Cisco Webex Room Panorama

Room Preparation Guidelines

This document outlines the basic guidelines for a successful installation and use of the *Cisco Webex Room Panorama* system.

In short, these guidelines deal with room design, room size, tables and seating, acoustic guidelines and microphone placement, and lighting.

Also, information that you need in order to prepare the room for the physical installation is included, such as system size and weight, how the system is fastened to the wall, and power and Ethernet requirements.

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Part 1: **Room considerations**

Room design considerations

We have developed a set of guidelines how you can create a premium and comfortable room for conferencing and local meetings. Amongst other, we have considered the product itself, the room in which it is used, the table shape, color, and finish when designing the premium Room Panorama experience.

New Panorama generation

The new *Cisco Webex Room Panorama* and *Room 70 Panorama* are designed to make your video conferencing room more versatile and flexible also for local meetings.

We have designed tables that ensure good communication locally in the room as well as to remote conference participants. Everybody has a good view of the content screen, which is placed above the main screens.

Classic video conferencing room

If you want a classic video conferencing room, we recommend that you install the *Cisco Webex Room 70 Panorama*.

We have designed a table to support the traditional video conferencing use case, with users sitting shoulder to shoulder, facing the system. We allocated the same premium seating space for each participant. In this set-up, the content screen is placed below the main screens.

Each customer is unique. It is important to involve the local workplace resources team and a skilled integrator to refine details of the set-up. Our drawings don't consider where the room entrance is, and some customers may have special universal design and accessibility requirements. It is important to take into account the holistic integration, and avoid combining our room elements in a way that compromise accessibility.

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Recommended room size

The recommended room size depends on the video system and the chosen table.

We recommend three table widths to accommodate different office spaces. All tables are tapered.

- ● Maximum width 2.5 m (98.4 in.)
- ● Maximum width 2.2 m (86.6 in.)
- ● Maximum width 1.9 m (74.9 in.)
  (not recommended for Room Panorama; only for Room 70 Panorama)

Read more in the "Tables and seating" chapter.

Room width

We have defined three levels of space surrounding the system and table, and we allocate more width for the meeting participants in rooms with larger tables.

The room width for the different levels of surrounding space is shown in the illustration.

- · Premium room size: The premium room size is adding extra space around the product and the table to ensure a spacious and comfortable experience.
- · Standard room size: The standard room size is fulfilling accessibility requirements.
- · Minimum room size: The minimum room size compromise some level of accessibility, while maintaining the product experience.

Room length

The length of the room depends on the size of the table and if you want the premium, standard or minimum room size. We offer tables for 6, 8, 10, 12, or 14 persons.
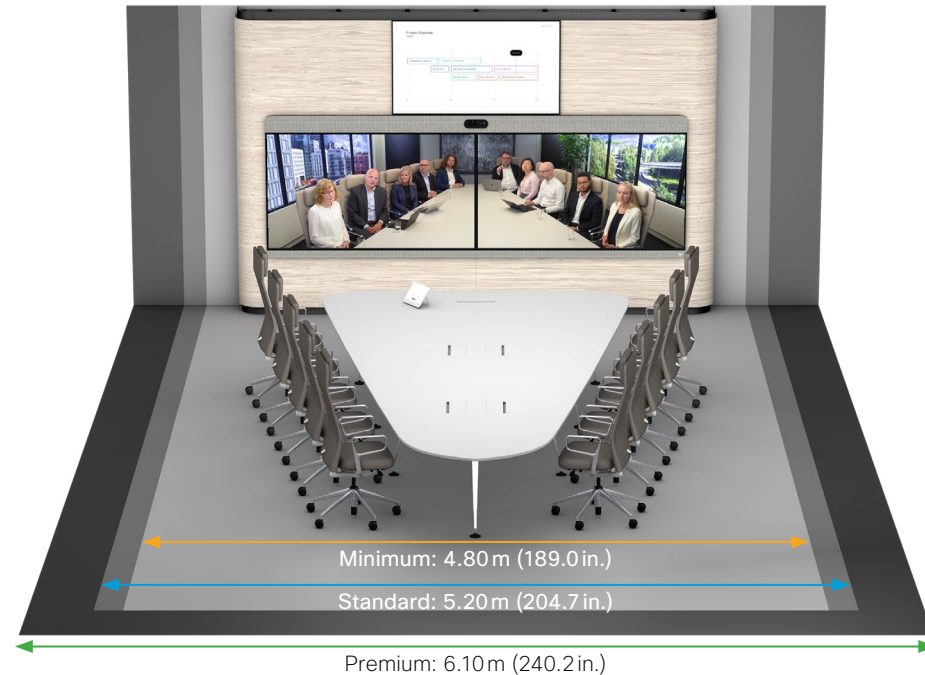

Minimum: 4.80 m (189.0 in.)

Standard: 5.20 m (204.7 in.)

Premium: 6.10 m (240.2 in.)

Table size	Room size – width × length [m (inch)]		
	Minimum room	Standard room	Premium room
6 persons	4.8 × 6.2 (189.0 × 244.1) ▶	5.2 × 6.5 (204.7 × 255.9) ▶	6.1 × 7.0 (240.2 × 275.6) ▶▶
8 persons	4.8 × 7.3 (189.0 × 287.4) ▶	5.2 × 7.3 (204.7 × 287.4) ▶	6.1 × 7.8 (240.2 × 307.1) ▶▶
10 persons	4.8 × 8.2 (189.0 × 322.8) ▶	5.2 × 8.2 (204.7 × 322.8) ▶	6.1 × 8.7 (240.2 × 342.5) ▶▶
12 persons	4.8 × 9.0 (189.0 × 354.3) ▶	5.2 × 9.0 (204.7 × 354.3) ▶	6.1 × 9.5 (240.2 × 374.0) ▶
14 persons	4.8 × 9.9 (189.0 × 389.8) ▶	5.2 × 9.9 (204.7 × 389.8) ▶	6.1 × 10.4 (240.2 × 409.4) ▶

▶ Recommended table width: 2.2 m   ▶ Recommended table width: 2.5 m

* All dimensions are after adding acoustic treatment to the walls.

Recommended room size

Room height

The ceiling height must be minimum 2.70 m (106.3 in.) to allow for the 65″ content screen above the main screens.

Table position

The table should be aligned to the product centerline, and placed 1.5 m (59.1 in.) from the system.

Read more in the "Tables and seating" chapter.

Avoid objects along the product centerline

For the best viewing experience, we recommend that you avoid placing objects along the center line of the product, neither on the table, on the rear wall, or otherwise in the room. Also avoid wall patterns crossing the center line, and people sitting at the end of the table.

We have optimized the system to show people at a natural size. The two camera lenses are adjusted so that objects at the rear table edge appear with natural width. Closer to or further away from the camera, the image will be slightly distorted around the centerline:

- As you get closer to the camera, objects close to the center line will appear in both camera views.
- As you move further away, objects close to the centerline will not be fully captured.

Minimum 2.70 m (106.3 in.)

1.5 m (59.1 in.)

Product centerline

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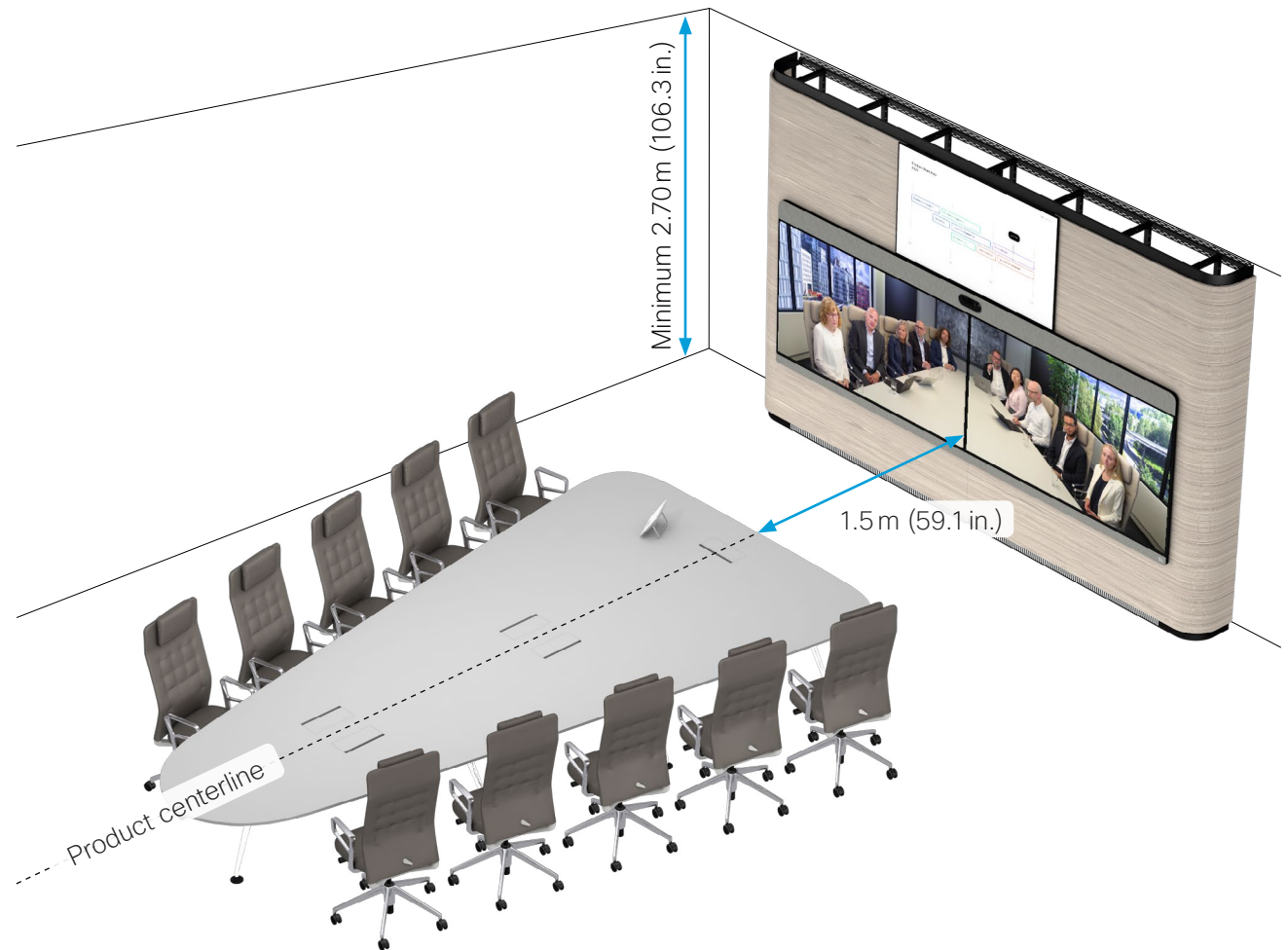
Re-using a CTS, TX, or IX immersive room for Panorama

Many customers want to upgrade their existing CTS-3x00, TX-9x00, and IX-5x00 rooms with the new *Room Panorama* system or the smaller *Room 70 Panorama* system.

There are a few considerations to make:

- The minimum ceiling height requirement for installing a Room Panorama system is 2.7 meter (106.3 in.).
- The CTS, TX and IX systems were often installed in dedicated studios, with no windows, not natural light, and purpose-built furniture to support the immersive experience.

    If your immersive room is built like this, Cisco recommends you to re-purpose that space instead of using it for Room Panorama. The room could be built into quiet rooms, huddle spaces, or other smaller spaces that are used only for shorter meetings and where people are not staying for longer periods of time.

- The Room Panorama systems has been designed for normal meeting rooms.
- The systems should be installed into existing comfortable and spacious meeting rooms with windows, natural light, and a "normal" meeting room table.

    A Panorama room should be the most comfortable room for users to be in for longer periods of time, to have local meetings in, and to use for video meetings.

If you still want to upgrade your existing CTS, TX or IX room to a Panorama room, here are a few recommendations:

- While the existing Immersive system normally is installed at the long wall of the room, the Panorama system should be installed at the short wall of the room.
- Look at all the different room size options in this document and find the one that match your existing space.
- Remember that you need 2.7 meter (106.3 in.) ceiling height to accommodate the content screen above the main screens. *

    See an example in the "Fitting Room Panorama in an IX5000 room" appendix.

- If you do not have the appropriate ceiling height, you can consider the Room 70 Panorama with the content screen below the main screens. This set-up requires a traditional immersive table for up to 6 persons.

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* This is 30 cm (11.8 in.) higher than the minimum height for an IX5000 room.

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Part 2: Tables and seating
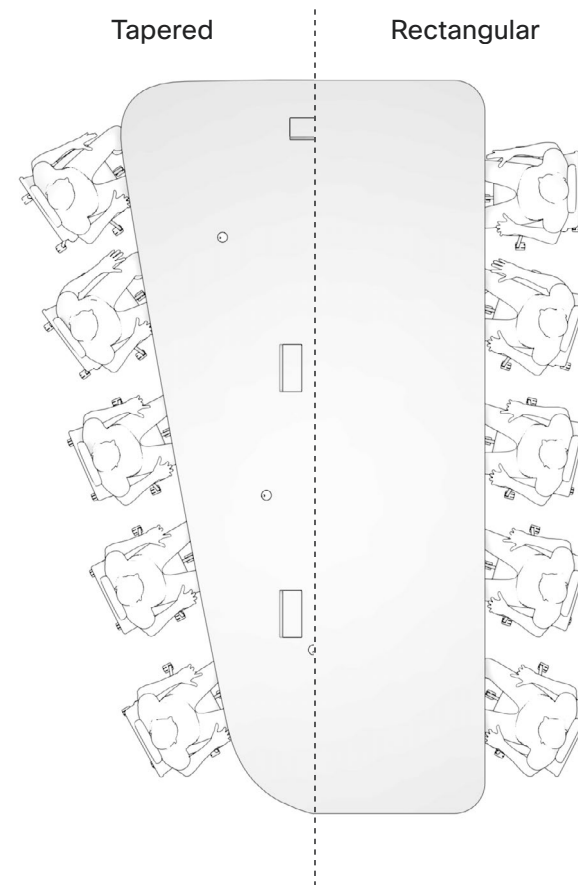
Tables and seating

Tables

The table design plays an important role in the product experience. With Webex Room Panorama, we wanted to create a table that works not only for video conferences, but also for local meetings.

We recommend a **tapered table shape**. The tapered table shape is ideal for both video conferencing and local meetings.

- Supports discussions around the table
- Gives all participants free view of the screens
- Free line-of-sight from the camera to each participant.
- Free line-of-flight from the loudspeaker system to each participant.
- Good conditions for tracking (face detection and audio localization).

With a straight table, people in the room naturally fan out to be able to see the screens, while the tapered table supports the natural seating positions of the people.

Refer to the "Recommended vendors" appendix to find a list of suggested table vendors.

Tapered   Rectangular

Tables and seating

Tables *(cont.)*

Shape and width

We recommend tapered tables in three different widths. As the table gets wider, it becomes more tapered. This is a better table arrangement for video conferences, and it gives the participants a better view to the screens.

The narrowest table is not recommended for Room Panorama; only for Room 70 Panorama.

Capacity

For all the three table widths, the same design is used for tables for 6, 8, 10, 12, and 14 persons.
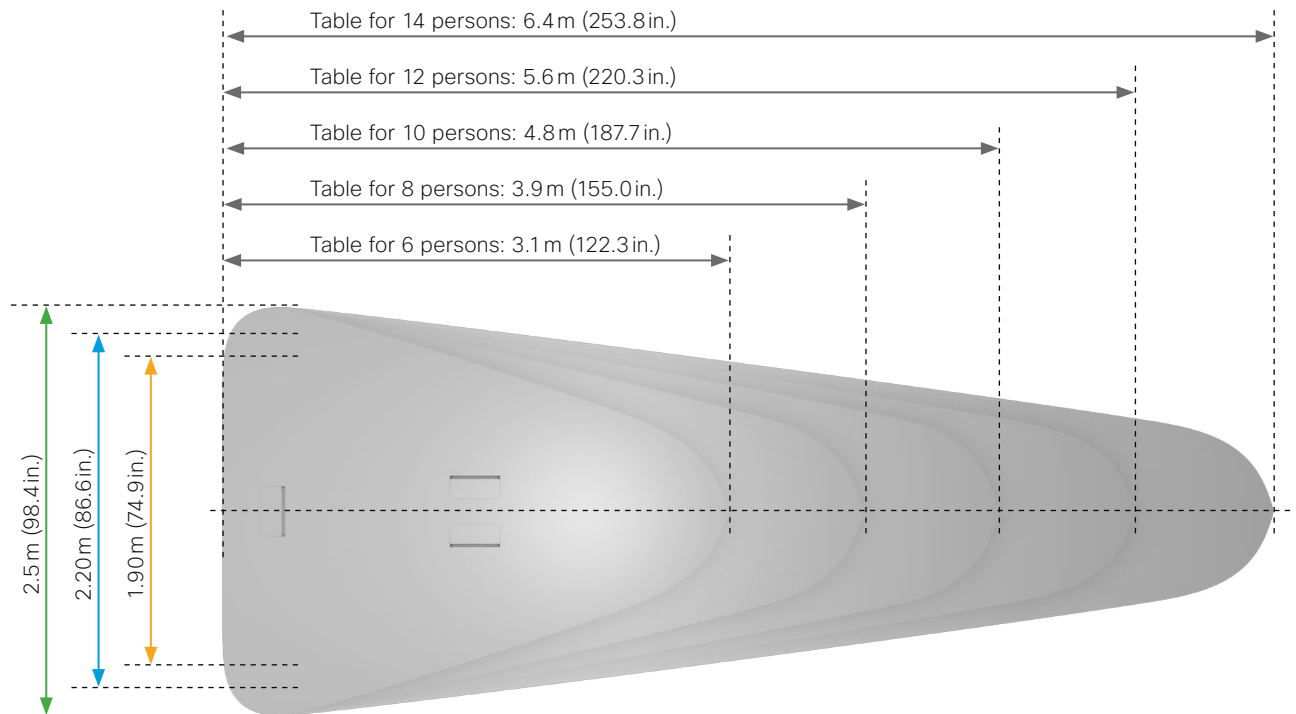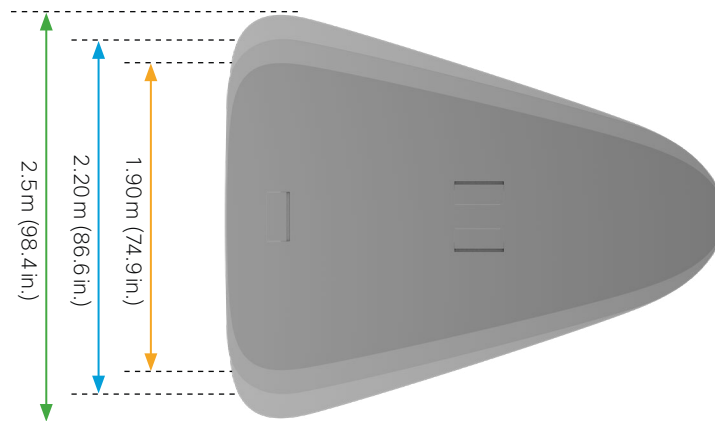
Find illustrations with dimensions in the "Room dimensions" appendix.

Color, material, and finish

The table color should give the best exposure for the people's faces. We have tested and validated this color from the Natural Color System color book for reference:

- NCS S2500-N

The table should have a smooth finish without any texture. We recommend a powdercoated finish to deliver a smooth monolithic surface finish all over the table top.

2.5 m (98.4 in.)

2.20 m (86.6 in.)

1.90 m (74.9 in.)

Table for 14 persons: 6.4 m (253.8 in.)

Table for 12 persons: 5.6 m (220.3 in.)

Table for 10 persons: 4.8 m (187.7 in.)

Table for 8 persons: 3.9 m (155.0 in.)

Table for 6 persons: 3.1 m (122.3 in.)

2.5 m (98.4 in.)

2.20 m (86.6 in.)

1.90 m (74.9 in.)

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Seating

With our recommended table designs, we allow for spacious and comfortable seating. Each table allocates 80 cm (31.5 in.) for each person.

However, if you allow some compromise of the premium comfort, you can add two more seats at each table set up. Then there will be 70 cm (27.6 in.) for each person.

We strongly recommend that nobody sits at the end of the table.

Ergonomics

For the best ergonomics, we recommend using chairs with headrest, swivel hinge, and coasters.

Comfortable chairs that allow meeting participants to sit back work very well with the 3-screen Panorama system, which has the content screen above the two main screens.

10 person table with premium level of comfort – 80 cm (31.5 in.) allocated for each participant.

Adding 2 persons to a 10 person table – 70 cm (27.6 in.) allocated for each participant.

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Part 3: **Wall preparation**

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Preparing the wall (page 1 of 4)

Due to the size and mass of the Panorama system, it must be installed by qualified personnel. The installer must determine whether the wall must be reinforced prior to the installation and calculate the number and type of screws required for a safe installation.

The product is fastened to the wall through three horizontal rails. The rails must be fastened so that they can safely support the product. In total, the product weighs close to 600 kg (1320 lb). When installed correctly, the system rests on the floor.

No obstructions

Once installed, the system covers the shaded area. There should be no obstacles in this area, not even baseboards / skirting boards.

The system will be fastened to the wall with screws in the areas marked with solid red color.

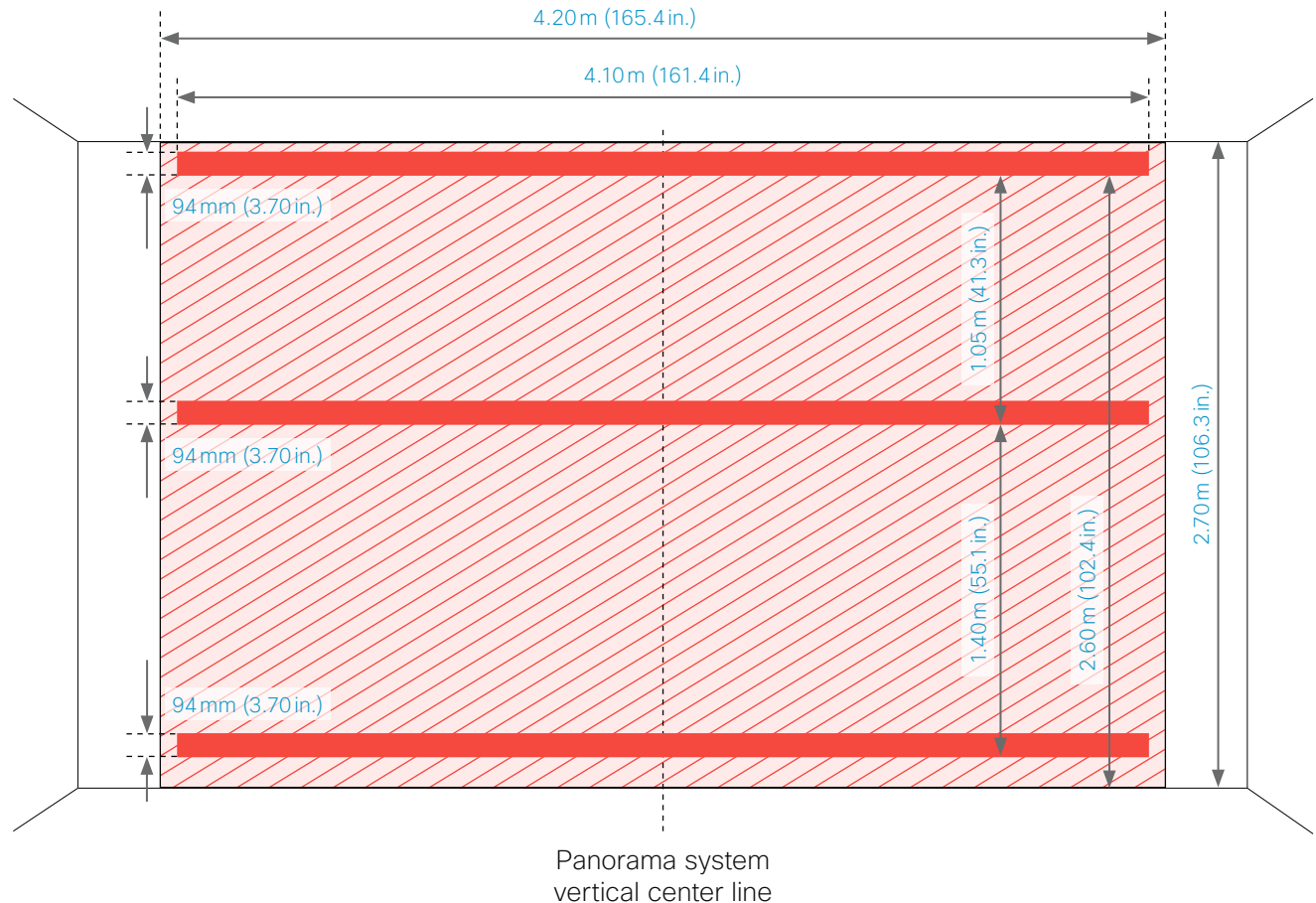See more details in the next pages.

Perfectly flat wall and floor

The rails must be level. If the wall is not perfectly flat, horizontally and vertically, this must be compensated for before you mount the rails.

The system has adjustable feet, which can compensate for the floor not being perfectly flat.

Socket outlets

You must install socket outlets for power and Ethernet in the shaded area. Their exact position is shown in the "Power and Ethernet" chapter.

4.20 m (165.4 in.)

4.10 m (161.4 in.)

94 mm (3.70 in.)

1.05 m (41.3 in.)

94 mm (3.70 in.)

2.70 m (106.3 in.)

1.40 m (55.1 in.)

2.60 m (102.4 in.)

94 mm (3.70 in.)

Panorama system vertical center line
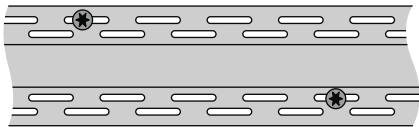
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Horizontal rails

Each rail is composed of three parts. All parts must be fastened securely to the wall. The number of screws depends on the type of wall.

Typical example for plaster wall:

- Upper rail: 4 + 8 + 4 screws
- Center rail: 4 + 8 + 4 screws
- Lower rail: 2 + 3 + 2 screws
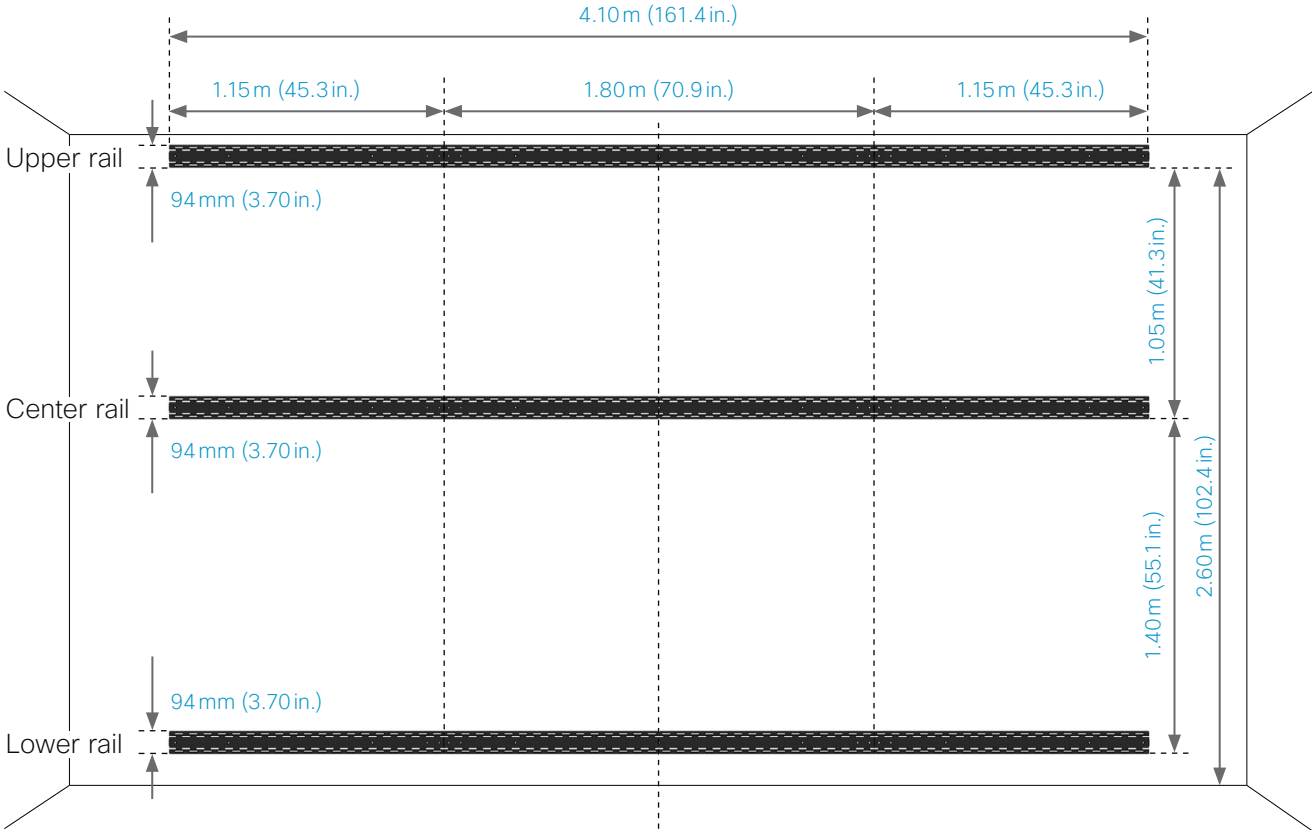
You can use any of the horizontal slots.

It is important that the rails are level. If the wall is not perfectly flat, horizontally and vertically, this must be compensated for before you mount the horizontal rails.

Front view of rail,
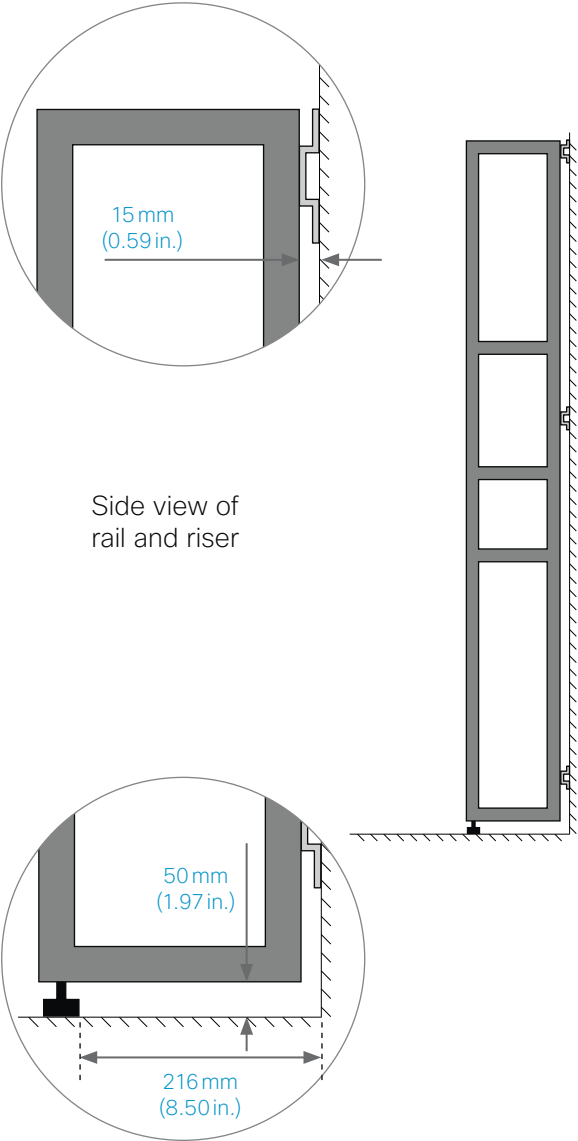fastened with screws

Side view of rail,
fastened with screws

4.10 m (161.4 in.)

1.15 m (45.3 in.)   1.80 m (70.9 in.)   1.15 m (45.3 in.)

Upper rail

94 mm (3.70 in.)

1.05 m (41.3 in.)

Center rail

94 mm (3.70 in.)

1.40 m (55.1 in.)   2.60 m (102.4 in.)

94 mm (3.70 in.)

Lower rail
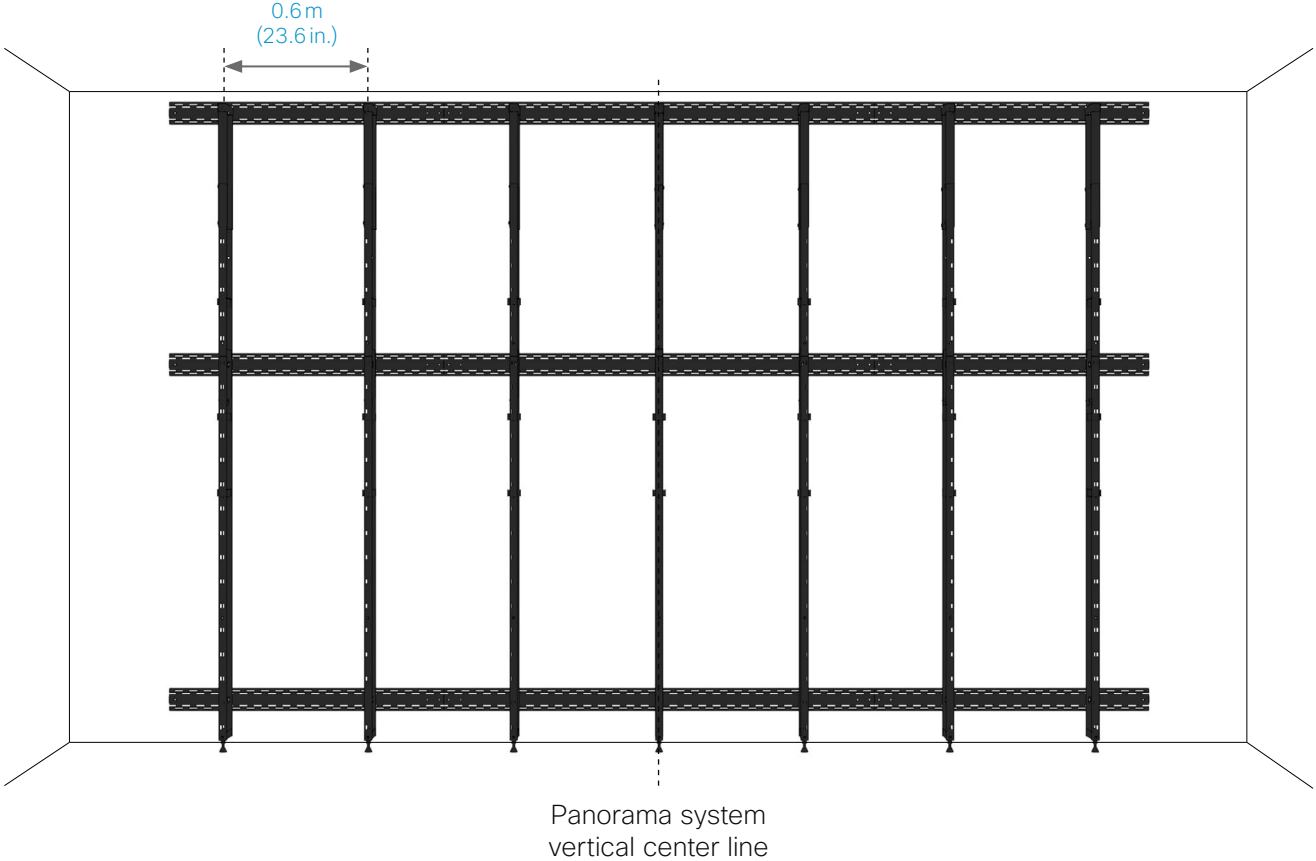
Panorama system
vertical center line

Preparing the wall (page 3 of 4)

Vertical risers

Seven risers hang on the rails. Their foot should be adjusted so that they rest on the floor.

15 mm
(0.59 in.)

Side view of
rail and riser

50 mm
(1.97 in.)

216 mm
(8.50 in.)

0.6 m
(23.6 in.)

Panorama system
vertical center line

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Wall panels

We offer cosmetic wall panels as an option when you buy Room Panorama. Alternatively, you can design and build your own custom wall.

Cosmetic wall panels

The cosmetic panels curve toward the wall on each side. They are adjacent to the wall all the way from bottom to top. See illustration.

You can choose between two types of finish:

- Wooden panels (light oak)
- Ready-to-paint panels

Read more in the "Cosmetic wall panel finish" appendix.

Custom wall

The custom wall must be designed to level at the same depth as the cosmetic wall offered by us. If not, the screen brackets and the hinge mechanism to access the components behind the screens will not work as they should.

Read more in the "Requirements for a custom wall" appendix.

4.20 m (165.4 in.)

2.70 m (106.3 in.)

A

A

A

A

350 mm (13.8 in.)

400 mm (15.7 in.)

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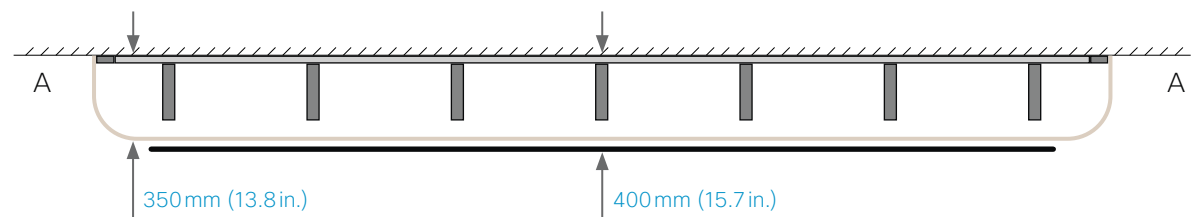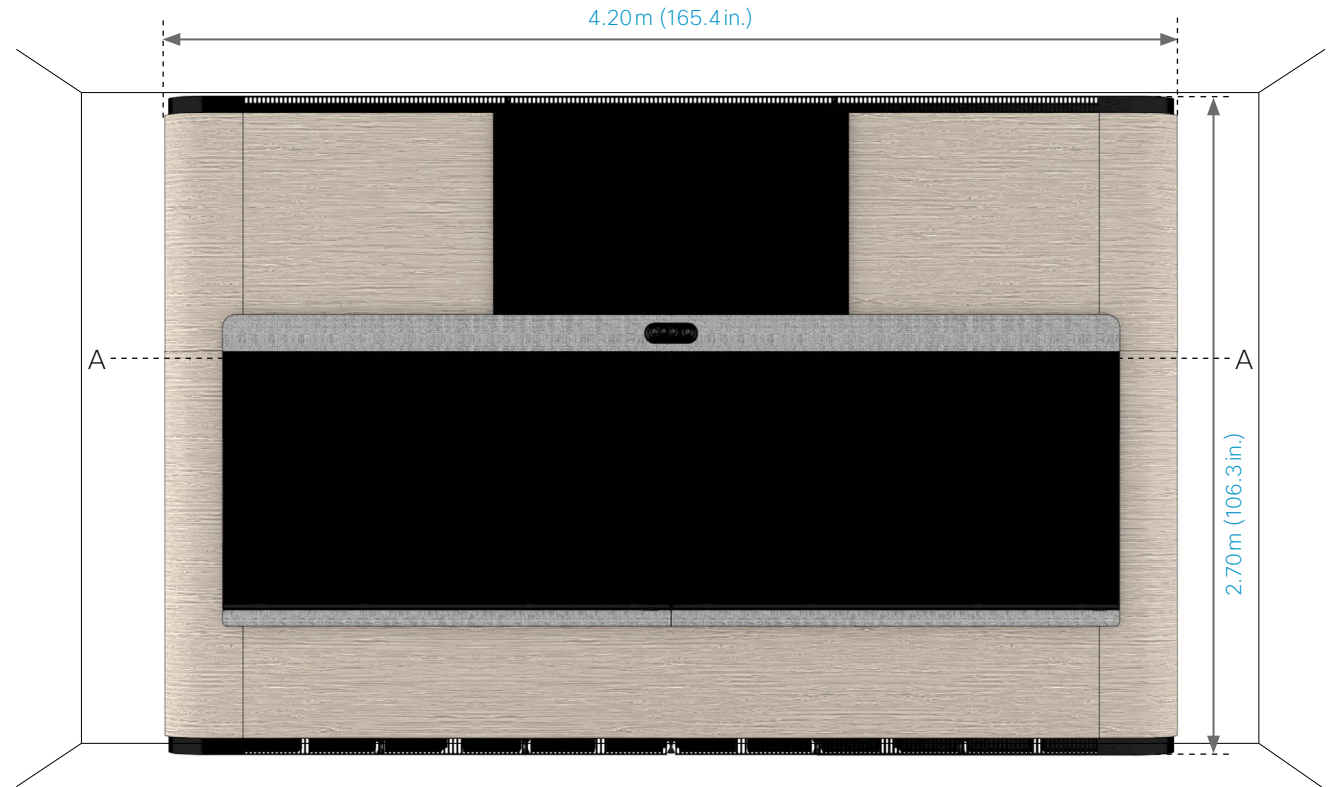
Power and Ethernet

Power

Wall socket outlets must be installed by a qualified electrician. Room Panorama consists of separately approved components. This requires each component to be connected directly to a wall socket outlet. You are not allowed to use a power strip (multi-socket extension cord).

Number of outlets

In total you need 7 power outlets on the wall. For flexibility and the possibility to distribute the load, we recommend at least 4 socket outlets on each side. In addition, you need one outlet on or close to the table.

The video system's content screen has an ungrounded plug. It shall preferably be connected to one of the sockets on the right hand side. The other equipment must be grounded.

Amount of power

The total amount of electrical power needed is (temporary figures; subject to change):

- 100 V, 60 Hz: 16 A / 1600 W
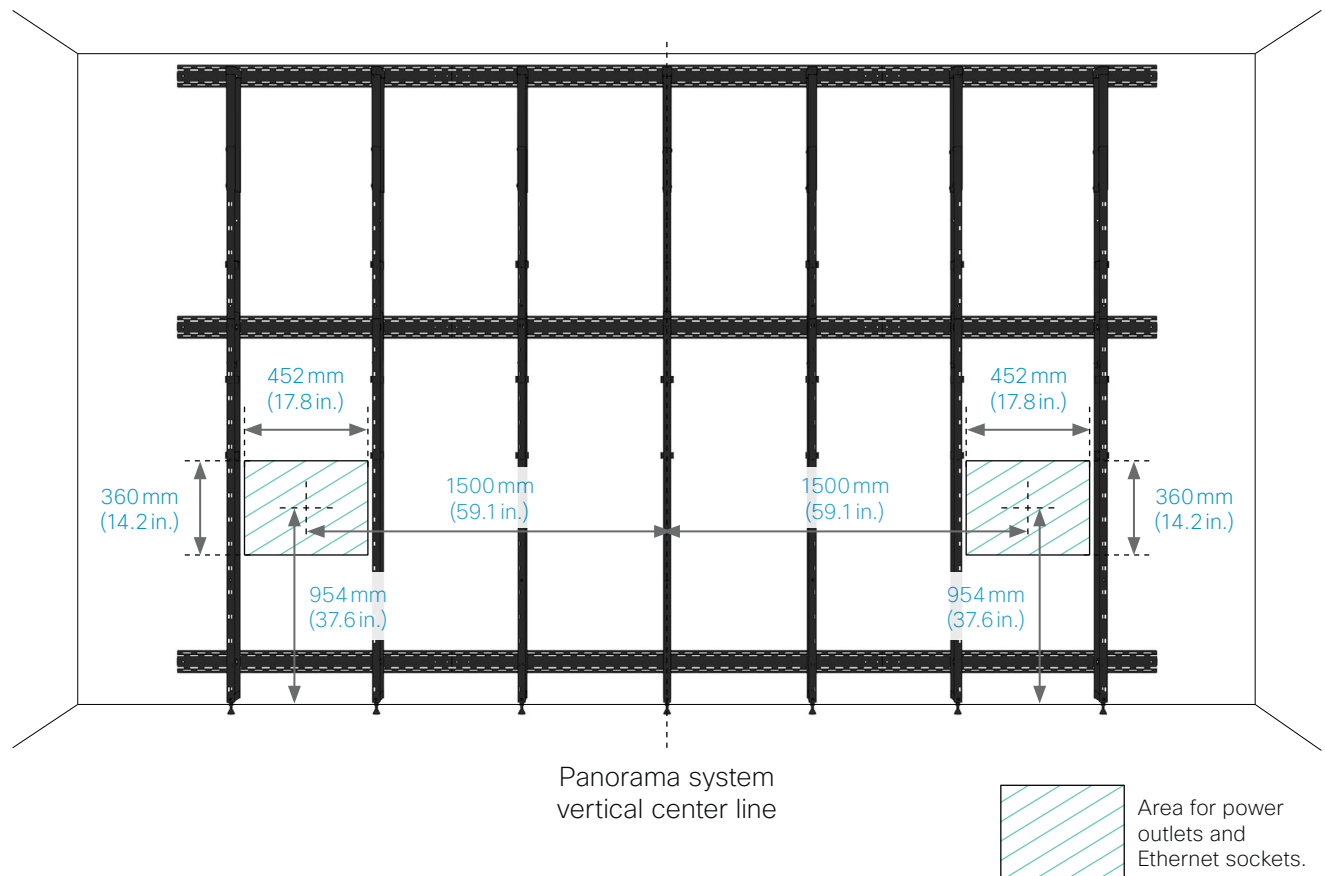- 240 V, 50Hz: 7 A / 1600 W

LAN/Ethernet

You only need one Ethernet socket on the wall. For flexibility, you may want to have Ethernet sockets on both sides.

The Ethernet bandwidth requirement is typically 20 Mbps, or higher.

Location of sockets

Sockets for power and LAN/Ethernet must be placed within the two shaded boxes, see illustration. These areas are hidden, but easily accessible, when the Panorama system is fully mounted. You just have to pull the main screens down to get access to the sockets.

452 mm (17.8 in.)
360 mm (14.2 in.)
1500 mm (59.1 in.)
1500 mm (59.1 in.)
452 mm (17.8 in.)
360 mm (14.2 in.)
954 mm (37.6 in.)
954 mm (37.6 in.)

Panorama system vertical center line

Area for power outlets and Ethernet sockets.

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Part 4: **Acoustic guidelines**

Acoustic room guidelines

These guidelines help you to get the best possible video conferencing experience and make your room a pleasant environment for both video calls and local meetings.

Understanding your meeting partners and being understood is crucial to the success of any meeting, whether it is a quarterly business review, sales pitch or a brainstorming session. Nothing does more to stop the flow of conversation than poor sound quality.

We work hard to ensure that our technology provides the highest quality audio and video in video conferencing. But every chain is only as strong as its weakest link, so let's make sure that your meeting room is on par with our technology.

The acoustic conditions of any space shape our experience in it. A conversation partner is easier to understand in a quiet, furnished room than in a busy restaurant with background noise, other guests, and hard wall and ceiling surfaces that reflect sound. The same applies to meeting rooms.

From an acoustic perspective, video conferencing rooms are more complex than ordinary meeting rooms. In a meeting room, the acoustic experience is defined by the properties of the room itself. The three most important acoustic factors are:

- Reverberation in the room (RT_{60})
  - The time it takes for sound to decay in the room
  - Defined by the room volume and sound absorption within the room

- Noise levels (background noise)
  - Noise from technical installations, such as air-conditioning, elevators, generators, and coffee machines
  - Noise from cooling fans on equipment, such as projectors, server racks, and other equipment

- Sound insulation between the room and the surrounding environment
  - Traffic noise, maintenance work, or people walking, talking and working outside the room
  - Assure confidentiality of information shared in the room

In a video conferencing room, however, the acoustic experience is defined by the combined effect of the above-mentioned factors of your room and the other meeting participants' room.

Consequently, acoustic requirements for video conferencing are stricter than for other rooms. What makes the acoustic experience more difficult to evaluate during a video call, is that certain aspects of the acoustic experience caused by your room may only be apparent to the remote meeting participants. Here are some examples of this:

- Reverberation: Longer reverberation times combined with larger distance between participants and the microphone in one room lead to reverberant sound on the remote site. This makes the participant more difficult to understand, which is fatiguing for the listener.
- Background noise: A noisy ventilation outlet above or close to a microphone makes it more difficult for remote meeting participants to understand the meeting partners.

For acoustic properties, we refer to limits satisfying requirements for *Class A* rating of rooms taken the following:

- Norwegian Standard NS8175, Acoustic conditions in buildings – Sound classification of various types of buildings.
- ITU H.TPS-AV, Audio/video parameters for telepresence systems.

These standards are consulted because they specifically address video conferencing rooms.

Class A rooms correspond to *sonically exceptionally good conditions in which participants rarely are disturbed by noise.* Acoustic and architectural consultants can use these guidelines to design a meeting room or improve an existing one.

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Reverberation time

Reverberation time is a measure of sound decay in a space. It is the time it takes for an abruptly stopped sound to decay by 60 dB.

Sound decay influences the perception of different environments and building types. Cathedrals, bathrooms and open outdoor spaces – they all sound distinctly different, and a good meeting room should not sound like any of them.

Reverberation is the result of sound reflections from boundaries in the room. For speech intelligibility, early reflections arriving shortly after the direct sound can be helpful. Long reverberation tails are detrimental to speech intelligibility, because words bleed into one another.

RT_{60} values are expressed for one-octave bands from 125 Hz to 4 kHz. The unit is seconds.

For video conferencing rooms with a ceiling hight between 2.7 m and 3.6 m, the RT_{60} should be between 0.3 s and 0.4 s. This recommendation is based on NS8175, which states a maximum RT_{60} of 0.11 times the average room height.

For the octave band centered on 125 Hz, the reverberation time may exceed the value of the higher bands by 40%. Thus the maximum permissible RT_{60} value for the 125 Hz octave band is 0.4 s to 0.55 s.

In rooms fulfilling the above requirements for RT_{60} values, the local acoustic experience is pleasant. This also allows for good sound quality during video meetings. RT_{60} values shorter than 0.3 s may make it more difficult for local participants to hear each other, especially when the speaking person is facing another direction.

Sound absorption

The combined sound absorptivity of surfaces in the room and the placement of absorbing materials define the reverberation time.

Sound absorptivity, the measure of how much sound energy a material absorbs rather than reflects, is given as the noise reduction coefficient *NRC* or sound absorption coefficient α. The values range from 0 (a perfectly reflective material) to 1 (a perfectly absorptive material). It should be noted that single-number *NRC* or α values do not consider frequencies below 250 Hz.

- Hard, rigid, sealed surfaces, such as painted concrete, marble, or glass reflect most of the incident sound energy.
- Soft, compliant, and porous materials, such as fiberglass, foam, or tuned panels absorb incident energy.

Although they may sometimes seem at odds with the aesthetics of modern architecture, acoustic considerations are crucial for the suitability of a room as a meeting space and should be part of the design process from the start. Good design balances the aesthetic and acoustic demands to ensure a pleasant experience.

There are many different types of absorbers and techniques for using them. Transparent panels, absorbers covered with fabric or custom print, wooden panel absorbers or microperforated surfaces can be matched to suit the desired aesthetics of the workplace and create the required acoustic conditions.

Resonant absorbers are designed to dampen sound at certain frequencies, whereas porous absorbers are usually most effective at higher frequencies. In general, absorbers become more effective at lower frequencies with increasing thickness or when placed at a distance from a hard surface. Therefore, we recommend mounting absorbers such that they protrude at least 10 cm / 4 in. from the hard surface behind.

The ceiling of the room should be fitted with acoustic ceiling tiles satisfying *Sound Absorption Class A* or an *NRC* of 0.9 or above.

In addition, acoustic absorption should be placed on the walls. An area corresponding to half of the ceiling area should be covered by absorbers on adjacent walls. Avoid placing it only on opposite walls, as this leaves the other pair of opposing walls untreated. This causes flutter echo, where sound bounces between parallel surfaces. Mounting panels at an angle to the wall reduces the area of parallel surfaces and thus reduces flutter echo. Angles of 4 to 5 degrees are sufficient to break up flutter echo.

Evenly distributed absorption at the height of the participants and microphones is most effective. For spaces with glass walls, microperforated transparent absorbers help retain the aesthetics.

A carpeted floor is often thought of as sound absorption. Most carpets are not thick enough to provide substantial absorption at frequencies of interest for speech. Nonetheless, carpets and other soft surfaces dampen sound from footsteps or moving chairs, which helps reduce distracting noise.

Noise levels

Low noise levels are essential for a good meeting experience. Intolerably high noise levels negatively impact meeting participants' ability to follow the meeting. Further, they may lead to listening fatigue during longer meetings.

The limits are maximum permissible levels for the total noise in the room.

- Noise from technical installations, such as air-conditioning, elevators, generators, and coffee machines
- Noise from cooling fans on equipment, such as PCs, projectors, server racks, and other equipment
- Background noise from traffic

When adding equipment to the room, be aware of noise this may add.

The limits are for A-weighted, time averaged levels (Lp,AT). The averaging period corresponds to the time of use and realistic environmental conditions. This means that a meeting room used during the daytime should fulfill the requirements under conditions resembling realistic occupation of other parts of the building, traffic noise etc.

For video conferencing rooms, we recommend a total A-weighted ambient noise level (Lp,AT) not exceeding 30 dB SPL.

Sound insulation

Sound insulation between the room and the surrounding environment is essential to:

- Guarantee the confidentiality of information shared in the meeting room
- Minimize disturbance *of* people outside the room
- Minimize disturbance *from* outside the room, such as people walking, talking and working, traffic, and maintenance work
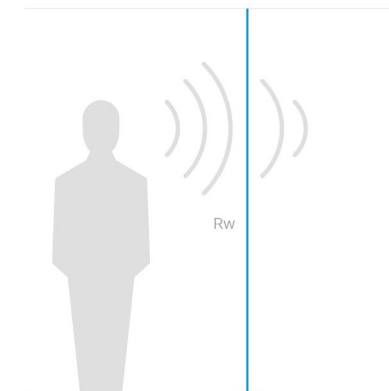
The requirements and improvement measures for sound insulation and noise levels are closely linked. Adequate sound insulation provides the reduction of exterior noise required to meet the noise level limits.

Reducing background noise is difficult for completed rooms, as measures for fulfilling requirements are primarily structural elements, such as walls, ceilings, floors and doors with a high sound reduction index *Rw*. The location of the video conferencing room within the building is a major factor for the noise level from external sources, such as traffic. Where possible, a room in a quieter part of the building should be chosen.
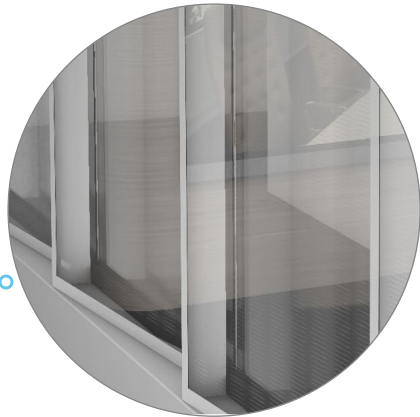
Where purpose-built video conferencing rooms are designed, the following limits can drive the choice of materials and construction method.

Between meeting rooms used for video conferencing and confidential meetings and neighboring spaces, the following minimum permissible levels for the sound reduction index R_w apply.

- Rooms not connected by a door: $R_w \geq 52\,dB$
- Rooms connected by a door: $R_w \geq 42\,dB$

Examples of acoustic optimization solutions

Sound absorbing ceiling tiles

DeAmp panels (*deamp.com*)

Acoustic panels

Carpeted floor

Sound insulated walls

Sound insulated door

Acoustic panels

Acoustically, the room is designed as a whole. For example, DeAmp panels installed at an angle along the side wall can both absorb acoustic energy directly and redirect reflections toward the acoustic absorbers at the rear of the room. This reduces both flutter echo and reverberation.

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When setting up microphones in a meeting room, it is important to consider the following factors:

- Distance from the microphone to the participant
- Volume of the room
- Reverberation time and acoustic treatment of the room
- Noise levels in the room
- Type of microphone

These factors are related to each other and influence the sound quality, speech intelligibility and overall audio experience for remote meeting participants.

For a given room, the distance between the microphone and the talking participant determines the ratio of direct sound to reverberant sound. A microphone close to the participant receives a higher level of direct sound compared to the reverberant sound, which is preferable. A microphone further away receives more reverberant sound relative to the direct sound. This is undesirable, as it degrades sound quality, can induce listener fatigue and, ultimately, reduces speech intelligibility.

This leads to a recommended limit for the maximum tolerable distance between a participant and the closest microphone. This distance depends on four factors:

- The volume of the room
- Noise levels
- Reverberation time
- The type of microphone used

For omnidirectional microphones in well-treated rooms (A-weighted noise level lower than 30 dB, *RT60* between 0.3 s and 0.4 s), a maximum distance of 1 meter is recommended.

For directional microphones under the same conditions, the distance between the talking participant and the microphone can be up to 1.5 meter.

In poorly-treated rooms, or where these distances are exceeded, sound quality will be negatively impacted.

For these reasons, we recommend the use of Cisco table boundary microphones. These are closer to the meeting participants, who are usually seated around the table, than ceiling microphones.

The following recommendations are tailored for Panorama tables. If using a different table shape or size, it is still possible to follow these guidelines, but consider that there can be specific challenges or microphone set-ups that are not covered in depth in this document.
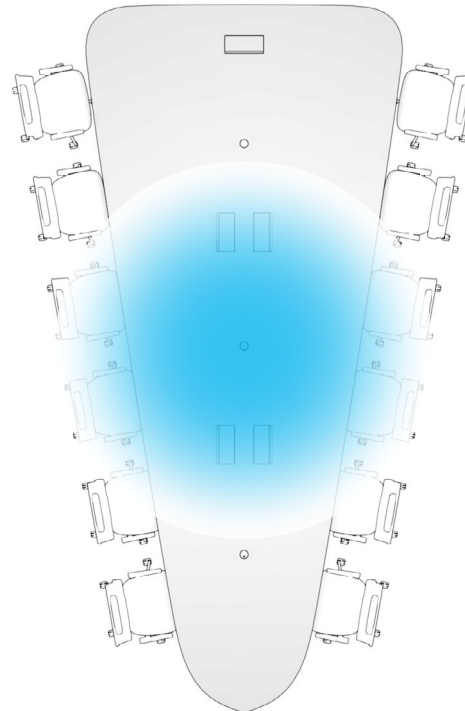
Refer to the "Table boundary microphones on non-Panorama tables" chapter for general recommendations.
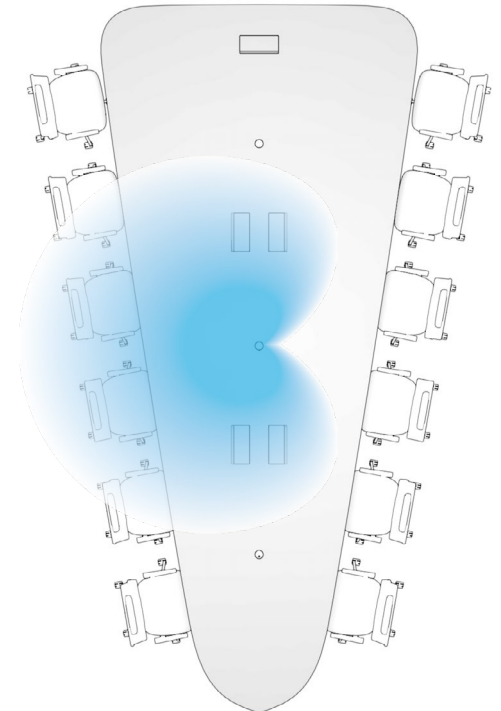
Table boundary microphones

We recommend using one table boundary microphone per four meeting participants. The microphone should be placed on the table with equal distance to each participant.

Omnidirectional table microphones

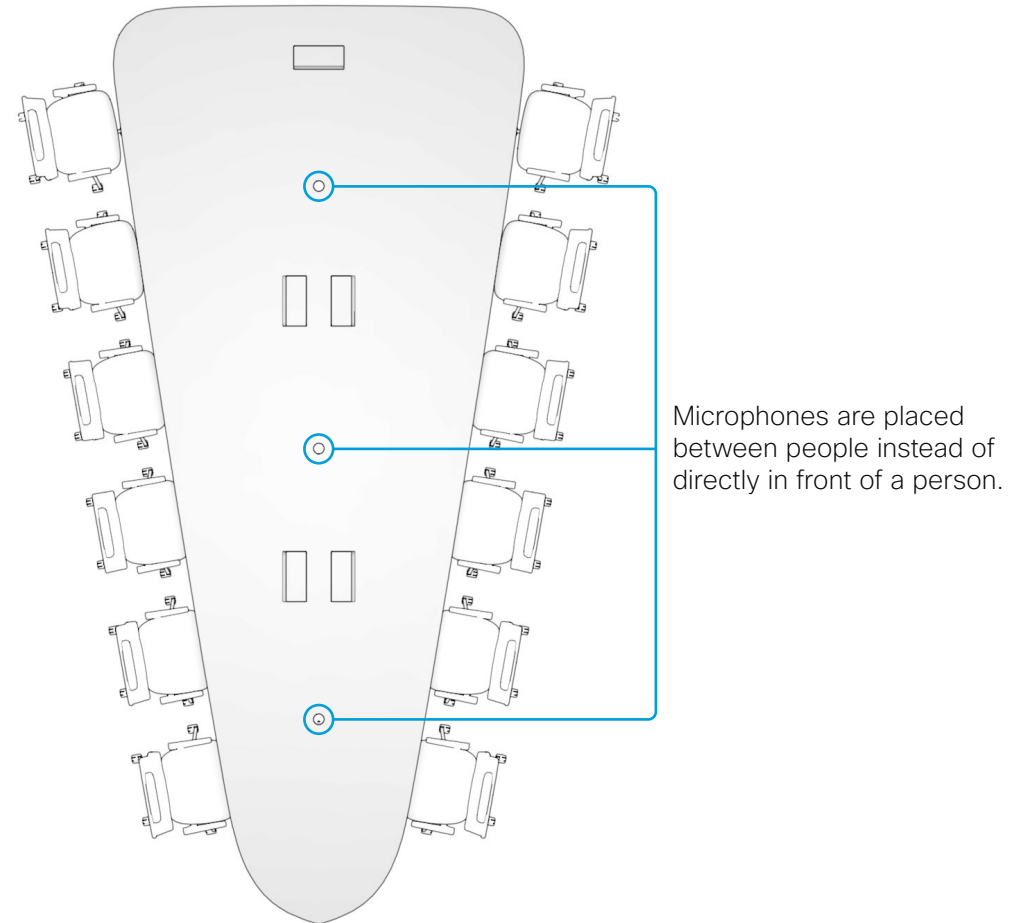*Microphone coverage*

Directional (cardioid) table microphones

Microphone coverage

When using directional microphones, ensure that the pickup direction is facing the participants.

Table boundary microphones *(cont.)*

It is important to place microphones between people, instead of directly in front of a person. This is to avoid participants' laptops interfering with the sound path from the person to the microphone. Such interference would result in muffled sound.

Microphones are placed between people instead of directly in front of a person.

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Microphone guidelines

Table boundary microphones *(cont.)*

When using multiple microphones we recommend the following distance between them to maximize coverage and speech quality:

- Recommended distance: 1.15 m – 1.5 m

The minimum value corresponds to *less well-treated* rooms, and the maximum value corresponds to *well-treated* rooms. This means that, in well-treated rooms, the area that a single microphone can cover is larger.

Sound reflections from table edges to the microphone create unwanted changes to its sound quality. Therefore, positioning the microphones away from table edges is important.

- Minimum distance from table edge: 0.15 m

Minimum distance from table edge:
0.15 m (5.9 in.)

Recommended distance between microphones:
1.15 m – 1.5 m (45.3 in. – 59.1 in.)

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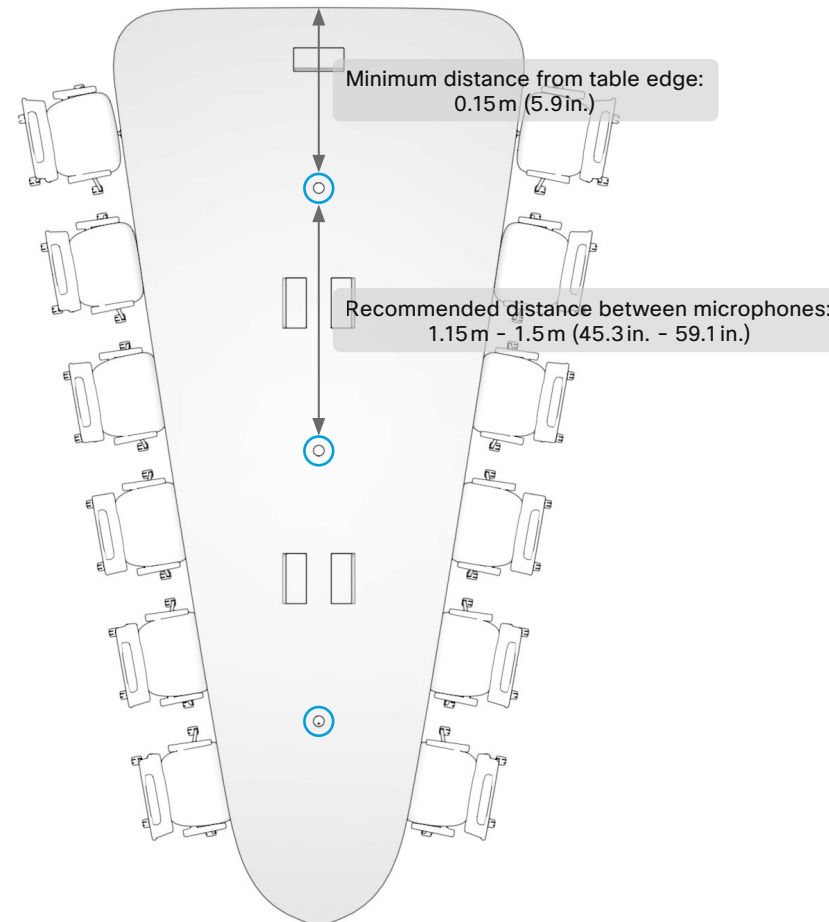
Microphone guidelines (page 5 of 8)

Table boundary microphones on Panorama tables

For Panorama tables, we offer two microphone arrangements:

- Dual lane
- Single lane

Both arrangements provide excellent audio quality and the table layouts are uncluttered.

Dual lane set-up

More microphones are added (in two lanes) as the table gets wider.
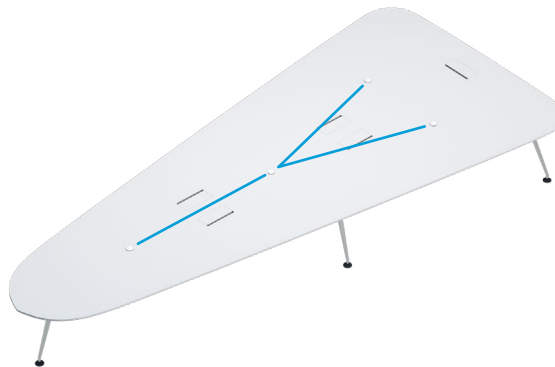
Single lane set-up

All microphones are placed along the center line of the table.

Reaching the mute button:

In a *Dual lane* arrangement, each participant can easily reach the mute button on the nearest microphone, also when sitting at the wide end of the table.

In a *Single lane* arrangement, participants at the wide end may have trouble reaching the mute button. In that case, you may consider adding other mechanisms for muting the microphones.

Objects appearing in both camera views:

The Panorama camera has two lenses. The lenses are adjusted so that objects at the rear table edge appear with natural width. As you get closer to the video system objects close to the center line will appear in both camera views.

This image distortion will be more visible for microphones that are located along the center line at the wide end of the table than at the narrow end.
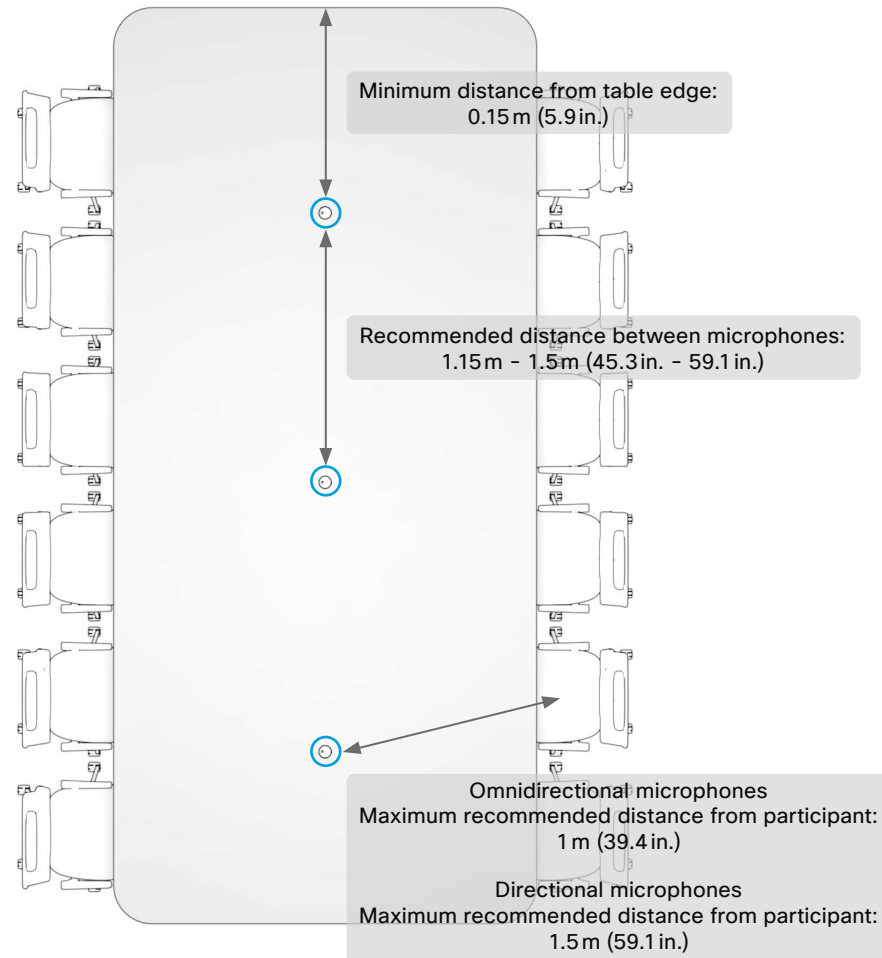
       CISCO
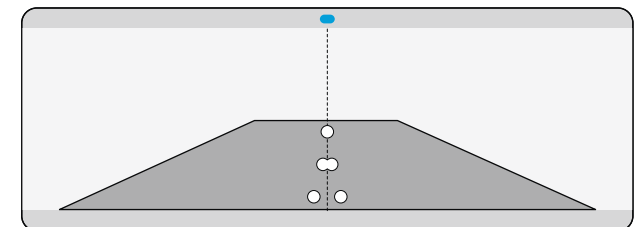
Microphone guidelines

Table boundary microphones on non-Panorama tables

If using a non-Panorama table, consider the following general guidelines for table microphone placement:

- 1 microphone will cover 4 people.

- Both flush-mounting and on-table top installations are possible, but flush-mounting the microphones in the table is the recommended approach.

- We recommend to place omnidirectional microphones at a maximum of 1 m (39.4 in.) from the participants.

- We recommend to place directional microphones at a maximum of 1.5 m (59.1 in.) from the participants.

- When using directional microphones, make sure that the sound pickup direction is aimed toward the person.

- Where possible, the microphones should be placed between two people, instead of directly in front of a person, to minimize laptop shadowing.

- Depending on the acoustics of the room, place the microphones between 1.15 m (45.3 in.) and 1.5 m (59.1 in.) apart.

- Keep the microphones away from the edges of the table. We recommend a minimum distance of 0.15 m (5.9 in.).

Minimum distance from table edge:
0.15 m (5.9 in.)

Recommended distance between microphones:
1.15 m - 1.5 m (45.3 in. - 59.1 in.)

Omnidirectional microphones
Maximum recommended distance from participant:
1 m (39.4 in.)

Directional microphones
Maximum recommended distance from participant:
1.5 m (59.1 in.)

Integrating microphones to the table

The Cisco Table Microphone can be integrated to the table in two ways:

- On top of the table
- Flush mounted in the table _{RECOMMENDED}

The Panorama tables can be ordered with pre-drilled holes for the microphones.

Mounted on top of the table

Drill a hole in the table for the cable routing, and then place the microphone on the table top.

Flush mounted in the table

Use a hole saw to make circular hole in the table. The hole must perfectly match the microphone as shown in the illustration.

We recommend flush mounting for enhanced microphone pick up quality.

For details, refer to the Cisco Table Microphone installation guide.

Microphone guidelines

Ceiling microphones

Where a clean table surface is required, ceiling microphones are an alternative to table microphones.

An advantage of ceiling microphones is that they do not emphasize noise at the table surface level, such as knocking, tapping and handling objects. In addition, the participants cannot cover a ceiling microphone with notes or their laptops.

However, due to their placement, they will often be more sensitive to other sounds in the room, people moving, doors opening, as well as to ambient noise or HVAC. Because of this, it is critical to follow these acoustic guidelines when installing them.

Many modern ceiling microphones are beamformers. Beamforming microphones utilize an array of microphone elements to increase directivity of sound pick up directly towards participants, thereby reducing how much noise and reverberation the microphone picks up.

The height of the room plays an important role for whether microphones are installed flush in or suspended from the ceiling. The distance between the seated participants and the microphone impacts sound quality.

The content screen of the Room Panorama is above the main screen. The upper edge of the system is 2.70 m (106 in.) above the floor. It is important that a ceiling microphone doesn't interfere with the visibility of this screen.

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Acoustic guidelines at a glance

Quality	Value	Condition or clarification
RT_{60}	0.3 s – 0.4 s	One-octave bands from 125 Hz to 4 kHz
Absorption	$NRC/\alpha > 0.9$	For ceiling tiles
	Absorbers on walls corresponding to half of ceiling area	On adjacent walls
Ambient noise	$L_{p,AT} \leq 30$ dB	Measured over time of use
Sound insulation between meeting room and surrounding spaces	52 dB	Without door
	42 dB	With door
Maximum distance between table boundary microphone and participant	1 m (39.4 in.)	Omnidirectional
	1.5 m (59.1 in.)	Directional
Distance between table boundary microphones	1.5 m (59.1 in.)	Well-treated rooms
	1.15 m (45.3 in.)	Less well-treated rooms

Summary of the acoustic room and microphone guidelines

Part 5: **Lighting and HVAC**

Lighting is essential when building great meeting rooms, supporting both local and remote telepresence meetings. Following are some general recommendations for how to create the best light conditions.

Types of light

To make telepresence meeting participants have the best appearance, techniques from both office lighting and video production should be combined. The subject, in this case the meeting participant, should be lit with:

- **Key light** – the main light source illuminating the subject.
- **Fill light** – added to avoid dark shadows over participants eyes, and a lack of it may cause the whites of the eyes to be lost along with any possibility of eye contact.
- **Backlight** – makes the subjects stand out from the background and gives depth to the scene.

Improving the perception of depth

To make meeting participants stand out from the background and promote a perception of depth, backlight is used. By placing light sources close to surrounding, bright colored walls, light will reflect back into the room. This will cast light on the back of meeting participants, illuminating their contour, thus causing a backlight effect.

To provide additional separation of the subject from background, the background itself should be lighted with less intensity than the subjects in the foreground.
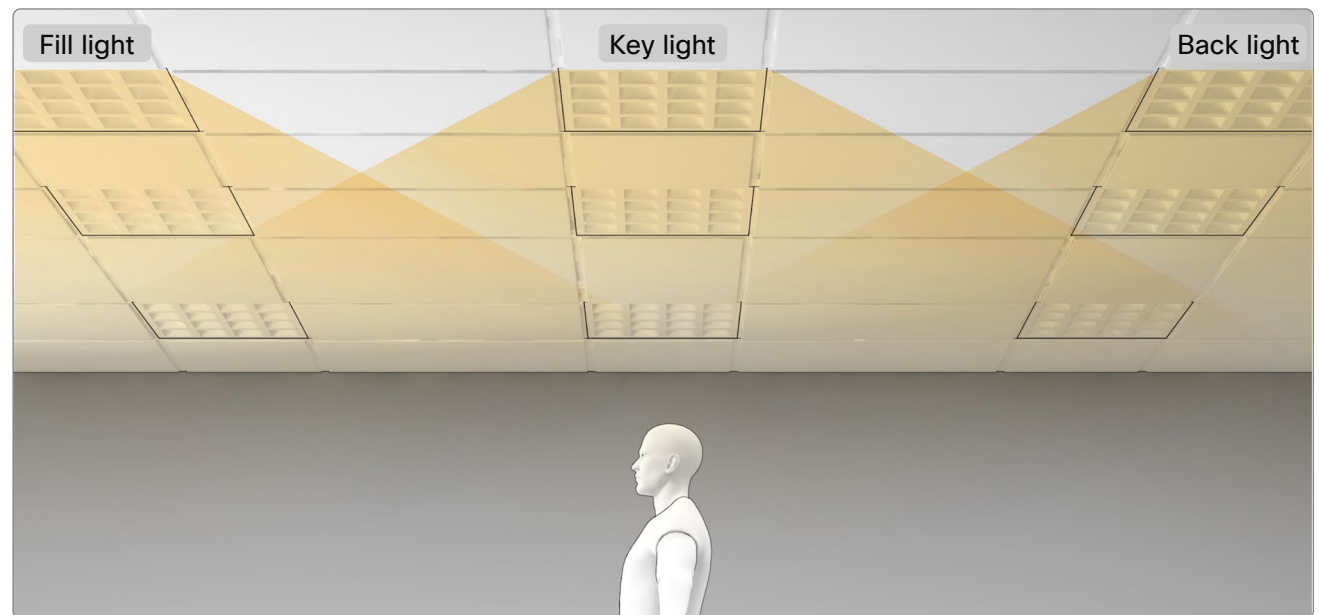
Example from PowerBalance by Signify

Lighting guidelines

Glare

A glare-free luminary with a beam angle of 90° or wider is optimal for video, as it will serve as both key light, as well as fill light. Some luminaries are made with less spread to avoid glare, thus focusing the effect on the work area rather than people's faces. Such luminaries are therefore not ideal for video capture as they create less fill light.

Be aware that luminaries that are placed too close to the screens may cause reflections (glare). The content screen (upper screen) is exposed the most to such reflections.

Light intensity

The recommended light intensity for faces is 400-500 lux, measured vertically. The general norm for illumination in meeting rooms is 500 lux. This is not sufficient for achieving high quality video capture.

We recommend 700-900 lux on horizontal work surfaces.

Even light

The lighting in the room should be even, with little variance between light and dark areas. This is typically measured as uniformity. The higher the uniformity number, the more even the lighting.

We recommend a uniformity number (E_{min}/E_m) higher than 0.8 on work surfaces.

Flicker

The camera system will automatically adjust to avoid flicker and stroboscopic effects caused by temporal artifacts in the room lighting. However, by utilizing a lighting system with minimal flicker, ideally with a switching frequency that is a multiple of 60 Hz, the camera can run at optimal settings, resulting in the highest quality camera capture.

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Lighting guidelines (page 3 of 3)

Color temperature

A light color temperature of 4000 K often works well, but there are different user preferences around the globe.

For optimal video capture, avoid blending light sources with different color temperatures. Some luminaries provide tunable white. This solution is ideal, as it allows for both matching preferences, as well as continuously adjusting the color temperature during the day to match the color of daylight.

Color rendering

In order to render skin tones and room interior with correct colors, it is important to have a color–rendering index (CRI) of 85 or better.

Don't mix different lighting technologies

Be careful if mixing different lighting technologies such as fluorescent lights and LED as their color profiles might differ. This might reduce the cameras ability to represent colors correctly.

Lighting control

Lighting control of the room should be automated.

Select a light control system that can be controlled by the Room Panorama system. By integrating these systems, the Room Panorama can automatically trigger the ideal lighting scene for the meeting.

Evening   Mid day   Morning

Example from OneSpace by Signify

Heating, ventilation and air-conditioning

The Panorama system uses approximately 1200 W in normal operation.

Ask your HVAC installer for advice about the type and size of installations you need in your room.

Avoid structural vibrations

The Panorama system should not be installed in rooms where structural vibrations are present—typically in rooms close to large machinery installations.

If the vibrations are severe, they are likely to cause camera shake and thus affect the user experience.

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Part 6: **Appendices**
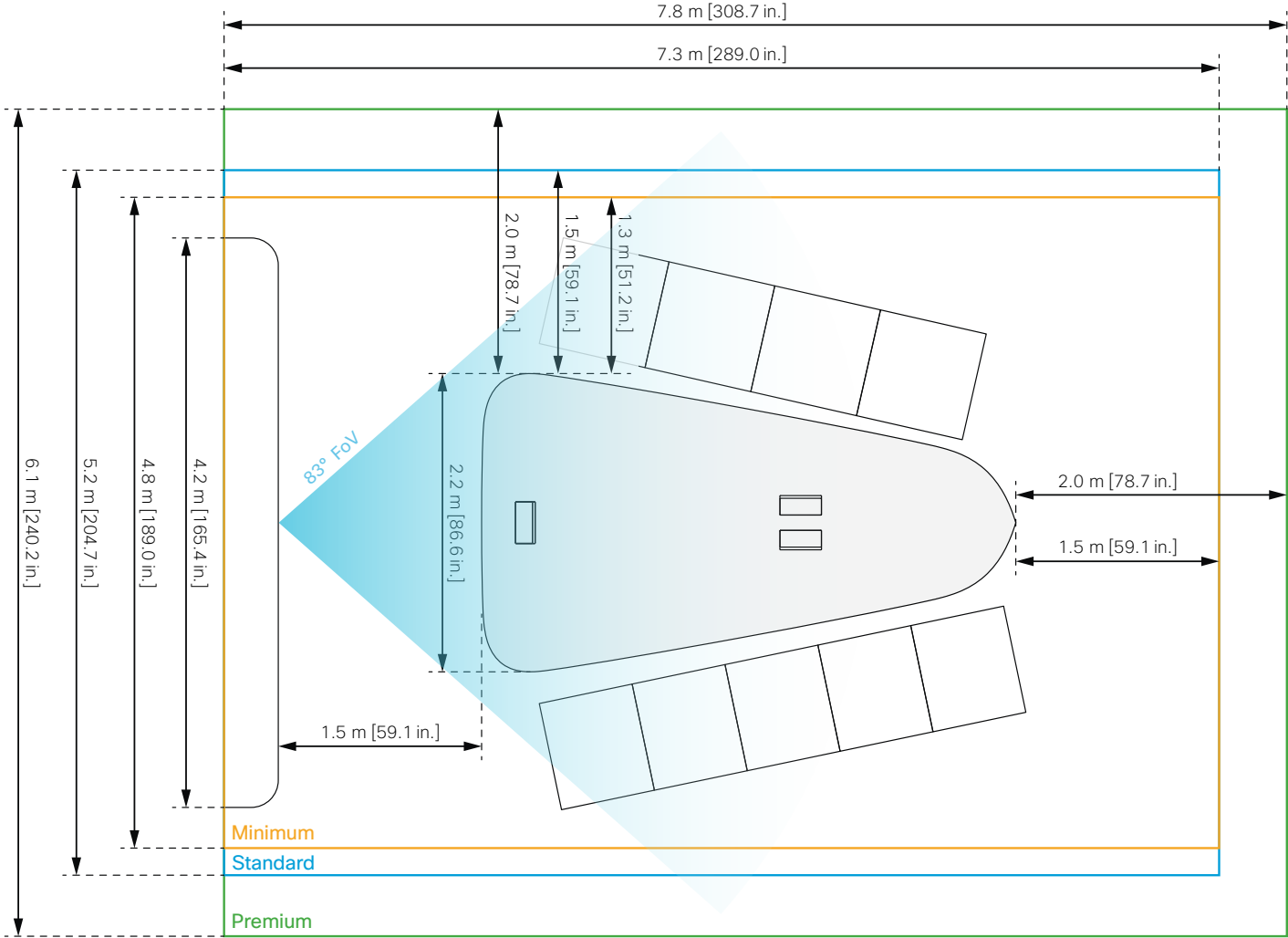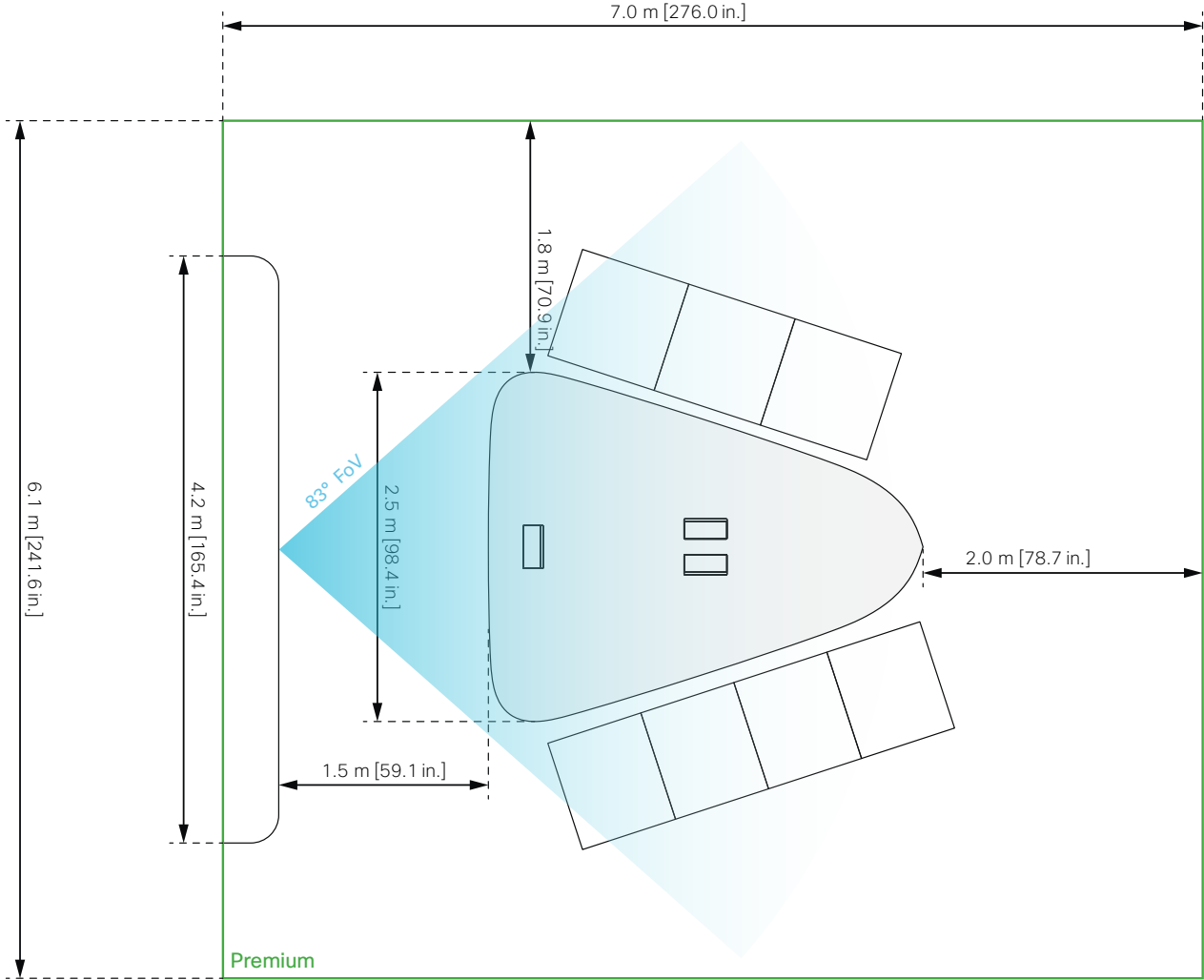
Room dimensions (page 1 of 8)

Number of persons:
- 2 × 7 seats → 80 cm [31.5 in.] per seat
- 2 × 8 seats → 70 cm [27.6 in.] per seat

Recommended table width:
- 2.5 m [98.4 in.]

Minimum room height:
- 2.70 m [106.3 in.]

10.4 m [407.5 in.]

1.8 m [70.9 in.]

83° FoV

2.5 m [98.4 in.]

6.1 m [240.2 in.]

4.2 m [165.4 in.]
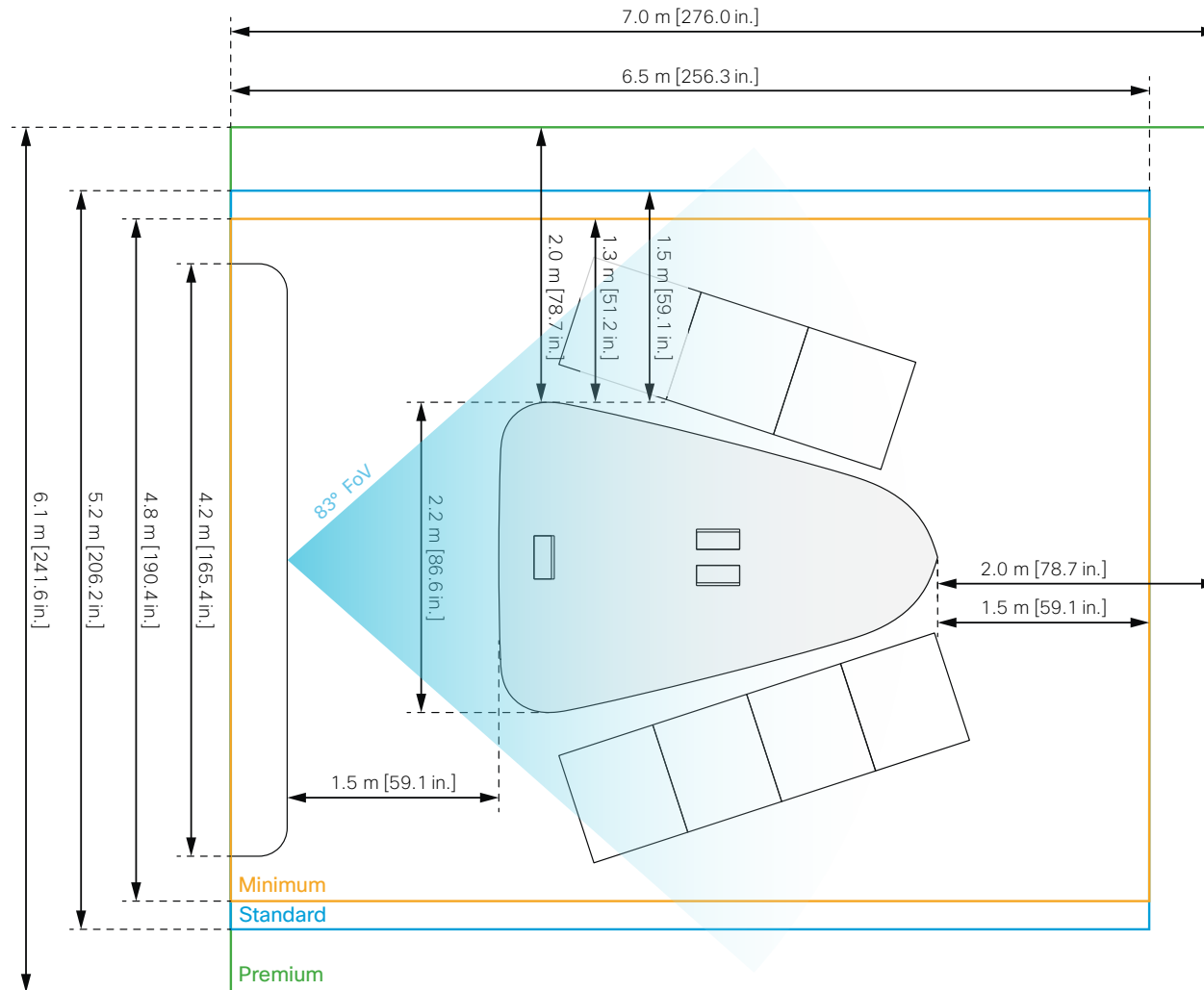
2.0 m [78.7 in.]

1.5 m [59.1 in.]

Premium

Number of persons:
- 2 × 6 seats → 80 cm [31.5 in.] per seat
- 2 × 7 seats → 70 cm [27.6 in.] per seat

Recommended table width:
- 2.5 m [98.4 in.]

Minimum room height:
- 2.70 m [106.3 in.]

9.5 m [374.0 in.]

1.8 m [70.9 in.]

6.1 m [240.2 in.]

4.2 m [165.4 in.]

83° FoV

2.5 m [98.4 in.]

2.0 m [78.7 in.]

1.5 m [59.0 in.]

Premium

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Room dimensions

Number of persons:
- 2 × 5 seats → 80 cm [31.5 in.] per seat
- 2 × 6 seats → 70 cm [27.6 in.] per seat

Recommended table width:
- 2.2 m [86.6 in.] (next page)
- 2.5 m [98.4 in.] (this page)

Minimum room height:
- 2.70 m [106.3 in.]

8.7 m [341.3 in.]

1.8 m [70.9 in.]

83° FoV

2.5 m [98.4 in.]

2.0 m [78.7 in.]

6.1 m [240.2 in.]

4.2 m [165.4 in.]

1.5 m [59.1 in.]

Premium

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Room dimensions

Number of persons:
- 2 × 5 seats → 80 cm [31.5 in.] per seat
- 2 × 6 seats → 70 cm [27.6 in.] per seat

Recommended table width:
- 2.2 m [86.6 in.] (this page)
- 2.5 m [98.4 in.] (previous page)

Minimum room height:
- 2.70 m [106.3 in.]

8.7 m [341.3 in.]
8.2 m [321.7 in.]
2.0 m [78.7 in.]
1.5 m [59.1 in.]
1.3 m [51.2 in.]
83° FoV
2.2 m [86.6 in.]
6.1 m [240.2 in.]
5.2 m [204.7 in.]
4.8 m [189.0 in.]
4.2 m [165.4 in.]
1.5 m [59.1 in.]
2.0 m [78.7 in.]
1.5 m [59.1 in.]
Minimum
Standard
Premium

Room dimensions

Number of persons:
- 2 × 4 seats → 80 cm [31.5 in.] per seat
- 2 × 5 seats → 70 cm [27.6 in.] per seat

Recommended table width:
- 2.2 m [86.6 in.] (next page)
- 2.5 m [98.4 in.] (this page)

Minimum room height:
- 2.70 m [106.3 in.]

7.8 m [308.7 in.]

1.8 m [70.9 in.]

83° FoV

2.5 m [98.4 in.]

6.1 m [240.2 in.]

4.2 m [165.4 in.]

2.0 m [78.7 in.]

1.5 m [59.1 in.]

Premium

           CISCO

Room dimensions (page 6 of 8)

Number of persons:
- 2 × 4 seats → 80 cm [31.5 in.] per seat
- 2 × 5 seats → 70 cm [27.6 in.] per seat

Recommended table width:
- 2.2 m [86.6 in.] (this page)
- 2.5 m [98.4 in.] (previous page)

Minimum room height:
- 2.70 m [106.3 in.]

Room dimensions

Number of persons:
- 2 × 3 seats → 80 cm [31.5 in.] per seat
- 2 × 4 seats → 70 cm [27.6 in.] per seat

Recommended table width:
- 2.2 m [86.6 in.] (next page)
- 2.5 m [98.4 in.] (this page)

Minimum room height:
- 2.70 m [106.3 in.]

7.0 m [276.0 in.]

1.8 m [70.9 in.]

6.1 m [241.6 in.]

4.2 m [165.4 in.]

83° FoV

2.5 m [98.4 in.]

2.0 m [78.7 in.]

1.5 m [59.1 in.]

Premium

CISCO

Room dimensions

Number of persons:
- 2 × 3 seats → 80 cm [31.5 in.] per seat
- 2 × 4 seats → 70 cm [27.6 in.] per seat

Recommended table width:
- 2.2 m [86.6 in.] (this page)
- 2.5 m [98.4 in.] (previous page)

Minimum room height:
- 2.70 m [106.3 in.]

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Fitting Room Panorama in an IX5000 room

Number of persons:
- 2 × 3 seats → 80 cm (31.5 in.) per seat
- 2 × 4 seats → 70 cm (27.6 in.) per seat

Recommended table width:
- 2.2 m [86.6 in.]

Minimum room height:
- 2.70 m [106.3 in.]

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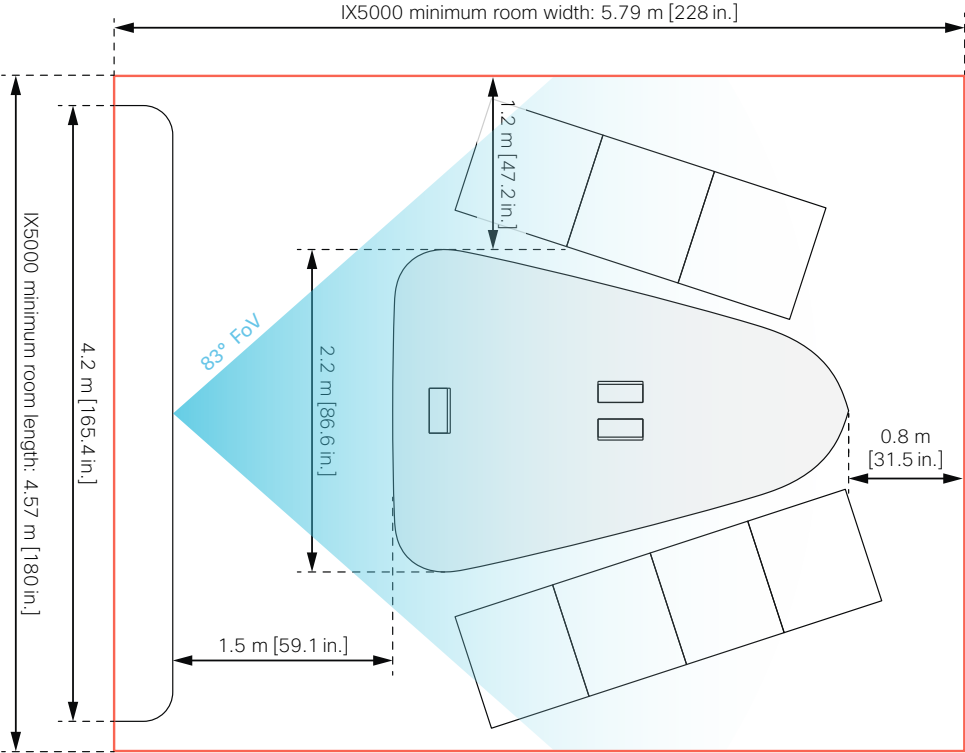
Cosmetic wall panel finish

We offer optional cosmetic wall panels with two types of finish.

Wooden panels (light oak)

These panels are ready to use as shipped with the product.

Ready-to-paint panels

You have to do the painting of the panels with a ready-to-paint finish yourself.

The panels are produced with primer and then sanded with fine-grained paper. You should use water based carpentry paint, which is slightly harder and more glossy than normal wall paint.

Cosmetic wall panel - wooden finish (light oak)

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Requirements for a custom wall

The wooden panels, as described earlier in this guide are optional. You can build your own custom wall.

For more information about requirements and installation of a custom wall, please contact:

John Yost (johyost@cisco.com)

Espen Christoffersen (espenc@cisco.com)

Anders Mortvedt (amortved@cisco.com)

Lighting example

PowerBalance from Signify

- Glare-free dimmable light with tunable white and high uniformity
- Energy efficient LED light with long lifetime
- Versatile 60 × 60 mm tiles for exposed and concealed T-bar ceilings
- Luminaire controller with power over Ethernet

Signify
www.signify.com
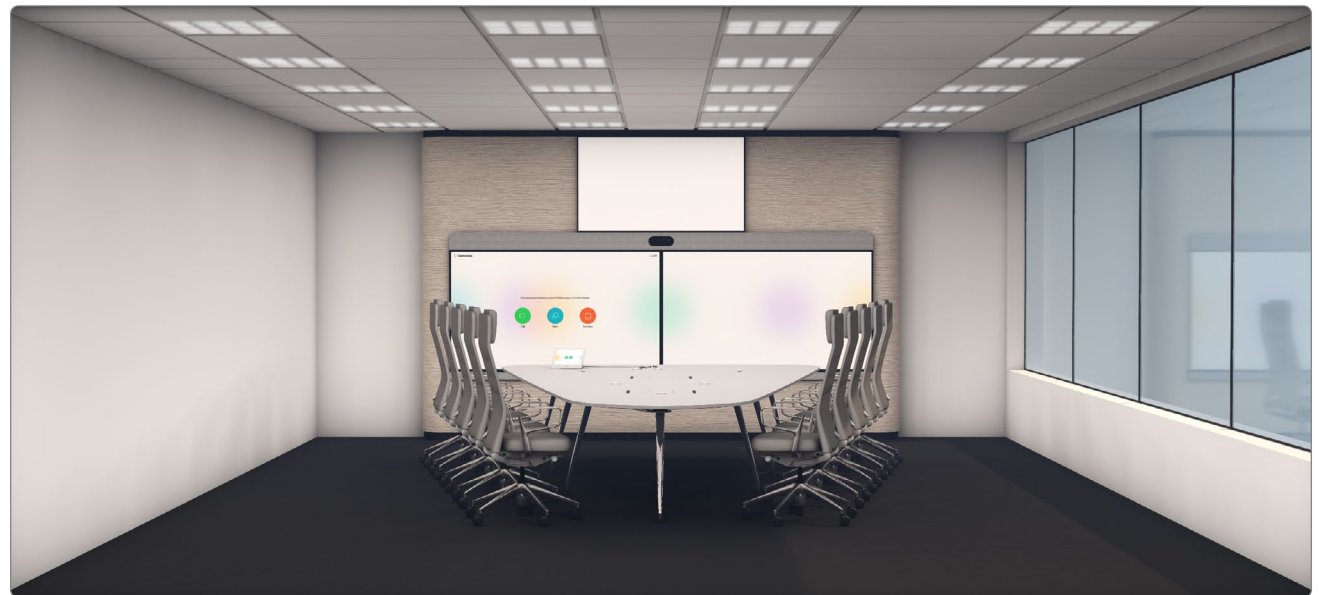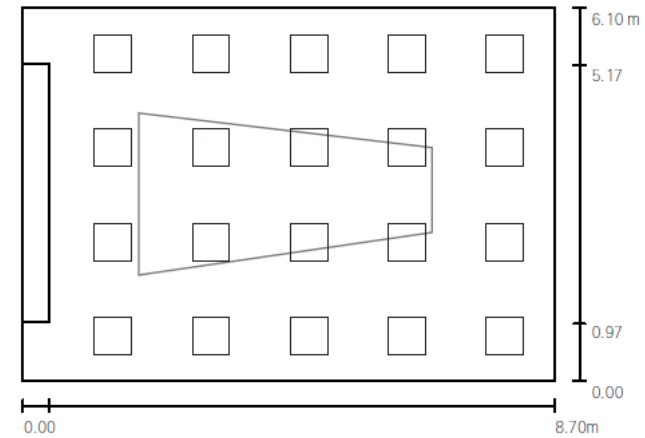
Recommended vendors

The following list of vendors have met the testing and certification standards for Room Panorama deployment specifications.

We highly encourage using these vendors for Room Panorama as they will provide the most optimized meeting room experience.

If you would like to be a certified vendor for Room Panorama, and learn more about the *Webex Certification Program,* please visit:

http://cs.co/rooms-certifications

Certified table vendors

Vitra International AG

Website: Vitra.com

Contact: Hendrik Woywod
Hendrik.Woywod@vitra.com

Phone: CH +49.160.829.5350
US +1.917.618.4443

Marshall Furniture

Website: marshallfurniture.com

Salamander Designs

Website: salamanderdesigns.com

Contact: Salvatore Carrabba
s.carrabba@salamanderdesigns.com

Walter Knoll

Website: Walterknoll.de

Contact: Jan Sneperger
jan.sneperger@walterknoll.de

Red Thread

Website: Red-thread.com

Certified chair vendors

Vitra International AG

Website: Vitra.com

Marshall Furniture

Website: marshallfurniture.com

Certified room lighting vendors

Signify

Website: signify.com

Certified acoustic panel vendors

DeAmp

Website: deamp.com

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