

# WELCOME TO "FLATE" PROFESSIONAL DEVELOPMENT MECHANICAL MEASUREMENT WORKSHOP

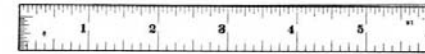


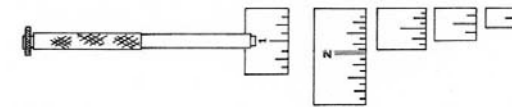
Fig. 4-1a. 6 in. - pocket rule.



Fig. 4-1b. Narrow rule.



Fig. 4-1c. Flexible rule.



Narrow rules with holder. The five small rule sections are interchangeable in the holder, and can be set at various angles. Rules are graduated in 1/32 and 1/64.

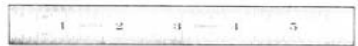


Fig. 4-7a. Rule with a beveled edge that puts the graduations closer to the work thus reducing the possibility for error.



Fig. 4-7b. Head rule with a fixed hook.



Fig. 4-7c. Head rule with an adjustable hook.



Fig. 4-7d. 12-in. rule. Note how the graduations are numbered. This rule has No. 4 graduations (see table).

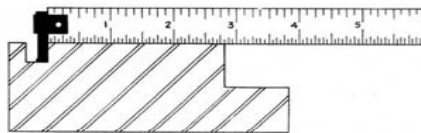


Fig. 4-7e. How the hooked rule is used.

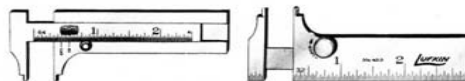
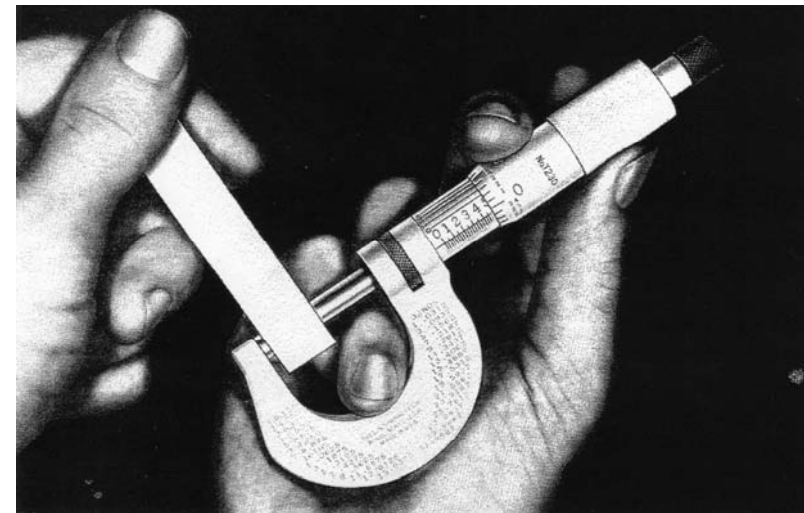


Fig. 4-7f. A slide caliper rule is fitted to the work and locked. Outside dimensions are read at the point marked "out." Inside dimensions at the point marked "in."



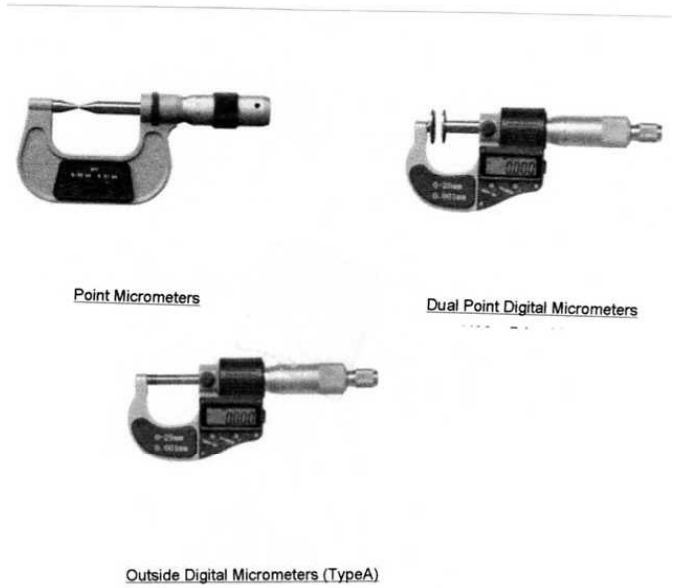
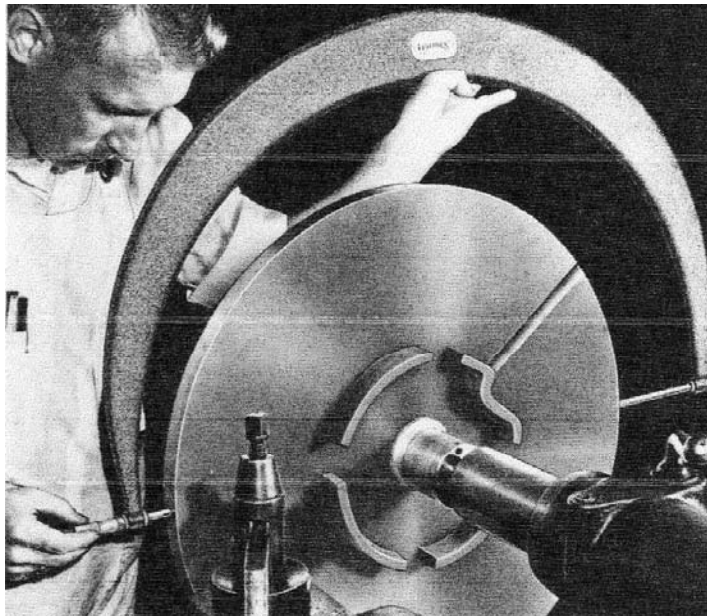
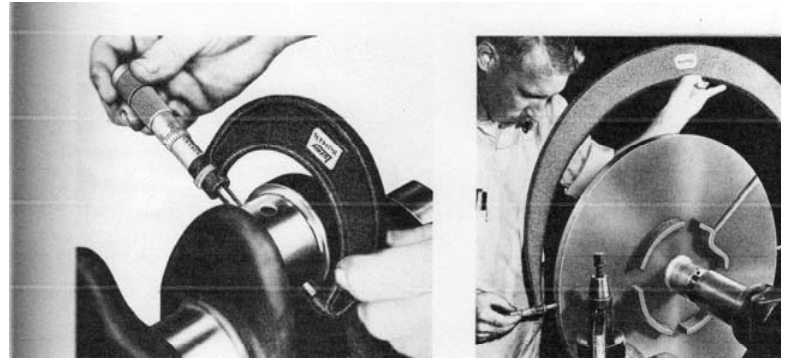
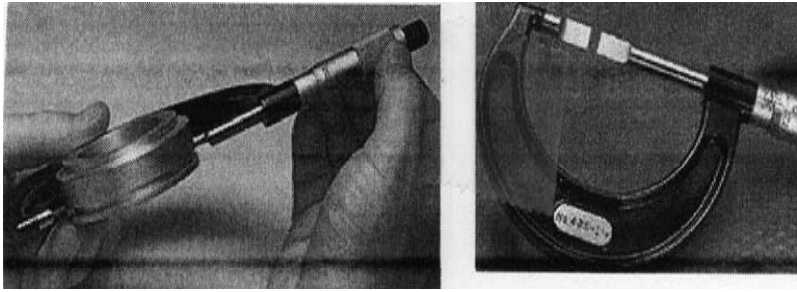




Fig. 4-9. The micrometer depth gage.



Fig. 4-7. Jaw-type inside micrometer. (Scherer-Tomica)

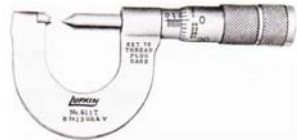


Fig. 4-10. The screw thread micrometer caliper.

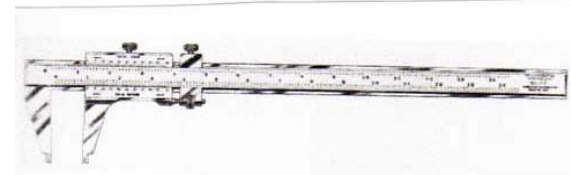
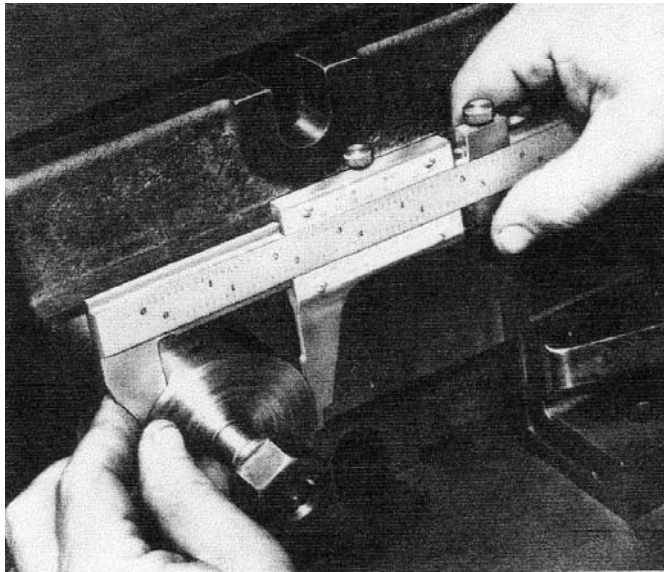


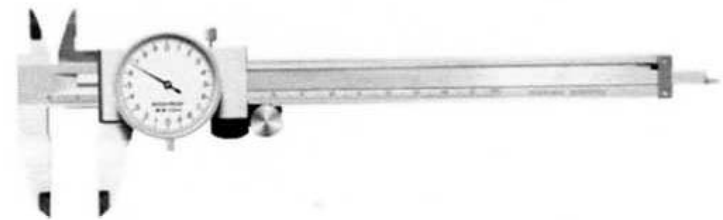
Fig. 4-23. Vernier caliper.



Fig. 4-24. Making an inside measurement with vernier caliper.



### Dial Callpers:





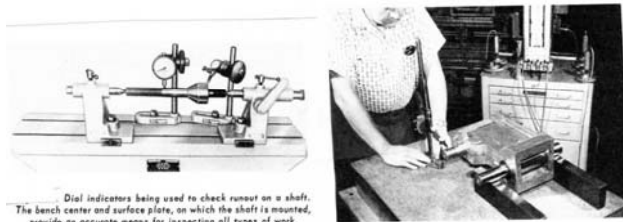


To control the quality of your manufacturing, you need the best tools for the job. And to control costs, you want the best value for your money. The OGP® Focus™ Contour Projector® definitely meets both requirements.

Focus is a rugged benchtop unit with a 14" viewable screen diameter. Its extensive list of standard features makes Focus best in class.



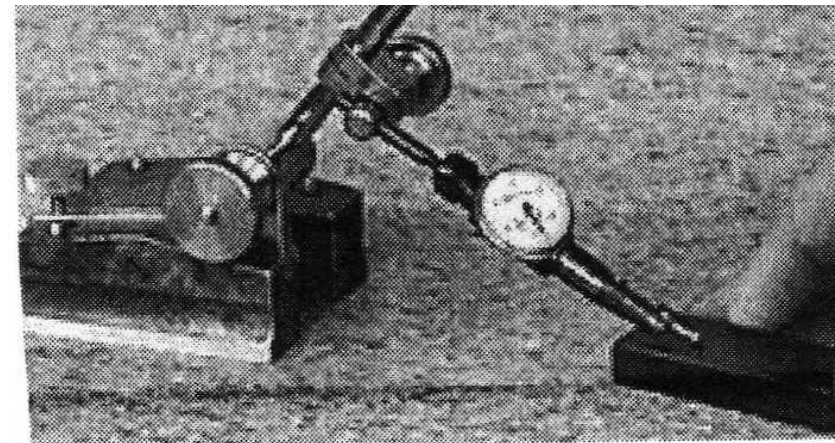
dial indicator



Dial indicators being used to check runout on a shaft. The bench center and surface plate, on which the shaft is mounted, provide an accurate means for inspecting all types of work.



Checking drill press column and quill bearing surfaces for alignment. Note air gage in background - used to check hole diameters.





IP65 Digital Indicators (Switchable Direction)



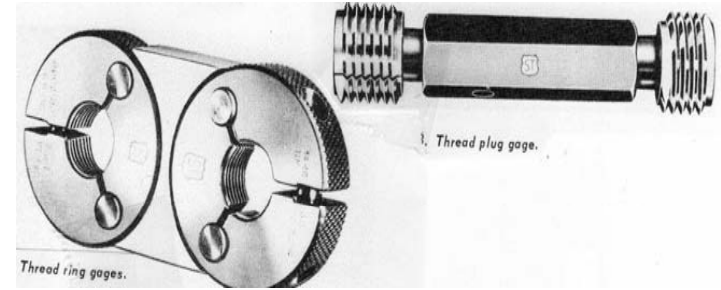
0-10mm Digital Indicators



0-30mm Digital Indicators



0-50mm Digital Indicators

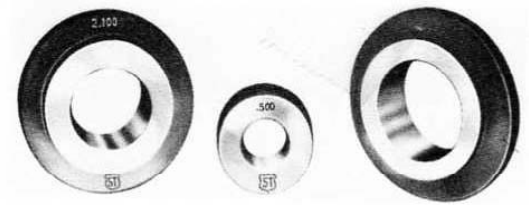


Thread ring gages.

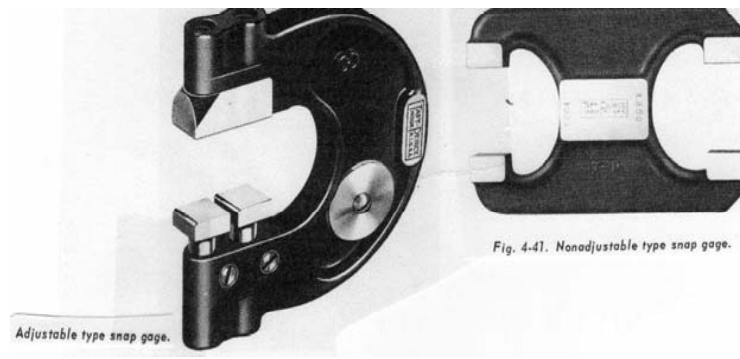
1. Thread plug gage.



Double and cylindrical plug gage.



Ring gages.



Adjustable type snap gage.

Fig. 4-41. Nonadjustable type snap gage.

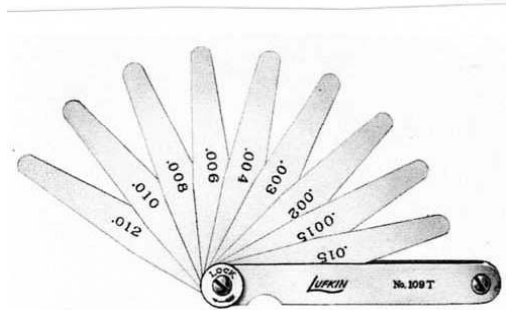
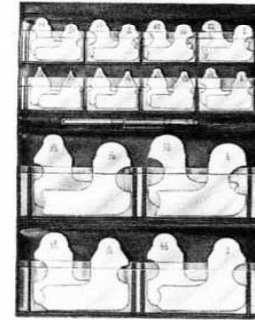
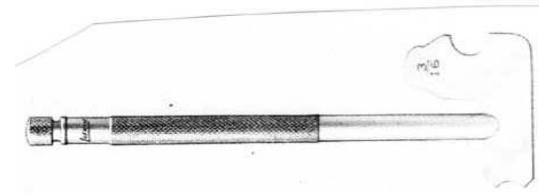
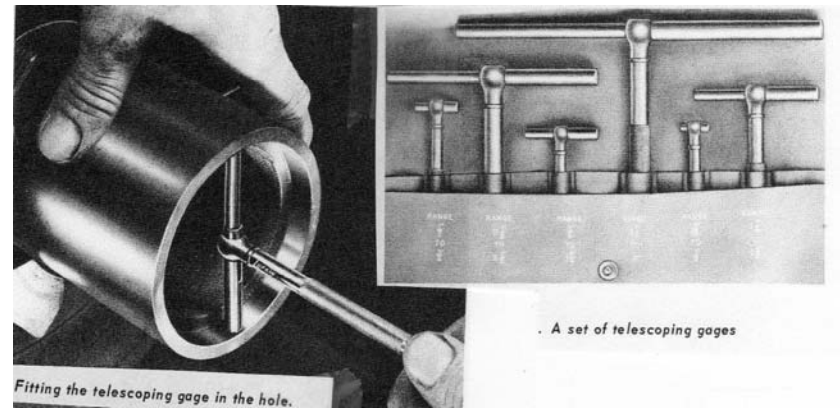
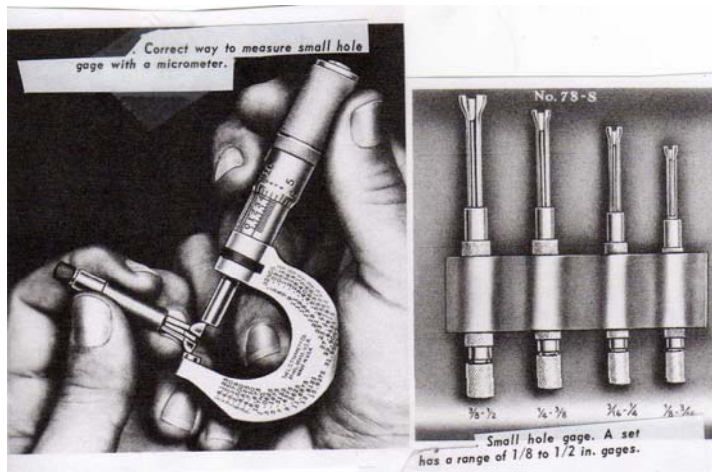


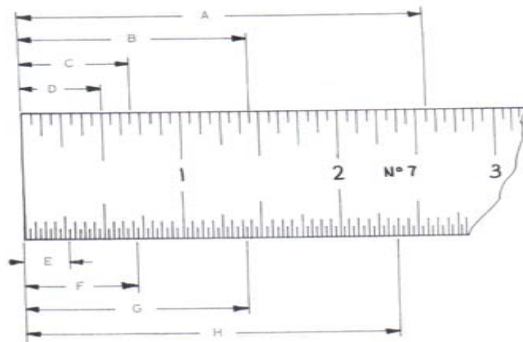
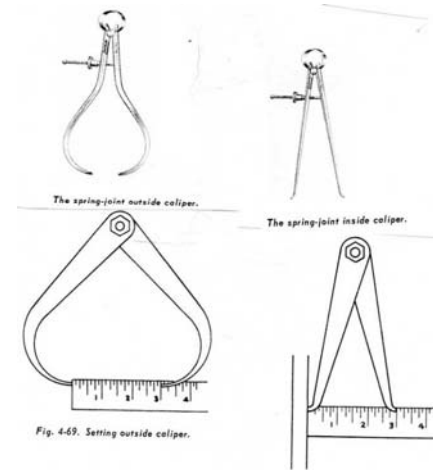
Fig. 4-63. The thickness or feeler gage.



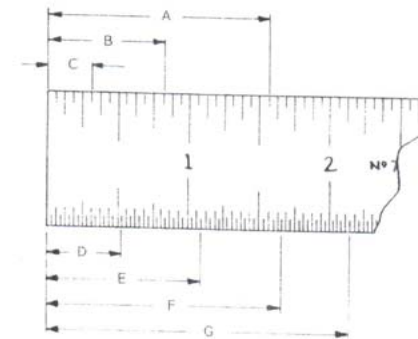
A set of radius and fillet gages.



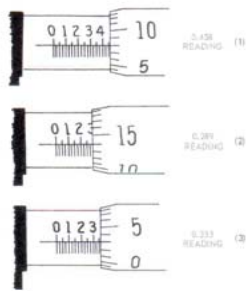
A set of telescoping gages



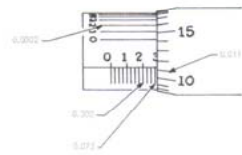
BASIC 6" RULE



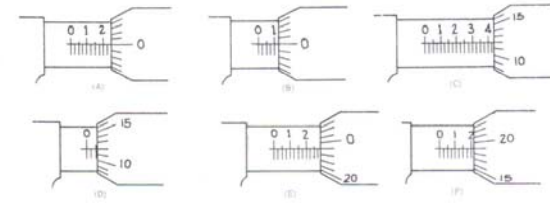
BASIC 6" RULE



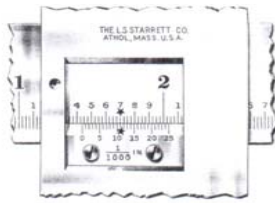
EXAMPLE:  
Fig. 4-13.  
The reading is composed of:  
2 large graduations or  $2 \times 0.100 = 0.200$   
3 small graduations or  $3 \times 0.025 = 0.075$   
11 graduations on the  
thimble or  $11 \times 0.001 = 0.011$   
and the additional distance the  
thimble has advanced beyond  
the 0.011 inch mark.  
In this case it has advanced  $0.0002$ .  
Total reading  $0.2862$  in.



1" MICROMETER

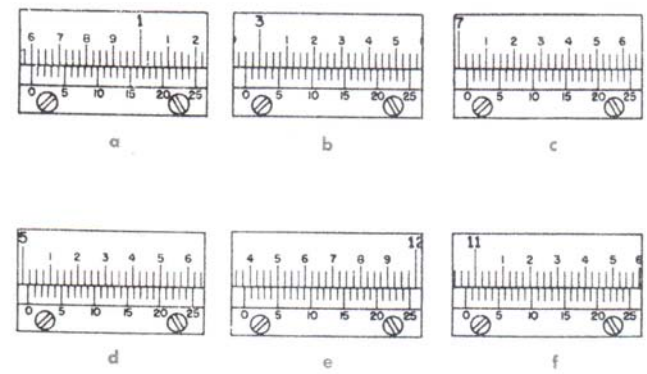


1" MICROMETER



To read the vernier, note how many inches (1, 2, 3, etc.), tenths (0.100, 0.200, etc.), and fortieths (0.025, 0.050 or 0.075), the "0" on the vernier slide is from the "0" on the beam. Add to this total the number of thousandths indicated by the line on the vernier scale that coincides with a line on the beam scale.  
EXAMPLE:  
Fig. 4-32.  
The reading is composed of:  
The "0" is between 1 and 2 on the beam or 1.000  
Four 1/10 graduations or 0.400  
One 1/40 graduation or 0.025  
and eleven 1/1000 graduations or 0.011  
(as indicated by the stars)  
Total reading 1.436

VERNIER CALIPER



VERNIER CALIPER

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## Brown & Sharpe Coordinate Measuring Machine (CMM)

The machine shop is equipped with a Brown & Sharpe Coordinate Measuring Machine (CMM). This machine is comes with Brown & Sharpe's own brand of mechanical inspection software call "Tutor for Windows." The inspection area is approximately 24 inches in the X axis by 30 inches in the Y axis. It can measure an object up to 16 inches high.

