MAGNETOM Free.Max

Environmental Product Declaration

siemens-healthineers.com/free-max

SIEMENS Healthineers

Breaking barriers

MAGNETOM Free.Max breaks barriers to expand the reach of MRI. Where patients have felt discomfort, the world's first 80 cm bore sets a new paradigm in patient comfort. Where infrastructure was an obstacle to MRI, MAGNETOM Free.Max slots into an existing helium-free infrastructure. Where access to MRI was not viable, MAGNETOM Free.Max makes access affordable. And where conventions have limited our thinking, MAGNETOM Free.Max breaks out of conventions to explore new clinical opportunities in MRI.

Key product features

The world's first 80 cm patient bore
Accessibility for claustrophobic and obese patients

DryCool technology
- 0.7 liters liquid helium
- Sealed-for-life magnet design
- No quench pipe

Our most compact whole-body MRI
- Smaller footprint
- Reduced infrastructure costs
- Increased flexibility in siting

High-V MRI
0.55 T for daily excellence and new clinical opportunities

Image processing innovations
- AI-based image reconstruction: Deep Resolve
- Simultaneous Multi-Slice
- Compressed Sensing

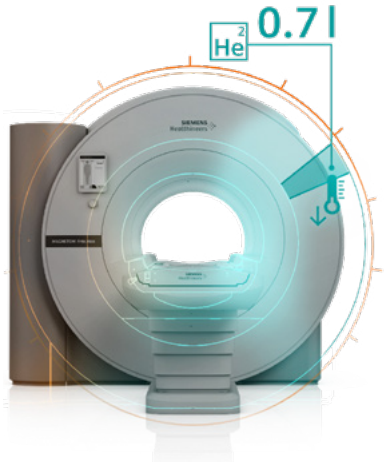
myExam Companion
Intuitive operation for any professional

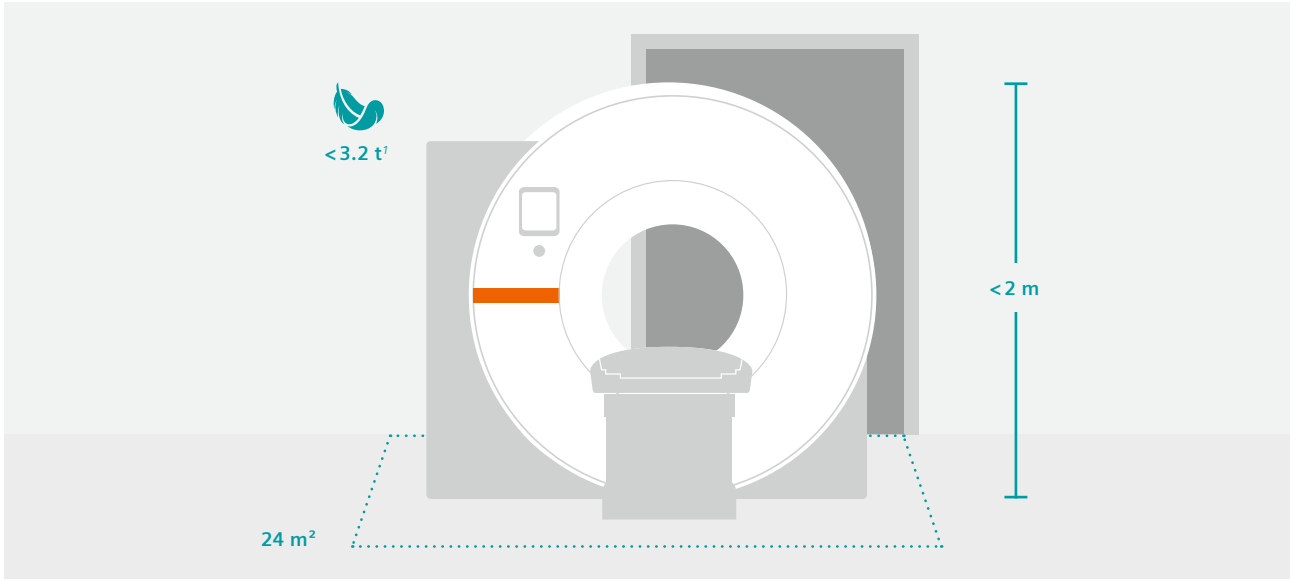
Providing greater flexibility to offer MR services and open up new clinical opportunities

MAGNETOM Free.Max

DryCool technology and minimum footprint

MAGNETOM Free.Max is our most compact whole-body MRI and with DryCool technology it provides a virtually helium-free infrastructure. And MAGNETOM Free.Max not only radically simplifies infrastructure requirements, this also translates into environmental benefits: e. g., simplifying transportation and minimizing helium demand.





Environmental benefits

- 18% less impact on climate change during transportation to the customer site[2] due to 18% reduced product weight compared to conventional MRI[3]
- > 50% reduction of critical substances and selective treatment parts in the product ingredients compared to conventional MRI[3]
- Only 0.7 liters of liquid helium compared to more than 1,000 liters for other magnets – enabled by sealed-for-life magnet with DryCool technology

Customer benefits

- Diagnostic confidence for daily excellence and new clinical opportunities
- Increased accessibility for claustrophobic and obese patients
- Increased flexibility for siting and reduced lifecycle costs
- Intuitive operation for any professional

[1] *Magnet in operation (incl. gradient coil, body coil, patient table, and covers)*
[2] *Basis for comparison: 1,000 km truck transport*
[3] *MAGNETOM Sempra*

Environmental management system

Siemens Healthineers gives high priority to achieving excellence in Environmental Protection, Health Management and Safety (EHS).

Across the globe, Siemens Healthineers has implemented a consistent EHS management system.

It lays the foundation for the continuous improvement of our performance in these areas, and regular auditing assures our conformance.

As a result of this consistent approach, Siemens Healthineers is considered one organization and is certified in accordance with ISO 14001 and ISO 45001.

Environmental product design

Manufacturing:
From natural resources to operation startup by customer

Use/maintenance:
Includes daily use by our customers as well as maintenance

End-of-life:
From disassembly at the customer site to material and energy recycling

Transportation:
Transports are summarized over the life cycle

Siemens Healthineers considers environmental aspects in all phases of the product life cycle, including material supply, component manufacturing and assembly (which is summarized in manufacturing), use/maintenance, and end of life.

Our product design procedure fulfills the requirements of IEC 60601-1-9:2007+A1:2013 “Environmental product design for medical electrical equipment”.

This standard supports the effort to improve the environmental performance of our products.

Ecodesign improvements

Siemens Healthineers is committed to contribute to the challenges for a greener and more sustainable world economy by developing new environmentally conscious technologies and concepts, while at the same time improving the clinical value of medical imaging and in-vitro diagnostic devices.

As a member of COCIR[1], Siemens Healthineers has proactively committed to the targets and objectives of the COCIR self-regulatory initiative (SRI) with the European Commission to reduce the environmental impact of medical imaging equipment, following the framework set by the Ecodesign Directive (2009/125/EC). A strong focus in the last years was on reducing the energy demand of our products. The results of the eco-design initiative are published by COCIR and regularly reviewed by the EU commission.

Energy and environmental achievements

- Saving ressources by DryCool magnet only 0.7 l liquid helium, sealed for life
- Weight reduction compared to conventional MRI[2] by 18%

[1] *COCIR = Coordination Committee of the Radiological, Electromedical and Healthcare IT Industry*
[2] *MAGNETOM Sempra*

Green Public Procurement (GPP)[1]

The Green Public Procurement (GPP) initiative within the EU established environmental criteria for certain product categories, including for imaging devices. As it's a focus of Siemens Healthineers to drive energy efficiency and performance criteria for its products we have proactively evaluated the GPP requirements relevant for our imaging products, and have included requirements of GPP in our product development processes.

The relevant criteria addressed with MAGNETOM Free.Max include:

- ✓ Chemicals management system
- ✓ User instruction for green performance management
- ✓ Product longevity
- ✓ Energy performance (specify for relevant modality)
- ✓ Automatic low power mode
- ✓ Equipment with a metering device

Management of chemicals of concern

Regulated and declarable substances are monitored through the materials compliance program at Siemens Healthineers and through BoMCheck, an industry-wide tool pioneered by Siemens Healthineers. Chemicals of concern (carcinogenic, mutagenic and/or endocrine disrupting) as listed on the materials declaration standards IEC 62474 and IPC 1752A (including RoHS, REACH and California Proposition 65 substances) are systematically identified.

We ensure these substances are not present above permitted threshold limits in our products and/or provide information on how the product can be used in a safe way (e.g. lead for radiation shielding for which no technical and/or environmental sound alternative is available).

We publish the result of our regular analysis based on product ID and part number via **siemens-healthineers.com/reach-svhc-information.pdf**.

MAGNETOM Free.Max conforms:

RoHS

with Directive 2011/65/EU of the European Parliament on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHs)

REACH

with EC 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

Calif Prop65

with California Proposition 65 administered by the California Environmental Protection Agency

[1] *For a description of the EU GPP criteria see: http://ec.europa.eu/environment/gpp/pdf/criteria/health/EN.pdf*

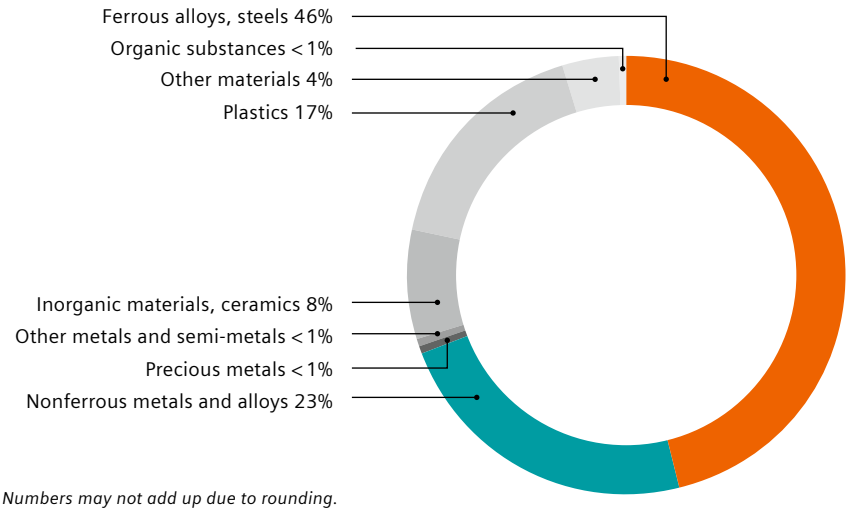
For developing and placing on the market the following environmentally related standards and laws were taken into account:

- ISO 14001:2015 (Environmental management system)
- ISO 45001:2018 (Occupational health and safety management system)
- IEC 60601-1-9:2007+A1:2013 (Environmental product design for medical electrical equipment)
- RoHS Directive 2011/65/EU (Restriction of the use of certain hazardous substances in electrical and electronic equipment)
- REACH Regulation EC 1907/2006 (Registration, Evaluation, Authorisation and Restriction of Chemicals)
- California Prop 65 (California Safe Drinking Water and Toxic Enforcement Act of 1986)
- IEC 62474:2018 (Material Declaration for Products of and for the Electrotechnical Industry)
- IPC 1752A (Materials Declaration Management)
- EN50581:2012 and IEC63000:2018 (Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances)
- Ecodesign Directive (2009/125/EC)
- ISO 14040/44:2006 (Environmental management – Life cycle assessment)

Product materials

MAGNETOM Free.Max is mainly built out of metals. This ensures a high degree of recyclability.

Total weight: approx. 4,957 kg



Numbers may not add up due to rounding.

Packaging materials

It is our goal to minimize our packaging material and reduce the packaging waste by reusing and recycling it.

MAGNETOM Free.Max is shipped as "open packaging" within Europe. This covers more than 15% of our total shipments. The individual system parts are only wrapped in dust protective covers. They are then mounted into special transport frames, which will be returned for reuse.

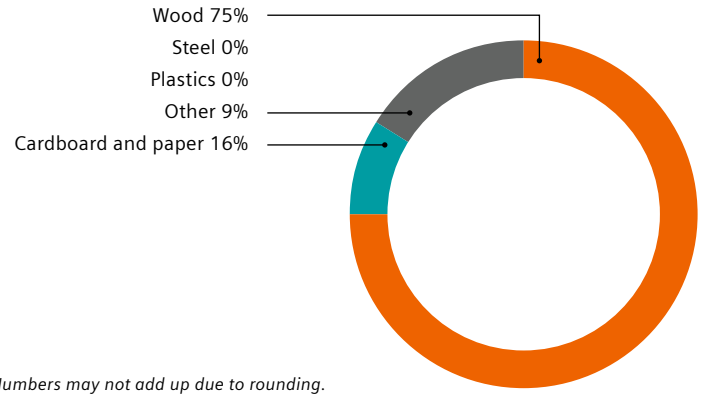
"Closed packaging" is used for sea-shipments as well as tropical countries or where it is required by law.

The wooden crates or sealed packaging can then be used for material, or to some extent, thermal recycling.

The values shown on the chart are average values of these kinds of packaging.

Total weight:

- Open packaging: approx. 380 kg
- Closed packaging: approx. 1,673 kg



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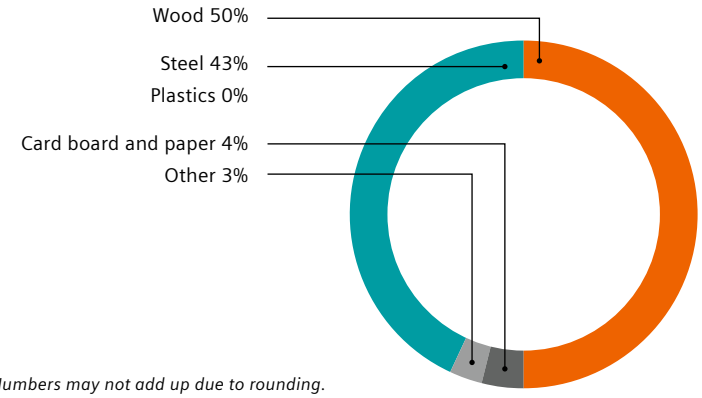


Numbers may not add up due to rounding.

Product take back

The great majority of the materials used to produce MAGNETOM Free.Max are recyclable. 86.5% (by weight) can be recycled for material content and 13.5% for energy.

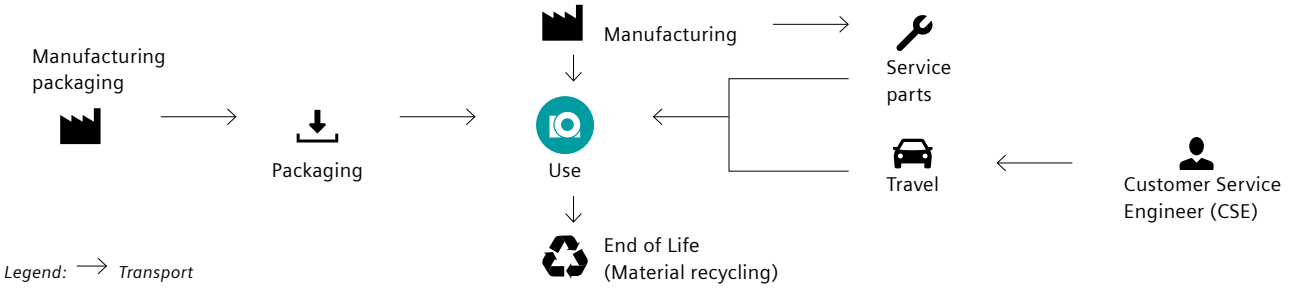
Our product take back program ensures that we address the environmental aspects of our products – even at the end of life. As part of this program, we refurbish systems and reuse components and replacement parts whenever possible through our Refurbished Systems business.

We also recycle for material or energy value. Disassembly instructions for disposal and recycling are available for our products.

Life Cycle Assessment (LCA)

In order to optimize environmental aspects of our products over all life cycle phases Siemens Healthineers performs Life Cycle Assessments. We perform LCAs according to ISO 14040/14044, following the recommendations of the ILCD (International Reference Life Cycle Data System) handbook.

The defined scope of the LCA

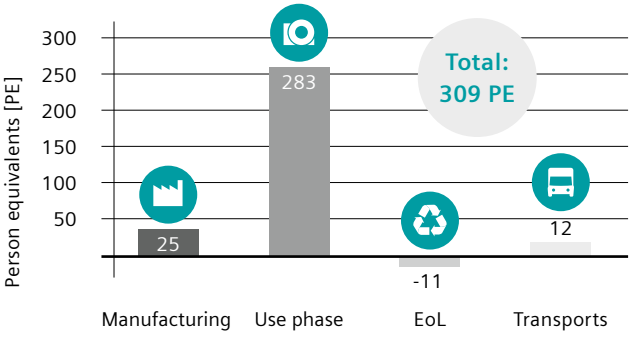


The overall life cycle is structured into four stages. The **Manufacturing** processes are modelled in three main sub-stages: Material supply, component manufacturing and assembly. The **Use** stage is modelled according the COCIR[1] SRI[2] use scenario with 260 working days per year. For **End of Life (EoL)** the name of product is disassembled and sorted into fractions with specific material recycling. **Transport** processes are summarized over the complete life cycle.

In order to ensure the high quality and completeness of the LCA results, a Primary Data have been used whenever possible. Datasets for resources such as electrical energy or natural gas are chosen from the region where the device is assembled. If primary data are not available datasets reflecting the state-of-the-art manufacturing technology are considered.

Total environmental impact [PE[3]]

The total impact for all impact categories is calculated according the Normalized ReCiPe 2016 v1.1 Midpoint (H) methodology. All impact categories are equally weighted and summed up.



For most impact categories the use phase is the dominant phase, which is rooted in electricity consumption and its generation in part by fossil energy carriers (like crude oil, coal and natural gas.)

Customers do have a significant potential to influence and reduce the overall impact of the MAGNETOM Free.Max by using green electricity or by using the MAGNETOM Free.Max in the most energy-efficient way.

The impact in the manufacturing phase is mainly driven by electr(on)ic parts such as printed circuit boards (PCB) with their energy-intensive production processes as well as by energy intensive material production of e.g. Aluminium.

Because of high recyclability of metals and their high use in the MAGNETOM Free.Max credits from EoL are visible.

[1] *COCIR = Coordination Committee of the Radiological, Electromedical and Healthcare IT Industry*
[2] *SRI = Self-Regulatory Initiative*
[3] *PE = Person equivalent = average annual environmental impact of one global citizen (normalized ReCiPe unit)*

Sustainability

Sustainability has always been a guiding principle for our company. Drawing on our extensive history, we innovate sustainability to enable healthcare for everyone, everywhere. We are therefore entirely aligned with the United Nations' aim of improving living conditions for all, documented in the 17 Sustainable Development Goals. All our employees contribute to this aspiration. We drive innovation to help humans live healthier and longer.

Siemens Healthineers focuses on four main areas:

- Improve quality of life through access to healthcare and innovation
- Contribute to a regenerative and healthy environment
- Advance diversity and inclusion and drive employee engagement
- Create sustainable value through responsible business and leadership

More information on our commitment to sustainability are available under:
siemens-healthineers.com/company/sustainability

Our commitment to sustainability has always been based on a wide range of innovations – technological, social, and environmental.

Innovation has always been at the heart of our company's activities – innovation coupled with responsibility. For example, we were able to reduce the average recording time for a human hand X-ray from the initial 20 minutes to between 0.25 and 0.5 seconds in 1913. Today, only a few milliseconds are needed.

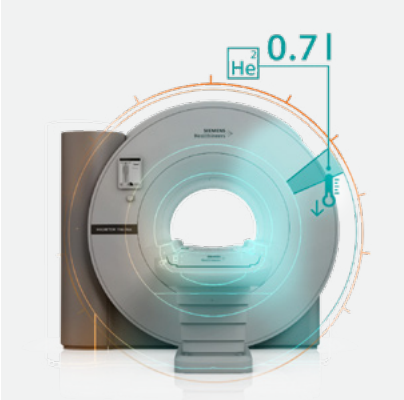
For more than 130 years, we have also contributed to a regenerative and healthy environment by improving the efficiency of our production facilities and the products themselves. For example, in 1993, we reduced the amount of wastewater produced by our plant in Rudolstadt, Germany, by 94 percent. In 2003, the Axiom Iconos R200 X-ray machine was designed to allow 99 percent material reuse, a dramatic reduction in radiation exposure of up to 93 percent, and significant power savings.

As early as 1877, Moritz Reiniger, one of our founders, began systematically training young employees, becoming a driver of personal growth among the company's employees from the very beginning. Reiniger, Gebbert & Schall and its successor Siemens-Reiniger-Werke were among the first companies to have a female board member, as early as the 1930s.

MAGNETOM Free.Max now breaks barriers to expand the reach of MRI. Where patients have felt discomfort, the world's first 80 cm bore sets a new paradigm in patient comfort. Where infrastructure was an obstacle to MRI, MAGNETOM Free.Max slots into an existing helium-free infrastructure. Where access to MRI was not viable, MAGNETOM Free.Max makes access affordable. And where conventions have limited our thinking, MAGNETOM Free.Max breaks out of conventions to explore new clinical opportunities in MRI.

DryCool technology is an innovative cooling technology that provides a sealed-for-life superconducting magnet that operates with 0.7 liters of liquid helium. It eliminates the need for helium refills and a quench pipe.

MAGNETOM Free.Max – Helium inventory 0.7 liters



Operating data

Heat emissions of the device[1]	
• System ready for measurement	< 9.07 kW
• Scan	< 14.22 kW
Allowed ambient temperature[2]	18°C–22°C
Allowed relative humidity[2]	40–60%
Noise level[3]	
• LEQ 8 h measurement	87.7 dB (A)
• Maximum sound pressure	115.0 dB (A)
Power consumption[1]	
• System off	7.01 kW
• System ready for measurement	9.07 kW
• Scan	14.22 kW
Power-on/off time	6.5 min

Technical specifications

Interface for heat recovery	No
Possible type of cooling	Standard: water/air Optional: water
Complete switch-off is possible	No
Device is adjustable for the user in terms of height	Not applicable
Uniform operating symbols for device families	Yes

Electromagnetic fields

Measures/techniques to minimize the exposure to electromagnetic fields	• actively shielded magnet • actively shielded gradients • if necessary magnetic shielding RF-cabin with 90 dB damping

[1] *All values are typical values, applicable for 400V/50Hz. The power consumption described herein is based on results that were achieved in a setting according to the COCIR methodology MRI – Measurement of the energy consumption (http://www.cocir.org/site/index.php?id=46). Since many variables impact power consumption (e.g. sequences used for scanning and sequence parameters, scan time), there can be no guarantee that each customer will achieve the same values.*

[2] *From off-mode to operating state*

[3] *Measured according to NEMA in magnet room.*

Replacement parts and consumables

Item	Life cycle[1]
• Cold head	24 months
• Mini UPS-battery	48 months
• Filter pad of outdoor cooling unit	12 months

Disposal/substance information

End-of-life concept	Yes
Recycling information	Yes
List of hazardous substances	Yes

Cleaning

The following classes of active agents in specific concentrations have been tested and are approved for cleaning	• Aldehydes • Quaternary compounds • Guanidine derivatives • Peroxide compounds • Pyridine derivatives • Chloro derivatives • Commercially available cleaning agents, detergent substances • Alkylamine • Organic acids
Suitability of device for sterile areas	Not applicable
Size of the surface to be cleaned[2]	Approx. 19 m^2

Please refer to the dedicated operator manuals for system and components for a detailed list of approved and not approved cleaning substances and further instructions.

Further ecologically relevant information

Elements of instructions are:	
• Recommendations for saving energy	Yes
• Recommendations for efficient cleaning	Yes
• Recommendations for appropriate use of consumables	Yes

[1] *Recommended exchange interval*
[2] *System covers, patient table, local coils, control elements*

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The information in this document contains general technical descriptions of specifications and options as well as standard and optional features which may not always be present in individual cases.

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The statements by Siemens Healthineers' customers described herein are based on results that were achieved in the customer's unique setting. Since there is no "typical" hospital and many variables exist (e.g., hospital size, case mix, level of IT adoption) the results shown in this brochure are not a guarantee that other customers will achieve the same results.

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