

6.5 Furniture, Fixtures, Equipment and Contents

6.5.3 Computer and Communication Equipment

6.5.3.4 Televisions and Video Monitors, Wall-Mounted

Wall and ceiling mounted televisions, monitors and projectors are found in many places including homes, classrooms, airports, and hospital rooms.

Provisions

BUILDING CODE PROVISIONS

Seismic loads for wall mounted television and video monitors are determined using ASCE/SEI 7-10, *Minimum Design Loads for Buildings and Other Structures*, (ASCE, 2010) Chapter 13. The principal objective is to prevent the components from falling.

- ASCE/SEI 7-10 requires anchorage for all equipment in Seismic Design Categories D, E, and F weighing over 20 pounds that are mounted over 4 feet above the floor. Lighter items may be exempt if the component Importance Factor $I_p = 1.0$.
- Items that are exempt from the anchorage requirements noted above are still required to be positively anchored to the structure. The anchorage need not be designed or detailed on the construction documents.
- Many proprietary wall mounts will provide adequate protection, if they are rated for seismic loads.

RETROFIT STANDARD PROVISIONS

ASCE/SEI 41-06, *Seismic Rehabilitation of Existing Buildings*, (ASCE, 2007) does not directly address wall mounted television and video monitors. Given the level of risk posed by these components, evaluation for the presence of adequate attachment and support should be performed for all performance levels in high and moderate seismicity areas.

Typical Causes of Damage

- These items may shake, bounce, impact adjacent items, or fall. Wall or ceiling-mounted items can become dislodged and fall from the supporting bracket, the bracket could pull out from the wall or ceiling, or the bracket can break and the television or monitor may be damaged or broken.
- These items are heavy and could cause serious bodily injury if they fall on someone.

EXISTING CONDITION



Figure 6.5.3.4-1 Wall-mounted monitor fell from the bracket in a hospital in the 2010 magnitude-8.8 Chile Earthquake; bracket still anchored to the wall (Photos courtesy of Rodrigo Retamales, Rubén Borosc hek & Associates)

Seismic Mitigation Considerations

- Proprietary video mounting brackets are available to support overhead or wall-mounted televisions, monitors, and screen of all sizes. These come as rigid mount, tilt mount, or motorized mount. Check the internet; some of these products indicate they are seismic rated for safer installations.
- Brackets will not provide seismic protection unless properly installed; follow the manufacturer's installation instructions. It is critical that the lag bolts, screws, or expansion bolts used be installed directly into structural elements such as studs, concrete or masonry wall, or ceiling joists that have adequate capacity to support the additional loading. Do not anchor to gypsum board, plaster or a suspended ceiling grid. See the installation notes in Section 6.6 of this document for more information on anchorage details.
- If the bracket can be adjusted into different positions, make sure it cannot swing and hit a window or light; providing a safety cable or tether to restrict the range of motion may reduce the risk of impact with other objects and the risk of falling.
- Do not locate overhead items directly over a bed, couch, bench, or desk in a classroom where people are likely to be.
- For televisions or monitors resting on furniture or a home entertainment center, heavy-duty safety fasteners or tethers should be used to prevent the television from falling and the furniture should be anchored to the floor or wall.

MITIGATION EXAMPLES



Figure 6.5.3.4-2 Wall-mounted television bracket anchored with sheet metal screws to wall studs at four locations. Bracket must be rated for the weight of television or monitor and that the unit must be securely attached to the bracket (Photo courtesy of Maryann Phipps, Estructure).



Figure 6.5.3.4-3 Mounting plate above ceiling for overhead television bracket in a hospital room. Television or monitor must be securely attached to the bracket (Photos courtesy of Maryann Phipps, Estructure).

MITIGATION DETAILS

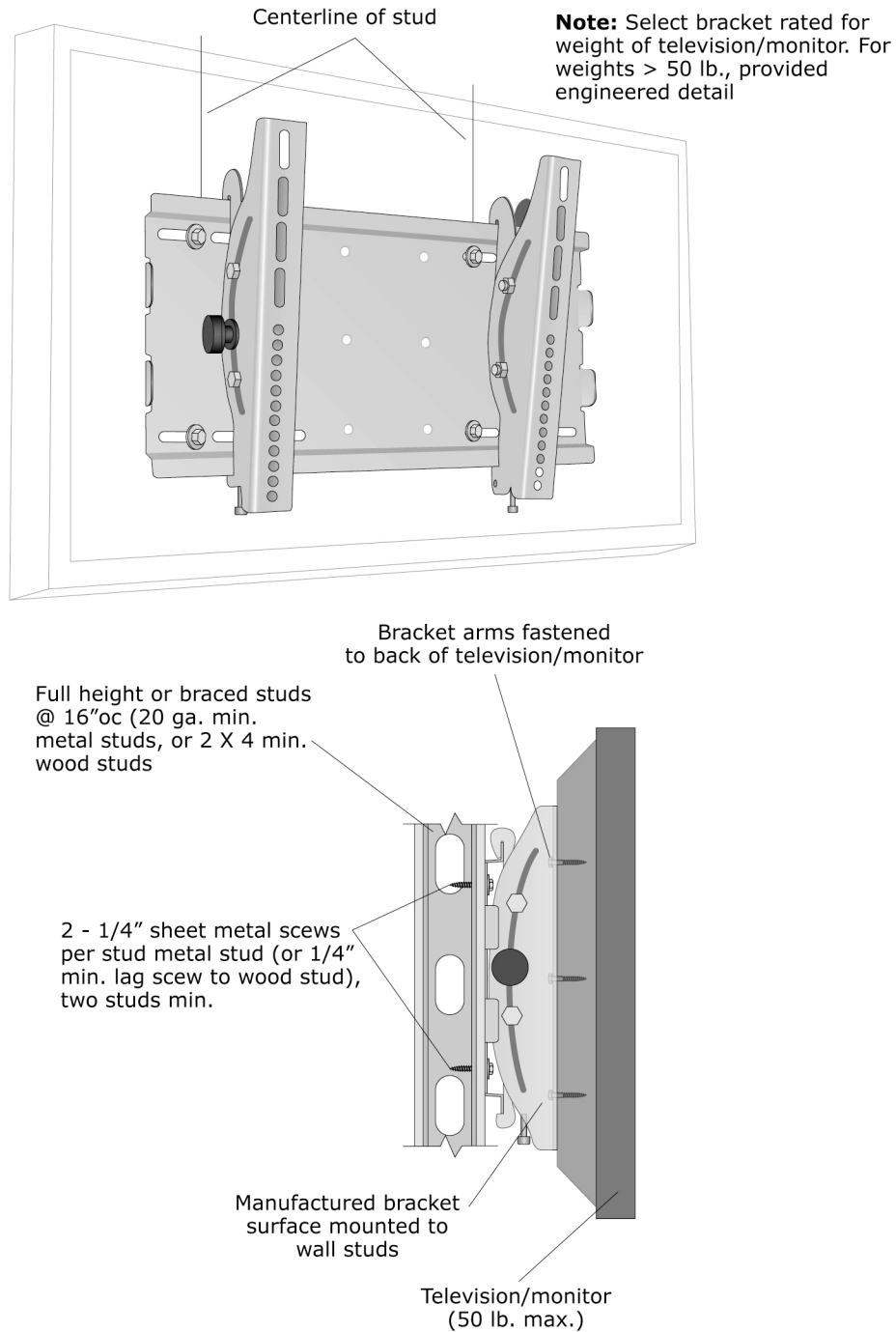


Figure 6.5.3.4-4 Wall-mounted bracket for television or monitor weighing less than 50 lb (NE).