Cisco TelePresence Room Readiness and Requirements Guide

TSBU Technical Marketing
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Preface

Introduction

Cisco TelePresence is a breakthrough technology for remote collaboration that allows local and remote participants to feel as if they are “in person” with all participants of the meeting. This is an immersive meeting experience created through a powerful combination of innovative audio and video technology and environmental design. Using the network as a platform, Cisco has created an environment for faster decision-making, better collaboration and communications, stronger relationships and improved time to market.

Cisco TelePresence will transform the speed and quality of human interactions and deliver on Cisco’s promise to change the way we work, live, play, and learn.

This guide provides best practice environmental design recommendations for successfully planning and implementing a Cisco TelePresence deployment. This guide is suitable for anyone involved in the sale, planning, design, implementation, and operation of Cisco TelePresence solutions.

Reference Documentation

This guide compliments the many other Solution Reference Network Designs (SRNDs) and administration guides available on http://www.cisco.com and http://www.cisco.com/go/srnd. In particular, the reader is encouraged to refer to the following documents for further information on specific topics:

- Cisco TelePresence Product Documentation
- Cisco TelePresence Solution and Product Information
- Cisco TelePresence 1.1 (or later) Solution Reference Network Design Guide
- Cisco TelePresence Room Requirements Power Point Presentation
Acknowledgements

This document is a collaborative effort among Cisco’s TelePresence System Business (TSBU) Technical Marketing Teams.
TelePresence Solution Overview

The Cisco TelePresence suite of virtual meeting solutions consists of the products and capabilities described in the following sections. The Cisco TelePresence System 500 and Cisco TelePresence 3200 are also part of these virtual meeting solutions but will be treated in a separate document.

Cisco TelePresence System 3200

The Cisco TelePresence System 3200 (CTS 3200) is designed for large group meetings, seating up to 18 participants on each site. It consists of:

- Three 65” high definition plasma displays
- Three high definition cameras
- Three High Definition speakers
- Three wide band microphones for the first row and 6 wide band microphones for the second row
- Purpose built meeting table with convenient power and data connections in the legs
- An integrated lighting shroud.
- A Cisco touch screen IP phone for the user interface.

Customers must furnish their own chairs and alternate display for the second row.

Figure 1  Cisco TelePresence System 3200

Participants are displayed life size in the first row with multi-channel, discrete, full-duplex audio with echo cancellation per channel that appears to emanate from the person speaking. The unique table design also provides power and Ethernet ports in each table leg. A projector is integrated under the middle section of the
table for convenient viewing of PC graphics on the panel below the plasma displays. Participants in the first row can share their presentation through the auto-collaborate feature by plugging their laptop to a VGA cable like in a normal meeting.

**Cisco TelePresence System 3000**

The Cisco TelePresence System 3000 (CTS 3000) is designed for large group meetings, seating up to 12 participants around a virtual table. It consists of:

- Three 65” high definition plasma displays
- Three high definition cameras
- Three wide band microphones and speakers
- Purpose built meeting table with convenient power and data connections in the legs
- An integrated lighting shroud.
- A Cisco touch screen IP phone for the user interface.

Customers must furnish their own chairs.

*Figure 2  Cisco TelePresence System 3000*

Participants are displayed life size with two participants per screen/table segment and multi-channel, discrete, full-duplex audio with echo cancellation per channel that appears to emanate from the person speaking. The unique table design also provides power and Ethernet ports in each table leg. A projector is integrated under the middle section of the table for convenient viewing of PC graphics on the panel below the plasma displays. Participants can share their presentation through the auto-collaborate feature by plugging their laptop to a VGA cable like in a normal meeting.
Cisco TelePresence System 1000

The Cisco TelePresence System 1000 (CTS 1000) is designed for smaller executive meeting room environments and one-on-one conversations, seating up to four participants at a virtual table. It consists of:

- One 65” high definition plasma display
- One high definition camera
- One wide band microphone and speaker
- A lighting shroud integrated over the display
- A Cisco touch screen IP phone for the user interface

The customer must furnish their own meeting room table, chairs and their own alternate display for auto-collaborate feature.

Figure 3  Cisco TelePresence System 1000

Cisco TelePresence System 500

The Cisco TelePresence System 500 (CTS 500) is designed for office environments and one-on-one conversations, seating up to four participants at a virtual table. It consists of:

- One 37” high definition Liquid Crystal Display (LCD)
- One high definition camera
- One wide band microphone and speaker embedded within the system
- A lighting shroud integrated over the display
- A Cisco touch screen IP phone for the user interface

The customers must furnish their own meeting room table, chairs. Although Presentation In Picture feature is available for auto-collaborate feature, customers can choose to use their own alternate display.
Figure 4  Cisco TelePresence System 500
The Cisco TelePresence eXperience

Introduction

Cisco TelePresence virtual meeting solutions are designed to provide users with the feeling that they are virtually in the same room together. To achieve this level of realism, certain conditions must be met:

- To present a life-like, high-definition image of a person in real-time over the network requires very stringent service level requirements for delay, delay variation (i.e., jitter), and packet loss.
- The meeting room environment also must provide a near perfect replication of lighting, acoustics, and ambiance.

The Cisco TelePresence eXperience (CTX) is a method of measuring these conditions to verify that the experience the customer is receiving meets Cisco’s expectations. CTX is both a measurement and a seal of approval. Upon successful installation of Cisco TelePresence, a trained CTX certification specialist performs a detailed certification of the customer’s meeting room environment and verifies that meetings can be held with no perceptible impairments to the experience. The CTX certification is done per room, but also entails a thorough analysis of the network connectivity between rooms.

CTX is an exclusive set of quality and performance standards established by Cisco to guarantee that your Cisco TelePresence solution provides you premium quality, performance, and reliability. CTX is a mark of excellence in a new and growing TelePresence industry. It maximizes your Cisco TelePresence investment and guarantees optimum performance.

The following sections briefly outline the items that are reviewed during the CTX certification.

Physical Installation Quality

Special attention must be given to the physical installation of the Cisco TelePresence system. This includes such items as the horizontal and vertical alignment of the plasma displays, a neat installation of the table, the calibration of the cameras, cables that are neatly dressed and tied, and a room that is clean and free of any fingerprints or dirt left over from the physical act of installation.

Picture Quality

The Cisco TelePresence cameras and monitors are tested to ensure that the picture quality is calibrated to CTX standards, using approved video test equipment.
Room Environment

The meeting room itself is inspected to verify that it meets CTX specifications. This includes such elements as room dimensions, door locations, window locations and any window treatments required, power requirements and the location of power and Ethernet receptacles, placement of decor and furniture, etc.

Lighting

The amount and temperature of ambient light within the room has a significant effect on the overall experience. Light fixtures, including their style, type, location, and elements of refraction must be carefully engineered to appropriately light the environment. The CTX certification measures:

- Lighting source location
- Level of output and dispersion
- Lighting temperature
- Color rendering index

Acoustics

The preservation of spatial audio is critical to maintaining a life-like virtual meeting experience. The CTX certification measures:

- Isolation—Outside noise sources, such as adjacent rooms, street traffic, and airplanes are not only distracting but can significantly inhibit the experience of the virtual meeting.
- Ambient noise—Ambient noises within the meeting room from fans, clocks, HVAC units, and other sources is also measured and cannot exceed specified levels. High levels of ambient noise can mask subtle effects in the virtual meeting and potentially disturb the reproduction of spatial audio.
- Reverberation—Reverberation greatly affects the quality of acoustics in a meeting room environment.
- Frequency response—This allows for an overall measurement of specific frequencies to determine the acoustic response of the Cisco TelePresence System within the environment.
- Speech intelligibility—This measurement takes into account all the above factors and allows measurement of the level and manner of the speech output from both the participants within the environment and the spatial audio from the endpoint.

Continuity

The design goals for continuity are to create the illusion that the meeting participants are in the same room together. The CTX certification process measures the amount of uniformity between the meeting rooms. This includes such aspects as wall color, texture, corporate identity, branding and adornments that fall within view of the cameras.
Targets and Tolerances

The CTX certification defines a scale that ranges from the ideal experience to an unacceptable experience. Specific ideal target numbers will be defined as well as the level of tolerance that is acceptable for each of the above categories. The definition of these factors are Cisco proprietary and are derived from TSBU engineering, current industry standards and best practices, mean opinion scores, and usability testing.

Remediation

If any area of the customer’s environment does not meet CTX specifications, the customer will be provided with recommendations on how to remediate those areas. The following chapters should be reviewed to properly plan and implement the appropriate room requirements, installation logistics, and network requirements.
General Room Requirements for Cisco TelePresence Systems

Preface

This chapter will define the general requirements, which pertain to all Cisco TelePresence meeting environments. For detailed information regarding specific product requirements, please see the following chapters. The elements, which are considered product specific, are as follows:

- Room Dimensions
- Acoustic Properties
- Lighting Levels
- Power Consumption
- Cooling Requirements

Initial Considerations

The Cisco TelePresence virtual meeting room solution has been designed to work well within standard business office and meeting room environments without requiring significant reconstruction. Cisco has successfully deployed hundreds endpoints into standard meeting environments with common finishes such as plasterboard walls, industrial carpet and suspended tile ceilings. However, as you follow the guidance outlined in this document keep in mind the following considerations to insure that you meet the proper expectation and requirements of your intended users. The Cisco TelePresence endpoints have been engineered to allow flexibility within the environments to allow the “Experience” to be tailored to meet the needs of its users.

Along with the CTX information in the previous chapter, the Cisco TelePresence Experience is addressed from two points of view: the in room experience and the on camera experience. The on camera experience renders a three-dimensional setting on a two-dimensional medium. Both experiences are enhanced with the addition of textures and efforts to build depth within the room. These effects can be achieved by introducing aesthetic and architectural upgrades to the room. Creating interest in the background behind the participants helps to project the environment to appear three-dimensional on the two dimensional screen. Aesthetic elements also help carry continuity of the room through all three screens promoting the feeling of sharing the same space. With variances in the selection of finish and adornment options, a room can be representative for use by knowledge workers or cater to a company’s top executives. Customers are also advised to design their TelePresence environments to reflect their corporate culture and local culture as well as their corporate identity. Consulting with customer's corporate branding representatives and workplace design representatives is highly encouraged.

The following is offered as a consideration, however your company’s requirements should be used to ultimately define the design strategy which best suits your companies needs and user expectations. Internally, Cisco has
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defined three levels of design strategy, which meet the general needs of many company’s: Executive level design, Professional level design, and Classic level design.

These design strategies are based on seven décor elements, which can add to the visual experience of the Cisco TelePresence environment. These elements are color, furniture, decorative accents, wall art, green (plants), hospitality, and signage.

The following are examples of the three design levels:

Executive Design:

Special attention to aesthetic detail and added accommodations to provide an environment commonly expected by many executives.

Professional Design:

Added decorative elements to provide visual interest and promote high quality video and audio

Classic Design:

Conservative deployment which supports an excellent experience that is quickly scalable.
If you would like to explore these in greater detail, please refer to the white paper titled “Cisco TelePresence Room Design” which discusses in depth the different elements of design which can personalize your Cisco TelePresence room to meet the needs and expectations of your users while capturing your corporate identity.

Room Dimensions and Spatial Orientation

Environmental characteristics of the room include the dimensions of the space including ceiling height as well as the spatial orientation referring to the location of doors, windows and other elements in the room. Rectangular rooms are most common and preferred for aesthetic reasons, however irregular shaped rooms may be accommodated and generally promote better-controlled acoustics. Ceiling heights for all Cisco TelePresence endpoints is recommended to be 8’ to 10’ (2.44m to 3.05m). Lower ceilings may be accommodated if the lighting façade of the CTS endpoint doesn’t create an obstruction to items such as fire sprinklers, light strobes, pendant lights, etc. Please consult your local fire code for specific restrictions. Ceilings lower than 7’ (2.13m) will not physically support the height of the CTS endpoint lighting façade, with exception to the CTS 500. Another purpose for the ceiling height restrictions pertains to lighting. When ceilings are lower than recommended, it becomes a greater challenge to light the environment properly. Adequate height is required to allow the ceiling fixtures enough distance to dissipate lighting across the environment in an even manner. Lower ceilings tend to promote greater contrast in lighting conditions and hotspots on participants shoulders.

Ceilings higher than 10’ (3.05m) may require special acoustic treatment as higher ceilings indicate a greater amount of hard surface wall surface space. Adding acoustic paneling to the walls can treat this. Open air ceilings, such as found with “rooms within a room” are not recommended due to possible distractions from exterior sources of sound.

Door Locations

Doors may be located anywhere within the room however it is optimal to have them out of view from the camera and not behind the system. If doors must be within camera view they should be located on side walls as preferred the back wall behind participants. Doorways should also provide a sealed closure in order to block noise transferring from exterior corridors. Gaskets and door skirts should be used along with solid or insulated doors for best sound insulation. Shielded from distraction and insuring privacy are highly desirable characteristics to a TelePresence room.

Windows

It is recommended that a TelePresence room have windows or glass walls that consume less than 20% of vertical wall space. Windows and glass walls will allow uncontrollable light to affect the quality of the video and overall experience. These hard surfaces will also promote undesirable acoustical conditions such as audio reverberation in excess of minimum Cisco TelePresence specifications. All windows and glass walls require treatment with materials that have acoustical dampening and light blocking characteristics. Treatments in the viewing area of the cameras should match or compliment the Cisco recommended wall colors (or colors chosen for this room) to insure the promotion of continuity across the environment.
Floor Leveling

The room chosen for the CTS 3000 and CTS 3200 systems must have a leveled floor. When the floor is uneven, this will create issues with camera level, plasma level and table leveling. Table beams may not sit flush and the closing panel may not close properly. The system will tolerate a 1cm gap over a 5m distance. If the difference is bigger than this, the customer must first resolve the issue.

Acoustic Properties

For pre-existing structures the information in this section should only be used to help define acoustic properties of the building materials and point out areas of possible remediation. For new structures, this section can serve as a guideline to structural material and design.

Cisco uses the following specifications and definitions for the acoustic properties of the wall, floor, and ceiling materials.

**Noise Reduction Coefficient—NRC**

The Noise Reduction Coefficient is a rating that represents the amount of sound energy absorbed on contact with a surface. NRC is generally used to rate carpeting, ceiling tile, acoustic treatments, and other sound absorbing materials. An NRC of 0 indicates 100% reflection; an NRC of 1 indicates 100% absorption. An NRC of .70 absorbs 70% of the sound that comes into contact with it and reflects 30% of the sound back into the space.

**Sound Transmission Class—STC**

The Sound Transmission Class is a rating that represents the amount of sound energy required to transfer through a structure. An STC of 40 requires greater than 40 decibels of sound energy to transfer through the structure. STC is generally used to rate wall structures, doors, windows, and other building materials.

**Impact Insulation Class—IIC**

The Impact Insulation Class is a rating similar to STC but is specific to flooring and ceilings. IIC measures the resistance to the transmission of impact noise such as footfall, chairs dragging, and dropped items. This measurement is specifically important to multi-floor buildings and plenum flooring. The IIC represents the amount of sound energy required to transfer sound through a structure. An IIC of 40 requires greater than 40 decibels of sound energy to travel through a structure.

**Ambient Sound - dB(SPL)**

All measurements are done using A-Weighting except when C-Weighting is specified.
Reverberation - RT(60)

High levels of reverberation can cause unwanted acoustic characteristics that potentially lower the quality of the experience. Absence of all reverberation can leave the audio feeling flat and unnatural, also lowering the experience.

Recommended Wall, Ceiling, and Flooring Material

The Cisco TelePresence System has been designed to deliver excellent acoustic performance in standard business conference rooms.

Wall Material

Normal drywall room surfaces are recommended. Cinder block and brick can be highly reverberant and therefore will likely require acoustical wall treatment.

Ceiling Material

Standard business office ceiling tiles with an NRC rating of .70 or greater are recommended.

Flooring Material

The TelePresence audio system is designed to work with standard business office environment using carpeted floors. Linoleum, hard wood, and other highly sound reflective flooring surfaces will likely require floor treatments to reduce reverberation. The floor could be a raised floor, but this will increase the risk of reverberation and insulation. Raised floor should be raised to a maximum of 30cm.
Acoustic Targets and Tolerances

Acoustic Rating Chart, Ambient Sound -dB (SPL), and Reverberation provide the ideal targets and acceptable tolerances for a properly designed Cisco TelePresence meeting room.

<table>
<thead>
<tr>
<th>Material</th>
<th>Target</th>
<th>Tolerance</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walls NRC</td>
<td>.40</td>
<td>&gt; .10</td>
<td>Acoustic fabric on gypsum or moderate weighted curtains will achieve a more desirable sound quality</td>
</tr>
<tr>
<td>Walls STC</td>
<td>60</td>
<td>&gt; 40</td>
<td>5/8” (13mm) gypsum (plasterboard) on both sides with heavy insulation is preferred.</td>
</tr>
<tr>
<td>Flooring NRC</td>
<td>.40</td>
<td>.20</td>
<td>Carpeting over cement. Padded carpet will help with sound quality but is less durable to ware.</td>
</tr>
<tr>
<td>Flooring IIC</td>
<td>60</td>
<td>&gt; 40</td>
<td>Standard commercial construction practices. Corrugated Steel Deck with 3” (7-8cm) cement or greater is ideal</td>
</tr>
<tr>
<td>Ceiling tile NRC</td>
<td>.80</td>
<td>&gt; .70</td>
<td>Commercial acoustic ceiling tile. Note the light reflectance of tiles as well. High reflection properties can promote efficient lighting as well as hot spots.</td>
</tr>
<tr>
<td>Ceiling IIC</td>
<td>60</td>
<td>&gt; 40</td>
<td>Standard commercial construction practices. Corrugated Steel Deck with 3” (7-8cm) cement or greater is ideal</td>
</tr>
<tr>
<td>Door(s) STC</td>
<td>60</td>
<td>&gt; 40</td>
<td>Solid core door with sound gasket on top, and sides. Skirt on bottom.</td>
</tr>
<tr>
<td>Interior window(s) STC</td>
<td>60</td>
<td>&gt; 40</td>
<td>¼” double pane windows or acoustical treated coverings</td>
</tr>
<tr>
<td>Exterior window(s) STC</td>
<td>90</td>
<td>&gt; 60</td>
<td>Location near high traffic or airports may want highest ratings</td>
</tr>
</tbody>
</table>
Table 2  Ambient Sound -dB (SPL)

<table>
<thead>
<tr>
<th>Sound Pressure Levels</th>
<th>Target</th>
<th>Tolerance</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>HVAC @ 1 meter</td>
<td>&lt; 36 dB</td>
<td>+ 9dBA</td>
<td>Recommend NC30 rated diffusers. Acoustic baffling may be required in ducting.</td>
</tr>
<tr>
<td>Lighting @ 1 meter</td>
<td>&lt; 36 dB</td>
<td>+ 9dBA</td>
<td>Some ballasts or dimmers can create buzzing sounds</td>
</tr>
<tr>
<td>Noise floor average</td>
<td>&lt; 36 dB</td>
<td>+ 9dBA</td>
<td>Various readings will be taken throughout environment.</td>
</tr>
<tr>
<td>Noise Floor Average C-Weighted</td>
<td>&lt; 54 dB</td>
<td>+ 9dBC</td>
<td>Consideration for lower frequencies and machine noise within the room or adjacent environment.</td>
</tr>
</tbody>
</table>

Table 3  Reverberation

<table>
<thead>
<tr>
<th>Reverberation (RT60) In milliseconds</th>
<th>RT60 at Critical Voice Frequencies 500Hz, 1kHz, 2kHz, = 300 milliseconds</th>
<th>RT60 at Critical Voice Frequencies 500Hz, 1kHz, 2kHz, &lt; 500 milliseconds</th>
<th>Insuring reverberation is adequate at voice frequencies is important for both the CTS endpoint as well as the in-room sound quality and experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reverberation (RT60) In milliseconds</td>
<td>RT60 at Sounds Frequencies 125Hz, 250Hz, 4kHz = 300-500 milliseconds</td>
<td>RT60 at Sounds Frequencies 125Hz, 250Hz, 4kHz &lt; 700 milliseconds</td>
<td>Installation of the CTS endpoint may reduce RT60 by 200-300ms. Rooms with RT60 greater than 700ms (post-installation) will be “live” or seem to have an echo.</td>
</tr>
<tr>
<td>Speech Intelligibility Index (STI-PA)</td>
<td>1 STI</td>
<td>&gt; .75 STI</td>
<td>This measurement is taken during CTX certification. (post-installation)</td>
</tr>
</tbody>
</table>

Illumination

The Cisco TelePresence System requires 300-400 lux of evenly dispersed, indirect ambient light. Indirect fluorescent lighting fixtures are required to provide best results. These fixtures are most efficient when an asymmetrical light distribution is used. This will insure greater illumination of participants without bleeding light onto plasmas and projection screens. Color temperature is also an important factor as it helps to unify the environment and provide a higher quality experience. A 4000K type 5 or 8 fluorescent lamp is recommended. Adjustments to light intensity (both up and down) are best managed by use of a dimmer system that can be set with a fixed preset. Other means of lighting adjustment can be managed by changing the wattage and number.
of the fluorescent bulbs in the fixtures. It’s important to be sure the ballasts in the fixtures are designed to manage dimming or multiple wattages as required. For fixtures that house multiple bulbs, it is recommended that the fixture is internally wired in parallel and not in series. This will allow for one bulb to fail without affecting other bulbs in the fixture. This will also allow for tuning light intensity by removing a bulb if intensity is too high. It is generally better to error by providing too much light rather than too little light.

**Room Lighting Specifications**

The table below will provide the target values and acceptable tolerances for lighting within a Cisco TelePresence virtual meeting room.

The TelePresence CTS 3000 system ships with built-in lighting that has been optimized for the upper torso and face of participants. The ceiling lighting provided by the customer should create an evenly dispersed ambient illumination of the environment. Light arrays centered over the displays (as with legacy video conferencing) is not optimal and may create harsh spot lights directed at participants eyes. Hot spots in other areas of the room are also undesirable. Windows should be treated to block natural sun light from the TelePresence environment. Natural sun light changes temperature and intensity throughout the day and therefore changes the overall experience.

**Note:** Overall illumination is to be measured on the vertical plane, not the horizontal plane or “work surface.” Horizontal lighting is referred to as “shoulder” or direct lighting.

**Table 4 Lighting Measurement**

<table>
<thead>
<tr>
<th>Illumination</th>
<th>Target</th>
<th>Tolerance</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall illumination lux (= lm/m²)</td>
<td>Lighting levels are specific to each product. Please refer to the appropriate chapter for the product you are deploying.</td>
<td>Lighting is generally between 250 lux and 450 lux depending on the specific products requirement. Dimmers (which can be hard set) are recommended to allow flexibility in lighting design.</td>
<td>Measured vertically w/ light sensor pointed at wall or intended camera location (not pointed at ceiling)</td>
</tr>
<tr>
<td>Should light/Direct down light.</td>
<td>Lighting levels are specific to each product. Please refer to the appropriate chapter for the product you are deploying.</td>
<td>Generally, shoulder lighting should not be more than double (or 400 lux) greater than the overall illumination of the room.</td>
<td>Measured horizontally at table height w/ light sensor pointed at ceiling</td>
</tr>
<tr>
<td>Even Diffusion of light across environment</td>
<td>&lt; 50 lux difference across all zones</td>
<td>&lt; 100 lux at Participant Zones &lt; 200 lux at any other Zone</td>
<td>Light intensity should be even across environment</td>
</tr>
</tbody>
</table>
Table 4  Lighting Measurement

<table>
<thead>
<tr>
<th>Illumination</th>
<th>Target</th>
<th>Tolerance</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lighting temperature</td>
<td>4000 Kelvin</td>
<td>Up to 4100</td>
<td>Required for all bulbs within room</td>
</tr>
<tr>
<td>Color Rendering Index (CRI)</td>
<td>CRI 82</td>
<td>or greater</td>
<td>Lower CRI or low quality bulbs will have a greater LLF (Light Loss Factor) and light levels will diminish rapidly over time.</td>
</tr>
<tr>
<td>Concentration or hotspots</td>
<td>&lt; 700 Lux</td>
<td>+ 100 Lux</td>
<td>May be an issue if hotspots are within view of camera</td>
</tr>
<tr>
<td>Shadows</td>
<td>&gt; 150 Lux</td>
<td>- 50 Lux</td>
<td>May be an issue if shadows are within view of camera</td>
</tr>
</tbody>
</table>

Lighting Fixture Types

This section will discuss both the different types of lighting fixtures as well as placement options. It is important to note that lighting design heavily depends on the style of ceiling fixtures as well as their placement and the characteristics of the environment such as surface reflectivity.

Generally, there are four common styles of commercial fluorescent lighting fixtures.

**Linear Pendant | Recessed Indirect | Recessed Parabolic Louver | Recessed Can**

**Indirect Linear Pendant**

These are highly recommended if ceiling height is adequate as they project a large amount of very well-dispersed indirect light. These fixtures direct the majority of lighting upwards and use the ceiling to reflect the light throughout the environment. Hotspots are generally not an issue with this type of lighting. However, many manufactures also make this fixture an “Indirect/Direct” style which can allow 20% or more direct lighting. These types of fixtures are not recommended but can be used if placed appropriately.

All linear pendant fixtures should be placed slightly forward and behind participant seating area to allow the reflected light from the ceiling to illuminate the participant area. Placing directly above participant may create some minimal shadowing or hot spots when using Indirect/Direct fixtures.
Indirect Recessed Panels

This type of fixture (available in both 2’x 4’ and 2’x 2’ panel) is recommended where pendant lighting may not be ideal due to ceiling height. The advantage to this fixture is similar to the pendant as it directs the majority of the light upwards and uses the reflector panel to redirect the light throughout the environment. Once again, most manufactures also make this fixture in an “Indirect/Direct” style which can allow 20% or more direct lighting. These are not recommended as they may create hotspots on shoulders if placed directly above participants. Figure 7 shows two different styles of indirect recessed panels. Both can be very effective in providing well-dispersed illumination and are available from many different manufactures. Figure 8 shows the difference between “Indirect” and “Indirect/Direct” fixtures.
**Parabolic Louver Recessed Panels—Not Recommended As Ambient Lighting Source**

This type of fixture (both 2’x 4’ or 2’x 2’ panels) provide direct light which falls (0 – 45 degrees) downward on participants head and shoulders creating shadows on participants faces. This type of fixture may still be used to provide an ambient light or wall wash on perimeter walls but not as main source of light in participant seating area.

If used for main source of ambient light, these fixtures must be fitted with lighting diffusers or filters and placed slightly forward and behind participant seating areas. Contact your lighting vendor for details and products that may help achieve adequate lighting with this type of existing fixture.
Recessed Can Lights—Highly Discouraged as Ambient Lighting Source

This type of fixture creates very direct and undesirable spot lights throughout the environment. However, when used as an accent on walls, this lighting can help to create depth to the environment, a positive attribute. Be sure that when using these fixtures for wall wash or other architectural effect that the light in view of the camera doesn’t exceed the recommended level for hot spots (800 lux).

Lighting Fixture Locations

When determining fixture placement it is critical to note that “Indirect/Direct” fixtures can produce too much shoulder light if placed directly above participant areas. These types of fixtures should be placed slightly forward and behind participant seating areas. This is a challenge as the participant area is on a curved radius at the table edge. It may be required to stagger the fixtures in the ceiling to achieve the desired lighting design. Using 2’x2’ fixtures may allow for more flexibility in placement but will require a greater number of fixtures.

Other types of fixture such as can lights or parabolic louvers are not ideal for ambient lighting as these provide too much directional lighting. These can still be used for creating “wall washes” or to achieve other architectural effects as long as the light level in view of the camera doesn’t exceed the specification for “hot spots” (800 lux).
**Cisco and Cisco ATP Partner Confidential**

Note: Many types of fluorescent fixtures including parabolic louvers can be altered to produce the proper illumination for TelePresence if fitted with lighting diffusers or filters. Contact your lighting vendor for details and products that may help achieve adequate lighting with existing fixtures.

**Pendant Fixtures**

The indirect linear pendant fixtures are recommended to provide the greatest amount of dispersed ambient lighting with the least number of fixtures. These fixture are ideal when ceiling heights are 9’ (2.74m) or greater. When using this style of fixture, the placement in Figure 12 is recommended for the CTS 3000. Rooms with greater depth than 15’ may require an additional row of fixtures. It is also important to keep in mind the reflective properties of the ceiling when using these fixtures. Ceiling tile manufactures will state the reflectivity of the tile on their product specification sheet and it is important that the lighting designer understand these values. The greater the reflectivity, the less fixture wattage required. High reflectivity also has the potential for creating harsh down (or direct shoulder) lighting.

![Indirect Linear Pendant Lighting Locations (CTS 3000)](image)

Note: This example and others in this chapter will depict a CTS 3000. However these lighting concepts pertain to all Cisco TelePresence endpoints.

**Recessed Fixtures**

The indirect recessed panel fixture is a highly recommended fixture style and is ideal in rooms of larger dimensions with low ceilings (under 9’). As stated previously in this document, 100% indirect fixtures are recommended as opposed to 80/20 Indirect/Direct fixtures. However, if using Indirect/Direct fixtures, they should be placed slightly forward and behind participant seating areas. This is a challenge as the participant area is on a curved radius at the table edge. It may be required to stagger the fixtures in the ceiling to achieve the desired lighting design. Using 2’x2’ fixtures may allow for more flexibility in placement but will require a greater number of fixtures. Either way, the layout for this type of lighting fixture should accommodate even
dispersed light and should not be directly above the TelePresence displays or participant seating locations. Recessed fixtures should only be used when ceiling height will not accommodate pendant lighting.

When using this style of fixture, you may be able to choose 2’x4’ or 2’x2’ fixtures. Either size of fixture can work very well. The advantage of using 2’x2’ fixtures is the flexibility to stagger fixtures is required. This can be helpful if trying to match the curve of the participant seating or avoiding obstructions in the ceiling. The disadvantage is that it will require a greater number of fixtures than would 2’x4’ fixtures. The advantage to 2’x4’ fixtures is achieving adequate illumination with a minimal number of fixtures.

Placement of any type of fixture is highly dependant on its intensity and dispersion of light. This can be surmised by referring to the manufactures photometric or more specifically the candela curve of the fixture. Fixtures with greater horizontal direction of illumination will provide greater dispersion while require fewer fixtures. This is indicated by the green highlighted images below in Figure 13 and Figure 14. If the fixtures don’t produce a great amount of light above 60 degrees, the images highlighted in red are more likely the type of layout that will achieve the required lighting levels. Be sure to follow the manufactures recommendations to reach the required level of lighting while maintaining even illumination.

**Figure 13  **Indirect Recessed Panel Illumination (CTS 3000)
Recessed Fixtures Layout Examples

The following images represent possible configurations for recessed fixtures to be installed. These are only generic examples of ceiling plans that have been successfully deployed to support Cisco TelePresence. These are offered to illustrate the flexibility in layouts and indicate a starting point for lighting design.

Note: Please refer to your lighting manufactures recommendations to insure proper and accurate illumination.
Figure 15 Recessed Fixtures Layout Examples

- Recessed Indirect 2’x4’ w/ radiant angle > 60°
- Recessed Indirect 2’x2’ w/ radiant angle < 60°
- Recessed Indirect/Direct 2’x4’ w/ radiant angle > 60° Allows for even illumination of direct light on participants
- Recessed Indirect/Direct 2’x2’ w/ radiant angle > 60° Allows for even illumination of direct light on participants
- Recessed Indirect 2’x4’ w/ radiant angle < 60°
- Recessed Indirect 2’x2’ w/ radiant angle < 60°
Other Sources of Illumination

Customers will want to be aware of any other additional sources of lighting such as interior windows, exterior windows, architectural lighting, etc. These sources of light are generally not consistent and may degrade the quality of the overall experience. These sources should be removed or controlled. Curtains or window coverings may suffice in some cases but should follow the guidelines under the Continuity section of this guide.

Continuity

The design goals for continuity are to strengthen the feeling of a common environment, enhancing the overall experience. To help create this uniform feeling across installations, aspects such as color, texture, and adornments that fall within view of the cameras must be considered.

Cisco provides CTX-certified color recommendations for the customer’s rooms. These colors meet most corporate standards while creating an environment that is warm and inviting (participants should feel comfortable sitting in the room for long durations). These colors are specifically designed to provide the best video quality.

Beyond colors, the textures and adornments on walls should be similar to the other rooms to further add to the feeling of a unified environment.

It is highly recommended that the company standardize on a single company color pallet to maintain continuity.
Table 5  Continuity

<table>
<thead>
<tr>
<th>Continuity</th>
<th>Target</th>
<th>Tolerance</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wall surface reflectivity</td>
<td>≤ 18%</td>
<td>≤ 40%</td>
<td>Recommended color choices which meet these reflectivity targets are listed in the following section. Please contact Cisco for additional recommendations</td>
</tr>
</tbody>
</table>

Texture/Patterns

Wall and wall covering should be within the TelePresence color palette. Patterns and textures should be subtle enough to show variances, but not too contrasting that they appear distracting on camera.

Furniture & Adornments

All items should be on or near the back wall to help create a feeling of depth and should be within the camera’s depth of field so that they appear in focus on camera.

Some suggested furnishings which work well in the TelePresence room environment are: seating, credenzas, bookshelves, console table, occasional tables, and coat racks. Suggested adornments are vases, corporate awards, table art, books, mirrors, clocks and items with interesting shapes.

All items should not be too large as to create excessive shadowing or have high specular reflectivity such as glass, chrome, and other metals.

Recommended Colors

The color temperature, intensity and positioning of a TelePresence room’s practical lights produce unique reactions from paint colors. Cisco has tested a broad spectrum of hues to identify the characteristics of paint colors that compliment the codec and plasma technology, work well with the skin tones of the participants on camera and feel comfortable in person. TelePresence technology works best when colors are within a neutral tone, chromatically tame and fall within a lower reflectance range. The first generation of Cisco TelePresence colors is warmer earth tones chosen so the technology can optimally portray the participants in the most accurate manner.

Note: Do not perform a color match using a printed version of this document. Due to the vast number of color systems and paint manufacturers throughout the world, it has not been scalable to identify matching colors for each paint or color provider. To translate colors to your local paint system and for an accurate representation of the paint colors, request a color sheet.

Color sheets can also be requested on line at:

https://bm.faicentral.com/logina/

For Web orders you will need to create an account.

For international orders and orders by phone, the phone number is +1 (888) 854-9889.
## Table 6  Recommended Colors

<table>
<thead>
<tr>
<th>Vendor</th>
<th>Color</th>
<th>Color#</th>
<th>Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benjamin More &amp; Co.</td>
<td>Classic Caramel</td>
<td>#1118</td>
<td></td>
</tr>
<tr>
<td>Benjamin More &amp; Co.</td>
<td>Huntington Beige</td>
<td>#HC-21</td>
<td></td>
</tr>
<tr>
<td>Benjamin More &amp; Co.</td>
<td>Cork</td>
<td>#2153-40</td>
<td></td>
</tr>
<tr>
<td>Benjamin More &amp; Co.</td>
<td>Peach Brandy</td>
<td>#112</td>
<td></td>
</tr>
<tr>
<td>Benjamin More &amp; Co.</td>
<td>Fairmont Gold</td>
<td>#1071</td>
<td></td>
</tr>
</tbody>
</table>
Table 6  Recommended Colors

<table>
<thead>
<tr>
<th>Benjamin More &amp; Co.</th>
<th>Wilmington Tan</th>
<th>#HC-34</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benjamin More &amp; Co.</td>
<td>Woodstock Tan</td>
<td>#HC-20</td>
</tr>
</tbody>
</table>

Contact the Cisco Systems TelePresence Business Unit for additional paint recommendations.

**Heating and Cooling Requirements**

Planning the cooling for a TelePresence room is not difficult as long as a few things are kept in considerations during your room search and planning phase. Most importantly, it is always be beneficial to select a room, which already has adequate cooling capacity. The cooling for a TelePresence room is not much greater than what should be available in most commercial office space. See the specific endpoint sections within this document to find cooling requirements for each product. However, when cooling is a challenge, following a few key recommendations can maximize the cooling efficiency of any space:

- Chose an interior room to avoid added radiant energy from exterior. (See figure 16 below)
- Place diffusers for optimum circulation and allow for natural heat dissipation by placing supplies behind participants and returns above the CTS endpoint
- Keep CTS rooms on individual zone with local thermostat. This may require the installation of a new VAV (variable air volume controller). If a new VAV is installed, place away from room (over hallway or an adjacent room) to remove added noise.

Noise from existing ducts and mechanical equipment should be evaluated. The target ambient noise level is 36dB, as measured by a Sound Pressure Level (SPL) meter one meter away from each register. Cisco highly recommends the use of NC30 rated diffusers and/or registers. Also, the use of sound boots or duct wrapping may be recommended where air velocity is increased and creates undesirable sound. Additional diffusers may be added to accommodate greater airflow without increased noise. Noise from mechanical hardware such as VAV (Variable Air Volume) controller or other should be placed away from room so ambient noise levels are not increased.

**Note:** The customer should consult their facilities department or an HVAC engineer to assist in evaluating their design for an acceptable cooling solution with moderate ambient noise added to environment.
It is important to keep in mind that the goal of the HVAC system is to ensure that the meeting room is comfortable (i.e. < 76° F or < 24° C) and inviting to its participants, while keeping ambient noise levels to a minimum. Each deployment has specific needs based on the envelope of the building and its location. The specifications in this document account for the overall TelePresence system including its lighting in a typical meeting environment which follows the guideline of this document.

For specific BTU output of each TelePresence product, please see the appropriate detailed product chapter in this guide.

### Table 7  CTS 3000 Heat Dissipation and HVAC BTU Requirements

<table>
<thead>
<tr>
<th></th>
<th>See specific product chapter for details on BTU requirements of each product</th>
<th>Ensure that the meeting room is comfortable and inviting to participants. (i.e. &lt; 76° F or &lt; 24° C)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BTU</strong> Participants</td>
<td></td>
<td></td>
</tr>
<tr>
<td>account for about 225</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BTU each</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Building Envelope</td>
<td>Chose interior rooms which are not affected by exterior radiant energy</td>
<td>Consider additional cooling when guidelines are not followed.</td>
</tr>
<tr>
<td>HVAC Design</td>
<td>Diffuser Type</td>
<td>Use N30 rated plaque diffusers</td>
</tr>
<tr>
<td></td>
<td>Diffuser Placemen</td>
<td>Supply behind participants and returns above endpoint</td>
</tr>
<tr>
<td>HVAC Sound</td>
<td>NC30</td>
<td>&lt; 36dBA (+9dBA Max)</td>
</tr>
</tbody>
</table>

*BTU = British Thermal Units = Total Watts x 3.413 (Also consider Building Envelope and Diversity)

**Figure 16  HVAC Placement Example (CTS 3000)**

**Figure 17  NC 30 Rated Plaque Diffuser**
Dimensions and Spatial Orientation

Environmental characteristics of the room include the dimensions and spatial orientation of the room (including the ceiling height) and the location of doors and windows. Rectangular rooms are preferred although irregular shaped rooms can also be accommodated. Ceiling height should be 8’ to 10’ (2.44m to 3.05m). Lower ceilings may be accommodated if the lighting façade of the CTS endpoint doesn’t create an obstruction to items such as sprinklers, light strobes, etc. Please consult your local fire code for specific restrictions. Ceilings lower than 7’ (2.13m) will not physically support the height of the CTS endpoint lighting façade. Ceilings higher than 10’ (3.05m) may require special acoustic treatment. This is generally accomplished by adding acoustic paneling to the walls.

Room Dimensions (CTS 3200)

The minimum room size for a Cisco TelePresence 3200 system is 8(2.44m) x 31(9.44m) x 23(7.01m) feet (H x W x D). The room width (31 feet or 9.44m) is based on the physical dimensions of the second-row table plus 3 feet (0.91m) minimum on either side to allow for freedom of movement in the room. The room depth (23 feet or 9.44m) is based on the physical distance between the camera and the edge of the second-row table plus 4 feet minimum for chairs and push-back distance. To help provide some more flexibility, we have created an additional deployment option where you simply install two fewer table segments and supporting structure. This ends up with a 2nd row table that fits 8 people (14 total participants in the room) and will fit into a 24 feet (7.31m) width room. The other room dimensions (height and depth) are the same as those listed above. Overall, this provides the flexibility to deploy the standard table configuration for maximum seating capacity (18 people in the room, 31 feet (9.44m) min room width) or to deploy a reduced table configuration for minimum room footprint (14 people in the room, 24 feet (7.31m) min room width). The minimum and recommended room dimensions for a Cisco TelePresence System 3200 are shown in the table below.
**Lighting requirements (CTS 3200)**

The Cisco TelePresence 3200 System requires the following lighting levels. Please refer to general lighting section for all complete lighting specifications.

**Table 10  Lighting Measurement**

<table>
<thead>
<tr>
<th>Illumination</th>
<th>Target</th>
<th>Tolerance</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall illumination lux (= lm/m2)</td>
<td>300-400 lux</td>
<td>+ or − 50 lux</td>
<td>Measured vertically w/ light sensor pointed at wall or intended camera location (not pointed at ceiling)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lighting should be evenly dispersed throughout the room.</td>
<td></td>
</tr>
<tr>
<td>Shoulder light/Direct down light.</td>
<td>600-700 lux or lower when possible</td>
<td>Generally, shoulder lighting should not be more the 400 lux greater than the overall illumination of the room and never exceed 800 lux</td>
<td>Measured horizontally at table height w/ light sensor pointed at ceiling</td>
</tr>
<tr>
<td>Lighting Dispersion Color Temperature Etc.</td>
<td>Refer to Chapter 3 for all other general Cisco TelePresence lighting requirements.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** The following examples are for reference only. Please consult with your light manufacture for adequate number and proper layout of fixtures to achieve the lighting levels mentioned above.
Figure 18  Lighting Fixture placement options

- 2x4 symmetric Staggered
- 2 rows 1x4 asymmetric Staggered
- 1x4 asymmetric Staggered
- 2x2 symmetric Staggered
Power Requirements

The Cisco TelePresence System 3200 requires 6 dedicated 20Amp circuits @120V (US electrical code requires maximum 16A on a 20Amp circuit) or 6 dedicated 10amp circuits @ 240V. These circuits must be dedicated to the Cisco TelePresence System. 4 circuits should be located on the wall behind the system at standard height for plasmas, codecs and front table of participants. 2 circuits should be provided via cable trench to back table.

Note: Peripherals are not included in the following power requirement tables. Peripherals such as document cameras or alternate displays will require additional circuits and receptacles. Placement will depend on the type and location of the peripheral.

Table 11  CTS–3200 Power Consumption

<table>
<thead>
<tr>
<th>Component</th>
<th>Maximum Wattage</th>
<th>Amperage @120V</th>
<th>Typical Wattage</th>
<th>Amperage @120V</th>
<th>Idle Wattage</th>
<th>Amperage @120V</th>
</tr>
</thead>
<tbody>
<tr>
<td>65” Plasma Display x3</td>
<td>3240</td>
<td>27</td>
<td>2339</td>
<td>16.95</td>
<td>1.8</td>
<td>0.01</td>
</tr>
<tr>
<td>NEC 40” LCD</td>
<td>252</td>
<td>2.1</td>
<td>252</td>
<td>2.1</td>
<td>1.2</td>
<td>0.01</td>
</tr>
<tr>
<td>Primary Codec x1</td>
<td>300</td>
<td>2.5</td>
<td>126</td>
<td>1.0</td>
<td>120</td>
<td>1</td>
</tr>
<tr>
<td>Secondary Codec x2</td>
<td>360</td>
<td>3</td>
<td>226</td>
<td>1.88</td>
<td>216</td>
<td>1.8</td>
</tr>
<tr>
<td>Lighting Façade Top x 3 + Sides x 2</td>
<td>348</td>
<td>2.91</td>
<td>348</td>
<td>2.91</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Light control</td>
<td>24</td>
<td>0.2</td>
<td>24</td>
<td>0.2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Projector x1</td>
<td>288</td>
<td>2.4</td>
<td>225</td>
<td>1.7</td>
<td>.6</td>
<td>.01</td>
</tr>
<tr>
<td>Expansion Unit</td>
<td>9.6</td>
<td>0.08</td>
<td>9.6</td>
<td>0.08</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>POWER TOTALS</strong></td>
<td><strong>4821 Watts</strong></td>
<td></td>
<td><strong>3549 Watts</strong></td>
<td></td>
<td><strong>339 Watts</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>40.2amps @ 120V</strong></td>
<td></td>
<td><strong>26.3amps @ 120V</strong></td>
<td></td>
<td><strong>3amps @ 120V</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>20.1amps @ 240V</strong></td>
<td></td>
<td><strong>13.17amps @ 240V</strong></td>
<td></td>
<td><strong>1.5amps @ 240V</strong></td>
<td></td>
</tr>
</tbody>
</table>

Optional: Additional Power Requirements for power in Table Legs

<table>
<thead>
<tr>
<th>Participant Convenient ports (18 participants)</th>
<th>Maximum Wattage</th>
<th>Amperage</th>
<th>Typical Wattage</th>
<th>Amperage</th>
<th>Idle</th>
<th>Amperage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4320</td>
<td>36</td>
<td>440</td>
<td>3.66</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

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The TelePresence CTS 3200 uses Power Distribution Units (PDU) to connect the components to the power circuits.

### Table 12  CTS 3200 Power Distribution

<table>
<thead>
<tr>
<th>PDU</th>
<th>Number of receptacles required</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC Plugs (front table legs) and Projector share 1st PDU</td>
<td>= 1 Receptacle</td>
</tr>
<tr>
<td>Primary Codec &amp; 1 secondary codec &amp; Plasma Display share 2nd PDU</td>
<td>= 1 Receptacle</td>
</tr>
<tr>
<td>2 Secondary Codec &amp; 1 Plasma Display share 3rd PDU</td>
<td>= 1 Receptacle</td>
</tr>
<tr>
<td>Lighting &amp; 1 Plasma Display share the Lighting Power Control Unit</td>
<td>= 1 Receptacle</td>
</tr>
<tr>
<td>AC Plugs (6 back table legs)</td>
<td>= 1 Receptacle</td>
</tr>
<tr>
<td>AC Plugs (6 back table legs)</td>
<td>= 1 Receptacle</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>= 6 Receptacles</strong></td>
</tr>
<tr>
<td></td>
<td><em>(20amp@120V, 10amp@240V)</em> each</td>
</tr>
</tbody>
</table>

**Network Port Requirements**

There are different options when planning the connectivity of the endpoint and the participant convenience ports. Please consult with your network administrator to understand which method meets the needs and requirements of your business.

The CTS 3200 requires a single Gigabit Ethernet port (RJ-45 UTP) installed on the wall behind the system at standard height. This one port will connect the primary codec which is the main interface between the CTS endpoint system and the network infrastructure.

For participant connectivity to the network there are three options. These are listed in the table below

### Table 13  CTS 3000 Network Access

<table>
<thead>
<tr>
<th>Options</th>
<th># of Ports</th>
<th>Connection</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>*CTS Codec (required)</td>
<td>1</td>
<td>Wired</td>
<td>RJ-45 UTP Gigabit Ethernet on wall 1</td>
</tr>
<tr>
<td>Participants Option 1</td>
<td>1</td>
<td>Wireless</td>
<td>Customer must provide wireless access</td>
</tr>
<tr>
<td>Participants Option 2</td>
<td>1</td>
<td>Wired w/ switch in room</td>
<td>An additional RJ-45 UTP port should be provided on wall 1 for the switch.</td>
</tr>
</tbody>
</table>
*Codec connectivity is required regardless of the participant access type

**Note:** Any switches installed in the TelePresence room must meet the company’s network policies. They must also meet the sound requirements of TelePresence. Switches should not generate more than 45dB of sound within the TelePresence room.

### Acoustic requirements (CTS 3200)

Since we are designing for high level speech intelligibility within a meeting environment, the specifications remain the same as with the CTS 3000, CTS 1000 and CTS 500.

- Ambient Noise less than 45dBA (ideally at 36dBA)
- RT60 less than 500ms (not to exceed 700ms for non voice critical freq)
- Noise Criteria no greater than 30

Standard meeting rooms (of drywall, suspended ceilings, and carpeting) at this size (31’x23’) have exposed, parallel hard surfaces, which promote reverberation to levels greater than 500ms (nearly 900ms – 1.2 seconds). The echo cancellation in the 3200 may compensate for this reverberation for the remote participants; however, local sound quality will be degraded in this very “live” environment.

Acoustic Treatment for CTS 3200 rooms is required (no longer just recommended as with CTS 3000 rooms). Acoustic panel are mandatory to guarantee that the room will be echo free.

![Minimal or Asymmetrical Treatment with Acoustic Panels](image1)

Notice how no opposing drywall surfaces are exposed.

![Complete Treatment Acoustic Panels / Fabric Walls](image2)

Wall surfaces covered around perimeter (Not necessarily floor to ceiling).
HVAC Requirements (CTS3200)

Planning the cooling for a CTS 3200 TelePresence room is important to ensure the room remains comfortable for participants and the equipment is kept safe. As outlined in the overview section of this document, HVAC considerations should be given from the initial phase of choosing a room.

The detail in the table below outlines the specific BTU output of a CTS 3200 when deployed as recommended and under typical operating conditions. Typical assumes normal usage conditions such that the system is not subject to 100 percent utilization rates and deployment following Cisco recommendations. i.e. room located on interior, proper air circulation, walls painted with neutral colors, temperature expected 72-76 degrees F. Within these guidelines and typical usage, diversity of 25 percent can be equated which lowers cooling requirements and increases overall efficiency.

**Note:** Conditions not inline with recommendations or typical usage may require additional cooling. Consult with HVAC engineer to define building envelope and unique requirements. Additional equipment such as data displays, document cameras, etc. will require additional cooling.

### Table 14  CTS 3200 BTU Output with 25% diversity

<table>
<thead>
<tr>
<th>Source</th>
<th>Wattage in kilowatts</th>
<th>BTU</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Power</td>
<td>3.0</td>
<td>9950</td>
</tr>
<tr>
<td>System Lighting</td>
<td>0.35</td>
<td>1190</td>
</tr>
<tr>
<td>12 Participants (Avg)</td>
<td>0.78</td>
<td>2660</td>
</tr>
<tr>
<td>8 Laptops (Avg)</td>
<td>0.44</td>
<td>1500</td>
</tr>
<tr>
<td>Ceiling Lights (1.4w/sqft)</td>
<td>0.99</td>
<td>3380</td>
</tr>
<tr>
<td>Total Typical Heat Dissipation</td>
<td>4.17kW</td>
<td>14,200 BTU/Hr</td>
</tr>
</tbody>
</table>

**Auxiliary display requirements (CTS 3200)**

The Cisco TelePresence 3200 comes with the standard Cisco TelePresence data projector, designed to project onto the white screen below the three primary video displays. Content on that screen is difficult for participants in the second row to see, so the system includes a 4-port HDMI splitter as part of the audio-video expansion unit. This splitter allows you to add up to three additional data displays in the room so that second-row participants can easily view shared data. It gives you flexibility to choose the number, size, and location of the extra displays you need to fit the room configuration. The size of the display is up to the customer. We would recommend at least 50 inches display when using one centered or two 46 inches display when located on both sides, but the customer must check the height of the room prior to installation. The system is 2.13m (7 feet) high.
Cabling requirements (CTS 3200)

We recommend core drilling or trenching the floor to route cables below the floor from the front row to the second row of tables for microphone, power, and (possibly) Ethernet cabling. This scenario provides the cleanest and simplest solution. If you are unable to route the cables under the floor, you must consult local fire, building, and safety codes to ensure that cable routing does not create any hazards. Solution like speeds bumps covering cables are not recommended as it break those rules. It can maintain room aesthetics; prevent tripping hazards, and meet fire, safety, and accessibility requirements. Please see figure in Room dimension to see the exact location of the trench. We recommend building a 12inch trench.

The trench should be able to allow a clear separation between power cable (2) when required, microphone cable (6) and Ethernet cable (2 to 12 depending on use of small switches or not). One exit of the trench should come out behind the right plasma. The exact location of the second exit of the trench is indicated in the figures below.

The microphones are connected through a microphone extension lead and the maximum distance between the microphones to the codec is 17.5 meters (57.4 feet). The extension microphone lead is 9 meter (29.5 feet). Longer distance between the microphone and primary codec is introducing noise and is not supported. The Ethernet cable which are connecting the participants in the second row are 10 meter (32.8 feet) long and the two Power Distribution Units which are used to provide power to the second row have a 7 meter (23 foot) cable.

Power and Data could be taken directly from the back wall in another trench as long as it follows all local fire, building and safety code.
**Figure 22**  CTS 3200 18 seats, trench location

**X** is the distance between system and light shroud, x varies depending on:
- Existing pillar between back wall and system
- Use of a central alternate display which requires a minimum of 40cm between back of system and back wall for LCD installation and maintenance
- Depth of the actual room
Figure 23  CTS 3200 14 seats, trench location

X is the distance between system and light shroud, x varies depending on:
- Existing pillar between back wall and system
- Use of centered alternate display which requires a minimum of 40cm between back of system and back wall for LCD installation and maintenance
- Depth of the actual room

\[ Y = x + 3.90 \]

\[ Z = x + 0.06 \text{m} \]
Dimensions and Spatial Orientation

Environmental characteristics of the room include the dimensions and spatial orientation of the room (including the ceiling height) and the location of doors and windows. Rectangular rooms are preferred although irregular shaped rooms can also be accommodated. Ceiling height should be 8’ to 10’ (2.44m to 3.05m). Lower ceilings may be accommodated if the lighting façade of the CTS endpoint doesn’t create an obstruction to items such as sprinklers, light strobes, etc. Please consult your local fire code for specific restrictions. Ceilings lower than 7’ (2.13m) will not physically support the height of the CTS endpoint lighting façade. Ceilings higher than 10’ (3.05m) may require special acoustic treatment. This is generally accomplished by adding acoustic paneling to the walls.

Room Dimensions (CTS 3000)

The minimum, recommended, and maximum room dimensions for a Cisco TelePresence System 3000 are shown in Table 15.
Table 15  CTS 3000 Room Dimensions

<table>
<thead>
<tr>
<th></th>
<th>Width</th>
<th>Depth</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>20’ (6.10m)</td>
<td>15’ (4.57m)</td>
<td>8’ (2.44m)</td>
</tr>
<tr>
<td>Recommended</td>
<td>22’ (6.70m)</td>
<td>19’ (5.80m)</td>
<td>10’ (3.05m)</td>
</tr>
<tr>
<td>Maximum</td>
<td>31’ (9.45m)</td>
<td>23’ (7.01m)</td>
<td>10’ (3.05m)</td>
</tr>
</tbody>
</table>

The minimum room dimensions are illustrated in Figure 24 and Figure 25.

Figure 24  CTS 3000 Room Dimensions (Standard)
Lighting Requirements

The Cisco TelePresence 3000 System requires the following lighting levels. Please refer to general lighting section for all complete lighting specifications.

<table>
<thead>
<tr>
<th>Illumination</th>
<th>Target</th>
<th>Tolerance</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall illumination lux (= lm/m2)</td>
<td>300-400 lux</td>
<td>+ or – 50 lux</td>
<td>Measured vertically w/ light sensor pointed at wall or intended camera location (not pointed at ceiling)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lighting should be evenly dispersed throughout the room.</td>
<td></td>
</tr>
<tr>
<td>Shoulder light/Direct down light.</td>
<td>600-700 lux or lower when possible</td>
<td>Generally, shoulder lighting should not be more the 400 lux greater than the overall illumination of the room and never exceed 800 lux</td>
<td>Measured horizontally at table height w/ light sensor pointed at ceiling</td>
</tr>
</tbody>
</table>
Table 16  Lighting Measurement

<table>
<thead>
<tr>
<th>Illumination</th>
<th>Target</th>
<th>Tolerance</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lighting Dispersion</td>
<td>Refer to Chapter 3 for all other general Cisco TelePresence lighting requirements.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Color Temperature</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Etc.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Power Requirements

The Cisco TelePresence System 3000 requires four dedicated 20Amp circuits @120V (US electrical code requires maximum 16A on a 20Amp circuit) or four dedicated 10amp circuits @ 240V. These circuits must be dedicated to the Cisco TelePresence System. Receptacles should be located on the wall behind the system at standard height.

Note: Peripherals are not included in the following power requirement tables. Peripherals such as document cameras or alternate displays will require additional circuits and receptacles. Placement will depend on the type and location of the peripheral.

Table 17  CTS – 3000 Power Consumption

<table>
<thead>
<tr>
<th>Component</th>
<th>Maximum Wattage</th>
<th>Amperage @120V</th>
<th>Typical Wattage</th>
<th>Amperage @120V</th>
<th>Idle Wattage</th>
<th>Amperage @120V</th>
</tr>
</thead>
<tbody>
<tr>
<td>65” Plasma Display x3</td>
<td>3240</td>
<td>27</td>
<td>2339</td>
<td>19.49</td>
<td>1.8</td>
<td>.01</td>
</tr>
<tr>
<td>Primary Codec x1</td>
<td>300</td>
<td>2.5</td>
<td>126</td>
<td>1.3</td>
<td>120</td>
<td>1</td>
</tr>
<tr>
<td>Secondary Codec x2</td>
<td>360</td>
<td>3</td>
<td>226</td>
<td>1.9</td>
<td>216</td>
<td>1.8</td>
</tr>
<tr>
<td>Lighting Façade Top x3 Sides x2</td>
<td>348</td>
<td>2.91</td>
<td>348</td>
<td>2.91</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Auxiliary Control Unit</td>
<td>24</td>
<td>.45</td>
<td>24</td>
<td>.45</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Projector x1</td>
<td>288</td>
<td>2.4</td>
<td>225</td>
<td>1.8</td>
<td>.6</td>
<td>.01</td>
</tr>
<tr>
<td><strong>POWER TOTALS</strong></td>
<td><strong>4560 Watts</strong></td>
<td></td>
<td><strong>3288 Watts</strong></td>
<td></td>
<td><strong>338 Watts</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>38amps @ 120V</td>
<td></td>
<td>28.7amps @ 120V</td>
<td></td>
<td>3amps @ 120V</td>
<td></td>
</tr>
<tr>
<td></td>
<td>19amps @ 240V</td>
<td></td>
<td>14.4amps @ 240V</td>
<td></td>
<td>1.5amps @ 240V</td>
<td></td>
</tr>
</tbody>
</table>

Optional: Additional Power Requirements for power in Table Legs

<table>
<thead>
<tr>
<th>Participant Convenient Ports x6</th>
<th>Wattage</th>
<th>Amperage @120V</th>
<th>Typical Wattage</th>
<th>Amperage @120V</th>
<th>Idle Wattage</th>
<th>Amperage @120V</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1440</td>
<td>12</td>
<td>165</td>
<td>1.3</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

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The TelePresence CTS 3000 uses Power Distribution Units (PDU) to connect the components to the power circuits.

**Table 18  CTS 3000 Power Distribution**

<table>
<thead>
<tr>
<th>PDU</th>
<th>Number of receptacles required</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC Plugs and Projector share 1st PDU</td>
<td>= 1 Receptacle</td>
</tr>
<tr>
<td>Primary Codec &amp; 1 secondary codec &amp; Plasma Display share 2nd PDU</td>
<td>= 1 Receptacle</td>
</tr>
<tr>
<td>Secondary Codec &amp; Two Plasma Display share 3rd PDU</td>
<td>= 1 Receptacle</td>
</tr>
<tr>
<td>Plasma Display &amp; Lighting share the Lighting Power Control Unit</td>
<td>= 1 Receptacle</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>= 4 Receptacles (20amp@120V, 10amp@240V) each</td>
</tr>
</tbody>
</table>

**Network Port Requirements**

There are different options when planning the connectivity of the endpoint and the participant convenience ports. Please consult with your network administrator to understand which methods meet the needs and requirements of your business.

The CTS 3000 requires a single Gigabit Ethernet port (RJ-45 UTP) installed on the wall behind the system at standard height. This one port will connect the primary codec which is the main interface between the CTS endpoint system and the network infrastructure.

For participant connectivity to the network there are three options. These are listed in Table 19.

**Table 19  CTS 3000 Network Access**

<table>
<thead>
<tr>
<th>Options</th>
<th># of Ports</th>
<th>Connection</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>*CTS Codec (required)</td>
<td>1</td>
<td>Wired</td>
<td>RJ-45 UTP Gigabit Ethernet on wall 1</td>
</tr>
<tr>
<td>Participants Option 1</td>
<td>1</td>
<td>Wireless</td>
<td>Customer must provide wireless access</td>
</tr>
<tr>
<td>Participants Option 2</td>
<td>1</td>
<td>Wired with switch in room</td>
<td>An additional RJ-45 UTP port should be provided on wall 1 for the switch.</td>
</tr>
<tr>
<td>Participants Option 3</td>
<td>6</td>
<td>Wired direct to wall with switch in wiring closet</td>
<td>Six additional RJ-45 UTP ports must be provided on wall 1.</td>
</tr>
</tbody>
</table>

*Codec connectivity is required regardless of the participant access type
Note: Any switches installed in the TelePresence room must meet the company’s network policies. They must also meet the sound requirements of TelePresence. Switches should not generate more than 45dB of sound within the TelePresence room.

**HVAC Requirements (CTS3000)**

Planning the cooling for a CTS 3000 TelePresence room is important to insure the room remains comfortable for participants and the equipment is kept safe. As outlined in the overview section of this document, HVAC considerations should be given from the initial phase of choosing a room.

The detail in the table below outlines the specific BTU output of a CTS 3000 when deployed as recommend and under typical operating conditions. Typical assumes normal usage conditions such that the system is not subject to 100 percent utilization rates and deployment following Cisco recommendations, i.e. room located on interior, proper air circulation, walls painted with neutral colors, temperature expected 72-76 degrees F. Within these guidelines and typical usage, diversity of 25 percent can be equated which lowers cooling requirements and increases overall efficiency.

Note: Conditions not inline with recommendations or typical usage may require additional cooling. Consult with HVAC engineer to define building envelope and unique requirements. Additional equipment such as data displays, document cameras, etc. will require additional cooling.

<table>
<thead>
<tr>
<th>Source</th>
<th>Wattage in kilowatts</th>
<th>BTU</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Power</td>
<td>2.9</td>
<td>9950</td>
</tr>
<tr>
<td>System Lighting</td>
<td>0.35</td>
<td>1190</td>
</tr>
<tr>
<td>6 Participants (Avg)</td>
<td>0.39</td>
<td>1330</td>
</tr>
<tr>
<td>3 Laptops (Avg)</td>
<td>0.17</td>
<td>560</td>
</tr>
<tr>
<td>Ceiling Lights (1.4w/sqft)</td>
<td>0.53</td>
<td>1560</td>
</tr>
<tr>
<td><strong>Total Typical Heat Dissipation</strong></td>
<td><strong>3.3kW</strong></td>
<td><strong>11,200 BTU/Hr</strong></td>
</tr>
</tbody>
</table>

**Figure 26**  HVAC Placement Example (CTS 3000)
NC 30 Rated Diffusers allow for greater volume of airflow with less noise.

Figure 27  NC 30 Rated Diffuser
CTS 1000 Specific Requirements

TelePresence CTS 1000 Overview

Cisco TelePresence System 1000

The Cisco TelePresence System 1000, or CTS 1000, is designed for smaller executive meeting room environments and one-on-one conversations, seating up to four participants at a virtual table. It consists of one 65” high definition plasma display and mounting stand, one high definition camera, one wide band microphone, one speaker, a lighting shroud integrated over the display and the primary codec. A Cisco 7970G IP Phone is also included and used to launch, control and end the meeting. The customer must furnish their own meeting room table and chairs. No closet rack space is required for the endpoint.
Environmental Considerations CTS 1000

Room Choice

The CTS 1000 can be installed in a purpose built room that is designed for TelePresence meetings or a multi-purpose environment that may accommodate multiple types of meetings or activities. For this reason, you will want to pick the proper size room for your application and meeting requirements. Each type of environment has special considerations that you will want to consider.

The minimum, recommended and maximum room dimensions for a Cisco TelePresence System 1000 are as follows:

<table>
<thead>
<tr>
<th></th>
<th>Minimum</th>
<th>Recommended</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>8’ (2.44m)</td>
<td>15’ (4.27m)</td>
<td>25’ (7.62m)</td>
</tr>
<tr>
<td>Depth</td>
<td>14’ (4.27m)</td>
<td>17’ (5.18m)</td>
<td>21’ (6.4m)</td>
</tr>
<tr>
<td>Height</td>
<td>8’ (2.44m)</td>
<td>8’ (2.44m)</td>
<td>10’ (3.05m)</td>
</tr>
</tbody>
</table>

Minimum Room Size

The recommended minimum room size is 14’ (4.27) by 8’ (2.44m). Ceiling height should measure no less than 8’ (2.44m). More details regarding ceiling height can be found in the ceiling section below. The minimum room size is expected to satisfy the requirements of the Executive Meeting Room or Executive Office. In this configuration, the CTS 1000 will allow four participants and the “Virtual Table” during a TelePresence meeting or four participants in the meeting room (see figure 1 below). Please note the following. Although it may seem possible to move the table closer to the CTS 1000 to accommodate a smaller environment, this is NOT recommended. The CTS 1000 is optimized for participants to remain at least 8.5’ (2.59m) from the camera to sustain eye gaze alignment, eye contact with the remote participants as well as life size aspect. You may read more details on this subject in section the Table Requirements and Placement section below.

Door and Window Locations

With the minimum size rooms, the doors may be located on any wall other than the wall in which the CTS 1000 will be mounted. This is noted on figure 1 below with hash-marked areas. Cisco does however recommend that doors be out of camera view to avoid distractions and promote continuity when possible. Doors located on side walls are preferred to the back wall behind participants.

Cisco recommends that with any TelePresence room, window or glass walls do not consume more than 20% of vertical wall space. Windows and glass walls expose the TelePresence environment to uncontrollable light such as sunlight or corridor lighting to affect the overall quality of the experience. As well, these hard surfaces can promote undesirable acoustic conditions which create audio reverberation in excess of ideal requirements. All window and glass walls should be treated with material which promote acoustic attenuation and provide light blocking characteristics. Treatments in the viewing area of the cameras should be consistent with the rest of the environment to promote continuity. Details regarding Cisco approved wall color can be found in the Continuity section of this document. Detailed specifications regarding acoustics are provided in the acoustic specifications section of this document below.
Recommended Room Size

The recommended room size for the CTS 1000 is 15’ (4.27m) by 17’ (5.18m). Although this size specification only allows four participants at the virtual table, it does allow for additional people to sit behind the participants and be involved in the meeting. (Please note that participants not sitting at the table are not intended to be life-size or in perfect focus, however this does allow for additional persons to be involved). This size room also allows for more flexibility as a multi-purpose environment when not used as a TelePresence meeting room. The additional space allows the accommodation of more participants at the local table for traditional meetings. Medium sized rooms and larger executive offices should accommodate this configuration very well and provide a great experience for both TelePresence and a collaborative space for traditional meetings. See Figure 29 for a recommended floor plan.
Maximum Room Size

The maximum size room recommended is 25’ (7.62m) by 21’ (6.4m). The expectation for a room this size is for use as a multi-purpose environment. In this type of space, it is not recommended that the CTS 1000 be centered in the room, but rather placed to one side to create a TelePresence area within your environment. This option allows for many possible configurations. The purpose of limiting the maximum size for this endpoint is due to acoustics. As the size of the room is increased, the area of hard parallel surfaces is increased which promotes reverberation and poor quality audio. Cisco highly recommends that any deployment in a space that is larger than the recommended size be tested for reverberation and treated where required for meeting specifications. More information on reverberation specifications is available in the Acoustics section of this document.

Ceiling Height for all Room Sizes

The recommended ceiling height for the intended location of your CTS 1000 should measure 8’ to 10’ (2.44m – 3.05m). The recommended minimum ceiling height requirement is one of physical dimension and possible fire code requirements. The height of the lighting facade for the CTS 1000 is such that the ceiling height should be a minimum of 8’ for to avoid interference with standard ceiling sprinkler systems. Please check with local fire code if installing this system in environments with ceiling heights lower than 8’ (2.44 m).
The recommended maximum ceiling height is suggested to promote good acoustics in the environment which are ideal for Cisco TelePresence and human speech in general. High ceilings over 10’ (such as an Auditorium) promote the reverberation of sound waves throughout the environment and may lower the quality of speech intelligibility and the overall level of experience. Environments with higher ceilings may be accommodated if the ceiling and walls are treated with reverberation attenuating materials. More information regarding environmental acoustics is available below.

### Table Specifications and Recommended Placement

#### Table Specifications

The table chosen for the TelePresence environment must accommodate two people side-by-side comfortably. It should not be the dominate element in the room and must have minimal reflectivity. The specifications below should be followed when selecting a proper table.

<table>
<thead>
<tr>
<th>Table 22 CTS 1000 Table Size</th>
<th>Width</th>
<th>Depth</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>6’ (1.83m)</td>
<td>4’ (1.22m)</td>
<td>28” (71cm)</td>
</tr>
<tr>
<td>Maximum</td>
<td>As space allows</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Material

Generally the material of the table is not of great concern. It is rather the finish and color of the table that is most important. Tables which are made of glass, marble, metal, and other reflective surfaces should not be used, as these will promote reflections onto the display and possibly the camera. Wood or laminate finishes with low reflectivity are highly recommended. Highly polished woods should be avoided.

#### Color

Neutral colors and natural light colored woods, such as oak and pine, are ideal. Very dark or brightly saturated colors such as dark mahogany and deep cherry-wood colors may reflect onto participants. This could result in changing skin tone to look muted or unnaturally saturated with color. Either scenario will degrade the quality of the video and overall experience.
Table 23  CTS 1000 Approved Table Examples

<table>
<thead>
<tr>
<th>Wood (Natural color and low reflectivity)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laminate (with low reflectivity)</td>
</tr>
</tbody>
</table>

Table 4: CTS 1000 Non-Recommended Table Examples

<table>
<thead>
<tr>
<th>Dark or Saturated Wood Colors not recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glass, Metal, Heavy Patterns with reflections not recommended</td>
</tr>
</tbody>
</table>

Additional Recommendations

A good thing to keep in mind when selecting a table is how cables are managed. The endpoint is controlled by a Cisco 7970G IP Phone which will need to be located conveniently on the table. This will require an Ethernet cable running onto the table. In addition, there will be a microphone cable and A/V cable for data sharing that should reside on the table as well.
Table Microphone Mat

Supplied with the CTS 1000 is a table top mat that designates the proper sitting location for participants. The mat is also designed to position the microphone in the optimal location for sound acquisition. The mat is 5.29’ in length and .88’ in depth and is equipped with cable management for the microphone. Once the table is properly placed, it is recommended to mark its location on the floor in case it is accidentally moved.

Proper Table Placement

The CTS 1000 is optimized for participants to remain at least 8.5’ (2.59m) from the camera and display to sustain ideal eye gaze alignment and eye contact with the remote participants and make participants appear life-size. The table should be placed so that participants sitting at the edge of the table opposite the CTS 1000 are 8.5’ (2.59m) from the display.

Improper Table Placement

Although it may seem possible to move the table closer to the CTS 1000 to accommodate a smaller environment, this is NOT recommended. As a participant moves closer to the camera and display, the critical angle required to sustain eye contact is increased to a point beyond what is ideal and eye contact will diminish. In addition, the closure of space between participant and camera also requires the camera angle to increase from the horizontal plane. This will result in the remote participants viewing from a virtually heightened angle, creating a downward gaze which will result in an awkward experience. This is not to say that you cannot move the participant location closer to the endpoint, but you must understand the implications and derogation to the overall TelePresence experience for yourself AND your remote participants. Figure 30 illustrates these two concepts of optical geometry and proper table placement.
The figures on the left illustrate the increase of critical angle required for eye contact.
The figures on the right illustrate how the tilt of the camera is required to achieve the same field of view, creating a “downward-look” effect for the remote participants.

**Room Lighting Specifications**

The TelePresence CTS 1000 system ships with built-in lighting source which has been optimized for the upper torso and face of the user.

Light arrays or fixtures centered over the display are not optimal, as they create harsh spot lights for the user viewing areas. Hot spots in other areas of the room are also undesirable. Windows should be treated to block natural sun light from the TelePresence environment. Natural sun light changes temperature and intensity throughout the day and therefore changes the overall experience.

The following chart provides the target values and acceptable tolerances for lighting within a Cisco TelePresence virtual meeting room.
Lighting Requirements

The Cisco TelePresence 3000 System requires the following lighting levels. Please refer to general lighting section for all complete lighting specifications.

### Table 24  Lighting Measurement

<table>
<thead>
<tr>
<th>Illumination</th>
<th>Target</th>
<th>Tolerance</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall illumination lux (= lm/m²)</td>
<td>300-400 lux</td>
<td>+ or – 50 lux</td>
<td>Measured vertically w/ light sensor pointed at wall or intended camera location (not pointed at ceiling)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>All lighting should be evenly dispersed. There should not be areas of 250 and 450 lux in the same room</td>
<td></td>
</tr>
<tr>
<td>Shoulder light/Direct down light.</td>
<td>600-700 lux</td>
<td>Generally, shoulder lighting should not be more the 400 lux greater than the overall illumination of the room and never exceed 800 lux</td>
<td>Measured horizontally at table height w/ light sensor pointed at ceiling</td>
</tr>
</tbody>
</table>

Recommended Configurations

The indirect pendant strip fixtures are recommended to provide the greatest amount of dispersed ambient lighting with the least number of fixtures. These fixture are ideal when ceiling heights are 9’ (2.74m) or greater. When using this style of fixture, the placement in figure 9 depicts the recommended layout for the CTS 1000. Rooms with greater depth than 14’ may require an additional row of fixtures.
The indirect recessed panel fixture measuring 4’ by 2’ (1.22m by .61m) or 2’ by 2’ (.61m by .6m) are the second most recommended fixture style and are ideal in rooms of larger dimensions. Please note that 100% indirect fixtures are recommended as opposed to 80/20 indirect/direct fixture. Layout for this type of lighting should accommodate even dispersed light and should not be directly above the display location. Recessed fixtures should only be used when ceiling height will not accommodate pendant lighting.

When using this style of fixture, the placements in the figures below are recommended for the CTS 1000. Please note that this highly depends on the light candle curve (direction of light output and its intensity) of the specific fixture. It may be possible to accommodate this space with fewer fixtures that have adequate intensity 60 degrees on the candle curve.
Power Requirements

The Cisco TelePresence System 1000 requires one dedicated 20Amp circuit @100V – 120V (US electrical code requires maximum 16A on a 20Amp circuit) or one dedicated 10amp circuit @ 240V. These circuits must be dedicated to the Cisco TelePresence System and two receptacles must be provided. One for the PDU and the other for the Auxiliary Control Unit which manages turning the light façade on and off when in and out of a call respectively. Receptacles should be located on the wall near the intended location of the endpoint but not directly behind the endpoint.

Table 25  CTS – 1000 Power Consumption

<table>
<thead>
<tr>
<th>Component</th>
<th>Maximum Wattage</th>
<th>Amperage @120V</th>
<th>Typical Wattage</th>
<th>Amperage @120V</th>
<th>Idle Wattage</th>
<th>Amperage @120V</th>
</tr>
</thead>
<tbody>
<tr>
<td>65” Plasma Display</td>
<td>1080</td>
<td>9</td>
<td>779</td>
<td>6.56</td>
<td>0.6</td>
<td>.01</td>
</tr>
<tr>
<td>Primary Codec x1</td>
<td>300</td>
<td>2.5</td>
<td>126</td>
<td>1.3</td>
<td>120</td>
<td>1</td>
</tr>
<tr>
<td>Lighting Façade Top</td>
<td>80</td>
<td>0.66</td>
<td>80</td>
<td>0.66</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Auxiliary Control Unit</td>
<td>24</td>
<td>.45</td>
<td>24</td>
<td>.45</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**POWER TOTALS**

- 1484 Watts @120V
- 1009 Watts @130V
- 120.6 Watts @240V

The TelePresence CTS 1000 uses Power Distribution Units (PDU) and Auxiliary Control Units to connect the components to the power circuits in the wall.

Table 26  Power Distribution

<table>
<thead>
<tr>
<th>PDU</th>
<th>Number of receptacles required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Codec, Monitor, Monitor</td>
<td>= 1 Receptacle</td>
</tr>
<tr>
<td>Auxiliary Control Unit</td>
<td>= 1 Receptacle</td>
</tr>
<tr>
<td>Total</td>
<td>20amp @ 120V, 10amp @ 240V</td>
</tr>
</tbody>
</table>
Network Port Requirements

The CTS 1000 requires one Gigabit Ethernet port (RJ-45 UTP) installed on the wall behind the system at standard height. One port will connect the primary codec, which is the main interface between the CTS endpoint system and the network infrastructure.

If participants require connectivity then this should be provided by means of wireless access or additional ports should be provided to the room. Ports provided in a floor box may provide more convenient access to the participants.

HVAC Requirements (CTS1000)

Planning the cooling for a CTS 1000 TelePresence room is important to insure the room remains comfortable for participants and the equipment is kept safe. As outlined in the overview section of this document, HVAC considerations should be given from the initial phase of choosing a room.

The detail in the table below outlines the specific BTU output of a CTS 1000 when deployed as recommend and under typical operating conditions. Typical assumes normal usage conditions such that the system is not subject to 100 percent utilization rates and deployment following Cisco recommendations, i.e. room located on interior, proper air circulation, walls painted with neutral colors, temperature expected 72-76 degrees F. Within these guidelines and typical usage, diversity of 25 percent can be equated which lowers cooling requirements and increases overall efficiency.

Note: Conditions not inline with recommendations or typical usage may require additional cooling. Consult with HVAC engineer to define building envelope and unique requirements. Additional equipment such as data displays, document cameras, etc. will require additional cooling.

<table>
<thead>
<tr>
<th>Source</th>
<th>Wattage in kilowatts</th>
<th>BTU</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Power</td>
<td>1.0</td>
<td>3413</td>
</tr>
<tr>
<td>System Lighting</td>
<td>0.08</td>
<td>273</td>
</tr>
<tr>
<td>2 Participants (Avg)</td>
<td>0.13</td>
<td>443</td>
</tr>
<tr>
<td>2 Laptops (Avg)</td>
<td>0.11</td>
<td>375</td>
</tr>
<tr>
<td>Ceiling Lights (1.4w/sqft)</td>
<td>0.19</td>
<td>669</td>
</tr>
<tr>
<td>Total Typical Heat Dissipation</td>
<td>1.44kW</td>
<td>3,700 BTU/Hr</td>
</tr>
</tbody>
</table>
Auto Collaboration Data Display

The Cisco TelePresence CTS 1000 ships with an output port which supports the display of data shared from other CTS endpoints. This port supports standard HDMI connectors and cables. The supported output resolution is 1024x768 at 49 Hertz. Qualified displays are a reference sale and are purchased separately by the customer. The HDMI to DVI cable for the data display has to be purchased by the customer.
NEC LCD2070NX (20-inch) Desktop Display

NEC LCD4010BK (40-inch) Desk / Wall Mount Display

Other qualified displays:
- Samsung 400PXN (40-inch)
- Samsung 460PXN & 460DX (46-inch)
- NEC LCD4610 & LCD4620 (46-inch)
- Sharp PN-525U (52-inch)
- Samsung 570DX (57-inch)

Cisco offers no support or warranty on the LCD itself.
CTS 500 Specific Requirements

Dimensions and Spatial Orientation

Environmental characteristics of the room include the dimensions and spatial orientation of the room (including the ceiling height) and the location of doors and windows. Rectangular rooms are preferred although irregular shaped rooms can also be accommodated. Ceiling height should be 8’ to 10’ (2.44m to 3.05m). Lower ceilings may be accommodated. Ceilings higher than 10’ (3.05m) may require special acoustic treatment. This is generally accomplished by adding acoustic paneling to the walls.

Room Dimensions and position of the system (CTS 500)

The minimum, recommended, and maximum room dimensions for a Cisco TelePresence System 500 are shown in the table below.
The CTS 500 system will adapt to most of office environments. There are some new features called the automatic camera mode which can be enabled on the system to accommodate varying lighting condition. However no external window should be in view of the system in order to provide the best TelePresence eXperience. If this is the case, curtains or windows coverings should be installed to block any external lighting.

There is no window in the room or all external light is blocked through this window:
The system can be placed in the room and Fixed camera mode should be used.

There is one window in the room. The system should be placed so the window is not behind the user. The order of preference is shown in Figure 35 with one being the highest priority. Automatic camera mode should be used.

There are two adjacent windows in the room. The system should be placed so the window is not behind the user. The order of preference is shown in Figure 35 with (1) being the highest priority. Automatic camera mode should be used.
There are two opposing windows in the room. The system should be placed so the window is not behind the user. Automatic camera mode should be used.

There windows in three side. There is only one location for the system so the user is not behind the window. Automatic camera mode should be used.
There are four windows in the room covering the four sides. This configuration is not recommended. One of the four windows should be covered during a call so that the room is effectively a three window room.

**Table Recommendations**

Figure 39 provides you with the recommended tables to use with the CTS 500

**Figure 39  Table Recommendations**

<table>
<thead>
<tr>
<th>Recommended</th>
<th>Not Recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood (Natural color and low reflectivity)</td>
<td>Dark Wood color</td>
</tr>
<tr>
<td>Laminate (with low reflectivity)</td>
<td>Glass surface and heavy pattern</td>
</tr>
</tbody>
</table>
CTS 500 Dimensions

The CTS 500 has 4 mounting options:

Wall mounted
Desktop
Pedestal

When Customer orders the Pedestal option, he receives two mounting options:

Wall Mounted pedestal
Free standing pedestal

Room Dimensions

A CTS 500 has the following required, recommended, and maximum room dimensions:

Minimum:
2.43m x 1.82m x 2.43m (8’ x 6’ x 8’)

Recommended:
3.04m x 3.35m x 2.74m (10’ x 11’ x 9’)

Maximum:
4.57m x 4.57m x 3.04m (15’ x 15’ x 10’)

The user has to be between 1.21m to 1.82m from the camera
The table and chair is provided by the customer.

The table requirements are as follows:

91cm (35”) x 121cm (47”) x 78cm (30”)

Rectangular shaped
Low-gloss finish
**Figure 40**  Minimum Room Requirements for the CTS 500

1.82M (6’)

2.43 M (8’)

98cm (3’3”)

121cm (4’)

Figure 41 shows the different options with the corresponding dimension:
Figure 41  CTS 500 Wall Mount Positioning and Dimension
Figure 42  CTS 500 Desktop Dimension

3'-2" / 0.96m

3'-.5" / 0.92m

2'-7.5" / 0.8m

1'-4.5" / 0.42m
Figure 43  CTS 500 Pedestal Free Standing Dimension

- 3’-2” / 0.96m
- 5’-6.5” / 1.69m
- 2’-8.75” / 0.83m
- 2’-1” / 0.63m
Presentation-in-Picture (PiP) Control for Auto-Collaboration

If a user is displaying an auto-collaboration presentation, it displays as Presentation in Picture (PiP) on the system in the remote room. No additional display is required. You can choose the placement of the PiP (Center, Left, Right, or Disabled) using the CTS 500 phone interface.
External Display Document Camera for Auto-Collaboration

You can use an external display for an auto-collaboration presentation. You should place the external display at the right or left hand corner of the table, out of camera view.

The following external displays are supported for use with the CTS 500:

**Note:** The displays must support XGA HDMI or DVI input, XGA and 60Hz.

- NEC LCD1770NX (17-inch)
- NEC LCD2070NX (20-inch)

A VGA (PC) to HDMI (codec) cable is provided. The user needs to provide an HDMI (codec) to DVI (display) cable.

No video splitter is required, but the display and/or camera requires its own power supply.

Document Camera for Auto-Collaboration

You can utilize a document camera as the auto-collaboration source. You should place the document camera at the right or left hand corner of the table, out of camera view.

The supported document camera is the WolfVision VZ-9plus Desktop Camera for the following reasons:

- It uses a convenient form factor
- The camera uses native HD 720p/SXGA
- The camera size is 15.6 x 12.6 x 24.9 inches unfolded
- The camera is very flexible (easy to move around and folds flat for storage)
- You can record outside of the working surface (for room views, persons and larger objects)
- The camera includes a built-in Preview Monitor
Digital Media Player (DMP) Integration

A Digital Media Player (DMP) can be used along with the CTS 500. When the CTS 500 system is idle, the Digital Media player will display its content on the LCD of the CTS 500. The DMP connects via the Dual HDMI input on the LCD display.

Lighting Recommendations

To have the best eXperience, the following recommendation would apply for the CTS 500:

<table>
<thead>
<tr>
<th>Illumination</th>
<th>Target</th>
<th>Tolerance</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall illumination lux (= lm/m2)</td>
<td>300-400 lux</td>
<td>+ or – 50 lux</td>
<td>Measured vertically w/ light sensor pointed at wall or intended camera location (not pointed at ceiling)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>All lighting should be evenly dispersed (3 point studio style lighting recommended). There should not be areas of 250 and 450 lux in the same room. A small room should use 250 lux.</td>
<td></td>
</tr>
<tr>
<td>Shoulder light/Direct down light.</td>
<td>600-700 lux</td>
<td>Generally, shoulder lighting should not be more the 400 lux greater than the overall illumination of the room and never exceed 800 lux</td>
<td>Measured horizontally at table height w/ light sensor pointed at ceiling</td>
</tr>
<tr>
<td>Color Temperature</td>
<td>4100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

However if those recommendations are not met, the CTS 500 has some additional features to adjust to varying lighting conditions:

- Auto brightness
- Auto Color balance

Those two features work best when they are enabled together. When auto feature is disabled, we notice video quality degradation when lighting is below 200 Lux or above 800 Lux on vertical plane. The auto feature will compensate very well for over exposed area. We also notice some level of noise/graininess in the image when the light is between 150 and 300 lux on the horizontal plane.
Ideal Lighting Environment

- Average lighting at 300-400 lux vertical plane
- Lighting on horizontal plane below 700 Lux
- Lighting to be even throughout the room
- Windows to be covered with light blocking material
- Auto feature should be disabled

Acceptable Lighting Environment

- Lighting condition within the room changes throughout the day
- Auto feature is enabled
- Windows cannot be directly behind participants
- Lighting can be as low as 200 lux and as great as 800 Lux on Vertical plane
- Auto feature will compensate very well for over exposed area
- Between 150 to 300 Lux, there will be some level of visible noise/graininess in the image

Difficult Lighting Environment

- Lighting condition within the room changes throughout the day
- Below 150 Lux, image quality will be much affected
- Saturated colors in view of the camera may affect the video

Acoustic recommendations (CTS 500)

Special attention should be given if the room where the system is installed has a lot of echo. This is usually the case for big room. This is less the case for small office where most of the CTS 500 will be installed. The system has a build in speaker and microphone. To ensure the best audio, we would recommend the following acoustic characteristics:

<table>
<thead>
<tr>
<th>Noise Level</th>
<th>Noise Level &lt; 50 db in the room for A weighted filter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reverberation Time (RT60) In Milliseconds</td>
<td>&lt; 500ms for 500Hz -2000Hz</td>
</tr>
<tr>
<td>HVAC @ 1 meter</td>
<td>HVAC diffuser should be rated at NC30</td>
</tr>
<tr>
<td>STC</td>
<td>&gt; 40</td>
</tr>
</tbody>
</table>

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Office furniture, plants will usually help to reduce reverberation. Office, which has too much noise or have too much reverberation, may require some acoustic treatment.

**HVAC recommendations (CTS 500)**

The CTS 500 system should not require additional cooling above the average existing cooling provided for a private office space.

The expected total *typical heat dissipation for the endpoint, one person with laptop, and lighting should be near 1,700 BTU. The TelePresence codec by itself may generate 500 BTU. This should be taken into consideration if customer wants to mount or store the codec in an enclosure or cabinet. This enclosure should provide adequate ventilation and cooling for the TelePresence codec.

* Typical assumes normal usage conditions and deployment following Cisco recommendations.

Please see the general requirements section for acoustic recommendation for the HVAC.

**Continuity Recommendations**

- Use a consistent warm color background with paint or fabric
- Use light color small furniture and artifacts

**Background Wall Color Recommendations**

- Use a warm tone
- If you use a neutral tone, make sure that it is chromatically tame and falls within a lower LRV range
- Do not use dark colors
- Do not use a light color (for example, white)

**Power and Network requirements (CTS 500)**

There is no Power Distribution Units provided with the CTS 500 system. The CTS 500 system requires two AC plug, one for the codec and one for the LCD. One 10AMP circuit with two outlets will be sufficient. The Display requires 240 watts (2A@120V / 1A@240V) and the codec requires an additional 120W (1A@120V / 0.5A@240V).

It is strongly advised not to leave the codec in a cabinet. If you do leave the codec in a cabinet, that cabinet should provide adequate ventilation and cooling (see HVAC recommendations above).

One additional power outlet will be required for each of the following optional items:

- External display
- Document camera
- Presentation codec
Ethernet Requirements

One Gigabit Ethernet connection is required to connect the CTS 500 to the network. An additional Ethernet cable is required if a Digital Media Player is used to connect to the CTS 500 system.
Cisco TelePresence Experience & Order Assurance (EOA) Program

As part of Cisco's go-to-market strategy for TelePresence, Cisco opened the TelePresence Experience and Order Assurance (EOA) Program Office to manage a controlled release process for all Cisco TelePresence Systems (CTS) products. The TelePresence Systems Business Unit (TSBU) and World Wide Channels have agreed to use a product hold type called Compliance Hold over Advanced Technology Partner (ATP) Restricted Specialization programs so that Cisco can move quickly to bring the solutions to market.

It is important to be clear with our customers and partners that the Compliance Hold status is being used to give us the opportunity to understand customer requirements, and provide guidance to Approved and Qualified Cisco TelePresence ATPs.

This page contains the information about the EOA processes that Cisco World Wide Sales, World Wide Channels, and Cisco TelePresence ATPs need to understand.

Program Overview

The EOA program ensures that our customers receive the highest quality Cisco TelePresence experience possible by providing a process in which the field can validate critical assessment data prior to solution deployment.

Throughout the process, assessments are completed by the field to identify potential room and network remediation needs before installing the equipment. The assessments are submitted and reviewed. Cisco Subject Matter Experts (SMEs) are available to offer assistance and guidance as needed. This process creates a fostering relationship between Cisco and the Approved and Qualified Cisco TelePresence ATPs and also allows internal Cisco organizations, like Customer Service, Manufacturing and Logistics to validate order and shipping information before the order is released.
The following sequential four steps are the backbone of this process:

1. **Prequalification**
   - This stage is required for a CTS 3200, CTS 3000, CTS-1000, CTS-MAN, and CTS-CTMS.
   - Uncovers potential remediation needs early so that customers have time to respond. It is completed and submitted online via the Cisco EOA Tool by the Cisco Account team, Cisco AS, or an Approved and Qualified Cisco TelePresence ATP. The online tool produces an immediate response. This response along with the room requirements guides should be shared with the Customer as a first step.

2. **Assessment and Release from Compliance Hold**
   - Analyzes TelePresence rooms and networks for remediation planning and/or validation of completed remediation. The assessments are completed and submitted online via the Cisco EOA Tool by an Approved and Qualified Cisco TelePresence ATP or Cisco AS and include:
     - Room Readiness Assessment (RRA) is required for a CTS 3200 or CTS 3000
     - Network Path Assessment (NPA) is required for a CTS 1000, CTS 3000, CTS 3200, CTS-MAN, and CTS-CTMS
     - Pre-installation Questionnaire is the only requirement for CTS 500 (Deployments of 1-15 units). For larger deployment or new deployments an NPA is required.

Once the Assessments have been completed, a request for Product Hold Release (PHR) can be submitted online via the Cisco EOA Tool by the Approved and Qualified Cisco TelePresence ATP or Cisco AS. This is required for all TelePresence Product Endpoints and Components in order to be released from Compliance Hold. This request will be reviewed by EOA Administrators and if approved will be forwarded to Manufacturing. It should also be noted that a Cisco TelePresence Transportation Form needs to be completed and forwarded to the contacts given in the form itself to ensure your shipping and delivery needs are met by Cisco Transportation. This form can be downloaded from the Cisco EOA Tool. From this point Manufacturing will build and schedule the products(s) for shipment. For questions on
shipments and shipment timeframes please contact Cisco Customer Service.

### 3 Installation/Request CTX

Installation occurs after the rooms and network are in optimal condition for TelePresence. Only a skilled technician from an Approved and Qualified Cisco TelePresence ATP or Cisco AS is allowed to install Cisco TelePresence endpoints and components. Prior to the installation the Partner or Cisco AS should enter in the installation information online via the Cisco EOA Tool to give the EOA team visibility to the install date which in turn schedules and Cisco TelePresence Business Unit Engineer for certification (CTX) of a meeting room. During the installation, the ATP partner collects information via the Post Installation Assessment process which is submitted to a Cisco SME that has been assigned to review the data.

### 4 Final Validation (CTX compliance validation)

TelePresence CTS 3000 and CTS 3200 meeting rooms are validated for their acoustics, lighting, continuity, and network design and system performance. This is completed by a combination of the Cisco TelePresence ATP and Cisco TelePresence Systems Business Unit. A Cisco engineer reviews PIA data collected from the installation. A report is submitted back to the Partner and Customer after the review is completed. This report can be viewed online via the Cisco EOA Tool.

Please note that this program and the supporting staff do not have access to Cisco Order Management, Manufacturing Scheduling or Shipping Databases. The only authorization that EOA program does have is passing the order through appropriate stages of the Experience and Order Assurance process. Please refer to the Related Ordering Information below for assistance with all Order Management, Scheduling, and Shipping inquiries.

### Related Support Information

**TSBU Experience & Order Assurance Team**

To contact the TSBU EOA Administration Team and access the EOA Web Tool please use the following:

- tsbu-eoa-orderassurance@cisco.com
Cisco Technical Support (TAC)
Cisco TAC is available to support TelePresence customers for the following:

- All Returns (RMA and DOA) – FRU Items*
- Technical Support

Visit the Cisco TAC Website for more information.

Customer Service
Cisco Customer Service is available to support TelePresence customers for the following:

- All Order Management Needs
- All Shipping Expedites, Shipping Inquiries, Special Delivery Needs, etc
- All Missing or Damaged components
- Non-FRU item replacement*
- Warranty Information
- Release of order holds (except for Compliance Hold)

Visit the Cisco Customer Service Website for more information.

Reference

*FRU = Field Replaceable Unit
These items are typically electronic components of the solution and will have a serial number associated with it. An example of an FRU is the Primary Codec or CTS-CODEC-PRI

*Non-FRU = Not a Field Replaceable Unit
These items cover those parts of the TelePresence solution that do not have electronic components or serial numbers associated with them. An example of a non-FRU is the Table that ships with a CTS-3200 or CTS-3000.
Installation Logistics

Introduction

Cisco TelePresence CTS 1000 and CTS 3000 virtual meeting solutions are physically very large and require two or more days to install. The installation is performed by three or more trained engineers from a Cisco Advanced Technology Provider (ATP) partner. The goal is for a CTS 3000 to be installed by three people in two to three days and a CTS 1000 in slightly less time. However, the actual requirements are directly proportional to the amount of up-front planning done by the customer, partner, and Cisco account team, as well as the amount of experience the partner has in performing installations. It can be assumed that every time the partner performs an installation of Cisco TelePresence they gain valuable lessons learned that will help them streamline future installations. Likewise, for customers deploying multiple Cisco TelePresence meeting rooms, the experience gained from the first one or two will directly influence the speed at which subsequent rooms are completed.

Note: It is critical that the Advanced Technology Provider (ATP) partner who is performing the installation conduct a detailed site survey prior to the arrival of the equipment to determine the best way of managing the delivery, transport, storage, and installation logistics.

Delivery Logistics

CTS 3200 Delivery Logistics

The CTS 3200 requires 14 pallets.

The following table shows the pallet layout for the CTS 3200. The part numbers are listed in the “Contents” column.
Table 31  CTS 3200 Shipping Container Contents

<table>
<thead>
<tr>
<th>Type of Container</th>
<th>Weight</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardboard containers strapped to pallet (Pallet 1)</td>
<td>124</td>
<td>Note: The primary codec for the CTS 3200 (800-30638-XX) is different from the primary codec for the CTS 3000 (800-28191-XX) Structure kit- 8 Cartons 53 kit box – 1 carton •53 kit •IP phone •Jumper cord •MIC kit •PWR-PDU •Power cord (country specific) Lapconn (country specific) Jumper cord (country specific) Bulk pack box 84-0145-xx Ten bear/Prim Ten bear/Sec Loud speakers Projector (CTS 3000/ATP Only) Camera Cluster Structures (8 cartons) 53 kit 2 box – 1 carton(55-3375-01) Power cord MIC kit Lapconn (NA) PWR-PDU Part numbers are: CTS3K-Structure CTS32-ACC-KIT CTS HFR-COLLAB-3K CTS AV-EXP</td>
</tr>
</tbody>
</table>

Note: Additional information about the accessory kits is in Figure 46 and Figure 47.
### Table 31  CTS 3200 Shipping Container Contents

<table>
<thead>
<tr>
<th>Type of Container</th>
<th>Weight</th>
<th>Contents</th>
<th>Picture</th>
</tr>
</thead>
</table>
| 3 separate cardboard containers strapped to pallets (pallets 2, 3, and 4) | 245 each | Display  
Part number is CTS DISP-65-GEN2 | ![Picture](image1.png) |
| Wooden container strapped to pallet (pallet 5) | 464 | Furniture  
Part numbers are:  
CTS LIGHT-FIXT  
CTS3K-SCREEN  
CTS CAM-TOOL  
CTS3K-M | ![Picture](image2.png) |
| Container strapped to pallet (pallet 6) | 442 | Furniture  
Part number is:  
CTS32-M-2TBL-G2 | ![Picture](image3.png) |
| Cardboard containers strapped to pallet (pallet 7) | 201 | Furniture (2 cartons) and lighting structure (1 carton)  
Part numbers are:  
CTS3K-STRUCTURE  
CTS3K-LIGHT-STR | ![Picture](image4.png) |
<table>
<thead>
<tr>
<th>Type of Container</th>
<th>Weight</th>
<th>Contents</th>
<th>Picture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardboard containers strapped to pallet (pallet 8)</td>
<td>110</td>
<td>Mechanical Kit and furniture</td>
<td></td>
</tr>
<tr>
<td>Part number is CTS3K-M-TABLE-G2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wooden container (pallet 9)</td>
<td>440</td>
<td>Light Structure</td>
<td></td>
</tr>
<tr>
<td>Part number is CTS3K-LIGHT-STR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wooden container (pallet 10)</td>
<td>812</td>
<td>Mechanical Kit and structure</td>
<td></td>
</tr>
<tr>
<td>Part number is CTS32-STRUCTURE</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 31  CTS 3200 Shipping Container Contents

<table>
<thead>
<tr>
<th>Type of Container</th>
<th>Weight</th>
<th>Contents</th>
<th>Picture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Furniture Structure Kit (pallet 11, 12, 13)</td>
<td>104 (pallet 11) 124 (pallet 12 and 13)</td>
<td>Structure Kit and furniture Part number is CTS3K-STRUCTURE</td>
<td><img src="image1.png" alt="Picture" /></td>
</tr>
<tr>
<td>Furniture structure kit (pallet 14)</td>
<td>265</td>
<td>Structure Kit and Furniture Part number is CTS3K-STRUCTURE</td>
<td><img src="image2.png" alt="Picture" /></td>
</tr>
</tbody>
</table>

Figure 46 and Figure 47 show the layout of the accessory kits for the CTS 3200.

Figure 46  Accessory Kit Layout 1

53 kit box (1) – 1 carton 53 kit IP phone Jumper cord MIC kit PWR-PDU Power cord (country specific) Lapconn (country specific)

4 lapconn 3 mic kits 5 PDUs

Packaged PDU as shown. Sealed box and labeled part as shown. Pack power cord into empty box from 53- kit. Insert 1 jumper cord into 69-kit from 53- kit.
The Cisco TelePresence System 3000 (CTS 3000) is shipped in several wooden crates and cardboard boxes and requires approximately 10 pallets.

Table 32 details the dimensions, weight, and contents of each container/pallet for the CTS 3000.

<table>
<thead>
<tr>
<th>Type of Container</th>
<th>Dimensions</th>
<th>Weight</th>
<th>Contents</th>
<th>Picture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardboard containers strapped to pallet</td>
<td>72”L x 50”W x 38”H</td>
<td>619 lbs.</td>
<td>Assembly structure, display support shelves, and privacy panels</td>
<td><img src="image" alt="Picture" /></td>
</tr>
</tbody>
</table>
### Table 32  CTS 3000 Shipping Container Dimensions and Contents

<table>
<thead>
<tr>
<th>Type of Container</th>
<th>Dimensions</th>
<th>Weight</th>
<th>Contents</th>
<th>Picture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardboard containers strapped to pallet</td>
<td>48”L x 40”W x 55”H</td>
<td>93 lbs.</td>
<td>Assembly structure brackets</td>
<td><img src="221635" alt="Picture" /></td>
</tr>
<tr>
<td>Wooden crate and cardboard containers</td>
<td>73”L x 48”W x 51”H</td>
<td>779 lbs.</td>
<td>Tabletops, light fixtures, projector screen, and camera tuning target</td>
<td><img src="221635" alt="Picture" /></td>
</tr>
<tr>
<td>Cardboard containers strapped to pallet</td>
<td>48”L x 40”W x 55”H</td>
<td>176 lbs.</td>
<td>Table legs</td>
<td><img src="221635" alt="Picture" /></td>
</tr>
<tr>
<td>Type of Container</td>
<td>Dimensions</td>
<td>Weight</td>
<td>Contents</td>
<td>Picture</td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>---------------</td>
<td>--------</td>
<td>-----------------------------------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>Cardboard containers strapped to pallet</td>
<td>48”L x 40”W x 55”H</td>
<td>177 lbs.</td>
<td>Light structure assembly brackets, and cabinets</td>
<td><img src="image1.png" alt="Picture" /></td>
</tr>
<tr>
<td>Wooden crates strapped together</td>
<td>48”L x 40”W x 55”H</td>
<td>1,580 lbs.</td>
<td>Light structure</td>
<td><img src="image2.png" alt="Picture" /></td>
</tr>
<tr>
<td>Cardboard containers strapped to pallet</td>
<td>48”L x 40”W x 55”H</td>
<td>274 lbs.</td>
<td>Codecs, speakers, microphones, cables, assembly hardware, etc.</td>
<td><img src="image3.png" alt="Picture" /></td>
</tr>
</tbody>
</table>
Table 32  CTS 3000 Shipping Container Dimensions and Contents

<table>
<thead>
<tr>
<th>Type of Container</th>
<th>Dimensions</th>
<th>Weight</th>
<th>Contents</th>
<th>Picture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardboard container with integrated pallet Quantity 3</td>
<td>66&quot;L x 22&quot;W x 49&quot;H each</td>
<td>245 lbs. each</td>
<td>65&quot; plasma display</td>
<td></td>
</tr>
</tbody>
</table>

CTS 1000 Delivery Logistics

The CTS 1000 requires approximately 4 pallets.

Table 33  CTS 1000 Shipping Container Dimensions and Contents

<table>
<thead>
<tr>
<th>Type of Container</th>
<th>Dimensions</th>
<th>Weight</th>
<th>Contents</th>
<th>Picture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardboard container strapped to pallet</td>
<td>66&quot;L x 47&quot;H x 18&quot;H</td>
<td>80 lbs.</td>
<td>Assembly structure</td>
<td></td>
</tr>
<tr>
<td>Cardboard containers strapped to pallet</td>
<td>48&quot;L x 40&quot;W x 39&quot;H</td>
<td>310 lbs.</td>
<td>Assembly structure, lighting structure, camera tuning target</td>
<td></td>
</tr>
</tbody>
</table>
## Table 33 CTS 1000 Shipping Container Dimensions and Contents

<table>
<thead>
<tr>
<th>Type of Container</th>
<th>Dimensions</th>
<th>Weight</th>
<th>Contents</th>
<th>Picture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wooden crate and cardboard containers strapped to pallet</td>
<td>73”L x 48”W x 21”H</td>
<td>90 lbs.</td>
<td>Codecs, speakers, microphones, cables, assembly hardware, etc</td>
<td><img src="231344" alt="Picture" /></td>
</tr>
<tr>
<td>Cardboard container with integrated pallet</td>
<td>66”L x 22”W x 49”H</td>
<td>245 lbs. each</td>
<td>65” plasma display</td>
<td><img src="221665" alt="Picture" /></td>
</tr>
</tbody>
</table>

The customer must be prepared to receive this amount of equipment and deliver it to the meeting room to be installed. Various factors should be considered and many of them will vary depending on the customer’s physical environment.
CTS 500 Delivery Logistics

The CTS 500 requires between 1 or 2 pallets depending on the installation option.

**Table 34  CTS 500 mounting options and pallet numbers**

<table>
<thead>
<tr>
<th>Mounting option</th>
<th>Number of pallet</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTS 500 with a pedestal mount</td>
<td>2 pallets</td>
</tr>
<tr>
<td>CTS 500 with table top mount</td>
<td>1 pallet and one box</td>
</tr>
<tr>
<td>CTS 500 Wall mounted</td>
<td>1 Pallet</td>
</tr>
</tbody>
</table>

Table 35 shows the shipping dimensions for the CTS 500.

**Table 35  CTS 500 Shipping Contents**

<table>
<thead>
<tr>
<th>Type of Container</th>
<th>Dimensions</th>
<th>Weight</th>
<th>Contents</th>
<th>Picture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardboard container strapped to pallet</td>
<td>48”L x 33.5”W x 32”H</td>
<td>218 pounds (99 kg)</td>
<td>All contents excluding stand (if using table- or pedestal-stand mount)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Note:</strong> If customer ordered wall mount kit, it is included in this pallet</td>
<td></td>
</tr>
<tr>
<td>Cardboard container strapped to pallet</td>
<td>27”L x 56”W x 32”H</td>
<td>236 pounds (107 kg)</td>
<td>Pedestal stand mount</td>
<td></td>
</tr>
</tbody>
</table>
Table 35  CTS 500 Shipping Contents

<table>
<thead>
<tr>
<th>Type of Container</th>
<th>Dimensions</th>
<th>Weight</th>
<th>Contents</th>
<th>Picture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Separate wooden box</td>
<td>24”L x 36”W x 27”H</td>
<td>96 pounds (44 kg)</td>
<td>Table stand mount</td>
<td>Not available</td>
</tr>
</tbody>
</table>

**Delivery and Storage of the Equipment**

The customer must provide a receiving dock with sufficient space to accommodate the number of pallets received. If there is a delay between the date the equipment is received and the date the installation is scheduled to occur, the customer must provide for secure storage of the received equipment, and the ability to move the received pallets from the initial receiving dock to the secure storage location.

**Transporting the Equipment**

The customer must provide the capability to move the received equipment from the receiving dock or storage facility to the destination meeting room in which it will be installed.

Moving the equipment can be done many different ways depending on the customer’s environment. A pallet jack is recommended. However, due to the size of the containers, in many customer environments it may not be feasible to navigate the hallways and elevators with such a large container on a pallet jack. In this case, the containers may be unboxed in the receiving dock and the contents of each hand-carried to the meeting room. This will require a significant amount of space in the receiving dock for a day or more while this operation takes place, and therefore may interfere with other daily operations occurring at that receiving dock.

**Weather**

Weather can play an important role in how you manage delivery and transportation logistics. The equipment must be kept dry and secure at all times to avoid damage.

**Space Preparation**

The room where the Cisco TelePresence System will be installed must be empty for the installation to occur. During installation, several square feet of empty floor space within the meeting room are required to assemble the equipment. This means that you cannot use the meeting room to store the equipment because you will need the floor space open to conduct the actual construction and installation of the equipment. Instead, it must be stored in the hallway outside the meeting room, or in another nearby room, and brought in one pallet at a time throughout the two+ day installation.
Personnel Requirements

In addition to the three or more engineers provided by the Advanced Technology Provider (ATP) partner, the customer should be prepared to make the following personnel and services available before, during, and after the installation:

- Electrical personnel to ensure that the appropriate power and lighting requirements are met.
- HVAC personnel to ensure that air conditioning and heating requirements are met.
- Facilities personnel to ensure that space is available for temporarily storing the equipment during the installation and that waste disposal is taken care of.
- Network/IT personnel to ensure that the network requirements are met and that the ATP partner has sufficient access and permissions to the network to configure the Cisco TelePresence Codecs, Cisco Unified Communications Manager, Cisco TelePresence System Manager, Microsoft Exchange and Active Directory accounts, etc.
- Security personnel to ensure that the ATP partner has access to the building, the receiving dock, storage facilities, and the meeting room in which the equipment will be installed.
- Parking for the ATP partner and Cisco employees at the customer’s facility.