# LASER CONVERSION CHART

| GRADIENT x % |
|---|
| 1:10 = 10,000 |
| 1:11 = 9.091 |
| 1:12 = 8,333 |
| 1:13 = 7,692 |
| 1:14 = 7,143 |
| 1:15 = 6,667 |
| 1:16 = 6,250 |
| 1:17 = 5,882 |
| 1:18 = 5,556 |
| 1:19 = 5,263 |
| 1:20 = 5,000 |
| 1:21 = 4,762 |
| 1:22 = 4,545 |
| 1:23 = 4,348 |
| 1:24 = 4,167 |
| 1:25 = 4,000 |
| 1:26 = 3,846 |
| 1:27 = 3.704 |
| 1:28 = 3,572 |
| 1:29 = 3,448 |
| 1:30 = 3,334 |
| 1:31 = 3,226 |
| 1:32 = 3,125 |
| 1:33 = 3,030 |
| 1:34 = 2,941 |
| 1:35 = 2,857 |
| 1:36 = 2,778 |
| 1:37 = 2,703 |
| 1:38 = 2,632 |
| 1:39 = 2,564 |
| 1:40 = 2,500 |
| 1:41 = 2,439 |
| 1:42 = 2,381 |
| 1:43 = 2,325 |
| 1:44 = 2,273 |
| 1:45 = 2,222 |
| 1:46 = 2,174 |
| 1:47 = 2,128 |
| 1:48 = 2,083 |
| 1:49 = 2,041 |
| 1:50 = 2,000 |
| 1:51 = 1,961 |
| 1:52 = 1,923 |
| 1:53 = 1,887 |
| 1:54 = 1,852 |

| GRADIENT x % |
|---|
| 1: 55 = 1,818 |
| 1: 56 = 1,786 |
| 1: 57 = 1,755 |
| 1: 58 = 1,724 |
| 1: 59 = 1,695 |
| 1: 60 = 1,667 |
| 1: 61 = 1,639 |
| 1: 62 = 1,613 |
| 1: 63 = 1,587 |
| 1: 64 = 1,563 |
| 1: 65 = 1,539 |
| 1: 66 = 1,515 |
| 1: 67 = 1,493 |
| 1: 68 = 1,471 |
| 1: 69 = 1,449 |
| 1: 70 = 1,429 |
| 1: 71 = 1,408 |
| 1: 72 = 1,389 |
| 1: 73 = 1,370 |
| 1: 74 = 1,351 |
| 1: 75 = 1,333 |
| 1: 76 = 1,316 |
| 1: 77 = 1,299 |
| 1: 78 = 1,282 |
| 1: 79 = 1,266 |
| 1: 80 = 1,250 |
| 1: 81 = 1,235 |
| 1: 82 = 1,219 |
| 1: 83 = 1,205 |
| 1: 84 = 1,191 |
| 1: 85 = 1,176 |
| 1: 86 = 1,163 |
| 1: 87 = 1,149 |
| 1: 88 = 1,137 |
| 1: 89 = 1,124 |
| 1: 90 = 1,111 |
| 1: 91 = 1,099 |
| 1: 92 = 1,087 |
| 1: 93 = 1,075 |
| 1: 94 = 1,064 |
| 1: 95 = 1,053 |
| 1: 96 = 1,042 |
| 1: 97 = 1,031 |
| 1: 98 = 1,020 |
| 1: 99 = 1,010 |

| GRADIENT x % |
|---|
| 1: 100 = 1,000 |
| 1: 105 = 0,952 |
| 1: 110 = 0,909 |
| 1: 115 = 0,870 |
| 1: 120 = 0,833 |
| 1: 125 = 0,800 |
| 1: 130 = 0,769 |
| 1: 135 = 0,741 |
| 1: 140 = 0,714 |
| 1: 145 = 0,690 |
| 1: 150 = 0,667 |
| 1: 155 = 0,645 |
| 1: 160 = 0,625 |
| 1: 165 = 0,606 |
| 1: 170 = 0,588 |
| 1: 175 = 0,571 |
| 1: 180 = 0,556 |
| 1: 185 = 0,541 |
| 1: 190 = 0,526 |
| 1: 195 = 0,513 |
| 1: 200 = 0,500 |
| 1: 205 = 0,488 |
| 1: 210 = 0,476 |
| 1: 215 = 0,465 |
| 1: 220 = 0,455 |
| 1: 225 = 0,445 |
| 1: 230 = 0,435 |
| 1: 235 = 0,426 |
| 1: 240 = 0,417 |
| 1: 245 = 0,408 |
| 1: 250 = 0,400 |
| 1: 255 = 0,392 |
| 1: 260 = 0,385 |
| 1: 265 = 0,377 |
| 1: 270 = 0,370 |
| 1: 275 = 0,363 |
| 1: 280 = 0,357 |
| 1: 285 = 0,351 |
| 1: 290 = 0,345 |
| 1: 295 = 0,339 |
| 1: 300 = 0,333 |

| GRADIENT x % |
|---|
| 1: 310 = 0,323 |
| 1: 320 = 0,313 |
| 1: 330 = 0,303 |
| 1: 340 = 0,294 |
| 1: 350 = 0,286 |
| 1: 360 = 0,278 |
| 1: 370 = 0,270 |
| 1: 380 = 0,263 |
| 1: 390 = 0,256 |
| 1: 400 = 0,250 |
| 1: 410 = 0,244 |
| 1: 420 = 0,238 |
| 1: 430 = 0,233 |
| 1: 440 = 0,227 |
| 1: 450 = 0,222 |
| 1: 460 = 0,217 |
| 1: 470 = 0,213 |
| 1: 480 = 0,208 |
| 1: 490 = 0,204 |
| 1: 500 = 0,200 |
| 1: 525 = 0,191 |
| 1: 550 = 0,182 |
| 1: 575 = 0,174 |
| 1: 600 = 0,167 |
| 1: 625 = 0,160 |
| 1: 650 = 0,154 |
| 1: 675 = 0,148 |
| 1: 700 = 0,143 |
| 1: 725 = 0,138 |
| 1: 750 = 0,133 |
| 1: 775 = 0,129 |
| 1: 800 = 0,125 |
| 1: 825 = 0,121 |
| 1: 850 = 0,117 |
| 1: 875 = 0,114 |
| 1: 900 = 0,111 |
| 1: 925 = 0,108 |
| 1: 950 = 0,105 |
| 1: 975 = 0,102 |
| 1:1000= 0,100 |


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# LASER INSTRUMENT CARE

**A laser instrument should be given the same amount of care you would give any other valuable instrument.**

- It should always be stored and transported in its specially designed carrying case which, in turn, should never be used as a temporary tool kit.
- Moist instruments should be wiped dry before being put away of course, and cleaned off if they are soiled during use.
- If the instrument is equipped with any kind of optical glass on the outside, these windows must be treated with care. If the glass needs to be cleaned, remember to always rinse it first with clean water and then dry it with a soft, clean cloth.
- If any kind of cleaning fluid has to be used, we recommend chemically pure acetone.
- If the glass surface gets scratched, the scratches may distort the laser beam and, in the worst situation - lead to incorrect readings.
- Never clean with pressurised air, since dust particles in the air can lead to a "sand blasting" effect.
- It is important to keep plugs and clamps for electrical connections dry and clean.
- Always use a fully charged battery or convertor (transformer). Charge battery when laser not in use.
- Finally, you should never carry a laser instrument by its cable, and a laser instrument should never be connected to a car battery that is still connected to a car.

## POTENTIAL OUTSIDE SOURCES OF ERROR

- During pipe laying, fogging in the pipe may be encountered leading to refraction of the laser beam. Since the beam appears to drift, the operator is likely to think that something is wrong with the instrument.
- This refraction problem can be solved by placing a fan at one end of the pipe to keep the pipe clear.
- Refraction caused by heat and particles in the air can also be a problem when using a rotating laser beam, especially at extended distances.
- To give you an example, a reading error of up to 6mm can be caused by refraction and the curvature of the earth at as little as 300metres' range.
- Reflections can result in incorrect signals to the laser detector. Glass-walled buildings can cause such reflections. This problem can be prevented by shielding the building from the beam with a blind mounted on the instrument.
- Other factors which can affect the laser beam are heavy rain, fog or snowfall. Water and ice particles in the air can lead to incorrect readings.

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