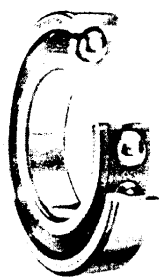
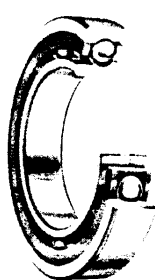




Angular contact ball bearing



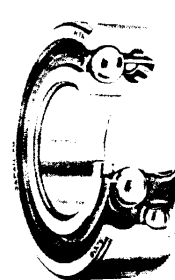
High speed use angular contact ball bearing



Ultra high speed use angular contact ball bearing



Four-point contact ball bearing



Double row angular contact ball bearing

## 1. Design features and special characteristics

### 1.1 Angular contact ball bearing

Angular contact ball bearings are non-separable type bearings. The line connecting the contact points of the ball and inner ring and the ball and outer ring creates an angle with the line drawn in the radial direction called the contact angle.

In addition to radial loads, single direction axial loads can also be accommodated by angular contact ball bearings.

Furthermore, since an axial load is generated from a radial force, these bearings are generally used in pairs facing each other. Standard type, high speed use type and ultra high speed use varieties of angular contact ball bearings are available through NTN, and there are also many duplex varieties. A bearing accuracy of JIS Class 5 or higher is applied to

duplex type angular contact ball bearings, and in many cases they are given a preload, in compliance with standard preload levels, before being used in an application. Table 2 shows information concerning angular contact ball bearings, and Table 3 shows similar information for duplex angular contact ball bearings.

Contact angle

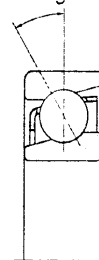


Diagram 1.

Table 1 Contact angle and contact angle codes

| Contact angle | 15° | 30°            | 40° |
|---------------|-----|----------------|-----|
| Code          | C   | A <sup>①</sup> | B   |

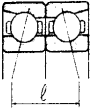
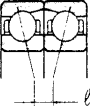
① A 30° contact angle is standard, and therefore the code "A" will usually be omitted.

Table 2 Angular contact ball bearing types and characteristics

| Type                      | Design                       | Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Standard type             |                              | <ul style="list-style-type: none"> <li>Available in bearing series 79, 70, 72, 72B, 73, and 73B.</li> <li>Contact angles: 30° and 40° (with B) available.</li> <li>Standard bearing cage type differs depending on bearing no. (Refer to Table 4)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| High speed use type       |                              | <ul style="list-style-type: none"> <li>Available in bearing series 78C, 79C, 70C, 72C, and 73C.</li> <li>Contact angles: 15°</li> <li>All bearing accuracies JIS Class 5 or higher.</li> <li>Standard bearing cage type differs depending on bearing no. (Refer to Table 4)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Ultra high speed use type | <br>BNT type<br><br>HSB type | <ul style="list-style-type: none"> <li>Available in bearing series HSB9C, HSB0C, BNT0, and BNT2; all boundary dimensions agree with JIS series dimensions.</li> <li>Contact angles: 15°; HSB type HSB9 and HSB0: 15° and 30°.</li> <li>All bearing accuracies JIS Class 5 or higher.</li> <li>BNT type internal design can be altered; suitable for higher speed applications than high speed use bearings.</li> <li>HSB series bearings have smaller diameter of balls than high speed use type bearings, so benefit by less torque for high precision, high speed applications.</li> <li>The inner ring bore diameter and outer ring inner diameter of the HSB series have a ground undercut on one side enabling easy oil flow.</li> <li>For even higher speed applications, there is a bearing in this series equipped with ceramic ball bearings.</li> <li>For standard cage types refer to Table 4; molded resin cages are also available for some varieties.</li> </ul> |

# ●Angular Contact Ball Bearings

Table 3 Duplex angular contact ball bearings — types and characteristics

| Duplex type              |                                                                                   | Characteristics                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Back-to-back duplex (DB) |  | <ul style="list-style-type: none"> <li>• Can accommodate radial loads and axial loads in either direction.</li> <li>• Has a large distance <math>l</math> between the acting load center of the bearing, and therefore a large momentary force load capacity.</li> <li>• Allowable misalignment angle is small.</li> </ul>                                       |
| Face-to-face duplex (DF) |  | <ul style="list-style-type: none"> <li>• Can accommodate radial loads and axial loads in either direction.</li> <li>• Has a smaller distance <math>l</math> between the acting load center of the bearing, and therefore a smaller momentary force load capacity.</li> <li>• Has a larger allowable misalignment angle than back-to-back duplex type.</li> </ul> |
| Tandem duplex (DT)       |  | <ul style="list-style-type: none"> <li>• Can accommodate radial loads and single direction axial loads.</li> <li>• Axial loads are received by both bearings as a set, and therefore heavy axial loads can be accommodated.</li> </ul>                                                                                                                           |

Note: 1. Duplex bearings are manufactured in a set to specified clearance and preload values, therefore they must be assembled together with identically numbered bearings and not mixed with other arrangements.

2. Triplex arrangements of angular contact bearings are also available. Consult NTN Engineering for details.

## 1.2 Four-point angular contact ball bearings

Four-point angular contact ball bearings have a contact angle of  $30^\circ$  and inner rings which are separated in half. As shown in **Diagram 2**, when the inner and outer rings receive a radial load the ball bearings contact the inner and outer rings at four points. This construction enables a single bearing to accommodate axial loads from either direction, and when generally under a simple axial load or heavy axial load, the bearing functions in reliance on two contact points like ordinary bearings.

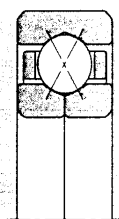


Diagram 2.

## 1.3 Double row angular contact ball bearings

The structure of double row angular contact ball bearings is designed by arranging two single row angular contact bearings back-to-back in duplex (DB) to form one united bearing with a contact angle of  $30^\circ$ .

These bearings are capable of accommodating radial

loads, axial loads in either direction, and have a high capacity for momentary loads as well.

As shown in **Diagram 3**, sealed and shielded type double row angular contact ball bearings are also available. Standard loads vary from those of open type bearings.

### ■ Flush ground

"Flush ground" is the name given to the finishing method shown in **Diagram 4** where the offset of the front and back faces of the bearing are ground to the same value. By doing this, a stated clearance or preload value can be achieved by using bearings with identical codes for these values, in other words by combining either DB or DF series bearings. DT series bearings can also be used in various arrangements to achieve uniform load distribution.

All BNT type bearings are flush ground, but other angular contact ball bearing series are not. If it is necessary to flush grind any of these other bearings, please consult NTN Engineering.

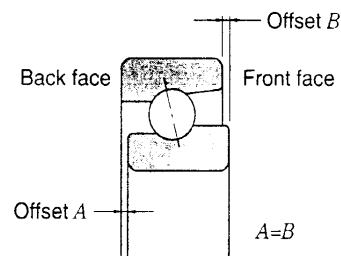
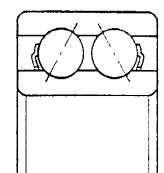
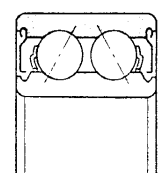


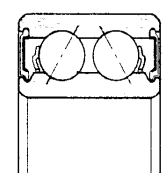
Diagram 4.



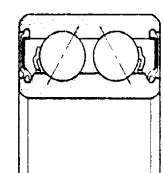
Open type



Shielded type (ZZ)



Non-contact sealed type (LLB)



Contact sealed type (LLU)

## 2. Standard cage types

Table 4 lists the standard cage types for angular contact ball bearings. For high speed use angular contact ball bearings, molded resin cages and machined cages are widely used.

Table 4 Standard cages for angular contact ball bearings

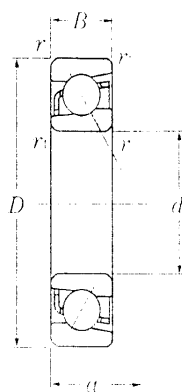
| Bearing series | Molded resin cage | Pressed cage | Machined cage   |
|----------------|-------------------|--------------|-----------------|
| 79             | 7904~7913         | —            | 7914 ~7960      |
| 70             | 7000~7024         | —            | 7026 ~7040      |
| 72             | —                 | 7200 ~7222   | 7224 ~7240      |
| 73             | —                 | 7300 ~7322   | 7324 ~7340      |
| 72B            | —                 | 7200B~7222B  | 7224B ~7240B    |
| 73B            | —                 | 7300B~7322B  | 7324B ~7340B    |
| 78C            | —                 | —            | 7805C ~7834C    |
| 79C            | 7904C~7913C       | —            | 7914C ~7934C    |
| 70C            | 7000C~7024C       | —            | 7026C ~7040C    |
| 72C            | 7200C~7220C       | —            | 7221C ~7240C    |
| 73C            | 7303C~7312C       | —            | 7300C ~7302C    |
|                |                   |              | 7313C ~7340C    |
| BNT0           | —                 | —            | BNT000 ~BNT009  |
| BNT2           | —                 | —            | BNT200 ~BNT209  |
| HSB9C          | —                 | —            | HSB910C~HSB934C |
| HSB0C          | HSB010C~HSB032C   | —            | HSB034C         |
| QJ2            | —                 | —            | QJ208 ~QJ224    |
| QJ3            | —                 | —            | QJ306 ~QJ324    |
| 52             | —                 | 5200 ~5218   | 5219, 5220      |
| 53             | —                 | 5302 ~5315   | —               |

1. Standard cages for 5S-BNT and 5S-HSB type bearings are the same as cages for BNT and HSB type bearings.

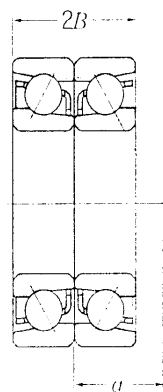
2. Due to the material characteristics of molded resin cages, use at application temperatures in excess of 120°C is not possible.

# ●Single and Duplex Arrangements

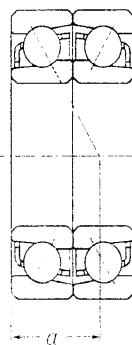
NTN



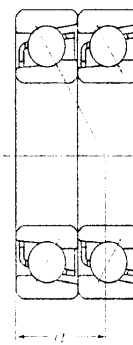
Single



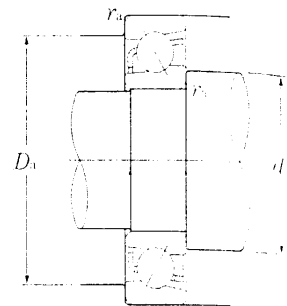
Back-to-back  
arrangement  
(DB)



Face-to-face  
arrangement  
(DF)

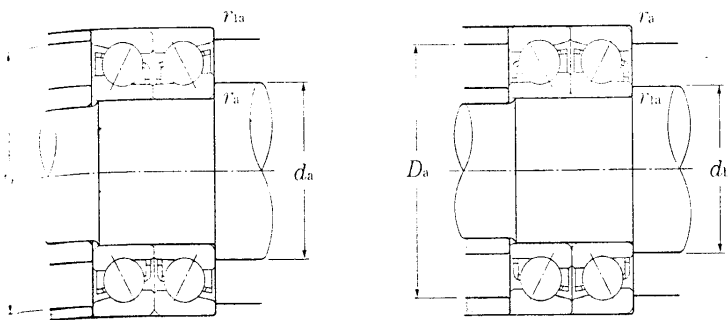


Tandem  
arrangement  
(DT)



d 10~30mm

| d  | Boundary dimensions |    |    |                                  |                                   | Basic load ratings |                 |                |                 | Limiting speeds <sup>1)</sup> |        | Bearing numbers <sup>2)</sup> | Load center <sup>3)</sup><br>mm<br>a | Mass <sup>4)</sup><br>kg<br>single<br>(approx.) |
|----|---------------------|----|----|----------------------------------|-----------------------------------|--------------------|-----------------|----------------|-----------------|-------------------------------|--------|-------------------------------|--------------------------------------|-------------------------------------------------|
|    | D                   | B  | 2B | r <sub>s min</sub> <sup>5)</sup> | r <sub>is min</sub> <sup>6)</sup> | dynamic            | static          | dynamic        | static          | rpm                           |        |                               |                                      |                                                 |
|    |                     |    |    |                                  |                                   | C <sub>r</sub>     | C <sub>0r</sub> | C <sub>r</sub> | C <sub>0r</sub> | grease                        | oil    |                               |                                      |                                                 |
|    |                     |    |    |                                  |                                   |                    |                 |                |                 |                               |        |                               |                                      |                                                 |
|    |                     |    |    |                                  |                                   |                    |                 |                |                 |                               |        |                               |                                      |                                                 |
| 10 | 26                  | 8  | 16 | 0.3                              | 0.15                              | 4.65               | 2.07            | 470            | 212             | 29,000                        | 39,000 | 7000                          | 9                                    | 0.023                                           |
|    | 30                  | 9  | 18 | 0.6                              | 0.3                               | 5.45               | 2.74            | 555            | 279             | 28,000                        | 37,000 | 7200                          | 10.5                                 | 0.029                                           |
|    | 30                  | 9  | 18 | 0.6                              | 0.3                               | 5.00               | 2.52            | 510            | 257             | 24,000                        | 32,000 | 7200B                         | 13                                   | 0.029                                           |
|    | 35                  | 11 | 22 | 0.6                              | 0.3                               | 10.1               | 4.95            | 1,030          | 500             | 26,000                        | 34,000 | 7300                          | 12                                   | 0.041                                           |
|    | 35                  | 11 | 22 | 0.6                              | 0.3                               | 9.50               | 4.60            | 970            | 470             | 22,000                        | 29,000 | 7300B                         | 15                                   | 0.041                                           |
| 12 | 28                  | 8  | 16 | 0.3                              | 0.15                              | 5.05               | 2.46            | 515            | 251             | 26,000                        | 35,000 | 7001                          | 10                                   | 0.025                                           |
|    | 32                  | 10 | 20 | 0.6                              | 0.3                               | 7.60               | 3.95            | 775            | 405             | 25,000                        | 33,000 | 7201                          | 11.5                                 | 0.035                                           |
|    | 32                  | 10 | 20 | 0.6                              | 0.3                               | 7.00               | 3.65            | 715            | 375             | 21,000                        | 28,000 | 7201B                         | 14                                   | 0.036                                           |
|    | 37                  | 12 | 24 | 1                                | 0.6                               | 11.2               | 5.25            | 1,140          | 535             | 23,000                        | 30,000 | 7301                          | 13                                   | 0.044                                           |
|    | 37                  | 12 | 24 | 1                                | 0.6                               | 10.5               | 4.95            | 1,080          | 505             | 19,000                        | 26,000 | 7301B                         | 16.5                                 | 0.045                                           |
| 15 | 32                  | 9  | 18 | 0.3                              | 0.15                              | 5.80               | 3.15            | 590            | 320             | 23,000                        | 31,000 | 7002                          | 11.5                                 | 0.035                                           |
|    | 35                  | 11 | 22 | 0.6                              | 0.3                               | 9.05               | 4.70            | 925            | 480             | 22,000                        | 29,000 | 7202                          | 12.5                                 | 0.046                                           |
|    | 35                  | 11 | 22 | 0.6                              | 0.3                               | 8.35               | 4.35            | 855            | 445             | 18,000                        | 25,000 | 7202B                         | 16                                   | 0.046                                           |
|    | 42                  | 13 | 26 | 1                                | 0.6                               | 13.5               | 7.20            | 1,370          | 735             | 19,000                        | 26,000 | 7302                          | 15                                   | 0.055                                           |
|    | 42                  | 13 | 26 | 1                                | 0.6                               | 12.5               | 6.65            | 1,270          | 680             | 17,000                        | 22,000 | 7302B                         | 19                                   | 0.057                                           |
| 17 | 35                  | 10 | 20 | 0.3                              | 0.15                              | 7.15               | 3.85            | 730            | 390             | 21,000                        | 28,000 | 7003                          | 12.5                                 | 0.046                                           |
|    | 40                  | 12 | 24 | 0.6                              | 0.3                               | 12.0               | 6.60            | 1,220          | 675             | 19,000                        | 26,000 | 7203                          | 14.5                                 | 0.064                                           |
|    | 40                  | 12 | 24 | 0.6                              | 0.3                               | 11.0               | 6.10            | 1,120          | 625             | 17,000                        | 22,000 | 7203B                         | 18                                   | 0.066                                           |
|    | 47                  | 14 | 28 | 1                                | 0.6                               | 15.9               | 8.65            | 1,630          | 880             | 18,000                        | 24,000 | 7303                          | 16                                   | 0.107                                           |
|    | 47                  | 14 | 28 | 1                                | 0.6                               | 14.8               | 8.00            | 1,510          | 820             | 15,000                        | 20,000 | 7303B                         | 20.5                                 | 0.109                                           |
| 20 | 42                  | 12 | 24 | 0.6                              | 0.3                               | 9.70               | 5.60            | 990            | 570             | 19,000                        | 25,000 | 7004                          | 15                                   | 0.08                                            |
|    | 47                  | 14 | 28 | 1                                | 0.6                               | 14.5               | 8.40            | 1,480          | 855             | 17,000                        | 23,000 | 7204                          | 17                                   | 0.1                                             |
|    | 47                  | 14 | 28 | 1                                | 0.6                               | 13.3               | 7.70            | 1,360          | 785             | 15,000                        | 20,000 | 7204B                         | 21.5                                 | 0.102                                           |
|    | 52                  | 15 | 30 | 1.1                              | 0.6                               | 18.7               | 10.4            | 1,910          | 1,060           | 16,000                        | 21,000 | 7304                          | 18                                   | 0.138                                           |
|    | 52                  | 15 | 30 | 1.1                              | 0.6                               | 17.3               | 9.65            | 1,770          | 985             | 13,000                        | 18,000 | 7304B                         | 22.5                                 | 0.141                                           |
| 25 | 42                  | 9  | 18 | 0.3                              | 0.15                              | 7.15               | 4.95            | 730            | 505             | 17,000                        | 22,000 | 7905                          | 14                                   | 0.05                                            |
|    | 47                  | 12 | 24 | 0.6                              | 0.3                               | 10.7               | 6.85            | 1,100          | 700             | 16,000                        | 21,000 | 7005                          | 16.5                                 | 0.093                                           |
|    | 52                  | 15 | 30 | 1                                | 0.6                               | 16.2               | 10.3            | 1,650          | 1,050           | 14,000                        | 19,000 | 7205                          | 19                                   | 0.125                                           |
|    | 52                  | 15 | 30 | 1                                | 0.6                               | 14.8               | 9.40            | 1,510          | 960             | 12,000                        | 16,000 | 7205B                         | 24                                   | 0.129                                           |
|    | 62                  | 17 | 34 | 1.1                              | 0.6                               | 26.4               | 15.8            | 2,690          | 1,610           | 13,000                        | 17,000 | 7305                          | 21                                   | 0.23                                            |
|    | 62                  | 17 | 34 | 1.1                              | 0.6                               | 24.4               | 14.6            | 2,490          | 1,490           | 11,000                        | 15,000 | 7305B                         | 27                                   | 0.234                                           |
| 30 | 47                  | 9  | 18 | 0.3                              | 0.15                              | 7.55               | 5.75            | 770            | 585             | 14,000                        | 19,000 | 7906                          | 15.5                                 | 0.056                                           |
|    | 55                  | 13 | 26 | 1                                | 0.6                               | 12.0               | 9.45            | 1,410          | 935             | 13,000                        | 18,000 | 7006                          | 19                                   | 0.135                                           |



## Equivalent bearing load

### dynamic

$$P_r = XF_r + YF_a$$

| Contact angle | e    | Single, DT       |   |               |      | DB, DF           |      |               |      |
|---------------|------|------------------|---|---------------|------|------------------|------|---------------|------|
|               |      | $F_a/F_r \leq e$ |   | $F_a/F_r > e$ |      | $F_a/F_r \leq e$ |      | $F_a/F_r > e$ |      |
|               |      | X                | Y | X             | Y    | X                | Y    | X             | Y    |
| 30°           | 0.80 | 1                | 0 | 0.39          | 0.76 | 1                | 0.78 | 0.63          | 1.24 |
| 40°           | 1.14 | 1                | 0 | 0.35          | 0.57 | 1                | 0.55 | 0.57          | 0.93 |

### static

$$P_{or} = X_o F_r + Y_o F_a$$

| Contact angle | Single, DT |       | DB, DF |       |
|---------------|------------|-------|--------|-------|
|               | $X_o$      | $Y_o$ | $X_o$  | $Y_o$ |
| 30°           | 0.5        | 0.33  | 1      | 0.66  |
| 40°           | 0.5        | 0.26  | 1      | 0.52  |

For single and DT arrangement,

When  $P_{or} < F_r$  use  $P_{or} = F_r$

| Basic load ratings |          |          |          | Limiting speeds <sup>①</sup> |        | Bearing numbers <sup>②</sup> |    |    | Abutment and fillet dimensions |       |       |       |          |           |
|--------------------|----------|----------|----------|------------------------------|--------|------------------------------|----|----|--------------------------------|-------|-------|-------|----------|-----------|
| dynamic            | static   | dynamic  | static   | (duplex)                     |        | DB                           | DF | DT | mm                             |       |       |       |          |           |
| (duplex)           | (duplex) | (duplex) | (duplex) | grease                       | oil    |                              |    |    | $d_a$                          | $d_b$ | $D_a$ | $D_b$ | $r_{as}$ | $r_{1as}$ |
| $C_r$              | $C_{or}$ | $C_r$    | $C_{or}$ | rpm                          |        |                              |    |    | min                            | min   | max   | max   | max      | max       |
| 7.50               | 4.15     | 765      | 425      | 23,000                       | 31,000 | DB                           | DF | DT | 12.5                           | 12.5  | 23.5  | 24.8  | 0.3      | 0.15      |
| 8.80               | 5.45     | 900      | 560      | 22,000                       | 30,000 | DB                           | DF | DT | 14.5                           | 12.5  | 25.5  | 27.5  | 0.6      | 0.3       |
| 8.10               | 5.05     | 825      | 515      | 19,000                       | 26,000 | DB                           | DF | DT | 14.5                           | 12.5  | 25.5  | 27.5  | 0.6      | 0.3       |
| 16.5               | 9.85     | 1,680    | 1,000    | 20,000                       | 27,000 | DB                           | DF | DT | 14.5                           | 12.5  | 30.5  | 32.5  | 0.6      | 0.3       |
| 15.4               | 9.20     | 1,570    | 940      | 18,000                       | 24,000 | DB                           | DF | DT | 14.5                           | 12.5  | 30.5  | 32.5  | 0.6      | 0.3       |
| 8.20               | 4.90     | 840      | 500      | 21,000                       | 28,000 | DB                           | DF | DT | 14.5                           | 14.5  | 25.5  | 26.8  | 0.3      | 0.15      |
| 12.3               | 7.95     | 1,260    | 810      | 20,000                       | 26,000 | DB                           | DF | DT | 16.5                           | 14.5  | 27.5  | 29.5  | 0.6      | 0.3       |
| 11.4               | 7.35     | 1,160    | 750      | 17,000                       | 23,000 | DB                           | DF | DT | 16.5                           | 14.5  | 27.5  | 29.5  | 0.6      | 0.3       |
| 18.2               | 10.5     | 1,850    | 1,070    | 18,000                       | 24,000 | DB                           | DF | DT | 17.5                           | 16.5  | 31.5  | 32.5  | 1        | 0.6       |
| 17.1               | 9.90     | 1,750    | 1,010    | 16,000                       | 21,000 | DB                           | DF | DT | 17.5                           | 16.5  | 31.5  | 32.5  | 1        | 0.6       |
| 9.40               | 6.30     | 960      | 640      | 18,000                       | 24,000 | DB                           | DF | DT | 17.5                           | 17.5  | 29.5  | 30.8  | 0.3      | 0.15      |
| 14.7               | 9.40     | 1,500    | 960      | 17,000                       | 23,000 | DB                           | DF | DT | 19.5                           | 17.5  | 30.5  | 32.5  | 0.6      | 0.3       |
| 13.6               | 8.70     | 1,390    | 885      | 15,000                       | 20,000 | DB                           | DF | DT | 19.5                           | 17.5  | 30.5  | 32.5  | 0.6      | 0.3       |
| 21.9               | 14.4     | 2,230    | 1,470    | 15,000                       | 21,000 | DB                           | DF | DT | 20.5                           | 19.5  | 36.5  | 37.5  | 1        | 0.6       |
| 20.3               | 13.3     | 2,070    | 1,360    | 13,000                       | 18,000 | DB                           | DF | DT | 20.5                           | 19.5  | 36.5  | 37.5  | 1        | 0.6       |
| 11.6               | 7.65     | 1,190    | 780      | 17,000                       | 22,000 | DB                           | DF | DT | 19.5                           | 19.5  | 32.5  | 33.8  | 0.3      | 0.15      |
| 19.4               | 13.2     | 1,980    | 1,350    | 15,000                       | 21,000 | DB                           | DF | DT | 21.5                           | 19.5  | 35.5  | 37.5  | 0.6      | 0.3       |
| 17.9               | 12.2     | 1,830    | 1,250    | 13,000                       | 18,000 | DB                           | DF | DT | 21.5                           | 19.5  | 35.5  | 37.5  | 0.6      | 0.3       |
| 25.9               | 17.3     | 2,640    | 1,760    | 14,000                       | 19,000 | DB                           | DF | DT | 22.5                           | 21.5  | 41.5  | 42.5  | 1        | 0.6       |
| 24.0               | 16.0     | 2,450    | 1,640    | 12,000                       | 16,000 | DB                           | DF | DT | 22.5                           | 21.5  | 41.5  | 42.5  | 1        | 0.6       |
| 15.8               | 11.2     | 1,610    | 1,140    | 15,000                       | 20,000 | DB                           | DF | DT | 24.5                           | 24.5  | 37.5  | 39.5  | 0.6      | 0.3       |
| 23.6               | 16.8     | 2,400    | 1,710    | 14,000                       | 18,000 | DB                           | DF | DT | 25.5                           | 24.5  | 41.5  | 42.5  | 1        | 0.6       |
| 21.6               | 15.4     | 2,200    | 1,570    | 12,000                       | 16,000 | DB                           | DF | DT | 25.5                           | 24.5  | 41.5  | 42.5  | 1        | 0.6       |
| 30.5               | 20.8     | 3,100    | 2,130    | 12,000                       | 17,000 | DB                           | DF | DT | 27                             | 24.5  | 45    | 47.5  | 1        | 0.6       |
| 28.2               | 19.3     | 2,870    | 1,970    | 11,000                       | 14,000 | DB                           | DF | DT | 27                             | 24.5  | 45    | 47.5  | 1        | 0.6       |
| 11.6               | 9.95     | 1,180    | 1,010    | 13,000                       | 18,000 | DB                           | DF | DT | 27.5                           | 27.5  | 39.5  | 40.8  | 0.3      | 0.15      |
| 17.5               | 13.7     | 1,780    | 1,400    | 12,000                       | 17,000 | DB                           | DF | DT | 29.5                           | 29.5  | 42.5  | 44.5  | 0.6      | 0.3       |
| 26.3               | 20.6     | 2,690    | 2,100    | 11,000                       | 15,000 | DB                           | DF | DT | 30.5                           | 29.5  | 46.5  | 47.5  | 1        | 0.6       |
| 24.0               | 18.8     | 2,450    | 1,920    | 10,000                       | 13,000 | DB                           | DF | DT | 30.5                           | 29.5  | 46.5  | 47.5  | 1        | 0.6       |
| 43.0               | 31.5     | 4,400    | 3,250    | 10,000                       | 14,000 | DB                           | DF | DT | 32                             | 29.5  | 55    | 57.5  | 1        | 0.6       |
| 39.5               | 29.3     | 4,050    | 2,980    | 9,100                        | 12,000 | DB                           | DF | DT | 32                             | 29.5  | 55    | 57.5  | 1        | 0.6       |
| 12.3               | 11.5     | 1,250    | 1,170    | 12,000                       | 15,000 | DB                           | DF | DT | 32.5                           | 32.5  | 44.5  | 45.8  | 0.3      | 0.15      |
| 22.5               | 18.9     | 2,300    | 1,930    | 11,000                       | 14,000 | DB                           | DF | DT | 35.5                           | 35.5  | 49.5  | 50.5  | 1        | 0.6       |