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MAKING AV TECHNOLOGY ADA COMPLIANT

An eBook prepared by James Careless
for AV Technology magazine

AVTECHNOLOGY

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I. DISCLAIMER

This eBook, *Making AV Technology ADA Compliant*, has been prepared by NewBay Media's *AV Technology* magazine for the benefit of this eBook's sponsors, Chief, Da-Lite, Middle Atlantic and Vaddio (AV brands of Legrand) and is intended to be used for educational purposes only.

This eBook has been prepared with input from ADA officials, Legrand employees, and third-party AV consultants with deep knowledge of ADA requirements. The intent of this eBook is to translate the ADA's requirements for audiovisual technology usage and installation, and serve as a guide to ADA regulations pertaining to AV.

Those seeking additional details or legally accurate definitions of the ADA's audiovisual technology requirements should contact **www.ada.gov**. Nothing herein shall be construed as legal advice nor should you rely upon any statements contained herein without obtaining your own project specific verification.

CHAPTER 1

Defining Terms

What is the ADA and how does it apply to AV?

First enacted in 1990 and amended/updated in 2008, the Americans with Disabilities Act (ADA) is aimed at preventing discrimination against people with mental or physical disabilities. The titles of the ADA that apply to schools are administered by the federal Department of Justice (DoJ). The DoJ provides informational, regulatory, and enforcement support for the ADA's requirements.

For the AV industry, the critically important document is the 2010 "ADA Standards for Accessible Design." (The ADA sections cited in this eBook are drawn from that document.) Assembly halls, conference rooms, classrooms, learning spaces, and lecture halls all fall within the ADA's compliance standards.

ADA and AV
Many ADA requirements apply to the AV industry.

The ADA's requirements are meant to allow people with disabilities to access and use AV equipment in business and educational settings as easily as people without disabilities. ADA requirements apply whether or not a school receives federal funding. (Schools that receive federal funding also have to comply with another federal law, Section 504 of the Rehabilitation Act.)

For example, teachers in wheelchairs should have access to lecterns set at usable heights, and with sufficient surrounding space for them to maneuver into and out of. Any AV controls and equipment associated with the lectern should be just as easy for them to access and use.

As the name suggests, "ADA compliance" applies to the sum of the combined systems—not just its individual components—and the ways in which it is installed/operated complies with the ADA's requirements. For example, under ADA rules that govern "Protruding Objects" (ADA Sections 204 and 307), a wall-mounted flat panel display cannot protrude more than 4 inches from that wall. There's a good reason for this: An object protruding more than 4 inches could be a serious obstacle for wheelchair users and people with visual disabilities. While a 2-inch-deep mount and 2.25-inch-deep display are ADA compliant on their own, when mounted together, they exceed the depth limit.

"Many ADA requirements apply to AV, including how far a video display may protrude from a wall, audio devices for the hearing impaired in assembly halls, and the control technology available at lecterns."

ADA National Network
Integrators and installers can get in-depth and project-specific advice on achieving ADA compliance from the ADA National Network.

The ADA National Network supports the mission of the ADA to "assure equality of opportunity, full participation, independent living, and economic self-sufficiency for individuals with disabilities," explained Janet Peters, Project Coordinator at the Great Lakes ADA Center/ University of Illinois, Chicago.

The ADA National Network is funded by the National Institute on Disability, Independent Living, and Rehabilitation Research, and consists of ten Regional ADA Centers located throughout the United States, plus an ADA Knowledge Translation Center. "Each Regional ADA Center focuses on its region's unique needs," said Peters. "This regional focus is critical to ensuring that ADA National Network services meet the needs of diverse populations and stakeholders throughout the country."

ADA is the Law
It is wise to assume that all AV projects should be ADA compliant, and therefore, you should act accordingly. In doing so, you will legally protect yourself and the clients you work for.

CHAPTER 2

Operable Parts

Placing controls within reach goes a long way.

ADA isn't just about offering access, wheelchair spaces, and bathrooms to everyone. ADA regulations even include "operable parts" (covered in ADA Sections 205 and 309). Operable parts refers to the control switches, equipment surfaces, and power outlets that are used by AV equipment, as well as other electrical and mechanical devices.

"Operable parts include classroom AV system components like touchscreen/button user interfaces, projection screen switches, and laptop input plates mounted on walls, lecterns, and teaching stations," said Mike Tomei, CTS-D/I, owner of Tomei AV Consulting LLC in Ithaca, NY, and an authority on ADA compliance for AV equipment.

Making Operable Parts Accessible

"For all of these items, the ADA specifies acceptable floor space, the allowable height for control surfaces, reach ranges for people using wheelchairs, and other rules affecting using these operable parts," said Tomei. Other operable parts subject to ADA compliance are projection screen switches, plus inputs for laptops and BYOD (Bring Your Own Devices) brought into the room by teachers and students.

"Consider using high-contrast touchscreens to aid users with visual disabilities, and even accompanying them with Braille-embossed control buttons."

An ADA-compliant "operable part" is one within a height range and depth that is easy for people with disabilities to use, without the part protruding too much into the room. Accessible operable parts go as far as to include the drawstrings attached to pull-down overhead projection screens, AV devices such as input/output cables for laptops, and BYODs, and PCs/Blu-ray players on lecterns and learning station surfaces. "If it is used to control anything within the classroom or learning space, it is an operable part," said Kathryn Gaskell, manager of product management at Chief, maker of mounts for displays, monitors, projectors, kiosks, and storage units. "So it needs to be ADA-compliant in terms of height, reach, and protrusion."

The 48/15 rule

ADA regulatory terms clearly define the heights and distances from walls for operable parts. Using the floor as the reference point, a wall-mounted switch or control panel should be no higher than 48 inches and no lower than 15 inches.

The 48/15 rule is a basic guide. It provides a good window for locating switches, control surfaces, and anything else that someone either standing or in a wheelchair may need to comfortably access, whether by reaching forward or to the side. The 48/15 rule is far more detailed, however. (If in doubt, contact a Regional ADA Center through **adata.org**.)

Tech Tricks to Help

"If possible, you should also consider using high-contrast touchscreens to aid users with visual disabilities, and even accompanying them with Braille-embossed control buttons," said Tomei. "Smart control interfaces using Google Alexa or Apple Siri voice recognition can also be extremely helpful to visually-impaired users."

A word of caution: "Electricians tend to measure to the center point of whatever they are installing," Tomei said. "This could lead to them putting control surfaces outside of the 48/15 zone, because they misinterpret your instructions. So be clear about what you need, and double-check that your installers understand what you are asking for."

CHAPTER 3

Reach Ranges

Make sure that everything is within easy reach for those who are restricted.

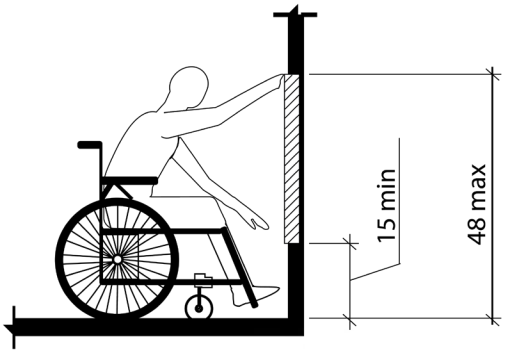


Figure 1

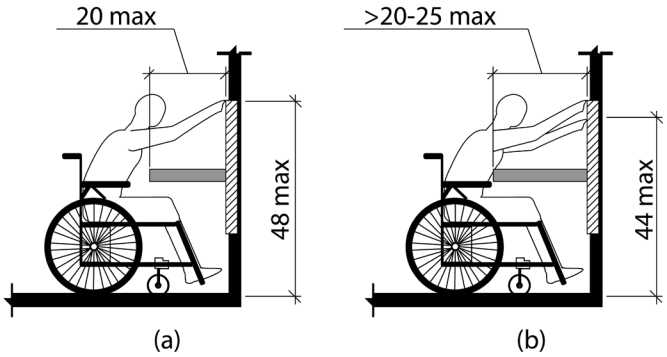


Figure 2

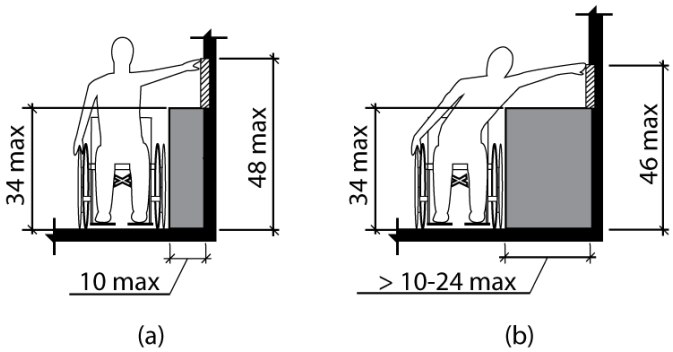


Figure 3

Reach ranges is one of those terms that seems strange until you know what it means.

In this case, a "reach range" refers to how easy it is for someone in a wheelchair to reach an AV control or device—or operable part, covered in Chapter 2—whether from the front or from the side of the chair.

ADA Section 308 defines four kinds of reach ranges. These are:

- Unobstructed front reach
- Obstructed high front reach
- Unobstructed side reach
- Obstructed high side reach

Reachable Zones

In all four instances, the idea is to ensure that the operable parts must be within a "reachable zone" (for lack of a better term) for someone in a wheelchair.

In the case of the unobstructed front reach, you need to place the operable parts no lower than 15 inches off the floor/ground surface, and no higher than 48 inches off the floor (Figure 1).

For obstructed high front reach, the architect must leave enough floor space for the wheelchair to fit into the space, along with locating the operable parts within the "reachable range."

If the obstruction is 20 inches wide or less, the "high forward reach shall be 48 inches," according to ADA Section 308 (Figure 2a). If the reach over the obstacle is more than 20 inches and up to 25 inches, the high forward reach is 44 inches (Figure 2b).

The unobstructed side reach for users in wheelchairs is no lower than 15 inches off the floor/ground surface and no higher than 48 inches, so they may easily access operable parts.

For an obstructed high side reach: If the wheelchair can roll up parallel to the operable parts and "the high side reach is over an obstruction," the obstructed high side reach can be:

- 48 inches, assuming that the obstruction is 10 inches wide or less (Figure 3a).
- 46 inches if the obstacle is between 10 inches and 24 inches (Figure 3b).
- 34 inches if the obstacle is 24 inches or wider.

“Operable parts must be within a ‘reachable zone’ for someone in a wheelchair.”

Obstructions and Tips
“Basically, the same unobstructed requirements apply to both front and side reaches,” said Mike Tomei, CTS-D/I, owner of Tomei AV Consulting LLC. “It is when there are obstructions such as heaters that the reach ranges vary.”

Once again, he cautions that electricians will tend to measure heights to the center of an operable parts installation, rather than to the top or bottom edges. “So be sure to double-check where they have located the operable parts mounts before giving them the go-ahead,” Tomei said.

To help achieve compliance with regard to reachable zones, manufacturers have created height-adjustable carts for moving interactive flat panel displays about a room. Chief and Middle Atlantic Products offer a range of display carts specifically designed with bases that allow individuals to approach the display more closely.

In addition, the display cart offering from Legrand’s commercial AV brands includes options for dynamnic and electronic height adjustments, further increasing their accessibility, especially with larger displays. “The Microsoft Surface Hub 2 is 300-some-odd pounds, so it’s a lot to raise and lower,” said Megan Knedler, director, product management – furniture at Middle Atlantic Products. “We have carts that can raise and lower that electronically, and meet ADA compliance.”



Chief’s XPD1U Cart



Middle Atlantic’s FlexView Cart

“Double-check where plans locate operable parts and mounts before giving the go-ahead.”

CHAPTER 4

Work Surfaces

Ensure that lecterns and desks are accessible for all.

As defined by the ADA in Sections 226 and 902, the tops of ADA compliant work surfaces shall be at least 28 inches and no taller than 34 inches above the floor. There also must be sufficient room for people in wheelchairs, as well as on foot, to access the work surfaces. (More on this in Chapter 7: Turning Space and Clear Floor/Ground Space).

When it comes to AV and educational/assembly spaces, work surfaces include:

- Lecterns
- Movable/portable collaborative tables in active learning rooms
- Instructor tables
- Teaching stations

Any table or surface used for presentations should fall within the above ADA standards, just to be safe.



Middle Atlantic's L7 Lectern

Balance the Needs for All

"For AV designers and integrators, the challenge is to select work surfaces that meet the needs of both people with disabilities and those without," said Mike Tomei, CTS-D/I, owner of Tomei AV Consulting LLC. "After all, a lectern devised for a person in a wheelchair may not work for a non-disabled person who prefers to stand as they teach."

According to Tomei, the simplest way to bridge this gap is by using an adjustable lectern, one that can be lowered to suit the needs of a wheelchair-using speaker or raised for someone who stands while speaking, such as the new L7 Lectern from Middle Atlantic Products.

For those seeking a low-tech solution, "It is possible to find lecterns with two switchable mechanical heights: one for seated presenters and a second one for standing," Tomei said. "Perhaps the simplest solution is to purchase a table that is ADA-compliant in height, and use a portable lectern on top of it for people who stand while speaking."

Select work surfaces that meet the needs of both people with disabilities and those without.

CHAPTER 5

Protruding Objects

The importance of keeping access clear and safe.

How many times have you accidentally struck or been struck by an object protruding from a wall? Protruding objects that interfere with people moving freely around classrooms, halls, and any usable space are a big focus for the ADA. Such objects can be mounted on floors, walls, or ceilings.

A protruding object can restrict the passage of people in wheelchairs and seriously injure a sight-impaired person passing by. These are risks that need to be mitigated before anyone enters a space.

Wall-Mounted Monitors

"Under the ADA, wall-mounted displays can't protrude more than 4 inches from the wall, including their mounting hardware," said Kathryn Gaskell, who manages Chief's product management team for Legrand AV. "We believe that the sweet spot for such protruding mounts is 2 inches depth or less—a goal that can be achieved using thin displays, and when needed, some form of in-wall box to store equipment."

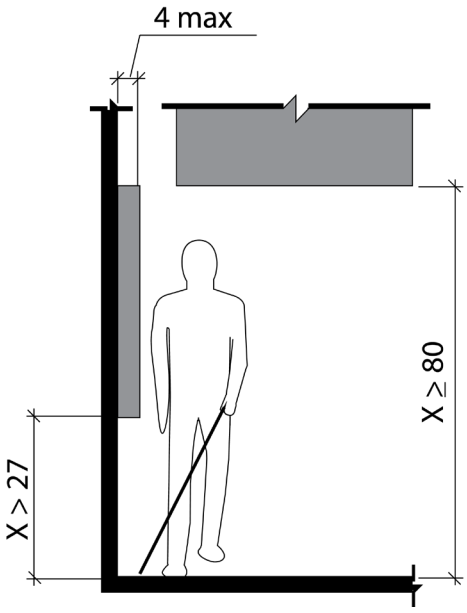


Figure 4

Other Mounting Limits

This isn't all you need to know to comply with ADA Sections 204 and 307: Anything you mount on the wall or a post should be no lower than 27 inches off the floor, and no higher than 80 inches tall (Figure 4). The 27-inch lower limit is particularly important, because it reduces the chances of tripping by protruding obstacles.

Other limits are as follows:

- Free-standing objects mounted on posts or pylons should be no wider than 12 inches, no lower than 27 inches, and no taller than 80 inches.
- Any objects suspended between posts/pylons that are more than 12 inches apart must also be no lower than 27 inches and no more than 80 inches in height.
- If you are mounting something over the users' heads, it must be at least 80 inches high to provide adequate vertical clearance for people moving underneath.

Fixing Protrusion Problems

What is an installer to do if the space has protrusions that violate the ADA standards? "In many cases, you can mitigate the situation by adding storage or millwork under the protruding object to bring the surrounding wall surfaces outward," said Gaskell. "The depth of the protrusion can be reduced to 4 inches or less." If the protruding object sticks out 6 inches, pushing out the wall 2 inches or more brings the net protrusion into ADA compliance.

Alternatively, placing a credenza with equipment mounting capabilities beneath the protruding object can be a practical way of fulfilling this requirement. "This approach can be simpler but still highly accessible, allowing people to interact with the flat panel," said Megan Knedler, director, product management—furniture at Middle Atlantic Products.

"A protruding object can restrict the passage of people in wheelchairs and seriously injure a sight-impaired person."

CHAPTER 6

Knee and Toe Clearance

Comfort space comes before component space.

Imagine being in a wheelchair, rolling toward a lectern, and wham! Your knee hits a metal box concealed under the table. Imagine the pain and aggravation.

For these reasons, ADA Section 306 covers 'knee and toe clearance' for:

- Keyboard trays/drawers
- Cable management systems or cable trays
- Under-table-mounted AV equipment i.e. projectors
- Underside of table boxes and power/charging boxes

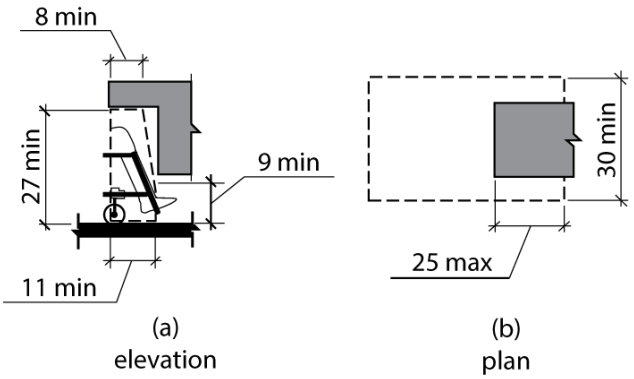


Figure 5

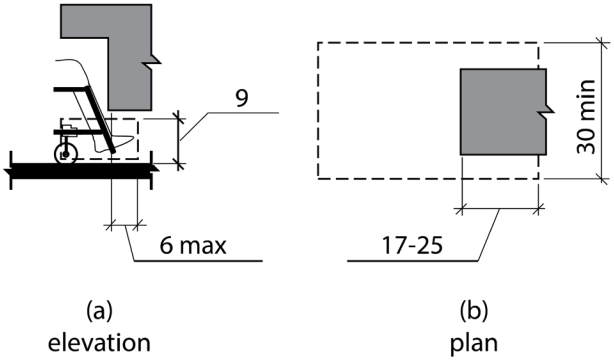


Figure 6

Knee Clearance

Any space under a working surface between 9 inches and 27 inches above the floor/ground falls within the ADA's knee clearance specification. This space should extend at least 11 inches deep at 9 inches above the floor, and at least 8 inches by the time the space gets up to 27 inches high. (The maximum knee clearance at 9 inches in height is 25 inches.) For every 6 inches the knee clearance goes above the original 9 inches minimum height, the knee clearance can be reduced by 1 inch in depth (Figure 5).

In all cases, the width for knee clearance has to be 30 inches or more.

Toe Clearance

The area between the floor and the first 9 inches above "shall be considered toe clearance," according to ADA Section 307. Beyond that, the space is in the knee-clearance zone.

The minimum toe clearance depth (under a desk, for instance) is 17 inches, up to a maximum of 25 inches. As with knees, the minimum width for toe clearance is 30 inches (Figure 6).

And this is worth knowing: "Space extending greater than 6 inches... beyond the available knee clearance at 9 inches... above the finish floor or ground shall not be considered toe clearance," according to ADA Section 307.

After-installation Clearance

"All these specifications must be met after any AV boxes, added keyboard trays/drawers, cable trays, and anything else have been mounted underneath a work surface," said Mike Tomei, CTS-D/I, owner of Tomei AV Consulting LLC. "The word to be stressed here is 'after.' You must provide adequate knee and toe clearance to be ADA compliant."

"When hiding electrical and low-voltage components, you must still provide adequate knee and toe clearance."

CHAPTER 7

Maneuvering Room

Turning and clear floor space requirements can affect AV.

Wheelchairs need room to turn and roll. Assuring they have enough space for both is the point of ADA requirements on Turning Space (Section 304) and Clear Floor/Ground Space (Section 305).

"Both sections deal with the required space needed for wheelchair access to AV system components," said Mike Tomei, CTS-D/I, owner of Tomei AV Consulting LLC. "People using wheelchairs need to have adequate room to roll up to and depart from AV equipment racks, instructor tables, lecterns, teaching stations, and walls with mounted AV equipment."

Turning Space
First, there should be a minimum of 30 inches by 48 inches of clear (unobstructed) floor/ground space in front of any accessible item. A wheelchair may approach an AV device either head-on or from the side, so it is wise to offer 48-inch minimum floor/ground space clearance all around.

Second, there are two options for providing adequate turning space:

- The turning circle
- The T-shaped turning space

The turning circle allows enough space for a wheelchair to turn 360 degrees. For this to be possible, the turning circle must be at least 60 inches in diameter.

The T-shaped turning space is space where a wheelchair user can make a three-point turn. It must be a minimum of 60 inches square. Each arm of the T must be at least 36 inches wide to allow enough room to maneuver, and there must not be any obstructions within 12 inches of the T-arm (Figure 7).

If you choose the T-shaped turning space, you will have to provide enough knee and toe clearance, as specified in Chapter VI of this eBook. Want to make life simple?
Ensure enough room for turning circles.

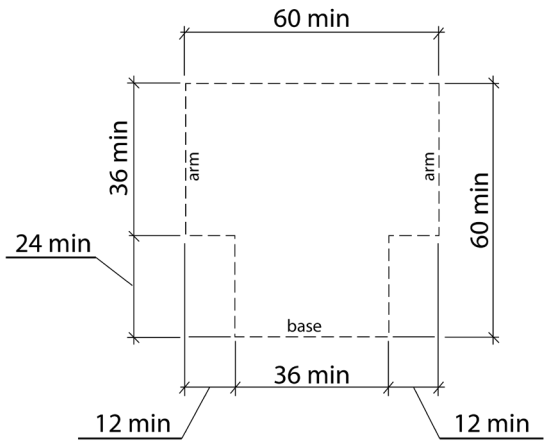


Figure 7

"Ensure enough room for turning circles."



Wiremold's OFR Series Overfloor Raceway

Floor and Ground Rules

In Clear Floor/Ground Space (Section 305), the idea is to provide enough free and unobstructed space for wheelchair users to access AV equipment and their operable parts.

The rule of thumb for a forward-facing person or wheelchair is a minimum of 30 inches wide going forward, and clearance of at least 48 inches on the side.

Remember, these are recommended minimums. More space is always better. If your space is minimal, you should determine whether it offers sufficient knee and toe clearance as well (covered in Chapter VI). Check with a Regional ADA center to get specifics for your location

It is also important to make sure that cables that run across floors are not barriers to wheelchairs. According to Megan Knedler, director, product management—furniture at Middle Atlantic Products, Wiremold's OFR Series Overfloor Raceway is one of the only ADA-compliant solutions for applications that require cabling be installed on top of an open floor area. It offers an extremely low profile and provides four channels of capacity and access to a wide range of power, communications, and AV connectivity options. It attaches directly to floor covering, with no need to alter carpeting, tile, or wood.

"Make sure that cables that run across floors are not barriers to wheelchairs."

CHAPTER 8

Assistive Listening Systems

Making sure everyone can hear.

Assisted Listening Systems (ALS) ensure that hearing-disabled listeners have access to audio enhancement technology in assembly/teaching areas.

The ADA refers to "auxiliary aids and services." These are any technological devices and human support that ensure "no individual with a disability is excluded, denied services, segregated or otherwise treated differently than other individuals because of the absence of auxiliary aids and services," said Janet Peters, Great Lakes ADA Center/University of Illinois in Chicago. For AV purposes, an assisted listening system in a lecture hall (ASL: Chapter VIII) would be considered an auxiliary aid.

Section 219 of the ADA code covers the "technology to user" ratio associated with ALS devices, namely the number of units considered sufficient to provide ALS delivery in a space.

Section 706 describes the performance specifications required for ALS deployments to be ADA compliant. (As well, Section 703 specifies that rooms equipped with ALS must have signs to that effect, using both visual and Braille raised characters. Contact your Regional ADA Center for details.)

The table below describes Section 219's 'technology to user' ratio in chart form:

Table 219.3 Receivers for Assistive Listening Systems

Capacity of Seating in Assembly Area	Minimum Number of Required Receivers	Minimum Number of Required Receivers Required to be Hearing-aid Compatible
50 or less	2	2
51 to 200	2, plus 1 per 25 seats over 50 seats or fraction thereof	2
201 to 500	2, plus 1 per 25 seats over 50 seats or fraction thereof	1 per 4 receivers or fraction thereof
501 to 1000	20, plus 1 per 33 seats over 500 seats or fraction thereof	1 per 4 receivers or fraction thereof
1001 to 2000	35, plus 1 per 50 seats over 1000 seats or fraction thereof	1 per 4 receivers or fraction thereof
2001 and over	55, plus 1 per 200 seats over 2000 seats or fraction thereof	1 per 4 receivers or fraction thereof

TABLE FROM **HTTP://WWW.AUDIOEVERYWHERE.COM/ASSISTIVE-ADA-RULES**

Requirements for ALS

"Basically, any room that requires an ALS must serve at least 25 percent of the seats with this receiver technology," said Mike Tomei, CTS-D/I, owner of Tomei AV Consulting LLC. "A percentage of these seats must also work with "neck loops" to provide inductive feeds directly to hearing aids equipped with built-in T coils (telecoils)."

"Saying that 'my room doesn't use microphones, so I don't need ALS' won't cut it," he added. "People try to fudge this, but you won't be fooling anyone, least of all the ADA."

ADA Section 706 delves into minimum performance requirements for ALS deployment.

Types of Assisted Listening

These days, ALS devices are generally deployed in portable radio frequency (RF), infrared, and induction loop/T coil arrangements:

- RF ALS uses RF broadcasting to transmit a signal captured by the room's microphones to users wearing headsets.
- Infrared ALS uses the same delivery model, except that the audio information is encoded and sent as infrared light throughout the room. Listeners hear it using headsets equipped with infrared detectors.
- The induction loop/T-coil ALS works by using magnetic strips typically built into the room's floor to radiate magnetic waves to the wire neck loops. The loops in turn capture and re-radiate the magnetic energy to the small copper T-coils within users' hearing-aids (assuming that their devices have this feature). In this way, the sound is delivered directly to their ears without the need for headsets.

"Each has advantages and disadvantages that can help determine which system is best for an application," according to the ADA (Section 706.1). "For example, an FM system may be better than an infrared system in some open-air assemblies since infrared signals are less effective in sunlight. On the other hand, an infrared system is typically a better choice than an FM system where confidential transmission is important because it will be contained within a given space."

Coming into use now is Wi-Fi-delivered ALS, which uses a room's Wi-Fi network to deliver audio to users' smartphones, with or without earbuds. This technology is not yet approved by the ADA, so it has to be used in conjunction with an approved ALS technology.

"ALS devices are generally deployed in portable RF, infrared, and induction loop/T coil arrangements."

CHAPTER 9

Wheelchair Spaces in Assembly Areas

Have enough spaces, and be sure everyone can see.

There are two parts to the ADA, when it comes to wheelchair spaces in assembly areas:

- Section 221 explains the number of wheelchair spaces to chairs in such areas.
- Section 802 details the space requirements and sightlines for people in wheelchair spaces.

Why it Matters to AV

"Much of the requirements for Sections 221 and 802 are really the responsibility of the architect and/or interior designer," said Mike Tomei, CTS-D/I, owner of Tomei AV Consulting LLC. "But issues such as sightlines matter to AV designers, because you want to be sure that people with disabilities can see the room's displays clearly. For this reason, AV people need to work closely with architects and interior designers to ensure the sightlines from all wheelchair spaces are ADA-compliant."

This table, which is based on a chart within the ADA, describes how many wheelchair spaces are needed under Section 221:

Number of Seats

Minimum Number of Required Wheelchair Spaces

NUMBER OF SEATS	MINIMUM NUMBER OF REQUIRED WHEELCHAIR SPACES
4 to 25	1
26 to 50	2
51 to 150	4
151 to 300	5
301 to 500	6
501 to 5000	6, plus 1 for each 150, or fraction thereof, between 501 through 5000
5001 and over	36, plus 1 for each 200, or fraction thereof, over 5000

SOURCE: **HTTPS://WWW.ADA.GOV/REGS2010/2010ADASTANDARDS/2010ADASTANDARDS.HTM#SEC221**

According to ADA Section 221,"Wheelchair spaces shall be an integral part of the seating plan." This means that these spaces must be integrated in overall seating, rather than segregated into a separate area(s).

Ensuring Proper Sightlines

For sightlines (Section 802), wheelchair spaces must be located so their occupants can see clearly over the heads of nondisabled spectators on the levels below them (Figure 8). If the people below are expected to stand from time to time as part of the audience experience, the wheelchair spaces must be high enough above them to maintain clear sightlines (Figure 9).

The numbers that matter most:

- A single wheelchair space must be at least 36 inches wide (Figure 10a).
- Where two or more wheelchair spaces are side-by-side, each one must be at least 33 inches wide (Figure 10b).
- If the space is entered from the front or back, it must be at least 48 inches deep (Figure 11a). If the chair comes in from the side, it must be a minimum of 60 inches deep (Figure 11b).

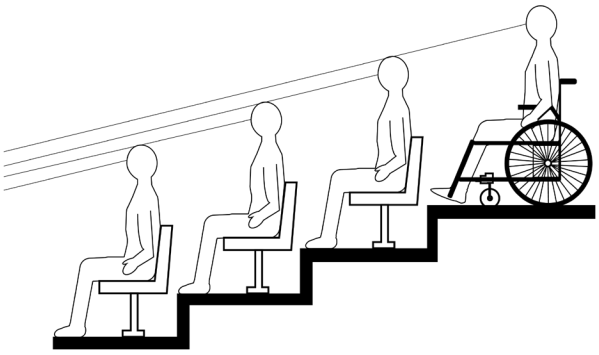


Figure 8

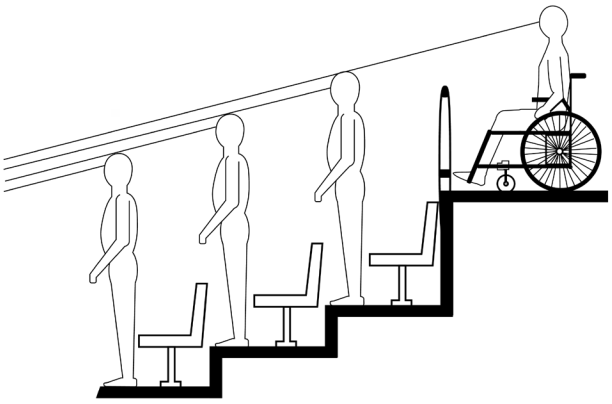


Figure 9

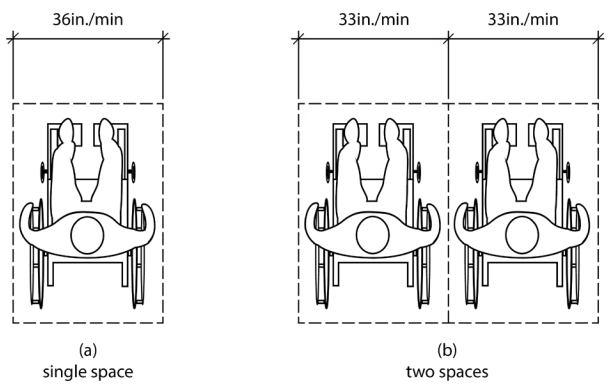


Figure 10

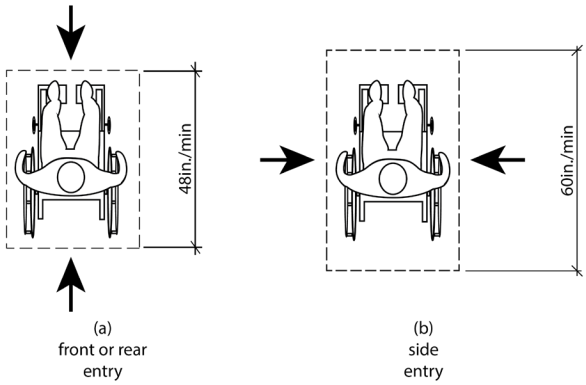


Figure 11

Other crucial wheelchair space requirements:

- Wheelchair spaces must be beside, not in, accessible paths and circulation routes. You can't put them in the aisle.
- Seats for companions of wheelchairs have to provide "shoulder alignment with adjacent wheelchair spaces," stated ADA Section 802, to provide a sense of inclusion for wheelchair users. The shoulder alignment point of the wheelchair space is measured 36 inches from the front of the wheelchair space.
- The floor elevation for the wheelchair space and companion seats have to be the same.

These last points may be architectural, but savvy AV designers will keep an eye out to ensure such spaces are ADA-compliant.

The reason: If these wheelchair spaces are not laid out properly and the designer installs AV equipment into these spaces, they will have to redo the installation when the ADA violation is noticed.

"AV professionals need to work closely with architects and interior designers to ensure the sightlines from all wheelchair spaces are ADA-compliant."

CHAPTER 10

The New Classroom

E-learning, online learning, flipped classroom, and distance learning compliance.

The development of non-traditional learning has made demands not only on educators, but on AV designers, integrators, and installers as well.

Alternative teaching methods such as e-learning/online learning (web-based courses), "flipped learning" (where instructional content is delivered to students outside of the classroom), and distance learning (with one site feeding live audio and video to multiple sites in real time, with or without interactivity), all have their own AV requirements. In turn, each has its own ADA compliance issues.

Our advice is to contact your regional ADA center (via the ADA National Network) to determine the specific ADA compliance requirements for your e-learning, flipped, or distance learning AV project.

Check Your Area Guidelines
"Depending on who is providing the e-learning, online learning, flipped, or distance learning, different compliance standards apply," said Janet Peters, Great Lakes ADA Center/University of Illinois in Chicago. "In post-secondary institutions, for the accessibility of digital learning materials and online courses, the guiding laws are Section 504 of the Rehabilitation Act of 1973, and the ADA." (Some general principles of ADA compliance for alternative teaching methods are covered in the University of Washington online document, "Real Connections: Making Distance Learning Accessible to Everyone.")

Points to consider:

- Ensure that people with disabilities who are required to take online courses have access to whatever assistive technology and human support they need to complete their studies as fully as any nondisabled person. This could include text-to-voice software for visually-impaired students.
- If interactivity is a part of the alternative teaching method, students with disabilities must have equal opportunities and the means to interact with teachers and other students. A hearing-impaired student may require a mix of real-time closed captioning, a sign language interpreter, and a keyboard-executed program that converts text-to-speech, for example.
- Whatever alternative teaching method is chosen, the AV designer needs to fully assess how this method will be used and consider what needs improvement to ensure ADA compliance. This may include talking plainly to clients who "don't want to spend the money on that."

Be sure to contact your Regional ADA Center for advice on designing these types of AV projects to be ADA-compliant—right from the start.

"Distance learning, flipped learning, BYOD (bring your own device) all have their own AV requirements and ADA compliance issues."

CHAPTER 11

Videoconferencing Scenarios & ADA

Making sure everyone is included.

In contrast to the other chapters in this eBook, this chapter on videoconferencing scenarios is drawn from the ADA-based document, "Effective Communication."

In simplest terms, any rooms that are equipped with videoconferencing cameras, microphones, displays, and speakers have to ensure that all of these devices are accessible to disabled persons. (Chapter 2's explanation of operable parts applies to setting up an ADA-compliant videoconferencing room.) This includes incorporating assisted listening systems (described in Chapter 8), to ensure that everyone can hear what is being said.

If the videoconference includes people with no functional hearing, achieving ADA compliance may include offering:

- Real-time closed captioning, either done by machines or humans. (Note: Machine-based captioning is not as accurate as human-based captioning, due to the challenges of voice recognition software capturing and translating individual voices to text.)
- On-site sign language interpretation, using a hearing-enabled specialist to translate what is being said into sign language, in real-time.
- Video remote interpreting, where an off-site sign language interpreter is linked into the videoconference live, and provided with his or her own video window in the feed to provide real-time signing to viewers.

Meanwhile, it is vital to install cameras and microphones such that people in wheelchairs, as well as those in standard seats or standing, can be clearly seen and heard by users at other sites. By the same token, monitors showing the return video feeds must be large enough to clearly let everyone see, no matter what location and height they are at within the room.

"In addition to the above mentioned information, the Twenty-First Century Communications and Video Accessibility Act may be applicable," said Janet Peters, project coordinator with the Great Lakes ADA Center/University of Illinois Chicago. Contact your Regional ADA Center to learn more.

"Any rooms that are equipped with videoconferencing cameras, microphones, video monitors, and speakers have to ensure that all of these devices are accessible to disabled persons."

CHAPTER 12

Capital Requests and Lifecycle Planning

How to document and log ADA-compliant equipment for successful budget plans.

There are a number of good reasons for documenting and logging your ADA-compliant AV technology purchases.

Capital Requests

- Logging which ADA standard(s) each requested piece of AV equipment complies with will also form the basis of a searchable ADA compliance database.
- Having ADA compliance information included in a capital request helps AV designers in assessing whether the overall AV system meets the needs of people with disabilities, in all aspects.
- Thorough documentation of ADA-compliant AV equipment "will help in budget fights with administrators who prefer to ignore the law in order to save money," said Mike Tomei, CTS-D/I, owner of Tomei AV Consulting LLC.

Lifecycle Planning

Here are five things to consider for lifecycle planning with ADA-compliant equipment:

1. Recording ADA compliance information upfront will streamline any ADA audits that may occur. The necessary data will be a few keystrokes away, saving you time in compiling this information after the fact.
2. Have ADA compliancy information available during equipment upgrades and replacements, and ensure your purchases are earmarked to be ADA-compliant.
3. Should new product categories become subject to ADA compliancy standards, a quick search of your database will indicate noncompliant equipment. This data will help you plan for future ADA-compliant purchases and ensure you meet any deadlines set by the Department of Justice.
4. "You can document and log compliant equipment with a VPAT (Voluntary Product Accessibility Template) process," said Janet Peters. "A VPAT is a vendor-generated statement that provides information on how a product or service conforms to the Section 508 Accessibility Standards (**www.section508.gov**) for Electronic and Information Technology in a consistent fashion and format. Some states, like Minnesota, also require a WCAG 2.0 VPAT for state agency purchases."
5. A word to the wise: Be sure to check with your Regional ADA Center to see which specific VPAT applies to your project.

"ADA compliance information included in a capital request helps AV designers in assessing whether the overall AV system meets the needs of people with disabilities."

CHAPTER 13

Future Forecast

Classroom design is changing rapidly, boasting a bevy of AV opportunities.

In today's AV landscape, achieving ADA compliance is no small feat. The task will likely become even more challenging in the future, as classroom designs and methods evolve and advance with distance learning, e-learning, hands-on learning and more.

Consider this:

- As the general population—including people with disabilities—relies increasingly on mobile devices, teaching will follow this migration and leverage it to better engage smartphone-centric students. For AV professionals working with educational clients, this goes way beyond simple BYOD support: The AV systems of the future may well have to collaborate with the devices owned by students, and even defer to them as their software becomes ever-more capable.
- The pressure to stretch education dollars will likely drive the growth of e-learning, distance education, and any other pedagogical method that is more efficient and cost-effective than traditional classroom-based learning.
- As all of these advances occur, ADA standards will adapt and expand to ensure that people with disabilities are not left behind.

Increasing Opportunities

For AV designers, integrators, and installers, the future of AV offers ever-increasing opportunities. At the same time, the need to include all Americans in these benefits means ADA compliance will become even more important in years to come.

The simplest way for the AV industry to address this challenge is to stop making distinctions between people with disabilities and those without, and instead serve people as a whole. This means every facility should be designed with ADA compliance as a given. Just as we cannot imagine a public washroom today without a wheelchair stall, we should not imagine designing spaces that are not equipped for all of mankind.

The time for people with disabilities to be afforded the same access and opportunities has arrived in North America. AV professionals who comply with the ADA standards not only obey the law, they ensure that this vast pool of talented people have an equal chance at "life, liberty, and the pursuit of happiness."

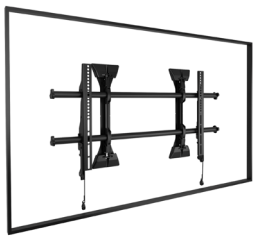
"As we rely on mobile devices, teaching will leverage smartphones to better engage students, creating opportunities for AV professionals to serve technology tools for all."

CHAPTER 14
Catalog of Solutions

These Chief, Da-Lite, Middle Atlantic, and Vaddio Products Comply with ADA Regulations.

The following products are designed to serve as building blocks for an ADA-compliant ecosystem. Keep in mind that compliance applies to the sum of the combined systems—not just its individual components—and the ways in which it is installed/operated.

Low-Profile Display Wall Mounts



Fusion Fixed Mounts
Static display mounts with post-installation adjustments for height, leveling, and lateral shift.



Thinstall Fixed Mounts
Ultra-low profile static mounts. Ideally paired with in-wall storage solutions.



Thinstall Swing Arm Mounts
Ultra-low profile swing arm mounts extend for component access.

Low-Profile Kiosk Solutions

Impact On-Wall Kiosks
Depth adjustable exterior frame keeps installation under 4 inches (102 mm) with panels up to 2.75 inches (69 mm) deep.



Storage Solutions



In-Wall Storage Solutions
PAC in-wall storage solutions provide space for housing equipment at the display while maintaining a low profile. UL2416 listed.

Ceiling Storage Solutions
CMS ceiling storage solutions provide an alternative space for housing equipment above a 2-foot by 2-foot ceiling tile. UL2043 listed and plenum rated.



Height Adjustable Display Mounts



FlexView Series Carts and Stands
Supports XL displays with electronic height adjustability offering 20 inches (508 mm) of vertical movement in slim design available in a variety of colors.



Electric Height Adjust Cart
High capacity cart supports heavy interactive displays with 26 inches (660 mm) of vertical travel.



Fusion Dynamic Display Mounts
Height adjustable solutions with 15.7 inches (400 mm) of ultra-smooth and fast vertical travel—no electricity needed. Available in wall, cart and floor-support models.

Furniture Solutions

L7 Series Lectern
Elegant, electronic height adjustable lectern with configurable storage, power and connectivity.





C3 Series Credenza
Ultra-low profile credenza with patented rackmount and small device storage ideal for housing equipment below interactive displays.

Surface Raceway Systems

Wiremold Overfloor Raceway
Four-channels of capacity to deliver power and connectivity to point of use in the smallest form factor available in overfloor raceway systems.



Cameras



RoboSHOT IW Smart Glass PTZ Camera
RoboSHOT IW (In-Wall) is semi-flush-mounted, making it compliant with the Americans with Disabilities Act. Designed with smart glass which changes from a frosted opaque when the power is off to a transparent clear glass with the camera is powered on.



RoboTRAK Presenter Tracking System
RoboTRAK is an IR lanyard-based camera tracking system. It provides a smooth, accurate panning and tilting motion that follows the instructor as they walk around the presentation area of a classroom, eliminating the need for a camera operator.



RoboSHOT IW Clear Glass PTZ Camera
RoboSHOT IW (In-Wall) is semi-flush-mounted, making it compliant with the Americans with Disabilities Act. It is enclosed behind clear glass—providing robust protection for high traffic areas, classrooms or multipurpose rooms where cameras might be subject to tampering during nonuse.



DocCAM
DocCAM 20 HDBT is a high-definition, recessed in-ceiling document camera with 20x optical zoom, 1080p/60Hz resolution and a 59.5-degree horizontal field of view to capture more of the table. Ideal for video conferencing, training or online learning.

Microphones



EasyMic Ceiling MicPOD

Designed for videoconferencing rooms, EasyMic Ceiling MicPOD microphones deliver professional audio quality into your PC system. Each MicPOD delivers the performance of three microphones built into a single pendant hanging enclosure.

AV Bridges



OneLINK Bridge AV Interface

The OneLINK Bridge AV Interface combines a camera extension system with an audio mixer to provide USB bridging functionality—making it easy to convert an audio and video source into a USB 3.0 media stream so you can use it with popular cloud conferencing solutions like Skype for Business, Google Hangouts, WebEx and Zoom.



AV Bridge Mini

With the AV Bridge Mini HD Audio-Video Encoder, you can bridge any high-definition HDMI and audio source into soft conferencing applications such as Skype for Business, Zoom, and WebEx through its powerful USB 3.0 interface. Creating production-quality live streams on platforms like YouTube Live, UStream, LiveStream and Panopto has never been easier with the AV Bridge Mini's flexible RTMP capabilities. Convenient, easy to install half-rack size.



AV Bridge

AV Bridge provides integrators the ability to integrate soft codecs such as Skype, Cisco Jabber, Microsoft Lync, as well as many more, into their traditional AV designs. The AV Bridge provides the digital USB gateway to allow the integration of PRO audio and video equipment into any PC software application. AV Bridge makes it simple to encode, capture and stream your AV content through a variety of PC applications or directly to the network.

Projection Screens



IDEA Screen

The Interactive Dry Erase Application screen features hotspot-free projection, is compatible with ultra-short throw interactivity projectors and standard dry-erase markers.

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