

SAE The Engineering Society
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SURFACE VEHICLE STANDARD

Submitted for recognition as an American National Standard

SAE J1946

REV.
JAN91

Issued 1990-06-18
Revised 1991-01-31

Superseding J1946 JUN90

COMPANION FLANGES, TYPE A (EXTERNAL PILOT) AND TYPE S (INTERNAL PILOT)

1. SCOPE:

(R)

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 Documents:

(R)

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 Table 2.

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4. DESIGNATION:

Companion flanges meeting the requirements of this document shall be identified by the following details in the order specified:

- a. Reference to this document
- b. The flange type
- c. The diameter of the flange, D_1 ; (Type A only - See Table 1)
- d. The size code; (Type S only - See Table 2)
- e. The number of bolts
- f. The size of bolts

4.1 Examples:

- 4.1.1 Designation of a companion flange type A with $D_1 = 150$ mm and eight 12 mm bolts:

a. Flange SAE J1946 Type A -- 150 x 8 x 12

- 4.1.2 Designation of a companion flange type S with size code 1500 and four (R) 14 mm bolts:

a. Flange SAE J1946 Type S -- 1500 x 4 x 14

- 4.1.3 Designation of a companion flange type S with size code 1710 and eight (R) 0.375 in bolts:

a. Flange SAE J1946 Type S -- 1710 x 8 x 0.375

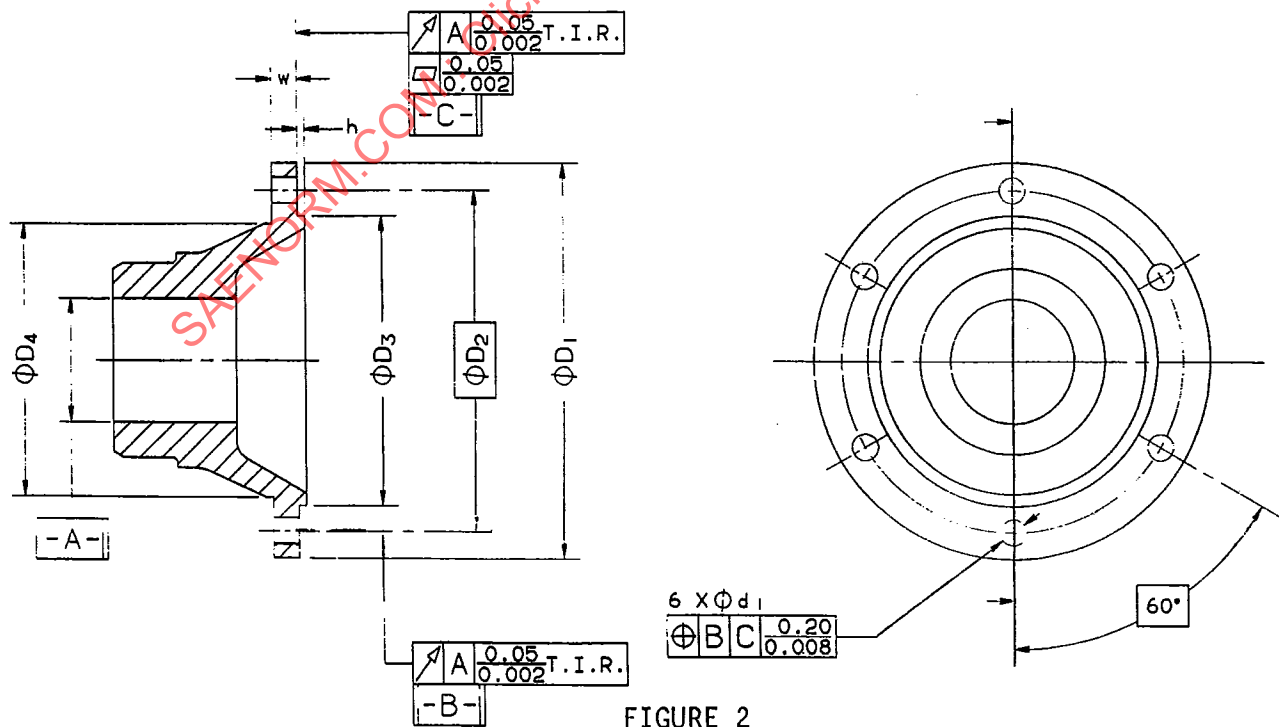
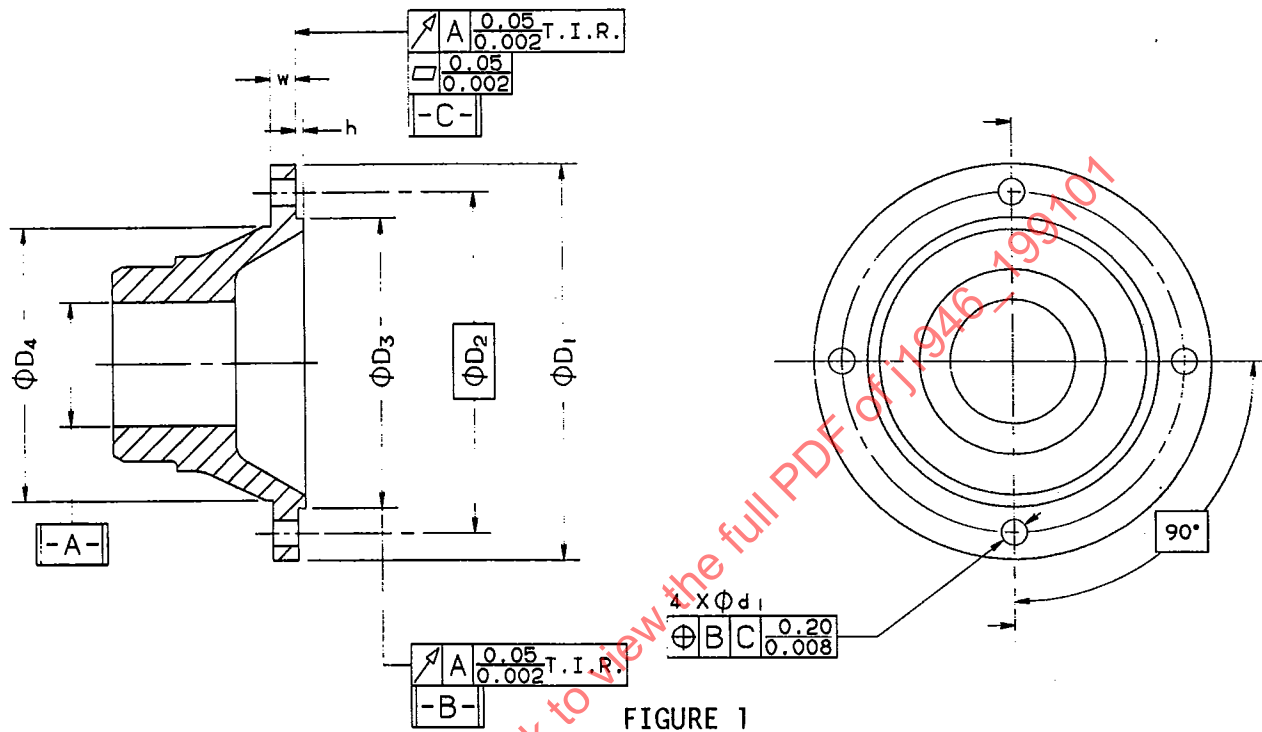
5. NOTES:

5.1 Marginal Indicia:

The (R) is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. If the symbol is next to the report title, it indicates a complete revision of the report.

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TYPE A COMPANION FLANGES
TRUE POSITION, FLATNESS & RUNOUT TOLERANCES
(FIGURES 1 to 5)



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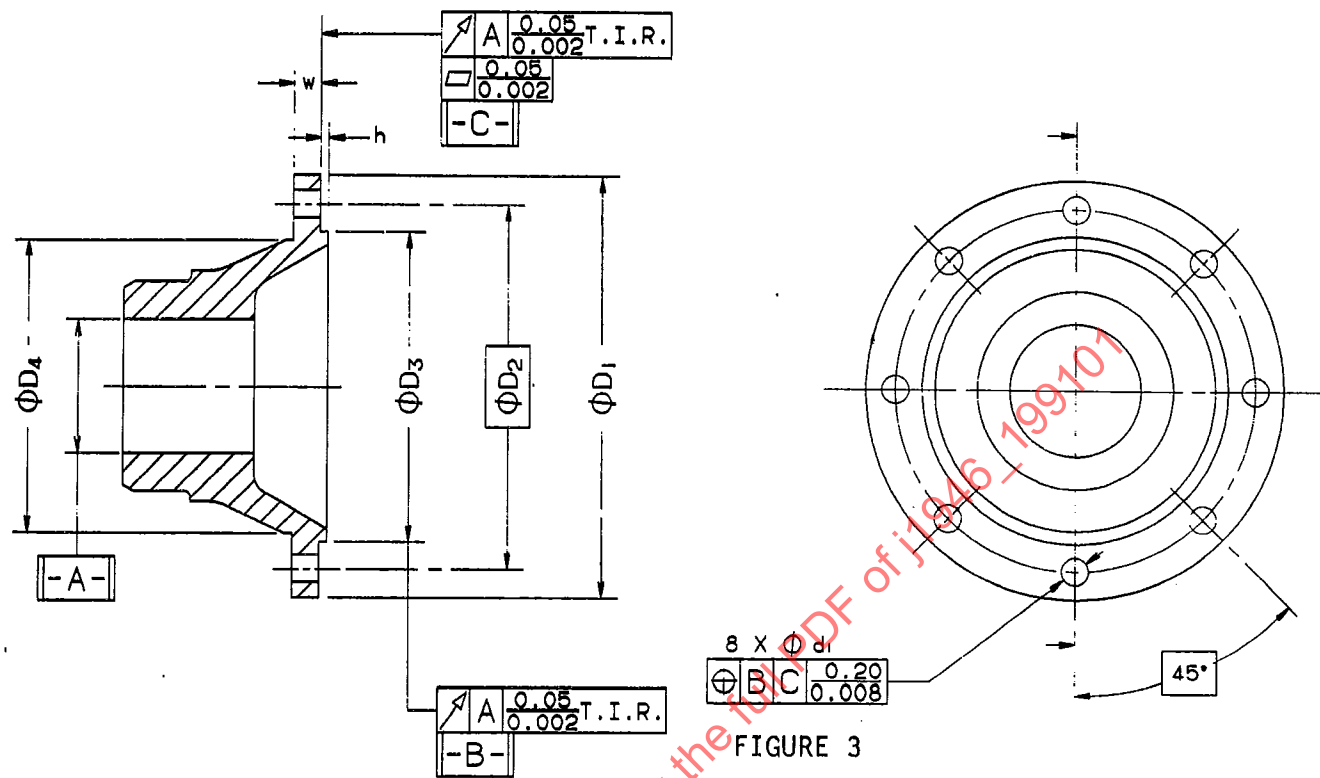


FIGURE 3

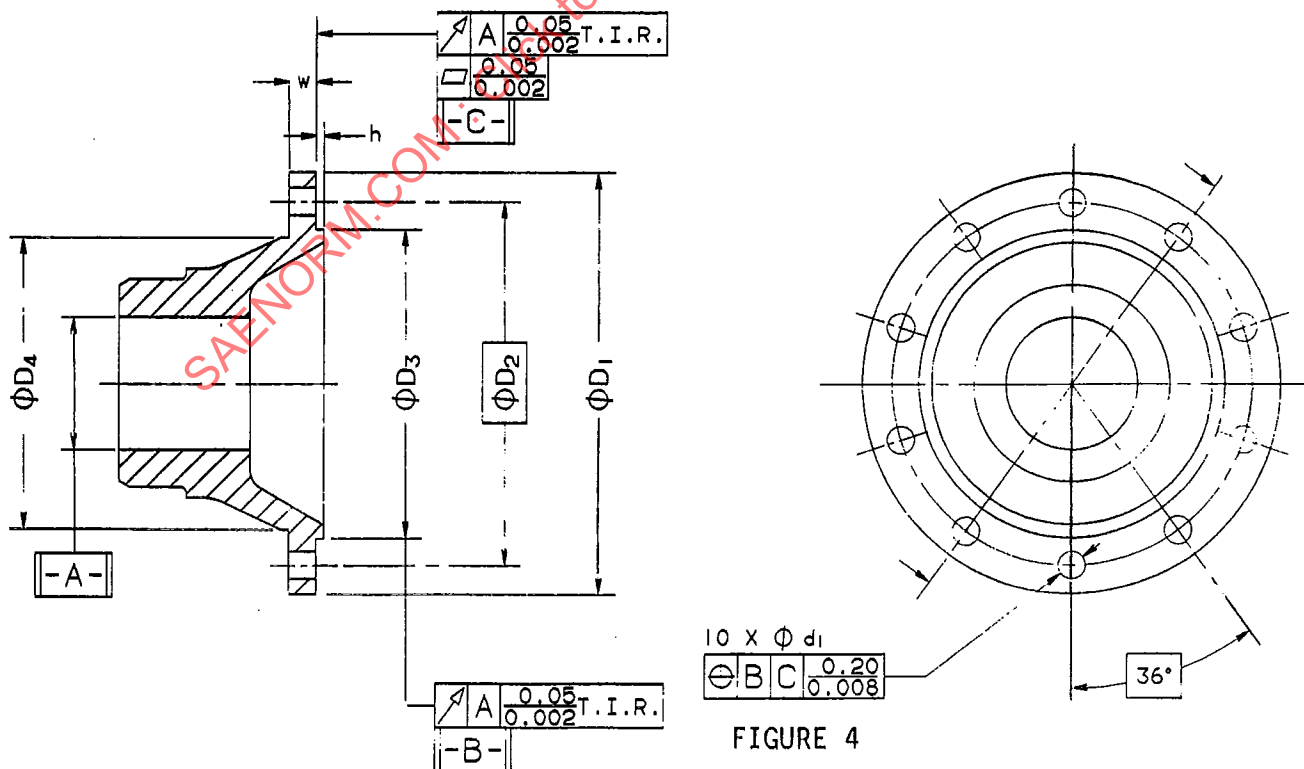


FIGURE 4

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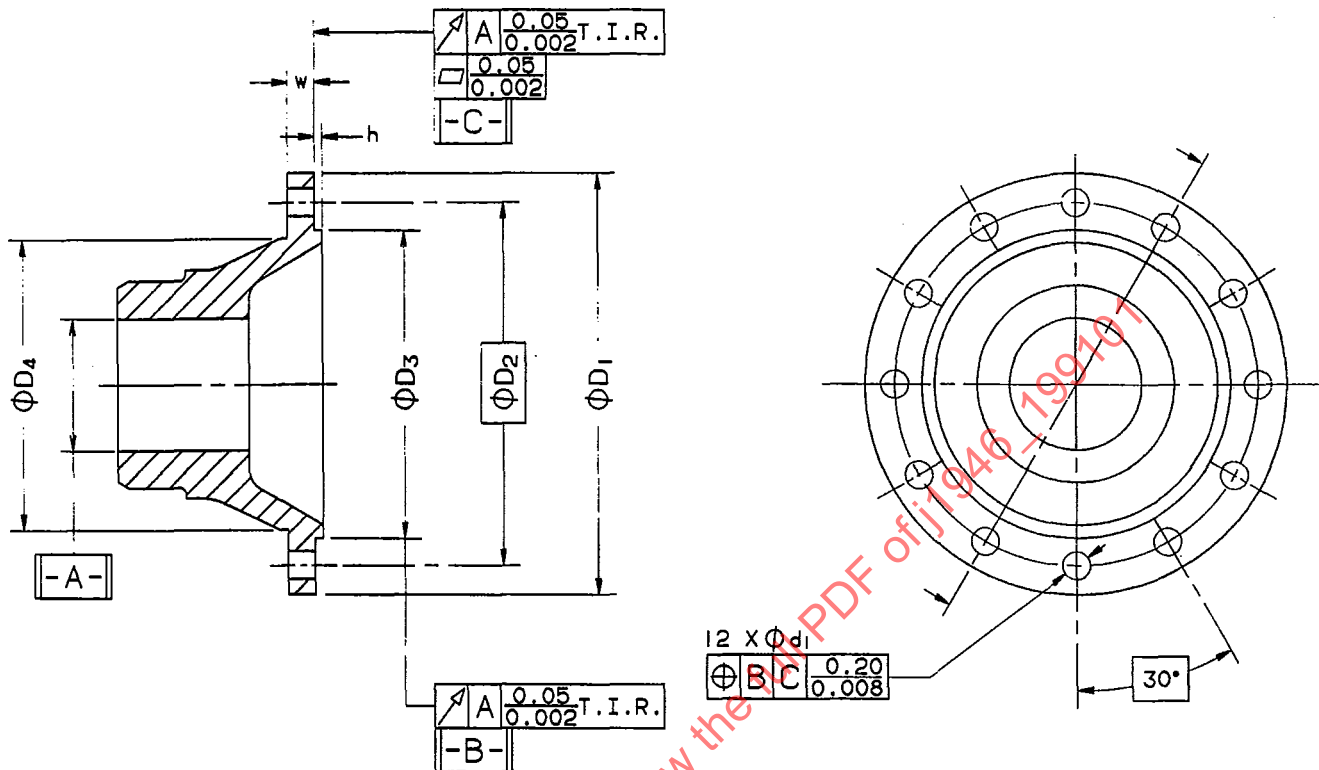


FIGURE 5

TABLE 1 - Dimensions and Tolerances
(Applicable to Figures 1 to 5)

D_1	Figure Number	Number of holes	d_1 +0.2 0	D_2	D_3 0 -0.05	$D_4^{1/}$ 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
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
165	5	12	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

Dimensions and tolerances in millimeters.

^{1/}This dimension shall be used when required to prevent bolt heads from rotating.

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TYPE S COMPANION FLANGES
TRUE POSITION, FLATNESS & RUNOUT TOLERANCES
(FIGURES 6 to 9)

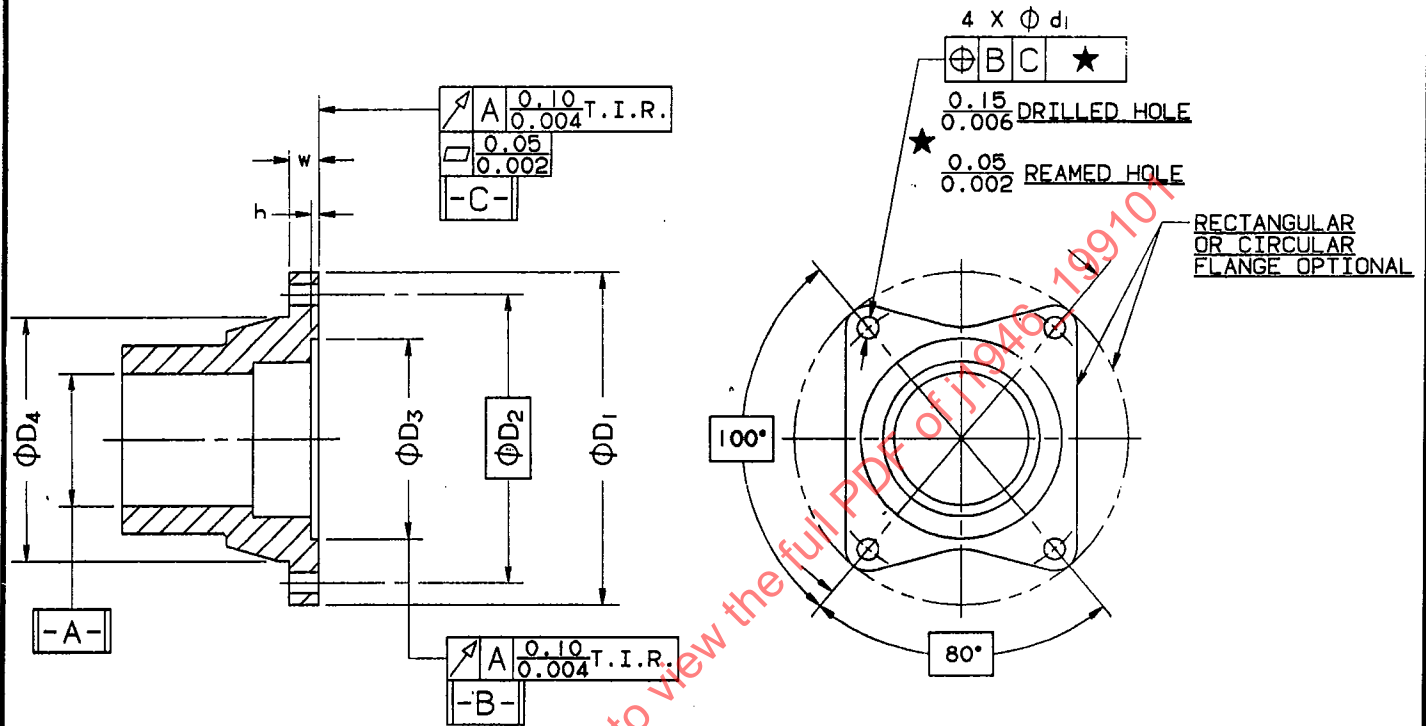


FIGURE 6

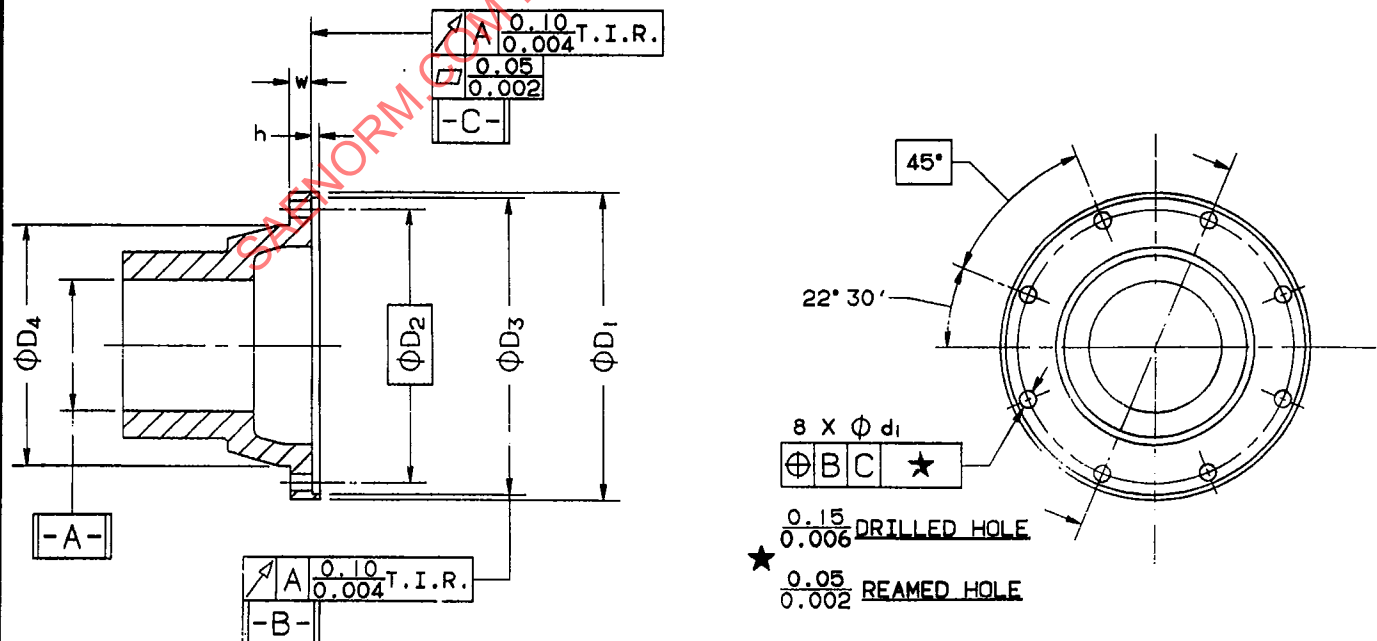


FIGURE 7

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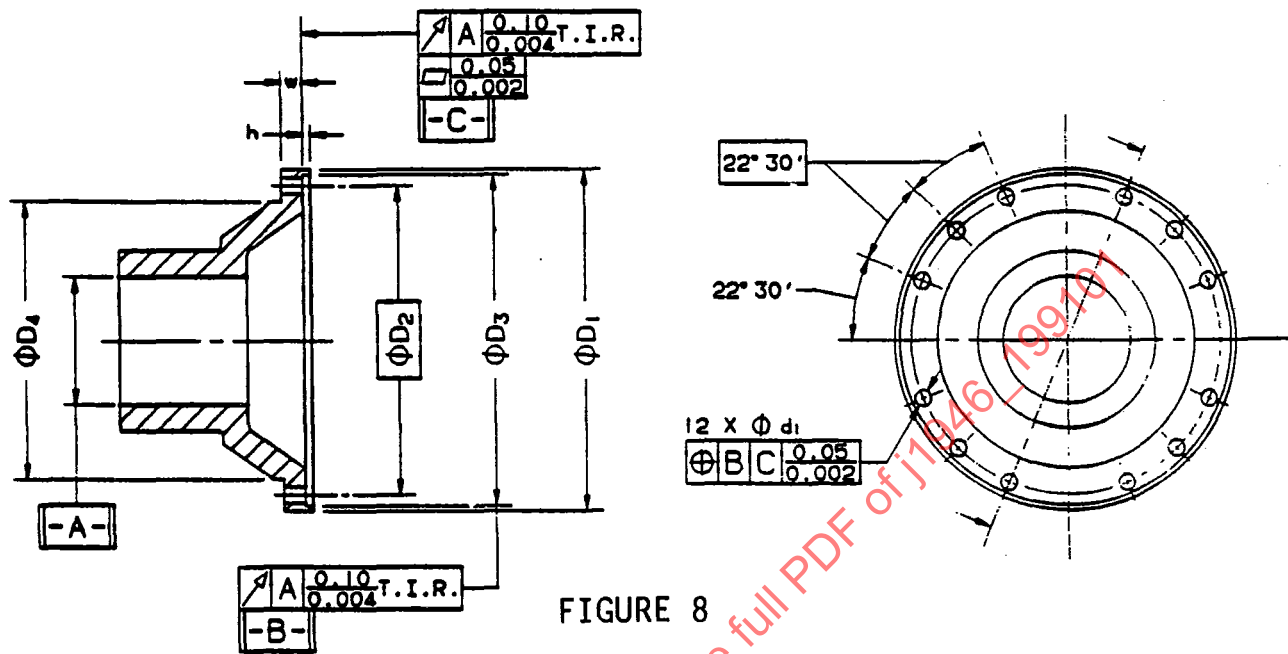


FIGURE 8

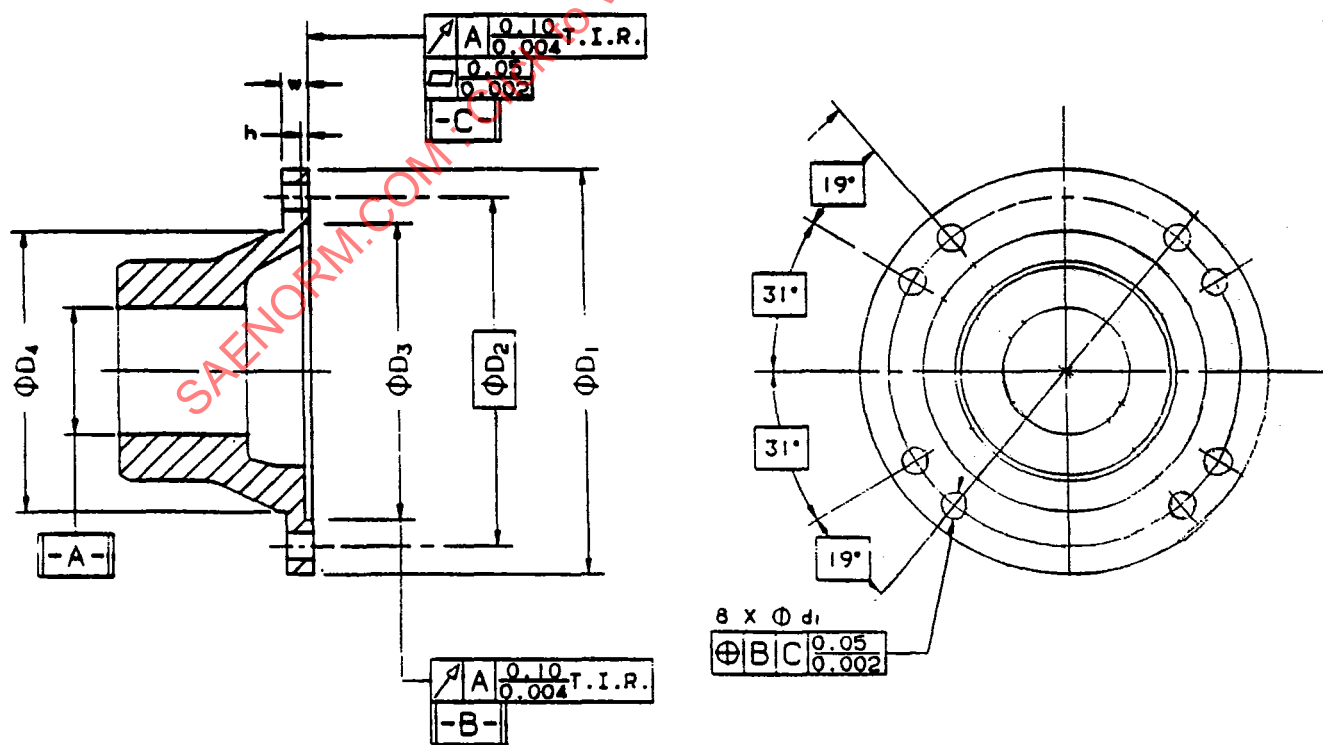


FIGURE 9

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TABLE 2 - Dimensions and Tolerances
(Applicable to Figures 6 to 9)

SAE - ORIGINAL INCH STANDARD

Size Code	Figure Number	D ₁	Number of holes	d ₁ ^{1/} +0.007(a) 0	D ₂	D ₃ +0.002 0	D ₄ ^{2/} 0 -0.005	w 0 -0.020	h +0.010 0
1 000	6	3.438	4	0.318	2.750	2.248	2.240	0.260	0.080
1 100	6	3.438	4	0.318	2.750	2.248	2.240	0.260	0.080
1 310	6	3.875	4	0.381	3.125	2.375	2.550	0.290	0.080
1 350	6	4.625	4	0.441/0.439	3.750	2.750	3.115	0.320	0.080
1 410	6	4.625	4	0.441/0.439	3.750	2.750	3.115	0.320	0.080
1 480	6	5.875	4	0.506	4.750	3.750	3.990	0.390	0.080
1 550	6	5.875	4	0.506	4.750	3.750	3.990	0.390	0.080
1 610	7	6.875	8	0.381	6.125	6.625	5.550	0.390	0.050
1 710	7	8.000	8	0.379/0.377	7.250	7.750	6.677	0.390	0.050
1 760	8	8.000	12	0.441/0.439	7.250	7.750	6.615	0.390	0.050
1 810	8	8.000	12	0.441/0.439	7.250	7.750	6.615	0.390	0.050
1 880	9	9.500	8	0.629/0.627	8.250	7.000	7.300	0.620	0.125
1 910	9	9.500	8	0.629/0.627	8.250	7.000	7.300	0.620	0.125

Dimensions and tolerances in inches

NOTE: Basic differences between the ISO and SAE companion flange standards are in bolt hole diameters (d₁) and bolt head locking diameters (D₄).
These two diameters correspond to the use of metric or inch mounting bolts.

ISO - METRIC CONVERSION STANDARD

Size Code	Figure Number	D ₁	Number of holes	d ₁ +0.2 0	D ₂	D ₃ +0.05 0	D ₄ ^{2/} 0 -0.2	w 0 -0.5	h +0.2 0
1 100	6	87	4	8.1	69.85	57.10	56.4	8	2.0
1 300	6	97	4	10.1	79.37	60.32	62.2	8	2.3
1 400	6	116	4	12.1	95.25	69.85	76	8	2.3
1 500	6	151	4	14.1	120.65	95.25	98.4	10	2.3
1 510	6	146	4	12.1	120.65	95.25	101.4	10	2.3
1 600	7	175	8	10.1	155.57	168.28	138.4	11	1.5
1 700	7	203	8	10.1	184.15	196.86	167	11	1.5
1 800	8	203	12	10.1	184.15	196.86	167	11	1.5

Dimensions and tolerances in millimeters

^{1/}+0.007 applies to dimensions without tolerance specified.

^{2/}This dimension shall be used when required to prevent bolt heads from rotating.