



Arc Flash Awareness

TOOLBOX TALK: Arc Flash Awareness

RATTLIR Safety Series – “Strike Before It Bites”

Purpose

Arc flash events release extreme heat, pressure waves, molten metal, and toxic gases capable of causing severe injury or death. This toolbox talk provides expert-level guidance on arc flash hazards, boundaries, labeling, NFPA 70E requirements, and proper PPE selection to ensure safe work near energized electrical equipment.

What Is an Arc Flash?

An arc flash occurs when electrical current leaves its intended path and travels through air between conductors or from conductor to ground. Temperatures can exceed 35,000°F, hotter than the surface of the sun, causing instant burns, pressure blasts, shrapnel, and ignition of clothing.

Common Causes of Arc Flash

- Dust, corrosion, or contamination on equipment.
- Loose or degraded electrical connections.
- Dropped tools or accidental contact.
- Insulation failure or equipment breakdown.
- Operating breakers, switches, or racking gear under load.
- Inadequate work practices or improper PPE.

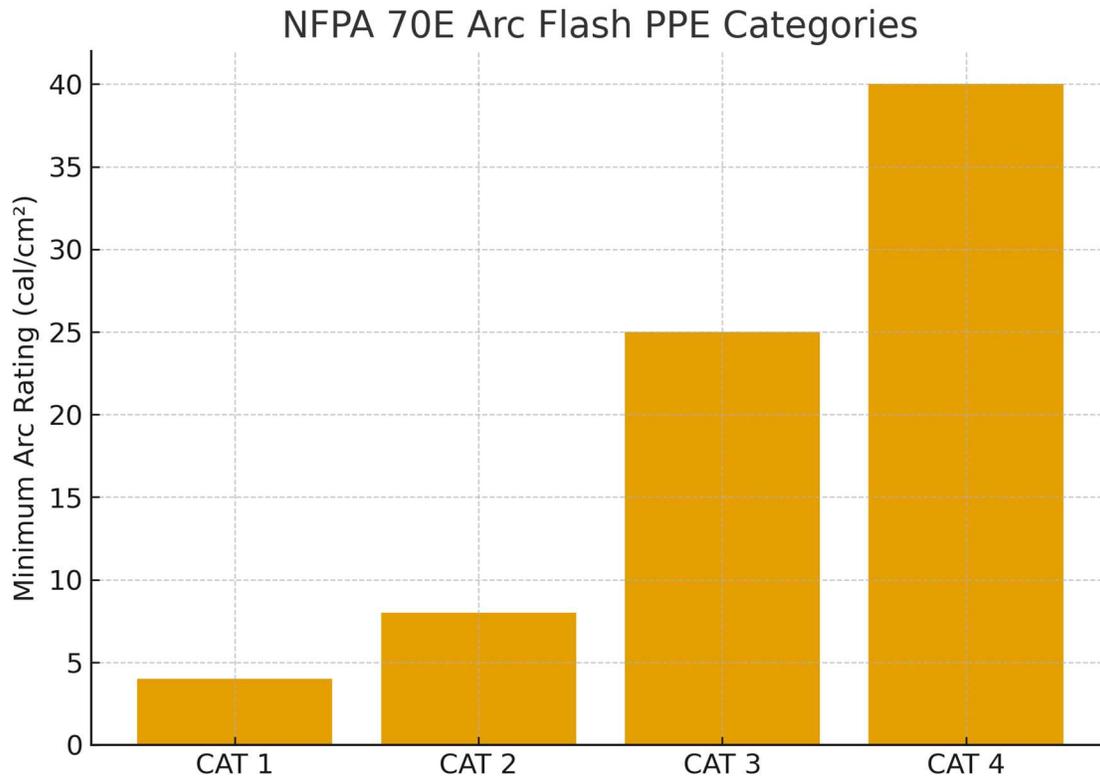


Figure 1 – NFPA 70E Arc Flash PPE Categories and minimum arc ratings (cal/cm²).

Arc Flash & Shock Boundaries

NFPA 70E defines key protection boundaries:

- **Limited Approach Boundary:** Distance at which a shock hazard exists; unqualified persons must stay outside this boundary unless escorted.
- **Restricted Approach Boundary:** Closer distance where increased shock protection is required; only qualified workers using proper procedures and PPE may enter.
- **Arc Flash Boundary:** Distance at which incident energy equals 1.2 cal/cm² (onset of second-degree burns). Workers within this boundary must wear appropriate arc-rated PPE.

Understanding Arc Flash Labels

Arc flash labels on equipment typically include:

- Incident energy level (cal/cm²) or PPE Category.
- Arc flash boundary distance.
- Required PPE (FR clothing, gloves, face shield or hood, hearing protection).



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- System voltage and equipment identification.

Workers must read and understand these labels before performing any work near energized equipment.

Arc Flash PPE Requirements (NFPA 70E)

- CAT 1 (4 cal/cm²): Arc-rated long-sleeve shirt and pants or coverall, safety glasses, hearing protection, and arc-rated face shield.
- CAT 2 (8 cal/cm²): CAT 1 PPE plus arc-rated balaclava or hood.
- CAT 3 (25 cal/cm²): Arc-rated flash suit (coat and pants or coverall), arc flash hood, voltage-rated gloves, and leather protectors.
- CAT 4 (40 cal/cm²): Highest level of protection – full flash suit and hood rated for at least 40 cal/cm².

All PPE must be inspected before use and maintained according to manufacturer and NFPA 70E requirements.

Best Practices for Arc Flash Prevention

- De-energize equipment whenever feasible using proper LOTO procedures.
- Verify absence of voltage before performing any contact work.
- Maintain equipment: tighten connections, remove dust, and repair insulation.
- Use properly rated test equipment and insulated tools.
- Never defeat interlocks, bypass covers, or open enclosures without authorization.
- Keep non-essential personnel outside the arc flash and shock boundaries.

Emergency Response

- Call emergency services immediately for suspected arc flash injuries.
- Do not approach the victim until it is confirmed the equipment is de-energized or safe.
- Treat visible burns with dry, sterile dressings – do not apply creams or ice.
- Remove smoldering clothing if it is not adhered to the skin.
- Stay alert for secondary hazards such as fire, smoke, or structural damage.

Discussion Questions

- Do we know the arc flash and shock boundaries for the equipment in our work area?
- Are arc flash labels present, legible, and up to date?
- Are we using the correct PPE category for the tasks being performed?



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RATTLIR Takeaway

Arc flash is a high-hazard, low-frequency event that demands respect and discipline. Understanding boundaries, labels, and PPE requirements ensures we strike before it bites – especially around high-voltage systems.