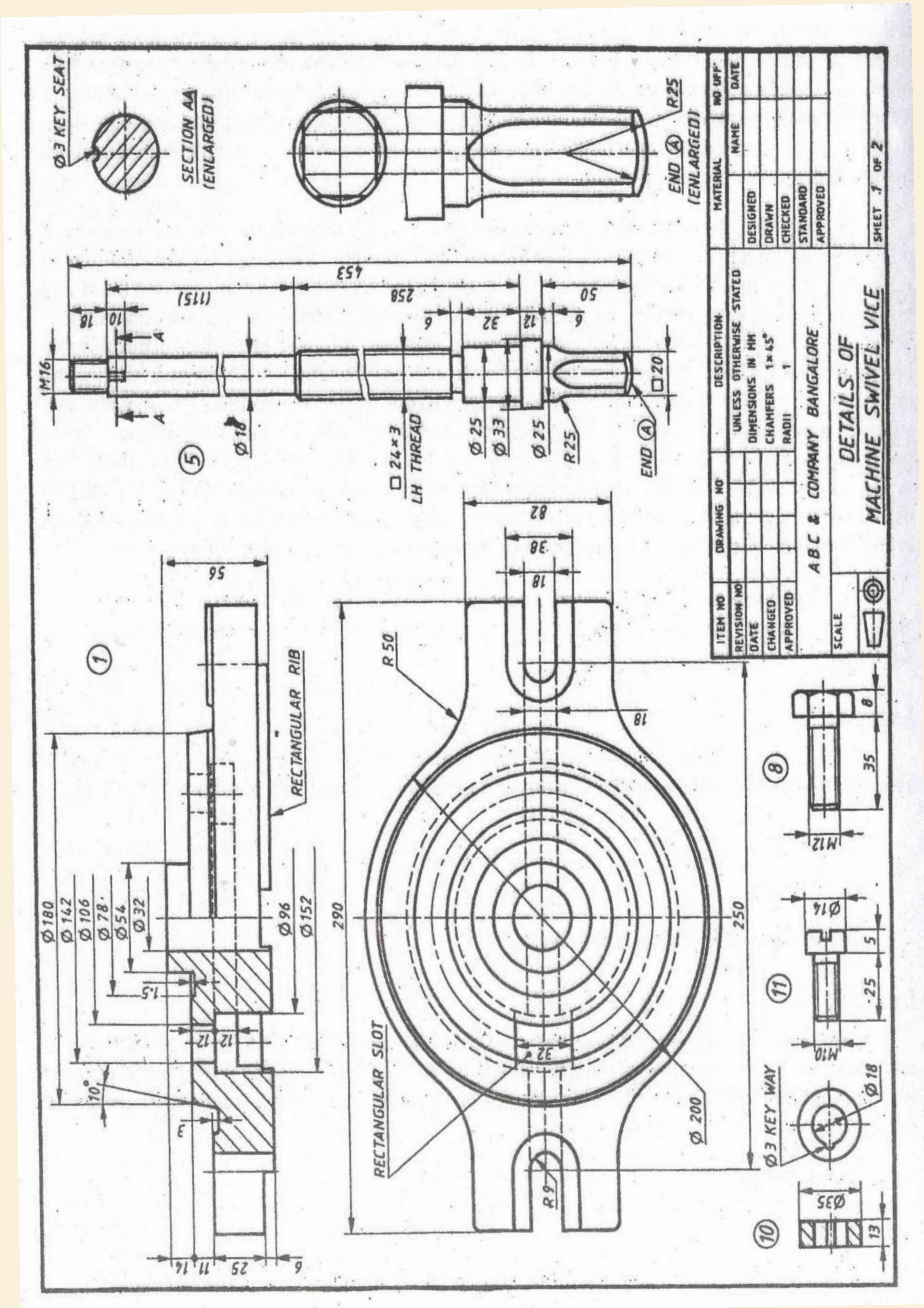
with manual vises, machining vises are often more well-suited to holding a work piece stationary during high-speed machining operations. Because high-speed machining can cause extensive vibrations, machining vises are equipped to dampen vibrations and provide excellent stability.

The milling vise is more rugged than the quick vise, but is still economical and easy to use. The detachable swivel base makes angle adjustments possible. The acme adjusting screw is covered for protection. The milling vise counts on gib-like hold-downs to prevent the movable jaw from lifting. Because there must be some play to allow the jaw to move, there is no way to prevent a small amount of lift as the vise jaws are tightened.

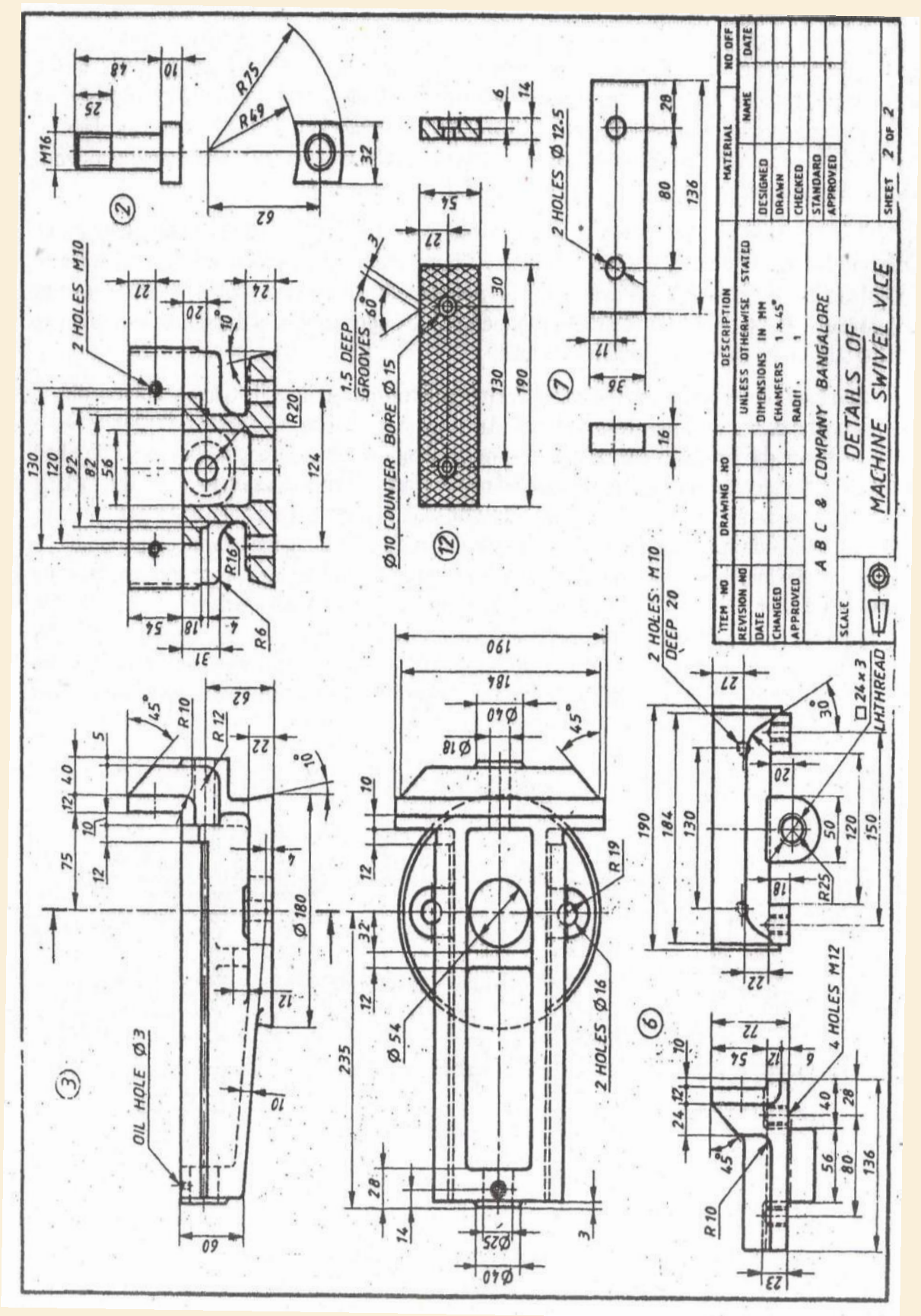


Machine Swivel Vice





Ø3 KEY SEAT
SECTION AA
(ENLARGED)
END (A)
(ENLARGED)
R25
453
(115)
258
50
M16
Ø18
□ 24×3
LH THREAD
Ø25
Ø33
Ø25
R25
END (A)
□20
RECTANGULAR RIB
RECTANGULAR SLOT
R50
Ø200
R9
290
250
Ø3 KEY WAY
Ø18
Ø35
M12
35
M10
Ø14
ITEM NO
REVISION NO
DATE
CHANGED
APPROVED
DRAWING NO
DESCRIPTION
UNLESS OTHERWISE STATED
DIMENSIONS IN MM
CHAMFERS 1×45°
RADII 1
MATERIAL
NAME
DATE
DESIGNED
DRAWN
CHECKED
STANDARD
APPROVED
A B C & COMPANY BANGALORE
DETAILS OF
MACHINE SWIVEL VICE
SCALE
SHEET 1 OF 2

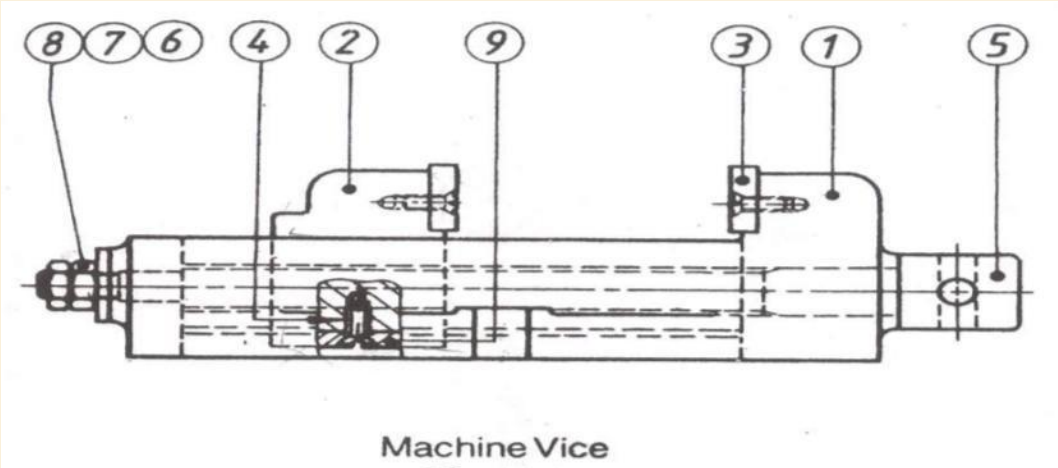

DETAILS OF
MACHINE SWIVEL VICE
A B C & COMPANY BANGALORE
SHEET 2 OF 2
2 HOLES M10
2 HOLES Ø 12.5
1.5 DEEP GROOVES
Ø10 COUNTER BORE Ø 15
2 HOLES M10 DEEP 20
24 x 3 LH THREAD
OIL HOLE Ø3
2 HOLES Ø16
4 HOLES M12

PART NO.	DESCRIPTION	MATERIAL	NO. OFF
1	BASE PLATE	CAST IRON	1
2	CLAMPING BOLTS	Fe 410 W	2
3	SWIVEL BODY	CAST STEEL	1
4*	HEX. NUT M16	Fe 410 W	2
5	SCREW ROD	Fe 410 W	1
6	MOVING JAW	CAST STEEL	1

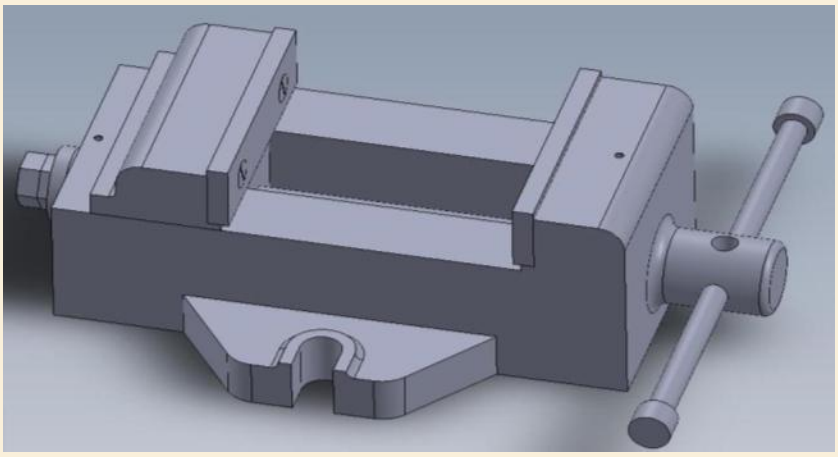
PART NO.	DESCRIPTION	MATERIAL	NO. OFF
7	SOLE PLATE	Fe 410 W	2
8	HEX. HEAD SCREW M12	Fe 410 W	4
9*	ROUND KEY ϕ3 x 10L	Fe 410 W	1
10	COLLAR	Fe 410 W	1
11	SOCKET HEAD SCREW M10	Fe 410 W	4
12	JAW PLATE	HARD STEEL	2

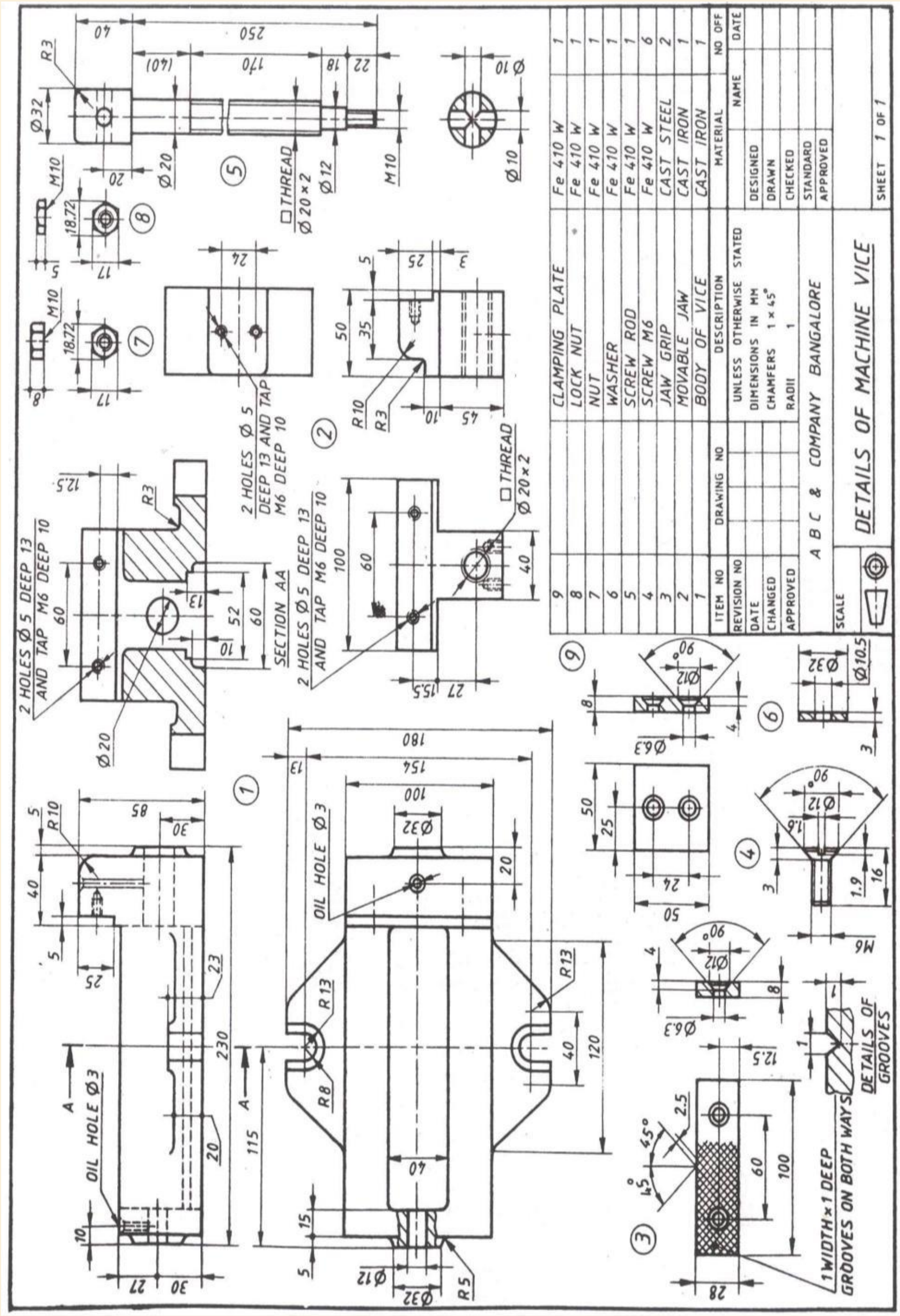
MACHINE VICE

A Machine vise — a mechanical device designed to hold workpieces still during machining operations — can function as manual components or as a machining device. Many typical manufacturing facilities use machining vises for applications that have tight tolerances and require high precision. Although there are many merits associated with manual vises, machining vises are often more well-suited to holding a work piece stationary during high-speed machining operations. Because high-speed machining can cause extensive vibrations, machining vises are equipped to dampen vibrations and provide excellent stability.



Machine Vice



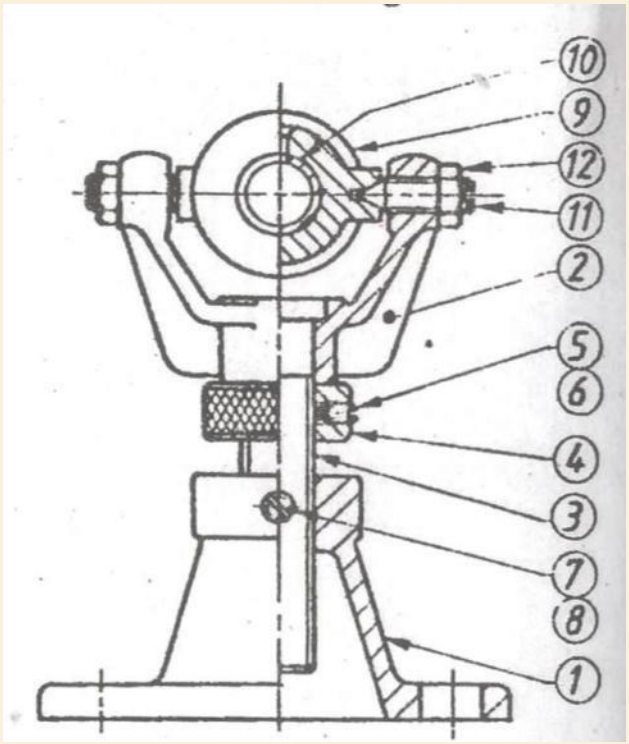

DETAILS OF MACHINE VICE
A B C & COMPANY BANGALORE
9 CLAMPING PLATE Fe 410 W 1
8 LOCK NUT Fe 410 W 1
7 NUT Fe 410 W 1
6 WASHER Fe 410 W 1
5 SCREW ROD Fe 410 W 1
4 SCREW M6 Fe 410 W 6
3 JAW GRIP CAST STEEL 2
2 MOVABLE JAW CAST IRON 1
1 BODY OF VICE CAST IRON 1
ITEM NO DRAWING NO DESCRIPTION MATERIAL NO OFF
UNLESS OTHERWISE STATED
DIMENSIONS IN MM
CHAMFERS 1 × 45°
RADII 1
DESIGNED
DRAWN
CHECKED
STANDARD
APPROVED
NAME DATE
SCALE
SHEET 1 OF 1
SECTION AA
DETAILS OF GROOVES
1 WIDTH × 1 DEEP GROOVES ON BOTH WAYS

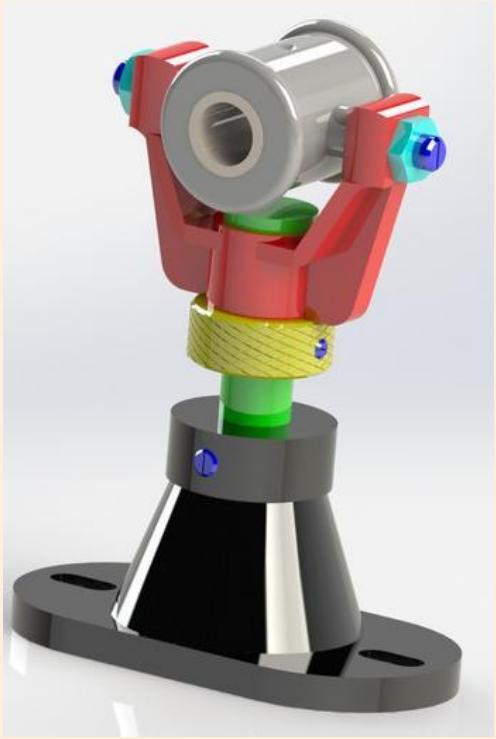
SWIVEL BEARING

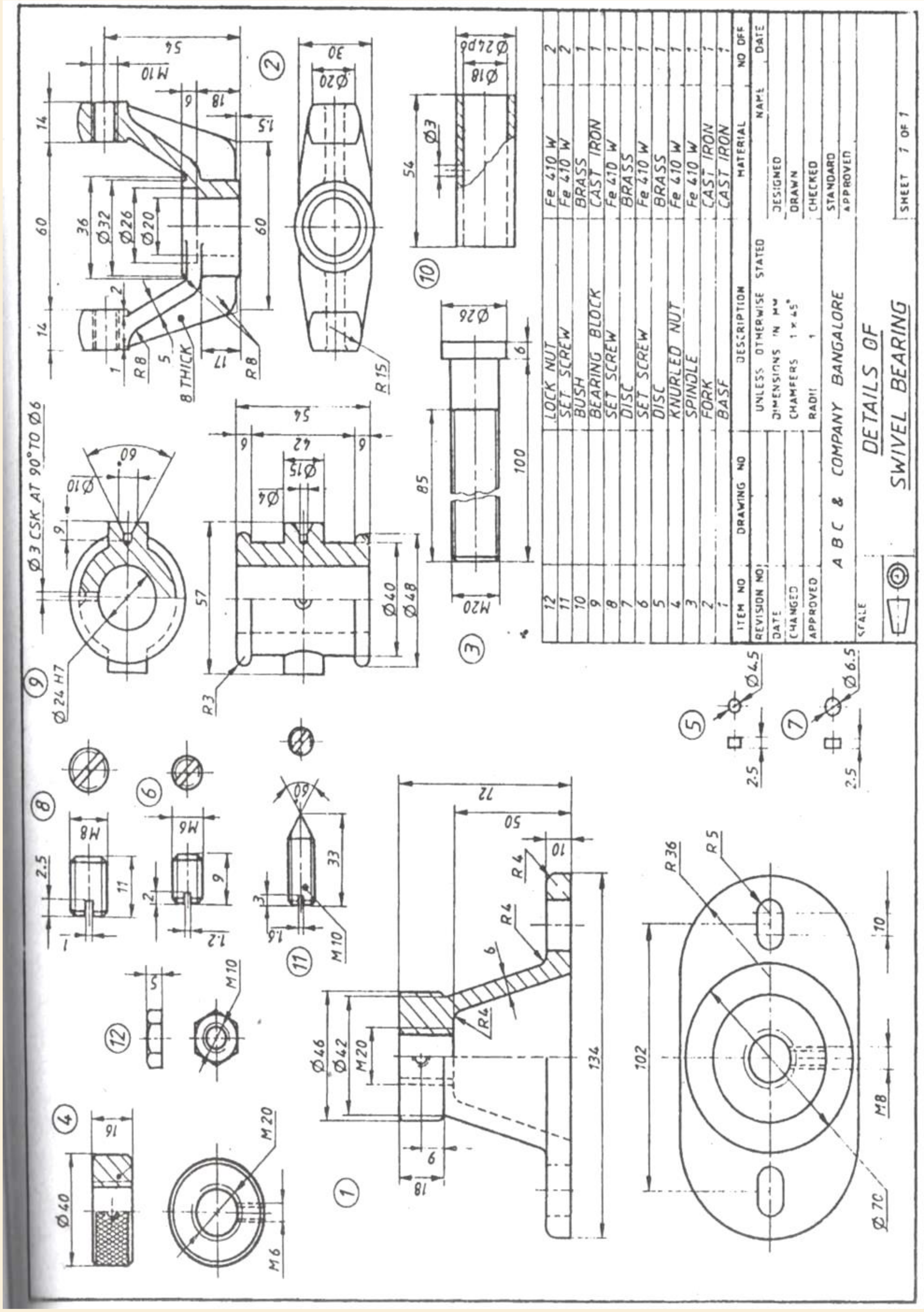
Swivel bearing is used to support and adjust itself the position of the shaft when there is possibility of slight misalignment. Figure shows the details of a swivelling or self-aligning bearing. If consists of the fork 3 which is fitted into the body 1 by means of the spindle 4, and by adjusting the spindle position, the fork may be elevated to any required height. It is then free to swivel in a horizontal plane.

The bearing 2, is then supported in the fork by means of two set screws 8. The connection between the fork and the screws is such that, the bearing is free to swivel in a vertical plane. The flexibility in both the planes is thus made available.

Accurate alignment may be obtained by screw height and slide adjustments. After the required adjustments are made to suit the shaft position, these are then locked.







DETAILS OF SWIVEL BEARING
A B C & COMPANY BANGALORE
ITEM NO
DESCRIPTION
MATERIAL
NO OFF
LOCK NUT
SET SCREW
BUSH
BEARING BLOCK
DISC
KNURLED NUT
SPINDLE
FORK
BASE
Fe 410 W
BRASS
CAST IRON
UNLESS OTHERWISE STATED
DIMENSIONS IN MM
SHEET 1 OF 1

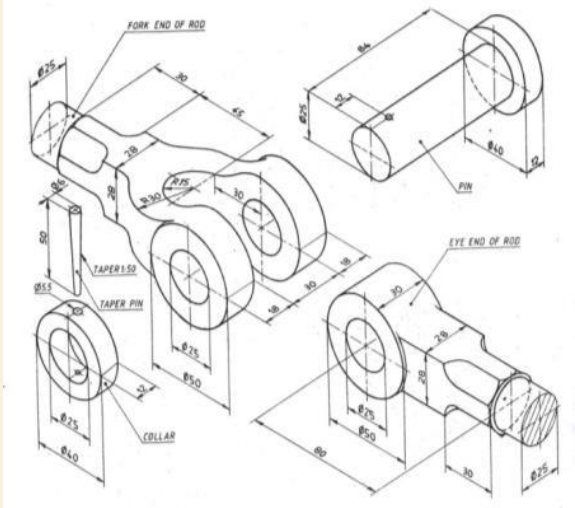
KNUCKLE JOINT

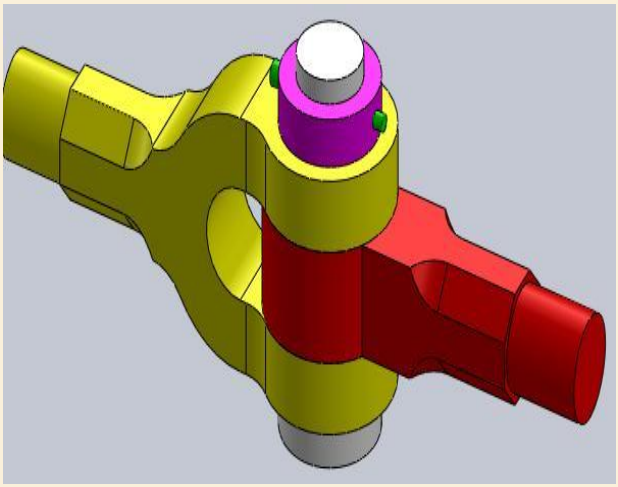
A knuckle joint is a mechanical joint used to connect two rods which are under a tensile load, when there is a requirement of small amount of flexibility, or angular moment is necessary. There is always axial or linear line of action of load.[1]

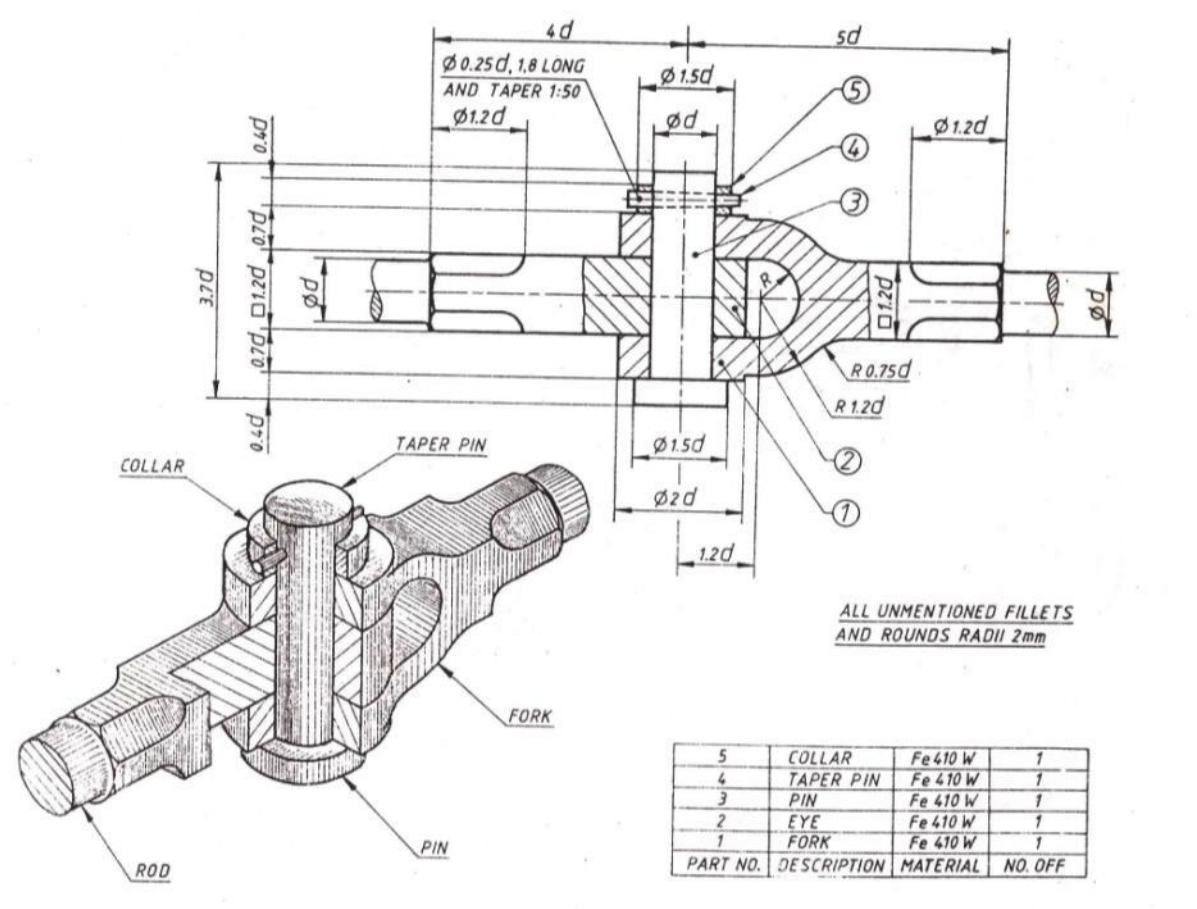
The knuckle joint assembly consists of the following major components:

1. Single eye.
2. Double eye or fork
3. Knuckle pin.

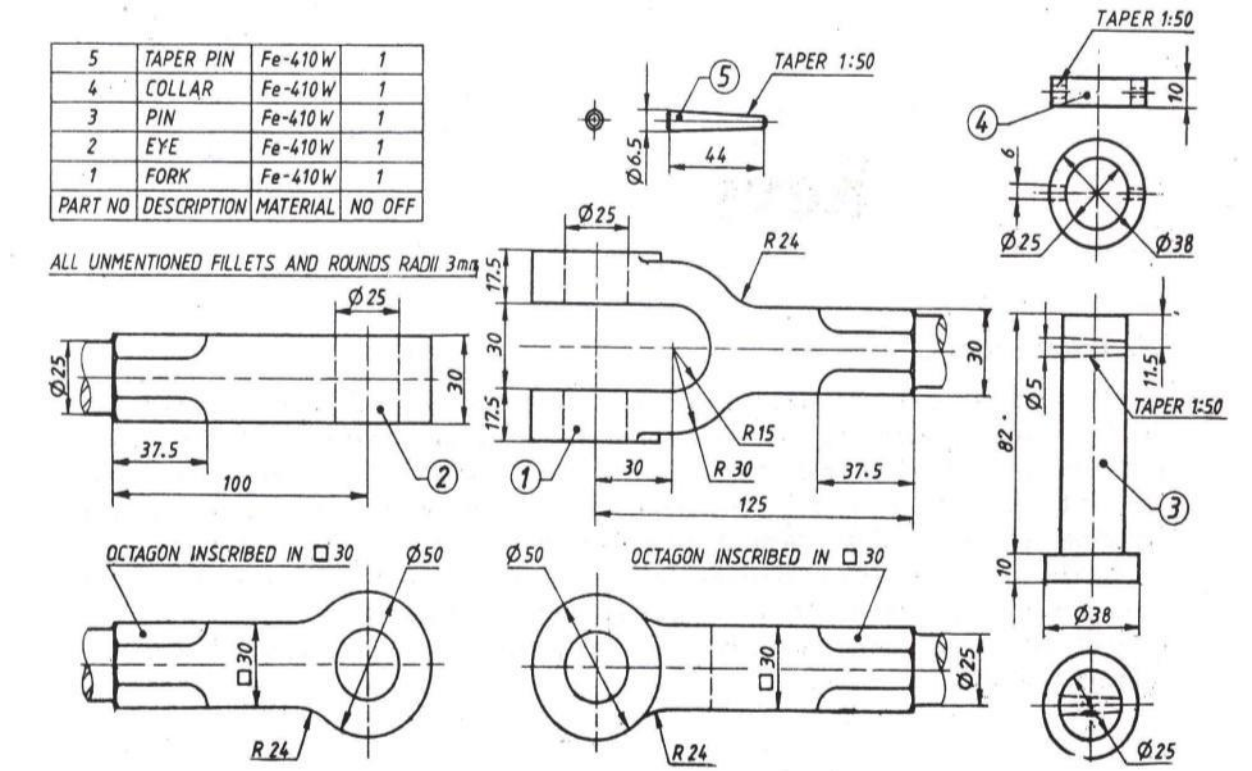
At one end of the rod the a single eye is formed and a double eye is formed at the other end of the rod. Both, single and double eye are connected by a pin inserted through the eye. The pin has a head at one end and at other end there is a taper pin or split pin. For gripping purpose, the ends of the rod are of octagonal forms. Now, when the two eyes are pulled apart, the pin holds them together. The solid rod portion of the joint in this case is much stronger than the portion through which the pin passes.





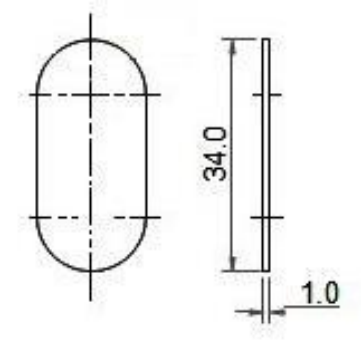


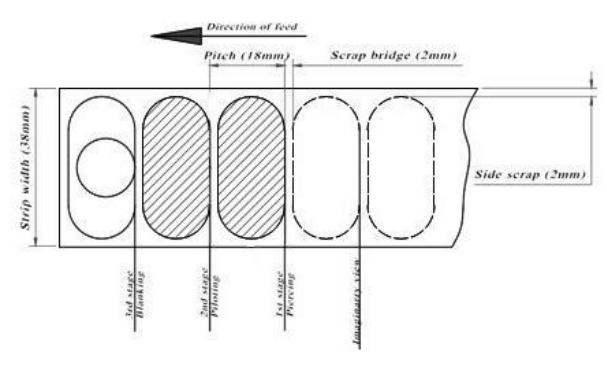
PART NO.	DESCRIPTION	MATERIAL	NO. OFF
5	COLLAR	Fe 410 W	1
4	TAPER PIN	Fe 410 W	1
3	PIN	Fe 410 W	1
2	EYE	Fe 410 W	1
1	FORK	Fe 410 W	1



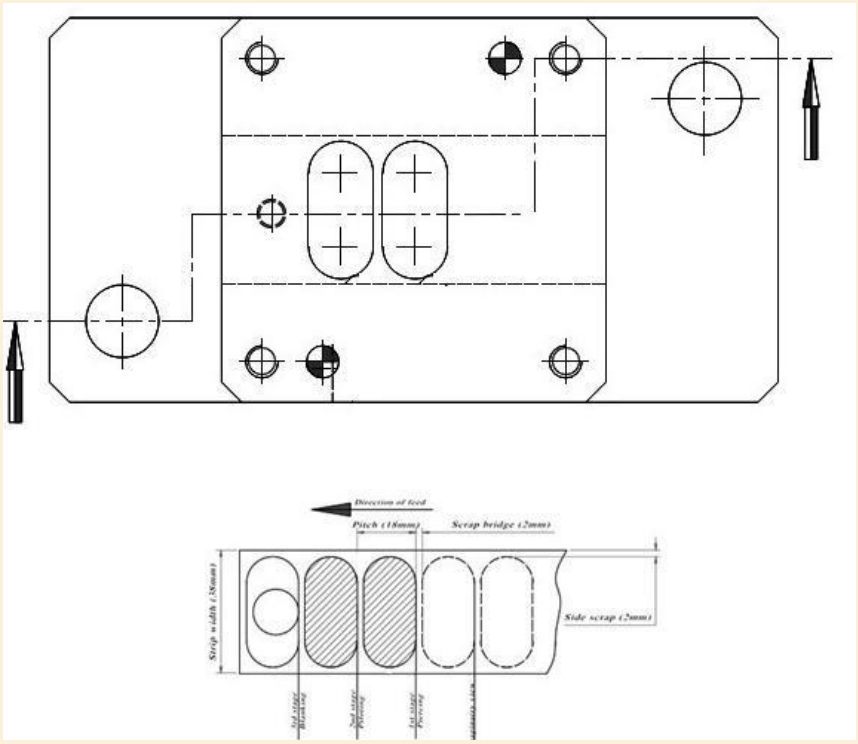
BLANKING TOOL

Blanking – shearing a closed outline (desired part called blank) Blanking is a basic and initial operation which is done in the press tool process. Here rear pillared press tool is designed and the guide pin is diagonally located so operator easily feed the strip. And Shear force required to blank the sheet is calculated to get the press tonnage. Press tonnage means total capacity of the press machine to be selected for blanking considering all the criteria. Clearance is calculated and incorporated while designing of punch and die.in the blanking tool is design like a compound tool so in this cause two blank parts produces in a single shot.

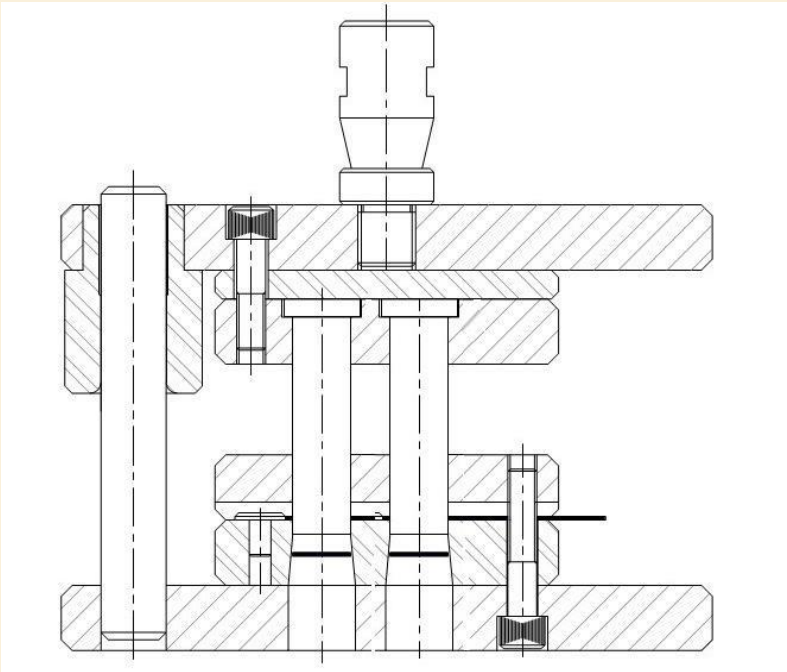




COMPONENT AND STRIP LAYOUT

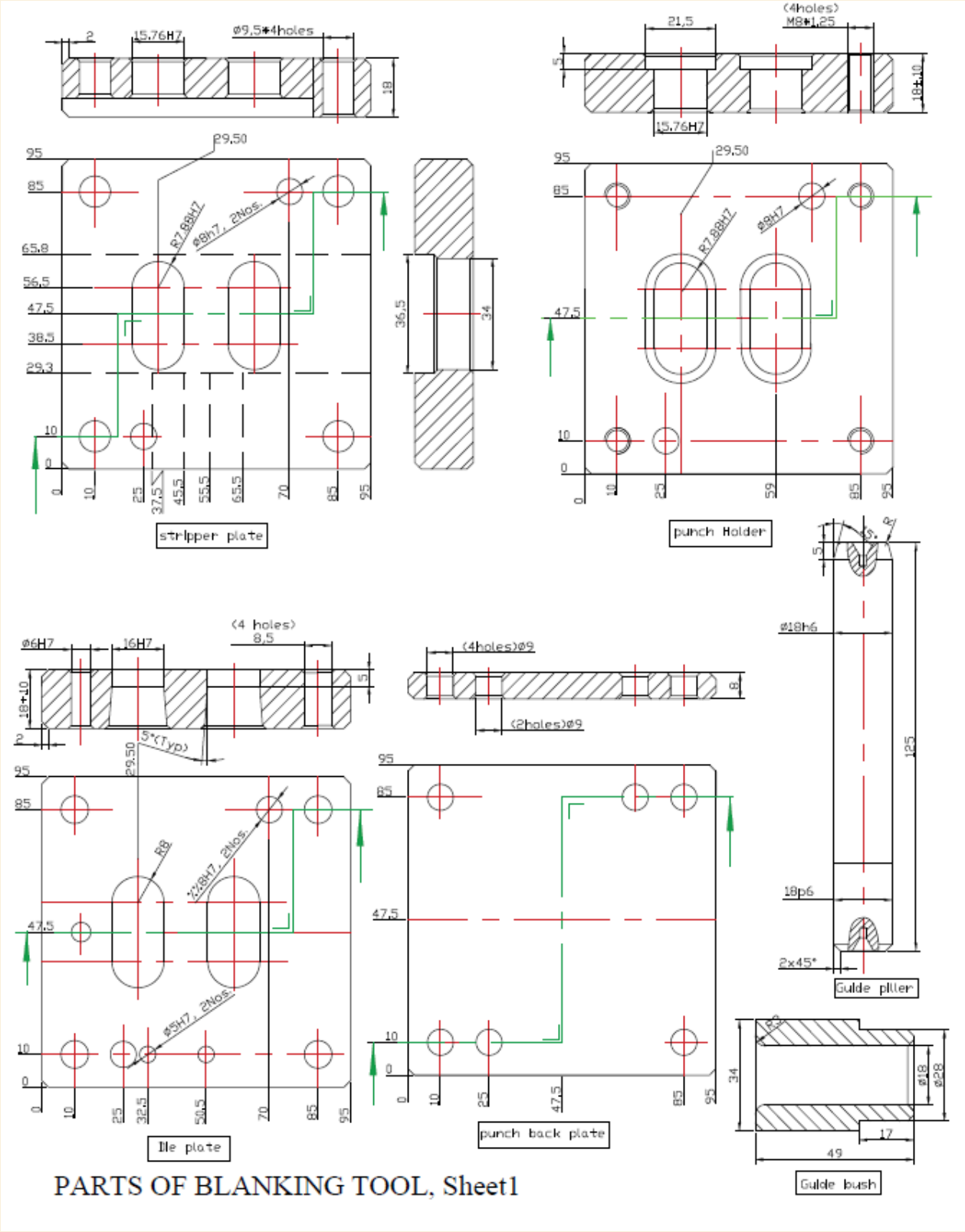


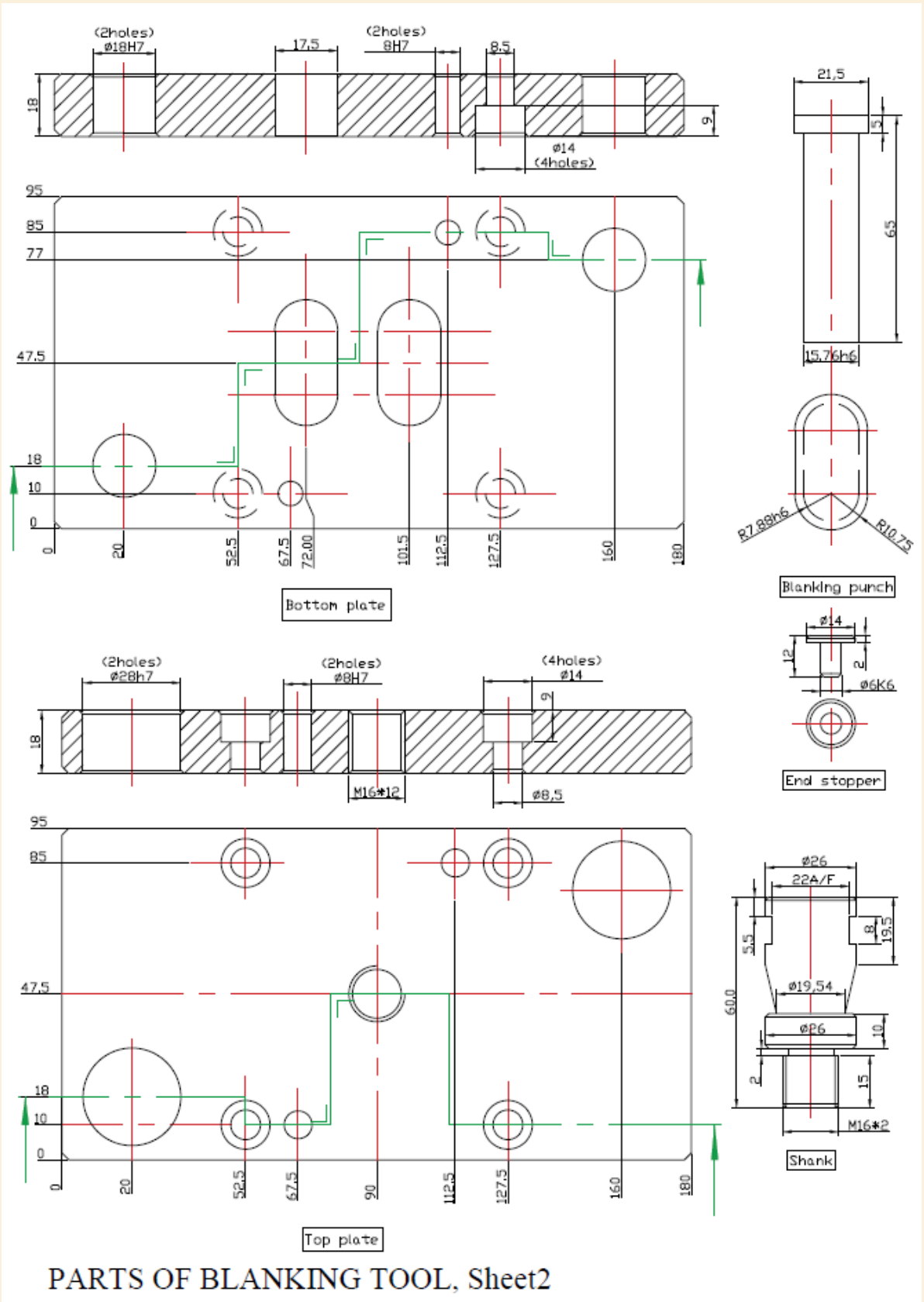
DIE LAYOUT



FRONT ELEVATION

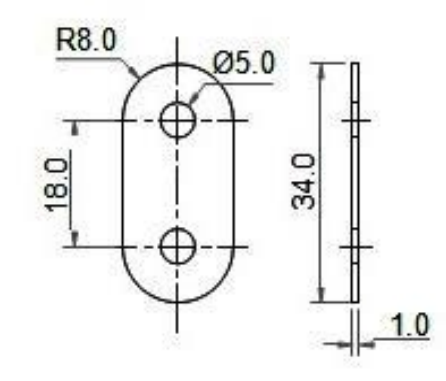
SL No.	DRAWING NO	DESCRIPTION	MATERIAL	NO OFF
13		DOWELL	STD	04
12		ALLEN SCREW	STD	08
11		SHANK	ST-42	01
10		STOPPER	ST-42	01
09		GUIDE BUSH	OHNS	02
08		GUIDE PILLER	OHNS	02
07		BLANKING PUNCH	HCHCr	02
06		PUNCH BACK PLATE	ONNS	01
05		PUNCH HOLDER	ST-42	01
04		STRIPPER PLATE	OHNS	01
03		DIE PLATE	HCHCr	01
02		TOP PLATE	ST-42	01
01		BOTTOM PLATE	ST-42	01

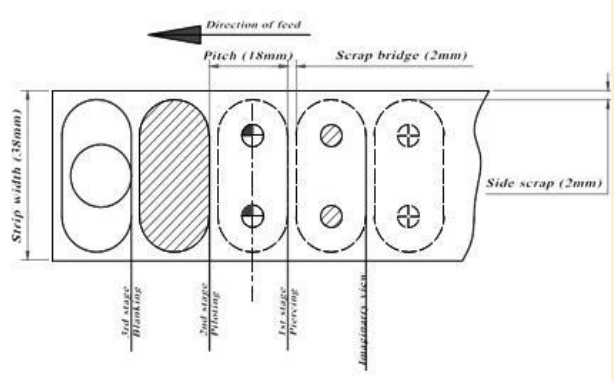

stripper plate
punch Holder
Ile plate
punch back plate
Gulde plller
Gulde bush
PARTS OF BLANKING TOOL, Sheet1



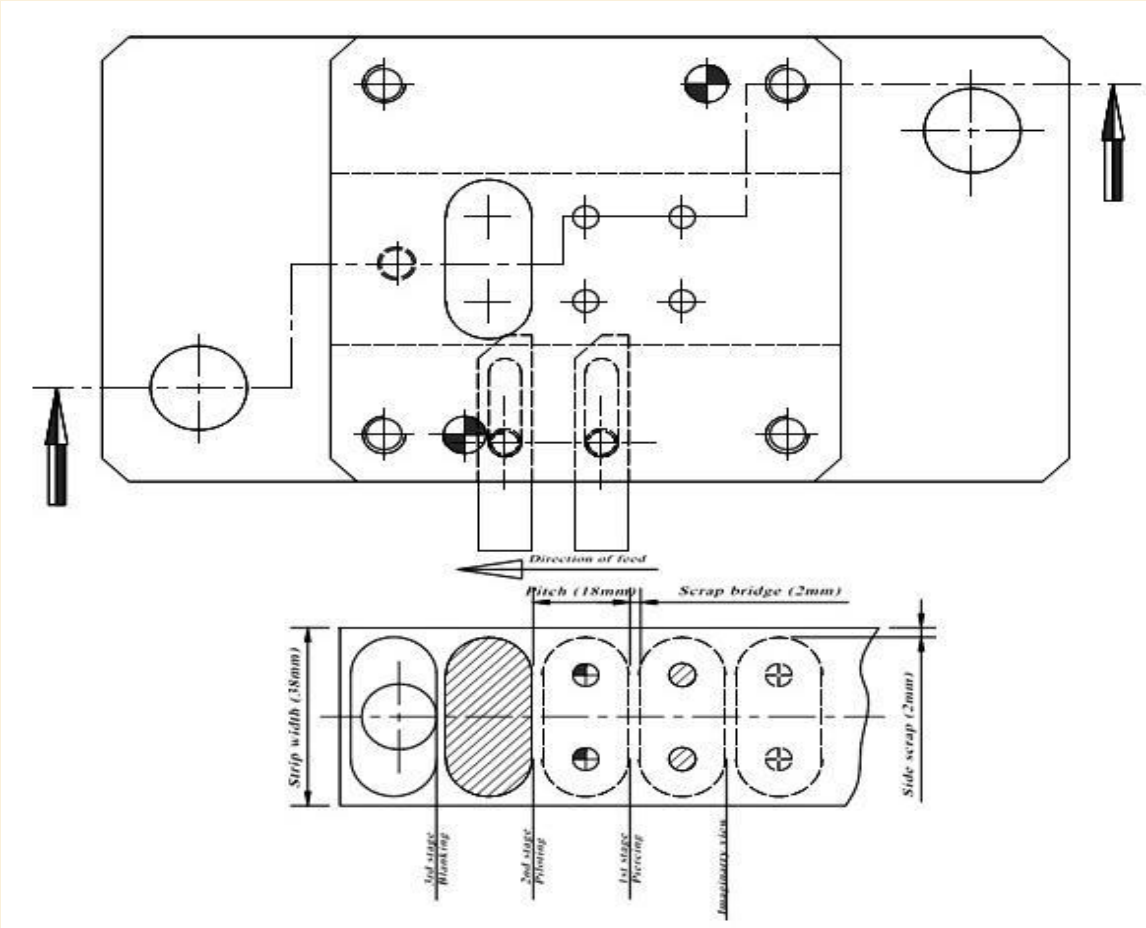
PARTS OF BLANKING TOOL, Sheet2

PROGRESSIVE TOOL A progressive tool differs from a stage tool in the following respect: in a progressive tool the final component is obtained by progressing the sheet metal or strip in more than one stage. At each stage the tool will progressively shape the component towards its final shape, with the final stage normally being cutting-off.

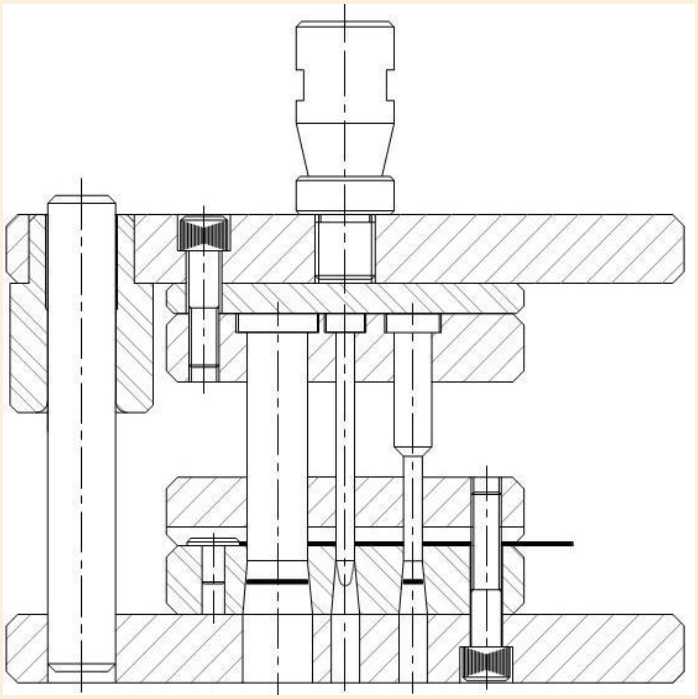




COMPONENT AND STRIP LAYOUT

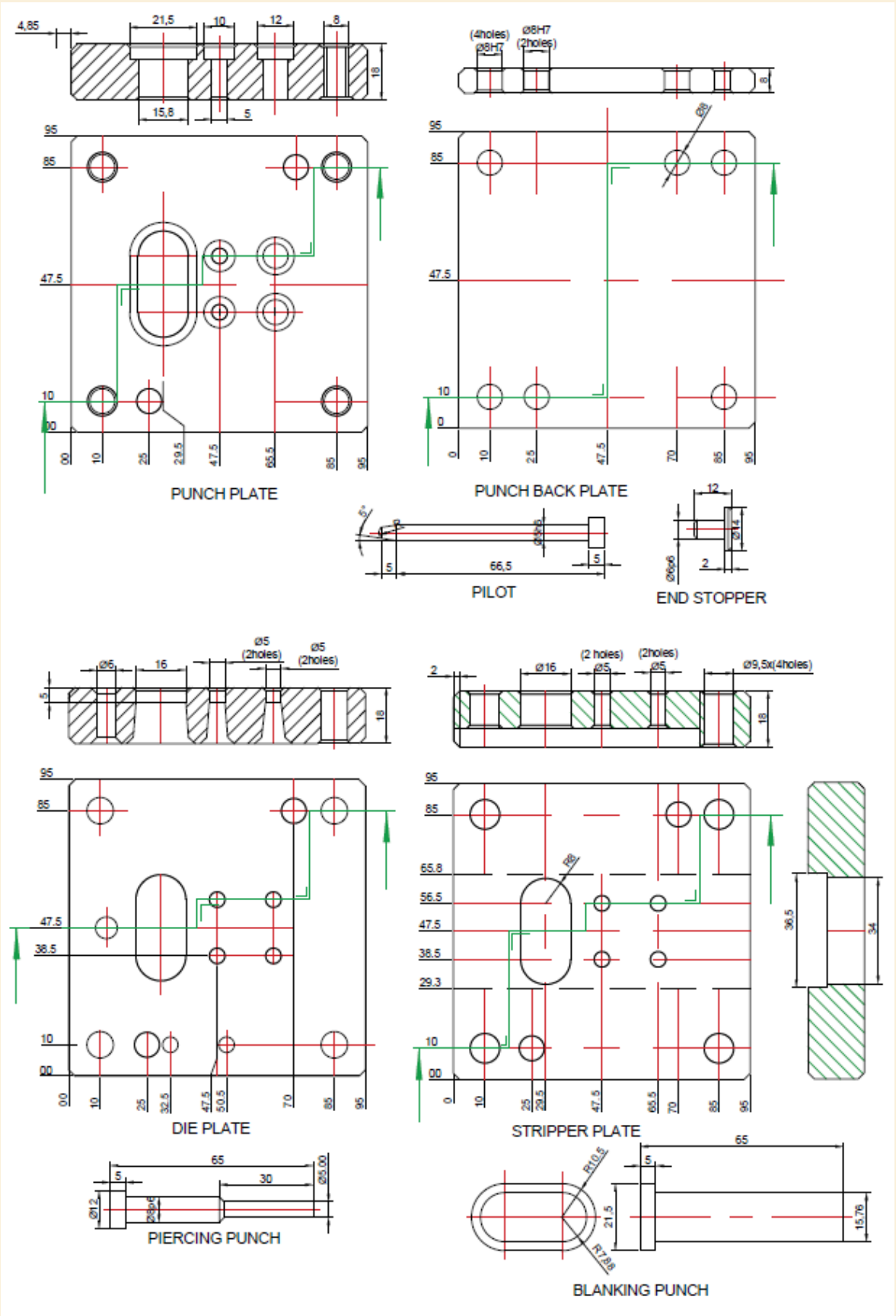

Direction of feed
Pitch (18mm)
Scrap bridge (2mm)
Strip width (38mm)
Side scrap (2mm)
3rd stage Blanking
2nd stage Piloting
1st stage Piercing
Auxiliary slot

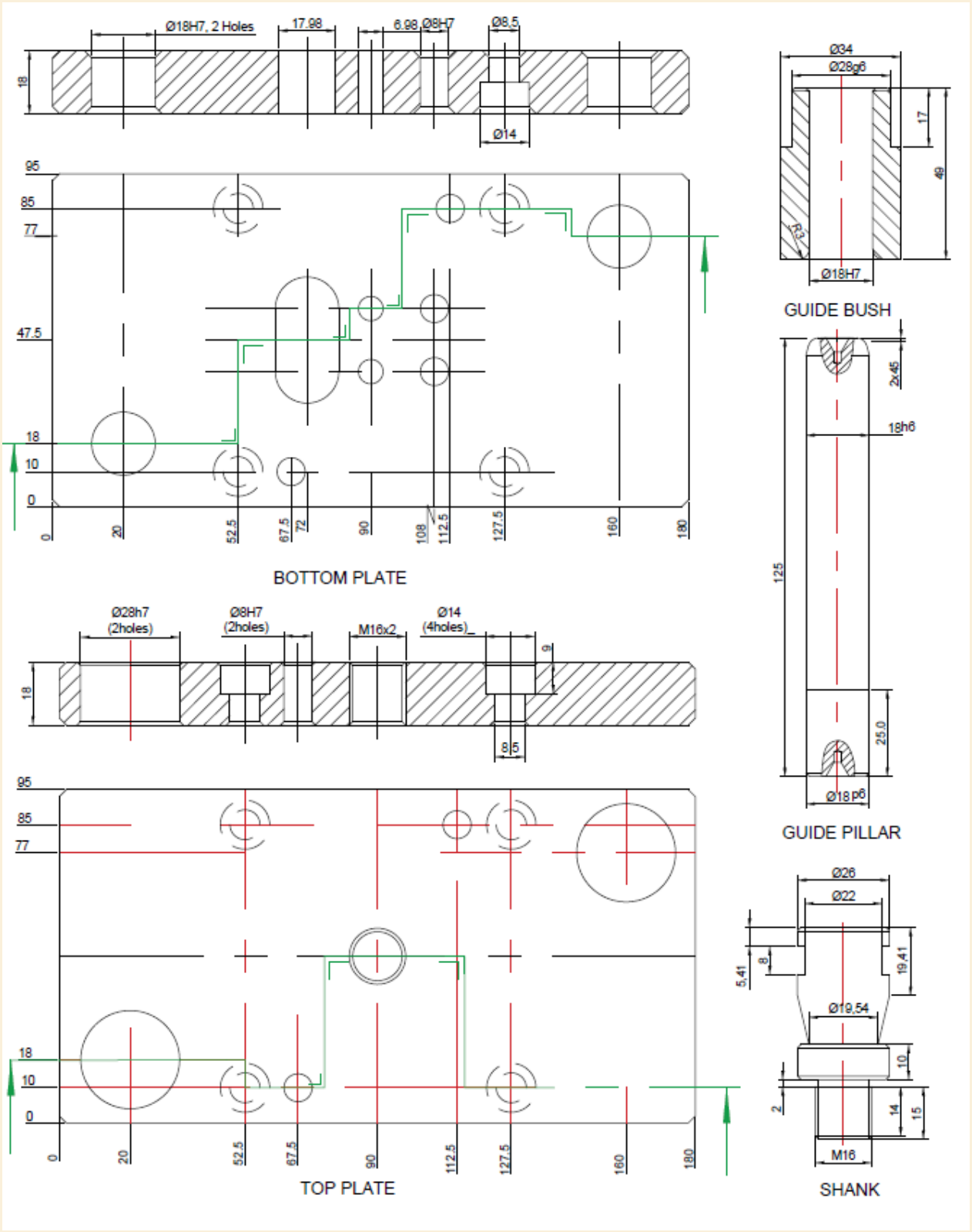
DIE LAYOUT



FRONT ELEVATION

16		DOWELL	STD	04
15		ALLEN SCREW	STD	08
14		SHANK	ST-42	01
13		STAGE STOPPER	ST-42	02
12		STOPPER	ST-42	01
11		GUIDE BUSH	OHNS	02
10		GUIDE PILLER	OHNS	02
09		PILOTING PUNCH	OHNS	02
08		PIERCING PUNCH	HCHCr	02
07		BLANKING PUNCH	HCHCr	01
06		PUNCH BACK PLATE	ONNS	01
05		PUNCH HOLDER	ST-42	01
04		STRIPPER PLATE	OHNS	01
03		DIE PLATE	HCHCr	01
02		TOP PLATE	ST-42	01
01		BOTTOM PLATE	ST-42	01
SL No.	DRAWING NO	DESCRIPTION	MATERIAL	NO OFF


PUNCH PLATE
PUNCH BACK PLATE
PILOT
END STOPPER
DIE PLATE
STRIPPER PLATE
PIERCING PUNCH
BLANKING PUNCH


Ø18H7, 2 Holes
17.98
6.98
Ø8H7
Ø8.5
Ø14
18
95
85
77
47.5
18
10
0
0
20
52.5
67.5
72
90
108
112.5
127.5
160
180
BOTTOM PLATE
Ø28h7
(2holes)
Ø8H7
(2holes)
M16x2
Ø14
(4holes)
9
8.5
95
85
77
18
10
0
TOP PLATE
Ø34
Ø28g6
17
49
2.3
Ø18H7
GUIDE BUSH
2x45
18h6
125
25.0
Ø18 p6
GUIDE PILLAR
Ø26
Ø22
5.41
8
19.41
Ø19.54
10
2
14
15
M16
SHANK