

Comparison of Playground Surfacing Materials

Material Type	Characteristics	Advantages	Disadvantages	Maintenance
Loose Fill Materials				
Sand	<p>A natural, clean and non-packing material. Size, texture and composition of particles may vary. Some sand types may not be appropriate for playground use due to their tendency to compact (pack down) quickly.</p> <p>Should be installed at minimum depth of 12 inches (30 cm). Installation over asphalt or concrete can cause poor impact results. Sub-surface preparation is essential.</p>	<ul style="list-style-type: none"> • Low to medium in cost • Easy to obtain • Easy to install • Not flammable • Some types provide excellent impact-absorption qualities • Does not support microbial growth 	<ul style="list-style-type: none"> • Can be hard to walk on and cannot be used with wheelchairs or other mobility aides • Can be swallowed or get into user's eyes, hair, clothes and shoes • Can hide insects, animal excrement and dangerous sharp objects • Can be thrown, scattered or tracked onto other surfaces • High humidity and freezing temperatures can reduce its effectiveness 	<ul style="list-style-type: none"> • Can have higher ongoing maintenance costs • Requires: <ul style="list-style-type: none"> • Regular inspection • Periodic raking, leveling and sifting of compacted sand • Removal of foreign matter • Periodic addition of sand ("topping up"), annually or at least every 2-3 years • Annual impact testing to ASTM* standards
Pea Gravel	<p>Pea gravel consists of small, clean and rounded particles. Crushed, broken or irregular particle sizes should be avoided.</p> <p>Should be installed at minimum depth of 12 inches (30 cm). Installation over asphalt or concrete can cause poor impact results. Sub-surface preparation is essential.</p>	<ul style="list-style-type: none"> • Low cost • Easy to obtain • Easy to install • Less attractive than sand to animals • Not flammable • Does not support microbial growth 	<ul style="list-style-type: none"> • Can be hard to walk on and cannot be used with wheelchairs or other mobility aides • Can hide insects, animal excrement and dangerous sharp objects • May be swallowed and put in ears or nose • Potential formation of "hard pan" under surface • Can be thrown or scattered and tracked onto other surfaces – on hard surfaces it may contribute to slip-fall injuries • Rainy weather, high humidity and freezing temperatures can reduce its 	<ul style="list-style-type: none"> • Higher ongoing maintenance costs • Requires: <ul style="list-style-type: none"> • Regular inspection • Periodic raking and break-up of "hard pan" under surface, which may decrease its cushioning properties • Removal of foreign matter • Periodic addition of gravel ("topping up"), annually or at least every 1-2 years • Clean-up of adjacent lawns and sidewalks • Annual impact testing to ASTM* standards

			effectiveness	
Material Type	Characteristics	Advantages	Disadvantages	Maintenance
Wood Chips / Bark Mulch	<p>Bark mulch comes from urban tree management and landscaping programs trees. Bark mulch may contain twigs and leaves. Wood chips generally do not contain twigs or leaves. Wood sources should be checked prior to chipping for toxins or allergens.</p> <p>Should be installed at minimum depth of 12 inches (30 cm). Installation over asphalt or concrete can cause poor impact results.</p>	<ul style="list-style-type: none"> • Low cost • Easy to obtain • Attractive natural appearance • Retards insect infestation and fungal growth with its mildly acidic composition • Less likely to be used as play material 	<ul style="list-style-type: none"> • May be swallowed, scattered or thrown into child's eyes • Decomposes and compacts over time • Can conceal animal excrement, dangerous sharp items and other foreign materials • Microbial growth when wet • Can be ignited • High humidity and freezing temperatures can reduce its effectiveness 	<ul style="list-style-type: none"> • Higher on-going maintenance costs • Requires: <ul style="list-style-type: none"> • Regular inspection • Periodic raking • Removal of foreign matter • Periodic addition and replacement of bark/chips; annually or at least every 2-3 years • Annual impact testing to ASTM* standards
Engineered Wood Fibre	<p>More expensive than bark mulch/wood chips, engineered wood fibre is processed new or virgin wood. Contains no twigs, bark or leaves. Wood source should be checked prior to chipping for toxins and allergens.</p> <p>Should be installed at minimum depth of 12 inches (30 cm). Installation over asphalt or concrete can cause poor impact results. Adequate drainage is essential and will lower long-term maintenance costs.</p>	<ul style="list-style-type: none"> • Wheelchair accessible • Fairly durable • Easy to obtain • Less abrasive than sand • Retards insect infestation and fungal growth • Free of bark and leaves • Stays in place better than other loose fill surface material (i.e. sand, pea gravel) 	<ul style="list-style-type: none"> • Initially expensive • Can conceal animal excrement or dangerous sharp items • Microbial growth when wet • High humidity and freezing temperatures can reduce its effectiveness • Decomposes and compacts over time 	<ul style="list-style-type: none"> • Higher on-going maintenance costs • Requires: <ul style="list-style-type: none"> • Regular inspection • Periodic raking • Removal of foreign matter • Periodic addition and replacement of surface material is required; typically every 3-5 years • Annual impact testing to ASTM* standards
Loose Rubber Crumb (Shredded Tires)	<p>Rubber crumb is processed through the grinding up of tire material. For playground use, rubber crumb should be free of metal and/or wires. Suppliers should also be able to confirm that the rubber does not contain</p>	<ul style="list-style-type: none"> • Durable • Easy to install • Not abrasive • Does not support microbial growth • Less attractive to animals 	<ul style="list-style-type: none"> • Can be ignited • Not appropriate for wheelchairs or other mobility aids • Wide variation in quality – may contain wire or metal; may also contain lead or 	<ul style="list-style-type: none"> • Higher ongoing maintenance costs • Requires: <ul style="list-style-type: none"> • Regular inspection • Periodic raking • Removal of foreign matter

	<p>lead, other toxins or allergens, such as latex.</p> <p>Should be installed at minimum depth of 12 inches (30 cm). Installation over asphalt or concrete can cause poor impact results.</p>		<p>other toxins</p> <ul style="list-style-type: none"> • May be thrown or scattered • May hide foreign matter • Can be lodged in ears or nose or dust particles may enter and remain in lungs 	<ul style="list-style-type: none"> • Periodic addition and replacement of surface material is required; annually or at least every 3-5 years • Annual impact testing to ASTM* standards
Material Type	Characteristics	Advantages	Disadvantages	Maintenance
Unitary Synthetic Materials				
Tiles	<p>Synthetic tiles and mats are a combination of a chemical binder and rubber filler. Intertwining strands create a “trampoline effect” that cushions falls.</p> <p>Installation over asphalt or concrete can cause poor impact results without adequate sub-grade. Tiles must be installed according to the manufacturer's instructions and are available in various thicknesses, lengths, colours and patterns.</p>	<ul style="list-style-type: none"> • Wheelchair accessible • Stays in place • Easy to clean • Consistent impact-absorbing qualities • Lower maintenance costs over long term • Decomposes slowly 	<ul style="list-style-type: none"> • Initially expensive • Requires professional installation • May be vandalized or burned • Wide variation in quality • Can become hard over time, tiles may curl on the edges, seams may tend to expand and cause tripping • Must be swept free of dirt and other debris that can collect and decrease its shock absorption • A blower or vacuum may be required to remove debris from air pockets found in tile surface 	<ul style="list-style-type: none"> • Regular inspection for damage and debris • General maintenance involves sweeping, blowing or vacuuming debris from surface • Easy to repair • Does not need replacement unless it has lost its impact-absorbing ability • Annual impact testing to ASTM* standards
Poured-In-Place	<p>Poured-in-place is a seamless synthetic surface that is formed with a chemical binder and rubber filler. Air pockets in the surface create the shock-absorbing properties.</p> <p>Can be installed on concrete or asphalt but must be used at suitable thickness and be well anchored. It is available in a</p>	<ul style="list-style-type: none"> • Wheelchair accessible • Stays in place • Easy to clean • Consistent impact-absorbing qualities • Lower maintenance costs over long term • Decomposes slowly 	<ul style="list-style-type: none"> • Initially expensive • Requires professional installation • May be vandalized or burned • Wide variation in quality • Can become hard over time • Must be swept free of dirt and other debris that can collect and decrease its shock absorption 	<ul style="list-style-type: none"> • Regular inspection for damage and debris • General maintenance involves sweeping, blowing or vacuuming debris from surface • Easy to repair • Does not need replacement unless it has lost its impact-absorbing ability • Annual impact testing to

	variety of patterns and colours.		<ul style="list-style-type: none"> • A blower or vacuum may be required to remove debris from air pockets found in surface 	ASTM* standards
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* **ASTM: American Society for Testing and Materials.** The ASTM standards are referenced in the CSA standard. For all surfacing types, the supplier should provide proof of lab testing to ensure surfacing meets ASTM standards for impact attenuation (impact-absorbing properties from various fall heights). After installation, the surfacing should be field tested to ensure it was properly installed.

Sources:

Calgary Injury Prevention Coalition Playground Safety Committee. "Comparison of Recommended Playground Surfaces." *Soft Landings: A Guide to Safe Playground Surfacing* (brochure). July 2003. Available at: www.calgaryhealthregion.ca/hecomm/IPC/kidsafe.htm

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Saskatchewan Institute on Prevention of Handicaps. "Table 1.2: Recommended Protective Surfacing Materials." *Playground Safety Workshop Resource Manual*. July 2001.

Canadian Standards Association. *Children's Playspaces and Equipment - CAN/CSA-Z614-03: A National Standard of Canada*. June 2003.

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