

ENDURO Rubber Mulch



Rubber Mulch Australia Pty Ltd



PLAYGROUNDS

ENDURO RUBBER MULCH PLAYGROUNDS

PLAYGROUNDS CAN BE A SOURCE OF HAPPINESS FOR OUR CHILDREN HOWEVER, THEY CAN ALSO BE A SOURCE OF INJURY. ASPHALT OR CONCRETE ARE UNSUITABLE FOR USE UNDER PLAYGROUND EQUIPMENT, UNLESS THEY ARE USED AS A BASE FOR A SHOCK ABSORBING MATERIAL SUCH AS RUBBER MULCH. RUBBER MULCH PROVIDES THE MOST SHOCK ABSORPTION THUS PROVIDING PLAYGROUNDS WITH TWICE THE CUSHIONING EFFECT, OVER, SAND, GRAVEL OR WOOD CHIP PRODUCTS . THE ULTIMATE SAFETY NET FOR OUR CHILDS SAFETY IN THE PLAYGROUND. INJURIES FROMS TRIPS AND FALLS, ESPECIALLY FALLS FROM PLAY EQUIPMENT, ARE SIGNIFICANTLY MINIMISED.

ENDURO RUBBER MULCH PLAYGROUNDS



IN PROPERLY MAINTAINED PLAYGROUND APPLICATIONS, RUBBER MULCH WILL REDUCE THE OCCURANCE OF FALL INJURIES. PLEASE NOTE THAT RUBBER MULCH CAN ONLY HELP REDUCE INJURIES FROM A FALL NOT PREVENT THEM.

TWO TYPES OF RUBBER MATERIAL ARE USED IN PLAY AREAS IN TODAYS MARKET. LOOSE FILL AND SOFT FALL. LOOSE FILL CONSISTS OF SHREDS OF RUBBER FROM 1 TO 3 CM IN LENGTH AND DOES NOT CONTAIN ASBESTOS NOR FIBERGLASS AS REINFORCEMENT FIBERS

RUBBER MULCH AUSTRALIA'S RECOMMENDATION IS TO USE PLAYGOUND FLOORING THAT "GIVES" SUCH AS COMPARISON BETWEEN RECYCLED TYRES AND OTHER LOOSE FILL PLAY AREA MATERIALS AT A DEPTH OF 20CM. IT WAS REPORTED THAT RECYCLED RUBBER HAD ROUGHLY TWICE THE CUSHIONING EFFECT OF OTHER MATERIAL.

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CRITICAL HEIGHTS FOR A 15CM UNCOMPRESSED LAYER

WOOD MULCH 1.550m

FINE SAND 1.550m

MEDIUM GRAVEL 2.100m

RUBBER SHREDS 4.200m

THE HIGHER THE HEIGHT, THE SAFER THE MATERIAL

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PLAYGROUND INSTALLATION SPECIFICATIONS FOR RUBBER MULCH

THE FALL ZONE VALUE FOR EARLY CHILDHOOD SETTINGS (WHERE THE CHILD IS SUPERVISED I.E CHILDCARE CENTRES) IS 1.9M FROM THE PERIMETRE OF ANY NON MOVING COMPONENT AND 1.9M FROM THE FURTHEREST EXTENSION OF ANY MOVING COMPONENT. THE FALL ZONE VALUE FOR OTHER SETTINGS, I.E. SCHOOLS, PARKS OR ANY PUBLICLY ACCESSIBLE SETTINGS IS 2.5M FOR ANY NON MOVING COMPONENT AND 2.5M FROM THE FURTHEREST EXTENSION FOR ANY MOVING COMPONENT. USE THESE DIMENSIONS AS A GUIDE AND ONLY WHEN THE VALUE OF ANY EQUIPMENT IS NOT KNOWN.

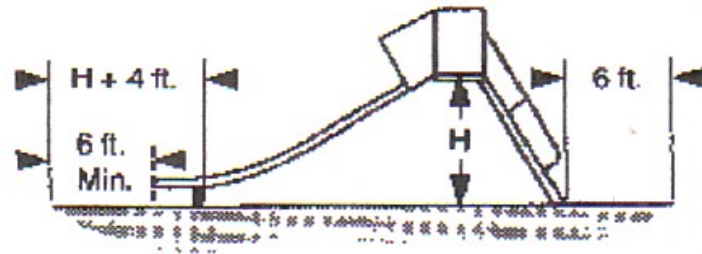
RECOMMENDATIONS FOR FALL ZONE STATIONARY EQUIPMENT

THE FALL ZONE SHOULD EXTEND A MINIMUM OF 2.5m IN ALL DIRECTIONS FROM THE PERIMETER OF THE EQUIPMENT.

SLIDES

THE FALL ZONE FOR SLIDES SHOULD EXTEND A MINIMUM OF 1.9M FROM THE PERIMETRE OF EQUIPMENT IN EARLY CHILDHOOD SETTINGS AND 2.5M FOR ALL OTHER SETTINGS.

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Shaded Area Denotes Fall Zone with Protective Surfacing



Figure 16 Fall Zone for Slides

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SINGLE AXIS SWINGS

BECAUSE CHILDREN MAY DELIBERATELY ATTEMPT TO EXIT FROM A SINGLE AXIS SWING WHILE IT IS IN MOTION, THE FALL ZONE IN FRONT OF AND BEHIND THE SWING SHOULD BE GREATER THAN TO THE SIDES OF SUCH A SWING. IT IS RECOMMENDED THAT THE FALL ZONE MEASURED FROM THE FURTHEREST EXTENSION OF THE SWING IN THE DIRECTION OF MOVEMENT BE 1.9M FOR EARLY CHILDHOOD SETTINGS AND 2.5M FOR ALL OTHER SETTINGS. THE NON MOVING COMPONENT (FRAME) HAS A FALL ZONE MEASURED FROM THE PERIMETRE, 1.9M FOR EARLY CHILDHOOD SETTINGS AND 2.5M FOR ALL OTHER SETTINGS.

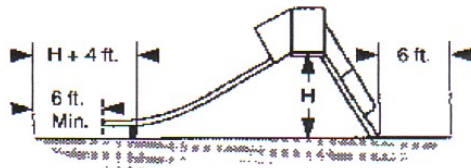
MULTI AXIS SWINGS

THE FALL ZONE SHOULD BE MEASURED FROM THE FURTHEREST EXTENSION IN ALL DIRECTIONS OF THE MOVING COMPONENT. A MINIMUM OF 1.9M FOR EARLY CHILDHOOD SETTINGS AND 2.5M FOR ALL OTHER SETTINGS.

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SPRING ROCKING EQUIPMENT

THE FALL ZONE SHOULD EXTEND A MINIMUM OF 1.9m FROM THE "AREST" PERIMETER OF THE EQUIPMENT . ADJACENT SPRING ROCKERS WITH A MAXIMUM SEAT HEIGHT OF 600mm MAY SHARE THE SAME FALL ZONE.



Shaded Area Denotes Fall Zone with Protective Surfacing

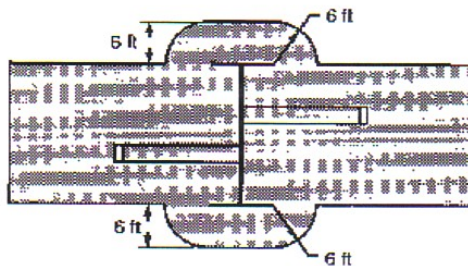
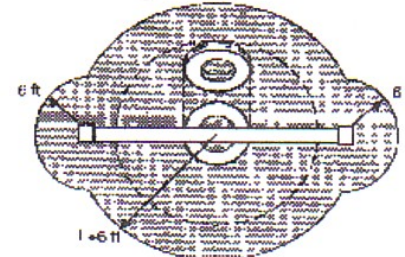


Figure 17 Fall Zone for Single Axis Swings



Shaded Area Denotes Fall Zone with Protective

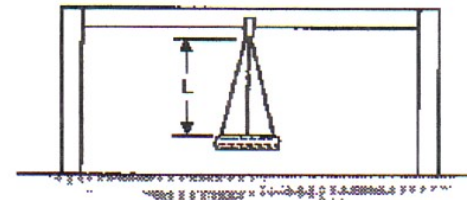


Figure 18 Fall Zone for Multi Axis Tire Swings

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COMPOSITE EQUIPMENT

THE ABOVE RECOMMENDATION FOR INDIVIDUAL PIECES OF EQUIPMENT SHOULD BE USED ONLY AS A GUIDE IN ESTABLISHING THE FALL ZONES AROUND PIECES OF COMPOSITE PLAYGROUND EQUIPMENT

PRODUCT	INSTALL DEPTH	CRITICAL FALL HEIGHT
RUBBER MULCH	200MM	2.4M

WITH PROPER INSTALLATION AND MAINTENANCE, RUBBER MULCH WILL REDUCE FALL INJURIES IN PLAYGROUNDS. HOWEVER, NOTE THAT RUBBER MULCH CAN ONLY HELP REDUCE INJURIES FROM A FALL, NOT PREVENT THEM. THE SURFACE IN THE IMPACT AREA (FALL ZONE) SHALL MEET THE REQUIREMENTS FOR IMPACT ATTENUATION SO THAT THE CRITICAL HEIGHT OF THE SURFACING, ACCORDING TO AS/NZS 4422, SHALL BE EQUAL TO OR GREATER THAN THE FREE HEIGHT OF FALL OF THE EQUIPMENT.

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- **MAINTAINANCE**

LOOSE FILL IS EXTREMELY SUSCEPTIBLE TO SCUFFING AND DISPLACEMENT WHICH MAY RESULT IN THE MATERIAL BECOMING TOO SHALLOW TO PROVIDE THE REQUIRED IMPACT ATTENUATION. THEREFORE, LOOSE FILL SHOULD BE REGULARLY INSPECTED, AND FURTHER FILL ADDED AS NECESSARY, IN ORDER TO ENSURE THE CORRECT DEPTH IS MAINTAINED. IN AREAS WHERE DIPLACEMENT IS PARTICULARLY LIKELY (UNDER SWINGS, OR IN AREAS OF HEAVY TRAFFIC) EXTRA MATERIAL SHOULD BE PROVIDED. **NOTE** : THE PROVISION OF EXTRA MATERIAL DOES NOT REMOVE THE NEED FOR REGULAR INSPECTIONS AND MAINTENANCE.



Has the shock-absorption been tested?

Yes. From the testing performed by RUBBER MULCH AUSTRALIA, the loose rubber mulch complied with the requirements of **AS4422-1996** and **EN1177:2008** at the time of testing in respect to 'G' and HIC values obtained at the fall heights tested. The material tested would be suitable for softfall that required a maximum fall height of 2.4m

Is there any steel content in Rubber Mulch?

No. Rubber Mulch 3cm shreds are smaller than most others. The smaller the shred, the less likely they are to contain embedded steel wire. To ensure that all wire is removed, Rubber Mulch shreds pass through 4 unique, state of the art magnets during the manufacturing process. This extra attention literally ensures no steel content. In fact, Rubber Mulch is guaranteed to be 99.9% steel-free.

Will Rubber Mulch crumble, disintegrate, or decompose?

No. Rubber Mulch shreds are made from 100% recycled tyre rubber. All tyres are made of vulcanized rubber. the vulcanizing process makes the rubber literally indestructible.

Is Rubber Mulch ever dusty or slippery?

No. In addition to promoting almost instantaneous drainage, Rubber Mulch retains small amounts of moisture, which is just enough to prevent the accumulation of dust and slipperiness.

How does Rubber Mulch compare with wood chips?

Wood chips absorb moisture from the soil and is dehydrated by the heat, where as rubber mulch is non porous and does not absorb water on its way through to the soil.

Does Rubber Mulch blow or wash away?

No. Rubber Mulch shreds are too heavy to be significantly affected by normal high winds or heavy rains.

Does Rubber Mulch fade?

No. Carbon black is a pigment which is an element in rubber tyres and is non fading. Coloured mulch can fade after 7-10 years.

How should the play area be prepared?

We recommend the area be prepared ahead of time by clearing the ground of rocks, stumps and other debris, then calculate an area that surrounds the play equipment of 1.9 m to 2.5m (commonly referred to as the "use" or "fall zone").

Is Rubber Mulch Toxic?

No. A carrier solvent more efficient than water would be needed to extract toxic chemicals from tyre shreds in quantity, and a suitable non polar vehicle would be required to penetrate protective skin layers for significant absorption. This was deemed implausible in a playground situation.







TEST RESULTS



WHAT IF RUBBER MULCH IS SWALLOWED

IN 1994 MARYLAND ENVIRONMENTAL SERVICES (MES) PUT THIS QUESTION TO A SERIES OF TESTS. A 2CM PIECE OF MULCH WAS ADDED TO HYDROCHLORIC ACID (stomach acid) AND APPEARED TO INDICATE ONLY FIBROUS REINFORCING STRANDS WERE DISSOLVED. THE RUBBER DID NOT APPEAR TO BE AFFECTED IN ANY WAY.

WHAT DOES THIS MEAN? IF A PIECE OF RUBBER IS SWALLOWED, IT SHOULD NOT CAUSE ANY ACUTE OR CHRONIC PROBLEMS. SHORT TERM ISSUES, SUCH AS AN UPSET STOMACH WILL BE A FUNCTION OF THE AMOUNT OF RUBBER SWALLOWED.

AS TO THE FATE OF THE RUBBER SWALLOWED, THEY ARE EVENTUALLY EVACUATED FROM THE BODY, JUST LIKE ANY OTHER NON DIGESTIVE MATERIAL.

TEST RESULTS

TOXICITY

RUBBER MULCH IS CONSIDERED NON TOXIC. BASED ON TOXICITY CHARACTERISTIC LEACHING PROCEDURE CONDUCTED ON RECYCLED TYRE SHREDS, THE FOLLOWING TRACE METAL ELEMENTS WERE DETERMINED TO BE SIGNIFICANTLY LOWER THAN REGULATORY THRESHOLD LIMITS: ARSENIC , CADMIUM, CHROMIUM, LEAD, SELENIUM, AND SILVER. SOURCE: CRITERIA OF SELECTING TOXICITY CHARACTERISTIC LEACHING PROCEDURE AND SYNTHETIC PRECIPITATION LEACHING PROCEDURE TESTS TO CHARACTERISE SPECIAL WASTES.

ORAL INGESTION IS DEEMED TO BE LOW IN OVER ALL HAZARD BECAUSE INGESTION OF TYRE SHREDS ON THE GROUND IS NOT LIKELY, AND THE GASTROINTESTINAL TRACT IS UNLIKELY TO BE EFFICIENT IN EXTRACTING TOXIC CHEMICALS FROM THE TYRE SHRED. TYRE SHRED DOES NOT CONTAIN CHEMICALS WITH HIGH VAPOUR PRESSURES , THUS, EXPOSURE VIA INHALATION IS DEEMED INCONSEQUENTIAL AND RESULTING HAZARD NEGLIGIBLE. DERMAL EXPOSURE IS DEEMED TO BE UNLIKELY AND THEREFORE TO PRESENT LOW OVERALL HAZARD.

TEST RESULTS

FLAMMABILITY

RUBBER SHREDS WERE TESTED IN 2008 TO DETERMINE WHETHER THIS MATERIAL WOULD BE CONSIDERED FLAMMABLE (a material is considered flammable if it ignites and burns with a self sustained flame at a rate greater than 2mm per second along its major axis).

FROM THESE RESULTS, IT WAS CONCLUDED THAT RECYCLED RUBBER MATERIAL IS CONSIDERED NON FLAMMABLE.

LEACHING

A NUMBER OF STUDIES HAVE BEEN DONE TO DETERMINE THE POTENTIAL FOR LEACHING FROM RECYCLED TYRE SHREDS. INCREASED LEVELS OF ZINC AND IRON WERE FOUND IN SOIL TILLED WITH RAW RUBBER SHRED PARTICLES (5ml and less) WHEN TESTED ANNUALLY FOR 4 YEARS.

THE AMOUNTS DETECTED WERE BELOW LEVELS OF CONCERN AND POSED NO HAZARDS TO WATER QUALITY. NO TOXICITY TO TURF GRASS OR ATHLETIC FIELDS WERE DETECTED. ZINC THAT HAD LEACHED FROM TYRE SHREDS WAS DETERMINED NOT TO POSE ANY POTENTIAL HARM TO THE ENVIRONMENT.

CONFIRMED TEST RESULTS



ZEDCON SCIENTIFIC SERVICES
ABN 21 298 113 838
CONSULTING FORENSIC AND MATERIALS SCIENTISTS

July 20, 2008

Ms Michele Boekelman
PO Box 111
Hillarys WA 6025

Re: Use of Recycled Tyre Rubber as Landscaping Mulch.

In accordance with your instructions, we have reviewed your intended application for recycled ground tyre rubber and understand you are exploring a market involving the use of tyre rubber particles as a groundcover mulch in public and commercial gardens.

Recycled tyre rubber has been extensively used in Australia for many years in a resin-bonded form as sheet and mat in playgrounds and as sports surfaces. It is durable and relatively inert.

Testing carried out by the United States Testing Company Inc has shown that aqueous extracts, or leachates, of ground tyre rubber were found to be of low toxicity at intake dosages as high as 15g/kg. This is consistent with other test authority findings. Current data indicates that human toxicity is likely to be low in the event of oral ingestion. Given that the rubber will be produced in relatively large shavings the potential for oral intake by children can be considered to be low.

The use of recycled tyre rubber has also been approved by the US EPA who recognise the value of such recycling initiatives and who have endorsed the environmental safety of this type of product. There is currently no evidence to suggest that recycled tyre rubber, when used as landscaping mulch, will have any detrimental environmental impact on soils or air quality.

The use of recycled tyre rubber in applications similar to that proposed is a recognised practice, particularly throughout the United States and is widely endorsed by government authorities. We have found no published data to indicate that using rubber granules as mulch will be detrimental to the soil or to plants. Any effect on food crops would need careful investigation but it is understood that the current application is for decorative plantings and playgrounds only.

In summary, the use of recycled ground tyre rubber as a landscaping groundcover and as softfall in playgrounds is an innovative application of an abundant waste material and if used wisely it is a relatively safe product in all aspects. Companies such as Rubber Recycle USA and Target Technologies International Inc in North America have been successfully providing coloured rubber mulch for playground applications since 1996.

We trust this assists in clarifying the issues surrounding your new product.

If you have any queries or if we can be of further assistance then please do not hesitate to contact us.

Dr Armand Zurhaar
BAppSc GradDipChem(WAIT)
MAppSc PhD(Curtin) MRACI CCHEM

AVAILABILITY

ENDURO RUBBER MULCH is available direct from
RUBBER MULCH AUSTRALIA.

**ORDERS OVER 5 TON NEED TO BE PLACED 4
WEEKS BEFORE DELIVERY**

**ALL ENDURO MULCH IS PACKAGED IN 25KG
BAGS.**

BAGS ARE GUSSETED AND CLEAR.

**PALLATIZED BAGS FOR BULK ORDERS WILL BE
200KG WEIGHT. 8 BAGS PER PALLET(M3)**

FREE DELIVERY metro only

MARKETING

- 16-23 APRIL 09 – GARDEN WEEK – PERRY LAKES
- 30 – 1 JUNE 09 – MASTER BUILDERS - CONVENTION CENTRE
- 26-28 AUGUST – MELBOURNE LANDSCAPE - MELB SHOWGROUNDS

- 4 – 7 SEPTEMBER 2009 - CONSCIOUS LIVING EXPO - CLAREMONT
- OCTOBER 2009 – PERTH LOVES EARTH - PERTH
- 11 OCTOBER 2009 - DUNNS GREEN FESTIVAL - WANNEROO
- OCTOBER 2009 – SUSTAINABILITY EXPO - FLOREAT
- OCTOBER 2009 – BUNBURY EXPO - BUNBURY
- 25 OCTOBER 2009 – AUSTRALIA OPEN GARDEN SCHEME - KARNUP
- 1 NOVEMBER 2009 - SPRING IN THE GROVE DAY - NEERABUP
PRIMARY SCHOOL

ENDURO RUBBER MULCH

PRICING

- AVAILABLE ON REQUEST.
- PRICES VARY ACCORDING TO AMOUNTS SUPPLIED.