



# Conventional SAM and SAMI (including HSS)

## Daily Record

**500E**

Transport for NSW  
(TfNSW)

**NOTE:** It is recommended that this form be printed on GREEN paper so that it is not confused with other TfNSW design and daily record forms (that are also uniquely coloured).



FOR 

D	M	Y
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 File ..... Instruction Sheet Reference No ..... 500E 

LOT NUMBER
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Office: ..... Road Number/Name: .....  
Location: ..... km to ..... km from ..... toward: .....

Roadloc to 

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 to 

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Type of Treatment: ..... Service Provider's Name: .....  
Material Sprayed: ..... Sprayer Certificate Number: .....  
Material Supplier: ..... Sprayer Certificate Expiry Date: .....

Existing Surface Type and Texture: ..... Number of Lanes: .....

	Sprayer Run	Unit	Calculation	A	B	C	D	E	Total
	1. Sprayer Number	-	-						
	2. Weather	-	-						
	3. Time of Spraying	Hrs	-						
	4. Air Temperature, Shade	°C	-						
	5. Pavement Surface Temperature	°C	-						
	6. Starting Point of Run	km	-						
	7. Finishing Point of Run	km	-						
	8. Length	m	-						
	9. Width	m	-						
	10. Area	m <sup>2</sup>	<b>8 x 9</b>						
TARGET BINDER	11. Scrap Rubber or Polymer Additives	Type	-						
	12. Scrap Rubber Percentage or Polymer Grade	% / Grade	-						
	13. Residual Binder Application Rate Cold	L/m <sup>2</sup>	Form 395K						
	14. Residual Binder Quantity Cold	L	<b>10 x 13</b>						
	15. Cutter Oil Percentage	%	Table 500E.3						
	16. Adhesion Agent Percentage	%	-						
	17. Mixture Application Rate Cold	L/m <sup>2</sup>	$13 \times \frac{100+15+16}{100}$						
SPRAYER LOAD	18. Residual Binder Nett Cold	L	$14 \times 1.1$						
	19. Cutter Oil Nett Cold	L	$18 \times \frac{15}{100}$						
	20. Adhesion Agent Nett Cold	L	$18 \times \frac{16}{100}$						
	21. Total Load Cold	L	<b>18+19+20</b>						
	22. Total Load Required Hot (Approx.)	L	<b>21 x 1.1</b>						
	23. Scrap Rubber	kg	Table 500E.2						
APPLICATION of BINDER	24. Sprayer Load at Start Hot	L	Dipstick						
	25. Mixture Temperature in Sprayer	°C	-						
	26. Volume Correction Multiplier	-	Table 500E.1						
	27. Mixture Application Rate Hot	L/m <sup>2</sup>	<b>17 x 26</b>						
	28. Pump Speed	r.p.m.	Spraying Table						
	29. Road Speed	m/min	Spraying Table						
	30. Sprayer Load at Finish Hot	L	Dipstick						
	31. Mixture Sprayed Hot	L	<b>24 - 30</b>						
	32. Volume Correction Multiplier for 15° C	-	Table 500E.1						
	33. Mixture Sprayed Cold	L	$31 \times \frac{32}{15}$						
	34. Cutter Oil Sprayed Cold	L	$33 \times \frac{100+15+16}{100}$						
	35. Adhesion Agent Sprayed Cold	L	$33 \times \frac{16}{100+15+16}$						
	36. Residual Binder Sprayed Cold	L	<b>33 - (34+35)</b>						
37. Over or Under Sprayed Cold	± L	<b>36 - 14</b>							
38. Tolerance (10% for Scrap Rubber)	L	5% of <b>14</b>							
39. Sprayed Outside Tolerance Cold	L	<b>  37   - 38</b>							
40. Actual binder Application Rate Cold*	L/m <sup>2</sup>	<b>36 / 10</b>							
APPLICATION of AGGREGATE	41. Aggregate Size	mm	-						
	42. Target Aggregate Rate	m <sup>2</sup> / m <sup>3</sup>	Form 395K						
	43. Target Aggregate Quantity	m <sup>3</sup>	<b>10 / 42</b>						
	44. Precoating Material	Type	-						
	45. Precoating Material Rate	L/m <sup>3</sup>	-						
	46. Aggregate Spread	m <sup>3</sup>	-						
	47. Over or Under Spread	± m <sup>3</sup>	<b>46 - 43</b>						
	48. Actual Rate	m <sup>2</sup> / m <sup>3</sup>	<b>10 / 46</b>						

Plan of sprayer runs. \* includes scrap rubber / polymer

Copy for:  
 1. Work File No: ..... Principal's Representative Signature: .....  
 2. Seal Design Record File ..... Service Provider's Representative Signature: .....  
 3. Service Provider's Representative ..... Representative Signature: .....

### Directions for Use

1. Use a new set of sheets for each day's work or each job if more than one job is done on the same day.
2. If different types of treatment are included in one job use a separate set of sheets for each treatment.
3. If more than one sheet is used on a single day, number the sheets consecutively.
4. Forward the original to the Principal (as applicable) at the completion of each day's work or as previously agreed. Copy to be retained by the service provider.
5. Record the particulars of each spray run in the appropriate column, in the field, as the work progresses.
6. For double application treatments, use separate column for each application.
7. Refer the location to the nearest town or village. In case of remote areas refer to kilometre posts or landmarks. Include the direction of measurement. The starting and finishing points of each run are to be referred to the same origin as the location.
8. Show the 'type of treatment' SAM (Seal or Reseal) or SAMI.
9. Inspect the sprayer certificate which should be in the sprayer cabin and record its number and the expiry date.
10. Record the sprayer number, weather, time, air temperature, pavement surface temperature, starting point, finishing point, length, width and area of the run in lines 1 to 10 of the form.
11. Record the scrap rubber or polymer additive type in line 11 and record the percentage or grades in line 12.
12. Obtain the target nett cold application rate (i.e. Residual Binder Application Rate Cold) of binder from Form 395K. Application rate at 15°C referred as cold application rate. Record it in line 13 and multiply it by the area (line 10) to give the target volume (i.e. Residual Binder Quantity Cold) and recorded it in line 14.
13. For SAM or SAMI treatments incorporating scrap rubber, the recommended percentage of cutter oil should be in accordance with Table 500E.3. Cutter proportions shown in the Table 500E.3 as parts per 100 parts of PMB and it may be taken as a reasonable approximation of percentage by volume. Where appropriate, manufacturer's guidelines should be followed. Record the added cutter percentage in line 15.
14. Record the percentage of adhesion agent in line 16.
15. Calculate the mixture application rate cold (i.e. for binder plus cutter oil and adhesion agent) and record this in line 17.
16. Determine the approximate total sprayer load required hot (line 22). Firstly, add 10% to the quantity of cold residual binder and cutter oil (lines 18 and 19). This allows 5% for possible over spraying and a further 5% to be retained in the sprayer to guard against sucking air into the sprayer pumps when the sprayer is nearly empty. Calculate the quantity of adhesion agent required (line 20) and the total load cold in line 21. Multiply this total by 1.1 to get the approximate total hot load required and record in line 22.
17. Where scrap rubber is used, calculate the quantity required (kg) from Table 500E.2 for the required percentage (line 12) and record in line 23.
18. If it is desired to spray a particular quantity of binder (e.g. a full sprayer load) rather than to cover a particular area, subtract 10% from the particular quantity (or full sprayer load hot in line 24) to give the 'available sprayer capacity' and divide this by the rate of application of hot cutback bitumen (line 27) to give the area which can be sprayed (line 10). Then mark the appropriate length on the road.

19. Calculate the quantities of cutter oil, binder and adhesion agent and scrap rubber or polymer to be added to the sprayer taking into account the material left in the sprayer after the previous run.
20. When using a scrap rubber modifier, the mixture should be properly blended. The quantity of binder in the sprayer must be limited to 80% of the sprayer capacity to allow for expansion of the binder when the scrap rubber is added. Measure the volume of the hot mixture in the sprayer at start by dipstick (line 24) and the temperature in the sprayer (line 25). Record volume correction multiplier from Table 500E.1 in line 26 and apply to calculate the hot mixture application rate (line 27). Check the pump speed and road speed appropriate to the required rate of application of hot binder by reference to the Spraying Table which is kept in the sprayer cabin. Record these in lines 28 and 29.
21. At the end of the sprayer run, measure the volume left in the sprayer by dipstick (line 30), subtract this from the load at start of run (line 24) to give the volume of hot mixture actually sprayed (line 31). Record the volume correction multiplier from Table 500E.1 in line 32, and use this to calculate the volume of mixture sprayed cold (line 33). Calculate the cold cutter oil volume sprayed (line 34) and the adhesion agent sprayed (line 35), and subtract from the cold mixture to give the volume of residual binder sprayed cold (line 36).
22. After each spray run, compare the volume of cold binder sprayed (line 36) with the target volume (i.e. Residual Binder Quantity Cold in line 14). Record the volume over or under sprayed in line 37 and compare this with the permissible tolerance of 5% when using a synthetic polymer modifier, or 10% when using Scrap Rubber, and record in line 38. If sprayed outside the permissible tolerance, record the difference in line 39. Calculate the actual nett cold binder application rate and record in line 40.
23. Record the aggregate size, target aggregate rate of application, target aggregate quantity and precoating details in lines 41 to 45.
24. Measure in levelled truckloads, the quantity of aggregate actually used (line 46). Compare this with the target quantity (line 43) and record the quantity over or under spread in line 47. Calculate the actual rate of application of aggregate (line 48).

**TABLE 500E.1  
VOLUME CORRECTION**

Multiply by "A" to reduce volume at T°C to volume at 15°C  
Multiply by "B" to increase volume at 15°C to volume at T°C

<b>A</b>	<b>Temp. (T°C)</b>	<b>B</b>	<b>A</b>	<b>Temp. (T°C)</b>	<b>B</b>
.9856	38	1.0146	<b>.9356</b>	<b>120</b>	<b>1.0688</b>
<b>.9844</b>	<b>40</b>	<b>1.0158</b>	.9344	122	1.0702
.9831	42	1.0172	.9332	124	1.0716
.9819	44	1.0184	.9320	126	1.0730
.9806	46	1.0198	.9308	128	1.0743
.9794	48	1.0210	<b>.9296</b>	<b>130</b>	<b>1.0757</b>
<b>.9782</b>	<b>50</b>	<b>1.0223</b>	.9284	132	1.0771
.9769	52	1.0236	.9272	134	1.0785
.9757	54	1.0249	.9260	136	1.0799
.9745	56	1.0262	.9249	138	1.0812
.9732	58	1.0275	<b>.9237</b>	<b>140</b>	<b>1.0826</b>
<b>.9720</b>	<b>60</b>	<b>1.0288</b>	.9225	142	1.0840
.9708	62	1.0301	.9213	144	1.0854
.9695	64	1.0315	.9201	146	1.0868
.9683	66	1.0327	.9189	148	1.0883
.9671	68	1.0340	<b>.9178</b>	<b>150</b>	<b>1.0896</b>
<b>.9659</b>	<b>70</b>	<b>1.0353</b>	.9166	152	1.0910
.9646	72	1.0367	.9154	154	1.0924
.9634	74	1.0380	.9142	156	1.0939
.9622	76	1.0393	.9130	158	1.0953
.9610	78	1.0406	<b>.9119</b>	<b>160</b>	<b>1.0966</b>
<b>.9597</b>	<b>80</b>	<b>1.0420</b>	.9107	162	1.0981
.9585	82	1.0433	.9095	164	1.0995
.9573	84	1.0446	.9084	166	1.1009
.9561	86	1.0459	.9072	168	1.1023
.9549	88	1.0472	<b>.9060</b>	<b>170</b>	<b>1.1038</b>
<b>.9537</b>	<b>90</b>	<b>1.0486</b>	.9049	172	1.1051
.9524	92	1.0500	.9037	174	1.1066
.9512	94	1.0513	.9025	176	1.1080
.9500	96	1.0526	.9014	178	1.1094
.9488	98	1.0540	<b>.9002</b>	<b>180</b>	<b>1.1109</b>
<b>.9476</b>	<b>100</b>	<b>1.0553</b>	.8990	182	1.1123
.9464	102	1.0566	.8979	184	1.1137
.9452	104	1.0580	.8967	186	1.1152
.9440	106	1.0593	.8956	188	1.1166
.9428	108	1.0607	<b>.8944</b>	<b>190</b>	<b>1.1181</b>
<b>.9416</b>	<b>110</b>	<b>1.0620</b>	.8933	192	1.1195
.9404	112	1.0634	.8921	194	1.1209
.9392	114	1.0647	.8909	196	1.1224
.9380	116	1.0661	.8898	198	1.1239
.9368	118	1.0675	<b>.8886</b>	<b>200</b>	<b>1.1253</b>

Source: Table 3 Volume Correction, AAPA/Austrroads Pavement Work Tips 40 (April 2014).

**TABLE 500E.2**

1 of 2

Rubber Bitumen Mixture (L) 15°C	15% Scrap Rubber		20% Scrap Rubber		25% Scrap Rubber	
	Bitumen (L) 15°C	Rubber (kg)	Bitumen (L) 15°C	Rubber (kg)	Bitumen (L) 15°C	Rubber (kg)
1	1	0	1	0	1	0
2	2	0	2	0	2	1
3	3	0	2	1	2	1
4	3	1	3	1	3	1
5	4	1	4	1	4	1
6	5	1	5	1	5	2
7	6	1	6	1	5	2
8	7	1	7	2	5	2
9	8	1	7	2	7	2
10	9	2	8	2	8	3
11	10	2	9	2	8	3
12	10	2	10	3	9	3
13	11	2	11	3	10	3
14	12	2	11	3	11	4
15	13	2	12	3	12	4
16	14	3	13	3	12	4
17	15	3	14	4	13	4
18	16	3	15	4	14	5
19	16	3	16	4	15	5
20	17	3	16	4	15	5
21	18	3	17	4	16	6
22	19	3	18	5	17	6
23	20	4	19	5	18	6
24	21	4	20	5	18	6
25	22	4	20	5	19	7
26	22	4	21	5	20	7
27	23	4	22	6	21	7
28	24	4	23	6	22	7
29	25	5	24	6	22	8
30	26	5	25	6	23	8
31	27	5	25	7	24	8
32	28	5	26	7	25	8
33	29	5	27	7	25	9
34	29	5	28	7	26	9
35	30	5	29	7	27	9
36	31	6	29	8	28	10
37	32	6	30	8	28	10
38	33	6	31	8	29	10
39	34	6	32	8	30	10
40	35	6	33	8	31	11
41	35	6	33	9	32	11
42	36	7	34	9	32	11
43	37	7	35	9	33	11
44	38	7	36	9	34	12
45	39	7	37	9	35	12
46	40	7	38	10	35	12
47	41	7	38	10	36	12
48	41	8	39	10	37	13
49	42	8	40	10	38	13
50	43	8	41	11	39	13
51	44	8	42	11	39	13
52	45	8	42	11	40	14
53	46	8	43	11	41	14
54	47	8	44	11	42	14
55	48	9	45	12	42	15
56	48	9	46	12	43	15
57	49	9	47	12	44	15
58	50	9	47	12	45	15
59	51	9	48	12	45	16
60	52	9	49	13	46	16
61	53	10	50	13	47	16
62	54	10	51	13	48	16
63	54	10	51	13	49	17
64	55	10	52	13	49	17
65	56	10	53	14	50	17
66	57	10	54	14	51	17
67	58	11	55	14	52	18
68	59	11	56	14	52	18
69	60	11	56	14	53	18
70	60	11	57	15	54	18
71	61	11	58	15	55	19
72	62	11	59	15	55	19
73	63	11	60	15	56	19
74	64	12	60	16	57	20
75	65	12	61	16	58	20
76	66	12	62	16	59	20
77	67	12	63	16	59	20
78	67	12	64	16	60	21
79	68	12	65	17	61	21
80	69	13	65	17	62	21
81	70	13	66	17	62	21
82	71	13	67	17	63	22
83	72	13	68	17	64	22
84	73	13	69	18	65	22
85	73	13	69	18	65	22
86	74	14	70	18	66	23
87	75	14	71	18	67	23
88	76	14	72	18	68	23
89	77	14	73	19	69	23
90	78	14	74	19	69	24
91	79	14	74	19	70	24
92	79	14	75	19	71	24
93	80	15	76	20	72	25
94	81	15	77	20	72	25
95	82	15	78	20	73	25
96	83	15	78	20	74	25
97	84	15	79	20	75	26
98	85	15	80	21	75	26
99	86	16	81	21	76	26
100	86	16	82	21	77	26

**TABLE 500E.2**

2 of 2

Rubber Bitumen Mixture (L) 15 °C	15% Scrap Rubber		20% Scrap Rubber		25% Scrap Rubber	
	Bitumen (L) 15 °C	Rubber (kg)	Bitumen (L) 15 °C	Rubber (kg)	Bitumen (L) 15 °C	Rubber (kg)
1000	864	157	817	210	770	264
1100	950	173	899	231	847	290
1200	1037	188	980	252	924	317
1300	1123	204	1062	273	1001	343
1400	1210	220	1144	294	1078	370
1500	1296	236	1226	315	1155	396
1600	1382	251	1307	336	1232	422
1700	1469	267	1389	357	1309	449
1800	1555	283	1471	378	1386	475
1900	1642	298	1552	399	1463	502
2000	1728	314	1634	420	1540	528
2100	1814	330	1716	441	1617	554
2200	1901	345	1797	462	1694	581
2300	1987	361	1879	483	1771	607
2400	2074	377	1961	504	1848	634
2500	2160	393	2043	525	1925	660
2600	2246	408	2124	546	2002	686
2700	2333	424	2206	567	2079	713
2800	2419	440	2288	588	2156	739
2900	2506	455	2369	609	2233	766
3000	2592	471	2451	630	2310	792
3100	2678	487	2533	651	2387	818
3200	2765	502	2614	672	2464	845
3300	2851	518	2696	693	2541	871
3400	2938	534	2778	714	2618	898
3500	3024	550	2860	735	2695	924
3600	3110	565	2941	756	2772	950
3700	3197	581	3023	777	2849	977
3800	3283	597	3105	798	2926	1003
3900	3370	612	3186	819	3003	1030
4000	3456	628	3268	840	3080	1056
4100	3542	644	3350	861	3157	1082
4200	3629	659	3431	882	3234	1109
4300	3715	675	3513	903	3311	1135
4400	3802	691	3595	924	3388	1162
4500	3888	707	3677	945	3465	1188
4600	3974	722	3758	966	3542	1214
4700	4061	738	3840	987	3619	1241
4800	4147	754	3922	1008	3696	1267
4900	4234	769	4003	1029	3773	1294
5000	4320	785	4085	1050	3850	1320
5100	4406	801	4167	1071	3927	1346
5200	4493	816	4248	1092	4004	1373
5300	4579	832	4330	1113	4081	1399
5400	4666	848	4412	1134	4158	1426
5500	4752	864	4494	1155	4235	1452
5600	4838	879	4575	1176	4312	1478
5700	4925	895	4657	1197	4389	1505
5800	5011	911	4739	1218	4466	1531
5900	5098	926	4820	1239	4543	1558
6000	5184	942	4902	1260	4620	1584
6100	5270	958	4984	1281	4697	1610
6200	5357	973	5065	1302	4774	1637
6300	5443	989	5147	1323	4851	1663
6400	5530	1005	5229	1344	4928	1690
6500	5616	1021	5311	1365	5005	1716
6600	5702	1036	5392	1386	5082	1742
6700	5789	1052	5474	1407	5159	1769
6800	5875	1068	5556	1428	5236	1795
6900	5962	1083	5637	1449	5313	1822
7000	6048	1099	5719	1470	5390	1848
7100	6134	1115	5801	1491	5467	1874
7200	6221	1130	5882	1512	5544	1901
7300	6307	1146	5964	1533	5621	1927
7400	6394	1162	6046	1554	5698	1954
7500	6480	1178	6128	1575	5775	1980
7600	6566	1193	6209	1596	5852	2006
7700	6653	1209	6291	1617	5929	2033
7800	6739	1225	6373	1638	6006	2059
7900	6826	1240	6454	1659	6083	2086
8000	6912	1256	6536	1680	6160	2112
8100	6998	1272	6618	1701	6237	2138
8200	7085	1287	6699	1722	6314	2165
8300	7171	1303	6781	1743	6391	2191
8400	7258	1319	6863	1764	6468	2218
8500	7344	1335	6945	1785	6545	2244
8600	7430	1350	7026	1806	6622	2270
8700	7517	1366	7108	1827	6699	2297
8800	7603	1382	7190	1848	6776	2323
8900	7690	1397	7271	1869	6853	2350
9000	7776	1413	7353	1894	6930	2376

**Table 500E.3**

**GUIDE TO CUTTING PRACTICE FOR POLYMER MODIFIED BINDERS**

Guide to cutting practice for PMBs for HSS, XSS and SAM applications <sup>(1), (2)</sup> (parts by volume of cutter oil to be added to 100 parts of PMB measured at 15°C <sup>(3), (4)</sup> )							
Pavement temperature (°C) <sup>(5)</sup>	Traffic v/l/d* (traffic used to design rates of application)	Class of PMB <sup>(2, 3)</sup>					
		S10E	S15E	S20E	S35E	S45R <sup>(6)</sup> S15RF	S18RF
20 to 25	< 1000	6	6 - 8	8	6	10	12
	≥ 1000	4	4 - 6	6 - 8	4	8	10
26 to 32	< 1000	4	4 - 6	6	4	6 - 8	10 - 12
	≥ 1000	2	2 - 4	4 - 6	2	6	8 - 10
33 to 38	< 1000	2	2 - 4	4	2	6	8
	≥ 1000	2	2	2 - 4	2	4 - 6	6 - 8
39 to 45	< 1000	0 - 2	Min 2	Min 2	0 - 2	4 - 6	6
	≥ 1000	0 - 2	Min 2	Min 2	0 - 2	4	4 - 6
> 45	All traffic	0 - 2	Min 2	Min 2	0 - 2	Min 4	Min 4

\*v/l/d = vehicles per lane per day.

**NOTES:**

- 1 In SAMI applications, where the seal is to be covered with asphalt within a short period, it is undesirable to add any cutter oil at all, and the maximum added should not exceed two parts of cutter oil per 100 parts of PMB.
- 2 Proportions of cutter oil refer to use in single/single seals or the second application of double/double seals. In double/double seal applications, where the second application is applied with little or no trafficking between applications, the proportion of cutter oil in the first application should be reduced to 2 - 4 parts maximum.
- 3 Where cutter proportions are added as a percentage of total binder, the proportions shown here as parts per 100 parts of PMB may be taken as a reasonable approximation of percentage by volume.
- 4 At high rates of application of PMB, say over 2 L/m<sup>2</sup>, the cutter oil may be reduced by 2 parts.
- 5 Pavement temperatures used to determine the proportion of cutter oil should consider the effect of shaded areas of pavement and cooling of pavements at the end of the day.
- 6 Pre-blended crumb rubber (R class) may contain combining/process oils that influence the proportion of cutter oil required. Where appropriate, manufacturer's guidelines should be followed.