



Pacemakers and Laser Welding

You probably know someone with a heart ailment. If the ailment is irregular heartbeat, chances are that person's treatment includes a pacemaker.

What are pacemakers?

According to the American Heart Association, in 2005, approximately 180,000 heart patients in the United States received implantable pacemakers.¹ For people whose heartbeat is irregular, a pacemaker can be a lifesaver. Irregular heartbeat, or *arrhythmia*, means your heart beats in an uneven pattern—sometimes too slowly, sometimes too quickly. This arrhythmia is usually caused by a faulty electrical system in the heart. A battery-powered pacemaker sends electrical impulses to the heart to help it beat at the proper pace. Pacemakers are implanted under the skin near the collarbone and then connected by wires to the heart, through which they send the electrical signals that even out the heartbeat.²

How pacemakers help people with heart problems live a better life

Dr. Kevin Heist, a cardiac electrophysiologist at Massachusetts General Hospital, describes the symptoms of heart failure from abnormal heartbeat: "Patients often feel fatigue, as well as shortness of breath from fluid building up in the lungs and swelling of the legs from fluid building up there as well."³ Because pacemakers coordinate the rhythm of the left and right sides of the heart, they can improve heart failure symptoms like shortness of breath, fatigue, lightheadedness, and fainting.

The latest generation of pacemakers can do even more than send electrical signals. Some can monitor blood temperature and breathing rate, and can even adjust your heart rate as your activity level changes. By easing symptoms of heart failure and adjusting the heart rate, pacemakers enable heart patients to live a more normal life.⁴

Where does laser welding fit in?

When it comes to the production of pacemakers, the [laser welding](#) industry plays two distinct roles. For many years, laser welding companies have served as contract manufacturers in the production of medical devices. More recently, they have also become a manufacturing source for entire [laser welding systems](#), enabling original equipment manufacturers (OEMs) to bring the laser welding process in-house.

¹ American Heart Association Web site: <http://americanheart.mediaroom.com/index.php?s=43&item=419>; accessed 10-7-09

² National Library of Medicine/National Institutes of Health Web site: http://www.nlm.nih.gov/medlineplus/news/fullstory_90074.html; accessed 10-7-09

³ National Library of medicine/National Institutes of Health Web site: http://www.nlm.nih.gov/medlineplus/news/fullstory_90074.html; accessed 10-17-09

⁴ National Heart, Lung and Blood Institute Web site: http://www.nhlbi.nih.gov/health/dci/Diseases/pace/pace_what.html; posted May 2008, accessed 10-07-09

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The assembly of pacemaker components typically takes place in a certified clean room, equipped with hermetically sealed gloveboxes. Litron, for instance, maintains a Class 10,000 clean room with state-of-the-art hermetic glovebox welding systems; equipped with vacuum bake ovens, Trumpf YAG lasers, and complete testing equipment in order to comply with strict regulations and quality standards. The atmosphere within the clean room is monitored and controlled through HEPA filters, ESD-safe flooring, and humidity controls to ensure all parts are safe from contamination or latent failure. This controlled environment and conformity to certifications ensures that all medical parts are built according to specification and within the safety requirements.

The [laser welding](#) industry can manufacture top-of-the-line laser systems for OEMs that bring the laser welding process in-house. Litron has built, installed, and tested glovebox welding systems for some of the leading medical device companies—including Guidant Cardiac, an in-house cardiac facility in Clomel, Ireland. The glovebox laser welding systems are part of Guidant's total pacemaker manufacturing process.

At Litron, we're proud to play a part in the technology that helps heart patients lead active, healthy lives.

About Litron

Litron is a complete contract manufacturer providing laser welding services and systems to the medical, aerospace, and industrial markets. We invite you to visit our website to learn more about our laser services, facilities, and capabilities. www.litron.com

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