5. MATERIAL APPLICATION RATES

The application rates for deicers depend on a variety of factors, such as pavement temperature, the amount of snow on the pavement, the level of service required, cycle time and deicer type. Some agencies use software, for example MDSS – Maintenance Decision Support System, to determine route-specific application rates based on Federal Guidelines found in FHWA TE-28 project (Manual of Practice for an Effective Anti-Icing Program: https://www.fhwa.dot.gov/publications/research/safety/95202/index.cfm).

Suggested application rate ranges for the most common liquid products (NaCl, $MgCl_2$, and $CaCl_2$) and dry and pre-wet salt are shown in Tables 1 – 4. These ranges are a synthesis of practices derived from guidelines and experiences used by many state DOTs. These states use different cut-off values based on snow intensity and use of liquids below 15 or 20°F.

Use these rates as a starting point, but ultimately use what works for you. However, your rates should vary with temperature, precipitation type and cycle time in the same way as these rates do. In other words, warmer pavement temperatures require much less salt than colder temperatures.

Pre-wetted salt application rates tend to be lower than for dry salt. If using pre-treated salt, then an application rate between the dry and pre-wet rates should be used. Pre-wetting abrasives is recommended as it improves longevity on the road, but does not usually reduce applied amount.

5 Application Rates

Table 1: Application Rate Guidelines for Light Snow (<1 in/hr., <4" in 24 hrs.)

- Use lower end of range for lower LOS or shorter cycle times
- Use higher end of range for higher LOS, longer cycle times, or greater dilution potential
- Plow to remove as much snow or ice as possible before material application
- Abbreviations: lb/LM = pounds per lane mile, G/LM = gallons per lane mile, *NR* = Not Recommended

Pavement Temp. Range, Trend	Road Surface Condition	Material Application					
		Liquid (G/LM)			Solid (lb/LM)		
		NaCl	$MgCl_2$	$CaCl_2$	Dry NaCl	Pre–Wet NaCl	Abrasives (less than 20% salt added)
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 is 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 to 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

Table 2: Application Rate Guidelines for Moderate Snow (1–2 in/hr., about 4–8" in 24 hrs.)

- Use lower end of range for lower LOS, shorter cycle times
- Use higher end of range for higher LOS, longer cycle times, or greater dilution potential
- Plow to remove as much snow or ice as possible before material application
- Abbreviations: lb/LM = pounds per lane mile, G/LM = gallons per lane mile, *NR* = Not Recommended

Pavement Temp. Range, Trend	Road Surface Condition	Material Application					
		Liquid (G/LM)			Solid (lb/LM)		
		NaCl	$MgCl_2$	$CaCl_2$	Dry NaCl	Pre–Wet NaCl	Abrasives (less than 20% salt added)
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 is 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 to 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 – 220	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 – 75	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 – 900

Table 3: Application Rate Guidelines for Heavy Snow (>2 in/hr. >8" in 24 hrs.)

- Use lower end of range for lower LOS, shorter cycle times
- Use higher end of range for higher LOS, longer cycle times, or greater dilution potential
- Plow to remove as much snow or ice as possible before material application
- Abbreviations: lb/LM = pounds per lane mile, G/LM = gallons per lane mile, NR = Not Recommended

Pavement Temp. Range, Trend	Road Surface Condition	Material Application					
		Liquid (G/LM)			Solid (lb/LM)		
		NaCl	$MgCl_2$	$CaCl_2$	Dry NaCl	Pre–Wet NaCl	Abrasives (less than 20% salt added)
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 is 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 to 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*	300– 350	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

Table 4: Application Rate Guidelines for Freezing Rain

- Use lower end of range for lower LOS, shorter cycle times
- Use higher end of range for higher LOS, longer cycle times, or greater dilution potential
- Plow to remove as much snow or ice as possible before material application
- Abbreviations: lb/LM = pounds per lane mile, G/LM = gallons per lane mile, *NR* = Not Recommended

Pavement Temp. Range, Trend	Road Surface Condition	Material Application					
		Liquid (G/LM)			Solid (lb/LM)		
		NaCl	$MgCl_2$	$CaCl_2$	Dry NaCl	Pre–Wet NaCl	Abrasives (less than 20% salt added)
32°F steady or rising	Icy patches	*NR*			*NR*	125 – 175	*NR*
32°F or below is imminent	Slush or ice	*NR*			180 – 240	140 – 180	*NR*
25 to 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