

# Lighting Considerations for A/V or Video Teleconferencing Rooms

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This report describes the general issues and concepts of lighting for rooms that are to be used for A/V or video conferencing. This article is © Philip Giddings 1995 and was revised Feb. 15, 1996.

## General

When a training room or board room becomes a video conferencing room; perception (visibility, intelligibility and comfort) becomes an even more important issue in the design. End users are not professional actors and will not feel comfortable in an overly illuminated or glaring environment or where they can not see or understand easily.

With the design of multi-purpose environments, each function of the room is often compromised. With video conferencing care should be taken to ensure ease of use and a well defined final image.

Consideration for physically challenged individuals might require modifications to conference tables and user controls.

## Lighting Overview

The two main aspects of lighting for video conferencing production are:

- control of lighting in terms of quantity, color and distribution to produce a well defined picture
- comfort of the participants.

The term "Visual lighting" refers to that lighting for the benefit of people while "Video lighting" is that for cameras.

To provide a general understanding of video lighting requirements it is useful to note the following generally accepted light source locations:

- *Key lighting*: are the main front lights focused at a 40 degree angle below horizontal. These circuits should not be dimmed.
- *Fill lighting*: are special front lights focused at a 15 degree angle below horizontal which removes shadows around the eyes and neck. These circuits should not be dimmed.
- *Back lighting*: are rear lights focused at a 45 degree angle below horizontal to help give some depth of field to the video image. These lights may be on a dimming circuit.
- *Wall lighting*: are room lights that illuminate the walls to separate the

persons being shot from the background. This system should be dimmed to below the reflected light level of the face which reflects about 45% of light falling on it.

Recessed or track lighting function well as a separate video lighting system and integrates into the conference environment more easily than television or theatrical luminaires will.

Energy efficient standards are usually exempted for video conferencing rooms due to their special purpose and low utilization application.

Care should be taken to control daylight coming into the room to avoid the potential of reflected glare projected on to the screen.

The additional light levels may impose a greater HVAC load.

### **Lighting System Recommendations**

The Visual Comfort rating dictates surface areas require a high reflective range (lighter colors), preferably with matte or semi-matte finish.

Conference and board room tables should not have a glossy finish and be of a higher reflective range.

### **Visual Lighting**

- Illumination levels for visual tasks are calculated based on age of user, speed and accuracy of task and reflectance of task background. In this case, 50 foot-candles are recommended for users over 50 years, importance of speed and accuracy (reading and writing) and reflectance of task background of over 70% (black print on white paper).
- The visual lighting system should be zoned on separate circuits and controls, from the video lighting. Dimming is also required.
- The proposed lighting approach is with dimmed incandescent color corrected up lighting capable of producing an ambient level of 70 foot candles in the rooms. This level will also be useful for video lighting. In addition to the up light will be halogen down lighting which will be used for A/V lectures where these lights will minimize light onto the screen images but still allow note taking. This light will also be effective when computers are being used in the room as it will minimize glare on the computer screen due to reflection from a high ceiling light level. Parabolic filters on fluorescent fixtures could also be used.
- If the above lighting approach provides sufficiently high ambient light levels in the room it may be adequate for video lighting as well.

### **Video Lighting**

- Illumination levels for color video camera recording require about 75 foot-candles. (Up to 100 foot-candles is acceptable. National television broadcasts can require up to 350 or 500 foot-candles of illumination.)
- Color temperature of light sources should be from 3000 degrees to 3400 degrees Kelvin.
- Incandescent quartz halogen light sources are the most popular for color video images. Fluorescent and high intensity discharge sources are sometimes used but would require color correction. These consist of filters installed over the light - often in the form of tubes. Mixing these sources is not recommended. HID sources use a ballast and should be checked for noise rating. PAR 36 120 volt light sources are very acceptable for video application and are available in a variety of wattages which helps to achieve the correct illumination on the subject when dimming is not used.
- Due to the difficulty of predicting how the conferencing may be set up in a room it is difficult to arrive at a cost effective solution which is also flexible. A number of tracks around the perimeter of the room with movable fixtures is a suggested approach.
- The video lighting system should also be zoned on separate circuits and controls from the visual lighting system. Ideally, dimming would not be used on circuits for front video lighting (see lighting positions in Lighting Overview), or proper color temperature will not be achieved and flesh tones can appear red or muddy.
- The reflected light from the walls should be slightly less than that from the faces of the individuals on camera. This is to provide some contrast while not creating exposure level difficulties for the camera.

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