

Index of Provisionally Approved Mix Designs
Excel Asphalt Limited

I. Normal Mix

Bituminous Material	HyD Mix No.	Supplier's Mix No.	Date of Design	Approval Date	Expiry Date
10mm Wearing Course	10WC/EXC/LT/002	10WC/EXC/LT/002	08-Sep-2020	30-Oct-2020	29-Oct-2023
20mm Wearing Course	20WC/EXC/LT/002	20WC/EXC/LT/002	18-Sep-2019	04-Feb-2020	03-Feb-2023
28mm Base Course	28BC/EXC/LT/002	28BC/EXC/LT/002	27-Nov-2019	04-Feb-2020	03-Feb-2023
37.5mm Base Course	40BC/EXC/LT/002	40BC/EXC/LT/002	12-Dec-2019	04-Feb-2020	03-Feb-2023
37.5mm Roadbase (recipe mix)	40RB/EXC/LT/001	40RB/EXC/LT/001	03-May-2016	--	--

II. Reclaimed Asphalt Pavement (RAP) Mix

Bituminous Material	HyD Mix No.	Supplier's Mix No.	Date of Design	Approval Date	Expiry Date
10mm Wearing Course	10WC/EXC/LT/RAP15/002	10WC/EXC/LT/RAP15/002	06-Jul-2020	26-Aug-2020	25-Aug-2023
20mm Wearing Course	20WC/EXC/LT/RAP15/002	20WC/EXC/LT/RAP15/002	16-Jan-2020	03-Jun-2020	02-Jun-2023
28mm Base Course	28BC/EXC/LT/RAP15/002	28BC/EXC/LT/RAP15/002	20-Jan-2020	03-Jun-2020	02-Jun-2023
37.5mm Base Course	40BC/EXC/LT/RAP15/002	40BC/EXC/LT/RAP15/002	21-Sep-2020	30-Oct-2020	29-Oct-2023
37.5mm Roadbase (recipe mix)	40RB/EXC/LT/RAP15/001	40RB/EXC/LT/RAP15/001	14-Apr-2016	--	--

Bituminous Material	HyD Mix No.	Supplier's Mix No.	Date of Design	Approval Date	Expiry Date
10mm Wearing Course	10WC/EXC/LT/RAP20/002	10WC/EXC/LT/RAP20/002	19-Dec-2019	04-Feb-2020	03-Feb-2023
20mm Wearing Course	20WC/EXC/LT/RAP20/002	20WC/EXC/LT/RAP20/002	31-Oct-2019	04-Feb-2020	03-Feb-2023
28mm Base Course	28BC/EXC/LT/RAP20/002	28BC/EXC/LT/RAP20/002	06-Nov-2019	04-Feb-2020	03-Feb-2023
37.5mm Base Course	40BC/EXC/LT/RAP20/002	40BC/EXC/LT/RAP20/002	18-Jun-2020	26-Aug-2020	25-Aug-2023

III. Polymer Modified Mix

Bituminous Material	HyD Mix No.	Supplier's Mix No.	Date of Design	Approval Date	Expiry Date
10mm Polymer Modified Friction Course	10PMFC/EXC/LT/PG/002	10PMFC/EXC/LT/PG/002	23-Jul-2019	04-Feb-2020	03-Feb-2023
10mm Polymer Modified Stone Mastic Asphalt	10PMSMA/EXC/LT/PG/ITE/002	10PMSMA/EXC/LT/PG/ITE/002	08-Aug-2019	04-Feb-2020	03-Feb-2023

Remark: Mix design details are tabled in the appropriate spreadsheets.

Summary of Provisionally Approved Mix Designs
Excel Asphalt Limited
(Normal Mix)

1. Source and Type of Constituent Materials :

Constituent Material	Source	Type
Bitumen	Dongguan Taihe Asphalt Products Co., Ltd	Grade 60/70 pen
Coarse Aggregate (retained on 5mm BS sieve)	Lam Tei Quarry	Crushed rock (Granite)
Fine Aggregate (passing 5mm BS sieve)	Lam Tei Quarry	Crushed rock (Granite)
Filler (passing 75 μ m BS sieve)	Lam Tei Quarry	Crushed rock filler

2. Mix Designs :

Bituminous Material	10mm Wearing Course		20mm Wearing Course		28mm Base Course		37.5mm Base Course		37.5mm Roadbase (recipe mix)	
HyD Mix No.	10WC/EXC/LT/002		20WC/EXC/LT/002		28BC/EXC/LT/002		40BC/EXC/LT/002		40RB/EXC/LT/001	
Supplier's Mix No.	10WC/EXC/LT/002		20WC/EXC/LT/002		28BC/EXC/LT/002		40BC/EXC/LT/002		40RB/EXC/LT/001	
Date of Design	08-Sep-2020		18-Sep-2019		27-Nov-2019		12-Dec-2019		03-May-2016	
Approval Date	30-Oct-2020		04-Feb-2020		04-Feb-2020		04-Feb-2020		--	
Expiry Date	29-Oct-2023		03-Feb-2023		03-Feb-2023		03-Feb-2023		--	
	Design Grading	GS Requirement*	Design Grading	GS Requirement*	Design Grading	GS Requirement*	Design Grading	GS Requirement*	Design Data	GS Requirement*
Binder content (%)	6.0	5.5 - 6.5	5.0	4.5 - 5.5	4.5	4.0 - 5.0	4.2	3.7 - 4.7	3.5	3.0 - 4.0
B.S. Sieve (mm)	% Passing		% Passing		% Passing		% Passing		% Passing	
50							100	100	100	100
37.5					100	100	98	94 - 100	99	90 - 100
28			100	100	96	92 - 100	87	80 - 94	84	70 - 94
20			98	94 - 100	90	83 - 97	78	71 - 85	72	62 - 84
14	100	100	88	81 - 95	76	69 - 83	69	62 - 76	--	--
10	99	95 - 100	81	74 - 88	66	59 - 73	63	56 - 70	58	49 - 67
5	74	67 - 81	67	60 - 74	42	35 - 49	44	37 - 51	47	37 - 55
2.36	51	44 - 68	47	40 - 54	29	22 - 36	31	24 - 38	34	27 - 43
1.18	37	30 - 44	34	27 - 41	21	14 - 28	22	15 - 29	--	--
0.600	26	21 - 31	24	19 - 29	15	10 - 20	16	11 - 21	18	13 - 28
0.300	18	13 - 23	17	12 - 22	11	6 - 16	11	6 - 16	13	7 - 21
0.150	12	9 - 15	11	8 - 14	7	4 - 10	8	5 - 11	--	--
0.075	7.1	5.1 - 9.1	6.6	4.6 - 8.6	4.5	2.5 - 6.5	4.8	2.8 - 6.8	5.4	2 - 8
		10.1 [#]		9.6 [#]		7.5 [#]		7.8 [#]		8.0 [@]
	Marshall Properties		Marshall Properties		Marshall Properties		Marshall Properties		Marshall Properties	
Air voids in mix, VIM (%)	3.6	3.0 - 5.0	4.3	3.0 - 5.0	4.5	3.0 - 5.0	4.8	3.0 - 5.0	--	--
Voids in mineral aggregate, VMA (%)	16.6	≥ 16	14.8	≥ 14	14.4	≥ 13	13.8	≥ 12.5	--	--
Marshall stability (kN)	13.4	≥ 10	15.8	≥ 10	14.0	≥ 10	16.5	≥ 10	--	--
Flow (mm)	2.2	≤ 4.0	2.0	≤ 4.0	2.1	≤ 4.0	1.8	≤ 4.0	--	--

* For reference only

[#] The percentage passing the 0.075mm BS sieve shall not deviate from the approved design value by more than 3%.[@] The percentage passing the 0.075mm BS test sieve shall not exceed 8.0%.

Summary of Provisionally Approved Mix Designs
Excel Asphalt Limited
(RAP Mix)

1. Source and Type of Constituent Materials :

Constituent Material	Source	Type
Bitumen	Dongguan Taihe Asphalt Products Co., Ltd	Grade 60/70 pen
Coarse Aggregate (retained on 5mm BS sieve)	Lam Tei Quarry	Crushed rock (Granite)
Fine Aggregate (passing 5mm BS sieve)	Lam Tei Quarry	Crushed rock (Granite)
Filler (passing 75 μ m BS sieve)	Lam Tei Quarry	Crushed rock filler

2. Mix Designs :

Bituminous Material	10mm Wearing Course		20mm Wearing Course		28mm Base Course		37.5mm Base Course		37.5mm Roadbase (recipe mix)	
	Design Grading	GS Requirement*	Design Grading	GS Requirement*	Design Grading	GS Requirement*	Design Grading	GS Requirement*	Design Data	GS Requirement*
HyD Mix No.	10WC/EXC/LT/RAP15/002		20WC/EXC/LT/RAP15/002		28BC/EXC/LT/RAP15/002		40BC/EXC/LT/RAP15/002		40RB/EXC/LT/RAP15/001	
Supplier's Mix No.	10WC/EXC/LT/RAP15/002		20WC/EXC/LT/RAP15/002		28BC/EXC/LT/RAP15/002		40BC/EXC/LT/RAP15/002		40RB/EXC/LT/RAP15/001	
Date of Design	06-Jul-2020		16-Jan-2020		20-Jan-2020		21-Sep-2020		14-Apr-2016	
Approval Date	26-Aug-2020		03-Jun-2020		03-Jun-2020		30-Oct-2020		--	
Expiry Date	25-Aug-2023		02-Jun-2023		02-Jun-2023		29-Oct-2023		--	
Binder content (%)	6.0	5.5 - 6.5	5.0	4.5 - 5.5	4.6	4.1 - 5.1	4.3	3.8 - 4.8	3.5	3.0 - 4.0
B.S. Sieve (mm)	% Passing		% Passing		% Passing		% Passing		% Passing	
50							100	100	100	100
37.5					100	100	98	94 - 100	99	90 - 100
28			100	100	96	92 - 100	88	81 - 95	84	70 - 94
20			98	94 - 100	90	83 - 97	79	72 - 86	72	62 - 84
14	100	100	88	81 - 95	76	69 - 83	69	62 - 76	--	--
10	99	95 - 100	81	74 - 88	67	60 - 74	63	56 - 70	60	49 - 67
5	69	62 - 76	66	59 - 73	43	36 - 50	44	37 - 51	47	37 - 55
2.36	48	41 - 55	47	40 - 54	29	22 - 36	31	24 - 38	34	27 - 43
1.18	35	28 - 42	35	28 - 42	22	15 - 29	23	16 - 30	--	--
0.600	25	20 - 30	24	19 - 29	15	10 - 20	16	11 - 21	18	13 - 28
0.300	17	12 - 22	17	12 - 22	11	6 - 16	12	7 - 17	13	7 - 21
0.150	12	9 - 15	11	8 - 14	7	4 - 10	8	5 - 11	--	--
0.075	7.1	5.1 - 9.1 10.1 [#]	7.0	5.0 - 9.0 10.0 [#]	4.5	2.5 - 6.5 7.5 [#]	4.8	2.8 - 6.8 7.8 [#]	5.6	2.0 - 8.0 8.0 [@]
	(including 15% RAP)		(including 15% RAP)		(including 15% RAP)		(including 15% RAP)		(including 15% RAP)	
	Marshall Properties		Marshall Properties		Marshall Properties		Marshall Properties		Marshall Properties	
Air voids in mix, VIM (%)	3.2	3.0 - 5.0	4.0	3.0 - 5.0	4.8	3.0 - 5.0	4.8	3.0 - 5.0	--	--
Voids in mineral aggregate, VMA (%)	16.1	≥ 16	14.8	≥ 14	14.8	≥ 13	14.0	≥ 12.5	--	--
Marshall stability (kN)	13.6	≥ 10	17.1	≥ 10	14.8	≥ 10	14.4	≥ 10	--	--
Flow (mm)	3.1	≤ 4.0	1.9	≤ 4.0	2.3	≤ 4.0	2.2	≤ 4.0	--	--

* For reference only

[#] The percentage passing the 0.075mm BS sieve shall not deviate from the approved design value by more than 3%.[@] The percentage passing the 0.075mm BS test sieve shall not exceed 8.0%.

Summary of Provisionally Approved Mix Designs
Excel Asphalt Limited
(RAP Mix)

1. Source and Type of Constituent Materials :

Constituent Material	Source	Type
Bitumen	Dongguan Taihe Asphalt Products Co., Ltd	Grade 60/70 pen
Coarse Aggregate (retained on 5mm BS sieve)	Lam Tei Quarry	Crushed rock (Granite)
Fine Aggregate (passing 5mm BS sieve)	Lam Tei Quarry	Crushed rock (Granite)
Filler (passing 75 μ m BS sieve)	Lam Tei Quarry	Crushed rock filler

2. Mix Designs :

Bituminous Material	10mm Wearing Course		20mm Wearing Course		28mm Base Course		37.5mm Base Course	
	Design Grading	GS Requirement*	Design Grading	GS Requirement*	Design Grading	GS Requirement*	Design Grading	GS Requirement*
HyD Mix No.	10WC/EXC/LT/RAP20/002		20WC/EXC/LT/RAP20/002		28BC/EXC/LT/RAP20/002		40BC/EXC/LT/RAP20/002	
Supplier's Mix No.	10WC/EXC/LT/RAP20/002		20WC/EXC/LT/RAP20/002		28BC/EXC/LT/RAP20/002		40BC/EXC/LT/RAP20/002	
Date of Design	19-Dec-2019		31-Oct-2019		06-Nov-2019		18-Jun-2020	
Approval Date	04-Feb-2020		04-Feb-2020		04-Feb-2020		26-Aug-2020	
Expiry Date	03-Feb-2023		03-Feb-2023		03-Feb-2023		25-Aug-2023	
	Design Grading	GS Requirement*	Design Grading	GS Requirement*	Design Grading	GS Requirement*	Design Grading	GS Requirement*
Binder content (%)	6.0	5.5-6.5	5.0	4.5 - 5.5	4.5	4.0 - 5.0	4.3	3.8 - 4.8
B.S. Sieve (mm)	% Passing		% Passing		% Passing		% Passing	
50							100	100
37.5					100	100	98	94 - 100
28			100	100	96	92 - 100	88	81 - 95
20			98	94 - 100	90	83 - 97	79	72 - 86
14	100	100	88	81 - 95	76	69 - 83	69	62 - 76
10	99	95 - 100	81	74 - 88	67	60 - 74	63	56 - 70
5	68	61 - 75	65	58 - 72	43	36 - 50	44	37 - 51
2.36	48	41 - 55	46	39 - 53	29	22 - 36	31	24 - 38
1.18	35	28 - 42	34	27 - 41	22	15 - 29	23	16 - 30
0.600	25	20 - 30	24	19 - 29	16	11 - 21	16	11 - 21
0.300	17	12 - 22	17	12 - 22	11	6 - 16	12	7 - 17
0.150	12	9 - 15	11	8 - 14	7	4 - 10	8	5 - 11
0.075	7.2	5.2 - 9.2	7.1	5.1 - 9.1	4.7	2.7 - 6.7	4.9	2.9 - 6.9
		10.2 [#]		10.1 [#]		7.7 [#]		7.9 [#]
	(including 20% RAP)		(including 20% RAP)		(including 20% RAP)		(including 20% RAP)	
	Marshall Properties		Marshall Properties		Marshall Properties		Marshall Properties	
Air voids in mix, VIM (%)	3.1	3.0 - 5.0	3.7	3.0 - 5.0	4.6	3.0 - 5.0	4.8	3.0 - 5.0
Voids in mineral aggregate, VMA (%)	16.1	≥ 16	14.5	≥ 14	14.4	≥ 13	14.1	≥ 12.5
Marshall stability (kN)	14.3	≥ 10	16.8	≥ 10	15.6	≥ 10	15.8	≥ 10
Flow (mm)	2.3	≤ 4.0	2.2	≤ 4.0	2.4	≤ 4.0	2.5	≤ 4.0

* For reference only

[#] The percentage passing the 0.075mm BS sieve shall not deviate from the approved design value by more than 3%.

Summary of Provisionally Approved Mix Designs
Excel Asphalt Limited
(Polymer Modified Mix)

1. Source and Type of Constituent Materials :

Constituent Material	Source	Type	
		10PMFC/EXC/LT/PG/002	10PMSMA/EXC/LT/PG/ITE/002
Bitumen	Dongguan Taihe Asphalt Products Co., Ltd	Grade PG76	
Coarse Aggregate (retained on 5mm BS sieve)	Lam Tei Quarry	Crushed rock (Granite)	
Fine Aggregate (passing 5mm BS sieve)	Lam Tei Quarry	Crushed rock (Granite)	
Filler (passing 75 μ m BS sieve)	Lam Tei Quarry Hydrated lime - Man Lung Fat Trading (Shenzhen) Ltd.	Mixture of crushed rock filler and hydrated lime	
Fibre	Asia Fiber Company Ltd (China)	Not applicable	Cellulose Fibre (Iterlong)

2. Mix Designs :

Bituminous Material	10mm Polymer Modified Friction Course		10mm Polymer Modified Stone Mastic Asphalt	
HyD Mix No.	10PMFC/EXC/LT/PG/002		10PMSMA/EXC/LT/PG/ITE/002	
Supplier's Mix No.	10PMFC/EXC/LT/PG/002		10PMSMA/EXC/LT/PG/ITE/002	
Date of Design	23-Jul-2019		08-Aug-2019	
Approval Date	04-Feb-2020		04-Feb-2020	
Expiry Date	03-Feb-2023		03-Feb-2023	
	Design Grading	PS Requirement*	Design grading	PS Requirement*
Polymer modified binder content (%)	5.5	5.0 - 6.0	6.0	5.3 - 6.3
B.S. Sieve (mm)	% passing		% Passing	
14	100	100	100	100
10	95	91 - 99	96	92 - 100
6.3	--	--	--	--
5	22	15 - 29	33	26 - 40
3.35	--	--	--	--
2.36	11	4 - 18	23	16 - 30
1.18	--	--	--	--
0.300	--	--	--	--
0.075	3.6	1.6 - 5.6 6.6 [#]	11.3	9.3 - 13.3 14.3 [#]
	(including 1.5% hydrated lime)		(including 2% hydrated lime)	
	Marshall Properties		Marshall Properties	
Air voids in mix, VIM (%)	20.4	≥ 20	3.9	3.5 - 4.5
Voids in mineral aggregate, VMA (%)	--	--	17.1	≥ 17
Marshall stability (kN)	--	--	12.1	≥ 6
Binder draindown (%)	--	--	0.03	≤ 0.3
Marshall quotient (kN/mm)	--	--	--	--
Binder drainage test	Pass	Tmax > Binder content	--	--

* For reference only

[#] The percentage passing the 0.075mm BS sieve shall not deviate from the approved design value by more than 3%.