

ATTACHMENT R15A**PAVEMENT MATERIAL SPECIFICATION****LIST OF PRODUCTS**

Identification No.	Source	Mix Design	Product
SPALLS			
SP300	Quarry	No	300 mm Spalls
ROAD BALLAST			
RB100	Quarry	No	100 mm Road Ballast
RB65	Quarry	No	65 mm Road Ballast
RAIL BALLAST			
RAIL50	Quarry	No	50 mm Rail Ballast
RAIL60	Quarry	No	60 mm Rail Ballast
RAIL60S	Quarry	No	60 mm Rail Ballast (steel sleepers)
CLASS 3 RECYCLED PAVEMENT MATERIALS			
PM3/20RG	Recycled	No	20 mm Class 3 Recycled Pavement Material [Grading Based]
PM3/40RG	Recycled	No	40 mm Class 3 Recycled Pavement Material [Grading Based]
PM3/55RG	Recycled	No	55 mm Class 3 Recycled Pavement Material [Grading Based]
PM3/75RG	Recycled	No	75 mm Class 3 Recycled Pavement Material [Grading Based]
CLASS 3 QUARRIED PAVEMENT MATERIALS			
PM3/20QG	Quarry	No	20 mm Class 3 Quarried Pavement Material [Grading Based]
PM3/40QG	Quarry	No	40 mm Class 3 Quarried Pavement Material [Grading Based]
PM3/55QG	Quarry	No	55 mm Class 3 Quarried Pavement Material [Grading Based]
PM3/75QG	Quarry	No	75 mm Class 3 Quarried Pavement Material [Grading Based]
CLASS 2 RECYCLED PAVEMENT MATERIALS			
PM2/20RG	Recycled	No	20 mm Class 2 Recycled Pavement Material [Grading Based]
PM2/30RG	Recycled	No	30 mm Class 2 Recycled Pavement Material [Grading Based]
PM2/40RG	Recycled	No	40 mm Class 2 Recycled Pavement Material [Grading Based]
PM2/20RM	Recycled	Yes	20 mm Class 2 Recycled Pavement Material [Performance Based]
PM2/30RM	Recycled	Yes	30 mm Class 2 Recycled Pavement Material [Performance Based]
CLASS 2 QUARRIED PAVEMENT MATERIALS			
PM2/20QG	Quarry	No	20 mm Class 2 Quarried Pavement Material [Grading Based]
PM2/30QG	Quarry	No	30 mm Class 2 Quarried Pavement Material [Grading Based]
PM2/40QG	Quarry	No	40 mm Class 2 Quarried Pavement Material [Grading Based]
PM2/20QM	Quarry	Yes	20 mm Class 2 Quarried Pavement Material [Performance Based]
PM2/30QM	Quarry	Yes	30 mm Class 2 Quarried Pavement Material [Performance Based]
CLASS 1 RECYCLED PAVEMENT MATERIALS			
PM1/20RG	Recycled	No	20 mm Class 1 Recycled Pavement Material [Grading Based]
PM1/30RG	Recycled	No	30 mm Class 1 Recycled Pavement Material [Grading Based]
PM1/40RG	Recycled	No	40 mm Class 1 Recycled Pavement Material [Grading Based]
PM1/20RM	Recycled	Yes	20 mm Class 1 Recycled Pavement Material [Performance Based]
PM1/30RM	Recycled	Yes	30 mm Class 1 Recycled Pavement Material [Performance Based]
CLASS 1 QUARRIED PAVEMENT MATERIALS			
PM1/20QG	Quarry	No	20 mm Class 1 Quarried Pavement Material [Grading Based]

Identification No.	Source	Mix Design	Product
PM1A/20QG	Quarry	No	20 mm Class 1 Heavy Duty Quarried Pavement Material
PM1B/20QG	Quarry	No	20 mm Class 1 Heavy Duty Quarried Pavement Material
PM1/30QG	Quarry	No	30 mm Class 1 Quarried Pavement Material [Grading Based]
PM1/40QG	Quarry	No	40 mm Class 1 Quarried Pavement Material [Grading Based]
PM1/20QM	Quarry	Yes	20 mm Class 1 Quarried Pavement Material [Performance Based]
PM1/30QM	Quarry	Yes	30 mm Class 1 Quarried Pavement Material [Performance Based]

STABILISED PAVEMENT MATERIAL

Refer clause R15.8 under “General” for examples of nomenclature for this class of pavement material.

SEALING AGGREGATE

SA20-14	Quarry	No	20/14 mm Sealing Aggregate
SA16-10	Quarry	No	16/10 mm Sealing Aggregate
SA14-10	Quarry	No	14/10 mm Sealing Aggregate
SA10-7	Quarry	No	10/7 mm Sealing Aggregate
SA7-5	Quarry	No	7/5 mm Sealing Aggregate
SA5-2	Quarry	No	5/2 mm Sealing Aggregate

SAND

Sa – A	Quarry/Pit	No	Type A Sand
Sa – B	Quarry/Pit	No	Type B Sand
Sa – C	Quarry/Pit	No	Type C Sand
Sa – D	Quarry/Pit	No	Type D Sand

ASPHALT AGGREGATE

Refer to the relevant Product Information Sheet for requirements of Source Materials and Product Quality Control.

MINERAL FILLER FOR ASPHALT, OTHER THAN HYDRATED LIME

Refer to the relevant Product Information Sheet for requirements of Product Quality Control.

ADDITIONAL REQUIREMENTS FOR BASIC IGNEOUS SOURCE ROCK

ARRESTOR BED MATERIAL

SPALLS**SOURCE MATERIALS**

Source materials must be natural quarried material and must be free from laminations or weak cleavages and of such character that they will not disintegrate from the action of the sea, sand or weather. No recycled material is permitted to be included.

PRODUCT QUALITY CONTROL

TEST PROCEDURE	MANUFACTURING TOLERANCE	
QUALITY CONTROL TESTS		
Particle Size Distribution AS 1141.11	Product	300 mm Spalls SP300
	Sieve Size (mm)	Percent Passing
	300	100
	125	0 – 30
	75	0 – 2

NOTES:

1. For all materials specifications, square aperture sieves conforming to AS 1152 "Specification for Test Sieves" shall be used for the determination of grading for particle sizes 75 mm and finer. Coarser sizes shall be determined by linear measurement.

ROAD BALLAST**SOURCE MATERIALS**

Source materials must be natural quarried material. No recycled material is permitted to be included.

PRODUCT QUALITY CONTROL

TEST PROCEDURE	MANUFACTURING TOLERANCE		
QUALITY CONTROL TESTS			
Particle Size Distribution AS 1141.11	Product	100 mm Ballast RB-100	65 mm Ballast RB-65
	Sieve Size (mm)	Percent Passing	
	125	100	
	106	90 – 100	
	75		100
	63		95 – 100
	53		40 – 70
37.5	0 - 5	0 – 15	
19		0 – 2	
AS1141.23	LA Abrasion Grading 'A'	Maximum 45%	

NOTES:

- For all materials specifications, square aperture sieves conforming to AS 1152 "Specification for Test Sieves" shall be used for the determination of grading for particle sizes 75 mm and finer. Coarser sizes shall be determined by linear measurement.

RAIL BALLAST**SOURCE MATERIALS**

Source materials must be natural quarried material and must not include recycled material or metallurgical slag. River gravel or crushed river gravel shall not be used as railway ballast because of the poor interlock between the rounded faces of the water worn rock. All testing be undertaken on representative ballast samples and not the source rock within the quarry. The sampling procedure must ensure that the samples are representative of the materials supplied and have not been affected by segregation during handling and transport.

PRODUCT QUALITY CONTROL

TEST PROCEDURE	MANUFACTURING TOLERANCE			
QUALITY CONTROL TESTS				
	Product	RAIL50	RAIL60	RAIL60S (Used under steel sleepers)
Particle Size Distribution AS 1141.11	Sieve Size (mm)	Percent Passing		
	63	100	100	100
	53	70 – 100	85 – 100	95 – 100
	37.5	70 – 100	20 – 65	35 – 70
	26.5	-	0 – 20	15 – 30
	19	40 – 60	0 – 5	5 – 15
	13.2	-	0 – 2	0 – 10
	9.5	10 - 30	-	0 - 1
	4.75	0 - 20	0 - 1	-
	1.18	0 - 10	-	-
0.075	0 - 1	0 - 1	0 - 1	
AS 1141.4	Bulk Density	Minimum 1200 kg/m ³		
AS 1141.6.1	Particle Density	Minimum 2500 kg/m ³		
AS 1141.22	Wet/Dry Strength ⁽²⁾	Minimum 150 kN Wet Strength, Maximum 30 % Wet/Dry Strength Variation		
AS 1141.23	LA Abrasion Grading B ^(3,4)	Track carrying < 6 Mt (gross) per annum: Max 30% Track carrying >6 Mt (gross) per annum: Max 25%		
AS 1141.14 ^[3]	Mis-shapen Particles % ⁽⁵⁾	Max 30 %		

NOTES:

1. Refer to Clause R15.9 "Rail Ballast" for further details.
2. Samples must be prepared from an appropriately sized fraction of ballast from delivered lots. Wet/Dry Strength testing must be carried out on the fraction of material passing 26.5mm sieve and retained on 19mm sieve.
3. Los Angeles testing must be carried out on the fraction of ballast passing 19mm sieve and retained on 9.5mm sieve.
4. In accordance with AS 2758.7, the ballast itself may be crushed to provide an appropriately graded test within the size range for Los Angeles Testing only.
5. Misshapen particles must be determined on the fraction of ballast retained on the 9.5 mm test sieve using a 2:1 Calliper Ratio. The report must indicate each of % flat, elongated, and flat and elongated particles.

CLASS 3 RECYCLED PAVEMENT MATERIAL [GRADING BASED]**SOURCE MATERIALS**

Source materials may be quarried material, reclaimed concrete or any combination of them. Supplementary source materials may comprise brick, tile and asphalt. Asbestos or asbestos fibre must not be incorporated into the product under any circumstances. No more than 20% by mass of supplementary materials may be incorporated and the constituent proportions must remain unchanged during production.

PRODUCT QUALITY CONTROL

TEST PROCEDURE	MANUFACTURING TOLERANCE				
QUALITY CONTROL TESTS					
	Product	20 mm Class 3 PM 3/20RG	40 mm Class 3 PM 3/40RG	55 mm Class 3 PM 3/55RG	75 mm Class 3 PM 3/75RG
Particle Size Distribution TP134	Sieve Size (mm)	Percent Passing			
	75				100
	53		100	100	75 – 95
	37.5		90 – 100	75 – 95	
	26.5	100			50 – 75
	19	90 – 100	60 – 85	50 – 75	
	13.2				
	4.75	40 – 65	25 - 50	20 – 45	20 – 40
0.075	5 – 15	3 - 11	3 - 11	3 - 11	
AS 1289.3.1.2 AS 1289.3.3.1 AS 1289.3.4.1	Liquid Limit Plasticity Index Linear Shrinkage	Maximum 35% Maximum 15% Maximum 8%			
RMS T276 RMS T276 AS/NZS 2891.3.3	Type II Foreign Materials Type III Foreign materials excluding bitumen Bitumen Content	Maximum 1% Maximum 0.5% Maximum 1%			
AS 1141.23	LA Abrasion Grading 'A'	N/A	Maximum 45%		
AS 1141.23	LA Abrasion Grading 'B'	Max 45%	N/A		

CLASS 3 QUARRIED PAVEMENT MATERIAL [GRADING BASED]**SOURCE MATERIALS**

Source materials must be natural quarried material. No recycled material is permitted to be included.

PRODUCT QUALITY CONTROL

TEST PROCEDURE	MANUFACTURING TOLERANCE				
QUALITY CONTROL TESTS					
	Product	20 mm Class 3 PM 3/20QG	40 mm Class 3 PM 3/40QG	55 mm Class 3 PM 3/55QG	75 mm Class 3 PM 3/75QG
Particle Size Distribution TP134	Sieve Size (mm)	Percent Passing			
	75				100
	53		100	100	75 – 95
	37.5		90 – 100	75 – 95	
	26.5	100			50 – 75
	19	90 – 100	60 – 85	50 – 75	
	13.2				
	4.75	40 - 65	25 - 50	20 - 45	20 - 40
0.075	5 - 15	3 - 11	3 - 11	3 - 11	
AS 1289.3.1.2 AS 1289.3.3.1 AS 1289.3.4.1	Liquid Limit Plasticity Index Linear Shrinkage	Maximum 35% Maximum 15% Maximum 8%			
AS 1141.23	LA Abrasion Grading 'A'	N/A	Maximum 45%		
AS 1141.23	LA Abrasion Grading 'B'	Max 45%	N/A		

NOTE: 1. Blast furnace slag can be substituted for quarried material subject to Part R15 Clause 6.

CLASS 2 RECYCLED PAVEMENT MATERIAL [GRADING BASED]**SOURCE MATERIALS**

Source materials may be quarried material, reclaimed concrete or any combination of them. Supplementary source materials may comprise brick, tile and asphalt. Asbestos or asbestos fibre must not be incorporated into the product under any circumstances. No more than 20% by mass of supplementary materials may be incorporated and the constituent proportions must remain unchanged during production.

PRODUCT QUALITY CONTROL

TEST PROCEDURE	MANUFACTURING TOLERANCE [Grading Based]			
QUALITY CONTROL TESTS				
	Product	20 mm Class 2 PM 2/20RG	30 mm Class 2 PM 2/30RG	40 mm Class 2 PM 2/40RG
Particle Size Distribution TP134	Sieve Size (mm)	Percent Passing		
	53			100
	37.5		100	90 – 100
	26.5	100	90 – 100	74 – 96
	19	90 – 100	77 – 95	62 – 86
	13.2	74 – 96		
	9.5	61 – 85	51 – 75	42 – 66
	4.75	42 – 66	35 – 57	28 – 50
	2.36	28 – 50	24 – 44	20 – 39
	0.425	11 – 27	9 – 22	8 – 21
0.075	4 – 14	4 – 12	3 – 11	
AS 1289.3.1.2 AS 1289.3.3.1 AS 1289.3.4.1	Liquid Limit Plasticity Index Linear Shrinkage	Maximum 28% Minimum 1% - Maximum 8% Maximum 4%		
AS 1141.23	LA Abrasion Grading 'A'	N.A.	N.A.	Maximum 45%
AS 1141.23	LA Abrasion Grading 'B'	Maximum 45%	Maximum 45%	N.A.
RMS T276	Type II Foreign Materials	Maximum 1%		
RMS T276	Type III Foreign Materials excluding bitumen	Maximum 0.5%		
AS/NZS 2891.3.3	Bitumen Content	Maximum 1%		

CLASS 2 RECYCLED PAVEMENT MATERIAL [PERFORMANCE BASED]**SOURCE MATERIALS**

Source materials may be quarried material, reclaimed concrete or any combination of them. Supplementary source materials may comprise brick, tile and asphalt. Asbestos or asbestos fibre must not be incorporated into the product under any circumstances. No more than 20% by mass of supplementary materials may be incorporated and the constituent proportions must remain unchanged during production.

NOMINATED MIX DESIGN PARAMETERS

TEST PROCEDURE	MIX DESIGN LIMITS		
QUALITY CONTROL TESTS			
Particle Size Distribution TP134	PRODUCT	20 mm Class 2 PM 2/20RM	30 mm Class 2 PM 2/30RM
		Sieve Size (mm)	Percent Passing
	37.5		100
	26.5	100	90 – 100
	19	90 – 100	80 – 95
	2.36	30 – 60	25 – 55
	0.075	5 – 20	5 – 20
AS 1289.3.1.2 AS 1289.3.3.1 AS 1289.3.4.1	Liquid Limit Plasticity Index Linear Shrinkage	Maximum 30% Minimum 1% - Maximum 10% Maximum 5%	
TP183 TP183 AS 1141.23 TP184	Resilient Modulus Deformation LA Abrasion Grading 'B' Triaxial Compression	Minimum 250 MPa Maximum 10^{-7} Contractor Nominated Value Cohesion Max 250 kPa, Friction Angle Min 40°	
RMS T276 RMS T276 AS/NZS 2891.3.3	Type II Foreign Materials Type III Foreign Materials excluding bitumen Bitumen Content	Maximum 1% Maximum 0.5% Maximum 1%	

PRODUCT QUALITY CONTROL

TEST PROCEDURE	MANUFACTURING TOLERANCE	
Particle Size Distribution TP134	Sieve Size (mm)	Percent Passing
		37.5
	26.5	0 (PM2/20), +/-6 (PM2/30)
	19	+/-6
	9.5	+/-9
	2.36	+/-8
	0.075	+/-3
AS 1289.3.1.2 AS 1289.3.3.1 AS 1289.3.4.1 AS 1141.23	Liquid Limit Plasticity Index Linear Shrinkage LA Abrasion Grading 'B'	+3 +2 +1 +3

CLASS 2 QUARRIED PAVEMENT MATERIAL [GRADING BASED]**SOURCE MATERIALS**

Source materials must be natural quarried material. No recycled material is permitted to be included.

PRODUCT QUALITY CONTROL

TEST PROCEDURE	MANUFACTURING TOLERANCE [Grading Based]			
QUALITY CONTROL TESTS				
	Product	20 mm Class 2 PM 2/20QG	30 mm Class 2 PM 2/30QG	40 mm Class 2 PM 2/40QG
Particle Size Distribution TP134	Sieve Size (mm)	Percent Passing		
	53			100
	37.5		100	90 – 100
	26.5	100	90 – 100	74 – 96
	19	90 – 100	77 – 95	62 – 86
	13.2	74 – 96		
	9.5	61 – 85	51 – 75	42 – 66
	4.75	42 – 66	35 – 57	28 – 50
	2.36	28 – 50	24 – 44	20 – 39
	0.425	11 – 27	9 – 22	8 – 21
0.075	4 – 14	4 – 12	3 – 11	
AS 1289.3.1.2 AS 1289.3.3.1 AS 1289.3.4.1	Liquid Limit Plasticity Index Linear Shrinkage	Maximum 28% Minimum 1% - Maximum 8% Maximum 4%		
AS 1141.23	LA Abrasion Grading 'A'	N.A.	N.A.	Maximum 45%
AS 1141.23	LA Abrasion Grading 'B'	Maximum 45%	Maximum 45%	N.A.

Note: 1. Blast furnace slag can be substituted for quarried material subject to Part R15 Clause 6.

CLASS 2 QUARRIED PAVEMENT MATERIAL [PERFORMANCE BASED]**SOURCE MATERIALS**

Source materials must be natural quarried material. No recycled material is permitted to be included.

NOMINATED MIX DESIGN PARAMETERS

TEST PROCEDURE	MIX DESIGN LIMITS		
QUALITY CONTROL TESTS			
	PRODUCT	20 mm Class 2 PM 2/20QM	30 mm Class 2 PM 2/30QM
Particle Size Distribution TP134	Sieve Size (mm)	Percent Passing	
	37.5		100
	26.5	100	90 – 100
	19	90 – 100	80 – 95
	9.5		
	2.36	30 – 60	25 – 55
	0.075	5 – 20	5 – 20
AS 1289.3.1.2 AS 1289.3.3.1 AS 1289.3.4.1	Liquid Limit Plasticity Index Linear Shrinkage	Maximum 30% Minimum 1% - Maximum 10% Maximum 5%	
TP183 TP183 TP184 AS 1141.23	Resilient Modulus Deformation Triaxial Compression LA Abrasion Grading 'B'	Minimum 250 MPa Maximum 10 ⁻⁷ Cohesion Max 250 kPa, Friction Angle Min 40° Contractor Nominated Value	

PRODUCT QUALITY CONTROL

TEST PROCEDURE	MANUFACTURING TOLERANCE	
Particle Size Distribution TP134	Sieve Size (mm)	Percent Passing
	37.5	0
	26.5	0 (PM2/20), +/-6 (PM2/30)
	19	+/-6
	9.5	+/-8
	2.36	+/-6
	0.075	+/-2
AS 1289.3.1.2 AS 1289.3.3.1 AS 1289.3.4.1	Liquid Limit Plasticity Index Linear Shrinkage	+3 +2 +1
AS 1141.23	LA Abrasion Grading 'B'	+3

- Note: 1. Blast furnace slag can be substituted for quarried material subject to Part R15 Clause 6.
2. Refer to the Contractor's current Mix Design certificate to assess compliance.

CLASS 1 RECYCLED PAVEMENT MATERIAL [GRADING BASED]**SOURCE MATERIALS**

Source materials may be quarried material, reclaimed concrete or any combination of them. Supplementary source materials may comprise brick, tile and asphalt. Asbestos or asbestos fibre must not be incorporated into the product under any circumstances. No more than 20% by mass of supplementary materials may be incorporated and the constituent proportions must remain unchanged during production.

PRODUCT QUALITY CONTROL

TEST PROCEDURE	MANUFACTURING TOLERANCE [Grading Based]			
QUALITY CONTROL TESTS				
	Product	20 mm Class 1 PM 1/20RG	30 mm Class 1 PM 1/30RG	40 mm Class 1 PM 1/40RG
Particle Size Distribution TP134	Sieve Size (mm)	Percent Passing		
	53			100
	37.5		100	95 – 100
	26.5	100	95 – 100	79 – 91
	19	95 – 100	79 – 93	65 – 83
	13.2	77 – 93		
	9.5	63 – 83	53 – 73	44 – 64
	4.75	44 – 64	36 – 56	29 – 49
	2.36	29 – 49	25 – 43	20 – 38
	0.425	13 – 23	10 – 21	8 – 18
0.075	5 – 11	4 - 10	3 – 9	
AS 1289.3.1.2 AS 1289.3.3.1 AS 1289.3.4.1	Liquid Limit Plasticity Index Linear Shrinkage	Maximum 25% Minimum 1% Maximum 6% Maximum 3%		
AS 1141.23	LA Abrasion Grading 'A'	N.A.	N.A.	Maximum 30%
AS 1141.23	LA Abrasion Grading 'B'	Maximum 30%	Maximum 30%	N.A.
RMS T276	Type II Foreign Materials	Maximum 1%		
RMS T276	Type III Foreign Materials excluding bitumen	Maximum 0.5%		
AS/NZS 2891.3.3	Bitumen Content	Maximum 1%		

NOTE: The recycled pavement material must have a uniform grading and must not be graded from the coarse limit of the grading envelope to the fine limit of the grading envelope, or vice versa.

CLASS 1 RECYCLED PAVEMENT MATERIAL [PERFORMANCE BASED]**SOURCE MATERIALS**

Source materials may be quarried material, reclaimed concrete or any combination of them. Supplementary source materials may comprise brick, tile and asphalt. Asbestos or asbestos fibre must not be incorporated into the product under any circumstances. No more than 20% by mass of supplementary materials may be incorporated and the constituent proportions must remain unchanged during production.

NOMINATED MIX DESIGN PARAMETERS

TEST PROCEDURE	MIX DESIGN LIMITS		
QUALITY CONTROL TESTS			
	PRODUCT	20 mm Class 1 PM 1/20RM	30 mm Class 1 PM 1/30RM
Particle Size Distribution TP134	Sieve Size (mm)	Percent Passing	
	37.5	100	100
	26.5	95 – 100	80 – 95
	19	65 – 85	50 – 75
	9.5	30 – 50	25 – 45
	2.36 0.075	5 – 15	5 – 15
AS 1289.3.1.2 AS 1289.3.3.1 AS 1289.3.4.1	Liquid Limit Plasticity Index Linear Shrinkage	Maximum 25% Minimum 1% - Maximum 6% Maximum 3%	
TP183 TP183 AS 1141.23 TP184	Resilient Modulus Deformation LA Abrasion Grading 'B' Triaxial Compression	Minimum 300 MPa Maximum 10 ⁻⁸ Contractor Nominated Value Cohesion Max 150 kPa, Friction Angle Min 45 ^o	
RMS T276 RMS T276 AS/NZS 2891.3.3	Type II Foreign Materials Type III Foreign Materials excluding bitumen Bitumen Content	Maximum 1% Maximum 0.5% Maximum 1%	

PRODUCT QUALITY CONTROL

TEST PROCEDURE	MANUFACTURING TOLERANCE	
Particle Size Distribution TP134	Sieve Size (mm)	Percent Passing
	37.5	0
	26.5	0 (PM1/20), +/-6 (PM1/30)
	19	+/-6
	9.5	+/-9
	2.36 0.075	+/-8 +/-3
AS 1289.3.1.2 AS 1289.3.3.1 AS 1289.3.4.1	Liquid Limit Plasticity Index Linear Shrinkage	+3 +2 +1
AS 1141.23	LA Abrasion Grading 'B'	+3

Note: 1. Refer to the Contractor's current Mix Design certificate to assess compliance

CLASS 1 QUARRIED PAVEMENT MATERIAL [GRADING BASED]**SOURCE MATERIALS**

Source materials must be natural quarried material. No recycled material is permitted to be included.

PRODUCT QUALITY CONTROL

TEST PROCEDURE	MANUFACTURING TOLERANCE [Grading based]			
QUALITY CONTROL TESTS				
	PRODUCT	20 mm Class 1 PM 1/20QG	30 mm Class 1 PM 1/30QG	40 mm Class 1 PM 1/40QG
	Particle Size Distribution TP134	Sieve Size (mm)	Percent Passing	
53				100
37.5			100	95 – 100
26.5		100	95 – 100	79 – 91
19		95 – 100	79 – 93	65 – 83
13.2		77 – 93		
9.5		63 – 83	53 – 73	44 – 64
4.75		44 – 64	36 – 56	29 – 49
2.36		29 – 49	25 – 43	20 – 38
0.425		13 – 23	10 – 21	8 – 18
0.075	5 – 11	4 – 10	3 – 9	
AS 1289.3.1.2 AS 1289.3.3.1 AS 1289.3.4.1	Liquid Limit Plasticity Index Linear Shrinkage	Maximum 25% Minimum 1% Maximum 6% Maximum 3%		
AS 1141.23	LA Abrasion Grading 'A'	N.A.	N.A.	Maximum 30%
AS 1141.23	LA Abrasion Grading 'B'	Maximum 30%	Maximum 30%	N.A.

NOTES:

1. Blast furnace slag can be substituted for quarried material subject to Part R15 Clause 6.
2. The quarried pavement material must have a uniform grading and must not be graded from the coarse limit of the grading envelope to the fine limit of the grading envelope, or vice versa.

CLASS 1 QUARRIED PAVEMENT MATERIAL [PERFORMANCE BASED]**SOURCE MATERIALS**

Source materials must be natural quarried material. No recycled material is permitted to be included.

NOMINATED MIX DESIGN PARAMETERS

TEST PROCEDURE	MIX DESIGN LIMITS		
QUALITY CONTROL TESTS			
	PRODUCT	20 mm Class 1 PM 1/20QM	30 mm Class 1 PM 1/30QM
Particle Size Distribution TP134	Sieve Size (mm)	Percent Passing	
	37.5	100	
	26.5	100	100
	19	95 – 100	80 – 95
	9.5	65 – 85	50 – 75
	2.36	30 – 50	25 – 45
	0.075	5 – 15	5 – 15
AS 1289.3.1.2 AS 1289.3.3.1 AS 1289.3.4.1	Liquid Limit Plasticity Index Linear Shrinkage	Maximum 25% Minimum 1% - Maximum 6% Maximum 3%	
TP183 TP183 AS 1141.23 TP184	Resilient Modulus Deformation LA Abrasion Grading 'B' Triaxial Compression	Minimum 300 MPa Maximum 10 ⁻⁸ Contractor Nominated Value Cohesion Max 150 kPa, Friction Angle Min 45 ⁰	

PRODUCT QUALITY CONTROL

TEST PROCEDURE	MANUFACTURING TOLERANCE	
Particle Size Distribution TP134	Sieve Size (mm)	Percent Passing
	37.5	0
	26.5	0 (PM1/20), +/-6 (PM1/30)
	19	+/-6
	9.5	+/-8
	2.36	+/-6
	0.075	+/-2
AS 1289.3.1.2 AS 1289.3.3.1 AS 1289.3.4.1	Liquid Limit Plasticity Index Linear Shrinkage	+3 +2 +1
AS 1141.23	LA Abrasion Grading 'B'	+3

Note: 1. Refer to the Contractor's current Mix Design certificate to assess compliance.

CLASS 1 HEAVY DUTY QUARRIED PAVEMENT MATERIAL
[GRADING BASED]

SOURCE MATERIALS

Source materials must be natural quarried material. No recycled material is permitted to be included.

PRODUCT QUALITY CONTROL

TEST PROCEDURE	MANUFACTURING TOLERANCE [Grading based]			
QUALITY CONTROL TESTS				
Particle Size Distribution TP134	PRODUCT	20 mm Class 1A PM 1A/20QG		
	Percent Passing		Percent Retained	
	Sieve Size (mm)	%	Size Range (mm)	%
	37.5			
	26.5	100	26.5 – 19.0	0 - 5
	19.0	95 – 100	19.0 – 13.2	7 - 18
	13.2	78 – 92	13.2 – 9.5	10 - 16
	9.5	63 – 83	9.5 – 4.75	14 - 24
	4.75	44 – 64	4.75 – 2.36	10 - 20
2.36	30 – 48	2.36 – 0.425	14 - 28	
0.425	14 – 22	0.425 – 0.075	6 - 13	
0.075	7 – 11			
AS 1289.3.1.2 AS 1289.3.3.1 AS 1289.3.4.1 AS 1141.23	Liquid Limit Plasticity Index Linear Shrinkage LA Abrasion Grading 'B'	Maximum 25% Minimum 2% Maximum 6% Maximum 3% Maximum 25%		

OR

TEST PROCEDURE	MANUFACTURING TOLERANCE [Grading based]			
QUALITY CONTROL TESTS				
Particle Size Distribution TP134	PRODUCT	20 mm Class 1B PM 1B/20QG		
	Percent Passing		Percent Retained	
	Sieve Size (mm)	%	Size Range (mm)	%
	37.5			
	26.5	100	26.5 – 19.0	0 - 5
	19.0	95 – 100	19.0 – 13.2	7 - 18
	13.2	78 – 92	13.2 – 9.5	10 - 16
	9.5	63 – 83	9.5 – 4.75	14 - 24
	4.75	44 – 64	4.75 – 2.36	10 - 20
2.36	29 – 48	2.36 – 0.425	15 – 29	
0.425	13 – 21	0.425 – 0.075	7 – 14	
0.075	5 – 9			
AS 1289.3.1.2 AS 1289.3.3.1 AS 1289.3.4.1 AS 1141.23	Liquid Limit Plasticity Index Linear Shrinkage LA Abrasion Grading 'B'	Maximum 25% Minimum 2% Maximum 6% Maximum 3% Minimum 25% - Maximum 30%		

STABILISED PAVEMENT MATERIAL [BINDER CONTROL]**SOURCE MATERIALS**

Source materials must be natural quarried material OR, where approved, recycled materials.

RAW FEED PRODUCT QUALITY CONTROL

TEST PROCEDURE	MANUFACTURING TOLERANCE [Grading Based]			
QUALITY CONTROL TESTS				
	Product	20 mm Class 2 PM 2/20*	30 mm Class 2 PM 2/30*	40 mm Class 2 PM 2/40*
Particle Size Distribution TP134	Sieve Size (mm)	Percent Passing		
	53			100
	37.5		100	90 – 100
	26.5	100	90 – 100	74 – 96
	19	90 – 100	77 – 95	62 – 86
	13.2	74 – 96		
	9.5	61 – 85	51 – 75	42 – 66
	4.75	42 – 66	35 – 57	28 – 50
	2.36	28 – 50	24 – 44	20 – 39
	0.425	11 – 27	9 – 22	8 – 21
0.075	4 – 14	4 – 12	3 – 11	
AS 1289.3.1.2 AS 1289.3.3.1 AS 1289.3.4.1	Liquid Limit Plasticity Index Linear Shrinkage	Maximum 28% Minimum 1% - Maximum 8% Maximum 4%		
AS 1141.23	LA Abrasion Grading 'A'	N.A.	N.A.	Maximum 45%
AS 1141.23	LA Abrasion Grading 'B'	Maximum 45%	Maximum 45%	N.A.

STABILISED PRODUCT QUALITY CONTROL

Test	Product	Refer R15.8 for nomenclature
Contractor Quality Plan	Target Binder Content (% dry mass)	Within the tolerance specified in clause R15.8 under "Additive Content Determination" of the binder content specified in the material description in accordance with clause R15.8 under "General".
AS 1141.51	Unconfined Compressive Strength (96% MDD - 7 days curing)	Reported Value
AS 1141.51	Unconfined Compressive Strength (96% MDD - 28 days curing)	Strength must not be less than the value specified in the material description in accordance with clause R15. under "General".

*Raw feed material must be: PM2/20QG, PM2/30QG, PM2/40QG, OR, with prior approval, PM2/20RG, PM2/30RG or PM2/40RG.

The Principal may specify Class 1 Quarried, Recycled or Performance Based materials as an alternative to Class 2 Pavement Material (Grading Based). When Class 1 materials are specified, Product Quality Control criteria for the appropriate Class 1 Pavement Material must apply.

STABILISED PAVEMENT MATERIAL [STRENGTH CONTROL]**SOURCE MATERIALS**

Source materials must be natural quarried material OR, where approved, recycled materials.

RAW FEED PRODUCT QUALITY CONTROL

TEST PROCEDURE	MANUFACTURING TOLERANCE [Grading Based]			
QUALITY CONTROL TESTS				
	Product	20 mm Class 2 PM 2/20*	30 mm Class 2 PM 2/30*	40 mm Class 2 PM 2/40*
Particle Size Distribution TP134	Sieve Size (mm)	Percent Passing		
	53			100
	37.5		100	90 – 100
	26.5	100	90 – 100	74 – 96
	19	90 – 100	77 – 95	62 – 86
	13.2	74 – 96		
	9.5	61 – 85	51 – 75	42 – 66
	4.75	42 – 66	35 – 57	28 – 50
	2.36	28 – 50	24 – 44	20 – 39
	0.425	11 – 27	9 – 22	8 – 21
0.075	4 – 14	4 – 12	3 – 11	
AS 1289.3.1.2 AS 1289.3.3.1 AS 1289.3.4.1	Liquid Limit Plasticity Index Linear Shrinkage	Maximum 28% Minimum 1% - Maximum 8% Maximum 4%		
AS 1141.23	LA Abrasion Grading 'A'	N.A.	N.A.	Maximum 45%
AS 1141.23	LA Abrasion Grading 'B'	Maximum 45%	Maximum 45%	N.A.

STABILISED PRODUCT QUALITY CONTROL

Test	Product	Refer R15.8 for nomenclature
Contractor Quality Plan	Target Binder Content (% dry mass)	Within the tolerance specified in clause R15.8 under "Additive Content Determination" of the binder content specified in the material description in accordance with clause R15.8 under "General".
AS 1141.51	Unconfined Compressive Strength (96% MDD - 7 days curing)	Reported Value
AS 1141.51	Unconfined Compressive Strength (96% MDD - 28 days curing)	Strength must not be less than the value specified in the material description in accordance with clause R15.8 under "General"

*Raw feed material must be: PM2/20QG, PM2/30QG, PM2/40QG, OR, with prior approval, PM2/20RG, PM2/30RG or PM2/40RG.

The Principal may specify Class 1 Quarried, Recycled or Performance Based materials as an alternative to Class 2 Pavement Material (Grading Based).). When Class 1 materials are specified, Product Quality Control criteria for the appropriate Class 1 Pavement Material must apply.

SEALING AGGREGATE**SOURCE MATERIALS**

Source materials must be natural quarried material. No recycled material is permitted to be included.

PRODUCT QUALITY CONTROL

TEST PROCEDURE	MANUFACTURING TOLERANCE							
QUALITY CONTROL TESTS								
	Product	SA 20-14	SA 16-10	SA 14-10	SA 10-7	SA 7-5	SA 5-2	
Particle Size Distribution AS 1141.11	Sieve Size (mm)	Percent Passing						
	26.5	100						
	19	95 – 100	100					
	16	35 – 65	65 – 90	100				
	13.2	0 – 10	15 – 40	90 – 100	100			
	9.5	0 – 2	0 – 8	0 – 15	85 – 100	100		
	6.7		0 – 2	0 – 2	0 – 15	80 – 100	100	
	4.75				0 – 3	0 – 20	80 – 100	
2.36					0 – 5	0 – 10		
1.18		0 – 1	0 – 1	0 – 1	0 – 1	0 – 1	0 – 1	
AS 1141.15	Flakiness Index	Maximum 25%				Reported Value	N/A	
TP244	% Flat Particles	N/A				Maximum 35%	N/A	
AS 1141.14 ^[3]	Mis-shapen Particles %	Reported Value			N/A			
AS 1141.23	LA Abrasion Grading H	Max 25%		N/A				
AS 1141.23	LA Abrasion Grading J	N/A		Max 25%	N/A			
AS 1141.23	LA Abrasion Grading K	N/A			Maximum 25%	Maximum 30%	Maximum 30% ⁽¹⁾	
AS 1141 42/40 ^[1]	PAFV	Min 48 ^[2]	Minimum 45 ^[2]					
TP705 ^[1]	Aggregate Stripping	Maximum 15% Wet and Maximum 5% Dry						
AS 1141.20.1	ALD – Direct	Reported Value				N/A		
AS 1141.20.2	ALD - Direct	N/A				Reported Value		
AS 1141.20.3	ALD – Calculated	Reported Value				N/A		

1. Sample must be prepared from an appropriately sized fraction of identical source rock.
2. A minimum value of 55 must apply to sites requiring high skid resistance.
3. Calliper Ratio = 2:1; report each of % flat, elongated, and flat and elongated particles.

SAND**SOURCE MATERIALS**

- Type A and B** Must be washed or unwashed natural pit, river or crushed quarry material.
- Type C** Must be a crushed quarry product only.
- Type D** Must be a natural pit material, dune sand or crushed quarry product.

PRODUCT QUALITY CONTROL

TEST PROCEDURE	MANUFACTURING TOLERANCE				
QUALITY CONTROL TESTS					
	Product	Sa - A	Sa - B	Sa - C	Sa - D
Particle Size Distribution TP134	Sieve Size (mm)	Percent Passing			
	9.5	100	100	100	95 – 100
	6.7				
	4.75	95 – 100	95 – 100	70 – 100	
	2.36	75 – 100	75 – 100	35 – 100	
	1.18	55 – 90	45 – 90		
	0.600	35 – 70	30 – 70		
	0.425			25 – 70	
	0.300	20 – 40	20 – 42		
	0.150	5 – 20	15 – 30		
0.075	0 - 10	5 – 20	8 – 23	0 – 10	
AS 1289.3.1.2 AS 1289.3.3.1 AS 1289.3.4.1	Liquid Limit Plasticity Index Linear Shrinkage	Non Plastic	Max 25% Max 6% Max 3%		Non Plastic
AS 1141.34	Organic Impurities	Satisfactory			

ASPHALT AGGREGATE**SOURCE MATERIALS**

Source materials must be natural quarried material. No recycled material is permitted to be included. Highly micaceous materials such as granite and gneiss should not be used for Asphalt Aggregates unless the Contractor can provide evidence that the aggregate particles will maintain long term strength and not exfoliate when subject to processing through an asphalt plant (or equivalent).

Materials of the same size from two or more sources must not be mixed

PRODUCT QUALITY CONTROL

Percentage Tolerances for the Assessment of Conformity of Aggregate and Sand Production

Percentage Passing	Tolerance about target composition of aggregate size D-d*			
	Small aggregate (D ≤ 20)	Large aggregate (D.> 20)	Natural Sand	Quarry Sand
One sieve less than D	±8	±10		
Closest sieve to d	±2.5	±5		
2.36 mm sieve	-	-	±5	±5
1.18 mm sieve	±0.5	±0.5	±4	±4
0.075 mm sieve			±3	±3

*Aggregate size D-d, e.g. 10-7

TEST PROCEDURE	MANUFACTURING TOLERANCE							
	QUALITY CONTROL TESTS							
	Product ⁵	Coarse Fraction (-37.5mm+ 19.0mm)	Medium Fraction (-19.0mm + 6.7mm)	Fine Fraction (-6.7mm + 2.36mm)	Natural Sand	Quarry Sand		
AS 1141.24	Sulphate Soundness	Maximum 12			Maximum 15			
AS 1141.30	Unsound & Marginal Stone Content	Maximum 5% (unsound stone) ⁶ Maximum 10% (marginal& unsound stone)			N/A			
AS 1141.15	Flakiness Index	Maximum 30	Maximum 30					
TP 240	Elongation Index	Maximum 35	Maximum 35					
AS 1141.23	LA Abrasion Max %	Maximum 35	Maximum 25	Maximum 30				
AS 1289.3.1.2	Liquid Limit				NP	Max. 25		
AS 1289.3.3.1	Plasticity index							Max 6 ¹
AS 1289.3.4.1	Linear shrinkage							Max 3
AS1141.34	Organic impurities				Satisfactory			
AS 1141 42/40 ²	PAFV ⁴	-	Minimum 48 ³	-	N/A			
AS1141.5, AS1141.6.1 & AS1141.6.2	Water absorption & densities	Report Only						

- Sand may be non-plastic.
- Sample must be prepared from an appropriately sized fraction of identical source rock.
- A minimum value of 55 must apply to all OG and SMA Asphalt mixes. A minimum value of 55 must also apply to specified sites requiring high skid resistance.
- Aggregates within -9.5 mm to +6.7 mm fraction, prepared in accordance with AS 1141.40 Section 7.1.
- 'Product' for asphalt aggregates refers to the fractions of individual asphalt aggregate products used in the asphalt mix; common asphalt aggregate products include 35/20 mm, 20/14 mm, 10/7 mm and 7/2 mm.
- Refer to "Additional Requirements for Basic Igneous Source Rock" for criteria which takes precedence where basic igneous source rock is used.

MINERAL FILLER FOR ASPHALT, OTHER THAN HYDRATED LIME**PRODUCT QUALITY CONTROL**

TEST PROCEDURE	MANUFACTURING TOLERANCE	
AS 1141.11	Gradings (0.60, 0.3 & 0.075 mm sieves) (%)	Report Only
AS 1141.17	Voids in Dry Compacted Filler (%)	Report Only
AS 1289.B1.3	Moisture Content (%)	3% maximum
AS 2350.8	Specific Surface (square metres per kilogram)	Report Only
AS 3583.3	Loss on Ignition (% by mass)	4% maximum
AS 1141.8	Water Soluble Fraction (% by mass)	20% maximum

ADDITIONAL REQUIREMENTS FOR BASIC IGNEOUS SOURCE ROCK

This clause applies where basic igneous source rock (as defined in AS 2758) is used for the production of a Pavement Material complying with this Part R15. The presence of Secondary Minerals must not have a deleterious effect of the Pavement Material's intended performance.

The Source Rock must be classified in accordance with the following:

Rock Classification	Secondary Mineral Content (%) AS1142.6	Accelerated Soundness Index AS 1141.29
Sound Rock	< 25	> 94
Marginal Rock	26-30	90-93
Unsound Rock	> 30	< 90

Unsound and marginal rock in that fraction of the product retained on a 4.75 mm AS sieve must not exceed the percentages specified below:

Material Class	Total of Marginal and Unsound Rock % (max)	Unsound Rock % (max)
PM 1	10	5
PM 2	10	7
PM 3	20	10
Sealing and Asphalt Aggregate	10	3

ARRESTOR BED MATERIAL**SOURCE MATERIALS**

Arrestor bed material shall have a smooth surface and be relatively spherical, well-rounded, hard and durable. Source materials shall be from a natural source such as river gravel, and be uncrushed, unblended and from a single quarry.

No recycled material is permitted to be included. Arrestor bed material shall be free of deleterious inclusions such as concrete, bitumen, bricks, and organic matter.

PRODUCT QUALITY CONTROL

TEST PROCEDURE	MANUFACTURING TOLERANCE	
Particle Size Distribution TP134	Sieve Size (mm)	Percent Passing
	19	100
	9.5	0 – 5
	0.075	Maximum 2
RMS T239	Fractured Faces	Maximum 10%
AS 1141.14 ^[1]	Mis-shapen Particles %	Maximum 10%
WA 223.1	Crushing	Maximum 5%
AS 1141.23	Los Angeles Value Grading B	Report Only
WA 223.1	Cracking	Maximum 5%
WA Specification 6706/02/1312 Attachment ^[2]	Slump Angle	Maximum 30°
AS 1141.4	Bulk Density	Maximum 3.4 tonnes/m ³

Notes:

1. Calliper Ratio = 2:1; report each of % flat, elongated, and flat and elongated particles.
2. Also report measured radius points and height of slump; repeat the test for a non-inverted cone.