

Technical Report No. 66

STATE OF THE ART FOR CHLORIDE MANAGEMENT

Appendix A

DEICING AND ANTI-ICING APPLICATION RATE GUIDANCE FOR PUBLIC ROADS AND HIGHWAYS

Table A.1
Application Rate Guidelines for Light Snow

Pavement Temperature and Trend	Road Surface Condition	Material Application					
		Liquid (G/LM)			Solid (lbs/LM)		
		NaCl	MgCl ₂	CaCl ₂	Dry NaCl	Pre-Wet NaCl	Abrasives
32°F steady or rising	Dry	NR			NR		
	Icy Patches	20-40	15-35	15-35	120-160	110-150	NR
32°F or below imminent	Dry (snow forecast)	20-40	15-35	15-35	NR	75-125	NR
	Slush or light snow	30-40	15-30	15-30	140-180	100-150	NR
25° - 32°F remaining in range	Dry (snow forecast)	30-50	20-40	20-40	NR	100-125	NR
	Light snow cover	40-60	20-40	20-40	160-200	125-175	NR
20° - 25°F remaining in range	Dry (snow forecast)	40-60	30-50	30-50	NR	125-175	NR
	Light snow cover	50-80	20-40	20-40	200-250	175-225	NR
15° - 20°F remaining in range	Dry (snow forecast)	NR	40-60	45-65	NR	175-225	NR
	Light snow cover	NR	45-65	45-65	250-300	200-250	500-750
0° - 15°F steady or falling	Dry (snow forecast)	NR			NR	200-250	NR
	Light snow cover	NR			NR	200-250	600-750
Below 0°F, steady or falling	Light snow cover	NR			NR	NR	600-750

Note: Light snow is defined as less than 1 inch per hour and less than 4 inches in 24 hours. Application rates for road surface conditions indicated as "Dry (snow forecast)" represent pre-storm anti-icing treatments. Operators should use the lower end of the range for lower level of service or shorter cycle times. Operators should use the higher end of the range for higher level of service, longer cycle times, or greater dilution potential. Operators should plow to remove as much snow or ice as possible before material application. Abbreviations in this table: lbs/LM = pounds per lane mile, G/LM = gallons per lane mile, NR = Not Recommended.

Source: Washington State University and Clear Roads "Material Application Methodologies Guidebook"

Table A.2
Application Rate Guidelines for Moderate Snow

Pavement Temperature and Trend	Road Surface Condition	Material Application					
		Liquid (G/LM)			Solid (lbs/LM)		
		NaCl	MgCl ₂	CaCl ₂	Dry NaCl	Pre-Wet NaCl	Abrasives
32°F steady or rising	Dry	NR			NR		
	Icy Patches	30-50	15-35	15-35	140-160	120-160	NR
32°F or below imminent	Dry (snow forecast)	20-40	15-35	15-35	NR	75-125	NR
	Slush or light snow	NR	NR	NR	140-180	100-150	NR
25° - 32°F remaining in range	Dry (snow forecast)	30-50	20-40	20-40	NR	100-150	NR
	Light snow cover	50-80	20-40	20-40	180-200	160-190	NR
20° - 25°F remaining in range	Dry (snow forecast)	40-60	30-50	30-50	NR	150-200	NR
	Light snow cover	NR	NR	NR	250-300	220-260	NR
15° - 20°F remaining in range	Dry (snow forecast)	NR	40-70	30-70	NR	200-250	NR
	Light snow cover	NR	40-70	30-70	325-375	275-325	500-750
0° - 15°F steady or falling	Dry (snow forecast)	NR			NR	300-350	NR
	Light snow cover	NR			NR	300-350	600-900
Below 0°F, steady or falling	Light snow cover	NR			NR	NR	600-90

Note: Moderate snow is defined as 1 to 2 inches per hour and about 4 to 8 inches in 24 hours. Application rates for road surface conditions indicated as "Dry (snow forecast)" represent pre-storm anti-icing treatments. Operators should use the lower end of the range for lower level of service or shorter cycle times. Operators should use the higher end of the range for higher level of service, longer cycle times, or greater dilution potential. Operators should plow to remove as much snow or ice as possible before material application. Abbreviations in this table: lbs/LM = pounds per lane mile, G/LM = gallons per lane mile, NR = Not Recommended.

Source: Washington State University and Clear Roads "Material Application Methodologies Guidebook"

Table A.3
Application Rate Guidelines for Heavy Snow

Pavement Temperature and Trend	Road Surface Condition	Material Application					
		Liquid (G/LM)			Solid (lbs/LM)		
		NaCl	MgCl ₂	CaCl ₂	Dry NaCl	Pre-Wet NaCl	Abrasives
32°F steady or rising	Dry	NR			NR		
	Icy Patches	30-60	15-35	15-35	150-180	130-170	NR
32°F or below imminent	Dry (snow forecast)	20-40	15-35	15-35	NR	100-150	NR
	Slush or light snow	NR	NR	NR	150-200	125-175	NR
25° - 32°F remaining in range	Dry (snow forecast)	40-60	20-40	20-40	NR	125-175	NR
	Light snow cover	60-90	NR	NR	225-275	175-250	NR
20° - 25°F remaining in range	Dry (snow forecast)	NR	30-50	NR	NR	200-250	NR
	Light snow cover	NR	NR	NR	275-325	225-300	500
15° - 20°F remaining in range	Dry (snow forecast)	NR	40-70	NR	NR	200-250	NR
	Light snow cover	NR	NR	NR	NR	275-325	500-750
0° - 15°F steady or falling	Dry (snow forecast)	NR			NR	300-350	NR
	Light snow cover	NR			NR	400-500	600-900
Below 0°F, steady or falling	Light snow cover	NR			NR	NR	600-900

Note: Heavy snow is defined as more than 2 inches per hour and more than 8 inches in 24 hours. Application rates for road surface conditions indicated as "Dry (snow forecast)" represent pre-storm anti-icing treatments. Operators should use the lower end of the range for lower level of service or shorter cycle times. Operators should use the higher end of the range for higher level of service, longer cycle times, or greater dilution potential. Operators should plow to remove as much snow or ice as possible before material application. Abbreviations in this table: lbs/LM = pounds per lane mile, G/LM = gallons per lane mile, NR = Not Recommended.

Source: Washington State University and Clear Roads "Material Application Methodologies Guidebook"

#280550
 200-1100
 AWO/mid
 3/25/2026

Table A.4
Application Rate Guidelines for Freezing Rain

Pavement Temperature and Trend	Road Surface Condition	Material Application					
		Liquid (G/LM)			Solid (lbs/LM)		
		NaCl	MgCl ₂	CaCl ₂	Dry NaCl	Pre-Wet NaCl	Abrasives
32°F steady or rising	Icy Patches		NR		NR	125-175	NR
32°F or below imminent	Slush or ice		NR		180-240	140-180	NR
25° - 32°F remaining in range	Slush or ice		NR		200-275	180-225	NR
20° - 25°F remaining in range	Slush or ice		NR		250-350	225-300	500
15° - 20°F remaining in range	Slush or ice		NR		350-450	300-400	500-750
0° - 15°F steady or falling	Slush or ice		NR		NR	NR	600-750
Below 0°F, steady or falling	Slush or ice		NR		NR	NR	750-900

Note: Operators should use the lower end of the range for lower level of service or shorter cycle times. Operators should use the higher end of the range for higher level of service, longer cycle times, or greater dilution potential. Operators should plow to remove as much snow or ice as possible before material application. Abbreviations in this table: lbs/LM = pounds per lane mile, G/LM = gallons per lane mile, NR = Not Recommended.

Source: Washington State University and Clear Roads "Material Application Methodologies Guidebook"

#280562
200-1100
AWO/mid
3/25/2026

Table A.5
Direct Liquid Application Rates for Light Snow with Salt Brine

Pavement Temperature and Trend	Road Surface Condition	Salt Brine (G/LM)
32°F steady or rising	Icy patches	30-50
32°F or below imminent	Slush or light snow	30-60
25° - 32°F remaining in range	Light snow cover	40-65
20° - 25°F remaining in range	Light snow cover	50-90

Note: Light snow is defined as less than 1 inch per hour and less than 4 inches in 24 hours. Abbreviations in this table: G/LM = gallons per lane mile.

Source: *University of Wisconsin Traffic Operations and Safety Laboratory and Clear Roads "Application Rate Guidance for Salt Brine Blends for Direct Liquid application and Anti-Icing"*

#280563
200-1100
AWO/mid
3/25/2026

Table A.6
Direct Liquid Application Rates for Light Snow with Magnesium Chloride

Pavement Temperature and Trend	Road Surface Condition	MgCl₂ (G/LM)
32°F or below imminent	Slush or light snow	30
25° - 32°F remaining in range	Light snow cover	30
20° - 25°F remaining in range	Light snow cover	30

Note: Light snow is defined as less than 1 inch per hour and less than 4 inches in 24 hours. Abbreviations in this table: G/LM = gallons per lane mile.

Source: *University of Wisconsin Traffic Operations and Safety Laboratory and Clear Roads "Application Rate Guidance for Salt Brine Blends for Direct Liquid application and Anti-Icing"*

#280564
200-1100
AWO/mid
3/25/2026

Table A.7
Direct Liquid Application Rates for Light Snow with Salt Brine and Calcium Chloride Blend

Pavement Temperature and Trend	Road Surface Condition	NaCl and CaCl₂ Blend (G/LM)^a
20° - 25°F remaining in range	Light snow cover	20-45
15° - 20°F remaining in range	Light snow cover	40-60

Note: Light snow is defined as less than 1 inch per hour and less than 4 inches in 24 hours. Abbreviations in this table: G/LM = gallons per lane mile.

^a Liquid brine blend should be a 90/10 NaCl to CaCl₂ ratio.

Source: University of Wisconsin Traffic Operations and Safety Laboratory and Clear Roads "Application Rate Guidance for Salt Brine Blends for Direct Liquid application and Anti-Icing"

#280565
200-1100
AWO/mid
3/25/2026

Table A.8
Direct Liquid Application Rates for Light Snow with Salt Brine and Geomelt Blend

Pavement Temperature and Trend	Road Surface Condition	NaCl and Geomelt Blend (G/LM)^a
32°F steady or rising	Icy patches	40
32°F or below imminent	Slush or light snow cover	40
15° - 32°F remaining in range	Light snow cover	40

Note: Light snow is defined as less than 1 inch per hour and less than 4 inches in 24 hours. Abbreviations in this table: G/LM = gallons per lane mile.

^a Liquid brine blend should be a 80/20 NaCl to Geomelt ratio.

Source: University of Wisconsin Traffic Operations and Safety Laboratory and Clear Roads "Application Rate Guidance for Salt Brine Blends for Direct Liquid application and Anti-Icing"

#280566
200-1100
AWO/mid
3/25/2026

Table A.9
Direct Liquid Application Rates for Light Snow with
Salt Brine, Calcium Chloride, and Geomelt Blend

Pavement Temperature and Trend	Road Surface Condition	NaCl, CaCl₂, Geomelt Blend (G/LM)^a
15° - 20°F remaining in range	Light snow cover	40
0° - 15°F steady or falling	Light snow cover	45

Note: Light snow is defined as less than 1 inch per hour and less than 4 inches in 24 hours. Abbreviations in this table: G/LM = gallons per lane mile.

^a Liquid brine blend should be a 80/10/10 NaCl/CaCl₂/Geomelt ratio.

Source: University of Wisconsin Traffic Operations and Safety Laboratory and Clear Roads "Application Rate Guidance for Salt Brine Blends for Direct Liquid application and Anti-Icing"

#280567
 200-1100
 AWO/mid
 3/25/2026

Table A.10
Pre-Wetting Application Rates for Light Snow with Salt Brine and Dry Rock Salt

Pavement Temperature and Trend	Road Surface Condition	Liquid NaCl Brine (G/LM)	Dry Rock Salt (lbs/LM)
32°F steady or rising	Dry	20-40	100-200
32°F or below imminent	Dry (snow forecast)	25-45	100-200
25° - 32°F remaining in range	Dry (snow forecast)	30-50	150-250
20° - 25°F remaining in range	Dry (snow forecast)	40-50	150-250
15° - 20°F remaining in range	Dry (snow forecast)	40-50	200-300
0° - 15°F steady or falling	Dry (snow forecast)	50-90	200-300

Note: Light snow is defined as less than 1 inch per hour and less than 4 inches in 24 hours. Abbreviations in this table: G/LM = gallons per lane mile and lbs/LM = pounds per lane mile.

Source: University of Wisconsin Traffic Operations and Safety Laboratory and Clear Roads "Application Rate Guidance for Salt Brine Blends for Direct Liquid application and Anti-Icing"