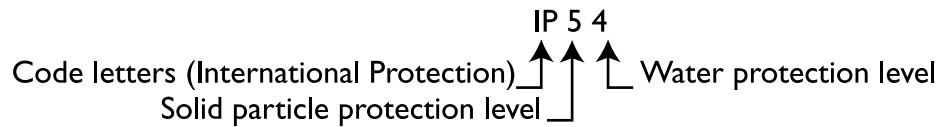


Technical Note

PROTECTION AGAINST WATER AND PARTICLES

THE IP CODE

HeartStart defibrillators use an international standard to identify the level of protection provided by the defibrillator enclosures against solid particles and water. This standard is called “IEC 529, Degrees of protection provided by enclosures (IP Code).” This standard identifies the protection with two numbers. The first number designates the level of protection against solid particles, and the second designates the level of protection against water.



Higher numbers indicate a higher level of protection. The degrees of protection are listed in the tables below:

Solid Particle Protection

FIRST NUMBER	DEGREE OF PROTECTION	
	USER PROTECTION FROM HAZARDS	SOLID OBJECT PROTECTION
0	Non-Protected	Non-Protected
1	Protected against access to hazardous parts with the back of the hand	Protected against solid foreign objects of 50 mm diameter and greater
2	Protected against access to hazardous parts with a finger	Protected against solid foreign objects of 12.5 mm diameter and greater
3	Protected against access to hazardous parts with a tool	Protected against solid foreign objects of 2.5 mm diameter and greater
4	Protected against hazardous parts with a 1mm diameter wire	Protected against solid foreign objects of 1.0 mm and greater
5	Protected against hazardous parts with a 1mm diameter wire	Dust protected
6	Protected against hazardous parts with a 1mm diameter wire	Dust-tight
X	Not Tested	Not Tested

Water Protection

SECOND NUMBER	DEGREE OF PROTECTION
	PROTECTION FROM WATER
0	Non-Protected
1	Protected against vertically falling water drops
2	Protected against vertically falling water drops when enclosure is tilted 15°
3	Protected against spraying water
4	Protected against splashing water
5	Protected against water jets
6	Protected against powerful water jets
7	Protected against the effects of temporary immersion in water
8	Protected against the effects of continuous immersion in water (special conditions)
X	Not tested

HEARTSTART DEFIBRILLATOR TESTING

Each level of protection requires that the product pass a predefined test. The HeartStart products meet the following specifications:

The tests performed by Philips to meet this standard are outlined below.

IP2X Testing

A 12.5 mm diameter probe was pushed into all openings of the defibrillator with a force of 30 N without passing through the openings.

IP5X Testing

A 1.0 mm wire was pushed into all openings of the defibrillator with a force of 1 N without pressing through the openings.

The defibrillator was placed in an enclosed chamber where talcum powder was circulated for 8 hours. After 8 hours the defibrillator was removed, inspected, and tested to ensure that the powder had not accumulated enough to affect the performance of the defibrillator.

DEFIBRILLATOR	IP CODE
FR series	IP54
FR2 series	IP54
HSI series	IP21
FRx series	IP55
MRx	IP24

IPX1 Testing

This test simulated rain falling on the device at a rate of 2.4 inches/hour. Water was dripped on the top of the defibrillator for 10 minutes. After 10 minutes the defibrillator was removed, inspected, and tested to ensure that the water had not accumulated enough to affect the performance or safety of the defibrillator.

IPX4 Testing

The defibrillator was placed in an enclosed chamber where water was sprayed on all sides of the defibrillator for 10 minutes. After 10 minutes the defibrillator was removed, inspected, and tested to ensure that the water had not accumulated enough to affect the performance or safety of the defibrillator.

IPX5 Testing

The defibrillator was sprayed on all sides with pressurized water using a calibrated nozzle for 3 minutes. The defibrillator was then removed, inspected, and tested to ensure that the water had not accumulated enough to affect the performance or safety of the defibrillator.