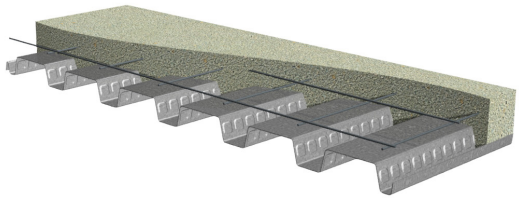
# 1.5VL-36/1.5VLI-36/1.5PLVLI-36 COMPOSITE DECKS
## GRADE 50 STEEL

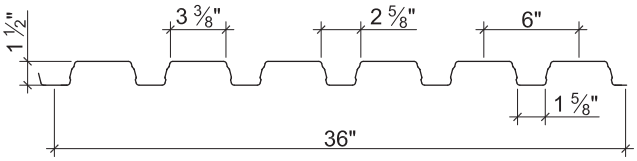
LRFD

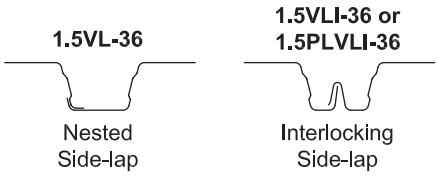
## 1.5VL COMPOSITE DECKS

- **1.5VL-36 Deck used with Side-lap Screws**
- **1.5VLI-36 Deck used with TSWs or BPs**
- **1.5PLVLI-36 Deck used with PunchLok® II System**



### Nominal Dimensions




### Section Properties

| Deck Gage | Deck Weight $w_{dd}$ (psf) | Base Metal Thickness t (in.) | Yield Strength $F_y$ (ksi) | Effective Moment of Inertia at Service Load $I_d = (2I_e+I_g)/3$ $I_d$+ (in⁴/ft) | $I_d$- (in⁴/ft) | Effective Section Modulus at $F_y$ = 50 ksi $S_e$+ (in³/ft) | $S_e$- (in³/ft) | Design Moment øM$_n$+ (lb-ft/ft) | øM$_n$- (lb-ft/ft) | Vertical Web Shear øV$_n$ (lb/ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| **22** | 1.6 | 0.0295 | 50 | 0.155 | 0.178 | 0.169 | 0.179 | 634 | 671 | 4035 |
| **20** | 2.0 | 0.0358 | 50 | 0.197 | 0.217 | 0.224 | 0.229 | 840 | 859 | 4874 |
| **19** | 2.3 | 0.0418 | 50 | 0.239 | 0.257 | 0.266 | 0.278 | 997 | 1042 | 5666 |
| **18** | 2.6 | 0.0474 | 50 | 0.277 | 0.290 | 0.306 | 0.318 | 1148 | 1193 | 6398 |
| **16** | 3.3 | 0.0598 | 50 | 0.364 | 0.367 | 0.393 | 0.402 | 1474 | 1508 | 7996 |

### Design Reactions at Supports Based on Web Crippling, øR$_n$ (lb/ft)

| Deck Gage | Bearing Length of Webs: One-Flange Loading, End Bearing 1½" | 2" | 3" | 4" | Interior Bearing 3" | 4" | Two-Flange Loading, End Bearing 1½" | 2" | 3" | 4" | Interior Bearing 3" | 4" |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **22** | 1235 | 1357 | 1563 | 1706 | 2204 | 2383 | 1289 | 1389 | 1556 | 1672 | 2728 | 2966 |
| **20** | 1763 | 1932 | 2215 | 2408 | 3164 | 3406 | 1949 | 2093 | 2333 | 2497 | 3960 | 4286 |
| **19** | 2344 | 2562 | 2927 | 3169 | 4222 | 4527 | 2702 | 2893 | 3213 | 3426 | 5324 | 5740 |
| **18** | 2954 | 3221 | 3669 | 3959 | 5334 | 5699 | 3515 | 3754 | 4156 | 4417 | 6762 | 7265 |
| **16** | 4525 | 4915 | 5568 | 5967 | 8206 | 8709 | 5681 | 6043 | 6651 | 7023 | 10487 | 11191 |

## Standard Features

- ASTM A653 SS GR50 Min., with G60 or G90, white or gray primer bottom optional
- ASTM A1008 SS GR50 Min. with gray primer bottom
- Standard lengths – 6'-0" to 42'-0"
- IAPMO UES ER-0652 and UL Listed
- Tables conform to ANSI/SDI C-2017

## Optional Features

- Inquire regarding cost and lead times for:
  - -Short cuts < 6'-0"
  - -Sheet Lengths > 42'-0"
  - -Alternative metallic and painted finishes
- Factory Hanger Tabs

# 1.5VL-36/1.5VLI-36/1.5PLVLI-36 COMPOSITE DECK-SLABS
## NORMAL WEIGHT CONCRETE (145 pcf)

LRFD

### Maximum Unshored Spans / Composite Deck-Slab Properties

| Slab Depth | | | Maximum Unshored Construction Clear Span | | | Concrete + Deck | Deflection | Moment | Shear |
|---|---|---|---|---|---|---|---|---|---|
| Total | Topping | Deck Gage | 1 | 2 | 3 | (psf) | $I_d = (I_{cr}+I_u)/2$ (in⁴/ft) | $\phi M_{no}$ (kip-ft/ft) | $\phi V_{no}$ (kip/ft) |
| 3½" | 2" | 22 | 6'-6" | 7'-7" | 7'-8" | 32.2 | 2.64 | 2.73 | 3.02 |
| | | 20 | 7'-10" | 9'-0" | 9'-3" | 32.6 | 2.85 | 3.22 | 3.02 |
| | | 19 | 8'-4" | 9'-11" | 10'-3" | 32.9 | 3.03 | 3.67 | 3.02 |
| | | 18 | 8'-9" | 10'-7" | 10'-11" | 33.2 | 3.19 | 4.07 | 3.02 |
| | | 16 | 9'-6" | 11'-10" | 11'-8" | 33.9 | 3.52 | 4.91 | 3.02 |
| 5" | 3½" | 22 | 5'-8" | 6'-7" | 6'-8" | 50.3 | 7.62 | 4.79 | 4.93 |
| | | 20 | 6'-9" | 7'-9" | 7'-11" | 50.7 | 8.18 | 5.69 | 4.93 |
| | | 19 | 7'-3" | 8'-7" | 8'-10" | 51.0 | 8.68 | 6.54 | 4.93 |
| | | 18 | 7'-8" | 9'-2" | 9'-5" | 51.3 | 9.12 | 7.30 | 4.93 |
| | | 16 | 8'-4" | 10'-3" | 10'-4" | 52.0 | 10.02 | 8.92 | 4.93 |
| 6" | 4½" | 22 | 5'-3" | 6'-1" | 6'-2" | 62.4 | 13.11 | 6.30 | 6.41 |
| | | 20 | 6'-3" | 7'-2" | 7'-4" | 62.8 | 14.02 | 7.51 | 6.41 |
| | | 19 | 6'-10" | 7'-11" | 8'-2" | 63.1 | 14.85 | 8.64 | 6.41 |
| | | 18 | 7'-2" | 8'-5" | 8'-9" | 63.4 | 15.57 | 9.67 | 6.41 |
| | | 16 | 7'-10" | 9'-6" | 9'-8" | 64.1 | 17.06 | 11.87 | 6.41 |

**Note:**

1. Maximum unshored spans do not consider web-crippling. Required bearing should be determined based on specific span conditions.

### Superimposed Design Load, $\phi W_n$, / Deflection at L/360 (psf)

NWC (145 pcf), $f'_c$ = 3000 psi

| Total Slab Depth | Deck Gage | Span (ft-in.) 4'-0" | 5'-0" | 6'-0" | 7'-0" | 8'-0" | 9'-0" | 10'-0" | 12'-0" |
|---|---|---|---|---|---|---|---|---|---|
| 3½" | 22 | 1327/1804 | 835/923 | 568/534 | 407/336 | 302/225 | 231/158 | 179/115 | 113/66 |
| | 20 | 1471/1944 | 990/995 | 676/576 | 486/362 | 363/243 | 278/170 | 218/124 | 139/72 |
| | 19 | 1471/2071 | 1135/1060 | 776/613 | 560/386 | 419/258 | 323/181 | 254/132 | 164/76 |
| | 18 | 1471/2179 | 1168/1115 | 864/645 | 624/406 | 469/272 | 362/191 | 285/139 | 186/80 |
| | 16 | 1470/2401 | 1168/1229 | 966/711 | 761/448 | 573/300 | 444/210 | 352/153 | 232/88 |
| 5" | 22 | 2336/5206 | 1473/2665 | 1004/1542 | 722/971 | 538/650 | 412/457 | 323/333 | 205/192 |
| | 20 | 2405/5585 | 1761/2859 | 1204/1654 | 868/1042 | 650/698 | 501/490 | 394/357 | 255/206 |
| | 19 | 2404/5929 | 1911/3035 | 1391/1756 | 1006/1106 | 756/741 | 584/520 | 461/379 | 302/219 |
| | 18 | 2404/6228 | 1911/3188 | 1559/1845 | 1129/1162 | 850/778 | 659/546 | 522/398 | 343/230 |
| | 16 | 2403/6842 | 1910/3503 | 1581/2027 | 1346/1276 | 1052/855 | 818/600 | 651/437 | 433/253 |
| 6" | 22 | 3075/8955 | 1941/4585 | 1325/2653 | 953/1670 | 712/1119 | 547/786 | 429/573 | 275/331 |
| | 20 | 3130/9574 | 2327/4902 | 1593/2836 | 1150/1786 | 863/1196 | 666/840 | 525/612 | 341/354 |
| | 19 | 3129/10137 | 2488/5190 | 1845/3003 | 1335/1891 | 1004/1267 | 777/889 | 615/648 | 404/375 |
| | 18 | 3129/10630 | 2488/5443 | 2060/3149 | 1502/1983 | 1132/1328 | 878/933 | 697/680 | 461/393 |
| | 16 | 3128/11651 | 2487/5965 | 2060/3452 | 1754/2174 | 1407/1456 | 1095/1022 | 873/745 | 582/431 |

**Notes:**

1. For high loads long term concrete creep should be considered.
2. Use Composite Deck-Slab Strength Web Based Solutions for alternate slabs or ASD design.

# 1.5VL-36/1.5VLI-36/1.5PLVLI-36 COMPOSITE DECK-SLABS
## LIGHT WEIGHT CONCRETE (110 pcf)

LRFD

### Maximum Unshored Spans / Composite Deck-Slab Properties

| Slab Depth | | | Maximum Unshored Construction Clear Span | | | Concrete + Deck | Deflection | Moment | Shear |
|---|---|---|---|---|---|---|---|---|---|
| Total | Topping | Deck Gage | 1 | 2 | 3 | (psf) | $I_d = (I_{cr}+I_u)/2$ (in⁴/ft) | $\phi M_{no}$ (kip-ft/ft) | $\phi V_{no}$ (kip/ft) |
| 3½" | 2" | 22 | 7'-1" | 8'-4" | 8'-5" | 24.8 | 2.07 | 2.58 | 3.02 |
| | | 20 | 8'-7" | 9'-10" | 10'-2" | 25.2 | 2.24 | 3.03 | 3.02 |
| | | 19 | 9'-2" | 10'-10" | 11'-2" | 25.5 | 2.39 | 3.44 | 3.02 |
| | | 18 | 9'-7" | 11'-6" | 11'-10" | 25.8 | 2.52 | 3.80 | 3.02 |
| | | 16 | 10'-5" | 12'-11" | 12'-5" | 26.5 | 2.79 | 4.56 | 3.02 |
| 4" | 2½" | 22 | 6'-9" | 7'-11" | 8'-0" | 29.4 | 3.06 | 3.18 | 3.62 |
| | | 20 | 8'-1" | 9'-4" | 9'-7" | 29.8 | 3.31 | 3.75 | 3.62 |
| | | 19 | 8'-8" | 10'-3" | 10'-8" | 30.1 | 3.54 | 4.27 | 3.62 |
| | | 18 | 9'-1" | 11'-0" | 11'-4" | 30.4 | 3.73 | 4.73 | 3.62 |
| | | 16 | 9'-10" | 12'-3" | 12'-0" | 31.1 | 4.12 | 5.71 | 3.62 |
| 4¾" | 3¼" | 22 | 6'-4" | 7'-5" | 7'-6" | 36.3 | 5.07 | 4.23 | 4.59 |
| | | 20 | 7'-7" | 8'-9" | 9'-0" | 36.7 | 5.48 | 5.00 | 4.59 |
| | | 19 | 8'-2" | 9'-8" | 9'-11" | 37.0 | 5.85 | 5.72 | 4.59 |
| | | 18 | 8'-6" | 10'-3" | 10'-8" | 37.3 | 6.17 | 6.36 | 4.59 |
| | | 16 | 9'-3" | 11'-6" | 11'-5" | 38.0 | 6.81 | 7.71 | 4.59 |

**Note:**

1. Maximum unshored spans do not consider web-crippling. Required bearing should be determined based on specific span conditions.

### Superimposed Design Load, $\phi W_n$, / Deflection at L/360 (psf)

LWC (110 pcf), $f'_c$ = 3000 psi

| Total Slab Depth | Deck Gage | Span (ft-in.) 4'-0" | 5'-0" | 6'-0" | 7'-0" | 8'-0" | 9'-0" | 10'-0" | 12'-0" |
|---|---|---|---|---|---|---|---|---|---|
| 3½" | 22 | 1262/1410 | 797/722 | 544/417 | 392/263 | 293/176 | 225/123 | 176/90 | 113/52 |
| | 20 | 1480/1528 | 939/782 | 643/452 | 464/285 | 348/191 | 268/134 | 212/97 | 138/56 |
| | 19 | 1480/1634 | 1071/837 | 734/484 | 531/305 | 399/204 | 309/143 | 244/104 | 160/60 |
| | 18 | 1479/1723 | 1177/882 | 814/510 | 589/321 | 444/215 | 344/151 | 273/110 | 180/63 |
| | 16 | 1479/1904 | 1176/975 | 975/564 | 712/355 | 538/238 | 418/167 | 332/121 | 221/70 |
| 4" | 22 | 1556/2088 | 983/1069 | 671/618 | 484/389 | 362/261 | 279/183 | 219/133 | 141/77 |
| | 20 | 1772/2260 | 1163/1157 | 796/669 | 576/421 | 432/282 | 334/198 | 264/144 | 172/83 |
| | 19 | 1772/2415 | 1330/1236 | 913/715 | 661/450 | 497/301 | 385/212 | 305/154 | 201/89 |
| | 18 | 1772/2546 | 1410/1303 | 1015/754 | 736/475 | 555/318 | 431/223 | 342/162 | 226/94 |
| | 16 | 1771/2811 | 1409/1439 | 1168/833 | 894/524 | 676/351 | 526/246 | 419/179 | 279/104 |
| 4¾" | 22 | 2072/3463 | 1310/1773 | 896/1026 | 647/646 | 485/432 | 374/304 | 294/221 | 191/128 |
| | 20 | 2249/3745 | 1556/1917 | 1067/1109 | 772/698 | 581/468 | 450/328 | 356/239 | 233/138 |
| | 19 | 2249/3997 | 1785/2046 | 1226/1184 | 889/745 | 670/499 | 520/350 | 413/255 | 273/148 |
| | 18 | 2249/4213 | 1790/2157 | 1367/1248 | 993/786 | 749/526 | 583/369 | 463/269 | 308/156 |
| | 16 | 2248/4649 | 1789/2380 | 1483/1377 | 1213/867 | 918/581 | 715/408 | 571/297 | 382/172 |

**Notes:**

1. For high loads long term concrete creep should be considered.
2. Use Composite Deck-Slab Strength Web Based Solutions for alternate slabs or ASD design.

## 1.5VL-36/1.5VLI-36/1.5PLVLI-36 Composite Deck-Slab Information

$f'_c$ = 3000 psi

| Total Slab Depth (in.) | Cover Depth (in.) | Theoretical Concrete Volume ($yd^3$/100 $ft^2$) | Min. $A_s$ for T&S ($in.^2$) | Recommended Reinforcing for Temperature and Shrinkage: WWR (OR) | Bekaert Dramix® Steel Fiber Alternate to WWR (lb/$yd^3$): 4D 65/60BG |
|---|---|---|---|---|---|
| **Normal Weight Concrete (145 pcf)** | | | | | |
| **3½** | **2** | 0.78 | 0.028 | 6x6-W1.4xW1.4 | 23 |
| **4** | **2½** | 0.94 | 0.028 | 6x6-W1.4xW1.4 | 18 |
| **4½** | **3** | 1.09 | 0.028 | 6x6-W1.4xW1.4 | 15 |
| **5** | **3½** | 1.24 | 0.032 | 6x6-W2.1xW2.1 | 15 |
| **5½** | **4** | 1.40 | 0.036 | 6x6-W2.1xW2.1 | 15 |
| **6** | **4½** | 1.55 | 0.041 | 6x6-W2.1xW2.1 | 15 |
| **Light Weight Concrete (110 pcf)** | | | | | |
| **3½** | **2** | 0.78 | 0.028 | 6x6-W1.4xW1.4 | 33 |
| **4** | **2½** | 0.94 | 0.028 | 6x6-W1.4xW1.4 | 25 |
| **4½** | **3** | 1.09 | 0.028 | 6x6-W1.4xW1.4 | 20 |
| **4¾** | **3¼** | 1.17 | 0.029 | 6x6-W2.1xW2.1 | 20 |
| **5** | **3½** | 1.24 | 0.032 | 6x6-W2.1xW2.1 | 20 |
| **5¾** | **4¼** | 1.48 | 0.038 | 6x6-W2.1xW2.1 | 20 |

**Notes:**

1. FRC reinforcement is based on IAPMO UES ER-465.
2. Dramix® fibers may be used in UL or ULC fire rated assemblies in lieu of WWR. See UL file R19307 for additional information.

**For information on Bekaert Dramix® fibers contact 770-514-2295 or infobuilding@bekaert.com.**