

## Depth Required for Shock-Absorbing Surfacing Materials for Use Under Play Equipment

The following fall heights and depth of loose-fill, impact-attenuating surfacing materials have been shown to reduce the risk of life-threatening head injuries. The depths shown assume the materials have been compressed due to use and weathering and are properly maintained to the given level.

Inches	(Loose-Fill Material)	Protects to Fall Height (feet)
6*	Shredded/recycled rubber	10
9	Sand	4
9	Pea Gravel	5
9	Wood mulch (non-CCA)	7
9	Wood chips	10
* Shredded/recycled rubber loose-fill surfacing does not compress in the same manner as other loose-fill materials. However, care should be taken to maintain a constant depth as displacement may still occur.		

Reproduced from: U.S. Consumer Product Safety Commission (CPSC). 2010. *Public playground safety handbook*. <http://www.cpsc.gov/cpsc/pub/pubs/325.pdf>.

Nine important tips to consider when choosing to use loose-fill materials under play equipment:

1. Loose-fill materials will compress at least 25% over time due to use and weathering (e.g., if the playground will require nine inches of wood chips, then the initial fill level should be twelve inches). Provide a margin of safety when selecting a type and depth of material.
2. Loose-fill surfacing requires frequent maintenance to ensure levels never drop below the minimum depth. Wear mats can be installed to reduce displacement.
3. Provide a method for containing loose-fill materials within the playground.
4. Consider marking equipment supports with the minimum fill level to help with maintaining the required depth of material.
5. Ensure that drainage from the playground is effective. Standing water reduces the effectiveness of the surfacing material by compaction and decomposition.
6. Keep in mind that as the ground freezes in colder months, the safe fall height may be reduced.
7. Never use less than nine inches of loose-fill material except for shredded/recycled rubber (six inches is recommended).
8. Some loose-fill materials may not meet Americans with Disabilities Act accessibility guidelines. Contact the Access Board at <http://www.access-board.gov>, or refer to ASTM F1951.
9. Wood mulch containing chromated copper arsenate (CCA)-treated wood should not be used. Also, consider the possible toxicity of recycled rubber.

**Note:**

The fall height is the maximum height of the structure or any part of the structure for all stationary and mobile equipment except swings. For swings, the fall height is the height above the surface of the pivot point where the swing's suspending elements connect to the supporting structure.

Unitary surfacing materials (such as rubber mats, tiles, or a combination of unitary/loose-fill category materials) and loose-fill surfacing materials should be tested and comply with the ASTM International (ASTM) standard F1292 for impact-attenuation of playground surfacing materials.

The manufacturer of unitary surfacing materials should provide test data to show a match between the fall height of the equipment to be used and the critical height shock-absorbing characteristics of the surfacing materials.

**References:**

U.S. Consumer Product Safety Commission (CPSC). 2010. *Public playground safety handbook*. <http://www.cpsc.gov/cpsc/pub/pubs/325.pdf>.

ASTM International (ASTM). 2009. F1292 – 09: Standard specification for impact attenuation of surfacing materials within the use zone of playground equipment. West Conshohocken, PA: ASTM.