



ACT
Government

RUBBER IMPACT ATTENUATING SURFACE 08C

MUNICIPAL
INFRASTRUCTURE
TECHNICAL
SPECIFICATION
08 - INCIDENTAL WORKS

Transport Canberra and
City Services

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CONTENTS

1 RUBBER IMPACT ATTENUATING SURFACE 4

1.1 General 4

 1.1.1 Responsibilities..... 4

 1.1.2 Cross references..... 4

 1.1.3 Referenced documents 5

 1.1.4 Interpretation..... 6

 1.1.5 Hold points and witness points 7

1.2 Pre-construction planning 8

 1.2.1 Submissions 8

1.3 Materials..... 9

 1.3.1 Subgrade 9

 1.3.2 Subbase 9

 1.3.3 Drainage 9

 1.3.4 No fines concrete 10

 1.3.5 Rubber softfall..... 10

1.4 Execution 12

 1.4.1 Provision for traffic..... 12

 1.4.2 Site establishment..... 12

 1.4.3 Preparation of subgrade 12

 1.4.4 Installation of granular subbase, no fines concrete base and drainage 12

 1.4.5 Installation of rubber softfall impact base and wear course 13

1.5 Completion 15

2 MEASUREMENT AND PAYMENT16

2.1 Measurement 16

2.2 Pay items 16

LIST OF TABLES

Table 8C-1 Hold point table..... 7

Table 8C-2 Witness points table..... 8

Table 8C-3 Pay items table 16

1 RUBBER IMPACT ATTENUATING SURFACE

1.1 General

General: This Specification comprises the construction of Rubber Impact Attenuating softfall surface, including the provision of drainage and various types of base and/or subbase layers.

Exclusions: This Specification does not include pre formed rubber tiles or synthetic grass, or organic softfall.

1.1.1 Responsibilities

1.1.1.1 Objectives

Requirement: Provide rubber impact attenuating softfall surface for playgrounds as documented and as follows:

- > Achieves or exceeds the required impact attenuation
- > Installed in accordance with the construction tolerances specified
- > Be free from trip hazards
- > Be free from toxic concerns
- > Be UV stable in Australian Conditions
- > Has high anti slip properties

1.1.2 Cross references

General: The following documents are related to this Specification:

1.1.2.1 ACT Legislation

Environmental Protection Act

Work Health and Safety Act

Waste Minimisation Act

1.1.2.2 Specifications

Requirement: Conform to the following:

MITS 00	Preliminaries
MITS 02	Earthworks
MITS 03	Underground services
MITS 06	Concrete kerbs, footpaths and minor works
MITS 09	Landscape
MITS 03I	Subsurface Drainage

1.1.2.3 Design Standards

General: The following Design Standards are related to this Specification:

MIS 21 Recreation Facilities

Attachment B Design acceptance requirements

1.1.2.4 TCCS Reference Documents

General: The following TCCS reference documents are related to this Specification:

- Reference document 04 Protection of public landscape assets
- Reference document 07 Operational acceptance submissions
- Reference document 08 Works as executed quality records
- Reference document 09 Final acceptance submissions
- Reference document 10 Landscape consolidation
- Reference document 11 Drafting Standard for Civil and Landscape works

1.1.3 Referenced documents

1.1.3.1 Standards

General: The following documents are incorporated into this Specification by reference:

- AS 4685 Playground Equipment and Surfacing
- AS 4685.0 Part 0: Development, installation, inspection maintenance
- AS 4685.1 Part 1: General Safety requirements and test methods
- AS 4685.2 Part 2: Additional specific safety requirements and test methods for swings
- AS 4685.3 Part 3: Additional specific safety requirements and test methods for slides
- AS 4685.4 Part 4: Additional specific safety requirements and test methods for cableways
- AS 4685.5 Part 5: Additional specific safety requirements and test methods for carousels
- AS 4685.6 Part 6: Additional specific safety requirements and test methods for rocking equipment
- AS 4685.11 Part 11: Additional specific safety requirements and test methods for spatial network
- AS/NZS 4422 Playground Surfacing – Specifications requirements and test methods
- ISO 7708 Air Quality- Particle size fraction definitions for health related sampling

1.1.3.2 Other Publications

SAPIA Code of Practice for the Installation and Maintenance of Impact Attenuating Surfacing Systems (IAS)
Part 1 – Wet Pour Rubber Safety Surfacing for Playgrounds

Proprietary products: To *TCCS Products previously considered for use list*

1.1.4 Interpretation

1.1.4.1 Abbreviations

General: For the purposes of this Specification the following abbreviations apply:

EDPM: Ethylene propylene diene monomer (M-class) rubber.

SBR: Styrene-butadiene rubber

TPV: Thermoplastic vulcanised

MDI: Methylene diphenyl diisocyanate

UV: Ultra violet

MPa: Megapascal

MMDD: Maximum modified dry density

uPVC: Unplasticised polyvinyl chloride

TCCS: Transport Canberra and City Services

NATA: National Association of Testing Authorities

1.1.4.2 Definitions

General: For the purposes of this work section the definition given below applies:

Critical fall height: The maximum free height of fall for which a surface provides an acceptable level of impact attenuation.

Rubber: Polymeric material, either natural or synthetic that is elastomeric.

Substrate: The surface to which a material or product is applied.

Surfacing: An impact-attenuating surface consisting of one or more material components cast in situ, where the underlying protective properties of the impact surfacing remain constant with consecutive and/or repeated use.

Authorised person: PAP/ Superintendent/Client of the Works

Select Fill: backfill material with known properties and grading placed and compacted in layers

Inadequate foundation material: material beneath or adjacent to the proposed drainage structures with insufficient strength to support the structure and loads on the structure or material with characteristics that would adversely affect the performance or construction.

1.1.5 Hold points and witness points

1.1.5.1 Notice

General: Give notice so that the documented inspection and submissions may be made to the **Hold point table**, the **Witness point table**.

Table 8C-1 Hold point table

Item	Clause title	Requirement	Notice for inspection	Release by
Materials				
8C.1	Polyurethane binder and rubber granules – wear course	Submit information for proposed products	4 weeks prior to commencement of installation	Authorised person
8C.2	Rubber Granules – wear course	Submit information to verify product conformance of rubber granule	4 weeks prior to commencement of installation	Authorised person
8C.3	Rubber Granules – wear course and Impact base	Submit samples	4 weeks prior to commencement of installation	Authorised person
8C.4	Impact base	Submit details to confirm that impact base will achieve requirements	1 week prior to commencement of works	Authorised person
Execution				
8C.5	Compaction - subgrade	Submit information confirming conformance	24 hrs prior to installation of subbase courses	Authorised person
8C.6	Compaction – subbase	Submit information confirming conformance	48 hrs prior to installation of base courses	Authorised person
8C.7	Acceptance of substrate by Installer	Provide certification from rubber softfall installer verifying acceptance of substrate	2 days prior to commencement of rubber impact and wear course	Authorised person
8C.8	Operation and Maintenance Manuals	Submit manufacturers published use, care and maintenance requirements for each type of synthetic surfacing	Prior to Operational Acceptance	Superintendent
8C.9	Warranty documents	Submit Warranty documents	Prior to Operational Acceptance	Superintendent

Table 8C-2 Witness points table

Item	Clause title	Requirement	Notice for inspection
Execution			
8C.1	Sub contractor details	Submit names and contact details of proposed suppliers and applicators	Prior to commencement of installation
8C.2	Laying of Rubber softfall	Allow at least 28 days to elapse when abutting with concrete edges / paths.	At completion of 28 days curing

1.2 Pre-construction planning

1.2.1 Submissions

1.2.1.1 General

Requirement: Use specialist Installers recommended by the material manufacturer. Submit details to verify experience of Installer:

- > Relevant and current trade licenses
- > Current system impact Certificates as per AS4422 to achieve the required impact attenuation
- > Membership of Sports and Play Industry Association Limited and /or list of Referees including contact details
- > WHS policy and Systems and relevant Safe Work Method Statements
- > Product and Public Liability Insurances endorsed for Playground Impact system design and installation
- > Draft Warranty Statements for Product + Installation

This is a **HOLD POINT**

1.2.1.2 Rubber Softfall Sample

Samples: Submit the following samples

- > 150 x 150mm x 15mm thick sample of each colour mix in a bound form as a control
- > 300 x 300mm sample of full depth sample of wear course bound to impact base

Label each sample with:

- > Granule type / brand name
- > Manufacturers colour code reference

This is a **HOLD POINT**

1.3 Materials

1.3.1 Subgrade

1.3.1.1 General

Standard: to *AS 3798 Section 4*

Quality: Clean, stable, free of perishable material and capable of compaction to the nominated density
(Execution)

Re-use excavated material: Only re-use suitable material in conformance with *AS 3798 Clause 4.4*

1.3.2 Subbase

1.3.2.1 General:

Specification: Crusher dust or granular material to conform to this specification.

Maximum particle size: not more than one third of the sub base thickness

Maximum amount passing 75µm sieve: 15%

Material properties: unless noted otherwise, conform to the following:

- > Liquid limit: ≤35% to *AS 1289.3.1.1*
- > Plasticity index: ≤12% to *AS 1289.3.3.1*
- > Linear shrinkage: ≤6% to *AS 1289.3.4.1*

1.3.3 Drainage

1.3.3.1 Drainage Sand

Specification: Type E filter material - To the requirements of *MITS03I Subsurface Drainage*.

1.3.3.2 Drainage Pipes:

Pipe: Conform to the following:

Standard: To *AS2439.1*

Type: 100mm diameter corrugated and slotted to *MITS03I Subsurface Drainage*, and 100mm diameter uPVC solid walled pipe to *MITS 03B Pipe drainage*.

High End riser: Solid, heavy duty cover to fit corrugated slotted pipe, screw fixed with galvanised or stainless steel screws to *Standard detail ACTSD 0302*.

1.3.4 No fines concrete

Specification: Provide No Fines concrete base where detailed to conform to this specification.

Material properties: conform to the following

- > Maximum aggregate size 20mm screen
- > Washed gravel or clean crushed rock
- > 20MPa concrete
- > No sand

1.3.5 Rubber softfall

1.3.5.1 Polyurethane binder

Type: Proprietary 100% MDI moisture curing polyurethane.

Objectives:

- > Be recommended by the manufacturer as suitable for the rubber granule proposed
- > Be within designated shelf life and have been stored appropriately
- > Offer the highest UV protection commercially available, minimising UV yellowing effect
- > Be suitable for the climate conditions throughout product life

Documentation: Submit information confirming above requirements, in addition to:

- > Material Safety Data sheet
- > Binder to granule proportion: Shall be determined by the manufacturer to achieve adequate bonding of granules with recognition of the impact absorption requirement.

This is a **HOLD POINT**

1.3.5.2 Rubber Granules – Wear Course

Standards: AS 4685.0:2017 and AS 4422:2016.

Type: May be of the following types:

Pre coated CSBR:

- > Black granule or 12 mesh shred coated with polyurethane and dispersed liquid pigments in a factory situation
- > Granule size of 1-4mm

EPDM Granule (Ethylene Propylene Diene Monomer):

- > Synthetic manufactured granules
- > Colour completely through the matrix
- > >25% polymer content
- > UV resistance rating for all colours of >5 after 1200hrs in UV-B lamp chamber or equal
- > Tensile strength of >5MPa
- > Granule size of 1-4mm

TPV Granule (Thermoplastic vulcanised):

- > Synthetic manufactured granules
- > Colour completely through the matrix
- > Non porous
- > Flame retardant
- > Minimum 20% polymer content
- > Granule size of 1-4mm

ATP Thermo Plastic Monomer Granules:

- > Synthetic manufactured granules
- > Colour completely through the matrix

1.3.5.3 Rubber Granules – Impact Base

Standard: *AS 4685.0:201*.

Type: 100% recycled granular tyre rubber SBR.

Conformance: Submit information to verify product conformance of the above requirements in addition to:

- > Product data sheets
- > Certificate of authenticity from manufacturer
- > Minimum 5 year product warranty
- > Written documentation stating that the proposed granules and proposed binder are an acceptable system and covered under the warranty.

This is a **HOLD POINT**

1.4 Execution

1.4.1 Provision for traffic

1.4.1.1 General

Requirement: Conform to *MIT S 01 Traffic Management*.

1.4.2 Site establishment

1.4.2.1 Survey

Requirement: Confirm site surface and benchmarks. Conform to *MIT S 00 Preliminaries*.

1.4.3 Preparation of subgrade

1.4.3.1 General

Clearing and Grubbing: To *MIT S 02A Clearing and grubbing*.

1.4.3.2 Detailed earthworks

Excavation and filling: carry out detailed cut and fill as required to achieve the documented design.

Removal of unsuitable material: Remove any soft, weak, saturated or organic material within the top 300mm of the subgrade to *MIT S 02B Bulk earthworks*.

Trimming: trim and shape the subgrade to fall to achieve the documented falls.

Compaction: Compact subgrade to Minimum 98% MMDD.

Requirement: Finished subgrade to have a tolerance of +/-20mm when measured across a 1.5m straight edge. Subgrade is to demonstrate falls to drainage outfalls. Once subgrade has been prepared and tested, there shall be no activities carried out that will compromise level and conformance.

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1.4.4 Installation of granular subbase, no fines concrete base and drainage

1.4.4.1 Subbase

Installation: Install granular subbase in uniform layers without segregation.

Depth: Minimum 100mm with edge thickening as detailed.

Trimming: Trim the subbase to the documented falls, or if not stated, a minimum 2% to slotted subsoil drains.

Compaction: Uniformly compact the subbase to minimum 98%MMDD.

Requirement: Finished subbase to have a tolerance of +/-10mm when measured across a 1.5m straight edge with demonstrated falls to slotted subsoil drains.

This is a **HOLD POINT**

1.4.4.2 Drainage

Requirement: Before commencement, verify that the drainage intent as documented on the design drawings can be achieved to ensure no ponding or holding of water. Mark locations of high end risers. Revise the layout if required to achieve drainage and submit to authorised person prior for approval prior to commencement of work.

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Installation: Install slotted and solid pipe in accordance with design drawings. High end risers shall be installed outside impact attenuating area and include a minimum 100mm wide x 100mm depth concrete edge, flush with top of cover plate.

Connection to Stormwater structures: to the requirements of *MITS 03 Underground services*.

Soakage pit: In the absence of connection to existing piped stormwater system, outfall shall be to a soakage (absorption) pit.

Requirement: Stake location of pit before commencement of excavation.

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Installation: Excavate pit minimum two (2) cubic metres volume or as otherwise detailed. Fill pit with stone ballast, cover with geotextile fabric. Select fill and minimum 100mm topsoil. Finish to match adjacent surface.

1.4.5 Installation of rubber softfall impact base and wear course

1.4.5.1 Delivery and Storage of Materials

Delivery: Deliver, unload and store materials in unbroken manufacturers packaging. Inspect for damage upon delivery. Store in a dry environment and in a location to allow installation of the surfacing without excessive disturbance of the substrate.

Identification: Materials to be marked to easily identify that the product conforms with the requirements of the specification:

- > Manufacturers identification:
- > Product brand name and type and reference number
- > Quantity
- > Batch number
- > Date of manufacture
- > Expiry date

1.4.5.2 Impact Base depth

Impact base depth: Prior to installation provide details that the depth of impact base will achieve the required:

- Setdowns, and
- Impact attenuation properties for each piece of equipment / structures.

This is a **HOLD POINT**

1.4.5.3 Installation of Impact Base and Wear Course

General: Mix and apply components to manufacturers recommendations to produce a uniform, seamless monolithic and impact attenuating surface of required overall thickness.

Acceptance of substrate by Installer: Provide certification from the Installer of the rubber softfall confirming that the surfacing substrate is acceptable for placement of the rubber softfall.

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Adjacent surfaces: Before laying, allow at least 28 days to elapse when abutting with concrete edges / paths.

This is a **WITNESS POINT**

Protection of adjacent surfaces: Mask adjacent pavements/ structures to prevent contamination.

Weather conditions: Schedule installation to occur when weather will not adversely affect installation. Installation must not occur when ambient temperatures are above the minimum recommended by the manufacturer. Cease installation if temperature drops / rises outside these limits. The surfacing system shall not be installed if inclement weather is present or expected.

Primer: Apply a light coating of manufacturer's recommended primer, to ensure good bond is achieved, to:

- > Adjacent edges
- > No Fines concrete substrate
- > Cured impact base

This must remain wet / tacky at all times during installation. If primer dries on concrete edging, lightly buff and reapply.

Joins: Installation must be scheduled so that there are no or minimal cold joints, including between different colours. Where pour of either Impact Base or Wear Course is stopped through weather or programme, edge shall be profiled / keyed and primed in accordance with the Standard Details.

Impact base layer: Mix components and spread evenly over primed substrate to form a uniform layer.

Wearing course: Mix components, ensuring colour mix and colour batches achieve an even colour distribution consistent in both appearance and mix through the profile. Spread evenly over impact base or substrate to form a uniform monolithic surface.

Minimum requirements: Minimum proportion of binder:rubber for wear layer shall be 5 parts binder:1 part rubber granules.

This is a **WITNESS POINT**

Compaction: Progressively tamp to achieve compaction and density to manufacturer's recommendation.

Wearing course Tolerance: Final surface shall be level

- > +/-2mm - Alignment with adjacent edges
- > +/-10mm - When measured across a 3m straight edge.

1.4.5.4 Testing

Testing: refer to *MITS 00 Preliminaries*.

Standard: *AS4422*.

Requirement: Laboratory testing or indicative test results are not acceptable.

Testing laboratory: Test shall be undertaken by a laboratory that fulfils requirements of *AS ISO/ IEC 17025*.

Locations: Test softfall at critical locations and extremities, as per *Table 2.1 of AS4422*.

1.5 Completion

1.5.1.1 Submissions

Work as Executed Records: To *MITS 00B Quality Requirements*.

1.5.1.2 Completion

Requirement: Keep traffic off finished work for a minimum of 48 hours after completion

Rejection: the installed surface may be rejected at completion or any time during the defects liability period for the following:

- > Tripping hazards – lipping exceeds 2mm
- > Inconsistent/ rough finish - Dimples/ pits in finished surface
- > Undulation exceeds 3mm over a 3 metre straight edge
- > Damage incurred during curing period
- > Crumbling/ rubbing off of granules
- > Separation from concrete edging
- > Separation gaps between colour pours
- > Excessive colour fading/ whitening of surface
- > Inconsistent colour/ speckling
- > Inconsistent density of impact attenuation base layer (i.e. noticeable soft / hard spots across surface)
- > Obvious Splitting/ cracking through wear layer

Reinstatement: If work cannot be repaired to the satisfaction of the Authorised person, replace the entire affected surface.

Non compliance: Entire surface is to be replaced if it does not achieve conformance with the minimum testing requirements.

1.5.1.3 Operation and Maintenance Manuals

Requirement: Submit manufacturers published use, care and maintenance requirements for each type of surfacing.

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1.5.1.4 Warranties

Requirement: Warranty shall cover materials and workmanship in the terms of the warranty in the form of interlocking warranties from the supplier and the installer.

Warranty period: Minimum 5 years from date of receipt of TCCS Operational acceptance. Warranty shall cover items listed in Completion, but will exclude vandalism.

This is a **HOLD POINT**

2 MEASUREMENT AND PAYMENT

2.1 Measurement

2.1.1.1 General

Payments made to the Schedule of Rates: To *MITS 00 Preliminaries*, this Specification, the drawings and **Pay items** inclusive.

2.1.1.2 Methodology

The following methodology will be applied for measurement and payment:

- > Allow for all work, materials, testing and quality assurance requirements in each Pay Item.
- > Detailed excavation and preparation of subgrade: to this Specification
- > Removal of unsuitable material: to *MITS 02B Bulk earthworks*
- > Base and Subbase for Rubber softfall: to this Specification
- > Slotted drainage pipe and filter material: to *MITS 03I Subsurface drainage*
- > High end risers: to *MITS 03I Subsurface drainage*
- > Solid uPVC pipe including connections to existing drainage structures: to *MITS 03B Pipe drainage*
- > Soakage pit: Paid under *MITS08B Play Equipment and Organic Surfacing*
- > Impact attenuation testing: to *MITS 00B Quality Construction*
- > Playground compliance audit and testing : to *MITS 00B Quality Construction*

2.2 Pay items

Table 8C-3 Pay items table

Item No	Pay Item	Unit of measurement	Schedule of rates scope
8C.1	Rubber softfall	m ²	All activities associated with detailed excavation/ fill and trim, removal of material, subgrade preparation and compaction, subbase and No Fines concrete base, supply and installation of rubber softfall impact base and wearing layers, including installation of patterns. A separate item shall be included in the contract for each softfall thickness.



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