



SOMATOM Drive

Environmental Product Declaration

siemens-healthineers.com/somatom-drive





Progress that is impressive – ecological advantages of SOMATOM Drive

- Dose reduction to less than 1 mSv for cardiac examinations
- Average energy savings of 45% during standard thorax examinations¹
- Average energy savings of 85% during cardiac examinations¹
- 70% less detector power consumption (down to 450 W) with Stellar^{Infinity} detectors
- No more lead used for counterweights
- All substances contained in the product and its packaging are documented
- Plastic parts are labeled for recycling
- Disassembly instructions for high-quality recycling are available
- Complete CT systems and their components are taken back and are refurbished
- Product take-back according to strict EU directives
- More than 97% of the materials used can be returned to the flow of recyclable materials
- Environmental product declaration is available for download via internet
- Dual Source CT technology allows to achieve precise dose and Superfast Scanning
- Stellar^{Infinity} detectors with integrated iterative reconstruction create high image quality with reduced noise
- CARE Screen with Tin Filters on both tubes, allows to lower the dose whilst maintaining image quality for non-contrast examinations
- Straton[®] MX Sigma X-ray tubes enables low dose scanning, optimized for low kV imaging for contrast examinations and to reduce scan time for all types of examinations
- Unique 10 kV Steps together with CARE kV allows a precise user independent kV selection
- Superfast Scanning with a full rotation in only 0.28 seconds

¹ Compared to SOMATOM Definition

SOMATOM Drive

Regardless of who walks through the door, your medical imaging institution is constantly pressured to provide state-of-the-art CT imaging – every day, every night, and at every single moment. This is why Siemens Healthineers, with its unique Dual Source technology, is collaborating with you to expand technological possibilities, simplify complex procedures, and raise clinical standards.

After all, patients don't always have an appointment, medical conditions often can't wait for specialized staff, and clinical trends are never constant. In today's world, you need to be prepared to aid your patients, to cope with your environment, and to meet your business needs – while driving precision every step of the way.

Drive precision for your patients

SOMATOM Drive provides reliable diagnostic results across clinical disciplines, as well as a new quality of patient care. Accept more patients than ever before and master urgent care. This will improve the CT experience for everybody involved.

Drive precision for your business needs

SOMATOM Drive allows you to implement unprecedented system-management efficiency. Versatile and future-proof, this CT technology connects you to the CT practice of tomorrow, advancing new clinical fields and new technologies. SOMATOM Drive boosts your performance, empowers your routines, and expands your capabilities.

Drive precision for your environment

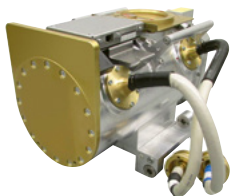
SOMATOM Drive lets you standardize your institution's quality of care to unseen levels. Promote optimum performance at all times by simplifying routines and accelerating workflows.

Reduction of Lead

The use of lead for balancing weight has been completely eliminated. Lead is now used only when necessary to protect patients from unnecessary radiation. And the amount of lead required in the radiation shield for this purpose has been reduced by 70% (from 5.26 to 1.45 kg) compared to SOMATOM Definition.

Straton MX Sigma X-ray tubes and generators

The Straton brand has been driving Siemens Healthineers' high-end CT scanners for a while, providing significant benefits in spatial resolution with its flying focal spot, its scan times, and its direct anode cooling. Straton MX Sigma is a full redesign of the core aspects of this highly efficient and reliable tube. It boosts the power available at most kVs, maintains the focal spot size, and offers low-dose scanning with consistent image quality. The highly accurate Sigma generators provide the reliable kV input required to enable these features.

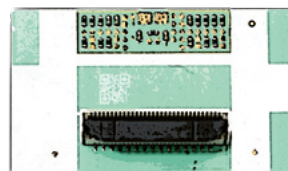


Progress that is impressive

Compared to the SOMATOM Definition model, the SOMATOM Drive uses (depending on the type of examination required) 45%¹ to 85%² less energy during scanning. An additional success is the significant reduction of radiation dose in heart examinations by about 70% (< 1 mSv at 100 kV and <1.5 mSv at 120 kV) compared to SOMATOM Definition. Competitive systems generally utilize from 9 to 30 mSv for equivalent examinations.³

Stellar^{Infinity} detector modules

The Stellar^{Infinity} detector features the most modern integrated chip design in the Siemens Healthineers portfolio. In addition to using the unique Ultra Fast Ceramic (UFC) detector material and the successful integration process seen with the Stellar detector, the Stellar^{Infinity} detector goes one step further by miniturizing and integrating more components to significantly improve the efficiency of the detector system.



¹ Standard thorax examination

² Heart examinations

³ Jörg Hausleiter, et al, JAMA 02/2009

Environmental product design



Material supply:

From natural resources to delivery of semi-finished products



Production/delivery:

From production of components to operation startup by the customer



Use/maintenance:

Includes daily use by our customers as well as maintenance



End-of-life:

From disassembly at the customer site, through material and energy recycling

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 IEC60601-1-9:2007+A1:2013 "Environmental product design for medical electrical equipment".

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

Environmental management system

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

Across the globe, Siemens Healthcare 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, the entire Healthcare Sector is considered as one organization and is certified in accordance with ISO 14001 and OHSAS 18001.

Sustainability – the Siemens Environmental Portfolio

The Siemens Environmental Portfolio comprises of selected sustainable products characterized by i.a. outstanding energy efficiency – so does the SOMATOM Drive. With our Environmental Portfolio, we make an important contribution to resource and climate protection and strengthen the competitiveness of our customers.

Siemens Healthineers respects society around the world. As a globally active company with innovation and investment competency, Siemens Healthineers holds itself to a high standard for sustainable development worldwide and makes a variety of contributions to this development. In addition, Siemens Healthineers is voluntarily and purposefully committed to advancing social issues and meeting needs.

As part of Siemens, we are proud to be top ranked within our peer group of the Dow Jones Sustainability Index¹ for our sustainability strategy and performance, especially in the environmental area.

The latest report as well as current rating results (e.g. Dow Jones Sustainability Index, Carbon Disclosure Project, Oekom, EcoVadis, MSCI) are available under:

<https://new.siemens.com/global/en/company/sustainability.html>

¹ In category "Industrial Conglomerates"

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 COCIR¹, 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.

Green public procurement (GPP)²

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 which are relevant for our imaging products, and have included requirements of GPP in our product development processes.

The relevant criteria addressed with SOMATOM Drive include:

- ✓ Chemicals management system
- ✓ User instruction for green performance management
- ✓ Product longevity
- ✓ Training for energy efficiency and optimization
- ✓ Installation with energy efficiency optimization
- ✓ Energy performance (specific for relevant modality)

Management of chemicals of concern

Within the materials compliance program at Siemens Healthineers and through use of BOMcheck³, an industry-wide tool pioneered by Siemens Healthineers, regulated and declarable substances are monitored.

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.

With this procedure we ensure those substances are not present above permitted threshold limits in our products and/or deliver 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)

SOMATOM Drive 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 COCIR is the European Coordination Committee of the Radiological, Electromedical and Healthcare IT Industry

² For a description of the EU GPP criteria see: <http://ec.europa.eu/environment/gpp/pdf/criteria/health/EN.pdf>

³ BOMcheck is a web-based declaration and regulatory compliance data base, see www.bomcheck.net

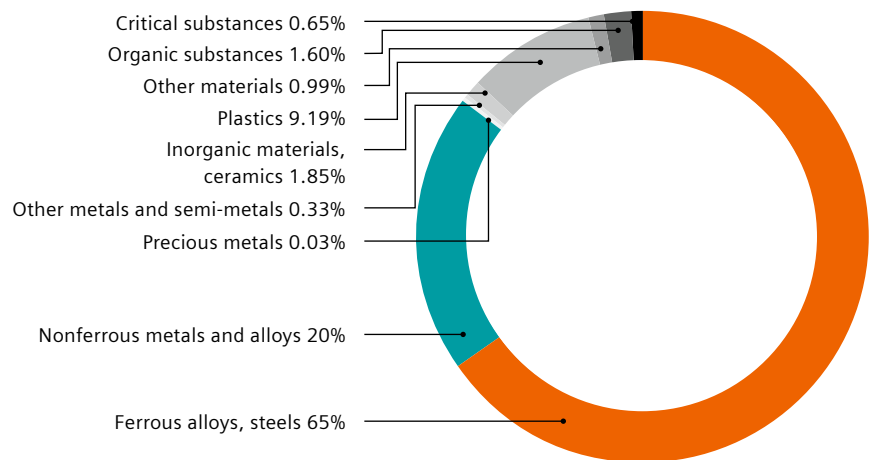
For developing and placing on the market the following environmentally related standards and laws were taken into account:

- 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)

Product materials

SOMATOM Drive is mainly built out of metals. This allows for a high degree of recyclability, moreover most of the materials used in the SOMATOM Drive are recyclable. 97.5% (by weight) can be recycled for material content and 2.5% for energy.

Total weight: approx. 4.750 kg (including gantry, patient table, operators console, image reconstruction system)



Packaging materials

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

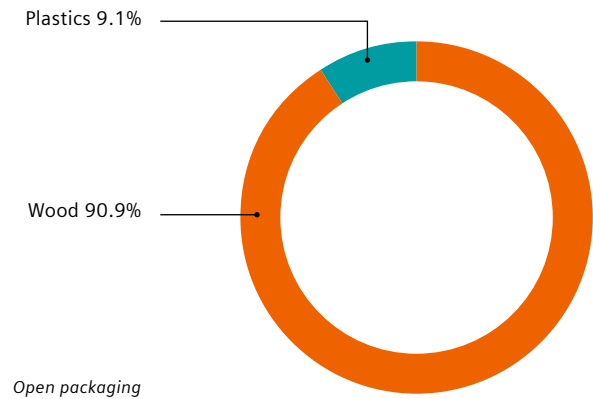
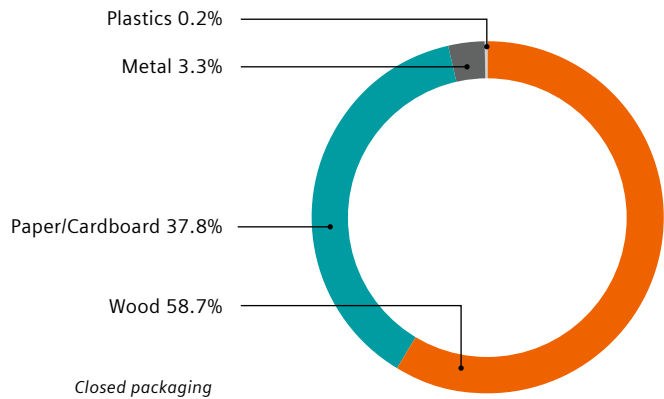
The SOMATOM Drive system is transported within Europe in open packaging, the CT Gantry is only protected by a light dust protective cover. A closed packaging is required for e.g. oversea transports.

The values shown on the chart are average values from the different kinds of packaging types of the SOMATOM Drive. The packaging materials consist of almost entirely wood and cardboard all of which can be recycled.

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

Total weight:

- Open packaging: approx. 55 kg
- Closed packaging: approx. 860 kg



Reduction of critical substances

We made strides to reduce materials in our SOMATOM Drive which are environmentally harmful and are not easily recyclable. As a first step we eliminated the usage of lead counterweights, and even for radiation shielding, where lead is still commonly used in medical engineering industry,

we were able to reduce further by substitution with alternative shielding materials. By all these measures we progressed to achieve a rate of recyclable substances in the SOMATOM Drive of 97.5%, while the remaining 2.5% can be completely used for thermal energy recovery.

Sustainable use of rare earth metals

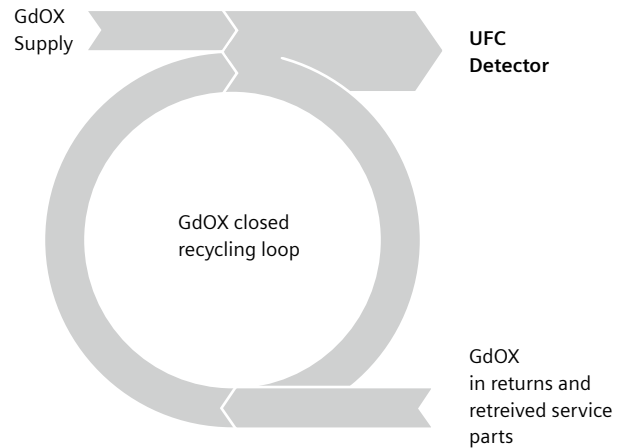
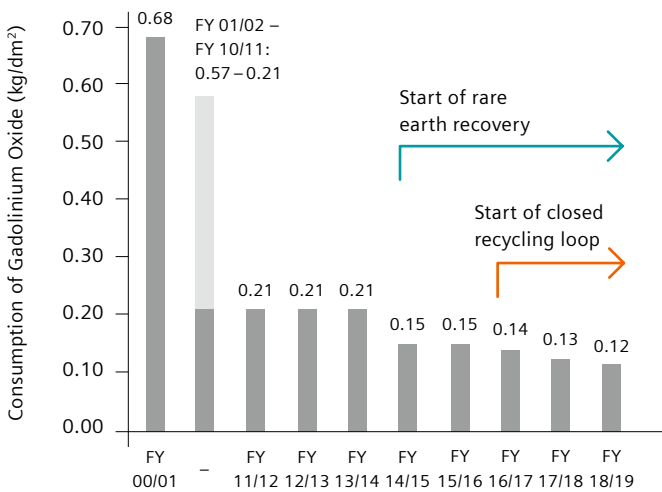
The consumption of rare earth material per unit area for CT detectors was reduced significantly. In fiscal year (FY) 18/19 we were able to reduce the supplied gadolinium oxide for production of a defined surface area of CT detector ceramics (UFC) by 82% in comparison to FY 00/01.

This is due to continuous improvements in our manufacturing technologies and processes.

Especially our measures in rare earth recovery which started in FY15 allowed for a further reduction. This could be even enhanced by introducing a closed recycling loop for the gadolinium oxide processing, which is unique in CT detector manufacturing worldwide.

Today, about 25% of the annually processed gadolinium oxide is utilized out of this closed and sustainable recycling loop.

Reduction of virgin Gadolinium Oxide for production of CT detector ceramics

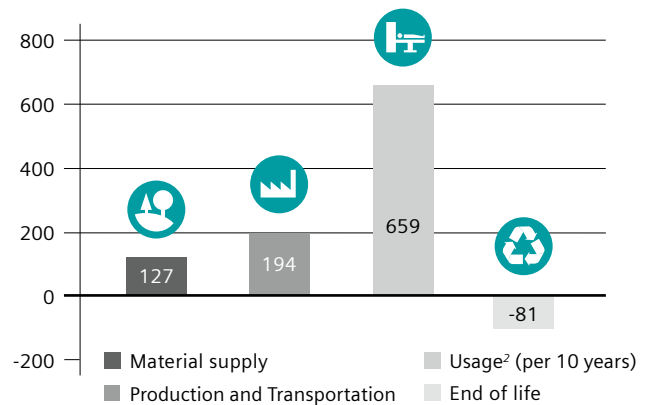


Cumulative energy demand

Energy consumption is the most important environmental characteristic of medical devices. This is why we use the “cumulative energy demand” to assess environmental performance. Cumulative energy demand is the total primary energy¹ that is necessary to produce, use, and dispose of a device – including all transportations.

Our medical devices can be recycled almost completely for materials or energy. With an appropriate end-of-life treatment, it is possible to return up to 81 MWh in form of secondary raw materials or thermal energy to the economic cycle.

Primary Energy in MWh



Based on one production site.

¹ Primary energy is the energy contained in natural resources prior to undergoing any man-made conversions (e.g. oil, solar).

² Based on COC/R definition of CT energy consumption, 10 years usage.

Product take back

The high-performance X-ray tube assemblies are designed the way that as much parts as possible may be reused. At the end of life the tube assemblies are taken back and are refurbished. Quality is guaranteed by compliance to standard IEC 62309.

Under optimal conditions up to 40% of a tube assembly may consist of reused parts. 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 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.

Sustainability in the supply chain

Purchased products and services account for almost half the value of our total revenue. As our suppliers play a critical role in our sustainability-oriented value chain, Siemens¹ expects them also to demonstrate their commitment towards these standards and principles which are summarized in the Code of Conduct.

Code of Conduct is based to a great extent on the principles of the UN Global Compact relating to human rights, labor standards, environmental protection and anticorruption initiatives. These principles are derived from the Universal Declaration of Human Rights, the Declaration on Fundamental Principles and Rights at Work of the International Labor Organization (ILO) and the principles of the Rio Declaration on Environment and Development.

We ensure sustainability in the supply chain with various programs, such as:

- **External Sustainability Audits**

External Sustainability Audits are extensive on-site inspections to check generally accepted sustainability standards. They are conducted on a risk-based approach by external specialists. The audits refer solely to the supplier's conformance and performance in relation to the six categories of the Code of Conduct for Siemens' Suppliers. The assessments will be further tailored to the type of facility under assessment and only relevant sections are covered.

- **Responsible Minerals Sourcing Initiative**

We have rolled out a uniform and enterprise-wide process to determine the use, source and origin of the relevant minerals in our supply chain ("Supply Chain Due Diligence") including "Responsible Minerals Assurance Process" (RMAP) as part of the "Responsible Minerals Initiative" (former "Conflict Free Sourcing Initiative"). We work closely with our direct suppliers to support us in carrying out these steps.

¹ As part of Siemens AG Siemens Healthineers is following the Siemens requirements

Operating Data

Heat emissions of the device	
• Basic load ¹	< 4.5 kW
• Full load ²	< 20 kW
Allowed ambient temperature ³	18°C–28°C
Allowed relative humidity	20–75%
Noise level ³	≤ 70 dB(A)
Energy consumption	
• Basic load ¹	< 4.5 kW
• Full load ²	~ 20 kW
• Maximum load	< 250 kW
Power-on time ⁴	< 5 min
Power-off time ⁵	< 5 min

Technical Specifications

Interface for heat recovery	Yes
Possible type of cooling	Standard: water/water Optional: water/air
Complete switch-off is possible	Yes
Device is adjustable for the user in terms of height	Yes
Uniform operating symbols for device families	Yes



syngo[®], the ergonomic and userfriendly user interface supports the clinical workflow. The intelligent automation functions accelerate your examination and make a smooth, efficient workflow for all modalities, departments and people possible.

With *syngo* your workplace is prepared for your mode of operation perfectly.

¹ Device is in operation but no patient examination takes place

² Average value at examination of patients (abdomen routine mode)

³ Within examination room

⁴ From off-mode to operating state

⁵ From operating state to off-mode

Radiation

Measures/techniques to minimize ionizing radiation exposure



- Stellar^{Infinity} detectors with integrated iterative reconstruction create high image quality with reduced noise
- CARE Screen with Tin Filters on both tubes, allows to lower the dose whilst maintaining image quality for noncontrast examinations
- Straton MX Sigma X-ray tubes enable low dose scanning, optimized for low kV imaging for contrast examinations and to reduce scan time for all types of examinations
- Unique 10 kV steps together with CARE kV allows a precise user independent kV selection
- Superfast Scanning with a full rotation in only 0.28 seconds

Reduction compared to the limit value for patients

Reduction in %:¹

- Organ:
- Head -0.7%
 - Sinus -67.8%
 - Thorax -66.3%
 - Abdomen -41.0%
 - Upper Abdomen -43.3%
 - Pelvis -48.2%
 - Spine -52.6%

Measures/techniques to minimize the exposure to electromagnetic radiation

Not applicable

Reduction compared to the limit value for users

Not applicable

Electromagnetic fields

Measures/techniques to minimize the exposure to electromagnetic fields

Not applicable

Replacement parts and consumables

Item	Life cycle ²
• X-ray tube	1 year warranty
• UPS-battery	24 months

¹ Further reduction possible when using IRIS protocols

² Recommended exchange interval

Disposal/Substance information

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

Cleaning

Incompatible cleaning processes:

Total device	<ul style="list-style-type: none"> • Sprays • Chlorine releasing agents • Substituted phenols based agents • Scouring cleaning agents • Organic solvents • Ammonia releasing agents
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Restrictions for particular device components	• Not applicable
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Suitability of device for sterile areas	Not applicable
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Size of the surface to be cleaned ¹ user in terms of height	Approx. 2.5 m ²
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Further ecologically relevant information

Elements of instructions are:

• Recommendations for saving energy	Yes
• Recommendations for efficient cleaning	Not applicable
• Recommendations for appropriate use of consumables	Yes

¹ Gantry-tunnel (inside), patient table overlay, control elements, console, keypad, intercom, mouse

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Note: Any technical data contained in this document may vary within defined tolerances. Original images always lose a certain amount of detail when reproduced.

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.

Not for distribution or use in countries that issue country-specific environmental product declarations. Please check with your local Siemens Healthineers representative if there is a country-specific version of this environmental product declaration.

Siemens Healthineers Headquarters

Siemens Healthcare GmbH
Henkestr. 127
91052 Erlangen, Germany
Phone: +49 9131 84-0
siemens-healthineers.com

Legal Manufacturer

Siemens Healthcare GmbH
Henkestr. 127
91052 Erlangen
Germany