Wolfson Electrostatics

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Mr Hugh Pratt
Load Monitor (UK) Ltd
Commercial Road
Bristol
BS1 6TG

Dear Mr Pratt

I am writing with reference to your enquiry regarding the effects of electrical current passing through the human body.

I am a Senior Consultant Engineer at the University of Southampton, where I have been involved in providing advice and guidance to industry worldwide in the field of electrical and electrostatic hazards. You will see from my CV (attached) that I have been operating in this field for approximately 20 years and that I have the necessary qualifications and experience to offer expert advice. As a qualified expert witness with The Law Society of Great Britain, I have been consulted on cases dealing with electrical shock and ignition. You will observe from my CV that I act as a consultant and expert witness in the United States and Canada. As an active member of various Standards Committees and Professional Groups, I am familiar with the various International Standards relating to electrical hazards, including IEC (International Electrotechnical Commission), NFPA (National Fire Protection Association) and ASTM (American Standard Test Methods). Naturally, these Standards are applicable to industrial situations in the United States.

The internationally recognised Standard dealing with the effects of electrical current passing through the human body is IEC479-1. The United States is a participating country with regard to the International Electrotechnical Commission and is, therefore, required to adhere to this Standard. The section of this Standard most relevant to your enquiry is Part 1, Chapter 2, which deals with the effects of alternating current in the range 15 Hz to 100 Hz.

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This chapter deals with physiological electric shock effects on the human body in terms of magnitude of current flowing through the body and duration of current flow. It should be noted that this Standard defines three thresholds – 'perception', 'let go' and 'ventricular fibrillation' (the definitions speak for themselves). The first threshold is at 0.5 mA and is independent of time. The second threshold is dependent on parameters such as contact area, shape and size of the electrodes and also on the physiological characteristics of the individual. This is known as the 'let go' current threshold and, assuming that the body current is limited to a value below this threshold, no harmful physiological effects are likely to occur. The lowest value of 'let go' current given by IEC479-1 for indefinite exposure is 10 mA.

The specification of the Load Insulator denotes a current of less than 2 mA at 25 kV (dry). This is significantly below the 'let go' threshold of 10 mA and furthermore in my view, is insufficient to cause an involuntary reaction in a worker such as to cause him to fall. Assuming that this specification is met, I have no hesitation in recommending the Load Insulator as an important safety item.

Yours sincerely

Graham Hearn
for and on behalf of Wolfson Electrostatics
University of Southampton

Note: It should be mentioned that the electrical safety specification for the load insulator exceeds that given in International Standards for footwear and flooring. In order to provide protection from exposure to electrical shock hazards from mains, the Standards allow a leakage current of up to 5 mA.