# BETONARME İNŞAAT

# DONATI ALAN VE YERLEŞİM TABLOLARI

## DONATI ALANLARI

PLAK ALANLARI 100 cm GENİŞLİK İÇİN DONATI ALANLARI (cm²)

| çubuk aralığı t (cm) | s | Ø (mm olarak çubuk çapı) | | | | | | | | | m. de çubuk sayısı |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | |
| 7.0 | 4.04 | 7.18 | 11.22 | 16.16 | 21.99 | 28.73 | 36.36 | 44.87 | 54.30 | 64.63 | 14.3 |
| 7.5 | 3.77 | 6.70 | 10.47 | 15.08 | 20.52 | 26.81 | 33.93 | 41.88 | 50.81 | 60.32 | 13.3 |
| 8.0 | 3.53 | 6.28 | 9.82 | 14.14 | 19.24 | 25.14 | 31.81 | 39.26 | 47.51 | 56.55 | 12.5 |
| 8.5 | 3.33 | 5.91 | 9.24 | 13.31 | 18.11 | 23.66 | 29.94 | 36.95 | 44.72 | 53.22 | 11.8 |
| 9.0 | 3.14 | 5.59 | 8.73 | 12.57 | 17.10 | 22.34 | 28.28 | 34.90 | 42.23 | 50.27 | 11.1 |
| 9.5 | 2.98 | 5.29 | 8.27 | 11.90 | 16.20 | 21.17 | 26.79 | 33.06 | 40.01 | 47.62 | 10.5 |
| 10.0 | 2.83 | 5.03 | 7.85 | 11.31 | 15.39 | 20.11 | 25.45 | 31.41 | 38.01 | 45.24 | 10.0 |
| 10.5 | 2.69 | 4.79 | 7.48 | 10.77 | 14.66 | 19.15 | 24.24 | 29.91 | 36.20 | 43.09 | 9.5 |
| 11.0 | 2.57 | 4.57 | 7.14 | 10.28 | 13.99 | 18.28 | 23.14 | 28.55 | 34.55 | 41.13 | 9.1 |
| 11.5 | 2.46 | 4.37 | 6.83 | 9.84 | 13.39 | 17.49 | 22.13 | 27.31 | 33.05 | 39.34 | 8.7 |
| 12.0 | 2.36 | 4.19 | 6.54 | 9.42 | 12.83 | 16.76 | 21.21 | 26.17 | 31.67 | 37.70 | 8.3 |
| 12.5 | 2.26 | 4.02 | 6.28 | 9.05 | 12.32 | 16.09 | 20.36 | 25.13 | 30.41 | 36.19 | 8.0 |
| 13.0 | 2.17 | 3.87 | 6.04 | 8.70 | 11.84 | 15.47 | 19.58 | 24.16 | 29.24 | 34.80 | 7.7 |
| 13.5 | 2.09 | 3.72 | 5.82 | 8.38 | 11.40 | 14.90 | 18.85 | 23.27 | 28.16 | 33.51 | 7.4 |
| 14.0 | 2.02 | 3.59 | 5.61 | 8.08 | 11.00 | 14.36 | 18.18 | 22.44 | 27.15 | 32.31 | 7.1 |
| 14.5 | 1.95 | 3.47 | 5.42 | 7.80 | 10.62 | 13.87 | 17.55 | 21.66 | 26.21 | 31.20 | 6.9 |
| 15.0 | 1.89 | 3.35 | 5.24 | 7.54 | 10.26 | 13.41 | 16.97 | 20.94 | 25.34 | 30.16 | 6.7 |
| 15.5 | 1.82 | 3.24 | 5.07 | 7.30 | 9.93 | 12.97 | 16.42 | 20.27 | 24.52 | 29.19 | 6.5 |
| 16.0 | 1.77 | 3.14 | 4.91 | 7.07 | 9.62 | 12.57 | 15.90 | 19.64 | 23.76 | 28.28 | 6.3 |
| 16.5 | 1.71 | 3.05 | 4.76 | 6.85 | 9.33 | 12.19 | 15.42 | 19.04 | 23.04 | 27.41 | 6.1 |
| 17.0 | 1.66 | 2.96 | 4.62 | 6.65 | 9.05 | 11.83 | 14.97 | 18.48 | 22.36 | 26.61 | 5.9 |
| 17.5 | 1.62 | 2.87 | 4.49 | 6.46 | 8.79 | 11.49 | 14.54 | 17.95 | 21.72 | 25.85 | 5.7 |
| 18.0 | 1.57 | 2.79 | 4.36 | 6.28 | 8.55 | 11.17 | 14.14 | 17.46 | 21.12 | 25.13 | 5.6 |
| 18.5 | 1.53 | 2.72 | 4.25 | 6.11 | 8.32 | 10.87 | 13.76 | 16.99 | 20.55 | 24.45 | 5.4 |
| 19.0 | 1.49 | 2.65 | 4.13 | 5.95 | 8.10 | 10.58 | 13.39 | 16.54 | 20.01 | 23.81 | 5.3 |
| 19.5 | 1.45 | 2.58 | 4.03 | 5.80 | 7.89 | 10.31 | 13.05 | 16.11 | 19.49 | 23.20 | 5.1 |
| 20.0 | 1.41 | 2.51 | 3.93 | 5.65 | 7.69 | 10.05 | 12.72 | 15.72 | 19.01 | 22.62 | 5.0 |
| 21.0 | 1.34 | 2.40 | 3.74 | 5.39 | 7.33 | 9.58 | 12.12 | 14.96 | 18.10 | 21.55 | 4.8 |
| 22.0 | 1.28 | 2.29 | 3.57 | 5.13 | 7.00 | 9.14 | 11.57 | 14.28 | 17.27 | 20.57 | 4.6 |
| 23.0 | 1.23 | 2.19 | 3.41 | 4.92 | 6.70 | 8.75 | 11.09 | 13.66 | 16.52 | 19.67 | 4.4 |
| 24.0 | 1.18 | 2.10 | 3.27 | 4.71 | 6.41 | 8.38 | 10.61 | 13.09 | 15.83 | 18.85 | 4.2 |
| 25.0 | 1.13 | 2.01 | 3.14 | 4.53 | 6.16 | 8.05 | 10.18 | 12.57 | 15.21 | 18.10 | 4.0 |
| 26.0 | 1.09 | 1.94 | 3.02 | 4.35 | 5.92 | 7.74 | 9.79 | 12.08 | 14.62 | 17.40 | 3.9 |
| 27.0 | 1.05 | 1.86 | 2.91 | 4.19 | 5.70 | 7.45 | 9.43 | 11.64 | 14.08 | 16.76 | 3.7 |
| 28.0 | 1.01 | 1.80 | 2.81 | 4.04 | 5.50 | 7.18 | 9.09 | 11.22 | 13.58 | 16.16 | 3.6 |
| 29.0 | 0.98 | 1.74 | 2.71 | 3.90 | 5.31 | 6.94 | 8.78 | 10.83 | 13.11 | 15.60 | 3.4 |
| 30.0 | 0.95 | 1.68 | 2.62 | 3.77 | 5.13 | 6.71 | 8.49 | 10.47 | 12.60 | 15.08 | 3.3 |

PLAKLARDA 100 cm GENİŞLİK VE İKİ ÇEŞİT ÇAPTA ÇUBUK İÇİN DONATI ALANLARI (cm²)

| çubuk aralığı t (cm) | Ø1 / Ø2 mm olarak çubuk çapları | | | | | | | | | | | | m. de çubuk sayısı |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 6/8 | 8/10 | 8/12 | 10/12 | 10/14 | 12/14 | 14/16 | 16/18 | 16/20 | 20/22 | 22/24 | 24/28 | |
| 8.0 | 4.9 | 8.1 | 10.2 | 12.0 | 14.5 | 16.7 | 22.2 | 28.4 | 36.4 | 43.3 | 52.0 | 61.4 | 12.5 |
| 8.5 | 4.6 | 7.6 | 9.6 | 11.3 | 13.7 | 15.7 | 20.9 | 26.7 | 33.3 | 40.7 | 48.9 | 57.7 | 11.8 |
| 9.0 | 4.4 | 7.2 | 9.1 | 10.7 | 12.9 | 14.8 | 19.7 | 25.2 | 31.5 | 38.6 | 46.2 | 54.6 | 11.1 |
| 9.5 | 4.1 | 6.8 | 8.6 | 10.1 | 12.2 | 14.1 | 18.7 | 23.9 | 29.8 | 36.5 | 43.7 | 51.6 | 10.5 |
| 10.0 | 3.9 | 6.4 | 8.2 | 9.6 | 11.6 | 13.4 | 17.8 | 22.8 | 28.9 | 34.7 | 41.6 | 49.1 | 10 |
| 10.5 | 3.8 | 6.1 | 7.8 | 9.1 | 11.0 | 12.7 | 16.9 | 21.7 | 27.0 | 33.0 | 39.6 | 47.2 | 9.5 |
| 11.0 | 3.6 | 5.9 | 7.4 | 8.7 | 10.6 | 12.1 | 16.1 | 20.6 | 25.7 | 32.0 | 38.3 | 44.7 | 9.1 |
| 11.5 | 3.4 | 5.6 | 7.1 | 8.3 | 10.1 | 11.5 | 15.4 | 19.8 | 24.7 | 30.1 | 36.1 | 42.6 | 8.7 |
| 12.0 | 3.3 | 5.4 | 6.8 | 8.0 | 9.7 | 11.1 | 14.8 | 19.0 | 23.7 | 28.9 | 34.6 | 40.9 | 8.3 |
| 12.5 | 3.1 | 5.2 | 6.5 | 7.7 | 9.3 | 10.7 | 14.2 | 18.3 | 22.7 | 27.7 | 33.2 | 39.3 | 8 |
| 13.0 | 3.0 | 5.0 | 6.3 | 7.4 | 8.9 | 10.3 | 13.7 | 17.5 | 21.7 | 26.6 | 32.0 | 37.8 | 7.7 |
| 13.5 | 2.9 | 4.8 | 6.1 | 7.1 | 8.6 | 9.8 | 13.1 | 16.8 | 21.0 | 25.7 | 31.1 | 36.4 | 7.4 |
| 14.0 | 2.8 | 4.6 | 5.8 | 6.9 | 8.3 | 9.5 | 12.7 | 16.2 | 20.3 | 24.8 | 29.7 | 35.0 | 7.1 |
| 14.5 | 2.7 | 4.4 | 5.6 | 6.6 | 8.0 | 9.2 | 12.2 | 15.7 | 19.5 | 23.9 | 28.7 | 33.9 | 6.9 |
| 15.0 | 2.5 | 4.3 | 5.5 | 6.4 | 7.8 | 8.9 | 11.8 | 15.2 | 18.9 | 23.1 | 27.7 | 32.7 | 6.7 |
| 15.5 | 2.5 | 4.2 | 5.3 | 6.2 | 7.5 | 8.6 | 11.5 | 14.7 | 18.3 | 22.4 | 26.9 | 31.7 | 6.5 |
| 16.0 | 2.5 | 4.0 | 5.1 | 6.0 | 7.3 | 8.3 | 11.1 | 14.2 | 17.7 | 21.7 | 26.0 | 30.6 | 6.3 |
| 16.5 | 2.4 | 3.9 | 4.9 | 5.8 | 7.0 | 8.1 | 10.8 | 13.8 | 17.2 | 21.0 | 25.2 | 29.8 | 6.1 |
| 17.0 | 2.3 | 3.8 | 4.8 | 5.6 | 6.8 | 7.9 | 10.4 | 13.4 | 16.7 | 20.4 | 24.5 | 28.3 | 5.9 |
| 17.5 | 2.3 | 3.7 | 4.7 | 5.5 | 6.6 | 7.6 | 10.1 | 13.0 | 16.2 | 19.8 | 23.7 | 28.1 | 5.7 |
| 18.0 | 2.2 | 3.6 | 4.5 | 5.3 | 6.5 | 7.4 | 9.9 | 12.6 | 15.8 | 19.3 | 23.1 | 27.3 | 5.6 |
| 18.5 | 2.1 | 3.5 | 4.4 | 5.2 | 6.3 | 7.2 | 9.6 | 12.3 | 15.3 | 18.8 | 22.5 | 26.9 | 5.4 |
| 19.0 | 2.1 | 3.4 | 4.3 | 5.1 | 6.1 | 7.0 | 9.3 | 12.0 | 14.9 | 18.2 | 21.9 | 25.9 | 5.3 |
| 19.5 | 2.0 | 3.3 | 4.2 | 4.9 | 6.0 | 6.8 | 9.1 | 11.6 | 14.5 | 17.8 | 21.3 | 25.2 | 5.1 |
| 20.0 | 2.0 | 3.2 | 4.1 | 4.8 | 5.8 | 6.7 | 8.9 | 11.4 | 14.2 | 17.3 | 20.8 | 24.5 | 5 |

KİRİŞLERİN $b_o$ GENİŞLİĞİ (cm), Ø MİNİMUM ETRİYE ÇAPI VE $F_e$ DONATISI (cm²)

| Ø mm | Ø1 mm | 3 Çubuk | | 4 Çubuk | | 5 Çubuk | | 6 çubuk | | 7 Çubuk | | 8 Çubuk | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $b_o$ | $F_e$ | $b_o$ | $F_e$ | $b_o$ | $F_e$ | $b_o$ | $F_e$ | $b_o$ | $F_e$ | $b_o$ | $F_e$ |
| 12 | 6 | 11.8 | 3.4 | 15.0 | 4.5 | 18.2 | 5.7 | 21.4 | 6.8 | 24.6 | 7.9 | 27.8 | 9.1 |
| 14 | 6 | 12.4 | 4.6 | 15.8 | 6.2 | 19.2 | 7.7 | 22.6 | 9.2 | 26.0 | 10.8 | 29.4 | 12.3 |
| 16 | 6 | 13.0 | 6.0 | 16.8 | 8.0 | 20.2 | 10.0 | 23.8 | 12.1 | 27.4 | 14.1 | 31.0 | 16.1 |
| 18 | 6 | 13.6 | 7.6 | 17.4 | 10.2 | 21.2 | 12.7 | 25.0 | 15.3 | 28.8 | 17.8 | 32.6 | 20.4 |
| 20 | 8 | 14.8 | 9.4 | 18.6 | 12.5 | 22.8 | 15.7 | 26.6 | 18.8 | 30.6 | 22.0 | 34.8 | 25.1 |
| 22 | 8 | 15.6 | 11.4 | 20.0 | 15.2 | 24.4 | 19.0 | 28.6 | 22.8 | 33.2 | 26.6 | 37.8 | 30.4 |
| 24 | 8 | 16.6 | 13.6 | 21.4 | 18.1 | 26.2 | 22.6 | 31.0 | 27.1 | 35.8 | 31.7 | 40.6 | 36.2 |
| 26 | 10 | 18.0 | 15.9 | 23.2 | 21.2 | 28.4 | 26.5 | 33.6 | 31.9 | 38.8 | 37.2 | 44.0 | 42.6 |
| 28 | 10 | 19.0 | 18.5 | 24.6 | 24.6 | 30.2 | 30.8 | 35.8 | 36.9 | 41.4 | 43.1 | 47.0 | 49.3 |
| 30 | 10 | 20.0 | 21.2 | 25.0 | 28.3 | 32.0 | 35.3 | 38.0 | 42.4 | 44.0 | 49.5 | 50.0 | 56.5 |
| 32 | 12 | 21.4 | 24.1 | 28.0 | 32.2 | 34.6 | 40.2 | 40.6 | 48.3 | 47.0 | 56.3 | 53.4 | 64.3 |
| 34 | 12 | 22.4 | 27.2 | 29.2 | 36.3 | 36.0 | 45.4 | 42.8 | 54.5 | 49.6 | 63.6 | 56.4 | 72.6 |
| 36 | 12 | 23.4 | 30.5 | 30.6 | 40.7 | 37.8 | 50.9 | 45.0 | 61.1 | 52.2 | 71.3 | 59.4 | 81.4 |
| 38 | 14 | 24.8 | 34.0 | 32.4 | 45.4 | 40.0 | 56.7 | 47.6 | 68.0 | 55.2 | 79.4 | 62.8 | 90.7 |
| 40 | 14 | 25.8 | 37.7 | 33.8 | 50.3 | 41.8 | 62.8 | 49.8 | 75.4 | 57.8 | 88.0 | 65.8 | 100.0 |

# DONATI ALANLARI

DONATI ÇUBUKLARI KESİT ALANLARI

| Ø mm | g kg/m | ÇUBUK SAYISI | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 6 | 0.222 | 0.28 | 0.57 | 0.85 | 1.13 | 1.41 | 1.70 | 1.98 | 2.26 | 2.54 | 2.83 |
| 8 | 0.395 | 0.50 | 1.01 | 1.51 | 2.01 | 2.51 | 3.02 | 3.52 | 4.02 | 4.52 | 5.03 |
| 10 | 0.617 | 0.79 | 1.57 | 2.36 | 3.14 | 3.93 | 4.71 | 5.50 | 6.28 | 7.07 | 7.85 |
| 12 | 0.888 | 1.13 | 2.26 | 3.39 | 4.52 | 5.65 | 6.79 | 7.92 | 9.05 | 10.18 | 11.31 |
| 14 | 1.21 | 1.54 | 3.08 | 4.62 | 6.16 | 7.70 | 9.24 | 10.78 | 12.32 | 13.85 | 15.39 |
| 16 | 1.58 | 2.01 | 4.02 | 6.03 | 8.04 | 10.05 | 12.06 | 14.07 | 16.08 | 18.10 | 20.11 |
| 18 | 2.00 | 2.54 | 5.09 | 7.63 | 10.18 | 12.72 | 15.27 | 17.81 | 20.36 | 22.90 | 25.45 |
| 20 | 2.47 | 3.14 | 6.28 | 9.42 | 12.57 | 15.71 | 18.85 | 21.99 | 25.13 | 28.27 | 31.42 |
| 22 | 2.98 | 3.80 | 7.60 | 11.40 | 15.21 | 19.01 | 22.81 | 26.61 | 30.41 | 34.21 | 38.01 |
| 24 | 3.55 | 4.52 | 9.05 | 13.57 | 18.10 | 22.62 | 27.14 | 31.67 | 36.19 | 40.72 | 45.24 |
| 26 | 4.17 | 5.31 | 10.62 | 15.93 | 21.24 | 26.55 | 31.86 | 37.17 | 42.47 | 47.78 | 53.09 |
| 28 | 4.83 | 6.16 | 12.32 | 18.47 | 24.63 | 30.79 | 36.95 | 43.10 | 49.26 | 55.42 | 61.58 |
| 30 | 5.55 | 7.07 | 14.14 | 21.21 | 28.27 | 35.34 | 42.41 | 49.48 | 56.55 | 63.62 | 70.68 |
| 32 | 6.31 | 8.04 | 16.08 | 24.13 | 32.17 | 40.21 | 48.26 | 56.30 | 64.34 | 72.38 | 80.42 |
| 34 | 7.13 | 9.08 | 18.16 | 27.24 | 36.32 | 45.40 | 54.48 | 63.55 | 72.63 | 81.71 | 90.79 |
| 36 | 7.99 | 10.18 | 20.36 | 30.54 | 40.72 | 50.89 | 61.07 | 71.25 | 81.43 | 91.61 | 101.79 |
| 38 | 8.90 | 11.34 | 22.68 | 34.02 | 45.36 | 56.71 | 68.05 | 79.39 | 90.73 | 102.07 | 113.41 |
| 40 | 9.87 | 12.57 | 25.13 | 37.70 | 50.27 | 62.83 | 75.40 | 87.96 | 100.53 | 113.10 | 125.66 |
| 45 | 12.48 | 15.90 | 31.81 | 47.71 | 63.62 | 79.52 | 95.43 | 111.33 | 127.23 | 143.14 | 159.04 |
| 50 | 15.41 | 19.64 | 39.27 | 58.91 | 78.54 | 98.17 | 117.81 | 137.45 | 157.08 | 176.72 | 196.35 |

KOLONLARDA BOYUNA ÇUBUK ÇAPINA GÖRE ETRİYE ARALIKLARI VE DONATI ENKESİT ALANLARI

| t = 12 a cm | G kg/m | Ø mm | $F_e$ (cm²) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 4 Ad. | 6 Ad. | 8 Ad. | 10 Ad. | 12 Ad. | 16 Ad. | 20 Ad. | 24 Ad. |
| 16.8 | 1.208 | 14 | 6.16 | 9.24 | 12.32 | 15.39 | 18.47 | | | |
| 19.2 | 1.578 | 16 | 8.04 | 12.06 | 16.08 | 20.11 | 24.13 | | | |
| 21.6 | 1.998 | 18 | 10.18 | 15.26 | 20.35 | 25.45 | 30.54 | | | |
| 24.0 | 1.466 | 20 | 12.57 | 18.84 | 25.14 | 31.40 | 37.68 | 50.28 | 62.8 | 75.4 |
| 26.4 | 2.984 | 22 | 15.21 | 20.81 | 30.41 | 38.01 | 45.62 | 60.82 | 76.0 | 91.2 |
| 28.8 | 3.551 | 24 | 18.10 | 27.14 | 36.19 | 45.24 | 54.28 | 72.38 | 90.5 | 108.6 |
| 31.2 | 4.169 | 26 | 21.24 | 31.86 | 42.47 | 53.09 | 63.72 | 84.94 | 106.2 | 127.4 |
| 33.6 | 4.839 | 28 | 24.63 | 36.94 | 49.26 | 61.58 | 73.88 | 98.52 | 123.2 | 147.8 |
| 36.0 | 5.546 | 30 | 28.26 | 42.41 | 56.55 | 70.69 | 84.83 | 113.1 | 141.4 | 169.7 |
| 38.4 | 6.313 | 32 | 32.17 | 48.26 | 64.34 | 80.42 | 96.52 | 128.7 | 160.8 | 193.0 |
| 40.8 | 7.127 | 34 | 36.32 | 54.47 | 72.63 | 90.79 | 108.9 | 145.3 | 181.6 | 217.9 |
| 43.2 | 7.990 | 36 | 40.74 | 61.07 | 81.43 | 101.8 | 122.1 | 162.8 | 203.6 | 244.3 |
| 48.0 | 9.865 | 40 | 50.26 | 75.40 | 100.5 | 125.7 | 150.8 | 201.1 | 251.4 | 301.5 |

# PİLYELER

PİLYELER İÇİN V 2 $F_{d/k}$ DEĞERLERİ

| Ø | Pilye sayısı | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 8 | 0.71 | 1.42 | 2.13 | 2.84 | 3.55 | 4.27 | 4.98 | 5.69 | 6.40 | 7.11 | 7.82 | 8.53 | 9.24 | 9.95 |
| 10 | 1.11 | 2.22 | 3.33 | 4.44 | 5.55 | 6.66 | 7.77 | 8.89 | 10.0 | 11.1 | 12.2 | 13.33 | 14.4 | 15.5 |
| 12 | 1.60 | 3.20 | 4.80 | 6.40 | 8.00 | 9.60 | 11.2 | 12.8 | 14.4 | 16.0 | 17.6 | 19.2 | 20.8 | 22.4 |
| 14 | 2.18 | 4.35 | 6.53 | 8.71 | 10.9 | 13.1 | 15.2 | 17.4 | 19.6 | 21.8 | 23.9 | 26.1 | 28.3 | 30.5 |
| 16 | 2.84 | 5.69 | 8.53 | 11.4 | 14.2 | 17.1 | 19.9 | 22.7 | 25.6 | 28.4 | 31.3 | 34.1 | 37.0 | 39.8 |
| 18 | 3.60 | 7.20 | 10.8 | 14.4 | 18.0 | 21.6 | 25.2 | 28.8 | 32.4 | 36.0 | 39.6 | 43.2 | 46.8 | 50.4 |
| 20 | 4.44 | 8.89 | 13.3 | 17.8 | 22.2 | 26.7 | 31.1 | 35.5 | 40.0 | 44.4 | 48.9 | 53.3 | 57.8 | 62.2 |
| 22 | 5.38 | 10.8 | 16.1 | 21.5 | 26.9 | 32.2 | 37.6 | 43.0 | 48.4 | 53.8 | 59.1 | 64.5 | 69.9 | 75.3 |
| 24 | 6.40 | 12.8 | 19.2 | 25.6 | 32.0 | 38.4 | 44.8 | 51.2 | 57.6 | 64.0 | 70.4 | 76.8 | 83.2 | 89.6 |
| 26 | 7.51 | 15.0 | 22.5 | 30.0 | 37.5 | 45.0 | 52.6 | 60.1 | 67.6 | 75.1 | 82.6 | 90.1 | 97.6 | 105 |
| 28 | 8.71 | 17.4 | 26.1 | 34.8 | 43.5 | 52.2 | 61.0 | 69.7 | 78.4 | 87.1 | 95.8 | 104 | 113 | 122 |
| 30 | 10.0 | 20.0 | 30.0 | 40.0 | 50.0 | 60.0 | 70.0 | 80.0 | 90.0 | 100 | 110 | 120 | 130 | 140 |
| 32 | 11.4 | 22.7 | 34.1 | 45.5 | 56.9 | 68.2 | 79.6 | 91.0 | 102 | 114 | 125 | 136 | 148 | 159 |
| 34 | 12.8 | 25.7 | 38.5 | 51.4 | 64.2 | 77.0 | 89.9 | 103 | 116 | 129 | 141 | 154 | 167 | 180 |
| 36 | 14.4 | 28.8 | 43.2 | 57.6 | 72.0 | 86.4 | 101 | 115 | 130 | 144 | 158 | 173 | 187 | 201 |
| 38 | 16.0 | 32.1 | 48.1 | 64.1 | 80.2 | 96.2 | 112 | 128 | 144 | 160 | 176 | 192 | 208 | 224 |
| 40 | 17.8 | 35.8 | 53.8 | 71.1 | 88.9 | 107 | 124 | 142 | 160 | 178 | 195 | 213 | 231 | 249 |
| 42 | 19.5 | 39.2 | 58.8 | 78.4 | 98.0 | 118 | 137 | 157 | 176 | 196 | 215 | 235 | 255 | 274 |
| 44 | 21.8 | 43.6 | 64.5 | 86.0 | 107 | 129 | 150 | 172 | 193 | 215 | 236 | 258 | 279 | 301 |
| 46 | 23.5 | 47.0 | 70.5 | 94.0 | 117 | 141 | 164 | 188 | 211 | 235 | 258 | 282 | 305 | 329 |
| 48 | 25.6 | 51.2 | 76.8 | 102 | 128 | 153 | 179 | 204 | 230 | 256 | 281 | 307 | 333 | 358 |
| 50 | 27.8 | 55.5 | 83.3 | 111 | 139 | 167 | 194 | 222 | 250 | 278 | 305 | 333 | 361 | 389 |

# ETRİYELER

ÇİFT KOLLU ETRİYELER İÇİN $F_{d/k}$ DEĞERLERİ

| Ø | Etriye sayısı | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 6 | 0.56 | 1.13 | 1.70 | 2.26 | 2.83 | 3.39 | 3.96 | 4.52 | 5.09 | 5.65 | 6.22 | 6.78 | 7.35 | 7.92 |
| 8 | 1.00 | 2.01 | 3.02 | 4.02 | 5.03 | 6.03 | 7.04 | 8.04 | 9.05 | 10.0 | 11.1 | 12.1 | 13.1 | 14.1 |
| 10 | 1.57 | 3.14 | 4.71 | 6.28 | 7.85 | 9.42 | 11.0 | 12.6 | 14.1 | 15.7 | 17.3 | 18.8 | 20.4 | 22.0 |
| 12 | 2.26 | 4.52 | 6.79 | 9.05 | 11.3 | 13.6 | 15.8 | 18.1 | 20.4 | 22.6 | 24.9 | 27.1 | 29.4 | 31.7 |
| 14 | 3.08 | 6.16 | 9.24 | 12.3 | 15.4 | 18.5 | 21.6 | 24.6 | 27.7 | 30.8 | 33.9 | 36.9 | 40.0 | 43.1 |
| 16 | 4.02 | 8.04 | 12.1 | 16.1 | 20.1 | 24.1 | 28.1 | 32.2 | 36.2 | 40.2 | 44.2 | 48.2 | 52.3 | 56.3 |
| 18 | 5.09 | 10.2 | 15.3 | 20.4 | 25.4 | 30.5 | 35.6 | 40.7 | 45.8 | 50.9 | 56.0 | 61.1 | 66.2 | 71.2 |
| 20 | 6.28 | 12.6 | 18.8 | 25.1 | 31.4 | 37.7 | 44.0 | 50.3 | 56.5 | 62.8 | 69.1 | 75.4 | 81.6 | 87.9 |

## BİR SIRAYA KONACAK EN ÇOK DEMİR SAYISI

| Kiriş Genişliği | DONATI ÇAPLARI | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 |
| 10 | 2 | 2 | 2 | 2 | (2) | 1 | 1 | 1 | 1 |
| 15 | 4 | 4 | 3 | 3 | 3 | 3 | 2 | 2 | 2 |
| 20 | (6) | 5 | 5 | (5) | 4 | 4 | 4 | 3 | 3 |
| 25 | 7 | 7 | 6 | 6 | (6) | 5 | 5 | 4 | 4 |
| 30 | 9 | 8 | (8) | 7 | 7 | 6 | 6 | 5 | 5 |
| 35 | (11) | 10 | 9 | 8 | 8 | 8 | 7 | 6 | 6 |
| 40 | 12 | 11 | (11) | 9 | 9 | 9 | 8 | 7 | 7 |
| 45 | 14 | 12 | 12 | 11 | 11 | 10 | 9 | 8 | 8 |
| 50 | (16) | (15) | 13 | 12 | 12 | 11 | 10 | 9 | 9 |
| 60 | 19 | 18 | 16 | 15 | 15 | 14 | 13 | (12) | 11 |

Açıklama: ( ) içindeki sayıda demir konduğu zaman iki demir arasındaki mesafe 20 mm.den biraz az olmaktadır.

## KİRİŞLER İÇİN SINIR DEĞERLER

| Donatı | Beton | $\rho_b$ için | | | $\rho_m=0.85\rho_b$ için | | | $\rho_g=0.25f_{cd}/f_{yd}$ için | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | $\lambda_b$ | $\rho_b$ | $k_{z,b}$ cm²/t | $\lambda_m$ | $\rho_m$ | $k_{z,m}$ cm²/t | $\lambda_g$ | $\rho_g$ | $k_{z,g}$ cm²/t |
| BÇI | BS14 | 0.0267 | 0.0230 | 33.6 | 0.727 | 0.0227 | 32.0 | 0.862 | 0.0014 | 53 |
| BÇI | BS16 | 0.678 | 0.0316 | 24.5 | 0.727 | 0.0268 | 26.9 | 0.862 | 0.0135 | 44.9 |
| BÇI | BS20 | 0.678 | 0.0373 | 20.7 | 0.727 | 0.0317 | 22.8 | 0.862 | 0.0160 | 38.0 |
| BÇI | BS25 | 0.678 | 0.0488 | 15.8 | 0.727 | 0.0415 | 17.4 | 0.862 | 0.0209 | 29.1 |
| | | | | | | | | | | |
| BÇII | BS14 | 0.0115 | 0.0098 | 38.0 | 0.776 | 0.0098 | 36.0 | 0.862 | 0.0081 | 53 |
| BÇII | BS16 | 0.736 | 0.0135 | 27.6 | 0.776 | 0.0116 | 30.7 | 0.862 | 0.0071 | 44.9 |
| BÇII | BS20 | 0.736 | 0.0160 | 23.3 | 0.776 | 0.0136 | 26.0 | 0.862 | 0.0084 | 38.0 |
| BÇII | BS25 | 0.736 | 0.0209 | 17.8 | 0.776 | 0.0178 | 19.9 | 0.862 | 0.0109 | 29.1 |
| BÇII | BS30 | 0.736 | 0.0237 | 15.7 | 0.786 | 0.0200 | 17.5 | 0.862 | 0.0129 | 24.7 |
| BÇII | BS35 | 0.736 | 0.0263 | 14.2 | 0.793 | 0.0222 | 15.6 | 0.862 | 0.0148 | 21.5 |
| BÇII | BS40 | 0.736 | 0.0297 | 12.5 | 0.802 | 0.0249 | 13.7 | 0.862 | 0.0174 | 18.3 |
| BÇII | BS45 | 0.736 | 0.0317 | 11.7 | 0.809 | 0.0267 | 12.7 | 0.862 | 0.0193 | 16.5 |
| BÇII | BS50 | 0.736 | 0.0334 | 11.1 | 0.816 | 0.0283 | 11.9 | 0.862 | 0.0212 | 15.0 |
| | | | | | | | | | | |
| BÇIV | BS14 | 0.0089 | 0.0077 | 39.6 | 0.791 | 0.0076 | 44.5 | 0.862 | 0.0050 | 53.0 |
| BÇIV | BS16 | 0.754 | 0.0106 | 28.8 | 0.791 | 0.0090 | 32.3 | 0.862 | 0.0059 | 44.9 |
| BÇIV | BS20 | 0.764 | 0.0125 | 24.4 | 0.791 | 0.0106 | 27.4 | 0.862 | 0.0070 | 38.0 |
| BÇIV | BS25 | 0.754 | 0.0164 | 18.6 | 0.791 | 0.0139 | 20.9 | 0.862 | 0.0092 | 29.1 |
| BÇIV | BS30 | 0.754 | 0.0186 | 16.4 | 0.800 | 0.0156 | 18.4 | 0.862 | 0.0108 | 24.7 |
| BÇIV | BS35 | 0.754 | 0.0206 | 14.8 | 0.807 | 0.0174 | 16.4 | 0.862 | 0.0124 | 21.5 |
| BÇIV | BS40 | 0.754 | 0.0232 | 13.1 | 0.816 | 0.0195 | 14.5 | 0.862 | 0.0146 | 18.3 |
| BÇIV | BS45 | 0.754 | 0.0248 | 12.3 | 0.822 | 0.0209 | 13.4 | 0.862 | 0.0162 | 16.5 |
| BÇIV | BS50 | 0.754 | 0.0262 | 11.6 | 0.829 | 0.0221 | 12.6 | 0.862 | 0.0178 | 15.0 |

# KENETLENME BOYLARI ($l_b$) (ÇAP CİNSİNDEN)

$l_b$ TS500'den

| BETON SINIFI | BÇ I | | BÇ III | |
|---|---|---|---|---|
| | Düz | Kancalı | Düz | Kancalı |
| BS14 | 49 ϕ | 34 ϕ | 52 ϕ | 41 ϕ |
| BS16 | 47 ϕ | 32 ϕ | 49 ϕ | 39 ϕ |
| BS20 | 42 ϕ | 27 ϕ | 44 ϕ | 35 ϕ |
| BS25 | 40 ϕ | 25 ϕ | 38 ϕ | 30 ϕ |
| BS30 | 40 ϕ | 25 ϕ | 35 ϕ | 28 ϕ |
| BS35 | 40 ϕ | 25 ϕ | 32 ϕ | 26 ϕ |
| BS40 | 40 ϕ | 25 ϕ | 30 ϕ | 24 ϕ |
| BS45 | 40 ϕ | 25 ϕ | 28 ϕ | 23 ϕ |
| BS50 | 40 ϕ | 25 ϕ | 27 ϕ | 21 ϕ |

1.5*$l_b$ (Kolon Alt Ucunda Bindirme Hali)

| BETON SINIFI | BÇ I | | BÇ III | |
|---|---|---|---|---|
| | Düz | Kancalı | Düz | Kancalı |
| BS14 | 74 ϕ | 59 ϕ | 77 ϕ | 67 ϕ |
| BS16 | 70 ϕ | 55 ϕ | 73 ϕ | 63 ϕ |
| BS20 | 63 ϕ | 48 ϕ | 66 ϕ | 56 ϕ |
| BS25 | 60 ϕ | 45 ϕ | 57 ϕ | 47 ϕ |
| BS30 | 60 ϕ | 45 ϕ | 53 ϕ | 43 ϕ |
| BS35 | 60 ϕ | 45 ϕ | 49 ϕ | 39 ϕ |
| BS40 | 60 ϕ | 45 ϕ | 45 ϕ | 36 ϕ |
| BS45 | 60 ϕ | 45 ϕ | 42 ϕ | 34 ϕ |
| BS50 | 60 ϕ | 45 ϕ | 40 ϕ | 32 ϕ |

**Konum I.**

Konum II de olmayan bütün çubuklar

**Konum II.**

Betonlama sırasında eğimi yatayla 45° - 90° arasında olanlar ile daha az eğimli veya yatay olupta betonlama sırasında kesitin alt yarısında veya kesitin serbest yüzünden en az 30 cm uzakta olan çubuklar.

Not : 1. $32<\phi<40$ durumunda çizelge değerleri $\frac{100}{132-\phi}$ ile çarpılmalıdır,( $\phi$ =mm)

2. Konum I'e giren çubukların çizelge değerleri 1.4 ile çarpılmalıdır.

## ÇEKME DONATISI İÇİN KENETLENME BOYLARI

### BÇI

| ϕ | BS14 | | BS16 | | BS20 | | BS25 | | BS30 | | BS35 | | BS40 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $l_b$ (cm) | | $l_b$ (cm) | | $l_b$ (cm) | | $l_b$ (cm) | | $l_b$ (cm) | | $l_b$ (cm) | | $l_b$ (cm) | |
| (mm) | düz | kancalı | düz | kancalı | düz | kancalı | düz | kancalı | düz | kancalı | düz | kancalı | düz | kancalı |
| 8 | 39 | 27 | 38 | 26 | 34 | 22 | 32 | 20 | 32 | 20 | 32 | 20 | 32 | 20 |
| 10 | 49 | 34 | 47 | 32 | 42 | 27 | 40 | 25 | 40 | 25 | 40 | 25 | 40 | 25 |
| 12 | 59 | 41 | 56 | 38 | 50 | 32 | 48 | 30 | 48 | 30 | 48 | 30 | 48 | 30 |
| 14 | 69 | 48 | 66 | 45 | 59 | 38 | 56 | 35 | 56 | 35 | 56 | 35 | 56 | 35 |
| 16 | 78 | 54 | 75 | 51 | 67 | 43 | 64 | 40 | 64 | 40 | 64 | 40 | 64 | 40 |
| 18 | 88 | 61 | 85 | 58 | 76 | 49 | 72 | 45 | 72 | 45 | 72 | 45 | 72 | 45 |
| 20 | 98 | 68 | 94 | 64 | 84 | 54 | 80 | 50 | 80 | 50 | 80 | 50 | 80 | 50 |
| 22 | 108 | 75 | 103 | 70 | 92 | 59 | 88 | 55 | 88 | 55 | 88 | 55 | 88 | 55 |
| 24 | 118 | 82 | 113 | 77 | 101 | 65 | 96 | 60 | 96 | 60 | 96 | 60 | 96 | 60 |
| 26 | 127 | 88 | 122 | 83 | 109 | 70 | 104 | 65 | 104 | 65 | 104 | 65 | 104 | 65 |
| 28 | 137 | 95 | 132 | 90 | 118 | 76 | 112 | 70 | 112 | 70 | 112 | 70 | 112 | 70 |
| 30 | 147 | 102 | 141 | 96 | 126 | 81 | 120 | 75 | 120 | 75 | 120 | 75 | 120 | 75 |
| 32 | 157 | 109 | 150 | 102 | 134 | 86 | 128 | 80 | 128 | 80 | 128 | 80 | 128 | 80 |

## ÇEKME DONATISI İÇİN KENETLENME BOYLARI

### BÇIII

| ϕ | BS14 | | BS16 | | BS20 | | BS25 | | BS30 | | BS35 | | BS40 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $l_b$ (cm) | | $l_b$ (cm) | | $l_b$ (cm) | | $l_b$ (cm) | | $l_b$ (cm) | | $l_b$ (cm) | | $l_b$ (cm) | |
| (mm) | düz | kancalı | düz | kancalı | düz | kancalı | düz | kancalı | düz | kancalı | düz | kancalı | düz | kancalı |
| 8 | 42 | 33 | 39 | 31 | 35 | 28 | 30 | 24 | 28 | 22 | 26 | 21 | 28 | 19 |
| 10 | 52 | 41 | 49 | 39 | 44 | 35 | 38 | 30 | 35 | 28 | 32 | 26 | 30 | 24 |
| 12 | 62 | 49 | 59 | 47 | 53 | 42 | 46 | 36 | 42 | 34 | 38 | 31 | 36 | 29 |
| 14 | 73 | 57 | 69 | 55 | 62 | 49 | 53 | 42 | 49 | 39 | 45 | 36 | 42 | 34 |
| 16 | 83 | 66 | 78 | 62 | 70 | 56 | 61 | 48 | 56 | 45 | 51 | 42 | 48 | 38 |
| 18 | 94 | 74 | 88 | 70 | 79 | 63 | 68 | 54 | 63 | 50 | 58 | 47 | 54 | 43 |
| 20 | 104 | 82 | 98 | 78 | 88 | 70 | 76 | 60 | 70 | 56 | 64 | 52 | 60 | 48 |
| 22 | 114 | 90 | 108 | 86 | 97 | 77 | 84 | 66 | 77 | 62 | 70 | 57 | 66 | 53 |
| 24 | 125 | 98 | 118 | 94 | 106 | 84 | 91 | 72 | 84 | 67 | 77 | 62 | 72 | 58 |
| 26 | 135 | 107 | 127 | 101 | 114 | 91 | 99 | 78 | 91 | 73 | 83 | 68 | 78 | 62 |
| 28 | 146 | 115 | 137 | 109 | 123 | 98 | 106 | 84 | 98 | 78 | 90 | 73 | 84 | 67 |
| 30 | 156 | 123 | 147 | 117 | 132 | 105 | 114 | 90 | 105 | 84 | 96 | 78 | 90 | 72 |
| 32 | 166 | 131 | 157 | 125 | 141 | 112 | 122 | 96 | 112 | 90 | 102 | 83 | 96 | 77 |

## KOLONLARDA ÇEKME DONATISI İÇİN KENETLENME BOYLARI ($1.5*l_b$)

### BÇ I

| ϕ | BS14 | | BS16 | | BS20 | | BS25 | | BS30 | | BS35 | | BS40 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1.5 * $l_b$ (cm) | | 1.5 * $l_b$ (cm) | | 1.5 * $l_b$ (cm) | | 1.5 * $l_b$ (cm) | | 1.5 * $l_b$ (cm) | | 1.5 * $l_b$ (cm) | | 1.5 * $l_b$ (cm) | |
| (mm) | düz | kancalı | düz | kancalı | düz | kancalı | düz | kancalı | düz | kancalı | düz | kancalı | düz | kancalı |
| 8 | 59 | 41 | 56 | 38 | 50 | 32 | 48 | 30 | 48 | 30 | 48 | 30 | 48 | 30 |
| 10 | 74 | 51 | 71 | 48 | 63 | 41 | 60 | 38 | 60 | 38 | 60 | 38 | 60 | 38 |
| 12 | 88 | 61 | 85 | 58 | 76 | 49 | 72 | 45 | 72 | 45 | 72 | 45 | 72 | 45 |
| 14 | 103 | 71 | 99 | 67 | 88 | 57 | 84 | 53 | 84 | 53 | 84 | 53 | 84 | 53 |
| 16 | 118 | 82 | 113 | 77 | 101 | 65 | 96 | 60 | 96 | 60 | 96 | 60 | 96 | 60 |
| 18 | 132 | 92 | 127 | 86 | 113 | 73 | 108 | 68 | 108 | 68 | 108 | 68 | 108 | 68 |
| 20 | 147 | 102 | 141 | 96 | 126 | 81 | 120 | 75 | 120 | 75 | 120 | 75 | 120 | 75 |
| 22 | 162 | 112 | 155 | 106 | 139 | 89 | 132 | 83 | 132 | 83 | 132 | 83 | 132 | 83 |
| 24 | 176 | 122 | 169 | 115 | 151 | 97 | 144 | 90 | 144 | 90 | 144 | 90 | 144 | 90 |
| 26 | 191 | 133 | 183 | 125 | 164 | 105 | 156 | 98 | 156 | 98 | 156 | 98 | 156 | 98 |
| 28 | 206 | 143 | 197 | 134 | 176 | 113 | 168 | 105 | 168 | 105 | 168 | 105 | 168 | 105 |
| 30 | 221 | 153 | 212 | 144 | 189 | 122 | 180 | 113 | 180 | 113 | 180 | 113 | 180 | 113 |
| 32 | 235 | 161 | 226 | 154 | 202 | 130 | 192 | 120 | 192 | 120 | 192 | 120 | 192 | 120 |

## KOLONLARDA ÇEKME DONATISI İÇİN KENETLENME BOYLARI ($1.5*l_b$)

### BÇ III

| ϕ | BS14 | | BS16 | | BS20 | | BS25 | | BS30 | | BS35 | | BS40 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1.5 * $l_b$ (cm) | | 1.5 * $l_b$ (cm) | | 1.5 * $l_b$ (cm) | | 1.5 * $l_b$ (cm) | | 1.5 * $l_b$ (cm) | | 1.5 * $l_b$ (cm) | | 1.5 * $l_b$ (cm) | |
| (mm) | düz | kancalı | düz | kancalı | düz | kancalı | düz | kancalı | düz | kancalı | düz | kancalı | düz | kancalı |
| 8 | 62 | 49 | 59 | 47 | 53 | 42 | 46 | 36 | 42 | 34 | 38 | 31 | 36 | 29 |
| 10 | 78 | 62 | 74 | 59 | 66 | 53 | 57 | 45 | 53 | 42 | 48 | 39 | 45 | 36 |
| 12 | 94 | 74 | 88 | 70 | 79 | 63 | 68 | 54 | 63 | 50 | 58 | 47 | 54 | 43 |
| 14 | 109 | 86 | 103 | 82 | 92 | 74 | 80 | 63 | 74 | 59 | 67 | 55 | 63 | 50 |
| 16 | 125 | 98 | 118 | 94 | 106 | 84 | 91 | 72 | 86 | 67 | 77 | 62 | 72 | 58 |
| 18 | 140 | 111 | 132 | 105 | 119 | 95 | 103 | 81 | 95 | 76 | 86 | 70 | 81 | 65 |
| 20 | 156 | 123 | 147 | 117 | 132 | 105 | 114 | 90 | 105 | 84 | 96 | 78 | 90 | 72 |
| 22 | 172 | 135 | 162 | 129 | 145 | 116 | 125 | 99 | 116 | 92 | 106 | 86 | 99 | 79 |
| 24 | 187 | 148 | 176 | 140 | 158 | 126 | 137 | 108 | 126 | 101 | 115 | 94 | 108 | 86 |
| 26 | 203 | 160 | 191 | 152 | 172 | 137 | 148 | 117 | 137 | 109 | 125 | 101 | 117 | 94 |
| 28 | 218 | 172 | 206 | 164 | 185 | 147 | 160 | 126 | 147 | 118 | 134 | 109 | 126 | 101 |
| 30 | 234 | 185 | 221 | 176 | 198 | 158 | 171 | 135 | 158 | 126 | 144 | 117 | 135 | 108 |
| 32 | 250 | 197 | 235 | 187 | 211 | 168 | 182 | 144 | 168 | 134 | 154 | 125 | 144 | 115 |

**ÇELİK HASIR DONATI HESAP TABLOSU**

Tanımı : BSt 5055 RK veya St Mb
Nitelikleri : Akma sınırı : 5000 Kg/cm²
Çekme mukavemeti : 5500 Kg/cm²
Kopma uzaması : 8
düğüm noktalarında
kesme mukavemeti : 0.30 $F_e B_e$ Kg

Basit eğilmeye çalışan dikdörtgen kesitler için

$$\varepsilon_n = \frac{h(cm)}{\sqrt{\frac{M(tm)}{b(cm)}}} \qquad F_e(cm^2) = k_e \frac{M(tm)}{h(cm)}$$

B 160 için $\sigma'_c$ = 2400 Kg/cm² B 225 için $\sigma'_c$ = 2800 kg/cm²

| $\sigma'_c$ kg/cm² / $\sigma'_b$ kg/cm² | | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2800 | $k_n$ | 22.4 | 17.4 | 14.2 | 12.2 | 10.7 | 9.6 | 8.8 | 8.0 | 7.5 | 7.0 |
| | $k_e$ | 37 | 38 | 38 | 39 | 39 | 40 | 40 | 40 | 41 | 41 |
| 2600 | $k_n$ | 21.7 | 16.9 | 13.9 | 11.9 | 10.5 | 9.4 | 8.6 | 7.9 | 7.3 | 6.9 |
| | $k_e$ | 40 | 41 | 42 | 42 | 43 | 43 | 43 | 44 | 44 | 45 |
| 2400 | $k_n$ | 21.2 | 16.4 | 13.5 | 11.6 | 10.2 | 9.2 | 8.4 | 7.7 | 7.2 | 6.7 |
| | $k_e$ | 44 | 45 | 45 | 46 | 46 | 47 | 47 | 48 | 48 | 49 |
| 2200 | $k_n$ | 20.4 | 15.9 | 13.1 | 11.3 | 10.0 | 9.0 | 8.2 | 7.6 | 7.0 | 6.6 |
| | $k_e$ | 48 | 49 | 50 | 50 | 51 | 52 | 52 | 53 | 53 | 54 |
| 2000 | $k_n$ | 19.7 | 15.3 | 12.7 | 11.0 | 9.7 | 8.7 | 8.0 | 7.4 | 6.9 | 6.5 |
| | $k_e$ | 55 | 54 | 55 | 56 | 57 | 57 | 58 | 58 | 59 | 59 |
| 1800 | $k_n$ | 18.9 | 14.8 | 12.3 | 10.6 | 9.4 | 8.5 | 7.8 | 7.2 | 6.7 | 6.3 |
| | $k_e$ | 60 | 61 | 62 | 63 | 63 | 64 | 65 | 66 | 66 | 67 |
| 1600 | $k_n$ | 18.1 | 14.2 | 11.9 | 10.3 | 9.1 | 8.3 | 7.6 | 7.0 | 6.6 | 6.2 |
| | $k_e$ | 67 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 75 | 76 |
| 1400 | $k_n$ | 17.3 | 13.6 | 11.4 | 9.9 | 8.8 | 8.0 | 7.4 | 6.8 | 6.4 | 6.0 |
| | $k_e$ | 78 | 79 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 |

Hesaplanmış $F_e$ kesitini sağlayan çubuk çapı ve aralığı ÇELİK HASIR KESİT TABLOSUNDAN seçilir. Mümkün olursa DEPO HASARLARI listesindeki tipler tercih edilmelidir.

ÇELİK HASIR - KESİT TABLOSU

| Çubuk çap ø mm | Tek Çubuk kesit alanı mm² | Çubuk aralıklarına göre DONATI KESİT ALANI (cm2/m) çubuk aralıkları (mm) 50 100 d | 75 150 d | 100 | 150 | 200 | 250 | 300 | Kaynaklanabileceği çubuk İlk sütundaki çubuk tek ø en ince mm | en kalın mm | İlk sütundaki çubuk çift ø en ince mm | en kalın mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4.0 | 0.126 | 2.52 | 1.68 | 1.26 | 0.84 | 0.63 | 0.50 | 0.42 | 4.0 | 6.0 | 4.0 | 5.5 |
| 4.5 | 0.159 | 3.19 | 2.12 | 1.59 | 1.06 | 0.80 | 0.64 | 0.53 | 4.0 | 6.5 | 4.0 | 6.5 |
| 5.0 | 0.196 | 3.93 | 2.62 | 1.96 | 1.31 | 0.98 | 0.78 | 0.65 | 4.0 | 8.5 | 4.5 | 7.0 |
| 5.5 | 0.238 | 4.75 | 3.17 | 2.38 | 1.58 | 1.19 | 0.95 | 0.79 | 4.0 | 8.5 | 4.5 | 7.5 |
| 6.0 | 0.283 | 5.65 | 3.77 | 2.82 | 1.88 | 1.41 | 1.13 | 0.94 | 4.0 | 8.5 | 5.0 | 8.5 |
| 6.5 | 0.332 | 6.64 | 4.43 | 3.31 | 2.21 | 1.65 | 1.33 | 1.10 | 4.5 | 9.0 | 5.5 | 9.0 |
| 7.0 | 0.385 | 7.70 | 5.13 | 3.85 | 2.57 | 1.92 | 1.54 | 1.28 | 5.0 | 10.0 | 6.0 | 10.0 |
| 7.5 | 0.442 | 8.83 | 5.89 | 4.42 | 2.95 | 2.20 | 1.77 | 1.47 | 5.0 | 10.5 | 6.5 | 10.5 |
| 8.0 | 0.503 | 10.05 | 6.70 | 5.03 | 3.35 | 2.51 | 2.01 | 1.67 | 5.0 | 11.0 | 7.0 | 11.0 |
| 8.5 | 0.567 | 11.35 | 7.57 | 5.67 | 3.78 | 2.84 | 2.27 | 1.89 | 5.0 | 12.0 | 8.0 | 12.0 |
| 9.0 | 0.636 | 12.72 | 8.48 | 6.36 | 4.24 | 3.18 | 2.54 | 2.12 | 6.5 | 11.0 | 7.5 | 12.0 |
| 9.5 | 0.709 | 14.18 | 9.45 | 7.09 | 4.73 | 3.54 | 2.83 | 2.36 | 7.0 | 12.0 | 7.5 | 12.0 |
| 10.0 | 0.785 | 15.71 | 10.47 | 7.85 | 5.24 | 3.92 | 3.14 | 2.61 | 7.0 | 12.0 | 8.5 | 12.0 |
| 10.5 | 0.866 | 17.32 | 11.55 | 8.66 | 5.77 | 4.33 | 3.46 | 2.89 | 7.5 | 12.0 | 9.0 | 12.0 |
| 11.0 | 0.950 | 19.01 | 12.67 | 9.50 | 6.34 | 4.75 | 3.80 | 3.16 | 8.0 | 12.0 | 9.5 | 12.0 |
| 11.3 | 1.000 | 20.07 | 13.85 | 10.39 | 6.92 | 5.19 | 4.15 | 3.45 | 8.5 | 12.0 | 9.5 | 12.0 |
| 12.0 | 1.131 | 22.62 | 15.08 | 11.31 | 7.54 | 5.66 | 4.52 | 3.76 | 8.5 | 12.0 | 10.0 | 12.0 |

# ÇELİK HASIR DONATI HESAP TABLOSU

| HASIRIN | | HASIR ÇUBUKLARININ | | | | | | KESİT ALANI | | AĞIRLIK | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BOYU ENİ | TİPİ | ARALIĞI | | ÇAPI | | ÇIKINTISI | | | | | |
| | | BOY | EN | BOY | EN | BOY | EN | BOY | EN | m² | Hasır |
| | | mm | | | | | | cm²/m | | kg | |
| 5,00 x 2,15 m | R 106 | 150 | 250 | 4,5 | 4,5 | 125/125 | 25/175 | 1,06 | 0,64 | 1,33 | 14,13 |
| | R 131 | 150 | 250 | 5,0 | 5,0 | 125/125 | 25/175 | 1,31 | 0,78 | 1,65 | 14,40 |
| | R 158 | 150 | 250 | 5,5 | 5,0 | 125/125 | 25/175 | 1,88 | 0,78 | 2,86 | 19,71 |
| | R 188 | 150 | 250 | 6,0 | 5,0 | 125/125 | 25/175 | 1,58 | 0,78 | 1,86 | 22,16 |
| | R 221 | 150 | 250 | 6,5 | 5,0 | 125/125 | 25/175 | 2,21 | 0,78 | 2,36 | 24,82 |
| | R 257 | 150 | 250 | 7,0 | 5,0 | 125/125 | 25/175 | 2,57 | 0,78 | 2,63 | 27,76 |
| | R 295 | 150 | 250 | 7,5 | 5,0 | 125/125 | 25/175 | 2,95 | 0,78 | 2,93 | 30,91 |
| | R 317 | 150 | 250 | 5,5d | 5,0 | 125/125 | 25/175 | 3,17 | 0,78 | 3,11 | 32,80 |
| | R 317 | 150 | 250 | 7,8 | 5,0 | 125/125 | 25/175 | 3,17 | 0,78 | 3,11 | 32,80 |
| | R 335 | 150 | 250 | 8,0 | 5,0 | 125/125 | 25/175 | 3,35 | 0,78 | 3,25 | 34,27 |
| | R 377 | 150 | 250 | 6,0d | 5,0 | 125/125 | 25/175 | 3,77 | 0,78 | 3,58 | 37,77 |
| | R 377 | 150 | 250 | 8,5 | 5,0 | 125/125 | 25/175 | 3,77 | 0,78 | 3,58 | 37,77 |
| | R 443 | 150 | 250 | 6,5d | 5,5 | 125/125 | 25/175 | 4,43 | 0,95 | 4,22 | 44,44 |
| | R 513 | 150 | 250 | 7,0d | 6,0 | 125/125 | 25/175 | 5,13 | 1,13 | 4,92 | 51,83 |
| | R 589 | 150 | 250 | 7,5d | 6,5 | 125/125 | 25/175 | 5,89 | 1,33 | 5,66 | 59,76 |
| 5,00 x 2,15 m | Q 106/106 | 150 | 150 | 4,5 | 4,5 | 100/100 | 25/175 | 1,06 | 1,06 | 1,66 | 17,62 |
| | Q 131/131 | 150 | 150 | 5,0 | 5,0 | 100/100 | 25/175 | 1,31 | 1,31 | 2,06 | 21,71 |
| | Q 158/158 | 150 | 150 | 5,5 | 5,5 | 100/100 | 25/175 | 1,58 | 1,58 | 2,48 | 26,36 |
| | Q 188/188 | 150 | 150 | 6,0 | 6,0 | 100/100 | 25/175 | 1,88 | 1,88 | 2,96 | 31,29 |
| | Q 221/221 | 150 | 150 | 6,5 | 6,0 | 100/100 | 25/175 | 2,21 | 1,88 | 3,97 | 41,93 |
| | Q 317/188 | 150 | 150 | 5,5d | 6,0 | 100/100 | 25/175 | 3,17 | 1,88 | 3,97 | 41,93 |
| | Q 317/188 | 150 | 150 | 7,8 | 6,0 | 100/100 | 25/175 | 3,17 | 1,88 | 3,97 | 41,93 |
| | Q 377/188 | 150 | 150 | 6,0d | 6,0 | 100/100 | 25/175 | 3,77 | 1,88 | 4,44 | 46,90 |
| | Q 377/188 | 150 | 150 | 8,5 | 6,0 | 100/100 | 25/175 | 3,77 | 1,88 | 4,44 | 46,90 |
| | Q 443/221 | 150 | 150 | 6,5d | 6,5 | 100/100 | 25/175 | 4,43 | 2,21 | 5,21 | 54,85 |
| | Q 589/378 | 150 | 150 | 7,5d | 8,5 | 100/100 | 25/175 | 5,89 | 3,78 | 7,59 | 80,15 |

DEPO HASIRLARI dışında KESİT TABLOSU'ndan seçilecek özel hasırlar 2.90x10,00 m boyutlara kadar yapılabilir. Tabii nakliye olanakları dikkate alınmalıdır.

ÇELİK HASIR - AĞIRLIK TABLOSU

| Çubuk Çapı Ø mm | Çubuk Ağırlığı Kg/m | AĞIRLIK (Kg/m²) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 50 / 100 | 75 / 150 | 100 | Çubuk Aralıkları (mm) 150 | 200 | 250 | 300 |
| 4,0 | 0,099 | 1,97 | 1,32 | 0,99 | 0,66 | 0,49 | 0,39 | 0,33 |
| 4,5 | 0,125 | 2,50 | 1,66 | 1,25 | 0,83 | 0,62 | 0,50 | 0,42 |
| 5,0 | 0,154 | 3,08 | 2,06 | 1,54 | 1,02 | 0,77 | 0,62 | 0,51 |
| 5,5 | 0,187 | 3,73 | 2,49 | 1,87 | 1,24 | 0,93 | 0,75 | 0,62 |
| 6,0 | 0,222 | 4,44 | 2,96 | 2,22 | 1,48 | 1,11 | 0,89 | 0,74 |
| 6,5 | 0,260 | 5,21 | 3,47 | 2,60 | 1,73 | 1,30 | 1,04 | 0,87 |
| 7,0 | 0,302 | 6,04 | 4,03 | 3,02 | 2,01 | 1,51 | 1,21 | 1,01 |
| 7,5 | 0,347 | 6,94 | 4,62 | 3,47 | 2,31 | 1,73 | 1,39 | 1,16 |
| 8,0 | 0,395 | 7,89 | 5,26 | 3,95 | 2,63 | 1,97 | 1,58 | 1,32 |
| 8,5 | 0,443 | 8,93 | 5,94 | 4,43 | 2,95 | 2,23 | 1,78 | 1,48 |
| 9,0 | 0,499 | 9,96 | 6,66 | 4,99 | 3,33 | 2,50 | 2,00 | 1,66 |
| 9,5 | 0,556 | 11,10 | 7,42 | 5,56 | 3,71 | 2,79 | 2,23 | 1,85 |
| 10,0 | 0,617 | 12,33 | 8,22 | 6,17 | 4,11 | 3,08 | 2,47 | 2,06 |
| 10,5 | 0,680 | 13,59 | 9,06 | 6,80 | 4,53 | 3,40 | 2,72 | 2,27 |
| 11,0 | 0,746 | 14,92 | 9,95 | 7,46 | 4,97 | 3,73 | 2,98 | 2,49 |
| 11,5 | 0,815 | 16,31 | 10,87 | 8,15 | 5,44 | 4,08 | 3,26 | 2,72 |
| 12,0 | 0,888 | 17,76 | 11,84 | 8,88 | 5,92 | 4,44 | 3,55 | 2,96 |

* Çift boyuna çubuk hali için

Bir metrekare hasır ağırlığını bulmak için, Tabloya boy ve en çubukları için ayrı ayrı bakmak ve bu değerleri toplamak gerekir. Hasır çift boy çubuklu ise boy çubuğu için bulunan ağırlık iki ile çarpılmalıdır.