

ments, a Commercial Standard (No. 141-47), which was issued by the U.S. Department of Commerce, in cooperation with the National Bureau of Standards, defines the required accuracy of several functionally essential elements of sine bars. The Standard distinguishes two qualities or grades, designated as commercial class and laboratory class, respectively. The tolerances of these two grades are generally established in a ratio of 2:1. The actual tolerance limits, which are specified by the standard and adopted by reputable manufacturers of inspection equipment, are listed in Table 10-5.

Sine blocks, which are extensively used for angle measurements on technical parts, operate by physically establishing the basic size of the angle to be checked in relation to a supporting surface plate. In the measuring process, the sloping platform of the sine block surface is used to support the tapered part whose vertex—actual or virtual—must point toward the elevated end of the sine plate, in a position where the part's axis is contained in a plane precisely perpendicular to the hinge line of the sine block (see Fig. 10-9).

The essentially simple elements of which a sine block setup is composed permit a high degree of accuracy to be accomplished by relatively inexpensive

Fig. 10-9. Cone angle measurement by supporting the part on a sine block. The setting of the sine block angle in relation to the part's taper angle β varies, depending on the selected system of work locating.

means. The slope of the top surface of a laboratory grade sine block in conjunction with gage blocks of Grade A or better, would have a possible error of 5 to 10 seconds of arc, or even less, with respect to the selected basic angle size. This accuracy level refers to angles in the 0- to 30-degree range; above that size the setting accuracy of the sine block setups gradually decreases, as a consequence of trigonometric relations. Sine blocks should not, in principle, be used of the direct setting of angles in excess of about 45

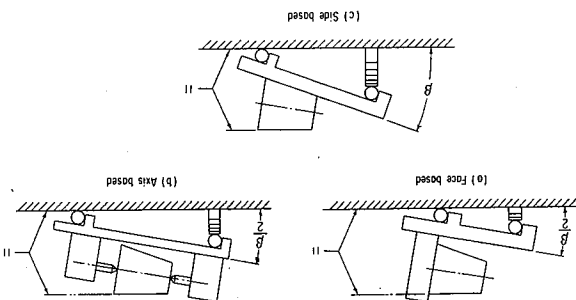


TABLE 10-5. TOLERANCES FOR SINE BARS, BLOCKS AND PLATES

(Commercial Standard 141-47)

SIZE	Working surface to be flat, square with sides and parallel (if double) within—	Cylinders to be alike, round and straight, within—	Cylinders to be parallel with each other and with working surface of bar within—	Cylinders to be at nominal center distance (±)—	Commercial Class					Laboratory Class				
					Inch	5	10	20	Inch	Inch	5	10	20	Inch
Bar					0.00010	0.00015	0.00020	0.00005	0.000075	0.000100	0.000050	0.000075	0.000100	0.00015
Buttons or cylinders					0.0002	0.0003	0.0004	0.00005	0.00010	0.00015	0.00005	0.00010	0.00015	0.00020