PA03
Concrete Segmental Pavements - Specifying Guide

CMAA
CONCRETE MASONRY ASSOCIATION OF AUSTRALIA

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Concrete Segmental and Flag Pavements

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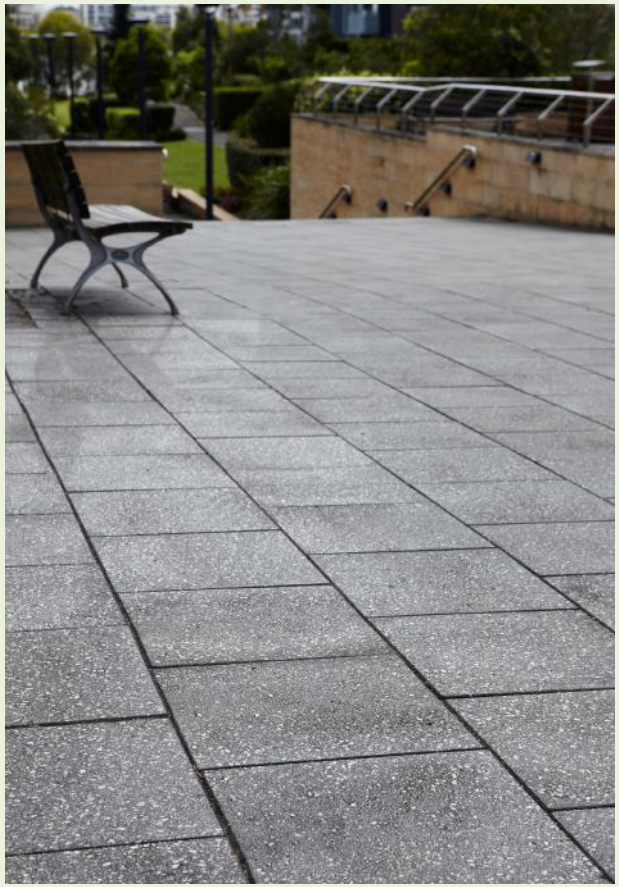
Contents

CONCRETE SEGMENTAL AND FLAG PAVEMENTS
Guide to Specifying

Introduction

To provide specifiers with an understanding of the product, this Guide sets out the requirements for the manufacture of concrete segmental pavers and flags. It takes account of the latest research and development and references Australian Standards AS/NZS *4456 Masonry Units, Pavers, Flags and Segmental Retaining Wall Units – Methods of Test, and AS/NZS 4455.2 Masonry Units, Pavers, Flags and Segmental Retaining Wall Units – Part 2 Pavers and Flags*. Industry design, detailing and construction guides should also be referenced when specifying concrete segmental and flag pavements.



2 DEFINITIONS

- **Abrasion Resistance**
  A measure of resistance to erosion of the surface of a paver or flag, expressed as an index, when tested in accordance with AS/NZS 4456.9.

- **Annual Average Daily Traffic (AADT)**
  The total volume of traffic passing a point in the pavement, in both directions, for one year divided by the number of days in the year.

- **Breaking Load**
  The failure load determined in accordance with AS/NZS 4456.5.

- **Characteristic Value**
  The value that is exceeded by at least 95% of the units in the lot.

- **Commercial Vehicle (CV)**
  A vehicle, having a gross weight of 3 t or more, that complies (in Australia) with State or Commonwealth legislation for the axle load, tyre pressures and dimensions of vehicles permitted on public roads and streets.

- **Dimensional Deviation**
  The deviation from work size of paving units when determined in accordance with AS/NZS 4456.3.

- **Flag**
  Large format solid (non-cored) paver with a gross plan area greater than 0.08 m^2.

- **Light Vehicle (LV)**
  A vehicle which, when fully loaded, has a gross weight less than 3t.
  NOTE: This category includes cars, utilities, delivery vans and some light two-axle trucks.

- **Lot**
  A group of units of a single type with specific characteristics and dimensions presented for sampling at the same time.

- **Paver**
  Solid unit with a gross plan area less than or equal to 0.08 m^2 which is used to form a surfacing layer.

- **Public Space Pavement**

  Pedestrian Pavement
  A pavement subject only to foot traffic. NOTE: Pedestrian pavements include footpaths not subject to vehicle overrun or parking, pedestrian precincts that are completely closed to vehicle access, residential paths, patios and hard landscaping.

  Low-volume Pavement
  A pavement with less than 3,000 pedestrian passes per day.
  NOTE: Low-volume pavements include residential paths, paths in public gardens, pavements at schools or campuses, hard landscape areas, common outdoor areas of residential buildings, and pedestrian areas around institutional buildings, sporting or recreational areas.

  Medium-volume Pavement
  A pavement with greater than 3,000 and less than 30,000 pedestrian passes per day.
  NOTE: Medium-volume pavements are typically suburban shopping area pavements.

  High-volume Pavement
  A pavement with high-volume pedestrian traffic exceeding 30,000 pedestrian passes per day. NOTE: High-volume pavements are typically inner-city and major suburban pedestrian areas and paths.

  Pedestrian and Light Vehicle Pavement
  A pavement carrying pedestrians and light vehicles (LV) only.

  Malls, Pedestrian and Commercial Vehicles Pavement
  An area carrying both pedestrian and mixed vehicular traffic.
  NOTE: This category of pavement includes commercial vehicle crossovers, driveways carrying occasional truck traffic, footpaths subject to truck overrun or parking, pedestrian malls accepting service vehicles and commercial vehicles, pedestrian crossings and lightly trafficked streets.

- **Trafficked Segmental Pavers**

  Minor and Residential
  Trafficked segmental pavers carrying an annual average daily traffic (AADT) less than 400 vehicles.

  Local Access
  Trafficked segmental pavers carrying an annual average daily traffic (AADT) between 400-1,000 vehicles.

  Collector
  Trafficked segmental pavers carrying an annual average daily traffic (AADT) between 1,000-2,000 vehicles.

- **Salt Attack Resistance**
  Resistance to attack by the action of soluble salts, determined by the action of sodium sulphate or sodium chloride, in accordance with AS/NZS 4456.10.

- **Slip Resistance Class**
  A classification of slip resistance as determined in accordance with AS/NZS 4586.

- **Work Size**
  The size of a unit specified for its manufacture, from which deviations are measured.

- **Industrial Pavements**
  Pavements that may be subject to a range of unregulated vehicle types, axle configurations, wheel and tyre pressures.

3 TABLE 1: MINIMUM REQUIREMENTS FOR DIMENSIONS, BREAKING LOAD AND ABRASION RESISTANCE

(Based on Table 2.8 AS/NZS 4455.2)

Pavement applications		Minimum characteristic breaking load * kN		Work size minimum thickness mm		Dimensional deviation category (See Table 2)		Maximum abrasion resistance (mean abrasion index) †		
		Pavers	Flags	Pavers	Flags	Pavers	Flags			
Relevant Australian Standard		AS/NZS 4455.2 AS/NZS 4456.5		AS/NZS 4455.2		AS/NZS 4455.2 AS/NZS 4456.3		AS/NZS 4455.2 AS/NZS 4456.9		
Residential	Pedestrians only (eg paths, patios and outdoor areas)	2	5	40	40	DP0	DPB1	§		
	Pedestrian and light vehicles only (eg driveways, parking spaces and the like)	3	7	40	50	DPB1	DPB2	§		
	Pedestrian and commercial vehicles	5	7	60	60	DPB1	DPB2	§		
								Pedestrian traffic volume		
								Low	Medium	High
Public space	Pedestrians only **	2	5	40	40	DPB1	DPB1	7‡	5.5	3.5
	Pedestrian and light vehicles only	3	7	50	50	DPB2	DPB2	7‡	5.5	3.5
	Pedestrian and commercial vehicles	5	§§	60	§§	DPB2	DPB2	7‡	5.5	3.5
Trafficked segmental pavers	Minor and residential	6	NA	60	NA	DPB2	NA	NA		
	Local access	6	NA	60	NA	DPB2	NA	NA		
	Collector ❋	6	NA	76	NA	DPB2	NA	NA		
Industrial	❋	10	NA	80	NA	DPB2 or DPB3	NA	7		

* At 28 days

† At 90 days

** Where cleaning of pavers and flags is undertaken by mechanical means or where prevention of vehicle entry cannot be guaranteed, the minimum recommended pavers and flags are the 'Pedestrian and light vehicles only' for such pavement applications

§ No abrasion criteria are specified for residential pavers. Abrasion resistance requirements for aesthetic or other purposes shall be specified to the supplier/manufacturer

§§ Flags should be specifically designed for each application – *see PA05 Concrete Flag Pavements – Design and Construction Guide*

NA Not applicable

❋ Shape Type A pavers – dentated pavers that key into each other and by their plan generally interlock and resist relative movement of joints parallel to both the longitudinal and transverse axes of the pavers

Examples of Type A shapes

4 TABLE 2: MAXIMUM DIMENSIONAL DEVIATIONS DETERMINED FOR PAVERS AND FLAGS BY INDIVIDUAL MEASUREMENT

(From Table 2.2(B) AS/NZS 4455.2)

Category	Work size dimensions, mm			
	Plan		Height	
	Standard deviation	Mean	Standard deviation	Mean
DP0	No requirement			
DPB1	2.0	±3.0	3.0	±2.5
DPB2	2.0	±2.5	3.0	±2.0
DPB3	Values declared by the supplier or by agreement between supplier and purchaser			
DPB4	1.5	±2.0	2.0	±2.0

All paving and flag units will be categorised in accordance with AS/NZS 4455.3 Method for Determining Dimensions.

FLAGS – DEVIATION FROM FLATNESS

- **Performance requirement**

  Flags shall be sufficiently flat to enable the units to be laid in pavements to give a functional and aesthetically acceptable surface.

- **Method**

  Flatness of flags shall be determined by measuring bow in accordance with AS/NZS 4456.19.

- **Deemed to Satisfy Flatness**

  Flags with bow not more than 2.5 mm convex deviation and 1.5 mm concave deviation are deemed to be satisfactory.

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