

Electrical Flash Hazard

Prediction & Mitigation for Distribution linemen

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Working Distance & Burn Severity

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Burns Defined

1st degree burn
#ADAM

2nd degree burn
#ADAM

- First degree burns affect the outer layer of the skin, causing pain, redness, and swelling
- Second-degree burns affect both the outer and underlying layer of the skin, causing pain, redness, swelling, and blistering
- Third-degree burns extend into deeper tissues, causing brown or blackened skin that may be numb

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HOW HOT IS HOT?

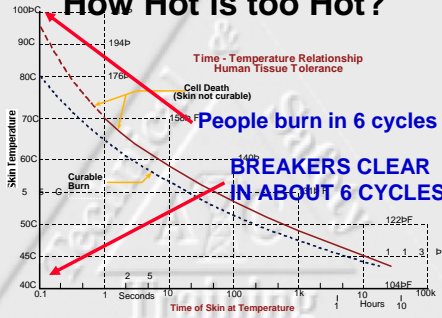
- Humans Normal Temperature 98.6°F
- Water boils at 212°F
- Clothing spontaneously ignite @ 750° - 1500°F
- Gold melts at 1063°F
- Hiroshima Atomic Bomb 7,000 °F
- Electric Arcs 35,000°F**



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How Hot is too Hot?



People burn in 6 cycles
BREAKERS CLEAR IN ABOUT 6 CYCLES

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SKIN TEMPERATURE RISE IN 0.1 SECONDS

| Time (s) | Temp (C) | Temp (F) |
|----------|----------|----------|
| 0.1 | 100 | 212 |
| 0.2 | 110 | 230 |
| 0.3 | 118 | 244 |
| 0.4 | 124 | 255 |
| 0.5 | 129 | 264 |
| 0.6 | 133 | 271 |
| 0.7 | 137 | 279 |
| 0.8 | 140 | 284 |
| 0.9 | 143 | 289 |
| 1.0 | 145 | 293 |
| 1.2 | 148 | 298 |
| 1.5 | 152 | 306 |
| 2.0 | 157 | 313 |
| 3.0 | 164 | 325 |
| 4.0 | 170 | 336 |
| 5.0 | 175 | 345 |
| 6.0 | 179 | 352 |
| 7.0 | 183 | 359 |
| 8.0 | 186 | 365 |
| 9.0 | 189 | 370 |
| 10.0 | 191 | 376 |
| 15.0 | 197 | 384 |
| 20.0 | 202 | 396 |
| 30.0 | 209 | 416 |
| 40.0 | 215 | 433 |
| 50.0 | 220 | 448 |
| 60.0 | 224 | 463 |
| 70.0 | 228 | 472 |
| 80.0 | 231 | 476 |
| 90.0 | 234 | 479 |
| 100.0 | 236 | 483 |
| 150.0 | 243 | 499 |
| 200.0 | 249 | 510 |
| 300.0 | 257 | 533 |
| 400.0 | 263 | 545 |
| 500.0 | 268 | 552 |
| 600.0 | 272 | 559 |
| 700.0 | 275 | 565 |
| 800.0 | 278 | 570 |
| 900.0 | 281 | 574 |
| 1000.0 | 283 | 578 |
| 1500.0 | 290 | 594 |
| 2000.0 | 296 | 605 |
| 3000.0 | 304 | 627 |
| 4000.0 | 310 | 638 |
| 5000.0 | 315 | 647 |
| 6000.0 | 319 | 654 |
| 7000.0 | 322 | 659 |
| 8000.0 | 325 | 663 |
| 9000.0 | 328 | 667 |
| 10000.0 | 330 | 670 |

BREAKERS CLEAR IN ABOUT 6 CYCLES

- A Person's skin - 20 inches
- From a - 4 In. Diameter ARC
- Will reach a Temperature of 988°F
- in 6 cycles!

Based on Ralph Lee's paper

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**REMEMBER NO AMOUNT OF
PROTECTION WILL REPLACE
AN ALERT WORKER!**

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