UK Surface Dressing

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Background

Main Businesses:

- Surface Dressing – 10,000,000m² in 2012
- Microsurfacing – 2,500,000m² in 2012

Surface Dressing – UK Marketplace

- Economic climate
- Increasing use of specialist treatments

Road Note 39 (6th Edition)

- Design guide for road surface dressings
- Written by RSTA
- Specifies surface dressing for all categories and types of road
- Simple flow chart method

Road Note 39 (6th Edition)

Changes from previous editions

- Cut-back bitumens discontinued
- Spread rates for PMB
- Traffic categories
- Simplified design process

Road Note 39 (6th Edition)

Design data

1. Surface Temperature Category
2. Road Hardness Category
3. Traffic
4. Geometrics
5. Chipping Properties

1. Surface Temperature Category

Approximate Location	Altitude above sea level	Surface Temp. Category
South – England, south of Nottingham and Stoke-on-Trent	200 m or less	A
	Over 200 m	B
Central – England, north of Nottingham and Stoke-on-Trent Scotland, south of Glasgow and Edinburgh Wales	200 m or less	
	Over 200 m	C
North – Scotland, north of Glasgow and Edinburgh Northern Ireland	200 m or less	
	Over 200 m	D

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1. Surface Temperature Category

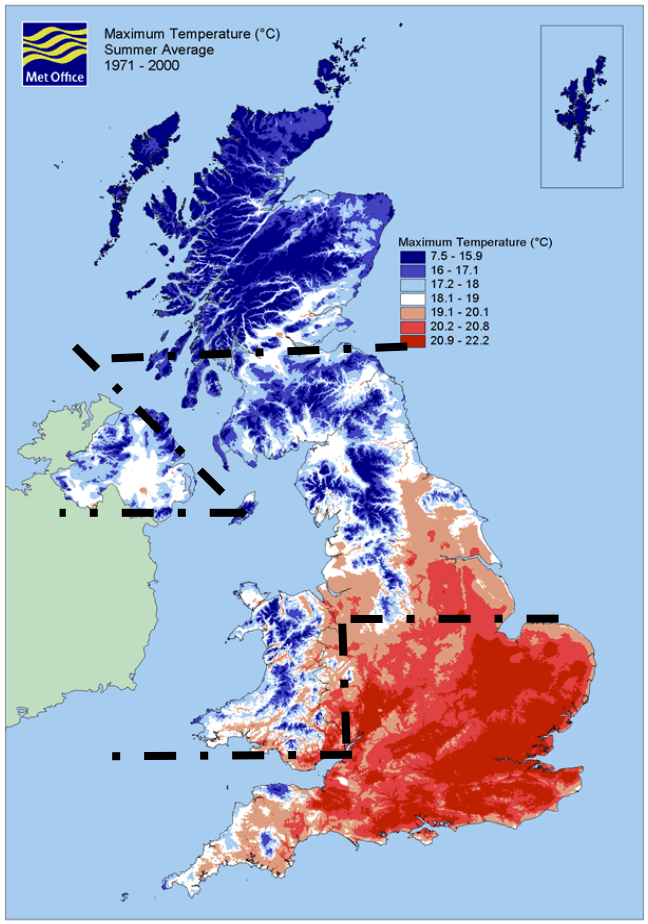

Figure 7.2.1

Locations to determine approximate Surface Temperature Categories over Meteorological Office data on mean summer maximum temperatures

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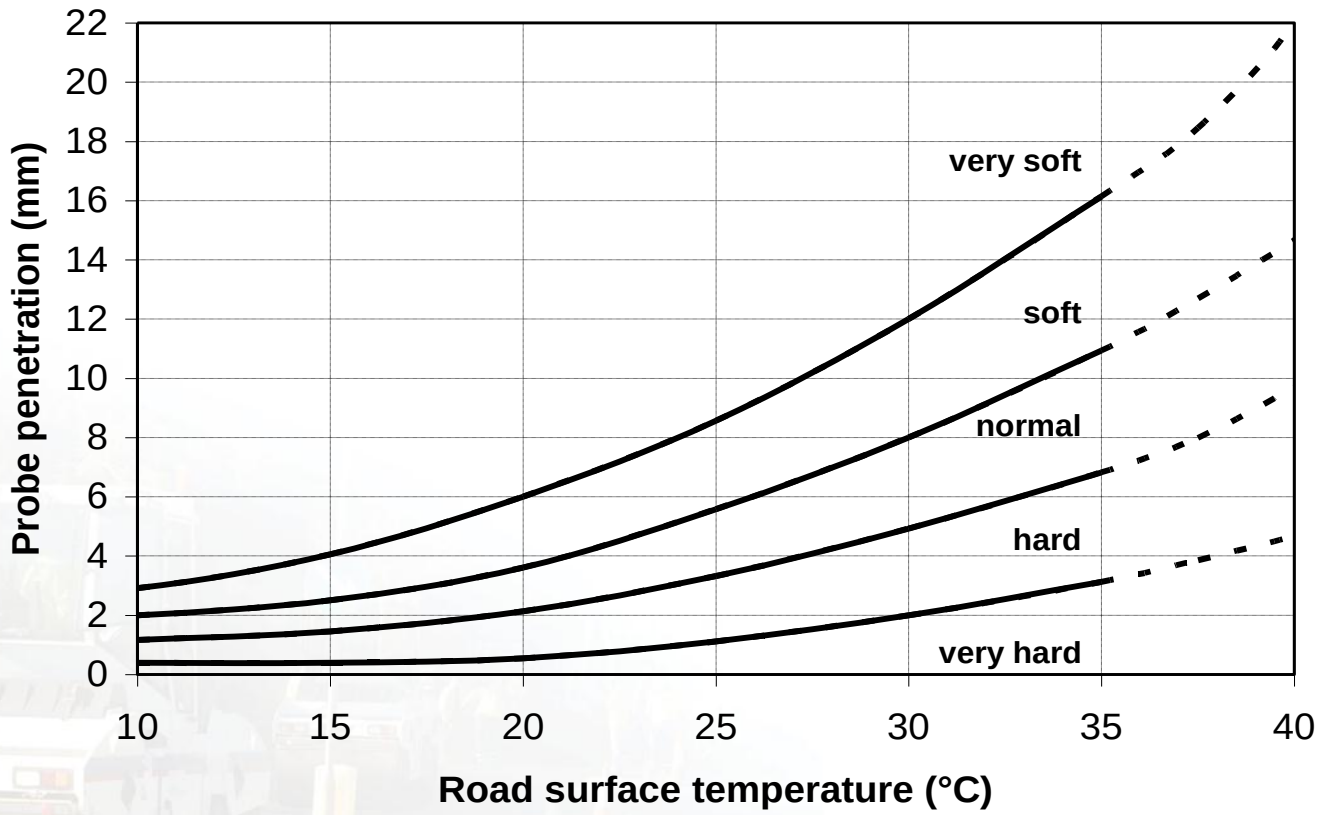
3. Road Hardness Category

3. Road Hardness Category



Category A

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4. Traffic

Medium & heavy vehicles / lane / day	0 to 50	51 to 125	126 to 250	251 to 500	501 to 1250	1251 to 2000	2001 to 2500	2501 to 3250	Over 3250
Traffic Category	H	G	F	E	D	C	B	B	A
NRSWA Road Type *	4	4	3	3	2	1	1	S	S

Table 7.2.3 – Traffic Categories

5. Geometrics

- Gradients
- Bends
- Junctions

→ **Stress**

Other Data Required

- General Surface Condition
- Season
- Shade
- Local Traffic
- Noise

Season

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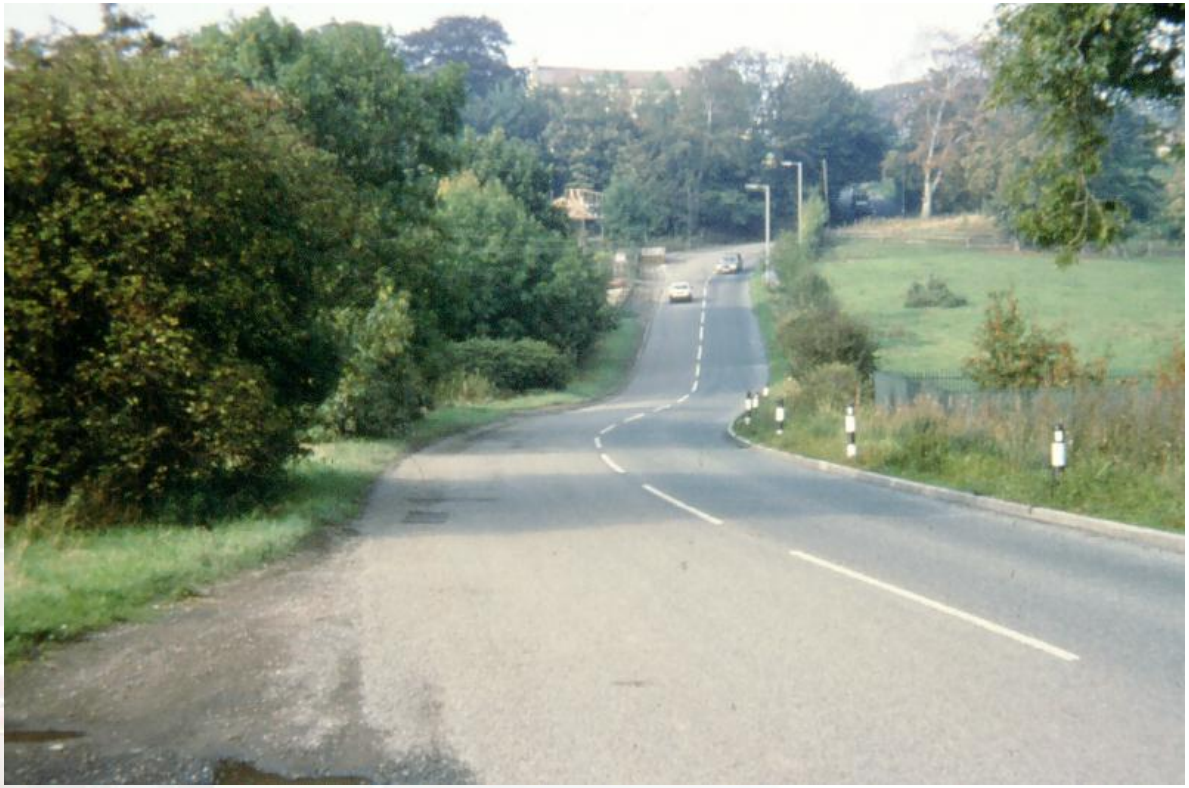
Shade

- Major cause of failures
- Vary binder rate of spread
  - None
  - Partial
  - Total

Shade



Local Traffic

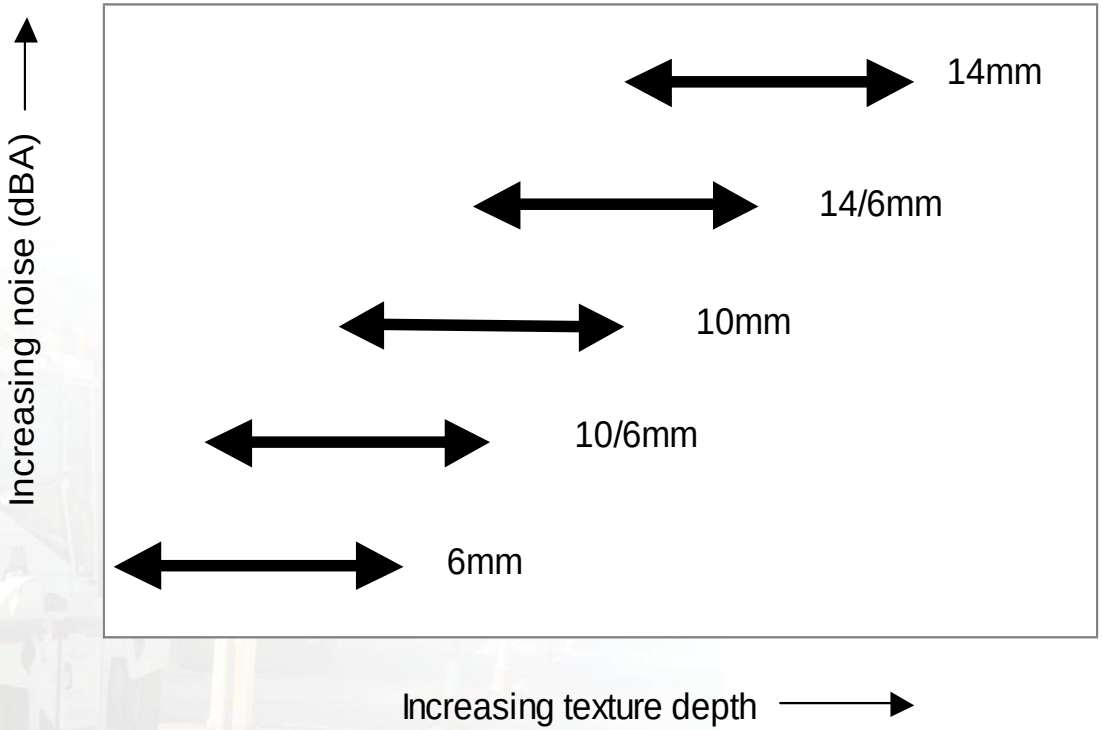
- Un-trafficked Areas
- Parked Areas
- Localised Heavy Turning Traffic

Local Traffic

Parked Vehicles

Parked Vehicles

Noise


Increasing noise (dBA)
14mm
14/6mm
10mm
10/6mm
6mm
Increasing texture depth

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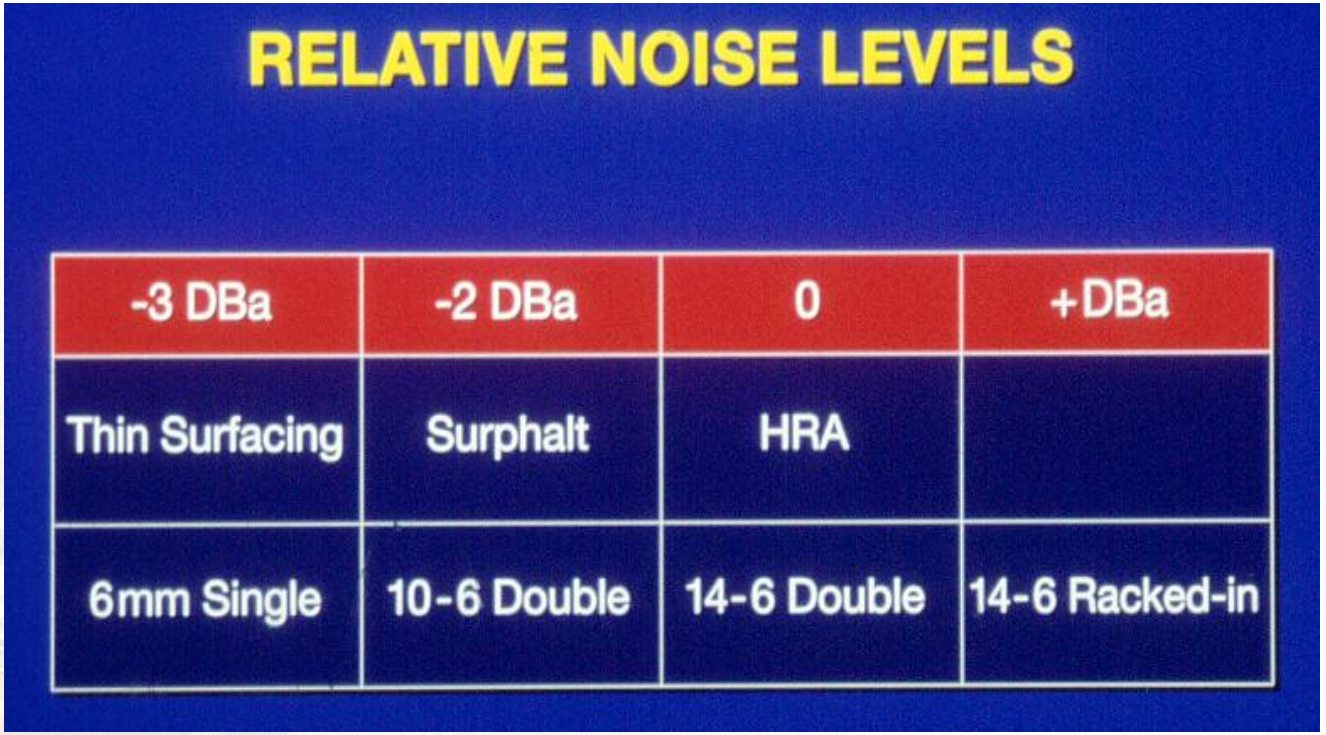
Noise



RELATIVE NOISE LEVELS

-3 DBa	-2 DBa	0	+DBa
Thin Surfacing	Surphalt	HRA	
6mm Single	10-6 Double	14-6 Double	14-6 Racked-in

Designing the dressings

- Site suitability
- Sections within the site
- Choosing the dressing type and binders
- Using the design proforma
- Selecting the rate of spread

Site suitability

Existing surface characteristic	Traffic Category							
	H	G	F	E	D	C	B	A
Very Hard and homogeneous	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hard and homogeneous	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Normal and homogeneous	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Soft and homogeneous	Yes	Yes	Yes	Yes	Texture	Texture	E	
Very Soft and homogeneous	Yes	Yes	Yes	Texture	E	E		
Fatting up in wheel tracks	Yes	Yes	Texture	Texture	E	E		
High macrotexture or fretted	Yes	Yes	Yes	Yes	Defects	Defects	E	
Porous	Yes	Yes	Yes	Defects	Defects	E		
Very variable	Defects	Defects	Defects	Defects	Defects	E	E	
Extensive patching	E	E	E	E	E			
Severe bleeding & extensive blackening								

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Site suitability – split into common areas

- Single/ Dual Carriageways / Hard Strips
- Similar Geometrics
- Similar Existing Surfaces
- Local Traffic
- Variable Hardness
- Urban / Rural

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Site suitability – split into common areas

Site suitability – split into common areas

Site suitability – split into common areas

Choosing the Dressing Type

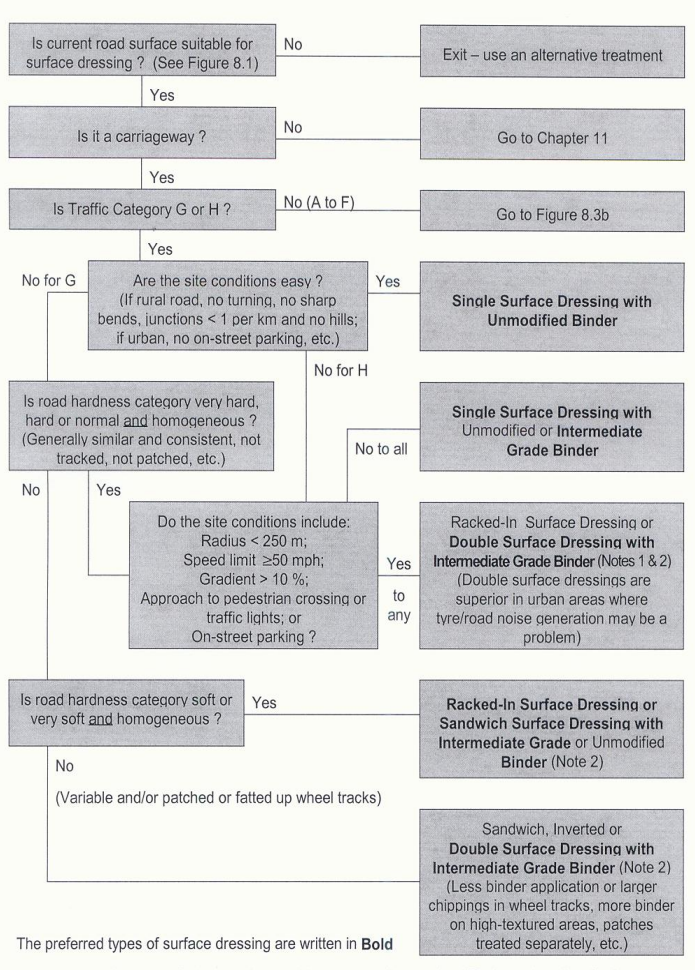
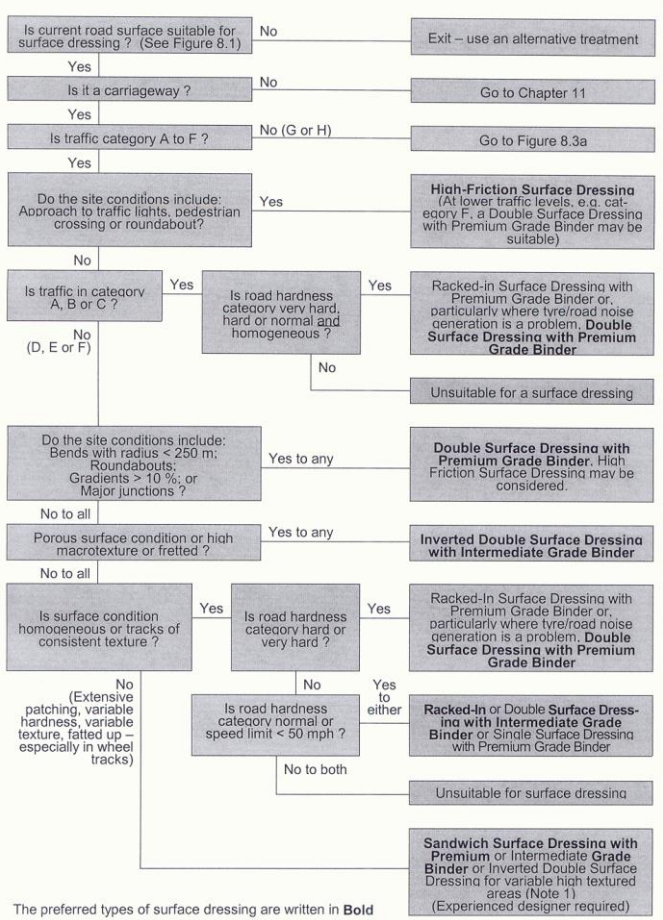


Figure 8.3a

Selection of Type of Surface Dressing for Lightly-Trafficked Sites

Choosing the Dressing Type



The preferred types of surface dressing are written in **Bold**

Note 1: Some such sites will be unsuitable for surface dressing (See Figure 8.1).

Figure 8.3b – Selection of Type of Surface Dressing for Heavily-Trafficked Sites

Figure 8.3b

Selection of Type of Surface Dressing for Heavily-Trafficked Sites

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Using the Design Proforma

Design of Road Surface Dressings to Road Note 39 (Sixth Edition)

Road number:		Region/Area:					
Section location:							
Length:	m	Width:	m	No. of lanes:		Area:	m^2
Lane(s)		Commercial Traffic:	cv/l/d			NRSWA road type:	
Traffic Speed: *	Limit > 50 mph	Limit ≤ 50 mph					
Traffic category: *	A	B	C	D	E	F	G	H
Latitude: *	South	Central	North	Temperature Category: *	A	B	C	D
Road hardness probe depth:	mm	at	°C	Min. PSV:		Max. AAV:	
Category: *	Very Hard	Hard	Normal	Soft	Very Soft	Variable	
Existing surface characteristics: *							
General surface condition: *	Very binder rich	Normal	Very binder lean				
Radius of curvature: *	Under 100 m	100 – 250 m	over 250 m	Expected Month on Site:			
Junction or crossing: *	Approach	Non-approach					
Overall gradient: *	up to 5 %	5 – 10 %	Over 10 %	Uphill	Downhill		

Using the Design Proforma

Type of surface dressing: *	Single	Racked-In	Double	Inverted Double	Sandwich	High-Friction

Chipping size: *	8/14 mm	6.3/10 mm	2.8/6.3 mm	Other:
	8/14 & 2.8/6.3 mm	6.3/10 & 2.8/6.3 mm	6.3/10 & 4/2 mm	

Aggregate type: *	Crushed rock	Blast-furnace	Steel slag	Gravel
Flakiness index: *	Less than 10 %	10 % to 15 %	15 % to 20 %	More than 20 %

Bituminous emulsion binder:	Unmodified	Intermediate	Premium Grade	Super-Premium

Seasonal risk category:	High	Significant	Low

Binder spread rate: First layer _____ L/m² Second layer * _____ L/m²

Location	Season	Aggregate type	Flakiness	Increase of chipping size	Shade	Surface condition	Gradient	Speed of traffic	Untrafficked area	Sum of factors	Rate of spread of binder
											L/m²
											L/m²
											L/m²
											L/m²

Designer: _____ Initials: _____ Date: / /

* Highlight or delete as appropriate

Shaded box indicates data that a Client should provide when seeking tenders

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Single Dressing

Traffic Category	Hardness Category of Road Surface									
	Very Hard		Hard		Normal		Soft		Very Soft	
	Size of Chipping (mm)	Binder Rate (L/m²)	Size of Chipping (mm)	Binder Rate (L/m²)	Size of Chipping (mm)	Binder Rate (L/m²)	Size of Chipping (mm)	Binder Rate (L/m²)	Size of Chipping (mm)	Binder Rate (L/m²)
A	(a)		(a)		(a)		(b)		(b)	
B	6.3/10	1.8 [c]	(a)		(a)		(a)		(b)	
C	6.3/10	1.8 [c]	6.3/10	1.6 [c]	(a)		(a)		(b)	
D	2.8/6.3	1.5 [c]	6.3/10	1.6 [c]	(a)		(a)		(a)	
E	2.8/6.3	1.5 [c]	6.3/10	1.6 [c]	6.3/10	1.6 [c]	6.3/10	1.6 [c]	(a)	
F	2.8/6.3	1.5 [c]	2.8/6.3	1.5 [c]	6.3/10	1.6 [c]	6.3/10	1.6 [c]	(a)	
G	2.8/6.3	1.5	2.8/6.3	1.5	2.8/6.3	1.5	6.3/10	1.6	(a)	
H	2.8/6.3	1.5	2.8/6.3	1.5	2.8/6.3	1.5	2.8/6.3	1.4	2.8/6.3	1.4

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Racked-in dressing

Traffic Category	Hardness Category of Road Surface									
	Very Hard		Hard		Normal		Soft		Very Soft	
	Size of Chipping [d] (mm)	Binder Rate (L/m²)	Size of Chipping [d] (mm)	Binder Rate (L/m²)	Size of Chipping [d] (mm)	Binder Rate (L/m²)	Size of Chipping [d] (mm)	Binder Rate (L/m²)	Size of Chipping [d] (mm)	Binder Rate (L/m²)
A	10&6	1.9 [c]	14&6	2.1 [c]	14&6	2.0 [c]	(b)		(b)	
B	10&6	1.9 [c]	10&6	1.8 [c]	14&6	2.0 [c]	(b)		(b)	
C	10&4 10&6	1.9 [c] 1.9 [c]	10&4 10&6	1.8 [c] 1.8 [c]	14&6	2.0 [c]	(b)		(b)	
D	10&4 10&6	1.9 [c] 1.9 [c]	10&4 10&6	1.8 [c] 1.8 [c]	14&6 10&4 10&6	2.0 [c] 1.8 [c] 1.8 [c]	14&6	2.0	14&6	1.9
E	10&4 10&6	1.9 [c] 1.9 [c]	10&4 10&6	1.8 [c] 1.8 [c]	10&4 10&6	1.8 [c] 1.8 [c]	14&6 10/4	2.0 1.8	14&6	1.9
F	10&4 10&6	2.0 [c] 2.0 [c]	10&4 10&6	1.9 [c] 1.9 [c]	10&4 10&6	1.9 [c] 1.9 [c]	10&4 10&6	1.8 1.8	10&4 10&6	1.6 1.6
G	10&4 10&6	2.0 2.0	10&4 10&6	2.0 2.0	10&4 10&6	1.9 1.9	10&4 10&6	1.9 1.8	10&4 10&6	1.7 1.7
H	(a)		(a)		(a)		10&4 10&6	1.9 1.8	10&4 10&6	1.7 1.7

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Double dressing

Traffic Category	Hardness Category of Road Surface														
	Very Hard			Hard			Normal			Soft			Very Soft		
	Size of Chipping [c] (mm)	Binder Rate, first layer (L/m²)	Binder Rate, second layer (L/m²)	Size of Chipping [c] (mm)	Binder Rate, first layer (L/m²)	Binder Rate, second layer (L/m²)	Size of Chipping [c] (mm)	Binder Rate, first layer (L/m²)	Binder Rate, second layer (L/m²)	Size of Chipping [c] (mm)	Binder Rate, first layer (L/m²)	Binder Rate, second layer (L/m²)	Size of chipping [c] (mm)	Binder Rate, first layer (L/m²)	Binder Rate, second layer (L/m²)
A	10&6	1.1	1.2 [b]	14&6 10&6	1.2 1.0	1.3 [b] 1.2 [b]	14&6 10&6	1.2 1.0	1.1 [b] 1.0 [b]	(a)			(a)		
B	10&6	1.1	1.2 [b]	14&6 10&6	1.2 1.0	1.3 [b] 1.2 [b]	14&6 10&6	1.2 1.0	1.1 [b] 1.0 [b]	(a)			(a)		
C	10&6	1.1	1.2 [b]	10&6	1.0	1.2 [b]	14&6 10&6	1.2 1.0	1.1 [b] 1.0 [b]	(a)			(a)		
D	10&6	1.1	1.2 [b]	10&6	1.0	1.2 [b]	14&6 10&6	1.2 1.0	1.2 [b] 1.1 [b]	14&6	1.0	1.1	14&6	0.8	1.0
E	10&6	1.1	1.2 [b]	10&6	1.1	1.2 [b]	10&6	1.0	1.1 [b]	14&6 10&6	1.0 0.8	1.1 1.0	14&6	0.8	1.0
F	10&6	1.2	1.2 [b]	10&6	1.1	1.2 [b]	10&6	1.0	1.1 [b]	14&6 10&6	1.0 0.8	1.2 1.1	14&6	0.8	1.1
G	10&6	1.2	1.3 [b]	10&6	1.1	1.3 [b]	10&6	1.0	1.2 [b]	10&6	1.0	1.1	10&6	0.8	1.0
H	10&6	1.2	1.3	10&6	1.1	1.3	10&6	1.0	1.2	10&6	1.0	1.1	10&6	0.8	1.0

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Sandwich dressing

Primary Chipping Size	8/14 mm	6.3/10 mm	6.3/10 mm
Secondary Chipping Size	2.8/6 mm	2.8/6 mm	2/4 mm
Binder Spread Rate	1.7 L/m²	1.5 L/m²	1.5 L/m²

Local Variations

Influence	Property	Effect (L/m²)	Comments
Season	Early and mid season	0	Late season work is very risky especially with 6.3/10 mm chippings – double surface dressing is recommended if the work has to be completed, (see Figure 7.3.2).
	Late season	+0.2	
Aggregate type	Crushed rock or slag	0	Gravel is only appropriate for Traffic Categories G and H.
	Gravel	+0.1	
Flakiness*	Index 10 % to 15 %	0	Flakiness index should conform to PD 6882-2. Adjustment is only required for non-conforming aggregates. Very cubical chippings (<10 %) require more binder to hold them initially. Flaky chippings (>20/25 %) will result in early loss of texture depending on traffic.
	Index 15% to 20/25 %	-0.1	
	Index <10%, or > 20/25 %	Consider design	
Shade	Un-shaded, open to sun	-0.1	Shaded areas are cooler and, therefore, the road is effectively harder so more binder is required.
	Partially shaded	+0.1	
	Fully shaded	+0.2	Double surface dressing is recommended for fully shaded areas (see Table 9.2.3).
Surface condition (consider suitability, see Figure 8.1 and type of surface dressing Figure 8.3a)	Very binder rich	-0.3	6.3/10 mm chippings are recommended for Traffic Category G, binder rich, soft road surfaces, without any adjustment.
	Binder rich	-0.1	
	Texture in wheel tracks	+0.1	
	Porous and binder lean	+0.2	A pad coat is recommended to normalise and seal porous road surfaces (see Section 9.2.4).
	Very binder lean and porous, high macrotexture, or variable and hard.	Not suitable	Double surface dressing with intermediate binder is recommended for variable hard and binder lean substrates (see Table 9.2.3).
Gradient	> 5 % uphill	-0.3	The gradient affects the traffic stress on the surface dressing and, therefore, the rate of embedment. For uphill sections, 6.3/10 mm chippings are recommended without any adjustment.
	< 5 %	0	
	> 5 % downhill	+0.1	
	> 10 % downhill	Not suitable	Racked-in or double surface dressing is recommended with Intermediate Grade binder for Traffic Category G hills and downhill high-speed sections (see Tables 9.2.2 and 9.2.3).
Speed of traffic	High speed (≥50 mph limit)	Not suitable	Racked-in or double dressing with intermediate binder is recommended for high-speed Traffic Category G and H roads (see Tables 9.2.2 and 9.2.3).
Local traffic	Design range	0	Un-trafficked areas (such as hatched sections, between the wheel tracks and edges of carriageways) require more binder.
	Effectively un-trafficked	+0.2	

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Local Variations

Influence	Property	Effect (L/m²)	Comments
Season	Early and mid season	0	
	Late season	+0.2	Late season work is very risky.
Aggregate type	Crushed rock or slag	0	Gravel is only appropriate for traffic categories F, G and H.
	Gravel	+0.1	
Flakiness*	Index < 10 %	+0.1	The flakiness index should conform to PD 6882-2. Adjustment is only required for non-conforming aggregates.
	Index 10 % to 20/25 %	0	
	Index > 20/25 %	-0.1	
Chipping size	Size smaller	-0.1	The chipping size appropriate to the traffic category can be changed to the adjacent size if required.
	"Design" size	0	
	Size larger	+0.2	
Shade	Unshaded	0	Shaded areas are cooler and therefore harder on average.
	Partially shaded	+0.1	
	Fully shaded	+0.2	
Surface condition	Very binder rich	-0.1	The road condition will affect how much binder is required to provide similar conditions at the interface.
	Binder rich & normal	0	
	Porous	+0.1	
	Very porous and binder lean	+0.2	
Gradient	> 5 % uphill	-0.1	The gradient affects the stresses applied to the surfacing.
	< 5 %	0	
	> 5 % downhill	+0.1	
	> 10 % downhill	+0.2	
Speed	High speed (≥50 mph limit)	+0.1	Roads subject to high traffic speeds induce greater surface stress.
	Low speed (<50 mph limit)	0	
Local traffic	Design range	0	Hard shoulders (unless a contra flow is planned) and sizeable areas with hatched lines to exclude traffic are effectively untrafficked.
	Effectively untrafficked	+0.2	

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Surface Dressing - Sweden

- Snow – more grip needed
- Chipping size – larger or smaller?
  - Failure possibilities
  - Rate of spread of binder
  - Embedment
  - Traffic volumes

Surface Dressing - Sweden

New Designs

- 14/10mm racked-in surface dressing
- 20/10mm racked-in
- 14mm single
    - Grouted in with Gripfibre

Innovation

Viasealer

- A highly mobile, self-contained surface dressing patcher
- All materials and applicator on one machine
- Able to move swiftly between sites and carry out small works
- Full-width capability for urban or estate areas

Innovation

Viasealer

Innovation

Combination Unit

- Fully computer controlled

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Innovation

Gripfibre

- Eurovia's advanced Microsurfacing system - European patent
- High cohesive strength, resistance to wheel-rutting
- Cold technology, fast trafficking, polymers and fibres
- Regulating properties and retained SRV
- Fast installation: 3,500 – 8,000 m^2 per day

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Innovation

Gripfibre

Innovation

Surface Jet-Dryer

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Thank you for listening!

Any questions?

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