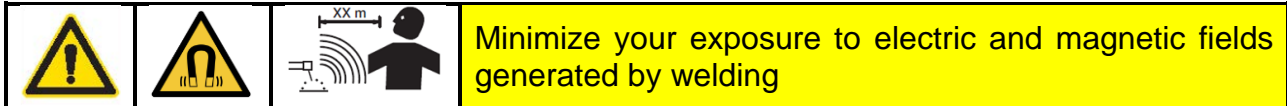


IMPLANTABLE MEDICAL DEVICES AND ELECTRIC WELDING/CUTTING



INTRODUCTION

In general, electrically conductive, or ferromagnetic materials are affected by EMF effects. These can be used as body aids but also as jewelry.

An implantable medical device is any medical device which is intended to be totally or partially introduced, surgically or medically, into the human body or by medical intervention into a natural orifice, and which is intended to remain after the procedure.

Implantable medical devices are classified as active or passive. Typical active implants rely on electrical energy to function. Passive implants perform their function without the use of electrical power.

Examples of active medical implants:

- Pacemakers
- Cardiac defibrillators
- Cochlear implants
- Diaphragm stimulators
- Insulin pumps
- Nerve stimulators
- Sleep apnea stimulators

Examples of passive medical implants:

- Artificial hip, knee and shoulder implants
- Spinal fusion hardware
- Screws for bone fracture repair
- Intra-uterine devices
- Coronary stents
- Artificial eye lenses

IS EMF HARMFUL?

Electric welding and cutting processes produce intense magnetic fields (EMF). Active medical implants are electrical in operation and their ability to function can be affected by strong EMF sources.

Passive body aids, prosthetics and jewelry can be hazardous when in close proximity to welding arrangements, especially cables, hose packages and all parts carrying welding current. The magnetic field generated by the welding current exerts forces on ferromagnetic parts that can lead to injuries. With AC or pulse welding, the resulting alternating magnetic fields induce electrical fields in the body. In conductive parts, this leads to a flow of current, which in turn involves electrical and thermal hazards.

The effects on medical devices by EMF can be very complex and have varying levels of effects on persons. These effects range from noticeable to unpleasant sensations to life-threatening conditions.

That is why it is particularly important to raise awareness and educate people about the hazards of EMF, especially for people with such parts on or in the body. In general, existing hazards should be avoided as much as possible by keeping such parts away from welding arrangements. If this is not possible one should always be aware of the hazards and effects in order to be able to counteract proactively and take appropriate measures.

HOW DO I MINIMIZE EXPOSURE?

- Limit welding to currents to as low as possible.
 - Avoid pulse and AC processes.
 - If possible, maintain at least a 60 centimeters (2 feet) distance between the welding circuit and implanted device.
 - Keep the welding cables close together and as far away as possible from your implanted device.
 - Place the welding machine at least 5 feet (150 centimeters) from the work area.
 - Connect the work clamp to the workpiece/metal as close to the point of welding as possible.
 - Arrange the work so the welding torch or gun and electrode will not contact the metal being welded if they are accidentally dropped.
 - Wait several seconds between attempts when having difficulty starting a weld.
 - If you feel sick, immediately stop welding and seek medical attention.
 - Notes and recommendations can be found in
 - EN IEC 60974-9
 - EU Directive 2013/35/EU
 - Non-binding Guides for implementing this directive
- <https://osha.europa.eu/en/legislation/guidelines/non-binding-guide-good-practice-implementing-directive-201335eu-electromagnetic-fields>

CONSULT YOUR DOCTOR

If you are getting an implanted medical device and will be working with or around electric welding or cutting processes, talk with your doctor. Inform the doctor of your occupation and discuss your work.

Implanted medical devices differ, and your doctor can select one that is less likely to be affected by interference.

No general statements can be made about the influence on active implants (such as cardiac pacemakers) by welding devices, components carrying welding current and high-voltage ignitions (with TIG).

Investigations by the German employers' liability insurance association have shown that in many cases there were no problems when pacemaker wearers are welding.

In all cases, however, this must be medically clarified by your doctor for you individually!

INFORMATION SOURCES

Further information on the subject of EMF and helpful tips for practical application can be found on the websites of the responsible country-specific authorities and offices for employee protection.

European Agency for Safety and Health at Work (EU-OSHA).
Directive 2013/35/EU – Electromagnetic Fields, available from EU- OSHA;
(website: www.osha.europa.eu/en)

Non-binding guide to good practice for implementing Directive 2013/35/EU Electromagnetic Fields
(website: <https://osha.europa.eu/en/legislation/guidelines/non-binding-guide-good-practice-implementing-directive-201335eu-electromagnetic-fields>)

International Commission on Non-Ionizing Radiation Protection (ICNIRP).
Low Frequency Guidelines, available from ICNIRP; (website: www.icnirp.org)