

Companion Flanges, Type A (External Pilot) and Type S (Internal Pilot)

This document is equivalent to ISO 7646 and ISO 7647.

1. **Scope**—This SAE Standard specifies the nominal dimensions and tolerances which affect the interchangeability between companion flanges and mating parts. The flanges covered by this document are designated type A and type S.

The type A flanges are equivalent to type A ISO 7646. The type S flanges are equivalent to the type S ISO 7647. Type A is an external (male) pilot construction and type S is an internal (female) pilot construction. These flanges are not interchangeable. Dimensions not specified are left to the discretion of the component manufacturer.

2. **References**

- 2.1 **Applicable Publications**—The following publications form a part of this specification to the extent specified herein.

- 2.1.1 ISO PUBLICATIONS—Available from ANSI, 11 West 42nd Street, New York, NY 10036-8002.

ISO 286—ISO system of limits and fits

ISO 1101—Technical drawings—Geometrical tolerancing—Tolerancing of form, orientation, location and run-out—Generalities, definitions, symbols, indications on drawings

ISO 7646—Road vehicles—Gearbox flanges for commercial vehicles and buses—Type A

ISO 7647—Road vehicles—Gearbox flanges for commercial vehicles and buses—Type S

3. **Dimensions and Tolerances**—Nominal dimensions, tolerances, and bolt hole locations of type A companion flanges are shown in Figures 1 to 5, and given in Table 1. Nominal dimensions, tolerances, and bolt hole locations of type S companion flanges are shown in Figures 6 to 9, and given in Tables 2A and 2B.

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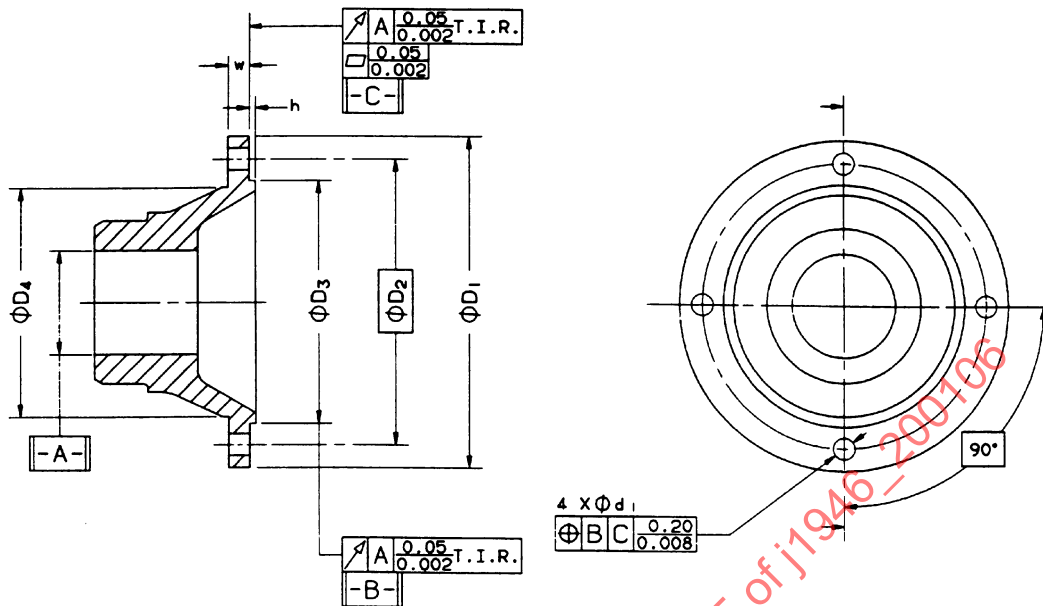


FIGURE 1—TYPE A COMPANION FLANGES—TRUE POSITION, FLATNESS AND RUNOUT TOLERANCES—mm/in

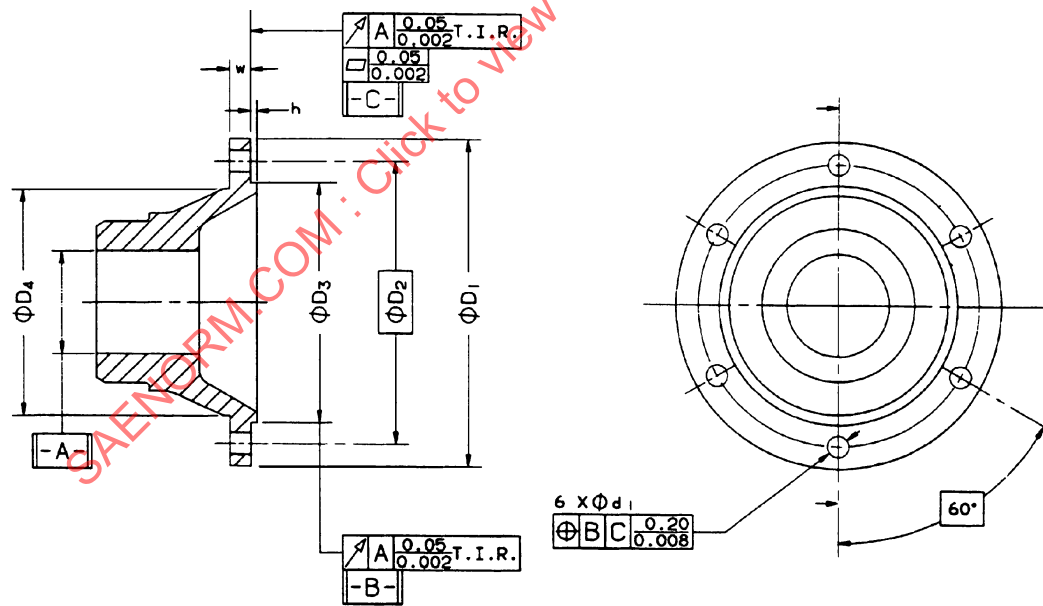


FIGURE 2—TYPE A COMPANION FLANGES—TRUE POSITION, FLATNESS AND RUNOUT TOLERANCES—mm/in

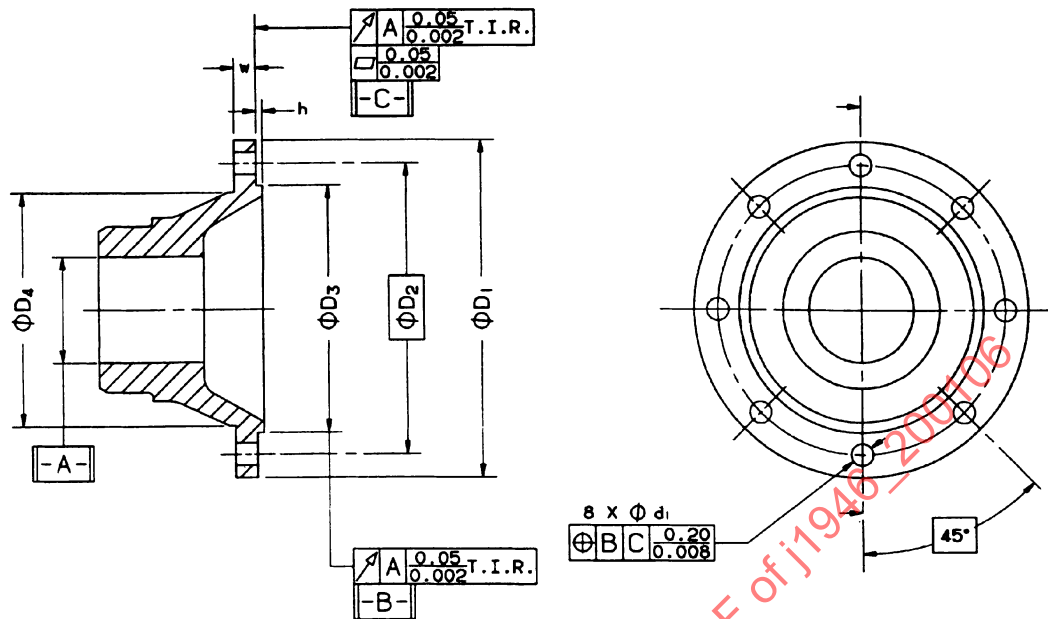


FIGURE 3—TYPE A COMPANION FLANGES—TRUE POSITION, FLATNESS AND RUNOUT TOLERANCES—mm/in

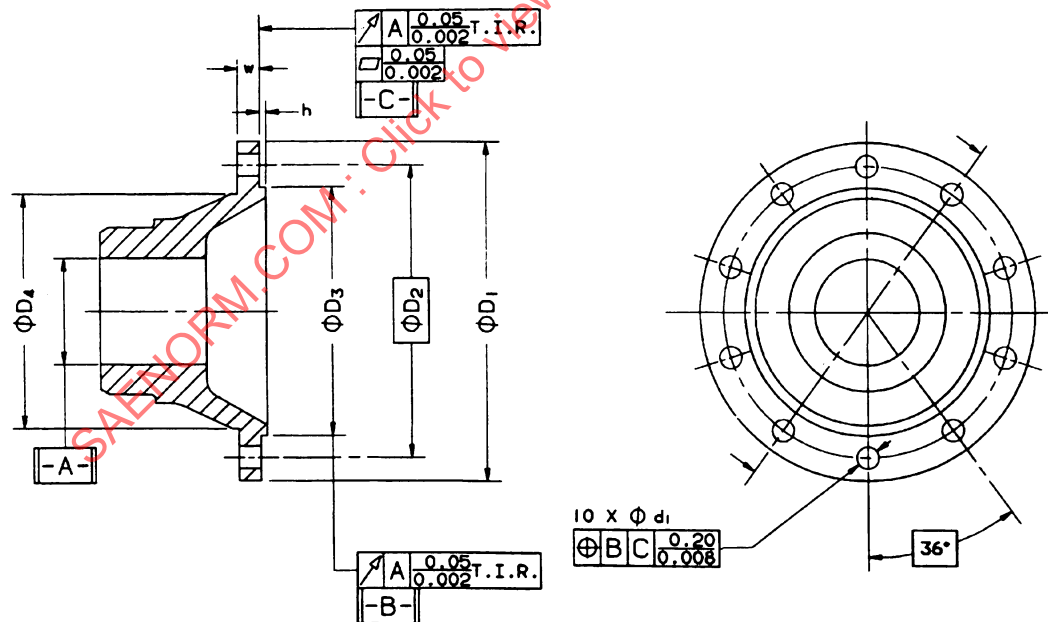


FIGURE 4—TYPE A COMPANION FLANGES—TRUE POSITION, FLATNESS AND RUNOUT TOLERANCES—mm/in

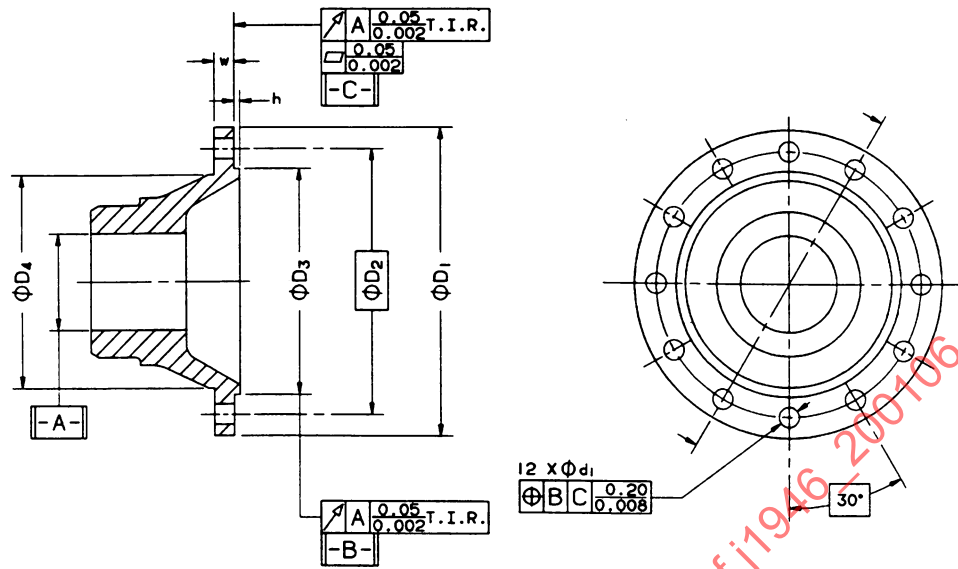


FIGURE 5—TYPE A COMPANION FLANGES—TRUE POSITION, FLATNESS AND RUNOUT TOLERANCES—mm/in

TABLE 1—DIMENSIONS AND TOLERANCES
(APPLICABLE TO FIGURES 1 TO 5)⁽¹⁾

D1	Figure Number	Number of holes	d_1 +0.2 0	D ₂	D ₃ 0 -0.05	D ₄ ⁽²⁾ 0 -0.2	w 0 -0.5	h 0 -0.2
75	2	6	6.1	62	42	51.6	5.5	1.8
90	1	4	8.1	74.5	47	61	6	2.3
90	2	6	8.1	74.5	47	61	6	2.3
100	2	6	8.1	84	57	70.5	7	2.3
120	3	8	10.1	101.5	75	84.3	8	2.3
150	3	8	12.1	130	90	110.7	10	2.3
150	5	12	12.1	130	90	110.7	10	2.3
165	3	8	16.1	140	95	115	12	2.3
180	4	10	16.1	155.5	110	130.5	12	2.3
225	5	12	16.1	196	140	171	15	4

1. Dimensions and tolerances in millimeters.

2. This dimension shall be used when required to prevent bolt heads from rotating.

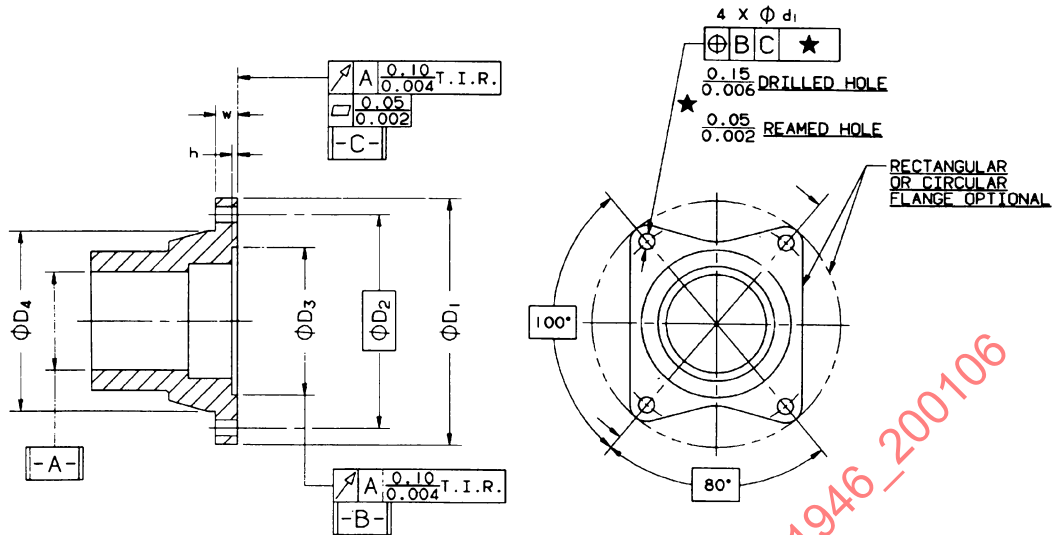


FIGURE 6—TYPE S COMPANION FLANGES—TRUE POSITION, FLATNESS AND RUNOUT TOLERANCES—mm/in

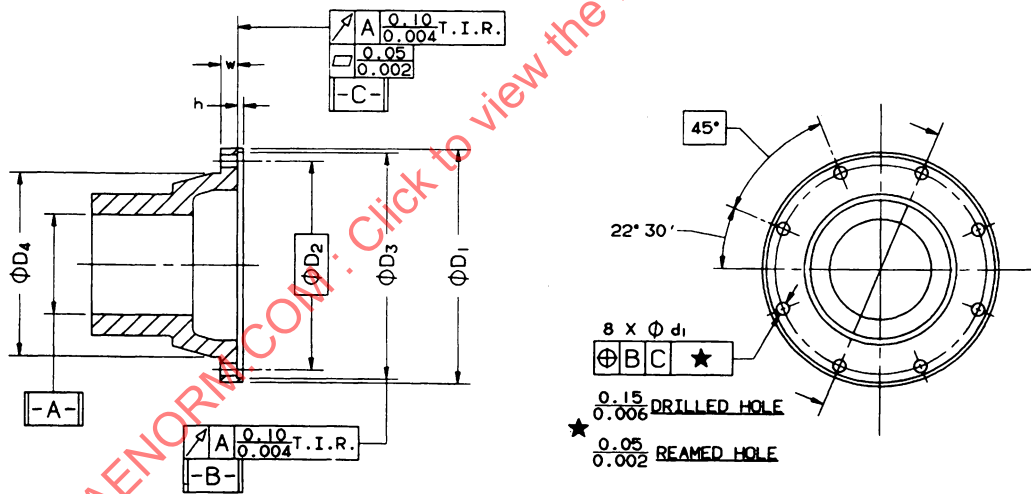


FIGURE 7—TYPE S COMPANION FLANGES—TRUE POSITION, FLATNESS AND RUNOUT TOLERANCES—mm/in

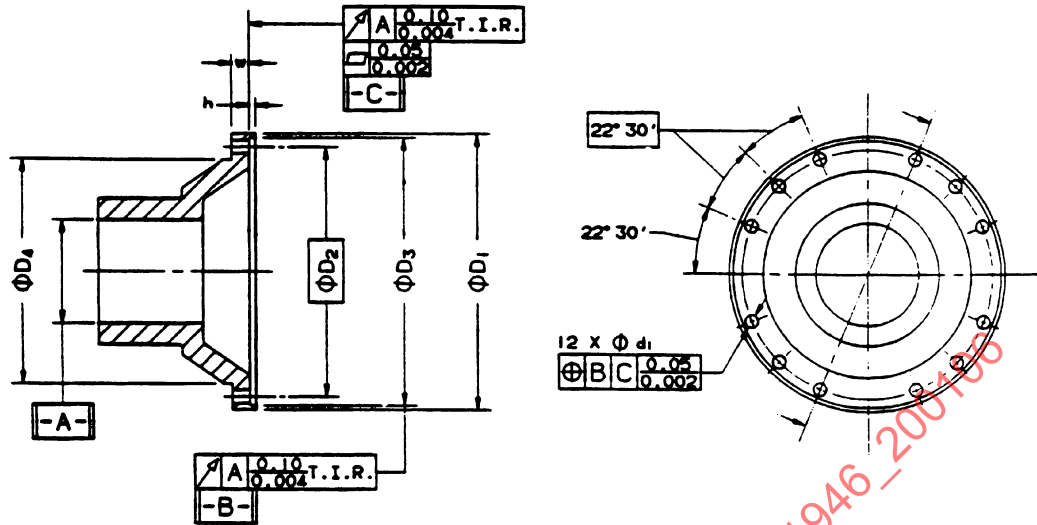


FIGURE 8—TYPE S COMPANION FLANGES—TRUE POSITION, FLATNESS AND RUNOUT TOLERANCES—mm/in

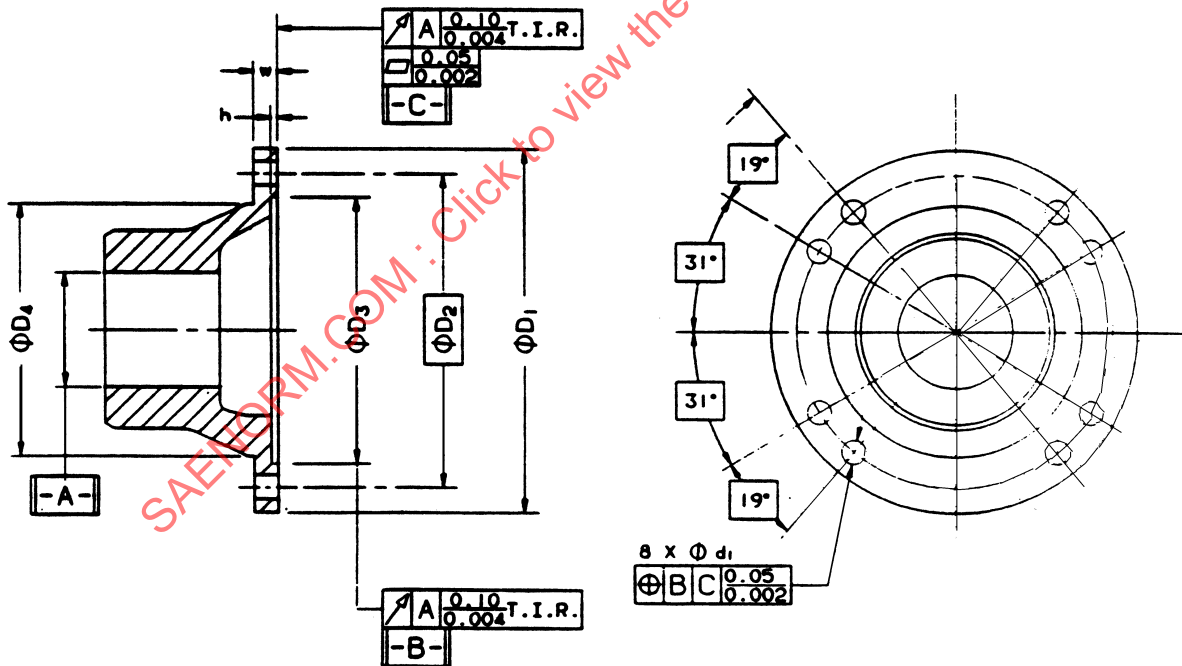


FIGURE 9—TYPE S COMPANION FLANGES—TRUE POSITION, FLATNESS AND RUNOUT TOLERANCES—mm/in

TABLE 2A—DIMENSIONS AND TOLERANCES—ISO METRIC CONVERSION STANDARD
(APPLICABLE TO FIGURES 6 TO 9)⁽¹⁾⁽²⁾

Size code	Figure number	D ₁	Number of holes	d ₁ +0.2 0	D ₂	D ₃ 0 +0.05	D ₄ ⁽³⁾ 0 -0.2	w 0 -0.5	h +0.2 0
1100	6	87	4	8.1	69.85	57.10	56.4	8	2.0
1300	6	97	4	10.1	79.37	60.32	62.2	8	2.3
1400	6	116	4	12.1	95.25	69.85	76	8	2.3
1500	6	151	4	14.1	120.65	95.25	96.4	10	2.3
1510	6	146	4	12.1	120.65	95.25	101.4	10	2.3
1600	7	175	8	10.1	155.57	168.28	138.4	11	1.5
1700	7	203	8	10.1	184.15	196.86	167	11	1.5
1800	8	203	12	10.1	184.15	196.86	167	11	1.5

1. Dimensions and tolerances are in millimeters.
2. Basic differences between the ISO and SAE companion flange standards are in bolt diameters (D₁) and bolt head locking diameters (D₄). These two diameters correspond to the use of metric or inch mounting bolts.
3. This dimension shall be used when required to prevent bolt heads from rotating.

TABLE 2B—DIMENSIONS AND TOLERANCES—SAE—ORIGINAL INCH STANDARD⁽¹⁾⁽²⁾
(APPLICABLE TO FIGURES 6 TO 9)

Size Code	Figure Number	D ₁	Number of Holes	d ₁ +0.007 ⁽³⁾ 0	D ₂	D ₃ +0.002 0	D ₄ ⁽⁴⁾ 0 -0.005	w 0 -0.020	h +0.010 0
1000	6	3.438	4	0.318	2.750	2.248	2.240	0.260	0.080
1100	6	3.438	4	0.318	2.750	2.248	2.240	0.260	0.080
1310	6	3.875	4	0.381	3.125	2.375	2.550	0.290	0.080
1350	6	4.625	4	0.441/0.439	3.750	2.750	3.115	0.320	0.080
1410	6	4.625	4	0.441/0.439	3.750	2.750	3.115	0.320	0.080
1480	6	5.875	4	0.506	4.750	3.750	3.990	0.390	0.080
1550	6	5.875	4	0.506	4.750	3.750	3.990	0.390	0.080
1610	7	6.875	8	0.381	6.125	6.625	5.550	0.390	0.050
1710	7	8.000	8	0.379/0.377	7.250	7.750	6.677	0.390	0.050
1760	8	8.000	12	0.441/0.439	7.250	7.750	6.615	0.390	0.050
1810	8	8.000	12	0.441/0.439	7.250	7.750	6.616	0.390	0.050
1880	9	9.500	8	0.629/0.627	8.250	7.000	7.300	0.620	0.125
1910	9	9.500	8	0.629/0.627	8.250	7.000	7.300	0.620	0.125

1. Dimensions and tolerances are in inches.
2. Basic differences between the ISO and SAE companion flange standards are in bolt diameters (D₁) and bolt head locking diameters (D₄). These two diameters correspond to the use of metric or inch mounting bolts.
3. +0.007 applies to dimensions without tolerance specified.
4. This dimension shall be used when required to prevent bolt heads from rotating.