NAEOTOM Alpha / NAEOTOM Alpha.Peak

Environmental Product Declaration

siemens-healthineers.com/naeotom-alpha-peak

SIEMENS Healthineers

Progress that is impressive – ecological advantages of NAEOTOM Alpha / NAEOTOM Alpha.Peak

- Eco Power Mode reduces the energy consumption and thereby saves 178.4 t of carbon dioxide over the lifetime of the system[1]
- Contactless data transmission prevents abrasion and dust
- 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
- CT systems and their components can be taken back for refurbishment
- Product take-back in alignment with EU directives
- About 98% of the materials used can be returned to the flow of recyclable material

[1] *Data on file*

The NAEOTOM Alpha class

Unstoppable

Patient-centered innovation

Siemens Healthineers has made an unstoppable commitment to transform medical imaging with photon-counting CT. And now, we present the NAEOTOM Alpha class, three photon-counting CT systems that can support diagnostic results and processes in many clinical scenarios. Proven Quantum Technology enables profound clinical impact, supported by AI-powered productivity solutions. Address the challenges of conventional CT with the unstoppable NAEOTOM Alpha class and lead the way to a new standard of care.

Profound clinical impact

If you can't see it, you can't diagnose it. If you can't diagnose it, you can't treat it. The NAEOTOM Alpha class delivers precise anatomical details with Quantum HD resolution with up to 0.2 mm, and Quantum Spectral imaging in every scan enables precise functional evaluation. Address limitations of conventional CT and experience the profound clinical impact of photon-counting CT.

- See the unseen with Quantum HD
- Be conclusive in every scan with Quantum Spectral Imaging

AI-powered productivity

Staff shortages, more patients, and manual processes complicate healthcare delivery. Powered by artificial intelligence (AI), workflows with smart technologies from patient positioning to scanning, result creation, and reading automate processes, save time, and add efficiency.

- Speed-up workflows with intuitive design
- Optimize productivity with automated processes

NAEOTOM Alpha.Peak The pioneer

NAEOTOM Alpha.Peak is the next generation of the pioneering photon-counting CT system that can generate insights that are not available on any other system.

- Spectral results for every exam
- Twice the spatial resolution of conventional CT
- Documented clinical impact on patient pathways since 2021

Benefits

- For leading institutions aiming to push the limits of CT, redefine clinical pathways, and pioneer CT research
- Highest photon-counting CT performance both in single and dual-source scans
- No compromise on clinical excellence with the possibility of Turbo Flash PCCT scans

NAEOTOM Alpha.Peak: Reduction of lead content

Rotating components of CT systems have to be balanced for quiet operation. The easiest way is the use of lead as counter balance. However, lead is a toxic element. Therefore we abandoned the usage of lead as counter balance at NAEOTOM Alpha.Peak completely. A minor amount of lead is only necessary for shielding and shaping of radiation. There is no technically and economically feasible alternative at present.

NAEOTOM Alpha.Peak's predecessor models of the SOMATOM product line were already equipped with effective low-dose technologies. Even though there seemed to be limited potential for further optimizations, the following innovations led to further success:

An adaptive dose shield mounted at the x-ray tube controls that unnecessary radiation is blocked from the patient. With this, dose can be reduced while the image quality is maintained.[2]

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 certified in accordance with ISO 14001 and ISO 45001.

Environmental product design

Manufacturing:
From natural resources to start of operation by the customer

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

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

Transportation:
Transports are minimized over the life cycle

Siemens Healthineers considers environmental aspects in all phases of the product life cycle, including material supply, component manufacturing and assembly (summarized as 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[3], Siemens Healthineers has proactively committed to the targets and objectives of the COCIR self-regulatory initiative (SRI) set by 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.

[2] *Deak PD et al. Effects of adaptive section collimation on patient radiation dose in multisection spiral CT. Radiology. 2009 Jul;252(1):140-7*
[3] *COCIR = Coordination Committee of the Radiological, Electromedical and Healthcare IT Industry*

Sustainability Criteria for purchasing medical imaging equipment[4]

The Medical Equipment Proactive Alliance for Sustainable Healthcare (MEPA) is a joint initiative of COCIR, HealthTrust, and Vizient to foster sustainability within healthcare. The Alliance, in consultation with the Global Electronics Council and Kaiser Permanente, developed the "Sustainability Criteria for Purchasing Medical Imaging Equipment".

The criteria aim to reduce the climate, environmental, and social impacts of medical imaging devices supplied to the healthcare sector.

The sustainability performance of the processes and procedures at Siemens Healthineers and the sustainability performance of NAEOTOM Alpha.Peak have been assessed along the four key areas of these criteria:

1) Climate change mitigation

2) Sustainable use of resources

3) Use of chemicals of concern

4) Social impacts

The criteria are recommendations and are divided into three levels:

a) Basic criteria

b) Intermediate criteria

c) Advanced criteria

Our commitment to sustainability

Human health is inextricably linked to the health of the planet. To achieve sustainability, the long-term well-being of both people and the environment, we must address how human activities impact Earth's natural systems, and how these changes, in turn, affect human health.

As a leading medical technology company, we aim to drive sustainability in healthcare, working together with our customers, partners, and employees worldwide towards a resilient, sustainable future. Our strategy is actively shaped through our engagement with key stakeholders, especially healthcare providers, and their evolving needs and opportunities for long-term value creation. It is rooted in the needs and priorities of our stakeholders and organized into three core pillars:

1) Healthcare Access

2) Resource Preservation

3) Diverse and Engaged Healthineers

These are supported by two cross-cutting enablers Volunteering and Employee-led Initiatives, and Global and Regional Partnerships. Together, these pillars and enablers leverage our foundation of innovation and robust governance, and contribute to the United Nations Sustainable Development Goals (SDGs).

We annually publish a comprehensive overview of our environmental, social, and governance (ESG) performance in line with recognized international reporting standards and regulatory requirements. The latest report as well as current rating results (e.g., MSCI, Sustainalytics) are available under: **siemens-healthineers.com/company/sustainability**

We are committed to achieving Net Zero emissions by 2050, both within our operations and across our value chain, and have set ambitious near-term and long-term quantitative targets across all material Scope 1, 2, and 3 categories.

These targets are approved by the Science Based Targets initiative (SBTi) and confirmed as aligned with the 1.5 °C reduction pathway.

This includes developing a comprehensive decarbonization roadmap that prioritizes energy efficiency, transitioning to renewable energy, and optimizing production processes and transportation. With targeted emission reduction initiatives across Scope 1, 2, and 3, we are taking meaningful steps to minimize our company's carbon footprint.

We are embedding circular economy principles into how we design, produce, and service our products, to minimize resource consumption, carbon emissions and reduce their environmental impact throughout their life cycle – from design to end-of-life.

We design products by applying systematic criteria that prioritize durability, energy efficiency, recyclability, and responsible use of materials. We also work to reduce waste at every stage, including in packaging, and comply with global regulatory requirements on environmental protection.

In doing so, we help healthcare providers to reduce resource consumption, improve operational efficiency, and achieve their climate goals.

[4] *For a description of the MEPA criteria see: https://www.mepaalliance.org*

Material compliance

Within the materials compliance program at Siemens Healthineers and with the use of BOMCheck[5] – an industry-wide tool pioneered by Siemens – regulated and declarable substances are monitored. Chemicals of concern as listed in the materials declaration standards IEC 62474 and IPC 1752A (including RoHS and REACH substances) are systematically identified to ensure they are not present above permitted threshold limits in our products.

NAEOTOM Alpha.Peak conforms with Directive 2011/65/EU of the European Parliament on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

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 in 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**

NAEOTOM Alpha.Peak 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

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

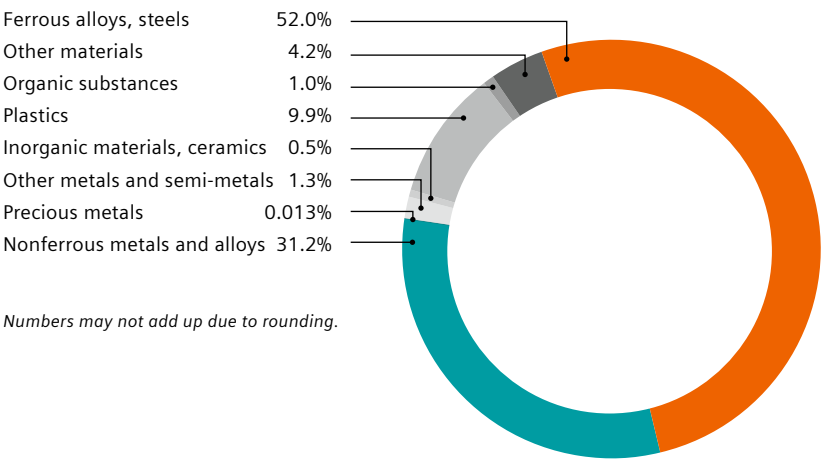
- ISO 14001:2015 (Environmental management system)
- ISO 45001:2018 (Occupational health and safety management system)
- IEC 60601-1-9:2007+A1:2013 (Environmental product design for medical electrical equipment)
- RoHS Directive 2011/65/EU (Restriction of the use of certain hazardous substances in electrical 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)

[5] *BOMCheck is a web-based declaration and regulatory compliance data base, see www.bomcheck.net.*

Product materials

NAEOTOM Alpha.Peak is mainly built out of metals. This ensures a high degree of recyclability.

Total weight: approx. 3,300 kg



Numbers may not add up due to rounding.

Packaging materials

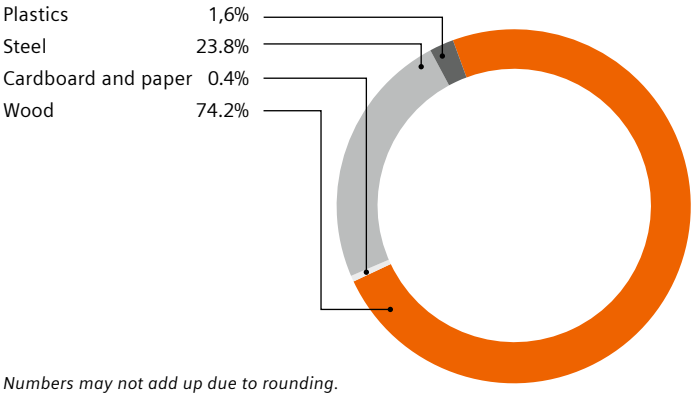
It is our goal to minimize our packaging material and reduce the packaging waste by reusing and recycling it.

The NAEOTOM Alpha.Peak 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 in the chart represent the material composition of "closed packaging" of NAEOTOM Alpha.Peak. The packaging materials consist of almost 75% wood and cardboard, all of which can be recycled.

Total weight:

- Open packaging: approx. 114 kg
- Closed packaging: approx. 534 kg



Numbers may not add up due to rounding.

Reduction of critical substances

We made strides to reduce materials in our NAEOTOM Alpha.Peak which are environmentally harmful and are not easily recyclable. As a first step, we eliminated the usage of lead counter weights 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 NAEOTOM Alpha.Peak of 98%, while the remaining 2% can be completely used for thermal energy recovery.

Use of recycled materials

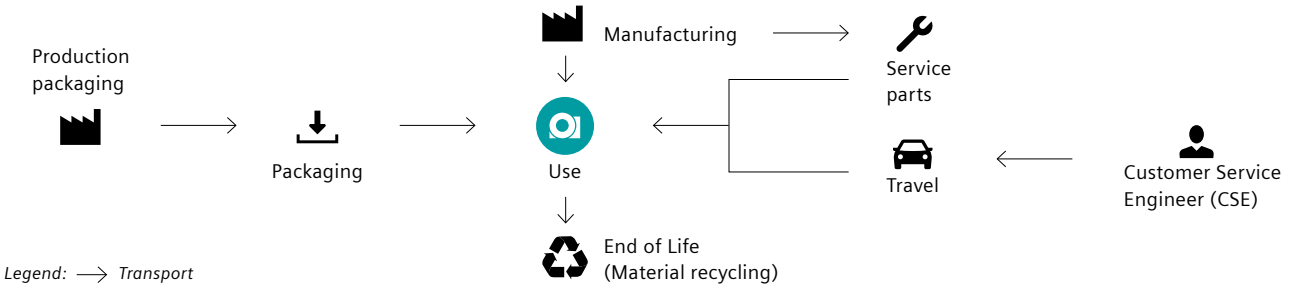
The use of recycled materials in a CT system allows to save natural resources and to reduce the CO_2 footprint of the product. For example, the production of steel and aluminium out of scrap metals uses significantly less energy than making these metals from scratch out of raw materials. In case of aluminium this saves about 95% energy.

In NAEOTOM Alpha.Peak the total amount of recycled materials is at least 36% in weight.

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



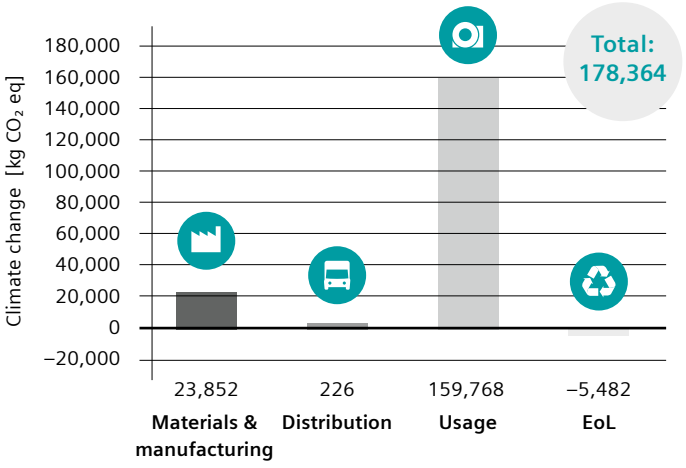
The overall life cycle is structured into four stages. The **Materials and manufacturing** covers material supply, component manufacturing, system assembly, and packaging. The **Distribution** covers the product's distribution to the customer, where 1000 km by truck are assumed. The **Usage** is modelled according the COCIR SRI use scenario with 260 working days per year and covers maintenance activities. For **End of Life (EoL)** NAEOTOM Alpha.Peak is disassembled and sorted into fractions with specific material recycling. All other **transport** processes except distribution are assigned to and included in the specific phase where they occur.

Key environmental performance indicators

The impact categories are calculated with Environmental Footprint (EF) 3.1 methodology in the GaBi LCA tool (content version 2024.2). Primary data for electrical energy consumption during usage have been modelled based on Electricity grid mix of Germany.

Impact category	Unit	Materials & manufacturing	Distribution	Usage	EoL
EF 3.1 Acidification	Mole of H+ eq.	1,28E+02	2,92E-01	2,93E+02	-6,28E+01
EF 3.1 Climate Change – total	kg CO_2 eq.	2,39E+04	2,26E+02	1,60E+05	-5,48E+03
EF 3.1 Climate Change, biogenic	kg CO_2 eq.	1,04E+02	1,36E+00	2,15E+03	-2,74E+00
EF 3.1 Climate Change, fossil	kg CO_2 eq.	2,37E+04	2,21E+02	1,58E+05	-5,48E+03
EF 3.1 Climate Change, land use and land use change	kg CO_2 eq.	2,81E+01	4,11E+00	3,74E+01	1,24E+00
EF 3.1 Ecotoxicity, freshwater - total	CTUe	1,61E+05	2,18E+03	8,29E+05	-2,59E+04
EF 3.1 Eutrophication, freshwater	kg P eq.	7,32E-02	5,82E-04	9,59E-01	-3,60E-03
EF 3.1 Eutrophication, marine	kg N eq.	3,00E+01	1,07E-01	8,06E+01	-6,15E+00
EF 3.1 Eutrophication, terrestrial	Mole of N eq.	3,26E+02	1,29E+00	8,35E+02	-6,63E+01
EF 3.1 Human toxicity, cancer - total	CTUh	5,80E-04	4,34E-08	2,68E-04	-6,51E-06
EF 3.1 Human toxicity, non-cancer – total	CTUh	2,23E-04	1,83E-06	7,15E-04	-7,92E-05
EF 3.1 Ionising radiation, human health	kBq U235 eq.	1,35E+03	4,71E-01	2,15E+04	-4,18E+02
EF 3.1 Land Use	Pt	1,42E+05	1,87E+03	1,48E+06	-1,56E+04
EF 3.1 Ozone depletion	kg CFC-11 eq.	1,86E-07	6,75E-11	4,93E-06	2,86E-09
EF 3.1 Particulate matter	Disease incidences	1,62E-03	3,06E-06	2,49E-03	-5,83E-04
EF 3.1 Photochemical ozone formation, human health	kg NMVOC eq.	8,79E+01	2,87E-01	2,02E+02	-2,04E+01
EF 3.1 Resource use, fossils	MJ	3,18E+05	2,81E+03	2,19E+06	-6,84E+04
EF 3.1 Resource use, mineral and metals	kg Sb eq.	1,34E+00	3,64E-05	8,78E-01	-2,92E+00
EF 3.1 Water use	m^3 worl eq.	2,99E+03	1,53E+00	6,55E+03	-1,47E+03

Climate change – total [kg CO_2 eq.]



This chart shows the overall impact of the product on climate change. The **Usage** is the life cycle phase with the biggest impact. Different operating conditions can lead to deviations from the reference scenario.

Product take back

The high-performance X-ray tube assemblies are designed in a way that as many 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, Siemens[5] 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[6] 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.

[6] As part of Siemens AG, Siemens Healthineers is following the Siemens requirements.

Operating data

Heat emissions of the device	
• Basic load[7]	< 3.1 kW
• Full load[8]	< 15 kW
Allowed ambient temperature[8]	18–30 °C / 64,4–86 °F
Allowed relative humidity[8]	20–75%
Noise level[9]	≤ 68 dB (A)
Power consumption	
• Basic load[7]	≤ 8 kVA
• Full load[8]	~ 20 kW
• Maximum load	≤ 350 kVA
Power-on time[10]	< 4 min
Power-off time[11]	< 6 min
Power consumption according to COCIR	
Use scenario 24-hours power consumption[12]	
• Off[13]	54.8 kWh
• Low power[14]	100.7 kWh
• Idle (stand-by)[15]	112.4 kWh

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 (patient table)
Uniform operating symbols for device families	Yes

Radiation

Measures / techniques to minimize ionizing radiation exposure	• QuantaMax detectors and iterative reconstruction create high image quality with reduced noise. Tin Filter allows to lower the dose whilst maintaining image quality for non-contrast examinations. • Vectron X-ray tube enables low-dose scanning and reduces scan time for all types of examinations. • CARE keV allows a precise user-independent kV selection. • Superfast scanning with a full rotation in only 0.25 seconds

[7] *Device is in operation but no patient examination takes place*
[8] *Average value at examination of patients (abdomen routine mode)*
[9] *Within examination room*
[10] *From off-mode to operating state*
[11] *From operating state to off-mode*
[12] *Values may vary approx. ± 3% due to specific system conditions, for example of UPS, etc.*
[13] *Eco Power during the day, with Site On/off switch*
[14] *Eco Power during day and night*
[15] *Eco Power during the day*

Electromagnetic fields

Measures / techniques to minimize the exposure to electromagnetic fields	Not applicable
Reduction compared to the limit value for users	Not applicable

Replacement parts and consumables

Item	Life cycle[12]
• X-ray tube	replaced when defective and non-operational[13]
• UPS-battery	24 months

Disposal / substance information

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

Cleaning

Incompatible cleaning processes:

Total device	• Sprays • Chlorine releasing agents • Substituted phenols based agents • Scouring cleaning agents • Organic solvents • Ammonia releasing agents
Restrictions for particular device components	• Not applicable
Suitability of device for sterile areas	Not applicable
Size of the surface to be cleaned[14]	Approx. 3 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	Not applicable
• Recommendations for appropriate use of consumables	Yes

[16] *Recommended exchange interval*
[17] *Average replacement varies form system to system as it depends on tube usage and the type of performed procedures*
[18] *Gantry-tunnel (inside), patient table overlay, control elements, console, keypad, intercom, mouse*

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With *syngo* CT VB20, the trade name NAEOTOM Alpha.Peak has been introduced. The medical device name remains NAEOTOM Alpha.

Throughout this document, the name NAEOTOM Alpha.Peak and its representation in images also refer to NAEOTOM Alpha CT systems that have been upgraded to *syngo* CT VB20.

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