Cutback Bitumen Seal and Reseal

Daily Record

500C

Transport for NSW
(TfNSW)

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

Transport for NSW

Cutback Bitumen Seal and Reseal Daily Record
Form 500C

FOR | D | M | Y | File .....

Instruction Sheet Reference No ..... 500C | LOT NUMBER

Office: .....

Road Number/Name: .....

Location: ..... km to ..... km from ..... toward: .....

Roadloc to | | | | to | | | |

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	^{0}C	-						
	5. Pavement Surface Temperature	^{0}C	-						
	6. Starting Point of Run	km	-						
	7. Finishing Point of Run	km	-						
	8. Length	m	-						
	9. Width	m	-						
	10. Area	m^2	**8 x 9**						
ORDERED BINDER	**11.** Residual Binder Application Rate Cold	L/m^2	Form 395K						
ORDERED BINDER	**12.** Residual Binder Quantity Cold	L	**10 x 11**						
ORDERED BINDER	**13.** Cutter Oil Percentage Cold	%	Form 382						
ORDERED BINDER	**14.** Adhesion Agent Percentage	%	-						
ORDERED BINDER	**15.** Binder + Cutter Oil Application Rate Cold	L/m^2	**11** x $\frac{100}{100 - \mathbf{13}}$						
SPRAYER LOAD	**16.** Residual Binder Nett Cold	L	**12** x 1.1						
SPRAYER LOAD	**17.** Cutter Oil Cold	L	**10** x(**15-11**)x 1.1						
SPRAYER LOAD	**18.** Adhesion Agent Cold	L	**16** x $\frac{\mathbf{14}}{100 - \mathbf{14}}$						
SPRAYER LOAD	**19.** Total Load Cold	L	**16+17+18**						
SPRAYER LOAD	**20.** Total Load Required Hot (Approx.)	L	**19** x 1.1						
APPLICATION of BINDER	**21.** Sprayer Load at Start Hot	L	Dipstick						
APPLICATION of BINDER	**22.** Mixture Temperature in Sprayer	^{0}C	-						
APPLICATION of BINDER	**23.** Volume Correction Multiplier	-	Table 500C.1						
APPLICATION of BINDER	**24.** Mixture Application Rate Hot	L/m^2	**15 x 23**						
APPLICATION of BINDER	**25.** Pump Speed	r.p.m.	Spraying Table						
APPLICATION of BINDER	**26.** Road Speed	m/min	Spraying Table						
APPLICATION of BINDER	**27.** Sprayer Load at Finish Hot	L	Dipstick						
APPLICATION of BINDER	**28.** Mixture Sprayed Hot	L	**21 - 27**						
APPLICATION of BINDER	**29.** Volume Correction Multiplier for 15^{0}C	-	Table 500C.1						
APPLICATION of BINDER	**30.** Mixture Sprayer Cold	L	**28 x 29**						
APPLICATION of BINDER	**31.** Cutter Oil Sprayed Cold	L	**30** x $\frac{\mathbf{13}}{100}$						
APPLICATION of BINDER	**32.** Adhesion Agent Sprayed Cold	L	**30** x $\frac{\mathbf{14}}{100}$						
APPLICATION of BINDER	**33.** Residual Binder Sprayed Cold	L	**30 - (31+32)**						
APPLICATION of BINDER	**34.** Over or Under Sprayed Cold	$\pm$ L	**33 - 12**						
APPLICATION of BINDER	**35.** Tolerance	L	5% of **12**						
APPLICATION of BINDER	**36.** Sprayed Outside Tolerance Cold	L	$\lvert$ **34** $\rvert$ **- 35**						
APPLICATION of BINDER	**37.** Actual Binder Application Rate Cold	L/m^2	**33 / 10**						
APPLICATION of AGGREGATE	**38.** Aggregate Size	mm	-						
APPLICATION of AGGREGATE	**39.** Target Aggregate Rate	m^2/m^3	Form 395K						
APPLICATION of AGGREGATE	**40.** Target Aggregate Quantity	m^3	**10 / 39**						
APPLICATION of AGGREGATE	**41.** Precoating Material	Type	-						
APPLICATION of AGGREGATE	**42.** Precoating Material Rate	L/m^3	-						
APPLICATION of AGGREGATE	**43.** Aggregate Spread	m^3	-						
APPLICATION of AGGREGATE	**44.** Over or Under Spread	$\pm$ m^3	**43 - 40**						
APPLICATION of AGGREGATE	**45.** Actual Rate	m^2/m^3	**10 / 43**						

Plan of sprayer runs.

Copy for:

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

Principal's Representative Signature: .....

Service Provider's Representative Signature: .....

UNCLASSIFIED

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 columns 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' as Seal or Reseal.

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. Obtain the target nett cold application rate of binder from Form 395K. Application rate at 15^{o}C referred as cold application rate. Record it in line 11 and multiply by the area (line 10) to give the target volume which is recorded in line 12.

12. Select the percentage of cutter oil from the Cutback Chart Form 382 and record this in line 13. Record the percentage of adhesion agent in line 14.

13. Calculate the cold application rate for binder plus cutter oil (line 15).

14. Determine the approximate total sprayer load hot (line 20) required. Firstly add 10% to the quantity of cold residual binder and cutter oil (lines 16 and 17). 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 18) and the total load cold in line 19. Multiply this by 1.1 to get the approximate total hot load required and record it line 20.

15. Calculate the quantities of cutter oil, binder and adhesion agent to be added to the sprayer taking into account the material left in the sprayer after the previous run.

16. Load the sprayer drawing the cold cutter oil into the sprayer tank (by the sprayer pump) before the hot bitumen. Measure the volume of the hot mixture in the sprayer at start by dipstick (line 21). Measure the temperature in the sprayer (line 22). Record volume correction multiplier from Table 500C.1 in line 23 and apply this to calculate the hot mixture application rate (line 24). Check the pump speed and road speed appropriate to the required rate of application of hot cutback bitumen by reference to the Spraying Table which is kept in the sprayer cabin. Record these in lines 25 and 26.

17. 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 21) to give the 'available sprayer capacity' and divide this by the rate of application of hot cutback bitumen (line 24) to give the area which can be sprayed (line 10). Then mark the appropriate length on the road.

18. At the end of the sprayer run, measure the volume left in the sprayer by dipstick (line 27), subtract this from the load at start of run (line 21) to give the volume of hot mixture actually sprayed (line 28) and convert this to cold volume of mixture (line 30) using the conversion table (Table 500C.1). Calculate the cold cutter oil volume sprayed (line 31) by multiplying the percentage cutter oil (line 13) by the cold mixture sprayed (line 30). Then subtract the cold cutter oil sprayed (line 31) and cold adhesion sprayed (line 32) from the cold mixture sprayed to give the nett cold residual binder actually sprayed (line 33).

19. After each spray run, compare the volume of residual binder sprayed (line 33) with the target volume (line 12). Record the volume over or under sprayed in line 34 and compare this with the permissible tolerance of 5% (line 35) and record the difference in line 36. Record the actual binder cold application rate in line 37.

20. Record the aggregate size, target aggregate rate of application, target aggregate quantity and precoating details in lines 38 to 42.

21. Measure in levelled truckloads, the quantity of aggregate actually used (line 43). Compare this with the target quantity (line 40) and record the quantity over or under spread in line 44. Calculate the actual rate of application of aggregate (line 45).

22. When using cutback bitumen prepared in a refinery, the target rate of application of the nett bitumen will need to be increased by the following amounts to compensate for the cutter oil contained in the mixture.

Grade of Refinery Cutback Bitumen	**Approx. amount of cutter oil in mixture %**	**Increase on ordered rate for nett bitumen to compensate for cutter oil in mixture %**
AMC 00	56	127
AMC 0	44	79
AMC 1	34	52
AMC 2	27	37
AMC 3	21	27
AMC 4	16	19
AMC 5	11	12
AMC 6	7	8
AMC 7	3	3

23. The range of temperature for heating and spraying are set out below.

Type of Material	**Grade**	**Range of temperatures for Heating and Spraying $0^{o}C$**
Cutback Bitumen	AMC 00	10 - 30
	AMC 0	35 - 55
	AMC 1	60 - 80
	AMC 2	75 - 100
	AMC 3	95 - 115
	AMC 4	110 - 135
	AMC 5	120 - 150
	AMC 6	135 - 160
	AMC 7	150 - 175
Bitumen	Class 170	160 - 190
	Class 240	165 - 195
	Class 320	170 - 200

TABLE 500C.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

A	Temp. (T°C)	B	A	Temp. (T°C)	B
.9856	38	1.0146	**.9356**	**120**	**1.0688**
.9844	**40**	**1.0158**	.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	**.9296**	**130**	**1.0757**
.9782	**50**	**1.0223**	.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	**.9237**	**140**	**1.0826**
.9720	**60**	**1.0288**	.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	**.9178**	**150**	**1.0896**
.9659	**70**	**1.0353**	.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	**.9119**	**160**	**1.0966**
.9597	**80**	**1.0420**	.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	**.9060**	**170**	**1.1038**
.9537	**90**	**1.0486**	.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	**.9002**	**180**	**1.1109**
.9476	**100**	**1.0553**	.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	**.8944**	**190**	**1.1181**
.9416	**110**	**1.0620**	.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	**.8886**	**200**	**1.1253**

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