



AMERICAN NATIONAL STANDARD

***Accredited Standards
Committee B3***



Thrust Bearings of Ball, Cylindrical Roller & Spherical Roller Types—Metric Design



Secretariat

**American Bearing
Manufacturers Association**

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AMERICAN NATIONAL STANDARD

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THRUST BEARINGS OF BALL, CYLINDRICAL ROLLER & SPHERICAL ROLLER TYPES—METRIC DESIGN

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ABMA STANDARD 24.1

THRUST BEARINGS OF BALL, CYLINDRICAL ROLLER & SPHERICAL ROLLER TYPES – METRIC DESIGN

1. SCOPE

This standard for thrust bearings of ball, cylindrical roller and spherical roller types of metric design covers:

Identification Code

Symbols and Nomenclature

Boundary Dimensions

Tolerances

Mounting Dimensions

All bearings and components in this standard are not necessarily available. For availability, consult bearing manufacturers.

Other Applicable standards should be consulted for tolerance definitions, gaging practices and methods of evaluating load ratings.

This standard only covers external dimensions. Functional interchangeability between different makes of standard bearings or components of the same size may depend on bearing features which are not standardized. Hence, the substitution of one make of standard bearing for another should only be made after careful comparison of their characteristics and consideration of the requirements of the particular application.

2. IDENTIFICATION CODE

2.1 Scope of Code

This code identifies and, as far as possible, describes each thrust bearing or component on the basis of complete dimensional interchangeability. This code establishes a universal language for describing and identifying metric design thrust bearings and components of the types covered in this standard in order to facilitate communications between the user and the manufacturer. The code is also intended to simplify the handling by user personnel of identical bearings made by different manufacturers, whose identification numbers may be different.

This code applies only to those thrust bearings or components whose boundary dimensions and tolerances conform to this standard.

2.2 Code

The identification code for thrust bearings of ball, cylindrical roller and spherical roller types of metric design is made up of three parts:

1. A one, two, three or four digit number identifying the bearing bore in millimetres.
2. The letter T identifying a thrust bearing followed by one or two arbitrarily chosen letters identifying the type of thrust bearing as shown in Table 1 and 2.
3. An arbitrarily chosen two digit number identifying the bearing series within its class as shown in Table 3.

3. SYMBOLS AND NOMENCLATURE

d = bore diameter of shaft washer, single direction bearing, nominal

Δd_{mp} = single plane mean bore diameter deviation of central shaft washer, single direction bearing

d_1 = outside diameter of shaft washer, single direction bearing, nominal

d_{1smax} = largest single outside diameter of shaft washer

d_2 = bore diameter of central shaft washer, double direction bearing, nominal

Δd_{2mp} = single plane mean bore diameter deviation of central shaft washer, double direction bearing

d_3 = outside diameter of central shaft washer, nominal

d_{3smax} = largest single outside diameter of central shaft washer

D = outside diameter of housing washer, nominal

ΔD_{mp} = single plane mean outside diameter deviation

D_1 = bore diameter of housing washer, nominal

D_{1smin} = smallest single bore diameter of housing washer

T = bearing height, single direction bearing, nominal

ΔT_s = deviation of the actual bearing height, single direction bearing

T_1 = bearing height, double direction bearing, nominal

ΔT_{1s} = deviation of the actual bearing height, double direction bearing

B = height of central shaft washer, nominal

r = back face chamfer dimension of shaft washer (single direction bearing) and housing washer

r_{smin} = smallest single dimension of r

r_1 = face chamfer dimension of central shaft washer

r_{1smin} = smallest single dimension of r_1

S_e = raceway parallelism with the face, housing mounted race or washer

S_i = raceway parallelism with the face, bore mounted race or washer

V_{dp} = roundness or bore diameter variation in a single radial plane

V_{Dp} = roundness or outside diameter variation in a single radial plane

TABLE 1. THRUST BALL BEARINGS — TYPE SYMBOLS

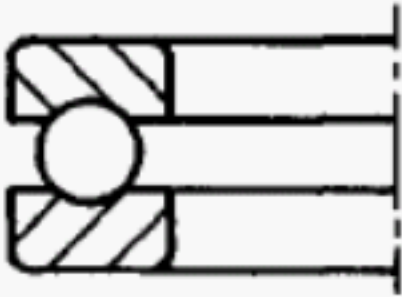
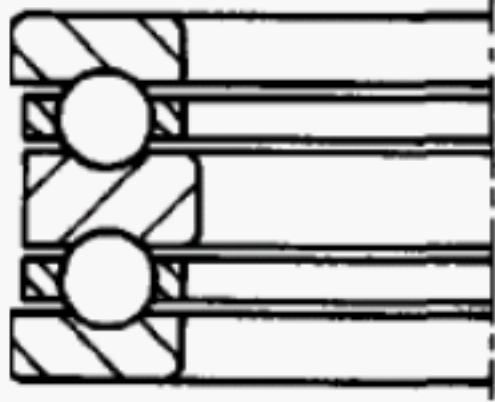
| SYMBOL | DESCRIPTION | |
|------------|---|---|
| TA | SINGLE DIRECTION, WASHERS WITH GROOVED RACEWAYS, FLAT SEATS |  |
| TDA | DOUBLE DIRECTION, WASHERS WITH GROOVED RACEWAYS, FLAT SEATS |  |

TABLE 2. THRUST ROLLER BEARINGS — TYPE SYMBOLS

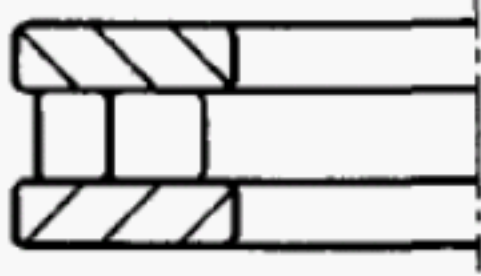
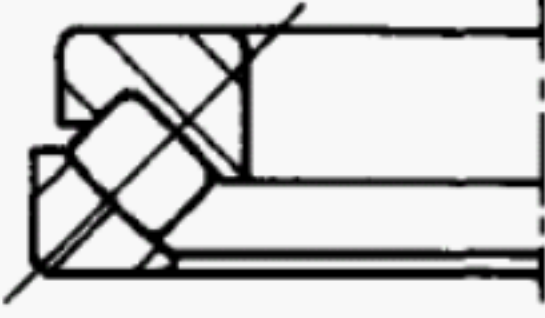
| SYMBOL | DESCRIPTION | |
|-----------|--|---|
| TP | SINGLE DIRECTION, FLAT RACEWAYS, FLAT SEATS, CYLINDRICAL ROLLERS |  |
| TS | SINGLE DIRECTION, ALIGNING FLAT SEATS, SPHERICAL ROLLERS |  |

TABLE 3. THRUST BEARING-SERIES

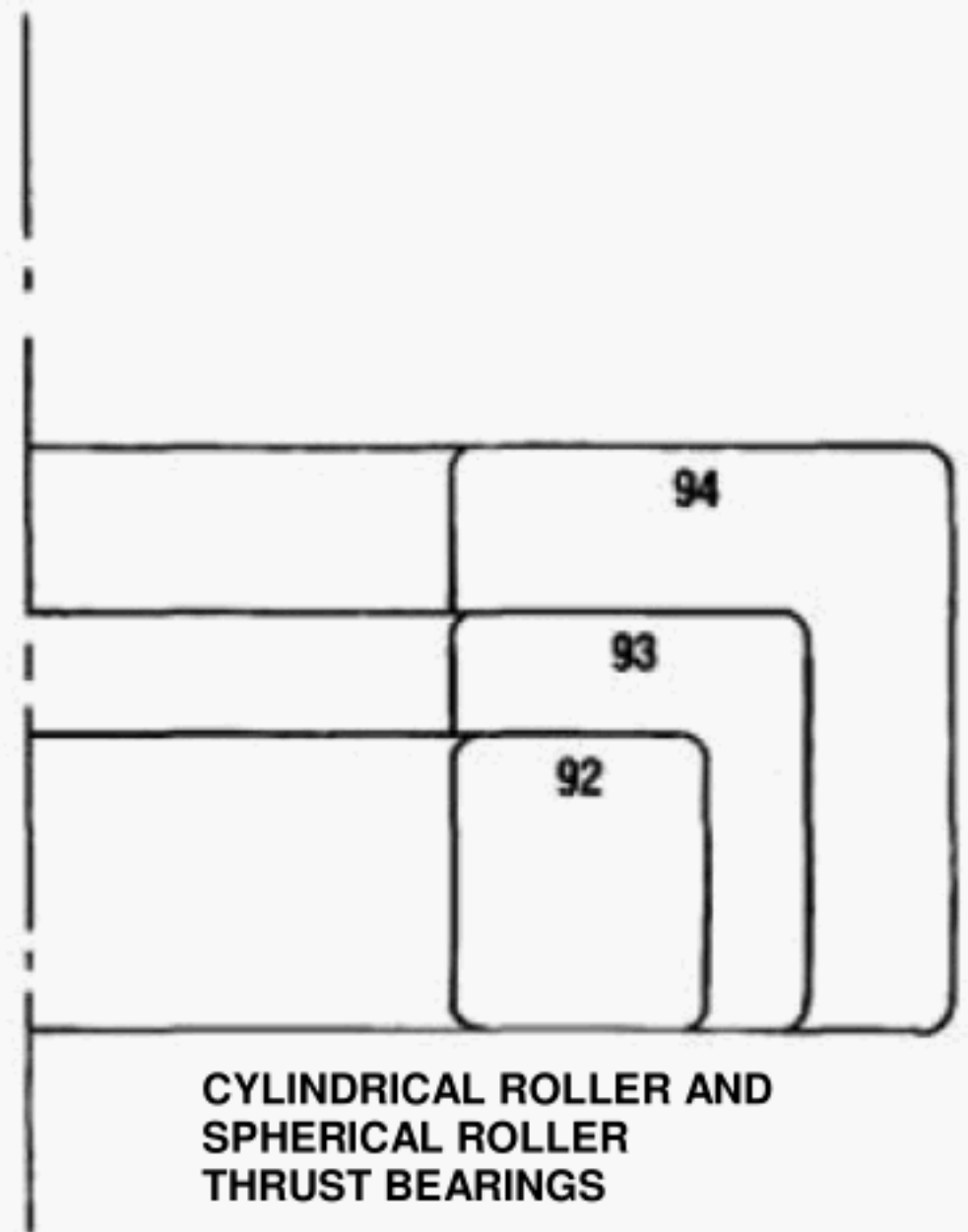
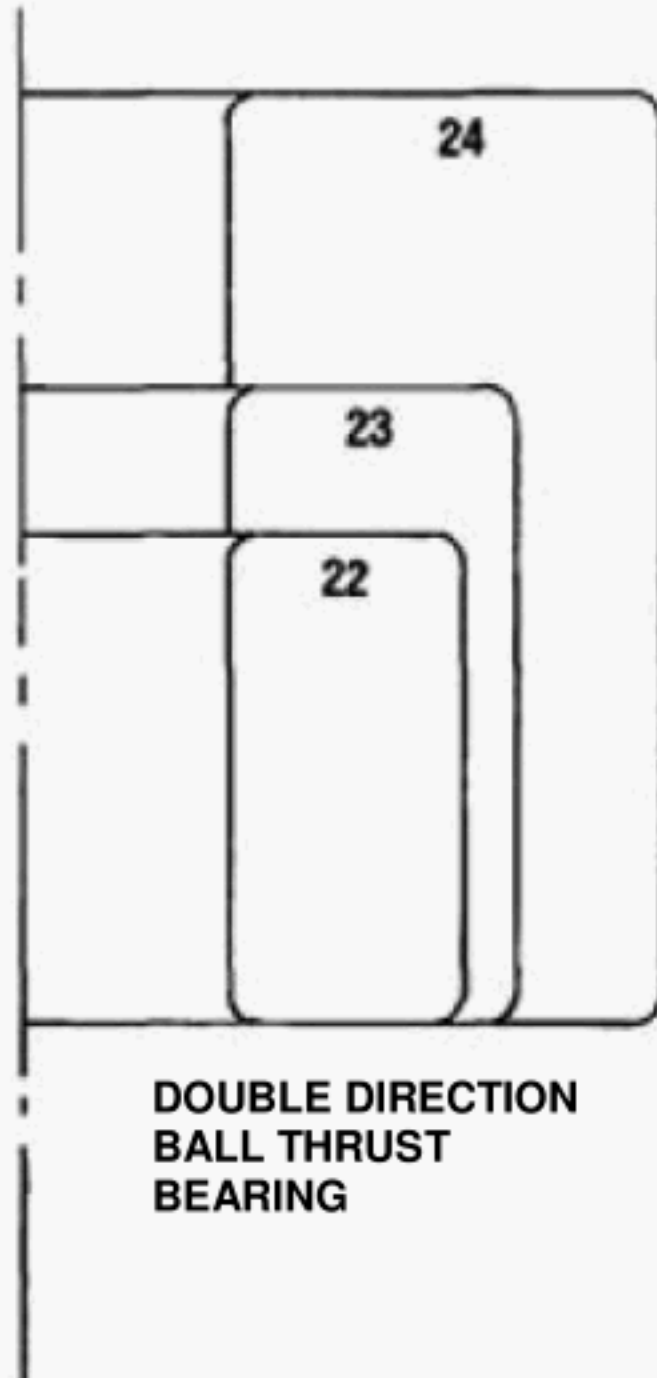
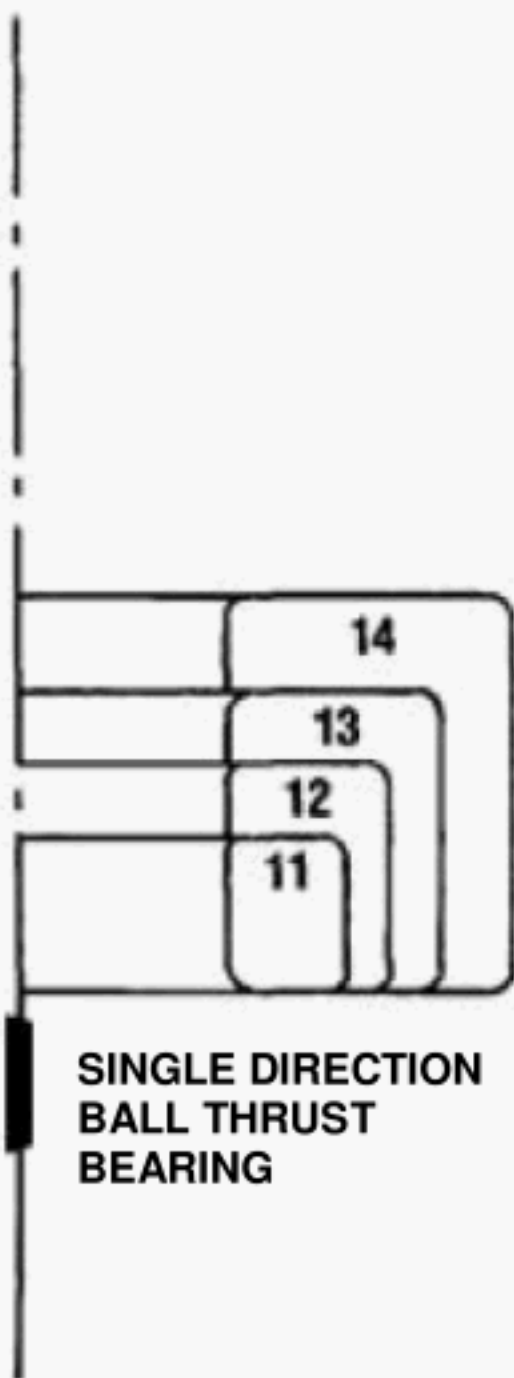
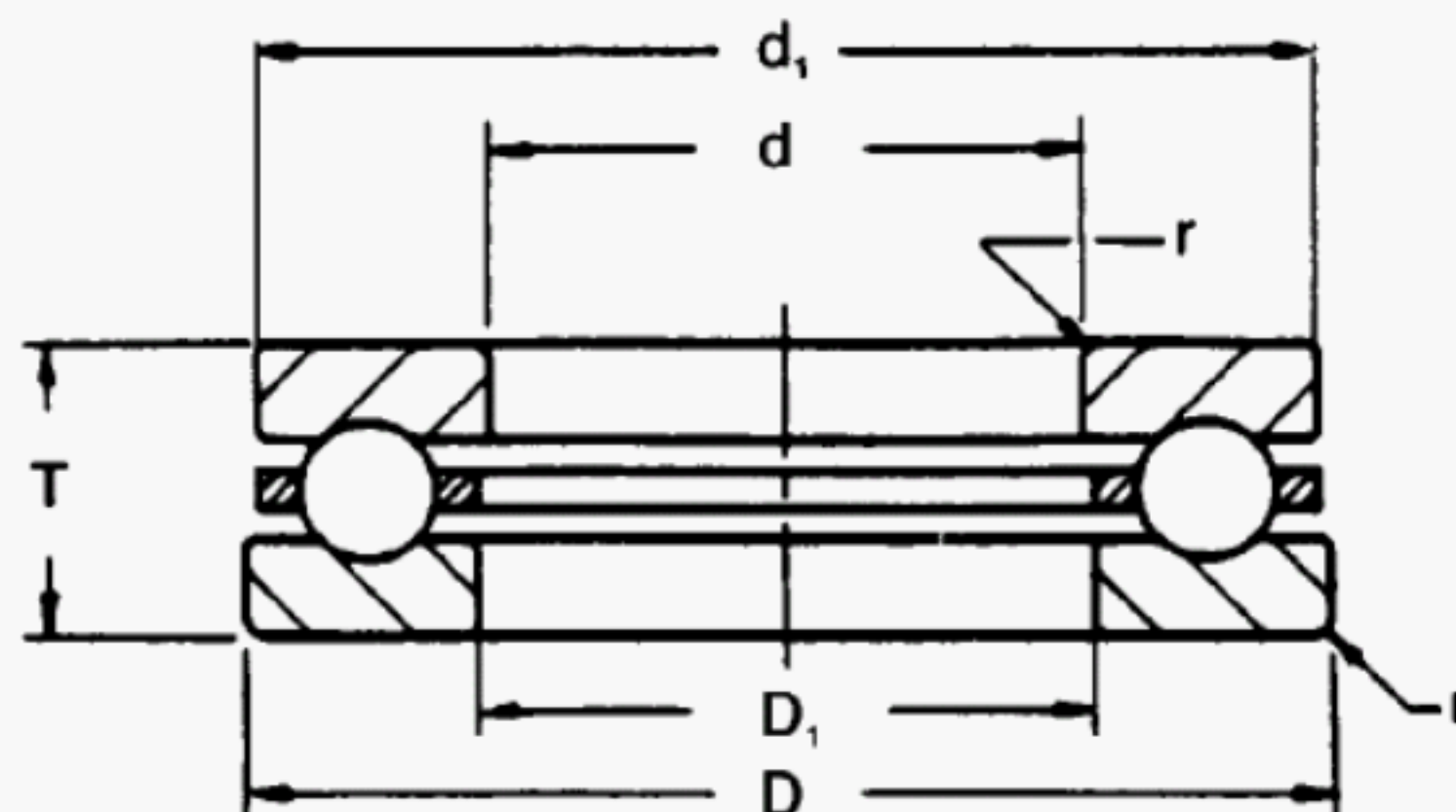


TABLE 4
BOUNDARY DIMENSIONS
THRUST BALL BEARING—SINGLE DIRECTION, WASHERS WITH GROOVED RACEWAYS,
FLAT BACK FACES, EXTRA LIGHT SERIES, TYPE TA
METRIC DESIGN



PART I

Dimensions in millimetres

| IDENTIFICATION CODE | d | D | T | $r_{smin}^{(1)}$ | d_{1smax} | D_{1smin} |
|---------------------|-----|-----|-----|------------------|-------------|-------------|
| 10TA11 | 10 | 24 | 9 | 0.3 | 24 | 11 |
| 12TA11 | 12 | 26 | 9 | 0.3 | 26 | 13 |
| 15TA11 | 15 | 28 | 9 | 0.3 | 28 | 16 |
| 17TA11 | 17 | 30 | 9 | 0.3 | 30 | 18 |
| 20TA11 | 20 | 35 | 10 | 0.3 | 35 | 21 |
| 25TA11 | 25 | 42 | 11 | 0.6 | 42 | 26 |
| 30TA11 | 30 | 47 | 11 | 0.6 | 47 | 32 |
| 35TA11 | 35 | 52 | 12 | 0.6 | 52 | 37 |
| 40TA11 | 40 | 60 | 13 | 0.6 | 60 | 42 |
| 45TA11 | 45 | 65 | 14 | 0.6 | 65 | 47 |
| 50TA11 | 50 | 70 | 14 | 0.6 | 70 | 52 |
| 55TA11 | 55 | 78 | 16 | 0.6 | 78 | 57 |
| 60TA11 | 60 | 85 | 17 | 1 | 85 | 62 |
| 65TA11 | 65 | 90 | 18 | 1 | 90 | 67 |
| 70TA11 | 70 | 95 | 18 | 1 | 95 | 72 |
| 75TA11 | 75 | 100 | 19 | 1 | 100 | 77 |
| 80TA11 | 80 | 105 | 19 | 1 | 105 | 82 |
| 85TA11 | 85 | 110 | 19 | 1 | 110 | 87 |
| 90TA11 | 90 | 120 | 22 | 1 | 120 | 92 |
| 100TA11 | 100 | 135 | 25 | 1 | 135 | 102 |
| 110TA11 | 110 | 145 | 25 | 1 | 145 | 112 |
| 120TA11 | 120 | 155 | 25 | 1 | 155 | 122 |
| 130TA11 | 130 | 170 | 30 | 1 | 170 | 132 |
| 140TA11 | 140 | 180 | 31 | 1 | 178 | 142 |
| 150TA11 | 150 | 190 | 31 | 1 | 188 | 152 |
| 160TA11 | 160 | 200 | 31 | 1 | 198 | 162 |
| 170TA11 | 170 | 215 | 34 | 1.1 | 213 | 172 |
| 180TA11 | 180 | 225 | 34 | 1.1 | 222 | 183 |
| 190TA11 | 190 | 240 | 37 | 1.1 | 237 | 193 |
| 200TA11 | 200 | 250 | 37 | 1.1 | 247 | 203 |

continued

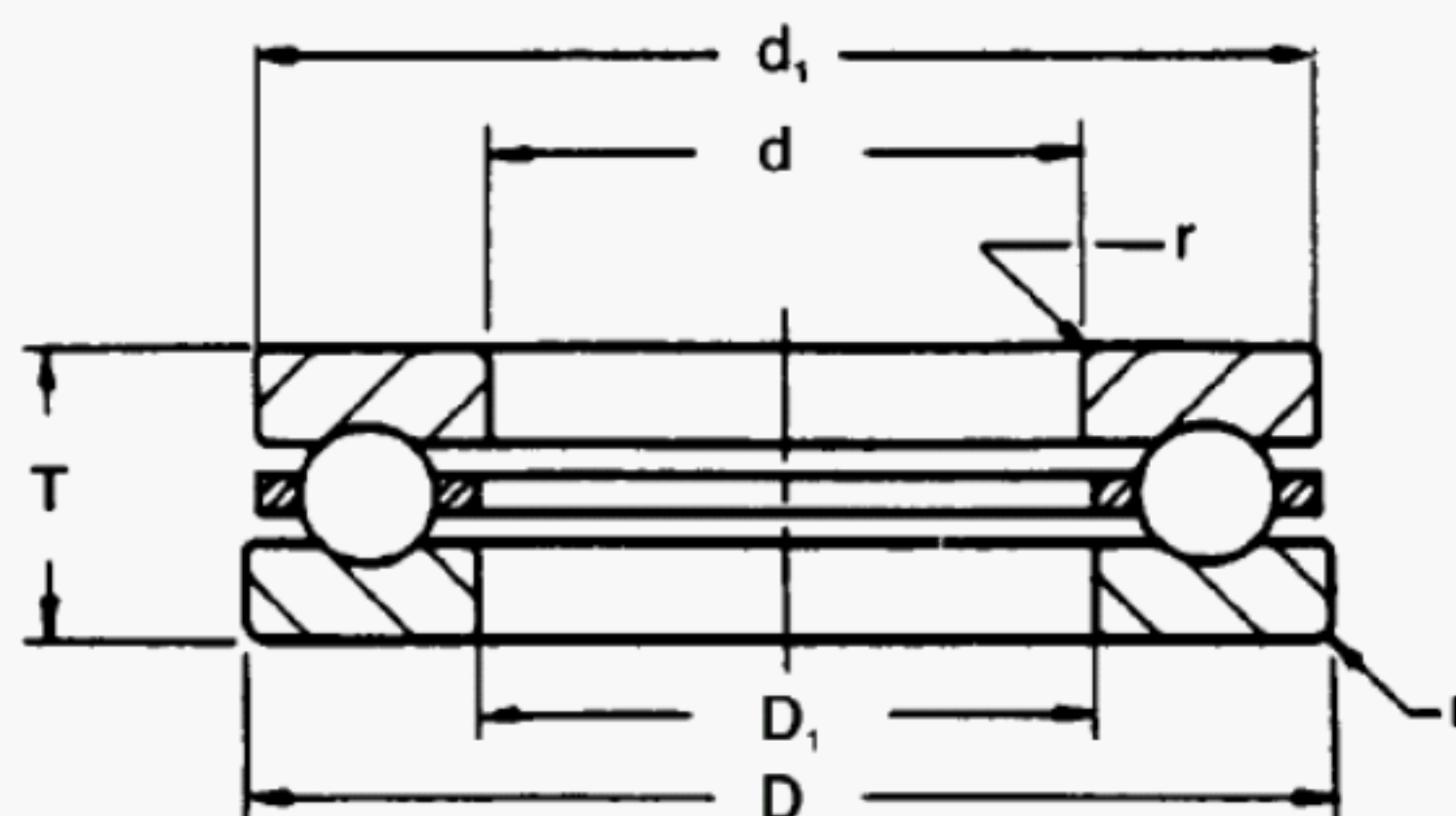
TABLE 4—PART I (continued)—Sheet 2 of 2

Dimensions in millimetres

| IDENTIFICATION CODE | d | D | T | $r_{smin}^{(1)}$ | d_{1smax} | D_{1smin} |
|------------------------|------|------|-----|------------------|-------------|-------------|
| 220TA11 | 220 | 270 | 37 | 1.1 | 267 | 223 |
| 240TA11 | 240 | 300 | 45 | 1.5 | 297 | 243 |
| 260TA11 | 260 | 320 | 45 | 1.5 | 317 | 263 |
| 280TA11 | 280 | 350 | 53 | 1.5 | 347 | 283 |
| 300TA11 | 300 | 380 | 62 | 2 | 376 | 304 |
| 320TA11 | 320 | 400 | 63 | 2 | 396 | 324 |
| 340TA11 | 340 | 420 | 64 | 2 | 416 | 344 |
| 360TA11 | 360 | 440 | 65 | 2 | 436 | 364 |
| 380TA11 | 380 | 460 | 65 | 2 | 456 | 384 |
| 400TA11 | 400 | 480 | 65 | 2 | 476 | 404 |
| 420TA11 | 420 | 500 | 65 | 2 | 495 | 424 |
| 440TA11 | 440 | 540 | 80 | 2.1 | 535 | 444 |
| 460TA11 | 460 | 560 | 80 | 2.1 | 555 | 464 |
| 480TA11 | 480 | 580 | 80 | 2.1 | 575 | 484 |
| 500TA11 | 500 | 600 | 80 | 2.1 | 595 | 504 |
| 530TA11 | 530 | 640 | 85 | 3 | 635 | 534 |
| 560TA11 | 560 | 670 | 85 | 3 | 665 | 564 |
| 600TA11 | 600 | 710 | 85 | 3 | 705 | 604 |
| 630TA11 | 630 | 750 | 95 | 3 | 745 | 634 |
| 670TA11 | 670 | 800 | 105 | 4 | 795 | 674 |
| 710TA11 | 710 | 850 | 112 | 4 | 845 | 714 |
| 750TA11 | 750 | 900 | 120 | 4 | 895 | 755 |
| 800TA11 | 800 | 950 | 120 | 4 | 945 | 805 |
| 850TA11 | 850 | 1000 | 120 | 4 | 995 | 855 |
| 900TA11 | 900 | 1060 | 130 | 5 | 1055 | 905 |
| 950TA11 | 950 | 1120 | 135 | 5 | 1115 | 955 |
| 1000TA11 | 1000 | 1180 | 140 | 5 | 1175 | 1005 |
| 1060TA11 | 1060 | 1250 | 150 | 5 | 1245 | 1065 |
| 1120TA11 | 1120 | 1320 | 160 | 5 | 1315 | 1125 |
| 1180TA11 | 1180 | 1400 | 175 | 6 | 1395 | 1185 |
| 1250TA11 | 1250 | 1460 | 175 | 6 | 1455 | 1255 |
| 1320TA11 | 1320 | 1540 | 175 | 6 | 1535 | 1325 |
| 1400TA11 | 1400 | 1630 | 180 | 6 | 1620 | 1410 |
| 1500TA11 | 1500 | 1750 | 195 | 6 | 1740 | 1510 |
| 1600TA11 | 1600 | 1850 | 195 | 6 | 1840 | 1610 |
| 1700TA11 | 1700 | 1970 | 212 | 7.5 | 1960 | 1710 |
| 1800TA11 | 1800 | 2080 | 220 | 7.5 | 2070 | 1810 |
| 1900TA11 | 1900 | 2180 | 220 | 7.5 | 2170 | 1910 |
| 2000TA11 | 2000 | 2300 | 236 | 7.5 | 2290 | 2010 |
| 2120TA11 | 2120 | 2430 | 243 | 7.5 | 2420 | 2130 |
| 2240TA11 | 2240 | 2570 | 258 | 9.5 | 2560 | 2250 |
| 2360TA11 | 2360 | 2700 | 265 | 9.5 | 2690 | 2370 |
| 2500TA11 | 2500 | 2850 | 272 | 9.5 | 2840 | 2510 |

(1) The single shaft and housing fillet radius must not exceed the smallest permissible single chamfer dimension of the corresponding ring (or washer) corner, r_{smin} . This dimension does not control the bearing chamfer contour.

TABLE 4
BOUNDARY DIMENSIONS
THRUST BALL BEARING—SINGLE DIRECTION, WASHERS WITH GROOVED RACEWAYS,
FLAT BACK FACES, EXTRA LIGHT SERIES, TYPE TA
METRIC DESIGN



PART II

Dimensions in inches

| IDENTIFICATION CODE | d | D | T | $r_{\text{smin}}^{(1)}$ | $d_{1\text{smax}}$ | $D_{1\text{smin}}$ |
|------------------------|--------|--------|--------|-------------------------|--------------------|--------------------|
| 10TA11 | 0.3937 | 0.9449 | 0.3543 | 0.012 | 0.945 | 0.433 |
| 12TA11 | 0.4724 | 1.0236 | 0.3543 | 0.012 | 1.024 | 0.512 |
| 15TA11 | 0.5906 | 1.1024 | 0.3543 | 0.012 | 1.102 | 0.630 |
| 17TA11 | 0.6693 | 1.1811 | 0.3543 | 0.012 | 1.181 | 0.709 |
| 20TA11 | 0.7874 | 1.3780 | 0.3937 | 0.012 | 1.378 | 0.827 |
| 25TA11 | 0.9842 | 1.6535 | 0.4331 | 0.024 | 1.654 | 1.024 |
| 30TA11 | 1.1811 | 1.8504 | 0.4331 | 0.024 | 1.850 | 1.260 |
| 35TA11 | 1.3780 | 2.0472 | 0.4724 | 0.024 | 2.047 | 1.457 |
| 40TA11 | 1.5748 | 2.3622 | 0.5118 | 0.024 | 2.362 | 1.654 |
| 45TA11 | 1.7716 | 2.5590 | 0.5512 | 0.024 | 2.559 | 1.850 |
| 50TA11 | 1.9685 | 2.7559 | 0.5512 | 0.024 | 2.756 | 2.047 |
| 55TA11 | 2.1654 | 3.0709 | 0.6299 | 0.024 | 3.071 | 2.244 |
| 60TA11 | 2.3622 | 3.3464 | 0.6693 | 0.039 | 3.346 | 2.441 |
| 65TA11 | 2.5590 | 3.5433 | 0.7087 | 0.039 | 3.543 | 2.638 |
| 70TA11 | 2.7559 | 3.7402 | 0.7087 | 0.039 | 3.740 | 2.835 |
| 75TA11 | 2.9528 | 3.9370 | 0.7480 | 0.039 | 3.937 | 3.031 |
| 80TA11 | 3.1496 | 4.1339 | 0.7480 | 0.039 | 4.134 | 3.228 |
| 85TA11 | 3.3465 | 4.3307 | 0.7480 | 0.039 | 4.331 | 3.425 |
| 90TA11 | 3.5433 | 4.7244 | 0.8661 | 0.039 | 4.724 | 3.622 |
| 100TA11 | 3.9370 | 5.3150 | 0.9842 | 0.039 | 5.315 | 4.016 |
| 110TA11 | 4.3307 | 5.7087 | 0.9842 | 0.039 | 5.709 | 4.409 |
| 120TA11 | 4.7244 | 6.1024 | 0.9842 | 0.039 | 6.102 | 4.803 |
| 130TA11 | 5.1181 | 6.6929 | 1.1811 | 0.039 | 6.693 | 5.197 |
| 140TA11 | 5.5118 | 7.0866 | 1.2205 | 0.039 | 7.008 | 5.591 |
| 150TA11 | 5.9055 | 7.4803 | 1.2205 | 0.039 | 7.402 | 5.984 |
| 160TA11 | 6.2992 | 7.8740 | 1.2205 | 0.039 | 7.795 | 6.378 |
| 170TA11 | 6.6929 | 8.4646 | 1.3386 | 0.043 | 8.386 | 6.772 |
| 180TA11 | 7.0866 | 8.8583 | 1.3386 | 0.043 | 8.740 | 7.205 |
| 190TA11 | 7.4803 | 9.4488 | 1.4567 | 0.043 | 9.331 | 7.598 |
| 200TA11 | 7.8740 | 9.8425 | 1.4567 | 0.043 | 9.724 | 7.992 |

continued

TABLE 4—PART II (continued)—Sheet 2 of 2

Dimensions in inches

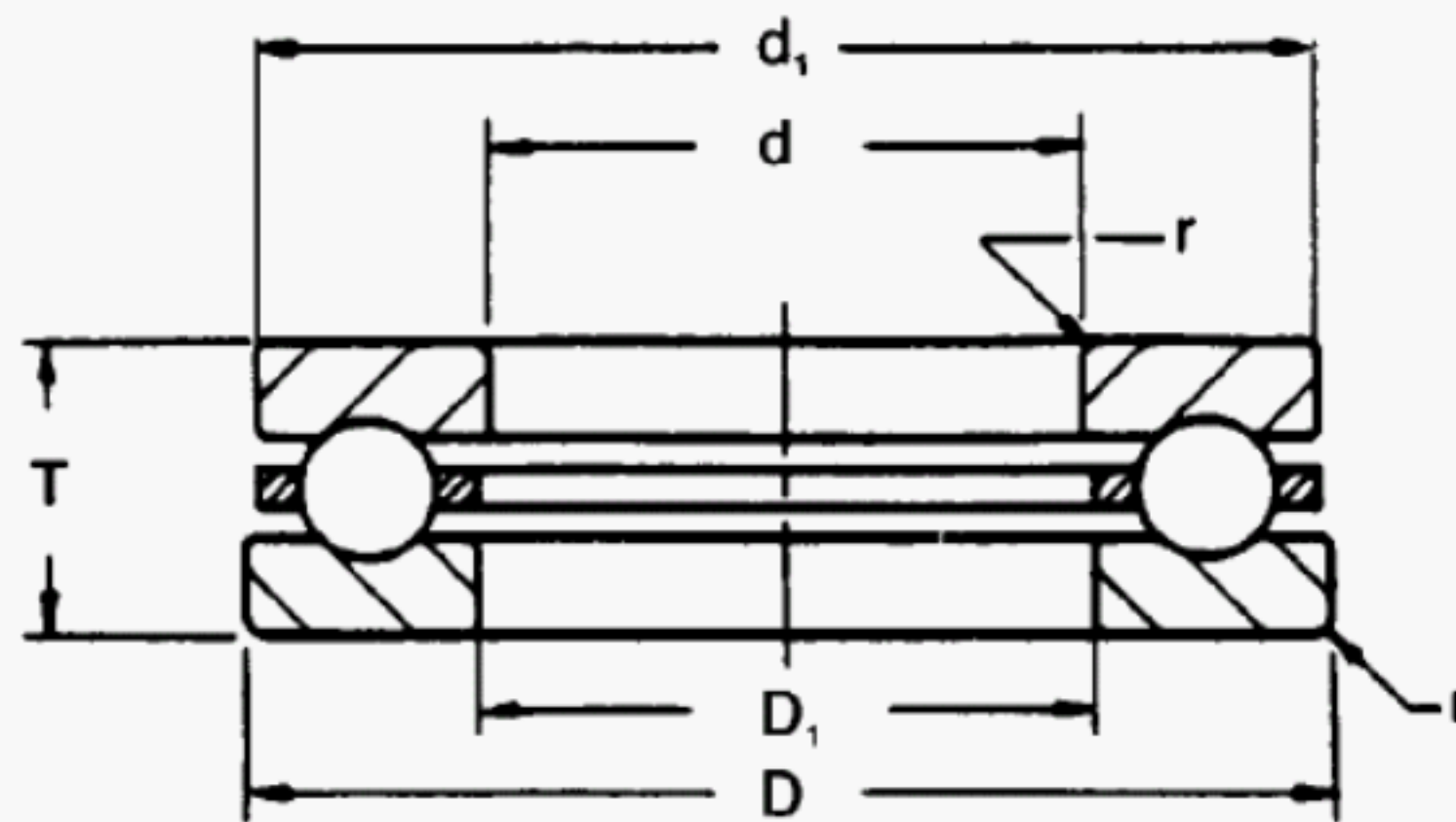
| IDENTIFICATION CODE | d | D | T | r _{smin} ⁽¹⁾ | d _{1smax} | D _{1smin} |
|------------------------|---------|----------|---------|----------------------------------|--------------------|--------------------|
| 220TA11 | 8.6614 | 10.6299 | 1.4567 | 0.043 | 10.512 | 8.780 |
| 240TA11 | 9.4488 | 11.8110 | 1.7716 | 0.059 | 11.693 | 9.567 |
| 260TA11 | 10.2362 | 12.5984 | 1.7716 | 0.059 | 12.480 | 10.354 |
| 280TA11 | 11.0236 | 13.7795 | 2.0866 | 0.059 | 13.661 | 11.142 |
| 300TA11 | 11.8110 | 14.9606 | 2.4409 | 0.079 | 14.803 | 11.969 |
| 320TA11 | 12.5984 | 15.7480 | 2.4803 | 0.079 | 15.591 | 12.756 |
| 340TA11 | 13.3858 | 16.5354 | 2.5197 | 0.079 | 16.378 | 13.543 |
| 360TA11 | 14.1732 | 17.3228 | 2.5590 | 0.079 | 17.165 | 14.331 |
| 380TA11 | 14.9606 | 18.1102 | 2.5590 | 0.079 | 17.953 | 15.118 |
| 400TA11 | 15.7480 | 18.8976 | 2.5590 | 0.079 | 18.740 | 15.906 |
| 420TA11 | 16.5354 | 19.6850 | 2.5590 | 0.079 | 19.488 | 16.693 |
| 440TA11 | 17.3228 | 21.2598 | 3.1496 | 0.083 | 21.063 | 17.480 |
| 460TA11 | 18.1102 | 22.0472 | 3.1496 | 0.083 | 21.850 | 18.268 |
| 480TA11 | 18.8976 | 22.8346 | 3.1496 | 0.083 | 22.638 | 19.055 |
| 500TA11 | 19.6850 | 23.6220 | 3.1496 | 0.083 | 23.425 | 19.843 |
| 530TA11 | 20.8661 | 25.1968 | 3.3464 | 0.118 | 25.000 | 21.024 |
| 560TA11 | 22.0472 | 26.3780 | 3.3464 | 0.118 | 26.181 | 22.205 |
| 600TA11 | 23.6220 | 27.9528 | 3.3464 | 0.118 | 27.756 | 23.780 |
| 630TA11 | 24.8031 | 29.5276 | 3.7402 | 0.118 | 29.331 | 24.961 |
| 670TA11 | 26.3780 | 31.4961 | 4.1338 | 0.157 | 31.299 | 26.535 |
| 710TA11 | 27.9528 | 33.4646 | 4.4094 | 0.157 | 33.268 | 28.110 |
| 750TA11 | 29.5276 | 35.4331 | 4.7244 | 0.157 | 35.236 | 29.724 |
| 800TA11 | 31.4961 | 37.4016 | 4.7244 | 0.157 | 37.205 | 31.693 |
| 850TA11 | 33.4646 | 39.3701 | 4.7244 | 0.157 | 39.173 | 33.661 |
| 900TA11 | 35.4331 | 41.7323 | 5.1181 | 0.197 | 41.535 | 35.630 |
| 950TA11 | 37.4016 | 44.0945 | 5.3150 | 0.197 | 43.898 | 37.598 |
| 1000TA11 | 39.3701 | 46.4567 | 5.5118 | 0.197 | 46.260 | 39.567 |
| 1060TA11 | 41.7323 | 49.2126 | 5.9055 | 0.197 | 49.016 | 41.929 |
| 1120TA11 | 44.0945 | 51.9685 | 6.2992 | 0.197 | 51.772 | 44.291 |
| 1180TA11 | 46.4567 | 55.1181 | 6.8898 | 0.236 | 54.921 | 46.654 |
| 1250TA11 | 49.2126 | 57.4803 | 6.8898 | 0.236 | 57.283 | 49.409 |
| 1320TA11 | 51.9685 | 60.6299 | 6.8898 | 0.236 | 60.433 | 52.165 |
| 1400TA11 | 55.1181 | 64.1732 | 7.0866 | 0.236 | 63.780 | 55.512 |
| 1500TA11 | 59.0551 | 68.8976 | 7.6772 | 0.236 | 68.504 | 59.449 |
| 1600TA11 | 62.9921 | 72.8346 | 7.6772 | 0.236 | 72.441 | 63.386 |
| 1700TA11 | 66.9291 | 77.5590 | 8.3464 | 0.295 | 77.165 | 67.323 |
| 1800TA11 | 70.8661 | 81.8898 | 8.6614 | 0.295 | 81.496 | 71.260 |
| 1900TA11 | 74.8031 | 85.8268 | 8.6614 | 0.295 | 85.433 | 75.197 |
| 2000TA11 | 78.7402 | 90.5512 | 9.2913 | 0.295 | 90.157 | 79.134 |
| 2120TA11 | 83.4646 | 95.6693 | 9.5669 | 0.295 | 95.276 | 83.858 |
| 2240TA11 | 88.1890 | 101.1811 | 10.1575 | 0.374 | 100.787 | 88.583 |
| 2360TA11 | 92.9134 | 106.2992 | 10.4331 | 0.374 | 105.906 | 93.307 |
| 2500TA11 | 98.4252 | 112.2047 | 10.7087 | 0.374 | 111.811 | 98.819 |

(1) The single shaft and housing fillet radius must not exceed the smallest permissible single chamfer dimension of the corresponding ring (or washer) corner, r_{smin}. This dimension does not control the bearing chamfer contour.

TABLE 5

BOUNDARY DIMENSIONS

THRUST BALL BEARING—SINGLE DIRECTION, WASHERS WITH GROOVED RACEWAYS,
FLAT BACK FACES, LIGHT SERIES, TYPE TA
METRIC DESIGN



PART I

Dimensions in millimetres

| IDENTIFICATION CODE | d | D | T | $r_{\text{min}}^{(1)}$ | $d_{1\text{max}}$ | $D_{1\text{min}}$ |
|---------------------|-----|-----|-----|------------------------|-------------------|-------------------|
| 4TA12 | 4 | 16 | 8 | 0.3 | 16 | 4 |
| 6TA12 | 6 | 20 | 9 | 0.3 | 20 | 6 |
| 8TA12 | 8 | 22 | 9 | 0.3 | 22 | 8 |
| 10TA12 | 10 | 26 | 11 | 0.6 | 26 | 12 |
| 12TA12 | 12 | 28 | 11 | 0.6 | 28 | 14 |
| 15TA12 | 15 | 32 | 12 | 0.6 | 32 | 17 |
| 17TA12 | 17 | 35 | 12 | 0.6 | 35 | 19 |
| 20TA12 | 20 | 40 | 14 | 0.6 | 40 | 22 |
| 25TA12 | 25 | 47 | 15 | 0.6 | 47 | 27 |
| 30TA12 | 30 | 52 | 16 | 0.6 | 52 | 32 |
| 35TA12 | 35 | 62 | 18 | 1 | 62 | 37 |
| 40TA12 | 40 | 68 | 19 | 1 | 68 | 42 |
| 45TA12 | 45 | 73 | 20 | 1 | 73 | 47 |
| 50TA12 | 50 | 78 | 22 | 1 | 78 | 52 |
| 55TA12 | 55 | 90 | 25 | 1 | 90 | 57 |
| 60TA12 | 60 | 95 | 26 | 1 | 95 | 62 |
| 65TA12 | 65 | 100 | 27 | 1 | 100 | 67 |
| 70TA12 | 70 | 105 | 27 | 1 | 105 | 72 |
| 75TA12 | 75 | 110 | 27 | 1 | 110 | 77 |
| 80TA12 | 80 | 115 | 28 | 1 | 115 | 82 |

continued

TABLE 5—PART I (continued)—Sheet 2 of 2

Dimensions in millimetres

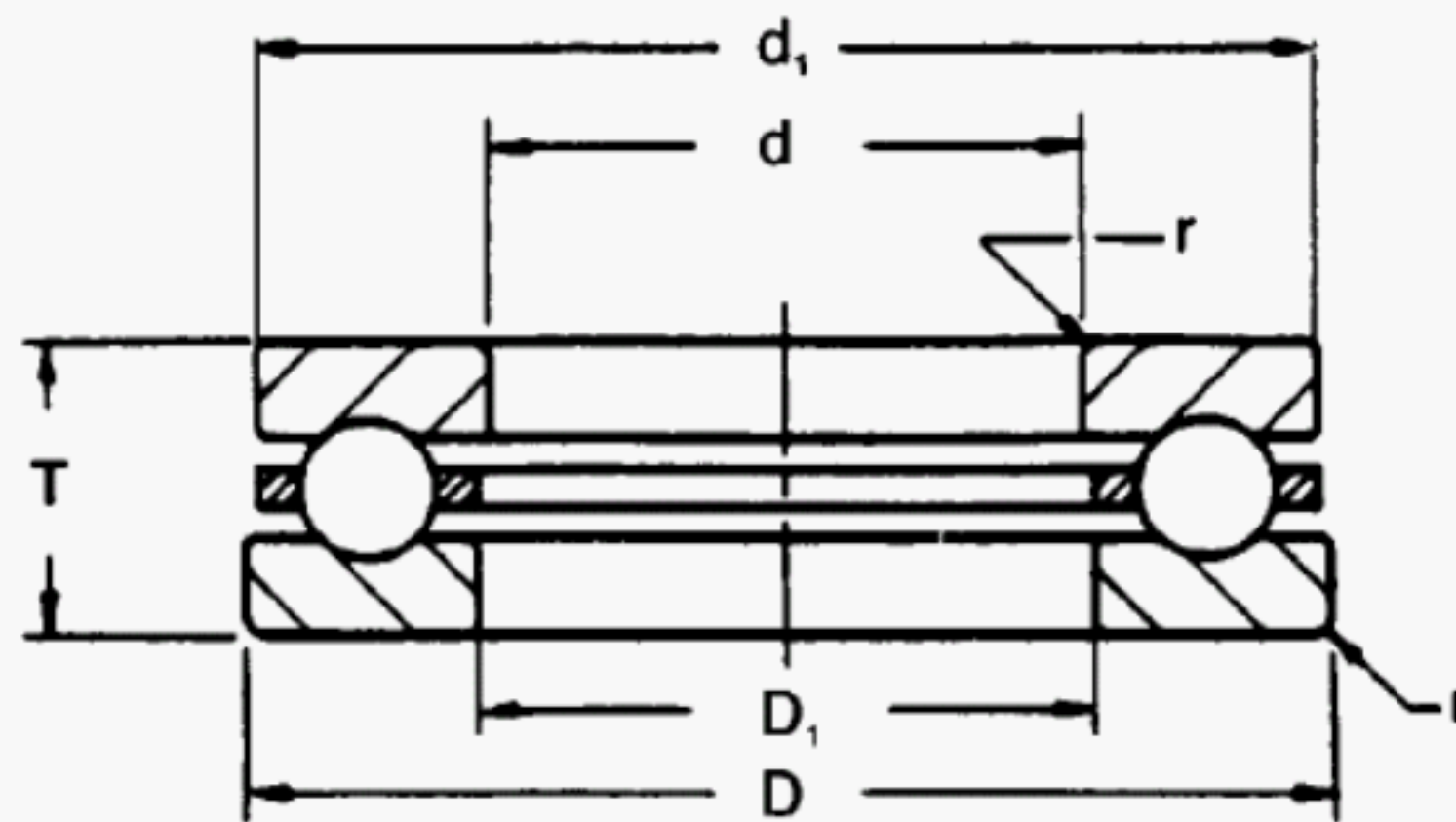
| IDENTIFICATION CODE | d | D | T | $r_{smin}^{(1)}$ | d_{1smax} | D_{1smin} |
|------------------------|-----|-----|----|------------------|-------------|-------------|
| 85TA12 | 85 | 125 | 31 | 1 | 125 | 88 |
| 90TA12 | 90 | 135 | 35 | 1.1 | 135 | 93 |
| 100TA12 | 100 | 150 | 38 | 1.1 | 150 | 103 |
| 110TA12 | 110 | 160 | 38 | 1.1 | 160 | 113 |
| 120TA12 | 120 | 170 | 39 | 1.1 | 170 | 123 |
| 130TA12 | 130 | 190 | 45 | 1.5 | 187 | 133 |
| 140TA12 | 140 | 200 | 46 | 1.5 | 197 | 143 |
| 150TA12 | 150 | 215 | 50 | 1.5 | 212 | 153 |
| 160TA12 | 160 | 225 | 51 | 1.5 | 222 | 163 |
| 170TA12 | 170 | 240 | 55 | 1.5 | 237 | 173 |
| 180TA12 | 180 | 250 | 56 | 1.5 | 247 | 183 |
| 190TA12 | 190 | 270 | 62 | 2 | 267 | 194 |
| 200TA12 | 200 | 280 | 62 | 2 | 277 | 204 |
| 220TA12 | 220 | 300 | 63 | 2 | 297 | 224 |
| 240TA12 | 240 | 340 | 78 | 2.1 | 335 | 244 |
| 260TA12 | 260 | 360 | 79 | 2.1 | 355 | 264 |
| 280TA12 | 280 | 380 | 80 | 2.1 | 375 | 284 |
| 300TA12 | 300 | 420 | 95 | 3 | 415 | 304 |
| 320TA12 | 320 | 440 | 95 | 3 | 435 | 325 |

- (1) The single shaft and housing fillet radius must not exceed the smallest permissible single chamfer dimension of the corresponding ring (or washer) corner, r_{smin} . This dimension does not control the bearing chamfer contour.

TABLE 5

BOUNDARY DIMENSIONS

THRUST BALL BEARING—SINGLE DIRECTION, WASHERS WITH GROOVED RACEWAYS,
FLAT BACK FACES, LIGHT SERIES, TYPE TA
METRIC DESIGN



PART II

Dimensions in inches

| IDENTIFICATION CODE | d | D | T | $r_{smin}^{(1)}$ | d_{1smax} | D_{1smin} |
|---------------------|--------|--------|--------|------------------|-------------|-------------|
| 4TA12 | 0.1575 | 0.6299 | 0.3150 | 0.012 | 0.630 | 0.157 |
| 6TA12 | 0.2362 | 0.7874 | 0.3543 | 0.012 | 0.787 | 0.236 |
| 8TA12 | 0.3150 | 0.8661 | 0.3543 | 0.012 | 0.866 | 0.315 |
| 10TA12 | 0.3937 | 1.0236 | 0.4331 | 0.024 | 1.024 | 0.472 |
| 12TA12 | 0.4724 | 1.1024 | 0.4331 | 0.024 | 1.102 | 0.551 |
| 15TA12 | 0.5906 | 1.2598 | 0.4724 | 0.024 | 1.260 | 0.669 |
| 17TA12 | 0.6693 | 1.3780 | 0.4724 | 0.024 | 1.378 | 0.748 |
| 20TA12 | 0.7874 | 1.5748 | 0.5512 | 0.024 | 1.575 | 0.866 |
| 25TA12 | 0.9842 | 1.8504 | 0.5906 | 0.024 | 1.850 | 1.063 |
| 30TA12 | 1.1811 | 2.0472 | 0.6299 | 0.024 | 2.047 | 1.260 |
| 35TA12 | 1.3780 | 2.4409 | 0.7087 | 0.039 | 2.441 | 1.457 |
| 40TA12 | 1.5748 | 2.6772 | 0.7480 | 0.039 | 2.677 | 1.654 |
| 45TA12 | 1.7716 | 2.8740 | 0.7874 | 0.039 | 2.874 | 1.850 |
| 50TA12 | 1.9685 | 3.0709 | 0.8661 | 0.039 | 3.071 | 2.047 |
| 55TA12 | 2.1654 | 3.5433 | 0.9842 | 0.039 | 3.543 | 2.244 |
| 60TA12 | 2.3622 | 3.7402 | 1.0236 | 0.039 | 3.740 | 2.441 |
| 65TA12 | 2.5590 | 3.9370 | 1.0630 | 0.039 | 3.937 | 2.638 |
| 70TA12 | 2.7559 | 4.1338 | 1.0630 | 0.039 | 4.134 | 2.835 |
| 75TA12 | 2.9528 | 4.3307 | 1.0630 | 0.039 | 4.331 | 3.031 |
| 80TA12 | 3.1496 | 4.5276 | 1.1024 | 0.039 | 4.528 | 3.228 |

continued

TABLE 5—PART II (continued)—Sheet 2 of 2

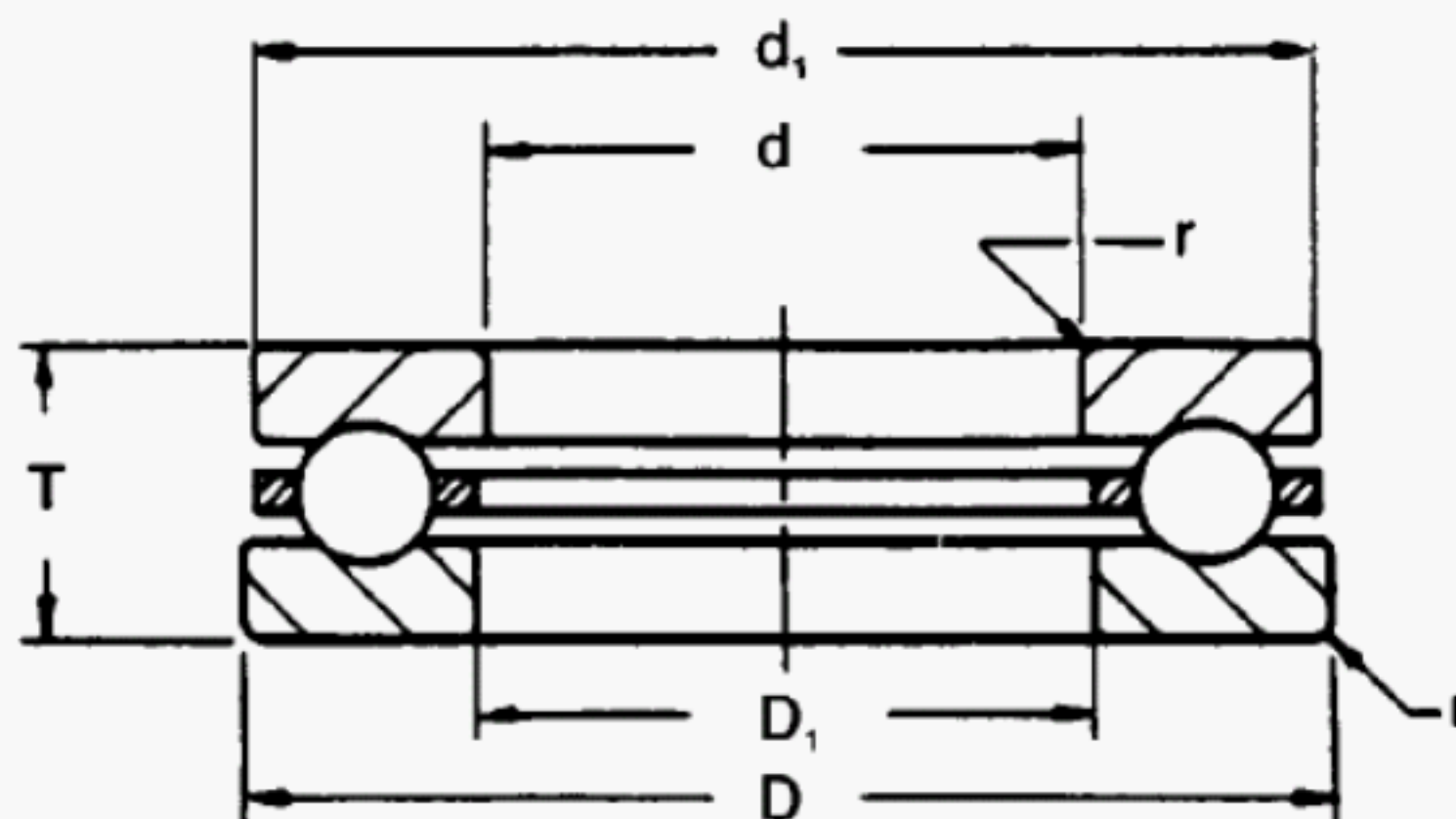
| IDENTIFICATION CODE | Dimensions in inches | | | | | |
|------------------------|----------------------|----------|----------|--|--------------------------|--------------------------|
| | d | D | T | r_{smin} ⁽¹⁾ | d_{1smax} | D_{1smin} |
| 85TA12 | 3.3465 | 4.9213 | 1.2205 | 0.039 | 4.921 | 3.465 |
| 90TA12 | 3.5433 | 5.3150 | 1.3780 | 0.043 | 5.315 | 3.661 |
| 100TA12 | 3.9370 | 5.9055 | 1.4961 | 0.043 | 5.906 | 4.055 |
| 110TA12 | 4.3307 | 6.2992 | 1.4961 | 0.043 | 6.299 | 4.449 |
| 120TA12 | 4.7244 | 6.6929 | 1.5354 | 0.043 | 6.693 | 4.843 |
| 130TA12 | 5.1181 | 7.4803 | 1.7717 | 0.059 | 7.362 | 5.236 |
| 140TA12 | 5.5118 | 7.8740 | 1.8110 | 0.059 | 7.756 | 5.630 |
| 150TA12 | 5.9055 | 8.4646 | 1.9685 | 0.059 | 8.346 | 6.024 |
| 160TA12 | 6.2992 | 8.8582 | 2.0079 | 0.059 | 8.740 | 6.417 |
| 170TA12 | 6.6929 | 9.4488 | 2.1653 | 0.059 | 9.331 | 6.811 |
| 180TA12 | 7.0866 | 9.8425 | 2.2047 | 0.059 | 9.724 | 7.205 |
| 190TA12 | 7.4803 | 10.6299 | 2.4409 | 0.079 | 10.512 | 7.638 |
| 200TA12 | 7.8740 | 11.0236 | 2.4409 | 0.079 | 10.906 | 8.031 |
| 220TA12 | 8.6614 | 11.8110 | 2.4803 | 0.079 | 11.693 | 8.819 |
| 240TA12 | 9.4488 | 13.3858 | 3.0709 | 0.083 | 13.189 | 9.606 |
| 260TA12 | 10.2362 | 14.1732 | 3.1102 | 0.083 | 13.976 | 10.394 |
| 280TA12 | 11.0236 | 14.9606 | 3.1496 | 0.083 | 14.764 | 11.181 |
| 300TA12 | 11.8110 | 16.5354 | 3.7402 | 0.118 | 16.339 | 11.969 |
| 320TA12 | 12.5984 | 17.3228 | 3.7402 | 0.118 | 17.126 | 12.795 |

- (1) The single shaft and housing fillet radius must not exceed the smallest permissible single chamfer dimension of the corresponding ring (or washer) corner, r_{smin} . This dimension does not control the bearing chamfer contour.

TABLE 6

BOUNDARY DIMENSIONS

THRUST BALL BEARING—SINGLE DIRECTION, WASHERS WITH GROOVED RACEWAYS,
FLAT BACK FACES, MEDIUM SERIES, TYPE TA
METRIC DESIGN



PART I

Dimensions in millimetres

| IDENTIFICATION CODE | d | D | T | $r_{smin}^{(1)}$ | d_{1smax} | D_{1smin} |
|---------------------|-----|-----|-----|------------------|-------------|-------------|
| 4TA13 | 4 | 20 | 11 | 0.6 | 20 | 4 |
| 6TA13 | 6 | 24 | 12 | 0.6 | 24 | 6 |
| 8TA13 | 8 | 26 | 12 | 0.6 | 26 | 8 |
| 10TA13 | 10 | 30 | 14 | 0.6 | 30 | 10 |
| 12TA13 | 12 | 32 | 14 | 0.6 | 32 | 12 |
| 15TA13 | 15 | 37 | 15 | 0.6 | 37 | 15 |
| 17TA13 | 17 | 40 | 16 | 0.6 | 40 | 19 |
| 20TA13 | 20 | 47 | 18 | 1 | 47 | 22 |
| 25TA13 | 25 | 52 | 18 | 1 | 52 | 27 |
| 30TA13 | 30 | 60 | 21 | 1 | 60 | 32 |
| 35TA13 | 35 | 68 | 24 | 1 | 68 | 37 |
| 40TA13 | 40 | 78 | 26 | 1 | 78 | 42 |
| 45TA13 | 45 | 85 | 28 | 1 | 85 | 47 |
| 50TA13 | 50 | 95 | 31 | 1.1 | 95 | 52 |
| 55TA13 | 55 | 105 | 35 | 1.1 | 105 | 57 |
| 60TA13 | 60 | 110 | 35 | 1.1 | 110 | 62 |
| 65TA13 | 65 | 115 | 36 | 1.1 | 115 | 67 |
| 70TA13 | 70 | 125 | 40 | 1.1 | 125 | 72 |
| 75TA13 | 75 | 135 | 44 | 1.5 | 135 | 77 |
| 80TA13 | 80 | 140 | 44 | 1.5 | 140 | 82 |

continued

TABLE 6—PART I (continued)—Sheet 2 of 2

Dimensions in millimetres

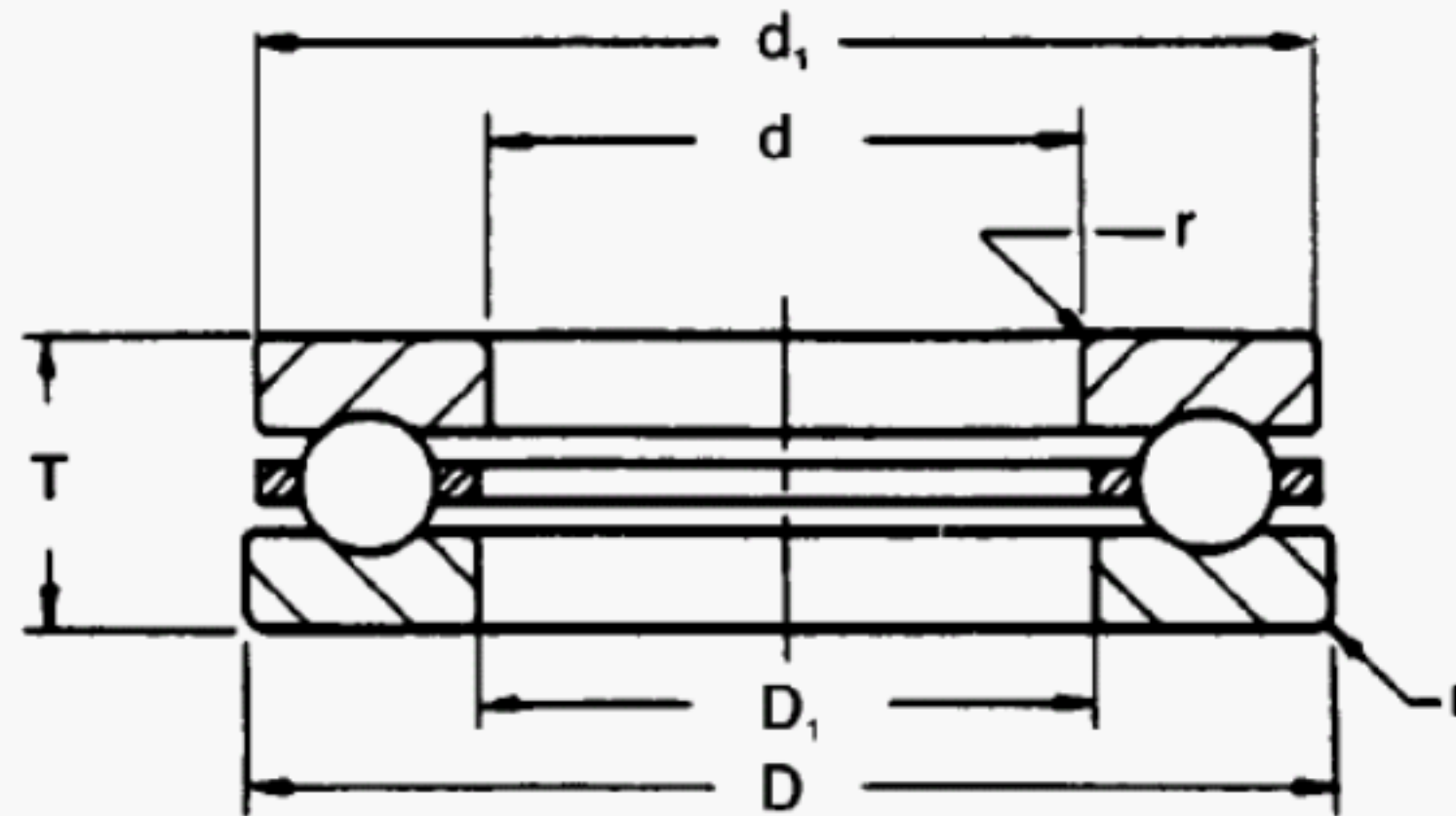
| IDENTIFICATION CODE | d | D | T | $r_{smin}^{(1)}$ | d_{1smax} | D_{1smin} |
|------------------------|-----|-----|-----|------------------|-------------|-------------|
| 85TA13 | 85 | 150 | 49 | 1.5 | 150 | 88 |
| 90TA13 | 90 | 155 | 50 | 1.5 | 155 | 93 |
| 100TA13 | 100 | 170 | 55 | 1.5 | 170 | 103 |
| 110TA13 | 110 | 190 | 63 | 2 | 187 | 113 |
| 120TA13 | 120 | 210 | 70 | 2.1 | 205 | 123 |
| 130TA13 | 130 | 225 | 75 | 2.1 | 220 | 134 |
| 140TA13 | 140 | 240 | 80 | 2.1 | 235 | 144 |
| 150TA13 | 150 | 250 | 80 | 2.1 | 245 | 154 |
| 160TA13 | 160 | 270 | 87 | 3 | 265 | 164 |
| 170TA13 | 170 | 280 | 87 | 3 | 275 | 174 |
| 180TA13 | 180 | 300 | 95 | 3 | 295 | 184 |
| 190TA13 | 190 | 320 | 105 | 4 | 315 | 195 |
| 200TA13 | 200 | 340 | 110 | 4 | 335 | 205 |
| 220TA13 | 220 | 360 | 112 | 4 | 355 | 225 |
| 240TA13 | 240 | 380 | 112 | 4 | 375 | 245 |
| 260TA13 | 260 | 420 | 130 | 5 | 415 | 265 |
| 280TA13 | 280 | 440 | 130 | 5 | 435 | 285 |
| 300TA13 | 300 | 480 | 140 | 5 | 475 | 305 |
| 320TA13 | 320 | 500 | 140 | 5 | 495 | 325 |

- (1) The single shaft and housing fillet radius must not exceed the smallest permissible single chamfer dimension of the corresponding ring (or washer) corner, r_{smin} . This dimension does not control the bearing chamfer contour.

TABLE 6

BOUNDARY DIMENSIONS

THRUST BALL BEARING—SINGLE DIRECTION, WASHERS WITH GROOVED RACEWAYS,
FLAT BACK FACES, MEDIUM SERIES, TYPE TA
METRIC DESIGN



PART II

Dimensions in inches

| IDENTIFICATION CODE | d | D | T | $r_{smin}^{(1)}$ | d_{1smax} | D_{1smin} |
|---------------------|--------|--------|--------|------------------|-------------|-------------|
| 4TA13 | 0.1575 | 0.7874 | 0.4331 | 0.024 | 0.787 | 0.157 |
| 6TA13 | 0.2362 | 0.9449 | 0.4724 | 0.024 | 0.945 | 0.236 |
| 8TA13 | 0.3150 | 1.0236 | 0.4724 | 0.024 | 1.024 | 0.315 |
| 10TA13 | 0.3937 | 1.1811 | 0.5512 | 0.024 | 1.181 | 0.394 |
| 12TA13 | 0.4724 | 1.2598 | 0.5512 | 0.024 | 1.260 | 0.472 |
| 15TA13 | 0.5906 | 1.4567 | 0.5906 | 0.024 | 1.457 | 0.591 |
| 17TA13 | 0.6693 | 1.5748 | 0.6299 | 0.024 | 1.575 | 0.748 |
| 20TA13 | 0.7874 | 1.8504 | 0.7087 | 0.039 | 1.850 | 0.866 |
| 25TA13 | 0.9842 | 2.0472 | 0.7087 | 0.039 | 2.047 | 1.063 |
| 30TA13 | 1.1811 | 2.3622 | 0.8268 | 0.039 | 2.362 | 1.260 |
| 35TA13 | 1.3780 | 2.6772 | 0.9449 | 0.039 | 2.677 | 1.457 |
| 40TA13 | 1.5748 | 3.0709 | 1.0236 | 0.039 | 3.071 | 1.654 |
| 45TA13 | 1.7716 | 3.3464 | 1.1024 | 0.039 | 3.346 | 1.850 |
| 50TA13 | 1.9685 | 3.7402 | 1.2205 | 0.043 | 3.740 | 2.047 |
| 55TA13 | 2.1654 | 4.1338 | 1.3780 | 0.043 | 4.134 | 2.244 |
| 60TA13 | 2.3622 | 4.3307 | 1.3780 | 0.043 | 4.331 | 2.441 |
| 65TA13 | 2.5590 | 4.5276 | 1.4173 | 0.043 | 4.528 | 2.638 |
| 70TA13 | 2.7559 | 4.9212 | 1.5748 | 0.043 | 4.921 | 2.835 |
| 75TA13 | 2.9528 | 5.3150 | 1.7323 | 0.059 | 5.315 | 3.031 |
| 80TA13 | 3.1496 | 5.5118 | 1.7323 | 0.059 | 5.512 | 3.228 |

continued

TABLE 6—PART II (continued)—Sheet 2 of 2

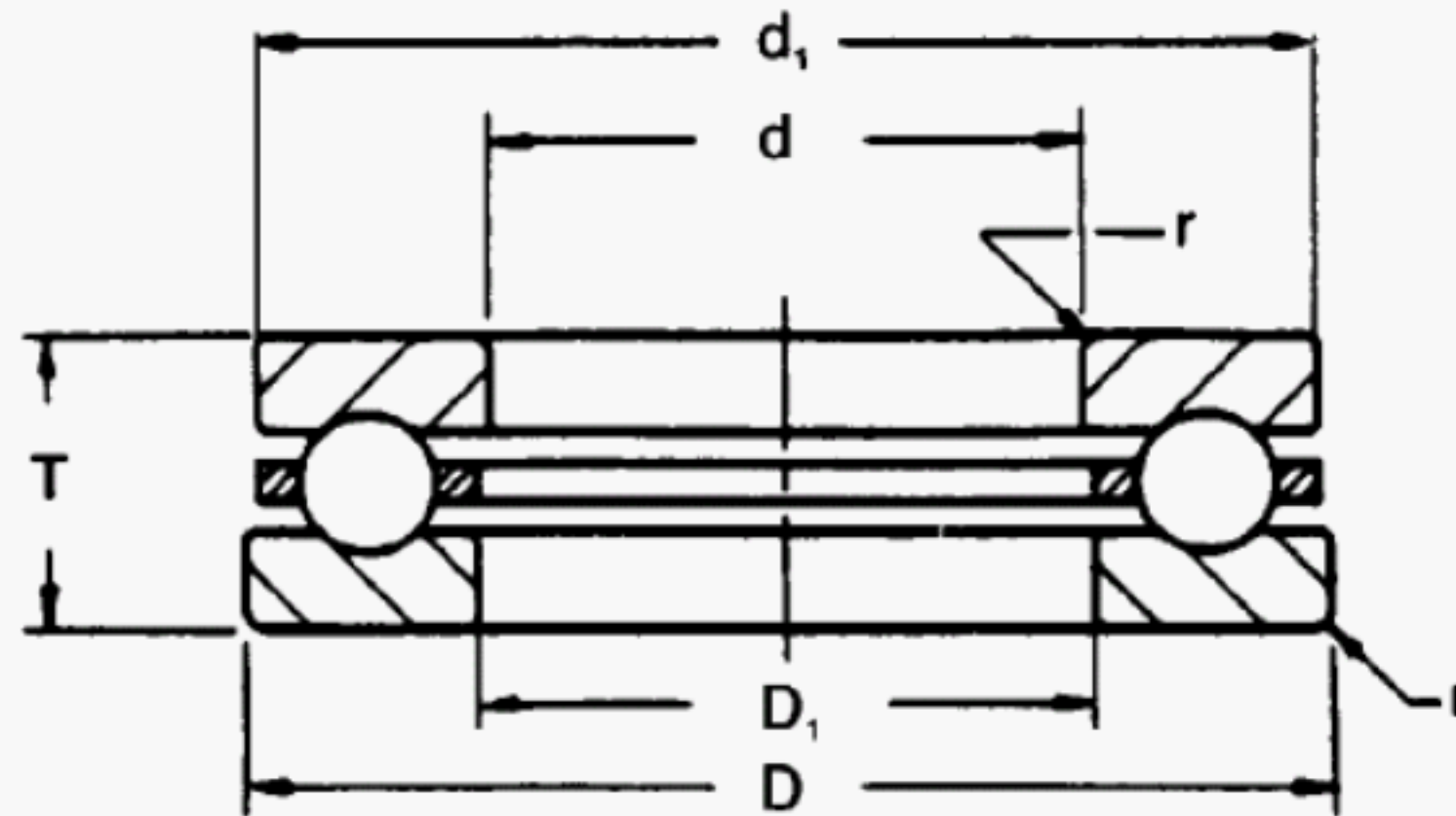
| IDENTIFICATION CODE | Dimensions in inches | | | | | |
|------------------------|----------------------|----------|----------|--|--------------------------|--------------------------|
| | d | D | T | r_{smin} ⁽¹⁾ | d_{1smax} | D_{1smin} |
| 85TA13 | 3.3464 | 5.9055 | 1.9291 | 0.059 | 5.906 | 3.465 |
| 90TA13 | 3.5433 | 6.1024 | 1.9685 | 0.059 | 6.102 | 3.661 |
| 100TA13 | 3.9370 | 6.6929 | 2.1654 | 0.059 | 6.693 | 4.055 |
| 110TA13 | 4.3307 | 7.4803 | 2.4803 | 0.079 | 7.362 | 4.449 |
| 120TA13 | 4.7244 | 8.2677 | 2.7559 | 0.083 | 8.071 | 4.843 |
| 130TA13 | 5.1181 | 8.8583 | 2.9528 | 0.083 | 8.661 | 5.276 |
| 140TA13 | 5.5118 | 9.4488 | 3.1496 | 0.083 | 9.252 | 5.669 |
| 150TA13 | 5.9055 | 9.8425 | 3.1496 | 0.083 | 9.646 | 6.063 |
| 160TA13 | 6.2992 | 10.6299 | 3.4252 | 0.118 | 10.433 | 6.457 |
| 170TA13 | 6.6929 | 11.0236 | 3.4252 | 0.118 | 10.827 | 6.850 |
| 180TA13 | 7.0866 | 11.8110 | 3.7402 | 0.118 | 11.614 | 7.244 |
| 190TA13 | 7.4803 | 12.5984 | 4.1338 | 0.157 | 12.402 | 7.677 |
| 200TA13 | 7.8740 | 13.3858 | 4.3307 | 0.157 | 13.189 | 8.071 |
| 220TA13 | 8.6614 | 14.1732 | 4.4094 | 0.157 | 13.976 | 8.858 |
| 240TA13 | 9.4488 | 14.9606 | 4.4094 | 0.157 | 14.764 | 9.646 |
| 260TA13 | 10.2362 | 16.5354 | 5.1181 | 0.197 | 16.339 | 10.433 |
| 280TA13 | 11.0236 | 17.3228 | 5.1181 | 0.197 | 17.126 | 11.220 |
| 300TA13 | 11.8110 | 18.8976 | 5.5118 | 0.197 | 18.701 | 12.008 |
| 320TA13 | 12.5984 | 19.6850 | 5.5118 | 0.197 | 19.488 | 12.795 |

- (1) The single shaft and housing fillet radius must not exceed the smallest permissible single chamfer dimension of the corresponding ring (or washer) corner, r_{smin} . This dimension does not control the bearing chamfer contour.

TABLE 7

BOUNDARY DIMENSIONS

THRUST BALL BEARING—SINGLE DIRECTION, WASHERS WITH GROOVED RACEWAYS,
FLAT BACK FACES, MEDIUM HEAVY SERIES, TYPE TA
METRIC DESIGN



PART I

Dimensions in millimetres

| IDENTIFICATION CODE | d | D | T | $r_{smin}^{(1)}$ | d_{1smax} | D_{1smin} |
|---------------------|-----|-----|-----|------------------|-------------|-------------|
| 25TA14 | 25 | 60 | 24 | 1 | 60 | 27 |
| 30TA14 | 30 | 70 | 28 | 1 | 70 | 32 |
| 35TA14 | 35 | 80 | 32 | 1.1 | 80 | 37 |
| 40TA14 | 40 | 90 | 36 | 1.1 | 90 | 42 |
| 45TA14 | 45 | 100 | 39 | 1.1 | 100 | 47 |
| 50TA14 | 50 | 110 | 43 | 1.5 | 110 | 52 |
| 55TA14 | 55 | 120 | 48 | 1.5 | 120 | 57 |
| 60TA14 | 60 | 130 | 51 | 1.5 | 130 | 62 |
| 65TA14 | 65 | 140 | 56 | 2 | 140 | 68 |
| 70TA14 | 70 | 150 | 60 | 2 | 150 | 73 |
| 75TA14 | 75 | 160 | 65 | 2 | 160 | 78 |
| 80TA14 | 80 | 170 | 68 | 2.1 | 170 | 83 |
| 85TA14 | 85 | 180 | 72 | 2.1 | 177 | 88 |
| 90TA14 | 90 | 190 | 77 | 2.1 | 187 | 93 |
| 100TA14 | 100 | 210 | 85 | 3 | 205 | 103 |
| 110TA14 | 110 | 230 | 95 | 3 | 225 | 113 |
| 120TA14 | 120 | 250 | 102 | 4 | 245 | 123 |
| 130TA14 | 130 | 270 | 110 | 4 | 265 | 134 |
| 140TA14 | 140 | 280 | 112 | 4 | 275 | 144 |
| 150TA14 | 150 | 300 | 120 | 4 | 295 | 154 |

continued

TABLE 7—PART I (continued)—Sheet 2 of 2

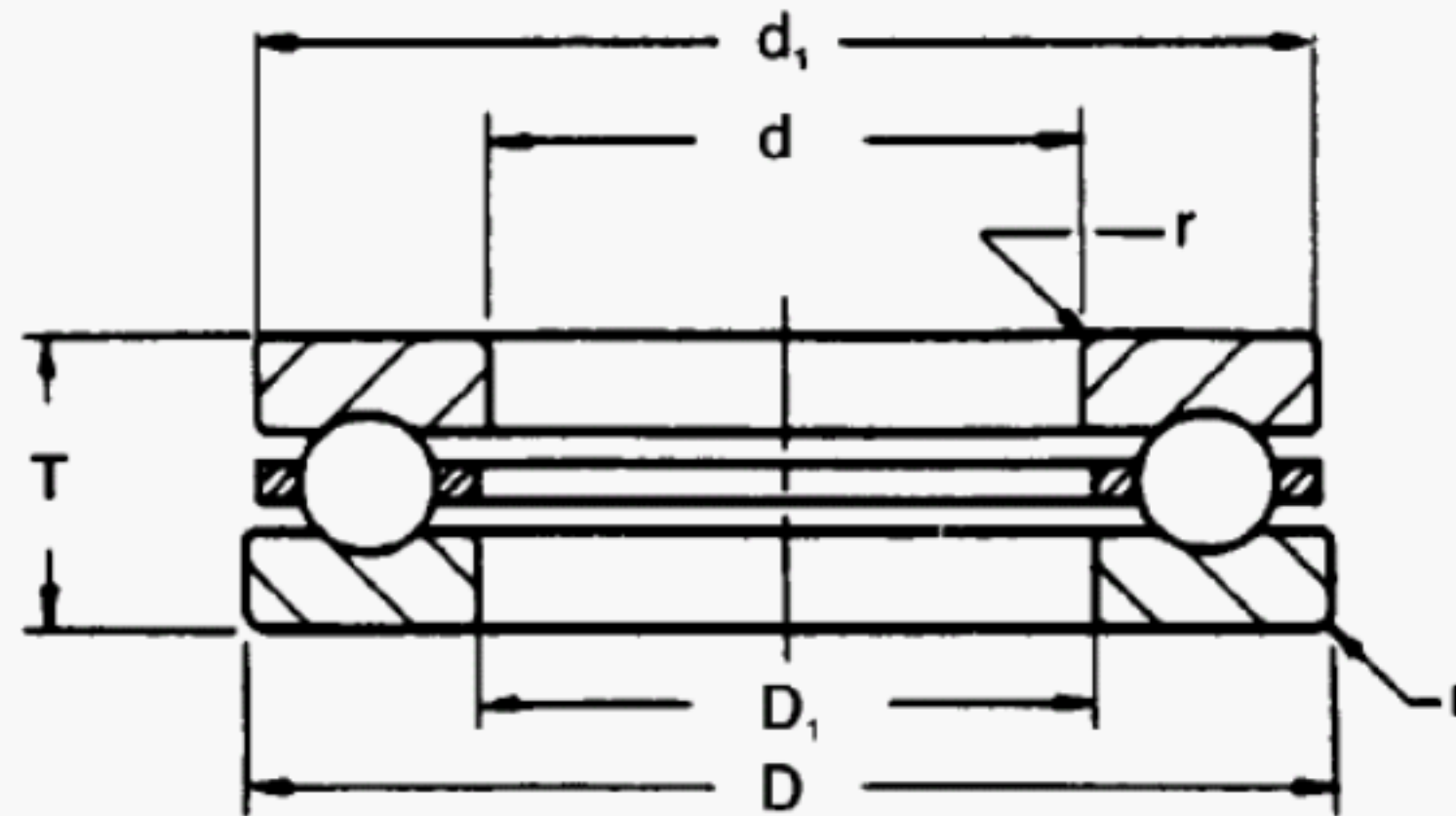
| Dimensions in millimetres | | | | | | |
|---------------------------|-----|-----|-----|----------------------------------|--------------------|--------------------|
| IDENTIFICATION CODE | d | D | T | r _{smin} ⁽¹⁾ | d _{1smax} | D _{1smin} |
| 160TA14 | 160 | 320 | 130 | 5 | 315 | 164 |
| 170TA14 | 170 | 340 | 135 | 5 | 335 | 174 |
| 180TA14 | 180 | 360 | 140 | 5 | 355 | 184 |
| 190TA14 | 190 | 380 | 150 | 5 | 375 | 195 |
| 200TA14 | 200 | 400 | 155 | 5 | 395 | 205 |
| 220TA14 | 220 | 420 | 160 | 6 | 415 | 225 |
| 240TA14 | 240 | 440 | 160 | 6 | 435 | 245 |
| 260TA14 | 260 | 480 | 175 | 6 | 475 | 265 |
| 280TA14 | 280 | 520 | 190 | 6 | 515 | 285 |
| 300TA14 | 300 | 540 | 190 | 6 | 535 | 305 |
| 320TA14 | 320 | 580 | 205 | 7.5 | 575 | 325 |

(1) The single shaft and housing fillet radius must not exceed the smallest permissible single chamfer dimension of the corresponding ring (or washer) corner, r_{smin}. This dimension does not control the bearing chamfer contour.

TABLE 7

BOUNDARY DIMENSIONS

THRUST BALL BEARING—SINGLE DIRECTION, WASHERS WITH GROOVED RACEWAYS,
FLAT BACK FACES, MEDIUM HEAVY SERIES, TYPE TA
METRIC DESIGN



PART II

Dimensions in inches

| IDENTIFICATION CODE | d | D | T | $r_{smin}^{(1)}$ | d_{1smax} | D_{1smin} |
|---------------------|--------|---------|--------|------------------|-------------|-------------|
| 25TA14 | 0.9842 | 2.3622 | 0.9449 | 0.039 | 2.362 | 1.063 |
| 30TA14 | 1.1811 | 2.7559 | 1.1024 | 0.039 | 2.756 | 1.260 |
| 35TA14 | 1.3780 | 3.1496 | 1.2598 | 0.043 | 3.150 | 1.457 |
| 40TA14 | 1.5748 | 3.5433 | 1.4173 | 0.043 | 3.543 | 1.654 |
| 45TA14 | 1.7716 | 3.9370 | 1.5354 | 0.043 | 3.937 | 1.850 |
| 50TA14 | 1.9685 | 4.3307 | 1.6929 | 0.059 | 4.331 | 2.047 |
| 55TA14 | 2.1654 | 4.7244 | 1.8898 | 0.059 | 4.724 | 2.244 |
| 60TA14 | 2.3622 | 5.1181 | 2.0079 | 0.059 | 5.118 | 2.441 |
| 65TA14 | 2.5590 | 5.5118 | 2.2047 | 0.079 | 5.512 | 2.677 |
| 70TA14 | 2.7559 | 5.9055 | 2.3622 | 0.079 | 5.906 | 2.874 |
| 75TA14 | 2.9528 | 6.2992 | 2.5591 | 0.079 | 6.299 | 3.071 |
| 80TA14 | 3.1496 | 6.6929 | 2.6772 | 0.083 | 6.693 | 3.268 |
| 85TA14 | 3.3464 | 7.0866 | 2.8346 | 0.083 | 6.969 | 3.465 |
| 90TA14 | 3.5433 | 7.4803 | 3.0315 | 0.083 | 7.362 | 3.661 |
| 100TA14 | 3.9370 | 8.2677 | 3.3465 | 0.118 | 8.071 | 4.055 |
| 110TA14 | 4.3307 | 9.0551 | 3.7402 | 0.118 | 8.858 | 4.449 |
| 120TA14 | 4.7244 | 9.8425 | 4.0157 | 0.157 | 9.646 | 4.843 |
| 130TA14 | 5.1181 | 10.6299 | 4.3307 | 0.157 | 10.433 | 5.276 |
| 140TA14 | 5.5118 | 11.0236 | 4.4094 | 0.157 | 10.827 | 5.669 |
| 150TA14 | 5.9055 | 11.8110 | 4.7244 | 0.157 | 11.614 | 6.063 |

continued

TABLE 7—PART II (continued)—Sheet 2 of 2

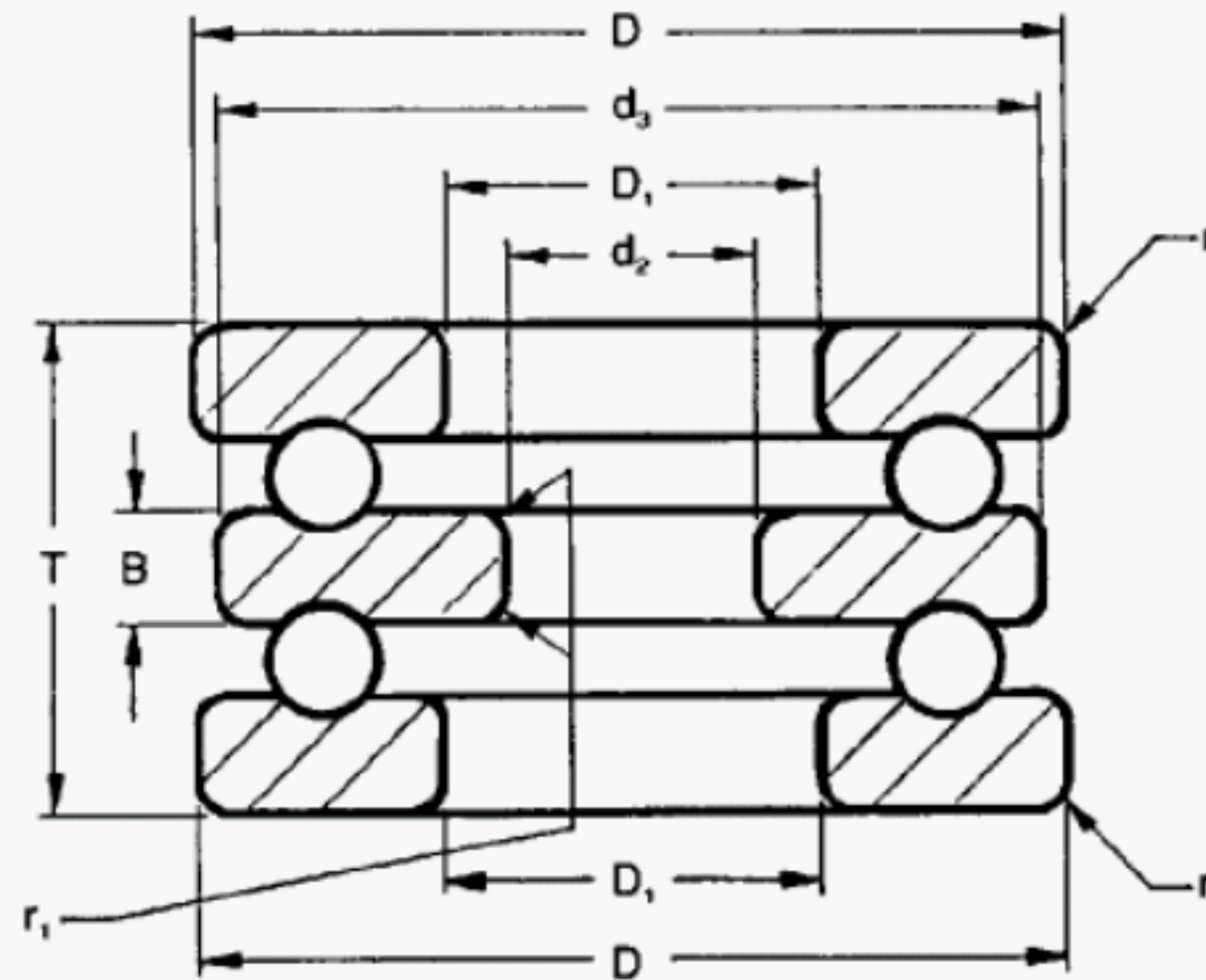
| Dimensions in inches | | | | | | |
|------------------------|---------|---------|--------|----------------------------------|--------------------|--------------------|
| IDENTIFICATION CODE | d | D | T | r _{smin} ⁽¹⁾ | d _{1smax} | D _{1smin} |
| 160TA14 | 6.2992 | 12.5984 | 5.1181 | 0.197 | 12.402 | 6.457 |
| 170TA14 | 6.6929 | 13.3858 | 5.3150 | 0.197 | 13.189 | 6.850 |
| 180TA14 | 7.0866 | 14.1732 | 5.5118 | 0.197 | 13.976 | 7.244 |
| 190TA14 | 7.4803 | 14.9606 | 5.9055 | 0.197 | 14.764 | 7.677 |
| 200TA14 | 7.8740 | 15.7480 | 6.1024 | 0.197 | 15.551 | 8.071 |
| 220TA14 | 8.6614 | 16.5354 | 6.2992 | 0.236 | 16.339 | 8.858 |
| 240TA14 | 9.4488 | 17.3228 | 6.2292 | 0.236 | 17.126 | 9.646 |
| 260TA14 | 10.2362 | 18.8976 | 6.8898 | 0.236 | 18.701 | 10.433 |
| 280TA14 | 11.0236 | 20.4724 | 7.4803 | 0.236 | 20.276 | 11.220 |
| 300TA14 | 11.8110 | 21.2598 | 7.4803 | 0.236 | 21.063 | 12.008 |
| 320TA14 | 12.5984 | 22.8346 | 8.0709 | 0.295 | 22.638 | 12.795 |

(1) The single shaft and housing fillet radius must not exceed the smallest permissible single chamfer dimension of the corresponding ring (or washer) corner, r_{smin}. This dimension does not control the bearing chamfer contour.

TABLE 8

BOUNDARY DIMENSIONS

THRUST BALL BEARING—DOUBLE DIRECTION, WASHERS WITH GROOVED RACEWAYS,
FLAT BACK FACES, LIGHT SERIES, TYPE TDA
METRIC DESIGN



PART I

Dimensions in millimetres

| IDENTIFICATION CODE | d_2 | D | $r_{smin}^{(1)}$ | $r_{1smin}^{(2)}$ | T | B | d_{3max} | D_{1min} |
|---------------------|-------|-----|------------------|-------------------|-----|-----|------------|------------|
| 15TDA22 | 10 | 32 | 0.6 | 0.3 | 22 | 5 | 32 | 17 |
| 20TDA22 | 15 | 40 | 0.6 | 0.3 | 26 | 6 | 40 | 22 |
| 25TDA22 | 20 | 47 | 0.6 | 0.3 | 28 | 7 | 47 | 27 |
| 30TDA22 | 25 | 52 | 0.6 | 0.3 | 29 | 7 | 52 | 32 |
| 35TDA22 | 30 | 62 | 1 | 0.3 | 34 | 8 | 62 | 37 |
| 40TDA22 | 30 | 68 | 1 | 0.6 | 36 | 9 | 68 | 42 |
| 45TDA22 | 35 | 73 | 1 | 0.6 | 37 | 9 | 73 | 47 |
| 50TDA22 | 40 | 78 | 1 | 0.6 | 39 | 9 | 78 | 52 |
| 55TDA22 | 45 | 90 | 1 | 0.6 | 45 | 10 | 90 | 57 |
| 60TDA22 | 50 | 95 | 1 | 0.6 | 46 | 10 | 95 | 62 |
| 65TDA22 | 55 | 100 | 1 | 0.6 | 47 | 10 | 100 | 67 |
| 70TDA22 | 55 | 105 | 1 | 1 | 47 | 10 | 105 | 72 |
| 75TDA22 | 60 | 110 | 1 | 1 | 47 | 10 | 110 | 77 |
| 80TDA22 | 65 | 115 | 1 | 1 | 48 | 10 | 115 | 82 |
| 85TDA22 | 70 | 125 | 1 | 1 | 55 | 12 | 125 | 88 |

continued

TABLE 8—PART I (continued)—Sheet 2 of 2

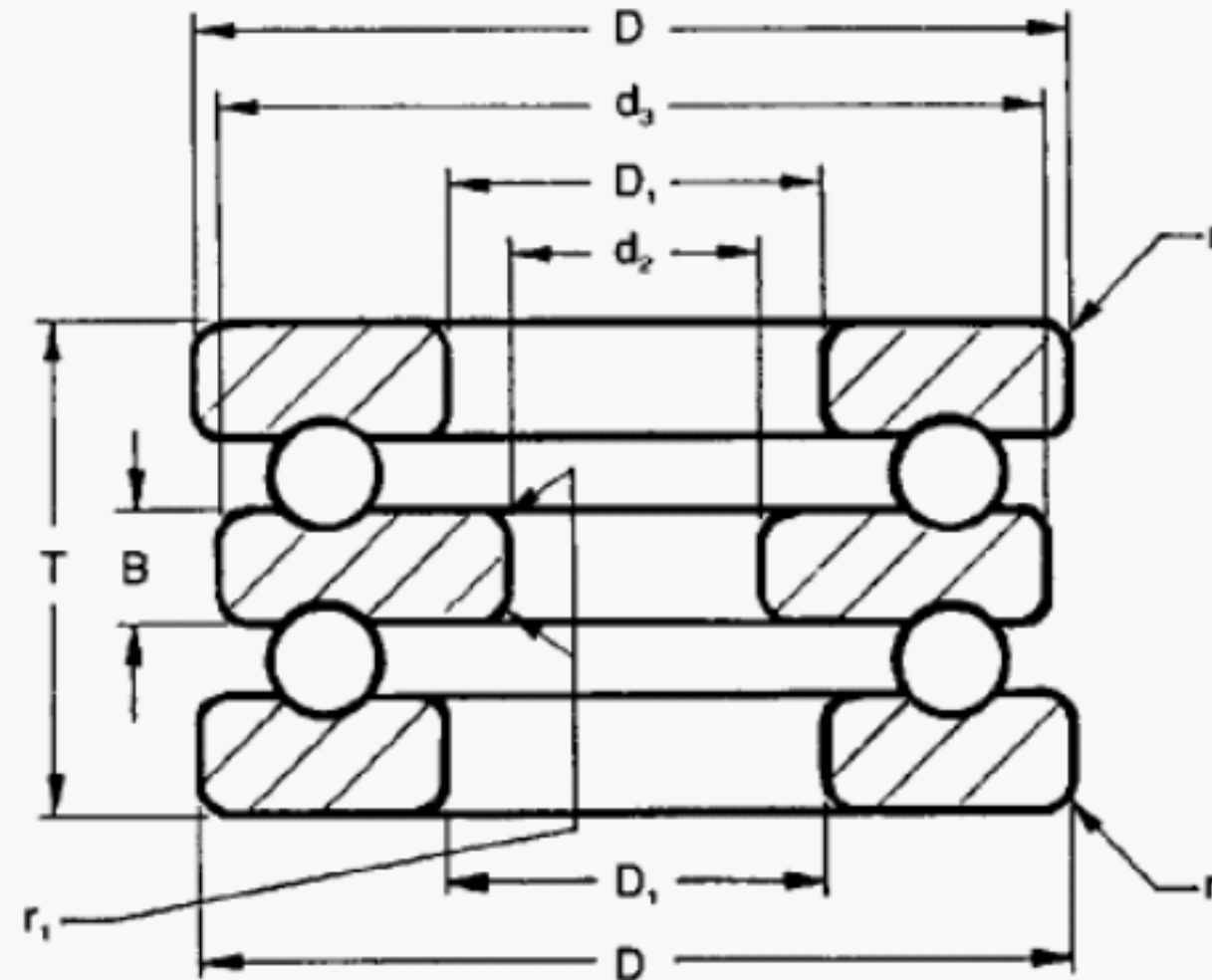
| IDENTIFICATION CODE | d_2 | D | $r_{smin}^{(1)}$ | $r_{1smin}^{(2)}$ | T | B | Dimensions in millimetres | |
|------------------------|-------|-----|------------------|-------------------|-----|----|---------------------------|------------|
| | | | | | | | d_{3max} | D_{1min} |
| 90TDA22 | 75 | 135 | 1.1 | 1 | 62 | 14 | 135 | 93 |
| 100TDA22 | 85 | 150 | 1.1 | 1 | 67 | 15 | 150 | 103 |
| 110TDA22 | 95 | 160 | 1.1 | 1 | 67 | 15 | 160 | 113 |
| 120TDA22 | 100 | 170 | 1.1 | 1.1 | 68 | 15 | 170 | 123 |
| 130TDA22 | 110 | 190 | 1.5 | 1.1 | 80 | 18 | 189.5 | 133 |
| 140TDA22 | 120 | 200 | 1.5 | 1.1 | 81 | 18 | 199.5 | 143 |
| 150TDA22 | 130 | 215 | 1.5 | 1.1 | 89 | 20 | 214.5 | 153 |
| 160TDA22 | 140 | 225 | 1.5 | 1.1 | 90 | 20 | 224.5 | 163 |
| 170TDA22 | 150 | 240 | 1.5 | 1.1 | 97 | 21 | 239.5 | 173 |
| 180TDA22 | 150 | 250 | 1.5 | 2 | 98 | 21 | 249 | 183 |
| 190TDA22 | 160 | 270 | 2 | 2 | 109 | 24 | 269 | 194 |
| 200TDA22 | 170 | 280 | 2 | 2 | 109 | 24 | 279 | 204 |
| 220TDA22 | 190 | 300 | 2 | 2 | 110 | 24 | 299 | 224 |

- (1) The single housing fillet radius must not exceed the smallest permissible single chamfer dimension of the corresponding ring (or washer) corner, r_{smin} . This dimension does not control the bearing chamfer contour.
- (2) The single shaft fillet radius must not exceed the smallest permissible single chamfer dimension of the corresponding ring (or washer) corner, r_{1smin} . This dimension does not control the bearing chamfer contour.

TABLE 8

BOUNDARY DIMENSIONS

THRUST BALL BEARING—DOUBLE DIRECTION, WASHERS WITH GROOVED RACEWAYS,
FLAT BACK FACES, LIGHT SERIES, TYPE TDA
METRIC DESIGN



PART II

Dimensions in inches

| IDENTIFICATION CODE | d_2 | D | $r_{smin}^{(1)}$ | $r_{1smin}^{(2)}$ | T | B | d_{3max} | D_{1min} |
|---------------------|--------|--------|------------------|-------------------|--------|--------|------------|------------|
| 15TDA22 | 0.3937 | 1.2598 | 0.0236 | 0.0118 | 0.8661 | 0.1968 | 1.2598 | 0.6693 |
| 20TDA22 | 0.5906 | 1.5748 | 0.0236 | 0.0118 | 1.0236 | 0.2362 | 1.5748 | 0.8661 |
| 25TDA22 | 0.7874 | 1.8504 | 0.0236 | 0.0118 | 1.1024 | 0.2756 | 1.8503 | 1.0630 |
| 30TDA22 | 0.9842 | 2.0472 | 0.0236 | 0.0118 | 1.1417 | 0.2756 | 2.0472 | 1.2598 |
| 35TDA22 | 1.1811 | 2.4409 | 0.0394 | 0.0118 | 1.3386 | 0.3150 | 2.4409 | 1.4567 |
| 40TDA22 | 1.1811 | 2.6772 | 0.0394 | 0.0236 | 1.4173 | 0.3543 | 2.6772 | 1.6535 |
| 45TDA22 | 1.3779 | 2.8740 | 0.0394 | 0.0236 | 1.4567 | 0.3543 | 2.8740 | 1.8504 |
| 50TDA22 | 1.5748 | 3.0709 | 0.0394 | 0.0236 | 1.5354 | 0.3543 | 3.0709 | 2.0472 |
| 55TDA22 | 1.7716 | 3.5433 | 0.0394 | 0.0236 | 1.7717 | 0.3937 | 3.5433 | 2.2441 |
| 60TDA22 | 1.9685 | 3.7401 | 0.0394 | 0.0236 | 1.8110 | 0.3937 | 3.7401 | 2.4409 |
| 65TDA22 | 2.1654 | 3.9370 | 0.0394 | 0.0236 | 1.8504 | 0.3937 | 3.9370 | 2.6378 |
| 70TDA22 | 2.1654 | 4.1338 | 0.0394 | 0.0394 | 1.8504 | 0.3937 | 4.1338 | 2.8346 |
| 75TDA22 | 2.3622 | 4.3307 | 0.0394 | 0.0394 | 1.8504 | 0.3937 | 4.3307 | 3.0315 |
| 80TDA22 | 2.5591 | 4.5276 | 0.0394 | 0.0394 | 1.8898 | 0.3937 | 4.5276 | 3.2283 |
| 85TDA22 | 2.7559 | 4.9212 | 0.0394 | 0.0394 | 2.1653 | 0.4724 | 4.9212 | 3.4646 |

continued

TABLE 8—PART II (continued)—Sheet 2 of 2

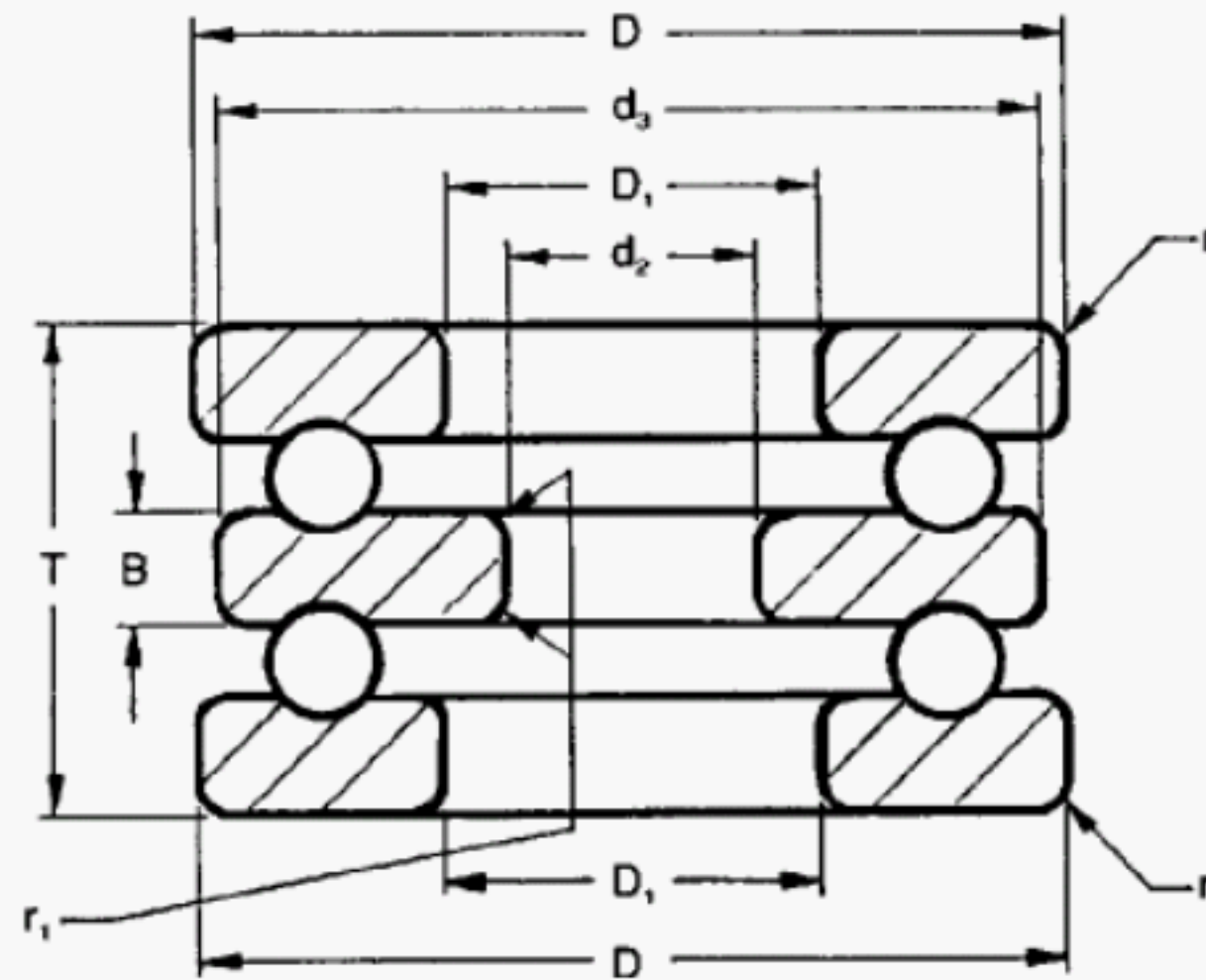
| IDENTIFICATION CODE | Dimensions in inches | | | | | | | |
|------------------------|----------------------|---------|------------------|-------------------|--------|--------|------------|------------|
| | d_2 | D | $r_{smin}^{(1)}$ | $r_{1smin}^{(2)}$ | T | B | d_{3max} | D_{1min} |
| 90TDA22 | 2.9528 | 5.3150 | 0.0433 | 0.0394 | 2.4409 | 0.5512 | 5.3150 | 3.6614 |
| 100TDA22 | 3.3464 | 5.9055 | 0.0433 | 0.0394 | 2.6378 | 0.5906 | 5.9055 | 4.0551 |
| 110TDA22 | 3.7402 | 6.2992 | 0.0433 | 0.0394 | 2.6378 | 0.5906 | 6.2992 | 4.4488 |
| 120TDA22 | 3.9370 | 6.6929 | 0.0433 | 0.0433 | 2.6772 | 0.5906 | 6.6929 | 4.8425 |
| 130TDA22 | 4.3307 | 7.4803 | 0.0591 | 0.0433 | 3.1496 | 0.7087 | 7.4606 | 5.2362 |
| 140TDA22 | 4.7244 | 7.8740 | 0.0591 | 0.0433 | 3.1890 | 0.7087 | 7.8543 | 5.6299 |
| 150TDA22 | 5.1181 | 8.4646 | 0.0591 | 0.0433 | 3.5039 | 0.7874 | 8.4449 | 6.0236 |
| 160TDA22 | 5.5118 | 8.8583 | 0.0591 | 0.0433 | 3.5433 | 0.7874 | 8.8386 | 6.4173 |
| 170TDA22 | 5.9055 | 9.4488 | 0.0591 | 0.0433 | 3.8189 | 0.8268 | 9.4291 | 6.8110 |
| 180TDA22 | 5.9055 | 9.8425 | 0.0591 | 0.0787 | 3.8583 | 0.8268 | 9.8031 | 7.2047 |
| 190TDA22 | 6.2992 | 10.6299 | 0.0787 | 0.0787 | 4.2913 | 0.9449 | 10.5906 | 7.6378 |
| 200TDA22 | 6.6929 | 11.0236 | 0.0787 | 0.0787 | 4.2913 | 0.9449 | 10.9842 | 8.0315 |
| 220TDA22 | 7.4803 | 11.8110 | 0.0787 | 0.0787 | 4.3307 | 0.9449 | 11.7716 | 8.8189 |

- (1) The single housing fillet radius must not exceed the smallest permissible single chamfer dimension of the corresponding ring (or washer) corner, r_{smin} . This dimension does not control the bearing chamfer contour.
- (2) The single shaft fillet radius must not exceed the smallest permissible single chamfer dimension of the corresponding ring (or washer) corner, r_{1smin} . This dimension does not control the bearing chamfer contour.

TABLE 9

BOUNDARY DIMENSIONS

THRUST BALL BEARING—DOUBLE DIRECTION, WASHERS WITH GROOVED RACEWAYS,
FLAT BACK FACES, MEDIUM SERIES, TYPE TDA
METRIC DESIGN



PART I

Dimensions in millimetres

| IDENTIFICATION CODE | d_2 | D | $r_{smin}^{(1)}$ | $r_{1smin}^{(2)}$ | T | B | d_{3max} | D_{1min} |
|---------------------|-------|-----|------------------|-------------------|-----|-----|------------|------------|
| 25TDA23 | 20 | 52 | 1 | 0.3 | 34 | 8 | 52 | 27 |
| 30TDA23 | 25 | 60 | 1 | 0.3 | 38 | 9 | 60 | 32 |
| 35TDA23 | 30 | 68 | 1 | 0.3 | 44 | 10 | 68 | 37 |
| 40TDA23 | 30 | 78 | 1 | 0.6 | 49 | 12 | 78 | 42 |
| 45TDA23 | 35 | 85 | 1 | 0.6 | 52 | 12 | 85 | 47 |
| 50TDA23 | 40 | 95 | 1.1 | 0.6 | 58 | 14 | 95 | 52 |
| 55TDA23 | 45 | 105 | 1.1 | 0.6 | 64 | 15 | 105 | 57 |
| 60TDA23 | 50 | 110 | 1.1 | 0.6 | 64 | 15 | 110 | 62 |
| 65TDA23 | 55 | 115 | 1.1 | 0.6 | 65 | 15 | 115 | 67 |
| 70TDA23 | 55 | 125 | 1.1 | 1 | 72 | 16 | 125 | 72 |
| 75TDA23 | 60 | 135 | 1.5 | 1 | 79 | 18 | 135 | 77 |
| 80TDA23 | 65 | 140 | 1.5 | 1 | 79 | 18 | 140 | 82 |
| 85TDA23 | 70 | 150 | 1.5 | 1 | 87 | 19 | 150 | 88 |
| 90TDA23 | 75 | 155 | 1.5 | 1 | 88 | 19 | 155 | 93 |
| 100TDA23 | 85 | 170 | 1.5 | 1 | 97 | 21 | 170 | 103 |
| 110TDA23 | 95 | 190 | 2 | 1 | 110 | 24 | 189.5 | 113 |
| 120TDA23 | 100 | 210 | 2.1 | 1.1 | 123 | 27 | 209.5 | 123 |
| 130TDA23 | 110 | 225 | 2.1 | 1.1 | 130 | 30 | 224 | 134 |
| 140TDA23 | 120 | 240 | 2.1 | 1.1 | 140 | 31 | 239 | 144 |
| 150TDA23 | 130 | 250 | 2.1 | 1.1 | 140 | 31 | 249 | 154 |
| 160TDA23 | 140 | 270 | 3 | 1.1 | 153 | 33 | 269 | 164 |
| 170TDA23 | 150 | 280 | 3 | 1.1 | 153 | 33 | 279 | 174 |
| 180TDA23 | 150 | 300 | 3 | 2 | 165 | 37 | 299 | 184 |
| 190TDA23 | 160 | 320 | 4 | 2 | 183 | 40 | 319 | 195 |
| 200TDA23 | 170 | 340 | 4 | 2 | 192 | 42 | 339 | 205 |

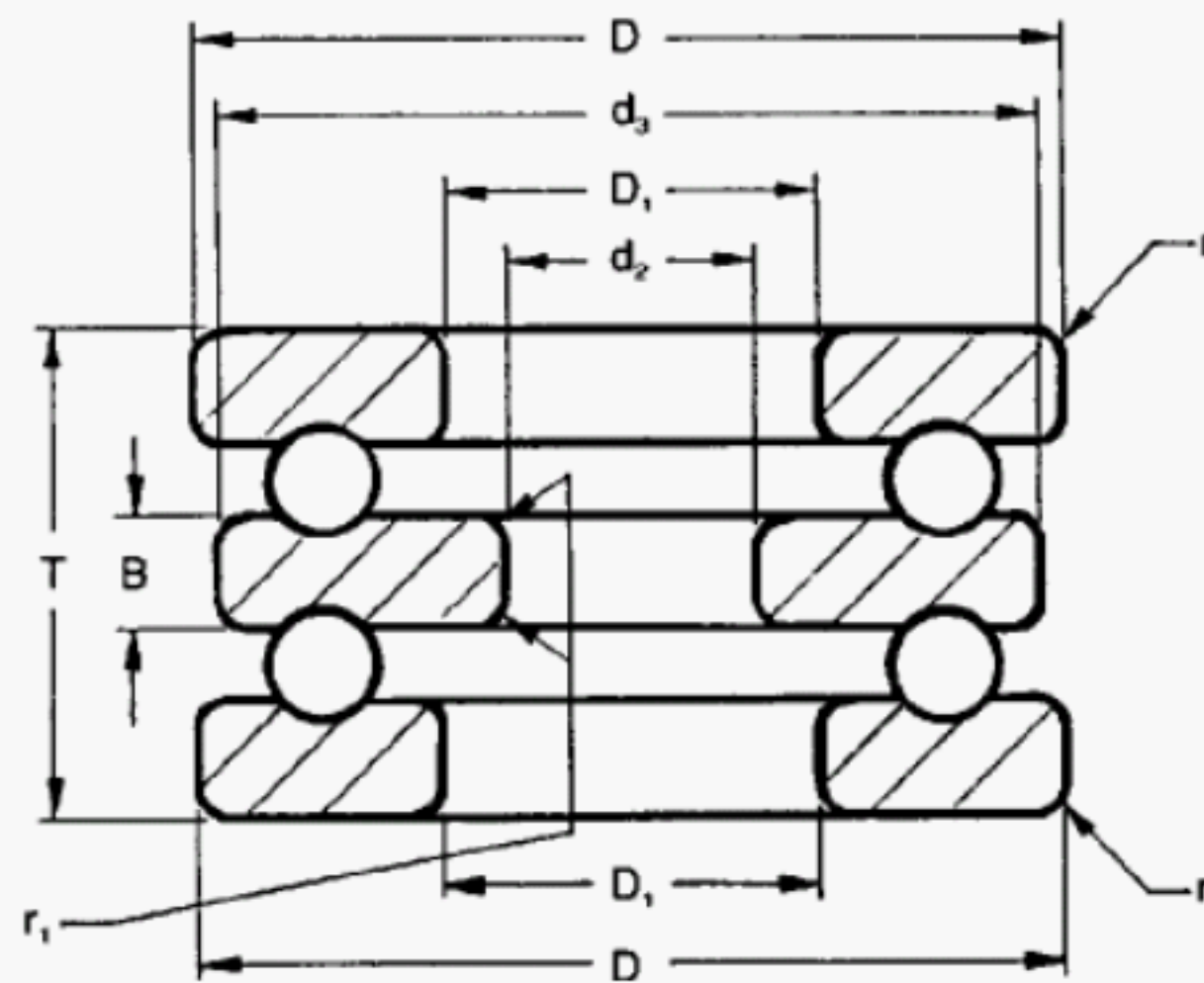
(1) The single housing fillet radius must not exceed the smallest permissible single chamfer dimension of the corresponding ring (or washer) corner, r_{smin} . This dimension does not control the bearing chamfer contour.

(2) The single shaft fillet radius must not exceed the smallest permissible single chamfer dimension of the corresponding ring (or washer) corner, r_{1smin} . This dimension does not control the bearing chamfer contour.

TABLE 9

BOUNDARY DIMENSIONS

THRUST BALL BEARING—DOUBLE DIRECTION, WASHERS WITH GROOVED RACEWAYS,
FLAT BACK FACES, MEDIUM SERIES, TYPE TDA
METRIC DESIGN



PART II

Dimensions in inches

| IDENTIFICATION CODE | d_2 | D | $r_{smin}^{(1)}$ | $r_{1smin}^{(2)}$ | T | B | d_{3max} | D_{1min} |
|---------------------|--------|---------|------------------|-------------------|--------|--------|------------|------------|
| 25TDA23 | 0.7874 | 2.0472 | 0.039 | 0.012 | 1.3386 | 0.3150 | 2.0472 | 1.0630 |
| 30TDA23 | 0.9842 | 2.3622 | 0.039 | 0.012 | 1.4961 | 0.3543 | 2.3622 | 1.2598 |
| 35TDA23 | 1.1811 | 2.6772 | 0.039 | 0.012 | 1.7323 | 0.3937 | 2.6772 | 1.4567 |
| 40TDA23 | 1.1811 | 3.0709 | 0.039 | 0.024 | 1.9291 | 0.4724 | 3.0709 | 1.6535 |
| 45TDA23 | 1.3780 | 3.3464 | 0.039 | 0.024 | 2.0472 | 0.4724 | 3.3464 | 1.8504 |
| 50TDA23 | 1.5748 | 3.7402 | 0.043 | 0.024 | 2.2835 | 0.5512 | 3.7402 | 2.0472 |
| 55TDA23 | 1.7716 | 4.1338 | 0.043 | 0.024 | 2.5197 | 0.5906 | 4.1338 | 2.2441 |
| 60TDA23 | 1.9685 | 4.3307 | 0.043 | 0.024 | 2.5197 | 0.5906 | 4.3307 | 2.4409 |
| 65TDA23 | 2.1654 | 4.5276 | 0.043 | 0.024 | 2.5590 | 0.5906 | 4.5276 | 2.6378 |
| 70TDA23 | 2.1654 | 4.9212 | 0.043 | 0.039 | 2.8346 | 0.6299 | 4.9212 | 2.8346 |
| 75TDA23 | 2.3622 | 5.3150 | 0.059 | 0.039 | 3.1102 | 0.7087 | 5.3150 | 3.0315 |
| 80TDA23 | 2.5590 | 5.5118 | 0.059 | 0.039 | 3.1102 | 0.7087 | 5.5118 | 3.2283 |
| 85TDA23 | 2.7559 | 5.9055 | 0.059 | 0.039 | 3.4252 | 0.7480 | 5.9055 | 3.4646 |
| 90TDA23 | 2.9528 | 6.1024 | 0.059 | 0.039 | 3.4646 | 0.7480 | 6.1024 | 3.6614 |
| 100TDA23 | 3.3465 | 6.6929 | 0.059 | 0.039 | 3.8189 | 0.8268 | 6.6929 | 4.0551 |
| 110TDA23 | 3.7402 | 7.4803 | 0.079 | 0.039 | 4.3307 | 0.9449 | 7.4606 | 4.4488 |
| 120TDA23 | 3.9370 | 8.2677 | 0.083 | 0.043 | 4.8425 | 1.0630 | 8.2480 | 4.8425 |
| 130TDA23 | 4.3307 | 8.8583 | 0.083 | 0.043 | 5.1181 | 1.1811 | 8.8188 | 5.2756 |
| 140TDA23 | 4.7244 | 9.4488 | 0.083 | 0.043 | 5.5118 | 1.2205 | 9.4094 | 5.6693 |
| 150TDA23 | 5.1181 | 9.8425 | 0.083 | 0.043 | 5.5118 | 1.2205 | 9.8031 | 6.0630 |
| 160TDA23 | 5.5118 | 10.6299 | 0.118 | 0.043 | 6.0236 | 1.2992 | 10.5906 | 6.4567 |
| 170TDA23 | 5.9055 | 11.0236 | 0.118 | 0.043 | 6.0236 | 1.2992 | 10.9842 | 6.8504 |
| 180TDA23 | 5.9055 | 11.8110 | 0.118 | 0.079 | 6.4960 | 1.4567 | 11.7716 | 7.2441 |
| 190TDA23 | 6.2992 | 12.5984 | 0.157 | 0.079 | 7.2047 | 1.5748 | 12.5591 | 7.6772 |
| 200TDA23 | 6.6929 | 13.3858 | 0.157 | 0.079 | 7.5590 | 1.6535 | 13.3464 | 8.0709 |

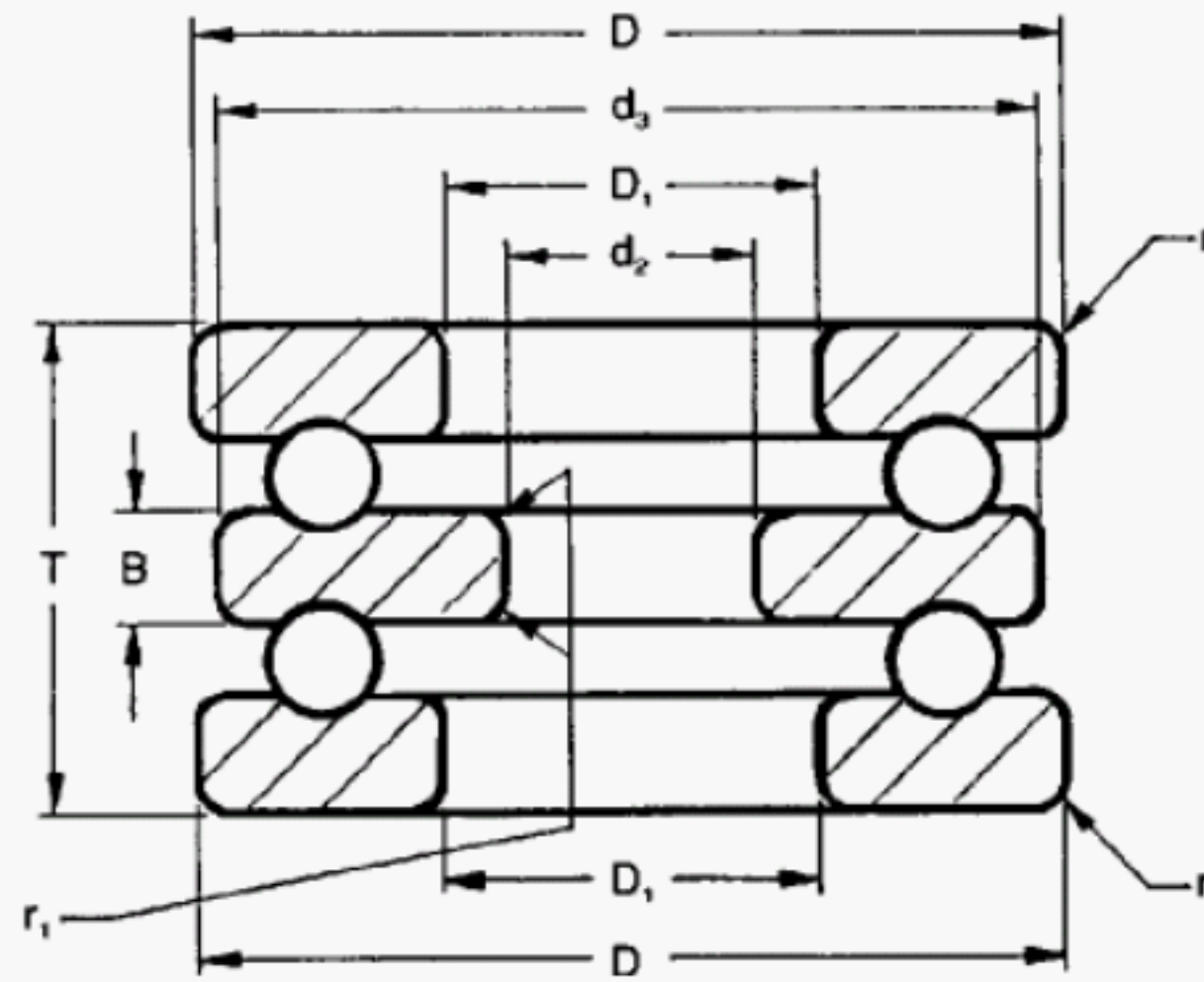
(1) The single housing fillet radius must not exceed the smallest permissible single chamfer dimension of the corresponding ring (or washer) corner, r_{smin} . This dimension does not control the bearing chamfer contour.

(2) The single shaft fillet radius must not exceed the smallest permissible single chamfer dimension of the corresponding ring (or washer) corner, r_{1smin} . This dimension does not control the bearing chamfer contour.

TABLE 10

BOUNDARY DIMENSIONS

THRUST BALL BEARING—DOUBLE DIRECTION, WASHERS WITH GROOVED RACEWAYS,
FLAT BACK FACES, HEAVY SERIES, TYPE TDA
METRIC DESIGN



PART I

Dimensions in millimetres

| IDENTIFICATION CODE | d_2 | D | $r_{smin}^{(1)}$ | $r_{1smin}^{(2)}$ | T | B | d_{3max} | D_{1min} |
|---------------------|-------|-----|------------------|-------------------|-----|-----|------------|------------|
| 25TDA24 | 15 | 60 | 1 | 0.6 | 45 | 11 | 60 | 27 |
| 30TDA24 | 20 | 70 | 1 | 0.6 | 52 | 12 | 70 | 32 |
| 35TDA24 | 25 | 80 | 1.1 | 0.6 | 59 | 14 | 80 | 37 |
| 40TDA24 | 30 | 90 | 1.1 | 0.6 | 65 | 15 | 90 | 42 |
| 45TDA24 | 35 | 100 | 1.1 | 0.6 | 72 | 17 | 100 | 47 |
| 50TDA24 | 40 | 110 | 1.5 | 0.6 | 78 | 18 | 110 | 52 |
| 55TDA24 | 45 | 120 | 1.5 | 0.6 | 87 | 20 | 120 | 57 |
| 60TDA24 | 50 | 130 | 1.5 | 0.6 | 93 | 21 | 130 | 62 |
| 65TDA24 | 50 | 140 | 2 | 1 | 101 | 23 | 140 | 68 |
| 70TDA24 | 55 | 150 | 2 | 1 | 107 | 24 | 150 | 73 |
| 75TDA24 | 60 | 160 | 2 | 1 | 115 | 26 | 160 | 78 |
| 80TDA24 | 65 | 170 | 2.1 | 1 | 120 | 27 | 170 | 83 |
| 85TDA24 | 65 | 180 | 2.1 | 1.1 | 128 | 29 | 179.5 | 88 |
| 90TDA24 | 70 | 190 | 2.1 | 1.1 | 135 | 30 | 189.5 | 93 |
| 100TDA24 | 80 | 210 | 3 | 1.1 | 150 | 33 | 209.5 | 103 |
| 110TDA24 | 90 | 230 | 3 | 1.1 | 166 | 37 | 229 | 113 |
| 120TDA24 | 95 | 250 | 4 | 1.5 | 177 | 40 | 249 | 123 |
| 130TDA24 | 100 | 270 | 4 | 2 | 192 | 42 | 269 | 134 |
| 140TDA24 | 110 | 280 | 4 | 2 | 196 | 44 | 279 | 144 |
| 150TDA24 | 120 | 300 | 4 | 2 | 209 | 46 | 299 | 154 |
| 160TDA24 | 130 | 320 | 5 | 2 | 226 | 50 | 319 | 164 |
| 170TDA24 | 135 | 340 | 5 | 2.1 | 236 | 50 | 339 | 174 |
| 180TDA24 | 140 | 360 | 5 | 3 | 245 | 52 | 359 | 184 |

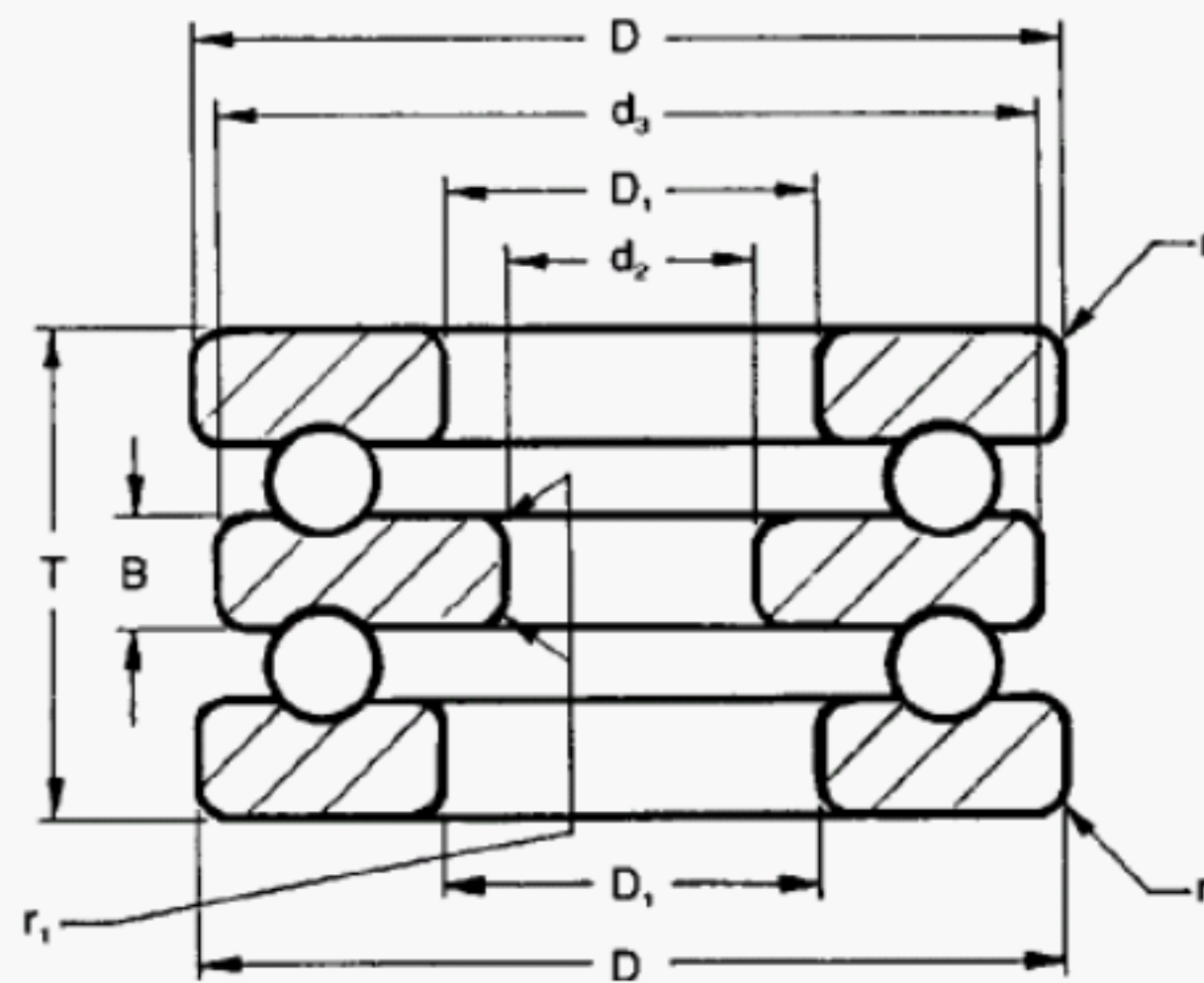
(1) The single housing fillet radius must not exceed the smallest permissible single chamfer dimension of the corresponding ring (or washer) corner, r_{smin} . This dimension does not control the bearing chamfer contour.

(2) The single shaft fillet radius must not exceed the smallest permissible single chamfer dimension of the corresponding ring (or washer) corner, r_{1smin} . This dimension does not control the bearing chamfer contour.

TABLE 10

BOUNDARY DIMENSIONS

THRUST BALL BEARING—DOUBLE DIRECTION, WASHERS WITH GROOVED RACEWAYS,
FLAT BACK FACES, HEAVY SERIES, TYPE TDA
METRIC DESIGN



PART II

Dimensions in inches

| IDENTIFICATION CODE | d_2 | D | $r_{smin}^{(1)}$ | $r_{1smin}^{(2)}$ | T | B | d_{3max} | D_{1min} |
|---------------------|--------|---------|------------------|-------------------|--------|--------|------------|------------|
| 25TDA24 | 0.5906 | 2.3622 | 0.039 | 0.024 | 1.7716 | 0.4331 | 2.3622 | 1.0630 |
| 30TDA24 | 0.7874 | 2.7559 | 0.039 | 0.024 | 2.0472 | 0.4724 | 2.7559 | 1.2598 |
| 35TDA24 | 0.9842 | 3.1496 | 0.043 | 0.024 | 2.3228 | 0.5512 | 3.1496 | 1.4567 |
| 40TDA24 | 1.1811 | 3.5433 | 0.043 | 0.024 | 2.5590 | 0.5906 | 3.5433 | 1.6535 |
| 45TDA24 | 1.3780 | 3.9370 | 0.043 | 0.024 | 2.8346 | 0.6693 | 3.9370 | 1.8504 |
| 50TDA24 | 1.5748 | 4.3307 | 0.059 | 0.024 | 3.0709 | 0.7087 | 4.3307 | 2.0472 |
| 55TDA24 | 1.7716 | 4.7244 | 0.059 | 0.024 | 3.4252 | 0.7874 | 4.7244 | 2.2441 |
| 60TDA24 | 1.9685 | 5.1181 | 0.059 | 0.024 | 3.6614 | 0.8268 | 5.1181 | 2.4409 |
| 65TDA24 | 1.9685 | 5.5118 | 0.078 | 0.039 | 3.9764 | 0.9055 | 5.5118 | 2.6772 |
| 70TDA24 | 2.1654 | 5.9055 | 0.078 | 0.039 | 4.2126 | 0.9449 | 5.9055 | 2.8740 |
| 75TDA24 | 2.3622 | 6.2992 | 0.078 | 0.039 | 4.5276 | 1.0236 | 6.2992 | 3.0709 |
| 80TDA24 | 2.5590 | 6.6929 | 0.083 | 0.039 | 4.7244 | 1.0630 | 6.6929 | 3.2677 |
| 85TDA24 | 2.5590 | 7.0866 | 0.083 | 0.043 | 5.0394 | 1.1417 | 7.0669 | 3.4646 |
| 90TDA24 | 2.7559 | 7.4803 | 0.083 | 0.043 | 5.3150 | 1.1811 | 7.4606 | 3.6614 |
| 100TDA24 | 3.1496 | 8.2677 | 0.118 | 0.043 | 5.9055 | 1.2992 | 8.2480 | 4.0551 |
| 110TDA24 | 3.5433 | 9.0551 | 0.118 | 0.043 | 6.5354 | 1.4567 | 9.0157 | 4.4488 |
| 120TDA24 | 3.7402 | 9.8425 | 0.157 | 0.059 | 6.9685 | 1.5748 | 9.8031 | 4.8425 |
| 130TDA24 | 3.9370 | 10.6299 | 0.157 | 0.078 | 7.5590 | 1.6535 | 10.5906 | 5.2756 |
| 140TDA24 | 4.3307 | 11.0236 | 0.157 | 0.078 | 7.7165 | 1.7323 | 10.9842 | 5.6693 |
| 150TDA24 | 4.7244 | 11.8110 | 0.157 | 0.078 | 8.2283 | 1.8110 | 11.7716 | 6.0630 |
| 160TDA24 | 5.1181 | 12.5984 | 0.197 | 0.078 | 8.8976 | 1.9685 | 12.5590 | 6.4567 |
| 170TDA24 | 5.3150 | 13.3858 | 0.197 | 0.083 | 9.2913 | 1.9685 | 13.3464 | 6.8504 |
| 180TDA24 | 5.5118 | 14.1732 | 0.197 | 0.118 | 9.6457 | 2.0472 | 14.1338 | 7.2441 |

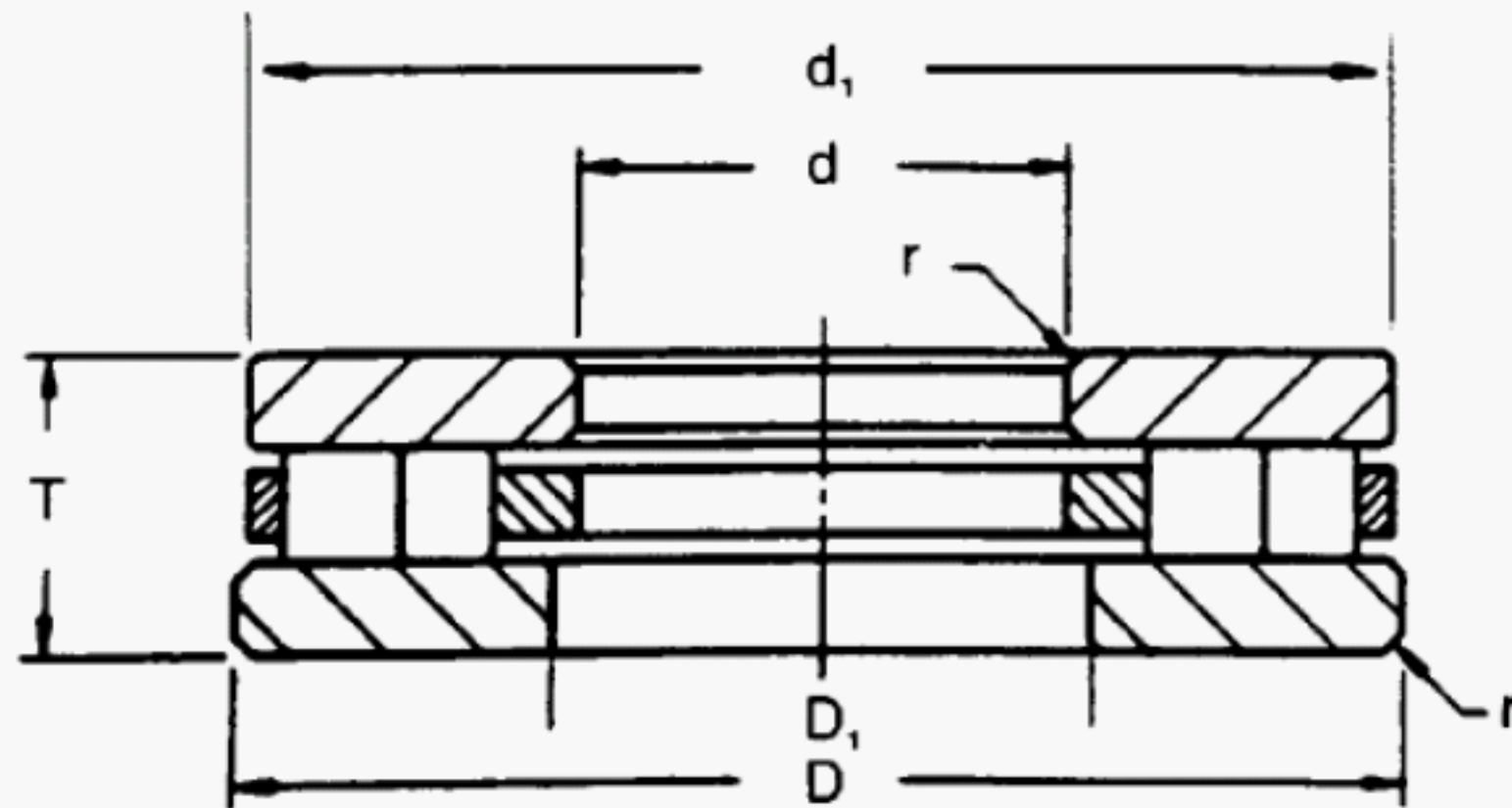
(1) The single housing fillet radius must not exceed the smallest permissible single chamfer dimension of the corresponding ring (or washer) corner, r_{smin} . This dimension does not control the bearing chamfer contour.

(2) The single shaft fillet radius must not exceed the smallest permissible single chamfer dimension of the corresponding ring (or washer) corner, r_{1smin} . This dimension does not control the bearing chamfer contour.

TABLE 11

BOUNDARY DIMENSIONS

THRUST BEARING—CYLINDRICAL ROLLERS, SINGLE DIRECTION
 FLAT RACEWAYS, FLAT BACK FACES, MEDIUM SERIES, TYPE TP
 METRIC DESIGN



PART I

Dimensions in millimetres

| IDENTIFICATION CODE | d | D | T | $r_{\text{min}}^{(1)}$ |
|---------------------|-----|-----|-----|------------------------|
| 40TP93 | 40 | 78 | 22 | 1 |
| 45TA93 | 45 | 85 | 24 | 1 |
| 50TP93 | 50 | 95 | 27 | 1.1 |
| 55TP93 | 55 | 105 | 30 | 1.1 |
| 60TP93 | 60 | 110 | 30 | 1.1 |
| 65TP93 | 65 | 115 | 30 | 1.1 |
| 70TP93 | 70 | 125 | 34 | 1.1 |
| 75TP93 | 75 | 135 | 36 | 1.5 |
| 80TP93 | 80 | 140 | 36 | 1.5 |
| 85TP93 | 85 | 150 | 39 | 1.5 |
| 90TP93 | 90 | 155 | 39 | 1.5 |
| 100TP93 | 100 | 170 | 42 | 1.5 |
| 110TP93 | 110 | 190 | 48 | 2 |
| 120TP93 | 120 | 210 | 54 | 2.1 |
| 130TP93 | 130 | 225 | 58 | 2.1 |
| 140TP93 | 140 | 240 | 60 | 2.1 |
| 150TP93 | 150 | 250 | 60 | 2.1 |
| 160TP93 | 160 | 270 | 67 | 3 |
| 170TP93 | 170 | 280 | 67 | 3 |
| 180TP93 | 180 | 300 | 73 | 3 |

continued

TABLE 11—PART I (continued)—Sheet 2 of 2

Dimensions in millimetres

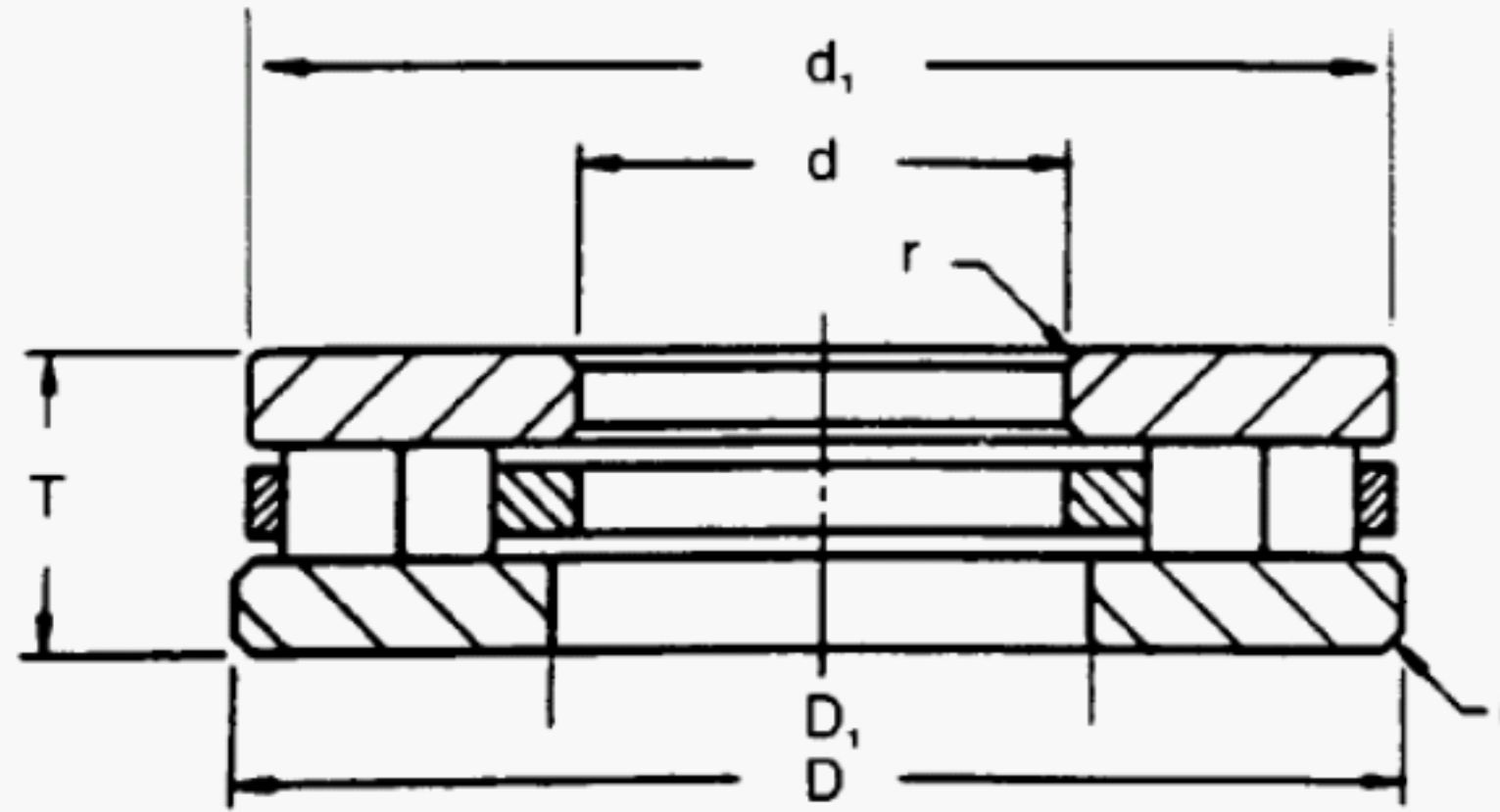
| IDENTIFICATION CODE | d | D | T | r _{min} ⁽¹⁾ |
|------------------------|-----|------|-----|---------------------------------|
| 190TP93 | 190 | 320 | 78 | 4 |
| 200TP93 | 200 | 340 | 85 | 4 |
| 220TP93 | 220 | 360 | 85 | 4 |
| 240TP93 | 240 | 380 | 85 | 4 |
| 260TP93 | 260 | 420 | 95 | 5 |
| 280TP93 | 280 | 440 | 95 | 5 |
| 300TP93 | 300 | 480 | 109 | 5 |
| 320TP93 | 320 | 500 | 109 | 5 |
| 340TP93 | 340 | 540 | 122 | 5 |
| 360TP93 | 360 | 560 | 122 | 5 |
| 380TP93 | 380 | 600 | 132 | 6 |
| 400TP93 | 400 | 620 | 132 | 6 |
| 420TP93 | 420 | 650 | 140 | 6 |
| 440TP93 | 440 | 680 | 145 | 6 |
| 460TP93 | 460 | 710 | 150 | 6 |
| 480TP93 | 480 | 730 | 150 | 6 |
| 500TP93 | 500 | 750 | 150 | 6 |
| 530TP93 | 530 | 800 | 160 | 7.5 |
| 560TP93 | 560 | 850 | 175 | 7.5 |
| 600TP93 | 600 | 900 | 180 | 7.5 |
| 630TP93 | 630 | 950 | 190 | 9.5 |
| 670TP93 | 670 | 1000 | 200 | 9.5 |
| 710TP93 | 710 | 1060 | 212 | 9.5 |
| 750TP93 | 750 | 1120 | 224 | 9.5 |
| 800TP93 | 800 | 1180 | 230 | 9.5 |
| 850TP93 | 850 | 1250 | 243 | 12 |
| 900TP93 | 900 | 1320 | 250 | 12 |
| 950TP93 | 950 | 1400 | 272 | 12 |

(1) The single shaft and housing fillet radius must not exceed the smallest permissible single chamfer dimension of the corresponding ring (or washer) corner, r_{min}. This dimension does not control the bearing chamfer contour.

TABLE 11

BOUNDARY DIMENSIONS

THRUST BEARING—CYLINDRICAL ROLLERS, SINGLE DIRECTION
FLAT RACEWAYS, FLAT BACK FACES, MEDIUM SERIES, TYPE TP
METRIC DESIGN



PART II

Dimensions in inches

| IDENTIFICATION CODE | d | D | T | $r_{\text{min}}^{(1)}$ |
|------------------------|--------|---------|--------|------------------------|
| 40TP93 | 1.5748 | 3.0709 | 0.8661 | 0.039 |
| 45TA93 | 1.7716 | 3.3464 | 0.9449 | 0.039 |
| 50TP93 | 1.9685 | 3.7402 | 1.0630 | 0.043 |
| 55TP93 | 2.1654 | 4.1338 | 1.1811 | 0.043 |
| 60TP93 | 2.3622 | 4.3307 | 1.1811 | 0.043 |
| 65TP93 | 2.5590 | 4.5276 | 1.1811 | 0.043 |
| 70TP93 | 2.7559 | 4.9212 | 1.3386 | 0.043 |
| 75TP93 | 2.9528 | 5.3150 | 1.4173 | 0.059 |
| 80TP93 | 3.1496 | 5.5118 | 1.4173 | 0.059 |
| 85TP93 | 3.3464 | 5.9055 | 1.5354 | 0.059 |
| 90TP93 | 3.5433 | 6.1024 | 1.5354 | 0.059 |
| 100TP93 | 3.9370 | 6.6929 | 1.6535 | 0.059 |
| 110TP93 | 4.3307 | 7.4803 | 1.8898 | 0.079 |
| 120TP93 | 4.7244 | 8.2677 | 2.1260 | 0.083 |
| 130TP93 | 5.1181 | 8.8583 | 2.2835 | 0.083 |
| 140TP93 | 5.5118 | 9.4488 | 2.3622 | 0.083 |
| 150TP93 | 5.9055 | 9.8425 | 2.3622 | 0.083 |
| 160TP93 | 6.2992 | 10.6299 | 2.6378 | 0.118 |
| 170TP93 | 6.6929 | 11.0236 | 2.6378 | 0.118 |
| 180TP93 | 7.0866 | 11.8110 | 2.8740 | 0.118 |

continued

TABLE 11—PART II (continued)—Sheet 2 of 2

Dimensions in inches

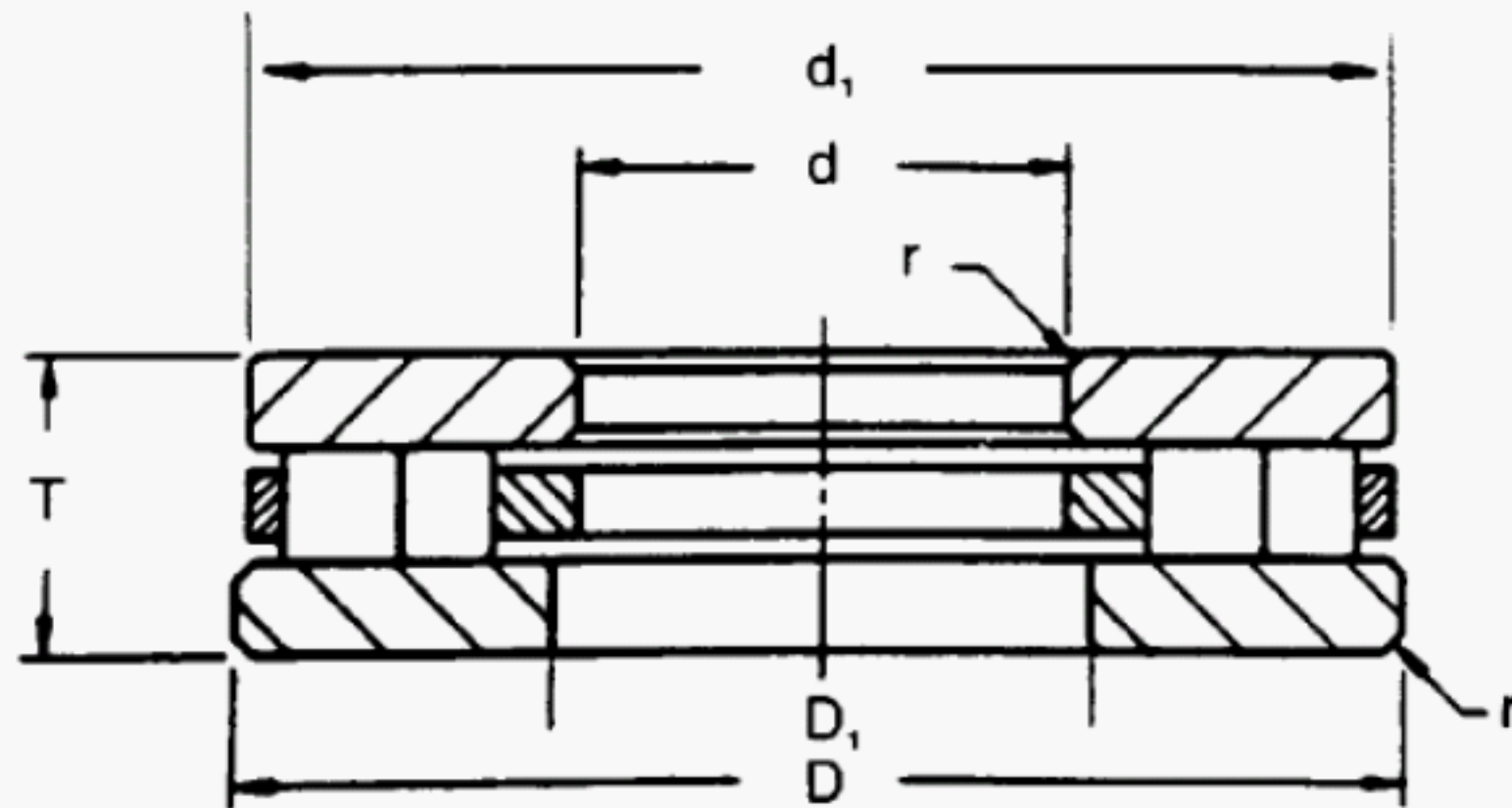
| IDENTIFICATION CODE | d | D | T | r _{min} ⁽¹⁾ |
|------------------------|---------|---------|---------|---------------------------------|
| 190TP93 | 7.4803 | 12.5984 | 3.0709 | 0.157 |
| 200TP93 | 7.8740 | 13.3858 | 3.3464 | 0.157 |
| 220TP93 | 8.6614 | 14.1732 | 3.3464 | 0.157 |
| 240TP93 | 9.4488 | 14.9606 | 3.3464 | 0.157 |
| 260TP93 | 10.2362 | 16.5354 | 3.7402 | 0.197 |
| 280TP93 | 11.0236 | 17.3228 | 3.7402 | 0.197 |
| 300TP93 | 11.8110 | 18.8976 | 4.2913 | 0.197 |
| 320TP93 | 12.5984 | 19.6850 | 4.2913 | 0.197 |
| 340TP93 | 13.3858 | 21.2598 | 4.8031 | 0.197 |
| 360TP93 | 14.1732 | 22.0472 | 4.8031 | 0.197 |
| 380TP93 | 14.9606 | 23.6220 | 5.1968 | 0.236 |
| 400TP93 | 15.7480 | 24.4094 | 5.1968 | 0.236 |
| 420TP93 | 16.5354 | 25.5906 | 5.5118 | 0.236 |
| 440TP93 | 17.3228 | 26.7716 | 5.7087 | 0.236 |
| 460TP93 | 18.1102 | 27.9528 | 5.9055 | 0.236 |
| 480TP93 | 18.8976 | 28.7402 | 5.9055 | 0.236 |
| 500TP93 | 19.6850 | 29.5276 | 5.9055 | 0.236 |
| 530TP93 | 20.8661 | 31.4961 | 6.2992 | 0.295 |
| 560TP93 | 22.0472 | 33.4646 | 6.8898 | 0.295 |
| 600TP93 | 23.6220 | 35.4331 | 7.0866 | 0.295 |
| 630TP93 | 24.8031 | 37.4016 | 7.4803 | 0.374 |
| 670TP93 | 26.3780 | 39.3701 | 7.8740 | 0.374 |
| 710TP93 | 27.9528 | 41.7323 | 8.3464 | 0.374 |
| 750TP93 | 29.5276 | 44.0945 | 8.8189 | 0.374 |
| 800TP93 | 31.4961 | 46.4567 | 9.0551 | 0.374 |
| 850TP93 | 33.4646 | 49.2126 | 9.5669 | 0.472 |
| 900TP93 | 35.4331 | 51.9685 | 9.8425 | 0.472 |
| 950TP93 | 37.4016 | 55.1181 | 10.7087 | 0.472 |

(1) The single shaft and housing fillet radius must not exceed the smallest permissible single chamfer dimension of the corresponding ring (or washer) corner, r_{min}. This dimension does not control the bearing chamfer contour.

TABLE 12

BOUNDARY DIMENSIONS

THRUST BEARING—CYLINDRICAL ROLLERS, SINGLE DIRECTION
FLAT RACEWAYS, FLAT BACK FACES, HEAVY SERIES, TYPE TP
METRIC DESIGN



PART I

Dimensions in millimetres

| IDENTIFICATION CODE | d | D | T | $r_{\text{min}}^{(1)}$ |
|---------------------|-----|-----|-----|------------------------|
| 25TP94 | 25 | 60 | 21 | 1 |
| 30TP94 | 30 | 70 | 24 | 1 |
| 35TP94 | 35 | 80 | 27 | 1.1 |
| 40TP94 | 40 | 90 | 30 | 1.1 |
| 45TP94 | 45 | 100 | 34 | 1.1 |
| 50TP94 | 50 | 110 | 36 | 1.5 |
| 55TP94 | 55 | 120 | 39 | 1.5 |
| 60TP94 | 60 | 130 | 42 | 1.5 |
| 65TP94 | 65 | 140 | 45 | 2 |
| 70TP94 | 70 | 150 | 48 | 2 |
| 75TP94 | 75 | 160 | 51 | 2 |
| 80TP94 | 80 | 170 | 54 | 2.1 |
| 85TP94 | 85 | 180 | 58 | 2.1 |
| 90TP94 | 90 | 190 | 60 | 2.1 |
| 100TP94 | 100 | 210 | 67 | 3 |
| 110TP94 | 110 | 230 | 73 | 3 |
| 120TP94 | 120 | 250 | 78 | 4 |
| 130TP94 | 130 | 270 | 85 | 4 |
| 140TP94 | 140 | 280 | 85 | 4 |
| 150TP94 | 150 | 300 | 90 | 4 |

continued

TABLE 12—PART I (continued)—Sheet 2 of 2

Dimensions in millimetres

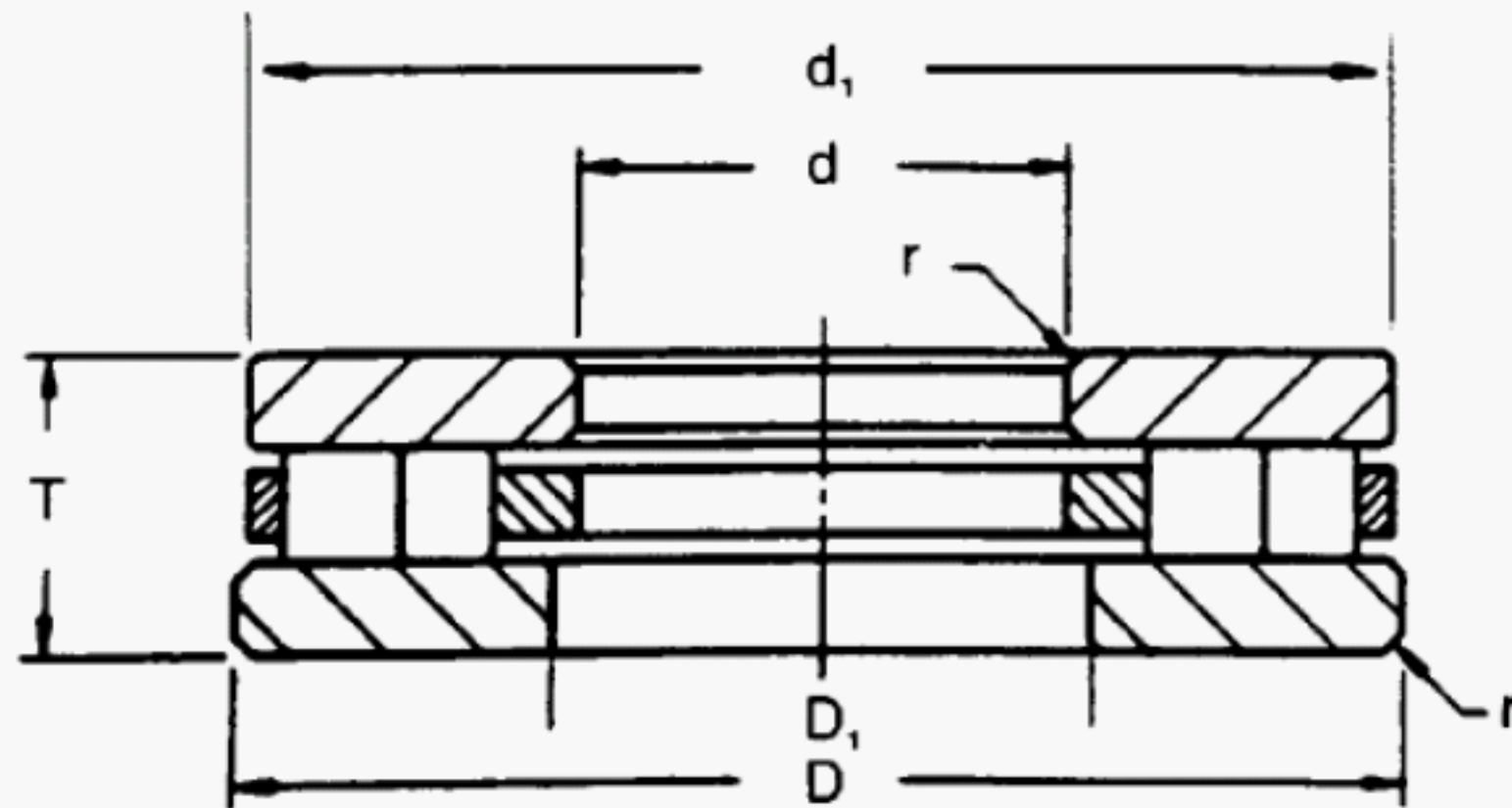
| IDENTIFICATION CODE | d | D | T | r _{sm} ⁽¹⁾ |
|------------------------|-----|------|-----|--------------------------------|
| 160TP94 | 160 | 320 | 95 | 5 |
| 170TP94 | 170 | 340 | 103 | 5 |
| 180TP94 | 180 | 360 | 109 | 5 |
| 190TP94 | 190 | 380 | 115 | 5 |
| 200TP94 | 200 | 400 | 122 | 5 |
| 220TP94 | 220 | 420 | 122 | 6 |
| 240TP94 | 240 | 440 | 122 | 6 |
| 260TP94 | 260 | 480 | 132 | 6 |
| 280TP94 | 280 | 520 | 145 | 6 |
| 300TP94 | 300 | 540 | 145 | 6 |
| 320TP94 | 320 | 580 | 155 | 7.5 |
| 340TP94 | 340 | 620 | 170 | 7.5 |
| 360TP94 | 360 | 640 | 170 | 7.5 |
| 380TP94 | 380 | 670 | 175 | 7.5 |
| 400TP94 | 400 | 710 | 185 | 7.5 |
| 420TP94 | 420 | 730 | 185 | 7.5 |
| 440TP94 | 440 | 780 | 206 | 9.5 |
| 460TP94 | 460 | 800 | 206 | 9.5 |
| 480TP94 | 480 | 850 | 224 | 9.5 |
| 500TP94 | 500 | 870 | 224 | 9.5 |
| 530TP94 | 530 | 920 | 236 | 9.5 |
| 560TP94 | 560 | 980 | 250 | 12 |
| 600TP94 | 600 | 1030 | 258 | 12 |
| 630TP94 | 630 | 1090 | 280 | 12 |
| 670TP94 | 670 | 1150 | 290 | 15 |
| 710TP94 | 710 | 1220 | 308 | 15 |
| 750TP94 | 750 | 1280 | 315 | 15 |
| 800TP94 | 800 | 1360 | 335 | 15 |

(1) The single shaft and housing fillet radius must not exceed the smallest permissible single chamfer dimension of the corresponding ring (or washer) corner, r_{sm}. This dimension does not control the bearing chamfer contour.

TABLE 12

BOUNDARY DIMENSIONS

THRUST BEARING—CYLINDRICAL ROLLERS, SINGLE DIRECTION
FLAT RACEWAYS, FLAT BACK FACES, HEAVY SERIES, TYPE TP
METRIC DESIGN



PART II

Dimensions in inches

| IDENTIFICATION CODE | d | D | T | $r_{\text{min}}^{(1)}$ |
|------------------------|--------|---------|--------|------------------------|
| 25TP94 | 0.9842 | 2.3622 | 0.8268 | 0.039 |
| 30TP94 | 1.1811 | 2.7559 | 0.9449 | 0.039 |
| 35TP94 | 1.3780 | 3.1496 | 1.0630 | 0.043 |
| 40TP94 | 1.5748 | 3.5433 | 1.1811 | 0.043 |
| 45TP94 | 1.7716 | 3.9370 | 1.3386 | 0.043 |
| 50TP94 | 1.9685 | 4.3307 | 1.4173 | 0.059 |
| 55TP94 | 2.1654 | 4.7244 | 1.5354 | 0.059 |
| 60TP94 | 2.3622 | 5.1181 | 1.6535 | 0.059 |
| 65TP94 | 2.5590 | 5.5118 | 1.7716 | 0.079 |
| 70TP94 | 2.7559 | 5.9055 | 1.8898 | 0.079 |
| 75TP94 | 2.9528 | 6.2992 | 2.0079 | 0.079 |
| 80TP94 | 3.1496 | 6.6929 | 2.1260 | 0.083 |
| 85TP94 | 3.3464 | 7.0866 | 2.2835 | 0.083 |
| 90TP94 | 3.5433 | 7.4803 | 2.3622 | 0.083 |
| 100TP94 | 3.9370 | 8.2677 | 2.6378 | 0.118 |
| 110TP94 | 4.3307 | 9.0551 | 2.8740 | 0.118 |
| 120TP94 | 4.7244 | 9.8425 | 3.0709 | 0.157 |
| 130TP94 | 5.1181 | 10.6299 | 3.3464 | 0.157 |
| 140TP94 | 5.5118 | 11.0236 | 3.3464 | 0.157 |
| 150TP94 | 5.9055 | 11.8110 | 3.5433 | 0.157 |

continued

TABLE 12—PART II (continued)—Sheet 2 of 2

Dimensions in inches

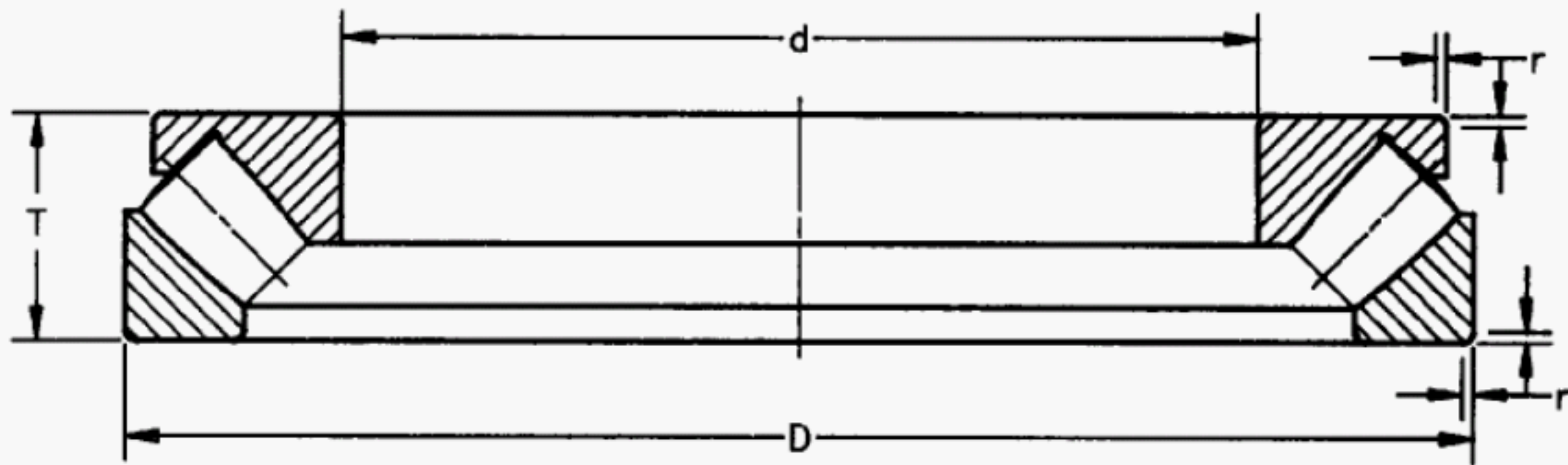
| IDENTIFICATION CODE | d | D | T | r _{min} ⁽¹⁾ |
|------------------------|---------|---------|---------|---------------------------------|
| 160TP94 | 6.2992 | 12.5984 | 3.7402 | 0.197 |
| 170TP94 | 6.6929 | 13.3858 | 4.0551 | 0.197 |
| 180TP94 | 7.0866 | 14.1732 | 4.2913 | 0.197 |
| 190TP94 | 7.4803 | 14.9606 | 4.5276 | 0.197 |
| 200TP94 | 7.8740 | 15.7480 | 4.8031 | 0.197 |
| 220TP94 | 8.6614 | 16.5354 | 4.8031 | 0.236 |
| 240TP94 | 9.4488 | 17.3228 | 4.8031 | 0.236 |
| 260TP94 | 10.2362 | 18.8976 | 5.1968 | 0.236 |
| 280TP94 | 11.0236 | 20.4724 | 5.7087 | 0.236 |
| 300TP94 | 11.8110 | 21.2598 | 5.7087 | 0.236 |
| 320TP94 | 12.5984 | 22.8346 | 6.1024 | 0.295 |
| 340TP94 | 13.3858 | 24.4094 | 6.6929 | 0.295 |
| 360TP94 | 14.1732 | 25.1968 | 6.6929 | 0.295 |
| 380TP94 | 14.9606 | 26.3780 | 6.8898 | 0.295 |
| 400TP94 | 15.7480 | 27.9528 | 7.2835 | 0.295 |
| 420TP94 | 16.5354 | 28.7402 | 7.2835 | 0.295 |
| 440TP94 | 17.3228 | 30.7087 | 8.1102 | 0.374 |
| 460TP94 | 18.1102 | 31.4961 | 8.1102 | 0.374 |
| 480TP94 | 18.8976 | 33.4646 | 8.8189 | 0.374 |
| 500TP94 | 19.6850 | 34.2520 | 8.8189 | 0.374 |
| 530TP94 | 20.8661 | 36.2204 | 9.2913 | 0.374 |
| 560TP94 | 22.0472 | 38.5827 | 9.8425 | 0.472 |
| 600TP94 | 23.6220 | 40.5512 | 10.1575 | 0.472 |
| 630TP94 | 24.8031 | 42.9134 | 11.0236 | 0.472 |
| 670TP94 | 26.3780 | 45.2756 | 11.4173 | 0.591 |
| 710TP94 | 27.9528 | 48.0315 | 12.1260 | 0.591 |
| 750TP94 | 29.5276 | 50.3937 | 12.4016 | 0.591 |
| 800TP94 | 31.4961 | 53.5433 | 13.1890 | 0.591 |

(1) The single shaft and housing fillet radius must not exceed the smallest permissible single chamfer dimension of the corresponding ring (or washer) corner, r_{min}. This dimension does not control the bearing chamfer contour.

TABLE 13

BOUNDARY DIMENSIONS

THRUST BEARING—SPHERICAL ROLLERS, SINGLE DIRECTION
ALIGNING, LIGHT SERIES, TYPE TS
METRIC DESIGN



PART I

Dimensions in millimetres

| IDENTIFICATION CODE | d | D | T | $r_{\text{min}}^{(1)}$ |
|---------------------|-----|-----|----|------------------------|
| 60TS92 | 60 | 95 | 21 | 1 |
| 65TS92 | 65 | 100 | 21 | 1 |
| 70TS92 | 70 | 105 | 21 | 1 |
| 75TS92 | 75 | 110 | 21 | 1 |
| 80TS92 | 80 | 115 | 21 | 1 |
| 85TS92 | 85 | 125 | 24 | 1 |
| 90TS92 | 90 | 135 | 27 | 1.1 |
| 100TS92 | 100 | 150 | 30 | 1.1 |
| 110TS92 | 110 | 160 | 30 | 1.1 |
| 120TS92 | 120 | 170 | 30 | 1.1 |
| 130TS92 | 130 | 190 | 36 | 1.5 |
| 140TS92 | 140 | 200 | 36 | 1.5 |
| 150TS92 | 150 | 215 | 39 | 1.5 |
| 160TS92 | 160 | 225 | 39 | 1.5 |
| 170TS92 | 170 | 240 | 42 | 1.5 |
| 180TS92 | 180 | 250 | 42 | 1.5 |
| 190TS92 | 190 | 270 | 48 | 2 |
| 200TS92 | 200 | 280 | 48 | 2 |
| 220TS92 | 220 | 300 | 48 | 2 |
| 240TS92 | 240 | 340 | 60 | 2.1 |

continued

TABLE 13—PART I (continued)—Sheet 2 of 2

Dimensions in millimetres

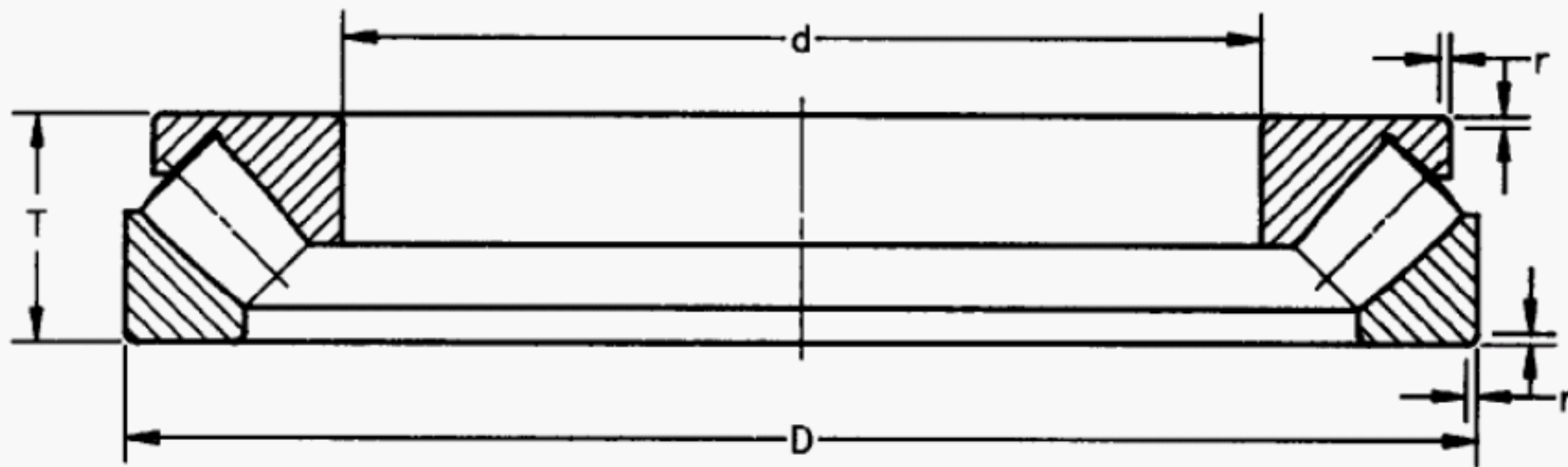
| IDENTIFICATION CODE | d | D | T | $r_{\text{smin}}^{(1)}$ |
|------------------------|------|------|-----|-------------------------|
| 260TS92 | 260 | 360 | 60 | 2.1 |
| 280TS92 | 280 | 380 | 60 | 2.1 |
| 300TS92 | 300 | 420 | 73 | 3 |
| 320TS92 | 320 | 440 | 73 | 3 |
| 340TS92 | 340 | 460 | 73 | 3 |
| 360TS92 | 360 | 500 | 85 | 4 |
| 380TS92 | 380 | 520 | 85 | 4 |
| 400TS92 | 400 | 540 | 85 | 4 |
| 420TS92 | 420 | 580 | 95 | 5 |
| 440TS92 | 440 | 600 | 95 | 5 |
| 460TS92 | 460 | 620 | 95 | 5 |
| 480TS92 | 480 | 650 | 103 | 5 |
| 500TS92 | 500 | 670 | 103 | 5 |
| 530TS92 | 530 | 710 | 109 | 5 |
| 560TS92 | 560 | 750 | 115 | 5 |
| 600TS92 | 600 | 800 | 122 | 5 |
| 630TS92 | 630 | 850 | 132 | 6 |
| 670TS92 | 670 | 900 | 140 | 6 |
| 710TS92 | 710 | 950 | 145 | 6 |
| 750TS92 | 750 | 1000 | 150 | 6 |
| 800TS92 | 800 | 1060 | 155 | 7.5 |
| 850TS92 | 850 | 1120 | 160 | 7.5 |
| 900TS92 | 900 | 1180 | 170 | 7.5 |
| 950TS92 | 950 | 1250 | 180 | 7.5 |
| 1000TS92 | 1000 | 1320 | 190 | 9.5 |
| 1060TS92 | 1060 | 1400 | 206 | 9.5 |

(1) The single shaft and housing fillet radius must not exceed the smallest permissible single chamfer dimension of the corresponding ring (or washer) corner, r_{smin} . This dimension does not control the bearing chamfer contour.

TABLE 13

BOUNDARY DIMENSIONS

THRUST BEARING—SPHERICAL ROLLERS, SINGLE DIRECTION
ALIGNING, LIGHT SERIES, TYPE TS
METRIC DESIGN



PART II

Dimensions in inches

| IDENTIFICATION CODE | d | D | T | $r_{\text{min}}^{(1)}$ |
|---------------------|--------|---------|--------|------------------------|
| 60TS92 | 2.3622 | 3.7401 | .8268 | 0.039 |
| 65TS92 | 2.5591 | 3.9370 | .8268 | 0.039 |
| 70TS92 | 2.7559 | 4.1338 | .8268 | 0.039 |
| 75TS92 | 2.9528 | 4.3307 | .8268 | 0.039 |
| 80TS92 | 3.1496 | 4.5276 | .8268 | 0.039 |
| 85TS92 | 3.3464 | 4.9212 | .9449 | 0.039 |
| 90TS92 | 3.5433 | 5.3150 | 1.0630 | 0.043 |
| 100TS92 | 3.9370 | 5.9055 | 1.1811 | 0.043 |
| 110TS92 | 4.3307 | 6.2992 | 1.1811 | 0.043 |
| 120TS92 | 4.7244 | 6.6929 | 1.1811 | 0.043 |
| 130TS92 | 5.1181 | 7.4803 | 1.4173 | 0.059 |
| 140TS92 | 5.5118 | 7.8740 | 1.4173 | 0.059 |
| 150TS92 | 5.9055 | 8.4645 | 1.5354 | 0.059 |
| 160TS92 | 6.2992 | 8.8583 | 1.5354 | 0.059 |
| 170TS92 | 6.6929 | 9.4488 | 1.6535 | 0.059 |
| 180TS92 | 7.0866 | 9.8425 | 1.6535 | 0.059 |
| 190TS92 | 7.4803 | 10.6299 | 1.8898 | 0.079 |
| 200TS92 | 7.8740 | 11.0236 | 1.8898 | 0.079 |
| 220TS92 | 8.6614 | 11.8110 | 1.8898 | 0.079 |
| 240TS92 | 9.4488 | 13.3858 | 2.3622 | 0.083 |

continued

TABLE 13—PART II (continued)—Sheet 2 of 2

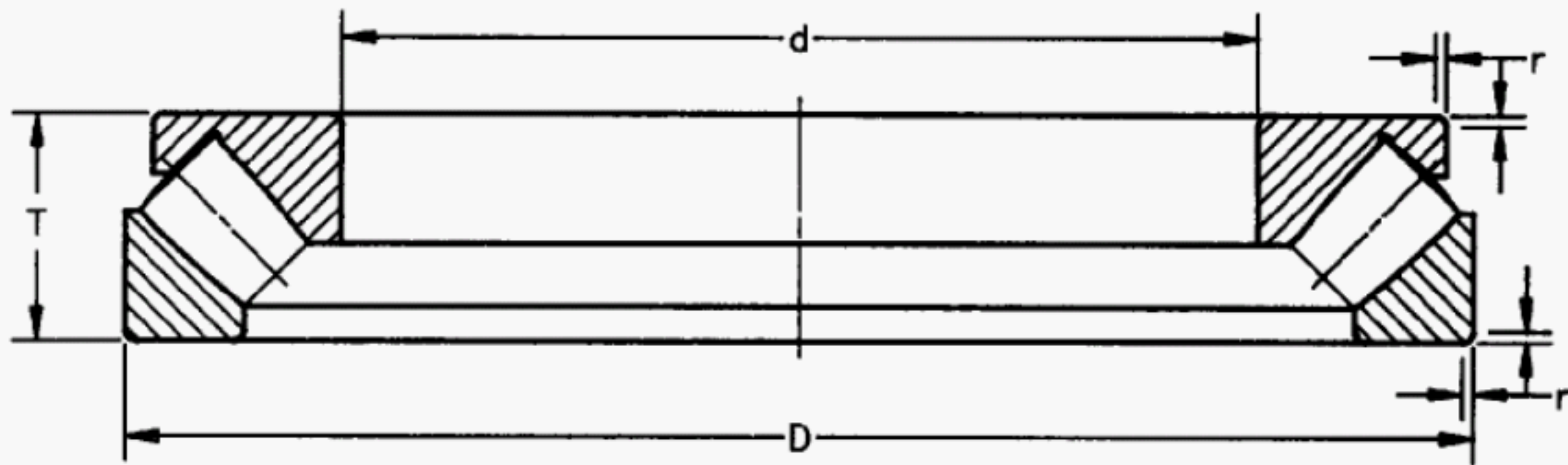
| Dimensions in inches | | | | |
|----------------------|---------|---------|--------|------------------|
| IDENTIFICATION CODE | d | D | T | $r_{smin}^{(1)}$ |
| 260TS92 | 10.2362 | 14.1732 | 2.3622 | 0.083 |
| 280TS92 | 11.0236 | 14.9606 | 2.3622 | 0.083 |
| 300TS92 | 11.8110 | 16.5354 | 2.8740 | 0.118 |
| 320TS92 | 12.5984 | 17.3228 | 2.8740 | 0.118 |
| 340TS92 | 13.3858 | 18.1102 | 2.8740 | 0.118 |
| 360TS92 | 14.1732 | 19.6850 | 3.3464 | 0.157 |
| 380TS92 | 14.9606 | 20.4724 | 3.3464 | 0.157 |
| 400TS92 | 15.7480 | 21.2598 | 3.3464 | 0.157 |
| 420TS92 | 16.5354 | 22.8346 | 3.7402 | 0.197 |
| 440TS92 | 17.3228 | 23.6220 | 3.7402 | 0.197 |
| 460TS92 | 18.1102 | 24.4094 | 3.7402 | 0.197 |
| 480TS92 | 18.8976 | 25.5905 | 4.0551 | 0.197 |
| 500TS92 | 19.6850 | 26.3780 | 4.0551 | 0.197 |
| 530TS92 | 20.8661 | 27.9528 | 4.2913 | 0.197 |
| 560TS92 | 22.0472 | 29.5276 | 4.5276 | 0.197 |
| 600TS92 | 23.6220 | 31.4961 | 4.8031 | 0.197 |
| 630TS92 | 24.8031 | 33.4646 | 5.1968 | 0.236 |
| 670TS92 | 26.3780 | 35.4330 | 5.5118 | 0.236 |
| 710TS92 | 27.9528 | 37.4016 | 5.7087 | 0.236 |
| 750TS92 | 29.5276 | 39.3701 | 5.9055 | 0.236 |
| 800TS92 | 31.4961 | 41.7322 | 6.1024 | 0.295 |
| 850TS92 | 33.4646 | 44.0945 | 6.2992 | 0.295 |
| 900TS92 | 35.4331 | 46.4567 | 6.6929 | 0.295 |
| 950TS92 | 37.4016 | 49.2126 | 7.0866 | 0.295 |
| 1000TS92 | 39.3701 | 51.9685 | 7.4803 | 0.374 |
| 1060TS92 | 41.7323 | 55.1181 | 8.1102 | 0.374 |

- (1) The single shaft and housing fillet radius must not exceed the smallest permissible single chamfer dimension of the corresponding ring (or washer) corner, r_{smin} . This dimension does not control the bearing chamfer contour.

TABLE 14

BOUNDARY DIMENSIONS

THRUST BEARING—SPHERICAL ROLLERS, SINGLE DIRECTION
ALIGNING, MEDIUM SERIES, TYPE TS
METRIC DESIGN



PART I

Dimensions in millimetres

| IDENTIFICATION CODE | d | D | T | $r_{\text{min}}^{(1)}$ |
|---------------------|-----|-----|----|------------------------|
| 40TS93 | 40 | 78 | 22 | 1 |
| 45TS93 | 45 | 85 | 24 | 1 |
| 50TS93 | 50 | 95 | 27 | 1.1 |
| 55TS93 | 55 | 105 | 30 | 1.1 |
| 60TS93 | 60 | 110 | 30 | 1.1 |
| 65TS93 | 65 | 115 | 30 | 1.1 |
| 70TS93 | 70 | 125 | 34 | 1.1 |
| 75TS93 | 75 | 135 | 36 | 1.5 |
| 80TS93 | 80 | 140 | 36 | 1.5 |
| 85TS93 | 85 | 150 | 39 | 1.5 |
| 90TS93 | 90 | 155 | 39 | 1.5 |
| 100TS93 | 100 | 170 | 42 | 1.5 |
| 110TS93 | 110 | 190 | 48 | 2 |
| 120TS93 | 120 | 210 | 54 | 2.1 |
| 130TS93 | 130 | 225 | 58 | 2.1 |
| 140TS93 | 140 | 240 | 60 | 2.1 |
| 150TS93 | 150 | 250 | 60 | 2.1 |
| 160TS93 | 160 | 270 | 67 | 3 |
| 170TS93 | 170 | 280 | 67 | 3 |
| 180TS93 | 180 | 300 | 73 | 3 |

continued

TABLE 14—PART I (continued)—Sheet 2 of 2

Dimensions in millimetres

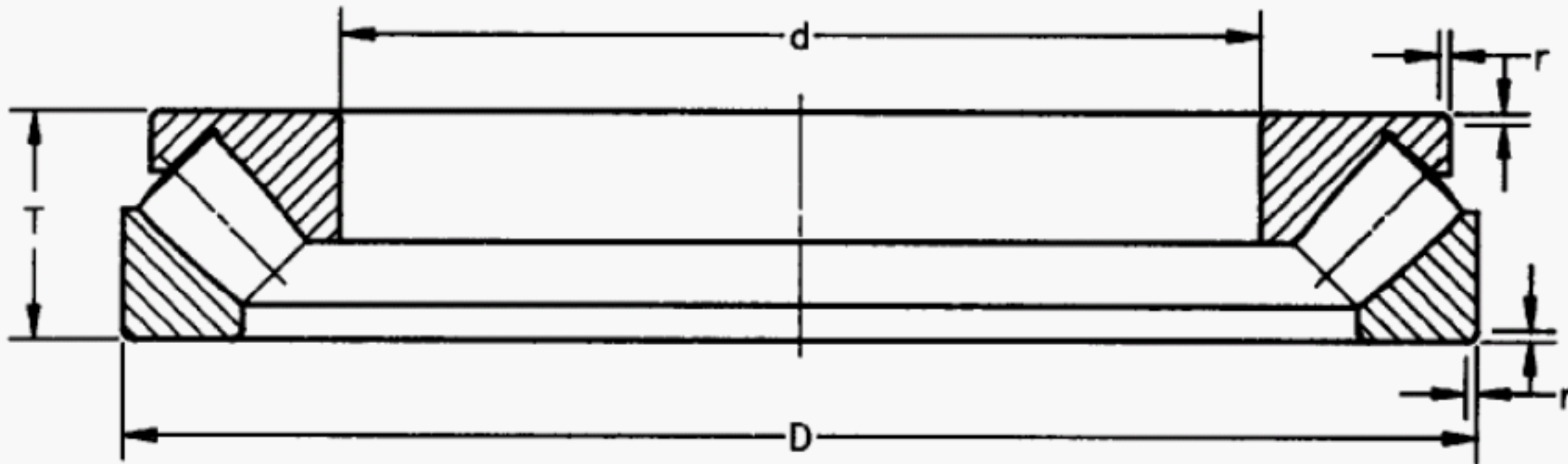
| IDENTIFICATION CODE | d | D | T | r _{min} ⁽¹⁾ |
|------------------------|-----|------|-----|---------------------------------|
| 190TS93 | 190 | 320 | 78 | 4 |
| 200TS93 | 200 | 340 | 85 | 4 |
| 220TS93 | 220 | 360 | 85 | 4 |
| 240TS93 | 240 | 380 | 85 | 4 |
| 260TS93 | 260 | 420 | 95 | 5 |
| 280TS93 | 280 | 440 | 95 | 5 |
| 300TS93 | 300 | 480 | 109 | 5 |
| 320TS93 | 320 | 500 | 109 | 5 |
| 340TS93 | 340 | 540 | 122 | 5 |
| 360TS93 | 360 | 560 | 122 | 5 |
| 380TS93 | 380 | 600 | 132 | 6 |
| 400TS93 | 400 | 620 | 132 | 6 |
| 420TS93 | 420 | 650 | 140 | 6 |
| 440TS93 | 440 | 680 | 145 | 6 |
| 460TS93 | 460 | 710 | 150 | 6 |
| 480TS93 | 480 | 730 | 150 | 6 |
| 500TS93 | 500 | 750 | 150 | 6 |
| 530TS93 | 530 | 800 | 160 | 7.5 |
| 560TS93 | 560 | 850 | 175 | 7.5 |
| 600TS93 | 600 | 900 | 180 | 7.5 |
| 630TS93 | 630 | 950 | 190 | 9.5 |
| 670TS93 | 670 | 1000 | 200 | 9.5 |
| 710TS93 | 710 | 1060 | 212 | 9.5 |
| 750TS93 | 750 | 1120 | 224 | 9.5 |
| 800TS93 | 800 | 1180 | 230 | 9.5 |
| 850TS93 | 850 | 1250 | 243 | 12 |
| 900TS93 | 900 | 1320 | 250 | 12 |
| 950TS93 | 950 | 1400 | 272 | 12 |

- (1) The single shaft and housing fillet radius must not exceed the smallest permissible single chamfer dimension of the corresponding ring (or washer) corner, r_{min}. This dimension does not control the bearing chamfer contour.

TABLE 14

BOUNDARY DIMENSIONS

THRUST BEARING—SPHERICAL ROLLERS, SINGLE DIRECTION
ALIGNING, MEDIUM SERIES, TYPE TS
METRIC DESIGN



PART II

Dimensions in inches

| IDENTIFICATION CODE | d | D | T | $r_{\text{min}}^{(1)}$ |
|---------------------|--------|---------|--------|------------------------|
| 40TS93 | 1.5748 | 3.0709 | 0.8661 | 0.039 |
| 45TS93 | 1.7716 | 3.3464 | 0.9449 | 0.039 |
| 50TS93 | 1.9685 | 3.7402 | 1.0630 | 0.043 |
| 55TS93 | 2.1654 | 4.1338 | 1.1811 | 0.043 |
| 60TS93 | 2.3622 | 4.3307 | 1.1811 | 0.043 |
| 65TS93 | 2.5590 | 4.5276 | 1.1811 | 0.043 |
| 70TS93 | 2.7559 | 4.9212 | 1.3386 | 0.043 |
| 75TS93 | 2.9528 | 5.3150 | 1.4173 | 0.059 |
| 80TS93 | 3.1496 | 5.5118 | 1.4173 | 0.059 |
| 85TS93 | 3.3464 | 5.9055 | 1.5354 | 0.059 |
| 90TS93 | 3.5433 | 6.1024 | 1.5354 | 0.059 |
| 100TS93 | 3.9370 | 6.6929 | 1.6535 | 0.059 |
| 110TS93 | 4.3307 | 7.4803 | 1.8898 | 0.079 |
| 120TS93 | 4.7244 | 8.2677 | 2.1260 | 0.083 |
| 130TS93 | 5.1181 | 8.8583 | 2.2835 | 0.083 |
| 140TS93 | 5.5118 | 9.4488 | 2.3622 | 0.083 |
| 150TS93 | 5.9055 | 9.8425 | 2.3622 | 0.083 |
| 160TS93 | 6.2992 | 10.6299 | 2.6378 | 0.118 |
| 170TS93 | 6.6929 | 11.0236 | 2.6378 | 0.118 |
| 180TS93 | 7.0866 | 11.8110 | 2.8740 | 0.118 |

continued

TABLE 14—PART II (continued)—Sheet 2 of 2

Dimensions in inches

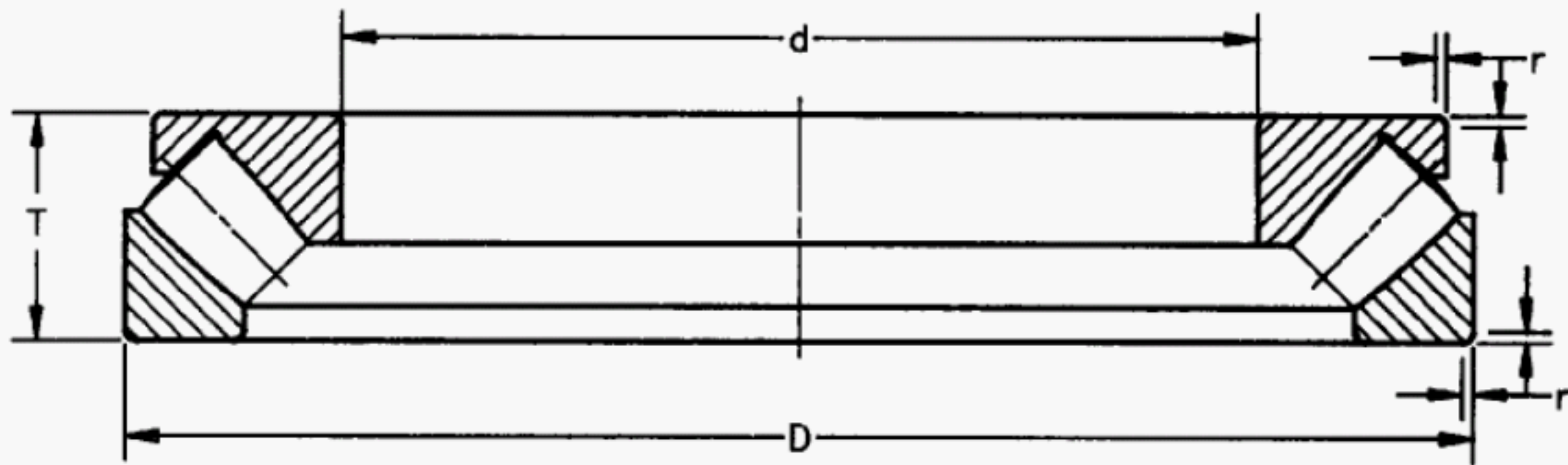
| IDENTIFICATION CODE | d | D | T | r _{min} ⁽¹⁾ |
|------------------------|---------|---------|---------|---------------------------------|
| 190TS93 | 7.4803 | 12.5984 | 3.0709 | 0.157 |
| 200TS93 | 7.8740 | 13.3858 | 3.3464 | 0.157 |
| 220TS93 | 8.6614 | 14.1732 | 3.3464 | 0.157 |
| 240TS93 | 9.4488 | 14.9606 | 3.3464 | 0.157 |
| 260TS93 | 10.2362 | 16.5354 | 3.7402 | 0.197 |
| 280TS93 | 11.0236 | 17.3228 | 3.7402 | 0.197 |
| 300TS93 | 11.8110 | 18.8976 | 4.2913 | 0.197 |
| 320TS93 | 12.5984 | 19.6850 | 4.2913 | 0.197 |
| 340TS93 | 13.3858 | 21.2598 | 4.8031 | 0.197 |
| 360TS93 | 14.1732 | 22.0472 | 4.8031 | 0.197 |
| 380TS93 | 14.9606 | 23.6220 | 5.1968 | 0.236 |
| 400TS93 | 15.7480 | 24.4094 | 5.1968 | 0.236 |
| 420TS93 | 16.5354 | 25.5906 | 5.5118 | 0.236 |
| 440TS93 | 17.3228 | 26.7716 | 5.7087 | 0.236 |
| 460TS93 | 18.1102 | 27.9528 | 5.9055 | 0.236 |
| 480TS93 | 18.8796 | 28.7402 | 5.9055 | 0.236 |
| 500TS93 | 19.6850 | 29.5276 | 5.9055 | 0.236 |
| 530TS93 | 20.8661 | 31.4961 | 6.2992 | 0.295 |
| 560TS93 | 22.0472 | 33.4646 | 6.8898 | 0.295 |
| 600TS93 | 23.6220 | 35.4331 | 7.0866 | 0.295 |
| 630TS93 | 24.8031 | 37.4016 | 7.4803 | 0.374 |
| 670TS93 | 26.3780 | 39.3701 | 7.8740 | 0.374 |
| 710TS93 | 27.9528 | 41.7323 | 8.3464 | 0.374 |
| 750TS93 | 29.5276 | 44.0945 | 8.8189 | 0.374 |
| 800TS93 | 31.4961 | 46.4567 | 9.0551 | 0.374 |
| 850TS93 | 33.4646 | 49.2126 | 9.5669 | 0.472 |
| 900TS93 | 35.4331 | 51.9685 | 9.8425 | 0.472 |
| 950TS93 | 37.4016 | 55.1181 | 10.7087 | 0.472 |

(1) The single shaft and housing fillet radius must not exceed the smallest permissible single chamfer dimension of the corresponding ring (or washer) corner, r_{min}. This dimension does not control the bearing chamfer contour.

TABLE 15

BOUNDARY DIMENSIONS

THRUST BEARING—SPHERICAL ROLLERS, SINGLE DIRECTION
ALIGNING, HEAVY SERIES, TYPE TS
METRIC DESIGN



PART I

Dimensions in millimetres

| IDENTIFICATION CODE | d | D | T | $r_{\text{min}}^{(1)}$ |
|---------------------|-----|-----|-----|------------------------|
| 40TS94 | 40 | 90 | 30 | 1.1 |
| 45TS94 | 45 | 100 | 34 | 1.1 |
| 50TS94 | 50 | 110 | 36 | 1.5 |
| 55TS94 | 55 | 120 | 39 | 1.5 |
| 60TS94 | 60 | 130 | 42 | 1.5 |
| 65TS94 | 65 | 140 | 45 | 2 |
| 70TS94 | 70 | 150 | 48 | 2 |
| 75TS94 | 75 | 160 | 51 | 2 |
| 80TS94 | 80 | 170 | 54 | 2.1 |
| 85TS94 | 85 | 180 | 58 | 2.1 |
| 90TS94 | 90 | 190 | 60 | 2.1 |
| 100TS94 | 100 | 210 | 67 | 3 |
| 110TS94 | 110 | 230 | 73 | 3 |
| 120TS94 | 120 | 250 | 78 | 4 |
| 130TS94 | 130 | 270 | 85 | 4 |
| 140TS94 | 140 | 280 | 85 | 4 |
| 150TS94 | 150 | 300 | 90 | 4 |
| 160TS94 | 160 | 320 | 95 | 5 |
| 170TS94 | 170 | 340 | 103 | 5 |
| 180TS94 | 180 | 360 | 109 | 5 |

continued

TABLE 15—PART I (continued)—Sheet 2 of 2

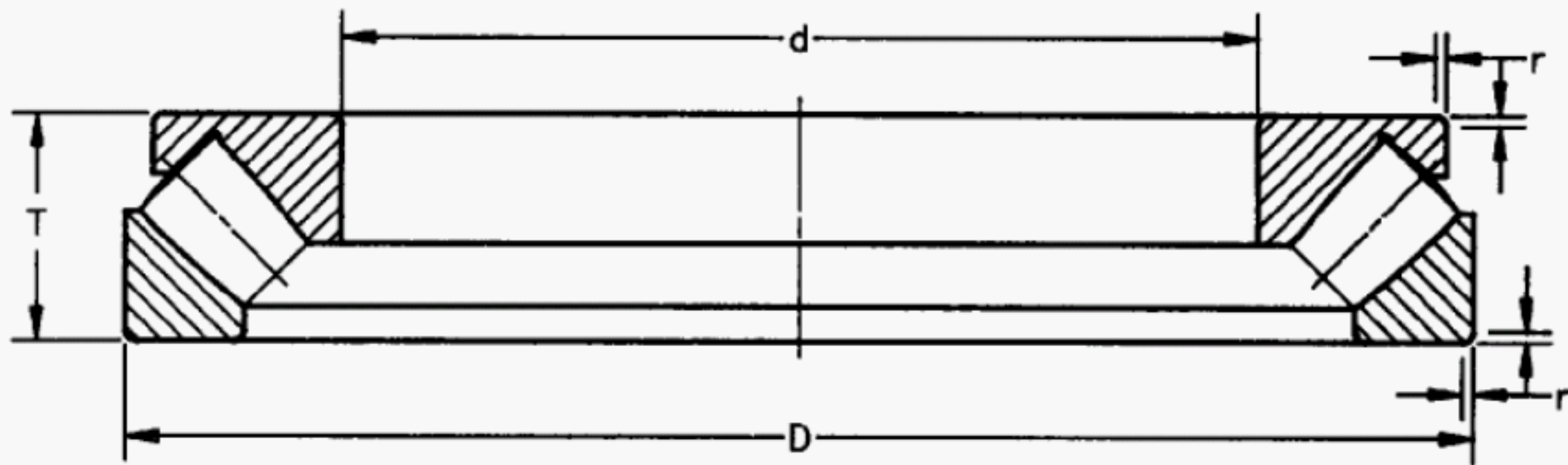
Dimensions in millimetres

| IDENTIFICATION CODE | d | D | T | r _{min} ⁽¹⁾ |
|------------------------|-----|------|-----|---------------------------------|
| 190TS94 | 190 | 380 | 115 | 5 |
| 200TS94 | 200 | 400 | 122 | 5 |
| 220TS94 | 220 | 420 | 122 | 6 |
| 240TS94 | 240 | 440 | 122 | 6 |
| 260TS94 | 260 | 480 | 132 | 6 |
| 280TS94 | 280 | 520 | 145 | 6 |
| 300TS94 | 300 | 540 | 145 | 6 |
| 320TS94 | 320 | 580 | 155 | 7.5 |
| 340TS94 | 340 | 620 | 170 | 7.5 |
| 360TS94 | 360 | 640 | 170 | 7.5 |
| 380TS94 | 380 | 670 | 175 | 7.5 |
| 400TS94 | 400 | 710 | 185 | 7.5 |
| 420TS94 | 420 | 730 | 185 | 7.5 |
| 440TS94 | 440 | 780 | 206 | 9.5 |
| 460TS94 | 460 | 800 | 206 | 9.5 |
| 480TS94 | 480 | 850 | 224 | 9.5 |
| 500TS94 | 500 | 870 | 224 | 9.5 |
| 530TS94 | 530 | 920 | 236 | 9.5 |
| 560TS94 | 560 | 980 | 250 | 12 |
| 600TS94 | 600 | 1030 | 258 | 12 |
| 630TS94 | 630 | 1090 | 280 | 12 |
| 670TS94 | 670 | 1150 | 290 | 15 |
| 710TS94 | 710 | 1220 | 308 | 15 |
| 750TS94 | 750 | 1280 | 315 | 15 |
| 800TS94 | 800 | 1360 | 335 | 15 |

(1) The single shaft and housing fillet radius must not exceed the smallest permissible single chamfer dimension of the corresponding ring (or washer) corner, r_{min}. This dimension does not control the bearing chamfer contour.

TABLE 15

BOUNDARY DIMENSIONS

THRUST BEARING—SPHERICAL ROLLERS, SINGLE DIRECTION
ALIGNING, HEAVY SERIES, TYPE TS
METRIC DESIGN

PART II

Dimensions in inches

| IDENTIFICATION CODE | d | D | T | $r_{\text{min}}^{(1)}$ |
|---------------------|--------|---------|--------|------------------------|
| 40TS94 | 1.5748 | 3.5433 | 1.1811 | 0.043 |
| 45TS94 | 1.7716 | 3.9370 | 1.3386 | 0.043 |
| 50TS94 | 1.9685 | 4.3307 | 1.4173 | 0.059 |
| 55TS94 | 2.1654 | 4.7244 | 1.5354 | 0.059 |
| 60TS94 | 2.3622 | 5.1181 | 1.6535 | 0.059 |
| 65TS94 | 2.5590 | 5.5118 | 1.7716 | 0.079 |
| 70TS94 | 2.7559 | 5.9055 | 1.8898 | 0.079 |
| 75TS94 | 2.9528 | 6.2992 | 2.0079 | 0.079 |
| 80TS94 | 3.1496 | 6.6929 | 2.1260 | 0.083 |
| 85TS94 | 3.3464 | 7.0866 | 2.2835 | 0.083 |
| 90TS94 | 3.5433 | 7.4803 | 2.3622 | 0.083 |
| 100TS94 | 3.9370 | 8.2677 | 2.6378 | 0.118 |
| 110TS94 | 4.3307 | 9.0551 | 2.8740 | 0.118 |
| 120TS94 | 4.7244 | 9.8425 | 3.0709 | 0.157 |
| 130TS94 | 5.1181 | 10.6299 | 3.3464 | 0.157 |
| 140TS94 | 5.5118 | 11.0236 | 3.3464 | 0.157 |
| 150TS94 | 5.9055 | 11.8110 | 3.5433 | 0.157 |
| 160TS94 | 6.2992 | 12.5984 | 3.7402 | 0.197 |
| 170TS94 | 6.6929 | 13.3858 | 4.0551 | 0.197 |
| 180TS94 | 7.0866 | 14.1732 | 4.2913 | 0.197 |

continued

TABLE 15—PART II (continued)—Sheet 2 of 2

Dimensions in inches

| IDENTIFICATION CODE | d | D | T | r _{min} ⁽¹⁾ |
|------------------------|---------|---------|---------|---------------------------------|
| 190TS94 | 7.4803 | 14.9606 | 4.5276 | 0.197 |
| 200TS94 | 7.8740 | 15.7480 | 4.8031 | 0.197 |
| 220TS94 | 8.6614 | 16.5354 | 4.8031 | 0.236 |
| 240TS94 | 9.4488 | 17.3228 | 4.8031 | 0.236 |
| 260TS94 | 10.2362 | 18.8976 | 5.1968 | 0.236 |
| 280TS94 | 11.0236 | 20.4724 | 5.7087 | 0.236 |
| 300TS94 | 11.8110 | 21.2598 | 5.7087 | 0.236 |
| 320TS94 | 12.5984 | 22.8346 | 6.1024 | 0.295 |
| 340TS94 | 13.3858 | 24.4094 | 6.6929 | 0.295 |
| 360TS94 | 14.1732 | 25.1969 | 6.6929 | 0.295 |
| 380TS94 | 14.9606 | 26.3780 | 6.8898 | 0.295 |
| 400TS94 | 15.7480 | 27.9528 | 7.2835 | 0.295 |
| 420TS94 | 16.5354 | 28.7402 | 7.2835 | 0.295 |
| 440TS94 | 17.3228 | 30.7087 | 8.1102 | 0.374 |
| 460TS94 | 18.1102 | 31.4961 | 8.1102 | 0.374 |
| 480TS94 | 18.8796 | 33.4646 | 8.8190 | 0.374 |
| 500TS94 | 19.6850 | 34.2520 | 8.8190 | 0.374 |
| 530TS94 | 20.8661 | 36.2205 | 9.2913 | 0.374 |
| 560TS94 | 22.0472 | 38.5827 | 9.8425 | 0.472 |
| 600TS94 | 23.6220 | 40.5512 | 10.1575 | 0.472 |
| 630TS94 | 24.8031 | 42.9134 | 11.0236 | 0.472 |
| 670TS94 | 26.3780 | 45.2756 | 11.4173 | 0.591 |
| 710TS94 | 27.9528 | 48.0315 | 12.1260 | 0.591 |
| 750TS94 | 29.5276 | 50.3937 | 12.4016 | 0.591 |
| 800TS94 | 31.4961 | 53.5433 | 13.1890 | 0.591 |

(1) The single shaft and housing fillet radius must not exceed the smallest permissible single chamfer dimension of the corresponding ring (or washer) corner, r_{min}. This dimension does not control the bearing chamfer contour.

TABLE 16

TOLERANCES

**THRUST BALL BEARING—SINGLE DIRECTION, WASHERS WITH GROOVED RACEWAYS,
FLAT BACK FACES, TYPE TA—ALL SERIES—
METRIC DESIGN**

Dimensions in millimetres
Tolerances in micrometres

PART I

| d | | Δd_{mp} | | | | V_{dp} | |
|----------|------|----------------------------------|------|----------------------|-----|-------------------------------------|----------------------|
| | | TOLERANCE CLASS NORMAL, 5 & 6 | | TOLERANCE CLASS 4 | | TOLERANCE CLASS NORMAL, 5 & 6 | TOLERANCE CLASS 4 |
| OVER | INCL | HIGH | LOW | HIGH | LOW | MAX | MAX |
| — | 18 | 0 | -8 | 0 | -7 | 6 | 5 |
| 18 | 30 | 0 | -10 | 0 | -8 | 8 | 6 |
| 30 | 50 | 0 | -12 | 0 | -10 | 9 | 8 |
| 50 | 80 | 0 | -15 | 0 | -12 | 11 | 9 |
| 80 | 120 | 0 | -20 | 0 | -15 | 15 | 11 |
| 120 | 180 | 0 | -25 | 0 | -18 | 19 | 14 |
| 180 | 250 | 0 | -30 | 0 | -22 | 23 | 17 |
| 250 | 315 | 0 | -35 | 0 | -25 | 26 | 19 |
| 315 | 400 | 0 | -40 | 0 | -30 | 30 | 23 |
| 400 | 500 | 0 | -45 | 0 | -35 | 34 | 26 |
| 500 | 630 | 0 | -50 | 0 | -40 | 38 | 30 |
| 630 | 800 | 0 | -75 | 0 | -50 | 41 | |
| 800 | 1000 | 0 | -100 | | | | |
| 1000 | 1250 | 0 | -125 | | | | |

Dimensions in millimetres
Tolerances in micrometres

| D | | ΔD_{mp} | | | | V_{Dp} | |
|----------|------|----------------------------------|------|----------------------|-----|-------------------------------------|----------------------|
| | | TOLERANCE CLASS NORMAL, 5 & 6 | | TOLERANCE CLASS 4 | | TOLERANCE CLASS NORMAL, 5 & 6 | TOLERANCE CLASS 4 |
| OVER | INCL | HIGH | LOW | HIGH | LOW | MAX | MAX |
| 10 | 18 | 0 | -11 | 0 | -7 | 8 | 5 |
| 18 | 30 | 0 | -13 | 0 | -8 | 10 | 6 |
| 30 | 50 | 0 | -16 | 0 | -9 | 12 | 7 |
| 50 | 80 | 0 | -19 | 0 | -11 | 14 | 8 |
| 80 | 120 | 0 | -22 | 0 | -13 | 17 | 10 |
| 120 | 180 | 0 | -25 | 0 | -15 | 19 | 11 |
| 180 | 250 | 0 | -30 | 0 | -20 | 23 | 15 |
| 250 | 315 | 0 | -35 | 0 | -25 | 26 | 19 |
| 315 | 400 | 0 | -40 | 0 | -28 | 30 | 21 |
| 400 | 500 | 0 | -45 | 0 | -33 | 34 | 25 |
| 500 | 630 | 0 | -50 | 0 | -38 | 38 | 29 |
| 630 | 800 | 0 | -75 | 0 | -45 | 55 | 34 |
| 800 | 1000 | 0 | -100 | 0 | | 75 | |
| 1000 | 1250 | 0 | -125 | 0 | | | |
| 1250 | 1600 | 0 | -160 | 0 | | | |

continued

TABLE 16—PART I (continued)—Sheet 2 of 2

Dimensions in millimetres
Tolerances in micrometres

| d | | S _i , S _e | | | | ΔT _s | |
|------|------|---------------------------------|------------|------------|------------|-----------------|-------|
| | | NORMAL CLASS | CLASS 6 | CLASS 5 | CLASS 4 | | |
| OVER | INCL | MAX | MAX | MAX | MAX | MAX | MIN |
| — | 18 | 10 | 5 | 3 | 2 | +20 | -250 |
| 18 | 30 | 10 | 5 | 3 | 2 | +20 | -250 |
| 30 | 50 | 10 | 6 | 3 | 2 | +20 | -250 |
| 50 | 80 | 10 | 7 | 4 | 3 | +20 | -300 |
| 80 | 120 | 15 | 8 | 4 | 3 | +25 | -300 |
| 120 | 180 | 15 | 9 | 5 | 4 | +25 | -400 |
| 180 | 250 | 20 | 10 | 5 | 4 | +30 | -400 |
| 250 | 315 | 25 | 13 | 7 | 5 | +40 | -400 |
| 315 | 400 | 30 | 15 | 7 | 5 | +40 | -500 |
| 400 | 500 | 30 | 18 | 9 | 6 | +50 | -500 |
| 500 | 630 | 35 | 21 | 11 | 7 | +60 | -600 |
| 630 | 800 | 40 | 25 | 13 | 8 | +70 | -750 |
| 800 | 1000 | 45 | 30 | 15 | | +80 | -1000 |
| 1000 | 1250 | 50 | 35 | 18 | | +100 | -1400 |

TABLE 16

TOLERANCES

**THRUST BALL BEARING—SINGLE DIRECTION, WASHERS WITH GROOVED RACEWAYS,
FLAT BACK FACES, TYPE TA—ALL SERIES—
METRIC DESIGN**

Dimensions in inches
Tolerances in 0.0001 inches

PART II

| d | | Δd_{mp} | | | | V_{dp} | |
|-------------|-------------|----------------------------------|------------|----------------------|------------|-------------------------------------|----------------------|
| | | TOLERANCE CLASS NORMAL, 5 & 6 | | TOLERANCE CLASS 4 | | TOLERANCE CLASS NORMAL, 5 & 6 | TOLERANCE CLASS 4 |
| OVER | INCL | HIGH | LOW | HIGH | LOW | MAX | MAX |
| — | 0.7087 | 0 | -3 | 0 | -3 | 2 | 2 |
| 0.7087 | 1.1811 | 0 | -4 | 0 | -3 | 3 | 2 |
| 1.1811 | 1.9685 | 0 | -5 | 0 | -4 | 3.5 | 3 |
| 1.9685 | 3.1496 | 0 | -6 | 0 | -5 | 4 | 3.5 |
| 3.1496 | 4.7244 | 0 | -8 | 0 | -6 | 6 | 4 |
| 4.7244 | 7.0866 | 0 | -10 | 0 | -7 | 7.5 | 5.5 |
| 7.0866 | 9.8425 | 0 | -12 | 0 | -9 | 9 | 7 |
| 9.8425 | 12.4015 | 0 | -14 | 0 | -10 | 10 | 7.5 |
| 12.4015 | 15.7480 | 0 | -16 | 0 | -12 | 12 | 9 |
| 15.7480 | 19.6850 | 0 | -18 | 0 | -14 | 13 | 10 |
| 19.6850 | 24.8031 | 0 | -20 | 0 | -16 | 15 | 12 |
| 24.8031 | 31.4961 | 0 | -30 | 0 | -20 | 16 | |
| 31.4961 | 39.3701 | 0 | -39 | | | | |
| 39.3701 | 49.2126 | 0 | -49 | | | | |

Dimensions in inches
Tolerances in 0.0001 inches

| D | | ΔD_{mp} | | | | V_{Dp} | |
|-------------|-------------|----------------------------------|------------|----------------------|------------|-------------------------------------|----------------------|
| | | TOLERANCE CLASS NORMAL, 5 & 6 | | TOLERANCE CLASS 4 | | TOLERANCE CLASS NORMAL, 5 & 6 | TOLERANCE CLASS 4 |
| OVER | INCL | HIGH | LOW | HIGH | LOW | MAX | MAX |
| 0.3937 | 0.7087 | 0 | -4 | 0 | -3 | 3 | 2 |
| 0.7087 | 1.1811 | 0 | -5 | 0 | -3 | 4 | 2 |
| 1.1811 | 1.9685 | 0 | -6 | 0 | -3.5 | 5 | 3 |
| 1.9685 | 3.1496 | 0 | -7.5 | 0 | -4 | 5.5 | 3 |
| 3.1496 | 4.7244 | 0 | -9 | 0 | -5 | 7 | 4 |
| 4.7244 | 7.0866 | 0 | -10 | 0 | -6 | 7.5 | 4 |
| 7.0866 | 9.8425 | 0 | -12 | 0 | -8 | 9 | 6 |
| 9.8425 | 12.4015 | 0 | -14 | 0 | -10 | 10 | 7.5 |
| 12.4015 | 15.7480 | 0 | -16 | 0 | -11 | 12 | 8 |
| 15.7480 | 19.6850 | 0 | -18 | 0 | -13 | 14 | 10 |
| 19.6850 | 24.8031 | 0 | -20 | 0 | -15 | 15 | 11 |
| 24.8031 | 31.4961 | 0 | -30 | 0 | -18 | 22 | 14 |
| 31.4961 | 39.3701 | 0 | -39 | 0 | | 30 | |
| 39.3701 | 49.2126 | 0 | -49 | 0 | | | |
| 49.2126 | 62.9921 | 0 | -63 | 0 | | | |

continued

TABLE 16—PART II (continued)—Sheet 2 of 2

Dimensions in inches
Tolerances in 0.0001 inches

| d | | S _i , S _e | | | | ΔT _s | |
|---------|---------|---------------------------------|------------|------------|------------|-----------------|------|
| | | NORMAL CLASS | CLASS 6 | CLASS 5 | CLASS 4 | | |
| OVER | INCL | MAX | MAX | MAX | MAX | MAX | MIN |
| — | 0.7087 | 4 | 2 | 1 | 0.7 | +8 | -98 |
| 0.7087 | 1.1811 | 4 | 2 | 1 | 0.7 | +8 | -98 |
| 1.1811 | 1.9685 | 4 | 2 | 1 | 0.7 | +8 | -98 |
| 1.9685 | 3.1496 | 4 | 3 | 1.5 | 1 | +8 | -118 |
| 3.1496 | 4.7244 | 6 | 3 | 1.5 | 1 | +10 | -118 |
| 4.7244 | 7.0866 | 6 | 3.5 | 2 | 1.5 | +10 | -158 |
| 7.0866 | 9.8425 | 8 | 4 | 2 | 1.5 | +12 | -158 |
| 9.8425 | 12.4015 | 10 | 5 | 3 | 2 | +16 | -158 |
| 12.4015 | 15.7480 | 12 | 6 | 3 | 2 | +16 | -197 |
| 15.7480 | 19.6850 | 12 | 7 | 3.5 | 2 | +20 | -197 |
| 19.6850 | 24.8031 | 14 | 8 | 4 | 3 | +24 | -236 |
| 24.8031 | 31.4961 | 16 | 10 | 5 | 3 | +28 | -296 |
| 31.4961 | 39.3701 | 18 | 12 | 6 | | +31 | -394 |
| 39.3701 | 49.2126 | 20 | 14 | 7 | | +39 | -552 |

TABLE 17

TOLERANCES

**THRUST BALL BEARING—DOUBLE DIRECTION, WASHERS WITH GROOVED RACEWAYS,
FLAT BACK FACES, TYPE TDA—ALL SERIES—
METRIC DESIGN**

Dimensions in millimetres
Tolerances in micrometres

PART I

| d₂ | | Δd_{2mp} | | | | V_{d2p} | |
|----------------------|-------------|--|------------|------------------------------|------------|--|------------------------------|
| | | TOLERANCE CLASS NORMAL, 5 & 6 | | TOLERANCE CLASS 4 | | TOLERANCE CLASS NORMAL, 5 & 6 | TOLERANCE CLASS 4 |
| OVER | INCL | HIGH | LOW | HIGH | LOW | MAX | MAX |
| 0 | 18 | 0 | -8 | 0 | -7 | 6 | 5 |
| 18 | 30 | 0 | -10 | 0 | -8 | 8 | 6 |
| 30 | 50 | 0 | -12 | 0 | -10 | 9 | 8 |
| 50 | 80 | 0 | -15 | 0 | -12 | 11 | 9 |
| 80 | 120 | 0 | -20 | 0 | -15 | 15 | 11 |
| 120 | 180 | 0 | -25 | 0 | -18 | 19 | 14 |
| 180 | 250 | 0 | -30 | 0 | -22 | 23 | 17 |
| 250 | 315 | 0 | -35 | 0 | -25 | 26 | 19 |
| 315 | 400 | 0 | -40 | 0 | -30 | 30 | 23 |
| 400 | 500 | 0 | -45 | 0 | -35 | 34 | 26 |
| 500 | 630 | 0 | -50 | 0 | -40 | 38 | 30 |
| 630 | 800 | 0 | -75 | 0 | -50 | 41 | |
| 800 | 1000 | 0 | -100 | | | 43 | |
| 1000 | 1250 | 0 | -125 | | | 48 | |

Dimensions in millimetres
Tolerances in micrometres

| D | | ΔD_{mp} | | | | V_{Dp} | |
|-------------|-------------|--|------------|------------------------------|------------|--|------------------------------|
| | | TOLERANCE CLASS NORMAL, 5 & 6 | | TOLERANCE CLASS 4 | | TOLERANCE CLASS NORMAL, 5 & 6 | TOLERANCE CLASS 4 |
| OVER | INCL | HIGH | LOW | HIGH | LOW | MAX | MAX |
| 10 | 18 | 0 | -11 | 0 | -7 | 8 | 5 |
| 18 | 30 | 0 | -13 | 0 | -8 | 10 | 6 |
| 30 | 50 | 0 | -16 | 0 | -9 | 12 | 7 |
| 50 | 80 | 0 | -19 | 0 | -11 | 14 | 8 |
| 80 | 120 | 0 | -22 | 0 | -13 | 17 | 10 |
| 120 | 180 | 0 | -25 | 0 | -15 | 19 | 11 |
| 180 | 250 | 0 | -30 | 0 | -20 | 23 | 15 |
| 250 | 315 | 0 | -35 | 0 | -25 | 26 | 19 |
| 315 | 400 | 0 | -40 | 0 | -28 | 30 | 21 |
| 400 | 500 | 0 | -45 | 0 | -33 | 34 | 25 |
| 500 | 630 | 0 | -50 | 0 | -38 | 38 | 29 |
| 630 | 800 | 0 | -75 | 0 | -45 | 55 | 34 |
| 800 | 1000 | 0 | -100 | | | 75 | |
| 1000 | 1250 | 0 | -125 | | | | |
| 1250 | 1600 | 0 | -160 | | | | |

continued

TABLE 17—PART I (continued)—Sheet 2 of 2

Dimensions in millimetres
Tolerances in micrometres

| d ₂ | | S _i , S _e | | | | ΔT _s | |
|----------------|------|---------------------------------|------------|------------|------------|-----------------|------|
| | | NORMAL CLASS | CLASS 6 | CLASS 5 | CLASS 4 | | |
| OVER | INCL | MAX | MAX | MAX | MAX | MAX | MIN |
| — | 18 | 10 | 5 | 3 | 2 | +50 | -150 |
| 18 | 30 | 10 | 5 | 3 | 2 | +50 | -150 |
| 30 | 50 | 10 | 6 | 3 | 2 | +75 | -200 |
| 50 | 80 | 10 | 7 | 4 | 3 | | |
| 80 | 120 | 15 | 8 | 4 | 3 | +125 | -300 |
| 120 | 180 | 15 | 9 | 5 | 4 | +150 | -350 |
| 180 | 250 | 20 | 10 | 5 | 4 | +175 | -400 |
| 250 | 315 | 25 | 13 | 7 | 5 | +200 | -450 |
| 315 | 400 | 30 | 15 | 7 | 5 | +250 | -600 |
| 400 | 500 | 30 | 18 | 9 | 6 | | |
| 500 | 630 | 35 | 21 | 11 | 7 | | |
| 630 | 800 | 40 | 25 | 13 | 8 | | |
| 800 | 1000 | 45 | 30 | 15 | | | |
| 1000 | 1250 | 50 | 35 | 18 | | | |

TABLE 17

TOLERANCES

**THRUST BALL BEARING—DOUBLE DIRECTION, WASHERS WITH GROOVED RACEWAYS,
FLAT BACK FACES, TYPE TDA—ALL SERIES—
METRIC DESIGN**

Dimensions in inches
Tolerances in 0.0001 inches

PART II

| d₂ | | Δd_{2mp} | | | | V_{d2p} | |
|----------------------|-------------|--|------------|------------------------------|------------|--|------------------------------|
| | | TOLERANCE CLASS NORMAL, 5 & 6 | | TOLERANCE CLASS 4 | | TOLERANCE CLASS NORMAL, 5 & 6 | TOLERANCE CLASS 4 |
| OVER | INCL | HIGH | LOW | HIGH | LOW | MAX | MAX |
| 0 | 0.7087 | 0 | -3 | 0 | -3 | 2 | 2 |
| 0.7087 | 1.1811 | 0 | -4 | 0 | -3 | 3 | 2 |
| 1.1811 | 1.9685 | 0 | -5 | 0 | -4 | 4 | 3 |
| 1.9685 | 3.1496 | 0 | -6 | 0 | -5 | 4 | 4 |
| 3.1496 | 4.7244 | 0 | -8 | 0 | -6 | 6 | 4 |
| 4.7244 | 7.0866 | 0 | -10 | 0 | -7 | 7 | 6 |
| 7.0866 | 9.8425 | 0 | -12 | 0 | -9 | 9 | 7 |
| 9.8425 | 12.4016 | 0 | -14 | 0 | -10 | 10 | 7 |
| 12.4016 | 15.7480 | 0 | -16 | 0 | -12 | 12 | 9 |
| 15.7480 | 19.6850 | 0 | -18 | 0 | -14 | 13 | 10 |
| 19.6850 | 24.8032 | 0 | -20 | 0 | -16 | 15 | 12 |
| 24.8032 | 31.4961 | 0 | -30 | 0 | -20 | 16 | |
| 31.4961 | 39.3701 | 0 | -39 | | | 17 | |
| 39.3701 | 49.2126 | 0 | -49 | | | 19 | |

Dimensions in inches
Tolerances in 0.0001 inches

| D | | ΔD_{mp} | | | | V_{Dp} | |
|-------------|-------------|--|------------|------------------------------|------------|--|------------------------------|
| | | TOLERANCE CLASS NORMAL, 5 & 6 | | TOLERANCE CLASS 4 | | TOLERANCE CLASS NORMAL, 5 & 6 | TOLERANCE CLASS 4 |
| OVER | INCL | HIGH | LOW | HIGH | LOW | MAX | MAX |
| 0.3937 | 0.7087 | 0 | -4 | 0 | -3 | 3 | 2 |
| 0.7087 | 1.1811 | 0 | -5 | 0 | -3 | 4 | 2 |
| 1.1811 | 1.9685 | 0 | -6 | 0 | -4 | 5 | 3 |
| 1.9685 | 3.1496 | 0 | -7 | 0 | -4 | 6 | 3 |
| 3.1496 | 4.7244 | 0 | -9 | 0 | -5 | 7 | 4 |
| 4.7244 | 7.0866 | 0 | -10 | 0 | -6 | 7 | 4 |
| 7.0866 | 9.8425 | 0 | -12 | 0 | -8 | 9 | 6 |
| 9.8425 | 12.4016 | 0 | -14 | 0 | -10 | 10 | 7 |
| 12.4016 | 15.7480 | 0 | -16 | 0 | -11 | 12 | 8 |
| 15.7480 | 19.6850 | 0 | -18 | 0 | -13 | 13 | 10 |
| 19.6850 | 24.8032 | 0 | -20 | 0 | -15 | 15 | 11 |
| 24.8031 | 31.4961 | 0 | -30 | 0 | -18 | 22 | 13 |
| 31.4961 | 39.3701 | 0 | -39 | | | 30 | |
| 39.3701 | 49.2125 | 0 | -49 | | | | |
| 49.2125 | 62.9921 | 0 | -63 | | | | |

continued

TABLE 17—PART II (continued)—Sheet 2 of 2

Dimensions in inches
Tolerances in 0.0001 inches

| d ₂ | | S _i , S _e | | | | ΔT _s | |
|----------------|---------|---------------------------------|------------|------------|------------|-----------------|------|
| | | NORMAL CLASS | CLASS 6 | CLASS 5 | CLASS 4 | | |
| OVER | INCL | MAX | MAX | MAX | MAX | MAX | MIN |
| 0.0000 | 0.7087 | 4 | 2 | 1 | 1 | +20 | -59 |
| 0.7087 | 1.1811 | 4 | 2 | 1 | 1 | +20 | -59 |
| 1.1811 | 1.9685 | 4 | 2 | 1 | 1 | +30 | -79 |
| 1.9685 | 3.1496 | 4 | 3 | 2 | 1 | +39 | -99 |
| 3.1496 | 4.7244 | 6 | 3 | 2 | 1 | +49 | -118 |
| 4.7244 | 7.0866 | 6 | 4 | 2 | 2 | +59 | -138 |
| 7.0866 | 9.8425 | 8 | 4 | 2 | 2 | +69 | -158 |
| 9.8425 | 12.4016 | 10 | 5 | 3 | 2 | +79 | -177 |
| 12.4016 | 15.7480 | 12 | 6 | 3 | 2 | +99 | -236 |
| 15.7480 | 19.6850 | 12 | 7 | 4 | 2 | | |
| 19.6850 | 24.8032 | 14 | 8 | 4 | 3 | | |
| 24.8032 | 31.4961 | 16 | 10 | 5 | 3 | | |
| 31.4961 | 39.3701 | 18 | 12 | 6 | | | |
| 39.3701 | 49.2126 | 20 | 14 | 7 | | | |

TABLE 18

TOLERANCES

**THRUST BEARING—CYLINDRICAL ROLLERS, SINGLE DIRECTION
FLAT RACEWAYS, FLAT BACK FACES, TYPE TP—MEDIUM & HEAVY SERIES—
METRIC DESIGN**

Dimensions in millimetres
Tolerances in micrometres

PART I

| d | | Δd_{mp} | | Δd_{mp} | | ΔT_s | |
|------|------|-----------------|------|-----------------|-----|--------------|-------|
| | | NORMAL | | CLASS 4 | | | |
| OVER | INCL | HIGH | LOW | HIGH | LOW | HIGH | LOW |
| 0 | 18 | 0 | -8 | 0 | -7 | +20 | -250 |
| 18 | 30 | 0 | -10 | 0 | -8 | +20 | -250 |
| 30 | 50 | 0 | -12 | 0 | -10 | +20 | -250 |
| 50 | 80 | 0 | -15 | 0 | -12 | +20 | -300 |
| 80 | 120 | 0 | -20 | 0 | -15 | +25 | -300 |
| 120 | 180 | 0 | -25 | 0 | -18 | +25 | -400 |
| 180 | 250 | 0 | -30 | 0 | -22 | +30 | -400 |
| 250 | 315 | 0 | -35 | 0 | -25 | +40 | -400 |
| 315 | 400 | 0 | -40 | 0 | -30 | +40 | -500 |
| 400 | 500 | 0 | -45 | 0 | -35 | +50 | -500 |
| 500 | 630 | 0 | -50 | 0 | -40 | +60 | -600 |
| 630 | 800 | 0 | -75 | 0 | -50 | +70 | -750 |
| 800 | 1000 | 0 | -100 | | | +80 | -1000 |
| 1000 | 1250 | 0 | -125 | | | +100 | -1400 |

Dimensions in millimetres
Tolerances in micrometres

| D | | ΔD_{mp} | | ΔD_{mp} | |
|----------|------|-----------------|------|-----------------|-----|
| | | NORMAL | | CLASS 4 | |
| OVER | INCL | HIGH | LOW | HIGH | LOW |
| 10 | 18 | 0 | -11 | 0 | -7 |
| 18 | 30 | 0 | -13 | 0 | -8 |
| 30 | 50 | 0 | -16 | 0 | -9 |
| 50 | 80 | 0 | -19 | 0 | -11 |
| 80 | 120 | 0 | -22 | 0 | -13 |
| 120 | 180 | 0 | -25 | 0 | -15 |
| 180 | 250 | 0 | -30 | 0 | -20 |
| 250 | 315 | 0 | -35 | 0 | -25 |
| 315 | 400 | 0 | -40 | 0 | -28 |
| 400 | 500 | 0 | -45 | 0 | -33 |
| 500 | 630 | 0 | -50 | 0 | -38 |
| 630 | 800 | 0 | -75 | 0 | -45 |
| 800 | 1000 | 0 | -100 | | |
| 1000 | 1250 | 0 | -125 | | |
| 1250 | 1600 | 0 | -160 | | |

TABLE 18

TOLERANCES

**THRUST BEARING—CYLINDRICAL ROLLERS, SINGLE DIRECTION
FLAT RACEWAYS, FLAT BACK FACES, TYPE TP—MEDIUM & HEAVY SERIES—
METRIC DESIGN**

PART II

Dimensions in inches
Tolerances in 0.0001 inches

| d | | Δd_{mp} | | Δd_{mp} | | ΔT_s | |
|---------|---------|-----------------|-----|-----------------|-----|--------------|------|
| | | NORMAL | | CLASS 4 | | | |
| OVER | INCL | HIGH | LOW | HIGH | LOW | HIGH | LOW |
| 0 | 0.7087 | 0 | -3 | 0 | -3 | +8 | -98 |
| 0.7087 | 1.1811 | 0 | -4 | 0 | -3 | +8 | -98 |
| 1.1811 | 1.9685 | 0 | -5 | 0 | -4 | +8 | -98 |
| 1.9685 | 3.1496 | 0 | -6 | 0 | -5 | +8 | -118 |
| 3.1496 | 4.7244 | 0 | -8 | 0 | -6 | +10 | -118 |
| 4.7244 | 7.0866 | 0 | -10 | 0 | -7 | +10 | -158 |
| 7.0866 | 9.8425 | 0 | -12 | 0 | -9 | +12 | -158 |
| 9.8425 | 12.4015 | 0 | -14 | 0 | -10 | +16 | -158 |
| 12.4015 | 15.7480 | 0 | -16 | 0 | -12 | +16 | -197 |
| 15.7480 | 19.6850 | 0 | -18 | 0 | -14 | +20 | -197 |
| 19.6850 | 24.8031 | 0 | -20 | 0 | -16 | +24 | -236 |
| 24.8031 | 31.4961 | 0 | -30 | 0 | -20 | +28 | -296 |
| 31.4961 | 39.3701 | 0 | -39 | | | +32 | -394 |
| 39.3701 | 49.2126 | 0 | -49 | | | +39 | -552 |

Dimensions in inches
Tolerances in 0.0001 inches

| D | | ΔD_{mp} | | ΔD_{mp} | |
|-------------|-------------|-----------------|------------|-----------------|------------|
| | | NORMAL | | CLASS 4 | |
| OVER | INCL | HIGH | LOW | HIGH | LOW |
| 0.3937 | 0.7087 | 0 | -4 | 0 | -3 |
| 0.7087 | 1.1811 | 0 | -5 | 0 | -3 |
| 1.1811 | 1.9685 | 0 | -6 | 0 | -4 |
| 1.9685 | 3.1496 | 0 | -7 | 0 | -4 |
| 3.1496 | 4.7244 | 0 | -9 | 0 | -5 |
| 4.7244 | 7.0866 | 0 | -10 | 0 | -6 |
| 7.0866 | 9.8425 | 0 | -12 | 0 | -8 |
| 9.8425 | 12.4015 | 0 | -14 | 0 | -10 |
| 12.4015 | 15.7480 | 0 | -16 | 0 | -11 |
| 15.7480 | 19.6850 | 0 | -18 | 0 | -13 |
| 19.6850 | 24.8031 | 0 | -20 | 0 | -15 |
| 24.8031 | 31.4961 | 0 | -30 | | |
| 31.4961 | 39.3701 | 0 | -39 | | |
| 39.3701 | 49.2126 | 0 | -49 | | |
| 49.2126 | 62.9921 | 0 | -63 | | |

TABLE 19

TOLERANCES

**THRUST BEARING—SPHERICAL ROLLERS, SINGLE DIRECTION
ALIGNING, TYPE TS—ALL SERIES
METRIC DESIGN**

Dimensions in millimetres
Tolerances in micrometres

PART I

| d | | Δd_{mp} | | V_{dp} | ΔT_s | |
|-------------|-------------|-----------------|------------|------------|--------------|------------|
| OVER | INCL | HIGH | LOW | MAX | HIGH | LOW |
| 30 | 50 | 0 | -12 | | +20 | -300 |
| 50 | 80 | 0 | -15 | | +20 | -400 |
| 80 | 120 | 0 | -20 | 25 | +25 | -400 |
| 120 | 180 | 0 | -25 | 30 | +25 | -500 |
| 180 | 250 | 0 | -30 | 41 | +30 | -500 |
| 250 | 315 | 0 | -35 | 51 | +40 | -700 |
| 315 | 400 | 0 | -40 | 61 | +40 | -700 |
| 400 | 500 | 0 | -45 | 66 | +50 | -900 |
| 500 | 630 | 0 | -50 | 71 | +60 | -1200 |
| 630 | 800 | 0 | -75 | | +70 | -1400 |
| 800 | 1000 | 0 | -100 | | +80 | -1800 |

Dimensions in millimetres
Tolerances in micrometres

| D | | ΔD_{mp} | | V_{Dp} |
|-------------|-------------|-----------------|------------|------------|
| OVER | INCL | HIGH | LOW | MAX |
| 50 | 80 | 0 | -19 | |
| 80 | 120 | 0 | -22 | |
| 120 | 180 | 0 | -25 | |
| 180 | 250 | 0 | -30 | 51 |
| 250 | 315 | 0 | -35 | 61 |
| 315 | 400 | 0 | -40 | 71 |
| 400 | 500 | 0 | -45 | 81 |
| 500 | 630 | 0 | -50 | 102 |
| 630 | 800 | 0 | -75 | 119 |
| 800 | 1000 | 0 | -100 | 140 |
| 1000 | 1250 | 0 | -125 | |
| 1250 | 1600 | 0 | -160 | |

TABLE 19

TOLERANCES

**THRUST BEARING—SPHERICAL ROLLERS, SINGLE DIRECTION
ALIGNING, TYPE TS—ALL SERIES
METRIC DESIGN**

Dimensions in inches
Tolerances in 0.0001 inches

PART II

| d | | Δd_{mp} | | V_{dp} | ΔT_s | |
|-------------|-------------|-----------------|------------|------------|--------------|------------|
| OVER | INCL | HIGH | LOW | MAX | HIGH | LOW |
| 1.1811 | 1.9685 | 0 | -5 | | +8 | -118 |
| 1.9685 | 3.1496 | 0 | -6 | | +8 | -158 |
| 3.1496 | 4.7244 | 0 | -8 | .0010 | +10 | -158 |
| 4.7244 | 7.0866 | 0 | -10 | .0012 | +10 | -197 |
| 7.0866 | 9.8425 | 0 | -12 | .0016 | +12 | -197 |
| 9.8425 | 12.4016 | 0 | -14 | .0020 | +16 | -276 |
| 12.4016 | 15.7480 | 0 | -16 | .0024 | +16 | -276 |
| 15.7480 | 19.6850 | 0 | -18 | .0026 | +20 | -355 |
| 19.6850 | 24.8031 | 0 | -20 | .0028 | +24 | -473 |
| 24.8031 | 31.4961 | 0 | -30 | | +28 | -552 |
| 31.4961 | 39.3700 | 0 | -39 | | +32 | -709 |

Dimensions in inches
Tolerances in 0.0001 inches

| D | | ΔD_{mp} | | V_{Dp} |
|-------------|-------------|-----------------|------------|------------|
| OVER | INCL | HIGH | LOW | MAX |
| 1.9685 | 3.1496 | 0 | -7 | |
| 3.1496 | 4.7244 | 0 | -9 | |
| 4.7244 | 7.0866 | 0 | -10 | |
| 7.0866 | 9.8425 | 0 | -12 | .0020 |
| 9.8425 | 12.4016 | 0 | -14 | .0024 |
| 12.4016 | 15.7480 | 0 | -16 | .0028 |
| 15.7480 | 19.6850 | 0 | -18 | .0032 |
| 19.6850 | 24.8031 | 0 | -20 | .0040 |
| 24.8031 | 31.4961 | 0 | -30 | .0047 |
| 31.4961 | 39.3700 | 0 | -39 | .0055 |
| 39.3700 | 49.2126 | 0 | -49 | |
| 49.2126 | 62.9921 | 0 | -63 | |

TABLE 20

MOUNTING DIMENSIONS

THRUST BALL BEARINGS

SINGLE DIRECTION—WASHERS WITH GROOVED RACEWAYS—FLAT BACK FACES—TYPE TA—ALL SERIES
 DOUBLE DIRECTION—WASHERS WITH GROOVED RACEWAYS—FLAT BACK FACES—TYPE TDA—ALL SERIES
 METRIC DESIGN

Dimensions in millimetres
Deviations in micrometres

PART I

| d | | Shaft Diameter Deviation from d | | | |
|------|------|---------------------------------|-----|--------------------------------|-----|
| | | Stationary Load | | Rotating or Indeterminate Load | |
| OVER | INCL | HIGH | LOW | HIGH | LOW |
| 3 | 6 | +7 | -1 | +9 | +1 |
| 6 | 10 | +7 | -2 | +10 | +1 |
| 10 | 18 | +8 | -3 | +12 | +1 |
| 18 | 30 | +9 | -4 | +15 | +2 |
| 30 | 50 | +11 | -5 | +18 | +2 |
| 50 | 80 | +12 | -7 | +21 | +2 |
| 80 | 120 | +13 | -9 | +25 | +3 |
| 120 | 180 | +14 | -11 | +28 | +3 |
| 180 | 250 | +16 | -13 | +33 | +4 |
| 250 | 315 | +16 | -16 | +36 | +4 |
| 315 | 400 | +18 | -18 | +40 | +4 |
| 400 | 500 | +20 | -20 | +45 | +5 |

Dimensions in millimetres
Deviations in micrometres

| D | | Housing Diameter Deviation from D | | | |
|------|------|-----------------------------------|------|-----------|-----|
| | | Normal | | Precision | |
| OVER | INCL | HIGH | LOW | HIGH | LOW |
| 6 | 10 | +47 | +25 | +9 | 0 |
| 10 | 18 | +59 | +32 | +11 | 0 |
| 18 | 30 | +73 | +40 | +13 | 0 |
| 30 | 50 | +89 | +50 | +16 | 0 |
| 50 | 80 | +106 | +60 | +19 | 0 |
| 80 | 120 | +126 | +72 | +22 | 0 |
| 120 | 150 | +148 | +85 | +25 | 0 |
| 150 | 180 | +148 | +85 | +25 | 0 |
| 180 | 250 | +172 | +100 | +29 | 0 |
| 250 | 315 | +191 | +110 | +32 | 0 |
| 315 | 400 | +214 | +125 | +36 | 0 |
| 400 | 500 | +232 | +135 | +40 | 0 |

TABLE 20

MOUNTING DIMENSIONS

THRUST BALL BEARINGS

SINGLE DIRECTION—WASHERS WITH GROOVED RACEWAYS—FLAT BACK FACES—TYPE TA—ALL SERIES
 DOUBLE DIRECTION—WASHERS WITH GROOVED RACEWAYS—FLAT BACK FACES—TYPE TDA—ALL SERIES
 METRIC DESIGN

PART II

Dimensions in inches
 Deviations in 0.0001 inches

| d | | Shaft Diameter Deviation from d | | | |
|---------|---------|---------------------------------|-----|--------------------------------|-----|
| | | Stationary Load | | Rotating or Indeterminate Load | |
| OVER | INCL | HIGH | LOW | HIGH | LOW |
| 0.1181 | 0.2362 | +3 | 0 | +4 | 0 |
| 0.2362 | 0.3937 | +3 | -1 | +4 | 0 |
| 0.3937 | 0.7087 | +3 | -1 | +5 | 0 |
| 0.7087 | 1.1811 | +4 | -2 | +6 | +1 |
| 1.1811 | 1.9685 | +4 | -2 | +7 | +1 |
| 1.9685 | 3.1496 | +5 | -3 | +8 | +1 |
| 3.1496 | 4.7244 | +5 | -4 | +10 | +1 |
| 4.7244 | 7.0866 | +6 | -4 | +11 | +1 |
| 7.0866 | 9.8425 | +6 | -5 | +13 | +2 |
| 9.8425 | 12.4016 | +6 | -6 | +14 | +2 |
| 12.4016 | 15.7480 | +7 | -7 | +16 | +2 |
| 15.7480 | 19.6850 | +8 | -8 | +18 | +2 |

Dimensions in inches
 Deviations in 0.0001 inches

| D | | Housing Diameter Deviation from D | | | |
|---------|---------|-----------------------------------|-----|-----------|-----|
| | | Normal | | Precision | |
| OVER | INCL | HIGH | LOW | HIGH | LOW |
| 0.2362 | 0.3937 | +19 | +10 | +4 | 0 |
| 0.3937 | 0.7087 | +23 | +13 | +4 | 0 |
| 0.7087 | 1.1811 | +29 | +16 | +5 | 0 |
| 1.1811 | 1.9685 | +35 | +20 | +6 | 0 |
| 1.9685 | 3.1496 | +42 | +24 | +7 | 0 |
| 3.1496 | 4.7244 | +50 | +28 | +9 | 0 |
| 4.7244 | 5.9055 | +58 | +33 | +10 | 0 |
| 5.9055 | 7.0866 | +58 | +33 | +10 | 0 |
| 7.0866 | 9.8425 | +68 | +39 | +11 | 0 |
| 9.8425 | 12.4016 | +75 | +43 | +13 | 0 |
| 12.4016 | 15.7480 | +84 | +49 | +14 | 0 |
| 15.7480 | 19.6850 | +91 | +53 | +16 | 0 |

TABLE 21

MOUNTING DIMENSIONS

**THRUST BEARING—CYLINDRICAL ROLLERS, SINGLE DIRECTION,
FLAT RACEWAYS, FLAT BACK FACES, TYPE TP—ALL SERIES
METRIC DESIGN**

PART I

Dimensions in millimetres
Deviations in micrometres

| d | | Shaft Diameter Deviation from d | |
|-------------|-------------|--|------------|
| OVER | INCL | HIGH | LOW |
| 30 | 50 | -25 | -51 |
| 50 | 80 | -30 | -56 |
| 80 | 120 | -38 | -64 |
| 120 | 180 | -38 | -64 |
| 180 | 250 | -46 | -84 |
| 250 | 315 | -46 | -84 |
| 315 | 400 | -51 | -102 |
| 400 | 500 | -64 | -114 |
| 500 | 630 | -64 | -114 |

Dimensions in millimetres
Deviations in micrometres

| D | | Housing Diameter Deviation from D | |
|-------------|-------------|--|------------|
| OVER | INCL | HIGH | LOW |
| 30 | 50 | +38 | +13 |
| 50 | 80 | +43 | +18 |
| 80 | 120 | +76 | +38 |
| 120 | 180 | +76 | +38 |
| 180 | 250 | +76 | +38 |
| 250 | 315 | +102 | +51 |
| 315 | 400 | +102 | +51 |
| 400 | 500 | +127 | +64 |
| 500 | 630 | +140 | +64 |

TABLE 21

MOUNTING DIMENSIONS

**THRUST BEARING—CYLINDRICAL ROLLERS, SINGLE DIRECTION,
FLAT RACEWAYS, FLAT BACK FACES, TYPE TP—ALL SERIES
METRIC DESIGN**

PART II Dimensions in inches
Deviations in 0.0001 inches

| d | | Shaft Diameter Deviation from d | |
|-------------|-------------|--|------------|
| OVER | INCL | HIGH | LOW |
| 1.1811 | 1.9685 | -10 | -20 |
| 1.9685 | 3.1496 | -12 | -22 |
| 3.1496 | 4.7244 | -15 | -25 |
| 4.7244 | 7.0866 | -15 | -25 |
| 7.0866 | 9.8425 | -18 | -33 |
| 9.8425 | 12.4016 | -18 | -33 |
| 12.4016 | 15.7480 | -20 | -40 |
| 15.7480 | 19.6850 | -25 | -45 |
| 19.6850 | 24.8031 | -25 | -45 |

Dimensions in inches
Deviations in 0.0001 inches

| D | | Housing Diameter Deviation from D | |
|-------------|-------------|--|------------|
| OVER | INCL | HIGH | LOW |
| 1.1811 | 1.9685 | +15 | +5 |
| 1.9685 | 3.1496 | +17 | +7 |
| 3.1496 | 4.7244 | +30 | +15 |
| 4.7244 | 7.0866 | +30 | +15 |
| 7.0866 | 9.8425 | +30 | +15 |
| 9.8425 | 12.4016 | +40 | +20 |
| 12.4016 | 15.7480 | +40 | +20 |
| 15.7480 | 19.6850 | +50 | +25 |
| 19.6850 | 24.8031 | +55 | +25 |

TABLE 22

MOUNTING DIMENSIONS

THRUST BEARINGS—SPHERICAL ROLLERS, SINGLE DIRECTION,
ALIGNING, TYPE TS, ALL SERIES
METRIC DESIGNDimensions in millimetres
Deviations in micrometres

PART I

| d | | Shaft Diameter Deviation from d | | | |
|------|------|---------------------------------|-----|---------------|-----|
| | | Stationary Load | | Rotating Load | |
| OVER | INCL | HIGH | LOW | HIGH | LOW |
| 30 | 50 | +11 | -5 | +18 | +2 |
| 50 | 80 | +12 | -7 | +21 | +2 |
| 80 | 120 | +13 | -9 | +25 | +3 |
| 120 | 180 | +14 | -11 | +28 | +3 |
| 180 | 200 | +16 | -13 | +33 | +4 |
| 200 | 250 | +16 | -13 | +37 | +17 |
| 250 | 315 | +16 | -16 | +43 | +20 |
| 315 | 400 | +18 | -18 | +46 | +21 |
| 400 | 500 | +20 | -20 | +80 | +40 |
| 500 | 630 | +23 | -20 | +88 | +44 |
| 630 | 800 | +23 | -23 | +100 | +50 |
| 800 | 1000 | +25 | -25 | +112 | +56 |

Dimensions in millimetres
Deviations in micrometres

| D | | Housing Diameter Deviation from D | | | |
|------|------|-----------------------------------|-----|---------------|-----|
| | | Stationary Load | | Rotating Load | |
| OVER | INCL | HIGH | LOW | HIGH | LOW |
| 50 | 80 | +18 | -12 | +10 | -20 |
| 80 | 120 | +22 | -13 | +10 | -25 |
| 120 | 180 | +26 | -14 | +13 | -28 |
| 180 | 250 | +30 | -16 | +13 | -33 |
| 250 | 315 | +36 | -16 | +15 | -36 |
| 315 | 400 | +39 | -18 | +15 | -41 |
| 400 | 500 | +43 | -20 | +18 | -46 |
| 500 | 630 | +46 | -23 | +20 | -48 |
| 630 | 800 | +51 | -23 | +23 | -51 |
| 800 | 1000 | +58 | -25 | +25 | -58 |
| 1000 | 1250 | +64 | -28 | +28 | -64 |
| 1250 | 1600 | +71 | -33 | +33 | -71 |

TABLE 22

MOUNTING DIMENSIONS

THRUST BEARINGS—SPHERICAL ROLLERS, SINGLE DIRECTION,
ALIGNING, TYPE TS, ALL SERIES
METRIC DESIGNDimensions in inches
Deviations in 0.0001 inches

PART II

| d | | Shaft Diameter Deviation from d | | | |
|---------|---------|---------------------------------|-----|---------------|-----|
| | | Stationary Load | | Rotating Load | |
| OVER | INCL | HIGH | LOW | HIGH | LOW |
| 1.1181 | 1.9685 | +4 | -2 | +7 | +1 |
| 1.9685 | 3.1496 | +4 | -3 | +8 | +1 |
| 3.1496 | 4.7244 | +5 | -4 | +10 | +1 |
| 4.7244 | 7.0866 | +6 | -4 | +11 | +1 |
| 7.0866 | 7.8740 | +7 | -5 | +13 | +2 |
| 7.8740 | 9.8425 | +7 | -5 | +15 | +7 |
| 9.8425 | 12.4016 | +7 | -6 | +17 | +8 |
| 12.4016 | 15.7480 | +7 | -7 | +18 | +8 |
| 15.7480 | 19.6850 | +9 | -8 | +31 | +16 |
| 19.6850 | 24.8031 | +9 | -8 | +35 | +17 |
| 24.8031 | 31.4961 | +9 | -9 | +39 | +20 |
| 31.4961 | 39.3701 | +10 | -10 | +44 | +22 |

Dimensions in inches
Deviations in 0.0001 inches

| D | | Housing Diameter Deviation from D | | | |
|---------|---------|-----------------------------------|-----|---------------|-----|
| | | Stationary Load | | Rotating Load | |
| OVER | INCL | HIGH | LOW | HIGH | LOW |
| 1.9685 | 3.1496 | +7 | -5 | +4 | -8 |
| 3.1496 | 4.7244 | +9 | -5 | +4 | -10 |
| 4.7244 | 7.0866 | +10 | -6 | +5 | -11 |
| 7.0866 | 9.8425 | +12 | -6 | +5 | -13 |
| 9.8425 | 12.4016 | +14 | -6 | +6 | -14 |
| 12.4016 | 15.7480 | +15 | -7 | +6 | -16 |
| 15.7480 | 19.6850 | +17 | -8 | +7 | -18 |
| 19.6850 | 24.8031 | +18 | -9 | +8 | -19 |
| 24.8031 | 31.4961 | +20 | -9 | +9 | -20 |
| 31.4961 | 39.3701 | +23 | -10 | +10 | -23 |
| 39.3701 | 49.2126 | +25 | -11 | +11 | -25 |
| 49.2126 | 62.9921 | +28 | -13 | +13 | -28 |