Coping With Static Shock

Static shock can be irritating to downright painful. That's because when you get shocked from what's commonly called "static electricity" it's really *high voltage* electricity. Depending on conditions, it can actually reach a potential of *several thousand volts,* and the drier the air, the greater your chances of getting shocked.

What Causes Static Shock

Static electricity appears whenever the quantities of positive and negative electrical charges in something aren't perfectly equal. Normally the positives cancel the negatives, and everything behaves electrically neutral. But if two insulators of different materials contact each other, then the electrical charges of the material transfer between the surfaces. One surface ends up with **more** negative charges than positive, and has a *negative charge imbalance*. The other surface has **fewer** negative charges than positive, so it has a *positive charge imbalance*. Both surfaces are electrically charged and a high potential voltage exists between them.

As long as these surfaces stay together, their electrical charges cancel each other out. But if you separate them, you also separate their polarities (a positive charge stays with one, a negative charge with the other). Now the potential voltage between the two surfaces rises dramatically. If you bring the two surfaces back together, at some point, the opposite polarities jump the gap and rejoin, producing a high-voltage spark.

From our little science lesson, you can see what happens in dry weather when you step out of the vehicle and get shocked closing the door. Your body becomes electrically charged from your clothes (an insulator) contacting the seats and seat-backs (a different insulator). When you step out, you're taking just one polarity of charge along with you, while the seat keeps the opposite polarity. At the same time, the seat is causing the entire vehicle to become electrically charged by a process called "Faraday's Icepail Effect." The potential voltage between you and the vehicle now surges up to 10,000 or even 20,000 volts. If you're wearing shoes, especially those with rubber soles, the charge has no chance to leak to ground. So when you reach out to close the door, which is grounded to the vehicle, the opposite polarities rejoin at your finger and ZAP!, you get shocked.

How to Prevent Static Shock

Now that you know what causes static shock, what can be done to prevent it? Here are some helpful tips to pass along to your customers:

- Avoid wearing clothes that contribute to static shock. Clothes made from wool or from synthetic materials such as nylon, polyester, or plastic, put a greater electrical charge on your body than clothes made from cotton or other materials. (A '98 study done in the UK recorded peak body voltages of 21,000 volts when wearing nylon clothes, 9,000 volts for wool clothes, and 7,000 volts for cotton clothes.) Also, consider choosing leather upholstery instead of fabric. Fabric upholstery creates a greater charge imbalance than leather does.
- Shoe soles create a charge imbalance and work as insulators as well. To avoid getting shocked, don't wear rubber-soled shoes—they create a significant charge imbalance, and when you step out of the vehicle, the insulating properties of rubber keep the charge from leaking to ground. Try wearing thin, leather-soled shoes instead.
- Try getting into the habit of holding your keys as you step out of the vehicle, then grip one of the keys firmly by the metal, and tap the door lock cylinder with the tip of the key. The spark will still jump, but it won't be painful. The tip of the key will take the spark's punishment instead of your tender finger.
- Try spraying the seats, seat-backs, floor mats, and carpet with some anti-static liquid such as ScotchGard or Static Gard, or your own brew from mixing 1 part liquid fabric softener with 10 parts water. This spray treatment dampens the surfaces making them slightly conductive, so the separated charges can instantly flow back together. This treatment generally lasts up to 3 months. On vehicles with side airbags, don't get the front passenger's seat too wet, or it may trigger the SIDE AIRBAG indicator (see the article *Side Airbag Indicator Comes On* in the November '00 edition.)
- If you get shocked when you drive up and touch outside objects that are grounded (mail boxes, toll booths, drive-up ATMs, etc.), the vehicle itself has probably created a charge imbalance. Waiting several seconds before touching any outside objects that are grounded can sometimes allow the charge to dissipate.