

VULCRAFT®

LEGACY ROOF DECK DIAPHRAGM TABLES



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Better Outcomes.™

MARCH 2018

DIAPHRAGM DESIGN

Diaphragm design information for Vulcraft roof and floor decks is based on the Steel Deck Institute “Diaphragm Design Manual, Third Edition” (DDM03) in accordance with the 2015 IBC.

ROOF DECK

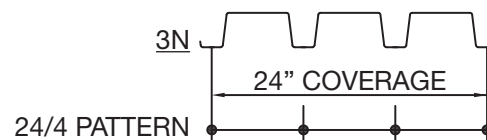
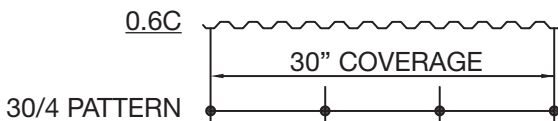
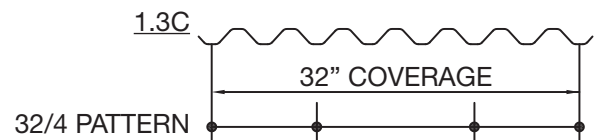
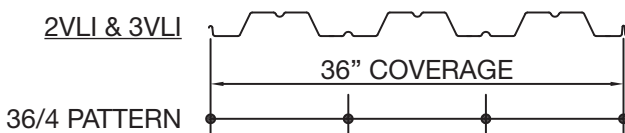
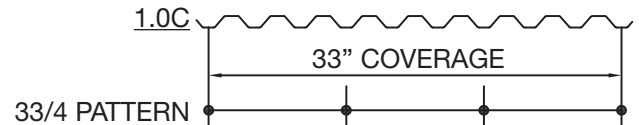
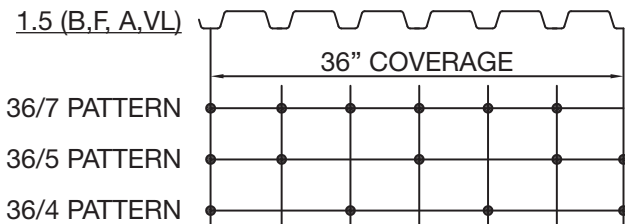
Historically, published diaphragm design tables for roof deck have been based on diaphragm shear loads only. These historical tables have not considered the condition of wind uplift in conjunction with diaphragm shear due to wind loads. When support fasteners must resist a significant amount of tension load due to wind uplift, the allowable shear strength of those fasteners is reduced. As net wind uplift increases, allowable diaphragm shear capacity decreases. The effects of uplift are included in the diaphragm tables in the Vulcraft catalogs for the PunchLok II System and DoveTail Deck.

Vulcraft Diaphragm Calculator: Vulcraft is pleased to introduce the Vulcraft Diaphragm Calculator to assist in the determination of diaphragm capacity and stiffness of roof decks without fill. The Diaphragm Calculator can determine capacity governed by seismic, wind only, or wind in conjunction with uplift. Access the diaphragm calculator at: www.vulcraft.com.

Diaphragm Design Resources: Additional diaphragm design information for Vulcraft roof decks is available at www.vulcraft.com, including:

- Vulcraft PunchLok II System Catalogs
- Vulcraft DoveTail Deck Catalogs
- Vulcraft Deck Catalog

TYPICAL FASTENER LAYOUT



DIAPHRAGM - 1.5B / 1.5BI

1.5B / 1.5BI ROOF DECK

- 22 Gage
- Support Fasteners: 3/4" puddle welds
- Sidelap Fasteners: welded¹

36/7 Attachment Pattern

Factor of safety = 2.35

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|-------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6" | 7'-0" | 7'-6" | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | |
| 0 | 585 | 509 | 443 | 391 | 350 | 316 | 288 | 264 | 244 | 226 | 210 | 197 | 186 | 177 | 168 | 0.486 |
| 1 | 734 | 643 | 572 | 514 | 461 | 417 | 380 | | | | | | | | | 0.287 |
| 2 | 866 | 766 | 685 | 619 | 563 | 517 | 473 | 435 | 402 | 374 | 349 | 328 | 310 | | | 0.204 |
| 3 | 982 | 877 | 790 | 717 | 656 | 603 | 558 | 519 | 481 | 448 | 419 | 384 | 343 | 308 | 278 | 0.158 |
| 4 | 1083 | 977 | 886 | 808 | 742 | 685 | 635 | 592 | 554 | 494 | 434 | 384 | 343 | 308 | 278 | 0.129 |
| 5 | 1169 | 1064 | 972 | 892 | 823 | 762 | 709 | 657 | 567 | 494 | 434 | 384 | 343 | 308 | 278 | 0.109 |
| 6 | 1244 | 1142 | 1050 | 969 | 898 | 835 | 771 | 657 | 567 | 494 | 434 | 384 | 343 | 308 | 278 | 0.094 |
| 7 | 1308 | 1210 | 1120 | 1039 | 967 | 902 | 771 | 657 | 567 | 494 | 434 | 384 | 343 | 308 | 278 | 0.083 |
| 8 | 1362 | 1269 | 1182 | 1103 | 1030 | 918 | 771 | 657 | 567 | 494 | 434 | 384 | 343 | 308 | 278 | 0.074 |
| 9 | 1409 | 1321 | 1238 | 1160 | 1088 | 918 | 771 | 657 | 567 | 494 | 434 | 384 | 343 | 308 | 278 | 0.067 |
| 10 | 1450 | 1367 | 1287 | 1212 | 1111 | 918 | 771 | 657 | 567 | 494 | 434 | 384 | 343 | 308 | 278 | 0.061 |

D_B = 129 K2 = 870

36/5 Attachment Pattern

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|-------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6" | 7'-0" | 7'-6" | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | |
| 0 | 518 | 455 | 405 | 361 | 323 | 292 | 266 | 244 | 225 | 208 | 194 | 182 | 172 | 163 | 155 | 0.583 |
| 1 | 641 | 572 | 514 | 466 | 426 | 392 | 358 | | | | | | | | | 0.319 |
| 2 | 741 | 670 | 609 | 557 | 512 | 473 | 439 | 410 | 383 | 356 | 333 | 312 | 295 | | | 0.219 |
| 3 | 821 | 752 | 691 | 637 | 590 | 548 | 511 | 478 | 449 | 423 | 399 | 378 | 343 | 308 | 278 | 0.167 |
| 4 | 884 | 820 | 760 | 707 | 658 | 615 | 576 | 541 | 510 | 481 | 434 | 384 | 343 | 308 | 278 | 0.135 |
| 5 | 934 | 875 | 819 | 767 | 719 | 675 | 635 | 599 | 566 | 494 | 434 | 384 | 343 | 308 | 278 | 0.113 |
| 6 | 974 | 920 | 868 | 818 | 772 | 728 | 688 | 652 | 567 | 494 | 434 | 384 | 343 | 308 | 278 | 0.098 |
| 7 | 1006 | 957 | 909 | 862 | 818 | 775 | 736 | 657 | 567 | 494 | 434 | 384 | 343 | 308 | 278 | 0.086 |
| 8 | 1032 | 988 | 944 | 900 | 858 | 817 | 771 | 657 | 567 | 494 | 434 | 384 | 343 | 308 | 278 | 0.076 |
| 9 | 1054 | 1014 | 973 | 933 | 893 | 854 | 771 | 657 | 567 | 494 | 434 | 384 | 343 | 308 | 278 | 0.069 |
| 10 | 1071 | 1035 | 998 | 960 | 923 | 886 | 771 | 657 | 567 | 494 | 434 | 384 | 343 | 308 | 278 | 0.063 |

D_B = 758 K2 = 870

36/4 Attachment Pattern

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|-------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6" | 7'-0" | 7'-6" | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | |
| 0 | 396 | 349 | 310 | 273 | 244 | 219 | 199 | 182 | 168 | 155 | 144 | 135 | 127 | 121 | 115 | 0.728 |
| 1 | 514 | 461 | 416 | 379 | 347 | 320 | 292 | | | | | | | | | 0.358 |
| 2 | 602 | 550 | 504 | 463 | 428 | 397 | 370 | 346 | 324 | 303 | 283 | 266 | 251 | | | 0.237 |
| 3 | 666 | 618 | 574 | 534 | 497 | 465 | 436 | 409 | 386 | 364 | 345 | 328 | 312 | 296 | 278 | 0.177 |
| 4 | 714 | 671 | 630 | 592 | 556 | 523 | 493 | 466 | 441 | 418 | 397 | 378 | 343 | 308 | 278 | 0.142 |
| 5 | 749 | 712 | 674 | 639 | 605 | 573 | 543 | 516 | 490 | 467 | 434 | 384 | 343 | 308 | 278 | 0.118 |
| 6 | 776 | 743 | 710 | 677 | 645 | 615 | 586 | 559 | 534 | 494 | 434 | 384 | 343 | 308 | 278 | 0.101 |
| 7 | 796 | 767 | 738 | 708 | 679 | 651 | 623 | 597 | 567 | 494 | 434 | 384 | 343 | 308 | 278 | 0.088 |
| 8 | 812 | 787 | 761 | 734 | 707 | 681 | 655 | 630 | 567 | 494 | 434 | 384 | 343 | 308 | 278 | 0.078 |
| 9 | 824 | 802 | 779 | 755 | 731 | 706 | 682 | 657 | 567 | 494 | 434 | 384 | 343 | 308 | 278 | 0.071 |
| 10 | 834 | 815 | 794 | 773 | 750 | 728 | 706 | 657 | 567 | 494 | 434 | 384 | 343 | 308 | 278 | 0.064 |

D_B = 1072 K2 = 870

¹The bold values do not comply with the minimum spacing requirements for sidelap connections and shall not be used except with properly spaced button-punched sidelaps with 1.5BI deck.

$$G' = \frac{K_2}{3.78 + 0.3 \cdot D_B^2 + 3 \cdot K_1 \cdot \text{SPAN}} \text{, Kips/inch}$$

SPAN is in feet



DIAPHRAGM - 1.5B / 1.5BI / 1.5F / 1.5A

1.5B / 1.5BI / 1.5F / 1.5A ROOF DECK

- 22 Gage
- Support Fasteners: 5/8" puddle welds¹
- Sidelap Fasteners: welded²

36/7 Attachment Pattern

Factor of safety = 2.35

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|-------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6" | 7'-0" | 7'-6" | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | |
| 0 | 484 | 420 | 366 | 323 | 289 | 261 | 238 | 218 | 201 | 187 | 174 | 163 | 154 | 146 | 139 | 0.486 |
| 1 | 630 | 554 | 493 | 443 | 400 | 362 | 330 | | | | | | | | | 0.287 |
| 2 | 757 | 673 | 604 | 546 | 498 | 457 | 423 | 389 | 360 | 335 | 313 | 283 | 252 | | | 0.204 |
| 3 | 865 | 778 | 704 | 641 | 587 | 542 | 502 | 467 | 417 | 363 | 319 | 283 | 252 | 226 | 204 | 0.158 |
| 4 | 956 | 869 | 793 | 727 | 670 | 620 | 568 | 484 | 417 | 363 | 319 | 283 | 252 | 226 | 204 | 0.129 |
| 5 | 1031 | 947 | 871 | 804 | 745 | 676 | 568 | 484 | 417 | 363 | 319 | 283 | 252 | 226 | 204 | 0.109 |
| 6 | 1093 | 1013 | 940 | 873 | 813 | 676 | 568 | 484 | 417 | 363 | 319 | 283 | 252 | 226 | 204 | 0.094 |
| 7 | 1145 | 1070 | 999 | 934 | 818 | 676 | 568 | 484 | 417 | 363 | 319 | 283 | 252 | 226 | 204 | 0.083 |
| 8 | 1188 | 1118 | 1051 | 988 | 818 | 676 | 568 | 484 | 417 | 363 | 319 | 283 | 252 | 226 | 204 | 0.074 |
| 9 | 1224 | 1160 | 1097 | 1009 | 818 | 676 | 568 | 484 | 417 | 363 | 319 | 283 | 252 | 226 | 204 | 0.067 |
| 10 | 1254 | 1195 | 1136 | 1009 | 818 | 676 | 568 | 484 | 417 | 363 | 319 | 283 | 252 | 226 | 204 | 0.061 |

D_F = 226 D_A = 356 D_B = 129 K2 = 870

36/5 Attachment Pattern

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|-------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6" | 7'-0" | 7'-6" | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | |
| 0 | 428 | 376 | 335 | 299 | 267 | 241 | 220 | 201 | 186 | 172 | 160 | 150 | 142 | 134 | 128 | 0.583 |
| 1 | 549 | 491 | 443 | 402 | 368 | 338 | 312 | | | | | | | | | 0.319 |
| 2 | 642 | 584 | 533 | 489 | 451 | 418 | 388 | 363 | 340 | 320 | 299 | 281 | 252 | | | 0.219 |
| 3 | 713 | 658 | 608 | 564 | 524 | 488 | 457 | 428 | 403 | 363 | 319 | 283 | 252 | 226 | 204 | 0.167 |
| 4 | 766 | 716 | 670 | 626 | 586 | 550 | 517 | 484 | 417 | 363 | 319 | 283 | 252 | 226 | 204 | 0.135 |
| 5 | 807 | 762 | 719 | 678 | 640 | 604 | 568 | 484 | 417 | 363 | 319 | 283 | 252 | 226 | 204 | 0.113 |
| 6 | 838 | 798 | 759 | 721 | 685 | 650 | 568 | 484 | 417 | 363 | 319 | 283 | 252 | 226 | 204 | 0.098 |
| 7 | 862 | 827 | 792 | 757 | 723 | 676 | 568 | 484 | 417 | 363 | 319 | 283 | 252 | 226 | 204 | 0.086 |
| 8 | 881 | 850 | 819 | 787 | 755 | 676 | 568 | 484 | 417 | 363 | 319 | 283 | 252 | 226 | 204 | 0.076 |
| 9 | 896 | 869 | 841 | 812 | 782 | 676 | 568 | 484 | 417 | 363 | 319 | 283 | 252 | 226 | 204 | 0.069 |
| 10 | 908 | 884 | 859 | 832 | 806 | 676 | 568 | 484 | 417 | 363 | 319 | 283 | 252 | 226 | 204 | 0.063 |

D_F = 886 D_A = 974 D_B = 758 K2 = 870

36/4 Attachment Pattern

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|-------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-----------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6" | 7'-0" | 7'-6" | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | |
| 0 | 328 | 288 | 256 | 226 | 201 | 181 | 165 | 151 | 139 | 128 | 119 | 112 | 105 | 100 | 95 | 0.728 |
| 1 | 442 | 398 | 361 | 329 | 302 | 278 | 257 | | | | | | | | | 0.358 |
| 2 | 522 | 480 | 442 | 409 | 379 | 353 | 329 | 309 | 290 | 273 | 258 | 242 | 229 | | | 0.237 |
| 3 | 577 | 540 | 505 | 472 | 443 | 415 | 391 | 368 | 348 | 330 | 313 | 283 | 252 | 226 | 204 | 0.177 |
| 4 | 615 | 583 | 552 | 522 | 494 | 467 | 443 | 420 | 399 | 363 | 319 | 283 | 252 | 226 | 204 | 0.142 |
| 5 | 642 | 615 | 588 | 561 | 535 | 510 | 486 | 464 | 417 | 363 | 319 | 283 | 252 | 226 | 204 | 0.118 |
| 6 | 662 | 639 | 615 | 591 | 568 | 545 | 522 | 484 | 417 | 363 | 319 | 283 | 252 | 226 | 204 | 0.101 |
| 7 | 676 | 657 | 636 | 615 | 594 | 573 | 552 | 484 | 417 | 363 | 319 | 283 | 252 | 226 | 204 | 0.088 |
| 8 | 687 | 670 | 653 | 634 | 615 | 596 | 568 | 484 | 417 | 363 | 319 | 283 | 252 | 226 | 204 | 0.078 |
| 9 | 695 | 681 | 666 | 649 | 633 | 615 | 568 | 484 | 417 | 363 | 319 | 283 | 252 | 226 | 204 | 0.071 |
| 10 | 702 | 690 | 676 | 662 | 647 | 631 | 568 | 484 | 417 | 363 | 319 | 283 | 252 | 226 | 204 | 0.064 |

D_F = 1216 D_A = 1282 D_B = 1072 K2 = 870

¹ A 3/8" x 1-1/4" arc seam weld shall be used with F deck or A Deck.
² The **bold** values do not comply with the minimum spacing requirements for sidelap connections and shall not be used except with properly spaced button-punched sidelaps with 1.5BI deck.

$$G' = \frac{K_2}{3.78 + 0.3 \cdot D_x + 3 \cdot K_1 \cdot \text{SPAN}}, \text{ Kips/inch}$$

SPAN is in feet Substitute D_B, D_F, or D_A for D_x



DIAPHRAGM - 1.5B / 1.5F / 1.5A

1.5B / 1.5F / 1.5A ROOF DECK

- 22 Gage
- Support Fasteners: 5/8" puddle welds¹
- Sidelap Fasteners: #10 TEK screws

36/7 Attachment Pattern

Factor of safety = 2.35

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6" | 7'-0" | 7'-6" | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | |
| 0 | 484 | 420 | 366 | 323 | 289 | | | | | | | | | | | 0.486 |
| 1 | 557 | 487 | 432 | 383 | 343 | 310 | 283 | | | | | | | | | 0.377 |
| 2 | 626 | 550 | 489 | 440 | 397 | 359 | 328 | 301 | 278 | 259 | 241 | 227 | 214 | | | 0.308 |
| 3 | 691 | 610 | 545 | 491 | 447 | 408 | 373 | 343 | 317 | 295 | 275 | 258 | 244 | 226 | 204 | 0.261 |
| 4 | 751 | 667 | 598 | 541 | 493 | 452 | 418 | 384 | 355 | 330 | 309 | 283 | 252 | 226 | 204 | 0.226 |
| 5 | 806 | 720 | 648 | 588 | 537 | 494 | 457 | 425 | 394 | 363 | 319 | 283 | 252 | 226 | 204 | 0.199 |
| 6 | 857 | 769 | 696 | 633 | 580 | 534 | 495 | 461 | 417 | 363 | 319 | 283 | 252 | 226 | 204 | 0.178 |
| 7 | 903 | 816 | 741 | 676 | 621 | 574 | 532 | 484 | 417 | 363 | 319 | 283 | 252 | 226 | 204 | 0.161 |
| 8 | 946 | 859 | 783 | 717 | 661 | 611 | 568 | 484 | 417 | 363 | 319 | 283 | 252 | 226 | 204 | 0.147 |
| 9 | 985 | 899 | 823 | 757 | 698 | 648 | 568 | 484 | 417 | 363 | 319 | 283 | 252 | 226 | 204 | 0.135 |
| 10 | 1021 | 936 | 860 | 794 | 735 | 676 | 568 | 484 | 417 | 363 | 319 | 283 | 252 | 226 | 204 | 0.125 |

D_F = 226 D_A = 356 D_B = 129 K2 = 870

36/5 Attachment Pattern

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6" | 7'-0" | 7'-6" | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | |
| 0 | 428 | 376 | 335 | 299 | 267 | | | | | | | | | | | 0.583 |
| 1 | 490 | 435 | 389 | 352 | 321 | 290 | 265 | | | | | | | | | 0.433 |
| 2 | 546 | 488 | 440 | 399 | 365 | 336 | 309 | 284 | 263 | 244 | 228 | 214 | 202 | | | 0.345 |
| 3 | 594 | 536 | 486 | 443 | 407 | 376 | 348 | 325 | 301 | 280 | 261 | 245 | 232 | 220 | 204 | 0.286 |
| 4 | 637 | 579 | 529 | 485 | 446 | 413 | 384 | 359 | 336 | 316 | 295 | 277 | 252 | 226 | 204 | 0.245 |
| 5 | 675 | 618 | 567 | 523 | 483 | 449 | 419 | 392 | 368 | 346 | 319 | 283 | 252 | 226 | 204 | 0.214 |
| 6 | 707 | 652 | 602 | 558 | 518 | 483 | 451 | 423 | 398 | 363 | 319 | 283 | 252 | 226 | 204 | 0.190 |
| 7 | 736 | 683 | 634 | 590 | 550 | 514 | 482 | 453 | 417 | 363 | 319 | 283 | 252 | 226 | 204 | 0.171 |
| 8 | 761 | 710 | 663 | 619 | 580 | 544 | 511 | 481 | 417 | 363 | 319 | 283 | 252 | 226 | 204 | 0.155 |
| 9 | 782 | 735 | 689 | 647 | 607 | 571 | 538 | 484 | 417 | 363 | 319 | 283 | 252 | 226 | 204 | 0.142 |
| 10 | 801 | 756 | 713 | 671 | 633 | 597 | 564 | 484 | 417 | 363 | 319 | 283 | 252 | 226 | 204 | 0.131 |

D_F = 886 D_A = 974 D_B = 758 K2 = 870

36/4 Attachment Pattern

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6" | 7'-0" | 7'-6" | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | |
| 0 | 328 | 288 | 256 | 226 | 201 | | | | | | | | | | | 0.728 |
| 1 | 388 | 345 | 310 | 281 | 255 | 230 | 210 | | | | | | | | | 0.509 |
| 2 | 439 | 395 | 358 | 326 | 299 | 276 | 255 | 234 | 216 | 200 | 186 | 175 | 165 | | | 0.391 |
| 3 | 482 | 438 | 400 | 367 | 339 | 314 | 292 | 272 | 254 | 236 | 220 | 207 | 195 | 185 | 176 | 0.318 |
| 4 | 518 | 476 | 438 | 405 | 375 | 349 | 325 | 305 | 286 | 270 | 254 | 238 | 225 | 213 | 203 | 0.267 |
| 5 | 548 | 508 | 471 | 438 | 408 | 381 | 357 | 335 | 316 | 298 | 282 | 268 | 252 | 226 | 204 | 0.231 |
| 6 | 573 | 535 | 500 | 467 | 438 | 411 | 386 | 364 | 343 | 325 | 308 | 283 | 252 | 226 | 204 | 0.203 |
| 7 | 594 | 559 | 525 | 494 | 464 | 437 | 413 | 390 | 369 | 350 | 319 | 283 | 252 | 226 | 204 | 0.181 |
| 8 | 611 | 579 | 547 | 517 | 489 | 462 | 437 | 415 | 394 | 363 | 319 | 283 | 252 | 226 | 204 | 0.164 |
| 9 | 626 | 596 | 567 | 538 | 510 | 484 | 460 | 437 | 416 | 363 | 319 | 283 | 252 | 226 | 204 | 0.149 |
| 10 | 639 | 611 | 583 | 556 | 530 | 504 | 481 | 458 | 417 | 363 | 319 | 283 | 252 | 226 | 204 | 0.137 |

D_F = 1216 D_A = 1282 D_B = 1072 K2 = 870

¹ A 3/8" x 1-1/4" arc seam weld shall be used with F deck or A Deck.

$$G' = \frac{K_2}{3.78 + 0.3 \cdot D_x + 3 \cdot K_1 \cdot \text{SPAN}}, \text{ Kips/inch}$$

SPAN is in feet Substitute D_B, D_F, or D_A for D_x



DIAPHRAGM - 1.5B / 1.5F / 1.5A

1.5B / 1.5F / 1.5A ROOF DECK

- 22 Gage
- Support Fasteners: #12 TEK screws
- Sidelap Fasteners: #10 TEK screws

36/7 Attachment Pattern

Factor of safety = 2.35

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6" | 7'-0" | 7'-6" | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | |
| 0 | 283 | 246 | 214 | 189 | 169 | | | | | | | | | | | 0.549 |
| 1 | 355 | 311 | 276 | 248 | 223 | 202 | 184 | | | | | | | | | 0.414 |
| 2 | 419 | 371 | 332 | 299 | 273 | 250 | 229 | 210 | 195 | 181 | 169 | 159 | 150 | | | 0.333 |
| 3 | 475 | 424 | 382 | 347 | 317 | 292 | 270 | 251 | 233 | 217 | 203 | 190 | 180 | 170 | 162 | 0.278 |
| 4 | 524 | 473 | 429 | 391 | 359 | 332 | 308 | 287 | 268 | 252 | 236 | 222 | 210 | 199 | 189 | 0.239 |
| 5 | 566 | 515 | 471 | 432 | 398 | 369 | 343 | 321 | 301 | 283 | 267 | 253 | 240 | 226 | 204 | 0.209 |
| 6 | 602 | 553 | 508 | 469 | 435 | 404 | 377 | 353 | 332 | 313 | 295 | 280 | 252 | 226 | 204 | 0.186 |
| 7 | 633 | 585 | 542 | 503 | 468 | 437 | 409 | 384 | 361 | 341 | 319 | 283 | 252 | 226 | 204 | 0.168 |
| 8 | 659 | 614 | 572 | 534 | 499 | 467 | 439 | 413 | 389 | 363 | 319 | 283 | 252 | 226 | 204 | 0.152 |
| 9 | 682 | 639 | 599 | 562 | 527 | 495 | 466 | 440 | 416 | 363 | 319 | 283 | 252 | 226 | 204 | 0.140 |
| 10 | 701 | 661 | 623 | 587 | 553 | 521 | 492 | 466 | 417 | 363 | 319 | 283 | 252 | 226 | 204 | 0.129 |

D_F = 226 D_A = 356 D_B = 129 K2 = 870

36/5 Attachment Pattern

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6" | 7'-0" | 7'-6" | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | |
| 0 | 250 | 220 | 196 | 175 | 156 | | | | | | | | | | | 0.659 |
| 1 | 310 | 276 | 249 | 225 | 206 | 189 | 173 | | | | | | | | | 0.474 |
| 2 | 358 | 324 | 295 | 269 | 248 | 229 | 213 | 198 | 185 | 172 | 161 | 151 | 143 | | | 0.370 |
| 3 | 397 | 364 | 334 | 308 | 285 | 265 | 247 | 231 | 217 | 205 | 193 | 183 | 173 | 164 | 155 | 0.304 |
| 4 | 427 | 396 | 368 | 342 | 319 | 298 | 279 | 262 | 247 | 233 | 221 | 209 | 199 | 190 | 181 | 0.257 |
| 5 | 452 | 423 | 396 | 371 | 348 | 327 | 307 | 290 | 274 | 260 | 246 | 234 | 223 | 213 | 204 | 0.223 |
| 6 | 471 | 445 | 420 | 396 | 373 | 352 | 333 | 315 | 299 | 284 | 270 | 258 | 246 | 226 | 204 | 0.197 |
| 7 | 486 | 463 | 440 | 417 | 396 | 375 | 356 | 339 | 322 | 307 | 293 | 280 | 252 | 226 | 204 | 0.177 |
| 8 | 499 | 478 | 456 | 435 | 415 | 395 | 377 | 359 | 343 | 328 | 314 | 283 | 252 | 226 | 204 | 0.160 |
| 9 | 509 | 490 | 471 | 451 | 432 | 413 | 395 | 378 | 362 | 347 | 319 | 283 | 252 | 226 | 204 | 0.146 |
| 10 | 518 | 500 | 483 | 464 | 446 | 429 | 412 | 395 | 379 | 363 | 319 | 283 | 252 | 226 | 204 | 0.134 |

D_F = 886 D_A = 974 D_B = 758 K2 = 870

36/4 Attachment Pattern

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6" | 7'-0" | 7'-6" | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | |
| 0 | 191 | 169 | 150 | 132 | 118 | | | | | | | | | | | 0.823 |
| 1 | 248 | 223 | 201 | 183 | 168 | 155 | 141 | | | | | | | | | 0.554 |
| 2 | 291 | 266 | 244 | 224 | 207 | 192 | 179 | 167 | 157 | 147 | 137 | 129 | 121 | | | 0.417 |
| 3 | 322 | 299 | 278 | 258 | 241 | 225 | 211 | 198 | 187 | 176 | 167 | 159 | 151 | 143 | 136 | 0.334 |
| 4 | 345 | 325 | 305 | 286 | 269 | 253 | 239 | 226 | 214 | 202 | 192 | 183 | 175 | 167 | 160 | 0.279 |
| 5 | 362 | 344 | 326 | 309 | 293 | 277 | 263 | 250 | 237 | 226 | 215 | 206 | 197 | 188 | 181 | 0.240 |
| 6 | 375 | 359 | 343 | 328 | 312 | 298 | 284 | 271 | 259 | 247 | 236 | 226 | 217 | 208 | 200 | 0.210 |
| 7 | 385 | 371 | 357 | 343 | 329 | 315 | 302 | 289 | 277 | 266 | 255 | 245 | 235 | 226 | 204 | 0.187 |
| 8 | 392 | 380 | 368 | 355 | 342 | 329 | 317 | 305 | 293 | 282 | 272 | 262 | 252 | 226 | 204 | 0.168 |
| 9 | 398 | 388 | 377 | 365 | 353 | 342 | 330 | 319 | 308 | 297 | 287 | 277 | 252 | 226 | 204 | 0.153 |
| 10 | 403 | 394 | 384 | 373 | 363 | 352 | 341 | 331 | 320 | 310 | 300 | 283 | 252 | 226 | 204 | 0.140 |

D_F = 1216 D_A = 1282 D_B = 1072 K2 = 870

$$G' = \frac{K_2}{3.78 + 0.3 \cdot D_x + 3 \cdot K_1 \cdot \text{SPAN}} \text{, Kips/inch}$$

SPAN is in feet Substitute D_B, D_F, or D_A for D_x



DIAPHRAGM - 1.5B / 1.5BI

1.5B / 1.5BI ROOF DECK

- 20 Gage
- Support Fasteners: 3/4" puddle welds
- Sidelap Fasteners: welded¹

36/7 Attachment Pattern

Factor of safety = 2.35

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|-------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6" | 7'-0" | 7'-6" | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | |
| 0 | 704 | 612 | 535 | 473 | 423 | 382 | 349 | 320 | 295 | 274 | 256 | 239 | 225 | 212 | 202 | 0.535 |
| 1 | 882 | 773 | 687 | 618 | 556 | 504 | 460 | | | | | | | | | 0.317 |
| 2 | 1041 | 921 | 824 | 744 | 677 | 621 | 571 | 525 | 486 | 452 | 422 | 396 | 373 | | | 0.225 |
| 3 | 1180 | 1055 | 950 | 862 | 788 | 725 | 671 | 623 | 581 | 541 | 505 | 474 | 447 | 422 | 381 | 0.174 |
| 4 | 1302 | 1174 | 1065 | 972 | 892 | 823 | 764 | 712 | 666 | 625 | 589 | 527 | 470 | 422 | 381 | 0.142 |
| 5 | 1406 | 1279 | 1169 | 1073 | 989 | 916 | 852 | 796 | 746 | 676 | 595 | 527 | 470 | 422 | 381 | 0.120 |
| 6 | 1495 | 1373 | 1263 | 1165 | 1079 | 1003 | 936 | 876 | 777 | 676 | 595 | 527 | 470 | 422 | 381 | 0.104 |
| 7 | 1572 | 1454 | 1346 | 1249 | 1162 | 1084 | 1014 | 901 | 777 | 676 | 595 | 527 | 470 | 422 | 381 | 0.092 |
| 8 | 1638 | 1526 | 1421 | 1325 | 1238 | 1159 | 1057 | 901 | 777 | 676 | 595 | 527 | 470 | 422 | 381 | 0.082 |
| 9 | 1694 | 1589 | 1488 | 1394 | 1308 | 1229 | 1057 | 901 | 777 | 676 | 595 | 527 | 470 | 422 | 381 | 0.074 |
| 10 | 1743 | 1644 | 1548 | 1457 | 1372 | 1258 | 1057 | 901 | 777 | 676 | 595 | 527 | 470 | 422 | 381 | 0.068 |

D_B = 97 K2 = 1056

36/5 Attachment Pattern

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|-------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6" | 7'-0" | 7'-6" | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | |
| 0 | 623 | 548 | 488 | 437 | 391 | 353 | 322 | 295 | 273 | 253 | 236 | 220 | 207 | 196 | 186 | 0.642 |
| 1 | 771 | 688 | 618 | 561 | 512 | 471 | 433 | | | | | | | | | 0.351 |
| 2 | 891 | 806 | 733 | 670 | 616 | 569 | 528 | 492 | 461 | 431 | 402 | 377 | 355 | | | 0.242 |
| 3 | 987 | 904 | 831 | 766 | 709 | 658 | 614 | 574 | 539 | 508 | 480 | 455 | 429 | 406 | 381 | 0.184 |
| 4 | 1063 | 985 | 914 | 849 | 791 | 739 | 692 | 650 | 613 | 579 | 548 | 520 | 470 | 422 | 381 | 0.149 |
| 5 | 1123 | 1052 | 984 | 922 | 864 | 811 | 763 | 720 | 680 | 644 | 595 | 527 | 470 | 422 | 381 | 0.125 |
| 6 | 1171 | 1106 | 1043 | 983 | 927 | 875 | 827 | 783 | 743 | 676 | 595 | 527 | 470 | 422 | 381 | 0.108 |
| 7 | 1210 | 1151 | 1093 | 1037 | 983 | 932 | 885 | 841 | 777 | 676 | 595 | 527 | 470 | 422 | 381 | 0.094 |
| 8 | 1241 | 1188 | 1135 | 1082 | 1031 | 982 | 936 | 893 | 777 | 676 | 595 | 527 | 470 | 422 | 381 | 0.084 |
| 9 | 1267 | 1219 | 1170 | 1121 | 1073 | 1027 | 982 | 901 | 777 | 676 | 595 | 527 | 470 | 422 | 381 | 0.076 |
| 10 | 1288 | 1245 | 1200 | 1155 | 1110 | 1065 | 1023 | 901 | 777 | 676 | 595 | 527 | 470 | 422 | 381 | 0.069 |

D_B = 567 K2 = 1056

36/4 Attachment Pattern

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|-------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6" | 7'-0" | 7'-6" | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | |
| 0 | 477 | 420 | 374 | 331 | 295 | 266 | 242 | 222 | 204 | 189 | 176 | 164 | 154 | 145 | 138 | 0.802 |
| 1 | 618 | 554 | 501 | 456 | 417 | 384 | 353 | | | | | | | | | 0.394 |
| 2 | 723 | 661 | 606 | 557 | 515 | 477 | 445 | 416 | 390 | 367 | 342 | 321 | 302 | | | 0.261 |
| 3 | 801 | 743 | 690 | 642 | 598 | 559 | 524 | 492 | 464 | 438 | 415 | 394 | 375 | 356 | 338 | 0.195 |
| 4 | 858 | 807 | 757 | 711 | 668 | 629 | 593 | 560 | 530 | 503 | 477 | 455 | 433 | 414 | 381 | 0.156 |
| 5 | 901 | 856 | 811 | 768 | 727 | 689 | 653 | 620 | 589 | 561 | 535 | 511 | 470 | 422 | 381 | 0.130 |
| 6 | 933 | 893 | 853 | 814 | 776 | 740 | 705 | 672 | 642 | 613 | 587 | 527 | 470 | 422 | 381 | 0.111 |
| 7 | 957 | 923 | 887 | 852 | 817 | 782 | 749 | 718 | 688 | 660 | 595 | 527 | 470 | 422 | 381 | 0.097 |
| 8 | 976 | 946 | 915 | 883 | 850 | 819 | 788 | 758 | 729 | 676 | 595 | 527 | 470 | 422 | 381 | 0.086 |
| 9 | 991 | 965 | 937 | 908 | 879 | 849 | 820 | 792 | 764 | 676 | 595 | 527 | 470 | 422 | 381 | 0.078 |
| 10 | 1003 | 980 | 955 | 929 | 902 | 875 | 848 | 822 | 777 | 676 | 595 | 527 | 470 | 422 | 381 | 0.071 |

D_B = 802 K2 = 1056

¹The **bold** values do not comply with the minimum spacing requirements for sidelap connections and shall not be used except with properly spaced button-punched sidelaps with 1.5BI deck.

$$G' = \frac{K_2}{3.78 + 0.3 \cdot D_B + 3 \cdot K_1 \cdot \text{SPAN}}, \text{ Kips/inch}$$

SPAN is in feet



DIAPHRAGM - 1.5B / 1.5BI / 1.5F / 1.5A

1.5B / 1.5BI / 1.5F / 1.5A ROOF DECK

- 20 Gage
- Support Fasteners: 5/8" puddle welds¹
- Sidelap Fasteners: welded²

36/7 Attachment Pattern

Factor of safety = 2.35

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|-------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6" | 7'-0" | 7'-6" | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | |
| 0 | 581 | 505 | 441 | 390 | 349 | 316 | 288 | 264 | 244 | 226 | 211 | 197 | 185 | 175 | 167 | 0.535 |
| 1 | 757 | 665 | 592 | 532 | 482 | 437 | 399 | | | | | | | | | 0.317 |
| 2 | 910 | 808 | 725 | 656 | 598 | 549 | 507 | 469 | 434 | 404 | 377 | 354 | 333 | | | 0.225 |
| 3 | 1039 | 934 | 845 | 770 | 705 | 650 | 602 | 561 | 524 | 492 | 437 | 387 | 345 | 310 | 279 | 0.174 |
| 4 | 1148 | 1043 | 952 | 873 | 804 | 744 | 692 | 646 | 570 | 497 | 437 | 387 | 345 | 310 | 279 | 0.142 |
| 5 | 1238 | 1137 | 1046 | 966 | 894 | 832 | 776 | 661 | 570 | 497 | 437 | 387 | 345 | 310 | 279 | 0.120 |
| 6 | 1313 | 1217 | 1128 | 1048 | 976 | 912 | 776 | 661 | 570 | 497 | 437 | 387 | 345 | 310 | 279 | 0.104 |
| 7 | 1375 | 1285 | 1200 | 1122 | 1050 | 924 | 776 | 661 | 570 | 497 | 437 | 387 | 345 | 310 | 279 | 0.092 |
| 8 | 1426 | 1343 | 1262 | 1187 | 1116 | 924 | 776 | 661 | 570 | 497 | 437 | 387 | 345 | 310 | 279 | 0.082 |
| 9 | 1470 | 1392 | 1317 | 1244 | 1118 | 924 | 776 | 661 | 570 | 497 | 437 | 387 | 345 | 310 | 279 | 0.074 |
| 10 | 1506 | 1435 | 1364 | 1295 | 1118 | 924 | 776 | 661 | 570 | 497 | 437 | 387 | 345 | 310 | 279 | 0.068 |

D_F = 169 D_A = 266 D_B = 97 K2 = 1056

36/5 Attachment Pattern

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|-------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6" | 7'-0" | 7'-6" | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | |
| 0 | 514 | 452 | 402 | 361 | 323 | 292 | 266 | 244 | 225 | 209 | 194 | 182 | 171 | 161 | 153 | 0.642 |
| 1 | 659 | 589 | 531 | 483 | 441 | 406 | 376 | | | | | | | | | 0.351 |
| 2 | 771 | 701 | 640 | 587 | 542 | 501 | 466 | 436 | 408 | 384 | 361 | 339 | 319 | | | 0.242 |
| 3 | 856 | 790 | 730 | 677 | 629 | 586 | 548 | 514 | 484 | 457 | 432 | 387 | 345 | 310 | 279 | 0.184 |
| 4 | 920 | 860 | 804 | 752 | 704 | 661 | 621 | 585 | 553 | 497 | 437 | 387 | 345 | 310 | 279 | 0.149 |
| 5 | 968 | 915 | 863 | 814 | 768 | 725 | 686 | 649 | 570 | 497 | 437 | 387 | 345 | 310 | 279 | 0.125 |
| 6 | 1006 | 959 | 912 | 866 | 822 | 781 | 742 | 661 | 570 | 497 | 437 | 387 | 345 | 310 | 279 | 0.108 |
| 7 | 1035 | 993 | 951 | 909 | 868 | 829 | 776 | 661 | 570 | 497 | 437 | 387 | 345 | 310 | 279 | 0.094 |
| 8 | 1058 | 1021 | 983 | 945 | 907 | 870 | 776 | 661 | 570 | 497 | 437 | 387 | 345 | 310 | 279 | 0.084 |
| 9 | 1076 | 1043 | 1009 | 974 | 939 | 905 | 776 | 661 | 570 | 497 | 437 | 387 | 345 | 310 | 279 | 0.076 |
| 10 | 1091 | 1062 | 1031 | 1000 | 967 | 924 | 776 | 661 | 570 | 497 | 437 | 387 | 345 | 310 | 279 | 0.069 |

D_F = 663 D_A = 728 D_B = 567 K2 = 1056

36/4 Attachment Pattern

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|-------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6" | 7'-0" | 7'-6" | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | |
| 0 | 393 | 346 | 309 | 273 | 244 | 220 | 200 | 183 | 168 | 156 | 145 | 135 | 127 | 120 | 114 | 0.802 |
| 1 | 530 | 478 | 433 | 395 | 362 | 334 | 310 | | | | | | | | | 0.394 |
| 2 | 626 | 576 | 531 | 491 | 455 | 423 | 395 | 370 | 348 | 328 | 310 | 292 | 275 | | | 0.261 |
| 3 | 693 | 648 | 606 | 567 | 531 | 499 | 469 | 442 | 418 | 396 | 376 | 357 | 340 | 310 | 279 | 0.195 |
| 4 | 738 | 700 | 663 | 627 | 593 | 561 | 532 | 504 | 479 | 456 | 434 | 387 | 345 | 310 | 279 | 0.156 |
| 5 | 771 | 739 | 706 | 674 | 642 | 612 | 584 | 557 | 532 | 497 | 437 | 387 | 345 | 310 | 279 | 0.130 |
| 6 | 794 | 767 | 739 | 710 | 682 | 654 | 627 | 602 | 570 | 497 | 437 | 387 | 345 | 310 | 279 | 0.111 |
| 7 | 812 | 788 | 764 | 739 | 713 | 688 | 663 | 639 | 570 | 497 | 437 | 387 | 345 | 310 | 279 | 0.097 |
| 8 | 825 | 805 | 784 | 761 | 739 | 716 | 693 | 661 | 570 | 497 | 437 | 387 | 345 | 310 | 279 | 0.086 |
| 9 | 835 | 818 | 799 | 780 | 759 | 739 | 718 | 661 | 570 | 497 | 437 | 387 | 345 | 310 | 279 | 0.078 |
| 10 | 843 | 828 | 812 | 794 | 776 | 758 | 739 | 661 | 570 | 497 | 437 | 387 | 345 | 310 | 279 | 0.071 |

D_F = 909 D_A = 959 D_B = 802 K2 = 1056

¹A 3/8" x 1-1/4" arc seam weld shall be used with F deck or A Deck.
²The **bold** values do not comply with the minimum spacing requirements for sidelap connections and shall not be used except with properly spaced button-punched sidelaps with 1.5BI deck.

$$G' = \frac{K_2}{3.78 + 0.3 \cdot D_x + 3 \cdot K_1 \cdot \text{SPAN}} \text{, Kips/inch}$$

SPAN is in feet Substitute D_B, D_F, or D_A for D_x



DIAPHRAGM - 1.5B / 1.5F / 1.5A

1.5B / 1.5F / 1.5A ROOF DECK

- 20 Gage
- Support Fasteners: 5/8" puddle welds¹
- Sidelap Fasteners: #10 TEK screws

36/7 Attachment Pattern

Factor of safety = 2.35

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|
| | SPAN LENGTH (ft-in.) | | | | | | | | | | | | | | | |
| | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6" | 7'-0" | 7'-6" | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | |
| 0 | 581 | 505 | 441 | 390 | 349 | | | | | | | | | | | 0.535 |
| 1 | 670 | 585 | 519 | 463 | 414 | 375 | 342 | | | | | | | | | 0.415 |
| 2 | 754 | 662 | 589 | 530 | 480 | 434 | 397 | 365 | 337 | 313 | 293 | 274 | 258 | | | 0.340 |
| 3 | 832 | 735 | 656 | 592 | 538 | 493 | 451 | 415 | 384 | 357 | 333 | 313 | 294 | 279 | 265 | 0.287 |
| 4 | 904 | 803 | 720 | 652 | 594 | 545 | 504 | 465 | 431 | 401 | 374 | 351 | 331 | 310 | 279 | 0.249 |
| 5 | 971 | 867 | 781 | 709 | 648 | 596 | 551 | 512 | 477 | 444 | 415 | 387 | 345 | 310 | 279 | 0.219 |
| 6 | 1032 | 927 | 839 | 764 | 700 | 645 | 597 | 556 | 520 | 488 | 437 | 387 | 345 | 310 | 279 | 0.196 |
| 7 | 1089 | 983 | 893 | 816 | 749 | 692 | 642 | 599 | 560 | 497 | 437 | 387 | 345 | 310 | 279 | 0.178 |
| 8 | 1140 | 1036 | 944 | 866 | 797 | 738 | 686 | 640 | 570 | 497 | 437 | 387 | 345 | 310 | 279 | 0.162 |
| 9 | 1187 | 1084 | 993 | 913 | 843 | 782 | 728 | 661 | 570 | 497 | 437 | 387 | 345 | 310 | 279 | 0.149 |
| 10 | 1230 | 1129 | 1038 | 957 | 886 | 824 | 769 | 661 | 570 | 497 | 437 | 387 | 345 | 310 | 279 | 0.138 |

D_F = 169 D_A = 266 D_B = 97 K2 = 1056

36/5 Attachment Pattern

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|
| | SPAN LENGTH (ft-in.) | | | | | | | | | | | | | | | |
| | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6" | 7'-0" | 7'-6" | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | |
| 0 | 514 | 452 | 402 | 361 | 323 | | | | | | | | | | | 0.642 |
| 1 | 589 | 523 | 468 | 423 | 386 | 351 | 320 | | | | | | | | | 0.477 |
| 2 | 656 | 587 | 529 | 481 | 439 | 404 | 374 | 344 | 318 | 296 | 276 | 259 | 243 | | | 0.380 |
| 3 | 715 | 645 | 585 | 534 | 490 | 452 | 420 | 391 | 365 | 339 | 317 | 297 | 280 | 265 | 251 | 0.315 |
| 4 | 767 | 697 | 637 | 584 | 538 | 498 | 463 | 433 | 405 | 381 | 358 | 336 | 316 | 299 | 279 | 0.270 |
| 5 | 812 | 744 | 683 | 630 | 583 | 541 | 505 | 472 | 443 | 418 | 394 | 374 | 345 | 310 | 279 | 0.236 |
| 6 | 852 | 786 | 726 | 672 | 624 | 582 | 544 | 510 | 480 | 453 | 428 | 387 | 345 | 310 | 279 | 0.209 |
| 7 | 886 | 823 | 764 | 711 | 663 | 620 | 581 | 546 | 515 | 486 | 437 | 387 | 345 | 310 | 279 | 0.188 |
| 8 | 916 | 856 | 799 | 747 | 699 | 656 | 616 | 580 | 548 | 497 | 437 | 387 | 345 | 310 | 279 | 0.171 |
| 9 | 942 | 885 | 830 | 779 | 732 | 689 | 649 | 613 | 570 | 497 | 437 | 387 | 345 | 310 | 279 | 0.156 |
| 10 | 965 | 911 | 858 | 809 | 763 | 720 | 680 | 644 | 570 | 497 | 437 | 387 | 345 | 310 | 279 | 0.144 |

D_F = 663 D_A = 728 D_B = 567 K2 = 1056

36/4 Attachment Pattern

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|
| | SPAN LENGTH (ft-in.) | | | | | | | | | | | | | | | |
| | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6" | 7'-0" | 7'-6" | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | |
| 0 | 393 | 346 | 309 | 273 | 244 | | | | | | | | | | | 0.802 |
| 1 | 466 | 415 | 373 | 338 | 308 | 279 | 254 | | | | | | | | | 0.561 |
| 2 | 528 | 476 | 431 | 393 | 360 | 332 | 308 | 284 | 262 | 243 | 227 | 212 | 199 | | | 0.431 |
| 3 | 580 | 528 | 482 | 443 | 408 | 378 | 352 | 328 | 308 | 287 | 268 | 251 | 236 | 223 | 212 | 0.350 |
| 4 | 623 | 573 | 528 | 488 | 452 | 420 | 392 | 368 | 345 | 326 | 308 | 289 | 272 | 258 | 245 | 0.294 |
| 5 | 659 | 612 | 568 | 528 | 492 | 459 | 430 | 404 | 381 | 360 | 341 | 323 | 308 | 292 | 277 | 0.254 |
| 6 | 689 | 645 | 603 | 563 | 528 | 495 | 466 | 439 | 414 | 392 | 372 | 354 | 337 | 310 | 279 | 0.224 |
| 7 | 715 | 673 | 633 | 595 | 560 | 528 | 498 | 471 | 446 | 423 | 402 | 383 | 345 | 310 | 279 | 0.200 |
| 8 | 736 | 697 | 659 | 623 | 589 | 557 | 528 | 500 | 475 | 452 | 430 | 387 | 345 | 310 | 279 | 0.180 |
| 9 | 753 | 718 | 682 | 648 | 615 | 584 | 555 | 527 | 502 | 479 | 437 | 387 | 345 | 310 | 279 | 0.164 |
| 10 | 768 | 736 | 702 | 670 | 638 | 608 | 580 | 553 | 527 | 497 | 437 | 387 | 345 | 310 | 279 | 0.151 |

D_F = 909 D_A = 959 D_B = 802 K2 = 1056

¹ A 3/8" x 1-1/4" arc seam weld shall be used with F deck or A Deck.

$$G' = \frac{K_2}{3.78 + 0.3 \cdot D_x + 3 \cdot K_1 \cdot \text{SPAN}}, \text{ Kips/inch}$$

SPAN is in feet Substitute D_B, D_F, or D_A for D_x



DIAPHRAGM - 1.5B / 1.5F / 1.5A

1.5B / 1.5F / 1.5A ROOF DECK

- 20 Gage
- Support Fasteners: #12 TEK screws
- Sidelap Fasteners: #10 TEK screws

36/7 Attachment Pattern

Factor of safety = 2.35

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|
| | SPAN LENGTH (ft-in.) | | | | | | | | | | | | | | | |
| | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6" | 7'-0" | 7'-6" | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | |
| 0 | 343 | 298 | 261 | 230 | 206 | | | | | | | | | | | 0.605 |
| 1 | 430 | 377 | 335 | 301 | 272 | 246 | 224 | | | | | | | | | 0.456 |
| 2 | 508 | 450 | 402 | 363 | 331 | 303 | 279 | 257 | 237 | 221 | 206 | 193 | 182 | | | 0.366 |
| 3 | 576 | 515 | 464 | 421 | 385 | 354 | 328 | 305 | 284 | 264 | 247 | 232 | 218 | 207 | 196 | 0.306 |
| 4 | 636 | 573 | 520 | 475 | 436 | 402 | 373 | 348 | 325 | 306 | 288 | 270 | 255 | 241 | 229 | 0.263 |
| 5 | 687 | 625 | 571 | 524 | 483 | 448 | 417 | 389 | 365 | 343 | 324 | 306 | 291 | 276 | 262 | 0.230 |
| 6 | 730 | 671 | 617 | 569 | 527 | 490 | 458 | 428 | 402 | 379 | 358 | 340 | 323 | 307 | 279 | 0.205 |
| 7 | 768 | 710 | 658 | 611 | 568 | 530 | 496 | 466 | 438 | 414 | 392 | 372 | 345 | 310 | 279 | 0.185 |
| 8 | 800 | 745 | 694 | 648 | 605 | 567 | 532 | 501 | 473 | 447 | 424 | 387 | 345 | 310 | 279 | 0.168 |
| 9 | 827 | 776 | 727 | 681 | 639 | 601 | 566 | 534 | 505 | 478 | 437 | 387 | 345 | 310 | 279 | 0.154 |
| 10 | 851 | 803 | 756 | 712 | 671 | 632 | 597 | 565 | 536 | 497 | 437 | 387 | 345 | 310 | 279 | 0.142 |

D_F = 169 D_A = 266 D_B = 97 K2 = 1056

36/5 Attachment Pattern

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|
| | SPAN LENGTH (ft-in.) | | | | | | | | | | | | | | | |
| | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6" | 7'-0" | 7'-6" | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | |
| 0 | 304 | 267 | 238 | 213 | 191 | | | | | | | | | | | 0.726 |
| 1 | 376 | 335 | 302 | 274 | 250 | 230 | 211 | | | | | | | | | 0.522 |
| 2 | 435 | 393 | 358 | 327 | 301 | 278 | 258 | 241 | 225 | 210 | 197 | 184 | 173 | | | 0.408 |
| 3 | 482 | 441 | 406 | 374 | 346 | 322 | 300 | 281 | 264 | 248 | 235 | 222 | 210 | 199 | 189 | 0.334 |
| 4 | 519 | 481 | 446 | 415 | 387 | 361 | 338 | 318 | 299 | 283 | 268 | 254 | 242 | 230 | 220 | 0.283 |
| 5 | 548 | 513 | 481 | 450 | 422 | 396 | 373 | 352 | 333 | 315 | 299 | 284 | 271 | 259 | 247 | 0.246 |
| 6 | 572 | 540 | 509 | 480 | 453 | 428 | 404 | 383 | 363 | 345 | 328 | 313 | 299 | 286 | 274 | 0.217 |
| 7 | 590 | 562 | 534 | 506 | 480 | 455 | 432 | 411 | 391 | 372 | 355 | 339 | 325 | 310 | 279 | 0.195 |
| 8 | 606 | 580 | 554 | 528 | 504 | 480 | 457 | 436 | 416 | 398 | 380 | 364 | 345 | 310 | 279 | 0.176 |
| 9 | 618 | 595 | 571 | 547 | 524 | 501 | 480 | 459 | 440 | 421 | 404 | 387 | 345 | 310 | 279 | 0.161 |
| 10 | 628 | 607 | 586 | 564 | 542 | 520 | 500 | 480 | 460 | 442 | 425 | 387 | 345 | 310 | 279 | 0.148 |

D_F = 663 D_A = 728 D_B = 567 K2 = 1056

36/4 Attachment Pattern

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|
| | SPAN LENGTH (ft-in.) | | | | | | | | | | | | | | | |
| | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6" | 7'-0" | 7'-6" | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | |
| 0 | 232 | 205 | 182 | 161 | 144 | | | | | | | | | | | 0.907 |
| 1 | 301 | 270 | 244 | 222 | 204 | 188 | 173 | | | | | | | | | 0.610 |
| 2 | 353 | 323 | 296 | 272 | 251 | 233 | 217 | 203 | 191 | 179 | 167 | 157 | 148 | | | 0.459 |
| 3 | 391 | 363 | 337 | 313 | 292 | 273 | 256 | 240 | 227 | 214 | 203 | 192 | 183 | 174 | 165 | 0.368 |
| 4 | 419 | 394 | 370 | 347 | 327 | 307 | 290 | 274 | 259 | 246 | 233 | 222 | 212 | 203 | 194 | 0.307 |
| 5 | 439 | 418 | 396 | 375 | 355 | 337 | 319 | 303 | 288 | 274 | 261 | 250 | 239 | 229 | 219 | 0.264 |
| 6 | 455 | 436 | 417 | 397 | 379 | 361 | 344 | 329 | 314 | 300 | 287 | 275 | 263 | 253 | 243 | 0.231 |
| 7 | 467 | 450 | 433 | 416 | 399 | 382 | 366 | 351 | 336 | 323 | 310 | 297 | 286 | 275 | 265 | 0.206 |
| 8 | 476 | 461 | 446 | 431 | 415 | 400 | 385 | 370 | 356 | 343 | 330 | 318 | 306 | 295 | 279 | 0.185 |
| 9 | 483 | 471 | 457 | 443 | 429 | 415 | 401 | 387 | 373 | 361 | 348 | 336 | 325 | 310 | 279 | 0.168 |
| 10 | 489 | 478 | 466 | 453 | 440 | 427 | 414 | 401 | 389 | 376 | 364 | 353 | 341 | 310 | 279 | 0.154 |

D_F = 909 D_A = 959 D_B = 802 K2 = 1056

$$G' = \frac{K_2}{3.78 + 0.3 \cdot D_x + 3 \cdot K_1 \cdot \text{SPAN}} \text{, Kips/inch}$$

SPAN is in feet Substitute D_B, D_F, or D_A for D_x



DIAPHRAGM - 1.5B / 1.5BI

1.5B / 1.5BI ROOF DECK

- 18 Gage
- Support Fasteners: 3/4" puddle welds
- Sidelap Fasteners: welded¹

36/7 Attachment Pattern

Factor of safety = 2.35

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|-------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6" | 7'-0" | 7'-6" | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | |
| 0 | 917 | 797 | 701 | 620 | 555 | 502 | 458 | 421 | 389 | 361 | 337 | 315 | 296 | 279 | 264 | 0.615 |
| 1 | 1148 | 1007 | 894 | 804 | 728 | 660 | 602 | | | | | | | | | 0.364 |
| 2 | 1355 | 1199 | 1072 | 968 | 881 | 808 | 746 | 687 | 636 | 592 | 553 | 519 | 489 | | | 0.259 |
| 3 | 1536 | 1372 | 1236 | 1121 | 1025 | 943 | 872 | 811 | 757 | 707 | 661 | 621 | 585 | 553 | 524 | 0.200 |
| 4 | 1693 | 1527 | 1385 | 1264 | 1160 | 1071 | 993 | 925 | 866 | 813 | 766 | 723 | 681 | 644 | 597 | 0.164 |
| 5 | 1829 | 1664 | 1520 | 1395 | 1286 | 1191 | 1108 | 1035 | 970 | 912 | 861 | 815 | 737 | 662 | 597 | 0.138 |
| 6 | 1946 | 1785 | 1642 | 1515 | 1403 | 1304 | 1217 | 1139 | 1070 | 1008 | 933 | 827 | 737 | 662 | 597 | 0.120 |
| 7 | 2046 | 1892 | 1751 | 1624 | 1511 | 1409 | 1319 | 1238 | 1165 | 1062 | 933 | 827 | 737 | 662 | 597 | 0.106 |
| 8 | 2131 | 1985 | 1849 | 1724 | 1610 | 1507 | 1415 | 1331 | 1219 | 1062 | 933 | 827 | 737 | 662 | 597 | 0.094 |
| 9 | 2205 | 2067 | 1936 | 1814 | 1701 | 1598 | 1505 | 1413 | 1219 | 1062 | 933 | 827 | 737 | 662 | 597 | 0.085 |
| 10 | 2268 | 2138 | 2013 | 1895 | 1784 | 1682 | 1588 | 1413 | 1219 | 1062 | 933 | 827 | 737 | 662 | 597 | 0.078 |

D_B = 63 K2 = 1398

36/5 Attachment Pattern

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|-------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6" | 7'-0" | 7'-6" | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | |
| 0 | 812 | 714 | 635 | 572 | 514 | 464 | 423 | 389 | 359 | 333 | 311 | 291 | 273 | 258 | 243 | 0.739 |
| 1 | 1003 | 895 | 805 | 730 | 667 | 613 | 567 | | | | | | | | | 0.404 |
| 2 | 1159 | 1049 | 953 | 872 | 801 | 740 | 687 | 641 | 600 | 564 | 527 | 495 | 466 | | | 0.278 |
| 3 | 1284 | 1177 | 1081 | 996 | 922 | 856 | 798 | 747 | 702 | 661 | 624 | 591 | 561 | 531 | 503 | 0.212 |
| 4 | 1383 | 1282 | 1189 | 1105 | 1029 | 961 | 900 | 846 | 797 | 752 | 712 | 676 | 643 | 613 | 585 | 0.171 |
| 5 | 1462 | 1369 | 1281 | 1199 | 1124 | 1055 | 993 | 936 | 885 | 838 | 795 | 756 | 721 | 662 | 597 | 0.144 |
| 6 | 1525 | 1440 | 1358 | 1279 | 1206 | 1139 | 1076 | 1018 | 966 | 917 | 873 | 827 | 737 | 662 | 597 | 0.124 |
| 7 | 1575 | 1498 | 1422 | 1349 | 1279 | 1212 | 1151 | 1093 | 1040 | 991 | 933 | 827 | 737 | 662 | 597 | 0.109 |
| 8 | 1616 | 1547 | 1477 | 1408 | 1341 | 1278 | 1218 | 1161 | 1108 | 1058 | 933 | 827 | 737 | 662 | 597 | 0.097 |
| 9 | 1649 | 1587 | 1523 | 1459 | 1396 | 1335 | 1277 | 1222 | 1169 | 1062 | 933 | 827 | 737 | 662 | 597 | 0.087 |
| 10 | 1677 | 1620 | 1562 | 1503 | 1444 | 1386 | 1330 | 1277 | 1219 | 1062 | 933 | 827 | 737 | 662 | 597 | 0.080 |

D_B = 372 K2 = 1398

36/4 Attachment Pattern

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|-------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6" | 7'-0" | 7'-6" | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | |
| 0 | 621 | 547 | 487 | 435 | 389 | 351 | 320 | 293 | 270 | 250 | 233 | 218 | 204 | 192 | 181 | 0.923 |
| 1 | 804 | 721 | 652 | 593 | 543 | 500 | 463 | | | | | | | | | 0.454 |
| 2 | 941 | 860 | 788 | 725 | 669 | 621 | 578 | 541 | 507 | 477 | 449 | 421 | 396 | | | 0.301 |
| 3 | 1043 | 967 | 898 | 835 | 778 | 727 | 681 | 640 | 603 | 570 | 539 | 512 | 487 | 464 | 441 | 0.225 |
| 4 | 1117 | 1050 | 986 | 925 | 869 | 818 | 771 | 728 | 689 | 653 | 621 | 591 | 564 | 538 | 515 | 0.180 |
| 5 | 1172 | 1113 | 1055 | 999 | 946 | 896 | 849 | 806 | 766 | 729 | 695 | 664 | 635 | 608 | 583 | 0.150 |
| 6 | 1214 | 1163 | 1111 | 1059 | 1010 | 962 | 917 | 874 | 835 | 797 | 763 | 730 | 700 | 662 | 597 | 0.128 |
| 7 | 1246 | 1201 | 1155 | 1108 | 1062 | 1018 | 975 | 934 | 895 | 858 | 823 | 791 | 737 | 662 | 597 | 0.112 |
| 8 | 1271 | 1232 | 1190 | 1149 | 1107 | 1065 | 1025 | 985 | 948 | 912 | 878 | 827 | 737 | 662 | 597 | 0.099 |
| 9 | 1290 | 1256 | 1219 | 1182 | 1143 | 1105 | 1067 | 1030 | 994 | 960 | 926 | 827 | 737 | 662 | 597 | 0.090 |
| 10 | 1306 | 1276 | 1243 | 1209 | 1174 | 1139 | 1104 | 1069 | 1035 | 1002 | 933 | 827 | 737 | 662 | 597 | 0.081 |

D_B = 526 K2 = 1398

¹The **bold** values do not comply with the minimum spacing requirements for sidelap connections and shall not be used except with properly spaced button-punched sidelaps with 1.5BI deck.

$$G' = \frac{K_2}{3.78 + 0.3 \cdot D_B + 3 \cdot K_1 \cdot \text{SPAN}}, \text{ Kips/inch}$$

SPAN is in feet



DIAPHRAGM - 1.5B / 1.5BI / 1.5F / 1.5A

1.5B / 1.5BI / 1.5F / 1.5A ROOF DECK

- 18 Gage
- Support Fasteners: 5/8" puddle welds¹
- Sidelap Fasteners: welded²

36/7 Attachment Pattern

Factor of safety = 2.35

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|-------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6" | 7'-0" | 7'-6" | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | |
| 0 | 754 | 655 | 576 | 510 | 456 | 413 | 377 | 346 | 320 | 297 | 277 | 259 | 244 | 230 | 217 | 0.615 |
| 1 | 982 | 863 | 768 | 691 | 627 | 570 | 521 | | | | | | | | | 0.364 |
| 2 | 1181 | 1049 | 941 | 851 | 776 | 713 | 658 | 612 | 567 | 528 | 493 | 463 | 436 | | | 0.259 |
| 3 | 1349 | 1212 | 1097 | 999 | 916 | 844 | 782 | 728 | 681 | 639 | 601 | 565 | 532 | 484 | 437 | 0.200 |
| 4 | 1490 | 1354 | 1236 | 1133 | 1044 | 966 | 898 | 839 | 786 | 739 | 683 | 605 | 540 | 484 | 437 | 0.164 |
| 5 | 1607 | 1475 | 1358 | 1253 | 1161 | 1079 | 1007 | 943 | 886 | 777 | 683 | 605 | 540 | 484 | 437 | 0.138 |
| 6 | 1704 | 1579 | 1465 | 1361 | 1267 | 1183 | 1108 | 1034 | 892 | 777 | 683 | 605 | 540 | 484 | 437 | 0.120 |
| 7 | 1784 | 1668 | 1558 | 1456 | 1363 | 1278 | 1202 | 1034 | 892 | 777 | 683 | 605 | 540 | 484 | 437 | 0.106 |
| 8 | 1852 | 1743 | 1639 | 1540 | 1449 | 1365 | 1214 | 1034 | 892 | 777 | 683 | 605 | 540 | 484 | 437 | 0.094 |
| 9 | 1908 | 1807 | 1709 | 1615 | 1526 | 1443 | 1214 | 1034 | 892 | 777 | 683 | 605 | 540 | 484 | 437 | 0.085 |
| 10 | 1955 | 1862 | 1770 | 1681 | 1595 | 1445 | 1214 | 1034 | 892 | 777 | 683 | 605 | 540 | 484 | 437 | 0.078 |

D_F = 111 D_A = 175 D_B = 63 K2 = 1398

36/5 Attachment Pattern

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|-------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6" | 7'-0" | 7'-6" | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | |
| 0 | 667 | 587 | 522 | 470 | 422 | 382 | 348 | 320 | 295 | 274 | 256 | 239 | 225 | 212 | 200 | 0.739 |
| 1 | 855 | 765 | 690 | 626 | 573 | 527 | 488 | | | | | | | | | 0.404 |
| 2 | 1000 | 910 | 831 | 763 | 703 | 651 | 605 | 565 | 530 | 498 | 470 | 443 | 417 | | | 0.278 |
| 3 | 1111 | 1025 | 948 | 878 | 816 | 761 | 712 | 668 | 628 | 593 | 561 | 532 | 505 | 482 | 437 | 0.212 |
| 4 | 1194 | 1116 | 1043 | 976 | 914 | 857 | 806 | 760 | 718 | 680 | 645 | 605 | 540 | 484 | 437 | 0.171 |
| 5 | 1257 | 1188 | 1121 | 1057 | 997 | 941 | 890 | 843 | 799 | 759 | 683 | 605 | 540 | 484 | 437 | 0.144 |
| 6 | 1306 | 1244 | 1183 | 1124 | 1067 | 1014 | 963 | 916 | 872 | 777 | 683 | 605 | 540 | 484 | 437 | 0.124 |
| 7 | 1343 | 1289 | 1234 | 1180 | 1127 | 1076 | 1027 | 981 | 892 | 777 | 683 | 605 | 540 | 484 | 437 | 0.109 |
| 8 | 1373 | 1325 | 1276 | 1226 | 1177 | 1129 | 1082 | 1034 | 892 | 777 | 683 | 605 | 540 | 484 | 437 | 0.097 |
| 9 | 1397 | 1354 | 1310 | 1265 | 1219 | 1174 | 1131 | 1034 | 892 | 777 | 683 | 605 | 540 | 484 | 437 | 0.087 |
| 10 | 1416 | 1378 | 1338 | 1297 | 1256 | 1214 | 1172 | 1034 | 892 | 777 | 683 | 605 | 540 | 484 | 437 | 0.080 |

D_F = 435 D_A = 478 D_B = 372 K2 = 1398

36/4 Attachment Pattern

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|-------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6" | 7'-0" | 7'-6" | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | |
| 0 | 511 | 450 | 401 | 358 | 320 | 289 | 263 | 241 | 222 | 206 | 192 | 179 | 168 | 158 | 149 | 0.923 |
| 1 | 688 | 620 | 562 | 512 | 470 | 434 | 402 | | | | | | | | | 0.454 |
| 2 | 813 | 748 | 689 | 637 | 591 | 550 | 513 | 481 | 452 | 426 | 403 | 382 | 360 | | | 0.301 |
| 3 | 899 | 841 | 787 | 736 | 690 | 648 | 609 | 574 | 543 | 514 | 488 | 464 | 442 | 422 | 403 | 0.225 |
| 4 | 958 | 909 | 860 | 814 | 770 | 729 | 690 | 655 | 622 | 592 | 564 | 538 | 514 | 484 | 437 | 0.180 |
| 5 | 1001 | 959 | 916 | 874 | 834 | 795 | 758 | 723 | 690 | 660 | 631 | 605 | 540 | 484 | 437 | 0.150 |
| 6 | 1031 | 995 | 959 | 922 | 885 | 849 | 814 | 781 | 749 | 719 | 683 | 605 | 540 | 484 | 437 | 0.128 |
| 7 | 1053 | 1023 | 992 | 959 | 926 | 893 | 861 | 830 | 799 | 770 | 683 | 605 | 540 | 484 | 437 | 0.112 |
| 8 | 1071 | 1045 | 1017 | 988 | 959 | 929 | 900 | 871 | 842 | 777 | 683 | 605 | 540 | 484 | 437 | 0.099 |
| 9 | 1084 | 1061 | 1037 | 1012 | 986 | 959 | 932 | 905 | 879 | 777 | 683 | 605 | 540 | 484 | 437 | 0.090 |
| 10 | 1094 | 1075 | 1054 | 1031 | 1008 | 984 | 959 | 934 | 892 | 777 | 683 | 605 | 540 | 484 | 437 | 0.081 |

D_F = 597 D_A = 630 D_B = 526 K2 = 1398

¹A 3/8" x 1-1/4" arc seam weld shall be used with F deck or A Deck.
²The **bold** values do not comply with the minimum spacing requirements for sidelap connections and shall not be used except with properly spaced button-punched sidelaps with 1.5BI deck.

$$G' = \frac{K_2}{3.78 + 0.3 \cdot D_x + 3 \cdot K_1 \cdot \text{SPAN}}, \text{ Kips/inch}$$

SPAN is in feet Substitute D_B, D_F, or D_A for D_x



DIAPHRAGM - 1.5B / 1.5F / 1.5A

1.5B / 1.5F / 1.5A ROOF DECK

- 18 Gage
- Support Fasteners: 5/8" puddle welds¹
- Sidelap Fasteners: #10 TEK screws

36/7 Attachment Pattern

Factor of safety = 2.35

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6" | 7'-0" | 7'-6" | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | |
| 0 | 754 | 655 | 576 | 510 | 456 | | | | | | | | | | | 0.615 |
| 1 | 872 | 762 | 675 | 606 | 543 | 492 | 449 | | | | | | | | | 0.478 |
| 2 | 983 | 863 | 768 | 691 | 627 | 570 | 521 | 479 | 443 | 412 | 385 | 361 | 340 | | | 0.391 |
| 3 | 1086 | 959 | 857 | 773 | 703 | 644 | 593 | 546 | 505 | 470 | 439 | 412 | 388 | 366 | 347 | 0.330 |
| 4 | 1181 | 1049 | 941 | 852 | 777 | 713 | 659 | 612 | 567 | 528 | 493 | 463 | 436 | 412 | 390 | 0.286 |
| 5 | 1269 | 1134 | 1022 | 927 | 848 | 780 | 721 | 671 | 627 | 586 | 548 | 514 | 484 | 458 | 434 | 0.253 |
| 6 | 1349 | 1213 | 1097 | 1000 | 916 | 844 | 782 | 728 | 681 | 639 | 602 | 565 | 532 | 484 | 437 | 0.226 |
| 7 | 1423 | 1286 | 1169 | 1068 | 982 | 907 | 842 | 785 | 734 | 690 | 650 | 605 | 540 | 484 | 437 | 0.204 |
| 8 | 1490 | 1354 | 1236 | 1134 | 1044 | 967 | 899 | 839 | 787 | 740 | 683 | 605 | 540 | 484 | 437 | 0.187 |
| 9 | 1552 | 1418 | 1299 | 1195 | 1104 | 1025 | 954 | 892 | 837 | 777 | 683 | 605 | 540 | 484 | 437 | 0.172 |
| 10 | 1607 | 1476 | 1358 | 1254 | 1162 | 1080 | 1008 | 944 | 887 | 777 | 683 | 605 | 540 | 484 | 437 | 0.159 |

D_F = 111 D_A = 175 D_B = 63 K2 = 1398

36/5 Attachment Pattern

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6" | 7'-0" | 7'-6" | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | |
| 0 | 667 | 587 | 522 | 470 | 422 | | | | | | | | | | | 0.739 |
| 1 | 767 | 680 | 609 | 551 | 502 | 460 | 420 | | | | | | | | | 0.549 |
| 2 | 855 | 765 | 690 | 627 | 573 | 527 | 488 | 453 | 419 | 390 | 364 | 341 | 321 | | | 0.437 |
| 3 | 933 | 842 | 764 | 697 | 640 | 591 | 548 | 511 | 478 | 447 | 418 | 392 | 369 | 349 | 330 | 0.363 |
| 4 | 1001 | 910 | 831 | 763 | 703 | 651 | 606 | 566 | 530 | 499 | 471 | 443 | 417 | 394 | 373 | 0.310 |
| 5 | 1060 | 972 | 893 | 823 | 762 | 708 | 660 | 618 | 580 | 547 | 516 | 489 | 465 | 440 | 417 | 0.271 |
| 6 | 1111 | 1026 | 948 | 879 | 817 | 761 | 712 | 668 | 628 | 593 | 561 | 532 | 506 | 482 | 437 | 0.241 |
| 7 | 1155 | 1074 | 999 | 930 | 867 | 811 | 761 | 715 | 674 | 637 | 604 | 573 | 540 | 484 | 437 | 0.216 |
| 8 | 1194 | 1117 | 1044 | 976 | 914 | 858 | 807 | 760 | 718 | 680 | 645 | 605 | 540 | 484 | 437 | 0.196 |
| 9 | 1228 | 1155 | 1085 | 1019 | 958 | 901 | 850 | 803 | 760 | 721 | 683 | 605 | 540 | 484 | 437 | 0.180 |
| 10 | 1257 | 1188 | 1121 | 1057 | 997 | 942 | 890 | 843 | 800 | 760 | 683 | 605 | 540 | 484 | 437 | 0.166 |

D_F = 435 D_A = 478 D_B = 372 K2 = 1398

36/4 Attachment Pattern

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6" | 7'-0" | 7'-6" | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | |
| 0 | 511 | 450 | 401 | 358 | 320 | | | | | | | | | | | 0.923 |
| 1 | 607 | 541 | 486 | 440 | 402 | 367 | 335 | | | | | | | | | 0.645 |
| 2 | 689 | 620 | 562 | 513 | 470 | 434 | 402 | 374 | 346 | 321 | 300 | 281 | 264 | | | 0.496 |
| 3 | 757 | 689 | 630 | 578 | 533 | 494 | 460 | 429 | 403 | 379 | 354 | 332 | 312 | 295 | 279 | 0.403 |
| 4 | 813 | 748 | 690 | 637 | 591 | 550 | 514 | 481 | 452 | 426 | 403 | 382 | 360 | 340 | 322 | 0.339 |
| 5 | 860 | 799 | 742 | 690 | 643 | 601 | 563 | 529 | 499 | 471 | 446 | 424 | 403 | 384 | 365 | 0.293 |
| 6 | 899 | 842 | 787 | 737 | 690 | 648 | 609 | 575 | 543 | 514 | 488 | 464 | 442 | 422 | 403 | 0.257 |
| 7 | 932 | 878 | 827 | 778 | 732 | 690 | 652 | 616 | 584 | 554 | 527 | 502 | 479 | 458 | 437 | 0.230 |
| 8 | 959 | 909 | 861 | 814 | 770 | 729 | 691 | 655 | 622 | 592 | 564 | 538 | 514 | 484 | 437 | 0.207 |
| 9 | 981 | 936 | 891 | 846 | 804 | 764 | 726 | 691 | 658 | 627 | 599 | 573 | 540 | 484 | 437 | 0.189 |
| 10 | 1001 | 959 | 917 | 875 | 834 | 795 | 758 | 724 | 691 | 660 | 632 | 605 | 540 | 484 | 437 | 0.174 |

D_F = 597 D_A = 630 D_B = 526 K2 = 1398

¹ A 3/8" x 1-1/4" arc seam weld shall be used with F deck or A Deck.

$$G' = \frac{K_2}{3.78 + 0.3 \cdot D_x + 3 \cdot K_1 \cdot \text{SPAN}}, \text{ Kips/inch}$$

SPAN is in feet Substitute D_B, D_F, or D_A for D_x



DIAPHRAGM - 1.5B / 1.5F / 1.5A

1.5B / 1.5F / 1.5A ROOF DECK

- 18 Gage
- Support Fasteners: #12 TEK screws
- Sidelap Fasteners: #10 TEK screws

36/7 Attachment Pattern

Factor of safety = 2.35

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6" | 7'-0" | 7'-6" | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | |
| 0 | 454 | 395 | 347 | 307 | 275 | | | | | | | | | | | 0.696 |
| 1 | 570 | 500 | 444 | 399 | 362 | 327 | 299 | | | | | | | | | 0.525 |
| 2 | 673 | 596 | 533 | 481 | 438 | 402 | 371 | 342 | 316 | 294 | 275 | 258 | 243 | | | 0.422 |
| 3 | 763 | 682 | 614 | 558 | 510 | 469 | 434 | 403 | 377 | 352 | 329 | 309 | 291 | 275 | 261 | 0.352 |
| 4 | 842 | 759 | 689 | 629 | 577 | 533 | 494 | 461 | 431 | 405 | 381 | 360 | 339 | 321 | 304 | 0.303 |
| 5 | 909 | 828 | 756 | 694 | 640 | 593 | 552 | 515 | 483 | 454 | 429 | 406 | 385 | 366 | 347 | 0.265 |
| 6 | 967 | 888 | 817 | 754 | 698 | 649 | 606 | 567 | 533 | 502 | 475 | 450 | 427 | 407 | 388 | 0.236 |
| 7 | 1016 | 941 | 871 | 808 | 752 | 702 | 657 | 617 | 580 | 548 | 519 | 492 | 468 | 446 | 426 | 0.212 |
| 8 | 1059 | 987 | 919 | 858 | 801 | 751 | 705 | 663 | 626 | 592 | 561 | 533 | 507 | 484 | 437 | 0.193 |
| 9 | 1095 | 1027 | 963 | 902 | 847 | 796 | 749 | 707 | 669 | 634 | 602 | 572 | 540 | 484 | 437 | 0.177 |
| 10 | 1126 | 1063 | 1001 | 942 | 888 | 837 | 791 | 748 | 709 | 673 | 640 | 605 | 540 | 484 | 437 | 0.164 |

D_F = 111 D_A = 175 D_B = 63 K2 = 1398

36/5 Attachment Pattern

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6" | 7'-0" | 7'-6" | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | |
| 0 | 402 | 353 | 315 | 283 | 254 | | | | | | | | | | | 0.835 |
| 1 | 498 | 444 | 399 | 362 | 331 | 304 | 281 | | | | | | | | | 0.601 |
| 2 | 576 | 521 | 474 | 433 | 398 | 368 | 341 | 318 | 298 | 280 | 262 | 246 | 232 | | | 0.469 |
| 3 | 638 | 585 | 537 | 495 | 458 | 426 | 397 | 372 | 349 | 329 | 311 | 294 | 279 | 264 | 250 | 0.385 |
| 4 | 687 | 637 | 591 | 549 | 512 | 478 | 448 | 421 | 396 | 374 | 355 | 337 | 320 | 305 | 291 | 0.326 |
| 5 | 726 | 680 | 636 | 596 | 559 | 525 | 494 | 466 | 440 | 417 | 396 | 377 | 359 | 343 | 328 | 0.283 |
| 6 | 757 | 715 | 675 | 636 | 600 | 566 | 535 | 507 | 481 | 457 | 435 | 414 | 396 | 378 | 362 | 0.250 |
| 7 | 782 | 744 | 706 | 670 | 636 | 603 | 573 | 544 | 518 | 493 | 470 | 449 | 430 | 412 | 395 | 0.224 |
| 8 | 802 | 768 | 733 | 700 | 667 | 635 | 606 | 578 | 551 | 527 | 504 | 482 | 462 | 444 | 426 | 0.203 |
| 9 | 818 | 788 | 756 | 725 | 694 | 664 | 635 | 608 | 582 | 557 | 535 | 513 | 493 | 474 | 437 | 0.185 |
| 10 | 832 | 804 | 775 | 746 | 717 | 689 | 661 | 635 | 610 | 586 | 563 | 541 | 521 | 484 | 437 | 0.170 |

D_F = 435 D_A = 478 D_B = 372 K2 = 1398

36/4 Attachment Pattern

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6" | 7'-0" | 7'-6" | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | |
| 0 | 308 | 271 | 241 | 215 | 193 | | | | | | | | | | | 1.044 |
| 1 | 399 | 358 | 324 | 294 | 270 | 248 | 230 | | | | | | | | | 0.702 |
| 2 | 467 | 427 | 391 | 360 | 333 | 309 | 288 | 269 | 252 | 237 | 224 | 210 | 197 | | | 0.528 |
| 3 | 518 | 480 | 446 | 415 | 387 | 362 | 339 | 318 | 300 | 283 | 268 | 255 | 242 | 231 | 220 | 0.424 |
| 4 | 555 | 521 | 490 | 460 | 432 | 407 | 384 | 362 | 343 | 325 | 309 | 294 | 281 | 268 | 257 | 0.354 |
| 5 | 582 | 553 | 524 | 497 | 470 | 446 | 423 | 401 | 381 | 363 | 346 | 331 | 316 | 303 | 290 | 0.304 |
| 6 | 602 | 577 | 552 | 526 | 502 | 478 | 456 | 435 | 415 | 397 | 380 | 364 | 349 | 335 | 322 | 0.266 |
| 7 | 618 | 596 | 573 | 550 | 528 | 506 | 485 | 465 | 445 | 427 | 410 | 394 | 378 | 364 | 351 | 0.237 |
| 8 | 630 | 611 | 591 | 570 | 550 | 529 | 509 | 490 | 471 | 454 | 437 | 421 | 405 | 391 | 377 | 0.213 |
| 9 | 640 | 623 | 605 | 587 | 568 | 549 | 530 | 512 | 494 | 477 | 461 | 445 | 430 | 416 | 402 | 0.194 |
| 10 | 648 | 633 | 617 | 600 | 583 | 566 | 548 | 531 | 515 | 498 | 482 | 467 | 452 | 438 | 424 | 0.178 |

D_F = 597 D_A = 630 D_B = 526 K2 = 1398

$$G' = \frac{K_2}{3.78 + 0.3 \cdot D_x + 3 \cdot K_1 \cdot \text{SPAN}} \text{ , Kips/inch}$$

SPAN is in feet Substitute D_B, D_F, or D_A for D_x



DIAPHRAGM - 3N / 3NI

3N / 3NI ROOF DECK

- Support Fasteners: 3/4" puddle welds
- Sidelap Fasteners: welded¹

$$G' = \frac{K_2}{4.31 + \frac{0.3 \cdot D_{3N}}{SPAN} + 3 \cdot K_1 \cdot SPAN}, \text{ Kips/inch}$$

SPAN is in feet

¹The **bold** values do not comply with the minimum spacing requirements for sidelap connections and shall not be used except with properly spaced button-punched sidelaps with 3NI deck.

Type 22 - 2/4 Attachment Pattern

Factor of safety = 2.35

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|------------|------------|------------|------------|------------|------------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | 10'-6" | 11'-0" | 11'-6" | 12'-0" | 12'-6" | 13'-0" | 13'-6" | 14'-0" | 14'-6" | 15'-0" | |
| 0 | 143 | 135 | 127 | 121 | 115 | 109 | 104 | 100 | 96 | 92 | 88 | 85 | 82 | 79 | 76 | 1.093 |
| 2 | 282 | 266 | 251 | | | | | | | | | | | | | 0.356 |
| 3 | 352 | 331 | 313 | 296 | 281 | 268 | 256 | 245 | 234 | | | | | | | 0.266 |
| 4 | 421 | 396 | 374 | 354 | 337 | 321 | 306 | 293 | 281 | 269 | 259 | 249 | 241 | 232 | 225 | 0.213 |
| 5 | 479 | 454 | 432 | 411 | 392 | 374 | 357 | 341 | 327 | 314 | 302 | 291 | 280 | 271 | 262 | 0.177 |
| 6 | 534 | 507 | 483 | 460 | 440 | 421 | 404 | 388 | 373 | 358 | 344 | 332 | 320 | 309 | 299 | 0.152 |
| 7 | 586 | 558 | 532 | 508 | 486 | 466 | 447 | 429 | 413 | 398 | 384 | 371 | 359 | 347 | 336 | 0.133 |
| 8 | 635 | 606 | 578 | 553 | 530 | 508 | 488 | 470 | 452 | 436 | 421 | 407 | 394 | 381 | 370 | 0.118 |
| 9 | 681 | 651 | 622 | 596 | 572 | 549 | 528 | 509 | 490 | 473 | 457 | 442 | 428 | 399 | 373 | 0.106 |
| 10 | 724 | 693 | 664 | 637 | 612 | 589 | 567 | 546 | 527 | 509 | 492 | 461 | 428 | 399 | 373 | 0.096 |

D_{3N} = 653 K2 = 870

Type 20 - 2/4 Attachment Pattern

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-----------|-----------|-----------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | 10'-6" | 11'-0" | 11'-6" | 12'-0" | 12'-6" | 13'-0" | 13'-6" | 14'-0" | 14'-6" | 15'-0" | |
| 0 | 173 | 162 | 153 | 145 | 138 | 131 | 125 | 120 | 115 | 110 | 106 | 102 | 99 | 95 | 92 | 1.204 |
| 2 | 339 | 319 | 301 | | | | | | | | | | | | | 0.392 |
| 3 | 422 | 398 | 376 | 356 | 338 | 322 | 307 | 294 | 282 | | | | | | | 0.293 |
| 4 | 506 | 476 | 450 | 426 | 405 | 385 | 368 | 352 | 337 | 324 | 311 | 300 | 289 | 279 | 270 | 0.234 |
| 5 | 576 | 546 | 519 | 494 | 471 | 449 | 428 | 410 | 393 | 377 | 363 | 349 | 337 | 325 | 314 | 0.195 |
| 6 | 642 | 610 | 580 | 553 | 529 | 506 | 485 | 466 | 448 | 430 | 414 | 398 | 384 | 371 | 359 | 0.167 |
| 7 | 704 | 670 | 639 | 610 | 584 | 559 | 537 | 516 | 497 | 478 | 462 | 446 | 431 | 417 | 403 | 0.146 |
| 8 | 763 | 728 | 695 | 665 | 637 | 611 | 587 | 564 | 544 | 524 | 506 | 489 | 473 | 458 | 444 | 0.130 |
| 9 | 818 | 782 | 748 | 716 | 687 | 660 | 635 | 611 | 589 | 569 | 549 | 531 | 514 | 498 | 483 | 0.117 |
| 10 | 870 | 833 | 798 | 766 | 735 | 707 | 681 | 656 | 633 | 612 | 591 | 572 | 554 | 537 | 510 | 0.106 |

D_{3N} = 448 K2 = 1056

Type 18 - 2/4 Attachment Pattern

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | 10'-6" | 11'-0" | 11'-6" | 12'-0" | 12'-6" | 13'-0" | 13'-6" | 14'-0" | 14'-6" | 15'-0" | |
| 0 | 225 | 212 | 200 | 189 | 180 | 171 | 163 | 156 | 150 | 144 | 138 | 133 | 128 | 124 | 120 | 1.385 |
| 2 | 441 | 415 | 392 | | | | | | | | | | | | | 0.451 |
| 3 | 549 | 517 | 488 | 462 | 439 | 418 | 399 | 382 | 366 | | | | | | | 0.337 |
| 4 | 657 | 619 | 584 | 553 | 526 | 501 | 478 | 457 | 438 | 421 | 404 | 389 | 376 | 363 | 351 | 0.269 |
| 5 | 748 | 709 | 674 | 642 | 612 | 583 | 557 | 532 | 510 | 490 | 471 | 454 | 437 | 422 | 408 | 0.224 |
| 6 | 834 | 792 | 754 | 719 | 687 | 658 | 630 | 605 | 582 | 559 | 538 | 518 | 499 | 482 | 466 | 0.192 |
| 7 | 915 | 871 | 830 | 793 | 759 | 727 | 698 | 670 | 645 | 622 | 600 | 579 | 560 | 542 | 524 | 0.168 |
| 8 | 992 | 946 | 903 | 864 | 827 | 794 | 762 | 733 | 706 | 681 | 658 | 635 | 615 | 595 | 577 | 0.149 |
| 9 | 1064 | 1016 | 972 | 931 | 893 | 858 | 825 | 794 | 766 | 739 | 714 | 690 | 668 | 647 | 628 | 0.134 |
| 10 | 1131 | 1082 | 1037 | 995 | 956 | 919 | 885 | 853 | 823 | 795 | 768 | 743 | 720 | 698 | 677 | 0.122 |

D_{3N} = 321 K2 = 1398

Type 16 - 2/4 Attachment Pattern

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | 10'-6" | 11'-0" | 11'-6" | 12'-0" | 12'-6" | 13'-0" | 13'-6" | 14'-0" | 14'-6" | 15'-0" | |
| 0 | 279 | 262 | 248 | 235 | 223 | 212 | 203 | 194 | 186 | 178 | 171 | 165 | 159 | 154 | 149 | 1.556 |
| 2 | 546 | 513 | 485 | | | | | | | | | | | | | 0.507 |
| 3 | 679 | 639 | 604 | 572 | 543 | 517 | 494 | 472 | 453 | | | | | | | 0.379 |
| 4 | 812 | 765 | 722 | 684 | 650 | 619 | 591 | 565 | 542 | 520 | 500 | 481 | 464 | 448 | 433 | 0.303 |
| 5 | 925 | 877 | 833 | 794 | 757 | 721 | 688 | 658 | 631 | 605 | 582 | 561 | 541 | 522 | 505 | 0.252 |
| 6 | 1031 | 980 | 932 | 889 | 849 | 813 | 779 | 748 | 720 | 691 | 664 | 640 | 617 | 596 | 576 | 0.216 |
| 7 | 1132 | 1077 | 1027 | 980 | 938 | 899 | 862 | 829 | 797 | 768 | 741 | 716 | 692 | 669 | 647 | 0.189 |
| 8 | 1227 | 1169 | 1117 | 1068 | 1023 | 981 | 943 | 907 | 873 | 842 | 813 | 785 | 760 | 736 | 713 | 0.168 |
| 9 | 1315 | 1256 | 1202 | 1151 | 1104 | 1060 | 1020 | 982 | 946 | 913 | 882 | 853 | 826 | 800 | 776 | 0.151 |
| 10 | 1399 | 1338 | 1282 | 1230 | 1182 | 1136 | 1094 | 1054 | 1017 | 982 | 950 | 919 | 890 | 863 | 837 | 0.137 |

D_{3N} = 226 K2 = 1764



DIAPHRAGM - 3N / 3NI

3N / 3NI ROOF DECK

- Support Fasteners: 5/8" puddle welds
- Sidelap Fasteners: welded¹

$$G' = \frac{K_2}{4.31 + 0.3 \frac{D_{3N}}{SPAN} + 3 \cdot K_1 \cdot SPAN}, \text{ Kips/inch}$$

SPAN is in feet

¹The **bold** values do not comply with the minimum spacing requirements for sidelap connections and shall not be used except with properly spaced button-punched sidelaps with 3NI deck.

Type 22 - 2/4 Attachment Pattern

Factor of safety = 2.35

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|------------|------------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | 10'-6" | 11'-0" | 11'-6" | 12'-0" | 12'-6" | 13'-0" | 13'-6" | 14'-0" | 14'-6" | 15'-0" | |
| 0 | 119 | 112 | 105 | 100 | 95 | 90 | 86 | 82 | 79 | 76 | 73 | 70 | 68 | 65 | 63 | 1.093 |
| 2 | 257 | 242 | 229 | | | | | | | | | | | | | 0.356 |
| 3 | 327 | 307 | 290 | 275 | 261 | 249 | 238 | 227 | 218 | | | | | | | 0.266 |
| 4 | 388 | 368 | 350 | 333 | 317 | 302 | 288 | 276 | 264 | 253 | 244 | 235 | 226 | 219 | 211 | 0.213 |
| 5 | 444 | 421 | 401 | 383 | 366 | 350 | 336 | 322 | 310 | 298 | 286 | 276 | 266 | 257 | 248 | 0.177 |
| 6 | 495 | 471 | 450 | 430 | 411 | 394 | 378 | 364 | 350 | 337 | 326 | 314 | 304 | 294 | 285 | 0.152 |
| 7 | 543 | 518 | 495 | 474 | 455 | 436 | 419 | 404 | 389 | 375 | 362 | 350 | 339 | 328 | 318 | 0.133 |
| 8 | 587 | 562 | 538 | 516 | 495 | 476 | 458 | 442 | 426 | 411 | 398 | 385 | 373 | 361 | 350 | 0.118 |
| 9 | 628 | 602 | 578 | 555 | 534 | 514 | 496 | 478 | 462 | 446 | 432 | 418 | 405 | 393 | 373 | 0.106 |
| 10 | 665 | 639 | 615 | 592 | 570 | 550 | 531 | 513 | 496 | 480 | 464 | 450 | 428 | 399 | 373 | 0.096 |

D_{3N} = 653 K2 = 870

Type 20 - 2/4 Attachment Pattern

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|------------|------------|------------|------------|------------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | 10'-6" | 11'-0" | 11'-6" | 12'-0" | 12'-6" | 13'-0" | 13'-6" | 14'-0" | 14'-6" | 15'-0" | |
| 0 | 142 | 134 | 127 | 120 | 114 | 108 | 104 | 99 | 95 | 91 | 88 | 84 | 81 | 79 | 76 | 1.204 |
| 2 | 309 | 291 | 275 | | | | | | | | | | | | | 0.392 |
| 3 | 392 | 369 | 349 | 330 | 314 | 299 | 285 | 273 | 262 | | | | | | | 0.293 |
| 4 | 466 | 442 | 420 | 400 | 380 | 362 | 346 | 331 | 317 | 304 | 293 | 282 | 272 | 262 | 254 | 0.234 |
| 5 | 533 | 506 | 482 | 459 | 439 | 420 | 403 | 387 | 372 | 358 | 344 | 331 | 319 | 308 | 298 | 0.195 |
| 6 | 595 | 566 | 540 | 516 | 494 | 473 | 454 | 437 | 420 | 405 | 391 | 378 | 365 | 353 | 342 | 0.167 |
| 7 | 652 | 622 | 595 | 569 | 546 | 524 | 504 | 485 | 467 | 450 | 435 | 420 | 407 | 394 | 382 | 0.146 |
| 8 | 705 | 675 | 646 | 620 | 595 | 572 | 550 | 530 | 512 | 494 | 477 | 462 | 447 | 434 | 421 | 0.130 |
| 9 | 754 | 723 | 694 | 667 | 641 | 617 | 595 | 574 | 554 | 536 | 518 | 502 | 486 | 472 | 458 | 0.117 |
| 10 | 799 | 768 | 738 | 711 | 685 | 660 | 637 | 616 | 595 | 576 | 558 | 540 | 524 | 509 | 494 | 0.106 |

D_{3N} = 448 K2 = 1056

Type 18 - 2/4 Attachment Pattern

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-----------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | 10'-6" | 11'-0" | 11'-6" | 12'-0" | 12'-6" | 13'-0" | 13'-6" | 14'-0" | 14'-6" | 15'-0" | |
| 0 | 185 | 174 | 164 | 156 | 148 | 141 | 134 | 129 | 123 | 118 | 114 | 109 | 106 | 102 | 99 | 1.385 |
| 2 | 401 | 377 | 356 | | | | | | | | | | | | | 0.451 |
| 3 | 509 | 479 | 453 | 429 | 407 | 388 | 370 | 354 | 339 | | | | | | | 0.337 |
| 4 | 605 | 574 | 545 | 519 | 494 | 470 | 449 | 429 | 412 | 395 | 380 | 366 | 353 | 341 | 329 | 0.269 |
| 5 | 691 | 657 | 625 | 596 | 570 | 545 | 523 | 502 | 483 | 464 | 446 | 430 | 415 | 400 | 387 | 0.224 |
| 6 | 772 | 735 | 701 | 670 | 641 | 614 | 590 | 567 | 546 | 526 | 507 | 490 | 474 | 459 | 444 | 0.192 |
| 7 | 846 | 808 | 772 | 739 | 708 | 680 | 654 | 629 | 606 | 585 | 565 | 546 | 528 | 512 | 496 | 0.168 |
| 8 | 915 | 876 | 839 | 804 | 772 | 742 | 714 | 688 | 664 | 641 | 620 | 600 | 581 | 563 | 546 | 0.149 |
| 9 | 979 | 938 | 901 | 865 | 832 | 801 | 772 | 745 | 720 | 695 | 673 | 651 | 631 | 612 | 594 | 0.134 |
| 10 | 1037 | 996 | 958 | 922 | 889 | 857 | 827 | 799 | 772 | 747 | 724 | 701 | 680 | 660 | 641 | 0.122 |

D_{3N} = 321 K2 = 1398

Type 16 - 2/4 Attachment Pattern

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | 10'-6" | 11'-0" | 11'-6" | 12'-0" | 12'-6" | 13'-0" | 13'-6" | 14'-0" | 14'-6" | 15'-0" | |
| 0 | 228 | 215 | 203 | 192 | 182 | 174 | 166 | 159 | 152 | 146 | 140 | 135 | 130 | 126 | 122 | 1.556 |
| 2 | 495 | 466 | 440 | | | | | | | | | | | | | 0.507 |
| 3 | 629 | 592 | 559 | 529 | 503 | 479 | 457 | 437 | 419 | | | | | | | 0.379 |
| 4 | 747 | 708 | 673 | 641 | 610 | 581 | 554 | 530 | 508 | 488 | 469 | 452 | 435 | 420 | 406 | 0.303 |
| 5 | 854 | 811 | 772 | 736 | 703 | 673 | 646 | 620 | 596 | 573 | 551 | 531 | 512 | 494 | 478 | 0.252 |
| 6 | 953 | 907 | 865 | 827 | 791 | 758 | 728 | 700 | 674 | 649 | 626 | 605 | 585 | 566 | 549 | 0.216 |
| 7 | 1045 | 997 | 953 | 912 | 874 | 839 | 807 | 776 | 748 | 722 | 697 | 674 | 652 | 631 | 612 | 0.189 |
| 8 | 1130 | 1081 | 1035 | 993 | 953 | 916 | 882 | 850 | 820 | 792 | 765 | 740 | 717 | 695 | 674 | 0.168 |
| 9 | 1208 | 1158 | 1112 | 1068 | 1028 | 989 | 953 | 920 | 888 | 859 | 831 | 804 | 779 | 756 | 734 | 0.151 |
| 10 | 1280 | 1230 | 1183 | 1139 | 1097 | 1058 | 1021 | 986 | 954 | 923 | 894 | 866 | 840 | 815 | 792 | 0.137 |

D_{3N} = 226 K2 = 1764



DIAPHRAGM - 3N

3N / 3NI ROOF DECK

• Support Fasteners: 5/8" puddle welds

• Sidelap Fasteners: #10 TEK Screws

Type 22 - 24/4 Attachment Pattern

Factor of safety = 2.35

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | 10'-6" | 11'-0" | 11'-6" | 12'-0" | 12'-6" | 13'-0" | 13'-6" | 14'-0" | 14'-6" | 15'-0" | |
| 2 | 186 | 175 | 165 | | | | | | | | | | | | | 0.587 |
| 3 | 220 | 207 | 195 | 185 | 176 | 167 | 160 | 153 | 146 | | | | | | | 0.476 |
| 4 | 253 | 238 | 225 | 213 | 203 | 193 | 184 | 176 | 169 | 162 | 156 | 150 | 145 | 140 | 135 | 0.401 |
| 5 | 287 | 270 | 255 | 242 | 230 | 219 | 209 | 200 | 191 | 184 | 177 | 170 | 164 | 158 | 153 | 0.346 |
| 6 | 321 | 302 | 285 | 270 | 257 | 244 | 233 | 223 | 214 | 205 | 197 | 190 | 183 | 177 | 171 | 0.305 |
| 7 | 353 | 334 | 315 | 298 | 284 | 270 | 258 | 247 | 236 | 227 | 218 | 210 | 203 | 196 | 189 | 0.272 |
| 8 | 382 | 362 | 344 | 327 | 310 | 296 | 282 | 270 | 259 | 248 | 239 | 230 | 222 | 214 | 207 | 0.246 |
| 9 | 409 | 388 | 369 | 352 | 336 | 321 | 307 | 293 | 281 | 270 | 260 | 250 | 241 | 233 | 225 | 0.224 |
| 10 | 436 | 414 | 394 | 376 | 359 | 343 | 329 | 316 | 304 | 291 | 280 | 270 | 260 | 251 | 243 | 0.206 |

D_{3N} = 653 K2 = 870

Type 20 - 24/4 Attachment Pattern

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | 10'-6" | 11'-0" | 11'-6" | 12'-0" | 12'-6" | 13'-0" | 13'-6" | 14'-0" | 14'-6" | 15'-0" | |
| 2 | 224 | 211 | 199 | | | | | | | | | | | | | 0.646 |
| 3 | 265 | 249 | 236 | 223 | 212 | 202 | 193 | 184 | 177 | | | | | | | 0.525 |
| 4 | 306 | 288 | 272 | 258 | 245 | 233 | 222 | 213 | 204 | 196 | 188 | 181 | 175 | 169 | 163 | 0.442 |
| 5 | 347 | 326 | 308 | 292 | 277 | 264 | 252 | 241 | 231 | 222 | 213 | 205 | 198 | 191 | 185 | 0.381 |
| 6 | 388 | 365 | 345 | 326 | 310 | 295 | 282 | 270 | 258 | 248 | 239 | 230 | 222 | 214 | 207 | 0.335 |
| 7 | 427 | 403 | 381 | 361 | 343 | 327 | 312 | 298 | 286 | 274 | 264 | 254 | 245 | 236 | 229 | 0.299 |
| 8 | 461 | 437 | 415 | 395 | 376 | 358 | 341 | 327 | 313 | 300 | 289 | 278 | 268 | 259 | 250 | 0.270 |
| 9 | 495 | 469 | 446 | 425 | 406 | 388 | 371 | 355 | 340 | 327 | 314 | 302 | 292 | 282 | 272 | 0.247 |
| 10 | 527 | 500 | 476 | 454 | 434 | 415 | 398 | 382 | 367 | 353 | 339 | 327 | 315 | 304 | 294 | 0.227 |

D_{3N} = 448 K2 = 1056

Type 18 - 24/4 Attachment Pattern

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | 10'-6" | 11'-0" | 11'-6" | 12'-0" | 12'-6" | 13'-0" | 13'-6" | 14'-0" | 14'-6" | 15'-0" | |
| 2 | 293 | 276 | 260 | | | | | | | | | | | | | 0.744 |
| 3 | 347 | 327 | 309 | 292 | 278 | 264 | 252 | 241 | 231 | | | | | | | 0.604 |
| 4 | 401 | 378 | 357 | 338 | 321 | 306 | 292 | 279 | 268 | 257 | 247 | 238 | 229 | 221 | 214 | 0.508 |
| 5 | 455 | 429 | 405 | 384 | 364 | 347 | 331 | 317 | 304 | 291 | 280 | 270 | 260 | 251 | 243 | 0.439 |
| 6 | 510 | 480 | 453 | 429 | 408 | 388 | 371 | 354 | 340 | 326 | 314 | 302 | 291 | 281 | 272 | 0.386 |
| 7 | 561 | 531 | 501 | 475 | 451 | 429 | 410 | 392 | 376 | 361 | 347 | 334 | 322 | 311 | 301 | 0.345 |
| 8 | 606 | 574 | 545 | 519 | 494 | 471 | 449 | 430 | 412 | 395 | 380 | 366 | 353 | 341 | 330 | 0.311 |
| 9 | 650 | 616 | 586 | 559 | 533 | 510 | 489 | 467 | 448 | 430 | 414 | 398 | 384 | 371 | 358 | 0.284 |
| 10 | 692 | 657 | 626 | 597 | 570 | 546 | 523 | 503 | 483 | 465 | 447 | 430 | 415 | 401 | 387 | 0.261 |

D_{3N} = 321 K2 = 1398

Type 16 - 24/4 Attachment Pattern

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | 10'-6" | 11'-0" | 11'-6" | 12'-0" | 12'-6" | 13'-0" | 13'-6" | 14'-0" | 14'-6" | 15'-0" | |
| 2 | 365 | 343 | 324 | | | | | | | | | | | | | 0.835 |
| 3 | 433 | 407 | 385 | 365 | 346 | 330 | 315 | 301 | 289 | | | | | | | 0.678 |
| 4 | 501 | 472 | 446 | 422 | 401 | 382 | 365 | 349 | 334 | 321 | 308 | 297 | 286 | 277 | 267 | 0.571 |
| 5 | 570 | 536 | 506 | 480 | 456 | 434 | 414 | 396 | 380 | 365 | 350 | 338 | 325 | 314 | 304 | 0.493 |
| 6 | 638 | 600 | 567 | 537 | 510 | 486 | 464 | 444 | 425 | 408 | 393 | 378 | 364 | 352 | 340 | 0.434 |
| 7 | 701 | 664 | 628 | 595 | 565 | 538 | 514 | 491 | 471 | 452 | 435 | 418 | 404 | 390 | 377 | 0.387 |
| 8 | 757 | 718 | 682 | 650 | 620 | 590 | 563 | 539 | 516 | 496 | 477 | 459 | 443 | 427 | 413 | 0.350 |
| 9 | 812 | 771 | 733 | 699 | 667 | 639 | 612 | 586 | 562 | 539 | 519 | 499 | 482 | 465 | 449 | 0.319 |
| 10 | 865 | 822 | 783 | 747 | 714 | 683 | 655 | 629 | 605 | 583 | 561 | 540 | 521 | 503 | 486 | 0.293 |

D_{3N} = 226 K2 = 1764

$$G' = \frac{K_2}{4.31 + \frac{0.3 \cdot D_x}{SPAN} + 3 \cdot K_1 \cdot SPAN}, \text{ Kips/inch}$$

SPAN is in feet



DIAPHRAGM - 3N

3N / 3NI ROOF DECK

- Support Fasteners: #12 TEK Screws
- Sidelap Fasteners: #10 TEK Screws

Type 22 - 24/4 Attachment Pattern

Factor of safety = 2.35

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | 10'-6" | 11'-0" | 11'-6" | 12'-0" | 12'-6" | 13'-0" | 13'-6" | 14'-0" | 14'-6" | 15'-0" | |
| 2 | 137 | 129 | 121 | | | | | | | | | | | | | 0.625 |
| 3 | 170 | 160 | 151 | 143 | 136 | 130 | 124 | 118 | 114 | | | | | | | 0.502 |
| 4 | 204 | 192 | 181 | 172 | 163 | 155 | 148 | 142 | 136 | 131 | 126 | 121 | 117 | 113 | 109 | 0.419 |
| 5 | 232 | 220 | 209 | 199 | 190 | 181 | 173 | 165 | 158 | 152 | 146 | 141 | 136 | 131 | 127 | 0.359 |
| 6 | 259 | 246 | 234 | 223 | 213 | 204 | 196 | 188 | 181 | 174 | 167 | 161 | 155 | 150 | 145 | 0.315 |
| 7 | 284 | 270 | 258 | 246 | 235 | 226 | 217 | 208 | 200 | 193 | 186 | 180 | 174 | 168 | 163 | 0.280 |
| 8 | 308 | 293 | 280 | 268 | 257 | 246 | 237 | 228 | 219 | 212 | 204 | 197 | 191 | 185 | 179 | 0.252 |
| 9 | 330 | 315 | 302 | 289 | 277 | 266 | 256 | 247 | 238 | 229 | 222 | 214 | 208 | 201 | 195 | 0.229 |
| 10 | 351 | 336 | 322 | 309 | 297 | 285 | 275 | 265 | 256 | 247 | 239 | 231 | 224 | 217 | 210 | 0.210 |

D_{3N} = 653 K2 = 870

Type 20 - 24/4 Attachment Pattern

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | 10'-6" | 11'-0" | 11'-6" | 12'-0" | 12'-6" | 13'-0" | 13'-6" | 14'-0" | 14'-6" | 15'-0" | |
| 2 | 166 | 156 | 147 | | | | | | | | | | | | | 0.689 |
| 3 | 207 | 195 | 184 | 174 | 165 | 157 | 150 | 144 | 138 | | | | | | | 0.552 |
| 4 | 247 | 233 | 220 | 208 | 198 | 189 | 180 | 172 | 165 | 158 | 152 | 147 | 141 | 137 | 132 | 0.461 |
| 5 | 282 | 267 | 254 | 242 | 231 | 220 | 210 | 201 | 192 | 185 | 178 | 171 | 165 | 159 | 154 | 0.396 |
| 6 | 314 | 298 | 284 | 271 | 259 | 248 | 237 | 228 | 219 | 211 | 203 | 195 | 188 | 182 | 176 | 0.347 |
| 7 | 345 | 328 | 313 | 299 | 286 | 274 | 263 | 253 | 243 | 234 | 226 | 218 | 211 | 204 | 197 | 0.308 |
| 8 | 373 | 356 | 340 | 325 | 312 | 299 | 287 | 276 | 266 | 257 | 248 | 239 | 232 | 224 | 217 | 0.278 |
| 9 | 400 | 383 | 366 | 351 | 336 | 323 | 311 | 299 | 289 | 278 | 269 | 260 | 252 | 244 | 237 | 0.253 |
| 10 | 426 | 407 | 391 | 375 | 360 | 346 | 333 | 321 | 310 | 299 | 290 | 280 | 271 | 263 | 255 | 0.232 |

D_{3N} = 448 K2 = 1056

Type 18 - 24/4 Attachment Pattern

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | 10'-6" | 11'-0" | 11'-6" | 12'-0" | 12'-6" | 13'-0" | 13'-6" | 14'-0" | 14'-6" | 15'-0" | |
| 2 | 220 | 207 | 195 | | | | | | | | | | | | | 0.793 |
| 3 | 274 | 258 | 243 | 230 | 219 | 209 | 199 | 190 | 182 | | | | | | | 0.636 |
| 4 | 328 | 309 | 291 | 276 | 262 | 250 | 238 | 228 | 219 | 210 | 202 | 194 | 187 | 181 | 175 | 0.531 |
| 5 | 373 | 354 | 336 | 320 | 305 | 291 | 278 | 266 | 255 | 244 | 235 | 226 | 218 | 211 | 204 | 0.455 |
| 6 | 416 | 395 | 376 | 359 | 343 | 328 | 314 | 302 | 290 | 279 | 268 | 258 | 249 | 241 | 233 | 0.399 |
| 7 | 456 | 434 | 414 | 395 | 378 | 363 | 348 | 334 | 322 | 310 | 299 | 289 | 279 | 270 | 261 | 0.355 |
| 8 | 494 | 471 | 450 | 431 | 413 | 396 | 380 | 366 | 352 | 340 | 328 | 317 | 307 | 297 | 288 | 0.319 |
| 9 | 530 | 507 | 485 | 464 | 445 | 428 | 411 | 396 | 382 | 369 | 356 | 344 | 333 | 323 | 313 | 0.291 |
| 10 | 564 | 539 | 517 | 496 | 477 | 458 | 441 | 425 | 411 | 397 | 383 | 371 | 359 | 348 | 338 | 0.266 |

D_{3N} = 321 K2 = 1398

Type 16 - 24/4 Attachment Pattern

| Number of Sidelap Fasteners | ALLOWABLE DIAPHRAGM SHEAR STRENGTH (plf) | | | | | | | | | | | | | | | K1 |
|-----------------------------|--|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| | SPAN LENGTH (ft.-in.) | | | | | | | | | | | | | | | |
| | 8'-0" | 8'-6" | 9'-0" | 9'-6" | 10'-0" | 10'-6" | 11'-0" | 11'-6" | 12'-0" | 12'-6" | 13'-0" | 13'-6" | 14'-0" | 14'-6" | 15'-0" | |
| 2 | 277 | 261 | 246 | | | | | | | | | | | | | 0.890 |
| 3 | 345 | 325 | 307 | 291 | 276 | 263 | 251 | 240 | 230 | | | | | | | 0.714 |
| 4 | 413 | 389 | 368 | 348 | 331 | 315 | 301 | 288 | 276 | 265 | 255 | 245 | 236 | 228 | 221 | 0.596 |
| 5 | 470 | 446 | 424 | 404 | 385 | 367 | 350 | 335 | 321 | 308 | 297 | 286 | 275 | 266 | 257 | 0.512 |
| 6 | 525 | 498 | 474 | 452 | 432 | 414 | 397 | 381 | 366 | 352 | 339 | 326 | 314 | 304 | 293 | 0.448 |
| 7 | 576 | 548 | 522 | 499 | 477 | 457 | 439 | 422 | 406 | 391 | 377 | 365 | 353 | 341 | 330 | 0.399 |
| 8 | 624 | 595 | 568 | 543 | 521 | 499 | 480 | 462 | 445 | 429 | 414 | 400 | 387 | 375 | 363 | 0.359 |
| 9 | 669 | 639 | 611 | 586 | 562 | 540 | 519 | 500 | 482 | 465 | 449 | 435 | 421 | 408 | 395 | 0.326 |
| 10 | 711 | 681 | 652 | 626 | 601 | 578 | 557 | 537 | 518 | 500 | 484 | 468 | 453 | 440 | 426 | 0.299 |

D_{3N} = 226 K2 = 1764

$$G' = \frac{K_2}{4.31 + \frac{0.3 \cdot D_x}{SPAN} + 3 \cdot K_1 \cdot SPAN}, \text{ Kips/inch}$$

SPAN is in feet

