I’ve heard that an arc flash can’t last longer than two seconds. Is that true?

NFPA 70E · https://brainfiller.com/es/knowledge-base/nfpa-70e/ieee-1584-nfpa-70e-and-the-2-second-arc-duration-myth/

Question

I’ve heard that an arc flash can’t last longer than two seconds. Is that true?

Short answer

No. An arc flash can absolutely last longer than two seconds. Neither IEEE 1584 nor NFPA 70E says an arc flash is physically limited to two seconds. The two-second value is an assumption used for exposure time, not a limit on how long an arc can actually exist.

Where the misunderstanding comes from

The confusion often comes from a statement in IEEE 1584-2018 that says “2 seconds usually is a reasonable assumption for the arc duration.” This gets repeated frequently, but it is commonly taken out of context.

IEEE 1584 is addressing how long to assume a worker is exposed to the arc for incident energy calculations, not how long the arc itself can physically persist.

What the 2-second assumption actually means

In an arc-flash study, arc duration is normally based on protective device clearing time—how long it takes a breaker, relay, or fuse to detect the fault and open the circuit. In some systems, especially where devices are slow or coordination is poor, that clearing time can exceed two seconds.

IEEE 1584 permits capping the arc duration at 2 seconds for calculation purposes only when it is reasonable to assume that a person can move out of the arc-flash exposure area.

In other words, the arc may still be burning and the equipment may still be energized, but the worker is assumed to no longer be in front of it.

Two seconds represents human reaction and escape time, not a physical limit on arc duration.

Arc flashes can last much longer

Actual arc duration is generally unpredictable and depends on many factors (for example: arcing current, electrode gap, and voltage). That is why studies often use protective device clearing time: it is a known value.

In real-world conditions, an arc flash can potentially last several seconds, tens of seconds, or until the equipment fails catastrophically or the power source is removed.

Longer-duration events are especially possible in systems with failed or miscoordinated protection, low arcing fault current that causes long response times, or utility-fed equipment without fast local protection (relying only on upstream utility devices).

This is why treating “two seconds” as a hard limit is incorrect—and potentially dangerous.

How NFPA 70E uses the same concept

NFPA 70E also references a two-second arc duration assumption in specific places.

For example, NFPA 70E Table 130.7(C)(15)(b), which provides arc-flash PPE categories for DC systems, includes Informational Note 2 stating that a two-second arc duration is assumed if there is no overcurrent protective device to limit the duration of the arc.

This does not mean the arc will self-extinguish after two seconds, that DC arc flashes are limited to two seconds, or that two seconds is inherently safe.

It means that, for PPE category guidance, NFPA 70E assumes a two-second exposure duration when no overcurrent protective device exists to clear the fault.

Similar to AC arcs, a DC arc can potentially continue well beyond two seconds.

Engineering judgment is required

The 2-second cap should only be used when it is realistic that a worker could recognize the event and physically move away.

Situations where the two-second assumption may be reasonable include standing in front of open, accessible equipment with no physical restraints and a clear escape path.

Situations where it may not be reasonable include working in a bucket truck, working in enclosed spaces, or other conditions that restrict the ability to rapidly move away.

If a worker cannot reasonably move away, the actual protective device clearing time should be used, even if it exceeds two seconds.

Bottom line

The 2-second value in IEEE 1584 is not a limit on arc duration, not a guarantee of safety, and not automatic.

It is a calculation assumption based on human response and should only be applied when justified.

Used correctly, it helps prevent unrealistic incident energy values. Used incorrectly, it can significantly underestimate arc-flash hazard.
Sources

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