

MACHINIST

1st YEAR

TRANSPARENCIES



**Directorate General of
Employment and Training**
Ministry of Labour, Govt. of India.

**Deutsche Gesellschaft für Technische
Zusammenarbeit (GTZ), GmbH**
German Technical Co-operation



CIM CENTRAL INSTRUCTIONAL
MEDIA INSTITUTE, CHENNAI
INDO - GERMAN PROJECT

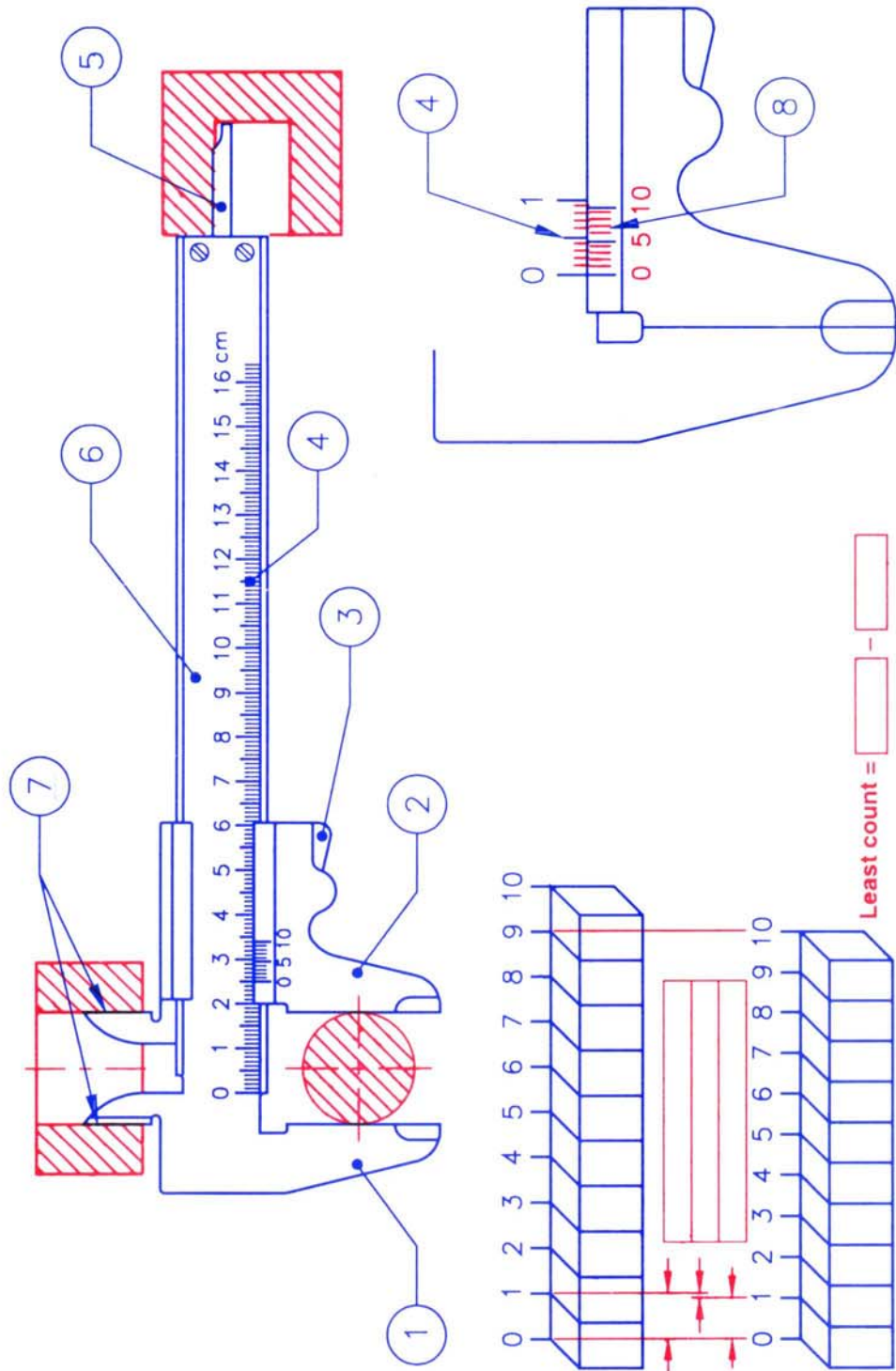
Developed by

CENTRAL INSTRUCTIONAL MEDIA INSTITUTE

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VERNIER CALIPER PARTS AND PRINCIPLE





READING OF VERNIER CALIPER

49 Main scale divisions are divided into 50 vernier scale divisions

Value of 1 VSD =

Least count = $1 \text{ MSD} - 1 \text{ VSD}$ =

=

Main scale reading =

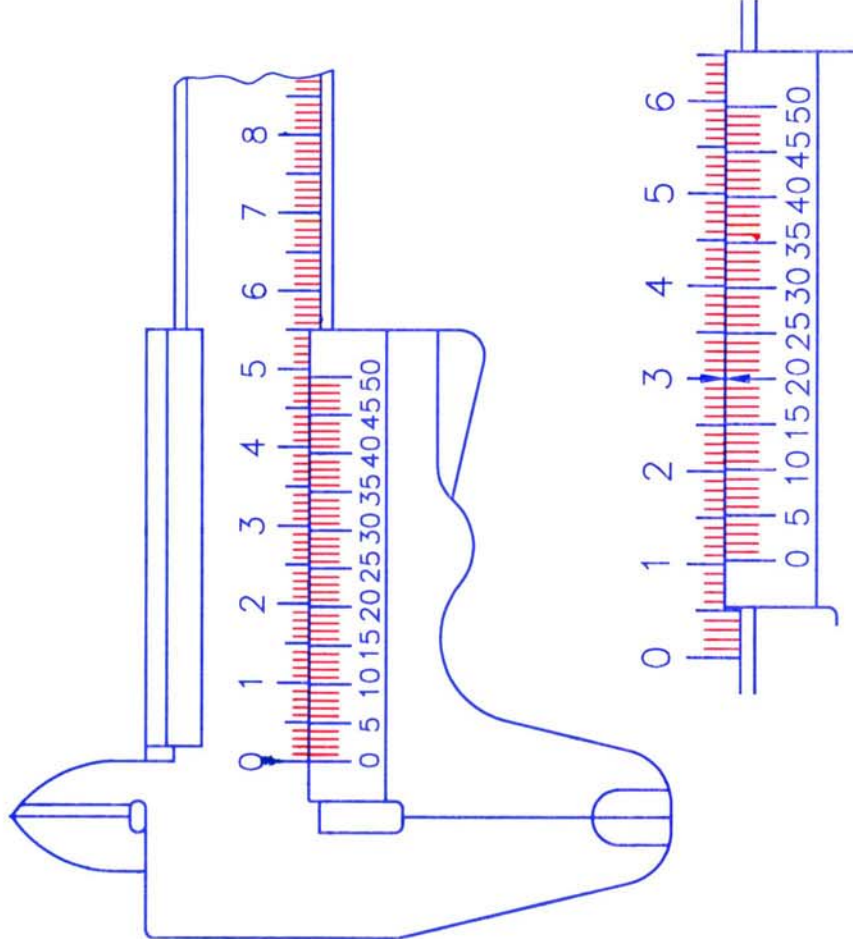
No of VSD coinciding with MSD =

Value of coinciding vernier division =

Reading = $\text{MS Reading} + \text{VS Reading}$

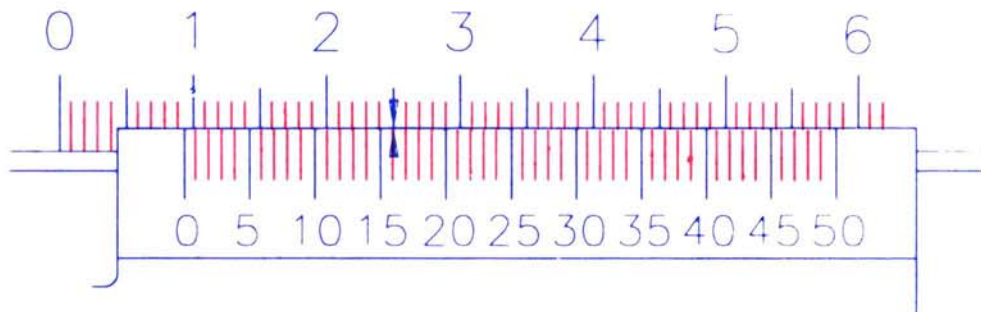
=

=

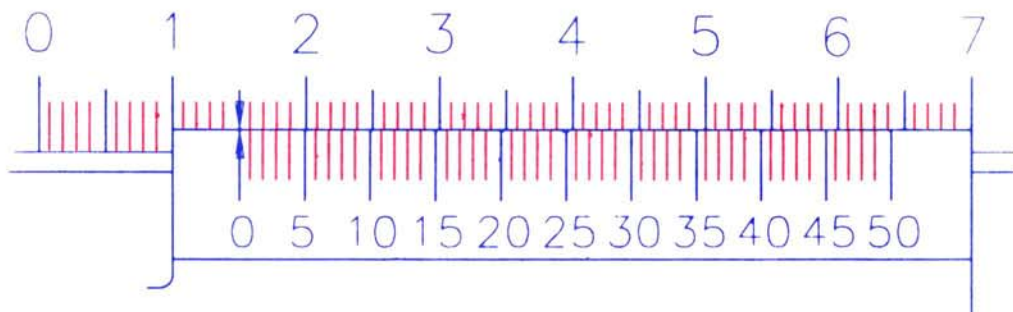




READING OF VERNIER CALIPER (ASSIGNMENTS)



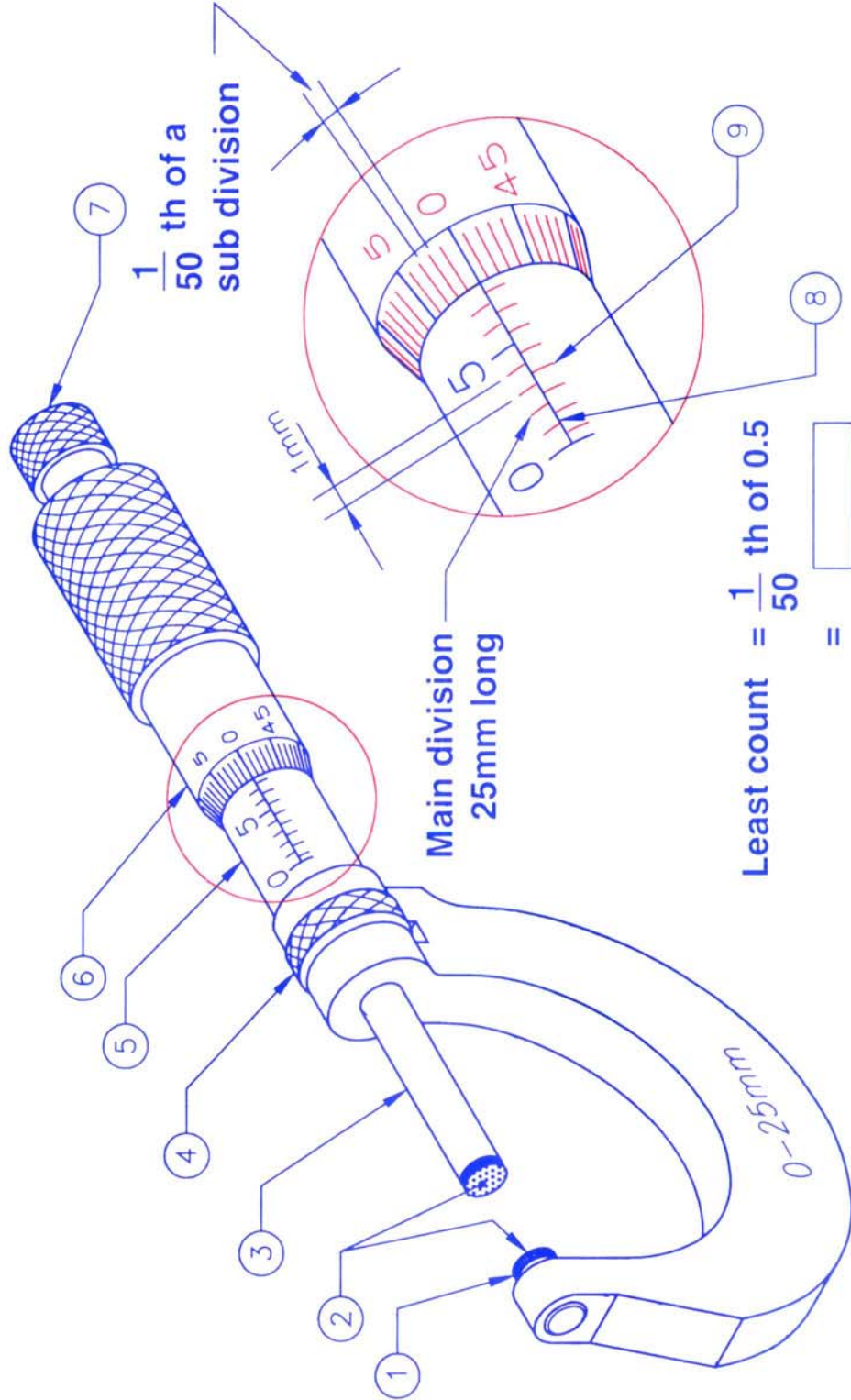
Main scale reading =
Value of coinciding vernier division =
Reading =



Main scale reading =
Value of coinciding vernier division =
Reading =



MICROMETER PARTS AND GRADUATIONS



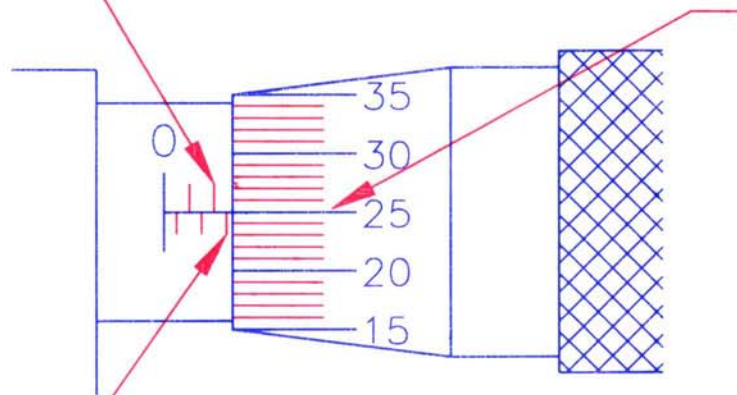
What is the range of the Micrometer?



READING OF MICROMETER (OUTSIDE)

Main divisions
 $2 \times 1\text{mm} = 2.00\text{ mm}$

Thimble divisions
 $25 \times 0.01\text{mm} = 0.25\text{ mm}$



Sub division
 $1 \times 0.5\text{mm} = 0.5\text{ mm}$

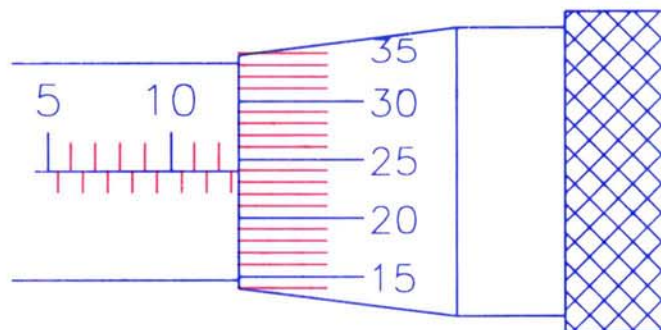
Main divisions = mm = mm

Sub division = mm = mm

Thimble divisions = mm = mm

Reading = mm

EXAMPLE



Main divisions = mm = mm

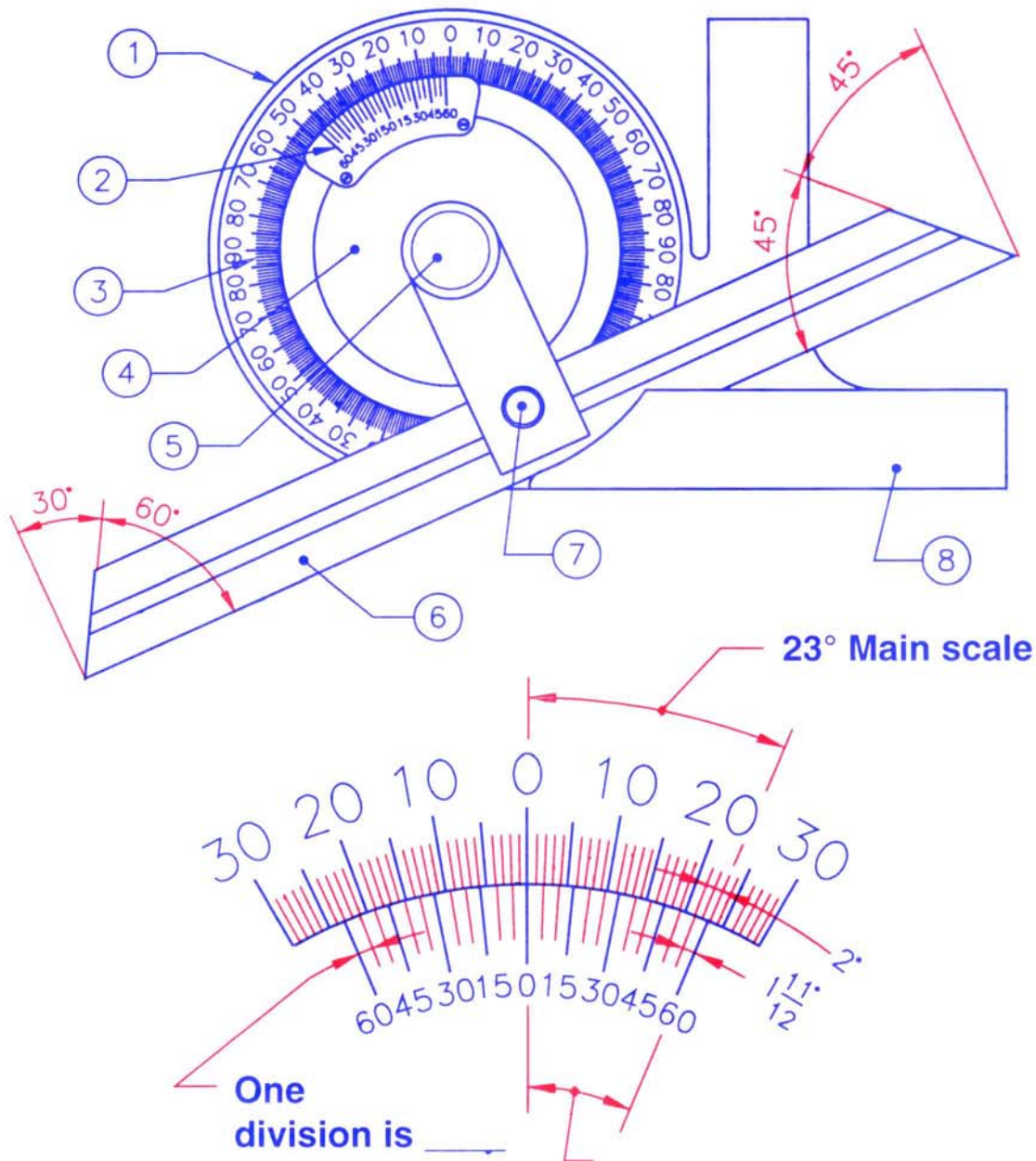
Sub division = mm = mm

Thimble divisions = mm = mm

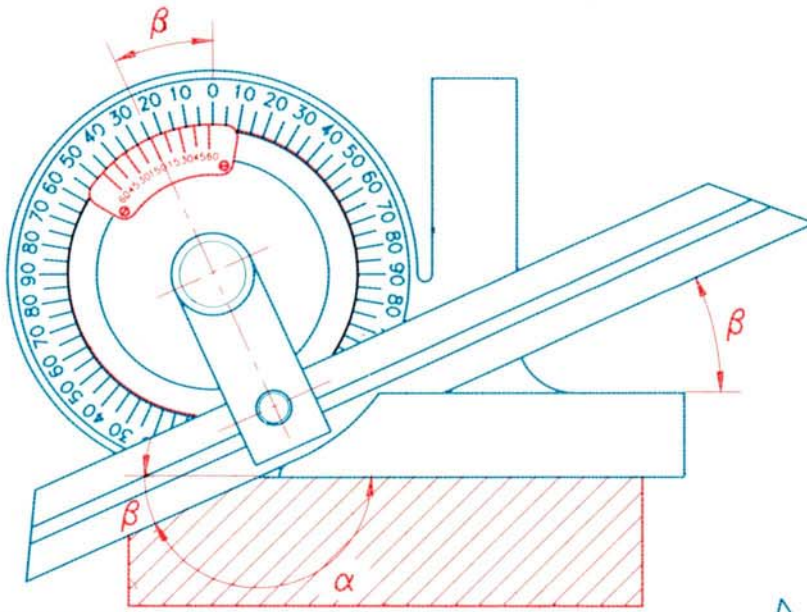
Reading = mm



VERNIER BEVEL PROTRACTOR PARTS AND PRINCIPLE



The value of each vernier scale division is =
Least count is =



Obtuse angle
 $\alpha = 180^\circ - \beta$

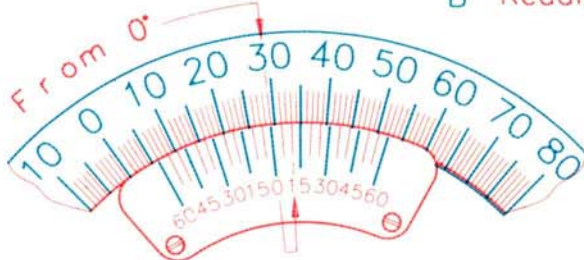
Assignments:-



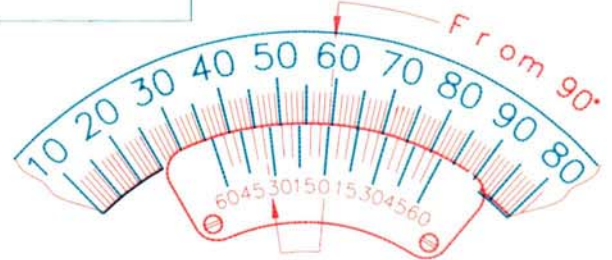
A Reading



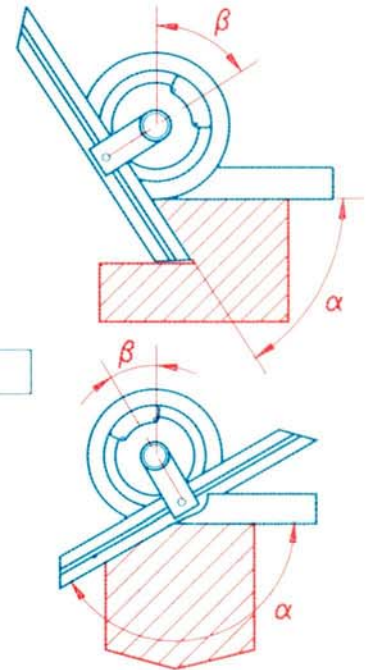
B Reading



C Reading

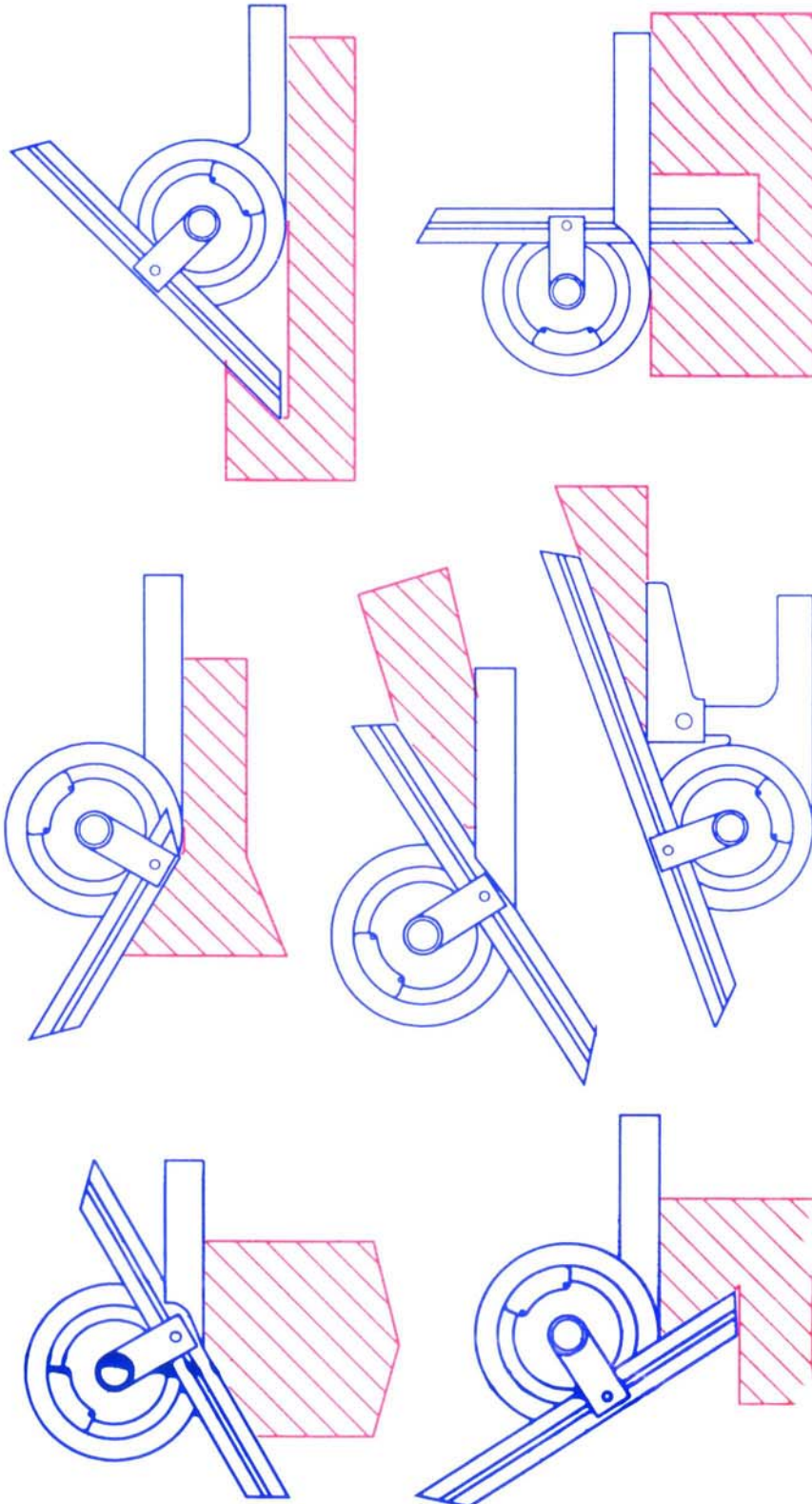


D Reading



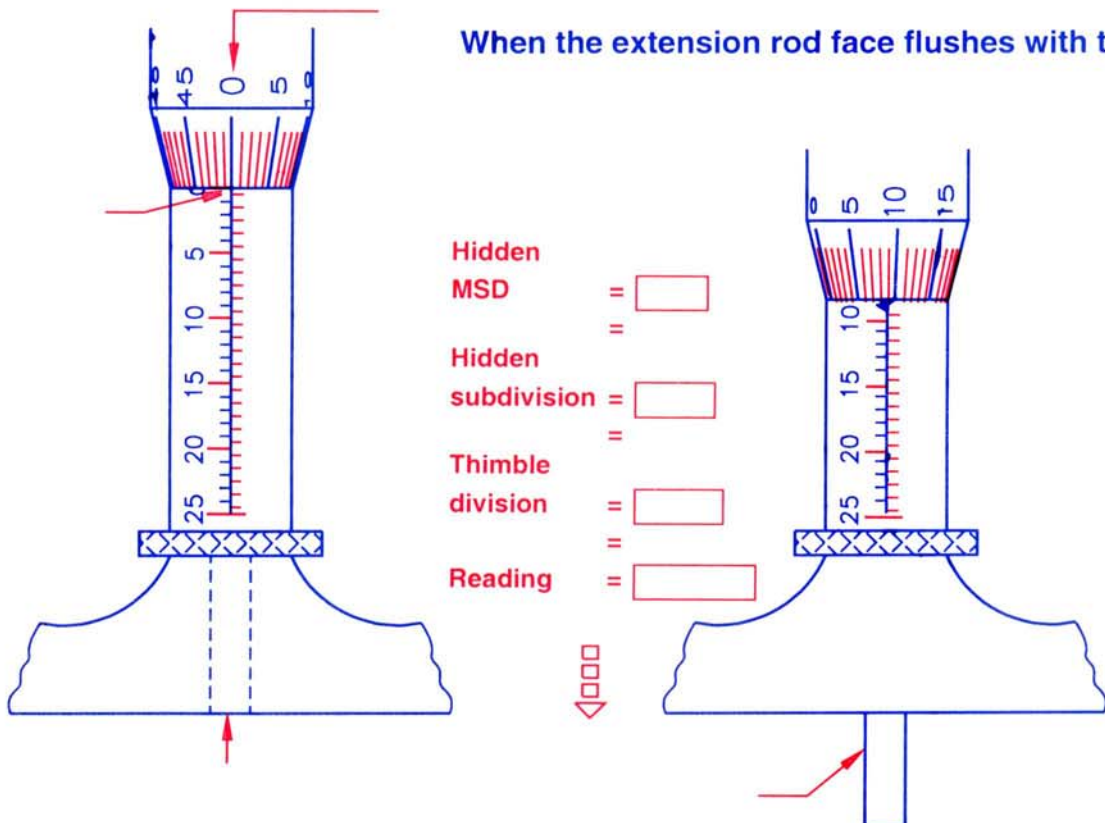
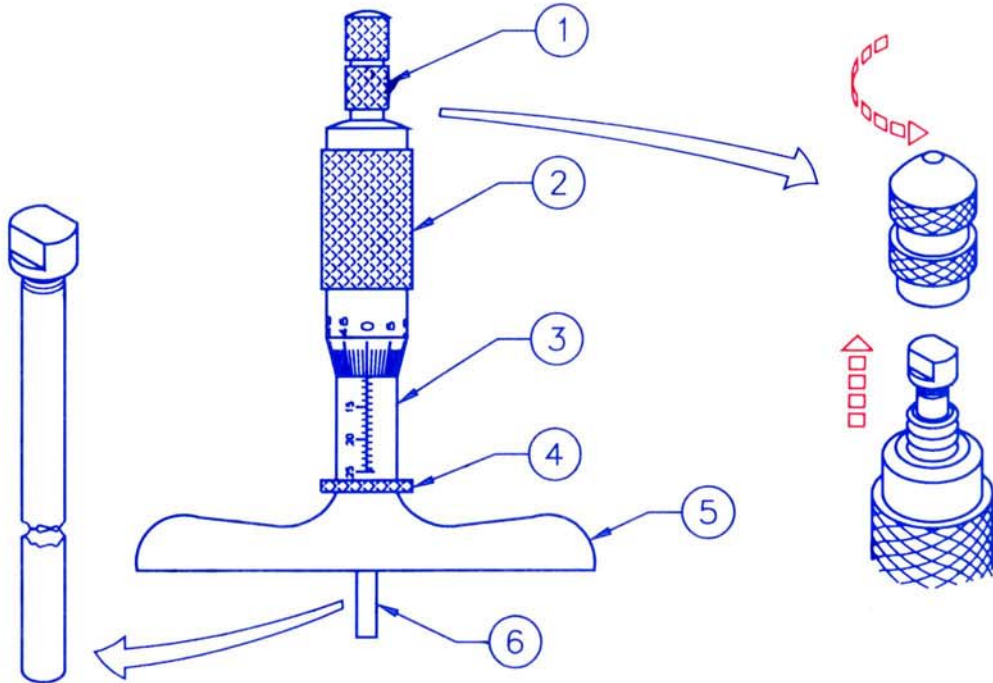


VERNIER BEVEL PROTRACTOR APPLICATIONS





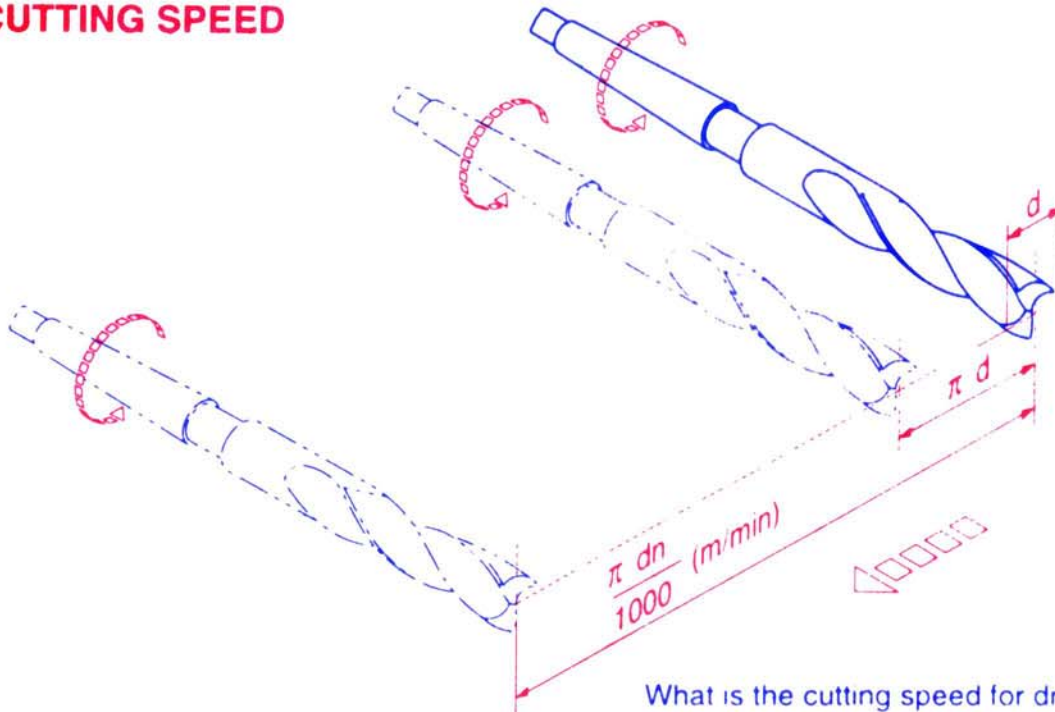
DEPTH MICROMETER PARTS AND READING



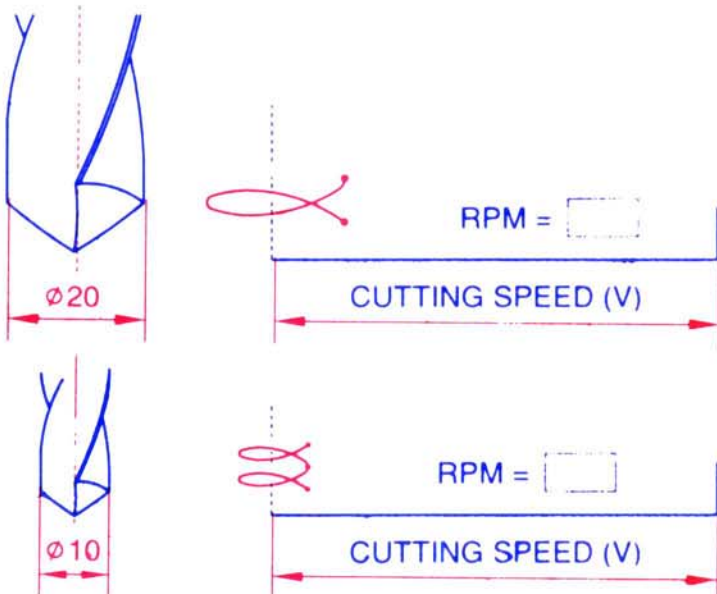


CUTTING SPEED, R P M AND FEED OF DRILLS

CUTTING SPEED

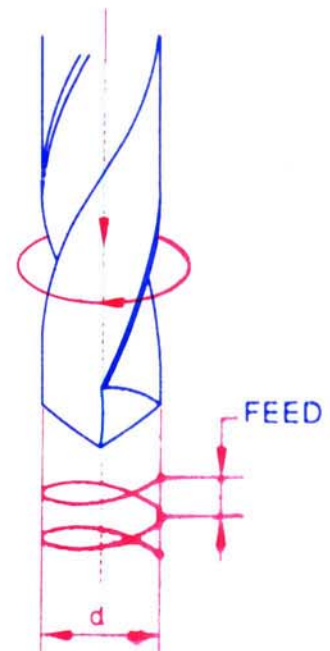


SPINDLE SPEED



The RPM of the drill depends on the _____
and _____ of the drill.

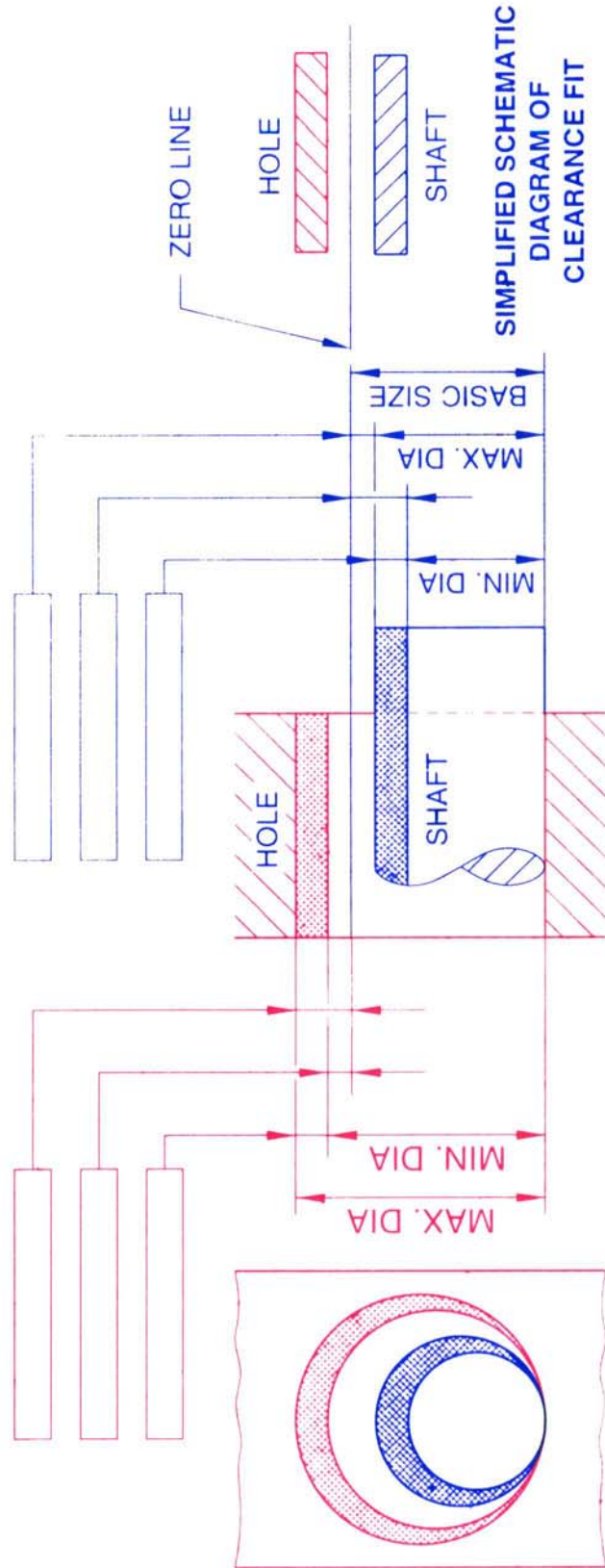
FEED



What is the feed in a drilling operation?



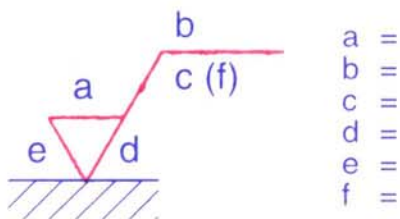
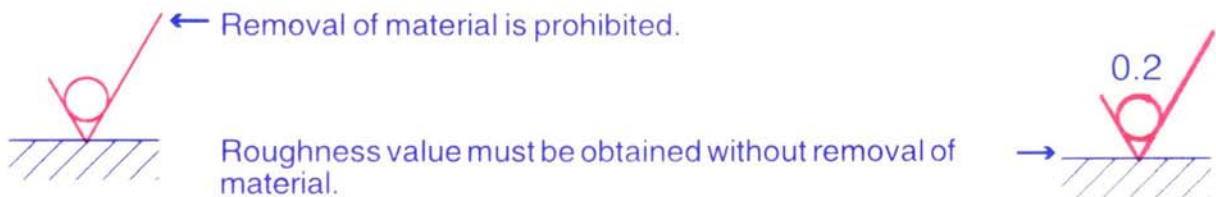
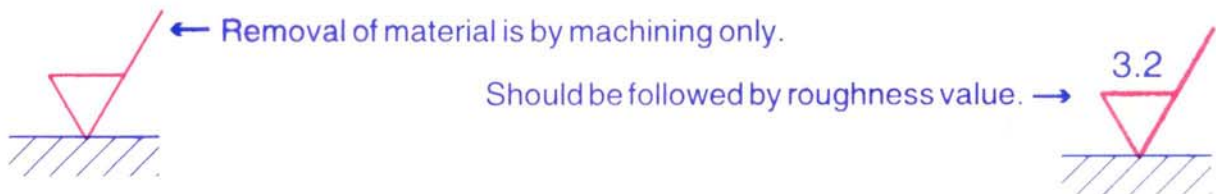
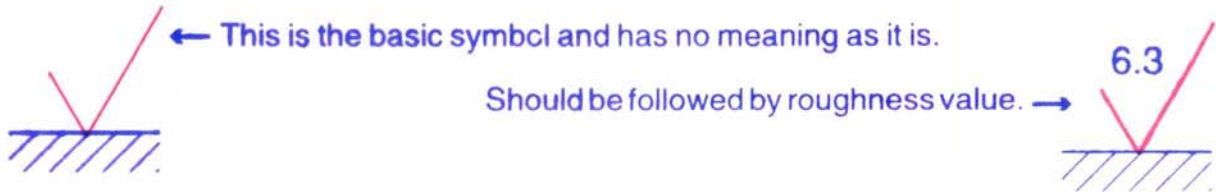
LIMITS AND FITS - TERMINOLOGY



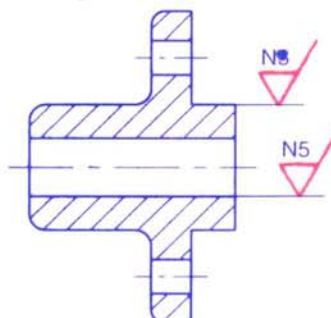
- The zero line is the line of zero deviation and represents the _____ size.
- The deviation which gives maximum limit of size is called _____ deviation.
- The deviation which gives minimum limit of size is called _____ deviation.
- By convention, when the zero line is drawn horizontally _____ deviations are shown above and _____ deviations are below it.



METHOD OF INDICATING SURFACE ROUGHNESS



EXAMPLE



The surface roughness is indicated as follows:

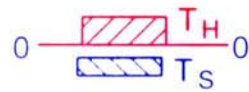
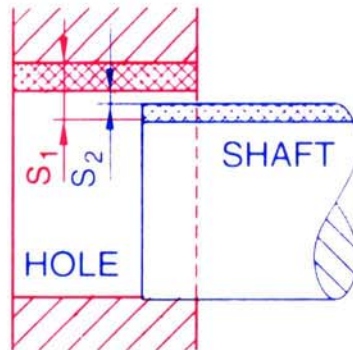
or

or



CLASSES OF FITS

CLEARANCE FIT



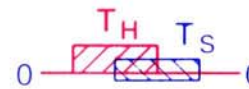
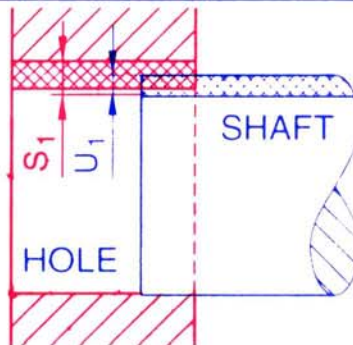
SIMPLIFIED REPRESENTATION

$S_1 =$ _____

$S =$ _____

In a clearance fit the tolerance zone of hole will be always _____ the tolerance zone of shaft.

TRANSITION FIT

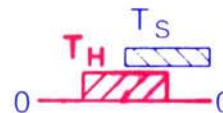
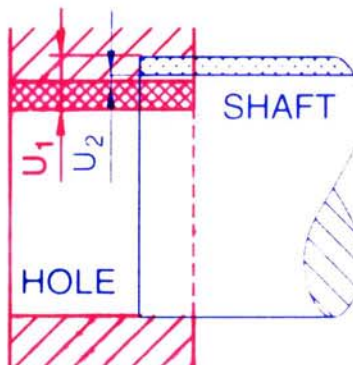


$S_1 =$ _____

$U_1 =$ _____

In a transition fit the tolerance zone of hole and tolerance zone of shaft will _____

INTERFERENCE FIT



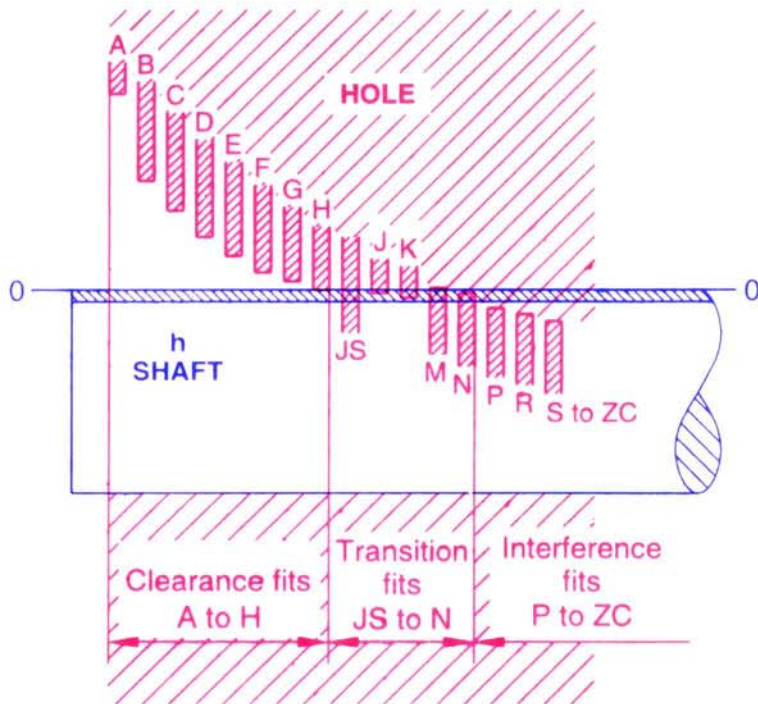
$U_1 =$ _____

$U_2 =$ _____

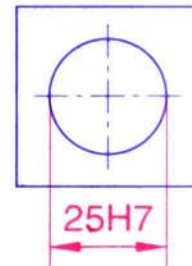
In a interference fit the tolerance zone of hole will be always _____ the tolerance zone of shaft.



BASIC SHAFT SYSTEM (SHAFT BASIS)

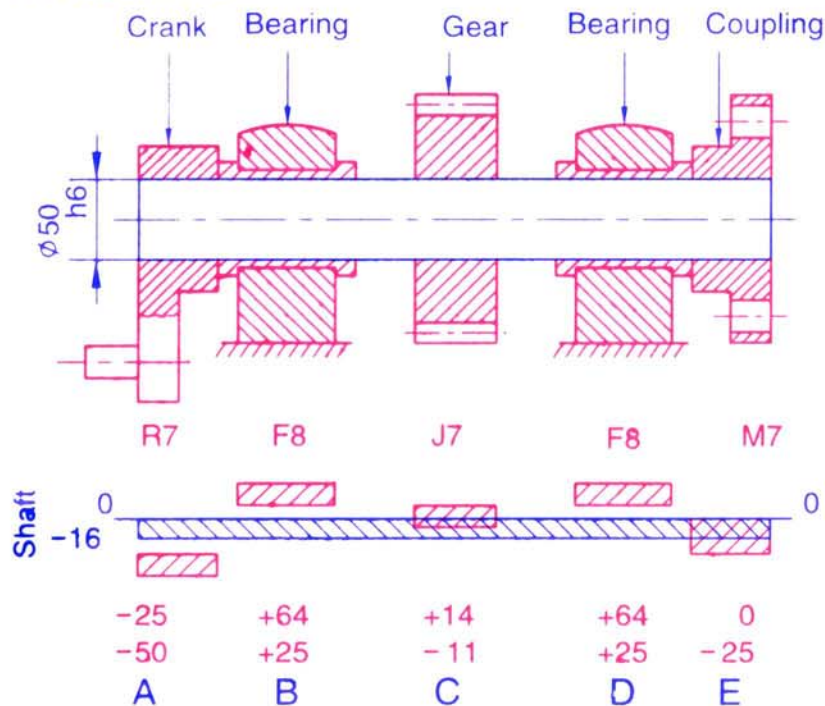


Capital letters A to ZC indicate 25 fundamental deviations for holes.



- 25mm is _____
- 'H' is the _____ for hole
- '7' is the _____ of tolerance

APPLICATION



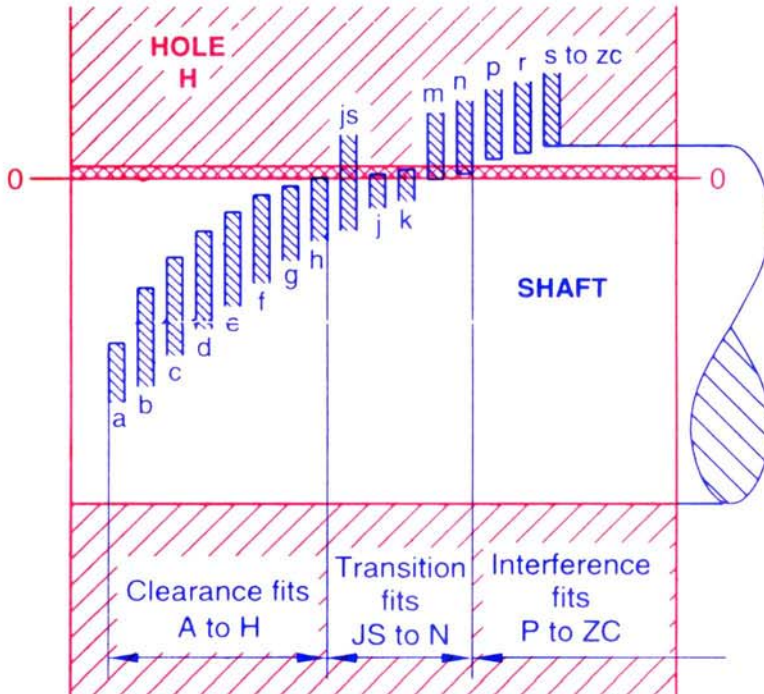
What is shaft basic system?

Name the fit

- A _____ fit
- B _____ fit
- C _____ fit
- D _____ fit
- E _____ fit



BASIC HOLE SYSTEM (HOLE BASIS)

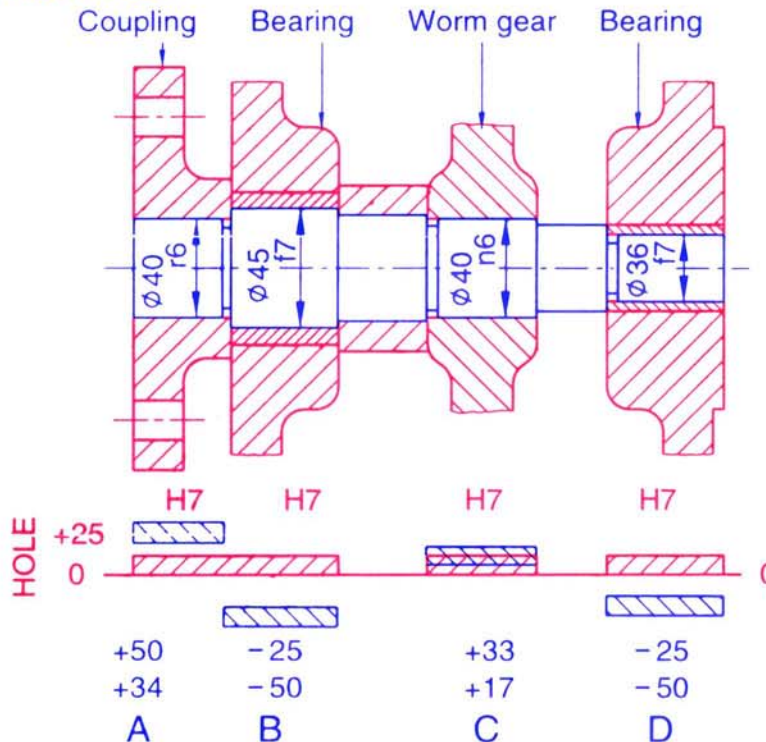


Small letters a to zc indicate 25 fundamental deviations for shafts.



- 25mm is _____
- 'e' is the _____ for shaft
- '8' is the _____ of tolerance

APPLICATION



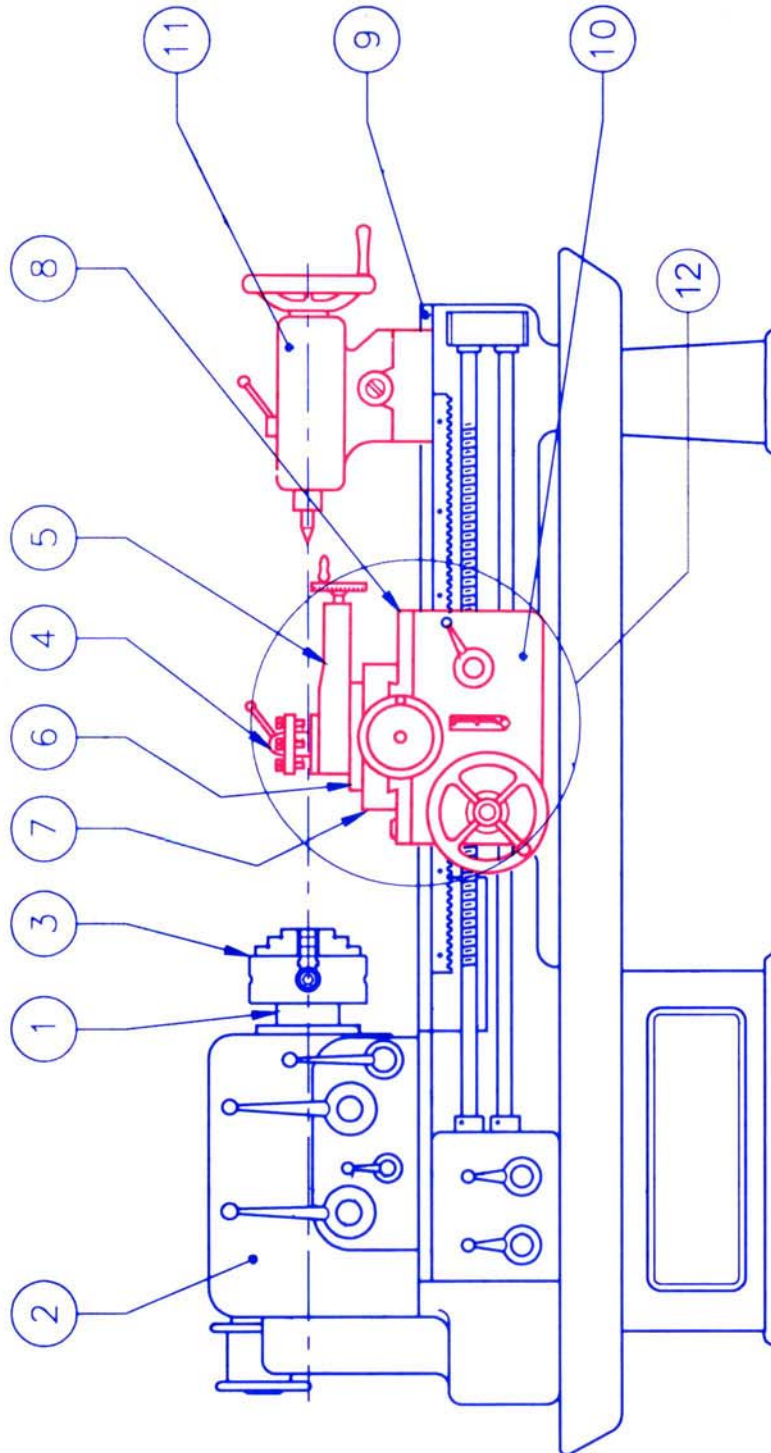
What is hole basic system?

Name the fit

- A _____ fit
- B _____ fit
- C _____ fit
- D _____ fit

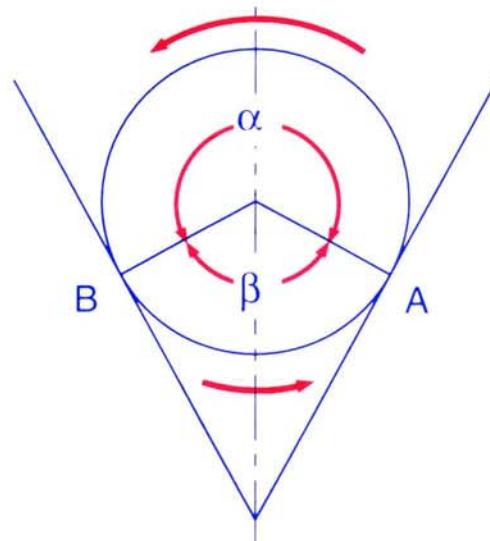
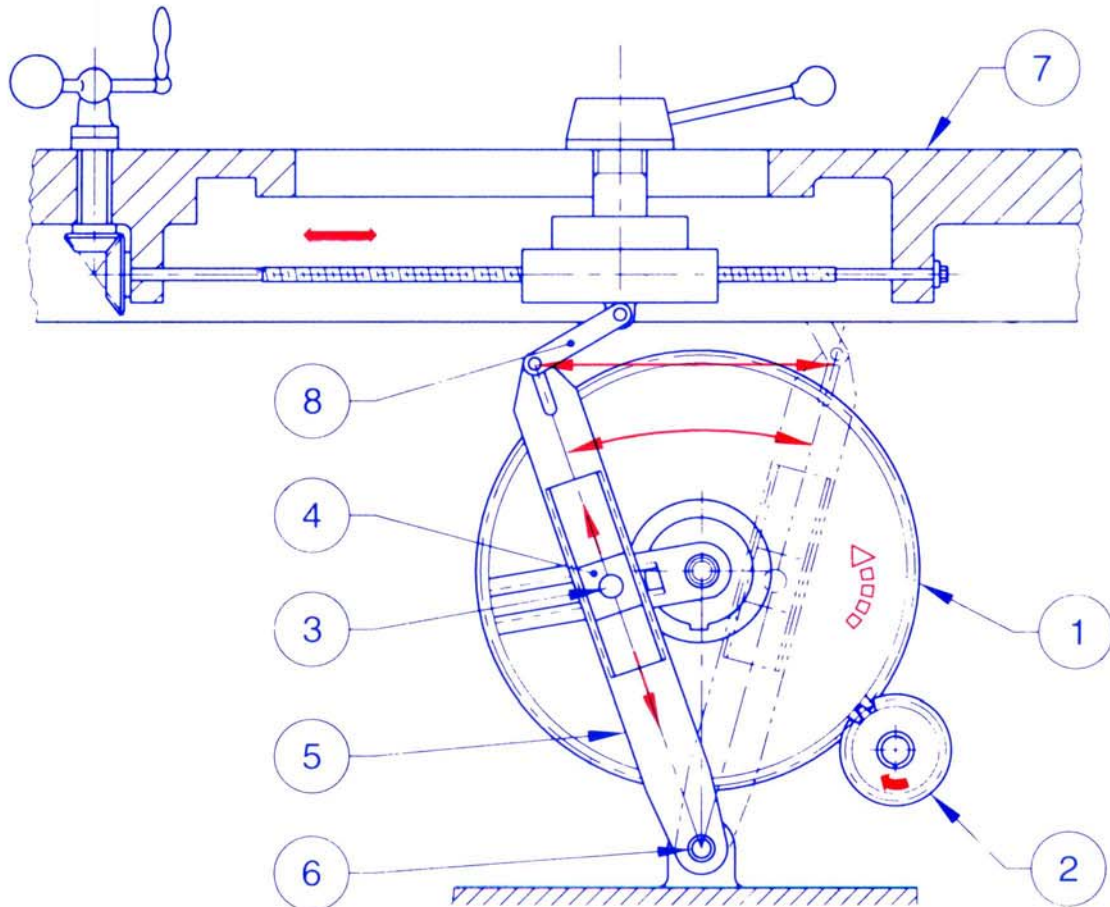


LATHE PARTS AND FUNCTION



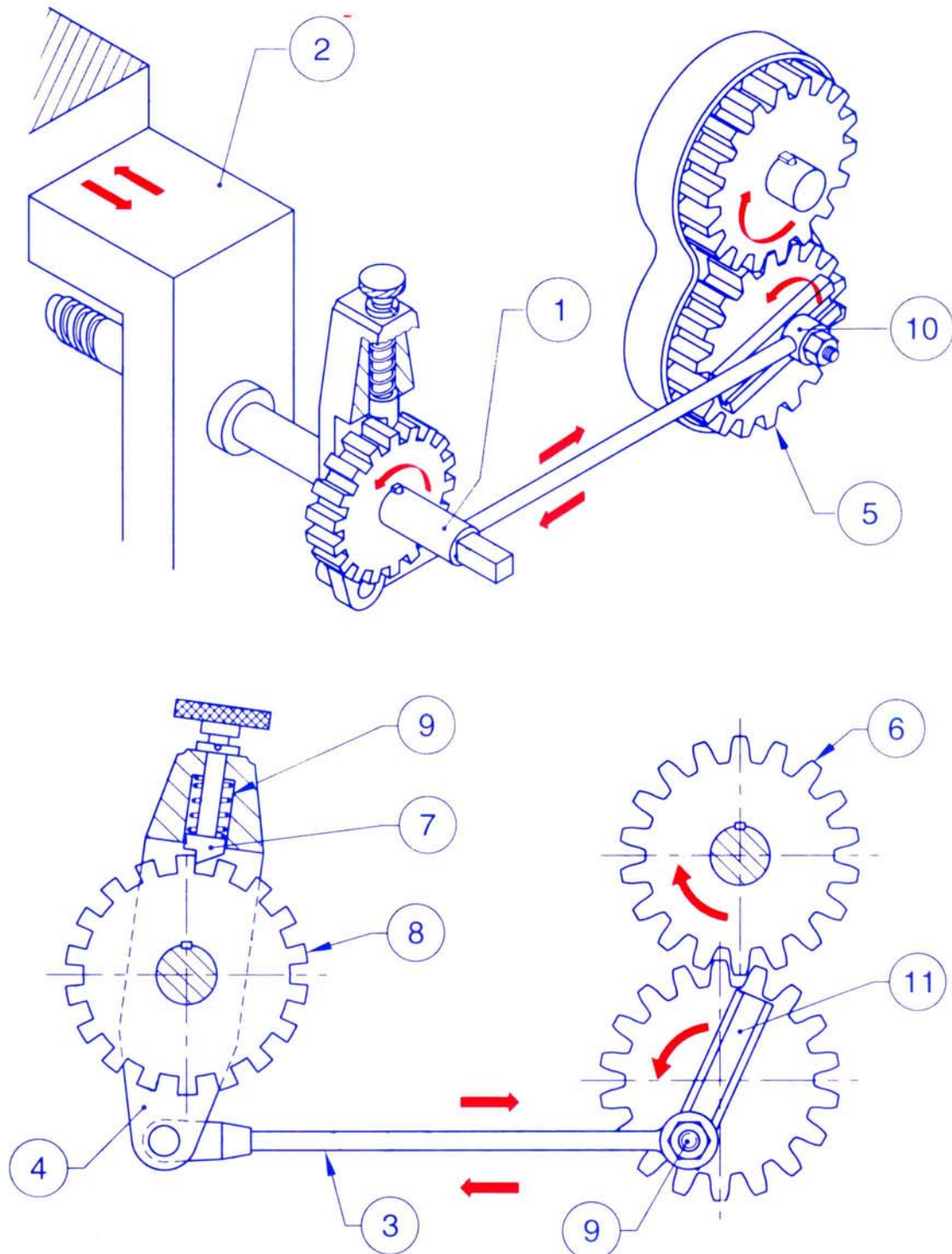


QUICK RETURN MOTION OF SHAPER



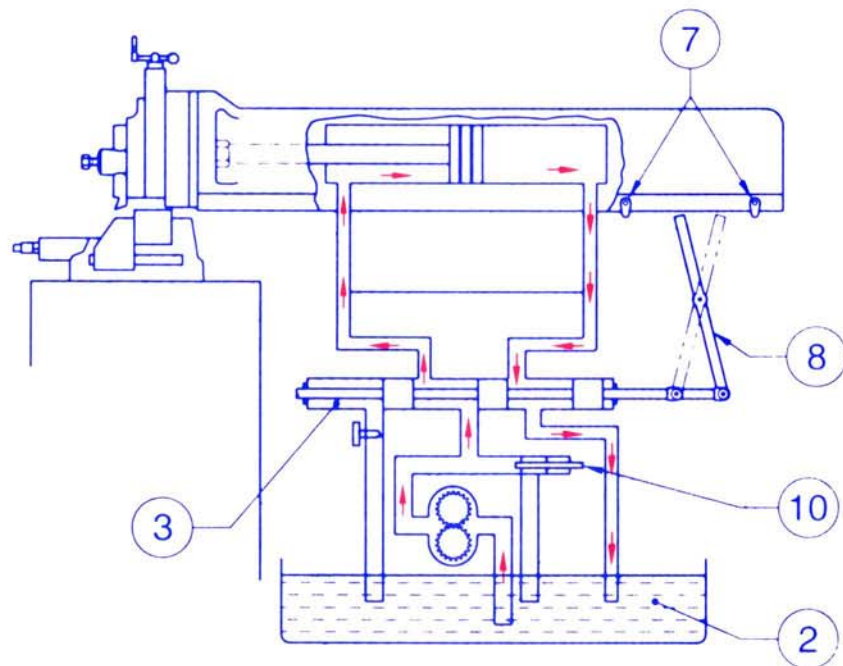
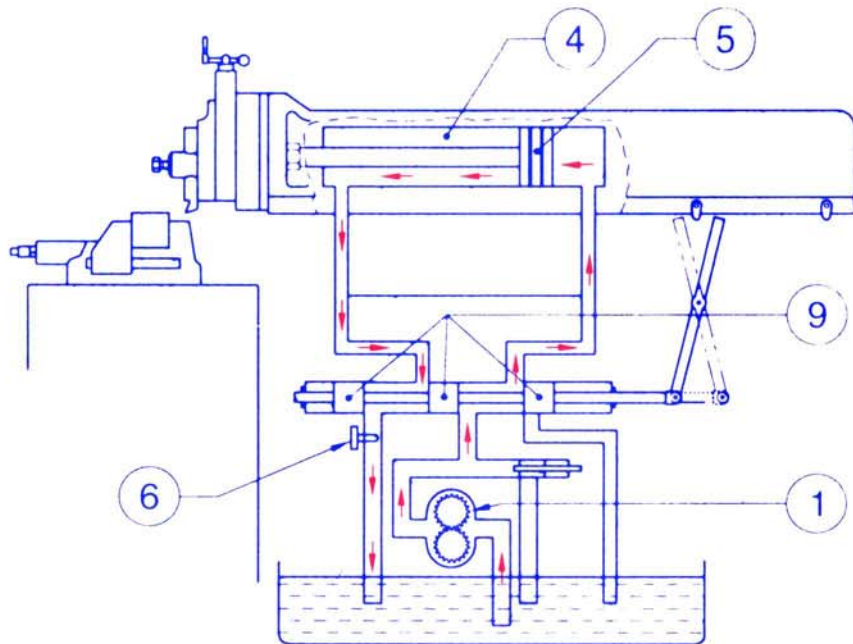


FEED MECHANISM OF A SHAPER



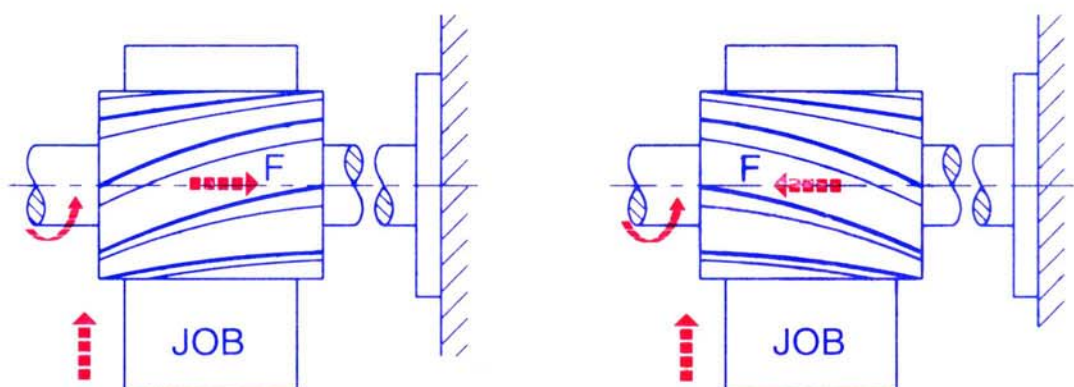
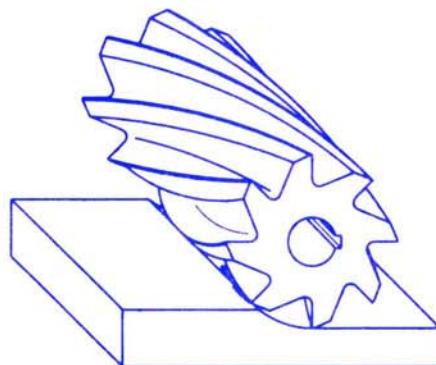


HYDRAULIC SHAPER MECHANISM



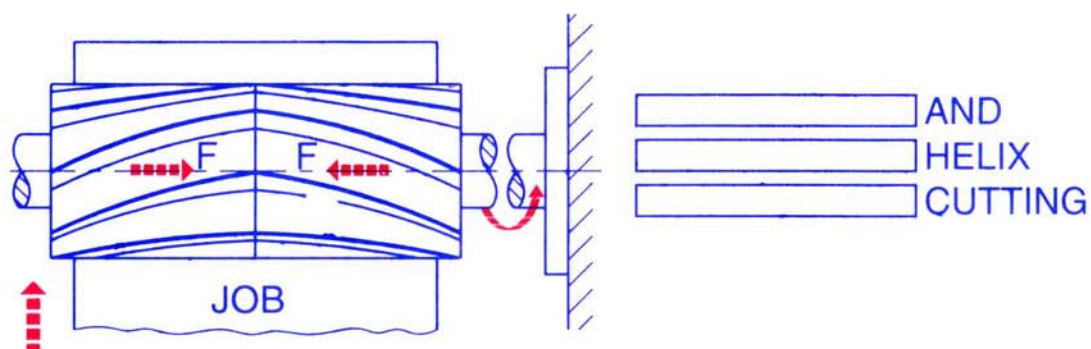


RELATIONSHIP OF HELIX ANGLE & FORCE ACTING



HELIX
CUTTING

HELIX
CUTTING

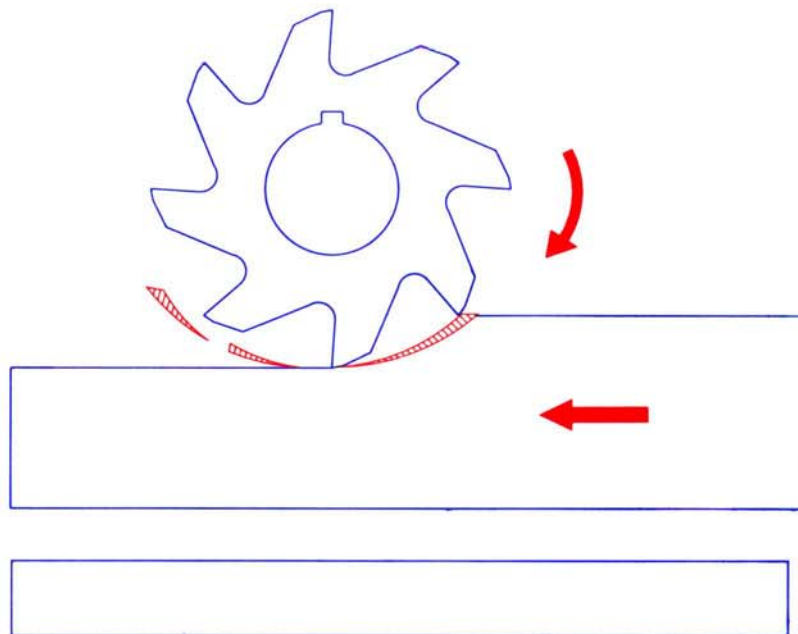
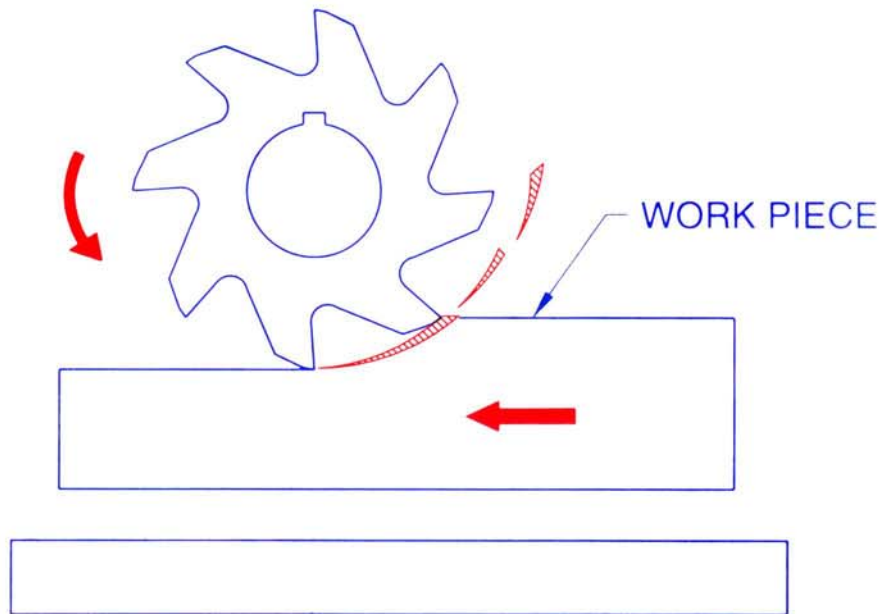


AND
HELIX
CUTTING

How the axial pressure is partially compensated?

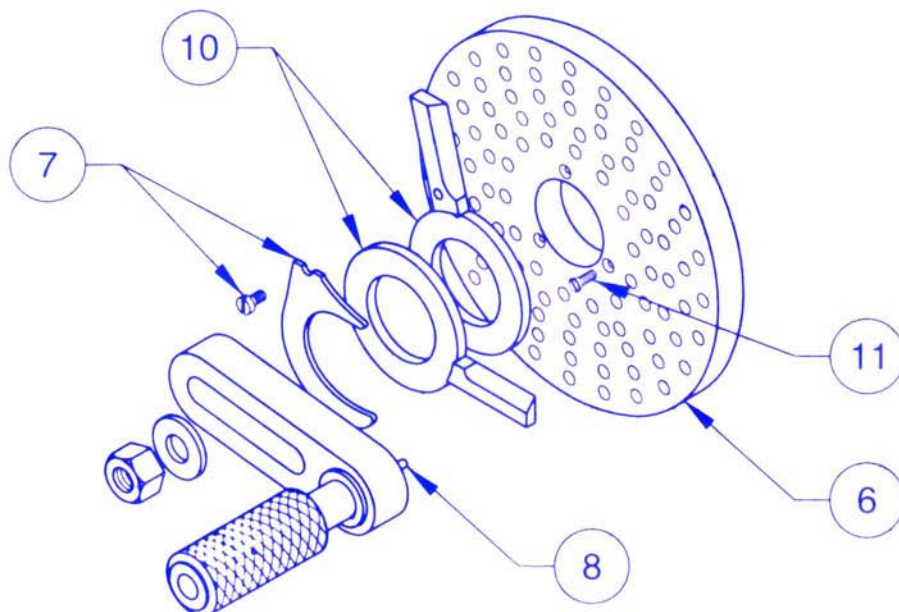
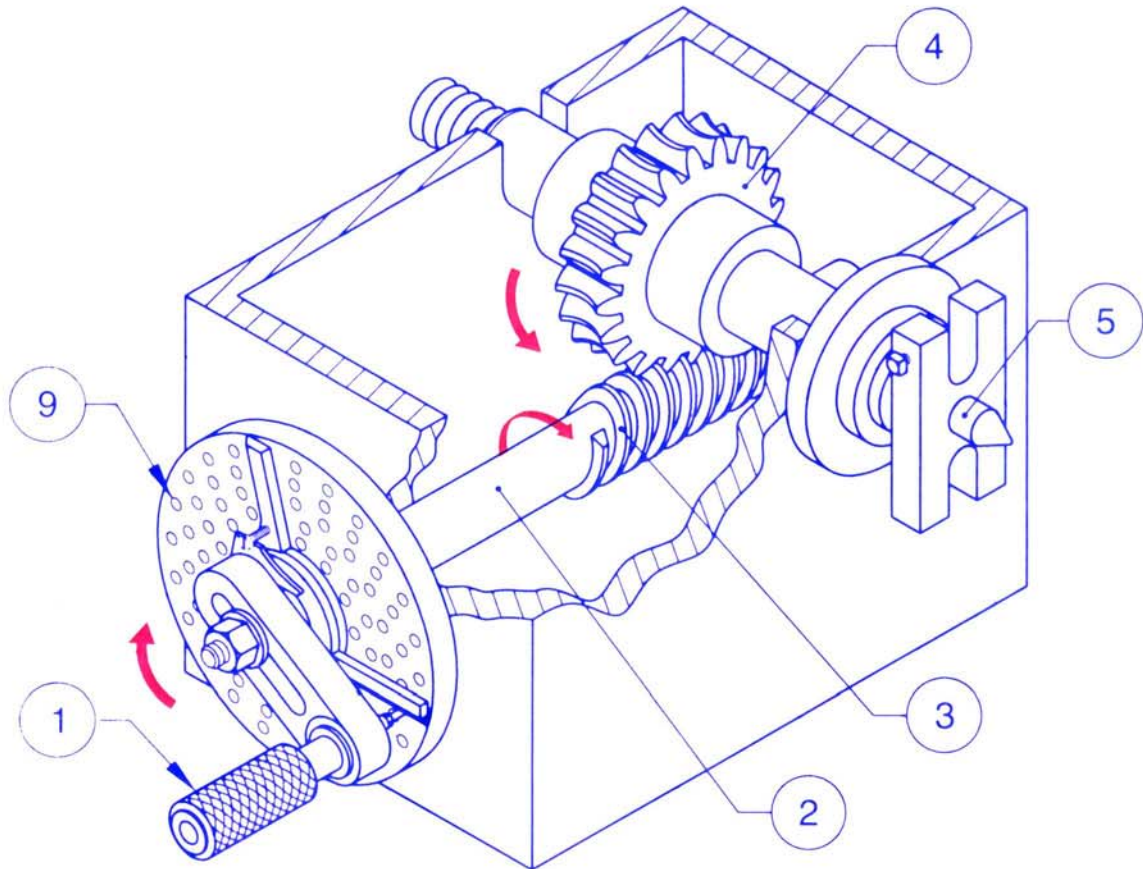


UP MILLING AND DOWN MILLING



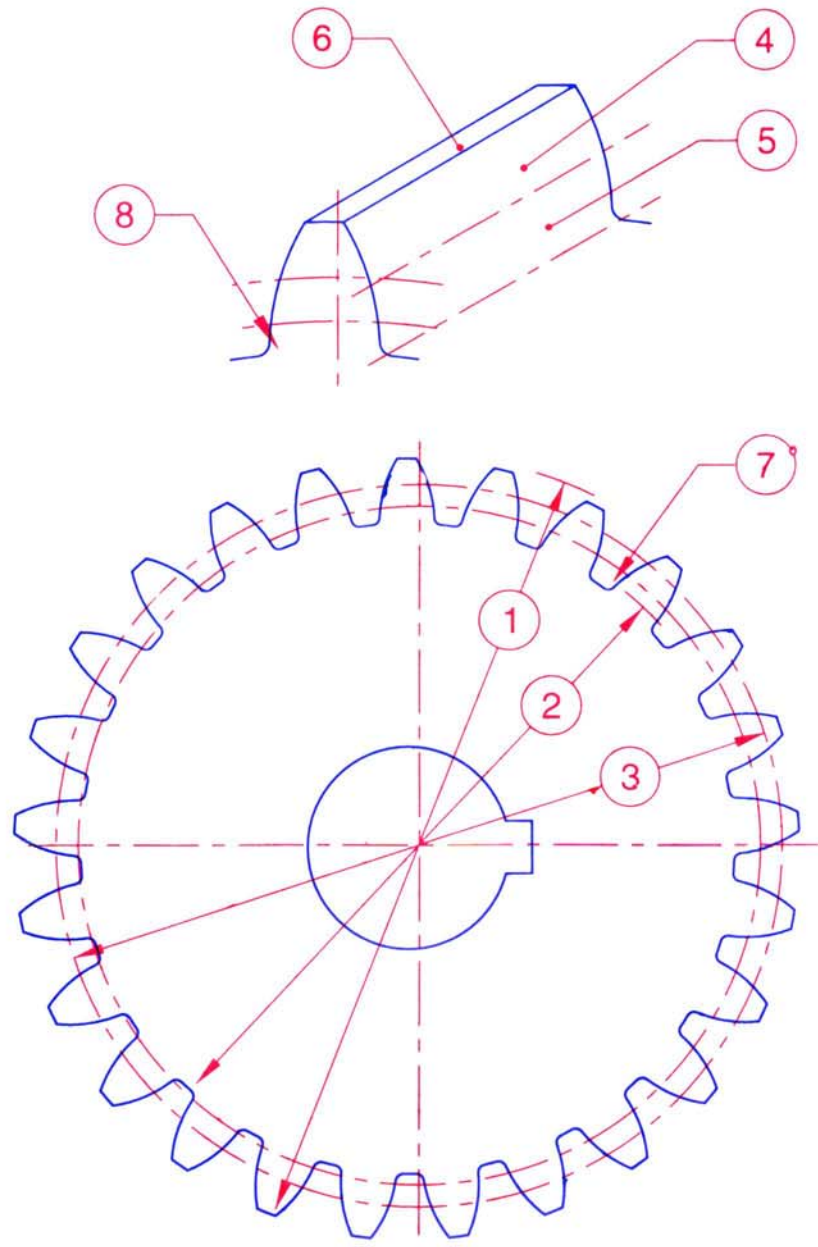


DIVIDING HEAD PARTS AND FUNCTIONS



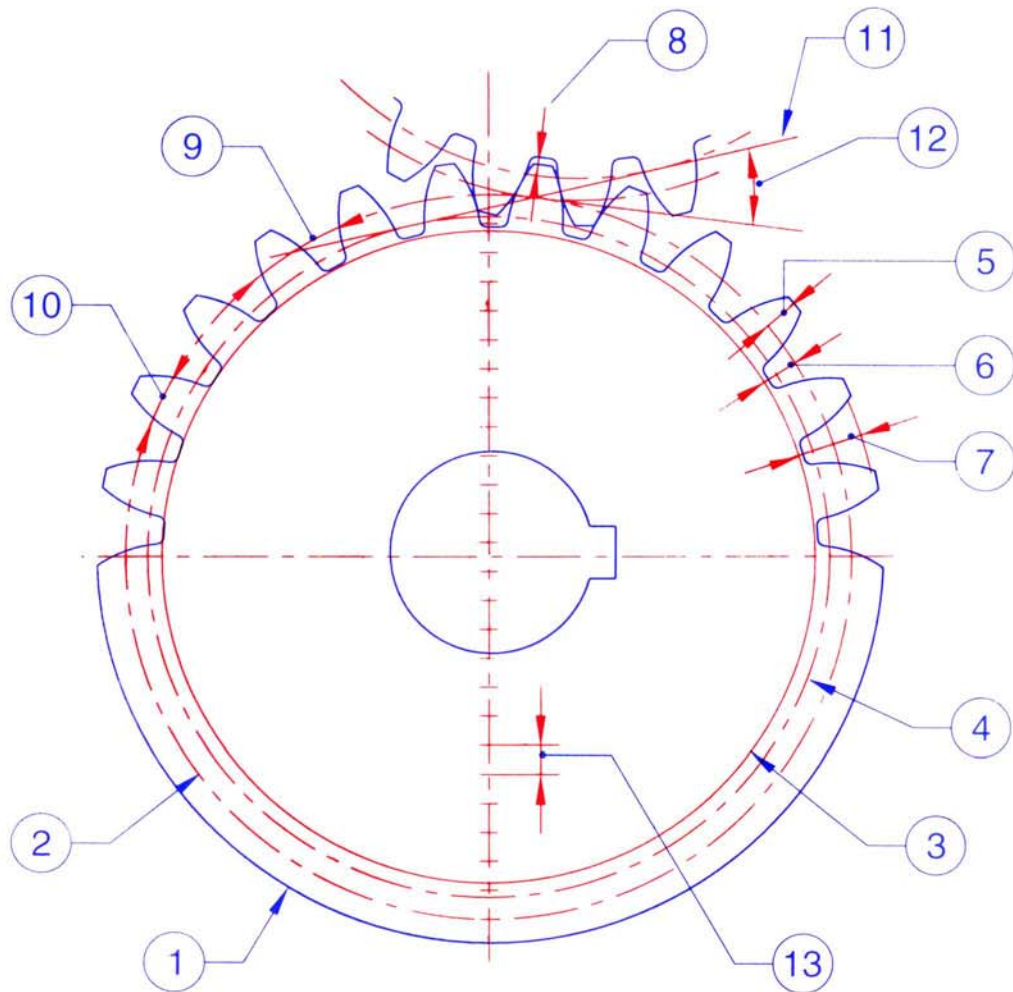


ELEMENTS OF A SPUR GEAR - I





ELEMENTS OF A SPUR GEAR - II





GEAR TOOTH VERNIER CALIPER & ITS APPLICATION

