

AED Plus Technical Application Note

Automated External Defibrillator with Real CPR Help



Measuring Chest Compression with Real CPR Help

Failure to adequately compress a victim's chest is a common error during CPR.^{1,2,3} The force required to properly compress a victim's chest 1 1/2 - 2 inches varies depending on the patient's build and anatomy. Until now, only force and pressure sensors have been available. Real CPR Help technology in ZOLL's **CPR-D•padz**® includes a hand-placement locator, an accelerometer, electronics, and a sophisticated processing algorithm. This technology accurately measures chest compressions and converts the motion of the accelerometer over time into distance moved. Only Real CPR Help can help an infrequent rescuer correct and improve compressions in real-time as CPR is performed during the rescue.

One Electrode Size Fits All

A one-piece electrode design must account for anatomical variation in the patient population. The design of ZOLL's **CPR-D•padz** is based on extensive human anthropometric data and studies designed to accommodate the wide range of patient sizes and shapes and to ensure that a one-piece electrode meets the needs of emergency AED use. The design developed for the **CPR-D•padz** meets the anthropometric characteristics of 99% of human chest anatomy. A special feature lets the rescuer separate the apex (lower) electrode to cover the other 1% of the population whose anatomical variations require special adaptation.

Simplified Electrode Placement

Simplifying electrode placement is critical to widespread use of AEDs. Labeling helps but is often overlooked or discarded in an emergency that is sudden and unanticipated. The infrequent rescuer is easily confused when looking at a victim as to "left," "right," "up," and "down." Two separate electrodes cause concern over incorrect placement and technical complications if electrodes stick together before being placed correctly on the patient. The unique one-piece design of ZOLL's **CPR-D•padz** addresses these problems by orienting the design to the head while using the easily remembered CPR landmark (the sternum) as the key placement cue. The backing of the electrode is then removed by a simple pull after positioning. Because this is the same placement taught for CPR hand position, AED users benefit from having to remember only one easy landmark for both interventions.

Five-Year Shelf Life

Infrequently used AEDs need electrodes that do not require frequent replacement. Most AED electrodes will expire before they are used. Corrosion of the electrode element due to long-term contact with ionic gel is the main limitation of electrode shelf life. ZOLL's **CPR-D•padz** protect the electrode elements with a novel design that sacrifices a non-critical element in the electrode to control the corrosion process and allow an unmatched five-year AED electrode life. ZOLL's **CPR-D•padz** reduce electrode replacement costs, facilitates AED readiness and maintenance, and decrease the probability of an AED's failure due to electrode expiration.

Specifications

DEFIBRILLATOR

Waveform: Rectilinear Biphasic
Defibrillator Charge Hold Time: 30 seconds
Energy Selection: Automatic preprogrammed selection (120J, 150J, 200J)
Patient Safety: All patient connections are electrically isolated.
Charge Time: Less than 10 seconds with new batteries.
Electrodes: ZOLL **CPR-D•padz**, **pedi•padz**® II or **stat•padz**® II.
Built-in Defibrillator Self Test: Included
CPR: Metronome Rate: Variable 60 to 100 CPM
Depth: 1 1/2" to 3"; 1.3 to 7.8 cm.
Defibrillation Advisory: Evaluates electrode connection and patient ECG to determine if defibrillation is required.
Shockable Rhythms: Ventricular fibrillation with average amplitude >100 microvolts and wide complex ventricular tachycardia with rates greater than 150 BPM for adults, 200 BPM for pediatrics. For ECG Analysis Algorithm sensitivity and specificity, refer to AED Plus Administrator's Guide.
Patient Impedance Measurement Range: 0 to 300 ohms
Defibrillator: Protected ECG Circuitry
Display Format: Optional LCD with Moving Bar
Size: 2.6" x 1.3"; 6.6 cm x 3.3 cm

Viewing Time: 2.6 seconds
Display Sweep Speed: 25 mm/sec; 1"/sec
Battery Capacity: Typical new (20°C) = 5 years (300 shocks) or 13 hours continuous monitoring. End of life designated by Red X (typical remaining shocks = 100, 5 hours continuous monitoring).
PC Minimum Requirements For Configuration And Patient Data Recovery: Windows® 98, Windows® 2000, Windows® NT, Windows® XP, IBM compatible PII with 16550 UART (or higher) computer. 64MB RAM. VGA monitor or better. CD-ROM drive. IrDA port. 2MB disk space.

DEVICE

Size: (H x W x D) 5.25" x 9.50" x 11.50"; 13.3 cm x 24.1 cm x 29.2 cm
Weight: 6.7 lbs.; 3.1 kg
Power: User Replaceable Batteries. 10 -Type 123A Photo Flash lithium manganese dioxide batteries.
Device Classification: Class II and internally powered per EN60601-1
Design Standards: Meets applicable requirements of UL 2601, AAMI DF-39, IEC 601-2-4, EN60601-1, IEC60601-1-2.

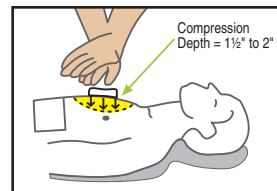
ENVIRONMENT

Operating Temperature: 32° to 122°F; 0° to 50°C
Storage Temperature: -22° to 140°F; -30° to 60°C

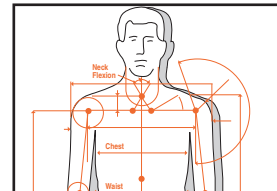
Humidity: 10 to 95% relative humidity, non-condensing
Vibration: MIL Std. 810F, Min. Helicopter Test
Shock: IEC 68-2-27; 100G
Altitude: 300 to 15,000 ft.; -91m to 4573m
Particle and Water Ingress: IP-55.

CPR-D•padz

Shelf Life: 5 years
Conductive Gel: Polymer Hydrogel
Conductive Element: Tin
Packaging: Multilayer foil laminate pouch
Impedance Class: Low
Cable Length: 43 in (1.1 m)
Sternum: Length: 6.1 in (15.5 cm); **Width:** 5.0 in (12.7 cm)
Length, conductive gel: 3.5 in (8.9 cm); **Width, conductive gel:** 3.5 in (8.9 cm); **Area, conductive gel:** 12.3 sq in (79 sq cm)
Apex: Length: 6.1 in (15.5 cm); **Width:** 5.6 in (14.1 cm); **Length, conductive gel:** 3.5 in (8.9 cm); **Width, conductive gel:** 3.5 in (8.9 cm); **Area, conductive gel:** 12.3 sq in (79 sq cm)
Complete assembly: Folded Length: 7.6 in (19.4 cm); **Folded width:** 7.0 in (17.8 cm); **Folded height:** 1.5 in (3.8 cm)
Design standards: Meets applicable requirements of ANSI/AAMI/ISO DF-39-1993.



Real CPR Help® provides unique assistance to rescuers with real-time feedback on CPR compression depth and rate.



ZOLL's one-piece **CPR-D•padz** are designed to fit 99% of the population's chest anatomy.



CPR-D•padz offer clear anatomical placement illustrations and a CPR hand positioning landmark.



CPR-D•padz come complete with resuscitation essentials including a barrier mask, a razor, scissors, disposable gloves, and a towelette.

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¹Moser DK, Dracup K, Guzy PM, Taylor SE, Breu C. Cardiopulmonary resuscitation skills retention in family members of cardiac patients. American Journal of Emergency Medicine. 1990;498-503.

²Kern KB, Hilwig RW, Berg RA, Ewy GA. Efficacy of chest compression-only BLS CPR in the presence of an occluded airway. Resuscitation. 1998;39:179-188.

³Handley AJ, Handley JA. The relationship between rate of chest compression and compression:relaxation ratio. Resuscitation. 1995;30:237-241. Moser DK, Dracup K, Guzy PM, Taylor SE, Breu C. Cardiopulmonary resuscitation skills retention in family members of cardiac patients. American Journal of Emergency Medicine. 1990;498-503.

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