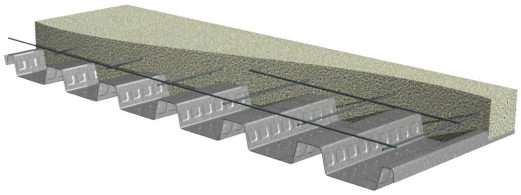
# 1.5VLR-36 COMPOSITE DECK
## GRADE 50 STEEL

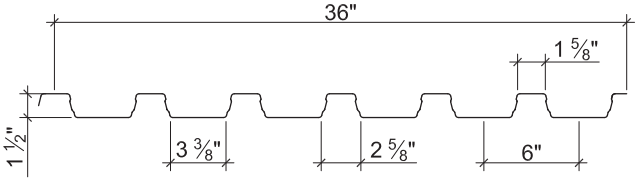
ASD

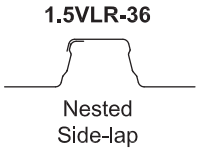
## 1.5VLR COMPOSITE DECK

- **1.5VLR-36 Deck used with Side-lap Screws**



### 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) | Allowable Moment $M_n$+/Ω (lb-ft/ft) | $M_n$-/Ω (lb-ft/ft) | Vertical Web Shear $V_n/\Omega$ (lb/ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| **22** | 1.6 | 0.0295 | 50 | 0.178 | 0.155 | 0.179 | 0.169 | 447 | 422 | 2654 |
| **20** | 2.0 | 0.0358 | 50 | 0.217 | 0.197 | 0.229 | 0.224 | 571 | 559 | 3207 |
| **19** | 2.3 | 0.0418 | 50 | 0.257 | 0.239 | 0.278 | 0.266 | 693 | 663 | 3728 |
| **18** | 2.6 | 0.0474 | 50 | 0.290 | 0.277 | 0.318 | 0.306 | 793 | 763 | 4209 |
| **16** | 3.3 | 0.0598 | 50 | 0.367 | 0.364 | 0.402 | 0.393 | 1003 | 981 | 5261 |

### Allowable Reactions at Supports Based on Web Crippling, $R_n/\Omega$ (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** | 807 | 887 | 1021 | 1115 | 1482 | 1602 | 842 | 908 | 1017 | 1093 | 1834 | 1994 |
| **20** | 1153 | 1263 | 1448 | 1574 | 2127 | 2289 | 1274 | 1368 | 1525 | 1632 | 2662 | 2881 |
| **19** | 1532 | 1674 | 1913 | 2071 | 2839 | 3043 | 1766 | 1891 | 2100 | 2239 | 3579 | 3859 |
| **18** | 1931 | 2105 | 2398 | 2588 | 3586 | 3831 | 2297 | 2454 | 2716 | 2887 | 4546 | 4884 |
| **16** | 2958 | 3212 | 3639 | 3900 | 5517 | 5855 | 3713 | 3950 | 4347 | 4590 | 7050 | 7523 |

## 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

# 1.5VLR-36 COMPOSITE DECK-SLABS
## NORMAL WEIGHT CONCRETE (145 pcf)

ASD

### Maximum Unshored Spans

| Slab Depth | | Deck | Maximum Unshored Construction Clear Span | | |
|---|---|---|---|---|---|
| Total | Topping | Gage | 1 | 2 | 3 |
| 3½” | 2” | 22 | 6'-5" | 7'-5" | 7'-7" |
| | | 20 | 7'-6" | 8'-7" | 8'-10" |
| | | 19 | 8'-2" | 9'-4" | 9'-7" |
| | | 18 | 8'-6" | 9'-11" | 10'-3" |
| | | 16 | 9'-2" | 11'-3" | 11'-3" |
| 5” | 3½” | 22 | 5'-8" | 6'-6" | 6'-8" |
| | | 20 | 6'-7" | 7'-6" | 7'-9" |
| | | 19 | 7'-3" | 8'-2" | 8'-5" |
| | | 18 | 7'-6" | 8'-9" | 9'-0" |
| | | 16 | 8'-1" | 9'-10" | 10'-0" |
| 6” | 4½” | 22 | 5'-4" | 6'-1" | 6'-3" |
| | | 20 | 6'-2" | 7'-0" | 7'-3" |
| | | 19 | 6'-10" | 7'-7" | 7'-10" |
| | | 18 | 7'-1" | 8'-2" | 8'-5" |
| | | 16 | 7'-8" | 9'-2" | 9'-5" |

### Composite Deck-Slab Properties

| Concrete + Deck (psf) | Deflection $I_d = (I_{cr}+I_u)/2$ (in⁴/ft) | Moment $M_{no}/\Omega$ (kip-ft/ft) | Shear $V_{no}/\Omega$ (kip/ft) |
|---|---|---|---|
| 37.5 | 3.43 | 2.60 | 3.36 |
| 37.9 | 3.68 | 3.08 | 3.36 |
| 38.2 | 3.91 | 3.53 | 3.36 |
| 38.5 | 4.11 | 3.93 | 3.36 |
| 39.2 | 4.50 | 4.79 | 3.36 |
| 55.6 | 9.34 | 3.80 | 5.03 |
| 56.0 | 9.97 | 4.53 | 5.21 |
| 56.3 | 10.55 | 5.22 | 5.21 |
| 56.6 | 11.05 | 5.84 | 5.21 |
| 57.3 | 12.09 | 7.18 | 5.21 |
| 67.7 | 15.62 | 4.84 | 5.59 |
| 68.1 | 16.63 | 5.78 | 6.10 |
| 68.4 | 17.55 | 6.67 | 6.33 |
| 68.7 | 18.36 | 7.48 | 6.33 |
| 69.4 | 20.03 | 9.23 | 6.33 |

**Note:**

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

### Superimposed Allowable Load, $W_n/\Omega$, Limited by 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" | 11'-0" | 12'-0" |
| 3½” | 22 | 1261 | 793 | 539 | 386 | 287 | 205 | 150 | 112 | 86 |
| | 20 | 1501 | 947 | 646 | 464 | 314 | 220 | 160 | 120 | 93 |
| | 19 | 1640 | 1091 | 746 | 498 | 333 | 234 | 170 | 128 | 98 |
| | 18 | 1639 | 1219 | 830 | 523 | 350 | 246 | 179 | 134 | 103 |
| | 16 | 1639 | 1303 | 911 | 573 | 384 | 269 | 196 | 147 | 113 |
| 5” | 22 | 1845 | 1160 | 789 | 565 | 419 | 319 | 248 | 195 | 155 |
| | 20 | 2210 | 1394 | 951 | 684 | 510 | 391 | 306 | 243 | 195 |
| | 19 | 2546 | 1614 | 1104 | 796 | 596 | 459 | 361 | 288 | 233 |
| | 18 | 2545 | 1813 | 1241 | 897 | 673 | 520 | 410 | 329 | 267 |
| | 16 | 2545 | 2024 | 1538 | 1115 | 840 | 652 | 517 | 396 | 305 |
| 6” | 22 | 2351 | 1480 | 1007 | 722 | 537 | 410 | 319 | 252 | 201 |
| | 20 | 2822 | 1782 | 1216 | 875 | 654 | 502 | 394 | 314 | 253 |
| | 19 | 3095 | 2066 | 1414 | 1020 | 765 | 590 | 465 | 372 | 302 |
| | 18 | 3095 | 2324 | 1593 | 1152 | 866 | 669 | 529 | 425 | 346 |
| | 16 | 3094 | 2461 | 1980 | 1436 | 1083 | 841 | 668 | 540 | 443 |

**Notes:**

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

# 1.5VLR-36 COMPOSITE DECK-SLABS
## LIGHT WEIGHT CONCRETE (110 pcf)

ASD

### Maximum Unshored Spans

| Slab Depth | | Deck | Maximum Unshored Construction Clear Span | | |
|---|---|---|---|---|---|
| Total | Topping | Gage | 1 | 2 | 3 |
| 3½” | 2” | 22 | 6'-11" | 8'-2" | 8'-3" |
| | | 20 | 8'-3" | 9'-4" | 9'-8" |
| | | 19 | 8'-11" | 10'-2" | 10'-6" |
| | | 18 | 9'-3" | 10'-10" | 11'-2" |
| | | 16 | 10'-0" | 12'-2" | 12'-0" |
| 4” | 2½” | 22 | 6'-8" | 7'-9" | 7'-11" |
| | | 20 | 7'-10" | 8'-11" | 9'-3" |
| | | 19 | 8'-6" | 9'-8" | 10'-0" |
| | | 18 | 8'-10" | 10'-5" | 10'-9" |
| | | 16 | 9'-6" | 11'-8" | 11'-7" |
| 4¾” | 3¼” | 22 | 6'-4" | 7'-4" | 7'-6" |
| | | 20 | 7'-5" | 8'-5" | 8'-8" |
| | | 19 | 8'-1" | 9'-2" | 9'-6" |
| | | 18 | 8'-4" | 9'-10" | 10'-2" |
| | | 16 | 9'-0" | 11'-1" | 11'-1" |

### Composite Deck-Slab Properties

| Concrete + Deck (psf) | Deflection $I_d = (I_{cr}+I_u)/2$ (in⁴/ft) | Moment $M_{no}/\Omega$ (kip-ft/ft) | Shear $V_{no}/\Omega$ (kip/ft) |
|---|---|---|---|
| 28.8 | 2.66 | 2.49 | 3.36 |
| 29.2 | 2.87 | 2.94 | 3.36 |
| 29.5 | 3.06 | 3.36 | 3.36 |
| 29.8 | 3.22 | 3.73 | 3.36 |
| 30.5 | 3.54 | 4.52 | 3.36 |
| 33.4 | 3.85 | 2.86 | 3.91 |
| 33.8 | 4.15 | 3.38 | 3.95 |
| 34.1 | 4.42 | 3.87 | 3.95 |
| 34.4 | 4.65 | 4.31 | 3.95 |
| 35.1 | 5.11 | 5.24 | 3.95 |
| 40.3 | 6.20 | 3.43 | 4.26 |
| 40.7 | 6.68 | 4.07 | 4.76 |
| 41.0 | 7.11 | 4.67 | 4.88 |
| 41.3 | 7.47 | 5.21 | 4.88 |
| 42.0 | 8.22 | 6.36 | 4.88 |

**Note:**

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

### Superimposed Allowable Load, $W_n/\Omega$, Limited by 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" | 11'-0" | 12'-0" |
| 3½” | 22 | 1214 | 766 | 523 | 338 | 226 | 159 | 116 | 87 | 67 |
| | 20 | 1439 | 910 | 580 | 365 | 244 | 172 | 125 | 94 | 72 |
| | 19 | 1648 | 1044 | 619 | 389 | 261 | 183 | 133 | 100 | 77 |
| | 18 | 1648 | 1125 | 651 | 410 | 274 | 193 | 140 | 105 | 81 |
| | 16 | 1647 | 1239 | 717 | 451 | 302 | 212 | 154 | 116 | 89 |
| 4” | 22 | 1396 | 881 | 601 | 433 | 323 | 230 | 168 | 126 | 97 |
| | 20 | 1658 | 1049 | 718 | 518 | 354 | 248 | 181 | 136 | 104 |
| | 19 | 1903 | 1205 | 826 | 563 | 377 | 264 | 193 | 145 | 111 |
| | 18 | 1938 | 1344 | 923 | 592 | 396 | 278 | 203 | 152 | 117 |
| | 16 | 1937 | 1542 | 1034 | 651 | 436 | 306 | 223 | 167 | 129 |
| 4¾” | 22 | 1674 | 1057 | 722 | 519 | 388 | 298 | 234 | 186 | 150 |
| | 20 | 1995 | 1262 | 864 | 624 | 468 | 361 | 285 | 219 | 168 |
| | 19 | 2294 | 1453 | 997 | 721 | 542 | 420 | 310 | 233 | 179 |
| | 18 | 2398 | 1625 | 1116 | 808 | 609 | 448 | 326 | 245 | 189 |
| | 16 | 2397 | 1909 | 1371 | 996 | 701 | 492 | 359 | 269 | 207 |

**Notes:**

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

## 1.5VLR-36 Composite Deck-Slab Information

| 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) | Recommended Reinforcing for Temperature and Shrinkage: Bekaert Dramix® Steel Fiber Alternate to WWR ($lb/yd^3$) 3D 65/60BG |
|---|---|---|---|---|---|
| **Normal Weight Concrete (145 pcf)** | | | | | |
| **3½** | **2** | 0.92 | 0.018 | 6x6-W1.4xW1.4 | 27 |
| **4** | **2½** | 1.07 | 0.023 | 6x6-W1.4xW1.4 | 22 |
| **4½** | **3** | 1.22 | 0.027 | 6x6-W1.4xW1.4 | 19 |
| **5** | **3½** | 1.38 | 0.032 | 6x6-W2.1xW2.1 | 18 |
| **5½** | **4** | 1.53 | 0.036 | 6x6-W2.1xW2.1 | 18 |
| **6** | **4½** | 1.69 | 0.041 | 6x6-W2.1xW2.1 | 18 |
| **Light Weight Concrete (110 pcf)** | | | | | |
| **3½** | **2** | 0.92 | 0.018 | 6x6-W1.4xW1.4 | 42 |
| **4** | **2½** | 1.07 | 0.023 | 6x6-W1.4xW1.4 | 30 |
| **4½** | **3** | 1.22 | 0.027 | 6x6-W1.4xW1.4 | 23 |
| **4¾** | **3¼** | 1.30 | 0.029 | 6x6-W2.1xW2.1 | 22 |
| **5** | **3½** | 1.38 | 0.032 | 6x6-W2.1xW2.1 | 22 |
| **5¾** | **4¼** | 1.61 | 0.038 | 6x6-W2.1xW2.1 | 22 |

**Notes:**

1. FRC reinforcement is based on IAPMO UES ER-497 and 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.**