

JAGAS wet cast paving manufacturing & technical specifications

1. Scope This JAGAS specification provides requirements for the manufacture of JAGAS precast flagstones in a range of sizes and thickness for use in the construction of footpaths and other paved areas such as city squares, patios, courtyards, pool surrounds, roof top paving, entrance ways and malls.

2. Cement The cement used in the manufacture of the JAGAS paving slabs shall comply with the following New Zealand standard NZS3122:1974 Portland Cement (ordinary and rapid hardening).

3. Aggregates The fine and coarse aggregate or decorative aggregate shall consist of naturally occurring clean, crushed or uncrushed materials complying with the quality requirements set out in the New Zealand Standard NZS3131.

4. Other Materials Any additional material required to produce special properties such as texture or colour, shall not have any deleterious effect upon the concrete.

5. Finish Special surface finishes may be agreed upon between JAGAS and the purchaser. All edges shall be clean and sharp except for minor chipping as occurs in transit and material handling which shall not be deemed as grounds for rejection. The surface layer shall not be less than 10mm thick and cast as an integral part of the paving slab.

6. Pigments Any pigments used in the colouring of the paving slab shall comply with the New Zealand Standard NZS3117.

7. Casting and Curing The paving slab must be made by a process which ensures the following;

- prevention of segregation of the finer particles of concrete as far as predictable.
 - water/cement ratio between 0.45 and 0.55
- After casting the paving slabs shall be stored so as to prevent undue loss of moisture particularly during the early stages of curing. They will be packaged to minimise damage to decorative faces and reduce any chipping in transit.

40mm thick paving slabs are normally manufactured as a standard run. 20 or 60mm thick pavers are to be specified when required. Other sizes available on request. There is a 1.5 - 2mm taper for demoulding purposes on each side of paving slab.

8. Dimensions and Tolerances

8.1 Paving Slab Dimensions

Type	Size mm at widest point	Available Thickness mm	Maximum limit of manufacturing size	Maximum thickness size limit
A	300x300	20, 40, 60	+/- 2mm	+/- 4mm
B	450x450	20, 40, 60	+/- 2mm	+/- 4mm
C	600x600	40	+/- 2mm	+/- 4mm

8.2 Thickness The average thickness of the twenty values obtained from four measurements on each of the five paving slabs shall be within +/- 4mm of the specified thickness. No individual sample shall exceed +/-5mm

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8.4 Squareness of Plan The difference between the two diagonals measured on the same face of each individual paving slab of the sample shall not exceed 3mm.

8.5 Flatness, Winding and Bowing The maximum deviation from a 550mm straightedge placed in any position on the wearing surface of each individual paving slab of the sample shall not exceed 3mm.

8.6 Chipping Minor chipping in handling and transit will not be grounds for rejection of pavers. Chips must be within the following tolerances to be acceptable as good product:
 < 3 mm onto face
 < 5 mm in from corners
 < 10mm per 300mm length of paver

8.7 Airholes and Voids The maximum size void in the surface of a paver is 5mm diameter. Table 2 indicates acceptable levels of surface voids.

Table 2 - Tolerance levels of Surface Voids

Diameter of Void	Acceptable number
> 5.0mm	No quantity acceptable
2.0 > 5.0mm	1 per 300mm ² ,2 per 450mm ² , 4 per 600mm ²
1.0 > 2.0mm	5 per 100mm ²
0.1 > 1.0mm	30 per 100mm ²
< 0.1mm	Any quantity acceptable

8.8 Cracking and crazing of paving. All steps to reduce shrinkage cracking and crazing will be taken. This will include but not be limited to tight water control in batching process; freshly poured products covered to reduce undue moisture loss; storage indoors for the first 24 hours after casting; and packaging that will reduce further rapid moisture loss while curing. However it must be noted that even with these steps taken all concrete is still subject to these phenomena and will crack over time.

9. Test Requirements When required, the samples shall be taken off at random from the appropriate consignment representing the whole or part of the order. These samples may be taken as required in Clause 12.

10. Manufacturers Certificate The manufacturer shall satisfy himself by regular testing that at the time of delivery the paving slabs comply with the requirements set out in the JAGAS manufacturers specification and if requested shall forward a certificate to this effect to the purchaser or his representative.

The manufacturer shall ensure all product is stamped with the date of manufacture of the paving slabs.

11. Facilities for Sampling The purchaser or his representative shall at all reasonable times, have access to the place where slabs are manufactured or stored for the purpose of examining and sampling the raw materials, testing mix batches, checking finished paving slabs and inspecting the process of manufacture.

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12. Purchaser's Sampling For the checking of the dimensions specified in Clause 8, the purchaser or his representative may check before or immediately after delivery, five sample paving slabs for every order or more provided that sampling does not exceed 2% of that total order and the order is greater than 200m².

13. Sampling for Independent Testing When it is agreed that independent testing as described in Clause 15 is required, the random sample of five paving slabs shall be selected and marked when both the purchaser and the manufacturer or their representative are present.

14. Test Results Four of the five samples tested must comply with the requirements in Clause 8 for the total consignment to be deemed acceptable.

15. Independent Tests If requested by the manufacturer, or the purchaser, independent tests shall be carried out. Such tests could include compressive strength, tensile breaking load, abrasion resistance and would be specified for a particular product at the time of ordering. Table 3 shows results of further testing on certain products for specific areas.

16. Costs of Tests Unless otherwise specified at the time of the enquiry and order, the costs of the independent test shall be borne as follows:

- a. By the manufacturer, in the event of results showing that the paving slabs do not comply with the standard.
- b. By the purchaser, in the event of results showing that the paving complies with the standard.

Table 3 - Technical Specifications

Test		Result	Comments
Compressive Strength (MPa)	Standard Mix	> 40	Using cylinders at 28 days.
	Coloured Mix	> 25	
	Aggregate Mix	> 40	
Transverse Test (kN)	300x300x40	> 11.40	Complies with British Standards for 50mm pavers
	450x450x40	> 9.60	
	600x600x40	> 11.36	
Density (kg/m ³)	Average	2.5	Standard Mix
Abrasion Resistance	Standard Mix	avg 1.7	SCC Tumbler
Abraded Volume (cm ³)	Coloured Mix	avg 2.5	Test
Slip Resistance	Smooth Finish	avg 0.45	Complies with NZS 3116 Table 1 all applications
	Etched Finish	avg 0.63	
	Weathered Finish	avg 0.70	
	Exposed Pebble	avg 0.60	
	Exposed Chip	avg 0.72	