

Guidance for Conducting the Six-Minute Walk Test for Lung Allocation

Per OPTN *Policy 10.3.B Lung Clinical Values That Must Be Updated Every Six Months*, transplant hospitals must update the six-minute walk distance in feet for each lung candidate at least once in every six-month period following registration on the waiting list. This guidance offers recommendations for performing the six-minute walk test to promote standardization across transplant programs in how the six-minute walk distance is reported for the purposes of lung allocation. Transplant programs are advised to follow the 2002 American Thoracic Society Guidelines for the Six-Minute Walk Test¹ and the 2014 European Respiratory Society/American Thoracic Society technical standard on field walking tests in chronic respiratory disease² to the extent possible. If the walk distance is measured in meters, use **Appendix A** to convert the walk distance from meters to feet.

Provision of Supplemental Oxygen

The 2014 technical standard states, “Oxygen is not to be titrated during any of the tests where distance is a measured outcome. If oxygen titration is desired, this should be done during a separate test.”³ Per OPTN *Policy 10.3 Clinical Values and Update Schedule*, transplant hospitals must conduct an oxygen titration test to determine the amount of supplemental oxygen that should be provided to the candidate during the candidate’s initial six-minute walk test. This requirement applies to candidates at least 12 years old and for six-minute walk distances reported during the six months preceding a candidate turning 12 years old. Accordingly, transplant programs are advised to perform the oxygen titration test as close in time ahead of the six-minute walk test as is feasible but no more than 12 weeks prior to the six-minute walk test. Pediatric lung transplant programs are advised to ensure that candidates approaching 12 years old complete an oxygen titration test ahead of the six-minute walk test for the six-minute walk distance reported within six months before the candidate turns 12 years of age. The intent of performing the oxygen titration test ahead of the six-minute walk test is to provide a standardized approach for determining supplemental oxygen needs for completing the test and to avoid titration during the test so as not to interfere with the candidate’s performance. Accordingly, transplant programs are advised to perform the oxygen titration test as close in time ahead of the six-minute walk test as is feasible but no more than 12 weeks prior to the six-minute walk test. A sample oxygen titration protocol is enclosed in **Appendix B**. If a candidate desaturates during the six-minute walk test, the transplant program may provide additional supplemental oxygen to enable the candidate to complete the test.

Per OPTN *Policy 10.3.B Lung Clinical Values That Must Be Updated Every Six Months*, the six-minute walk distance must be updated at least once in every six-month period following registration for each candidate on the lung waiting list. To align with this timing, transplant programs are advised to perform the oxygen titration test at least once in every six-month period. Both the oxygen titration test and the six-minute walk test may be completed and updated more frequently if deemed appropriate by the transplant program due to a candidate’s changing clinical status. However, transplant programs may determine that a candidate’s supplemental oxygen needs are well established and that a separate

¹ “Guidelines for the Six-Minute Walk Test,” American Thoracic Society, March 2002, accessed October 9, 2023, available <https://www.atsjournals.org/doi/10.1164/ajrccm.166.1.at1102>.

² Anne E. Holland, Martijn A. Spruit, Thierry Troosters, et al., “An official European Respiratory Society/American Thoracic Society technical standard: field walking tests in chronic respiratory disease,” *European Respiratory Journal* 44 (2014): 1428-1446, DOI: 10.1183/09031936.00150314.

³ Holland et al., “Field walking tests,” 1438.

oxygen titration test is not necessary prior to performing a six-minute walk test other than the candidate's initial six-minute walk test. For example, particularly for pediatric candidates, adherence to multiple test protocols in the same day may present a challenge and the candidates' oxygen needs with exertion may be well established.

Safety Considerations

For most candidates, it is recommended that transplant programs provide supplemental oxygen to maintain a candidate's oxygen saturation of greater than 88% during the performance of the test. The 2014 technical standard states that the six-minute walk test "has an excellent safety profile" when the test is stopped if the patient's oxygen saturation falls below 80%.⁴ Depending on the candidate's diagnosis and disease severity, lung transplant programs should not feel obligated to allow their candidates to desaturate below 80% before halting the test. For candidates who are unable to maintain an oxygen saturation of 88% or greater at rest but can safely complete the six-minute walk test, the transplant program may use a lower oxygen saturation threshold to guide supplemental oxygen needs.

If a candidate is unable to safely perform the six-minute walk test, then the test should not be performed, and the lung transplant program should report a walk distance of 0 feet for the candidate. However, lung transplant programs are advised to avoid entering a walk distance of 0 feet and to administer the six-minute walk test if it is deemed safe for a candidate to attempt the test, even if the candidate is not expected to walk far or is not expected to walk the full six minutes.

When a lung candidate is unable to complete the six-minute walk due to reasons unrelated to their lung disease severity (e.g., lower limb amputation, joint necrosis, etc.), the lung transplant program should report a walk distance of 0 feet for the candidate. The transplant program may submit an exception request for the post-transplant outcomes component of the candidate's lung composite allocation score. In this case, transplant programs should estimate the candidate's six-minute walk distance based on the documented walk distance of candidates with similar levels of fitness and enter that value into the CAS calculator⁵ along with the candidate's other characteristics to determine the estimated post-transplant outcomes subscore for that candidate were they able to complete the six-minute walk test. The transplant program should then divide this value by the total possible number of points for post-transplant outcomes and multiply by 100 to determine the percentage that should be entered into the exception request form. The exception request will be reviewed and adjudicated as outlined in OPTN *Policy 10.2 Lung Composite Score Exceptions* and the Lung Review Board Operational Guidelines.⁶

Altitude Considerations

Some candidates may live at an altitude that is different enough from their transplant program that the candidates require different levels of supplemental oxygen when at the transplant center relative to what they use at home.⁷ Transplant programs located in areas where residential altitude varies widely are advised to perform the oxygen titration test and the six-minute walk test at their transplant hospital

⁴ Holland et al., "Field walking tests," 1433.

⁵ "Lung CAS Calculator," OPTN, accessed October 9, 2023, available <https://optn.transplant.hrsa.gov/data/allocation-calculators/lung-cas-calculator/>.

⁶ "Lung Review Board Operational Guidelines," OPTN, accessed October 9, 2023, available <https://optn.transplant.hrsa.gov/about/review-boards/>.

⁷ Deirdre Caffrey, J. Jaime Miranda, Robert H. Gilman, et al., "A cross-sectional study of differences in 6-min walk distance in health adults residing at high altitude versus sea level," *Extreme Physiology & Medicine* 3, no. 3 (2014), <https://extremephysiolmed.biomedcentral.com/articles/10.1186/2046-7648-3-3>.

when possible so that all candidates registered at the program are performing these tests at the same altitude. This approach will help to ensure that the six-minute walk distances reported for each candidate registered at the program are being measured consistently.

Appendix A: Convert Walk Distance from Meters to Feet

Six-minute walk distance is entered in OPTN Waiting List as a whole number measured in feet. The following table is provided for converting six-minute walk distances measured in meters to a whole number in feet, where one meter is equal to 3.28084 feet. The value was rounded up to the next whole number if the converted value in feet ended in a decimal value of at least 0.5.

Meters	Feet	Meters	Feet	Meters	Feet
<u>0</u>	<u>0</u>	<u>35</u>	<u>115</u>	<u>70</u>	<u>230</u>
<u>1</u>	<u>3</u>	<u>36</u>	<u>118</u>	<u>71</u>	<u>233</u>
<u>2</u>	<u>7</u>	<u>37</u>	<u>121</u>	<u>72</u>	<u>236</u>
<u>3</u>	<u>10</u>	<u>38</u>	<u>125</u>	<u>73</u>	<u>240</u>
<u>4</u>	<u>13</u>	<u>39</u>	<u>128</u>	<u>74</u>	<u>243</u>
<u>5</u>	<u>16</u>	<u>40</u>	<u>131</u>	<u>75</u>	<u>246</u>
<u>6</u>	<u>20</u>	<u>41</u>	<u>135</u>	<u>76</u>	<u>249</u>
<u>7</u>	<u>23</u>	<u>42</u>	<u>138</u>	<u>77</u>	<u>253</u>
<u>8</u>	<u>26</u>	<u>43</u>	<u>141</u>	<u>78</u>	<u>256</u>
<u>9</u>	<u>30</u>	<u>44</u>	<u>144</u>	<u>79</u>	<u>259</u>
<u>10</u>	<u>33</u>	<u>45</u>	<u>148</u>	<u>80</u>	<u>262</u>
<u>11</u>	<u>36</u>	<u>46</u>	<u>151</u>	<u>81</u>	<u>266</u>
<u>12</u>	<u>39</u>	<u>47</u>	<u>154</u>	<u>82</u>	<u>269</u>
<u>13</u>	<u>43</u>	<u>48</u>	<u>157</u>	<u>83</u>	<u>272</u>
<u>14</u>	<u>46</u>	<u>49</u>	<u>161</u>	<u>84</u>	<u>276</u>
<u>15</u>	<u>49</u>	<u>50</u>	<u>164</u>	<u>85</u>	<u>279</u>
<u>16</u>	<u>52</u>	<u>51</u>	<u>167</u>	<u>86</u>	<u>282</u>
<u>17</u>	<u>56</u>	<u>52</u>	<u>171</u>	<u>87</u>	<u>285</u>
<u>18</u>	<u>59</u>	<u>53</u>	<u>174</u>	<u>88</u>	<u>289</u>
<u>19</u>	<u>62</u>	<u>54</u>	<u>177</u>	<u>89</u>	<u>292</u>
<u>20</u>	<u>66</u>	<u>55</u>	<u>180</u>	<u>90</u>	<u>295</u>
<u>21</u>	<u>69</u>	<u>56</u>	<u>184</u>	<u>91</u>	<u>299</u>
<u>22</u>	<u>72</u>	<u>57</u>	<u>187</u>	<u>92</u>	<u>302</u>
<u>23</u>	<u>75</u>	<u>58</u>	<u>190</u>	<u>93</u>	<u>305</u>
<u>24</u>	<u>79</u>	<u>59</u>	<u>194</u>	<u>94</u>	<u>308</u>
<u>25</u>	<u>82</u>	<u>60</u>	<u>197</u>	<u>95</u>	<u>312</u>
<u>26</u>	<u>85</u>	<u>61</u>	<u>200</u>	<u>96</u>	<u>315</u>
<u>27</u>	<u>89</u>	<u>62</u>	<u>203</u>	<u>97</u>	<u>318</u>
<u>28</u>	<u>92</u>	<u>63</u>	<u>207</u>	<u>98</u>	<u>322</u>
<u>29</u>	<u>95</u>	<u>64</u>	<u>210</u>	<u>99</u>	<u>325</u>
<u>30</u>	<u>98</u>	<u>65</u>	<u>213</u>	<u>100</u>	<u>328</u>
<u>31</u>	<u>102</u>	<u>66</u>	<u>217</u>	<u>101</u>	<u>331</u>
<u>32</u>	<u>105</u>	<u>67</u>	<u>220</u>	<u>102</u>	<u>335</u>
<u>33</u>	<u>108</u>	<u>68</u>	<u>223</u>	<u>103</u>	<u>338</u>
<u>34</u>	<u>112</u>	<u>69</u>	<u>226</u>	<u>104</u>	<u>341</u>

<u>Meters</u>	<u>Feet</u>
<u>105</u>	<u>344</u>
<u>106</u>	<u>348</u>
<u>107</u>	<u>351</u>
<u>108</u>	<u>354</u>
<u>109</u>	<u>358</u>
<u>110</u>	<u>361</u>
<u>111</u>	<u>364</u>
<u>112</u>	<u>367</u>
<u>113</u>	<u>371</u>
<u>114</u>	<u>374</u>
<u>115</u>	<u>377</u>
<u>116</u>	<u>381</u>
<u>117</u>	<u>384</u>
<u>118</u>	<u>387</u>
<u>119</u>	<u>390</u>
<u>120</u>	<u>394</u>
<u>121</u>	<u>397</u>
<u>122</u>	<u>400</u>
<u>123</u>	<u>404</u>
<u>124</u>	<u>407</u>
<u>125</u>	<u>410</u>
<u>126</u>	<u>413</u>
<u>127</u>	<u>417</u>
<u>128</u>	<u>420</u>
<u>129</u>	<u>423</u>
<u>130</u>	<u>427</u>
<u>131</u>	<u>430</u>
<u>132</u>	<u>433</u>
<u>133</u>	<u>436</u>
<u>134</u>	<u>440</u>
<u>135</u>	<u>443</u>
<u>136</u>	<u>446</u>
<u>137</u>	<u>449</u>
<u>138</u>	<u>453</u>
<u>139</u>	<u>456</u>
<u>140</u>	<u>459</u>
<u>141</u>	<u>463</u>
<u>142</u>	<u>466</u>
<u>143</u>	<u>469</u>
<u>144</u>	<u>472</u>
<u>145</u>	<u>476</u>

<u>Meters</u>	<u>Feet</u>
<u>146</u>	<u>479</u>
<u>147</u>	<u>482</u>
<u>148</u>	<u>486</u>
<u>149</u>	<u>489</u>
<u>150</u>	<u>492</u>
<u>151</u>	<u>495</u>
<u>152</u>	<u>499</u>
<u>153</u>	<u>502</u>
<u>154</u>	<u>505</u>
<u>155</u>	<u>509</u>
<u>156</u>	<u>512</u>
<u>157</u>	<u>515</u>
<u>158</u>	<u>518</u>
<u>159</u>	<u>522</u>
<u>160</u>	<u>525</u>
<u>161</u>	<u>528</u>
<u>162</u>	<u>531</u>
<u>163</u>	<u>535</u>
<u>164</u>	<u>538</u>
<u>165</u>	<u>541</u>
<u>166</u>	<u>545</u>
<u>167</u>	<u>548</u>
<u>168</u>	<u>551</u>
<u>169</u>	<u>554</u>
<u>170</u>	<u>558</u>
<u>171</u>	<u>561</u>
<u>172</u>	<u>564</u>
<u>173</u>	<u>568</u>
<u>174</u>	<u>571</u>
<u>175</u>	<u>574</u>
<u>176</u>	<u>577</u>
<u>177</u>	<u>581</u>
<u>178</u>	<u>584</u>
<u>179</u>	<u>587</u>
<u>180</u>	<u>591</u>
<u>181</u>	<u>594</u>
<u>182</u>	<u>597</u>
<u>183</u>	<u>600</u>
<u>184</u>	<u>604</u>
<u>185</u>	<u>607</u>
<u>186</u>	<u>610</u>

<u>Meters</u>	<u>Feet</u>
<u>187</u>	<u>614</u>
<u>188</u>	<u>617</u>
<u>189</u>	<u>620</u>
<u>190</u>	<u>623</u>
<u>191</u>	<u>627</u>
<u>192</u>	<u>630</u>
<u>193</u>	<u>633</u>
<u>194</u>	<u>636</u>
<u>195</u>	<u>640</u>
<u>196</u>	<u>643</u>
<u>197</u>	<u>646</u>
<u>198</u>	<u>650</u>
<u>199</u>	<u>653</u>
<u>200</u>	<u>656</u>
<u>201</u>	<u>659</u>
<u>202</u>	<u>663</u>
<u>203</u>	<u>666</u>
<u>204</u>	<u>669</u>
<u>205</u>	<u>673</u>
<u>206</u>	<u>676</u>
<u>207</u>	<u>679</u>
<u>208</u>	<u>682</u>
<u>209</u>	<u>686</u>
<u>210</u>	<u>689</u>
<u>211</u>	<u>692</u>
<u>212</u>	<u>696</u>
<u>213</u>	<u>699</u>
<u>214</u>	<u>702</u>
<u>215</u>	<u>705</u>
<u>216</u>	<u>709</u>
<u>217</u>	<u>712</u>
<u>218</u>	<u>715</u>
<u>219</u>	<u>719</u>
<u>220</u>	<u>722</u>
<u>221</u>	<u>725</u>
<u>222</u>	<u>728</u>
<u>223</u>	<u>732</u>
<u>224</u>	<u>735</u>
<u>225</u>	<u>738</u>
<u>226</u>	<u>741</u>
<u>227</u>	<u>745</u>

<u>Meters</u>	<u>Feet</u>
<u>228</u>	<u>748</u>
<u>229</u>	<u>751</u>
<u>230</u>	<u>755</u>
<u>231</u>	<u>758</u>
<u>232</u>	<u>761</u>
<u>233</u>	<u>764</u>
<u>234</u>	<u>768</u>
<u>235</u>	<u>771</u>
<u>236</u>	<u>774</u>
<u>237</u>	<u>778</u>
<u>238</u>	<u>781</u>
<u>239</u>	<u>784</u>
<u>240</u>	<u>787</u>
<u>241</u>	<u>791</u>
<u>242</u>	<u>794</u>
<u>243</u>	<u>797</u>
<u>244</u>	<u>801</u>
<u>245</u>	<u>804</u>
<u>246</u>	<u>807</u>
<u>247</u>	<u>810</u>
<u>248</u>	<u>814</u>
<u>249</u>	<u>817</u>
<u>250</u>	<u>820</u>
<u>251</u>	<u>823</u>
<u>252</u>	<u>827</u>
<u>253</u>	<u>830</u>
<u>254</u>	<u>833</u>
<u>255</u>	<u>837</u>
<u>256</u>	<u>840</u>
<u>257</u>	<u>843</u>
<u>258</u>	<u>846</u>
<u>259</u>	<u>850</u>
<u>260</u>	<u>853</u>
<u>261</u>	<u>856</u>
<u>262</u>	<u>860</u>
<u>263</u>	<u>863</u>
<u>264</u>	<u>866</u>
<u>265</u>	<u>869</u>
<u>266</u>	<u>873</u>
<u>267</u>	<u>876</u>
<u>268</u>	<u>879</u>

<u>Meters</u>	<u>Feet</u>
<u>269</u>	<u>883</u>
<u>270</u>	<u>886</u>
<u>271</u>	<u>889</u>
<u>272</u>	<u>892</u>
<u>273</u>	<u>896</u>
<u>274</u>	<u>899</u>
<u>275</u>	<u>902</u>
<u>276</u>	<u>906</u>
<u>277</u>	<u>909</u>
<u>278</u>	<u>912</u>
<u>279</u>	<u>915</u>
<u>280</u>	<u>919</u>
<u>281</u>	<u>922</u>
<u>282</u>	<u>925</u>
<u>283</u>	<u>928</u>
<u>284</u>	<u>932</u>
<u>285</u>	<u>935</u>
<u>286</u>	<u>938</u>
<u>287</u>	<u>942</u>
<u>288</u>	<u>945</u>
<u>289</u>	<u>948</u>
<u>290</u>	<u>951</u>
<u>291</u>	<u>955</u>
<u>292</u>	<u>958</u>
<u>293</u>	<u>961</u>
<u>294</u>	<u>965</u>
<u>295</u>	<u>968</u>
<u>296</u>	<u>971</u>
<u>297</u>	<u>974</u>
<u>298</u>	<u>978</u>
<u>299</u>	<u>981</u>
<u>300</u>	<u>984</u>
<u>301</u>	<u>988</u>
<u>302</u>	<u>991</u>
<u>303</u>	<u>994</u>
<u>304</u>	<u>997</u>
<u>305</u>	<u>1001</u>
<u>306</u>	<u>1004</u>
<u>307</u>	<u>1007</u>
<u>308</u>	<u>1010</u>
<u>309</u>	<u>1014</u>

<u>Meters</u>	<u>Feet</u>
<u>310</u>	<u>1017</u>
<u>311</u>	<u>1020</u>
<u>312</u>	<u>1024</u>
<u>313</u>	<u>1027</u>
<u>314</u>	<u>1030</u>
<u>315</u>	<u>1033</u>
<u>316</u>	<u>1037</u>
<u>317</u>	<u>1040</u>
<u>318</u>	<u>1043</u>
<u>319</u>	<u>1047</u>
<u>320</u>	<u>1050</u>
<u>321</u>	<u>1053</u>
<u>322</u>	<u>1056</u>
<u>323</u>	<u>1060</u>
<u>324</u>	<u>1063</u>
<u>325</u>	<u>1066</u>
<u>326</u>	<u>1070</u>
<u>327</u>	<u>1073</u>
<u>328</u>	<u>1076</u>
<u>329</u>	<u>1079</u>
<u>330</u>	<u>1083</u>
<u>331</u>	<u>1086</u>
<u>332</u>	<u>1089</u>
<u>333</u>	<u>1093</u>
<u>334</u>	<u>1096</u>
<u>335</u>	<u>1099</u>
<u>336</u>	<u>1102</u>
<u>337</u>	<u>1106</u>
<u>338</u>	<u>1109</u>
<u>339</u>	<u>1112</u>
<u>340</u>	<u>1115</u>
<u>341</u>	<u>1119</u>
<u>342</u>	<u>1122</u>
<u>343</u>	<u>1125</u>
<u>344</u>	<u>1129</u>
<u>345</u>	<u>1132</u>
<u>346</u>	<u>1135</u>
<u>347</u>	<u>1138</u>
<u>348</u>	<u>1142</u>
<u>349</u>	<u>1145</u>
<u>350</u>	<u>1148</u>

<u>Meters</u>	<u>Feet</u>
<u>351</u>	<u>1152</u>
<u>352</u>	<u>1155</u>
<u>353</u>	<u>1158</u>
<u>354</u>	<u>1161</u>
<u>355</u>	<u>1165</u>
<u>356</u>	<u>1168</u>
<u>357</u>	<u>1171</u>
<u>358</u>	<u>1175</u>
<u>359</u>	<u>1178</u>
<u>360</u>	<u>1181</u>
<u>361</u>	<u>1184</u>
<u>362</u>	<u>1188</u>
<u>363</u>	<u>1191</u>
<u>364</u>	<u>1194</u>
<u>365</u>	<u>1198</u>
<u>366</u>	<u>1201</u>
<u>367</u>	<u>1204</u>
<u>368</u>	<u>1207</u>
<u>369</u>	<u>1211</u>
<u>370</u>	<u>1214</u>
<u>371</u>	<u>1217</u>
<u>372</u>	<u>1220</u>
<u>373</u>	<u>1224</u>
<u>374</u>	<u>1227</u>
<u>375</u>	<u>1230</u>
<u>376</u>	<u>1234</u>
<u>377</u>	<u>1237</u>
<u>378</u>	<u>1240</u>
<u>379</u>	<u>1243</u>
<u>380</u>	<u>1247</u>
<u>381</u>	<u>1250</u>
<u>382</u>	<u>1253</u>
<u>383</u>	<u>1257</u>
<u>384</u>	<u>1260</u>
<u>385</u>	<u>1263</u>
<u>386</u>	<u>1266</u>
<u>387</u>	<u>1270</u>
<u>388</u>	<u>1273</u>
<u>389</u>	<u>1276</u>
<u>390</u>	<u>1280</u>
<u>391</u>	<u>1283</u>

<u>Meters</u>	<u>Feet</u>
<u>392</u>	<u>1286</u>
<u>393</u>	<u>1289</u>
<u>394</u>	<u>1293</u>
<u>395</u>	<u>1296</u>
<u>396</u>	<u>1299</u>
<u>397</u>	<u>1302</u>
<u>398</u>	<u>1306</u>
<u>399</u>	<u>1309</u>
<u>400</u>	<u>1312</u>
<u>401</u>	<u>1316</u>
<u>402</u>	<u>1319</u>
<u>403</u>	<u>1322</u>
<u>404</u>	<u>1325</u>
<u>405</u>	<u>1329</u>
<u>406</u>	<u>1332</u>
<u>407</u>	<u>1335</u>
<u>408</u>	<u>1339</u>
<u>409</u>	<u>1342</u>
<u>410</u>	<u>1345</u>
<u>411</u>	<u>1348</u>
<u>412</u>	<u>1352</u>
<u>413</u>	<u>1355</u>
<u>414</u>	<u>1358</u>
<u>415</u>	<u>1362</u>
<u>416</u>	<u>1365</u>
<u>417</u>	<u>1368</u>
<u>418</u>	<u>1371</u>
<u>419</u>	<u>1375</u>
<u>420</u>	<u>1378</u>
<u>421</u>	<u>1381</u>
<u>422</u>	<u>1385</u>
<u>423</u>	<u>1388</u>
<u>424</u>	<u>1391</u>
<u>425</u>	<u>1394</u>
<u>426</u>	<u>1398</u>
<u>427</u>	<u>1401</u>
<u>428</u>	<u>1404</u>
<u>429</u>	<u>1407</u>
<u>430</u>	<u>1411</u>
<u>431</u>	<u>1414</u>
<u>432</u>	<u>1417</u>

<u>Meters</u>	<u>Feet</u>
<u>433</u>	<u>1421</u>
<u>434</u>	<u>1424</u>
<u>435</u>	<u>1427</u>
<u>436</u>	<u>1430</u>
<u>437</u>	<u>1434</u>
<u>438</u>	<u>1437</u>
<u>439</u>	<u>1440</u>
<u>440</u>	<u>1444</u>
<u>441</u>	<u>1447</u>
<u>442</u>	<u>1450</u>
<u>443</u>	<u>1453</u>
<u>444</u>	<u>1457</u>
<u>445</u>	<u>1460</u>
<u>446</u>	<u>1463</u>
<u>447</u>	<u>1467</u>
<u>448</u>	<u>1470</u>
<u>449</u>	<u>1473</u>
<u>450</u>	<u>1476</u>
<u>451</u>	<u>1480</u>
<u>452</u>	<u>1483</u>
<u>453</u>	<u>1486</u>
<u>454</u>	<u>1490</u>
<u>455</u>	<u>1493</u>
<u>456</u>	<u>1496</u>
<u>457</u>	<u>1499</u>
<u>458</u>	<u>1503</u>
<u>459</u>	<u>1506</u>
<u>460</u>	<u>1509</u>
<u>461</u>	<u>1512</u>
<u>462</u>	<u>1516</u>
<u>463</u>	<u>1519</u>
<u>464</u>	<u>1522</u>
<u>465</u>	<u>1526</u>
<u>466</u>	<u>1529</u>
<u>467</u>	<u>1532</u>
<u>468</u>	<u>1535</u>
<u>469</u>	<u>1539</u>
<u>470</u>	<u>1542</u>
<u>471</u>	<u>1545</u>
<u>472</u>	<u>1549</u>
<u>473</u>	<u>1552</u>

<u>Meters</u>	<u>Feet</u>
<u>474</u>	<u>1555</u>
<u>475</u>	<u>1558</u>
<u>476</u>	<u>1562</u>
<u>477</u>	<u>1565</u>
<u>478</u>	<u>1568</u>
<u>479</u>	<u>1572</u>
<u>480</u>	<u>1575</u>
<u>481</u>	<u>1578</u>
<u>482</u>	<u>1581</u>
<u>483</u>	<u>1585</u>
<u>484</u>	<u>1588</u>
<u>485</u>	<u>1591</u>
<u>486</u>	<u>1594</u>
<u>487</u>	<u>1598</u>
<u>488</u>	<u>1601</u>
<u>489</u>	<u>1604</u>
<u>490</u>	<u>1608</u>
<u>491</u>	<u>1611</u>
<u>492</u>	<u>1614</u>
<u>493</u>	<u>1617</u>
<u>494</u>	<u>1621</u>
<u>495</u>	<u>1624</u>
<u>496</u>	<u>1627</u>
<u>497</u>	<u>1631</u>
<u>498</u>	<u>1634</u>
<u>499</u>	<u>1637</u>
<u>500</u>	<u>1640</u>
<u>501</u>	<u>1644</u>
<u>502</u>	<u>1647</u>
<u>503</u>	<u>1650</u>
<u>504</u>	<u>1654</u>
<u>505</u>	<u>1657</u>
<u>506</u>	<u>1660</u>
<u>507</u>	<u>1663</u>
<u>508</u>	<u>1667</u>
<u>509</u>	<u>1670</u>
<u>510</u>	<u>1673</u>
<u>511</u>	<u>1677</u>
<u>512</u>	<u>1680</u>
<u>513</u>	<u>1683</u>
<u>514</u>	<u>1686</u>

<u>Meters</u>	<u>Feet</u>
<u>515</u>	<u>1690</u>
<u>516</u>	<u>1693</u>
<u>517</u>	<u>1696</u>
<u>518</u>	<u>1699</u>
<u>519</u>	<u>1703</u>
<u>520</u>	<u>1706</u>
<u>521</u>	<u>1709</u>
<u>522</u>	<u>1713</u>
<u>523</u>	<u>1716</u>
<u>524</u>	<u>1719</u>
<u>525</u>	<u>1722</u>
<u>526</u>	<u>1726</u>
<u>527</u>	<u>1729</u>
<u>528</u>	<u>1732</u>
<u>529</u>	<u>1736</u>
<u>530</u>	<u>1739</u>
<u>531</u>	<u>1742</u>
<u>532</u>	<u>1745</u>
<u>533</u>	<u>1749</u>
<u>534</u>	<u>1752</u>
<u>535</u>	<u>1755</u>
<u>536</u>	<u>1759</u>
<u>537</u>	<u>1762</u>
<u>538</u>	<u>1765</u>
<u>539</u>	<u>1768</u>
<u>540</u>	<u>1772</u>
<u>541</u>	<u>1775</u>
<u>542</u>	<u>1778</u>
<u>543</u>	<u>1781</u>
<u>544</u>	<u>1785</u>
<u>545</u>	<u>1788</u>
<u>546</u>	<u>1791</u>
<u>547</u>	<u>1795</u>
<u>548</u>	<u>1798</u>
<u>549</u>	<u>1801</u>
<u>550</u>	<u>1804</u>
<u>551</u>	<u>1808</u>
<u>552</u>	<u>1811</u>
<u>553</u>	<u>1814</u>
<u>554</u>	<u>1818</u>
<u>555</u>	<u>1821</u>

<u>Meters</u>	<u>Feet</u>
<u>556</u>	<u>1824</u>
<u>557</u>	<u>1827</u>
<u>558</u>	<u>1831</u>
<u>559</u>	<u>1834</u>
<u>560</u>	<u>1837</u>
<u>561</u>	<u>1841</u>
<u>562</u>	<u>1844</u>
<u>563</u>	<u>1847</u>
<u>564</u>	<u>1850</u>
<u>565</u>	<u>1854</u>
<u>566</u>	<u>1857</u>
<u>567</u>	<u>1860</u>
<u>568</u>	<u>1864</u>
<u>569</u>	<u>1867</u>
<u>570</u>	<u>1870</u>
<u>571</u>	<u>1873</u>
<u>572</u>	<u>1877</u>
<u>573</u>	<u>1880</u>
<u>574</u>	<u>1883</u>
<u>575</u>	<u>1886</u>
<u>576</u>	<u>1890</u>
<u>577</u>	<u>1893</u>
<u>578</u>	<u>1896</u>
<u>579</u>	<u>1900</u>
<u>580</u>	<u>1903</u>
<u>581</u>	<u>1906</u>
<u>582</u>	<u>1909</u>
<u>583</u>	<u>1913</u>
<u>584</u>	<u>1916</u>
<u>585</u>	<u>1919</u>
<u>586</u>	<u>1923</u>
<u>587</u>	<u>1926</u>
<u>588</u>	<u>1929</u>
<u>589</u>	<u>1932</u>
<u>590</u>	<u>1936</u>
<u>591</u>	<u>1939</u>
<u>592</u>	<u>1942</u>
<u>593</u>	<u>1946</u>
<u>594</u>	<u>1949</u>
<u>595</u>	<u>1952</u>
<u>596</u>	<u>1955</u>

<u>Meters</u>	<u>Feet</u>
<u>597</u>	<u>1959</u>
<u>598</u>	<u>1962</u>
<u>599</u>	<u>1965</u>
<u>600</u>	<u>1969</u>
<u>601</u>	<u>1972</u>
<u>602</u>	<u>1975</u>
<u>603</u>	<u>1978</u>
<u>604</u>	<u>1982</u>
<u>605</u>	<u>1985</u>
<u>606</u>	<u>1988</u>
<u>607</u>	<u>1991</u>
<u>608</u>	<u>1995</u>
<u>609</u>	<u>1998</u>
<u>610</u>	<u>2001</u>
<u>611</u>	<u>2005</u>
<u>612</u>	<u>2008</u>
<u>613</u>	<u>2011</u>
<u>614</u>	<u>2014</u>
<u>615</u>	<u>2018</u>
<u>616</u>	<u>2021</u>
<u>617</u>	<u>2024</u>
<u>618</u>	<u>2028</u>
<u>619</u>	<u>2031</u>
<u>620</u>	<u>2034</u>
<u>621</u>	<u>2037</u>
<u>622</u>	<u>2041</u>
<u>623</u>	<u>2044</u>
<u>624</u>	<u>2047</u>
<u>625</u>	<u>2051</u>
<u>626</u>	<u>2054</u>
<u>627</u>	<u>2057</u>
<u>628</u>	<u>2060</u>
<u>629</u>	<u>2064</u>
<u>630</u>	<u>2067</u>
<u>631</u>	<u>2070</u>
<u>632</u>	<u>2073</u>
<u>633</u>	<u>2077</u>
<u>634</u>	<u>2080</u>
<u>635</u>	<u>2083</u>
<u>636</u>	<u>2087</u>
<u>637</u>	<u>2090</u>

<u>Meters</u>	<u>Feet</u>
<u>638</u>	<u>2093</u>
<u>639</u>	<u>2096</u>
<u>640</u>	<u>2100</u>
<u>641</u>	<u>2103</u>
<u>642</u>	<u>2106</u>
<u>643</u>	<u>2110</u>
<u>644</u>	<u>2113</u>
<u>645</u>	<u>2116</u>
<u>646</u>	<u>2119</u>
<u>647</u>	<u>2123</u>
<u>648</u>	<u>2126</u>
<u>649</u>	<u>2129</u>
<u>650</u>	<u>2133</u>
<u>651</u>	<u>2136</u>
<u>652</u>	<u>2139</u>
<u>653</u>	<u>2142</u>
<u>654</u>	<u>2146</u>
<u>655</u>	<u>2149</u>
<u>656</u>	<u>2152</u>
<u>657</u>	<u>2156</u>
<u>658</u>	<u>2159</u>
<u>659</u>	<u>2162</u>
<u>660</u>	<u>2165</u>
<u>661</u>	<u>2169</u>
<u>662</u>	<u>2172</u>
<u>663</u>	<u>2175</u>
<u>664</u>	<u>2178</u>
<u>665</u>	<u>2182</u>
<u>666</u>	<u>2185</u>
<u>667</u>	<u>2188</u>
<u>668</u>	<u>2192</u>
<u>669</u>	<u>2195</u>
<u>670</u>	<u>2198</u>
<u>671</u>	<u>2201</u>
<u>672</u>	<u>2205</u>
<u>673</u>	<u>2208</u>
<u>674</u>	<u>2211</u>
<u>675</u>	<u>2215</u>
<u>676</u>	<u>2218</u>
<u>677</u>	<u>2221</u>
<u>678</u>	<u>2224</u>

<u>Meters</u>	<u>Feet</u>
<u>679</u>	<u>2228</u>
<u>680</u>	<u>2231</u>
<u>681</u>	<u>2234</u>
<u>682</u>	<u>2238</u>
<u>683</u>	<u>2241</u>
<u>684</u>	<u>2244</u>
<u>685</u>	<u>2247</u>
<u>686</u>	<u>2251</u>
<u>687</u>	<u>2254</u>
<u>688</u>	<u>2257</u>
<u>689</u>	<u>2260</u>
<u>690</u>	<u>2264</u>
<u>691</u>	<u>2267</u>
<u>692</u>	<u>2270</u>
<u>693</u>	<u>2274</u>
<u>694</u>	<u>2277</u>
<u>695</u>	<u>2280</u>
<u>696</u>	<u>2283</u>
<u>697</u>	<u>2287</u>
<u>698</u>	<u>2290</u>
<u>699</u>	<u>2293</u>
<u>700</u>	<u>2297</u>
<u>701</u>	<u>2300</u>
<u>702</u>	<u>2303</u>
<u>703</u>	<u>2306</u>
<u>704</u>	<u>2310</u>
<u>705</u>	<u>2313</u>
<u>706</u>	<u>2316</u>
<u>707</u>	<u>2320</u>
<u>708</u>	<u>2323</u>
<u>709</u>	<u>2326</u>
<u>710</u>	<u>2329</u>
<u>711</u>	<u>2333</u>
<u>712</u>	<u>2336</u>
<u>713</u>	<u>2339</u>
<u>714</u>	<u>2343</u>
<u>715</u>	<u>2346</u>
<u>716</u>	<u>2349</u>
<u>717</u>	<u>2352</u>
<u>718</u>	<u>2356</u>
<u>719</u>	<u>2359</u>

<u>Meters</u>	<u>Feet</u>
<u>720</u>	<u>2362</u>
<u>721</u>	<u>2365</u>
<u>722</u>	<u>2369</u>
<u>723</u>	<u>2372</u>
<u>724</u>	<u>2375</u>
<u>725</u>	<u>2379</u>
<u>726</u>	<u>2382</u>
<u>727</u>	<u>2385</u>
<u>728</u>	<u>2388</u>
<u>729</u>	<u>2392</u>
<u>730</u>	<u>2395</u>
<u>731</u>	<u>2398</u>
<u>732</u>	<u>2402</u>
<u>733</u>	<u>2405</u>
<u>734</u>	<u>2408</u>
<u>735</u>	<u>2411</u>
<u>736</u>	<u>2415</u>
<u>737</u>	<u>2418</u>
<u>738</u>	<u>2421</u>
<u>739</u>	<u>2425</u>
<u>740</u>	<u>2428</u>
<u>741</u>	<u>2431</u>
<u>742</u>	<u>2434</u>
<u>743</u>	<u>2438</u>
<u>744</u>	<u>2441</u>
<u>745</u>	<u>2444</u>
<u>746</u>	<u>2448</u>
<u>747</u>	<u>2451</u>
<u>748</u>	<u>2454</u>
<u>749</u>	<u>2457</u>
<u>750</u>	<u>2461</u>
<u>751</u>	<u>2464</u>
<u>752</u>	<u>2467</u>
<u>753</u>	<u>2470</u>
<u>754</u>	<u>2474</u>
<u>755</u>	<u>2477</u>
<u>756</u>	<u>2480</u>
<u>757</u>	<u>2484</u>
<u>758</u>	<u>2487</u>
<u>759</u>	<u>2490</u>
<u>760</u>	<u>2493</u>

<u>Meters</u>	<u>Feet</u>
<u>761</u>	<u>2497</u>
<u>762</u>	<u>2500</u>
<u>763</u>	<u>2503</u>
<u>764</u>	<u>2507</u>
<u>765</u>	<u>2510</u>
<u>766</u>	<u>2513</u>
<u>767</u>	<u>2516</u>
<u>768</u>	<u>2520</u>
<u>769</u>	<u>2523</u>
<u>770</u>	<u>2526</u>
<u>771</u>	<u>2530</u>
<u>772</u>	<u>2533</u>
<u>773</u>	<u>2536</u>
<u>774</u>	<u>2539</u>
<u>775</u>	<u>2543</u>
<u>776</u>	<u>2546</u>
<u>777</u>	<u>2549</u>
<u>778</u>	<u>2552</u>
<u>779</u>	<u>2556</u>
<u>780</u>	<u>2559</u>
<u>781</u>	<u>2562</u>
<u>782</u>	<u>2566</u>
<u>783</u>	<u>2569</u>
<u>784</u>	<u>2572</u>
<u>785</u>	<u>2575</u>
<u>786</u>	<u>2579</u>
<u>787</u>	<u>2582</u>
<u>788</u>	<u>2585</u>
<u>789</u>	<u>2589</u>
<u>790</u>	<u>2592</u>
<u>791</u>	<u>2595</u>
<u>792</u>	<u>2598</u>
<u>793</u>	<u>2602</u>
<u>794</u>	<u>2605</u>
<u>795</u>	<u>2608</u>
<u>796</u>	<u>2612</u>
<u>797</u>	<u>2615</u>
<u>798</u>	<u>2618</u>
<u>799</u>	<u>2621</u>
<u>800</u>	<u>2625</u>
<u>801</u>	<u>2628</u>

<u>Meters</u>	<u>Feet</u>
<u>802</u>	<u>2631</u>
<u>803</u>	<u>2635</u>
<u>804</u>	<u>2638</u>
<u>805</u>	<u>2641</u>
<u>806</u>	<u>2644</u>
<u>807</u>	<u>2648</u>
<u>808</u>	<u>2651</u>
<u>809</u>	<u>2654</u>
<u>810</u>	<u>2657</u>
<u>811</u>	<u>2661</u>
<u>812</u>	<u>2664</u>
<u>813</u>	<u>2667</u>
<u>814</u>	<u>2671</u>
<u>815</u>	<u>2674</u>
<u>816</u>	<u>2677</u>
<u>817</u>	<u>2680</u>
<u>818</u>	<u>2684</u>
<u>819</u>	<u>2687</u>
<u>820</u>	<u>2690</u>
<u>821</u>	<u>2694</u>
<u>822</u>	<u>2697</u>
<u>823</u>	<u>2700</u>
<u>824</u>	<u>2703</u>
<u>825</u>	<u>2707</u>
<u>826</u>	<u>2710</u>
<u>827</u>	<u>2713</u>
<u>828</u>	<u>2717</u>
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<u>835</u>	<u>2740</u>
<u>836</u>	<u>2743</u>
<u>837</u>	<u>2746</u>
<u>838</u>	<u>2749</u>
<u>839</u>	<u>2753</u>
<u>840</u>	<u>2756</u>
<u>841</u>	<u>2759</u>
<u>842</u>	<u>2762</u>

<u>Meters</u>	<u>Feet</u>
<u>843</u>	<u>2766</u>
<u>844</u>	<u>2769</u>
<u>845</u>	<u>2772</u>
<u>846</u>	<u>2776</u>
<u>847</u>	<u>2779</u>
<u>848</u>	<u>2782</u>
<u>849</u>	<u>2785</u>
<u>850</u>	<u>2789</u>
<u>851</u>	<u>2792</u>
<u>852</u>	<u>2795</u>
<u>853</u>	<u>2799</u>
<u>854</u>	<u>2802</u>
<u>855</u>	<u>2805</u>
<u>856</u>	<u>2808</u>
<u>857</u>	<u>2812</u>
<u>858</u>	<u>2815</u>
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<u>860</u>	<u>2822</u>
<u>861</u>	<u>2825</u>
<u>862</u>	<u>2828</u>
<u>863</u>	<u>2831</u>
<u>864</u>	<u>2835</u>
<u>865</u>	<u>2838</u>
<u>866</u>	<u>2841</u>
<u>867</u>	<u>2844</u>
<u>868</u>	<u>2848</u>
<u>869</u>	<u>2851</u>
<u>870</u>	<u>2854</u>
<u>871</u>	<u>2858</u>
<u>872</u>	<u>2861</u>
<u>873</u>	<u>2864</u>
<u>874</u>	<u>2867</u>
<u>875</u>	<u>2871</u>
<u>876</u>	<u>2874</u>
<u>877</u>	<u>2877</u>
<u>878</u>	<u>2881</u>
<u>879</u>	<u>2884</u>
<u>880</u>	<u>2887</u>
<u>881</u>	<u>2890</u>
<u>882</u>	<u>2894</u>
<u>883</u>	<u>2897</u>

<u>Meters</u>	<u>Feet</u>
<u>884</u>	<u>2900</u>
<u>885</u>	<u>2904</u>
<u>886</u>	<u>2907</u>
<u>887</u>	<u>2910</u>
<u>888</u>	<u>2913</u>
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<u>890</u>	<u>2920</u>
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<u>892</u>	<u>2927</u>
<u>893</u>	<u>2930</u>
<u>894</u>	<u>2933</u>
<u>895</u>	<u>2936</u>
<u>896</u>	<u>2940</u>
<u>897</u>	<u>2943</u>
<u>898</u>	<u>2946</u>
<u>899</u>	<u>2949</u>
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<u>907</u>	<u>2976</u>
<u>908</u>	<u>2979</u>
<u>909</u>	<u>2982</u>
<u>910</u>	<u>2986</u>
<u>911</u>	<u>2989</u>
<u>912</u>	<u>2992</u>
<u>913</u>	<u>2995</u>
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<u>915</u>	<u>3002</u>
<u>916</u>	<u>3005</u>
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<u>919</u>	<u>3015</u>
<u>920</u>	<u>3018</u>
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<u>922</u>	<u>3025</u>
<u>923</u>	<u>3028</u>
<u>924</u>	<u>3031</u>

<u>Meters</u>	<u>Feet</u>
<u>925</u>	<u>3035</u>
<u>926</u>	<u>3038</u>
<u>927</u>	<u>3041</u>
<u>928</u>	<u>3045</u>
<u>929</u>	<u>3048</u>
<u>930</u>	<u>3051</u>
<u>931</u>	<u>3054</u>
<u>932</u>	<u>3058</u>
<u>933</u>	<u>3061</u>
<u>934</u>	<u>3064</u>
<u>935</u>	<u>3068</u>
<u>936</u>	<u>3071</u>
<u>937</u>	<u>3074</u>
<u>938</u>	<u>3077</u>
<u>939</u>	<u>3081</u>
<u>940</u>	<u>3084</u>
<u>941</u>	<u>3087</u>
<u>942</u>	<u>3091</u>
<u>943</u>	<u>3094</u>
<u>944</u>	<u>3097</u>
<u>945</u>	<u>3100</u>
<u>946</u>	<u>3104</u>
<u>947</u>	<u>3107</u>
<u>948</u>	<u>3110</u>
<u>949</u>	<u>3114</u>
<u>950</u>	<u>3117</u>
<u>951</u>	<u>3120</u>
<u>952</u>	<u>3123</u>
<u>953</u>	<u>3127</u>
<u>954</u>	<u>3130</u>
<u>955</u>	<u>3133</u>
<u>956</u>	<u>3136</u>
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<u>958</u>	<u>3143</u>
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<u>962</u>	<u>3156</u>
<u>963</u>	<u>3159</u>
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<u>Meters</u>	<u>Feet</u>
<u>966</u>	<u>3169</u>
<u>967</u>	<u>3173</u>
<u>968</u>	<u>3176</u>
<u>969</u>	<u>3179</u>
<u>970</u>	<u>3182</u>
<u>971</u>	<u>3186</u>
<u>972</u>	<u>3189</u>
<u>973</u>	<u>3192</u>
<u>974</u>	<u>3196</u>
<u>975</u>	<u>3199</u>
<u>976</u>	<u>3202</u>
<u>977</u>	<u>3205</u>
<u>978</u>	<u>3209</u>
<u>979</u>	<u>3212</u>
<u>980</u>	<u>3215</u>
<u>981</u>	<u>3219</u>
<u>982</u>	<u>3222</u>
<u>983</u>	<u>3225</u>
<u>984</u>	<u>3228</u>
<u>985</u>	<u>3232</u>
<u>986</u>	<u>3235</u>
<u>987</u>	<u>3238</u>
<u>988</u>	<u>3241</u>
<u>989</u>	<u>3245</u>
<u>990</u>	<u>3248</u>
<u>991</u>	<u>3251</u>
<u>992</u>	<u>3255</u>
<u>993</u>	<u>3258</u>
<u>994</u>	<u>3261</u>
<u>995</u>	<u>3264</u>
<u>996</u>	<u>3268</u>
<u>997</u>	<u>3271</u>
<u>998</u>	<u>3274</u>
<u>999</u>	<u>3278</u>
<u>1000</u>	<u>3281</u>
<u>1001</u>	<u>3284</u>
<u>1002</u>	<u>3287</u>
<u>1003</u>	<u>3291</u>
<u>1004</u>	<u>3294</u>
<u>1005</u>	<u>3297</u>
<u>1006</u>	<u>3301</u>

<u>Meters</u>	<u>Feet</u>
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<u>1008</u>	<u>3307</u>
<u>1009</u>	<u>3310</u>
<u>1010</u>	<u>3314</u>
<u>1011</u>	<u>3317</u>
<u>1012</u>	<u>3320</u>
<u>1013</u>	<u>3323</u>
<u>1014</u>	<u>3327</u>
<u>1015</u>	<u>3330</u>
<u>1016</u>	<u>3333</u>
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<u>1018</u>	<u>3340</u>
<u>1019</u>	<u>3343</u>
<u>1020</u>	<u>3346</u>
<u>1021</u>	<u>3350</u>
<u>1022</u>	<u>3353</u>
<u>1023</u>	<u>3356</u>
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<u>1025</u>	<u>3363</u>
<u>1026</u>	<u>3366</u>
<u>1027</u>	<u>3369</u>
<u>1028</u>	<u>3373</u>
<u>1029</u>	<u>3376</u>
<u>1030</u>	<u>3379</u>
<u>1031</u>	<u>3383</u>
<u>1032</u>	<u>3386</u>
<u>1033</u>	<u>3389</u>
<u>1034</u>	<u>3392</u>
<u>1035</u>	<u>3396</u>
<u>1036</u>	<u>3399</u>
<u>1037</u>	<u>3402</u>
<u>1038</u>	<u>3406</u>
<u>1039</u>	<u>3409</u>
<u>1040</u>	<u>3412</u>
<u>1041</u>	<u>3415</u>
<u>1042</u>	<u>3419</u>
<u>1043</u>	<u>3422</u>
<u>1044</u>	<u>3425</u>
<u>1045</u>	<u>3428</u>
<u>1046</u>	<u>3432</u>
<u>1047</u>	<u>3435</u>

<u>Meters</u>	<u>Feet</u>
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<u>1049</u>	<u>3442</u>
<u>1050</u>	<u>3445</u>
<u>1051</u>	<u>3448</u>
<u>1052</u>	<u>3451</u>
<u>1053</u>	<u>3455</u>
<u>1054</u>	<u>3458</u>
<u>1055</u>	<u>3461</u>
<u>1056</u>	<u>3465</u>
<u>1057</u>	<u>3468</u>
<u>1058</u>	<u>3471</u>
<u>1059</u>	<u>3474</u>
<u>1060</u>	<u>3478</u>
<u>1061</u>	<u>3481</u>
<u>1062</u>	<u>3484</u>
<u>1063</u>	<u>3488</u>
<u>1064</u>	<u>3491</u>
<u>1065</u>	<u>3494</u>
<u>1066</u>	<u>3497</u>
<u>1067</u>	<u>3501</u>
<u>1068</u>	<u>3504</u>
<u>1069</u>	<u>3507</u>
<u>1070</u>	<u>3510</u>
<u>1071</u>	<u>3514</u>
<u>1072</u>	<u>3517</u>
<u>1073</u>	<u>3520</u>
<u>1074</u>	<u>3524</u>
<u>1075</u>	<u>3527</u>
<u>1076</u>	<u>3530</u>
<u>1077</u>	<u>3533</u>
<u>1078</u>	<u>3537</u>
<u>1079</u>	<u>3540</u>
<u>1080</u>	<u>3543</u>
<u>1081</u>	<u>3547</u>
<u>1082</u>	<u>3550</u>
<u>1083</u>	<u>3553</u>
<u>1084</u>	<u>3556</u>
<u>1085</u>	<u>3560</u>
<u>1086</u>	<u>3563</u>
<u>1087</u>	<u>3566</u>
<u>1088</u>	<u>3570</u>

<u>Meters</u>	<u>Feet</u>
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<u>1090</u>	<u>3576</u>
<u>1091</u>	<u>3579</u>
<u>1092</u>	<u>3583</u>
<u>1093</u>	<u>3586</u>
<u>1094</u>	<u>3589</u>
<u>1095</u>	<u>3593</u>
<u>1096</u>	<u>3596</u>
<u>1097</u>	<u>3599</u>
<u>1098</u>	<u>3602</u>
<u>1099</u>	<u>3606</u>
<u>1100</u>	<u>3609</u>
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<u>1102</u>	<u>3615</u>
<u>1103</u>	<u>3619</u>
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<u>1106</u>	<u>3629</u>
<u>1107</u>	<u>3632</u>
<u>1108</u>	<u>3635</u>
<u>1109</u>	<u>3638</u>
<u>1110</u>	<u>3642</u>
<u>1111</u>	<u>3645</u>
<u>1112</u>	<u>3648</u>
<u>1113</u>	<u>3652</u>
<u>1114</u>	<u>3655</u>
<u>1115</u>	<u>3658</u>
<u>1116</u>	<u>3661</u>
<u>1117</u>	<u>3665</u>
<u>1118</u>	<u>3668</u>
<u>1119</u>	<u>3671</u>
<u>1120</u>	<u>3675</u>
<u>1121</u>	<u>3678</u>
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<u>1124</u>	<u>3688</u>
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<u>1127</u>	<u>3698</u>
<u>1128</u>	<u>3701</u>
<u>1129</u>	<u>3704</u>

<u>Meters</u>	<u>Feet</u>
<u>1130</u>	<u>3707</u>
<u>1131</u>	<u>3711</u>
<u>1132</u>	<u>3714</u>
<u>1133</u>	<u>3717</u>
<u>1134</u>	<u>3720</u>
<u>1135</u>	<u>3724</u>
<u>1136</u>	<u>3727</u>
<u>1137</u>	<u>3730</u>
<u>1138</u>	<u>3734</u>
<u>1139</u>	<u>3737</u>
<u>1140</u>	<u>3740</u>
<u>1141</u>	<u>3743</u>
<u>1142</u>	<u>3747</u>
<u>1143</u>	<u>3750</u>
<u>1144</u>	<u>3753</u>
<u>1145</u>	<u>3757</u>
<u>1146</u>	<u>3760</u>
<u>1147</u>	<u>3763</u>
<u>1148</u>	<u>3766</u>
<u>1149</u>	<u>3770</u>
<u>1150</u>	<u>3773</u>
<u>1151</u>	<u>3776</u>
<u>1152</u>	<u>3780</u>
<u>1153</u>	<u>3783</u>
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<u>1156</u>	<u>3793</u>
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<u>1158</u>	<u>3799</u>
<u>1159</u>	<u>3802</u>
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<u>1166</u>	<u>3825</u>
<u>1167</u>	<u>3829</u>
<u>1168</u>	<u>3832</u>
<u>1169</u>	<u>3835</u>
<u>1170</u>	<u>3839</u>

<u>Meters</u>	<u>Feet</u>
<u>1171</u>	<u>3842</u>
<u>1172</u>	<u>3845</u>
<u>1173</u>	<u>3848</u>
<u>1174</u>	<u>3852</u>
<u>1175</u>	<u>3855</u>
<u>1176</u>	<u>3858</u>
<u>1177</u>	<u>3862</u>
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<u>1179</u>	<u>3868</u>
<u>1180</u>	<u>387</u>
<u>1181</u>	<u>3875</u>
<u>1182</u>	<u>3878</u>
<u>1183</u>	<u>3881</u>
<u>1184</u>	<u>3885</u>
<u>1185</u>	<u>3888</u>
<u>1186</u>	<u>3891</u>
<u>1187</u>	<u>3894</u>
<u>1188</u>	<u>3898</u>
<u>1189</u>	<u>3901</u>
<u>1190</u>	<u>3904</u>
<u>1191</u>	<u>3907</u>
<u>1192</u>	<u>3911</u>
<u>1193</u>	<u>3914</u>
<u>1194</u>	<u>3917</u>
<u>1195</u>	<u>3921</u>
<u>1196</u>	<u>3924</u>
<u>1197</u>	<u>3927</u>
<u>1198</u>	<u>3930</u>
<u>1199</u>	<u>3934</u>
<u>1200</u>	<u>3937</u>
<u>1201</u>	<u>3940</u>
<u>1202</u>	<u>3944</u>
<u>1203</u>	<u>3947</u>
<u>1204</u>	<u>3950</u>
<u>1205</u>	<u>3953</u>
<u>1206</u>	<u>3957</u>
<u>1207</u>	<u>3960</u>
<u>1208</u>	<u>3963</u>
<u>1209</u>	<u>3967</u>
<u>1210</u>	<u>3970</u>
<u>1211</u>	<u>3973</u>

<u>Meters</u>	<u>Feet</u>
<u>1212</u>	<u>3976</u>
<u>1213</u>	<u>3980</u>
<u>1214</u>	<u>3983</u>
<u>1215</u>	<u>3986</u>
<u>1216</u>	<u>3990</u>
<u>1217</u>	<u>3993</u>
<u>1218</u>	<u>3996</u>
<u>1219</u>	<u>3999</u>
<u>1220</u>	<u>4003</u>

Appendix B: Oxygen Titration Protocol

This protocol⁸ may be used in advance of the six-minute walk test to determine the amount of supplemental oxygen needed so that the candidate can complete the six-minute walk test without titrating up supplemental oxygen during the test. The oxygen titration test should be conducted on a flat standard 30-meter course with cones at each end and wall markings at 1-meter intervals as advised by the European Respiratory Society/American Thoracic Society for the six-minute walk test.⁹

1. Prior to the start of the test, record resting heart rate and room air SpO₂.
2. Supply continuous supplemental oxygen as needed to ensure a resting SpO₂ > 88%. If candidate's baseline SpO₂ is less than 88%, supply continuous supplemental oxygen as needed to ensure a resting SpO₂ equal to or greater than the candidate's baseline.
3. Stabilize the candidate on any supplemental oxygen for 5 minutes prior to the start of the test to establish resting supplemental oxygen demands. Enter this value on the Lung Candidate record in OPTN Waiting List as the amount of supplemental oxygen required at rest.
4. Instruct the candidate to walk at "a vigorous pace or one that they can maintain for at least 6 minutes."
5. Station the respiratory technician performing the test near the halfway point on the course to continuously monitor the candidate without interfering with the walking pace. The technician walks directly with the candidate only if it is necessary as a safety precaution against falls.
6. Measure time via a stopwatch. The testing time starts when the candidate begins to walk.
7. Record heart rate, SpO₂, and any supplemental oxygen flow (L/min) every minute, or sooner with any significant clinical change.
8. The minimum duration of testing is 6 minutes.
 - a. If no desaturation occurs (SpO₂ remains > 88%) for the duration of testing, the test concludes at 6 minutes.
 - b. If desaturation occurs during testing (SpO₂ ≤ 88%), stop the candidate and timer and deliver supplemental oxygen through a nasal cannula at an increase of 2 L/min greater than the current oxygen amount until SpO₂ is ≥ 90%.
 - i. Allow the candidate to stabilize at this level for 2 minutes.
 - ii. Restart the timer and instruct the candidate to resume walking.
 - iii. Repeat this process as necessary until at least 6 minutes of walking has occurred and the oxygen amount has remained unchanged for 3 minutes, at which point the test is terminated.
 - iv. The test is also terminated if:
 1. The candidate is unable to maintain SpO₂ > 88% at 25 L/min for 3 minutes.
 2. The candidate experiences chest pain or lightheadedness or requests to stop the test for any reason.
9. The final amount of supplemental oxygen from the oxygen titration test must be documented in the candidate's medical record. Provide that amount of supplemental oxygen to the candidate when completing the six-minute walk test for lung allocation.

⁸ Adopted with modifications from: Coral X. Giovacchini, Anne M. Mathews, Brian R. Lawlor, and Neil R. MacIntyre, "Titrating Oxygen Requirements During Exercise: Evaluation of a Standardized Single Walk Test Protocol," *CHEST* 153 no. 4 (2018): 922-928, <https://doi.org/10.1016/j.chest.2017.11.009>.

⁹ Anne E. Holland, Martijn A. Spruit, Thierry Troosters, et al., "An official European Respiratory Society/American Thoracic Society technical standard: field walking tests in chronic respiratory disease," *European Respiratory Journal* 44 (2014): 1428-1446, DOI: 10.1183/09031936.00150314.