

TABLE 3. CIRCULAR EQUIVALENTS OF RECTANGULAR DUCTS FOR EQUAL FRICTION—(Continued)

| Side<br>Rectangular<br>Duct | 25   | 26   | 27   | 28   | 29   | 30   | 31   | 32   | 33   | 34   | 35   | 36   | 37   | 38   | 39   | 40   | 42   | 44   | 46   | 48   |
|-----------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 26                          | 28.1 | 28.6 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 28                          | 29.1 | 29.7 | 30.2 | 30.8 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 30                          | 30.1 | 30.7 | 31.3 | 31.9 | 32.5 | 33.0 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 32                          | 31.1 | 31.7 | 32.3 | 32.9 | 33.5 | 34.1 | 34.6 | 35.2 |      |      |      |      |      |      |      |      |      |      |      |      |
| 34                          | 32.0 | 32.7 | 33.3 | 33.9 | 34.5 | 35.1 | 35.7 | 36.3 | 36.8 | 37.4 |      |      |      |      |      |      |      |      |      |      |
| 36                          | 32.9 | 33.7 | 34.3 | 34.9 | 35.5 | 36.1 | 36.7 | 37.3 | 37.9 | 38.5 | 39.1 | 39.6 |      |      |      |      |      |      |      |      |
| 38                          | 33.8 | 34.6 | 35.3 | 35.9 | 36.5 | 37.1 | 37.7 | 38.4 | 39.0 | 39.5 | 40.1 | 40.7 | 41.2 | 41.8 |      |      |      |      |      |      |
| 40                          | 34.6 | 35.3 | 36.0 | 36.7 | 37.4 | 38.0 | 38.6 | 39.3 | 39.9 | 40.5 | 41.1 | 41.7 | 42.3 | 42.9 | 43.4 | 44.0 |      |      |      |      |
| 42                          | 35.2 | 36.0 | 36.8 | 37.6 | 38.3 | 39.0 | 39.6 | 40.3 | 40.9 | 41.5 | 42.1 | 42.7 | 43.4 | 44.0 | 44.5 | 45.1 | 46.2 |      |      |      |
| 44                          | 36.1 | 36.9 | 37.7 | 38.5 | 39.2 | 39.9 | 40.5 | 41.2 | 41.8 | 42.5 | 43.1 | 43.7 | 44.3 | 44.9 | 45.5 | 46.1 | 47.2 | 48.4 |      |      |
| 46                          | 37.0 | 37.8 | 38.5 | 39.3 | 40.0 | 40.8 | 41.5 | 42.2 | 42.9 | 43.5 | 44.2 | 44.8 | 45.4 | 46.0 | 46.6 | 47.2 | 48.4 | 49.5 | 50.6 | 52.8 |
| 48                          | 37.8 | 38.5 | 39.2 | 40.0 | 40.8 | 41.5 | 42.3 | 43.0 | 43.7 | 44.4 | 45.0 | 45.6 | 46.3 | 46.9 | 47.5 | 48.1 | 49.3 | 50.5 | 51.6 | 54.0 |
| 50                          | 38.4 | 39.2 | 40.0 | 40.8 | 41.5 | 42.3 | 43.0 | 43.8 | 44.5 | 45.2 | 45.9 | 46.5 | 47.1 | 47.9 | 48.5 | 49.1 | 50.4 | 51.6 | 52.9 | 55.0 |
| 52                          | 39.1 | 40.0 | 40.8 | 41.6 | 42.3 | 43.1 | 43.9 | 44.7 | 45.4 | 46.1 | 46.8 | 47.5 | 48.2 | 48.9 | 49.5 | 50.1 | 51.3 | 52.5 | 53.8 | 56.0 |
| 54                          | 39.8 | 40.7 | 41.5 | 42.4 | 43.2 | 44.0 | 44.7 | 45.5 | 46.4 | 47.0 | 47.6 | 48.4 | 49.2 | 49.9 | 50.5 | 51.1 | 52.3 | 53.5 | 54.8 | 57.0 |
| 56                          | 40.4 | 41.3 | 42.1 | 43.0 | 43.8 | 44.6 | 45.4 | 46.2 | 46.9 | 47.7 | 48.5 | 49.1 | 49.9 | 50.6 | 51.3 | 52.0 | 53.3 | 54.6 | 55.9 | 58.0 |
| 58                          | 41.2 | 42.1 | 42.9 | 43.8 | 44.5 | 45.4 | 46.2 | 47.0 | 47.8 | 48.5 | 49.4 | 50.0 | 50.8 | 51.5 | 52.2 | 52.9 | 54.2 | 55.5 | 56.8 | 58.9 |
| 60                          | 41.8 | 42.7 | 43.6 | 44.5 | 45.4 | 46.1 | 46.9 | 47.8 | 48.5 | 49.3 | 50.1 | 50.9 | 51.6 | 52.4 | 53.0 | 53.8 | 55.0 | 56.4 | 57.7 | 59.9 |
| 62                          | 42.5 | 43.4 | 44.3 | 45.1 | 46.0 | 46.8 | 47.6 | 48.4 | 49.3 | 50.0 | 50.9 | 51.7 | 52.4 | 53.2 | 53.9 | 54.7 | 55.9 | 57.2 | 58.5 | 60.6 |
| 64                          | 43.1 | 44.0 | 44.9 | 45.8 | 46.7 | 47.5 | 48.4 | 49.2 | 50.0 | 50.9 | 51.7 | 52.4 | 53.2 | 53.9 | 54.7 | 55.4 | 56.8 | 58.1 | 59.4 | 61.6 |
| 66                          | 43.7 | 44.7 | 45.6 | 46.5 | 47.3 | 48.2 | 49.1 | 50.0 | 50.7 | 51.6 | 52.4 | 53.1 | 53.9 | 54.7 | 55.5 | 56.2 | 57.6 | 59.1 | 60.4 | 62.6 |
| 68                          | 44.4 | 45.3 | 46.3 | 47.2 | 48.0 | 48.9 | 49.7 | 50.7 | 51.4 | 52.2 | 53.1 | 53.8 | 54.6 | 55.5 | 56.2 | 56.9 | 58.4 | 59.9 | 61.3 | 63.5 |
| 70                          | 45.0 | 46.0 | 46.9 | 47.8 | 48.7 | 49.5 | 50.4 | 51.3 | 52.0 | 52.9 | 53.7 | 54.5 | 55.4 | 56.2 | 57.0 | 57.7 | 59.1 | 60.6 | 62.1 | 64.5 |
| 72                          | 45.5 | 46.5 | 47.5 | 48.4 | 49.3 | 50.1 | 51.0 | 51.9 | 52.8 | 53.7 | 54.6 | 55.4 | 56.2 | 57.0 | 57.8 | 58.7 | 60.0 | 61.3 | 63.0 | 65.5 |

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| Side<br>Rectangular<br>Duct | 50   | 52   | 54   | 56   | 58   | 60   | 62   | 64   | 66   | 68   | 70   | 72   | 74   | 76   | 78   | 80   | 82   | 84   | 86    | 88    |
|-----------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|
| 50                          | 55.0 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |
| 52                          | 56.1 | 57.2 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |
| 54                          | 57.2 | 58.3 | 59.4 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |
| 56                          | 58.3 | 59.4 | 60.5 | 61.6 | 62.7 | 63.8 |      |      |      |      |      |      |      |      |      |      |      |      |       |       |
| 58                          | 59.3 | 60.5 | 61.6 | 62.7 | 63.8 | 64.9 | 66.0 |      |      |      |      |      |      |      |      |      |      |      |       |       |
| 60                          | 60.3 | 61.5 | 62.7 | 63.8 | 64.9 | 66.1 | 67.2 | 68.2 | 69.3 | 70.4 | 71.5 | 72.6 |      |      |      |      |      |      |       |       |
| 62                          | 61.3 | 62.5 | 63.7 | 64.8 | 66.0 | 67.1 | 68.2 | 69.3 | 70.4 | 71.5 | 72.6 | 73.7 | 74.8 | 75.9 | 77.0 | 78.1 | 79.2 | 80.3 | 81.4  | 82.5  |
| 64                          | 62.2 | 63.5 | 64.7 | 65.9 | 67.1 | 68.2 | 69.3 | 70.4 | 71.5 | 72.6 | 73.7 | 74.8 | 75.9 | 77.0 | 78.1 | 79.2 | 80.3 | 81.4 | 82.5  | 83.6  |
| 66                          | 63.2 | 64.4 | 65.7 | 66.9 | 68.1 | 69.3 | 70.4 | 71.5 | 72.6 | 73.7 | 74.8 | 75.9 | 77.0 | 78.1 | 79.2 | 80.3 | 81.4 | 82.5 | 83.6  | 84.7  |
| 68                          | 64.1 | 65.4 | 66.6 | 67.9 | 69.1 | 70.3 | 71.5 | 72.6 | 73.7 | 74.8 | 75.9 | 77.0 | 78.1 | 79.2 | 80.3 | 81.4 | 82.5 | 83.6 | 84.7  | 85.8  |
| 70                          | 65.0 | 66.3 | 67.6 | 68.8 | 70.1 | 71.3 | 72.5 | 73.7 | 74.8 | 75.9 | 77.0 | 78.1 | 79.2 | 80.3 | 81.4 | 82.5 | 83.6 | 84.7 | 85.8  | 86.9  |
| 72                          | 65.9 | 67.2 | 68.5 | 69.8 | 71.1 | 72.3 | 73.5 | 74.7 | 75.9 | 77.0 | 78.1 | 79.2 | 80.3 | 81.4 | 82.5 | 83.6 | 84.7 | 85.8 | 86.9  | 88.0  |
| 74                          | 66.8 | 68.1 | 69.4 | 70.7 | 72.0 | 73.3 | 74.5 | 75.7 | 76.9 | 78.1 | 79.2 | 80.3 | 81.4 | 82.5 | 83.6 | 84.7 | 85.8 | 86.9 | 88.0  | 89.1  |
| 76                          | 67.6 | 69.0 | 70.3 | 71.6 | 72.9 | 74.2 | 75.5 | 76.7 | 77.9 | 79.2 | 80.3 | 81.4 | 82.5 | 83.6 | 84.7 | 85.8 | 86.9 | 88.0 | 89.1  | 90.2  |
| 78                          | 68.4 | 69.8 | 71.2 | 72.6 | 73.9 | 75.2 | 76.4 | 77.7 | 78.9 | 80.2 | 81.4 | 82.5 | 83.6 | 84.7 | 85.8 | 86.9 | 88.0 | 89.1 | 90.2  | 91.3  |
| 80                          | 69.2 | 70.7 | 72.1 | 73.5 | 74.8 | 76.1 | 77.4 | 78.6 | 79.9 | 81.2 | 82.4 | 83.6 | 84.7 | 85.8 | 86.9 | 88.0 | 89.1 | 90.2 | 91.3  | 92.4  |
| 82                          | 70.1 | 71.5 | 73.0 | 74.4 | 75.7 | 77.1 | 78.4 | 79.6 | 80.9 | 82.1 | 83.4 | 84.6 | 85.8 | 86.9 | 88.0 | 89.1 | 90.2 | 91.3 | 92.4  | 93.5  |
| 84                          | 70.9 | 72.3 | 73.8 | 75.2 | 76.6 | 78.0 | 79.3 | 80.6 | 81.9 | 83.1 | 84.4 | 85.6 | 86.8 | 88.0 | 89.1 | 90.2 | 91.3 | 92.4 | 93.5  | 94.6  |
| 86                          | 71.7 | 73.2 | 74.6 | 76.0 | 77.4 | 78.9 | 80.3 | 81.5 | 82.9 | 84.0 | 85.3 | 86.6 | 87.8 | 89.0 | 90.2 | 91.3 | 92.4 | 93.5 | 94.6  | 95.7  |
| 88                          | 72.5 | 74.0 | 75.5 | 76.8 | 78.3 | 79.8 | 81.2 | 82.5 | 83.9 | 85.0 | 86.3 | 87.5 | 88.8 | 90.0 | 91.2 | 92.4 | 93.5 | 94.6 | 95.7  | 96.8  |
| 90                          | 73.3 | 74.7 | 76.3 | 77.7 | 79.1 | 80.6 | 82.0 | 83.4 | 84.7 | 85.9 | 87.2 | 88.5 | 89.7 | 91.0 | 92.2 | 93.4 | 94.6 | 95.7 | 96.8  | 97.9  |
| 92                          | 74.1 | 75.5 | 77.1 | 78.5 | 79.9 | 81.4 | 82.8 | 84.3 | 85.6 | 86.9 | 88.2 | 89.5 | 90.7 | 92.0 | 93.2 | 94.4 | 95.6 | 96.7 | 97.9  | 99.0  |
| 94                          | 74.8 | 76.3 | 77.8 | 79.3 | 80.7 | 82.2 | 83.7 | 85.1 | 86.5 | 87.8 | 89.1 | 90.4 | 91.7 | 93.0 | 94.2 | 95.4 | 96.6 | 97.8 | 99.0  | 100.1 |
| 96                          | 75.5 | 77.1 | 78.7 | 80.2 | 81.6 | 83.0 | 84.5 | 85.9 | 87.4 | 88.7 | 90.0 | 91.3 | 92.6 | 93.9 | 95.2 | 96.4 | 97.6 | 98.8 | 100.0 | 101.2 |