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Biograph mMR

[siemens.com/mMR](https://www.siemens.com/mMR)

Biograph **mMR**

Environmental Product Declaration

Biograph mMR

For the first time, MR and PET are one.

Biograph mMR® brings a revolution in diagnostic imaging to life. For the first time, state-of-the-art 3T MRI and cutting-edge PET are fully integrated as one. Only Siemens makes the simultaneous acquisition of whole-body MR and PET possible. Molecular MR supports our joint vision for healthcare – to advance disease management and improve care for all patients.

MR and PET in a single scanner means one exam, one room, and one whole-body solution for optimized productivity. The increased productivity enables higher patient throughput and optimized workflow, ultimately increasing the number of examinations that can be done with one system and thereby, potentially increasing the energy efficiency. With Biograph mMR, there is no need for patients to schedule multiple visits, reducing the environmental effects of extra transportation.

Siting of one system instead of two also requires a smaller installation space, allowing the Biograph mMR to have a small footprint with one room and one cooling system. Due to the Zero Helium boil-off technology, the system does not use any helium during normal operation, so this expensive and scarce resource does not need regular refill intervals. With Biograph mMR, radiation dose is low for all patients, especially pediatric*. Radiation exposure is also low for the technologist.

Key product features

- One exam – one room – one whole-body solution
- Comprehensive diagnostic picture with only one scan
- One exam instead of two can boost productivity and reduce costs
- New medical applications and advanced research
- One fully integrated MR and PET system

* MR scanning has not been established as safe for imaging fetuses and infants under two years of age. The responsible physician has to decide about the benefit of the MRI examination in comparison to other imaging modalities.



Key differentiator

Siemens makes the simultaneous acquisition of whole-body MR and PET possible. One exam instead of two can reduce examination time and boosts productivity up to 50%. The increased productivity enables higher patient throughput and optimized workflow, ultimately increasing the number of examinations that can be done with one system and thereby, increasing the energy efficiency.

Reduction of helium consumption

The performance of Biograph mMR is dependent on the cooling of helium. Helium is extracted from natural gas, which makes its availability very limited. If helium reaches the atmosphere, it will eventually escape to space due to its low weight and be lost forever.

Biograph mMR is equipped with a Zero Helium boil-off technology. The complete supply of helium, which vaporizes while patients are examined, will be liquefied in the application breaks (patient change, night, weekend) again. Only during maintenance minor helium loss is possible. With that, the refill interval has been raised from typically one year with previous devices to over ten years under normal operating conditions. Depending on the frequency and type of applications used, overall savings of up to 1,300 liters of liquid helium per year are possible.

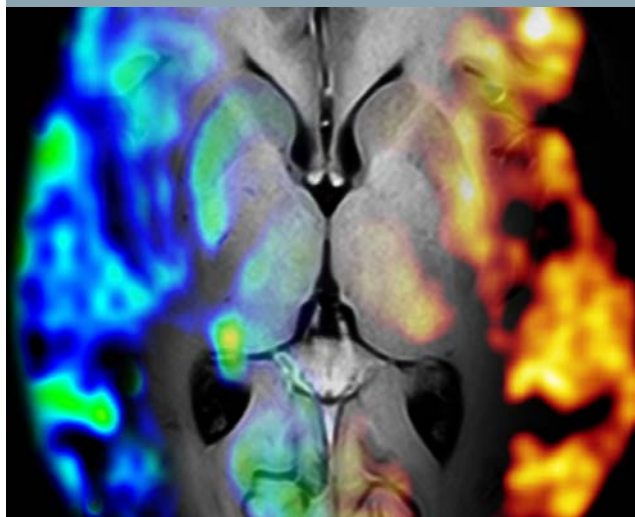
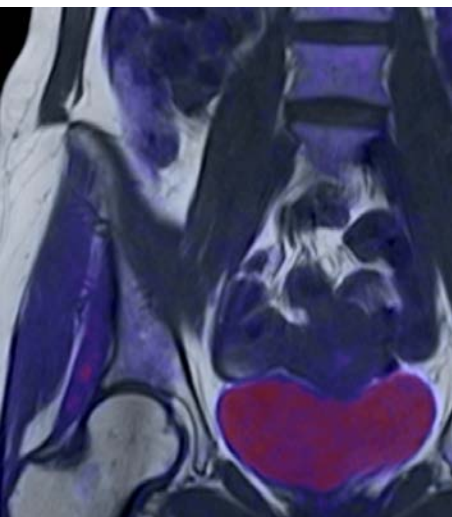
Environmental benefits

- Better energy efficiency with one system, one exam
- No transportation of patients between examination rooms and for multiple patient visits
- Footprint similar to a conventional 3T MRI system
- Zero Helium boil-off

Customer benefits

- Simultaneous imaging of morphology, function, and metabolism
- Significant reduction in costs with one system instead of two
- Reduction in examination time up to 50%* for increased productivity
- Increase patient comfort with shorter and less exams

* Data on file (results may vary)



Environmental management system

Our management system for environmental protection, health, and safety conforms to ISO14001, OHSAS18001, and BS8800 and helps us put our policy into practice. To find further information about our management system for environmental protection, health, and safety, visit:

siemens.com/healthcare-ehs

Environmental product design



Material supply: from natural resources to delivery of semi-finished products



Production/delivery: from production of components to operation start-up by the customer



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



End of life: from disassembly at the customer through material and energy recycling

Siemens Healthcare considers environmental aspects in all phases of the product life cycle, including material supply, production/delivery, use/maintenance, and end of life.

Our product design procedure fulfills the requirements of IEC60601-1-9:2007 "Environmental product design for medical electrical equipment."

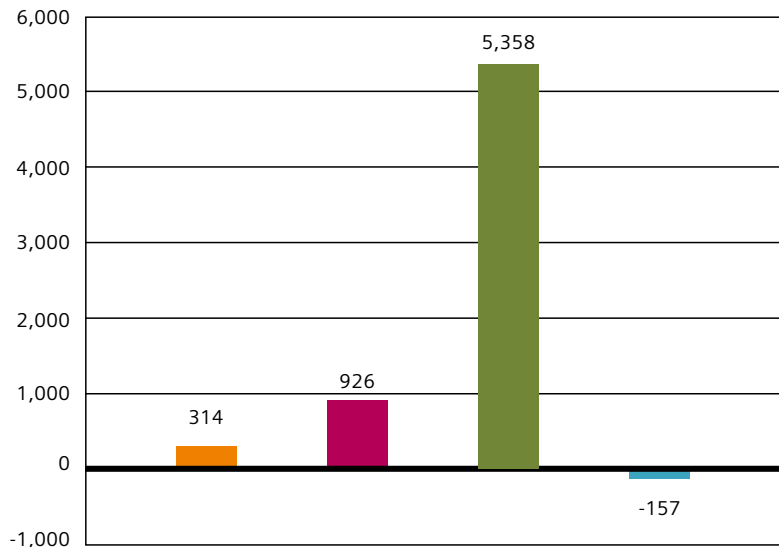
This standard supports the effort to improve the environmental performance of our products.

Cumulative energy demand

Energy consumption is the most important environmental aspect of medical devices. This is why we use cumulative energy demand to assess environmental performance. Cumulative energy demand is the total primary energy* that is necessary to produce, use and dispose of a device – including all transportation. Our medical devices can be recycled almost completely for materials or energy. With an appropriate end-of-life treatment, it is possible to return 157 MWh in form of secondary raw materials or thermal energy to the economic cycle.

* Primary energy is the energy contained in natural resources prior to undergoing any man made conversions (e.g., oil, solar).

Primary Energy in MWh



Material supply

Production and transportation

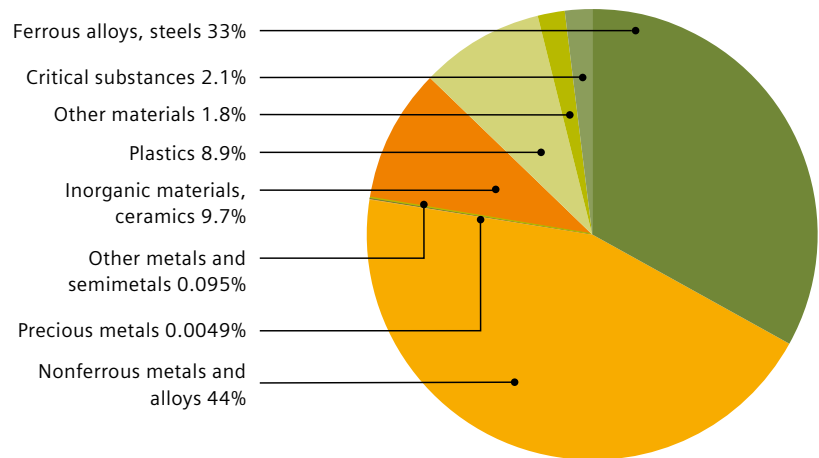
Usage (per 10 years)

End of life

Identification of product materials

Biograph mMR is built primarily of metals. This ensures a high degree of recyclability.

Total weight:
~ 12,900 kg /28,440 lbs



Packaging

Within Europe, magnetic resonance imaging systems are transported in open packaging. The magnet is only protected by a light dust cover.

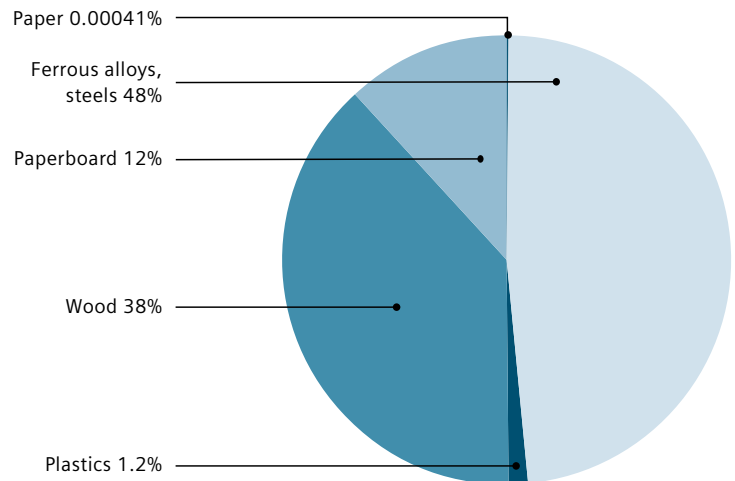
Closed packaging is required for overseas transport. In this case the magnet is delivered on a reusable steel pallet.

The values shown on the chart are average values from these two kinds of packaging. The packaging reuse ratio is more than 50%.

The rest is supplied to material recycling. Only an insignificant amount (<1%) has to be recycled for energy.

Total weight:

- Open packaging ~ 1,500 kg /3,300 lbs
- Closed packaging ~ 2,750 kg /6,060 lbs



Product take back

Most of the materials used to produce Biograph mMR are recyclable. Around 96% (by weight) can be recycled for material content and 4% for energy.

Our product take back program ensures 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 reuse components and subsystems for non-medical products. We also recycle for material or energy value. Disassembly instructions for disposal and recycling are available for our products.

Operating data

Heat emissions of the device	
Basic load ¹	≤ 27 kW
Full load ²	33 kW
Allowed room temperature³	18°C - 22°C
Allowed room humidity³	40 - 60%
Noise level	
Basic load ¹	≤ 61 dB (A)
Full load ²	≤ 107 dB (A) ⁶
Energy consumption ⁷	
During ramp up ⁴	7 - 27 kW
Basic load ¹	≤ 27 kW
Full load ²	≤ 33 kW
Power-on time⁴	15 min
Power-off time⁵	7 min

¹ Device is in operation but no patient examination takes place

² Average value for energy consumption at examination of patients

³ Within examination room

⁴ From off-mode to operating state

⁵ From operating state to off-mode

⁶ Measured according to NEMA in magnet room

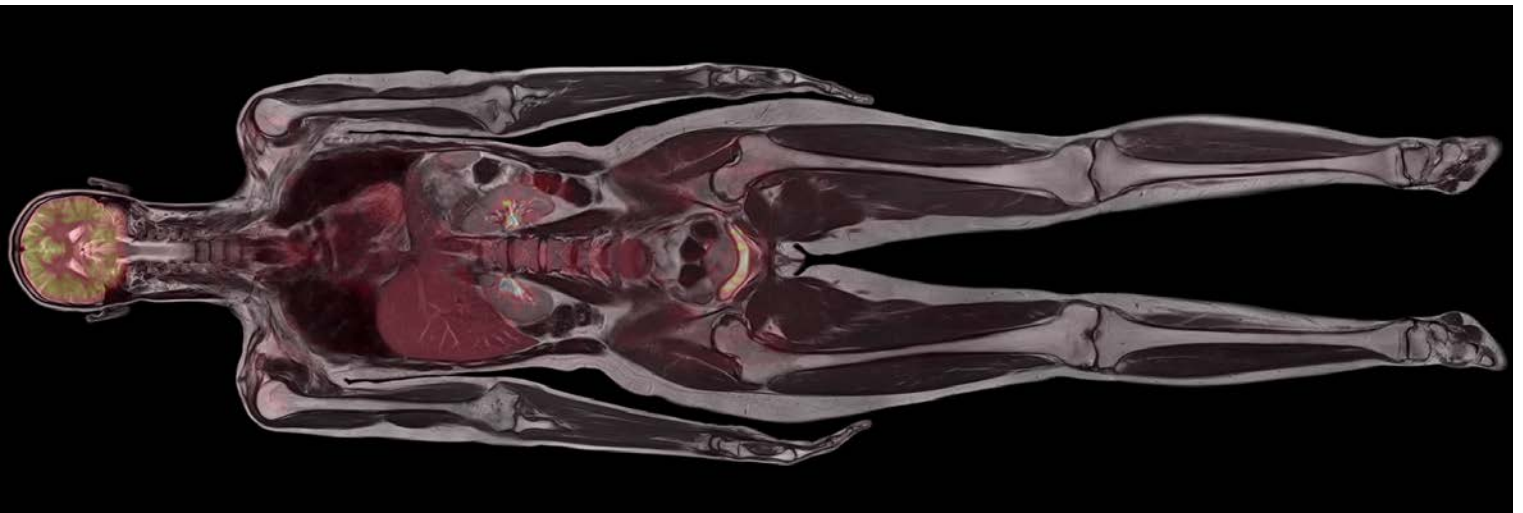
⁷ All data incl. cold head compressor, without cooling

Technical specifications

Interface for heat recovery	✓
Possible type of cooling	water-cooling
Complete switch-off is possible	⊙
Device is adjustable for the user in terms of height	✓
Uniform operating symbols for device families	✓

Radiation

Measures/techniques to minimize ionizing radiation exposure	not applicable
Minimization compared to the limit value for patients	not applicable
Measures/techniques to minimize ionizing radiation exposure to electromagnetic radiation	actively shielded magnet actively shielded gradients if necessary magnetic shielding HF-cabine with 90 dB damping
Minimization compared to the limit value for users	individual



Replacement parts and consumables

Item	Life cycle*
Absorber	every 2 years
Accu (Patient trolley)	optional
ERDU-battery	every 2 years
Cold head	every 2 years
Vacuum pump filter	every 2 years
EKG-Electrodes	one way material

*Recommended exchange interval

Disposal / substance information

End-of-life concept	✓
Recycling information	✓
List of hazardous substances (not contained in the device)	✓

Cleaning

Incompatible cleaning processes

Total device	⊗
Restrictions for particular device components	⊗

List of incompatible substance classes

Total device	alcoholic/etheric disinfections sprays organic solvents scouring solvents products containing phenolalcyamin / lye
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Restrictions for particular device components	⊗
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Suitability of the device for sterile areas	⊗
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Size of the surface to be cleaned*	approx. 5 m ²
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* Body Coil (inside), patient table overlay, local-coil, control element, console, keypad, intercom, mouse

Further ecologically relevant information

Elements of instruction are

Recommendations for savings energy	✓
Recommendations for efficient cleaning	⊗
Recommendations for appropriate use of consumables	✓



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