

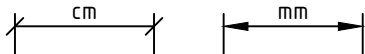


MAGNETOM Flow.Ace / MAGNETOM Flow.Plus

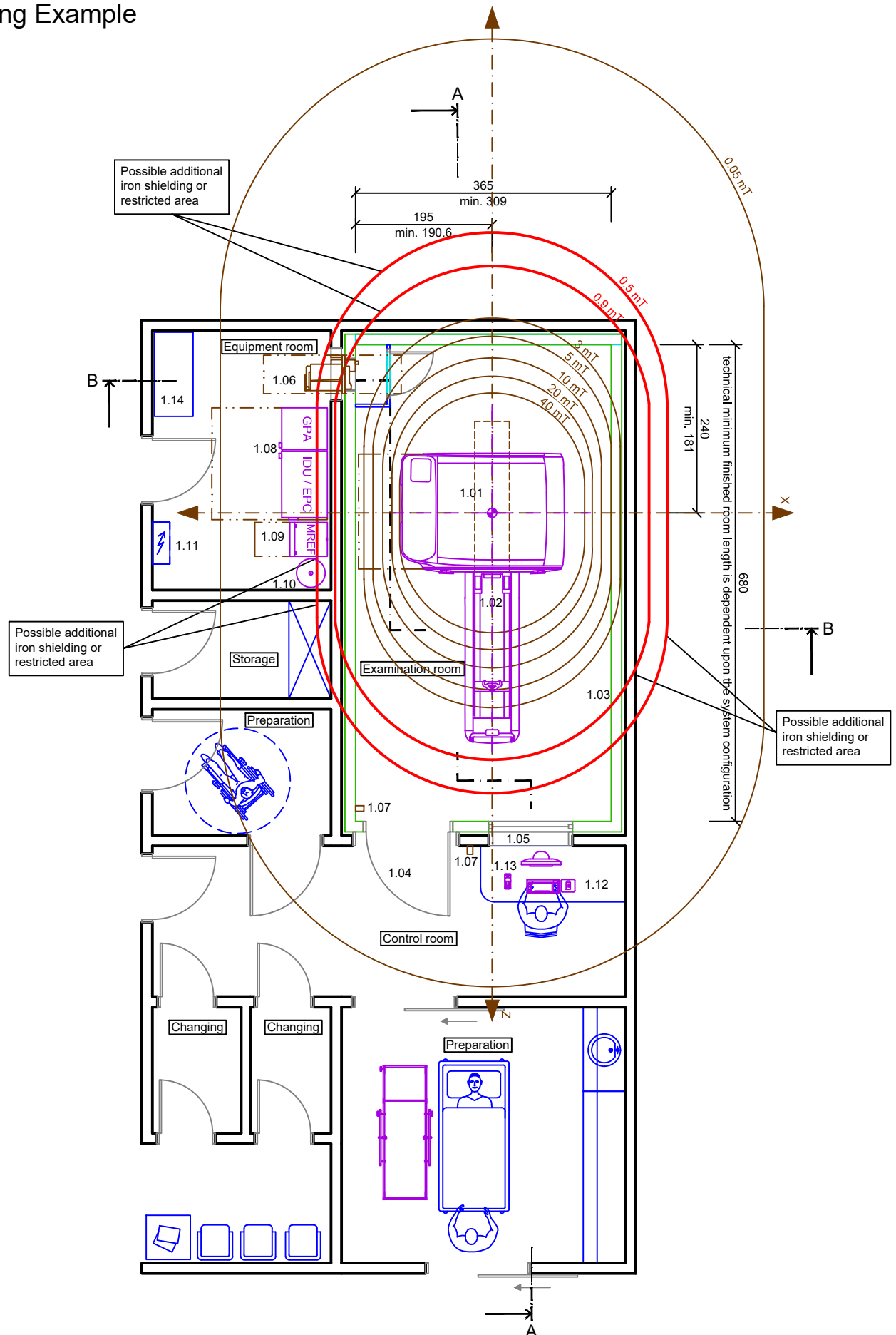
Basic Planning Information

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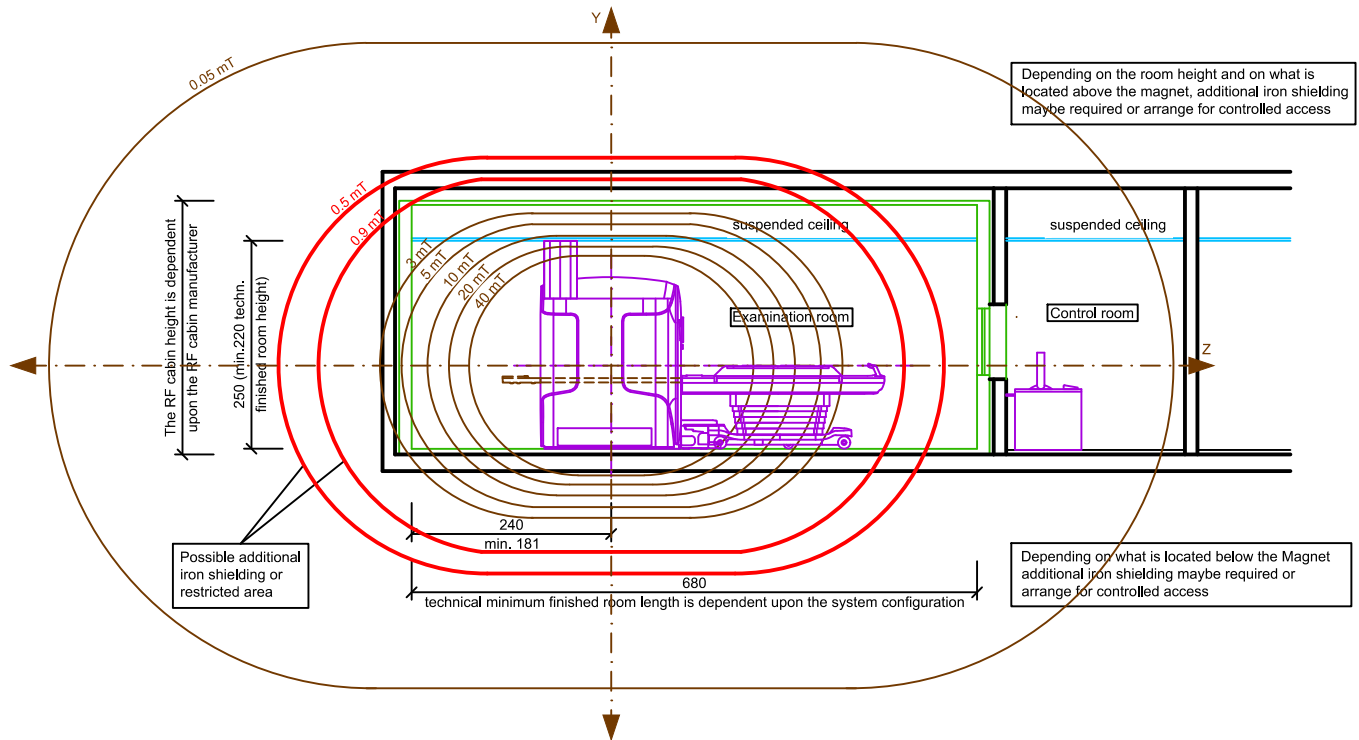
Legend		
-----	Motion area / Swivelling range / Minimal room size / Safety distance	
.....	Service area	----- Ceiling mounted
-----	Additional equipment	----- Wall mounted
		----- Floor mounted
		----- New construction
		----- Demolition

Dimensioning	
All installation measurements apply to finished wall/floor/ceiling and are to be checked prior to assembling the unit.	
	
	Orientation point = reference point of the Siemens Healthineers unit for planning and installation
Please note: The drawing parts in this document are not to scale!	

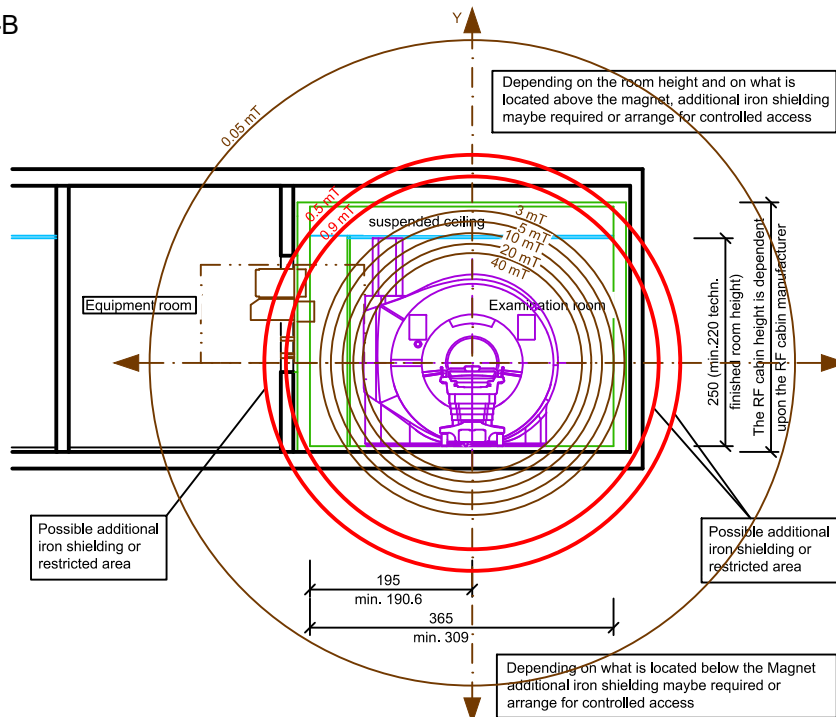
Planning Example



Section A-A



Section B-B



MAGNETOM Flow.Ace / MAGNETOM Flow.Plus - Equipment Legend				
Pos.	Description	Weight (kg), Heat dissipation to the air (W)		
		kg	W	Remark
1.01	Magnet	3460	1000	#1/#2
1.02	Mobile patient table	293		
1.03	RF-cabin			
1.04	RF-door			
1.05	RF-window			
1.06	RF-System filter plate	63	250	Upright installation,#5
1.07	Magnet stop			
1.08	Electronics cabinet GPA / IDU/ EPC	970		#1/#3
1.09	MREF - passive cooling	130		#2/#3/#4
1.10	Expansion vessel	9,5		50 litres
1.11	Power distributor			by customer
1.12	Control unit MR AWP with 24" Monitor	9,8	60	
1.13	Console node	2		
1.14	Air conditioning cabinet			by customer
	#1 Heat dissipation depending on measuring #2 Additional water cooling system necessary #3 Typical heat dissipation of both components to the environment in the Technical-Room ≤ 1 kW #4 The type of the cooling must be cleared with the Siemens Healthineers project manager. #5 Installation of non-Siemens Healthineers components prohibited			

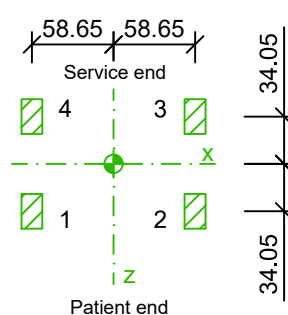
Room Dimensioning

Technical minimum finished room length	
Partial Drive, Mobile Patient Table:	min. 590 cm, recommended 610 cm
Partial Drive, Fixed Patient Table:	min. 560 cm

Technical minimum finished room height
Examination room min. 220 cm, Control room min. 210 cm, Equipment room min. 240 cm.

SkyView Siting Infloor Option (Floor Bound System Connection)
If you are using the SkyView Siting Infloor Option be aware that you might need additional room height! The minimum technical room height for the MAGNETOM Flow inside the Examination Room is 220 cm! The minimum required clear height for the floor bound cabling is 8 cm for the system connections (without e.g. computer floor like construction; this has to be added if applicable).

Statics and Transport

Statics not to scale	
Support feet and floor load Weight of the magnet: ~ 3250 kg Installation weight of the magnet: ~ 3460 kg 4 support feet each 15 cm x 25 cm (375 cm²) Pos. 1 = 940 kg Pos. 2 = 640 kg Pos. 3 = 680 kg Pos. 4 = 990 kg	
You have to consider the additional weights of the RF cabin and the possible iron shielding for the static calculation. It is only possible to position the magnet on Spring Solution (Stop-Chocs) if it is installed in a non-magnetic RF cabin and if there is no iron shielding below the magnet. Standard configuration is an installation on Sylomer Solution.	

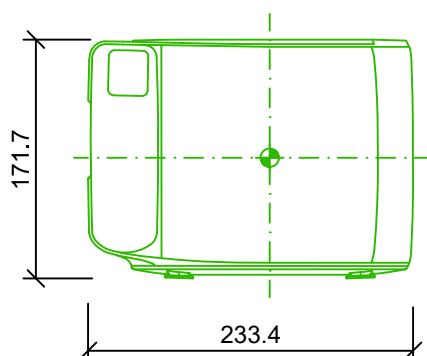
Building vibrations
External vibrations or shocks affecting the magnet may degrade image quality. In the three spatial orientations the building vibration must not exceed the following specification: Building vibration specification: $a_{\max} = -80 \text{ dB(g)}$ in the frequency range from 0 to 100 Hz The requirement for $a_{\max}$ is depending on the frequency.

Transport

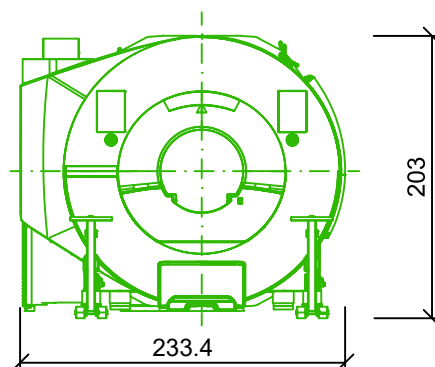
not to scale

Insertion Magnet Minimum

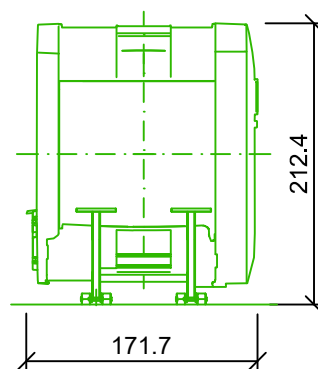
transport opening in the ceiling: L = 250
cm / W = 180 cm

**Standard direction**

Transport opening in the wall:
W = 250 cm / H = 210 cm

**Insertion Magnet**
90° rotated

Recommended transport opening in the wall:
W = 180 cm / H = 220 cm



The maximum load and the width of doors and openings must be considered for the delivery of system parts and the later delivery of cryogenes.

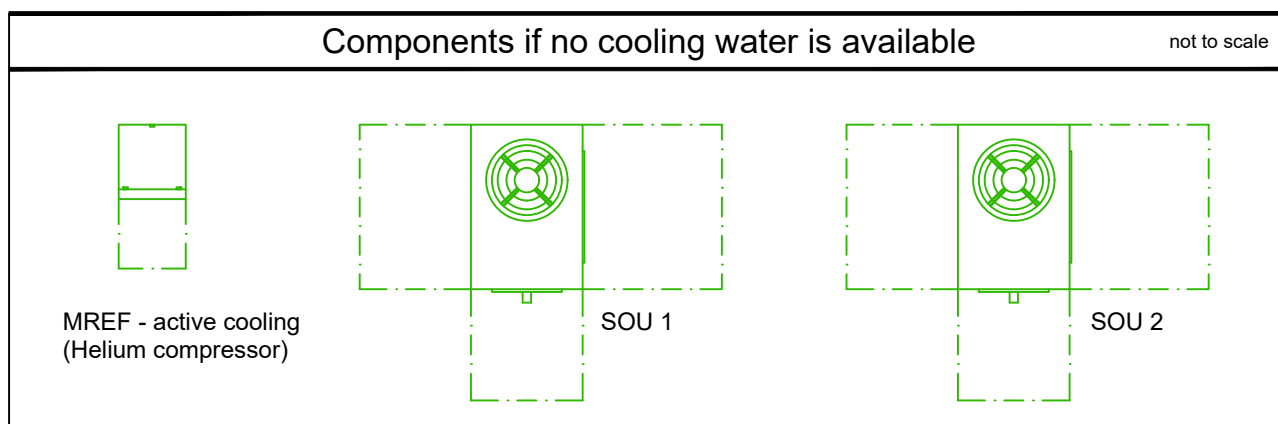
Largest Parts	Length	Width	Height	Weight
Magnet	171.7 cm	233.4 cm	203 / 212.4 cm	3250 kg
Fixed patient table	245 cm	75.6 cm	89.85 / 90.85 cm	180 kg
Fixed patient table (with vertical drive)	245 cm	75.6 cm	48 / 93 cm	240 kg
Mobile patient table	244.5 cm	77.3 cm	70 / 117.3 cm	293 kg
Cabinet GPA/IDU/EPC	156 cm	65 cm	198 cm	980 kg
MREF	48.3 cm	53.5 cm	67.7 cm	135 kg
SOU	130.8 cm	81.4 cm	155.9 cm	258 kg
Gradient coil (information for service only)	140 cm	Ø 89.2 cm		935 kg

Dimensions without safety loading.

Cooling Water Installation

Cooling water (Passive cooling)		
Central cooling water supply (e.g.in Hospitals) is already available or local chiller is available. The system requires chilled water 24 h a day, 7 days a week. An emergency cooling system is required or the local cooling circuit needs to be planned redundant.		
Water quality Primary water Recommendation	pH-value Hardness Chlorine portion Sulfate portion Filtration Water / antifreeze	: 6 to 8 : < 250 ppm CaCO ₃ , < 14 °dH : < 200 ppm : < 200 ppm : 700 µm : Depending on hospital chiller requirement
Water quality Secondary water	Water to be used Filtration	: Use only the delivered glycol/ water compound! (40% ethylene glycol / 60% water) : 700 µm
IDU	Heat dissipation to water Water flow rate Primary water temperature Primary water pressure Pressure loss across IDU Min. water flow rate for the He-compressor operation Heat dissipation for He-compressor operation only	: 34 kW : 70 - 90 l/min +/- 10 l/min : 6 to 14 °C : < 6 bar : < 1 bar typical 0.8 bar : 15 - 20 l/min : 9 kW (10 kW for 60 Hz)

Cooling water (Active cooling)		
No central hospital cooling water or a local chiller is available. The system requires chilled water 24 h a day, 7 days a week. The 2nd SOU is required during normal examination but functions also as Backup chiller.		
Water quality	Water to be used Filtration	: Use only the delivered glycol/ water compound! (40% ethylene glycol / 60% water) : 700 µm
MREF + SOU 1 + SOU 2	Heat dissipation to water Water flow rate Water supply temperature Primary water pressure	: 34 kW : fixed setting : fixed setting : n.a.



Environmental conditions

Environmental conditions		
In the MR-area must be ensure following conditions (system during operation)		
Examination room	Room temperature Relative humidity Absolute humidity Air intake system Off-take installation height Air pressure	18 to 22 °C 40 to 60 % < 11 g / kg ~ 30% - 50% fresh air > 2000 mm 700-1060 mbar
Run supply air and exhaust air ducts via RF honey combs, galvanic separated. Location see RF-cabin plan of the manufacturer.		
Technique room	Room temperature Relative humidity Absolute humidity Air pressure	15 to 30 °C 40 to 80 % < 11 g / kg 700-1060 mbar
Control / Evaluation room	Room temperature Relative humidity Absolute humidity Air pressure	15 to 30 °C 40 to 60 % < 11 g / kg 700-1060 mbar
The operating values should be set within these limits and ventilation must conform to local standards and regulations.		
Air filtering	In the equipment area: filter classification EU 4 (ISO 16890-2 / part 2) to filter out dust particles > 10 µm. For the MR examination room observe the local regulations.	
Typical heat dissipation of the MR-components to the environment during an operation.	Examination room Control room Technique room	≤ 1 kW ≤ 0.15 kW ≤ 1.5 kW
An Air-conditioning system is required to meet the specified conditions. A separate air conditioning system for the equipment room is not necessary if an air exchange, e.g. natural air convection, is guaranteed.		

Electrical Installation

Power requirements			
Mains: TN-S	3/N/PE	AC 50/60 Hz $\pm$ 1 Hz	Connection value
Line voltage		400 V $\pm$ 10 %	Passive cooling 31 kVA
Line to line unbalanced		max. 2 %	Power consumption for time up to < 3 s 45 kVA
System passive cooling	Line impedance	$\leq$ 420 m Ω	Connection value
			Active cooling 53 kVA
			(Including SOU 1 + SOU 2)
System active cooling	Line impedance	$\leq$ 420 m Ω	Power consumption for time up to < 3 s: 75 kVA
			Measurement sequences < 3 s.
The size of the terminals in the EPC are designed for 50 mm ² .			Only copper cables are allowed.
Cable cross section is to be determined by national regulation and calculation.			

Room lighting
Ambient lighting in rooms with diagnostics or with workstations must comply with the respective local and national regulations. General requirements like the needed intensity of illumination - adjustable, reproducible, flicker-free or a limitation of dazzlings and reflections etc. have to be observed (EN 12464-1, DIN 5035-7).

Noise Emission Values

Noise emission values			
If required, noise reduction should be realized based on the noise emission values as specified.			
Average values across 8 hours	Examination room	Control room	Technique room
	$\leq$ 80.4 dB(A)	$\leq$ 55 dB(A)	$\leq$ 65 dB(A)
Noise emission @ 10 m distance: SOU1 60 dB(A), SOU1 + SOU2 63 dB(A)			

Fringe Field

Requirement for magn. field level warning signs in the control zone ≥ 0.5 mT/ 0.9 mT

Limit for persons with cardiac pacemaker.

If the magnetic flux density in a given area exceeds 0.5 mT or 0.9 mT, it is necessary to display warning signs and restrict access in accordance with local regulations.

Fringe field distribution MAGNETOM Flow.platform

Fringe field	Distance in m from the magnetic center in direction of		
	X axis	Y axis	Z axis
40 mT	1.32	1.32	1.71
20 mT	1.43	1.43	1.95
10 mT	1.56	1.56	2.21
5 mT	1.70	1.70	2.52
3 mT	1.83	1.83	2.78
0.9 mT	2.24	2.24	3.52
0.5 mT	2.50	2.50	4.0
0.05 mT	3.88	3.88	6.76

Iron shielding -z-axis

In case of iron shielding behind the magnet, a minimum distance of 200 cm must be kept from iso center to the shielding.

Siting Requirements

Siting requirements for the magnet

The siting of the magnet must be such that during operation neither external influences affect the homogeneity of the magnetic field nor the safety of persons and/or the functioning of sensitive equipment can be affected by the stray magnetic field.

Disturbing influences on the magnetic field

Static

E.g. steel beams, reinforcements, especially beneath the magnet. Partially correctable by shimming of the magnet and/or compliance with minimum clearances/maximum weights.

Dynamic

E.g. moving ferromagnetic objects, electrical wiring, transformers. Avoidable when minimum clearances are observed. Minimum distance depend on moving direction and magnet orientation. If distances are not kept please contact the Siemens Healthineers Planning Department.

	Object	Minimum clearance		Max. weight
		radial (X/Y)	axial (Z)	
Guidelines for minimum clearances and maximum weights	Water cooling system	4,0 m	4,0 m	
	Wheelchairs, beds, angiography systems	4,9 m	5,8 m	
	Carts up to approx. 200 kg	5,3 m	6,5 m	
	Transformers < 1600 kVA	5,0 m	5,0 m	
	AC cables < 1000A	2,5 m	2,5 m	
	Cars up to approx. 900 kg, CT	5,5 m	7,5 m	
	Trucks up to approx. 4500 kg, Lifts	6,2 m	9,0 m	
	Cyclotron	20,0 m	20,0 m	
	Street cars, trains	40,0 m	40,0 m	#1
	Angiography systems with magnetic navigation	30,0 m	30,0 m	
	Reinforcement distributed in thickness of floor slab	> 1,20 m below magnet center #2		≤ 100 kg/m ²
	Steel beam	> 1,20 m below magnet center #2		≤ 100 kg/m

#1 The DC disturbances must not exceed a peak-peak value of 1250 nT (axial) and 2500 nT (radial). Occasionally these values might be exceeded although the minimum distances to DC sources are kept as stated in the planning guide. Please contact the Siemens Healthineers Planning Department if the distances to trains, tramways or subways are smaller than 100 m.

#2 This minimum distance is required for shimming.

Distance for magnetic shielding has to be adjusted according to individual shielding requirements.

Minimum distance between MAGNETOM Flow. to other MAGNETOM systems in [m] from magnet iso-center						
Magnetic field intensity in [T]	direction	3 T		1.5 T	0.55 T	7 T
System type		Vida, Lumina, Skyra, Vida Fit	Prisma, Trio Tim	all systems	Free.Max Free.Star	Terra Terra.X
distance from magnet iso-center	X/Y	4 m	5 m	4 m	4 m	7 m
	Z	6 m	7 m	6 m	6 m	12 m
No magnet is ramping during the other runs applications! Shim is only optimized with both magnets ramped up during the shimming procedure.						

Guidelines for max.Permissible Magnetic Flux Density (mT)			
mT	radial (X/Y)	axial (Z)	
40	1.32 m	1.71 m	Servoventilator
20	1.43 m	1.95 m	Defibrillator
10	1.56 m	2.21 m	RF-filter plate
5	1.70 m	2.52 m	MR electronics cabinet (Siemens Healthineers) GPA/IDU/EPC, MREF
3	1.83 m	2.78 m	Small motors, watches, cameras
0.9	2.24 m	3.52 m	Pacemakers, limit for public access
0.5	2.50 m	4.0 m	Pacemakers, limit for public access
0.05	3.88 m	6.76 m	Gamma cameras, linear accelerators
The magnetic stray field is present in all three dimensions around the magnet and can be reduced by a magnetic shielding. Typical lines of constant magnetic flux density are shown in the drawing. This represents the ideal field distribution in air, which can be distorted by the presence of steel in the building. Magnetic field specification depends on manufacturer.			

Disturbances caused by the stray magnetic field
All equipment and systems whose functions could be influenced by external magnetic field must be taken into consideration. The maximum permissible magnetic flux density depends on the sensitivity of each system component and must be clarified if necessary with equipment manufacturer.

Site inspection
In critical cases the site must be inspected on customer's expense by Siemens Healthineers or one of Siemens Healthineers appointed representatives to ensure basic suitability on the site. This inspection is exclusively concerned with the measurement of the magnetic and radio frequency interference and building vibrations. This inspection of other construction requirements, in particular the static and air conditioning and also the performance and supervision of on-site installation preparations and the later compliance with the basic operating requirements is not our responsibility.

RF-Shielding

RF-shielding

An RF-shielding (faraday cage) is required for the MR-examination room. This shielding protects the environment from RF interference and conversely protects the MR system from external interference.

Required attenuation: >90 dB over the frequency range 15 to 128 MHz (>100 dB at Co-Siting).

These values must be certified by measuring before the MR system is installed.

RF-shielding components (doors, windows, interfaces) and complete modular RF-cabins can be supplied on request by Siemens Healthineers.

RF-Door

All RF-doors leading into the examination room have to be equipped with a door switch for indicating the closed / open position of the RF-door! It must be possible to lock the RF-doors from the outside. In addition to that it must always be possible to open the RF-door without key or additional devices in any cases from the inside!

The opening direction of the RF-door has to be to the outside of the RF-room.

Doors that open inwards is a safety risk due to room overpressure. For these rooms a pressure relief panel 600 mm x 600 mm (minimum size) must be installed into the RF cabin.

The RF-door is an important component for a good image quality and also for safety aspects. The customer/user of the MR system has to be informed to maintain the maintenance intervals given by the RF-room enclosure manufacturer. This will guarantee a correct function of the RF-door.

For the examination room at least one door with a minimal finish entrance width of 100 cm is required. (120 cm is recommended)

Flooring

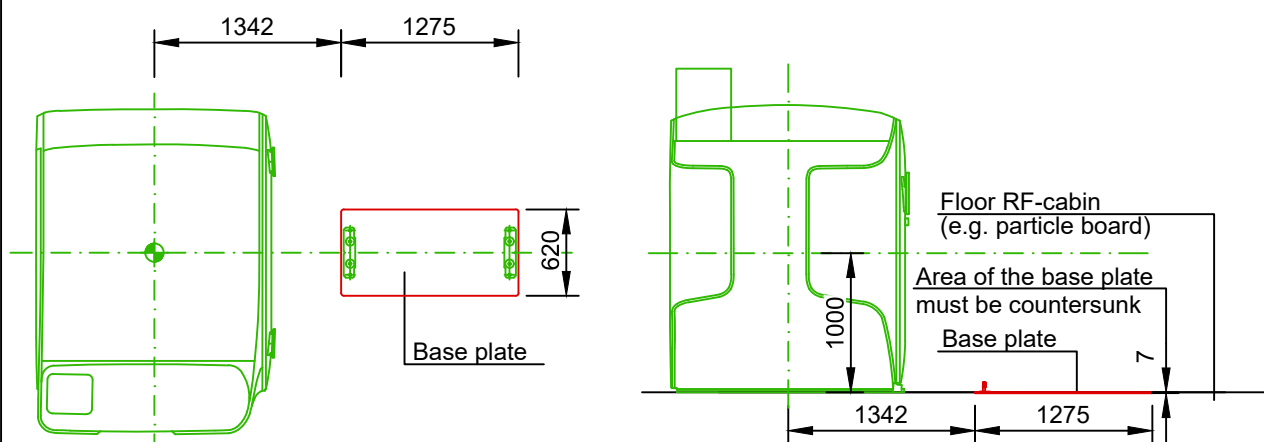
An antistatic floor covering is necessary. The floor in the vicinity of the magnet and patient table (3 m x 5 m) must be levelled to within max. ± 1.5 mm.

The loading capacity of the flooring must be designed with the weight of the respective system components in mind.

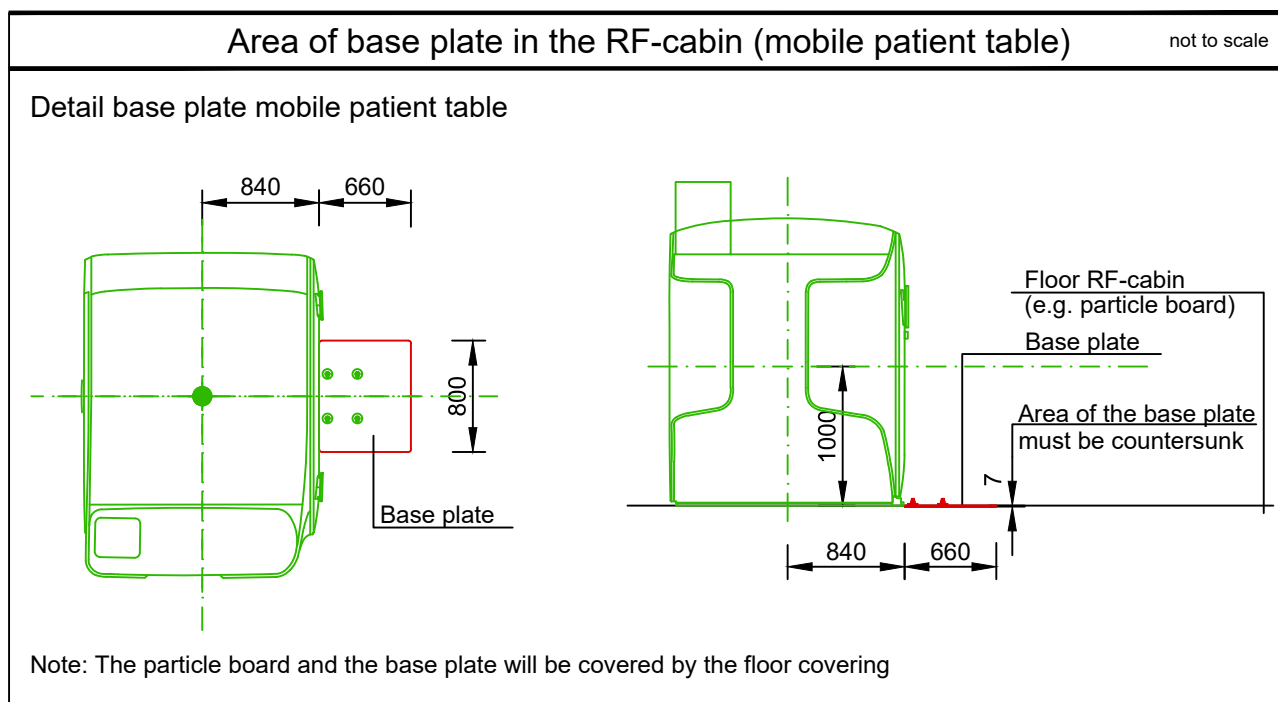
Area of base plate in the RF-cabin (fixed patient table)

not to scale

Detail base plate fixed patient table



Note: The particle board and the base plate will be covered by the floor covering



General Information

Display screen workstations

For setting up display screen workstations, take account of the guidelines in the Display Screen Workstation directive as well as any national regulations (e.g. EN ISO 9241-5).

Smart Remote Services (SRS)

Smart Remote Services (SRS) is used for remote diagnostics as well as remote service to provide highest system availability. Requirements:

- Broadband connection (minimum 10 Mbit/s down- and upstream, optimum 50 Mbit/s down- and upstream) without time or volume limitations
- The computer hosting of the Teamplay Receiver requires access to the hospital intranet and the internet. It should have a at least 6 Mbits/s upstream to the internet and at least 100 Mbits/s downstream from the internet.
- Router (for exclusive use with SRS)

Data protection and security is defined in the Smart Remote Services security concept.

Network Integration

The Siemens Healthineers components are using TCP/IP Protocol, a 100/1000 Mbit/s switched Ethernet network and static IP addresses.

The required network cabling (min. CAT 5 TP) has to be provided on site. Media converters, which are needed for using fibre optic cabling, are not in scope of delivery.

To prepare the implementation of the new system into the existing network environment, the availability of the needed network data at least two weeks before starting the installation is mandatory.

This is the only way to ensure a seamless integration of the new system into the workflow of the department.

Cryogenics

Liquid helium (He) and also helium gas are required for operation of the superconducting magnet. The transport of these liquid gases to the examination room requires the use of special vessels. The size and weight of the vessels should be checked with the local cryogen supplier.

If the magnet can not be filled from the left service side, a long helium transfer line has to be ordered for the refilling process!

Safety distances

Distances from moving parts of the medical device to walls, furniture and other equipment have to be kept to avoid injuries by crushing in compliance with local regulations, e.g. a minimum distance of 50 cm according to EN ISO 13854.

It is the customer's responsibility to ensure the above requirements are followed.

This is to avoid the risk of injury.

If safety distances are not maintained **appropriate on-site safety measures** have to be put in place. Clear visible markings according to national guidelines, e.g. crushing warning signs, hazard warning tape, hazard area cordon, safety mats, may be required.



Site readiness guidelines:

The following general conditions are necessary to have the status of "Ready site":

- 1) Proper power available at Siemens Healthineers Equipment Power Cabinet location and all power outlets functioning.
- 2) Air conditioning / humidification systems complete, tested and functioning properly according to Siemens Healthineers specifications.
- 3) RF enclosure, infrastructure of the examination room complete.
- 4) Plumbing complete except for any final connections to Siemens Healthineers equipment.
- 5) All cable trays, ducts, conduits correctly sized, located and installed according to the Siemens Healthineers drawings.
- 6) Room for equipment installation and immediate vicinity is dust-free and is to remain so for the duration of the installation.
- 7) Customer approval for Siemens Healthineers Remote Service (SRS) connection and customers IT. Contact information and IP address established.

Notes on preparations for installation

Contracts for performing and supervising on-site installation preparations should be concluded with technically competent companies by the customer. The customer is responsible for timely and proper completion and supervision of all preparations for installation at the construction site in observance of all applicable legal regulations (e.g. X-ray regulations, radiation protection regulations) and all applicable general recognized rules of technology (e.g. VDE regulations, DIN standards).

Execution and supervision of installation preparations at the construction site and later observance of the standard operating conditions are not included in our duties. The customer is responsible for checking the static calculations and, where applicable, the air conditioning in the building to be equipped.

On account of certain regional limitations of sales rights and service availability, we cannot guarantee that all products included in this brochure are available through the Siemens Healthineers sales organization worldwide. Availability and packaging may vary by country and are subject to change without prior notice. Some/all of the features and products described herein may not be available in the United States.

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

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), there can be no guarantee that other customers will achieve the same results.

The customers cited are employed by an institution that might provide Siemens Healthineers product reference services, R&D collaboration or other relationship for compensation pursuant to a written agreement.

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