



Current is not the whole story.

# Energy matters most.

**Defibrillation technology is complex.**

But the bottom line for you and your patients is simple.

Defibrillation works on the heart in complex ways. But at the scene of a cardiac arrest, patients don't need explanations. They need energy.

Many factors contribute to successful defibrillation, including the peak current of the waveform, how long the current is applied and how the current is maintained throughout the shock.<sup>1-7</sup> While peak current plays a role, it alone does not determine shock efficacy.

Energy includes all three elements and has been shown to best describe the therapeutic dose delivered to the heart.<sup>5-9</sup> How do we know this? Independently conducted, peer-reviewed studies prove it.

Every Physio-Control defibrillator can escalate energy to an industry-leading 360 joules for difficult-to-defibrillate cardiac arrest victims.



Learn more at [360-joules.com](http://360-joules.com)

ENERGY  
MATTERS MOST 

The logo icon for 'Energy Matters Most' features a stylized ECG waveform with a circular arrow around it, symbolizing energy and defibrillation.

# Proof that Energy Matters Most

Decades of research proves that no single measure of current determines shock efficacy. The evidence shows that many factors influence effective defibrillation, including:

1. The peak current delivered to the patient
2. The length of time over which current is delivered
3. How the current is maintained throughout the duration of the shock

Energy includes all three elements, and has been shown to best describe the therapeutic dose delivered to the heart.<sup>5-9</sup>

Biphasic waveforms on the market differ with respect to all three of these factors. Five independently conducted, peer-reviewed clinical studies comparing them prove that shocks of the same energy provide the same success rate, even if the level of current is significantly different.<sup>5-9</sup>

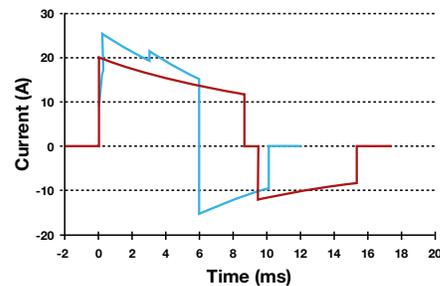
The level of current delivered by the shock, therefore, cannot single-handedly determine shock efficacy.

Regardless of how this complex process works, we believe the bottom line is whether a patient is effectively defibrillated. We know our approach is sound because our products have been studied in over twice as many cardiac arrest patients as all other manufacturers combined. The data show the only way to increase shock efficacy when lower-energy shocks fail is to increase energy. That's why we provide the highest available energy—up to 360 joules—in every defibrillator we make.

Learn more at:  
**360-joules.com**

## Biphasic waveforms are equally effective at 200J

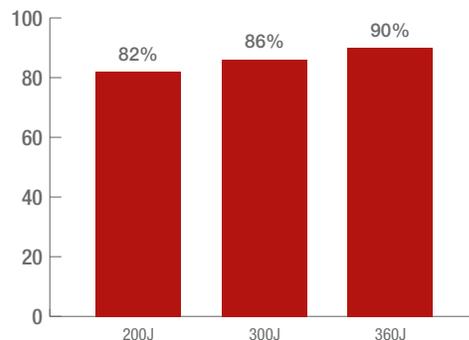
The level of current doesn't determine shock efficacy<sup>5-7</sup>



PHYSIO-CONTROL®	ZOLL®
200J 96% Efficacy (184/192)	200J 96% Efficacy (188/195)

Three clinical studies have compared biphasic waveforms used by Physio-Control and ZOLL in synchronized cardioversion. The combined results show that, though ZOLL's waveform delivers higher levels of current, the waveforms are equally effective at 200J.

## Defibrillation probability increases with each energy dose<sup>10</sup>



- 1 Geddes LA, et al. *Med Biol Eng* 1971;9(3):185-99.
- 2 Bourland JD, et al. *Med Instrum* 1978;12(1):38-41.
- 3 Wessale JL, et al. *J Electrocardiol* 1980;13(4):359-65.
- 4 Geddes LA, et al. *Med Biol Eng Comput* 1985;23(2):122-30.
- 5 Alatawi F, et al. *Heart Rhythm* 2005;2(4):382-87.
- 6 Kim ML, et al. *Am J Cardiol* 2004;94(11):1438-40.
- 7 Neal S, et al. *Am J Cardiol* 2003;92(7):810-14.
- 8 Deakin CD, et al. *Circulation* 2011;124(21 Suppl):A244.
- 9 Santomauro M, et al. *Ital Heart J Suppl.* 2004;5(1):36-43.
- 10 Walker RG, et al. *Resuscitation* 2009;80(7):773-7.