

3.2.6 Holes, slots, and inserts Holes, slots, and inserts, when required, shall not deform or stress the work surface (see appendix 60).

3.3 Work surface.

3.3.1 Workmanship of work surface. The work surface shall be fine precision lapped, free from rough lapping marks, and objectionable scratches for the work surface area, (see 3.3.4.1). Evidence of loosely bound crystals on the surface of grade AA plates shall be cause for rejection. When periodically cleaned with soap and water or any other noncorrosive cleaner, the work surface shall have a quality of negligible stickiness when in contact with clean precision objects.

3.3.2 Surface texture. The surface roughness, average of five readings shall not exceed 32 microinches arithmetical average for grade AA and A plates and 64 microinches arithmetical average for grade B (see 4.5.4). To prevent sticking and permit free sliding of workpieces and accessories, the surface roughness shall not be less than 16 microinches.

3.3.3 Tolerances on repeat reading measurement. Tolerances on repeat reading measurement, when the work surface is scanned with the repeat reading gage, are given in table II (see 4.5.5 for test procedure). If the smallest tolerance is required, specify it on invitation for bid, contract or order (see 6.2(m)). If it is intended that small objects be measured on large surface plates, it should be noted that a larger tolerance in flatness over small areas is permitted on larger plates.

TABLE II. Tolerances for repeat reading of measurement

Diagonal or diameter range Inches	Grade AA	Grade A	Grade B	Obtained
	Full indicator movement (FIM) microinches			
Thru 30	35	60	110	When not specified
Over 30 thru 60	45	70	120	
Over 60 thru 90	60	80	160	
Over 90 thru 120	75	100	200	
Over 120 thru 150	90	120	240	
Over 150	100	140	280	
All sizes	25	50	100	When specified

3.3.4 Flatness tolerance. All points of the work surface (as measured with .375-inch diameter flat contacts or probes) shall be contained between two parallel planes, the base plane and the roof plane, separated a distance no greater than that specified for the respective grades. The enveloping planes shall be parallel to the reference plane (see figure 9). The work surface flatness tolerance for the three grades of plates are given in table III and 3.3.4.1. The tolerances on the A and B grade plates are 2 and 4 times respectively, those of grade AA. Listed values in table III do not necessarily comply with formula in 3.3.4.1 because they conform with commercial practice.

TABLE III. Total flatness tolerance in microinches

Rectangular plates		Grade	Grade	Grade
Width	Length	AA	A	B
Inches				
12	12	50	100	200
12	18	50	100	200
18	18	50	100	200
18	24	75	150	300
24	24	75	150	300
24	36	100	200	400
24	48	150	300	600
36	36	150	300	600
36	48	200	400	800
36	60	250	500	1000
36	72	300	600	1200
48	48	200	400	800
48	60	300	600	1200
48	72	350	700	1400
48	96	500	1000	2000
48	120	700	1400	2800
60	120	750	1500	3000
72	96	600	1200	2400
72	144	1100	2200	4400
Round plates				
diameter				
12		50	100	200
18		50	100	200
24		75	150	300
36		100	200	400
48		125	250	500

3.3.4.1 Flatness tolerances for unlisted surface plate sizes. The flatness tolerances for unlisted grade AA plates are obtained from the following formula:

$$\text{Total flatness tolerance in microinches} = 40 + \frac{D^2}{25}$$

where D = diagonal or diameter of the plate in inches. The calculated flatness tolerance for grade AA is rounded off to the nearest 25 microinches. The tolerances on the A and B grade plates are 2 and 4 times, respectively, those for grade AA.

3.3.4.2 Working surface area. The flatness tolerance shall not include the surface along the edge of each size plate as specified in table IV.

TABLE IV. Restrictions on surface area for flatness tolerance - all values in inches

Diameter or diagonal of plate	Distance in from edges All grades
12 thru 48	1.0
over 48	1.5