Transport for NSW

Cutback Bitumen
Prime and Primerseal

Daily Record

500A

Transport for NSW
(TfNSW)

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

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NSW GOVERNMENT | Transport for NSW

Cutback Bitumen Prime and Primerseal Daily Record
Form 500A

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

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

Office: .....

Road Number/Name: .....

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

Roadloc to | | | | | | | | to | | | | | | | |

Type of Treatment: (Tick) ☐ Prime ☐ Primerseal

Service Provider's Name: .....

Material Sprayed: .....

Sprayer Certificate Number: .....

Material Supplier: .....

Sprayer Certificate Expiry Date: .....

Type of Base: .....

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**						
TARGET BINDER	**11.** Equivalent % of Cutter in Mixture	%	Form 395A						
TARGET BINDER	**12.** Primer or Primerbinder Application Rate Cold	L/m^2	Form 395A						
TARGET BINDER	**13.** Primer or Primerbinder Quantity Cold	L	**10 x 12**						
TARGET BINDER	**14.** Adhesion Agent Type	-	-						
TARGET BINDER	**15.** Adhesion Agent Percentage	%	-						
SPRAYER LOAD	**16.** Primer or Primerbinder Cold	L	**13** x 1.1						
SPRAYER LOAD	**17.** Adhesion Agent Cold	L	**16** x $\frac{15}{100}$						
SPRAYER LOAD	**18.** Total Load Cold	L	**16 + 17**						
SPRAYER LOAD	**19.** Total Load Required Hot (Approx.)	L	**18** x 1.1						
APPLICATION of PRIMER OR PRIMERBINDER	**20.** Sprayer Load at Start Hot	L	Dipstick						
APPLICATION of PRIMER OR PRIMERBINDER	**21.** Mixture Temperature in Sprayer	^{0}C	-						
APPLICATION of PRIMER OR PRIMERBINDER	**22.** Volume Correction Multiplier	-	Table 500A.1						
APPLICATION of PRIMER OR PRIMERBINDER	**23**. Mixture Application Rate Hot	L/m^2	**12 x 22**						
APPLICATION of PRIMER OR PRIMERBINDER	**24**. Pump Speed	r.p.m.	Spraying Table						
APPLICATION of PRIMER OR PRIMERBINDER	**25**. Road Speed	m/min	Spraying Table						
APPLICATION of PRIMER OR PRIMERBINDER	**26.** Sprayer Load at Finish Hot	L	Dipstick						
APPLICATION of PRIMER OR PRIMERBINDER	**27.** Mixture Sprayed Hot	L	**20 - 26**						
APPLICATION of PRIMER OR PRIMERBINDER	**28.** Volume Correction Multiplier	-	Table 500A.1						
APPLICATION of PRIMER OR PRIMERBINDER	**29.** Mixture Sprayed Cold	L	**27 x 28**						
APPLICATION of PRIMER OR PRIMERBINDER	**30.** Adhesion Agent Sprayed	L	**29** x $\frac{15}{100 + 15}$						
APPLICATION of PRIMER OR PRIMERBINDER	**31.** Primer or Primerbinder Sprayed Cold	L	**29 - 30**						
APPLICATION of PRIMER OR PRIMERBINDER	**32.** Over or Under Sprayed Cold	± L	**31 - 13**						
APPLICATION of PRIMER OR PRIMERBINDER	**33**. Tolerance	L	5% of **13**						
APPLICATION of PRIMER OR PRIMERBINDER	**34.** Sprayed Outside Tolerance Cold	L	| **32** | - **33**						
APPLICATION of PRIMER OR PRIMERBINDER	**35.** Actual Rate Cold	L/m^2	**31 / 10**						
APPLICATION of AGGREGATE	**36.** Aggregate Size	mm	-						
APPLICATION of AGGREGATE	**37.** Target Aggregate Rate	m^2 / m^3	Form 395A						
APPLICATION of AGGREGATE	**38.** Target Aggregate Quantity	m^3	**10 / 37**						
APPLICATION of AGGREGATE	**39.** Precoating Material	Type	-						
APPLICATION of AGGREGATE	**40.** Precoating Material Rate	L/m^3	-						
APPLICATION of AGGREGATE	**41.** Aggregate Spread	m^3	-						
APPLICATION of AGGREGATE	**42.** Over or Under Spread	± m^3	**41 - 38**						
APPLICATION of AGGREGATE	**43**. Actual Rate	m^2 / m^3	**10 / 41**						

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: .....

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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. 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.

7. Show the 'type of treatment' by ticking the appropriate Prime or Primerseal box. (Note: Primer or Primerbinder maybe refinery cutback bitumen or bitumen cut back on site.)

8. Inspect the sprayer certificate which should be in the sprayer cabin and record its number and the expiry date.

9. 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.

10. For cutback bitumen mixtures, select the appropriate type and grade of primer or primerbinder from Form 395A and record the equivalent % of cutter oil mixture in line line 11.

11. Obtain the target nett cold application rate of primer or primerbinder from Form 395A. Application rate at 15^0C referred as cold application rate. Record the rate in line 12 and multiply it by the area (line 10) to give the target volume and record it in line 13. Record the adhesion agent type and percentage in lines 14 and 15.

12. Determine the approximate total sprayer load hot required (line 19). Firstly add 10% to the quantity of cold primer or primerbinder (line 16). 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 17) and record the total load cold in line 18. Multiply this load by 1.1 to get the approximate total sprayer load hot required and record it line 19.

13. If it is desired to spray a particular quantity of primer or primerbinder (e.g. a full sprayer load) rather than to cover a particular area, subtract 10% from the particular quantity (or full sprayer load in line 20) to give the 'available sprayer capacity' and divide this by the rate of application of hot mixture (line 23) to give the area which can be sprayed (line 10). Then mark the appropriate length on the road.

14. Calculate the quantities of primer or primerbinder (or cutter oil and bitumen) and adhesion agent (if any) to be added to the sprayer taking into account the material left in the sprayer after the previous run.

15. If producing cutback bitumen on site, load the sprayer drawing the cold cutter oil into the sprayer tank (by the sprayer pump) before the hot bitumen otherwise load required quantity of refinery cutback bitumen. Measure the volume of the hot mixture in the sprayer at start by dipstick (line 20) and the temperature in the sprayer (line 21). Record the volume correction multiplier from Table 500A.1 in line 22 and apply this to calculate the hot mixture application rate (line 23). Check the pump speed and road speed appropriate to the required rate of application of hot cutback bitumen, or primer or primerbinder by reference to the Spraying Table which is kept in the sprayer cabin. Record these in lines 24 and 25.

16. At the end of the sprayer run, measure the volume left in the sprayer by dipstick (line 26), subtract this from the load at start of run (line 20) to give the volume of hot mixture actually sprayed (line 27). Record the volume correction multiplier from Table 500A.1 in line 28, and use this to calculate the volume of mixture sprayed cold (line 29). Calculate the adhesion agent sprayed cold (line 30) and subtract from the cold mixture sprayed to give the nett primer or primerbinder actually sprayed (line 31).

17. After each spray run, compare the volume of primer or primerbinder sprayed cold (line 31) with the target volume (line 13). Record the volume over or under sprayed in line 32 and compare this with the permissible tolerance of 5% (line 33). If sprayed outside the permissible tolerance record the difference in line 34. Calculate the actual nett rate of application and show it in line 35.

18. Record the aggregate size, target aggregate rate of application, target aggregate quantity and precoating details in lines 36 to 40.

19. Measure in levelled truckloads, the quantity of aggregate actually used (line 41). Compare with the target quantity (line 38) and record the quantity over or under spread in line 42. Calculate the actual rate of application of aggregate (line 43).

20. 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 in target 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

21. 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
Cutback Bitumen - Fast evaporating cutter	FC2	70 - 95
	FC3	80 - 95
	FC4	95 - 110
Bitumen	Class 170	160 - 190
	Class 240	165 - 195
	Class 320	170 - 200

TABLE 500A.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).