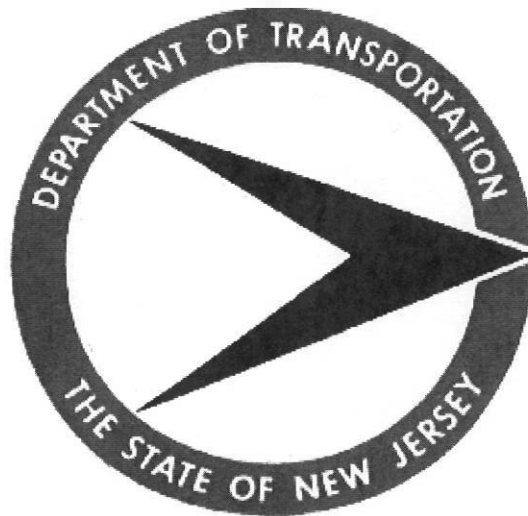


Solid Chemical Application Guidelines

for an Effective Anti-icing Program

(as modified from the Manual of Practice for an Effective Anti-Icing Program
prepared by FHWA,
US Army cold Regions Research and Engineering Laboratory, Corps of
Engineers- 1996)

New Jersey Department of Transportation



Winter Maintenance Program

Table 5. Solid Chemical Applications Guide - Weather event: **Light** snow storm with period(s) of moderate or heavy snow.

PAVEMENT	INITIAL OPERATION			SUBSEQUENT OPERATIONS			COMMENTS
TEMPERATURE RANGE, AND TREND	pavement surface at time of	Maintenance action	Chemical spread rate, lb/lane-mi	Maintenance action	Chemical spread rate, lb/lane-mi		
	initial operation		solid or prewetted solid		solid or prewetted solid		
					light snow	heavier snow	
Above 32°F steady or rising	Dry, wet, slush, or light snow cover	None, see comments		None, see comments			1) Monitor pavement temperature closely for drops toward 32°F and below 2) Treat icy patches if needed with chemical at 150 lb/lane-mi, plow if needed
32°F 32°F or below is imminent;	Wet, slush, or light snow cover	Apply pre-wetted solid chemical	150	Plow as needed; reapply solid chemical when needed	150	250	1) Applications will need to be more frequent at lower temperatures and higher snowfall rates 2) After heavier snow periods and during light snow fall, reduce chemical rate to 150 lb/lane-mi; continue to plow and apply chemicals as needed
ALSO 25 to 32°F remaining in range	Wet, slush, or light snow cover	Apply pre-wetted solid chemical	200				
15 to 25°F remaining in range	Dry, wet, slush, or light snow cover	Apply pre-wetted solid chemical	250	Plow as needed; reapply pre-wetted solid chemical when needed	250	350	1) If sufficient moisture is present, solid chemical without pre-wetting can be applied 2) Reduce chemical rate to 250 lb/lane-mi after heavier snow periods and during light snow fall; continue to plow and apply chemicals as needed
Below 15°F steady or falling	Dry or light snow cover	Plow as needed		Plow as needed			1) It is not recommended that chemicals be applied in this temperature range 2) Abrasives can be applied to enhance traction

Notes: CHEMICAL APPLICATIONS. (1) Time initial and subsequent chemical applications to *prevent* deteriorating conditions or development of packed and bonded snow. (2) *Anticipate increases in snowfall intensity. Apply higher rate treatments prior to or at the beginning of heavier snowfall periods to prevent development of packed and bonded snow.* (3) Apply chemical ahead of traffic rush periods occurring during storm. **PLOWING.** If needed, *plow before chemical applications* so that excess snow, slush, or ice is removed and pavement is wet, slushy, or lightly snow covered when treated.

Table 6. Solid Chemical Application Guide - Weather event: **Moderate or Heavy** snow storm.

PAVEMENT	INITIAL OPERATION			SUBSEQUENT OPERATIONS		COMMENTS
TEMPERATURE RANGE, AND TREND	pavement surface at time of	maintenance action	chemical spread rate, lb/lane-mi	maintenance action	chemical spread rate, lb/lane-mi	
	initial operation		solid or prewetted solid		solid or prewetted solid	
Above 32°F steady or rising	Dry, wet, slush, or light snow cover	None, see comments		None, see comments		1) Monitor pavement temperature closely for drops toward 32°F and below 2) Treat icy patches if needed with chemical at 150 lb/lane-mi; plow if needed
30- 32°F 32°F or below is imminent;	Wet, slush, or light snow cover	Apply pre-wetted solid chemical	150	Plow accumulation and reapply solid chemical as needed	150	1) If the desired plowing/treatment frequency cannot be maintained, the spread rate can be increased to 250 lb/lane-mi to accommodate longer operational cycles
25 to 30°F remaining in range	Wet, slush, or light snow cover	Apply pre-wetted solid chemical	200-250	Plow accumulation and reapply chemical as needed	200-250	1) If the desired plowing/treatment frequency cannot be maintained, the spread rate can be increased to 350 lb/lane-mi to accommodate longer operational cycles
15 to 25°F remaining in range	Dry, wet, slush, or light snow cover	Apply pre-wetted solid chemical	350	Plow accumulation and reapply pre-wetted solid chemical as needed	250-350	1) If the desired plowing/treatment frequency cannot be maintained, the spread rate can be increased to 400 lb/lane-mi to accommodate longer operational cycles 2) If sufficient moisture is present, solid chemical without pre-wetting can be applied
Below 15°F steady or falling	Dry or light snow cover	Plow as needed		Plow accumulation as needed		1) It is not recommended that chemicals be applied in this temperature range 2) Abrasives can be applied to enhance traction

Notes: CHEMICAL APPLICATIONS. (1) Time initial and subsequent chemical applications to *prevent* deteriorating conditions or development of packed and bonded snow -- *timing and frequency of subsequent applications will be determined primarily by plowing requirements.* (2) Apply chemical ahead of traffic rush periods occurring during storm. **PLOWING.** *Plow before chemical applications* so that excess snow, slush, or ice is removed and pavement is wet, slushy, or lightly snow covered when treated.

Table 7. Solid Chemical Application Guide - Weather event: Frost or Black Ice.

PAVEMENT	TRAFFIC	INITIAL OPERATION		SUBSEQUENT OPERATIONS		COMMENTS
TEMPERATURE RANGE, TREND, AND	CONDITION	maintenance action	chemical spread rate, lb/lane-mi	maintenance action	chemical spread rate, lb/lane-mi	
RELATION TO DEW POINT			solid or prewetted solid		solid or prewetted solid	
Above 32°F steady or rising	Any level	None, see comments		None, see comments		Monitor pavement temperature closely; begin treatment if temperature starts to fall to 32°F or below and is at or below dew point
28 to 32°F remaining in range or falling to	Traffic rate less than 100 vehicles per hr	Apply pre-wetted solid chemical	150	Reapply pre-wetted solid chemical as needed	150	1) Monitor pavement closely; if pavement becomes wet or if thin ice forms, reapply chemical at higher indicated rate
(32°F) or below, and equal to or below dew point	Traffic rate greater than 100 vehicles per hr	Apply pre-wetted solid chemical	150	Reapply liquid or pre-wetted solid chemical as needed	150	
20 to 28°F remaining in range, and equal to or below dew point	Any level	Apply pre-wetted solid chemical	150-200	Reapply liquid or pre-wetted solid chemical when needed	150-200	1) Monitor pavement closely; if thin ice forms, reapply chemical at higher indicated rate 2) Applications will need to be more frequent at higher levels of condensation; if traffic volumes are not enough to disperse condensation, it may be necessary to increase frequency
15 to 20°F remaining in range, and equal to or below dew point	Any level	Apply pre-wetted solid chemical	200-250	Reapply pre-wetted solid chemical when needed	200-250	1) Monitor pavement closely; if thin ice forms, reapply chemical at higher indicated rate 2) Applications will need to be more frequent at higher levels of condensation; if traffic volumes are not enough to disperse condensation, it may be necessary to increase frequency
Below 15°F steady or falling	Any level	Apply abrasives		Apply abrasives as needed		It is not recommended that chemicals be applied in this temperature range

Notes :TIMING. (1) Conduct initial operation in advance of freezing. Apply pre-wetted solid 1 to 2 hrs in advance.

Table 8. Solid Chemical Application Guide - Weather event: **Freezing Rain** storm.

PAVEMENT	INITIAL OPERATION		SUBSEQUENT OPERATIONS		COMMENTS
TEMPERATURE RANGE, AND TREND	maintenance action	chemical spread rate, lb/lane-mi	maintenance action	chemical spread rate, lb/lane-mi	
Above 32°F steady or rising	None, see comments		None, see comments		1) Monitor pavement temperature closely for drops toward 32°F and below 2) Treat icy patches if needed with pre-wetted solid chemical at 150 lb/lane-mi
Above 32°F 32°F or below is imminent	Apply pre-wetted solid chemical	150	Reapply pre-wetted solid chemical as needed	150	Monitor pavement temperature and precipitation closely
20 to 32°F remaining in range	Apply pre-wetted solid chemical	150-250	Reapply pre-wetted solid chemical as needed	150-250	1) Monitor pavement temperature and precipitation closely 2) Increase spread rate toward <i>higher indicated rate</i> with decrease in pavement temperature or increase in intensity of freezing rainfall 3) Decrease spread rate toward <i>lower indicated rate</i> with increase in pavement temperature or decrease in intensity of freezing rainfall
15 to 20°F remaining in range	Apply pre-wetted solid chemical	250-350	Reapply pre-wetted solid chemical as needed	250-350	1) Monitor precipitation closely 2) Increase spread rate toward <i>higher indicated rate</i> with increase in intensity of freezing rainfall 3) Decrease spread rate toward <i>lower indicated rate</i> with decrease in intensity of freezing rainfall
Below 15°F steady or falling	Apply abrasives		Apply abrasives as needed		It is not recommended that chemicals be applied in this temperature range

Notes :CHEMICAL APPLICATIONS. (1) Time initial and subsequent chemical applications to *prevent* glaze ice conditions. (2) Apply chemical ahead of traffic rush periods occurring during storm.

Table 9. Solid Chemical Application Guide - Weather event: **Sleet storm.**

PAVEMENT TEMPERATURE RANGE, AND TREND	INITIAL OPERATION		SUBSEQUENT OPERATIONS		COMMENTS
	maintenance action	chemical spread rate, lb/lane-mi	maintenance action	Chemical spread rate, lb/lane-mi	
Above 32°F steady or rising	None, see comments		None, see comments		1) Monitor pavement temperature closely for drops toward 32°F and below 2) Treat icy patches if needed with pre-wetted solid chemical at 150 lb/lane-mi
Above 32°F 32°F or below is imminent	Apply pre- wetted solid chemical	150	Plow as needed, reapply pre-wetted solid chemical when needed	150	Monitor pavement temperature and precipitation closely
28 to 32°F remaining in range	Apply pre- wetted solid chemical	150-250	Plow as needed, reapply pre-wetted solid chemical when needed	150-250	1) Monitor pavement temperature and precipitation closely 2) Increase spread rate toward <i>higher indicated rate</i> with increase in sleet intensity 3) Decrease spread rate toward <i>lower indicated rate</i> with decrease in sleet intensity
15 to 28°F remaining in range	Apply pre- wetted solid chemical	250-350	Plow as needed, reapply pre-wetted solid chemical when needed	250-350	1) Monitor precipitation closely 2) Increase spread rate toward <i>higher indicated rate</i> with decrease in pavement temperature or increase in sleet intensity 3) Decrease spread rate toward <i>lower indicated rate</i> with increase in pavement temperature or decrease in sleet intensity
Below 15°F steady or falling	Plow as needed		Plow as needed		1) It is not recommended that chemicals be applied in this temperature range 2) Abrasives can be applied to enhance traction

Notes :CHEMICAL APPLICATIONS. (1) Time initial and subsequent chemical applications to *prevent* the sleet from bonding to the pavement. (2) Apply chemical ahead of traffic rush periods occurring during storm.