ZOLL®

CASE STUDY

Ottawa Police Service and the Submerged AED Plus

The Setting

Constable Rick Giroux of the Ottawa Police Service is assigned to the harbor patrol. His boat is outfitted with a ZOLL® AED Plus® automated external defibrillator (AED). Giroux recalls a unique situation one autumn that involved this AED.

The Accident

"Our patrol boat was docked because of a large impending storm," said Giroux. "We had a pump going inside the boat to prevent it from sinking. Once the storm hit, however, the pump failed, and the boat took on water."

The Loss

As the boat filled with water, it flipped over and ripped the cleats right off the pier. Although the boat didn't sink, all the equipment, including the AED Plus, was submerged for four hours.

The Surprise

After the storm, Giroux said that a marine patrol officer removed the waterlogged AED and attempted to turn it on. The unit went into self-test mode, and it checked out fine! Giroux then brought it to the biomedical department of the Ottawa Paramedics Service, which took it out of service despite the successful self-test. They sent the soaked AED to ZOLL's technical service department for inspection.

Although the AED Plus is not designed to be submerged under water, one of the reasons that it remained functional is that it has an ingress protection, or IP, rating of 55, the highest such rating of any public access AED available today.

Ingress Protection

Ingress protection is a worldwide standard that has been established by the International Electrotechnical Commission (IEC) for rating the ability of electronic devices to withstand exposure to dust particles and water. These IP values are specified in the IEC 60529 standard.

A full rating consists of two digits. The first number indicates the protection level against particulates, while the second number signifies the protection level against water. Ratings for solids range from 0—no protection—to 6, dust tight. Ratings for water range from 0 to 8, with 0 signifying not at all water tight and 8 indicating that the device is protected against submersion in water more than one meter deep.

The ZOLL AED Plus, the first and only Full-Rescue AED that provides Real CPR Help® for depth and rate of chest compressions, audibly coaches rescuers with prompts such as "Push Harder" or "Good Compressions" during CPR.

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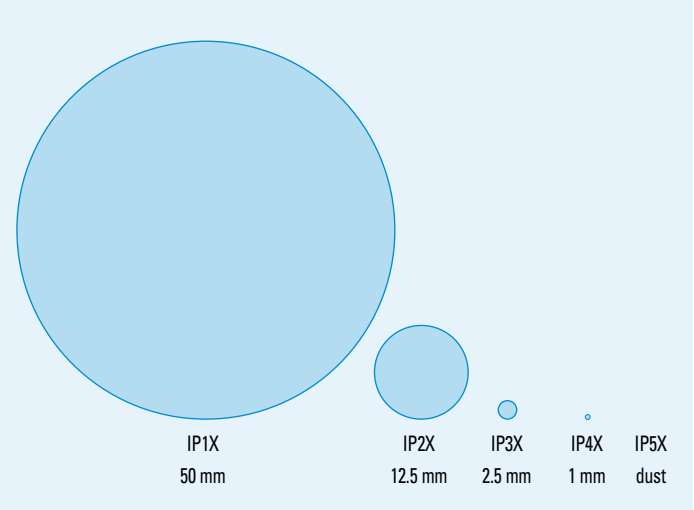
The higher the number, the better the protection. The lowest combined rating would be IP11; the highest would be IP68. Where a device has not been rated for either dust or water, an "X" is substituted for the digit. Thus a device like the LIFEPAK CR® Plus, with a rating of IPX4, has not been tested and rated for its ability to resist dust, while its rating for water ingress is 4. So what do these different values mean? The table below was developed by Underwriter's Laboratory (UL) to explain the ingress protection code values, as specified in the IEC 60529 standard.

First Digit	Protection Against Foreign Objects	Second Digit	Protection Against Moisture
0	Not Protected	0	Not Protected
1	>50 mm	1	Dripping Water
2	>12.5 mm	2	Dripping Water When Tilted Up to 15°N
3	>2.5 mm	3	Spraying Water
4	>1.0 mm	4	Splashing Water
5	Dust Protected	5	Water Jets
6	Dust Tight	6	Heavy Seas
		7	Immersion
		8	Submersion

Particle Size Comparison



To get some notion of how big the "foreign objects" being described in each of these ratings really are, the diagram above illustrates actual particle sizes. It shows that an AED like the Philips HeartStart OnSite, because it has a rating of IP21, is in danger of being compromised by a small pebble about 12.5 millimeters (mm) in diameter.

If you're in a dust- and water-prone environment and you don't have an AED Plus, you're running a risk that when you need your AED, it may not work. The table below lists the IP ratings of ZOLL's competitors.

For more information on the ZOLL AED Plus, please call 800-804-4356 or go to www.zoll.com/aedplus.

Ingress Protection Comparison

ZOLL AED Plus	Physio Control LIFEPAK® CR® Plus	Physio Control LIFEPAK EXPRESS	Philips HeartStart OnSite	Defibtech Lifeline	Cardiac Science Powerheart G3 Plus
IP55	IPX4	IPX4	IP21	IP54	IP24

All comparisons are based on published specifications, descriptions, and literature.

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Printed in U.S.A. 041301 PN-230