**APÉNDICE A**

**TABLA A1**. ESFUERZOS Y MÓDULOS DE YOUNG, 10%, DÍA 7

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **DEFORMACIÓN** | **G1 - 10% - Día 7** | | | | | | | |
| **MUESTRA 1** | | **MUESTRA 2** | | **MUESTRA 3** | | **PROMEDIOS** | |
| **ESFUERZOS [MPa]** | **E** | **ESFUERZOS [MPa]** | **E** | **ESFUERZOS [MPa]** | **E** | **ESFUERZO [MPa]** | **MÓDULO DE YOUNG (E)** |
| 0.0000 | 0 |  | 0 |  | 0 |  | 0 |  |
| 0.0025 | 0.9078 | 363.8445 | 1.7022 | 682.2084 | 0.3783 | 151.6019 | 0.9961 |  |
| 0.0050 | 2.6478 | 697.3686 | 3.7826 | 833.8103 | 1.0591 | 272.8834 | 2.4965 |  |
| 0.0075 | 6.6196 | 1591.8197 | 10.5913 | 2728.8337 | 1.8913 | 333.5241 | 6.3674 | 1551.3925 |
| 0.0100 | 11.3478 | 1895.0234 | 17.2865 | 2683.3532 | 3.2152 | 530.6066 | 10.6165 | 1702.9944 |
| 0.0125 | 17.4756 | 2455.9504 | 24.2086 | 2774.3143 | 5.9765 | 1106.6937 | 15.8869 | 2112.3195 |
| 0.0150 | 24.0195 | 2622.7124 | 31.2065 | 2804.6347 | 16.6434 | 4275.1729 | 23.9565 | 3234.1733 |
| 0.0175 | 31.5847 | 3032.0375 | 38.7717 | 3032.0375 | 25.5326 | 3562.6441 | 31.963 | 3208.9064 |
| 0.0200 | 40.663 | 3638.445 | 45.7695 | 2804.6347 | 34.9891 | 3790.0469 | 40.4738 | 3411.0422 |
| 0.0225 | 48.7956 | 3259.4403 | 52.5782 | 2728.8337 | 44.0673 | 3638.4450 | 48.4803 |  |
| 0.0250 | 57.3064 | 3411.0422 | 59.576 | 2804.6347 | 51.6325 | 3032.0375 | 56.1716 |  |
| 0.0274 | 65.2499 | 3183.6394 | 65.6281 | 2425.6300 | 58.2521 | 2653.0328 | 63.0433 |  |
| 0.0299 | 76.5977 | 4548.0562 | 73.3825 | 3107.8384 | 65.2499 | 2804.6347 | 71.7433 |  |
| 0.0324 | 80.3803 | 1516.0187 | 79.4346 | 2425.6300 | 71.8694 | 2653.0328 | 77.2281 |  |
| 0.0349 |  |  | 85.1085 | 2274.0281 | 76.5977 | 1895.0234 | 80.8531 |  |
| 0.0374 |  |  | 86.9998 | 758.0094 |  |  | 86.9998 |  |
|  |  |  |  |  |  |  |  | **2536.8047** |

**TABLA A2**. ESFUERZOS Y MÓDULOS DE YOUNG, 10%, DÍA 14

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **DEFORMACIÓN** | **G1 - 10% - Día 14** | | | | | | | |
| **MUESTRA 1** | | **MUESTRA 2** | | **MUESTRA 3** | | **PROMEDIOS** | |
| **ESFUERZOS [MPa]** | **E** | **ESFUERZOS [MPa]** | **E** | **ESFUERZOS [MPa]** | **E** | **ESFUERZO [MPa]** | **MÓDULO DE YOUNG (E)** |
| 0.0000 | 0 |  | 0 |  | 0 |  | 0 |  |
| 0.0025 | 1.2036 | 482.3696 | 3.6107 | 1447.1088 | 1.0316 | 413.4597 | 1.9486 |  |
| 0.0050 | 2.9229 | 689.0994 | 17.7094 | 5650.6153 | 2.5790 | 620.1895 | 7.7371 | 2319.9681 |
| 0.0075 | 7.2213 | 1722.7486 | 46.2509 | 11439.0506 | 4.6423 | 826.9193 | 19.3715 | 4662.9062 |
| 0.0100 | 20.4604 | 5306.0656 | 64.6481 | 7373.3639 | 9.6284 | 1998.3884 | 31.5790 | 4892.6060 |
| 0.0125 | 32.1521 | 4685.8761 | 68.7746 | 1653.8386 | 33.5276 | 9578.4821 | 44.8181 | 5306.0656 |
| 0.0150 | 43.1560 | 4410.2364 | 74.7923 | 2411.8480 | 54.1600 | 8269.1932 | 57.3694 | 5030.4258 |
| 0.0175 | 73.0730 | 11990.3301 | 76.5117 | 689.0994 | 74.7923 | 8269.1932 | 74.7923 | 6982.8742 |
| 0.0200 | 89.4069 | 6546.4446 | 78.2311 | 689.0994 | 85.1085 | 4134.5966 | 84.2488 |  |
| 0.0225 | 95.4247 | 2411.8480 |  |  | 88.5472 | 1378.1989 | 91.9860 |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  | **4865.8077** |

**TABLA A3**. ESFUERZOS Y MÓDULOS DE YOUNG, 10%, DÍA 21

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **DEFORMACIÓN** | **G1 - 10% - Día 21** | | | | | | | |
| **MUESTRA 1** | | **MUESTRA 2** | | **MUESTRA 3** | | **PROMEDIOS** | |
| **ESFUERZOS [MPa]** | **E** | **ESFUERZOS [MPa]** | **E** | **ESFUERZOS [MPa]** | **E** | **ESFUERZO [MPa]** | **MÓDULO DE YOUNG (E)** |
| 0.0000 | 0 |  | 0 |  | 0 |  | 0 |  |
| 0.0025 | 0.5158 | 206.7298 | 4.9862 | 1998.3884 | 8.4249 | 3376.5872 | 4.6423 |  |
| 0.0050 | 1.2036 | 275.6398 | 15.9901 | 4410.2364 | 24.9308 | 6615.3545 | 14.0415 | 3767.0769 |
| 0.0075 | 1.8913 | 275.6398 | 26.6501 | 4272.4165 | 49.5177 | 9854.1219 | 26.0197 | 4800.7260 |
| 0.0100 | 2.4071 | 206.7298 | 44.1877 | 7028.8142 | 70.4939 | 8407.0131 | 39.0296 | 5214.1857 |
| 0.0125 | 6.1897 | 1516.0187 | 54.1600 | 3996.7767 | 79.0907 | 3445.4972 | 46.4801 | 2986.0975 |
| 0.0150 | 20.8043 | 5857.3452 | 65.3358 | 4479.1463 | 87.6876 | 3445.4972 | 57.9426 | 4593.9962 |
| 0.0175 | 37.1383 | 6546.4446 | 79.9504 | 5857.3452 | 100.5828 | 5168.2457 | 72.5572 | 5857.3452 |
| 0.0200 | 57.5987 | 8200.2832 | 90.2666 | 4134.5966 |  |  | 73.9327 | 6167.4399 |
| 0.0225 | 77.3714 | 7924.6435 |  |  |  |  | 77.3714 |  |
| 0.0250 | 97.1441 | 7924.6435 |  |  |  |  | 97.1441 |  |
| 0.0274 | 116.0571 | 7580.0937 |  |  |  |  | 116.0571 |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  | **4769.5525** |

**TABLA A4**. ESFUERZOS Y MÓDULOS DE YOUNG, 10%, DÍA 28

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **DEFORMACIÓN** | **G1 - 10% - Día 28** | | | | | | | |
| **MUESTRA 1** | | **MUESTRA 2** | | **MUESTRA 3** | | **PROMEDIOS** | |
| **ESFUERZOS [MPa]** | **E** | **ESFUERZOS [MPa]** | **E** | **ESFUERZOS [MPa]** | **E** | **ESFUERZO [MPa]** | **MÓDULO DE YOUNG (E)** |
| 0.0000 | 0 |  | 0 |  | 0 |  | 0 |  |
| 0.0025 | 9.2846 | 3721.1369 | 4.2984 | 1722.7486 | 4.1265 | 1653.8386 | 5.9031 |  |
| 0.0050 | 19.4288 | 4065.6866 | 16.5059 | 4892.6060 | 10.8320 | 2687.4878 | 15.5889 | 3881.9268 |
| 0.0075 | 28.1976 | 3514.4071 | 30.2608 | 5512.7955 | 17.5375 | 2687.4878 | 25.3320 | 3904.8968 |
| 0.0100 | 42.4683 | 5719.5253 | 47.9703 | 7097.7241 | 28.1976 | 4272.4165 | 39.5454 | 5696.5553 |
| 0.0125 | 67.0552 | 9854.1219 | 71.3536 | 9371.7523 | 49.1738 | 8407.0131 | 62.5275 | 9210.9624 |
| 0.0150 | 81.6698 | 5857.3452 | 94.5650 | 9302.8423 | 73.9327 | 9923.0318 | 83.3892 |  |
| 0.0175 | 92.8457 | 4479.1463 | 114.3377 | 7924.6435 | 97.1441 | 9302.8423 | 101.4425 |  |
| 0.0200 | 96.5689 | 1492.2384 | 127.2329 | 5168.2457 | 111.7587 | 5857.3452 | 111.8535 |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  | **5673.5853** |

**TABLA A5**. ESFUERZOS Y MÓDULOS DE YOUNG, 12,5%, DÍA 4

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **DEFORMACIÓN** | **G1 - 12,5% - Día 4** | | | | | | | |
| **MUESTRA 1** | | **MUESTRA 2** | | **MUESTRA 3** | | **PROMEDIOS** | |
| **ESFUERZOS [MPa]** | **E** | **ESFUERZOS [MPa]** | **E** | **ESFUERZOS [MPa]** | **E** | **ESFUERZO [MPa]** | **MÓDULO DE YOUNG (E)** |
| 0.0000 | 0 |  | 0 |  | 0 |  | 0 |  |
| 0.0025 | 2.9126 | 1167.3344 | 6.7055 | 2687.4878 | 2.2352 | 895.8293 | 3.9511 |  |
| 0.0050 | 5.9009 | 1197.6548 | 22.3517 | 6270.8048 | 6.5336 | 1722.7486 | 11.5954 | 3063.7361 |
| 0.0075 | 11.8017 | 2364.9892 | 39.2015 | 6753.1744 | 16.5059 | 3996.7767 | 22.5030 | 4371.6468 |
| 0.0100 | 17.4756 | 2274.0281 | 61.8971 | 9096.1125 | 32.1521 | 6270.8048 | 37.1749 | 5880.3151 |
| 0.0125 | 23.2630 | 2319.5087 | 67.0552 |  | 46.4228 | 5719.5253 | 45.5803 |  |
| 0.0150 | 30.8282 | 3032.0375 |  |  | 62.7568 | 6546.4446 | 46.7925 |  |
| 0.0175 | 37.2586 | 2577.2319 |  |  | 72.2133 | 3790.0469 | 54.7360 |  |
| 0.0200 | 43.8782 | 2653.0328 |  |  | 76.5117 | 1722.7486 | 60.1949 |  |
| 0.0225 | 50.8760 | 2804.6347 |  |  |  |  | 50.8760 |  |
| 0.0250 | 56.7390 | 2349.8291 |  |  |  |  | 56.7390 |  |
| 0.0274 | 64.1151 | 2956.2366 |  |  |  |  | 64.1151 |  |
| 0.0299 | 69.4107 | 2122.4262 |  |  |  |  | 69.4107 |  |
| 0.0324 | 74.1390 | 1895.0234 |  |  |  |  | 74.1390 |  |
| 0.0349 | 80.1911 | 2425.6300 |  |  |  |  | 80.1911 |  |
| 0.0374 | 83.7846 | 1440.2178 |  |  |  |  | 83.7846 |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  | **4438.5660** |

**TABLA A6**. ESFUERZOS Y MÓDULOS DE YOUNG, 12,5%, DÍA 11

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **DEFORMACIÓN** | **G1 - 12,5% - Día 11** | | | | | | | |
| **MUESTRA 1** | | **MUESTRA 2** | | **MUESTRA 3** | | **PROMEDIOS** | |
| **ESFUERZOS [MPa]** | **E** | **ESFUERZOS [MPa]** | **E** | **ESFUERZOS [MPa]** | **E** | **ESFUERZO [MPa]** | **MÓDULO DE YOUNG (E)** |
| 0.0000 | 0 |  | 0 |  | 0 |  | 0 |  |
| 0.0025 | 7.04939242 | 2825.30767 | 0.1719364 | 68.9099431 | 13.2391028 | 5306.0656 | 6.82014388 |  |
| 0.0050 | 23.5552869 | 6615.35454 | 7.04939242 | 2756.39773 | 33.1837253 | 7993.5534 | 21.2628015 | 5788.43522 |
| 0.0075 | 39.8892449 | 6546.4446 | 24.0710961 | 6822.08437 | 54.1599661 | 8407.0131 | 39.3734357 | 7258.51401 |
| 0.0100 | 62.7567861 | 9165.02244 | 42.8121637 | 7511.1838 | 72.2132882 | 7235.544 | 59.2607460 | 7970.58342 |
| 0.0125 | 84.2488362 | 8613.74289 | 57.5986941 | 5926.25511 | 91.9859742 | 7924.6435 | 77.9445015 |  |
| 0.0150 | 89.4069282 | 2067.29829 | 79.9504262 | 8958.29261 | 95.4247022 | 1378.1989 | 88.2606855 |  |
| 0.0175 |  |  | 89.1085182 | 2067.29829 |  |  | 89.1085182 |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  | **7005.8442** |

**TABLA A7**. ESFUERZOS Y MÓDULOS DE YOUNG, 12,5%, DÍA 18

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **DEFORMACIÓN** | **G1 - 12,5% - Día 18** | | | | | | | |
| **MUESTRA 1** | | **MUESTRA 2** | | **MUESTRA 3** | | **PROMEDIOS** | |
| **ESFUERZOS [MPa]** | **E** | **ESFUERZOS [MPa]** | **E** | **ESFUERZOS [MPa]** | **E** | **ESFUERZO [MPa]** | **MÓDULO DE YOUNG (E)** |
| 0.0000 | 0 |  | 0 |  | 0 |  | 0 |  |
| 0.0025 | 2.2352 | 895.8293 | 1.0316 | 413.4597 | 1.5474 | 620.1895 | 1.6047 |  |
| 0.0050 | 6.7055 | 1791.6585 | 6.0178 | 1998.3884 | 6.7055 | 2067.2983 | 6.4763 |  |
| 0.0075 | 17.5375 | 4341.3264 | 21.8359 | 6339.7148 | 19.7727 | 5237.1557 | 19.7154 | 5306.0656 |
| 0.0100 | 31.1205 | 5443.8855 | 41.9525 | 8062.4633 | 36.1066 | 6546.4446 | 36.3932 | 6684.2645 |
| 0.0125 | 50.7212 | 7855.7335 | 61.0374 | 7649.0037 | 54.1600 | 7235.5440 | 55.3062 | 7580.0937 |
| 0.0150 | 73.0730 | 8958.2926 | 85.9682 | 9991.9418 | 80.8101 | 10681.0412 | 79.9504 | 9877.0919 |
| 0.0175 | 90.2666 | 6890.9943 | 104.8812 | 7580.0937 | 91.1263 | 4134.5966 | 95.4247 |  |
|  | 103.1618 | 5168.2457 |  |  |  |  | 103.1618 |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  | **7129.8821** |

**TABLA A8**. ESFUERZOS Y MÓDULOS DE YOUNG, 12,5%, DÍA 25

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **DEFORMACIÓN** | **G1 - 12,5% - Día 25** | | | | | | | |
| **MUESTRA 1** | | **MUESTRA 2** | | **MUESTRA 3** | | **PROMEDIOS** | |
| **ESFUERZOS [MPa]** | **E** | **ESFUERZOS [MPa]** | **E** | **ESFUERZOS [MPa]** | **E** | **ESFUERZO [MPa]** | **MÓDULO DE YOUNG (E)** |
| 0.0000 | 0 |  | 0 |  | 0 |  | 0 |  |
| 0.0025 | 1.7194 | 689.0994 | 4.2984 | 1722.7486 | 6.8775 | 2756.3977 | 4.2984 |  |
| 0.0050 | 10.1442 | 3376.5872 | 18.9130 | 5857.3452 | 20.9762 | 5650.6153 | 16.6778 | 4961.5159 |
| 0.0075 | 26.1343 | 6408.6247 | 42.9841 | 9647.3920 | 38.1699 | 6890.9943 | 35.7628 | 7649.0037 |
| 0.0100 | 42.9841 | 6753.1744 | 61.8971 | 7580.0937 | 53.3003 | 6064.0750 | 52.7272 | 6799.1144 |
| 0.0125 | 68.7746 | 10336.4915 | 87.6876 | 10336.4915 | 70.4939 | 6890.9943 | 75.6520 | 9187.9924 |
| 0.0150 | 91.1263 | 8958.2926 | 101.4425 | 5512.7955 | 79.9504 | 3790.0469 | 90.8397 |  |
| 0.0175 | 104.8812 | 5512.7955 | 107.4603 | 2411.8480 | 92.8457 | 5168.2457 | 101.7290 |  |
|  | 111.7587 | 2756.3977 |  |  |  |  | 111.7587 |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  | **7149.4066** |