

ADA in AV

Making AV Technology ADA Compliant



TABLE OF CONTENTS

CHAPTER 1

UNIVERSAL COMMUNICATION

Accessible AV Design 6

Multisensory Design 8

ADA is the Law 10

ADA National Network 17

CHAPTER 2

OPERABLE PARTS

Placing Controls Within Reach.....14

The 48/15 Rule 16

Know the Code17

CHAPTER 3

REACH RANGES

Make Sure Everything is Within Reach ..18

Front and Side Reach Ranges19

CHAPTER 4

WORK SURFACES

Lecterns and Desks.....22

Balance Needs for All.....23

CHAPTER 5

PROTRUDING OBJECTS

Keeping Access Clear and Safe.....26

Expanding Your Options30

Fitting AV Technology Within ADA Compliance.....30

CHAPTER 6

KNEE AND TOE CLEARANCE

Comfort Space Before Component Space.....32

CHAPTER 7

ROOM TO MOVE

Turning and Clear Floor Space Requirements34

Floor and Ground Rules36

CHAPTER 8

MAKE SURE EVERYONE CAN HEAR

Assistive Listening Systems.....38

Adding Captioning40

Types of Assistive Listening.....41

Advancements in Hearing Aids.....42

Requirements for ALS.....44

CHAPTER 9

WHEELCHAIR SPACES IN ASSEMBLY AREAS

Have Enough Spaces46

Ensuring Proper Sightlines.....47

Making Sure Everyone Can See51

CHAPTER 10

THE FLEXIBLE CLASSROOM

Active Learning Accessible Options.....52

A Few Key Takeaways.....53

Higher Education and Universal Design54

CHAPTER 11

THE NEW COLLABORATION SPACE

Make it Possible for Everyone to Participate56

Interface Design57

Know the Code59

Conduct Accessible Meetings 60

CHAPTER 12

INVEST IN A BETTER EXPERIENCE

Budget and Lifecycle Planning.....62

Five Considerations for ADA-Compliant Equipment65

CHAPTER 13

LOOKING AHEAD

Accessibility Upgrades.....67

Learning Environments68

Collaboration Spaces70

CHAPTER 14

LEGRAND | AV ADA SOLUTIONS

Commonly Used AV Solutions for ADA Compliance 72-78

Solutions Engineering and Other Resources.....79

DISCLAIMER

This guide is intended to be used for educational purposes only. It has been prepared based on ADA enforcement guidance, as well as, input from Legrand employees, and third-party audiovisual (AV) consultants with deep knowledge of ADA requirements.

The intent of this publication is to serve as a guide to ADA regulations pertaining to the installation and usage of audiovisual technology. However, nothing herein shall be construed as legal advice, nor should you rely upon any statements contained herein without obtaining your own project-specific verification.

Those seeking additional details or legally accurate definitions of the ADA’s audiovisual technology requirements should contact www.ada.gov.

YOUR GUIDE TO AV AND ADA COMPLIANCE

Accessibility and AV have a lot in common. They both create better experiences for everyone by adding layers of communication and interaction. And both take a multisensory approach to enhancing comfort and ease for anyone who might use a space.

Designing for accessibility and the legal requirements of the Americans with Disabilities Act (ADA) means more than just following a set of instructions. It's an expanded design viewpoint. It's about making the world easier to navigate and enabling more people to participate.

AV technology is a powerful tool for adding more flexibility to spaces, especially when many no longer feel complete without a "digital" element.

That's a big motivator in collaboration and learning environments, where the goal is to connect people across disciplines, talents, and distance. Adding dynamic audiovisual technology to these spaces supports those goals and can also help to improve accessibility.

Read on to find out more about how AV and ADA Compliance can create amazing experiences.



UNIVERSAL DESIGN

According to the CDC's ["Disability Impacts All of Us"](#) report, 26% of American adults have some form of disability. That number increases when you think about those with illnesses or temporary disabilities like a broken leg. Designing with the universal human experience in mind, knowing that anyone might have a disability at some point, is one way that AV can improve understanding.

WHY LEGRAND | AV?

Why is an AV manufacturing company publishing a resource for ADA guidance? At trade shows, we're always asked if a solution complies with the ADA. More importantly, inclusion is a core piece of our [corporate social responsibility mission](#), both in our hiring practices and our approach to AV design.

"Diversity of people creates diversity in thought and perspective for new approaches to problem solving and solution development," said Tim Troast, VP – Technology & Product Strategy at Legrand | AV. "We strive to be a leading player in the area of diversity and inclusion, embracing and promoting all types of differences. That includes pursuing initiatives and developing resources to help us and the industry at large achieve equity of opportunity for people of any background and ability."



UNIVERSAL COMMUNICATION

1

ACCESSIBLE AV DESIGN AND INSTALLATION IMPROVES THE EXPERIENCE FOR EVERYONE

TIPS & TECHNIQUES

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Most AV professionals are keeping ADA in mind during design, and are genuinely making an effort to address the needs of all potential users in learning and collaboration environments. This is key to being in ADA compliance. We need to ensure that these spaces have accommodations. Starting with the basics, look at egress pathways and determine alternate display options if existing displays cause problems. From there, create designs that can be used by everyone, and be prepared to work with individuals who have specific needs.

- Brian Retzlaff, CTS
Manager, Solutions Engineering
Legrand | AV

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Attitudes toward ADA compliance are changing as more people become aware of just how many different populations would benefit from better accessibility. Now that there is more awareness around “invisible” challenges – such as mental or neurological conditions that are not visible from the outside, yet can limit or challenge a person’s movements, senses, or activities – there is greater interest in enhancing collaboration and learning spaces for inclusivity.

ADA compliance is beneficial because it addresses the needs of a significant portion of any population. In its [Accessible Meetings, Events & Conferences Guide](#), the ADA [makes a good business case](#) for upgrading accessibility for everyone’s benefit: “While the [U.S. Department of Labor](#) estimates that individuals with disabilities control more than \$200 billion in discretionary spending, this figure is likely much less than the true market power of all individuals with functional

needs to be accommodated. In fact, many Americans who would benefit from a fully accessible meeting, event, or conference environment may not identify their needs as a ‘disability.’”

The guide then goes on to reveal how many people in the U.S. have vision, hearing, mobility, and cognitive/developmental disabilities – and it goes further to include health concerns and temporary disabilities that might change the needs of individuals at any given time. The [newest U.S. Census data](#) including all age groups estimates nearly 42.5 million people have a disability. Imagine providing a service that up to 13% of your potential end users can’t access. Meeting ADA requirements is not a hurdle, it’s just good business.

Reading through that list makes it easier to see that ADA compliance applies to all of us.



MULTISENSORY DESIGN

At its core, AV is about communication and connecting with all the senses. For many of us, the audio and visual experiences we provide are what get us excited every day. Throughout the process of designing and integrating sound, video, lighting, control, and acoustics solutions, there is an awareness of how the built environment affects how we receive information. Designing for ADA simply extends that understanding beyond your individual experience to how others experience the same event. With a long history of creating spaces that inform and engage in a multisensory way, the AV industry is well placed to help make collaboration and learning spaces better for everyone.

When it comes to the workplace and educational institutions, the continued growth of “hybrid” collaboration is driving AV installers to reconsider how technology best connects across distance and in the room. Steps are being taken to ensure equity of participation.

“Corporate and educational spaces have a lot of the same characteristics,” observed Paul Chávez, Associate, User Experience and Technology Design with the Los Angeles office of [Arup America](#). “These spaces are designed to develop ideas through conversation, and visual content. So the important baseline question is, how do you facilitate that for every kind of person?”

It seems only logical that designing for everyone means designing for all the senses, which is where AV shines.



It starts with the entrance and visitor journey throughout a space, all the way through to large and small spaces where people gather to learn and work together.

Amazing experiences are more within reach when you consider how hearing, vision, and kinesthetic or tactile senses are engaged. Greater understanding is possible for everyone if we can add more layers of expression.

This is particularly evident when it comes to hearing. Live captioning is used a lot more often now, as people of all abilities

rely on it to follow along with content. That added support, the extra sensory input, is beneficial to delivering the message.

“When you take the disability part away from it, it gets to intelligibility,” said Jeanne Stiernberg, Principal Consultant with Stiernberg Consulting. “When you can’t hear everything, your mind fills in the missing parts. So when you add captions, it’s multisensory. You want to provide as much input as possible. The same is true for video meetings – it’s way easier to communicate when there’s a visual component.”

This is also the case for anyone who has watched The Great British Bake Off with captions, to fully understand the perils of delivering a “claggy” brownie. Everyone benefits from multisensory information.

That’s a fact the AV industry was built on. Adding more layers of sensory input always helps to deliver the message. And when AV systems and content are made more accessible, everyone’s experience is improved!

ADA IS THE LAW

First enacted in 1990 and amended in 2008, the Americans with Disabilities Act (ADA) was established to ensure the provision of equal opportunities for individuals with disabilities.

As written in the U.S. Code, Title 42, Section 12101(a)(5):

“Individuals with disabilities continually encounter various forms of discrimination, including outright intentional exclusion, the discriminatory effects of architectural, transportation, and communication barriers, overprotective rules and policies, failure to make modifications to existing facilities and practices, exclusionary qualification standards and criteria, segregation, and relegation to lesser services, programs, activities, benefits, jobs, or other opportunities.”

The AV industry can help to eliminate those communication barriers. And from an “architectural barrier” standpoint, AV designers and installers should also ensure that any related sound, video, control, or storage equipment is accessible and is not an obstacle for anyone who is moving through a space by any means.

Guidance for achieving these goals can be found in the 2010 [“ADA Standards for Accessible Design.”](#)

There have been some more recent updates to keep up with new technologies. The ADA guidelines for [“Effective Communication”](#) were revised in 2020. These include AV-related offerings like assistive listening systems, real-time captioning, and video feeds for sign language interpretation.

Other accessibility requirements to keep in mind when designing AV systems include:

The Twenty-First Century Communications and Video Accessibility Act (CVAA) - This covers video conferencing and communications, and also some specifics on control of video programming devices.

U.S. Access Board Section 508 Information and Communication Technology (ICT) - This applies to technology used by federal agencies, so AV integrators working in government might want to check these accessibility guidelines for telecommunications equipment – including kiosks.

ADA NATIONAL NETWORK

Two more questions that come up frequently in AV are:

- What can I do to make my installation ADA compliant?
- Who is responsible for determining ADA compliance?

The answers vary – a lot. Every state and region in the U.S. has its own specifics in terms of regulations and “authority having jurisdiction.” And, further, some local building codes actually exceed Federal ADA standards. That means in some cities or states, you might be dealing with extra requirements beyond the ADA.

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.

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 Jennifer Perry, Access Specialist with the Northeast ADA Center at Cornell University’s Yang-Tan Institute on Employment and Disability. “This regional focus is critical to ensuring that ADA National Network services meet the needs of diverse populations and stakeholders throughout the country.”





“

We have come a long way since the initial ADA standards for design in 1991. The ADA provides a baseline for a minimum standard for accessibility. But sometimes, if you want to provide true accessibility, you have to surpass that to create a workplace or learning institution that works for everyone.

”

– Jennifer Perry
Access Specialist with the
Northeast ADA Center

Getting back to the ADA, this guide was created to share information about how accessible design can improve the AV experience in learning and collaboration spaces. These venues are covered in [Title II](#) and [Title III](#) within the ADA. Title II applies to public schools and universities, as well state and local government facilities (like city halls, courts, etc.). Title III is for “Public Accommodations and Commercial Facilities.” This includes assembly areas, conference rooms, classrooms, learning spaces, and lecture halls – anywhere people might gather for presentations and interaction supported by audiovisual technology.

All of these facilities need to be ADA compliant. It’s a common misconception that these rules only apply to new construction. But according to the law, any Title II building

constructed or altered since 1992, or in 1993 for Title III facilities, is included in these requirements.

Some exceptions exist, but when in doubt, it’s best to assume that all AV projects should be ADA compliant, and you should design and install systems according to accessibility standards to legally protect yourself and your clients.

“ADA is the law, so compliance is certainly important from that perspective,” said Jennifer Perry, Access Specialist with the Northeast ADA Center at Cornell University’s Yang-Tan Institute on Employment and Disability. “Whether it’s a business, workplace, or educational institution, from a civil rights standpoint, these spaces must be universally

accessible to serve people with disabilities.”

From an AV standpoint, accessibility includes basics like making sure equipment isn’t in the way, and also creating audiovisual content that can be understood by everyone in the room.

Beyond those fundamentals, a lot has changed with increased awareness of the needs of many people with physical, sensory, or cognitive disabilities.

It’s on us as AV professionals to stay informed and keep in mind how our designs perform for everyone as we learn about new user needs.



Look for projection screens that can be integrated with control systems to allow more accessible use. Camera products that offer full API integration will enable large-button options for those with limited motor control, and can also provide support for multiple languages to improve the experience for all users.



- Brian Retzlaff, CTS
Manager, Solutions Engineering
Legrand | AV

2

PLACING CONTROLS WITHIN REACH GOES A LONG WAY

TIPS & TECHNIQUES



Consider using high-contrast touchscreens to aid users with visual disabilities, and even accompany them with braille-embossed control buttons. Smart control interfaces using Google, Amazon Alexa, or Apple Siri voice recognition can also be extremely helpful to visually-impaired users.



- Mike Tomei, CTS-D, CTS-I
Tomei AV Consulting

Beyond offering access, wheelchair spaces, and bathrooms to everyone who might use a public space, ADA regulations also include “operable parts” ([Sections 205 and 309](#)). These include control switches, equipment surfaces, and power outlets associated with AV equipment. Other electrical and mechanical devices that might be part of an integrated presentation or collaboration system are also considered operable parts. Remember to consider additional types of controls or access points, like the drawstrings attached to overhead projection screens, or media players in lecterns and learning stations.

Section [309.4](#) provides specific guidance on operable parts:

Operable parts must be usable with one hand and not require:

- Tight grasping, pinching, or twisting of the wrist
 - More than five pounds of force to operate
- Keep in mind:
- Buttons that are raised or flush are easier to use than those that are recessed.
 - Dials and other controls that can be turned with the fingers but not the full hand can be used if they do not require twisting of the wrist or pinching.
 - Flip switches and similar controls are acceptable, though push plate types can provide easier access.

“Operable parts include 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, CTS-I, Owner of [Tomei AV Consulting](#) in Ithaca, NY, and an authority on ADA compliance for AV equipment. “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 the use of these operable parts.”

There are plenty of options for camera controls that accommodate varying levels of motor function. Joysticks and large, defined buttons can be manipulated more easily than a standard remote controller. Buttons, step mats, IR sensors and other triggers can be programmed with macros to perform complex, pre-set camera movements. Touch display controls perform similar functions for ease of production. Web-based cameras widen accessibility by allowing the user to interact with any specialized mousing or keyboard equipment they choose.

Such remote access also helps technicians access cameras in rooms across an organization, even in older buildings that are less navigable.

Hands-free, motion-based tracking cameras give everyone the ultimate freedom to use the space as they choose without having to worry about staying in frame or juggling multiple devices.

An ADA-compliant operable part should be installed within a height range and depth that is easy to access. But it's also important to ensure that it doesn't cause obstruction.

"If it is used to control anything within the collaboration or learning space, it is an operable part," said Kathryn Gaskell, Director of Product Management with Legrand | AV. "So it needs to be ADA compliant in terms of height, reach, and protrusion."

THE 48/15 RULE

A handy way to remember the ADA's specifications for reach heights and distances for operable parts is the 48/15 rule. 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.

This is a good basic metric for locating switches, control surfaces, and anything else that someone either standing or in a wheelchair may need to comfortably access by reaching forward or to the side. But there are many more details that designers and installers should keep in mind, particularly when obstructions are involved. Read more about all the specifications of Reach Ranges in the next chapter.

If you have more questions, contact your [Regional ADA Center](#). These offices are funded specifically to answer questions about ADA standards compliance, and their teams are very responsive.



KNOW THE CODE

AV systems designers and installers may be familiar with an exception within the ADA Standards that may apply to equipment rooms or similar areas "where electrical and communications systems receptacles are not normally intended for use by building occupants."

Specific exceptions include:

- Operable parts that are intended for use only by service or maintenance personnel
- Electrical or communication receptacles serving a dedicated use
- Floor electrical receptacles
- Except for light switches, where redundant controls are provided for a single element, one control in each space shall not be required to comply

By that description, equipment rooms might be considered an exception. "But ideally these spaces should be designed for full accessibility, to allow use by anyone working with AV or IT systems," said Paul Chávez, Associate, User Experience and Technology Design with the Los Angeles office of [Arup America](#). "Technicians with disabilities are everywhere, in all locations and aspects of our work. And with new hardware options today, it's possible to provide more flexibility in the height of things like keyboards and controls in equipment racks."

AVIXA's "[Rack Design for Audiovisual Systems](#)" publication highlights system operator accessibility as a requirement. When installing equipment that requires operator interaction in a rack, it should be located between 15 and 48 inches above the floor. Additional racks or wall-mounted racks can be considered to meet this reach requirement. While not noted in the publication, rack lights can also provide needed illumination for people with vision difficulties while keeping their hands free to interact with equipment.



REACH RANGES

3

MAKE SURE EVERYTHING IS WITHIN EASY REACH

TIPS & TECHNIQUES

“Electricians tend to measure to the center point of whatever they are installing. This could lead to them putting control surfaces outside of the acceptable reach range. So be clear about what you need, and double-check that your installers understand what you are asking for.”

– Mike Tomei, CTS-D, CTS-I
Tomei AV Consulting

A “reach range” refers to how easy it is for someone in a wheelchair to access an AV control, device, or operable part from the front or the side.

This guidance makes sure operable parts are within a reachable zone for someone in a wheelchair. There are different reach ranges for “unobstructed” areas, where nothing is in the way, and areas where “obstructions” might get in the way, narrowing the allowable range of control or device placement.

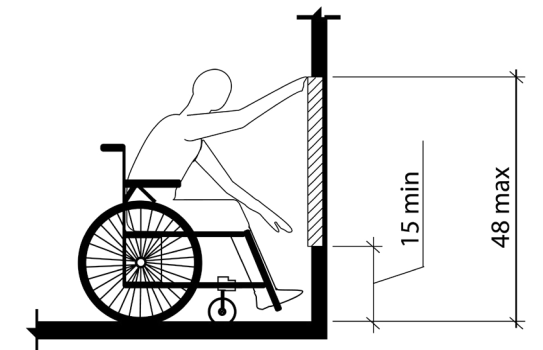
“Basically, the same unobstructed requirements apply to both front and side reaches,” explained Mike Tomei, CTS-D, CTS-I, Owner of Tomei AV Consulting. “It is when there are obstructions such as heaters, shelves, and table tops that the reach ranges vary.”

[ADA Section 308](#) defines four kinds of reach ranges:

- Unobstructed Front Reach
- Obstructed High Front Reach
- Unobstructed Side Reach
- Obstructed High Side Reach

UNOBSTRUCTED FRONT REACH

With no obstructions to worry about, just make sure to place operable parts no lower than 15 inches off the floor/ground surface, and no higher than 48 inches off the floor (Figure 1).



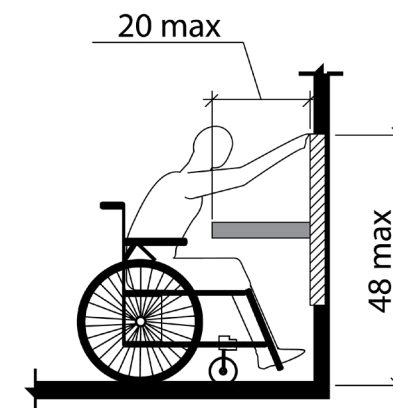
(Figure 1)

OBSTRUCTED HIGH FRONT REACH

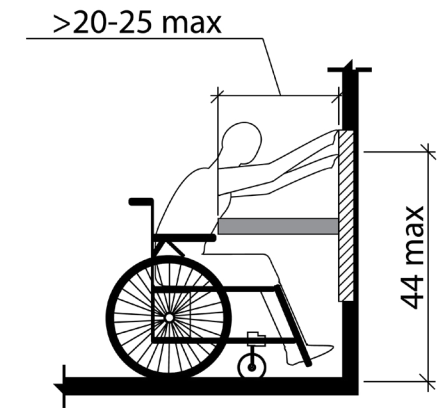
Where an obstacle such as a shelf or piece of furniture might be in the way, the design must leave enough floor space for a wheelchair to fit, while also placing operable parts within the reachable range.

If the obstruction is 20 inches in depth or less, the high forward reach measures 48 inches, just like an unobstructed front reach (Figure 2a).

However, if the reach over the obstacle is more than 20 inches in depth and up to 25 inches, the high forward reach area for operable parts is no more than 44 inches (Figure 2b).



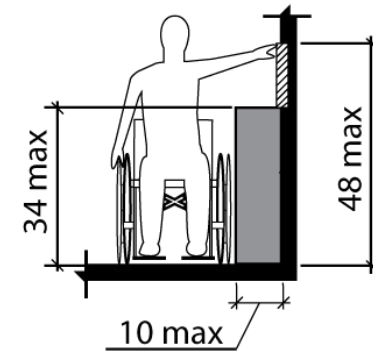
(Figure 2a)



(Figure 2b)

UNOBSTRUCTED SIDE REACH

Unobstructed side reach guidance is similar to unobstructed front reach. In areas where the wheelchair can be parallel to the equipment, make sure the operable part is no lower than 15 inches off the floor or ground surface and no higher than 48 inches.



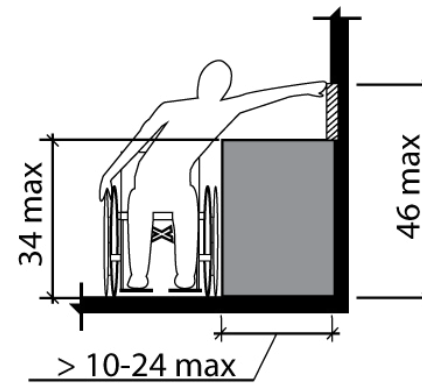
(Figure 3a)

OBSTRUCTED HIGH SIDE REACH

If the wheelchair can roll up parallel to the operable parts and the high side reach is over an obstruction (maximum height 34 inches), the obstructed high side reach can be:

48 inches, assuming that the obstruction is 10 inches in depth or less (Figure 3a)

46 inches if the obstacle is between 10 inches and 24 inches (Figure 3b)



(Figure 3b)

SAFETY IS KEY



We design our products to meet high standards for safety. Our mobile carts must pass a 15-degree tip test with displays up to 200 pounds. And our electric height adjustable carts and stands have anti-collision sensors to stop and reverse the height adjustment if they meet an obstruction. Those measures protect all users. In terms of accessibility, it helps to ensure that people who are in wheelchairs and those with other mobility issues can easily reach and move displays without risk of the cart tipping over.

- Alan Jacobson, CTS
Solutions Engineer
Legrand | AV



PRODUCT SPOTLIGHT

HEIGHT ADJUSTABLE FLAT PANEL CARTS

To help keep displays within reach, Chief offers height-adjustable display carts that increase accessibility. These are designed to safely raise or lower even the heaviest displays. [Electric](#) or [dynamic spring-system](#) lift options make adjustments easy. Wide-angle bases allow for better clearance to reach the display from the front.





WORK SURFACES

4

ENSURE THAT LECTERNS
AND DESKS ARE
ACCESSIBLE FOR ALL

TIPS & TECHNIQUES

“Furniture solutions with options like flip-up shelves, when appropriately installed, make a presentation station more usable for those with limited mobility.”

- Brian Retzlaff, CTS
Manager, Solutions Engineering
Legrand | AV

Collaboration and learning spaces are becoming more flexible in every way. This includes furniture and work surfaces. Adding mobile carts and movable tables makes it easier to meet everyone’s individual needs, while enabling a group to really connect. And many new teaching and collaboration stations include storage and control options that provide easy access to media and content sharing tools.

No matter how the room is arranged, make sure all work surfaces are accessible. According to [ADA Sections 226 and 902](#), the tops of ADA-compliant work surfaces need to be at least 28 inches high, and no taller than 34 inches above the floor.

There should also be enough room for people in wheelchairs, as well as on foot, to access the work surfaces (read more about providing space for easy access in Chapter 7: Turning Space and Clear Floor/Ground Space).

When it comes to collaboration and learning spaces, work surfaces include:

- Lecterns
- Fixed and Portable Collaborative Tables
- Instructor Tables
- Teaching Stations

Treat any table or surface used for presentations as something that should fall within ADA standards, just to be safe.



BALANCE NEEDS FOR ALL

“For AV designers and integrators, the challenge is to design work surface layouts to meet the needs of both people with disabilities and those without,” said Mike Tomei, CTS-D, CTS-I, Owner of Tomei AV Consulting. “After all, a lectern devised for a person in a wheelchair may not work for a 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 [Middle Atlantic L7 Lectern](#).

For those seeking a low-tech solution, “It is possible to find lecterns with two fixed 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.”

L7 SERIES LECTERN

The [L7 Series Lectern](#) transforms today's learning spaces in its ability to unite the needs of AV system integrators and educators. The motorized height adjustability and expansive leg room coalesced with a boastful mix of materials — the L7 Series Lectern is the first of its kind to meet ADA requirements with such sophistication and style. The lectern enables any user, regardless of stature or seated/standing positioning, to effectively engage with technology and the audience for a seamless learning experience.



PRODUCT SPOTLIGHT



FORUM™ COLLABORATION SUITE

Creates a more equitable hybrid experience with flexible work surfaces and display mounts that make content and participants visible to everyone. The suite offers a variety of table shapes and display mounts that can be a part of an ADA-compliant system.





5

THE IMPORTANCE OF KEEPING ACCESS CLEAR AND SAFE

TIPS & TECHNIQUES

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Making large monitors compliant with the protrusion requirements of ADA can be a challenge. The Middle Atlantic C3 Credenza specifically provides storage, rack space, and power distribution below a wall-mounted monitor, adding depth below a display and helping to achieve compliance in many circumstances.

”

- Brian Retzlaff, CTS
Manager, Solutions Engineering
Legrand | AV

If there's one question about ADA that we get asked more often than any others, it's about how far the mounted display will stick out from the wall. When something gets added to a smooth wall surface or along the floor, causing a potential stumbling block or head injury, it can be called a number of things, but in ADA parlance, it's known as a protrusion. And where objects protrude, care should be taken. These guidelines protect the safety of all people moving about a space, including people with visual impairments and people walking while texting.

ADA and accessibility guidelines add safety and comfort for anyone who might be using a space. This is particularly evident in collaboration and learning environments, where technology is often added to rooms that weren't always built to accommodate a bunch of extra hardware. This means that a lot of audiovisual equipment is hung from walls, takes up floor space, or is suspended from the ceiling.

Anywhere those extras are added, we're talking about things potentially getting in the way. But with a little bit of planning and strategic placement of mounts and furniture, we can make sure everyone can move through a room without fear of colliding with unexpected objects. Better yet, many AV solutions have shrunk enough in size so that they can be easily kept in in-wall boxes or located in storage boxes above suspended ceilings. So let's avoid these risks with careful installation techniques.

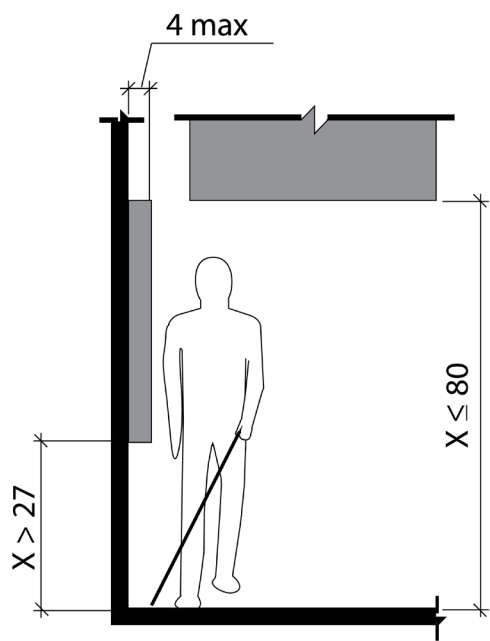


WALL-MOUNTED MONITORS

“Under the ADA, wall-mounted displays can’t protrude more than four inches from the wall, including their mounting hardware,” said Kathryn Gaskell, Director of Product Management with Legrand | AV. “We believe that the sweet spot for such protruding mounts is two inches in depth or less — a goal that can be achieved using thin displays, and when needed, some form of in-wall box to store equipment.”

OTHER MOUNTING LIMITS

This isn’t all you need to know to comply with [ADA Sections 204 and 307](#): Equipment that protrudes more than four inches into areas where people circulate in a space may be hazardous to people with visual disabilities if the protrusion is located anywhere from 27-80 inches above the floor (Figure 4). This can be hazardous because someone walking and sweeping a cane in front of them will not detect this protrusion and can inadvertently collide with it.



(Figure 4)

The guidelines differ for post-mounted objects. If the display’s leading edges are within the 27-80-inch range, they can protrude up to 12 inches into circulation paths. The 12-inch limit also applies to the distance between multiple posts.

For floor-mounted displays on posts or columns that exceed the 12-inch limit, a guardrail or other barrier should be considered. This is a common practice for floor-mounted digital signage in airports.

When mounting displays from the ceiling, be sure the bottom edge stays above the 80-inch height clearance requirement.

All such installations should be handled on a case-by-case basis with input from the proper authority having jurisdiction (AHJ) to be sure everything complies with local codes. Your AHJ should also have input on what constitutes a circulation path for any given site.

TEMPO™ FLAT PANEL WALL MOUNT SYSTEM



KEEPING A LOW PROFILE

As AV technology becomes more streamlined, with fewer big components and less cabling, a lot of hardware is moving behind displays. This is especially true in hybrid collaboration spaces. As soon as you add a virtual meeting platform to a room, you’re adding components, bulky power supplies, excessively long stock USB cables, and maybe even an additional PC.

At the same time, installers are being asked to find new ways to hide all this gear in rooms that aren’t designed to have furniture or racks. (By the way, AV storage furniture and racks really do add an aesthetically pleasing option, but that’s another topic.)

When you have to make tech disappear within ADA guidelines for protrusions extending off of walls, what are your options?

“Aesthetics are driving a trend toward installing displays flush with the wall, or using very thin displays to get that sleek look,” noted Kathryn Gaskell, Director

of Product Management at Legrand | AV. “This helps keep protrusions within four inches from a wall to meet ADA compliance. But it also introduces a need for more behind-the-display storage. In-wall boxes and slide-out racks can help to hide hardware and maintain that thin profile.”

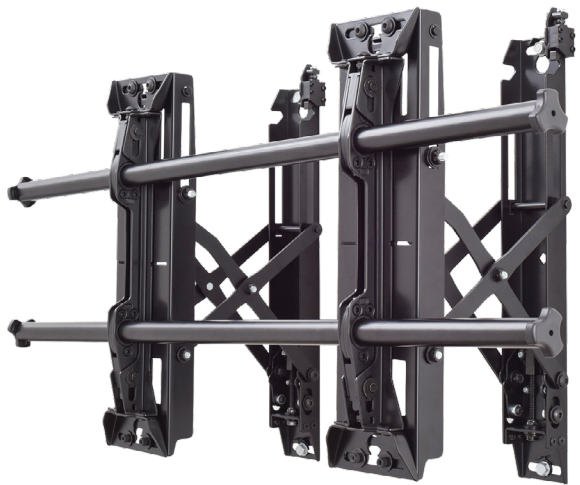
A wide range of Chief display mounts help prevent displays from protruding more than four inches into egress pathways. Storage solutions that can be installed behind displays or in walls also help to limit the depth that wall-mounted equipment extends off of wall surfaces. Cameras can be ceiling mounted or wall-recessed to best fit the needs of the room. Cameras are also getting smaller, and to the point, a thin-profile camera wall mount will meet guidelines with no trouble.

Projection solutions are also a good option to consider. Ultra-thin frame, wall-mounted projector screens can protrude less than two inches from the wall.

EXPANDING YOUR OPTIONS

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,” Gaskell explained. “The depth of the protrusion can be reduced to four inches or less.” If the protruding object sticks out six inches, pushing out the wall two inches or more brings the net protrusion into ADA compliance.

Alternatively, placing a [C3 Credenza](#) beneath the protruding object can be a practical way of fulfilling this requirement. Middle Atlantic’s C3 Credenzas with equipment and display mounting capabilities are a great option. “This approach can be simpler but still highly accessible, allowing people to interact with the flat panel,” Gaskell said.



FUSION® PULL OUT ACCESSORY

Meet protrusion requirements for recessed displays while still allowing for easy servicing with the [FCAV1U Fusion Pull Out Accessory](#) and [FCAXV1U Fusion Extra-Large Pull Out Accessory](#). Use with Fusion micro-adjustable fixed and tilt wall mounts, including portrait models, to add up to 11.54” (293 mm) extension to access equipment behind the display.

FITTING AV TECHNOLOGY WITHIN ADA COMPLIANCE

Making sure you are meeting the four-inch protrusion requirements within areas of circulation is important.

Keri Manasa, Legrand | AV’s Regional Director, Solutions & Consultants, provides some tips for making AV technology fit within ADA compliance:

- On the floor, adding a toe-kick below a video display or other wall-mounted AV equipment can help extend the area within ADA compliance. If a piece of technology protrudes more than four inches from a wall, installing a bumper below it will provide a boundary for vision-impaired people who use canes, or for those relying on other mobility assistance.
- Above a display, if a technology, such as a wall-mounted camera or short-throw projector, must protrude more than four inches from the wall, make sure it’s mounted more than 80 inches above the floor.
- If you’re using adjustable mounts or extensions, make sure to return the display back to its flat position against a wall. A tilt or extension might place a display out of ADA compliance. You can provide instructions to ensure that users or installers remember to return the display to compliance if they’re accessing technology behind the screen, or adjusting a display for better viewing.

PRODUCT SPOTLIGHT

TEMPO™ FLAT PANEL FLOOR-TO-WALL SYSTEM

“The [Tempo Flat Panel Floor-to-Wall System](#) can help achieve ADA compliance where a few extra inches of depth are needed. The 5.5-inch base depth provides a little extra depth allowance for a single display mounted above it. The base provides a buffer along the floor for visually impaired individuals using canes or those with wheelchairs or other mobility issues, helping to provide a safe pathway in front of wall-mounted displays for anyone who passes.”

- Alan Jacobson, CTS
Solutions Engineer
Legrand | AV





KNEE AND TOE CLEARANCE

6

COMFORT SPACE COMES BEFORE COMPONENT SPACE

TIPS & TECHNIQUES

“All knee and toe clearance specifications must be met after any AV devices, added keyboard trays/drawers, cable trays, and anything else have been mounted underneath a work surface. The word to be stressed here is ‘after.’ You must provide adequate knee and toe clearance to be ADA compliant.”

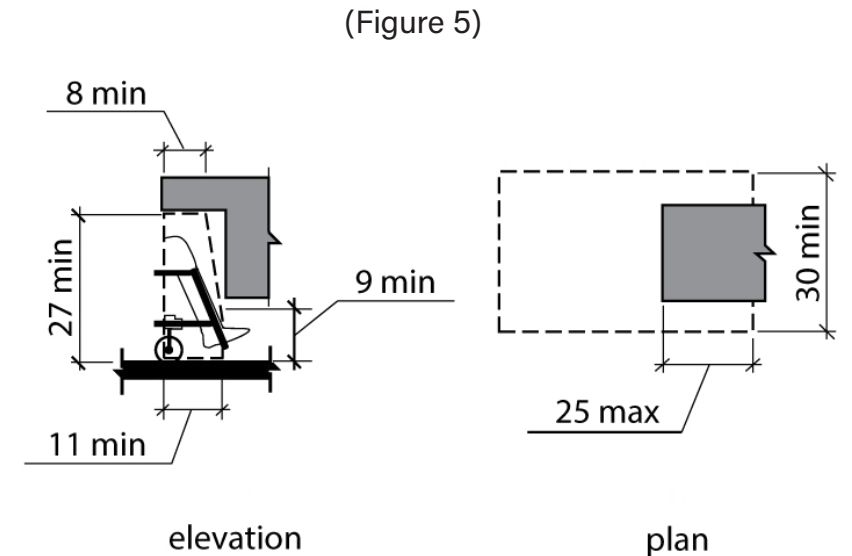
- Mike Tomei, CTS-D, CTS-I
Tomei AV Consulting

To make sure there’s plenty of room for anyone who might need to sit close to a work surface, [ADA Section 306](#) covers ‘knee and toe clearance’ for:

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

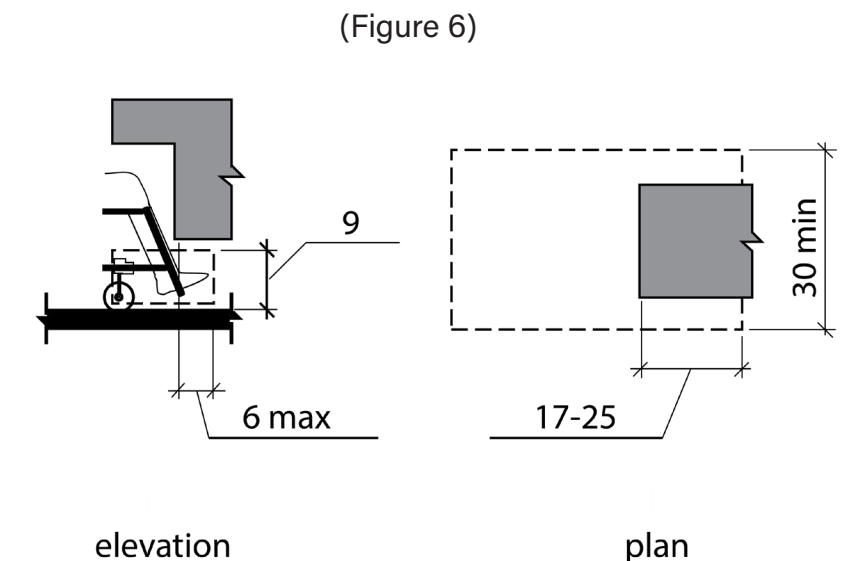
KNEE CLEARANCE

Any space under a working surface between nine 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 nine inches above the floor, and at least eight inches by the time the space gets up to 27 inches high. (The maximum knee clearance at nine inches in height is 25 inches.)



For every six inches the knee clearance goes above the original nine inches minimum height, the knee clearance can be reduced by one 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 nine inches above “shall be considered toe clearance,” according to ADA Section 306. 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 six inches beyond the available knee clearance at nine inches above the finish floor or ground shall not be considered toe clearance,” according to [ADA Section 306](#).



ROOM TO MOVE

7

TURNING AND CLEAR FLOOR SPACE REQUIREMENTS CAN AFFECT AV

TIPS & TECHNIQUES

“

It’s important to make sure cables that run across floors are not barriers to wheelchairs. Wiremold’s OFR Series Overfloor Raceway is one of the only ADA-compliant solutions for applications that require cabling to 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 the floor covering, with no need to alter carpeting, tile, or wood.

”

- Alan Jacobson, CTS
Solutions Engineer
Legrand | AV

Providing plenty of room to move through a space improves access for everyone, including those who have mobility issues, vision impairment, or other challenges with navigating a space. ADA guidelines provide a useful framework for literally clearing the way for a better experience.

Specifically for wheelchairs and mobility scooters, ADA requirements provide detailed guidelines on Turning Space ([Section 304](#)) and Clear Floor/Ground Space ([Section 305](#)).

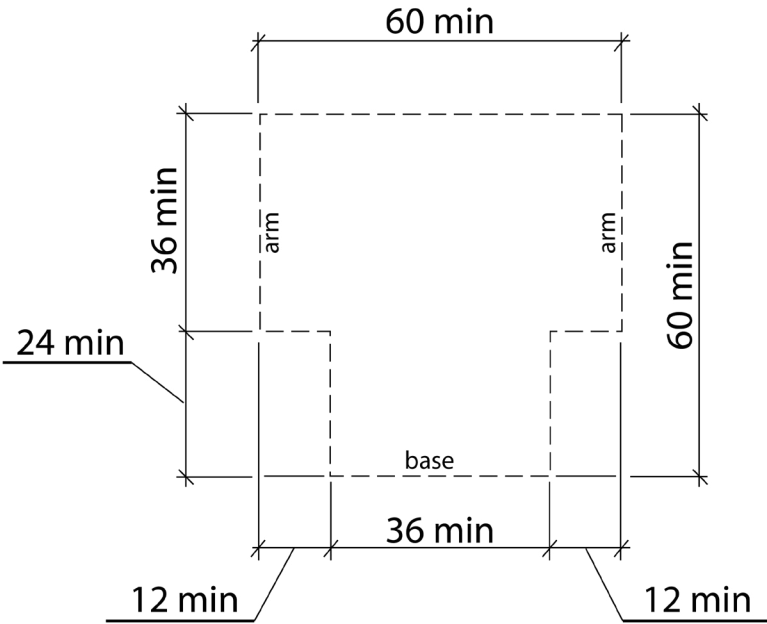
Both sections deal with the required space needed for wheelchair access, and this applies to access to AV components. “People using wheelchairs need to have adequate room to roll up to and depart from AV equipment racks, instructor tables, lecterns, teaching stations, and walls with mounted AV equipment,”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

TURNING SPACE

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.

There are two options for providing adequate turning space:

- **The turning circle** allows enough space for a wheelchair to turn 360 degrees, which means the area 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). And make sure you provide enough knee and toe clearance, as specified in Chapter 6 of this guide.



(Figure 7)

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 any operable parts of the AV equipment they are using.

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. Check with a [Regional ADA Center](#) to get specifics for your location.



PRODUCT SPOTLIGHT



WIREMOLD OFR SERIES AND CONNECTRAC

Section [303.3](#) of the ADA provides specifications for on-floor equipment like raceways. For changes in level between ¼ inch and ½ inch, the slope should not be steeper than 1:2. The Wiremold OFR Series and [Connectrac](#) Kits for both on floor and under carpet cable management solutions bring connectivity to areas where access is needed, without impeding mobility.





8

ADDING ASSISTIVE LISTENING SYSTEMS, CAPTIONING AND VOICE LIFT TO CLEARLY COMMUNICATE

TIPS & TECHNIQUES

“

You can help participants hear important content with amplification and voice lift systems using Vaddio microphones, speakers, and audio DSP. Vaddio also offers several video processing devices that enable picture-in-picture so one can see the presenter and the sign language interpreter in the USB and production video output.

”

- Alan Jacobson, CTS
Solutions Engineer
Legrand | AV

AV technology is all about multisensory communication. Sound and vision are constantly combined with interactive elements so people can present and receive the necessary information they need in the way they prefer. For example, digital signage can provide a complementary source of information when paired with voice announcements delivered by public address systems. If you can't hear an announcement, you can look for the text on a video display.

There's a good reason we seem to understand things better when more than one sense is involved. "Language by its very nature is built on redundancy," said Jeanne Stiernberg, Principal Consultant with Stiernberg Consulting, who is also a speech pathologist and one of the first experts to write about ADA standards for the AV industry. "At every level — phonemes, words, sentences, paragraphs, context — it's just full of redundancy."

And all along the way, your brain is using that extra information to fill in gaps in sound or vision. That's called closure, Stiernberg explained: "So even when you don't hear the whole word, or someone is talking rapidly and smushing sounds together, closure is at work all the time because there are so many clues and cues to pick up on."

When we talk about assistive listening systems (ALS) and closed captioning, we're talking about adding more layers of expression that help everyone enjoy a more complete understanding of what's going on around them. "Assistive listening provides more clues and more cues, and it just provides more redundancy of the whole message so a person can fill in the

gaps much easier," Stiernberg explained. "That means the brain doesn't have to work as hard. By contrast, if you're having a difficult listening situation, you feel tired mentally."

In this age of burnout and so many kinds of fatigue, it's a good idea to make communication easier for everyone. Remember, beyond hearing deficiencies, other "invisible disabilities" can get in the way of understanding. Whether it's cognitive challenges brought on by a stroke or brain injury, ADHD, dyslexia or other neurodivergent sensory factors, or even a language barrier, "sometimes the brain can't fill in those missing parts of speech," Stiernberg noted.

That's where AV can help provide support for all the senses to make sure everyone can understand what's being communicated.



ADDING CAPTIONING

There are many ways to help everyone understand what is being said in a collaboration and learning space. Now that video displays are found in almost any room – or rolled in on mobile carts for extra visual support – there is even more flexibility in sharing the message.

Everywhere, at home or at work, video streaming has made closed captioning an expectation rather than a bonus feature. More people are using closed captioning to make sure they don't miss anything that happens.

"Closed captioning is coming up a lot," said Paul Chávez, Associate, User Experience and Technology Design with the Los Angeles office of [Arup America](#). "In any room with a display, if you can do voice capture and automatic closed captioning for anyone presenting in a room, that is really valuable."

To make that a reality, it helps to think about how you're going to pick up the voices of everyone in a room. Rather than putting microphones on every person, there are new options for steerable room microphones with smart sensing technology to make sure only the person speaking is being picked up. That can help you avoid feedback or a lot of extra room noise in the audio.

That's also important for assistive listening systems that depend on a room audio feed for transmission of speech to individual headsets. Up until now, this type of advanced sound support has always been a consideration primarily in larger learning and collaboration spaces. But now demand is also picking up for smaller rooms, Chávez pointed out, "We've been asked to add audio systems in order to do assistive listening systems in small spaces like university seminar rooms."



We're going to see that trend continue, as rooms of every size add captioning and voice capture to enhance the hybrid experience. "And even if the ADA doesn't require assistive listening support for smaller spaces, people may need it in those rooms, too," Chávez said. "We need to fill in the gaps for closed captioning and auditory enhancement in any scale of room."

TYPES OF ASSISTIVE LISTENING

Assistive Listening Systems (ALS) devices are generally deployed in portable frequency modulation (FM), infrared (IR), and induction loop/T-coil arrangements:

- FM or Radio Frequency (RF) ALS broadcasts signal from the room's microphones and program audio sources to users wearing headsets.
- IR 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 receivers.
- The induction loop/T-coil ALS works by using magnetic strips built into the room's floor to radiate magnetic waves to wire neck loops worn by users. The loops capture and re-radiate the magnetic energy to small copper T-coils within users' hearing-aids (in recent years, far more hearing aids are now equipped with this option). In this way, the sound is delivered directly to their ears without the need for headsets.

For more specifics on the different [types of ALS](#), the Hearing Loss Association of America (HLAA) provides a helpful [Comparison of Large-Area Assistive Listening Systems](#).

ADVANCEMENTS IN HEARING AIDS

Steve Romeo, a retired audiologist and former AV industry executive, provided an update on hearing aid technology:

Signal Processing

“There are two sides to assistive listening — the transmitter and the receiver. The real advances have been made on the receiver side. More and more hearing aids have become technologically advanced to the point where they can work with multiple transmitters. And there’s a lot of very complicated signal processing going on. I used to design sound systems for auditoriums and stadiums, and the signal processing in the hearing aid is easily equal to a full-rack system from five years ago. I mean, we’re talking 31 bands, individual compression and equalization in each band. Some hearing aids use time delay in one ear to help you understand things better. There are directional microphones, so a hearing aid can vary from hypercardioid to omnidirectional depending on the situation. And they do so by sampling the environment about 55 million times an hour.”

Hearing with Both Ears

“There is cognitive research by Vanderbilt University and other experts who have shown that when you hear with both ears, you don’t hear twice as well as with one ear, you hear four times as well. And that’s because the brain uses processing and looks for differences between the two ears, it’s called interaural cross correlation. And the brain uses that to help concentrate on the signal and understand it. But you can’t do that unless you hear with both ears. And that’s one benefit of new technologies that use the combination of the iPhone microphone and hearing aids. If you put the iPhone near the sound source, it gives you a signal that is slightly offset in time relative to the signal from the hearing aid microphone. There is evidence that this time delay helps in speech understanding. Another possible benefit of having the iPhone close to the other talker is the reduction in the adverse effects of room acoustics. In some cases, there is a great improvement in speech understanding gained by turning the hearing aid microphones to off and just listening through the iPhone microphone.”



MADE TO MEASURE

The U.S. Access Board’s report, [Large Area Assistive Listening Systems](#), reveals that in addition to providing an enhanced experience for those with hearing loss, assistive listening systems also make it easier to understand speech for anyone in the audience. ALS can also provide additional support to those whose primary language is different from the one being spoken.

The report’s [Comparisons Between ALS](#) section shows that even those in “favorable” seating locations understand speech better with personal audio support. This may explain the demand for IR receivers, even by those without hearing deficiencies, in theaters and other public venues. If that’s the case, providing ALS for large-area listening environments should be a universal concern.



There is an exception in Section 219 that some might be tempted to use to skip the ALS option. It says, “Other than in courtrooms, assistive listening systems shall not be required where audio amplification is not provided.”

But it’s important to remember the overall ADA requirement, which is: “In each assembly area where audible communication is integral to the use of the space, an assistive listening system shall be provided.”

The goal is to make sure that everyone can hear what is being said in a public space. “Saying that ‘my room doesn’t use microphones, so I don’t need ALS’ won’t cut it,” said Mike Tomei, CTS-D, CTS-I, Owner of Tomei AV Consulting. “People try to fudge this, but you won’t be fooling anyone, least of all the Department of Justice, which enforces the ADA.”

REQUIREMENTS FOR ALS

The ADA expanded its requirements for “[Effective Communication](#)” in 2020, to provide that Title II entities (state and local governments) and Title III entities (businesses and nonprofit organizations that serve the public) take additional steps to ensure effective communication with people who have vision, hearing, or speech disabilities.

From an AV standpoint, the guidelines for effective communication include assistive listening and live-captioning as “auxiliary aids and services.” These 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.

To ensure that hearing-disabled listeners have access to audio enhancement technology in assembly areas, [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.

The following table describes Section 219’s ‘technology to user’ ratio, detailing the number of receivers needed.

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



WHEELCHAIR SPACES IN ASSEMBLY AREAS

9

HAVE ENOUGH SPACES,
AND MAKE SURE
EVERYONE CAN SEE

TIPS & TECHNIQUES

“

Much of the requirements for Sections 221 and 802 are really the responsibility of the architect and/or interior designer. 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 designers need to work closely with architects and interior designers to ensure the sightlines from all wheelchair spaces are ADA compliant.

”

- Mike Tomei, CTS-D, CTS-I
Tomei AV Consulting

When it comes to wheelchair spaces in assembly areas, there are two relevant sections in the ADA standards:

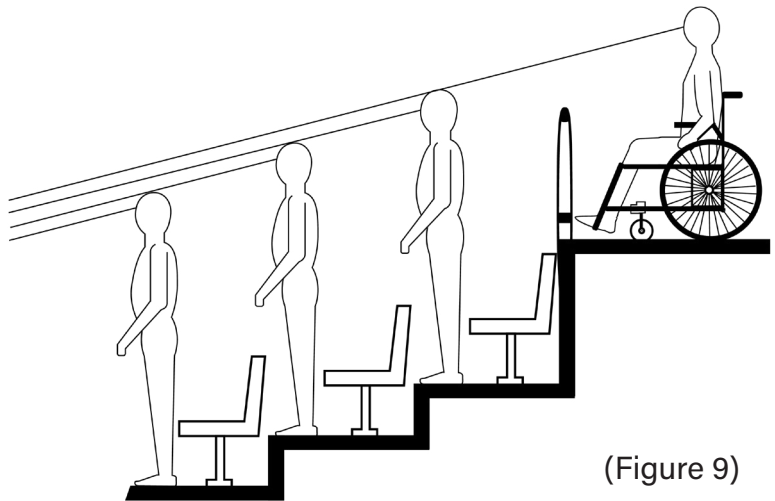
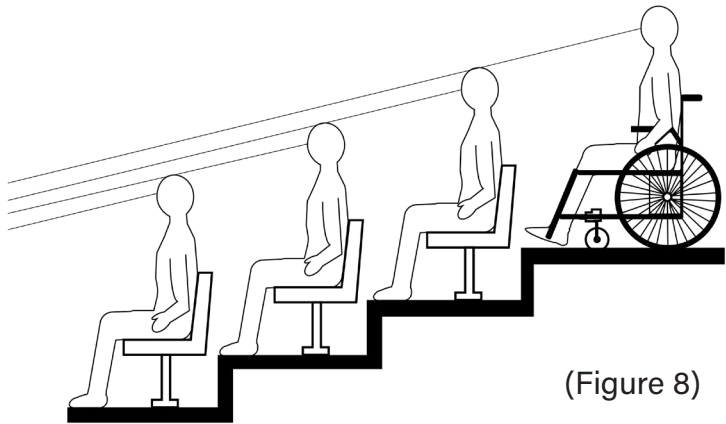
- [Section 221](#) explains the number of wheelchair spaces to chairs in such areas.
- [Section 802](#) details the space requirements and sightlines for people in wheelchair spaces.

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 those seated on the levels below them (Figure 8).

If 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).



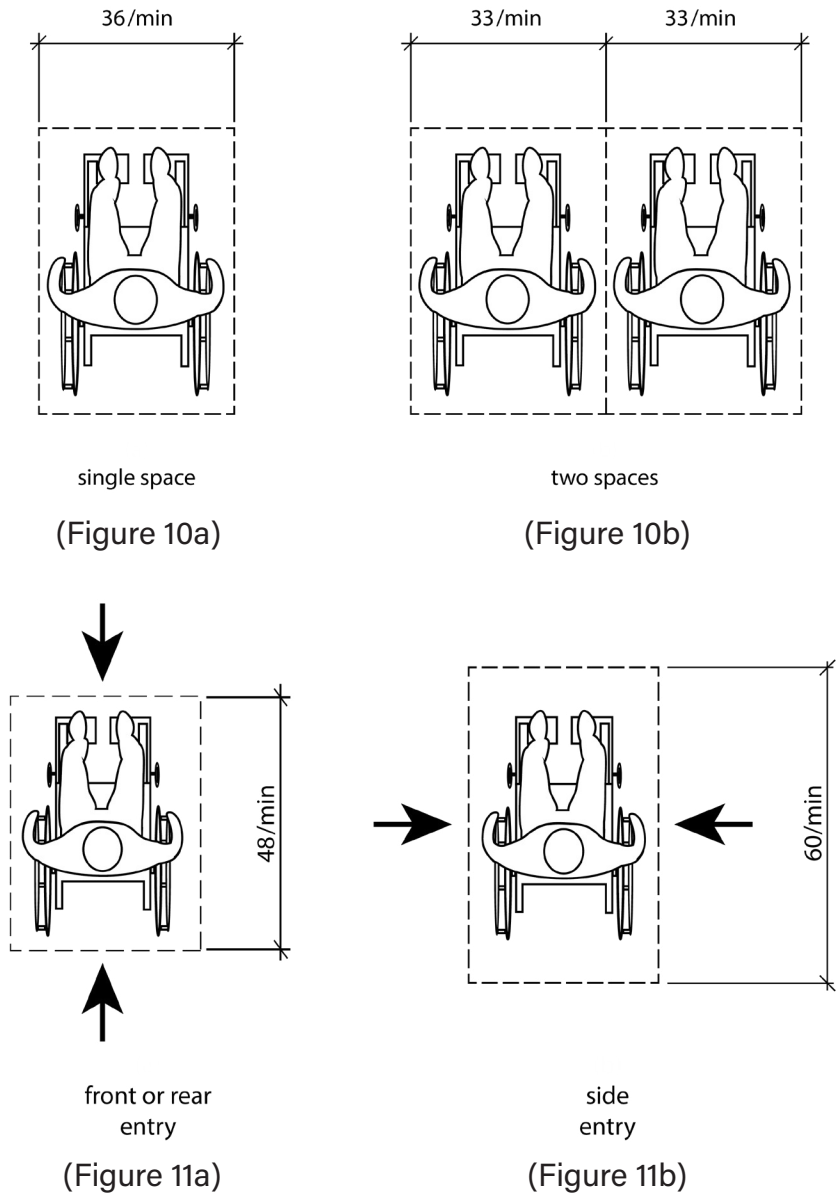
A single wheelchair space must be at least 36 inches wide (Figure 10a).

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).

Placement of wheelchair spaces will be part of the architectural design, but savvy AV designers should check that these areas are ADA compliant and to make sure they don't install any equipment that blocks access.



“

A big part of accessibility and inclusion is making students feel welcome in classroom and collaborative learning spaces. Where possible, design for more possibilities beyond the basic requirements. Create flexibility in a classroom layout so that all students can sit where they choose, not just in limited, designated places.

”

- Julie Johnston, Educause Learning Space Rating System Team Member



WHEELCHAIR SPACE REQUIREMENTS TO KEEP IN MIND

- Wheelchair spaces must be beside, not in, accessible paths and circulation routes. You can't put them in the aisle.
- Seats for companions of wheelchair users have to provide "shoulder alignment with adjacent wheelchair spaces," as stated in 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 surface of the companion seat shall be at the same elevation as the floor surface of the wheelchair space.



MAKING SURE EVERYONE CAN SEE

Legibility of text-based content is key to understanding presentations or course material. And as live captioning becomes an increasingly prominent part of meetings and events, it's especially important to make sure your video displays are capable of presenting clear text for your entire audience.

Applying AVIXA's [DISCAS](#) guidelines can help everyone see visual material more clearly. These guidelines can be used for video displays or projection setups.

"Typically, larger images are needed to provide ideal viewing for everyone in a room, and projection is still going to be the most cost-effective way to accomplish this in larger spaces," said Brian Retzlaff, CTS, Manager, Solutions Engineering, Legrand | AV. "[Da-Lite projection surfaces](#) increase the visual acuity of images, and they allow all viewers to see a larger, clearer image. Adding [Vaddio PTZ camera systems](#) can also make it possible to view content that otherwise might be too small to see."

The flexibility of projection setups can also solve installation challenges, Retzlaff added. "For spaces that might otherwise be too cramped, projection screens that can electrically raise and lower are a great option."



THE FLEXIBLE CLASSROOM

10

ACTIVE LEARNING
INSPIRES AND CONNECTS,
WITH PLENTY OF
ACCESSIBLE OPTIONS

TIPS & TECHNIQUES

“

Add hardware and software accessories to stay connected in the classroom and remotely. Use Vaddio’s [auto-framing camera systems](#) to keep the instructor in view as they move around the room. And provide additional network access to important assistive learning devices with Luxul [WiFi extenders or access points](#).

”

- Brian Retzlaff, CTS
Manager, Solutions Engineering
Legrand | AV

Hybrid learning continues to connect in-classroom and remote educators and students in new ways. To provide the best experience for the maximum amount of instruction and learning styles, there is a growing need for adaptable spaces.

These tech-centric “active learning spaces” support small-group collaboration. Usually arranged with open seating and space for wheelchairs around a table with a video display at one end, this flexible setup makes it easier to communicate – bringing instructors and participants closer together in person or virtually.

Studies have shown that [active learning spaces are a great equalizer](#), giving marginalized groups, including those with disabilities, better access to education. This is vital to meeting the requirements of [Section 504 of the Rehabilitation Act](#) of 1973, which prohibits discrimination based

on disability in any program or activity operated by recipients of federal funds.

Formal and informal education spaces are taking on a variety of shapes and sizes. Now students can gather in tech-enabled social or group study spaces indoors or outdoors, or attend classes and labs in reconfigurable classrooms that easily accommodate flipped classroom learning.

The possibilities are endless, and each learning space will have its own AV requirements. In turn, each has its own ADA compliance considerations.

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](#).”

A FEW KEY TAKEAWAYS

- Ensure that people with disabilities who are required to take online courses have access to the assistive technology and human support they need to complete their studies. Add tools that will allow them to participate and engage with learning equitably with other classmates. This could include text-to-voice software for students with visual impairments and other adaptive design elements that make content accessible.
- If interactivity is a part of the teaching method, students with disabilities must have equal opportunities and the means to interact with teachers and other students. A student or instructor with hearing impairments 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.
- AV designers should think about what teaching methods will be used and figure out which improvements are needed to achieve ADA compliance. Contact your [Regional ADA Center](#) with questions on specific requirements.
- Be ready to have a conversation with educators and administrators to secure the budget necessary for technology that will create a more equitable experience. Remember, ADA is the law.



HIGHER EDUCATION

“Accessibility is about more than compliance with standards. It’s about developing solutions to meet the needs of all users, with and without disabilities.” That’s how the U.S. government begins its look at how Universal Design can be used to improve the experience of anyone. Then it continues, “Universal Design is a concept in which products and environments are designed to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design.”

The principles of Universal Design are truly universal – they’re used everywhere from websites to furniture and architectural design to create a better experience for everyone. When it comes to learning spaces, Universal Design encompasses accessibility. But it can also go further in the tech-enhanced classrooms of today.

From an AV technology and connectivity standpoint, “It’s about ensuring that all classrooms are at a consistent standard, regardless of building or discipline,” said Shannon Dowling, AIA, LEED AP, Principal for Learning Environments Strategy and Design with Ayers Saint Gross.

Dowling was a 2020-2021 Fellow with The Society for College and University Planning (SCUP). During her fellowship, she wrote a report on how physical space can facilitate inclusion and belonging.

In her report, Dowling provided a Playbook for the Planning and Design of Diverse, Equitable, and Inclusive Campus Environments. It offers a set of guidelines that institutions can use to think about their own spaces and how they might improve accessibility. “It’s a way for institutions to learn

some terminology to start the conversation, because a lot of people want to

be more inclusive, but they don’t quite understand how physical spaces can help with that,” Dowling said.

That’s where we get back to Universal Design. In addition to addressing accessibility and inclusivity, it also creates a more equitable learning experience. Too often, it’s the most well-funded colleges within universities that get the best technology experiences. The business schools, medical schools, and other large-endowment targets benefit from being able to purchase the most immersive technology. Meanwhile, the liberal arts and other colleges tend to suffer from a lack of digital learning support.

But as more and more tech-savvy students enroll in universities, we need to start thinking about how to raise the level for every learning space. Especially as expectations for more dynamic learning environments continue to rise in tandem with hybrid learning.

All together, these enhancements improve access and flexibility, and can help learning institutions with ADA compliance.

So how do we make this happen? Start with Educause’s Learning Space Rating System (LSRS), which “provides a set of measurable criteria to assess how well the design of classrooms supports and enables multiple modalities of learning and teaching, especially that of active learning.”

Educause’s annual Horizon Report for 2022 also highlighted a trend toward using technology to support accessibility and inclusivity. Educause is a great source of knowledge on the subject of accessibility and inclusion in learning spaces — particularly with reimagining tech-enhanced hybrid learning spaces.

The good news is, these research organizations are finding that students really do want to be on campus. “That doesn’t necessarily mean they want to be in the classroom,” Dowling said. Rather, it’s the community aspects, or in AV-technology-speak, the collaborative learning opportunities.

“They’re going to campus and still signing up for classes online,” Dowling notes. “So we need to think about the campus as something beyond just a place for college-dictated and teacher-dictated learning. It should really be student-first learning experiences.”



THE NEW COLLABORATION SPACE

11

AV TECHNOLOGY HELPS
MAKE IT POSSIBLE FOR
EVERYONE TO PARTICIPATE

TIPS & TECHNIQUES

“

New collaborative technologies make it easier to share content and include more voices. Make sure everyone in the room and remote participants have the ability to contribute by thinking of the full system. Especially with hybrid conferencing, mount cameras so everyone can be seen. Use all-in-one speakers so everyone can be heard. There are ways to improve accessibility throughout the entire AV system.

”

**- Kathryn Gaskell
Director, Product Management
Legrand | AV**

Now that collaboration can happen almost anywhere, there is a universal expectation for seamless connections. Video meetings, team chats, virtual whiteboards, and webinars are a part of daily life, and in the built environment, AV systems enable everyone to participate from wherever they happen to be joining. Whether it's in the room or in another time zone, make sure everyone has full access to what's being discussed, shared, and ideated on.

In the workplace, this new style of working is changing the shape and style of meeting spaces. Not too long ago, the goal was to fit as many people into an office as possible, which led to open-plan spaces that created acoustic discomfort and distractions. Demand for conference rooms and phone booths was climbing ever higher as people sought quiet places to concentrate.

Now that offices are less crowded, with more people working from home, there is an opportunity to rethink why people want to get together in person. The reasons will be different for every company and its distinct culture. But in most cases, in order for team members to work together and have productive meetings, it's useful to create more types and sizes of gathering spaces that meet many needs. In addition to large-scale conference rooms and town hall meeting areas, there is a need for more “in-between-sized” spaces for individuals to make video calls, or for small-group brainstorming sessions.

INTERFACE DESIGN

Remember to design for optimal reach range for all operable parts in any video-enabled collaboration or learning space. Make sure cameras, microphones, video monitors, speakers, and any control interfaces are accessible to all potential users.

“When it comes to interactive displays, it's important to ensure that everyone has access to content and controls,” said Michelle Montazeri, Manager, Digital Signage, Legrand | AV.

“If a display is in portrait mode, for example, create an interface design with the buttons placed within ADA guidelines for reach range.”

Don't forget to add vision and hearing accessibility options as well. “In collaboration spaces — or any space — consider providing many options for how to interact with each device,” Montazeri added. “Visual cues, voice integration, or mobile integration, which provides the ability to use a personal device to interact, are all possibilities.

When it comes to the content itself, digital signage content creators are looking to Web Content Accessibility Guidelines ([WCAG](#)) to make digital signage and wayfinding material easier to read. “This is driven by content creators who develop their platforms to meet the needs of an expansive audience, from language/translation to visual standards,” Montazeri explained. “Audio also plays a big part in tech equity, and is one of the greater challenges.”

Increased recognition of different working and learning styles is making collaboration spaces more comfortable. Added focus on human-centric design is improving accessibility and addressing the needs of those who are neurodivergent. This places more emphasis on improving acoustics, lighting, sound, and visual elements, which all contribute to a better overall sensory experience – for everyone.

“There has been a noticeable shift toward creating more accommodating and accessible workplaces,” said Jennifer Perry, Access Specialist with the [Northeast ADA Center](#) at Cornell University’s [Yang-Tan Institute on Employment and Disability](#).

“Especially with how everyone’s lives and work environments changed during Covid. There has been a lot of thought about how to accommodate people with disabilities.”

Many AV-related features that improve accessibility are being used more often. Live captioning is used in almost every meeting, and many team members are asking for it because they have seen how it raises the level of comprehension for everyone.

Even as some accessible technologies become more prevalent, there are still others that can be made more readily available. For those who are reluctant to make requests, or who have disabilities that are not readily apparent or visible, it’s important to make it easier to ask for what they need. Accessibility is all about access, after all.

“Employers should have a really obvious, forward-facing accommodation approach,” Perry said. “Let it be known that people can ask for support, and really tout a willingness to accommodate disabilities in any form, so it’s not a hurdle to ask. Then more people would be better inclined to make that request should they need that accommodation.”



KNOW THE CODE

The Federal Communications Commission’s Twenty-First Century Communications and Video Accessibility Act ([CVAA](#)) makes sure that accessibility laws enacted in the 1980s and 1990s are brought up to date with 21st century technologies.

No matter what platform is most popular at the moment, the CVAA requires that captioning and audio descriptions are provided. It covers everything from the cabling to the display, transmission, and recording devices used.

There are also guidelines for controls and user interfaces. Specifically for people who are blind or visually impaired, video programming devices and on-screen text menus must “have a button, key, icon, or comparable mechanism designated for activating closed captioning and audio description.”

CONDUCT ACCESSIBLE MEETINGS, EVENTS, AND CONFERENCES

The ADA National Network's "[Accessible Meetings, Events, and Conferences Guide](#)" offers several tips that can help create a more accessible learning and collaboration experience.

Here's some advice for [Audio Visual Components](#):

Audience Participation

- When wireless microphones and staff are available:
 - Ensure at least two to three staff with wireless microphones are circulating in the crowd during question and answer periods.
 - Instruct speakers and panelists not to answer questions from individuals who are not using a microphone.
 - Be aware that attendees with electrical sensitivities may not tolerate wireless microphones. In this case, ask an event staff member to convey the question via microphone for the attendee.
- When microphones are not available:
 - Place blank cards and pens on each table and tell attendees in advance to use these to write down their questions. Cards can then be collected and speakers can read them into the microphone before answering. Even better, a [document camera](#) can project the question on the screen for multisensory message reinforcement. Plan for staff to assist participants who are not able to write on cards.

Presentations

- Guidelines from the [National Disability Rights Network](#):
 - Use a sans-serif font (e.g., Arial)
 - Use a large font size — at least 22 point
 - Use a dark text font and a light-colored background
 - Text on a slide should have nothing behind it (no watermarks or images)
 - Provide "alternative text" descriptions for all images, pictures, graphics, tables, etc.
 - Check out [Tips for Presenters](#) for more ideas

Videos

- Videos should be captioned. [YouTube Help](#) provides instructions to add subtitles and closed captions.
- If there is no way to have a video captioned, it is best not to use it. If a video without captions must be used, a sign language interpreter or speech-to-text service provider may be able to convey the audible content if given enough time prior to the meeting.

VIDEO MEETINGS

The ADA expanded its requirements for "[Effective Communication](#)" in 2020, to provide that Title II entities (state and local governments) and Title III entities (businesses and nonprofit organizations that serve the public) take additional steps to ensure effective communication with people who have vision, hearing, or speech disabilities.

All of these places must provide what the ADA calls "auxiliary aids and services" to communicate effectively. These include a number of AV technologies. For people who are deaf or hearing impaired, options include assistive listening systems (see Chapter 8), real-time captioning and video remote sign language interpretation for those with hearing disabilities. For those who are blind or have vision loss, consider providing a computer screen-reading program or an audio recording of printed information.

With so many video meetings taking place all day in the workplace, make sure you're within ADA compliance.

Offer one of several options for hearing impaired attendees:

- Real-time closed captioning, either done by machines or humans
- On-site simultaneous sign language interpretation, using a hearing-enabled specialist to translate what is being said into sign language





In the new hybrid reality, employers and educators are taking an inventory of their real estate and redesigning for more collaborative work and learning, which also opens the door for accessibility improvements. Whether it's new construction or figuring out how to use existing rooms in new ways, a bit of planning will help set up the budget for technology and design updates to modernize access for all users.

In education, the interactive, tech-centric modes of remote learning are changing classrooms at an extremely fast pace. "A lot of institutions are struggling with how to do active learning at scale," observed

into flexible multipurpose spaces with ADA standards and accessibility built in. Beyond the boost in engagement and functionality, the evolution has budget and planning benefits as well.

From a real estate perspective, transforming under-utilized lecture halls and other large spaces into divisible rooms maximizes use of the whole building. For larger groups, several rooms can be physically or digitally combined using AV technology. "Then, when those classes aren't in session, instead of a large space being left empty, you have all the small rooms available for use, so you're not doubling up the footprint," Dowling said.

Something similar is happening in the workplace. Now, instead of trying to cram more people into denser spaces, we're trying to make big, empty buildings attractive to team members. To do that, we need to make buildings more connected and accessible, which will attract not only existing team members, but potentially future talent as well.

Conferencing has indelibly changed, and AV systems need to adapt to meet the new realities of the hybrid workplace. Prior to 2020, conferencing spaces were largely designed to be used in person with AV equipment designated to share presentations and brainstorm. With nearly every meeting now including a mix of in-person and remote attendees, designing for ADA has the additional benefit of ensuring everyone in the meeting can be seen and be heard.

Companies that set up an equitable meeting experience show their employees they care about creating a culture of



Shannon Dowling, AIA, LEED AP, Principal for Learning Environments Strategy and Design with Ayers Saint Gross. "Many schools have minimized their use of lecture halls because active learning rooms have been so successful."

This trend is prompting many colleges and universities to divide large rooms

12

BUDGET AND LIFECYCLE PLANNING FOR ADA-COMPLIANT COLLABORATION AND LEARNING SPACES

TIPS & TECHNIQUES

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

Additionally, thorough documentation of ADA-compliant AV equipment and installation specifications/methods "will help in budget conversations with clients who prefer to ignore the law in order to save money," said Mike Tomei, CTS- D, CTS-I, Owner of Tomei AV Consulting.

As a bonus, you create a good foundation for a searchable ADA compliance database.

belonging by putting them first. “We need a better handle on acoustics, lighting, and video in personal workspaces to stay connected in the ways we’ve become accustomed to,” said David Albright, Senior Business Development Manager, Legrand | AV.

Focusing AV design on meeting equity impacts company culture. It can be a brand boost to invest in new collaborative, inclusive designs. “It’s a question of who corporations want to be from the perspective of, ‘Who are we? Are we an innovative company? Do we want to attract smart, innovative people? How does our real estate reflect that?’” asked Scott Walker, President and Founding Partner of Waveguide, an AV, IT, acoustics consulting and design firm that also provides comprehensive AV operations services.

Audio design should be the first concern for a conferencing space for hybrid meetings. Many existing spaces have hard surfaces or open floor plans that can overwhelm the capabilities of microphones to capture clear audio. When one or two people are joining remotely, overlapping dialogue and poor room acoustics make it much more difficult to clearly hear what is being said and for closed captioning systems to perform optimally.

Smart speakers, rolling walls and directional sound masking can work wonders on open office spaces.

By maximizing the experience from anywhere, everyone on the call can be engaged in collaboration on a level playing field. To get to that level, designing for ADA guidelines helps create environments that allow employees to feel valued.

In offices, as well as in schools, smarter buildings and more collaboration support often means more AV. Universally, there’s a move toward larger video displays and 21:9 ultrawide aspect ratios, which provide more screen real estate for showing clearer content, captioning, dedicated ASL interpreter space, and video feeds from remote participants together on a screen. With that in mind, Walker added, “Dealing with ADA compliance is important, to ensure these larger displays are installed within accessibility guidelines.”

More investment is being made in improving the user experience and creating more accessible learning and collaboration spaces. And the AV industry is here to support it.

FIVE CONSIDERATIONS 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 compliance 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 compliance standards, a quick search of your database will indicate non-compliant 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 Voluntary Product Accessibility Template (VPAT) process. A VPAT is a vendor-generated statement that provides information on how a product or service conforms to the [Section 508 Accessibility Standards for Electronic and Information Technology](#) in a consistent fashion and format. Some states also require a [Web Content Accessibility Guidelines \(WCAG\)](#) VPAT for state agency purchases.
- 5

Be sure to check with your [Regional ADA Center](#) to see which specific VPAT applies to your project.



13

ADDING MORE
ACCESSIBILITY
WITH AV

Even with all the hype about AI, the future is human. Especially when it comes to AV, which is built for creating connections between people.

As providers of multisensory technology that improves the experience of hearing, seeing, and participating in technology-enabled interactive experiences, the AV industry has an opportunity to bring human-centric design to collaboration and learning spaces.

The time has come 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 to be ADA compliant, both online and in person, allowing greater access and expanding the collaborative conversation for everyone. AV professionals who comply with the ADA standards not only obey the law, they ensure that everyone has a seat at the table.

ACCESSIBILITY UPGRADES

As larger displays and dual-screen setups are fast becoming the norm, the need for safe and secure mounting solutions is growing. Flexible solutions like mobile carts and adjustable display mounts also increase the need for stability and protective measures. In addition to designing for ADA compliance, make sure you're looking for proof of safety testing, including UL and TUV certification, and seismic rating.

"While displays are getting larger, a lot of the hardware required to support collaboration and learning applications has gotten smaller," said Nathan Bohl, Vice President and General Manager, Legrand | AV. "With these trends, you will see more and more mounting solutions that integrate storage, power, and accessibility to these components near or behind the displays. This prevents the need to route cables and power from other parts of the room, which provides a better and safer environment for the users of those rooms."

Other hardware solutions are increasing accessibility in collaboration and learning spaces:

- Dynamically adjustable mounts allow users to adjust the display, camera and other AV equipment by hand to easily suit the needs of anyone in the room
- Mobile carts allow users to move the display around the room in order to adjust to the usage of that room
- Carts with wide open bases allow easier access for those in wheelchairs and those with vision impairment to easily and safely interact with a touch-panel display
- Height-adjustable solutions let occupants of the room move the display and technology up or down based on the needs of people, whether they are standing, sitting or in a wheelchair
- Larger displays or projection screens give you more ability to adjust font and image sizes for better visibility
- Directional audio can help ensure the audio experience is appropriate for hearing impaired users
- The use of mobile solutions in order to place the technology in the ideal spot for certain audiences is a great way to adjust the space for all types of groups and people



LEARNING ENVIRONMENTS

Online and face-to-face learning modalities have blended together in new and valuable ways since remote learning became a permanent option in more colleges and universities. These changes, according to the [2022 Educause Horizon Report: Teaching and Learning Edition](#), “present institutions with the opportunity to provide educational experiences better fitted to the needs of students for whom traditional classroom experiences and access have been challenging or even impossible.”

To help guide these improvements, there is a metric, also provided by Educause, called the Learning Space Rating System ([LSRS](#)). LSRS contains sections on Physical Inclusion and Universal Design, and also Cognitive Inclusion, which provides specifics on how to create more accessible learning experiences.

The goal is to help everyone, students and instructors, participate fully in learning. Now, with AV technology adding so much flexibility to classrooms, labs, and study spaces, we have an opportunity to rethink how these rooms are built. Julie Johnston, Educause LSRS Team Member, shared ideas for where to begin: “Are we asking the right questions as we design a space? Are we going beyond the minimum? It feels like in the past, ADA and accessibility was just a checkbox. There’s more we can do, and doing more doesn’t necessarily mean more money. It just means better design. Now we can have conversations about Universal Design and create an experience that’s better for everyone.”

Before schools invest in renovating their entire suite of classrooms, they can test these new tools and technologies in a “sandbox” classroom, where faculty from different departments can experiment with new modes of learning.

“These new options are especially needed as schools compete for students and find new ways to attract academics to campus. Even if all their classes are online, students do want to be on campus to socialize and learn with their peers and instructors,” observed Shannon Dowling, AIA, LEED AP, Principal for Learning Environments Strategy and Design with [Ayers Saint Gross](#). “But with all the other alternatives and credentialing pathways out there, and students looking for a real return on investment, we’re going to have to give students high-impact experiences if we want them to actually physically be on campus.”

COLLABORATION SPACES

When it comes to collaboration spaces built for the workplace, flexibility is what everyone wants. While some industries are fully back to the office, many teams are blended between remote and on-site every day.

This presents an opportunity for AV integrators, who can help smooth out the jagged edges of hybrid technology setups. “We’re still in that early-adolescent, awkward phase of hybrid work, because everybody’s in the middle of a lease and people are still trying to make sense of the hybrid workweek,” said Scott Walker, President and Founding Partner of [Waveguide](#). While companies try to make the most of under-utilized real estate, the hope is to make office buildings smarter and more efficient.

“A big driver for smart buildings is, people want to be in the building when most of their team members are there,” Walker said. “So offices need some intelligence to share that information. And then, when people come in, they’ll want to use those same sensors and data to figure out how to book meeting rooms or focused work spaces near them.”

While few companies expect people to come back into the office five days a week, the trick will be figuring out how to lease the right amount of space for the numbers of people who might come in on any given day. “The smart play long-term is to figure out how many people are really coming in, and how much space do we really need?” Walker advised. Hot desking will continue to be an option. And companies might be able to structure which teams come in on which days of the week, coordinating it so teams that need to interact will be there on the same day.

Rather than expecting everyone to come into one big headquarters, the future of offices might actually be a “hub and spoke” model. In order to meet workers where they want to live, rather than requiring them to live in high-cost real estate areas, companies might have several smaller office locations in smaller cities in regions across the country. This again will call for more AV technology.

With people spread out across the country and around the world, hybrid meetings will be a way of life. “All day long, there will be meetings where some people are in the room and some aren’t, and we need to optimize space for that,” Walker said. “Until the 90 million rooms that Frost and Sullivan estimates need to be updated for video meetings get redesigned around the advances in technology that have actually happened, we’re still going to be logging in with individual laptops in a meeting room.

To offer a better solution, more meeting rooms are being built with longer, 21:9 aspect ratio video displays. These ultrawide screens provide plenty of space to have content at the top-middle, with video streams of people along the bottom, and team chat along the side. That may require reconfiguring many meeting rooms, which currently have their video displays on the short wall of the rectangle. When you go to the long wall, a lot of times that wall is made of glass, so projection setups and other flexible options will be needed.



And in the modernist, sleek meeting room designs where clients don’t want to see any technology, Walker said, “Furniture is going to be more important. We need to make the equipment disappear.”

The workplace of the past was built for maximizing space, often to the detriment of human comfort and accessibility. Now offices need to think from the human perspective, and make spaces more inviting to everyone of all abilities and needs. Walker added, “The worst thing you could have is employees who say, ‘Well, I have a really busy day with lots of meetings, so I’ll just stay home.’ Because what day isn’t busy with lots of meetings? The office needs to improve to make the experience better for everyone.”

COMMONLY USED AV SOLUTIONS FOR ADA COMPLIANCE

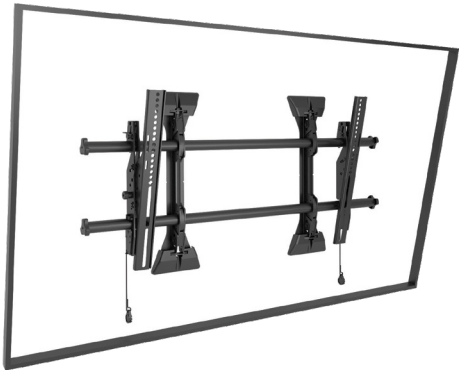
KEY PRODUCTS ARE EASILY INTEGRATED INTO ADA-COMPLIANT AV SYSTEMS

The following AV products and solutions are designed to serve as the building blocks for an ADA-compliant ecosystem. Remember, the sum of the system's pieces can affect the overall adherence to ADA guidelines. For instance, a display can protrude more than 4" if an adequately sized piece of furniture is located directly below it.

LOW-PROFILE WALL MOUNT AND KIOSK SOLUTIONS

Fusion® Tilt and Fixed Mounts

Installer-inspired Fusion® Mounts solve installation problems and offer flexible adjustments for large displays.



Thinstall™ Fixed Mounts

These ultra-low profile static mounts are ideally paired with in-wall storage solutions.



LOW-PROFILE WALL MOUNT AND KIOSK SOLUTIONS

Thinstall™ Swing Arm Mounts

These ultra-low profile swing arm mounts extend for convenient component access. Add a [Thinstall in-Wall Accessory Box](#) to take it down to zero depth.



Impact™ On-Wall Kiosks

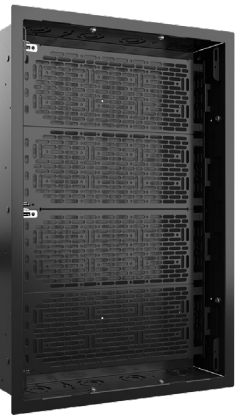
The depth adjustable exterior frame keeps the installation under 4 inches (102 mm) for panels up to 2.75 inches (69 mm) in depth. Available in landscape and portrait orientation.



STORAGE SOLUTIONS

Proximity® Storage Solutions

Proximity solutions provide maximum storage capacity with multi-level, multi-sectioned Lever Lock™ plates. Keep equipment close to where it's needed, yet hidden out of the way.



Proximity® Component Storage Slide-Lock Panel

Facilitate easy, concealed mounting of AV equipment behind displays. The flexible design can be oriented to slide sideways or down for optimal positioning.



MOBILE DISPLAY MOUNTS

FlexView™ Series Carts and Stands

Support extra-large displays with 20 inches (508 mm) of electronic height adjustability in a slim design.



Fusion® Electric Height Adjust Cart

Ideal for interactive applications by increasing accessibility in the boardroom and the classroom with 26 inches (660 mm) of vertical lift.



Voyager Manual Height Adjustable AV Cart

The stylish and compact solution supports flexible conferencing and collaboration, particularly with an interactive display in either portrait or landscape orientation.



FLOOR SUPPORTED DISPLAY SYSTEMS

Tempo™ Flat Panel Floor-to-Wall System

Storage below the display helps meet protrusion requirements and keeps equipment close without cutting into a wall. Compatible with select Chief mounts.



Forum™ Collaboration Suite

Designed for hybrid collaboration, the Forum Display Stand includes a display shroud with acoustic felt to ensure the highest quality audio experience for both in-person and remote audiences.



FURNITURE SOLUTIONS

C3 Series Credenza

The C3 low profile credenza with patented Rackmount and small device storage is ideal for housing equipment. Accessorize with C3 display mounts for a full AV system. This solution can also be used below a projection screen that is more than 4 inches away from the wall to meet ADA protrusion guidelines.



L7 Series Lectern

This elegant, electronic height adjustable lectern comes with configurable storage, power and connectivity.



RACEWAY SYSTEMS

Wiremold Overfloor Raceway

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



Connectrac Express Kits

The Express Kits for both on floor and under carpet hold up to eight CAT-6 data cables as well as a pre-wired conduit to power a quad receptacle for quick installation.



MICROPHONES

CeilingMIC Microphone

CeilingMIC provides excellent coverage for an average size meeting room without any cords or table clutter getting in the way. A built-in digital signal processor cancels echoes and allows voices to be heard clearly.



SOFTWARE

Vaddio Deployment Tool

Access any web-enabled Vaddio device from your preferred device for control, simple adjustments, and troubleshooting.



JOYSTICK CONTROLLER

PCC Premier

The PCC Premier has a full-color touchscreen interface for easy-to-find camera functions, illuminated push buttons for camera selection, a large focus knob for fine control, and a three-axis Hall-effect joystick for smooth precise camera movements. All these controls are browser-based and available through an embedded web server for control anywhere.

CAMERAS

IntelliSHOT® Auto-Tracking Camera

The IntelliSHOT professional camera uses advanced motion-tracking technology to keep a presenter or group of coworkers perfectly framed. 30x zoom allows you to get close to your subject and see small details.



ConferenceSHOT ePTZ Camera

The ConferenceSHOT ePTZ auto-framing camera for video conferencing creates a dynamic, hands-free video experience for hybrid working environments, all in a 2.2 inch deep form factor.

RoboTRAK Presenter Tracking System

This IR lanyard-based camera tracking system provides smooth, accurate motion to follow the speaker as they move around the presentation area, eliminating the need for a camera operator.



DocCAM

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

CAMERA MOUNTS

IN-Wall Enclosures

Vaddio makes IN-Wall Enclosures for its conferencing cameras as well as other manufacturers to meet ADA guidelines.



PROJECTION & FIXED FRAME SCREENS

IDEA™ Screen

The Interactive Dry Erase Application screen features hotspot-free projection and a rigid surface for a superior interactive experience.



UTB Contour

This fixed frame screen features an ultra-thin bezel and low profile. Designed to look like a large flat panel, the UTB Contour can more than double the size of the largest flat panel televisions available.



Tensioned Advantage® with SightLine™

Creates an inclusive environment for videoconferencing with space for attendees and shared content. SightLine cables allow greater flexibility in camera and speaker placement for an optimal experience.

LEGRAND | AV SOLUTIONS ENGINEERING TEAM

Sometimes keeping up with the code and the many nuances that apply to AV can be overwhelming. [The Legrand | AV Solutions Engineering Team](#) can be a great resource for navigating the design process, provide guidance through technical challenges, and research new solutions. Reach out with your questions, and we'll help you improve the experience for everyone.



RESOURCES

- [Americans with Disabilities Act](#)
- [ADA Standards for Accessible Design](#)
- [ADA Title II Regulations](#)
- [ADA Title III Regulations](#)
- [ADA National Network](#)
- [ADA Requirements for Effective Communication](#)
- [ADA Operable Parts Guidelines](#)
- [ADA Work Surfaces Guidelines](#)
- [ADA Protruding Objects Guidelines](#)
- [ADA Knee and Toe Clearance Guidelines](#)
- [ADA Turning Space Guidelines](#)
- [Clear Floor/Ground Space Guidelines](#)
- [Guide to Accessible Meetings, Events and Conferences](#)
- [Making Distance Learning Accessible to Everyone](#)
- [Universal Design](#)
- [21st Century Communications and Video Accessibility Act \(CVAA\)](#)
- [The Learning Space Rating System](#)

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