Pavement Marking Products and Design

April 30, 2026

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Purpose of Pavement Markings

- Provides Guidance for
  - Lane Position
  - Lane Use Changes
  - When it is Safe to Pass
  - What to do at an Intersection
  - Day and Night Driving

- White
  - Lane Lines
  - Right Edgelines
  - Channelizing Lines
  - Words/Arrows/Symbols
- Yellow
  - Centerlines
  - Left Edgelines

Pavement Marking Constraints in Wisconsin

Problems

- Plows shear off beads so they do not reflect back at night
- Rain covers beads making it hard to see in rain/snow conditions

Ways we try to help

- Groove Wet Reflective Markings use large beads to help the beads reflect back in rain while the groove protects it from plows and traffic.

Skip Cycles

- The standard skip cycle is a 12.5’ line with a 37.5’ gap.
- Cat tracks or dotted lines that go through intersections and are a 2’ line with a 6’ gap.
- Broken line or dotted lane line is 3’ line with a 9’ gap. This is used before reaching the intersection.
- The circulatory dotted lane line in a roundabout is 1’ line with 3’ gap.
- The circulatory lane line in a roundabout is 6’ line with 3’ gap.

Move to 6”

More Detectable

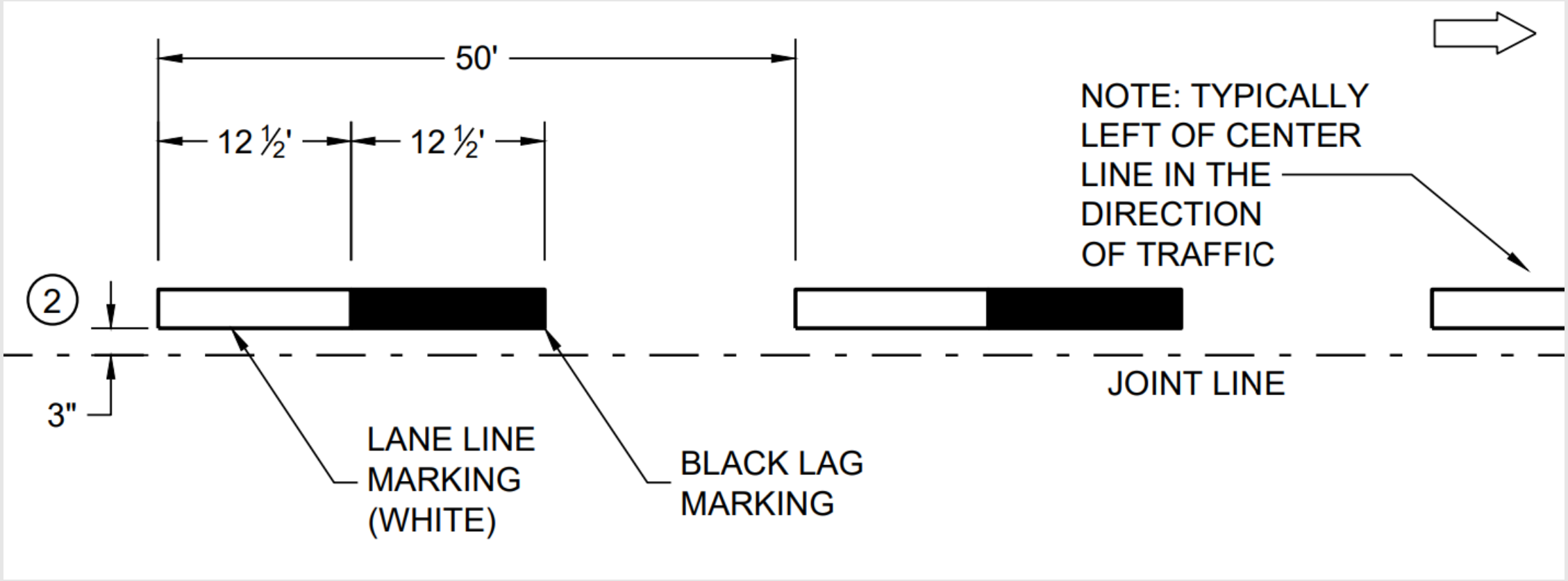
17.5% Reduction in all crashes

36.5% Reduction in fatal and injury crashes on rural two-lane highways

All state-maintained roadways are 6”

Marking Placement

- Groove Depth is consistent for both white and black markings even if the product type is different.



Spec

- Refer to Spec 643 for:
  - Temporary Application Rates
  - Temporary Mil Thickness
- Refer to Spec 646 for:
  - Application Rates
  - Mil Thickness
  - Required Retro Values
- Refer to Spec 648 for:
  - No Passing Zone Requirements

No Passing Zones Bid Item

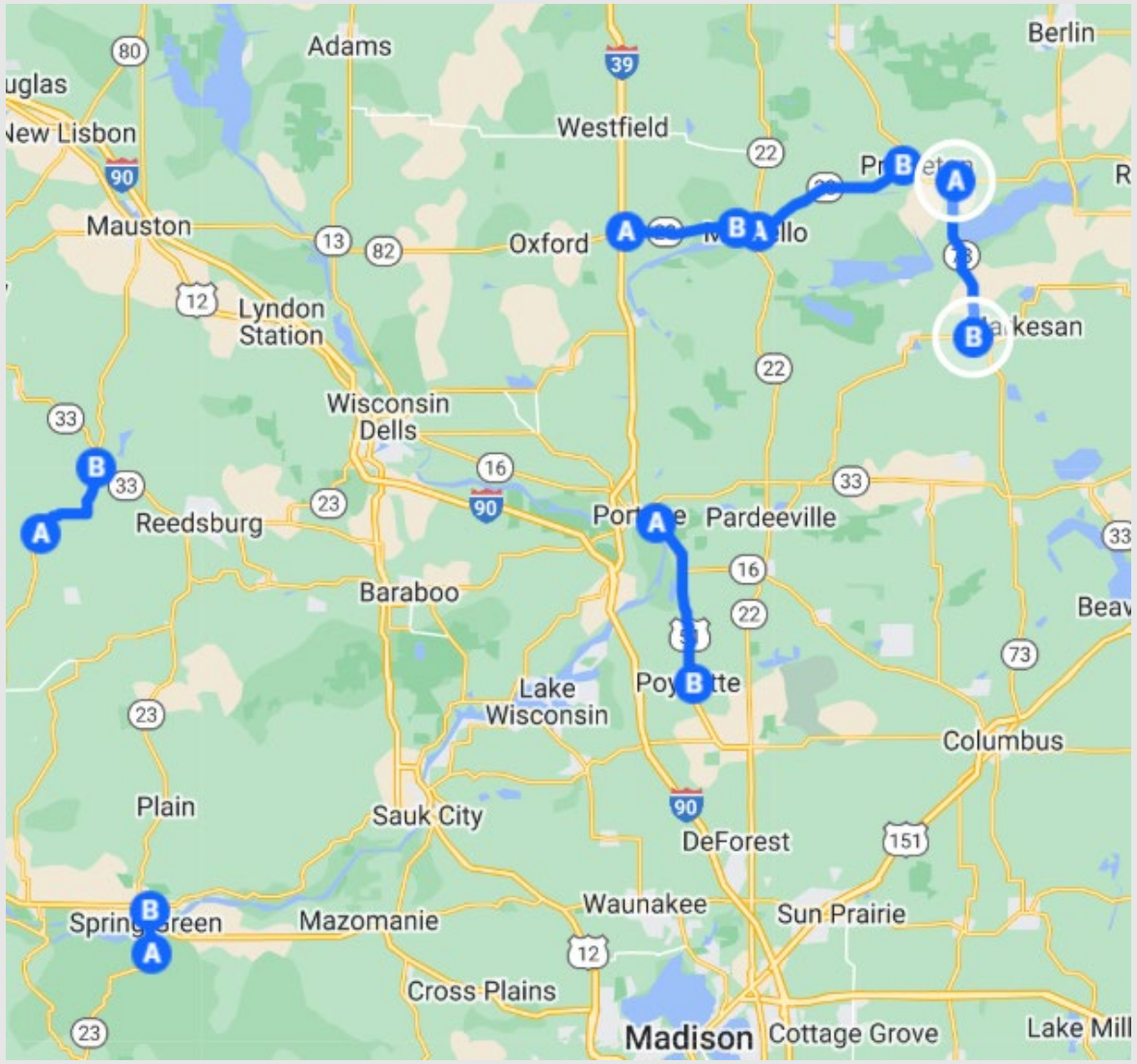
- Include the no passing zone bid item on any alignment changes or shoulder widening projects
- Do not include on overlay projects where no geometrics change unless directed to by the region marking engineer or coordinator.
- 0.21 sight distance is used on **most** 55 mph roadways.
- Insert STSP 648.005 if 0.26 Sight Distance is needed. Contact the Region Signing/Marking Engineer if you think this sight distance may be needed.
- DT2124 should be filled out and sent to the Region Marking Engineer/Coordinator.

How are Products Placed on the APL

- Pavement Marking Products are tested through PEAS (Product Evaluation and Audit Solutions). Products must meet the criteria outlined here to be eligible to be added to our APL
- https://wisconsindot.gov/Documents/doing-bus/eng-consultants/cnslt-rsrces/tools/appr-prod/ap-current/pavement-marking.pdf
    - 1, 2 and 3 year PEAS Data is used by meeting criteria for:
        - retros or how much it shines at night
        - durability or how much is left of the line.
- Products are reviewed throughout the year and will be added once they meet the criteria.

Bead Pilots

- WisDOT, Century Traffic, Forward Traffic 3M and Potters worked together to do a pilot on the best bead combinations for wet reflective markings.
- 4 pilot locations were selected and 2 controls to test new bead combinations.
- Pilots were conducted on STH 23 and STH 58. Controls were conducted on USH 51 and STH 73.
- This reflects updates made in November of 2024.



Product Comparison

	Mask Out Tape	Tabs	Pucks	Paint	Epoxy	Wet Reflective Epoxy	Permanent Tape
Life Span (years)	0.5	0.5	0.5	1-2	3-5	4-6	10+
Main Use	Cover Markings	Chip seals	Lane Shifts	Temp Markings in Summer Local	Temp Markings Local	Permanent Markings	Permanent Lane Lines
Application Temperature (F)	50+	50+	50+	50+	35+	35+	50+
Track Free Time (mins)	0	0	0	0.5 -2	Slow- 45 min Fast- 10 min	Slow- 45 min Fast- 10 min	0
Parts	1	2	1	1	2	2	1
Beads	-	-	-	Added	Added	2 Beads Added	-
Groove (mil)	None	-	-	None	None	90 +/- 10	175 +/- 10
Adhesive	Sept-June	-	-	No	No	No	Sept-June
Cost ($/LF of 6”)	$3.43	$5.64	$7.94	$.30	$0.43	$1.30	$8.25

Plowable Raised Pavement Markers

- Plows and traffic have dislodged plowable raised pavement markers out of the ground, and they have become projectiles.
- Plowable raised pavement markers should be removed through projects. Do not cover them up during paving.
- Plowable raised pavement markers are no longer permitted in Wisconsin due to the time and cost required to maintain them.

Temporary Markings

Transition Areas, Lane Shift, Crossovers

- Contrast lane lines or solid lines can be used in transition areas, lane shifts or crossovers to emphasize the markings.
- Type I temporary raised pavement markers (pucks) can be used to supplement other markings in transition areas, lane shift, and crossovers.

Temporary Markings

- Must follow existing patterns and widths.
- Type II Temporary Raised Pavement Markers (tabs) may be used with supplemental signage. Permanent marking shall be applied within 7 days. Follow SDD 15C34
- Mask out must be 2” wider than marking

Incorrect Arrows/Words/Symbols during Construction

- Do not cover existing arrows with 4” tape strips
- If any markings are incorrect, they shall be removed for the duration of the project.

TEOpS 6-6-78 Temporary Marking Flow Chart

https://wisconsindot.gov/dtsdManuals/traffic-ops/manuals-and-standards/teops/06-06.pdf

Permanent Pavement Marking Material Selection

TEOpS 3-10-1

Two different Flow Charts are available to determine what pavement marking material should be used:

Conventional Highways	Freeways/Expressways

Considerations on Flow Charts include:

Pavement Life	# of Lanes	Line Location

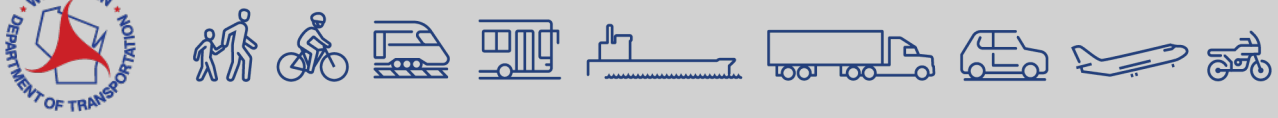
Arrows and Words

Arrows

- Lane Control
  - Install per SDD 15C8 Sheet C
- Wrong Way/Stick Arrows (Type 4)
  - Used where there is a demonstrated problem with wrong way driving, poor geometrics or side by side ramps
- Lane Drop Arrows (Type 5)
  - Used where there is a high crash rate
  - Install using SDD 15C21

Words

- “ONLY” is required per SDD 15C8 (turn lanes longer than 166’)
- “OK” is not allowed on state-maintained roadways
- “BIKE LANE” is only allowed in a signed bike lane.
- “SCHOOL” is only allowed if there is a marked crosswalk



Stop Lines

- 18” stop lines are typical.
- 12” stop lines may be used on local projects.
- Install at all signalized intersections.
- Where the stop sign is installed way in advance of the stop line.
- May be used in unusual geometrics or complex multilane approaches
- Place stop lines in accordance with SDD 15C33

Crosswalks

- Crosswalks are installed at signalized intersections or on a permitted basis using DT2136.
- Crosswalks typically are 2 transverse lines that are 6” wide.
- 24” block crosswalks are used at midblock crossing or areas with high volumes of pedestrian traffic.
- At a minimum crosswalks need to be 6’ wide
- Place stop bars 4’ back from crosswalks

Special Treatments for Crosswalks

- Special treatments for crosswalks must be installed within 2-6” Transverse Lines.
- Special treatments must be non-retroreflective and red, rust, brown, burgundy, clay, tan, or a similar earth tone in color.
- Acceptable treatments include brick lattice patterns, paving bricks, paving stones, cobbles, or other types of paving that does not impede a wheelchair.
- WisDOT will not pay for or maintain these markings.

Bike Lanes

- Bike lanes are at least 5’ wide and have 4’ of continuous pavement. This means that if there is a curb that can count as 1’ of 5’ bike lane but you still need to have 4’ of additional pavement with no joints.
- If there is not enough width for a bike lane, “sharrows" may be installed instead. A sharrow is shown to the right.
- Follow SDD 15C29 for placement and number of arrows, words, and/or symbols needed.
- Locals can install green bike lanes or green bike boxes as long as it is full locally funded.
- Bike Lanes are by permit only. Fill out DT2500 or DT2137 for locals to install and maintain bike markings.

Bid Items

- Yield Line is paid for by each triangle. Install per SDD 15C20.
- Aerial Enforcement Bars are paid for by each individual block. Minimum of 4 is required. Install per SDD 15C14
- Railroad crossing bid item includes the RR Xing Symbol **and** 3 stop lines. Install per SDD 15C9.
  - Railroad crossing removal is 3 removals.
- All words, arrows, and symbols are covered under the appropriate item. Call out each type of arrow, word or symbol in the MQ sheet.

Delineators

- Install delineators on unlit freeways and expressways at every 400’ on mainline and at every 100’ on ramps.
- Delineators may be installed on other highways with demonstrated and documented safety issues.
- If guardrail or barrier wall is present install delineators on that device.
- Follow SDD 15A2 through 15A7 for dimensions.

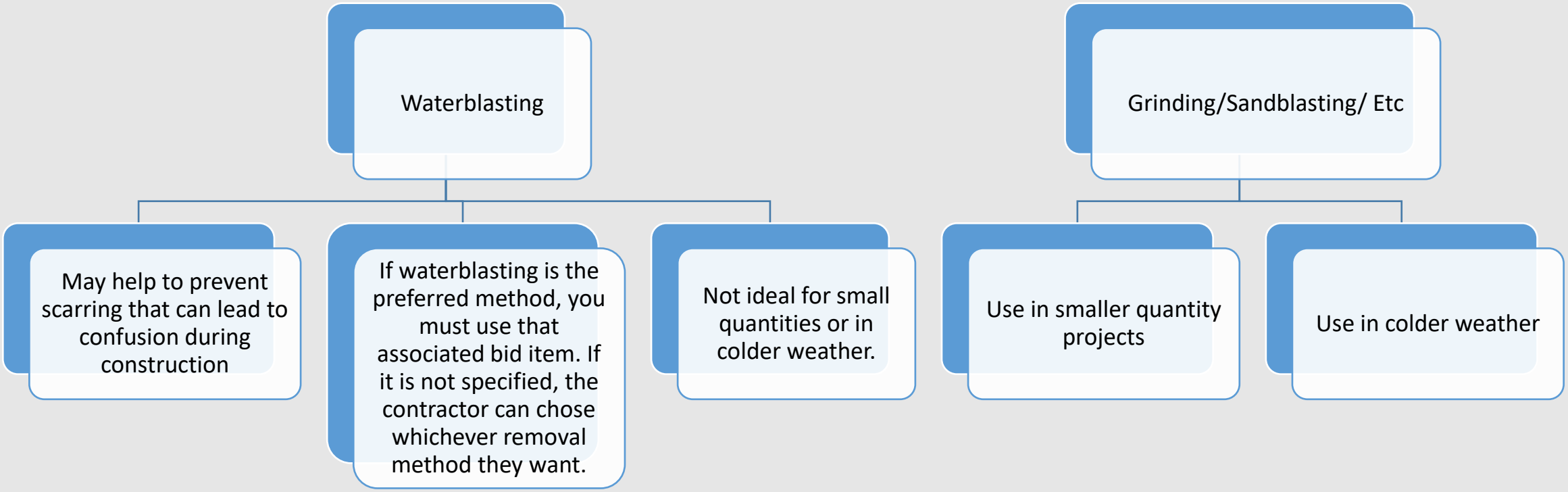
Polymer Overlay- CMM 650

- Polymer Overlays **DO NOT** groove in Markings
- Any other bridge deck **DO** groove in Markings

Cold Weather Marking

- Inserted into all projects that are intended to be completed after October 1st.
- Epoxy is considered cold weather if it is applied under 35°F
- Tape shall not be installed under 50°F.
- Install and maintain epoxy over the winter or until tape can be put down according to specification.
- When pavement marking is installed outside of the temperature specifications, the marking should be considered cold weather marking.
- Install cold weather marking at the permanent installation thickness.

Removal Methods



MQs Example

				MARKING EPOXY ITEMS								
STATION	TO	STATION	LOCATION	643.3165 TEMPORARY MARKING LINE PAINT 6-INCH LF	646.1020 MARKING LINE EPOXY 4-INCH LF	646.2020 MARKING LINE EPOXY 6-INCH LF	646.2040 MARKING LINE GROOVED WET REF EPOXY 6-INCH LF	646.3020 MARKING LINE EPOXY 8-INCH LF	646.4020 MARKING LINE EPOXY 10-INCH LF	646.4040 MARKING LINE GROOVED WET REF EPOXY 10-INCH LF	646.6120 MARKING STOP LINE EPOXY 18-INCH LF	646.7120 MARKING DIAGONAL EPOXY 12-INCH LF
49+59	-	140+30	STH 54	--	--	--	17,743	--	--	631	--	110
49+59	-	254+76	STH 54 (CENTERLINE FINAL SURFACE)	--	--	13,290	4,778	--	--	--	--	--
			STH 54 CENTERLINE (PRIOR TO RUMBLE STRIPS)	1,113	--	--	--	--	--	--	--	--
			STH 54 CENTERLINE (MILLED SURFACE)	15,421	--	--	--	--	--	--	--	--
			STH 73	--	--	700	216	--	40	--	13	--
			PORT RD	--	561	--	--	88	--	--	12	--
140+41	-	154+16	STH 54	--	--	3,419	--	--	--	--	--	21
154+24	-	171+75	STH 54	--	--	4,913	--	--	--	--	--	32
171+75	-	199+25	STH 54	--	--	8,144	--	--	--	--	--	--
			WISCONSIN RIVER DR	--	133	--	--	--	--	--	19	--
199+25	-	254+76	STH 54	--	--	14,203	--	--	--	--	--	--
			TOTAL 0010	16,534	694	44,669	22,737	88	40	631	44	163

- Use Temp Paint before rumbles
- More detail the better

Question 1: How long is the standard skip length in Wisconsin?

A. 10’

B. 11’

C. 12.5’

D. 15’

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Question 2: How wide is a normal line on state-maintained roads in Wisconsin?

A. 3”

B. 4”

C. 5”

D. 6”

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Question 3: Where do you go to find Marking Product Selection Matrix?

A. FDM

B. CMM

C. TEOpS

D. Standard Spec

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Question 4: Does the No Passing Zone bid item need to be included on every project?

A. Yes

B. No

Question 4: Does the No Passing Zone bid item need to be included on every project?

A. Yes

B. No

Question 5: When do you include the cold weather marking bid item?

A. Always
B. Never
C. After October 1st
D. After November 15th

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B. Never

C. After October 1st

D. After November 15th

Manuals & Resources

- **MUTCD Chapter 3** https://wisconsindot.gov/dtsdManuals/traffic-ops/manuals-and-standards/wmutcd/mutcd-ch03.pdf
- **TEOpS Chapter 3** https://wisconsindot.gov/Pages/doing-bus/local-gov/traffic-ops/manuals-and-standards/teops/ch03.aspx
- **Facilities Development Manual (FDM)** https://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrces/rdwy/fdm.aspx
- **Standard Detail Drawings (SDD) FDM Chapter 16 Series 15** https://wisconsindot.gov/rdwy/sdd/sd-15-00toc.pdf
- **Standard Specifications**
  - 646 https://wisconsindot.gov/rdwy/stndspec/ss-06-46.pdf#ss646
  - 643 https://wisconsindot.gov/rdwy/stndspec/ss-06-43.pdf
- **Construction & Materials Manual (CMM)** https://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrces/rdwy/cmm.aspx
- **Approved Products List (APL)** https://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrces/tools/appr-prod/default.aspx

Bureau of Traffic Operation Contacts

- Matt Rauch – Signing, Marking, Work Zone Supervisor
  - High Level Signing, Marking & Work Zone Issues
- Jeannie Silver – State Marking Engineer
  - Marking Policy, Procedures, and Products
- DOTBTOMarking@dot.wi.gov
  - Send NPZ Logs
  - Cc Jeannie and PMs
- DOTSignMarkWZMaterials@dot.wi.gov
  - Send Material Questions
  - Cc Jeannie and PMs