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The Quest for Personal Protective Equipment Arc Rating: Implications for Electrical Workers' Safety and Health

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Abstract : Since the primary numerical metric used to evaluate Personal Protective Equipment – PPE, including protective clothing or other equipment designs, is typically derived from a single arc rating report, researchers and occupational safety professionals have raised significant concerns regarding the reliability of assigning a safety rating based on a single thermal performance test. Moreover, questions arise about the adequacy of determining PPE conformity solely from a single arc flash test. Although it is well known that the arc rated PPE work and show unquestionable evolution on workers' safety, a tendency of pursuit every higher arc rating value is evidenced in the marketing, and in Brazil, it has been a special concern on reliability of such practice of "select" a more convenient arc rating report to use as base parameter on final PPE test and subsequently certification process. In fact, this procedure is not forbidden and it ends up being supported and encouraged due to the way such tests are conducted according to the international standards. Recent research has shown significant variation in arc rating values, highlighting that relying on higher margins of values obtained from tests conducted at different times and in different laboratories can be a risky practice. It is emphasized that working with conservative and more realistic values should be the approach to follow. However, this requires advancing and correcting the course of standardization. The present study demonstrates the difference between claimed arc rating values and those obtained from laboratory tests over time in various textile materials, presenting practical results where, focusing on the upper margins of thermal characterization, leads to concerning effects on PPE in its final version, where in principle they are ready for use by workers.

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