



REVISION: MARS 2007

| | | #2 GFRP V-ROD | #3 GFRP V-ROD | #4 GFRP V-ROD | #5 GFRP V-ROD | #6 GFRP V-ROD | #7 GFRP V-ROD | #8 GFRP V-ROD |
|-------------------------------------|------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Nominal tensile strength | MPa | 874 | 856 | 786 | 751 | 728 | 693 | 675 |
| | ksi | 127 | 124 | 114 | 109 | 106 | 100 | 98 |
| Guaranteed design tensile strength | MPa | 784 | 765 | 708 | 683 | 656 | 625 | 597 |
| | ksi | 114 | 111 | 103 | 99 | 95 | 91 | 87 |
| Equivalent load at GUTS (nominal Ø) | N | 24829 | 54511 | 89687 | 135188 | 186975 | 242467 | 302504 |
| | Lbfs | 5582 | 12254 | 20162 | 30391 | 42034 | 54509 | 68006 |
| Nominal tensile modulus | GPa | 46,1 | 45,4 | 46,3 | 48,2 | 47,6 | 46,4 | 51,9 |
| | ksi | 6681 | 6580 | 6710 | 6986 | 6899 | 6725 | 7522 |
| Tensile strain | % | 1,90 | 1,89 | 1,70 | 1,56 | 1,53 | 1,49 | 1,30 |
| Poisson's ratio | (-) | 0,25 | 0,21 | 0,26 | 0,25 | 0,25 | 0,25 | 0,28 |

| | | | | | | | | |
|--|------|-------|-------|-------|-------|-------|-------|-------|
| Development length (CSA-S6-00 clause 16.8.3) | mm | 256 | 354 | 433 | 533 | 587 | 643 | 722 |
| | inch | 10,09 | 13,95 | 17,05 | 20,99 | 23,10 | 25,33 | 28,42 |
| Splice length (CSA-S6-00 clause 16.8.3.1) | mm | 333 | 461 | 563 | 693 | 763 | 836 | 938 |
| | inch | 13,12 | 18,13 | 22,16 | 27,29 | 30,03 | 32,93 | 36,94 |
| Development length (CSA-S806-02 clause 9.3) | mm | 262 | 362 | 443 | 545 | 600 | 658 | 738 |
| | inch | 10,32 | 14,26 | 17,43 | 21,46 | 23,61 | 25,90 | 29,05 |
| Development length (ACI 440.1R-06 Clause 11.3) | mm | 309 | 421 | 495 | 599 | 641 | 681 | 734 |
| | inch | 12,15 | 16,57 | 19,49 | 23,59 | 25,24 | 26,82 | 28,90 |
| Splice length (ACI 440.1R-06 Clause 11.3) | mm | 401 | 547 | 644 | 779 | 833 | 885 | 954 |
| | inch | 15,80 | 21,55 | 25,34 | 30,67 | 32,81 | 34,86 | 37,57 |

note: all development lengths and splice lengths are given without correction factors (such as concrete cover)

| | | | | | | | | |
|------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Nominal Compressive strength | MPa | 553 | 538 | 473 | 504 | 519 | 488 | 339 |
| | ksi | 80 | 78 | 69 | 73 | 75 | 71 | 73 |

| | | | | | | | | |
|---------------------------|-----|------|------|------|------|------|------|------|
| Nominal Flexural strength | MPa | 1200 | 1161 | 1005 | 930 | 882 | 811 | 776 |
| | ksi | 174 | 168 | 146 | 135 | 128 | 117 | 112 |
| Nominal Flexural modulus | GPa | 48,8 | 46,1 | 46,8 | 46,8 | 45,1 | 44,6 | 45,1 |
| | ksi | 7071 | 6685 | 6787 | 6786 | 6533 | 6466 | 6539 |
| Flexural strain | % | 2,46 | 2,52 | 2,15 | 1,99 | 1,96 | 1,82 | 1,72 |

| | | | | | | | | |
|------------------------|-----|------|------|------|------|------|------|------|
| Nominal Shear strength | MPa | 225 | 183 | 212 | 195 | 200 | 203 | 203 |
| | ksi | 32,6 | 26,5 | 30,7 | 28,3 | 29,0 | 29,4 | 29,4 |

| | | | | | | | | |
|----------------------------|-----|------|------|------|------|------|------|------|
| Nominal Bond strength | MPa | 20,5 | 17,5 | 14,1 | 13,7 | 16,7 | 16,5 | 14,8 |
| | psi | 2971 | 2536 | 2043 | 1986 | 2420 | 2391 | 2145 |
| Bond dependent coefficient | (-) | 0,8 | 0,8 | 0,8 | 0,8 | 0,8 | 0,8 | 0,8 |

| | | | | | | | | |
|---|--------------------|--------|--------|--------|--------|--------|--------|--------|
| Longitudinal coefficient of thermal expansion | xE-6/C | 5,9 | 5,5 | 5,5 | 6,4 | 6 | 6 | 6,1 |
| | xE-6/F | 3,2 | 3 | 3 | 3,5 | 3,3 | 3,3 | 3,4 |
| Transverse coefficient of thermal expansion | xE-6/C | | | 29,5 | 29,1 | | 23,4 | 23,2 |
| | xE-6/F | | | 16,4 | 16,2 | | 13 | 12,9 |
| Moisture absorption | % | 0,65 | 0,47 | 0,38 | 0,42 | 0,21 | 0,38 | 0,17 |
| Glass content | % vol | 59,1 | 59,6 | 60,3 | 60,1 | 60,8 | 60,1 | 60,7 |
| | % weight | 77,1 | 77,4 | 77,9 | 77,8 | 78,3 | 77,8 | 78,2 |
| Ratio of modulus of elasticity to strength | (-) | 52,7 | 53,0 | 58,9 | 64,2 | 65,4 | 67,0 | 76,9 |
| Weight | # / LF | 0,052 | 0,113 | 0,182 | 0,286 | 0,413 | 0,561 | 0,733 |
| Effective cross-sectional area | (mm ²) | 38,97 | 78,00 | 136,70 | 224,36 | 292,57 | 387,9 | 527,34 |
| | inch ² | 0,0604 | 0,1209 | 0,2119 | 0,3478 | 0,4535 | 0,6012 | 0,8174 |
| Nominal cross-sectional area | (mm ²) | 31,67 | 71,26 | 126,68 | 197,93 | 285,02 | 387,95 | 506,71 |
| | inch ² | 0,0491 | 0,1104 | 0,1963 | 0,3068 | 0,4418 | 0,6013 | 0,7854 |