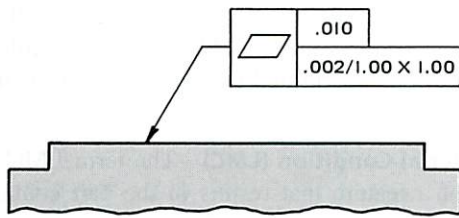


Nominal Size Range Inches	Class RC1 Precision Sliding			Class RC2 Sliding Fit			Class RC3 Precision Running			Class RC4 Close Running			
	Hole Tol. GR5	Minimum Clearance	Shaft Tol. GR4	Hole Tol. GR6	Minimum Clearance	Shaft Tol. GR5	Hole Tol. GR7	Minimum Clearance	Shaft Tol. GR6	Hole Tol. GR8	Minimum Clearance	Shaft Tol. GR7	
	-0		+0	-0		+0	-0		+0	-0		+0	
Over	To												
0	.12	+0.15	0.1	-0.12	+0.25	0.1	-0.15	+0.4	0.3	-0.25	+0.6	0.3	-0.4
.12	.24	+0.2	0.15	-0.15	+0.3	0.15	-0.2	+0.5	0.4	-0.3	+0.7	0.4	-0.5
.24	.40	+0.25	0.2	-0.15	+0.4	0.2	-0.25	+0.6	0.5	-0.4	+0.9	0.5	-0.6
.40	.71	+0.3	0.25	-0.2	+0.4	0.25	-0.3	+0.7	0.6	-0.4	+1.0	0.6	-0.7
.71	1.19	+0.4	0.3	-0.25	+0.5	0.3	-0.4	+0.8	0.8	-0.5	+1.2	0.8	-0.8
1.19	1.97	+0.4	0.4	-0.3	+0.6	0.4	-0.4	+1.0	1.0	-0.6	+1.6	1.0	-1.0
1.97	3.15	+0.5	0.4	-0.3	+0.7	0.4	-0.5	+1.2	1.2	-0.7	+1.8	1.2	-1.2
3.15	4.73	+0.6	0.5	-0.4	+0.9	0.5	-0.6	+1.4	1.4	-0.9	+2.2	1.4	-1.4
4.73	7.09	+0.7	0.6	-0.5	+1.0	0.6	-0.7	+1.6	1.6	-1.0	+2.5	1.6	-1.6
7.09	9.85	+0.8	0.6	-0.6	+1.2	0.6	-0.8	+1.8	2.0	-1.2	+2.8	2.0	-1.8
9.85	12.41	+0.9	0.8	-0.6	+1.2	0.8	-0.9	+2.0	2.5	-1.2	+3.0	2.5	-2.0
12.41	15.75	+1.0	1.0	-0.7	+1.4	1.0	-1.0	+2.2	3.0	-1.4	+3.5	3.0	-2.2

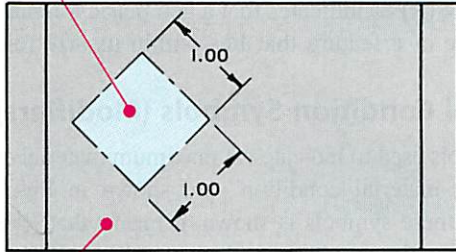
Class RC5 Medium Running			Class RC6 Medium Running			Class RC7 Free Running			Class RC8 Loose Running			Class RC9 Loose Running		
Hole Tol. GR8	Minimum Clearance	Shaft Tol. GR7	Hole Tol. GR9	Minimum Clearance	Shaft Tol. GR8	Hole Tol. GR9	Minimum Clearance	Shaft Tol. GR8	Hole Tol. GR10	Minimum Clearance	Shaft Tol. GR9	Hole Tol. GR11	Minimum Clearance	Shaft Tol. GR10
-0		+0	-0		+0	-0		+0	-0		+0	-0		+0
+0.6	0.6	-0.4	+1.0	0.6	-0.6	+1.0	1.0	-0.6	+1.6	2.5	-1.0	+2.5	4.0	-1.6
+0.7	0.8	-0.5	+1.2	0.8	-0.7	+1.2	1.2	-0.7	+1.8	2.8	-1.2	+3.0	4.5	-1.8
+0.9	1.0	-0.6	+1.4	1.0	-0.9	+1.4	1.6	-0.9	+2.2	3.0	-1.4	+3.5	5.0	-2.2
+1.0	1.2	-0.7	+1.6	1.2	-1.0	+1.6	2.0	-1.0	+2.8	3.5	-1.6	+4.0	6.0	-2.8
+1.2	1.6	-0.8	+2.0	1.6	-1.2	+2.0	2.5	-1.2	+3.5	4.5	-2.0	+5.0	7.0	-3.5
+1.6	2.0	-1.0	+2.5	2.0	-1.6	+2.5	3.0	-1.6	+4.0	5.0	-2.5	+6.0	8.0	-4.0
+1.8	2.5	-1.2	+3.0	2.5	-1.8	+3.0	4.0	-1.8	+4.5	6.0	-3.0	+7.0	9.0	-4.5
+2.2	3.0	-1.4	+3.5	3.0	-2.2	+3.5	5.0	-2.2	+5.0	7.0	-3.5	+9.0	10.0	-5.0
+2.5	3.5	-1.6	+4.0	3.5	-2.5	+4.0	6.0	-2.5	+6.0	8.0	-4.0	+10.0	12.0	-6.0
+2.8	4.5	-1.8	+4.5	4.0	-2.8	+4.5	7.0	-2.8	+7.0	10.0	-4.5	+12.0	15.0	-7.0
+3.0	5.0	-2.0	+5.0	5.0	-3.0	+5.0	8.0	-3.0	+8.0	12.0	-5.0	+12.0	18.0	-8.0
+3.5	6.0	-2.2	+6.0	6.0	-3.5	+6.0	10.0	-3.5	+9.0	14.0	-6.0	+14.0	22.0	-9.0

TABLE 43 Running and sliding fits. (Values in thousandths of an inch.)



(A) DRAWING CALLOUT

MAXIMUM FLATNESS TOLERANCE OF .002 FOR ANY 1.00 SQUARE SURFACE



MAXIMUM FLATNESS TOLERANCE OF .010 FOR ENTIRE SURFACE AREA

(B) INTERPRETATION

**Fig. 16-29** Overall flatness tolerance combined with a flatness tolerance of a unit area.

### 16-3 ASSIGNMENTS

See Assignments 4 through 7 for Unit 16-3 on page 602.



**INTERNET CONNECTION** Visit this site for additional information on geometric dimensioning and tolerancing: <http://www.engineersedge.com/gdt.htm>

### 16-4 STRAIGHTNESS OF A FEATURE OF SIZE

#### Features of Size

So far, only lines, line elements, and single surfaces have been considered. These are features having no diameter or thickness, and geometric tolerances applied to them cannot be affected by feature size.

Features of size are features that do have diameter or thickness. These may be cylinders, such as shafts and holes. They may be slots, tabs, or rectangular or flat parts, where two parallel, flat surfaces are considered to form a single feature. With features of size, the feature control frame is associated with the size dimension (Fig. 16-30).

#### Definitions

Before examples of features of size are given, it is essential to understand certain terms.

INTERNAL FEATURE	EXTERNAL FEATURE
<p>DRAWING CALLOUT</p>	<p>DRAWING CALLOUT</p>
<p>MAXIMUM MATERIAL CONDITION = MINIMUM PERMISSIBLE DIAMETER</p> <p>NOTE-LEAST MATERIAL CONDITION <math>\phi</math>.505</p>	<p>MAXIMUM MATERIAL CONDITION = LARGEST PERMISSIBLE DIAMETER</p> <p>NOTE-LEAST MATERIAL CONDITION <math>\phi</math>.494</p>
<p>VIRTUAL CONDITION</p> <p><math>\phi</math>.500</p> <p><math>\phi</math>.497</p> <p><math>\phi</math>.003 TOLERANCE ZONE</p>	<p>VIRTUAL CONDITION</p> <p><math>\phi</math>.500</p> <p><math>\phi</math>.503</p> <p><math>\phi</math>.003 TOLERANCE ZONE</p>

**Fig. 16-30** Maximum material and virtual conditions.